

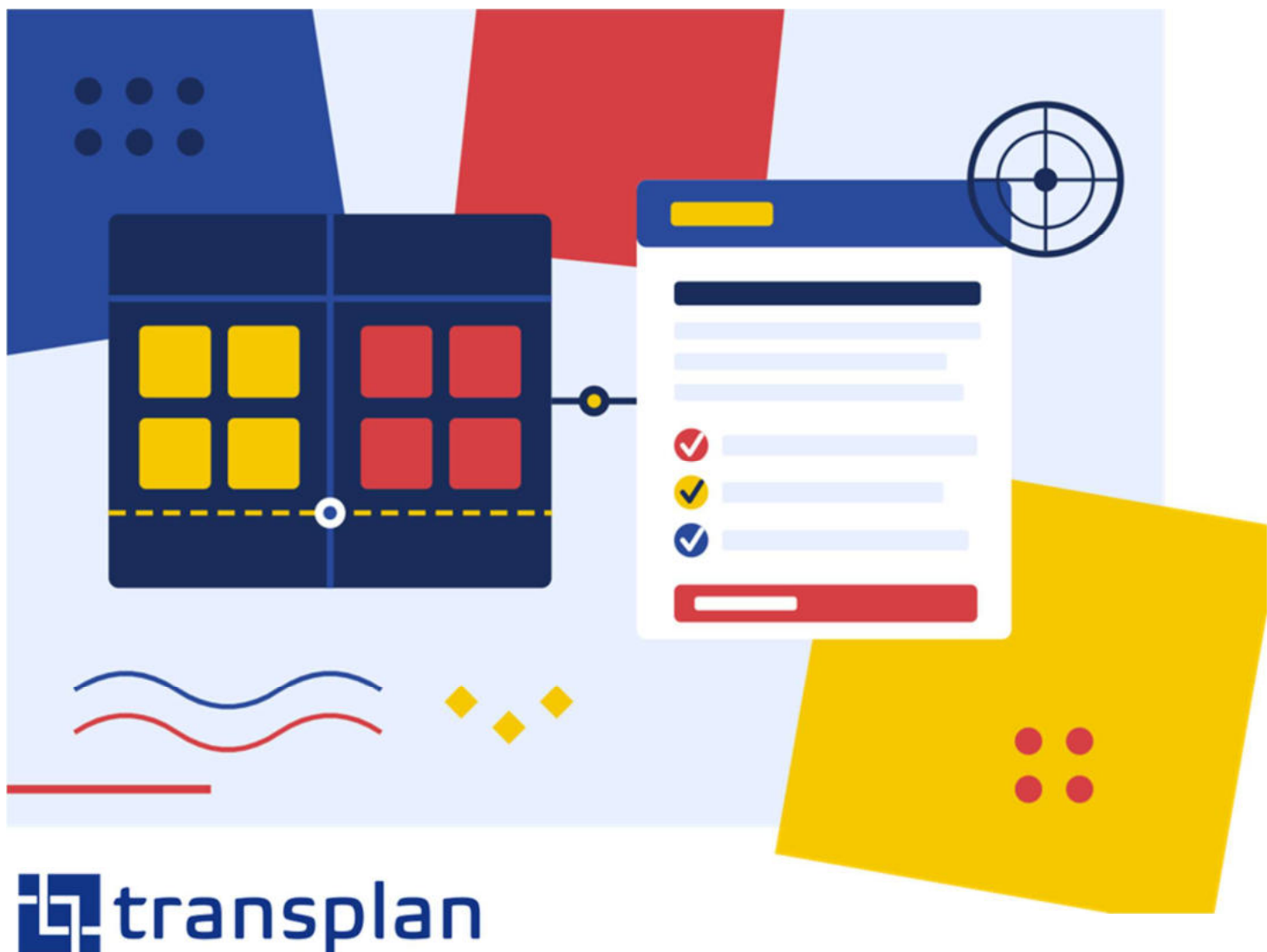
Brymer Farms

584 State Highway 23 | Whatawhata Road, Temple View & Brymer Road, Rotokauri

Integrated Transport Assessment

Final, Issue 1

20 August 2026





Document Control Record

Client	Brymer Farms Limited
Property	Brymer Farms
Location	584 State Highway 23 Whatawhata Road & Brymer Road, Rotokauri
Report	Integrated Transport Assessment
Date	20 August 2026
Version	Final, Issue 1
Filename	2026-08-20_brymer-farms_ita-fin.docx
Author	T. M. Ueckermann



Qualifications and Code of Conduct

I am Tobias Muller Ueckermann, a Director and Principal Transportation Engineer with Transplan New Zealand. I hold a Master of Transportation Engineering from the University of Pretoria and a Certificate of Proficiency in Engineering -Road Safety Improvement from the University of Canterbury. I have 30 years of professional experience in traffic engineering, transport planning and transportation infrastructure planning and design. My qualifications and relevant experience are set out in further detail in my curriculum vitae in **Appendix A** to this report.

I confirm that I have read and understood the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023, and I agree to comply with it.

I acknowledge that, as an expert, I have an overriding duty to assist the decision maker impartially on matters within my area of expertise. In preparing this report, I have exercised my independent professional judgement, and the opinions I express are my own. I understand that my duty as an expert is not to advocate for the interests of the applicant or any other party.

I confirm that the matters addressed in this report are within my area of expertise, except where I expressly state that I am relying on information or opinions provided by another person. I have not omitted to consider any material facts known to me that might alter or detract from the opinions expressed in this report.



Executive summary

Purpose

This Integrated Transport Assessment (ITA) has been prepared by Transplan Limited in support of the substantive resource consent application lodged under the Fast-track Approvals Act 2024 for the Brymer Farms development. The Project is the subject of a Notice of Decision by the Minister dated 4 September 2025 to refer the Project.

The proposal provides for a comprehensively planned, multi-staged residential community of approximately 1,042 residential units, including approximately 248 apartments across Sites A1, A2, C1 and C2, together with approximately 2,184 m² of ground-floor retail gross floor area (GFA) and some 552 m² of office GFA within the two neighbourhood centre sites, plus open space, three-waters infrastructure and an internal transport network, delivered in twelve stages over the medium (c. 2035) to long term (c. 2045).

The scale of the proposal exceeds the ITA-Full thresholds in the NZTA Integrated Transport Assessment Guide (17 June 2026) for both residential (120 units) and retail (1,000 m² GFA) activity, and the assessment has accordingly been undertaken as a full ITA. It assesses the transport effects of the development across all modes, the integration of land use and transport, the mitigation, staging and design responses required to manage adverse effects, and the consistency of the proposal with the relevant strategies, plans, policies and standards.

Methodology

The assessment has been informed by:

- Traffic surveys: 24-hour turning-movement surveys undertaken at ten intersections on Thursday 9 October 2025.
- Trip generation: estimated from first principles using TfNSW (2024) and ITE (2017, 2021) rates, with a neighbourhood shopping plaza (ITE code 821) for retail and a small office building (code 712) for offices. Retail rates were applied without reduction for pass-by, linked or internally captured trips, making the adopted trip generation deliberately conservative.
- Strategic modelling: the Waikato Regional Transport Model (WRTM), reported in Appendix H. The 2025 base model met the NZTA Transport Model Guidelines criteria for small area / corridor models after local refinement (87.9% of morning turning movements at a GEH below 5.0, 100% below 10.0), and development loading was calibrated to the first-principles estimates to within 2% across both peaks. Scenarios were tested at 2035 (no development, Stages 1–5, Stages 1–6, full development) and at 2045 and 2055 (no development and full development).
- Intersection modelling: detailed operational analysis in SIDRA Intersection v11.
- Safety and accessibility: a five-year Crash Analysis System (CAS) review for 2021 to 2025, and 15-minute walking, cycling and driving isochrone analysis.
- Consultation: with Hamilton City Council (HCC), Waikato District Council (WDC) and NZTA, including a pre-lodgement meeting with NZTA on 3 August 2026.

Wider network effects and local traffic distribution effects have been assessed separately, so that the effects on each adjoining local street can be tested on their own terms. Two model limitations are acknowledged and have been managed rather than relied upon: modelled flows on SH 23 west of Dinsdale could not be reconciled with the surveyed counts, and validation was weaker at the SH 23 / Newcastle Road and Newcastle Road / Ellicott Street intersections, where the assessment applies the modelled change in flows to the 2025 counted movements rather than the absolute model outputs.

Key findings

- Integration and accessibility. The masterplan delivers a legible, connected, grid-influenced street network with footpaths on all internal streets, bi-directional cycleways and shared paths on the collector network, bus-capable collector geometry, and multiple connections into Grandview Heights,



Western Heights and the surrounding reserves. Within 15-minute walk residents reach Grandview Heights, Western Heights and much of Nawton; within a 15-minute cycle, Dinsdale, Frankton, Forest Lake, the Nawton and Dinsdale shopping centres and the local school network; and within a 15-minute drive, effectively all key destinations in Hamilton City.

- Wider network effects are modest. The WRTM predicts little or no change in strategic intersection level of service at 2035 and 2045 in any scenario. Development traffic loads onto the roads built or designated to carry it, being Grandview Road, the SH 23 corridor and Brymer Road, while the component on Newcastle Road is negligible (+4% AM, +1% PM at 2035) and by 2045 the completed network relieves Newcastle Road relative to the no-development case. The 12 to 18% increases on the SH 23 corridor represent the development using the strategic network for its strategic movements. This conclusion is expressly conditional on delivery of the Grandview Road connection, the SH 23 access and the internal collectors linking them.
- The 2055 constraints are driven by background growth. Capacity constraints emerge at several SH 23 corridor intersections by 2055, but they appear in the no-development scenarios as well, with SH 23 / Newcastle Road already at LOS E and the Dinsdale roundabout at LOS E in the evening peak. With full development, SH 23 / Newcastle Road moves to LOS F (PM) and SH 23 / Wallace Road to LOS E (AM). The development is an incremental contributor to constraints created by background growth across the western Hamilton catchment; the appropriate response is corridor-level intervention led by the road controlling authorities.
- Local streets are largely unaffected. At full development the development component is between -2 and +34 vph in the peak hour on Ayrshire Drive, Angus Street, Baverstock Road, Farmborough Drive, Bagust Road and O'Brien Road. Brymer Road takes a further 87 to 120 vph (AM) and 134 to 170 vph (PM), with volumes of 500 to 700 vph at 2035 rising to 780 to 1,130 vph by 2055, within the capacity of the existing two-lane carriageway. Grandview Road carries the largest change, by design, rising from about 96 to 111 vph surveyed in 2025 to 418 to 494 vph, and is essentially flat across 2035, 2045 and 2055. The 118-dwelling Harrogate Place catchment (Stage 1) generates approximately 99 movements in each peak hour and 889 per day, is confirmed self-contained, and requires no reduction in yield or mitigation beyond the design itself. Western Heights Drive is the one street requiring specific attention, rising from 183 to 198 vph to approximately 300 to 380 vph; the volumes remain within collector-street function, so the matter is one of amenity and route discipline rather than capacity.
- Intersection performance is sound throughout. Every intersection at the site access connections and in the established residential network operates at LOS A, B or C in every scenario and horizon year. The worst result is 15.6 seconds at the Grandview Road / Newcastle Road / Brymer Road crossroads in the 2055 morning peak, some nine seconds inside the 25-second LOS D threshold, and six of the seven are stable or improving between 2035 and 2055.
- Practicable mitigation is demonstrated where required. SIDRA analysis of the 2055 full-development scenario confirms conventional mitigation at each constrained external intersection, none of it requiring additional lanes: signalisation at SH 23 / Wallace Road (LOS C in both peaks), signalisation with short lanes at SH 23 / Newcastle Road (LOS E AM, LOS C PM) and a compact urban roundabout at Newcastle Road / Ellicott Street (LOS B AM, LOS C PM). None is required to be delivered by the Applicant. The SH 23 site access is, by contrast, development-specific and Applicant-delivered: priority-controlled, the right-turn exit reaches LOS F at 2055, so signalisation will be required before that horizon; signalised, all approaches operate at LOS B (AM) and LOS B to C (PM), with 95th percentile right-turn queues of 3.4 to 3.8 vehicles, some 24 to 27 m.
- Safety outcomes improve on the status quo. The CAS review identified 22 crashes on the Brymer Road corridor (no fatalities, three serious and six minor injuries) and 27 crashes on SH 23 Whatawhata Road (one fatality, four serious and six minor injuries), with neither corridor exhibiting a crash cluster or systemic deficiency. The new SH 23 access will be a purpose-designed, protected intersection, replacing what would otherwise be uncontrolled rural frontage access onto a high-speed state highway, and the internal network adopts low-speed geometry with a 30 km/h environment around the neighbourhood centres and park. The masterplan has been designed with regard to CPTED principles.
- Parking is deliberately car-lite. Apartment parking is provided at approximately 0.59 (A1) and 0.58 (A2) spaces per apartment, an appropriate response in the NPS-UD context but one that depends on the



travel demand management measures being secured rather than left to the market. The matters remaining are design refinements for engineering approval and building consent, not matters affecting the acceptability of the proposal.

- Construction effects are low and temporary. Earthworks will import approximately 299,710 m³ of material (59,710 m³ of roading aggregate and 240,000 m³ of fill) over some eleven years, with cut-to-fill balanced on site. Heavy vehicle demand ranges from about 6 truck movements per day to a peak of about 19 during the E2b fill stage, with 10 to 20 staff movements. At the busiest stage total construction traffic is 30 to 40 movements per day, fewer than three trucks per hour across a 7:30 am to 6:00 pm working day. No temporary road cLOSures or network detours are required, and heavy vehicles are not anticipated to exceed the 20% threshold, so a pavement maintenance assessment is not warranted.
- The proposal is consistent with the relevant policy framework. No inconsistency has been identified with the GPS on land transport 2024–34, the Waikato RLTP, RPTP and RPS, the Future Proof Strategy and Future Development Strategy, the adjacent structure plans and previous ITAs, the HCDP transport provisions and RITS, the Transport Emissions Reduction Plan or NZTA design guidance that would weigh against the grant of consent.

Conclusions and recommendations

Residual effects after mitigation

Subject to the mitigation in Section 8 and the conditions recommended in Section 9.4, residual transport effects are assessed as follows:

- Network capacity and efficiency: less than minor. No wider network upgrades are triggered, individually or cumulatively, beyond the site access points and their immediate connections.
- 2055 intersection performance: minor. The degradation identified arises predominantly from background growth and is appropriately managed through the road controlling authority's programme.
- Local traffic distribution: minor, subject to the staged access framework and the monitoring regime being secured.
- Safety: less than minor, and improved relative to the status quo by replacing informal rural frontage access with a designed, protected intersection.
- Construction: less than minor, readily managed through the CTMP and, for works within the state highway corridor, an NZTA-approved TMP.
- Parking and servicing: minor and manageable, provided the travel demand management measures are secured by condition.
- Active modes and public transport: positive, through footpaths on all streets, a connected cycleway and shared path network, the upgraded shared path connection to the established neighbourhood, bus-capable collector geometry and stops, and neighbourhood centres that shorten daily trips.

Recommended conditions

It is recommended that the following matters be secured through conditions of consent:

- Staging and access triggers: no development beyond the Stages 1–5 catchment (approximately 200 dwellings reliant on the Grandview Road connection) is to be occupied until the SH 23 access has been constructed, is operational and has been approved by NZTA, delivered by the consent holder at its own cost. O'Brien Road access is limited to the 8 dwellings in Stage 1A and the Harrogate Place catchment to 118 detached dwellings.
- Design, audit and approvals: safe system audits at design, during construction and on completion of each stage; engineering approval for each stage; and the SH 23 access design approved by NZTA, able to be signalised without reconstruction and signalised at the consent holder's cost on the specified triggers.
- Public transport and active modes: bus-capable collector geometry with stop infrastructure installed progressively; engagement with WRC at a defined population trigger regarding extension of scheduled



services; and footpaths, cycleways, shared paths and neighbourhood connections delivered with the stage in which they fall.

- Parking, servicing and travel demand management: recessed on-street loading bays; servicing management plans for Sites C1 and C2; ride-share, car-share and EV charging spaces retained in perpetuity and unallocated; parking unbundled from apartment titles with residents' travel plans; and cycle parking to the HCDP rates.
- Speed management and street environment: a 30 km/h speed limit and supporting low-speed design around the neighbourhood centres and park, with lighting to the relevant AS/NZS 1158 category.
- Construction: a contractor-prepared CTMP per stage; construction traffic restricted to 7:30 am to 6:00 pm Monday to Saturday; heavy vehicle access primarily from SH 23 and none via Harrogate Place or the Grandview Road residential streets; and an NZTA-approved TMP for works within the SH 23 corridor.
- Monitoring and review: tube counts on Grandview Road, Highgrove Drive, Ayrshire Drive and Western Heights Drive at the completion of each stage, reported to HCC; LATM measures investigated if Western Heights Drive exceeds approximately 280 vph two-way in the peak hour on the busiest section; and turning movement surveys at the Grandview Road access, the SH 23 access and the Brymer Road / Grandview Road / Newcastle Road intersection within twelve months of occupation of the 200th and 600th dwellings.

Overall conclusion

The traffic effects of the proposal on the wider network are modest. The WRTM confirms no material change in strategic intersection level of service at 2035 or 2045, and the constraints identified at 2055 arise predominantly from background growth rather than from this development, with practicable mitigation demonstrated at each affected intersection. On the local network the development's traffic is confined to the streets designed to carry it, the single exception being a predicted redistribution onto Western Heights Drive that is addressed through monitoring and, if required, local area traffic management. Every intersection at and near the site access connections operates at LOS C or better at every horizon year, and construction effects are low and temporary.

Subject to the measures in Section 8 and the conditions recommended in Section 9.4, in particular the staged access framework and SH 23 trigger, the NZTA-approved SH 23 intersection, progressive safe system audits, the approved CTMP, the monitoring regime with its LATM trigger for Western Heights Drive and the travel demand management package, it is concluded that the proposal will not have unacceptable adverse effects on the safety or efficiency of the transport network, is consistent with the relevant transport plans, policies and standards, and can be supported from a transportation perspective.

Note

The assessments in this ITA are based on the use and reference to the masterplan set dated 30 July 2026. A revised set has been issued on 19 August 2026. The revised masterplan now reflects a residential yield of approximately 1,042 residential units/lots of varying typologies and 248 apartments. The prior yield was 1,054 residential units/lots (12 more) and 272 apartments (24 more). This does not materially affect the content in this ITA. Copies of both masterplan sets are included for reference in **Appendix B**.



Contents

1	INTRODUCTION.....	1
1.1	Purpose of this assessment	1
1.2	Regulatory context	1
1.3	Basis for Applying Hamilton City Council Transport Standards	1
1.4	ITA thresholds	3
1.5	Scope, limitations and professional judgement	4
1.6	Consultation	4
2	PROJECT DESCRIPTION	5
3	EXISTING TRANSPORT ENVIRONMENT	8
3.1	Overview	8
3.2	Existing travel behaviour	9
3.3	Active transport.....	11
3.3.1	Pedestrian	11
3.3.2	Cycling	12
3.4	Public Transport	14
3.4.1	Commuter rail services	14
3.4.2	Commuter bus services	15
3.4.3	Taxi services	15
3.5	Private transport	17
3.5.1	Road network	17
3.6	Intersection traffic volumes (24-hour) and operational conditions	22
3.6.1	Introduction.....	22
3.6.2	Existing network/intersection performance	22
4	FUTURE TRANSPORT ENVIRONMENT.....	23
4.1	Overview.....	23
4.2	Active transport.....	23
4.3	Commuter bus services.....	23
4.3.1	Final 2028 network - short-term overview	23
4.3.2	Long-term network vision (c. 2037).....	25
4.3.3	Implications for the Brymer Farms development.....	25
4.4	Commuter rail services	27
4.5	Private transport	28
4.6	Background growth	28
5	DESCRIPTION OF THE PROPOSAL	29
5.1	Study area.....	29
5.2	Zoning.....	29
5.3	Site plan.....	29



5.4	Land-use and intensity	29
5.4.1	Site C1 (Commercial 1)	30
5.4.2	Site C2 (Commercial 2)	30
5.4.3	Site A1 (Apartments - Site 1)	30
5.4.4	Site A2 (Apartments - Site 2)	30
5.5	Transport Elements	31
5.5.1	Access points	31
5.5.2	Roads.....	31
5.5.3	Road cross-sections	31
5.5.4	Staging and sequencing.....	32
5.6	Trip generation estimation	32
5.6.1	Overview	32
5.6.2	Residential Trips	33
5.6.3	Commercial trips, retail.....	33
5.6.4	Commercial trips, offices	34
5.6.5	Summary.....	34
5.7	Trip distribution and assignment	38
5.8	Traffic modelling using the WRTM	38
5.8.1	About the WRTM model.....	38
5.8.2	Model commissioning.....	38
5.8.3	Development model network.....	38
5.8.4	WRTM modelling summary	40
5.9	Assessment of Wider Traffic Effects	40
5.9.1	Introduction and scope	40
5.9.2	Reliability of the modelling evidence	40
5.9.3	Strategic intersection performance	41
5.9.4	Change in corridor traffic flows	41
5.9.5	The 2055 horizon.....	42
5.9.6	Summary - wider network effects.....	42
5.10	Assessment of Local Traffic Distribution Effects	42
5.10.1	Introduction.....	42
5.10.2	Staged access framework	43
5.10.3	Surrounding local road network	43
5.10.4	Intersection performance at the site access connections and nearby intersections.....	46
5.10.5	Harrogate Place catchment (Stage 1) - detailed assessment	51
5.10.6	Grandview Road connection and staging - detailed assessment	51
5.10.7	Summary - local traffic distribution effects	52
5.11	Traffic modelling using SIDRA Intersection	52



5.11.1	Overview	52
5.11.2	SH 23 / Wallace Road	53
5.11.3	SH 23 / Newcastle Road	54
5.11.4	Newcastle Road / Ellicott Street.....	55
5.11.5	SH 23 Site Access	56
5.12	Site servicing, deliveries and loading.....	57
5.13	General.....	57
5.13.1	Site C1 & C2	58
5.13.2	Site A1 & A2	58
5.14	Site access and parking	58
5.14.1	General access.....	58
5.14.2	Site C1 access	58
5.14.3	Site C2 access	59
5.14.4	Site A1 access	59
5.14.5	Site A2 access	59
5.14.6	General parking	59
5.14.7	Site C1 parking.....	59
5.14.8	Site C2 parking.....	60
5.14.9	Site A1 parking.....	60
5.14.10	Site A2 parking	61
5.15	Earthworks construction traffic.....	61
5.15.1	Introduction.....	61
5.15.2	Indicative construction transport movements	61
5.15.3	Heavy vehicle movements - number and type	61
5.15.4	Staff travel to and from the site	62
5.15.5	Hours of operation and peak hour for construction traffic.....	62
5.15.6	Detours required during construction.....	63
5.15.7	Matters to be covered in the Traffic Management Plan.....	63
6	CONTEXT-SPECIFIC TRANSPORT EVALUATIONS	64
6.1	Accessibility assessment	64
6.1.1	Overview	64
6.1.2	Accessibility by walking.....	64
6.1.3	Accessibility by cycling.....	64
6.1.4	Accessibility by driving	65
6.2	Safety assessment	66
6.2.1	Brymer Road corridor – crash summary 2021–2025.....	66
6.2.2	SH 23 Whatawhata Road – crash summary 2021–2025.....	68
6.3	Personal security	69



6.4	Pavement maintenance impact, heavy vehicles	70
7	ASSESSMENT AGAINST RELEVANT PLANS AND STANDARDS	71
8	MITIGATION	73
9	CONCLUSIONS	74
9.1	Overview.....	74
9.2	Summary of findings.....	74
9.2.1	Integration of land use and transport, and accessibility.....	74
9.2.2	Trip generation and modelling.....	74
9.2.3	Wider network effects	75
9.2.4	Local traffic distribution effects	75
9.2.5	Intersection performance and mitigation.....	76
9.2.6	Site access, servicing and parking.....	77
9.2.7	Safety and personal security.....	77
9.2.8	Construction effects	77
9.2.9	Consistency with plans, policies and standards.....	78
9.3	Residual effects after mitigation	78
9.4	Recommended conditions	79
9.4.1	Staging and access triggers	79
9.4.2	Design, audit and approvals	79
9.4.3	Public transport and active modes.....	79
9.4.4	Parking, servicing and travel demand management.....	80
9.4.5	Speed management and street environment	81
9.4.6	Construction	81
9.4.7	Monitoring and review	81
9.5	Overall conclusion	82
10	REFERENCES	83



List of Appendices

Appendix A:	Curriculum Vitae
Appendix B:	Development Masterplans
	B.1: Latest set dated 19 August 2026, including Overall Plan; Staging Plan; Movement Network & Roding Hierarchy; and Public Transport and Active Modes Network
	B.2: Earlier set dated 30 July 2026 (as used and referred to throughout this ITA) including Land Uses; Staging and Roding Hierarchy
Appendix C:	Mixed-use Commercial Centre Plans: Sites C1 & C2
Appendix D:	Apartment Plans: Sites A1 & A2
Appendix E:	Road Typical Sections & Series C340 Plans
Appendix F:	Roding Plans
	F1: Series C300 - Brymer Farms (Site)
	F2: Series C310 – Internal Roundabouts
	F3: Series C330 – Intersections/Connections
Appendix G:	Intersection Traffic Count Survey Data Summary
Appendix H:	WRTM Traffic Modelling Report
Appendix I:	SIDRA Intersection Modelling Outputs
	I.1: Newcastle Road / Ellicott Street
	I.2: SH 23 / Wallace Road
	I.3: SH 23 / Newcastle Road
	I.4: SH 23 / Site Access (Brymer Farms)
Appendix J:	Construction Traffic Management Plan Framework (Planning-Stage)



List of Figures

Figure 2.1: Project Location	5
Figure 3.1: Structure Plan Areas	8
Figure 3.2: Fast Track Development Areas	9
Figure 3.3: Grandview Heights SA2 Area	10
Figure 3.4: Nawton Community Link route	12
Figure 3.5: Hamilton City Bike Map.....	13
Figure 3.6: New Zealand Cycle Trails	14
Figure 3.7: Hamilton Bus Network.....	16
Figure 3.8: Bus route and stop locations in/near Grandview Heights and Western Heights	17
Figure 3.9: One Network Framework (ONF) Road Classification	19
Figure 3.10: One Network Road Classification (ONRC)	19
Figure 3.11: Limited Access Roads - State Highways	20
Figure 3.12: High Productivity Motor Vehicle Routes.....	20
Figure 3.13: Over Dimension Routes in/near Hamilton	21
Figure 3.14: Road Network Speed Limits	21
Figure 3.15: Traffic count locations	22
Figure 4.1: Final 2028 Hamilton bus network - full city	24
Figure 4.2: Hamilton long-term bus network (c. 2037)	26
Figure 4.3: Potential Future HCC Rapid Transit Network and Park & Ride Sites.....	27
Figure 5.1: Brymer Farms WRTM model network zones and nodes	39
Figure 5.2: Intersection level of service - 2035 AM peak, full development	48
Figure 5.3: Intersection level of service - 2035 PM peak, full development	48
Figure 5.4: Intersection level of service - 2045 AM peak, full development	49
Figure 5.5: Intersection level of service - 2045 PM peak, full development	49
Figure 5.6: Intersection level of service - 2055 AM peak, full development	50
Figure 5.7: Intersection level of service - 2055 PM peak, full development	50
Figure 5.8: Upgraded layout for SH 23 / Newcastle Road with traffic signals	54
Figure 5.9: Upgraded compact roundabout layout for Newcastle Road / Ellicott Road.....	55
Figure 5.10: SH 23 protected, T-junction configuration, priority control	56
Figure 5.11: SH 23 protected, T-junction configuration, signalised	57
Figure 5.12: Example of a T-intersection with channelised right-turn treatment on the major road	57
Figure 5.13: Detour route(s) for SH 23.....	63
Figure 6.1: 15-minute walk isochrone map	64
Figure 6.2: 15-minute cycle isochrone map	65
Figure 6.3: 15-minute drive isochrone map	65
Figure 6.4: Road Traffic Crashes since January 2021, North	66
Figure 6.5: Crash Analysis System (CAS) vehicle movement coding sheet	67



Figure 6.6: Collision Map, North	68
Figure 6.7: Road Traffic Crashes since January 2021, South (SH 23)	69
Figure 6.8: Collision Map, South (SH 23)	69



List of Tables

Table 1.1: Base thresholds for ITA types	4
Table 3.1: Modal splits from SA2 Grandview Heights	10
Table 5.1: Development yield by stage.....	32
Table 5.2: Trip generation summary, vehicles (hourly, daily)	35
Table 5.3: Inbound/outbound trip splits by peak period	36
Table 5.4: Inbound/outbound trips by development stage and peak period.....	37
Table 5.5: Two-way one-hour corridor flows, 2035 (vehicles per hour)	41
Table 5.6: Two-way one-hour flows - 2035 (vehicles per hour, AM/PM)	43
Table 5.7: Two-way one-hour flows - 2045 and 2055 (vehicles per hour, AM/PM).....	44
Table 5.8: Delay (seconds per vehicle) and level of service - full development	47
Table 5.9: HCM Level of Service (LOS) thresholds	53
Table 5.10: Selection of design and checking vehicle and turning radius for intersections	58
Table 5.11: Imported construction aggregate and fill, and truck movements, by earthworks stage	62
Table 5.12: Daily earthworks construction, staff traffic movements	62
Table 7.1: Assessment against relevant plans and standards	71
Table 8.1: Mitigation considerations.....	73



Abbreviations

ADT	Average Daily Traffic
CAS	Crash Analysis System
CBD	Central Business District
FTAA	Fast-track Approvals Act 2024
GFA	Gross Floor Area
Ha	Hectares
HCC	Hamilton City Council
HCDP	Hamilton City District Plan
HGV	Heavy Goods Vehicle
ITA	Integrated Transport Assessment
LATM	Local Area Traffic Management
LOS	Level of Service
NZTA	New Zealand Transport Agency Waka Kotahi
ODP	Operative District Plan
ONRC	One Network Road Classification
RITS	Regional Infrastructure Technical Specifications
SH	State Highway
SH 23	State Highway 23
Veh/hr	Vehicles per hour
vpd	Vehicles per day
WDC	Waikato District Council
WDDP	Waikato District Council District Plan Operative in Part
WRTM	Waikato Regional Transport Model



1 INTRODUCTION

1.1 Purpose of this assessment

This Integrated Transport Assessment (ITA) has been prepared for the Substantive Resource Consent application in terms of the Fast-track Approvals Act ('FTAA') 2024 for a large-scale residential subdivision referred to as Brymer Farms (the 'Site').

An ITA is used to evaluate significant development and land use change proposals. It takes a multidisciplinary approach to identify and assess the potential effects of a proposal on the existing and future transport network.

For this development, the assessment covers:

- The transport effects of the development across all modes, including walking, cycling, public transport, freight and general traffic, and how those effects are to be managed.
- Integration of land use and transport, by aligning the proposal with the existing and planned transport network.
- Informing decision-making by identifying potential adverse effects and recommending appropriate mitigation, staging, or design responses.
- Where appropriate, how the development can support travel by public transport and active modes and improve accessibility.
- Consistency with the relevant strategies and policies (refer **Section 1.2**).

1.2 Regulatory context

The following statutory and planning instruments, in particular, are relevant to this assessment:

- Resource Management Act 1991 (RMA): assessment of actual and potential effects, including positive, negative, future and cumulative effects.
- Fast-track Approvals Act 2024 (FTAA): this ITA supports a substantive resource consent application lodged under the FTAA.
- Local Government Act 2002 (LGA) and Land Transport Management Act 2003 (LTMA): links to development contributions and transport project funding / timing.
- Hamilton City Council Operative District Plan ('HCDP') transport provisions.
- Access Hamilton - HCCs Transport Strategy.
- Waikato District Council (WDC) District Plan Operative in Part ('WDDP').

1.3 Basis for Applying Hamilton City Council Transport Standards

The Brymer Farms site is presently located within the Waikato District Council (WDC) administrative area and, accordingly, the relevant provisions of the Waikato District Plan remain part of the statutory planning framework applying to the proposal. However, for the purposes of assessing the detailed form, function and performance of the proposed transport network, the Integrated Transport Assessment has primarily adopted the relevant Hamilton City Council (HCC) transport provisions, standards and design criteria as the appropriate technical benchmark.

The relevant WDC provisions have not been disregarded; rather, the HCC framework has been used as the principal basis for detailed assessment because it most closely reflects the actual and anticipated transport environment within which the Brymer Farms development will function.

There are a number of reasons for this approach:

- First, the Brymer Farms site occupies a transitional location immediately adjoining the western edge of Hamilton City. While the land is currently within WDC's jurisdiction and retains a predominantly rural character, the proposed development is urban in its nature, scale and function. It comprises a



comprehensively planned residential community of approximately 1,042 dwellings, together with neighbourhood commercial activities, an internal collector and local road network, walking and cycling infrastructure, and provision for future public transport. The development therefore bears substantially greater similarity to the adjoining urban environment of Hamilton than to the rural or peri-urban transport environment that presently characterises much of the surrounding Waikato District.

- Secondly, the proposed transport network is intended to operate as an extension of, and integrate directly with, Hamilton's urban transport network. The development provides connections towards Grandview Road and the established Grandview Heights and Western Heights neighbourhoods, together with a future connection to SH23. The internal collector, local road, pedestrian and cycle networks have been deliberately configured to provide continuity with these adjoining Hamilton neighbourhoods rather than functioning as an isolated or self-contained transport system. The ITA records that the proposed active-mode infrastructure is intended to tie directly into Grandview Heights and Western Heights so that pedestrian and cycling connections continue across neighbourhood boundaries.

This physical integration is particularly important because a substantial proportion of trips generated by Brymer Farms can reasonably be expected to interact with the Hamilton transport network. Access to employment, education, retail, community facilities and public transport will predominantly involve travel into or through Hamilton. The relevant receiving environment for assessing transport effects is therefore not limited to the territorial boundary within which the development site happens to be located. From a transport-planning perspective, the functional network extends across that boundary.

- Thirdly, the rural and semi-rural suburbs to the north, comprising the suburbs of Baverstock and Burbush, is itself undergoing a significant transition from rural to urban. HCC has undertaken and planned substantial transport investment associated with this new urban growth based on the Rotokauri and Rotokauri North Structure Plans and associated strategic transport infrastructure as important components of the future transport environment. Although Brymer Farms sits outside those formal structure plan areas, its proposed access points, internal network and active-mode connections have been designed to integrate with that planned urban system.

Applying the HCC standards therefore provides an appropriate means of ensuring continuity in road hierarchy, corridor width, street function, pedestrian and cycling provision, public transport capability, access design and intersection treatment between Brymer Farms and the adjoining Hamilton urban area. The proposed internal road typologies consequently follow the Hamilton City District Plan (HCDP) road formations, including collector roads and local roads designed for use by future commuter bus services.

- Fourthly, applying an urban HCC standard provides a suitably robust and conservative basis for assessing the effects of the proposal. Brymer Farms is not being proposed as a rural subdivision; it is a significant urban development that will ultimately accommodate a substantial resident population and associated commercial activity. It is therefore appropriate that matters such as vehicle access, intersection spacing, parking layout, pedestrian facilities, cycle infrastructure, road cross-sections and public transport accommodation are assessed against standards developed for a comparable urban environment. This avoids designing infrastructure merely to satisfy standards associated with the site's existing jurisdiction or zoning where those standards may not adequately represent its intended long-term function.

This approach also provides for long-term infrastructure compatibility. Designing the Brymer Farms network to HCC's road formation and transport criteria from the outset means that the development will interface appropriately with adjoining HCC infrastructure and avoids creating an artificial change in engineering standard at the territorial boundary. It also provides a network capable of being integrated into Hamilton's wider urban transport system should administrative boundaries or infrastructure ownership arrangements change in the future. The ITA expressly identifies this consideration, noting that the HCC road formation criteria have been applied so that the network is capable of adoption following any future boundary change.

The use of the HCC framework is also consistent with the practical transport planning undertaken for the development to date. For example, the staging strategy has been developed through consultation with HCC and presently limits development relying on the Grandview Road connection to approximately 200 dwellings before the proposed SH23 connection is required.



This reflects the fact that the development's transport effects, connections and mitigation requirements cannot sensibly be considered solely by reference to the territorial authority boundary. Importantly, adopting HCC standards as the primary technical benchmark does not mean that the applicable WDC provisions have no relevance.

The Waikato District Plan Transportation provisions remain relevant to the statutory assessment, including requirements concerning road and access design and the maintenance of network safety and efficiency. The proposed roads and transport infrastructure will also need to satisfy applicable regional infrastructure requirements, including the Waikato Regional Infrastructure Technical Specifications (RITS), together with relevant NZTA, Austroads and other relevant design guidance.

Accordingly, the approach taken in the ITA is best understood as distinguishing between statutory jurisdiction and the appropriate technical and functional benchmark. WDC provisions remain relevant because the site is presently located within Waikato District. However, the HCC transport framework provides the more representative basis for assessing the detailed urban transport outcomes sought for Brymer Farms because:

- the site immediately adjoins Hamilton's urban boundary;
- the proposal is urban rather than rural in its scale, density and transport demands;
- its principal transport connections integrate directly with existing Hamilton neighbourhoods and the wider Hamilton network;
- its walking, cycling and future public transport networks are intended to form part of the Hamilton system;
- HCC's standards provide the closest comparable urban design and operational environment for the proposed development;
- applying consistent standards avoids an undesirable discontinuity in infrastructure at the HCC/WDC boundary; and
- designing to HCC standards provides appropriate long-term compatibility with the adjoining and progressively urbanising Rotokauri environment.

For these reasons, while the Waikato District Plan has been recognised and considered as part of the applicable statutory framework, it is considered appropriate for the detailed transport assessment and design of Brymer Farms to be undertaken primarily against the relevant HCC transport provisions and standards, supplemented by WDC, RITS, NZTA, Austroads and other relevant guidance.

This provides a more realistic assessment of the environment into which the development will connect and, importantly, ensures that the transport network is designed for its anticipated urban function and receiving environment, rather than solely by reference to its current territorial boundary and zoning.

1.4 ITA thresholds

This ITA report is based on the assessment requirements for a full ITA in terms of meeting the threshold for a full ITA as specified in the NZTA ITA Guide (June 2026) as summarised in **Table 1.1**.



Table 1.1: Base thresholds for ITA types

Activity type	ITA-Lite threshold	ITA-Full threshold
Residential	30 dwellings / units	120 dwellings / units
Retail	500 m ² GFA	1,000 m ² GFA

1.5 Scope, limitations and professional judgement

This document was prepared by Transplan Limited (Transplan). The content and opinions included are based on the conditions and information existing at the time of publication. In preparing the document, Transplan may have relied on information supplied by others. Any use a third party makes of this document is that party's responsibility; no liability is accepted by Transplan or any employee or sub-consultant for its use by a third party.

1.6 Consultation

During the course of the project meetings were held with officials for the key road controlling authorities including HCC, WDC and the NZTA:

- 11 March 2026 – 'Brymer FTA Transport Matters Modelling Brief.'
- 15 April 2026 – 'Brymer FTA Transport Matters Modelling Brief.'
- 03 August 2026 – 'Brymer Farms - pre-lodgement meeting' with NZTA attended by Emily Hunt - Senior Planner, XiaoFan Lin - Senior Transport Planner and Ryan Boyle - Network Manager.

In addition, there has also been several email communications with officials from the various RCAs in relation to the above meetings and also individually during the course of the project.



2 PROJECT DESCRIPTION

The Brymer Farms property sits within the Rotokauri and Temple View townships on the western edge of Hamilton City (refer to Error! Reference source not found.). It is situated around 6.5 km or about 11 minutes driving from the Hamilton CBD via SH 23 and Killarney Road.

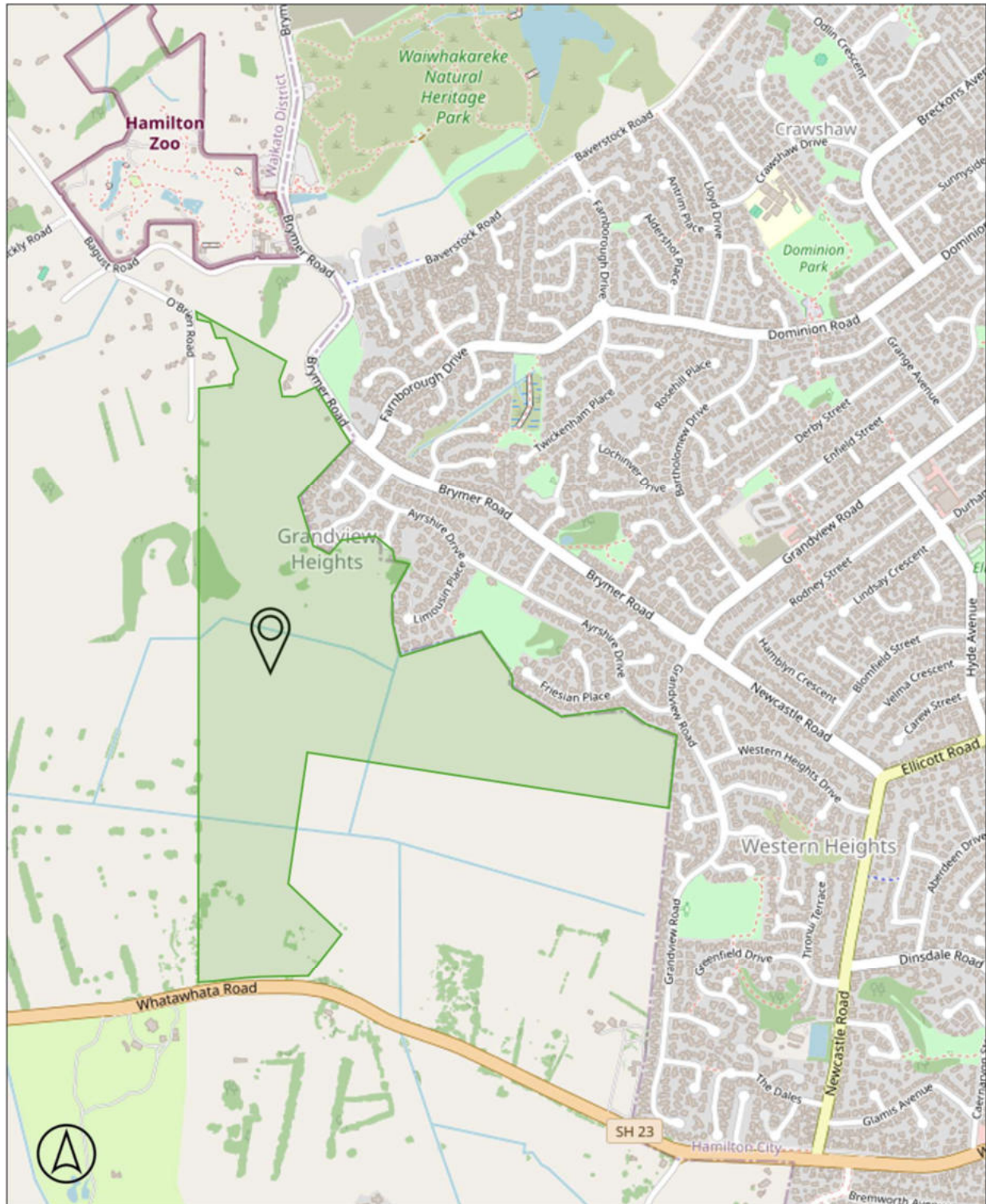


Figure 2.1: Project Location

Source: Openstreetsmap.com



The Brymer Farms Limited development (Brymer) is a comprehensively planned, multi-staged residential development providing for the urbanisation and subdivision of the project site. The site includes the following properties: Lot 1 DPS 57291, Lot 3 DP 385271, Lot 22 DPS 79526; Part Lot 2 DP 18355; and Allotment 365 Pukete Parish.

The Project is the subject of a Notice of Decision by the Minister, dated 4 September 2025, to refer the Project. It seeks the land use, environmental, subdivision and associated infrastructure consents required to enable the development to be delivered progressively and in a coordinated manner.

The Project will provide approximately 1,042 residential units, including approximately 248 apartment units, across a range of housing typologies and densities. Housing will comprise a mix of terraced, duplex and detached dwellings, conventional and compact residential lots, irregular lots, and eight larger rural-residential lots. This range of typologies is intended to provide housing choice while enabling the development pattern to respond appropriately to the physical characteristics, environmental features and constraints of the site.

The master plan also provides for two mixed-use commercial sites, identified as C1 and C2, which will form a neighbourhood scale commercial component within the development. C1 will provide approximately 910 m² of ground-floor commercial retail gross floor area (GFA), with 48 two bedroom apartments above. C2 will provide approximately 1,274 m² of ground-floor commercial retail GFA, with 16 two bedroom apartments above, as well as 552 m² for commercial offices. Both sites C1 and C2 will provide for some surface car parking, whilst site C1 will also incorporate a basement car park. The respective sites will further provide for dedicated vehicle access, servicing areas and landscaping. Collectively, C1 and C2 will provide approximately 2,736 m² of commercial GFA and 64 apartments, supporting the day-to-day needs of residents and contributing to a mixed-use neighbourhood environment.

The development will be supported by the necessary transport and three-waters infrastructure. Water supply and wastewater servicing will connect to the IAWAI reticulated networks, with internal reticulation and associated infrastructure established progressively as development is staged. This may include pump stations, storage, reservoirs and mains, where required. Stormwater will be managed through an integrated stormwater management system, with discharge ultimately occurring to the receiving environment within the Waikato District. The stormwater system will incorporate appropriate treatment, attenuation and conveyance measures and will integrate, where appropriate, with proposed wetlands, watercourses, stormwater reserves and other water-sensitive design features throughout the development.

Implementation of the Project will require staged development related earthworks to establish suitable building platforms, a well-connected road network, infrastructure corridors, reserves and other components of the master plan. These works will include site formation, cut and fill, retaining, erosion and sediment control, and other enabling works required to facilitate the staged subdivision and development of the site. The proposal will also require the undergrounding of existing power lines within the Applicant's site.

A significant component of the Project is the provision and enhancement of open space and ecological values. The development will provide an integrated network of public and recreational open spaces, pedestrian connections, wetlands, watercourses, stormwater reserves, landscaped areas and retained vegetation. Environmental and ecological mitigation and offsetting will also be provided where required to address effects arising from the development and to support the protection, restoration and enhancement of ecological values across the site and wider receiving environment. Where appropriate, these measures will be integrated with the development's open-space and stormwater networks.

The overall open-space and movement network will connect with the surrounding urban environment and existing reserves, including Waiwhakareke Natural Heritage Park, Rakautahi Park, Brymer Glen Reserve, Brymer Park, Te Kootii Park and Derek Heather Park. These connections will provide links between residential neighbourhoods, commercial and community areas, recreational spaces and the wider transport network.

Overall, Brymer is a large scale, comprehensively planned urban development that will enable approximately 1,042 residential units, including approximately 248 apartments, together with approximately 2,736 m² of commercial GFA. The Project encompasses the subdivision and development of the land and the associated development related earthworks, transport and access infrastructure, water supply and wastewater connections to the IAWAI reticulated networks, stormwater management and discharge,



ecological mitigation and offsetting, landscaping, open space, recreation, and other supporting infrastructure necessary to establish the new community.

The Project will be implemented through a multi-staged consenting and development framework, enabling subdivision, land use and infrastructure works to proceed progressively while ensuring that each stage is appropriately serviced and integrated with the wider development and surrounding environment.

The development will be subject to a comprehensive suite of proposed conditions of consent, including a design guide, developed with input from the Applicant's relevant technical and environmental specialists. These conditions will provide the framework for managing the construction, staging, servicing and operation of the development, including earthworks, transport, three-waters infrastructure, stormwater discharges, ecological effects and offsetting, landscaping and open space, and other potential environmental effects associated with the Project.

Collectively, the master plan, supporting technical assessments and proposed conditions of consent provide an integrated framework for the staged delivery and management of Brymer, including measures to avoid, remedy or mitigate adverse environmental effects and, where appropriate, provide environmental offsets.

Note

The assessments in this ITA are based on the use and reference to the masterplan set dated 30 July 2026. A revised set has been issued on 19 August 2026. The revised masterplan now reflects a residential yield of approximately 1,042 residential units/lots of varying typologies and 248 apartments. The prior yield was 1,054 residential units/lots (12 more) and 272 apartments (24 more). This does not materially affect the content in this ITA. Copies of both masterplan sets are included for reference in **Appendix B**.



3 EXISTING TRANSPORT ENVIRONMENT

3.1 Overview

This section describes the existing land-use and transport environment around the development site. While the site itself lies outside the Rotokauri and Rotokauri North Structure Plan areas (refer **Figure 3.1**), the wider Rotokauri area is being developed rapidly, and a range of transport infrastructure is planned or underway to serve the future community. The project is one of several Fast-track Approvals Act (FTAA) projects in and around Hamilton (refer **Figure 3.2**).

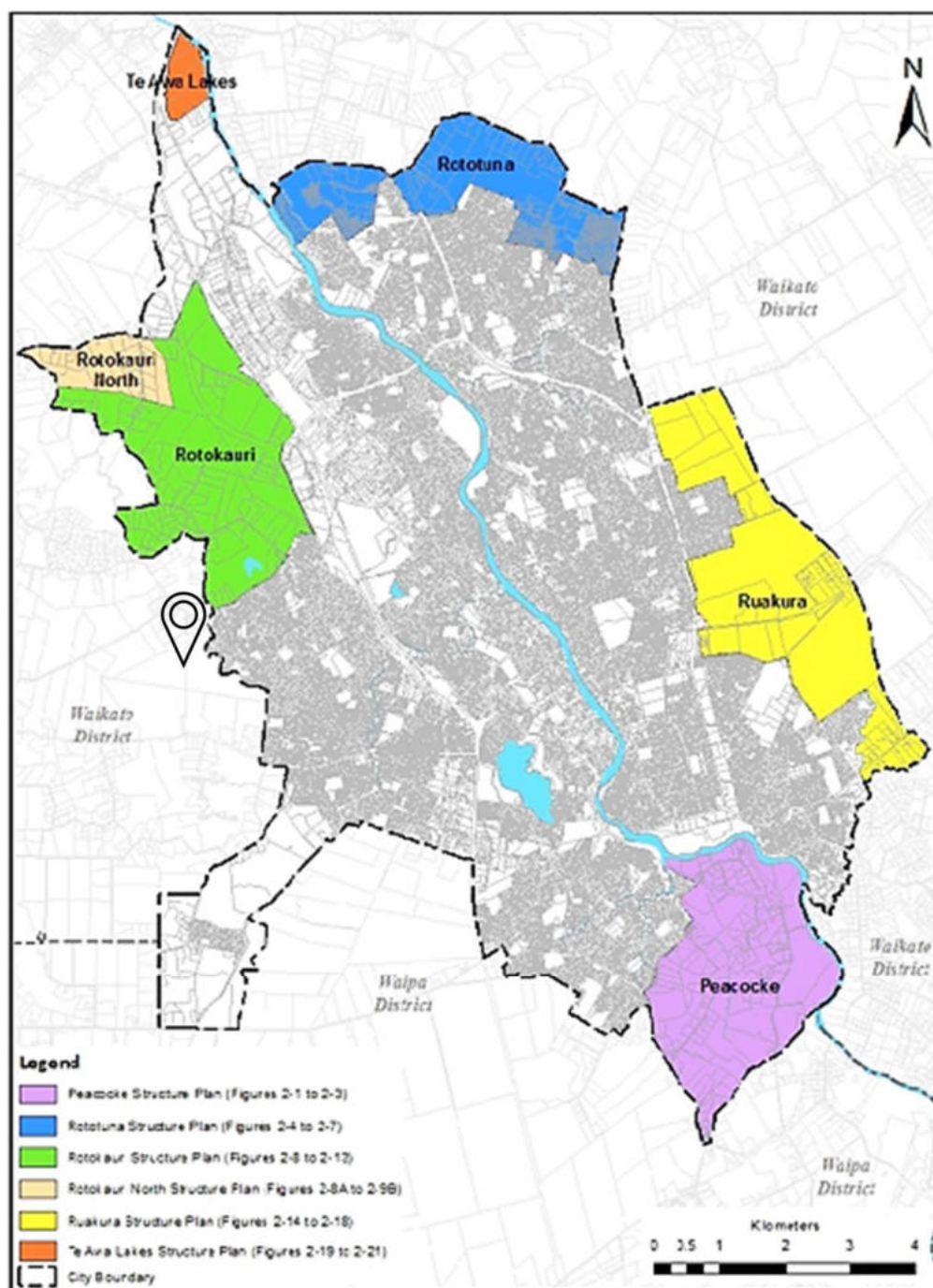


Figure 3.1: Structure Plan Areas

Source: Chapter 3 - Structure Plans, Hamilton Operative District Plan

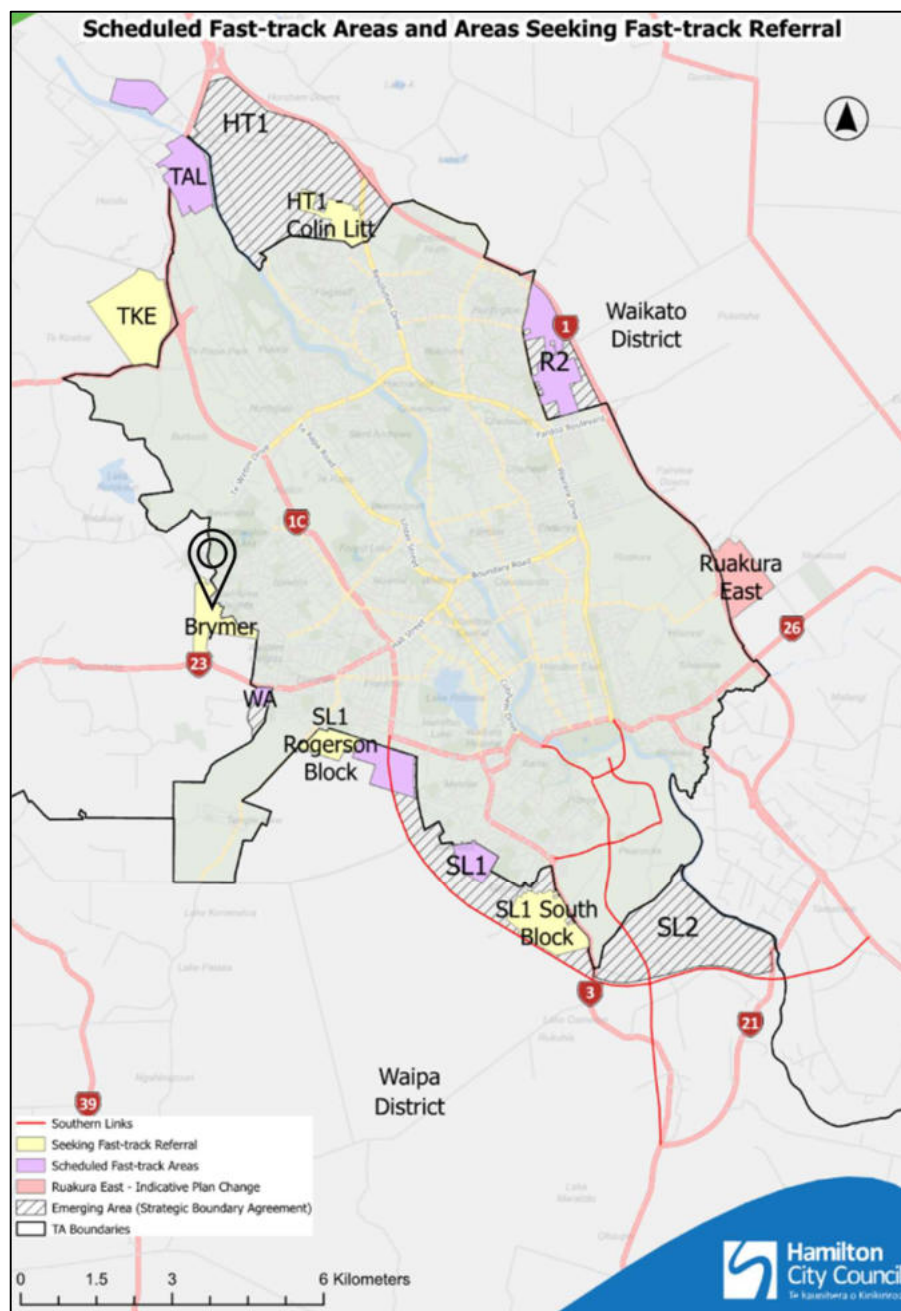


Figure 3.2: Fast Track Development Areas

Source: Hamilton City Council

3.2 Existing travel behaviour

Hamilton is New Zealand's fourth-largest city and, like most provincial centres, is largely car-dependent. There is, however, a growing push toward mode shift: HCC's transport strategy - Access Hamilton (HCC, 2022b) - aims to reduce single-occupancy car travel, lift active-mode use, and improve the quality and appeal of public transport.

The mode share patterns in Hamilton reflect that most trips are made by private vehicles (HCC, 2022b):

- Journey to work: 81% car or passenger in car, 5% walk, 3% bus, 2% bike
- Journey to education: 57% car or passenger in car, 20% walk, 13% bus, 5% bike



Modal splits from SA2 Grandview Heights		
		- walk: 5%
Arrivals	48 people (17% of arrivals) travel to Western Heights for work, while 231 people (83% of arrivals) also live & work within Western Heights. Main arrival modes (work): - work at home: 74% - drive: 17% - walk: 1% - passenger in a car, etc.: 1% - bus: 1%	45 people (100% of arrivals) live & learn within Western Heights. Main arrival modes (education): - study at home: 93% - drive: 7%

Source: <https://commuter.waka.app/>

The census data from SA2 - Grandview Heights show that there is a reduction in private car use in the area compared to the wider Hamilton City area. This appears to be mostly due to the higher levels of working / studying from home. The use of all other modes remain low.

3.3 Active transport

3.3.1 Pedestrian

The pedestrian environment in the wider area has been upgraded substantially as part of the Council's work to ready the area for further residential development and in addressing road safety concerns.

HCC has recently completed works on Rotokauri Road and Baverstock Road, installing new raised pedestrian crossings, new bus stops, accessible kerbs and bus shelters. These improve pedestrian safety and the link between the local street network and bus services in the area.

HCC has also completed part of the works associated with the Nawton's shared pathways project (a.k.a. Nawton Community Link) to make walking and cycling journeys safer, easier, and more enjoyable (refer **Figure 3.4**). The project benefits include for:

- Safer, accessible routes for walking and biking for all ages and abilities.
- Upgraded pathways and crossings to match the quality of Hamilton's newer suburbs.
- Better connections to schools, parks, shopping areas, and community centres.
- Improved safety features for mobility users and children.

The second stage of the Nawton Community Link project will commence in early 2027 and will include for the following improvements:

- Widening the existing footpaths so pedestrians and people on bikes can use it.
- Narrowing the kerb at intersections to make it easier for pedestrians to cross and reduce vehicle speeds.
- Adding traffic signals to the existing crossing and widening the path on Grandview Road (opposite Nawton Primary School), to make it safer for students to cross the road.
- Removing the flush median in the middle of some roads to reduce the crossing distance for pedestrians once the shared paths are built.
- Moving the existing bus shelter to improve pedestrian visibility and safety when crossing the road.
- Adding a new shelter to the bus stop to improve the experience for people catching the bus.



Figure 3.4: Nawton Community Link route

Source: HCC, 2026

3.3.2 Cycling

Hamilton has invested heavily in cycling, with more than 150 kilometres of on-road cycle lanes and off-road shared paths across the city. HCC's 2015 – 2045 Biking Plan and the Waka Kotahi Urban Cycleways Programme have together funded a series of projects to build a connected cycle/shared path network linking schools, employment areas and other key destinations (refer to **Figure 3.5**).

CLOSeR to the site, formal cycling infrastructure is limited, and cyclists currently share the carriageway for the most part. Development of the Brymer Farms site is planned to deliver cycle infrastructure progressively in line with the development staging.

It is noted that SH 23 on the site's southern boundary forms part of the NZ Cycle Trail network (refer **Figure 3.6**). The cycle trail network provides for connection to all key surrounding towns, other than for Te Awamutu.

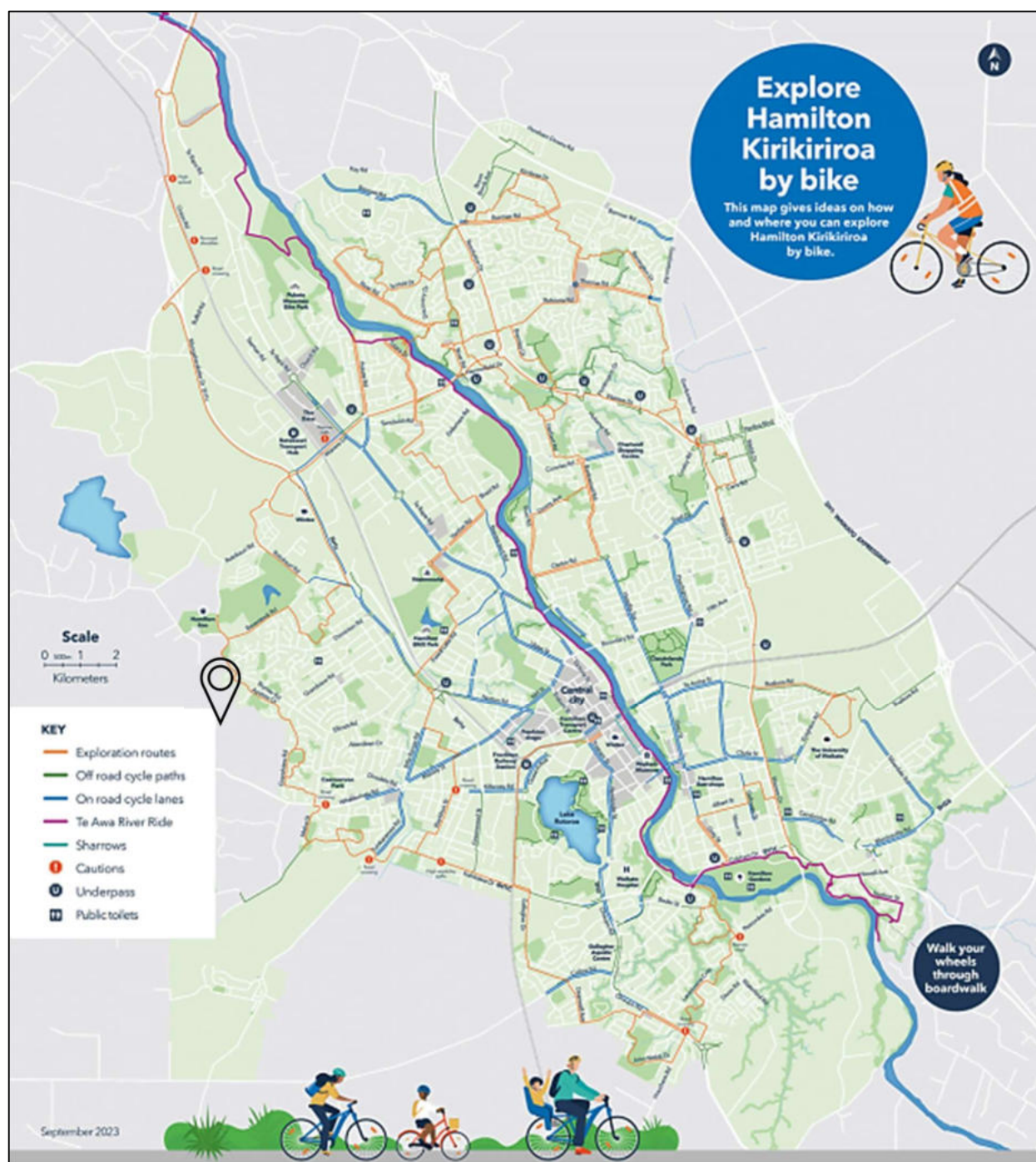


Figure 3.5: Hamilton City Bike Map

Source: HCC, 2023

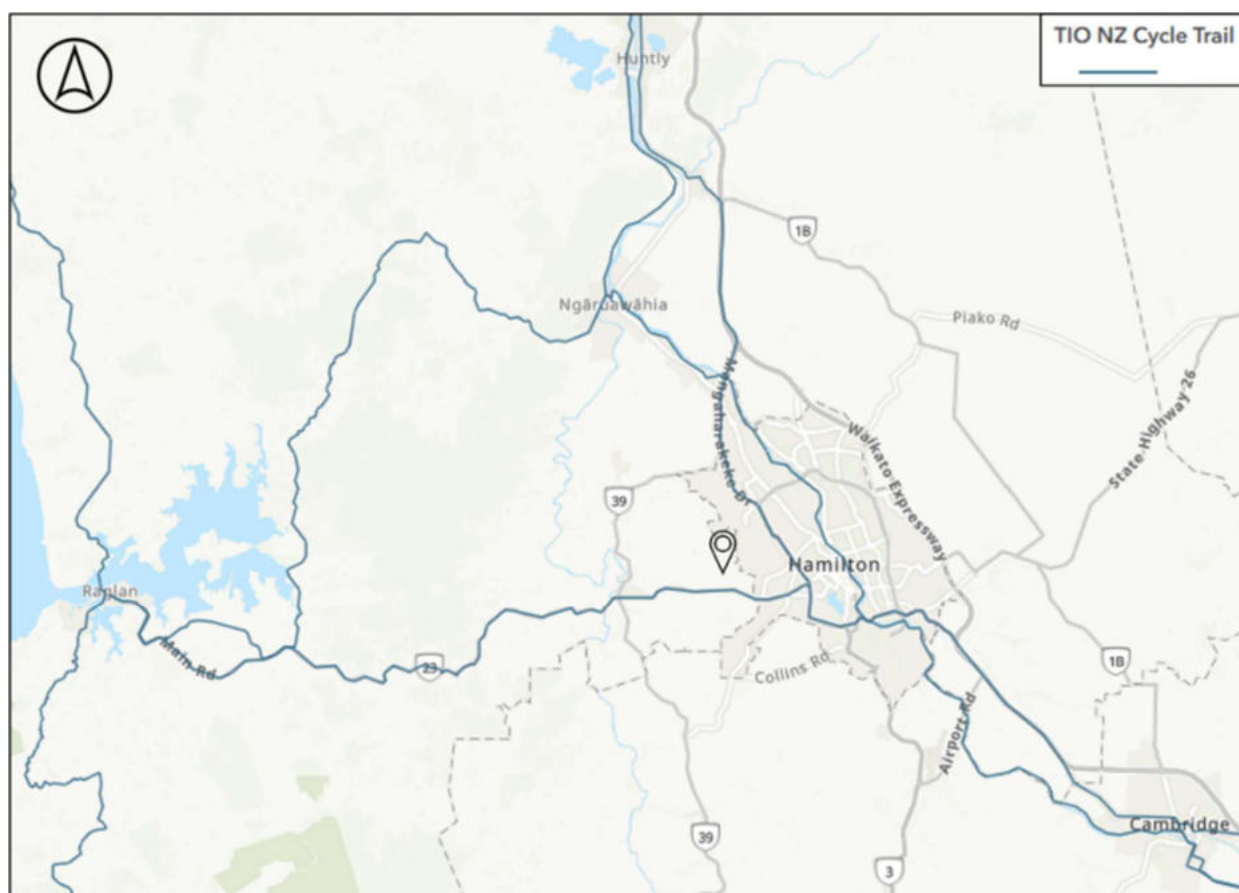


Figure 3.6: New Zealand Cycle Trails

Source: NZTA, 2026

3.4 Public Transport

3.4.1 Commuter rail services

The Te Huia commuter rail service² operating along the North Island Main Trunk Railway (NIMT), serves passenger travel between Hamilton and Auckland (The Strand). offers daily return services Monday through Sunday, with two return services on Monday to Wednesday, three return services on Thursday and Friday, two return services on Saturday, and one return service on Sunday. The service stops at six stations: Frankton, Rotokauri, Huntly, Pukekohe, Puhinui, and The Strand.

The trip time from Frankton Station to The Strand is approximately 2 hours and 30 minutes. There are no direct bus services serving Frankton Station. The nearest bus stops are located along Queens Avenue, serviced by No. 3 Dinsdale. The journey time by car from the site is approximately 10-minutres (5.5 km) measured from the Grandview Road access and travelling via Killarney Road (Google Maps, 2026).

The Rotokauri Transport Hub on Tasman Road (reached via Kiriwai Kaui Drive off Arthur Porter Drive) is the main public transport interchange for the north-western growth areas of Hamilton. The hub has a park-and-ride for rail and bus passengers, with mobility parking, electric-vehicle charging, drop-off and pick-up zones and taxi stands. The hub is serviced by the Meteor and Orbiter bus services. A pedestrian bridge over the railway connecting to Te Awa The Base from where other bus services can be accessed. The journey time by car from the site is approximately 8-minutres (5.5 km) measured from the Grandview Road access and travelling via Brymer Road (Google Maps, 2026).

² <https://www.tehuiatrain.co.nz/>



3.4.2 Commuter bus services

The Hamilton area is served by Waikato Regional Council's BUSIT³ network (refer to **Figure 3.7**). The following routes are most relevant to the site and the surrounding area:

- No. 3 Dinsdale: The service travels from the Transport Centre to the Dinsdale Shops, via Farnborough Dr to Hamilton Zoo – in both directions, seven days per week and serves the adjacent Grandview Heights and Western Heights suburbs. The nearest stops are located as follows:
 - o Near Ayrshire Drive / Harrogate Place
 - o Near Ayrshire Drive / Angus Street
 - o Near Grandview Road / Newcastle Road
 - o Near Grandview Road / Western Heights Drive
- Orbiter (O): The Orbiter is a high-frequency service, which travels around the perimeter of Hamilton City, approximately every 15 minutes – in both circular directions, seven days per week. The nearest stops are located as follows:
 - o Near Western Heights Drive / Newcastle Road
- Meteor (Route M): The Meteor is a high-frequency service which travels between the Rotokauri Transport Hub and southern Hamilton via the central city, seven days per week. It passes through Dinsdale and Nawton and connects to the Hamilton Transport Centre in the CBD, giving residents a direct link to the city centre and the activity nodes along the route. The nearest stops are located as follows:
 - o Near Ellicott Drive / Maple Avenue
- The No. 23 Raglan: This regional service travels between Manu Bay, Raglan and Hamilton – in both directions, operating seven days per week. The nearest stops are located as follows:
 - o Near Western Heights Drive / Newcastle Road
 - o Near SH 23 Whatawhata Road / Wallace Road

Note: It is planned to provide for bus stops at the proposed access intersection at SH 23, along with suitable shelter facilities and active mode connections.

The bus routes and stops in/near Grandview Heights and Western heights are shown in **Figure 3.8**.

3.4.3 Taxi services

Taxi and ride-share services operate throughout Hamilton. The Rotokauri Transport Hub has designated taxi stands, providing a formal pick-up and drop-off point at the interchange. For the Brymer Road area, taxis and ride-share offer on-demand connectivity, particularly for trips not well served by fixed routes.

The growth of ride-share (such as Uber) means on-demand transport is increasingly available across the city, supplementing scheduled services for less frequent trips or outside service hours.

³ <https://www.busit.co.nz/>

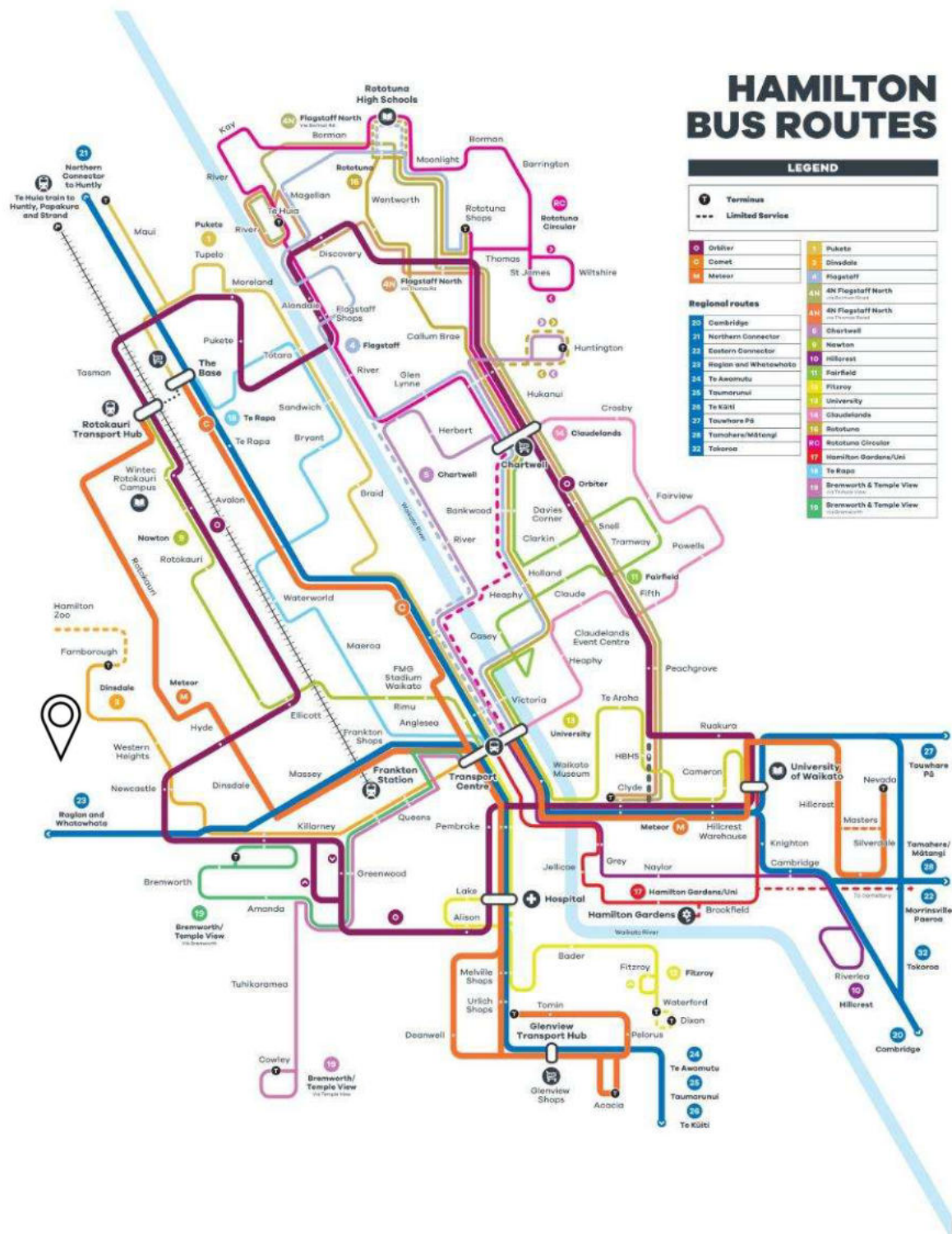


Figure 3.7: Hamilton Bus Network

Source: BUSIT, 2026

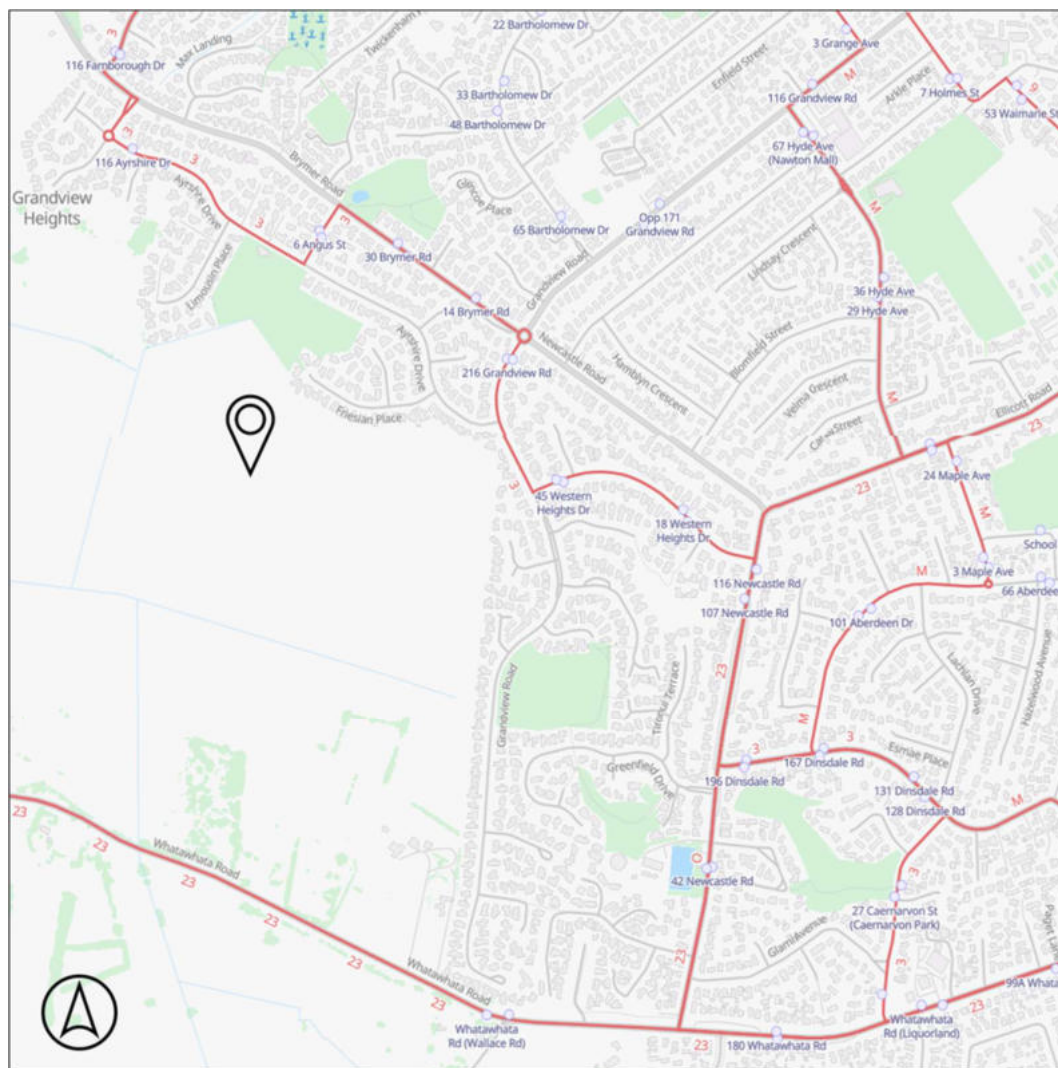


Figure 3.8: Bus route and stop locations in/near Grandview Heights and Western Heights

Source: *Openstreetsmap.com*

3.5 Private transport

3.5.1 Road network

3.5.1.1 Road hierarchy

The road hierarchy classification for the roads surrounding the site in terms of the One Network Framework (ONF) classification system is as shown in **Figure 3.9**. The One Network Road Classification (ONRC) is shown in **Figure 3.10**. The ONRC classification has now been replaced by the ONF classification system but is still widely used in data and graphical information system applications.

3.5.1.2 Frontage roads

The subject site fronts Brymer Road to the northeast, which runs broadly north-south through the suburbs of Grandview Heights, Rotokauri and Baverstock. Brymer Road is an Urban Connector road in the One Network Framework (ONF) classification and as a Primary Collector road in the One Road network Classification (ONRC) and is located in a suburban / peri-urban setting, providing frontage access to residential and rural properties, including the recently completed Brymer Heights subdivision on its eastern side (north of Waiwhakareke Natural Heritage Park). The annual daily traffic (ADT) volumes along this road varies between 4,624 vpd (south of Glenside Rise) and 1,025 vpd (north of Bagust Road).



The northernmost part of the site is bounded by Obrien Road, a Peri Urban road (ONF) and as a Low Volume road (ONRC) on its western side, serving rural properties. The ADT volume along this road is 91 vpd.

The site is bounded by Grandview Road on the eastern boundary. The road is defined as Local Street (Secondary Collector) south of Newcastle Road and have an ADT volume of 1,490 vpd between Ayrshire Drive and Newcastle Road.

The site is bounded by SH 23 Whatawhata Road on its southern boundary. SH 23 is a 42.7 km long state highway connecting Hamilton and the west coast town of Raglan via Whatawhata. SH 23 is defined as a Rural connector (Primary Collector) and have an ADT volume of 9,953 vpd on the site frontage.

- SH 23 is a defined Limited Access Road ('LAR') as shown in **Figure 3.11**. Limited-access roads are sections of the state highway, usually bordered by residential or commercial properties, that can only be accessed from authorised crossing points.
- SH 23 serves as a High Productivity Motor Vehicle (HPMV) route as shown in **Figure 3.12**. A HPMV route is a specifically approved state highway or local road cleared for heavy trucks carrying weights above the standard 44-tonne limit (up to 62 tonnes) under a valid permit.
- SH 23 further serves as an Over Dimension ('OD') route as shown in **Figure 3.13**. An OD route is a designated roadway network evaluated and cleared to safely accommodate oversized or overweight vehicle loads that exceed standard legal dimensions. The approved roads generally feature specific clearance thresholds, typically a clear width of 11.0 metres and a height of 6.2 metres, to prevent structural and overhead clashes.

The above SH 23 route functions will be taken into account in the design development process for the proposed access intersection on SH 23 in consultation with the NZTA.

3.5.1.3 *Speed Limits*

The speed limit zones on the surrounding road network is shown on **Figure 3.14**. The general speed limits within the adjacent suburbs of Grandview Height and Western Heights are 50 km/h. A speed limit of 100 km/h apply along SH 23.

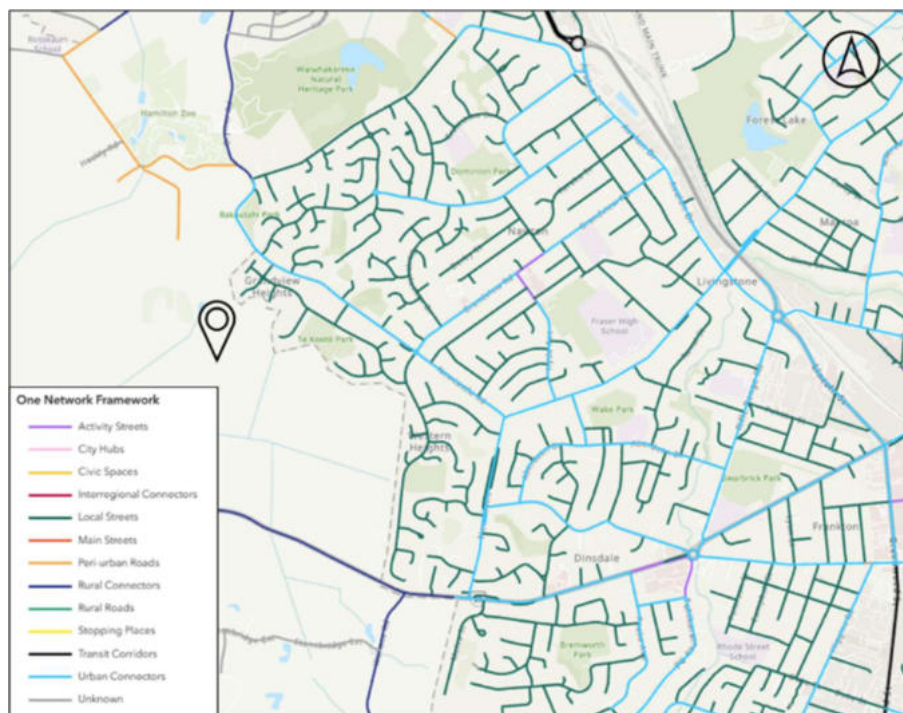


Figure 3.9: One Network Framework (ONF) Road Classification

Source: NZTA, 2026

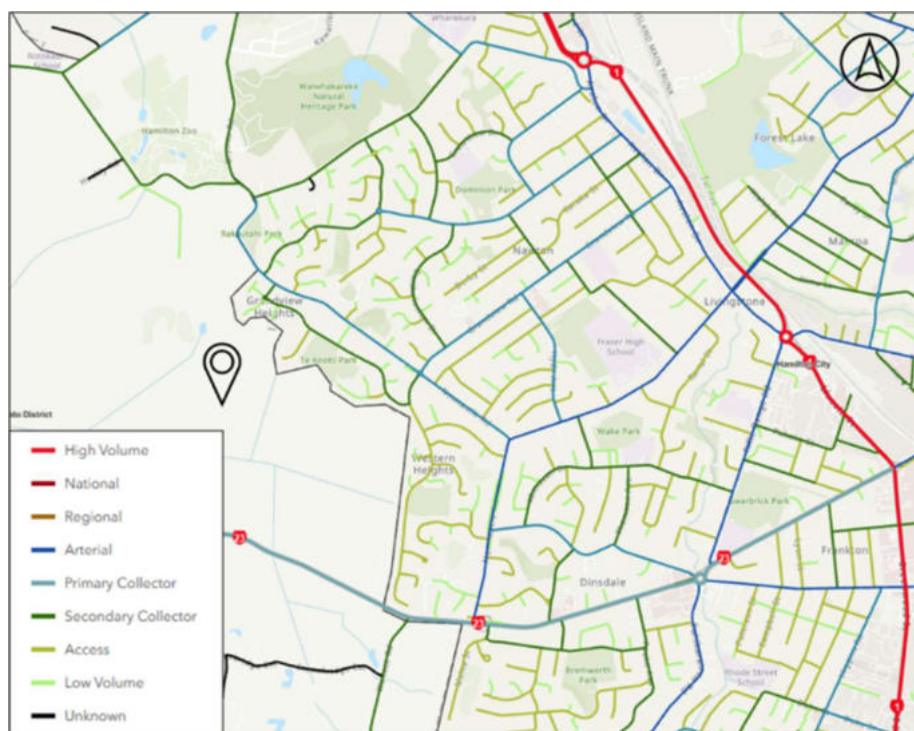


Figure 3.10: One Network Road Classification (ONRC)

Source: NZTA, 2026

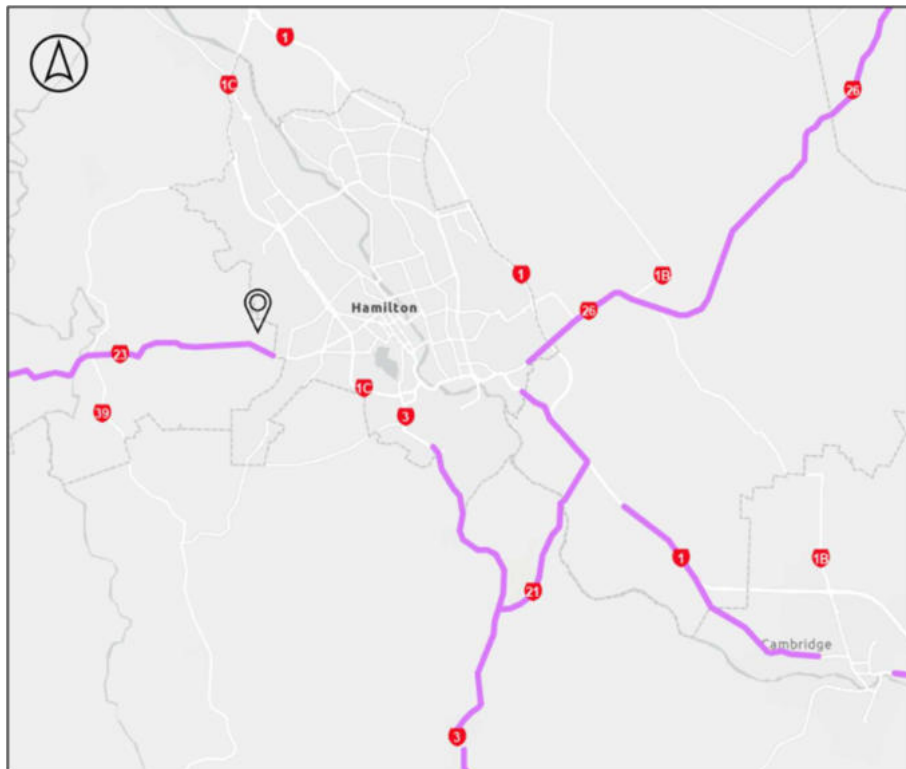


Figure 3.11: Limited Access Roads - State Highways

Source: NZTA, 2026

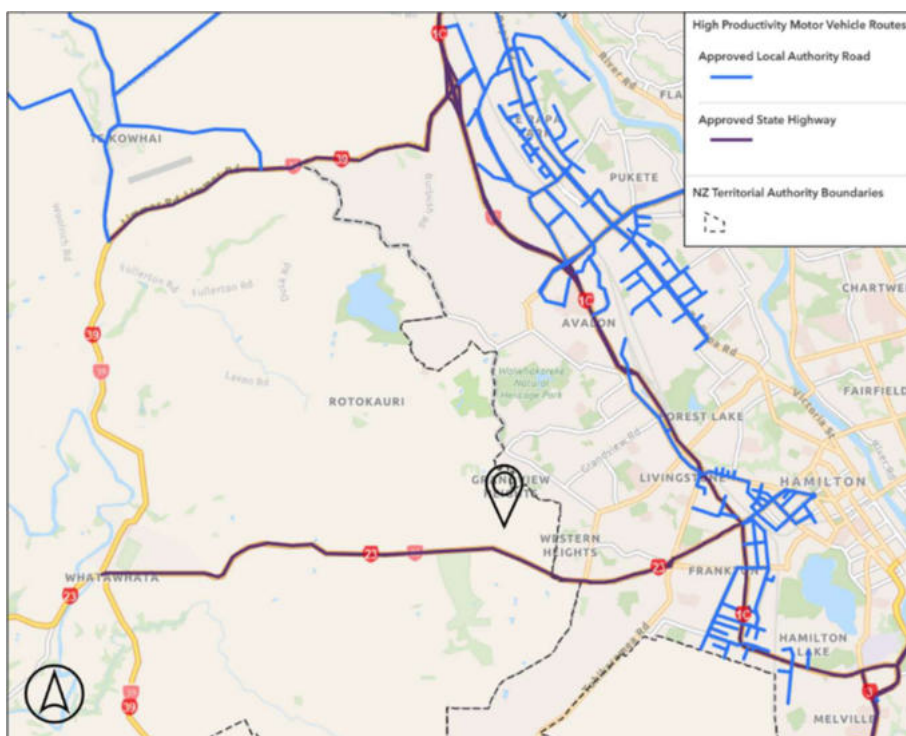


Figure 3.12: High Productivity Motor Vehicle Routes

Source: NZTA, 2026

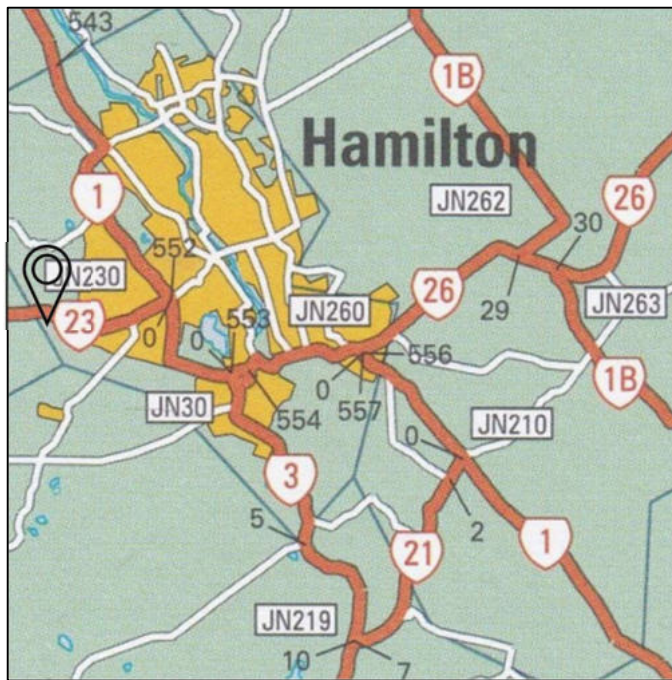


Figure 3.13: Over Dimension Routes in/near Hamilton

Source: NZTA, 2026

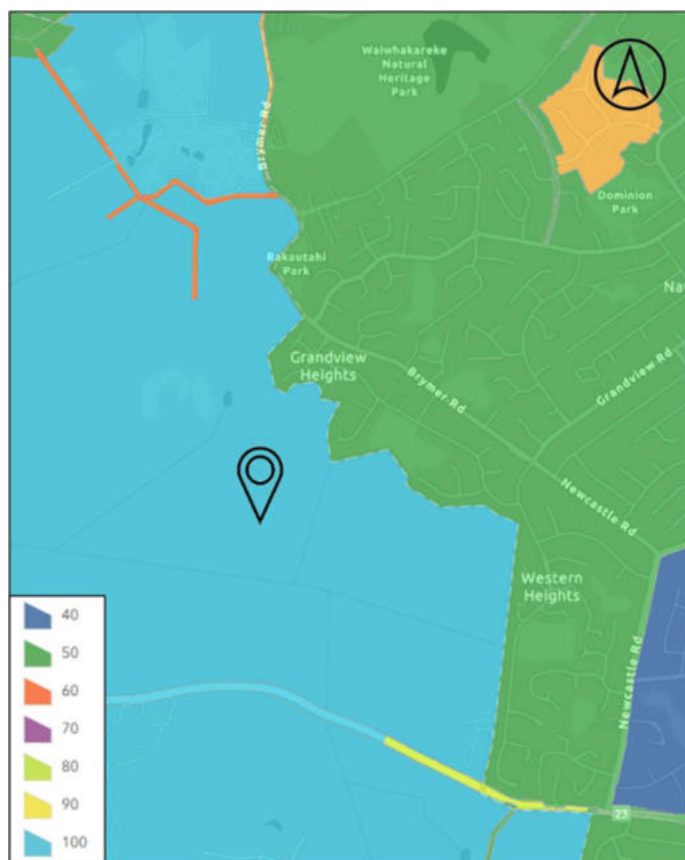


Figure 3.14: Road Network Speed Limits

Source: NZTA, 2026



3.6 Intersection traffic volumes (24-hour) and operational conditions

3.6.1 Introduction

24-hour, video-based intersection traffic count surveys have been conducted by Spotlight Traffic on Thursday, 9 October 2025, at the following ten (10) intersections as shown in the map in **Figure 3.15**.

1. Bagust Rd & Obrien Rd
2. Bagust Rd/Brymer Rd
3. Brymer Rd & Baverstock Rd
4. Brymer Rd & Farmborough Dr
5. Brymer Rd & Highgrove Dr
6. Brymer Rd & Angus St
7. Brymer Rd & Newcastle Rd & Grandview Rd
8. Grandview Rd & Ayrshire Dr
9. Newcastle Rd & Ellicott Rd
10. Whatawhata Rd (SH 23) & Newcastle Rd

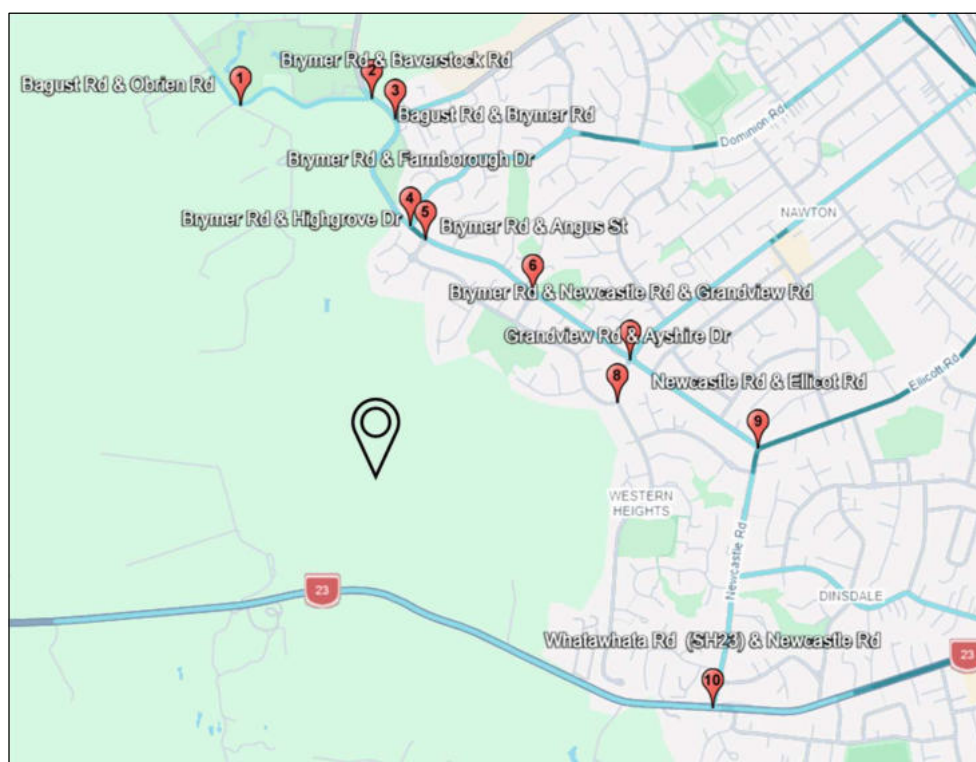


Figure 3.15: Traffic count locations

A summary of the 24-hour counts is included in **Appendix G**.

3.6.2 Existing network/intersection performance

The existing (2025) network and intersection performances, have been modelled using the Waikato Regional Traffic Model. The findings are summarised in **Sections 5.8, 5.9 and 5.10**. A full copy of the WRTM report is included in **Appendix H**.



4 FUTURE TRANSPORT ENVIRONMENT

4.1 Overview

This section describes the future transport environment around the subject site without the proposed development. It identifies committed transport upgrades and service improvements that are either underway or funded and programmed for the short to medium term, together with the background traffic growth that would occur regardless of the proposal as the wider Rotokauri locality and Hamilton growth network develop.

A substantial programme of transport investment is planned for the Rotokauri locality at both local and strategic levels. Hamilton City Council, Waikato Regional Council and Waka Kotahi each have committed or planned projects that will improve walking, cycling, public transport and roading over the next five to ten years. These will gradually shift the area from its current semi-rural character toward one able to support a fully urbanised community.

The committed improvements and background growth assumptions described here form the ‘future base case’ against which the transport effects of the proposed development are assessed later in this report.

4.2 Active transport

There are no active transport projects planned or in progress in the adjacent Grandview Heights and Western heights suburbs⁴.

4.3 Commuter bus services

Several short- to longer-term changes to Hamilton’s bus network are planned from 2028 onwards. The proposed changes are consistent with the strategic direction established in the Waikato Regional Public Transport Plan 2022–2032 (RTP), which sets out a Metro Ridership Network Plan for Hamilton based on shifting from a coverage-oriented network to a ridership-oriented network based on frequent, direct services on key corridors, supplemented by coverage services and on-demand transport for lower-density areas.

4.3.1 Final 2028 network - short-term overview

The final 2028 Hamilton bus network, as recommended by Waikato Regional Council following public consultation, is shown in **Figure 4.1**.

⁴ <https://hamilton.govt.nz/strategies-plans-and-projects/projects>

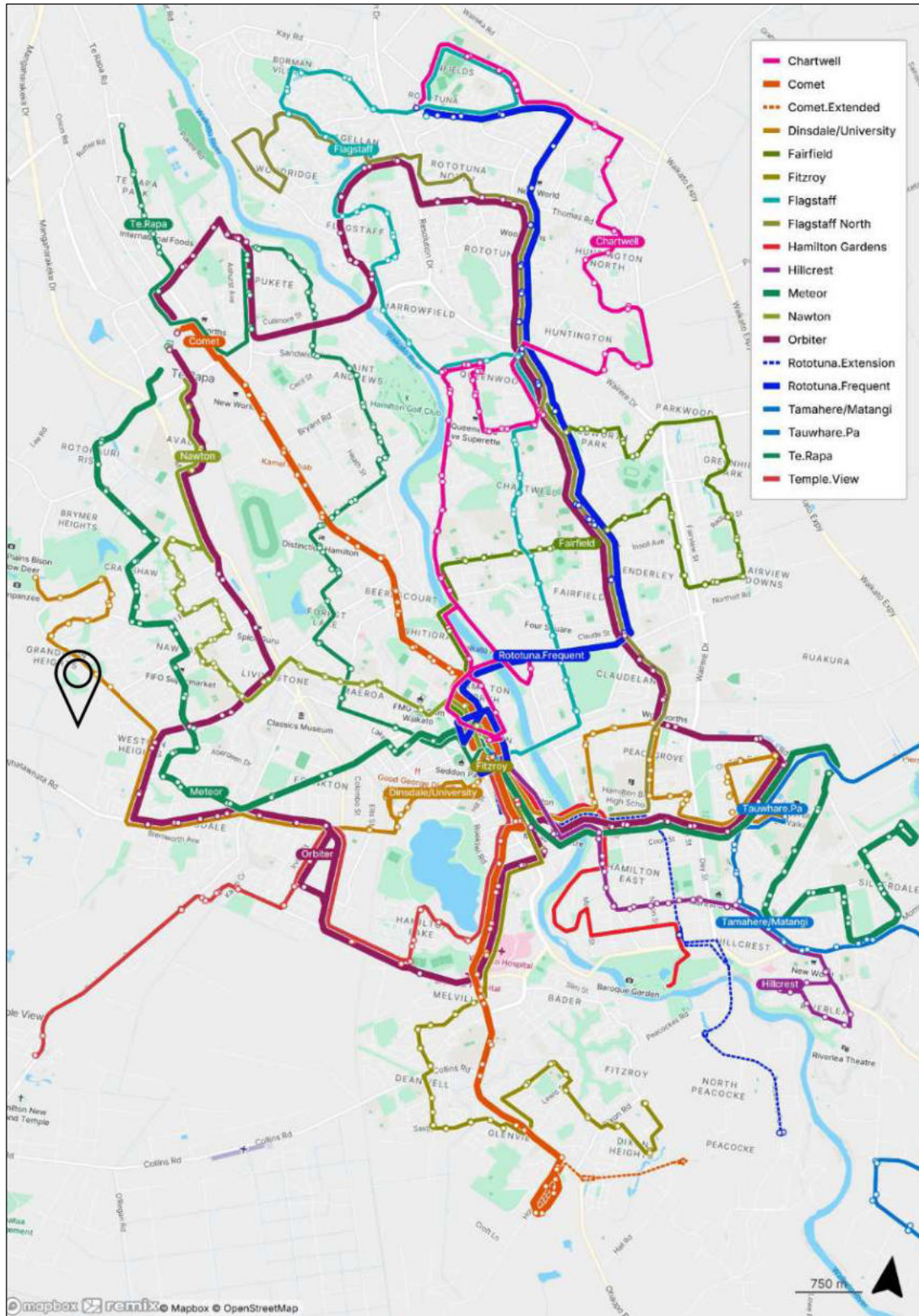


Figure 4.1: Final 2028 Hamilton bus network - full city

Source: WRC. 2025



4.3.2 Long-term network vision (c. 2037)

The long-term network for Hamilton - intended to be implemented progressively over the 2028–2037 contract period, subject to funding - represents a further evolution toward a high-frequency, direct public transport system. Key long-term changes of relevance to the northwest include (refer to **Figure 4.2**):

- Upgrading the Meteor, Comet and Rototuna High Frequent services to T1F (Tier 1 Frequent) classification, operating at 10-minute frequency from 6:30am to 7pm, with 30-minute frequency from 6am to 6:30am and 7pm to 10pm.
- Removal of the Orbiter service and its replacement with two new high-frequency routes: the Northern Link (serving the northeast and northwest corridors) and the Southern Link (serving the southern corridor through to Peacocke).
- Upgrade of most Hamilton Coverage services to T2F (15-minute peak) classification.
- The Dinsdale/University service is expected to remain at HC (Hamilton Coverage) classification in the long-term network.
- A new Ruakura service will provide east-of-river coverage, replacing part of the Dinsdale/University route east of the CBD.

4.3.3 Implications for the Brymer Farms development

The proposed changes to the northwest Hamilton bus network have direct implications for the proposed Brymer development.

- Short-term (2028 network)

Peak frequency improvements on all Coverage services from 60 minutes to 30 minutes will meaningfully improve the usability of bus services for residents.

The bus-ready design of the Brymer Road development's internal road network is consistent with the WRC's requirement that new development provide appropriate roading geometry and infrastructure to support future bus route extensions into the development as the resident population grows.

- Long-term (2037 network)

The introduction of the Northern Link, replacing the Orbiter, will provide a direct, high-frequency route connecting the local residents with Te Rapa/The Base, the CBD and Ruakura.

The extension of services to new growth areas (Peacocke, Airport) reflects the RPTP's expectation that the public transport network will grow in parallel with Hamilton's residential development programme, an expectation that applies equally to the Rotokauri area as the Brymer Road development and surrounding subdivisions reach population thresholds sufficient to warrant new or extended bus services.

It is noted that there are longer-term proposals (beyond the 2040s) for the implementation of Bus Rapid Transit (BRT) networks along the city's high demand, high frequency bus corridors (refer to **Figure 4.3**). The BRT networks would be supported by park-and-ride facilities as shown.

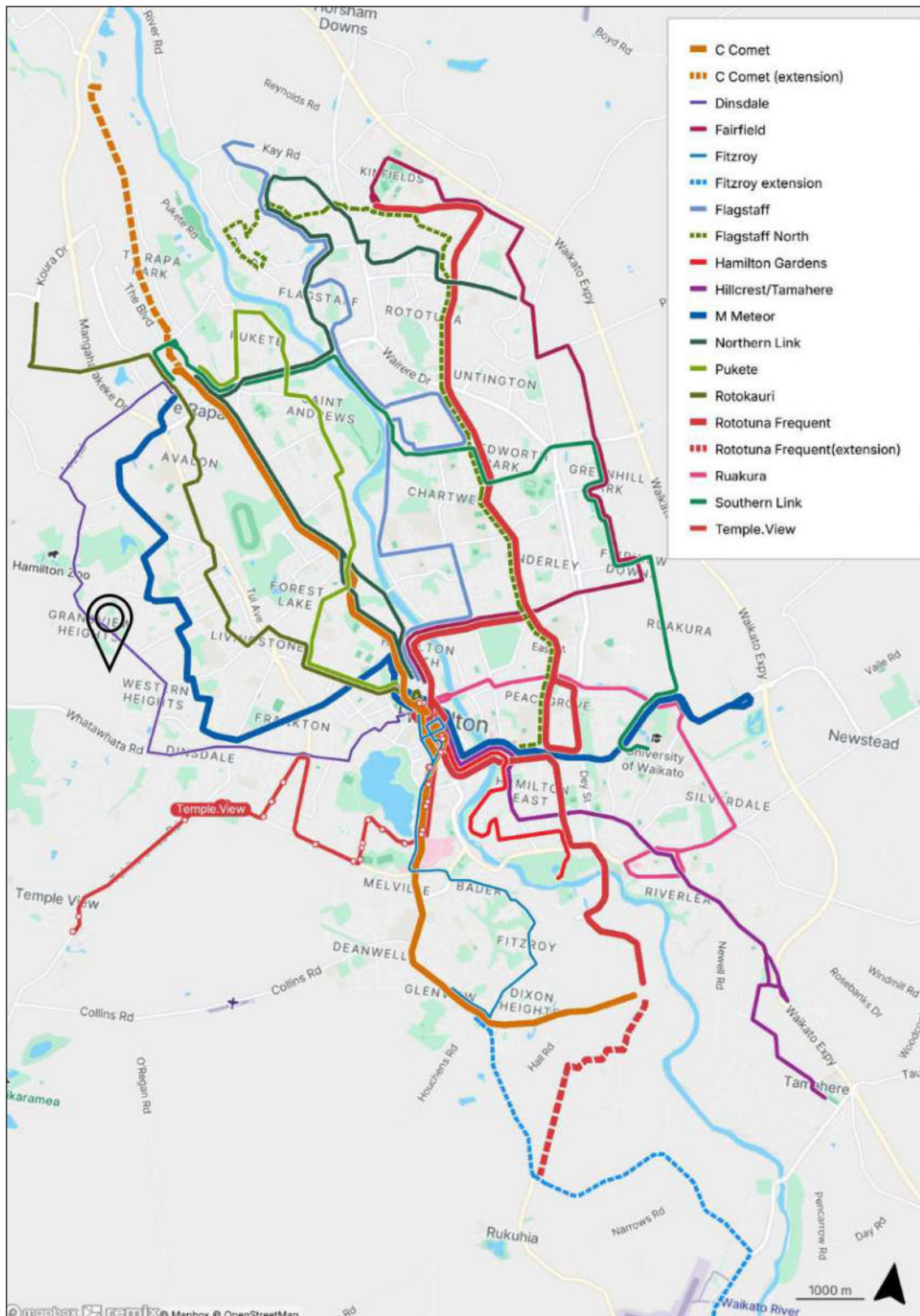


Figure 4.2: Hamilton long-term bus network (c. 2037)

Source: WRC. 2025

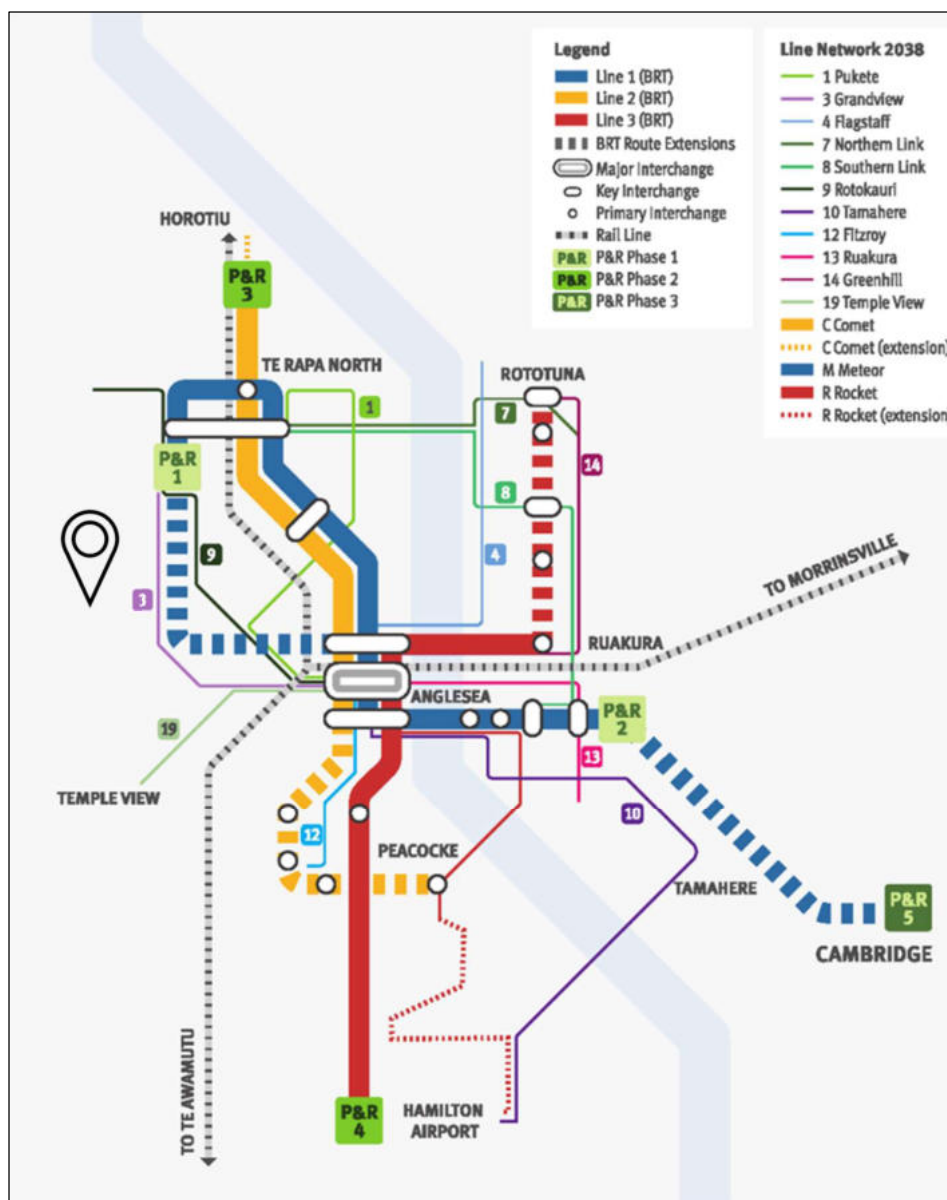


Figure 4.3: Potential Future HCC Rapid Transit Network and Park & Ride Sites

Source: HCC, 2025

4.4 Commuter rail services

Te Huia rail service (trial extension and long-term future): The Te Huia service between the Rotokauri Transport Hub and Auckland (The Strand) has been extended for a further year, with Waikato Regional Council confirming on 25 February 2026 that funding will continue to 30 June 2027. Waka Kotahi and the Regional Council agreed the extension to let the service be tested under the post-City Rail Link timetable, due in Auckland in 2026, which is expected to improve journey times, connectivity and patronage on the northern leg.

A 'Future Service' single stage business case study is underway to look at longer-term improvements, including higher frequency, faster journeys and possible new stops. The Council has also set aside \$550,000 for a rolling-stock business case to consider replacements for the current ex-British Rail Mark 2 carriages. The permanent future of Te Huia will be worked through as part of the Council's 2027–2037 Long Term Plan. As a commuter and leisure link between Hamilton and Auckland, Te Huia is a useful strategic option for the Rotokauri area, and continued investment will add to its value for future Brymer Road residents.



4.5 Private transport

Hamilton Southern Links: At the strategic level, Waka Kotahi's State Highway Investment Proposal identifies Hamilton's Southern Links, a future state highway and local arterial network in the south of the city, as an important long-term transport project for the region. Although it mainly affects the southern network, Southern Links will change city-wide traffic distribution as it redistributes north-south and cross-city movements, with flow-on effects for the arterial corridors serving the north-western growth areas.

4.6 Background growth

Traffic on the network serving the Brymer Road catchment will keep growing over the planning horizon regardless of the proposed development, driven by residential and commercial development across the wider area. This background growth has to be accounted for when assessing future network performance so that the analysis reflects the conditions the proposal's traffic will be added to.

For this assessment, background growth for future-year scenarios is based on the WRTM model scenarios for 2035, 2045 and 2055, and reflects the expected pace of development-led growth on the local and arterial network. Beyond general background growth, the following developments and infrastructure are expected to add traffic to the local network over the assessment horizon:

- continued build-out of approved subdivisions within the Rotokauri, Baverstock, Burbush and Te Rapa North areas;
- continued growth in employment and retail at Te Awa The Base and the Te Rapa commercial and industrial precincts, which generate significant trips and pass-by traffic on the local and arterial network; and
- Industrial development in Te Kowhai near Hamilton's north-western boundary.

Taken together, these factors mean that, even without the proposed development, the network serving the Brymer Road catchment will carry materially higher volumes at the relevant horizons than it does today. The future base case used later in this report reflects that growth, so the development's incremental traffic is assessed against a realistic and suitably conservative baseline.



5 DESCRIPTION OF THE PROPOSAL

5.1 Study area

The study area for this ITA is the part of the transport network materially affected by the proposal. It extends from the Site to the key intersections and links that will carry the development's traffic, including Brymer Road / Highgrove Drive, Brymer Road / Bagust Road, Brymer Road / Baverstock Road, Brymer Road / Grandview Road / Newcastle Road, Ellicott Road / Newcastle Road and SH 23 / Newcastle Road. The site and its relationship to the surrounding network is shown on the masterplans in **Appendix B**.

5.2 Zoning

The proposal is a Substantive Resource Consent application to establish a large-scale residential subdivision on the site, with associated infrastructure, open space and neighbourhood commercial uses. It is made under the RMA as a non-complying or restricted discretionary activity (as applicable), seeking to give effect to the development ahead of any formal plan change to rezone the land.

Following the approach taken for Rotokauri North under Plan Change 7 (operative July 2022), the proposal anticipates eventual rezoning to residential and commercial/business (neighbourhood centres). The built form, lot layout and land use pattern have been designed in anticipation of those outcomes and are consistent with what those zones would enable.

5.3 Site plan

The masterplan for the Brymer Road development in **Appendix B** was prepared by Barker and Associates. It sets the overall structure of the development, including lot layout, road network, open space and land use designations across the whole site.

The internal road network is a legible, connected, grid-influenced layout, with four vehicle access points to adjacent roads (refer to **Section 5.5.1**) and neighbourhoods.

The road hierarchy comprises a collector network supported by local residential streets and rear lanes (JOALs). All internal roads have footpaths, and bi-directional cycleways run on the collector network, connecting to the active-mode network in Grandview Heights and Western Heights (also refer to **Section 5 – Transport elements**).

Public open space areas are provided for on the masterplan as parks and recreational reserves, which together with Te Kootii Park provides for green space and recreation within walking distance of all lots.

Infrastructure sites are set aside within the masterplan for the stormwater, wastewater and water supply needed to service the development. The road network is designed to suit buses in its geometry and cross-section, with future bus routes envisaged through the development once the resident population can support scheduled services.

5.4 Land-use and intensity

The proposal is a large-scale, master-planned residential community of approximately 1,042 units across a range of housing types. The mix is intended to provide a variety of dwelling types and lot sizes suited to different household sizes, tenures and price points, consistent with Hamilton's growth strategy and the National Policy Statement on Urban Development 2020.

The following residential typologies are provided within the development, as confirmed by the proposed masterplan lot data:

- Single dwelling lots: standard lots for one detached dwelling, yielding one unit per lot. These are the predominant type and occur across all stages of the masterplan.
- Duplex dwelling lots: lots for a pair of attached or semi-detached dwellings. They lift density while keeping the low-to-medium density character of the wider development.
- Split-level dwelling lots: lots for split-level dwellings, generally used to suit site topography, yielding one unit per lot.



- Rear-loaded superlots: medium-density superlots with vehicle access from a rear lane (JOAL, or Joint Owner Access Lane), which keeps driveways off the street frontage and improves the pedestrian streetscape. These suit a range of attached and semi-detached forms.
- Front-loaded superlots: medium-density superlots with vehicle access from the street frontage, suited to attached terrace housing or multiple-dwelling forms.
- Large-lot residential: larger lots at the north edge of the development, where it meets adjoining rural or semi-rural land, providing a graduated interface and accommodating more spacious single dwellings, yielding one unit per lot.
- The masterplan also provides for two closely located neighbourhood centre sites, referred to as C1 and C2, respectively, for business-equivalent uses, allowing small-scale retail, hospitality and services for the day-to-day needs of residents. The sites provide for a combined total of 2,184 m² commercial space on ground floor level, 64 apartments and some 552 m² office space (on the northern site).
- In addition, there are two apartment blocks, referred to as A1 and A2, respectively, providing for a total of 208 apartments.

Other land uses through the masterplan include public parks and recreational reserves, public walkways, infrastructure facilities, and the rear lanes and joint owner access lanes serving the medium-density typologies.

5.4.1 Site C1 (Commercial 1)

Site C1 is the southern of the two commercial sites (refer **Appendix C**). It sits at the southern end of a block bounded by collector roads to the west (Road 1) and south (Road 8) and a local road (neighbourhood centre road) to the east, with the 2,855 m² neighbourhood park immediately to the north. A pedestrian connection from the site to the park is shown at the north-western corner.

The development comprises four mixed-use buildings of five levels arranged around a central at-grade parking court, with a single level of basement parking beneath, plus a single-level commercial building on the western part of the site.

5.4.2 Site C2 (Commercial 2)

Site C2 is located to the north, at the western end of the Apartment Site 1 block (A1). It has road frontage on three sides – north (Road 6), west (Road 1) and south (Road 28) - with a roundabout at the south-western corner. A pedestrian connection runs south from the site frontage across the collector road to the neighbourhood park.

The development comprises seven buildings arranged around a central at-grade car park. Buildings 1, 2, 4 and 5 are three levels (ground floor retail with apartments or office above); Buildings 3, 6 and 7 are single level. Buildings 6 and 7 are cafes on the southern frontage with outdoor dining addressing the street and the park connection.

5.4.3 Site A1 (Apartments - Site 1)

Site A1 occupies the greater part of a superblock bounded by Road 6 to the north, Road 28 to the south and Road 6 to the east (refer **Appendix D**). Commercial Site C2 adjoins the site at its western end and shares the same Road 6 frontage. Twenty buildings are arranged in pairs either side of a central east-west vehicle and parking spine, with landscaped pedestrian courts between the building clusters. Ten buildings are five levels and ten are three levels. The unit mix comprises one, two and three bedroom apartments.

5.4.4 Site A2 (Apartments - Site 2)

Site A2 is the wedge-shaped block to the east, bounded by a right of way to the north, Road 22 to the east, Road 28 to the south and Road 6 to the west, with a roundabout at the south-western corner. Eight three-level buildings are arranged around the perimeter of a single central at-grade parking court, with pedestrian paths running between the buildings to the street frontages. All apartments are two bedroom units.



5.5 Transport Elements

5.5.1 Access points

The development makes provision for four access points, namely:

- An access to O'Brien Road for 8 detached dwellings (serving Stage 1A only). The proposed access layout is based on the layout of an industrial vehicle crossing as per RITS Drawing D3.3.1 (refer to Drawing C300-1A in **Appendix F**).
- A connection to Harrogate Place limited to 118 detached dwellings with no vehicular access to the rest of the development. The proposal makes provision for upgrading the southern and eastern footpaths along the existing road sections of Harrogate Place, Ayrshire Drive and Highgrove Drive to a 3.0 m wide shared path.
- A connection to Grandview Road between Ayrshire Drive and Western Heights Drive. This intersection is proposed as a conventional T-intersection, e.g., similar to the existing Grandview Intersection with Western Heights Drive.
- A connection / access intersection to SH 23 Whatawhata Road, approximately 1.5 km west of Newcastle Road. The intersection is proposed as a protected, T-intersection with options to signalise the layout when pedestrian crossings are introduced. A roundabout layout has also been assessed.

The latter two access points, Grandview Road and SH 23, will ultimately be connected by internal subdivision roads as development progresses. The intersection formations/layouts for the access points are shown on the roading plans included in **Appendix F**.

5.5.2 Roads

The development is served by an internal road network providing safe, well-connected access through the site and to the surrounding network.

The road hierarchy comprises a collector network supported by local residential streets and rear lanes (JOALs). The respective road cross-sections meet or exceed the HCC criteria for the form of transport corridors and internal vehicle access and associated dimensions as listed in the following tables included in Appendix 15 of the HCDP:

- Table 15-5ai) - Criteria for the form of Internal Vehicle Access
- Table 15-5aaii) - Criteria for the form of Transport Corridors

A summary of the relevant criteria are included in **Section E**.

The collector roads and selected local roads make provision for future bus services through the site by means of wider traffic lanes. Bus stop infrastructure will be provided so bus routes can be extended into and through the development (e.g., via Grandview Road) as demand warrants. Bus stop locations will be finalised during the design development stages in consultation with the WRC and HCC.

Active-mode infrastructure runs throughout the development. Footpaths are provided on all internal streets, and a network of bi-directional cycleways and shared paths supports cycling along the collector roads cycling within the site. These tie in with the established neighbourhoods around the site, including Grandview Heights and Western Heights, so pedestrian and cycling links carry across neighbourhood boundaries. Together they give future residents a real choice of travel mode from the outset.

5.5.3 Road cross-sections

This summary included in **Appendix E** document summarises the proposed roading typical cross-sections for the Brymer Farms subdivision. It describes each cross-section in terms of its legal road boundary width, carriageway and traffic lane arrangement, provision for cycleways and shared paths, footpaths, berms, parking and associated widths.



The road cross-section drawing set covers the road hierarchy from primary collectors through to local roads, jointly owned access lanes (JOALs), open-space-edge roads with stormwater treatments, and standard parking bay and bus stop details.

5.5.4 Staging and sequencing

The development will be delivered in stages over the medium (2035) to long term (2045), in keeping with the scale of the masterplan and the phased delivery of supporting infrastructure. The proposed staging is shown on the Proposed Staging Plan (refer **Appendix B**). The early stages are expected to obtain access from Obrien Road (Stage 1A), Harrogate Place (Stage 1) and Grandview Road (Stage 2). These stages will deliver residential lots, internal local roads, footpaths and the first sections of cycleway, along with the stormwater and utility infrastructure needed to service them.

Later stages will extend the internal road (except for Stages 1 and 1A) and active-mode network and deliver the remaining lots across all typologies and provide the neighbourhood centre sites and further open space as the population reaches the levels needed to support them, ultimately completing the integrated network shown in the masterplan.

The specific stage boundaries, lot counts and indicative delivery programme are set out in the Proposed Staging Plan and accompanying schedule in the **Appendix B**. These should be read with the overall Brymer Farms Masterplan to understand how the stages relate spatially and how the road, active-mode and open-space network is delivered over time.

The development staging, sequencing and associated yields are summarised in **Table 5.1** below.

Table 5.1: Development yield by stage

	Residential, units				Cumulative, All Stages	Commercial, square metres	
Main Stage	Detached dwellings	Terraces	Apartments	Total		Shopping Plaza	General Offices
1	118			118			
1A	8			8	126		
2	59			59	185		
3	36			36	221		
4	70	6		76	297		
5	50			50	347		
6	57			57	404		
7	119	17		136	540		
8	30	6		36	576		
9	27	21		48	624		
10	0	81	272	353	977	2,184	552
11	31			31	1008		
12	46			46	1054		
Totals	651	131	272	1,054		2,184	552

5.6 Trip generation estimation

5.6.1 Overview

The trip generation of the development has been estimated based on the use of recently published trip generation data from Transport for New South Wales (TfNSW, 2024) and the Institute of Transportation Engineers (ITE, 2017 & 2021). The trip rates sourced are average trip generation rates for application in general suburban areas with low public transportation provisions.



5.6.2 Residential Trips

The TfNSW trip generation rates for the following TfNSW residential uses have been used to estimate the trip generation for the range of similar housing typologies provided for within the Brymer Farms development:

- Low density residential dwellings: These include for detached/attached dwellings on separate lots as well as for duplexes.
- Medium density residential dwellings: These include housing typologies such as villas, townhouses within larger area developments such as Brymer Farms.
- High-density residential dwellings: These include for residential apartment buildings with limited accessibility to major public transport hubs or corridors (i.e., as the case with Brymer Farms).

5.6.3 Commercial trips, retail

The development makes provision for two small, almost side-by-side mixed-use commercial sites, identified as C1 and C2, which will form a neighbourhood scale, convenience-oriented retail component within the development. C1 will provide approximately 910 m² of ground-floor commercial gross floor area (GFA). C2 will provide approximately 1,274 m² of ground-floor commercial GFA. Collectively, C1 and C2 will provide approximately 2,184 m² of commercial retail GFA.

The potential range of uses include retail (convenience stores, dairies, small superettes, bakeries, pharmacies, florists and specialty shops), food and beverage (cafes, takeaway shops, small restaurants and bars), personal services (hairdressers, barbers, beauty salons, laundromats, dry cleaners and repair services) and health services (GPs, dentists, physios and pharmacies).

The following is noted regarding the extent of commercial trips:

- High intensity of use (turnover): Small convenience-oriented neighbourhood centres typically yields higher peak-hour trip generation rates per 100 m² GFA than larger commercial centres. This is driven by frequent, short-duration visits rather than extended shopping trips.
- High internal capture (internalisation): Because the neighbourhood centres will serve an immediate, enclosed catchment of some 1,042 dwelling units, a substantial percentage of trips are captured internally. This means the neighbourhood centres absorb local retail demand that would otherwise generate external trips onto the wider arterial network.
- Pass-by and linked trips: A high proportion of vehicle trips to the neighbourhood centres will not be 'new' trips. They will largely consist of pass-by or diverted linked trips made by residents stopping at the plaza while already on their way to or from their homes. Based on standard traffic engineering guidelines, such as the ITE Trip Generation Manual, the typical trip breakdown for a small neighbourhood shopping centre in a medium-density area can vary as follows:
 - o Pass-by Trips (20% – 40%): Trips made by vehicles already on the adjacent roadway that stop at the centre without altering their overall route. This rate is usually highest (closer to 35-40%) during the PM peak hour.
 - o Linked / Diverted Trips (15% – 25%): Trips made by drivers who deviate slightly from their primary route to visit the centre before continuing to their final destination.
 - o Primary / New Trips (35% – 65%): Trips made specifically to visit the shopping centre as the primary destination.

Note: Exact percentages vary based on the anchor tenant (e.g., convenience stores drive higher pass-by rates) and the specific local road network.

- Active transport shift: The physical proximity of 1,042 households to a centralised neighbourhood centre node naturally facilitates a higher modal share of walking and cycling, which reduced the proportion of trips requiring a vehicle.



As a result, the net external traffic generation remains proportionally contained. However, for modelling purposes, the average trips rates were used 'as is' without a reduction for pass-by or linked trips. This is to allow for a conservative assessment of the relatively small neighbourhood centres and the potential for increased trip generation with health uses and food and beverage outlets.

The ITE trips rates for a 'shopping plaza' with a neighbourhood supermarket(land-use code: 821) was used to estimate the trip generation of the two neighbourhood centres. Shopping plazas function as stand-alone neighbourhood centres often anchored by a small grocery store or pharmacy.

5.6.4 Commercial trips, offices

The C2 site includes a small 552 m² GFA for offices. The ITE trip rates for a 'small office building' (land-use code: 712) was used to estimate the trip generation for the office component.

5.6.5 Summary

A summary of the estimated development trip generation by land-use, stage and peak period is provided in **Table 5.2**. **Figure 5.3** summarises the estimated inbound/outbound trip splits by peak period, and **Table 5.4** summarises the inbound/outbound trips by development stage and peak period.



Table 5.2: Trip generation summary, vehicles (hourly, daily)

	Detached dwellings			Terraces			Apartments			Shopping Plaza			General Offices			Totals			Cumulative, All Stages		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Main Stage	0.83	0.84	7.53	0.41	0.60	3.67	0.38	0.45	2.77	3.39	6.98	73.00	1.64	1.55	11.67						
1	98	99	889	-	-	-	-	-	-	-	-	-	-	-	-	98	99	889			
1A	7	7	60	-	-	-	-	-	-	-	-	-	-	-	-	7	7	60	105	106	949
2	49	50	444	-	-	-	-	-	-	-	-	-	-	-	-	49	50	444	154	155	1,393
3	30	30	271	-	-	-	-	-	-	-	-	-	-	-	-	30	30	271	183	186	1,664
4	58	59	527	2	4	22	-	-	-	-	-	-	-	-	-	61	62	549	244	248	2,213
5	42	42	377	-	-	-	-	-	-	-	-	-	-	-	-	42	42	377	285	290	2,590
6	47	48	429	-	-	-	-	-	-	-	-	-	-	-	-	47	48	429	333	338	3,019
7	99	100	896	7	10	62	-	-	-	-	-	-	-	-	-	106	110	958	439	448	3,977
8	25	25	226	2	4	22	-	-	-	-	-	-	-	-	-	27	29	248	466	477	4,225
9	22	23	203	9	13	77	-	-	-	-	-	-	-	-	-	31	35	280	497	512	4,506
10	-	-	-	33	49	297	103	123	755	74	152	1,594	9	9	64	219	332	2,711	716	844	7,216
11	26	26	233	-	-	-	-	-	-	-	-	-	-	-	-	26	26	233	742	870	7,450
12	38	39	346	-	-	-	-	-	-	-	-	-	-	-	-	38	39	346	780	909	7,796
Totals	540	547	4,902	54	79	481	103	123	755	74	152	1,594	9	9	64	780	909	7,796			



Table 5.3: Inbound/outbound trip splits by peak period

Detached dwellings							
AM	In	Out	PM	In	Out	Daily	In Out
Total	0.25	0.75	Total	0.63	0.37	Total	0.5 0.5
Terraces							
AM	In	Out	PM	In	Out	Daily	In Out
Total	0.23	0.77	Total	0.63	0.37	Total	0.5 0.5
Apartments							
AM	In	Out	PM	In	Out	Daily	In Out
Total	0.28	0.72	Total	0.70	0.30	Total	0.50 0.50
Shopping Plaza							
AM	In	Out	PM	In	Out	Daily	In Out
Total	0.6	0.4	Total	0.49	0.51	Total	0.50 0.50
General Offices							
AM	In	Out	PM	In	Out	Daily	In Out
Total	0.86	0.14	Total	0.16	0.84	Total	0.50 0.50



Table 5.4: Inbound/outbound trips by development stage and peak period

Totals										Cumulative, All Stages									
Main Stage	AM	In	Out	PM	In	Out	Daily	In	Out	AM	In	Out	PM	In	Out	Daily	In	Out	
1	98	24	73	99	62	37	889	444	444										
1A	7	2	5	7	2	5	60	30	30	105	26	78	106	64	42	949	474	474	
2	49	12	37	50	12	37	444	222	222	154	38	115	155	77	79	1,393	697	697	
3	30	7	22	30	8	23	271	136	136	183	46	138	186	84	102	1,664	832	832	
4	61	15	45	62	17	45	549	275	275	244	61	183	248	101	147	2,213	1,107	1,107	
5	42	10	31	42	11	32	377	188	188	285	71	214	290	112	178	2,590	1,295	1,295	
6	47	12	35	48	12	36	429	215	215	333	83	250	338	124	214	3,019	1,509	1,509	
7	106	26	79	110	31	79	958	479	479	439	109	329	448	155	293	3,977	1,989	1,989	
8	27	7	21	29	9	20	248	124	124	466	116	350	477	163	313	4,225	2,113	2,113	
9	31	8	23	35	14	22	280	140	140	497	124	373	512	177	335	4,506	2,253	2,253	
10	219	89	131	332	192	140	2,711	1,355	1,355	716	213	504	844	370	475	7,216	3,608	3,608	
11	26	6	19	26	7	20	233	117	117	742	219	523	870	376	494	7,450	3,725	3,725	
12	38	10	29	39	10	29	346	173	173	780	228	552	909	386	523	7,796	3,898	3,898	
Totals	780	228	552	909	386	523	7,796	3,898	3,898										



5.7 Trip distribution and assignment

Trip distribution and assignment were modelled in the Waikato Regional Traffic Model (WRTM). In the WRTM, trip distribution pairs trip origins with trip destinations to form origin-destination (O-D) trip matrices. Trip assignment then loads those O-D trips onto the physical road network along the most efficient routes.

WRTM uses a doubly-constrained gravity model utilising negative exponential deterrence functions. It calculates spatial interaction between zones, assuming trip exchange increases with zone attractiveness and decreases as travel cost increases. Trip distribution is calculated separately for different trip purposes (e.g., home-based work, home-based education, home-based shopping, non-home-based) across modelled time periods (AM peak, interpeak, PM peak).

Once trips are distributed (and split by transport mode), vehicle driver O-D matrices are assigned to the highway network using user equilibrium road assignment. WRTM explicitly models key intersection capacities and turn penalties, adding realistic node-level delays into the assignment convergence process.

5.8 Traffic modelling using the WRTM

5.8.1 About the WRTM model

The purpose of the Waikato Regional Transport Model (WRTM) strategic model is to enable integrated planning of land use and transport, for proposals to be analysed, and possible changes in policies to be evaluated.

The WRTM assists with:

- Forecasting future traffic volumes for investment and maintenance;
- Alternative land use policy analysis and spatial planning;
- Testing the merits of alternative transport networks (including road and public transport);
- Calculation of future benefits for economic evaluation of transport projects; and
- Providing inputs into other tools to undertake more detailed intersection or urban modelling analyses.

The geographic coverage of the WRTM includes the Waikato Regional Council area from the Auckland boundary in the north, up to and including the Taupo District in the south, and from the west coast of the Waikato to the east.

5.8.2 Model commissioning

Hollyford Consulting Ltd was commissioned by Co-Lab, at the request of Brymer Farms Limited, to model the traffic effects of the then approx. 1,068 lot development (based on the masterplan dated 16 July 2026) using the WRTM. The overall yield has since reduced to 1,042 dwelling units.

The full modelling report is attached as **Appendix H** and should be read as part of this ITA.

5.8.3 Development model network

The 'coded' Brymer Farms WRTM model network and associated zones and nodes are shown in **Figure 5.1**.

The zones are shown as the 'big numbers' in the image below and matches the development stages indicated on a slightly earlier version of the masterplan dated 16 July 2026.

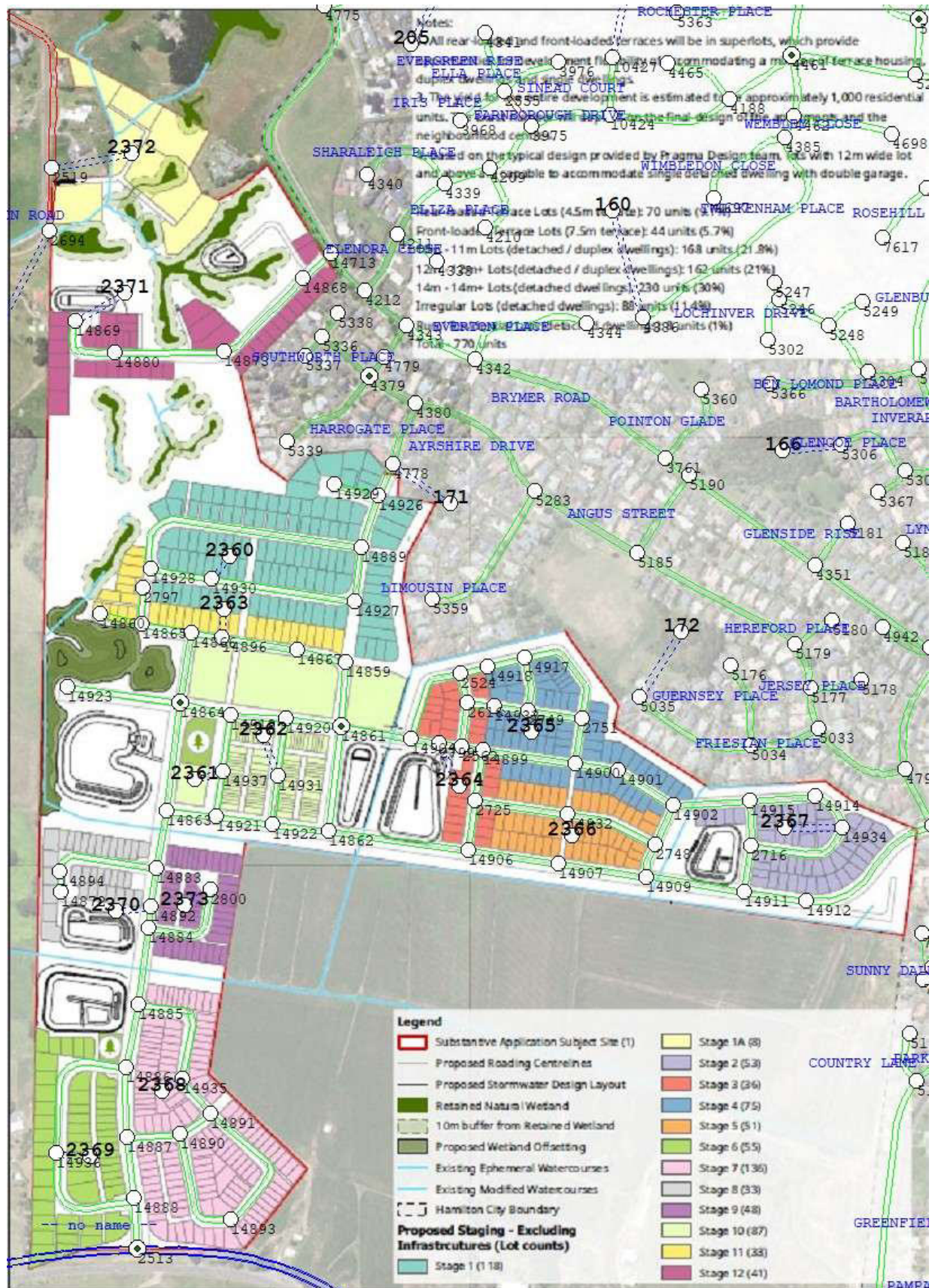


Figure 5.1: Brymer Farms WRTM model network zones and nodes

Source: Hollyford Consulting, 2026



5.8.4 WRTM modelling summary

The 2025 base model was first validated against surveyed counts at ten key intersections near the site. Following refinement of zone loading and link speeds, the model largely met the NZTA Transport Model Guidelines criteria for small area / corridor models, with the residual weaker fits concentrated at the Newcastle Road / Ellicott Street and SH 23 / Newcastle Road intersections.

Development trip generation in the WRTM was adjusted to match the first-principles calculations in this ITA, achieving agreement within 2% overall across the morning and evening peaks.

Scenarios were tested at 2035 (no development, Stages 1–5, Stages 1–6, and full development), and at 2045 and 2055 (no development and full development).

- At 2035, neither the part-development scenarios nor full development produced any material change in level of service compared with the no-development baseline; the Dinsdale roundabout worsens slightly in the evening peak and delays of 26 seconds are predicted on the Wallace Road approach to SH 23.
- Results at 2045 are effectively unchanged from 2035.
- By 2055, background growth alone degrades several local intersections, with Newcastle Road/SH 23 reaching LOS E; with full development, Wallace Road / SH 23 moves to LOS E in the morning peak and SH 23 / Newcastle Road to LOS F in the evening peak.

Two caveats apply. Modelled flows on SH 23 west of Dinsdale could not be matched to counts despite network refinement, indicating a structural trip generation/distribution issue in the WRTM beyond the scope of this analysis. For the SH 23/Newcastle Road and Newcastle Road/Ellicott Street intersections the detailed assessment applies the modelled change in flows to the 2025 counted movements rather than relying on the absolute model outputs from the WRTM.

The WRTM modelling outputs are further assessed in the following sections focussed on the wider area (**Section 5.11**) and local area (**Section 5.12**) traffic distribution, respectively.

5.9 Assessment of Wider Traffic Effects

5.9.1 Introduction and scope

This section assesses the effects of the development on the wider, strategic road network: the SH 23 corridor, the arterial/collector routes, and the major intersections that connect them. It is deliberately separated from the assessment of local traffic distribution effects, which addresses the adjoining residential streets.

The evidence base for this section is the WRTM strategic modelling reported in **Appendix H**, including link flows extracted directly from the loaded networks for the no-development and with-development scenarios at each horizon year; conclusions drawn here are strategic network conclusions and are not relied upon to establish the acceptability of effects on individual local streets.

5.9.2 Reliability of the modelling evidence

The WRTM evidence carries substantial weight for the strategic assessment. The 2025 base model was validated against turning counts surveyed at ten local intersections, achieving the NZTA Transport Model Guidelines small-area criteria after local refinement (87.9% of AM turning movements with GEH under 5.0, and 100% under 10.0).

Development trip generation in the model was calibrated to the first-principles calculations in this ITA to within 2% overall in both peaks. Scenarios were tested for partial development (Stages 1–5 and Stages 1–6) and full development at 2035, and full development at 2045 and 2055, each against a corresponding no-development baseline.

Two limitations are acknowledged: the model could not be made to match counted flows on SH 23 west of Dinsdale, pointing to a structural limitation in that corridor, and validation was comparatively weak at the SH 23/Newcastle Road and Newcastle Road/Ellicott Street intersections. For these intersections the detailed assessment applied the modelled change in flows to the 2025 counted movements rather than relying on absolute model outputs.



5.9.3 Strategic intersection performance

The WRTM predicts that the development causes little or no change in intersection level of service across the strategic network at 2035 and 2045, whether for the part-development or full-development scenarios.

The network deficiencies that emerge by 2055 - at the SH 23/Newcastle Road intersection (LOS F, PM), the SH 23/Wallace Road approach (LOS E, AM) - arise predominantly in the no-development scenarios as well and are attributable to background growth across the western Hamilton catchment rather than to the development.

These intersections were then assessed in detail in the separate operational assessment using SIDRA Intersection (refer to **Section 5.13**).

5.9.4 Change in corridor traffic flows

Intersection level of service alone does not convey where development traffic goes. **Table 5.5** reports the WRTM-predicted flows on the corridors surrounding the development at 2035, comparing the no-development and full-development scenarios directly. This link-flow evidence, rather than LOS results, is the appropriate strategic measure of the development's distribution effects.

Table 5.5: Two-way one-hour corridor flows, 2035 (vehicles per hour)

Corridor	No development (AM / PM)	Full development (AM / PM)	Increase	% increase	ITA finding
Grandview Road (Newcastle Rd – Ayrshire Dr)	180 / 186	418 / 494	+238 / +308	+132% / +166%	Development access route; increase is by design and within collector function; staged per the local effects assessment
Brymer Road north (north of Bagust Rd)	254 / 340	354 / 510	+100 / +170	+40% / +50%	Within link capacity; substantial background (Rotokauri) growth in both scenarios
Newcastle Road (Grandview Rd – Ellicott Rd)	679 / 792	705 / 798	+26 / +6	+4% / +1%	Negligible development effect; falls below no-development case by 2045–2055 (PM) as SH 23 access redistributes traffic
Ayrshire Drive / local residential network	107 / 112	119 / 126	+12 / +14	+11% / +13%	No meaningful reassignment of development traffic
SH 23 east of Newcastle Rd	826 / 1,061	978 / 1,233	+151 / +172	+18% / +16%	Development traffic uses the strategic corridor as intended; 2055 intersection constraints assessed in SIDRA
SH 23 west of Newcastle Rd	889 / 1,116	1,010 / 1,248	+120 / +131	+14% / +12%	Note WRTM validation limitation west of Dinsdale; counts-plus-growth approach adopted for intersection assessment

Notes: Flows extracted from the WRTM loaded networks (two-hour volumes × 0.5). The corresponding comparisons at 2045 and 2055 show the development increment stable or declining on every corridor: for example, Grandview Road +236/+270 vph (2045) and +228/+292 vph (2055); Newcastle Road +16/-68 vph (2045) and +4/-60 vph (2055).



The overall pattern is clear: development traffic loads onto the roads built or designated to carry it - Grandview Road, the SH 23 corridor and Brymer Road - while the development component on Newcastle Road and the established residential network is negligible, and by 2045 the completed development network actually relieves Newcastle Road relative to the no-development case. The percentage increases on the SH 23 corridor itself (12–18%) represent the development using the strategic network for its strategic movements, which is the outcome sought by the access strategy.

5.9.5 The 2055 horizon

By 2055 the WRTM predicts capacity constraints at several SH 23 corridor intersections. The no-development scenarios show the SH 23/Newcastle Road intersection already at LOS E and the Dinsdale roundabout at LOS E in the evening peak without any contribution from the development; with full development, SH 23/Newcastle Road moves to LOS F (PM) and Wallace Road/SH 23 to LOS E (AM).

The development is therefore an incremental contributor to constraints that are created by background growth, and the appropriate response is corridor-level intervention led by the road controlling authorities, with the development making a proportionate contribution to the SH 23/Newcastle Road upgrade as assessed in the network operation assessment. It is not credible to attribute the 2055 corridor deficiencies to the development, nor to require the development to resolve them.

5.9.6 Summary - wider network effects

On the basis of the traffic surveys, the validated and calibrated WRTM strategic modelling, the corridor link-flow comparisons reported above, and the staging controls identified in this ITA, the full Brymer Farms development can be accommodated on the wider strategic network without unacceptable adverse effects on its safety or efficiency, provided that development is staged in step with the delivery of the external access network.

The WRTM demonstrates that the development does not materially alter strategic intersection level of service at 2035 or 2045 relative to the no-development scenarios, that its traffic distributes onto the strategic corridors designed to carry it, and that the longer-term constraints at 2055 are predominantly associated with background growth across the wider western Hamilton catchment.

This wider-network conclusion is expressly conditional: it assumes delivery of the planned external access network - the Grandview Road connection, the SH 23 access, and the internal collectors linking them - rather than unrestricted loading of development traffic onto the existing local roads, and it does not by itself establish the acceptability of effects on individual local streets, which is demonstrated separately in the assessment of local traffic distribution effects.

5.10 Assessment of Local Traffic Distribution Effects

5.10.1 Introduction

The WRTM strategic modelling reported in **Appendix H**, and the assessment of wider network effects based on it, support conclusions about the strategic road network: the arterial/collector corridors and major intersections. Those conclusions do not, of themselves, demonstrate that the effects of the development on individual local residential streets are acceptable. This section therefore assesses the local distribution of development traffic separately, so that the effects on each adjoining road can be seen and tested on its own terms.

The assessment draws on four sources: intersection turning counts surveyed at ten local intersections on Thursday 9 October 2025; link flows extracted directly from the WRTM loaded networks for the no-development, Stages 1–5, Stages 1–6 and full-development scenarios at 2035, and the no-development and full-development scenarios at 2045 and 2055 (AM and PM peaks); the corresponding 2025 validated base model; and the development trip generation calculated in this ITA, to which the WRTM was calibrated within 2%. All flows quoted are two-way, one-hour volumes unless stated otherwise, derived from the WRTM two-hour peak-period outputs using the 0.5 conversion adopted in the WRTM modelling report. Because both no-development and with-development flows are reported for each horizon year, the development component on each road can be read directly as the difference between the two.



5.10.2 Staged access framework

The development is proposed to be built out in 12 stages over an extended period, and its connections to the existing network are themselves staged. The local effects assessment is therefore structured around five sequential access states, each of which functions as a self-contained catchment with a defined maximum yield:

- Stage 1A - O'Brien Road catchment. Comprising 8 dwellings accessed solely from O'Brien Road, with no connection to the balance of the development.
- Stage 1 - Harrogate Place catchment. Comprising 118 dwellings accessed from Harrogate Place, physically and functionally separated from the balance of Brymer Farms, with no vehicular connection to the remainder of the development. This catchment is assessed in detail in **Section 5.12.4**.
- Grandview-enabled stages. Stages 2 to 5 (approximately 215 lots) accessed via the new Grandview Road connection between Ayrshire Drive and Western Heights Drive. During this interim state Grandview Road carries only this defined catchment. This is assessed in **Section 5.12.5**, drawing on the Stages 1–5 scenario modelled expressly in the WRTM.
- SH 23 trigger. Before development proceeds beyond the Grandview-enabled yield (limited to approximately 200 dwelling units), the permanent SH 23 access must be constructed, operational and approved by NZTA.
- Post-SH 23 stages. Stages 6 to 12, with the SH 23 and Grandview Road accesses linked by internal collector roads. In this state the traffic distribution is fundamentally different: development traffic oriented to and from the west and south uses the SH 23 access rather than the established residential network.

5.10.3 Surrounding local road network

Table 5.6 sets out, for every road in the surrounding local network, the surveyed 2025 flows and the modelled 2035 flows for the no-development, Stages 1–5, Stages 1–6 and full-development scenarios, together with the development component at full development (the difference between the full-development and no-development flows). **Table 5.7** carries the comparison through to 2045 and 2055. Shaded rows are the streets where the development materially changes traffic volumes; these are discussed individually below.

Table 5.6: Two-way one-hour flows - 2035 (vehicles per hour, AM/PM)

Road / segment	2025 surveyed	2035 no dev	2035 Stages 1–5	2035 Stages 1–6	2035 full dev	Dev traffic at full dev (FD – ND)
Brymer Rd, north of Bagust Rd	214 / 238	254 / 340	315 / 434	320 / 437	354 / 510	+100 / +170
Brymer Rd, Bagust Rd – Baverstock Rd	361 / 347	458 / 534	528 / 638	520 / 629	560 / 703	+102 / +169
Brymer Rd, Baverstock – Farmborough	401 / 368	434 / 527	495 / 597	493 / 596	542 / 674	+108 / +147
Brymer Rd, Farmborough – Highgrove	446 / 425	458 / 558	513 / 614	512 / 616	563 / 692	+105 / +134
Brymer Rd, Highgrove – Angus	390 / 402	422 / 546	452 / 593	459 / 598	509 / 680	+87 / +134
Brymer Rd, Angus – Newcastle/Grandview	423 / 450	464 / 554	527 / 612	534 / 617	584 / 699	+120 / +145
Grandview Rd, Newcastle – Ayrshire	96 / 111	180 / 186	240 / 252	293 / 308	418 / 494	+238 / +308



Road / segment	2025 surveyed	2035 no dev	2035 Stages 1–5	2035 Stages 1–6	2035 full dev	Dev traffic at full dev (FD – ND)
Grandview Rd, Ayrshire – site connection	95 / 154	147 / 158	216 / 228	276 / 294	404 / 486	+257 / +328
Grandview Rd, east of Newcastle/Brymer	213 / 276	370 / 400	414 / 444	442 / 472	518 / 568	+148 / +168
Ayrshire Drive	76 / 94	107 / 112	111 / 116	118 / 122	119 / 126	+12 / +14
Western Heights Drive	[no count]	183 / 198	279 / 291	270 / 284	356 / 380	+173 / +182
Highgrove Drive	62 / 69	110 / 150	168 / 234	163 / 228	162 / 224	+52 / +74
Harrogate Place	[no count]	169 / 180	266 / 277	267 / 278	268 / 279	+99 / +99
Angus Street	32 / 42	70 / 45	103 / 54	104 / 55	104 / 55	+34 / +10
Baverstock Road	112 / 123	142 / 150	160 / 176	154 / 175	162 / 178	+20 / +28
Farmborough Drive	98 / 107	66 / 66	66 / 64	66 / 62	68 / 64	+2 / –2
Bagust Road	176 / 120	222 / 210	230 / 220	218 / 210	224 / 210	+2 / 0
O'Brien Road	28 / 21	30 / 30	34 / 36	34 / 36	36 / 36	+6 / +6
Newcastle Rd, Grandview – Ellicott	528 / 680	679 / 792	714 / 815	697 / 792	705 / 798	+26 / +6

Notes: Flows extracted from the WRTM loaded networks (two-hour volumes × 0.5). "No dev" is the 2035 no-development scenario. Harrogate Place and Western Heights Drive were not surveyed in 2025; modelled 2025 base flows are 132/140 and 180/200 respectively. Model flows on short residential links include zone-connector loading and are indicative.

Table 5.7: Two-way one-hour flows - 2045 and 2055 (vehicles per hour, AM/PM)

Road / segment	2045 no dev	2045 full dev	2055 no dev	2055 full dev
Brymer Rd, north of Bagust Rd	304 / 463	442 / 624	408 / 617	545 / 762
Brymer Rd, Bagust Rd – Baverstock Rd	536 / 680	682 / 838	774 / 980	914 / 1,127
Brymer Rd, Baverstock – Farmborough	519 / 696	648 / 822	717 / 950	840 / 1,070
Brymer Rd, Farmborough – Highgrove	550 / 734	666 / 844	742 / 978	850 / 1,087
Brymer Rd, Highgrove – Angus	507 / 712	600 / 802	692 / 944	776 / 1,034
Brymer Rd, Angus – Newcastle/Grandview	546 / 715	668 / 821	724 / 949	833 / 1,056
Grandview Rd, Newcastle – Ayrshire	188 / 196	424 / 466	192 / 201	420 / 494
Grandview Rd, Ayrshire – site connection	156 / 174	408 / 472	166 / 185	415 / 494
Grandview Rd, east of Newcastle/Brymer	383 / 424	516 / 522	449 / 431	574 / 548
Ayrshire Drive	105 / 107	117 / 133	102 / 109	122 / 128
Western Heights Drive	186 / 201	334 / 318	186 / 206	300 / 348



Road / segment	2045 no dev	2045 full dev	2055 no dev	2055 full dev
Highgrove Drive	118 / 158	173 / 213	128 / 161	176 / 226
Harrogate Place	178 / 189	276 / 285	187 / 198	282 / 296
Angus Street	73 / 52	104 / 68	78 / 60	105 / 72
Baverstock Road	140 / 144	160 / 162	192 / 189	203 / 199
Farmborough Drive	73 / 78	74 / 70	82 / 88	80 / 83
Bagust Road	244 / 235	254 / 240	376 / 376	382 / 379
O'Brien Road	28 / 29	34 / 34	27 / 28	33 / 34
Newcastle Rd, Grandview – Ellicott	760 / 948	776 / 880	976 / 1,146	980 / 1,086

Three patterns are evident. First, on the great majority of local streets - Ayrshire Drive, Angus Street, Baverstock Road, Farmborough Drive, Bagust Road and O'Brien Road - the development component at full development is small in absolute terms (between -2 and +34 vph) and the totals remain low. Secondly, the streets that do carry development traffic are those able to do so based on available carrying capacities: Grandview Road, and for the Stage 1 catchment, Harrogate Place and Highgrove Drive. Thirdly, on Newcastle Road the development component is negligible at 2035 (+26 vph AM, +6 vph PM) and negative by 2045 and 2055 in the PM peak, because the completed internal network and SH 23 access draw traffic away from Newcastle Road. The exception requiring attention is Western Heights Drive, discussed at **Section 13.12.4**.

5.10.3.1 Brymer Road

Brymer Road is the principal north-south route past the development's eastern boundary and is classified as an urban connector road (a.k.a. primary collector). The development adds between about 87 and 120 vph (AM) and 134 and 170 vph (PM) to Brymer Road at full development, an uplift of roughly 20 to 40 per cent over the no-development case, on top of background growth. Resulting 2035 volumes of 500 to 700 vph, rising to 780 to 1,130 vph by 2055, remain within the practical mid-block capacity of the existing two-lane carriageway, and the WRTM predicts no approach on Brymer Road to exceed 17 seconds average delay at any modelled intersection at 2035. Brymer Road continues to function as intended at all horizon years.

5.10.3.2 Grandview Road

Grandview Road experiences the largest change of any existing street, and this is the intended consequence of the access strategy. Between Newcastle Road and the site connection, background growth alone takes flows from about 96-111 vph (surveyed 2025) to about 180-186 vph at 2035; the Stages 1-5 interim state adds about 60-66 vph (to 240-252 vph); opening the SH 23 access with Stage 6 adds a further 53-56 vph (to 293-308 vph); and full development takes the road to 418-494 vph.

Two observations are important. First, the absolute flows remain moderate (under 500 vph two-way in the busiest hour at full development), within the normal operating range of a collector road. Secondly, the full-development flows are essentially flat across 2035, 2045 and 2055 (418, 424 and 420 vph AM respectively) while the no-development flows barely grow: Grandview Road reaches a stable share of movement once the SH 23 access is open, and all subsequent growth is carried on SH 23 and Brymer Road. The staging controls in **Section 5.12.5** ensure the interim state is limited to the yield demonstrated acceptable.

5.10.3.3 Ayrshire Drive

Ayrshire Drive connects the existing Western Heights neighbourhood to Grandview Road immediately west of the site connection. The development component at full development is 12-14 vph (less than one additional vehicle every four minutes in the peak hour), and totals remain at 119-133 vph across all scenarios and horizon years. The model confirms that development traffic does not route through Ayrshire Drive in any meaningful volume.



5.10.3.4 Western Heights Drive

Western Heights Drive is the one street where the model predicts a redistribution effect requiring specific attention. The WRTM assigns development traffic to the Western Heights Drive loop between Grandview Road and Newcastle Road: against a no-development 2035 flow of 183–198 vph on its busiest section (near Newcastle Road), the Stages 1–5 state adds about 96 vph and full development about 173–182 vph; the quieter middle sections of the loop rise from about 31 vph today to about 206 vph at full development.

Monitoring of Western Heights Drive is included in the recommended monitoring regime (**Section 5.12.5**) with an explicit trigger for a local area traffic management (LATM) intervention. Even at the full-development prediction, the resulting volumes (about 300–380 vph on the busiest section) remain within a collector-street function, so the issue is one of neighbourhood amenity and route discipline rather than capacity.

5.10.3.5 Highgrove Drive

Highgrove Drive is the route by which the Stage 1 (Harrogate Place) catchment reaches Brymer Road. Background growth takes it from a surveyed 62–69 vph to a modelled 110–150 vph at 2035 without the development; the development adds a further 52–74 vph, for totals of about 162–234 vph. The development increment is present in full, from the Stages 1–5 state (as expected, since Stage 1 is included in every scenario) and does not grow thereafter. Flows of this order remain within the function of a local residential street; the assessment of acceptability is set out in **Section 5.12.4**.

5.10.3.6 Other local streets

Angus Street rises from about 32 vph (surveyed) to 70 vph at 2035 through background growth, with the development adding a further 34 vph (AM); the resulting 104 vph is low. Baverstock Road sees a development component of 20–28 vph on top of moderate background growth. Farmborough Drive is essentially unchanged by the development (+2/–2 vph). Bagust Road's growth to 2055 is background (Rotokauri) growth; the development component is negligible (+2 vph) beyond the 8-dwelling Stage 1A catchment, which adds about 6 vph to O'Brien Road, an imperceptible change. No other residential street in the study area shows a meaningful redistribution of traffic in the WRTM outputs.

5.10.4 Intersection performance at the site access connections and nearby intersections

The link-flow assessment above addresses the volume of traffic on each street. This section addresses how the intersections between those streets operate, at the site access connections themselves and at the nearby junctions of the established residential network. **Table 5.8** reports the worst-approach delay and resulting level of service at each, for the full-development scenario at each horizon year.

Delays are taken from the WRTM loaded networks. The level of service criteria and the rating rule are those set out in the WRTM modelling report: priority-controlled intersections are rated on the worst approach (LOS D at 25 seconds, LOS E at 35 seconds, LOS F at 50 seconds), while roundabouts (and signalised intersections) are rated on the intersection average (LOS D at 55 seconds).

Every one of these intersections operates at level of service A, B or C in every scenario and at every horizon year.

Two features of the results are significant for the assessment.

- First, the intersections closest to the established neighbourhood (Harrogate Place/Ayrshire Drive, the Highgrove Drive/Ayrshire Drive link and Highgrove Drive/Brymer Road) are the best performing of the set, at 5.8 to 9.0 seconds (LOS A) throughout.
- Secondly, six of the eight are stable or improving between 2035 and 2055: delays do not deteriorate as the development completes, because the completed access network distributes traffic more evenly than the interim states.



Table 5.8: Delay (seconds per vehicle) and level of service - full development

Intersection	2035 AM	2035 PM	2045 AM	2045 PM	2055 AM	2055 PM	Control
Harrogate Pl / Ayrshire Dr	8.1 A	7.5 A	8.2 A	7.5 A	8.2 A	7.5 A	Priority (give way)
Highgrove Dr / Ayrshire Dr link	8.8 A	5.8 A	8.9 A	5.9 A	9.0 A	6.0 A	Roundabout
Highgrove Dr / Brymer Rd	8.7 A	8.5 A	8.8 A	8.5 A	8.9 A	8.7 A	Priority (give way)
Grandview Rd / site access	10.5 B	9.7 A	10.5 B	9.3 A	10.4 B	9.6 A	Priority (give way)
Grandview Rd / Western Heights Dr	8.5 A	9.2 A	8.5 A	9.0 A	8.4 A	9.2 A	Priority (give way)
Grandview Rd / Ayrshire Dr	10.1 B	9.8 A	10.1 B	9.7 A	10.1 B	10.0 A	Priority (give way)
Grandview Rd / Newcastle Rd / Brymer Rd	11.4 B	12.7 B	11.6 B	12.7 B	12.9 B	14.2 B	Roundabout

Figures 5.2 to 5.7 present the same results geographically, for each horizon year and peak period. The maps confirm the pattern described in this section: the local road network surrounding the development remains at level of service A to C throughout.



Figure 5.2: Intersection level of service - 2035 AM peak, full development



Figure 5.3: Intersection level of service - 2035 PM peak, full development

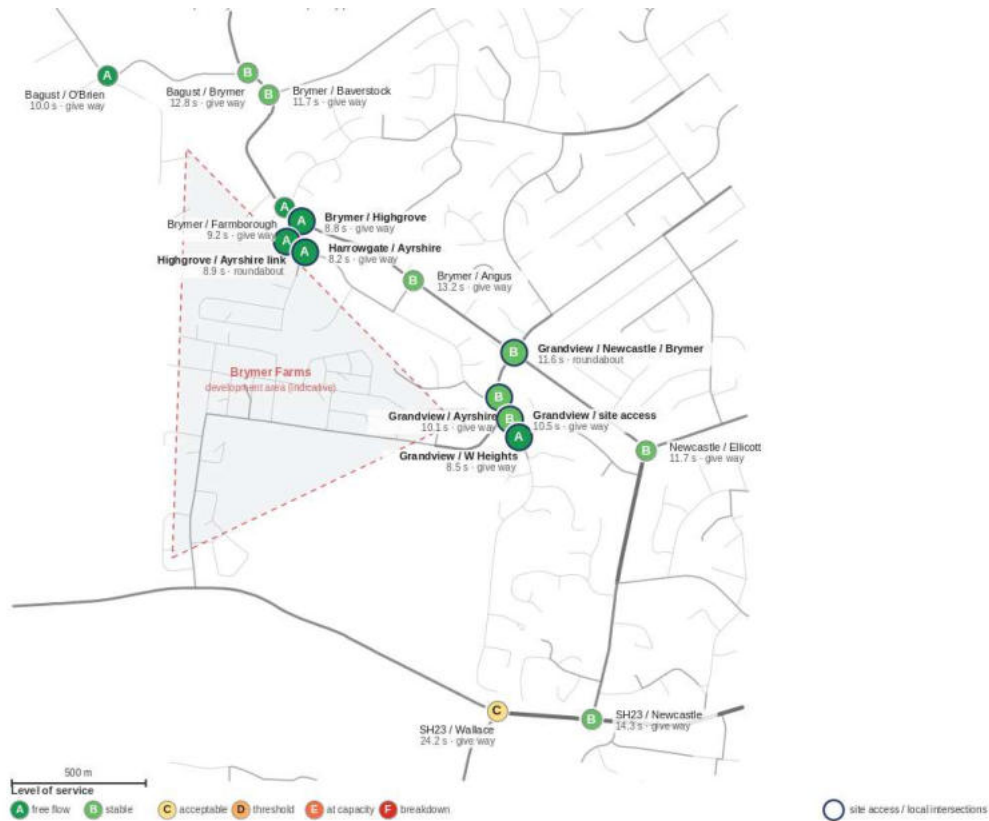


Figure 5.4: Intersection level of service - 2045 AM peak, full development

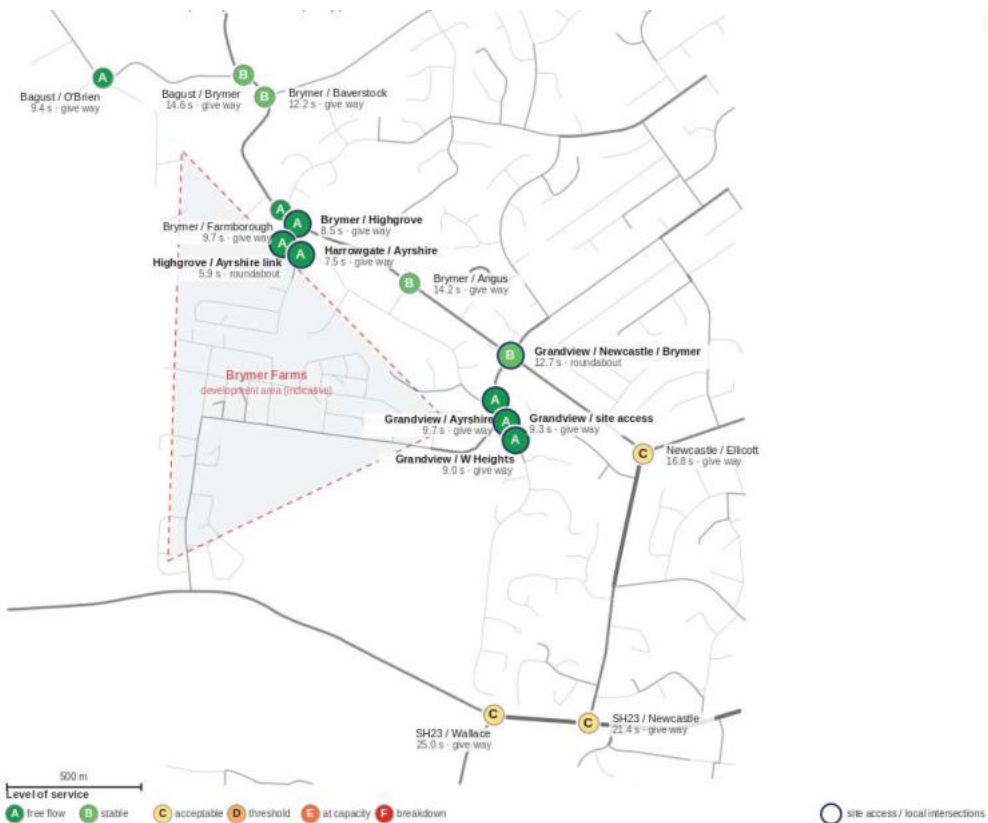


Figure 5.5: Intersection level of service - 2045 PM peak, full development

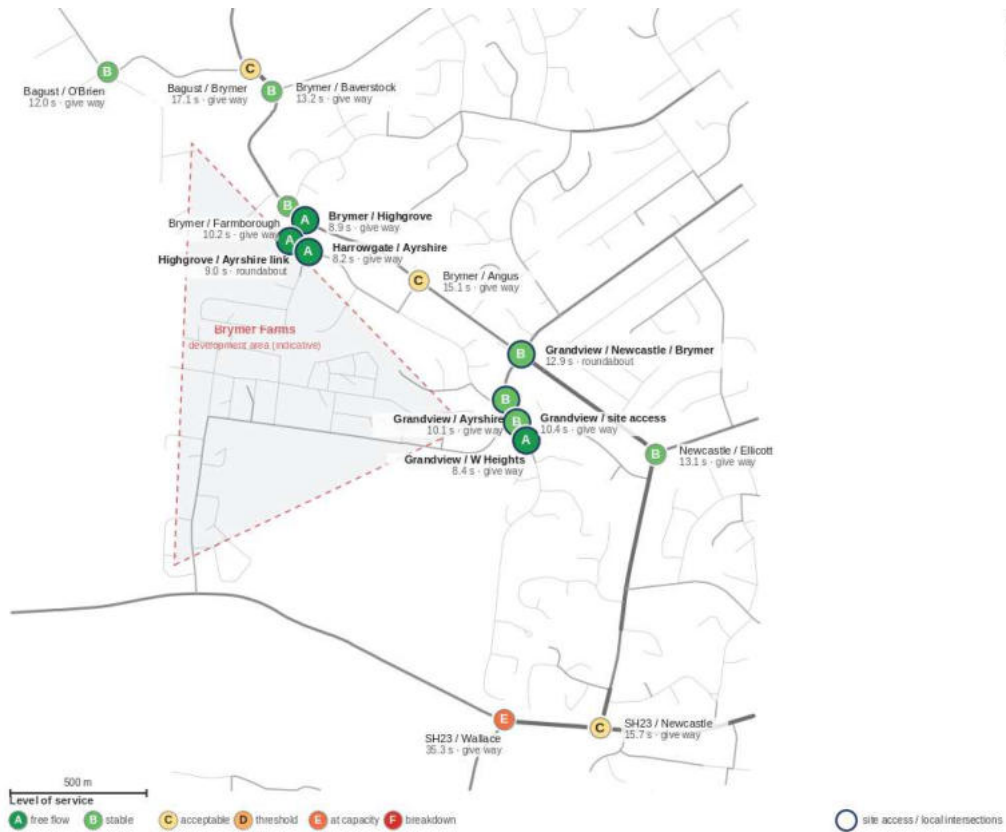


Figure 5.6: Intersection level of service - 2055 AM peak, full development

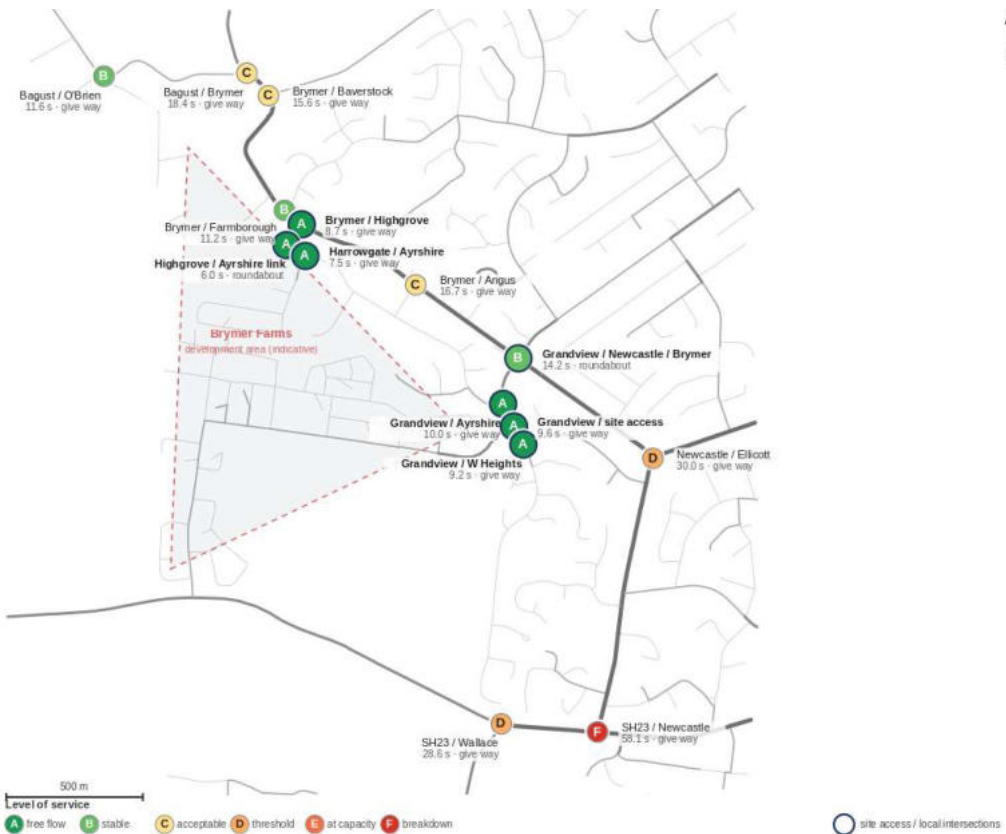


Figure 5.7: Intersection level of service - 2055 PM peak, full development



5.10.5 Harrogate Place catchment (Stage 1) - detailed assessment

5.10.5.1 The proposal

Stage 1 comprises a maximum of 118 detached dwellings accessed from Harrogate Place, with no vehicular connection to the remainder of Brymer Farms. The approved plans do not show, and the internal road layout does not provide, any through connection; the restriction is therefore embodied in the design itself rather than requiring a separate condition. The connection point is an integration point between a major greenfield development and an established residential neighbourhood, and it is assessed here in the detail that warrants.

5.10.5.2 Traffic generation

Applying the trip generation rates adopted in this ITA (to which the WRTM was calibrated within 2%), 118 dwellings generate approximately 99 vehicle movements in each of the AM/PM peak hours, together with approximately 889 movements per day. Because the stage will be built out progressively over 3-years, these flows will accrue gradually - in the order of 33 additional peak-hour movements per year of construction - rather than arriving as a single change.

5.10.5.3 Distribution and resulting flows

All Stage 1 traffic enters the existing network at Harrogate Place and distributes via Highgrove Drive to Brymer Road. The WRTM link flows confirm this directly: the development component on Harrogate Place is +99 vph in both peaks, matching the catchment's calculated generation almost exactly, and is identical in the Stages 1–5, Stages 1–6 and full-development scenarios, confirming the catchment is self-contained and carries no traffic from later stages. Resulting flows are about 266–279 vph on Harrogate Place (against a modelled no-development 2035 flow of 169–180 vph) and about 162–234 vph on Highgrove Drive.

No meaningful Stage 1 traffic is assigned to Ayrshire Drive or other residential streets. For a residential street network these volumes sit within the range normally accepted for local streets, and the Highgrove Drive/Brymer Road intersection is predicted to operate with a worst approach delay of no more than 10 seconds at any horizon year.

5.10.5.4 Integration considerations

Beyond traffic volumes, the classic ITA considerations for this interface include: the safety of the Harrogate Place/Ayrshire Drive and Highgrove Drive/Brymer Road intersections under the increased flows; pedestrian and cycle connectivity between the new and existing neighbourhoods (which is provided for by means of a proposed 3.0 m wide shared path); on-street parking behaviour near the connection; and construction traffic management (i.e., during construction of the shared path).

5.10.5.5 Summary - Stage 1

On the quantified evidence (approximately 100 peak-hour movements, accruing progressively, matching the modelled assignment within 1 vph, distributed onto streets whose resulting volumes remain within local street function, with intersection delays below 10 seconds), the existing network can safely and efficiently accommodate the 118-dwelling Harrogate Place catchment. No reduction in stage yield and no mitigation beyond the design itself is required. Because the plans provide no vehicular connection to the balance of the development, a separate condition restricting such a connection is unnecessary.

5.10.6 Grandview Road connection and staging - detailed assessment

5.10.6.1 The interim state

Between the opening of the Grandview Road connection and the opening of the SH 23 access, all development traffic other than the O'Brien Road and Harrogate Place catchments uses Grandview Road. The acceptable scale of this interim state is a staging question that must be answered quantitatively, and the WRTM tested it directly: the Stages 1–5 scenario models precisely this state.

5.10.6.2 Quantified effects of the interim catchment

The Stages 1–5 loaded network shows Grandview Road between the site connection and Newcastle Road carrying 240 vph (AM) and 252 vph (PM), an addition of about 60–66 vph to the no-development case, consistent with the approximately 215-lot Grandview-enabled catchment generating around 170 vph spread across its two directions of travel. These volumes are about 40 per cent below the full-development flows on



the same road (418–494 vph), which the modelling shows to be acceptable, and the Brymer Road/Newcastle Road/Grandview Road intersection operates at LOS B–C with approach delays no greater than 16 seconds even under full development. The interim state is therefore demonstrated acceptable both directly (by the Stages 1–5 model) and by bounding (by the full-development model).

5.10.6.3 Why approximately 200 dwellings is the right trigger

The approximately 200-dwelling threshold is not arbitrary: it is the yield of the defined Stages 2–5 catchment (approximately 215 lots on the current staging plan) that was expressly tested in the WRTM Stages 1–5 scenario, which shows little if any change in level of service from the no-development baseline and moderate absolute flows on Grandview Road. The trigger should accordingly be expressed as: development beyond the Stages 1–5 catchment (approximately 200 dwellings reliant on the Grandview Road connection) shall not be occupied until the SH 23 access is constructed, operational and approved by NZTA.

5.10.6.4 The post-SH 23 state

Once the SH 23 access opens, the development's centre of gravity shifts. The Stages 1–6 scenario shows the SH 23 access immediately carrying about 270 vph (AM) while Grandview Road rises only modestly (to 293–308 vph), and at full development the access carries about 265–290 vph while Grandview Road plateaus at 418–494 vph from 2035 through 2055. The WRTM select link analysis (in **Appendix H**) shows west- and south-oriented development traffic using SH 23 directly. The established residential network is thus protected not only by staging but by the permanent structure of the road network once complete. The modelling also identifies a modest volume of external traffic using the internal collector roads between SH 23 and Grandview Road to bypass Newcastle Road (visible in the Newcastle Road flows falling below the no-development case by 2045), and the internal roads should be designed (through geometry and traffic calming) to discourage through movement, with monitoring as below.

5.10.6.5 Monitoring

It is recommended that tube counts be undertaken on Grandview Road, Highgrove Drive, Ayrshire Drive and Western Heights Drive [annually / at each stage completion] and reported to HCC, with the counts compared against the forecasts in this section. For Western Heights Drive, an explicit trigger is recommended: if counted flows exceed say, the Stages 1–5 forecast of about 280 vph on the busiest section, local area traffic management measures should be investigated and implemented in consultation with HCC. This provides an early-warning mechanism ahead of each staging decision and gives the community confidence that the staging controls are performing as intended.

5.10.7 Summary - local traffic distribution effects

The development will increase traffic on parts of the surrounding local road network and will alter movement patterns as each connection is established; the assessment does not suggest otherwise. The quantified evidence - no-development and with-development flows for every adjoining street at every horizon year - is that these effects are confined to the streets designed to carry development traffic (Grandview Road and, for the defined 118-dwelling Stage 1 catchment, Highgrove Drive and Harrogate Place), plus a predicted redistribution onto Western Heights Drive that is to be addressed through a monitoring-and-response mechanism.

On every other residential street in the study area the development component is small (between –2 and +34 vph in the peak hour). On the streets that do carry development traffic, the resulting volumes remain within the function of the roads concerned, and the staged access framework - the 8-dwelling O'Brien Road cap, the 118-dwelling Harrogate Place catchment with no through connection, the approximately 200-dwelling Grandview Road interim limit demonstrated by the Stages 1–5 model, and the SH 23 trigger - keeps each interim state within the envelope demonstrated to be acceptable. Subject to those staging controls and the monitoring regime being secured, the local traffic distribution effects of the development are acceptable.

5.11 Traffic modelling using SIDRA Intersection

5.11.1 Overview

The SIDRA Intersection modelling outputs for intersections with a reduced level of service (LOS) above LOS E is described in this section. Intersections operating at LOS C or better is not described.



The complete list of LOS classifications based on average control delay (measured in seconds per vehicle) for unsignalised (stop and yield-controlled) intersections are as summarised in **Table 5.9** (HCM, 2022):

Table 5.9: HCM Level of Service (LOS) thresholds

LOS	Signalised Intersections (Delay in sec/veh)	Unsignalised & Yield Intersections (Delay in sec/veh)	General Operational Characteristics & Driver Experience
A	≤ 10.0	≤ 10.0	Excellent operations: Progression is highly favourable. Almost all vehicles arrive during the green phase or find immediate gaps at yield signs.
B	> 10.0 to 20.0	> 10.0 to 15.0	Good operations: Good travel progression still exists. Drivers experience slight delays but generally clear the intersection smoothly.
C	> 20.0 to 35.0	> 15.0 to 25.0	Fair operations: Stable traffic flow. Individual cycle failures may appear at signals. Queues form on minor yield approaches but clear quickly.
D	> 35.0 to 55.0	> 25.0 to 35.0	Marginal operations: Congestion becomes noticeable. High volume-to-capacity (v/c) ratios limit driver freedom, and longer queues persist on minor movements.
E	> 55.0 to 80.0	> 35.0 to 50.0	Poor operations: The intersection is operating at or near capacity. Delays are significant, cycle failures are frequent, and queues rarely clear entirely.
F	> 80.0	> 50.0	Breakdown / Forced flow: Demand severely exceeds capacity. Drivers experience extreme delays, gridlock conditions, or continuous queuing.

The WRTM level of service (LOS) diagrams for 2055 full development is shown on Figure 7-9 (AM peak) and Figure 7-10 (PM peak) in **Appendix H**.

In the morning peak:

- the SH 23 / Wallace Road intersection moves to LOS E due to drivers on the stop-controlled Wallace Road approach experiencing noticeable delays while waiting for gaps in the SH 23 traffic flow. SH 23 traffic receive priority and is not delayed.

In the evening peak:

- the SH 23 / Newcastle Road moves to LOS F due to drivers on the priority-controlled Newcastle Road approach experiencing noticeable delays while waiting for gaps in the SH 23 traffic flow. SH 23 traffic receive priority and is not delayed.
- the Newcastle Road / Ellicott Road intersection moves to LOS D due to drivers on the priority-controlled Newcastle Road (North) approach experiencing noticeable delays while waiting for gaps in the Ellicott Road / Newcastle Road (South) traffic flow, with both approaches receive priority and is hence not delayed.

The performance of these intersections was assessed using Sidra Intersection v.11 and used to determine suitable mitigation measures to improve operations to LOS D or better, where necessary. The proposed new access to the development from SH 23 was also modelled and reported on. All scenarios are based on the 2055 horizon year, with full development of Brymer Farms included.

5.11.2 SH 23 / Wallace Road

The junction has been modelled with the current seagull-type T-junction configuration. As expected the Wallace Road approach operate at LOS F during both the AM and PM peak hours at 2055, with excessive delay and associated queues evident. SH 23 traffic receive priority and is not delayed.



The intersection layout was then converted to a signalised intersection without any additional lanes. This improved / reduced intersection operations as follows:

- AM peak hour: The Wallace Road LOS improves to LOS C, whilst the SH 23 (East) LOS drops to LOS C, and the SH 23 (West) LOS drops down to LOS B. The overall intersection operates at LOS C.
- PM peak hour: The Wallace Road LOS improves to LOS C. The SH 23 (East) LOS drops to LOS C, and the SH 23 (West) LOS drops down to LOS A. The overall intersection operates at LOS C.

The overall LOS C operations achieved with signalisation would be a good outcome to resolve the congestion anticipated at this intersection by 2055, whilst providing for safety benefits. Ongoing development in the local area and in particular along Wallace Road, will likely require signalisation well in advance of 2055.

5.11.3 SH 23 / Newcastle Road

The junction has been modelled with the current T-junction configuration. As expected the Newcastle Road approach operate at LOS F during both the AM and PM peak hours at 2055, with excessive delay and associated queues evident. SH 23 traffic receive priority and is not delayed.

The intersection was then converted to a signalised intersection with significant upgrades including new short-lanes on all approaches to increase throughput (refer **Figure 5.8**). The upgrade improved / reduced intersection operations as follows:

- AM peak hour: The Newcastle Road LOS improves to LOS E, whilst the SH 23 (East) LOS drops to LOS C, and the SH 23 (West) LOS drops down to LOS E. The overall intersection operates at LOS E.
- PM peak hour: The Newcastle Road LOS improves to LOS D. The SH 23 (East) LOS drops to LOS C, and the SH 23 (West) LOS drops down to LOS D. The overall intersection operates at LOS C.

Whereas the signalisation of the intersection would resolve the congestion on the Newcastle Road approach, the overall LOS at this intersection will reduce significantly by 2055 despite the upgrades. It is however noted that LOS E operation on a higher-order urban arterial during peak periods is not unexpected and is not, of itself, an unacceptable outcome.

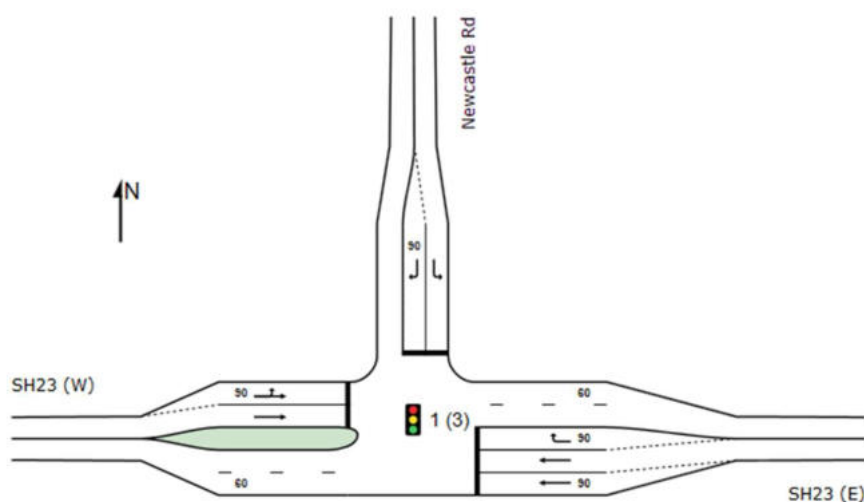


Figure 5.8: Upgraded layout for SH 23 / Newcastle Road with traffic signals

5.11.4 Newcastle Road / Ellicott Street

The junction has been modelled with the current T-junction configuration. As expected the Newcastle Road (North) approach operate at LOS F during both the AM and PM peak hours at 2055, with excessive delay and associated queues evident. Ellicott Road and Newcastle Road (South) traffic receive priority and is not delayed.

The intersection layout was then converted to a compact urban roundabout (without any additional lanes (refer **Figure 5.9**).

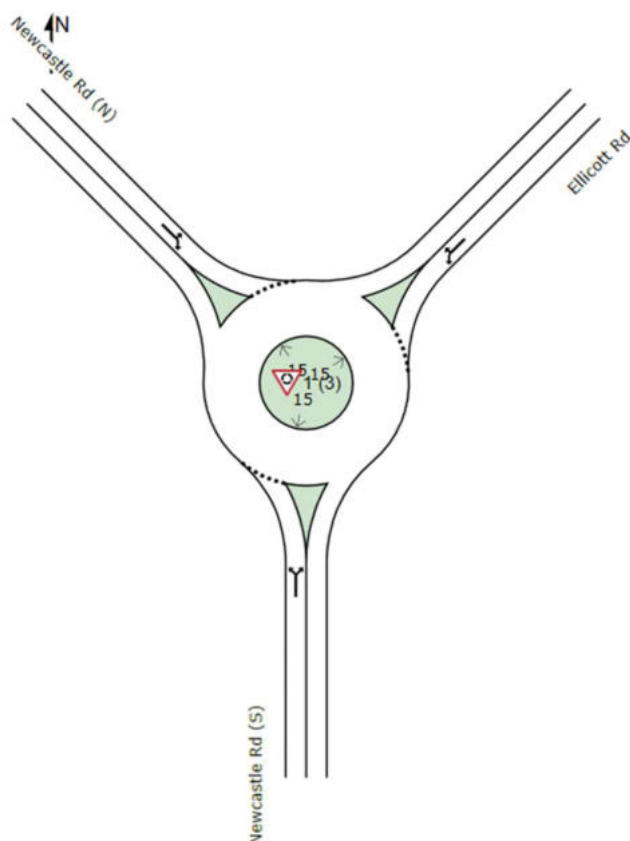


Figure 5.9: Upgraded compact roundabout layout for Newcastle Road / Ellicott Road

This conversion improved / reduced intersection performance as follows:

- AM peak hour: The Newcastle Road (North) LOS improves to LOS C, whilst the Ellicott Road and Newcastle Road (South) approaches operate at LOS A. The overall intersection operates at LOS B.
- PM peak hour: The Newcastle Road (North) LOS improves to LOS B, whilst the Ellicott Road approach drops to LOS E – delayed due to giving priority to traffic approaching from Newcastle Road (North), and the Newcastle Road (South) approach operate at LOS A. The overall intersection operates at LOS C.

The overall LOS B – C operations achieved with the conversion of the intersection to a roundabout would be a good outcome to resolve the congestion anticipated at this intersection by 2055, whilst providing for safety benefits. However, there is limited visibility to pedestrians on the Ellicott Road and Newcastle Road (South) approaches, and hence pedestrian crossings on these approached should be setback from the intersection.

5.11.5 SH 23 Site Access

The proposed new access intersection to Brymer Farms off SH 23 has been modelled with three different intersection configurations for assessment purposes: a priority-controlled, protected T-intersection and a traffic signal controlled, protected T-intersection. The analysis used the WRTM 2055 traffic volumes with full development as basis.

The modelled protected, T-intersection operations indicate 'un-delayed' performances along the two SH 23 approaches during both the AM and PM peaks. The Brymer Farms approach however reflects the right-turn movement operating at LOS F in the AM peak PM peak period. The right-turn movement is delayed due to priority given to SH 23 traffic. This increases delays and leads to increased queueing on the Brymer Farms approach. This indicates that the addition of traffic signals will be required prior to 2055.

The signalised version of the protected, T-intersection operations indicate as follows:

- AM peak hour: All approaches operate LOS B, indicating good performance. All left-turn movements all operate at LOS A and the right-turn movements at LOS D with 95th percentile queues of approximately 3.4 vehicles on each approach (a queue length of only approx. 24 m).
- PM peak hour: SH 23 (West) operate at LOS B, and both the SH 23 (East) and Brymer Farms approaches operate at LOS C. All left-turn movements all operate at LOS A (SH 23) to LOS B (Brymer Farms) and the right-turn movements at LOS D (SH 23) to LOS E (Brymer Farms). The 95th percentile right-turn queue on the Brymer Farms approaches is only about 3.8 vehicles (a queue length of only approx. 27 metres).

Note: The signal-version has been modelled with stage controlled pedestrian crossings on the SH 23 west and Brymer Farms approaches. This affects the staging of the traffic signals as well as the LOS performances of each approach and the overall intersection.

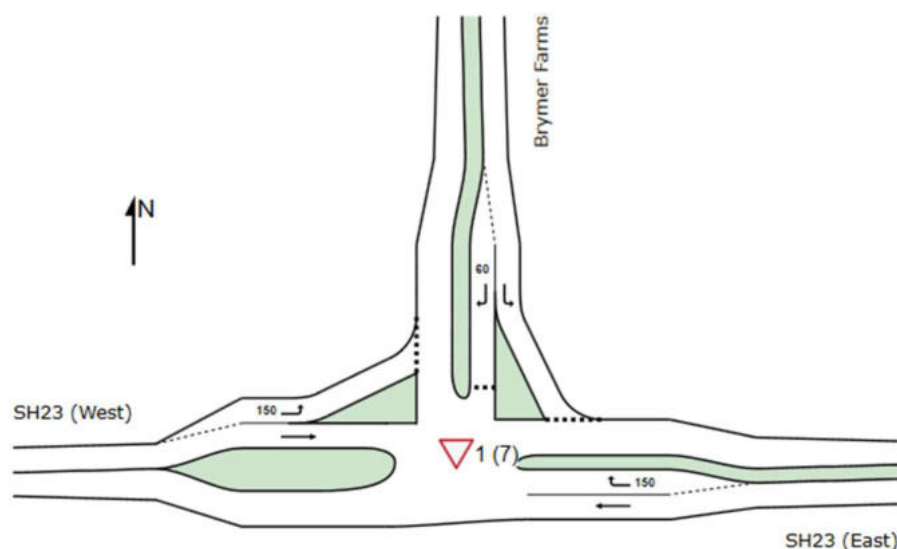


Figure 5.10: SH 23 protected, T-junction configuration, priority control

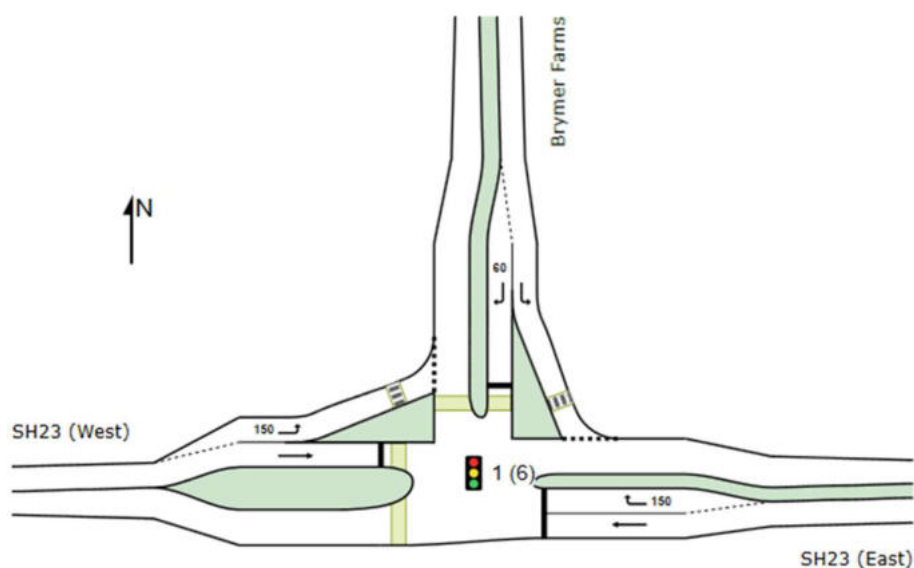


Figure 5.11: SH 23 protected, T-junction configuration, signalised



Figure 5.12: Example of a T-intersection with channelised right-turn treatment on the major road

Source: Safe System Solutions, 2026

5.12 Site servicing, deliveries and loading

5.13 General

The development has been planned with the requirements of large vehicles in mind, including for deliveries, emergency responses (fire trucks and engines), and waste removal services (refer to the roading plans in **Appendix F**).

All intersections can accommodate these vehicles safely based on the range of design and checking vehicles used. The collector and local road intersection geometry, in particular, has been determined based on a vehicle-tracking assessment of manoeuvring at accesses and on site, and in particular for waste collection services based on the HCC *Design for Waste* guidelines.



For the key intersections, the design and checking vehicles used were as listed in **Table 5.10**.

Table 5.10: Selection of design and checking vehicle and turning radius for intersections

Intersecting road types	Design	Checking
Arterial/Arterial	Prime mover and semi-trailer (19 m) ⁽¹⁾ Radius 15 m	Appropriate vehicle e.g. B-double (25 m) ⁽²⁾ or Prime mover and long semi-trailer (25 m) or Road train ⁽³⁾ or appropriate PBS level
Arterial/Collector	Single unit truck/bus (12.5 m) Radius 12.5 m	Prime mover and semi-trailer (19 m) Radius 15 m

Source: Table 2.3 in the Austroads Design Vehicles and Turning Path Templates Guide (AP-G34-23)

The first row is relevant to the design of the SH 23 intersection. In addition to these vehicles, the needs of over-dimension ('OD') and high-performance motor vehicles ('HPMV') has been considered, with SH 23 serving as a route for both OD and HPMV trucks.

The second row is relevant to the design of the internal roundabouts. In addition, the latest NZ vehicle dimensions list a 13.5m SU Bus which will likely be more frequently use the internal roundabouts in the longer term compared to 12.5m SU trucks.

5.13.1 Site C1 & C2

At this time, site servicing, deliveries and loading will occur from recessed on-street loading bays (which are not currently shown on the roading plans). Based on the size of the neighbourhood centres, loading bays to accommodate at least two (2) trucks simultaneously are recommended. These loading bays would also be used for kerbside waste collection.

Delivery and collection times will likely have to be managed to fall outside the peak retail and commuter peaks, and to limit noise disturbance to the apartments above. A short servicing management plan setting out permitted hours, the design vehicle, the service bay location and the bin haul arrangements is recommended as a condition for both sites.

5.13.2 Site A1 & A2

At this time, site servicing, deliveries and loading will occur from recessed on-street loading bays (which are not currently shown on the roading plans). Based on the size of the apartment blocks, loading bays to accommodate at least two (2) trucks simultaneously are recommended for Site A1 and one (1) loading bay for Site A2. These loading bays would also be used for kerbside waste collection.

5.14 Site access and parking

5.14.1 General access

The development access points have been described in **Section 5.5.1**.

5.14.2 Site C1 access

Vehicle access is taken from the eastern road frontage (Road 16). Two access points are shown: a two-way crossing serving the at-grade court, and immediately to the south a separate ramp access annotated 'Access to basement car parking'. The basement plan shows the ramp as a side-by-side 'Ramp up' and 'Ramp down' pair.

HCDP Rule 25.14.4.1.a requires crossings on the same frontage, where the posted speed is 60 km/h or less, to be either less than 2 m apart or more than 7.5 m apart. The separation will be confirmed at more than 7.5 m to avoid confusion between shoppers and residents/tenants. The use of signage will be used to guide drivers to the public, surface car park and similarly 'residents/tenants – only' signage will be used at the basement entrance, as necessary.

HCDP Rule 25.14.4.1.c requires 15 m separation from a local road intersection and 20 m from a collector road intersection. Based on the proposed adoption of a reduced speed limit of 30 km/h in and around the



neighbourhood centres and neighbourhood park, a spacing between the basement entrance and Road 8, a collector road, a spacing of 15 m or more should be acceptable.

HCDP Rule 25.14.4.1.n requires a 6m on-site platform at no steeper than 1 in 20 at the road boundary, and HCDP Rule 25.14.4.1.o requires a 2m transition where the gradient changes by more than 12.5% at the top or 15% at the bottom. Both are relevant to the basement ramp profile, which is not shown in the current set.

All vehicle movements to and from the road are in forward gear, so HCDP Rule 25.14.4.2.j is satisfied.

5.14.3 Site C2 access

A single two-way vehicle crossing on the northern frontage (Road 8), dimensioned at 6.0 m, serves the entire site. A marked pedestrian crossing point is shown across the accessway immediately inside the entrance, which is a positive feature given the desire lines between the car park, the retail frontages and the park connection to the south.

HCDP Rule 25.14.4.2.n queuing: with 38 spaces, $0.03 \times 38 = 1.14$, rounded up to 2 vehicles, giving 12m of on-site queuing from the road boundary.

5.14.4 Site A1 access

Two vehicle crossings are shown, both on the Road 8 frontage and approximately 90 m apart. There is no vehicle access from Road 28 or Road 6. The western crossing feeds Car Park 1 and the western end of the spine; the eastern crossing feeds the spine directly.

HCDP Rule 25.14.4.1.f limits any site within a Residential Zone to one vehicle crossing to the transport corridor, or nil where vehicle access is provided by a rear lane. If A1 is within a Residential Zone, the two crossings do not comply with this standard and consent will be required. The supporting argument is that two connected crossings avoid a single 200 m dead-end serving 160 apartments, allow waste and emergency vehicles to enter and leave in forward gear, and distribute turning movements on Road 8 rather than concentrating them at one point.

HCDP Rule 25.14.4.1.a requires crossings on the same frontage, where the posted speed is 60 km/h or less, to be either less than 2 m apart or more than 7.5 m apart. At approximately 90 m apart this is comfortably satisfied.

HCDP Rule 25.14.4.2.n requires on-site queuing, but proviso v excludes Residential Activities and Structures in the Residential Zones. If the exemption does not apply, 94 spaces give $0.03 \times 93 = 2.82$, rounded up to 3 vehicles, and 18 m of queuing measured from the road boundary to the nearest vehicle control point, which is comfortably achieved at both accessways.

All vehicle movements to and from Road 8 are in forward gear, so HCDP Rule 25.14.4.2.j is satisfied at the crossings.

5.14.5 Site A2 access

A single two-way vehicle crossing on the Road 6 frontage serves the entire site. This satisfies the one-crossing limit in HCDP Rule 25.14.4.1.f.

Rule 25.14.4.2.n queuing, if the residential exemption in proviso v does not apply: with 28 spaces the site falls under the 30 space threshold, so a minimum on-site queuing length of 6 m applies.

5.14.6 General parking

The roads within the development all make provision for recessed on-street parking spaces (refer **Appendix F** for indicative locations). In addition, each individual lot will make provision for on-site parking provisions.

The commercial and apartment blocks make provision for a suitable level of on-site parking. It is noted that the apartments are earmarked as a car-lite development, with the consideration of the growth in the uptake of car-share services, e.g., Zilch and Cityhop.

5.14.7 Site C1 parking

64 car parks are provided - 40 in the basement and 24 at grade.



Basement bays are angled, with 5.4 m bay depths and 4.6 m one-way aisles, and 6.0 m internal turning radii at the aisle ends. The aisle widths satisfy the 3.0 m one-way minimum in note 2 to Table 15-1h. Two EV charging spaces (bays 18 and 19) are provided in the basement.

At grade, 24 spaces are shown at 90° with 5.1 m bay depths. Two accessible spaces and two ride share spaces are marked. The ride share provision is a useful travel demand management feature and should be secured and signposted.

Because more than 50 car parks are provided, HCDP Rule 25.14.4.2.c.ii is triggered and spaces for less mobile users must be provided in addition to accessible spaces, in accordance with Tables 15-1d and 15-1e.

HCDP Rule 25.14.4.2.o requires a 2.5m vertical clearance at accessible spaces and along the full length of their vehicular access route. The accessible spaces are currently at grade, so this is not a constraint, but it becomes one if any accessible space is relocated to the basement.

Following the National Policy Statement on Urban Development there is no longer a minimum car parking requirement for most activities. Instead, HCDP Rule 25.14.4.2.d imposes a maximum in Business 1 to 7 Zones where 10 or more spaces are provided. The 64 spaces should be tested against that maximum.

Cycle parking is shown in the basement, combined with a service area.

HCDP Rule 25.14.4.2.p requires visitor cycle parking to be within 25 m of the principal entrance of the activity visited, which the facility adjacent to Building 1 and Building 6 provides.

HCDP Rule 25.14.4.2.t requires resident cycle and micro-mobility parking to incorporate charging facilities, not to be located within a habitable room, entrance or passageway, and to be reachable from the road without passing through a habitable room or another residential unit. HCDP Rule 25.14.4.2.u.v also requires an accessible, obvious and step-free route between the road and the cycle parking area, which will need to be demonstrated for a basement location served by a lift.

5.14.8 Site C2 parking

38 spaces are provided at grade in a single central court, with one-way circulation around a central landscaped island - entry along the western aisle and exit along the eastern aisle. Bays are angled with 5.4 m depths and aisles of 5.0 m to 6.0 m, comfortably above the 3.0 m one-way minimum. Two accessible spaces are shown on the eastern side adjacent to the service area, with two EV spaces and two ride share spaces at the northern end near the entrance.

It is noted that one-way circulation suits a site with a single access point and reduces conflict within the court, but it depends on clear directional signage and pavement marking to work.

Cycle parking areas are provided at grade adjacent to the retail frontages and the cafes. These are well placed against the 25 m visitor requirement in HCDP Rule 25.14.4.2.p. A separate, secure cycle parking facility for residents and tenants with charging facilities is also provided for under HCDP Rule 25.14.4.2.t.

Pedestrian routes between the car park, the retail frontages, the cafe outdoor dining and the park connection at the south should be continuous and clearly marked, and where they cross the circulation aisles should be raised or otherwise treated to give pedestrian priority.

5.14.9 Site A1 parking

94 car parks are provided at grade for 160 apartments, a ratio of 0.59 spaces per apartment. No visitor parking is separately identified.

Four rideshare spaces and EV charging spaces are marked within the spine. These support the low parking supply and car-lite development and should be secured by condition, alongside measures such as unbundling parking from apartment titles, car share membership for residents, and a residents' travel plan.

Bays are arranged at 90° on both sides of two-way aisles. At 90° Table 15-1h requires a 5.1 m bay depth from a wall and a manoeuvring width between 6.8 m and 7.9 m depending on bay width (2.7 m down to 2.4 m); note 2 to that table sets a 5.5 m minimum for two-way flow in any case, with 6.0 m recommended.

Four accessible spaces are marked within the spine.



Cycle parking: Table 15-1a requires one visitor cycle space per four units for apartment buildings, which is 40 spaces at A1. Four cycle parking areas are shown, two at the western end of Car Park 1 and two at the eastern end of the spine. HCDP Rule 25.14.4.2.p requires visitor cycle parking to be within 25 m of the principal entrance of the activity visited; with 20 buildings spread across a 12,356 m² site, parking concentrated at the two ends will not achieve this for most lobbies. Distributed visitor cycle parking at each lobby is recommended.

Resident cycle and micro-mobility parking is not shown. HCDP Rule 25.14.4.2.t requires it to incorporate charging facilities, not to be located within a habitable room, entrance or passageway, and to be reachable from the road without passing through a habitable room or another residential unit. With no basement, this means dedicated ground floor stores within each building, which should be added to the plans. HCDP Rule 25.14.4.2.u also requires Class A or B facilities for residents, a step-free route, lighting, and at least 20% of spaces that do not require the cycle to be lifted.

5.14.10 Site A2 parking

28 car parks are provided at grade for 48 apartments, a ratio of 0.58 spaces per apartment – similar to A1. Bays are arranged around the perimeter of a single large, paved court.

Two accessible spaces are marked on the eastern side of the court, and a ride share space on the western side. Bay depths and aisle widths are not dimensioned and should be confirmed against Table 15-1h, with two-way aisles at least 5.5 m.

Cycle parking is shown at the north-western corner of the court. Table 15-1a requires 12 visitor cycle spaces for 48 units. The 25 m proximity requirement in HCDP Rule 25.14.4.2.p will not be met from that single location for the buildings on the Road East and Road South frontages, so distributed provision is recommended. Resident cycle parking with charging facilities under HCDP Rule 25.14.4.2.t is not shown and should be provided within each building.

5.15 Earthworks construction traffic

5.15.1 Introduction

This section addresses the construction traffic matters identified in the NZTA Integrated Transport Assessment Guidelines (section 5.3.4). It summarises the external transport movements generated during earthworks construction of the Brymer Farms development, the number and type of heavy vehicle movements, the means by which staff will travel to and from the site, hours of operation and peak-hour effects, any construction detours, and the matters to be addressed in the Construction Traffic Management Plan (CTMP).

The construction sequence referenced throughout is shown on the earthworks staging plan (Maven drawing 2026-08-06_SK EARTHWORKS CIVILS STAGING 2-CXXX-1a), which sets out earthworks sub-stages E1a to E4b. A copy of the drawing is included in **Appendix J**.

5.15.2 Indicative construction transport movements

The principal source of construction traffic during the earthworks stages is the importation of aggregate and fill for earthworks and roading. Over the full earthworks programme, approximately 299,710 m³ of material will be imported, comprising approximately 59,710 m³ of roading aggregate and 240,000 m³ of fill. Based on an assumed truck capacity of 20 m³ per load, this equates to approximately 14,990 loaded delivery trips (around 29,970 two-way truck movements) spread across the staged programme, which extends over approximately eleven years. The distribution of this material, and the resulting truck movements by stage, is set out in **Table 5.11**.

The imported fill (approximately 240,000 m³) is additional to the on-site cut-to-fill balancing already allowed for. Cut-to-fill earthworks are balanced within the site and are moved by on-site plant; they do not generate heavy vehicle movements on the public road network. The truck movements reported in this section therefore relate to imported material only.

5.15.3 Heavy vehicle movements - number and type

Heavy vehicles will comprise truck-and-trailer / tipper units carting imported aggregate and fill to the site via the designated construction access(es). Demand varies by earthworks stage. During the roading-aggregate stages (Years 1–4) the rate is modest, at approximately 6 truck movements per day (in and out). Demand is



highest during the bulk-fill stages, peaking in the E2b sub-stage at approximately 19 truck movements per day. In summary, heavy vehicle demand ranges from approximately 6 truck movements per day during the roading-aggregate stages to a peak of approximately 19 truck movements per day during the E2b fill stage.

Table 5.11: Imported construction aggregate and fill, and truck movements, by earthworks stage

Year	Earthworks stage(s)	Material type	Imported material (m ³)	Deliveries / day*	Truck movements / day (in + out)
1	E1a, E1b, E1c	Roding	14,928	2.9	5.7
2	E4a, E4b	Roding	14,928	2.9	5.7
3	E3a	Roding	14,928	2.9	5.7
4	E2a	Roding	14,928	2.9	5.7
5	E2b	Fill	50,000	9.6	19.2
6	E1d	Fill	35,000	6.7	13.5
7	E1d	Fill	35,000	6.7	13.5
8	E2c	Fill	30,000	5.8	11.5
9	E2c	Fill	30,000	5.8	11.5
10	E3b	Fill	30,000	5.8	11.5
11	E3b	Fill	30,000	5.8	11.5
Total	E1–E4	Roding + fill	299,710	-	-

Notes: *One-way loaded deliveries, based on 20 m³ per truck and a 5-day working week.

5.15.4 Staff travel to and from the site

Approximately 5 to 10 construction workers will be on site per day over the duration of the earthworks period. Staff are assumed to travel entirely by private car at an occupancy of 1.0 person per vehicle. On this basis, staff generate 5 to 10 inbound trips in the morning and 5 to 10 outbound trips in the afternoon, giving a total of approximately 10 to 20 staff vehicle movements per day, as summarised in **Table 5.12**.

Table 5.12: Daily earthworks construction, staff traffic movements

Staff count	Mode / occupancy	Morning (in)	Afternoon (out)	Total daily movements
5 staff	100% private car, 1.0 person/vehicle	5 trips	5 trips	10 movements
10 staff	100% private car, 1.0 person/vehicle	10 trips	10 trips	20 movements

5.15.5 Hours of operation and peak hour for construction traffic

Construction is proposed to operate during permitted hours of 7:30 am to 6:00 pm, Monday to Saturday, consistent with NZS 6803:1999. Reduced-noise activities only (quiet set-up and tidying, with no heavy pumps or impact tools) may occur during the restricted periods of 6:30 am to 7:30 am and 6:00 pm to 8:00 pm. No construction is proposed on Sundays or public holidays other than approved emergency works.

Staff trips will therefore generally not directly coincide with the commuter peaks on the adjacent road network - up to approximately 10 staff vehicle movements in the morning peak (inbound) and up to 10 in the afternoon peak (outbound).

Truck movements are distributed across the working day rather than concentrated in a single hour; even at the busiest fill stage the peak demand of approximately 19 movements per day averages fewer than three



truck movements per hour over a typical working day. Combining staff and heavy-vehicle demand, total construction traffic at the busiest stage is in the order of 30 to 40 vehicle movements per day.

5.15.6 Detours required during construction

During construction of the proposed temporary construction access intersection along SH 23, which will involve improvements/safety works (e.g., shoulder widening and surfacing works), some short-period detours (e.g., during overnight construction cLOSures) will also be required.

No temporary road cLOSures or detours of the surrounding network are required during the earthworks stages. Construction traffic during earthworks is accommodated on the existing road network via the designated construction access(es), which will predominantly from SH 23 and also from Obrien Road (Stage E4b) and potentially also from Brymer Road (Stage E4a).

Some short-period detours (e.g., during overnight construction cLOSures) will also be required during construction of the new SH 23 intersection to/from the development (e.g., for integration/finishing works, road marking applications, signage installations, street lighting and the like). As SH 23 is a State Highway, this work and its associated detour will be managed under a Traffic Management Plan (TMP) prepared in accordance with the New Zealand Guide to Temporary Traffic Management (NZGTTM) and approved by the NZ Transport Agency – Waka Kotahi.

For information, the indicative detour routes available in the event of a section cLOSure of SH 23 comprise SH1C, SH39, Laxton Road, Cemetery Road, Rotokauri Road, Brymer Road and Newcastle Road (refer **Figure 5.13**). These routes are indicative only and subject to confirmation and approval by NZTA at the time the works are planned.

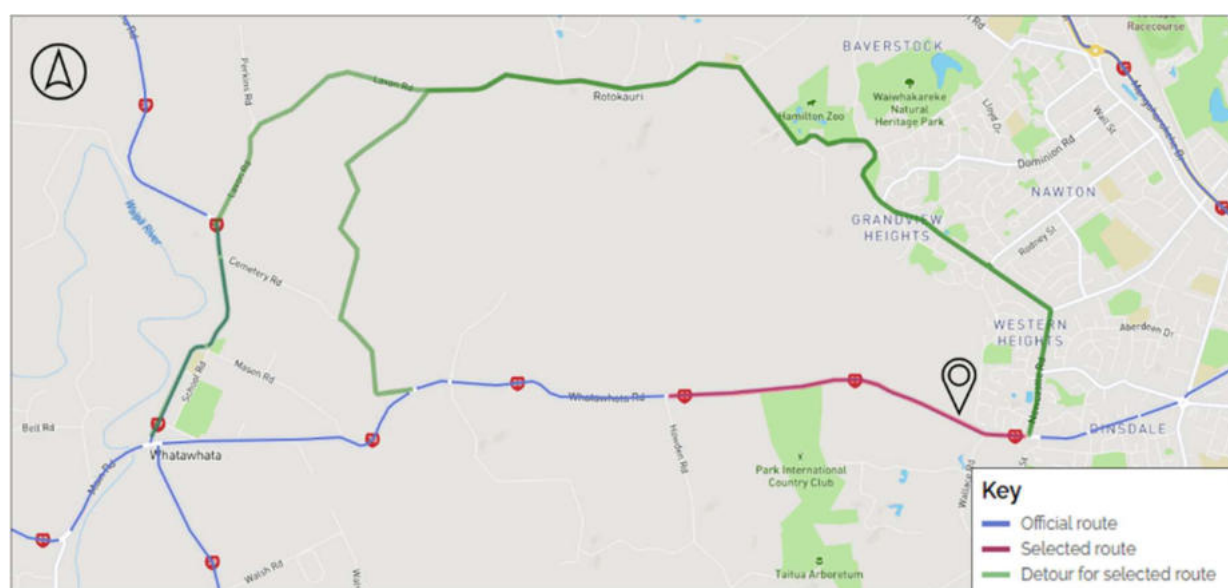


Figure 5.13: Detour route(s) for SH 23

5.15.7 Matters to be covered in the Traffic Management Plan

A Construction Traffic Management Plan (CTMP) will be prepared by the appointed contractor(s) and submitted for approval prior to works commencing. Consistent with the NZTA guidance, the CTMP will address, as a minimum, the construction programme and staging; the designated heavy-vehicle routes and construction access arrangements; the hours over which construction traffic operates; management of any temporary traffic management within the road corridor under NZGTTM; and communication and complaints procedures.

A separate CTMP Framework (Planning Stage) has been prepared to accompany the application and is included in **Appendix J**.



6 CONTEXT-SPECIFIC TRANSPORT EVALUATIONS

6.1 Accessibility assessment

6.1.1 Overview

The following catchment isochrone maps provide an indication of the level of external accessibility the development will be able to achieve, based on a 15-minute walk, cycle or drive, measured from the proposed Grandview Road access point as a common start point (in the absence of a current formal road connection on the site to use as reference point). This means travel distance and time within the development is excluded.

6.1.2 Accessibility by walking

The site's 15-minute accessibility by means of walking is shown in **Figure 6.1**. Pedestrians would be able to reach the adjacent residential neighbourhoods of Grandview heights, Western Heights and a large part of Nawton. The Nawton Shopping Centre and three schools are located just outside the isochrone boundary, including Nawton School, Fraser High and Aberdeen School. Pedestrians would also be able to reach several open space reserves and parks on foot including Brymer Glen Reserve, Brymer Park, Te Kootii Park and Derek Heather Park.



Figure 6.1: 15-minute walk isochrone map

<https://www.smappen.com/>

6.1.3 Accessibility by cycling

The site's accessibility by means of cycling (using a conventional non-motorised bicycle or pushbike) is shown in **Figure 6.2**. The catchment area increases significantly compared to walking and enables cyclists to reach more neighbourhoods including parts of Dinsdale, Frankton and Forest Lake, the key shopping precincts including the Nawton Shopping Centre, Dinsdale Shopping Centre as well as several other shops, services and the like, all the local schools including Cranshaw School, Nawton School, Fraser High, Aberdeen School and Frankton School.

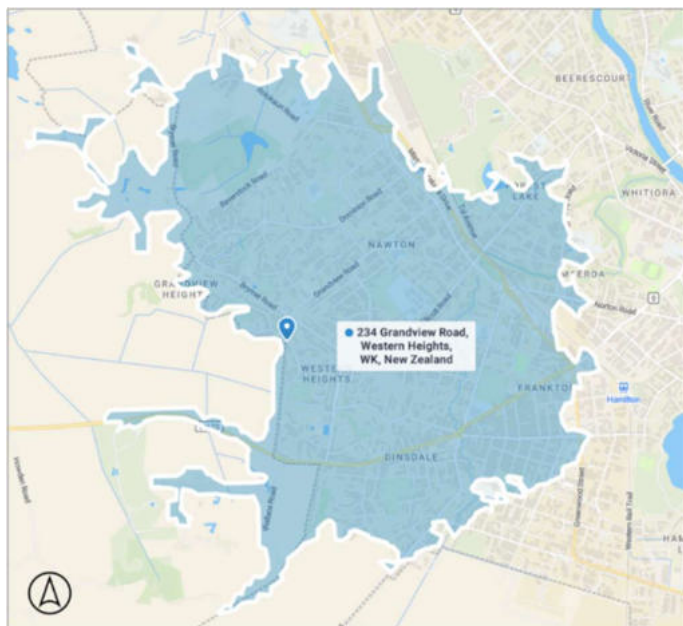


Figure 6.2: 15-minute cycle isochrone map

<https://www.smappen.com/>

6.1.4 Accessibility by driving

The site's 15-minute accessibility by means of driving is shown in **Figure 6.3**. Based on free-flow conditions, drivers would be able to reach all key destinations within Hamilton City, other than for the easternmost suburbs located on the western side of SH1 - Waikato Expressway, and including the Ruakura industrial hub. The University of Waikato however falls within the driving isochrone catchment. Other destinations within reach include Temple View, Whatawhata, Te kowhai and Horotiu.

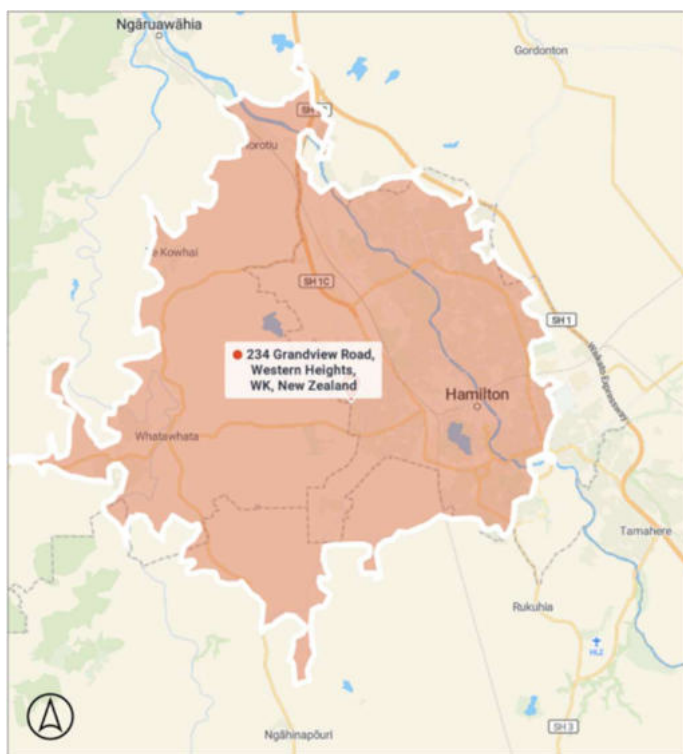


Figure 6.3: 15-minute drive isochrone map

<https://www.smappen.com/>



6.2 Safety assessment

6.2.1 Brymer Road corridor – crash summary 2021–2025

- Overview: There were 22 crashes recorded across the study area over the five-year period, with no fatalities. Three resulted in serious injuries, six in minor injuries, and thirteen were non-injury. .
- Annual Distribution: Crash numbers were fairly steady year to year: 6 in 2021, 2 in 2022, 6 in 2023, 4 in 2024 and 4 in 2025. Aside from a quieter 2022, the rate was relatively stable.
- Location: The most affected road was Brymer Road (8 crashes), followed by Newcastle Road (4), Bagust Road (3) and Grandview Road (3). Most crashes occurred at or near intersections, with 7 at T-junctions and 6 at roundabouts.
- Crash Types: The most common movement code was DB (4 crashes), being LOSs of control turning right and running off the road, followed by cornering and other LOST-control movements. This points to speed and cornering as recurring factors in the area.
- Conditions: Most crashes occurred on dry roads (13) and in daylight (13), which suggests conditions were not the main factor and that driver behaviour is the more likely cause. Most also occurred in fine weather (17 of 22), and the area is predominantly a 50 km/h zone (19 of 22 crashes).
- Vehicles Cars (coded C) were involved as Vehicle 1 in 19 of the 22 crashes, with a small number involving SUVs/light trucks.

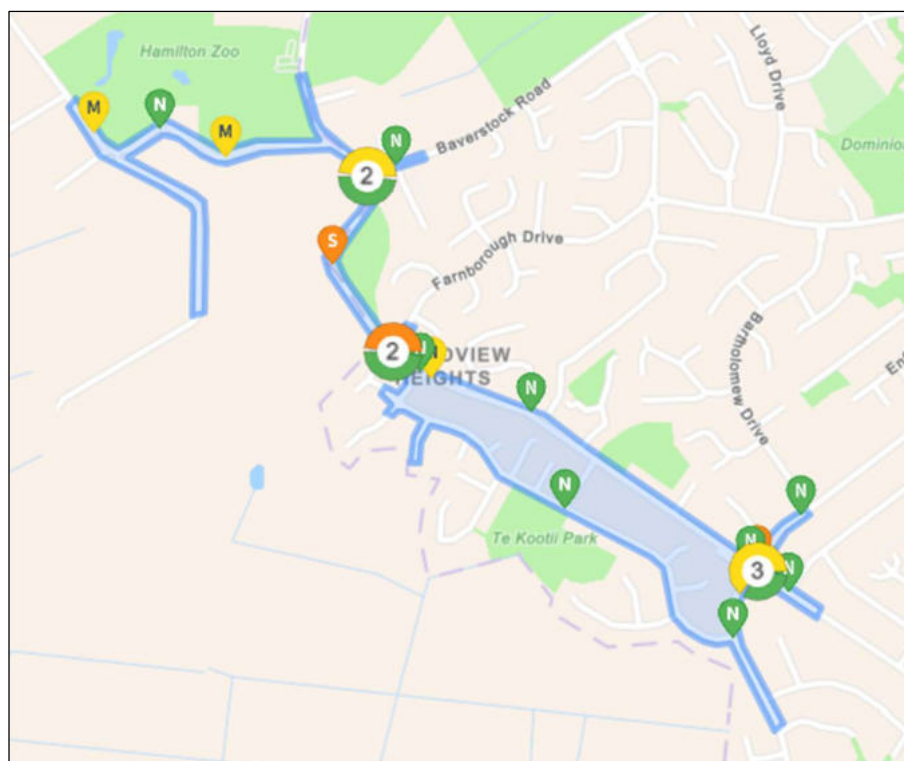


Figure 6.4: Road Traffic Crashes since January 2021, North

Source: Crash Assessment System (CAS), NZTA, 2026



TYPE		A	B	C	D	E	F	G	O
OVERTAKING AND LANE CHANGE	A	Pulling out or changing lane to right	Head on	Cutting in or changing lane to left	Lost control (overtaking vehicle)	Side road	Lost control (overtaken vehicle)	Weaving in and out of traffic	A OTHER
HEAD ON	B	On straight	Cutting corner	Swinging wide	Both or unknown *	Lost control on straight	Lost control on curve *		B OTHER
LOST CONTROL OR OFF ROAD (STRAIGHT ROADS)	C	Out of control on roadway	Off roadway to left	Off roadway to right					C OTHER
CORNERING	D	Lost control turning right - remained on roadway	Lost control turning right - off roadway to left	Lost control turning right - off roadway to right	Lost control turning left - remained on roadway	Lost control turning left - off roadway to left	Lost control turning left - off roadway to right	Missed intersection or end of road	D OTHER
COLLISION WITH OBSTRUCTION	E	Parked vehicle	Crash or broken down	Non vehicular obstructions (including animals)		Opening door	Opening door non traffic side		E OTHER
REAR END	F	Slower vehicle	Cross traffic	Pedestrian	Queue	Signals	Rear end into object		F OTHER
TURNING VERSUS SAME DIRECTION	G	Rear of left turning vehicle	Left turn side swipe	Stopped or turning from left side	Near centre line	Overtaking vehicle	Two turning *		G OTHER
CROSSING (NO TURNS)	H	Right angle (70° to 110°)							H OTHER
CROSSING (VEHICLE TURNING)	J	Right turn right side	Opposing right turns	Two turning	Left turn left side				J OTHER
MERGING	K	Left turn in	Right turn in	Two turning					K OTHER
RIGHT TURN AGAINST	L	Stopped waiting to turn	Making turn						L OTHER
MANOEUVERING	M	Parking or leaving	'U' turn	'U' turn	Driveway manoeuvre	Entering or leaving from opposite side	Entering or leaving from same side	Reversing along road	M OTHER
PEDESTRIANS CROSSING ROAD	N	Left side	Right side	Left turn left side	Right turn right side	Left turn right side	Right turn left side	Manoeuvring vehicle	N OTHER
PEDESTRIANS OTHER	P	Walking with traffic	Walking facing traffic	Walking on footpath	Child playing (including tricycle)	Attending vehicle	Entering or leaving vehicle		P OTHER
MISCELLANEOUS	Q	Fell while boarding or alighting	Fell from moving vehicle	Train	Parked vehicle ran away	Equestrian	Fell inside vehicle	Trailer or load	Q OTHER

Figure 6.5: Crash Analysis System (CAS) vehicle movement coding sheet

Source: <https://www.nzta.govt.nz/assets/Safety/docs/vehicle-movement-codes.pdf>

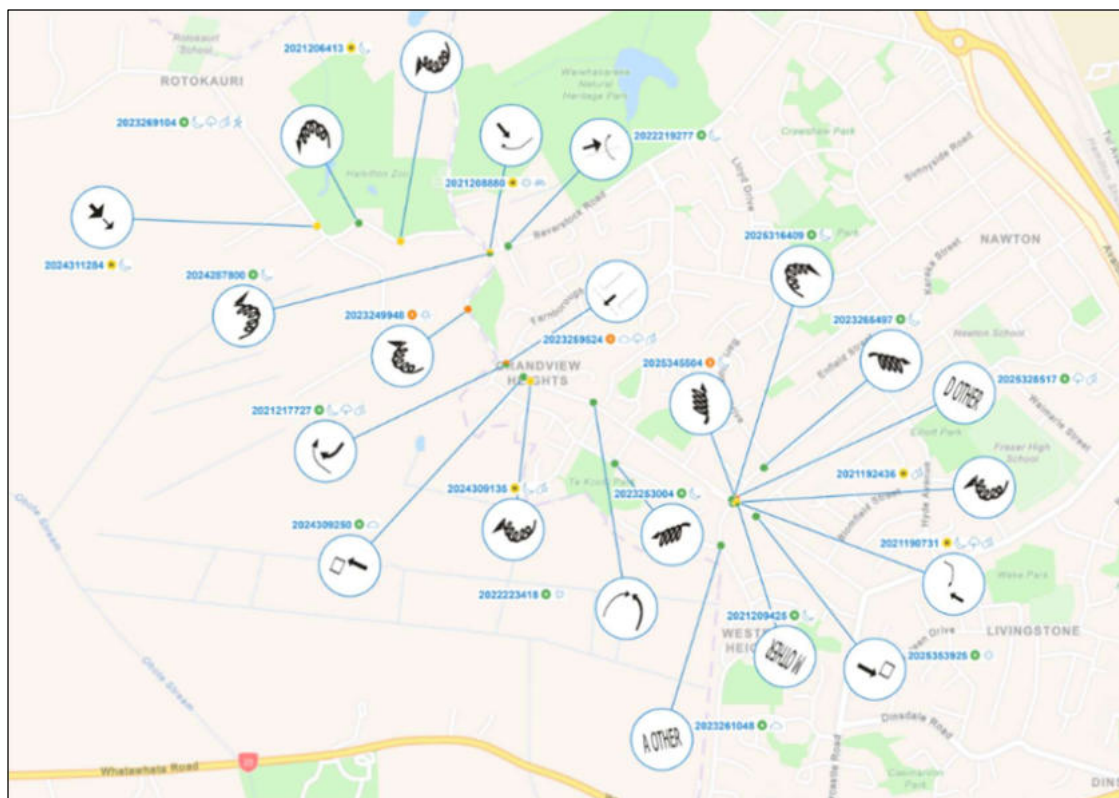


Figure 6.6: Collision Map, North

Source: Crash Assessment System (CAS), NZTA, 2026

6.2.2 SH 23 Whatawhata Road – crash summary 2021–2025

- Overview: There were 27 crashes recorded along Whatawhata Road over the five-year period. This corridor recorded one fatal crash, the only fatality across both study areas, along with 4 serious injuries, 6 minor injuries and 16 non-injury crashes.
- Annual Distribution: Crash numbers peaked in 2022 with 9, then fell away: 3 in 2021, 6 in 2023, 5 in 2024 and 4 in 2025. The 2022 peak stands out and may warrant a cLOSer look.
- Location: All 27 crashes occurred on Whatawhata Road, which changes speed environment along its length: 15 in the 100 km/h rural zone, 5 in the 80 km/h transition zone and 7 in the 50 km/h urban section near the Dinsdale/Newcastle Road end. The higher-speed sections carry the greater injury risk.
- Crash Types: The most common movement type was CB (3 crashes), being LOSs of control on a straight road and running off the roadway to the left, followed by a spread of cornering, LOST-control, rear-end and turning movements. The mix reflects the road's changing character, from rural highway to urban arterial. Eleven crashes occurred at or near T-intersections.
- Conditions: Most crashes occurred on dry roads (20) and in fine weather (21), again pointing to driver behaviour rather than conditions as the main factor. Lighting was more varied than at Brymer Farms, with 10 crashes at night (darkness or artificial light) and 9 in daylight, consistent with the higher-speed rural context where night-time risk is greater.
- Vehicles: Cars were the most common vehicle type (16), with a more varied mix than at Brymer Farms, including utility vehicles (6) and a motorcycle, reflecting the rural highway setting.
- Comparison with Brymer Farms Area: While the Brymer Farms area had slightly fewer crashes (22 vs 27), the SH 23 corridor carries a much higher safety risk, driven by higher speed limits and the single fatal crash. Both areas show crashes mainly in fine, dry conditions, which points to driver behaviour and road geometry as the key risk factors.

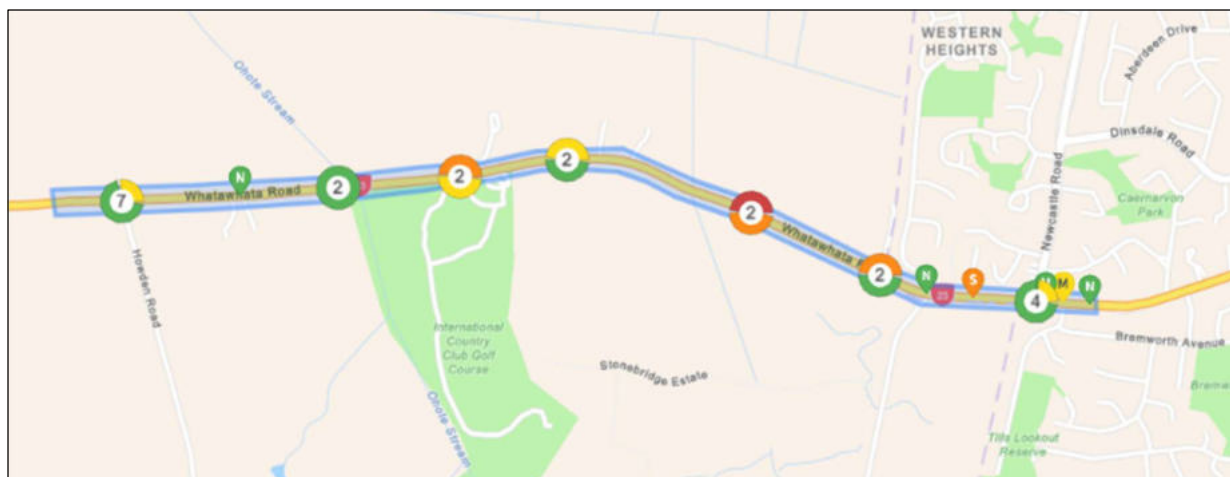


Figure 6.7: Road Traffic Crashes since January 2021, South (SH 23)

Source: Crash Assessment System (CAS), NZTA, 2026

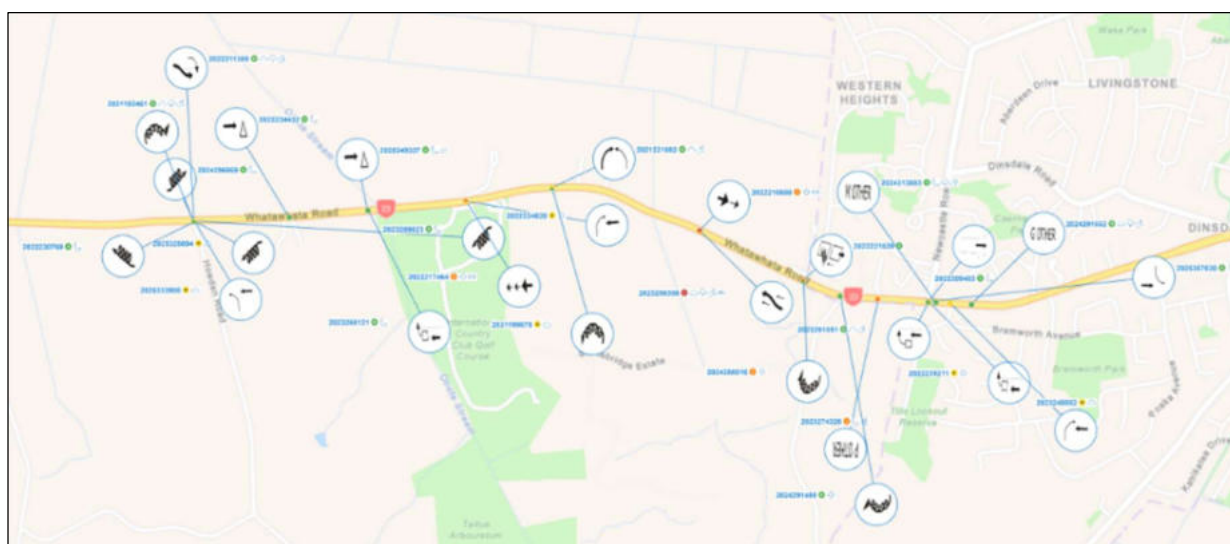


Figure 6.8: Collision Map, South (SH 23)

Source: Crash Assessment System (CAS), NZTA, 2026

6.3 Personal security

The masterplan has been designed with regard to the principles of Crime Prevention Through Environmental Design (CPTED), as set out in the Ministry of Justice's National Guidelines for Crime Prevention through Environmental Design in New Zealand (2005). The key CPTED qualities of surveillance, safe movement and connection, legible layout, activity mix, and sense of ownership are embedded in the transport network design and will benefit all users of the network, whether travelling by private vehicle, on foot, or by cycle.

The internal road network adopts a connected, grid-influenced layout with short block lengths. This provides pedestrians and cyclists with direct routes and a choice of paths, avoiding entrapment spots and long, unobserved segments, while ensuring that streets carry sufficient movement to provide passive surveillance throughout the day. Multiple connections to Brymer Road and to the adjacent Grandview Heights and Western Heights neighbourhoods, together with pedestrian accessways, shared paths and bi-directional cycleways linking to existing streets, parks, and Council playgrounds, ensure that all transport users can move safely and legibly between the development and the surrounding area without reliance on isolated or dead-end routes.



Active frontages are provided throughout the development. Residential lots front the street network, public parks, recreation reserves, and stormwater reserves, ensuring that public spaces and walkways are overlooked by adjacent dwellings ("eyes on the street").

The rear-loaded terrace typologies remove driveways and garage doors from the street frontage, delivering continuous, activated frontages onto key streets. The neighbourhood centres and apartment sites concentrate activity at focal points of the movement network, extending passive surveillance across a longer portion of the day.

Pedestrian accessways are short, direct, and designed with clear sightlines and adjacent lot frontage rather than rear fencing wherever practicable.

All internal streets include footpaths and street lighting, and cycleways are provided on the collector network, ensuring active mode users are visible and well-lit rather than displaced onto informal routes. Collectively, these measures provide a safe and secure environment for all transport users and are consistent with CPTED best practice for greenfield residential development.

6.4 Pavement maintenance impact, heavy vehicles

The development is not anticipated to generate significant levels of heavy-vehicle trips during both the staged construction and operational stages. In particular, the development of Brymer Farms is not anticipated to exceed the 20% heavy-vehicle threshold, based on the primary construction access being proposed via SH 23 and with most earthworks and roading construction heavy vehicles based on-site. As such an assessment of the impacts on pavement condition and maintenance is not deemed necessary.



7 ASSESSMENT AGAINST RELEVANT PLANS AND STANDARDS

An assessment against relevant transport plans, policies and/or standards has been prepared and is summarised in **Table 7.1** below.

Table 7.1: Assessment against relevant plans and standards

Plan / policy / standard	Relevant provisions	Assessment of consistency
Government Policy Statement on land transport (GPS)	GPS 2024–34. Strategic priorities of economic growth and productivity, safety, better transport choices and resilience; identifies new housing and urban development as a key driver of transport investment.	Consistent. The development delivers ~1,050 dwellings supported by a connected road network, comprehensive active mode infrastructure and bus-ready design, unlocking housing capacity while enabling genuine transport choice.
Regional Land Transport Plan (RLTP)	Waikato RLTP 2024–2054. Strategic outcomes of safety, mode shift, growth and economic development, resilience and environmental sustainability; target to double active and public transport mode share (from 2018 levels) by 2035.	Consistent. Footpaths on all streets, bi-directional cycleways on the collector network, bus-compatible road geometry and connections to the Rotokauri Transport Hub catchment directly support the mode shift and growth outcomes.
Regional Public Transport Plan (RPTP)	Requires new development to provide bus-ready road geometry, stop infrastructure and passenger facilities; provides for progressive extension of BUSIT services (Orbiter, Meteor) as population thresholds are reached.	Consistent. The collector network is designed to be bus-compatible with provision for future stops; neighbourhood centres are located to anchor future route extensions. Interim access is available to existing stops on Brymer Road, Ayrshire Drive, Grandview Road and Western Heights Drive.
Regional Policy Statement (RPS)	WRPS including Change 1 (gives effect to the NPS-UD and updated Future Proof Strategy). Requires urban growth to be integrated with the progressive delivery of walking, cycling and public transport infrastructure.	Consistent. The masterplan stages active mode and bus-ready infrastructure with development and integrates with the local road network in the adjacent neighbourhoods.
Growth strategy	Future Proof Strategy (2022 update) for the Hamilton–Waikato sub-region. Identifies Rotokauri as a key greenfield growth area to be supported by frequent transit and walking and cycling networks.	Consistent. The site is located in cLOSe proximity to the Rotokauri growth area and gives practical effect to Future Proof's integrated land use and transport objectives.
Future Development Strategy (FDS)	The Future Proof Strategy update fulfils the FDS function under the NPS-UD for the metro area, identifying the location and sequencing of urban growth with supporting infrastructure.	Consistent. The development provides housing capacity in an identified growth location, staged and sequenced with the delivery of internal and external transport infrastructure.
Structure plans / previous ITAs for the area	Rotokauri Structure Plan and Rotokauri North Structure Plan (Plan Change 7) framework for arterial roads, the Rotokauri Greenway and active mode corridors; Rotokauri Strategic Infrastructure Designation (NoR lodged 2023).	The site sits outside the structure plan areas but has been designed to integrate with them: access points and the internal network are compatible with the road and active mode connections to Grandview Heights and Western Heights.



Plan / policy / standard	Relevant provisions	Assessment of consistency
District plan transport provisions	Waikato District Plan Transportation (TRPT) chapter: road and access design, parking and management of effects on network safety and efficiency. Site zoned Future Urban. The HCDP criteria for the form of transport corridors (in Appendix 15) have used relevant given anticipated amalgamation via the New Zealand Government local government reform initiative.	Consistent. The road network, access and parking provision have been designed to the applicable HCDP road formation criteria, so the network is adoptable on any future boundary change. Road, transport corridor, footpath and cycleway designs will also be designed in compliant with the relevant Waikato Regional Infrastructure Technical specifications (RITS), NZ Transport Agency design specifications and Austroads design guidance, where relevant.
Transport Emissions Reduction Plan (TERP)	National Emissions Reduction Plan transport actions (VKT and emissions reduction, mode shift), given effect regionally through the Hamilton–Waikato Metro Area Mode Shift Plan.	Consistent. The connected, walkable street pattern, cycleway network, neighbourhood centres (shortening trip lengths) and bus-ready design reduce reliance on private vehicle travel and support emissions reduction objectives.
NZTA design / LOS standards	NZTA ITA Guidance; NZTA pedestrian and cycling network guidance; Safe System principles; intersection level of service assessment.	This ITA has been prepared in accordance with the latest NZTA ITA Guide dated 17 June 2026. Street cross-sections and active mode facilities follow NZTA design guidance, and intersection performance (WRTM/SIDRA) is assessed in the traffic assessment section of this report, with upgrades identified where required.

In summary, the Brymer farms development proposals are broadly consistent with the plans, policies and standards assessed.



8 MITIGATION

The mitigation measures considered are summarised in **Table 8.1** below.

Table 8.1: Mitigation considerations

Consideration	What to address
Local and wider effects	The development proposal does not trigger wider network upgrades (directly or cumulatively), i.e., other than for upgrades/improvements associated with the site access points / connections.
Construction effects	A Construction Traffic Management Plan (CTMP) will be required from the contractor(s) prior to works commencing. Heavy-vehicle access, traffic movements and routes (e.g. earthworks, turning to/from a high-speed state highway – SH 23, intersection/connection upgrades) will need to be adequately addressed and monitored on an ongoing basis.
Development / mitigation staging	The infrastructure required for each phase(s) and the ‘triggers’ for them has been described in this report. A particular trigger include the following: There is a limit on the number of dwellings (and associated development stages) taking access via Grandview Road. This has been restricted (in consultation with HCC) to approx. 200 dwelling units. Once this threshold has been reached, or earlier if necessary, the SH 23 intersection is required to be implemented prior to any further development taking place.
Public transport and active travel	The development makes provision for future bus operation within the development in terms of bus routes and stops. In time, there will be a need to work with the public transport authority to divert/extend services to the development. The development provides for a comprehensive walking and cycling network which will also provide for connectivity to the wider walking/cycling networks and to existing commuter bus stops.
Behaviour change and TDM	The development will consider travel demand management (TDM) measures to reduce single-occupant vehicle trips by means of supporting car clubs and car-share initiatives (reducing the need for private car ownership) by providing parking facilities and EV charging points as necessary (i.e., within the apartment blocks) and supporting travel plans for workplaces (retail and offices).



9 CONCLUSIONS

9.1 Overview

This Integrated Transport Assessment (ITA) has been prepared by Transplan Limited in support of the substantive resource consent application lodged under the Fast-track Approvals Act 2024 for the Brymer Farms development at 584 State Highway 23 (Whatawhata Road) and Brymer Road, Rotokauri. The Project is the subject of a Notice of Decision by the Minister dated 4 September 2025 to refer the Project.

The proposal provides for a comprehensively planned, multi-staged residential community of approximately 1,042 residential units, including approximately 272 apartments across Sites A1, A2, C1 and C2, together with approximately 2,184 m² of ground-floor retail gross floor area (GFA) and some 552 m² of office GFA within the two neighbourhood centre sites (C1 and C2), supporting open space, three-waters infrastructure and an internal transport network. The development is to be delivered in twelve stages over the medium (c. 2035) to long term (c. 2045).

The scale of the proposal exceeds the ITA-Full thresholds in the NZTA Integrated Transport Assessment Guide (17 June 2026) for both residential (120 units) and retail (1,000 m² GFA) activity, and the assessment has accordingly been undertaken as a full ITA. It has been informed by 24-hour turning-movement surveys at ten intersections (Thursday 9 October 2025), strategic modelling in the Waikato Regional Transport Model (WRTM) reported in Appendix H, detailed intersection modelling in SIDRA Intersection v11, a five-year CAS crash review (2021–2025), accessibility isochrone analysis, and consultation with Hamilton City Council (HCC), Waikato District Council (WDC) and NZTA, including a pre-lodgement meeting with NZTA on 3 August 2026.

9.2 Summary of findings

9.2.1 Integration of land use and transport, and accessibility

The masterplan delivers a legible, connected, grid-influenced street network with short block lengths, footpaths on all internal streets, bi-directional cycleways and shared paths on the collector network, and multiple pedestrian and cycle connections into Grandview Heights and Western Heights and to the surrounding reserves. The collector roads and selected local roads are designed to accommodate future bus services, with stop locations to be confirmed with Waikato Regional Council (WRC) and HCC.

The isochrone analysis confirms a substantial catchment is accessible from the site. Within a 15-minute walk, residents can reach Grandview Heights, Western Heights and much of Nawton, together with Brymer Glen Reserve, Brymer Park, Te Kootii Park and Derek Heather Park. Within a 15-minute cycle, the catchment extends to Dinsdale, Frankton and Forest Lake, the Nawton and Dinsdale shopping centres, and the local school network including Cranshaw, Nawton, Aberdeen, Frankton and Fraser High. Within a 15-minute drive, effectively all key destinations in Hamilton City are reachable, including the University of Waikato. The neighbourhood centres will further shorten day-to-day trip lengths by providing convenience retail, food and beverage, personal and health services within the development itself.

On this basis the proposal achieves integration of land use and transport and gives practical effect to the mode-shift and integrated-growth outcomes sought by the GPS on land transport 2024–34, the Waikato RLTP, the RPTP, the Waikato RPS, the Future Proof Strategy and Future Development Strategy, and the NPS-UD.

9.2.2 Trip generation and modelling

Trip generation has been estimated from first principles using recently published TfNSW (2024) and ITE (2017, 2021) rates for the low, medium and high-density residential typologies, a neighbourhood shopping plaza (ITE land-use code 821) for the retail component, and a small office building (code 712) for the office component.

The retail rates have deliberately been applied without any reduction for pass-by, linked or internally captured trips, notwithstanding that a neighbourhood centre serving an enclosed catchment of 1,042 dwellings would ordinarily attract a substantial internalisation and pass-by allowance. The trip generation adopted is therefore conservative.



Those first-principles estimates were used to calibrate the development loading in the WRTM, achieving agreement within 2% overall across both peaks. The 2025 base model was validated against the surveyed counts and met the NZTA Transport Model Guidelines criteria for small area / corridor models following local refinement, with 87.9% of morning turning movements achieving a GEH below 5.0 and 100% below 10.0.

Two model limitations are acknowledged and have been managed rather than relied upon. Modelled flows on SH 23 west of Dinsdale could not be reconciled with the surveyed counts despite network refinement, indicating a structural limitation in that corridor, and validation was comparatively weak at the SH 23 / Newcastle Road and Newcastle Road / Ellicott Street intersections. For those intersections the detailed assessment applies the modelled change in flows to the 2025 counted movements rather than relying on the absolute model outputs.

9.2.3 Wider network effects

The WRTM predicts little or no change in intersection level of service across the strategic network at 2035 and 2045, whether for the part-development (Stages 1–5 and Stages 1–6) or full-development scenarios. The corridor link-flow comparisons show development traffic loading onto the roads built or designated to carry it (Grandview Road, the SH 23 corridor and Brymer Road), while the development component on Newcastle Road and the established residential network is negligible. By 2045 the completed internal network and SH 23 access in fact relieve Newcastle Road relative to the no-development case. The 12–18% increases on the SH 23 corridor represent the development using the strategic network for its strategic movements, which is the outcome the access strategy is designed to achieve.

By 2055 the WRTM predicts capacity constraints at several SH 23 corridor intersections. Those constraints appear in the no-development scenarios as well, with SH 23 / Newcastle Road already at LOS E and the Dinsdale roundabout at LOS E in the evening peak without any contribution from the development. With full development, SH 23 / Newcastle Road moves to LOS F (PM) and SH 23 / Wallace Road to LOS E (AM). The development is therefore an incremental contributor to constraints created by background growth across the western Hamilton catchment. The appropriate response is corridor-level intervention led by the road controlling authorities, with the development making a proportionate contribution where relevant; it would not be credible to attribute the 2055 corridor deficiencies to this development, nor to require the development to resolve them.

The wider-network conclusion is expressly conditional. It assumes delivery of the planned external access network, being the Grandview Road connection, the SH 23 access and the internal collectors linking them, rather than unrestricted loading of development traffic onto the existing local roads.

9.2.4 Local traffic distribution effects

The effects on the adjoining local streets have been assessed separately and quantitatively, road by road, using the surveyed 2025 counts and the WRTM link flows for the no-development, Stages 1–5, Stages 1–6 and full-development scenarios at each horizon year. The findings are as follows:

- Most local streets are effectively unaffected: the development component at full development is small in absolute terms, between –2 and +34 vph in the peak hour, on Ayrshire Drive, Angus Street, Baverstock Road, Farmborough Drive, Bagust Road and O'Brien Road, and the resulting totals remain low.
- Brymer Road continues to function as intended: the development adds approximately 87–120 vph (AM) and 134–170 vph (PM) at full development. Resulting volumes of 500–700 vph at 2035, rising to 780–1,130 vph by 2055, remain within the practical mid-block capacity of the existing two-lane carriageway, and no Brymer Road approach is predicted to exceed 17 seconds average delay at any modelled intersection at 2035.
- Grandview Road carries the largest change, by design: flows rise from about 96–111 vph surveyed in 2025 to 418–494 vph at full development. This is the intended consequence of the access strategy. The absolute flows remain within the normal operating range of a collector road, and they are essentially flat across 2035, 2045 and 2055, because Grandview Road reaches a stable share of movement once the SH 23 access opens and all subsequent growth is carried on SH 23 and Brymer Road.
- The Harrogate Place catchment (Stage 1) is acceptable as proposed: the 118-dwelling catchment generates approximately 99 vehicle movements in each peak hour and about 889 movements per day, accruing progressively over a three-year build-out. The WRTM confirms the catchment is self-contained: the development component on Harrogate Place is +99 vph in both peaks and is identical in every



scenario. Resulting flows of about 266–279 vph on Harrogate Place and 162–234 vph on Highgrove Drive sit within the range normally accepted for local streets, and the Highgrove Drive / Brymer Road intersection is predicted to operate with a worst-approach delay of no more than 10 seconds at any horizon year. No reduction in stage yield, and no mitigation beyond the design itself, is required. Because the plans provide no vehicular connection to the balance of the development, a separate condition restricting such a connection is not necessary.

- Western Heights Drive is the one street requiring specific attention: the WRTM assigns development traffic to the loop between Grandview Road and Newcastle Road, taking the busiest section from a no-development 2035 flow of 183–198 vph to approximately 300–380 vph at full development. Even at that level the volumes remain within collector-street function, so the matter is one of neighbourhood amenity and route discipline rather than capacity. It is appropriately addressed through the monitoring-and-response mechanism recommended below, including an explicit trigger for local area traffic management (LATM) intervention.

Every intersection at the site access connections and in the established residential network operates at LOS A, B or C in every scenario and at every horizon year. The worst result anywhere in the set is 15.6 seconds at the Grandview Road / Newcastle Road / Brymer Road crossroads in the 2055 morning peak, some nine seconds inside the 25-second threshold at which LOS D would be reached and an intervention considered. Six of the seven intersections are stable or improving between 2035 and 2055, because the completed access network distributes traffic more evenly than the interim states.

The staged access framework, comprising the 8-dwelling O'Brien Road cap, the self-contained 118-dwelling Harrogate Place catchment, the approximately 200-dwelling Grandview Road interim limit demonstrated by the Stages 1–5 model and the SH 23 trigger, keeps each interim state within the envelope demonstrated to be acceptable. The approximately 200-dwelling threshold is not arbitrary: it is the yield of the Stages 2–5 catchment expressly tested in the WRTM, which shows little if any change in level of service from the no-development baseline and moderate absolute flows on Grandview Road.

9.2.5 Intersection performance and mitigation

Detailed SIDRA analysis of the 2055 full-development scenario confirms that practicable, conventional mitigation is available at each constrained intersection:

- SH 23 / Wallace Road: signalisation, without additional lanes, returns the intersection to an overall LOS C in both peaks and delivers a safety benefit. Ongoing development along Wallace Road will likely require signalisation well in advance of 2055.
- SH 23 / Newcastle Road: signalisation with short lanes on all approaches resolves the congestion on the Newcastle Road approach, giving an overall LOS E in the morning peak and LOS C in the evening peak. LOS E operation on a higher-order urban arterial during peak periods is not unexpected and is not, of itself, an unacceptable outcome.
- Newcastle Road / Ellicott Street: conversion to a compact urban roundabout, without additional lanes, returns the intersection to an overall LOS B in the morning peak and LOS C in the evening peak. Pedestrian crossing points on the Ellicott Road and Newcastle Road (South) approaches should be set back from the intersection to address the limited approach visibility to pedestrians.

None of these three external upgrades is required to be delivered by the Applicant. Each is a consequence of background growth and is appropriately advanced by the relevant road controlling authority through its own investment programme.

The SH 23 site access is, by contrast, development-specific and is proposed to be delivered by the Applicant. It has been modelled as a protected T-intersection in both priority-controlled and signalised forms. In priority-controlled form the two SH 23 approaches operate un-delayed, but the right-turn movement out of the development reaches LOS F at 2055, indicating that signalisation will be required before that horizon.



In signalised form (modelled with stage-controlled pedestrian crossings on the SH 23 west and Brymer Farms approaches), all approaches operate at LOS B in the morning peak and LOS B–C in the evening peak, with 95th percentile right-turn queues of only some 3.4 to 3.8 vehicles, a queue length of approximately 24 to 27 m. The intersection form, its staged upgrade to signals, and the associated approach treatments are to be confirmed with and approved by NZTA.

9.2.6 Site access, servicing and parking

Four access points are proposed: O'Brien Road (8 detached dwellings, Stage 1A only, formed as an industrial vehicle crossing to RITS Drawing D3.3.1); Harrogate Place (118 detached dwellings, with the existing southern and eastern footpaths along Harrogate Place, Ayrshire Drive and Highgrove Drive to be upgraded to a 3.0 m shared path); Grandview Road, as a conventional T-intersection between Ayrshire Drive and Western Heights Drive; and the new SH 23 protected T-intersection approximately 1.5 km west of Newcastle Road.

The internal network has been designed to accommodate service, waste and emergency vehicles, with intersection geometry confirmed by vehicle-tracking assessment against the Austroads design and checking vehicles and the HCC Design for Waste guidelines. The SH 23 intersection design also accounts for over-dimension and HPMV vehicles, SH 23 being a route for both, and the internal roundabouts should accommodate the 13.5 m single-unit bus now listed in the NZ vehicle dimensions.

Parking within the apartment sites is provided at approximately 0.59 (A1) and 0.58 (A2) spaces per apartment, consistent with a deliberately car-lite development supported by ride-share, car-share and EV charging provision. That is an appropriate response in the NPS-UD context, where minimum parking requirements no longer apply, but it depends on the supporting travel demand management measures being secured rather than left to the market.

A number of detailed matters remain to be resolved at engineering approval and building consent stage. These are principally the recessed on-street loading bays for Sites C1, C2, A1 and A2 (not yet shown on the roading plans), the basement ramp profile and crossing separations at C1, the two vehicle crossings serving Site A1, on-site queuing lengths and parking bay and aisle dimensions at Sites C2, A1 and A2, distributed visitor cycle parking at each apartment lobby, and resident cycle and micro-mobility storage with charging within each apartment building. These are design refinements rather than matters affecting the acceptability of the proposal and are addressed in the recommended conditions below.

9.2.7 Safety and personal security

The CAS review for the five years 2021–2025 identified 22 crashes on the Brymer Road corridor (no fatalities, three serious and six minor injuries) and 27 crashes on SH 23 Whatawhata Road (one fatality, four serious and six minor injuries). Neither corridor exhibits a crash cluster or a systemic deficiency attributable to a single site or feature. The predominance of crashes in fine weather, on dry roads and, on Brymer Road, in daylight indicates that driver behaviour, speed and road geometry are the principal contributing factors rather than environmental conditions. The higher risk on SH 23 reflects its higher-speed environment and the single fatal crash.

The proposal responds directly to that risk profile. The new SH 23 access will be formed as a purpose-designed, protected intersection with the appropriate speed environment and sight distance, replacing what would otherwise be uncontrolled rural frontage access onto a high-speed state highway. The internal network adopts low-speed geometry, with a 30 km/h environment proposed in and around the neighbourhood centres and neighbourhood park. Progressive safe system audits at design, construction and post-construction stages are recommended for each development stage.

The masterplan has been designed with regard to CPTED principles, with active frontages to streets, parks and stormwater reserves, short and direct pedestrian accessways with clear sightlines, rear-loaded typologies removing garage doors from key frontages, and footpaths and lighting on all internal streets. Personal security outcomes are consistent with best practice for greenfield residential development.

9.2.8 Construction effects

Earthworks will import approximately 299,710 m³ of material (approximately 59,710 m³ of roading aggregate and 240,000 m³ of fill) over a programme extending some eleven years. Cut-to-fill is balanced on site and moved by on-site plant, generating no movements on the public network. Heavy vehicle demand ranges from approximately 6 truck movements per day during the roading-aggregate stages to a peak of



approximately 19 movements per day during the E2b fill stage, with 10 to 20 staff vehicle movements per day. At the busiest stage, total construction traffic is in the order of 30 to 40 vehicle movements per day, which is fewer than three truck movements per hour averaged across a 7:30 am to 6:00 pm working day, rather than concentrated in the commuter peaks.

Construction traffic effects are therefore low and temporary. No temporary road closures or network detours are required during the earthworks stages, with construction access predominantly from SH 23 and also from O'Brien Road (stage E4b) and potentially Brymer Road (stage E4a). Short-period detours will be required during construction of the SH 23 intersection and associated safety works; as SH 23 is a state highway, that work and any associated detour will be managed under a Traffic Management Plan prepared in accordance with the NZGTTM and approved by NZTA. A CTMP Framework (Planning Stage) accompanies this application at Appendix J, and a contractor-prepared CTMP is recommended to be secured by condition.

Heavy vehicles are not anticipated to exceed the 20% threshold on the surrounding network during either construction or operation, given the primary construction access from SH 23 and the on-site basing of earthworks and roading plant. An assessment of pavement condition and maintenance impacts is accordingly not warranted.

9.2.9 Consistency with plans, policies and standards

The assessment in Section 7 confirms that the proposal is consistent with each of the relevant transport plans, policies and standards, including the GPS on land transport 2024–34, the Waikato RLTP, the RPTP, the Waikato RPS, the Future Proof Strategy and Future Development Strategy, the adjacent structure plans and previous ITAs for the area, the HCDP transport provisions and RITS, the Transport Emissions Reduction Plan, and NZTA design and level of service guidance. No inconsistency has been identified that would weigh against the grant of consent.

9.3 Residual effects after mitigation

Subject to the measures identified in Section 8 and the conditions recommended in Section 9.4, the residual transport effects of the proposal are assessed as follows:

- Network capacity and efficiency: the development does not trigger the need for wider network upgrades, either individually or cumulatively, beyond the site access points and their immediate connections. Residual effects on the wider network are less than minor.
- 2055 intersection performance: the degradation identified at SH 23 / Wallace Road, SH 23 / Newcastle Road and Newcastle Road / Ellicott Street at 2055 arises predominantly from background growth. The development's incremental contribution is modest, and conventional, practicable mitigation has been demonstrated at each location. Residual effects are minor and are appropriately managed through the relevant road controlling authority's programme rather than by this development.
- Local traffic distribution: subject to the staged access framework and the monitoring regime being secured, the effects on the adjoining residential streets are acceptable. On every street other than Grandview Road, Harrogate Place, Highgrove Drive and Western Heights Drive the development component is small, and on those streets the resulting volumes remain within the function of the roads concerned. The residual matter is the predicted redistribution onto Western Heights Drive, which is a matter of amenity and route discipline and is addressed by monitoring with an LATM trigger. Residual effects are minor.
- Safety: with the SH 23 intersection constructed to an NZTA-approved design, progressive safe system audits and a low-speed internal environment with continuous footpaths and lighting, residual safety effects are less than minor. The proposal improves safety relative to the status quo by replacing informal rural frontage access with a designed, protected intersection.
- Construction: temporary and low, and readily managed through the CTMP and, for works within the state highway corridor, an NZTA-approved TMP. Residual effects are less than minor.
- Parking and servicing: parking supply at the apartment sites is below conventional rates by design. Provided the supporting TDM measures (unbundled parking, car-share and ride-share spaces, EV charging, secure resident cycle parking and residents' travel plans) are secured by condition, the residual risk of parking overspill onto the internal street network is minor and manageable within the recessed on-street parking provided throughout the development.



- Active modes and public transport: the proposal delivers positive effects through footpaths on all streets, a connected cycleway and shared path network, the upgraded 3.0 m shared path connection to the established neighbourhood, bus-capable collector geometry and stops, connections into adjoining neighbourhoods and reserves, and neighbourhood centres that shorten daily trip lengths.

9.4 Recommended conditions

It is recommended that the following matters be secured through conditions of consent. Conditions C1 to C6 give effect to the mitigation and staging matters identified in Section 8 and in the body of this assessment; the balance address matters raised in Sections 5 and 6 that are not otherwise resolved on the plans lodged. The conditions are expressed as outcomes to be achieved and should be read alongside the mitigation considerations in Section 8.

9.4.1 Staging and access triggers

- a) Development beyond the Stages 1–5 catchment, that is beyond approximately 200 dwellings reliant on the Grandview Road connection, shall not be occupied until the SH 23 access intersection has been constructed, is operational, and has been approved by NZTA. The SH 23 access is to be delivered by the consent holder at its own cost.
- b) Vehicular access via O'Brien Road is to be limited to the 8 detached dwellings within Stage 1A, and the Stage 1 (Harrogate Place) catchment is to be limited to a maximum of 118 detached dwellings, consistent with the staging and yields assessed in this ITA.

9.4.2 Design, audit and approvals

- a) A safe system audit of all roading design drawings is to be carried out prior to construction, during construction of the works by development stage, and on completion of the works by development stage. Audit findings are to be actioned or, where not adopted, the reasons recorded and provided to the relevant road controlling authority.
- b) A Construction Traffic Management Plan is to be prepared and approved prior to the commencement of works on each stage, as set out in conditions C34 to C40 below.
- c) Detailed engineering design of all roads, intersections, accesses and active mode facilities is to be submitted for engineering approval to the relevant road controlling authority prior to construction of each stage and is to comply with the applicable HCDP transport corridor and internal vehicle access criteria (Appendix 15, Tables 15-5a i and ii), the Waikato Regional Infrastructure Technical Specifications (RITS), and the relevant Austroads and NZTA design guidance.
- d) The final form and detailed design of the SH 23 site access intersection is to be confirmed in consultation with, and approved by, NZTA prior to construction, together with the associated approach treatments, right-turn protection, speed environment, lighting, sight distance, and any limited access road crossing place approval required under the Government Roding Powers Act 1989.
- e) The SH 23 access is to be designed so that it can be signalised without reconstruction of the intersection and is to be signalised at the consent holder's cost when pedestrian crossing facilities are introduced on the SH 23 west or Brymer Farms approaches, or when monitoring under condition C43 demonstrates that the right-turn movement from the development operates below LOS D in either peak, whichever occurs first, or as otherwise agreed with NZTA.
- f) The design of the SH 23 intersection is to demonstrate accommodation of over-dimension and HPMV vehicles, SH 23 being a designated route for both.

9.4.3 Public transport and active modes

- a) Collector roads and the nominated local roads are to be constructed to bus-capable geometry and cross-section, with bus stop hardstands, shelters, seating, accessible kerbs and lighting provided at locations agreed with WRC and the relevant road controlling authority and installed progressively as each stage is delivered. No works are to be undertaken that would preclude the future operation of a scheduled bus route through the development, including via Grandview Road.



- b) The consent holder is to engage with WRC at a defined population trigger (for example, on the issue of the 400th residential title) regarding the extension or diversion of scheduled bus services into the development and is to report the outcome of that engagement to HCC.
- c) Footpaths on all internal streets, and the bi-directional cycleway and shared path network on the collector roads, are to be constructed as part of the stage in which they fall. Connections into Grandview Heights, Western Heights and the surrounding reserve and path network are to be completed at the time the abutting stage is delivered, rather than deferred to a later stage.

9.4.4 Parking, servicing and travel demand management

- a) Recessed on-street loading bays are to be provided and shown on the roading plans prior to engineering approval, comprising a minimum of two truck bays for each of Sites C1 and C2, two bays for Site A1 and one bay for Site A2, designed for the nominated design vehicle and also serving kerbside waste collection.
- b) A servicing management plan is to be prepared and approved for each of Sites C1 and C2 prior to the commencement of the commercial activity, setting out permitted delivery and collection hours (outside the retail and commuter peaks), the design vehicle, the servicing bay locations, and the bin haul route and arrangements, and addressing noise effects on the apartments above.
- c) The ride-share, car-share and EV charging spaces shown on the plans for Sites C1, C2, A1 and A2 are to be constructed, marked, signposted and maintained for those purposes in perpetuity, and are not to be allocated to individual units.
- d) Car parking within Sites A1 and A2 is to be unbundled from the individual apartment titles, and a residents' travel plan (including car-share membership provision, cycle parking information, public transport information and a review mechanism) is to be prepared and implemented for each apartment site prior to occupation, as necessary.
- e) Visitor cycle parking is to be distributed so that provision is located within 25 m of the principal entrance of each apartment building and each commercial tenancy, in accordance with HCDP Rule 25.14.4.2.p and the rates in Table 15-1a (40 spaces at Site A1 and 12 spaces at Site A2).
- f) Resident cycle and micro-mobility parking with charging facilities is to be provided within each apartment building in accordance with HCDP Rules 25.14.4.2.t and 25.14.4.2.u, including a step-free, obvious and lit route from the road, and at least 20% of spaces that do not require the cycle to be lifted.
- g) Prior to building consent for Site C1, the basement ramp profile is to be demonstrated to comply with the 6 m platform at no steeper than 1 in 20 (HCDP Rule 25.14.4.1.n) and the 2 m transition requirement (Rule 25.14.4.1.o); the separation between the at-grade and basement crossings is to be confirmed at greater than 7.5 m (Rule 25.14.4.1.a) and the separation between the basement crossing and Road 8 confirmed at 15 m or more, consistent with the reduced 30 km/h speed environment (Rule 25.14.4.1.c); and directional and 'residents and tenants only' signage is to be installed to distinguish the two accesses.
- h) The two vehicle crossings serving Site A1 are to be retained in the locations shown, at a separation of approximately 90 m, so as to avoid a single 200 m dead-end serving 160 apartments, to allow waste and emergency vehicles to enter and leave in forward gear, and to distribute turning movements along Road 8. Any departure from HCDP Rule 25.14.4.1.f is to be addressed at the time of the relevant land use consent.
- i) On-site queuing is to be demonstrated at building consent in accordance with HCDP Rule 25.14.4.2.n where it applies, being a minimum of 12 m at Site C2, 18 m at Site A1 and 6 m at Site A2, measured from the road boundary to the nearest vehicle control point.
- j) Parking bay dimensions, aisle widths and manoeuvring areas at Sites C1, C2, A1 and A2 are to be confirmed against HCDP Table 15-1h at building consent, with two-way aisles of not less than 5.5 m (6.0 m recommended), and the 2.5 m vertical clearance in Rule 25.14.4.2.o maintained at all accessible spaces and along the full length of their vehicular access route.
- k) Where pedestrian routes cross vehicle circulation aisles within Sites C1 and C2 they are to be raised or otherwise treated to give pedestrian priority, and the one-way circulation within Site C2 is to be reinforced by directional signage and pavement marking.



- l) The total parking provision at Site C1 is to be tested against the maximum in HCDP Rule 25.14.4.2.d, and spaces for less mobile users are to be provided in addition to accessible spaces in accordance with HCDP Rule 25.14.4.2.c.ii and Tables 15-1d and 15-1e.

9.4.5 Speed management and street environment

- a) A 30 km/h speed limit and supporting low-speed street design (including threshold treatments, raised platforms or equivalent) are to be implemented in and around the neighbourhood centres and neighbourhood park, and a speed management plan for the internal network is to be submitted with the engineering approval for each stage. The consent holder is to work with the relevant road controlling authority to give effect to the speed limit through that authority's speed management planning process and the National Speed Limit Register under the Land Transport Rule: Setting of Speed Limits 2024.
- b) Street lighting is to be designed and installed to the relevant AS/NZS 1158 category on all internal streets, cycleways, shared paths and pedestrian accessways, and is to be operational at the time each stage is occupied.

9.4.6 Construction

- a) A Construction Traffic Management Plan (CTMP) is to be prepared by the appointed contractor, generally in accordance with the CTMP Framework (Planning Stage) at Appendix J and submitted for approval prior to the commencement of works on each stage. The CTMP is to address, as a minimum, the construction programme and staging, designated heavy vehicle routes and construction accesses, hours of construction traffic operation, temporary traffic management within the road corridor under the NZGTTM, dust and debris tracking controls (including wheel wash and road sweeping), and communication and complaints procedures.
- b) Construction traffic is to operate only between 7:30 am and 6:00 pm Monday to Saturday, with reduced-noise activities only during the restricted periods of 6:30 am to 7:30 am and 6:00 pm to 8:00 pm, and no construction traffic on Sundays or public holidays other than for approved emergency works, consistent with NZS 6803:1999.
- c) Construction heavy vehicle access is to be taken primarily from SH 23, with access from O'Brien Road limited to earthworks stage E4b and from Brymer Road limited to earthworks stage E4a. No construction heavy vehicle access is to be taken via Harrogate Place or the Grandview Road residential streets, other than for the works required to form those connections and the associated shared path upgrade.
- d) All works within the SH 23 corridor, including the temporary construction access and any associated shoulder widening, surfacing, or overnight cLOSures and detours, are to be undertaken in accordance with a Traffic Management Plan prepared under the NZGTTM and approved by NZTA. Detour routes are to be confirmed and approved by NZTA and any other affected road controlling authority at the time the works are planned and notified to affected road users and residents in advance.
- e) Any temporary construction access to SH 23 is to be designed for the required sight distance and heavy vehicle turning path and is to be removed and the corridor reinstated to NZTA's satisfaction on completion of the works it serves.
- f) A pre-construction condition survey of the designated construction haul routes is to be undertaken and provided to the relevant road controlling authority, with a corresponding post-construction survey on completion of each earthworks stage. Any damage to the road, footpath, berm or drainage infrastructure attributable to construction traffic is to be remedied at the consent holder's cost.
- g) A complaints register is to be maintained for the duration of construction and made available to the relevant road controlling authority on request.

9.4.7 Monitoring and review

- a) Tube counts are to be undertaken on Grandview Road, Highgrove Drive, Ayrshire Drive and Western Heights Drive at the completion of each development stage, and the results reported to HCC and compared against the forecasts in Section 5.12 of this assessment.
- b) If the counts on Western Heights Drive exceed approximately 280 vph (two-way, peak hour) on the busiest section between Grandview Road and Newcastle Road, local area traffic management measures are to be investigated and implemented in consultation with HCC.



- c) Turning movement surveys are to be undertaken at the Grandview Road access, the SH 23 access and the Brymer Road / Grandview Road / Newcastle Road intersection within twelve months of the occupation of the 200th and 600th dwellings, with the results provided to the relevant road controlling authorities and compared against the trip generation assumptions in this assessment. Where surveyed volumes materially exceed those assumptions, a review of the staging triggers is to be undertaken in consultation with the road controlling authorities.
- d) Roads, footpaths, cycleways, shared paths, bus stop infrastructure and associated assets to be vested are to be constructed, as-built documented and maintained through the standard defects liability period to the satisfaction of the relevant road controlling authority prior to vesting.

9.5 Overall conclusion

The Brymer Farms development delivers approximately 1,042 dwellings and a neighbourhood-scale commercial component in an identified growth location on the western edge of Hamilton, supported by a connected internal street network, footpaths on all streets, a cycleway and shared path network on the collector roads, bus-capable geometry and stops, and connections into the surrounding neighbourhoods, reserves and path network.

The traffic effects of the proposal on the wider network are modest. The WRTM modelling confirms no material change in strategic intersection level of service at 2035 or 2045 relative to the no-development baseline, and the constraints identified at 2055 arise predominantly from background growth across the western Hamilton catchment rather than from this development. Practicable and conventional mitigation has been demonstrated at each of the affected intersections. On the local network, the quantified street-by-street assessment shows the development's traffic is confined to the streets designed to carry it, with the single exception of a predicted redistribution onto Western Heights Drive that is addressed through monitoring and, if required, local area traffic management. Every intersection at and near the site access connections operates at LOS C or better at every horizon year. Construction traffic effects are low, temporary and readily managed. No wider network upgrades are triggered by the proposal, either individually or cumulatively, beyond the site access points and their immediate connections.

Subject to the measures identified in Section 8 and the conditions recommended in Section 9.4, in particular the staged access framework and the SH 23 trigger, the delivery of the SH 23 intersection to an NZTA-approved design with provision for signalisation, progressive safe system audits, the approved CTMP, the monitoring regime with its LATM trigger for Western Heights Drive, and the travel demand management package supporting the car-lite apartment sites, it is concluded that the proposal will not have unacceptable adverse effects on the safety or efficiency of the transport network. The proposal is consistent with the relevant national, regional and district transport plans, policies and standards, and can be supported from a transportation perspective.



10 REFERENCES

The following references have been used and/or referred to in the compilation of this report:

- Auckland Transport, 2025. Integrated Transportation Assessment - Guidelines. Version 2.
- BBO, 2022. Integrated Transport Assessment: Te Rapa Racecourse Medium Density Residential Plan Change (Plan Change 13). Waikato Racing Club Incorporated. 15 September.
- BBO, 2024. SL1 – Fast Track Consenting Process Application: Transportation and Access Summary (including Stage 1). 2 May.
- BUSIT (current). About us - network overview. Available at: <https://www.busit.co.nz/about-us/>
- Co-Lab, 2026. Waikato Regional Traffic Model. <https://colabsolutions.govt.nz/shared-services/wrtm/>
- Commuter Waka, 2026. <https://commuter.waka.app/>
- HCC, 2015. Hamilton Biking Plan 2015 – 2045 - A bike friendly city. <https://hamilton.govt.nz/assets/Uploads/Documents/Plans/Hamilton-Biking-Plan-2015-45.pdf>
- HCC, 2022a. Plan Change 7: Rotokauri North Private Plan Change (operative 15 July 2022). Hamilton: Hamilton City Council. <https://hamilton.govt.nz/property-rates-and-building/district-plan/plan-changes/plan-change-7>
- HCC, 2022b. Access Hamilton. August. <https://hamilton.govt.nz/strategies-plans-and-projects/strategies/access-hamilton>
- HCC, 2023. New road gives way to future development in Rotokauri. <https://hamilton.govt.nz/your-council/news/growing-hamilton/new-road-gives-way-to-future-development-in-rotokauri-1>
- HCC, 2024a. Timetable refresh increases bus frequency across the Hamilton network. <https://business.scoop.co.nz/2024/01/23/timetable-refresh-increases-bus-frequency-across-the-hamilton-network>, 23 January.
- HCC, 2024b. Plan Change 12: Growing Up. Hamilton: Hamilton City Council. <https://hamilton.govt.nz/property-rates-and-building/district-plan/plan-changes/plan-change-12>
- HCC, 2025a. Decision made on Transport Choices programme. <https://hamilton.govt.nz/your-council/news/on-the-move/decision-made-on-transport-choices-programme>
- HCC, 2025b. Rotokauri Road and Baverstock Road improvements. <https://hamilton.govt.nz/strategies-plans-and-projects/projects/cerf/rotokauri-road-and-baverstock-road>
- HCC, 2026b. Hamilton City District Plan (Revised 30 June 2026; Operative 1 July 2026). <https://hamilton.govt.nz/property-rates-and-building/district-plan>
- HCC, 2026a. Nawton Community Link. <https://hamilton.govt.nz/strategies-plans-and-projects/projects/city-wide-transport/nawton-community-link>
- ITE, 2017. Trip Generation Manual, 10th Edition. September
- ITE, 2021. Trip Generation Manual, 11th Edition. September
- LTNZ, 2007. Transport Impact Guidelines for Site Development. Research Report 327 Part I. Land Transport New Zealand (LTNZ). Wellington, August.
- MftE, 2020. National Policy Statement on Urban Development 2020. Ministry for the Environment. Wellington.
- New Zealand Government, 1991. Resource Management Act 1991. Wellington.
- NZTA, 2011. Trips and parking related to land use. NZ Transport Agency Research Report 453. November.
- NZTA, 2021. One Network Road Classification (ONRC).
- NZTA, 2026a. One Network Framework (ONF). <https://www.nzta.govt.nz/partners/planning-and-investment/planning/one-network-framework>



- NZTA, 2026b. Integrated Transport Assessment Guide. Part of the NZTA Planning Policy Manual (PPM). 17 June.
- Roads and Traffic Authority, 2002. Guide to Traffic Generating Developments. Report TTR - 002. Issue 2.2. NSW, October.
- Stantec, 2013. Ruakura Plan Change Proposal: Transportation Assessment. 19 June.
- Stantec, 2021. Broad integrated Transportation Assessment: Te Awa Lakes. Prepared for Te Awa Lakes Development Company. 17 March.
- Stantec, 2022a. Tuumata Block (Private Plan Change 15): Integrated Transport Assessment. December.
- Stantec, 2022b. Tuumata Block (Private Plan Change 15): Traffic Modelling Report. December.
- Stats NZ (2025): Housing in Aotearoa New Zealand: 2025 Report. This provides the most up-to-date breakdown of dwelling density and household crowding.
- TDG, 2018. Integrated Transportation Assessment: Amberfield Subdivision, Peacocke. TDG Ref: 13646. Prepared by Traffic Design Group for Weston Lea Ltd., May.
- TfNSW, 2024. Guide to Transport Impact Assessment - Technical guidance for transport practitioners. Version 1.1. Prepared by Strategic Transport Planning Branch, Transport for New South Wales. 4 November. <https://www.transport.nsw.gov.au/system/files/media/documents/2025/print-version-guide-transport-impact-assessment-TS00085-v1.1.pdf>
- Transplan, 2026. Brymer Farms: Waikato Regional Traffic Model (WRTM) Scope. Revision 3. 24 March.
- TRB, 2022. Highway Capacity Manual 7th Edition: A Guide for Multimodal Mobility Analysis. Transportation Research Board (TRB).
- WDC, 2025. Waikato District Plan – Operative in Part. 8 October. <https://eplan.waikatodistrict.govt.nz/>
- WRC, 2025a. Future bus services for the Waikato region - public consultation, June–July 2025. <https://yourvoicematters.waikatoregion.govt.nz/future-bus-services>
- WRC, 2025b. Public transport - service overview page. <https://www.waikatoregion.govt.nz/services/transport/public-transport/>
- WRC, 2025c. Future of Te Huia - public consultation page, November–December 2025. <https://yourvoicematters.waikatoregion.govt.nz/future-of-te-huia>



APPENDICES

Appendix A:	Curriculum Vitae
Appendix B:	Development Masterplans
	B.1: Latest set dated 19 August 2026, including Overall Plan; Staging Plan; Movement Network & Rooding Hierarchy; and Public Transport and Active Modes Network
	B.2: Earlier set dated 30 July 2026 (as used and referred to throughout this ITA) including Land Uses; Staging and Rooding Hierarchy
Appendix C:	Mixed-use Commercial Centre Plans: Sites C1 & C2
Appendix D:	Apartment Plans: Sites A1 & A2
Appendix E:	Road Typical Sections & Series C340 Plans
Appendix F:	Rooding Plans
	F1: Series C300 - Brymer Farms (Site)
	F2: Series C310 – Internal Roundabouts
	F3: Series C330 – Intersections/Connections
Appendix G:	Intersection Traffic Count Survey Data Summary
Appendix H:	WRTM Traffic Modelling Report
Appendix I:	SIDRA Intersection Modelling Outputs
	I.1: Newcastle Road / Ellicott Street
	I.2: SH 23 / Wallace Road
	I.3: SH 23 / Newcastle Road
	I.4: SH 23 / Site Access (Brymer Farms)
Appendix J:	Construction Traffic Management Plan Framework (Planning-Stage)



APPENDICES

Appendix A:	Curriculum Vitae
Appendix B:	Development Masterplans
	B.1: Latest set dated 19 August 2026, including Overall Plan; Staging Plan; Movement Network & Roading Hierarchy; and Public Transport and Active Modes Network
	B.2: Earlier set dated 30 July 2026 (as used and referred to throughout this ITA) including Land Uses; Staging and Roading Hierarchy
Appendix C:	Mixed-use Commercial Centre Plans: Sites C1 & C2
Appendix D:	Apartment Plans: Sites A1 & A2
Appendix E:	Road Typical Sections & Series C340 Plans
Appendix F:	Roading Plans
	F1: Series C300 - Brymer Farms (Site)
	F2: Series C310 – Internal Roundabouts
	F3: Series C330 – Intersections/Connections
Appendix G:	Intersection Traffic Count Survey Data Summary
Appendix H:	WRTM Traffic Modelling Report
Appendix I:	SIDRA Intersection Modelling Outputs
	I.1: Newcastle Road / Ellicott Street
	I.2: SH 23 / Wallace Road
	I.3: SH 23 / Newcastle Road
	I.4: SH 23 / Site Access (Brymer Farms)
Appendix J:	Construction Traffic Management Plan Framework (Planning-Stage)



Appendix A: Curriculum Vitae



SELECTED RELEVANT PROJECT EXPERIENCE

Selected from more than 100 New Zealand commissions since 2019; full project records are available on request.

Brymer Estate and directly comparable growth-area planning

- **Proposed Brymer Estate, Waikato** (Brymer Farms, 2021 – present). Transportation advisory services for a proposed 81-ha, 1 000-dwelling multi-typology residential growth cell west of Hamilton: high-level integrated transportation assessment, concept designs for the three key access intersections, Multi-modal Transportation Connectivity Report, and transport inputs to the Waikato Future Proof Strategy 2021 hearing submission; advice continuing under Transplan.
- **Cambridge C5 Growth Cell Structure Plan** (Private client, Stantec). Transport planning, ITA and concept design inputs (internal and external roads and intersections) for a structure plan providing >1,500 medium to high-density dwellings, two neighbourhood centres, parks and community facilities.
- **Te Awamutu Senior Living & Affordable Housing Growth Cell** (Ultimate Solutions, Stantec). High-level transportation masterplan for an 81-ha, 2,000-dwelling growth cell, including SH3 access intersection concept options, multimodal connectivity assessment and Future Proof hearing submission inputs.
- **Tauriko West Structure Plan** (Tauranga City Council, Stantec). Draft ITA for a new residential growth cell, including road cross-section development using the TCC Street Design Toolkit.
- **PC77, West Coast Road (SH73), West Melton** (West Melton Holdings, Stantec). 525-dwelling private plan change: network connectivity assessment, submissions, Waka Kotahi consultation and s92 responses; and expert witness evidence, expert conferencing, joint witness statement and hearing appearance for the associated Selwyn District Plan rezoning — rezoning achieved.

Urban regeneration, agency and infrastructure work

- **Tāmaki Regeneration Programme, Auckland** (LEAD Alliance / Kāinga Ora, Harrison Grierson). Integrated Transport Assessments with traffic engineering, modelling and concept design inputs for large-scale social housing redevelopment at precinct and neighbourhood level (Mangere East, Tāmaki and Te Ararata B; 10,500+ dwellings programme-wide).
- **SH2 Waikare Gorge Realignment, Hawke's Bay** (NZ Transport Agency, Stantec). ITA for the Assessment of Environmental Effects for a nationally significant 3.9-km state highway realignment.
- **Weiti Station, Stillwater, Auckland** (Hugh Green Group, Harrison Grierson). Assessment of access options for future housing development to and from the protected Penlink (SH19) corridor and East Coast Road, including traffic modelling - development enablement alongside corridor protection.
- **SH1B/SH26 and SH1H Revocation Business Cases, Waikato** (NZ Transport Agency, WSP). Transport inputs to combined PBC/SSBC processes under the national investment framework; also peer reviewed the Whangarei Network Strategy PBC and the Auckland Airport to Botany rapid transit SSBC.
- **Drury Central Station, Auckland** (KiwiRail, Harrison Grierson). Stage 3 Safe System Audit of revised detailed designs for the new rail station.
- **Taupiri Urupā (SH1H), Waikato** (NZ Transport Agency, WSP). Traffic and safety investigation along SH1H past the Taupiri Cemetery, a site of deep cultural significance, with the technical response shaped around cultural values; also delivered a Papakāinga housing ITA for the Maraetakaroro Lands Trust (Rotorua).
- **Transplan commissions** (Various clients, 2024 – present). More than 20 commissions across Auckland, Waikato and the Bay of Plenty spanning ITAs, plan change and consent support, access and intersection design, traffic modelling and peer review for councils and developers.





Curriculum Vitae - Tobie Ueckermann

Director & Principal Transportation Engineer, Transplan

CMEngNZ · MEng (Transportation) · | +64 27 722 2218 · [REDACTED]

PROFILE

Tobie is a chartered transportation engineer with 30 years of experience in traffic engineering, transport planning and road safety, gained in New Zealand, Australia, South Africa, the UK, the UAE and across Southern Africa and the Middle East. He has held senior consultancy leadership roles including Regional/Technical Director (WSP South Africa), Principal and Senior Principal (WSP and Stantec New Zealand) and Technical Director (Harrison Grierson), and founded Transplan in 2024.

His particular expertise is the transport planning of residential growth areas: structure planning, multimodal connectivity, access strategy and integrated transport assessment for growth cells of 1,500 to 2,000+ dwellings - directly relevant to the proposed Brymer Estate, on which he has advised since 2021. His advice and evidence have been tested through council hearings, expert conferencing and joint witness statements, and he is experienced in preparing and presenting evidence to Environment Court, Board of Inquiry and Hearing Panel standard.

QUALIFICATIONS & MEMBERSHIPS

- Postgraduate Certificate of Proficiency in Engineering - Road Safety Improvement, University of Canterbury, 2022
- MEng (Transportation), University of Pretoria, 2008
- BEng (Hons) (Transportation), 2000
- BEng (Civil) University of Johannesburg, 1996
- Chartered Member, Engineering New Zealand (Reg. 1162984)

WORK EXPERIENCE

Director - Transportation , Transplan New Zealand, Cambridge	2024 – present
Technical Director - Transportation , Harrison Grierson Consultants, Hamilton / Auckland	2023 – 2024
Senior Principal Transportation Engineer , Stantec New Zealand, Hamilton	2021 – 2023
Principal Transportation Engineer , WSP New Zealand, Hamilton	2019 – 2021
Regional / Technical Director - Traffic & Transport , WSP South Africa, Johannesburg	2011 – 2019
Technical Executive - Traffic & Transport , GIBB, Johannesburg, South Africa	2006 – 2011
Associate - Transport Development Planning , Halcrow Group (now Jacobs), London, UK	2004 – 2006
Senior Engineer - UTC / Traffic Engineering , Mouchel (now WSP UK), Hertfordshire, UK	2002 – 2004
Senior Engineer / Engineer - Transportation , Jeffares & Green (now JG Afrika), Johannesburg	1998 – 2002
Engineer- Geometric Design / Traffic Engineering , Department of Transport, Pretoria	1996 – 1998

TECHNICAL EXPERTISE

- | | |
|--|--|
| - Integrated Transportation Assessments / TIAs | - Land-use & Development Planning |
| - Transport Planning & Structure Planning | - Road Safety / Safe System Audits |
| - Traffic Engineering & Intersection Design | - Expert Evidence & Statutory Hearings |
| - Traffic Modelling & Simulation (incl. SIDRA) | - Plan Changes, Consents & Due Diligence |
| - Access & Access Management Studies | - Public Transport & Intermodal Planning |
| - Active Transport & Multimodal Planning | - Parking, Traffic Calming & Demand Management |



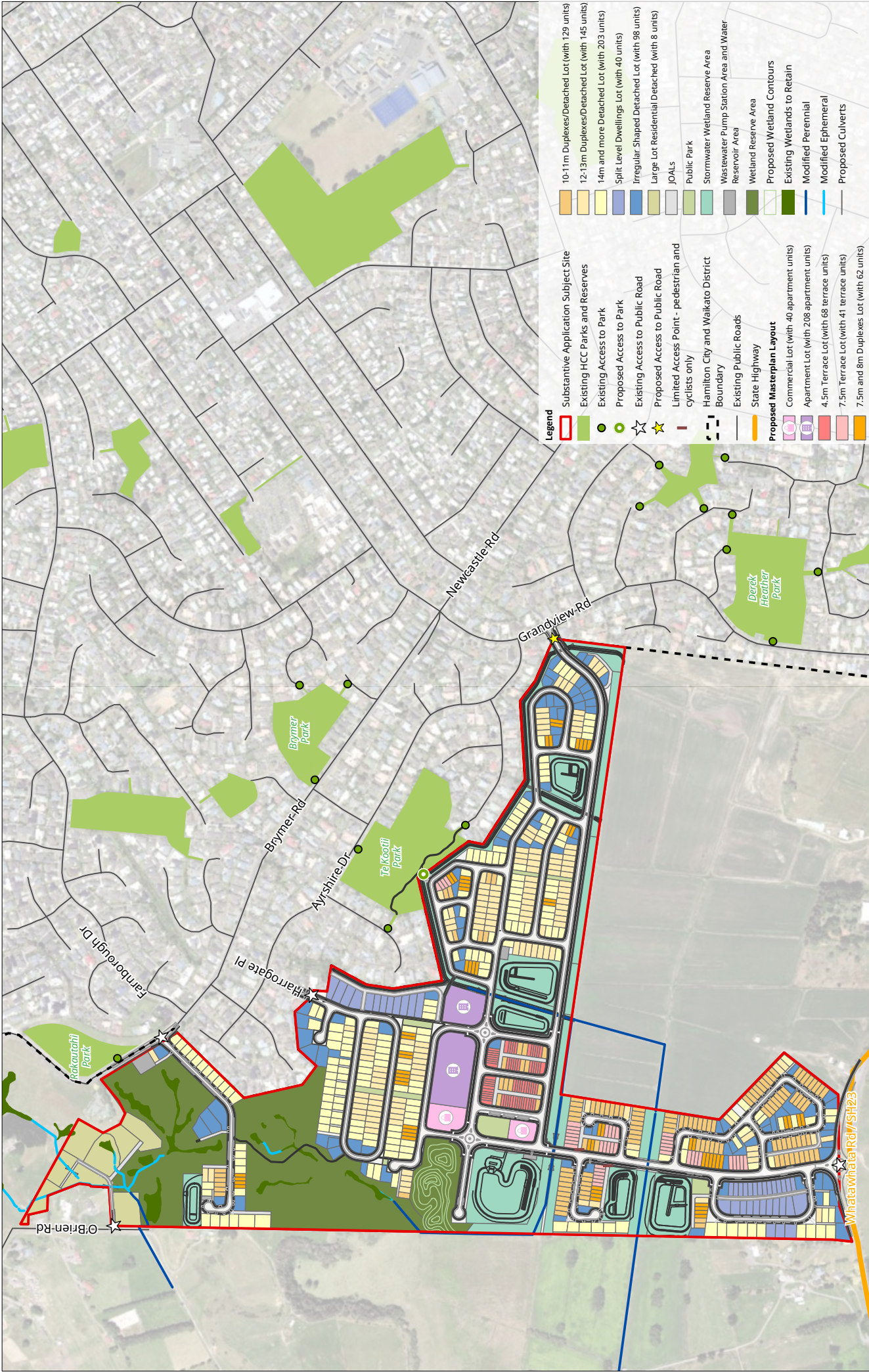
Appendix B: Masterplans

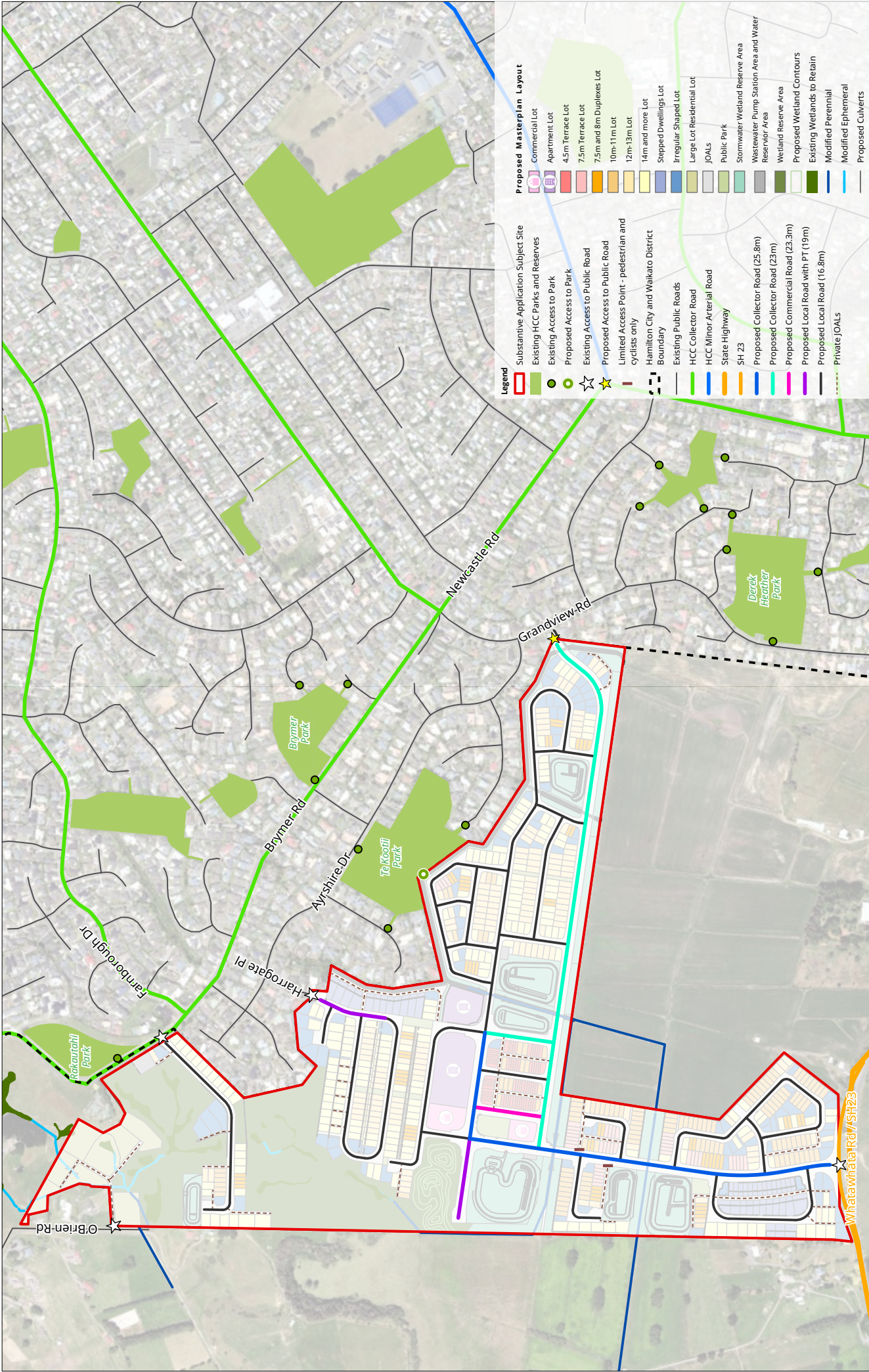
B.1: Latest set dated 19 August 2026, including Overall Plan; Staging Plan; Movement Network & Roading Hierarchy; and Public Transport and Active Modes Network

B.2: Earlier set dated 30 July 2026 (as used and referred to throughout this ITA) including Land Uses; Staging and Roading Hierarchy



Appendix B.1: Latest Development Masterplans (19/08/2026)



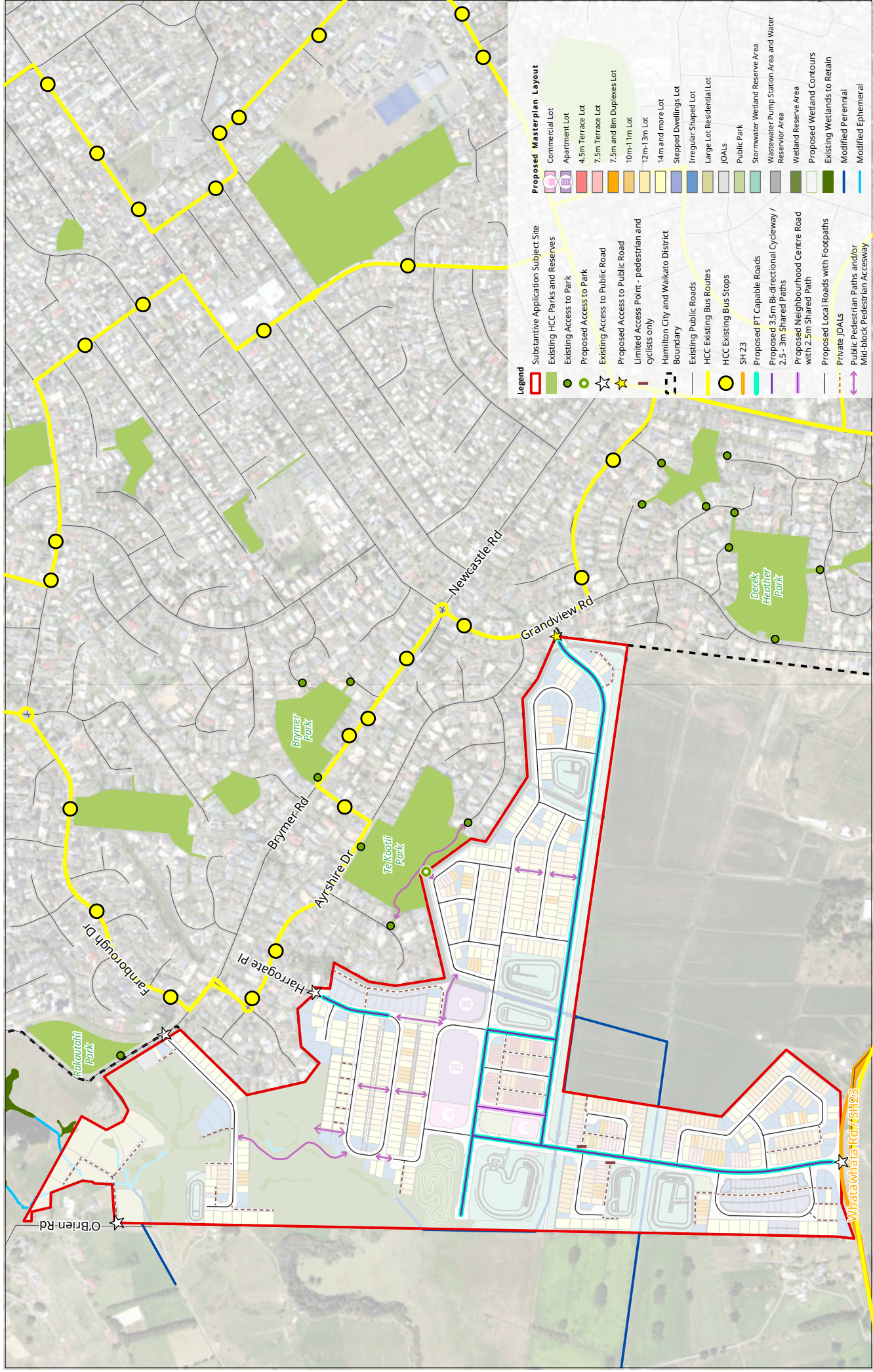


Legend

- Substantive Application Subject Site
- Existing HCC Parks and Reserves
- Existing Access to Park
- Proposed Access to Park
- Existing Access to Public Road
- Proposed Access to Public Road
- Limited Access Point - pedestrian and cyclists only
- Hamilton City and Walkato District Boundary
- Existing Public Roads
- HCC Collector Road
- HCC Minor Arterial Road
- State Highway
- SH 23
- Proposed Collector Road (25.8m)
- Proposed Collector Road (23m)
- Proposed Commercial Road (23.3m)
- Proposed Local Road with PT (19m)
- Proposed Local Road (16.8m)
- Private JOALS

Proposed Masterplan Layout

- Commercial Lot
- Apartment Lot
- 4.5m Terrace Lot
- 7.5m Terrace Lot
- 7.5m and 8m Duplexes Lot
- 10m-11m Lot
- 12m-13m Lot
- 14m and more Lot
- Stepped Dwellings Lot
- Irregular Shaped Lot
- Large Lot Residential Lot
- JOALS
- Public Park
- Stormwater Wetland Reserve Area
- Wastewater Pump Station Area and Water Reservoir Area
- Wetland Reserve Area
- Proposed Wetland Contours
- Existing Wetlands to Retain
- Modified Perennial
- Modified Ephemeral
- Proposed Culverts



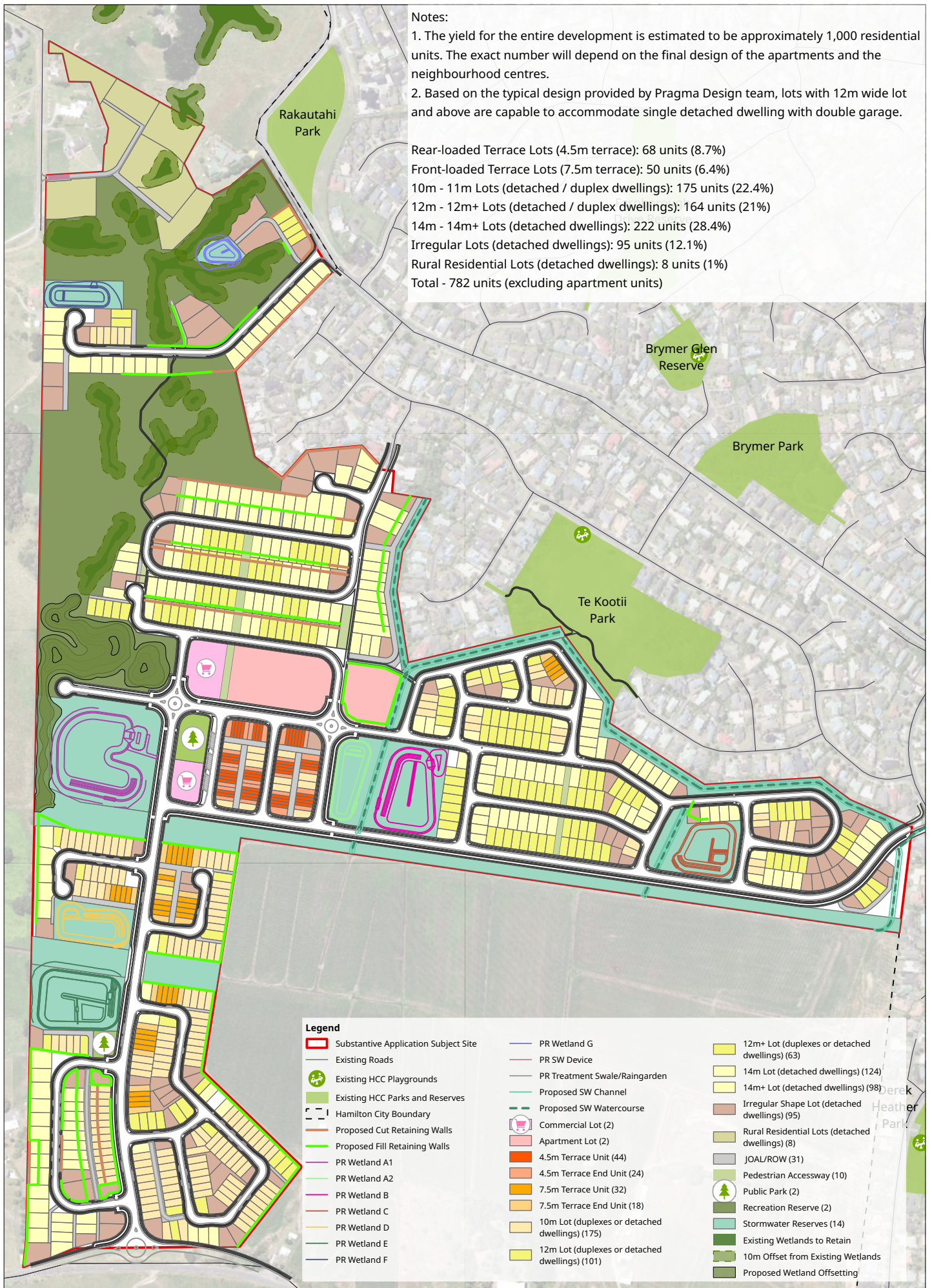


Appendix B.2: Prior Development Masterplans (30/07/2026)

Notes:

1. The yield for the entire development is estimated to be approximately 1,000 residential units. The exact number will depend on the final design of the apartments and the neighbourhood centres.
2. Based on the typical design provided by Pragma Design team, lots with 12m wide lot and above are capable to accommodate single detached dwelling with double garage.

Rear-loaded Terrace Lots (4.5m terrace): 68 units (8.7%)
 Front-loaded Terrace Lots (7.5m terrace): 50 units (6.4%)
 10m - 11m Lots (detached / duplex dwellings): 175 units (22.4%)
 12m - 12m+ Lots (detached / duplex dwellings): 164 units (21%)
 14m - 14m+ Lots (detached dwellings): 222 units (28.4%)
 Irregular Lots (detached dwellings): 95 units (12.1%)
 Rural Residential Lots (detached dwellings): 8 units (1%)
 Total - 782 units (excluding apartment units)



Client: Brymer Farms Ltd
 Job Number: 26666
 Drawing: Proposed Masterplan - Landuses
 Version: Draft
 Date: July 2026

Scale: 1:5,000 @ A3
 Sheet: 1 of 1



Brymer Fast-track Substantive

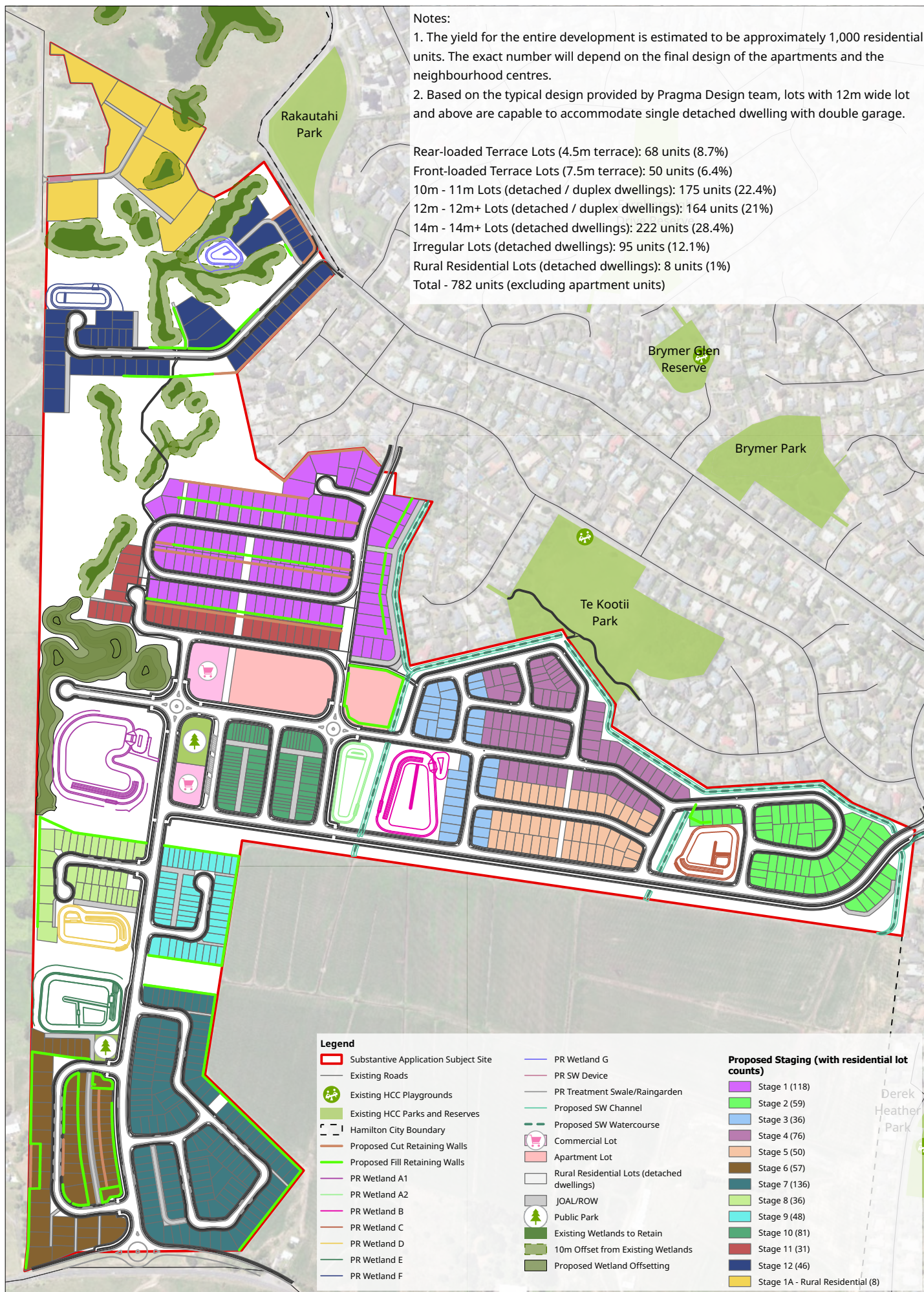
Lot 22 DP 79526; Lot 3 DP 385271 and Lot 1 DP 87291;
 Pt Allotment 365 Parish of Pukete; Pt Lot 2 DP 18355

B&A
 Urban & Environmental

Notes:

1. The yield for the entire development is estimated to be approximately 1,000 residential units. The exact number will depend on the final design of the apartments and the neighbourhood centres.
2. Based on the typical design provided by Pragma Design team, lots with 12m wide lot and above are capable to accommodate single detached dwelling with double garage.

Rear-loaded Terrace Lots (4.5m terrace): 68 units (8.7%)
 Front-loaded Terrace Lots (7.5m terrace): 50 units (6.4%)
 10m - 11m Lots (detached / duplex dwellings): 175 units (22.4%)
 12m - 12m+ Lots (detached / duplex dwellings): 164 units (21%)
 14m - 14m+ Lots (detached dwellings): 222 units (28.4%)
 Irregular Lots (detached dwellings): 95 units (12.1%)
 Rural Residential Lots (detached dwellings): 8 units (1%)
 Total - 782 units (excluding apartment units)



Client: Brymer Farms Ltd
 Job Number: 26666
 Drawing: Proposed Masterplan - Staging (Residential)
 Version: Draft
 Date: July 2026

Scale: 1:5,000 @ A3
 Sheet: 1 of 1



Brymer Fast-track Substantive

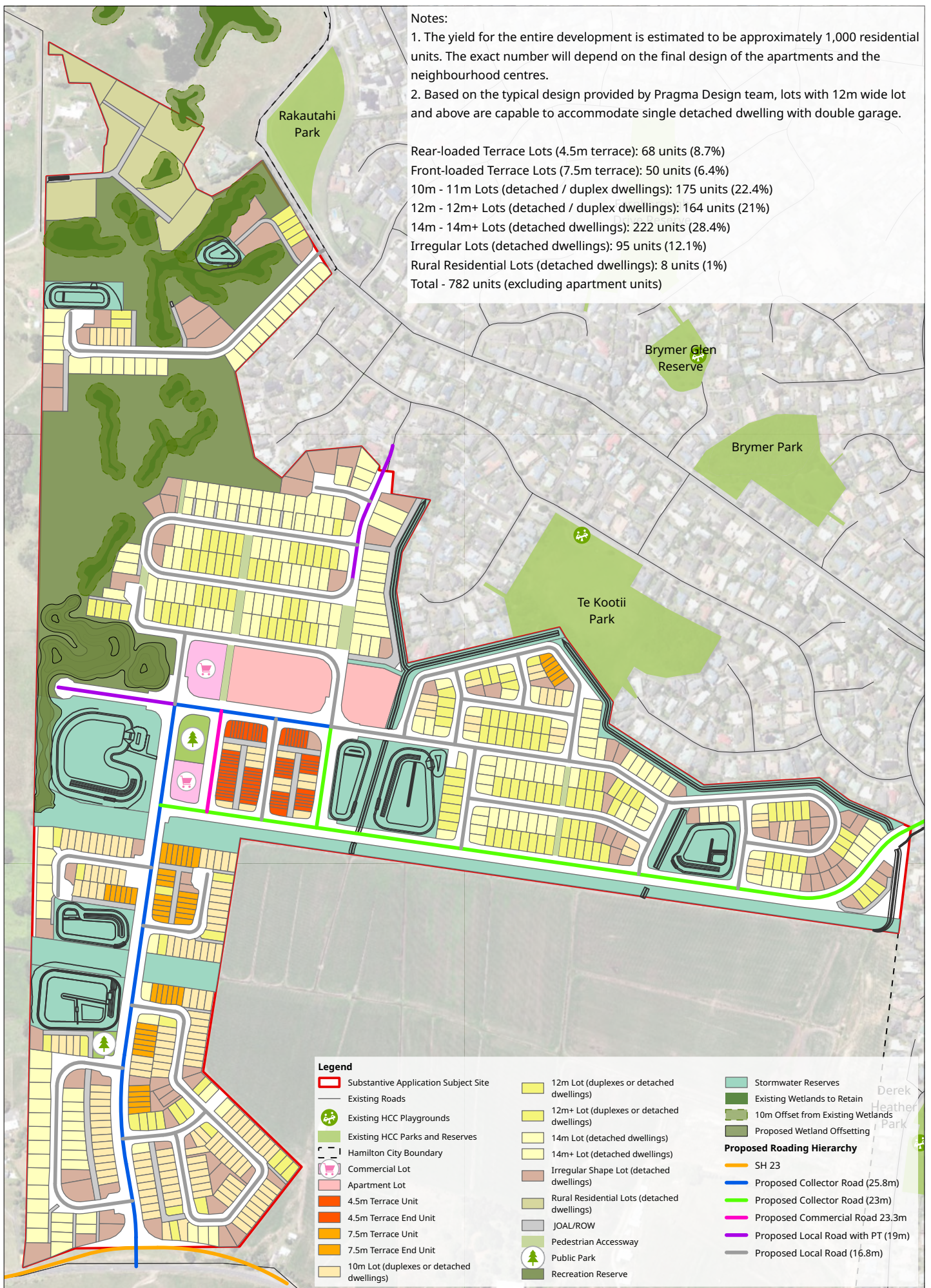
Lot 22 DP 79526; Lot 3 DP 385271 and Lot 1 DP 87291;
 Pt Allotment 365 Parish of Pukete; Pt Lot 2 DP 18355

B&A
 Urban & Environmental

Notes:

1. The yield for the entire development is estimated to be approximately 1,000 residential units. The exact number will depend on the final design of the apartments and the neighbourhood centres.
2. Based on the typical design provided by Pragma Design team, lots with 12m wide lot and above are capable to accommodate single detached dwelling with double garage.

Rear-loaded Terrace Lots (4.5m terrace): 68 units (8.7%)
 Front-loaded Terrace Lots (7.5m terrace): 50 units (6.4%)
 10m - 11m Lots (detached / duplex dwellings): 175 units (22.4%)
 12m - 12m+ Lots (detached / duplex dwellings): 164 units (21%)
 14m - 14m+ Lots (detached dwellings): 222 units (28.4%)
 Irregular Lots (detached dwellings): 95 units (12.1%)
 Rural Residential Lots (detached dwellings): 8 units (1%)
 Total - 782 units (excluding apartment units)



Legend

- Substantive Application Subject Site
- Existing Roads
- Existing HCC Playgrounds
- Existing HCC Parks and Reserves
- Hamilton City Boundary
- Commercial Lot
- Apartment Lot
- 4.5m Terrace Unit
- 4.5m Terrace End Unit
- 7.5m Terrace Unit
- 7.5m Terrace End Unit
- 10m Lot (duplexes or detached dwellings)

- 12m Lot (duplexes or detached dwellings)
- 12m+ Lot (duplexes or detached dwellings)
- 14m Lot (detached dwellings)
- 14m+ Lot (detached dwellings)
- Irregular Shape Lot (detached dwellings)
- Rural Residential Lots (detached dwellings)
- JOAL/ROW
- Pedestrian Accessway
- Public Park
- Recreation Reserve

- Stormwater Reserves
 - Existing Wetlands to Retain
 - 10m Offset from Existing Wetlands
 - Proposed Wetland Offsetting
- Proposed Roading Hierarchy**
- SH 23
 - Proposed Collector Road (25.8m)
 - Proposed Collector Road (23m)
 - Proposed Commercial Road 23.3m
 - Proposed Local Road with PT (19m)
 - Proposed Local Road (16.8m)

Client: Brymer Farms Ltd
 Job Number: 26666
 Drawing: Proposed Masterplan - Roading Hierarchy
 Version: Draft
 Date: July 2026

Scale: 1:5,000 @ A3
 Sheet: 1 of 1



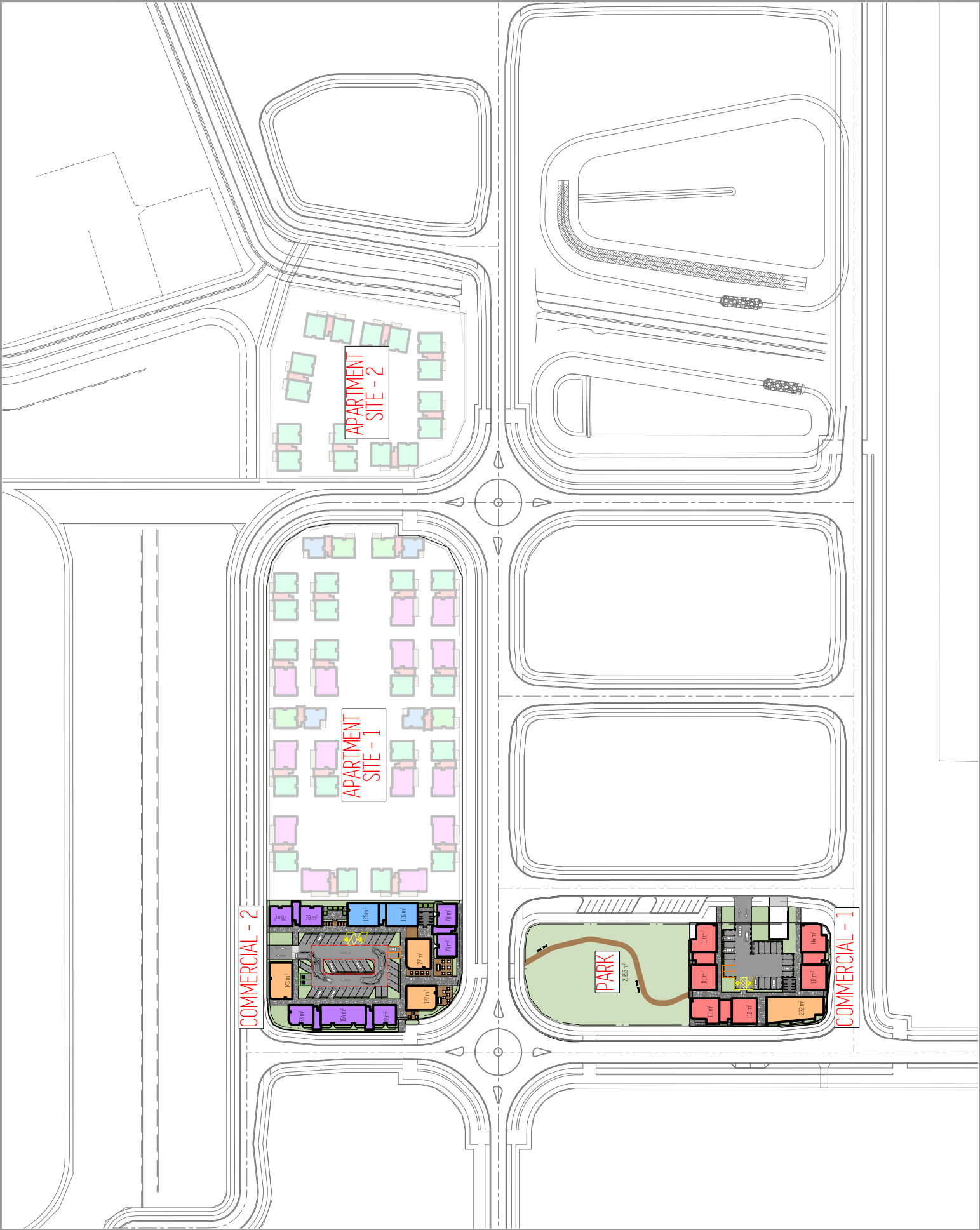
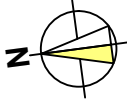
Brymer Fast-track Substantive

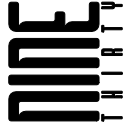
Lot 22 DP 79526; Lot 3 DP 385271 and Lot 1 DP 87291;
 Pt Allotment 365 Parish of Pukete; Pt Lot 2 DP 18355

B&A
 Urban & Environmental

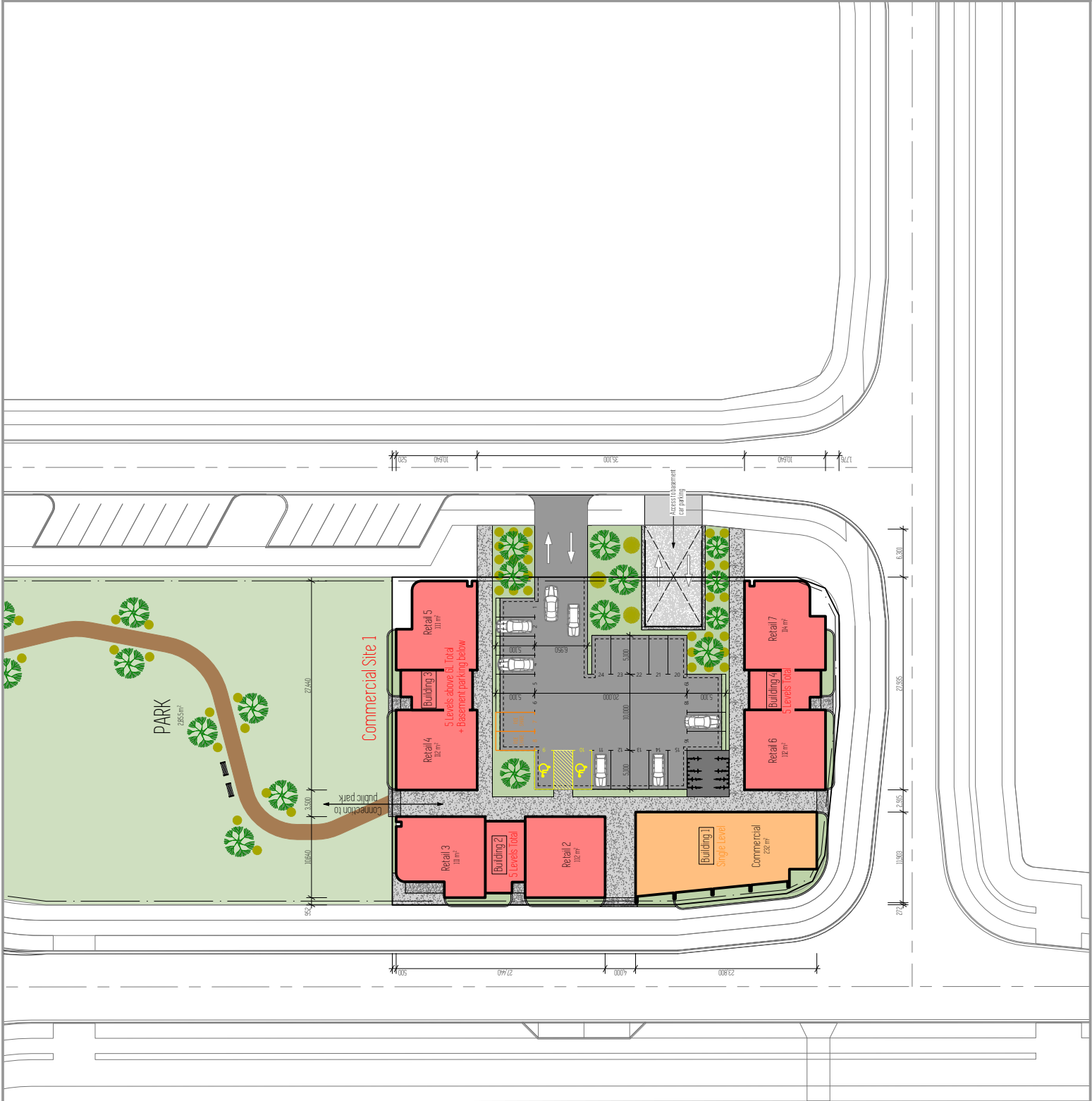
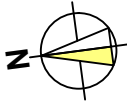


Appendix C: Mixed-use Commercial Centre Plans: Sites C1 & C2





Brymer Farms Development
127 Brymer Rd. Hamilton
Sites C1 & C2



Issue Date Revision

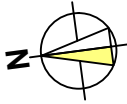
C1 - Site

Scale = 1:500
Original sheet size A2

RESOURCE CONSENT

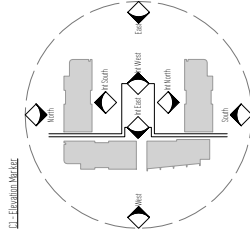
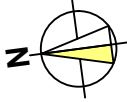
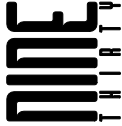
2

14/08/2026



Commercial Site 2





Issue Date Revision

C1 - Basement

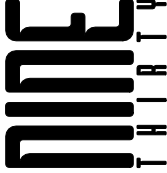
Scale = 1:500
Original sheet size A2

RESOURCE CONSENT

3

14/08/2026





Brymer Farms
Development
127 Brymer Rd, Hamilton

C1

Building	Level -1	Level 0	Level 1	Level 2	Level 3	Level 4	Total m2
0	Basement Car Park	825					825
1	Retail Apartments		232				232 0
2	Retail Apartments		226	275	186	275	226 186 922
3	Retail Apartments		226	275	186	275	226 186 922
4	Retail Apartments		226	275	186	275	226 186 922
Total Buildings							4
Total Apartments							24
Total GFA							4501
Roof Area							1228
Hardstand Area							854
Site Area							2461
Site Coverage							49.90%
Permeability	379						15.40%
Car Parks		40	24				64

C2

Building					Level 0	Level 1	Level 2	Total
1	Retail Apartments		315		370		370	315 740
2	Retail Apartments		156		182		182	156 364
3	Retail		143					143
4	Retail Office		250		276		276	250 552
5	Retail Apartments		156		182		182	156 364
6	Retail		127					127
7	Retail		127					127
Total Buildings								7
Total Apartments								16
Total GFA								3294
Roof Area								1762
Hardstand Area								1446
Site Area								4206
Site Coverage								41.89%
Permeability	998							23.73%
Car Parks			38					38

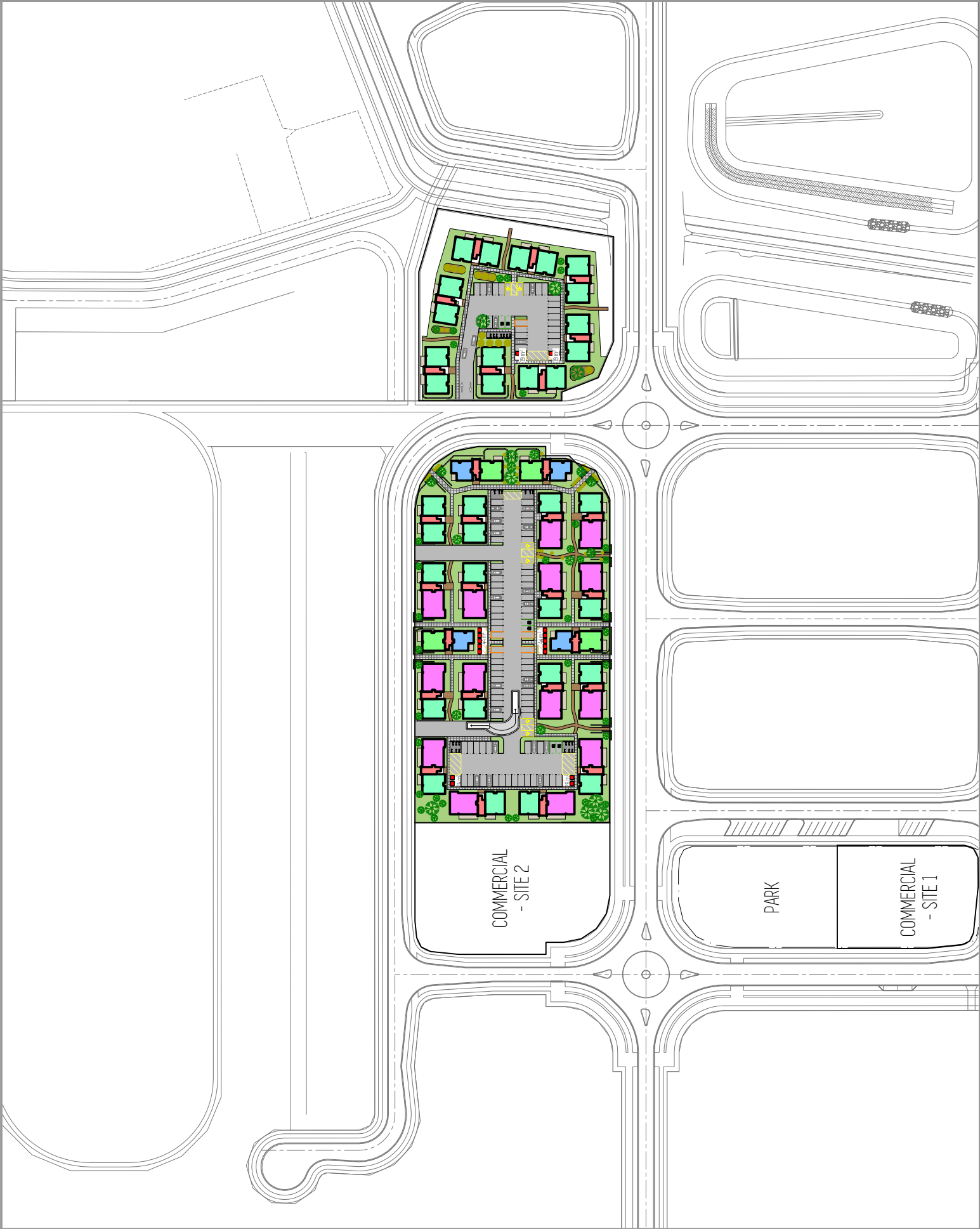
Issue Date Revision

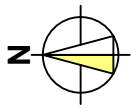
AreaCalcs

Scale =
Original sheet size A3



Appendix D: Apartment Plans: Sites A1 & A2





- 2 Bedroom - Type A
 - 2 Bedroom - Type B
 - 1 Bedroom - Type A
 - 3 Bedroom - Type A
 - Lobby/Garage
- | Issue | Date | Revisions |
|-------|------|-----------|
| | | |

ROAD - NORTH

COMMERCIAL
- SITE 2

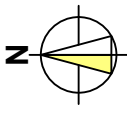
ROAD - SOUTH

APARTMENTS - SITE 1

APARTIME

PARK





- 2 Bedroom - Type A
- 2 Bedroom - Type B
- 1 Bedroom - Type A
- 3 Bedroom - Type A
- Utility/Garage

Issue	Date	Revisions

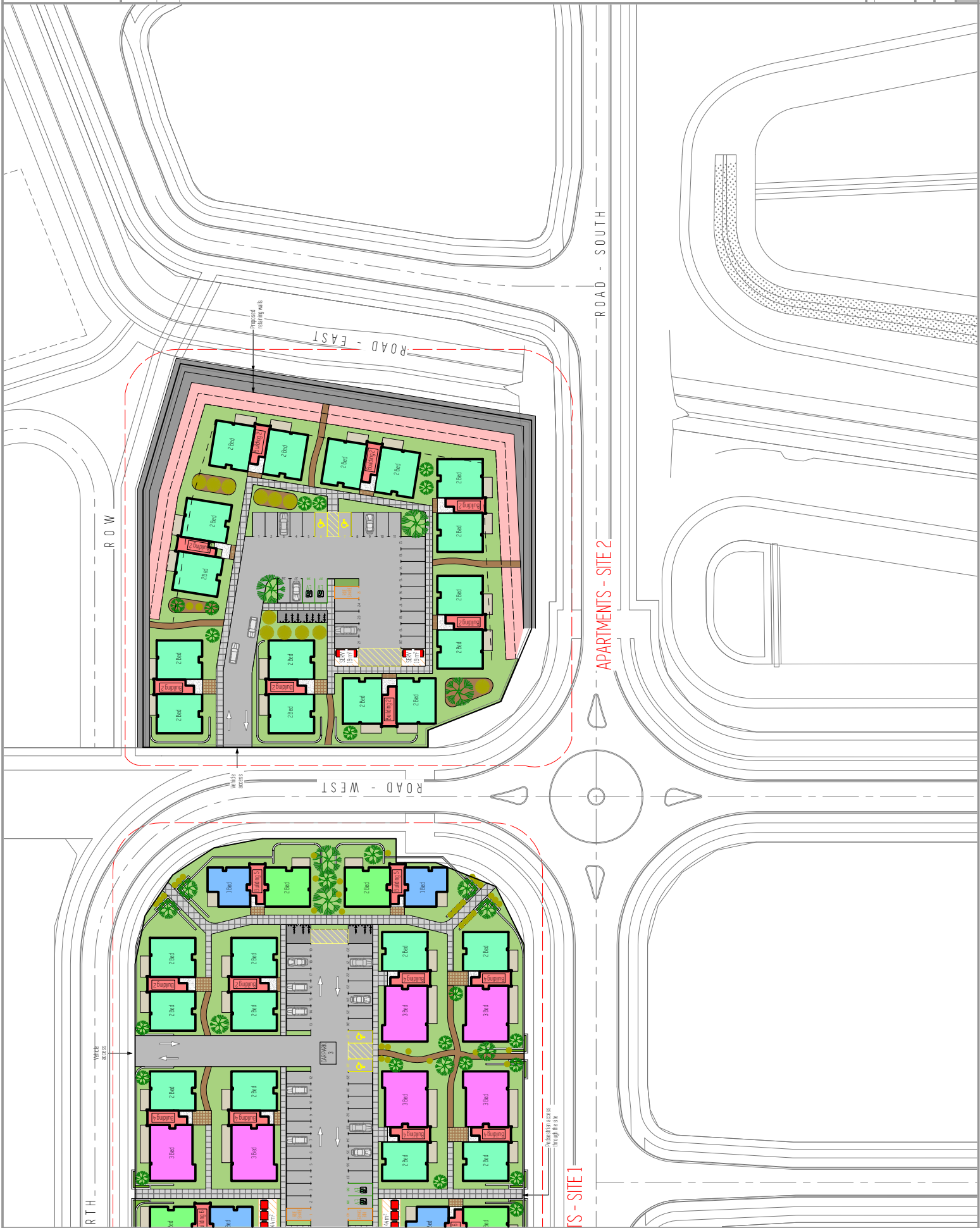
A2 - Site

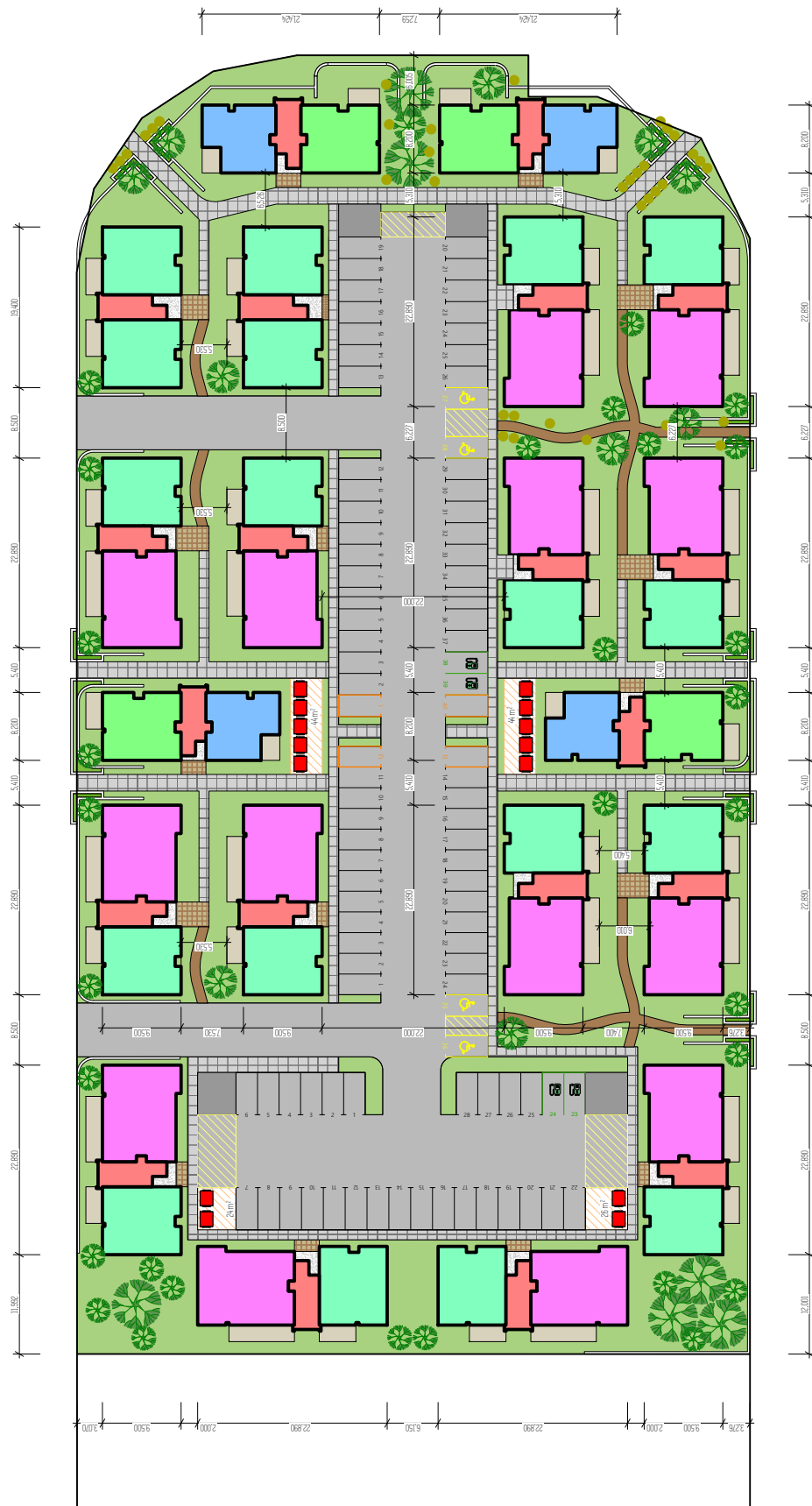
Scale = 1:500
Original sheet size A2

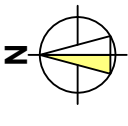
RESOURCE CONSENT

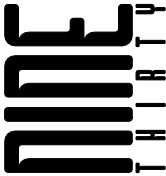
3

14/08/2026









Brymer Farm
127 Brymer Rd Hamilton

A1						
Building Type	Level 0	Level 1	Level 2	Level 3	Level 4	Building QTY
	Total	Total	Total	Total	Total	Total
B2 (3 Levels)	Apartment QTY/Level	2	2	2	0	6
	2+2 Bed (Floor Area/Level)	178	178	178	0	534
B2 (5 Levels)	Apartment QTY/Level	2	2	2	2	10
	2+2 Bed (Floor Area/Level)	178	178	178	178	890
B4 (3 Levels)	Apartment QTY/Level	2	2	2	0	6
	2+3 Bed (Floor Area/Level)	207	207	207	0	621
B4 (5 Levels)	Apartment QTY/Level	2	2	2	2	10
	2+3 Bed (Floor Area/Level)	207	207	207	207	1035
B5 (5 Levels)	Apartment QTY/Level	2	2	2	2	10
	1+2 Bed (Floor Area/Level)	166	166	166	166	830
B6 (3 Levels)	Apartment QTY/Level	2	2	2	0	6
	1+2 Bed (Floor Area/Level)	166	166	166	0	498
Total Buildings						20
Total Apartments						160
Total GFA						15672
Roof Area						4576
Hardstand Area						3895
Site Area						12356
Site Coverage						37.03%
Permeability	3885					31.44%
Car Parks						94

A2						
Building Type	Level 0	Level 1	Level 2	Level 3	Level 4	Building QTY
	Total	Total	Total	Total	Total	Total
B1 (3 Levels)	Apartment QTY/Level	2	2	2	0	6
	2+2 Bed (Floor Area/Level)	178	178	178	0	534
Total Buildings						8
Total Apartments						48
Total GFA m2						4272
Roof Area m2						1632
Hardstand Area						1423
Site Area						5764
Site Coverage						28.31%
Permeability	2709					47.00%
Car Parks						28

Issue Date Revision

Area Calcs

Scale =
Original sheet size A3

18

RESOURCE CONSENT

14/08/2026



Appendix E: Road Typical Sections & Series C340 Plans



Appendix B – Roading Typical Sections

Contents

1.	Introduction.....	1
2.	Common Design Elements	2
3.	Cross-Section Descriptions	3
3.1	Section A — 25.8m Primary Collector Road / PT	3
3.2	Section A-1 — 28.5m Primary Collector Road / PT (Bus Stop)	4
3.3	Section B — 23m Secondary Collector Road PT	4
3.4	Section B-1 — 23m Secondary Collector Road PT (Batter Variant)	4
3.5	Section C — 23.3m Neighbourhood Centre Road	5
3.6	Section D — 20.5m Existing Collector Road (Highgrove)	5
3.7	Section E — 19m Existing Collector Road (Harrogate Place)	6
3.8	Section F — 18m Primary Collector Road / PT (Bridge)	6
3.9	Section G — 18m Existing Collector Road (Ayrshire Drive)	6
3.10	Section H — 19m Local Road PT	7
3.11	Section H-1 — 24.5m Local Road PT (Angled Parking)	7
3.12	Section I — 16.8m Local Road	7
3.13	Section J — JOAL (8.0m)	8
3.14	Section K — JOAL (7.0m)	8
3.15	Section L — JOAL (4.0m).....	9
3.16	Parking Bay Details	9

List of Figures

Figure 3.1: Section A — 25.8m Primary Collector Road / PT	3
---	---

List of Tables

Table 3.1: Section A — 25.8m Primary Collector Road / PT	3
Table 3.2: Section A-1 — 28.5m Primary Collector Road / PT (Bus Stop)	4
Table 3.3: Section B — 23m Secondary Collector Road PT.....	4
Table 3.4: Section B-1 — 23m Secondary Collector Road PT (Batter Variant)	5
Table 3.5: Section C — 23.3m Neighbourhood Centre Road	5
Table 3.6: Section D — 20.5m Existing Collector Road (Highgrove)	5
Table 3.7: Section E — 19m Existing Collector Road (Harrogate Place).....	6
Table 3.8: Section F — 18m Primary Collector Road / PT (Bridge)	6
Table 3.9: Section G — 18m Existing Collector Road (Ayrshire Drive).....	6
Table 3.10: Section H — 19m Local Road PT.....	7
Table 3.11: Section H-1 — 24.5m Local Road PT (Angled Parking)	7



Table 3.12: Section I — 16.8m Local Road	8
Table 3.13: Section J — JOAL (8.0m).....	8
Table 3.14: Section K — JOAL (7.0m)	8
Table 3.15: Section L — JOAL (4.0m)	9
Table 3.16: Parking Bay Details.....	9



1. Introduction

The development is served by an internal road network providing safe, well-connected access through the site and to the surrounding network.

The road hierarchy comprises a collector network supported by local residential streets and rear lanes (JOALs). The respective road cross-sections meet or exceed the HCC criteria for the form of transport corridors and internal vehicle access and associated dimensions as listed in the following tables included in Appendix 15 of the HCDP:

- Table 15-5ai) - Criteria for the form of Internal Vehicle Access
- Table 15-5aii) - Criteria for the form of Transport Corridors

A summary of the relevant HCDP internal vehicle access and transport corridor criteria are included in the tables in **Annexure A**.

The proposed roading typical cross-sections for the Brymer Farms subdivision is shown on the Maven C340 drawing series as included in **Annexure B**. The sections depict each cross-section in terms of its legal road boundary width, carriageway and traffic lane arrangement, provision for cycleways and shared paths, footpaths, berms, parking and associated widths.

The set comprises fifteen sheets (drawings C340-1 to C340-12, including variant sheets C340-1A, C340-2A and C340-8A), spanning primary and secondary collectors, a neighbourhood-centre road, existing-road adaptations, a bridge cross-section, local roads, jointly owned access lanes (JOALs) and standard parking bay details. An option for public-transport bus-stop provision is shown on the primary collector (Section A-1).



2. Common Design Elements

The following elements are common across the section set unless a sheet states otherwise:

- Carriageway pavement (all trafficked roads): 40mm DG10 asphaltic concrete on first coat chip seal, over AP40 basecourse aggregate, over GAP 65 aggregate, designed to CBR 4. Basecourse and sub-base thicknesses vary by road type (150mm/300mm on primary/PT routes; 100mm/200mm on lighter local and existing-road adaptations). Where the insitu CBR is less than 4 (and again where less than 2) the engineer is to provide an alternative pavement design. A 300mm brown rock layer is required where underlying peat soils are present.
- Cycleway pavement: 25mm DG7 asphalt on 150mm GAP40 (insitu CBR greater than 10).
- Footpath pavement: 100mm 20MPa concrete on 100mm GAP20 or GAP40 (insitu CBR greater than 10). Concrete footpaths behind parking bays are 125mm thick per RITS D3.3.5.
- Underground services (typical depths): HVLV 800mm, gas 900mm, power 600–1000mm, fibre 1200mm, water 1500mm.
- General: all works are to accord with the Waikato Regional Infrastructure Technical Specifications (RITS).



3. Cross-Section Descriptions

3.1 Section A — 25.8m Primary Collector Road / PT

The primary collector carries public transport and provides the full active-mode provision: a 3.5m bi-directional cycle way on the left, set behind a 0.8m separation berm and 2.0m berm, plus 2.0m footpaths on both sides. Two 3.4m traffic lanes are split by a 2.5m flush median. Pavement is specified separately for the carriageway, cycleway and footpath elements. Refer to Drawing C340-1.

Table 3.1: Section A — 25.8m Primary Collector Road / PT

Boundary width	25.8m legal road boundary
Carriageway	9.3m — two 3.4m traffic lanes + 2.5m flush median
Cycleway	3.5m bi-directional cycle way (left side)
Footpath	2.0m each side
Berms / parking	2.0m services berm each side; 0.8m separation berm; 2.1m car parking or landscaping each side

A render of the primary collector road is shown in **Figure 3.1**.



Figure 3.1: Section A — 25.8m Primary Collector Road / PT

Note: The bi-directional cycleway has been positioned on the boundary of the collector road cross-section to remove conflicts with pedestrians along the cycleway route and at crossings, and also with bus passengers (waiting for buses and alighting/disembarking buses) and private vehicle passengers (getting in and out of vehicles).



3.2 Section A-1 — 28.5m Primary Collector Road / PT (Bus Stop)

A bus-stop variant of the primary collector, widened to 28.5m to accommodate an in-line bus stop and shelter on the cycle-way side. It retains the 3.5m bi-directional cycle way (behind a 0.8m separation berm), 2.0m footpaths and 2.0m services berms, with two 3.4m traffic lanes split by a 2.5m flush median. A 2.7m bus-stop bay and 2.1m bus shelter are provided, with an accessible bus stop 0.20m kerb per RITS D3.3.8. Refer to Drawing C340-1A.

Table 3.2: Section A-1 — 28.5m Primary Collector Road / PT (Bus Stop)

Boundary width	28.5m legal road boundary
Carriageway	9.3m — two 3.4m traffic lanes + 2.5m flush median
Cycleway	3.5m bi-directional cycle way (left side)
Footpath	2.0m each side
Bus stop	2.7m bus-stop bay + 2.1m bus shelter; accessible stop 0.20m kerb per RITS D3.3.8
Berms / parking	2.0m services berm each side; 0.8m separation berm; 2.1m car parking or landscaping (one side)

3.3 Section B — 23m Secondary Collector Road PT

A secondary collector on a PT route, similar in make-up to Section A but without a flush median (6.8m carriageway). It retains the 3.5m bi-directional cycle way on the left and 2.0m footpaths, with 2.1m car parking or landscaping strips on each side. As a PT route the carriageway uses the full 150mm AP40 / 300mm GAP 65 build, with the same separate cycleway and footpath pavement specifications as Section A. Kerbs are 0.45m Type 3. Refer to Drawing C340-2.

Table 3.3: Section B — 23m Secondary Collector Road PT

Boundary width	23m legal road boundary
Carriageway	Two 3.4m traffic lanes (no median)
Cycleway	3.5m bi-directional cycle way (left side)
Footpath	2.0m each side
Berms / parking	1.7m + 2.0m services berms; 0.8m separation; 2.1m car parking or landscaping each side

3.4 Section B-1 — 23m Secondary Collector Road PT (Batter Variant)

A variant of the 23m secondary collector with dimensions identical to Section B (1.7m services berm, 3.5m bi-directional cycle way, 0.8m berm, 2.0m footpath, 2.1m car parking or landscaping, two 3.4m traffic lanes, and the matching arrangement on the opposite side).

The drawing depicts the treatment where the cycle-way-side boundary meets a change in level: the services berm is formed as a batter to the boundary, with street trees within it. Carriageway and active-mode pavements are as Section B. Refer to Drawing C340-2A.



Table 3.4: Section B-1 — 23m Secondary Collector Road PT (Batter Variant)

Boundary width	23m legal road boundary
Carriageway	Two 3.4m traffic lanes (no median)
Cycleway	3.5m bi-directional cycle way (left side)
Footpath	2.0m each side
Berms / parking	1.7m + 2.0m services berms; 0.8m separation; 2.1m car parking or landscaping each side
Boundary treatment	Batter to cycle-way-side services berm; street trees

3.5 Section C — 23.3m Neighbourhood Centre Road

The neighbourhood-centre (town centre) cross-section, characterised by 60° angled car parking. The left side combines a 2.5m shared path with 6.9m of angled parking or landscaping, while the right has a 2.1m parking or landscaping strip and 1.8m footpath. Two 3.5m traffic lanes, no median. Refer Drawing C340-3.

Table 3.5: Section C — 23.3m Neighbourhood Centre Road

Boundary width	23.3m legal road boundary
Carriageway	7.0m — two 3.5m traffic lanes (no median)
Shared path	2.5m shared path (left side)
Footpath	1.8m (right side)
Berms / parking	1.5m services berm each side; 6.9m of 60° angled car parking or landscaping (left, incl. buffer); 2.1m car parking or landscaping (right)

3.6 Section D — 20.5m Existing Collector Road (Highgrove)

An adaptation to the existing Highgrove collector road. Cross-section (one side to the other): 2.0m services berm, 1.5m footpath, 2.0m parking or landscaping, 3.7m traffic lane, 3.1m painted median, 3.7m traffic lane, 3.0m shared path, 1.5m berm. A 3.0m shared path replaces a separate cycleway on one side.

Table 3.6: Section D — 20.5m Existing Collector Road (Highgrove)

Boundary width	20.5m legal road boundary
Carriageway	Two 3.7m traffic lanes + 3.1m painted median
Shared path	3.0m shared path (one side)
Footpath	1.5m (one side)
Berms / parking	2.0m services berm + 1.5m berm; 2.0m parking or landscaping



3.7 Section E — 19m Existing Collector Road (Harrogate Place)

An adaptation to the existing Harrogate Place collector. Cross-section (one side to the other): 2.0m services berm, 1.5m footpath, 2.0m parking or landscaping, 3.5m traffic lane, 1.0m painted median, 3.5m traffic lane, 2.0m parking or landscaping, 3.0m shared path, 0.5m berm. Parking or landscaping strips are provided on both sides. Like Section D, a shared path is provided on one side in lieu of a cycleway.

Table 3.7: Section E — 19m Existing Collector Road (Harrogate Place)

Boundary width	19m legal road boundary
Carriageway	Two 3.5m traffic lanes + 1.0m painted median
Shared path	3.0m shared path (one side)
Footpath	1.5m (one side)
Berms / parking	2.0m services berm + 0.5m berm; 2.0m parking or landscaping each side

3.8 Section F — 18m Primary Collector Road / PT (Bridge)

The bridge cross-section for the primary collector / PT route. It carries a 3.5m bi-directional cycle way and 1.9m footpaths on each side, each protected by 0.6m offsets and steel hand rails to both edges. Two 3.5m traffic lanes with a 2.5m flush median make up the 10.7m carriageway. No parking or berms, given the bridge deck context. Refer to Drawing C340-6.

Table 3.8: Section F — 18m Primary Collector Road / PT (Bridge)

Boundary width	18m legal road boundary
Carriageway	10.7m — two 3.5m traffic lanes + 2.5m flush median
Cycleway	3.5m bi-directional cycle way
Footpath	1.9m each side
Edge treatment	0.6m offsets; steel hand rails to both edges

3.9 Section G — 18m Existing Collector Road (Ayrshire Drive)

An adaptation to the existing Ayrshire Drive collector, with two wide 4.0m traffic lanes and no median. Cross-section: 2.0m berm, 1.5m footpath, 2.0m parking or landscaping, 4.0m + 4.0m traffic lanes, 2.0m parking or landscaping, 3.0m shared path.

Table 3.9: Section G — 18m Existing Collector Road (Ayrshire Drive)

Boundary width	18m legal road boundary
Carriageway	Two 4.0m traffic lanes (no median)
Shared path	3.0m shared path (one side)
Footpath	1.5m (one side)
Berms / parking	2.0m berm each side; 2.0m parking or landscaping each side



3.10 Section H — 19m Local Road PT

A local road on a PT route. Cross-section: 1.5m berm, 1.8m footpath, 2.1m parking lane or landscaping, two 3.4m traffic lanes, 2.1m parking lane or landscaping, 3.0m shared path, 1.7m berm. A 2.1m single parking bay (6.0m long) is provided. The footpath is 100mm 20MPa concrete on GAP20/sand per RITS D3.3.5 (broom finish, saw cuts at max 4m centres). As a PT route the carriageway uses a 150mm AP40 / 250mm GAP 65 pavement, with brown rock over peat. Refer to Drawing C340-8.

Table 3.10: Section H — 19m Local Road PT

Boundary width	19m legal road boundary
Carriageway	6.8m — two 3.4m traffic lanes
Shared path	3.0m shared path (one side)
Footpath	1.8m (one side); 100mm 20MPa concrete per RITS D3.3.5
Berms / parking	1.5m + 1.7m berms; 2.1m parking lane or landscaping each side; 2.1m single parking bay (6.0m long)

3.11 Section H-1 — 24.5m Local Road PT (Angled Parking)

A variant of the local road PT with 60° angled car parking on one side, widening the boundary to 24.5m. Cross-section: 1.5m services berm, 2.5m shared path, 6.9m of 60° angled car parking or landscaping (incl. buffer area), two 3.4m traffic lanes (6.8m carriageway), 2.1m parking lane or landscaping, 3.0m shared path, 1.7m berm. Channel crossings per RITS D3.3.2. Refer to Drawing C340-8A.

Table 3.11: Section H-1 — 24.5m Local Road PT (Angled Parking)

Boundary width	24.5m legal road boundary
Carriageway	6.8m — two 3.4m traffic lanes
Shared path	2.5m (one side) + 3.0m (other side)
Angled parking	6.9m of 60° angled car parking or landscaping (incl. buffer)
Berms / parking	1.5m services berm + 1.7m berm; 2.1m parking lane or landscaping

3.12 Section I — 16.8m Local Road

A symmetrical local road: 1.5m berm, 1.8m footpath and 2.1m parking lane or landscaping on each side, with two 3.0m traffic lanes. A 2.1m single parking bay (6.0m long) is provided on each side. Lighter 100mm AP40 / 200mm GAP 65 carriageway pavement. Refer to Drawing C340-9.

**Table 3.12: Section I — 16.8m Local Road**

Boundary width	16.8m legal road boundary
Carriageway	6.0m — two 3.0m traffic lanes
Footpath	1.8m each side
Berms / parking	1.5m berm each side; 2.1m parking lane or landscaping each side; two 2.1m single parking bays (6.0m long)
Kerb	Type 3 Extruded Std kerb & channel; Type 3 Cut Down

3.13 Section J — JOAL (8.0m)

The widest Jointly Owned Access Lane. A shared concrete-surfaced lane with a 2% central fall and 1.0m grassed berm, built as a heavy-duty reinforced concrete pavement with subsoil drainage to a downstream catchpit. Refer to Drawing C340-10.

Table 3.13: Section J — JOAL (8.0m)

Width	8.0m jointly owned access lane
Surface	Shared concrete surface, 2% central fall
Berm	1.0m grassed berm
Construction	150mm 25MPa concrete (28-day), 40mm saw cuts every 3m, 665 mesh centrally placed (min. 50mm cover), on 150mm GAP40/GAP65 sub-base (CBR ≥40)
Drainage	110mm Ø draincoil, filter sock, NZTA F/2 material 450mm below subgrade to downstream catchpit

3.14 Section K — JOAL (7.0m)

A 7.0m jointly owned access lane incorporating a 1.0m footpath (125mm concrete per RITS D3.3.5) and a 4.0m trafficable rear-lane width within the right-of-way. Same concrete lane construction and subsoil drainage as Section J. Refer to Drawing C340-10.

Table 3.14: Section K — JOAL (7.0m)

Width	7.0m right-of-way
Trafficable	4.0m rear-lane width
Footpath	1.0m (125mm concrete per RITS D3.3.5)
Construction	As Section J (150mm 25MPa concrete lane, 665 mesh, GAP sub-base, draincoil drainage)



3.15 Section L — JOAL (4.0m)

The narrowest access lane — a minimal shared driveway / rear-lane detail at 4.0m, using the same concrete pavement construction and drainage principles as the wider JOALs. Refer to Drawing C340-10.

Table 3.15: Section L — JOAL (4.0m)

Width	4.0m jointly owned access lane
Surface	Shared concrete driveway / rear-lane
Construction	As Sections J and K, scaled to 4.0m width

3.16 Parking Bay Details

Two parking-bay detail sheets covering the collector road (with PT option) and the local road. Both show bin pad areas at the kerb face, vertical kerb nibs per RITS D3.3.3, and an asphalt parking-bay pavement build-up. Refer to Drawings C340-11 & C340-12.

Table 3.16: Parking Bay Details

C340-11	Collector Road (25.8m) with PT — single (6.0m) and double (12.0m) bays behind 3.5m bi-directional cycle path, 0.8m separation berm, 2.0m footpath, 2.1m bay
C340-12	Local Road (16.8m) — double parking bay (12.0m), 1.8m footpath, 2.1m bay
Bin pads	Min. 800×800mm, 100mm thick 20MPa concrete, at kerb face
Bay pavement	40mm DG10 on 130mm AP40 on 300mm GAP 65; vertical kerb nibs per RITS D3.3.3



ANNEXURES

Annexure A: HCC criteria for the form of transport corridors and internal vehicle access

Annexure B: Typical Sections Drawings (Series C340 Plans)



Annexure A: HCC criteria for the form of transport corridors and internal vehicle access



Table A.1: Criteria for the form of Internal Vehicle Access

Transport corridor type	Land use environment	Design speed environment (max desirable)	Legal width (min desirable)	Carriageway width	Movement lane width	Berm requirements	Berm requirements			Public transport requirements (min desirable)	Footpath requirements (min desirable)	Cycle requirements (absolute minimum)	Service corridor (min desirable)
							On street parking requirements (min desirable)						
Residential Land Use Environment													
Private Way	Residential (serving 2-6 units)	10 km/h	4m	3.5m	2-way flow, not marked	One side	None		None	None	Shared zone	Shared zone – no dedicated facility	One side
Private Way	Residential (serving 7-20 units – via common property under Unit Titles Act)	10 km/h	6m	5.5m	2-way flow, not marked	1.5m both sides	None		None	None	Shared zone	Shared zone – no dedicated facility	One side
Rear Lane	Residential	10 km/h	7m	5.5m	2-way flow, not marked	None	None		None	None	Shared zone	Shared zone – no dedicated facility	One side

Source: Table 15-5a1, in Appendix 15, HCDP

Table A.2: Criteria for the form of Transport Corridors

Transport corridor type	Land use environment	Design speed environment (max desirable)	Legal width (min desirable)	Carriageway width	Movement lane width	Berm requirements	Berm requirements			Public transport requirements (min desirable)	Footpath requirements (min desirable)	Cycle requirements (absolute minimum)	Service corridor (min desirable)
							On street parking requirements (min desirable)	Stormwater Management and landscaping					
Residential Land Use Environment													
Local (low volume)	Residential (serving 7-20 units via fee simple tenure)	30 km/h	16.8 m	6 m	2-way flow, not marked	5.4 m both sides	Recessed parallel parking bays (2.1 m) on both sides	Where parking is not provided -specific design (2.1 m wide) on both sides ^a	None		1.8 m wide footpath, both sides	Cycling on road shared in movement lane	1.5 m both sides
Local	Residential	30 km/h	20 m	6 m	2-way flow, not marked	7 m both sides	Recessed parallel parking bays (2.1 m) on both sides	Where parking is not provided -specific design (2.1 m wide) on both sides ^a	None		1.8 m wide footpath, both sides	Cycling on road shared in movement lane	1.5 m both sides
Collector - Non-PT Route	Residential	40 km/h	24.2 m or 22.9 m with bi-directional cycleway	6.4 m	2 @ 3.2 m, marked	8.9 m both sides or 6.1 m and 10.4 m with bi-directional cycleway	Recessed parallel parking bays (2.1 m) on both sides	Where parking is not provided -specific design (2.1 m wide) on both sides ^a	N/A		2 m wide footpath, both sides	2 m off road, separated from carriageway, both sides with 0.8 m separator from parking or 3.5 m bi-directional off-road separated from carriageway on one side with 0.8 m separator from parking	2 m both sides
Collector - PT Route	Residential	40 km/h	24.6 m or 23.3 m with bi-directional cycleway	6.8 m	2 @ 3.4 m	8.9 m both sides or 6.1 m and 10.4 m with bi-directional cycleway	Recessed parallel parking bays (2.1 m) on both sides	Where parking is not provided -specific design (2.1 m wide) on both sides ^a	All bus stops to be in lane. 2.8 m berm with bus shelter		2 m wide footpath, both sides	2 m off road, separated from carriageway, both sides with 0.8 m separator from parking or 3.5 m bi-directional off-road separated from carriageway on one side with 0.8 m separator from parking	2 m both sides

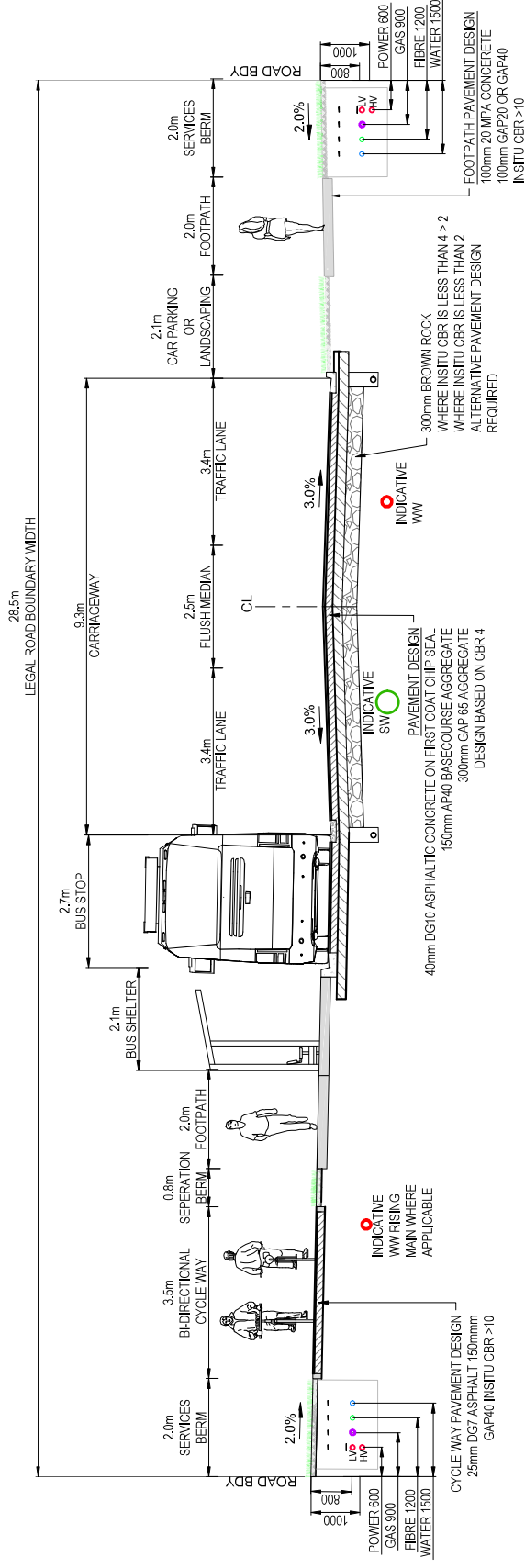
Source: Table 15-5a1, in Appendix 15, HCDP



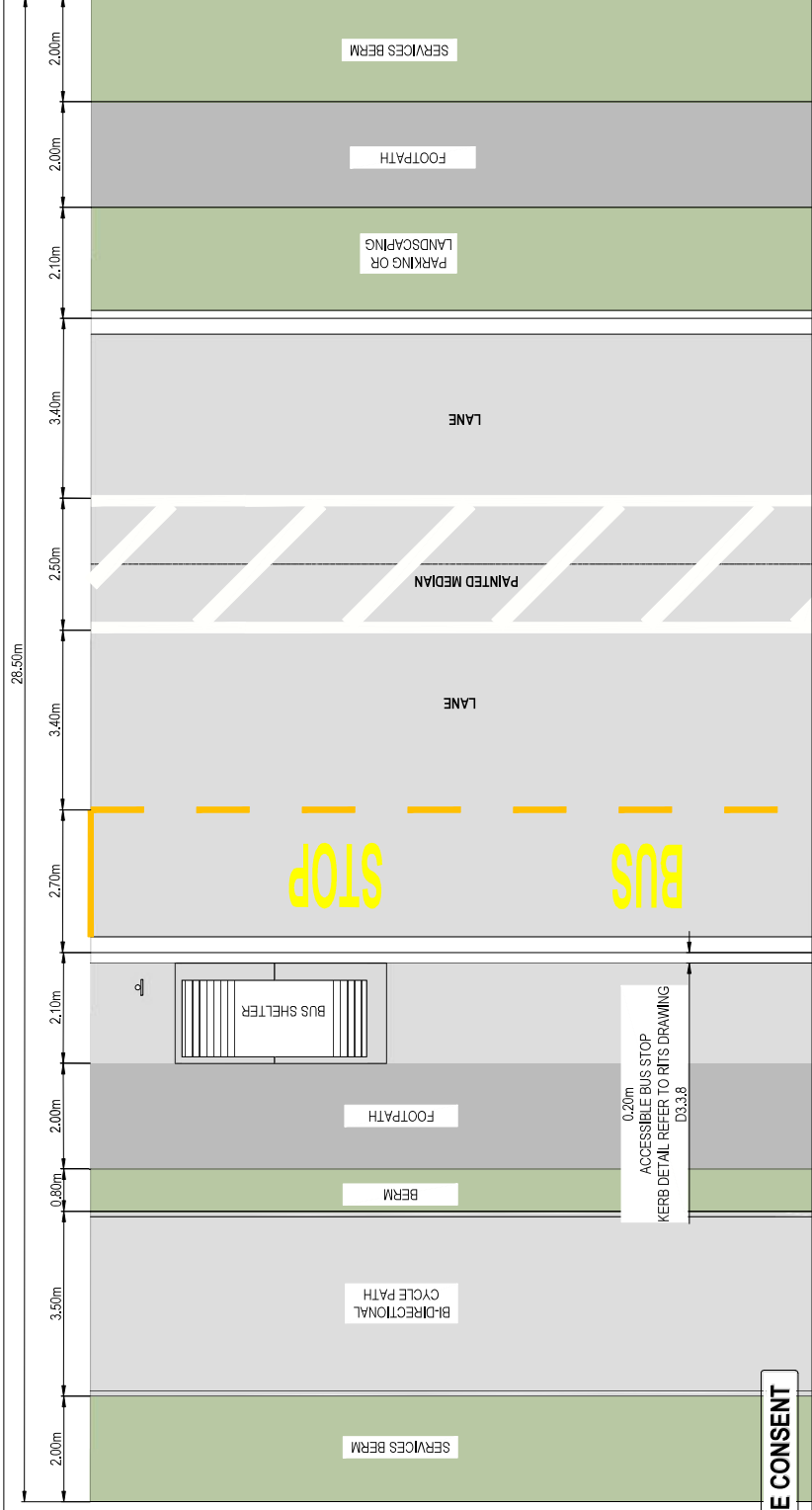
Annexure B: Typical Sections Drawings (Series C340 Plans)

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, COORDINATES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO GCBREEM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED DOWN AND IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS INCLUDING WINNING TAKE, TRACE MIRE AND PROTECTIVE SLABS AS REQUIRED.



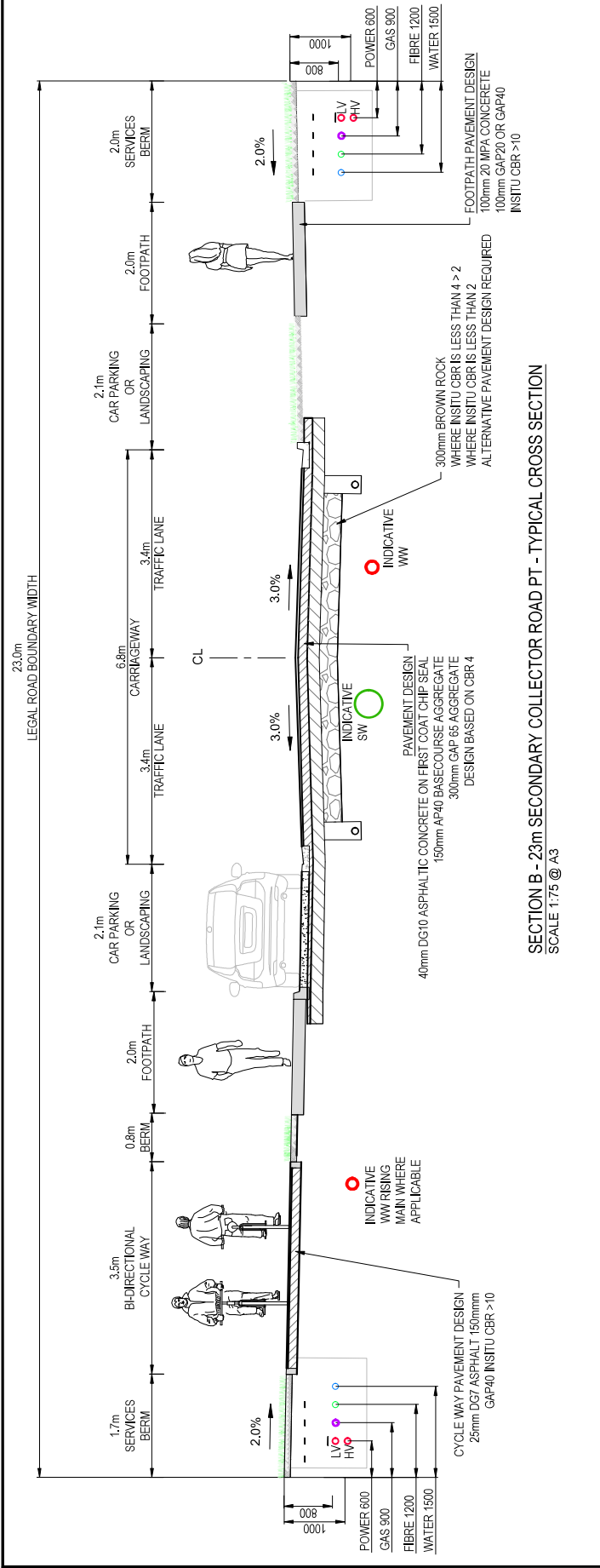
SECTION A-1 - 25.8m PRIMARY COLLECTOR ROAD / PT - TYPICAL CROSS SECTION
SCALE 1:100 @ A3



RESOURCE CONSENT

[illegible]

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, COORDINATES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO CIGRE/AM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED DOWN AND IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS INCLUDING WINNING PLATE, TRACE MIRE AND PROTECTIVE SLABS AS REQUIRED.



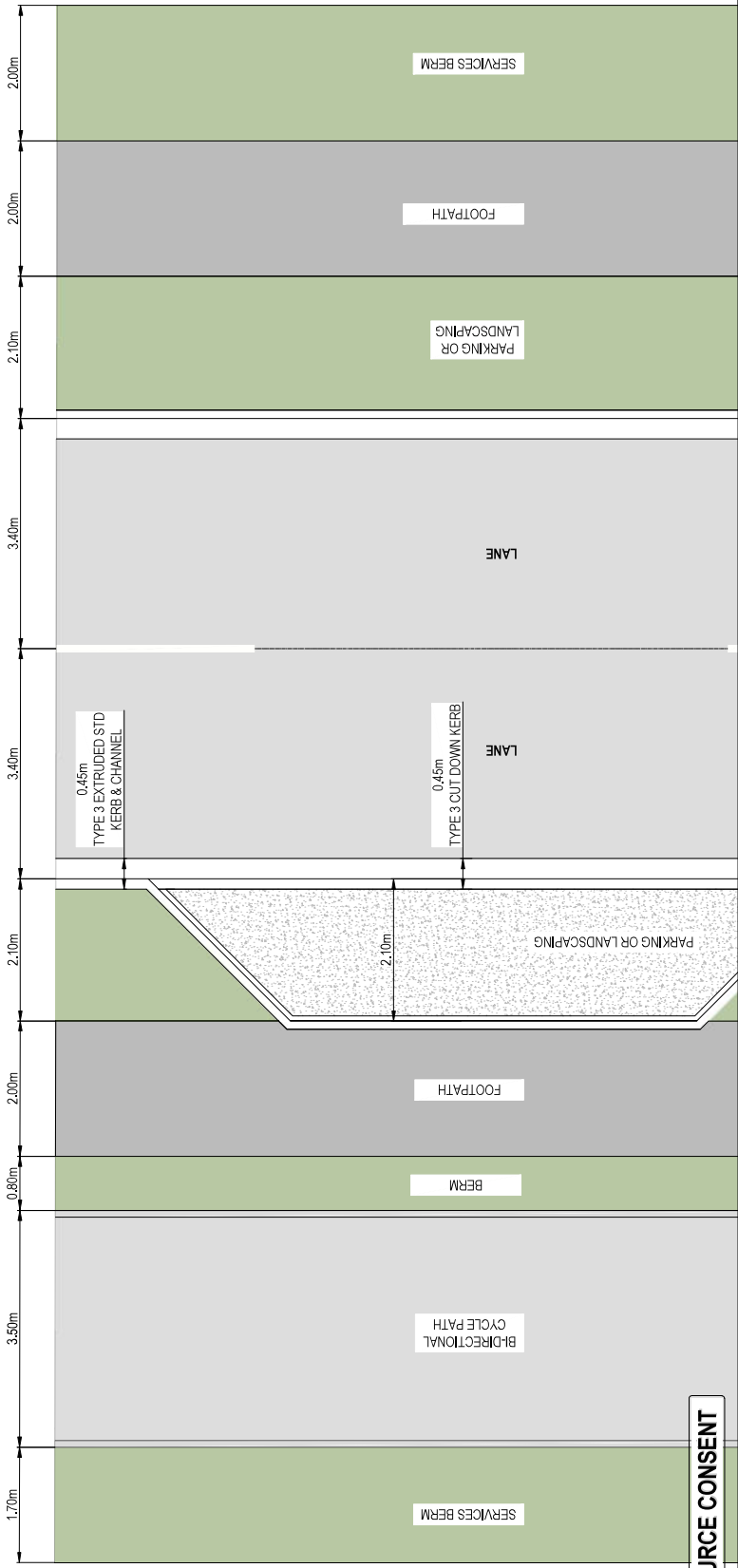
						Date
A	FAST TRACK		AJP			08/2026
Rev	Description		By			
	Survey	MAYEN		10/2025		
	Design	TCH		10/2025		
	DRAWN	AJP		10/2025		
	Checked					

Maven Waikato
07 242 0001
info@maven.co.nz
www.maven.co.nz
Level 1 265 Victoria Street, Hamilton
New Zealand

**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

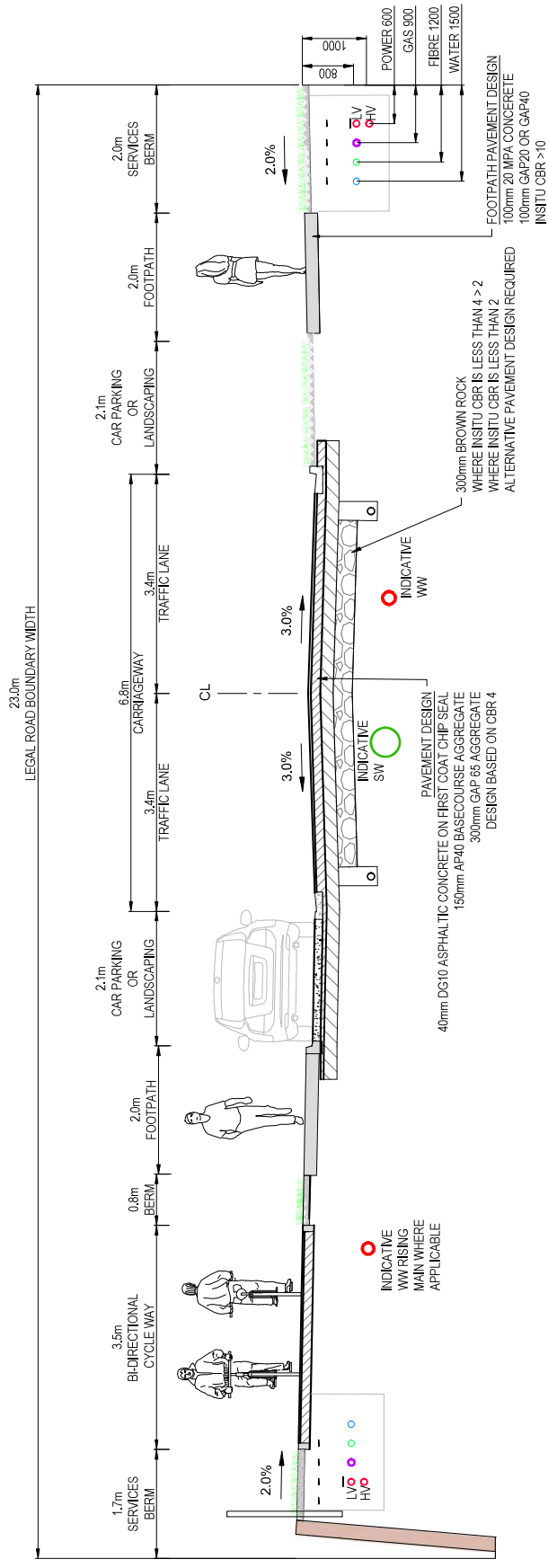
Tide
PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014
Scale	1:75 @ A3
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-2
	Rev A

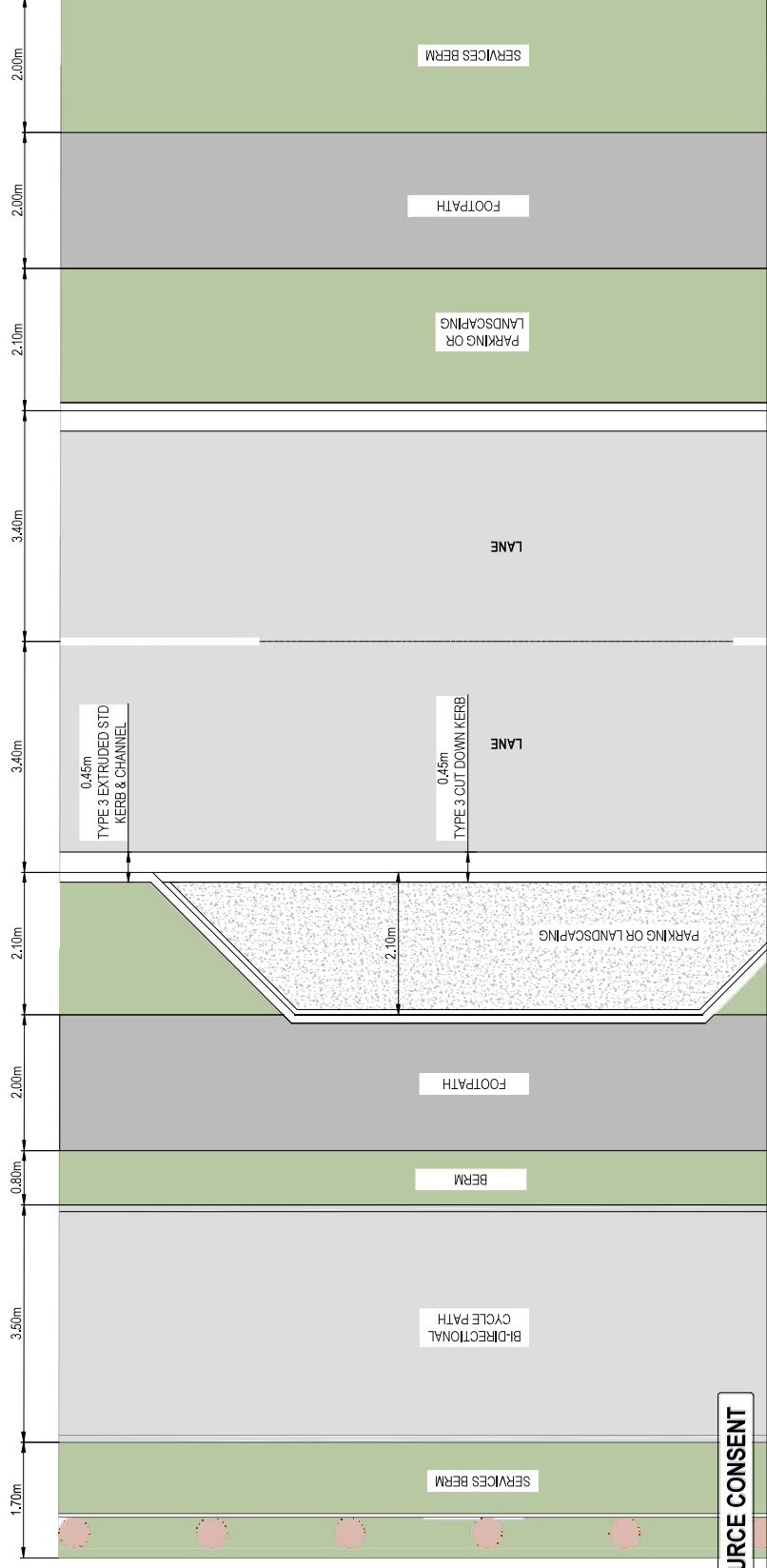


RESOURCE CONSENT

1. ALL WORKS TO BE IN ACCORDANCE WITH WAKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, COORDINATES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO ENSURE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO GOREHAM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO LONG SECTION FOR **FINISHED** CENTRELINE LEVELS REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAPD TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAPD, BEDDED, GRADED AND PROTECTED WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS INCLUDING WINNING TAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION B-1 - 23m SECONDARY COLLECTOR ROAD PT - TYPICAL CROSS SECTION
SCALE 1:75 @ A3



A	FAST TRACK	AJP	Date	08/2026		
Rev	Description	By	Date			
	SURVEY	MAYEN	10/2025			
	DESIGN	TCH	10/2025			
	DRAWN	AJP	10/2025			
	CHECKED					

Maven Waikato
07 242 0801
info@maven.co.nz
www.maven.co.nz
Level 1 265 Victoria Street, Hamilton
New Zealand

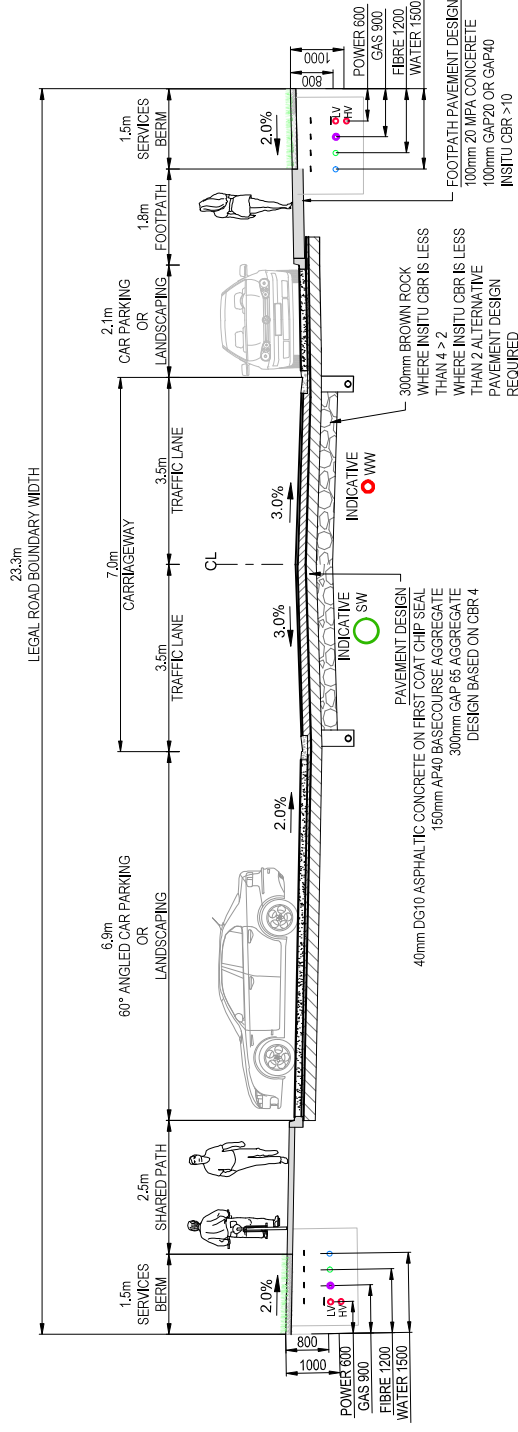
Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

**PROPOSED
ROADING TYPICAL
SECTIONS**

Project no.	119014	
Scale	1:75 @ A3	
Cad file	119014-C340-TYP RD SECTION.DWG	
Drawing no.	C340-2A	Rev A

RESOURCE CONSENT

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, COORDINATES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO GIBREHAM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED DOWN AND IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS AND THE WINNING TAKE, TRACE, MIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION C - 23.3m NIEGHBORHOOD CENTRE ROAD - TYPICAL CROSS SECTION
SCALE 1:100 @ A3

			A.P.	Date
Rev	Description	By	Date	
A	FAST TRACK		10/2025	
	Survey	MVEN	10/2025	
	Design	TCH	10/2025	
	Drawn	RL	10/2025	
	Checked			



Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

Title
PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014
Scale	AS SHOWN
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-3
	Rev A



RESOURCE CONSENT

1. ALL WORKS TO BE IN ACCORDANCE WITH WHATMAI SPECIFICATIONS.
2. CO-ORDINATIONS IN TERMS OF NZ GEODETIC DATUM WILL BE DONE BY THE SURVEYING COMPANIES OF THE NZ FINAL SURVEY. DRAWINGS, DOCUMENTS ARE SUBJECT TO FINAL SURVEY.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR OWNERSHIP.
5. FINAL UTILITY DESIGN SUBJECT TO CIBREHAM TESTS ON SUBGRADE MATERIAL.
6. SET-OUT SCHEDULE WITH CO-ORDINATES OF CHANGE PANTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS, REFER TO TYPICAL CROSS SECTIONS FOR FINISHED ROAD LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID, BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANIES SPECIFICATIONS AND WARNING TAPE, TRAGE WIRE AND PROTECTIVE SLABING REQUIRED.

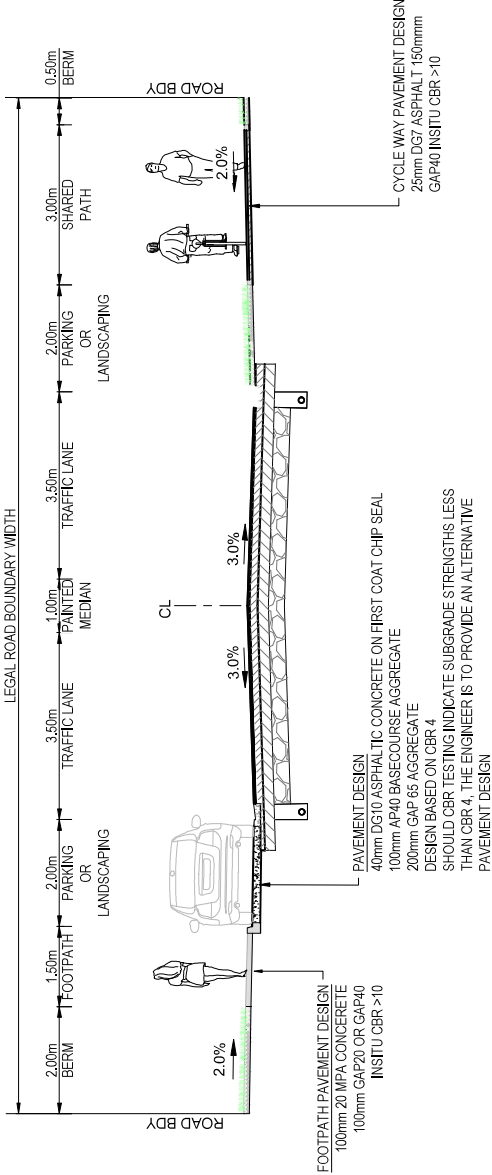


Maven Waikato
07 242 0501
info@maven.co.nz
www.maven.co.nz
Level 1, 205 Victoria Street, Hamilton
New Zealand

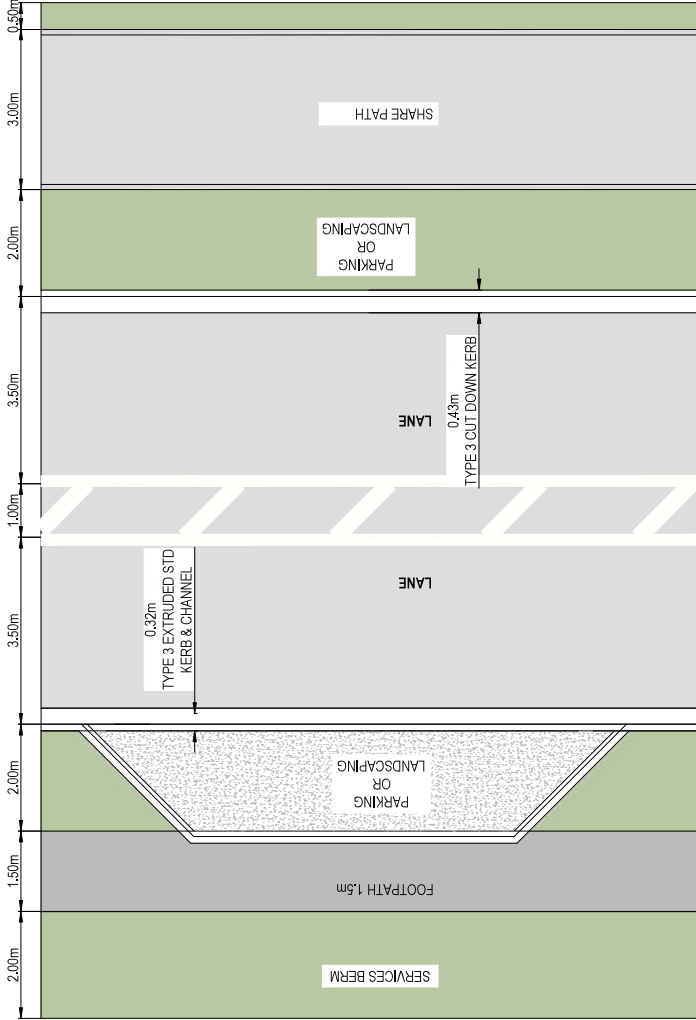
Title	PROPOSED		
	ROADWAY TYPICAL		
	SECTIONS		
	Project no.	119014	
Scale	1:100 @ A3		
Cad file	119014-2404-TYP RD SECTION.DWG		
Drawing no.	C340-4	Rev	A

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EBYEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. BOUNDARIES ARE SUBJECT TO FUTURE REVISIONS.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
6. CONTRACTORS SHALL OBTAIN ALL NECESSARY PERMITS AND CONSENTS FROM THE COUNCIL. DAMAGE PAINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY CONTRACTOR. OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDERS SPECIFICATIONS INCLUDING WARNING PAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION E - 19m EXISTING COLLECTOR ROAD HARROGATE PLACE- TYPICAL CROSS SECTION
SCALE 1:100 @ A3



Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

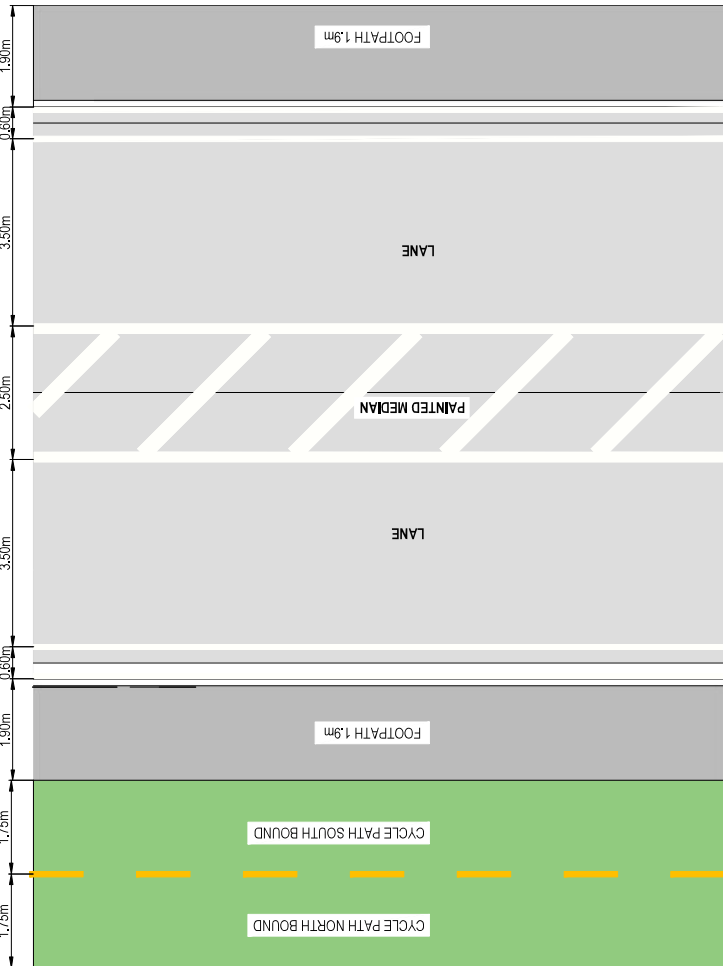
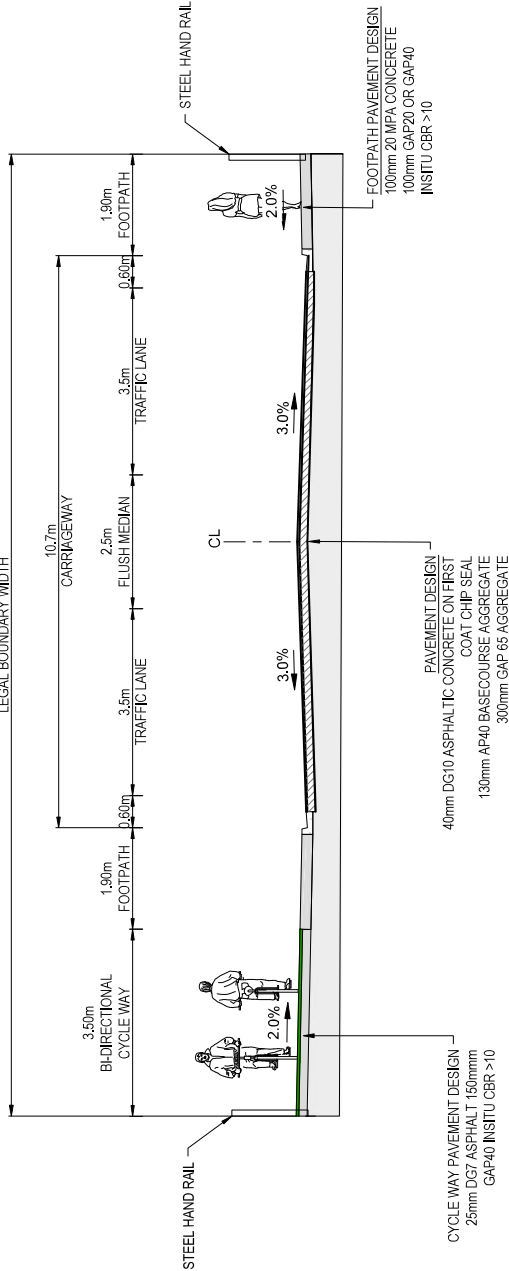
Title
**PROPOSED
ROADING TYPICAL
SECTIONS**

Project no.	119014
Scale	1:100 @ A3
Cad file	119014-25-01-19 RD SECTION.DWG
Drawing no.	C340-5
Rev	A

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT ELEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. BOUNDARIES ARE SUBJECT TO FUTURE ADJUSTMENTS.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
6. CONTRACTORS TO OBTAIN DIMENSIONS OF EXISTING PAVEMENTS AND LOCATE ALL SERVICES ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY CONTRACTORS AND OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAD, BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDERS SPECIFICATIONS INCLUDING WARNING TAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.

SECTION F - 18m PRIMARY COLLECTOR ROAD / PT BRIDGE - TYPICAL CROSS SECTION
SCALE 1:100 @ A3



RESOURCE CONSENT

A	FAST TRACK	A.P	18/02/2026		
Rev	Description	By	Date		
Survey	MAVEN		10/02/25		
Design	TCH		10/02/25		
Drawn	A.P		10/02/25		
Checked					

M

Maven Waikato

100 Victoria Street, Hamilton

021 778 0000

info@maven.co.nz

www.maven.co.nz

Level 1, 280 Victoria Street, Hamilton

New Zealand

MAVEN

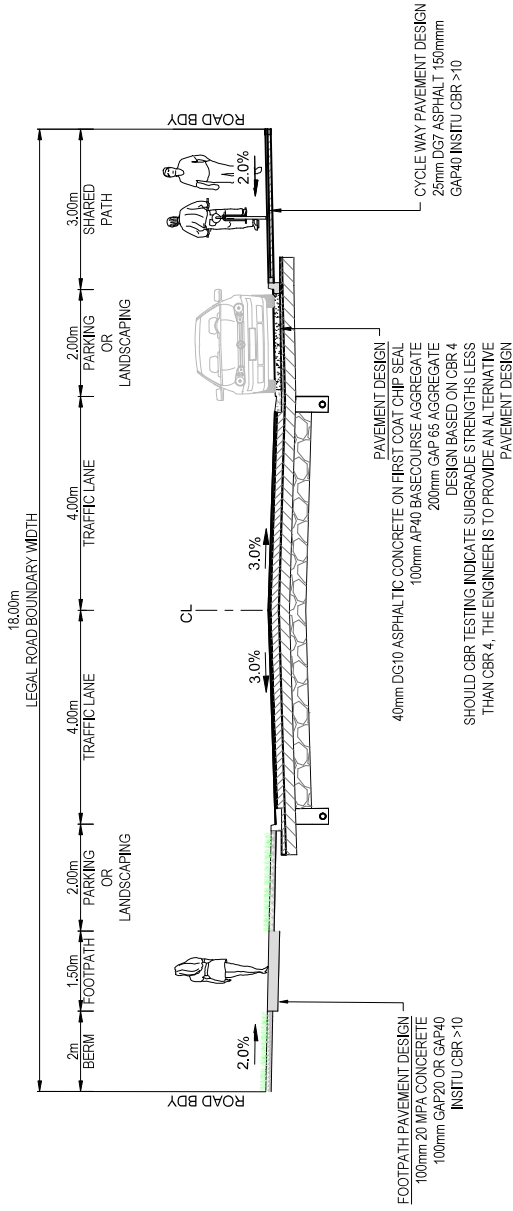
Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014		
Scale	1:100 @ A3		
Client	119014-25-01-PT BRIDGE SECTION.DWG		
Drawing no.	C340-S	Rev	A

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WHATAMU REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATIONS IN TERMS OF NZ GEODETIC DATUM WILL BE DONE BY THE ENGINEERS IN TERMS OF THE NZ DATUM. ALL LEVELS, DIMENSIONS ARE SUBJECT TO FINAL SURVEY.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR OWNERSHIP.
5. FINAL UTILITY DESIGN SUBJECT TO CIBRESEM TESTS ON SUBGRADE MATERIAL.
6. SET-OUT SCHEDULE WITH CO-ORDINATES OF CHANGE PANTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS, REFER TO TYPICAL CROSS SECTIONS FOR FINISHED LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID, BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY SPECIFICATIONS. PROVIDE ADEQUATE WARNING TAPE, TRAFFIC MIRE AND PROTECTIVE SLABING AS REQUIRED.



SECTION G - 18m EXISTING COLLECTOR ROAD AYSHIRE DRIVE- TYPICAL CROSS SECTION
SCALE 1:100 @ A3

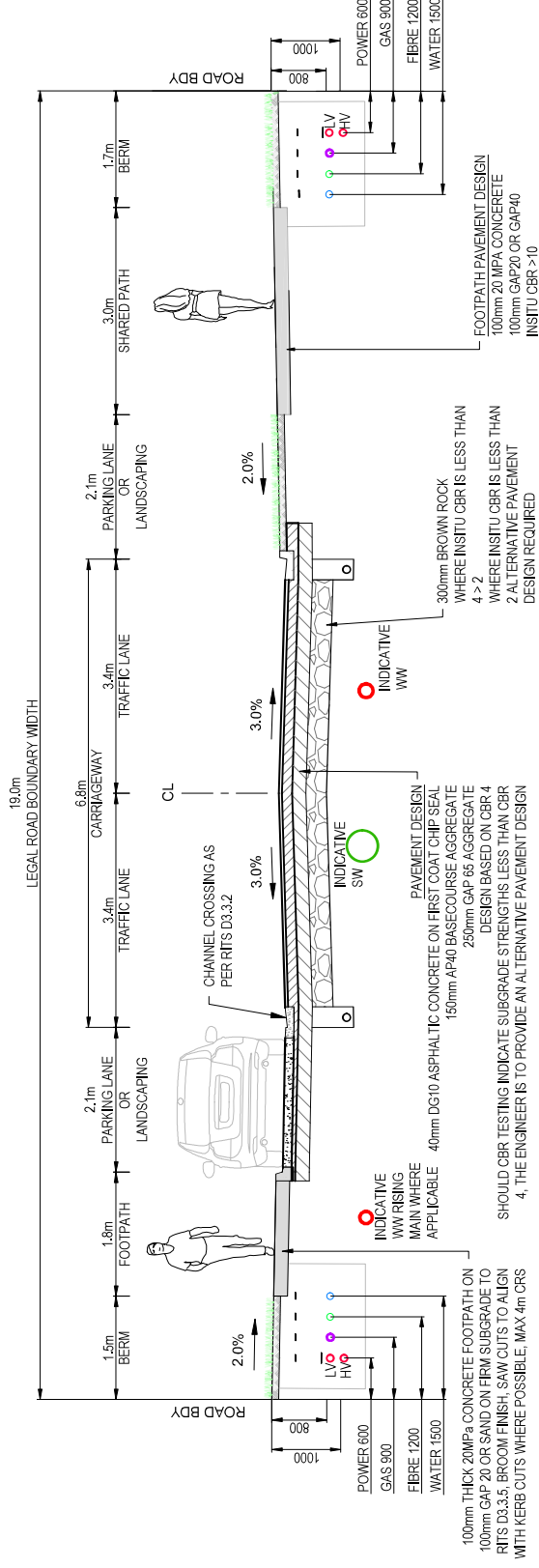
[illegible]

Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

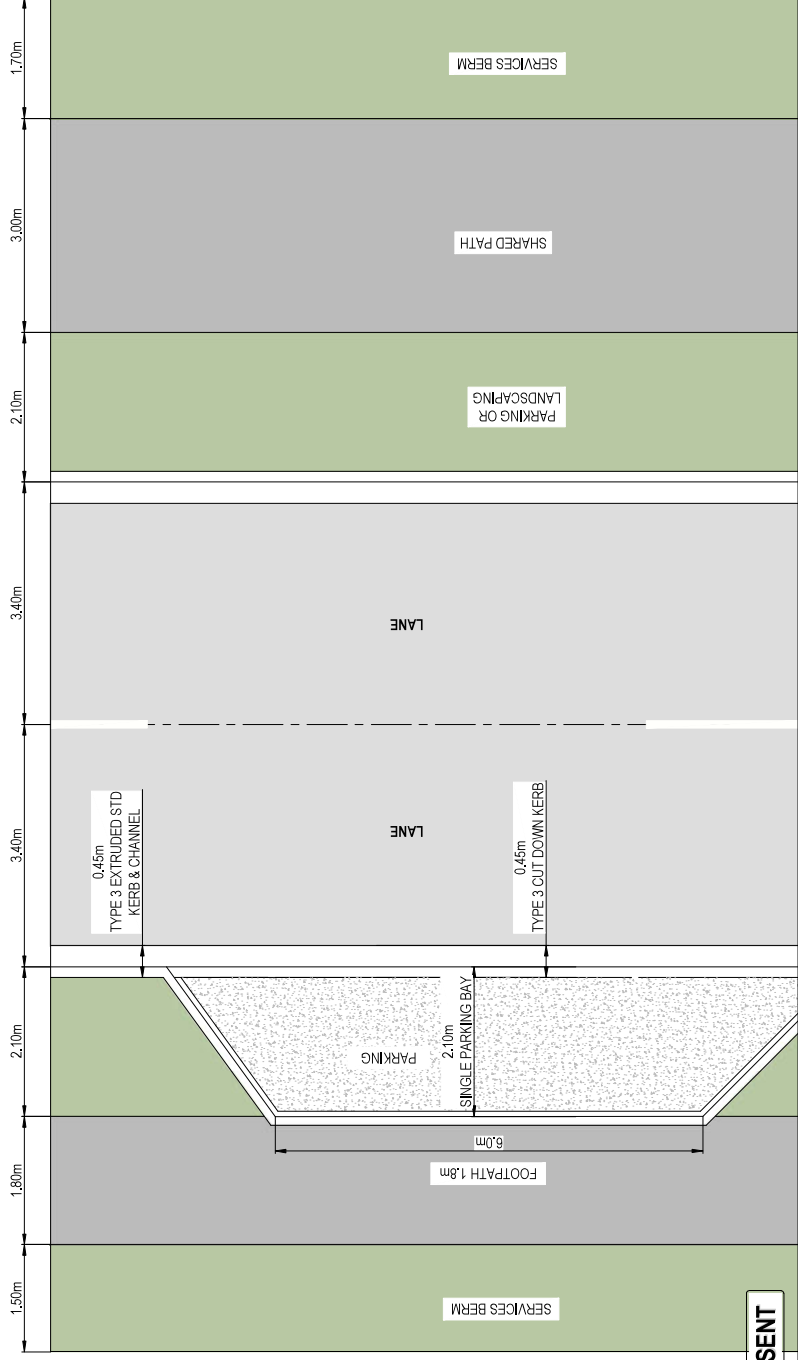
**PROPOSED
ROADING TYPICAL
SECTIONS**

Project no.	119014
Scale	1:100 @ A3
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-7
	Rev A

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, OUNDARIES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. ALL PAVEMENT DESIGN SUBJECT TO CIREBAM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS AND WINNING TAKE, GRADE MIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION H - 19m LOCAL ROAD PT - TYPICAL CROSS SECTION
SCALE 1:75 @ A3



RESOURCE CONSENT

Rev	Description	By	Date
A	FAST TRACK	AJP	08/2026
Survey	MAVEN		10/2025
Design	TCH		10/2025
Drawn	AJP		10/2025
	Checked		

Maven Waikato
07 242 0801
info@maven.co.nz
www.maven.co.nz
Level 1 265 Victoria Street, Hamilton
New Zealand

**Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

Title	PROPOSED ROADING TYPICAL SECTIONS
-------	---

Project no.	119014
Scale	1:75 @ A3
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-8
	Rev A

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016,OUNDARIES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. ALL PAVEMENT DESIGN SUBJECT TO CIREBAM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS AND WINNING TAKE, TRACE, MIRE AND PROTECTIVE SLABS AS REQUIRED.

[illegible]

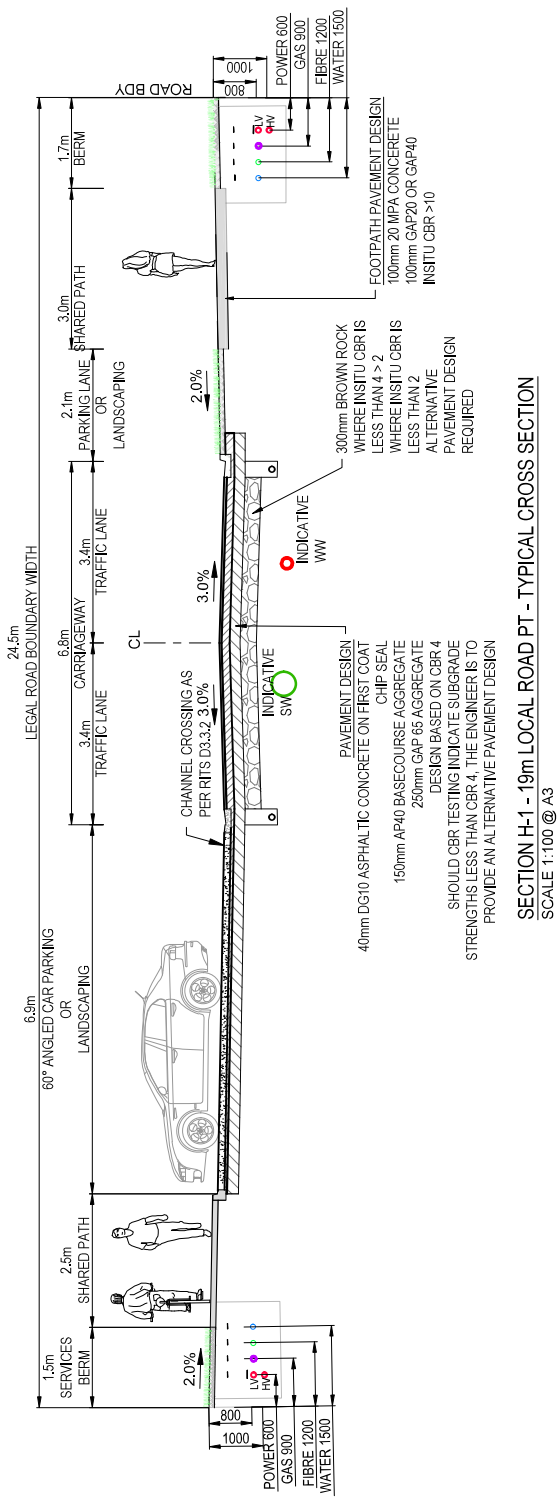
Maven Waikato
07 242 0501
info@maven.co.nz
www.maven.co.nz
Level 1 265 Victoria Street, Hamilton
New Zealand

**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

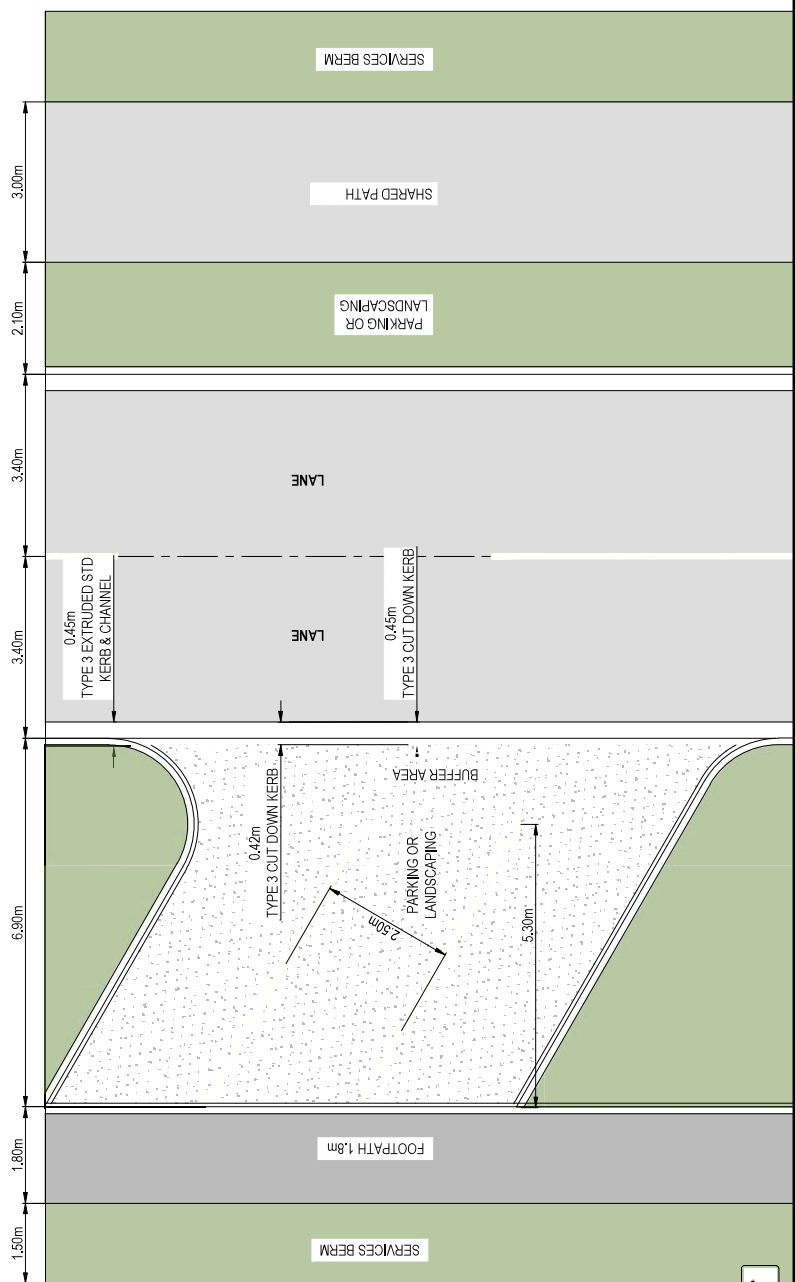
Title

**PROPOSED
ROADING TYPICAL
SECTIONS**

Project no.	119014
Scale	1:75 @ A3
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-8A
	Rev A

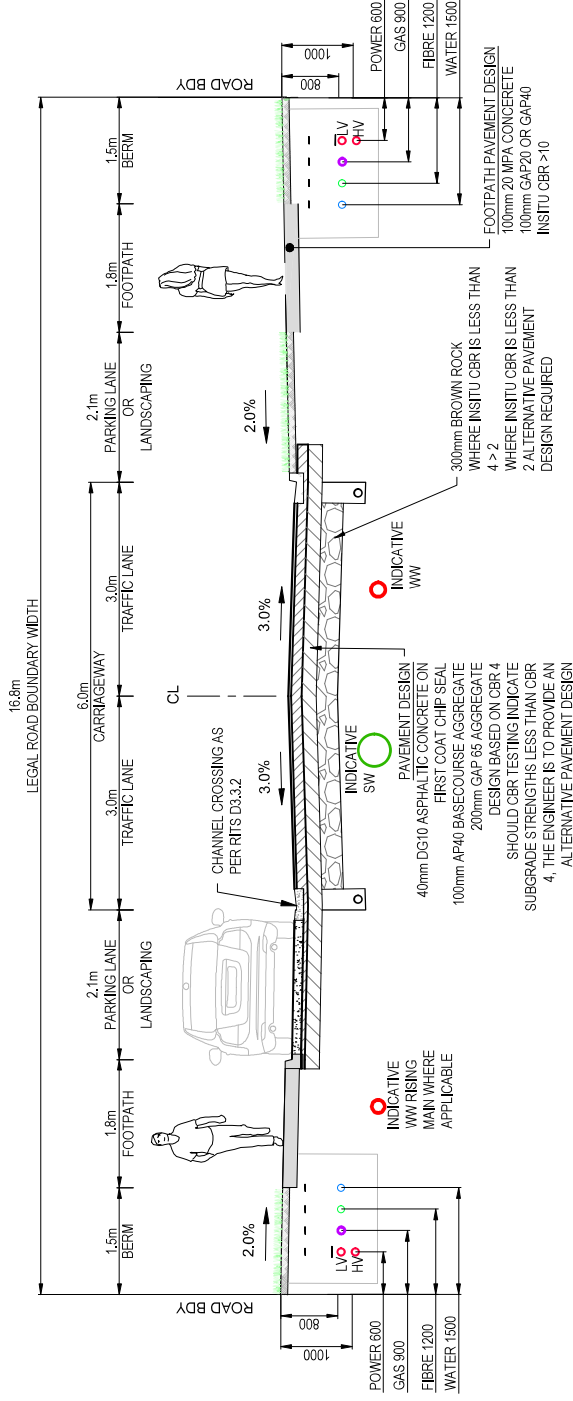


SECTION H-1 - 19m LOCAL ROAD PT - TYPICAL CROSS SECTION
SCALE 1:100 @ A3

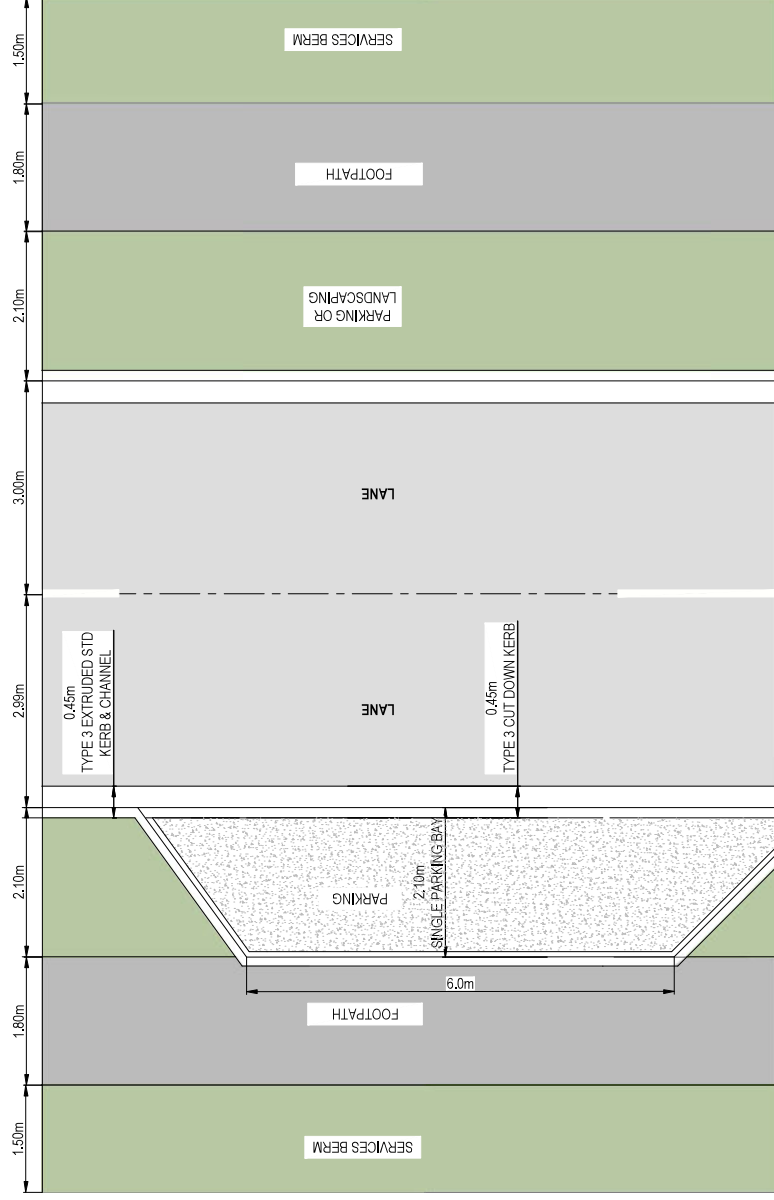


RESOURCE CONSENT

1. ALL WORKS TO BE IN ACCORDANCE WITH MWATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. COORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016, OUNDARIES ARE SUBJECT TO FINAL SURVEY
3. IT IS THE CONTRACTORS RESPONSIBILITY TO OBTAIN ALL PERMITS THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. ALL PAVEMENT DESIGN SUBJECT TO CIREBAM TESTS ON SUBGRADE MATERIAL.
6. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO SECTION FOR FINISHED CENTERLINE LEVELS REFER TO VERTICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.
8. VEHICLE CROSSING TO BE CONSTRUCTED BY OTHERS UNLESS OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDER SPECIFICATIONS AND WINNING TAKE, GRADE MIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION I - 16.8m LOCAL ROAD - TYPICAL CROSS SECTION
SCALE 1:75 @ A3



RESOURCE CONSENT

[illegible]

Maven Waikato
07 242 0801
info@maven.co.nz
www.maven.co.nz
Level 1 285 Victoria Street, Hamilton
New Zealand

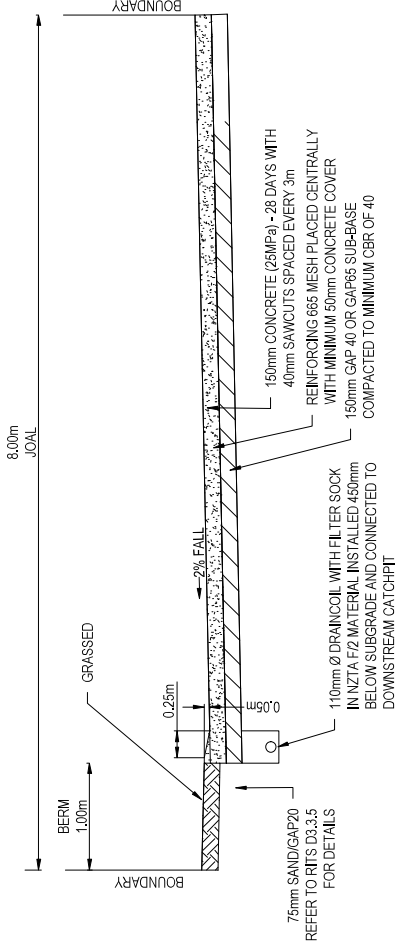
**Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

Title	PROPOSED ROADING TYPICAL SECTIONS
-------	---

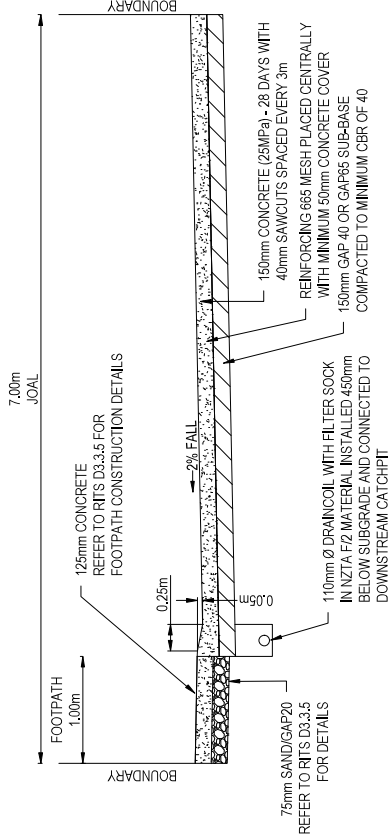
Project no.	119014
Scale	1:75 @ A3
Cad file	119014-C340-TYP RD SECTION.DWG
Drawing no.	C340-9
	Rev A

NOTES

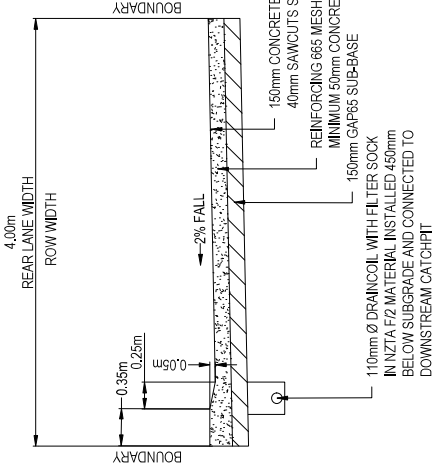
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MIT EBN 2000 LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. BOUNDARIES ARE SUBJECT TO FUTURE ADJUSTMENTS.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
6. CONTRACTOR SHALL PROVIDE DIMENSIONS OF DAMAGE FENCES ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS LOCATIONS.
8. VEHICLE CROSSINGS TO BE CONSTRUCTED BY CONTRACTOR. OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAD, BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDERS SPECIFICATIONS INCLUDING WARNING TAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.



SECTION J - JOAL (8.0m) - TYPICAL CROSS SECTION
SCALE: 1:50 @ A3



SECTION K - JOAL (7.0m) - TYPICAL CROSS SECTION
SCALE: 1:50 @ A3



SECTION L - JOAL (4.0m) - TYPICAL CROSS SECTION
SCALE: 1:50 @ A3

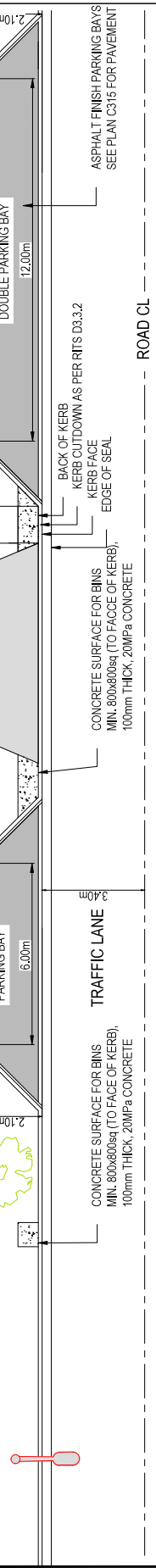


Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014
Scale	1:50 @ A3
Cad file	119014-ROAD TYP RO SECTION.DWG
Drawing no.	C340-10
Rev	A

- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT ELEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. BOUNDARIES ARE SUBJECT TO FUTURE ADJUSTMENTS.
 3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 5. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
 6. CURB AND KERB SHALL BE CONSTRUCTED IN 100mm THICK, 20MPa CONCRETE. DIMENSIONS OF DAMAGE FENCES ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 7. REFER TO LONG SECTION FOR FINISHED CENTRELINE LEVELS. REFER TO TYPICAL CROSS LOCATIONS.
 8. VEHICLE CROSSINGS TO BE CONSTRUCTED BY CONTRACTOR. OTHERWISE STATED AT BUILDING CONSENT STAGE.
 9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
 10. ALL UTILITY SERVICES TO BE LAD, BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDERS SPECIFICATIONS INCLUDING WARNING TAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.



COLLECTOR ROAD INCLUDING PT OPTION (25.8m) DETAIL - PARKING BAY
SCALE: 1:50 @ A3

A		FAST TRACK	A.P	18/02/25
Rev	Description	By	Date	
Survey		MAVEN	10/02/25	
Design	TCH		10/02/25	
Drawn	RL		10/02/25	
Checked				

M

MAVEN

Maven Waikato

125 Victoria Street, Hamilton

021 778 0000

info@maven.co.nz

www.maven.co.nz

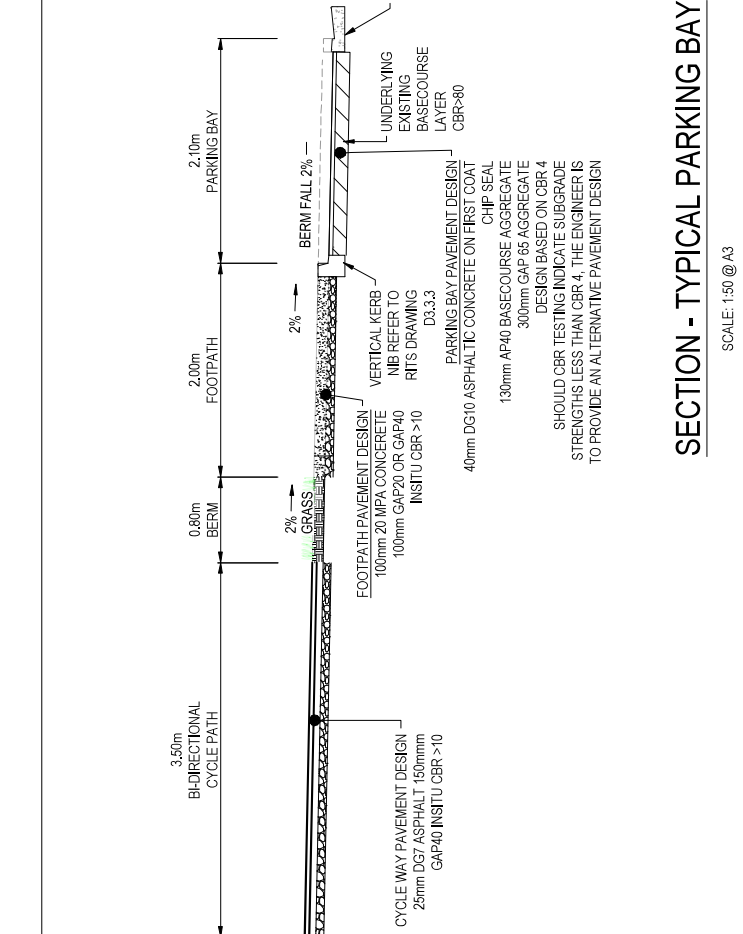
Level 1, 258 Victoria Street, Hamilton

New Zealand

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014
Scale	AS SHOWN
Client	11801425AC17P RD SECTION/DWG
Drawing no.	C340-11
Rev	A

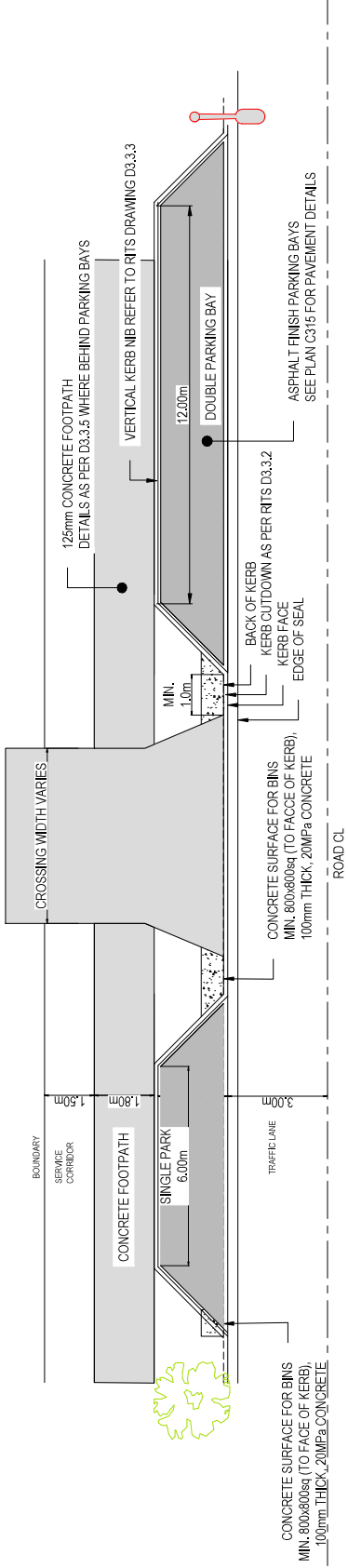


SECTION - TYPICAL PARKING BAY
SCALE: 1:50 @ A3

RESOURCE CONSENT

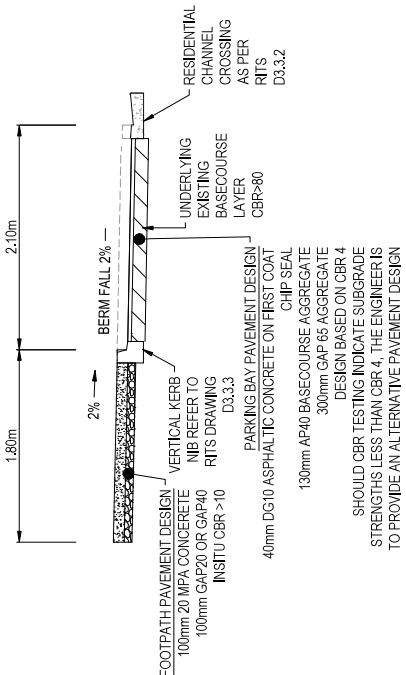
NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT ELEN 2000. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. BOUNDARIES ARE SUBJECT TO FURTHER SURVEY.
3. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
4. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
5. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
6. STAKE OUTS SHALL BE CO-ORDINATES OF SHAPAGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS LOCATIONS.
8. VEHICLE CROSSINGS TO BE CONSTRUCTED BY CONTRACTOR. OTHERWISE STATED AT BUILDING CONSENT STAGE.
9. ALL SERVICES SHALL BE LAID TO UTILITY AUTHORITIES SPECIFICATIONS.
10. ALL UTILITY SERVICES TO BE LAID BEDDED, BACKFILLED IN ACCORDANCE WITH THE RESPECTIVE UTILITY PROVIDERS SPECIFICATIONS INCLUDING WARNING TAPE, TRACE WIRE AND PROTECTIVE SLABS AS REQUIRED.



LOCAL ROAD (16.8m) DETAIL - PARKING BAY

SCALE: 1:150 @ A3



SECTION - PARKING BAY

SCALE: 1:50 @ A3

RESOURCE CONSENT

Rev	Description	By	Date
A	FAST TRACK	A.P	08/2026

Survey	MAVEN	10/2025
Design	TCH	10/2025
Drawn	RL	10/2025
Checked	DJM	08/2026

Project

BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

PROPOSED
ROADING TYPICAL
SECTIONS

Project no.	119014
Scale	AS SHOWN
Client	11601425AC11P RD SECTION/DWG
Drawing no.	C340-12
Rev	A



Appendix F: Rooding Plans

F1: Series C300 - Brymer Farms (Site)

F2: Series C310 – Internal Roundabouts

F3: Series C330 – Intersections/Connections



Appendix F1: Series C300 - Brymer Farms (Site)



- [illegible]

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000.
3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUMUKU 1983 CAN BE ACHIEVED BY ADDING 12.294M. BOUNDARIES ARE SUBJECT TO SURVEY.
4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
6. FINAL PAVEMENT DESIGN SUBJECT TO CURBTEAM TESTS ON SUBGRADE MATERIAL.
7. CHANGES TO THE WORKS AND MATERIALS OF CHANGING POINTS TO THE ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX BGV
PROP. BGV
EX SW DRAIN
AC PAVING
BRUSHED CONCRETE
EXPOSED CONCRETE
DISH CHANNEL
KERB AND CHANNEL
K&N
WHEEL STOP
PROP. SING. SINGLE
PROP. STREET LIGHT
PROP. STREET SIGN
ROAD NAME SIGN
TACTILE PAVERS
EX STREET TREE

AC
CB
CEA
DC
K&C
K&N
WS
PROP. SING. SINGLE
PROP. STREET LIGHT
PROP. STREET SIGN
ROAD NAME SIGN
TACTILE PAVERS
EX STREET TREE

Rev

Rev	Description	By	Date
A	FAST TRACK	AJP	08/2025

Survey

By	Date
MAVEN	10/2025

Design

By	Date
TCH	10/2025

Drawn

By	Date
AJP	10/2025

Checked

By	Date
DJM	10/2025

Maven Waikato
119014-000-ROADS.DWG
Level 1, 286 Victoria Street, Hamilton
www.maven.co.nz
info@maven.co.nz
New Zealand

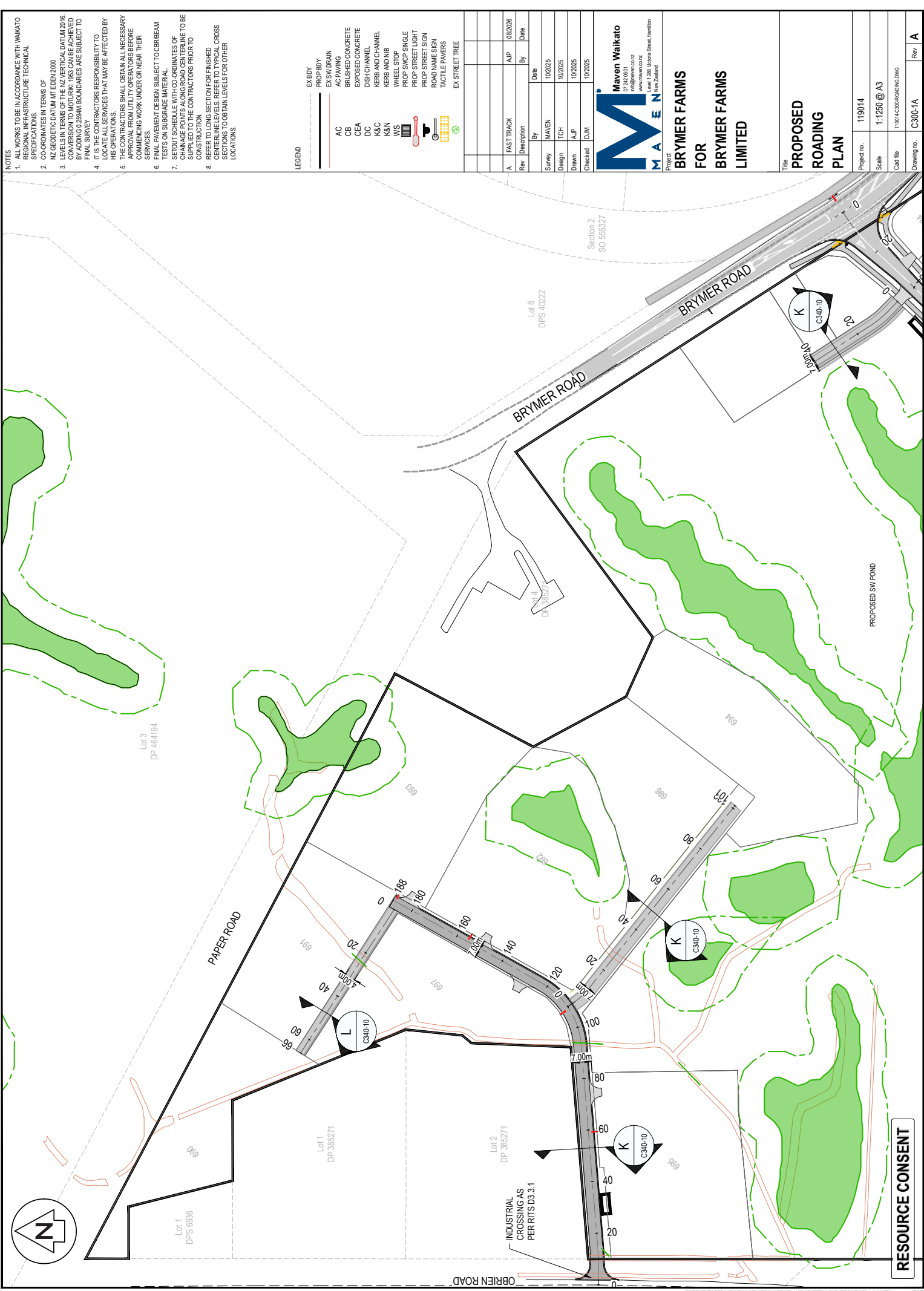
Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING
PLAN

Project no. 119014
Scale 1:7500 @ A3
Cad file 119014-000-ROADS.DWG
Drawing no. C300
Rev. A

RESOURCE CONSENT





- NOTES**
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUKI 1953 CAN BE ACHIEVED BY ADDING 259MM. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CURB/BEAM TESTS ON SUBGRADE MATERIAL.
 7. SURFACE DRAINAGE AND CO-ORDINATES OF CHANGING POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX-BODY	PROF-BODY
AC	AC PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
K&C	KERB AND CHANNEL
K&N	KERB AND NIB
WS	WHEEL STOP
	PROP SWCP SINGLE
	PROP STREET LIGHT
	ROAD NAME SIGN
	TACTILE PAVERS
	EX STREET TREE

A	FAST TRACK	AJP	10/2025
Rev	Description	By	Date
1	Survey	MAVEN	10/2025
2	Design	TCH	10/2025
3	Drawn	AJP	10/2025
4	Checked	DJM	10/2025

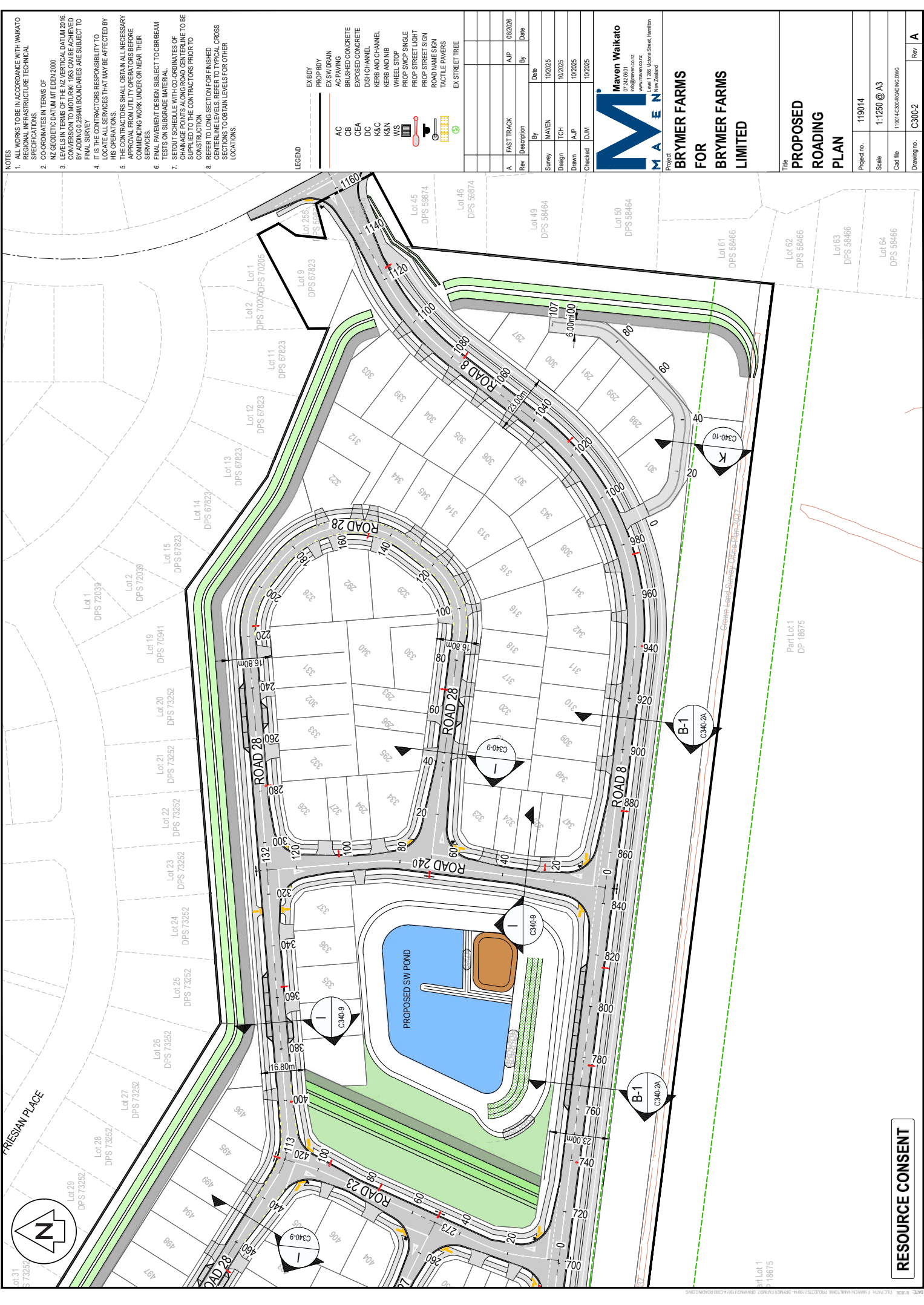
Maven **Waikato**
1280 Victoria Street, Hamilton
New Zealand
www.maven.co.nz
info@maven.co.nz

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING
PLAN

Project no.	119014
Scale	1:1250 @ A3
Cad file	119014-C300-ROADING.DWG
Drawing no.	C300-1A
Rev	A

RESOURCE CONSENT



- NOTES**
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTURIKI 1953 CAN BE ACHIEVED BY ADDING 225MM. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CRRBEAM TESTS ON SUBGRADE MATERIAL.
 7. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX-BODY	PROF BODY
AC	AS/PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DSH CHANNEL
K&C	K&B AND CHANNEL
K&N	K&B AND NIB
MS	WHEEL STOP
PROP SNCP	PROP SNCP SINGLE
PROP STREET LIGHT	PROP STREET LIGHT
PROP STREET SIGN	PROP STREET SIGN
ROAD NAME SIGN	ROAD NAME SIGN
TACTILE PAVERS	TACTILE PAVERS
EX STREET TREE	EX STREET TREE

Rev	Description	By	Date
A	FAST TRACK	AJP	10/02/25
Survey	MAVEN		10/02/25
Design	TCH		10/02/25
Drawn	AJP		10/02/25
Checked	DJM		10/02/25

Maven
Maven Walkato
1280 Victoria Street, Hamilton
New Zealand
www.maven.co.nz
info@maven.co.nz

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title		PROPOSED ROADING PLAN	
Project no.	119014	Cad file	119014-C300-ROADING.DWG
Scale	1:1250 @ A3	Drawing no.	C300-2
Rev	A		

RESOURCE CONSENT



- NOTES**
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUKI 1993 CAN BE ACHIEVED BY ADDING 10.025M TO ALL LEVELS. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CRRBAM TESTS ON SAMPLES OF SUBGRADE MATERIALS. COORDINATES OF SHALLOU POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
 7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX BODY	PROF BODY
AC	AC PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
KCC	KERB AND CHANNEL
KCN	KERB AND NB
WIS	WHEEL STOP SINGLE
PROF STOP SIGN	PROF STOP SIGN
ROAD NAME SIGN	ROAD NAME SIGN
TACTILE PAVERS	TACTILE PAVERS
EX STREET TREE	EX STREET TREE

Rev	Description	By	Date
A	FAST TRACK	AJP	10/2025
Survey	MAVEN		10/2025
Design	TCH		10/2025
Drawn	AJP		10/2025
Checked	DJM		10/2025

Maven
Waiwaka
www.maven.co.nz
info@maven.co.nz
Level 1, 280 Victoria Street, Hamilton
New Zealand

Project
FOR
BRYMER FARMS
BRYMER FARMS
LIMITED

Title		PROPOSED ROADING PLAN	
Project no.	119014	Scale	1:1250 @ A3
Cad file	119014-C300-3-ROADING.DWG	Rev	A
Drawing no.	C300-3		

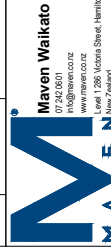
RESOURCE CONSENT

1. ALL WORKS TO BE IN ACCORDANCE WITH WHATATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
2. CO-ORDINATES IN TIEIN 2000
3. NZ GEODETIC DATUM M TERN 2000
4. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MONTKRI 1983 CAN BE OBTAINED FROM THE PROJECT BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
5. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
6. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
7. FINAL PAVEMENT DESIGN SUBJECT TO CROSBREAM TESTS ON SUBGRADE MATERIAL.
8. SETOUT SCHEDULE WITH CO-ORDINATES OF CHANGING POINTS ALONG ROAD CENTRELINIE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
9. REFER TO LONG SECTION FOR FINISHED CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

- | EXHIBIT | PROPERTY | EXHIBIT DRAIN | AC PAVING | BRUSHED CONCRETE | EXPOSED CONCRETE | DISH-CHANNEL | KERB AND CHANNEL | KERB AND NIB | WHEEL STOP | PROP SWCP SINGLE | PROP STREET LIGHT | PROP STREET SIGN | ROAD NAME SIGN | TACTILE PAVERS | EX STREET TREE |
|---------|----------|---------------|-----------|------------------|------------------|--------------|------------------|--------------|------------|------------------|-------------------|------------------|----------------|----------------|----------------|
| AC | CB | CEA | DC | K&C | K&N | WS | | | | | | | | | |

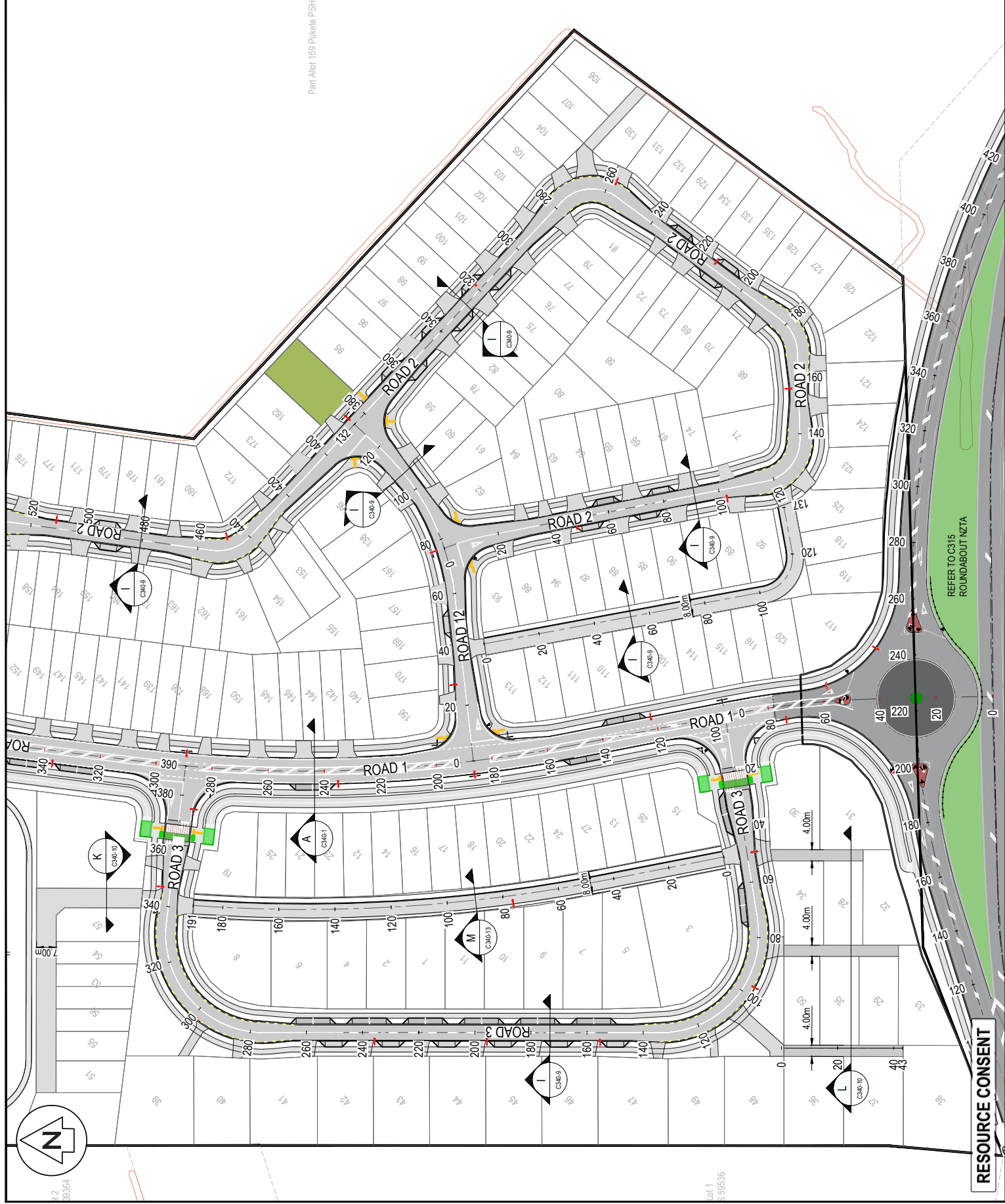
A	FAST TRACK		AJP	08/2026	
Rev	Description		By	Date	
	Survey	MAYEN	10/2025		
	Design	TCH	10/2025		
	DRAWN	AJP	10/2025		
	CHECKED	DJMI	10/2025		



Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

Title
**PROPOSED
ROADING
PLAN**

Project no.	119014	
Scale	1:1250 @ A3	
Cad file	119014-C300-ROADING.DWG	
Drawing no.	C300-4	Rev A





- NOTES**
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTURIKI 1953 CAN BE ACHIEVED BY ADDING 10.00M TO THE LEVELS.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAYMENT DESIGN SUBJECT TO CRRBEAM TESTS ON SURFACE MATERIAL.
 7. SHOWN CURVES AND CO-ORDINATES OF CHANGING POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX BODY	PROF BODY
AC	AC PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
K&C	KERB AND CHANNEL
K&N	KERB AND NIB
W/S	WHEEL STOP
PROF SNCP SINGLE	PROF STREET LIGHT
PROF STREET SIGN	ROAD NAME SIGN
TACTILE PAVERS	TACTILE PAVERS
EX STREET TREE	EX STREET TREE

Rev	Description	By	Date
A	FAST TRACK	AJP	10/02/25
Survey	MAVEN		10/02/25
Design	TCH		10/02/25
Drawn	AJP		10/02/25
Checked	DJM		10/02/25

Maven **Waikato**
10/02/25
www.maven.co.nz
Level 1, 280 Victoria Street, Hamilton
New Zealand

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title		119014	
Scale		1:1250 @ A3	
Cad file		119014-C300-ROADING.DWG	
Drawing no.		C300-5	
Rev		A	

RESOURCE CONSENT



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM AT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUKI 1953 CAN BE ACHIEVED BY ADDING 12.5MM. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAYMENT DESIGN SUBJECT TO CRIBBEAM TESTS ON SUBGRADE MATERIAL.
 7. SURFACE FINISHES AND CO-ORDINATES OF CHANGE POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

- LEGEND
- | | |
|------------------|-------------------|
| EXISTING | PROPOSED |
| AC PAVING | BRUSHED CONCRETE |
| CB | CEA |
| DC | DISH CHANNEL |
| K&B | K&B AND CHANNEL |
| K&N | K&B AND NIB |
| NIS | WHEEL STOP |
| PROP SWCP SINGLE | PROP STREET LIGHT |
| PROP STREET SIGN | ROAD NAME SIGN |
| TACTILE PAVERS | TACTILE PAVERS |
| EX STREET TREE | EX STREET TREE |

Rev	Description	By	Date
A	FAST TRACK	AJP	10/02/2025
Survey	MAVEN		10/02/25
Design	TCH		10/02/25
Drawn	AJP		10/02/25
Checked	DJM		10/02/25

Maven
Waiakato
maven.co.nz
180 120 1200
180 120 1200
180 120 1200
180 120 1200

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

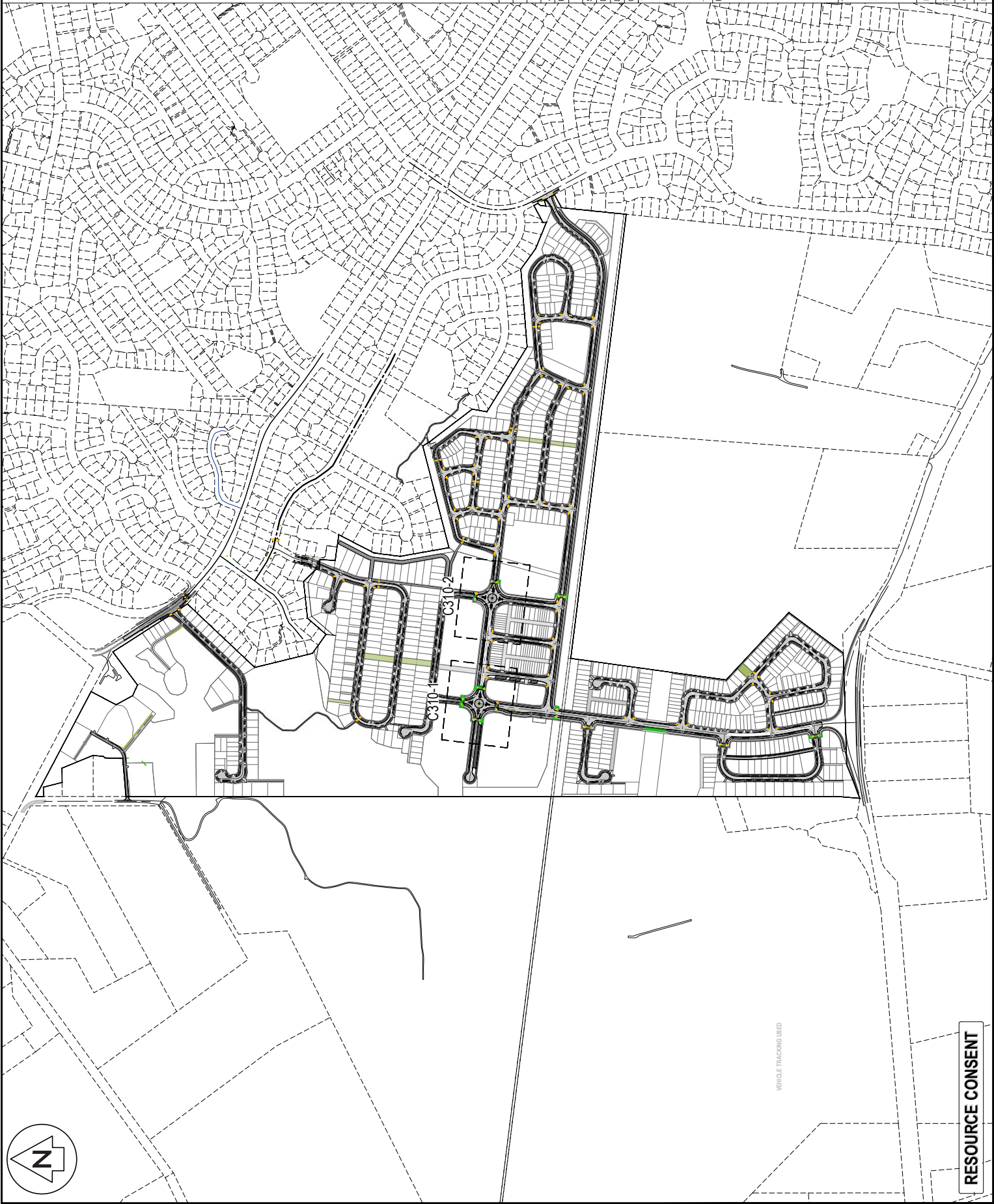
Title
PROPOSED
ROADING
PLAN

Project no.	119014
Scale	1:1250 @ A3
Cad file	119014-C340-ROAD.DWG
Drawing no.	C300-7
Rev	A

RESOURCE CONSENT



Appendix F2: Series C310 – Internal Roundabouts



RESOURCE CONSENT

- ## LEGEND

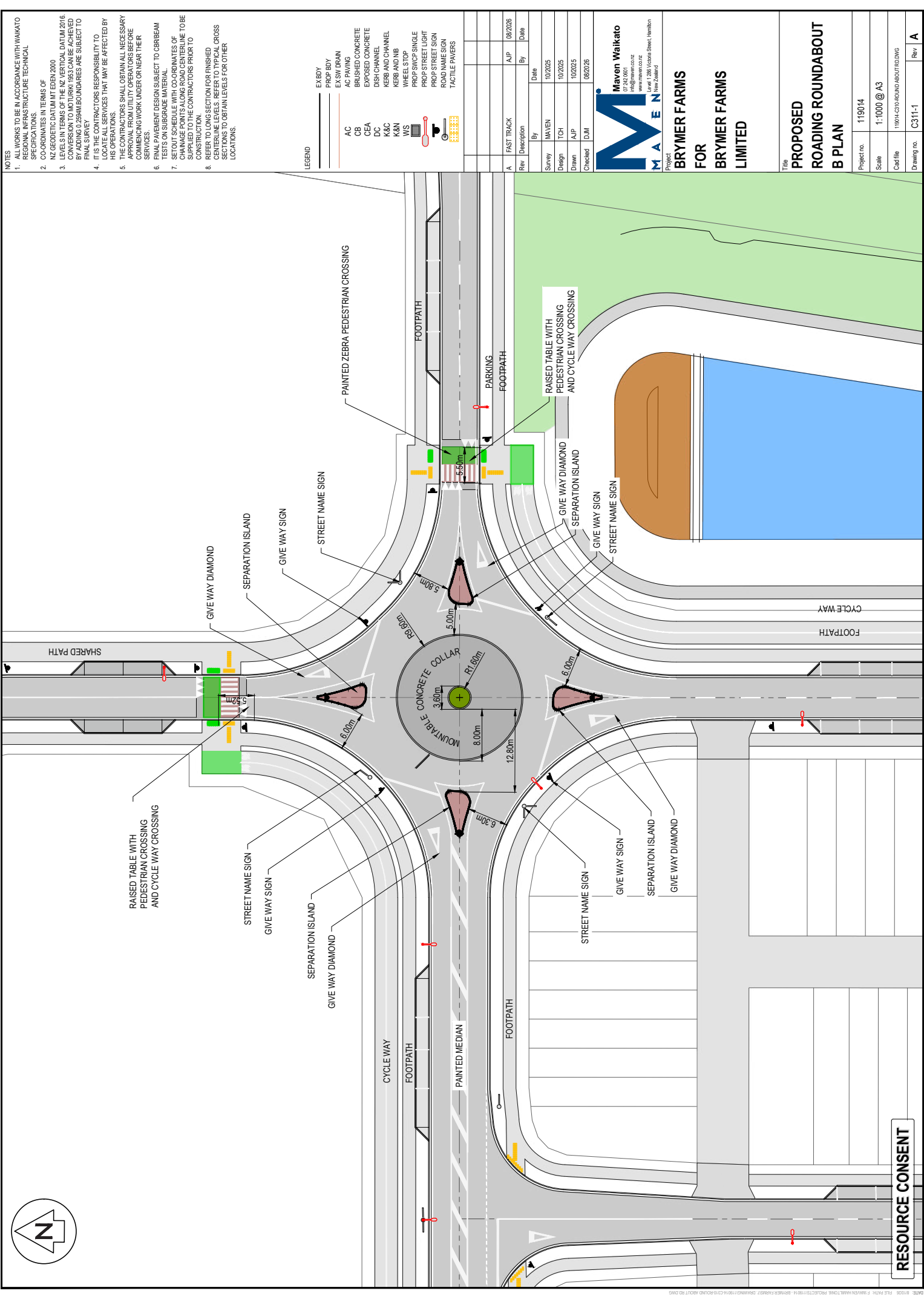
EX BOY	EX SW/DRAN	EX PAVING	BRUSHED CONCRETE	EXPOSED CONCRETE	DISH CHANNEL	KERB AND CHANNEL	KERB AND NB	WHEEL STOP	PROP SWCP SINGLE	PROP STREET LIGHT	PROP STREET SIGN	ROAD NAME SIGN	TACTILE PAVERS	
			AC	CB	CEA	DC	K&C	K&N	WS					

[illegible]

Project
**BRYMER FARMS
FOR
BRYMER FARMS
LIMITED**

Title
**PROPOSED
ROADING ROUNDABOUTS
OVERVIEW PLAN**

Project no.	119014	
Scale	1:7500 @ A3	
Cad file	119014-C310-ROUND ABOUT RD.DWG	
Drawing no.	C310	Rev A



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTURIKI 1993 CAN BE ACHIEVED BY ADDING 225MM. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CURBEAM TESTS ON SUBGRADE MATERIAL.
 7. SIGNPOSTS AND SIGN CO-ORDINATES OF CHANGING POINTS ALONG ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LOCATIONS.

LEGEND

EX-BODY	PROP BODY
AC PAVING	EXIST DRAIN
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
K&C	KERB AND CHANNEL
K&N	KERB AND NB
W/S	WHEELS TOP
PROP SWCP SINGLE	PROP STREET LIGHT
PROP STREET SIGN	ROAD NAME SIGN
TACTILE PATTERS	

Rev	Description	By	Date
A	FAST TRACK	AJP	08/2026
Survey	WAVEN		10/2025
Design	TCH		10/2025
Drawn	AJP		10/2025
Checked	DJM		08/2026

Maven **Waikato**
120 Victoria Street, Hamilton
New Zealand
021 623 623
info@maven.co.nz
www.maven.co.nz

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED
ROADING ROUNDABOUT
B PLAN

Project no.	119014
Scale	1:1000 @ A3
Client	119014 CS10 ROUNDABOUT REDWING
Drawing no.	C311-1
Rev	A



RESOURCE CONSENT



Appendix F3: Series C330 – Intersections/Connections



RESOURCE CONSENT

- | | | |
|-------------|--------------------------|-------|
| Project no. | 119014 | |
| Scale | 1:500 @ A3 | |
| Cad file | 119014-C330-RD-TIE-INDWG | |
| Drawing no. | C330-3 | Rev A |



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTURKI 1950 CAN BE ACHIEVED BY ADDING 4.386M. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CRR/BEAM TESTS OR SUBSEQUENT TO CONSTRUCTION.
 7. CHANGING POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LEGATIONS.

LEGEND

EX BODY	PROF BOY	EX SW DRAIN
AC	AC PAVING	BRUSHED CONCRETE
CB	CEA	EXPOSED CONCRETE
DC	K&C	DISH CHANNEL
K&C	K&N	K&B AND CHANNEL
K&N	WS	K&B AND NIB
WS	PROP SWCP SINGLE	WHEEL STOP
PROP SWCP SINGLE	PROP STREET LIGHT	PROP STREET LIGHT
PROP STREET LIGHT	PR/ EX STREET SIGN	PR/ EX STREET SIGN
PR/ EX STREET SIGN	EX ROAD NAME SIGN	EX ROAD NAME SIGN
EX ROAD NAME SIGN	TACTILE PAVERS	TACTILE PAVERS
TACTILE PAVERS	EX STREET TREE	EX STREET TREE
EX STREET TREE	EX FOOTPATH	EX FOOTPATH
EX FOOTPATH	PR FOOTPATH	PR FOOTPATH
PR FOOTPATH	EX PAVEMENT	EX PAVEMENT
EX PAVEMENT	PR PAVEMENT	PR PAVEMENT

A	FAST TRACK	AJP	08/2026
Rev	Description	By	Date
Survey	WAVEN	10/2025	
Design	TCH	10/2025	
Drawn	AJP	10/2025	
Checked	DJM	08/2026	

Maven Waikato
05 336 6600
info@maven.co.nz
www.maven.co.nz
Level 1, 280 Victoria Street, Hamilton
New Zealand

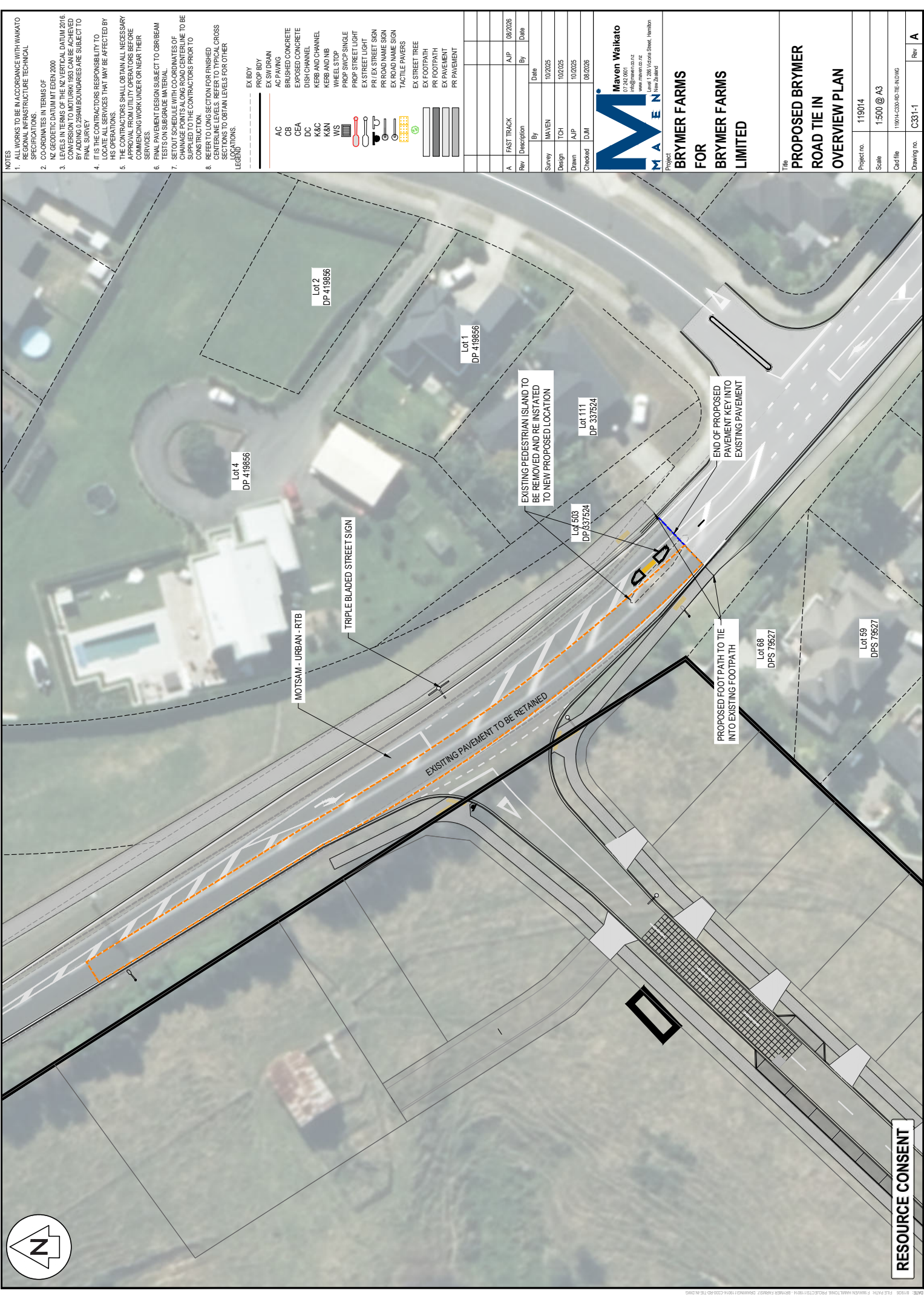
Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED BRYMER
ROADTIE IN
OVERVIEW PLAN

Project no.	119014	Rev	A
Scale	1:2000 @ A3		
Card file	119014-C330-RO-TIE-ALONG		
Drawing no.	C331		



RESOURCE CONSENT



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUKI 1993 CAN BE ACHIEVED BY ADDING 22.5MM. BOUNDARIES ARE SUBJECT TO FINAL SURVEY.
 4. IT IS THE CONTRACTORS RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTORS SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CURB/BEAM TESTS ON SUBGRADE. FINAL COORDINATES OF CHANGING POINTS ALONG ROAD CENTERLINE TO BE SUPPLIED TO THE CONTRACTORS PRIOR TO CONSTRUCTION.
 7. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LEGATIONS.

LEGEND

EX BDY	EX SW DRAIN
PROF BOY	AC PAVING
AC PAVING	BRUSHED CONCRETE
CB	EXPOSED CONCRETE
CEA	DISH CHANNEL
DC	K&C
K&C	K&B AND NB
K&B	WHEEL STOP
NB	PROP SWCP SINGLE
WS	PROP STREET LIGHT
PROP SWCP SINGLE	EX STREET LIGHT
PROP STREET LIGHT	PR / EX STREET SIGN
EX STREET LIGHT	PR ROAD NAME SIGN
PR / EX STREET SIGN	EX ROAD NAME SIGN
PR ROAD NAME SIGN	TACTILE PAVERS
EX ROAD NAME SIGN	EX STREET TREE
TACTILE PAVERS	EX FOOTPATH
EX STREET TREE	PR FOOTPATH
EX FOOTPATH	EX PAVEMENT
PR FOOTPATH	PR PAVEMENT
EX PAVEMENT	
PR PAVEMENT	

A	FAST TRACK	AJP	08/2026
Rev	Description	By	Date
1	Survey	HAVER	10/2025
2	Design	TCH	10/2025
3	Drawn	AJP	10/2025
4	Checked	DJM	08/2026

Maven **Waikato**
05 336 6600
info@maven.co.nz
www.maven.co.nz
Level 1, 280 Victoria Street, Hamilton
New Zealand

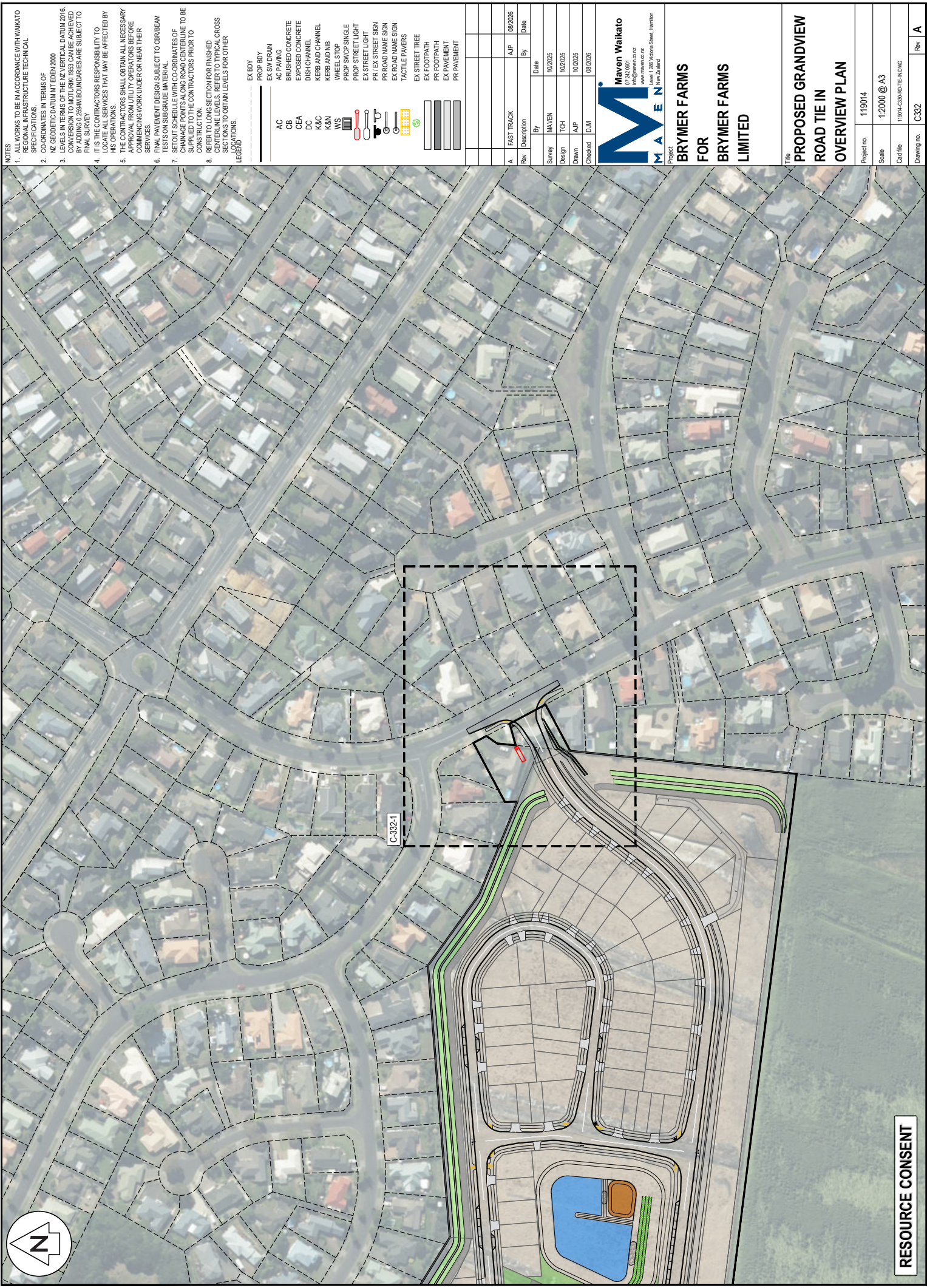
Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED BRYMER
ROAD TIE IN
OVERVIEW PLAN

Project no.	119014	Rev	A
Scale	1:500 @ A3		
Cad file	119014-030-00-TIE-IN.DWG		
Drawing no.	C331-1		



RESOURCE CONSENT



- NOTES
1. ALL WORKS TO BE IN ACCORDANCE WITH WAIKATO REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATIONS.
 2. CO-ORDINATES IN TERMS OF NZ GEODETIC DATUM MT EDEN 2000
 3. LEVELS IN TERMS OF THE NZ VERTICAL DATUM 2016. CONVERSION TO MOTUKI 1950 CAN BE ACHIEVED BY ADDING 45.7 TO ALL ELEVATIONS.
 4. IT IS THE CONTRACTOR'S RESPONSIBILITY TO LOCATE ALL SERVICES THAT MAY BE AFFECTED BY HIS OPERATIONS.
 5. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY APPROVAL FROM UTILITY OPERATORS BEFORE COMMENCING WORK UNDER OR NEAR THEIR SERVICES.
 6. FINAL PAVEMENT DESIGN SUBJECT TO CRIBBEAM TESTS TO DETERMINE THE STRENGTH OF THE SUBGRADE AND THE STRENGTH OF THE PAVEMENT.
 7. THE CONTRACTOR SHALL OBTAIN THE CO-ORDINATES OF ALL EXISTING CHANGEPOLY POINTS ALONG THE ROAD CENTRELINE TO BE SUPPLIED TO THE CONTRACTOR PRIOR TO CONSTRUCTION.
 8. REFER TO LONG SECTION FOR FINISHED CENTERLINE LEVELS. REFER TO TYPICAL CROSS SECTIONS TO OBTAIN LEVELS FOR OTHER LEGATIONS.

LEGEND

EX BODY	EX SWDRAIN
PROP BOY	EX SWDRAIN
AC	AC PAVING
CB	BRUSHED CONCRETE
CEA	EXPOSED CONCRETE
DC	DISH CHANNEL
K&C	K&B AND CHANNEL
K&N	K&B AND NIB
WS	WHEEL STOP
PROP SWCP SINGLE	PROP STREET LIGHT
PROP STREET LIGHT	EX STREET LIGHT
PR EX STREET SIGN	PR EX STREET SIGN
PR ROAD NAME SIGN	PR ROAD NAME SIGN
EX ROAD NAME SIGN	EX ROAD NAME SIGN
TACTILE PAVERS	TACTILE PAVERS
EX STREET TREE	EX STREET TREE
EX FOOTPATH	EX FOOTPATH
PR FOOTPATH	PR FOOTPATH
EX PAVEMENT	EX PAVEMENT
PR PAVEMENT	PR PAVEMENT

A	FAST TRACK	AJP	08/2026
Rev	Description	By	Date
Survey	MAVEN	MAVEN	10/2025
Design	TCH	TCH	10/2025
Drawn	AJP	AJP	10/2025
Checked	DJM	DJM	08/2026

M **MAVEN**

Maven Waikato
1200 Victoria Street, Hamilton
New Zealand
www.maven.co.nz
info@maven.co.nz

Project
BRYMER FARMS
FOR
BRYMER FARMS
LIMITED

Title
PROPOSED GRANDVIEW
ROAD TIE IN
OVERVIEW PLAN

Project no.	119014	Rev	A
Scale	1:2000 @ A3		
Card file	119014-C332-1-IE-NOVIG		
Drawing no.	C332		

RESOURCE CONSENT



- | | | | | | | | | | | | | | | | | | | | | |
|--------|----------|--------------|------------------|------------------|--------------|-----------------|------------|------------|--------------------|-------------------|-----------------|-------------------|-------------------|-------------------|----------------|----------------|-------------|-------------|-------------|-------------|
| EX BOY | PROF BOY | AC SWIN DRAN | BRUSHED CONCRETE | EXPOSED CONCRETE | DISH CHANNEL | K&B AND CHANNEL | K&B AND NB | WHEEL STOP | PROP STREET SINGLE | PROP STREET LIGHT | EX STREET LIGHT | PR EX STREET SIGN | PR ROAD NAME SIGN | EX ROAD NAME SIGN | TACTILE PAVERS | EX STREET TREE | EX FOOTPATH | PR FOOTPATH | EX PAVEMENT | PR PAVEMENT |
| | | | | | | | | | | | | | | | | | | | | |

Maven Waikato
07 342 0001
info@maven.co.nz
www.maven.co.nz
Level 1, 286 Victoria Street, Hamilton
New Zealand

**PROPOSED GRANDVIEW
ROAD TIE IN
OVERVIEW PLAN**

RESOURCE CONSENT



Appendix G: Intersection Traffic Count Survey Data Summary

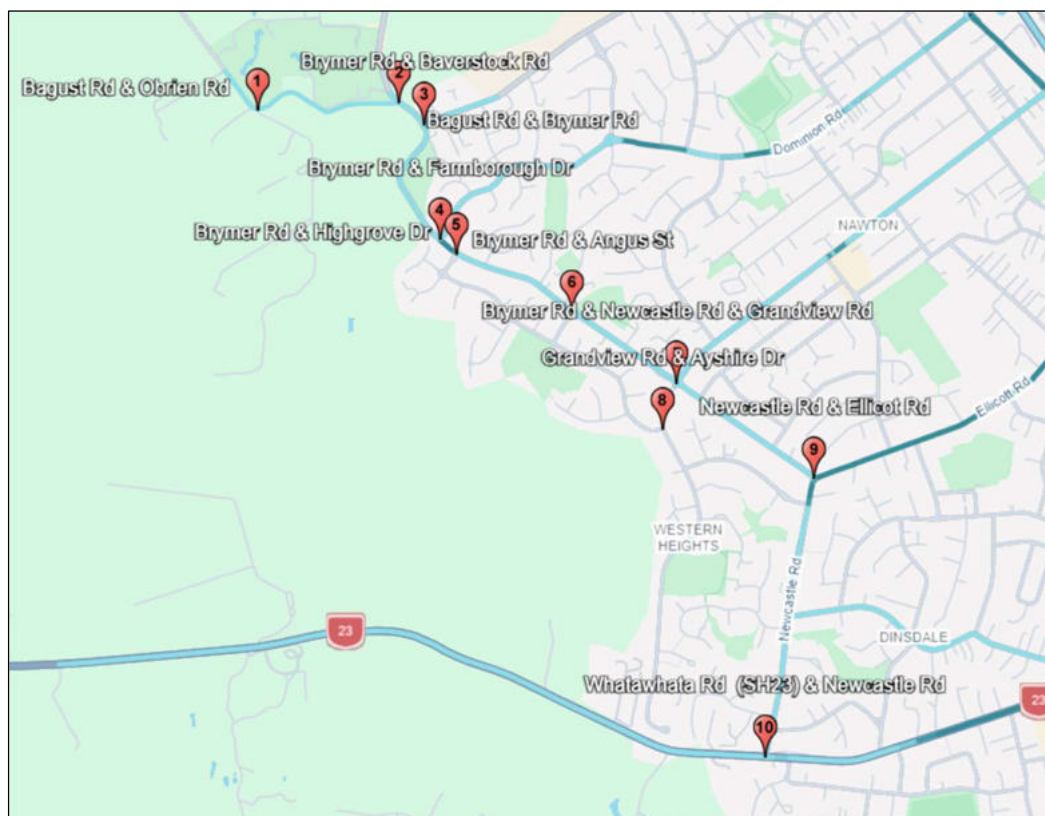


APPENDIX G: Intersection Traffic Count Survey Data Summary

Overview

24-hour, video-based intersection traffic count surveys have been conducted by Spotlight Traffic on Thursday, 9 October 2025, at the following ten (10) intersections as shown in the map below.

1. Bagust Rd & Obrien Rd
2. Bagust Rd/Brymer Rd
3. Brymer Rd & Baverstock Rd
4. Brymer Rd & Farmborough Dr
5. Brymer Rd & Highgrove Dr
6. Brymer Rd & Angus St
7. Brymer Rd & Newcastle Rd & Grandview Rd
8. Grandview Rd & Ayshire Dr
9. Newcastle Rd & Ellicot Rd
10. Whatawhata Rd (SH23) & Newcastle Rd



The counts have been specified/classified as follows:

- 15 minute intervals
- Hourly and daily summaries
- Peak hours identified and reported
- Classification by Car (including SUVs, Utes, etc.), Bus, LCV, MCV and HCV and turning movement.

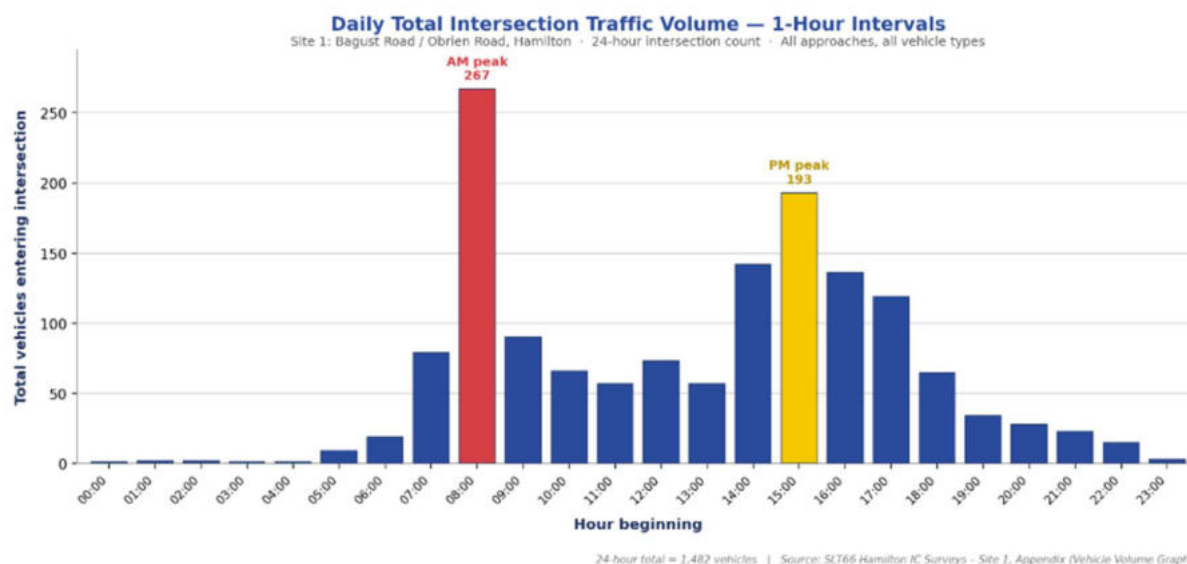
A summary of the operational conditions for each intersection is provided in the following sections. A copy of the summarised data for each is included in **Annexure A**.



1 Bagust Road / Obrien Road, Hamilton

Drawing on the Peak Hr Summary tab, this survey is a 24-hour turning-movement count at the Bagust Road / Obrien Road intersection. The key findings are:

- Overall volume. The intersection carried 1,482 vehicles across the full 24-hour period, distributed across the surveyed approaches — Obrien Road (154 vehicles), and the two Bagust Road approaches (708 and 620 vehicles). Bagust Road clearly functions as the main through-route, accounting for roughly 90% of total movements, while Obrien Road is a minor approach.
- AM peak hour. The busiest hour of the day was 8:00–9:00 AM, with 267 vehicles entering the intersection. This is a pronounced morning commuter peak — volumes climb steeply from around 7:00 AM (79 vehicles in the 7–8 hour) to the 267 peak, then fall away through the morning. The dominant movement in the AM peak is on the Bagust Road approaches (124 and 109 vehicles), consistent with inbound commuter traffic.
- PM peak hour. The afternoon peak occurred at 2:45–3:45 PM, with 225 vehicles (the highest rolling-hour value in the summary). On a clean clock-hour basis the busiest afternoon hour is 3:00–4:00 PM with 193 vehicles. The PM peak is broader and flatter than the sharp AM spike, spread across the early-to-mid afternoon — a profile typical of a school-influenced catchment combined with general afternoon activity.
- Vehicle mix. Traffic is overwhelmingly light vehicles. Of the 1,482 daily total, cars make up the large majority (around 1,426), with only small numbers of buses, light commercial vehicles (LCVs), and very few medium/heavy commercial vehicles (MCV/HCV) — indicating a predominantly residential/local traffic function rather than a freight route.
- Daily profile. The intersection shows the classic twin-peak commuter pattern: very low overnight volumes (1–2 vehicles per hour between midnight and 5:00 AM), a sharp morning peak at 8:00 AM, a midday plateau of roughly 55–75 vehicles per hour, and an increase around the afternoon peak hour, peaking at 193 vehicles per hour.

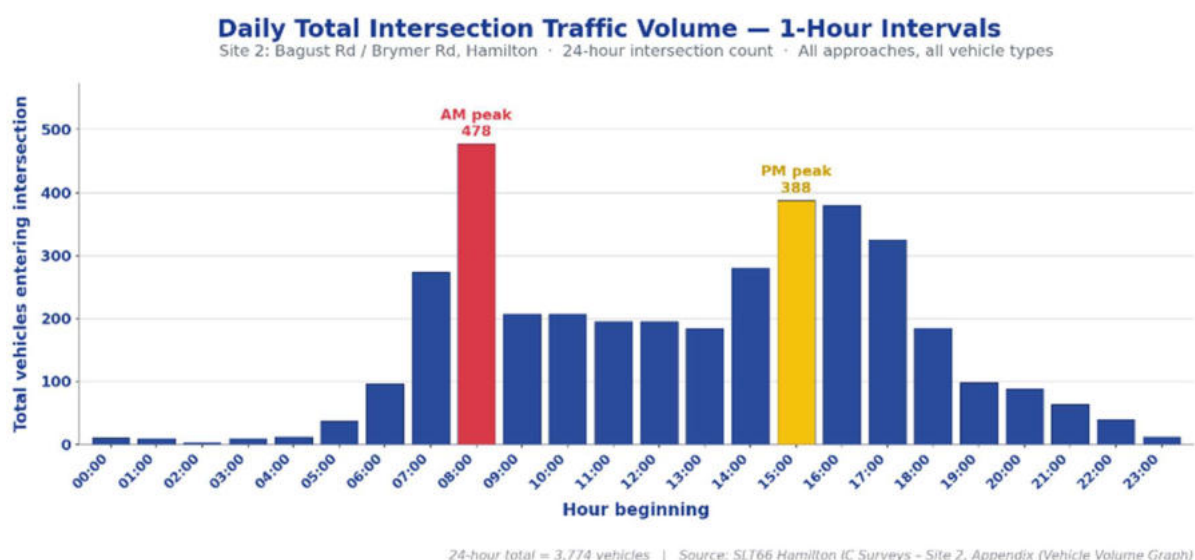




2 Bagust Road / Brymer Road

Drawing on the Peak Hr Summary tab, this 24-hour turning-movement count carried 3,774 vehicles across the surveyed approaches — the Bagust Road approach (1,783 vehicles), the Brymer Road approach (1,250), and a further Brymer Road approach (741). Bagust Road and Brymer Road carry broadly comparable through-volumes, consistent with this being a junction of two collector-level roads rather than a single dominant route.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 478 vehicles entering the intersection — a pronounced morning commuter spike, building sharply from around 7:00 AM (79 in the 7–8 hour) before falling away through the morning.
- PM peak hour. The afternoon peak occurred at 3:00–4:00 PM with 388 vehicles, with the rolling-hour analysis identifying the busiest window slightly earlier in the afternoon. The PM peak is broader and flatter than the sharp AM spike.
- Vehicle mix. Traffic is overwhelmingly light vehicles — cars make up 3,597 of the 3,774 total, with only small numbers of LCVs (102), MCVs (44), buses (25), and very few HCVs (6), indicating a predominantly residential/local function.
- Daily profile. The intersection shows the classic twin-peak commuter pattern: very low overnight volumes, a sharp 8:00 AM peak, a midday plateau, a sustained afternoon peak, and a steady evening tail-off.

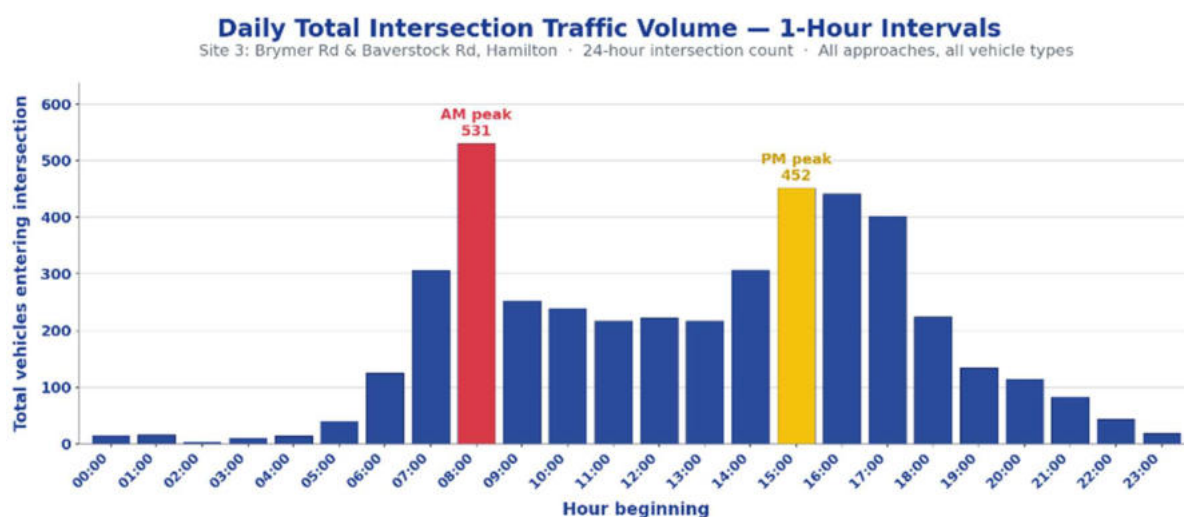




3 Brymer Road & Baverstock Road

This count carried 4,426 vehicles over 24 hours, distributed across the Brymer Road approach (1,844 vehicles), the Baverstock Road approach (1,849), and a Brymer Road approach (733). The two main legs (Brymer Road and Baverstock Road) carry almost equal volumes, reflecting this intersection's role as a key node where two upgraded urban roads meet.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 531 vehicles — a strong, well-defined morning commuter peak.
- PM peak hour. The afternoon peak occurred at 3:00–4:00 PM with 452 vehicles, forming a broad afternoon plateau.
- Vehicle mix. Cars dominate (4,231 of 4,426), with LCVs (94), MCVs (63), buses (26), and HCVs (12) making up the small remainder — consistent with a local/collector traffic function, with the modest bus count reflecting the bus services operating on the Rotokauri Road/Baverstock Road corridor.
- Daily profile. A clear twin-peak commuter profile with sharply defined morning and afternoon peaks and low overnight volumes.



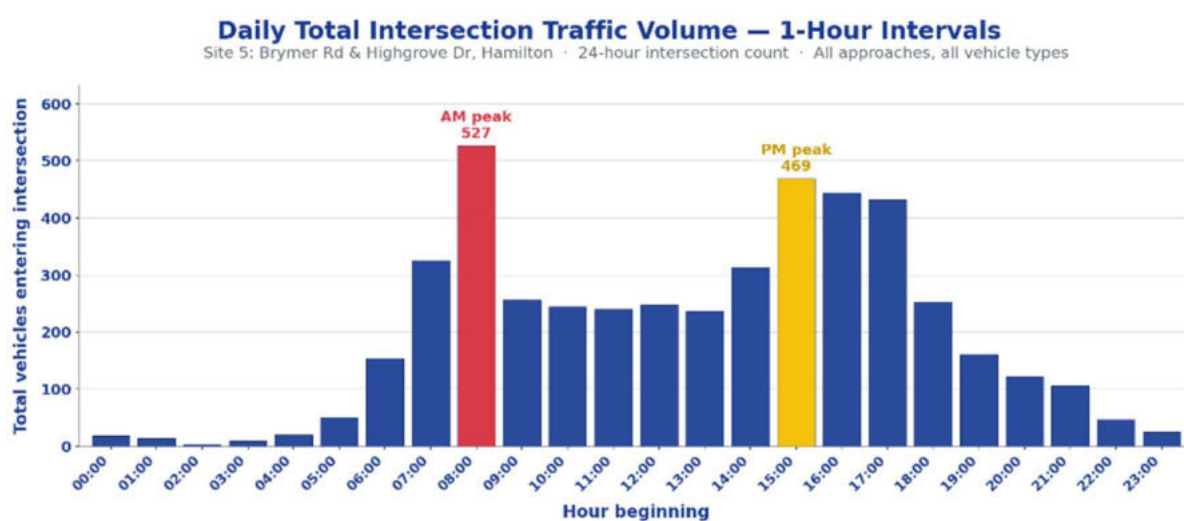
24-hour total = 4,426 vehicles | Source: SLT66 Hamilton IC Surveys - Site 3, Appendix (Vehicle Volume Graph)



5 Brymer Road & Highgrove Drive

This count carried 4,718 vehicles over 24 hours, across a Brymer Road approach (2,002 vehicles), the Brymer Road approach (2,344), and the Highgrove Drive approach (372). As at Site 4, Brymer Road dominates the through-movement while Highgrove Drive is a minor side approach.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 527 vehicles.
- PM peak hour. The afternoon peak occurred at 3:00–4:00 PM with 469 vehicles.
- Vehicle mix. Cars dominate (4,510 of 4,718), with LCVs (100), MCVs (59), buses (38), and HCVs (11). The vehicle profile is almost identical to Site 4.
- Daily profile. The daily shape closely mirrors Site 4 — unsurprising given the two intersections sit on the same Brymer Road corridor a short distance apart — with matching twin commuter peaks.



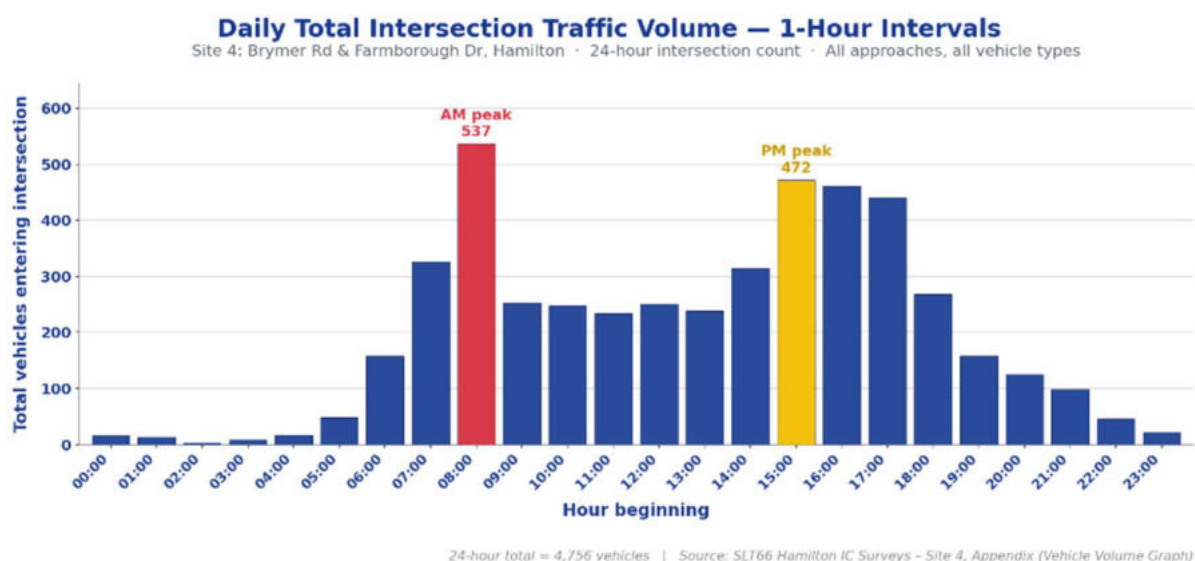
24-hour total = 4,718 vehicles | Source: SLT66 Hamilton IC Surveys - Site 5, Appendix (Vehicle Volume Graph)



4 Brymer Road & Farmborough Drive

This count carried 4,756 vehicles over 24 hours, across the Brymer Road approach (2,176 vehicles), a Brymer Road approach (1,953), and the Farmborough Drive approach (627). Brymer Road clearly functions as the main through-route here, with Farmborough Drive a lesser side-road approach.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 537 vehicles — among the higher morning peaks of the Brymer Road corridor intersections.
- PM peak hour. The afternoon peak occurred at 3:00–4:00 PM with 472 vehicles, with a sustained afternoon shoulder.
- Vehicle mix. Overwhelmingly cars (4,544 of 4,756), with LCVs (100), MCVs (63), buses (38), and HCVs (11) making up the balance.
- Daily profile. Balanced twin-peak commuter pattern with a sharp AM spike and a slightly broader afternoon peak.

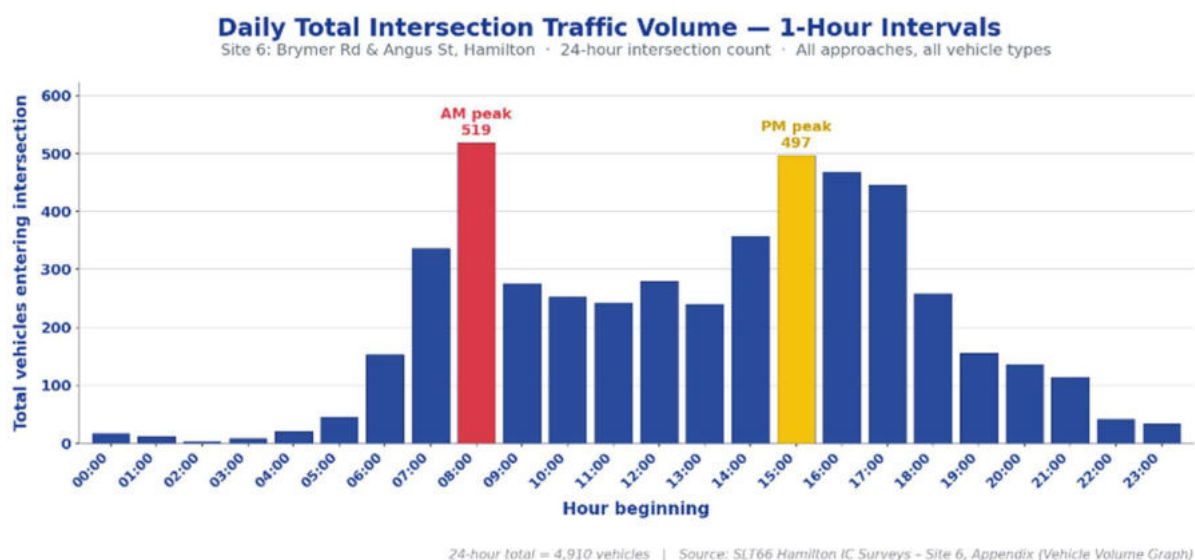




6 Brymer Road & Angus Street

This is the busiest of the mid-Brymer Road intersections, carrying 4,910 vehicles over 24 hours, across the Brymer Road approach (2,374 vehicles), a Brymer Road approach (2,313), and the Angus Street approach (223). Brymer Road carries the overwhelming majority of movements; Angus Street is a minor local side-street.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 519 vehicles.
- PM peak hour. The afternoon peak occurred at 3:00–4:00 PM with 497 vehicles — a notably flat, sustained afternoon period where the PM peak is nearly as high as the AM peak.
- Vehicle mix. Cars dominate (4,698 of 4,910), with LCVs (105), MCVs (60), buses (37), and HCVs (10).
- Daily profile. A twin-peak commuter pattern, but with an unusually broad and sustained afternoon shoulder — the afternoon period carries volumes close to the morning peak across several hours.

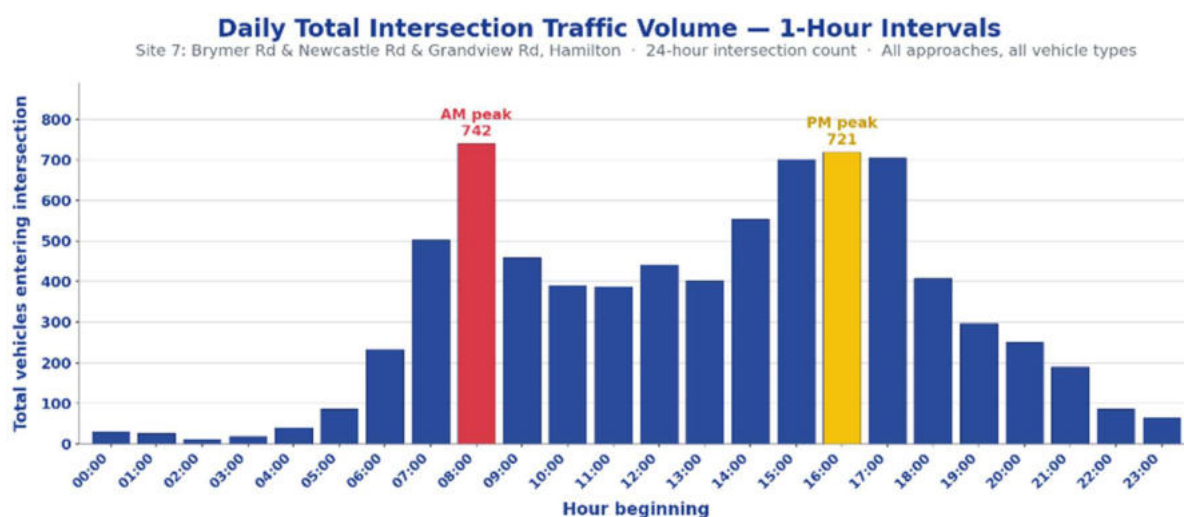




7 Brymer Road & Newcastle Road & Grandview Road

A major three-leg intersection carrying 7,750 vehicles over 24 hours — well above the mid-corridor sites. The movements split across the Brymer Road approach (3,094 vehicles), the Newcastle Road approach (2,489), and the Grandview Road approach (1,512), plus a further approach (655). The high volumes reflect its role as a convergence point of three roads.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 742 vehicles, with the rolling-hour analysis showing the morning peak building from around 7:45 AM.
- PM peak hour. The afternoon peak occurred at 4:00–5:00 PM with 721 vehicles — later than the Brymer Road corridor sites, and nearly as high as the morning peak, giving very high sustained volumes through both peaks.
- Vehicle mix. Cars dominate (7,443 of 7,750), with higher commercial and bus activity than the smaller sites: LCVs (145), MCVs (106), buses (40), and HCVs (16).
- Daily profile. A high-volume twin-peak profile with strong, broad morning and afternoon peaks reflecting its function as a multi-road junction.



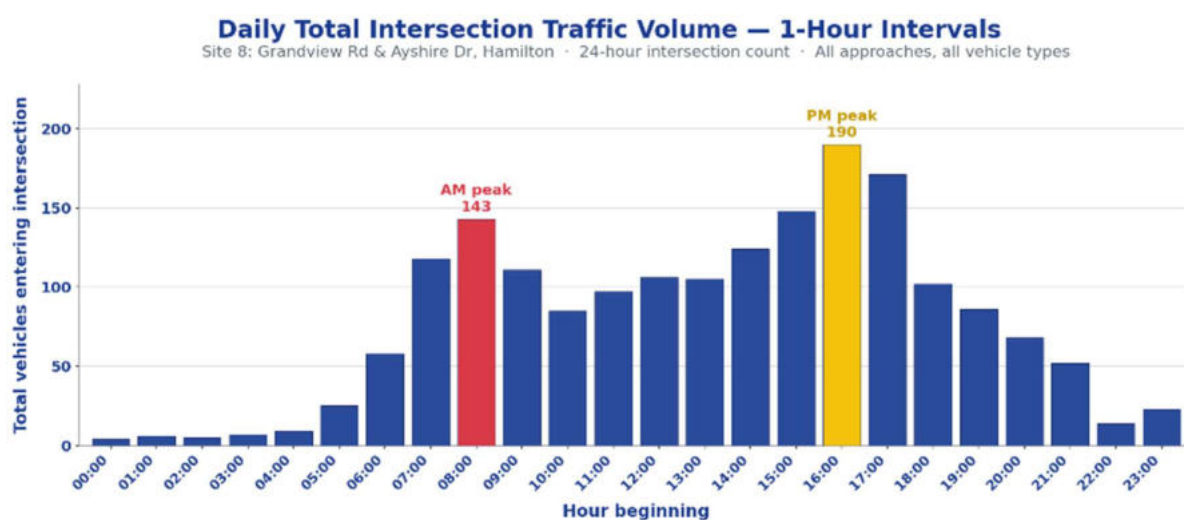
24-hour total = 7,750 vehicles | Source: SLT66 Hamilton IC Surveys - Site 7, Appendix (Vehicle Volume Graph)



8 Grandview Road & Ayshire Drive

The quietest site in the survey, a minor local intersection carrying 1,857 vehicles over 24 hours, across the Grandview Road approach (714 vehicles), a Grandview Road approach (610), and the Ayshire Drive approach (533).

- AM peak hour. The morning peak occurred at 8:00–9:00 AM with 143 vehicles.
- PM peak hour. Unusually, the afternoon peak is the higher of the two — 4:00–5:00 PM with 190 vehicles, exceeding the AM peak. This "PM-dominant" pattern is characteristic of a residential side-road that sees more outbound evening and discretionary trips than concentrated morning commuting.
- Vehicle mix. Almost entirely cars (1,785 of 1,857), with very little commercial traffic — buses (31), LCVs (27), MCVs (14), and no HCVs recorded at all, confirming a purely local residential function.
- Daily profile. Rather than sharp commuter spikes, the intersection shows a broad, gentle daytime profile that rises through the day to an afternoon peak — typical of a low-volume local road.



24-hour total = 1,857 vehicles | Source: SLT66 Hamilton IC Surveys - Site 8, Appendix (Vehicle Volume Graph)



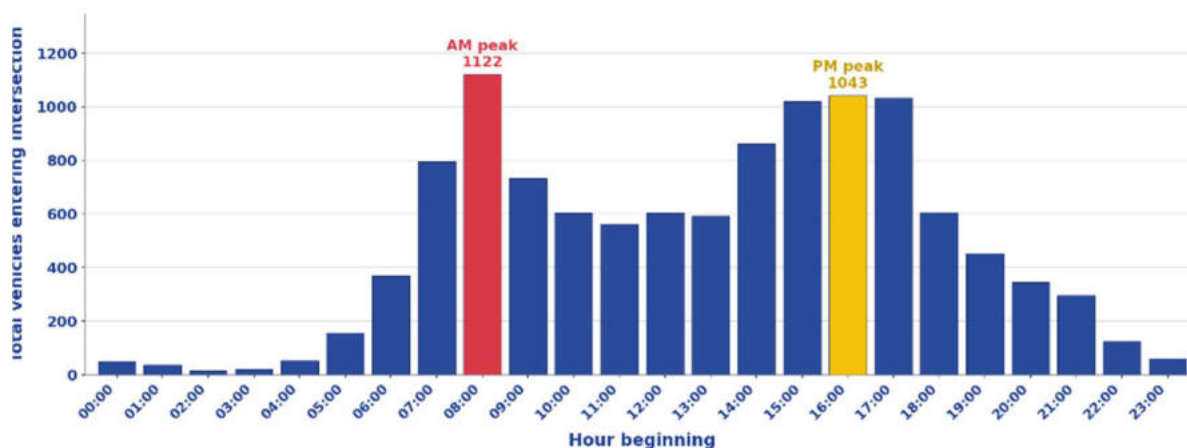
9 Newcastle Road & Ellicot Road

A high-volume arterial intersection carrying 11,552 vehicles over 24 hours, across the Newcastle Road approach (4,689 vehicles), the Ellicot Road approach (3,487), and a further approach (3,376). The large, fairly balanced approach volumes are consistent with an arterial-level junction.

- AM peak hour. The busiest hour was 8:00–9:00 AM, with 1,122 vehicles, with the rolling-hour peak building from around 7:45 AM.
- PM peak hour. The afternoon peak occurred at 4:00–5:00 PM with 1,043 vehicles — high sustained volumes through both peaks.
- Vehicle mix. Cars dominate (11,016 of 11,552), but with notably higher heavy-vehicle and bus activity than the local sites: buses (145), LCVs (202), MCVs (164), and HCVs (25), reflecting an arterial route carrying through-traffic and services.
- Daily profile. A high-volume twin-peak arterial profile with strong morning and afternoon peaks and substantial midday "base" traffic — the intersection stays busy throughout the day rather than emptying out between peaks.

Daily Total Intersection Traffic Volume — 1-Hour Intervals

Site 9: Newcastle Rd & Ellicot Rd, Hamilton · 24-hour intersection count · All approaches, all vehicle types



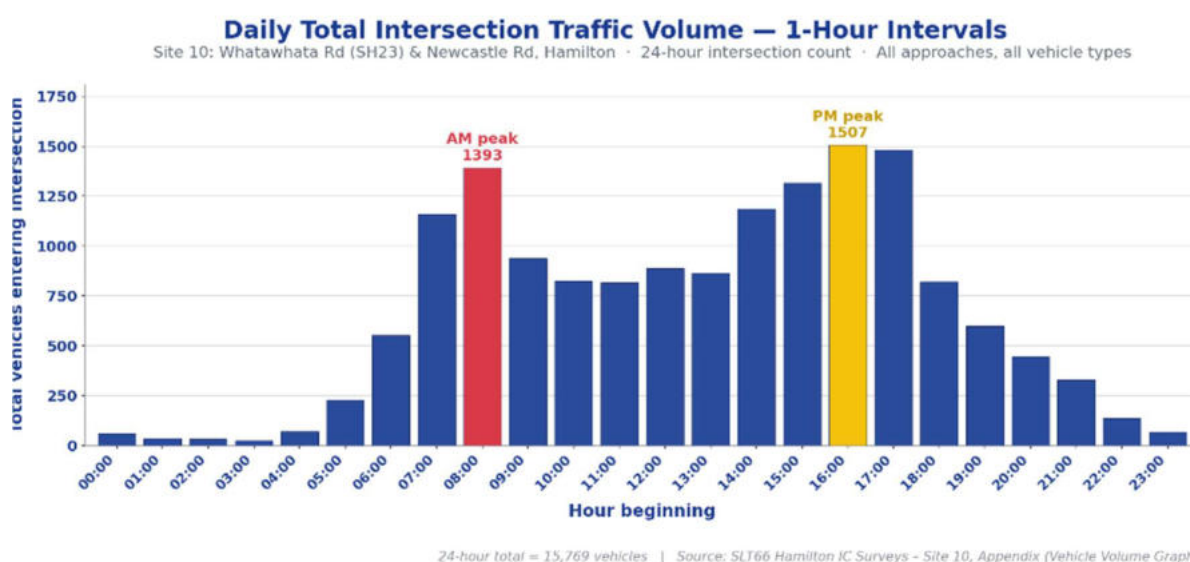
24-hour total = 11,552 vehicles | Source: SLT66 Hamilton IC Surveys - Site 9, Appendix (Vehicle Volume Graph)



10 Whatawhata Road (SH23) & Newcastle Road

By far the busiest intersection in the survey, as expected for a State Highway junction, carrying 15,769 vehicles over 24 hours. The movements split across the Whatawhata Road (SH23) approach (6,750 vehicles), the Newcastle Road approach (3,866), and a further approach (5,153). The very high volumes reflect SH23's strategic through-traffic and freight function.

- AM peak hour. On a clock-hour basis the morning peak is 8:00–9:00 AM with 1,393 vehicles; the rolling-hour analysis identifies an even earlier and higher peak from around 7:30 AM, characteristic of highway commuter and freight movements that start earlier in the day.
- PM peak hour. The afternoon peak is the highest single hour of the day — 4:00–5:00 PM with 1,507 vehicles — slightly exceeding the morning peak.
- Vehicle mix. Cars dominate (14,910 of 15,769), but this site records by far the highest heavy-vehicle counts of all ten sites: HCVs (62), MCVs (274), LCVs (361), and buses (162). The elevated heavy-vehicle share is the signature of a State Highway carrying regional freight and through-traffic, not just local trips.
- Daily profile. A high-volume twin-peak profile with a strong, early-building morning peak and an even higher afternoon peak, underpinned by high all-day base volumes consistent with a strategic highway corridor.





ANNEXURE A: 24-HOUR TRAFFIC COUNT SUMMARIES

Intersection Diagram				
Project Name	[51166] Hamilton IC Surveys			
Survey Type	Intersection Turning Counts			
Job No.	SL166			
Client	Transplan			
Suburb	Hamilton			
Location	IC1, Bagust Rd & Obrien Rd			
Day/Date	Thu, 9th Oct 2025			
Time Period	08:00 AM - 24:00 AM [Total 24 hours]			
Weather	Cloudy			

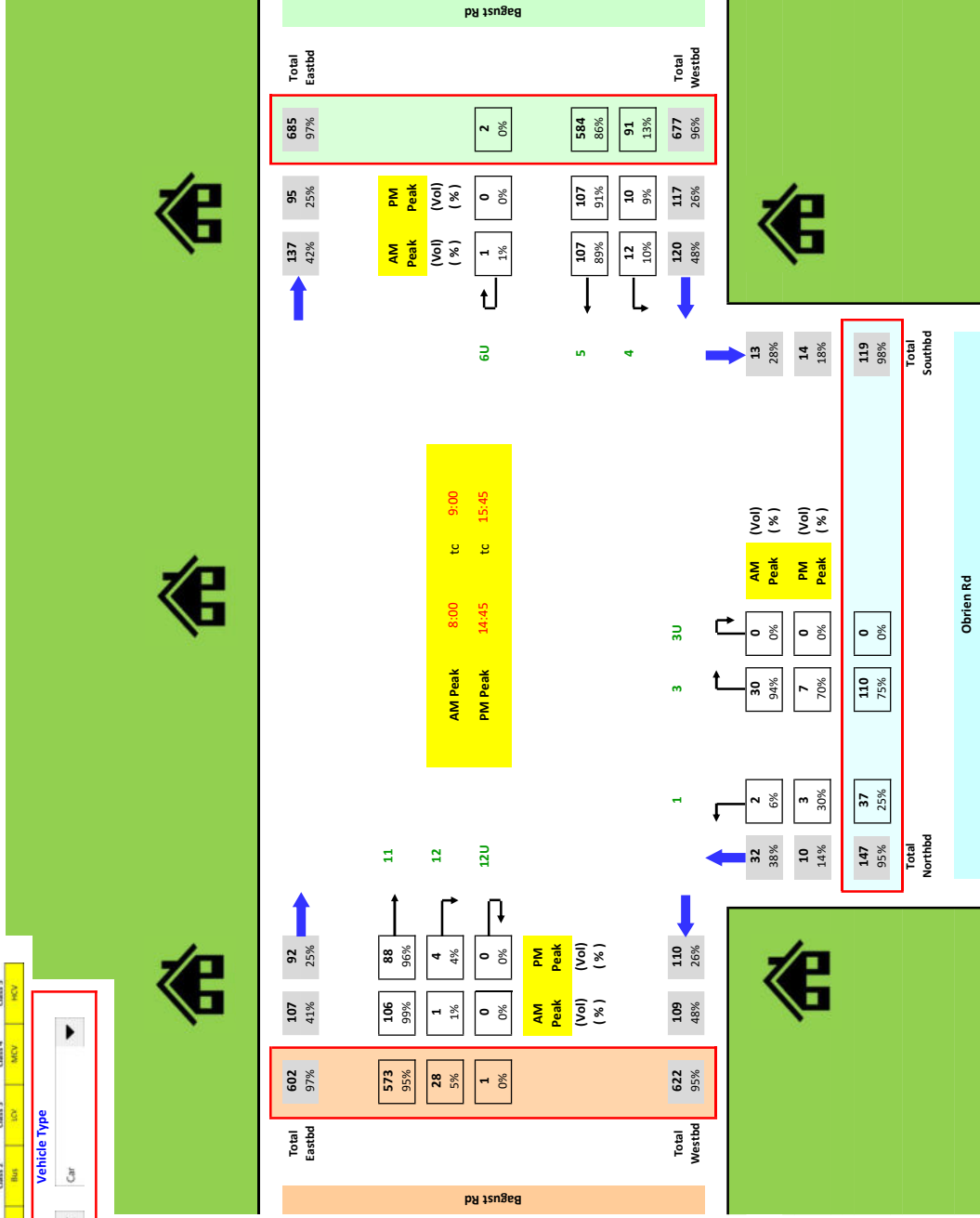
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LT	MCV	MCV

Hour Starting

Vehicle Type

24hr Totals

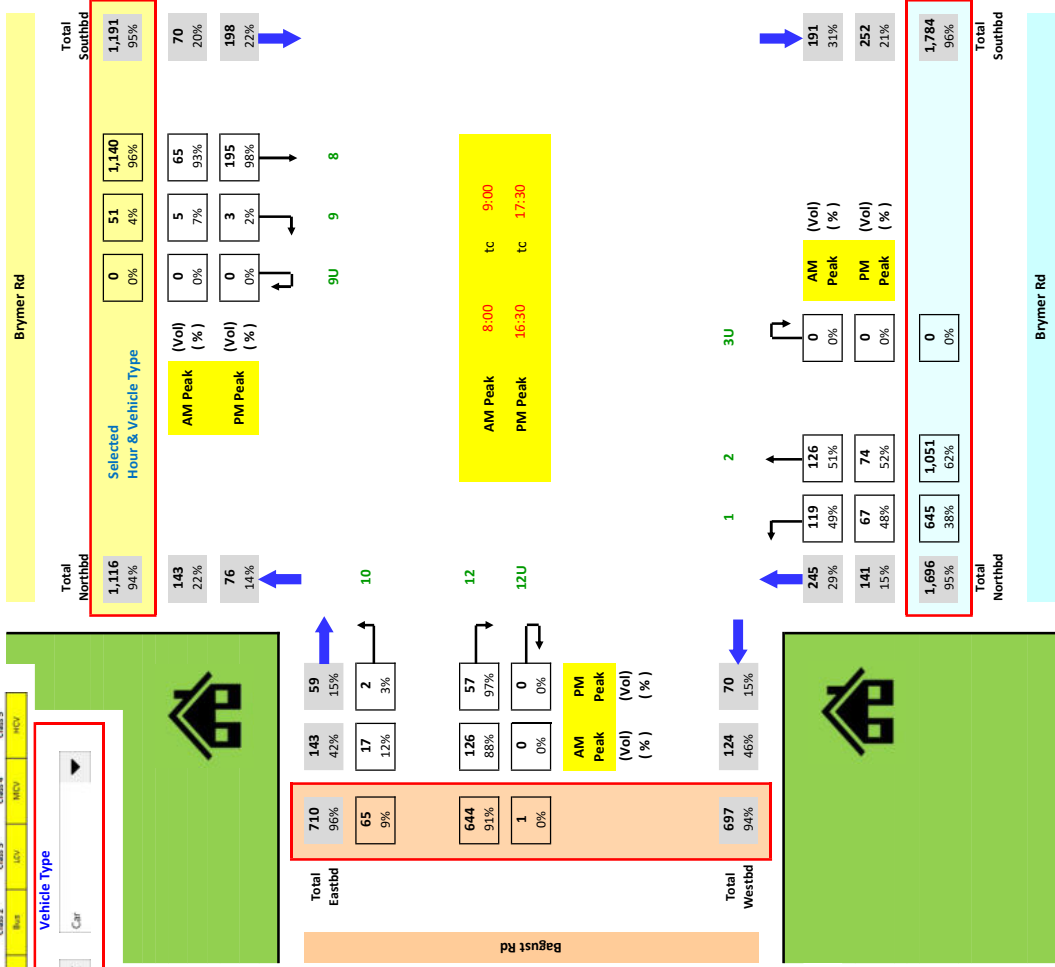
Car



Intersection Diagram									
Project Name	SL1661 Hamilton IC Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SL166								
Client	Transplan								
Suburb	Hamilton								
Location	IC2, Bagust Rd/Brymer Rd								
Day/Date	Thur, 9th Oct 2025								
Time Period	08:00am - 24:00pm (Total 24 hours)								
Weather	Cloudy								

Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
Car	Yes	Yes	Yes	Yes	Yes
Bus	Yes	Yes	Yes	Yes	Yes
LCV	Yes	Yes	Yes	Yes	Yes
MPV	Yes	Yes	Yes	Yes	Yes
MCV	Yes	Yes	Yes	Yes	Yes

Hour Starting Vehicle Type



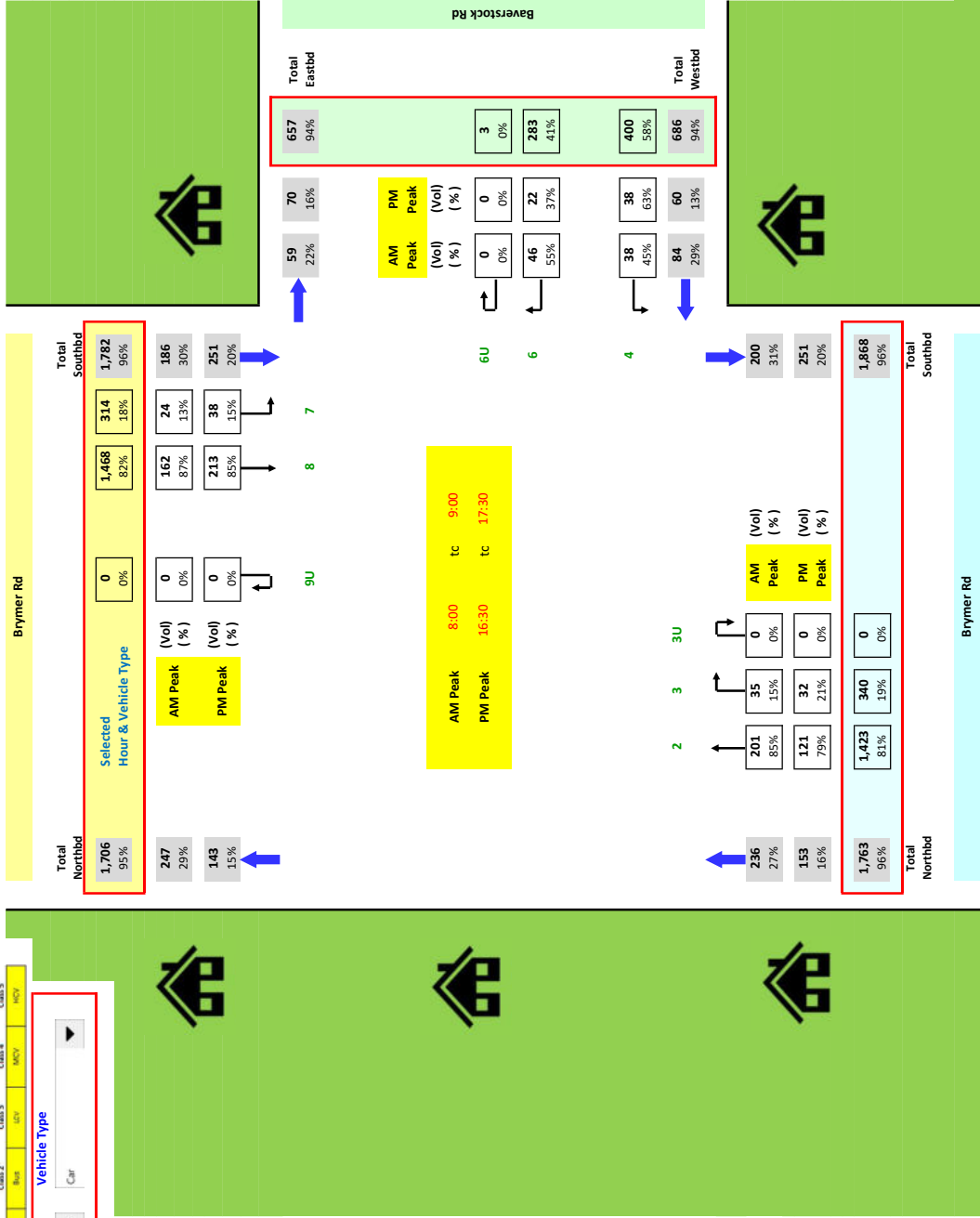
Intersection Diagram									
Project Name	[SL165] Hamilton, IC Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SL166								
Client	Transplan								
Suburb	Hamilton								
Location	IC3 Brymer Rd & Baverstock Rd								
Day/Date	Thu, 9th Oct 2025								
Time Period	00:00am - 24:00pm [Total 24hours]								
Weather	Cloudy								

Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LTU	MCU	MCU

Hour Starting

Vehicle Type

24hr Totals



Intersection Diagram									
Project Name	[SLT66] Hamilton IC Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SLT66								
Client	Transplan								
Suburb	Hamilton								
Location	104 Brymer Rd & Farmborough Dr								
Day/Date	Thru, 9th Oct 2025								
Time Period	00:00am - 24:00pm (Total 24 hours)								
Weather	Cloudy								

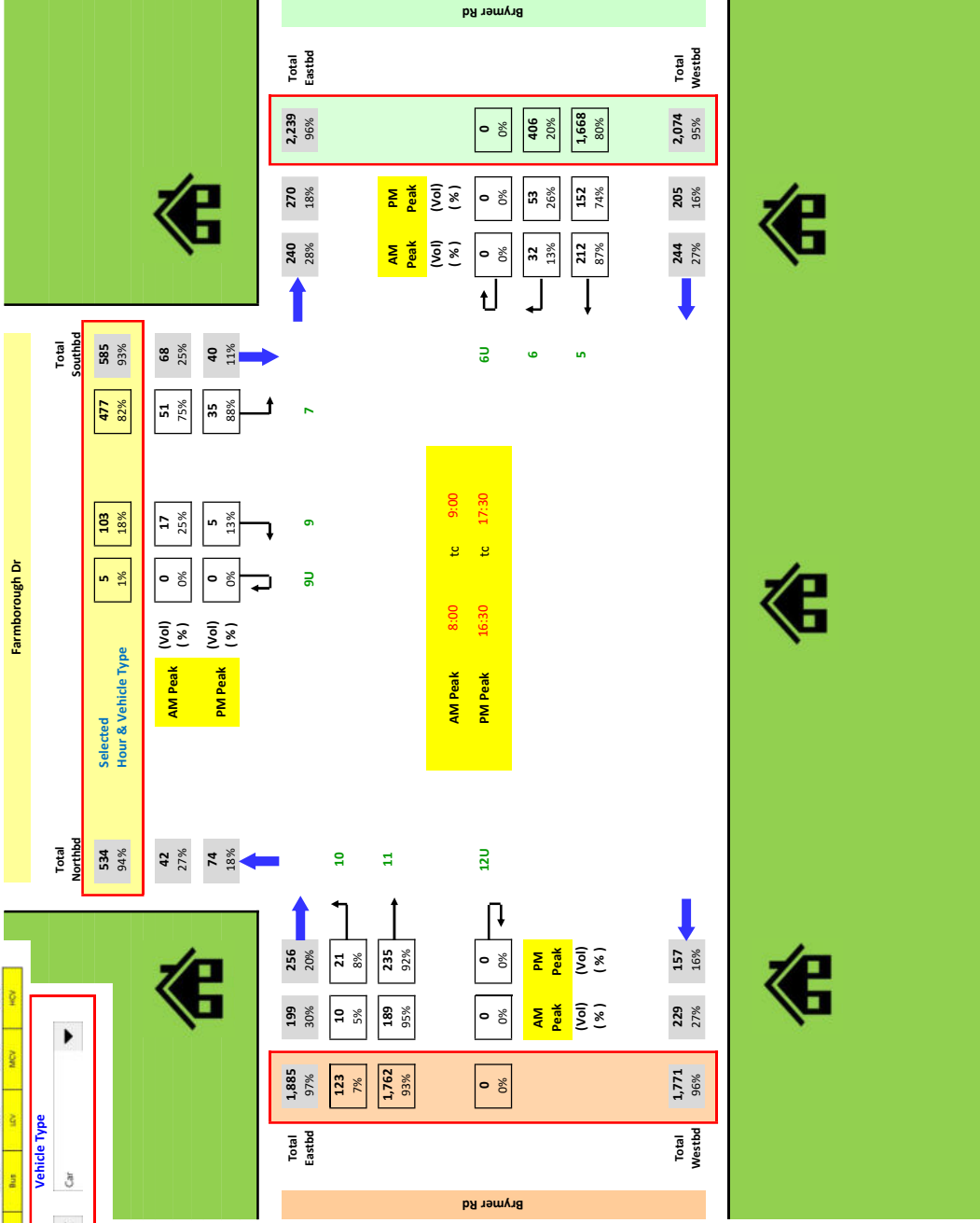
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	OV	MCV	MCV

Hour Starting

Vehicle Type

24hr Totals

Car



Intersection Diagram				
Project Name	SLT661 Hamilton iC Surveys			
Survey Type	Intersection Turning Counts			
Job No.	SLT66			
Client	Transplan			
Suburb	Hamilton			
Location	105 Brymer Rd & Highgrove Dr			
Day/Date	Thu, 9th Oct 2025			
Time Period	00:00 AM - 24:00 PM (Total 24 hours)			
Weather	Cloudy			

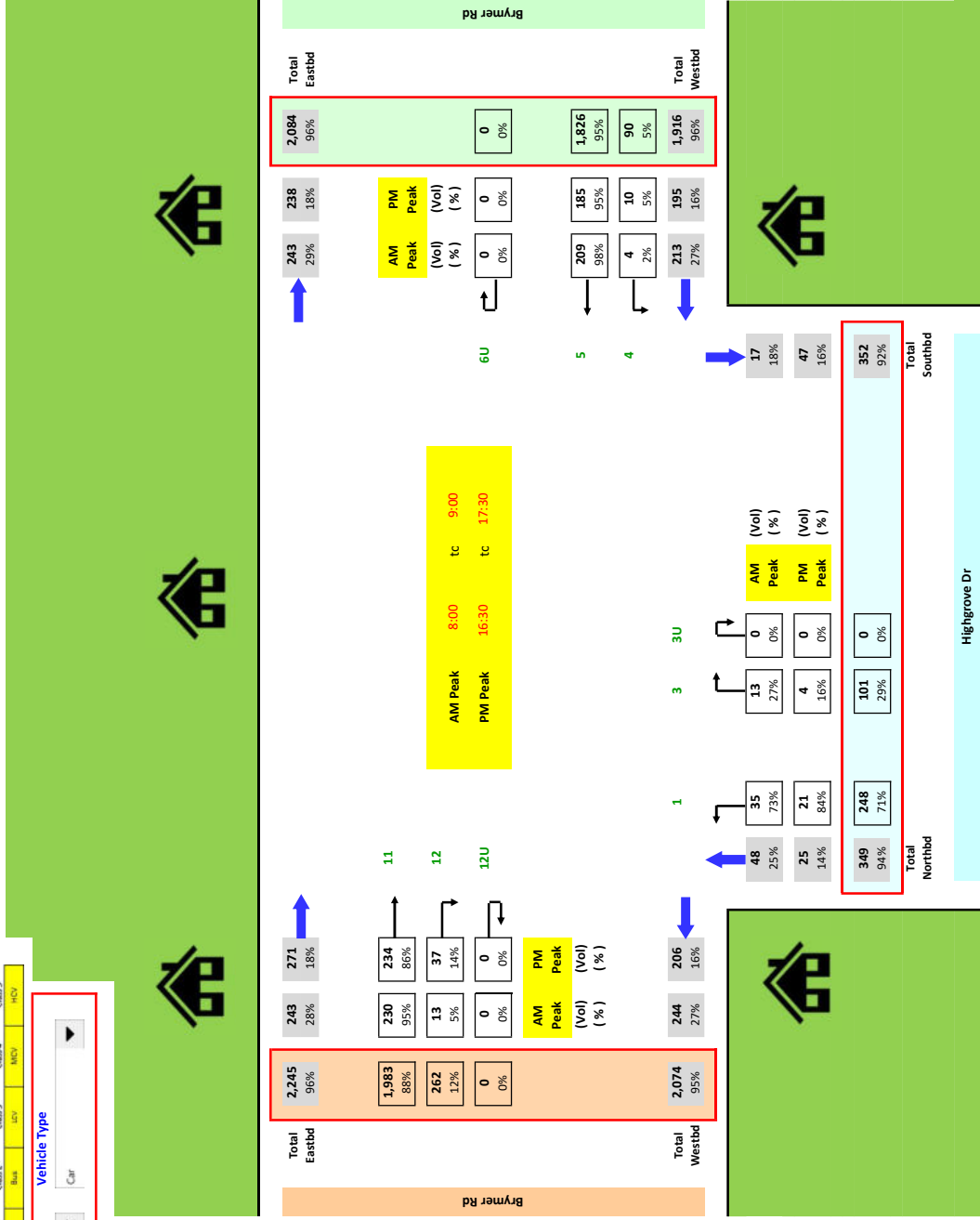
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LCV	MOP	MOP

Hour Starting

Vehicle Type

24hr Totals

Car



Intersection Diagram									
Project Name	[SL166] Hamilton I.C Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SL166								
Client	Transplan								
Suburb	Hamilton								
Location	106 Brymer Rd & Angus St								
Day/Date	Thu, 9th Oct 2023								
Time Period	05:00 AM - 24:00 PM (Total 24 hours)								
Weather	Cloudy								

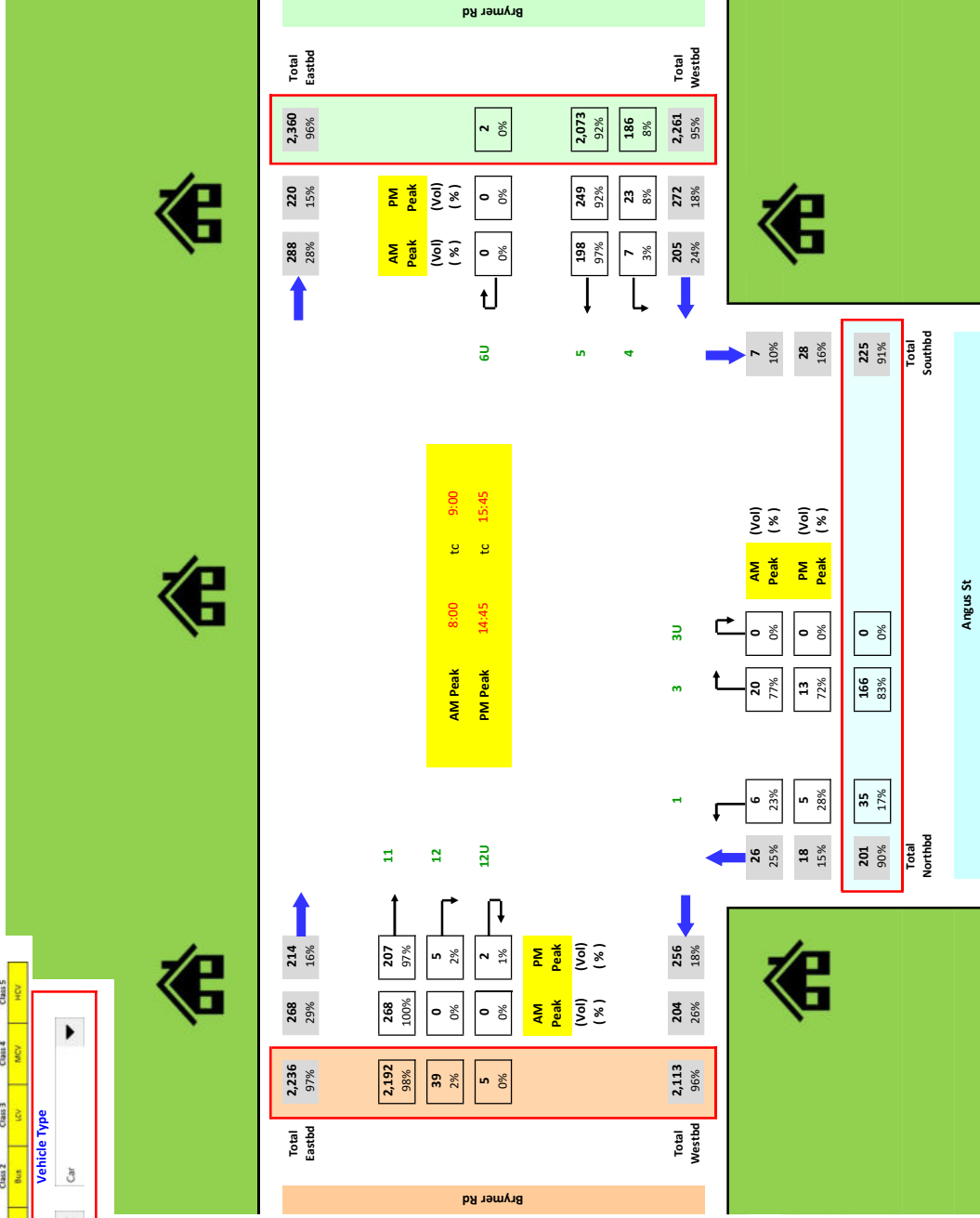
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	UV	MCV	MCV

Hour Starting

Vehicle Type

24hr Totals

Car



Intersection Diagram									
Project Name	[SL166] Hamilton IC Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SL166								
Client	Transpian								
Suburb	Hamilton								
Location	IC7 Brymer Rd & Newcastle Rd & Grandview Rd								
Day/Date	Thu, 9th Oct 2025								
Time Period	00:00am - 24:00pm (Total 24hours)								
Weather	Cloudy								

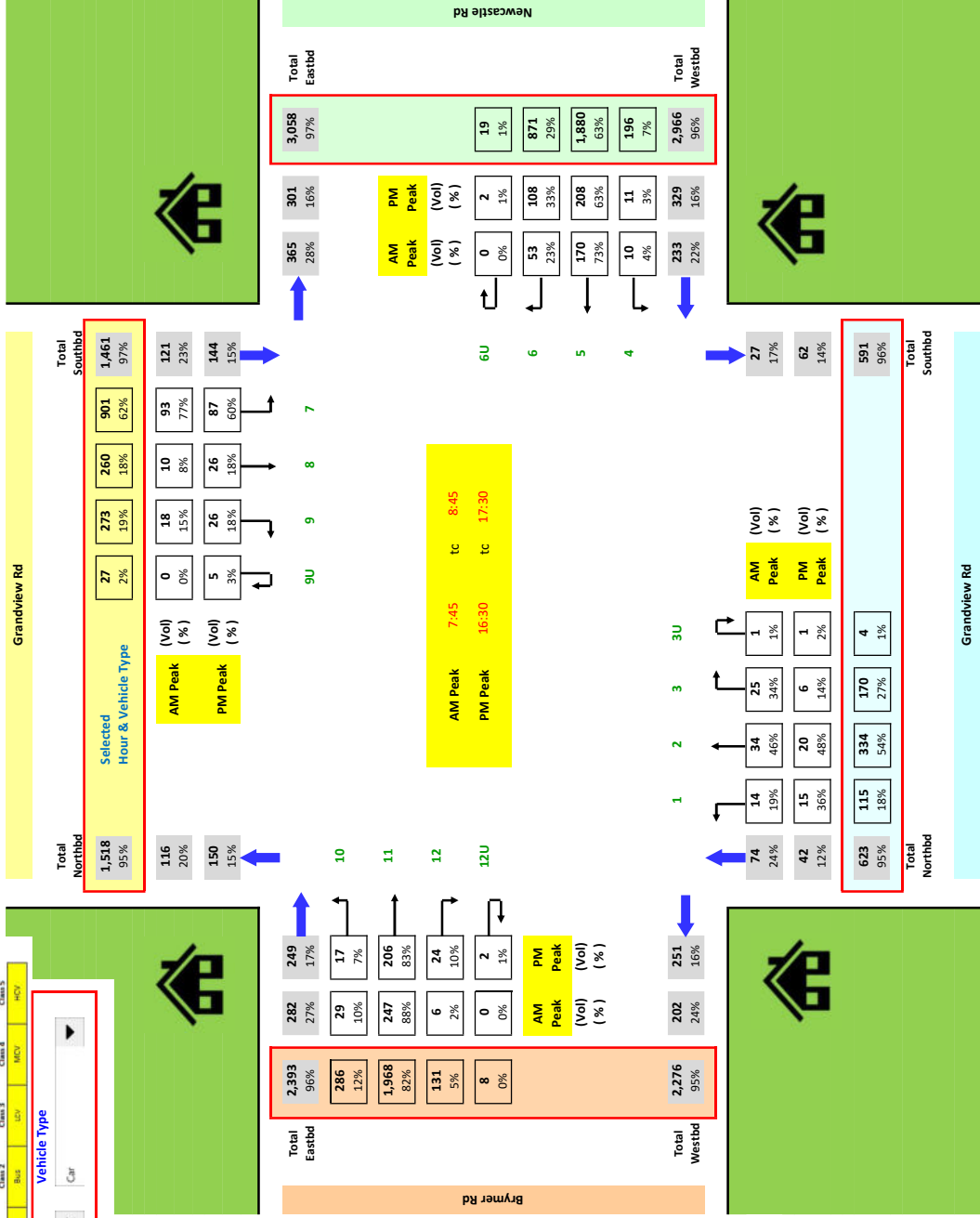
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LCV	MCV	MCV

Hour Starting

Vehicle Type

24hr Totals

Car



Intersection Diagram									
Project Name	[SL166] Hamilton I.C. Surveys								
Survey Type	Intersection Turning Counts								
Job No.	SL166								
Client	Transplan								
Suburb	Hamilton								
Location	ICB, Grandview Rd & Ashpire Dr								
Day/Date	Thurs 9th Oct 2025								
Time Period	9:00am - 24:00pm (Total 24 hours)								
Weather	Cloudy								

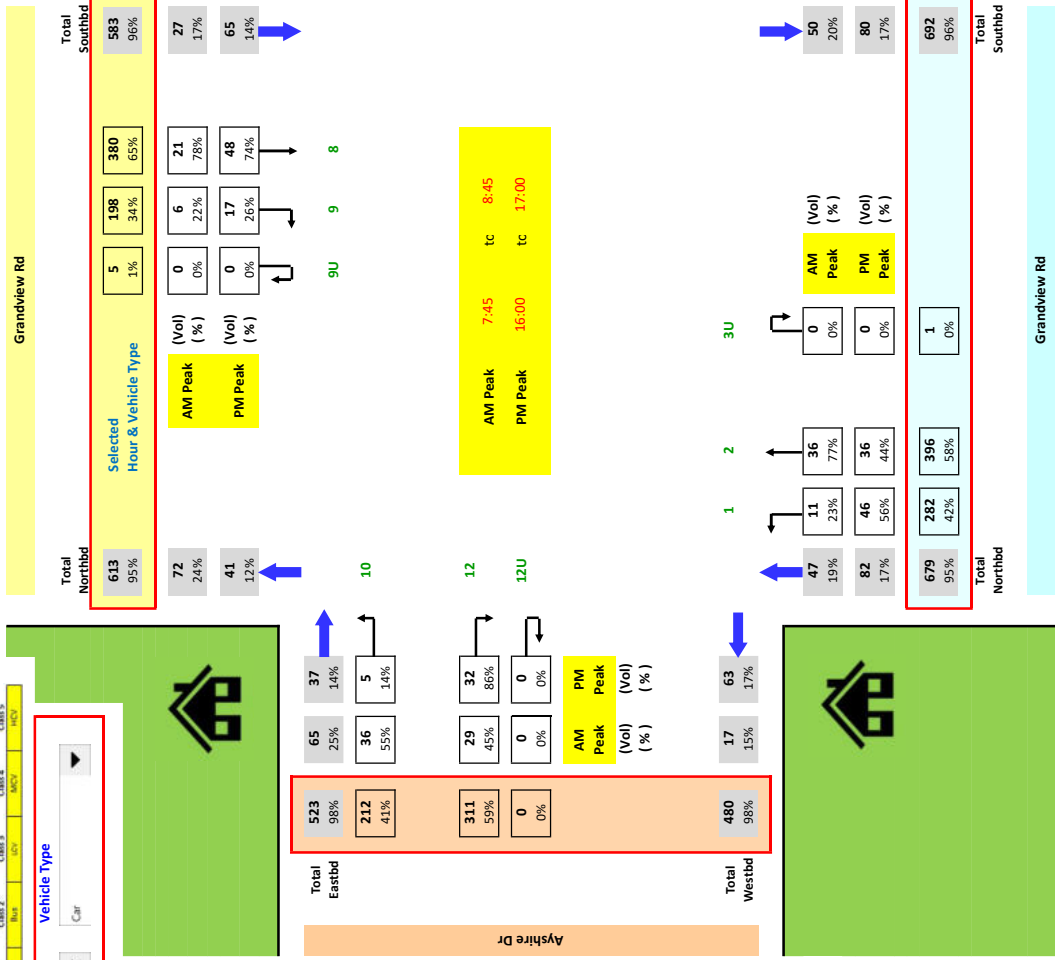
Classifications: Class 1 Class 2 Class 3 Class 4 Class 5

Hour Starting

Vehicle Type

24hr Totals

Car



Intersection Diagram	
Project Name	151765 Hamilton IC Surveys
Survey Type	Intersection Turning Counts
Job No.	SLT66
Client	Transplan
Suburb	Hamilton
Location	109 Newcastle Rd & Ellicott Rd
Day/Date	Thu, 8th Oct 2025
Time Period	09:00 AM - 24:00 PM (Total 24 hours)
Weather	Cloudy

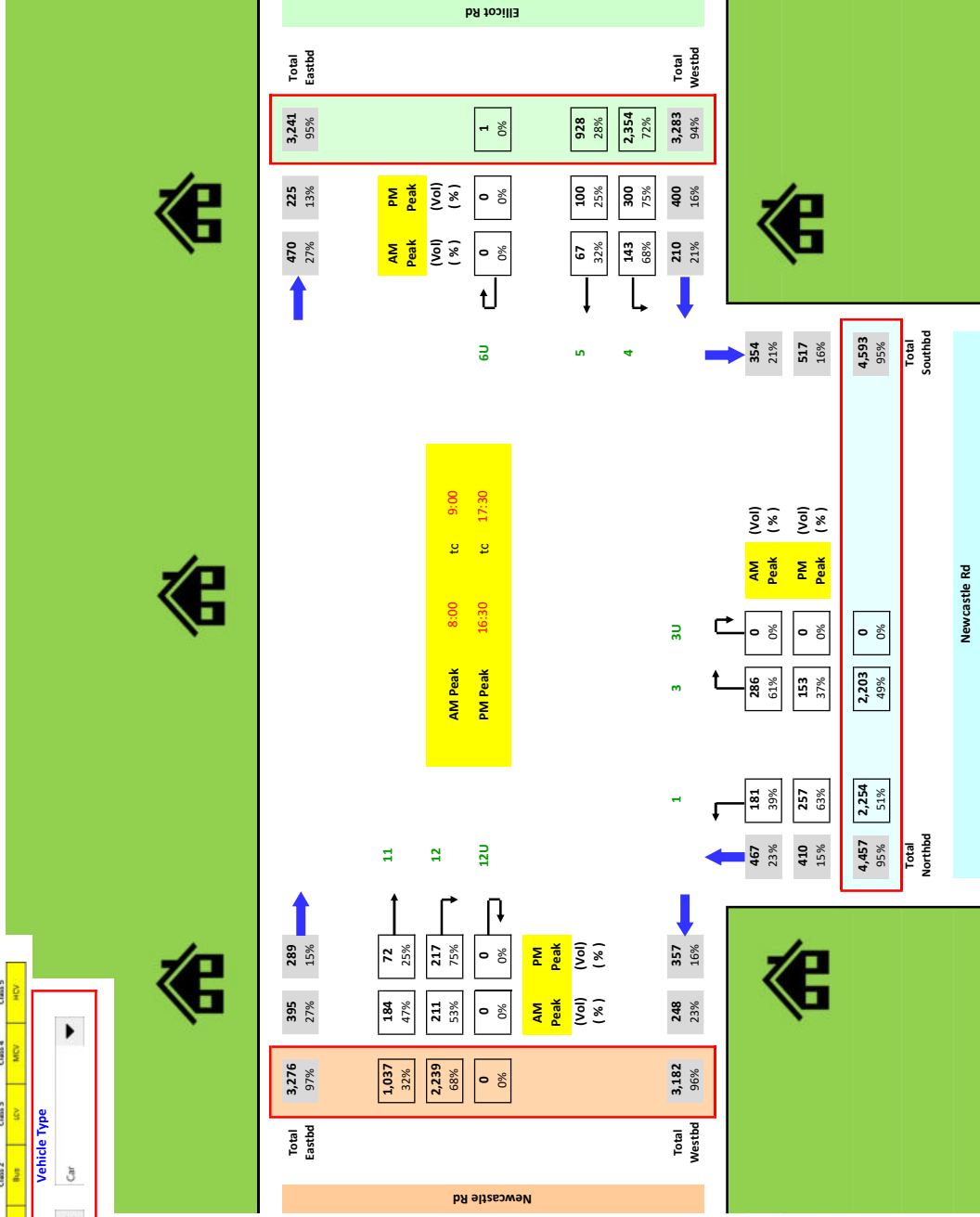
Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LTV	MCS	MCS

Hour Starting

Vehicle Type

24hr Totals

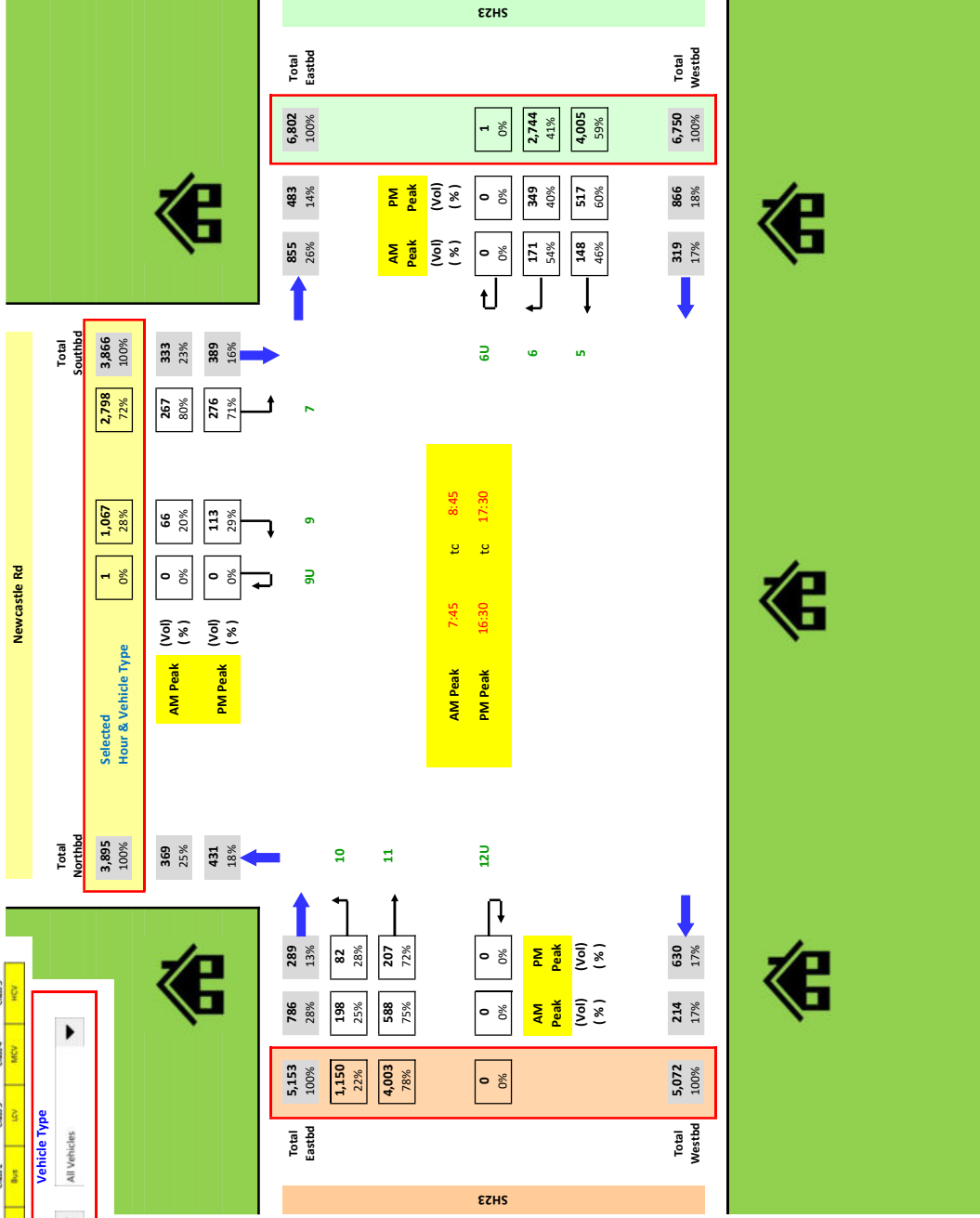
Car



Intersection Diagram	
Project Name	SL1651 Hamilton IC Surveys
Survey Type	Intersection Turning Counts
Job No.	SL166
Client	Transplan
Suburb	Hamilton
Location	IC10, Whatawhata Rd (SH23) & Newcastle Rd
Day/Date	Thu, 9th Oct 2025
Time Period	08:00am - 24:00am (Total: 24 hours)
Weather	Cloudy

Classifications	Class 1	Class 2	Class 3	Class 4	Class 5
	Car	Bus	LCV	MCV	HCV

Hour Starting Vehicle Type





Appendix H: WRTM Traffic Modelling Report

Brymer Farms

Fast Track Substantive

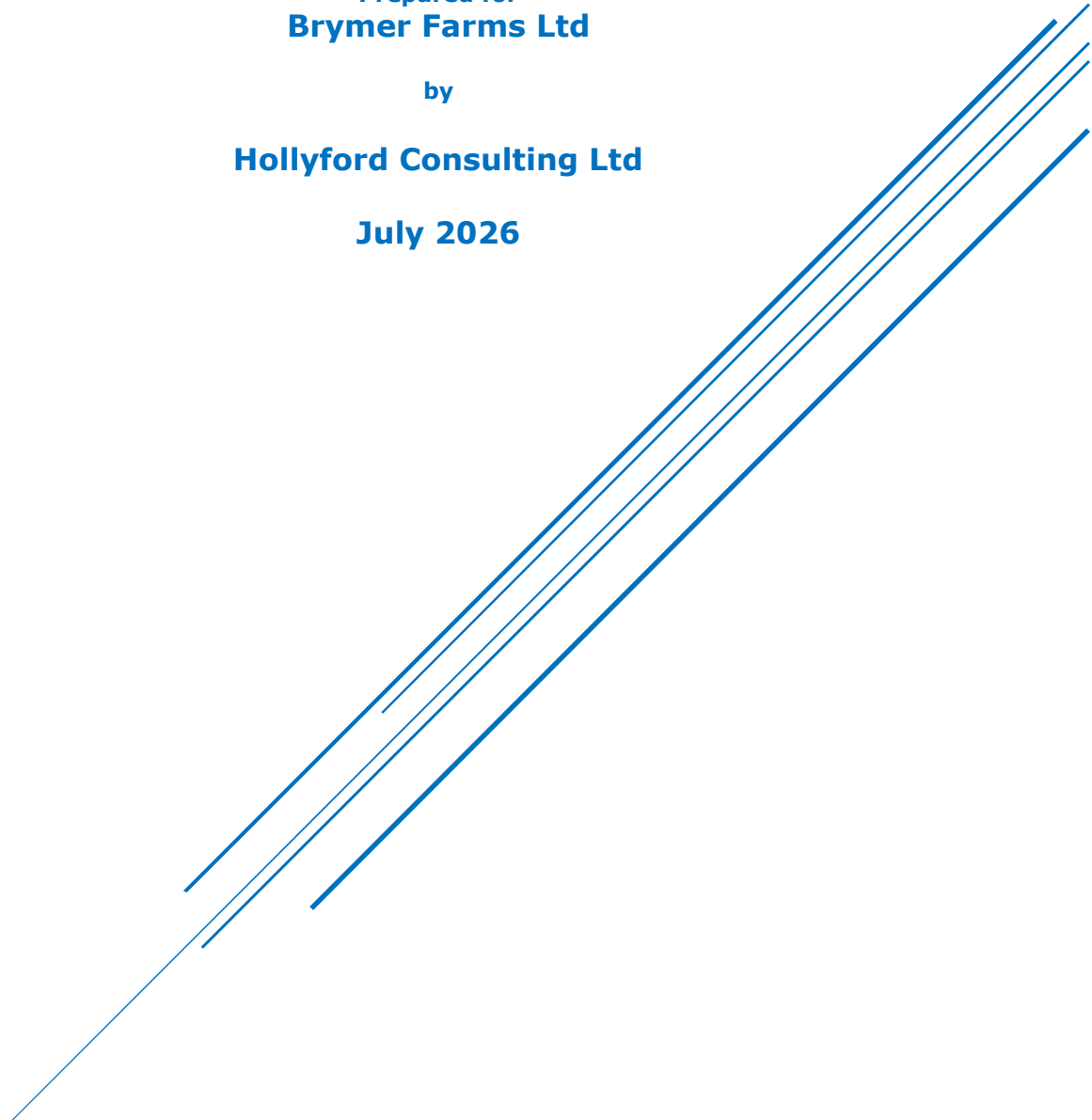
WRTM Modelling

Prepared for
Brymer Farms Ltd

by

Hollyford Consulting Ltd

July 2026



Project manager	Project technical lead
Grant Smith	Grant Smith

PREPARED BY

Grant Smith

29/07/2026



1. Introduction

1.1 Background

The Waikato Regional Transport Model (WRTM) Was originally built in 2007 and has been regularly updated since that time with the most recent update being to the 2023 census. The model was built by Gabites Porter and has been operated over the years by Gabites Porter, then by Traffic Design Group, and latterly by Stantec. Geographically it cover the whole of the Waikato Region, and also includes Tauranga City, Western Bay of Plenty and Rotorua.

The WRTM is owned jointly by local authorities across the Waikato region, the Waikato Regional Council, and the New Zealand Transport Agency. CoLab manages the model on behalf of the owners.

It provides a single source of truth for transport modelling in the Waikato and has supported analysis for hundreds of projects over the past 20 years. These projects have ranged from small subdivision assessments through to modelling of the various stages of the Waikato Expressway.

Hollyford Consulting Ltd was commissioned by CoLab to operate the model at the request of Brymer Farms Ltd to analyse the traffic effects of a 1068 lot development in Hamilton West just north of state highway 23. (SH23)

A detailed description of the development is included in the Integrated Transport Assessment (ITA) prepared by Transplan Ltd, but in summary it involves development of a subdivision with a mixture of detached house, terrace housing and apartments. The project has been split into 12 stages, with four access points, namely

- An access to Obrien Road for 8 detached dwellings
- A connection to Harrowgate Place limited to 121 detached dwellings with no vehicular access to the rest of the development.
- A connection to Grandview Road between Ayrshire Drive and Western Heights Drive
- A connection to SH23 approximately 1.5km west of Newcastle Road.

The latter two access points are connected by internal subdivision roads.

1.2 The Modelling Brief

The brief for this work is in five parts

- Local area validation of 2025 modelled traffic flows against ten key intersection counts in the immediate area.
- Running the model at 2035 with part of the development including Obrien Road and Harrogate Place and Grandview Road connections for a total of 331 detached dwelling and 10 Terrace Houses
- Running the model at 2035 with all connections in place and a further 55 dwellings just north of SH23.
- Running the model at 2035, 2045 and 2055 with all connections in place and the full 1068 dwellings completed.

Each of these components is described in subsequent sections of this report.

1.3 This report

This report is intended as an Appendix to the ITA prepared by Transplan. It is intended to be read as part of the ITA – not as a standalone report.

2. Local Area Validation

2.1 Introduction

When building a strategic model, and particularly on as large as WRTM, there will always be parts of the model that have not been well validated. This particularly true for those parts of the model away from the main urban areas. It is always good practice to check that model flows match counts in the area around the development or transport component being investigated.

For the Brymer analysis, Morning and Evening peak models were supplied by Stantec through CoLab. The land use code for the 2025 base was 25GH, and the network was 25H2. Local area validation comprised checking 10 key intersections in Hamilton on roads close to the proposed development.

2.2 Intersections analysed

Transplan commissioned counts at 10 intersections on Thursday 9th October 2025, namely

1. Bagust Rd & Obrien Rd
2. Bagust Rd/Brymer Rd
3. Brymer Rd & Baverstock Rd
4. Brymer Rd & Farmborough Dr
5. Brymer Rd & Highgrove Dr
6. Brymer Rd & Angus St
7. Brymer Rd & Newcastle Rd & Grandview Rd
8. Grandview Rd & Ayshire Dr
9. Newcastle Rd & Ellicot Rd
10. Whatawhata Rd (SH23) & Newcastle Rd

2.3 The process

A comparison of the model as supplied is shown in Appendix One. The model flows are for 2 hours in each period – 0700-0900 hours in the morning and 1600-1700 hours in the evening.

The measure used is the GEH statistic – commonly used in model validation. It has the formula:

$$GEH = \sqrt{\frac{2(m-o)^2}{m+o}}$$

Where *m* is the modelled flow and *o* is the observed count.

The formula assumes that the flows are in hourly units. For two-hour flows, the coefficient '2' on the top line reduces to '1'. In the appendices, both flows and counts are two-hour for ease of checking against the loaded network.

2.4 Results

In summary, the performance of the 2025 model compared against counts is shown in Table 2-1. The comparison is at two levels – firstly for every approach to the intersection and secondly for every individual turn.

generation and Distribution, but changing those components of the model is beyond the scope of this analysis.

The network changes made are shown in Figure 2-1 as an overview and Figure 2-2 zoomed in. Green means a new link or Intersection; Cyan means that the link or intersection attributes have been changed and Red is a deleted link or intersection.

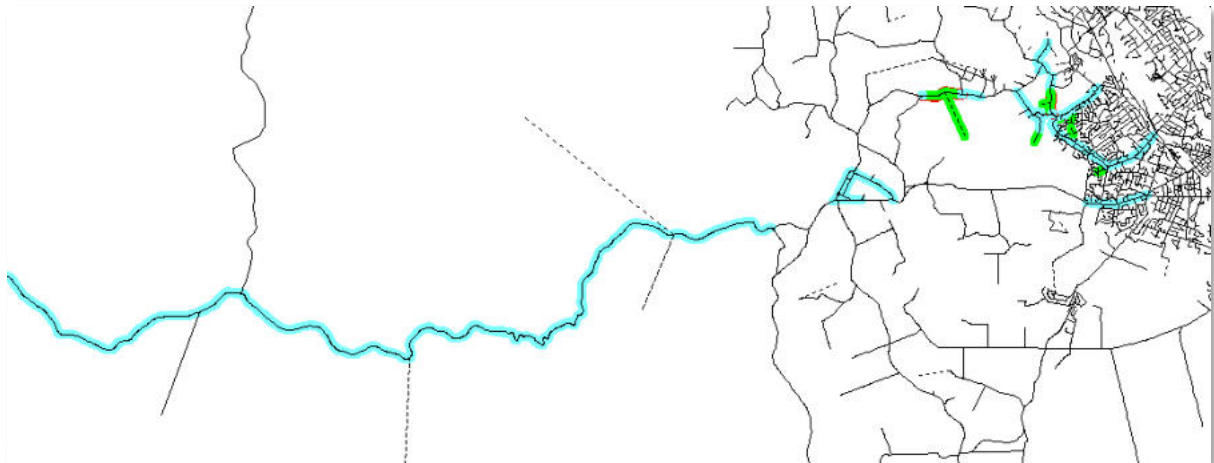


Figure 2-1: Network changes for local validation – Overview

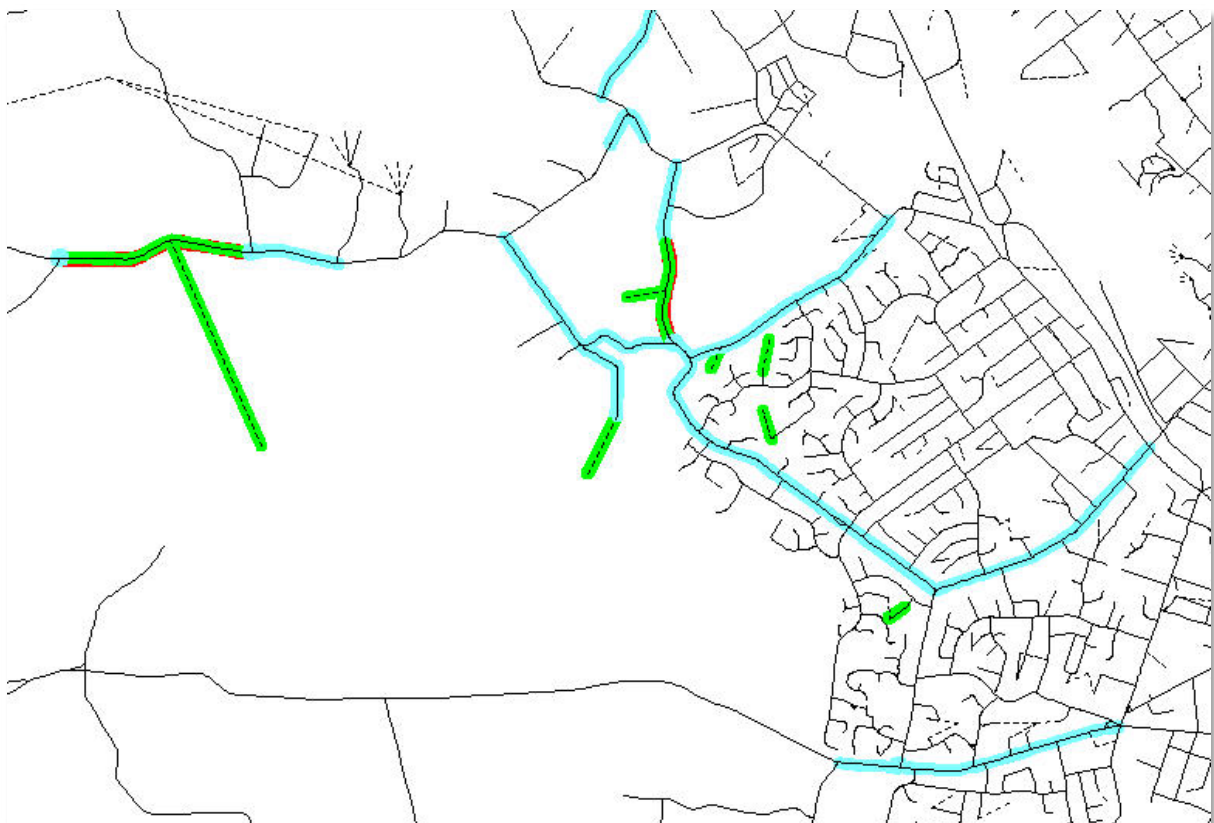


Figure 2-2: Network changes for local validation – zoomed in

The network code after these changes have been made is 25B0

Changes made in the 2025 network also have to be made to each of the future base networks. These diagrams provide a visual aid to check that the changes made to the 2025 base network are correctly transferred to the future base networks.

Model Performance as supplied			
GEH summary – Morning Peak			
	Percent < 5.0	Percent < 7.5	Percent < 10.0
All approaches	59.7%	91.9%	98.4%
All turns	66.7%	90.9%	98.5%
GEH summary – Evening Peak			
	Percent < 5.0	Percent < 7.5	Percent < 10.0
All approaches	79.0%	90.3%	96.8%
All turns	76.1%	80.6%	97.0%

Table 2-1: Network Performance for the model as supplied.

The aim of the exercise was to get 85% of GEH statistics under 5.0, 90% under 7.5 and 95% under 10.0 to meet the small area/corridor model type criteria in the NZTA Transport Model Guidelines. As shown in Table 2-1, the morning peak comparisons for the model as supplied meet the criteria for GEH statistics less than 7.5, but not less than 5.0

The evening peak at the turn level only meets the criteria for GEH <10. Obviously, some changes to the model were required.

In order to improve the validation, several zones close to Brymer Road were split to obtain a better loading pattern, and secondly, the running speed of roads were altered until the GEH stats were acceptable. Table 2-2 shows the summary of all approaches and turns for the final network, and the detailed comparisons are shown in Appendix Two.

Model Performance after modification			
GEH summary – Morning Peak			
	Percent < 5.0	Percent < 7.5	Percent < 10.0
All approaches	83.9%	95.2%	98.4%
All turns	87.9%	97.0%	100.0%
GEH summary – Evening Peak			
	Percent < 5.0	Percent < 7.5	Percent < 10.0
All approaches	85.5%	96.8%	98.4%
All turns	82.1%	92.5%	95.5%

Table 2-2: Network Performance for the model as modified.

The guideline criteria are largely met, except for turns <5.0 in the evening peak and approaches <5.0 in the Morning peak.

In the 10 intersections there are 66 individual turns and 31 approaches. In the morning peak only 5 approaches (16%) had a GEH greater than 5.0 and only one was more than 10. Of the 66 turns, only 8 (12%) had a GEH over 5.0 and all were under 10.0. Five of the eight high GEH statistics occurred at the intersections of Newcastle Road and Ellicott Street, and Whatawhata Road (SH23) and Newcastle Road.

The evening peak tells a similar story with the two intersections a little worse than the morning, but the other 8 are remarkably good. These two intersections will need further analysis in the future year models with the likely analytical approach being adding the change in flow to the 2025 counted turns.

No matter what was changed, it proved impossible to get flows on SH23 west of Dinsdale correct in the model. It points to a structural issue with the model in terms of Trip

2.5 Level of Service - Concept

Level of service (LoS) is a qualitative measure used to describe the quality of vehicle traffic service. LoS is used to analyse roadways and intersections by categorizing traffic flow and assigning quality levels of traffic based on performance measures such as vehicle speed and delays.

It is a concept developed by American Highway Engineers, with six levels A to F. Levels A, B and C describe free flow to near free flow and can be ignored for this type of analysis. Level D is approaching unstable flow, speeds decrease, and minor incidents are expected to cause delays. LoS 'D' is normally considered acceptable for planning purposes as the cost of maintaining LoS 'C' network wide would be prohibitive. Level 'E' is unstable flow, and the road or intersection is operating at capacity. Any incident will create serious delays. Level 'F' is forced or breakdown flow, with unpredictable travel times.

As a rule of thumb, when LoS 'D' is predicted, then an intervention should be considered, detailed design and funding committed by the time it reaches LoS 'E', and the intervention completed before LoS 'F' is reached.

Level of Service is calculated both for mid-block lengths of road, where LoS is a function of traffic flow, and link capacity, and separately for intersections where LoS is a function of delay. LoS for signalised intersections and roundabouts is calculated for the intersection as a whole, but priority (sign controlled) intersection the LoS is calculated for the worst approach.

Table 2-3 shows the LoS criteria used in this project

LEVEL OF SERVICE CRITERIA				
LOS	AustRoads Description	Transportation Model HCM LOS Criteria		
		Link (vehicles per hour)	Intersection (average delay/veh)	
			Priority	Signal/Rotary
LOS F	Forced flow. The amount of traffic approaching a point exceeds that which can pass it. Flow break-downs occur, and queuing and delays occur.	In excess of 900-1700 depending on link type	50 sec	80 sec
LOS E	Traffic volumes are at or close to <i>capacity and there is virtually no freedom</i> to select desired speed and to manoeuvre within the traffic stream. Flow is unstable and <i>minor disturbances within the traffic stream will cause break-downs in operation.</i>	Between 720-1360 depending on link type	35 sec	55 sec
LOS D	Approaching unstable flow where <i>all drivers are severely restricted</i> in their freedom to select desired speed and to manoeuvre within the traffic stream. The general level of <i>comfort and convenience is poor</i> and small increases in traffic flow will cause operational problems.	Between 585-1105 depending on link type	25 sec	35 sec

2.6 Traffic Flow – 2025

Figures 2-3 and 2-4 show the traffic flows that result from the validation process for the morning and evening peaks in 2025.

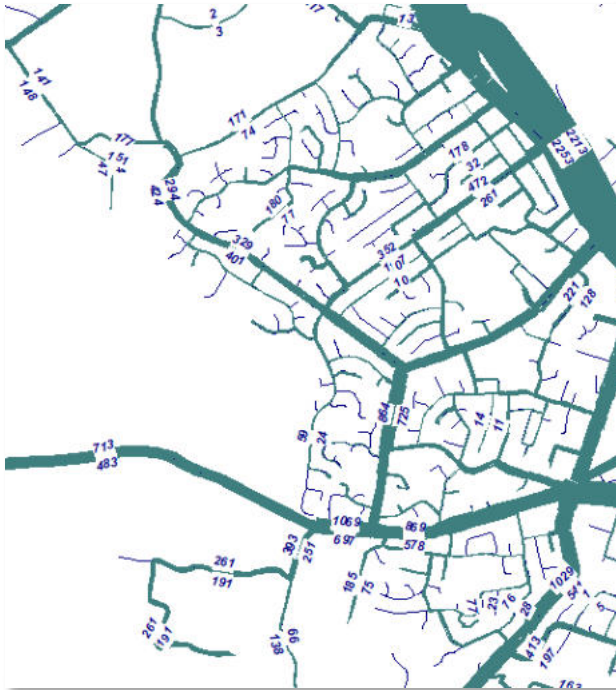


Figure 2-3 Morning peak flows

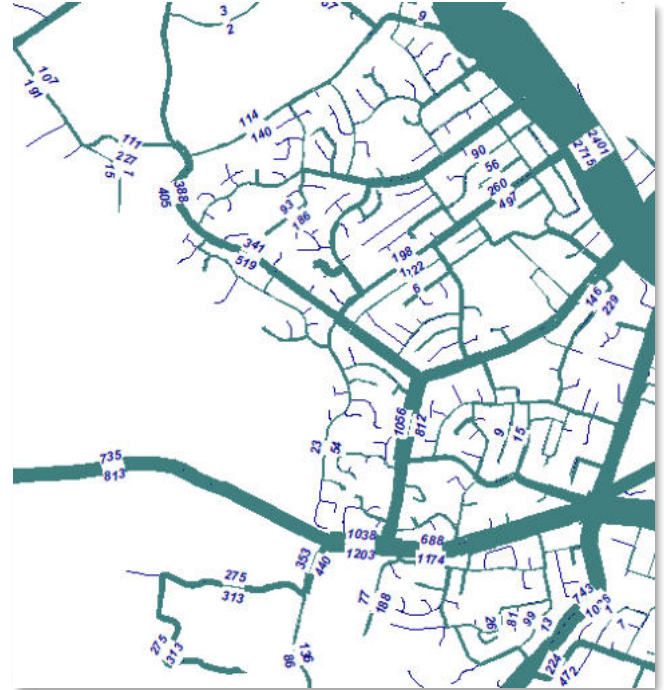


Figure 2-4 Evening Peak flows

2.7 Level of Service

Figures 2-5 and 2-6 show the levels of Service for 2025 Am peak and Pm peak respectively. There is very little stress in the local area in the either period although the Dinsdale roundabout is at LoS 'D' in the evening peak

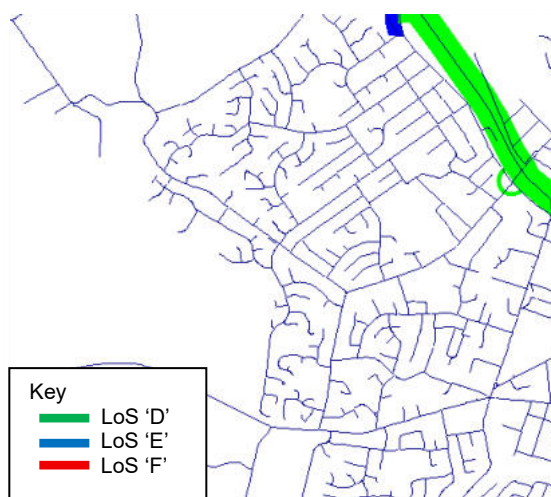


Figure 2-5 Morning peak LoS

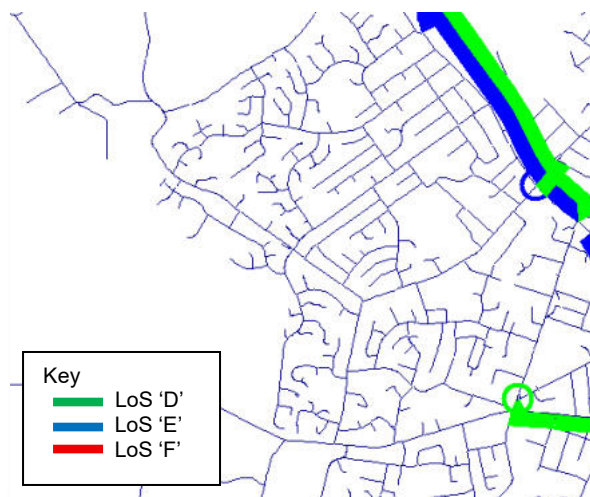


Figure 2-6 Evening Peak LoS

3. Trip generation

3.1 The process

The WRTM is calibrated from household interview data, and the relationships are the average over the whole of the model area. When looking at individual developments such as Brymer, where the detail of the local area becomes important, it is current practice to calculate the expected trip generation from first principles and then adjust the model parameters for the development zones to achieve that development.

The available parameters are household size, employment per household and car ownership. These were varied until both the morning and evening trip generation matched those calculated by Transplan and reported in the ITA.

The development was split into 14 zones¹ with each zone representing a stage in the development, with the commercial areas also given a separate zone.

3.2 Generation check

Tables 3-1 and 3-2 show the generation calculated by Transplan for the morning and evening peaks, with the WRTM generation shown alongside.

WRTM Trip generation Compared with Transplan Calculation – Morning Peak							
Stage	WRTM Zone	WRTM Outbound	WRTM Inbound	WRTM Total	Transplan Generation	Diff	%outbound
1	2360	146	56	202	201	-1	72%
10 Comm	2361	39	116	155	161	6	25%
10 Res'l	2362	243	96	339	298	-41	72%
11	2363	34	13	47	50	3	72%
3	2364	39	14	53	55	2	74%
4	2365	87	29	116	118	2	75%
5	2366	61	24	85	83	-2	72%
2	2367	64	25	89	88	-1	72%
7	2368	109	41	150	145	-5	73%
6	2369	67	26	93	91	-2	72%
8	2370	37	13	50	55	5	74%
12	2371	50	21	71	68	-3	70%
1A	2372	10	3	13	13	0	77%
9	2373	40	17	57	62	5	70%
	Total	1026	494	1520	1488	-32	68%

Table 3-1 – Morning Peak Trip generation

¹ The zones used were 2360 to 2373

WRTM Trip generation Compared with Transplan Calculation – Morning Peak							
Stage	WRTM Zone	WRTM Outbound	WRTM Inbound	WRTM Total	Transplan Generation	Diff	%outbound
1	2360	53	147	200	203	3	27%
10 Comm	2361	253	119	372	332	-40	68%
10 Res'l	2362	91	249	340	371	31	27%
11	2363	11	34	45	50	5	24%
3	2364	13	39	52	58	6	25%
4	2365	30	87	117	121	4	26%
5	2366	22	61	83	84	1	27%
2	2367	23	65	88	89	1	26%
7	2368	43	143	186	183	-3	23%
6	2369	24	67	91	92	1	26%
8	2370	12	37	49	55	6	24%
12	2371	19	51	70	69	-1	27%
1A	2372	3	9	12	13	1	25%
9	2373	15	41	56	71	15	27%
	Total	612	1149	1761	1791	30	35%

Table 3-2 – Evening Peak Trip generation

The WRTM generation matches the empirical calculations very well with the exception of the Commercial and residential apartments but even these are within 30-40 trips over the two-hour periods. Overall, the generation is within 2% of the Transplan Calculations.

4 Future Models

4.1 Future Base Networks

The base models for 2035, 2045 and 2055 were those used for the Te Kowhai development analysed by Stantec in April 2026. The land use codes were yyTK, and the networks 35Z3, 45Z4 and 55Z5. The changes made to the 2025 base network were transferred to the supplied bases and the new base networks without the Brymer development were given codes of yyB0.

4.2 Future base land use

Also, because several zones were split, the future land use files also had to be altered, and these were given codes of yyB0.

5 Scenarios at 2035

5.1 No development

This scenario is the baseline and provides the situation of Brymer does not go ahead. Traffic flow diagrams for the morning and evening peaks are shown in Figures 5-1 and 5-2, the change in flow between 2025 and 2035 in Figures 5-3 and 5-4, and the Level of Service diagrams are shown in Figure 5-5 and Figure 5-6.

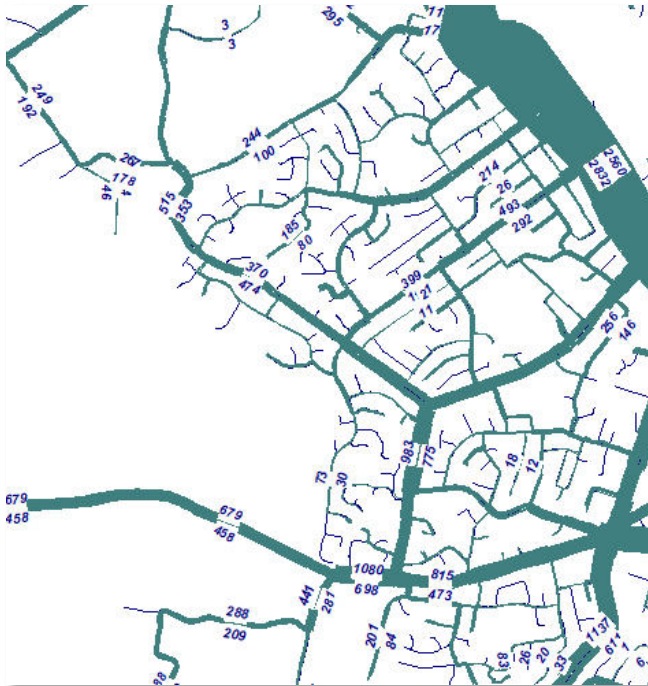


Figure 5-1 Morning peak flows

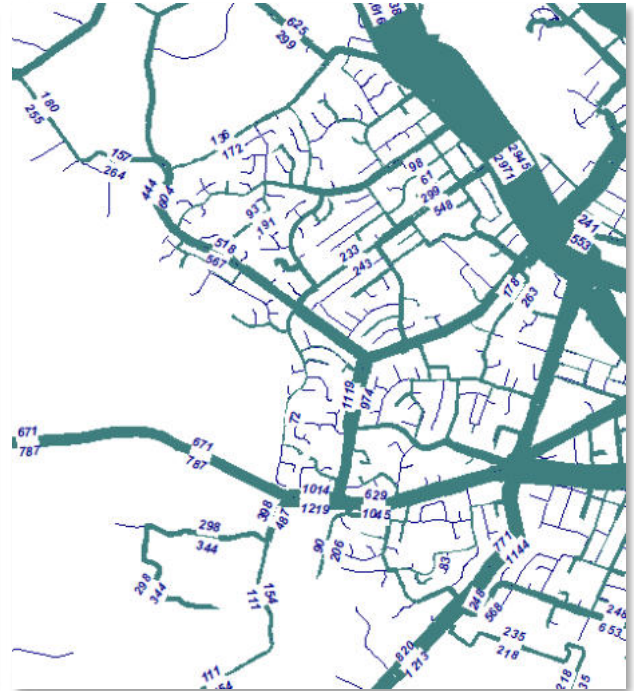


Figure 5-2 Evening Peak flows



Figure 5-3 Morning peak Change in flow

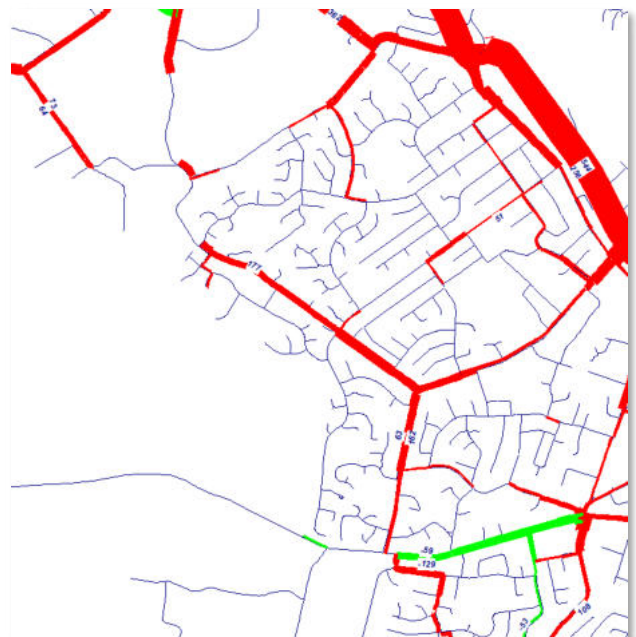


Figure 5-4 Evening Peak change in flow

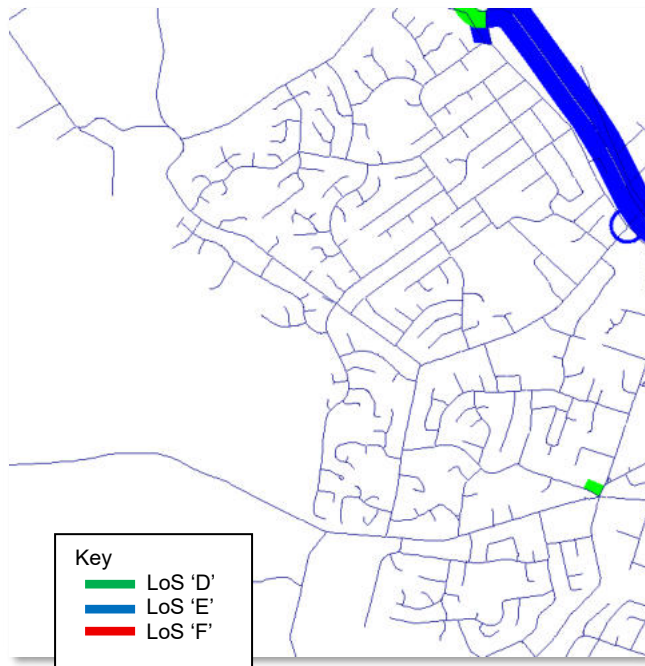


Figure 5-5 Morning peak LoS

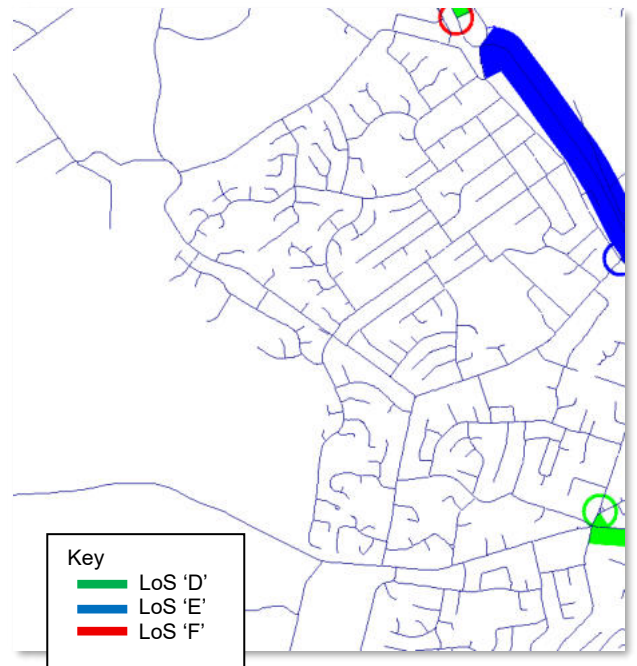


Figure 5-6 Evening Peak LoS

There are only small changes in traffic flow in the local area between 2025 and 2035 without the Brymer Farms development, and no discernible change in level of Service.

5.2 Part development Scenarios

Two part-development scenarios were prepared for 2035. These were

- Stages 1-5 of the development, including 8 dwellings with access to Obrien Road, 121 dwellings with access to Harrogate Place, and 212 dwellings with access to Grandview Road.
- Stages 1-6 of the development – that is the addition of stage 6 which comprises 55 dwellings and with a third access formed at SH23 – necessary to enable development of Stages 6 to 9. The SH23 and Grandview Road accesses are linked by internal roads, but there is no internal connection between these and Harrogate Place.

Analysis of the 'with development' scenarios has also included a 'select link' analysis which isolates the traffic using each of the access points in each direction.

Figures 5-7 to 5-10 show the traffic volumes for each of the 'part development' scenarios.

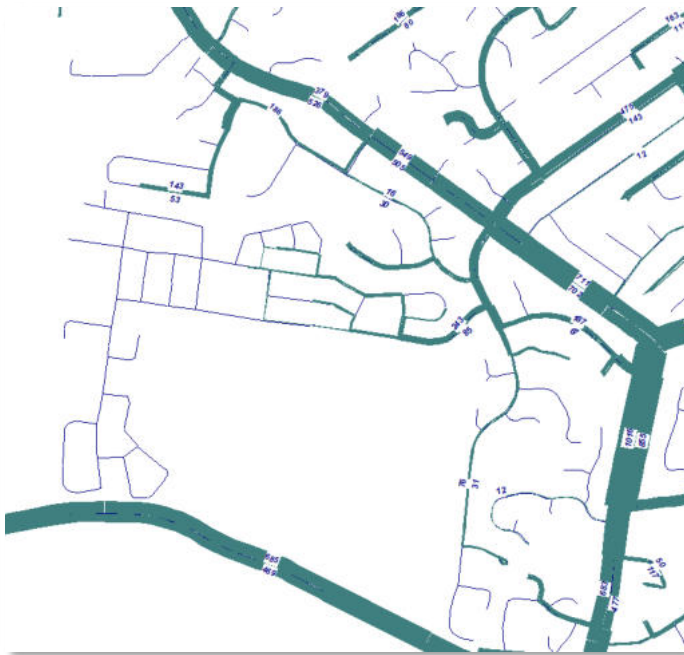


Figure 5-7 Morning peak flows Stages 1-5



Figure 5-8 Evening Peak flows Stages 1-5

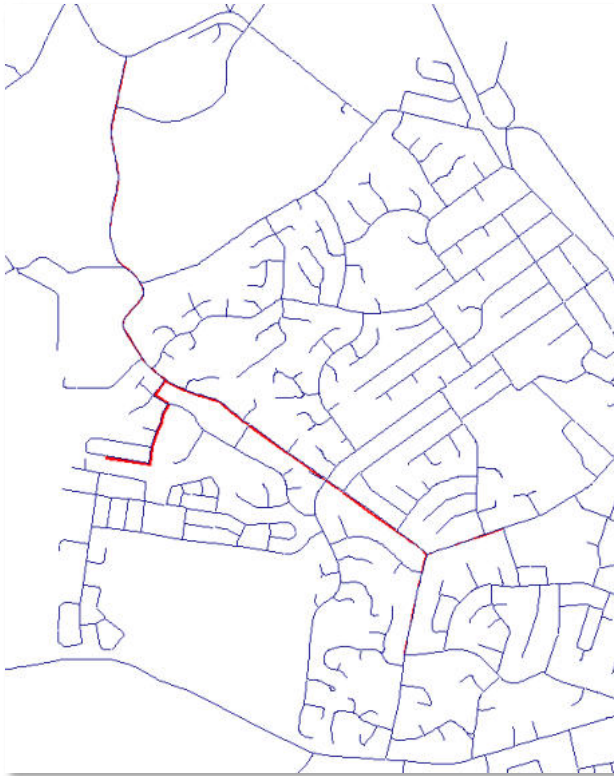


Figure 5-9 Morning peak flows Stages 1-6



Figure 5-10 Evening Peak flows Stages 1-6

Figures 5-11 to 5-14 show the select link volumes for each access in each direction in the morning peak and 5-15 to 5-18 for the evening peak for stages 1-5. The volume change diagrams have not been included as they tell the same story as the select link diagrams



Southbound

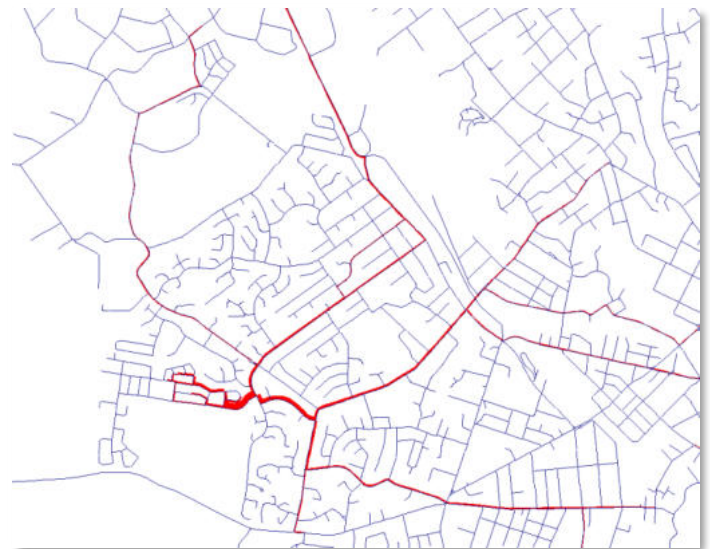


Northbound

Figure 5-11 and Figure 5-12 Flows on Harrogate Place Access - Morning peak

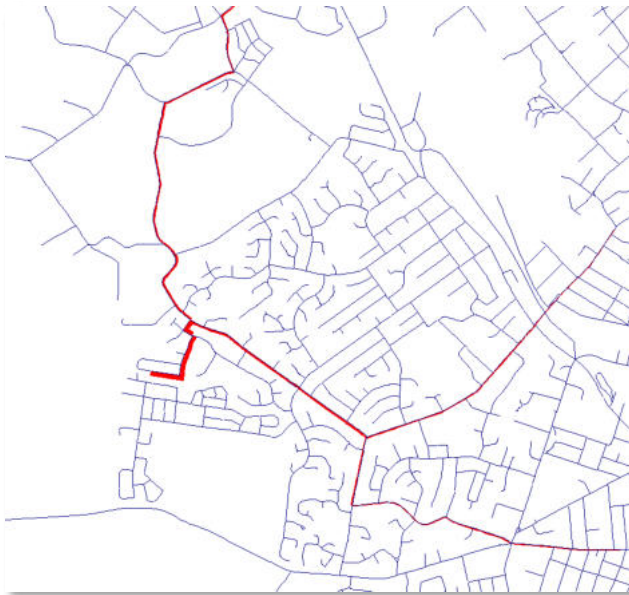


Southbound

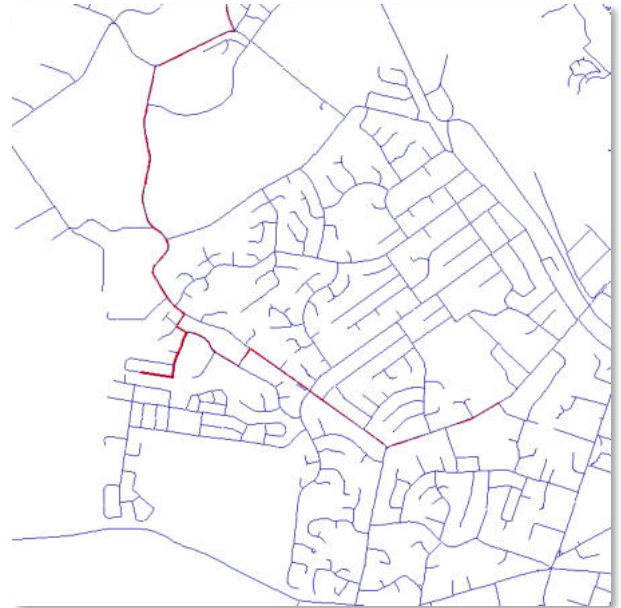


Northbound

Figure 5-13 and Figure 5-14 Flows on Grandview Road Access - Morning peak



Southbound



Northbound

Figure 5-15 and Figure 5-16 Flows on Harrogate Place Access - Evening peak



Southbound



Northbound

Figure 5-17 and Figure 5-18 Flows on Grandview Road Access - Evening peak

Figures 5-19 to 5-22 show the select link volumes for the Grandview Road and SH23 access points in each direction in the morning peak and 5-23 to 5-26 for the evening peak for stages 1-6. The Harrogate Place access diagrams are the same as in Figures 5-11, 5-12, 5-15 and 5-16.

Note that the flow on SH23 to the west of the access is traffic that is using the internal roads as a 'rat run' to avoid using Newcastle Road



Southbound

Northbound

Figure 5-19 and Figure 5-20 Flows on Grandview Road Access - Morning peak



Southbound

Northbound

Figure 5-21 and Figure 5-22 Flows on the SH23 Access - Morning peak

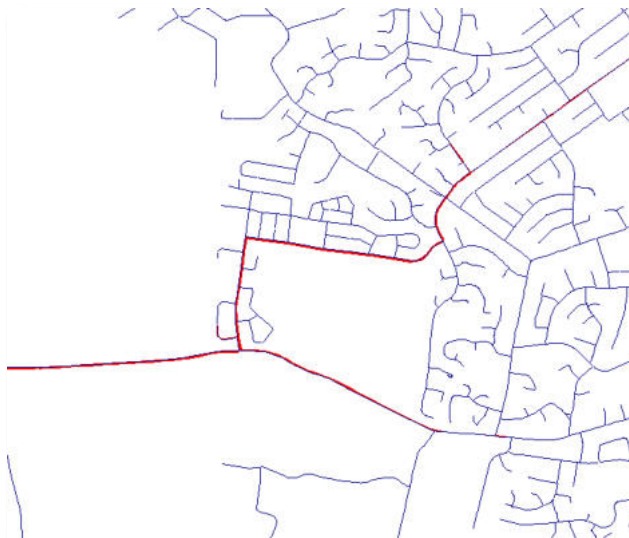


Southbound

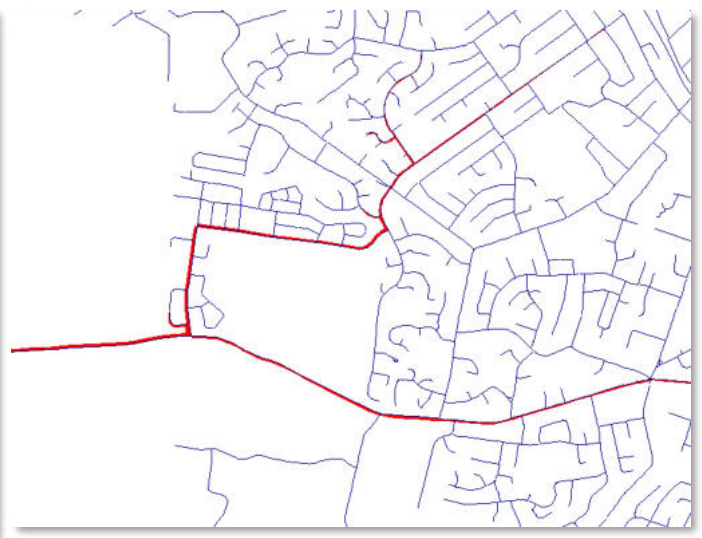


Northbound

Figure 5-23 and Figure 5-24 Flows on Grandview Road Access - Evening peak



Southbound



Northbound

Figure 5-25 and Figure 5-26 Flows on the SH23 Access - Evening peak

Figures 5-27 to 5-30 show the levels of service for the two part-development scenarios. There is little if any change caused by either of the part development scenarios from the 'no development' baseline.



Morning Peak



Evening Peak

Figure 5-30 and Figure 5-31 Full development traffic flows



Morning Peak



Evening Peak

Figure 5-32 and Figure 5-33 Full development change in flow compared with no development

The select link diagrams are shown in Figures 5-34 to 5-37 for the full development scenario for the Grandview Road and SH23 accesses. The Harrogate Place access diagrams are not included as they are the same as in Figures 5-11, 5-12, 5-15 and 5-16.

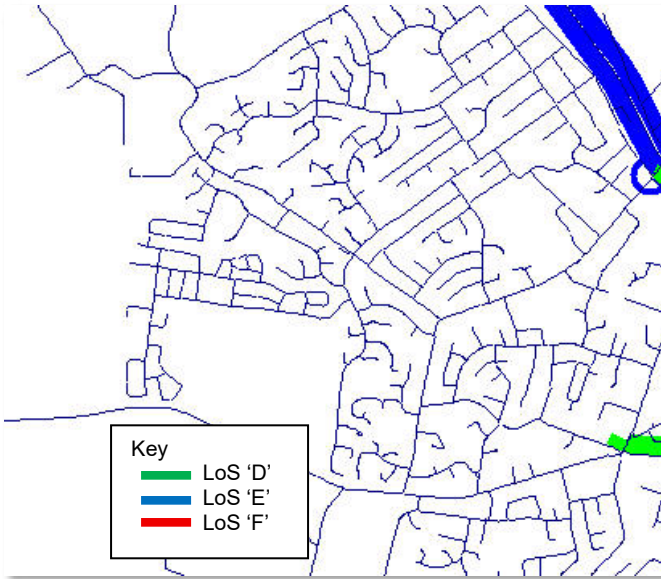


Figure 5-27 Stages 1-5 Morning peak LoS

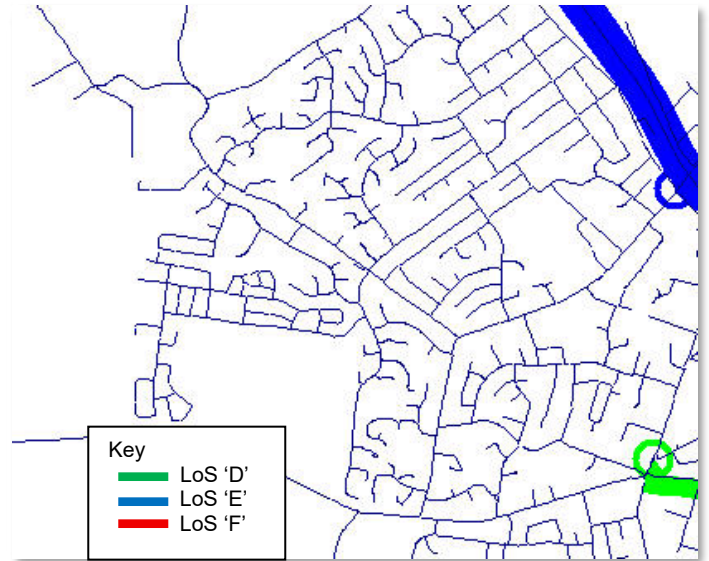


Figure 5-28 Stages 1-5 Evening Peak LoS

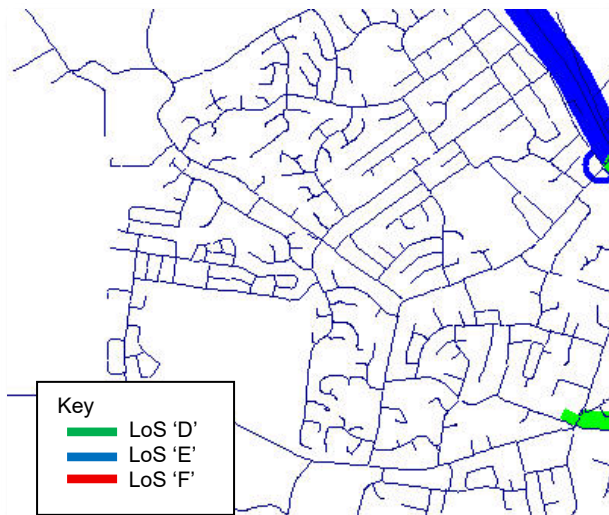


Figure 5-29 Stages 1-5 Morning peak LoS

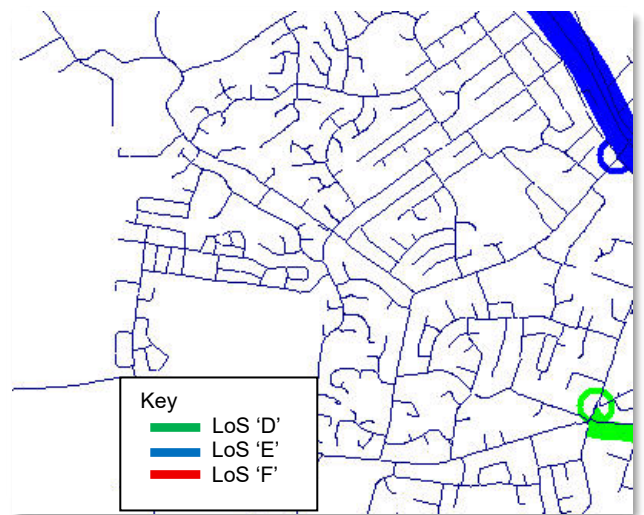


Figure 5-30 Stages 1-5 Evening Peak LoS

5.3 Full Development at 2035

Although it is unlikely to occur, a scenario of full development by 2035 was also tested. Figures 5-30 and 5-31 show the traffic flows for the morning and evening peaks respectively, and figures 5-32 and 5-33 show the change in flow compared with the 'no development' scenario.



Southbound



Northbound

Figure 5-34 and Figure 5-35 Flows on the Grandview Road access - Morning peak

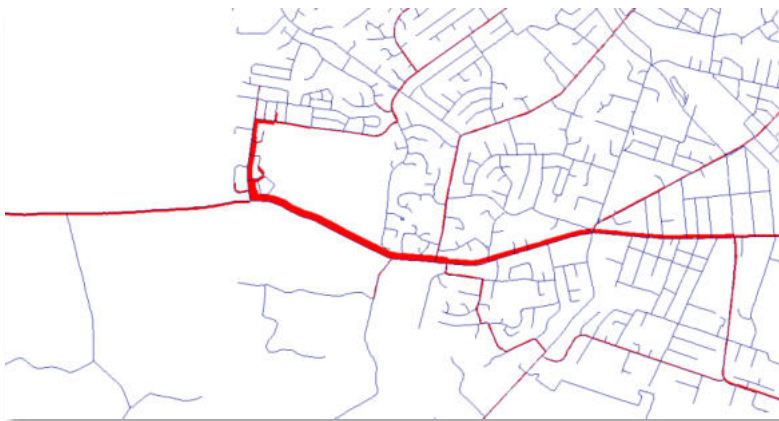


Figure 5-36 Flows on the SH23 Access – Southbound Morning Peak



Figure 5-37 Flows on the SH23 Access – Northbound Morning Peak



Southbound



Northbound

Figure 5-38 and Figure 5-39 Flows on the Grandview Road access - Evening peak

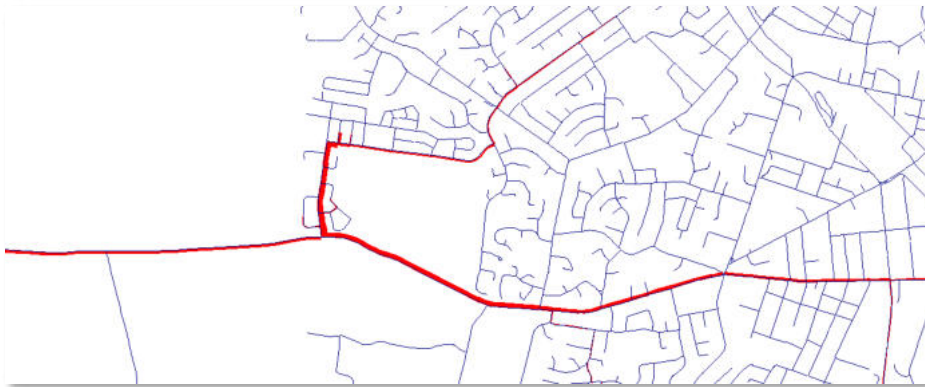


Figure 5-40 Flows on the SH23 Access – Southbound Evening Peak



Figure 5-41 Flows on the SH23 Access – Northbound Evening Peak

Again, as shown in Figures 5-42 and 5-43, there is little or no change in the Levels of service with Full development when compared against the 'no development' scenario. The Dinsdale roundabout in the PM peak is slightly worse, and there are delays of 26 seconds on the Wallace Road approach to SH23.

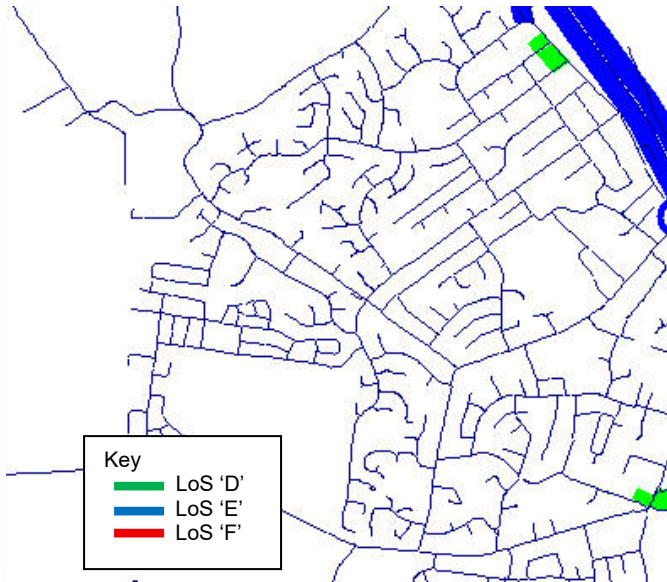


Figure 5-27 Stages 1-5 Morning peak LoS

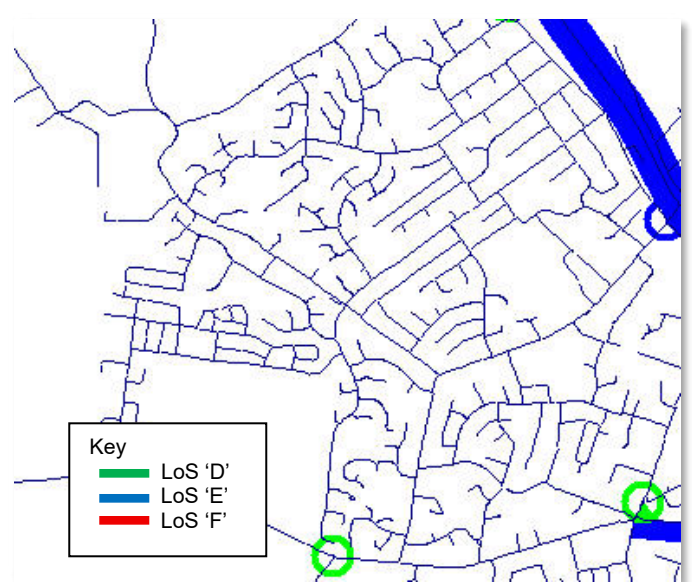


Figure 5-28 Stages 1-5 Evening Peak LoS

6 Scenarios at 2045

6.1 No development

This scenario is the baseline and provides the situation of Brymer does not go ahead. Traffic flow diagrams for the morning and evening peaks are shown in Figures 6-1 and 6-2, the change in flow between 2025 and 2045 in Figures 6-3 and 6-4. As there is no difference in the Level of Service in the local area between 2035 and 2045, these diagrams have not been included.

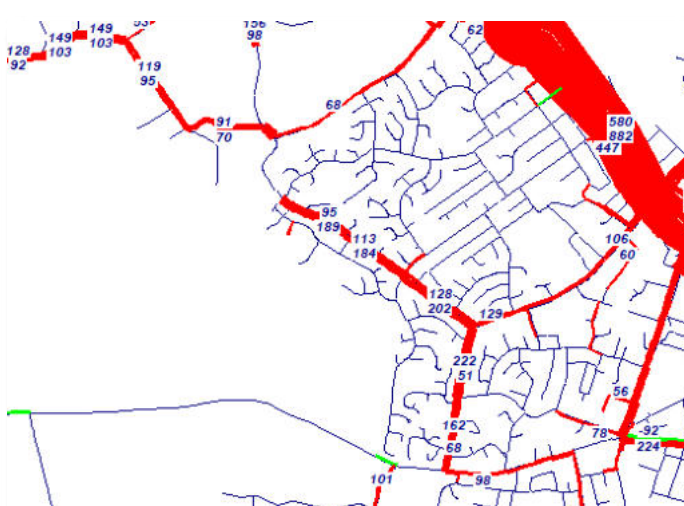


Morning Peak

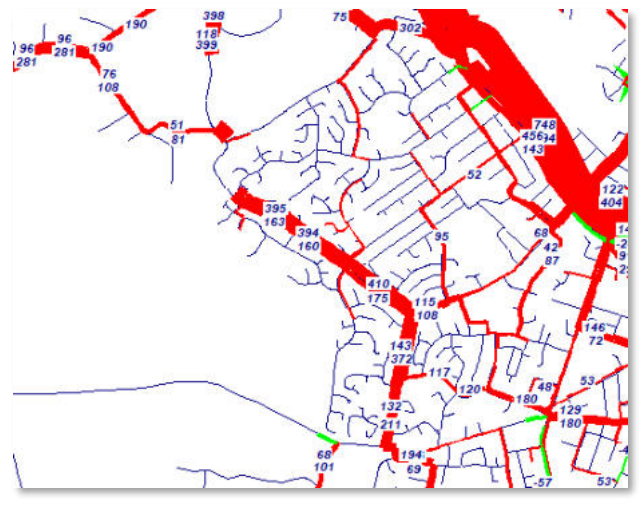


Evening Peak

Figures 6-1 and 6-2 Traffic flows no development



Morning Peak



Evening Peak

Figures 6-3 and 6-4. Change in flow 2025 to 2045

6.2 Full development

The only Scenario run at 2045 was that with full development. Flow diagrams are shown in Figures 6-5 and 6-6. The change in flow between full development and no development is the same as for 2035 and there is also no change in level of service with the development. The diagrams for 2045 have not been included.



Morning Peak

Evening Peak

Figures 6-5 and 6-6 Traffic flows no development

The select link diagrams are very similar to the 2035 'full development' scenario and have not been included.

Figures 7-5 and 7-6 show the level of service for 2055 with no development. In the local area, the Intersection of Wallace Road and SH23 is at LoS 'D', as is the intersection of Dinsdale Road and Newcastle Road. The intersection of Newcastle Road and SH23 has moved to LoS 'E'. The Dinsdale roundabout is also showing LoS 'E'

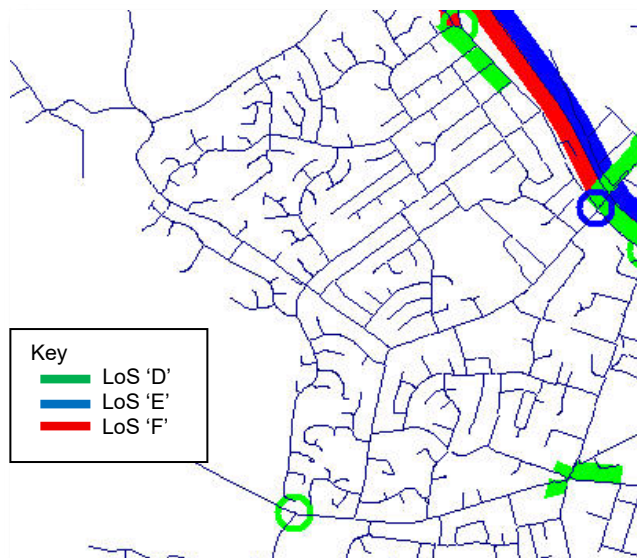


Figure 7-5 Morning peak LoS

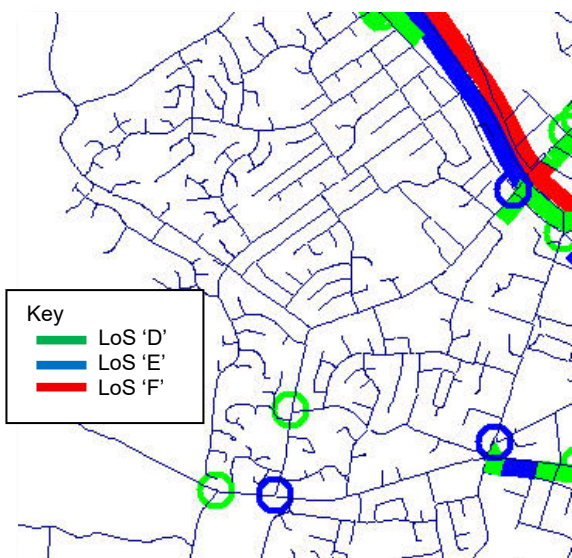


Figure 7-6 Evening Peak LoS

7.2 Full development

The only Scenario run at 2055 was that with full development. Flow diagrams are shown in Figures 7-7 and 7-8. The change in flow between full development and no development is the same as for 2035 and the diagrams for 2055 have not been included.



Morning Peak



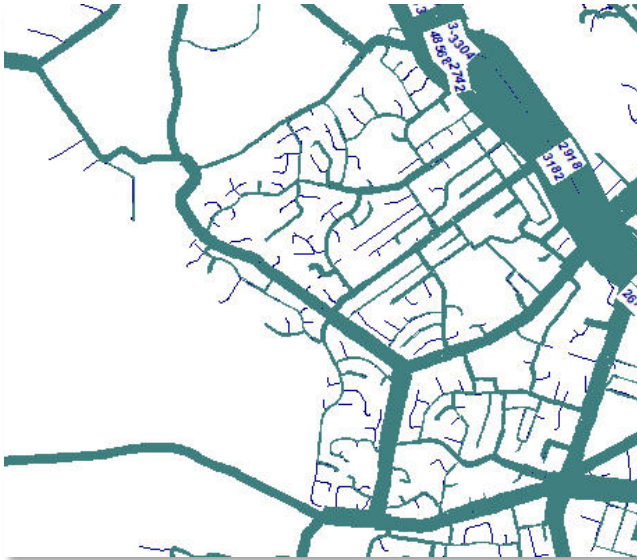
Evening Peak

Figures 7-7 and 7-8 Traffic flows with full development

7 Scenarios at 2055

7.1 No development

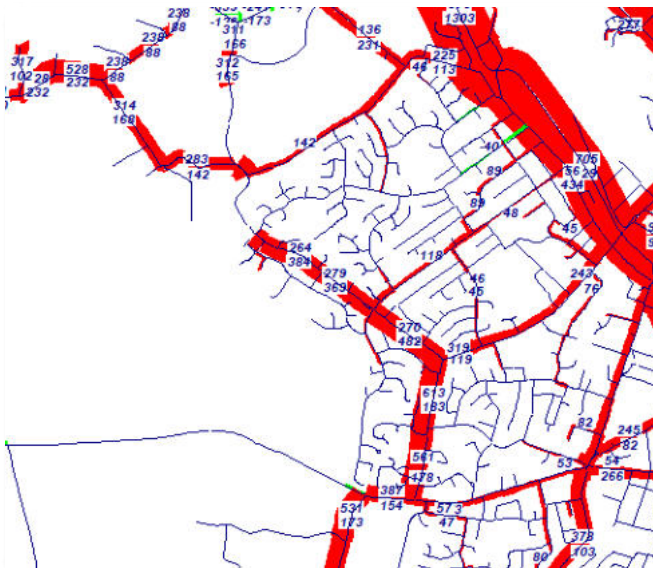
This scenario is the baseline and provides the situation of Brymer does not go ahead. Traffic flow diagrams for the morning and evening peaks are shown in Figures 7-1 and 7-2, and the change in flow between 2025 and 2055 in Figures 7-3 and 7-4.



Morning Peak

Evening Peak

Figures 7-1 and 7-2 Traffic flows no development



Morning Peak

Evening Peak

Figures 7-3 and 7-4. Change in flow 2025 to 2055

Level of service diagrams for 2055 full development are shown on Figures 7-9 and 7-10. In the morning peak, the Wallace Road/SH23 intersection moves to LoS 'E', and in the evening peak the Newcastle/Ellicott Road moves to LoS 'D' and Newcastle/Sh23 to LoS 'F'.

The performance of these intersections needs to be checked in Sidra, noting that the base year validation is not very good.

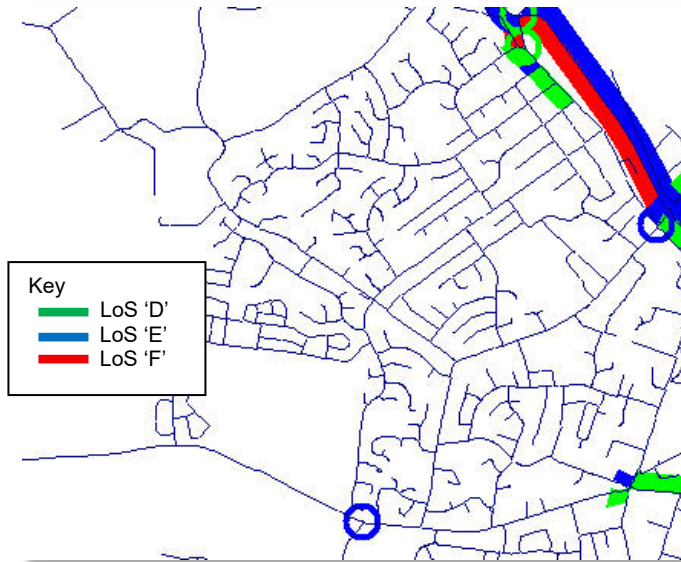


Figure 7-9 Morning peak LoS

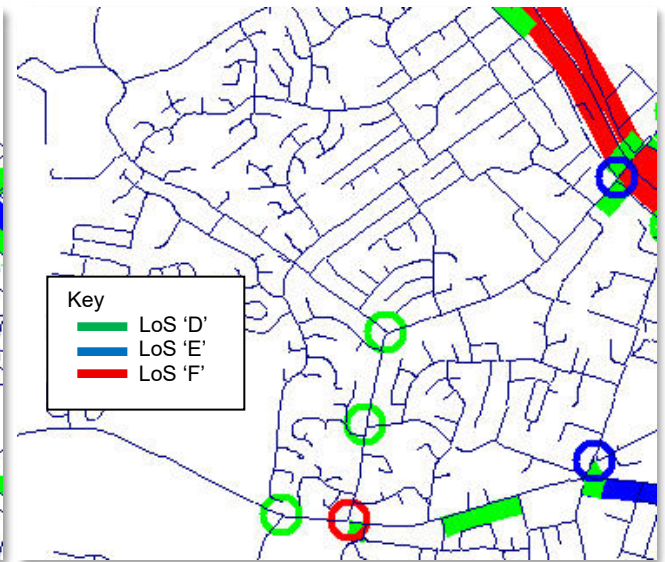


Figure 7-10 Evening Peak LoS

The select link diagrams are very similar to the 2035 'full development' scenario and have not been included.

Appendix 1a – Morning peak detailed comparisons as supplied from Stantec

Brymer Farms Development - Turning movement analysis

HCL_LAPTOP 24/ 2/2027

```

TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS TR
TRACKS +-----+ TRACKS
S TRACKS |          | S TRACKS
KS TRACK | Program :   TURNON | KS TRACK
CKS TRAC | Version :   V7.01 | CKS TRAC
ACKS TRA |          | ACKS TRA
RACKS TR | Date run : 19-MAY-26 | RACKS TR
TRACKS T | Time run : 14:46:17 | TRACKS T
  TRACKS | Platform : Win 10    | TRACKS
S TRACKS +-----+ S TRACKS
KS TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS

+-----+
|
|          TRACKS Licenced to
|          Hollyford Consulting Limited
|          Computer : HCL_LAPTOP
|          Build Date : 10/04/26 14:42
|          Parameter version : V7.00
|
+-----+

```

Loaded Network read from file: WM25GHALTDH2.NL

Turn movement counts read from file : AMTRNON.DAT

Described as : Turning movements for Brymer Farms analysis - Morning Peak W

Factors used in calculation of GEH (one hour) statistics

Count Factor : 0.5000 Factor to convert turn counts to 1 hour

Volume Factor : 0.5000 Factor to convert Assigned turns to 1 hour

Intersection Number : 1 at Node 2693

```
Intersection Number      : 1 at Node
Number of incoming links :      3
```

Description : Bagurst Road and O'Brien Road

			4126			4979			2694		
			Bagurst Road Count Model			Bagurst Road Count Model			O'Brien Road Count Model		
				GEH			GEH			GEH	
Bagurst Road	4126		0	0	0.0	141	181	2.2	1	0	1.0
Bagurst Road	4979		131	153	1.3	0	0	0.0	18	0	4.2
O'Brien Road	2694		2	0	1.4	34	0	5.8	0	0	0.0

Correlation Coefficient : 0.979

% RMS : 44,751

Intersection turns GEH :	%<5.0	%<7.5	%<10.0
	83.3	100.0	100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4126 - 2693	142	181	127.5	2.2	133	153	115.0	1.2	Bagurst Road
4979 - 2693	149	153	102.7	0.2	175	181	103.4	0.3	Bagurst Road
2694 - 2693	36	0	0.0	6.0	19	0	0.0	4.4	O'Brien Road

	In	Out	Both
Correlation Coefficient :	0.988	0.979	0.995

Approaches GEH :	%<5.0	%<7.5	%<10.0
	83.3	100.0	100.0

Intersection Number : 2 at Node 4979
 Number of incoming links : 3
 Description : Bagurst Road and Brymers Road

		2693			10665			4775		
		Bagurst Road			Brymer Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Bagurst Road	2693	0	0	0.0	19	0	4.4	169	181	0.6
Brymer Road	10665	10	0	3.2	0	0	0.0	109	98	0.8
Brymer Road	4775	154	153	0.1	290	173	5.4	0	0	0.0

Correlation Coefficient : 0.947
 % RMS : 39.161
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
2693 - 4979	188	181	96.3	0.4	164	153	93.3	0.6	Bagurst Road
10665 - 4979	119	98	82.4	1.4	309	173	56.0	6.2	Brymer Road
4775 - 4979	444	326	73.4	4.3	278	279	100.4	0.0	Brymer Road

Correlation Coefficient : In 0.992 Out 0.995 Both 0.965
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Intersection Number : 3 at Node 4775
 Number of incoming links : 3
 Description : Brymer Road and Baverstock Road

		4979			10662			4212		
		Brymer Road			Baverstock Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4979	0	0	0.0	35	93	5.1	238	186	2.5
Baverstock Road	10662	78	41	3.4	0	0	0.0	66	2	7.8
Brymer Road	4212	368	285	3.2	44	5	5.6	0	0	0.0

Correlation Coefficient : 0.958
 % RMS : 41.727
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 50.0 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4979 - 4775	273	279	102.2	0.3	446	326	73.1	4.3	Brymer Road
10662 - 4775	144	43	29.9	7.4	79	98	124.1	1.4	Baverstock Road
4212 - 4775	412	290	70.4	4.6	304	188	61.8	5.2	Brymer Road

Correlation Coefficient : In 0.993 Out 0.969 Both 0.991
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Intersection Number : 4 at Node 4212
 Number of incoming links : 3
 Description : Brymer Road and Farmborough Road

		4775			4211			4343		
		Brymer Road			Farmborough Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4775	0	0	0.0	31	36	0.6	439	152	11.8
Farmborough Road	4211	29	89	5.5	0	0	0.0	90	115	1.7
Brymer Road	4343	387	201	7.7	45	66	2.0	0	0	0.0

Correlation Coefficient : 0.876
 % RMS : 83.679
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 50.0 66.7 83.3

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4775 - 4212	470	188	40.0	11.0	416	290	69.7	4.7	Brymer Road
4211 - 4212	119	204	171.4	4.7	76	102	134.2	1.9	Farmborough Road
4343 - 4212	432	267	61.8	6.2	529	267	50.5	9.3	Brymer Road

Correlation Coefficient : In 0.967 Out 0.912 Both 0.978
 Approaches GEH : %<5.0 %<7.5 %<10.0
 50.0 66.7 83.3

Intersection Number : 5 at Node 4343
 Number of incoming links : 3
 Description : Brymer Road and Highgrove Drive

		4212			4342			4779		
		Brymer Road			Brymer Road			Highgrove Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4212	0	0	0.0	363	229	5.5	27	37	1.2
Brymer Road	4342	368	191	7.5	0	0	0.0	7	0	2.6
Highgrove Drive	4779	66	76	0.8	23	0	4.8	0	0	0.0

Correlation Coefficient : 0.981
 % RMS : 64.177
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4212 - 4343	390	266	68.2	4.8	434	267	61.5	6.3	Brymer Road
4342 - 4343	375	191	50.9	7.7	386	229	59.3	6.3	Brymer Road
4779 - 4343	89	76	85.4	1.0	34	37	108.8	0.4	Highgrove Drive

Correlation Coefficient : In 0.995 Out 0.988 Both 0.999
 Approaches GEH : %<5.0 %<7.5 %<10.0
 50.0 83.3 100.0



Intersection Number : 6 at Node 5190
 Number of incoming links : 3
 Description : Brymer Road and Angus Street

		3761			4351			5185		
		Brymer Road			Brymer Road			Angus Street		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	3761	0	0	0.0	433	229	7.9	1	1	0.0
Brymer Road	4351	357	180	7.6	0	0	0.0	16	26	1.5
Angus Street	5185	8	11	0.7	38	75	3.5	0	0	0.0

Correlation Coefficient : 0.979
 % RMS : 78.339
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 66.7 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
3761 - 5190	434	230	53.0	7.9	365	191	52.3	7.4	Brymer Road
4351 - 5190	373	206	55.2	6.9	471	304	64.5	6.0	Brymer Road
5185 - 5190	46	86	187.0	3.5	17	27	158.8	1.5	Angus Street

Correlation Coefficient : In 0.991 Out 0.982 Both 0.994
 Approaches GEH : %<5.0 %<7.5 %<10.0
 33.3 83.3 100.0

Intersection Number : 7 at Node 4331
 Number of incoming links : 4
 Description : Brymer Road - Newcastle Road and Grandview Road

		4332			5075			4889			4790		
		Brymer Road			Grandview Road			Newcastle Road			Grandview Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4332	0	0	0.0	51	24	3.1	401	267	5.2	34	13	3.1
Grandview Road	5075	37	17	2.7	0	0	0.0	154	179	1.4	16	62	5.2
Newcastle Road	4889	299	169	6.0	104	114	0.7	0	0	0.0	24	5	3.5
Grandview Road	4790	27	21	0.9	64	166	6.7	39	9	4.3	0	0	0.0

Correlation Coefficient : 0.888
 % RMS : 62.565
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4332 - 4331	486	304	62.6	6.5	363	207	57.0	6.5	Brymer Road
5075 - 4331	207	258	124.6	2.4	219	304	138.8	3.7	Grandview Road
4889 - 4331	427	288	67.4	5.2	594	455	76.6	4.3	Newcastle Road
4790 - 4331	130	196	150.8	3.7	74	80	108.1	0.5	Grandview Road

Correlation Coefficient : In 0.962 Out 0.955 Both 0.965
 Approaches GEH : %<5.0 %<7.5 %<10.0
 62.5 100.0 100.0

Intersection Number : 8 at Node 4790
 Number of incoming links : 3
 Description : Grandview Road and Ayrshire Drive

		4331			7530			5033		
		Grandview Road			Grandview Road			Ayrshire Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Grandview Road	4331	0	0	0.0	36	60	2.4	18	20	0.3
Grandview Road	7530	74	142	4.6	0	0	0.0	20	53	3.9
Ayrshire Drive	5033	53	53	0.0	60	121	4.5	0	0	0.0

Correlation Coefficient : 0.955
 % RMS : 93.916
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4331 - 4790	54	80	148.1	2.2	127	195	153.5	3.8	Grandview Road
7530 - 4790	94	195	207.4	5.9	96	181	188.5	5.1	Grandview Road
5033 - 4790	113	174	154.0	3.6	38	73	192.1	3.3	Ayrshire Drive

Correlation Coefficient : In 0.993 Out 0.989 Both 0.995
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Intersection Number : 9 at Node 7332
 Number of incoming links : 3
 Description : Newcastle Road and Ellicott Road

		7030			10655			4770		
		Newcastle Road			Ellicott Road			Newcastle Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	7030	0	0	0.0	382	204	7.4	282	242	1.7
Ellicott Road	10655	95	78	1.3	0	0	0.0	189	307	5.3
Newcastle Road	4770	332	191	6.2	576	697	3.4	0	0	0.0

Correlation Coefficient : 0.912
 % RMS : 37.797
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 50.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
7030 - 7332	664	446	67.2	6.5	427	269	63.0	6.0	Newcastle Road
10655 - 7332	284	385	135.6	3.9	958	901	94.1	1.3	Ellicott Road
4770 - 7332	908	888	97.8	0.5	471	549	116.6	2.4	Newcastle Road

Correlation Coefficient : In 0.984 Out 0.980 Both 0.988
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Intersection Number : 10 at Node 7165
 Number of incoming links : 3
 Description : Whatawhata Road (SH23) and Newcastle Road

		4194			3412			4980		
		Newcastle Road			Whatawhata Road (S			Whatawhata Road (S		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	4194	0	0	0.0	476	485	0.3	120	237	6.2
Whatawhata Road (SH2	3412	293	336	1.7	0	0	0.0	270	447	6.6
Whatawhata Road (SH2	4980	334	403	2.5	1058	716	8.1	0	0	0.0

Correlation Coefficient : 0.928
 % RMS : 39.436
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 50.0 83.3 100.0

Approach		Count	In		GEH	Out		GEH	Approach name
Totals			Volume	%Change		Count	Volume		
4194 - 7165		596	722	121.1	3.5	627	739	117.9	Newcastle Road
3412 - 7165		563	783	139.1	6.0	1534	1201	78.3	Whatawhata Road (SH2
4980 - 7165		1392	1119	80.4	5.4	390	684	175.4	Whatawhata Road (SH2

Correlation Coefficient : In 0.996 Out 0.973 Both 0.964
 Approaches GEH : %<5.0 %<7.5 %<10.0
 33.3 83.3 100.0

GEH Summary %<5.0 %<7.5 %<10.0
 All turns : 66.7 90.9 98.5
 All approaches: 59.7 91.9 98.4

TURNON terminated successfully

Appendix 1b – Evening peak detailed comparisons as supplied by Stantec

TRACKS - 19-MAY-26 @ 14:59:30

Licenced to Hollyford Consulting Limited

Brymer Farms Development - Turning movement analysis

HCL_LAPTOP 24/ 2/2027

```

TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS TR
TRACKS +-----+ TRACKS
S TRACKS |
KS TRACK|   Program :   TURNON |KS TRACK
CKS TRAC|   Version :   V7.01 |CKS TRAC
ACKS TRA|                   |ACKS TRA
RACKS TR|   Date run : 19-MAY-26 |RACKS TR
TRACKS T|   Time run : 14:59:30 |TRACKS T
TRACKS |   Platform : Win 10 |TRACKS
S TRACKS+-----+S TRACKS
KS TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS TRACKS
+-----+
|
|   TRACKS Licenced to
|   Hollyford Consulting Limited
|   Computer : HCL_LAPTOP
|   Build Date : 10/04/26 14:42
|   Parameter version : V7.00
|

```

Loaded Network read from file: WM25GHPLTDH2.NL

Turn movement counts read from file : PMTRNON.DAT

Described as : Turning movements for Brymer Farms analysis - Evening Peak W

Factors used in calculation of GEH (one hour) statistics

Count Factor : 0.5000 Factor to convert turn counts to 1 hour

Volume Factor : 0.5000 Factor to convert Assigned turns to 1 hour

```

Intersection Number      : 1 at Node   2693
Number of incoming links :          3
Description              : Bagurst Road and O'Brien Road

```

			4126			4979			2694		
			Bagurst Road		GEH	Bagurst Road		GEH	O'Brien Road		GEH
			Count	Model		Count	Model		Count	Model	
Bagurst Road	4126		4	0	2.0	94	147	3.4	5	0	2.2
Bagurst Road	4979		105	190	4.9	0	0	0.0	16	0	4.0
O'Brien Road	2694		11	0	3.3	9	0	3.0	0	0	0.0

Correlation Coefficient : 0.988

```

% RMS : 103.030

```

Intersection turns GEH :	%<5.0	%<7.5	%<10.0
	100.0	100.0	100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4126 - 2693	103	147	142.7	2.8	120	190	158.3	4.0	Bagurst Road
4979 - 2693	121	190	157.0	3.9	103	147	142.7	2.8	Bagurst Road
2694 - 2693	20	0	0.0	4.5	21	0	0.0	4.6	O'Brien Road

	In	Out	Both
Correlation Coefficient :	0.992	0.991	0.990

Approaches GEH :	%<5.0	%<7.5	%<10.0
	100.0	100.0	100.0

Intersection Number : 2 at Node 4979
 Number of incoming links : 3
 Description : Bagurst Road and Brymers Road

		2693			10665			4775		
		Bagurst Road			Brymer Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Bagurst Road	2693	0	0	0.0	6	0	2.4	112	147	2.2
Brymer Road	10665	5	0	2.2	0	0	0.0	324	241	3.5
Brymer Road	4775	116	190	4.2	141	106	2.2	0	0	0.0

Correlation Coefficient : 0.930
 % RMS : 42.437
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
2693 - 4979	118	147	124.6	1.8	121	190	157.0	3.9	Bagurst Road
10665 - 4979	329	241	73.3	3.7	147	106	72.1	2.6	Brymer Road
4775 - 4979	257	296	115.2	1.7	436	388	89.0	1.7	Brymer Road

Correlation Coefficient : In 0.983 Out 0.973 Both 0.982
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 3 at Node 4775
 Number of incoming links : 3
 Description : Brymer Road and Baverstock Road

		4979			10662			4212		
		Brymer Road			Baverstock Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4979	0	0	0.0	64	64	0.0	379	324	2.1
Baverstock Road	10662	43	69	2.5	0	0	0.0	77	5	8.0
Brymer Road	4212	216	227	0.5	62	2	7.5	0	0	0.0

Correlation Coefficient : 0.964
 % RMS : 32.702
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 66.7 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4979 - 4775	443	388	87.6	1.9	259	296	114.3	1.6	Brymer Road
10662 - 4775	120	74	61.7	3.3	126	66	52.4	4.3	Baverstock Road
4212 - 4775	278	229	82.4	2.2	456	329	72.1	4.5	Brymer Road

Correlation Coefficient : In 0.989 Out 0.998 Both 0.974
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 4 at Node 4212
 Number of incoming links : 3
 Description : Brymer Road and Farmborough Road

		4775			4211			4343		
		Brymer Road			Farmborough Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4775	0	0	0.0	34	109	6.3	424	220	8.0
Farmborough Road	4211	17	48	3.8	0	0	0.0	66	65	0.1
Brymer Road	4343	262	181	3.8	97	146	3.1	0	0	0.0

Correlation Coefficient : 0.894
 % RMS : 65.073
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4775 - 4212	458	329	71.8	4.6	279	229	82.1	2.2	Brymer Road
4211 - 4212	83	113	136.1	2.1	131	255	194.7	6.3	Farmborough Road
4343 - 4212	359	327	91.1	1.2	490	285	58.2	7.4	Brymer Road

Correlation Coefficient : In 0.973 Out 0.989 Both 0.918
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Intersection Number : 5 at Node 4343
 Number of incoming links : 3
 Description : Brymer Road and Highgrove Drive

		4212			4342			4779		
		Brymer Road			Brymer Road			Highgrove Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4212	0	0	0.0	417	189	9.3	72	97	1.9
Brymer Road	4342	321	290	1.3	0	0	0.0	17	0	4.1
Highgrove Drive	4779	39	37	0.2	10	0	3.2	0	0	0.0

Correlation Coefficient : 0.917
 % RMS : 64.956
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4212 - 4343	489	286	58.5	7.3	360	327	90.8	1.3	Brymer Road
4342 - 4343	338	290	85.8	1.9	427	189	44.3	9.6	Brymer Road
4779 - 4343	49	37	75.5	1.3	89	97	109.0	0.6	Highgrove Drive

Correlation Coefficient : In 0.996 Out 0.983 Both 0.939
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 83.3 100.0



Intersection Number : 6 at Node 5190
 Number of incoming links : 3
 Description : Brymer Road and Angus Street

		3761			4351			5185		
		Brymer Road			Brymer Road			Angus Street		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	3761	0	0	0.0	428	188	9.7	11	1	2.9
Brymer Road	4351	401	282	4.6	0	0	0.0	48	62	1.3
Angus Street	5185	4	8	1.2	21	34	1.8	0	0	0.0

Correlation Coefficient : 0.959
 % RMS : 72.111
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
3761 - 5190	439	189	43.1	10.0	405	290	71.6	4.4	Brymer Road
4351 - 5190	449	344	76.6	3.7	449	222	49.4	8.8	Brymer Road
5185 - 5190	25	42	168.0	2.1	59	63	106.8	0.4	Angus Street

Correlation Coefficient : In 0.996 Out 0.961 Both 0.981
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 66.7 100.0

Intersection Number : 7 at Node 4331
 Number of incoming links : 4
 Description : Brymer Road - Newcastle Road and Grandview Road

		4332			5075			4889			4790		
		Brymer Road			Grandview Road			Newcastle Road			Grandview Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4332	0	0	0.0	49	26	2.7	360	161	8.7	44	34	1.1
Grandview Road	5075	46	22	2.9	0	0	0.0	165	176	0.6	45	140	7.0
Newcastle Road	4889	373	311	2.4	198	204	0.3	0	0	0.0	41	24	2.1
Grandview Road	4790	29	12	2.7	48	70	2.0	15	3	2.8	0	0	0.0

Correlation Coefficient : 0.890
 % RMS : 57.515
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 91.7 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4332 - 4331	453	221	48.8	8.9	448	345	77.0	3.7	Brymer Road
5075 - 4331	256	338	132.0	3.4	295	300	101.7	0.2	Grandview Road
4889 - 4331	612	539	88.1	2.2	540	340	63.0	6.7	Newcastle Road
4790 - 4331	92	85	92.4	0.5	130	198	152.3	3.8	Grandview Road

Correlation Coefficient : In 0.976 Out 0.955 Both 0.971
 Approaches GEH : %<5.0 %<7.5 %<10.0
 75.0 87.5 100.0



Intersection Number : 8 at Node 4790
 Number of incoming links : 3
 Description : Grandview Road and Ayrshire Drive

		4331			7530			5033		
		Grandview Road			Grandview Road			Ayrshire Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Grandview Road	4331	0	0	0.0	101	139	2.5	31	60	3.0
Grandview Road	7530	70	63	0.6	0	0	0.0	87	129	2.9
Ayrshire Drive	5033	19	21	0.3	50	57	0.7	0	0	0.0

Correlation Coefficient : 0.973
 % RMS : 44.083
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4331 - 4790	132	199	150.8	3.7	89	84	94.4	0.4	Grandview Road
7530 - 4790	157	192	122.3	1.9	151	196	129.8	2.4	Grandview Road
5033 - 4790	69	78	113.0	0.7	118	189	160.2	4.1	Ayrshire Drive

Correlation Coefficient : In 0.999 Out 0.994 Both 0.986
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 9 at Node 7332
 Number of incoming links : 3
 Description : Newcastle Road and Ellicott Road

		7030			10655			4770		
		Newcastle Road			Ellicott Road			Newcastle Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	7030	0	0	0.0	119	135	1.0	422	195	9.1
Ellicott Road	10655	550	167	14.3	0	0	0.0	181	623	15.6
Newcastle Road	4770	476	361	4.0	328	480	5.3	0	0	0.0

Correlation Coefficient : 0.577
 % RMS : 77.387
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 33.3 50.0 66.7

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
7030 - 7332	541	330	61.0	7.1	1026	528	51.5	12.6	Newcastle Road
10655 - 7332	731	790	108.1	1.5	447	615	137.6	5.2	Ellicott Road
4770 - 7332	804	841	104.6	0.9	603	818	135.7	5.7	Newcastle Road

Correlation Coefficient : In 0.946 Out 0.983 Both 0.895
 Approaches GEH : %<5.0 %<7.5 %<10.0
 33.3 83.3 83.3



Appendix 2a – Morning peak detailed comparisons after local area validation

TRACKS - 17-APR-26 @ 15:01:14 Licenced to Hollyford Consulting Limited
Brymer Farms Development - Turning movement analysis HCL_LAPTOP 24/ 2/2027

TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TR
TRACKS	+	+	+	+	+	+
S TRACKS						S TRACKS
KS TRACK	Program :		TURNON			KS TRACK
CKS TRAC	Version :		V7.01			CKS TRAC
ACKS TRA						ACKS TRA
RACKS TR	Date run :		17-APR-26			RACKS TR
TRACKS T	Time run :		15:01:14			TRACKS T
TRACKS	Platform :		Win 10			TRACKS
S TRACKS	+	+	+	+	+	S TRACKS
KS TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS

TRACKS Licenced to Hollyford Consulting Limited Computer : HCL_LAPTOP Build Date : 10/04/26 14:42 Parameter version : V7.00

Loaded Network read from file: WM25B0AALLB0.NL

Turn movement counts read from file : AMTRNON.DAT

Described as : Turning movements for Brymer Farms analysis - Morning Peak W

Factors used in calculation of GEH (one hour) statistics

Count Factor : 0.5000 Factor to convert turn counts to 1 hour

Volume Factor : 0.5000 Factor to convert Assigned turns to 1 hour

Intersection Number : 1 at Node 2693
Number of incoming links : 3
Description : Bagurst Road and O'Brien Road

		4126			4979			2694		
		Bagurst Road			Bagurst Road			O'Brien Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Bagurst Road	4126	0	0	0.0	141	138	0.2	1	3	1.0
Bagurst Road	4979	131	140	0.5	0	0	0.0	18	11	1.3
O'Brien Road	2694	2	8	1.9	34	39	0.6	0	0	0.0

Correlation Coefficient : 0.997

% RMS : 10.699

Intersection turns GEH : %<5.0 %<7.5 %<10.0
100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4126 - 2693	142	141	99.3	0.1	133	148	111.3	0.9	Bagurst Road
4979 - 2693	149	151	101.3	0.1	175	177	101.1	0.1	Bagurst Road
2694 - 2693	36	47	130.6	1.2	19	14	73.7	0.9	O'Brien Road

Correlation Coefficient : In 1.000 Out 0.999 Both 0.999

Approaches GEH : %<5.0 %<7.5 %<10.0
100.0 100.0 100.0

Intersection Number : 10 at Node 7165
 Number of incoming links : 3
 Description : Whatawhata Road (SH23) and Newcastle Road

		4194			3412			4980		
		Newcastle Road			Whatawhata Road (S			Whatawhata Road (S		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	4194	0	0	0.0	518	351	5.7	216	336	5.1
Whatawhata Road (SH2	3412	619	562	1.7	0	0	0.0	1062	915	3.3
Whatawhata Road (SH2	4980	159	385	9.7	411	656	7.5	0	0	0.0

Correlation Coefficient : 0.929
 % RMS : 34.645
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 33.3 66.7 100.0

Approach Totals		Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4194 -	7165	734	687	93.6	1.2	778	947	121.7	4.1	Newcastle Road
3412 -	7165	1681	1477	87.9	3.6	929	1007	108.4	1.8	Whatawhata Road (SH2
4980 -	7165	570	1041	182.6	11.7	1278	1251	97.9	0.5	Whatawhata Road (SH2

Correlation Coefficient : In 0.993 Out 0.964 Both 0.996
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 83.3 83.3

GEH Summary %<5.0 %<7.5 %<10.0
 All turns : 76.1 83.6 97.0
 All approaches: 79.0 90.3 96.8

TURNON terminated successfully

Intersection Number : 2 at Node 4979
 Number of incoming links : 3
 Description : Bagurst Road and Brymers Road

		2693			14655			4775		
		Bagurst Road			Brymer Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Bagurst Road	2693	0	0	0.0	19	17	0.3	169	160	0.5
Brymer Road	14655	10	5	1.3	0	0	0.0	109	130	1.4
Brymer Road	4775	154	146	0.5	290	280	0.4	0	0	0.0

Correlation Coefficient : 0.997
 % RMS : 8.721
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
2693 - 4979	188	177	94.1	0.6	164	151	92.1	0.7	Bagurst Road
14655 - 4979	119	135	113.4	1.0	309	297	96.1	0.5	Brymer Road
4775 - 4979	444	426	95.9	0.6	278	290	104.3	0.5	Brymer Road

Correlation Coefficient : In Out Both
 1.000 0.999 0.999
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 3 at Node 4775
 Number of incoming links : 3
 Description : Brymer Road and Baverstock Road

		4979			10662			4212					
		Brymer Road	Count	Model	GEH	Baverstock Road	Count	Model	GEH	Brymer Road	Count	Model	GEH
Brymer Road	4979	0	0	0.0		35	51	1.7		238	239	0.0	
Baverstock Road	10662	78	46	2.9		0	0	0.0		66	54	1.1	
Brymer Road	4212	368	380	0.4		44	44	0.0		0	0	0.0	

Correlation Coefficient : 0.995
 % RMS : 11.704
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4979 - 4775	273	290	106.2	0.7	446	426	95.5	0.7	Brymer Road
10662 - 4775	144	100	69.4	2.8	79	95	120.3	1.2	Baverstock Road
4212 - 4775	412	424	102.9	0.4	304	293	96.4	0.5	Brymer Road

Correlation Coefficient : In Out Both
 1.000 0.996 0.999
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0



Intersection Number : 4 at Node 4212
 Number of incoming links : 3
 Description : Brymer Road and Farmborough Road

		4775			4211			4343		
		Brymer Road			Farmborough Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4775	0	0	0.0	31	7	3.9	439	287	5.6
Farmborough Road	4211	29	25	0.5	0	0	0.0	90	58	2.6
Brymer Road	4343	387	399	0.4	45	26	2.3	0	0	0.0

Correlation Coefficient : 0.967
 % RMS : 38.104
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4775 - 4212	470	294	62.6	6.4	416	424	101.9	0.3	Brymer Road
4211 - 4212	119	83	69.7	2.5	76	33	43.4	4.1	Farmborough Road
4343 - 4212	432	425	98.4	0.2	529	345	65.2	6.2	Brymer Road

Correlation Coefficient : In 0.999 Out 0.976 Both 0.974
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0

Intersection Number : 5 at Node 4343
 Number of incoming links : 3
 Description : Brymer Road and Highgrove Drive

		4212			4342			4779		
		Brymer Road			Brymer Road			Highgrove Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4212	0	0	0.0	363	315	1.8	27	30	0.4
Brymer Road	4342	368	353	0.6	0	0	0.0	7	48	5.5
Highgrove Drive	4779	66	72	0.5	23	14	1.5	0	0	0.0

Correlation Coefficient : 0.994
 % RMS : 18.887
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4212 - 4343	390	345	88.5	1.7	434	425	97.9	0.3	Brymer Road
4342 - 4343	375	401	106.9	0.9	386	329	85.2	2.1	Brymer Road
4779 - 4343	89	86	96.6	0.2	34	78	229.4	4.2	Highgrove Drive

Correlation Coefficient : In 0.999 Out 0.996 Both 0.994
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0



Intersection Number : 6 at Node 5190
 Number of incoming links : 3
 Description : Brymer Road and Angus Street

		3761 Brymer Road			4351 Brymer Road			5185 Angus Street		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	3761	0	0	0.0	433	319	4.2	1	9	2.5
Brymer Road	4351	357	381	0.9	0	0	0.0	16	0	4.0
Angus Street	5185	8	20	2.3	38	95	4.9	0	0	0.0

Correlation Coefficient : 0.970
 % RMS : 37.754
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
3761 - 5190	434	328	75.6	3.8	365	401	109.9	1.3	Brymer Road
4351 - 5190	373	381	102.1	0.3	471	414	87.9	1.9	Brymer Road
5185 - 5190	46	115	250.0	5.4	17	9	52.9	1.6	Angus Street

Correlation Coefficient : In 0.998 Out 0.979 Both 0.994
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Intersection Number : 7 at Node 4331
 Number of incoming links : 4
 Description : Brymer Road - Newcastle Road and Grandview Road

		4332 Brymer Road			5075 Grandview Road			4889 Newcastle Road			4790 Grandview Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4332	0	0	0.0	51	31	2.2	401	365	1.3	34	18	2.2
Grandview Road	5075	37	22	2.0	0	0	0.0	154	174	1.1	16	49	4.1
Newcastle Road	4889	299	313	0.6	104	259	8.1	0	0	0.0	24	20	0.6
Grandview Road	4790	27	45	2.1	64	124	4.4	39	54	1.6	0	0	0.0

Correlation Coefficient : 0.935
 % RMS : 49.614
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 91.7 91.7 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4332 - 4331	486	414	85.2	2.4	363	380	104.7	0.6	Brymer Road
5075 - 4331	207	245	118.4	1.8	219	414	189.0	7.8	Grandview Road
4889 - 4331	427	592	138.6	5.2	594	593	99.8	0.0	Newcastle Road
4790 - 4331	130	223	171.5	4.9	74	87	117.6	1.0	Grandview Road

Correlation Coefficient : In 0.987 Out 0.971 Both 0.975
 Approaches GEH : %<5.0 %<7.5 %<10.0
 75.0 87.5 100.0

Intersection Number : 8 at Node 4790
 Number of incoming links : 3
 Description : Grandview Road and Ayrshire Drive

		4331			7530			5033		
		Grandview Road			Grandview Road			Ayrshire Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Grandview Road	4331	0	0	0.0	36	55	2.0	18	32	2.0
Grandview Road	7530	74	133	4.1	0	0	0.0	20	21	0.2
Ayrshire Drive	5033	53	90	3.1	60	48	1.2	0	0	0.0

Correlation Coefficient : 0.939
 % RMS : 69.929
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4331 - 4790	54	87	161.1	2.8	127	223	175.6	5.1	Grandview Road
7530 - 4790	94	154	163.8	3.8	96	103	107.3	0.5	Grandview Road
5033 - 4790	113	138	122.1	1.6	38	53	139.5	1.6	Ayrshire Drive

Correlation Coefficient : In 0.991 Out 0.990 Both 0.978
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Intersection Number : 9 at Node 7332
 Number of incoming links : 3
 Description : Newcastle Road and Ellicott Road

		7030			10655			4770		
		Newcastle Road			Ellicott Road			Newcastle Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	7030	0	0	0.0	382	243	5.6	282	342	2.4
Ellicott Road	10655	95	121	1.8	0	0	0.0	189	289	4.6
Newcastle Road	4770	332	453	4.3	576	471	3.2	0	0	0.0

Correlation Coefficient : 0.929
 % RMS : 32.128
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
7030 - 7332	664	585	88.1	2.2	427	574	134.4	4.6	Newcastle Road
10655 - 7332	284	410	144.4	4.8	958	714	74.5	6.0	Ellicott Road
4770 - 7332	908	924	101.8	0.4	471	631	134.0	4.8	Newcastle Road

Correlation Coefficient : In 0.996 Out 0.992 Both 0.959
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0



Intersection Number : 10 at Node 7165
 Number of incoming links : 3
 Description : Whatawhata Road (SH23) and Newcastle Road

		4194			3412			4980		
		Newcastle Road			Whatawhata Road (S			Whatawhata Road (S		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	4194	0	0	0.0	476	293	6.6	120	252	6.8
Whatawhata Road (SH2	3412	293	247	2.0	0	0	0.0	270	445	6.5
Whatawhata Road (SH2	4980	334	399	2.4	1058	670	9.3	0	0	0.0

Correlation Coefficient : 0.904
 % RMS : 46.886
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 33.3 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4194 - 7165	596	545	91.4	1.5	627	646	103.0	0.5	Newcastle Road
3412 - 7165	563	692	122.9	3.6	1534	963	62.8	11.4	Whatawhata Road (SH2
4980 - 7165	1392	1069	76.8	6.5	390	697	178.7	9.3	Whatawhata Road (SH2

Correlation Coefficient : In 0.994 Out 0.984 Both 0.935
 Approaches GEH : %<5.0 %<7.5 %<10.0
 50.0 66.7 83.3

GEH Summary %<5.0 %<7.5 %<10.0
 All turns : 87.9 97.0 100.0
 All approaches: 83.9 95.2 98.4

TURNON terminated successfully

Appendix 2b – Evening peak detailed comparisons after local area validation

TRACKS - 17-APR-26 @ 15:10:59 Licenced to Hollyford Consulting Limited
Brymer Farms Development - Turning movement analysis PM Pe HCL_LAPTOP 24/ 2/2027

TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TR
TRACKS	+	+	+	+	+	+	+
S TRACKS							S TRACKS
KS TRACK	Program :		TURNON				KS TRACK
CKS TRAC	Version :		V7.01				CKS TRAC
ACKS TRA							ACKS TRA
RACKS TR	Date run :		17-APR-26				RACKS TR
TRACKS T	Time run :		15:10:59				TRACKS T
TRACKS	Platform :		Win 10				TRACKS
S TRACKS	+	+	+	+	+	+	S TRACKS
KS TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS	TRACKS
TRACKS Licenced to Hollyford Consulting Limited Computer : HCL_LAPTOP Build Date : 10/04/26 14:42 Parameter version : V7.00							

Loaded Network read from file: WM25B0PALLB0.NL

Turn movement counts read from file : PMTRNON.DAT

Described as : Turning movements for Brymer Farms analysis - Evening Peak W

Factors used in calculation of GEH (one hour) statistics

Count Factor : 0.5000 Factor to convert turn counts to 1 hour

Volume Factor : 0.5000 Factor to convert Assigned turns to 1 hour

Intersection Number : 1 at Node 2693
Number of incoming links : 3
Description : Bagurst Road and O'Brien Road

		4126			4979			2694		
		Bagurst Road			Bagurst Road			O'Brien Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Bagurst Road	4126	4	0	2.0	94	99	0.4	5	9	1.1
Bagurst Road	4979	105	188	4.8	0	0	0.0	16	39	3.1
O'Brien Road	2694	11	3	2.1	9	12	0.7	0	0	0.0

Correlation Coefficient : 0.957

% RMS : 87.217

Intersection turns GEH : %<5.0 %<7.5 %<10.0
100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4126 - 2693	103	108	104.9	0.3	120	191	159.2	4.0	Bagurst Road
4979 - 2693	121	227	187.6	5.7	103	111	107.8	0.5	Bagurst Road
2694 - 2693	20	15	75.0	0.8	21	48	228.6	3.3	O'Brien Road

Correlation Coefficient : In 0.998 Out 0.964 Both 0.980

Approaches GEH : %<5.0 %<7.5 %<10.0
83.3 100.0 100.0



Intersection Number : 2 at Node 4979
 Number of incoming links : 3
 Description : Bagurst Road and Brymers Road

		2693			14655			4775		
		Bagurst Road		GEH	Brymer Road		GEH	Brymer Road		GEH
		Count	Model		Count	Model		Count	Model	
Bagurst Road	2693	0	0	0.0	6	7	0.3	112	104	0.5
Brymer Road	14655	5	20	3.0	0	0	0.0	324	321	0.1
Brymer Road	4775	116	207	5.1	141	168	1.5	0	0	0.0

Correlation Coefficient : 0.969
 % RMS : 33.570
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
2693 - 4979	118	111	94.1	0.5	121	227	187.6	5.7	Bagurst Road
14655 - 4979	329	341	103.6	0.5	147	175	119.0	1.6	Brymer Road
4775 - 4979	257	375	145.9	4.7	436	425	97.5	0.4	Brymer Road

Correlation Coefficient : In 0.998 Out 0.985 Both 0.978
 Approaches GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Intersection Number : 3 at Node 4775
 Number of incoming links : 3
 Description : Brymer Road and Baverstock Road

		4979			10662			4212					
		Brymer Road	Count	Model	GEH	Baverstock Road	Count	Model	GEH	Brymer Road	Count	Model	GEH
Brymer Road	4979	0	0	0.0	64	75	0.9	379	350	1.1			
Baverstock Road	10662	43	32	1.3	0	0	0.0	77	38	3.6			
Brymer Road	4212	216	343	5.4	62	62	0.0	0	0	0.0			

Correlation Coefficient : 0.950
 % RMS : 39.864
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4979 - 4775	443	425	95.9	0.6	259	375	144.8	4.6	Brymer Road
10662 - 4775	120	70	58.3	3.6	126	137	108.7	0.7	Baverstock Road
4212 - 4775	278	405	145.7	4.9	456	388	85.1	2.3	Brymer Road

Correlation Coefficient : In 0.998 Out 0.975 Both 0.970
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0



Intersection Number : 4 at Node 4212
 Number of incoming links : 3
 Description : Brymer Road and Farmborough Road

		4775			4211			4343		
		Brymer Road			Farmborough Road			Brymer Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4775	0	0	0.0	34	15	2.7	424	373	1.8
Farmborough Road	4211	17	17	0.0	0	0	0.0	66	36	3.0
Brymer Road	4343	262	388	4.9	97	50	3.9	0	0	0.0

Correlation Coefficient : 0.951
 % RMS : 40.320
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4775 - 4212	458	388	84.7	2.4	279	405	145.2	4.8	Brymer Road
4211 - 4212	83	53	63.9	2.6	131	65	49.6	4.7	Farmborough Road
4343 - 4212	359	438	122.0	2.8	490	409	83.5	2.7	Brymer Road

Correlation Coefficient : In 0.996 Out 0.983 Both 0.960
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 5 at Node 4343
 Number of incoming links : 3
 Description : Brymer Road and Highgrove Drive

		4212			4342			4779		
		Brymer Road			Brymer Road			Highgrove Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4212	0	0	0.0	417	335	3.0	72	73	0.1
Brymer Road	4342	321	404	3.1	0	0	0.0	17	115	8.5
Highgrove Drive	4779	39	35	0.5	10	5	1.3	0	0	0.0

Correlation Coefficient : 0.948
 % RMS : 42.645
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 83.3 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4212 - 4343	489	408	83.4	2.7	360	439	121.9	2.8	Brymer Road
4342 - 4343	338	519	153.6	6.2	427	340	79.6	3.1	Brymer Road
4779 - 4343	49	40	81.6	1.0	89	188	211.2	5.9	Highgrove Drive

Correlation Coefficient : In 0.996 Out 0.955 Both 0.965
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0



Intersection Number : 6 at Node 5190
 Number of incoming links : 3
 Description : Brymer Road and Angus Street

		3761 Brymer Road			4351 Brymer Road			5185 Angus Street		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	3761	0	0	0.0	428	317	4.1	11	24	2.2
Brymer Road	4351	401	509	3.6	0	0	0.0	48	0	6.9
Angus Street	5185	4	9	1.4	21	46	3.1	0	0	0.0

Correlation Coefficient : 0.953
 % RMS : 44.173
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 83.3 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
3761 - 5190	439	341	77.7	3.5	405	518	127.9	3.7	Brymer Road
4351 - 5190	449	509	113.4	1.9	449	363	80.8	3.0	Brymer Road
5185 - 5190	25	55	220.0	3.4	59	24	40.7	3.8	Angus Street

Correlation Coefficient : In 1.000 Out 0.982 Both 0.973
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 7 at Node 4331
 Number of incoming links : 4
 Description : Brymer Road - Newcastle Road and Grandview Road

		4332 Brymer Road			5075 Grandview Road			4889 Newcastle Road			4790 Grandview Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Brymer Road	4332	0	0	0.0	49	34	1.6	360	282	3.1	44	47	0.3
Grandview Road	5075	46	28	2.1	0	0	0.0	165	185	1.1	45	110	5.2
Newcastle Road	4889	373	459	3.0	198	303	4.7	0	0	0.0	41	53	1.2
Grandview Road	4790	29	22	1.0	48	52	0.4	15	22	1.2	0	0	0.0

Correlation Coefficient : 0.953
 % RMS : 42.425
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 91.7 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4332 - 4331	453	363	80.1	3.2	448	509	113.6	2.0	Brymer Road
5075 - 4331	256	323	126.2	2.8	295	389	131.9	3.6	Grandview Road
4889 - 4331	612	815	133.2	5.4	540	489	90.6	1.6	Newcastle Road
4790 - 4331	92	96	104.3	0.3	130	210	161.5	4.3	Grandview Road

Correlation Coefficient : In 0.995 Out 0.979 Both 0.986
 Approaches GEH : %<5.0 %<7.5 %<10.0
 87.5 100.0 100.0



Intersection Number : 8 at Node 4790
 Number of incoming links : 3
 Description : Grandview Road and Ayrshire Drive

		4331			7530			5033		
		Grandview Road			Grandview Road			Ayrshire Drive		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Grandview Road	4331	0	0	0.0	101	127	1.7	31	83	4.9
Grandview Road	7530	70	58	1.1	0	0	0.0	87	56	2.6
Ayrshire Drive	5033	19	38	2.5	50	24	3.0	0	0	0.0

Correlation Coefficient : 0.848
 % RMS : 50.844
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4331 - 4790	132	210	159.1	4.2	89	96	107.9	0.5	Grandview Road
7530 - 4790	157	114	72.6	2.6	151	151	100.0	0.0	Grandview Road
5033 - 4790	69	62	89.9	0.6	118	139	117.8	1.3	Ayrshire Drive

Correlation Coefficient : In 0.978 Out 0.934 Both 0.997
 Approaches GEH : %<5.0 %<7.5 %<10.0
 100.0 100.0 100.0

Intersection Number : 9 at Node 7332
 Number of incoming links : 3
 Description : Newcastle Road and Ellicott Road

		7030			10655			4770		
		Newcastle Road			Ellicott Road			Newcastle Road		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	7030	0	0	0.0	119	174	3.2	422	303	4.4
Ellicott Road	10655	550	210	12.3	0	0	0.0	181	559	13.9
Newcastle Road	4770	476	594	3.6	328	354	1.0	0	0	0.0

Correlation Coefficient : 0.728
 % RMS : 63.570
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 66.7 66.7 66.7

Approach Totals	Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
7030 - 7332	541	477	88.2	2.0	1026	804	78.4	5.2	Newcastle Road
10655 - 7332	731	769	105.2	1.0	447	528	118.1	2.6	Ellicott Road
4770 - 7332	804	948	117.9	3.4	603	862	143.0	6.8	Newcastle Road

Correlation Coefficient : In 0.981 Out 0.995 Both 0.963
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 100.0 100.0



Intersection Number : 10 at Node 7165
 Number of incoming links : 3
 Description : Whatawhata Road (SH23) and Newcastle Road

		4194			3412			4980		
		Newcastle Road			Whatawhata Road (S			Whatawhata Road (S		
		Count	Model	GEH	Count	Model	GEH	Count	Model	GEH
Newcastle Road	4194	0	0	0.0	518	247	9.8	216	357	5.9
Whatawhata Road (SH2	3412	619	386	7.3	0	0	0.0	1062	846	4.9
Whatawhata Road (SH2	4980	159	404	10.3	411	634	6.9	0	0	0.0

Correlation Coefficient : 0.874
 % RMS : 45.246
 Intersection turns GEH : %<5.0 %<7.5 %<10.0
 16.7 66.7 83.3

Approach Totals		Count	In Volume	%Change	GEH	Count	Out Volume	%Change	GEH	Approach name
4194 -	7165	734	604	82.3	3.6	778	790	101.5	0.3	Newcastle Road
3412 -	7165	1681	1232	73.3	8.3	929	881	94.8	1.1	Whatawhata Road (SH2
4980 -	7165	570	1038	182.1	11.7	1278	1203	94.1	1.5	Whatawhata Road (SH2

Correlation Coefficient : In 0.984 Out 0.940 Both 1.000
 Approaches GEH : %<5.0 %<7.5 %<10.0
 66.7 66.7 83.3

GEH Summary %<5.0 %<7.5 %<10.0
 All turns : 82.1 92.5 95.5
 All approaches: 85.5 96.8 98.4

TURNON terminated successfully



Appendix I: SIDRA Intersection Modelling Outputs

- I.1: Newcastle Road / Ellicott Street
- I.2: SH 23 / Wallace Road
- I.3: SH 23 / Newcastle Road
- I.4: SH 23 / Site Access (Brymer Farms)



Appendix I.1: Newcastle Road / Ellicott Street



Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	v/c	sec		[Veh.	Dist]			km/h
			veh/h	%	veh/h	%					veh	m			
South: Newcastle Rd (S)															
1a	L1	All MCs	447	8.0	447	8.0	0.672	5.5	LOS A	7.7	57.4	0.42	0.54	0.46	45.0
3a	R1	All MCs	528	8.0	528	8.0	0.672	5.5	LOS A	7.7	57.4	0.42	0.54	0.46	45.1
Approach			975	8.0	975	8.0	0.672	5.5	NA	7.7	57.4	0.42	0.54	0.46	45.1
NorthEast: Ellicott Rd															
24a	L1	All MCs	225	6.0	225	6.0	0.122	4.2	LOS A	0.0	0.0	0.00	0.52	0.00	46.1
26	R2	All MCs	106	6.0	106	6.0	0.099	6.6	LOS A	0.4	3.1	0.50	0.65	0.50	44.6
Approach			331	6.0	331	6.0	0.122	4.9	NA	0.4	3.1	0.16	0.56	0.16	45.6
NorthWest: Newcastle Rd (N)															
27	L2	All MCs	316	10.0	316	10.0	2.117	1016.0	LOS F	211.7	1609.3	1.00	11.11	28.93	3.3
29a	R1	All MCs	314	10.0	314	10.0	2.117	1040.7	LOS F	211.7	1609.3	1.00	11.11	28.93	3.3
Approach			631	10.0	631	10.0	2.117	1028.3	LOS F	211.7	1609.3	1.00	11.11	28.93	3.3
All Vehicles			1936	8.3	1936	8.3	2.117	338.5	NA	211.7	1609.3	0.57	3.98	9.68	8.8

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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



 Site: [1 (2)] New & Ellicott 2055 PM (Newcastle & Ellicott AM)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	veh/h	v/c	sec	veh	veh	Dist]	km/h
South: Newcastle Rd (S)														
1a	L1	All MCs	404	8.0	404	8.0	0.506	5.7	LOS A	3.9	0.41	0.59	0.46	45.1
3a	R1	All MCs	313	8.0	313	8.0	0.506	5.9	LOS A	3.9	0.41	0.59	0.46	45.2
Approach			716	8.0	716	8.0	0.506	5.8	NA	3.9	0.41	0.59	0.46	45.1
NorthEast: Ellicott Rd														
24a	L1	All MCs	524	6.0	524	6.0	0.285	4.2	LOS A	0.0	0.00	0.52	0.00	46.0
26	R2	All MCs	209	6.0	209	6.0	0.185	6.5	LOS A	0.8	0.50	0.66	0.50	44.7
Approach			733	6.0	733	6.0	0.285	4.9	NA	0.8	0.14	0.56	0.14	45.6
NorthWest: Newcastle Rd (N)														
27	L2	All MCs	279	10.0	279	10.0	3.421	2186.7	LOS F	337.5	1.00	11.75	30.32	1.6
29a	R1	All MCs	479	10.0	479	10.0	3.421	2219.0	LOS F	337.5	1.00	11.75	30.32	1.6
Approach			758	10.0	758	10.0	3.421	2207.1	LOS F	337.5	1.00	11.75	30.32	1.6
All Vehicles			2207	8.0	2207	8.0	3.421	761.1	NA	337.5	0.52	4.41	10.61	4.4

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



Site: [1 (3)] New & Ellicott 2055 AM - Conversion (Newcastle & Ellicott AM)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Newcastle Rd (S)															
1a	L1	All MCs	447	8.0	447	8.0	0.755	4.6	LOS A	11.4	85.6	0.75	0.51	0.75	44.7
3a	R1	All MCs	528	8.0	528	8.0	0.755	8.0	LOS A	11.4	85.6	0.75	0.51	0.75	44.1
Approach			975	8.0	975	8.0	0.755	6.5	LOS A	11.4	85.6	0.75	0.51	0.75	44.4
NorthEast: Ellicott Rd															
24a	L1	All MCs	225	6.0	225	6.0	0.372	5.7	LOS A	2.9	21.2	0.71	0.61	0.71	44.9
26	R2	All MCs	106	6.0	106	6.0	0.372	9.9	LOS A	2.9	21.2	0.71	0.61	0.71	44.3
Approach			331	6.0	331	6.0	0.372	7.0	LOS A	2.9	21.2	0.71	0.61	0.71	44.7
NorthWest: Newcastle Rd (N)															
27	L2	All MCs	316	10.0	316	10.0	0.902	29.7	LOS C	20.0	151.9	1.00	1.39	2.18	34.7
29a	R1	All MCs	314	10.0	314	10.0	0.902	32.9	LOS C	20.0	151.9	1.00	1.39	2.18	34.4
Approach			631	10.0	631	10.0	0.902	31.3	LOS C	20.0	151.9	1.00	1.39	2.18	34.5
All Vehicles			1936	8.3	1936	8.3	0.902	14.7	LOS B	20.0	151.9	0.82	0.82	1.21	40.7

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

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



Site: [1 (4)] New & Ellicott 2055 PM - Conversion (Newcastle & Ellicott AM)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total veh/h	HV] %	[Total veh/h	HV] %	v/c	sec		[Veh. veh	Dist] m				km/h
South: Newcastle Rd (S)															
1a	L1	All MCs	404	8.0	404	8.0	0.675	6.0	LOS A	8.2	61.3	0.83	0.61	0.86	44.4
3a	R1	All MCs	313	8.0	313	8.0	0.675	9.4	LOS A	8.2	61.3	0.83	0.61	0.86	43.8
Approach			716	8.0	716	8.0	0.675	7.5	LOS A	8.2	61.3	0.83	0.61	0.86	44.1
NorthEast: Ellicott Rd															
24a	L1	All MCs	524	6.0	524	6.0	0.994	52.0	LOS E	36.6	269.4	1.00	1.92	3.21	28.9
26	R2	All MCs	209	6.0	209	6.0	0.994	56.3	LOS E	36.6	269.4	1.00	1.92	3.21	28.7
Approach			733	6.0	733	6.0	0.994	53.3	LOS E	36.6	269.4	1.00	1.92	3.21	28.8
NorthWest: Newcastle Rd (N)															
27	L2	All MCs	279	10.0	279	10.0	0.820	13.6	LOS B	15.0	113.8	1.00	0.91	1.38	40.7
29a	R1	All MCs	479	10.0	479	10.0	0.820	16.8	LOS B	15.0	113.8	1.00	0.91	1.38	40.4
Approach			758	10.0	758	10.0	0.820	15.6	LOS B	15.0	113.8	1.00	0.91	1.38	40.5
All Vehicles			2207	8.0	2207	8.0	0.994	25.5	LOS C	36.6	269.4	0.95	1.15	1.82	36.6

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

Roundabout LOS Method: SIDRA Roundabout LOS.

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

Roundabout Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

Gap-Acceptance Capacity Formula: SIDRA Standard (Akcelik M3D).

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



Appendix I.2: SH 23 / Wallace Road



Site: [1] SH23 & Wallace AM (SH23 & Wallace Rd)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	veh/h	v/c	sec	veh	Dist]	m	km/h
South: Wallace Rd														
1	L2	All MCs	33	8.1	33	8.1	2.450	1317.0	LOSF	205.4	1538.0	1.00	8.77	24.98
3	R2	All MCs	513	8.1	513	8.1	2.450	1336.9	LOSF	205.4	1538.0	1.00	8.77	24.98
Approach			546	8.1	546	8.1	2.450	1335.7	LOSF	205.4	1538.0	1.00	8.77	24.98
East: SH23 (E)														
4	L2	All MCs	232	5.4	232	5.4	0.130	4.6	LOSA	0.0	0.0	0.00	0.53	45.9
5	T1	All MCs	288	5.4	288	5.4	0.153	0.0	LOSA	0.0	0.0	0.00	0.00	49.9
Approach			520	5.4	520	5.4	0.153	2.1	NA	0.0	0.0	0.00	0.23	48.0
West: RoadNameSH23 (W)														
11	T1	All MCs	433	5.4	433	5.4	0.230	0.1	LOSA	0.0	0.0	0.00	0.00	49.9
12	R2	All MCs	22	5.4	22	5.4	0.029	7.3	LOSA	0.1	0.8	0.50	0.64	44.2
Approach			455	5.4	455	5.4	0.230	0.5	NA	0.1	0.8	0.02	0.03	49.6
All Vehicles			1521	6.4	1521	6.4	2.450	480.2	NA	205.4	1538.0	0.37	3.24	6.6

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



Site: [1 (2)] SH23 & Wallace PM (SH23 & Wallace Rd)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	v/c	sec		[Veh.	Dist]				km/h
			veh/h	%	veh/h	%				veh	m				
South: Wallace Rd															
1	L2	All MCs	27	8.1	27	8.1	3.324	2106.7	LOS F	145.3	1087.4	1.00	6.07	18.34	1.6
3	R2	All MCs	300	8.1	300	8.1	3.324	2147.6	LOS F	145.3	1087.4	1.00	6.07	18.34	1.6
Approach			327	8.1	327	8.1	3.324	2144.2	LOS F	145.3	1087.4	1.00	6.07	18.34	1.6
East: SH23 (E)															
4	L2	All MCs	500	5.4	500	5.4	0.280	4.7	LOS A	0.0	0.0	0.00	0.53	0.00	45.8
5	T1	All MCs	509	5.4	509	5.4	0.270	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
Approach			1009	5.4	1009	5.4	0.280	2.4	NA	0.0	0.0	0.00	0.26	0.00	47.8
West: RoadNameSH23 (W)															
11	T1	All MCs	432	5.4	432	5.4	0.229	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.9
12	R2	All MCs	44	5.4	44	5.4	0.115	13.4	LOS B	0.4	2.8	0.74	0.87	0.74	41.2
Approach			475	5.4	475	5.4	0.229	1.3	NA	0.4	2.8	0.07	0.08	0.07	48.9
All Vehicles			1812	5.9	1812	5.9	3.324	388.7	NA	145.3	1087.4	0.20	1.26	3.33	7.9

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



 Site: [1 (3)] SH23 & Wallace AM - Conversion (SH23 & Wallace Rd)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
South: Wallace Rd															
1	L2	All MCs	33	8.1	33	8.1	0.844	27.8	LOSC	15.2	113.8	0.99	1.00	1.27	35.5
3	R2	All MCs	513	8.1	513	8.1	* 0.844	27.9	LOSC	15.2	113.8	0.99	1.00	1.27	35.5
Approach			546	8.1	546	8.1	0.844	27.9	LOSC	15.2	113.8	0.99	1.00	1.27	35.5
East: SH23 (E)															
4	L2	All MCs	232	5.4	232	5.4	0.715	28.3	LOSC	6.0	43.7	0.99	0.90	1.17	35.4
5	T1	All MCs	288	5.4	288	5.4	* 0.844	27.9	LOSC	8.3	60.5	1.00	1.05	1.41	36.1
Approach			520	5.4	520	5.4	0.844	28.1	LOSC	8.3	60.5	1.00	0.98	1.30	35.8
West: RoadNameSH23 (W)															
11	T1	All MCs	433	5.4	433	5.4	0.545	12.2	LOS B	8.1	59.6	0.80	0.69	0.80	42.9
12	R2	All MCs	22	5.4	22	5.4	* 0.106	27.2	LOSC	0.5	3.8	0.92	0.70	0.92	35.6
Approach			455	5.4	455	5.4	0.545	12.9	LOS B	8.1	59.6	0.81	0.69	0.81	42.5
All Vehicles			1521	6.4	1521	6.4	0.844	23.5	LOSC	15.2	113.8	0.94	0.90	1.14	37.4

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)



 **Site: [1 (4)] SH23 & Wallace PM - Conversion (SH23 & Wallace Rd)**
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Mov Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	v/c	sec		[Veh.	veh	Dist]			km/h
South: Wallace Rd															
1	L2	All MCs	27	8.1	27	8.1	0.867	33.6	LOSC	9.7	72.4	1.00	1.04	1.46	33.6
3	R2	All MCs	300	8.1	300	8.1	* 0.867	33.7	LOSC	9.7	72.4	1.00	1.04	1.46	33.6
Approach			327	8.1	327	8.1	0.867	33.7	LOSC	9.7	72.4	1.00	1.04	1.46	33.6
East: SH23 (E)															
4	L2	All MCs	500	5.4	500	5.4	* 0.867	30.6	LOSC	14.8	108.2	1.00	1.05	1.37	34.6
5	T1	All MCs	509	5.4	509	5.4	0.838	23.3	LOSC	14.1	103.5	0.99	1.05	1.28	37.9
Approach			1009	5.4	1009	5.4	0.867	26.9	LOSC	14.8	108.2	1.00	1.05	1.32	36.2
West: RoadNameSH23 (W)															
11	T1	All MCs	432	5.4	432	5.4	0.407	6.9	LOSA	6.1	44.3	0.61	0.53	0.61	45.7
12	R2	All MCs	44	5.4	44	5.4	* 0.206	27.7	LOSC	1.0	7.6	0.94	0.72	0.94	35.5
Approach			475	5.4	475	5.4	0.407	8.8	LOSA	6.1	44.3	0.64	0.55	0.64	44.6
All Vehicles			1812	5.9	1812	5.9	0.867	23.4	LOSC	14.8	108.2	0.90	0.92	1.17	37.5

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)



Appendix I.3: SH 23 / Newcastle Road



 Site: [1] SH23 Newcastle AM (SH23 Newcastle 2055)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	v/c	sec		[Veh.	Dist]			km/h
			veh/h	%	veh/h	%				veh	m			
East: SH23 (E)														
5	T1	All MCs	95	2.0	95	2.0	1.112	185.3	LOS F	27.7	197.6	1.00	2.06	13.9
6	R2	All MCs	175	2.0	175	2.0	1.112	190.3	LOS F	27.7	197.6	1.00	2.06	13.8
Approach			269	2.0	269	2.0	1.112	188.5	NA	27.7	197.6	1.00	2.06	13.9
North: Newcastle Rd														
7	L2	All MCs	336	8.0	336	8.0	1.350	333.8	LOS F	77.5	579.5	1.00	6.77	8.8
9	R2	All MCs	111	8.0	111	8.0	1.350	357.5	LOS F	77.5	579.5	1.00	6.77	8.8
Approach			446	8.0	446	8.0	1.350	339.7	LOS F	77.5	579.5	1.00	6.77	8.8
West: SH23 (W)														
10	L2	All MCs	500	5.4	500	5.4	0.701	5.1	LOS A	0.0	0.0	0.00	0.20	46.9
11	T1	All MCs	807	5.4	807	5.4	0.701	0.6	LOS A	0.0	0.0	0.00	0.20	48.1
Approach			1307	5.4	1307	5.4	0.701	2.3	NA	0.0	0.0	0.00	0.20	47.6
All Vehicles			2023	5.5	2023	5.5	1.350	101.5	NA	77.5	579.5	0.35	1.90	20.7

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



 Site: [1 (2)] SH23 Newcastle PM (SH23 Newcastle 2055)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance														
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	sec		[Veh.	Dist]			km/h
			veh/h	%	veh/h	%	v/c			veh	m			
East: SH23 (E)														
5	T1	All MCs	657	2.0	657	2.0	0.787	6.3	LOSA	15.5	110.5	0.62	1.45	45.6
6	R2	All MCs	516	2.0	516	2.0	0.787	11.9	LOSB	15.5	110.5	0.62	1.45	44.4
Approach			1173	2.0	1173	2.0	0.787	8.8	NA	15.5	110.5	0.62	1.45	45.0
North: Newcastle Rd														
7	L2	All MCs	371	8.0	371	8.0	3.338	2111.4	LOS F	284.8	2130.3	1.00	28.83	1.7
9	R2	All MCs	275	8.0	275	8.0	3.338	2168.4	LOS F	284.8	2130.3	1.00	28.83	1.7
Approach			645	8.0	645	8.0	3.338	2135.7	LOS F	284.8	2130.3	1.00	28.83	1.7
West: SH23 (W)														
10	L2	All MCs	133	5.4	133	5.4	0.220	4.7	LOSA	0.0	0.0	0.00	0.00	47.7
11	T1	All MCs	279	5.4	279	5.4	0.220	0.1	LOSA	0.0	0.0	0.00	0.00	48.9
Approach			412	5.4	412	5.4	0.220	1.6	NA	0.0	0.0	0.00	0.00	48.5
All Vehicles			2229	4.4	2229	4.4	3.338	623.0	NA	284.8	2130.3	0.61	3.77	5.2

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

Vehicle movement LOS values are based on average delay per movement.

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

NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).

Two-Way Sign Control Capacity Model: SIDRA Standard.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



 Site: [1 (3)] SH23 Newcastle AM - Conversion (SH23 Newcastle 2055)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows			Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	%	veh/h	v/c	sec			[Veh.	Dist]				km/h
East: SH23 (E)																
5	T1	All MCs	95	2.0	2.0	95	0.058	4.8	LOS A		0.8	5.7	0.41	0.32	0.41	46.9
6	R2	All MCs	175	2.0	2.0	175	* 0.944	50.4	LOS D		6.9	49.3	1.00	1.18	1.88	29.2
Approach			269	2.0	2.0	269	0.944	34.3	LOS C		6.9	49.3	0.79	0.88	1.36	33.7
North: Newcastle Rd																
7	L2	All MCs	336	8.0	8.0	336	* 1.044	96.5	LOS F		19.8	148.4	1.00	1.57	2.44	21.4
9	R2	All MCs	111	8.0	8.0	111	0.344	28.9	LOS C		3.0	22.2	0.91	0.76	0.91	35.2
Approach			446	8.0	8.0	446	1.044	79.8	LOS E		19.8	148.4	0.98	1.37	2.06	23.7
West: SH23 (W)																
10	L2	All MCs	500	5.4	5.4	500	0.661	21.7	LOS C		12.0	88.0	0.86	0.83	0.86	38.5
11	T1	All MCs	807	5.4	5.4	807	* 1.044	89.3	LOS F		49.9	365.6	1.00	1.94	2.22	22.8
Approach			1307	5.4	5.4	1307	1.044	63.4	LOS E		49.9	365.6	0.95	1.51	1.70	26.6
All Vehicles			2023	5.5	5.5	2023	1.044	63.1	LOS E		49.9	365.6	0.93	1.40	1.74	26.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)



 Site: [1 (4)] SH23 Newcastle PM - Conversion (SH23 Newcastle 2055)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	veh/h	v/c	sec	veh	Dist]	m		km/h
East: SH23 (E)															
5	T1	All MCs	657	2.0	657	2.0	0.425	8.4	LOS A	9.1	64.9	0.56	0.49	0.56	44.9
6	R2	All MCs	516	2.0	516	2.0	* 0.854	36.0	LOS D	19.6	139.5	1.00	0.99	1.23	33.0
Approach			1173	2.0	1173	2.0	0.854	20.5	LOS C	19.6	139.5	0.76	0.71	0.86	38.7
North: Newcastle Rd															
7	L2	All MCs	371	8.0	371	8.0	* 0.854	40.0	LOS D	14.4	107.9	1.00	0.99	1.29	31.8
9	R2	All MCs	275	8.0	275	8.0	0.633	31.2	LOS C	8.7	65.3	0.95	0.83	0.96	34.5
Approach			645	8.0	645	8.0	0.854	36.3	LOS D	14.4	107.9	0.98	0.92	1.15	32.9
West: SH23 (W)															
10	L2	All MCs	133	5.4	133	5.4	0.428	33.8	LOS C	4.2	31.0	0.94	0.78	0.94	33.6
11	T1	All MCs	279	5.4	279	5.4	* 0.854	38.1	LOS D	10.9	79.9	1.00	1.03	1.34	32.9
Approach			412	5.4	412	5.4	0.854	36.7	LOS D	10.9	79.9	0.98	0.95	1.21	33.1
All Vehicles			2229	4.4	2229	4.4	0.854	28.1	LOS C	19.6	139.5	0.86	0.82	1.01	35.8

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)



Appendix I.4: SH 23 / Site Access (Brymer Farms)



Site: [1 (7)] SH23 T AM (Brymer Farms)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	[Total	HV]	%	veh/h	v/c	sec	veh	Dist]	m		km/h
East: SH23 (East)															
4	T1	All MCs	544	17.0	544	17.0	0.306	0.1	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
6	R2	All MCs	98	3.0	98	3.0	0.128	8.4	LOS A	0.5	0.5	0.61	0.74	0.61	44.0
Approach			641	14.9	641	14.9	0.306	1.4	NA	0.5	0.5	0.09	0.11	0.09	48.8
North: Brymer Farms															
7	L2	All MCs	246	3.0	246	3.0	0.346	9.6	LOS A	1.6	11.5	0.66	0.89	0.82	43.4
9	R2	All MCs	93	3.0	93	3.0	0.784	68.9	LOS F	3.4	24.5	0.97	1.24	1.86	25.6
Approach			339	3.0	339	3.0	0.784	25.9	LOS D	3.4	24.5	0.74	0.98	1.11	36.5
West: SH23 (West)															
10	L2	All MCs	69	3.0	69	3.0	0.047	4.8	LOS A	0.2	1.4	0.19	0.47	0.19	45.7
5	T1	All MCs	664	17.0	664	17.0	0.374	0.2	LOS A	0.0	0.0	0.00	0.00	0.00	49.8
Approach			733	15.7	733	15.7	0.374	0.6	LOS A	0.2	1.4	0.02	0.04	0.02	49.4
All Vehicles			1713	12.9	1713	12.9	0.784	5.9	NA	3.4	24.5	0.19	0.26	0.26	46.0

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



Site: [1 (8)] SH23 T PM (Brymer Farms)
Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance												
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Aver. Speed
			[Total	HV]	[Total	HV]	v/c	sec		[Veh.	Dist]	
			veh/h	%	veh/h	%				veh	m	km/h
East: SH23 (East)												
4	T1	ALL MCs	795	17.0	795	17.0	0.448	0.2	LOSA	0.0	0.0	49.7
6	R2	ALL MCs	278	3.0	278	3.0	0.478	13.2	LOSB	2.5	18.2	41.6
Approach			1073	13.4	1073	13.4	0.478	3.6	NA	2.5	18.2	47.3
North: Brymer Farms												
7	L2	ALL MCs	145	3.0	145	3.0	0.267	11.1	LOSB	1.0	7.4	42.7
9	R2	ALL MCs	73	3.0	73	3.0	2.642	1604.3	LOS F	30.6	219.7	2.2
Approach			218	3.0	218	3.0	2.642	545.0	LOS F	30.6	219.7	5.9
West: SH23 (West)												
10	L2	ALL MCs	125	3.0	125	3.0	0.100	5.5	LOSA	0.4	2.9	45.3
5	T1	ALL MCs	806	17.0	806	17.0	0.454	0.2	LOSA	0.0	0.0	49.7
Approach			931	15.1	931	15.1	0.454	0.9	LOSA	0.4	2.9	49.1
All Vehicles			2221	13.1	2221	13.1	2.642	55.5	NA	30.6	219.7	28.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.



 Site: [1 (4)] SH23 T AM (Brymer Farms)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
			[Total	HV]	[Total	HV]				[Veh.	Dist]				
			veh/h	%	veh/h	%	v/c	sec		veh	m				
East: SH23 (East)															
4	T1	All MCs	544	17.0	544	17.0	0.553	10.9	LOS B	12.0	96.2	0.69	0.61	0.69	43.5
6	R2	All MCs	98	3.0	98	3.0	* 0.515	38.9	LOS D	3.4	24.3	0.99	0.77	0.99	32.2
Approach			641	14.9	641	14.9	0.553	15.1	LOS B	12.0	96.2	0.74	0.64	0.74	41.3
North: Brymer Farms															
7	L2	All MCs	246	3.0	246	3.0	0.287	9.7	LOS A	4.2	30.4	0.53	0.69	0.53	43.4
9	R2	All MCs	93	3.0	93	3.0	* 0.590	40.9	LOS D	3.3	24.0	1.00	0.80	1.07	31.8
Approach			339	3.0	339	3.0	0.590	18.3	LOS B	4.2	30.4	0.66	0.72	0.68	39.5
West: SH23 (West)															
10	L2	All MCs	69	3.0	69	3.0	0.042	4.7	LOS A	0.1	0.9	0.06	0.51	0.06	46.1
5	T1	All MCs	664	17.0	664	17.0	* 0.675	12.0	LOS B	16.2	130.3	0.77	0.69	0.77	42.9
Approach			733	15.7	733	15.7	0.675	11.4	LOS B	16.2	130.3	0.70	0.67	0.70	43.2
All Vehicles			1713	12.9	1713	12.9	0.675	14.1	LOS B	16.2	130.3	0.71	0.67	0.71	41.7

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance



Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE		Prop. Qued	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Brymer Farms												
P31	Stage 1	50	59	29.3	LOSC	0.1	0.1	0.92	0.92	183.2	200.0	1.09
P32	Stage 2	50	59	29.3	LOSC	0.1	0.1	0.92	0.92	183.2	200.0	1.09
West: SH23 (West)												
P41	Stage 1	50	53	29.3	LOSC	0.1	0.1	0.92	0.92	183.2	200.0	1.09
P42	Stage 2	50	53	29.3	LOSC	0.1	0.1	0.92	0.92	183.2	200.0	1.09
All Pedestrians		150	223	29.3	LOSC	0.1	0.1	0.92	0.92	183.2	200.0	1.09

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



 Site: [1 (6)] SH23 T PM (Brymer Farms)

Output produced by SIDRA INTERSECTION Version: 11.0.3.112

Vehicle Movement Performance																
Mov ID	Turn	Mov Class	Demand Flows			Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed
			[Total	HV]	%	veh/h	%	v/c	sec		[Veh.	Dist]				km/h
East: SH23 (East)																
4	T1	All MCs	795	17.0	17.0	795	17.0	0.786	18.2	LOSB	30.3	242.7	0.84	0.78	0.85	40.0
6	R2	All MCs	278	3.0	3.0	278	3.0	* 0.797	51.0	LOSD	14.1	101.2	1.00	0.92	1.15	29.1
Approach			1073	13.4	13.4	1073	13.4	0.797	26.7	LOSC	30.3	242.7	0.88	0.81	0.93	36.5
North: Brymer Farms																
7	L2	All MCs	145	3.0	3.0	145	3.0	0.188	16.7	LOSB	4.4	31.8	0.67	0.72	0.67	40.1
9	R2	All MCs	73	3.0	3.0	73	3.0	* 0.662	58.9	LOSE	3.8	27.4	1.00	0.82	1.13	27.5
Approach			218	3.0	3.0	218	3.0	0.662	30.9	LOSC	4.4	31.8	0.78	0.75	0.82	34.8
West: SH23 (West)																
10	L2	All MCs	125	3.0	3.0	125	3.0	0.086	6.0	LOSA	1.1	7.7	0.19	0.56	0.19	45.4
5	T1	All MCs	806	17.0	17.0	806	17.0	* 0.797	19.0	LOSB	31.4	251.8	0.85	0.79	0.87	39.7
Approach			931	15.1	15.1	931	15.1	0.797	17.2	LOSB	31.4	251.8	0.76	0.76	0.78	40.4
All Vehicles			2221	13.1	13.1	2221	13.1	0.797	23.1	LOSC	31.4	251.8	0.82	0.79	0.85	37.8

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

Vehicle movement LOS values are based on average delay per movement.

Intersection and Approach LOS values are based on average delay for all vehicle movements.

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

Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.

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

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

Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance



Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE		Prop. Qued	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
North: Brymer Farms												
P31	Stage 1	50	59	44.3	LOSE	0.2	0.2	0.94	0.94	198.1	200.0	1.01
P32	Stage 2	50	59	44.3	LOSE	0.2	0.2	0.94	0.94	198.1	200.0	1.01
West: SH23 (West)												
P41	Stage 1	50	53	44.3	LOSE	0.1	0.1	0.94	0.94	198.1	200.0	1.01
P42	Stage 2	50	53	44.3	LOSE	0.1	0.1	0.94	0.94	198.1	200.0	1.01
All Pedestrians		150	223	44.3	LOSE	0.2	0.2	0.94	0.94	198.1	200.0	1.01

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.



Appendix J: Construction Traffic Management Plan Framework (Planning-Stage)



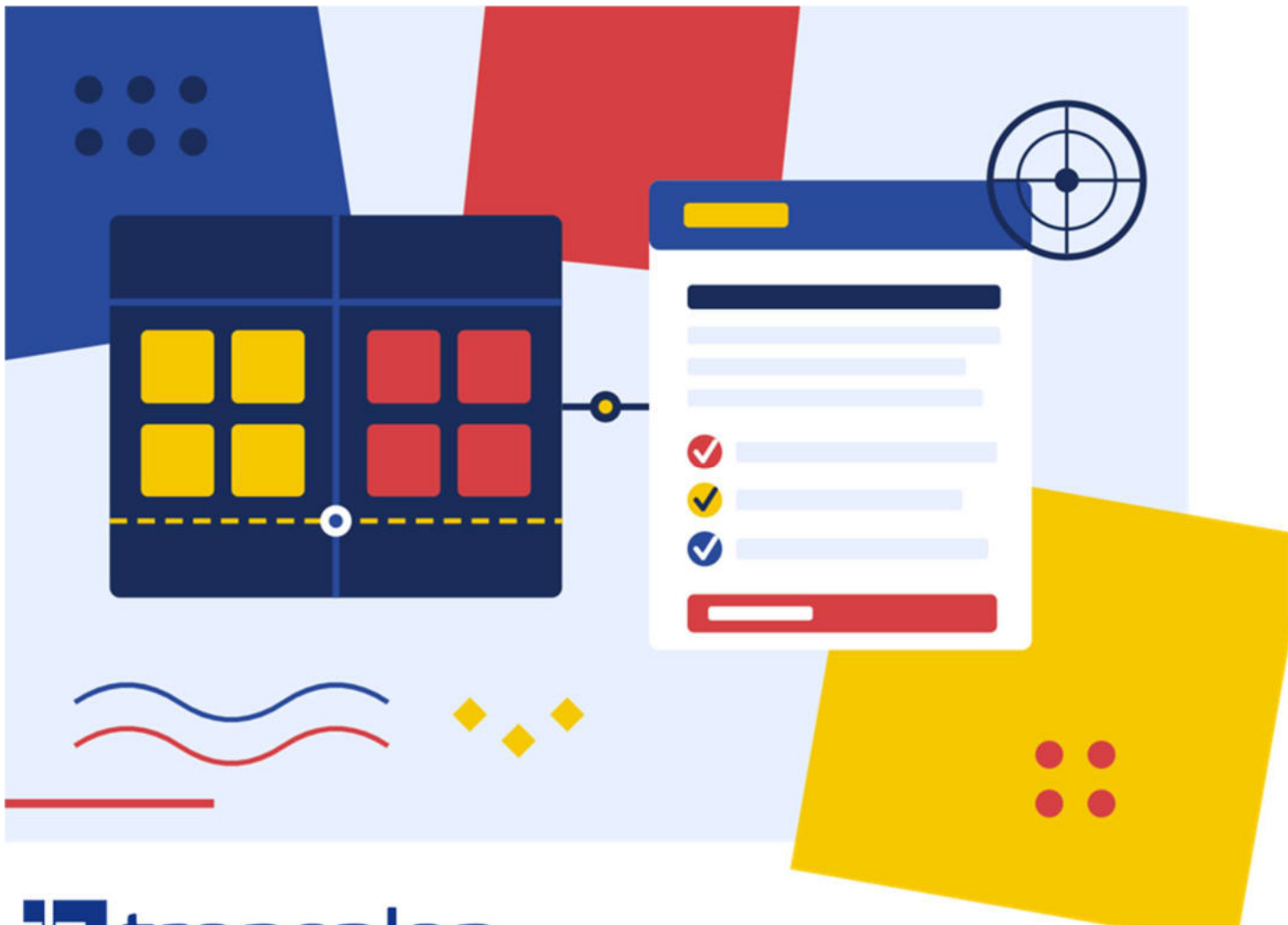
Brymer Farms

584 State Highway 23 | Whatawhata Road, Temple View & Brymer Road, Rotokauri

Construction Traffic Management Plan Framework (Planning-Stage)

Version: Issue 1 – Planning stage / for resource consent

7 August 2026





Document Control Record

Document title	Construction Traffic Management Plan Framework (Planning-Stage)
Project	Brymer Farms Residential Development, Rotokauri, Hamilton
Status	Planning stage / for resource consent
Version	Issue 1
Prepared by	T. Ueckermann
Date	7 August 2026
Road controlling authorities	NZ Transport Agency – Waka Kotahi (SH23); Hamilton City Council & Waikato District Council (local roads)



Contents

1	Introduction and Purpose	1
1.1	Purpose of this plan	1
1.2	Status of this document	1
1.3	Scope	1
2	The Development and Site Context	1
2.1	Site location and description	1
2.2	Development overview and indicative staging	2
3	Statutory and Policy Framework	3
3.1	Resource consent and district plan	3
3.2	Road controlling authorities and corridor access	3
3.3	Temporary traffic management – NZGTTM	3
3.4	Construction noise	3
4	Objectives and Performance Standards	3
5	Roles and Responsibilities	4
6	Existing Transport Environment	4
6.1	State Highway 23 (Whatawhata Road)	4
6.2	Local road network	4
6.3	Active modes and public transport	4
6.4	Sensitive receivers	4
7	Construction Traffic Activity	5
7.1	Works, programme and staging	5
7.2	Construction vehicle types	5
7.3	Traffic generation – methodology and worst case	5
7.4	Earthworks construction traffic	5
7.4.1	Introduction	5
7.4.2	Indicative construction transport movements	5
7.4.3	Heavy vehicle movements — number and type	5
7.4.4	Staff travel to and from the site	6
7.5	Construction hours	6
8	Traffic Management Measures	7
8.1	Heavy commercial vehicle routes	7
8.2	Prohibited routes and rat-running	7
8.3	Site access and intersection management	7
8.4	Construction worker parking and site facilities	7
8.5	Pedestrian, cyclist and mobility-impaired management	7
8.6	Weekend and public holiday management	7
8.7	Over-dimension and over-weight loads	7
8.8	Road cleanliness, mud tracking and material confinement	7
8.9	Temporary traffic management within corridors	8



9	Detour Routes (SH23)	8
10	Communication, Consultation and Complaints	8
11	Emergency Access and Incident Management	8
12	Monitoring, Review and Compliance	8
13	Approvals and Sign-off	9



1 Introduction and Purpose

1.1 Purpose of this plan

This Construction Traffic Management Plan (CTMP) sets out the framework for managing the temporary traffic effects of construction associated with the proposed Brymer Farms residential development at Rotokauri, Hamilton. Its purpose is to demonstrate, at the resource-consent stage, that the traffic effects of construction can be appropriately avoided, remedied or mitigated, and to establish the objectives, standards, roles and procedures that a final, contractor-specific CTMP will be required to satisfy before works commence.

It is recommended that preparation and approval of a CTMP be secured as a condition of consent, to ensure considered and appropriate management of the temporary traffic effects of construction.

1.2 Status of this document

No contractor has yet been appointed, and other than for estimated earthworks (internal/external) and imported roading materials quantities, the other material quantities that drive housing construction vehicle demand are not yet available. This document is therefore a Framework (planning-stage) CTMP. It fixes the management framework and performance standards without pre-empting means and methods that are properly the responsibility of the appointed contractor.

A final CTMP will be prepared in consultation with the appointed contractor, having regard to the confirmed construction programme, and submitted to the relevant road controlling authority for approval prior to the commencement of works. The final CTMP will populate the placeholders identified throughout this document (shown as “[to be confirmed at contractor stage]”) with quantified vehicle movements, staged programmes and site-specific traffic management layouts.

1.3 Scope

This CTMP addresses construction traffic on the public road network and at the interface between the site and that network. It covers the following matters, each of which the final CTMP must address in detail:

- the construction works proposal and indicative programme and staging;
- the existing transport environment and sensitive receivers;
- construction hours and work-time management, including weekends and public holidays;
- heavy commercial vehicle (HCV) demand, designated routes and prohibited routes;
- site access and intersection management;
- pedestrian, cyclist and mobility-impaired user management;
- construction worker parking and contractor site facilities;
- confinement and management of materials, dust and road cleanliness;
- temporary traffic management (TTM) within the road corridors, and detour arrangements;
- communication, complaints handling and contractor contacts;
- emergency access and incident management; and
- monitoring, review, approvals and compliance.

2 The Development and Site Context

2.1 Site location and description

The Brymer Farms development is located at Rotokauri, on the western side of Hamilton. The principal regional access to the construction site is proposed via Whatawhata Road (State Highway 23), with distribution to the site via the local road network (including Brymer Road, Baverstock Road, Grandview Road, Ellicot Road, Newcastle Road, Rotokauri Road and connecting streets). A locality plan is provided in **Figure 2.1**.

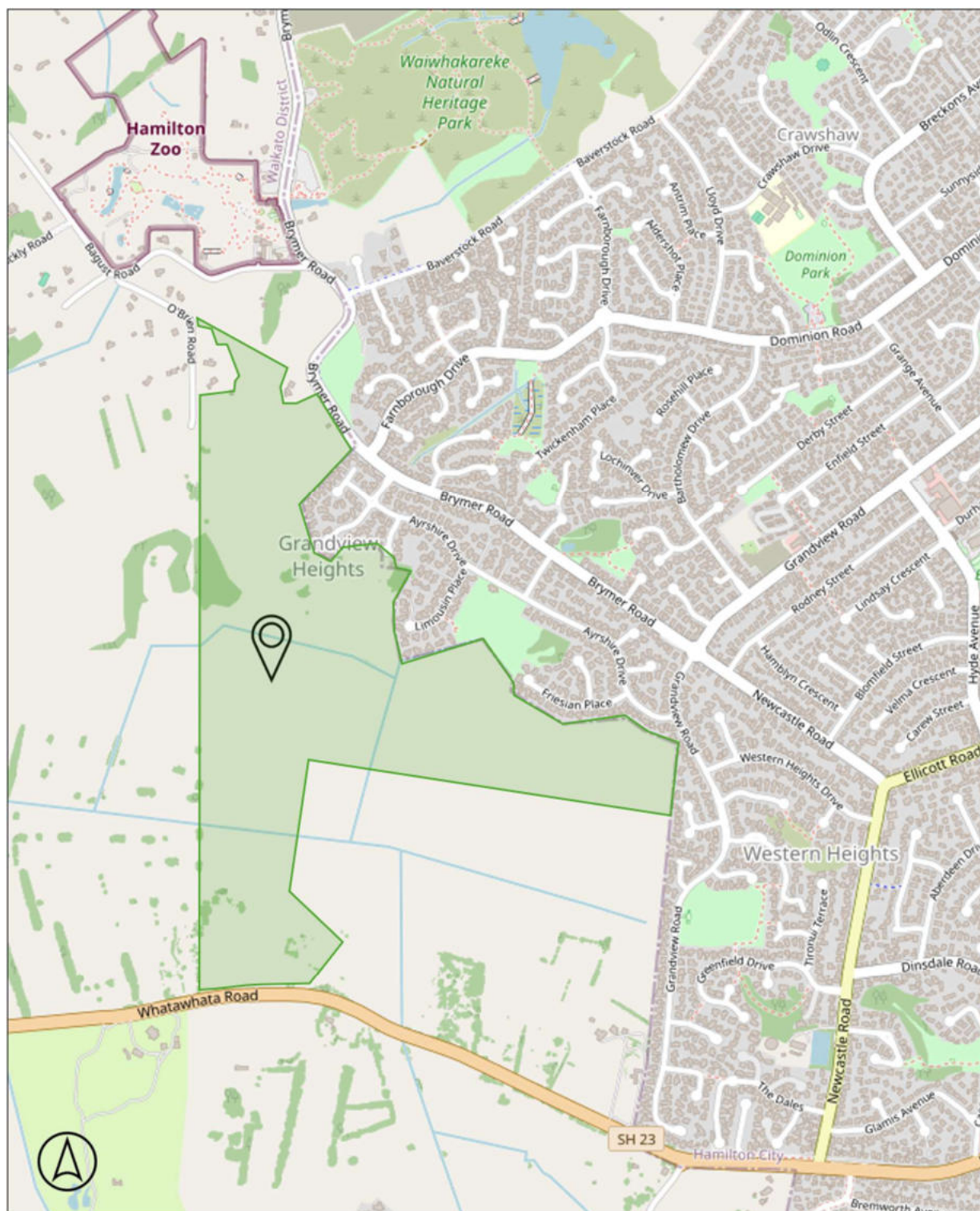


Figure 2.1: Project Location

Source: Openstreetsmap.com

2.2 Development overview and indicative staging

The development comprises for the construction of some 1,000 dwellings and apartments, associated earthworks, roading, three-waters infrastructure and landscaping. Construction is anticipated to be delivered in several stages. The indicative earthworks staging sequence plan is included in **Appendix A** and will be confirmed in the final CTMP once the contractor's programme is available.



3 Statutory and Policy Framework

3.1 Resource consent and district plan

This CTMP supports the resource consent application for the development and is intended to give effect to the relevant conditions of consent and the transport provisions of the Hamilton City and Waikato District Council's Operative District Plans (ODPs). The final CTMP will be prepared to satisfy the specific wording of the consent conditions as granted.

3.2 Road controlling authorities and corridor access

Three road controlling authorities (RCAs) are relevant, and the distinction is critical.

- Whatawhata Road (SH23) is a State Highway, with the RCA the NZ Transport Agency – Waka Kotahi (NZTA). All works within, or affecting, the SH23 corridor – including any temporary traffic management, lane closures, new or modified accesses onto SH23, or full closures and detours – require the approval of NZTA.
- Works, where necessary, within the Hamilton City Council (HCC) local road corridors (for example Brymer Road, Harrowgate Place, Ayshire Drive, Highgrove Drive and Grandview Road) are subject to their approval.
- Works, where necessary, within the Waikato District Council (WDC) local road corridors (for example Obrien Road) are subject to their approval.

Any works within the road corridor(s) that cannot be fully isolated from public access require an approved Corridor Access Request (CAR) and a Traffic Management Plan (TMP), lodged with the relevant RCA before works begin. Where a proposed construction access connects to SH23, early engagement with NZTA is required to confirm access location, form, sight distances and any required corridor improvements.

3.3 Temporary traffic management – NZGTTM

All temporary traffic management within the road corridor will be designed and implemented in accordance with the New Zealand Guide to Temporary Traffic Management (NZGTTM), which has replaced the Code of Practice for Temporary Traffic Management (CoPTTM). From 1 July 2026 all CAR applications to a local authority must be submitted under NZGTTM; CoPTTM-based TMPs are no longer accepted. TTM will be planned using the NZGTTM risk-based approach and delivered by suitably competent personnel.

3.4 Construction noise

Construction noise will be managed in accordance with NZS 6803:1999 Acoustics – Construction Noise and any noise conditions of consent. The construction hours in Section 7.4 are set to align with the daytime periods over which NZS 6803:1999 anticipates significant construction activity adjacent to residential areas.

4 Objectives and Performance Standards

The objectives of this CTMP, against which the final CTMP and construction activity will be measured, are to:

- maintain the safe and efficient operation of SH23 and the local road network for all users throughout construction;
- protect the safety of pedestrians, cyclists and mobility-impaired users, and maintain connectivity of active-mode routes;
- confine construction vehicles to designated routes and prevent adverse effects on residential streets not intended to carry construction traffic;
- manage the timing of heavy vehicle movements to avoid network peak periods and sensitive times where practicable;
- keep the public road network clean, unobstructed and free of construction debris and material tracking;
- provide clear communication channels and a responsive complaints procedure for affected parties; and
- ensure all works within the road corridor are appropriately authorised and delivered under NZGTTM.



Measurable performance standards will be confirmed in the final CTMP and are expected to include, for example: nil unauthorised use of prohibited routes; complaint acknowledgement within one working day; no uncontrolled deposition of material on the carriageway; and compliance with all CAR/TMP conditions.

5 Roles and Responsibilities

The following roles apply to the delivery and oversight of construction traffic management. Names and contact details will be completed in the final CTMP (see Section 10).

Table 5.1: Roles and Responsibilities

Role	Responsibility
Developer / consent holder	Overall accountability for compliance with consent conditions; appoints the contractor; ensures a final CTMP is approved before works start.
Principal contractor	Prepares and implements the final CTMP; obtains CAR/TMP approvals; day-to-day management of construction traffic and site accesses.
Traffic management provider / STMS	Designs and implements TTM under NZGTTM; holds current competency; liaises with RCAs on TMPs.
Project / site engineer	Confirms construction programme, vehicle demand and staging inputs to the CTMP; oversees road cleanliness and access condition.
NZTA – Waka Kotahi	RCA for SH23; approves CARs/TMPs and any access or detour affecting the state highway.
Hamilton City Council	RCA for local roads; approves the CTMP (as consent authority) and local-road CARs/TMPs.
Community liaison / complaints officer	Single point of contact for the public; logs, actions and closes out complaints.

6 Existing Transport Environment

A description of the existing transport environment establishes the baseline against which construction effects are assessed. The final CTMP will confirm the following with current data; the framework below identifies what must be described.

6.1 State Highway 23 (Whatawhata Road)

SH23 is the principal regional access and is managed by NZTA. The final CTMP will describe its function and classification, posted speed limit(s) in the vicinity of the site, traffic volumes and heavy-vehicle percentage, the relevant safety/crash history, and any NZTA improvement projects on this corridor that may interact with the construction period.

6.2 Local road network

The collector and local roads used for site access, where necessary, will be described in terms of their road hierarchy, cross-section, speed environment, existing use and sensitivity to additional heavy vehicles.

6.3 Active modes and public transport

Existing and planned pedestrian and cycle facilities, and any bus routes or stops in the vicinity, will be identified so that connectivity can be maintained during construction (Section 8.5).

6.4 Sensitive receivers

Adjacent residential areas, schools, early childhood centres and other sensitive land uses will be identified, as these inform work-time management, HCV routing and the timing of movements.



7 Construction Traffic Activity

7.1 Works, programme and staging

The construction works comprise [earthworks, bulk cut/fill and site preparation; three-waters and roading infrastructure; building construction; and landscaping]. The programme, staging sequence and duration of each stage will be confirmed by the appointed contractor and set out in the final CTMP.

7.2 Construction vehicle types

Construction traffic is expected to include light vehicles (worker and supervisory vehicles), rigid trucks and truck-and-trailer units for earthworks and material cartage, concrete trucks, delivery vehicles for building materials, and occasional over-dimension loads for plant delivery. The design vehicles for access and intersection checks will be nominated in the final CTMP.

7.3 Traffic generation – methodology and worst case

Although material quantities are not yet fully available, other than for earthworks cut/fill volumes and the indicative volume of imported fill and roading materials required (and associated truck movements), the final CTMP will need to quantify construction vehicle demand using a transparent methodology. The calculations will need to specify the daily and peak truck movements per stage, plus worker and delivery vehicle estimates.

7.4 Earthworks construction traffic

7.4.1 Introduction

The construction sequence referenced throughout is shown on the earthworks staging plan (Maven drawing 2026-08-06_SK EARTHWORKS CIVILS STAGING 2-CXXX-1a), which sets out earthworks sub-stages E1a to E4b. A copy of the drawing is included in **Appendix A**.

7.4.2 Indicative construction transport movements

The principal source of construction traffic during the earthworks stages is the importation of aggregate and fill for earthworks and roading. Over the full earthworks programme, approximately 299,710 m³ of material will be imported, comprising approximately 59,710 m³ of roading aggregate and 240,000 m³ of fill. Based on an assumed truck capacity of 20 m³ per load, this equates to approximately 14,990 loaded delivery trips (around 29,970 two-way truck movements) spread across the staged programme, which extends over approximately eleven years. The distribution of this material, and the resulting truck movements by stage, is set out in **Table 7.1**.

The imported fill (approximately 240,000 m³) is additional to the on-site cut-to-fill balancing already allowed for. Cut-to-fill earthworks are balanced within the site and are moved by on-site plant; they do not generate heavy vehicle movements on the public road network. The truck movements reported in this section therefore relate to imported material only.

7.4.3 Heavy vehicle movements — number and type

Heavy vehicles will comprise truck-and-trailer / tipper units carting imported aggregate and fill to the site via the designated construction access(es). Demand varies by earthworks stage. During the roading-aggregate stages (Years 1–4) the rate is modest, at approximately 6 truck movements per day (in and out). Demand is highest during the bulk-fill stages, peaking in the E2b sub-stage at approximately 19 truck movements per day. Movements per stage are set out below.

**Table 7.1: Imported construction aggregate and fill, and truck movements, by earthworks stage**

Year	Earthworks stage(s)	Material type	Imported material (m ³)	Deliveries / day*	Truck movements / day (in + out)
1	E1a, E1b, E1c	Roading	14,928	2.9	5.7
2	E4a, E4b	Roading	14,928	2.9	5.7
3	E3a	Roading	14,928	2.9	5.7
4	E2a	Roading	14,928	2.9	5.7
5	E2b	Fill	50,000	9.6	19.2
6	E1d	Fill	35,000	6.7	13.5
7	E1d	Fill	35,000	6.7	13.5
8	E2c	Fill	30,000	5.8	11.5
9	E2c	Fill	30,000	5.8	11.5
10	E3b	Fill	30,000	5.8	11.5
11	E3b	Fill	30,000	5.8	11.5
Total	E1–E4	Roading + fill	299,710	—	—

Notes: *One-way loaded deliveries, based on 20 m³ per truck and a 5-day working week.

In summary, heavy vehicle demand ranges from approximately 6 truck movements per day during the roading-aggregate stages to a peak of approximately 19 truck movements per day during the E2b fill stage.

7.4.4 Staff travel to and from the site

Approximately 5 to 10 construction workers will be on site per day over the duration of the earthworks period. Staff are assumed to travel entirely by private car at an occupancy of 1.0 person per vehicle. On this basis, staff generate 5 to 10 inbound trips in the morning and 5 to 10 outbound trips in the afternoon, giving a total of approximately 10 to 20 staff vehicle movements per day, as summarised in **Table 7.2** below.

Table 7.2: Daily earthworks construction staff traffic movements

Staff count	Mode / occupancy	Morning (in)	Afternoon (out)	Total daily movements
5 staff	100% private car, 1.0 person/vehicle	5 trips	5 trips	10 movements
10 staff	100% private car, 1.0 person/vehicle	10 trips	10 trips	20 movements

7.5 Construction hours

Construction hours adjacent to established residential areas are proposed as follows, consistent with NZS 6803:1999 and subject to any more restrictive conditions of consent:



Table 7.3: Construction Hours

Period	Days	Hours	Permitted activity
Permitted hours	Monday to Saturday	7:30 am – 6:00 pm	Normal construction activity.
Restricted (reduced-noise)	Monday to Saturday	6:30 am – 7:30 am and 6:00 pm – 8:00 pm	Quiet set-up, tidying and restricted operations only – no heavy pumps or impact tools.
Outside hours / Sundays & public holidays	Sun & public holidays	Nil	No construction, except approved emergency works (Section 11).

8 Traffic Management Measures

8.1 Heavy commercial vehicle routes

Construction HCVs will need to be confined to designated routes between SH23 and the site accesses. The designated route(s) will be nominated in the final CTMP, will use roads of appropriate hierarchy and geometry, and will minimise travel on residential streets.

8.2 Prohibited routes and rat-running

Routes not intended to carry construction traffic will be explicitly identified as prohibited. Drivers and subcontractors will be directed, via induction and signage, not to use residential streets as short-cuts. Compliance will be monitored and non-compliance addressed through the contractor's management system.

8.3 Site access and intersection management

Construction access points and their interface with the road network will be designed for safe entry and egress of the design vehicles, with adequate sight distances and, where required, temporary controls. Any access to or works at the SH23 interface require NZTA approval (Section 3.2). Key intersections on the HCV route will be assessed and, if warranted, managed through TTM measures designed under NZGTTM.

8.4 Construction worker parking and site facilities

Contractor offices, amenities and worker parking will be accommodated within the site so that construction activity does not generate demand for on-street parking on surrounding streets. Locations will be confirmed in the final CTMP.

8.5 Pedestrian, cyclist and mobility-impaired management

Existing pedestrian and cycle connectivity will be maintained throughout construction. Where a footpath, cycleway or crossing must be temporarily affected, a safe, accessible and clearly signed alternative will be provided in accordance with NZGTTM, with particular regard to mobility-impaired and vision-impaired users. Conflicts between construction vehicles and active-mode users at accesses will be actively managed.

8.6 Weekend and public holiday management

Works on Saturdays are limited to the hours in Section 7.4. No construction is proposed on Sundays or public holidays other than approved emergency works. HCV movements around long weekends and holiday periods with elevated SH23 tourist traffic (for example travel to Raglan) will be managed in consultation with NZTA.

8.7 Over-dimension and over-weight loads

Over-dimension and over-weight loads (for example large plant delivery) will be pre-planned, permitted as required, and scheduled for off-peak periods with any necessary pilot and TTM arrangements approved by the relevant RCA.

8.8 Road cleanliness, mud tracking and material confinement

Materials will be confined to the site and secured during transport. Measures to prevent tracking of soil and debris onto the road – such as stabilised construction entrances, wheel-wash facilities and regular road sweeping – will be implemented, particularly during earthworks. Loads of dusty or loose material will be covered.



8.9 Temporary traffic management within corridors

All activities within the road corridor that are not fully isolated from public access will be undertaken under an approved CAR and TMP prepared and implemented in accordance with NZGTTM, by competent personnel, and approved by the relevant RCA before works begin.

9 Detour Routes (SH23)

In the event that construction requires a temporary partial or full closure of a section of SH23, a detour will be implemented under an NZTA-approved TMP. Any full closure and detour of the state highway require NZTA approval and coordination with emergency services, public transport operators and affected communities.

Indicative detour routes for a section closure of SH23 include SH1C, SH39, Laxton Road, Cemetery Road, Rotokauri Road, Brymer Road and Newcastle Road, as shown in **Figure 9.1**. These routes are indicative only and are subject to confirmation and approval by NZTA at the time works are planned.

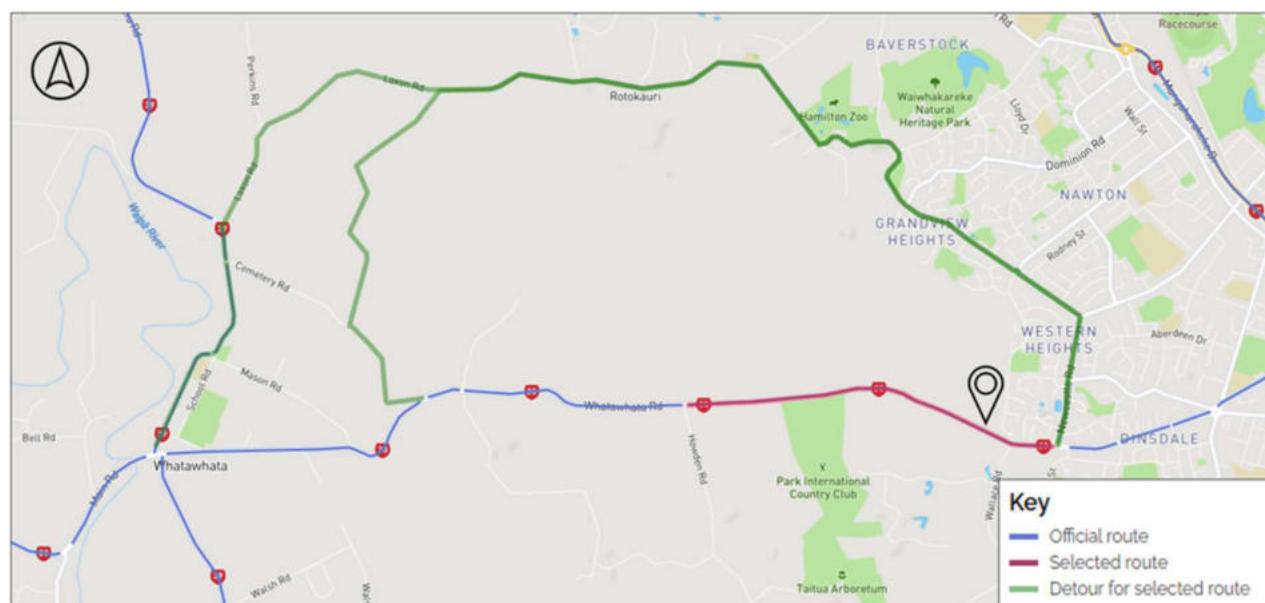


Figure 9.1: SH23 detour route plan

<https://detours.myworksites.co.nz/>

10 Communication, Consultation and Complaints

Affected residents, road users and stakeholders will be notified in advance of activities that materially affect the network (for example lane closures, detours or out-of-hours works). A single point of contact will be maintained for the duration of construction, and a complaints procedure will log, action and close out issues within defined timeframes.

11 Emergency Access and Incident Management

Emergency service access to the site and along the affected network will be maintained at all times. TMPs will provide for the passage of emergency vehicles, and emergency services will be notified of any closures or detours. Procedures for responding to on-road incidents involving construction traffic (including spillage recovery and road reinstatement) will be set out in the final CTMP. Approved emergency works outside normal construction hours will be limited to what is necessary to make the site or network safe.

12 Monitoring, Review and Compliance

The contractor will monitor compliance with the CTMP, including route adherence, road cleanliness, TTM compliance and complaint resolution. The CTMP is a living document: it will be reviewed and updated as



construction stages change, as the programme is refined, or if monitoring identifies that measures are not achieving the objectives in Section 4. Material changes will be re-submitted to the relevant RCA for approval. Compliance with consent conditions and CAR/TMP conditions is subject to audit by HCC and NZTA.

13 Approvals and Sign-off

This Framework CTMP accompanies the resource consent application. Prior to the commencement of works, a final CTMP will be prepared in consultation with the appointed contractor and submitted for approval as follows:

- NZ Transport Agency – Waka Kotahi – approval of any access, works, TTM or detour affecting SH23.
- Hamilton City Council – approval of the CTMP under the relevant condition of consent, and CAR/TMP approvals for works on local roads.
- Waikato District Council – approval of the CTMP under the relevant condition of consent, and CAR/TMP approvals for works on local roads.

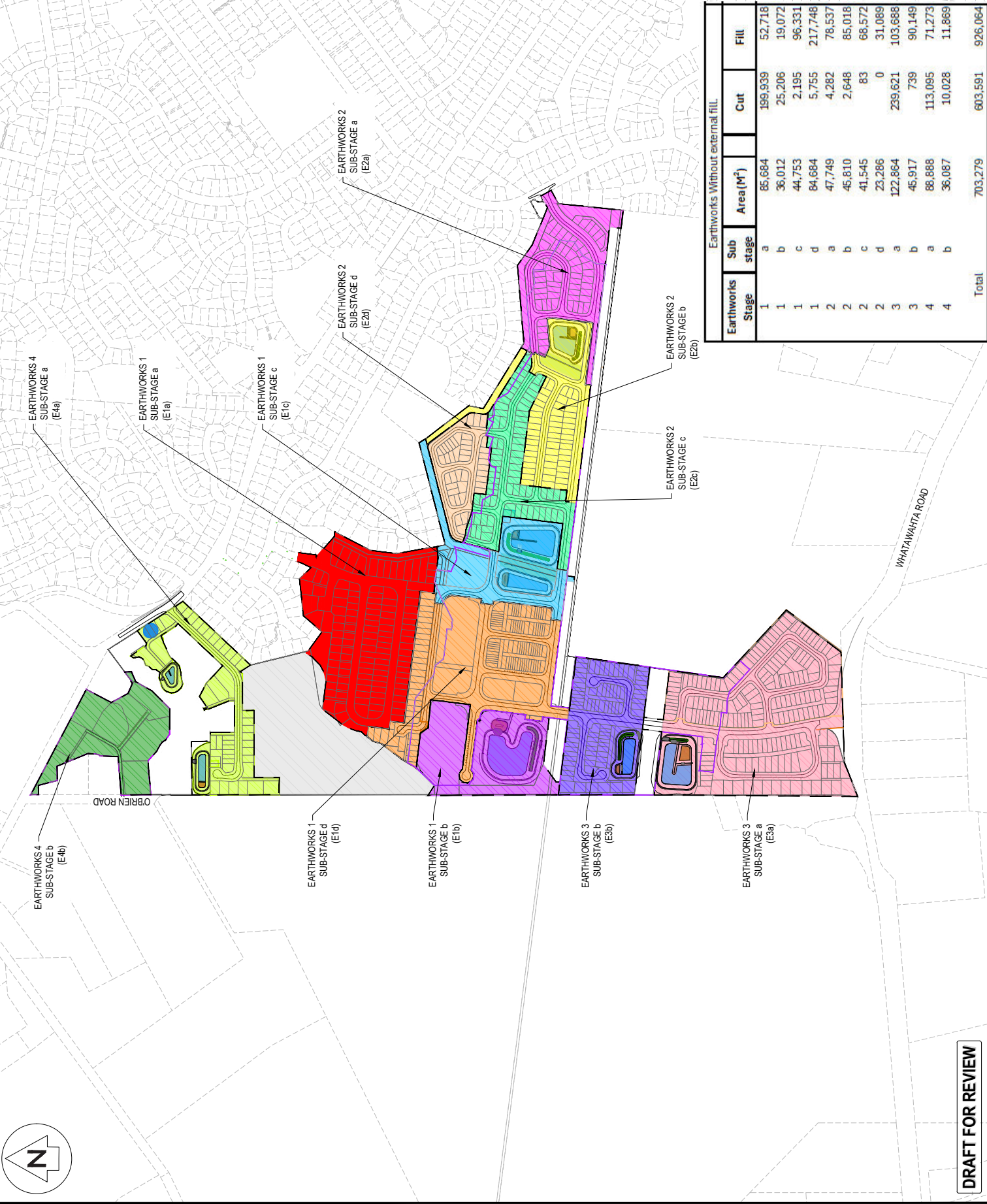
With this well-established assessment, planning and approval framework in place, it is assessed that the traffic management measures necessary to enable the staged construction activity will mitigate the effects of construction to an appropriately minimal level at all stages.





Appendix A - Proposed Earth Moving Overall Plan

Ref. Maven Drawing No. SK EARTHWORKS YEAR 1 - 4 -CXXX-3.pdf



- SUB-STAGE E1a
- SUB-STAGE E1b
- SUB-STAGE E1c
- SUB-STAGE E1d
- SUB-STAGE E2a
- SUB-STAGE E2b
- SUB-STAGE E2c
- SUB-STAGE E2d
- SUB-STAGE E3a
- SUB-STAGE E3b
- SUB-STAGE E4a
- SUB-STAGE E4b

A	DRAFT	NDL	07/2026		
Rev	Description	By	Date		
Survey			10/2025		
Design		TCH	07/2026		
Drawn		AJP	07/2026		
Checked					

M

Maven Walkato

1286 Victoria Street, Hamilton

021 778 0000

info@maven.co.nz

www.maven.co.nz

New Zealand

Project

BRYMER FARMS

FOR

BRYMER FARMS

LIMITED

Title

PROPOSED

EARTH MOVING

OVERALL PLAN

Project no.

119014

Scale

1:7500 @ A3

Cad file

SK EARTHWORKS CIVILS STAGING 2.DWG

Drawing no.

CXXX-1A

Rev

A

Earthworks Without external fill					
Earthworks Stage	Sub stage	Area (M ²)	Cut	Fill	
1	a	65,684	199,939	52,718	
1	b	36,012	25,206	19,072	
1	c	44,753	2,195	96,331	
1	d	84,684	5,755	217,748	
2	a	47,749	4,282	78,537	
2	b	45,810	2,648	85,018	
2	c	41,545	83	68,572	
2	d	23,286	0	31,089	
3	a	122,864	239,621	103,688	
3	b	45,917	739	90,149	
4	a	88,888	113,095	71,273	
4	b	36,087	10,028	11,869	
Total		703,279	603,591	926,064	

DRAFT FOR REVIEW



transplan