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Gore District Plan Review

Traffic Assessment Report – General Industrial Zones

28th June, 2023



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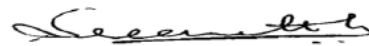
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Revision Details

Revision	Details
1.0	GDC Plan Change – Initial assessment based on proposed area of development
2.0	Areas for assessment revised
3.0	Changes in draft report, advised for Mataura Development plan

Disclaimers and Limitations

This report ('**Report**') has been prepared by WSP exclusively for Gore District Council in relation to Traffic Assessment of the proposed Gore District Subdivision ('**Purpose**') and in accordance with the Offer of Service letter and Short Form Agreement with the Client dated 12th August 2022 and subsequent change of scope in email dated 4th April 2023. The findings in this Report are based on and are subject to the assumptions specified in the Report and the designs and design report information provided. WSP accepts no liability whatsoever for any reliance on or use of this Report, in whole or in part, for any use or purpose other than the Purpose or any use or reliance on the Report by any third party.



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Abbreviations

ADT	Average Daily Traffic
CAS	Crash Analysis System
EBD	Eastbound
FTE	Full Time Equivalent
GDC	Gore District Council
HCV	Heavy Commercial Vehicle
LOS	Level of Service
NBD	Northbound
ODP	Outline Development Plan
ONF	One Network Framework
SBD	Southbound
SH#	State Highway
VKT	Vehicle kilometres travelled
vpd	Vehicle per day
vph	Vehicle per hour
WBD	Westbound

1 Overview

Gore District Council (GDC) is in the process of reviewing their District Plan. The objective of this review is to give effect to changes in regulation, align with national frameworks, and refine the vision for the district. The ten yearly review is a requirement of the Resource Management Act (RMA) 1991, with the current District Plan being made operative in August 2014.

In August 2022, GDC sought community feedback on the draft District Plan. The Council is now in the process of preparing a proposed District Plan for public consultation.

Specific to this report, the draft Plan proposes to rezone land in **South Gore** from 'Rural' to 'General Industrial' and in **South Mataura** from 'Rural' to a 'Rural Industry Precinct'. The Council is in the process of developing Outline Development Plans (ODP) for the two locations. Through the ODP process, GDC will determine the roading connectivity through the development areas and the surrounding roading network with a view to enable staged development outcomes.

As the proposal will change travel behaviours within and to the sites, including interactions with the state highway network, WSP New Zealand (WSP) has been commissioned to undertake an assessment of the traffic related impacts of the proposed rezoning.

In doing so, this Traffic Impact Assessment includes consideration of the following key matters:

- Details of the existing surrounding road network
- An overview of the transport related components of the proposal
- An estimate of the additional vehicular traffic anticipated to be generated by the new activity, and associated effect on the performance and safety of the surrounding road network, and
- High level design recommendations for the site roading network and access points.

By way of summary, it is considered that the traffic activity of the rezoning proposal will not give rise to safety and network efficiency effects that cannot be managed and/or mitigated appropriately.

2 Existing Transport Environment

2.1 South Gore

2.1.1 Site Location

The proposed development area in South Gore is shown in Figure 1 within the context of the wider area. The site is currently predominantly zoned as Rural under the operative District Plan, with the key amenities on the site being the Gore and Tapanui Racing Clubs, and the Silver Fern Farms Waitane processing unit (zoned as Industrial, under the operative District Plan).

Legend

-  Development Area
- District Plan Zones**
-  General Industrial Zone
 -  General Residential Zone
 -  General Rural Zone
 -  Large Lot Residential Zone
 -  Light Industrial Zone
 -  Local Centre Zone
 -  Medium Density Residential Zone
 -  Mixed Use Zone
 -  Neighbourhood Centre Zone
 -  Open Space Zone
 -  Rural Lifestyle Zone
 -  Settlement Zone
 -  Special Purpose Zone
 -  Sports and Active Recreation Zone
 -  Town Centre Zone

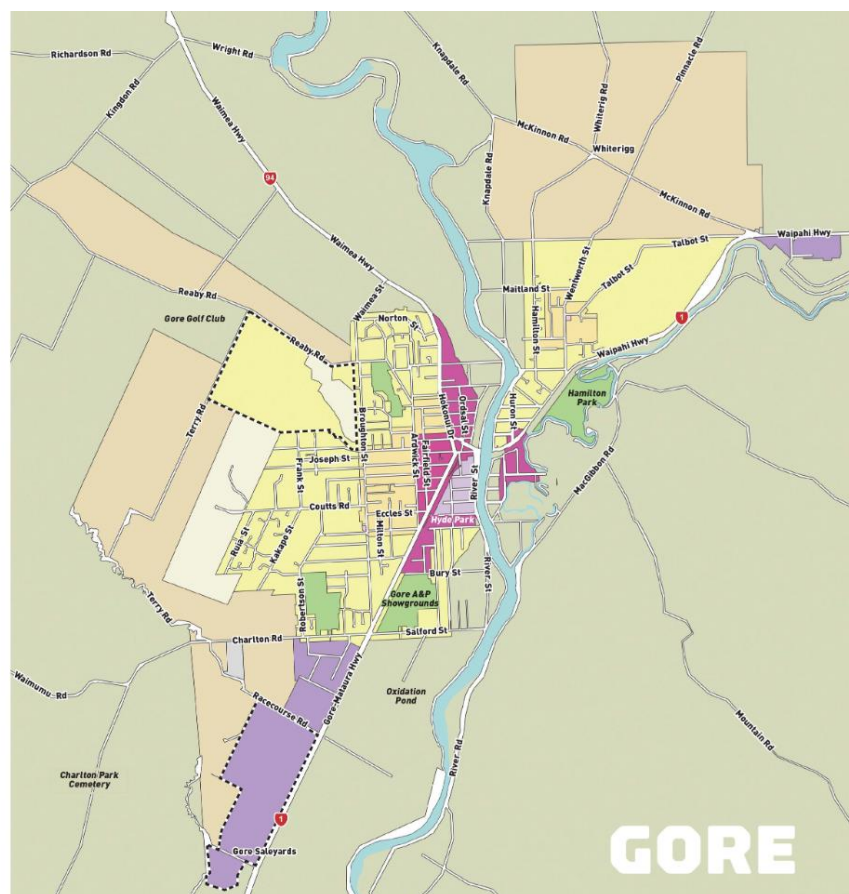


Figure 1: South Gore proposed development area¹

2.1.2 Road Network

The South Gore development area has frontages to, and is accessed from, the Gore-Mataura Highway (SH1), Racecourse Road, and Saleyard Road. Raceway Lane is the western boundary of the site but does not provide access to the site. The characteristics of each of the roads in the vicinity of the development area are given in Table 1.

¹ Gore District Council, 2022. *Draft District Plan Mapping – Gore zones*. Retrieved 14 June 2022 from bb47396db8cb5c7b1cfe1bea1a4a7c19_gore_maps_all_zones.jpg (3427*2480) (amazonaws.com).

Table 1: South Gore surrounding road characteristics^{2,3}

Characteristic	State Highway 1	Racecourse Road	Raceway Lane	Saleyard Road
Road Hierarchy (ONF ⁴)	Interregional Connectors	Peri-urban Roads	Peri-urban Roads	Rural Connectors
Average daily traffic	6,500 vpd ⁵ est. 23/12/2021	165 vpd est.23/05/2023	80 vpd est.23/05/2023	390 vpd est.23/05/2023
HCV ⁶ percentage	9%	21%	19%	21%
Sealed width	10 m (Two lanes, sealed shoulders)	6 m (Two lanes, unsealed shoulders)	3.7 m (No centre line)	4.7 m (No centre line)
Speed limit	100 km/h	70 km/h	70 km/h (unposted)	100 km/h (unposted)
Mean operating speed	95 km/h	50 km/h	38 km/h	37 km/h

2.1.3 Existing Traffic Generating Activities

The South Gore development area has three main existing land uses that generate traffic:

- Gore and Tapanui Racing Clubs**
 The Gore and Tapanui Racing Clubs occupy most of the space in the proposed development area. It is assumed the Racing Clubs do not generate significant traffic on regular days aside from members who would occasionally use the facility to train. However, traffic generation is assumed to increase and show outlier data on race days. The 2022 – 2023 racing calendar showed three race days at the Gore Racing Club – September 2022, October 2022, and January 2023.⁷
- Silver Fern Farms Waitane**
 The Silver Fern Farms Waitane manufacturing and processing plant is located at the southern end of the development area. In 2021 the site processed about 360,000 stock units (lamb and calves), or approximately 900 containers.⁸ Traffic generation will consist of supply trucks servicing the site throughout the day and employee trips. It is understood that employments movements are on a shift pattern with the site operating day shifts in November to June starting at 6am and 6:30am (lamb season), and two shifts in July to October starting at 6am and 12pm (calf season).⁹

² Data sourced from Mobile Road, 2023. <https://mobileroad.org/index.html> Retrieved 14 June 2023

³ Data sourced from Waka Kotahi NZ Transport Agency, 2023. *Mega Maps Road to Zero Edition 2. Mega Maps (nzta.govt.nz)* Retrieved 15 June 2023

⁴ ONF = One Network Framework

⁵ vpd = vehicles per day

⁶ HCV = Heavy commercial vehicle

⁷ Gallop South, 2021. *2022 – 2023 Racing Calendar*. Retrieved 14 June 2023 from [Race Dates & Events | Gallop South](#)

⁸ Otago Daily Times, 2021. *Waitane plant named meat company's site of the year in awards*. Retrieved 14 June 2023 from [Rural Life | Otago Daily Times Online News \(odt.co.nz\)](#)

⁹ Silver Fern Farms, 2022. *Team Members – Meat Processing*. Retrieved 14 June 2023 from [Job: Team Members - Meat Processing at Silver Fern Farms New Zealand \(joblum.com\)](#)

- **Residential properties and farmland**

There are approximately three residential dwellings in the development area. In accordance with *NZ Transport Agency research report 453*, the 85% percentile estimate for daily trips is 10.1 per rural dwelling, including 1.4 trips in the peak hour.¹⁰

2.1.4 Crash History

State Highway 1 in the vicinity of the South Gore development site has ratings of Medium for both collective and personal risk. This corridor is also identified as a High Benefit Speed Management Corridor.¹¹

A search of the Waka Kotahi NZ Transport Agency's (Waka Kotahi) Crash Analysis System (CAS) database was undertaken for the purposes of reviewing the crash history in the proximity of the South Gore development area. A ten-year period was searched for the local roads due to the low volumes (2013-2022) and a five-year period for SH1 (2018-2022). Any reported crashes for 2023 to date were also included.

A summary of the crash record is provided in Figure 2 and Table 2.

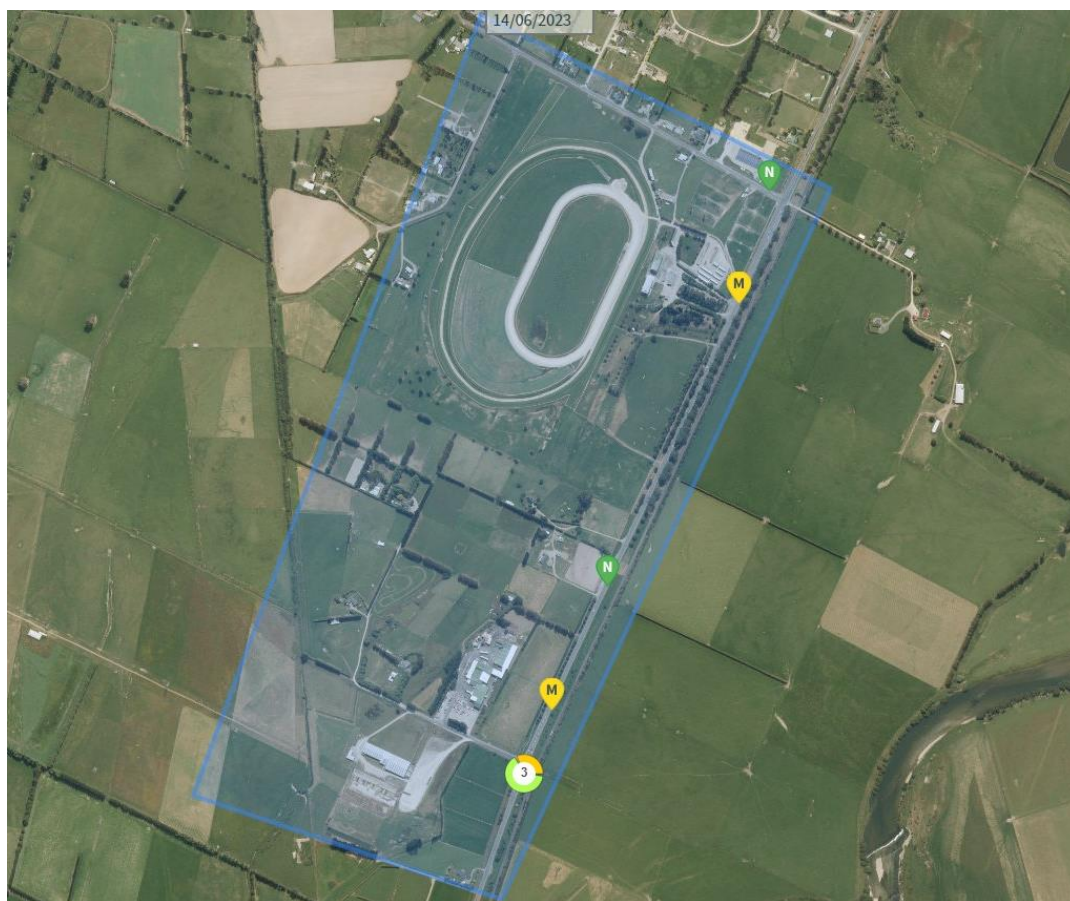


Figure 2: South Gore development area crash map¹²

¹⁰ Douglass, M and S Abley, 2011. *Trips and parking related to land use*, NZ Transport Agency research report 453. Retrieved 14 June 2023 from [Research Report 453. Trips and parking related to land use \(nzta.govt.nz\)](#)

¹¹ Data sourced from Waka Kotahi NZ Transport Agency, 2023. *MegaMaps Road to Zero Edition 2*. [MegaMaps \(nzta.govt.nz\)](#) Retrieved 15 June 2023

¹² Data extracted from Waka Kotahi CAS database on 14 June 2023

Table 2: South Gore development area crash summary¹³

Crash date	Location	Severity	Description
27/12/2019	SH1, approx. 400m north of Saleyard Road	Non-injury	Vehicle northbound on SH1 had a loss of control type event following a period of rain.
20/12/2020	SH1 at Racing Club access	Minor	Vehicle southbound on SH1 rear ended vehicle waiting to turn right into the access. Crash report noted heavy traffic encompassed with sports event as a road user factor.
08/07/2021	SH1 intersection with Saleyard Road	Non-injury	Vehicle northbound on SH1 hit a metal strut on the road that had fallen off another vehicle.
10/09/2021	SH1, approx. 150m north of Saleyard Road	Minor	Vehicle southbound on SH1 hit a pedestrian in dark conditions with low visibility. Crash report notes pedestrian was detained under MH act.
19/10/2021	Racecourse Road near SH1	Non-injury	Vehicle found in the roadside ditch. Crash report assumes vehicle has lost control.
05/02/2022	SH1, approx. 100m south of Saleyard Road	Non-injury	Vehicle northbound on SH1 had a loss of control type event. Crash report noted driver fatigue as a road user factor.
06/11/2022	SH1 intersection with Saleyard Road	Minor	Vehicle northbound on SH1 had a loss of control type event. Crash report noted driver medical episode as a road user factor.

Based on the reported crash history in proximity to the South Gore development area, there is a trend of loss of control type crashes. However, this is not unexpected for a rural state highway and each event had unique contributing factors that are not expected to be exacerbated by the proposal.

The minor injury crash that occurred at access to the Racing Club is of interest to this assessment. It is recommended that the development undertake suitable mitigation measures at this location. This may be in the form of closing this access to SH1 or upgrading the access to have a right turn bay / shoulder widening on SH1.

Overall, the crash record does not reveal underlying existing hazards that could not be appropriately managed through adherence with the Safe Systems in Design Philosophies, the Transit Planning Policy Manual, and the draft District Plan.

¹³ Data extracted from Waka Kotahi CAS database on 14 June 2023

2.2 South Mataura

2.2.1 Site Location

The proposed development area in South Mataura is shown in Figure 3 within the context of the wider area. The site is currently zoned as Rural under the operative District Plan, with predominantly farmland land use and minimal structural development.

Legend

--- Rural Industry Precinct

Proposed District Plan Zones

- General Industrial Zone
- General Residential Zone
- General Rural Zone
- Large Lot Residential
- Large Lot Residential
- Light Industrial Zone
- Local Centre Zone
- Medium Density Residential Zone
- Mixed Use Zone
- Neighbourhood Centre Zone
- Natural Open Space Zone
- Rural Lifestyle Zone
- Settlement Zone
- Special Purpose Zone
- Sports and Active Recreation Zone
- Town Centre Zone

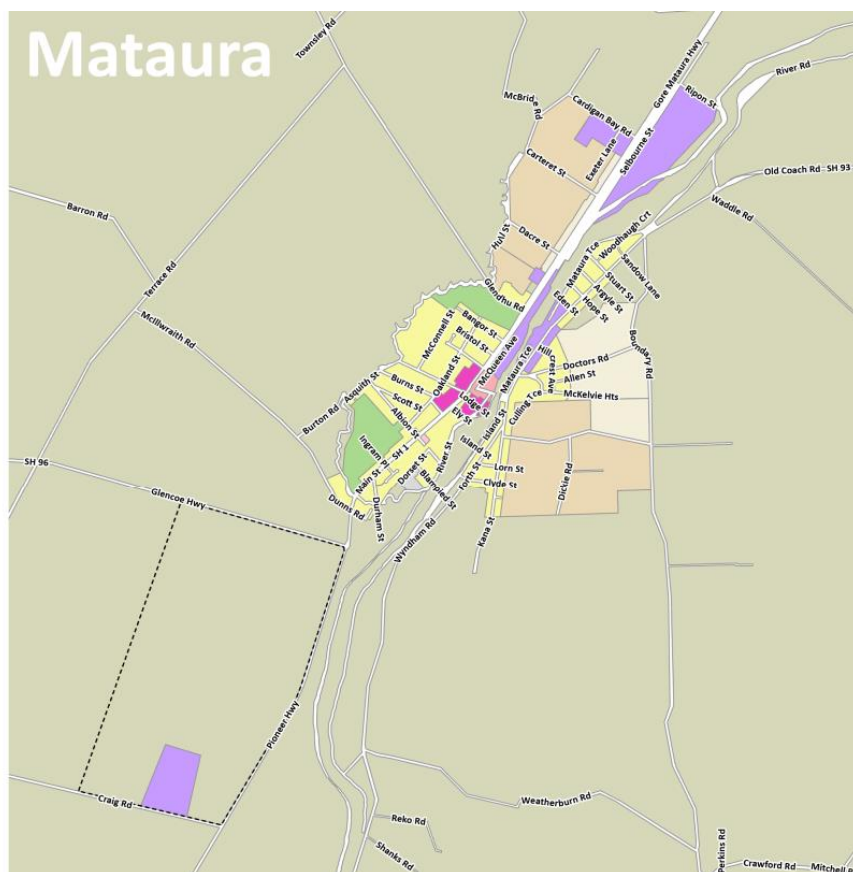


Figure 3: South Mataura proposed development area¹⁴

2.2.2 Road Network

The South Mataura development area has frontages to, and is accessed from, the Pioneer Highway (SH1), the Glencoe Highway (SH96), and Craig Road. The characteristics of each of the roads in the vicinity of the development area are given in Table 3.

¹⁴ Gore District Council, 2022. *Draft District Plan Mapping – Mataura zones*. Retrieved 14 June 2022 from b7576a8553a1e4c8524c030db986202d.Mataura_Map_all_zones.jpg (3427*2480) (amazonaws.com).

Table 3: South Mataura surrounding road characteristics^{15,16}

Characteristic	State Highway 1	State Highway 96	Craig Road
Road Hierarchy (ONF ¹⁷)	Interregional Connectors	Rural Connectors	Rural Roads
Average daily traffic	5,000 vpd ¹⁸ est. 23/12/2021	900 vpd est. 23/12/2021	90 vpd est. 23/05/2023
HCV ¹⁹ percentage	17%	17%	19%
Sealed width	10 m (Two lanes, sealed shoulders)	7 m (Two lanes, unsealed shoulders)	7.4 m (Two lanes, unsealed shoulders)
Speed limit	100 km/h	100 km/h	100 km/h (unposted)
Mean operating speed	96 km/h	94 km/h	51 km/h

2.2.1 Existing Traffic Generating Activities

Residential properties and farmland are assumed to be the main existing land uses in the South Mataura development area that generate traffic. There are approximately six residential dwellings in the development area. In accordance with *NZ Transport Agency research report 453*, the 85% percentile estimate for daily trips is 10.1 per rural dwelling, including 1.4 trips in the peak hour.²⁰

2.2.2 Crash History

State Highway 1 in the vicinity of the South Mataura development site has ratings of Medium and Low-Medium for collective and personal risk, respectively. This corridor is also identified as a High Benefit Speed Management Corridor. State Highway 96 has ratings of Low for both collective and personal risk.²¹

A search of the Waka Kotahi NZ Transport Agency's Crash Analysis System (CAS) database was undertaken for the purposes of reviewing the crash history in the proximity of the South Gore development area. A ten-year period was searched for the local roads due to the low volumes (2013-2022) and a five-year period for the state highways (2018-2022). Any reported crashes for 2023 to date were also included.

A summary of the crash record is provided in Figure 4 and Table 4.

¹⁵ Data sourced from MobileRoad, 2023. <https://mobileroad.org/index.html> Retrieved 14 June 2023

¹⁶ Data sourced from Waka Kotahi NZ Transport Agency, 2023. *MegaMaps Road to Zero Edition 2. MegaMaps (nzta.govt.nz)* Retrieved 15 June 2023

¹⁷ ONF = One Network Framework

¹⁸ vpd = Vehicles per day

¹⁹ HCV = Heavy commercial vehicle

²⁰ Douglass, M and S Abley, 2011. *Trips and parking related to land use*, NZ Transport Agency research report 453. Retrieved 14 June 2023 from [Research Report 453. Trips and parking related to land use \(nzta.govt.nz\)](#)

²¹ Data sourced from Waka Kotahi NZ Transport Agency, 2023. *MegaMaps Road to Zero Edition 2. MegaMaps (nzta.govt.nz)* Retrieved 15 June 2023

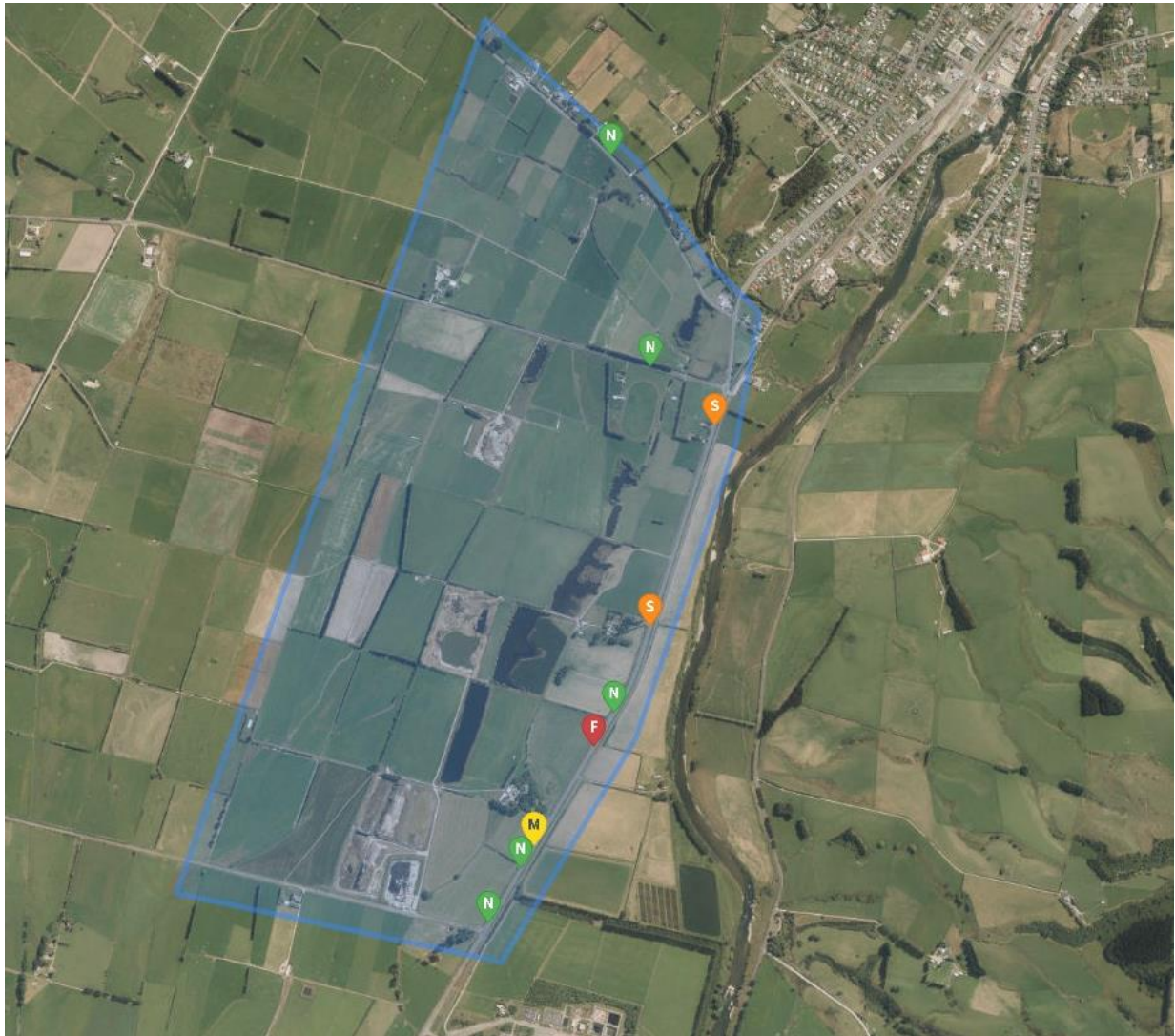


Figure 4: South Maitara development area crash map²²

Table 4: South Maitara development area crash summary²³

Crash date	Location	Severity	Description
28/04/2018	SH1, approx. 1km north of Craig Road	Non-injury	Vehicle southbound on SH1 had a loss of control type event.
13/02/2018	SH1, approx. 150m south of SH96	Serious	Vehicle southbound on SH1 rear ended vehicle waiting to turn right into an access. Impact caused stationary vehicle to cross centre line and hit an oncoming vehicle travelling northbound. Crash report noted driver fatigue as a road user factor.
26/01/2020	SH1, approx. 800m north of Craig Road	Fatal	Vehicle southbound on SH1 travelling more than the speed limit had a loss of control type event and hit a power pole. The two rear passengers are deceased. Crash report noted alcohol and drugs suspected, racing, and casualty thrown from vehicle as road user factors.

²² Data extracted from Waka Kotahi CAS database on 15 June 2023

²³ Data extracted from Waka Kotahi CAS database on 15 June 2023

04/04/2021	SH96, approx. 300m west of SH1	Non-injury	Vehicle eastbound on SH96 in low light conditions hit a tree that had fallen on the road during a period of strong wind.
28/06/2021	SH1, approx. 40m north of Craig Road	Non-injury	Two vehicles travelling southbound on SH1 following a period of rain/sleet both had a loss of control type event.
16/12/2021	SH1, approx. 270m north of Craig Road	Non-injury	Vehicle northbound on SH1 had a loss of control type event. Crash report noted driver fatigue as a road user factor.
29/06/2022	SH1, approx. 900m south of SH96	Serious	Vehicle northbound on SH1 had a loss of control type event and hit a power pole. Crash report noted driver medical episode as a road user factor.
21/08/2022	SH1, approx. 360m north of Craig Road	Minor	Vehicle southbound on SH1 had a loss of control type event. Crash report noted driver fatigue as a road user factor.

Based on the reported crash history in proximity to the South Mataura development area, there is a trend of loss of control type crashes. However, like the South Gore development area, this is not unexpected for a rural state highway and each event had unique contributing factors that are not expected to be exacerbated by the proposal.

The serious injury crash that occurred at the private access off SH1 is of interest to this assessment. However, it is noted that the development is not proposed to have access from the state highway.

Overall, the crash record does not reveal underlying existing hazards that could not be appropriately managed through adherence with the Safe Systems in Design Philosophies, the Transit Planning Policy Manual, and the draft District Plan.

3 Proposal

3.1 Proposal Outline

The proposal seeks to rezone land in South Gore from Rural to General Industrial. The draft District Plan defines the purpose of a General Industrial Zone as:

The purpose of the General Industrial Zone is to provide for a range of industrial and ancillary activities which fulfil an important role in meeting the economic needs of the local community and providing for employment opportunities. Industrial activities may include manufacturing and processing of natural resources and agricultural production. General Industrial zoned land is generally located near key transport routes such as State Highways and Railways.

...

To support economic growth within the district additional land is identified for general industrial zoning to the south of Gore. The development of these areas will be managed through Outline Development Plans (ODPs) to ensure growth occurs in a coordinated manner with good levels of urban design, connectivity, integrated servicing infrastructure and provision of green corridors.²⁴

The proposal seeks to rezone land in South Maitava from 'Rural' to 'Rural Industrial' precinct, this is proposed by The Property Group and defined as:

A Rural Industry Precinct (PREC13) applies to land south of Maitava which has been identified as suitable for larger scale rural industry activities that support, service or are dependent on primary production. Desktop Geotechnical surveys indicate the presence of historic mines in this area which may affect land stability and constrain development opportunities. However, future activities are encouraged to develop on land outside the areas identified as potentially unstable whilst integrating ponds and land instability areas for green infrastructure and landscape buffers. The permitted larger scale rural industry activities will support the purpose of the General Rural Zone and provide for the economic wellbeing of the district.²⁵

3.1.1 South Gore development zone

The proposed South Gore development zone is approximately 74 hectares in gross area. The site is bordered by Racecourse Road to the north, SH1 to the east, Saleyard Road to the south, and Rural Lifestyle Zones to the west. A proposed development map has been provided and is shown in Figure 5.

It is understood that the site may be developed in stages which will act as trigger points for infrastructure development. The proposed staging is: ²⁶

- **Stage 1 (5 ha):** located at the north-eastern corner of the site, this stage would allow for a limited number of sites to be developed without requiring direct access from SH1.

²⁴ Gore District Council, 2022. *Draft District Plan*. Retrieved 14 June 2023 from [ba77d9e747b51da4432ddc7cc86c496a_34._General_Industrial_Zone_-Final.pdf \(amazonaws.com\)](https://www.gore.govt.nz/assets/Uploads/Draft-District-Plan-2022-2028/General-Industrial-Zone-Final.pdf)

²⁵ Definition supplied by The Property Group via email to WSP, 26 June 2023.

²⁶ Information sourced from email sent by The Property Group to Waka Kotahi, 13 January 2023.

- **Stage 2 (7 ha):** located on the eastern side of the site, this stage will serve a range of sites potentially ranging from 2,000 m² to 2 ha. A new road connection to SH1 is proposed with an indicative location shown.
- **Stage 3 (40 ha):** located on the western side of the site on the land currently occupied by the racecourse. It is understood from discussions with the racecourse that this stage will not be developed within the next ten years. It is proposed to upgrade the new connection to SH1 from Stage 2 into a roundabout when Stage 3 is developed.
- **Future Stage (22 ha):** located at the southern end of the site. It is understood this stage is unlikely to be developed in the short term due to lack of support from landowners.



Figure 5: South Gore development area proposed plan (supplied)²⁷

The proposal for the South Gore development area will include the construction of internal roads within the site. These roads are shown indicatively on the figure above; however, the design will be developed through the subsequent phases of development to best suit the needs of the site. It is understood all new internal roads are proposed to be two-way single carriageway and designed to meet the provisions and requirements in the revised District Plan (when notified).

²⁷ Image supplied by The Property Group, 24 February 2023

The construction of the new proposed internal roads will result in the formation of new intersections with the existing road network. It is understood these intersections will be designed in accordance with the revised District Plan (when notified) and the Transit Planning Policy Manual guidelines (where applicable). The proposed intersections are as follows:

- Priority controlled T-intersection with Racecourse Road (Stage 1)
- Priority controlled T-intersection with SH1 (Stage 2) to be potentially converted into a roundabout (Stage 3)
- Priority controlled T-intersection with Saleyard Road x2 (Future Stage)

In addition, existing property access to the existing road network would be closed in line with the staged development except for the accesses to the racecourse. It is understood that the racecourse intends to retain their existing access to SH1 whilst the racecourse is still in operation.

Recommendation: *It is recommended that the proposal for a roundabout to SH1 in Stage 3 is removed, or the decision is delayed until Stage 3 is triggered. In the current road environment, a roundabout would be out of place, noting northbound drivers on SH1 would not have had to give way since Edendale, some 24 km south. Similarly, a roundabout in a high-speed environment (100 km/h) is not typical on New Zealand roads. Should the speed limit be reviewed and subsequently reduced, to achieve a compliant island diameter and circulating lane width(s), the footprint of the roundabout would likely be significant. As the road corridor is constrained to the east by the South Island Main Trunk Railway running parallel to SH1, this would likely require either a deviation to SH1 or the railway line.*

Recommendation: *It is recommended that the racecourse access to SH1 is closed in Stage 1, with access to the racecourse being provided through the development area from Racecourse Road. This is cognisant of the crash history at this location and the anticipated increase in through traffic on this section of SH1 because of the development. Should full closure not be acceptable, it is recommended to mitigate the risk through rationalisation of the existing racecourse accesses into one improved access that satisfies the Transit Planning Policy Manual guidelines.*

Further assessment of the additional traffic movements generated by the proposed site changes on the operation of the surrounding road network is described in the next chapter.

3.1.2 South Mataura development zone

The proposed South Mataura development zone is approximately 264 hectares in gross area. The site is bordered by SH96 to the north, SH1 to the east and Craig Road to the south. The proposed area has been provided and is shown on an aerial in Figure 6.

It is noted that the proposed extent of land to be developed has been revised from that shown in the draft District Plan. Following a Geotechnical Desk Study, in December 2022, it was identified that the original proposed area had constraints due to the presence of historic mines, lignite sandstone and quarrying activities, and flood hazards.

An ODP has not yet been created for the South Mataura site, however it is understood the following assumptions have been made:²⁸

- The land could accommodate two larger industrial activities, like existing land uses in the close surrounds to the site.
- Areas on the eastern portion of the site may be unsuitable for road construction, therefore the site will be accessed from SH96 and Craig Road, and not SH1.

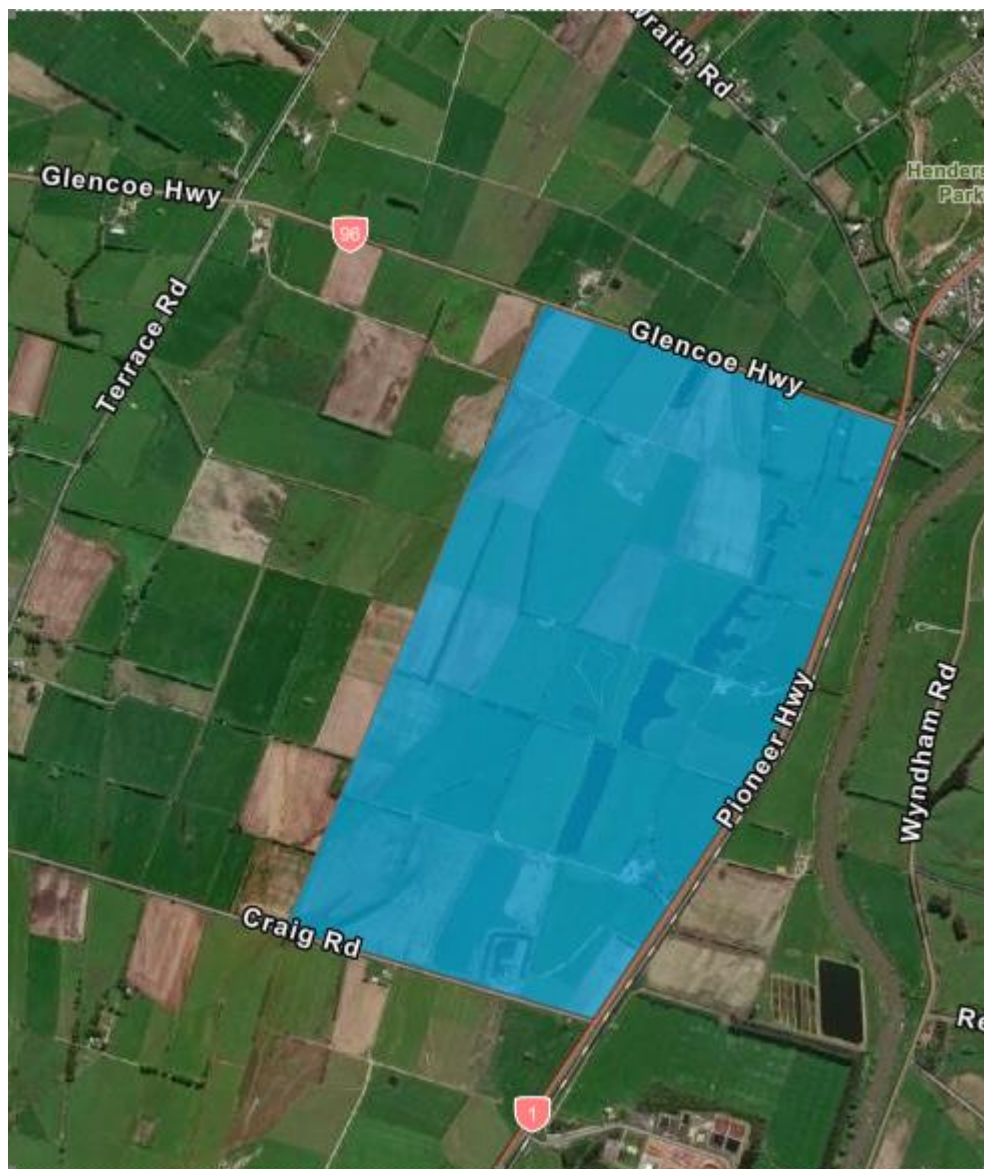


Figure 6: South Mataura development area proposed plan (supplied)²⁹

The proposal for the South Mataura development area will include the construction of internal roads within the site. These roads will be developed through the subsequent phases of development to best suit the needs of the site, however, it is assumed there will likely be one main road running north-south acting as a spine to access the development. It is understood

²⁸ Information sourced from email sent by The Property Group to WSP New Zealand, 24 February 2023.

²⁹ Image supplied by The Property Group, 19 June 2023

all new internal roads are proposed to be two-way single carriageway and designed to meet the provisions and requirements in the revised District Plan (when notified).

The construction of the proposed new internal roads would result in the formation of new intersections with the existing road network. It is understood these intersections will be designed in accordance with the revised District Plan (when notified) and the Transit Planning Policy Manual guidelines (where applicable). The proposed intersections are as follows:

- Priority controlled T-intersection with SH96
- Priority controlled T-intersection with Craig Road

In addition, existing property accesses to the existing road network would be closed in line with the staged development.

Recommendation: *It is recommended that a T-intersection is formed with SH96, and that should the land north of SH96 be developed later then that land is to access SH96 also by a T-intersection, rather than a single cross-roads intersection. The T-intersection should a form left-right staggered T-intersection pair (as opposed to right-left stagger) with appropriate spacing between intersections in accordance with the Transit Planning Policy Manual for accesses to a state highway and Austroads Guide to Road Design guidance. A staggered 'T' formation is a better design outcome because it includes fewer vehicle conflict points than a four-leg configuration.*

3.2 Proposed Development Activities

The primary purpose of these proposed development areas is to support economic growth of the region. Table 5 provides a proposed distribution of development that has been supplied by The Property Group.

Table 5: General Industrial Zones proposed distribution of development (supplied)³⁰

Sector	Projected employee numbers 2041	Estimated net site area	Estimated number of new operations/sites
Meat and meat product manufacturing	104	20 ha	2 new site operations
Dairy processing	5	< 10 ha	Expansion of existing operation or 1 new if investment attached
Food processing	< 1	< 1 ha	Expansion of existing operation or 1 new if investment attached
Heavy/metal manufacturing	11	4-18 ha	1-2 new operations
Other small to medium scale manufacturing	31	10-15 ha*	4-5 new operations
Wholesale trade	34	1.5-2 ha	4-5 new operations
Chemical processing	3	< 5 ha*	Expansion of existing operation or 1 new if investment attached

* Based on medium scale operation land requirements

³⁰ Information sourced from email sent by The Property Group to WSP, 5 August 2022.

3.3 Engagement

Gore District Council has shared the proposal to rezone land in South Gore and South Maitāra with the public and Waka Kotahi as follows:

- **Public engagement**
In 2022, GDC sought community feedback on the draft District Plan. This included the proposed rezoning of the two development areas. Any specific feedback will be considered by the Council for any changes to the draft District Plan. The Council will undertake a formal consultation process with the public when a Proposed District Plan is notified.
- **Waka Kotahi engagement**
In 2022, The Property Group acting for GDC discussed with Waka Kotahi the industrial growth areas proposed in the District Plan review. Feedback was also provided by way of email in February 2023.

It is understood that The Property Group have also undertaken engagement with landowners on behalf of GDC.

4 Forecast Traffic Generation

Table 6 provides peak hour and daily trip generation estimates of the proposed General Industrial Zones at South Gore and South Maita. The estimates are based on information supplied by The Property Group regarding anticipated development, combined with local area knowledge.

In the process of generating these estimates it was found that most empirical sources (e.g., *NZ Transport Agency research report 453*) are based on surveys from the main population centers. As a result, the published estimated trip generation rates were not directly applicable to the nature of the rural industrial characteristics, most notably including a much lower intensity (when based on floor area). Therefore, comparable estimates for anticipated employment numbers were drawn from surrounding local activities, and trip generation rates were derived with a First Principles approach.

Table 6: General Industrial Zones traffic generation estimates (supplied)³¹

Sector	Approximate site (ha)	Approximate FTE ³² per ha	Daily trips (vpd)	Peak hour trips (vph)	Daily HCV trips (vpd)
Meat and meat product manufacturing	20	5	260	26	31
Dairy processing	5	5	65	7	8
Food processing	0.5	85	111	11	14
Heavy/metal manufacturing	12	3	94	9	12
Other small to medium scale manufacturing	12.5	15	488	49	58
Wholesale trade	2	28	146	15	18
Chemical processing	2.5	27	176	18	31
		Total	1,340	135	172

Regarding the estimated peak hour trips, there is an underlying assumption that certain developments within the General Industrial Zones will likely include sites operating with shift work patterns. To this end, the peak hour for trip generation of the development area may be influenced by the timing of shifts and may not coincide with the current peak hours on the existing road network.

Recommendation: *It is recommended that consideration is given to requiring developments within the site to have shift timings staggered as a condition of consent. This will result in reduced impact on the network, despite overall anticipated trip generation assumed to be relatively low. Staggering of shift changeover times across developments should be reasonable and not overly onerous on the normal operation of the respective site.*

A further consideration is that SH1 and Craig Road are part of the school bus route network for Gore and Maita.³³ Therefore, shift patterns are recommended to be cognisant of when schools buses are expected to be on the road, and vulnerable road users (i.e., school children) may be present.

³¹ Information sourced from email sent by The Property Group to WSP New Zealand, 5 August 2022.

³² FTE = Full Time Equivalent

³³ Ministry of Education, 2023. *School bus route maps*. Retrieved 15 June 2023 from [School bus route maps \(arcgis.com\)](https://www.schoolbusroute.com/)

5 Traffic Effects

5.1 Traffic Modelling Inputs

Traffic modelling has been undertaken using SIDRA software to inform an indicative assessment of impacts on the receiving road network. The modelling can inform both level of service impacts and contribute to assessment of likely effects on safety. Intersection modelling was undertaken for the new proposed external intersections as part of the development only, and the intersection of State Highway 1 and Racecourse Road.

The key inputs to the modelling process were:

- Trip generation estimates
- Trip distribution and network assignment estimates
- Assumptions of transport mode selection
- Assumptions of intersection design
- Existing traffic volumes
- Sensitivity testing (demand uplift), to achieve robustness of forecasting.

5.1.1 Trip Generation

As detailed in Chapter 4, trip rates were estimated for the proposed General Industrial Zones at South Gore and South Maitara. To demonstrate a worst realistic case scenario, these estimates were uplifted significantly allowing a higher tolerance ceiling. This uplifted level of trip generation could occur if the development happened more rapidly than predicted, or at a higher density of development.

Total daily trips estimate: 1,400 trips.

Total daily trips uplifted: 6,000 trips.

Total peak hour trips modelled: 600 vehicles per hour.

5.1.2 Trip Distribution and Network Assignment

The principle of trip distribution is based on identifying the origin and destination 'trip pair'. The premise of distribution is bounded by the principle of how far people are predicted to be willing to travel / pay to travel – an outcome controlled by a parameter known as the 'deterrence factor'. The process of estimating trip distribution is easier in a more urban setting, where the distribution of trip lengths generally accords with a pattern roughly confirming to a negative exponential distribution. This same parameter does not apply in a rural context, and hence the process of estimating the origin of trips to the proposed development areas is adapted based on knowledge of local area and the demographics of the Gore and Maitara regions.

Factoring in the variables such as population, and proximity (distance); origins of trips to either site is estimated to be:

- 60% from Gore
- 40% from Maitara

Regarding assignment of trips to the proposed site accesses, the trips were distributed based on existing ADT values for the surrounding network. Busier roads on the surrounding network have been assigned a greater number of trips generated. Owing to lack in information on the exact location of each industry type within the subdivision.

5.1.3 Mode choice assumptions

It was assumed that all employee travel to and from the development area would be in private single occupancy vehicles, reflective of the rural nature of the site.

Recommendation: *It is recommended that consideration is given to requiring developments within the site to prepare a travel management plan as a condition of consent. This may include incentives to encourage employees to carpool and/or the provision of employee transport (e.g., a shuttle). This will result in reduced impact on the network and a reduction in induced VKT³⁴, despite overall anticipated trip generation assumed to be relatively low.*

Heavy vehicles were assumed to be 12 percent of total vehicles. This was reduced to 6 percent on Saleyard Road to reflect that this road is a cul-de-sac and therefore does not attract as much through traffic.

5.1.4 Intersection Geometric Assumptions

The modelled intersection layout assumptions are outlined below. These do not constitute detailed design outcomes.

- All intersections are assumed to be priority-controlled intersections, with the existing road network being the major approaches.
- All minor approaches are assumed to be under a Give-Way control based on anticipated adequate sight distance (Greenfields development).
- Approaches are assumed to intersect at 90-degree angles to each other.
- Approaches are assumed to have right turn bays installed to reduce the risk of rear end type crashes. These were modelled as 100 m on SH1 and 60 m on all other roads.
- Major approaches are assumed to have auxiliary left turn lanes to allow for deceleration. These were modelled as 100 m on SH1 and 60 m on all other roads.
- No change to existing speed limits.

As noted in Chapter 3, it is understood these intersections will be designed in accordance with the revised District Plan (when notified) and the Transit Planning Policy Manual guidelines (where applicable).

5.1.5 Existing Traffic Volumes

Existing traffic volumes were sourced from MobileRoad using the most recent traffic estimates available.³³ The information retrieved reflects an approximate estimate for the Average Daily Traffic (ADT). Peak hour volumes were assumed to be 10 percent of the ADT with equal flow in each direction.

5.2 Traffic Modelling Outputs

5.2.1 South Gore development area

5.2.1.1 Intersection of Racecourse Road and proposed internal road.

The intersection of Racecourse Road and the proposed internal road was modelled as a priority-controlled T-intersection. The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 7.

³⁴ VKT = Vehicle km travelled

³³ Data sourced from MobileRoad, 2023. <https://mobileroad.org/index.html> Retrieved 24 May 2023

Table 7: Intersection of Racecourse Road and proposed internal road.

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
Racecourse Road EBD	Through	20	A	20	A
	Right	40	A	10	A
Racecourse Road WBD	Left	120	A	10	A
	Through	20	A	20	A
Internal Road	Left	10	A	40	A
	Right	10	A	120	A

5.2.1.2 Intersection of Racecourse Road and SH1

The existing intersection of Racecourse Road and SH1 was modelled as a priority-controlled T-intersection. In practice this is a four-legged intersection, however Noble Road (the fourth leg) is a low volume rural road with an estimated daily traffic volume of 10 vehicles per day.³⁵ The modelling applied the assumption that shoulder and seal widening would be carried out on the Racecourse Road approach as part of the development, with a right turn lane of at least 60 meters provided.

The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 8. Similar results are anticipated for the intersection of Saleyard Road and SH1.

Table 8: Intersection of Racecourse Road and SH1

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
SH1 SBD	Through	300	A	300	A
	Right	70	A	25	A
SH1 NBD	Left	50	A	300	A
	Through	300	A	25	A
Racecourse Road	Left	30	A	50	A
	Right	30	A	70	C

5.2.1.3 Intersection of SH1 and proposed internal road.

The intersection of SH1 and the proposed internal road was modelled as a priority-controlled T-intersection. The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 9.

³⁵ Data sourced from Mobile Road, 2023. <https://mobileroad.org/index.html> Retrieved 15 June 2023

Table 9: Intersection of SH1 and proposed internal road.

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
SH1 SBD	Through	300	A	300	A
	Right	216	A	30	A
SH1 NBD	Left	144	A	300	A
	Through	300	A	30	A
Internal Road	Left	30	A	216	A
	Right	30	B	144	C

5.2.1.4 Intersection of Saleyard Road and proposed internal road.

The intersection of Saleyard Road and the proposed internal road was modelled as a priority-controlled T-intersection. The development proposes two intersections to Saleyard Road, whereas only one intersection has been modelled carrying the trip generation of both intersections to show a worst-case event (e.g., if only one intersection is ultimately developed).

The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 10.

Table 10: Intersection of Saleyard Road and proposed internal road.

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
Saleyrd Road WBD	Through	5	A	5	A
	Right	120	A	5	A
Saleyrd Road EBD	Left	15	A	5	A
	Through	5	A	5	A
Internal Road	Left	5	A	120	A
	Right	5	A	20	A

5.2.2 South Mataka development area

5.2.2.1 Intersection of SH96 and proposed internal road.

The intersection of SH96 and the proposed internal road was modelled as a priority-controlled T-intersection. This intersection provides access to the area south of SH96. The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 11.

Table 11: Intersection of SH96 and proposed internal road.

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
SH96 EBD	Through	15	A	15	A
	Right	180	A	15	A
SH96 WBD	Left	252	A	15	A
	Through	15	A	15	A
Internal Road	Left	30	A	180	A
	Right	30	A	252	A

5.2.2.2 Intersection of Craig Road and proposed internal road.

The intersection of Craig Road and the proposed internal road was modelled as a priority-controlled T-intersection. The estimated traffic volumes and level of service (LOS) for the AM and PM peak periods are shown in Table 12.

Table 12: Intersection of Craig Road and proposed internal road.

Approach	Movement	AM volume (vph)	AM LOS	PM volume (vph)	PM LOS
Craig Road WBD	Through	10	A	10	A
	Right	104	A	10	A
Craig Road EBD	Left	64	A	10	A
	Through	10	A	10	A
Internal Road	Left	10	A	104	A
	Right	10	A	64	A

5.3 Network Performance Summary

Level of Service for all roads is determined to be within the range of (A-C) owing to the relatively smaller volumes of traffic flowing through each intersection. The intersection of the proposed internal road with State Highway 1 has been identified as the intersection with the lowest Level of Service "C" based on the demand inputted within the model. The expected intersection levels of service do not indicate delays which would lead to poor gap selection.

Overall, it is considered that the additional level of traffic generation resulting from the proposed changes to the site activities will be acceptable.

6 Conclusions and Recommendations

As part of the ten-year review of the Gore District Plan, land in South Gore is proposed to be rezoned from 'Rural' to 'General Industrial' and in South Mataura from 'Rural' to 'Rural Industrial' precinct. The primary purpose of these proposed development areas is to support economic growth of the region.

This report has considered the expected traffic generation and subsequent effects of the proposal on the surrounding road network and road users. The increase in traffic associated with the proposal is not considered to result in adverse effects on the safety and efficiency of the transport network or other road users that cannot be managed and/or mitigated appropriately.

From discussions included in this report, it is recommended that:

- The proposal for a roundabout to SH1 in Stage 3 is removed, or the decision is delayed until Stage 3 is triggered. In the current road environment, a roundabout would be out of place, noting northbound drivers on SH1 would not have had to give way since Edendale, some 24 km south. Similarly, a roundabout in a high-speed environment (100 km/h) is not typical on New Zealand roads. Should the speed limit be reviewed and subsequently reduced, to achieve a compliant island diameter and circulating lane width(s), the footprint of the roundabout would likely be significant. As the road corridor is constrained to the east by the South Island Main Trunk Railway running parallel to SH1, this would likely require either a deviation to SH1 or the railway line.
- The racecourse accesses to SH1 are closed in Stage 1, with access to the racecourse being provided through the development area from Racecourse Road. This is cognisant of the crash history at this location and the anticipated increase in through traffic on this section of SH1 because of the development. Should full closure not be acceptable, it is recommended to mitigate the risk through rationalisation of the existing racecourse accesses into one improved access that satisfies the Transit Planning Policy Manual guidelines.
- For any future development north of SH96, it is recommended that access to SH96 is formed as a T-intersections, rather than a single cross-roads intersection with the access to the South Mataura development site. The two T-intersections should form a left-right staggered T-intersection pair (as opposed to right-left stagger) with appropriate spacing between intersections in accordance with the Transit Planning Policy Manual for accesses to a state highway and Austroads Guide to Road Design guidance.
- Consideration is given to requiring developments within the site to have shift timings staggered as a condition of consent. This will result in reduced impact on the network, despite overall anticipated trip generation assumed to be relatively low. Staggering of shift changeover times across developments should be reasonable and not overly onerous on the normal operation of the respective site. A further consideration is that SH1 and Craig Road are part of the school bus route network for Gore and Mataura. Therefore, shift patterns are recommended to be cognisant of when schools buses are expected to be on the road, and vulnerable road users (i.e., school children) may be present.
- Consideration is given to requiring developments within the site to prepare a travel management plan as a condition of consent. This may include incentives to encourage employees to carpool and/or the provision of employee transport (e.g., a shuttle). This will

result in reduced impact on the network and a reduction in induced VKT36, despite overall anticipated trip generation assumed to be relatively low.

- Shoulder and seal widening would be carried out on the Racecourse Road approach to SH1 intersection as part of the development, with a right turn lane of at least 60 meters provided.

It is acknowledged that finance arrangements for the upgraded SH1 accesses are not identified, however we recommend that this could be resolved at subsequent Resource Consent stages, should the proposed Plan Change proceed.

Assessed overall, and for the reasons described, it is concluded that the transport impacts of the proposal are expected to be minimal, owing to the low traffic volumes expected to be generated. The additional safety and design stresses for the surrounding road network are assumed to be minor, assuming suitable detailed design measures and site investigations, and Safe System audits will be carried out prior to any intersection and lane upgrades.

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