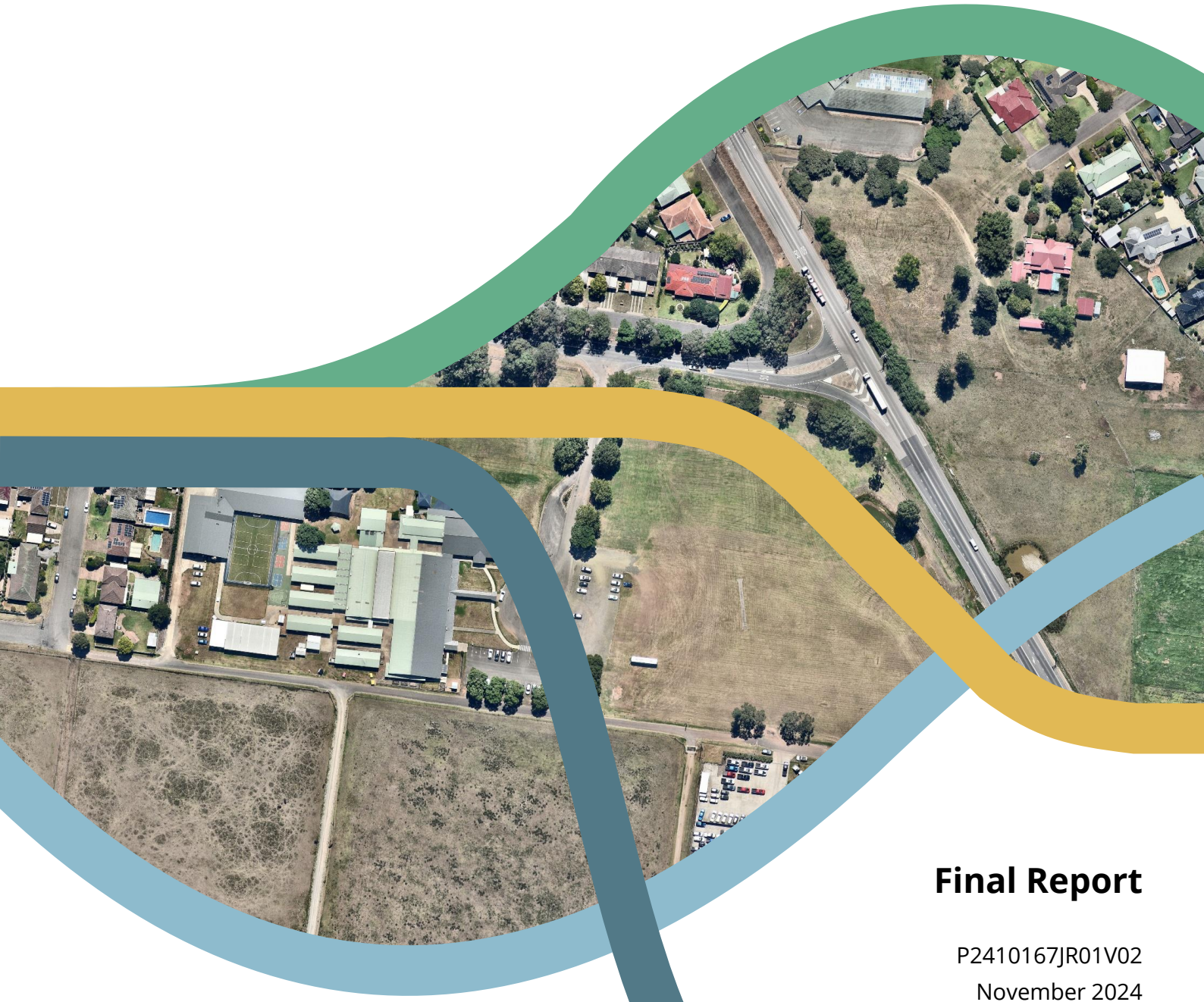
Flood Assessment and Flood Emergency Response Plan

109 – 129 Kelso Street, Singleton, NSW



Final Report

P2410167JR01V02

November 2024

Prepared For Australian Christian College Singleton

environmental science & engineering

Project Details

Report Title	Flood Assessment and Flood Emergency Response Plan: 109 – 129 Kelso Street, Singleton, NSW
Client	Australian Christian College Singleton
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1	27/05/2024	Final	Development Application	PD	AA / DD	JF
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Executive Summary

Martens & Associates Pty Ltd (MA) have prepared this flood assessment and flood emergency response plan (FERP) to support a development application (DA) for the proposed Stage 1 redevelopment works at 109 – 129 Kelso Street, Singleton (the site).

A flood study was previously prepared by BMT (2023). Review of the BMT (2023) flood modelling results found that:

1. The site is subject to both mainstream flooding from the Hunter River and local overland flooding.

2. In both the mainstream flooding and local overflooding events, flood behaviour is characterised by slow moving floodwaters, with typical velocities of less than 1.0 m/s during the 1% AEP event.

3. Mainstream flooding from the Hunter River dictates the site peak flood levels, as well as the minimum finished floor levels for the proposed works. The predicted flood levels from the mainstream flood modelling from BMT (2023) are summarised in Table 1.

Table 1: Mainstream peak flood levels.

Facility ID	Description	FFL (mAHD)	Peak Flood Level (mAHD)			
			2% AEP	1% AEP	0.5% AEP	PMF
A	New Classroom Building	40.46	39.21	39.78	40.39	42.91
B	Proposed Carpark (57 Car-spaces)	38.98	39.03	39.80	40.40	42.91
C	Proposed Carpark (25 Car-spaces)	39.50	NF	40.09	40.73	43.19

This site specific FERP has been prepared to ensure that the site can operate safely in the floodplain environment. Whilst the proposed classroom building is located above the flood planning level, the proposed carparks experience variable levels of flooding. To assist in managing the risk on site, a range of straightforward mitigation measures can be implemented to reduce the flood risks at the site to acceptable levels. In summary:

1. Warning procedures prior to the flood occurring will significantly reduce the likelihood of persons on site being exposed to a major flood event.

2. In the unlikely scenario that persons are onsite during an unanticipated major flood event, risk to persons on site is managed through an evacuation strategy

with a minimum of 16 hour warning time available during major flood events greater than the 1% AEP event.

3. The proposed backup flood warning device ensures that effective warning time and reliable flood-safe egress can occur in the unlikely event that there are no other prior emergency services flood warnings.

4. With the implementation of the FERP procedures the risk to life is reduced to acceptable levels.

5. There is no FERP in place for the existing school population. This FERP therefore reduces the risk to the existing and proposed school population.

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Glossary of Terms

ACCS	Australian Christian College Singleton
AEP	Annual exceedance probability: the probability of a flood event occurring within a year. A 1% AEP flood has a 1% chance of occurring in any given year.
ARI	Average recurrence interval: the average time between flood events occurring. A 1 in 100 year ARI flood occurs on average once every 100 years.
ARR	Australian Rainfall & Runoff
BoM	Bureau of Meteorology
Council	Singleton Council (SC)
DA	Development Application
FERP	Flood emergency response plan
FFL	Finished floor level
FLI	Flood level indicator
MA	Martens & Associates Pty Ltd
PMF	Probable maximum flood: the most extreme flood event possible for a certain location, with an approximate ARI of 100,000 to 10,000,000 years.

1 Introduction

1.1 Overview

Martens & Associates Pty Ltd (MA) have prepared this flood assessment and flood emergency response plan (FERP) to support a development application (DA) for proposed redevelopment works at Australian Christian College Singleton (ACCS) located at 109-129 Kelso Street, Singleton, NSW (the site). Refer to Attachment A for site survey and Attachment B for proposed site layout.

This report should be read in conjunction with the site specific flood assessment report *Australian Christian College Singleton Redevelopment – Stage 1, Flood Impact Assessment* prepared by BMT (October 2023, REF: R.A11097.003.00_ACCS_FIA), hereafter referred to as 'BMT (2023) flood assessment'). The modelling has been utilised for the analysis which forms the basis of the discussions and findings in this report.

It should be noted that the existing school has been operating since circa 1988 and has not had a FERP in place. The FERP prepared to support this DA includes procedures which are also applicable to the existing school, and therefore this FERP reduces the risk to the existing and proposed school population.

1.2 Project Scope and Objectives

Project scope and objectives are:

1. Summarise local flood characteristics from the BMT (2023) flood assessment report.
2. Prepare a flood emergency response plan (FERP) for ACCS.
3. Recommend controls to improve safety in case of site flooding.

1.3 Relevant Guidelines

This report has been prepared in accordance with the following guidelines and policies:

1. Commonwealth of Australia (2019), *Australian Rainfall and Runoff – A Guide to Flood Estimation.*
2. NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*.
3. Singleton Council (2013), *Singleton Local Environmental Plan (LEP).*
4. Singleton Council (2014), *Singleton Development Control Plan (DCP).*
5. State Emergency Services (2018), *Singleton Flood Emergency Sub Plan.*

Furthermore, the site has been assessed against the recommendations within the Singleton Floodplain Risk Management Study and Plan (BMT, 2022).

2 Site Description and Background Data

2.1 Location and Site Description

Existing site description summary is provided in Table 2.

Table 2: Existing site description summary.

Item	Description
Address	109 – 129 Kelso Street, Singleton, NSW
Lot / DP	Lot 4 in DP1119857
Site Area	Approximately 5.6 ha
Local Government Area (LGA)	Singleton Council (SC)
Current Land Use	School
Current Zoning	RU1 – Primary Production
Site Description	The site is primarily grassed at lower elevations with trees around the site boundary. There are several structures on the site including the existing ACCS structures and a carpark.
Surrounding Land Uses	Primary production / agricultural to the south, with predominantly general residential to the north.
Site Elevation	Approximately 40 mAHD near the existing structures on site, falling to 38.40 mAHD near the existing dam in the eastern portion of the site. Elevations extracted from site survey data provided by RAP surveying, refer to Attachment A.
Site Grading & Aspect	Approximately 0.5 – 0.1%, ENE aspect
Site Drainage	The site generally drains towards the east, with site flows coalescing into the existing dam on the eastern end of the site. These flows spill into a channel to the south of the dam, travelling under the New England Highway towards the east.

2.2 Catchment Description

We note the following regarding the catchment upstream of the site:

- The site is located within the Hunter River catchment.
- The mainstream catchment is primarily agricultural and rural land with significant portions of bushland, including several national parks. These include Coolah Tops National Park, Wollemi National Park, and Goulburn River National Park.

- The Hunter River catchment totals approximately 21,460 km2 with an approximate catchment of 16,400 km2 at Singleton.

2.3 Site Flood Mechanisms

Based on the BMT (2023) flood assessment the site can be affected by the following flood mechanisms:

- Overland flows from the site itself and the local upstream catchment (refer Section 2.2).
- Flood overbank flows from Hunter River.
- High tailwater conditions in Hunter River causing upstream flows to back up onto the site.

2.4 Previous Flood Studies

A review of previous flood investigations was undertaken to assess likely local flood behaviour and characteristics for the site and the Hunter River catchment. Review identified several previous flood studies which would be relevant to this assessment.

2.4.1 BMT WBM (2007) Singleton Flood Study

BMT WBM conducted a flood assessment for this catchment on behalf of SC and summarised the assessment in the report *Singleton Flood Study* (2007), hereafter referred to as the BMT WBM (2007) flood study. As part of their study, BMT WBM used TUFLOW for hydraulic modelling.

2.4.2 Patterson Consultants (2012) Singleton Flood Risk Management Study

Patterson Consultants conducted a flood assessment for the Hunter River catchment on behalf of SC and summarised the assessment in the report *Singleton Flood Risk Management Study (FRMS)* (2007), hereafter referred to as the Patterson (2012) flood study. The report provides further detail on flood management in the study area, as well as additional mapping on hazard levels as well as hazard categories.

2.4.3 BMT WBM (2022) Draft Singleton Floodplain Risk Management Study

BMT conducted a further flood assessment for the Hunter River catchment on behalf of SC and summarised the assessment in the report *Draft Singleton Floodplain Risk Management* (2022), hereafter referred to as the draft BMT (2022) flood study.

The report provided flood heights, depths, velocities and hazards for the mainstream Hunter River flood event. As this report is in draft, these details were generally used to inform of the flood behaviour of the floodplain in general, rather than for site specific flood details.

2.4.4 BMT WBM (2023) Australian Christian College Singleton Redevelopment – Stage 1, Flood Impact Assessment

BMT further conducted a site specific flood assessment for Australian Christian College Singleton (ACCS) and summarised the assessment in the report *Australian Christian College Singleton Redevelopment – Stage 1, Flood Impact Assessment* (2023), hereafter referred to as the draft BMT (2023) flood study.

The report provided flood heights, depths, velocities and hazards for the local overland and mainstream Hunter River flood event. These findings have informed the inputs and outcomes of this report.

2.5 Proposed Development

Architectural drawings prepared by Christian Education Ministries (Attachment B) indicate that the proposed development will include:

- Demolition of the existing building, carpark and road, and some trees on site.
- Construction of new 2 storey primary building.
- New carpark with entrance from Kelso Place (approx. 57 spaces in Stage 1, with a further 48 spaces in Stage 2).
- New carpark with entrance from Waddells Lane (approx. 25 spaces).

3 Site Flood Characteristics

3.1 Overview

Based on BMT (2007) flood study, Patterson (2012) Flood Risk Management Study and BMT (2023) flood assessment, we provide the following summary of flood characteristics which have been relied upon to prepare this FERP. We note:

1. The site is affected by overland flows from the local upstream catchments, as well as from overbank flows from the Hunter River. Consequently, the site may be affected by short duration flooding in the local event, and experience long durations of flooding in mainstream flood events from the Hunter River. The Hunter River catchment upstream of the site is approximately 16,400 km^2.

2. The BMT WBM (2023) flood results show the site is affected by the 1% AEP flood event and PMF events, for both the local flooding and mainstream flood events. Site flood affectation is dominated by the local flooding event in events more frequent than the 1% AEP flood, and by mainstream flooding event in events equal to rarer than the 1% AEP flood event.

3. The peak 1% AEP flood levels on site range from 40.26-39.56 mAHD from west to east on the southern boundary.

4. The peak PMF levels on site range from 43.30-42.92 mAHD from west to east on the southern boundary, with flood levels generally ranging from 43.30-42.92 mAHD over existing buildings on site.

5. Existing ground floor levels range between 39.99-40.51 mAHD (Attachment A). In the 1% AEP event the majority existing floors will not be inundated by flood waters (excepting the classroom adjacent to the western boundary), and in the PMF event there would be up to 2.65-3.12 m of flood water depth, which would likely be classified high hazard.

6. The BMT (2023) flood model and report show that offsite flood impacts are less than 20 mm in 1% AEP local flood event as well as the 1% AEP mainstream flood event.

3.2 Water Level Gauges

The site lies within the vicinity of the Singleton water level gauge, operated by WaterNSW. These gauges are used to monitor water levels, and aid in flood forecasting and emergency response planning.

The location of the Singleton gauge (AWRC 210001) is shown in Figure 1, with the live data available at the following address:

https://realtimedata.waternsw.com.au/water.stm?ppbm=210001&rs&1&rslf_org

The Singleton gauge serves as the primary reference for flood warnings and forecasts for the Singleton area, based on specific gauge height values for flood level classifications. The flood water level and warning timing from this gauge have been relied upon in the assessment for evacuation and emergency response of the site.

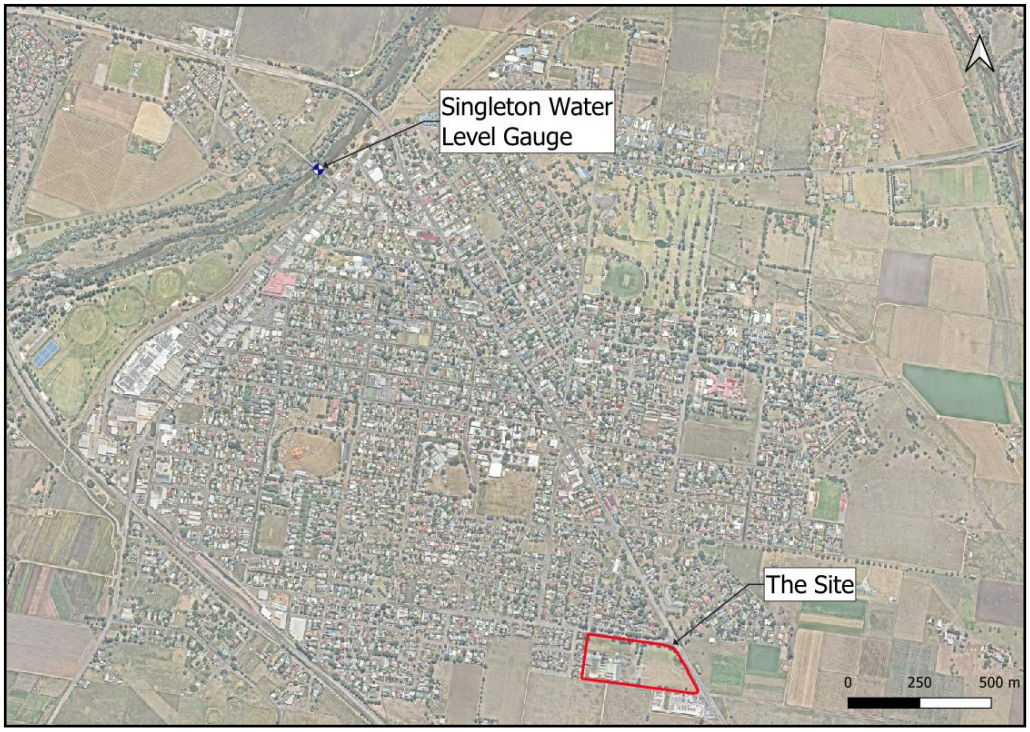

Figure 1: Location of Singleton gauge (AWRC 210001) (background aerial from Nearmap, 2024).

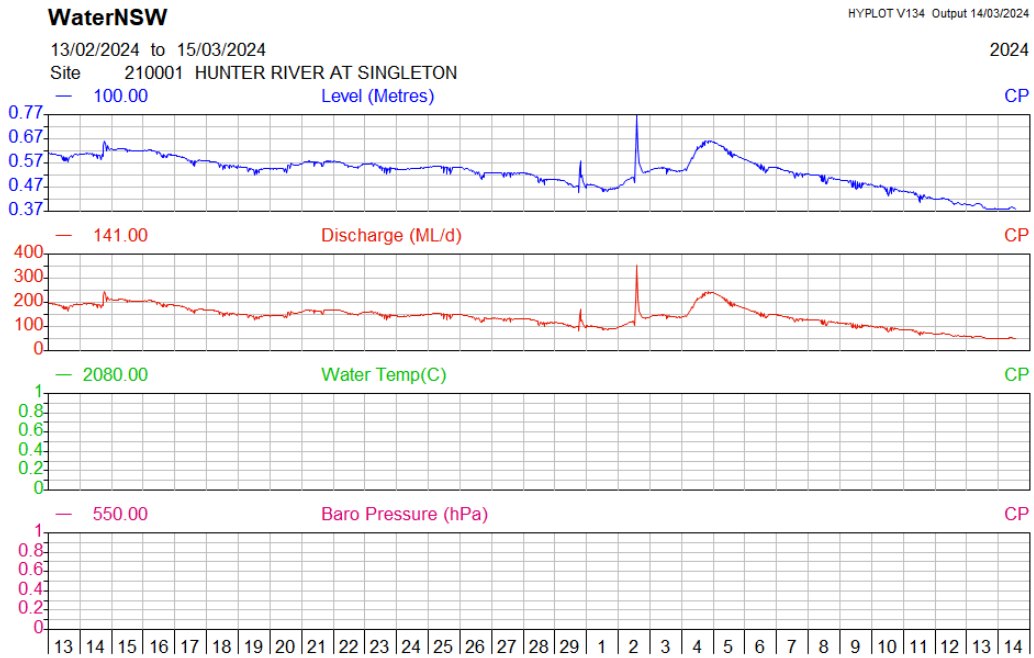

Figure 2: WaterNSW Data Plots at Singleton gauge (AWRC 210001)

3.3 Evacuation Cut Off Water Levels Relative to Singleton Gauge

Review of the BMT WBM (2007) flood study hydraulic model results indicate that flood levels at the evacuation cut off routes are lower than experienced at the Singleton gauge. The location of these key water level locations is shown in Figure 3.

There are two primary evacuation routes for the Singleton sector, the New England Highway Route, and the Queen Street Route. Due to the distance from the Singleton gauge, the site, and the Queen Street evacuation route cut off location (refer to Section 4.3.2.2) there are several metres difference in water level. This is most likely because of the Singleton Levee reducing the water levels of the downstream properties, particularly in the more frequent events. This also shows that flood levels on site are lower than that of the Hunter River, and therefore the controlling factor is evacuation route cut off, rather than site inundation.

Accordingly, the Singleton gauge is best used to inform the potential New England Highway cut off times (refer to Section 4.3.2.1). Based on the below, the water level difference is approximately 0.23 m in the 1% AEP flood event, and 0.11 m in the PMF event.

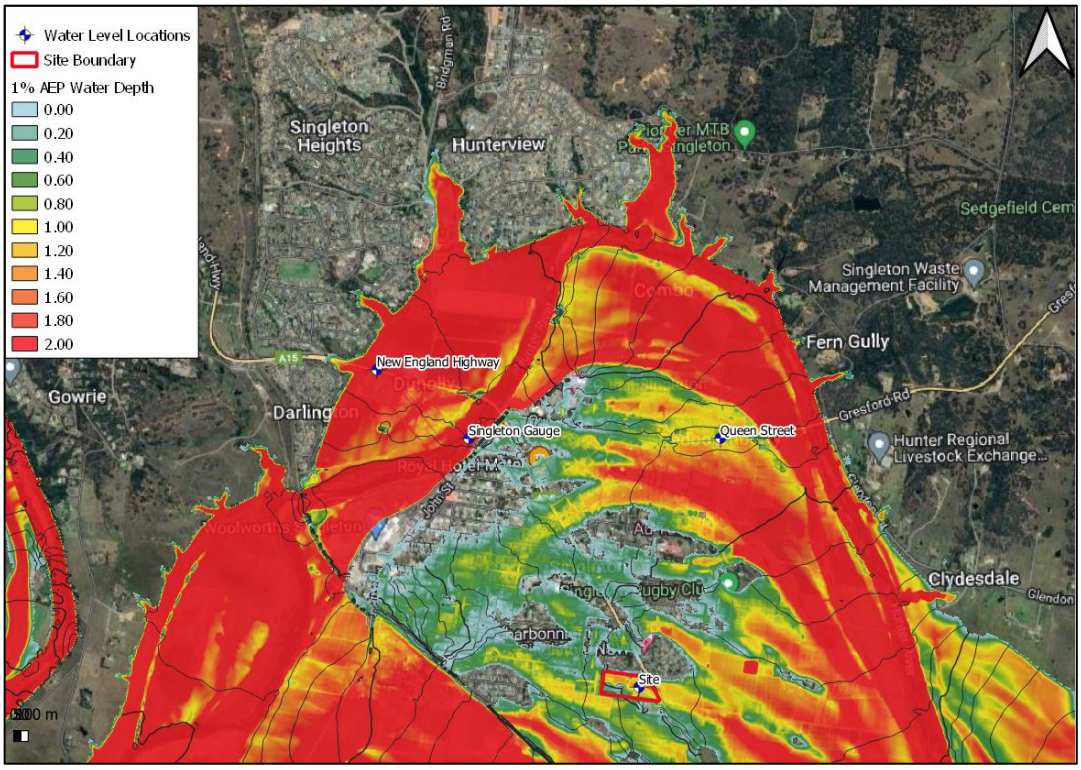

Figure 3: Key Water Level Locations

Table 3: Comparison of water levels between key locations

Event	Singleton Gauge (mAHD)	Site (mAHD)	New England Highway cut off Location (mAHD)	Queen Street cut off Location (mAHD)
1% (100 year)	42.49	39.79	42.26	40.21
PMF	44.01	43.04	43.9	43.06

4 Flood Emergency Response Plan – Background Details

4.1 Overview

This FERP makes recommendations to ensure that in the event of a flood at the site, risk to personal safety and the environment is appropriately managed. The plan provides strategic level advice and assumes that detailed design of various site controls will be undertaken prior to issue of construction certificate and implemented as part of the site's construction and ongoing operation.

It is expected that as these events will be widely anticipated several days ahead of time, that the site will simply remain closed for the duration of potential flooding. Should large flood events occur at the site while occupants are present, floodwater could potentially become hazardous across a large portion of the site. Therefore, the emergency response for the site is evacuation of people and vehicles from the premises prior to a flood occurring.

This section of the report includes the background details used to inform the FERP. The operational FERP is provided at Appendix D as a standalone document for use by site management. Refer to the operational FERP for details of:

- Flood warning mechanisms
- Roles and responsibilities
- Evacuation details
- Flood awareness training
- Communication protocols
- Flood actions checklist
- Flood response phases and triggers
- Emergency contacts
- Department of Education emergency response exercise observer checklist template
- Department of Education emergency response exercise debrief and report template

4.2 Flood Engineering Control Features

The following features of the proposed site design reduce the risk of site occupants coming in contact with flood waters:

1. The proposed new classroom building ground floor finished floor level (FFL) is at 40.46 mAHD which is 0.68 m above the peak 1% AEP flood level at the development.
2. The proposed development first floor FFL is at 44.06 mAHD which is 1.15 m above the peak PMF level, hence the upper floor level is not affected by flood events up to and including the PMF.
3. There will be a public address system within the building and carpark to allow warnings and advice to be issued to site occupants.
4. Flood warning signage will be installed along the northern and western grassed areas to notify visitors and occupants not to enter flood water if present on the way to or from the site.
5. Signage within the building will notify occupants not to leave the building if flood waters are present on the site.

4.3 Evacuation Details

4.3.1 Evacuation Capability Assessment

The NSW SES (2018) *Singleton Flood Emergency Sub Plan* (hereafter referred to as the SES Plan) includes details of flood emergency procedures for the Singleton area. The SES Plan categorises the floodplain into 8 'boxes' each with specific evacuation procedures. The site is located within Box 2 (Sub-sector Bravo).

The SES Plan identifies six time-based factors for a flood evacuation timeline:

- Mobilisation Time
- Warning Time
- Travel Time
- Warning Acceptance Factor
- Warning Lag Factor
- Traffic Safety Factor

The SES Plan states that 'a reasonable timeframe to evacuate the Singleton Township is around 10 hours', which we understand represents the total time required to evacuate the entire sector following consideration of the above six factors.

The Singleton flood gauge ID 210001 (https://realtimedata.waternsw.com.au/water.stm?-ppbm=210001&rs&1&rslf_org) provides 6 hours' notice prior to a minor flood warning (BoM (2024) Service Level Specification for Flood Forecasting and Warning Services). The SES Plan states that it takes an additional 9.75-18.5 hours for flood levels to rise from the minor flood level to cut off the Queen Street evacuation route (refer to Section 4.3.2.2) from the Singleton area. In total it is expected that there would be approximately 16-24 hours' notice to evacuate the Singleton township.

As the available warning time (16-24 hours) exceeds the time required to evacuate (10 hours), there is sufficient time to fully evacuate the Singleton area prior to evacuation route cutoff.

The proposed development increases the school population from 378 to 536 (including staff and students). Based on a conservative assumption of one additional vehicle per staff member / student, and a travel rate of 600 vehicles per hour (Molino et al, 2013), the time to evacuate the additional school population would be approximately 16 minutes. This would increase the total time required to evacuate to 10.25 hours, however this is still lower than the available warning time (16-24 hours), hence there is sufficient time to fully evacuate the Singleton area prior to evacuation route cutoff, even with the additional proposed development traffic.

In Stage 3 of the proposal, it is expected that the total population will increase to total of 700 students and 88 staff. This represents an increase of 410 people, which would increase the total evacuation time to approximately 10.7 hours. As this still lies below the available warning time, the Stage 3 development would have enough time to fully evacuate the Singleton area.

4.3.2 Evacuation Route

4.3.2.1 New England Highway Route

This flood assessment and the Singleton Local Flood Plan (2018) demonstrates that White Avenue (approximately 4 km from the site) is located outside the PMF extents. This evacuation route is expected to be cut off in the 1 in 10-20 year ARI events. The route is expected to be trafficable until the Singleton gauge reads 12.30 m (water levels read 39.93 mAHD). The evacuation route from the site is as follows:

- Exit east from any of the carpark exits onsite, onto New England Highway.
- Travel northwest on New England Highway.
- Continue northwest onto Maitland Road.
- Continue northwest onto George Street.
- Continue northwest onto New England Highway.
- Turn north onto White Avenue.

The evacuation route comprises a total distance of approximately 4 km. The evacuation route is shown in Figure 4 and can be accessed by vehicle in approximately 10 minutes.

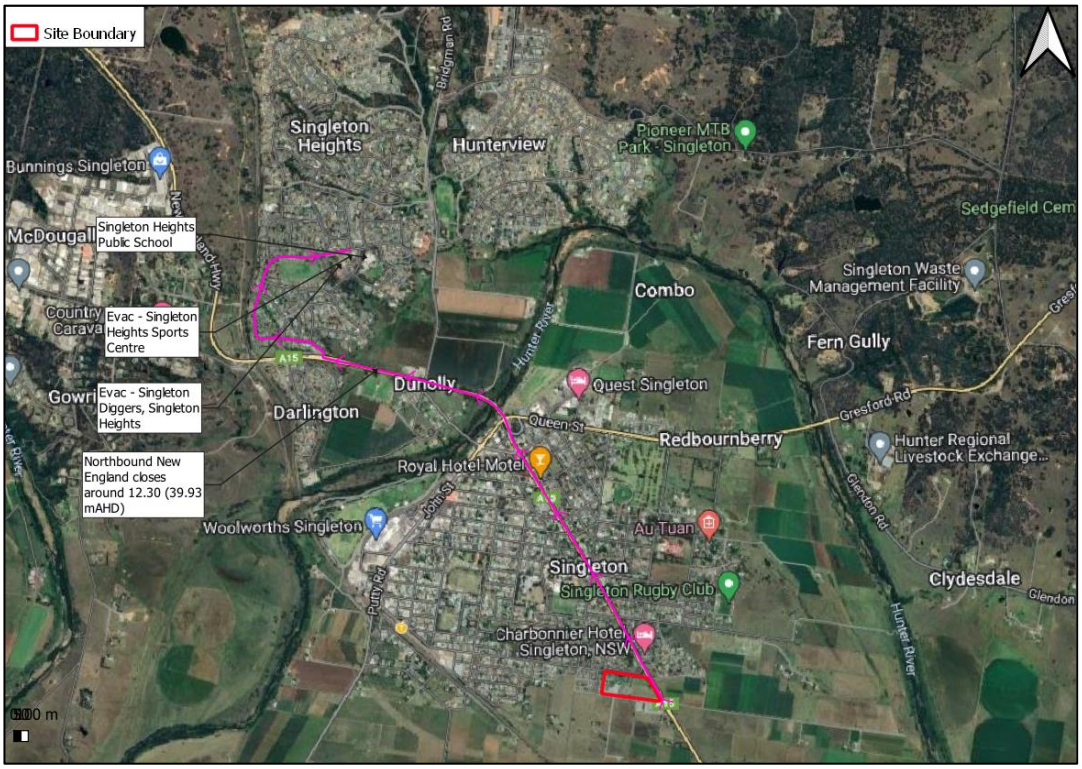

Figure 4: Adopted evacuation route (background aerial from Google Satellite, 2024).

4.3.2.2 Queen Street Route

In the event that the New England Highway route is cut off (i.e. the Singleton gauge reads 12.30 m or higher), the alternative evacuation route is via Queen Street. This evacuation route is approximately 13 km long, and is the last available evacuation route for the sector, cutting off in the 1 in 50 year ARI event. The evacuation route from the site is as follows:

- Exit east from any of the carpark exits onsite, onto New England Highway.
- Travel northwest on New England Highway.
- Continue northwest onto Maitland Road.
- Continue northwest onto George Street.
- Continue northwest onto New England Highway.
- Turn east onto Queen Street.
- Continue east onto Gresford Road.

- Travel north onto Dyring Road.
- Turn West onto Pioneer Road.
- Turn south onto Bridgman Road.
- Turn west onto Blaxland Avenue.

The evacuation route comprises a total distance of approximately 13 km. The evacuation route is shown in Figure 5 and can be accessed by vehicle in approximately 25 minutes depending on traffic conditions. This provides egress from the area in flood events up to the 1 in 50 year ARI event.

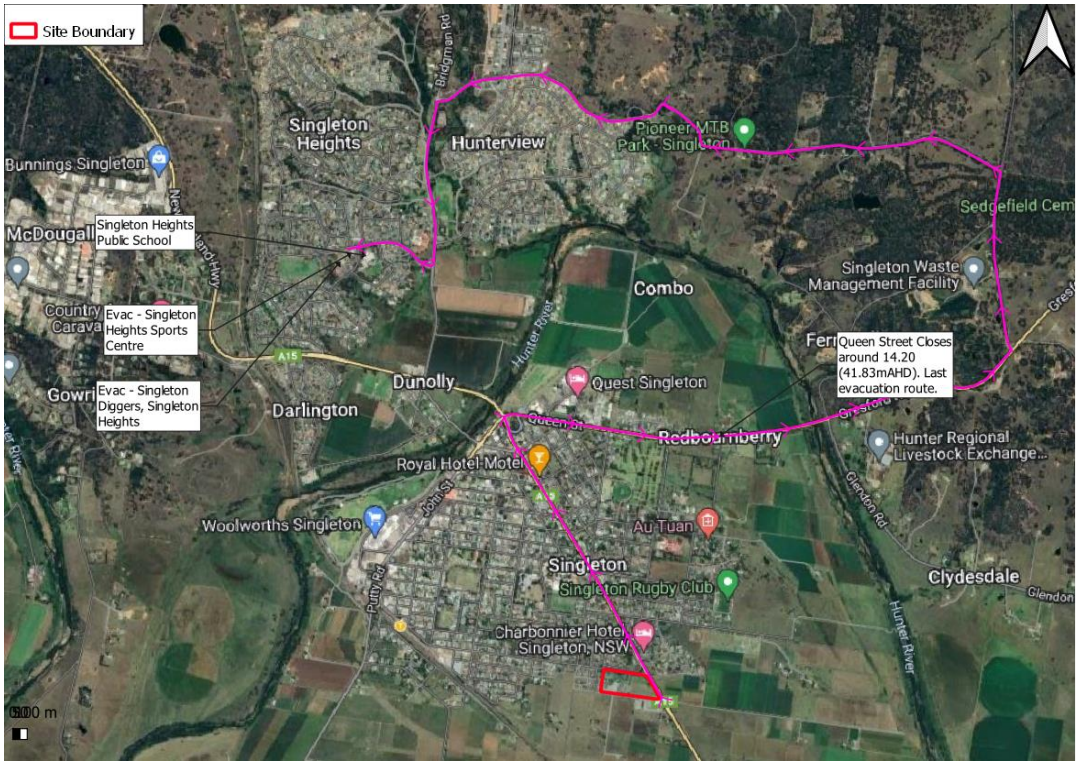

Figure 5: Alternative evacuation route (background aerial from Google Satellite, 2024).

4.3.3 Shelter Locations

Shelter should be taken where possible, such as family members within the area living outside the PMF flood extents. Additionally, from White Avenue there are multiple evacuation centres detailed in the Singleton Flood Emergency Sub Plan and are listed below:

- Singleton Diggers/Club Dorsman, 8 Dorsman Dr, Singleton Heights.
- Singleton Heights Sports Centre, 105 Blaxland Ave, Singleton Heights.
- Singleton Heights Public School, 1-13 Dorsman Dr, Singleton Heights.

4.4 Flood Signage Details

Flood Level Indicators (FLI's) and flood warning signage should be installed on the site and maintained by site management. These should be:

1. Provided at a level that warns residents to avoid entering flood waters.
2. Maintained in perpetuity by the lot owner.
3. Prevented from being removed by way of a restriction on title.
4. At the locations shown in Figure 6 denoting the high flood depths in the grassed areas.

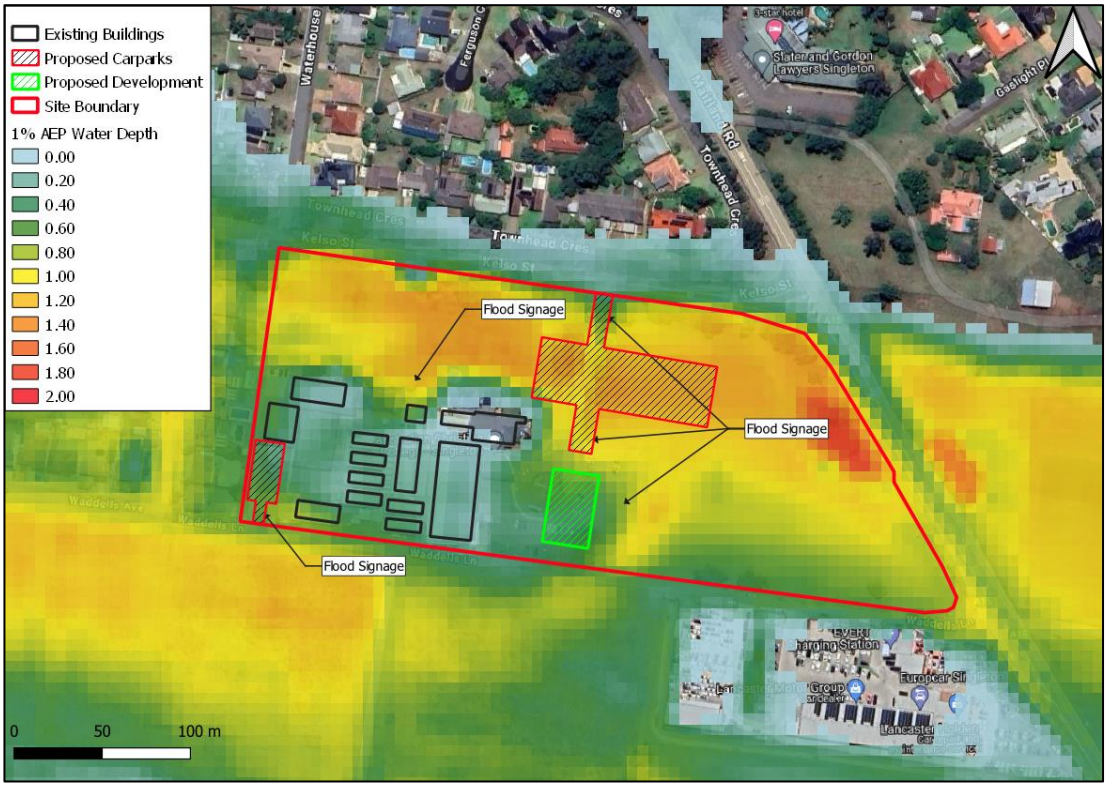

Figure 6: Proposed signage locations (background map shows the 1% AEP flood depths from the Draft BMT Study (2022).

5 LEP Flooding Compliance Assessment

An assessment against the provisions of clauses 5.21(2) - (3) of the Singleton LEP 2013 is provided in Table 4, demonstrating that applicable flood planning provisions are achieved.

Table 4: Compliance with Singleton LEP (2013) flooding controls (clauses 5.21(2)-(3)).

Singleton LEP Requirement	Compliance Assessment
(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—	
(a) is compatible with the flood function and behaviour on the land, and	(1) Refer to the BMT (2023) flood study. The report concludes that the proposed new suspended building will be above the 1% AEP flood extents with 500 mm freeboard. Offsite afflux is expected to remain under 20 mm for the 1% AEP flood event, which is considered negligible, and therefore will not increase the risk to people or property. The proposed development is therefore compatible with the Site flood function and behaviour.
(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and	(2) Refer to the BMT (2023) flood study. The modelling results show that in the 1% AEP event the proposed development does not materially alter the local flood characteristics. Overall, the proposed flooding conditions are largely unchanged from the existing condition and the flood impacts of the development are considered acceptable.
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and	(3) Refer to Section 4.3. The SES Timeline Evacuation Model (TEM) shows that the proposed evacuation route has capacity for the existing and proposed local traffic.
(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	(4) As discussed at (3) and in Section 4.
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.	(5) As discussed in (1) and (2), there are no significant offsite flood impacts, hence the proposed development will not adversely affect the environment or cause increased risk of erosion, siltation destruction of riparian vegetation or bank stability issues.

Singleton LEP Requirement	Compliance Assessment
(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—	
(a) the impact of the development on projected changes to flood behaviour as a result of climate change,	(6) Refer to the BMT (2023) flood study. In lieu of the climate change event, the 0.5% AEP flood was used to infer the climate change impacts. BMT determined that offsite afflux of up to 50 mm was observed, noting that these impacts were not deemed to be significant give the relatively low probability of these rare flood events.
(b) the intended design and scale of buildings resulting from the development,	(7) Refer to the BMT (2023) flood study. The proposed buildings are flood free in 1% AEP event and do not cause any significant offsite impacts, hence the design and scale of the buildings are considered acceptable.
(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,	(8) As discussed at (3) and in Section 4.
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	(9) The proposed development has been sited and iterated to ensure compatibility with the existing site flood characteristics. Since the proposed development does not cause material offsite impacts or increase risk to life, there will be no need to modify or relocate the proposed buildings.

6 Summary and Recommendations

This site specific FERP has been prepared to ensure that the site can operate safely in the floodplain environment. Whilst the buildings are not directly affected by flooding, part of the site is inundated and likely experiences high flood hazards during the PMF event. In summary:

1. Subscription to several warning systems will significantly reduce the likelihood of persons on site during a major flood event.

2. If persons are onsite during a flood, various real time warning mechanisms can be reviewed to determine if it is safe to evacuate.

3. In the unlikely scenario that persons are onsite during an unanticipated major flood event, risk to persons on site is managed through an evacuation strategy with a minimum of 16 hour warning time is available during major flood events greater than the 1% AEP event.

4. With the implementation of the FERP procedures, the risk to life is reduced to acceptable levels.

5. There is no FERP in place for the existing school population. This FERP therefore reduces the risk to the existing and proposed school population.

7 References

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8 Attachment A: Site Survey

IMPORTANT NOTES:-
1. CONTOUR INTERVAL IS 0.2 METRES.

2. REDUCED LEVELS BASED ON AUSTRALIAN HEIGHT DATUM [AHD]. ORIGIN OF REDUCED LEVELS IS PM 147713 AND VERIFIED TO SSM 165258

3. TITLE BOUNDARIES HAVE BEEN DERIVED FROM LIMITED BOUNDARY INVESTIGATION AND COMPILATION FROM PLANS ON PUBLIC RECORD. FOR ANY CONSTRUCTION ON OR NEAR THE TITLE BOUNDARIES, A MORE THOROUGH INVETSIGATION MUST BE UNDERTAKEN

4. CO-ORDINATES ARE BASED ON MGA [ZONE 56 - GDA94] WITH ORIGIN BEING PM 147713

5. UNLESS OTHERWISE STATED, ALL DIMENSIONS SHOWN HEREON ARE IN METRES

6.UNDERGROUND SERVICE LOCATION HAS BEEN CARRIED OUT BY MSG LOCATING. SPRAY MARKS ON SURFACE WITH DEPTHS HAS BEEN SURVEYED BY US . THE SERVICE LOCATION HAS BEEN CARRIED OUT WITH THE LOCAL KNOWLEDGE OF THE SINGLETON CHRISTIAN COLLEGE GROUNDS FOREMAN. THE INVESTIGATION MAY NOT HAVE LOCATED ALL UNDERGROUND SERVICES.

LEGEND

- SUBJECT TITLE BOUNDARY
- FENCE
- TOP OF EMBANKMENT / BANK
- TOE OF BANK
- UNDERGROUND STORMWATER PIPE / CULVERT
- GUARD SAFETY RAIL
- ELECTRICAL STAY WIRE
- POWER LINE
- BENCHMARK
- HYDRANT
- STOP VALVE
- WATER METER/MARKER
- LIGHT POLE
- TELSTRA / NBN PIT
- ELECTRICAL PILLAR
- POWER POLE
- PROPOSED LOT POST

RAP SURVEYING
A business of R.A. PEASLEY CONSULTING PTY LTD
REGISTERED LAND SURVEYORS
10 TOP KNOT PLACE MUSWELLBROOK NSW 2333
M: 0400 863 950 E: RAPSURVEYING@GMAIL.COM
WWW.RAPSURVEYING.COM.AU

AUSTRALIAN CHRISTIAN COLLEGE

Project/Site
DETAILED/SITE SURVEY OF SINGLETON CHRISTIAN COLLEGE
KELSO STREET, SINGLETON - LOT 4 IN DP 1119857

SHEET 1 of 3

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JOB REF:	2020/180	SCALES:	1:600 (A1)
DWG FILE:	20180.dwg	DATE:	19TH DECEMBER 2020 (Surveyed)
PLAN No.	1	REVISION NOTES	
REVISION No.	0		

4

DP 1119857

GOALS

TANK
Capacity: 100,000 L
Invert: RL.37.6 (abt)

ANCHOR WIRES FOR PLAY AREA SAILS

PLAY AREA

BUILDING
(BRICK & METALLIC)
FL.39.99

CARPARK
(Concrete)

RAMP

PERGOLA

CONCRETE AREA

CLASSROOMS
(BRICK & METALLIC BUILDING)
FL.39.99

SYNTHETIC SURFACED SPORTING COURT

GARDEN

DRIVEWAY

Conc.

HYDRANT

GATE

Service Trench (dotted)

IRONBARK

TAP

A/C

SEPTIC

BOX

SPILLWAY

PIT

POLE

MELALEUCAs

UNDERGROUND HIGH VOLTAGE ELECTRICITY

ELECT. PIT

0.9 Deep

1.3 Deep

0.85 Deep

0.8 Deep

SEWER PIT

SEWER 0.7 Deep

HYDRANT

OAK

JACARANDA

TREE (GENERIC)

ELECT.

COMMs

SHED

BUILDING

SEWER INSPECT.

SEWER 0.5 Deep

GAZEBO

TIMBER DECK

CLASSROOMS
(METALLIC BUILDING)
FL.40.43
SPORTS STORE

STEPS

CLASSROOMS
(METALLIC BUILDING)
FL.40.42

CONCRETE AREA

CLASSROOMS
(BRICK BUILDING)

CONCRETE (COVERED) AREA

BASKETBALL RING

CLASSROOMS
(METALLIC BUILDING)
C5
FL.40.51
C4

C6
CLASSROOM
(METALLIC BUILDING)
FL.40.50
TOILETS

ENTRY

RAMP

VERANDAH
FL.40.20
FL.40.21

D3 D2 D1
CLASSROOMS
(METALLIC BUILDING)

BUILDING

SHED

SHED

SHED

BUILDING

GUM

WATER MAIN

HYDRANT

WADDELLS LANE

GIRLS TOILET

BOYS TOILET

BUILDING
(BRICK)
FL.40.21

LANDING

CONCRETE AREA

MAIN OFFICE
FL.40.13

ADMINISTRATION & HALL
(BRICK BUILDING)
RIDGE LINE
RL.45.28

ROOF OVER

HYDRANT PIT

PIPE OUTLET

BIN

GARDEN

ROOF OVER PATHWAY

GARDEN

SEWER INSPECT.

CONCRETE PATHWAY

LIGHT POLE

TAP

LIGHT POLE

CARPARK

UNDERGROUND HIGH VOLTAGE ELECTRICAL LINE
LINE OF SILKY OAKS

PLAY AREA

CONCRETE

KERB AND GUTTER

PATHWAY

LIGHT POLE

LONDON PLANE

TRAFFIC ISLAND

LONDON PLANE

JACARANDAH

DRAIN

DISH

MGA

FLAGPOLE

PATH

MEMORIAL

GRAVEL

EDGE OF

GN

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KELSO STREET, SINGLETON - LOT 4 IN DP 1119857

SHEET 2 of 3

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JOB REF: 2020/180	SCALES: 1:250 (A1)
DWG FILE: 20180.dwg	DATE: 19TH DECEMBER 2020 (Surveyed)
PLAN No. 1	REVISION NOTES
REVISION No. 0	

0 4 8 13 25 38 50
BARSCALE(m)

BUILDING
(BRICK)
PLAY AREA
LIGHT POLE
LONDON PLANE
JACARANDA
A/C
A/C
CONCRETE
PATHWAY
MAIN OFFICE
BIN
CONCRETE PATHWAY (covered)
FL 40.13
SEWER INSPECT.
FLAG POLE
PATH
MEMORIAL
ADMINISTRATION & HALL
EDGE OF BITUMEN
CONCRETE
PATHWAY
LIGHT POLE
TAP
LIGHT POLE
FL 40.15
CARPARK
GRAVEL
EDGE OF
CARPARK
4
DP 1119857
CRICKET PITCH
G N
MGA
LINE OF SILKY OAKS
UNDERGROUND
ELECTRICAL
LINE
VOLTAGE
HIGH
IRONBARK TREES
TELSTRA
TAP
POWER POLE
BARRIER
WADDELLS LANE

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KELSO STREET, SINGLETON - LOT 4 IN DP 1119857

SHEET 3 of 3

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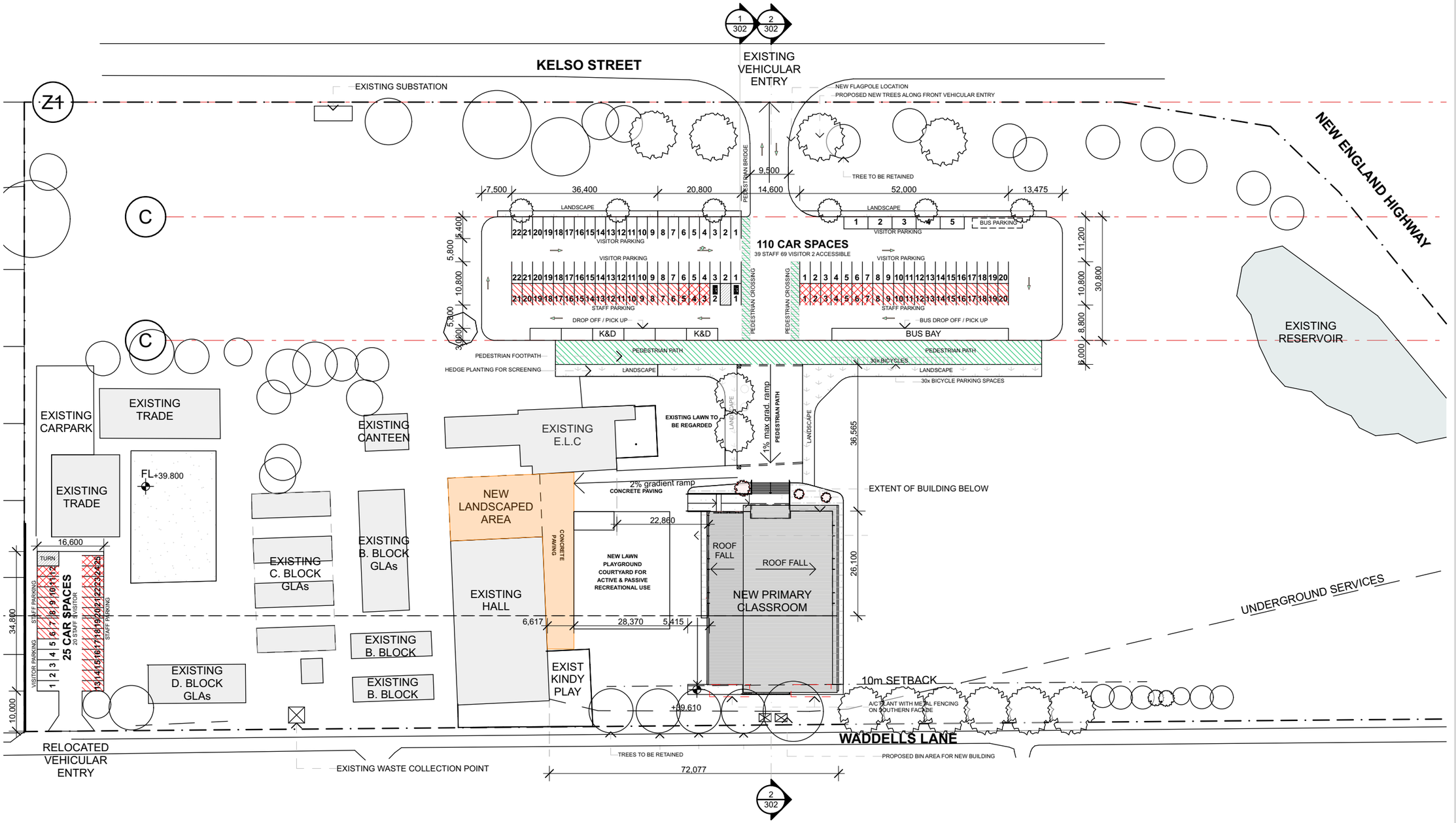
JOB REF: 2020/180	SCALES: 1:200 (A1)
DWG FILE: 20180.dwg	DATE: 19TH DECEMBER 2020 (Surveyed)
PLAN No. 1	REVISION NOTES
REVISION No. 0	

0 3 7 10 20 30 40
BARSCALE(m)

9 Attachment B: Proposed Site Layout



1 Site Plan Stage 4

Scale 1:1000@A3

DRAWING LEGEND

- TREE TO REMAIN
- TREE TO BE REMOVED
- PROPOSED WALLS/ ELEMENTS
- WALLS/ ELEMENTS TO BE DEMOLISHED
- WALLS/ ELEMENTS EXISTING
- BOUNDARY LINE
- NEW PROPOSED TREE
- STAFF PARKING (SCHOOL)
- STAFF PARKING (CHILDCARE)
- PEDESTRIAN PATH

STAGES

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- LOW LEVEL VEGETATIONS
- SOIL

CEM — CHRISTIAN EDUCATION MINISTRIES

N

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
		28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn | Checked: SH | SH

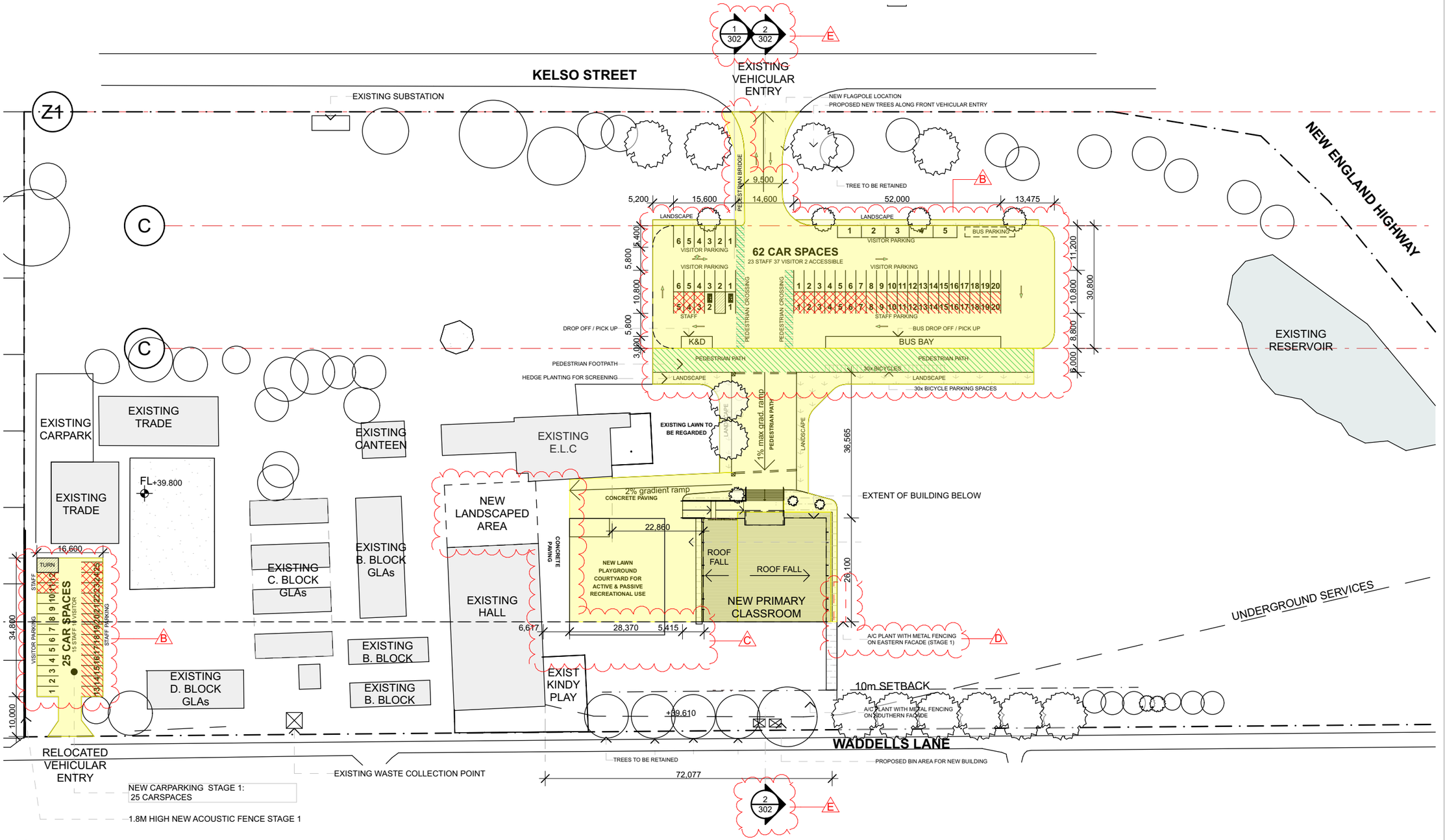
Plot Date: 28.10.2024

Drawing Title: Cover Page and Site Plan Proposed Site Plan Stage 4

DA006

Drawing No.

Drawing Issue. 01



1 **Site Plan Stage 1**

Scale 1:1000@A3

DRAWING LEGEND

- TREE TO REMAIN
- TREE TO BE REMOVED
- PROPOSED WALLS/ ELEMENTS
- WALLS/ ELEMENTS TO BE DEMOLISHED
- WALLS/ ELEMENTS EXISTING
- BOUNDARY LINE
- NEW PROPOSED TREE
- STAFF PARKING (SCHOOL)
- STAFF PARKING (CHILDCARE) — B
- PEDESTRIAN PATH

STAGES

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4 — C
- LOW LEVEL VEGETATIONS
- SOIL

CEM — CHRISTIAN EDUCATION MINISTRIES

N

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
A	Carspace & tree amendment	20/5/2024
B, C, D, E	Carpark allocations, additional landscape and pedestrian paths, Staging revised, A/C Plant relocated, Site sections added	28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn | Checked: SH | SH

Plot Date: 28.10.2024

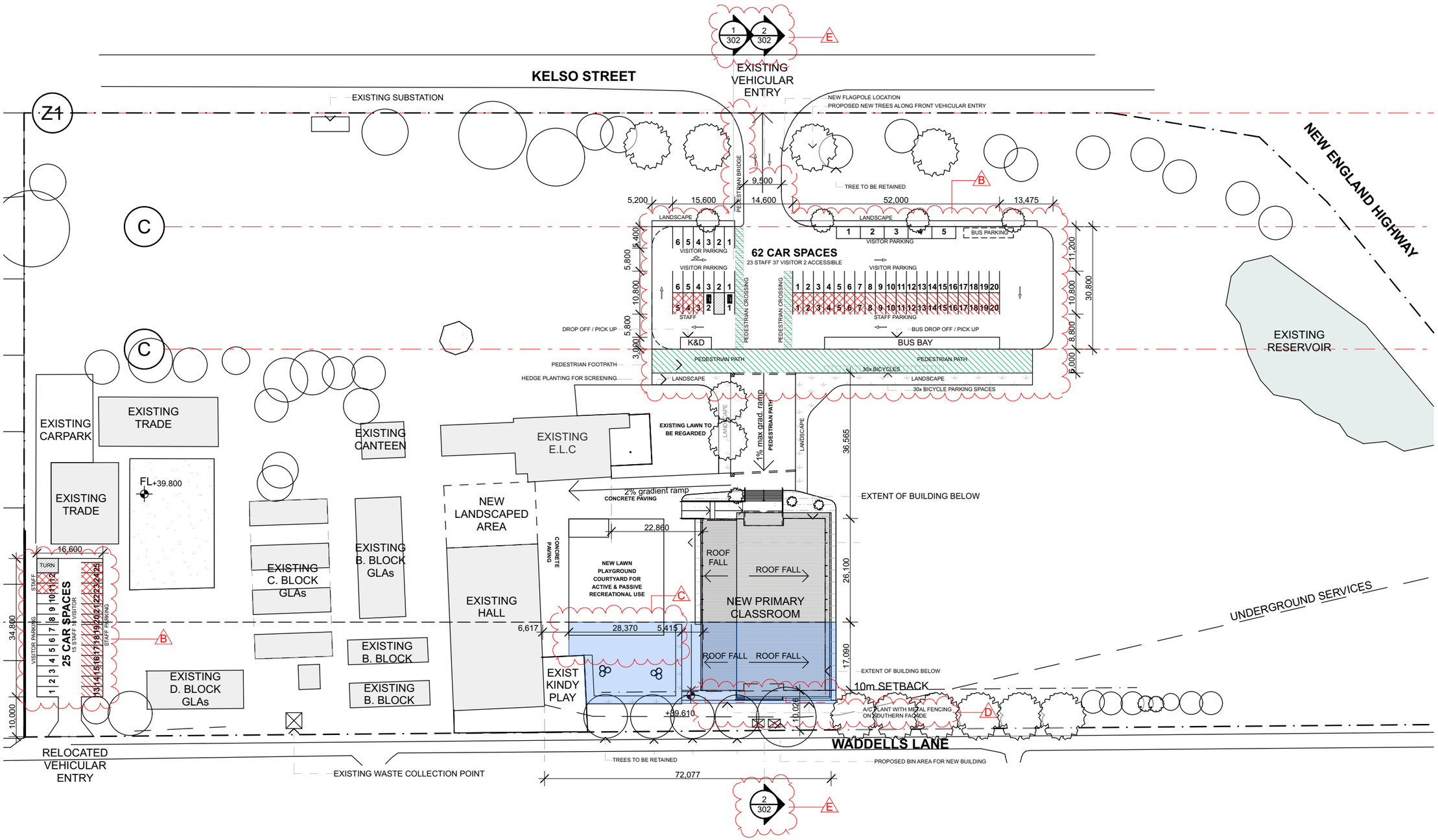
Drawing Title: Cover Page and Site Plan

Proposed Site Plan Stage 1

DA002

Drawing No.

Drawing Issue. 02



1 Site Plan Stage 2

Scale 1:1000@A3

DRAWING LEGEND

- TREE TO REMAIN
- TREE TO BE REMOVED
- PROPOSED WALLS/ ELEMENTS
- WALLS/ ELEMENTS TO BE DEMOLISHED
- WALLS/ ELEMENTS EXISTING
- BOUNDARY LINE
- NEW PROPOSED TREE
- STAFF PARKING (SCHOOL)
- STAFF PARKING (CHILDCARE) — B
- PEDESTRIAN PATH

STAGES

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4 — C
- LOW LEVEL VEGETATIONS
- SOIL

CEM — CHRISTIAN EDUCATION MINISTRIES

N

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
A	Carspace & tree amendment	20/5/2024
B, C, D, E	Carpark allocations, additional landscape and pedestrian paths, Staging revised, A/C Plant relocated, Site sections added	28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn I Checked: SH I SH

Plot Date: 28.10.2024

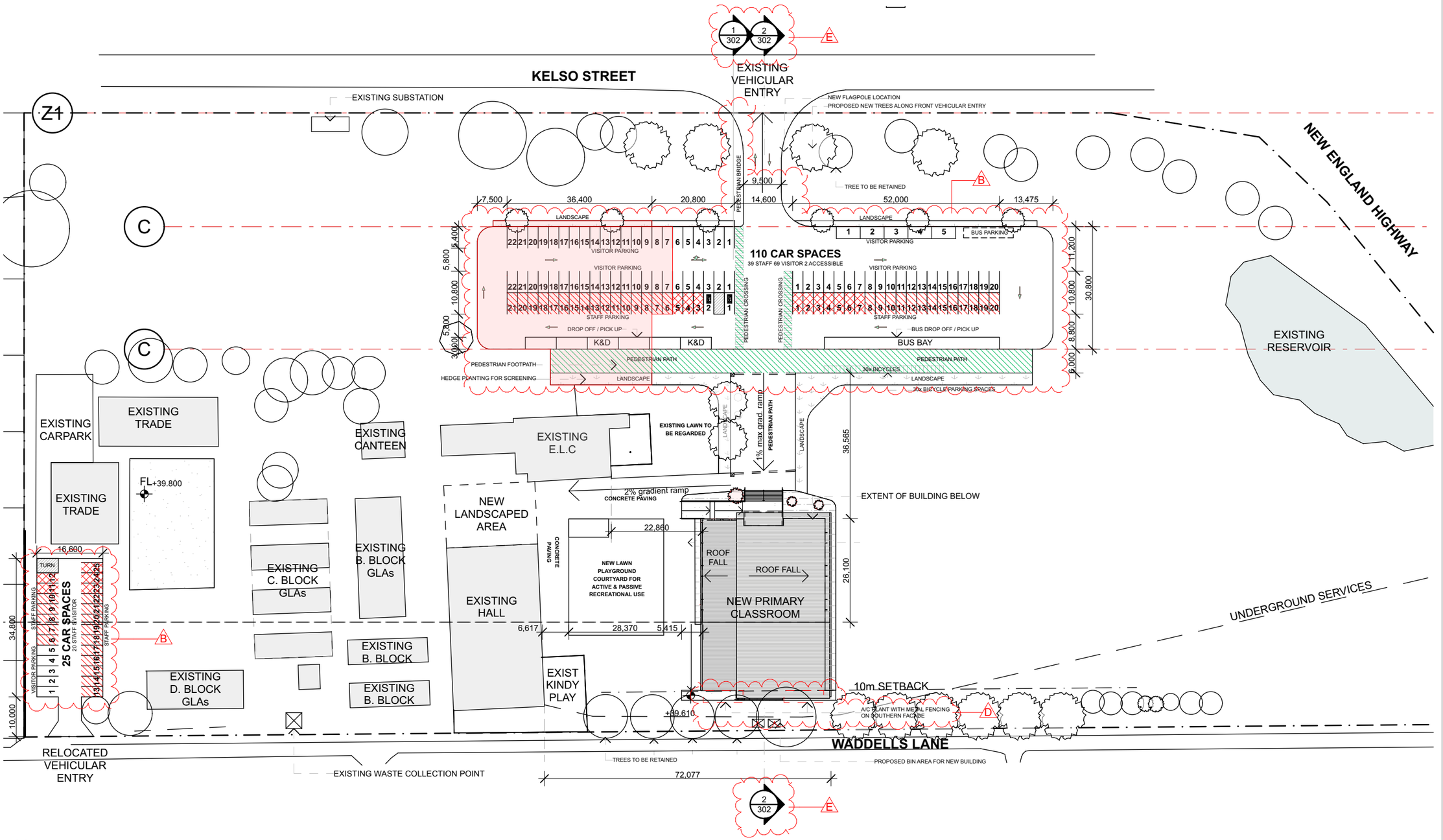
Drawing Title: Cover Page and Site Plan

Proposed Site Plan Stage 2

DA003

Drawing No.

Drawing Issue: 02



1 Site Plan Stage 3

Scale 1:1000@A3

DRAWING LEGEND

- TREE TO REMAIN
- TREE TO BE REMOVED
- PROPOSED WALLS/ ELEMENTS
- WALLS/ ELEMENTS TO BE DEMOLISHED
- WALLS/ ELEMENTS EXISTING
- BOUNDARY LINE
- NEW PROPOSED TREE
- STAFF PARKING (SCHOOL)
- STAFF PARKING (CHILDCARE) — B
- PEDESTRIAN PATH

STAGES

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4 — C
- LOW LEVEL VEGETATIONS
- SOIL

CEM — CHRISTIAN EDUCATION MINISTRIES

N

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
A	Carspace & tree amendment	20/5/2024
B, C, D, E	Carpark allocations, additional landscape and pedestrian paths, Staging revised, A/C Plant relocated, Site sections added	28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn | Checked: SH | SH

Plot Date: 28.10.2024

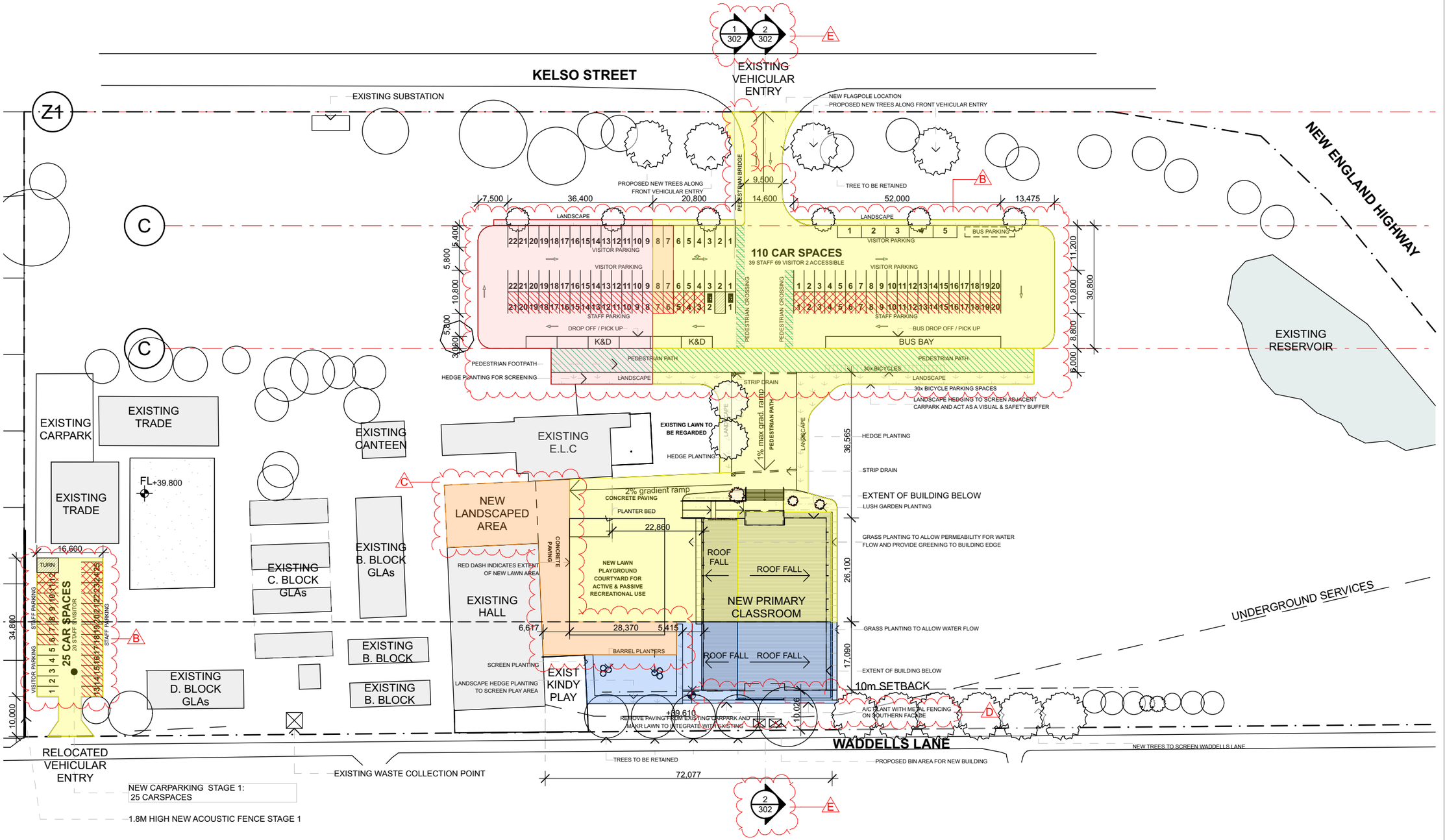
Drawing Title: Cover Page and Site Plan

Proposed Site Plan Stage 3

DA004

Drawing No.

Drawing Issue: 02



1 Staged Site Plan

Scale 1:1000@A3

NOTE: FOR LANDSCAPE DETAILS, REFER TO LANDSCAPE CONSULTANT DRAWINGS

DRAWING LEGEND

- TREE TO REMAIN
- TREE TO BE REMOVED
- PROPOSED WALLS/ ELEMENTS
- WALLS/ ELEMENTS TO BE DEMOLISHED
- WALLS/ ELEMENTS EXISTING
- BOUNDARY LINE
- NEW PROPOSED TREE
- STAFF PARKING (SCHOOL)
- STAFF PARKING (CHILDCARE)
- PEDESTRIAN PATH

FILL LEGEND

- STAGE 1
- STAGE 2
- STAGE 3
- STAGE 4
- LOW LEVEL VEGETATIONS
- SOIL

CEM — CHRISTIAN EDUCATION MINISTRIES

N

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
A	Carspace & tree amendment	20/5/2024
B, C, D, E	Carpark allocations, additional landscape and pedestrian paths, Staging revised, A/C Plant relocated, Site sections added	28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn I Checked: SH I SH

Plot Date: 28.10.2024

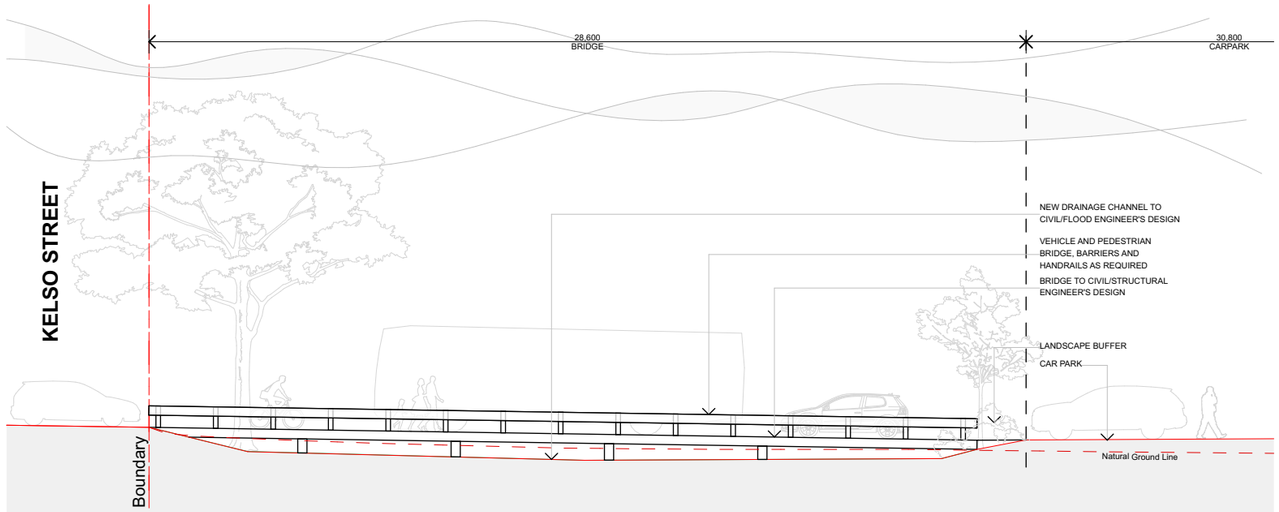
Drawing Title: Cover Page and Site Plan

Proposed Staged Site Plan

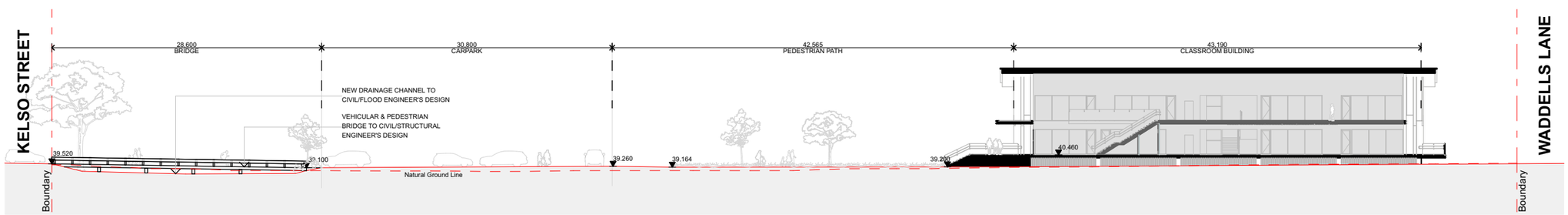
DA005

Drawing No.

Drawing Issue. 02



1 **Section C (Bridge)**
Scale 1:200



2 **Section D (Site)**
Scale 1:500

CEM
CHRISTIAN
EDUCATION
MINISTRIES

Singleton Primary BGA

Legend

(a)	ABOVE
C	CLADDING TYPE
COL	COLUMN
CONC	CONCRETE
CPT	CARPET
CT	CERAMIC TILE
DP	DOWNPIPE
F	FRIDGE
FG	FIXED GLASS
LVR	LOUVRED GLASS
MR	METAL ROOF
PB	PLASTERBOARD
SG	SLIDING GLASS
SNK	SINK
STR	STORAGE
(u)	UNDER
VNL	VINYL

Rev	Description	Date
		28/10/2024

Site: Lot 4, 109-129 Kelso Street , Singleton, NSW 2330

Project No.: 18120-02-ACC-2010

Project Status: Development Application

Drawn I Checked: SH I SH

Plot Date: 28.10.2024

Drawing Title

Sections
Site Sections

DA302

Drawing No.

Drawing Issue. 01

10 Attachment C: Flood Emergency Response Plan – Operational Details