SAFE SYSTEM ASSESSMENT

Bellbrae Primary School, Bellbrae

+61 431 202 164
info@roadsolutions.com.au
roadsolutions.com.au

Road Safety | Auditing | Development | Movement and Place | Training

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

QUALITY INFORMATION PAGE

Client: Aoife Corcoran | Senior Project Engineer | Surf Coast Shire Council

Safe System Assessment Team:

Daniel Mustata - Safe System Assessor, Road Solutions Pty Ltd

Duc Phan - Safe System Assessor, Road Solutions Pty Ltd

Revision	Date	Details	Name	Authorised
A	22.03.2023	Draft report	Daniel Mustata	
B	12.02.2024	Final report	Daniel Mustata	
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EXECUTIVE SUMMARY

Safe System Assessment (SSA) is a tool that assesses the extent to which a proposed infrastructure project aligns with Safe System principles and the objective to eliminate fatal and serious injuries. The process allows project options to be compared with a base case (i.e., existing conditions) and with each other.

A Safe System Assessment will identify areas where the risk of fatal and serious injury (FSI) crashes is high and identifies design changes which, if adopted, would improve alignment with the Safe System approach. When Safe System principles are being followed and applied correctly, there should be a Safe System compliant when progressing from existing conditions to the initial design options and, finally, to the adopted design.

A Rapid SSA has been conducted on 22 March 2023, and a site inspection was completed on 15 December, 2022 and 10 January, 2023.

Bellbrae Primary School was originally constructed to cater to 35 students and has grown significantly with 480 students currently enrolled. As a result of this growth, the existing infrastructure is insufficient to facilitate traffic volumes, parking requirements, and safe vulnerable road movements when travelling to/from the school, and at the school.

Table 1: Existing condition and Proposed design scores

Intersection	Score
Existing Conditions	154 / 448
Proposed Design	121 / 448

This project seeks to improve parking amenity, and vulnerable road user safety and connectivity in view of the existing and projected growth of the student population at Bellbrae Primary School.

Existing conditions scoring compared to the proposed design option has been assessed and is shown in the table above.

The proposed design is expected to improve overall road safety within the project scope, with the biggest benefits achieved for parking manoeuvre crashes, and pedestrian-type crashes as a result of parking infrastructure and construction of additional pedestrian facilities.

Cyclist connectivity and safety is also improved under the proposed design through the provision of a formalised crossing point across the Great Ocean Road from Strathmore Drive, and modification of a roundabout to include protected cycling lanes.

RECOMMENDATION / OPTIONS

Primary treatments

- Provide additional drop-off/pick-up zones north of Bellbrae Primary School and on Cemetery Road
- Provide footpath connecting the drop-off/pick-up zone on Cemetery Road and the school through the cemetery
- Install pedestrian operated signal crossing across Great Ocean Road at Strathmore Drive / Great Ocean Road intersection

Supporting treatments

- Ban on road parking at the bend on School Road and east side of the service road, north of the school
- Construct kerb outstands at the exit of the service road, north of the school to improve sightline
- Modify the parking opposite the school to 30-degree parking
- Provide additional 30-degree parking north of the school
- Install speed humps at the bend on School Road, north of the school
- Modify Cemetery Road / Great Ocean Road intersection to reduce vehicles' turning speed

Other Safe System treatments

For further safety improvements, in the long-term, the following treatments should be considered:

- Modify Anglesea Road / School Road intersection layout to improve sightline of vehicle on School Road and install side road activated signals.
- Install raised intersection at Cemetery Road / School Road intersection to reduce vehicle speed and raise the awareness of changing road environment
- Construct a footpath and a wombat crossing on School Road connecting the roundabout and the supervised crossing at Cemetery Road / School Road intersection
- Install raised safety platforms on the approaches to the Great Ocean Road / Anglesea Road intersection

1. BACKGROUND

1.1. INTRODUCTION TO THE SAFE SYSTEM

1.1.1. SAFE SYSTEM PILLARS

The Safe System approach views human life and life and health as the paramount consideration when designing a road network. There are five Safe System components: post-crash care, safer vehicles, safer speeds, safer roads, and safer road users. The Safe System acknowledges that people will at times make mistakes that can lead to crashes. Therefore, all parts of the system must be considered and strengthened so that road safety outcomes are maximised and to ensure that road users are adequately protected even if one part fails.

Figure 1: Safe System Pillars

1.1.2. SAFE SYSTEM IMPACT SPEEDS

Safe System impact speeds are speeds below which the chances of survival are high, and the likelihood of serious injury is low. The human body is vulnerable not built to withstand impact forces greater than 30km/h, above which the risk of death greatly increases.

Figure 2 is a guide to Safe System impact speeds for common crash types. It should be noted that the angle of impact of a collision is also a factor that affects the severity of a crash. As far as is practically possible, infrastructure should be designed, and travel speeds managed so that the impact speeds when a crash occurs are below the thresholds shown in Figure 2.

Figure 2: Safe System Impact Speeds

2. ASSESSMENT DETAILS

2.1. TYPE OF ASSESSMENT

Under this report a Rapid Safe System Assessment has been conducted in accordance with VicRoads Safe System Assessment Guidelines and Austroads Safe System Assessment Framework (Austroads Research Report AP-R509-16).

2.2. ASSESSMENT TEAM

The assessment was conducted by:

- Daniel Mustata, Principal Road Safety Engineer, Road Solutions
    - DoT (Vic) recommended Safe System Assessor & Accredited Senior Road Safety Auditor
- Duc Phan, Transport Specialist, Road Solutions
    - DoT (Vic) recommended Safe System Assessor & Accredited Senior Road Safety Auditor

2.3. MEETINGS AND SITE INSPECTIONS

The site inspections were undertaken on December 15th, 2022 and January 10th 2023 at Bellbrae Primary School, School Road, Cemetery Road, and along the Great Ocean Road, between Jan Juc and Bellbrae. Site inspection details are listed in the table below.

Table 2: Site inspection details

Date	Time
Thursday, December 15th, 2022	8:00AM – 10:30AM 3:00PM – 4:30PM
Tuesday, January 10th, 2023	12:00PM – 13:00PM

3. PROJECT CONTEXT AND DESCRIPTION

3.1. EXISTING CONDITIONS & PROJECT BACKGROUND

Bellbrae Primary School is located on School Road, in Bellbrae. School Road is the main point of access to and throughfare through Bellbrae, serving a local access and low collector function in the local context. School Road connects to Great Ocean Road to the south, and Anglesea Road to the north. The broader Bellbrae locality has a general residential land usage within a rural area.

Table 3: Project Context

Prompts	Comments
What is the reason for the project? Is there specific crash type risk? Is it addressing specific issues such as poor speed limit compliance, road access, congestion, future traffic growth, freight movement, amenity concerns from the community, maintenance/asset renewal, etc.	This project seeks to improve parking amenity, VRU safety, and VRU connectivity at Bellbrae Primary School in view of significant growth in the student population.
What is the function of the road? Consider location, roadside land use, area type, speed limit, intersection type, presence of parking, public transport services and vehicle flows. What traffic features exist nearby (e.g. upstream and downstream)? What alternative routes exist?	Bellbrae is located on School Road. School Road is a local access road serving as the main point of thoroughfare through Bellbrae and facilitating movement to/from/at the school. School Road provides access to Anglesea Road to the north and Great Ocean Road to the south.
What is the speed environment? What is the current speed limit? Has it changed recently? Is it similar to other roads of this type? How does it compare to Safe System speeds? What is the acceptability of lowering the speed limit at this location?	The posted speed limit on School Road is 50 km/h, with a 40 km/h speed zone in place during school start and end times. This speed limit is typical for similar road types. Lowering the speed limit below 50km/h outside of school hours would likely not be credible.
What road users are present? Consider the presence of elderly pedestrians, school children and cyclists. Also note what facilities are available to vulnerable road users (e.g. signalised crossings, bicycle lanes, school speed limits, etc.)	A high volume of both vehicles and vulnerable road users are present during school start and end times, including cyclists. There are two flagged school crossings with crossing guards present, located on School Road outside the school entrance, and at the intersection of School Road and Cemetery Road. A pedestrian refugee is also located on School Road just south of Cemetery Road. At the school, a footpath is present on the west side of the road. Beyond the site, a service road runs along the north side of the Great Ocean Road and is used by some cycling students to access the school via Cemetery Road.

What is the vehicle composition? Consider the presence of heavy vehicles (and what type), motorcyclists and other vehicles using the roadway.	The vehicle composition along School Road is mostly passenger vehicles.

3.1.1. MOVEMENT AND PLACE

The Movement and Place (M&P) framework translates transport and land use plans and frameworks/network functions into 'one integrated network view' to guide projects and operational initiatives in a coordinated way.

Segment			Place	Movement	General Traffic	Tram	Bus	Freight	Cycling	Walking	Interchange	Tourist Route	Biodiversity
Road	Start	End											
School Road	Great Ocean Road	Cemetary Road	P4	M5	GT5	N/A	N/A	N/A	N/A	W5	N/A	N/A	BD1
School Road	Cemetary Road	Anglesea Road	P5	M5	GT5	N/A	N/A	N/A	N/A	W5	N/A	N/A	BD1
Cemetary Road	School Road	Great Ocean Road	P5	M5	GT5	N/A	N/A	N/A	N/A	W5	N/A	N/A	BD1
Anglesea Road	Great Ocean Road	School Road	P5	M3	GT3	N/A	N/A	F3	N/A	W3	N/A	N/A	BD1
Great Ocean Road	Strathmore Drive	Anglesea Road	P5	M3	GT3	N/A	N/A	F3	N/A	W3	N/A	N/A	BD1
Strathmore Drive	Seaview Rise	Great Ocean Road	P5	M5	GT5	N/A	N/A	N/A	N/A	W4	N/A	N/A	BD1

Figure 3: Movement and Place classifications

Under the M&P framework School Road is generally classified as M5P5, indicating local movement within a place of local significance. In the vicinity of Bellbrae Reserve near the intersection with Great Ocean Road, School Road has a slightly higher P4 place value. Given the local access function served by School Road and the general residential land usage, School Road overall has low movement functions. Strathmore Drive similarly has a low M5P5 classification, although the road serves a slightly higher W4 walking function compared to W5 on School Road.

Adjacent to School Road, Anglesea Road and Great Ocean Road are both classified as M3P5, indicating moderate movement of people and/or goods within a place of local significance. Given the regional-level connectivity of these two roads, they also have a moderate F3 freight classification. Despite of the increased movement functions of these roads they also have a W3 walking classification, indicating municipal walking links around activity generators such as schools and transport interchanges.

STRATEGIC FOCUS SCORE

The Strategic Focus Score (SFS) is a relative measure of how the network is currently performing against the desired / aspirational state informed by the network classifications. Network performance indicators for each of the M&P themes have been developed and inform the SFS, which is represented by a pie chart. The size of the pie chart reflects the size of the performance gap (the

bigger the pie, the bigger the problem) and the M&P themes and modes can be compared to understand the relativity of the issues.

Figure 4: Strategic Focus Scores

The Strategic Focus Scores indicate road safety as having the largest gap in aspirational performance, with non-intersection type crashes shown as a key issue on approach to the roundabout on both Great Ocean Road and Anglesea Road. There is a known crash history which includes a fatal accident on Anglesea Road approximately 350 meters north of the roundabout, and a serious injury crash on Great Ocean Road approximately 560 meters east of the roundabout. The typically high speeds on these roads in combination with slowing vehicles approaching the roundabout are considered to be a driving factor behind this performance gap.

The 'place' function is also shown as having a minor performance gap in several locations, with accessibility indicated as an issue at the intersection of Strathmore Drive and Great Ocean Road, on School Road, on Cemetery Road, and along the Great Ocean Road between Strathmore Drive and Cemetery Road. Vulnerable road user connectivity is known to be lacking both in the vicinity of Bellbrae Primary School and between Strathmore Drive and the school. This reduced connectivity is considered to be a main contributor to a reduced 'place' function performance at the site.

Following the evaluation of the strategic focus scores, the objectives for potential improvements are defined and shown in the table below.

Table 4: Movement and Place Objectives

Objective Strength	Objective Description
Very Strongly	**Objective 1:** Improve road safety along Great Ocean Road between Strathmore Dr and School Road • Reduce likelihood of rear-end crashes in the vicinity of Anglesea Road/Great Ocean Road roundabout.
Strongly	**Objective 2:** Improve VRU connectivity between Jan Juc and Bellbrae Primary School • Improve VRU accessibility at Strathmore Dr/Great Ocean Road • Improve VRU accessibility along Cemetery Road

3.2. PROPOSED WORKS

The scope of works for the proposed design option is as follows:

Short-term:

- Modification of parking spaces opposite the school to 30-degree parking.
- Install a raised safety platform at the following locations along School Road:
    - south of Cunningham Drive
    - at the bend north of the school.
    - at the existing school crossing outside of the school.
    - between the school and Cemetery Road.
- Install a raised intersection at the intersection of Cemetery Road / School Road, including the existing school crossing south of Cemetery Road, along with connecting footpaths.
- Modify Cemetery Road / Great Ocean Road intersection to reduce vehicles' turning speed.
- Installation of a refuge island at the intersection of Strathmore Drive / Great Ocean Road to facilitate access to off-road shared path.

Long-term:

The following treatments are proposed in addition to the short term options.

- Modification of intersection alignment at School Road / Anglesea Road
- Construct a footpath and a wombat crossing on School Road connecting the roundabout and the supervised crossing at Cemetery Road / School Road intersection.
- Formalise the service road and provide additional 30-degree parking and drop-off /pick-up bays north of the school within this area.
- Provide additional drop-off/pick-up zone on Cemetery Road.
- Provide footpath connecting the drop-off/pick-up zone on Cemetery Road and the school through the cemetery.
- Provide a footpath along the eastern verge of School Road between Cemetery Road and Bellbrae Reserve access.
- Seal and formalise the Bellbrae Reserve access.
- Seal and formalise the intersection of Great Ocean Road / Cemetery Road.
- Installation of a pedestrian operated signal (POS) on the short-term refuge island at the intersection of Strathmore Drive / Great Ocean Road.

The full proposed design can be found in Appendix C.

4. SAFE SYSTEM ASSESSMENT

4.1. ASSESSMENT SUMMARY

The Safe System Assessment Matrix scores for the existing conditions and the proposed design option are shown in Table 5. The scores for each crash type are shown in Figure 5 with detailed assessments presented in Section 4.2.

Table 5: SSA Matrix Scores for the Project

Intersection	Score
Existing Conditions	154 / 448
Proposed Design	121 / 448

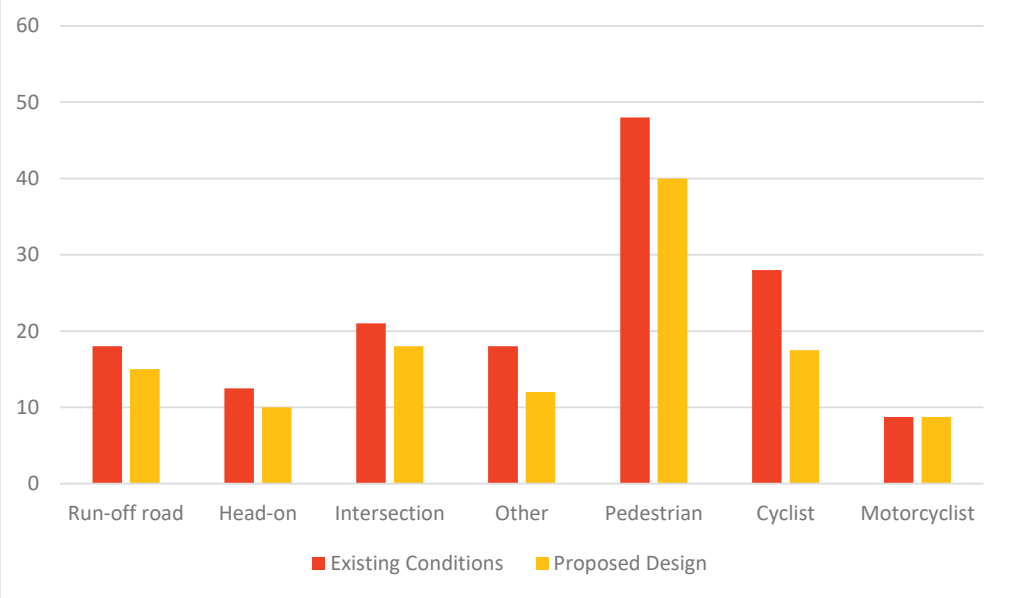

Figure 5: SSA Scores for Crash Types

The proposed design is expected to improve overall road safety within the project scope, with the biggest benefits achieved for parking manoeuvre crashes, and pedestrian-type crashes. Provision of additional parking spaces and drop-off zones is expected to significantly reduce the likelihood of vehicles stopping on the carriageway, which in turn reduces the likelihood of associated crashes such as rear-end and head-on crashes as a result of overtaking a stopped vehicle. Construction of a new footpath between Cemetery Avenue and Bellbrae Primary School is expected to reduce likelihood of pedestrian crashes and increase student connectivity along a known movement corridor for students travelling to/from the Torquay and Jan Juc area.

Cyclist connectivity and safety is also improved through the provision of a bike path and median crossing refuge to facilitate movement across the Great Ocean Road from Strathmore Drive, as well as modification of the roundabout at Great Ocean Road/Anglesea Road to include protected cycling lanes and raised platforms.

4.2. SAFE SYSTEM ASSESSMENT MATRICES

The columns of the Safe System matrix show the crash types that represent the main crash and road user types. Six major crash types are included to help concentrate thinking on crash causes and solutions. Pedestrian, cyclist, and motorcyclist crashes are separated to highlight the special focus on vulnerable road users.

The six major crash types as shown in the matrices are:

1. Run-off road
2. Head-on
3. Intersection
4. Other (parking related)
5. Pedestrian
6. Cyclist
7. Motorcyclist

Table 6: SSA Matrix – Existing Conditions

SSA Matrix for Bellbrae PS - Existing Conditions							
	Run-off road	**Head-on**	**Intersection**	**Other (parking related)**	**Pedestrian**	**Cyclist**	**Motorcyclist**
Exposure Comments:	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	More than 100 pedestrians per day	10 to 50 cyclists per day	Less than 10 motorcyclists per day
Exposure Score:	2 /4	2 /4	2 /4	2 /4	4 /4	2 /4	1 /4
Likelihood Comments:	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**
	- Gravel road shoulders - Sloping geometry results in downhill approach from the south which is conducive to increased speeds -Bend in the road when approaching the school from the north - Over-speeding issue	- Undivided road - Vehicles may overtake other vehicles which are stopped on carriageway for drop-off / pick up or parking on the road shoulder - Over-speeding issue	- Intersection of School Road with Anglesea Road and Great Oean Road are both controlled by 'Stop' signs - Cemetary Road/School Road and Cemetary Road/Great Ocean Road intersections are controlled by 'Give Way' sign - The exit of service road at the north of the school and the entrance of the oval parking are located near the bends where sightline is limited - High speeds on Anglesea Rd and Great Ocean Road - Poor sightlines towards vehicles approaching from the right on Anglesea Rd when exiting School Road to the north, due to a bend in the road	- Reversing vehicles from parking spaces opposite the school access gate have reduced visibility towards approaching vehicles and VRUs - On-street parking on local roads - Drivers known to stop on carriageway for pick-up/drop-off when parking is limited - Drivers focus on looking for parking oppotunities at peak hours hence loss attention to road hazards - Unsupervised behaviours of childrens around the parking areas	- Limited crossing facilities relative to the volume of crossing activity (across School Road and Great Ocean Road) - Poor VRU connectivity in general area leading to unsafe pedestrian movements - 50 km/h posted speed limit - Over-speeding issue	- 50 km/h posted speed limit - On-street parking on School Road - Lack of cycling facilities at the school and cycling connectivity in the broader area - Vehicles reversing out of parking spaces opposite the school - Limited midblock and intersection crossing facilities - Great Ocean Road / Anglesea Road roundabout requires cyclists to cycle in the circulating lane with no separaration	- 50 km/h posted speed limit on School Road - On-street parking
	Factors that decrease the likelihood include:	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**
	- 50 km/h posted speed limit - Pavement color treatment presents on School Road in advance of the access gate for both approaches - Adequate pavement condition	- Good road delineation - Countinuous centre line - 50 km/h posted speed limit	- Roundabout control at Great Ocean Road / Anglesea Rd - Right turn auxiliary lane from Great Ocean Road to School Road	- Mainly attract local traffic who may have some degree of familarity with the road environment - 50 km/h posted speed limit - Low operational speeds during school hours when the most parking activity is occuring	- Footpath present on one side of the road - Flagged school crossings with crossing guard provided in two locations near and at the school (the one on the south of the school is operated at PM only) - 40 km/h school speed zone	- Low operational speeds in the vicinity of Bellbrae PS during school hours - Calm cycling route along Great Ocean Road service road and Cemetery Road however the pavement condition is not ideal.	- Adequate pavement condition
Likelihood Score:	3 /4	2.5 /4	3.5 /4	3 /4	3 /4	3.5 /4	2.5 /4
Severity Comments:	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**
	- Exposed roadside hazards such as trees and poles - Roadside parking - Road side table drains - Lack of road barriers at the bend north of the school	-N/A	- High vehicle speeds on Great Ocean Road and Anglesea Rd - VRU presence in the vicinity have an impact intersection type crashes	- Presence of VRUs	- 50 km/h posted speed limit	- 50 km/h posted speed limit	- Exposed roadside hazards such as trees and poles - Roadside parking - Road side table drains - Lack of road barriers at the bend north of the school - 50 km/h posted speed limit on School Road
	Factors that decrease the severity include:	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**
	- 50 km/h posted speed limit on School Rd	- 50 km/h posted speed limit on School Rd	- 50 km/h posted speed limit on School Rd	- Low operational speeds during school hours when the most parking activity is occuring	- N/A	- N/A	- N/A
Severity Score:	3 /4	2.5 /4	3 /4	3 /4	4 /4	4 /4	3.5 /4
Product (Multiply scores above for each column)	18 /64	12.5 /64	21 /64	18 /64	48 /64	28 /64	8.75 /64
TOTAL (add all scores products in row)	**154 /448**						

Table 7: SSA Matrix – Proposed Design (Short-term)

SSA Matrix for Bellbrae PS - Proposed Design (Short-term and Medium-term)							
	Run-off road	**Head-on**	**Intersection**	**Other (parking related)**	**Pedestrian**	**Cyclist**	**Motorcyclist**
Exposure Comments:	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	Two-way AADT is between 1,000 and 5,000 vpd	More than 100 pedestrians per day	10 to 50 cyclists per day	Less than 10 motorcyclists per day
Exposure Score:	2 /4	2 /4	2 /4	2 /4	4 /4	2 /4	1 /4
Likelihood Comments:	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**	**Factors that increase the likelihood include:**
	- Gravel road shoulders - Sloping geometry results in downhill approach from the south which is conducive to increased speeds -Bend in the road when approaching the school from the north - Over-speeding issue	- Undivided road - Vehicles may overtake other vehicles which are stopped on carriageway for drop-off / pick up or parking on the road shoulder - Over-speeding issue	- Intersection of School Road with Anglesea Road and Great Ocean Road are both controlled by 'Stop' signs - Cemetary Road/School Road and Cemetary Road/Great Ocean Road intersections are controlled by 'Give Way' sign - The exit of service road at the north of the school and the entrance of the oval parking are located near the bends where sightline is limited - High speeds on Anglesea Rd and Great Ocean Road - Poor sightlines towards vehicles approaching from the right on Anglesea Rd when exiting School Road to the north, due to a bend in the road	- Reversing vehicles from parking spaces opposite the school access gate have reduced visbility towards approaching vehicles and VRUs - On-street parking on local roads - Drivers known to stop on carriageway for pick-up/drop-off when parking is limited - Drivers focus on looking for parking oppotunities at peak hours hence loss attention to road hazards - Unsupervised behaviours of childrens around the parking areas	- Limited crossing facilities relative to the volume of crossing activity (across School Road and Great Ocean Road) - Poor VRU connectivity in general area leading to unsafe pedestrian movements - 50 km/h posted speed limit - Over-speeding issue	- 50 km/h posted speed limit - On-street parking on School Road - Lack of cycling facilities at the school and cycling connectivity in the broader area - Vehicles reversing out of parking spaces opposite the school - Limited midblock and intersection crossing facilities - Great Ocean Road / Anglesea Road roundabout requires cyclists to cycle in the circulating lane with no separaration	- 50 km/h posted speed limit on School Road - On-street parking
	Factors that decrease the likelihood include:	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**	**Factors that decrease the likelihood include:**
	- 50 km/h posted speed limit - Pavement color treatment presents on School Road in advance of the access gate for both approaches - Adequate pavement condition - Install speed humps on the road bend north of the school to reduce travel speed	- Good road delineation - Countinuous centre line - 50 km/h posted speed limit - Provision of additional pick-up/drop-off zones will reduce likelihoood of vehicles stopping on carriageway	- Roundabout control at Great Ocean Road / Anglesea Rd - Right turn auxiliary lane from Great Ocean Road to School Road - Kerb outstand at the service road exit north of the school to improve sightline - Install speed humps on the road bend north of the school to reduce travel speed	- Mainly attract local traffic who may have some degree of familarity with the road environment - 50 km/h posted speed limit - Low operational speeds during school hours when the most parking activity is occuring - Modify reversed parking to 30 degree parking to increase sightline - Provision of additional parking spaces will reduce likelihoood of vehicles stopping on carriageway for pick-up/drop off, as well as reduce parking on nearby local roads - Ban on-road parking at the road bend north of the school	- Footpath present on one side of the road - Flagged school crossings with crossing guard provided in two locations near and at the school (the one on the south of the school is operated at PM only) - 40 km/h school speed zone - Footpath present on both sides of the road on School Road between Cemetary Road and Bellbrae PS - POS crossing near Great Ocean Road / Strathmore Drive intersection	- Low operational speeds in the vicinity of Bellbrae PS during school hours - Calm cycling route along Great Ocean Road service road and Cemetery Road however the pavement condition is not ideal. - Reduced number of reverse parking places due to installation of new drop-off zones - POS crossing near Great Ocean Road / Strathmore Drive intersection	- Adequate pavement condition
Likelihood Score:	2.5 /4	2 /4	3 /4	2 /4	2.5 /4	2.5 /4	2.5 /4
Severity Comments:	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**	**Factors that increase the severity include:**
	- Exposed roadside hazards such as trees and poles - Roadside parking - Road side table drains - Lack of road barriers at the bend north of the school	-N/A	- High vehicle speeds on Great Ocean Road and Anglesea Road - VRU presence in the vicinity have an impact intersection type crashes	- Presence of VRUs	- 50 km/h posted speed limit	- 50 km/h posted speed limit	- Exposed roadside hazards such as trees and poles - Roadside parking - Road side table drains - Lack of road barriers at the bend north of the school - 50 km/h posted speed limit on School Road
	Factors that decrease the severity include:	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**	**Factors that decrease the severity include:**
	- 50 km/h posted speed limit on School Road	- 50 km/h posted speed limit on School Road	- 50 km/h posted speed limit on School Road	- Low operational speeds during school hours when the most parking activity is occuring	- N/A	- N/A	- N/A
Severity Score:	3 /4	2.5 /4	3 /4	3 /4	4 /4	3.5 /4	3.5 /4
Product (Multiply scores above for each column)	15 /64	10 /64	18 /64	12 /64	40 /64	17.5 /64	8.75 /64
TOTAL (add all scores products in row)	**121 /448**						

4.3. TREATMENTS TO IMPROVE SAFE SYSTEM ALIGNMENT

Table 8 and Table 9 list treatments that will improve the Safe System alignment of the project.

Primary treatments are those measures that have the potential to eliminate or come close to eliminating the risk of fatal and serious injury (FSI) crashes.

Supporting treatments are effective in reducing the risk of FSI crashes but not to the extent of primary treatment (i.e., there is a residual moderate or significant FSI crash risk). Implementation of a primary treatment should be given priority over a supporting treatment that may be targeting a similar crash risk.

Table 8: Primary Treatments

Treatments for consideration
Provide additional drop-off/pick-up zones north of Bellbrae Primary School and on Cemetery Road
Provide footpath connecting the drop-off/pick-up zone on Cemetery Road and the school through the cemetery
Install pedestrian operated signal crossing across Great Ocean Road at Strathmore Drive / Great Ocean Road intersection

Table 9: Supporting Treatments

Treatments for consideration
Ban on road parking at the bend on School Road and east side of the service road, north of the school
Construct kerb outstands at the exit of the service road, north of the school to improve sightline
Modify the parking opposite the school to 30-degree parking
Provide additional 30-degree parking north of the school
Install speed humps at the bend on School Road, north of the school
Modify Cemetery Road / Great Ocean Road intersection to reduce vehicles' turning speed

Other Safe System treatments

For further safety improvements, in the long-term, the following treatments should be considered:

- Modify Anglesea Road / School Road intersection layout to improve sightline of vehicle on School Road and install side road activated signals.

- Install raised intersection at Cemetery Road / School Road intersection to reduce vehicle speed and raise the awareness of changing road environment
- Construct a footpath and a wombat crossing on School Road connecting the roundabout and the supervised crossing at Cemetery Road / School Road intersection
- Install raised safety platforms on the approaches to the Great Ocean Road / Anglesea Road intersection

CONCLUSIONS

Under this report, a Rapid Safe System Assessment has been conducted.

The result of the assessment shows that the proposed design has a strong alignment with Safe System principles for key crash-types such as pedestrian and cyclist crashes.

The main issue affecting the site is reduced road safety and operability of School Road as a result of significant student population growth, as well as a lack of connectivity and safe infrastructure to facilitate student movements between the Torquay/Jan Juc area and Bellbrae Primary School. The proposed provision of additional parking spaces and drop-off zones, additional crossing infrastructure and footpaths, and installation of raised platforms is expected to increase road operability, reduce vehicle speeds, and increase vulnerable road user amenity.

Adopting some of the recommended treatments will further reduce the potential severity of certain crash types such as parking related crashes or pedestrian crashes.

APPENDICES

APPENDIX A – SITE PHOTOS









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IT'S COOL TO WALK TO SCHOOL


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APPENDIX B – CRASH MAP

APPENDIX C – PRELIMINARY CONCEPT DESIGN

WARNING
BEWARE OF UNDERGROUND SERVICES
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PRELIMINARY PLAN
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DATE OF ISSUE: 21/11/2023

ISSUE	DRAWN	APP'D	DATE	AMENDMENT
A	GD	DM	21/11/23	CLIENT COMMENTS

GENERAL NOTES

1. NEARMAP AERIAL IMAGE UNDER LICENSE AGREEMENT WITH ROAD SOLUTIONS PTY LTD.
2. ALL DIMENSIONS ARE TO FACE OF KERB UNLESS SPECIFIED OTHERWISE.

DESIGN
EXISTING
CADASTRE

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Short Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
1	24743	24743-CTP-01	A

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BELLBRAE

SCALE OF METRES
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Surf Coast Shire

Concept Plan - Short Term

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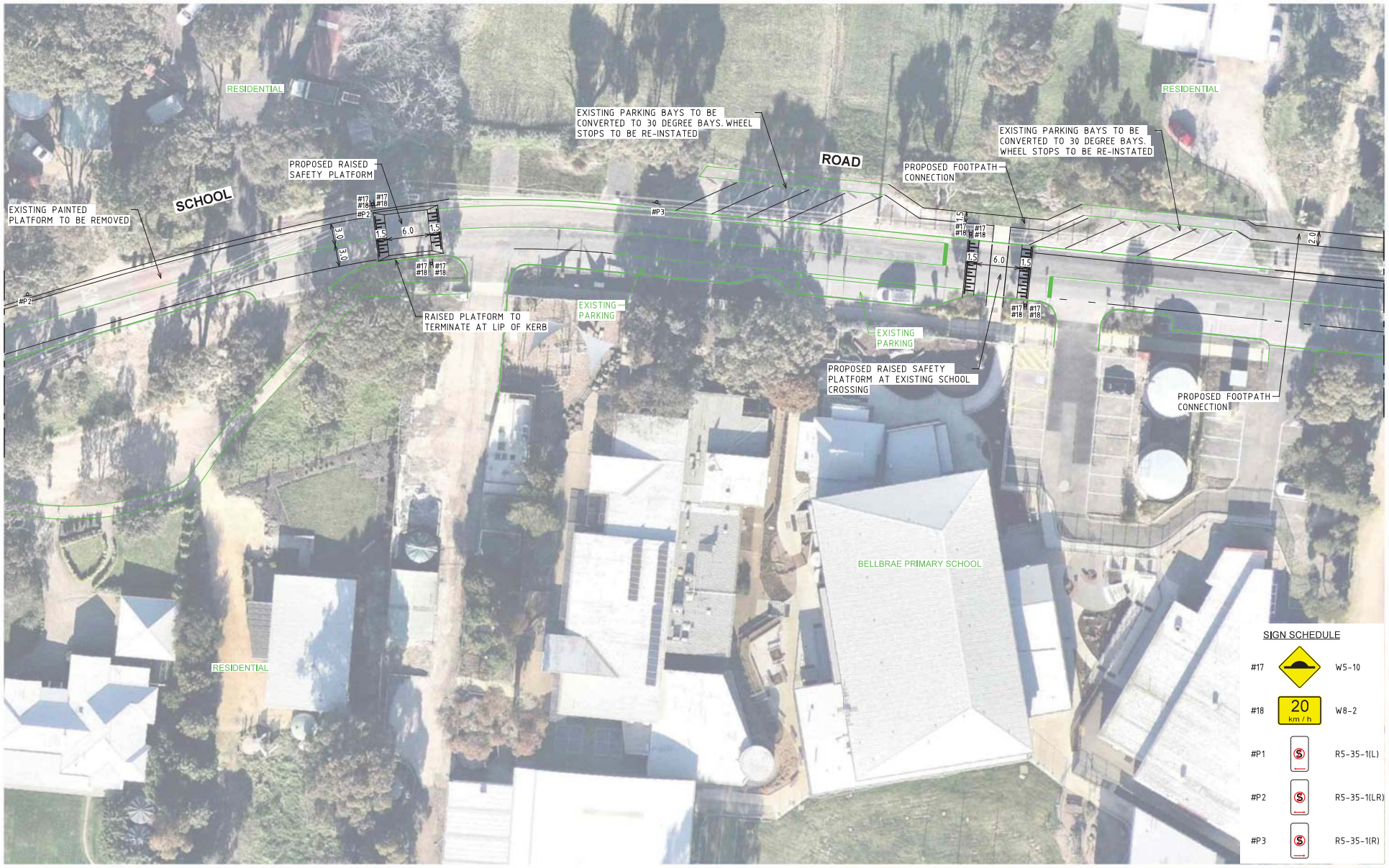

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EXISTING
CADASTRE

ROAD SOLUTIONS

CLIENT: Surf Coast Shire

BELLBRAE

SCALE OF METRES 0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Short Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Short Term

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BELLBRAE

SCALE OF METRES
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Surf Coast Shire

Concept Plan - Short Term

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FOR CONTINUATION REFER TO SHEET 05

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DESIGN
EXISTING
CADASTRE

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

Great Ocean Road / Anglesea Road / School Road

Surf Coast Shire

Concept Plan - Short Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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DESIGN
EXISTING
CADASTRE

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

Great Ocean Road / Cemetary Road

Surf Coast Shire

Concept Plan - Short Term

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ISSUE	DRAWN	APP'D	DATE	AMENDMENT
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GENERAL NOTES

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DESIGN
EXISTING
CADASTRE

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

JAN JUC

SCALE OF METRES
0 5 10

Great Ocean Road / Strathmore Drive

Surf Coast Shire

Concept Plan - Short Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
	24743	24743-CTP-21	C

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DATE OF ISSUE: 05/12/2023

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LONG TERM
EXISTING
CADASTRE
SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT: Surf Coast Shire

BELLBRAE

SCALE OF METRES 0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Long Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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LONG TERM
EXISTING
CADASTRE
SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Long Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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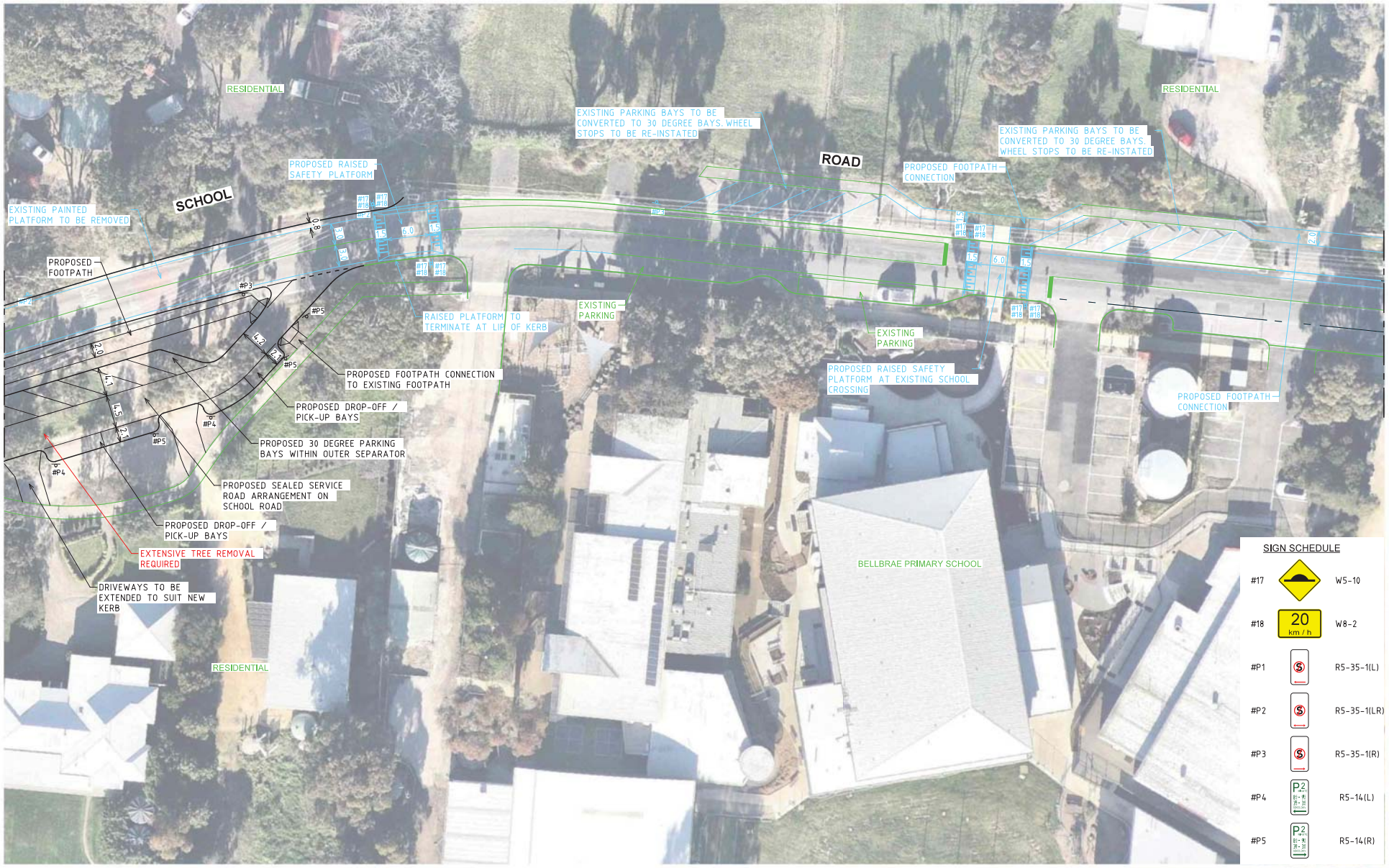

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LONG TERM
EXISTING
CADASTRE
SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE
SCALE OF METRES 0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Long Term

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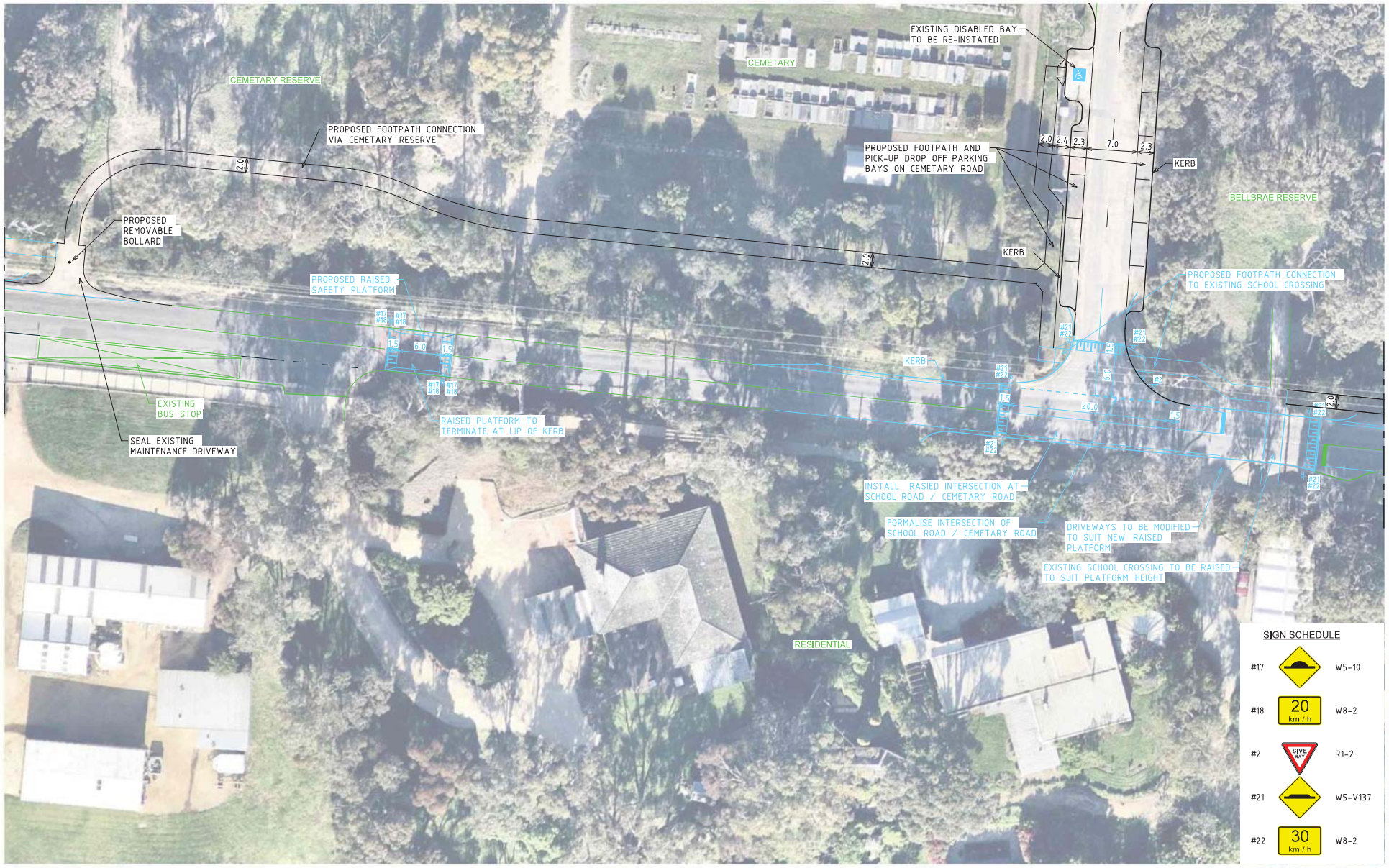

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LONG TERM
EXISTING
CADASTRE
SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE
SCALE OF METRES 0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Long Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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LONG TERM
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CADASTRE
SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE
SCALE OF METRES 0 5 10

School Road between Anglesea Road and Great Ocean Road

Surf Coast Shire

Concept Plan - Long Term

SHEET NO.	CONTRACT NO.	DRAWING NO.	ISSUE
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SHORT TERM TREATMENTS

ROAD SOLUTIONS

CLIENT
Surf COAST SHIRE

BELLBRAE

SCALE OF METRES
0 5 10

Great Ocean Road / Anglesea Road / School Road

Surf Coast Shire

Concept Plan - Long Term

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BELLBRAE

SCALE OF METRES
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JAN JUC

SCALE OF METRES
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Great Ocean Road / Strathmore Drive
Surf Coast Shire
Concept Plan - Long Term

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ROAD SOLUTIONS

E: info@roadsolutions.com.au

M: +61 431 202 164