

520 GSR Limited

Proposed Rezoning of land at  
520/522 Great South Road and 21 Gatland Road, Papakura

Transport Assessment

Ref: 18538-r1v3  
27 June 2019

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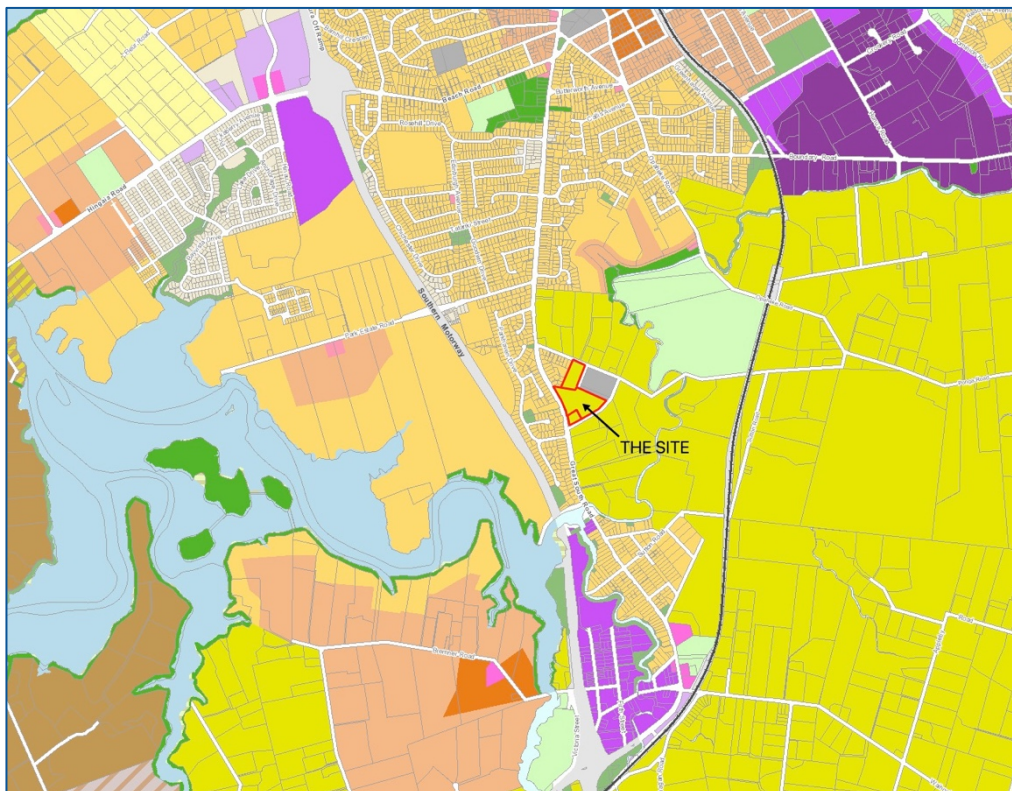
## 1. Introduction

The purpose of this report is to provide a Transport Assessment of a request by 520 GSR Limited to rezone the sites at 520/522 Great South Road and 21 Gatland Road, Papakura to enable a residential development with capacity for approximately 113 residential lots of varying sizes. The site currently lies within the Future Urban Zone, and the proposal is to re-zone it to Residential - Mixed Housing Urban Zone.

The report describes the location of the site in relation to the adjacent transport environment; describes the form of a potential development and its connections to the road network; assesses the likely impacts of the rezoning on the transport environment; and assesses the proposal in terms of the relevant objectives and policies in the Auckland Unitary Plan (Operative in Part) (AUP).

## 2. The transport environment

The location of the site in relation to the road network and the current AUP zoning is shown in [Figure 1](#).

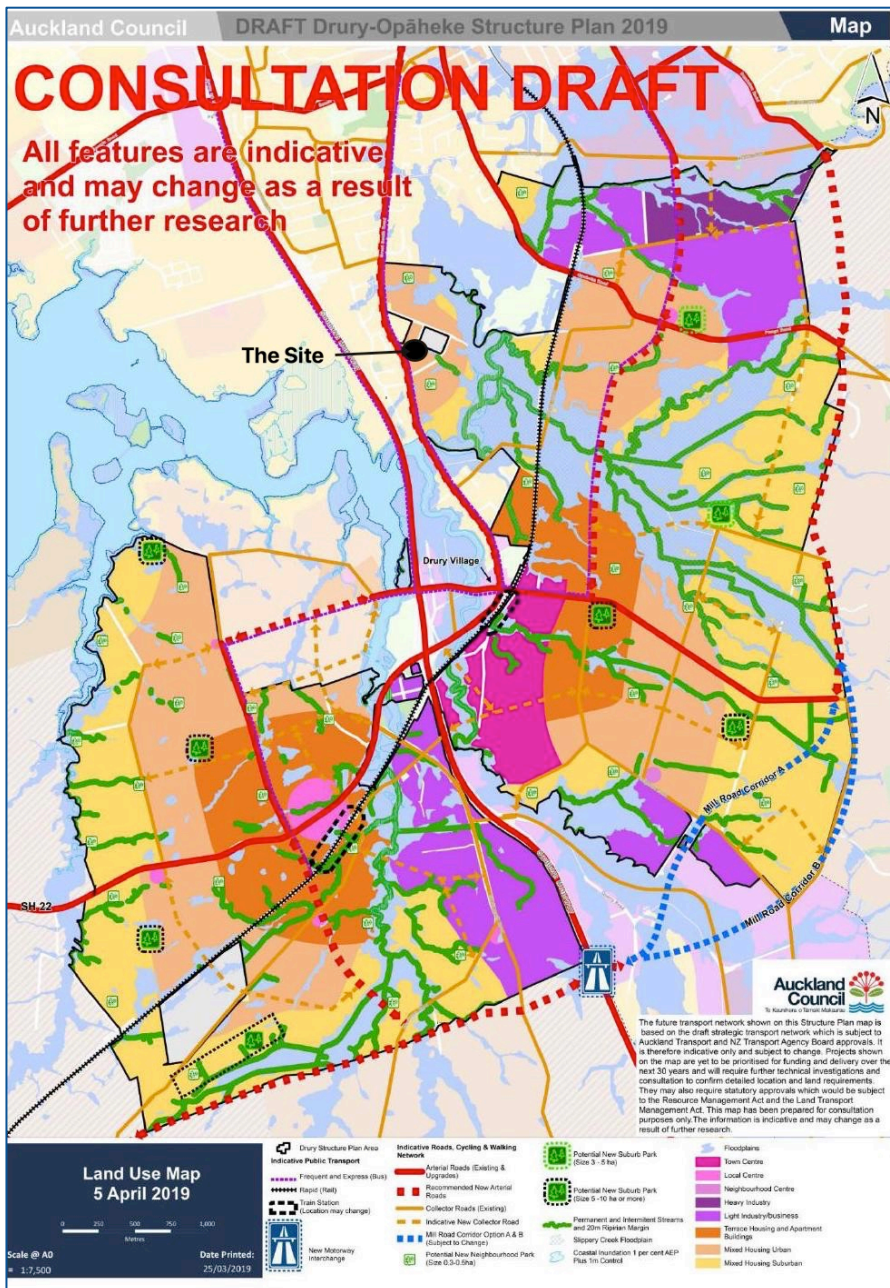


**Figure 1**  
**Site location and Auckland Unitary Plan zoning**

The site lies on the eastern side of Great South Road, which is the main north-south arterial route that runs to the east of and parallel to the Southern Motorway. The site lies more or less midway between the Papakura and Drury Interchanges on the Motorway.

The site lies on the western edge of the Future Urban Zone. The land adjoining the eastern boundary of the site and the land situated directly across Great South Road has a Residential – Mixed Housing Suburban Zone.

The site also lies within the Drury-Opaheke Structure Plan area, which is shown in [Figure 2](#).



**Figure 2**  
**The Draft Drury-Opaheke Structure Plan Map 2019**



**Figure 3** shows the site in relation to surrounding activities.



**Figure 3**  
*The site in relation to surrounding activities*

The main part of the site has frontage to Great South Road to the west and to Gatland Road to the north. 520 and 522 Great South Road are accessed from Great South Road, whilst the part of the property at 21 Gatland Road will have access from Gatland Road.

As described later in Section 3, it is proposed to construct a new intersection on Great South Road to provide access to the development, approximately midway along the site's road frontage. The current traffic environment in the vicinity of this new intersection is shown in **Figure 4 and 5**.

Great South Road is classed as an Arterial Road in the AUP. It is a two-lane road with shoulders along both sides which can accommodate kerbside parking in places, with widening at the Parkhaven Drive intersection to provide a painted flush median and right turn pocket for traffic turning into Parkhaven Drive. This section of Great South Road has a posted speed limit of 70 km/hr.





*Figure 4*  
*Great South Road looking to the south from proposed new intersection*

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*Figure 5*  
*Great South Road looking to the north from proposed new intersection*

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Gatland Road is a local no-exit road that provides access to residential development and the nearby Papakura South Cemetery. The intersection with Great South Road is Stop controlled, and the sight distance to the south for vehicles turning right out of Gatland Road is restricted, as seen in [Figure 6](#).



**Figure 6**  
*Great South Road looking to the south from the Gatland Road intersection*

As part of this assessment, traffic surveys were undertaken at the intersection of Great South Road and Gatland Road on Thursday 21 March 2019, during the 07:00-09:00 AM peak period, the midday 11:00-13:00 period and the 16:00-18:00 PM peak period. The results are presented in [Appendix A](#). Great South Road to the south of Gatland Road is currently carrying up to 1350 vehicles/hour (vph) in the peak periods, which indicates a daily flow of about 13,000 vehicles/day (vpd).

Currently the only bus service operating along this section of Great South Road is the 376 service between Drury and Papakura Station, which operates every 30 minutes during the morning and afternoon peak periods and hourly through the middle of the day.

A summary of the crash records maintained by the New Zealand Transport Agency for the period 2014-2018 is included in [Appendix B](#). This shows that there have been two reported crashes on Great South Road during that period between Gatland Road and Parkhaven Drive (south), both involving single vehicles losing control. There have been no reported accidents at the intersections with Gatland Road and Parkhaven Drive (south) during that period. This indicates that the road network is generally operating safely, as are all existing vehicle crossings that serve frontage sites along this section of Great South Road. No crashes have been reported involving vehicles turning right out of Gatland Road, despite the restricted sight lines shown in [Figure 6](#).



### 3. Future Development

A potential future development layout is shown in **Figure 7**.



**B&A**

Level 4 Old South British Building  
3-13 Shortland Street, Auckland  
www.barker.co.nz

**INDICATIVE MASTERPLAN**  
520 Great South Road  
B&A Ref # 17104

Scale: NTS  
Drawn by: CW  
Date: 06/06/2019

**Figure 7**  
**Potential development**

The site has capacity to accommodate a total of 113 lots that will vary in size from 180 m<sup>2</sup> to over 350 m<sup>2</sup>. The lots on both 520 and 522 Great South Road will have their main access from the Great South Road frontage, whilst the lots on 21 Gatland Road will also gain access from Gatland Road.

The plan also shows a paper road that runs along the western side of the Cemetery, and construction of this road will form part of the development of this property.



### 3.1 General accessibility of the site

As discussed earlier in Section 2, residential development on the site would have direct access to Great South Road, which is a key arterial road that links with Drury to the south and Papakura to the north, providing easy and direct access to these commercial centres. Both of these centres offer opportunities for employment, shopping and other services on a local basis. For those residents who need to travel further afield, Great South Road provides direct connections with the Southern Motorway and the wider transport network through the Drury and Papakura Interchanges.

In relation to the Drury-Opaheke Structure Plan referred to earlier in [Figure 2](#), the draft Integrated Transport Assessment<sup>1</sup> (ITA) for the Structure Plan sets out in detail the transport related aspects of the area, and it is considered that the current rezoning proposal is generally in line with the Structure Plan insofar as transportation matters are concerned.

The Great South Road route between Drury and Papakura is served by one bus service (376) that operates every 30 minutes during the morning and afternoon peak periods and hourly through the day. Hourly services operate at weekends. This section of Great South Road is however identified in the ITA as forming part of the future Bus Frequent Transport Network, and so bus services can be expected to increase in the future.

### 3.2 Access considerations

The site has direct access to Great South Road, which represents the obvious choice for establishing a main access to the site.

Along the southern boundary of the property there is a “paper” road that is currently unformed that runs between Great South Road and the end of Gatland Road which could provide an alternative access to the site. Consideration was therefore given to creating a new intersection at this location to serve the proposed subdivision. The paper road connects with Great South Road some 40 metres to the north of Parkhaven Drive, and a new intersection would result in back-to-back right turn pockets which is not an ideal arrangement in terms of potential conflict between opposing vehicles. It was therefore concluded that a new intersection some 170 metres to the north of Parkhaven Drive would be a preferred location, where sight distances are very good (see [Figures 4 and 5](#)).

As discussed later in Section 4, the traffic modelling for this intersection indicates that a simple Give Way controlled T-intersection without any road widening along Great South Road would be able to accommodate the turning movements that are predicted for full development of the site. However, given the importance of Great South Road as a main Arterial road, it is considered that a preferred approach would be to provide some widening along the Great South Road frontage in order to accommodate a painted flush median and right turn pocket, similar to that at the Parkhaven Drive intersection just to the south. This would minimise any potential impact that traffic slowing and stopping to turn right into the subdivision might have on following northbound traffic.

Also, with the formation of the paper road along the western side of the Cemetery, this new intersection could provide an alternative route to the Cemetery and other residential property along Gatland Road.

<sup>1</sup> Supporting Growth - Drury-Opaheke and Pukekohe-Paerata Structure Plan - Draft Integrated Transport Assessment - 2 April 2019

As noted earlier, the sight distance to the south for traffic turning right out of Gatland Road is restricted, and the new intersection would provide a safe alternative.

**Figure 8** shows a concept layout for this new intersection, subject to detailed location and design as part of a future resource consent. It is recommended that some road widening of Great South Road is included to enable the provision of a painted flush median and right turn pocket, similar to the current intersection at Parkhaven Drive.



**Figure 8**  
**Proposed intersection on Great South Road - concept layout**

### 3.3 Traffic generation predictions

The traffic generation rates for different lot sizes and types of residential development may vary but, for the purposes of this assessment, a trip rate of 0.8 vehicle movements per hour (vph) has been assumed for all lots during the AM and PM peak periods, and 0.5 vph per lot during the midday periods.

For the 113 lots envisaged, this equates to peak hour flows of about 90 vph, and off-peak flows of 57 vph. It is assumed that the traffic that is generated by the 19 lots on 21 Gatland Road would use the Gatland Road intersection, whilst the remainder would use the proposed new intersection on Great South Road. It is acknowledged that the formation of the paper road as discussed above would enable some flexibility in terms of which access route each lot could use.

The resulting traffic predictions have been added to the existing traffic flows recorded in the traffic surveys, and the results are shown in **Figure 9**. The new flows have been distributed at the intersections in the same proportions as the existing turning movements recorded at the Great South Road/Gatland Road intersection.



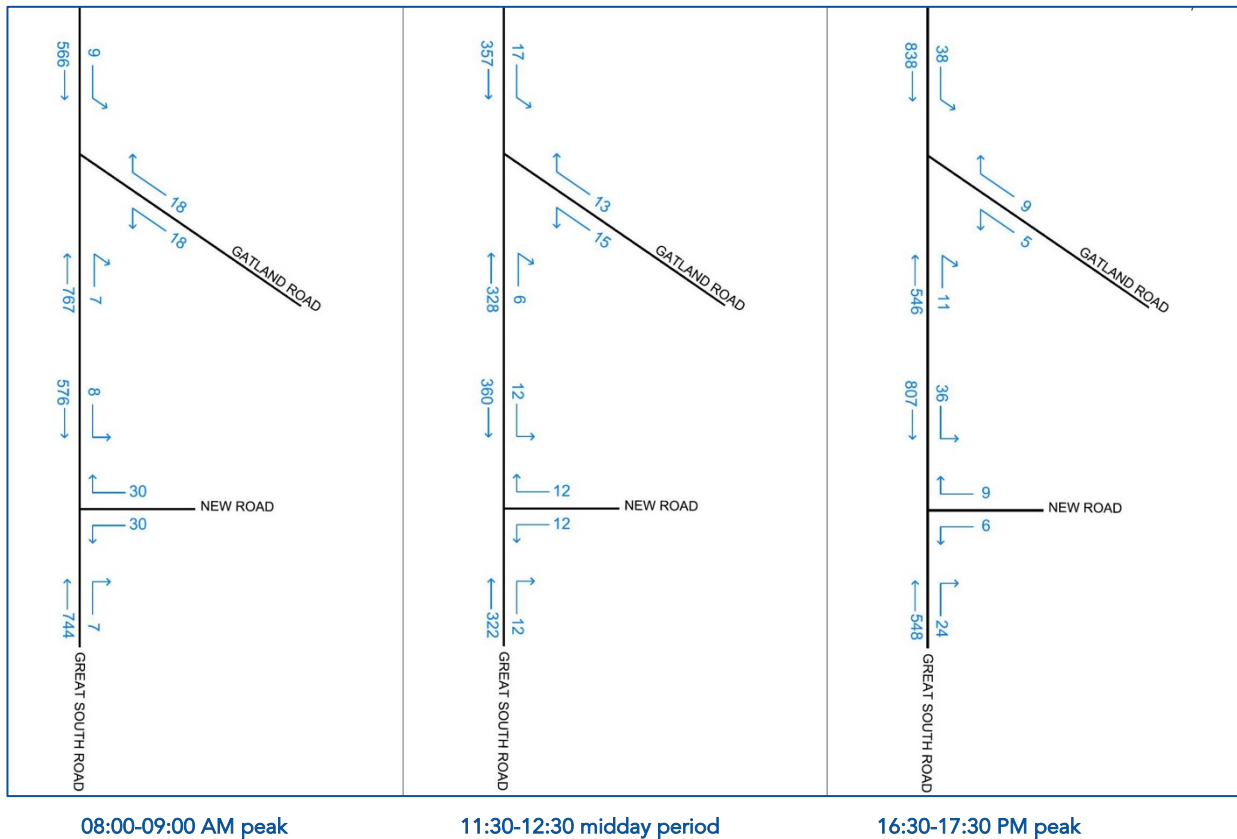


Figure 9  
 Predicted traffic flows from Masterplan development

## 4. Impacts of the rezoning

### 4.1 Effects on the transport environment

To test the likely effects of the generated traffic from a development of the site, a SIDRA-8 traffic model has been run for the proposed new intersection on Great South Road, and for the existing Gatland Road intersection with and without the development.

The models have been run for the AM peak hour (08:00-09:00), the midday period (11:30-12:30) and the PM peak hour (16:30-17:30). The results are presented in [Appendix C](#), and summarised in the following tables.

**Table 1** summarises the results for the new intersection during the three periods.

**Table 1**  
**Great South Road/Subdivision Road intersection**  
**SIDRA Results - existing 2019 flows plus development**

Movement	08:00-09:00 AM peak					11:30-12:30 midday period				
	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%
Gt South (S)										
through	783	0.429	0.1	A	1	339	0.196	0.1	A	1
right	7	0.429	10.7	B	1	13	0.196	7.3	A	1
Subdivision (E)										
left	32	0.037	8.2	A	1	13	0.011	6.9	A	0
right	32	0.158	22.1	C	3	13	0.021	9.3	A	1
Gt South (N)										
left	8	0.330	5.6	A	0	13	0.212	5.6	A	0
through	606	0.330	0	A	0	379	0.212	0	A	0
Intersection	1468	0.429	0.8			768	0.212	0.5		
	16:30-17:30 PM peak									
Movement	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%					
Gt South (S)										
through	577	0.352	1.0	A	6					
right	25	0.352	14.3	B	6					
Subdivision (E)										
left	6	0.011	10.3	B	0					
right	9	0.055	23.8	C	1					
Gt South (N)										
left	38	0.469	5.6	A	0					
through	849	0.469	0.1	A	0					
Intersection	1505	0.469	1.0							

The model results show that the new intersection will operate safely and efficiently during all periods, with minimal delay and queuing. As indicated earlier, it is proposed to provide a flush median and right turn pocket to assist right turn movements and to minimise any potential impact on through traffic along Great South Road.

**Tables 2, 3 and 4** summarise the model results for the existing Gatland Road intersection with and without the proposed development, for each of the three periods.

The results show that the existing intersection will continue to operate satisfactorily during all periods with the development, noting again the difficult right turn movement in terms of the restricted visibility towards the south. Apart from a small increase in delays to turning traffic, the overall effects will be less than minor.



**Table 2**  
**Great South Road/Gatland Road intersection: SIDRA Results - existing 2019 flows plus development – 08:00:09:00 AM peak**

Movement	existing					with development				
	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%
Gt South (S)										
through	776	0.424	0.1	A	1	807	0.441	0.1	A	1
right	6	0.424	10.4	B	1	7	0.441	10.7	B	1
Gatland (E)										
left	13	0.019	12.0	B	1	19	0.029	11.9	B	1
right	13	0.085	29.3	D	2	19	0.141	32.1	D	3
Gt South (N)										
left	7	0.320	5.7	A	0	9	0.325	5.7	A	0
through	587	0.320	0	A	0	596	0.325	0	A	0
Intersection	1402	0.424	0.5			1458	0.441	0.7		

**Table 3**  
**Great South Road/Gatland Road intersection: SIDRA Results - existing 2019 flows plus development – 11:30-12:30 period**

Movement	existing					with development				
	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%
Gt South (S)										
through	333	0.187	0	A	0	345	0.195	0.1	A	1
right	4	0.187	8.1	A	0	6	0.195	7.9	A	1
Gatland (E)										
left	13	0.016	11.2	B	1	16	0.019	11.0	B	1
right	12	0.023	12.2	B	1	14	0.028	12.5	B	1
Gt South (N)										
left	15	0.204	5.6	A	0	18	0.212	5.6	A	0
through	363	0.204	0	A	0	376	0.212	0	A	0
Intersection	739	0.204	0.6			775	0.212	0.7		

**Table 4**  
**Great South Road/Gatland Road intersection: SIDRA Results - existing 2019 flows plus development – 16:30-17:30 PM peak**

Movement	existing					with development				
	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%	Flow (vph)	Degree of saturation	Av delay secs/veh	LOS	Q 95%
Gt South (S)										
through	565	0.316	0.3	A	2	575	0.328	0.5	A	3
right	8	0.316	13.8	B	2	12	0.328	15.0	B	3
Gatland (E)										
left	4	0.010	14.5	B	0	5	0.013	15.3	C	0
right	7	0.057	32.4	D	1	9	0.085	36.6	E	2
Gt South (N)										
left	31	0.464	5.7	A	0	40	0.488	5.7	A	0
through	844	0.464	0.1	A	0	882	0.488	0.1	A	0
Intersection	1460	0.464	0.6			1523	0.488	0.8		

## 4.2 Safety impacts

As noted above, the sight lines at the proposed new intersection are good in both directions, and the provision of a high standard of intersection with painted flush median and right turn pocket on Great South Road will result in a safe and efficient traffic environment in terms of access to the site. The inter-visibility between vehicles turning at the intersection and any passing pedestrians will be good, and there should be no detrimental effect on the safety of any pedestrians walking along Great South Road.

The small amount of additional traffic that will be using the Gatland Road intersection will have minimal effect on the continuing safe operation of the intersection, acknowledging the restricted visibility to the south.

Overall it is considered that the proposed rezoning will be able to operate safely and efficiently with minimal impact on other traffic or on pedestrian movements.

## 4.3 Effects on neighbouring properties

All of the land in the immediate vicinity of the site is generally residential in nature, and the proposed rezoning for residential development is in keeping with the existing environment from an overall transportation point of view. Provided safe access is established as discussed in this report, the small amounts of additional traffic that will be generated by the development will have minimal effect on the existing traffic environment along Great South Road.

# 5. Auckland Unitary Plan assessment

## 5.1 Section E27 – Objectives and Policies

*Section E27.2 Objectives* includes the following:

- (1) *Land use and all modes of transport are integrated in a manner that enables:*
  - (a) *the benefits of an integrated transport network to be realised; and*
  - (b) *the adverse effects of traffic generation on the transport network to be managed.*

Great South Road is currently served by bus service 376 between Drury and Papakura Station. Great South Road provides a strong arterial link between the two Centres, making it appropriate for increased services along this route to be provided in the future in line with the Council's aspirations set out in the ITA for the Structure Plan. In this regard, the proposed residential rezoning is suitably located on this arterial link.

As demonstrated in this report, any adverse effects of generated traffic on the transport network can be mitigated through the provision of a high standard of intersection on Great South Road.



**Section E27.3 Policies** includes the following:

- (1) *Require subdivision, use and development which:*
  - (a) *generate trips resulting in potentially more than minor adverse effects on the safe, efficient and effective operation of the transport network;*
  - (b) *are proposed outside of the following zones:*
    - (i) *the Business – City Centre Zone, Business – Metropolitan Centre Zone, Business – Town Centre Zone;*
    - (ii) *Residential – Terrace Housing and Apartment Buildings Zone;*
    - (iii) *the Centre Fringe Office Control as shown on the planning maps; or*
  - (c) *do not already require an integrated transport assessment or have been approved based on an integrated transport assessment*

*to manage adverse effects on and integrate with the transport network by measures such as travel planning, providing alternatives to private vehicle trips, staging development or undertaking improvements to the local transport network.*

The rezoning would enable a relatively small residential development potentially containing 113 lots of varying sizes, predicted to generate up to some 90 vehicle/movements in the peak hours. The assessment contained in this report is considered to be appropriate for such a scale of development. Any potential minor adverse effects will be managed and mitigated through the provision of a high standard of access on Great South Road.

## 5.2 Section E27 - Transport rules

**Section E27.6 Standards** sets out the transport related standards for development. Compliance with these standards would be assessed as part of any future resource consent application.

The property is to gain access directly from Great South Road in the future, which is an Arterial road on the planning maps. Resource consent is required for any new access on an Arterial road, and the effects will need to be assessed in detail at that time.

## 5.3 Section E27.8.2 - Assessment criteria

Again, these assessment criteria will need to be considered at the time of a future resource consent application. Notwithstanding that, this report demonstrates that access can be provided safely and efficiently from Great South Road.

## 6. Conclusions

The proposal is to rezone the properties at 520/522 Great South Road and 21 Gatland Road to enable a residential development of these sites.

The site is located on a main Arterial road that provides direct access to Papakura to the north and Drury to the south, providing convenient access to both Centres via all modes of transport. The site lies within the Drury-Opaheke Structure Plan area, and the proposal is generally consistent with the transport initiatives set out in the Supporting Growth ITA.

A new intersection to serve the development would be required on Great South Road more or less midway along the site's frontage, and this will provide safe and easy access to the site whilst minimising any potential impact on the transport environment along this section of Great South Road.

It is concluded that the proposal is acceptable from an overall transportation point of view, and that the effects on the existing transport environment will be less than minor.



John Burgess  
Director



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## **APPENDIX A**

*Great South Road/Gatland Road intersection  
Existing traffic flows – March 2019*

Great South Road/Gatland Road, Papakura  
 Traffic survey - Thursday 21 March 2019

Time	Great South Road (S)								Gatland Road (E)								Great South Road (N)							
	Through northbound				Right				Left				Right				Left				Through southbound			
	Cars	Trucks	Bus	Cycles	Cars	Trucks	Bus	Cycles	Cars	Trucks	Bus	Cycles	Cars	Trucks	Bus	Cycles	Cars	Trucks	Bus	Cycles	Cars	Trucks	Bus	Cycles
7:00	173	10	0	0	1	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	87	9	0	0
7:15	175	12	2	1	3	0	0	0	0	0	0	0	3	0	0	0	1	0	0	0	91	10	0	0
7:30	201	12	0	0	1	0	0	0	1	0	0	0	2	0	0	0	0	0	0	0	112	16	1	0
7:45	172	14	2	0	1	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	93	9	1	0
8:00	181	15	1	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	120	7	1	0
8:15	185	16	1	2	1	0	0	0	3	1	0	0	3	0	0	0	1	1	0	0	147	11	1	0
8:30	163	14	2	1	2	0	0	0	2	0	0	0	6	0	0	0	3	0	0	0	145	10	1	0
8:45	154	4	1	0	3	0	0	0	3	0	0	0	3	0	0	0	1	0	0	0	106	9	0	0
08:00-09:00	683	49	5	3	6	0	0	0	11	1	0	0	12	0	0	0	6	1	0	0	518	37	3	0
11:00	77	11	0	0	1	1	0	0	0	0	0	0	3	1	0	0	2	0	0	0	71	7	0	0
11:15	81	7	0	0	1	2	0	0	1	0	0	0	1	0	0	0	3	0	0	0	75	8	1	0
11:30	71	7	1	0	0	0	0	0	3	0	0	0	2	0	0	0	3	0	0	0	70	9	0	0
11:45	68	6	0	0	1	0	0	0	0	0	0	0	3	0	0	0	6	0	0	0	82	6	0	1
12:00	72	10	0	0	1	0	0	0	5	2	0	0	2	0	0	0	2	0	0	0	85	4	0	0
12:15	72	9	0	0	1	1	0	0	1	1	0	0	4	0	0	0	3	0	0	0	80	8	1	0
12:30	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	1	0	0	0	79	7	1	0
12:45	89	5	1	0	1	0	0	0	2	0	0	0	3	0	0	0	3	0	0	0	99	8	0	0
11:30-12:00	283	32	1	0	3	1	0	0	9	3	0	0	11	0	0	0	14	0	0	0	317	27	1	1
16:00	95	6	1	0	0	0	0	0	1	1	0	0	0	0	0	0	5	0	0	0	170	5	2	1
16:15	94	2	0	0	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0	0	187	10	1	1
16:30	124	8	2	1	1	0	0	0	2	0	0	0	2	0	0	0	9	1	0	0	164	7	1	0
16:45	108	6	1	0	4	0	0	0	1	0	0	0	0	0	0	0	4	1	0	0	201	11	1	0
17:00	130	7	0	0	2	0	0	0	0	0	0	0	0	0	0	0	8	0	0	0	186	8	1	0
17:15	141	9	1	0	1	0	0	0	1	0	0	0	5	0	0	0	6	0	0	0	213	9	0	0
17:30	121	10	0	0	0	0	0	0	1	0	0	0	4	0	0	0	2	0	0	0	184	3	1	0
17:45	124	5	1	0	1	0	0	0	0	0	0	0	2	0	0	0	8	0	0	0	137	5	0	0
16:30-17:30	503	30	4	1	8	0	0	0	4	0	0	0	7	0	0	0	27	2	0	0	764	35	3	0

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**APPENDIX B**

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*New Zealand Transport Agency safety records: 2014-2018*



## 5 year crash

### Saved sites

18538 - 520 Great South Road

### Crash year

2014 — 2019

## Plain English report

9 results from your query.

1-9 of 9

Crash road	Distance	Direction	Side road	ID	Date	Day of week	Time	Description of events	Crash factors	Surface condition	Natural light	Weather	Junction	Control	Crash count fatal	Crash count severe	Crash count minor
<b>GREAT SOUTH ROAD</b>	230m	N		<a href="#">201817190</a>	23/08/2018	Thu	08:50	Van1 NDB on GREAT SOUTH ROAD, ROSEHILL, AUCKLAND hit rear end of Truck2 stop/slow for queue	VAN1, following too closely, other inappropriate speed TRUCK2, alcohol test below limit, suddenly braked	Wet	Overcast	Mist or Fog	Nil (Default)	Unknown	0	0	1
<b>GREAT SOUTH ROAD</b>	100m	N	GATLAND ROAD	<a href="#">201713219</a>	25/04/2017	Tue	16:28	Car/Wagon1 NDB on Great South Road, Papakura overtaking Cyclist2 (Age 44)	CAR/WAGON1, other attention diverted, ENV: dazzling sun	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	1	0
<b>GREAT SOUTH ROAD</b>	330m	S	GATLAND ROAD	<a href="#">201517637</a>	10/10/2015	Sat	10:25	Car/Wagon1 SDB on GREAT SOUTH ROAD lost control; went off road to left, Car/Wagon1 hit poles	CAR/WAGON1, alcohol test above limit or test refused, other fatigue	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	1
<b>GREAT SOUTH ROAD</b>	500m	S	GATLAND ROAD	<a href="#">201432187</a>	17/02/2014	Mon	21:10	Car/Wagon1 SDB on GREAT SOUTH ROAD lost control turning right, Car/Wagon1 hit cliffs	CAR/WAGON1, alcohol suspected, speed entering corner/curve	Dry	Dark	Fine	Nil (Default)	Nil	0	0	0
<b>GREAT SOUTH ROAD</b>		I	GATLAND ROAD	<a href="#">201435113</a>	06/03/2014	Thu	06:45	Bus1 NDB on GREAT SOUTH ROAD hit rear end of Car/Wagon2 stopped/moving slowly	BUS1, following too closely CAR/WAGON2, emotionally upset/road rage, suddenly braked	Dry	Overcast	Fine	T Junction	Nil	0	0	0
<b>GREAT SOUTH ROAD</b>	70m	N	GATLAND ROAD	<a href="#">201718430</a>	23/09/2017	Sat	10:30	Car/Wagon1 NDB on Great south road, papakura hit SUV2 headon on straight	CAR/WAGON1, fatigue due to long day (working/recreation), too far right	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	3
<b>GREAT SOUTH ROAD</b>	50m	S	PARK ESTATE ROAD	<a href="#">201617871</a>	15/11/2016	Tue	15:00	Car/Wagon1 SDB on Great south road hit parked veh, Car/Wagon1 hit parked vehicle	CAR/WAGON1, medical illness (not sudden)	Dry	Overcast	Fine	Nil (Default)	Unknown	0	0	1
<b>GREAT SOUTH ROAD</b>	40m	S	PARK ESTATE ROAD	<a href="#">201817195</a>	23/08/2018	Thu	06:00	Car/Wagon1 NDB on GREAT SOUTH ROAD, OPAHEKE, AUCKLAND lost control; went off road to left, Car/Wagon1 hit parked vehicle	CAR/WAGON1, alcohol test below limit, speed on straight, too far left	Wet	Dark	Light rain	Nil (Default)	Unknown	0	0	1
<b>GREAT SOUTH ROAD</b>	80m	S	PARKHAVEN DRIVE	<a href="#">201835354</a>	25/03/2018	Sun	16:00	Car/Wagon1 NDB on Great south road, papakura hit rear end of SUV2 stop/slow for queue	CAR/WAGON1, alcohol test below limit, speed on straight SUV2, alcohol test below limit, suddenly braked	Dry	Bright sun	Fine	Nil (Default)	Unknown	0	0	0

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## **APPENDIX C**

*SIDRA-8 model results*

# MOVEMENT SUMMARY

▽ Site: 101 [AM proposed]

Gt South Road - Subdivision Road  
 Site Category: (None)  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	783	7.3	0.429	0.1	LOS A	0.2	1.3	0.02	0.01	0.03	59.8
3	R2	7	0.0	0.429	10.7	LOS B	0.2	1.3	0.02	0.01	0.03	57.9
Approach		791	7.2	0.429	0.2	NA	0.2	1.3	0.02	0.01	0.03	59.8
East: Subdivision (E)												
4	L2	32	0.0	0.037	8.2	LOS A	0.1	0.9	0.53	0.71	0.53	51.6
6	R2	32	0.0	0.158	22.1	LOS C	0.5	3.2	0.87	0.95	0.88	42.8
Approach		63	0.0	0.158	15.2	LOS C	0.5	3.2	0.70	0.83	0.70	46.8
North: Gt South (N)												
7	L2	8	0.0	0.330	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	58.2
8	T1	606	7.1	0.330	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		615	7.0	0.330	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1468	6.8	0.429	0.8	NA	0.5	3.2	0.04	0.04	0.05	59.1

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [MID proposed]

Gt South Road - Subdivision Road  
 Site Category: (None)  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	339	10.6	0.196	0.1	LOS A	0.1	1.0	0.05	0.02	0.05	59.6
3	R2	13	0.0	0.196	7.3	LOS A	0.1	1.0	0.05	0.02	0.05	57.7
Approach		352	10.2	0.196	0.4	NA	0.1	1.0	0.05	0.02	0.05	59.5
East: Subdivision (E)												
4	L2	13	0.0	0.011	6.9	LOS A	0.0	0.3	0.41	0.59	0.41	52.3
6	R2	13	0.0	0.021	9.3	LOS A	0.1	0.5	0.54	0.75	0.54	50.3
Approach		25	0.0	0.021	8.1	LOS A	0.1	0.5	0.48	0.67	0.48	51.3
North: Gt South (N)												
7	L2	13	0.0	0.212	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.1
8	T1	379	8.6	0.212	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach		392	8.3	0.212	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		768	8.9	0.212	0.5	NA	0.1	1.0	0.04	0.04	0.04	59.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [PM proposed]

Gt South Road - Subdivision Road  
 Site Category: (None)  
 Giveway / Yield (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	577	6.2	0.352	1.0	LOS A	0.9	6.3	0.14	0.03	0.19	58.5
3	R2	25	0.0	0.352	14.3	LOS B	0.9	6.3	0.14	0.03	0.19	56.7
Approach		602	5.9	0.352	1.5	NA	0.9	6.3	0.14	0.03	0.19	58.4
East: Subdivision (E)												
4	L2	6	0.0	0.011	10.3	LOS B	0.0	0.3	0.65	0.75	0.65	50.1
6	R2	9	0.0	0.055	23.8	LOS C	0.2	1.1	0.87	0.95	0.87	41.9
Approach		16	0.0	0.055	18.4	LOS C	0.2	1.1	0.78	0.87	0.78	44.8
North: Gt South (N)												
7	L2	38	0.0	0.469	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	58.0
8	T1	849	4.7	0.469	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		887	4.5	0.469	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
All Vehicles		1505	5.0	0.469	1.0	NA	0.9	6.3	0.06	0.04	0.08	58.9

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [AM existing]

Gt South Road - Gatland Road intersection  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	776	7.3	0.424	0.1	LOS A	0.1	1.1	0.02	0.00	0.03	59.8
3	R2	6	0.0	0.424	10.4	LOS B	0.1	1.1	0.02	0.00	0.03	57.9
Approach		782	7.3	0.424	0.2	NA	0.1	1.1	0.02	0.00	0.03	59.8
East: Gatland (E)												
4	L2	13	8.3	0.019	12.0	LOS B	0.1	0.5	0.55	0.90	0.55	49.6
6	R2	13	0.0	0.085	29.3	LOS D	0.2	1.7	0.88	1.00	0.88	40.1
Approach		25	4.2	0.085	20.7	LOS C	0.2	1.7	0.72	0.95	0.72	44.4
North: Gt South (N)												
7	L2	7	14.3	0.320	5.7	LOS A	0.0	0.0	0.00	0.01	0.00	57.5
8	T1	587	7.2	0.320	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach		595	7.3	0.320	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1402	7.2	0.424	0.5	NA	0.2	1.7	0.02	0.02	0.03	59.4

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [MID existing]

Gt South Road - Gatland Road intersection

Site Category: (None)

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	333	10.4	0.187	0.0	LOS A	0.1	0.4	0.02	0.01	0.02	59.9
3	R2	4	25.0	0.187	8.1	LOS A	0.1	0.4	0.02	0.01	0.02	56.7
Approach		337	10.6	0.187	0.1	NA	0.1	0.4	0.02	0.01	0.02	59.8
East: Gatland (E)												
4	L2	13	25.0	0.016	11.2	LOS B	0.1	0.5	0.45	0.87	0.45	49.9
6	R2	12	0.0	0.023	12.2	LOS B	0.1	0.5	0.57	0.94	0.57	49.1
Approach		24	13.0	0.023	11.7	LOS B	0.1	0.5	0.51	0.90	0.51	49.5
North: Gt South (N)												
7	L2	15	0.0	0.204	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	58.1
8	T1	363	8.1	0.204	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		378	7.8	0.204	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles		739	9.3	0.204	0.6	NA	0.1	0.5	0.02	0.04	0.02	59.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [PM existing]

Gt South Road - Gatland Road intersection  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	565	6.3	0.316	0.3	LOS A	0.3	2.0	0.05	0.01	0.06	59.5
3	R2	8	0.0	0.316	13.8	LOS B	0.3	2.0	0.05	0.01	0.06	57.6
Approach		574	6.2	0.316	0.5	NA	0.3	2.0	0.05	0.01	0.06	59.5
East: Gatland (E)												
4	L2	4	0.0	0.010	14.5	LOS B	0.0	0.2	0.69	0.90	0.69	48.3
6	R2	7	0.0	0.057	32.4	LOS D	0.2	1.1	0.90	1.00	0.90	38.8
Approach		12	0.0	0.057	25.9	LOS D	0.2	1.1	0.82	0.96	0.82	41.8
North: Gt South (N)												
7	L2	31	6.9	0.464	5.7	LOS A	0.0	0.0	0.00	0.02	0.00	57.7
8	T1	844	4.7	0.464	0.1	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		875	4.8	0.464	0.3	NA	0.0	0.0	0.00	0.02	0.00	59.6
All Vehicles		1460	5.3	0.464	0.6	NA	0.3	2.0	0.03	0.02	0.03	59.3

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [AM proposed]**

Gt South Road - Gatland Road intersection

Site Category: (None)

Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	807	7.0	0.441	0.1	LOS A	0.2	1.4	0.02	0.01	0.03	59.8
3	R2	7	0.0	0.441	10.7	LOS B	0.2	1.4	0.02	0.01	0.03	57.9
Approach		815	7.0	0.441	0.2	NA	0.2	1.4	0.02	0.01	0.03	59.8
East: Gatland (E)												
4	L2	19	5.6	0.029	11.9	LOS B	0.1	0.7	0.55	0.92	0.55	49.7
6	R2	19	0.0	0.141	32.1	LOS D	0.4	2.7	0.90	1.00	0.90	38.9
Approach		38	2.8	0.141	22.0	LOS C	0.4	2.7	0.73	0.96	0.73	43.7
North: Gt South (N)												
7	L2	9	11.1	0.325	5.7	LOS A	0.0	0.0	0.00	0.01	0.00	57.7
8	T1	596	7.1	0.325	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach		605	7.1	0.325	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles		1458	6.9	0.441	0.7	NA	0.4	2.7	0.03	0.03	0.04	59.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [MID proposed]

Gt South Road - Gatland Road intersection  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	of Queue Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	345	10.1	0.195	0.1	LOS A	0.1	0.6	0.03	0.01	0.03	59.8
3	R2	6	16.7	0.195	7.9	LOS A	0.1	0.6	0.03	0.01	0.03	57.0
Approach		352	10.2	0.195	0.2	NA	0.1	0.6	0.03	0.01	0.03	59.7
East: Gatland (E)												
4	L2	16	20.0	0.019	11.0	LOS B	0.1	0.6	0.45	0.88	0.45	50.1
6	R2	14	0.0	0.028	12.5	LOS B	0.1	0.6	0.59	0.95	0.59	48.9
Approach		29	10.7	0.028	11.7	LOS B	0.1	0.6	0.52	0.91	0.52	49.5
North: Gt South (N)												
7	L2	18	0.0	0.212	5.6	LOS A	0.0	0.0	0.00	0.03	0.00	58.1
8	T1	376	7.8	0.212	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		394	7.5	0.212	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.6
All Vehicles		775	8.8	0.212	0.7	NA	0.1	0.6	0.03	0.05	0.03	59.2

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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 [PM proposed]**

Gt South Road - Gatland Road intersection  
 Site Category: (None)  
 Stop (Two-Way)

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total Flows veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Gt South (S)												
2	T1	575	6.2	0.328	0.5	LOS A	0.4	3.1	0.07	0.01	0.09	59.2
3	R2	12	0.0	0.328	15.0	LOS B	0.4	3.1	0.07	0.01	0.09	57.3
Approach		586	6.1	0.328	0.8	NA	0.4	3.1	0.07	0.01	0.09	59.2
East: Gatland (E)												
4	L2	5	0.0	0.013	15.3	LOS C	0.0	0.3	0.72	0.93	0.72	47.9
6	R2	9	0.0	0.085	36.6	LOS E	0.2	1.6	0.91	1.00	0.91	37.2
Approach		15	0.0	0.085	29.0	LOS D	0.2	1.6	0.84	0.98	0.84	40.4
North: Gt South (N)												
7	L2	40	5.3	0.488	5.7	LOS A	0.0	0.0	0.00	0.03	0.00	57.7
8	T1	882	4.5	0.488	0.1	LOS A	0.0	0.0	0.00	0.03	0.00	59.6
Approach		922	4.6	0.488	0.3	NA	0.0	0.0	0.00	0.03	0.00	59.5
All Vehicles		1523	5.1	0.488	0.8	NA	0.4	3.1	0.04	0.03	0.04	59.1

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.

SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.

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

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