

REF: N147950

DATE: 27 February 2020

School Infrastructure NSW
C/- Woods Bagot
Level 2, 60 Carrington Street
SYDNEY NSW 2000

Attention: Mr Chris Savva

Dear Chris

**RE: MEADOWBANK EDUCATION AND EMPLOYMENT PRECINCT SCHOOLS PROJECT – SSD
18_9343 RESPONSE TO TRANSPORT RELATED SUBMISSIONS**

A State Significant Development (SSD) application has been submitted for the new Meadowbank Education and Employment Precinct Schools Project at 2 Rhodes Street, Meadowbank. GTA Consultants (GTA) completed a Transport and Accessibility Impact Assessment and School Travel Plan, both dated 14 October 2019, to support the SSD application.

Subsequent to the SSD application being lodged, stakeholders have requested additional information in relation to several aspects related to traffic and transport. This letter has been prepared to specifically provide a response to the submissions received in this regard. The relevant stakeholder submissions are reproduced in Attachment 1 together with relevant detailed responses. It should be noted that the Transport and Accessibility Impact Assessment and School Travel Plan have both been separately updated for consistency with the responses provided.

Should you have any questions or require any further information, please do not hesitate to contact me on (02) 8448 1800.

Yours sincerely

GTA CONSULTANTS



Brett Maynard
Director

encl.

Attachment 1 – Response to Submissions
Attachment 2 – Swept Path Assessment and Intersection Concept
Attachment 3 – SIDRA Modelling Sensitivity Analysis
Attachment 4 – School Crossing Sight Line Assessment
Attachment 5 – Traffic Volumes and Traffic Distribution

ATTACHMENT 1

Response to Submissions

Transport for NSW Comments

Comment 1: Swept path analysis should be provided for buses on all streets between Victoria Road and the proposed bus zone locations to ensure the surrounding streets are capable of accommodating the future school bus services. Turnaround facility on Rhodes Street with access for all services via Hermitage Road should also be considered to better facilitate the future traffic generating from the school sites. The proposed length and allocation to Primary school of a bus zone on Rhodes Street should also be further reviewed for servicing the proposed two school bus stops. Clarification should also be provided on how the works will be delivered.

GTA response: A swept path assessment has been completed for the likely 12.5 metre bus on approach and departure between the site and Victoria Road and shown in Attachment 2. It is noted that the proposed bus route (particularly Rhodes Street and Hermitage Road) is already a heavy vehicle access route for the existing industrial area.

A range of bus servicing options were considered during the concept design phase, with options to provide bus facilities within the Schools boundary not feasible due to spatial requirements, topography and/or operational safety considerations.

Comment 2: The proposal to stagger the school start and finish time to better facilitate distribution of school demand on the transport network is supported. As part of the RtS, quantitative assessment of pick-up/drop-off demand generating from the school on the proposed facilities should be provided to better inform the required sign posing on Rhodes Street and Macpherson Street. A signage and lane marking lane plan complementing the proposed pick-up/drop-off arrangement should also be provided for further review.

GTA response: Based on the Rhodes Street pick-up and set-down area capacity of 29 spaces and an average dwell time of two minutes per vehicle (consistent with the 'no parking' time limit and GTA observations at schools with a level of active pick-up/ set-down management), this results in capacity for up to 870 vehicles per hour. As detailed in the updated TAIA, it is anticipated that at the ultimate capacity for both primary and secondary schools, up to 485 vehicles per hour would pick-up or set-down passengers in the AM or PM school peak hours respectively. As such, the provision is considered acceptable.

Council has recommended signposting indicating 'no parking' between 8-9:30am and 2:30pm-4pm on school days, noting this would be determined under separate Traffic Committee approvals. Signage and linemarking is shown on the civil plans.

Comment 3: There are 60 spaces proposed for 215 staff (total of primary and secondary schools). Mode share for staff arriving by car at the existing schools has been surveyed at 75%, which translates to an expected demand of some 150 spaces. The forecast staff travel mode by car is stated to reduce to 40%, which is based on a list of assumptions outlined in section 7.1.1. The assumptions have not been supported by any supporting evidence. Without the significant change in travel patterns, there is likely to be unmet demand for staff parking which would place additional demand on the surrounding roads and compete with other workers and users in the area for pick-up/drop off spaces

Further work should be undertaken to provide evidence to support the mode share changes for example, consideration could be given to undertake a travel preference

survey with the existing school staff to understand whether the proposed mode shift could be achieved through the assumptions and initiatives as suggested in the report i.e. assume more staff using rail due to school relocation, reduced parking, etc. Further sustainable travel incentives should be considered if necessary. In addition, further consideration should be given to increasing staff parking to meet any unmet demand not achievable through the travel demand initiatives.

GTA response: SINSW and GTA acknowledge that the target travel mode shares are ambitious and reflect a new, comprehensive approach from DoE and SINSW to reduce car dependence. Accordingly, detailed evidence is not available from other schools to demonstrate such a mode shift. Achieving such a significant behaviour change requires a top-down approach. The Department of Education and SINSW are committed to reducing car dependence and have taken the following steps:

- Appointment of a Sustainable Transport Technical Advisor to manage the planning and implementation of travel initiatives across schools, as well as collating data to inform the planning of new schools/ facilities and benchmarking activities
- Preparation of a transport calculator and transport study analysing depersonalised student and staff data (as a case study), with the calculator having received in principle commitment from stage government agencies including the Department of Planning and Environment, Transport for NSW and the former Roads and Maritime Services.
- Written commitment from the school directors regarding the implementation of travel initiatives, reduced on-site parking provisions and supporting systems/ processes for staff to reduce the work-related need for private car travel
- Workshops and development of a Memorandum of Understanding (MOU) between SINSW and TfNSW, which includes a more comprehensive planning and transport assessment process for new and upgraded schools, as well as progressing a range of transport programs and initiatives that will improve travel, operations and road safety for school staff and students.

It should also be noted that:

- A variety of affordable accommodation is available within a reasonable walking and cycling distance of the schools. This housing supply is increasing, with the Shepherds Bay precinct being completed (500 metres walk away) and Melrose Park commencing (2.5 kilometres away and readily accessible by bus or bicycle). Such local accommodation provides opportunities for new (and/or existing staff) to live close to the schools.
- Studies have found that 'millennials' own fewer cars than previous generations and are driving less¹ (Nicholas Klein, 2017). While this is balanced with other demographic changes such as people getting married and having children later in life (delaying complex trips that are more convenient by car), it suggests that a lower mode share towards private vehicle travel for younger staff is likely.

¹Nicholas Klein and Michael Smart. 2017. Millennials and car ownership: Less money, fewer cars
<https://www.sciencedirect.com/science/article/abs/pii/S0967070X16305571>

- TAFE students are young adults with similar characteristics to the current cohort of graduate teachers that will join the schools in future. The current Meadowbank TAFE student car driver mode share is around 40 per cent.
- Given the on-street car parking footprint of the adjacent existing industrial area in particular (where employees are also typically arriving at work earlier than school staff), there is a sufficiently constrained on-street car parking supply that will discourage school staff from simply seeking alternative parking locations.
- Other employment centres around Sydney have had success with car-pooling programs similar to what is proposed at the schools, including Macquarie Park which has over 2,000 people registered in the car-pooling program specific to Macquarie Park (similar to the Liftango app proposed to be used by schools' staff).

Unfortunately, any staff surveys are likely to be biased as staff presumably want greater on-site parking provisions as this represents the greatest level of convenience but is not a sustainable approach to school travel demand management (and/or road network management).

Catchment analysis completed by Frank Turquoise for staff indicates that around 28% of existing staff are within an 800-metre walk of bus stops containing routes to the site and around 10% of staff are within 800 metres walking distance of a train station connecting with Meadowbank Station. In addition, 17% of staff are within a 10-minute bicycle ride of the new schools. On this basis, there is a sufficient number of target staff to achieve the active travel and public transport targets. Travel planning initiatives included in the travel plan which will be implemented during operation such as car-pooling to increase vehicle occupancy and encouraging active travel groups for staff will assist with ensuring the residual car parking demand is generally accommodated on-site.

Finally, the Department of Education will be responsible for the implementation of the School Travel Plan and identifying additional initiatives if necessary in order to meet the travel mode share targets.

Comment 4: The school catchment analysis prepared by Frank Turquoise Group indicates a potential of 27.8% of staff and 52.6% of students live within an 800m catchment of the proposed school, which could potentially use buses to reach the school. 800m is considered to be within walking distance. Existing bus services primarily stop along Victoria Road. The current report provides no clear indication of how pedestrian accessibility and footpath requirements have been considered for access between Victoria Road bus stops and the school entrance.

Consideration should be given to implement measures to improve pedestrian facilities to ensure safe and efficient paths of travel for students, especially for those students needing to traverse the T9 railway line and Victoria Road.

GTA response: As part of the MEEP master plan, routes along Mellor Street and Hermitage Road are identified as key routes to be improved to provide better connection between the schools and Victoria Road bus stops. The key features of the MEEP master plan are identified in Figure 1.

Existing footpaths are available on Hermitage Road, Mellor Street and Bowden Street and provide connectivity between the Schools and the bus stops along Victoria Road.

The pedestrian connection through the TAFE campus will be upgraded as part of a separate planning pathway by TAFE NSW to provide better connectivity between the Schools and Meadowbank Station, noting that this connection is already available and will be promoted to students. Key routes to the site are shown in Figure 2.

Figure 1: MEEP preliminary master plan

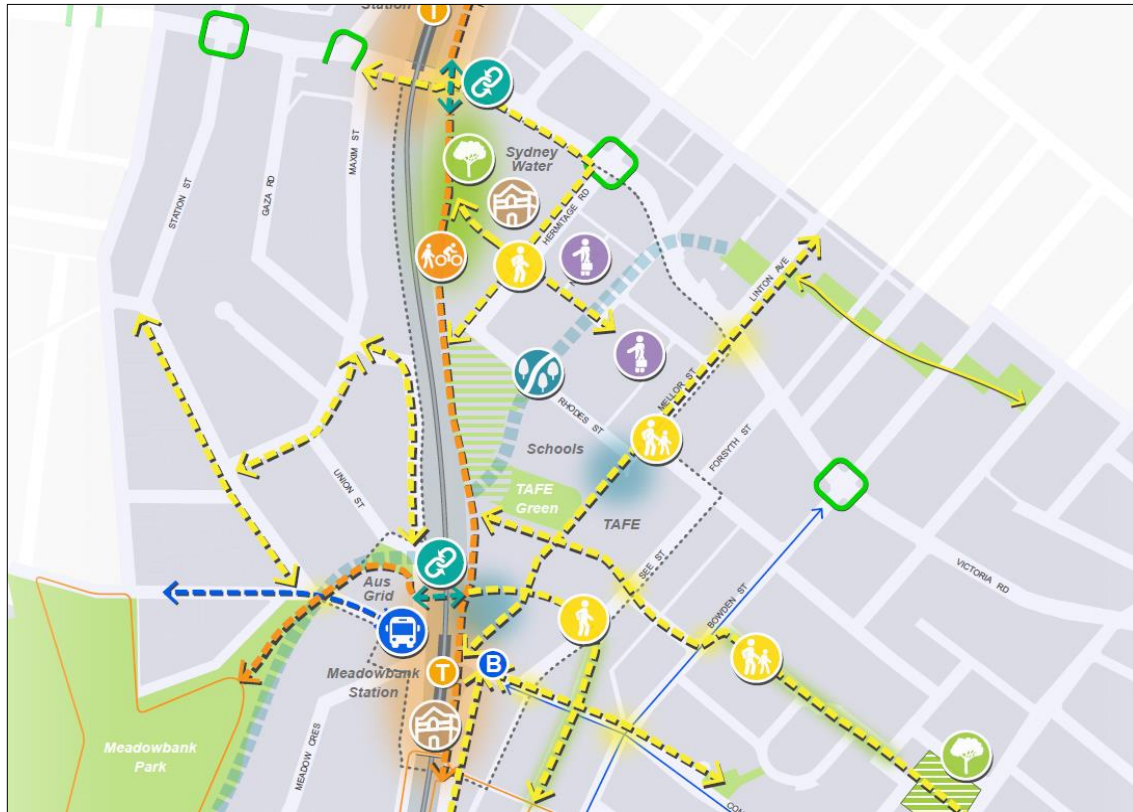


Figure 2: Key pedestrian routes to the schools



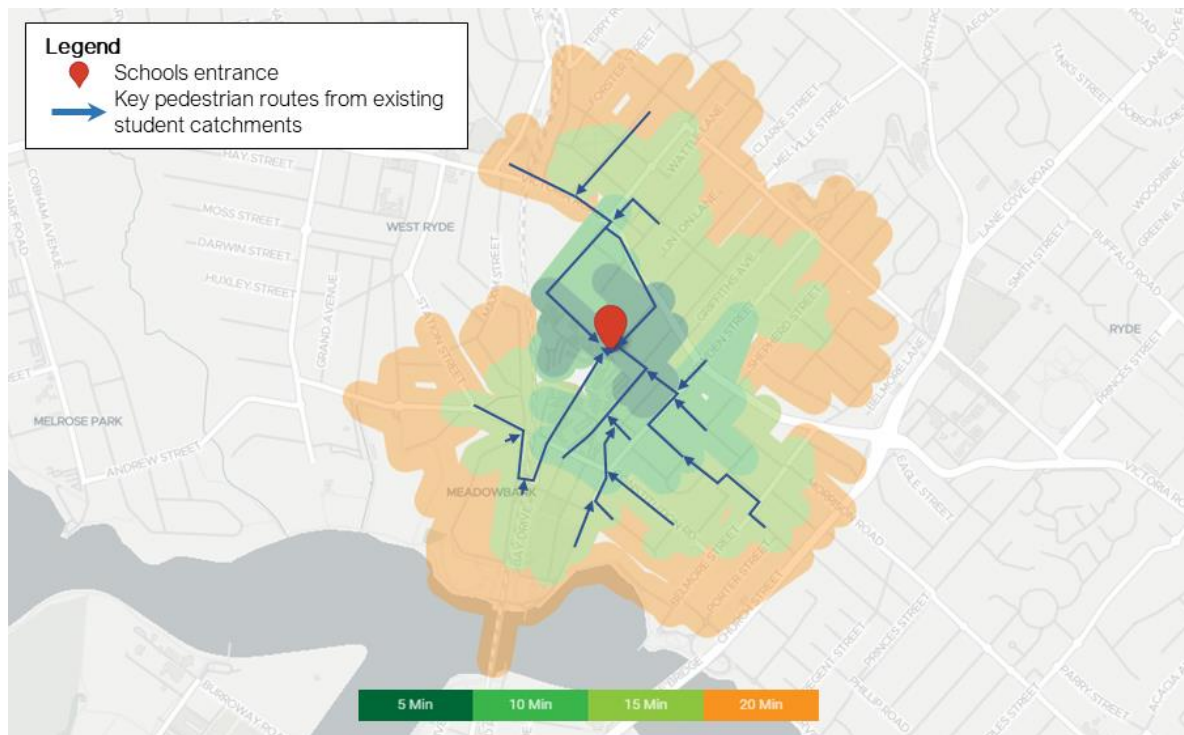
Base image source: Nearmap

As part of the Meadowbank Education and Employment Precinct master plan, opportunities are being investigated to improve walking and cycling connections around the site. Specifically, this includes providing a walking and cycling connection across the T9 railway line north of Meadowbank Station, as well as improved pedestrian connections on Hermitage Road and Mellor Street between Victoria Road and the site.

The original Transport and Accessibility Impact Assessment (TAIA) report estimated a breakdown of pedestrian volumes from the north and south of the school. GTA has completed further detailed analysis of existing student home locations to understand likely routes to the new schools. The data indicates that key streets which will likely cater for much of the student volumes are as follows and as shown in Figure 3:

- Hermitage Road (for pedestrians travelling from Victoria Road bus stops and homes north of Victoria Road.
- Bowden Street (for pedestrians travelling from Victoria Road bus stops and homes north of Victoria Road.
- Macpherson Street (for pedestrians travelling from Bowden Street and further east)
- See Street (for pedestrians travelling from Shepherds Bay that are not diverted through the TAFE campus)
- Pedestrian connection through the TAFE campus (for pedestrians travelling from western end of Shepherds Bay.

Figure 3: Student catchment analysis



The key routes identified above have footpaths provided on both sides of the road, with the exception of Macpherson Street on the northern side of the road and Hermitage Road on the western side of the road.

Based on the catchment analysis of trips associated with walking from home, walking from the train station and walking from Victoria Road, it is expected that the highest pedestrian volumes will be along the southern side of Macpherson Street with a total 1,120 pedestrians expected before and after school including staff, students and parents/ carers².

Much of the pedestrian volumes are located to the south-east, however noting that the pedestrian refuge located at the Macpherson Street/ Bowden Street intersection will allow pedestrians travelling from north of Victoria Road to connect with the footpath on the southern side of Macpherson Street. The proposed pedestrian (zebra) crossing at the western end of Macpherson Street connects Mellor Street to the schools (allowing pedestrians to avoid the industrial driveways on the western side of Mellor Street), while the proposed school crossing at the eastern end of Rhodes Street connect the footpath on the eastern side of Hermitage Road to the schools (via the northern side of Rhodes Street).

A Fruin level of service (LOS) assessment can be used to understand the performance of pedestrian space under certain conditions. The levels of service are categorised between LOS A (free flow conditions) and F (a complete breakdown in flow). The Fruin LOS criteria is typically applied to areas where pedestrians are traversing, such as footpaths. These criteria are summarised in Figure 4.

² Assumes 1 parent/ carer per 1.25 primary school children

Figure 4: Fruin level of service criteria

Level of Service	Flow Rate (pedestrian/minute/meter)	Density (pedestrian per squared meter)
A	≤ 7	≤ 0.08
B	7 - 23	0.08 - 0.27
C	23 - 33	0.27 - 0.45
D	33 - 49	0.45 - 0.69
E	49 - 82	0.69 - 1.66
F	≥ 82	≥ 1.66

Considering the Fruin level of service criteria, and based on the general minimum 1.2 metre footpath width, the following can be assumed

- LOS A = 0-8 pedestrians per minute
- LOS B = 8-28 pedestrians per minute
- LOS C = 28-40 pedestrians per minute
- LOS D = 40-59 pedestrians per minute
- LOS E = 59-98 pedestrians per minute
- LOS F = 98+ pedestrians per minute.

For the purposes of assessing the adequacy of surrounding footpaths, even when assuming all 1,120 walking trips expected along Macpherson Street occur within a one hour period and to also account for fluctuations throughout the hour, this equates to 19 pedestrians per minute on average or a LOS B for a 1.2-metre-wide footpath; well within satisfactory limits. As such, the proposed schools do not warrant upgrades to the width of existing footpaths.

A new pedestrian crossing is proposed on Macpherson Street improving pedestrian amenity to the north and connecting with the bus stops along Victoria Road. Pedestrian (zebra) crossing reduced warrants for sites used predominantly by children are as follows:

For two counts of one hour duration immediately before and after school hours:

- *pedestrian volume ≥ 30*
- *and*
- *vehicle volume ≥ 200*

a pedestrian (zebra) crossing may be installed.

Forecast traffic volumes for 2022 considering the additional traffic generated by both the Schools and TAFE SSDAs indicates that Rhodes Street, Macpherson Street and Bowden Street will likely all exceed 200 vehicles in the AM and PM school peak hours. See Street is also expected to exceed the 200 vehicles per hour in the school peak hours, noting however that estimates in the PM peak hour are only just exceeding 200 vehicles per hour (229 vehicles expected).

The additional catchment analysis completed by GTA indicates that pedestrian volumes crossing Macpherson Street (at Mellor Street), See Street (at Macpherson

Street) and Bowden Street (south of Squire Street) would all likely exceed 30 pedestrians per hour in the AM and PM school peak hours.

Based on the above, the proposed pedestrian (zebra) crossing on Macpherson Street would meet TfNSW warrants.

The assessment also indicates that a pedestrian (zebra) crossing on Bowden Street, south of Squire Street, would also meet TfNSW warrants and should be considered by Council as part of broader planning for the surrounding area. It is noted that a pedestrian (zebra) crossing in this location would likely require relocation of the existing bus stops on Bowden Street and the loss of some on-street parking spaces as a result. Consultation would be required between Council and TfNSW in this regard, with any design required to go through the relevant Traffic Committee approval process. Given that the forecast traffic volumes on See Street are expected to only just meet TfNSW warrants in the PM school peak hour, it is recommended that an assessment of the crossing treatment at this location be reviewed post opening of the school.

Comment 5: Survey of the existing high school indicates a mode share (for students) of 22% and 14% for walk and cycle respectively. This mode share has been assumed for the proposed high school. However, the new school site is located to the east of the T9 Main Northern railway line and to the south of Victoria Road both of which present increased separation from the majority of the student catchment. The proponent has suggested that the anticipated mode share for these users remain largely unchanged.

The proponent should review the analysis to demonstrate that the existing mode share for active transport can be maintained for the new school. This may require implementation of measures to ensure that walking and cycling to school is efficient and safe.

GTA response: As mentioned in response to Comment 4, GTA has completed further analysis on existing school student home locations and the catchment of the proposed schools. The additional analysis indicates that a similar number of high school students will be within a 20 minute walking catchment of the new school compared to within the same catchment of the existing Marsden High School, with data indicating around 8 per cent of students within this distance from the existing schools and 7 per cent within this distance from the new school location, with linked trips associated with children being dropped off at a satellite location and walking the rest of the way likely making up the remaining portion of the existing walking mode share recorded at the Marsden High School. It is also noted that the Shepherds Bay precinct (generally within a 10-minute walk) will likely be a key generator of new/ increased enrolments. Signalised pedestrian crossings are provided across Victoria Road at Hermitage Road and Bowden Street which link with existing footpath connections to the proposed schools. Most of these roads are local roads with low traffic volumes suitable for cyclists, with only students on the fringe of the 20 minute catchment interfacing with Victoria Road.

The new schools site is a similar distance away from bus stops along Victoria Road, while the location adjacent to Meadowbank Station will likely attract increased travel by train by students who currently live near the railway line (particularly the cluster of students near Eastwood and Epping) who are currently likely required to drive to the existing Marsden High School.

On the above basis, it is expected that existing mode share for active transport can be maintained for the new school.

Comment 6: As the high school will be relocated to the eastern side of the railway and southern side of Victoria Road, more consideration should be given to how to improve the travel options between the school population and the new school site.

GTA response: As part of the Meadowbank Education and Employment Precinct master plan, opportunities are being investigated to improve walking and cycling connections around the site. Specifically, this includes providing a walking and cycling connection across the T9 railway line north of Meadowbank Station as well as improved pedestrian connections on Hermitage Road which links with the existing signalised crossing across Victoria Road. Transport for NSW could also investigate the opportunity to provide a signalised pedestrian crossing on the western side of the Victoria Road/ Hermitage Road intersection.

In the interim, it is noted that there is an existing footpath on the eastern side of Hermitage Road able to connect students living to the northwest of the new school with a signalised pedestrian crossing across Victoria Road. In addition, the pedestrian connection through the TAFE campus will also reduce the travel distance to the new schools for pedestrians and cyclists travelling from the western side of the railway line via the Bank Street bridge.

It is recommended that Council construct the remaining section of the shared path on the western side of Hermitage Road, which would then connect with the new pathway proposed as part of the Schools project along the full length of the Rhodes Street frontage (noting this is already part of the Ryde Section 94 [now Section 7.11] Contributions Plan).

Comment 7: As the high school will be relocated to the eastern side of the T9 railway and southern side of Victoria Road, further assessment should be undertaken on how to improve the travel options (i.e. combination of bus and access to rail services) between the school population and the new school site which is in proximity of Meadowbank Station.

GTA response: As mentioned previously, the new high school is located a similar distance away from Victoria Road bus stops as the existing Marsden High School. The nearest bus stops to the school on Victoria Road are at Hermitage Road and Bowden Street which service the 513, 524 and M52 bus routes which operate at frequencies of up to one service every 10 minutes. These routes operate west through the existing high school catchment on Victoria Road and Kissing Point Road.

The proposed upgrade of the pedestrian connection through the TAFE campus will improve connectivity and reduce travel distance between Meadowbank Station and the new schools (noting this connection is already available).

While the above comment does not refer to the capacity of existing services, GTA has completed some further analysis and the updated TAIA estimates an increase of up to 140 train trips in any peak hour in 2032. Based on eight trains per hour servicing Meadowbank Station, this equates to around 18 additional people per train on average in a peak hour. Such an increase is considered minor given each train has seating capacity for around 900 people, along with additional standing capacity. In addition, the updated TAIA estimates up to around 60 additional public bus trips in a

peak hour. Considering the variety and high frequency of bus routes along Victoria Road during peak hours, the increase in bus usage is considered minor.

Comment 8: The cycling mode share for primary school students at the existing school is reported as 0%. The proponent expects that the mode share of travel by bicycle to the new school to be 10%. There are limited cycling facilities located within the transport network surrounding site (section 3.9), and the distance between the new and existing primary school sites are less than 800m apart and are on the same side of the T9 railway and Victoria Rd. Further, the assumed increase in mode share for bicycle trips corresponds to a similar drop in car mode share. There does not appear to be a strong justification for this assumed travel change.

Further work needs to be undertaken to justify the assumptions regarding the changed travel behaviours – especially the bicycle mode.

GTA response: Detailed analysis of existing student home locations indicates a similar number of primary school students living within an indicative 20 minute walking catchment of the existing Meadowbank Public School compared with the same catchment for the new primary school, with data indicating around 83 per cent of students within this distance from the existing Meadowbank Public school and 71 per cent of students within this distance from the new school. As such, it is expected that active transport to the site will remain as the most popular choice of travel. Primary school students in particular are able to cycle on footpaths, with formal bicycle paths not necessarily required. With future upgrades around the precinct proposed as part of the MEEP master plan and specifically walking and cycling routes to the east including along Thorn Street, Stone Street and Constitution Road, a 10% increase in sustainable travel is certainly achievable.

It is likely that the existing primary school actively discourages cycling for legacy reasons, and scooters may not have been captured in the surveys as part of the cycling travel mode. Given the low existing cycling mode share and significant opportunity for local bicycle access, the full 10% mode shift was allocated to cycling, however this could readily be shared between cycling and walking, with a resultant 30% car, 65% walking and 5% cycling travel mode split. This would not affect the outcomes of the assessment. In addition to the above, the provision of school bus routes (or regular route bus servicing the primary school) could also contribute to reducing private car mode share. Available primary school travel mode survey data was interrogated for further evidence to support the proposed cycling mode share target and it is noted that:

- 6 per cent of students cycle to Epping Public School (2017, excludes scooters)
- 7 per cent of students cycle to St Kevin's Primary School Dee Why (2014)
- 10 per cent of students cycle to Kurnell Public School (2014)

These figures indicate that with a range of strong programs and initiatives, the 10 per cent target should be within appropriate reach.

Notwithstanding, GTA has completed a sensitivity analysis assuming no mode shift away from private vehicle travel, with this analysis presented in Attachment 3. The analysis indicates only minor increases to delay and queuing at surveyed intersections given the primary school catchment primarily impacting local roads and pick-up/ set-down facilities south of Victoria Road.

Comment 9: There is no indication of whether E-charging facilities have been provided. Future Transport 2056 supports initiatives to encourage use of electric vehicles. Consideration could also be given to E-transportation charging facilities at the school parking area.

GTA response: It is understood that the design has been future-proofed to allow for E-transportation charging facilities to be installed at a later date if there is demand for these facilities.

Comment 10: The report mentions that some students will not be eligible for the School Student Transport Scheme (SSTS) and therefore less likely to travel by public transport. The School Travel plan should investigate alternatives to encourage the use of public transport in particular with consideration of the proximity of Meadowbank Station.

GTA response: Promotion of public transport would be an essential part of the Travel Plan. Several initiatives are included in the Travel Plan such as preparing a Transport Access Guide detailing the proximity of the site to Meadowbank Station. It is not expected that SSTS ineligibility would result in students not travelling by public transport if this is the most convenient/ efficient mode of transport to the site for them (particularly students living close to West Ryde Station). That said, much of the high school catchment to the northwest of Victoria Road will be eligible for the SSTS, including students that are not currently eligible with the existing Marsden High School location.

With specific reference to Meadowbank Station, detailed initiatives proposed include:

- Prepare a welcome pack for new staff and students that outlines the active travel and public transport options and support available, as well as including bicycle facilities and connections to key pedestrian routes/ station etc. on any student/parent tours of the school.
- Allocate staff to walk groups of students to/from the station each day and potentially provide a level of supervision at Meadowbank Station.
- Include active travel and public transport messaging in all student/parent letters.

Comment 11: There are proposed pedestrian crossing facilities and new vehicle access on Rhodes Street and Macpherson Street that would result in a change of traffic condition upon the completion of the school project.

An independent Detailed Design Road Safety Audit (RSA, refer to NSW Centre for Road Safety Guidelines for Road Safety Audit Practices) of the proposed pedestrian facility improvements and bus zone arrangements on Rhodes Street and Macpherson Street should be conducted, prior to issue of construction certificate. The proposed design shall address any deficiencies identified within the RSA.

GTA response: The proposed school crossing is considered the best available location when considering set-out and sight line requirements. A sight line assessment has been completed for the proposed pedestrian crossing and is included in Attachment 4. This demonstrates that adequate sight lines would be available for a 40-kilometre-per-hour School Zone design speed, assuming minor landscaping adjustments to the southeast corner of the 21 Mellor Street property. It is noted, however, that the 90-degree bend between Rhodes Street and Mellor Street could not be negotiated safely by a vehicle at 40 kilometres per hour. Additional sight line assessments have been completed at 30 and 20 kilometres per hour, demonstrating adequate sight lines would be available with no changes to the existing road environment required for these speeds.

Notwithstanding the above, Council would be consulted during detailed design with respect to all design elements within the road reserve and a suitable consent condition is appropriate.

Comment 12: Appendix A.1.2 indicates gap acceptance calibration has been used to inform intersection assessment (acceptance factor from $1.0 > 0.5$). This assumes that all drivers are willing to accept smaller gaps to turn at intersections. Justification has not been provided for the departure from SIDRA recommended practice.

GTA response: The gap acceptance factor assumptions were based on what was observed on-site as shown in Figure A.1 and Figure A.2 of the TAIA. Vehicles were observed to accept smaller gaps. Roads and Maritime Traffic Modelling guidelines recommend that “Appropriate judgement is required while selecting the critical gap and follow-up headway values to suit the circumstances considering grades, sight distance conditions, opposing movement speeds, number of lanes, and one-way or two-way conditions. Any changes to these values should be justified.” Given that this behaviour was observed on site, GTA has provided appropriate evidence for changing these parameters and is in-line with the recommended practice.

Comment 13: The traffic report acknowledges that the existing Meadowbank Primary School is in the same vicinity as the proposed new school and states that some of the car trips generated by the existing school will be redistributed to the new site at the year of opening. The report does not clearly document how the assumptions regarding trips from the existing schools and additional school trips (from increased enrolments) have been distributed between modes and assigned to the network.

GTA response: A traffic distribution diagram (percentage distribution) has been provided in Attachment 5.

Comment 14: There is some discussion about how existing and future additional trips have been assigned to the network (mode share, and traffic assignment). However, it is not clear how existing primary school trips (in particular) are assigned to the network. It appears that only the additional trips from new enrolments have been assigned to the local network surrounding the new school site. While this might be acceptable to understand the impacts on the regional network, it would understate the impacts on the local network near to the proposed school site.

GTA response: A traffic distribution diagram (percentage distribution) has been provided in Attachment 5. Given that the existing primary school and the proposed new school is only 800m apart, the travel patterns are expected to largely remain the same and hence the traffic distribution is based on the existing travel patterns (i.e. the existing survey count data). It is noted that there will be some drivers (local or regional) that will change their travel patterns due to the changed road conditions attributed not only by schools but also TAFE and the broader Meadowbank Education and Employment Precinct over time, which are difficult to accurately predict at this stage. Hence, for simplicity and consistency the existing travel patterns are assumed.

Comment 15: The same comment above applies to the approach taken for the assumptions related to the secondary school trips.

GTA response: A traffic distribution diagram (percentage distribution) has been provided in Attachment 5. GTA has taken a conservative approach in assessing the secondary

school traffic. The existing secondary school trips have not been removed from the network and all secondary school trips are assumed to be new trips.

Comment 16: Table 7.7 presents anticipated number of person trips during peak hour and per day for primary school students. For the car travel mode, the sum of AM and PM peak hour person trips is greater than the total number of person trips per day.

GTA response: Table 7.7 has been corrected in the revised TAIA.

Comment 17: Figure 9.1 SIDRA Modelling layout shown for Bowden Road and Stone Street shows stop lines present on all approaches. Bowden Road should not have any stoplines present. The SIDRA network layout also does not reflect street parking and bus stops on the kerbside.

GTA response: The SIDRA model for the Bowden St/ Stone St intersection has been updated to correctly display the priority controls on-site, with modelling results updated in the revised TAIA.

Kerbside parking lanes are only included in the models if the parking lane has 'No Stopping' or 'No Parking' signage and the parking lane can be used by vehicles to manoeuvre around a right-turning vehicle. The SIDRA models have taken this into account and where required, flaring at intersections is represented as short turning lanes.

Comment 18: Table 9.1 presents the anticipated additional peak hour traffic generation of the proposed schools which makes reference to the anticipated car trips discussed in Section 7. It is noted that the anticipated car trips are derived from the anticipated mode shares, peak hour person trips and car occupancy. Fundamentally, the peak hour person trips are based upon the number of students/staffs either arriving or departing the schools at AM/PM peak hour, i.e. inbound or outbound movement only. It is therefore not evident that the anticipated car trips discussed in Section 7 is a representation of two-way trips and compatible for direct application of the directional split in Table 9.1.

GTA response: The car trips presented in Table 9.1 are two-way trips and were calculated as follows:

- Calculate the number of staff, primary and secondary students arriving in the peak hours.
- Calculate how many staff and students will arrive by car, i.e. multiply the peak hour number by the mode share percentage for car (40% for staff, 30% for primary students and 23% for secondary students). This provides one-way trips.
- Noting that primary and secondary students will get dropped off, double the above one-way trip estimates for students to get two-way trips, as parents will typically set-down and leave or pick-up and leave within the peak hour being assessed.
- Staff trips are only one-way within the peak hour.

Comment 19: Provide justification for the adopted gap acceptance factor in accordance with the methodology for calibrating gap acceptance per SIDRA recommended practice.

GTA response: See response to Comment 12.

Comment 20: Clarification is required on the methodology used to understand the distribution of trips as outlined in the comments above. Further assessment may be required on the local network surrounding the proposed school site.

GTA response: See response to comment 13. The existing primary school generates around 60 to 80 peak hour vehicle trips (at existing mode share of 40%). Given that that local network is generally performing at good level of service (B or above) for both peak hours, it can be expected that the locally redistributed trips from Meadowbank Public School can adequately be accommodated on the surrounding local road network.

Comment 21: SIDRA model layout should accurately represent the present and future conditions.

GTA response: The SIDRA models have been updated based on comments received, with modelling results updated in the revised TAIA.

Comment 22: The total trips and directional split (inbound and outbound traffic) shown in Table 9.1 needs to be clarified in reference to the above discussed comment.

GTA response: See response to Comment 18.

Comment 23: The current report only provides summary of the intersection performance of the assessed scenarios.

Further details of the SIDRA modelling should be attached as Appendix to the report including:

- *Layouts of the networked intersections and standalone intersections*
- *SIDRA result summaries.*

GTA response: The SIDRA models and detailed PDF outputs have been provided separately to TfNSW and Council for information and review. The pdf outputs were not included with the report as they are 100 pages and 19mb by themselves.

Comment 24: The applicant is requested to provide electronic copies of the SIDRA network files to Roads and Maritime Services for review and take into account of comments, if any, before finalising the RtS.

GTA response: The SIDRA models and detailed PDF outputs have been provided separately to TfNSW and Council for information and review.

It is acknowledged that, based on the traffic analysis and assumptions made, the proposed schools will impact other road users. However, it should be noted that:

- All high school student vehicle trips were conservatively assumed to be new trips on the road network, however there is likely to be a proportion of diverted trips where a parent/ carer already travels on Victoria Road during the school peak hours (particularly AM peak).
- The dynamic nature of SCATS operation is likely to better address the relatively short school peak pick-up and set-down activity, compared with the SIDRA modelling.
- Parents/ carers are likely to adjust inbound and outbound trips, both in terms of route and timing to avoid traffic congestion where possible, reducing the impact on the immediate road network. Similarly, other road users may adjust travel behaviour in response to additional traffic delays.

- In terms of Victoria Road corridor performance, there is likely to be an improvement in the vicinity of the existing Marsden High School, which may assist in offsetting any additional delays in the vicinity of the new schools.
- Other capacity/ traffic progression constraints along the Victoria Road corridor (e.g. West Ryde shops) and any local traffic growth that might occur at these locations will influence the traffic arrival profile at the key intersections, potentially reducing the impact of schools traffic.

There are no simple intersection upgrades that can deliver additional capacity at the Victoria Road/ Hermitage Road and Victoria Road/ Bowden Street intersections (noting that the existing green time bias towards Victoria Road through movements means that additional travel lane(s) on Victoria Road would provide the greatest additional throughput). The future of Victoria Road is best addressed through the MEEP master plan and existing TfNSW corridor improvement programs.

It is recommended that TfNSW and SINSW continue to work together and complete post-opening road network monitoring in order to identify any operational issues and potential management solutions (in the absence of any strategic corridor upgrade proposals). Given the above traffic capacity and upgrade constraints, there may need to be some resolution in terms of user group prioritisation, noting we expect that local traffic access and circulation would be prioritised over long-distance through traffic.

Comment 25: A School Travel Plan has been provided as part of the EIS that discusses the objectives and possible travel demand management measures to be implemented. On this note it is recommended that the Travel Plan should:

- *consider including training courses for students on safe walking, riding and public transport use as the Student Targeted Actions;*
- *consider installation of next service departure screens for T9 rail services (and bus services if possible e.g. Victoria Road bus services) in the lobby to encourage public transport use; and*
- *develop and deliver a robust communications strategy for the Travel Plan to users of the site prior to occupation which includes key messages on how to travel including prioritising public and active transport as well as road safety messages.*

GTA response: These are valuable additional measures and would be considered/ included in the detailed travel plan to be prepared prior to occupation.

Comment 26: Many of the proposed actions (e.g. develop map showing public transport routes...) should be rolled up into a high quality Travel Access Guide which provides staff and students and visitors with information on site access by all modes as well as advice and links to travel planning tools, Opal and contactless payments. This should be distributed prior to occupation. In addition, the following detail should be reviewed/amended:

- *One of the Staff Targeted Actions under Public Transport suggest "Staff access to the Opal SSTS for up to two public transport trips per weekday". This is not supported and it is requested that this item be excluded from the list of actions.*

GTA response: Agreed, noting a Transport Access Guide is one of the initiatives proposed in the School Travel Plan. This detail would form part of the detailed travel plan that will be prepared prior to occupation. The Transport Access Guide would be included in the

welcome pack for new staff and students to outline the active travel and public transport options and support available, Opal card sign up information, as well as details on bicycle facilities and connections to key pedestrian routes/ station.

Comment 27: Prior to occupancy, a comprehensive Travel Plan, taking into consideration the above suggestions, should be prepared in consultation with Council and TfNSW.

GTA response: A detailed travel plan could be conditioned to be prepared prior to occupation.

General Public Submission Comments

Comment 28: General concern regarding the impact of the proposed development on traffic.

GTA response: The transport assessment indicates the increase in traffic generated from the proposal at opening year could adequately be accommodated on the surrounding network.

Comment 29: Traffic projections have been inadequately assessed – the Transport and Accessibility Impact Assessment should be re-done based on traffic conditions when TAFE is in session (not during holidays).

GTA response: Traffic surveys were completed outside of school and TAFE NSW holidays.

Comment 30: Concern regarding increased congestion, noise and traffic (queuing) coming into Macpherson Street and Forsyth.

GTA response: General increase in traffic is expected for any new development. There is a pick-up and set-down area provided along the Rhodes Street frontage of the site suitable for accommodating approximately 29 cars. This, combined with the offset of start and finish times between the primary and high schools, will assist in minimising the impact on surrounding local roads during peak arrival and departure times.

Macpherson is a key route to/ from the schools, however traffic modelling indicates that intersections will operate satisfactorily. Forsyth Street is unlikely to carry any significant amount of school traffic. It is left-in/ left-out only at Victoria Road, with Mellor Street providing a more direct connection to the schools. Bowden Street and Hermitage Road provide signalised right turn movements at Victoria Road and will be utilised accordingly.

Comment 31: Propose to relocate proposed bus stops in front of the substation on Macpherson Street to Rhodes Street for improved safety.

GTA response: The proposed location of the bus stops on Macpherson Street are considered appropriate and avoid blocking the key substation driveways. An appropriate setback from the Mellor Street intersection and proposed pedestrian crossing is required for pedestrian safety reasons.

Comment 32: Propose to convert Forsyth Street into a Cul-de-sac to ease traffic.

GTA response: Forsyth Street is not expected to experience any significant increase in traffic from the proposed schools given the function of the road and existing left-in/left-out restrictions at Victoria Road as discussed above. However, Council could consider such changes.

Comment 33: Lack of car parking in the proposal.

GTA response: The proposal seeks to constrain car parking supply, incentivise alternative modes of travel to the site and reduce the traffic impact of the development, given the location directly adjacent to Meadowbank Station and within a short walk of the bus stops along Victoria Road.

Comment 34: The proposal should include free car-parking for students.

GTA response: Department of Education policy is to discourage students driving to school for safety reasons.

Comment 35: Increased on-street parking along local roads.

GTA response: Given the already limited available parking on surrounding roads, any increase to on-street parking demand is expected to be minor.

Comment 36: Congestion of local roads (rat-run) Hermitage Road, Bowden Street during peak hours.

GTA response: The proposal could not be expected to result in an increase in vehicles rat-running via local roads to avoid congestion on Victoria Road.

Comment 37: Underground car park does not accommodate for trade vehicles (i.e. height clearance).

GTA response: A minimum 4.5 metre height clearance is achieved in accordance with the Australian Standard for Off-Street Commercial Vehicle Facilities (AS2890.2:2018).

Comment 38: Safety for pedestrians/children and lack of visibility.

GTA response: A sight line assessment has completed for the school crossing on Rhodes Street and provided in Attachment 4. The proposed access to the car park allows for adequate sight lines to pedestrians on the footpath along Rhodes Street. As such, the proposed design is considered acceptable.

Comment 39: Propose to reinstate right turn from Bowden Street.

GTA response: It is unclear what is meant by this submission given right turns are permitted from between Bowden Street and Victoria Road and Macpherson Street.

Comment 40: Insufficient kiss-and-ride provisions.

GTA response: General increase in traffic is expected for any new development. There is a pick-up and set-down area provided along the Rhodes Street frontage of the site suitable for accommodating over 19 cars. This, combined with the offset of start and finish times between the primary and high schools, will assist in minimising the impact on surrounding local roads during peak arrival and departure times.

Comment 41: Access from West Ryde Station to the School cannot accommodate projected foot traffic.

GTA response: It is expected that the majority of staff/ students travelling to the new schools by train will use Meadowbank Station rather than West Ryde Station. Notwithstanding, based on Fruin's level of service criteria as discussed in response to Comment 4, it could not be expected that the increase in pedestrians as a result of the proposed would compromise the function of the existing surrounding footpaths.

Comment 42: Proposed pedestrian pathway for direct access to the site from Meadowbank Station.

GTA response: The pedestrian connection through the TAFE site will provide direct access to Meadowbank Station. As part of the MEEP master plan, opportunities are currently being explored to provide a shared pedestrian and cyclist route along the railway line with links to the Meadowbank and West Ryde stations, the schools and TAFE.

Comment 43: Construct a Pedestrian overpass at the southern side of Victoria Road.

GTA response: The works required to provide an overpass on Victoria Road are extensive to put the onus on one developer, nor does the proposed schools warrant the need for a pedestrian overpass over Victoria Road given existing signalised pedestrian crossings at Hermitage Road and Bowden Street. As part of the MEEP master plan,

opportunities are currently being explored to provide a pedestrian and cyclist connection across Victoria Road.

Comment 44: Local Infrastructure & Public Transport is already at capacity – in its current state it cannot safely accommodate the proposed scale of development (i.e. associated pedestrian foot/cycling traffic).

GTA response: It is TfNSW's responsibility to increase public transport provision such as frequency of trains and buses to meet demand. As mentioned in response to Comment 4, it is not expected that the increase in pedestrian volumes will compromise the function of the existing surrounding footpaths.

Comment 45: The school needs a bus turnaround bay.

GTA response: Buses servicing the school would approach the schools via Victoria Road, Bowden Street, Macpherson Street, Rhodes Street and would depart via Hermitage Road. Swept paths provided in Attachment 2 confirm this route is acceptable.

Comment 46: Propose additional traffic calming devices (i.e. extended school zone & additional pedestrian/zebra crossings) in the area surrounding the proposed school.

GTA response: School and pedestrian crossings are provided on Rhodes and Macpherson Streets providing connection for pedestrians travelling to/ from the north. Further afield, pedestrian volumes will be more distributed between local roads and as such, pedestrian volumes in other locations will unlikely meet warrants for formal pedestrian crossings. The extent of school zones should be in-line with TfNSW requirements.

Comment 47: Propose to relocate bus stop on Victoria Road to encourage use of Bowden Street lights.

GTA response: Bus stops are provided on both sides of Victoria Road at Bowden Street. Minimum offsets are required between intersections and bus stops. A similar walking distance will be required between the schools and the bus stops on Victoria Road regardless of whether the bus stop is provided on the east or west side of Bowden Street.

Comment 48: The site cannot accommodate the projected student population.

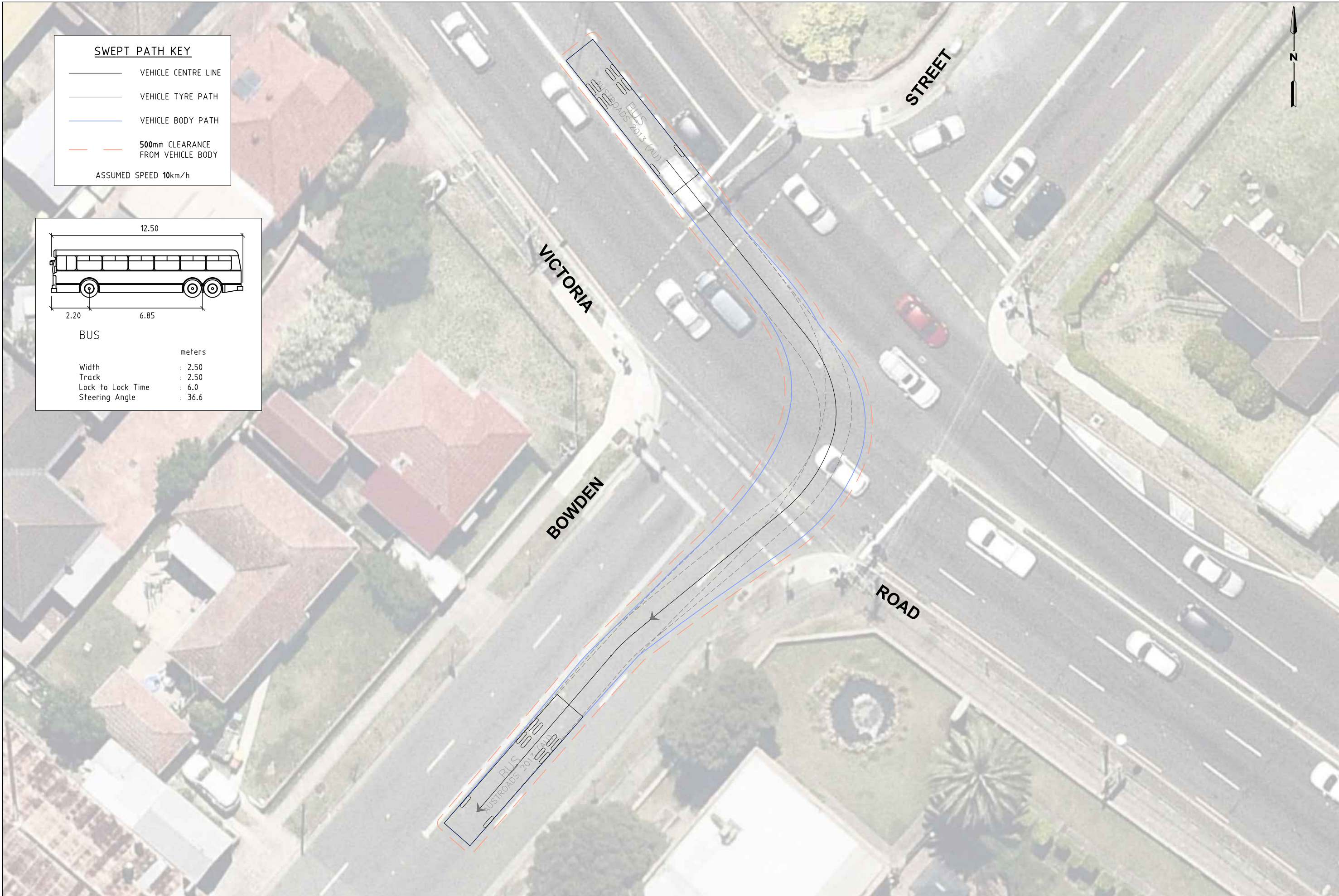
GTA response: The transport assessment indicates the increase in traffic generated from the proposal at opening year could adequately be accommodated on the surrounding network.

Comment 49: Lengthen Angas Lane to the intersection of Angas and See Street and construct pedestrian crossing.

GTA response: Pedestrian volumes in this location are not expected to be high enough to warrant a pedestrian crossing in this location or the extension of Angas Lane which would require property acquisition.

ATTACHMENT 2

Swept Path Assessment and Intersection Concept



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- - - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - - 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 10km/h

BUS

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

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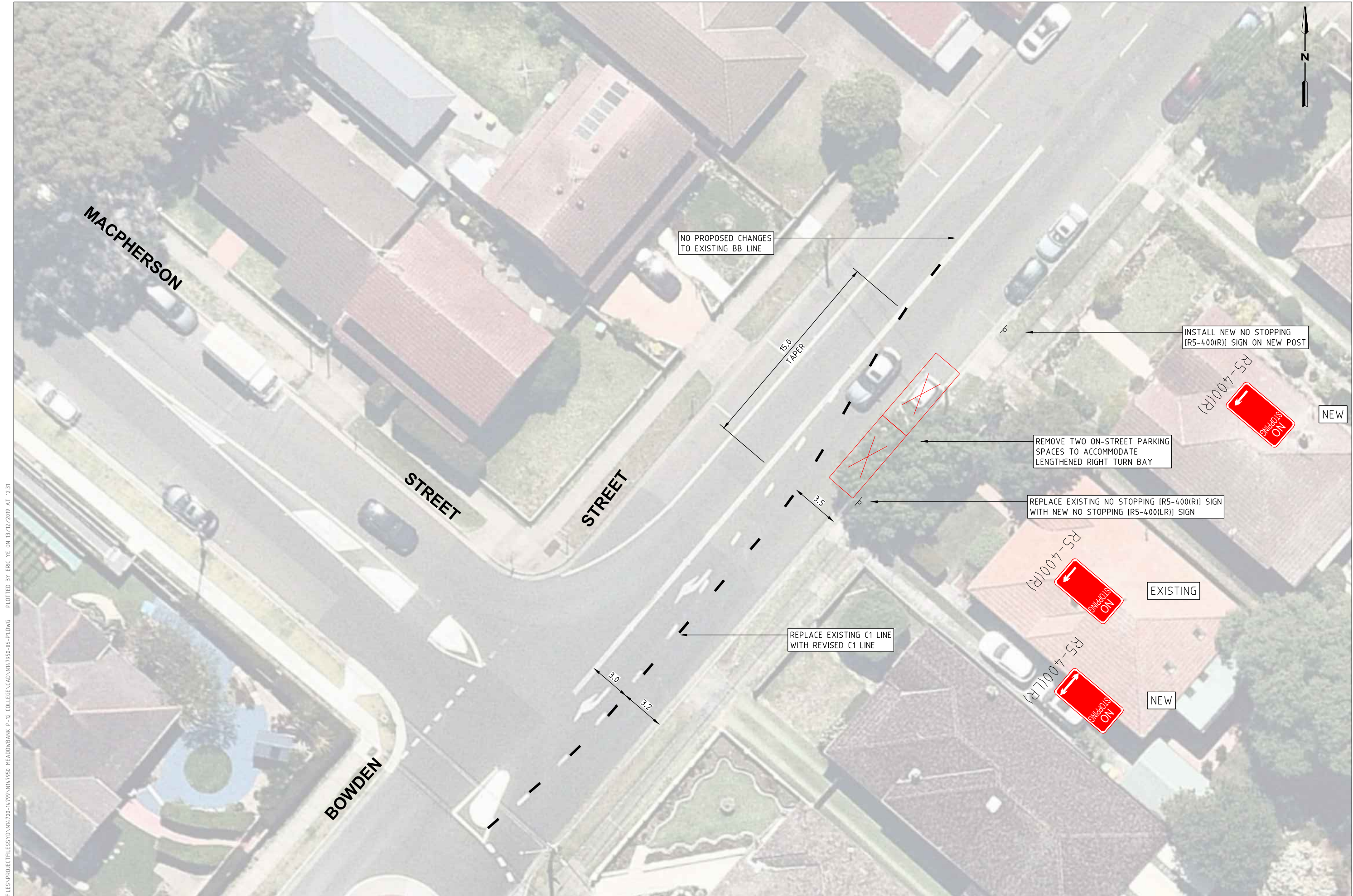
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SWEPT PATH ASSESSMENT

DRAWING NO. N147950-06-01

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ISSUE P1



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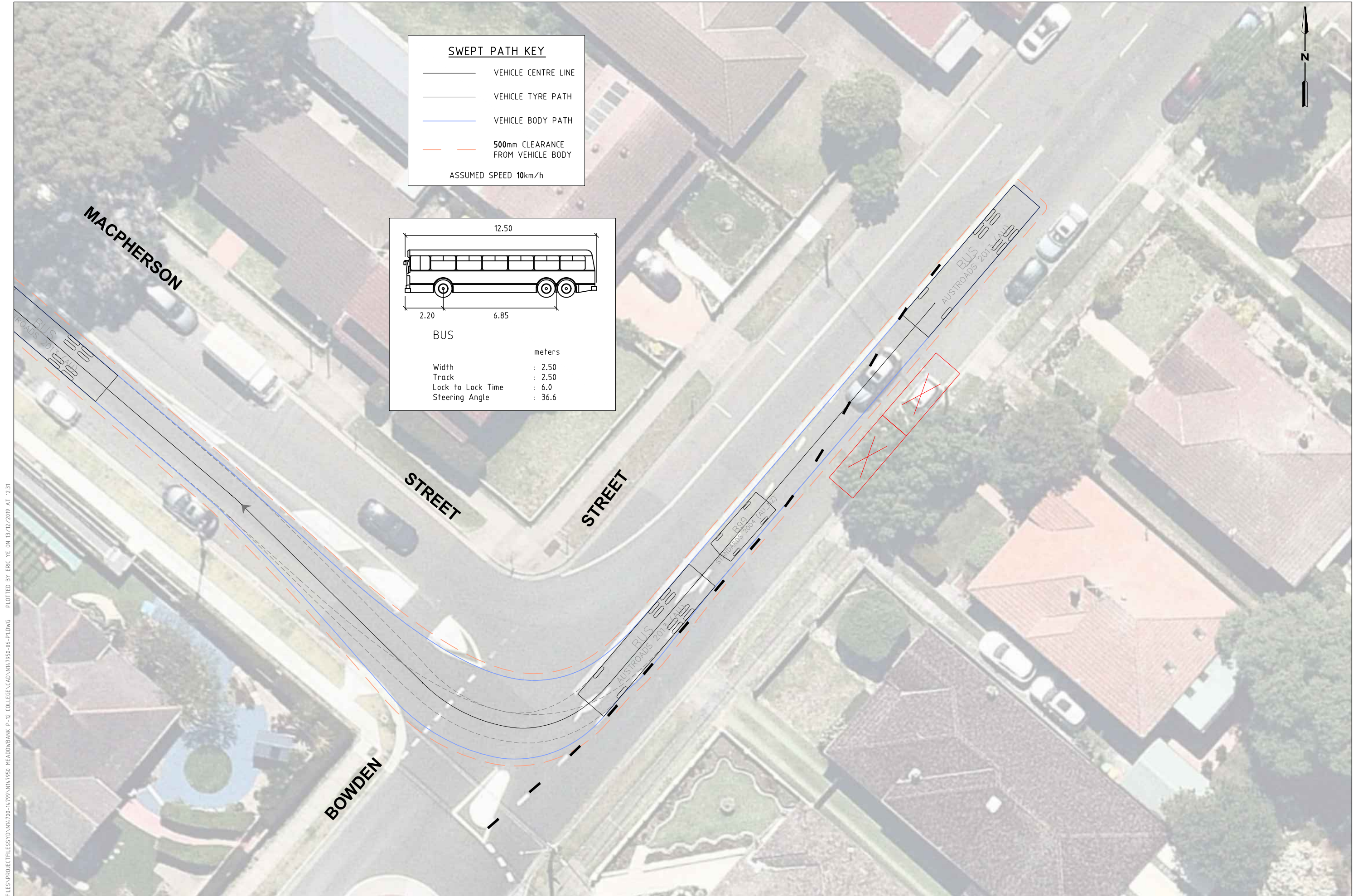
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CONCEPT LAYOUT
DRAWING NO. N147950-06-02 SHEET 02 OF 08 ISSUE P1



SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - - 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 10km/h

12.50

2.20 6.85

BUS

	metres
Width	: 2.50
Track	: 2.50
Lock to Lock Time	: 6.0
Steering Angle	: 36.6

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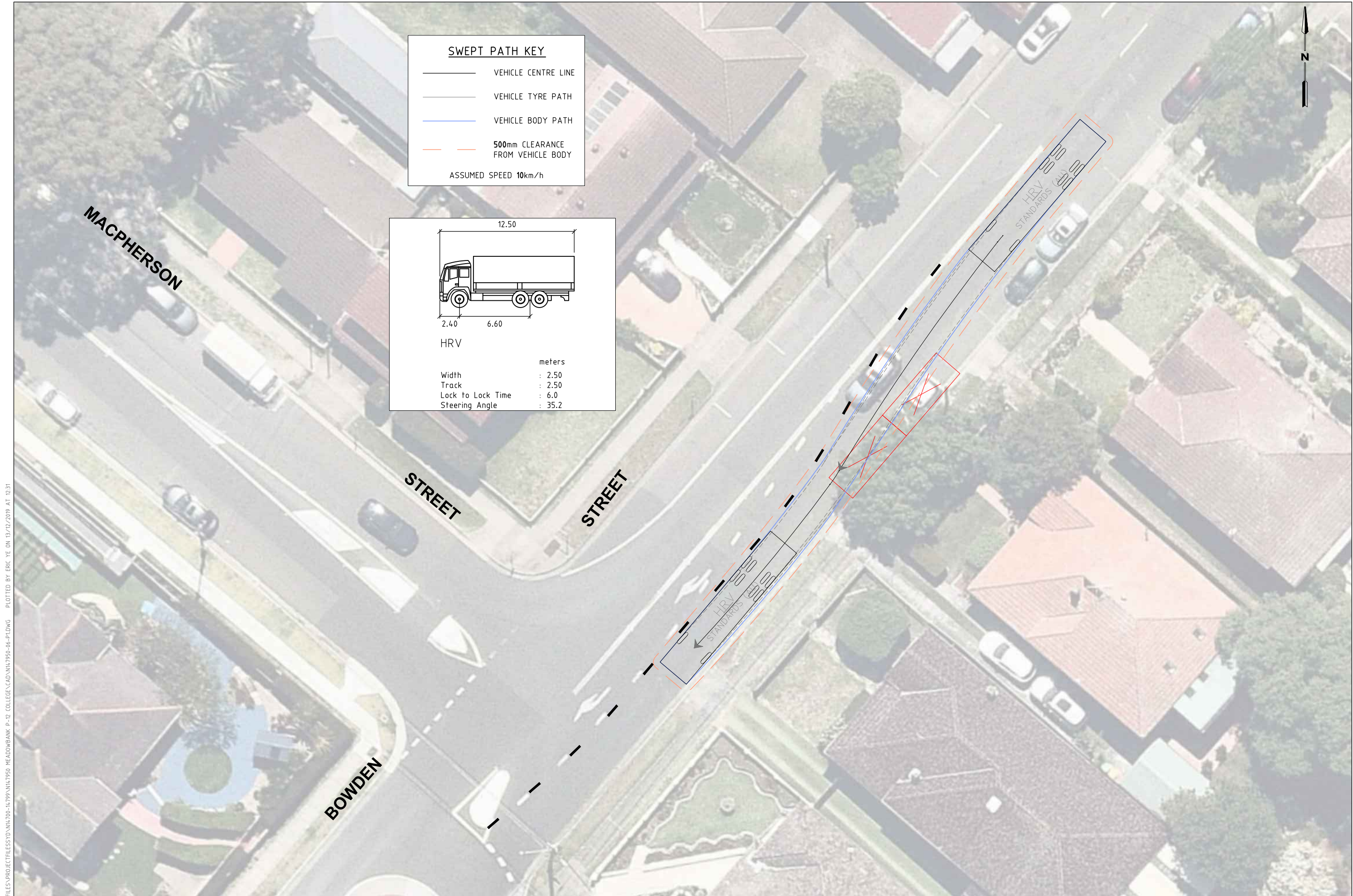
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SWEPT PATH ASSESSMENT

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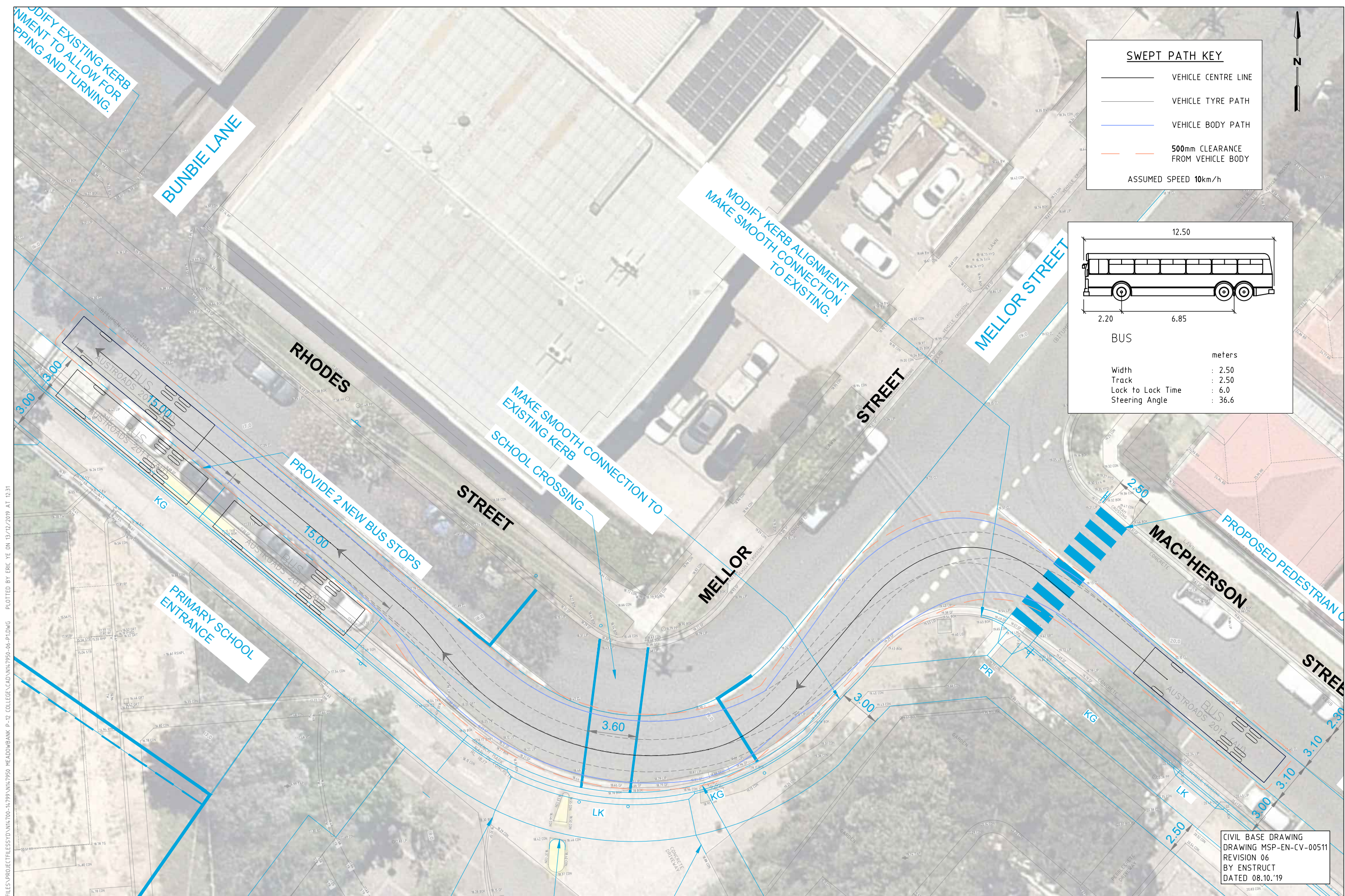
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ISSUE P1

SWEPT PATH KEY

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 10km/h

12.50

2.20 6.85

BUS

meters

Width : 2.50

Track : 2.50

Lock to Lock Time : 6.0

Steering Angle : 36.6

HERMITAGE ROAD

HERMITAGE ROAD

ADDITIONAL SURVEY INFORMATION REQUIRED FOR FURTHER ANALYSIS AND DESIGN. ROAD AND KERB LAYOUT MAY BE SUBJECT TO ESTIMATED BUS TURNING BODY

MODIFY EXISTING KERB ALIGNMENT TO ALLOW BUS TURNING RADIUS. PROPOSED FOOTPATH WIDENING

RHODES

STREET

CIVIL BASE DRAWING
DRAWING MSP-EN-CV-00511
REVISION 06
BY ENSTRUCT
DATED 08.10.19



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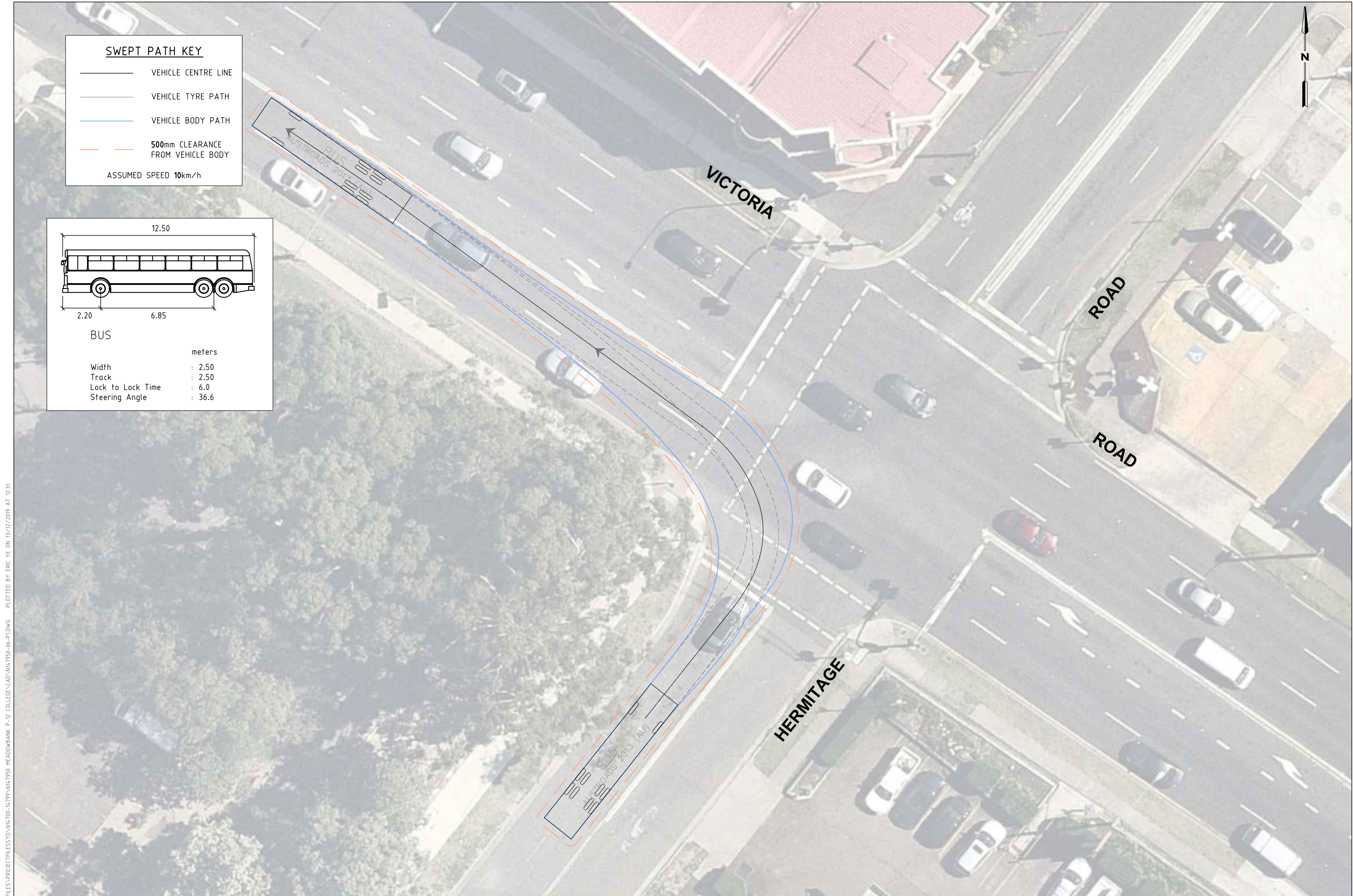
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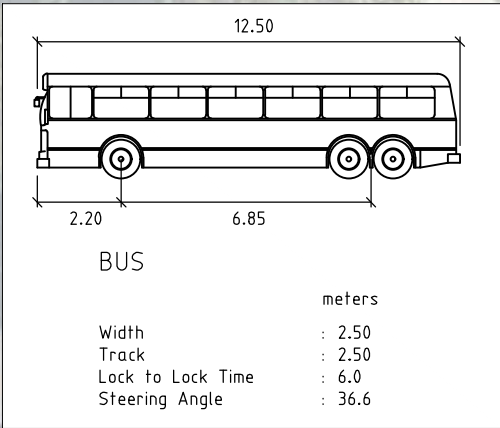
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SWEPT PATH KEY	
	VEHICLE CENTRE LINE
	VEHICLE TYRE PATH
	VEHICLE BODY PATH
	500mm CLEARANCE FROM VEHICLE BODY
ASSUMED SPEED 10km/h	



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SWEPT PATH ASSESSMENT
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SWEPT PATH KEY

— VEHICLE CENTRE LINE

— VEHICLE TYRE PATH

— VEHICLE BODY PATH

— 500mm CLEARANCE FROM VEHICLE BODY

ASSUMED SPEED 10km/h

12.50

2.20 6.85

BUS

meters

Width : 2.50

Track : 2.50

Lock to Lock Time : 6.0

Steering Angle : 36.6

5.20

0.95 3.05

B99

meters

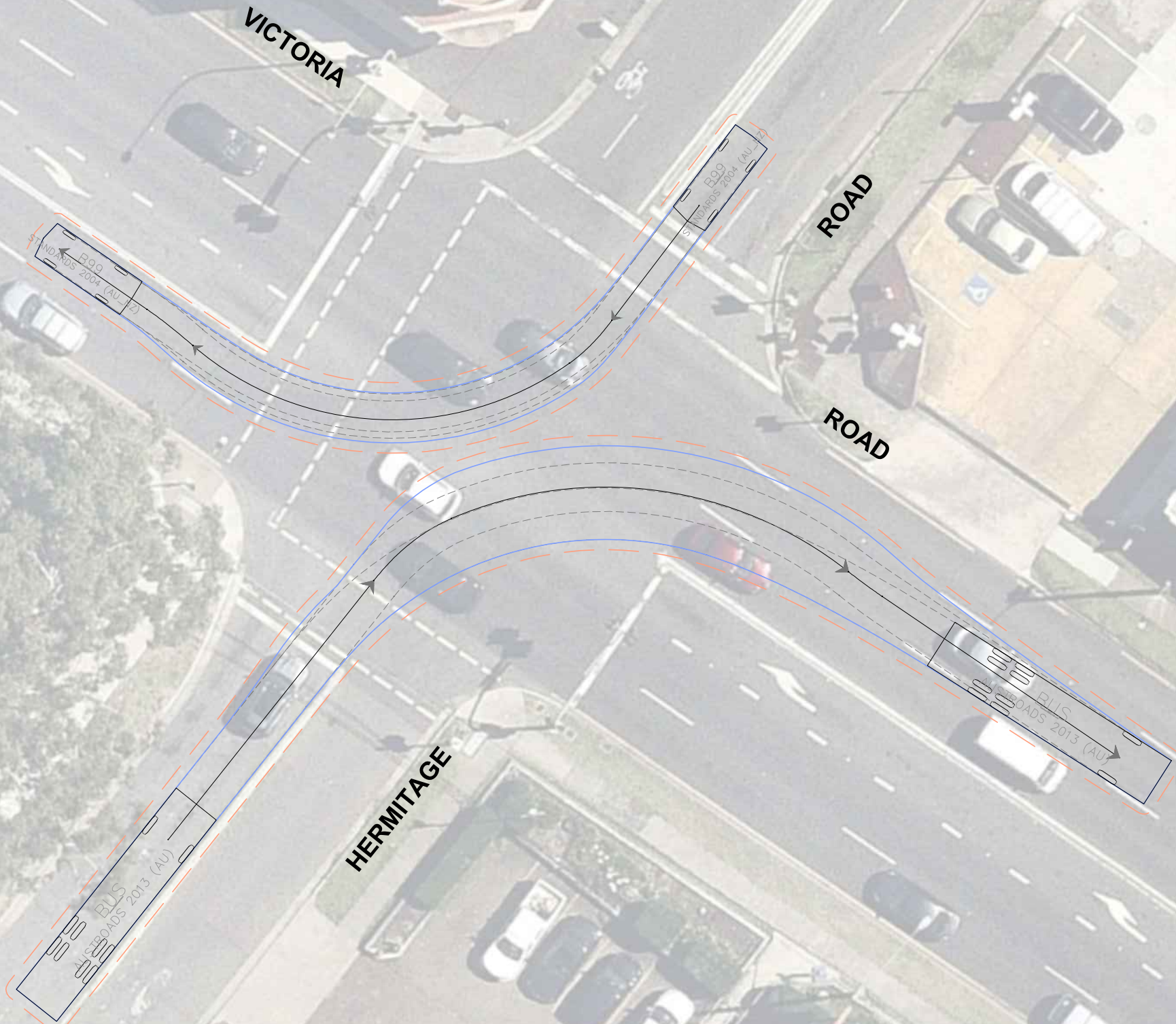
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Track : 1.84

Lock to Lock Time : 6.0

Steering Angle : 33.9

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SWEPT PATH ASSESSMENT

DRAWING NO. N147950-06-08

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ISSUE P1

ATTACHMENT 3

SIDRA Modelling Sensitivity Analysis

Primary School Mode Share

The mode share for primary school car trips is forecast to be 30 per cent; a 10 per cent reduction when compared to the existing Meadowbank Public School. A sensitivity test was carried out to analyse the performance of the network should the mode shift of 10 per cent to cycling (or active transport in general) not be achieved.

A comparison of the estimated trips under the two mode share scenarios is presented in Table 1.

Table 1: Estimated two-way car trips

Year	30% Mode Share		40% Model Share		Difference	
	AM	PM	AM	PM	AM	PM
2022	221	231	229	270	8	40
2032	430	362	469	424	39	61

As indicated in the table above, a car mode share of 40 per cent would result in between 8- 40 additional two-way trips upon opening of the schools, increasing to between 40- 60 additional two-way car trips at full capacity (2032).

Traffic Impact

2022 intersection performance results with the additional school traffic (at 40 per cent car mode share) and additional TAFE traffic (as per Section 9.2 of the TAIA) is presented in Table 2 and Table 3.

Table 2: Intersection performance for Future with Development Sensitivity scenario - 2022 AM

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Macpherson Street/ Mellor Street	Priority	0.05	5	1	LOS A
Macpherson Street/ See Street	Priority	0.16	0	0	LOS A
Macpherson Street/ Bowden Street	Priority	0.24	0	0	LOS A
Bowden Street/ Squire Street	Roundabout	0.20	2	4	LOS A
Constitution Road/ Bowden Street	Signals	0.63	17	52	LOS B
Victoria Road/ Bowden Street	Signals	1.30	54	370	LOS D
Victoria Road/ Hermitage Road	Signals	1.21	63	571	LOS E
Bowden Street/ Stone Street	Priority	0.07	12	1	LOS A
Constitution Road/ Belmore Street	Signals	0.76	18	63	LOS B
Church Street/ Morrison Road	Signals	1.12	21	164	LOS B
Banks Street/ Bay Drive/ Railway Road	Roundabout	0.36	7	7	LOS A

Table 3: Intersection performance for Future with Development Sensitivity scenario - 2022 PM

Intersection	Control	Degree of Saturation	Average delay (seconds)	Average queue (metres)	Level of Service
Macpherson Street/ Mellor Street	Priority	0.05	6	1	LOS A
Macpherson Street/ See Street	Priority	0.12	0	0	LOS A
Macpherson Street/ Bowden Street	Priority	0.23	0	0	LOS A
Bowden Street/ Squire Street	Roundabout	0.22	4	5	LOS A
Constitution Road/ Bowden Street	Signals	0.76	22	52	LOS B
Victoria Road/ Bowden Street	Signals	1.01	27	255	LOS B
Victoria Road/ Hermitage Road	Signals	1.26	57	499	LOS E
Bowden Street/ Stone Street	Priority	0.29	0	1	LOS A
Constitution Road/ Belmore Street	Signals	0.90	30	67	LOS C
Church Street/ Morrison Road	Signals	0.98	17	153	LOS B
Banks Street/ Bay Drive/ Railway Road	Roundabout	0.44	7	9	LOS A

Summary of Results

Table 4 provides a comparison of results for the two different mode share scenarios assessed.

Table 4: Intersection performance Level of Service Summary - PM

Intersection	Control	AM		PM	
		30%	40%	30%	40%
Macpherson Street/ Mellor Street	Priority	A	A	A	A
Macpherson Street/ See Street	Priority	A	A	A	A
Macpherson Street/ Bowden Street	Priority	B	A	A	A
Bowden Street/ Squire Street	Roundabout	A	A	A	A
Constitution Road/ Bowden Street	Signals	B	B	B	B
Victoria Road/ Bowden Street	Signals	D	D	B	B
Victoria Road/ Hermitage Road	Signals	E	E	D	E
Bowden Street/ Stone Street	Priority	A	A	A	A
Constitution Road/ Belmore Street	Signals	B	B	C	C
Church Street/ Morrison Road	Signals	B	B	B	B
Banks Street/ Bay Drive/ Railway Road	Roundabout	A	A	A	A

The results indicate that for the AM peak, the level of service remains the same. For PM peak the intersection of Victoria Road and Hermitage Road would operate at level of service E rather than D with the higher car mode share.

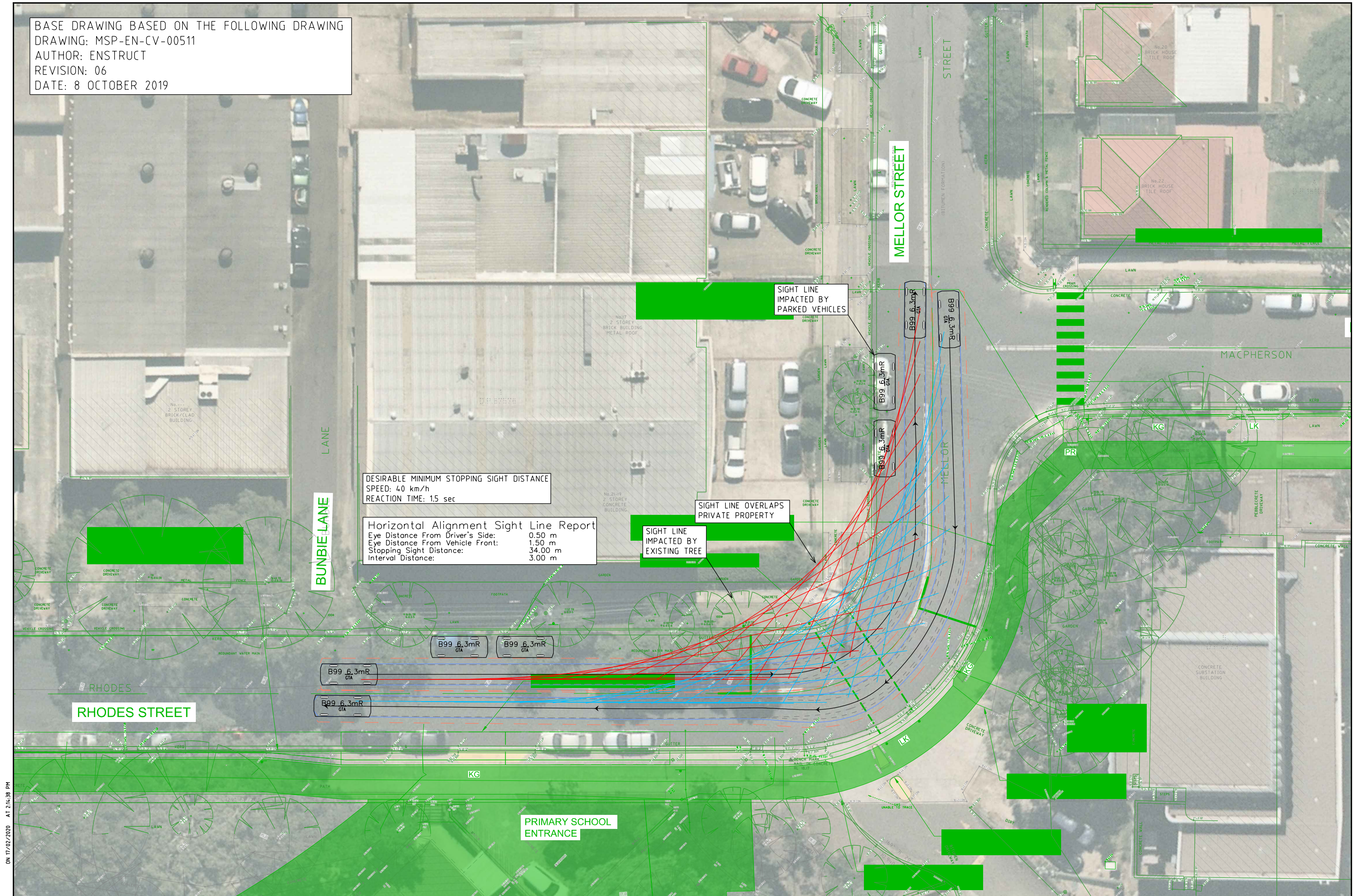
It is noted that the Victoria Road/ Hermitage Road intersection experiences an overall average delay of 57 seconds in the higher car mode share scenario, which is just one second above the threshold for level of service D (56 seconds). Therefore, the sensitivity analysis indicates that the increase in delay with a 40% car mode share is marginal for 2022 traffic conditions and it can be concluded that the

network as a whole could still be expected to operate at satisfactory levels in 2022 (with the additional schools and TAFE traffic) if a primary school student mode shift away from private cars is not achieved.

ATTACHMENT 4

School Crossing Sight Line Assessment

BASE DRAWING BASED ON THE FOLLOWING DRAWING
DRAWING: MSP-EN-CV-00511
AUTHOR: ENSTRUCT
REVISION: 06
DATE: 8 OCTOBER 2019



ON 17/02/2020 AT 2:14:38 PM

PLOTTED BY : EricYe



Melbourne 03 9851 9600
Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000



PRELIMINARY PLAN
FOR DISCUSSION PURPOSES
ONLY SUBJECT TO CHANGE
WITHOUT NOTIFICATION

WARNING
BEWARE OF UNDERGROUND SERVICES
THE LOCATIONS OF UNDERGROUND SERVICES ARE
APPROXIMATE ONLY AND THEIR EXACT POSITION
SHOULD BE PROVEN ON SITE. NO GUARANTEE IS
GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.

DESIGNED
E.YE

APPROVED BY
B.MAYNARD

DESIGN CHECK
B.MAYNARD

DATE ISSUED
17 FEBRUARY 2020

SCALE
A3

1:500

CAD FILE NO.
N147950-03-P4.dgn

MEADOWBANK P-12 COLLEGE

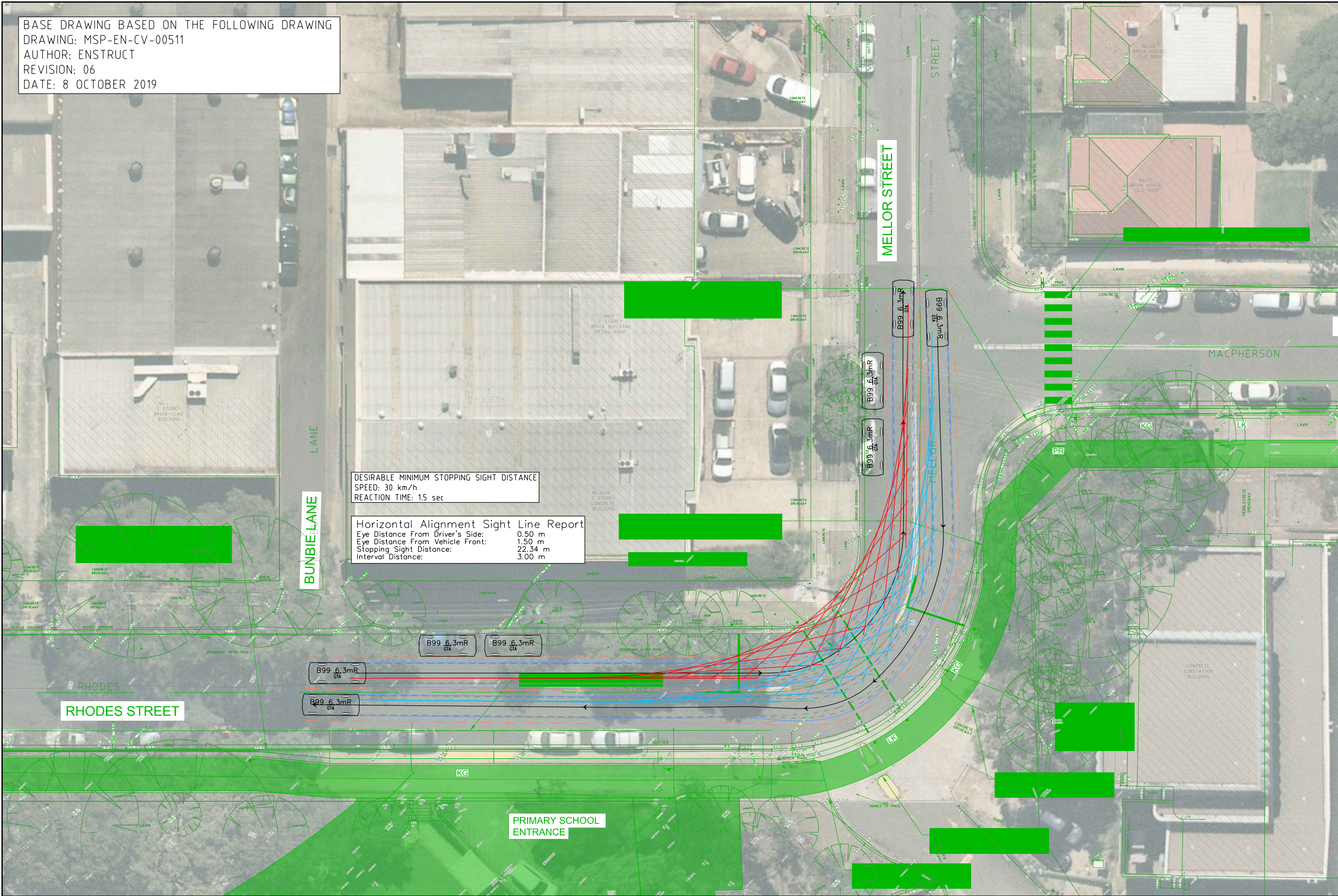
STOPPING SIGHT DISTANCE

DRAWING NO. N147950-03-01

SHEET 01 OF 03

ISSUE P4

BASE DRAWING BASED ON THE FOLLOWING DRAWING
DRAWING: MSP-EN-CV-00511
AUTHOR: ENSTRUCT
REVISION: 06
DATE: 8 OCTOBER 2019



DESIRABLE MINIMUM STOPPING SIGHT DISTANCE
SPEED: 30 km/h
REACTION TIME: 1.5 sec

Horizontal Alignment Sight Line Report
Eye Distance From Driver's Side: 0.50 m
Eye Distance From Vehicle Front: 1.50 m
Stopping Sight Distance: 22.34 m
Interval Distance: 3.00 m

ON 17/02/2020 AT 2:14:40 PM

PLOTTED BY : Eric Ye



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Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000



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DESIGNED
E.YE

APPROVED BY
B.MAYNARD

DESIGN CHECK
B.MAYNARD

DATE ISSUED
17 FEBRUARY 2020

SCALE
A3

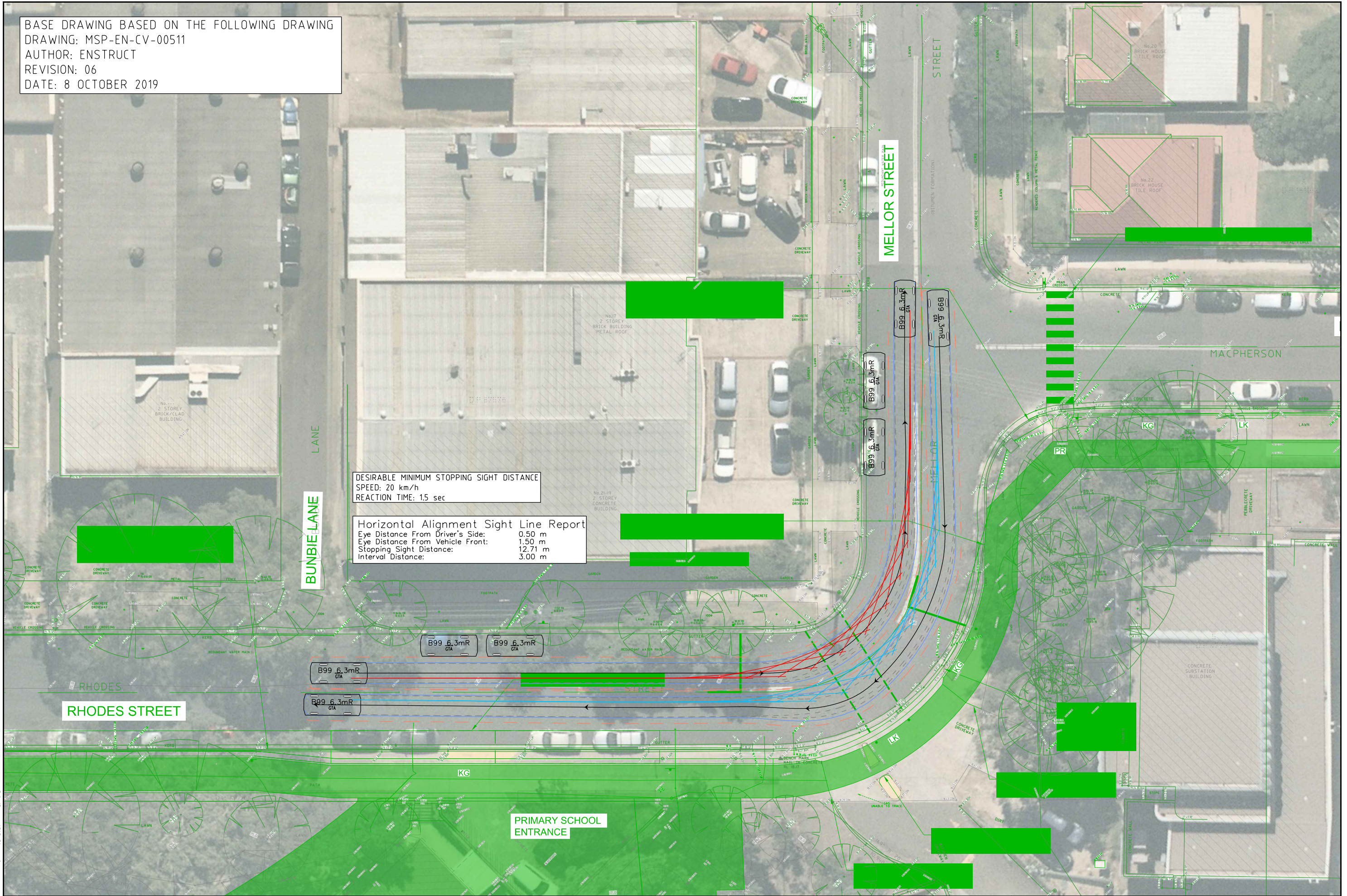
CAD FILE NO.
N147950-03-P4.dgn

MEADOWBANK P-12 COLLEGE

STOPPING SIGHT DISTANCE
DRAWING NO. N147950-03-02

SHEET 02 OF 03
ISSUE P4

BASE DRAWING BASED ON THE FOLLOWING DRAWING
DRAWING: MSP-EN-CV-00511
AUTHOR: ENSTRUCT
REVISION: 06
DATE: 8 OCTOBER 2019



DESIRABLE MINIMUM STOPPING SIGHT DISTANCE
SPEED: 20 km/h
REACTION TIME: 1.5 sec

Horizontal Alignment Sight Line Report
Eye Distance From Driver's Side: 0.50 m
Eye Distance From Vehicle Front: 1.50 m
Stopping Sight Distance: 12.71 m
Interval Distance: 3.00 m

ON 17/02/2020 AT 2:14:42 PM

PLOTTED BY : Eric Ye



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Sydney 02 8448 1800
Brisbane 07 3113 5000
Adelaide 08 8334 3600
Perth 08 6169 1000



PRELIMINARY PLAN
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DESIGNED
E.YE

APPROVED BY
B.MAYNARD

DESIGN CHECK
B.MAYNARD

DATE ISSUED
17 FEBRUARY 2020

SCALE
A3

1:500

CAD FILE NO.
N147950-03-P4.dgn

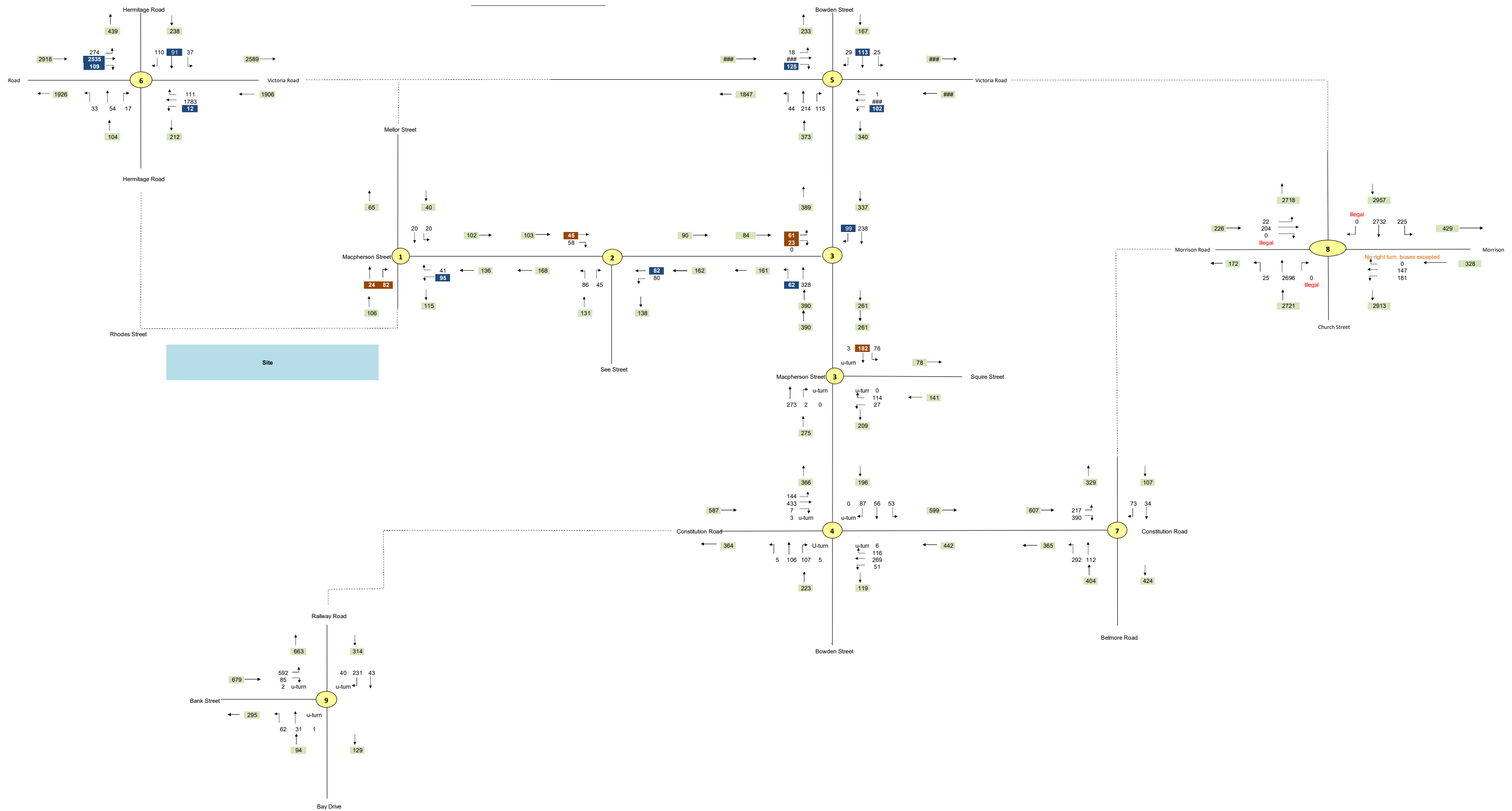
MEADOWBANK P-12 COLLEGE

STOPPING SIGHT DISTANCE
DRAWING NO. N147950-03-03

SHEET 03 OF 03
ISSUE P4

ATTACHMENT 5

Traffic Volumes and Traffic Distribution



PM Peak Hour Existing Traffic Volumes (veh/h)

