BEFORE THE HEARING COMMISSIONER

IN THE MATTER of the Resource Management Act 1991

AND

IN THE MATTER of a subdivision to create 242 residential lots within the C2 Growth Cell, and associated lots for public assets by 3MS OF CAMBRIDGE GP LIMITED (SP/0179/20)

SUPPLEMENTARY STATEMENT OF EVIDENCE OF MARK JOHN APELDOORN (TRAFFIC)

Dated: 25 May 2021

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INTRODUCTION

1. My full name is Mark John Apeldoorn. I am the Practice Leader: Transport Advisory Private Sector at Stantec NZ Ltd. My qualifications and experience are set out in my primary statement of evidence dated 11 May 2021 (**primary evidence**).

SCOPE OF EVIDENCE

2. This supplementary statement of evidence includes the following:

   (a) A brief summary of the findings set out in my primary evidence and in the s92 response;

   (b) Clarification in relation to the Ministry of Education (**MoE**) student numbers planned for the proposed school site;

   (c) Further description of the traffic engineering aspects of the proposal following my conferencing engagement with Mr Cameron Inder; and

   (d) Recommended conditions.

CODE OF CONDUCT

3. I confirm that I have read and am familiar with the Code of Conduct for Expert Witnesses in the Environment Court Practice Note 2014, and I agree to comply with it.

4. I confirm that this supplementary evidence is written within my expertise, except where otherwise stated, and that I have not omitted to consider material facts known to me that might alter or detract from the opinions expressed.

EVIDENCE AND S92 RESPONSE SUMMARY

5. The key findings from my primary evidence can be summarised as follows:

(a) With the introduction of the super-lot site and its intended use for retirement living, overall dwelling density is maintained, however peak period and total traffic demands are expected to be lower than those the Structure Plan initially anticipated for the site;

(b) The proposed subdivision concept establishes an extensive network of on and safely separated off-road walking and cycling paths that are well integrated with the overall Structure Plan concept. The strategic hierarchy of off-road paths includes a strategic east – west link across the site to integrate with adjacent neighbourhoods. It is located to link with the future Collector Road corridor off-road paths and also provides off-road pathway integration with the proposed reserve, school and commercial areas;

(c) Appendix C of the s92 response demonstrates how the graduated uptake of development within the site aligns with Council's planned long-term transport infrastructure implementation;

(d) I noted at paragraph 60 that the Integrated Transportation Assessment (**ITA**) did not recommend closure of either local road connection with Cambridge Road as had been inferred in the s 42A report. Rather it was recommended that Road 11 revert to a left-in, left-out arrangement following construction of the C2/C3 Collector Road roundabout;

(e) The traffic matters raised in submissions (paragraphs 63 to 68) are addressed through the design integration of the subdivision proposal with the proposed Structure Plan and the staged intersection arrangements with Cambridge Road.

6. On the matter of conditions, I concluded:

(a) An extension of the 50km/h speed zone to the west of the site was supported;

(b) Establishment of right turn bays on Cambridge Road at the two intersections and extension of a painted median from Kelly Road to the Te Awa Lifecare Village access was warranted;

(c) The need for an off-road shared path across the northern Cambridge Road frontage of the site was necessary;

(d) The process for design development and approval proposed by Council officers was appropriate; and

(e) I recommended amendment to the conditions to support establishment of the Road 11 intersection as a left-in, left out only intersection in conjunction with formation of the Collector Road roundabout.

7. My overall conclusion was that the subdivision proposal was able to be appropriately integrated into the existing and planned transport networks.

MOE STUDENT NUMBERS

8. The assessments in the ITA are based on an expectation for 1,000 students (ultimately) at the school. My response in Appendix C of the s 92 response was based on what was understood at the time (6 April 2021) to be a reduced school size of 300 pupils. Mr Bax has indicated at paragraph 10 of his supplementary evidence that the longer-term expectation indicated by MoE remains at 1,000 pupils although growth will be staged.

9. I have since sought further confirmation from the MoE and have been advised that an initial commencement is expected to provide for up to 300 pupils at or about 2024. There is no current horizon plan for growth beyond this, other than an expectation that growth may occur commensurate with population change in Cambridge over the ensuing years. A designation for up to 1,000 pupils is however currently anticipated. I address the traffic effects of this later in this evidence.

EXPERT WITNESS CONFERENCING - TRAFFIC

10. Engagement with Council officers, which included my participation, following release of the s42A report occurred by way of a meeting on Monday, 17 May 2021. I subsequently conferenced directly with Mr Inder on Wednesday 19 May 2021. The summary set out at paragraphs 40 to 42 of Mr Inder's evidence presents a fair summary of the matters we agreed at that time.

11. Mr Inder notes at his paragraph 41.d that I was to give some further consideration to the strategic internal and perimeter network measures with regard further prioritisation of walking and cycling and the reduction of potential "rat-running" both pre and post the C2/C3 roundabout and Collector Road.

12. I have made those further assessments together with further regard for the potential impact of the school numbers (refer my paragraph 6). On these matters, I have progressed further assessment and again conferenced with Mr Inder on 24 May 2021. On these bases, I have concluded as follows:

(a) Where the school roll increases beyond 300 pupils post-2024, and assuming the Cambridge Road roundabout is not constructed, the demand for some additional traffic capacity at the two Cambridge Road intersections increases. This effect is able to be addressed by way of either a mid-block signalised intersection (potentially including queue-based call detectors on Roads 10 and 11), or where further capacity is necessary, signalisation of one of the intersections. I have undertaken intersection modelling (**Appendix A**) for both signal scenarios. The results confirm these responses are appropriate and achievable. This addresses the school roll matter raised in the evidence of Mr Bax.

(b) I have further considered development of the subdivision Master Plan with respect to mode-filtering and in terms of potential rat-running described by Mr Inder. I set out some further background to describe the strategic design approach that has been adopted for the subdivision at my **Appendix B**. In these regards however, I have further recommended:

(i) A southbound vehicular movement filter on Road 10 at the Road 20 intersection, this interrupting through travel from Road 2 to Cambridge Road;

(ii) A potential post-roundabout and Collector Road mode-filter at the intersection of Road 20 and Road 11. This could interrupt

eastbound through vehicular travel along Road 20 between the Collector Road and Road 10. It will support local trip making to the shops, playground and reserve area by walk/cycle modes;

(iii) I would also support a mode-filter on Road 10 in terms of the potential connection through to Kelly Road to the east, again, maintaining this link as a walk/cycle connection only; and

(iv) I have introduced further mid-block speed management devices on both Road 10 and Road 11 to smooth the speed profile on these corridors, to align with currently anticipated pedestrian access links with the super-lot, and to manage vehicular speeds to safe system outcome levels at these expected road crossing locations.

13. I have included an updated plan set at my **Appendix C** that:

a) Demonstrates a range of alternate, practical and achievable implementation measures on Cambridge Road which provide for all potential subdivision generated demands, respond to a safe systems environmental outcome, and which also provide for co-ordinated planning between the Cambridge Road roundabout, the Collector Road and the form of subdivision intersections;

b) Demonstrates a carefully considered strategic approach to walk/cycle mode prioritisation and a corresponding avoidance of potentially negative transport outcomes as a result.

14. By way of a summary therefore, I have concluded:

(a) The subdivision proposal remains strongly aligned with the proposed Structure Plan;

(b) Full development potential within the subdivision area is provided for, to integrate in a safe systems way with either interim and/or full implementation outcomes associated with the Cambridge Road roundabout and C2/C3 Collector Road; and

(c) Walk/cycle modes will be highly prioritised over local vehicle travel and are safely established across the subdivision together with targeted traffic management responses to deter the potential for traffic rat-running.

Recommended Conditions

15. Mr Inder sets out at his paragraphs 45 to 52 recommended conditions that reflect the conferencing we undertook together on 19 May 2021. Pursuant to the further matters I was tasked with in that conferencing and based on the further refined assessments I have just described, I consider some amendment and consolidation of the draft conditions is warranted to reflect elements now included on the plans and to recognise that a fully integrated design solution (or alternative staged outcome) is provided for by way of the *Safe Travel Management Plan* condition. I have canvassed these changes with Mr Inder on 24 and 25 May.

16. I set out a suggested tracked-changes version to those conditions at my **Appendix D**. The key changes (with reference to the condition numbering I set out at **Appendix D**) can be summarised as follows:

(a) Condition 47.b, a minor wording change to reflect that safe system intersection arrangements have been demonstrated to be achievable, are provided for on the plans and may vary depending on progress of the Cambridge Road roundabout and Collector Road;

(b) Condition 47.c, a minor wording change to provide for the potential for a signalised crossing place to be integrated within an intersection signalisation outcome, again, subject to timing and progress of the Cambridge Road roundabout and Collector Road;

(c) Condition 48, this is a transferred condition from the "*Trigger Condition*" (paragraphs 49 to 52 of Mr Inder's evidence). I consider that this is better integrated with the *Safe Travel Management Plan* undertakings which will have full regard for progress and timing of the Cambridge Road roundabout and Collector Road. Together with Condition 47.d the staging of infrastructure implementation will be addressed through the *Safe Travel Management Plan*. This change deletes any further need for the separate "*Trigger Condition*" set out at paragraphs 49 to 52 of Mr Inder's evidence.

(d) Conditions 49 and 51, "*Submit Roading Design Drawings*", no changes are proposed.

(e) Conditions 51 to 54, "*Trigger Condition*", these are in part transferred to my suggested Condition 48 and the remaining content is no longer relevant, being provided for by way of the Condition 47 and 48 *Safe Travel Management Plan* structure.

17. The adoption of conditions as I have set out will provide the subdivision the necessary flexibility to integrate safe system access management outcomes that align with progress on delivery of the Cambridge Road roundabout and the C2/C3 Collector Road as provided for through years 1 to 3 of the Long Term Plan.

Conclusion

18. On the basis of the summaries and further expert conferencing assessments I have described, I remain of the conclusion the traffic and transportation planning elements of the proposal have been comprehensively considered and the subdivision will be appropriately integrated into the existing and planned transport networks.

Mark John Apeldoorn

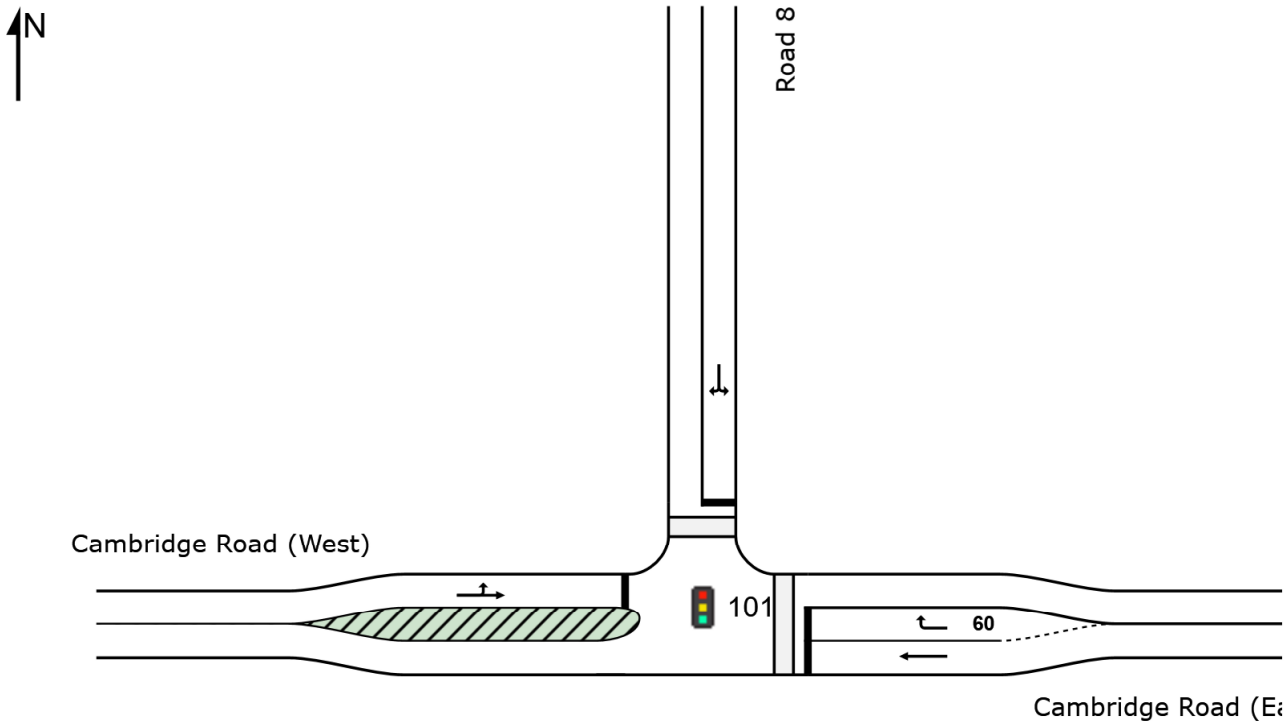
25 May 2021

Appendix A: Cambridge Road Intersection Modelling Results

SITE LAYOUT

Site: 101 [Road 8/Cambridge Road Layout 1AM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated



LANE SUMMARY

Site: 101 [Road 8/Cambridge Road Layout 1AM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 100 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows Total veh/h	Demand Flows HV %	Cap. veh/h	Deg. Satn v/c	Lane Util. %	Average Delay sec	Level of Service	95% Back of Queue Veh	95% Back of Queue Dist m	Lane Config	Lane Length m	Cap. Adj. %	Prob. Block. %
East: Cambridge Road (East)													
Lane 1	857	7.0	1171[1]	0.732	100	11.9	LOS B	26.5	196.7	Full	500	0.0	0.0
Lane 2	52	3.0	110	0.468	100	57.3	LOS E	2.6	18.8	Short	60	0.0	NA
Approach	908	6.8		0.732		14.5	LOS B	26.5	196.7				
North: Road 8													
Lane 1	376	3.0	423	0.889	100	57.1	LOS E	21.2	152.3	Full	500	0.0	0.0
Approach	376	3.0		0.889		57.1	LOS E	21.2	152.3				
West: Cambridge Road (West)													
Lane 1	892	6.2	994	0.897	100	35.4	LOS D	47.1	347.0	Full	500	0.0	0.0
Approach	892	6.2		0.897		35.4	LOS D	47.1	347.0				
Intersection	2176	5.9		0.897		30.4	LOS C	47.1	347.0				

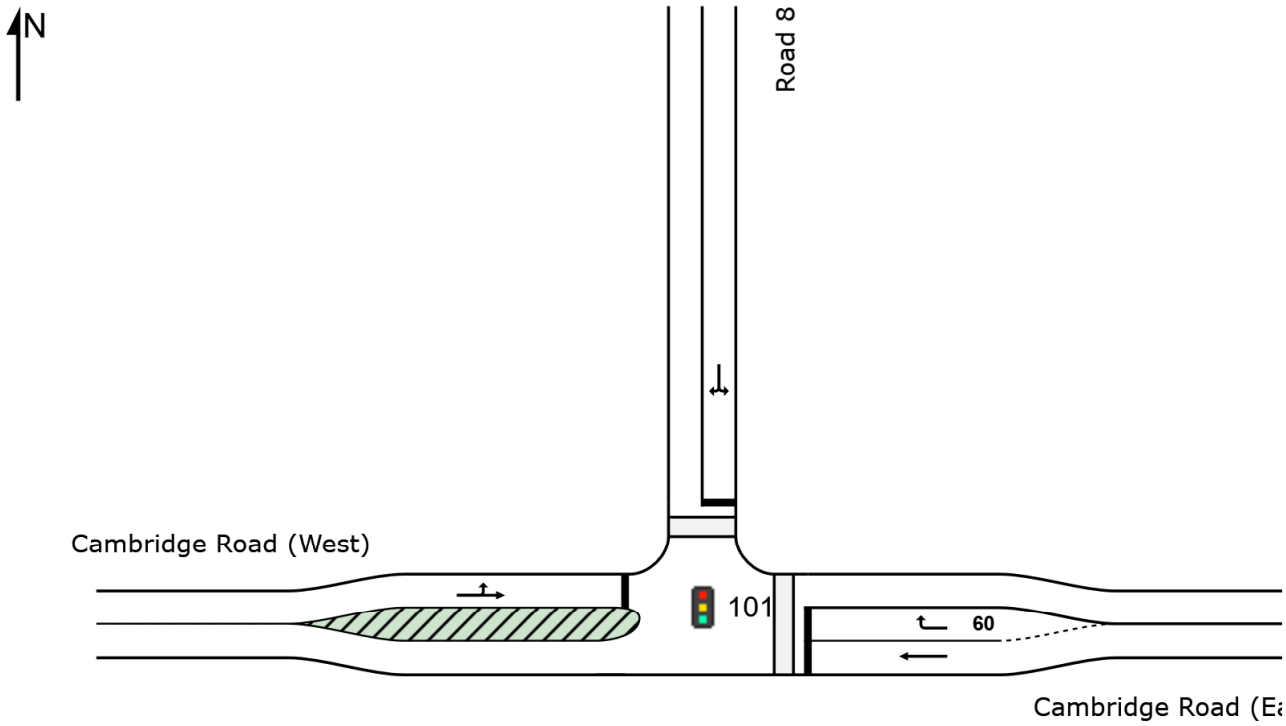
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

SITE LAYOUT

Site: 101 [Road 8/Cambridge Road Layout 1 PM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated



LANE SUMMARY

Site: 101 [Road 8/Cambridge Road Layout 1 PM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

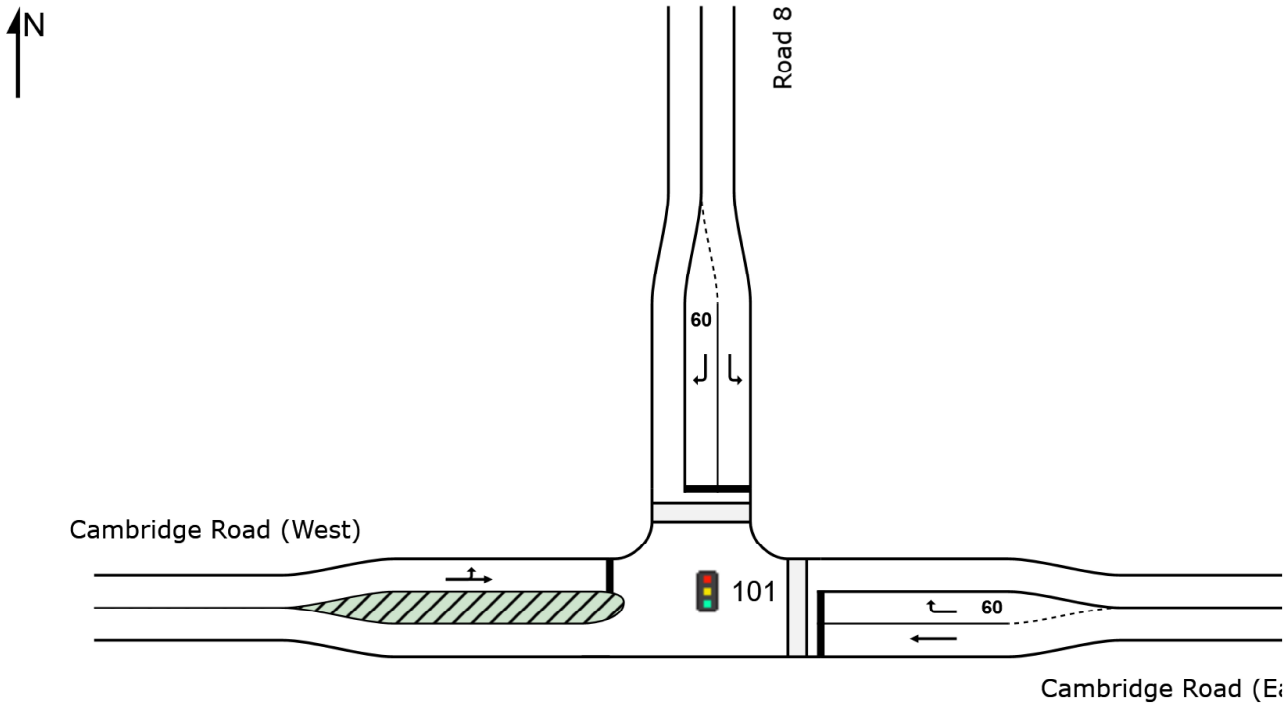
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	786	7.0	1445	0.544	100	4.5	LOS A	13.6	101.1	Full	500	0.0	0.0
Lane 2	75	3.0	122	0.610	100	52.7	LOS D	3.5	25.0	Short	60	0.0	NA
Approach	861	6.7		0.610		8.6	LOS A	13.6	101.1				
North: Road 8													
Lane 1	158	3.0	184	0.859	100	56.5	LOS E	7.9	56.8	Full	500	0.0	0.0
Approach	158	3.0		0.859		56.5	LOS E	7.9	56.8				
West: Cambridge Road (West)													
Lane 1	1029	6.6	1190	0.865	100	21.0	LOS C	41.8	309.4	Full	500	0.0	0.0
Approach	1029	6.6		0.865		21.0	LOS C	41.8	309.4				
Intersection	2048	6.3		0.865		18.6	LOS B	41.8	309.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [Road 8/Cambridge Road Layout 1aAM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [Road 8/Cambridge Road Layout 1aAM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 80 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	857	7.0	1241[1]	0.690	100	7.7	LOS A	19.0	141.2	Full	500	0.0	0.0
Lane 2	52	3.0	138	0.374	100	45.4	LOS D	2.1	14.8	Short	60	0.0	NA
Approach	908	6.8		0.690		9.8	LOS A	19.0	141.2				
North: Road 8													
Lane 1	117	3.0	574	0.204	100	26.5	LOS C	3.4	24.2	Full	500	0.0	0.0
Lane 2	259	3.0	299	0.867	100	49.2	LOS D	11.7	84.0	Short	60	0.0	NA
Approach	376	3.0		0.867		42.1	LOS D	11.7	84.0				
West: Cambridge Road (West)													
Lane 1	892	6.2	1008	0.885	100	29.1	LOS C	38.1	281.0	Full	500	0.0	0.0
Approach	892	6.2		0.885		29.1	LOS C	38.1	281.0				
Intersection	2176	5.9		0.885		23.3	LOS C	38.1	281.0				

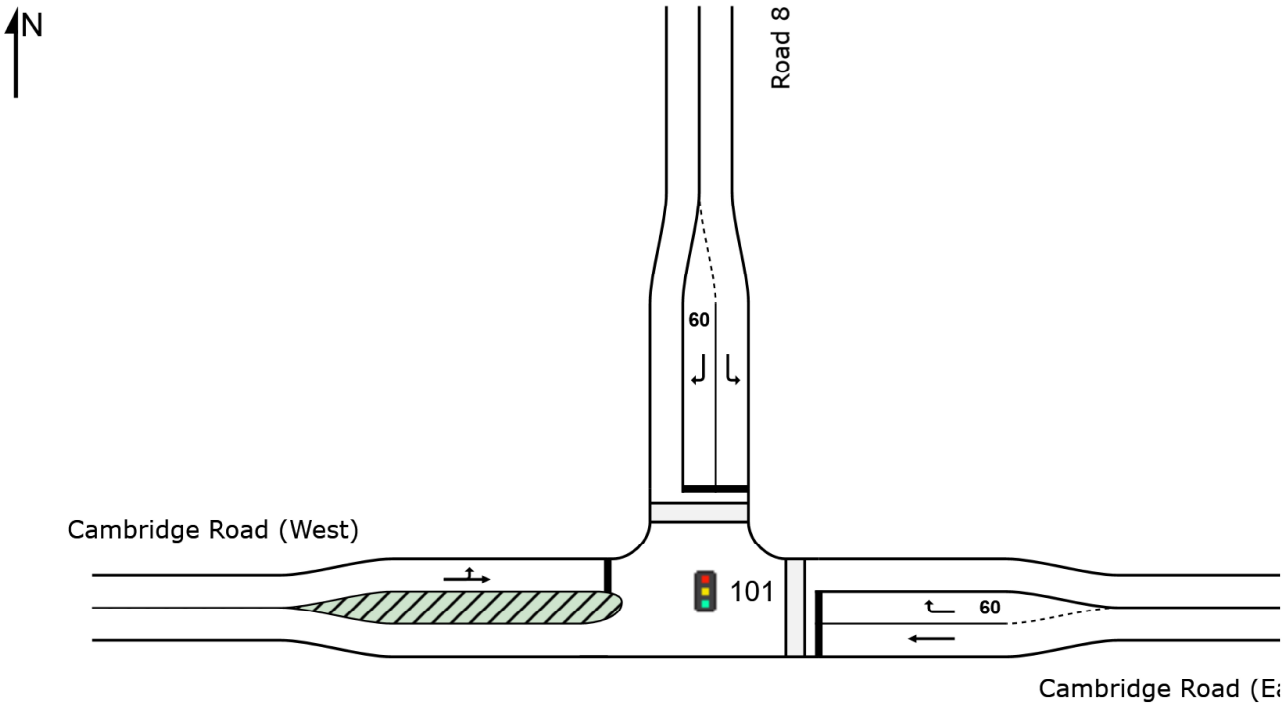
Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

1 Reduced capacity due to a short lane effect. Short lane queues may extend into the full-length lanes. Some upstream delays at entry to short lanes are not included.

SITE LAYOUT

Site: 101 [Road 8/Cambridge Road Layout 1aPM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [Road 8/Cambridge Road Layout 1aPM 10Y]

Road 8/Cambridge Road
Site Category: (None)
Signals - Fixed Time Isolated Cycle Time = 90 seconds (Site Practical Cycle Time)
Variable Sequence Analysis applied. The results are given for the selected output sequence.

Lane Use and Performance

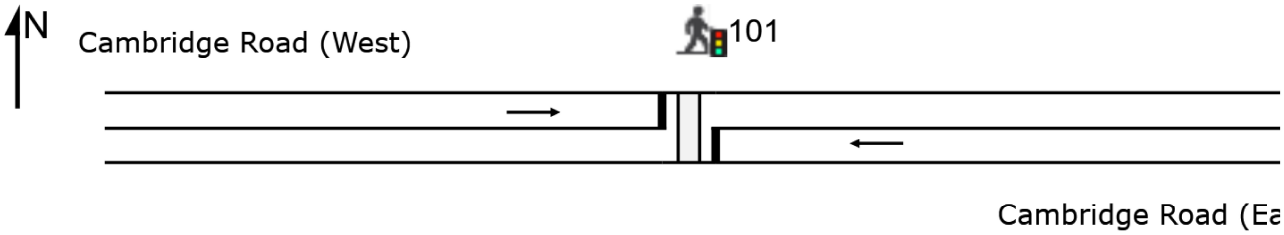
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	786	7.0	1445	0.544	100	4.5	LOS A	13.6	101.1	Full	500	0.0	0.0
Lane 2	75	3.0	122	0.610	100	52.7	LOS D	3.5	25.0	Short	60	0.0	NA
Approach	861	6.7		0.610		8.6	LOS A	13.6	101.1				
North: Road 8													
Lane 1	60	3.0	429	0.140	100	34.3	LOS C	2.1	15.1	Full	500	0.0	0.0
Lane 2	98	3.0	184	0.533	100	48.5	LOS D	4.3	31.1	Short	60	0.0	NA
Approach	158	3.0		0.533		43.1	LOS D	4.3	31.1				
West: Cambridge Road (West)													
Lane 1	1029	6.6	1190	0.865	100	21.0	LOS C	41.8	309.4	Full	500	0.0	0.0
Approach	1029	6.6		0.865		21.0	LOS C	41.8	309.4				
Intersection	2048	6.3		0.865		17.5	LOS B	41.8	309.4				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [POS AM Practical Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [POS AM Practical Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Lane Use and Performance

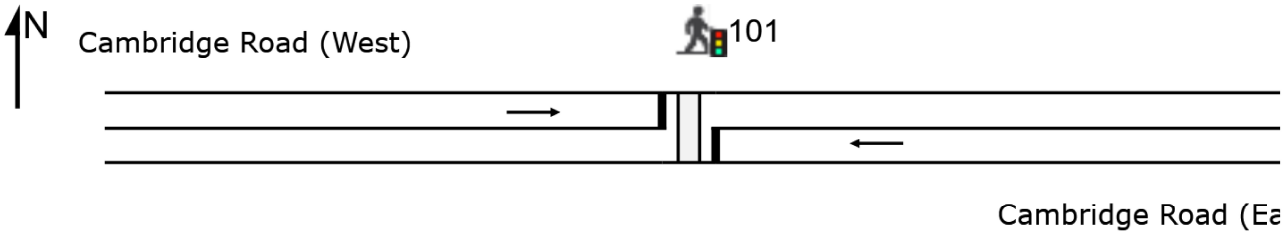
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	908	7.0	1119	0.812	100	9.7	LOS A	13.9	103.3	Full	500	0.0	0.0
Approach	908	7.0		0.812		9.7	LOS A	13.9	103.3				
West: Cambridge Road (West)													
Lane 1	825	7.0	1119	0.737	100	6.6	LOS A	10.3	76.3	Full	500	0.0	0.0
Approach	825	7.0		0.737		6.6	LOS A	10.3	76.3				
Intersection	1734	7.0		0.812		8.2	LOS A	13.9	103.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [POS PM Practical Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [POS PM Practical Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 30 seconds (Site Practical Cycle Time)

Lane Use and Performance

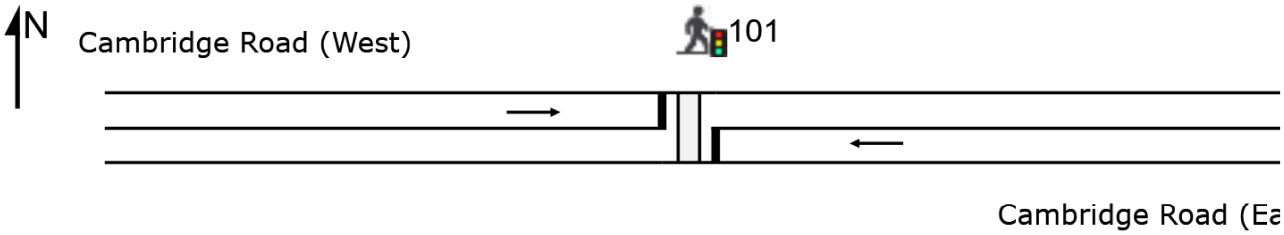
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	861	7.0	1119	0.769	100	7.7	LOS A	11.7	86.5	Full	500	0.0	0.0
Approach	861	7.0		0.769		7.7	LOS A	11.7	86.5				
West: Cambridge Road (West)													
Lane 1	982	7.0	1119	0.878	100	15.1	LOS B	19.2	142.3	Full	500	0.0	0.0
Approach	982	7.0		0.878		15.1	LOS B	19.2	142.3				
Intersection	1843	7.0		0.878		11.7	LOS B	19.2	142.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [POS AM Optimum Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated



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LANE SUMMARY

Site: 101 [POS AM Optimum Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 76 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

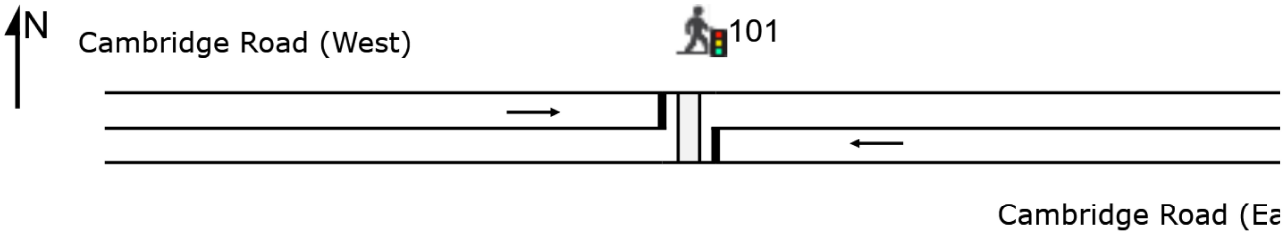
	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	908	7.0	1448	0.627	100	4.0	LOS A	14.6	108.1	Full	500	0.0	0.0
Approach	908	7.0		0.627		4.0	LOS A	14.6	108.1				
West: Cambridge Road (West)													
Lane 1	825	7.0	1448	0.570	100	3.6	LOS A	12.2	90.3	Full	500	0.0	0.0
Approach	825	7.0		0.570		3.6	LOS A	12.2	90.3				
Intersection	1734	7.0		0.627		3.8	LOS A	14.6	108.1				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

SITE LAYOUT

Site: 101 [POS PM Optimum Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated



Organisation: STANTEC NEW ZEALAND | Created: Sunday, 23 May 2021 3:17:50 pm
Project: U:\310204689\XXX. Hearing\SIDRA Results\210523 Update with 1000 students\Signal Tests_210523_1000 Pupils.sip8

LANE SUMMARY

Site: 101 [POS PM Optimum Cycle Time]

New Site
Site Category: (None)
Pedestrian Crossing (Signals) - Fixed Time Isolated Cycle Time = 148 seconds (Site Optimum Cycle Time - Minimum Delay)

Lane Use and Performance

	Demand Flows		Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Config	Lane Length	Cap. Adj.	Prob. Block.
	Total veh/h	HV %	veh/h	v/c	%	sec		Veh	Dist m		m	%	%
East: Cambridge Road (East)													
Lane 1	861	7.0	1600	0.538	100	2.9	LOS A	15.9	118.1	Full	500	0.0	0.0
Approach	861	7.0		0.538		2.9	LOS A	15.9	118.1				
West: Cambridge Road (West)													
Lane 1	982	7.0	1600	0.614	100	3.3	LOS A	20.7	153.3	Full	500	0.0	0.0
Approach	982	7.0		0.614		3.3	LOS A	20.7	153.3				
Intersection	1843	7.0		0.614		3.1	LOS A	20.7	153.3				

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site tab).
Lane LOS values are based on average delay per lane.
Intersection and Approach LOS values are based on average delay for all lanes.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix B: Strategic Multi-Modal Subdivision Design Approach Summary

1. A significant and strategically planned approach to prioritisation of walking and cycling modes has formed the underlying structure of the subdivision proposal. This has included:

   (a) A hierarchy approach to walking and cycling that establishes a protected off-road movement network with (as far as New Zealand Law permits) prioritisation of these modes at key road crossing places. This network establishes off-road accessibility east-west across the site and with adjoining future neighbourhoods; integrated access with the school, reserves and commercial site; and establishes future off-road connectivity with the Collector Road and planned grade-separated crossing place at the Cambridge Road roundabout;

   (b) A secondary walk/cycle network establishes linkages between the off-road networks and the key points of activity within and beyond the site. These include the local road link from Road 14 to the off-road path in the stormwater reserve; and an extensive network of facilities integrating with the off-carriageway shared facility planned for the northern Cambridge Road frontage to the site, as well as links providing for future integration with Structure Plan areas to the north, west and east of the site;

   (c) A dedicated cycleway is planned for the east-west Collector Road (Road 2) to provide for safe and prioritised cycle access to the school site, linking this with other future neighbourhoods. Again, road crossings are as far as possible prioritised for walking and cycling movements;

   (d) Earlier planned on-road parking across the school frontage has been removed to preserve this space and prioritise its function for pedestrian and cycle access;

(e) A reduced internal (40km/h) speed limit or speed managed outcome area is proposed, actively discouraging errant through traffic and/or short internal trip making;

(f) All key walk/cycle road crossing places are established on raised platform crossings to adjust the motor vehicle priority and shift preference to walk/cycle modes;

(g) The potential for a future vehicular link between Road 10 and Kelly Road to the east is recommended as a key mode-filter point for the neighbourhood where it is established as an off-road walk/cycle connection only. Access from eastern neighbourhoods to the reserve, school, and commercial activity areas will be significantly more efficient for walking and cycling through this approach;

(h) The potential for turning restriction and management by way of delivering key mode filters for the subdivision is assessed as being optimally introduced around the periphery of the subdivision. Observation of the wider Structure Plan indicates that future land development areas create 4 quadrants of development at the intersection of the C2/C3 Collector Road and the Road 2 Collector Road intersection. Management of mode filtering at these interfaces along the Collector Road (together with internal traffic management measures) will deliver key outcomes that prevent “rat-running” through all of the neighbourhoods and will contribute to focussing traffic activity away from the internal neighbourhood areas. The C2/C3 Collector Road future intersections with the proposed subdivision provide this opportunity to the west and are beyond the realm of the subdivision proposal. At Cambridge Road a future left-in, left-out vehicle movement control is to be considered long-term, while full pedestrian and cycle access is proposed to be maintained.

To the east, the recommended Kelly Road walk/cycle mode-filter link is recommended.

(i) Two points of connectivity are proposed between the subdivision and the Road 2 Collector Road. Potential rat-running via Roads 23, 20, and 11 is convoluted and traffic management in terms of speed management devices have been designed to deter this. While Road 10 presents a potentially more direct route, traffic management devices were recommended along its length to discourage such outcomes, and these have been added to along with a mode-filter approach at the Road 20 intersection. From a network perspective therefore, the future Collector Roads will provide the optimal travel route for vehicles and neighbourhood rat-running will be appropriately deterred through traffic management.

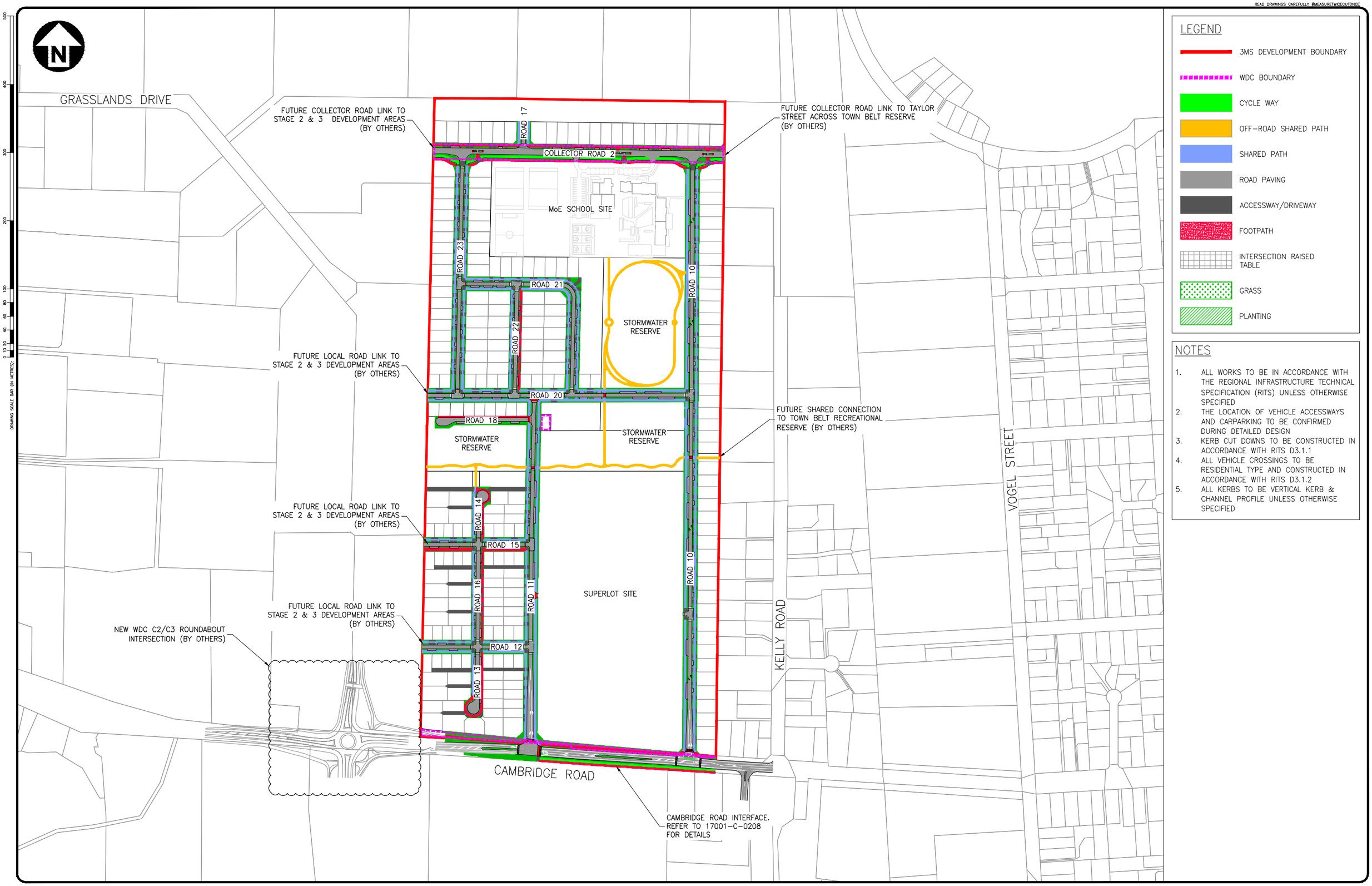
(j) Internal to the neighbourhood mode-filtering methods have been considered, in particular at the intersections of Roads 10/20, Roads 20/23, Roads 20/11, Roads 11/15, and Roads 11/12. While it may be physically possible to introduce mode filtering at some or all of these locations, considered assessment indicates this has the potential in many cases to have a negative impact, increasing intra-neighbourhood vehicle kilometers travelled (VKT) (where trips are by vehicle) and as a consequence are expected to adversely contribute to potential vehicle emissions outcomes. The principal reason for this is that many of these trips are origin and/or destination based within the neighbourhood, therefore there may be frequent need for these travel movements to occur in any event. Circumventing these travel movements results in longer and more convoluted vehicular travel and is therefore not recommended.

(k) Further to (j) above however, it has been determined that internal mode-filters are practically achievable at Road 10/20 and Road 11/20

intersections. Together with the Kelly Road mode-filter, a comprehensive approach to prioritising pedestrian/cycle modes is assessed as being delivered, these in a way that successfully avoids the potential adverse outcomes that could otherwise be expected.

Appendix C: Further Refined Subdivision Master Plans

READ DRAWINGS CAREFULLY & MEASURE TWICE CUT ONCE



LEGEND

- 3MS DEVELOPMENT BOUNDARY
- WDC BOUNDARY
- CYCLE WAY
- OFF-ROAD SHARED PATH
- SHARED PATH
- ROAD PAVING
- ACCESSWAY/DRIVEWAY
- FOOTPATH
- INTERSECTION RAISED TABLE
- GRASS
- PLANTING

NOTES

1. ALL WORKS TO BE IN ACCORDANCE WITH THE REGIONAL INFRASTRUCTURE TECHNICAL SPECIFICATION (RITS) UNLESS OTHERWISE SPECIFIED
2. THE LOCATION OF VEHICLE ACCESSWAYS AND CARPARKING TO BE CONFIRMED DURING DETAILED DESIGN
3. KERB CUT DOWNS TO BE CONSTRUCTED IN ACCORDANCE WITH RITS D3.1.1
4. ALL VEHICLE CROSSINGS TO BE RESIDENTIAL TYPE AND CONSTRUCTED IN ACCORDANCE WITH RITS D3.1.2
5. ALL KERBS TO BE VERTICAL KERB & CHANNEL PROFILE UNLESS OTHERWISE SPECIFIED

REV	DESCRIPTION	BY	DATE
D	FOR INFORMATION	LPM	25.05.21
C	FOR INFORMATION	GCJ	08.12.20
B	FOR INFORMATION	GCJ	17.04.20
A	FOR INFORMATION	GCJ	30.03.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY: L. MCCAFFREY	DATE: 30.03.20
DRAWN BY: G. JONES	DATE: 30.03.20
APPROVED BY: —	DATE: —

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: ROADING GENERAL ARRANGMENT

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE: 1:5000

REVISION No.: D

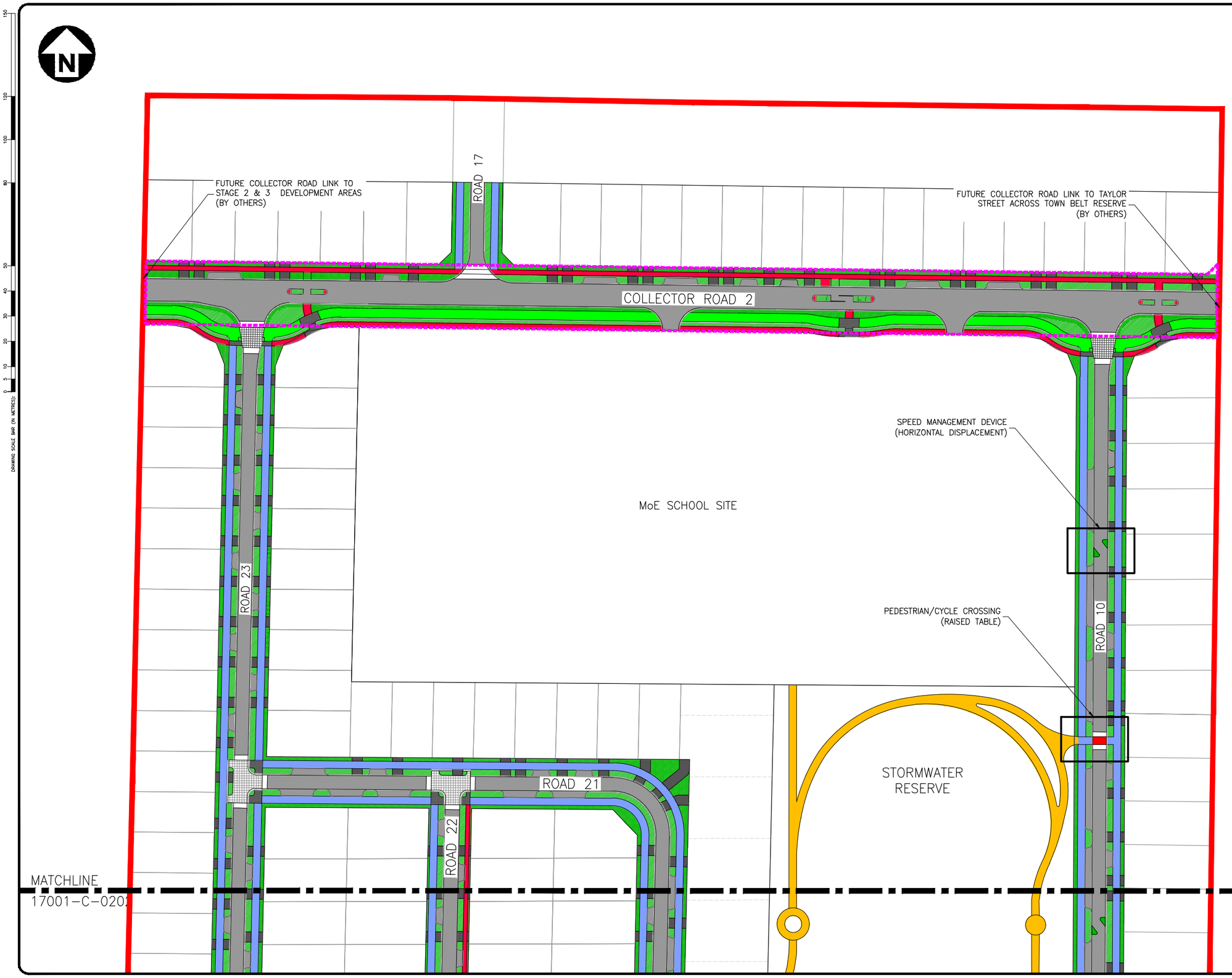
DISCIPLINE: CIVIL ENGINEERING

DRAWING No.: 17001-C-0200

FILE NAME: 17001-C-0200.dwg

READ DRAWINGS CAREFULLY @MEASURETWICECUTONCE

DRAWING SCALE BAR (IN METRES): 150 120 100 80 50 40 30 20 10 5 0



LEGEND

- 3MS DEVELOPMENT BOUNDARY
- WDC BOUNDARY
- CYCLE WAY
- OFF-ROAD SHARED PATH
- SHARED PATH
- ROAD PAVING
- ACCESSWAY/DRIVEWAY
- FOOTPATH
- INTERSECTION RAISED TABLE
- GRASS
- PLANTING

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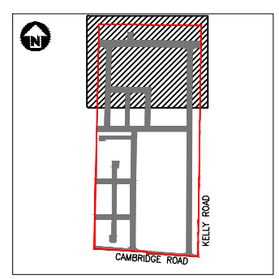
5. ALL KERBS TO BE VERTICAL KERB & CHANNEL PROFILE UNLESS OTHERWISE SPECIFIED



KEY PLAN

REV	DESCRIPTION	BY	DATE
D	FOR INFORMATION	LPM	25.05.21
C	FOR INFORMATION	GCJ	08.12.20
B	FOR INFORMATION	GCJ	17.04.20
A	FOR INFORMATION	GCJ	30.03.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY: L. MCCAFFREY	DATE: 30.03.20
DRAWN BY: G. JONES	DATE: 30.03.20
APPROVED BY: –	DATE: –

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: ROADING LAYOUT PLAN

SHEET 1 OF 3

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE: 1:1500	REVISION No.: D
DISCIPLINE: CIVIL ENGINEERING	
DRAWING No.: 17001-C-0201	

FILE NAME: 17001-C-0201.dwg

READ DRAWINGS CAREFULLY @MEASURETWICECUTONCE

DRAWING SCALE BAR (IN METRES): 0 5 10 20 30 40 50 80 100 120 150

17001–C–0201
MATCHLINE

ROAD 23
ROAD 22
ROAD 21
ROAD 10
ROAD 20
ROAD 18
ROAD 11
ROAD 14

STORMWATER RESERVE

SPEED MANAGEMENT DEVICE (HORIZONTAL DISPLACEMENT)

FUTURE LOCAL ROAD LINK TO STAGE 2 & 3 DEVELOPMENT AREAS (BY OTHERS)

PEDESTRIAN/CYCLE CROSSING (RAISED TABLE)

FUTURE SHARED CONNECTION TO TOWN BELT RECREATIONAL RESERVE (BY OTHERS)

PEDESTRIAN/CYCLE CROSSING (RAISED TABLE)

PEDESTRIAN/CYCLE CROSSING (RAISED TABLE)

STORMWATER RESERVE

STORMWATER RESERVE

SUPERLOT SITE

MATCHLINE
17001–C–0203

LEGEND

- 3MS DEVELOPMENT BOUNDARY
- WDC BOUNDARY
- CYCLE WAY
- OFF–ROAD SHARED PATH
- SHARED PATH
- ROAD PAVING
- ACCESSWAY/DRIVEWAY
- FOOTPATH
- INTERSECTION RAISED TABLE
- GRASS
- PLANTING

NOTES

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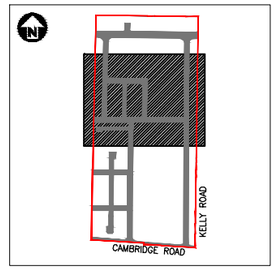
2. THE LOCATION OF VEHICLE ACCESSWAYS AND CARPARKING TO BE CONFIRMED DURING DETAILED DESIGN
3. KERB CUT DOWNS TO BE CONSTRUCTED IN ACCORDANCE WITH RITS D3.1.1
4. ALL VEHICLE CROSSINGS TO BE RESIDENTIAL TYPE AND CONSTRUCTED IN ACCORDANCE WITH RITS D3.1.2
5. ALL KERBS TO BE VERTICAL KERB & CHANNEL PROFILE UNLESS OTHERWISE SPECIFIED



KEY PLAN

REV	DESCRIPTION	BY	DATE
D	FOR INFORMATION	LPM	25.05.21
C	FOR INFORMATION	GCJ	08.12.20
B	FOR INFORMATION	GCJ	17.04.20
A	FOR INFORMATION	GCJ	30.03.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY	L. MCCAFFREY	DATE 30.03.20
DRAWN BY	G. JONES	DATE 30.03.20
APPROVED BY	—	DATE —

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: ROADING LAYOUT PLAN

SHEET 2 OF 3

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE: 1:1500

REVISION No.: D

DISCIPLINE: CIVIL ENGINEERING

DRAWING No.: 17001–C–0202

FILE NAME: 17001–C–0202.dwg

READ DRAWINGS CAREFULLY @MEASURETWICECUTONCE

DRAWING SCALE BAR (IN METRES): 0 5 10 20 30 40 50 80 100 120 150

N

17001-C-0202
MATCHLINE

ROAD 15

FUTURE LOCAL ROAD LINK TO STAGE 2 & 3 DEVELOPMENT AREAS (BY OTHERS)

ROAD 16

ROAD 11

SPEED MANAGEMENT DEVICE (HORIZONTAL DISPLACEMENT)

FUTURE LOCAL ROAD LINK TO STAGE 2 & 3 DEVELOPMENT AREAS (BY OTHERS)

SUPERLOT SITE

SPEED MANAGEMENT DEVICE (HORIZONTAL DISPLACEMENT)

ROAD 12

ROAD 13

ROAD 10

SPEED MANAGEMENT DEVICE (HORIZONTAL DISPLACEMENT)

PROPOSED INTERFACE WITH EXISTING CAMBRIDGE ROAD CORRIDOR. REFER TO 17001-C-0208 FOR FURTHER DETAILS

CAMBRIDGE ROAD

LEGEND

- 3MS DEVELOPMENT BOUNDARY
- WDC BOUNDARY
- CYCLE WAY
- OFF-ROAD SHARED PATH
- SHARED PATH
- ROAD PAVING
- ACCESSWAY/DRIVEWAY
- FOOTPATH
- INTERSECTION RAISED TABLE
- GRASS
- PLANTING

NOTES

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KEY PLAN

REV	DESCRIPTION	BY	DATE
D	FOR INFORMATION	LPM	25.05.21
C	FOR INFORMATION	GCJ	08.12.20
B	FOR INFORMATION	GCJ	17.04.20
A	FOR INFORMATION	GCJ	30.03.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY: L. MCCAFFREY — DATE: 30.03.20

DRAWN BY: G. JONES — DATE: 30.03.20

APPROVED BY: — — DATE: —

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: ROADING LAYOUT PLAN

SHEET 3 OF 3

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE: 1:1500

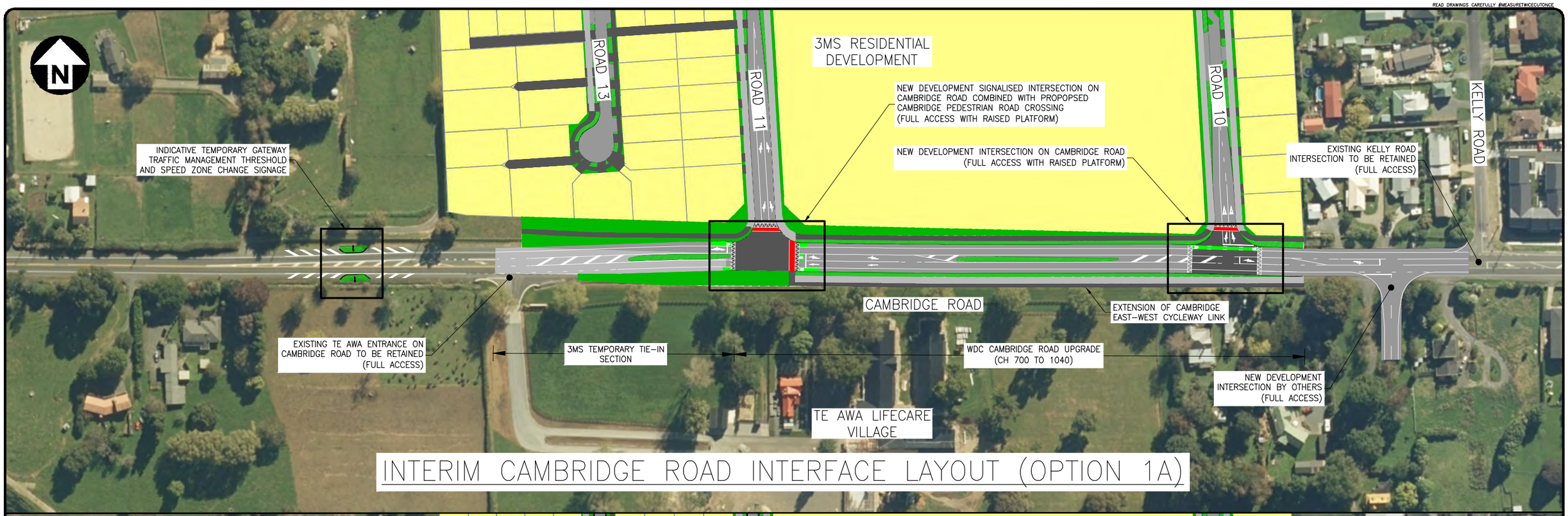
REVISION No.: D

DISCIPLINE: CIVIL ENGINEERING

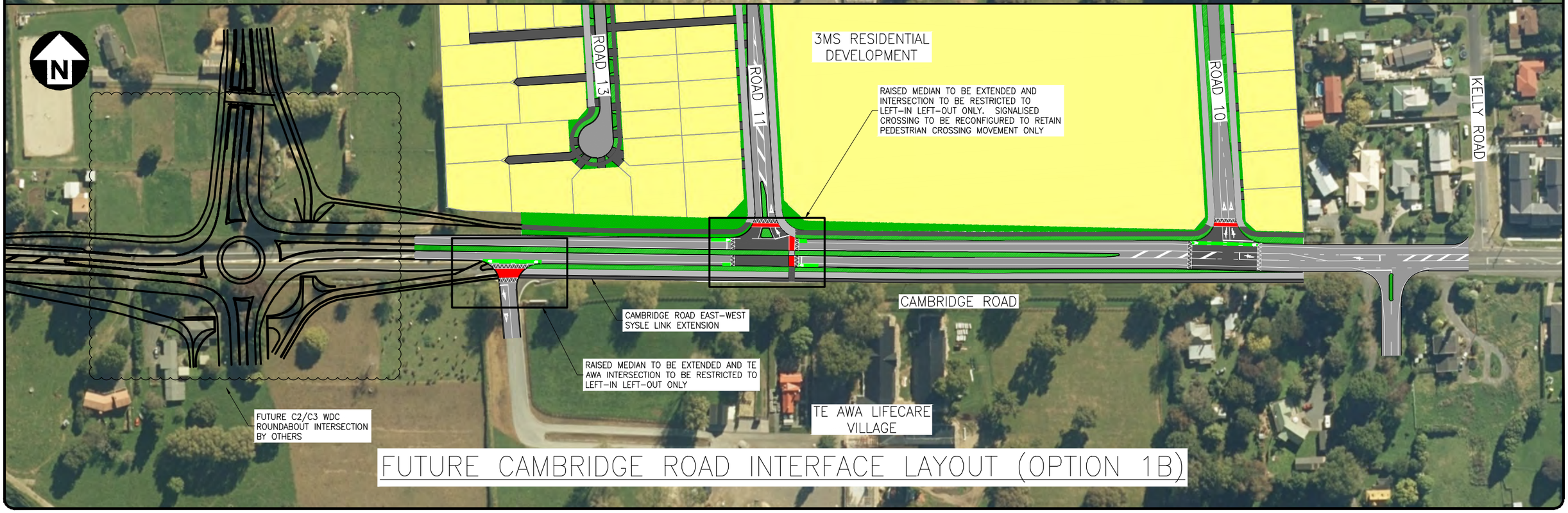
DRAWING No.: 17001-C-0203

FILE NAME: 17001-C-0203.dwg

READ DRAWINGS CAREFULLY @MEASURETWICECUTONCE



INTERIM CAMBRIDGE ROAD INTERFACE LAYOUT (OPTION 1A)



FUTURE CAMBRIDGE ROAD INTERFACE LAYOUT (OPTION 1B)

REV	DESCRIPTION	BY	DATE
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C	FOR INFORMATION	LPM	21.05.21
B	FOR INFORMATION	GCJ	08.04.20
A	FOR INFORMATION	LPM	31.01.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY	L. MCCAFFREY	DATE 31.01.20
DRAWN BY	L. MCCAFFREY	DATE 31.01.20
APPROVED BY	–	DATE –

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: TRANSPORT NETWORK
WALKING & CYCLING NETWORK

GENERAL ARRANGEMENT

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE:

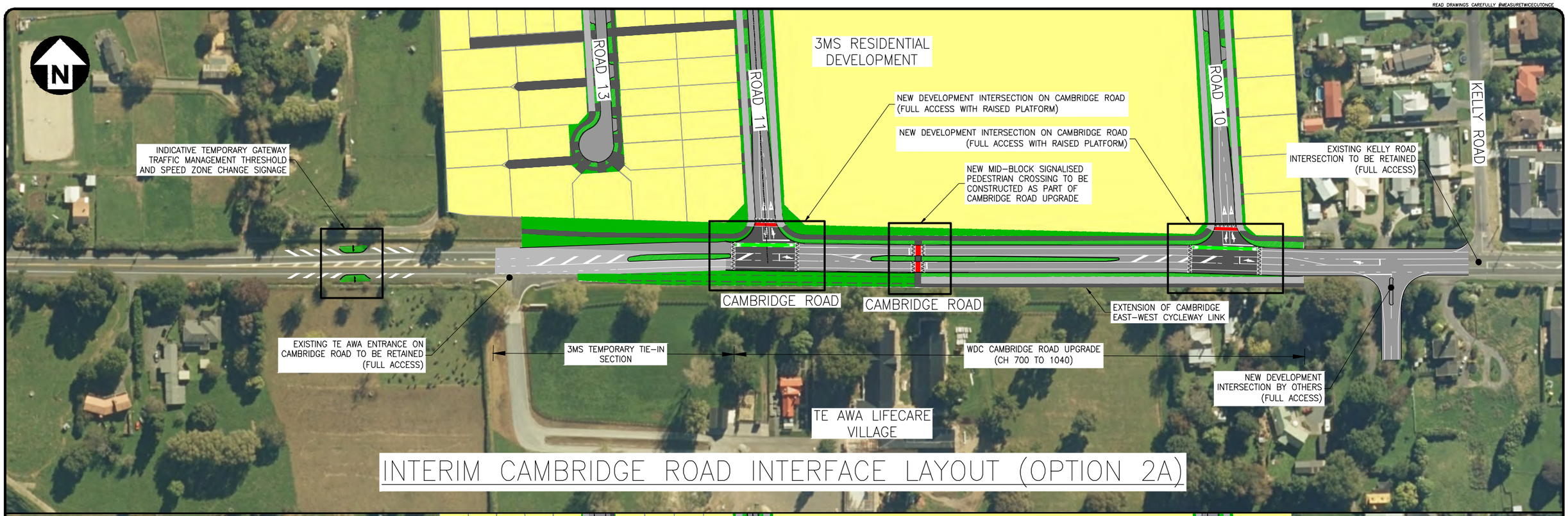
REVISION No.: D

DISCIPLINE: CIVIL ENGINEERING

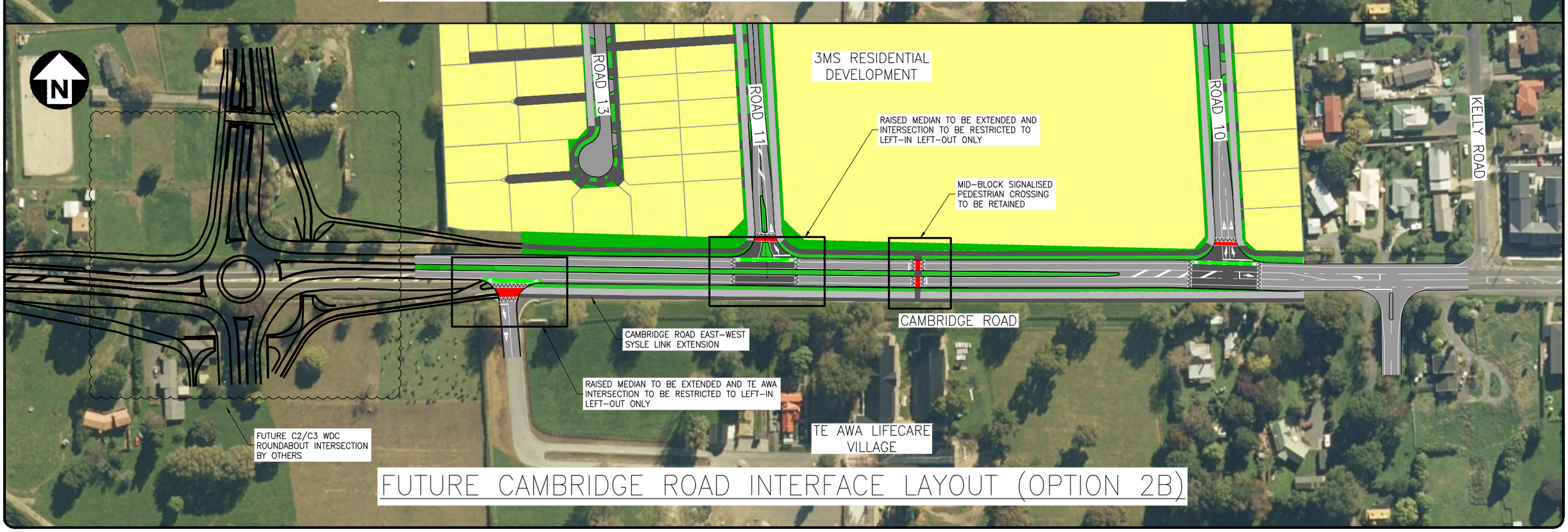
DRAWING No.: 17001–C–0207

FILE NAME: 17001–C–0208.dwg

READ DRAWINGS CAREFULLY @MEASURETWICECUTONCE



INTERIM CAMBRIDGE ROAD INTERFACE LAYOUT (OPTION 2A)



FUTURE CAMBRIDGE ROAD INTERFACE LAYOUT (OPTION 2B)

REV	DESCRIPTION	BY	DATE
B	FOR INFORMATION	GCJ	25.05.21
A	FOR INFORMATION	LPM	31.01.20

APPROVAL STATUS: FOR INFORMATION

DESIGNED BY	L. MCCAFFREY	DATE 31.01.20
DRAWN BY	L. MCCAFFREY	DATE 31.01.20
APPROVED BY	–	DATE –

CLIENT NAME: 3MS

PROJECT NAME: 3MS RESIDENTIAL DEVELOPMENT

MASTER PLAN

DRAWING TITLE: TRANSPORT NETWORK
WALKING & CYCLING NETWORK

ALTERNATIVE ARRANGEMENT

PRODUCED BY: MCCAFFREY ENGINEERING CONSULTANTS

DATE PRINTED: 25 May 2021

DRAWING SCALE:

REVISION No.: B

DISCIPLINE: CIVIL ENGINEERING

DRAWING No.: 17001-C-0207

FILE NAME: 17001-C-0209.dwg

Appendix D: Suggested Amended Conditions

SAFE TRAVEL MANAGEMENT PLAN

47 The consent holder shall provide a Safe Travel Management Plan, from a suitably qualified Transportation Engineer to Council's Team Leader – Development Engineering for certification and shall be at the consent holder's expense. The purpose of the submitted plan is to demonstrate the transport network design aligns with Vision Zero principles, and incorporates strategic infrastructure supporting the Structure Plan objective of prioritising walking and cycling over vehicle trips. This shall include, but is not limited to:

a Methods to encourage residents to choose walking and cycling over vehicular trips within and through the network for short local journeys. In addition to walking and cycling paths and crossing, it includes strategic prevention of certain movements by vehicles to provide 'rat run' mitigation while enabling full access by walking and cycling.

b Safety System design features of intersections, both internal and connecting to Cambridge road including consideration for, but not limited to, providing raised platform intersections of Road 11 and Road 10 with Cambridge Road.

c Provision of a Safe System road crossing for pedestrians and cyclists across Cambridge Road ~~between~~ in the vicinity of Road 11 and/or Road 10 intersections, strategically positioned to prioritise and encourage walking and cycling, and transport safety.

d Any proposed transport infrastructure amendments with trigger points/scenarios for implementation (e.g.: infrastructure specific to pre and/or post C2/C3 roundabout and collector road

construction) including but not limited to right turn movement bans, and/or signalisation of intersections with Cambridge Road;

e Recommended speed limits internally and on Cambridge Road; and

f CPTED requirements.

48 Determination of which treatment is applied to which intersection is subject to Council agreement, and likewise Council shall retain discretion as to the need for and appropriateness of such upgrades at the time.

Advice note: This enables Council to confirm the works are not necessary if the roundabout and internal connection to the Collector Road are soon to be constructed.

SUBMIT ROADING DESIGN DRAWINGS

49 The consent holder shall submit design/construction plans for the roads to vest Lots 510 and 511 as shown on the SP/0179/20. The design/construction plans shall be based on the Safe Travel Management Plan under **Condition x** – Safe Travel Management Plan above and shall be submitted to Council for acceptance prior to carrying out any construction work required by this consent, and at the consent holders expense. This plan shall be submitted to Council no less than 2 months prior to detailed engineering design drawings being submitted for Council acceptance.

50 The submitted road design plans shall include, but are not limited to appropriate:

a Pavement design;

b Connection to existing infrastructure;

c Fixed entrance locations;

d Maintenance access tracks;

e Tracking curve analysis;

f Line marking and signage;

g Longitudinal sections;

h Common services trench details;

i Surface treatments;

j Streetscape & berm planting; and

k Traffic volume management (rat-run / short vehicle trip mitigation) and speed calming measures.

~~***TRIGGER CONDITION***~~

~~51 In the event the C2/C3 Roundabout and sufficient length of Collector Road for the consent holder's development to connect into is not under construction by 31 December 2027, the consent holder shall upgrade either Road 11 or Road 10 intersection with Cambridge Road to a raised platform traffic signal intersection with signalised pedestrian and cycle crossings, to provide improved safety for right turners. The other intersection with Cambridge Road shall be modified to left in and left out only with a solid median island installed on Cambridge Road.~~

~~52 All works shall be at the consent holders expense and shall be completed no later than 8 months following written confirmation by Council that they are required.~~

~~53 Determination of which treatment is applied to which intersection is subject to Council agreement, and likewise Council shall retain~~

~~discretion as to the need for and appropriateness of such upgrades at the time.~~

~~***Advice note: This enables Council to confirm the works are not necessary if the roundabout and internal connection to the Collector Road are soon to be constructed.***~~

~~54 Given that the final 224C could potentially be issued before this trigger date, it would be appropriate for Council to require a bond from the consent holder.~~