BASELINEGROUP

Appendix 6: Integrated Transport Assessment

Planning. Traffic. Development.

Integrated Transport Assessment

prepared for

BIRCHS VILLAGE LIMITED

Hamptons Road / Birchs Road, Prebbleton

November 2021

Integrated Transport Assessment

prepared for

Birchs Village Limited

Hamptons Road / Birchs Road, Prebbleton

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Document Date:	24/11/21
Document Version/Status:	Final - Revised Proposal #2
Project Reference:	442004
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Introduction

1. Birchs Village Limited have commissioned Novo Group to prepare an Integrated Transport Assessment (ITA) for the proposed residential re-zoning submission on the Selwyn District Plan Review and in support of a private plan change request to the Operative Selwyn District Plan.

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 and describes the transport related components of the proposal. It has been prepared broadly in accordance with the Integrated Transportation Assessment Guidelines specified in New Zealand Transport Agency Research report 422, November 2010.

3. The proposal entails a Rural to Residential rezoning of a block of land to accommodate approximately 600 future residential dwellings and is supported by a preschool and some local shops. The location is shown in **Figure 1**.

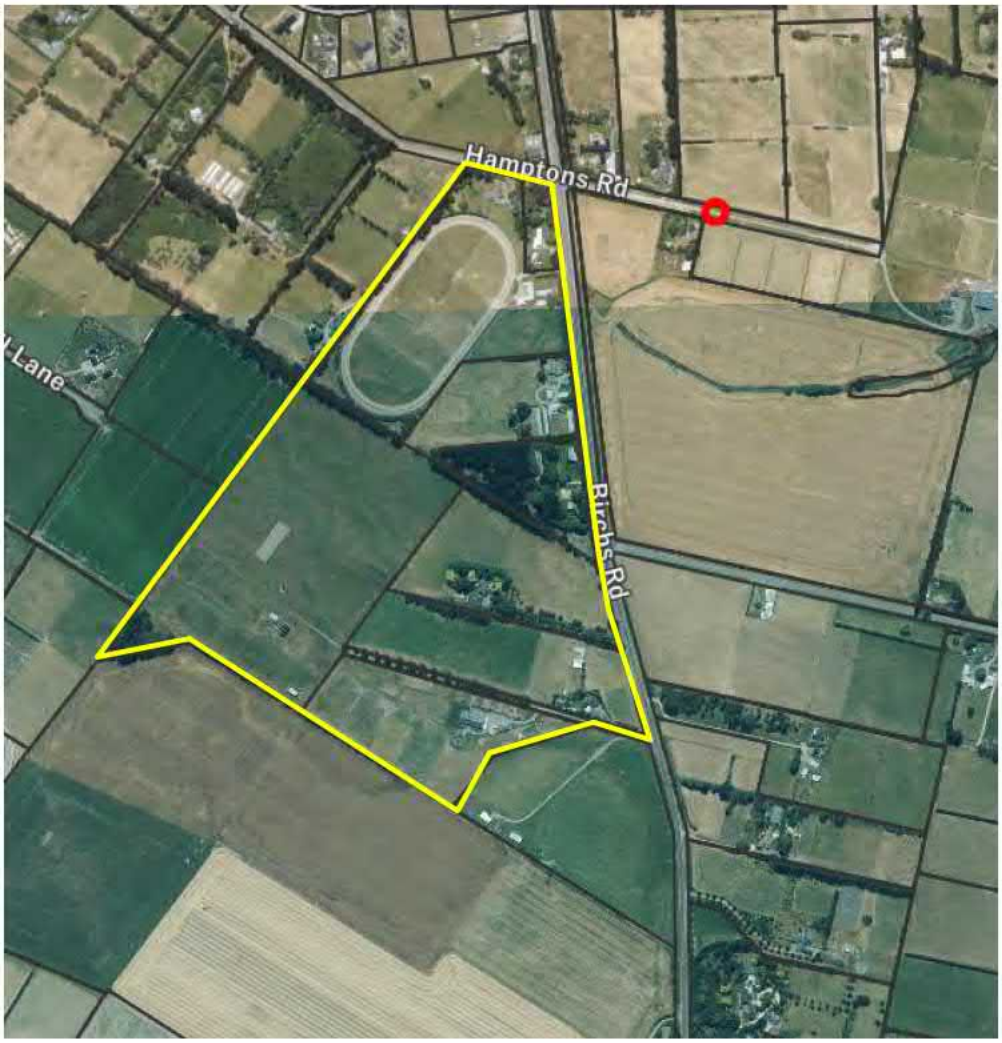

Figure 1: Site Location [Source: Canterbury Maps]

The Proposal

4. It is proposed to re-zone the site from Rural to Residential, catering for approximately 600 future residential dwellings, and some local businesses such as a preschool, corner dairy, hairdresser, and the likes.

5. The proposed main roads and pedestrian / cycle connections are shown in **Figure 2**. It is anticipated that the internal roads and intersections be laid out in accordance with the Proposed District Plan standards.

Figure 2: Proposed Road Layout [Extract – Refer to Appendix 1 for full plan]

6. The NZ Transport Agency Research Report 453 (*Trips and Parking Related to Land Use*) for residential trip generation suggests an 85th percentile traffic generation rate of 0.9 vehicle movements per dwelling per hour in the peak hours. The ITE *Trip Generation* guidebook suggests a split of 63% arrivals and 37% departures in the weekday PM peak and 26% arrivals and 74% departures in the AM Peak. This suggests the proposed 600 lots will generate **540 trips** in the **peak hour** of which 340 are arrivals and 200 are departures in the PM peak hour (140 are arrivals and 400 are departures in the AM peak hour).

7. It is also proposed to include a small area of local businesses to service the residential area which could include typical local businesses such as a preschool, diary, hairdressers, and the like.

8. A preschool with a typical 100 child roll would generate[1] around 74 trips in the evening peak hour and around 86 trips in the morning peak hour. Noting that there are already a number of preschools in Prebbleton a large proportion of these trips would be anticipated to be internal to the subdivision, that is people living within the plan change area. As such an allowance for 25% of this traffic to be external (i.e., via one of the proposed intersections) has been adopted (19 trips in the evening peak and 22 in the morning peak). For those

[1] 0.74 trips per Child in the evening peak hour and around 0.86 trips per child in the morning peak hour based on surveys of preschools undertaken by Novo Group at several centres in Christchurch.

external trips, distribution is considered to be approximately equal between arrivals and departures in the peak hours.

9. NZTA Research Report 453 (Trips and Parking Related to Land Use), suggests an average maximum traffic generation rate of 14.6 vehicles per hour per 100m^2 GFA for small shopping centres. Assuming 600m^2 GFA this would equate to 88 trips. In terms of local shops, the ITE Trip Generation Handbook suggests around 34% pass by trips for shopping centres and around 51% for convenience markets (such as a dairy). As there will be a mix of activities aimed a local residents a rate of 40% pass-by trips has been applied. This equates to 53 trips in the peak hour external to the subdivision. For those external trips, distribution is considered to be approximately equal between arrivals and departures in the peak hours.

10. The anticipated trip generation is therefore summarised in **Table 1** below:

Table 1: Summary of Trip Generation

Activity	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Residential	140	400	340	200
Preschool	11	11	10	9
Shops	26	27	26	27
Total	**177**	**438**	**376**	**236**

Transport Description

11. The proposal includes a primary road connection to Hamptons Road and a fourth arm at the intersection of Birchs Road and Leadleys Road. This will be supported by Local Roads to provide property access including the potential for a third, lower volume local road intersection with Birchs Road at the southern end of the ODP area. It is noted that this would not be considered a primary or secondary level road and is therefore not shown on the ODP. It would be intended solely to provide property access to the future lots at the southern end of the ODP area.

12. Connections are proposed to integrate the road networks with any future development of the land to the south and west of the site.

13. Walking and cycling will be accommodated within the future road corridors. In addition, two off-road pedestrian and cycling connections are also identified to connect to Birchs Road for access to the Christchurch to Little River Rail Trail, bus stops and Prebbleton Park (on the opposite side of Birchs Road).

Transport Environment

Existing Road Network

14. The site fronts Birchs Road and Hamptons Road and intersects with Leadleys Road. These roads are described below.

Birchs Road

15. Birchs Road is classified as a Collector Road and has an 80 km/h speed limit decreasing to 60km/h 40m south of Hamptons Road. It is however understood that as part of the development of Prebbleton Park, the 60km/h speed limit is proposed to be relocated to a point south of Leadleys Road.

16. Near the site, Birchs Road has one approximately 3.0-3.4m wide traffic lane in each direction with gravel shoulders and grass berms.

17. A shared path is provided along the eastern side of Birchs Road and forms part of the Christchurch to Little River Rail Trail.

18. The Councils RAMM database indicates a daily average volume of 4,422 vehicles per day on Birchs Road[2]. Morning and evening traffic counts undertaken[3] on Thursday 05/11/2020 indicated an AM peak hour volume of 490 vehicles and a PM peak of 516.

Hamptons Road

19. Hamptons Road is a Local Road[4] and has an approximately 6m wide sealed carriageway with grass berms on both sides. The Speed Limit Bylaw indicates Hamptons Road has an 80km/h speed limit, although it is envisaged that this would reduce to 60km/h on the approach to the intersection with Birchs Road[5].

20. Hamptons Road currently terminates 450m east of the intersection with Birchs Road.

21. The Councils RAMM database indicates a daily average volume of 329 vehicles per day to the west of Birchs Road. Intersection counts on the 11th of February 2021 indicated that this section of Hamptons Road had a peak hour traffic volume of 36 vehicles in the AM peak hour and 52 vehicles in the PM peak hour.

Leadleys Road

22. Leadleys Road forms a giveway controlled intersection with Birchs Road, opposite the proposed site.

23. Leadleys Road is classified as a Local Road with an 80km/h speed limit. Leadleys Road has a sealed width of approximately 5.8m with wide grass berms.

24. The Mobile Road website estimates traffic volumes on this section of Leadleys Road as approximately 1,174 vehicles per day.

Crash History

25. The NZ Transport Agency Crash Analysis System (CAS) has been reviewed to identify crashes that have been reported on the frontage roads between 2011 and 2021. The output from the CAS database identified five crashes and is included in **Appendix 2**.

26. Two reported crashes occurred at the intersection of Birchs Road and Leadleys Road, one resulted in a minor injury and was associated with a vehicle turning failing to giveway and

[2] 2020 Count, north of Trices Road
[3] At the intersection of Trices Road
[4] Then an arterial west of Springs Road (to Waterholes Road).
[5] To co-ordinate with changes to the 60km/h speed limit proposed on Birchs Road.

colliding with a south-bound cyclist. The other was a non-injury crash as a result of a driver losing control turning too fast.

27. There was one reported crash on Birchs Road 20m north of the intersection of Leadleys Road, which resulted in a fatal and minor injury as a result of a stray animal.

28. The other reported crash was a non-injury crash which occurred on Birchs Road 530m south of Leadleys Road and was a rear end collision associated with a vehicle stopping / moving slowly, late at night and alcohol was identified as a crash factor.

29. There was one non-injury crash on Birchs Road approximately 287m south of Leadleys Road as a result of a driver attention diverted by a cell phone resulting in loss of control of the vehicle.

30. These crashes do not suggest any inherent safety concerns with the existing road network.

Future Road Networks

31. The Councils *Long Term Plan* 2018/28 includes upgrading the Springs Road / Hamptons Road intersection, which is anticipated to be a roundabout this is likely to include closure of the Trices Road arm and diversion of traffic from Trices Road (between Birchs Road and Springs Road) onto Hamptons Road.

32. The Councils Long Term Plan 2021-2031 includes roundabouts at the Shands Road - Trents Road, Shands Road – Hamptons Road, & Springs Road – Hamptons Road intersections during the 2022-2025 period. These will improve capacity for connections to Christchurch and the Southern- Motorway.

33. Prebbleton Park (located on the opposite side of Birchs Road between Hamptons Road and Leadleys Road) includes a vehicle access to the main car park from Birchs Road[6], with service vehicle access only from Hamptons Road.

34. It is assumed for the assessment in this report, that should the proposed residential development proceed on this site, the urban speed limit (50km/h) would move south on Birchs Road and west on Hamptons Road, to accommodate this change in land use, prior to occupation of the dwellings.

Passenger Transport

35. The nearest bus route is the #80 which connects with Lincoln and Christchurch. The nearest bus stops are on Birchs Road south of Hamptons Road[7] and north of the site near Glenwood Drive. There are typically two buses per hour and some additional buses in the peak periods.

36. There is also a school bus route from Prebbleton to Lincoln High School.

37. It is anticipated that the future primary roads would be constructed to a standard able to accommodate any future public transport routes and otherwise the ODP provides for good

[6] A secondary car park is provided to Leadleys Road.
[7] There is currently only a north-bound bus stop in this location. A future south-bound bus stop in this location is being investigated to service Prebbleton Park.

walking and cycle connections to existing and any future services that may operate along Birchs Road.

Active Transport Modes

38. The shared path along the eastern side of Birchs Road forms part of the Rail Trail and connects to Christchurch and Lincoln.

39. There are a variety of landuse destinations within walking and cycling distance of the site, including[8]:

- Prebbleton School 2.2km north.
- Shops on Springs Road 1.8km north.
- Future Prebbleton Park – opposite side of Birchs Road.
- Existing Prebbleton Domain – 1.9km North-east.

40. The Councils Long Term Plan 2021-2031 includes a future cycle connection between Prebbleton and Templeton.

Assessment of Effects

Proposed Transport Layout

41. The proposed layout has been designed to provide primary road connections to Birchs Road and Hamptons Road. This will be supported by Local Roads to provide property access including the potential for a third, lower volume local road intersection with Birchs Road at the southern end of the ODP area. It is noted that this would not be considered a primary or secondary level road and is therefore not shown on the ODP. It would be intended solely to provide property access to the future lots at the southern end of the ODP area.

42. The proposed development road / Hamptons Road intersection has been positioned to the far west of the development area, to maximise the intersection separation distance from the Birchs Road / Hamptons Road intersection. This achieves an intersection separation distance of approximately 120m[9] which is slightly below the 123m required by the District Plan,[10] but will be sufficient to avoid confusion between turning vehicles or queuing from one intersection affecting the other (refer to the SIDRA analysis below). Hamptons Road is straight and flat towards the intersection with Birchs Road and there is good intervisibility. The location still achieves 123m SISD[11] towards the west, noting that Hamptons Road curves slightly north, to the west of the proposed intersection.

43. The proposed development road connection to Birchs Road forms a fourth arm at the Leadleys Road intersection. Noting the angle of Leadleys Road relative to Birchs Road, this intersection will require some consideration of detailed alignment at subdivision stage to ensure good visibility and continuity for the through movement. There appears to be

[8] Measured from the nearest edge of the development area.
[9] Measured centreline to centreline.
[10] Assuming a future 50km/h speed limit and noting that Birchs Road is a Collector Road.
[11] Safe Intersection Sight Distance from Austroads Guide to Road Design Part 4A. For a 60km/h design speed and 2 second reaction time.

sufficient flexibility over the proposed road alignment, and space within the existing road corridors such that good layout is achievable.

44. The alignment of the main roads within the development area enables integration with any future development of adjacent land as can additional Local Roads, particularly for the land to the south. There is no known development to the south or west of this site at present, however the layout proposed facilitates integration should that land develop in the long-term.

45. In addition to catering for walking and cycling along the future road corridors, two off-road connections have been proposed to Birchs Road to connect to the Rail Trail, Prebbleton Park, and the bus stop.

46. The provision of a preschool and local shops will also provide for day to day services and convenience related products, such as that available at a corner dairy, that are within walking and cycling distance of the future residents. This will support the use of non-motorised travel for access to these goods / services and may reduce the need for some trips external to the ODP area.

47. Overall, the proposed layout is considered to provide an appropriate structure of primary roads and can be serviced by future Local Roads to be consistent with and integrate into the existing road network and to provide for property access to future residential development. The proposed layout also provides for good connectivity for active modes towards existing public transport routes and key landuse destinations. As such the layout is considered to be appropriate for the proposed location and future use and the associated effects of the proposed layout are therefore considered to be acceptable.

Connections to Existing Road Network

48. As outlined above, the future lots are anticipated to generate 612 trips in the evening peak hour onto the external road network, of which 376 are arrivals and 236 are departures in the PM peak hour (615 trips in the morning peak hour of which 177 are arrivals and 438 are departures).

49. The Trices Road – Birchs Road intersection peak hour traffic volumes were surveyed (5/11/2020 all movements) and turning movements were surveyed at the Hamptons Road / Birchs Road intersection (11/02/2021). These surveyed volumes were used to determine the existing traffic volume and directional flows.

50. For the purposes of the following analysis, it is assumed that surveyed traffic using Trices Road Western arm is diverted through the Birchs Road / Hamptons Road intersection as this road upgrade (i.e., closure of Trices Road at Hamptons Road / Springs Road) is anticipated to be completed prior to the Plan Change traffic commencing.

51. Trips via the primary road connections are likely to be dispersed across the road network similar to the proportionate traffic volumes on Birchs Road and Hamptons Road. The Plan Change traffic accessing Hamptons Road assumes that the Trices Road – Springs Road connection is terminated and that approximately 80% of the existing peak hour volume on Trices Road[12] (additional 230 peak hour trips) are diverted onto Hamptons Road. The traffic to and from the development is split proportionate to recognised key destinations of travel. The resultant volumes via the two primary road intersections are shown in **Table 2**.

[12] From an intersection survey undertaken by Novo Group in 2020

Table 2: Arrival and Departure Trips, Primary Road Intersections

Key intersection to:	Direction	AM Peak Hour	PM Peak Hour
Birchs Road – Northern (65%)	Arrivals	115	244
	Departures	285	153
Hamptons Road (35%)	Arrivals	62	132
	Departures	153	83

52. Based on the volumes and directional flows the peak hour volumes for each movement have been estimated as outlined in **Table 3.**

Table 3: Summary of Access Turning Movements AM and PM Peak Hour

	Peak Hour	Direction	Left	Through	Right
Proposed Road to Hamptons Road	AM	In	28	N/A	34
		Out	70	N/A	84
	PM	In	34	N/A	97
		Out	22	N/A	61
Proposed Road to Birchs Road (intersection with Leadleys Road)	AM	In	57	16	42
		Out	124	69	92
	PM	In	64	43	138
		Out	40	27	87

53. A SIDRA Intersection analysis was undertaken for each proposed intersection based on existing volumes, proposed traffic and 20% general growth across the road network. The proposed development road / Hamptons Road "T" intersection results are provided in **Appendix 3**. The results show all movements operating at excellent levels of service (LOS A[13]) with a basic intersection layout and no additional turning lanes required.

54. As outlined above, the SIDRA Intersection analysis for the intersections of Birchs Road - Hamptons Road assumes that the Trices Road western arm has been closed and this traffic is diverted to the western arm of the Hamptons Road intersection[14]. The **Table 2** values shaded grey, show directions of travel that will pass through this intersection. This suggests 278 trips in the morning peak hour and 273 trips in the evening peak hour, associated with the development, will pass through this intersection in each peak hour. This represents an increase of approximately 42% above existing volumes in the AM Peak and 36% in the PM peak hours. This increase has been disbursed across the intersection based on the existing turning movements. The analysis also assumes 20% growth in traffic volumes generally (i.e., to allow for additional traffic from other plan changes and general traffic growth on the road network). A minimum of three vehicles was applied to each turning movement where one or less were recorded during the surveys. This allows for future

[13] A rating of Level of Service A (best) to F (worst).
[14] Via the applicable turning movements i.e., left from Birchs Road southern arm, Right from Birchs Road Northern Arm as well as left and right from Hamptons Road western arm.

demand that may not currently exist and would otherwise not be captured by scaling, such as for PC72 traffic using Hamptons Road Eastern Arm.

55. This indicates that these connections can operate within good Levels of Service (all movements A-C) with standard give-way controlled intersections and no additional turning lanes are needed. The SIDRA intersection layouts and movement summaries are provided in **Appendix 4**.

56. The Leadleys Road / Birchs Road / Proposed Road intersection has also been modelled in SIDRA. No existing turning counts have been undertaken at this intersection and as such these have been estimated based on the following assumptions:

- Leadleys Road peak hour traffic volume is 20% of the daily volume (1,174vpd[15] = 235 vph).
- Directional flows on Leadleys Road are similar to that observed on Trices Road[16] (66% eastbound, 44% westbound in the AM peak hour and approximately 50% each direction in the PM Peak hour).
- North and southbound traffic volumes on Birchs Road are similar to that from Birchs Road – Trices Road intersection counts (i.e., volumes on the block between Trices Road and Hamptons Road)[17].
- Existing turning volumes have been approximated based on directional flows.

57. The resultant movement volumes are shown in **Table 4** below, as well as the additional traffic for the proposed development (shaded blue, values from **Table 3** above).

Table 4: Leadleys Road, Birchs Road and Proposed Road, Estimated Peak Hour Movement Volumes

Arm	Peak Hour	Left	Through	Right
Leadleys Road	AM	46	16	34
	PM	38	43	80
Birchs Road Northern Arm	AM	65	208	42
	PM	80	382	138
Birchs Road Southern Arm	AM	57	281	90
	PM	64	177	38
Proposed Road	AM	124	69	92
	PM	40	27	87

58. The SIDRA results for the above intersection are provided in **Appendix 5** and also confirm that this intersection can accommodate the likely traffic volumes and 20% growth in traffic

[15] From Mobile Road as outlined earlier in this report.
[16] East of Birchs Road i.e., parallel block to Leadleys Road.
[17] It is noted that these do not take into account turning volumes to and from Hamptons Road however if anything, volumes on Birchs Road, south of Hamptons Road would be anticipated to be lower (than the block north or Hamptons Road) therefore this likely represents a reasonable volume.

generally[18], with a standard give-way controlled intersection and that no additional turning lanes are required. All movements were indicated to operate at acceptable levels of service (All movements LOS A to C in the morning peak hour and LOS A – D in the evening peak hour).

59. In terms of the future roads within the Proposed Development area, these Local Road connections are to be designed such that they are not attractive through routes and service low traffic volumes which can be catered for with basic giveway controlled intersections.

60. All roads are anticipated to be formed to standard designs consistent with the Proposed District Plan layouts and/or the Code of Practice. This would include an upgrade of adjacent sections of Hamptons Road and Birchs Road to include kerb and channel, and footpaths.

61. For the above reasons, subject to appropriate detailed design at subdivision stage, traffic from the proposed development can be safely and efficiently accommodated via the proposed connections to the existing road network with effects being acceptable .

Wider Road Network

62. The site has good connectivity to the wider road network for travel in all directions. There is direct access along Birchs Road to Lincoln, Leadleys Road to Halswell and to Rolleston via Hamptons Road – Selwyn Road – Lincoln Rolleston Road.

63. The Christchurch Southern Motorway upgrades are scheduled for completion during 2021 and will be open prior to occupation of any new residential units. This has been specifically designed to cater for future growth and will provide safe and efficient connections to Christchurch. The Councils roundabout upgrades proposed for Shands Road -Trents Road, Shands Road – Hamptons Road, & Springs Road – Hamptons Road intersections during the 2022-2025 period will also improve capacity for main connections to the Southern Motorway and to Christchurch.

64. Only a small number of trips are anticipated to be dispersed across other destinations. These will also disperse over the road network such that any increase in traffic in any one location is not likely to result in any noticeable effects.

Future Capacity

65. Noting the potential for increased densities in the future, we have been asked to consider the potential for infill development which might increase the number of residential dwellings from the 600 anticipated to up to potentially 1,500 dwellings.

66. **Table 5** shows the revised traffic generation under this scenario.

[18] The 20% growth is intended to allow for traffic associated with Prebbleton Park as well as general traffic volume growth on the road network.

Table 5: Summary of Trip Generation

Activity	AM Arrivals	AM Departures	PM Arrivals	PM Departures
Residential	351	999	851	499
Preschool	11	11	10	9
Shops	26	27	26	27
Total	**388**	**1,037**	**887**	**535**

67. The following assumptions have been made with regards to ODP layout and traffic distribution under this scenario:

- A low volume local road[19] at the southern end of the ODP area provides a "T" intersection with Birchs Road and carries 23% of trips, i.e., services those dwellings at the southern end of the ODP area for which this would provide the most direct route to the wider road network.
- 42% of trips use the Proposed Road intersection at Birchs Road / Leadleys Road and 35% use the Proposed Road - Hamptons Road intersection.
- All other assumptions regarding trip directions, existing traffic volumes and 20% allowance for general increases in traffic volumes across the network have been adopted as set out in the SIDRA analysis outlined earlier in this report.

68. The intersections have been modelled using the above volumes and assumptions. The SIDRA input and output summaries are including in **Appendix 6**. These show that:

- There is ample capacity provided by a basic "T" intersection at the proposed local road - Birchs Road intersection (operating within levels of service A or B).
- There is ample capacity provided by the proposed development road - Hamptons Road "T" intersection (operating within levels of service A or B).
- The Proposed Road – Leadleys Road - Birchs Road intersection would likely require upgrade to a roundabout and would then operate within acceptable levels of service (Levels A- C).
- The Hamptons Road – Birchs Road intersection would require upgrade to a roundabout and would then operate within acceptable levels of service (Levels A or B).

69. The above analysis suggests that the additional density could be accommodated subject to appropriate intersection design. This can be addressed in detail at subdivision stage and as a minimum should include provision for a local road intersection with Birchs Road at the southern end of the ODP area and ample road reserve width near the intersections of Birchs Road - Leadleys Road and the Hamptons Road – Birchs Road intersections to ensure provision of a roundabout could be achieved in the future.

[19] This is anticipated to be a lower order road, i.e., lesser than a primary or secondary road.

Proposed District Plan Objectives and Policies

70. The Operative and Proposed District Plan Transport Related Objectives and Policies are considered in **Appendix 7** and the proposal is considered to be generally consistent with those provisions from a transport perspective.

Conclusion

71. The proposed Rural to Residential rezoning will provide for an estimated 600 future residential dwellings and be supported by a preschool and around 600m^2 GFA of local shops. The proposed road layout has been designed to integrate with the existing and planned road network. Based on the assessment above the proposal can be appropriately designed to operate within good levels of service.

72. The proposal is consistent with the existing road hierarchy and future / planned roads and intersection upgrades. There do not appear to be any timing constraints in terms of development and planned road networks.

73. The proposal includes provision for shared path connections to provide access to the existing Rail Trail, Prebbleton Park, and bus stop. The site is appropriately located to support travel by all modes.

74. There is ample ability to accommodate future increases in residential dwellings as a result of infill development with the provision of a local road intersection at the southern end of the ODP area and the ability to upgrade the intersections of Leadleys Road - Birchs Road and Birchs Road – Hamptons Road to roundabouts if significant infill development up to 1,500 dwellings, was to occur in the future.

75. Overall, from a transport perspective there is no reason that the proposed development cannot be integrated into the transport network in a safe, efficient, and appropriate manner which provides for travel by all modes and appropriately manages any transport related effects.

Appendix 1

Proposed Plan

Key

- Development Boundary
- Proposed Medium Density (Small Lots) (400m² - 500m²)
- Proposed Medium Density (Comprehensive) (Maximum 350m²)
- Business 1 Commercial
- Proposed Reserve
- Proposed Primary Road (Width 21m)
- Future Road Connection
- Proposed Indicative Pedestrian & Cycle Route
- Indicative Pedestrian & Cycle Link
- Existing Pedestrian & Cycle Route

N

Hamptons Road

OPEN SPACE

500m Offset From Open Space

Birchs Road

BASELINEGROUP

Prebbleton

Scale	1:2000 @A1, 1:4000@A3
Date	22 Feb 2021
Design	EL
Drawn	EL
Review	SE

Rev.	Date	Amendment
A	24/02/21	Traffic engineer feedback updating
B	02/03/21	Plan change density increasing
C	18/03/21	Layout updating
D	23/03/21	ODP updating
E	04/05/21	ODP updating
F	14/05/21	ODP boundary updating
G	20/05/21	ODP boundary updating
H	28/10/21	RFI updating
I	23/11/21	Updating in accordance with current master plan

Revision I

Sheet 1

Appendix 2

NZTA CAS Data

Untitled query

Saved sites

Prebbleton Birchs Road

Crash year

2011 — 2021

Plain English report

5 results from your query.

1-5 of 5

Crash road	Side road	Feature	Distance from side road/feature	Direction	Reference station	Route position	Easting	Northing	Longitude	Latitude	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Casualty count fatal	Casualty count serious	Casualty count minor	Social cost $(m)
BIRCHS ROAD	LEADLEYS ROAD		287m	S			1560694	5172084	172.512982	43.603181	2020170138	18/11/2020	Wed	12:45	Car/Wagon1 NDB on BIRCHS ROAD lost control; went off road to left	CAR/WAGON1, alcohol test below limit, attention diverted by cell phone, too far left	Dry	Overcast	Fine	Nil (Default)	Nil	0	0	0	0.04
BIRCHS ROAD	LEADLEYS ROAD			I			1560617	5172373	172.512039	43.600578	201121970	06/06/2011	Mon	15:00	Cycle1 SDB on BIRCHS ROAD hit Van2 turning right onto AXROAD from the left	VAN2, failed to give way at priority traffic control, misjudged another vehicle	Dry	Overcast	Fine	T Junction	Give way	0	0	1	0.10
BIRCHS ROAD	LEADLEYS ROAD		530m	S			1560732	5171858	172.513428	43.605221	201652990	20/11/2016	Sun	00:45	Car/Wagon1 NDB on Birches hit rear end of Car/Wagon2 stopped/moving slowly	CAR/WAGON1, alcohol test above limit or test refused, following too closely	Dry	Dark	Fine	Nil (Default)	Unknown	0	0	0	0.04
BIRCHS ROAD	LEADLEYS ROAD		20m	N			1560613	5172392	172.511993	43.600407	201300255	05/12/2013	Thu	21:53	Car/Wagon1 SDB on BIRCHS ROAD hit obstruction, Car/Wagon1 hit non specific animal	CAR/WAGON1, alcohol not suspected, tested and -ve (mot use onl, ENV: farm animal straying	Dry	Dark	Fine	Nil (Default)	Unknown	1	0	1	5.56
LEADLEYS ROAD	BIRCHS ROAD			I			1560624	5172363	172.512135	-43.600663	2020170259	16/11/2020	Mon	22:30	Car/Wagon1 NDB on Birchs Road lost control turning right; went off road to left, Car/Wagon1 hit other	CAR/WAGON1, lost control when turning, speed entering corner/curve	Dry	Dark	Fine	T Junction	Give way	0	0	0	0.04

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Appendix 3

Proposed Road / Hamptons Road Intersection SIDRA Inputs and Outputs (including development and 20% traffic growth)

MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Access AM - +20% - 600 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	70	5.0	88	5.0	0.177	5.1	LOS A	0.7	5.0	0.28	0.58	0.28	45.9
3	R2	84	5.0	106	5.0	0.177	6.2	LOS A	0.7	5.0	0.28	0.58	0.28	45.5
Approach		154	5.0	195	5.0	0.177	5.7	LOS A	0.7	5.0	0.28	0.58	0.28	45.7
East: Hamtpons Road Eastern Arm														
4	L2	28	5.0	35	5.0	0.085	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.7
5	T1	95	10.0	120	10.0	0.085	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.2
Approach		123	8.9	155	8.9	0.085	1.1	NA	0.0	0.0	0.00	0.12	0.00	49.1
West: Hamptons Road Western Arm														
11	T1	114	10.0	144	10.0	0.107	0.2	LOS A	0.3	2.2	0.14	0.13	0.14	48.9
12	R2	34	5.0	43	5.0	0.107	5.2	LOS A	0.3	2.2	0.14	0.13	0.14	47.9
Approach		148	8.9	187	8.9	0.107	1.3	NA	0.3	2.2	0.14	0.13	0.14	48.6
All Vehicles		425	7.5	537	7.5	0.177	2.8	NA	0.7	5.0	0.15	0.29	0.15	47.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Access PM - +20% - 600 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	22	5.0	28	5.0	0.155	5.1	LOS A	0.5	3.8	0.41	0.68	0.41	44.6
3	R2	61	5.0	77	5.0	0.155	9.2	LOS A	0.5	3.8	0.41	0.68	0.41	44.2
Approach		83	5.0	105	5.0	0.155	8.1	LOS A	0.5	3.8	0.41	0.68	0.41	44.3
East: Hamtpons Road Eastern Arm														
4	L2	34	5.0	43	5.0	0.104	4.6	LOS A	0.0	0.0	0.00	0.12	0.00	48.7
5	T1	116	10.0	147	10.0	0.104	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	49.2
Approach		150	8.9	189	8.9	0.104	1.1	NA	0.0	0.0	0.00	0.12	0.00	49.1
West: Hamptons Road Western Arm														
11	T1	327	10.0	413	10.0	0.310	0.3	LOS A	1.0	7.9	0.19	0.13	0.19	48.7
12	R2	97	5.0	123	5.0	0.310	5.5	LOS A	1.0	7.9	0.19	0.13	0.19	47.7
Approach		424	8.9	536	8.9	0.310	1.5	NA	1.0	7.9	0.19	0.13	0.19	48.5
All Vehicles		657	8.4	830	8.4	0.310	2.2	NA	1.0	7.9	0.18	0.20	0.18	48.1

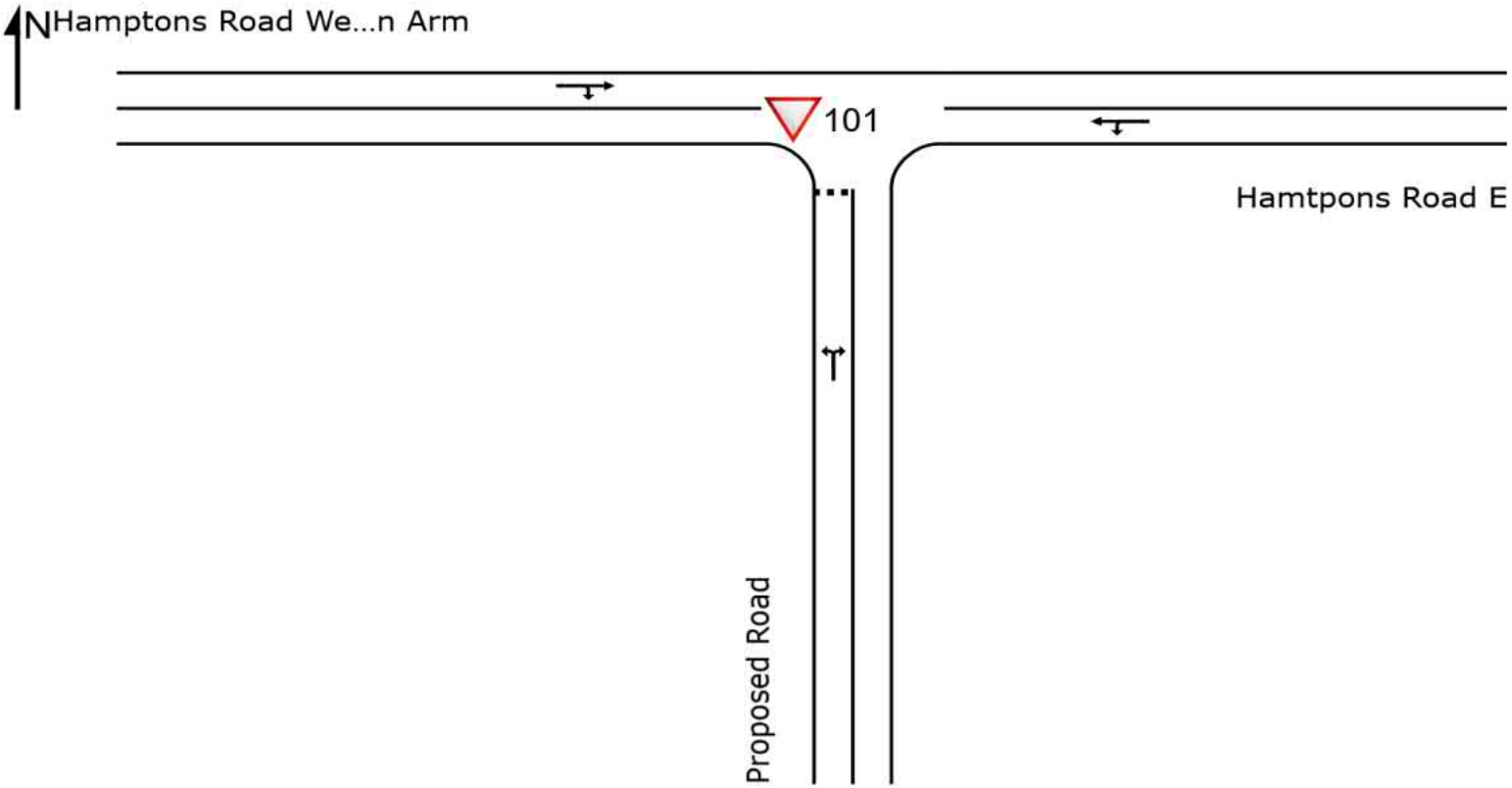
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Hamptons Access AM - +20% - 600 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Appendix 4

Hamptons Road / Birchs Road Intersection SIDRA Inputs and Outputs (including diversion from Trices Road western arm and development and 20% traffic growth)

MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Birchs Existing AM - Plus Proposal and 20% growth - 600 lots - plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	17	10.0	29	10.0	0.267	4.9	LOS A	0.1	0.4	0.01	0.04	0.01	49.1
2	T1	266	10.0	454	10.0	0.267	0.0	LOS A	0.1	0.4	0.01	0.04	0.01	49.8
3	R2	2	10.0	3	10.0	0.267	6.5	LOS A	0.1	0.4	0.01	0.04	0.01	48.6
Approach		285	10.0	486	10.0	0.267	0.4	NA	0.1	0.4	0.01	0.04	0.01	49.7
East: Hamptons Road Eastern Arm														
4	L2	2	10.0	3	10.0	0.026	5.9	LOS A	0.1	0.6	0.61	0.73	0.61	42.8
5	T1	2	10.0	3	10.0	0.026	11.0	LOS B	0.1	0.6	0.61	0.73	0.61	42.9
6	R2	2	10.0	3	10.0	0.026	17.2	LOS C	0.1	0.6	0.61	0.73	0.61	42.4
Approach		6	10.0	10	10.0	0.026	11.4	LOS B	0.1	0.6	0.61	0.73	0.61	42.7
North: Birchs Road Northern Arm														
7	L2	2	10.0	3	10.0	0.316	7.8	LOS A	1.7	13.2	0.42	0.22	0.47	47.1
8	T1	190	10.0	324	10.0	0.316	1.7	LOS A	1.7	13.2	0.42	0.22	0.47	47.7
9	R2	78	10.0	133	10.0	0.316	7.9	LOS A	1.7	13.2	0.42	0.22	0.47	46.6
Approach		270	10.0	460	10.0	0.316	3.5	NA	1.7	13.2	0.42	0.22	0.47	47.4
West: Hamptons Road Western Arm														
10	L2	97	10.0	165	10.0	0.290	7.3	LOS A	1.2	9.4	0.58	0.79	0.65	44.1
11	T1	2	10.0	3	10.0	0.290	12.9	LOS B	1.2	9.4	0.58	0.79	0.65	44.1
12	R2	19	10.0	32	10.0	0.290	17.0	LOS C	1.2	9.4	0.58	0.79	0.65	43.7
Approach		118	10.0	201	10.0	0.290	9.0	LOS A	1.2	9.4	0.58	0.79	0.65	44.0
All Vehicles		679	10.0	1158	10.0	0.316	3.2	NA	1.7	13.2	0.28	0.25	0.31	47.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Birchs Existing PM - Plus proposed +20% growth - 600 lots -plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	20	10.0	33	10.0	0.170	5.1	LOS A	0.1	0.5	0.03	0.06	0.03	48.9
2	T1	164	10.0	269	10.0	0.170	0.1	LOS A	0.1	0.5	0.03	0.06	0.03	49.5
3	R2	2	10.0	3	10.0	0.170	8.3	LOS A	0.1	0.5	0.03	0.06	0.03	48.4
Approach		186	10.0	305	10.0	0.170	0.7	NA	0.1	0.5	0.03	0.06	0.03	49.4
East: Hamptons Road Eastern Arm														
4	L2	2	10.0	3	10.0	0.034	7.5	LOS A	0.1	0.8	0.74	0.83	0.74	41.2
5	T1	2	10.0	3	10.0	0.034	14.1	LOS B	0.1	0.8	0.74	0.83	0.74	41.3
6	R2	2	10.0	3	10.0	0.034	22.3	LOS C	0.1	0.8	0.74	0.83	0.74	40.9
Approach		6	10.0	10	10.0	0.034	14.6	LOS B	0.1	0.8	0.74	0.83	0.74	41.1
North: Birchs Road Northern Arm														
7	L2	2	10.0	3	10.0	0.449	6.9	LOS A	2.3	17.7	0.29	0.14	0.34	47.9
8	T1	355	10.0	583	10.0	0.449	0.9	LOS A	2.3	17.7	0.29	0.14	0.34	48.5
9	R2	95	10.0	156	10.0	0.449	6.9	LOS A	2.3	17.7	0.29	0.14	0.34	47.4
Approach		452	10.0	742	10.0	0.449	2.2	NA	2.3	17.7	0.29	0.14	0.34	48.3
West: Hamptons Road Western Arm														
10	L2	102	10.0	167	10.0	0.361	6.8	LOS A	1.7	12.8	0.52	0.73	0.65	43.3
11	T1	2	10.0	3	10.0	0.361	17.6	LOS C	1.7	12.8	0.52	0.73	0.65	43.4
12	R2	29	10.0	48	10.0	0.361	22.8	LOS C	1.7	12.8	0.52	0.73	0.65	42.9
Approach		133	10.0	218	10.0	0.361	10.4	LOS B	1.7	12.8	0.52	0.73	0.65	43.2
All Vehicles		777	10.0	1276	10.0	0.449	3.3	NA	2.3	17.7	0.27	0.23	0.32	47.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

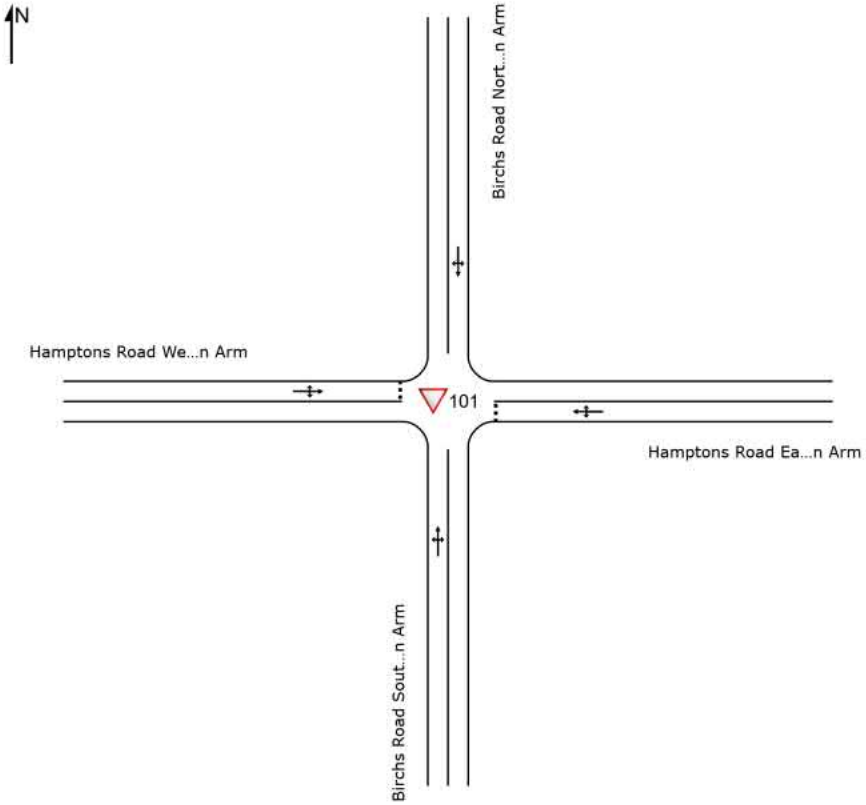
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 101 [Hamptons Birchs Existing PM - Plus proposed +20% growth - 600 lots -plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Appendix 5

Proposed Road / Leadleys Road / Birchs Road Intersection SIDRA Inputs and Outputs (including development and 20% traffic growth)

MOVEMENT SUMMARY

▽ Site: 101 [Leadleys Proposed Birchs AM +20% - 600 lots -plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	57	5.0	72	5.0	0.332	6.2	LOS A	1.5	11.2	0.32	0.18	0.32	47.6
2	T1	281	10.0	355	10.0	0.332	0.8	LOS A	1.5	11.2	0.32	0.18	0.32	48.1
3	R2	90	10.0	114	10.0	0.332	6.7	LOS A	1.5	11.2	0.32	0.18	0.32	47.0
Approach		428	9.3	541	9.3	0.332	2.8	NA	1.5	11.2	0.32	0.18	0.32	47.8
East: Leadleys Road														
4	L2	46	10.0	58	10.0	0.266	6.2	LOS A	1.0	7.5	0.55	0.74	0.62	42.7
5	T1	16	5.0	20	5.0	0.266	11.5	LOS B	1.0	7.5	0.55	0.74	0.62	42.8
6	R2	34	10.0	43	10.0	0.266	19.1	LOS C	1.0	7.5	0.55	0.74	0.62	42.3
Approach		96	9.2	121	9.2	0.266	11.7	LOS B	1.0	7.5	0.55	0.74	0.62	42.6
North: Birchs Road Northern Arm														
7	L2	65	10.0	82	10.0	0.239	5.8	LOS A	0.7	5.6	0.24	0.17	0.24	47.7
8	T1	208	10.0	263	10.0	0.239	0.6	LOS A	0.7	5.6	0.24	0.17	0.24	48.3
9	R2	42	5.0	53	5.0	0.239	6.9	LOS A	0.7	5.6	0.24	0.17	0.24	47.3
Approach		315	9.3	398	9.3	0.239	2.5	NA	0.7	5.6	0.24	0.17	0.24	48.0
West: Proposed Road														
10	L2	124	5.0	157	5.0	0.692	11.7	LOS B	5.1	37.3	0.72	1.16	1.56	40.3
11	T1	69	5.0	87	5.0	0.692	18.5	LOS C	5.1	37.3	0.72	1.16	1.56	40.3
12	R2	92	5.0	116	5.0	0.692	22.4	LOS C	5.1	37.3	0.72	1.16	1.56	39.9
Approach		285	5.0	360	5.0	0.692	16.8	LOS C	5.1	37.3	0.72	1.16	1.56	40.2
All Vehicles		1124	8.2	1420	8.2	0.692	7.0	NA	5.1	37.3	0.42	0.48	0.64	45.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Leadleys Proposed Birchs PM +20% - 600 lots - plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	64	5.0	81	5.0	0.224	6.7	LOS A	0.9	6.8	0.31	0.18	0.31	47.2
2	T1	177	10.0	224	10.0	0.224	1.2	LOS A	0.9	6.8	0.31	0.18	0.31	47.7
3	R2	38	10.0	48	10.0	0.224	8.5	LOS A	0.9	6.8	0.31	0.18	0.31	46.7
Approach		279	8.9	352	8.9	0.224	3.5	NA	0.9	6.8	0.31	0.18	0.31	47.5
East: Leadleys Road														
4	L2	38	10.0	48	10.0	0.675	15.2	LOS C	3.6	26.9	0.87	1.20	1.66	36.9
5	T1	43	5.0	54	5.0	0.675	24.1	LOS C	3.6	26.9	0.87	1.20	1.66	37.0
6	R2	80	10.0	101	10.0	0.675	30.1	LOS D	3.6	26.9	0.87	1.20	1.66	36.6
Approach		161	8.7	203	8.7	0.675	25.0	LOS C	3.6	26.9	0.87	1.20	1.66	36.8
North: Birchs Road Northern Arm														
7	L2	80	10.0	101	10.0	0.458	6.4	LOS A	2.9	21.7	0.35	0.21	0.41	47.3
8	T1	382	10.0	483	10.0	0.458	1.1	LOS A	2.9	21.7	0.35	0.21	0.41	47.9
9	R2	138	5.0	174	5.0	0.458	6.9	LOS A	2.9	21.7	0.35	0.21	0.41	46.9
Approach		600	8.9	758	8.9	0.458	3.1	NA	2.9	21.7	0.35	0.21	0.41	47.6
West: Proposed Road														
10	L2	40	5.0	51	5.0	0.605	11.4	LOS B	3.0	22.2	0.74	1.02	1.30	38.1
11	T1	27	5.0	34	5.0	0.605	22.6	LOS C	3.0	22.2	0.74	1.02	1.30	38.2
12	R2	87	5.0	110	5.0	0.605	26.4	LOS D	3.0	22.2	0.74	1.02	1.30	37.9
Approach		154	5.0	195	5.0	0.605	21.8	LOS C	3.0	22.2	0.74	1.02	1.30	38.0
All Vehicles		1194	8.3	1508	8.3	0.675	8.6	NA	3.6	26.9	0.46	0.44	0.67	44.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.

Minor Road Approach LOS values are based on average delay for all vehicle movements.

NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.

Delay Model: SIDRA Standard (Geometric Delay is included).

Queue Model: SIDRA Standard.

Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).

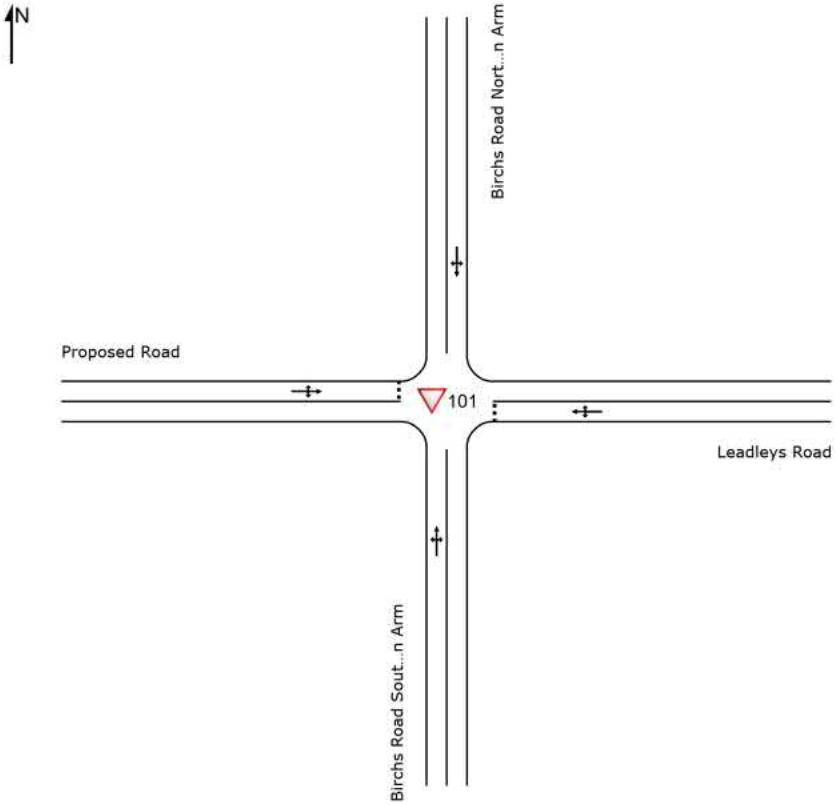
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 101 [Leadleys Proposed Birchs PM +20% - 600 lots - plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Appendix 6

Future Capacity SIDRA Intersection Inputs and Outputs [1500 dwellings, Commercial and 20% growth scenario]

MOVEMENT SUMMARY

Site: 101v [Hamptons Birchs Existing AM - Plus Proposal and 20% growth - 1500 lots plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	17	10.0	40	10.0	0.585	5.0	LOS A	5.5	41.9	0.66	0.56	0.66	45.8
2	T1	266	10.0	622	10.0	0.585	4.9	LOS A	5.5	41.9	0.66	0.56	0.66	46.9
3	R2	2	10.0	5	10.0	0.585	9.5	LOS A	5.5	41.9	0.66	0.56	0.66	47.0
Approach		285	10.0	666	10.0	0.585	5.0	LOS A	5.5	41.9	0.66	0.56	0.66	46.8
East: Hamptons Road Eastern Arm														
4	L2	2	10.0	5	10.0	0.021	7.7	LOS A	0.1	0.9	0.72	0.63	0.72	44.5
5	T1	2	10.0	5	10.0	0.021	7.6	LOS A	0.1	0.9	0.72	0.63	0.72	45.5
6	R2	2	10.0	5	10.0	0.021	12.2	LOS B	0.1	0.9	0.72	0.63	0.72	45.6
Approach		6	10.0	14	10.0	0.021	9.2	LOS A	0.1	0.9	0.72	0.63	0.72	45.2
North: Birchs Road Northern Arm														
7	L2	2	10.0	5	10.0	0.451	3.3	LOS A	4.5	34.4	0.35	0.42	0.35	46.3
8	T1	190	10.0	444	10.0	0.451	3.3	LOS A	4.5	34.4	0.35	0.42	0.35	47.4
9	R2	78	10.0	182	10.0	0.451	7.8	LOS A	4.5	34.4	0.35	0.42	0.35	47.5
Approach		270	10.0	631	10.0	0.451	4.6	LOS A	4.5	34.4	0.35	0.42	0.35	47.4
West: Hamptons Road Western Arm														
10	L2	97	10.0	227	10.0	0.424	9.1	LOS A	3.3	24.9	0.88	0.89	0.92	44.1
11	T1	2	10.0	5	10.0	0.424	9.1	LOS A	3.3	24.9	0.88	0.89	0.92	45.1
12	R2	19	10.0	44	10.0	0.424	13.6	LOS B	3.3	24.9	0.88	0.89	0.92	45.2
Approach		118	10.0	276	10.0	0.424	9.8	LOS A	3.3	24.9	0.88	0.89	0.92	44.3
All Vehicles		679	10.0	1587	10.0	0.585	5.7	LOS A	5.5	41.9	0.58	0.57	0.58	46.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [Hamptons Birchs Existing PM - Plus proposed +20% growth - 1500 lots plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	20	10.0	44	10.0	0.383	4.7	LOS A	2.9	22.3	0.59	0.54	0.59	46.1
2	T1	164	10.0	357	10.0	0.383	4.7	LOS A	2.9	22.3	0.59	0.54	0.59	47.2
3	R2	2	10.0	4	10.0	0.383	9.2	LOS A	2.9	22.3	0.59	0.54	0.59	47.3
Approach		186	10.0	405	10.0	0.383	4.8	LOS A	2.9	22.3	0.59	0.54	0.59	47.0
East: Hamptons Road Eastern Arm														
4	L2	2	10.0	4	10.0	0.034	13.8	LOS B	0.2	1.8	0.93	0.77	0.93	41.4
5	T1	2	10.0	4	10.0	0.034	13.8	LOS B	0.2	1.8	0.93	0.77	0.93	42.3
6	R2	2	10.0	4	10.0	0.034	18.3	LOS B	0.2	1.8	0.93	0.77	0.93	42.4
Approach		6	10.0	13	10.0	0.034	15.3	LOS B	0.2	1.8	0.93	0.77	0.93	42.0
North: Birchs Road Northern Arm														
7	L2	2	10.0	4	10.0	0.712	3.9	LOS A	10.5	79.7	0.59	0.45	0.59	45.8
8	T1	355	10.0	774	10.0	0.712	3.9	LOS A	10.5	79.7	0.59	0.45	0.59	46.8
9	R2	95	10.0	207	10.0	0.712	8.4	LOS A	10.5	79.7	0.59	0.45	0.59	46.9
Approach		452	10.0	985	10.0	0.712	4.8	LOS A	10.5	79.7	0.59	0.45	0.59	46.8
West: Hamptons Road Western Arm														
10	L2	102	10.0	222	10.0	0.329	5.9	LOS A	2.3	17.6	0.69	0.69	0.69	45.7
11	T1	2	10.0	4	10.0	0.329	5.9	LOS A	2.3	17.6	0.69	0.69	0.69	46.8
12	R2	29	10.0	63	10.0	0.329	10.4	LOS B	2.3	17.6	0.69	0.69	0.69	46.9
Approach		133	10.0	290	10.0	0.329	6.9	LOS A	2.3	17.6	0.69	0.69	0.69	46.0
All Vehicles		777	10.0	1693	10.0	0.712	5.2	LOS A	10.5	79.7	0.61	0.52	0.61	46.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

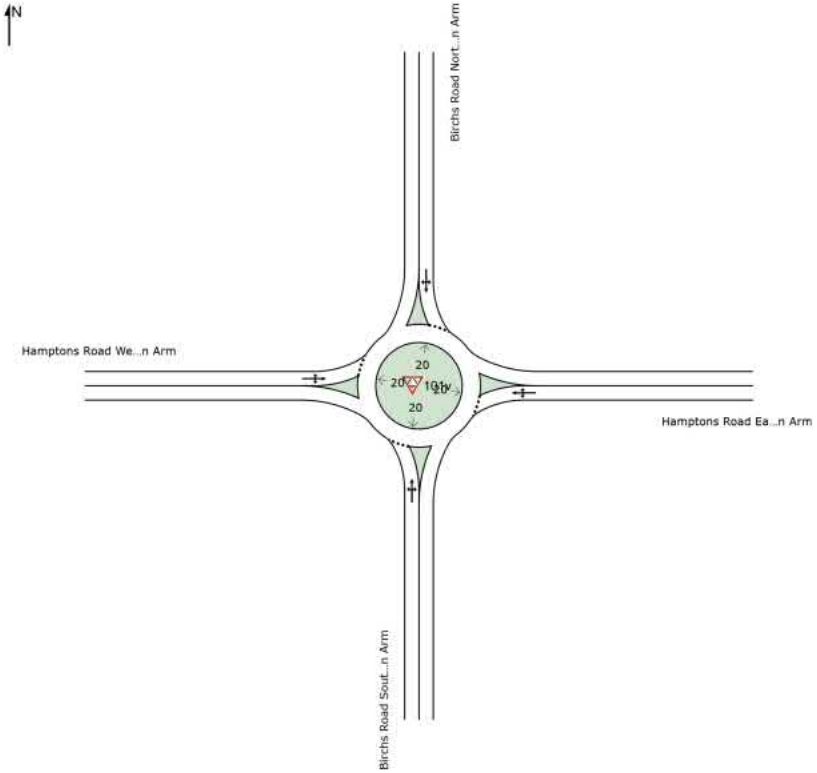
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101v [Hamptons Birchs Existing PM - Plus proposed +20% growth - 1500 lots plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: 101v [Leadleys Proposed Birchs AM +20% - 1500 lots-Plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	80	5.0	101	5.0	0.473	4.1	LOS A	4.1	30.9	0.53	0.52	0.53	46.0
2	T1	281	10.0	355	10.0	0.473	4.3	LOS A	4.1	30.9	0.53	0.52	0.53	47.1
3	R2	90	10.0	114	10.0	0.473	8.7	LOS A	4.1	30.9	0.53	0.52	0.53	47.2
Approach		451	9.1	570	9.1	0.473	5.2	LOS A	4.1	30.9	0.53	0.52	0.53	46.9
East: Leadleys Road														
4	L2	46	10.0	58	10.0	0.166	6.5	LOS A	1.1	8.1	0.71	0.71	0.71	45.2
5	T1	23	5.0	29	5.0	0.166	6.3	LOS A	1.1	8.1	0.71	0.71	0.71	46.2
6	R2	34	10.0	43	10.0	0.166	11.1	LOS B	1.1	8.1	0.71	0.71	0.71	46.2
Approach		103	8.9	130	8.9	0.166	8.0	LOS A	1.1	8.1	0.71	0.71	0.71	45.7
North: Birchs Road Northern Arm														
7	L2	65	10.0	82	10.0	0.504	7.4	LOS A	4.3	32.8	0.82	0.81	0.87	44.9
8	T1	208	10.0	263	10.0	0.504	7.3	LOS A	4.3	32.8	0.82	0.81	0.87	46.0
9	R2	60	5.0	76	5.0	0.504	11.7	LOS B	4.3	32.8	0.82	0.81	0.87	46.1
Approach		333	9.1	421	9.1	0.504	8.1	LOS A	4.3	32.8	0.82	0.81	0.87	45.8
West: Proposed Road														
10	L2	190	5.0	240	5.0	0.679	12.3	LOS B	8.3	60.4	0.95	1.06	1.27	42.2
11	T1	105	5.0	133	5.0	0.679	12.3	LOS B	8.3	60.4	0.95	1.06	1.27	43.1
12	R2	141	5.0	178	5.0	0.679	16.7	LOS B	8.3	60.4	0.95	1.06	1.27	43.3
Approach		436	5.0	551	5.0	0.679	13.7	LOS B	8.3	60.4	0.95	1.06	1.27	42.8
All Vehicles		1323	7.7	1671	7.7	0.679	8.9	LOS A	8.3	60.4	0.75	0.78	0.87	45.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101v [Leadleys Proposed Birchs PM +20% - 1500 lots plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	97	5.0	123	5.0	0.477	7.1	LOS A	3.8	28.8	0.80	0.79	0.84	45.1
2	T1	177	10.0	224	10.0	0.477	7.4	LOS A	3.8	28.8	0.80	0.79	0.84	46.1
3	R2	38	10.0	48	10.0	0.477	11.8	LOS B	3.8	28.8	0.80	0.79	0.84	46.2
Approach		312	8.4	394	8.4	0.477	7.9	LOS A	3.8	28.8	0.80	0.79	0.84	45.8
East: Leadleys Road														
4	L2	38	10.0	48	10.0	0.528	17.0	LOS B	4.9	36.9	1.00	1.11	1.25	40.0
5	T1	65	5.0	82	5.0	0.528	16.6	LOS B	4.9	36.9	1.00	1.11	1.25	40.8
6	R2	80	10.0	101	10.0	0.528	21.6	LOS C	4.9	36.9	1.00	1.11	1.25	40.8
Approach		183	8.2	231	8.2	0.528	18.9	LOS B	4.9	36.9	1.00	1.11	1.25	40.6
North: Birchs Road Northern Arm														
7	L2	80	10.0	101	10.0	0.799	10.1	LOS B	13.8	103.7	0.97	0.90	1.19	43.3
8	T1	382	10.0	483	10.0	0.799	10.0	LOS A	13.8	103.7	0.97	0.90	1.19	44.3
9	R2	210	5.0	265	5.0	0.799	14.4	LOS B	13.8	103.7	0.97	0.90	1.19	44.5
Approach		672	8.4	849	8.4	0.799	11.4	LOS B	13.8	103.7	0.97	0.90	1.19	44.3
West: Proposed Road														
10	L2	59	5.0	75	5.0	0.310	5.8	LOS A	2.2	16.0	0.68	0.71	0.68	44.9
11	T1	39	5.0	49	5.0	0.310	5.8	LOS A	2.2	16.0	0.68	0.71	0.68	45.9
12	R2	127	5.0	160	5.0	0.310	10.2	LOS B	2.2	16.0	0.68	0.71	0.68	46.1
Approach		225	5.0	284	5.0	0.310	8.3	LOS A	2.2	16.0	0.68	0.71	0.68	45.7
All Vehicles		1392	7.9	1758	7.9	0.799	11.1	LOS B	13.8	103.7	0.89	0.87	1.04	44.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

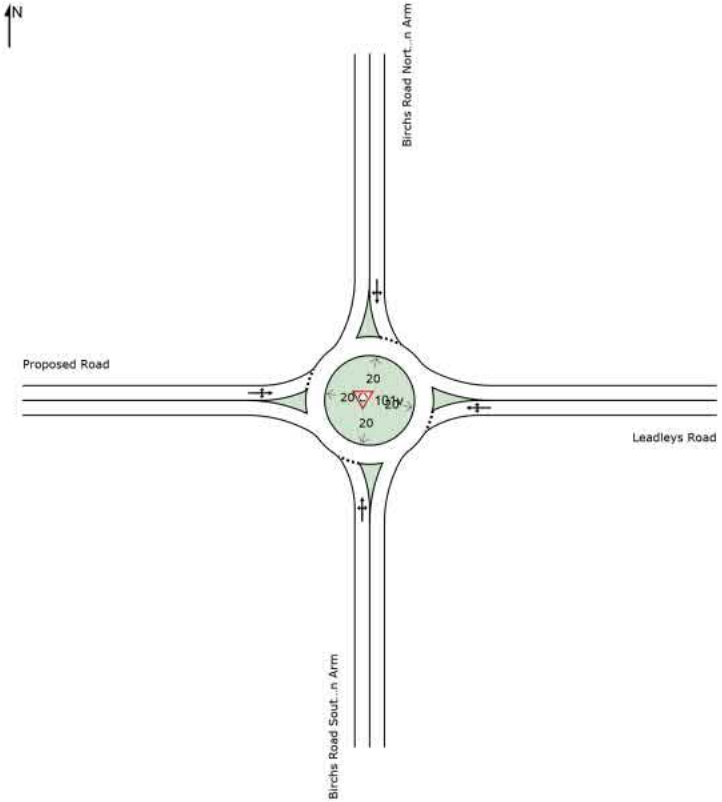
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101v [Leadleys Proposed Birchs AM +20% - 1500 lots-Plus commercial roundabout (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

▽ Site: 101 [Birchs Road Southern Most Access AM +20% 1500 lots plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Southern Arm														
1	L2	51	5.0	64	5.0	0.230	4.7	LOS A	0.0	0.0	0.00	0.08	0.00	48.8
2	T1	281	10.0	355	10.0	0.230	0.1	LOS A	0.0	0.0	0.00	0.08	0.00	49.4
Approach		332	9.2	419	9.2	0.230	0.8	NA	0.0	0.0	0.00	0.08	0.00	49.3
North: Birchs Northern Arm														
8	T1	208	10.0	263	10.0	0.187	0.5	LOS A	0.5	3.7	0.20	0.10	0.20	48.9
9	R2	38	5.0	48	5.0	0.187	6.7	LOS A	0.5	3.7	0.20	0.10	0.20	47.9
Approach		246	9.2	311	9.2	0.187	1.5	NA	0.5	3.7	0.20	0.10	0.20	48.8
West: Proposed Road (Southern-most Access)														
10	L2	137	5.0	173	5.0	0.371	6.9	LOS A	1.8	13.3	0.54	0.79	0.67	44.4
12	R2	101	5.0	128	5.0	0.371	10.3	LOS B	1.8	13.3	0.54	0.79	0.67	44.0
Approach		238	5.0	301	5.0	0.371	8.3	LOS A	1.8	13.3	0.54	0.79	0.67	44.3
All Vehicles		816	8.0	1031	8.0	0.371	3.2	NA	1.8	13.3	0.22	0.29	0.26	47.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

▽ Site: 101 [Birchs Road Southern Most Access PM +20% 1500 lots plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Southern Arm														
1	L2	65	5.0	82	5.0	0.168	4.7	LOS A	0.0	0.0	0.00	0.15	0.00	48.5
2	T1	177	10.0	224	10.0	0.168	0.1	LOS A	0.0	0.0	0.00	0.15	0.00	49.1
Approach		242	8.7	306	8.7	0.168	1.3	NA	0.0	0.0	0.00	0.15	0.00	48.9
North: Birchs Northern Arm														
8	T1	382	10.0	483	10.0	0.401	0.9	LOS A	2.0	15.4	0.32	0.18	0.35	48.3
9	R2	139	5.0	176	5.0	0.401	6.6	LOS A	2.0	15.4	0.32	0.18	0.35	47.3
Approach		521	8.7	658	8.7	0.401	2.4	NA	2.0	15.4	0.32	0.18	0.35	48.0
West: Proposed Road (Southern-most Access)														
10	L2	39	5.0	49	5.0	0.297	6.1	LOS A	1.1	8.3	0.54	0.77	0.64	43.1
12	R2	84	5.0	106	5.0	0.297	13.1	LOS B	1.1	8.3	0.54	0.77	0.64	42.7
Approach		123	5.0	155	5.0	0.297	10.9	LOS B	1.1	8.3	0.54	0.77	0.64	42.8
All Vehicles		886	8.2	1119	8.2	0.401	3.3	NA	2.0	15.4	0.26	0.25	0.30	47.5

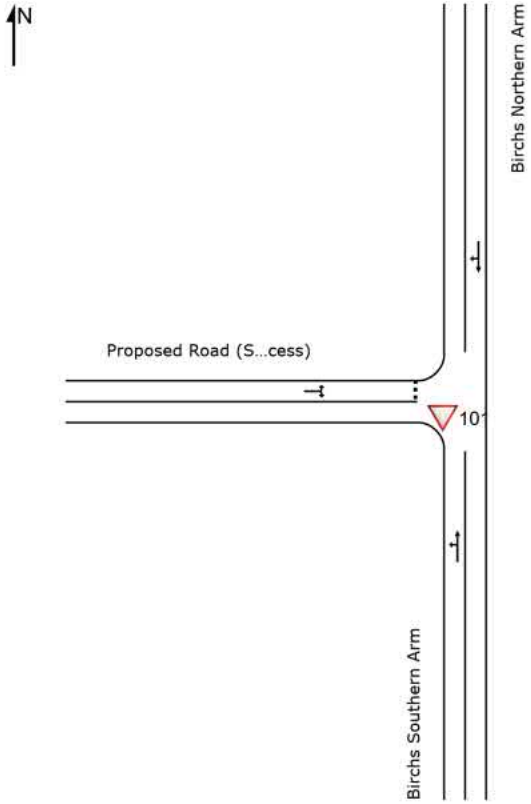
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

▽ Site: 101 [Birchs Road Southern Most Access AM +20% 1500 lots plus commercial (Site Folder: General)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Access AM - +20% - 1500 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	165	5.0	208	5.0	0.439	5.6	LOS A	2.6	19.1	0.36	0.65	0.42	45.3
3	R2	198	5.0	250	5.0	0.439	7.7	LOS A	2.6	19.1	0.36	0.65	0.42	44.9
Approach		363	5.0	459	5.0	0.439	6.8	LOS A	2.6	19.1	0.36	0.65	0.42	45.1
East: Hamtpons Road Eastern Arm														
4	L2	62	5.0	78	5.0	0.109	4.6	LOS A	0.0	0.0	0.00	0.21	0.00	48.2
5	T1	95	10.0	120	10.0	0.109	0.0	LOS A	0.0	0.0	0.00	0.21	0.00	48.7
Approach		157	8.0	198	8.0	0.109	1.8	NA	0.0	0.0	0.00	0.21	0.00	48.5
West: Hamptons Road Western Arm														
11	T1	114	10.0	144	10.0	0.144	0.5	LOS A	0.6	4.5	0.26	0.23	0.26	48.1
12	R2	74	5.0	93	5.0	0.144	5.4	LOS A	0.6	4.5	0.26	0.23	0.26	47.1
Approach		188	8.0	237	8.0	0.144	2.4	NA	0.6	4.5	0.26	0.23	0.26	47.7
All Vehicles		708	6.5	894	6.5	0.439	4.5	NA	2.6	19.1	0.25	0.44	0.28	46.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Project: S:\Novo Projects\400-499\442 Baseline Group\442004 Prebbleton PC\SIDRA\Project1 Hamptons Proposed Int.sip9

MOVEMENT SUMMARY

▽ Site: 101 [Hamptons Access PM - +20% - 1500 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Proposed Road														
1	L2	49	5.0	62	5.0	0.461	6.9	LOS A	2.2	15.7	0.53	0.82	0.79	42.2
3	R2	138	5.0	174	5.0	0.461	14.7	LOS B	2.2	15.7	0.53	0.82	0.79	41.9
Approach		187	5.0	236	5.0	0.461	12.6	LOS B	2.2	15.7	0.53	0.82	0.79	41.9
East: Hamtpons Road Eastern Arm														
4	L2	81	5.0	102	5.0	0.137	4.6	LOS A	0.0	0.0	0.00	0.22	0.00	48.1
5	T1	116	10.0	147	10.0	0.137	0.0	LOS A	0.0	0.0	0.00	0.22	0.00	48.7
Approach		197	7.9	249	7.9	0.137	1.9	NA	0.0	0.0	0.00	0.22	0.00	48.4
West: Hamptons Road Western Arm														
11	T1	327	10.0	413	10.0	0.438	1.1	LOS A	2.9	21.8	0.40	0.27	0.43	47.7
12	R2	229	5.0	289	5.0	0.438	6.2	LOS A	2.9	21.8	0.40	0.27	0.43	46.7
Approach		556	7.9	702	7.9	0.438	3.2	NA	2.9	21.8	0.40	0.27	0.43	47.3
All Vehicles		940	7.4	1187	7.4	0.461	4.8	NA	2.9	21.8	0.34	0.37	0.41	46.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

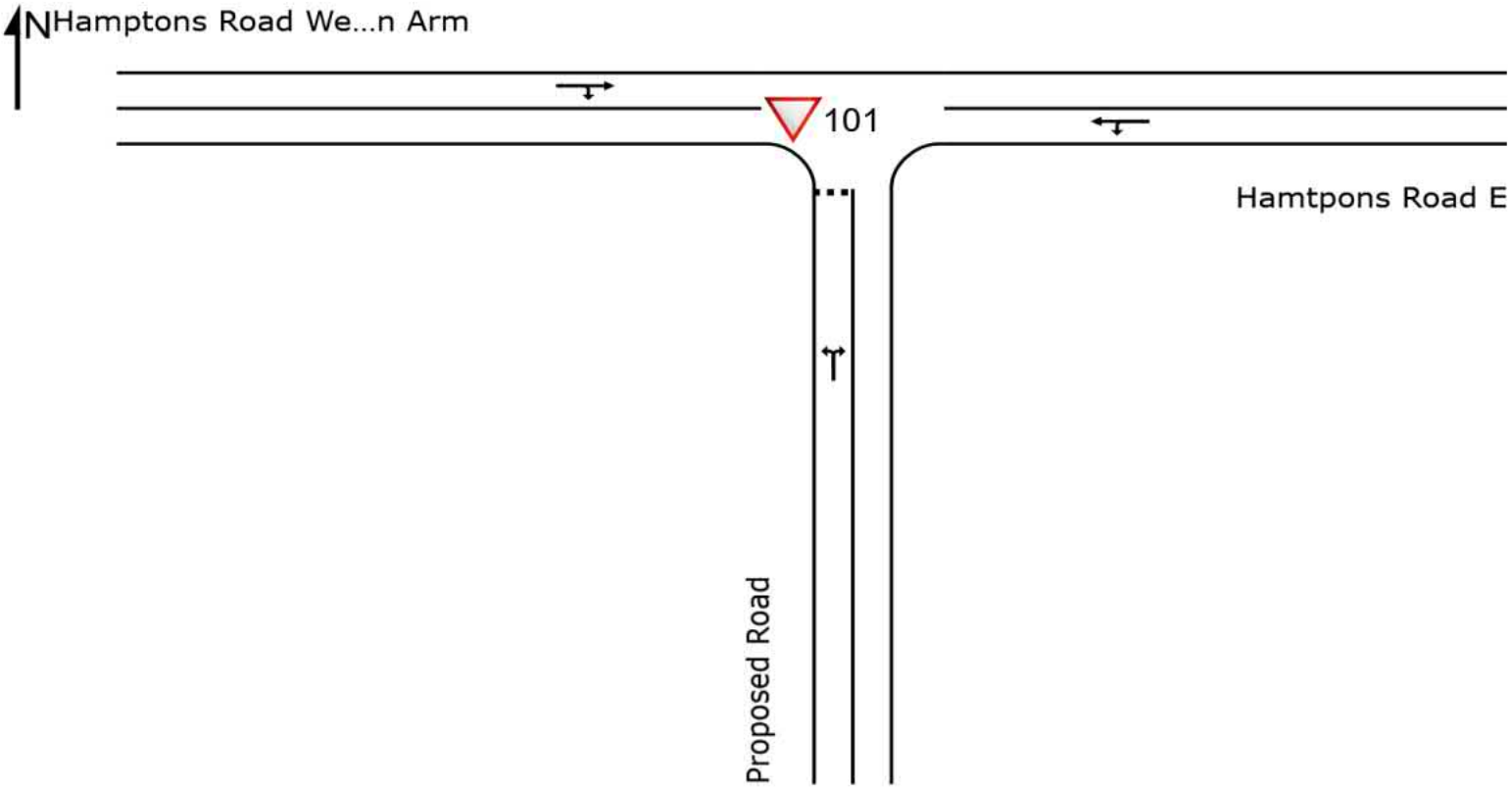
Project: S:\Novo Projects\400-499\442 Baseline Group\442004 Prebbleton PC\SIDRA\Project1 Hamptons Proposed Int.sip9

SITE LAYOUT

Site: 101 [Hamptons Access AM - +20% - 1500 lots plus commercial (Site Folder: Hamptons)]

New Site
Site Category: (None)
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Appendix 7

District Plan Objectives and Policies

Proposed District Plan provision	Comment / Assessment
TRAN-O1 People and places are connected through safe, efficient, and convenient land transport corridors and land transport infrastructure which is well integrated with land use activities and subdivision development.	Noting the assessment above, the proposal is consistent with this objective.
TRAN-O2 Land transport corridors and land transport infrastructure are protected from incompatible land use activities and subdivision development.	The traffic generation associated with the proposed residential landuse is considered to be acceptable within the existing and proposed transport infrastructure.
TRAN-O3 Land transport corridors and land transport infrastructure support the needs of people and freight, while ensuring adverse effects on the surrounding environment from their establishment and operation are managed.	The proposed transport infrastructure will provide for the transport needs of the future residents. Several transport upgrades are recommended and will mitigate any adverse effects on the existing transport infrastructure .
TRAN-P1 The safety and efficiency of the District's land transport network and systems are enabled through integrated land use and subdivision development that: *Manages the levels of service, formation standards and the types of land transport corridors and land transport infrastructure, including through the network road classifications and compliance with the design and operational standards;* *Provides land transport infrastructure that is consistent with the form, function, and character of each zone;* *Ensures there is enough space within land transport corridors to support the efficient and effective operation of network utilities;* *Provides for the safe and efficient movement and operation of emergency services; and* *Recognises cross-boundary connections with adjoining districts.*	The road layout provides a safe and efficient hierarchy of road and off-road links for the intended residential use. The proposed road network can be developed in accordance with standard design. The proposed road layout will provide good access for emergency services. The site is appropriately located in respect of existing arterial connections to Christchurch District.
TRAN-P2 Manage any extensions to the District's land transport network to ensure it occurs in an integrated way by: *Co-coordinating the timing of land use activities and subdivision development with the availability of capacity in land transport corridors;* *Providing a range of travel modes and ensuring these are integrated, including between walking, cycling, public transport, freight and private vehicle modes; and* *Ensuring land use activities and subdivision development do not foreclose on the opportunity for land transport corridors to meet future land transport needs.*	CSM2 and the Hamptons Road / Springs Road / Trices Road intersection upgrades are anticipated to be complete prior to occupation of future residential units. All proposed road infrastructure and frontage road upgrades would be co-ordinated through the subdivision process. The assessment above includes considerations of travel by all modes. Future road connections have been provided for to accommodate any future development of land to the south and west of the site.
TRAN-P5 Promote a range of transport options to reduce the number of trips and distances travelled in private motor vehicles by: *Encouraging land use activities and subdivision development to include connected walking and cycling networks and access to public transport and public transport facilities, including within and between townships; and* *Managing the design, layout and function of new land transport infrastructure to ensure they integrate with existing and future land transport corridors.*	The proposed layout includes direct links via road corridors and off-road connections, to the existing Rail Trail on Birchs Road and to existing public transport routes and key landuse destinations. As outlined above the proposed layout has been specifically designed to integrate with existing and future transport connections.

TRAN-P6 Enable safe, multi-modal connections that support walking, cycling, and access to public transport and public transport facilities through land use activities and subdivision development that: *Establish levels of service and multi-modal transport options based on the network road classifications, including the provision of strategic level walking and cycling connections where they are identified in Development Plans or ODP;* *Encourage residential blocks to be small, navigable and convenient to move around through legible, convenient and attractive walking and cycling routes to public transport facilities and between residential areas, business centres, community facilities, recreation space and local services;* *Manage the number and design of cul de sacs, rear lots and accessways;* *Provide for the interaction between vehicle access and manoeuvring, loading and parking areas when determining on-site pedestrian and cycling routes; and* *Align street layouts to maximise views and landscape features to promote attractive streets.*	The assessment above concludes that the proposed layout accommodates appropriate connections for all modes. Inclusion of local shops and a preschool would also provide for day to day services within walking and cycling distance of the future dwellings.
TRAN-P7 Recognise and protect the function of the District's land transport network and systems by managing land use activities and subdivision development to ensure the safe and efficient movement of people and goods by: *Managing adverse effects from activities on land transport corridors and land transport infrastructure, particularly where it may reduce safe and efficient traffic flows within the strategic transport network and links with Christchurch City;* *Ensuring land transport corridors and land transport infrastructure can support the volume and type of transport movements based on the network road classifications; and* *Requiring the design, positioning, and maintenance of accessways, corner splays, vehicle crossings, intersections, footpaths, plantings, and signs to ensure appropriate sightline visibility is provided to road users to support safe and efficient vehicle, pedestrian, and cycle movements.*	As outlined above, the site is well located in terms of road connections to Chch, reflecting the volume of traffic anticipated and functions of the road network.

Operative District Plan Provision	Comment / Assessment
Objective B2.1.1 *An integrated approach to land use and transport planning to ensure the safe and efficient operation of the District's roads, pathways, railway lines and airfields is not compromised by adverse effects from activities on surrounding land or by residential growth.*	The proposed road and off-road connections will provide for safe and convenient access and the proposed development can be appropriately integrated into the existing transport network
Objective B2.1.2 *An integrated approach to land use and transport planning to manage and minimise adverse effects of transport networks on adjoining land uses, and to avoid "reverse sensitivity" effects on the operation of transport networks.*	
Objective B2.1.3 *Future road networks and transport corridors are designed, located and protected, to promote transport choice and provide for: a range of sustainable transport modes; and alternatives to road movement of freight such as rail.*	Noting the conclusions in the assessment of effects, the site is well located for travel by private vehicle, public transport, walking and cycling.
Policy B2.1.2 *Manage effects of activities on the safe and efficient operation of the District's existing and planned road network, considering the classification and function of each road in the hierarchy.*	The proposed development will be co-ordinated with the proposed upgrades through the subdivision process and occupation would be subsequent to already planned upgrades outlined in the assessment of effects.
Policy B2.1.4(a) *Ensure all sites, allotments or properties have legal access to a legal road which is formed to the standard necessary to meet the needs of the activity considering:* *the number and type of vehicle movements generated by the activity;* *the road classification and function; and* *any pedestrian, cycle, public transport or other access required by the activity.*	The assessment above does not identify any constraints in achieving this.
Policy B2.1.5 *Ensure the development of new roads is:* *integrated with existing and future transport networks and landuses; and* *is designed and located to maximise permeability and accessibility;* *through achieving a high level of connectivity within and through new developments to encourage use of public and active transport; whilst having regard to the road hierarchy.*	The assessment above concludes that the proposal can be well integrated with the existing and future transport network. The proposal includes direct links for active modes towards key landuse destinations, the Rail Trail and to public transport routes. The site is in close proximity to existing public transport routes.
Policy B2.1.12 *Address the impact of new residential or business activities on both the local roads around the site and the District's road network, particularly Arterial Road links with Christchurch City.*	The assessment above concludes that the proposal can be readily accommodated in this respect.
Policy B2.1.13 *Minimise the effects of increasing transport demand associated with areas identified for urban growth by promoting efficient and consolidated land use patterns that will reduce the demand for transport.*	The assessment of effects above outlines that the site is suitably located in this respect.

Policy B2.1.14 *Encourage people to walk or cycle within and between townships by providing a choice of routes for active transport modes and ensuring there is supporting infrastructure such as parking for cycles, at destinations.*	As outlined above the site is close to the town centre and the Rail Trail (between Lincoln and Christchurch).
Policy B2.1.15 *Require pedestrian and cycle links in new and redeveloped residential or business areas, where such links are likely to provide a safe, attractive and accessible alternative route for pedestrians and cyclists, to surrounding residential areas, business or community facilities*	An off road connection and road corridors all provide access to the existing Rail Trail.
Policy B4.2.10 *Ensure that new residential blocks are small in scale, easily navigable and convenient to public transport services and community infrastructure such as schools, shops, sports fields and medical facilities, particularly for pedestrians and cyclists.*	The primary roads provide an appropriate structure for a subdivision layout of the local roads and off-road-connections to accommodate this.
Objective B4.3.4 *New areas for residential or business development support the timely, efficient and integrated provision of infrastructure, including appropriate transport and movement networks through a coordinated and phased development approach*	As outlined above the timing of future roads and development is and can be well co-ordinated.
Policy B4.3.8 *Each Outline Development Plan shall include:* *Principal through roads, connection and integration with the surrounding road networks, relevant infrastructure services and areas for possible future development;* ..... *Indicate how required infrastructure will be provided and how it will be funded;* ..... *Demonstrate how effective provision is made for a range of transport options, including public transport systems, pedestrian walkways and cycleways, both within and adjoining the ODP area;* *Show how other potential adverse effects on and/or from nearby existing or designated strategic infrastructure (including requirements for designations, or planned infrastructure) will be avoided, remedied or appropriately mitigated;*	These matters are achieved and addressed in the assessment of effects above.

8 April 2022

Novo Group Limited
Level 1, 279 Montreal Street
PO Box 365, Christchurch 8140
O - 03 365 5570
info@novogroup.co.nz

Baseline Group

Attention: Sally Elford

By email: sally@blg.nz

Dear Sally,

TRANSPORT ASSESSMENT ADDENDUM
CHANGES TO PLAN CHANGE 79, PREBBLETON

1 Since the preparation of the Integrated Transport Assessment (ITA) dated 24/11/21 there have been several changes to the proposal for Plan Change 79 (PC70) which of relevance to the transport assessment include:

- Provision of a secondary road and intersection with Birchs Road
- Minor re alignments of the primary N-S and E W roads
- Considerations of future dwellings to achieve Medium Density requirements of 1581 dwellings (preferred) and 2500 dwellings (worst case).

2 The changes to the ODP are shown in **Attachment 1** An additional local road connection to Birchs Road at the southern end had been anticipated and inclusion of this within the ODP plan is considered appropriate. The location provides 181m separation distance from the Leadleys Road / Birchs Road intersection which will be appropriate noting the future urban speed limits following residential re-zoning. There is good visibility in both directions from this location

3. The minor re-alignments of the primary internal roads do not change any of the conclusions of the ITA and future connections to the south and west are still provided for.

4 The 1581 dwelling scenario is 81 additional lots above the 1500 “future scenario” consideration in paragraphs 65-69 of the ITA.

5 The conclusions (para 68) of the ITA and comment in respect of the 81 extra dwellings is outlined below.

- *There is ample capacity provided by a basic “T” intersection at the proposed local road Birchs Road intersection (operating within levels of service A or B)*

  Comment: There is sufficient capacity to accommodate this increase within acceptable Levels of Service (LOS).

- *There is ample capacity provided by the proposed development road – Hamptons Road “T” intersection (operating within levels of service A or B)*

Comment: There is sufficient capacity to accommodate this increase within acceptable Levels of Service (LOS).

- *The Proposed Road Leadleys Road - Birchs Road intersection would likely require upgrade to a roundabout and would then operate within acceptable levels of service (Levels A C)*

  Comment: The movement operating at LOS C is the right turn movement for the existing section of Leadleys Road in the PM peak A scenario test indicated it is still within LOS C for this movement i.e., no change in LOS. Refer to **Attachment 2**.

- *The Hamptons Road Birchs Road intersection would require upgrade to a roundabout and would then operate within acceptable levels of service (Levels A or B).*

- **Comment:** With the roundabout in place there is ample capacity for this increase

6. It is understood that the 2500 dwelling capacity is an unlikely scenario and would be the result of secondary subdivisions in the longer term. As such it is understood that this scenario is likely to be managed by way of proposed rules / assessment matters that enable consideration of effects at that time. Such an approach is supportable in principle and similar to current “infill” processes

7. Based on the above the changes are considered to be acceptable and generally within the scope of the ITA. Mechanisms to enable consideration of the 2500 dwelling scenario at a future time are being considered by others

Yours sincerely,

Novo Group Limited

Lisa Williams

Transport Engineer and Planner

D: 03 365 5596 | **M**: 027 2929 825 | **O**: 03 365 5570

E: lisa@novogroup.co.nz | W: www.novogroup.co.nz

ATTACHMENT 1: AMENDED ODP

Key

- Development Boundary
- Proposed Living Medium Density Zone (minimum individual net area 400m²)
- Proposed Reserve
- Business 1 Commercial
- Proposed Primary Road (Width 21m)
- Future Road Connection
- Proposed Indicative Pedestrian & Cycle Route
- Indicative Pedestrian & Cycle Link
- Existing Pedestrian & Cycle Route

N

50m

500m Offset From Open Space

40m

Hamptons Road

Birchs Road

OPEN SPACE

BASELINEGROUP

Prebbleton

Scale	1:2000 @A1, 1:4000@A3
Date	22 Feb 2021
Design	EL
Drawn	EL
Review	SE

Rev.	Date	Amendment
A	24/02/21	Traffic engineer feedback updating
B	02/03/21	Plan change density increasing
C	18/03/21	Layout updating
D	23/03/21	ODP updating
E	04/05/21	ODP updating
F	14/05/21	ODP boundary updating
G	20/05/21	ODP boundary updating
H	28/10/21	RFI updating
I	23/11/21	Updating in accordance with current master plan
J	24/11/21	Road layout updating
K	07/03/22	Zoning updating
L	16/03/22	RFI updating
M	30/03/22	RFI updating
N	05/04/22	RFI updating

Revision N

Sheet 1

ATTACHMENT 2: SIDRA SCENARIO TEST

MOVEMENT SUMMARY

Site: 101v [Leadleys Proposed Birchs PM +20% - 1581 lots plus commercial roundabout -trial (Site Folder: General)]

New Site
Site Category: (None)
Roundabout

Vehicle Movement Performance

Mov ID	Turn	INPUT VOLUMES [Total veh/h	HV] %	DEMAND FLOWS [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% BACK OF QUEUE [Veh. veh	Dist] m	Prop. Que	Effective Stop Rate	Aver. No. Cycles	Aver. Speed km/h
South: Birchs Road Southern Arm														
1	L2	102	5.0	129	5.0	0.495	7.6	LOS A	4.2	31.2	0.83	0.83	0.88	45.0
2	T1	177	10.0	224	10.0	0.495	7.9	LOS A	4.2	31.2	0.83	0.83	0.88	46.0
3	R2	38	10.0	48	10.0	0.495	12.3	LOS B	4.2	31.2	0.83	0.83	0.88	46.0
Approach		317	8.4	400	8.4	0.495	8.3	LOS A	4.2	31.2	0.83	0.83	0.88	45.6
East: Leadleys Road														
4	L2	38	10.0	48	10.0	0.561	19.0	LOS B	5.4	40.7	1.00	1.14	1.31	39.2
5	T1	68	5.0	86	5.0	0.561	18.6	LOS B	5.4	40.7	1.00	1.14	1.31	39.9
6	R2	80	10.0	101	10.0	0.561	23.6	LOS C	5.4	40.7	1.00	1.14	1.31	40.0
Approach		186	8.2	235	8.2	0.561	20.9	LOS C	5.4	40.7	1.00	1.14	1.31	39.8
North: Birchs Road Northern Arm														
7	L2	80	10.0	101	10.0	0.822	11.3	LOS B	15.4	115.6	1.00	0.96	1.29	42.7
8	T1	382	10.0	483	10.0	0.822	11.2	LOS B	15.4	115.6	1.00	0.96	1.29	43.7
9	R2	221	5.0	279	5.0	0.822	15.6	LOS B	15.4	115.6	1.00	0.96	1.29	43.8
Approach		683	8.4	863	8.4	0.822	12.7	LOS B	15.4	115.6	1.00	0.96	1.29	43.6
West: Proposed Road														
10	L2	62	5.0	78	5.0	0.325	5.8	LOS A	2.3	17.0	0.69	0.71	0.69	44.9
11	T1	41	5.0	52	5.0	0.325	5.8	LOS A	2.3	17.0	0.69	0.71	0.69	45.9
12	R2	133	5.0	168	5.0	0.325	10.2	LOS B	2.3	17.0	0.69	0.71	0.69	46.1
Approach		236	5.0	298	5.0	0.325	8.3	LOS A	2.3	17.0	0.69	0.71	0.69	45.7
All Vehicles		1422	7.8	1796	7.8	0.822	12.0	LOS B	15.4	115.6	0.91	0.91	1.10	43.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Geometric Delay is included).
Queue Model: SIDRA Standard.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.