Omahu North Industrial Zone

Proposed Industrial Development

Hastings

Integrated Transportation Assessment Report

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Status: Final

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Contents

1. Executive Summary

Hastings District Council (the Applicant) requested Council's Traffic Engineer to examine and assess the transportation planning issues in relation to a Council initiated District Plan Change to establish a new industrial development on the northern side of Omahu Road, between Ormond Road and Kirkwood Road in Hastings.

The proposed development site (the Site) of approximately 36 ha is currently zoned Plains Zone under the Hastings District Plan (the District Plan).

Existing traffic volume data for Omahu Road and the surrounding network are known and have been used to present the base conditions for assessment. The assessed future volumes for this assessment include the base conditions, network growth and the expected development generated traffic volumes. These figures have been analysed to assess the impact of the proposed land use on the surrounding transport network.

The Integrated Transportation Assessment finds that this development can occur with the effects on the transport network being considered no more than minor following the completion of the development and the implementation of the recommendations contained within this report.

2. Introduction

The Hastings District Council is seeking A Plan Change to establish an industrial development on land currently zoned Plains on Omahu Road, Hastings.

The Hastings District Council requested Council's Traffic Engineer to examine and assess what effect the proposed development is likely to have on the efficiency and performance of the local transport network. Of note, the potential transportation effects of the Proposed Plan Change arise primarily from the manner in which vehicle, servicing and multi modal access is to be provided to and from the site, and how the expected level of traffic is able to be managed by the public road network.

Based on the scale of the proposed development and the immediate surrounding environment, the primary considerations are the following:

- The extent of traffic expected to be generated by the proposed development
- The likely effect traffic generation will have on the safety and efficiency of the transport network
- The ability of the site and its surrounds to meet the access, parking, loading and manoeuvring demands created by the proposed development.

In examining these affects, this report provides a brief description of the site location, and then discusses present form, function and use patterns of the adjoining public road network that provides access to the proposed site.

A full assessment is included of the operation and performance of the road network, involving analysis of trip generations, distributions and appropriate recommendations.

Provision for pedestrians, cyclists, parking and servicing are also considered.

3. Existing Transport Infrastructure

3.1. Location in the Transport Network

The site is located between the intersections of Ormond Road running North West bound to the intersection of Kirkwood Road. Figure 2 shows the site (highlighted in Grey – industrial growth node).

3.2. Site Description

The site is made up of multiple titles comprising a total land area of approximately 36ha. This land is zoned Plains under the Hastings District Plan with landuse predominantly consisting of horticultural and agricultural activities.

The proposed development is situated immediately adjacent Omahu Road, extending from its intersection with Ormond Road to Kirkwood Road, a distance of approximately 3.3km.

3.3. Omahu Road

Omahu Road is defined as a 'Regional Arterial' in Council's Road hierarchy.

The route currently services residential, light and heavy industrial traffic. It provides a direct link between the Hastings urban area, Flaxmere and Fernhill Township, providing high level connectivity to Hawkes Bay Expressway (SH50A), SH50, Hawkes Bay Regional Hospital and the existing Industrial/ commercial land uses.

The Hawkes Bay Expressway (SH50A) intercepts Omahu Road on the eastern fringe of the new industrial zone.

Omahu Road has recently undergone renewal between Ormond Road and Jarvis Road.

Through this section the existing carriageway consists of two 3.0m traffic lanes, a 3.0m central median, two 2.0m on road cycle lanes, one 2.5m on street parking lane on the southern side only and one footway on the southern side only.

The typical cross section is illustrated in Figure 1.

The carriageway width along its entire length varies with the average carriageway width being approximately 16m.

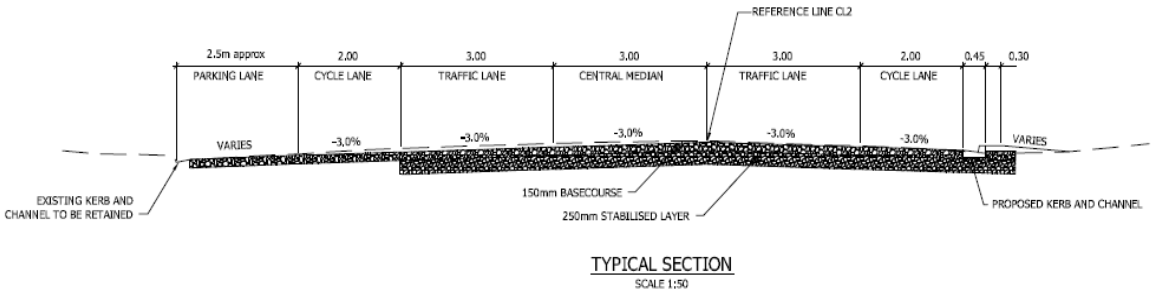


Figure 1: Typical Cross Section - Omahu Road

The average daily traffic (ADT) for Omahu Road, between the intersection of Kirkwood Road and the Hawkes Bay Expressway has been assessed using Councils' Road Asset Maintenance Management System (RAMM). The relevant information has been extracted and is provided within Table 1.

The highest traffic volume experienced along this route occurs between Wilson Road to Chatham Road. This is recorded as 12,300 vehicles per day with a peak volume of 1300 vehicles per hour experienced at 16:00. For each section an average of the collected data for each section has been used. The data range period is for 2000 – 2009.

Table 1: Network Traffic

Section	Average Daily Traffic	Peak traffic	Peak Period	85% Speed
Wilson Rd – Henderson Rd	12,300 vpd	1300	16:00	57
Henderson Rd to Chatham Rd	12,300 vpd	1250	16:00	Not available
Chatham Rd – Jarvis Rd	5000 vpd	600	17:00	72
Jarvis Rd – Twyford Rd	4800 vpd	600	17:00	72

The Traffic Composition is provided in Table 2. This shows that on average, the traffic volume experienced on Omahu Road, consists of 87% Cars, 2 % Light Commercial Vehicles and 11% Heavy Commercial Vehicles. The vehicle composition is generally consistent along the assessed length of Omahu Road despite the fluctuation in traffic volumes. Omahu Road also forms part of the regions over dimensioned vehicle haulage network and provides as a significant link in supporting the regions distribution of goods and freight.

Table 2: Traffic Composition

Section	Car %	LCV %	HCVI %	HCV-II %	Total HCV %
Wilson Rd to Henderson Rd	87	3	7	3	10
Jarvis Rd - Twyford Rd	86	2	10	2	12
Twyford Rd – Kirkwood Rd	88	2	6	4	10

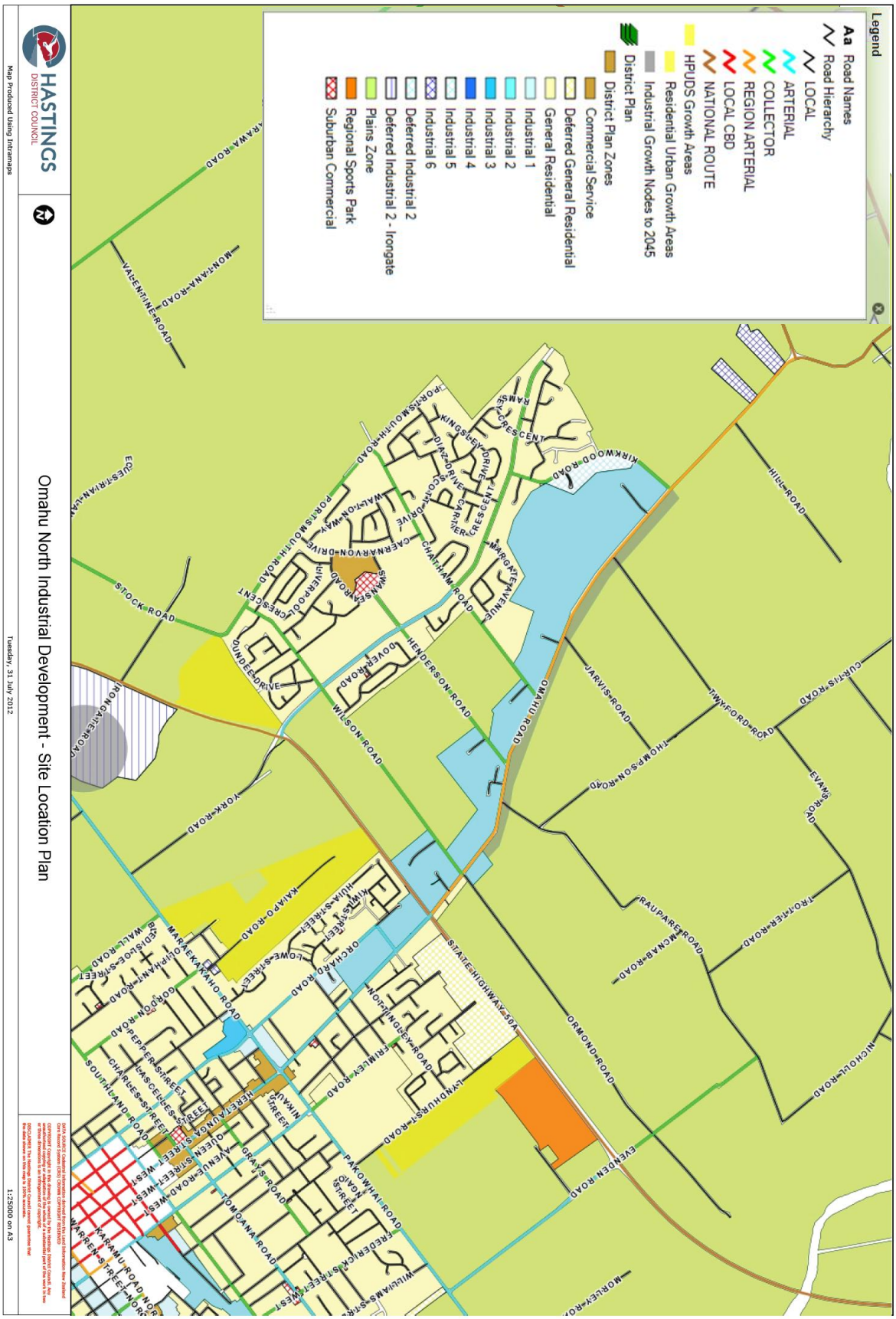
In the vicinity of the site, Omahu Road is subject to two speed limits. A 50km/hr speed limit extends from the Hawkes Bay Expressway, in a northerly direction to a point south of its intersection with Barnes Place. Speed Limit repeater signs are present in this section. A 70km/hr speed limit extends from the termination of the 50km/hr, south of Barnes Place, in a northerly direction to a point just north of its intersection with Kirkwood Road. Speed Limit repeater signs are present in this section also. The speed limit changes to 100km/hr at the termination of the 70km/hr speed limit.

The Omahu Road reserve width varies along the site frontage. The various widths are identified in Table 3 using Council's GIS system and on site observations.

Road Section	Reserve Width (m)
Kirkwood Rd – Jarvis Rd	30
Jarvis Rd – Raupare Rd	23
Raupare Rd – Wilson Road	26

Table 3: Omahu Road - reserve widths

Figure 2 : Site Location Plan



The carriageway along Omahu Road is classified as generally flat. This is illustrated in Figure 3; with no one point exceeding +/- 2% gradient. The alignment of the route is generally linear running in a northwest, southeast direction with minimal deviation.

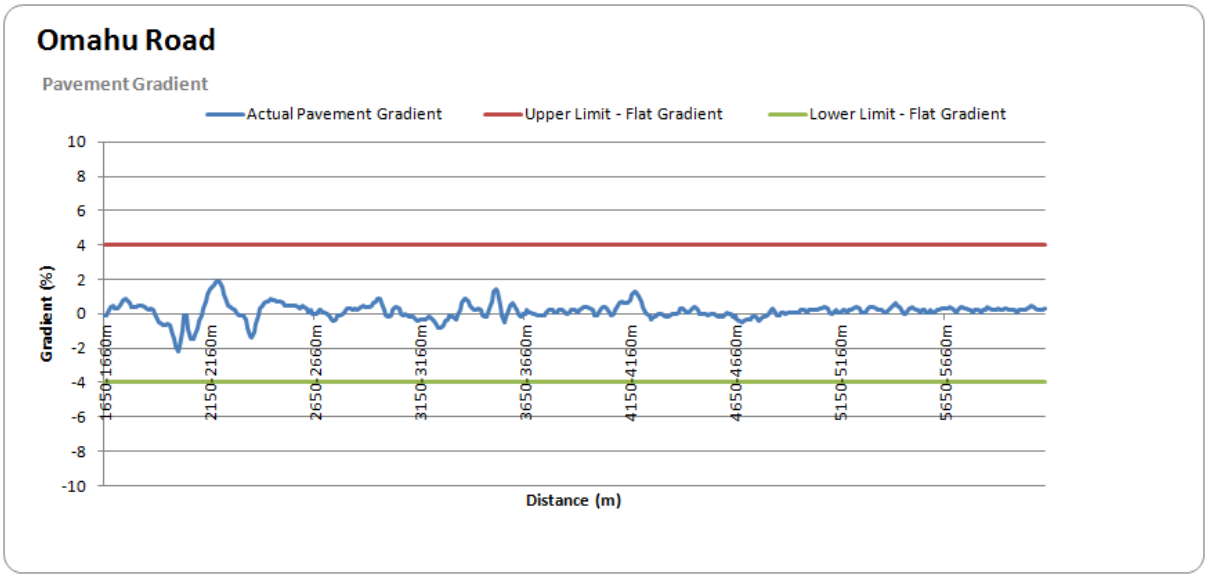


Figure 3: Omahu Road – Gradient

3.4. Kirkwood Road

Kirkwood Road is situated on the southern side of Omahu Road and is located to the south of the site and is classified as an Urban Collector Road. The road has an average daily traffic volume (ADT) of 1407 vehicles per day and a peak volume of 195 vehicles per hour (vph) during the evening.

The existing carriageway is sealed and comprises of two 5m traffic lanes, with a painted centreline.

Kirkwood Road terminates with a 'T' intersection at Flaxmere Avenue to the south and Omahu Road to the north. The road is approximately 1.4km in length.

The Kirkwood Road/ Omahu Road Intersection is located opposite the northern extent of the proposed site. At this intersection the following observations are made:

- Kirkwood Road traffic yields to Omahu Road under Give Way conditions
- The posted speed limit is 70km/hr
- There is good signage
- There is street lighting on the all corners of the intersection
- A central splitter island is provided on Kirkwood Road
- A short deceleration lane is provided for vehicles turning left from Omahu Road into Kirkwood Road
- A Right turn bay is provided for vehicles turning right from Omahu Road into Kirkwood Road
- This route is signed to prevent general use by Heavy Commercial Vehicles

Figure 4: Kirkwood Road

3.5. James Rochfort Place

James Rochfort Place is situated on the southern side of Omahu Road and is located to the south of the site and is classified as an urban local road. The road is an industrial cul de sac (no exit road) of approximately 300m in length. The road has an average daily traffic volume (ADT) of 451 vehicles per day and a peak volume of 75 vehicles per hour (vph) during the evening.

The existing carriageway is sealed and comprises of a 12m wide seal.

The James Rochfort Place / Omahu Road Intersection is located opposite the northern extent of the proposed site. At this intersection the following observations are made:

- James Rochfort Place yields to Omahu Road, albeit this is an uncontrolled intersection
- The posted speed limit is 70km/hr
- There are no road markings
- Footways are provided on both sides of the road
- There is street lighting
- On street parking occurs on both sides of the road
- An informal deceleration facility exists via the existing sealed shoulder for vehicles turning left from Omahu Road into James Rochfort Place.

Figure 5: James Rochfort Place

3.6. Twyford Road

Twyford Road is situated on the northern side of Omahu Road and dissects the proposed development site. No direct access for the proposed site is currently indicated from this road. This road is classified as a rural local road. The road is approximately 4.6km in length. The road has an average daily traffic volume (ADT) of 482 vehicles per day and a peak volume of 85 vehicles per hour (vph) during the evening.

The existing carriageway is sealed and comprises of a 4.8m wide seal with a centre line marking only.

Twyford Road terminates with a 'T' intersection at Omahu Road. At this intersection the following observations are made:

- Twyford Road traffic yields to Omahu Road under Give Way conditions
- A central splitter island is provided on Twyford Road
- The posted speed limit after departing the intersection is 100km/hr
- A chevron warning sign is provided at the head of the 'T'.
- An informal deceleration facility exists via the existing sealed shoulder for vehicles turning left in to Twyford Road from Omahu Road.
- No right turn facilities exist for vehicles leaving Omahu Road
- The intersection is street lit.

It was noted that the Give way yield Line has faded and in need of renewal.

Figure 6: Twyford Road

3.7. Jarvis Road

Jarvis Road is situated on the northern side of Omahu Road and dissects the proposed development site. No direct access for the site is currently indicated from this road. The road is classified as a Rural Local Road. The road has an average daily traffic volume (ADT) of 294 vehicles per day and a peak volume of 59 vehicles per hour (vph) during the evening.

The existing carriageway is sealed and comprises of a 5.5m carriageway.

Jarvis Road terminates with a 'T' intersection at Thomson Road to the north east and Omahu Road to the south west. The road is approximately 1.1km in length.

The Jarvis Road / Omahu Road Intersection is an existing intersection dissecting the land area for proposed development. At this intersection the following observations are made:

- Jarvis Road traffic yields to Omahu Road under Give Way conditions
- The posted speed limit after departing the intersection is 100km/hr
- Road Markings are only present at the intersection.
- The intersection is street lit.
- A right turn bay is provided for traffic turning from Omahu Road into Jarvis Road.

Figure 7: Jarvis Road

3.8. Barnes Place

Barnes Place is situated on the southern side of Omahu Road and is classified as an urban local road. The road is an industrial cul de sac (no exit road) of approximately 160m in length. The road has an ADT of 240 vpd and a peak volume of 43 vph during the evening.

The existing carriageway is sealed and comprises of a 12.5m wide seal.

The Barnes Place / Omahu Road Intersection is located opposite the proposed site. At this intersection the following observations are made:

- Barnes Place yields to Omahu Road, albeit this is an uncontrolled intersection
- There are no road markings except for a short centre line within the intersection
- The posted speed limit is 50km/hr
- Footways of 1.5m wide are provided on both sides of the road
- There is street lighting
- On street parking occurs on both sides of the road
- A right turn bay is provided for traffic turning from Omahu Road into Barnes Place
- The intersection benefits from localised kerb extensions, however the extent of on street parking provision permitted on Omahu Road at this location would obstruct visibility when occupied.
- On road cycle lanes are present through the intersection.

Figure 8 (Barnes Place Intersection- Pre Road Renewal)

3.9. Chatham Road

Chatham Road is situated on the southern side of Omahu Road and is located to the south of the site. The road is classified as an Urban Collector Road. The road has an ADT of 2765 vpd and a peak volume of 282 vph during the evening.

The existing carriageway is sealed and comprises of a 15m sealed width

This section of Chatham Road intersects with a roundabout intersection at Flaxmere Avenue to the south west and a 'T' intersection at Omahu Road to the North West. The road length for this section is approximately 1.05km.

The Chatham Road / Omahu Road Intersection is located opposite the proposed site. At this intersection the following observations are made:

- Chatham Road traffic yields to Omahu Road under Give Way conditions
- The posted speed limit is 50km/hr
- A central splitter island is provided on Chatham Road
- There is good signage
- There is Street lighting along Chatham Road and at the Intersection is street lit.
- The road consists of two 5m traffic lanes and two 2.5m parking lanes
- There are narrow footways on both sides of the road.
- Road marking consists of a centreline and formal on street parking bays
- A Right turn bay is provided for vehicles turning right from Omahu Road into Chatham Road
- The intersection benefits from localised kerb extensions
- The Chatham Road intersection approach is widened to allow a right turn and left turn manoeuvre simultaneously. This provision exists for approximately 2 – 3 car lengths.

Figure 9 : Chatham Road Intersection - Pre Road Renewal

3.10. Henderson Road

Henderson Road is situated on the southern side of Omahu Road and is located to the south of the site. The road is classified as an Urban Collector Road. The road has an ADT of 3041 vpd and a peak volume of 378 vph during the evening.

The existing carriageway is sealed and comprises of a 14m sealed width

This section of Henderson Road intersects with a roundabout intersection at Flaxmere Avenue to the southwest and a 'T' intersection at Omahu Road to the northwest. The road length for this section is approximately 1.3km.

The Henderson Road/Omahu Road Intersection is located opposite the proposed site. At this intersection the following observations are made:

- Henderson Road traffic yields to Omahu Road under Give Way conditions
- The posted speed limit is 50km/hr
- A central splitter island is provided on Henderson Road
- There is good signage(Flaxmere Village is signed along this road from Omahu Road)
- The Council Refuse Depot is located within Henderson Road
- There is street lighting along Henderson Road and at the Intersection is street lit.
- The road consists of two 5m traffic lanes and two 2.0m parking lanes
- An off road cycle lane is provided through this intersection
- There are narrow footways on both sides of the road.
- Road marking consists of a centreline and formal on street parking bays
- A Right turn bay is provided for vehicles turning right from Omahu Road into Henderson Road
- The intersection benefits from localised kerb extensions

  It was noted that the existing pavement surface at the intersection within Omahu Road was poor and in need of repair.

Figure 10: Henderson Road Intersection – Pre Road Renewal

3.11. Raupare Road

Raupare Road is situated on the northern side of Omahu Road and dissects the proposed development site. The road is classified as a Local Rural Road. The road has an ADT of 1000 vpd and a peak volume of 177 vph during the evening.

The existing carriageway is sealed and comprises of a 6.5m sealed width

This section of Raupare Road intersects with a T - Intersection at Omahu Road to the south and intersects with Thomson Road to the north with a T- Intersection. The road length for this section is approximately 350m.

The Raupare Road /Omahu Road Intersection is located within the proposed site. At this intersection the following observations are made:

- Raupare Road traffic yields to Omahu Road under Give Way conditions
- The posted speed limit is 100km/hr on Raupare Road
- Central splitter islands are provided on Raupare Road,
- One splitter island effectively separates right turn entry and left turn entry manoeuvres from Omahu Road into Raupare Road. The other splitter island provides channelisation for approaching vehicles travelling on Raupare Road.
- The intersection is street lit.
- The road consists of two 3.2m traffic lanes with edge lines and a centre line
- An on road cycle lane is provided through the intersection on Omahu Road.
- A Right turn bay is provided for vehicles turning right from Omahu Road into Raupare Road
- Raupare Road emerging visibility is restricted by a Shelter belt situated to the east of the intersection.

  It was noted that the existing road name sign at the intersection is currently obscured from overhanging vegetation

Figure 11 : Raupare Road Intersection

3.12. Ormond Road

Ormond Road is situated on the northern side of Omahu Road and demarks the southern extent of the proposed site. The road is classified as an Urban Local Road. The road has an ADT of 1303 vpd and a peak volume of 198 vph during the evening.

The existing carriageway is sealed and comprises of a 6m sealed width, with no road markings.

This section of Ormond Road is a special character route uniquely lined continuously on both sides by large oak trees situated close to the sealed shoulder. This section forms a cross road intersection with Evenden Road to the north east and a roundabout intersection at Omahu Road to the south west. The road length for this section is approximately 2.4km and runs parallel to Hawkes Bay Expressway.

The Ormond Road/Omahu Road Intersection is located to the immediate south of the proposed site. At this intersection the following observations are made:

- Ormond Road yields under Roundabout conditions with Omahu Road
- The posted speed limit is 60km/hr
- A central splitter island is provided on Ormond Road
- Good signage is provided at the intersection
- Pedestrian provision is provided through the splitter island
- The intersection is street lit

Figure 12: Ormond Road/Wilson Road Intersection - Pre Road Renewal

3.13. Wilson Road

Wilson Road is situated on the southern side of Omahu Road. The road is classified as an Urban Collector Road. The road has an ADT of 2977 vpd and a peak volume of 321 vph during the evening.

The existing carriageway is sealed and comprises of a 13.6m sealed width.

This section of Wilson Road intersects with a roundabout intersection at Flaxmere Avenue to the southwest and a Roundabout intersection at Omahu Road to the northwest. The road length for this section is approximately 2.0km and runs parallel to Hawkes Bay Expressway. This route forms part of Hastings District Council's Arterial I-Way Network and is provided with an off road shared footpath / cycle path

The Wilson Road /Omahu Road Intersection is located opposite the proposed site at the southern extent. At this intersection the following observations are made:

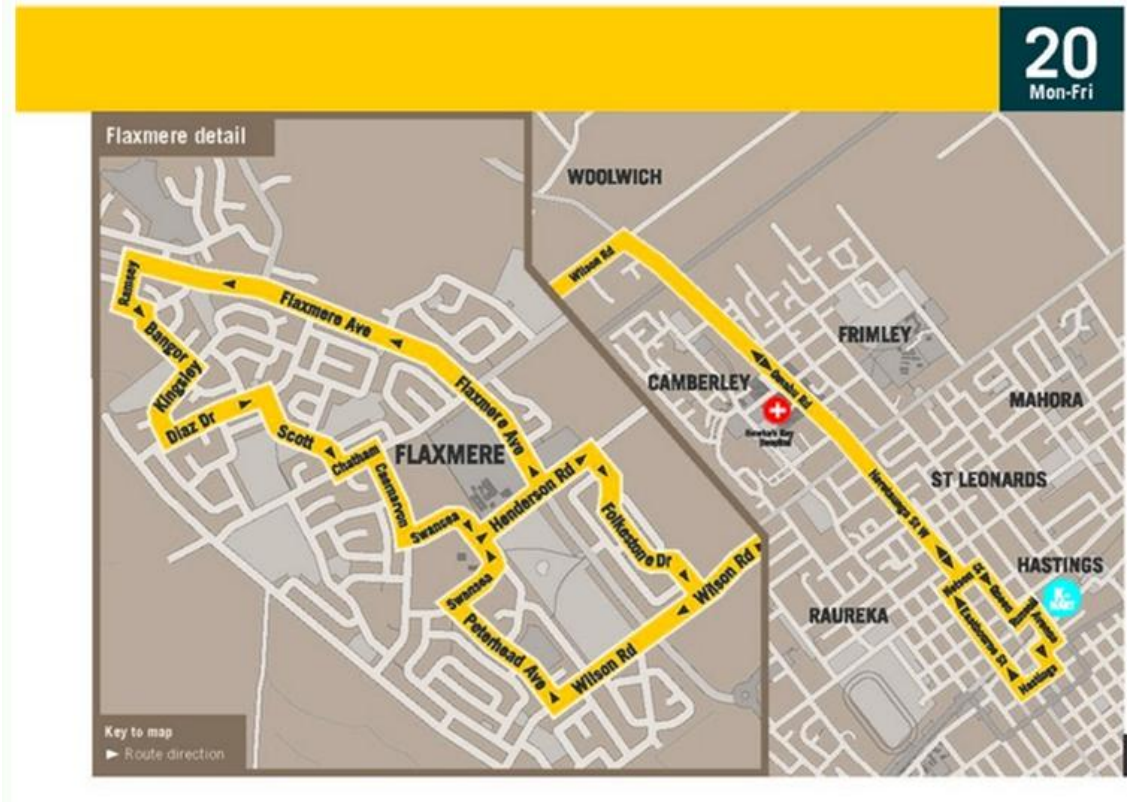
- Wilson Road traffic yields under roundabout conditions with Omahu Road
- The posted speed limit is 50km/hr in the vicinity of the intersection
- A central splitter island is provided on Wilson Road
- Good signage is provided at the intersection
- Pedestrian provision is provided through the splitter island
- Pedestrian footpaths are provided on both sides of the road
- There is street lighting along Wilson Road and the Intersection is street lit.
- The road consists of two 4.8m traffic lanes and two 2m parking lanes
- Road marking consists of a centreline and formal on street parking bays
- The intersection benefits from localised kerb extensions

Please refer to Figure 12 for the intersection location plan

3.14. Public Transport Provision

Currently Go Bus operates a bus service (Route 20) which travels between Flaxmere and Hastings via Omahu Road and Wilson Road. This route represents the only suitable public transport service in the locality of the proposed development site.

Figure 13: Public Transport Route 20



3.15. Cyclist and Pedestrian Assessment

Omahu Road is highlighted as an integral part of the Hastings Cycling Strategy, with Omahu Road forming part of Hastings District Council's Arterial I-Way Network.

The southern section of Omahu Road, linking from Heretaunga Street, forms the Arterial section, connecting through to Wilson Road which is also a key Arterial Link. The northern section of Omahu Road is then downgraded to a Collector Route and is intended to connect through to Kirkwood Road.

Ormond Road is also identified as a Collector Route, and whilst not currently constructed it is intended that this will be an on road facility and constructed within the 2012/13 financial period.

The Northern section of Omahu Road generally from Wilson Road through to Jarvis Road provides two x 2.0m on road cycle lanes.

A pedestrian footway is provided on the southern side of Omahu Road only and reflects the footfall generated by the existing industrial activities that have established there.

On-site inspections have confirmed the availability and quality of these existing footpaths and cycling facilities on the local road network. It is considered likely these facilities will be used predominantly by employment staff, commuting from nearby residences and to a lesser extent by customers.

There is no footpath provision provided on the northern side of Omahu Road. Furthermore there are no pedestrian crossing facilities provided either at the intersections or mid-block to safely provide for pedestrians wishing to cross and access this side of Omahu Road.

Based on these existing facilities, from a pedestrian perspective, the proposed site is not well connected to the existing footpath network currently serving Omahu Road. Omahu Road effectively acts as a barrier between the site and the existing industrial uses established on the southern side of Omahu Road.

4. Travel Patterns

4.1. Traffic Volumes

Existing Traffic Volumes have been obtained using RAMM, provided in Table 1.

A review of the Hastings Area Transport micro simulation model (HAT model) was used to observe the Traffic Flow conditions for the AM and PM Peak Periods for the local network.

The link of Omahu Road situated between Ormond Road and the Hawkes Bay Expressway was observed through the model period and flows recorded. These are provided below in Table 4 and Table 5.

The AM period data is for a model period of 07:15am – 09:30am, with the peak period observed between 08:00am and 09:00am with a total flow of 1286 vph.

The PM period data is for a model period of 03:30pm – 06:00pm, with the peak period observed between 04:15pm and 05:15pm with a total flow of 1285 vph.

It is noted that when viewing a rolling hour period through both the AM and PM periods, the PM period presents the highest flow conditions and therefore the PM period is considered best representative of the Peak Period for subsequent assessment.

Start	End	Flow 1	Flow 2	Total
7:15:00 a.m.	7:30:00 a.m.	73	71	144
7:30:00 a.m.	7:45:00 a.m.	110	127	237
7:45:00 a.m.	8:00:00 a.m.	122	141	263
8:00:00 a.m.	8:15:00 a.m.	150	176	326
8:15:00 a.m.	8:30:00 a.m.	143	176	319
8:30:00 a.m.	8:45:00 a.m.	147	177	324
8:45:00 a.m.	9:00:00 a.m.	137	180	317
9:00:00 a.m.	9:15:00 a.m.	135	168	303
9:15:00 a.m.	9:30:00 a.m.	118	171	289

Table 4: AM Traffic Flow – Omahu Road

Start	End	Flow 1	Flow 2	Total
3:30:00 p.m.	3:45:00 p.m.	84	56	140
3:45:00 p.m.	4:00:00 p.m.	135	113	248
4:00:00 p.m.	4:15:00 p.m.	156	138	294
4:15:00 p.m.	4:30:00 p.m.	159	167	**326**
4:30:00 p.m.	4:45:00 p.m.	161	165	**326**
4:45:00 p.m.	5:00:00 p.m.	156	159	**315**
5:00:00 p.m.	5:15:00 p.m.	162	156	**318**
5:15:00 p.m.	5:30:00 p.m.	162	151	313
5:30:00 p.m.	5:45:00 p.m.	155	126	281
5:45:00 p.m.	6:00:00 p.m.	132	106	238

Table 5: Traffic Flow - Omahu Road

4.2. Traffic Growth

Local and Arterial Roads in Hawkes Bay currently sustain an annual growth rate of 1.5% as per the New Zealand Transport Agency's Economic Evaluation Manual.

Whilst it is likely that this development will be deferred for a number of years with the full traffic affects not being recognised until the site is fully developed, only a 2012 baseline assessment of traffic related affects have been undertaken at this stage.

4.3. Existing Peak Hour Volumes

Individual turn count surveys have not been undertaken for this assessment. Turn counts have been obtained from the Hastings HAT micro simulation model for the identified peak hour period being 04:15pm to 05:15pm.

The level of accuracy for these turn counts is considered appropriate for this level of assessment and has been checked against Count Data extracted from RAMM.

Figure 14: Existing Peak Hour Volumes - Omahu Road / Kirkwood Road

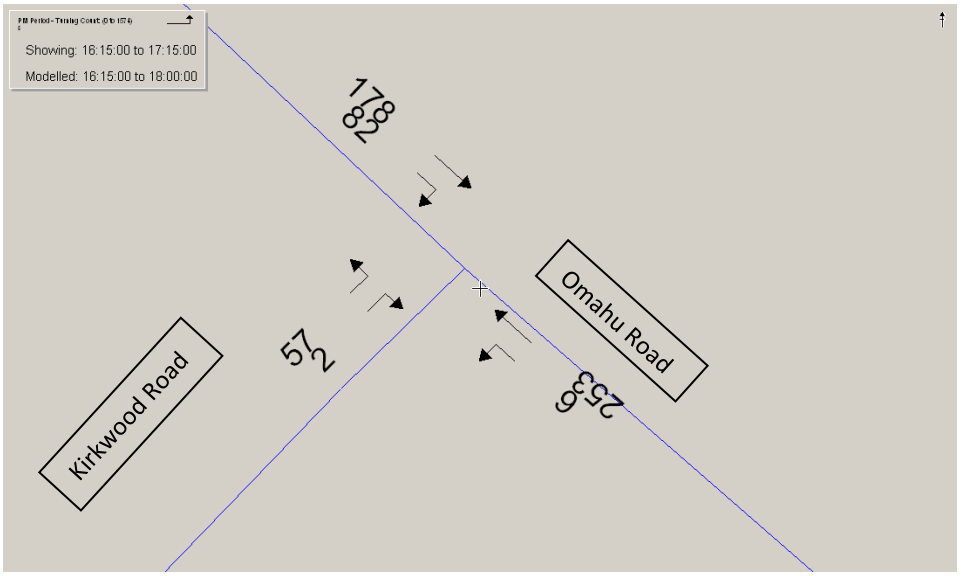


Figure 15: Existing Peak Hour Volumes – Omahu Road / Twyford Road

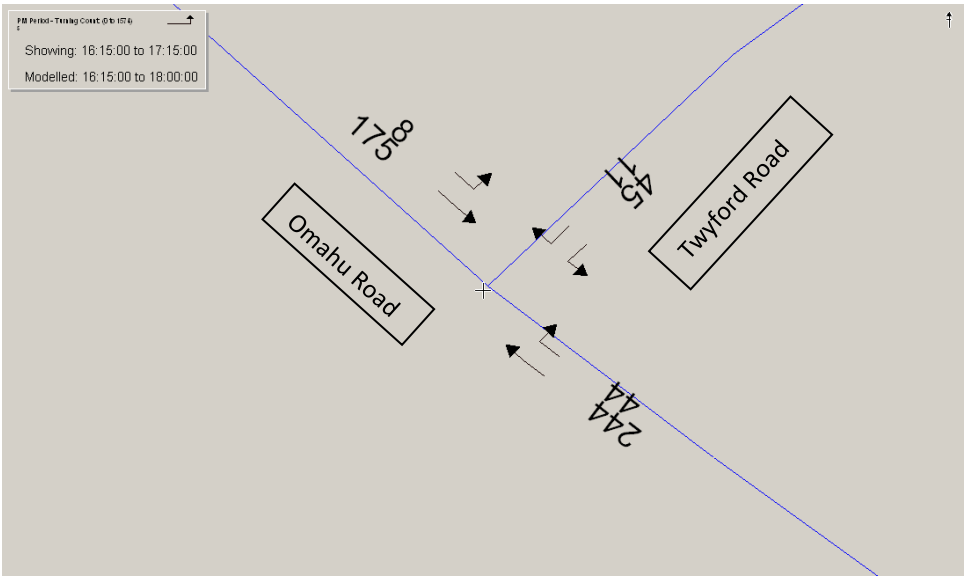


Figure 16: Existing Peak Hour Volumes – Omahu Road / Jarvis Road

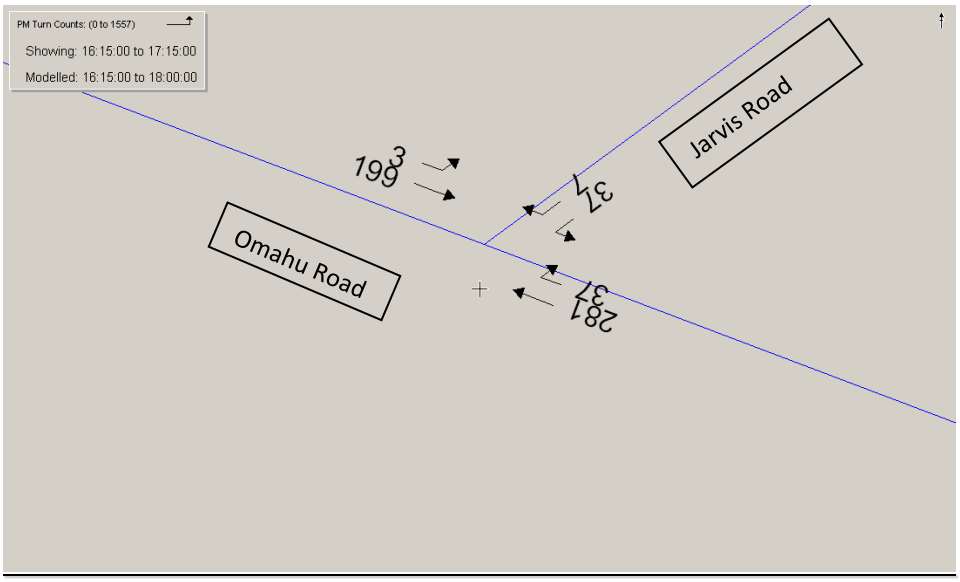


Figure 17: Existing Peak Hour Volumes – Omahu Road / Chatham Road

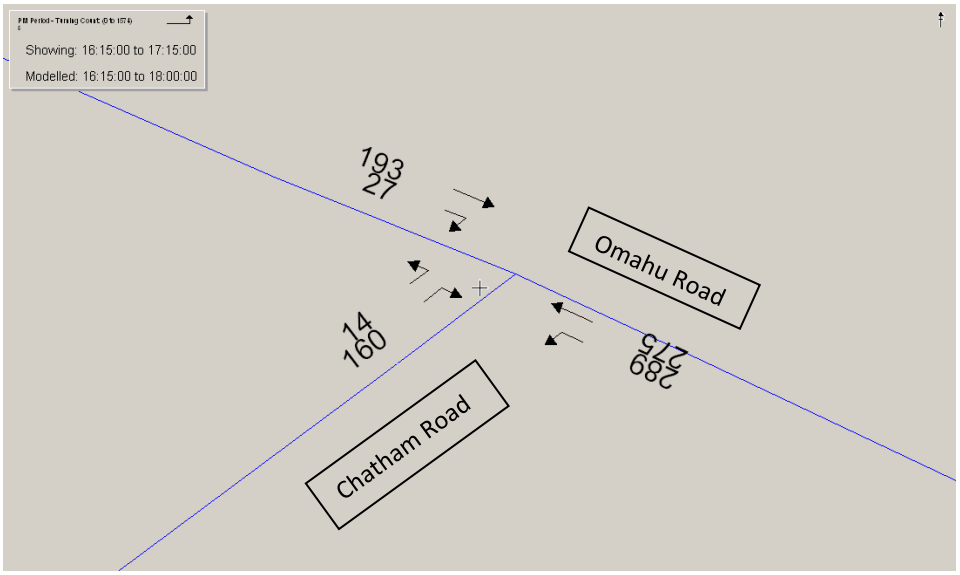


Figure 18: Existing Peak Hour Volumes – Omahu Road / Henderson Road

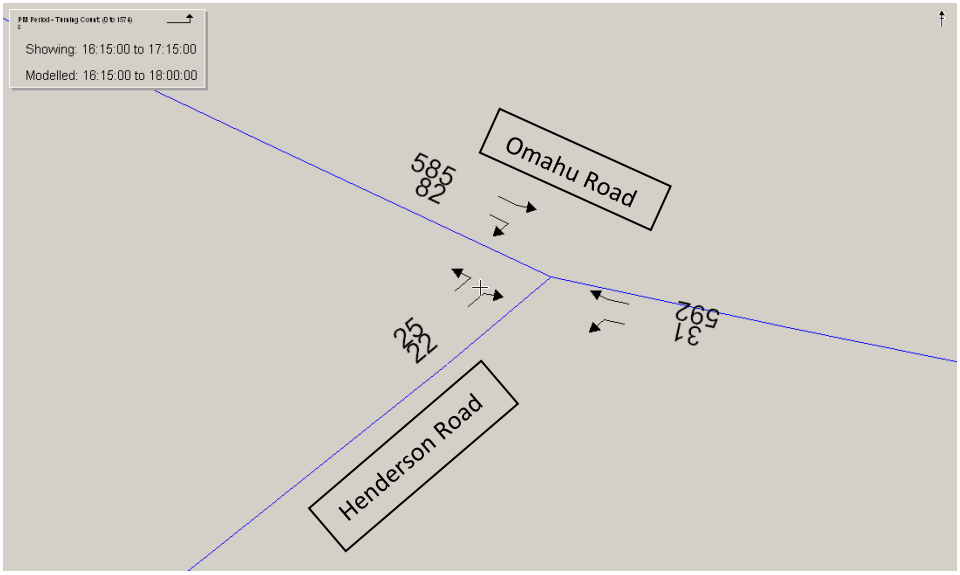


Figure 19: Existing Peak Hour Volumes – Omahu Road / Raupare Road

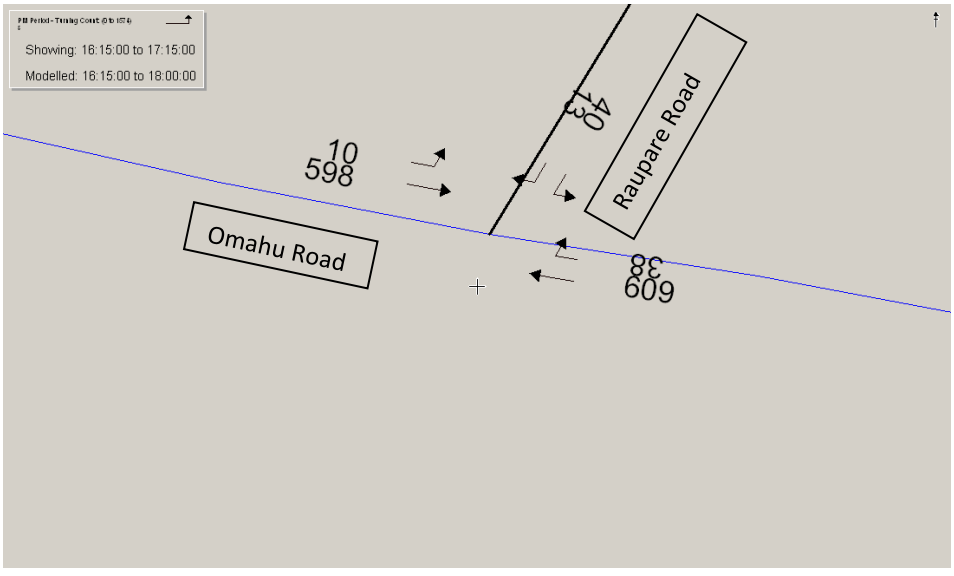
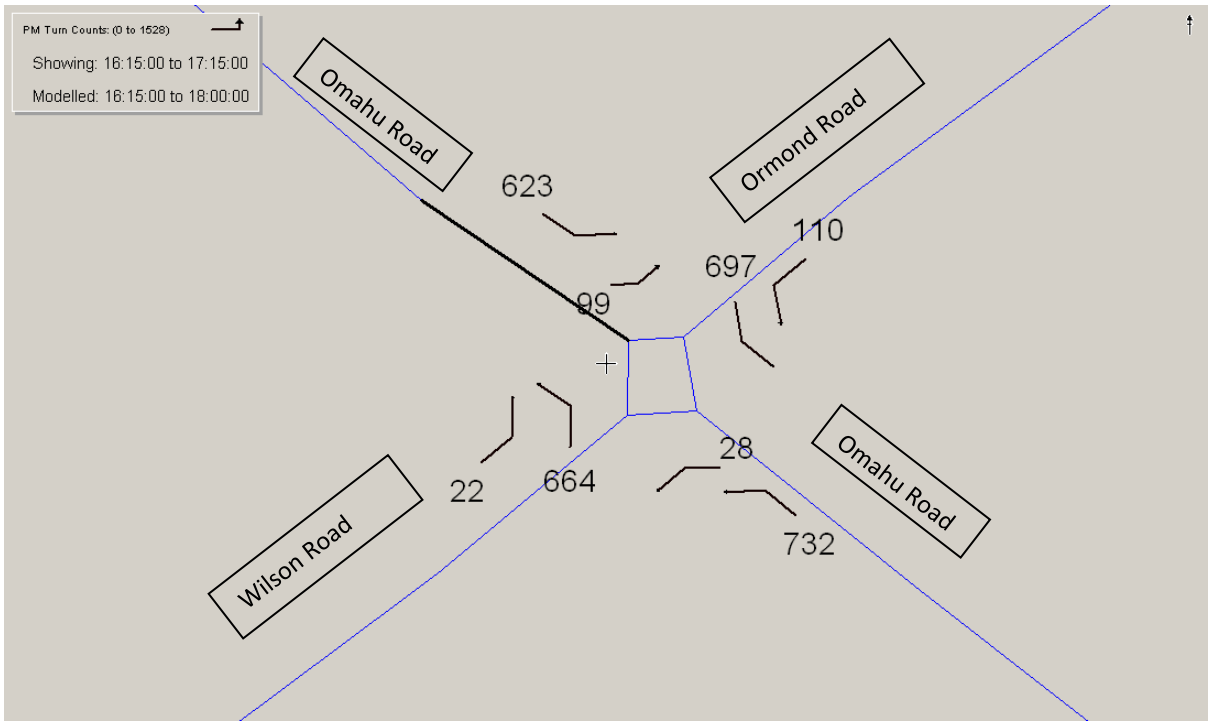


Figure 20: Existing Peak Hour Volumes – Omahu Road /Ormond Road / Wilson Road



5. Safety

A review of the current safety performance was undertaken to determine the nature of crash types and severity in the immediate vicinity of the site. The New Zealand Transport Agency (NZTA) Crash Analysis System was used, with a 5 year period assessed from 2006 to 2011.

The review extended from Kirkwood Road to Ormond Road, including a 50m buffer of all intersections contained within this length.

A total of 111 crashes have occurred within the subject area in the 5 year period.

Table 6: 2006 - 2011 Crash Record

Location	Non-injury	Minor	Serious	Total
Intersection	41	9	2	52
Mid-Block	43	14	2	59
Total	**84**	**23**	**4**	**111**

47% of all recorded crashes have occurred at intersections along this route. Collectively this rate is considered in keeping with the general crash rate performance of intersections in the Hastings District, which is currently sitting at approximately 48% of all crashes occurring at intersections.

Hastings District Council has recently undertaken an Intersection Intervention Prioritisation Study, which includes a technique for refining the order in which Intersections are prioritised. This is classed as a Level of Safety Service (LoSS) and is a method derived from the General Flow Crash prediction models contained within the Economic Evaluation Manual (EEM). The LoSS method takes into account the speed environment, intersection form and amount of traffic travelling through an intersection. In this instance it has been used to identify Intersections that have the greatest differential between actual crash performance and predicted crash performance as in indication of poor performing intersections in the vicinity of the development site.

The Level of Service Safety classifications are listed below, with LoSS 5 representing the worst performing category and LoSS 1 representing a good level of performance.

Level of Safety Service	Definition
LoSS 5	The number of observed injury crashes divided by the predicted number of injury crashes is greater than 3.0
LoSS 4	The number of observed injury crashes divided by the predicted number of injury crashes is greater than 2.0 and less than or equal to 3.0
LoSS 3	The number of observed injury Crashes divided by the predicted number of injury crashes is greater than 1.5 and less than or equal to 2.0
LoSS 2	The number of observed injury crashes divided by the predicted number of injury crashes is greater than 1.0 and less than or equal to 1.5
LoSS 1	The number of observed injury crashes divided by the predicted number of injury crashes is less than or equal to 1.0

Table 7: Level of Safety Service Bands

From the recorded crashes, the existing intersections of concern are highlighted below and are considered to be high risk in that they are already performing worse than expected.

INTERSECTION	TOTAL CRASHES	LEVEL OF SAFETY SERVICE
CHATHAM ROAD	11	
HENDERSON ROAD	7	**LoSS 4**
JAMES ROCHFORT PLACE	2	
KIRKWOOD ROAD	1	
MEIHANA ST	3	
ORMOND ROAD	8	
RAUPARE ROAD	6	**LoSS 5**
TWYFORD ROAD	7	**LoSS 5**
WILSON ROAD	7	
Total Crashes	52	

Table 8: High Risk Intersections

The intersection crash causes are listed below in Figure 21. The top cause factors which represent over 50% of all intersections crashes are; Failed to Give Way, Inattentive and Did Not see or Look for Another Party until too late.

Crash Cause	Total Crashes
100 - Alcohol or Drugs	1
110 - Too fast for Conditions	4
120 - Failed to Keep Left	1
130 - Lost Control	3
140 - Failed to Signal in Time	1
180 - In Line of Traffic	2
190 - Sudden Action	1
300 - Failed to Give Way	10
330 - Inattentive: Failed to Notice	7
350 - Attention Diverted By:	5
370 - Did Not See or Look for Another Party Until Too Late	7
380 - Misjudged speed	1
400 - Inexperience	2
420 - Incorrect use of vehicle controls	1
430 - Showing Off	1
510 - Intentional or Criminal	1
600 - Lights and Reflectors at Fault or Dirty	1
610 - Brakes	1
660 - Body or Chassis	2
800 - Slippery	1
820 - Obstructed	1
900 - Weather	1
Total	55

Figure 21: Intersection Crash Cause Factors

The mid-block crash causes are listed below in Figure 22. The top cause factors which represent over 50% of all mid - block crashes are; Inattentive: Failed to Notice, Entering or Leaving Land Use, Lost Control, Did Not see or Look for Another Party until too late and Alcohol or Drugs.

Crash Cause	Total Crashes
100 - Alcohol or Drugs	5
110 - Too fast for Conditions	3
120 - Failed to Keep Left	1
130 - Lost Control	6
140 - Failed to Signal in Time	1
170 - Wrong Lane/Turned From Wrong Position	1
180 - In Line of Traffic	2
200 - Forbidden Movements	1
300 - Failed to Give Way	4
330 - Inattentive: Failed to Notice	9
350 - Attention Diverted By:	5
370 - Did Not See or Look for Another Party Until Too Late	6
380 - Misjudged speed	3
500 - Illness and Disability	1
510 - Intentional or Criminal	3
630 - Tyres	1
640 - Windscreen or Mirror	1
810 - Surface	1
830 - Visibility Limited	1
900 - Weather	1
920 - Entering or Leaving Land Use	7
Total	63

Figure 22: Mid-Block Crash Cause Factors

Hastings District Council has included Omahu Road in the Long Term Plan for safety works programmed in the 2013/14 financial year. The strategy for works being undertaken is 'Safer Corridors' and will include low cost improvements only along the entire length of Omahu Road. These works do not include significant transformation works, i.e. change of Intersection control.

6. Proposed development

The applicant is seeking a Plan Change for a new industrial development on a 36ha strip of land identified along the northern side of Omahu Road, Hastings.

It is the applicant's intent to stage the development over two stages. The stages chosen reflect a number of issues including infrastructure capital costs, expected demand, and Council's overall strategy. Figure 23 shows the extent of the proposed development (Deferred I2 Omahu North Zone). Although the applicant is unable to confirm the exact detail and composition of the businesses that are likely to establish on the site, it is expected that the businesses will be those broadly summarised as dry industry. This reflects the limited capacity for the supply of process water to this area.

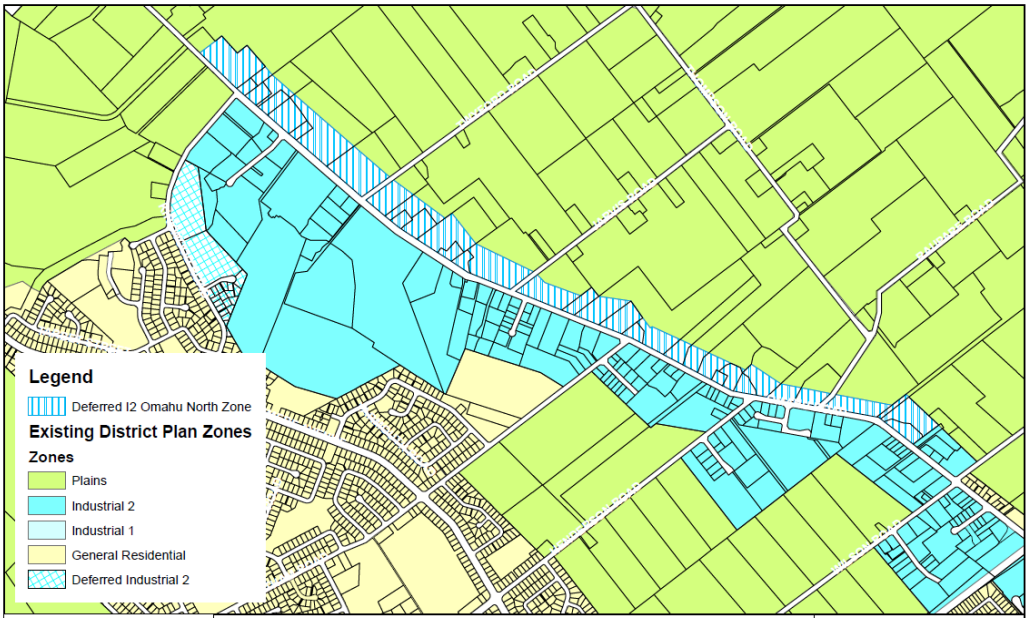


Figure 23: Development Site and Zone Plan

The proposed site is intended to be zoned as Industrial and will support the existing Industrial zone that it already established on the southern side of Omahu Road.

7. Trip Generation and Distribution

In order to assess the impact of the proposed development on the transport network it is necessary to calculate the expected number of trips likely to be generated. These trips are then assigned to a distribution route through the network and added to the existing traffic volumes. All volumes used at this time are reflective of a 2010 base condition.

7.1. Existing Activity

The existing area is zoned as Plains Zone within the Hastings District Plan and land use is generally consisting of horticultural and agricultural activities. Some industrial and commercial activities are already located within the area.

The existing land use has a trip generation assigned that has been discounted to reflect the change in landuse, however it should be noted that this is considered to be insignificant. (20vph).

7.2. Expected Trip Generation

The trip generation for the development was previously calculated for inclusion within the Hastings Industrial Development Traffic Impact Assessment (HIDTIA) 2005. The Gross Floor Area that was considered at that time (2005) was greater than that which is currently available. On this basis, the previous generation rate has been applied to the lower current GFA. This is provided in Table 9.

	Calculation	Output (2 hr. period)
Typical Trip Rate	=(126,000 m^2/100m^2) x 1 trips	1260 vehicles

Table 9: Trip Generation Rate

7.3. Mode Split

Given the semi-rural location of the site, and the proposed type of activity, this assessment has anticipated that the majority of trips will be vehicle based. It is noted however that some staff and visitors may wish to walk or cycle to the site and that this is becoming increasingly more likely with the infrastructure provisions that Council have provided in recent years. The current bus route also provides a reduced level of connectivity to the proposed site as mentioned previously, providing service to the southern extent of the site, where passengers would be required to complete their journey by foot or on bicycle.

7.1. Trip Distribution

The likely distribution for the predicted development traffic onto the surrounding road network had been accounted for within HIDTIA 2005. Whilst the trip generation rates are now lower than originally calculated, the original distribution of that traffic on the network will remain relatively unchanged.

In addition to the HIDTIA 2005, an assessment of the impact of the proposed land development has been carried out using the Hastings Area Transport micro simulation model (HAT model). This model has the key role of measuring the travel times, queues and level of service.

The trip distribution patterns assigned to the development in the HAT model where derived from average trips distribution patterns assigned to the existing industrial land use on the Southern side of Omahu Road. The general distribution values are contained within Table 10.

	AM Peak	PM Peak
From development	30%	70%
To development	70%	30%

Table 10: Traffic Distribution

The Heretaunga Plains Transportation Model is the higher tier regional travel demand model which sits above the HAT model. It is built around relationships between landuse, trip rates and trip making patterns. The key purpose of this model is to forecast travel demand based on changing landuse. This model has a range of future scenarios, all of which have this development included as a component of its base conditions. This enables us to understand the future operating conditions of the transport network collectively, however unable to ascertain direct effects generated a result of the Omahu Road Industrial Development in isolation to other influences.

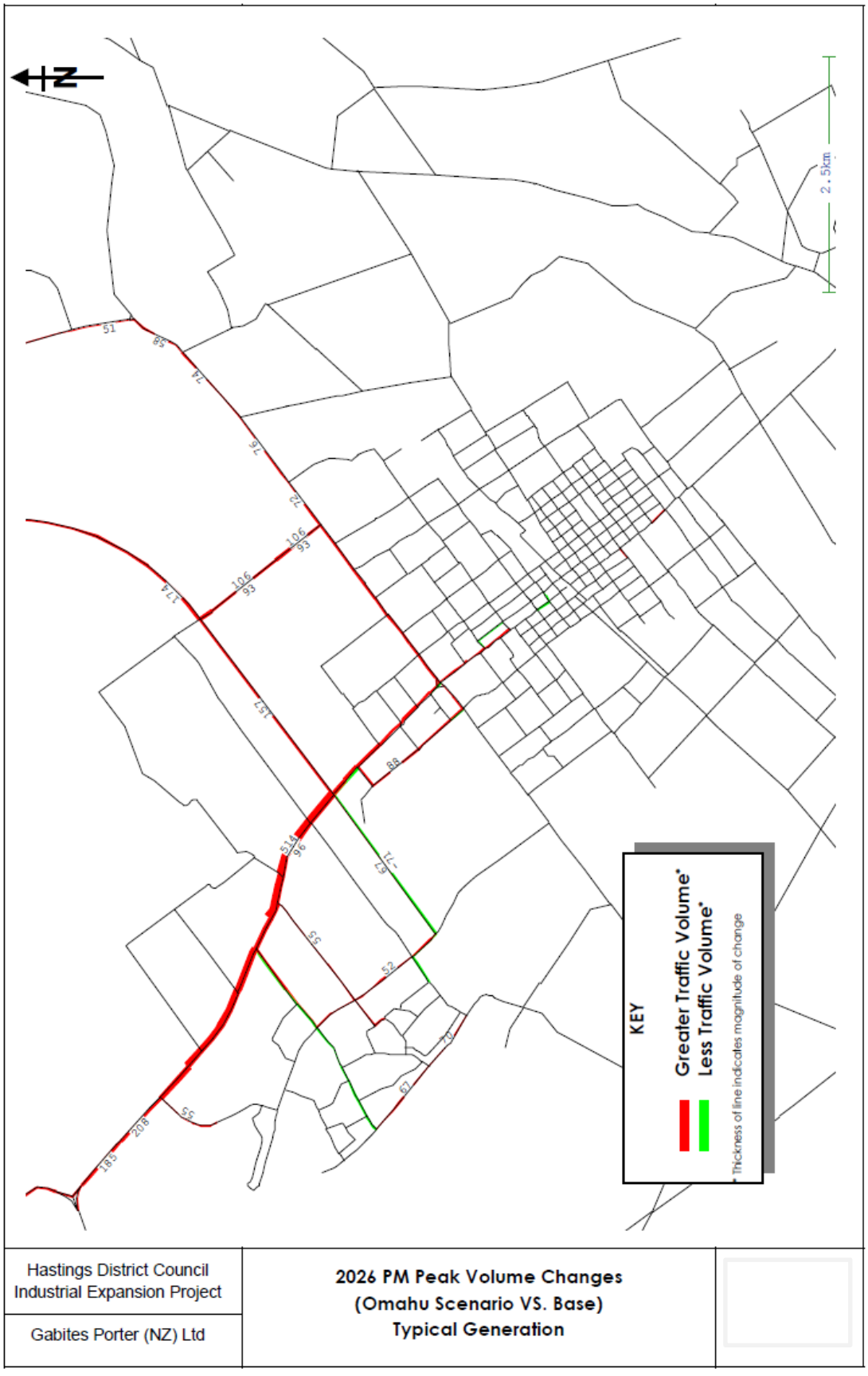


Figure 24: Network Traffic Distribution

8. Effects on the existing Transport Network

The HAT model was used in the main to assess the current intersection performance and capacity of the local road network at the key intersections identified along Omahu Road. Additionally industry recognised modelling software SIDRA was used to further validate some of the modelling outcomes obtained.

In addition to this, a network flow analysis and mean speed queue analysis was undertaken using HAT to determine if other affects where considered likely outside of the immediate study area.

The assessment has focused on the evening peak hour between 04:15pm and 05:15pm as discussed earlier in this report and only provides a current network observation, i.e. no future scenario has been assessed in this manner.

The existing evening peak flows where analysed to ascertain current performance. The resulting outputs are detailed in Table 11. This information was then used as a basis for comparison when determining the likely affect generated by the proposed development.

The outputs are measured using Level of Service (LoS) which is a standard quality measure describing the operational conditions within a traffic stream. In this instance the specific measure is vehicle delay.

Letters designate each level of service, from A to F, with LoS A representing the best operating conditions and LoS F representing the worst. It should be noted that a LoS A, B OR C are considered to be within capacity and provide an acceptable level of service for road users.

Table 11 demonstrates that the majority of the transport network can readily accommodate the increased traffic generation without change and maintain a LoS A, with the exception of a few intersections. Significant change (≥ LoS C) is expected to occur at both Raupare Road/Omahu Road Intersection and Henderson Road/Omahu Road Intersection.

In addition to the detailed assessment undertaken within the HAT model, a desktop review of the HIDTIA 2005 and the Heretaunga Plains Transportation Model Report was also undertaken. Following this review the HIDTIA was discounted from this stage of the assessment based on the following

- HIDTIA contained a LoS classification system that was developed through a community and stakeholder lead consultation process that does not reflect industry standards.
- The strategic transport network can no longer take the same form as previously assessed. For example the Northern Arterial Route is no longer feasible in its original status and only a truncated version and reduced network benefits are available.
- The trip generation rates that were calculated are considerably higher than that which is currently being considered.

The Heretaunga Plains Transportation Model Report is used, but it is recognised that this provides a crude level assessment.

Figure 25 provides a baseline condition. Figure 26 and Figure 27 provide future LoS plots of the network. In summary this identifies that no change to the baseline conditions occur between Henderson Road and Kirkwood Road, until 2046 which sees the link between Chatham Road and Jarvis decrease to LoS C.

Between Henderson Road and the Hawkes Bay Expressway, a steady deterioration occurs resulting in the overall link reaching a LoS E by 2046.

Intersection	Approach	Level of Service (Base)	Level of Service (Base + Development)	Change
Omahu Road/ Kirkwood Road	OM_KR_SB	A	A	No Change
	OM_KR_NB	A	A	No Change
	KR_OM_NEB	A	A	No Change
Omahu Road / Twyford Road	OM_TY_SB	A	A	No Change
	OM_TY_NB	A	A	No Change
	TY_OM_SWB	A	A	No Change
Omahu Road / Jarvis Road	OM_JR_SB	A	A	No Change
	OM_JR_NB	A	A	No Change
	JR_OM_SWB	A	A	No Change
Omahu Road / Chatham Road	OM_CH_SB	A	A	No Change
	OM_CH_NB	A	A	No Change
	CH_OM_NEB	A	B	Change
Omahu Road / Henderson Road	OM_HN_SB	A	B	Change
	OM_HN_NB	A	A	No Change
	HN_OM_NEB	C	E	Change
Omahu Road / Raupare Road	OM_RP_SB	A	A	No Change
	OM_RP_NB	A	A	No Change
	RP_OM_SWB	B	F	Change
Omahu Road / Ormond Road / Wilson Road	OM_WL_SB	A	A	No Change
	OM_WL_NB	A	A	No Change
	WR_OM_NEB	A	A	No Change
	OR_OM_SWB	A	A	No Change

Table 11: HAT Intersection Performance Analysis

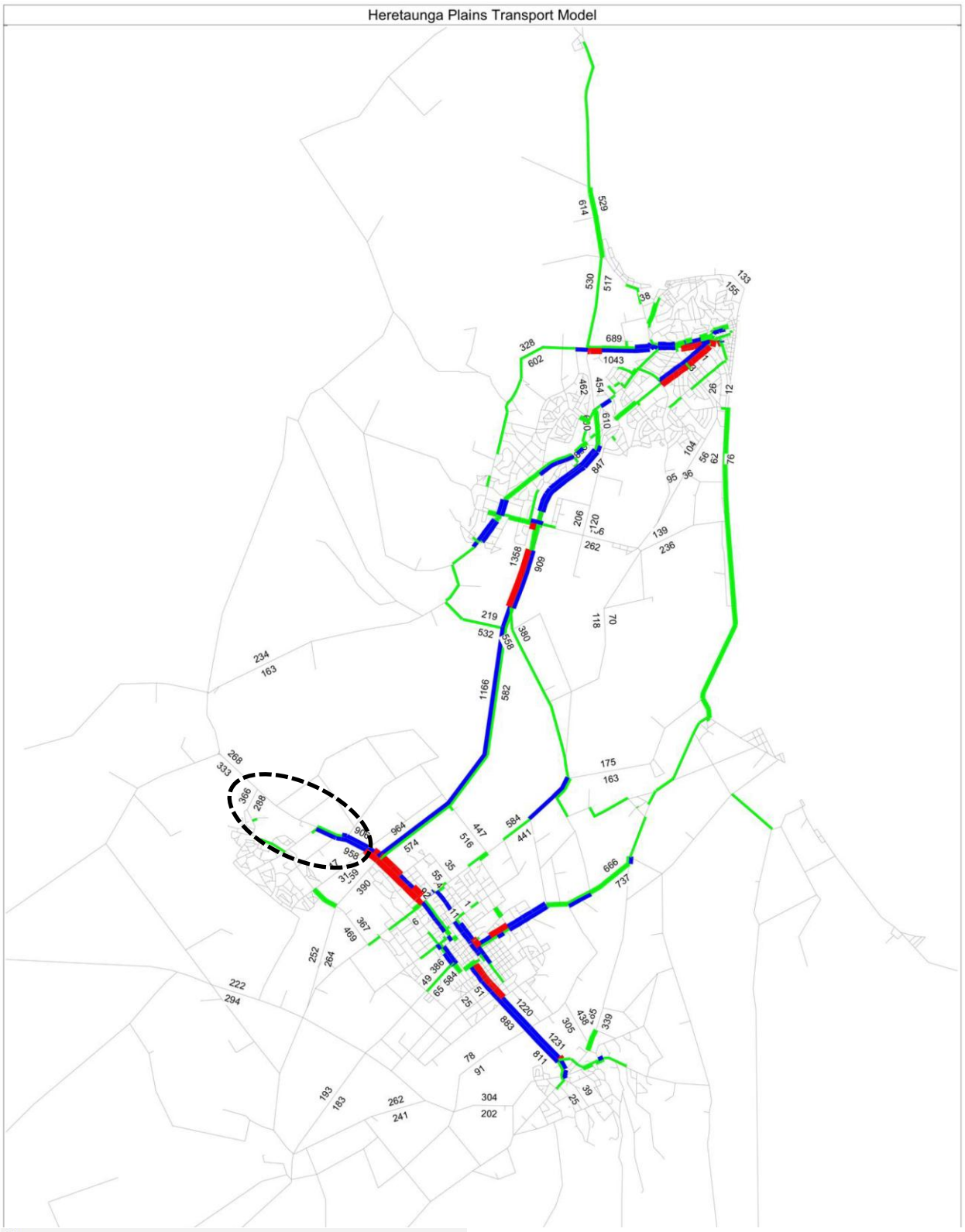
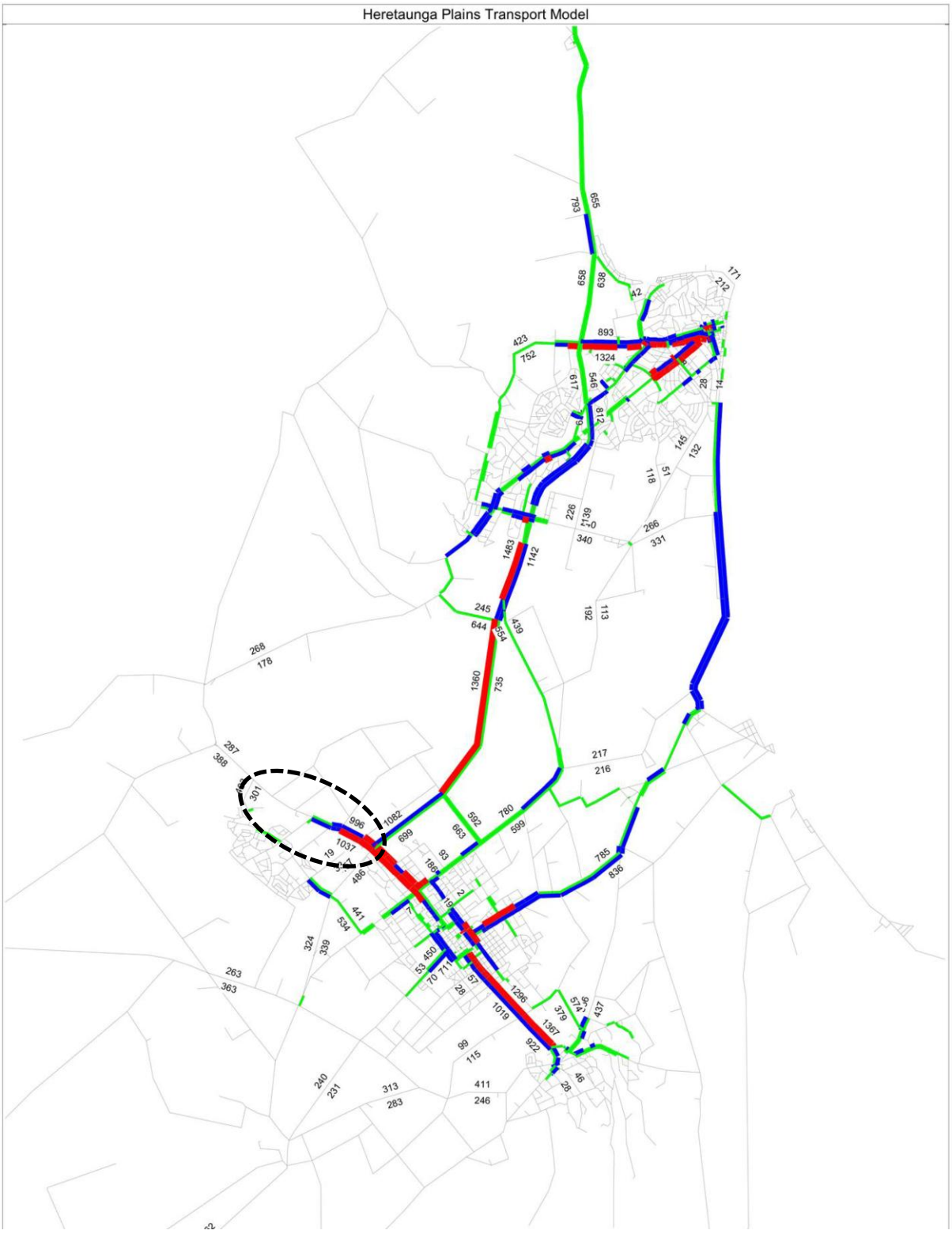


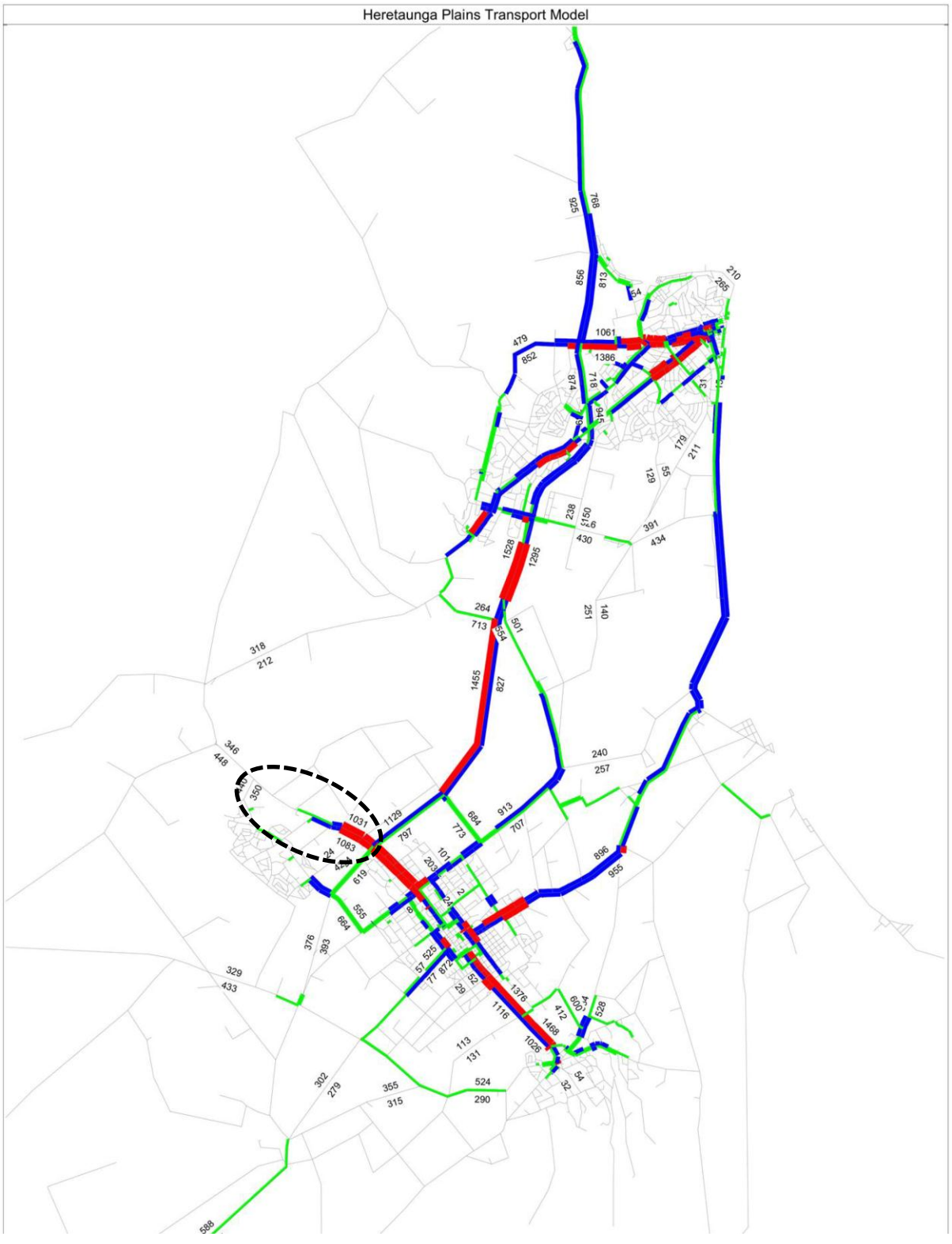
Figure 25: Level of Service 2009 PM Peak



Key:

Grey	Level of service A and B defined as unaffected/reasonable freedom
Green	Level of service C defined as comfort and convenience declines
Blue	Level of service D defined as all drivers markedly restricted
Red	Level of service E and above defined as near capacity, little of no freedom

Figure 26: Level of Service 2026 PM Peak



Key:

Grey	Level of service A and B defined as unaffected/reasonable freedom
Green	Level of service C defined as comfort and convenience declines
Blue	Level of service D defined as all drivers markedly restricted
Red	Level of service E and above defined as near capacity, little of no freedom

Figure 27: Level of Service 2046 PM Peak

9. Access and Egress

The level of access to the site is unknown at this stage; however multiple access points are anticipated along Omahu Road. The majority of the access points are anticipated to form private driveways as commonly seen on the southern side of Omahu Road. It is also likely that a small quantity of high volume driveways will be established.

The existing road layout provides a central flush median. It is anticipated that this facility will provide effective holding and turning provision for vehicles performing right turn manoeuvres both to and from the site. Furthermore on road cycle lanes exists, which when unoccupied are commonly utilised as left turn deceleration lanes.

In addition, both the Hastings District Plan and Engineering Code of Practice provide specific requirements pertaining to the location, design and construction standards of private driveways.

Specific attention is required where footpaths are located near or immediately adjacent to property boundaries and will be intersected by private driveways. These locations require sufficient visibility to ensure that vehicles are able to sight pedestrians before pulling into the footway.

This can be adequately achieved with a pedestrian visibility splay.

10. District Plan Provisions

The development is bound by the requirements of the District Plan where it is zoned Rural Plains, and the proposed activities are described as being industrial. As such it has been assessed against the General Performance Standards of Section 14.1 Traffic Sightlines, Parking, Access and Loading.

10.1. Traffic Sightlines

The proposed development will comprise of multiple industrial activities in private ownership. This will strongly influence the frequency and location of private access points that are established along Omahu Road.

The quantity and spacing of access points will be influenced by any on street parking provision within the road reserve corridor. The safety assessment of Omahu Road has identified that crashes are occurring either entering or leaving landuse and is one of the top crash cause factors along this route. Therefore it will be paramount to ensure that emerging visibility is not compromised at private entranceways by the presence of road side parking.

Compliance with Section 14.1.8.2 (I) Austroads standards requires a Safe Intersection Stopping Distance (SSID) of 97m. The Hastings District Council's Engineering Code of Practice, also suggests that 'Guidelines for Visibility at Driveways RTS6' would also be an acceptable means of compliance in this instance and stipulates a 90m SSID.

The road alignment is relatively straight in nature with a flat gradient which would generally satisfy achieving the visibility requirements as described in Section 14.1.8.2 of the Hastings District Plan. However the provision of existing on street parking and any additional on street parking will influence this outcome and should be managed from the outset to ensure compliance is achieved and maintained.

In accordance with the 90m SSID obtained from RTS6, and a 50km/hr speed environment, no on street parking can occur within either 20m of an access (in the direction of approaching nearside traffic) or 10m of the access (in the direction of approaching far side traffic). This is illustrated in Figure 28. It has been assumed that any on street parking will be inset behind the existing kerb line. On site observations confirm that this parking configuration is feasible and is considered to provide the optimal arrangement.

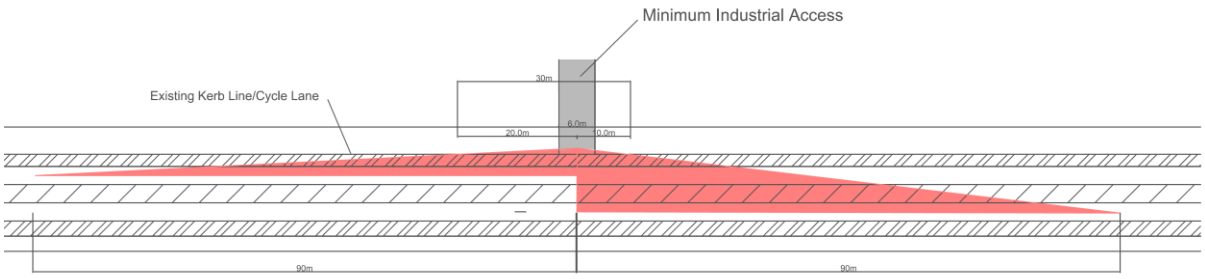


Figure 28: Access Visibility Requirements

10.2. Parking

This section provides an analysis of the future demand on the parking resource caused by the proposed development site. The scope of this investigation can broadly be defined as follows

- An assessment of the likely car parking demand generated by the proposed development
- Whether or not this demand can be accommodated by the existing car parking resource within the immediate vicinity of the development
- An assessment of the shortfall, if any, between the supply and projected demand.

10.3. Parking and Occupancy Surveys

Six existing sites situated on the southern side of Omahu Road where surveyed with the Gross Floor Area (GFA) and car parks recorded. The survey information is provided in Table 12.

Site	Area (m^2)	Number of car park	m^2 GFA/Car parks	Number of Employees derived from District Plan Parking Standard
Site 1	408	5	82	10
Site 2	947	10	95	20
Site 3	756	7	108	14
Site 4	1596	13	123	26
Site 5	2074	15	138	30
Site 6	8949	64	140	128

Table 12: Site Parking Survey

An on street parking investigation was undertaken to examine the existing demand for public parking within the study area and capture the extent of on road parking provision. This comprised of a series of parking occupancy surveys throughout the study area. These surveys occurred on Tuesdays 31st July 2012 through to Monday 6th August 2012. Three daily surveys where carried at the hours of 10:00am, 1:00pm and 3:00pm. Only weekday surveys where completed.

Details relating to the car parking inventory contained within the study area is provided within Table 13. Both the northern and southern sides of Omahu Road where surveyed, with the results displayed in Figure 29 and Figure 30.

Section	Type of Park	Quantity	Time Limitation	Survey Length
Northern Side	Parallel	70	None	2200m
Southern Side	Parallel	133	None	1800m
Total		203	None	4000m

Table 13: Car Parking Inventory

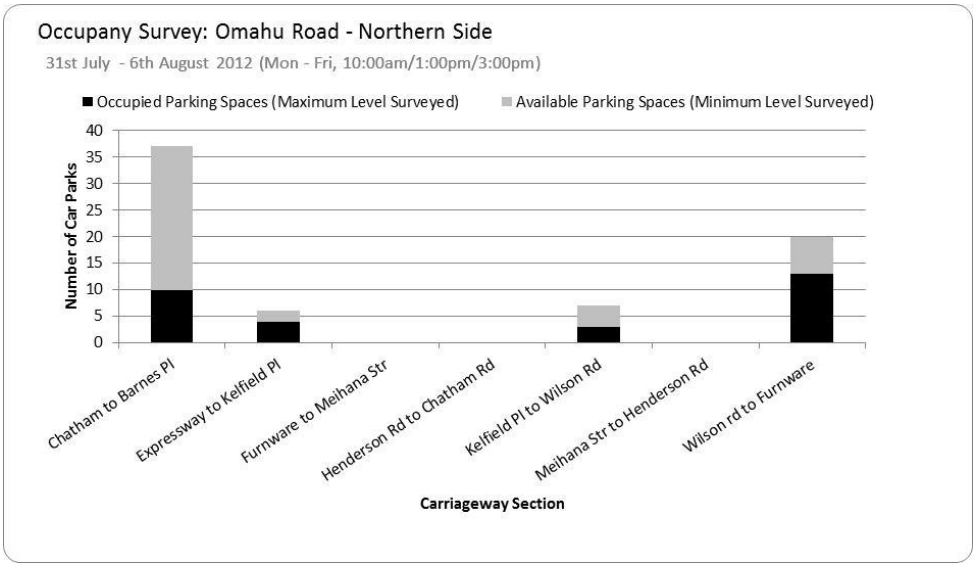


Figure 29: Car parking Occupancy Survey – Northern Side

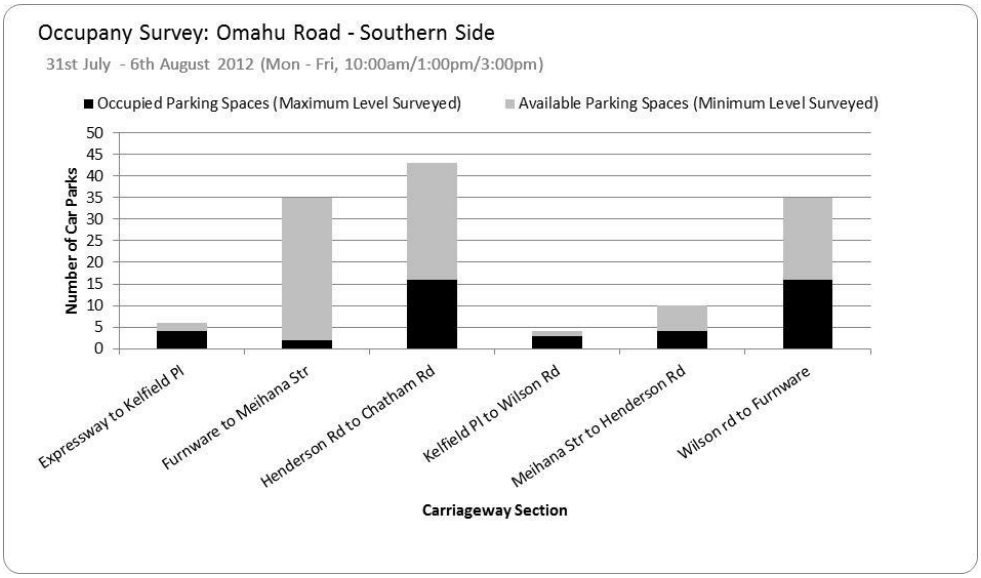


Figure 30: Car parking Occupancy Survey – Southern Side

	Number of Parks	Carriage way Length	Maximum Number of Parks Occupied	Existing Landuse Frontage Parking Ratio (m/Park)	Occupancy of available car parks (%)
Northern side - Existing	70	2206	30	31.50	43%
Southern side - Existing	133	1765	45	13.3	34%

Table 14: Existing on street car parking summary

On average Table 12 suggests that an average parking allocation of 0.88 car parking spaces per 100m² is being achieved for this landuse. Furthermore this is supported with an on street parking provision on both the north and south side of the road, with a ratio of 31.50 linear metres per park a 13.0 linear metres per park respectively. The maximum car parking occupancy was recorded for the three survey periods and therefore this summary is considered to be conservative.

10.4. Parking Demand

Table 6.2 contained within the Trips and Parking Related to Land Use Report provides a parking demand rate of 1.5 car parks/100m² as an average representation of industrial activities.

Total Site Area	Developable floor area (GFA) (m)		Land Use	Parking Demand	No. of Parks
360000 sqm	35%	126000 sqm	Industrial	1.5 spaces per 100m²	1890

Table 15: Parking Demand – Trips Database Bureau

The current parking provision as recorded in Table 12 is being applied at a rate generally lower than that indicated by the Trips Database Bureau, however it is acknowledged that on street parking is also supporting this demand. The on street parking surveys have identified that utilisation of the existing parking facilities is low, and that additional capacity exists in this respect.

In order to quantify any available capacity to support the development, the maximum recorded occupancy levels have been used to derive a Minimum frontage parking ratio for the existing landuse activities.

It should be noted that when traffic flows are high, drivers typically consider areas of on street parking to be either full or inconvenient once the overall on street occupancy reaches around 85% occupancy. Beyond these levels, drivers can experience inconveniently long search patterns to find a vacant space.

With this in mind, the existing observed on street parking occupancy has been factored to reflect the upper threshold of 85% occupancy. This has been used to develop a minimum Frontage parking ratio for the existing landuse as contained in Table 16.

Section	Minimum Frontage Parking Ratio - m/ Park (85% Capacity)
Northern side - Existing	62.5
Southern side - Existing	33.0

Table 16: Existing minimum on street car parking ratio

10.5. Parking Provision

Compliance with the Provision of On-Site Parking, Section 14.1.8.4 of the Hastings District Plan will be required for the proposed development. The car parking space requirements as extracted from Table 14.1.8.3-1 of the district plan are provided in Table 17.

Activity	Parking requirement
Industrial Activities	1 space per 2 persons usually employed on the site at any time.

Table 17: Hastings District Plan - Parking Requirements

The total parking provision requirement will be subject to the specific industrial activities that establish at the site, with parking being provided as per the standards highlighted in Table 17. These standards currently apply to the existing landuse which has also been supported with on street car parking. This combined level of private and public parking provision is considered to be effectively meeting the car parking requirements of the existing landuse with surplus capacity provided.

It is considered rational to apply the same provision to the proposed landuse. The minimum on road car parking ratios to be applied are described Table 18.

	Proposed Minimum Frontage Parking Ratio –- Parks/m (85% Capacity)
Northern side – Existing + Development	0.046
Southern side – Existing + Development	0.046

Table 18: Proposed minimum on street car parking ratio

	Minimum Number of Parks	Length [of zone
Northern side	151	3300
Southern side	81	1765

Table 19: Minimum on street parking required

It is noted that the southern side of Omahu Road contains 133 existing car parks and far exceeds the minimum 81 car parks required. On this basis no additional parking provision is required to the southern side of Omahu Road and approximately 52 car parks are generally available to support parking demand generated by the site in the locality of the survey area.

The northern side may experience roadside modifications as a result of development works and access configuration which could potentially impact on the existing on street parking provision. It is therefore recommended that a minimum provision of 151 formal parks be maintained on the northern side of Omahu Road.

Given the location of the existing kerb line and recent road renewal on Omahu Road, it would be optimal to inset parking behind the existing kerb line. On site observations have confirmed that sufficient space exists between the recently constructed kerb line and the private boundary to readily achieve this requirement.

It is recommended in this instance that inset parking on this route should be able to accommodate HCV class 1 vehicles as a minimum. These vehicles are up to 18.5m in length. Therefore any provision of inset parking should be a minimum of 3 standard bays long with entry and exit tapers as required.

11. Construction Effects

Hastings District Council has indicated intent to phase the development over two key areas. Each area/zone will contain numerous land parcels which will see private construction activities varying in scale and duration.

It is estimated that with the staging of zones, and staggered construction activities within each zone, the highest level of construction traffic occurring at any one time is expected to be significantly less than the daily flows anticipated by the fully developed site. As it has been assessed that there is adequate provision for the developed site traffic demand on the existing road network, it is expected that the construction traffic will also be readily accommodated.

12. Conclusions

This assessment has examined the traffic related features and effects of the proposed development. The resulting analysis indicates that the proposed development may generate up to 1260vph during the weekday peak period. While the peak hour traffic flows at the site are likely to coincide with the surrounding network peak, it is concluded, that following successfully implementation of the recommendations contained within this report, there will be no significant impact on the functionality of Omahu road or the main intersections along this route.

No other significant affects have been observed outside of the Omahu Road corridor, other than a volume increase on the Hawkes Bay Expressway which is a strategic route purposely built for this function.

13. Recommendations

Based on the findings of this report and the associated conclusions, it is recommended that:

13.1. General

- A footpath is established along the northern side of Omahu Road for the extent of the development frontage.
- Pedestrian crossing provision is provided at intersections and at key midblock locations.
- A minimum of 100 on street in set parking spaces be established on the northern side of Omahu Road.
- Minimum on street parking bay length should be 18m (i.e. three car parks in length)
- Additional planning controls are provided to ensure private access ways are staggered with a minimum 50m separation distance at locations where on street parking is being provided.
- Additional planning controls are provided to ensure that a pedestrian visibility splay, as detailed within the Hastings District Engineering Code of Practice (DWG C38) is provided and maintained at all vehicle crossing locations.
- A post construction speed limit assessment is undertaken in accordance with Speed Limits New Zealand.
- Council may wish to consider Public Transport opportunities for the Omahu Road corridor to support the employment commute to both this development and the existing industrial landuse activities which have established on Omahu Road.

13.2. Stage 1

- The Henderson Road intersection with Omahu Road be upgraded to a roundabout intersection
- The Raupare Road intersection with Omahu Road requires a sight line improvement, a gentle alignment modification and localised widening to the Raupare Road approach lane. A review of the Cadastral Boundary lines suggest that the offending vegetation resides within Road Reserve, however the existing road infrastructure does not reside within dedicated road reserve boundary, as such Council may wish to confirm/re-establish boundaries during any land acquisition process undertaken.
- It is recommended that Council monitor the effectiveness of the safety improvements carried out at Raupare Road. Should safety issues arise, it is recommended that Council consider either providing a protected right turn facility for vehicles exiting Raupare Road, or alternatively preventing this right turn manoeuvre. No land implications occur as a result of these additional measures.

13.3. Stage 2

- Whilst no capacity or safety issues have been predicted at the Chatham Road and Omahu Road Intersection, should safety issues arise at a point in the future, it is recommended that Council would need to consider upgrading this intersection to a roundabout. This safety evaluation should be carried out prior to the commencement of Stage 2.
- It is recognised that this measure would impact on private land and Council should protect this now as part of this Plan change.
- Twyford Road and Omahu Road intersection be upgraded to include a formal right turn lane
- It is recommended that the on street parking provision provided during Stage 1 be reviewed and modified if necessary to better reflect observed demand.