



# Shore School, North Sydney

## Pick-up Zone Options

**Job Number 600321**

**Prepared for Sydney Church of England**

**Grammar School**

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## Document Control

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## Executive Summary

WSP Environment & Energy, Project Managers for Sydney Church of England Grammar School (hereon referred to as Shore School) engaged Cardno to prepare design concepts for a proposed student pick-up area within school grounds. This report discusses the 8 options identified and provides an overview of the opportunities and constraints associated with each. Options 1 to 5 were developed and presented to the community and Council. Based on feedback a further 3 options (1A, 2A & 3A) were developed. A summary of these options are tabulated below.

	Description	Direction of Travel	Drawing Ref	Comment
<b>Initial Options</b>				
<b>Option 1</b>	New entry driveway off 80 Union Street	Ingress Union Street Egress Hunter Crescent	600321-SK02(2)	Option considered viable
<b>Option 2</b>	Utilise existing car park for thoroughfare	Ingress Union Street Egress Hunter Crescent	600321-SK03(2)	Option considered viable
<b>Option 3</b>	New road to south of existing car park	Ingress Union Street Egress Hunter Crescent	600321-SK04(2)	Option considered viable
<b>Option 4</b>	Utilise existing Graythwaite & Shore School driveways	Ingress & Egress Union Street	600321-SK05(2)	Option not viable
<b>Option 5</b>	Utilise existing tennis courts of Mount Street	Ingress & Egress Mount Street	600321-SK06(2)	Option not viable
<b>Additional Options</b>				
<b>Option 1A</b>	New entry driveway off 80 Union Street	Ingress Hunter Crescent Egress Union Street	600321- SK07(1) 600321- SK08(1)	Incorporating community & council comments
<b>Option 2A</b>	Utilise existing car park for thoroughfare	Ingress Hunter Crescent Egress Union Street	600321- SK09(1) 600321- SK10(1)	Incorporating community & council comments
<b>Option 3A</b>	New road to south of existing car park	Ingress Hunter Crescent Egress Union Street	600321- SK11(1) 600321- SK12(1)	Incorporating community & council comments

Note: Ingress refers to the entrance & egress refers to the exit

The design concept plans demonstrate preliminary horizontal alignments, vertical grades, typical sections and concept drainage designs to convey rainfall runoff during minor storm events from the proposed access road for each of the viable options. Each option proposes an access road 4.5m wide (except where utilising an existing access roads) with a 3m lane widening near the proposed student waiting area designed to cater for a standard Austroads car 5m long & 1.9m wide. The road holds a constant 3% one way cross fall along its full length.

Options 1 to 5 were presented to the community and Council for comment, however Options 4 and 5 were considered not viable due to underlying issues discussed in Section 2 of this report. Suggestions received via community consultation were

interpreted for Options 1 to 3 and Options 1A to 3A were then derived. These have been nominated as the viable options for the proposed pick-up zone that Cardno recommend are developed further. Of these options, 1A and 3A are preferred over 2A since they avoid travel through the existing car park.



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## **1 Introduction**

WSP Environment & Energy, Project Managers for Sydney Church of England Grammar School (hereon referred to as Shore School) engaged Cardno to prepare design concepts for a proposed student pick-up area within school grounds.

This report discusses the 8 options identified and provides an overview of the opportunities and constraints associated with each. Viable options are highlighted in consideration of feedback from Shore School, the community and discussions with North Sydney LGA.

## 2 Design Concepts

The following options for an afternoon pick-up zone to service Stages 2 & 3 were considered with a view to provide extra traffic capacity and be easily accessible by parents and students at Shore School.

We have prepared preliminary horizontal alignments, vertical grades, typical sections and concept drainage designs to convey rainfall runoff during minor storm events from the proposed access road for each of the viable options. Each option proposes an access road 4.5m wide (except where utilising an existing access road) with a 3m lane widening near the proposed student waiting area designed to cater for a standard Austroads car 5m long & 1.9m wide. The road holds a constant 3% one way cross fall along its full length – refer to **Annex A** for an illustration.

A summary of the options prepared have been tabulated below. These options are discussed in further detail in the following sections of the report.

**Table 1: Summary of Design Concepts**

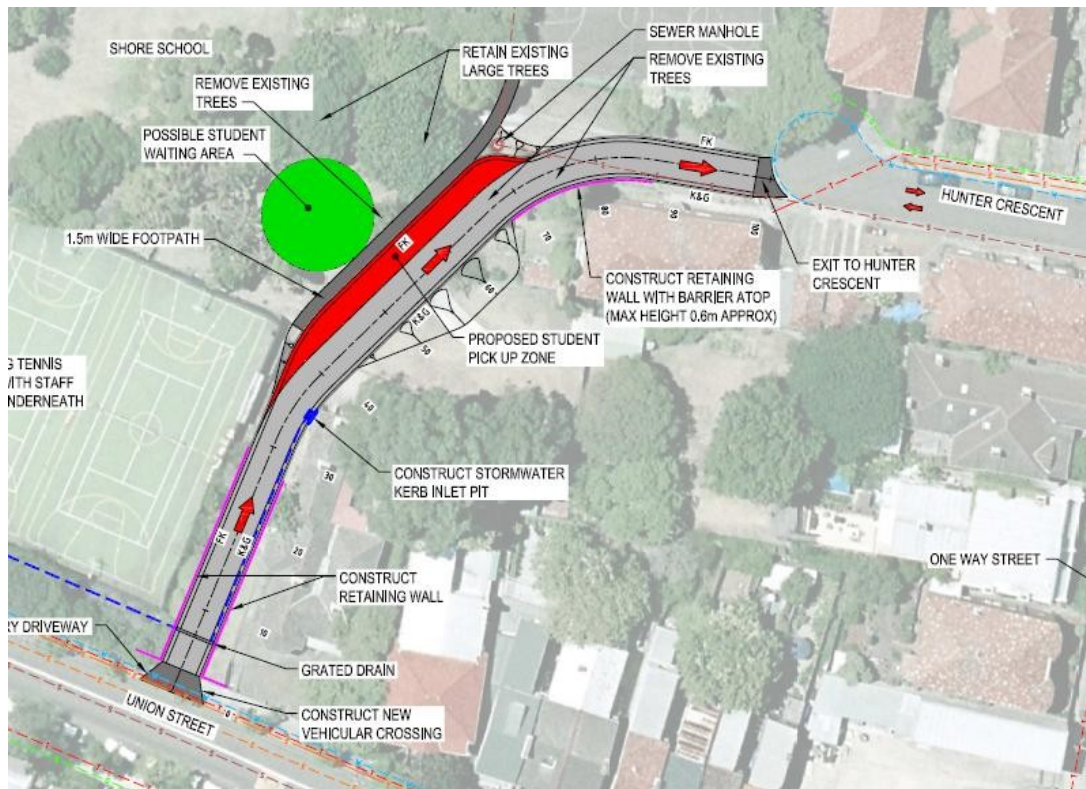
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Note: Ingress refers to the entrance & egress refers to the exit



## 2.1 Option 1

This option proposes construction of a new entry (ingress) driveway crossing at 80 Union Street. The access road travels north towards the proposed student waiting area; west of the existing staff car park. Egress is to the cul-de-sac at Hunter Crescent, see Figure A below and Annex A for a more detailed drawing.



**Figure A - Option 1 Concept**

### 2.1.1 Opportunities

- This access road stands independent of other traffic movements within the campus. As such, there is a reduced likelihood of traffic congestion;
- Avoids relocation of sewer manhole;
- Alignment of the access road allows for greater retention of trees.

### 2.1.2 Constraints

- Council may require a traffic study to assess the safety issues associated with creation of a new vehicular crossing at Union Street with a right hand turn from Union Street;
- Construction of an access road through the corridor between the existing staff car park and 80 Union Street will require retaining walls either side of the road from approximately chainage 70m through to the proposed vehicular crossing

at Union Street. Figure B below is an illustration of the corridor the access road passes through;

- Requires the purchase and re-zoning of land;
- A small section of the existing retaining wall fronting Union Street needs to be demolished to make provision for the new driveway.
- Requires demolition & disposal of the detached brick building at the rear of 80 Union Street. The alignment of the access road during detailed design should be such that there is adequate clearance to the main brick residence to avoid further demolition works;
- The location of the proposed vehicle crossing necessitates the removal of an existing street tree within the footpath on Union Street and possibly some large trees east of the existing car park.



**Figure B - Corridor looking south towards Union Road**



### 2.2 Option 2

This option proposes to utilise the existing gated entry/exit driveway to Shore School on Union Street as ingress and direct vehicles through the existing car park and exit at the north-west corner of the building. The access road from this point onwards travels north-west past the proposed student waiting area with egress to Hunter Crescent. See Figure C below and Annex A for a more detailed drawing.

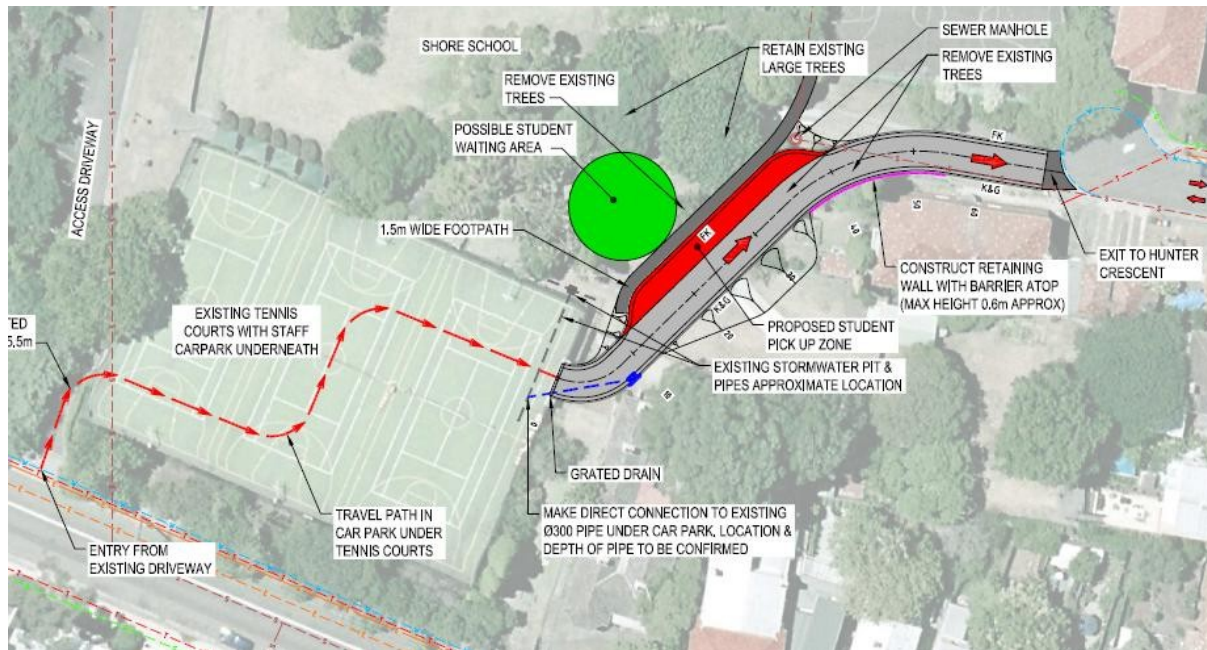


Figure C - Option 2 Concept

#### 2.2.1 Opportunities

- The proposed alignment of the access road and utilising the existing car park as a travel path allows for maximum retention of trees. The north-east access point from the car park is depicted in Figure B above;
- Cost effective solution with less new pavement area required. Avoids construction of additional retaining walls as identified in Option 1;
- Avoids relocation of sewer manhole;
- Eliminates the need for a new vehicular crossing to Union Street;
- Additional undercover waiting area available when required.

#### 2.2.2 Constraints

- Right hand turn from Union Street;
- Vertical clearance of the car park roof slab is less than recommended standards. We have identified a localised high spot at the entry/exit point of the car park which effectively reduces vertical clearance to less than 1.8m.

Modification is required to lower pavement levels at this section to achieve the minimum vertical clearance;

- Boom gates at the entry/exit point of the staff car park could potentially cause congestion during peak periods. These gates malfunctioned during a site meeting and can easily occur again. For such occurrences the boom gates would hinder the free flow of traffic during the pick-up periods. Figure D gives an illustration of these gates;
- To alleviate the above issue, the car park may have to be manned during the busy period to ensure the boom gates are fully operational and/or remove the access controls to the car park to ensure there is a clear travel path through the car park to the proposed pick-up area;
- New stormwater drainage for the access road relies on a direct connection to an existing stormwater drainage pipe under the staff car park. Details of the position and depth of pipe should be sourced from Shore School work-as-executed during detailed design phase;
- Australian Standards for off-street parking facilities (AS/NZS 2890.1:2004) clause 3.2.2 states *“driveways with 30 or more movements in peak hour (in and out combined) usually requires provision for two vehicles to pass on the driveway, i.e. a minimum width of 5.5m”*. The existing gated entry at Union Street provides 5m at its narrowest point. As such, the entry/exit driveway needs to be widened for this option to comply with the standards.



**Figure D - Boom gates at entry/exit of staff car park**



### 2.3 Option 3

This option proposes to utilise the existing gated entry/exit driveway to Shore School on Union Street and have traffic directed through a corridor between the existing car park and the southern property boundary before turning north towards the proposed student waiting area. Egress is to Hunter Crescent as per previous the options. See Figure E below and Annex A for a more detailed drawing.

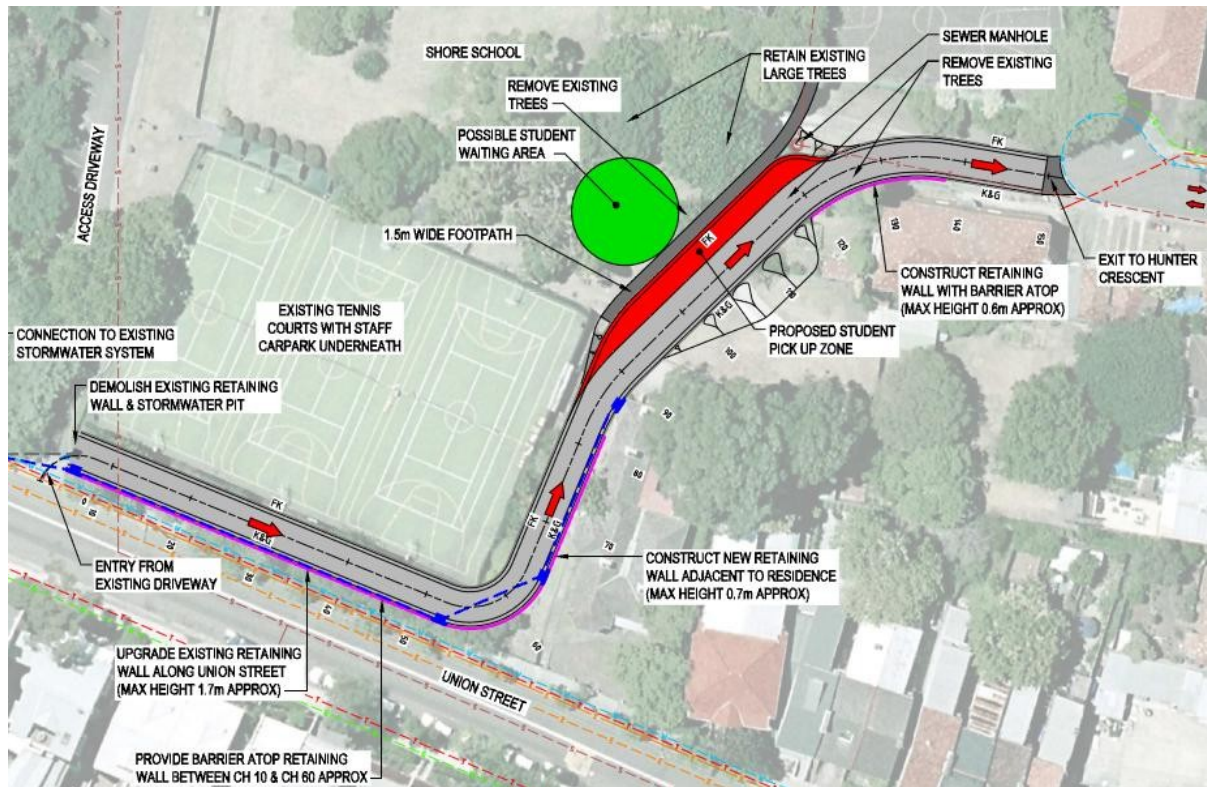


Figure E - Option 3 Concept

#### 2.3.1 Opportunities

- Right hand turn from Union Street;
- Considering the intended travel route is offline from the existing car park unlike Option 2, there is a reduced likelihood of traffic congestion;
- Shore School will provide a landscape solution to shield the carriageway from Union Street for the section of road between the existing car park and the southern property boundary;
- Eliminates the need for a new vehicular crossing to Union Street;
- Stormwater drainage from the existing car park may be utilised. Further investigation is required as to the location and depth of pipes underneath the existing staff car park and details should be sourced from Shore School work-as-executed during detailed design phase;
- Avoids relocation of sewer manhole;

- Does not necessitate widening the gated entry to 5.5m as discussed in Option 2.

### **2.3.2 Constraints**

- Requires removal of established trees and shrubs through the corridor between the existing car park and the southern property boundary. None of the vegetation appears to be ecologically significant. Shore School will be looking to re-landscape this area to shield the view of the carriageway from the street as noted above;
- Structural upgrade of the existing retaining wall along Union Street is required where in close proximity to the access road to sustain the vehicle traffic loads (from chainage 95m to 140m approximately) to an approximate maximum height of 1.7m. The existing wall is approximately 0.3m high at the gated entry to Shore School and tapers to approximately 0.8m high near 80 Union Street – see Figure F for an illustration.
- A safety guardrail atop this wall is suggested to shield vehicles from the edge of the retaining wall. This would require reconstruction of the wall and boundary fence.



**Figure F - Retaining wall at Union Street**



### 2.4 Option 4

This option considers utilising existing access roads. Proposed ingress is from an existing access road to Graythwaite House and the planned egress is from the existing access road to Union Street as discussed in the above options situated on Shore School grounds. See Figure G below and Annex A for a more detailed drawing.

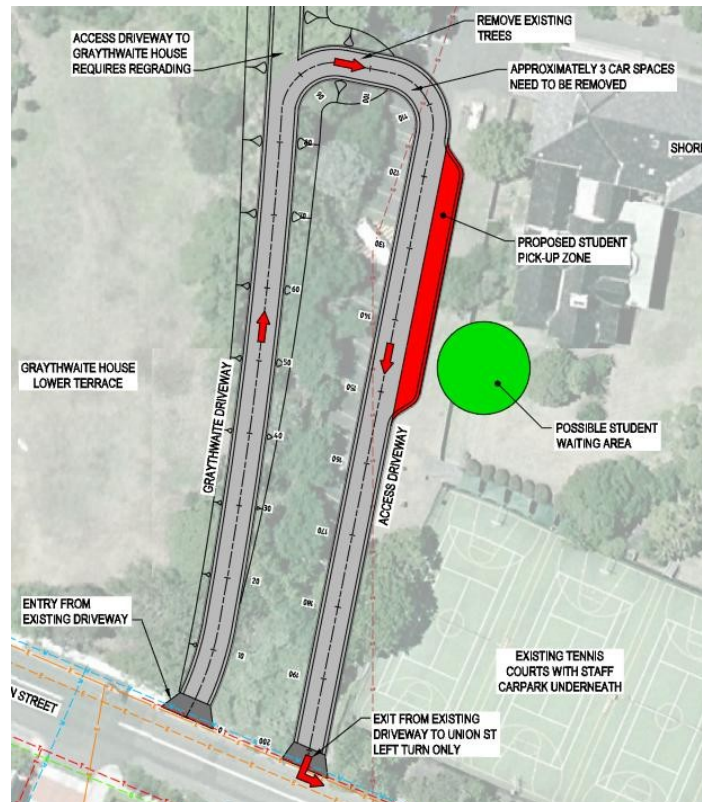


Figure G - Option 4 Concept

#### 2.4.1 Opportunities

- Utilises existing access roads and vehicular crossings;
- Appears to be no underground services in close proximity to the works.

#### 2.4.2 Constraints

- This option will trigger a number of heritage constraints;
- There is a significant level difference between the Graythwaite and Shore School access roads at the proposed crossover point. The existing Graythwaite access road appears to be approximately 2m lower at the crossover and would need to be raised by approximately 1m (minimum) to achieve around a 10% grade in the crossover. In doing so, full length of Graythwaite access road will require regrading;

- Further to the above point, it is understood the trees surrounding the Graythwaite access road are heritage listed and any modifications to raise the road may require removal of the adjacent trees. The proposed 1 in 3 batters from the raised access road and the crossover to the Shore School access road will result in the removal of heritage listed trees. Consequently an approval will need to be sought from the relevant authority;
- This option is likely to provide minimum traffic relief at this point during peak periods. It increases the queuing times on Union Street given the proposed ingress. Furthermore, the crossover will effectively eliminate several established car spaces along the Shore School access road which we feel is not a favourable outcome;
- The 3m widening for the proposed pick-up area (illustrated in Figure H on the following page) would also necessitate relocation of existing light poles currently positioned behind the kerb and gutter.

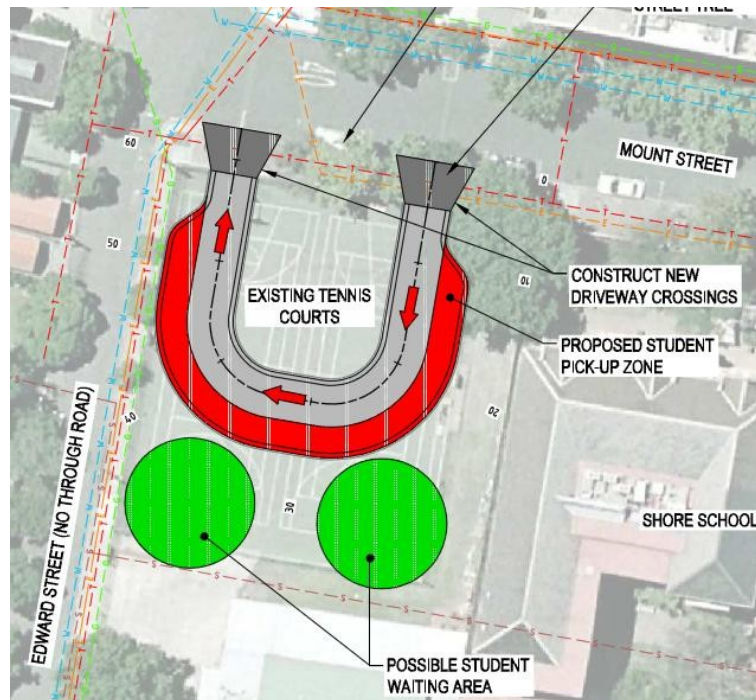
Considering the above issues, we feel this is less than optimum solution and would suggest that it is not considered as an ultimate solution for a student pick-up zone.



**Figure H - Shore School access road southbound**

## 2.5 Option 5

This option proposes to convert the existing tennis court at the corner of Mount and Edward Street into a pick-up zone. Proposed ingress and egress would be via new vehicular crossings at Mount Street. See Figure I below and Annex A for a more detailed drawing.



**Figure I - Option 5 Concept**

### 2.5.1 Opportunities

- Large area for proposed pick-up area;
- Impact on services is likely to be less than Options 1 to 3;
- Considering the area is fully developed, there is maximum opportunity for retention of trees.

### 2.5.2 Constraints

- Loss of use of tennis courts;
- Council metered parking on Mount Street and a bus stop in close proximity. An application to Council would be required to remove some of these metered parking space for construction of new vehicular crossings here – refer to Figure J below;
- Egress to Edward Street is not a favourable option considering it is a no through road and with road side parking on the western side it proves a to be a difficult turning path for vehicles. In addition, Shore Preparatory School is



situated further south on Edward Street and this option does not improve the combined traffic requirements of these two sites;

- Street trees in the road reserve will need to be removed to make way for the new vehicle crossings;
- The site is in close proximity to a three way intersection and is Near intersection, not safe;

Considering the above issues, we feel this is less than optimum solution and would suggest that it is not considered as an ultimate solution for a student pick-up zone.



**Figure J - Mount Street parking**

### **3 Revised Design Concepts**

From the viable Options 1 to 3, comments and suggested amendments from the community and Council have been incorporated into the following options.

#### **3.1 Options 1A, 2A and 3A**

These are the same as Options 1 to 3 but they propose vehicles travel in the opposite direction with ingress at Hunter Crescent and egress to Union Street. As a result of this change, reversing the current 1-way direction of William Street south of Blue Street was considered. The intention here is to avoid queuing of vehicles on Blue Point road travelling southbound intending to turn right into William Street. See Annex A for more detailed drawings.

As mentioned above, the road and stormwater design for Options 1A to 3A are exactly the same as Options 1, 2 and 3 respectively. As such, the associated opportunities and constraints determined in Section 2.0 of this report are identical. Issues over and above those already identified are discussed below.

A left turn only is suggested at the egress to Union Street for safety and to avoid traffic congestion for Options 1A to 3A and promote the free flow of traffic during busy periods. With respect to all options, appropriate signage and line marking needs to be established to ensure errant vehicles do not travel in the opposite direction to what is intended.

The consequence of reversing the direction of travel means that passengers would have to enter from the driver side of the vehicle and not the passenger side at the pick-up zone. The width of the carriageway at this point should be wide enough to allow passengers to approach the passenger side of the vehicle if required and still have adequate clearance for 2 vehicles, if circumstances require it. With the appropriate signage to warn drivers of this hazard, sectioned line marking and a moderate speed limit applied to these options, the intended travel direction can still be accommodated.

In order to reverse the one-way direction of William Street south of its intersection with Blue Street, Council approval is required. They will need to notify the neighbouring residents who will be affected by the change and given a chance to comment. Furthermore, if the one-way direction is reversed, signage will have to be reposted and Council may choose to retain the metered parking on the western side of William Street or relocate it to the eastern side of the road – see Figure K on the following page showing the current parking arrangement on William Street.

With the ingress at Hunter Crescent, a gated entry should be established and opened during the busy period for student pick-up after school. This gate and use of appropriate signage should deter unauthorised entry to the access road.



**Figure K - William Street one-way northbound**



## **4 Recommendations for Future Works**

### **4.1 Development of Detailed Design**

The viable options are concept only and are subject to detailed design. Additional details for the viable options will be required to obtain Development Application and Construction approval. These details include, but are not limited to the following:

- Conduct a Dial Before You Dig;
- Road long sections and cross sections for horizontal and vertical geometry for the access road;
- Access road pavement design prepared by a geotechnical engineer;
- Structural design of retaining walls and preparation of design plans;
- Set-out details for the access road and retaining walls;
- Sizing of stormwater drainage and preparation of design plans;
- Utilities plan for lighting along access road if required;
- Design of utility relocations if required;
- Signposting, line marking and details of a gated entry if required;
- Erosion & sediment control plans.

### **4.2 Utility Investigation & Relocation**

Prior to detailed design, the depth and location of on-site of subsurface utilities need to be confirmed to ensure they are considered in the design process and, if necessary, design for the relocation of any utilities. Once a preferred option has been agreed, we recommend pot holing services to establish exact locations and depths.

### **4.3 Property Boundary Adjustments**

In order to maximise retention of existing trees, limit services clashes at ground level and improve turning paths through the access road, the viable options will encroach on neighbouring property and involve minor boundary adjustments. However, we understand this should be achievable through negotiation and approvals.

### **4.4 Specialist Studies**

Council may require a traffic study in support of a Development Application to affirm the design and the traffic control measures in place are suitable i.e. lane width, speed limit, signage, line marking and enforced left turn only at the egress to Union Street.

A geotechnical investigation would also be necessary to further develop the detailed design so as to prepare a suitable pavement design and for input to the structural engineers to design the required retaining walls.

An Arborist report may be required. The scope of the report will depend on the final option selected.

Finally an electrical engineer should prepare the lighting design if required.

## **5 Conclusion**

The design concepts prepared present the full range of options investigated for a new afternoon pick-up area for Shore School students. Of the 8 options identified and discussed, we feel that Options 1 to 3 and 1A to 3A reflect the interests of the School, Council and the community and warrant further assessment. Of these options, we feel Options 1A & 3A are preferable over option 2A since they avoid travel through the car park.

Further design development and investigation is required before Development Application or Construction approval can be obtained. The information provided in this report forms the basis of the detailed design work. Further detail and specialist studies as identified in this report will be required prior to seeking Development Approval.