REEL PLANNING
Urban & Rural Strategies

TOWN PLANNING REPORT

2 COLLARD STREET, BILOELA

DEVELOPMENT PERMIT FOR MATERIAL CHANGE OF USE FOR AN EDUCATIONAL ESTABLISHMENT

Lutheran Church of Australia Queensland District T/A Redeemer Lutheran College Biloela

JUNE 2026

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1.0 EXECUTIVE SUMMARY

This application applies to land at 2 Collard Street, Biloela (formally described as Lot 1 on RP607657) and seeks a Development Permit for a Material Change of Use for Educational Establishment.

The proposal is for an extension to an existing Educational establishment; Redeemer Lutheran College. The works involve:

- Addition of three (3) General Learning Areas, including staff room and toilets;
- Relocation of the existing Chapel and Uniform shop from the Collard Street frontage to behind the existing car park on Archer Street;
- Removal and reconstruction of existing access and car park on Collard Street and addition of five (5) car parking spaces off Bell Street;
- Addition of a new covered area; and
- Covered walkway.

The proposed works will facilitate an increase in student numbers from 346 to 389 (additional 43) and additional 2 staff members.

The application is supported by the following report and plans:

- Architectural Plans prepared by BEAT Architects (Appendix A);
- Traffic Impact Assessment prepared by PTT Traffic & Transport Engineering (Appendix C)
- Site Based Stormwater Management Plan prepared by Moloney & Sons (Appendix D)
- Landscape Concept Plan prepared by Anderson + Associates Landscape Architects (Appendix E)
- Engineering Services Report prepared by Moloney & Sons (Appendix F)
- Engineering Drawings prepared by Moloney & Sons (Appendix G)

The site is located within the Banana Shire Council local government area and assessment of the development is administered under the Banana Shire Council Planning Scheme 2021 (Planning Scheme).

The purpose of this report is to carry out an assessment of the proposal against the applicable planning instruments, including any relevant Local and State planning instruments.

The report begins with an overview of the site and a description of the proposal. This is followed by a detailed assessment of the relevant assessment benchmarks and matters prescribed in the State planning instruments and the Local planning instruments. The report concludes with a discussion on overall compliance with those planning instruments.

2.0 APPLICATION DETAILS

Address:	2 Collard Street, Biloela
Lot Description:	Lot 1 on RP607657
Site Area:	23,890m^2
Current Use:	Educational Establishment
Applicant:	Lutheran Church of Australia Queensland District T/A Redeemer Lutheran College Biloela
Land Owner:	Lutheran Church of Australia Queensland District
Application Type:	Development Permit for Material Change of Use for an Educational Establishment
Local Government Area:	Banana Shire Council
Planning Scheme:	Banana Shire Council Planning Scheme 2021
Zone:	Community Facilities
Precinct:	CF1 – community facilities precinct 1 (Education)
Relevant Overlays:	• Flood Hazard Overlay (Flood 1 per cent AEP) • Infrastructure • Water Resources (Callide)
Category of Development:	Assessable Development
Category of Assessment:	Impact Assessment
Prescribed Assessable Development (Planning Regulations):	Not applicable
Assessment Manager:	Banana Shire Council
Referral Agencies:	Nil
Primary Contact:	Reel Planning Pty Ltd Tim O'Leary

3.0 THE SITE

This section of the report provides a description of the site, details about the existing use and notable characteristics of the site and the surrounding land use within the immediate locality.

3.1 SITE DESCRIPTION

The subject site is located at 2 Collard Street, Biloela (formally described as Lot 1 on RP607657) as shown by the red outline in **Figure 1.** The subject site has an area of 23,890m^2 and is located within the Communities Facilities Zone (CF1 – community facilities precinct 1 (Education)) under the Banana Shire Planning Scheme 2021. The site is currently occupied by Redeemer Lutheran College which is private school that caters for students from Prep to year 12.

Figure 1: Aerial Photograph of the Site (Source: Queensland Government DAMS)

3.2 TOPOGRAPHY

The subject site has a gentle slope from the north east (contour RL180m) to south west (contour RL177m (see **Figure 2).**

Figure 2: Topography of the Site (Source: Qld Globe)

3.3 ENCUMBERANCES

The site is subject to various easements as shown in green in **Figure 3**. The easements are for stormwater conveyance.

Figure 3: Easements (Source: Queensland Government DAMS)

3.4 DEVELOPMENT HISTORY OF THE SITE

Redeemer Lutheran College opened on 23 January 1978 for primary students. The College has expanded over time to now cater for students from Prep to Year 12, leading to a total of 346 students being enrolled.

The most recent development approval (MCU002-23/24) over the stie was for an Educational Establishment (Additional Double Classroom & Office). Council granted approval on 20 November 2023 subject to conditions.

4.0 ADJOINING LAND USES AND THE LOCALITY

The site is located on the southern edge of the Biloela township approximately 900m from the town centre. The surrounding locality contains a mix of uses with residential dwellings to the north and west, vacant land to the south and Biloela State High School to the north east.

The site is highly accessible and within close proximity to the Dawson and Burnett Highways.

Figure 4: Locality Map (Source: Queensland Government DAMS)

5.0 PROPOSAL DETAILS

This section of the report provides a description of the proposed development.

5.1 APPLICATION TYPE

This application formally seeks approval for a:

- Development Permit for a Material Change of Use for an Educational Establishment

The Planning Scheme defines Educational Establishment as follows:

Educational Establishment –

The use of premises for:
- *(a) training and instruction to impart knowledge and develop skills, or*
- *(b) student accommodation, before or afterschool care, or vacation care, if the use is ancillary to the use in paragraph (a).*

5.2 DESCRIPTION OF THE PROPOSAL

The proposal is for an extension to an existing Educational establishment; Redeemer Lutheran College. The works involve:

- Addition of three (3) General Learning Areas, including staff room and toilets;

- Relocation of the existing Chapel and Uniform shop from the Collard Street frontage to behind the existing car park on Archer Street;
- Removal and reconstruction of existing access and car park on Collard Street and addition of five (5) car parking spaces off Bell Street;
- Addition of a new covered area; and
- Covered walkway.

All buildings will be limited to a single storey and have been designed to be consistent with the existing built form, scale and colour scheme of existing buildings.

The proposed works will facilitate an increase in student numbers from 346 to 389 (additional 43) and additional 2 staff members.

Specific information for each aspect of the extension is provided below:

General learning areas

The proposal results in the addition of three (3) General Learning Areas (GLAs) contained in one storey building (Block P) located near Collard Street with the following attributes:

- Each GLA has a gross floor area of 72m^2;
- Staff room with a gross floor area of 35.7m^2; and
- Amenities block with male, female and unisex accessible toilets.

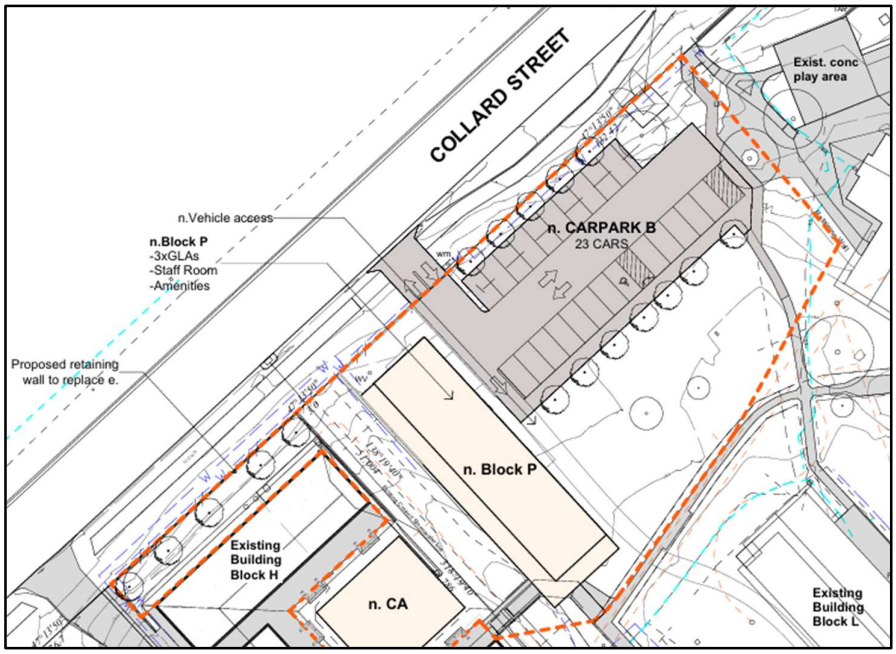


Figure 5: GLA Location (Source: BEAT Architects)

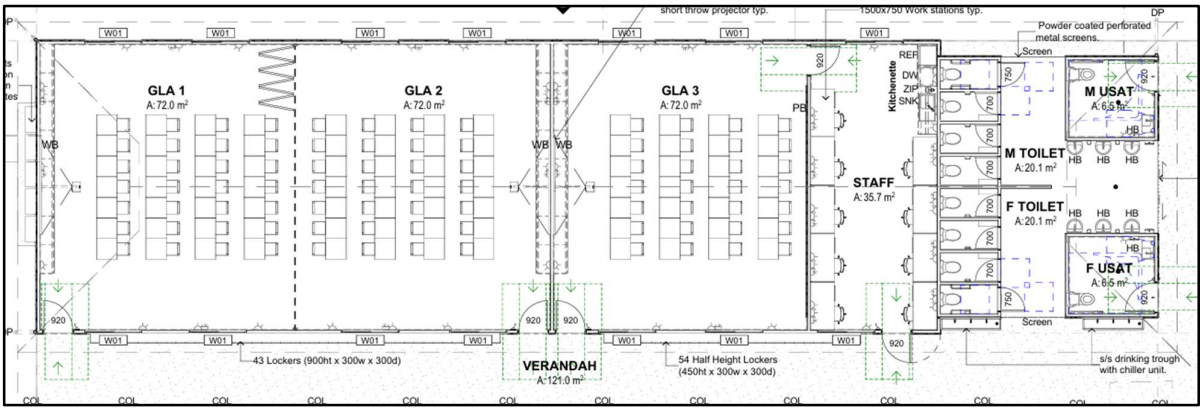


Figure 6: GLA Layout (Source: BEAT Architects)

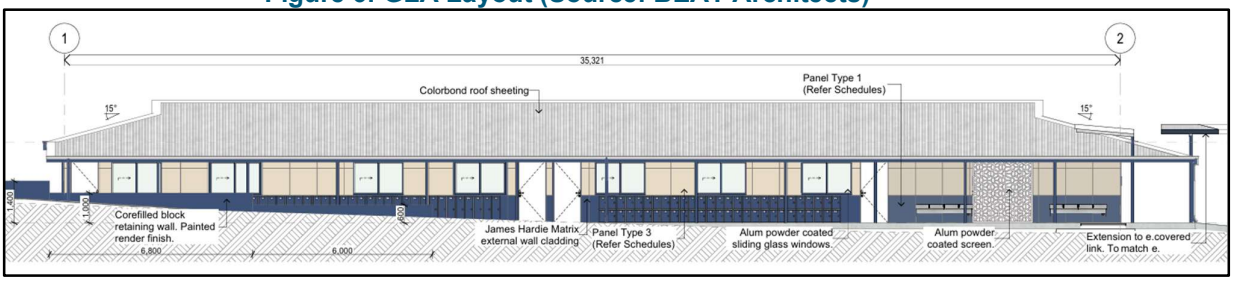


Figure 7: GLA South West Elevation (Source: BEAT Architects)

Chapel and Uniform shop

The existing Chapel and Uniform shop will be relocated from the Collard Street frontage to a new location behind the existing car park on Archer Street.

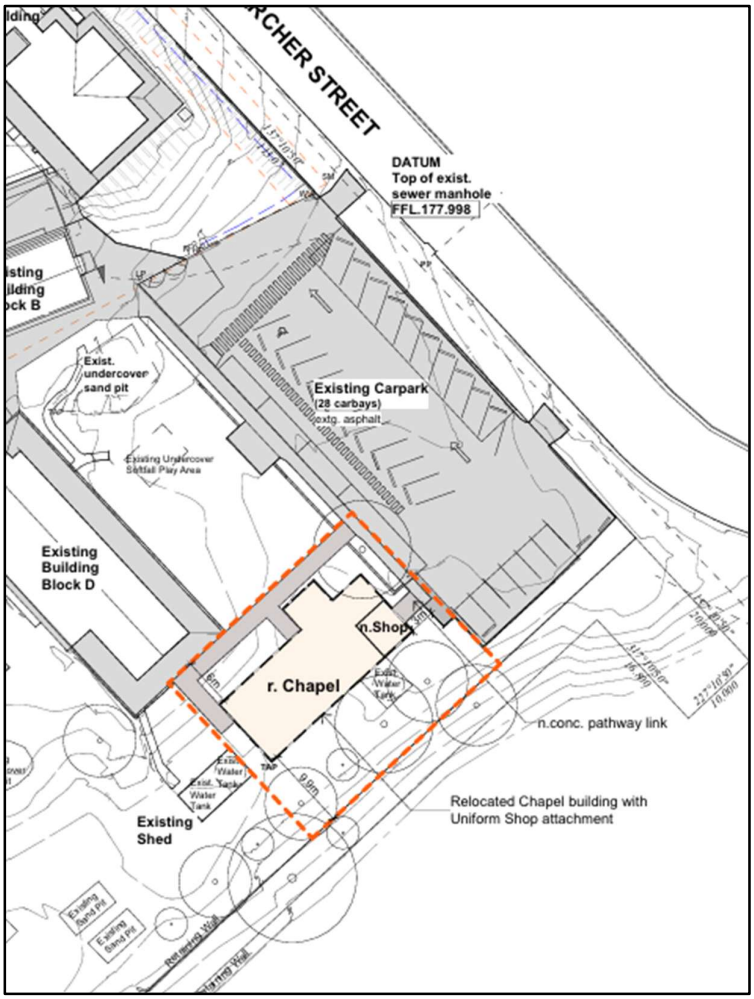


Figure 8: New Chapel and Uniform Shop Location (Source: BEAT Architects)

<u>Car park improvements</u>

It is proposed to remove and reconstruct the existing Collard Street access and carpark. The reconstruction will result in a more uniform and efficient carpark with 23 car spaces. The carpark includes a PWD space as well as a turning bay. The carpark will be screened with landscape trees. It also proposed to provide an additional five (5) car spaces adjacent to the Bell Street access driveway.

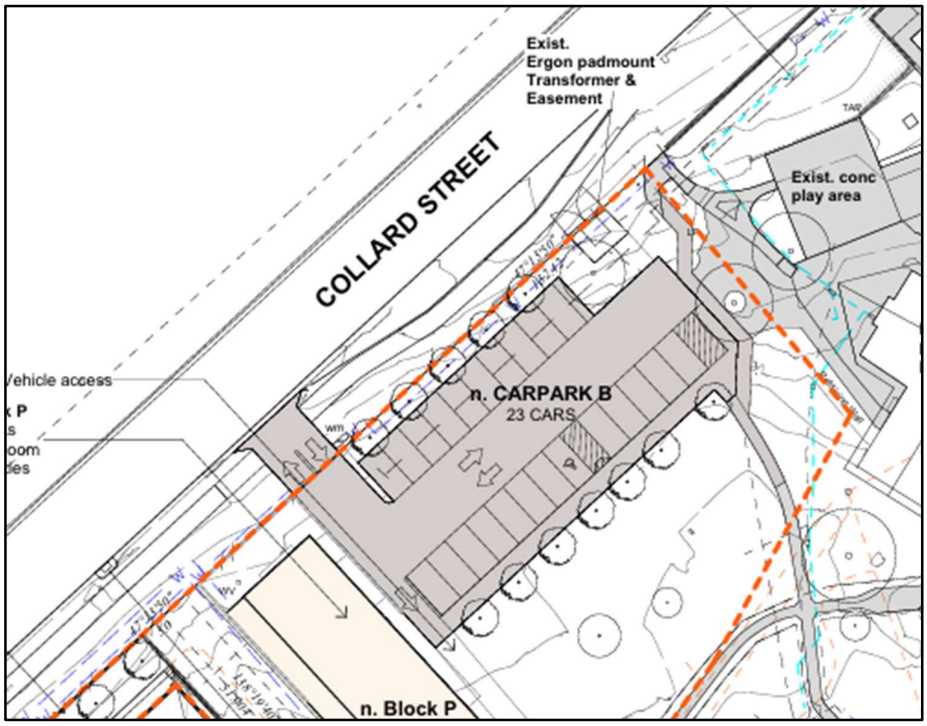


Figure 9: New Carpark Area (Source: BEAT Architects)

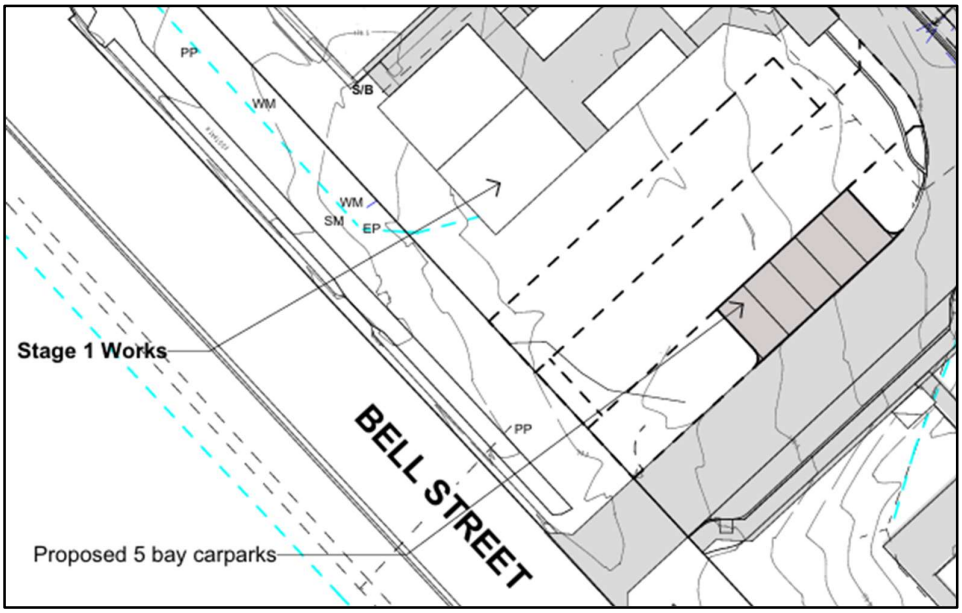


Figure 10: Additional Bell Street Car Spaces (Source: BEAT Architects)

Covered area

A new covered area is proposed between existing Block H and K GLAs. The covered area will result in an additional covered recreation area for students. The covered area will have an overall maximum height of 5.514m and floor area of approximately 195m^2.

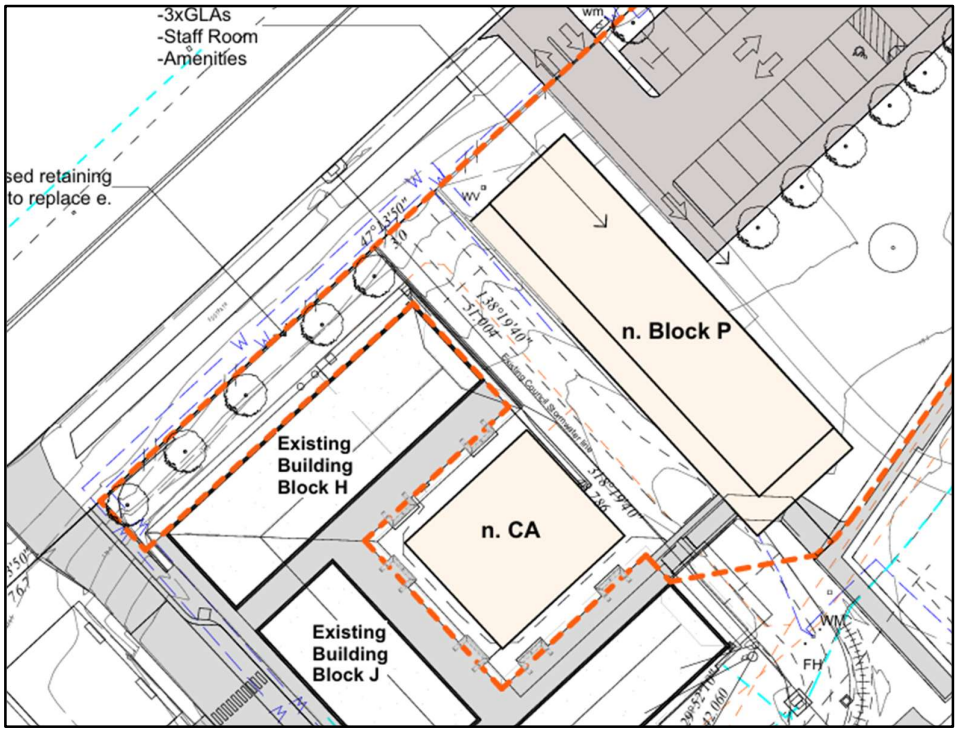


Figure 11: New Covered Area (Source: BEAT Architects)

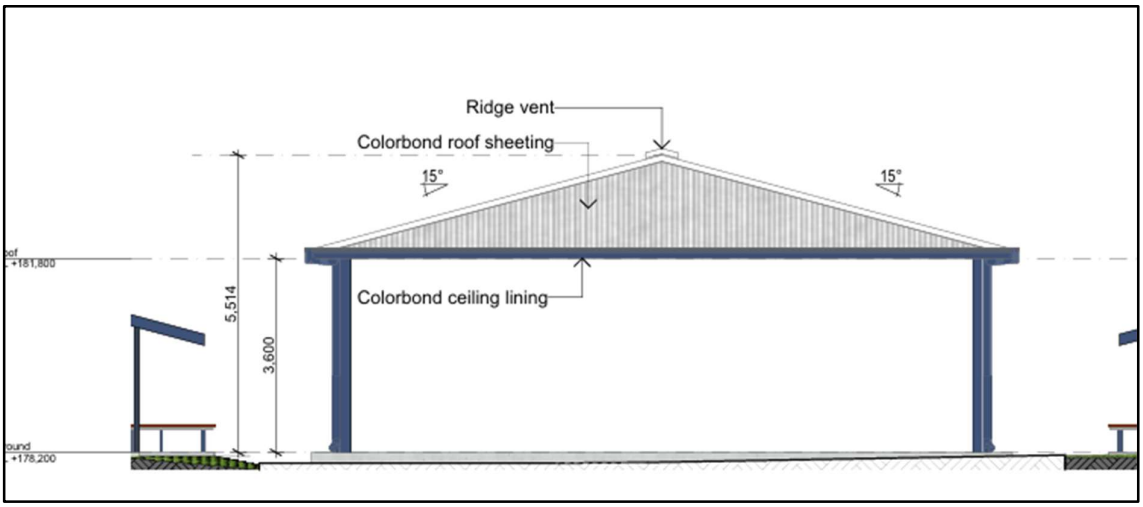


Figure 12: New Covered Area Elevation (Source: BEAT Architects)

Appendix A includes a full set of Architectural Plans.

5.3 SERVICES

The subject site has access to all urban services, and any new works will be provided with adequate connections, as required.

5.4 ACCESS

The site currently has the following access arrangements:

- separate entry and exit driveways on Archer Street, providing access to a drop-off / pick-up facility and short-term parking;
- all-movements driveway on Collard Street, providing access to the long-term (staff) parking area
- entry only crossover on Collard Street, providing access to the drop-off / pick-up area;
- exit only crossover on Bell Street, providing egress from the drop-off / pick-up area; and
- all-movements crossover on Bell Street, providing service vehicle access.

The above access arrangements will remain unchanged with the exception of the reconstruction of the Collard Street access.

6.0 STATE PLANNING INSTRUMENTS

6.1 OVERVIEW

This section of the report includes an assessment of the proposal against the State Planning Instruments. The State Planning Instruments are:

- Planning Regulation 2017.
- State Planning Policy; and
- Regional Plan.

6.2 PLANNING REGULATION 2017

The Planning Regulation 2017 (PR 2017) is a categorising instrument that can:

(A) Prescribe the assessment manager for a development application.
(B) Categorise development as prohibited, assessable or accepted development or development a planning scheme cannot make assessable; specify the category of assessment for assessable development; and set out assessment benchmarks.
(C) Prescribe referral agencies for an application.

Each of these matters is addressed in turn below.

(A) Assessment Manager

The Assessment Manager prescribed in Schedule 8 of the Regulation is the Local Government – Banana Shire Council as the proposal involves assessable development under Banana Shire Planning Scheme 2021.

(B) Categorising Development

(i) Development a local categorising instrument is prohibited from making assessable development
This application is not for development identified in Schedule 6 of the PR 2017 as development a local categorising instrument is prohibited from making assessable development.

(ii) Accepted Development
This application is not for development identified as accepted development in Schedule 7 of the PR 2017.

(iii) Prohibited Development
The application does not involve prohibited development identified in Schedule 10 of the PR 2017.

(iv) Assessable Development & Assessment Benchmarks

The application does not include development identified as Assessable Development in Schedule 10 on the Regulation.

(C) Referral Agencies

This application does not require referral to the State Assessment and Referral Agency.

6.3 STATE PLANNING POLICY

The State Planning Policy (July 2017) (SPP) commenced on the 3 July 2017 and is effective at the time of writing this report. The overall purpose of the SPP is to ensure that State interests are appropriately reflected in the planning instruments and development decisions. The State interest statements relate to the following five themes:

- Liveable communities and housing.
- Economic growth.
- Environment and heritage.
- Safety and resilience to hazards.
- Infrastructure.

The State interests in the SPP apply to development, only when a local planning instrument such as a planning scheme does not appropriately integrate the State interests and only to the extent of an inconsistency with the local planning instrument.

The State Planning Policy is not reflected in the planning scheme. Assessment against the SPP is, therefore, required. The site is identified as being subject to the Natural Hazards Risk and Resilience as the site is identified by the Queensland floodplain assessment overlay and local government flood mapping.

The site is partially affected by flooding (see **Figure 13**) along the eastern boundary of Lot 1 on RP607657.

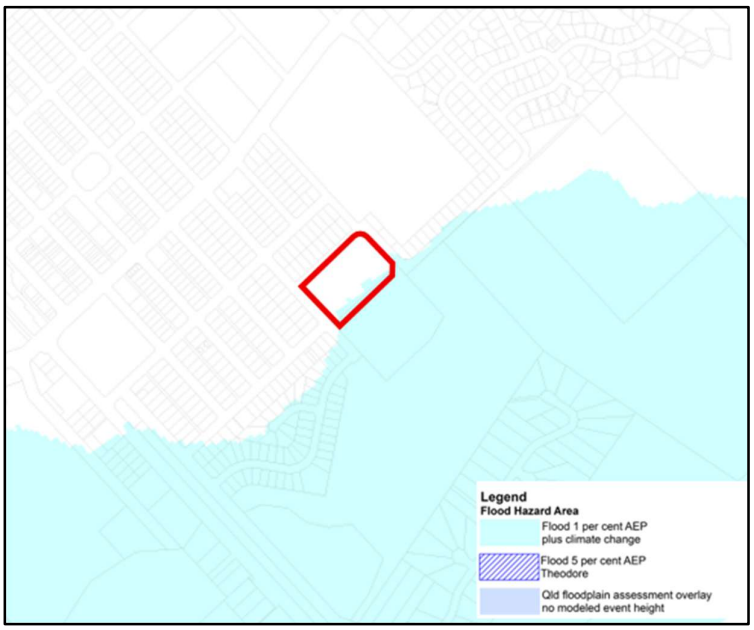


Figure 13: Flood Hazard (Source: Banana Shire Council Planning Scheme)

It is noted that all new works will be located outside the flood hazard area. The school has established flood management procedures to ensure there is no risk to students and staff during flood events. As all new buildings and works will be located outside the flood hazard area it is considered that the proposal will not result in additional risk to property.

The proposed development is considered to comply with the State Interest Policies relating to Natural Hazards Risk and Resilience.

6.4 REGIONAL PLAN

The Regional Plan effective at the time of writing this report is the Central Queensland Regional Plan 2013. The site is located within the Priority Living Area. The proposal involves an extension to an existing education establishment that is located in an established urban area.

The Regulation states the assessment must be carried out against the assessment benchmarks stated in the Regional Plan to the extent they are not appropriately integrated into the planning scheme. The Banana Shire Planning Scheme 2021 does not integrate of the Central Queensland Regional Plan.

Despite this is noted that the Regional Plan does not provide any specific assessment benchmarks for the site, therefore no further assessment is required.

7.0 LOCAL PLANNING INSTRUMENTS

7.1 OVERVIEW

This section of the report includes an assessment of the proposal against the Local Planning Instruments. Local Planning Instruments are:

- Planning Scheme and associated Planning Scheme Policies
- Temporary Local Planning Instruments (TLPIs).

The relevant planning scheme, and its associated planning scheme policies, is the Banana Shire Council Planning Scheme 2021.

7.2 TEMPORARY LOCAL PLANNING INSTRUMENT

The Banana Shire Council adopted the Temporary Local Planning Instrument No. 1 of 2024 – Workforce Accommodation (the TLPI) on 24 January 2024. The purpose of the TLPI is to provide an interim response to the significant increase in the demand for workforce accommodation within the Banana Shire.

The TLPI has no effect on the proposed Material change of use for an Educational Establishment.

7.3 CATEGORY OF ASSESSMENT AND ASSESSMENT BENCHMARKS

The level of assessment of the application is typically determined by reference to the tables of assessment in section 5 of the Planning Scheme. Table 5.8.1 of the Planning Scheme details the level of assessment for a Material Change of Use in the Community Facilities Zone. Educational Establishment is listed as being subject to Accepted development where located in Precinct 1 and within an existing building or involving only minor building work. As the proposal involves new

buildings that are not considered minor building work, the proposal will be subject to Impact assessment.

As the application is subject to Impact assessment it requires an assessment against the entire Planning Scheme. The parts of the scheme considered to be relevant to the assessment of the application are identified in **Table 2** below.

Table 2: Summary of Assessment Benchmarks

Assessment Benchmarks	Location of Assessment
Strategic Framework	Section 7.4 of Town Planning Report
Zone Code	
Community Facilities Zone	Section 6 of Town Planning Report (Appendix B) Code Assessment
Development Codes	
Development Design code	(Appendix B) Code Assessment
Other	
State Planning Policy	Section 6.3 of Town Planning Report

7.4 STRATEGIC FRAMEWORK

The following is an assessment of the proposal against the relevant outcome in the Strategic Framework. The Planning Scheme contains a Strategic Framework Map, identifying the settlement pattern of the Shire. The site is identified as being within an urban area within the strategic framework.

The strategic framework includes a strategic intent (in Section 2.2) followed by a policy intent with 6 themes:

(i) Settlement pattern;
(ii) Rural areas
(iii) Strong communities;
(iv) Natural systems and hazards;
(v) Strong economy; and
(vi) Infrastructure and servicing.

The below sections address the relevant outcomes in the Strategic framework.

2.3 Settlement Pattern

2.3.1 Strategic outcomes and 2.3.1.1 Specific outcomes

Criteria	Comment
Strategic outcomes *(2) Biloela, as the Shire's largest town, will accommodate the majority of new urban growth with the highest level of commercial, industrial, community and municipal services. Moura, Taroom and Theodore service their respective communities and districts and accommodate local population growth while*	The proposal is for an extension to an existing educational establishment that services both Biloela and the wider community. The site is located in an established urban area, and the proposed development will allow for the use to expand and service additional members of the community as the population continues to grow.

Criteria	Comment
supporting Biloela's role. The remaining townships provide country town lifestyle options, access to services, opportunities for employment and economic activity at a local level. *(3) Urban development comprises a mix of land uses in well-defined areas that integrate with existing urban areas, support town centres and other business areas and provides housing diversity.*	The development has been designed to be sympathetic to surrounding built form and will tie in neatly with existing buildings on the site. The site is well located and is adequately serviced.
Specific outcomes *(1) Biloela develops as the major business and retail area for the Shire, providing a broad range of higher order business, community and civic functions.* *(5) Town centres in Biloela, Moura, Taroom and Theodore are the focus of a mix of retail, business, professional, tourist accommodation and community services, sensitively redeveloping old buildings or new sites. Expansion beyond zoned commercial areas is discouraged in the absence of demonstrated demand. Small-business and niche markets may be supported outside of these centres where amenity impacts can be managed and the role of the centres is not undermined.*	The site is located in the Community facilities zone and within the Education precinct. The use is a consistent use in the zone and provides a community function. The extension will ensure education options are available for the community. The site contains an existing educational establishment and therefore provides a seamless opportunity for expansion in a well located and serviced area. The proposal ensures a diverse mix of uses are maintained in Biloela.

2.5 Strong Communities

2.5.1 Strategic outcomes and 2.5.1.1 Specific Outcomes

Criteria	Comment
Strategic outcomes *(2) Development occurs in a manner that provides access to a range of employment, commercial, cultural, recreational, education and community opportunities in serviceable locations throughout the Shire that respond to community needs.*	The proposal is for an extension to an existing educational establishment that services both Biloela and the wider community. The site is located in an established serviced urban area, and the proposed development will cater for the communities educational needs.
Specific outcomes *(18) The design of buildings and the private and public spaces around them minimise the incidence, opportunities and fear of crime.*	The proposal incorporates the addition of various buildings that have been designed to both complement the existing built form of the site but also the surrounding locality. The buildings have been designed to allow for causal surveillance and will be located in a fenced and secure compound.

2.6 Natural Systems and Hazards

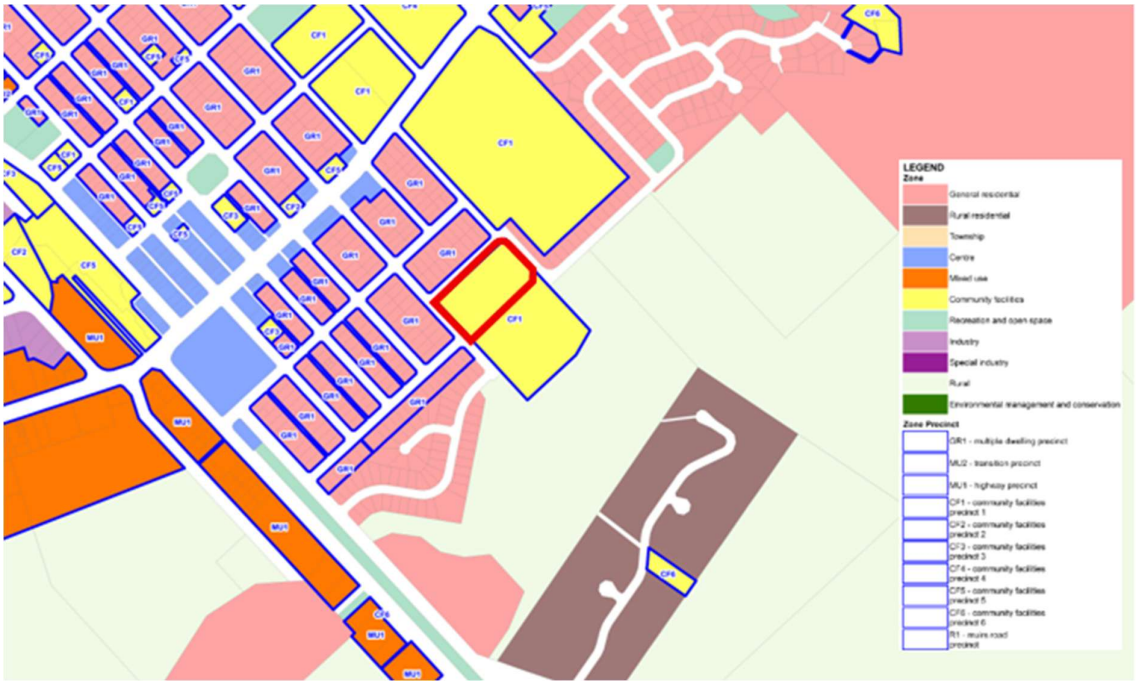
2.6.1 Strategic outcomes

Criteria	Comment
Strategic outcomes *(4) Development ensures storm water quality and flow is managed and risk of erosion is mitigated to protect the ecological properties of waterways and the functioning of the aquatic ecosystem. Wastewater and solid waste disposal activities and facilities take into account topography and the potential impacts on groundwater resources.* *(6) Development is designed, located, constructed and operated to manage the impacts of hazards, while natural processes and biodiversity are protected, managed and rehabilitated.* **Specific outcomes** *(10) Development manages risks from natural hazards, prioritising in order, the safety of people, protection of public infrastructure and protection of private property.* *(11) Development avoids impacts on the function of flood plains and does not worsen the severity or impact of natural hazards.*	A Site Based Stormwater Management Plan has been prepared to ensure stormwater quantity and quality is appropriately managed. The site is partially affected by flooding along the eastern boundary of Lot 1 on RP607657. It is noted that all new works will be located outside the flood hazard area. The school has established flood management procedures to ensure there is no risk to students and staff during flood events. As all new buildings and works will be located outside the flood hazard area it is considered that the proposal will not result in additional risk to property.

7.5 COMMUNITY FACILITIES ZONE CODE

The site is lcoated within the Community Facilities Zone (CF1 – community facilities precinct 1 (Education)). The purpose of the Community Facilities Zone is to:

provide for community-related uses, activities and facilities, whether publicly or privately owned, including, for example:
(a) educational establishments; and
(b) hospitals; and
(c) transport and telecommunications networks; and
(d) utility installations;



Response:

The proposal is for an extension to an existing educational establishment that services the community. The site is located in an established urban area, and the proposed development will allow for the use to expand and service additional members of the community as the population continues to grow.

The development has been designed to be sympathetic to surrounding built form and will tie in neatly with existing buildings on the site. The proposal is considered to comply with purpose and assessment benchmarks of the Community facilities zone code.

A full assessment against the Community facilities zone code is included in **Appendix B**.

8.0 CONCLUSION

This application applies to land at 2 Collard Street, Biloela (formally described as Lot 1 on RP607657) seeks a Development Permit for a Material Change of Use for an Educational Establishment. The site contains Redeemer Lutheran College.

The proposal development seeks to expand the existing College and involves the following works:

- Addition of three (3) General Learning Areas, including staff room and toilets;
- Relocation of the existing Chapel and Uniform shop from the Collard Street frontage to behind the existing car park on Archer Street;
- Removal and reconstruction of existing access and car park on Collard Street and addition of five (5) car parking spaces off Bell Street;
- Addition of a new covered area; and
- Covered walkway.

The proposed development has been designed to both complement the existing built form of the site but also the surrounding locality.

The site is located in the Community facilities zone and within the Education precinct. The use is a consistent use in the zone and provides a community function that will service the educational needs of the wider community.

The proposal has been assessed against the relevant assessment benchmarks prescribed in the applicable Local and State planning instruments. The report and appendices have demonstrated that the application complies with the relevant assessment benchmarks.

As such the application should be approved subject to reasonable conditions. Should you wish to discuss any aspect of this development please contact the undersigned

Kind Regards,

Tim O'Leary | **Principal Planner**
REEL PLANNING

APPENDIX A: PROPOSAL PLANS

PROPOSED MULTI-PURPOSE CENTRE & COVERED AREA
REDEEMER LUTHERAN PRIMARY SCHOOL
2 COLLARD STREET, BILOELA QUEENSLAND

NOTES

1. These general notes are relevant to all drawings of the Hydraulic Service set.
2. The notes on this drawing are supplementary to and do not replace the Specification to which the Contractor must conform.
3. The drawings indicate the general Hydraulic Services layout and are diagrammatic only. Incorporate diversions and minor adjustments as may be necessary to complete the works.
4. For penetrations through beams and footings refer to Structural Engineer's details. All penetrations through fire rated walls or floors shall be approved fire stopped. Provide fire collars to all penetrations through party walls, ducts, floors, etc.
5. Prior to forming or coring any penetrations, the Hydraulic Services Contractor shall coordinate and confirm with the Builder, Structural Concrete Contractor and all other trades for the location of all penetrations.

GENERAL

G1. The Services drawings shall be read in conjunction with all relevant architectural and other consultants drawings, specifications and any written Instructions Issued during the course of the written instructions issued during the course of the contract Discrepancies shall be referred to the engineer for decision before proceeding with work.

G2. Dimensions shall not be obtained by scaling the drawings. Refer to Architects dimensioned drawings. Verify all dimensions on site before preparation of shop drawings.

G3. Substitutes will not be permitted without the written approval of the engineer.

G4. Materials and workmanship shall be in accordance with the specification, the current revision of all relevant SAA codes, the requirements of the QLD building regulations, the Building code of Australia, Local Authorities and the provisions of the current Occupational Health and Safety Act.

G5. The drawings are diagrammatic only. The Contractor must allow for all works necessary to provide an installation which is complete and complying with the scope, its intent, and all Codes and Standards.

G6. Contractors shall ensure that locations of all underground services are identified and co-ordinated prior to commencement of works and excavations.

G7. It is the contractors responsibility to visit the site before submitting a tender, to verify existing conditions and any issues which may impact on the contract.

FIRE HYDRANTS

1. All hydrants pipework shall be to sizes not less than shown on the drawing and in accordance with relevant standards. final pipe sizes are to be the responsility of the Hydraulic Services Contractor.
2. The installation shall include all equipment sized to achieve pressures and flow rates needed to satisfy the pressure/flow requirements specified.
   All under ground pipework shall be blue brute' PVC pressure pipe and shall be photographed prior to backfilling commencing. All booster assembly pipework shall be medium gauge galvanised steel tube with flanged joint and extend 100MM above the finished ground level, wrapped in "denso" tape.
3. Above ground pipework shall be metal primed medium paupe galanised steel pipe to SSL & UL standard roll groove jointd, fixed securely to the building infrastructure with adequate thrust restraints for the test pressure.
4. Installer to ensure correct pipe" Victaulic" couplings are installed in acccordance with the manufacturer's recommendations.

NOTES

1. Structural concrete N25, benching N10 in accordance with AS 1379 and AS 3600.
2. Refer Standard Drawing D-0011 and D-0012 for roof slab reinforcement details.
3. Alternatives :-
   for access hole location refer Service Authority.
   for turent type refer Service Authority.
4. Refer Project Drawings for size and level of culverts, and chamber cover level.
5. Lifting anchors to be "swiftlift" or equivalent 1.8 tonne, galvanized to AS 1650 and fitted to manufacturer's specifications.
6. Access chambers deeper than 3.0m to have an access ladder to AS 1657 in lieu of step irons.
7. All dimensions in millimetres.

Ø100 uPVC slotted pipe stub, 1000 long with end cap installed on the upstream side of access chamber (unless directed otherwise) The stub is required to dewater the pipe trench.

SEWERAGE

1. All sewerage shall comply with australian standard AS3500, BCA, and other authorities or regulations having jurisdiction over the Installation. Make all necessary applications and pay all associated fees and charges.
2. Co-ordinate with other services contractors before commencing to determine the correct construction sequence.
3. Confirm the location and level of the nominated outlet before laying of any drains.
4. Pipework shall be DN100mm unless noted otherwise. All pipework shall be equal to or greater than the nominated outlet size of the fixture, appliance or tundish.
5. Waste pipes of DN100 shall be graded at 1:60 and all other pipework shall be graded at 1:40. Vents shall be graded at 1:80.
6. Where pipework penetrates fire rated walls, ceilings or floors, a fire stop collar shall be installed. All work shall be strictly installed to the manufacturer's recommendations. Refer to the specification for further details.
7. All pipework shall be adequately supported. Support system shall be designed to safely and completely support the weight of pipework and associated work. Support system shall be installed immediately on pipe installation and allowance for expansion provided.
8. Pipework shall be constructed of Unplasticized Polyvinyl Chloride (UPVC), U.N.O. Pipework receiving hot discharges shall be constructed of brass or High Density Polyethylene (HDPE).
9. All pipework shall be concealed in walls, void space or ducts unless noted otherwise.
10. Pipework shall be pressure tested progressively to ensure no leaks. Refer Specification.
11. Where floor waste gullies are indicated, the floors shall be graded towards the outlet.
12. Tundishes shall be installed to receive Mechanical Plant waste and be connected above waste traps where detailed on Mechanical Engineer's drawings. Discharge to tundishes shall be 25mm above the tundish edge and be located in an accessible position.

WATER

1. All water supply shall comply with Australian Standard AS3500, the Building Code of Australia and other authorities or regulations having jurisdiction over the installation. Make all applications and pay all associated fees and charges.
2. All copper pipework shall be Hard Drawn Copper tubing type 'B' conforming to AS1432. Rehau Crosslinked Polyethylene tubing may be used as an alternative to copper tube except for any piping exposed externally, the last one metre at the hot water unit or penetrations through fire rated elements. Equivalent pipe sizes shall be used in accordance with AS3500.
3. All pipework shall be concealed. Where pipework is exposed it shall be chrome plated. All pipework through fire rated walls or floors or ceiling shall be fire stopped.
4. Pipe supports shall be installed progressively as pipes are installed. Support system shall be designed to safely and completely support the weight and thrust of pipework and associated work. Pipework shall be adequately anchored at thrust points.
5. All pipework shall be DN20mm with DN15mm branches to individual fixtures unless noted otherwise. Maximum length of DN15mm branches shall be 2.0 metres.
6. Do not install pipework into sound insulated walls unless otherwise noted.
7. Closet pan cisterns shall be provided with chrome plated isolation valves.
8. Where pipework is in contact with dissimilar metals, the metals shall be insulated against bi-metal corrosion.
9. All isolation valves shall be positioned in approved accessible locations. Valves located in ducts or walls shall be positioned behind approved type access covers.
10. Hose cocks shall be 600mm above finished surface level and shall be 20mm in size, and fitted with anti-vandal taps and approved vacuum breakers.
11. Hot water installations to all personal hygiene fixtures shall be set at max. 50° Celsius.

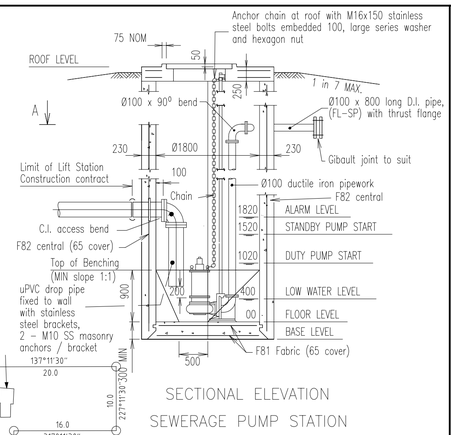
LEGEND

- : SANITARY DRAINAGE AND SANITARY PLUMBING
- : STORMWATER DRAINAGE
- : AGRICULTURAL DRAIN
- : COLD WATER SERVICE
- : HOT WATER SERVICE
- TW : TEMPERED WATER SERVICE
- : FIRE SERVICE
- : RAIN/TANK WATER SERVICE
- : VENT PIPE
- : PIPE RISER OR DROPPER
- : SANITARY PLUMBING FIXTURE
- : WATER CLOSET FIXTURE
- : CAPPED SANITARY SERVICE
- : WATER FIXTURE
- : HOSE TAP
- NS : NEW COUNCIL SEWER
- W : EXISTING COUNCIL WATER MAIN
- d : EXISTING COUNCIL STORMWATER DRAINAGE
- TW : TRADEWASTE
- SW : EXISTING STORMWATER
- SW : STORMWATER BY CIVIL CONTRACTOR

ABBREVIATIONS

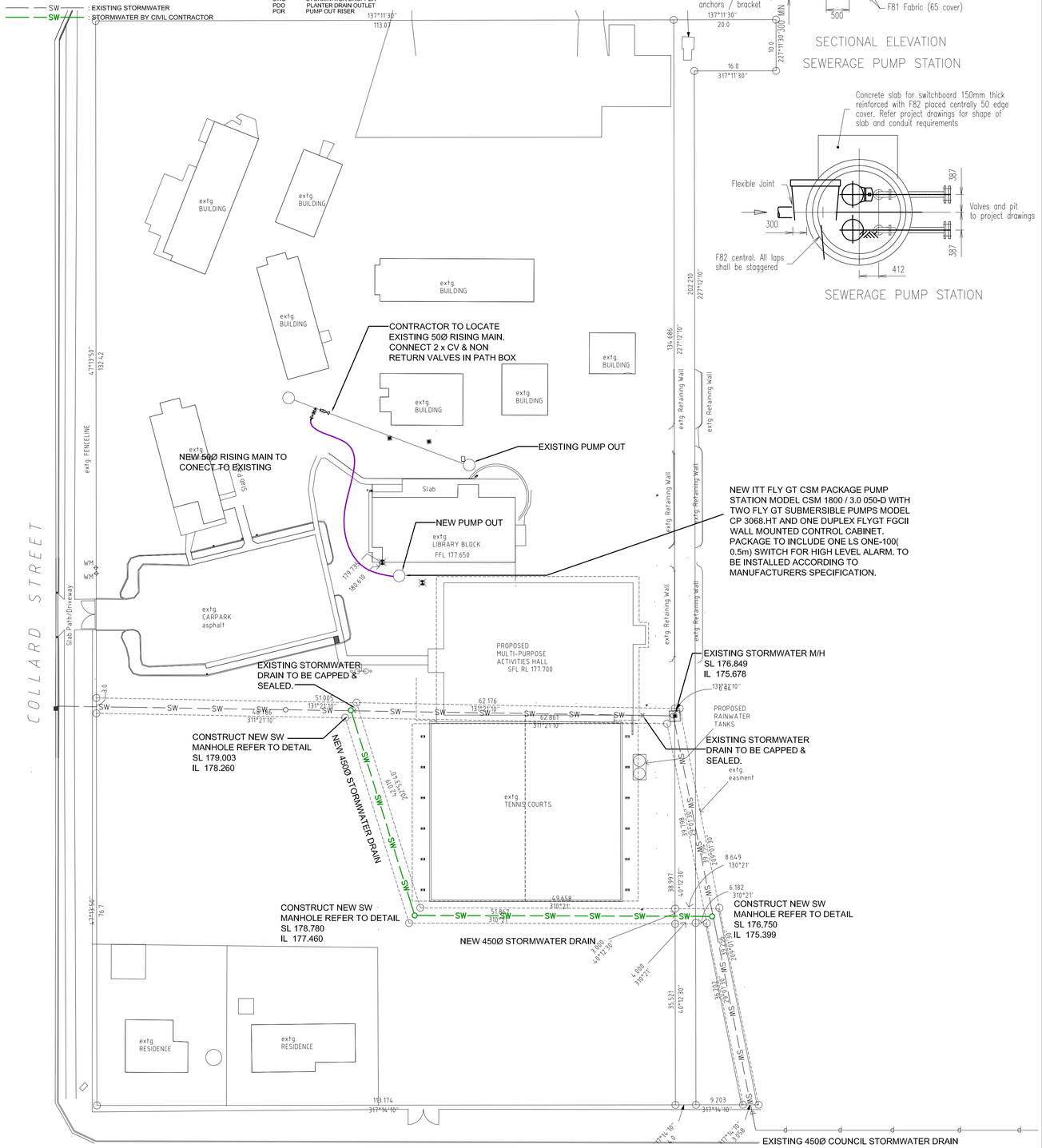
B	BASIN
IOS	INSPECTION OPENING TO SURFACE
CW	COLD WATER
DP	DOWN PIPE
DSK	DOUBLE SINK
FWG	FLOOR WASTE GULLY
ORG	OVERFLOW RELIEF GULLY
L/S	LITRES PER SECOND
HW	HOT WATER
IO	INSPECTION OPENING
SK	SINK
SHR	SHOWER
VP	VENT PIPE
WC	WATER CLOSET
WM	WASHING MACHINE
EPD	ELEVATED PIPEWORK DROPPER
FSR	FIRE SERVICE RISER
CWR	COLD WATER RISER
SWD	STORMWATER DROPPER
PDO	PLANTER DRAIN OUTLET
POR	PUMP OUT RISER

SERVICE TAG
DIRECTION OF FLOW
SERVICE INDICATOR (SERVICE / SIZE)
SIZE
DIRECTION OF FLOW



SECTIONAL ELEVATION
SEWERAGE PUMP STATION

SEWERAGE PUMP STATION



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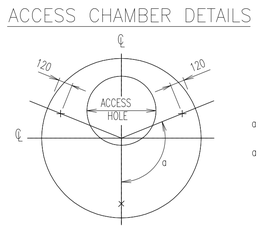

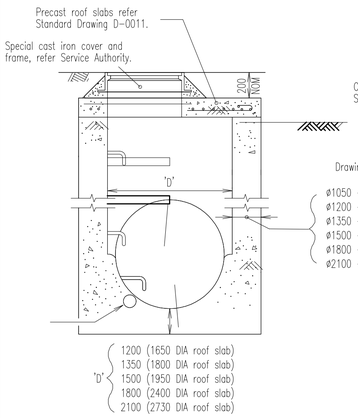

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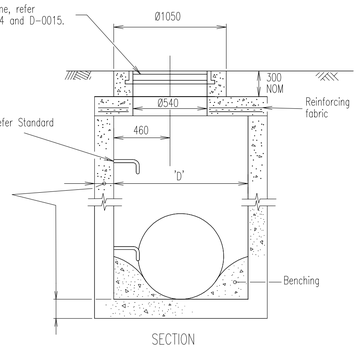

SECTION
ALTERNATIVE 2

NOTE : SYMBOLS ARE DRAWN IN THE CORRECT POSITION BUT ARE NOT SHOWN TO SCALE

Issue	Date	Amendment	Int.	App.
A	18/05/09	PRELIMINARY ISSUE	C.S	C.S
B	18/06/09	TENDER / APPROVAL ISSUE	C.S	C.S
C	30/07/09	TENDER / APPROVAL ISSUE	C.S	C.S
D	20/11/09	AMENDED BUILDING LAYOUT	C.S	C.S

COORDINATED REFERENCE DRAWINGS			
SERVICE	DRAWING NUMBER	ISSUE	DATE
ARCH			
ARCH			

LOT AND RP No:
LOT RP
PARISH: COUNTY:

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Hydraulic Consultant:

Water Wise Design
Hydraulic Consultant
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HERVEY BAY
P 4125 3510
F 4125 1802
EMAIL chriswwd@bigpond.net.au
QBSA No. 886793 AHSCA

Project:
PROPOSED MULTI-PURPOSE CENTRE & COVERED AREA
REDEEMER LUTHERAN PRIMARY SCHOOL
2 COLLARD STREET
BILOELA QLD

Title:
REDEEMER LUTHERAN

Owner:

Drawing Title:
HYDRAULIC SERVICES
SITE LAYOUT PLAN
STORMWATER LAYOUT

North Point:

BSA License No. 886793
Design: CHRIS SEARLE
Design Validated: CLIFFORD SEARLE
Drawn: CHRIS SEARLE

Date:	Scale:	Sheet:
NOVEMBER 2009	(A1) 1:500 (A3) 1:1000	1 OF 5

Job No:	Disc:	Dwg No:	Stage:	Issue:
090518		H-000	PR	D

0 10 20 30 40 50 ORIGINAL SIZE: A1

project name

Redeemer Stage 2 A BGA Application

project address

2 Collard Street Biloela QLD 4715

project owner

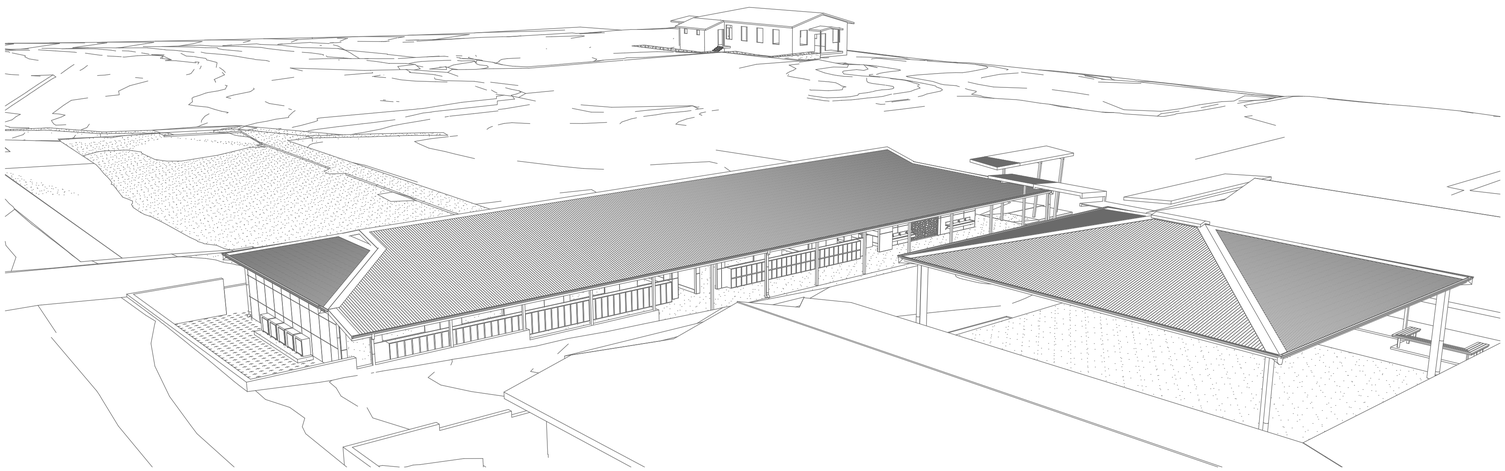
Redeemer Lutheran College, Biloela

drawing schedule

Architect :
BEAT Architects

Project No. BT251085

drw.	title	rev.
A000	Coversheet	P10
A100	Locality Plan & Existing & Demolition Site Plan	P10
A101	Proposed Site Plan	P10
A102	Proposed Carpark Plan	P9
A103	Proposed External Works Plan	P8
A200	Relocated Chapel & n.Uniform Shop Plans	P8
A201	Proposed Floor & Reflected Ceiling Plan	P8
A202	Proposed Roof Plans	P8
A300	Elevations	P8
A400	Sections	P8
A500	3D Views	P8



Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P10	25/05/26	Lot Number	TG

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If in doubt, ASK

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Coversheet

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QLD. 4700

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Reg. No. 2592

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design CB	drawn TG	chkd CB	
date 25/05/2026		job no. BT251085	
scale		dwg no. DA. A000	
orig size A1	sheet 1 of 3	rev. P10	

Proposed extent of works for relocating the e.Chapel, demolishing the e.Carpark and the proposed n.Carpark, Block P, and Covered Area. Refer to Proposed Plans.

Proposed extent of works for the relocated e.Chapel. Refer to A200 Relocated Chapel & n.Uniform Shop Plans.

Proposed Carparking bays

Locality Plan
1:1000

50m @ 1:1000
0 10 20 30 40 50

Existing & Demolition Site Plan
1:500

30m @ 1:500
0 10 20 30

REAL PROPERTY DESCRIPTION

LOT 1 ON RP607657
BANANA SHIRE
SITE AREA 23,980m²

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG
P10	25/05/26	Lot Number	TG

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COLOUR DRAWINGS
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Non colour copies will reduce information, detail and clarity.

Legend

- Existing Building.
- Existing Pathways & Carparks.
- Proposed Building.
- Proposed Pathways & Carpark.
- To Be Demolished.
- Proposed Area of Works.
- Contour Lines.
- Sewer.
- W – Water.
- Comms.
- Electrical.

Abbreviations

CA	Covered Area.
e/exist.	Existing.
Emt.	Easement.
FH	Fire Hydrant.
LP	Light Pole.
n.	New.
PP	Power Pole.
r.	Relocated.
RL.	Relative level.
SM	Sewer manhole.
SW	Stormwater.
WM	Water meter.
WV	Water Valve.

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Locality Plan & Existing & Demolition Site Plan

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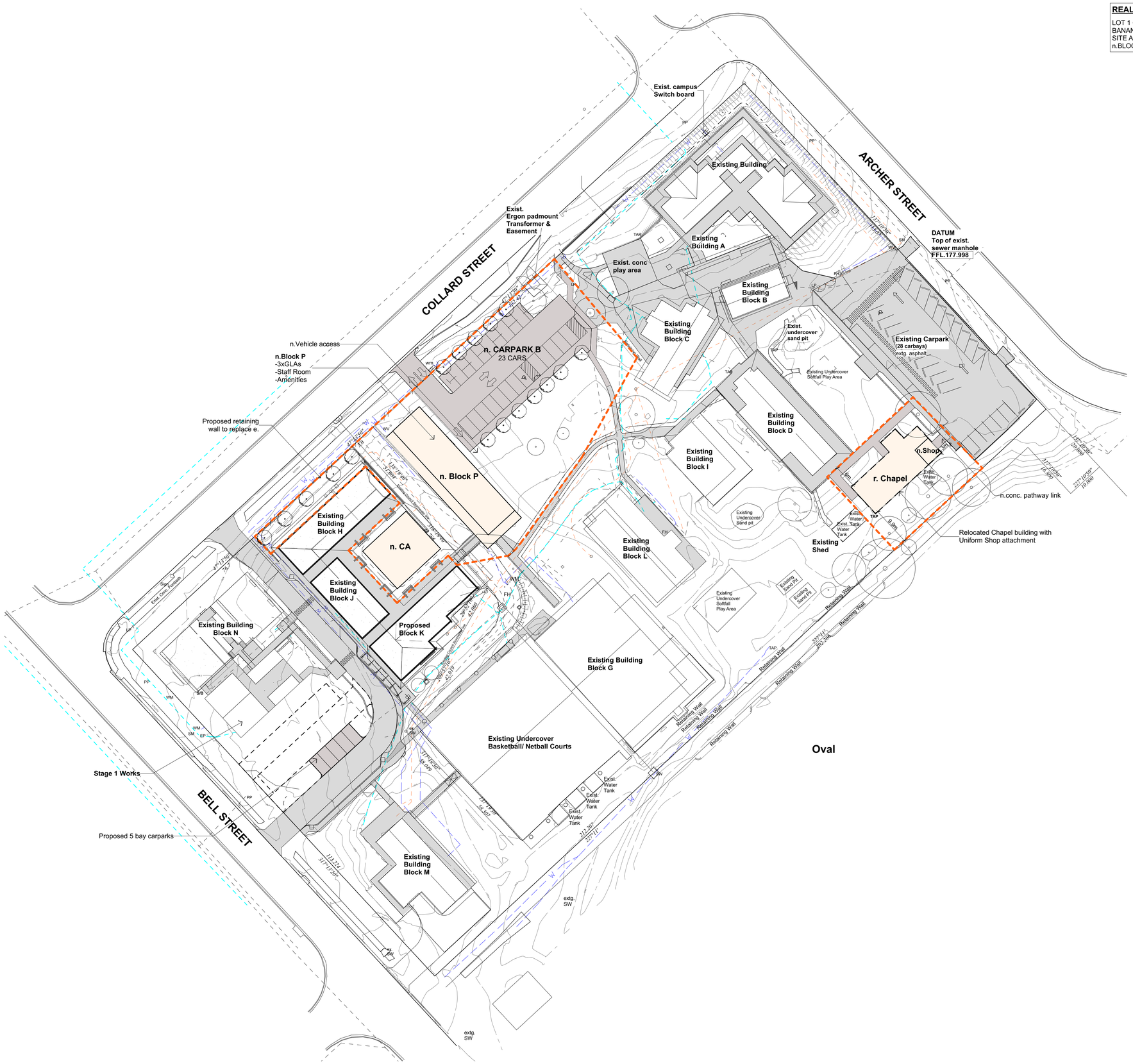
design	CB	drawn TG	chkd CB
date	25/05/2026	job no.	BT251085
scale	1:500, 1:1000	dwg no.	DA. A100
orig size	A1	sheet 2 of 3	rev. P10



Proposed Site Plan
1:500

30m @ 1:500
0 10 20 30

REAL PROPERTY DESCRIPTION

LOT 1 ON RP607657
BANANA SHIRE
SITE AREA 23,980m²
n.BLOCK P GFA: 448m²

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG
P10	25/05/26	Lot Number	TG

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- Existing Pathways & Carparks.
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- Proposed Pathways & Carpark.
- To Be Demolished.
- Proposed Area of Works.
- Contour Lines.
- Sewer.
- W – Water.
- Comms.
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LP	Light Pole.
n.	New.
PP	Power Pole.
r.	Relocated.
RL.	Relative level.
SM	Sewer manhole.
SW	Stormwater.
WM	Water meter.
WV	Water Valve.

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

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title
Proposed Site Plan

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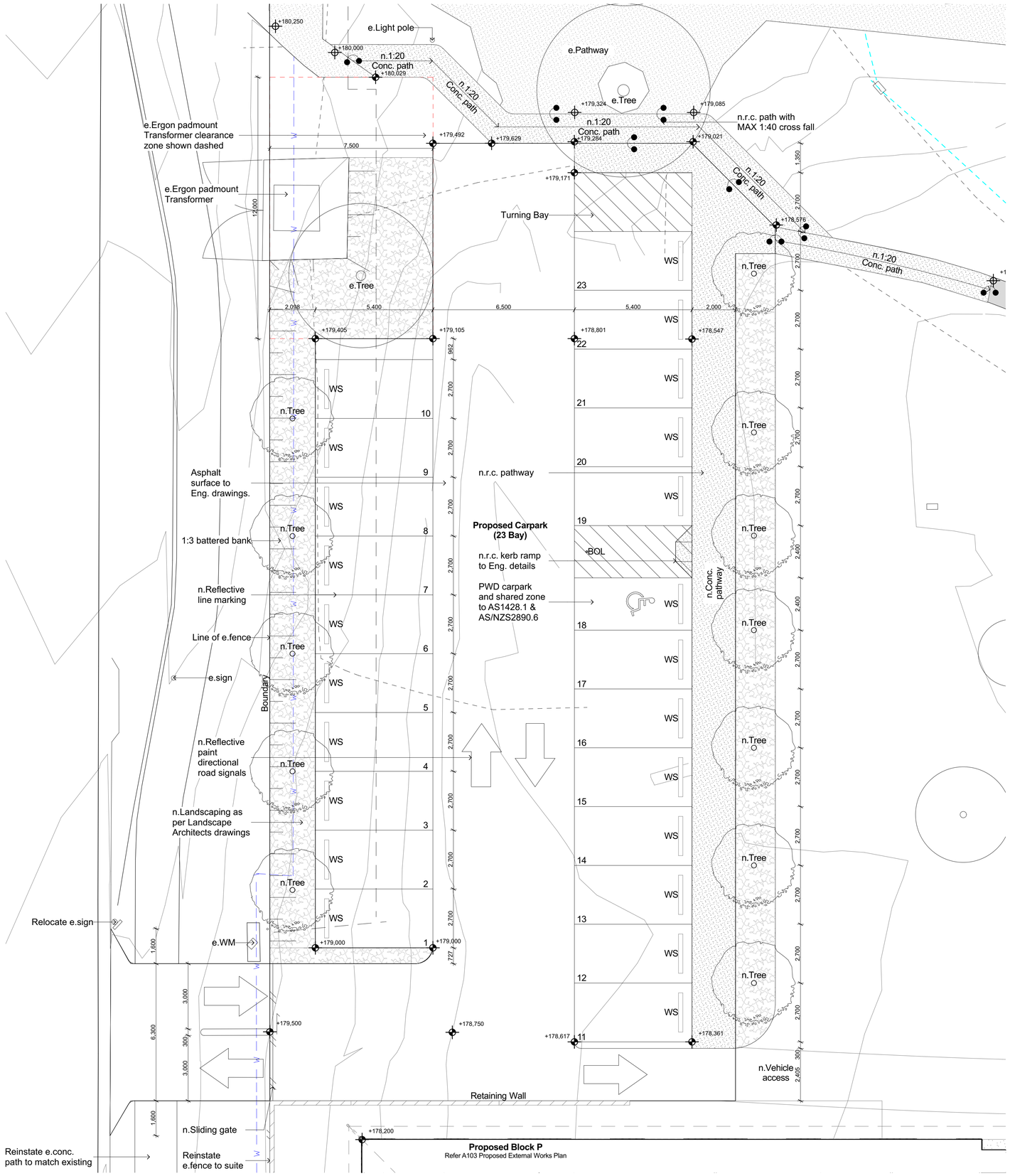
design	CB	drawn TG	chkd CB
date	25/05/2026	job no.	BT251085
scale	1:500	dwg no.	DA. A101
orig size	A1	sheet 3 of 3	rev. P10



Carpark Plan
1:100

Notes

1. Car bays 5,400 x 2,700mm typically.
2. Pathways max 1:20 rise and max 1:40 cross fall.
3. Carpark signage to Australian Standards.
4. Refer Civil Engineers Drawings for Carpark Levels and falls & kerb and channel details.
5. Reflective line marking to all car bays to Australian Standards.
6. Make good road seal to Eng. Details.
7. PWD carpark to AS1428.1 & AS/NZS2890.6.
8. All levels are as provided by surveyor C.O.S.

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
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P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG

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Abbreviations

BF	Broom Finish.
BOL	Bollard.
COL	Column.
Conc.	Concrete.
C.O.S	Confirm on Site.
DP	Downpipe.
e/exist.	Existing.
n.	New.
RL	Relative level.
SM	Sewer manhole.
SW	Stormwater.
Typ.	Typical.
WM	Water meter.
WS	Wheel Stop.
WV	Water Valve.

e.RL - Refer Survey Drawings.
n.RL - Refer Civil Eng. Drawings.
Flush

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

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title
Proposed Carpark Plan

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design CB	drawn TG	chkd CB	
date 25/05/2026	job no. BT251085		
scale 1:100	dwg no. DA. A102		
orig size A1	sheet	of	rev. P9

5m @ 1:100
0 1 2 3 4 5

External Works Plan
1:100

5m @ 1:100
0 1 2 3 4 5

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
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P8	11/05/26	Preliminary DA Plans	TG

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n.RL - Refer Civil Eng. Drawings.
Flush

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Proposed External Works Plan

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design CB	drawn TG	chkd CB	
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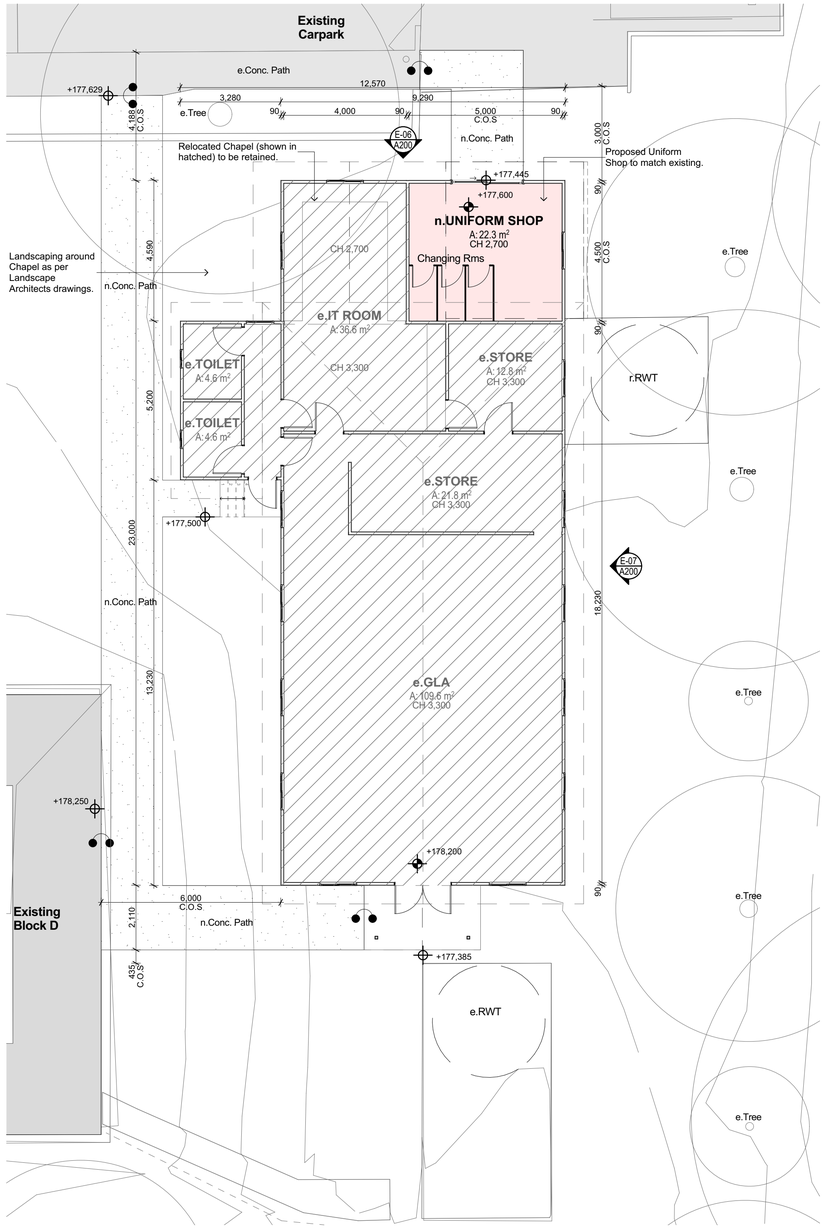
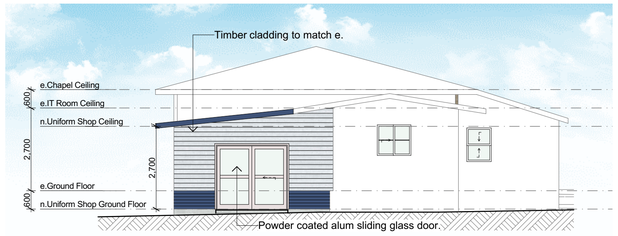
orig size A1	sheet	of	rev. P8



0. Proposed Chapel Floor Plan
1:100



E-06 North-East Uniform Shop Elevation
1:100

E-07 South-East Uniform Shop Elevation
1:100

5m @ 1:100
0 1 2 3 4 5

Revisions

rev	date	description	by
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

Building Application Notice

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AC	Air Conditioner.
Alum	Aluminium.
AMB	Ambulant.
COL	Column.
Conc.	Concrete
D	Door.
DP	Downpipe.
DW	Dishwasher
e.	Existing.
GLA	General Learning Area.
HB	Hand basin.
HD	Hand dryer.
n.	New.
r.c/conc.	Reinforced Concrete.
REF	Refrigerator.
SNK	Sink.
s/s	Stainless steel.
typ.	Typical.
USAT	Unisex Accessible Toilet.
W	Window.
WB	White Board.
WC	Water closet.
ZIP	ZIP Chiller & Boil Unit

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

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2 Collard Street Biloela QLD 4715

title
Relocated Chapel & n.Uniform Shop Plans

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date 25/05/2026		job no.	BT251085
scale 1:100		dwg no.	DA. A200
orig size A1	sheet	of	rev P8

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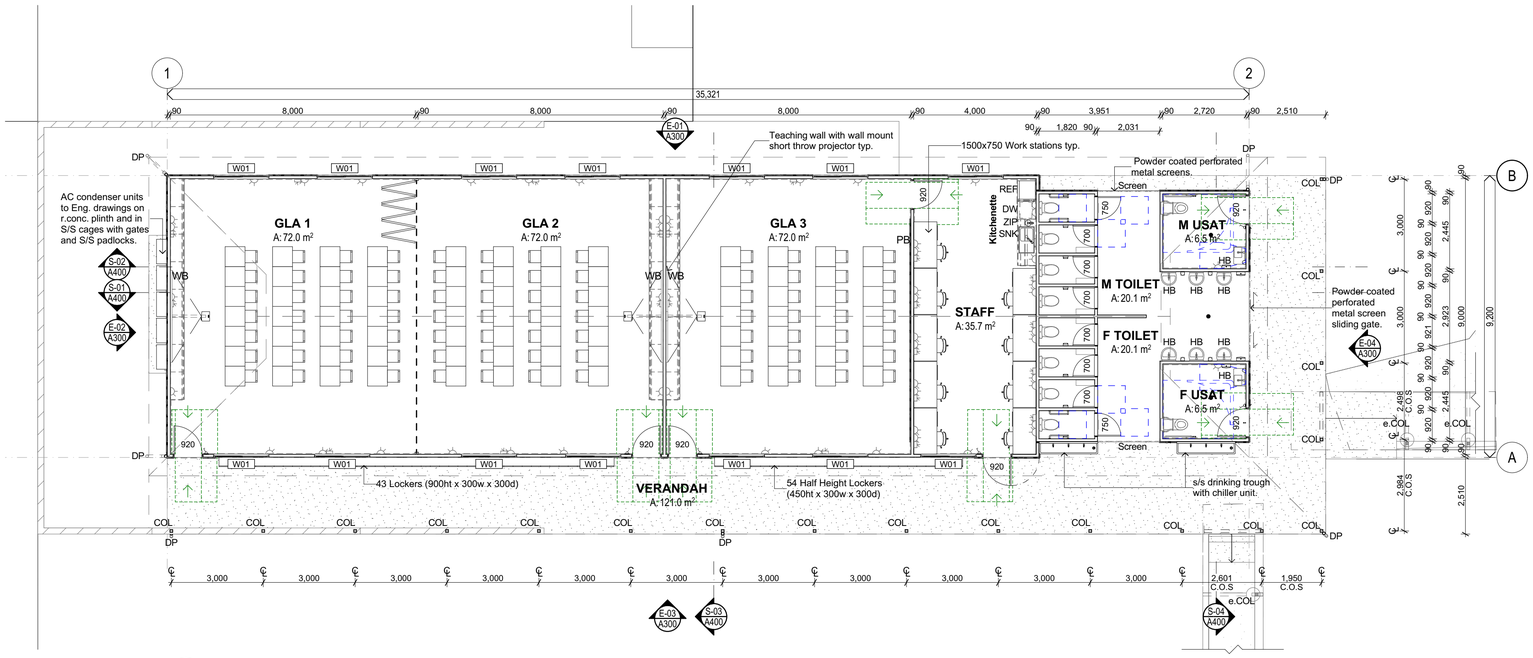
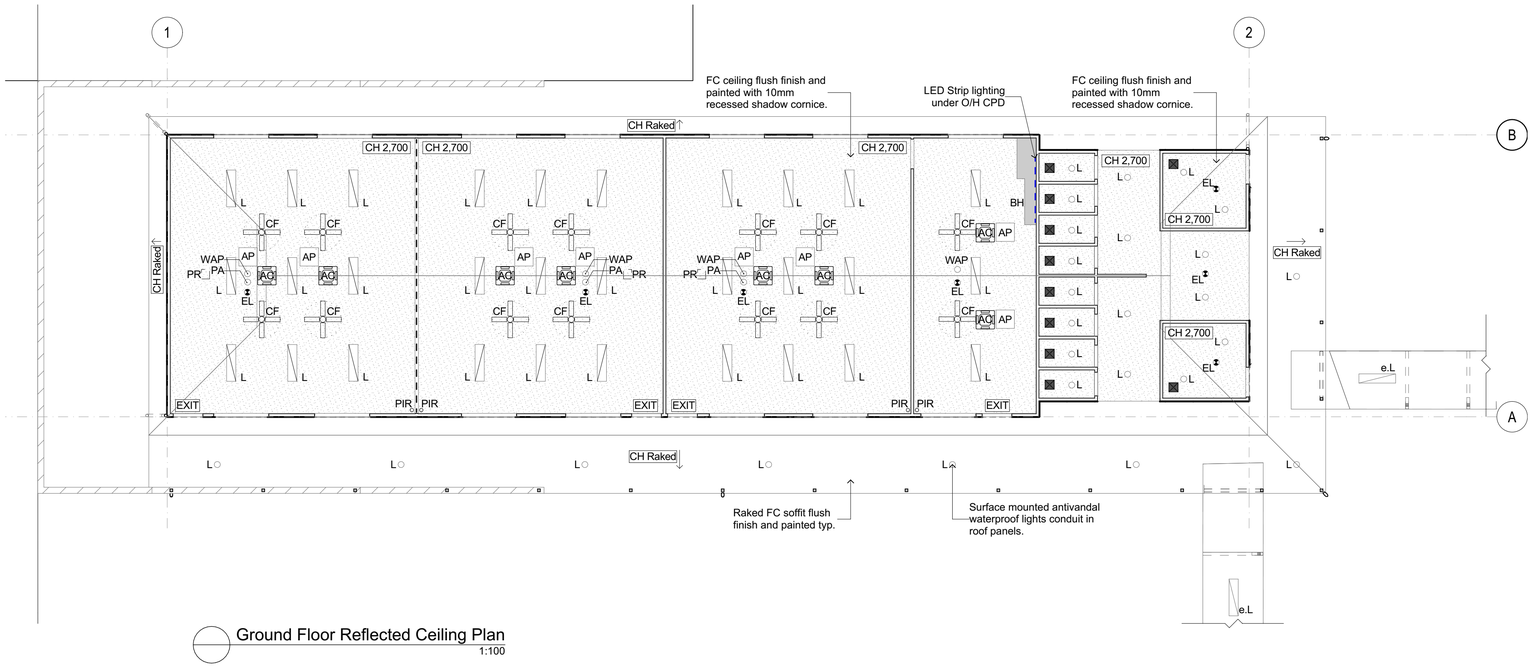


Proposed Ground Floor Plan
1:100



Ground Floor Reflected Ceiling Plan
1:100

Abbreviations

AC	Air Conditioner.
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Conc.	Concrete
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s/s	Stainless steel.
typ.	Typical.
USAT	Unisex Accessible Toilet.
W	Window.
WB	White Board.
WC	Water closet.
ZIP	ZIP Chiller & Boil Unit

RCP Notes

1. Layout shown is indicative; refer Electrical & Mechanical Engs. drawings for details.
2. Regardless of specification ceiling light colour to match ceiling.
3. Toilet lights to be on timer switch and sensor.
4. External lights to be on timer switch.
5. Provide 150mm mineral wool blanket insulation to 100% of ceiling area, do not cover over light fittings.
6. Ensure all wirse & cables are suspended above insulation in ceiling space.

RCP Legend

AC	Air Conditioner.
AP	Access Panel.
CF	Ceiling fan, (all lights to be clear of fan arc).
CH	Ceiling Height
e.	Existing.
EL	Emergency light.
EXIT	Illuminated exit light.
L	Surface mount batten light
L	Ceiling recessed downlight.
LS	Light switch.
PA	PA System.
PIR	PIR Sensor.
PR	Projector.
	Vent.
WAP	Wireless Access Point.

5m @ 1:100
0 1 2 3 4 5

Revisions

rev	date	description	by
P1	18.12.25	Preliminary Issue	TG
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24.03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

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Project Details

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Redeemer Lutheran College, Biloela

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Proposed Floor & Reflected Ceiling Plan

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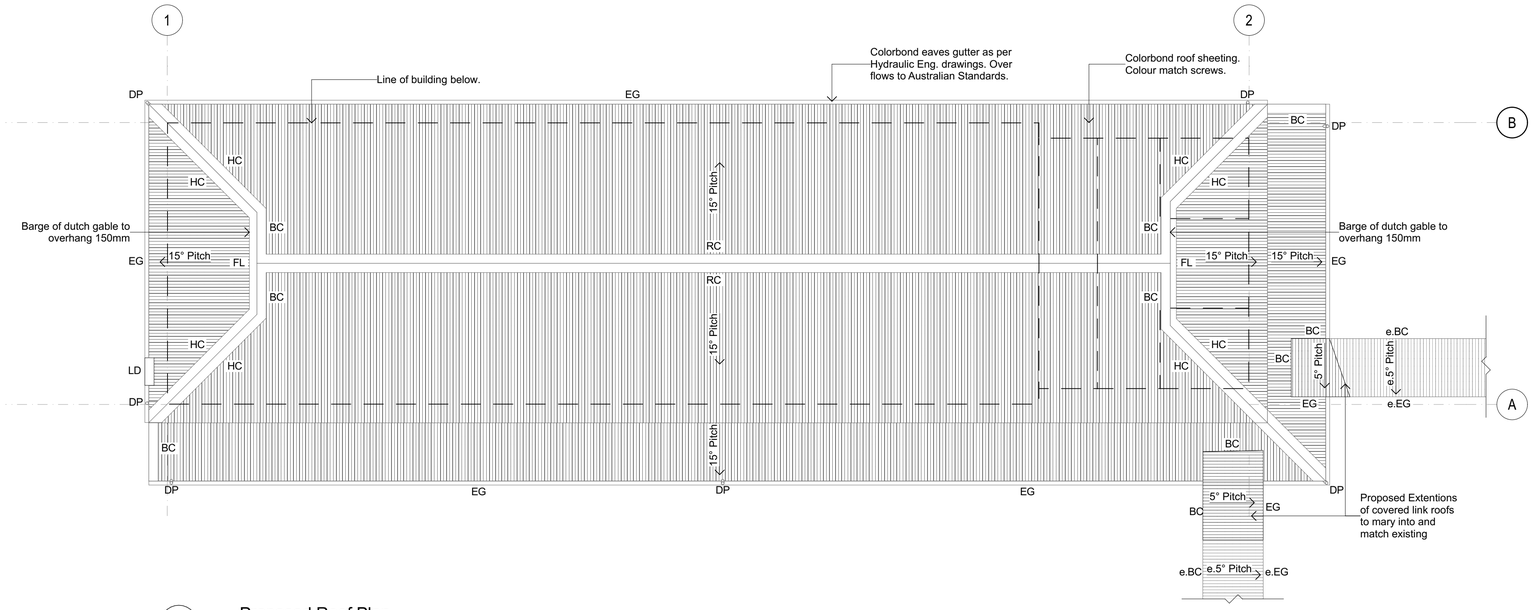
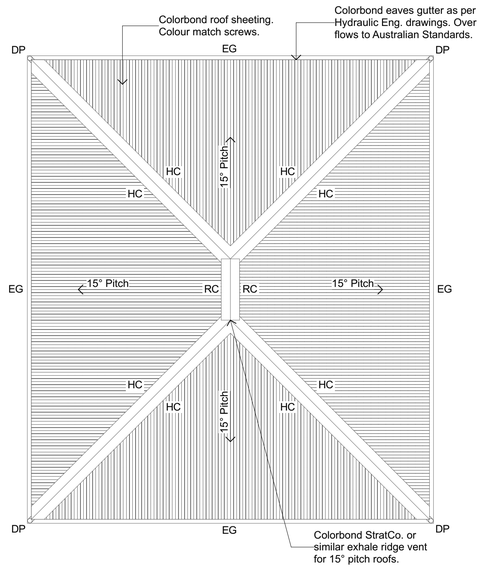
date	25/05/2026	job no.	BT251085
scale	1:100	dwg no.	DA. A201
orig size	A1	sheet of	rev. P8



Proposed Roof Plan
1:100



CA Proposed Roof Plan
1:100

General Roof Notes

1. Roof anchor layout not shown. Provide roof anchors to roof as per Australian Standards. Supplier to provide design and layout.
2. Provide Colorbond flashing from ridge down to penetration.
3. Fall gutters min 1:500 to DP's

Abbreviations

BC	Barge capping.
DP	Downpipe.
e.	Existing.
EG	Eaves gutter.
FL	Flashing.
HC	Hip capping.
LD	Access ladder.
RC	Ridge capping.
5°	Roof pitch and direction of fall.
	Gutter fall.

5m @ 1:100
0 1 2 3 4 5

Revisions

rev	date	description	by
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

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Project Details

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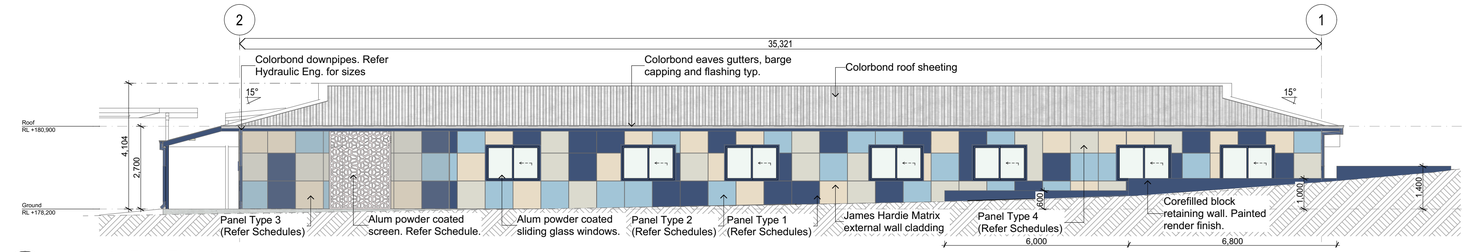
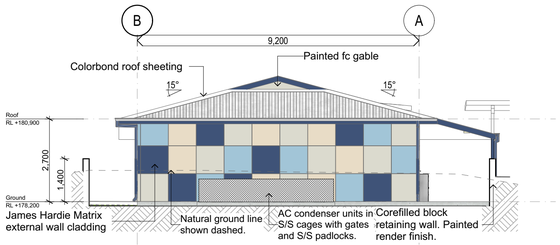
design CB	drawn TG		chkd CB
date 25/05/2026		job no.	BT251085
scale 1:100		dwg no.	DA. A202
orig size A1	sheet of	rev.	P8



E-01 North-East Elevation
1:100



E-02 North-West Elevation
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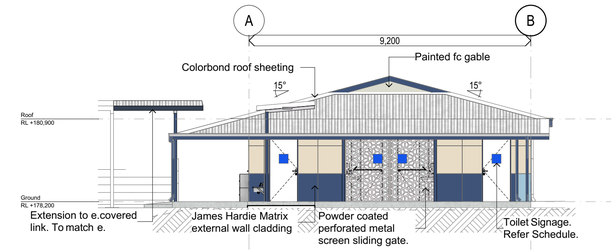

E-04 South-East Elevation
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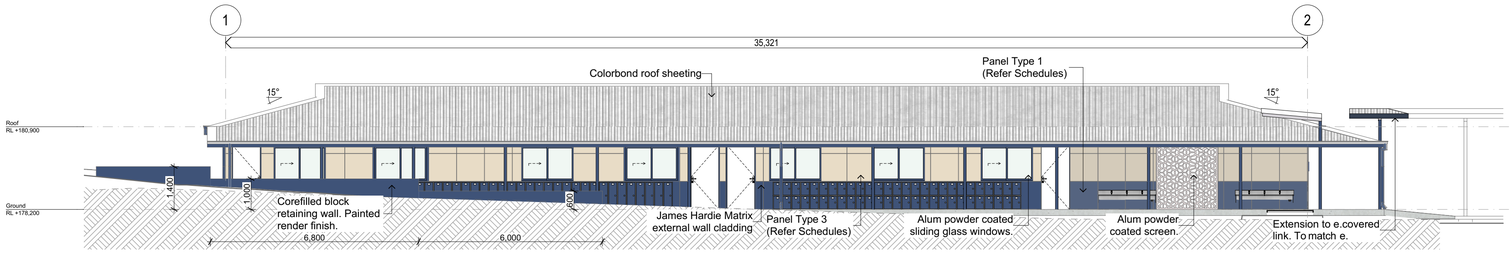

E-03 South-West Elevation
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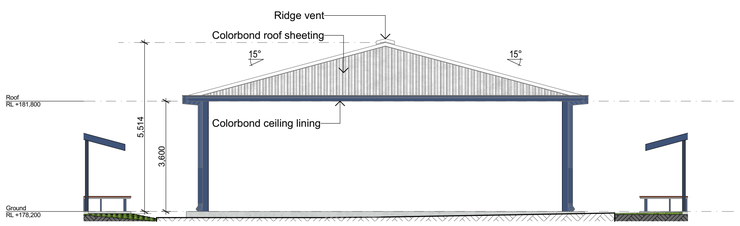

E-05 Typ. Covered Area Elevation
1:100

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

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Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

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2 Collard Street Biloela QLD 4715

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Elevations

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orig size A1	sheet	of	rev. P8

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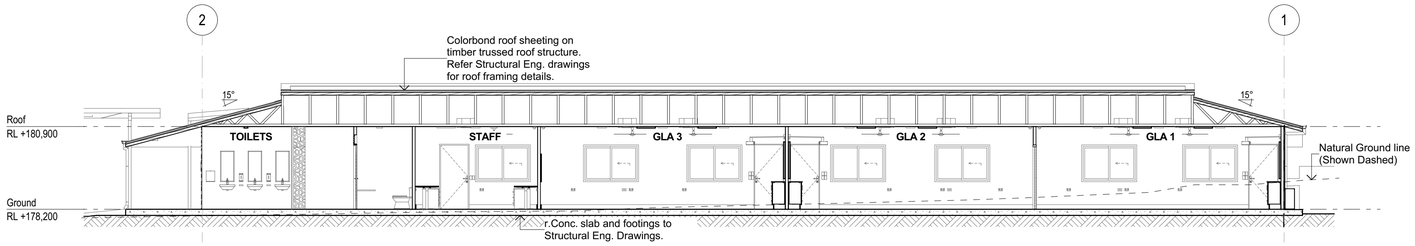

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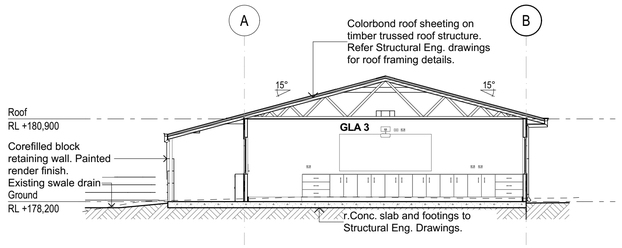

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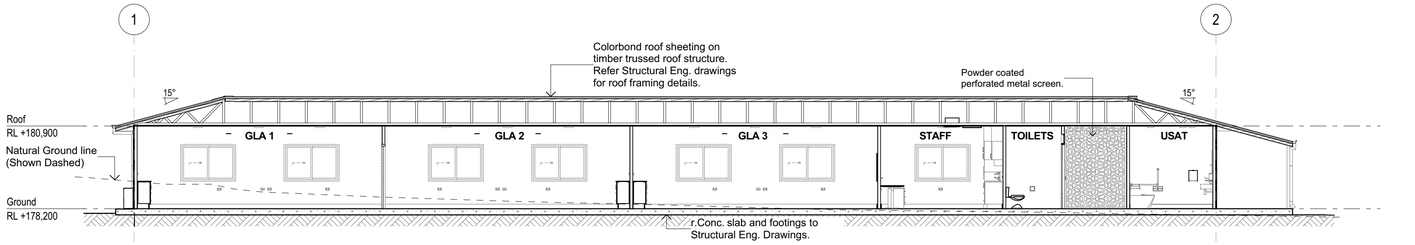

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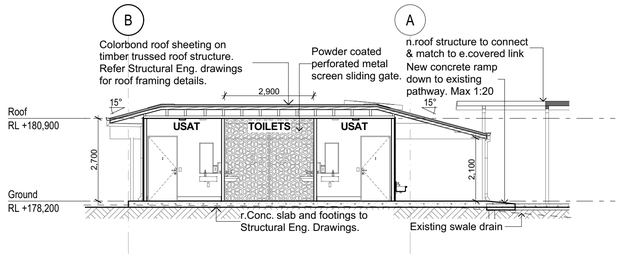

S-04 Section
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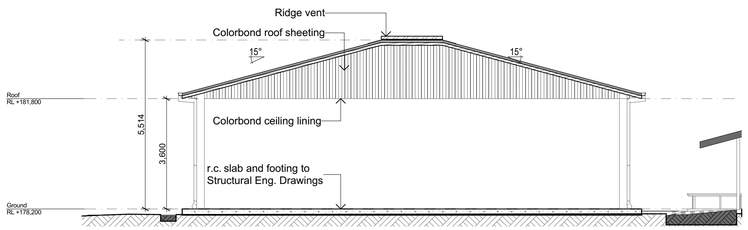

S-05 Covered Area Section
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Revisions

rev	date	description	by
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

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Project Details

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date 25/05/2026		job no. BT251085	
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orig size A1	sheet	of	rev. P8

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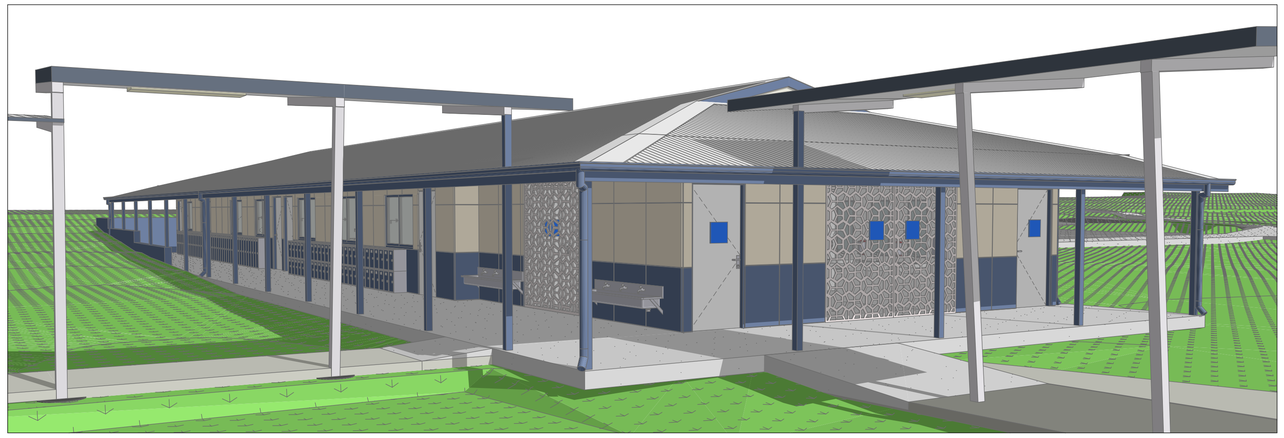

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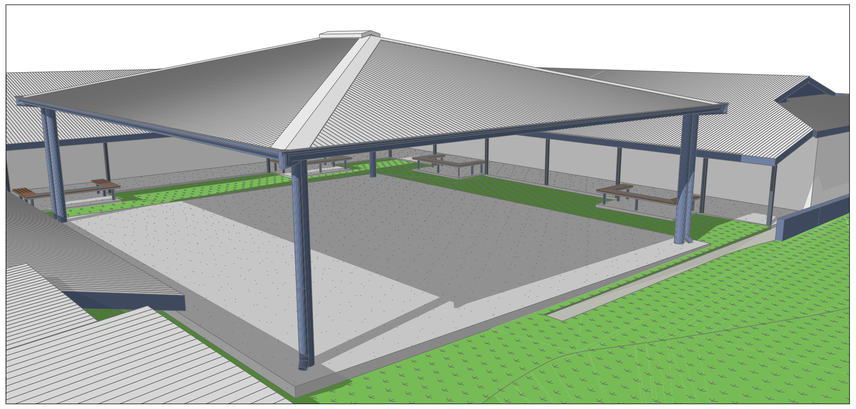
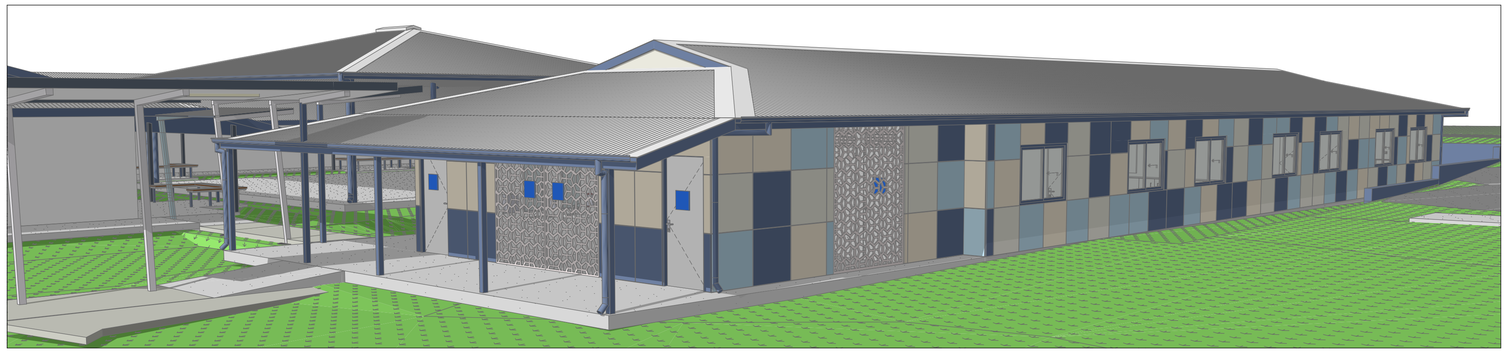


Covered Area 3D View



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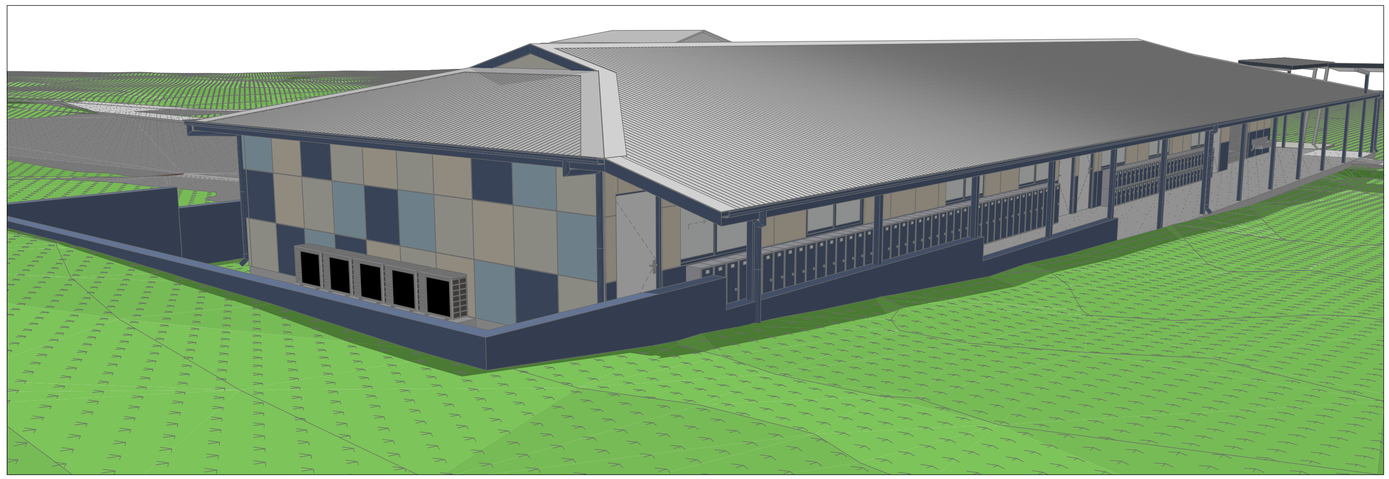

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Revisions

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P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
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3D Views

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orig size A1	sheet	of	rev P8

APPENDIX B: ASSESSMENT AGAINST ASSESSMENT BENCHMARKS

Community facilities zone code

Table 5.8.3—For assessable development

Performance outcomes	Response
General	
PO1 Development for community activities and services occurs on the same site or adjoining sites to other community-based activities or services of a similar nature. and	**Complies with PO1** The proposal involves an extension to an existing educational establishment on the same site.
PO2 Land uses with the potential to be affected by the operation of community activities or services on an adjoining site provide buffering and screening on the development site to prevent any negative impact from the community activity or service.	**Complies with PO2** The proposal is for an extension to an existing educational establishment. The site is bound by roads, and the only adjoining property is the school oval which is part of the educational establishment. The new buildings are limited to a single storey and will be setback from all adjoining uses. A Landscape Concept Plan has been prepared to buffer and screen the development.
Built form	
PO3 The built form and appearance of development continues the form and streetscape character of the surrounding area.	**Complies with PO3** The development has been designed to be sympathetic to surrounding built form and will tie in neatly with existing buildings on the site. The development will be limited to a single storey to ensure it is consistent with the prevailing bulk and scale.
Amenity	
Where sharing a common boundary with land in the General Residential Zone **PO4** Landscaping and fencing along the full length of each common boundary protects the privacy and amenity of adjoining residences. and	**N/A**
In all instances **PO5** Outdoor activities associated with the use maintain the early morning and late evening amenity of the surrounding area. and	**Complies with PO5** The aspects of the proposed development that may facilitate outdoor activities will be used in association with the existing established school. The proposal will therefore maintain the early morning and late evening amenity of the surrounding area.
PO6 Plant and service equipment (air conditioning, exhaust fans, lift motor rooms, telecommunication devices, etc.) is	**Complies with PO6**

Performance outcomes	Response
acoustically screened and are fully screened from view at the property boundary. and	All plant will be screened. A condition to this effect can be included.
PO7 Light spill from the premises does not create a nuisance outside the site. and	**Complies with PO7** All lighting will be internal and not cause nuisance outside the site.
PO8 The air quality objectives of the *Environmental Protection (Air) Policy 2019* are maintained for the ongoing operation of the use. and	**Complies with PO8** The proposal will not cause any air quality impacts, due to the nature of the use.
PO9 The acoustic objectives of the *Environmental Protection (Noise) Policy* 2019 are maintained for the ongoing operation of the use. and	**Complies with PO9** The proposed addition will be used in association with the existing established school. The site will be used during business hours and is not expected to create noise impacts for surrounding development.
PO10 Landscaping contributes to the established streetscape, protects visual amenity and offers effective screening of unsightly activities.	**Complies with PO10** A Landscape Concept Plan has been prepared to buffer and screen the development. The new car parking areas will incorporate landscaping to break up hardstand areas but also to screen the development.
Servicing	
PO11 Development is serviced with infrastructure and services to a standard suitable to the development and location.	**Complies with PO11** The site will continue to be serviced by all urban infrastructure. An Engineering Services Report has been prepared which details all service connections.
Streetscape and activity	
PO12 New buildings create street activation and a safe and secure environment.	**Complies with PO12** The new buildings have clear entry points that assist with wayfinding and street activation. The new buildings are in addition to an established secure use that provides street activation.
Separation distances	
Where in Precinct 1 or Precinct 4 and adjoining the Rural Zone	**N/A**

Performance outcomes	Response
PO13 The siting of new sensitive uses protects the ongoing operation of special or extractive industries operating in the Rural Zone and any associated transport routes. and	
PO14 New sensitive land uses are separated from agricultural production uses and activities so that they: (a) do not result in any loss of agricultural productivity in the Rural Zone; (b) are not exposed to impacts associated with chemical spray drift, noise, dust, odours or other emissions; and (c) do not represent a biosecurity risk to agriculture;	**N/A**
Caretaker's accommodation	
PO15-PO16	**Not Applicable** The proposal is not mapped within this overlay
For development affected by one or more overlays	
Agricultural land	
PO17-PO23	**Not Applicable** The proposal is not mapped within this overlay
Biodiversity	
PO24-PO27	**Not Applicable** The proposal is not mapped within this overlay
Bushfire risk	
PO28-PO35	**Not Applicable** The proposal is not mapped within this overlay
Extractive and mining resources	
PO36-PO40	**Not Applicable** The proposal is not mapped within this overlay
Flood risk	
Generally **PO41** Development is designed and sited to ensure structures are adequate to resist hydrostatic, hydrodynamic and debris impact loads associated with the defined flood event. and	**Complies with PO41** The site is partially affected by flooding along the eastern boundary. It is noted that all new works will be located outside the flood hazard area. As all new buildings and works will be located outside the flood hazard area it is considered that the proposal will not result in additional risk to property.
PO42 Development directly, indirectly and cumulatively avoids any increase in water flow depth, duration or velocity and does	**Complies with PO42** The site is partially affected by flooding along the eastern boundary. It is noted that all new works will be located outside

Performance outcomes	Response
not increase the potential for flood damage either on site or on other properties. and	the flood hazard area. A Site Based Stormwater Management Plan has been prepared to manage stormwater flows and to ensure no nuisance is caused.
PO43 Public safety and the environment are protected from the detrimental impacts of the release of hazardous materials into floodwaters. and	**Complies with PO43** The storage of hazardous materials is not proposed.
PO44 Essential community infrastructure in any area mapped as Flood Hazard is able to function effectively during and immediately after flood. and	**N/A**
For development in Theodore only **PO45** All development within the town of Theodore is subject to a fit-for-purpose Flood Risk Assessment prepared by a suitably qualified person in accordance with the Flood Planning Scheme Policy. and	**N/A**
PO46 Development is located: (a) south of Seventh Avenue; (b) outside of and can evacuate the site without passing through the 5% AEP area mapped on Overlay Map OM-0402; and (c) outside the areas identified on Overlay Map OM-0402 as Flood Hazard Vulnerability Class H4 or higher; or	**N/A**
PO47 Development north of Seventh Avenue or inside the 5% AEP or H4 and higher Flood Hazard Vulnerability Classes is located, designed and operated in accordance with the recommendations of the Flood Risk Assessment required by PO40. and	**N/A**
PO48 Land use is compatible with the flood hazard for Theodore and does not include uses that have high concentrations of people or are difficult to evacuate such as child care centre, health care service, hospital, veterinary service (if involving animal keeping) or commercial accommodation activity. and	**N/A**

Performance outcomes	Response
PO49 The design and layout of the development provides for: (a) vehicle parking and other low-intensity, non-habitable activities at ground level; (b) work areas above parking areas to increase flood immunity; (c) expensive plant, equipment and stock in the part of the site with the greatest flood immunity; and	**N/A**
PO50 Building materials and surface treatments used below the defined flood event are resistant to water damage and do not include wall cavities that may be susceptible to the intrusion of water and sediment. and	**N/A**
PO51 Electrical switchboards, data servers and the like are located 300mm above the defined flood event or are designed and constructed to withstand submergence in flood water. and	**N/A**
PO52 Plumbing fixtures connected to the reticulated sewerage network are designed to be 300mm above the defined flood event or are fitted with reflux valves to prevent the intrusion of flood water into the sewerage network. and	**N/A**
For development in other locations **PO53** Development does not result in any increase in exposure to flood risk for all flood events up to and including the defined flood event. and	**Complies with PO53** The site is partially affected by flooding along the eastern boundary. It is noted that all new works will be located outside the flood hazard area. As all new buildings and works will be located outside the flood hazard area it is considered that the proposal will not result in additional risk to property.
PO54 Services infrastructure is designed and constructed to prevent risk of electrocution or intrusion of flood water into reticulated networks. and	**Complies with PO54** An Engineering Services Report has been prepared which demonstrates the site can be adequately serviced without services being affected by flood impacts.
PO55 Siting and layout provides safe pedestrian and vehicular access and egress for all flood events up to and including the defined flood event. and	**Complies with PO55** The site is partially affected by flooding along the eastern boundary. It is noted that all new works including new pedestrian links will be located outside the flood hazard area
For reconfiguring a lot only	**N/A**

Performance outcomes	Response
PO56 The number of lots exposed to flood risk for all flood events up to and including the defined flood event is not increased.	
Heritage	
PO57-PO63	**Not Applicable** The proposal is not mapped within this overlay
Infrastructure	
Water treatment, wastewater treatment and waste disposal facilities **PO64** Separation distances are established between solid waste management facilities, water or sewerage treatment plants and incompatible land uses that protects the ongoing operation of the facility and the amenity for occupants or users of nearby premises. and	**Complies with PO64** The site is setback a suitable distance from all solid waste management facilities, water or sewerage treatment plants.
Roads and railway **PO65** Development on premises with a frontage to the road corridors shown on Infrastructure Overlay Maps OM-07A01 - OM-07A05 mitigates the potential adverse impacts of the road corridor including traffic noise, headlights and streetlights. and	**N/A**
PO66 Sensitive land uses on land with a frontage to the road corridors shown on Infrastructure Overlay Maps OM-07A01 - OM-07A05 achieve a level of amenity consistent with the intended use. and	**N/A**
PO67 Development provides protection for site users from unreasonable interference associated with rail operations noise. and	**Complies with PO67** The site is setback a suitable distance from all rail infrastructure.
PO68 Development protects rail corridors from intrusion of incompatible land use by incorporating separation distances consistent with the intended use. and	**Complies with PO68** The site is not in proximity to any rail corridors.
Coal load-out facility and haul route **PO69** Uses are protected from adverse noise, vibration, air emissions and traffic safety impacts associated with the intensive haulage of coal along a Coal Train Load-Out Facility Haul Route and operation of a Coal Train Load-Out Facility identified on Overlay Map OM-07B01.	**N/A**

Performance outcomes	Response
and	
Oil and gas pipelines **PO70** Separation distances between petroleum and natural gas pipeline infrastructure and people, property and hazardous materials establishes a low risk of harm or damage to people, property and the infrastructure. and	**N/A**
Power station **PO71** Separation distance between sensitive land uses and the power station protects the safety and amenity for occupants or users of nearby premises and the continued and unimpeded operation of the power station. and	**N/A**
PO72 There is no increase in the number of lots in the separation area associated with the power station as identified on Infrastructure Overlay Map OM-07C05. and	**Complies with PO72** The proposal is not for a reconfiguration of lots.
Electricity **PO73** Development is separated from major electricity infrastructure or substations and incorporates buffers to maintain public health and safety, residential amenity and allow access to infrastructure for maintenance. and	**Complies with PO73** The site is separated from major electricity infrastructure and substations.
PO74 Development dedicates part of the site to establish landscaping which screens or otherwise softens the visually obtrusive impacts of electricity infrastructure.	**N/A**
Water resources	
PO75 Development within the Callide and Kroombit Dam Water Resource Catchment Areas or the weir buffers shown on Overlay Map OM-08 protects the quality and availability of raw water for consumption, as determined by a suitably qualified water quality expert. and	**N/A**
PO76 Stormwater releases and development discharges do not compromise the achievement of water quality objectives of receiving waters, including the groundwater management areas identified on Overlay Map OM-08. and	**Complies with PO76** A Site Based Stormwater Management Plan has been prepared to manage stormwater flows and to ensure no nuisance is caused. Water quality is also addressed.

Performance outcomes	Response
PO77 Development does not deteriorate the quality of water supplies obtainable from a town water supply bore identified on Overlay Map OM-08.	**Complies with PO77** The proposal will not deteriorate the quality of water supplies obtainable from a town water supply bore

6.3.1 Development Design Code

6.3.1.3 Requirements for accepted development or assessment benchmarks

Performance Outcomes	Response
PO1 Access arrangements protect the efficient functioning of the transport network and provide safe access to development in direct response to the demonstrated demand of the development. and **PO2** There is no damage to or interference with the location, function or access to any utility infrastructure.	**Complies with PO1 and PO2** The existing access arrangements will remain unchanged with the exception of the reconstruction of the Collard Street access. A Traffic Impact Assessment has been prepared confirming the access will be provided in accordance with the relevant standards.
PO3 Any off-site impact from earthworks is minimised and acceptable having regard to: (a) the environment in which the earthworks are located; (b) the measures proposed to mitigate any off-site impact; (c) any compensation measures for an impact that are proposed by the applicant; and **PO4** The earthworks are safe and stable and **PO5** Community safety is ensured in the event that Category 3 earthworks fail. and **PO6** Retaining walls protect the visual amenity of development on adjoining premises. and **PO7** Fill material provides support for the proposed development in accordance with certified geotechnical engineering requirements. and	**Complies with PO3 - PO9** Engineering Plans have been prepared to show the extent of site works including retaining walls and to confirm the works will comply with the relevant standards. All works have been designed and certified by an RPEQ.

Performance Outcomes	Response
PO8 Filling or excavation does not result in the contamination of land or water bodies, wetlands and waterways. and **PO9** Filling or excavation does not cause environmental nuisance impacts.	
PO11 The development provides car parking spaces to accommodate the demonstrated demand generated by the use. and **PO12** The site provides safe and convenient movement areas for pedestrians and persons in wheelchairs. and **PO13** The movement of vehicles on to and from the site does not create a traffic hazard. and **PO14** Vehicle parking areas protect the character of surrounding development.	**Complies with PO11 - PO14.** A Traffic Impact Assessment has been prepared which demonstrates the site will be provided with adequate car parking. The assessment also demonstrates that site access and manoeuvring is provided in accordance with the relevant standards. The car parking areas will be screened with landscaping to protect the character of the surrounding area.
PO15 Landscaping does not interfere with motorists' sightlines. and **PO16** Landscaping provides buffering and screening, shades activity areas and allows casual surveillance of the street. and **PO17** Landscaped areas with species selected to suit the streetscape are provided adjacent to all road frontages (excluding crossover and pedestrian access). and **PO18** Landscaping provides shading for the majority of spaces in outdoor parking areas. and	**Complies with PO15 – PO21** A Landscape Concept Plan has been prepared to demonstrate that landscaping will be provided to buffer and screen the development but to also provide shade and an attractive streetscape. Landscaping will be provided to ensure it does not impact infrastructure. All landscaping will be suited to the local climate.

Performance Outcomes	Response
PO19 Landscaping does not pose a potential risk to the ongoing operation of public infrastructure. **PO20** Plant species used in landscaping are suited to the local climate and proposed purpose and do not increase the risk of pest species infestation. and **PO21** Existing native vegetation that already contribute to these requirements are retained where their removal is not required to site the use.	
If in a water supply area **PO24** The reticulated water supply has sufficient capacity and water quality to meet the development demand for potable use, operational use and emergency purposes without interfering with supply to existing development. and **PO25** The installation and location of water meters allows lawful access by the relevant authority. **If outside a water supply area** **PO26** A water supply is provided to meet the development demand of the intended use.	**Complies with PO24 – PO26** An Engineering Services Report has been prepared to demonstrate the site can be provided with adequate water supply.
If in a reticulated sewerage area **PO27** The reticulated sewerage has sufficient capacity to meet the development demand of the proposed use without interfering with supply to existing development **In all circumstances** **PO28** The disposal of effluent and other wastewater protects public health and safety and the environment.	**Complies with PO27 and PO28** An Engineering Services Report has been prepared to demonstrate that the proposal will be provided with sewer without impacting supply or health and safety.
PO33 Stormwater drainage:	**Complies with PO33 – PO36**

Performance Outcomes	Response
(a) detains, collects, reuses or otherwise manages stormwater without adversely affecting upstream or downstream premises; (b) directs stormwater to one or more legal points of discharge or to downstream properties, subject to the consent of the affected landowners; (c) protects the efficiency of downstream drainage; (d) protects and maintains environmental values and quality of downstream water by removing or reducing sediment, nutrients and other pollutants; and **PO34** Development has no significant impact on the concentration or discharge rate of surface water flows from a development site. and **PO35** Works effectively control onsite erosion and the release of sediment or sediment-laden stormwater from the site. and **PO36** Works do not result in an increased risk to people and property from the effects of stormwater drainage or containment structure failure.	An Site Based Stormwater Management Plan has been prepared to demonstrate that stormwater will be managed to ensure it does not cause nuisance to people and property.
PO39 Waste generated by the development is collected and stored in a manner that: (a) prevents the intrusion of vermin; (b) does not create an odour nuisance; (c) contains all litter and refuse; (d) is kept clean; (e) screens the storage area and waste receptacles from view from external to the site; (f) does not result in any contamination of the environment;	**Complies with PO39** Existing waste arrangements will be maintained ensuring waste is appropriately managed without impact the cleanliness of the site or surrounding areas.

Performance Outcomes	Response
and **PO40** The development utilises waste management systems that promote recycling, reuse and reduction of waste being disposed of to landfill. and **PO41** The discharge of trade waste protects: (a) the health and safety of people working in and around the sewerage system; (b) receiving environments from harmful substances; (c) the sewerage treatment plants and sewage systems from damage from harmful substances; (d) assists treatment plants to process sewage and produce recycled water and bio-solids of a guaranteed quality;	

APPENDIX C: TRAFFIC IMPACT ASSESSMENT

REDEEMER LUTHERAN COLLEGE
TRAFFIC ENGINEERING ASSESSMENT

19 MAY 2026

PREPARED FOR
REDEEMER LUTHERAN COLLEGE

TRAFFIC & TRANSPORT ENGINEERING

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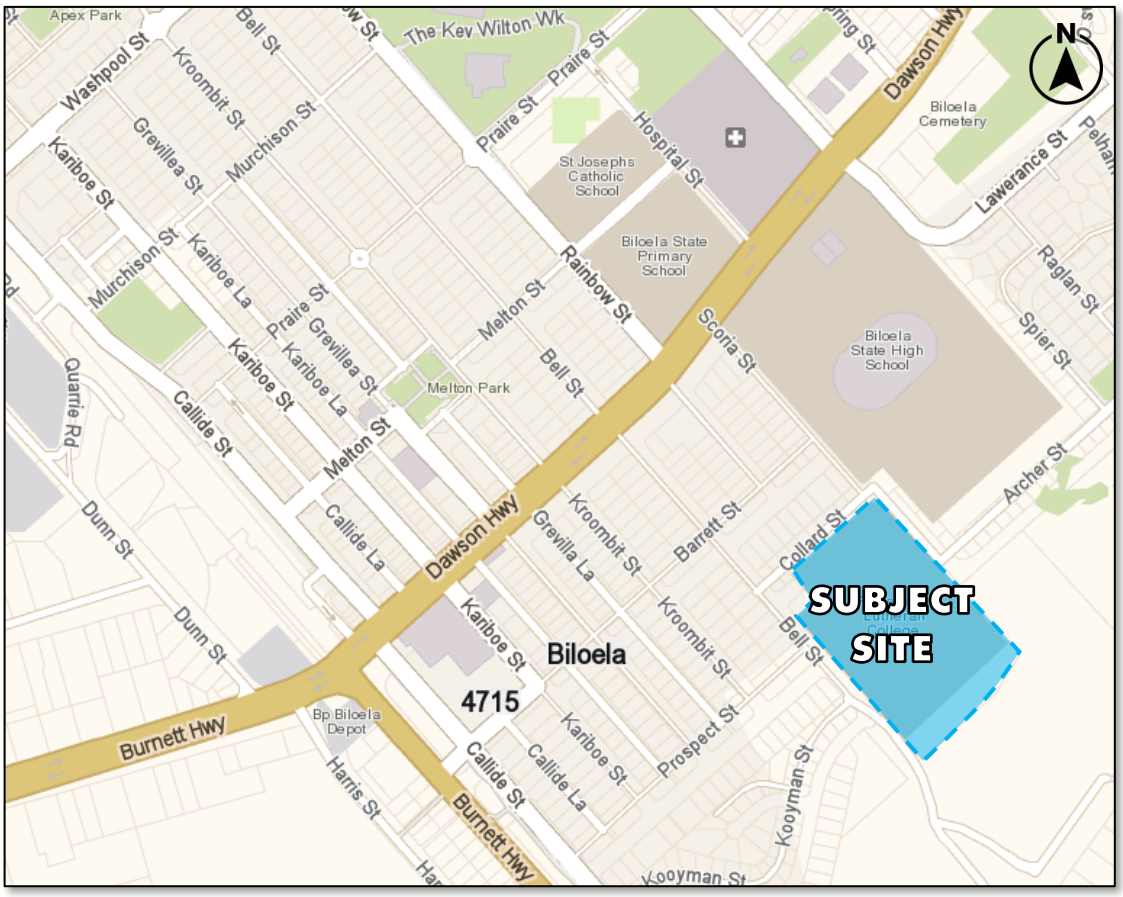
1.0 INTRODUCTION

1.1 BACKGROUND

In December 2025, PTT was commissioned by Redeemer Lutheran College to undertake a traffic impact assessment for a proposed expansion at Redeemer Lutheran College. The subject site is located at 2 Collard Street, Biloela as indicated in Figure 1.1.

Figure 1.1: SITE LOCALITY



1.2 AIM

The aim of this assessment is to evaluate the proposed development in terms of its access arrangements, parking provision and design, servicing arrangements, pedestrian / cyclist facilities, likely peak period traffic generation and impact on the surrounding road network.

1.3 SCOPE OF REPORT

This report begins by summarising the characteristics of the existing site and the surrounding road network (Chapter 2), followed by a description of the scope and scale of the proposed development, including a consideration of the access operations, parking provision, drop-off / pick-up facilities, servicing arrangements and pedestrian / cyclist facilities (Chapter 3). The report concludes with an analysis of the traffic generation and likely impact of the proposed development (Chapter 4) and a summary of key findings and recommendations (Chapter 5).

2.0 EXISTING CONDITIONS

2.1 SUBJECT SITE

2.1.1 Site Description

Redeemer Lutheran College, Biloela is located at 2 Collard Street, Biloela and is formally identified as Lot 1 on RP607657 and Lot 3 of CP8431118 and is located in the Banana Shire Council (BSC).

The school currently operates with a student enrolment capacity of 346 students. It has been advised that the school is currently supported by 50 Full-Time Equivalent (FTE) Staff. The existing site layout is shown in Figure 2.1.

Figure 2.1: EXISTING SITE LAYOUT

2.1.2 Access

Vehicular access to the school is currently provided as follows:

- separate entry and exit driveways on Archer Street, providing access to a drop-off / pick-up facility and short-term parking
- all-movements driveway on Collard Street, providing access to the long-term (staff) parking area
- entry only crossover on Collard Street, providing access to the drop-off / pick-up area
- exit only crossover on Bell Street, providing egress from the drop-off / pick-up area
- all-movements crossover on Bell Street, providing service vehicle access

2.1.3 Surrounding Area

The site is bounded by Collard Street to the north, to the east by Archer Street, to the west by Bell Street and open space to the south. The surrounding area consists primarily of residential, education and community uses.

2.2 TRANSPORT INFRASTRUCTURE

2.2.1 Parking Requirement

The parking demand generated by the existing school has been calculated based on the current student enrolment capacity and associated staff numbers, in accordance with the Department of Transport and Main Roads' (TMR) Planning for Safe Transport Infrastructure at Schools (PSTIS).

It has been assumed that students are equally distributed between year levels (ie 29 students in preparatory and 317 students in Years 1 to 12). Table 2.1 indicates a requirement of 65 spaces, comprising 35 staff spaces, 25 spaces for short-term parking and five pick-up / drop-off bays.

Table 2.1: PSTIS SCHOOL PARKING REQUIREMENT

USE	SCALE	PARKING RATE	REQUIRED
Long-term (staff/visitor)	50 FTE staff	0.7 space per staff	35 spaces
Years 1 to 12	317 students	1 per 15 students	22 spaces
		Pick-up/drop-off - 20% of short-term supply	5 spaces
Preparatory	29 students	1 per 8-10 students in preparatory	3 spaces
		Total	**65 spaces**

2.2.2 Parking Provision

The school is currently supported by 68 on-site parking spaces, including one PWD space and 11 drop-off / pick-up bays.

2.2.3 Drop-off / Pick Up Facilities

The school currently provides two separate drop-off / pick-up facilities, on the eastern side and the western side of the school.

The drop-off / pick-up facility on the eastern side of the school, is accessed from Archer Street and provides a total five bays. It is understood that this facility serves the primary school.

The drop-off / pick-up facility on the western side of school is accessed from Collard Street and exits onto Bell Street. This area has capacity for eight drop-off / pick-up bays, and it is understood serves the secondary school.

On-site observations indicated that the queueing at the secondary school drop-off / pick-up area experienced some queuing that extended one car beyond the property boundary. This is because the second drop-off / pick-up bay was not being utilised.

2.2.4 Commercial Vehicle Servicing

Refuse collection is currently undertaken on-street on the school's northern frontage (ie Collard Street). Smaller deliveries are undertaken Archer Street parking, outside of school peak pick-up / drop-off periods.

2.3 EXISTING TRAVEL BEHAVIOUR

2.4.1 Mode Share Survey

A mode share survey was conducted on 6 May 2026 to identify the travel behaviour of existing students at the school. A total of 285 responses were collected, which equates to an 82% response rate. The results of the mode share survey are summarised below, with detailed results attached in Appendix A.

The survey indicates that 58% of students arrive and depart the school by private vehicle, 32% by bus transport and 10% of student travel via active transport, as shown in Figure 2.2. The mode share of Redeemer Luthern College shows that the college has a slightly lower private car usage and a higher bus transport usage than other private schools in Queensland, as demonstrated in Figure 2.3.

2.4.2 Drop-off / Pick-up Locations

The survey also identified the locations where students travelling by private vehicle were dropped-off / picked-up. The results indicate that 60% of students were dropped-off / picked-up at the Collard Street and senior drop-off / pick-up facility, 39% from Archer Street and the junior drop-off / pick-up, and 1% on Bell Street, as shown in Figure 2.4.

Figure 2.2: STUDENT MODE SHARE SURVEY RESULTS

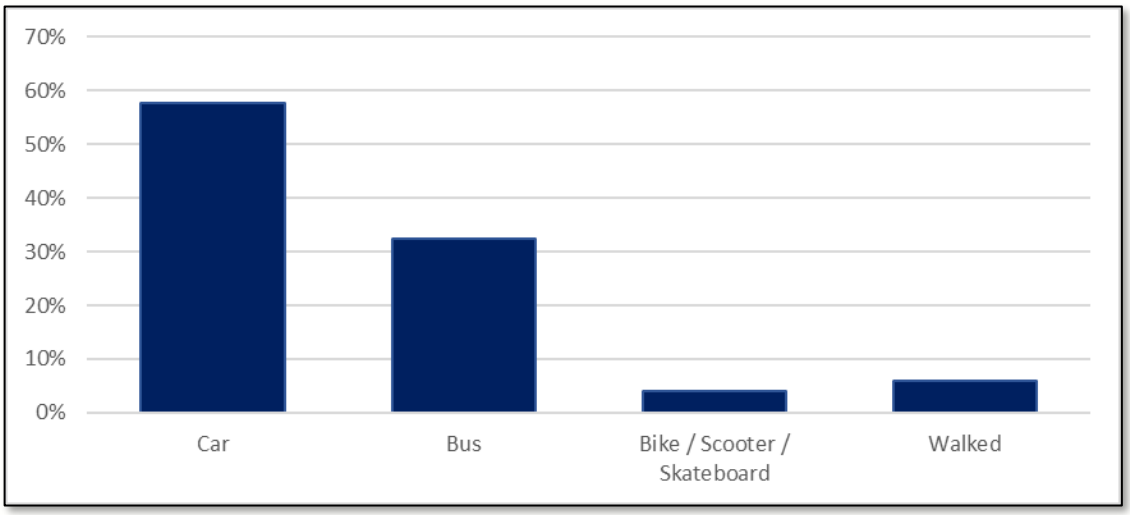


Figure 2.3: STUDENT MODE SHARE COMPARISON

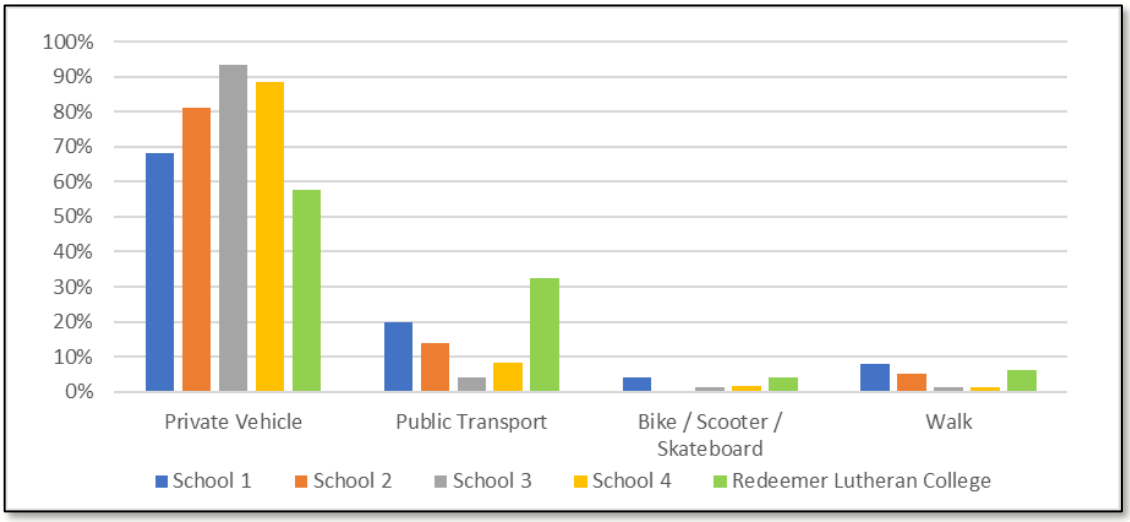
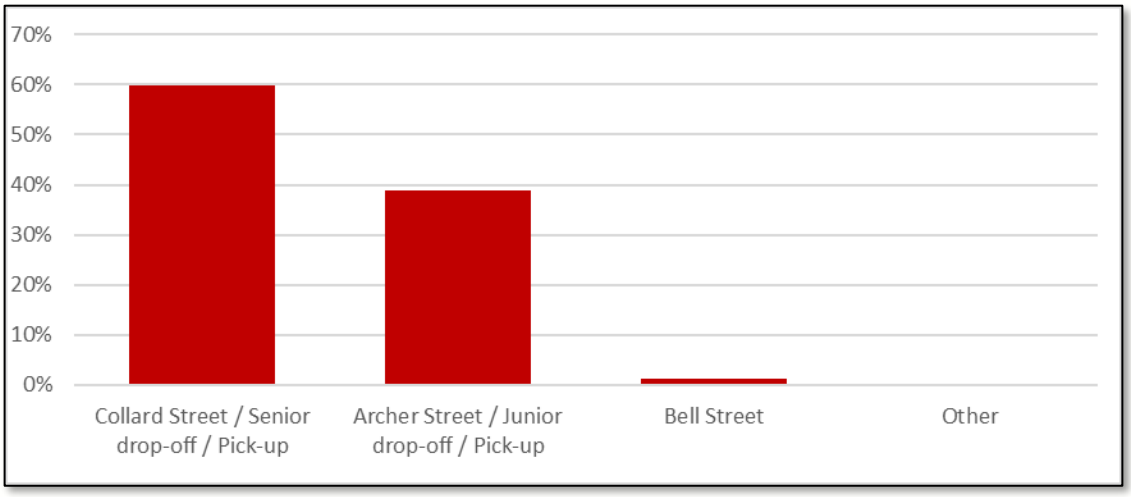


Figure 2.4: DROP-OFF / PICK-UP LOCATIONS



2.4.3 *Vehicle Occupancy*

The mode share survey was also used to obtain vehicle occupancy data for the school. The results indicate an average private vehicle occupancy of 1.8 students per vehicle.

2.4 ACTIVE AND PUBLIC TRANSPORT

2.4.1 Pedestrians

There are four dedicated pedestrian access points to the school, as shown in Figure 2.5. There are pedestrian footpaths located on one side of Bell Street and Collard Street. There is a dedicated children crossing on Collard Street and Scoria Street.

2.4.2 Public Transport

The school currently operates a courtesy bus to transport students to the Biloela State School on Gladstone Road, where buses are available to provide connections the surrounding areas.

Figure 2.5: PEDESTRIAN AND ACTIVE TRANSPORT FACILITIES

2.4.3 *Cyclists*

Table 2.2 indicates a minimum bicycle parking provision of 90 spaces as per TMR's PSTIS requirements. Based on mode share results approximately 10% of students use active travel to school (ie walk / bicycle) travel to / from school by bicycle. As such, it is expected that a provision much less than TMR's PSTIS requirements would be appropriate. Two separate bicycle parking areas are provided and on-site observations confirmed this these areas easily accommodate the existing demand with ample spare capacity.

Table 2.2 SCHOOL BICYCLE PARKING REQUIREMENTS

USE	SCALE	PARKING RATE	REQUIRED
Students	230	1 per 3 students in Year 4 or above	77 spaces
Visitors	-	10% of student parking	8 spaces
Staff (FTE)	50	1 per 10 staff	5 spaces
		Total	**90 spaces**

2.5 SURROUNDING ROAD NETWORK

The key attributes of the surrounding road network are summarised in Table 2.3.

Table 2.3: ROAD NETWORK ATTRIBUTES

ATTRIBUTE	COLLARD STREET	BELL STREET	ARCHER STREET
Road Hierarchy	Local Road	Local Road	Local Road
Cross Section	Undivided, with one lane of traffic in each direction	Undivided, with one lane of traffic in each direction	Undivided, with one lane of traffic in each direction
Speed Limit (km/h)	40 school zone	50	50
Jurisdiction	Council	Council	Council
On-Street Parking	Yes	Yes	Yes
Footpaths	Yes	Yes	No
Bicycle Lanes	No	No	No
Bus Route	No	No	No

2.6 TRAFFIC VOLUMES

To assist in the quantification of existing road network operations proximate to the site, turning movement surveys were conducted on Thursday, 30 April 2026 from 7:00am to 9:00am and from 2:00pm to 5:00pm, to capture the morning and afternoon peak traffic volumes. The following intersections were surveyed:

- Bell Street / Collard Street priority-controlled intersection
- Collard Street / Scoria Street priority-controlled intersection

The traffic count data survey results are provided in Appendix B.

Table 2.4: INTERSECTION ATTRIBUTES

ATTRIBUTE	WEEKDAY MORNING SCHOOL PEAK	WEEKDAY AFTERNOON SCHOOL PEAK
Bell Street / Collard Street		
School Peak Hour	7:45am – 8:45am	2:30pm – 3:30pm
Volume (vph)	190	175
% Heavy Vehicles	3.2%	3.4%
Peak Flow Factor	76.4%	68.9%
Collard Street / Scoria Street		
School Peak Hour	8:00am – 9:00am	2:45pm – 3:45pm
Volume (vph)	190	190
% Heavy Vehicles	2.1%	1.1%
Peak Flow Factor	76.2%	68.0%

2.7 INTERSECTION OPERATIONS

2.7.1 *Intersection Parameters*

A series of SIDRA analyses were conducted to quantify the existing traffic operations at the Bell Street / Collard Street and the Collard Street / Scoria Street priority-controlled intersections. The analyses were based on the traffic count data presented in Appendix B with:

- Peak Flow Factors (PFF), as detailed in Table 2.4
- the observed proportion of heavy vehicles (%HV) on each movement
- SIDRA default values for other parameters

The results are presented in terms of the degree of saturation (DOS), average delay, 95th percentile vehicle queues and critical movement at each intersection. The degree of saturation for a movement is defined as the ratio of traffic demand to the capacity of the movement. The critical movement relates to the approach or movement with the highest degree of saturation. Table 2.5 is an extract from the SIDRA manual and defines the operational rating and level of service for all intersections, including priority-controlled intersections.

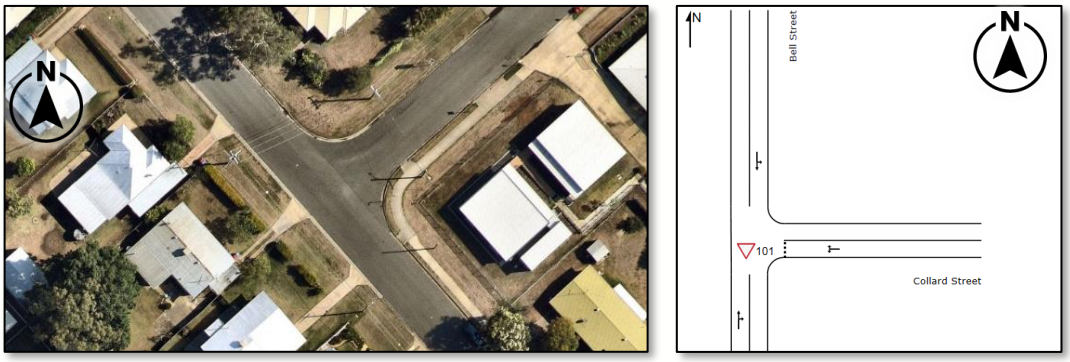
Table 2.5: SIDRA INTERSECTION RATINGS

LEVEL OF SERVICE	DEGREE OF SATURATION		
	SIGNALS	ROUNDABOUT	PRIORITY
LOS A	$x \leq 60\%$	$x \leq 60\%$	$x \leq 60\%$
LOS B	$60\% < x \leq 70\%$	$60\% < x \leq 70\%$	$60\% < x \leq 70\%$
LOS C	$70\% < x \leq 90\%$	$70\% < x \leq 85\%$	$70\% < x \leq 80\%$
LOS D	$90\% < x \leq 95\%$	$85\% < x \leq 95\%$	$80\% < x \leq 90\%$
LOS E	$95\% < x \leq 100\%$	$95\% < x \leq 100\%$	$90\% < x \leq 100\%$
LOS F	$100\% < x$	$100\% < x$	$100\% < x$

2.7.2 *Bell Street / Collard Street Intersection*

The existing intersection layout and equivalent SIDRA representation for the Bell Street / Collard Street priority-controlled intersection is shown in Figure 2.6.

Figure 2.6: BELL STREET / COLLARD STREET INTERSECTION LAYOUT



The results of the intersection analysis are summarised in Table 2.6 and attached in Appendix C. The results indicate that the Bell Street / Collard Street priority-controlled intersection currently experiences LOS A conditions under existing weekday morning and afternoon peak hours conditions.

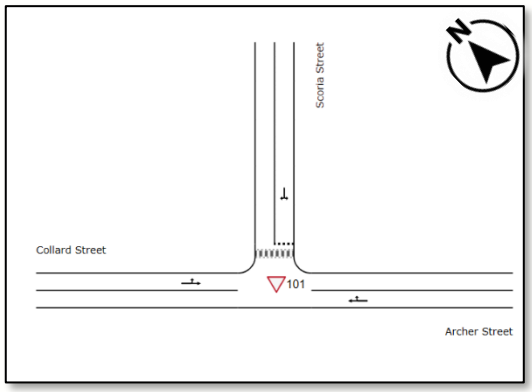
Table 2.6: BELL STREET / COLLARD STREET OPERATIONS

SCENARIO	DOS	AVG DELAY	95% QUEUE	CRITICAL MOVEMENT
Morning Peak	5.8%	3.8s	0.2 veh	East Approach
Afternoon Peak	5.9%	4.0s	0.2 veh	East Approach

2.7.3 *Collard Street / Scoria Street Intersection*

The existing intersection layout and equivalent SIDRA representation for the Collard Street / Scoria Street priority-controlled intersection is shown in Figure 2.6.

Figure 2.6: COLLARD STREET / SCORIA STREET INTERSECTION LAYOUT



The results of the intersection analyses are summarised in Table 2.7 and attached in Appendix C. The results indicate that the Collard Street / Scoria Street priority-controlled intersection currently experiences LOS A conditions under existing weekday morning and afternoon peak hour conditions.

Table 2.7: COLLARD STREET / SCORIA STREET OPERATIONS

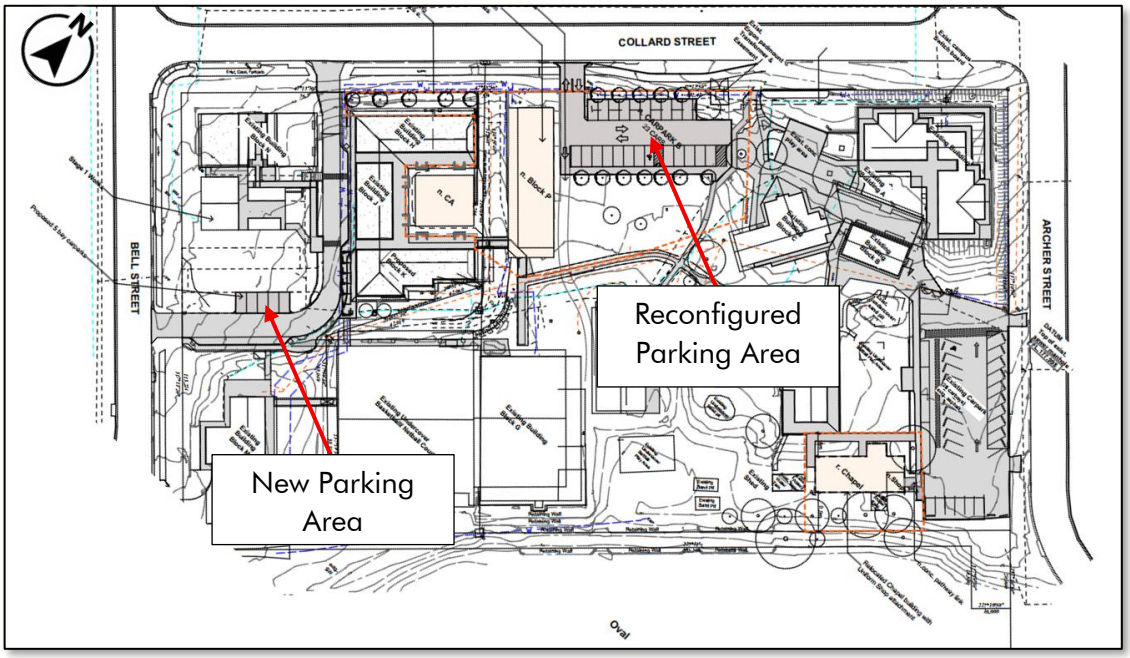
SCENARIO	DOS	AVG DELAY	95% QUEUE	CRITICAL MOVEMENT
Morning Peak	6.0%	3.1s	0.2 veh	East Approach
Afternoon Peak	6.0%	3.0s	0.2 veh	East Approach

3.0 PROPOSED DEVELOPMENT

3.1 PROPOSAL

The proposed school expansion at Redeemer Lutheran College comprises consists of three new buildings, five new General Learning Areas (GLA), associated staff facilities, a new parking area and the reconfiguration of an existing parking area. It is understood that the proposed expansion would increase the Student Enrolment Capacity (SEC) to 389 (ie increase of 43 students). It has been advised that a total of 52 FTE staff (ie increase of 2 staff) would be required to support the proposed expansion. The proposed layout is shown in Figure 3.1 and attached in Appendix D.

Figure 3.1: SITE LAYOUT



3.2 ACCESS ARRANGEMENTS

3.2.1 Location

No changes to the access locations are proposed.

3.3 PARKING

3.3.1 Requirement

The additional parking demand generated by the proposed expansion has been calculated using the same methodology outlined in Section 2.5.1. An additional four parking spaces (ie total of 69 spaces) are required to support the proposed increase in students and staff, as shown in Table 3.1.

Table 3.1: TMR'S PSTIS SCHOOL PARKING REQUIREMENT

USE	SCALE	PARKING RATE	REQUIRED	
			TOTAL	ADDITIONAL
Long-term (staff/visitor)	52 staff	0.7 space per staff	37 spaces	2 spaces
Years 1 to 12	359 students	1 per 15 students	24 spaces	2 spaces
		Pick-up/drop-off– 20% of short-term supply	5 spaces	0 spaces
Preparatory	30 students	1 per 8-10 students in preparatory	3 spaces	0 spaces
		Total	**69 spaces**	**4 spaces**

3.3.2 Provision

As shown in Figure 3.1, the parking area accessed from Collard Street is to be reconfigured and five new spaces are proposed at the southwest corner of the school. Accordingly, the proposed development results in total on-site parking provision of 69 spaces. Therefore, the total parking provision is expected to cater for the proposed expansion and is consistent with TMR's PSTIS requirements and is expected to cater for the additional SEC.

3.3.3 Persons with Disabilities Parking

TMR's PSTIS requires one Persons with Disabilities (PWD) space be provided for every 100 regular car parking spaces. Based on a total on-site parking provision of 69 spaces, a minimum of one PWD space are required. There is two PWD spaces on-site. As such, the PWD parking provision is consistent with TMR's PSTIS requirements.

3.3.4 Design

The existing and proposed parking facilities are designed generally in accordance with the requirements of Council's Transport Code, TMR's PSTIS and AS2890.1. This is typified by the following:

- regular parking spaces dimensioned a minimum 2.6m wide by 5.4m long
- PWD parking space dimensioned a minimum 2.4m wide by 5.4m long with an adjacent shared bay dimensioned 2.4m wide by 5.4m long
- parking aisles dimensioned a minimum of 6.5m wide (staff / 90-degree parking)
- parking aisles dimensioned a minimum of 6.2m wide (short-term / 60-degree parking)
- turn bay provided at dead-end aisles

3.3.5 Drop-off / Pick Up Facilities

As discussed in Section 2.2.3, the secondary school pick-up / drop-off area experiences some queueing that extends minorly passed the property boundary, which is due to the area being inefficiently utilised. Therefore, it is recommended that measures be implemented to encourage students and parents to utilise the second pick-up / drop-off bay in this area. It is understood that works are to be undertaken to provide shade infrastructure in this location which would promote use of this area.

3.4 BUS INFRASTRUCTURE

No changes to the existing bus infrastructure are proposed nor considered required.

3.5 COMMERCIAL VEHICLE SERVICING

No changes to the existing service vehicle arrangements are proposed nor considered required.

3.6 ACTIVE AND PUBLIC TRANSPORT

3.6.1 Pedestrians

The existing and proposed internal pedestrian facilities are expected to be adequate to support the proposed SEC increase.

3.6.2 Cyclists

As shown in Table 3.2, an additional nine bicycle parking spaces would be required to support the proposed development. As discussed in Section 2.4.3, the existing bicycle parking facilities have ample spare capacity, and it is expected that additional bicycle parking demand could be readily accommodated with these existing facilities.

Table 3.2 SCHOOL BICYCLE PARKING REQUIREMENTS

USE	SCALE	PARKING RATE	REQUIRED
Students	43	1 per 3 students in Year 4 or above	7 spaces
Visitors	-	10% of student parking	1 space
Staff (FTE)	2	1 per 10 staff	1 space
		Total	**9 spaces**

3.6.3 Public Transport

The proposed development is expected to increase the viability of public transport in the area.

4.0 TRAFFIC OPERATIONS

4.1 DEVELOPMENT PROFILE

4.1.1 Staging

It is standard practice when analysing future year traffic operations to adopt a ten-year design horizon from the year of full occupation. Therefore, the following development staging has been adopted:

- Traffic Counts: 2026
- Development Application: 2026
- Construction and Opening: 2028
- Design Horizon: 2038

4.1.2 Assessment Scenarios

The following assessment scenarios have been adopted:

- Opening year (2028) pre-development
- Opening year (2028) post-development
- Future year (2038) pre-development
- Future year (2038) post-development

4.1.3 Background Traffic Growth

The scenarios modelled reflect the development staging with detailed analysis undertaken on the year of opening (2028) and the future year (2038). Forecast population data published by the Queensland Government Statisticians Office indicates a population growth rate of 0.0% per annum for the population of Biloela. Accordingly, we have adopted a conservative background growth rate of 1.0%. The application of this rate equates to a 112.7% increase in background traffic volumes over the next 12 years (2026 - 2038).

4.2 TRAFFIC GENERATION

The peak hour traffic generation for Redeemer Lutheran College has been determined based on the expected mode share of the students and staff and the vehicle occupancy (VOc) as outlined in Section 2.3.

It has been assumed that 100% of trips to and from the school for work purposes are by private vehicle and the private vehicle would have one person per vehicle. An arrival rate of 70% in the peak hour has been adopted based on the HTS data for Southeast Queensland for both students and staff.

A 50:50 in:out split has been adopted for student drop-off / pick-up in the morning and afternoon peak periods. A 100:0 in:out split has been adopted for staff in the morning peak period, with the reverse for the afternoon.

Additional development generated traffic has been summarised in Table 4.1 for the morning peak period, with the reverse occurring in the afternoon peak. As shown, the proposed development is expected to generate an additional 21 trips (11 in and 10 out) during the morning peak hour, with the reverse in the afternoon peak hour.

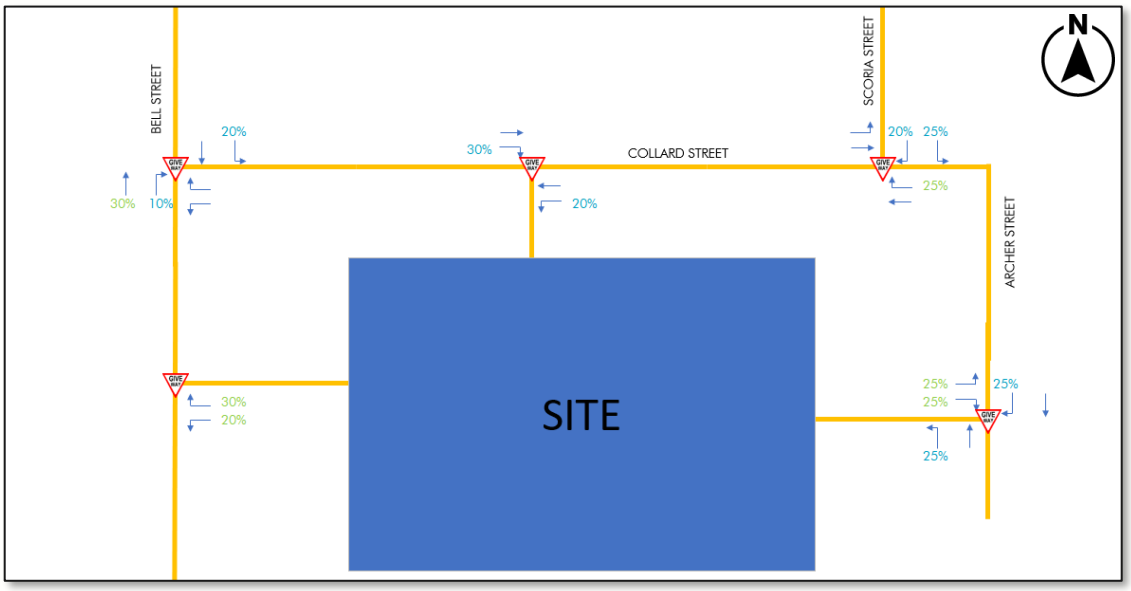
Table 4.1: SCHOOL MORNING PEAK HOUR TRAFFIC GENERATION

USE	SCALE	VOC	% BY CAR	PEAK VTE	IN:OUT SPLIT	IN:OUT VPH
Students						
Existing Enrolment	346	1.8	58%	156	50 : 50	78 : 78
Proposed Upgrade	389	1.8	58%	175	50 : 50	88 : 88
Student Increase	**43**	-	-	**19**	-	**10 : 10**
FTE Staff						
Existing FTE	50	1	100%	35	100 : 0	35 : 0
Proposed Upgrade	52	1	100%	36	100 : 0	36 : 0
Staff Increase	**2**	-	-	**1**	-	**1 : 0**
Net Increase	**45**	-	-	**21**	-	**11 : 10**

4.3 DIRECTIONAL DISTRIBUTION

The distribution of school related traffic on the surrounding road network has been estimated based on the directional split inherent in the traffic surveys. The resulting distribution of traffic is shown in Figure 4.1 for the weekday morning and afternoon peak hours.

Figure 4.1: WEEKDAY PEAK PERIOD DEVELOPMENT TRAFFIC DISTRIBUTION



4.4 INTERSECTION PERFORMANCE

The likely impact of the proposed expansion on the peak hour operations on the surrounding road network has been assessed using SIDRA. These analyses are based on the peak hour turning movement forecasts presented in Appendix E and the SIDRA intersection representations shown in Section 2.7.

4.4.1 Bell Street / Collard Street Intersection Operations

The results of the analysis of the Bell Street / Collard Street priority-controlled intersection are attached in Appendix C and summarised in Table 4.2.

Table 4.2: BELL STREET / COLLARD STREET OPERATIONS

PEAK HOUR	DOS	AVG DELAY	95% QUEUE	CRITICAL MOVEMENT
Weekday Morning				
2028 Pre-Development	5.9%	3.8s	0.2 veh	East Approach
2028 Post-Development	5.9%	3.8s	0.2 veh	East Approach
2038 Pre-Development	6.6%	3.8s	0.2 veh	East Approach
2038 Post-Development	6.6%	3.8s	0.2 veh	East Approach
Weekday Afternoon				
2028 Pre-Development	6.0%	4.0s	0.2 veh	East Approach
2028 Post-Development	6.1%	4.0s	0.2 veh	East Approach
2038 Pre-Development	6.7%	4.0s	0.2 veh	East Approach
2038 Post-Development	6.7%	4.0s	0.2 veh	East Approach

Table 4.2 demonstrates that the intersection is expected to experience LOS A operations during the weekday morning and afternoon peak hours, under all pre and post development scenarios. Therefore, the addition of development generated traffic is not expected to have a significant adverse impact on intersection operations.

4.4.2 Collard Street / Scoria Street Intersection

The results of the analysis of the Collard Street / Scoria Street priority-controlled intersection are attached in Appendix C and summarised in Table 4.3.

Table 4.3 demonstrates that the intersection is expected to experience LOS A operations during the weekday morning and afternoon peak hours, under all pre and post development scenarios. Therefore, the addition of development generated traffic is not expected to have a significant adverse impact on intersection operations.

Table 4.3: COLLARD STREET / SCORIA STREET FUTURE OPERATIONS

PEAK HOUR	DOS	AVG DELAY	95% QUEUE	CRITICAL APPROACH
Weekday Morning				
2028 Pre-Development	6.2%	3.1s	0.2 veh	East Approach
2028 Post Development	6.6%	3.2s	0.2 veh	North Approach
2038 Pre-Development	6.8%	3.1s	0.3 veh	East Approach
2038 Post Development	7.2%	3.2s	0.3 veh	North Approach
Weekday Afternoon				
2028 Pre-Development	6.1%	3.0s	0.2 veh	North Approach
2028 Post Development	6.5%	3.1s	0.2 veh	North Approach
2038 Pre-Development	6.8%	3.0s	0.3 veh	North Approach
2038 Post Development	7.4%	3.1s	0.3 veh	North Approach

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS

The proposed expansion at Redeemer Lutheran College, Biloela, has been evaluated in terms of its access arrangements, parking requirements and design, servicing arrangements, pedestrian / cyclist facilities, likely peak period traffic generation and impact on the surrounding road network. The main points to note are:

- the existing college comprises of 346 students which would be supported by 50 FTE staff
- the proposed upgrades will increase the total enrolment of 389 students (ie increase of 43 students) to be supported by 52 FTE staff (ie increase of 2 FTE staff)
- no changes are proposed to the existing arrangements
- the proposed total parking provision is expected to cater for the additional SEC and FTE staff and is consistent with TMR's PSTIS
- the existing and proposed internal pedestrian facilities are expected to accommodate safe and efficient movement within the school
- the expansion is expected to generate an additional 21 trips (11 in and 10 out) during the morning, with the reverse during the afternoon peak
- the proposed development is not expected to result in any significant adverse impact on the surrounding road network

5.2 RECOMMENDATIONS

Based on the above, it is recommended that measures be implemented to encourage the second bay within the secondary pick-up / drop-off area be utilised.

APPENDIX A
MODE SHARE SURVEY

Redeemer Lutheran College, Biloela

PTT Traffic & Transport Engineering Questionnaire

Completed 6th May 2026

STUDENT MODE SHARE SURVEY		NUMBER OF STUDENTS	
		TO SCHOOL	FROM SCHOOL
Q1. How did students travel to school today and travel home from school yesterday?	Parent / guardian dropped-off / picked-up	168	158
	Drove themselves	4	4
	School Bus	89	94
	Bike / Scooter / Skateboard	12	11
	Walked	16	18
	TOTAL	**289**	**285**

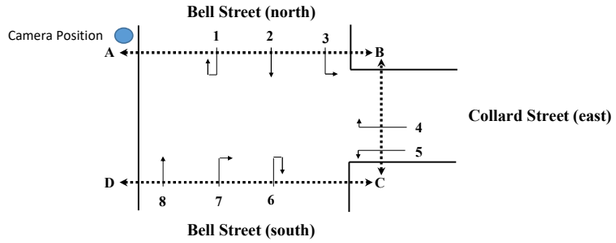
Q2. For those students that travelled via private vehicle, where was the vehicle parked? (Refer to Figure 1 overleaf, if required)	On School Grounds - Collard Street Car Park	26	35
	On School Grounds - Archer Street Car Park	54	47
	On School Grounds - School Drop-off Zone	59	36
	On Surrounding Street - Collard Street	5	4
	On Surrounding Street - Archer Street	1	0
	On Surrounding Street - Bell Street	1	2
	Other (Please describe)	0	0
	TOTAL	**146**	**124**

Q3. For those students that travelled by private vehicle, how many students were in the vehicle with you?	1 student (just themselves)	22	23
	2 students	63	50
	3 students	31	23
	4 or more students	16	14
	TOTAL	**132**	**110**

APPENDIX B
TRAFFIC COUNT DATA

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Bell Street/Collard Street, Biloela
Day/Date: Thursday, 30 April 2026
AM Peak: *Hour ending - 8:45 AM*
PM Peak: *Hour ending - 3:30 PM*



TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8				Pedestrian Movements											
																																	A - B		B - A		B - C		C - B		C - D		D - C	
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*
7:15 AM	0	0	**0**	0	2	0	**2**	0	0	0	**0**	0	1	0	**1**	0	2	0	**2**	0	0	0	**0**	0	1	0	**1**	0	2	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30 AM	0	0	**0**	0	0	0	**0**	0	2	0	**2**	0	3	0	**3**	0	2	0	**2**	0	0	0	**0**	0	3	0	**3**	0	3	0	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	0	0	**0**	0	1	0	**1**	0	6	0	**6**	0	3	0	**3**	0	2	0	**2**	0	0	0	**0**	0	4	0	**4**	0	3	0	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	0	0	**0**	0	3	0	**3**	0	6	0	**6**	0	3	0	**3**	0	5	0	**5**	0	0	0	**0**	0	2	0	**2**	0	6	0	**6**	0	0	0	0	0	0	1	0	0	0	0	1	0
8:15 AM	0	0	**0**	0	2	0	**2**	0	13	0	**13**	0	8	0	**8**	0	4	0	**4**	0	0	0	**0**	0	4	0	**4**	0	8	1	**9**	0	0	0	0	0	0	1	0	0	2	0	0	0
8:30 AM	0	0	**0**	0	10	1	**11**	0	15	0	**15**	0	15	3	**18**	1	3	0	**3**	0	0	0	**0**	0	12	0	**12**	0	21	0	**21**	0	0	0	0	0	0	1	0	1	0	0	0	0
8:45 AM	0	0	**0**	0	4	0	**4**	0	11	0	**11**	0	7	1	**8**	0	5	0	**5**	0	0	0	**0**	0	4	0	**4**	0	11	0	**11**	0	0	0	0	0	1	1	1	0	0	0	0	0
9:00 AM	0	0	**0**	0	2	0	**2**	0	1	0	**1**	0	6	0	**6**	0	1	0	**1**	0	0	0	**0**	0	2	0	**2**	0	1	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
2 hr Total	**0**	**0**	**0**	**0**	**24**	**1**	**25**	**0**	**54**	**0**	**54**	**0**	**46**	**4**	**50**	**1**	**24**	**0**	**24**	**0**	**0**	**0**	**0**	**0**	**32**	**0**	**32**	**0**	**55**	**1**	**56**	**0**	**0**	**0**	**0**	**0**	**1**	**4**	**1**	**1**	**2**	**0**	**1**	**0**
AM Peak	**0**	**0**	**0**	**0**	**19**	**1**	**20**	**0**	**45**	**0**	**45**	**0**	**33**	**4**	**37**	**1**	**17**	**0**	**17**	**0**	**0**	**0**	**0**	**0**	**22**	**0**	**22**	**0**	**46**	**1**	**47**	**0**	**0**	**0**	**0**	**0**	**1**	**4**	**1**	**1**	**2**	**0**	**1**	**0**

TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8				Pedestrian Movements											
																																	A - B		B - A		B - C		C - B		C - D		D - C	
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*
2:15 PM	0	0	**0**	0	1	0	**1**	0	4	0	**4**	0	3	0	**3**	0	1	0	**1**	0	0	0	**0**	0	1	0	**1**	0	2	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0
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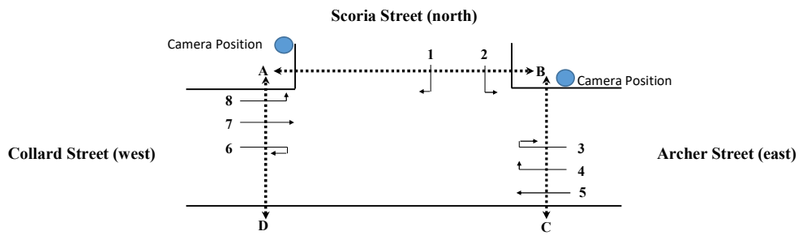
5:00 PM	0	0	**0**	0	1	0	**1**	0	7	0	**7**	0	6	0	**6**	0	1	0	**1**	0	0	0	**0**	0	3	0	**3**	0	5	0	**5**	0	0	0	0	0	0	0	0	0	0	0	0	0
3 hr Total	**0**	**0**	**0**	**0**	**38**	**1**	**39**	**0**	**72**	**2**	**74**	**0**	**70**	**4**	**74**	**1**	**32**	**1**	**33**	**0**	**0**	**0**	**0**	**0**	**42**	**0**	**42**	**0**	**59**	**1**	**60**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**5**	**2**	**1**	**0**	**0**	**0**
PM Peak	**0**	**0**	**0**	**0**	**20**	**1**	**21**	**0**	**45**	**1**	**46**	**0**	**32**	**3**	**35**	**0**	**14**	**0**	**14**	**0**	**0**	**0**	**0**	**0**	**24**	**0**	**24**	**0**	**34**	**1**	**35**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**4**	**2**	**0**	**0**	**0**	**0**

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 2 **Weather:** Fine
Location: Collard Street/Archer Street/Scoria Street, Biloela
Day/Date: Thursday, 30 April 2026
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 3:45 PM*



TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8				Pedestrian Movements											
																																	A - B		B - A		B - C		C - B		D - A		A - D	
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*
7:15 AM	2	0	**2**	0	2	0	**2**	0	0	0	**0**	0	2	0	**2**	0	1	0	**1**	0	0	0	**0**	0	1	0	**1**	0	1	0	**1**	0	1	0	1	0	0	0	0	0	0	0	0	0
7:30 AM	3	0	**3**	0	2	0	**2**	0	0	0	**0**	0	4	0	**4**	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0
7:45 AM	5	0	**5**	1	5	0	**5**	0	0	0	**0**	0	7	0	**7**	0	3	0	**3**	0	0	0	**0**	0	1	0	**1**	0	2	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0
8:00 AM	1	0	**1**	0	5	0	**5**	0	0	0	**0**	0	2	0	**2**	0	7	0	**7**	0	0	0	**0**	0	1	0	**1**	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0
8:15 AM	8	0	**8**	0	6	0	**6**	0	0	0	**0**	0	9	0	**9**	0	16	0	**16**	0	0	0	**0**	0	9	0	**9**	0	2	0	**2**	0	1	0	0	2	0	0	0	0	0	0	0	0
8:30 AM	8	3	**11**	0	16	0	**16**	0	0	0	**0**	0	11	0	**11**	0	20	0	**20**	0	0	0	**0**	0	14	0	**14**	0	2	0	**2**	0	5	0	8	0	0	0	0	0	0	0	0	0
8:45 AM	3	1	**4**	0	10	0	**10**	0	0	0	**0**	0	8	0	**8**	0	14	0	**14**	0	0	0	**0**	0	5	0	**5**	0	3	0	**3**	0	4	0	8	0	0	0	0	0	0	0	0	0
9:00 AM	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	5	0	**5**	0	7	0	**7**	0	0	0	**0**	0	3	0	**3**	0	3	0	**3**	0	0	0	0	0	0	0	0	0	0	0	0	0
2 hr Total	**30**	**4**	**34**	**1**	**49**	**0**	**49**	**0**	**0**	**0**	**0**	**0**	**48**	**0**	**48**	**0**	**71**	**0**	**71**	**0**	**0**	**0**	**0**	**0**	**37**	**0**	**37**	**0**	**13**	**0**	**13**	**0**	**11**	**0**	**17**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
AM Peak	**19**	**4**	**23**	**0**	**35**	**0**	**35**	**0**	**0**	**0**	**0**	**0**	**33**	**0**	**33**	**0**	**57**	**0**	**57**	**0**	**0**	**0**	**0**	**0**	**31**	**0**	**31**	**0**	**10**	**0**	**10**	**0**	**10**	**0**	**16**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8				Pedestrian Movements											
																																	A - B		B - A		B - C		C - B		D - A		A - D	
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*	*Pedestrians*	*Cyclists*
2:15 PM	0	0	**0**	0	4	0	**4**	0	0	0	**0**	0	3	0	**3**	0	4	0	**4**	0	0	0	**0**	0	5	0	**5**	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	2	0	**2**	0	6	0	**6**	0	0	0	**0**	0	2	0	**2**	0	1	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
2:45 PM	2	1	**3**	0	1	0	**1**	0	0	0	**0**	0	1	0	**1**	0	4	1	**5**	0	0	0	**0**	0	6	0	**6**	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0
3:00 PM	6	1	**7**	0	17	0	**17**	0	0	0	**0**	0	9	0	**9**	0	17	0	**17**	0	0	0	**0**	0	14	1	**15**	0	4	0	**4**	0	12	2	0	0	0	0	0	0	0	0	0	0
3:15 PM	3	0	**3**	0	14	0	**14**	0	0	0	**0**	0	14	0	**14**	0	17	0	**17**	0	0	0	**0**	0	15	0	**15**	0	1	0	**1**	0	1	0	13	0	0	0	0	0	0	0	0	0
3:30 PM	3	0	**3**	0	8	0	**8**	0	0	0	**0**	0	4	0	**4**	0	2	0	**2**	0	0	0	**0**	0	11	0	**11**	0	1	0	**1**	0	1	0	0	0	0	0	0	0	0	0	0	0
3:45 PM	0	0	**0**	0	7	0	**7**	0	0	0	**0**	0	1	0	**1**	0	5	0	**5**	1	0	0	**0**	0	5	0	**5**	0	1	0	**1**	0	0	0	0	0	0	0	0	0	0	0	0	0
4:00 PM	1	0	**1**	0	0	0	**0**	0	0	0	**0**	0	2	0	**2**	0	5	0	**5**	0	0	0	**0**	0	3	0	**3**	0	2	0	**2**	0	0	0	0	0	0	0	0	0	0	0	0	0
4:15 PM	4	1	**5**	0	1	0	**1**	0	0	0	**0**	0	2	0	**2**	0	5	0	**5**	0	0	0	**0**	0	5	0	**5**	0	5	0	**5**	0	0	0	0	0	0	0	0	0	0	0	0	0
4:30 PM	3	0	**3**	0	13	0	**13**	0	0	0	**0**	0	5	0	**5**	0	4	1	**5**	0	0	0	**0**	0	3	1	**4**	1	4	0	**4**	0	0	0	0	0	0	0	0	0	0	0	0	0
4:45 PM	0	0	**0**	0	5	0	**5**	0	0	0	**0**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	3	0	**3**	0	0	0	**0**	0	1	0	1	0	0	0	0	0	0	0	0	0
5:00 PM	1	0	**1**	0	4	0	**4**	0	0	0	**0**	0	5	1	**6**	0	4	0	**4**	0	0	0	**0**	0	7	0	**7**	0	0	0	**0**	0	0	0	0	0	0	0	0	0	0	0	0	0
3 hr Total	**23**	**3**	**26**	**0**	**77**	**0**	**77**	**0**	**0**	**0**	**0**	**0**	**48**	**1**	**49**	**0**	**76**	**2**	**78**	**1**	**0**	**0**	**0**	**0**	**79**	**2**	**81**	**1**	**19**	**0**	**19**	**0**	**15**	**2**	**14**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
PM Peak	**12**	**1**	**13**	**0**	**46**	**0**	**46**	**0**	**0**	**0**	**0**	**0**	**28**	**0**	**28**	**0**	**41**	**0**	**41**	**1**	**0**	**0**	**0**	**0**	**45**	**1**	**46**	**0**	**7**	**0**	**7**	**0**	**14**	**2**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

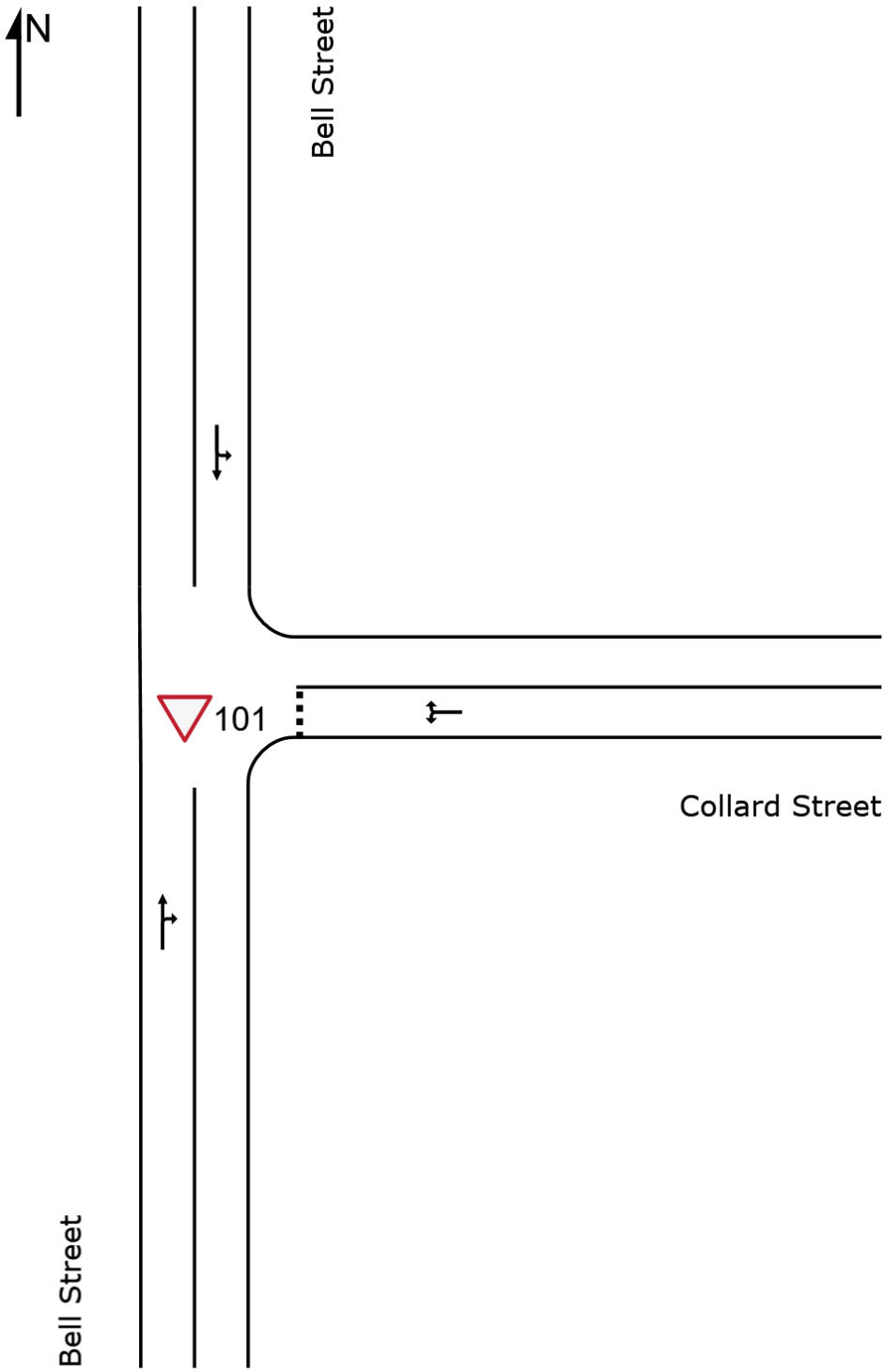
APPENDIX C
SIDRA ANALYSES

SITE LAYOUT

Site: [101] 2026 AM EXISTING (Existing)

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



MOVEMENT SUMMARY

Site: [101] 2026 AM EXISTING (Existing)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	62	3.2	62	3.2	0.048	0.1	LOS A	0.2	1.2	0.13	0.21	0.13	57.8
3	R2	All MCs	29	3.2	29	3.2	0.048	5.8	LOS A	0.2	1.2	0.13	0.21	0.13	55.3
Approach			90	3.2	90	3.2	0.048	1.9	NA	0.2	1.2	0.13	0.21	0.13	57.0
East: Collard Street															
4	L2	All MCs	22	3.2	22	3.2	0.058	5.7	LOS A	0.2	1.4	0.14	0.55	0.14	52.3
6	R2	All MCs	48	3.2	48	3.2	0.058	6.1	LOS A	0.2	1.4	0.14	0.55	0.14	52.3
Approach			71	3.2	71	3.2	0.058	6.0	LOS A	0.2	1.4	0.14	0.55	0.14	52.3
North: Bell Street															
7	L2	All MCs	59	3.2	59	3.2	0.043	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.1
8	T1	All MCs	26	3.2	26	3.2	0.043	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			85	3.2	85	3.2	0.043	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.8
All Vehicles			246	3.2	246	3.2	0.058	3.8	NA	0.2	1.4	0.09	0.37	0.09	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (2)] 2026 PM EXISTING (Existing)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	51	3.4	51	3.4	0.047	0.2	LOS A	0.2	1.3	0.16	0.26	0.16	57.2
3	R2	All MCs	35	3.4	35	3.4	0.047	5.9	LOS A	0.2	1.3	0.16	0.26	0.16	54.7
Approach			86	3.4	86	3.4	0.047	2.5	NA	0.2	1.3	0.16	0.26	0.16	56.2
East: Collard Street															
4	L2	All MCs	20	3.4	20	3.4	0.059	5.7	LOS A	0.2	1.5	0.16	0.55	0.16	52.3
6	R2	All MCs	51	3.4	51	3.4	0.059	6.1	LOS A	0.2	1.5	0.16	0.55	0.16	52.2
Approach			71	3.4	71	3.4	0.059	6.0	LOS A	0.2	1.5	0.16	0.55	0.16	52.3
North: Bell Street															
7	L2	All MCs	67	3.4	67	3.4	0.049	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.1
8	T1	All MCs	30	3.4	30	3.4	0.049	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.5
Approach			97	3.4	97	3.4	0.049	3.8	NA	0.0	0.0	0.00	0.40	0.00	54.8
All Vehicles			254	3.4	254	3.4	0.059	4.0	NA	0.2	1.5	0.10	0.39	0.10	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (4)] 2028 AM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	63	3.2	63	3.2	0.049	0.1	LOS A	0.2	1.2	0.13	0.20	0.13	57.8
3	R2	All MCs	29	3.2	29	3.2	0.049	5.8	LOS A	0.2	1.2	0.13	0.20	0.13	55.3
Approach			92	3.2	92	3.2	0.049	1.9	NA	0.2	1.2	0.13	0.20	0.13	57.0
East: Collard Street															
4	L2	All MCs	22	3.2	22	3.2	0.059	5.7	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
6	R2	All MCs	50	3.2	50	3.2	0.059	6.1	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
Approach			72	3.2	72	3.2	0.059	6.0	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
North: Bell Street															
7	L2	All MCs	60	3.2	60	3.2	0.043	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.1
8	T1	All MCs	26	3.2	26	3.2	0.043	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			86	3.2	86	3.2	0.043	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.7
All Vehicles			250	3.2	250	3.2	0.059	3.8	NA	0.2	1.5	0.09	0.37	0.09	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (3)] 2028 PM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	52	3.4	52	3.4	0.047	0.2	LOS A	0.2	1.4	0.16	0.25	0.16	57.3
3	R2	All MCs	35	3.4	35	3.4	0.047	5.9	LOS A	0.2	1.4	0.16	0.25	0.16	54.8
Approach			87	3.4	87	3.4	0.047	2.5	NA	0.2	1.4	0.16	0.25	0.16	56.2
East: Collard Street															
4	L2	All MCs	20	3.4	20	3.4	0.060	5.7	LOS A	0.2	1.5	0.16	0.55	0.16	52.3
6	R2	All MCs	52	3.4	52	3.4	0.060	6.1	LOS A	0.2	1.5	0.16	0.55	0.16	52.2
Approach			73	3.4	73	3.4	0.060	6.0	LOS A	0.2	1.5	0.16	0.55	0.16	52.2
North: Bell Street															
7	L2	All MCs	68	3.4	68	3.4	0.049	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.1
8	T1	All MCs	30	3.4	30	3.4	0.049	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.4
Approach			99	3.4	99	3.4	0.049	3.9	NA	0.0	0.0	0.00	0.40	0.00	54.8
All Vehicles			258	3.4	258	3.4	0.060	4.0	NA	0.2	1.5	0.10	0.39	0.10	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (5)] 2038 AM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	69	3.2	69	3.2	0.054	0.1	LOS A	0.2	1.4	0.14	0.21	0.14	57.7
3	R2	All MCs	33	3.2	33	3.2	0.054	5.9	LOS A	0.2	1.4	0.14	0.21	0.14	55.2
Approach			102	3.2	102	3.2	0.054	2.0	NA	0.2	1.4	0.14	0.21	0.14	56.9
East: Collard Street															
4	L2	All MCs	25	3.2	25	3.2	0.066	5.7	LOS A	0.2	1.7	0.16	0.55	0.16	52.3
6	R2	All MCs	55	3.2	55	3.2	0.066	6.2	LOS A	0.2	1.7	0.16	0.55	0.16	52.2
Approach			80	3.2	80	3.2	0.066	6.0	LOS A	0.2	1.7	0.16	0.55	0.16	52.3
North: Bell Street															
7	L2	All MCs	67	3.2	67	3.2	0.048	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.1
8	T1	All MCs	30	3.2	30	3.2	0.048	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.4
Approach			97	3.2	97	3.2	0.048	3.9	NA	0.0	0.0	0.00	0.40	0.00	54.8
All Vehicles			279	3.2	279	3.2	0.066	3.8	NA	0.2	1.7	0.10	0.37	0.10	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (6)] 2038 PM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	57	3.4	57	3.4	0.053	0.2	LOS A	0.2	1.5	0.18	0.26	0.18	57.2
3	R2	All MCs	39	3.4	39	3.4	0.053	5.9	LOS A	0.2	1.5	0.18	0.26	0.18	54.7
Approach			96	3.4	96	3.4	0.053	2.5	NA	0.2	1.5	0.18	0.26	0.18	56.1
East: Collard Street															
4	L2	All MCs	23	3.4	23	3.4	0.067	5.7	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
6	R2	All MCs	57	3.4	57	3.4	0.067	6.2	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
Approach			80	3.4	80	3.4	0.067	6.1	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
North: Bell Street															
7	L2	All MCs	75	3.4	75	3.4	0.055	5.6	LOS A	0.0	0.0	0.00	0.40	0.00	54.1
8	T1	All MCs	35	3.4	35	3.4	0.055	0.0	LOS A	0.0	0.0	0.00	0.40	0.00	56.5
Approach			110	3.4	110	3.4	0.055	3.8	NA	0.0	0.0	0.00	0.40	0.00	54.8
All Vehicles			286	3.4	286	3.4	0.067	4.0	NA	0.2	1.7	0.11	0.40	0.11	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (7)] 2028 AM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	67	3.2	67	3.2	0.052	0.1	LOS A	0.2	1.3	0.13	0.21	0.13	57.8
3	R2	All MCs	31	3.2	31	3.2	0.052	5.8	LOS A	0.2	1.3	0.13	0.21	0.13	55.3
Approach			98	3.2	98	3.2	0.052	2.0	NA	0.2	1.3	0.13	0.21	0.13	56.9
East: Collard Street															
4	L2	All MCs	22	3.2	22	3.2	0.059	5.7	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
6	R2	All MCs	50	3.2	50	3.2	0.059	6.1	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
Approach			72	3.2	72	3.2	0.059	6.0	LOS A	0.2	1.5	0.14	0.55	0.14	52.3
North: Bell Street															
7	L2	All MCs	63	3.2	63	3.2	0.045	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.0
8	T1	All MCs	26	3.2	26	3.2	0.045	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			89	3.2	89	3.2	0.045	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.7
All Vehicles			259	3.2	259	3.2	0.059	3.8	NA	0.2	1.5	0.09	0.37	0.09	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (8)] 2028 PM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	57	3.4	57	3.4	0.051	0.2	LOS A	0.2	1.4	0.16	0.25	0.16	57.3
3	R2	All MCs	36	3.4	36	3.4	0.051	5.9	LOS A	0.2	1.4	0.16	0.25	0.16	54.8
Approach			93	3.4	93	3.4	0.051	2.4	NA	0.2	1.4	0.16	0.25	0.16	56.3
East: Collard Street															
4	L2	All MCs	20	3.4	20	3.4	0.061	5.7	LOS A	0.2	1.5	0.16	0.55	0.16	52.3
6	R2	All MCs	52	3.4	52	3.4	0.061	6.2	LOS A	0.2	1.5	0.16	0.55	0.16	52.2
Approach			73	3.4	73	3.4	0.061	6.0	LOS A	0.2	1.5	0.16	0.55	0.16	52.2
North: Bell Street															
7	L2	All MCs	71	3.4	71	3.4	0.051	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.0
8	T1	All MCs	30	3.4	30	3.4	0.051	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			102	3.4	102	3.4	0.051	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.7
All Vehicles			267	3.4	267	3.4	0.061	4.0	NA	0.2	1.5	0.10	0.39	0.10	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (9)] 2038 AM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	73	3.2	73	3.2	0.057	0.2	LOS A	0.2	1.4	0.14	0.21	0.14	57.8
3	R2	All MCs	34	3.2	34	3.2	0.057	5.9	LOS A	0.2	1.4	0.14	0.21	0.14	55.2
Approach			107	3.2	107	3.2	0.057	2.0	NA	0.2	1.4	0.14	0.21	0.14	56.9
East: Collard Street															
4	L2	All MCs	25	3.2	25	3.2	0.066	5.7	LOS A	0.2	1.7	0.16	0.55	0.16	52.3
6	R2	All MCs	55	3.2	55	3.2	0.066	6.2	LOS A	0.2	1.7	0.16	0.55	0.16	52.2
Approach			80	3.2	80	3.2	0.066	6.0	LOS A	0.2	1.7	0.16	0.55	0.16	52.3
North: Bell Street															
7	L2	All MCs	69	3.2	69	3.2	0.050	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.1
8	T1	All MCs	30	3.2	30	3.2	0.050	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			99	3.2	99	3.2	0.050	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.7
All Vehicles			287	3.2	287	3.2	0.066	3.8	NA	0.2	1.7	0.10	0.37	0.10	54.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (10)] 2038 PM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Bell Street / Collard Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
South: Bell Street															
2	T1	All MCs	62	3.4	62	3.4	0.056	0.2	LOS A	0.2	1.6	0.18	0.26	0.18	57.2
3	R2	All MCs	41	3.4	41	3.4	0.056	5.9	LOS A	0.2	1.6	0.18	0.26	0.18	54.8
Approach			103	3.4	103	3.4	0.056	2.5	NA	0.2	1.6	0.18	0.26	0.18	56.2
East: Collard Street															
4	L2	All MCs	23	3.4	23	3.4	0.067	5.7	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
6	R2	All MCs	57	3.4	57	3.4	0.067	6.2	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
Approach			80	3.4	80	3.4	0.067	6.1	LOS A	0.2	1.7	0.17	0.55	0.17	52.2
North: Bell Street															
7	L2	All MCs	78	3.4	78	3.4	0.057	5.6	LOS A	0.0	0.0	0.00	0.41	0.00	54.1
8	T1	All MCs	35	3.4	35	3.4	0.057	0.0	LOS A	0.0	0.0	0.00	0.41	0.00	56.4
Approach			113	3.4	113	3.4	0.057	3.9	NA	0.0	0.0	0.00	0.41	0.00	54.8
All Vehicles			296	3.4	296	3.4	0.067	4.0	NA	0.2	1.7	0.11	0.39	0.11	54.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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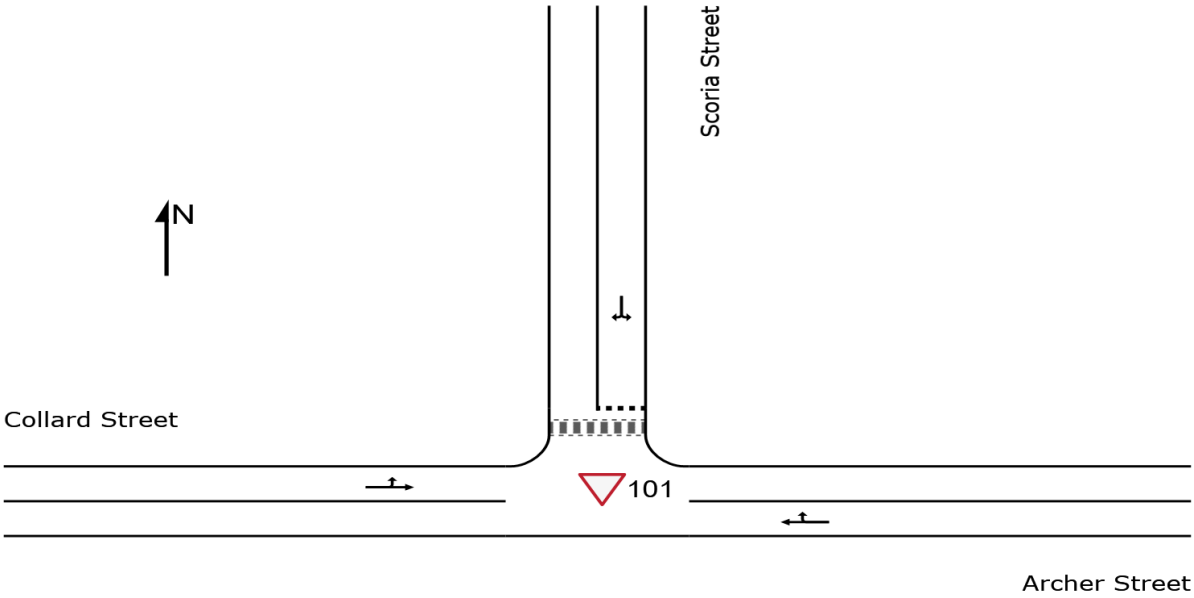
SITE LAYOUT

Site: [101] 2026 AM EXISTING (General)

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



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MOVEMENT SUMMARY

Site: [101] 2026 AM EXISTING (General)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	75	2.1	75	2.1	0.060	0.1	LOS A	0.2	1.5	0.09	0.21	0.09	57.8
6	R2	All MCs	39	2.1	39	2.1	0.060	5.7	LOS A	0.2	1.5	0.09	0.21	0.09	55.3
Approach			114	2.1	114	2.1	0.060	2.0	NA	0.2	1.5	0.09	0.21	0.09	56.9
North: Scoria Street															
7	L2	All MCs	49	2.1	49	2.1	0.059	5.7	LOS A	0.2	1.6	0.13	0.54	0.13	52.4
9	R2	All MCs	31	2.1	31	2.1	0.059	6.1	LOS A	0.2	1.6	0.13	0.54	0.13	52.4
Approach			80	2.1	80	2.1	0.059	5.9	LOS A	0.2	1.6	0.13	0.54	0.13	52.4
West: Collard Street															
10	L2	All MCs	9	2.1	9	2.1	0.023	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	56.4
11	T1	All MCs	38	2.1	38	2.1	0.023	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
Approach			47	2.1	47	2.1	0.023	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.4
All Vehicles			241	2.1	241	2.1	0.060	3.1	NA	0.2	1.6	0.09	0.30	0.09	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (2)] 2026 PM EXISTING (General)

Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	60	1.1	60	1.1	0.055	0.1	LOS A	0.2	1.5	0.14	0.25	0.14	57.3
6	R2	All MCs	41	1.1	41	1.1	0.055	5.8	LOS A	0.2	1.5	0.14	0.25	0.14	54.9
Approach			101	1.1	101	1.1	0.055	2.4	NA	0.2	1.5	0.14	0.25	0.14	56.3
North: Scoria Street															
7	L2	All MCs	59	1.1	59	1.1	0.060	5.8	LOS A	0.2	1.6	0.17	0.54	0.17	52.3
9	R2	All MCs	24	1.1	24	1.1	0.060	6.2	LOS A	0.2	1.6	0.17	0.54	0.17	52.3
Approach			82	1.1	82	1.1	0.060	5.9	LOS A	0.2	1.6	0.17	0.54	0.17	52.3
West: Collard Street															
10	L2	All MCs	9	1.1	9	1.1	0.038	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.9
11	T1	All MCs	69	1.1	69	1.1	0.038	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach			78	1.1	78	1.1	0.038	0.6	NA	0.0	0.0	0.00	0.07	0.00	59.1
All Vehicles			262	1.1	262	1.1	0.060	3.0	NA	0.2	1.6	0.11	0.29	0.11	55.8

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (3)] 2028 AM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	76	2.1	76	2.1	0.062	0.1	LOS A	0.2	1.6	0.10	0.21	0.10	57.8
6	R2	All MCs	41	2.1	41	2.1	0.062	5.7	LOS A	0.2	1.6	0.10	0.21	0.10	55.3
Approach			117	2.1	117	2.1	0.062	2.0	NA	0.2	1.6	0.10	0.21	0.10	56.9
North: Scoria Street															
7	L2	All MCs	50	2.1	50	2.1	0.060	5.7	LOS A	0.2	1.6	0.14	0.54	0.14	52.4
9	R2	All MCs	31	2.1	31	2.1	0.060	6.1	LOS A	0.2	1.6	0.14	0.54	0.14	52.4
Approach			81	2.1	81	2.1	0.060	5.9	LOS A	0.2	1.6	0.14	0.54	0.14	52.4
West: Collard Street															
10	L2	All MCs	9	2.1	9	2.1	0.024	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	56.5
11	T1	All MCs	39	2.1	39	2.1	0.024	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	59.0
Approach			49	2.1	49	2.1	0.024	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.5
All Vehicles			247	2.1	247	2.1	0.062	3.1	NA	0.2	1.6	0.09	0.30	0.09	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (4)] 2028 PM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	62	1.1	62	1.1	0.056	0.1	LOS A	0.2	1.6	0.14	0.25	0.14	57.3
6	R2	All MCs	43	1.1	43	1.1	0.056	5.8	LOS A	0.2	1.6	0.14	0.25	0.14	54.9
Approach			104	1.1	104	1.1	0.056	2.4	NA	0.2	1.6	0.14	0.25	0.14	56.3
North: Scoria Street															
7	L2	All MCs	60	1.1	60	1.1	0.061	5.8	LOS A	0.2	1.6	0.17	0.55	0.17	52.3
9	R2	All MCs	24	1.1	24	1.1	0.061	6.2	LOS A	0.2	1.6	0.17	0.55	0.17	52.3
Approach			84	1.1	84	1.1	0.061	5.9	LOS A	0.2	1.6	0.17	0.55	0.17	52.3
West: Collard Street															
10	L2	All MCs	9	1.1	9	1.1	0.039	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.9
11	T1	All MCs	71	1.1	71	1.1	0.039	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach			79	1.1	79	1.1	0.039	0.6	NA	0.0	0.0	0.00	0.07	0.00	59.1
All Vehicles			268	1.1	268	1.1	0.061	3.0	NA	0.2	1.6	0.11	0.29	0.11	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (5)] 2038 AM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	84	2.1	84	2.1	0.068	0.1	LOS A	0.2	1.8	0.11	0.21	0.11	57.7
6	R2	All MCs	45	2.1	45	2.1	0.068	5.7	LOS A	0.2	1.8	0.11	0.21	0.11	55.3
Approach			129	2.1	129	2.1	0.068	2.1	NA	0.2	1.8	0.11	0.21	0.11	56.8
North: Scoria Street															
7	L2	All MCs	55	2.1	55	2.1	0.068	5.7	LOS A	0.3	1.8	0.16	0.55	0.16	52.3
9	R2	All MCs	35	2.1	35	2.1	0.068	6.2	LOS A	0.3	1.8	0.16	0.55	0.16	52.3
Approach			91	2.1	91	2.1	0.068	5.9	LOS A	0.3	1.8	0.16	0.55	0.16	52.3
West: Collard Street															
10	L2	All MCs	10	2.1	10	2.1	0.030	5.6	LOS A	0.0	0.0	0.00	0.10	0.00	56.5
11	T1	All MCs	50	2.1	50	2.1	0.030	0.0	LOS A	0.0	0.0	0.00	0.10	0.00	59.1
Approach			60	2.1	60	2.1	0.030	1.0	NA	0.0	0.0	0.00	0.10	0.00	58.6
All Vehicles			280	2.1	280	2.1	0.068	3.1	NA	0.3	1.8	0.10	0.30	0.10	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (6)] 2038 PM Pre Dev (Pre Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	68	1.1	68	1.1	0.062	0.2	LOS A	0.2	1.8	0.15	0.26	0.15	57.2
6	R2	All MCs	47	1.1	47	1.1	0.062	5.8	LOS A	0.2	1.8	0.15	0.26	0.15	54.9
Approach			115	1.1	115	1.1	0.062	2.5	NA	0.2	1.8	0.15	0.26	0.15	56.3
North: Scoria Street															
7	L2	All MCs	66	1.1	66	1.1	0.068	5.8	LOS A	0.3	1.8	0.19	0.55	0.19	52.3
9	R2	All MCs	26	1.1	26	1.1	0.068	6.3	LOS A	0.3	1.8	0.19	0.55	0.19	52.2
Approach			93	1.1	93	1.1	0.068	5.9	LOS A	0.3	1.8	0.19	0.55	0.19	52.3
West: Collard Street															
10	L2	All MCs	10	1.1	10	1.1	0.043	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.9
11	T1	All MCs	78	1.1	78	1.1	0.043	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach			88	1.1	88	1.1	0.043	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles			296	1.1	296	1.1	0.068	3.0	NA	0.3	1.8	0.12	0.29	0.12	55.7

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (7)] 2028 AM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	76	2.1	76	2.1	0.063	0.1	LOS A	0.2	1.7	0.10	0.22	0.10	57.7
6	R2	All MCs	43	2.1	43	2.1	0.063	5.7	LOS A	0.2	1.7	0.10	0.22	0.10	55.2
Approach			119	2.1	119	2.1	0.063	2.1	NA	0.2	1.7	0.10	0.22	0.10	56.8
North: Scoria Street															
7	L2	All MCs	52	2.1	52	2.1	0.066	5.7	LOS A	0.2	1.7	0.14	0.54	0.14	52.4
9	R2	All MCs	35	2.1	35	2.1	0.066	6.2	LOS A	0.2	1.7	0.14	0.54	0.14	52.3
Approach			88	2.1	88	2.1	0.066	5.9	LOS A	0.2	1.7	0.14	0.54	0.14	52.4
West: Collard Street															
10	L2	All MCs	9	2.1	9	2.1	0.024	5.6	LOS A	0.0	0.0	0.00	0.11	0.00	56.5
11	T1	All MCs	39	2.1	39	2.1	0.024	0.0	LOS A	0.0	0.0	0.00	0.11	0.00	59.0
Approach			49	2.1	49	2.1	0.024	1.1	NA	0.0	0.0	0.00	0.11	0.00	58.5
All Vehicles			256	2.1	256	2.1	0.066	3.2	NA	0.2	1.7	0.09	0.31	0.09	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (8)] 2028 PM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	62	1.1	62	1.1	0.058	0.2	LOS A	0.2	1.7	0.15	0.26	0.15	57.2
6	R2	All MCs	46	1.1	46	1.1	0.058	5.8	LOS A	0.2	1.7	0.15	0.26	0.15	54.8
Approach			107	1.1	107	1.1	0.058	2.5	NA	0.2	1.7	0.15	0.26	0.15	56.2
North: Scoria Street															
7	L2	All MCs	63	1.1	63	1.1	0.065	5.8	LOS A	0.2	1.8	0.18	0.55	0.18	52.3
9	R2	All MCs	26	1.1	26	1.1	0.065	6.2	LOS A	0.2	1.8	0.18	0.55	0.18	52.3
Approach			90	1.1	90	1.1	0.065	5.9	LOS A	0.2	1.8	0.18	0.55	0.18	52.3
West: Collard Street															
10	L2	All MCs	9	1.1	9	1.1	0.039	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.9
11	T1	All MCs	71	1.1	71	1.1	0.039	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach			79	1.1	79	1.1	0.039	0.6	NA	0.0	0.0	0.00	0.07	0.00	59.1
All Vehicles			276	1.1	276	1.1	0.065	3.1	NA	0.2	1.8	0.11	0.30	0.11	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (9)] 2038 AM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	84	2.1	84	2.1	0.070	0.1	LOS A	0.3	1.8	0.11	0.22	0.11	57.7
6	R2	All MCs	47	2.1	47	2.1	0.070	5.7	LOS A	0.3	1.8	0.11	0.22	0.11	55.2
Approach			131	2.1	131	2.1	0.070	2.1	NA	0.3	1.8	0.11	0.22	0.11	56.8
North: Scoria Street															
7	L2	All MCs	58	2.1	58	2.1	0.072	5.7	LOS A	0.3	1.9	0.15	0.54	0.15	52.4
9	R2	All MCs	38	2.1	38	2.1	0.072	6.2	LOS A	0.3	1.9	0.15	0.54	0.15	52.3
Approach			96	2.1	96	2.1	0.072	5.9	LOS A	0.3	1.9	0.15	0.54	0.15	52.3
West: Collard Street															
10	L2	All MCs	10	2.1	10	2.1	0.027	5.6	LOS A	0.0	0.0	0.00	0.12	0.00	56.4
11	T1	All MCs	43	2.1	43	2.1	0.027	0.0	LOS A	0.0	0.0	0.00	0.12	0.00	58.9
Approach			54	2.1	54	2.1	0.027	1.1	NA	0.0	0.0	0.00	0.12	0.00	58.4
All Vehicles			281	2.1	281	2.1	0.072	3.2	NA	0.3	1.9	0.10	0.31	0.10	55.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: [101 (10)] 2038 PM Post Dev (Post Dev)
Output produced by SIDRA INTERSECTION Version: 10.0.5.217

Collard Street / Archer Street / Scoria Street
Site Category: (None)
Give-Way (Two-Way)
Site Scenario: 1 | Local Volumes

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Qued	Eff. Stop Rate	Number of Cycles to Depart	Aver. Speed km/h
East: Archer Street															
5	T1	All MCs	68	1.1	68	1.1	0.064	0.2	LOS A	0.3	1.9	0.16	0.26	0.16	57.2
6	R2	All MCs	50	1.1	50	1.1	0.064	5.8	LOS A	0.3	1.9	0.16	0.26	0.16	54.8
Approach			118	1.1	118	1.1	0.064	2.6	NA	0.3	1.9	0.16	0.26	0.16	56.1
North: Scoria Street															
7	L2	All MCs	71	1.1	71	1.1	0.074	5.8	LOS A	0.3	2.0	0.19	0.55	0.19	52.3
9	R2	All MCs	29	1.1	29	1.1	0.074	6.3	LOS A	0.3	2.0	0.19	0.55	0.19	52.2
Approach			100	1.1	100	1.1	0.074	5.9	LOS A	0.3	2.0	0.19	0.55	0.19	52.3
West: Collard Street															
10	L2	All MCs	10	1.1	10	1.1	0.043	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	56.9
11	T1	All MCs	78	1.1	78	1.1	0.043	0.0	LOS A	0.0	0.0	0.00	0.07	0.00	59.4
Approach			88	1.1	88	1.1	0.043	0.7	NA	0.0	0.0	0.00	0.07	0.00	59.0
All Vehicles			306	1.1	306	1.1	0.074	3.1	NA	0.3	2.0	0.12	0.30	0.12	55.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
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APPENDIX D
DEVELPOMENT PLANS

project name

Redeemer Stage 2 A BGA Application

project address

2 Collard Street Biloela QLD 4715

project owner

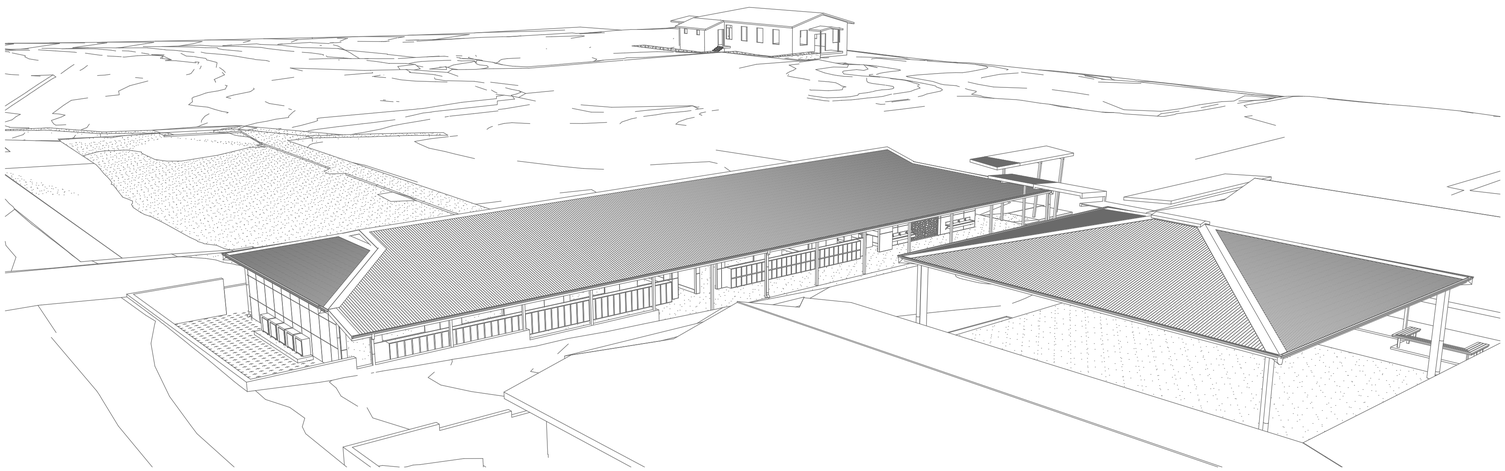
Redeemer Lutheran College, Biloela

drawing schedule

Architect :
BEAT Architects

Project No. BT251085

drw.	title	rev.
A000	Coversheet	P8
A100	Locality Plan & Existing & Demolition Site Plan	P9
A101	Proposed Site Plan	P9
A102	Proposed Carpark Plan	P9
A103	Proposed External Works Plan	P8
A200	Relocated Chapel & n.Uniform Shop Plans	P8
A201	Proposed Floor & Reflected Ceiling Plan	P8
A202	Proposed Roof Plans	P8
A300	Elevations	P8
A400	Sections	P8
A500	3D Views	P8



Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

Building Application Notice

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Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Coversheet

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Reg. No. 2592

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design CB	drawn TG	chkd CB	
date 13/05/2026		job no. BT251085	
scale		dwg no. DA. A000	
orig size A1	sheet of	rev. P8	

Locality Plan
1:1000

50m @ 1:1000
0 10 20 30 40 50

Proposed extent of works for relocating the e.Chapel, demolishing the e.Carpark and the proposed n.Carpark, Block P, and Covered Area. Refer to Proposed Plans.

Proposed extent of works for the relocated e.Chapel. Refer to A200 Relocated Chapel & n.Uniform Shop Plans.

Proposed Carparking bays

Existing Chapel building with Uniform Shop attachment to be relocated.

Existing Carpark and driveway to be demolished

Existing garden and trees to be demolished as shown.

Demolish e.retaining walls

Prepare existing concrete path for n.Carpark and concrete path

Demolish portion of e.covered link

Extent of e.links shown dashed

Demolish e.sand pit and prepare site for relocated Chapel

COLLARD STREET

ARCHER STREET

BELL STREET

Exist. campus Switch board

Exist. Ergon padmount Transformer & Easement

DATUM
Top of exist. sewer manhole
FFL.177.998

Existing Building

Existing Building A

Exist. conc play area

Existing Building Block B

Existing Building Block C

Exist. undercover sand pit

Existing Carpark (28 carbays) extg. asphalt

Existing Undercover Softfall Play Area

Relocate Existing Building (Chapel)

e.Shop

Existing Building Block D

Existing Building Block I

Existing Carpark (27 carbays)

Existing Building Block H

Existing Building Block L

Existing Undercover Sand pit

Existing Shed

Existing Sand Pit

Existing Building Block J

Proposed Block K

Existing Building Block N

Existing Shed

Existing House

Existing Building Block G

Existing Undercover Basketball/ Netball Courts

Existing Building Block M

Retaining Wall

Oval

Existing & Demolition Site Plan
1:500

30m @ 1:500
0 10 20 30

REAL PROPERTY DESCRIPTION

LOT 2 ON RP607657
BANANA SHIRE
SITE AREA 23,980m²

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG

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COLOUR DRAWINGS
Some of the features of this plan are drawn in COLOUR.
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Legend

- Existing Building.
- Existing Pathways & Carparks.
- Proposed Building.
- Proposed Pathways & Carpark.
- To Be Demolished.
- Proposed Area of Works.
- Contour Lines.
- Sewer.
- W – Water.
- Comms.
- Electrical.

Abbreviations

CA	Covered Area.
e/exist.	Existing.
Emt.	Easement.
FH	Fire Hydrant.
LP	Light Pole.
n.	New.
PP	Power Pole.
r.	Relocated.
RL.	Relative level.
SM	Sewer manhole.
SW	Stormwater.
WM	Water meter.
WV	Water Valve.

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Locality Plan & Existing & Demolition Site Plan

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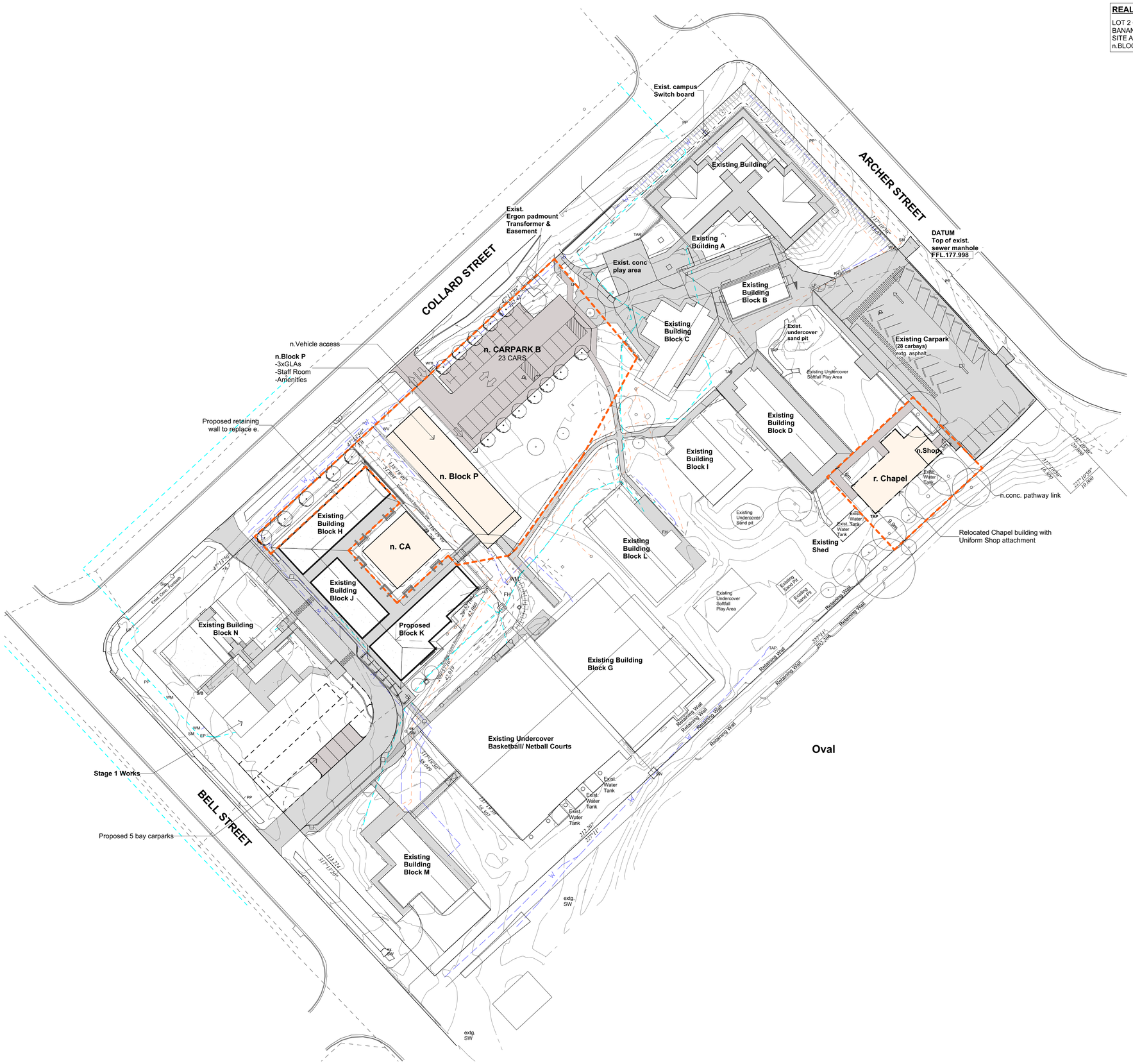
design	CB	drawn TG	chkd CB
date	13/05/2026	job no.	BT251085
scale	1:500, 1:1000	dwg no.	DA. A100
orig size	A1	sheet 1 of 3	rev. P9

REAL PROPERTY DESCRIPTION

LOT 2 ON RP607657
BANANA SHIRE
SITE AREA 23,980m²
n.BLOCK P GFA: 448m²



Proposed Site Plan
1:500

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG

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- Existing Pathways & Carparks.
- Proposed Building.
- Proposed Pathways & Carpark.
- To Be Demolished.
- Proposed Area of Works.
- Contour Lines.
- Sewer.
- W – Water.
- Comms.
- Electrical.

Abbreviations

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LP	Light Pole.
n.	New.
PP	Power Pole.
r.	Relocated.
RL.	Relative level.
SM	Sewer manhole.
SW	Stormwater.
WM	Water meter.
WV	Water Valve.

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Proposed Site Plan

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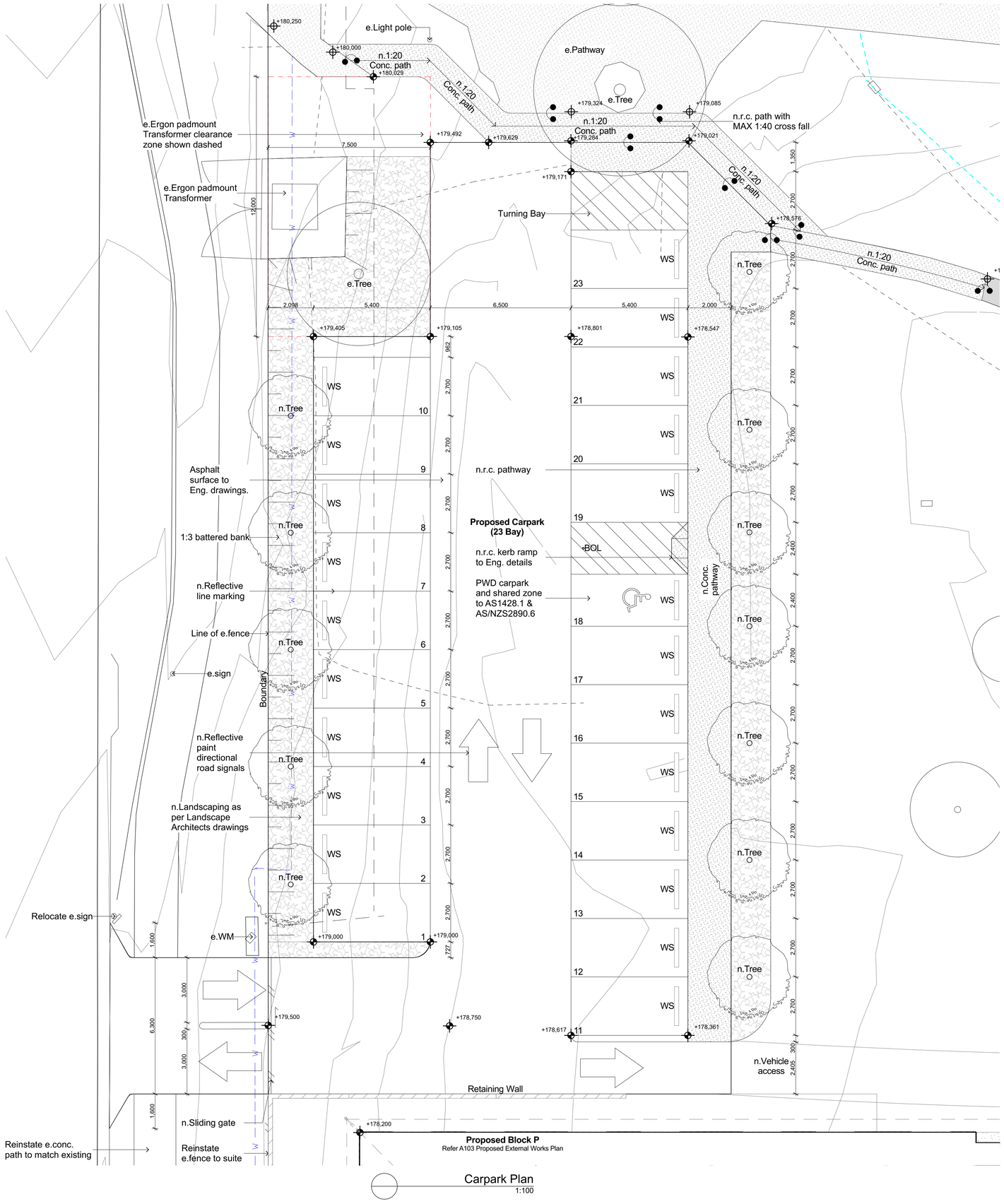
30m @ 1:500
0 10 20 30

design	CB	drawn TG	chkd CB
date	13/05/2026	job no.	BT251085
scale	1:500	dwg no.	DA. A101
orig size	A1	sheet 2 of 3	rev. P9



Carpark Plan
1:100

Notes

1. Car bays 5,400 x 2,700mm typically.
2. Pathways max 1:20 rise and max 1:40 cross fall.
3. Carpark signage to Australian Standards.
4. Refer Civil Engineers Drawings for Carpark Levels and falls & kerb and channel details.
5. Reflective line marking to all car bays to Australian Standards.
6. Make good road seal to Eng. Details.
7. PWD carpark to AS1428.1 & AS/NZS2890.6.
8. All levels are as provided by surveyor C.O.S.

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG
P9	13/05/26	New Carpark	TG

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Abbreviations

BF	Broom Finish.
BOL	Bollard.
COL	Column.
Conc.	Concrete.
C.O.S	Confirm on Site.
DP	Downpipe.
e/exist.	Existing.
n.	New.
RL	Relative level.
SM	Sewer manhole.
SW	Stormwater.
Typ.	Typical.
WM	Water meter.
WS	Wheel Stop.
WV	Water Valve.

e.RL - Refer Survey Drawings.
n.RL - Refer Civil Eng. Drawings.
Flush

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Proposed Carpark Plan

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design CB	drawn TG	chkd CB	
date 13/05/2026		job no.	BT251085
scale 1:100		dwg no.	DA. A102
orig size A1	sheet 3 of 3	rev.	P9

5m @ 1:100
0 1 2 3 4 5

External Works Plan
1:100

Revisions

rev	date	description	by
P2	04.02.26	Preliminary Issue	TG
P3	05.02.26	Preliminary Issue	TG
P4	12.02.26	Preliminary Issue	TG
P5	02.03.26	Preliminary Issue	TG
P6	24/03/26	Preliminary Issue	TG
P7	02/04/26	Preliminary DA Plans	TG
P8	11/05/26	Preliminary DA Plans	TG

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WS	Wheel Stop.
WV	Water Valve.

e.RL - Refer Survey Drawings.
n.RL - Refer Civil Eng. Drawings.
Flush

Project Details

client
Redeemer Lutheran College, Biloela

project
Redeemer Stage 2 A BGA Application

address
2 Collard Street Biloela QLD 4715

title
Proposed External Works Plan

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design CB	drawn TG	chkd CB	
date 13/05/2026		job no.	BT251085
scale 1:100		dwg no.	DA. A103
orig size A1	sheet of	rev.	P8

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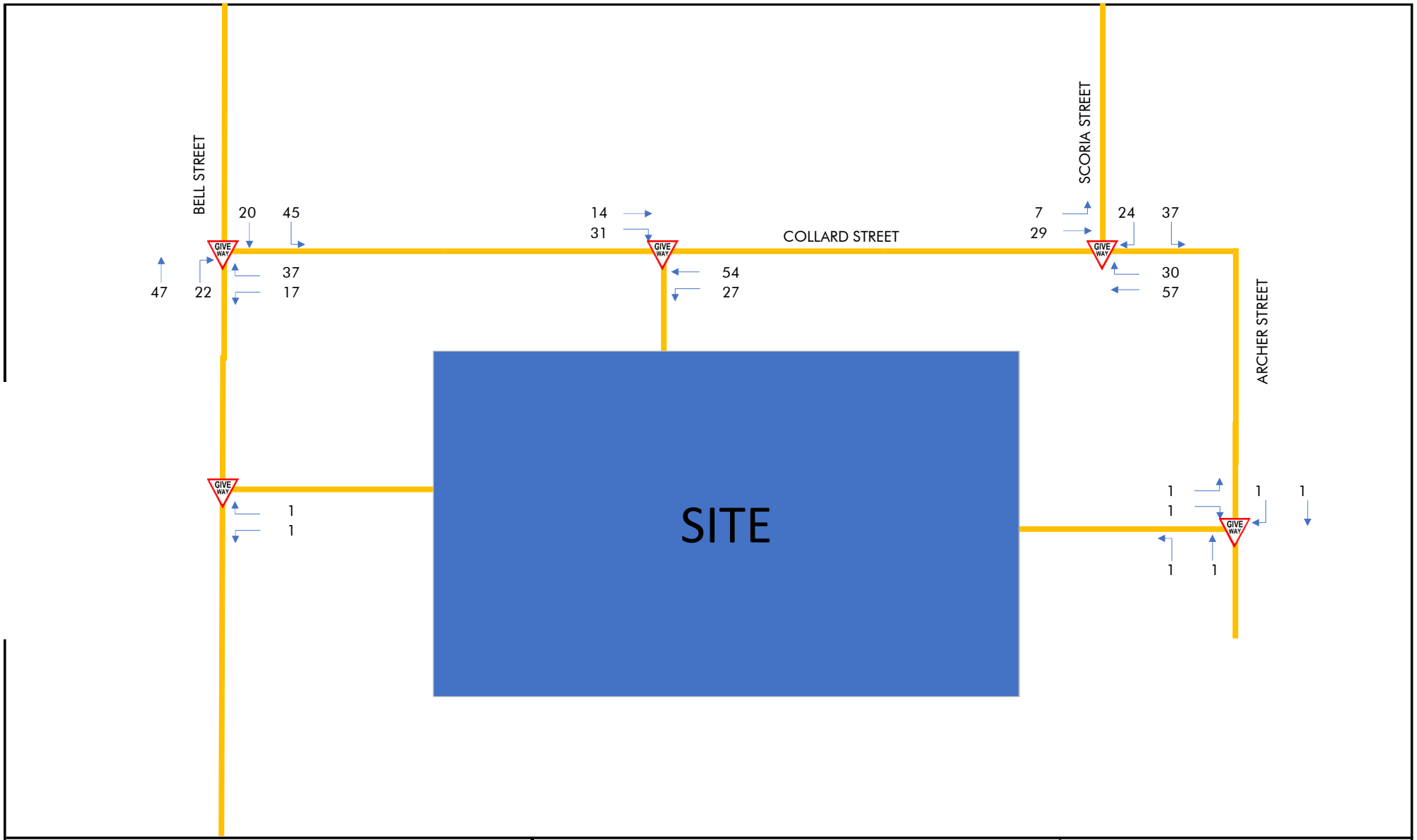
APPENDIX E
TURNING MOVEMENT FORECASTS



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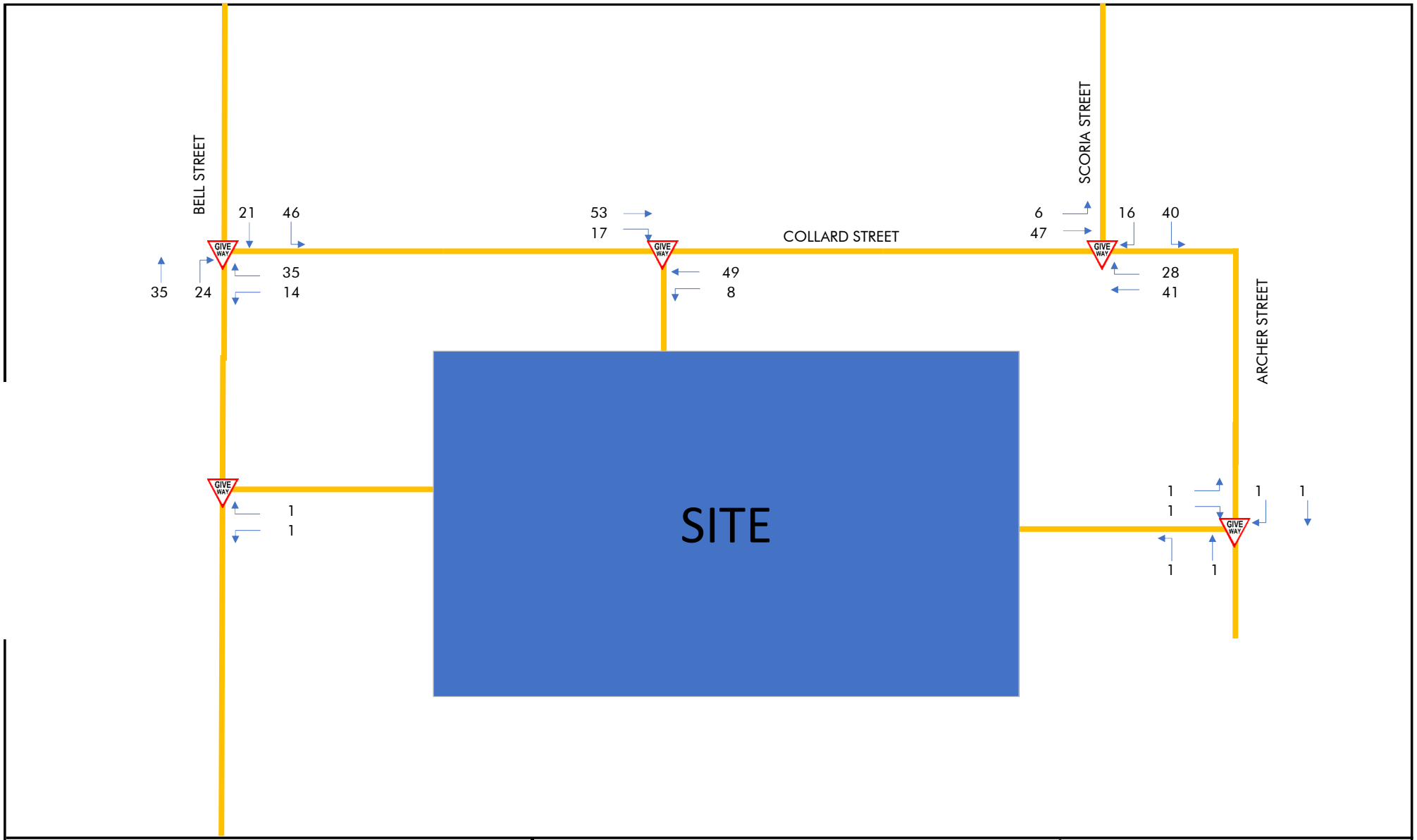
Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 1	Job No.	26-288

2026 Existing Morning Peak Hour



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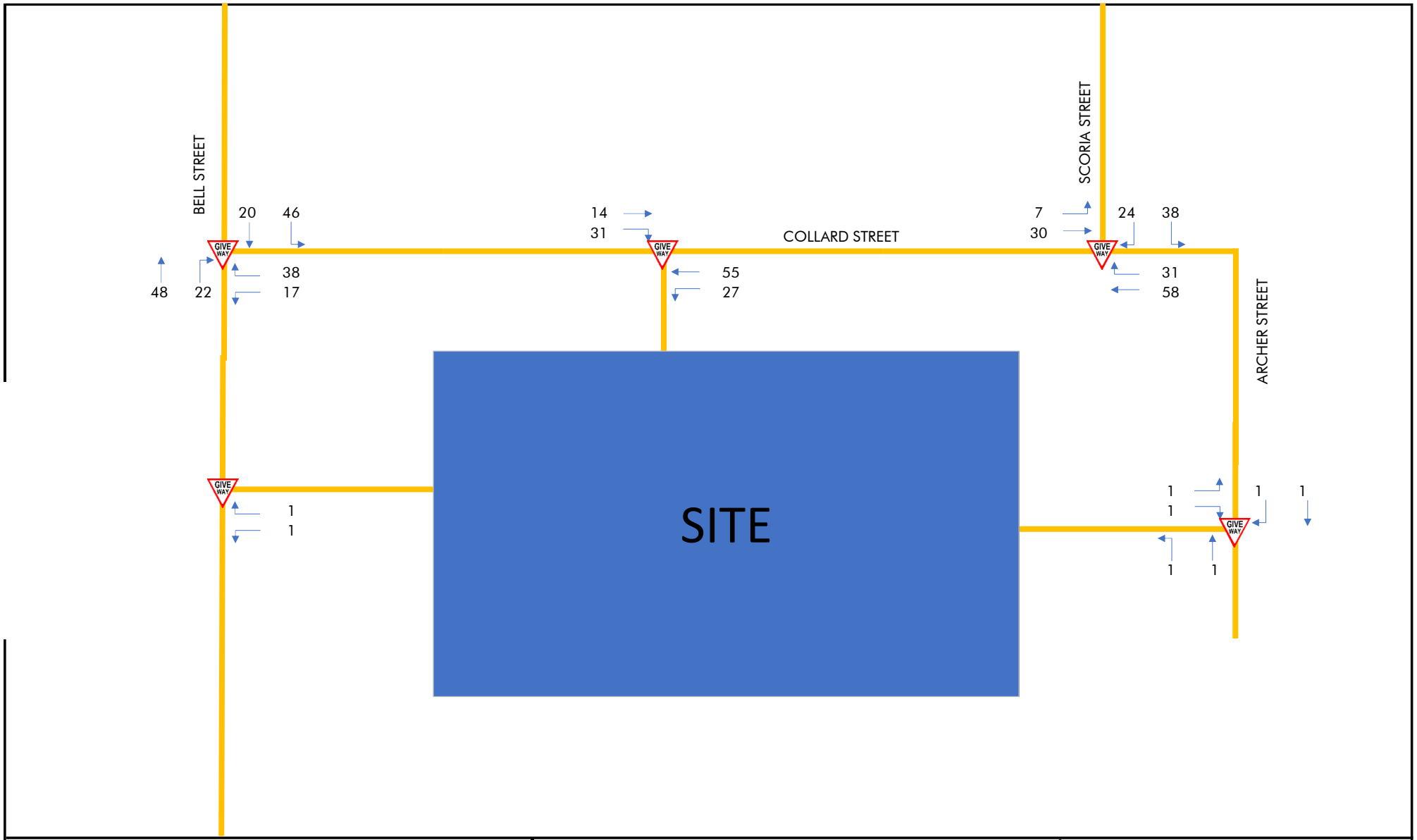
Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 2	Job No.	26-288

2026 Existing Evening Peak Hour



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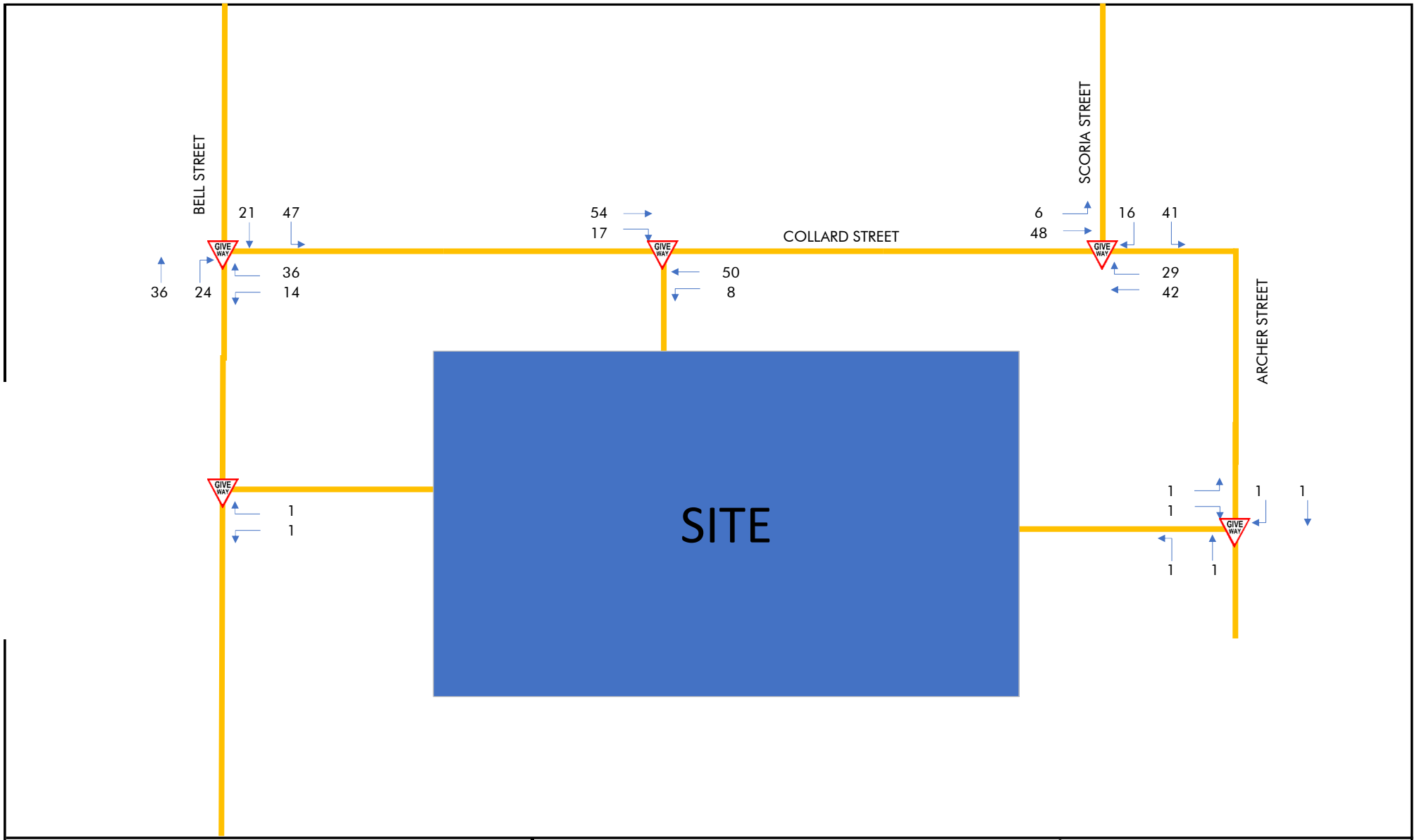
Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 3	Job No.	26-288

2028 Pre-Development Morning Peak Hour



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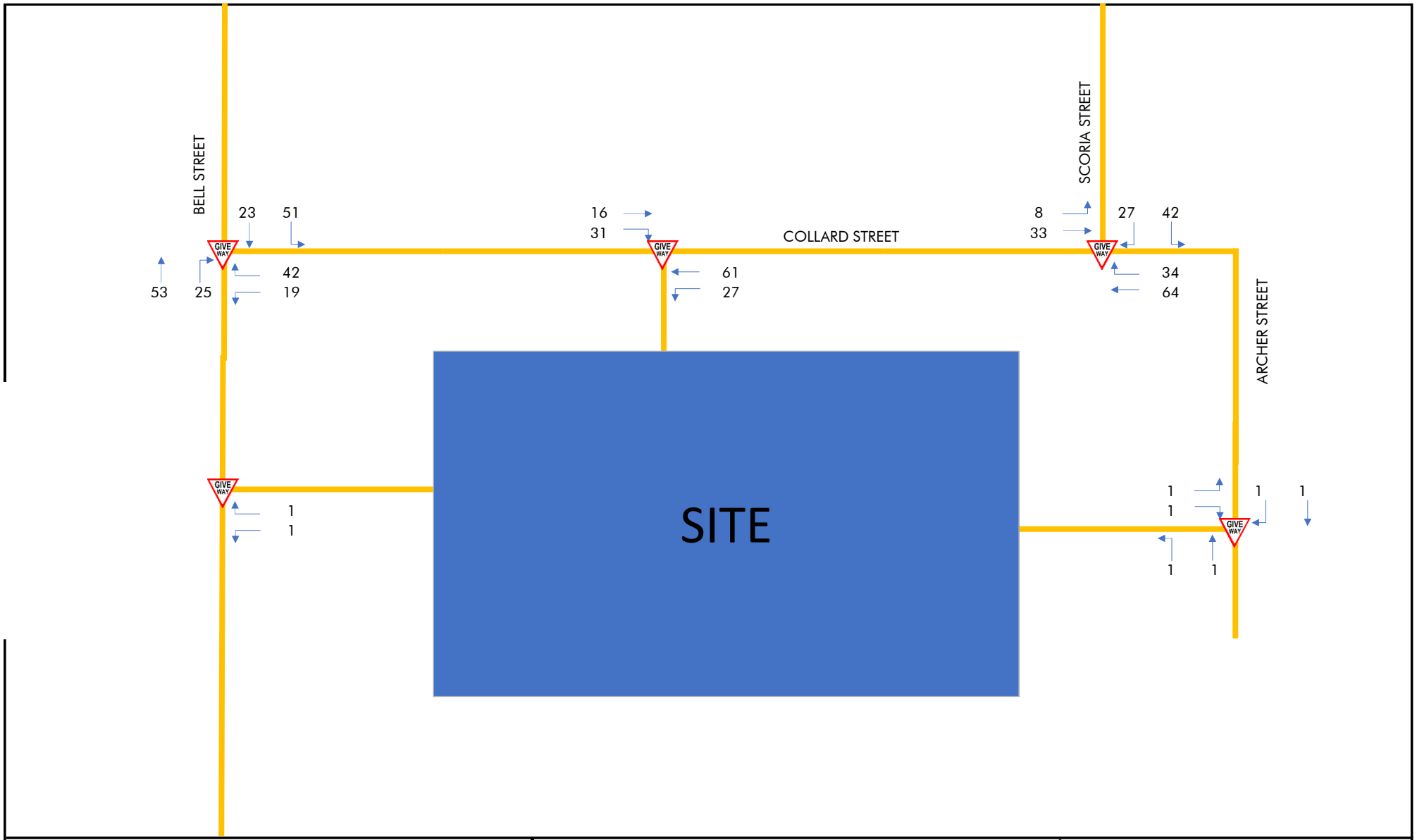
PTT
ABN 96 067 593 962
P 07 3839 6771 WWW.PTT.COM.AU
Level 2, 62 Astor Tce, Spring Hill QLD 4000

Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 4	Job No.	26-288

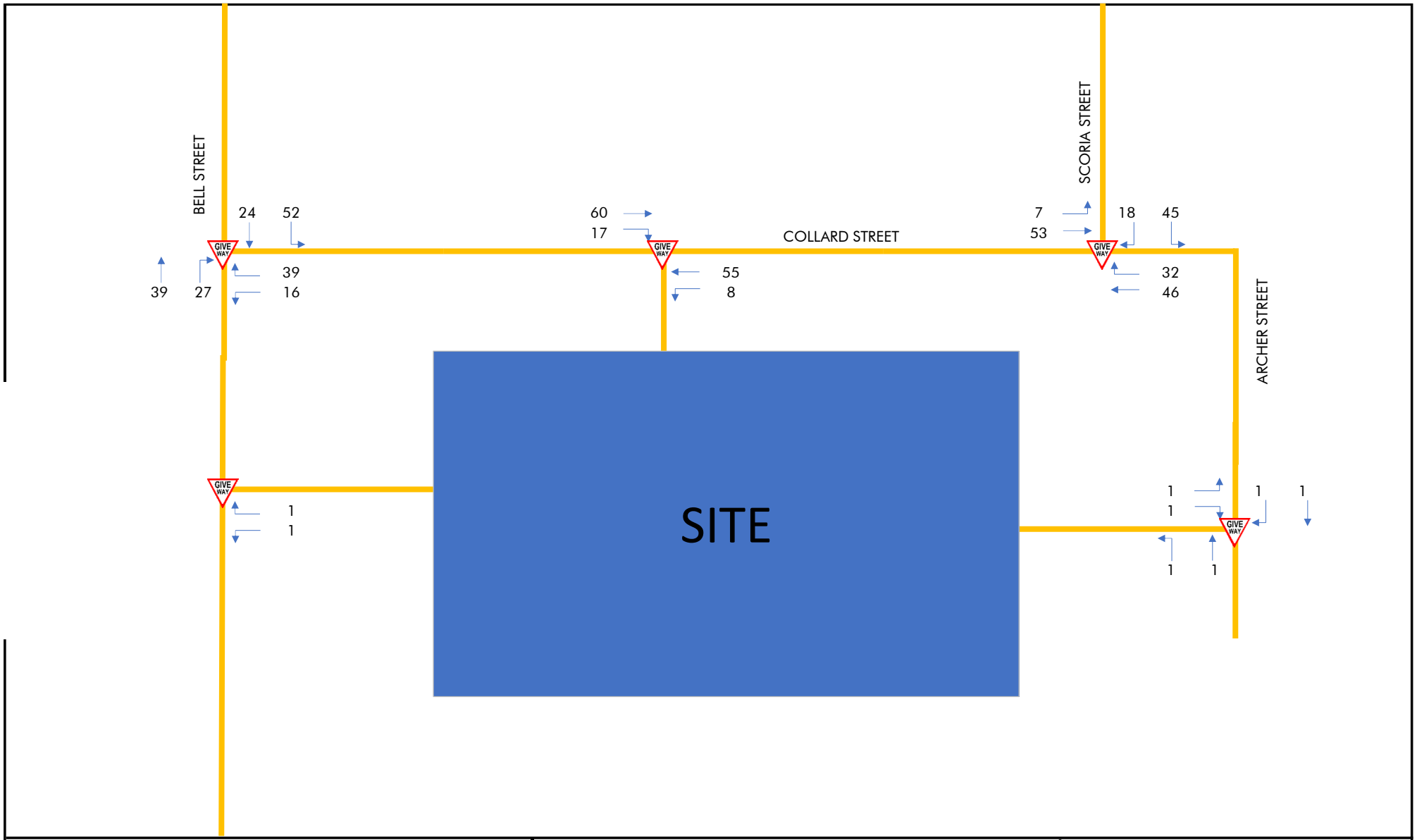
2028 Pre-Development Evening Peak Hour



PTT
TRAFFIC & TRANSPORT ENGINEERING
PTT
ABN 96 067 593 962
P 07 3839 6771 WWW.PTT.COM.AU
Level 2, 62 Astor Tce, Spring Hill QLD 4000

Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 5	Job No.	26-288

2038 Pre-Development Morning Peak Hour



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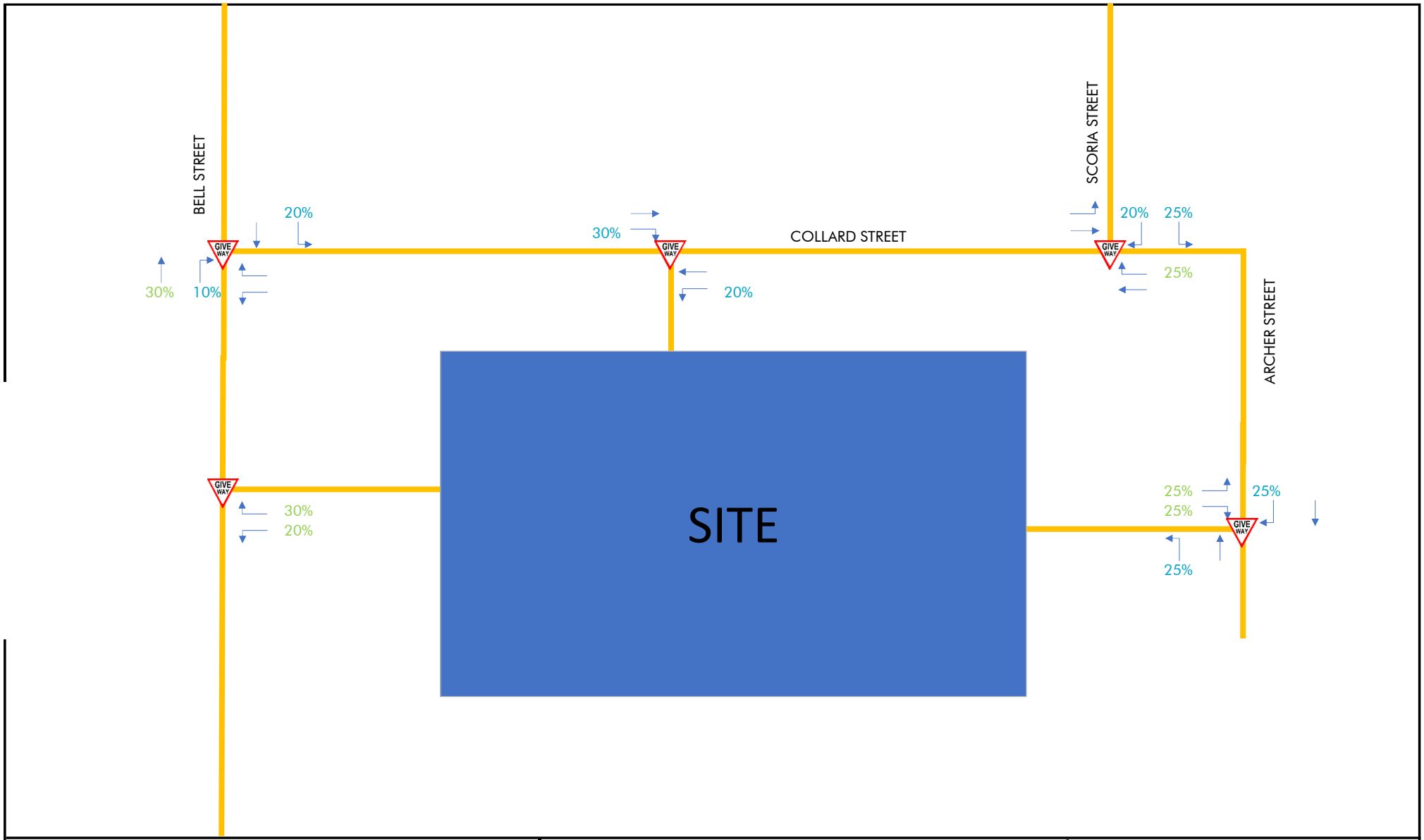
Level 2, 62 Astor Tce, Spring Hill QLD 4000

Client	Redeemer Lutheran College	Project	Redeemer Lutheran College
Date	18/05/2026	Figure	Figure 6	Job No.	26-288

2038 Pre-Development Evening Peak Hour



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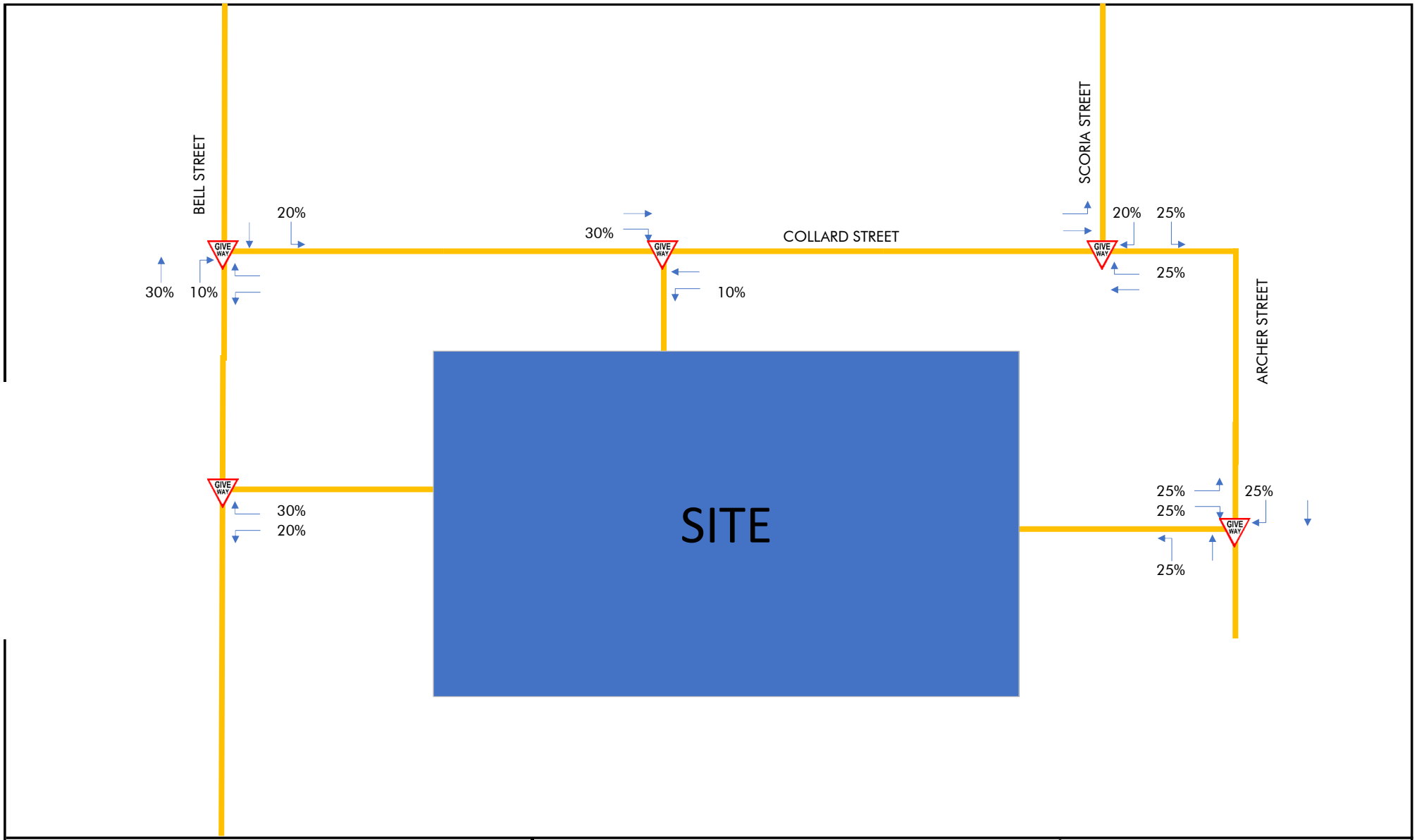
Development Traffic Distribution - Morning Peak Hour



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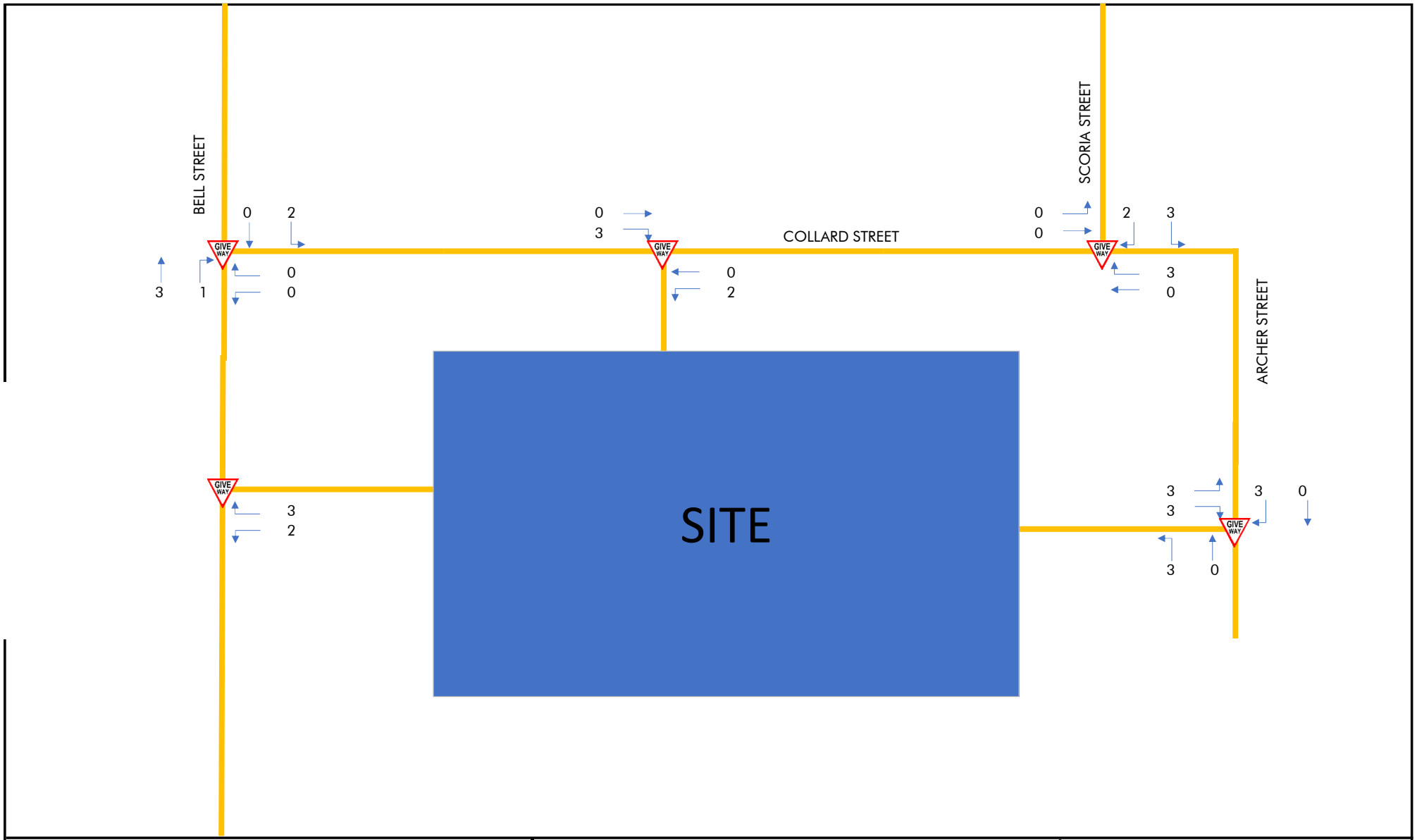
Development Traffic Distribution - Weekend Peak Hour



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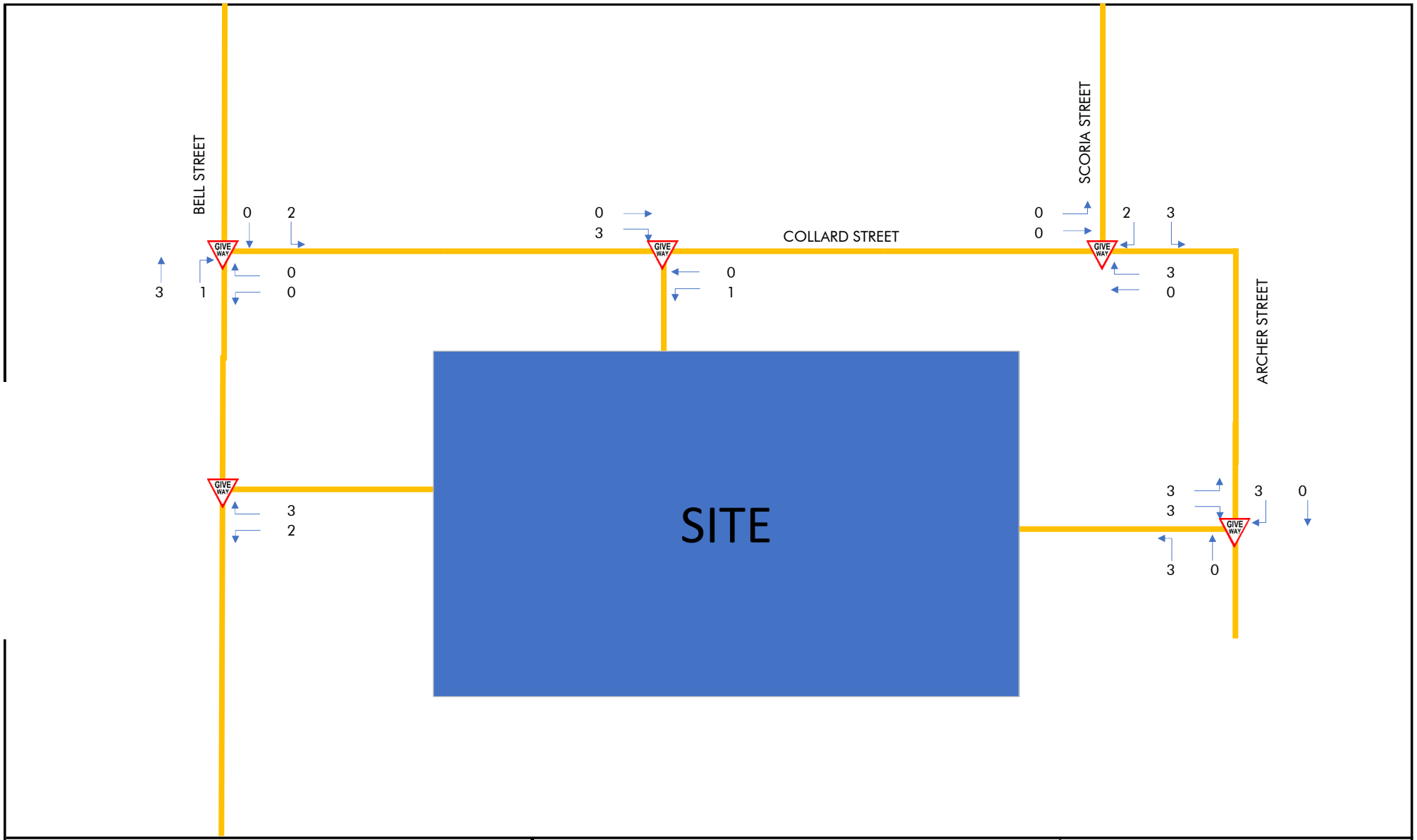
Development Traffic Generation - Morning Peak Hour



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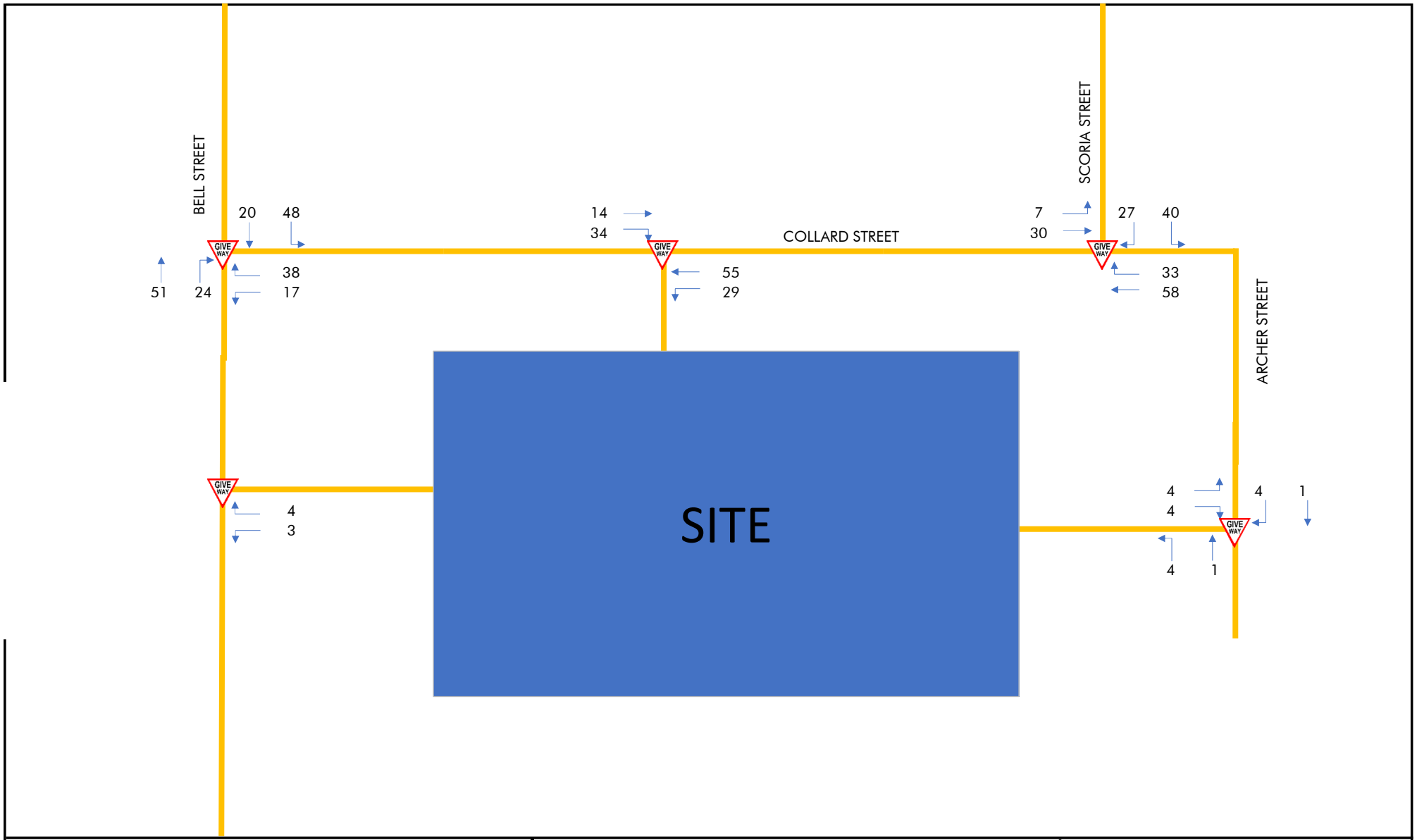
Development Traffic Generation - Evening Peak Hour



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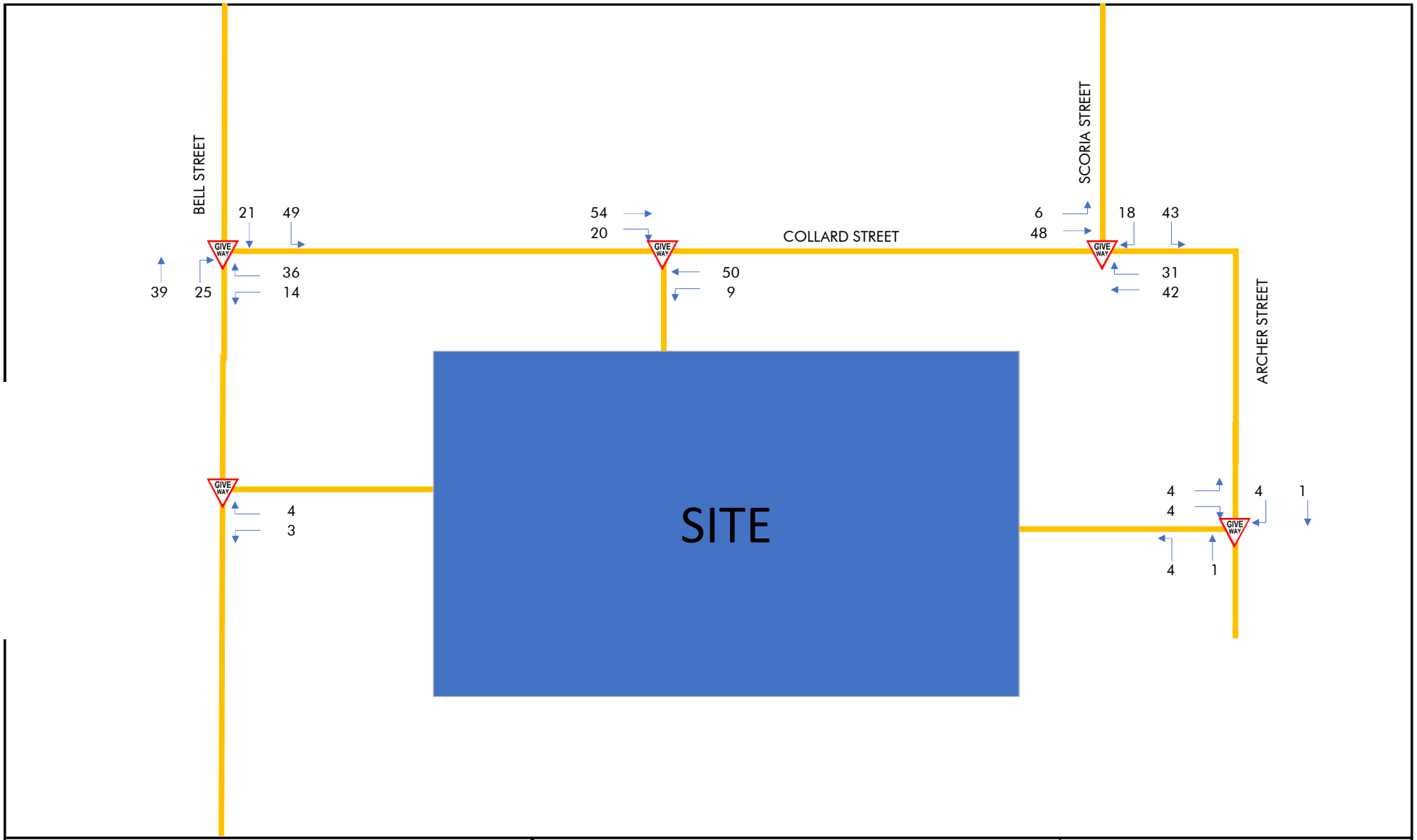
2028 Post-Development Morning Peak Hour



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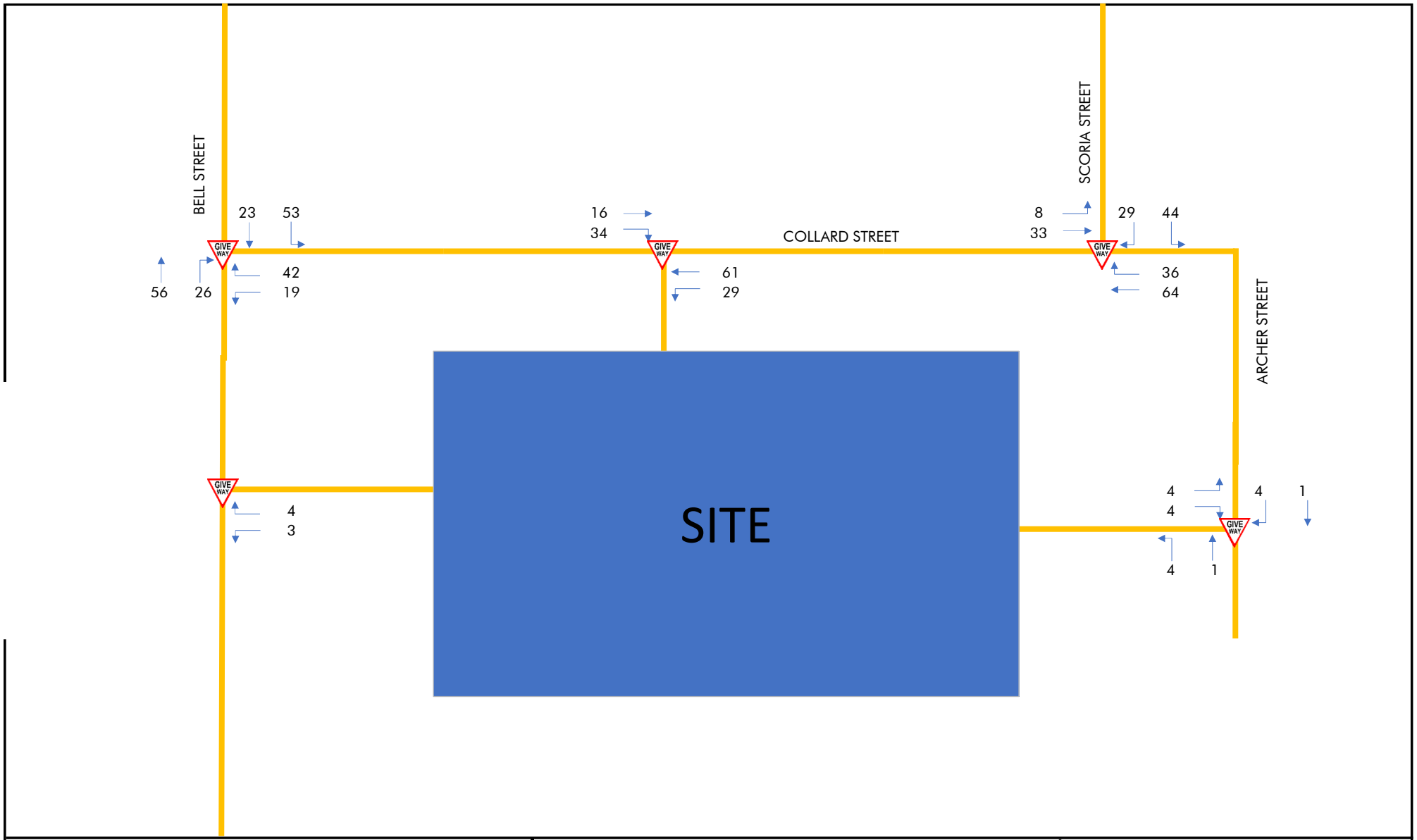
2028 Post-Development Evening Peak Hour



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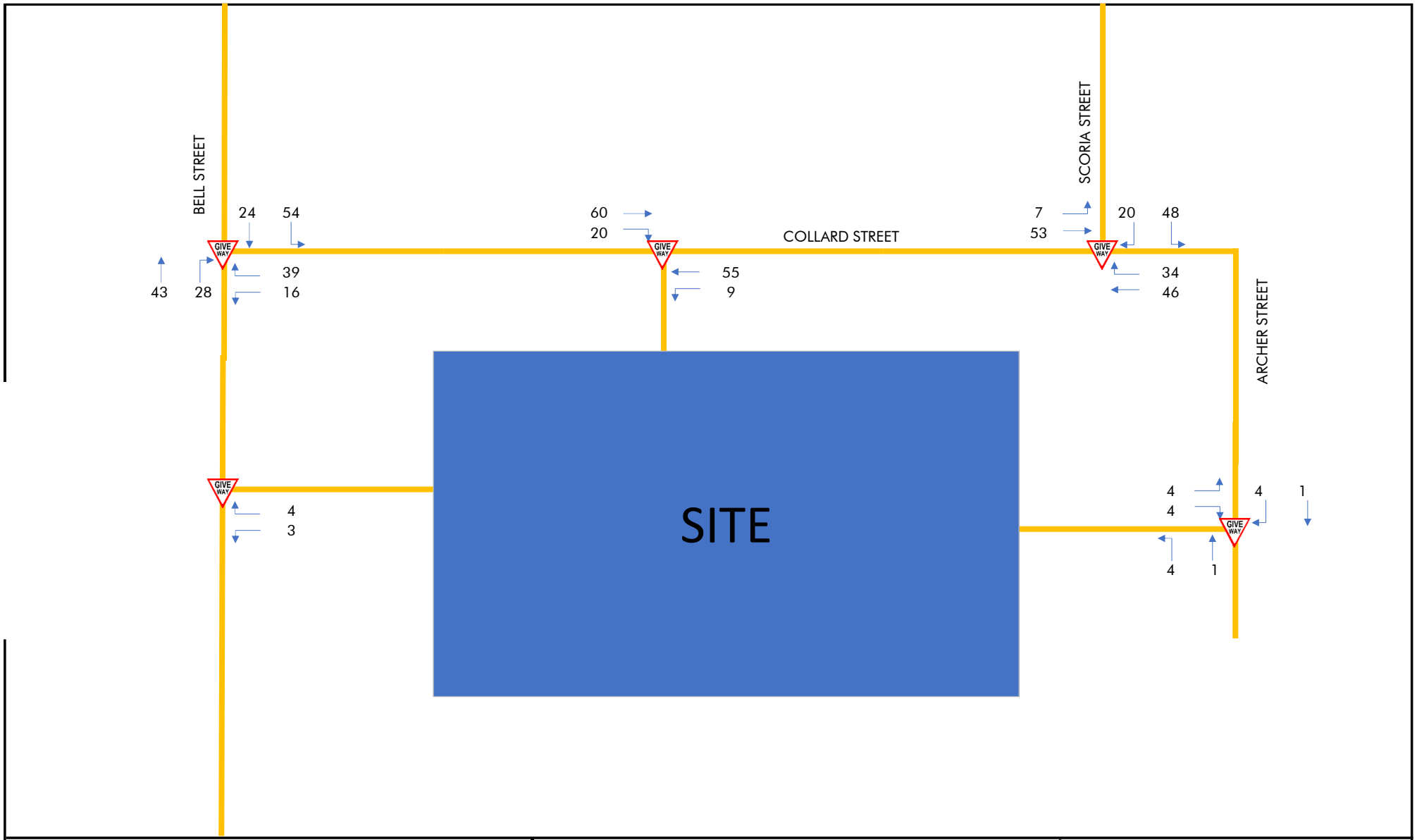
Date	18/05/2026	Figure	Figure 13	Job No.	26-288

2038 Post-Development Morning Peak Hour



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2038 Post-Development Evening Peak Hour

APPENDIX D: SITE BASED STORMWATER MANAGEMENT PLAN

MOLONEY & SONS™
ENGINEERING

SITE BASED STORMWATER MANAGEMENT PLAN

2 Collard Street, Biloela QLD 4715

REDEEMER LUTHERAN COLLEGE

29 May 2026

CE26020.1 – SBSMP

Contract No. CE26020.1

A/ PO BOX 3203 RED HILL ROCKHAMPTON Q 4701
MOLONEY & SONS
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1. INTRODUCTION

1.1. PROJECT COMMISSION

Moloney & Sons Engineering was commissioned by Redeemer Lutheran College to prepare a Site Based Stormwater Management Plan (SBSWMP) in support of expansion and upgrade work to the existing College campus at Lot 1 on RP607657; known as 2 Collard Street, Biloela QLD 4715.

The total site occupies an area of approximately 2.402 hectares. The Site is located within the Banana Shire Council and has a Land Use Zoning of "Community Facilities". The proposed development comprises expansion and upgrade work to the existing College campus, including new educational facilities, internal access roads, car parking areas, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil works.

1.2. PROJECT BACKGROUND

1.2.1. PROJECT LOCATION

The subject site is accessed off 2 Collard Street, Biloela QLD 4715 (at Lot 1 on RP607657), is zoned Community Facilities in the suburb of Biloela QLD 4715 and has an area of 2.402 hectares.

The site is bounded by established road frontage to Collard Street to the north-west, Bell Street to the south-west, Archer Street to the north-east and rural lot to the south.

Please refer to *Figure 1* which shows the site location.

Figure 1: Locality Plan (Source:Queensland Globe)

1.2.2. Existing Site and Land Use

At the time of writing this report, the existing College campus currently accommodates a range of educational buildings, administration areas, internal access driveways, parking areas, landscaped areas and associated school infrastructure.

Based on the available contour information, the site generally falls across the development area with localised level differences requiring retaining walls, batter transitions and associated earthworks to achieve the proposed finished surface levels.

A topographical map of the site is illustrated in *Figure 2.*

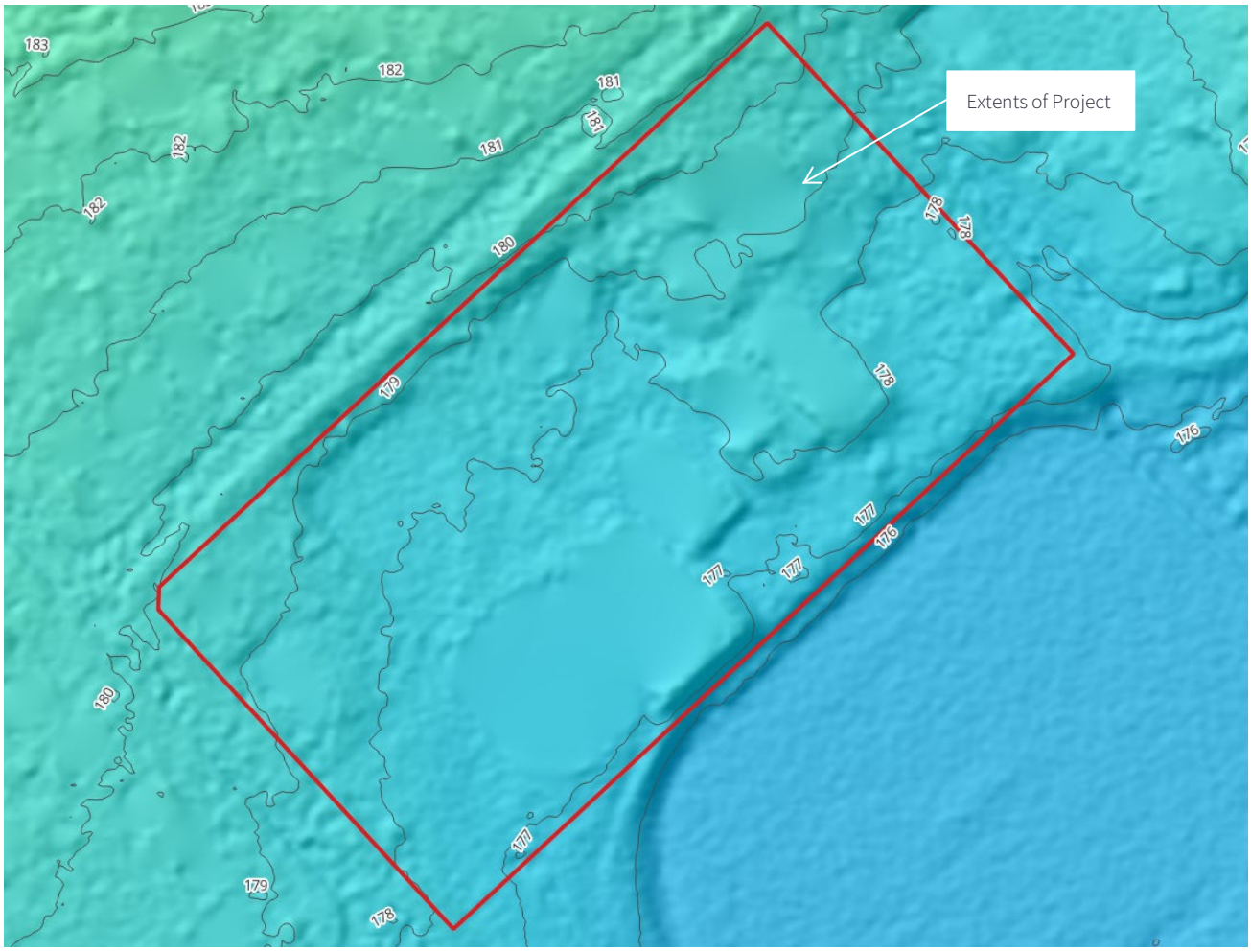


Figure 2: Site Elevation

1.3. Description of Proposed Project

The proposed development comprises expansion and upgrade work to the existing Redeemer Lutheran College campus located at 2 Collard Street, Biloela QLD.

The proposed development has been designed to improve the operational functionality of the College and support future educational and campus requirements.

Please refer to the Proposed Site General Arrangement included as *APPENDIX A – Proposed Layout* for further details of the proposed layout.

1.4. Proposed Conceptual Drainage

It is proposed that stormwater flows generated from the proposed development area will be captured by the proposed drainage system, then will be conveyed to the proposed Drainwell underground tank for quantity treatment and mitigation. The Legal Point of Discharge (LPoD) of the proposed development will be the existing stormwater drainage network of the southern site boundary.

2. SITE HYDROLOGY

2.1. Background

This section of the SBSWMP defines the method and parameters applied in the hydrological assessment of the location to simulate the expected flow pattern and maximum discharge at the Lawful Point of Discharge (LPoD).

For evaluating the peak flow rates before and after development, a Rational Method computation is presented as a reference.

The Rational Method, as discussed in Section 4.3 of the Queensland Urban Drainage Manual 2017 (i.e. QUDM), is a feasible and reliable method for approximation, owing to its adaptability to the available data and its ability to generate suitable approximations of the maximum site discharge based on the data inputs mentioned below:

- specific intensity frequency duration (IFD) data;
- length/type of flow path;
- contributing catchment areas; and
- coefficient of discharge.

Intensity Frequency Duration (IFD) data for the hydrologic modelling was obtained from the Bureau of Meteorology website. The IFD data is summarised in *Table 1*.

Table 1: Intensity Frequency Duration Data

Duration (min)	63 % (mm/hr)	0.5 EY (mm/hr)	0.2 EY (mm/hr)	10 % (mm/hr)	5 % (mm/hr)	2 % (mm/hr)	1 % (mm/hr)
5	106.00	131.00	158.00	180.00	204.00	235.00	259.00
10	87.20	107.00	129.00	145.00	164.00	189.00	208.00
15	74.20	91.40	110.00	124.00	140.00	161.00	177.00
20	64.80	79.80	95.80	109.00	123.00	142.00	156.00
25	57.60	71.00	85.40	96.90	110.00	127.00	140.00
30	51.90	64.00	77.10	87.70	99.50	115.00	127.00
45	40.30	49.70	60.10	68.70	78.20	90.80	101.00
60	33.10	40.90	49.60	56.70	64.70	75.50	83.80

2.2. Pre-Development SCENARIO

2.2.1. Catchment Definition

The pre-development catchments have been analysed as a catchment with contributing areas of 2.402 hectares. The catchment boundary and LPoD for the pre-development plan will be shown in Moloney & Sons Engineering Drawing CE26020-600-DR in *APPENDIX B – Stormwater Catchment Plan Drawings*.

2.2.2. Rational Method

The pre-development coefficient of runoff (C year) was determined on the fraction impervious method specified in *QUDM*. For the purposes of this report and in order to establish an effective and accurate modelling and analysis approach and based on the detailed survey information provided at the time of this report, the pre-development catchment A and up to stage 1 have adopted a fraction impervious of 47% and 51% respectively.

Using the Rational Method, C_{10} value of 0.70 and 0.72 have been adopted for the catchment in 2 (two) stages, and a corresponding 60 minute ten-year rainfall intensity (I_{10}) of 56.70 mm/hr was calculated.

The Time of Concentration for the pre developed catchments has been calculated in accordance with QUDM Table 4.6.3 – Recommended roof drainage system travel times as *Table 2*.

Table 2: Pre-Development Time of Concentration

Catchment	Standard Inlet Time	Pipe Flow Time	Total ToC
Pre	15 mins	-	15 minutes
Pre A+Stage 1	15 mins	-	15 minutes

The pre-development peak flow rates have been calculated for the selected storms, by utilising the Bureau of Meteorology IFD data design rainfall intensities.

To determine the design peak flow rates for the site, the Rational Method (I.e. Q = 2.78 x 10-3 CIA) has been applied.

The coefficient of runoff, time of concentration and peak flow rate are presented in *Table 3* for the standard Annual Exceedance Probability (AEP) design storms of 39%, 10%, 5% and 1% (corresponding to the 2, 10, 20 and 100 year Average Recurrence Interval (ARI) storms).

Table 3: Pre Development Peak Flow Estimation – Rational Method

PRE – DEVELOPMENT SCENARIO PRE					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.60	0.70	0.74	0.84
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.363	0.579	0.687	0.992
PRE – DEVELOPMENT SCENARIO PRE + STAGE 1					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.61	0.72	0.76	0.86
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.373	0.596	0.706	1.020

2.3. Post-Development SCENARIO

2.3.1. Catchment Definition

The post-development catchments will be analysis as catchment A with contributing areas of 2.402 hectares.

It is proposed that stormwater flows generated from the proposed development area will be captured by the proposed drainage system, then will be conveyed to the proposed Drainwell underground tank for quantity treatment and mitigation. The Legal Point of Discharge (LPoD) of the proposed development will be the existing stormwater drainage network of the southern site boundary.

The catchment boundary and LPoD for the post-development plan will be shown in CE26020-601-DR in *APPENDIX B – Stormwater Catchment Plan Drawings*.

2.3.2. Rational Method

The post-development coefficient of runoff (C year) was determined based on the fraction impervious method specified in *QUDM*.

Based on the provided layout, the post-development catchment has fraction impervious of 55% and 63% for post only stage 2A and post stage 4.

The Time of Concentration for the post developed catchments has been calculated in accordance with QUDM Table 4.6.3 – Recommended roof drainage system travel times as *Table 4.*

Table 4: Post Development Time of Concentration

Catchment	Standard Inlet Time	Pipe Flow Time	Total ToC
Post only Stage 2A	15 mins	-	15 minutes
Post up to stage 4	15 mins	-	15 minutes

The peak flow rates for the post development scenario, have been calculated for the selected storms by utilising the Bureau of Meteorology IFD Data design rainfall intensities. Similar to pre-development peak flow calculations, the Rational Method (i.e. Q = 2.78 x 10-3 CIA) has been applied been applied for the post-development scenario.

The coefficient of runoff, time of concentration and peak flow rate are presented in *Table 5* for the standard Annual Exceedance Probability (AEP) design storms of 39%, 10%, 5% and 1% (corresponding to the 2, 10, 20 and 100 year Average Recurrence Interval (ARI) storms).

Table 5: Post Development Peak Flow Estimation – Rational Method

POST – DEVELOPMENT SCENARIO POST ONLY STAGE 2A					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.62	0.73	0.77	0.88
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.378	0.604	0.716	1.035
POST – DEVELOPMENT SCENARIO POST UP TO STAGE 4					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.64	0.75	0.79	0.90
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.389	0.621	0.736	1.063

2.4. Change in Flow Rates

Rational Method assessment aims to evaluate the change in flow rates calculated from the pre and post development catchments. From Table 3 and Table 5, the peak flow rate for AEP design storms of 39%, 10%, 5% and 1% are compared in *Table 6*.

Table 6: Change in Peak Flow Rate

PRE + STAGE 1 and POST ONLY STAGE 2A					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Pre-Developed Peak Flow Rate (m3/s)	Q	0.373	0.596	0.706	1.020
Post-Developed Peak Flow Rate (m3/s)	Q	0.378	0.604	0.716	1.035
Change in Peak Flow Rates (m3/s)	Q	0.005	0.008	0.010	0.014
PRE and POST UP TO STAGE 4					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Pre-Developed Peak Flow Rate (m3/s)	Q	0.363	0.579	0.687	0.992
Post-Developed Peak Flow Rate (m3/s)	Q	0.389	0.621	0.736	1.063
Change in Peak Flow Rates (m3/s)	Q	0.026	0.041	0.049	0.071

Table 6 shows that the post-catchment A has demonstrated via a Rational Method assessment an increase in peak flow rates discharging from the site, therefore on-site detention is deemed required to mitigate flows to pre development conditions.

2.5. External Catchment

An assessment was conducted on the subject site and its vicinity to identify any external catchments that could potentially impact the site. External catchment has been determined through external contours and infrastructure.

Based on the contours sourced from ELVIS data, there is no external catchment having potential to discharge stormwater flows to the subject site.

3. STORMWATER QUANTITY MANAGEMENT PLAN

3.1. WATER QUANTITY OBJECTIVES

The following objective has been set for post development stormwater discharge from the site:

- No net increase in peak flows from the subject site, for all durations up to the 1% AEP design storm event, during the post-developed condition.

This objective shall be demonstrated through hydrologic and hydraulic models by developing on-site detention measures. XP-SWMM has been used to mitigate any increase in total site discharge rates.

3.2. STORMWATER MITIGATION

Stormwater runoff within the site will be directed to a detention system before being discharged via staged outlets to the respective Lawful Point of Discharge (LPoD). Stormwater flow generated from the new development will be discharged to the LPoDs at flow rates equal to or below predevelopment rates.

Major & Minor Systems have been classified and adopted in accordance with Queensland Urban Drainage Manual (QUDM) guideline as 1% AEP & 10% AEP (10yr ARI) respectively.

3.3. 1D MODELLING ASSUMPTIONS & METHODOLOGY

The following modelling assumptions were used to create the XP-SWMM Models

- Two (2) separate scenarios were generated, which were:
  - Pre-Development (which included all points of discharge); and
  - Post-Development (which included all points of discharge).
- Each model included runoff nodes for each contributing sub-catchment
- The sub-catchment areas were split into school campus land uses with absolute values adopted for percentages impervious as specified in *Table 8.*
- Infiltration uniform losses were applied to the pervious areas of the sub-catchments
- The models were run at various durations for a constant ARI to determine the critical storm event.

3.4. XP-SWMM Input Parameters

In this study, the "Laurenson" routing method was applied to XP-SWMM for hydrograph generation. To enable this method to be used, each catchment must be split into pervious (undeveloped) and impervious (developed) portions. Adopted parameters for the Laurenson routing method included:

The fraction impervious has been determined by analysis of aerial photographs and the proposed development layout;

- Manning Roughness coefficient (n):
  - Pervious portion: 0.035;
  - Impervious portion: 0.015.

AR&R 2019 Initial Loss (IL) and Continuing Losses (CL) have been applied to the hydrologic model. Details of IL and CL parameters applied in the XP-SWMM model are presented in *Table 7.*

Table 7: Adopted Initial & Continuing Losses

Impervious Area		Pervious Area	
IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
0	0	10	2

Analysis of the catchment has been undertaken to determine the average slope, with the results of this being applied to the model.

Table 8: Catchment Parameters

Scenario	Catchment	Impervious Area			Pervious Area		
		Area (ha)	Fraction Impervious (%)	Slope (m/m)	Area (ha)	Fraction Impervious (%)	Slope (m/m)
Pre-Development	PRE + STAGE 1	1.232	100 %	2%	1.170	0%	2%
	PRE	1.136	100 %	2%	1.266	0%	2%
Post-Development	POST ONLY STAGE 2A	1.321	100 %	2%	1.081	0%	2%
	POST UP TO STAGE 4	1.513	100 %	2%	0.889	0%	2%

3.5. XP-SWMM Analysis

A XP-SWMM model has been adopted at the preliminary planning stage to ensure that the storage volume is estimated with a higher degree of confidence. Laurenson's Hydrology has been used as the routing method within XP-SWMM. Sub-catchment routing in this method is carried out using the Muskingum procedure, which is a storage routing method based on the storage equation.

A range of storm events up to 1% AEP design storm events were analysed for all standard durations ranging from 10 minutes to 360 minutes. The combined peak discharge rates for the site calculated by the XP-SWMM model are shown below for both scenarios.

A comparison between the peak discharge values obtained for the 1% through to the 39% AEP storm events using the Rational Method and the XP-SWMM model is contained in *Table 9.* As can be seen, the peak discharges generated by the XP-SWMM model mostly compare well (~20% difference) to the values obtained from Rational Method calculations and are therefore considered appropriate for subsequent hydraulic analysis. It is noted that where higher differences occur this will result in a conservative approach.

Table 9: Rational Method vs XP-SWMM Generated Peak Discharges for LPD A

PRE-DEVELOPMENT PRE + STAGE 1							POST-DEVELOPMENT POST ONLY STAGE 2A				
Event (ARI)	Event (AEP %)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)
100	1	ECN_1pct_15 min_5	LPD A	1.020	0.987	-3%	ECN_1pct_15 min_5	LPD A	1.035	1.019	-2%
50	2	ECN_2pct_15 min_5	LPD A	0.889	0.876	-2%	ECN_2pct_15 min_5	LPD A	0.902	0.907	1%
20	5	ECN_5pct_10 min_4	LPD A	0.706	0.724	2%	ECN_5pct_10 min_8	LPD A	0.716	0.763	6%
10	10	ECN_10pct_10 min_8	LPD A	0.596	0.626	5%	ECN_10pct_1 5min_2	LPD A	0.604	0.651	7%
5	20	ECN_0.2EY_30 min_9	LPD A	0.502	0.544	8%	ECN_0.2EY_3 0min_6	LPD A	0.509	0.562	9%
2	39	ECN_0.5EY_30 min_9	LPD A	0.373	0.425	12%	ECN_0.5EY_1 0min_2	LPD A	0.378	0.446	15%
PRE-DEVELOPMENT PRE							POST-DEVELOPMENT POST UP TO STAGE 4				
Event (ARI)	Event (AEP %)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)
100	1	ECN_1pct_30 min_8	LPD A	0.992	0.958	-3%	ECN_1pct_15 min_3	LPD A	1.063	1.114	5%
50	2	ECN_2pct_30 min_8	LPD A	0.865	0.853	-1%	ECN_2pct_15 min_3	LPD A	0.927	1.005	8%
20	5	ECN_5pct_30 min_4	LPD A	0.687	0.67	-2%	ECN_5pct_15 min_2	LPD A	0.736	0.845	13%
10	10	ECN_10pct_30 min_4	LPD A	0.579	0.579	0%	ECN_10pct_1 5min_2	LPD A	0.621	0.741	16%
5	20	ECN_0.2EY_30 min_9	LPD A	0.488	0.526	7%	ECN_0.2EY_1 0min_2	LPD A	0.523	0.617	15%
2	39	ECN_0.5EY_30 min_9	LPD A	0.363	0.409	11%	ECN_0.5EY_1 0min_2	LPD A	0.389	0.511	24%

The proposed development has demonstrated via a XP-SWMM assessment that an increase in peak flow rates discharging from Catchments A is anticipated, therefore On-Site Detention (OSD) is deemed required to mitigate flows to pre-development conditions. A comparison of the pre-development and mitigated flow rates is shown in *Table 10*.

Table 10: Comparison of Pre – Mitigated flow rates – Extracted from XP-SWMM Model (m3/s)

PRE + STAGE 1 and POST ONLY STAGE 2A						
Annual Exceedance Probability	0.5EY	0.2EY	10%	5%	2%	1%
Pre Development	0.425	0.544	0.626	0.724	0.876	0.987
Post Development (Mitigated)	0.423	0.539	0.607	0.704	0.864	0.972
PRE and POST UP TO STAGE 4						
Annual Exceedance Probability	0.5EY	0.2EY	10%	5%	2%	1%
Pre Development	0.409	0.526	0.579	0.670	0.853	0.958
Post Development (Mitigated)	0.407	0.514	0.557	0.646	0.831	0.934

The hydrograph for the critical duration of the Mitigated 1% AEP storm event compared against the pre and post development is shown in *Figure 3* and *Figure 4*.

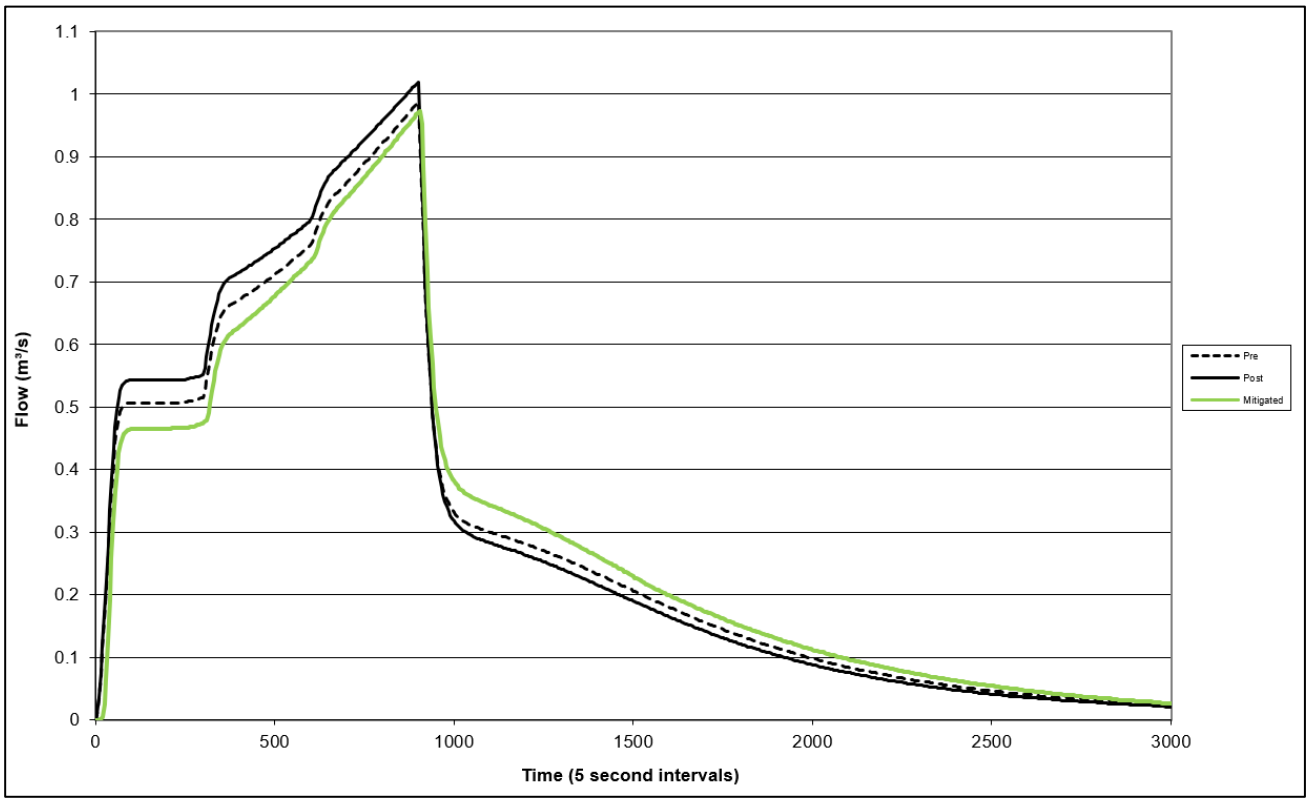


Figure 3: Pre, Post and Mitigated Flow Rates for the 1% AEP Design Storm Event at LPD for only Stage 2A

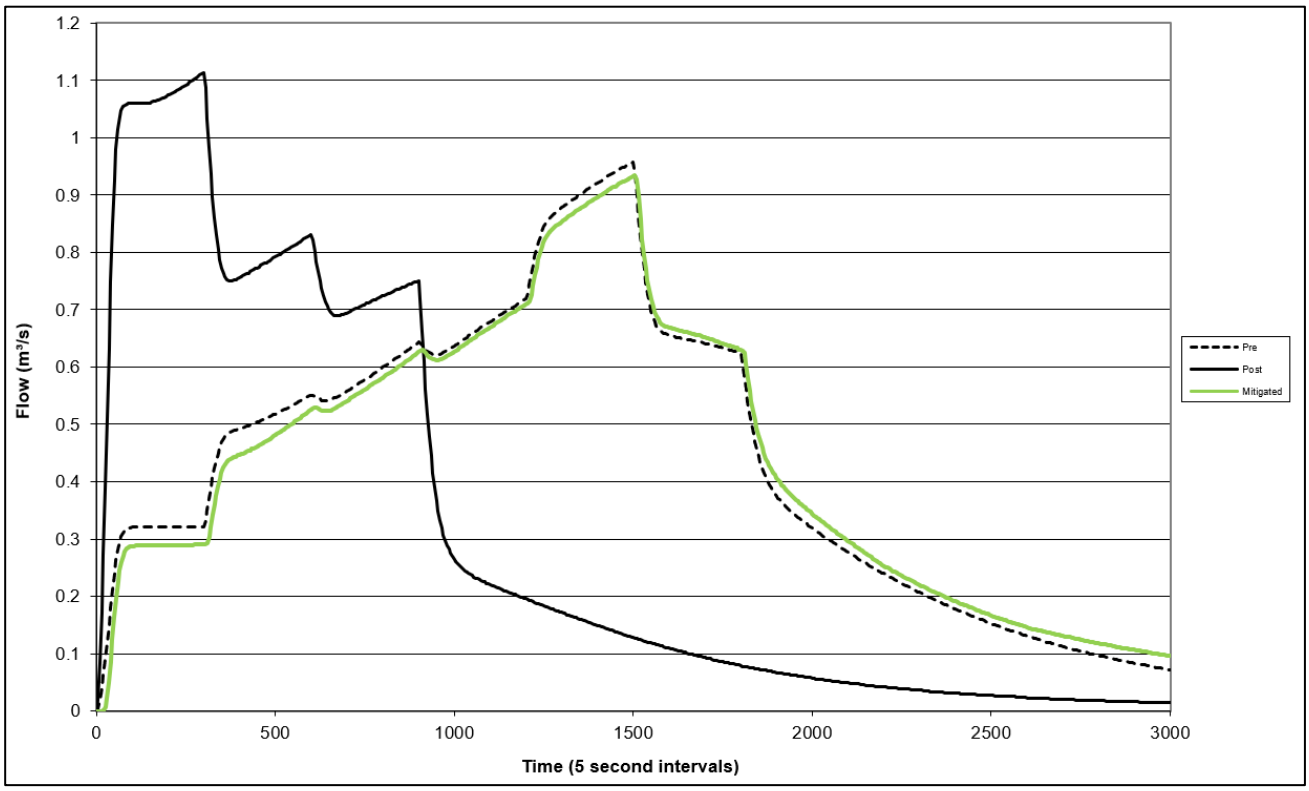


Figure 4: Pre, Post and Mitigated Flow Rates for the 1% AEP Design Storm Event at LPD for up to Stage 4

3.6. On Site Detention (OSD) Details

The following detention storage parameters were adopted to achieve the target pre-development flow rates, via mitigation of the post-development flow rates. The proposed OSD system (proposed Drainwell underground tank) is to be implemented to ensure a non-worsening of peak discharges at LPDs.

The storage volumes for the modelled detention system are presented in the table below.

Table 11: Detention System Volumes

I.D	Design Storm	Required Detention Volume (m^3)
Post Only Stage 2a	1%	51
Post Up to Stage 4	1%	77

A summary of the modelled outlet configuration is provided in the table below

Table 12: Adopted Outlet Configuration

I.D	Minor Event	Major Event
STAGE 2A	0.15m dia Orifice at Base @ 0.032 m3/s	0.1m dia Orifice @ 0.40m above Base Connect to Ø 0.30m Outlet Pipe at Base @ 0.064 m3/s
STAGE 4	0.20m dia Orifice at Base @ 0.06 m3/s	0.3m dia Orifice @ 0.50m above Base Connect to Ø 0.375m Outlet Pipe at Base @ 0.153 m3/s

Table 13: Outlet Configuration Results

EVENT (ARI)	EVENT (AEP %)	CATCH ID	PRE-DEV FLOWS (m3/s)	POST-DEV FLOWS (m3/s)	TOTAL POST-DEV MITIGATED FLOWS (m3/s)	FLOW DIFFERENCE (m3/s)
100	1	STAGE 2A	0.987	1.019	0.972	-0.015
2	39	STAGE 2A	0.425	0.446	0.423	-0.002
100	1	STAGE 4	0.958	1.114	0.934	-0.024
2	39	STAGE 4	0.409	0.511	0.407	-0.002

The Outlet details and LPoD for the out-flow control will be shown in *APPENDIX B – Stormwater Catchment Plan Drawings*.

4. STORMWATER QUALITY MANAGEMENT PLAN

4.1. SITE SPECIFIC OBJECTIVES

The site development may increase the pollutant loads within stormwater runoff and downstream watercourses. During the construction and operational phase, the site disturbance the site and soil exposure result in erosion and sediment transportation, causing erosive influence of the environment. As the development is school campus / community facilities development with roof, pavement/parking and landscaped catchments in character, the water quality parameters of relevance to the site are suspended solids, nutrients (nitrogen and phosphorus), litter and faecal coliforms.

Of these parameters, detailed modelling of litter and faecal coliforms is not considered practical at this stage using MUSIC, due to the limited availability of site-specific export rates for these parameters. The modelling has therefore focused on the standard stormwater quality pollutants typically assessed in MUSIC, including total suspended solids, total phosphorus, total nitrogen and gross pollutants.

In the absence of specific Banana Shire Council water quality objectives for the proposed school development, the relevant stormwater quality load reduction targets adopted under the State Planning Policy / QUDM framework have been applied:

- 80% Reduction of Total Suspended Solids
- 60% Reduction in Total Phosphorus
- 40% Reduction in Total Nitrogen
- 90% Reduction in Gross Pollutants

These targets are measured against the pollutant load generated for the untreated developed scenario. Load reduction targets will be modelled as they more closely represent effects on the site.

4.2. MUSIC WATER QUALITY ANALYSIS METHODOLOGY

In order to determine the effectiveness of different water quality treatment measures and meet the water quality objectives, a stormwater quality analysis was performed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3.

The models consist of three types of nodes:

- Source nodes representing different land uses and defining size of sub catchments
- Treatment Node representing different types of water quality treatment measures
- Receiving nodes represent the outlet point for the catchment under consideration. Each model only has one receiving node

The model requires the user to specify meteorological data (rainfall and evaporation), soil properties and pollutant loads for each catchment. Suitable parameters for the MUSIC model were adopted in accordance with the recommendations of MUSIC Modelling Guidelines Version 3.0.2018.

The hydrologic routing option for the modelling was the “No Routing” option. This option generates more conservative results from the treatment measures as the runoff is modelled reaching the treatment measure all at the same time rather than allowing for travel and detention stages as the runoff progresses through the catchment.

In accordance with the State Planning Policy for Healthy Waterways Section 2.7, the policy does not apply to the material change of use or operational works to the land less than 2,500m^2 or the creation of less than 6 residential allotments. Therefore, as Stage 2A only covers the proposed buildings and car park, with a total area of less than 2,500 m^2, there is no deemed requirement for water quality management in accordance with Healthy Waterways for Stage 2A.

A MUSIC model was created to determine the Stage 4 with Water Sensitive Urban Design (WSUD) treatments.

Table 14 Post Development Sub-Catchments Parameters

CATCHMENT	AREA (ha)	% IMPERVIOUS
Roof Stage 4	0.272	100%
Roads/Parking Stage 4	0.136	100%
Landscaping Stage 4	0.085	100%

Refer to the ***Figure 5*** for identification of sub catchment zones / areas for post development condition. The MUSIC model is based on a split catchment approach and will incorporate various treatment nodes.

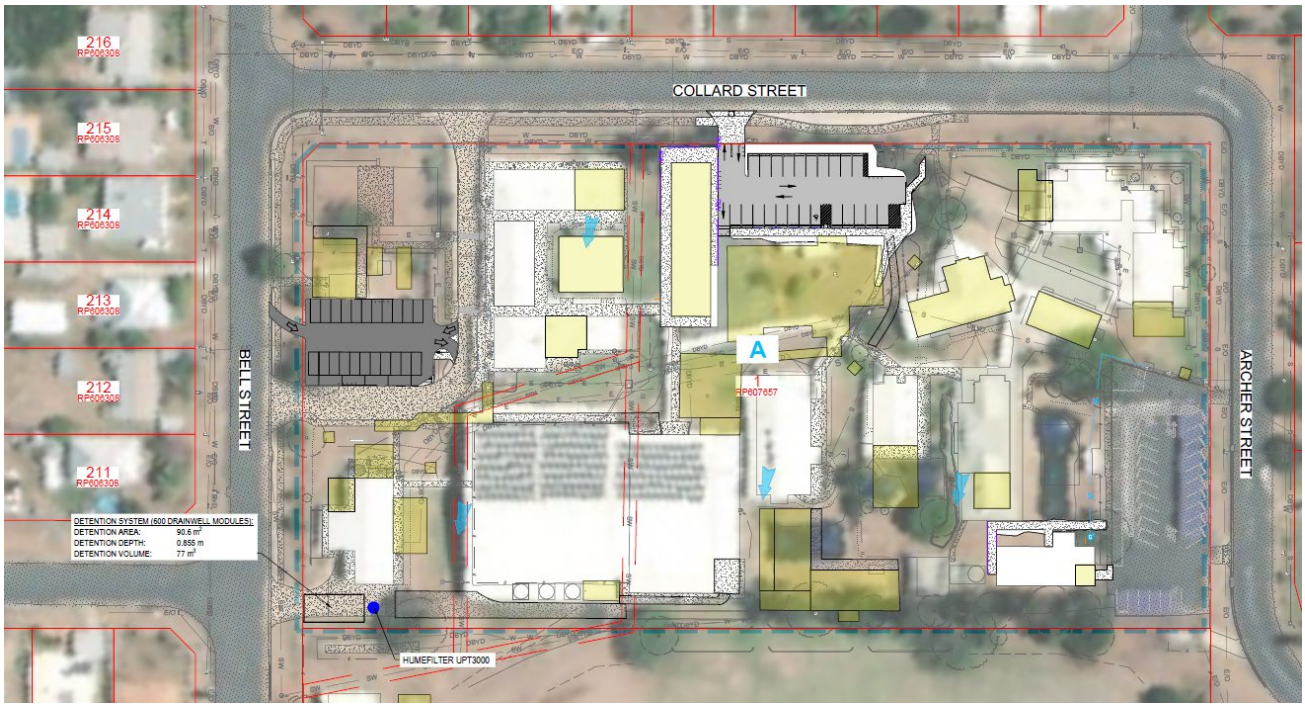


Figure 5 Proposed Site WSUB Sub-Catchments

The adopted MUSIC Runoff Generation Parameters used for the modelling are detailed in the below table.

Table 15 Catchment Runoff Generation Parameters

PARAMETER	COMMERCIAL
Field Capacity (mm)	18
Infiltration Capacity Coefficient A	243
Infiltration Capacity Exponent B	0.6
Rainfall Threshold (mm)	1
Soil Capacity (mm)	18
Initial Storage (%)	10
Daily Recharge Rate (%)	0
Daily Baseflow Rate (%)	31
Initial Depth (mm)	50
Daily Deep Seepage (%)	0

Table 16: Pollutant Export Relationships – Split Land Uses

LAND USE FOR MUSIC SOURCE NODE	PARAMETER	TOTAL SUSPENDED SOLIDS (LOG 10mg/L)		TOTAL PHOSPHORUS (LOG 10mg/L)		TOTAL NITROGEN (LOG 10mg/L)	
		BASE FLOW	STORM FLOW	BASE FLOW	STORM FLOW	BASE FLOW	STORM FLOW
Commercial- Roof	Mean	-	1.3	-	-0.89	-	0.37
	Std Deviation	-	0.38	-	0.34	-	0.34
Commercia– Roads/Parking	Mean	0.78	2.43	-0.60	-0.3	0.32	0.37
	Std Deviation	0.39	0.38	0.50	0.34	0.30	0.34
Commercial – Landscape	Mean	0.78	2.16	-0.60	-0.39	0.32	0.37
	Std Deviation	0.39	0.38	0.50	0.34	0.30	0.34

4.3. Treatment Train

The Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software was used to propose a treatment train for the developed site, which was necessary to meet the Water Quality Objectives (WQOs) at the site's LPoD.

Rainfall data has been sourced from Rainfall Station 042069 RAINMLB using a date range from 2011 to 2021 and a 6 Minute Time Step.

The proposed HUME Filter – UPT 3000 (Or approved equivalent) will be designed in accordance with the Water by Design Technical Design Guidelines during the detailed design phase of the development (Water by Design, 2014).

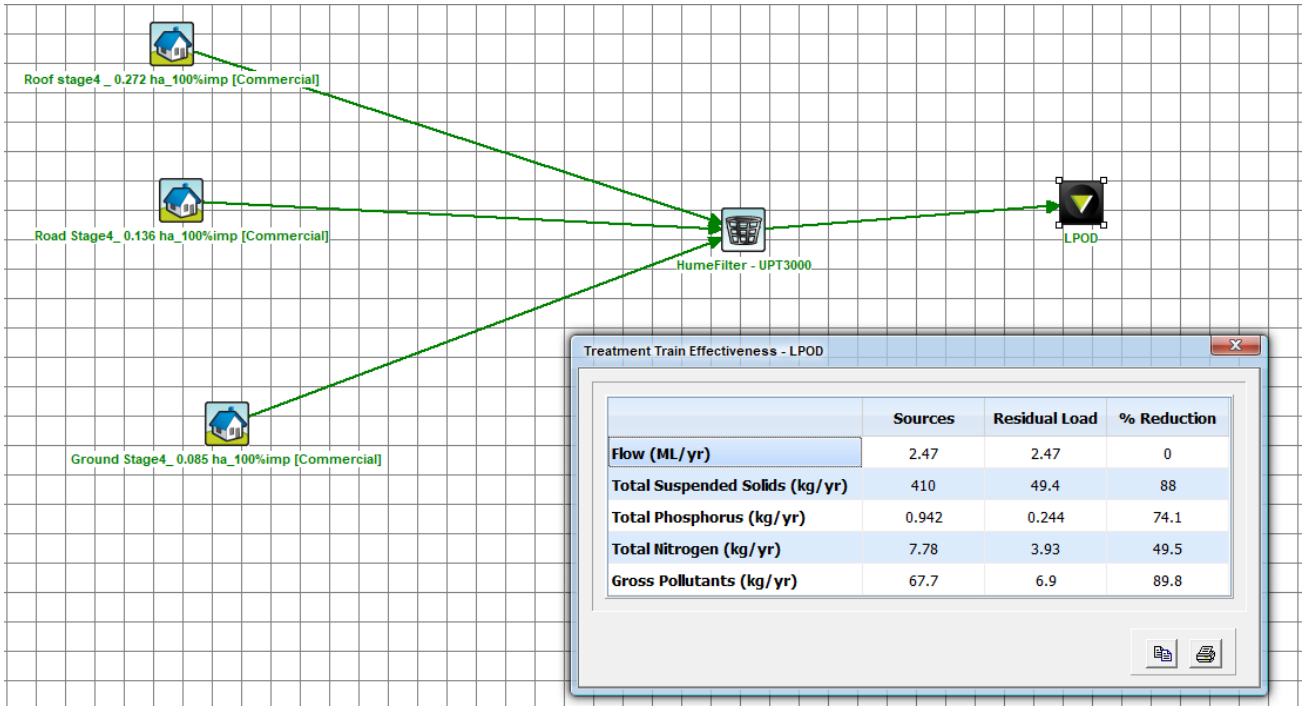
4.4. MUSIC Modelling Results

Results of MUSIC modelling which has been modelled for this site will be shown in *Table 17*, and these results will also be compared with reduction target for TSS, TP, TN and gross pollutants shown in Section 4.1. The results should be lower than the target parameters.

Table 17: Treatment Train Effectiveness at Receiving Node

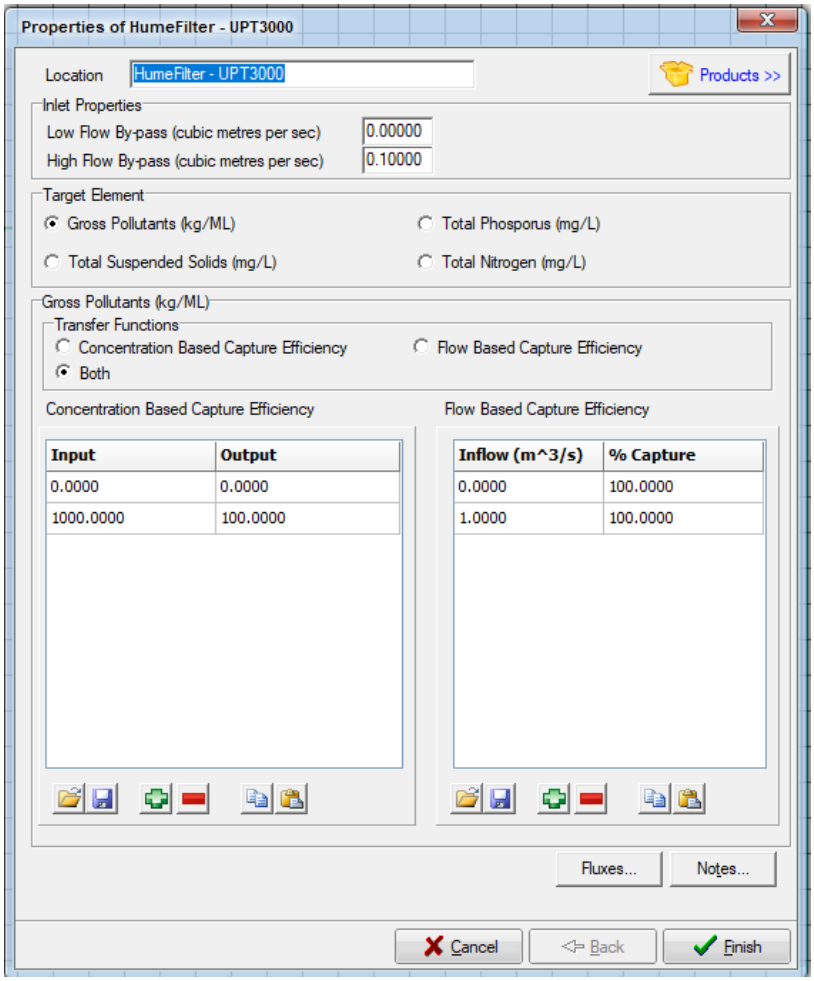
Catchment	Parameter	Post	Post Mitigated	Reduction Achieved (%)	Water Quality Objective (%)
A	Flow (ML/yr)	2.47	2.47	0	-
	TSS (kg/yr)	410	49.4	88	80
	TP (kg/yr)	0.942	0.244	74.1	60
	TN (kg/yr)	7.78	3.93	49.5	40
	GP (kg/yr)	67.7	6.9	89.8	90

Arrangement of MUSIC model and treatment train effectiveness results are represented in *Figure 6*.



	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.47	2.47	0
Total Suspended Solids (kg/yr)	410	49.4	88
Total Phosphorus (kg/yr)	0.942	0.244	74.1
Total Nitrogen (kg/yr)	7.78	3.93	49.5
Gross Pollutants (kg/yr)	67.7	6.9	89.8

Figure 6: Treatment Train Layout and MUSIC Results



Input	Output
0.0000	0.0000
1000.0000	100.0000

Inflow (m^3/s)	% Capture
0.0000	100.0000
1.0000	100.0000

Figure 7: Hume Filter

5. CONCLUSION

This Site Based Stormwater Management Plan has been prepared in support of Redeemer Lutheran College at 2 Collard Street, Biloela QLD 4715.

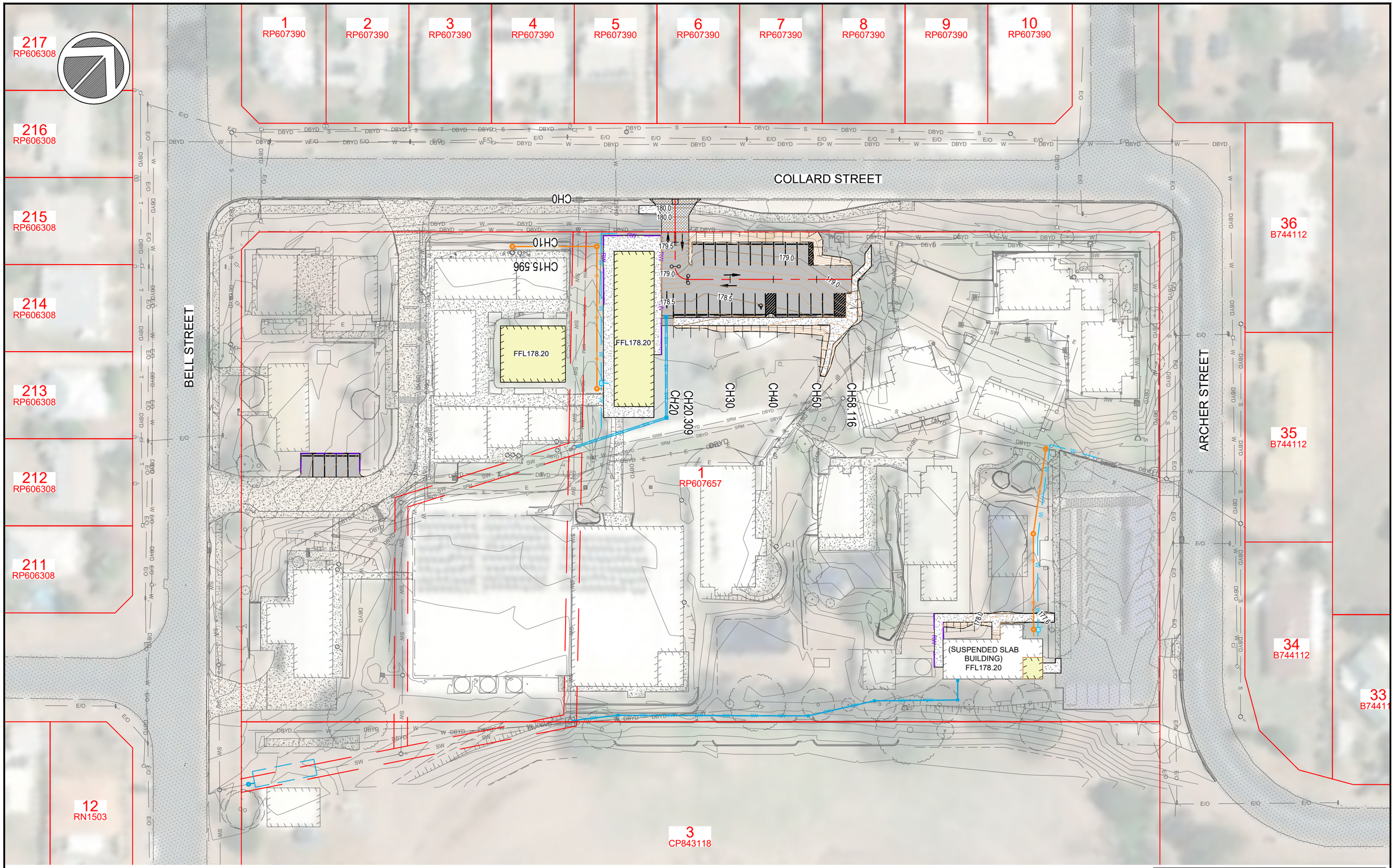
A hydrological analysis demonstrated that the anticipated post-development peak flow rates discharging from the site are higher than the pre-development flow rates. A hydraulic model was built using the XP-SWMM software program, to estimate the required detention volume and arrangement.

This report and stormwater management methodology have concluded that the following mitigation measures would be required:

1. 400 x Drainwell Detention Tank with 51 m^3 for Stage 2A.
2. 600 x Drainwell Detention Tank with 77 m^3 and HUME Filter – UPT 3000 (Or approved equivalent) for Stage 4.

After reviewing the modelling results and subject to the detailed design and construction of the proposed stormwater management infrastructure, MSE are of the opinion that no actionable damage and/or nuisance would be generated to the subject property or external/neighboring property's and downstream infrastructure as a direct result of this development being approved.

APPENDIX A – PROPOSED LAYOUT



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		LM	AWE	03/26	
AMENDMENTS	A	LM	AWE	29/05/26	ISSUED FOR APPROVAL

DESIGN CHECK: vs
DRAWN CHECK: vt

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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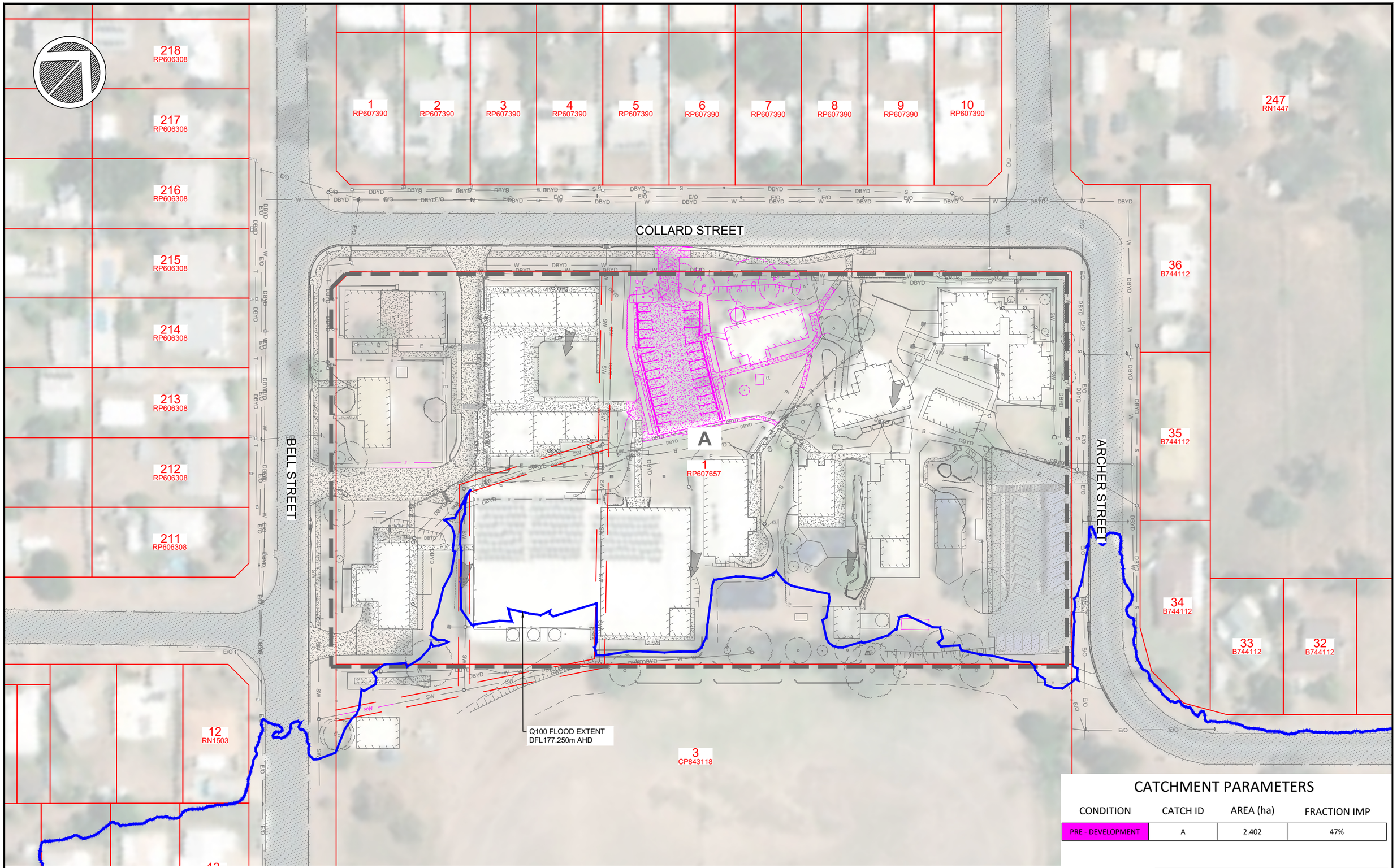
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT OVERALL LAYOUT PLAN

DRAWING NUMBER: CE26020-300-GA
ISSUE: A

APPENDIX B – STORMWATER CATCHMENT PLAN DRAWINGS



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
PRE - DEVELOPMENT	A	2.402	47%

STORMWATER PRE-DEVLOPEMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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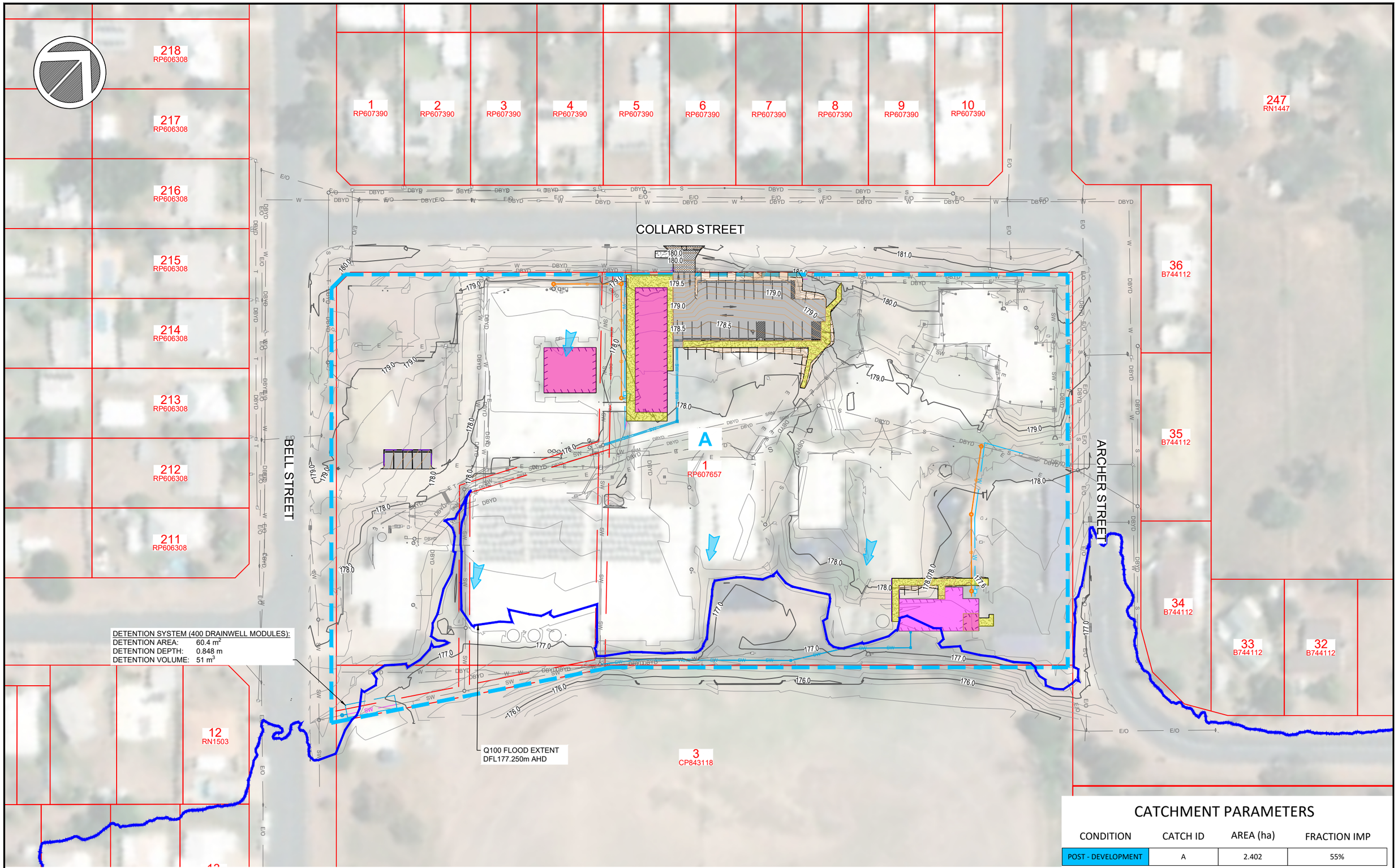
ISSUE: A



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
POST - DEVELOPMENT	A	2.402	55%

STORMWATER POST-DEVELOPMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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DRAWING TITLE: STORMWATER POST-DEVELOPMENT CATCHMENT PLAN

DRAWING NUMBER: CE26020-601-DR

ISSUE: A

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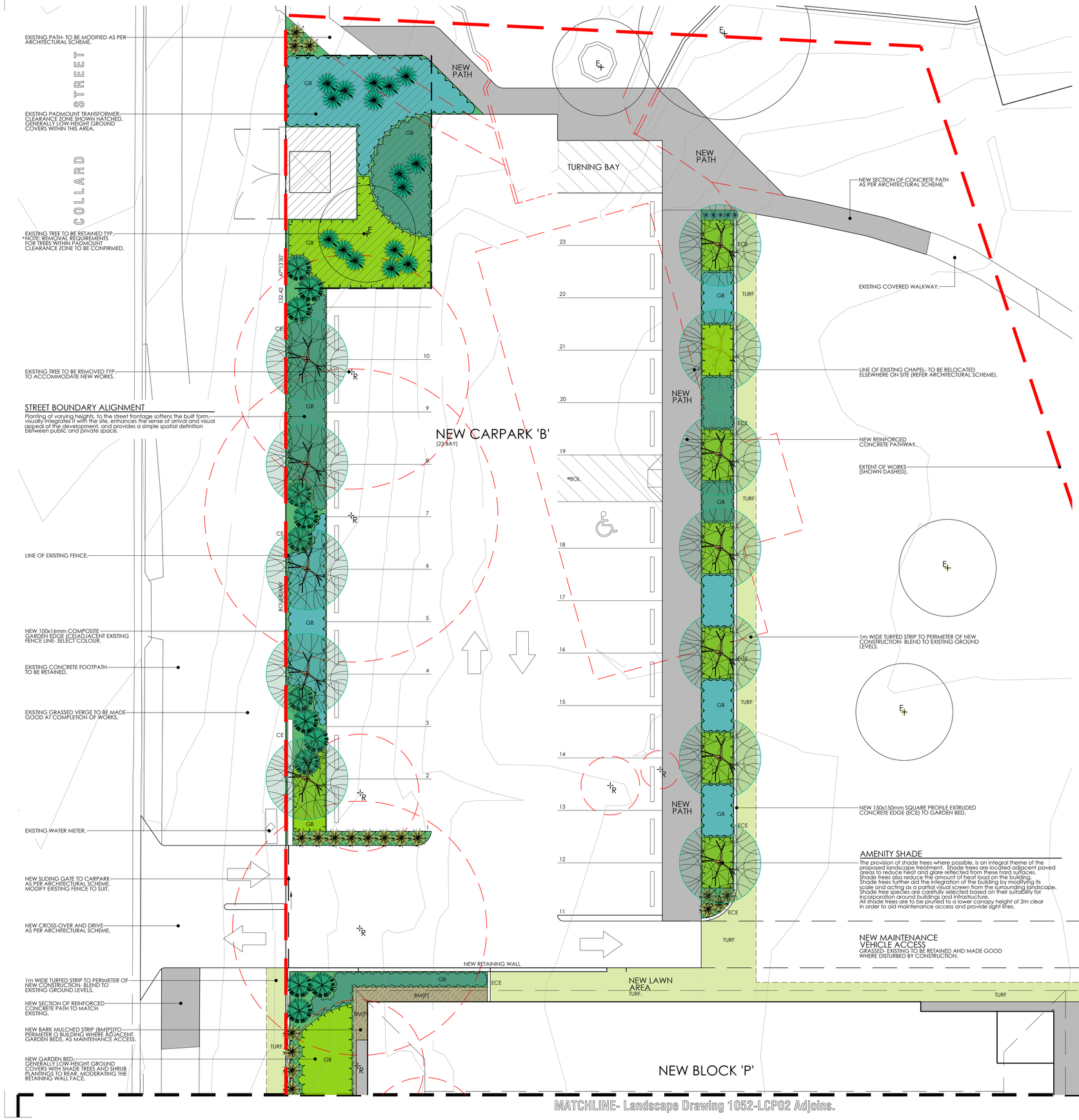
APPENDIX E: LANDSCAPE CONCEPT PLAN



SPECIMEN PLANTING SCHEDULE: 1052

Native	Species	Common Name	Mature Size (HxDia.-metres)
	Trees		
Native	Backhousia citriodora	Lemon Scented Myrtle	8-10 x 3-5
Native	Brachychiton acerifolius	Illawarra Flame Tree	12 x 6
Native	Brachychiton discolor	Lace Kurrajong	15 x 10
Native	Brachychiton populneus	Kurrajong	8-10 x 5-7
Native	Brachychiton rupestris	Queensland Bottle Tree	10-15 x 5-7
Native	Callistomen salignus	Willow Bottlebrush	7-9 x 4-5
Native	Commersonia bartramia	Brown Kurrajong	6-12 x 3-5
Native	Corymbia ficifolia 'Summer Red'	Corymbia 'Summer Red' (red flowering)	4-6 x 3-4
Native	Corymbia ptychocarpa	Swamp Bloodwood	8-15 x 3-10
Native	Corymbia tessellaris	Moreton Bay Ash	10-25 x 7-10
Native	Cupaniopsis anarcardioides	Tuckeroo	8 x 5
Native	Elaeocarpus eumundii	Eumundi Quandong	5-10 x 3-6
Native	Elaeocarpus obovatus	Hard Quandong	10-25 x 4-10
Native	Flindersia bennettiana	Bennett's Ash	15-20 x 7-10
Native	Grevillea baileyana	White Oak	10-15 x 5-8
Native	Grevillea pteridifolia	Honeysuckle Grevillea	4-8 x 3-4
Native	Harpullia pendula	Tulip Wood	6 x 4
Native	Leptospermum longifolium	Weeping Tea Tree	8-10 x 4-6
Native	Mallotus philippensis	Red Kamala	8-10 x 5-6
Native	Melaleuca leucadendron (broad leaf)	Broad Leaf Paper Bark	15-20 x 5-8
Native	Melaleuca viridiflora	Broad Leaf Paper Bark	8-10 x 3-4
Native	Syzygium luehmannii	Small Leafed Lilly Pilly	6-10 x 3-5
	Shrubs		
Native	Acacia fimbriata	Brisbane Wattle	5-8 x 3-5
Native	Acacia flavescens	Yellow Wattle	4-6 x 3-5
Native	Acacia macradenia	Zig Zag Wattle	3-5 x 3-4
Native	Acacia podalyriifolia	Mount Morgan Wattle	4-5 x 4-5
Native	Austromytus dulcis	Midyim	1 x 1
Native	Baeckea virgata	Twiggy Baeckea	2.5 x 2.5
Native	Callistemon 'Ewan Road'	Bottlebrush (cv)	1.5-2.5 x 1-2
Native	Callistemon 'Firebrand'	Weeping Bottlebrush (cv)	1.5-2 x 1-1.5
Native	Callistemon 'Injune'	Bottle Brush (cv)	2-4x2-4
Native	Callistemon pearsonii 'Rocky Rambler'	Bottle Brush (cv)	0.5-0.7 x 0.5-0.7
Native	Callistemon viminalis 'Dawson River'	Bottle Brush (cv)	4-7 x 3-4
Native	Callistemon viminalis 'Wilderness White'	Bottlebrush (cv)	1-2 x 1-2
	Cuphea hyssopifolia	Cuphea	0.45 x 0.45
Native	Eremophila hybrida 'Summertime Blue'	Emu Bush (cv)	0.6-1 x 0.6-1
Native	Eremophila maculata brevifolia	Emu Bush	0.5-2.5 x 1-2
Native	Eremophila youngii	Emu Bush	2-3 x 1.5-2
Native	Grevillea 'Formosa'	Grevillea	2-4 x 2-4
Native	Grevillea 'Honey Gem'	Grevillea (cv)	4-5 x 3-4
Native	Grevillea 'Moonlight'	Grevillea (cv)	4-6 x 3-5
Native	Grevillea rosmarinifolia 'Scarlet Sprite'	Grevillea (cv)	0.8-1 x 0.8-1
Native	Grevillea 'Superb'	Grevillea (cv)	1.5-2 x 1.5-2
Native	Leptospermum scoparium 'Crimson Cascade'	Dwarf Pink Tea Tree (cv)	0.8-1.5 x 1.5-2
Native	Leptospermum scoparium 'Pink Cascade'	Dwarf Pink Tea Tree (cv)	0.8-1.5 x 1.5-2
Native	Melaleuca linariifolia 'Claret Tops'	Honey Myrtle (cv)	1-2 x 1-2
Native	Melaleuca thymifolia	Thyme Honey Myrtle	1-1.2 x 1-2
	Nandina domestica	Sacred Japanese Bamboo	1-2 x 0.6-1.5
	Rhaphiolepis fergusonii	Indian Hawthorn	1-2 x 1-2
	Raphiolepis indica 'Apple Blossom'	Indian Hawthorn (cv)	0.6-1 x 0.6-1
Native	Syzygium australe	Scrub Cherry	4-10 x 2-3
Native	Syzygium 'Cascade'	Lilly Pilly (cv)	2-3 x 1-2
Native	Westringia fruticosa 'Mundi'	Coastal Rosemary (cv)	0.4-0.5 x 1.5
Native	Westringia fruticosa 'Zena'	Dwarf Coastal Rosemary (cv)	0.6 x 0.9
Native	Xanthorrhoea johnsonii	Grass Tree	0.2-5 x 1-2
	Vines		
Native	Pandorea jasminioides	Bower of Beauty	
Native	Pandorea pandorana	Wonga Wonga Vine	
	Groundcovers		
Native	Acacia amblygona	Fan Wattle	1-2 x 1-2
Native	Acacia cognata 'Limelight'	Acacia (cv) prostrate	1.2-1.5 x 1
Native	Carpobrotus glaucescens	Pig Face	0.3 x 1-2
	Dietes bicolor	Spanish Iris	0.5-1 x 0.5-1
	Dietes grandiflora	Spanish Iris	0.8-1.2 x 0.8-1.2
Native	Doryanthes excelsa	Gymea Lily	2-4 x 2-4
	Erigeron karvinskianus	Seaside Daisy	0.15-0.3 x 0.3
Native	Grevillea 'Bronze Rambler'	Prostrate Grevillea (cv)	0.3-0.5 x 3-5
Native	Hardenbergia violacea	Native Sarsparilla	0.6-1 x 1-2
Native	Helichrysum ramosissimum	Everlasting Daisy	0.15-0.3 x 0.6-1
	Hymenocallis littoralis	Spider Lilly	0.75 x 0.75
	Liriope muscari 'Just Right'	Turf Lily (cv)	0.3-0.6 x 0.3-0.6
Native	Myoporum parvifolium	Creeping Boobialla	0.1-0.3 x 1-3
Native	Scaevola 'Purple Fanfare'	Fan Flower	0.2-0.3 x 1-1.5
	Trachelospermum jasminioides	Star Jasmine	0.5 x 1-2
	Zephyranthes candida	False Crocus	0.15-0.3 x 0.2-0.3
	Native Grasses		
Native	Anigozanthos species	Kangaroo Paw	Varies
Native	Crinum pedunculatum	Swamp Lily	1.5-3 x 1-3
Native	Dianella caerulea 'Little Jes'	Flax Lilly (cv)	0.3-0.6 x 0.3-0.6
Native	Ficinia nodosa	Knobby Club Rush	0.5-1.5 x 0.6-2
Native	Gahnia sieberana	Red Fruited Saw Sedge	1-2 x 1.5-2
Native	Juncus usitatus	Common Rush	0.3-1.2 x 0.3-1.5
Native	Lomandra fluviatilis 'Shara'	Mat Rush (cv)	0.5 x 0.5
Native	Lomandra hystrix	Mat Rush	0.7-1.5 x 0.7-1

REFER SHEET 10520-LCP02 FOR DRAWING LEGEND.

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CLIENT:
REDEEMER LUTHERAN COLEGE, BILOELA

PROJECT:
REDEEMER STAGE 2A BGA APPLICATION

2 COLLARD STREET, BILOELA.

DRAWING TITLE:
LANDSCAPE CONCEPT PLAN 1: NEW CAR PARK+ BLOCK 'P'

NORTH:

DATE:	DRAWN:	SCALE:
APRIL 2026	DB	1:100 AT A1

PROJECT NO.:	DWG NO.:	REVISION:
1052	1052-LCP01	A

MATCHLINE- Landscape Drawing 1052-LCP01 Adjoins.

1m WIDE TURFED STRIP TO PERIMETER OF NEW CONSTRUCTION- BLEND TO EXISTING GROUND LEVELS.

NEW BARK MULCHED STRIP TO PERIMETER OF BUILDING WHERE ADJACENT GARDEN BEDS. AS MAINTENANCE ACCESS.

EXISTING CONCRETE FOOTPATH TO BE RETAINED.

NEW RETAINING WALL AS PER ARCHITECTURAL SCHEME.

EXISTING CONCRETE SURFACE DRAIN.

EXISTING GRASSED VERGE TO BE MADE GOOD AT COMPLETION OF WORKS.

NEW CONCRETE INFILL SLAB BETWEEN EXISTING SURFACE DRAIN AND NEW COVERED AREA SLAB.

EXISTING GRASSED VERGE TO BE RETAINED AND MADE GOOD WHERE DISTURBED BY CONSTRUCTION.

1m WIDE TURFED STRIP TO PERIMETER OF NEW CONSTRUCTION- BLEND TO EXISTING GROUND LEVELS.

NEW BLOCK WORK RETAINING WALL AS PER ARCHITECTURAL SCHEME.

NEW GARDEN BED TO BE ESTABLISHED. GENERALLY LOW-HEIGHT GROUND COVERS WITH SHADE TREES AND SHRUB PLANTINGS TO REAR. MODERATING THE RETAINING WALL FACE.

EXISTING SEAT BUILD-OUT TYP. - PROTECT DURING CONSTRUCTION.

EXISTING GARDEN BEDS TO PERIMETER OF COURTYARD TO BE RETAINED. PROTECT DURING CONSTRUCTION. EXTENT SHOWN HATCHED.

COLLARD STREET

NEW BLOCK 'P'

EXISTING GRASSED SWALE
TO BE RETAINED.

EXISTING COVERED WALKWAY- MODIFY TO SUIT NEW WORKS AS PER ARCHITECTURAL SCHEME.

1m WIDE TURFED STRIP TO PERIMETER OF NEW CONSTRUCTION- BLEND TO EXISTING GROUND LEVELS.

EXTENT OF WORKS (SHOWN DASHED).

EXISTING COVERED WALKWAY- MODIFY TO SUIT NEW WORKS AS PER ARCHITECTURAL SCHEME.

EXISTING VERANDAH

NEW COVERED AREA

EXISTING VERANDAH

EXISTING BUILDING BLOCK 'H'

EXISTING VERANDAH

EXISTING BUILDING BLOCK 'J'

EXISTING BUILDING BLOCK 'K'

EXISTING DRIVE

TURF

GB

BM(P)

R

REFER SHEET 1052-LCP01 FOR SPECIMEN PLANTING SCHEDULE.

LANDSCAPE TREATMENT- GENERALLY

The landscape treatment for the proposed development is directed towards the establishment of an attractive setting for the built forms, emphasising site integration and amenity.
Treatment will be fully integrated with storm water requirements and based on water sensitive design principles e.g.: efficient irrigation design, maximising storm water infiltration etc.
C.P.T.E.D. principals will be incorporated throughout the development with species selected being compatible with casual surveillance requirements.
The garden layouts are based on simple geometric forms, reflecting the built forms set within. This ensures visual unity, integration and interest.

PLANTING APPROACH

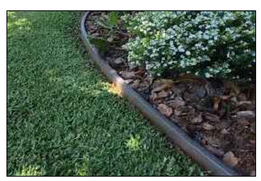
Plant arrangements are designed to maximise visual amenity (attractiveness) and visual coherence. Plant layering produces simple and easily maintained, visual landscape.

Planting is designed to reinforce elements of the built form and site layout e.g.: articulating entry points and circulation, creating a sense of enclosure, establishing focal points and emphasis on elements, providing amenity shade and establishing visual screening.

Plant selection is based on site suitability and longevity, with an emphasis on native plants.
Shrubs in particular, are selected for hardiness, longevity and according to their ability to retain vigour with periodic pruning to maintain shape.

NOTES:

- CONCEPT IS BASED ON BUILDING DESIGN DRAWINGS PROVIDED. ALL EXISTING LEVELS AND SET OUT TO BE CONFIRMED ON SITE.
- REFER TO ARCHITECTURAL AND CIVIL WORKS DRAWINGS FOR DETAILS OF BUILDING AND RELATED EXTERNAL WORKS UNLESS OTHERWISE NOTED.
- CONFIRM LOCATIONS OF ALL SERVICES ON SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- SITE DRAINAGE DETAILS TO BE DETERMINED AT CONTRACT DOCUMENTATION STAGE.



EXAMPLE IMAGE:
RECYCLED COMPOSITE GARDEN EDGING.

EXAMPLE IMAGE:
EXTRUDED CONCRETE GARDEN EDGING.

EXAMPLE IMAGE:
LOW HEIGHT MASS PLANTING WITH TREES PRUNED TO CLEAR CANOPY HT. IN ACCORDANCE WITH CPTED PRINCIPLES.

EXAMPLE IMAGE:
LOW HEIGHT MASS PLANTING.

EXAMPLE IMAGE:
TREE PRUNED TO CLEAR CANOPY HT. IN ACCORDANCE WITH CPTED PRINCIPLES.

LEGEND:

- TURF — GRASSED AREA: NEW TURF.
- GB — GARDEN BED: ORGANIC MULCHED.
- EXISTING LANDSCAPING: TO BE RETAINED.
- NEW PATH: CONCRETE AS PER ARCHITECTURAL SCHEME.
- BM(P) — BARK MULCH: PLASTIC SHEET UNDERLAY -NO PLANTING.
- ECE — CONCRETE EDGING: 150mm WIDE EXTRUDED SQUARE PROFILE.
- CE — COMPOSITE EDGING: 100x16mm RECTANGULAR PROFILE - SELECT COLOUR.
- DEMOLITION: EXISTING ITEMS TO BE REMOVED.
- R — EXISTING TREE: TO BE REMOVED.
- E — EXISTING TREE: TO BE RETAINED.
- NEW AMENITY SHADE TREE: SELECT SPECIES.

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REDEEMER LUTHERAN COLEGE, BILOELA

PROJECT:
REDEEMER STAGE 2A BGA APPLICATION

2 COLLARD STREET, BILOELA.

DRAWING TITLE:
LANDSCAPE CONCEPT PLAN 2: NEW BLOCK 'P'+ COVERED AREA

NORTH:

DATE:	DRAWN:	SCALE:
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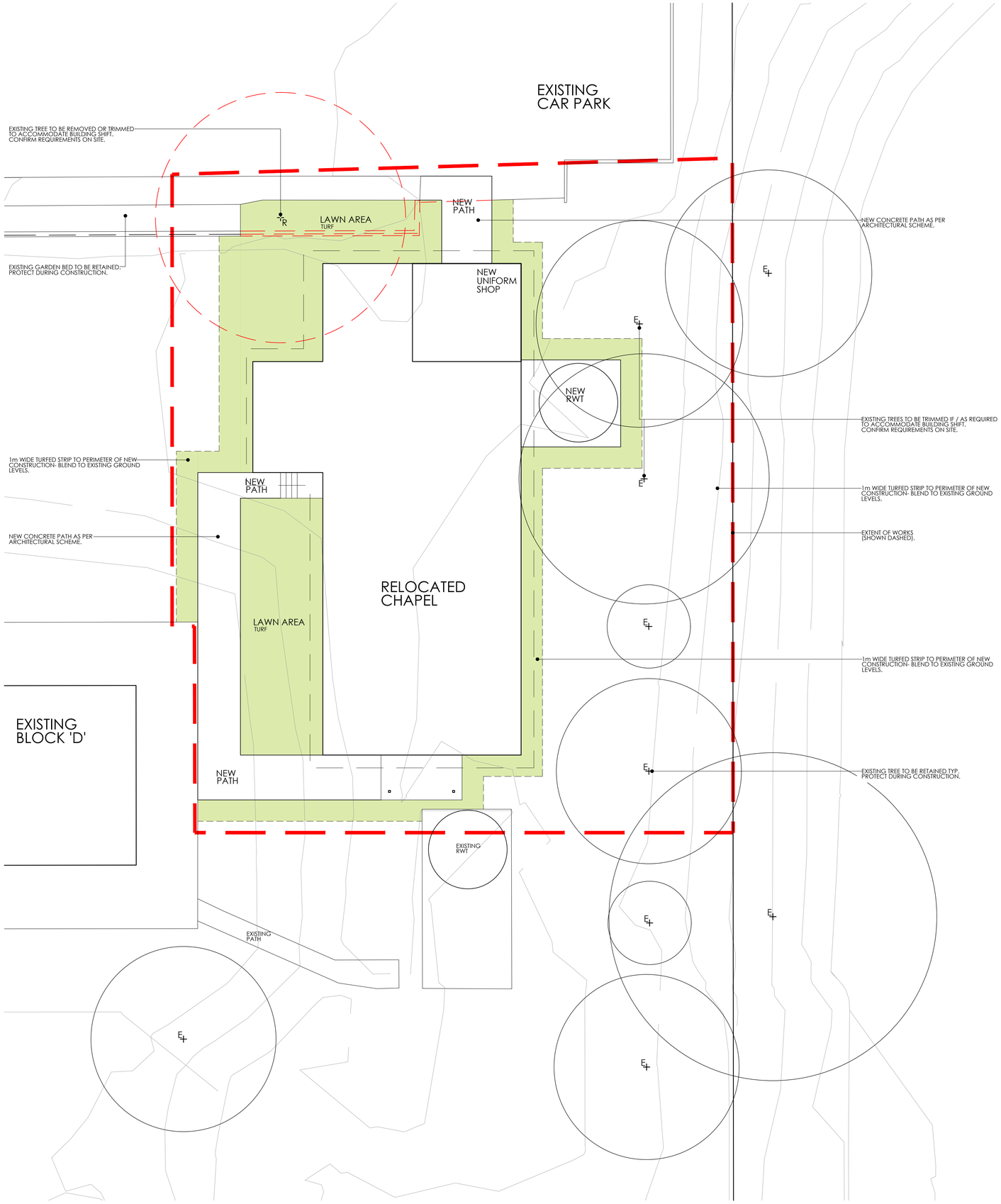
PROJECT NO.:	DWG NO.:	REVISION:
1052	1052-LCP02	A



REFER SHEET 1052-LCP01 FOR SPECIMEN PLANTING SCHEDULE.

REFER SHEET 10520-LCP02 FOR DRAWING LEGEND.

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REDEEMER LUTHERAN COLEGE, BILOELA

PROJECT:
REDEEMER STAGE 2A BGA APPLICATION

2 COLLARD STREET, BILOELA.

DRAWING TITLE:
LANDSCAPE CONCEPT PLAN 3: RELOCATED CHAPEL

NORTH:

DATE:	DRAWN:	SCALE:
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APPENDIX F: ENGINEERING SERVICES REPORT

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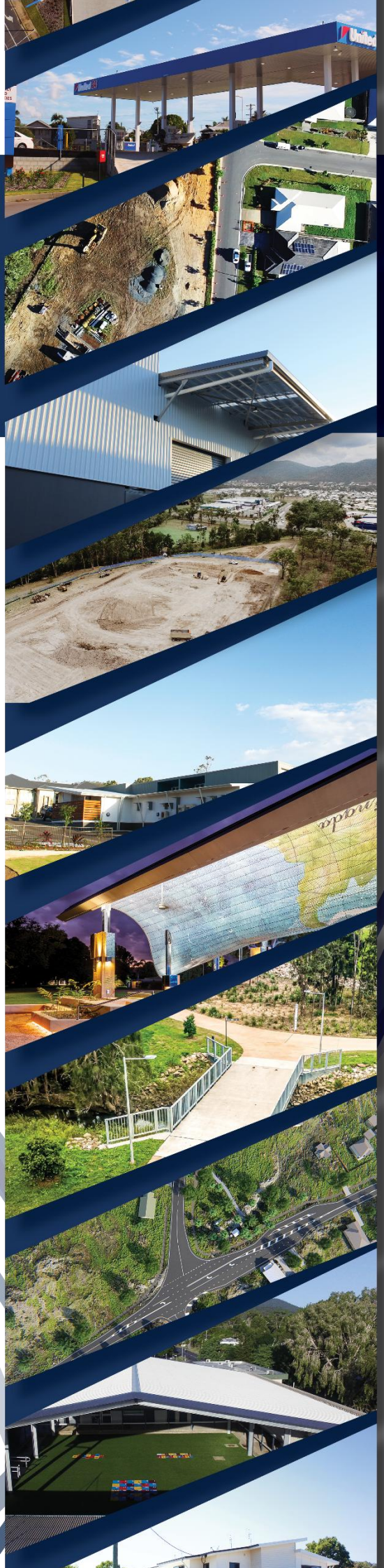
ENGINEERING



ENGINEERING SERVICES REPORT

MASTERPLAN EXPANSIONS

2 Collard Street, Biloela QLD 4715

REDEEMER LUTHERAN COLLEGE

29 May 2026

CE26020 – Engineering Services Report - Revision A
Contract No. CE26020 – 2 Collard Street, Biloela

A/ PO BOX 3203 RED HILL ROCKHAMPTON Q 4701
MOLONEY & SONS
ABN: 39 133 970 689

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2026

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1. Introduction

1.1. Background

Moloney & Sons Engineering (MSE) has been engaged by Redeemer Lutheran College to prepare this Engineering Services Report (ESR) in support of the proposed development located at 2 Collard Street, Biloela QLD 4715.

The subject site comprises the existing Redeemer Lutheran College campus and is legally described as Lot 1 on RP607657. The site is situated within an established urban area of Biloela and is bounded generally by Collard Street to the north, Bell Street to the west and Archer Street to the east.

The proposed development comprises expansion and upgrade work to the existing College campus, including new educational facilities, internal access roads, car parking areas, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil works.

The proposed civil works have been developed to support the future operational requirements of the College and improve internal circulation, site functionality and servicing infrastructure throughout the campus.

This report has been prepared to provide a preliminary engineering assessment of the proposed development and to demonstrate that the site can be appropriately serviced by existing and proposed infrastructure networks, subject to detailed design and relevant authority approvals.

The proposed development site is illustrated as

Figure 1 Subject Site Locality Subject Site Locality.

Figure 1 Subject Site Locality

1.2. Existing Development Site

The existing College campus currently accommodates a range of educational buildings, administration areas, internal access driveways, parking areas, landscaped areas and associated school infrastructure.

The site has frontage to Collard Street, Bell Street and Archer Street, with existing access arrangements servicing student, staff, visitor and service vehicle movements associated with the ongoing operation of the College.

Existing infrastructure services, including water supply, sewerage, stormwater drainage, electricity and telecommunications, are available within the surrounding road reserve network adjacent to the site.

The existing development layout and surrounding infrastructure network provide a suitable basis for the proposed expansion and upgrade works associated with the College masterplan development.

1.3. Existing Topography

The subject site comprises an existing developed educational facility with established building platforms, internal access driveways, parking areas and landscaped open space.

Based on the available survey information and concept civil design drawings, the site generally falls across the development area with localised level differences requiring retaining walls, batter transitions and associated earthworks to achieve the proposed finished surface levels.

The proposed development includes localised cut and fills earthworks associated with the construction of new building platforms, internal access roads, parking areas, footpaths and drainage infrastructure.

Concept earthworks drawings indicate that retaining walls will be required in selected areas of the site to accommodate finished level transitions and improve site functionality. Preliminary cut and fill quantities have also been identified as part of the proposed civil works. Existing overland flow paths and site grading characteristics have been considered as part of the preliminary stormwater design to facilitate lawful stormwater conveyance throughout the development site.

Detailed earthworks design; final grading and stormwater management measures will be confirmed during detailed design and construction documentation phases.

1.4. Proposed Development

The proposed development comprises a staged expansion of the existing Redeemer Lutheran College campus located at 2 Collard Street, Biloela. The masterplan development has been prepared by BEAT Architects and includes a combination of new educational facilities, refurbishment and repurposing of existing buildings, parking upgrades, internal access improvements and associated civil infrastructure works.

Based on the current concept design drawings, the proposed works generally include:

- new educational building facilities,
- internal access roads and circulation areas,
- additional car parking areas,
- pedestrian footpaths and external hardstand areas,
- retaining walls and associated earthworks,
- stormwater drainage infrastructure,
- sewer servicing works, and
- associated utility servicing infrastructure.

The proposed development layout is illustrated as *Figure 2* Proposed Development.

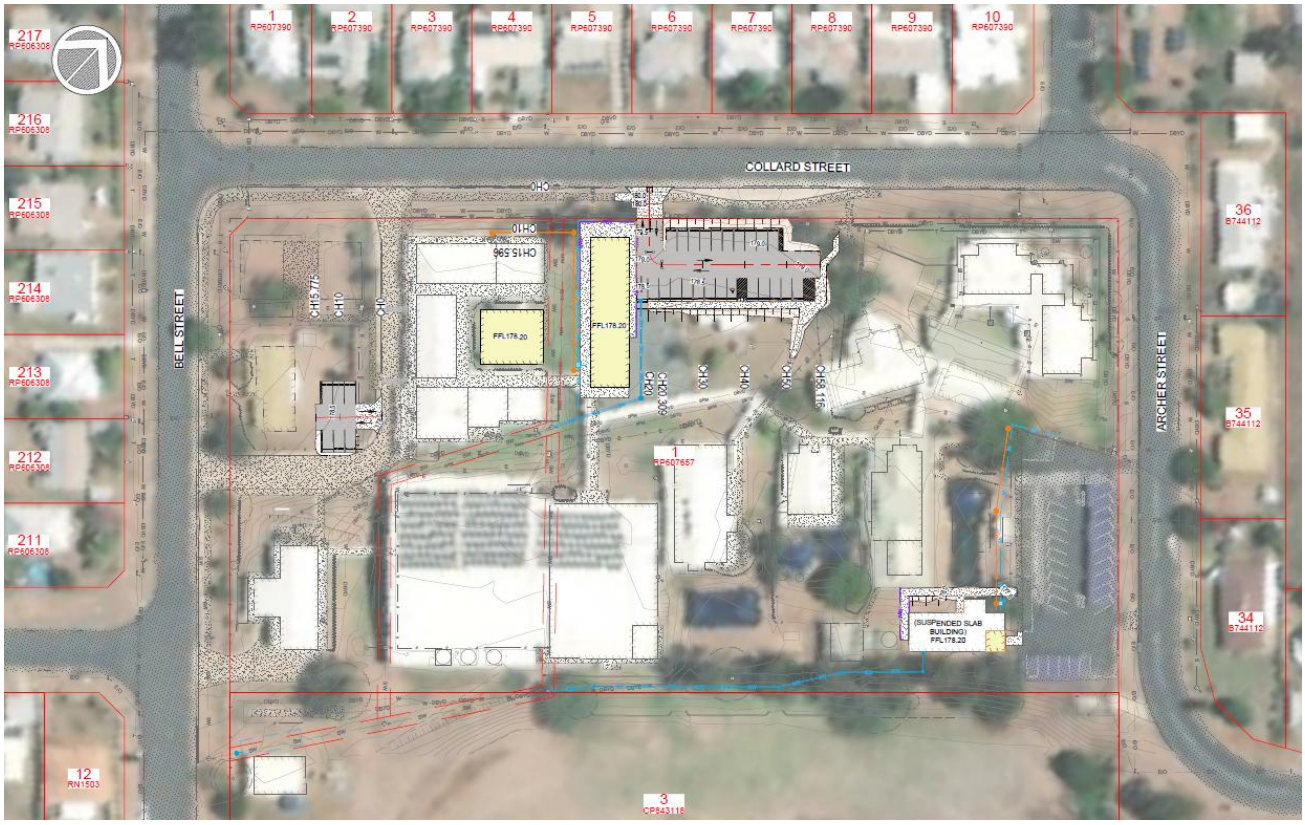


Figure 2 Proposed Development

The proposed development is intended to be delivered in multiple stages to accommodate future growth of the College and associated increases in student and staff population over time.

The proposed staging arrangement prepared by BEAT Architects is illustrated in

Figure 3 Proposed Staging Masterplan

The proposed masterplan includes staged expansion works identified as Stage 1, Stage 2A, Stage 2B, Stage 3, Stage 4 and future indicative Stage 5 and Stage 6 development areas. The future stages generally comprise additional educational buildings, specialist learning areas, covered play spaces and supporting campus infrastructure.

Stage 1 works generally include additional modular classroom facilities, staff parking and associated pedestrian connectivity upgrades. Stage 2A and Stage 2B works primarily comprise additional secondary learning facilities, administration buildings, covered areas and associated access improvements. Future stages include additional educational buildings, specialist teaching facilities and associated campus expansion works.

The proposed development layout, access arrangements and indicative staging framework have been considered as part of this Engineering Services Report for the purposes of assessing the servicing requirements associated with the ultimate masterplan development.

2. Earthworks

2.1. Civil Design

Localised earthworks are proposed throughout the development site to facilitate the construction of the proposed educational facilities, internal access roads, parking areas, footpaths and associated infrastructure. The concept civil design has considered the existing site topography, surrounding road interfaces and proposed finished surface levels to achieve suitable vehicle manoeuvring, pedestrian connectivity and stormwater drainage outcomes throughout the site. The proposed works generally include:

- cut and fill earthworks,
- pavement preparation,
- retaining walls,
- localised batter transitions, and
- site grading works.

Figure 4 illustrates the proposed earthworks and civil design layout associated with the development.

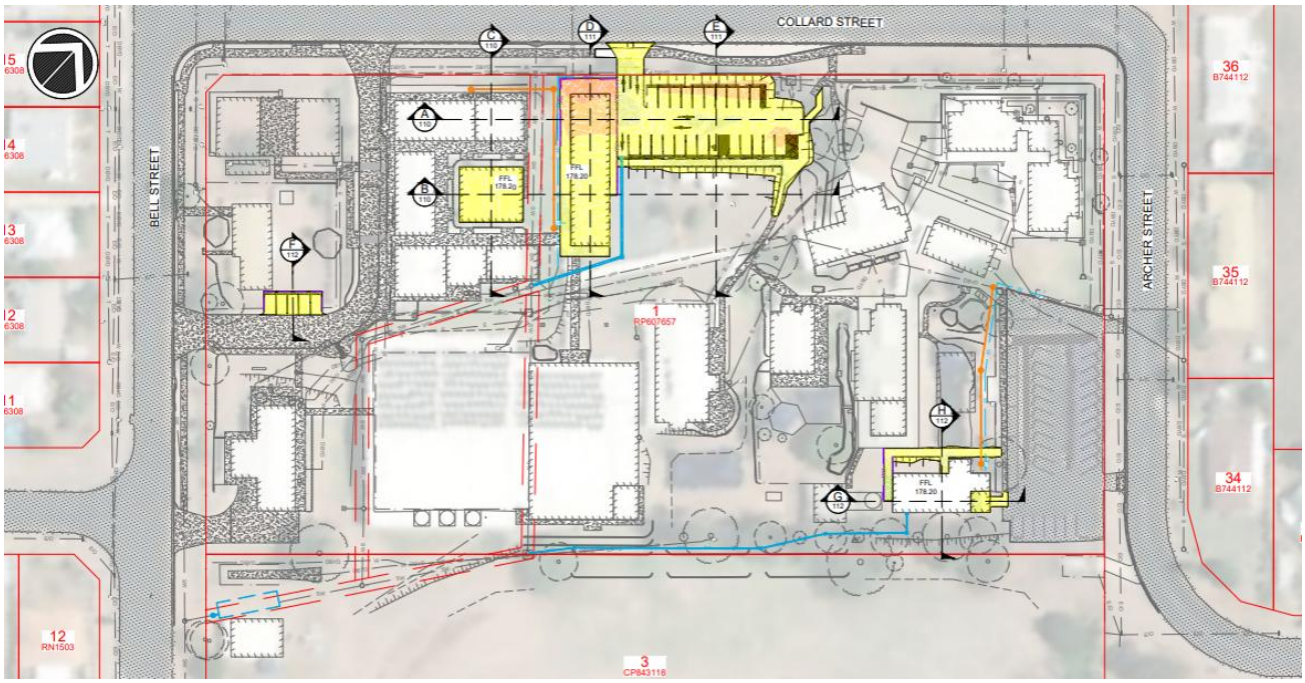


Figure 4 Proposed Earthworks Layout and Cut/Fill Depth Range.

Preliminary earthworks quantities identified within the concept civil design drawings are summarised in *Table 1*

Table 1 Proposed Earthworks Volumes for the Proposed Upgrades & Master Plan Expansion

Land Use	Cut to Fill (m^3)	Cut (Spoil off from Site) (m^3)	Total Volume (m^3)
Proposed Educational Development	26	483	509

The proposed finished levels have been developed to integrate with the existing surrounding road network, including Collard Street, Bell Street and Archer Street, whilst also facilitating suitable drainage outcomes throughout the site. Detailed earthworks design, retaining wall design and final grading arrangements will be confirmed during detailed design and construction documentation phases.

2.2. Erosion & Sediment Control

Erosion and sediment control measures are implemented during construction to minimise the potential for sediment migration and environmental impacts associated with the proposed works.

Concept erosion and sediment control measures are identified and illustrated on the *MSE Engineering Drawings*. The proposed concept measures generally include:

- stabilised construction access points,
- sediment fencing,
- inlet protection,
- stockpile management,
- diversion controls, and
- progressive stabilisation of disturbed areas.

The final detailed Erosion and Sediment Control Plan (ESCP) and associated design requirements form part of the Operational Works stage and future construction documentation process, in accordance with relevant local authority requirements and applicable industry guidelines.

3. Sewer Reticulation

3.1. Existing Sewer Reticulation

The subject site is located within the Banana Shire Council wastewater servicing area and is understood to be connected to the existing sewer reticulation network servicing the Biloela township.

Based on available information, existing sewer infrastructure is located within the surrounding road network, including Collard Street, Bell Street and Archer Street. The presence of this infrastructure indicates that the site is positioned within an established sewer catchment and is capable of being serviced by the existing network.

The exact location, depth, capacity and configuration of the existing sewer assets, including nearby manholes and connection points, will be confirmed during detailed design and through Dial Before You Dig (DBYD) enquiries and/or Council records.

Accordingly, sewer servicing to the subject land is considered feasible in principle, subject to detailed design and approval by Banana Shire Council.

3.2. Sewer Design Demands Calculation

The sewerage demand for the proposed development has been calculated generally in accordance with:

- Capricorn Municipal Development Guidelines (CMDG) D12 – Sewerage Design
- Table D12.07.01 – Design Average Dry Weather Flow (ADWF)

Equivalent Population (EP) for the development has been determined based on the projected student and staff population associated with the staged masterplan development prepared by BEAT Architects. The adopted EP values for each development stage are summarised in *Table 2*

The Existing Sewer System Design Calculation is summarised in *Table 3.* and the Ultimate Sewer System Design Demand Summary for the staged development summarised in *Table 4.*

Table 2 Equivalent Persons (EPS), Summary for Proposed Development Staging

Development Stage	Students	Staff	Equivalent Persons (EPs)
Existing Development	346	50	396
Stage 1 – 2 New GLAs	363	51	414
Stage 2A – 3 New GLAs	389	52	441
Stage 2B – Administration Expansion	408	52	460
Stage 3 – Internal Conversions & Specialist Spaces	423	52	475
Stage 4 – 2 Gla's & Drama Rooms	440	52	492

The sewer servicing demands associated with the proposed development have been assessed based on the ultimate development scenario to ensure adequate servicing capacity is available for the future expansion of the College campus.

Detailed sewer design calculations, including ADWF, PDWF and WWF, are provided within the following sections of this report.

Table 3 Sewerage Existing System Design

Item/Source	Value/Description
Average Dry Weather Flow (ADWF)	ADWF = 200 L/EP/day × 396 EP = 79,200 L/day or 0.92 L/s
Peak Dry Weather Flow (PDWF)	PDWF=2.5×79,200=198,000L/day or 2.29 L/s
Wet Weather Flow (WWF)	WWF=5×79,200=396,000L/day = 4.58L/s

Table 4 Sewerage Ultimate System Design

Development Stage	ADWF (L/day) - (L/Sec)	PDWF (L/day) - (L/Sec)	WWF (L/day) - (L/Sec)
Stage 1 – 2 New GLAs	82,800 – 0.96	207,000 – 2.40	414,000 – 4.79
Stage 2A – 3 New GLAs	88,200 – 1.02	220,500 – 2.55	441,000 – 5.10
Stage 2B – Administration Expansion	92,000 – 1.06	230,000 – 2.66	460,000 – 5.32
Stage 3 – Internal Conversions & Specialist Spaces	95,000 - 1.10	237,500 – 2.75	475,000 – 5.50
Stage 4 – 2 Gla's & Drama Rooms	98,400 – 1.14	246,000 – 2.85	492,000 – 5.69

Where:

- ADWF = Average Dry Weather Flow.
- PDWF = Peak Dry Weather Flow; and
- WWF = Wet Weather Flow.

The above sewer design demands have been calculated based on an adopted Average Dry Weather Flow of 200L/EP/day in accordance with CMDG D12 – Sewerage Design. Peak flow factors have been applied to determine the design loading associated with the proposed staged development.

Based on the available information and preliminary servicing assessment, the existing sewer reticulation network is considered capable of servicing the proposed staged development, subject to detailed hydraulic design, confirmation of connection points and approval by Banana Shire Council.

The proposed sewer servicing layout is illustrated in *APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS.*

3.3. Proposed Sewerage

The proposed development will be serviced by a new internal gravity sewer reticulation system connecting to the existing sewer infrastructure adjacent to the site.

Based on the proposed sewer layout drawings and sewer longitudinal sections, the works generally comprise new Ø150mm PVC sewer pipework, proposed sewer maintenance holes, and new Ø150mm sewer property connections to service the proposed development and associated facilities. The proposed internal sewer reticulation arrangement includes two primary sewer branches identified as *Sewer Line 1* and *Sewer Line 2* within the engineering drawings.

Sewer Line 1 is proposed to connect directly into the existing sewer maintenance hole adjacent to the site and includes new maintenance holes *SEMH 01-2*, *SEMH 01-3*, and *SEMH 01-4* together with associated sewer reticulation infrastructure.

Sewer Line 2 is proposed to service the eastern portion of the development and includes new maintenance holes *SEMH 02-1*, *SEMH 02-2*, and *SEMH 02-3*. The proposed works include breaking into the existing sewer main and constructing a new maintenance hole to facilitate the proposed connection arrangement.

The proposed sewer reticulation network has been configured to accommodate the proposed staged development and ultimate sewer demand identified in *Section 3.2*

Final sewer infrastructure design, including pipe grades, invert levels, cover, maintenance hole configuration and connection details, will be confirmed during detailed design and authority approval phases.

The proposed sewer servicing layout is illustrated in *APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS.*

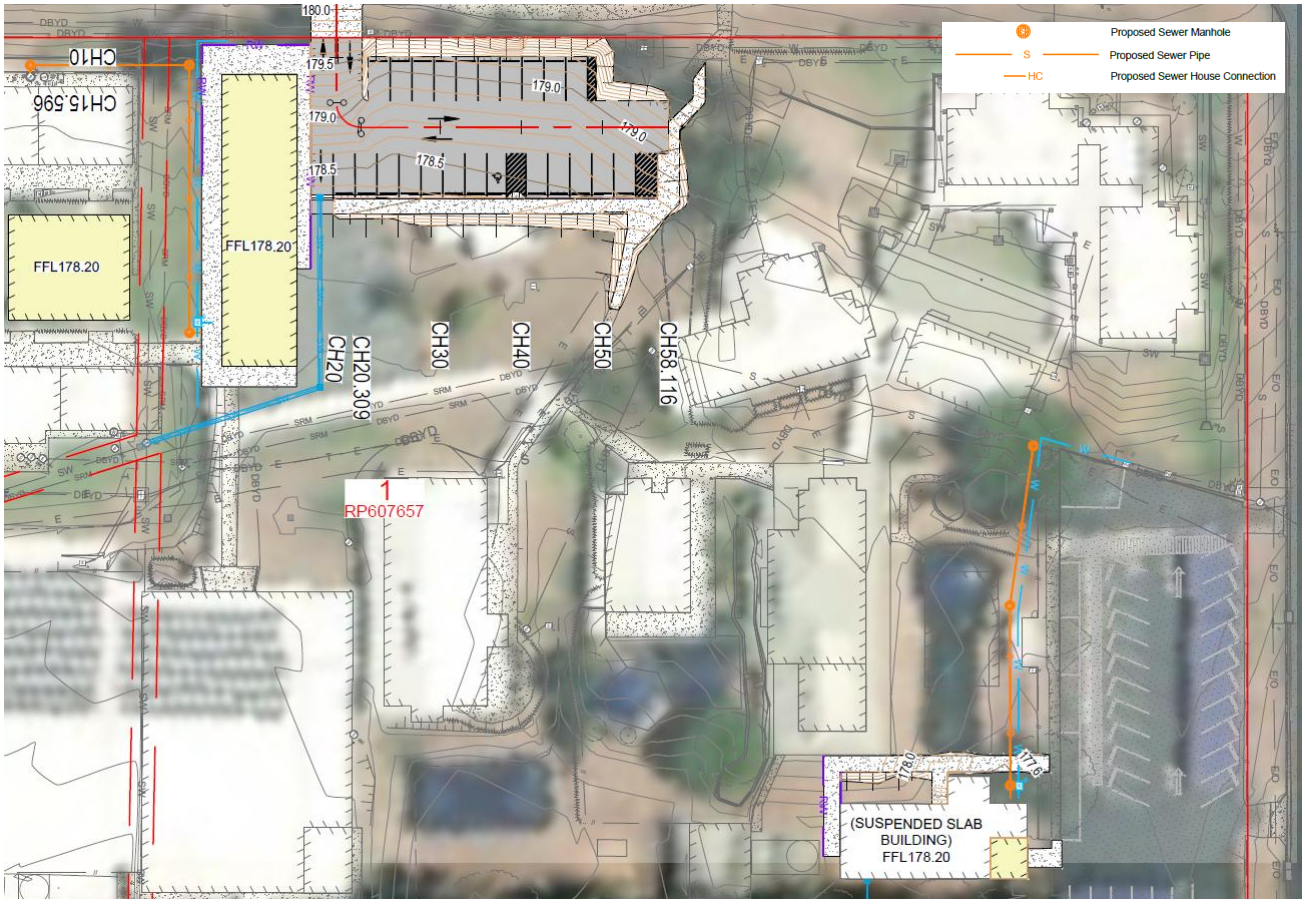


Figure 5 Proposed Sewer Overall Layout Plan

4. Water Supply

4.1. Existing Water Supply

The subject site is located within an established serviced area and is currently adjacent to existing potable water infrastructure.

Review of the available servicing information and preliminary design drawings indicates the presence of an existing water reticulation network within the surrounding road reserve, capable of servicing the proposed development. Existing water infrastructure is understood to include an existing water main located adjacent to the site frontage, with proposed connection points identified within the preliminary servicing layout drawings.

Further confirmation of the existing network configuration, pipe sizes, available pressures, and connection requirements will be subject to detailed design and consultation with the relevant Local Government Authority and service authority requirements.

4.2. Water Design Demands Calculation

Water demand for the proposed school expansion has been calculated generally in accordance with the *Capricorn Municipal Development Guidelines (CMDG) D11 – Water Supply Network, specifically Section D11.07 – Design Demands and Table D11.07.01 – Design Demands.*

Equivalent Population (EP) for the development has been determined based on the projected student and staff population associated with the staged masterplan development prepared by BEAT Architects. The adopted EP values for each development stage are summarised in ***Table 2.*** In accordance with *CMDG D11 Table D11.07.01*, the following water demand criteria have been adopted for the proposed development:

- Average Day Demand (AD) = 650 L/EP/day
- Peak Day Demand (PD) = 2.25 × AD
- Peak Hour Demand (PH) = PD / 12

The Existing Water Demand Summary is provided in ***Table 5*** and the Ultimate Water Demand Summary for the staged development is provided in

Table 6.

Table 5 Water Existing System Design

Item/Source	Value/Description
Average Day Demand (AD)	AD = 650 L/EP/day × 396 EP = 257,400 L/day = 2.98 L/s
Peak Day Demand (PD)	PD=2.25×257,400 = 579,150L/day = 6.703L/s
Peak Hour Demand (PH)	PH=1/12 × 579,150L/day = 48,263 L/hr = 13.41 L/s

Table 6 Water Ultimate System Design Summary

Development Stage	AD (L/day) – (L/sec)	PD (L/day) – (L/sec)	PH (L/hr) – (L/sec)
Stage 1 – 2 New GLAs	269,100 – 3.115	605,475 – 7.008	50,456 – 14.016
Stage 2A – 3 New GLAs	286,650 – 3.318	644,963 – 7.465	53,747 – 14.930
Stage 2B – Administration Expansion	299,000 – 3.461	672,750 – 7.786	56,063 – 15.573

Stage 3 – Internal Conversions & Specialist Spaces	308,750 – 3.573	694,688 – 8.040	57,891 – 16.081
Stage 4 – 2 Gla's & Drama Rooms	319,800 – 3.701	719,550 – 8.328	59,963 – 16.656

4.3 Proposed Water Supply

The proposed development will be serviced via connection to the existing potable water reticulation network located within Archer Street adjacent to the site.

Based on the preliminary water servicing layout, the proposed works include a new water service connection extending from the existing water main within the road reserve to the proposed development area. The final connection location and existing service levels are to be confirmed on site during detailed design and construction phases.

The proposed water servicing arrangement includes a new Ø40mm approved water meter within an approved meter pit located adjacent to the proposed development. Internal building water supply infrastructure will be designed and coordinated by the Hydraulic Engineer as part of the detailed building services design.

The proposed water reticulation has been developed to accommodate the staged masterplan expansion of the College and provide suitable servicing capacity for the ultimate development scenario identified within this report.

Final water infrastructure design, including pipe sizing, meter requirements, valve arrangements, connection details and construction requirements, will be confirmed during detailed design and authority approval phases.

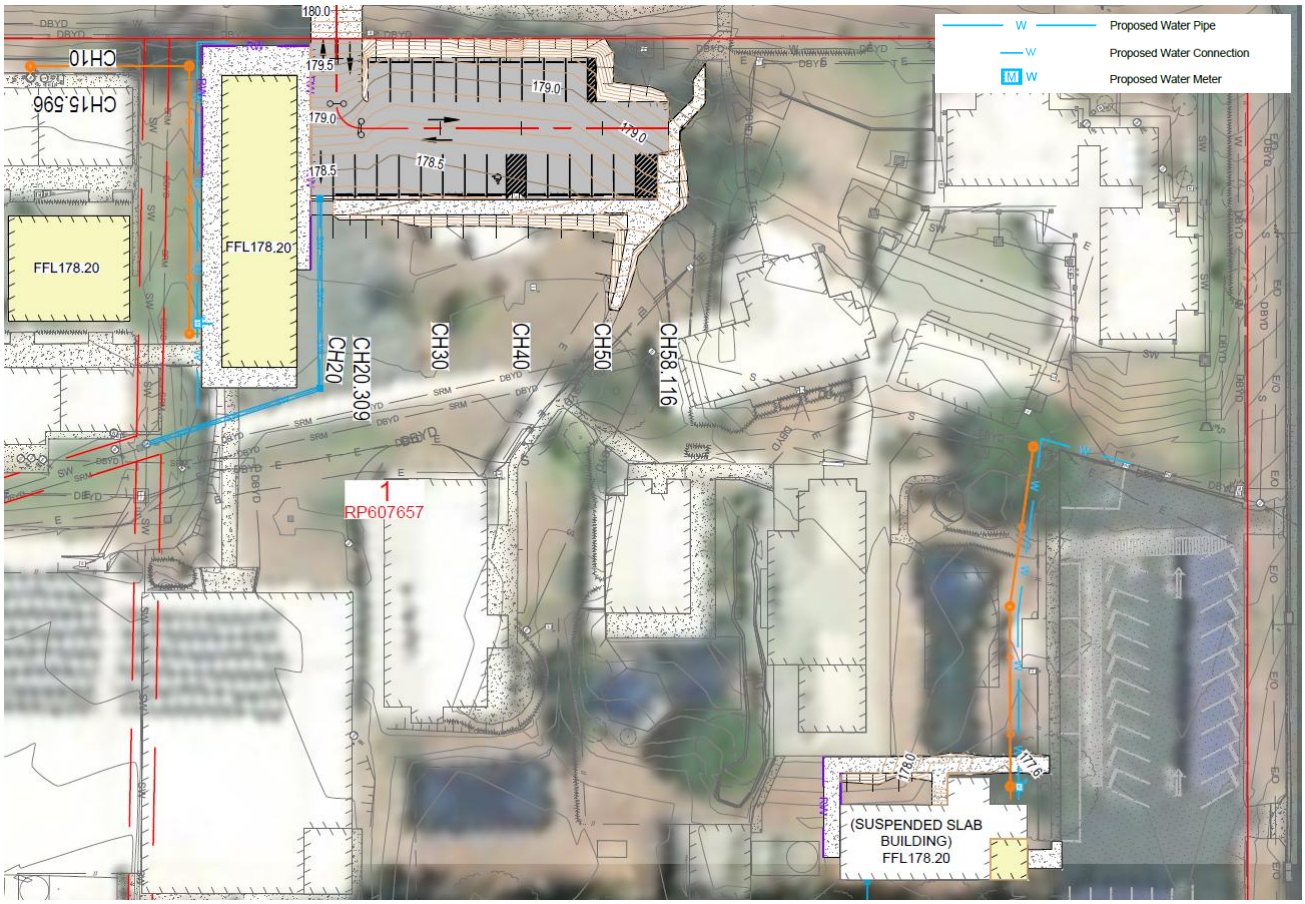


Figure 6 Proposed Water Overall Layout Plan

5. Access & Roadworks

5.1. Existing Access

The subject site currently obtains vehicle access from *Collard Street*, *Bell Street*, and *Archer Street* via the existing internal driveway network servicing the existing College campus.

The surrounding road network generally comprises sealed local roads within an established urban environment servicing the surrounding residential area and existing educational facilities.

Existing on-site access arrangements currently provide vehicle circulation, staff parking, student drop-off/pick-up functionality, and servicing access associated with the operation of the College.

Based on the current proposed development layout, the existing access arrangements from *Bell Street* and *Archer Street* remain unchanged as part of the proposed development works. The proposed access upgrade works are limited to the existing *Collard Street* frontage and associated internal vehicle circulation areas.

The existing surrounding road network is considered capable of accommodating the anticipated traffic movements associated with the proposed staged expansion of the College, subject to detailed design and operational assessment where required.

Figure 7 Existing Collard Street / College Access

5.2. Proposed Access & Roadworks

The proposed development includes upgrades to the existing internal access and parking arrangements associated with the staged expansion of the College campus.

Based on the current concept design, the proposed works generally include:

- upgrades to the existing Collard Street access arrangement.
- internal vehicle circulation improvements.
- additional car parking areas.
- pedestrian pathway connections.
- associated access and manoeuvring areas servicing the proposed educational facilities.

No new driveway access is currently proposed from Bell Street as part of the proposed development works.

The proposed access and parking layout has been developed to support the staged masterplan development while maintaining suitable vehicle manoeuvring, pedestrian connectivity and operational functionality across the site.

Final access design details, including driveway geometry, parking layout, pavement design, pedestrian connectivity and associated line marking/signage requirements, will be confirmed during detailed design and approval phases.

6. Flooding

Flood information provided by Banana Shire Council for Lot 1 on RP607657, being the subject site at 2 Collard Street, Biloela, has been reviewed as part of this Engineering Services Report. The Council flood advice is based on the Callide Valley Flood Model prepared by Kellogg Brown & Root (KBR) for Banana Shire Council.

The Council flood information indicates that the subject site is not identified as being affected by the 10 year ARI, 20 year ARI, 50 year ARI, 100 year ARI or 2013 flood events. Flood impact to the property is identified only under the 100 year ARI plus climate change flood model scenario. Under this scenario, Council's flood information identifies a maximum flood level of RL 177.25 m AHD and a maximum modelled flood depth of 1.08 m.

Maximum Flood Depths - 100yr ARI Flood

Maximum Flood Depths – 100+ccyr ARI Flood

Figure 8: Banana Shire Council Flood Modelling Extract – 100 year ARI and 100 year ARI plus Climate Change Flood Events

The proposed Stage 2A works and broader masterplan upgrades are located within the existing developed school campus and comprise new educational facilities, access and parking upgrades, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil servicing works. The current civil engineering drawings nominate proposed building and platform levels above the reported 100 year ARI plus climate change flood level of RL 177.25 m AHD, including the principal proposed building FFL of RL 178.20 m AHD. Where lower finished floor levels are nominated, including RL 177.60 m AHD, these levels remain above the reported 100 year ARI plus climate change flood level, subject to final confirmation during detailed design.

On this basis, the proposed development is not expected to be adversely affected by the modelled flood level and is not expected to increase flood risk to adjoining properties. The proposed earthworks are localised and are primarily associated with site grading, pavement preparation, building platform formation, retaining wall transitions and stormwater drainage infrastructure. Preliminary earthworks quantities mentioned in *Section 2.1* indicate that the proposed works include approximately 26 m^3 of cut-to-fill and approximately 499 m^3 of material to be removed from site. Accordingly, the proposed works are not expected to materially reduce available flood storage.

The proposed stormwater drainage design incorporates internal drainage infrastructure and detention measures to manage runoff from the developed catchment prior to discharge to the downstream stormwater network. Final stormwater and flood-related design details will be confirmed during the Operational Works / detailed design stage and remain subject to Council approval.

Based on the available Council flood information and the current civil design, the proposed development is not expected to result in adverse flood impacts, unacceptable flood immunity outcomes, or a material reduction in flood storage.

7. Electricity

7.1. Existing Electricity

Electricity servicing for the subject site is available from the existing electrical distribution network within the surrounding Biloela area.

Based on available mapping and aerial information, existing electricity infrastructure is located within the surrounding road corridors, including Collard Street, Bell Street and Archer Street adjacent to the site. The surrounding network is understood to service the existing Redeemer Lutheran College campus and adjoining residential development.

The presence of established electrical infrastructure surrounding the site indicates that the proposed development is located within an existing electricity service area and is capable of being connected to the local distribution network.

The exact location, capacity and configuration of the existing electrical infrastructure, including any overhead and underground assets, transformers and connection points, will be confirmed during detailed design and consultation with the relevant electricity authority.

Any required augmentation, relocation, or extension of the existing network associated with the proposed development will be determined during detailed design and subject to approval by the relevant electricity authority.

Accordingly, electricity supply to the subject land is considered feasible in principle, subject to detailed design and approval by the relevant electricity service provider. Refer to *Figure 9.*

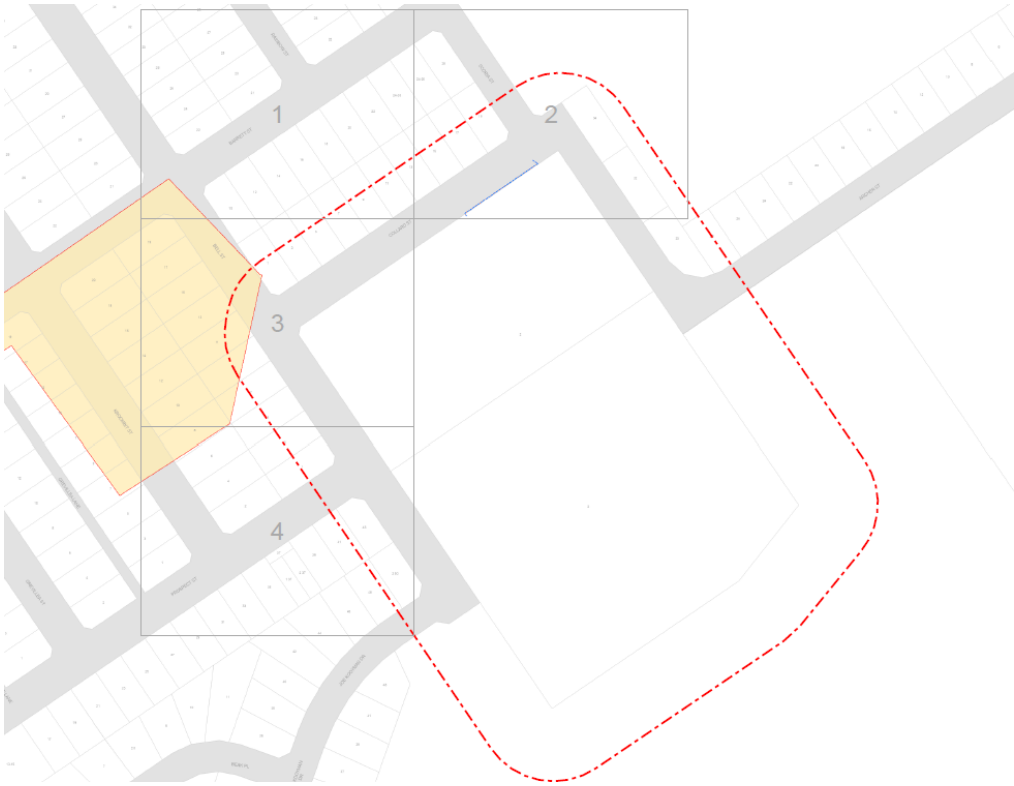


Figure 9 Existing Electricity Network

7.2. Proposed Electricity

The proposed development will be serviced via extension and/or augmentation of the existing electricity distribution network to support the future operation of the Redeemer Lutheran College expansion areas.

Electrical servicing will be provided to the proposed educational buildings, administration areas, amenities, parking areas and associated infrastructure throughout the development site.

The proposed electrical reticulation network will generally be arranged within the internal development areas and road corridors to provide efficient distribution throughout the site.

The final network configuration, including any required transformers, conduits, switchboards, underground reticulation and connection points, will be determined during detailed electrical design and in consultation with the relevant electricity authority.

All electrical infrastructure will be designed and constructed in accordance with applicable Queensland standards and service authority requirements.

Accordingly, the proposed electrical servicing arrangement demonstrates that the development can be effectively supplied with electricity, subject to detailed design and final approval by the relevant electricity authority.

8. Communications

8.1. Existing Telecommunications

Telecommunications service for the subject site is available from the existing communications infrastructure located within the surrounding Biloela urban area.

Based on available utility mapping and surrounding development infrastructure, existing telecommunications assets are located within the adjacent road corridors, including Collard Street, Bell Street and Archer Street surrounding the subject site.

The surrounding telecommunications network is understood to service the existing Redeemer Lutheran College campus and adjoining residential development areas. Existing infrastructure generally comprises underground telecommunications conduits, pits and associated reticulation infrastructure within the surrounding road reserve.

The presence of established telecommunications infrastructure adjacent to the site indicates that the proposed development is located within an existing serviced area and is capable of being connected to the existing network.

The exact location, capacity and configuration of the existing telecommunications infrastructure, including any NBN Co and/or Telstra assets, will be confirmed during detailed design and consultation with the relevant service providers.

Accordingly, telecommunications servicing to the subject land is considered feasible in principle, subject to detailed design and approval by the relevant telecommunications authorities.

Please refer to *Figure 10*

Figure 10 Existing NBN Telecommunication

8.2. Proposed Telecommunications

The proposed development will be serviced by extension and/or augmentation of the existing telecommunications infrastructure to support the future operation of the Redeemer Lutheran College expansion areas.

Telecommunications infrastructure will be provided to service the proposed educational buildings, administration areas and associated facilities throughout the development site.

The proposed telecommunications reticulation network will generally be arranged within the internal development areas and service corridors to provide efficient connectivity throughout the site.

The final network configuration, including conduit alignments, pit locations, service connections and associated communications infrastructure, will be determined during detailed design and in consultation with the relevant telecommunications providers.

All telecommunications infrastructure will be designed and constructed in accordance with applicable Australian Standards and relevant authority requirements.

Accordingly, the proposed telecommunications servicing arrangement demonstrates that the development can be effectively connected to the existing communications network, subject to detailed design and final approval by the relevant telecommunications authorities.

9. Summary

This Engineering Services Report has been prepared to provide a preliminary assessment of the infrastructure servicing requirements required to support the proposed staged expansion works and broader masterplan development for Redeemer Lutheran College located at 2 Collard Street, Biloela QLD.

The assessment confirms that the subject site is located within an established urban area serviced by existing infrastructure networks and is considered capable of accommodating the proposed development, subject to detailed design and relevant authority approvals.

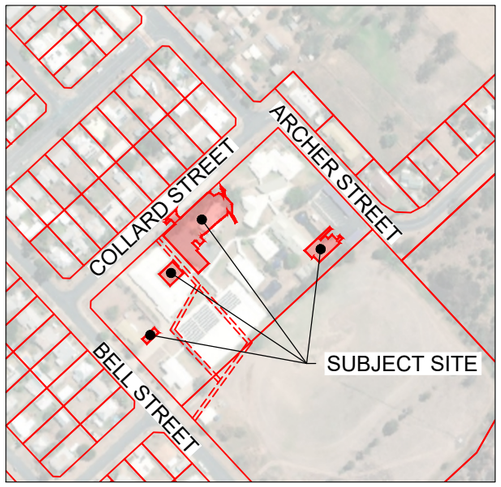
The key findings of this report are summarised as follows:

- Earthworks:
  Preliminary assessment indicates that the proposed development can be suitably integrated within the existing site topography, subject to detailed earthworks design, grading and stormwater management considerations.
- Sewer Reticulation:
  Existing sewer infrastructure is available within the surrounding road network and is considered capable of servicing the proposed College expansion. Preliminary sewer demand calculations indicate that the development can be accommodated within the existing servicing framework, subject to detailed design and authority approval.
- Water Supply:
  Potable water infrastructure is available adjacent to the site within the surrounding road network. Preliminary water demand assessment indicates that the proposed development can be effectively serviced by the existing reticulation network, subject to detailed hydraulic design and final approval by the relevant authority.
- Access & Roadworks:
  The site currently benefits from established access arrangements via Collard Street, Bell Street and Archer Street servicing the existing College campus. The proposed development includes upgrades to the Collard Street access arrangement, internal circulation network, pedestrian connectivity and additional parking areas to support the operational requirements and future expansion of the College. The surrounding road network is considered capable of accommodating the anticipated traffic movements associated with the proposed staged development, subject to detailed design and operational assessment where required.
- Flooding:
  Council flood information indicates that the subject site is not affected by the 10 year ARI, 20 year ARI, 50 year ARI, 100 year ARI or 2013 flood events, with flood impact identified only under the 100 year ARI plus climate change model. The proposed building finished floor levels are above the reported 100 year ARI plus climate change flood level, and the proposed localised earthworks are not expected to materially reduce flood storage or result in adverse flood impacts.
- Electricity:
  Existing electricity infrastructure is available surrounding the site and is considered capable of servicing the proposed development through extension and augmentation where required, subject to detailed design and approval by the relevant electricity authority.
- Telecommunications:
  Existing telecommunications infrastructure is located within the surrounding road reserve and can be extended to service the proposed development. Final service arrangements will be confirmed during detailed design in consultation with the relevant telecommunications providers.

Overall, the proposed development is considered capable of being appropriately serviced by the existing and proposed infrastructure networks in a coordinated and practical manner. Detailed design, confirmation of servicing arrangements and relevant authority approvals will be required prior to construction and future development stages.

APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS

REDEEMER LUTHERAN
COLLEGE STAGE 2A, 2 COLLARD ST.
BILOELA QLD 4715



LOCALITY PLAN
N.T.S

COMMERCIAL DEVELOPMENT
DESIGN FILE No: CE26020
DESIGN STANDARD: CMDG, IPWEA, SEQ & TMR

DESIGN TRAFFIC
ROAD CLASSIFICATION: DRIVEWAY
PAVEMENT DESIGN LIFE: 30 YRS
DESIGN SPEED: 5KM/H

STORMWATER/FLOOD DATA
NEW STRUCTURES & NETWORK, COMPLY WITH THE FOLLOWING:

MAJOR SYSTEM:	1% AEP
MINOR SYSTEM:	10% AEP
BLOCKAGE FACTOR:	0.5 ON INLETS

REFERENCE DESIGN REPORTS
STORMWATER REPORT: SBSMP REPORT REV A BY "Moloney & Sons Engineering" dated 20th May 2026.

GENERAL
1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE SUPERINTENDENT.
3. DO NOT SCALE FROM DRAWINGS.
4. ALL MATERIALS/CONSTRUCTION & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND THE LOCAL AUTHORITY'S STANDARD DRAWINGS AND BY-LAWS.
5. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
6. UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE LINE & LEVEL (DEPTH) OF ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCEMENT OF ANY EXCAVATION.
7. DISPERSIVE SOILS ARE NOT TO BE USED AS FILL/EMBANKMENT MATERIAL. ALL CONSTRUCTION & EARTHWORKS TO BE COMPLETED IN ACCORDANCE WITH THE SPECIFICATION LISTED AND UNDER LEVEL 1 SUPERVISION DURING EARTHWORKS.

CONTRACT SPECIFICATIONS
CMDG CONSTRUCTION SPECIFICATIONS:

CMDG C201	CONTROL OF TRAFFIC;
CMDG C211	CONTROL OF EROSION AND SEDIMENTATION;
CMDG C212	CLEARING AND GRUBBING;
CMDG C213	EARTHWORKS;
CMDG C220	STORMWATER DRAINAGE;
CMDG C221	PIPE DRAINAGE SPECIFICATION;
CMDG C223	DRAINAGE STRUCTURE;
CMDG C224	OPEN DRAINS;
CMDG C230	SUBSURFACE DRAINAGE;
CMDG C231	SUBSOIL AND FOUNDATION DRAINS;
CMDG C265	BOUNDARY FENCING;
CMDG C271	MINOR CONCRETE WORKS;
CMDG C273	LANDSCAPING;

STANDARD DRAWINGS
CMDG STANDARD DRAWINGS:

CMDG-D-010	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE
CMDG-D-022	FIELD INLET DETAILS
CMDG-D-030	ACCESS CHAMBER DETAILS, DIA 1050 TO 1500
CMDG-D-050	SEDIMENT CONTROL DEVICES SEDIMENT FENCE ENTRY EXIT SEDIMENT TRAP
CMDG-D-051	SEDIMENT CONTROL DEVICES, KERB AND FIELD INLETS, CHECK DAMS & STRAW BALE BANK
CMDG-R-042A	URBAN COMMERCIAL/ INDUSTRIAL DRIVEWAY
CMDG-R-060	STANDARD KERB AND CHANNEL PROFILES
CMDG-S-030	HOUSE CONNECTION BRANCHES;
CMDG-W-090	20 AND 25mm SERVICE AND WATER METER CONNECTIONS
CMDG-W-091	20, 25, 32 AND 40mm WATER METER DETAILS BELOW GROUND

IPWEAQ STANDARD DRAWINGS:

DRG RS-080	KERB AND CHANNEL PROFILES AND DIMENSIONS INCLUDING EDGE RESTRAINTS, MEDIAN & CHANNEL

DRAWING SCHEDULE

DOCUMENT TITLE	DOCUMENT NO.
COVER SHEET LOCALITY PLAN & DRG SCHEDULE	CE26020-001-CO
LEGEND	CE26020-002-CO
TYPICAL SECTIONS & DETAILS SHEET 1 OF 2	CE26020-101-TC
TYPICAL SECTIONS & DETAILS SHEET 2 OF 2	CE26020-102-TC
SITE SECTIONS SHEET 1 OF 3	CE26020-110-TC
SITE SECTIONS SHEET 2 OF 3	CE26020-111-TC
SITE SECTIONS SHEET 3 OF 3	CE26020-112-TC
EXISTING SITE LAYOUT & DEMOLITION PLAN	CE26020-200-AL
GENERAL ARRANGEMENT OVERALL LAYOUT PLAN	CE26020-300-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 1 OF 4	CE26020-301-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 4	CE26020-302-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 4	CE26020-303-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 4	CE26020-304-GA
SWEPT PATH CAR SHEET 1 OF 2	CE26020-311-GA
SWEPT PATH CAR SHEET 2 OF 2	CE26020-312-GA
PROPOSED SITE BULK EARTHWORKS	CE26020-400-GA
DRIVEWAY LONGITUDINAL SECTIONS	CE26020-501-LS
STORMWATER PRE - DEVELOPMENT CATCHMENT PLAN	CE26020-600-DR
STORMWATER POST - DEVELOPMENT CATCHMENT PLAN	CE26020-601-DR
STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2	CE26020-611-DR
STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2	CE26020-612-DR
PROPOSED SITE WATER LAYOUT PLAN	CE26020-700-WA
PROPOSED SITE SEWER LAYOUT PLAN	CE26020-800-SEW
SEWER LONGITUDINAL SECTIONS	CE26020-811-SEW
SEDIMENT & EROSION CONTROL PLAN	CE26020-900-SE
SEDIMENT & EROSION CONTROL PLAN TYPICAL DETAILS	CE26020-910-SE

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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DETAIL SURVEY BY:
FREDRIKSEN MACLEAN & ASSOCIATES CONSULTING SURVEYORS
DATE SURVEYED 16/04/2026
SURVEY: MGA2020 ZONE 56 GRID

STANDARD DRAWINGS:
AUSTROADS DESIGN & TMR GUIDELINES / CAPRICORN MUNICIPAL DESIGN GUIDELINES / INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA)

FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL

AMENDMENTS

DESIGN CHECK: vs
DRAWN CHECK: vt

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED
RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

MOLONEY & SONS ENGINEERING
design it. build it.
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
www.moloneyandsons.com.au

DRAWING TITLE: COVER SHEET LOCALITY PLAN & DRG SCHEDULE
DRAWING NUMBER: CE26020-001-CO
ISSUE: A

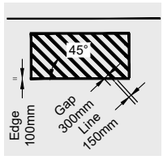
LEGEND

EXISTING SURVEY

- Existing Lot Boundary
- Existing Easement
- Existing Structure / Infrastructure to be Demolished
- Existing Edge of Bitumen
- Existing building
- Existing Top of Batter
- Existing Toe of Batter
- Existing Fence Line
- Existing Vegetation
- E — Existing Electricity
- E/O — Existing Overhead Electrical
- DBYD T — Existing DBYD Telecommunication
- DBYD S — Existing DBYD Sewer
- DBYD W — Existing DBYD Water
- SW — Existing Stormwater
- Existing Bitumen Surface
- Existing Footpath Concrete
- 12.0 — Existing Surface Contours Major
- 12.0 — Existing Surface Contours Minor
- S MH — Existing Sewer Structures
- SW MH — Existing Stormwater Structures
- T P — Existing Telstra Structures
- E P — Existing Electrical Structures
- PP — Existing Power Pole
- FH W M W — Existing Water Structures
- Existing Drainage Structures
- HW — Existing Stormwater Structures Headwall
- Existing Tree

PROPOSED

- Proposed Barrier Kerb And Channel Type 1
- Proposed Barrier Kerb Type 3
- Proposed Carpark Asphalt
- Proposed Concrete Driveway
- Proposed Footpath Concrete
- Proposed Building (By others)
- 12.0 — Proposed Surface Contours
- SW — Proposed Stormwater Pipe
- W — Proposed Water Pipe
- Proposed Stormwater Field inlet
- S — Proposed Sewer Manhole
- S — Proposed Sewer Pipe
- HC — Proposed Sewer House Connection
- W — Proposed Water Connection
- M W — Proposed Water Meter
- EL 100mm — Edge Line
- Chevron



SEDIMENT & EROSION CONTROL

- Proposed Catch Drain
- Proposed Sediment Fence
- Clearing & Grubbing
- Temporary Straw Filter Sock
- Temporary Construction Entry

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL

AMENDMENTS

DESIGN CHECK: vs

DRAWN CHECK: vt

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED RPEQ 33682

L Moloney

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

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DRAWING TITLE: LEGEND

DRAWING NUMBER: CE26020-002-CO

ISSUE: A

NOTES:

1. ALL PAVEMENT PROFILES ARE SUBJECT TO SUBGRADE TESTING OF ALL AREAS PRIOR TO COMMENCING WORKS AND APPROVED BY BANANA SHIRE COUNCIL AND SUPERINTENDENT.
2. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
3. ALL FILL BATTERS TO BE 1 IN 4, 1 IN 2 MAY BE ADOPTED IN CONSTRAINED ENVIRONMENTS SUBJECT TO SUPERINTENDENTS APPROVAL.
4. ALL BATTER SECTIONS ARE INDICATIVE ONLY. GEOTECHNICAL ENGINEERING ADVICE SHALL BE REQUIRED FOR ALL BATTER SLOPES TO ASSESS THE SUITABILITY OF EITHER THE CUT FACE OR FILL EMBANKMENT GEOMETRY. THE INSPECTIONS SHALL BE UNDERTAKEN BY REGISTERED GEOTECHNICAL ENGINEER. FLATTER OR STEEPER SLOPES MAY BE ADOPTED BASED ON THE RECOMMENDATIONS.
5. ALL DUMPED ROCK SHALL BE UNDERLAIN BY APPROVED GEOTEXTILE SUITABLE FOR SUBMERSION IN WATER. DUMPED ROCK SHALL COMPRISE ROCK MATERIAL WHICH IS NOT SUSCEPTIBLE TO BREAKDOWN UNDER WETTING & DRYING.
6. DUMPED ROCK SHOULD NOT BE SINGLE SIZED, BUT WELL GRADED MIXTURE DESIGNED TO ENSURE THAT ALL INTERSTICES BETWEEN LARGE ROCKS ARE FILLED WITH ROCK OF PROGRESSIVELY SMALLER SIZE.
7. THE THICKNESS OF THE DUMPED ROCK LAYER SHALL NOT BE LESS THAT $2.1xD_{50}$.
8. DUMPED ROCK SHALL BE PLACED IN A MANNER AS TO AVOID DAMAGE TO THE UNDERLYING GEOTEXTILE.
9. DUMPED ROCK SIZING IS BASED ON A MINIMUM SPECIFIC GRAVITY OF 2.50.
10. THE RATIO OF DUMPED ROCK LENGTH TO THICKNESS SHALL BE LESS THAN 2.0.
11. DISTURBANCE OF THE WATER COURSE BED AND BANKS SHALL BE KEPT WITHIN THE EXTENTS OF THE WORKS. ANY WORKS REQUIRED BEYOND THE EXTENTS OF THE WORKS SHALL BE COMPLETED TO COMPLEMENT THE DESIGN.
12. SEDIMENT AND EROSION CONTROL MEASURES APPROPRIATE FOR USE ADJACENT TO AND IN THE WATER COURSE SHALL BE USED TO PREVENT DOWNSTREAM CONTAMINATION AND SILTING.

PRELIMINARY PAVEMENT DESIGN:

TYPE	AREA	DESIGN	SURFACE SEAL	BASE COURSE	SUB-BASE	SUBGRADE REPLACEMENT	TOTAL PAVEMENT THICKNESS	COMMENTS
	780 m^2	FULL DEPTH PAVEMENT	ASPHALT 25mm DG10 (REFER NOTE 2)	150mm TYPE 2.1	150mm TYPE 2.3	200mm AT CBR15 SELECT FILL	525mm	COMPLETE BOX OUT AND PREP SUBGRADE
	58 m^2	CONCRETE PAVEMENT	N/A	175mm THK 32MPa CONCRETE WITH SL92 50mm TOP & EDGE COVER	N/A	N/A	175mm	COMPLETE BOX OUT AND PREP SUBGRADE
	450 m^2	CONCRETE FOOTPATH	N/A	100mm THK 32MPa CONCRETE WITH SL72 40mm TOP COVER				

1. ADOPTED CBR OF 1.5% AS PER CQ SOIL TESTING REPORT
2. PRIME AMC0

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DATUM

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ISSUED FOR APPROVAL

APPROVED L Moloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

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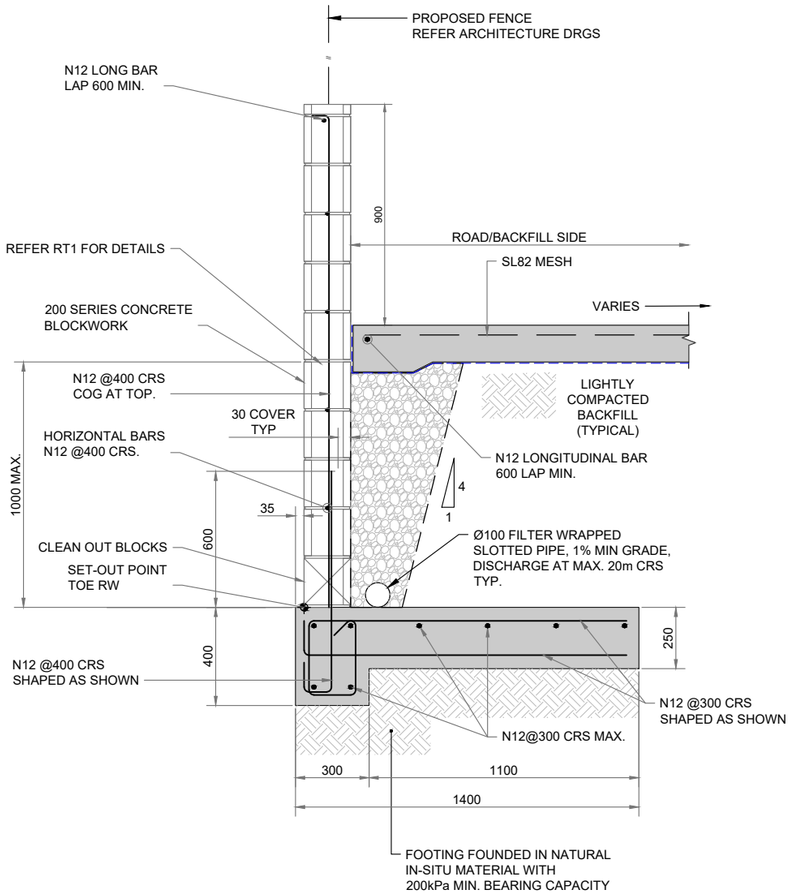
DRAWING TITLE: TYPICAL SECTIONS & DETAILS SHEET 1 OF 2

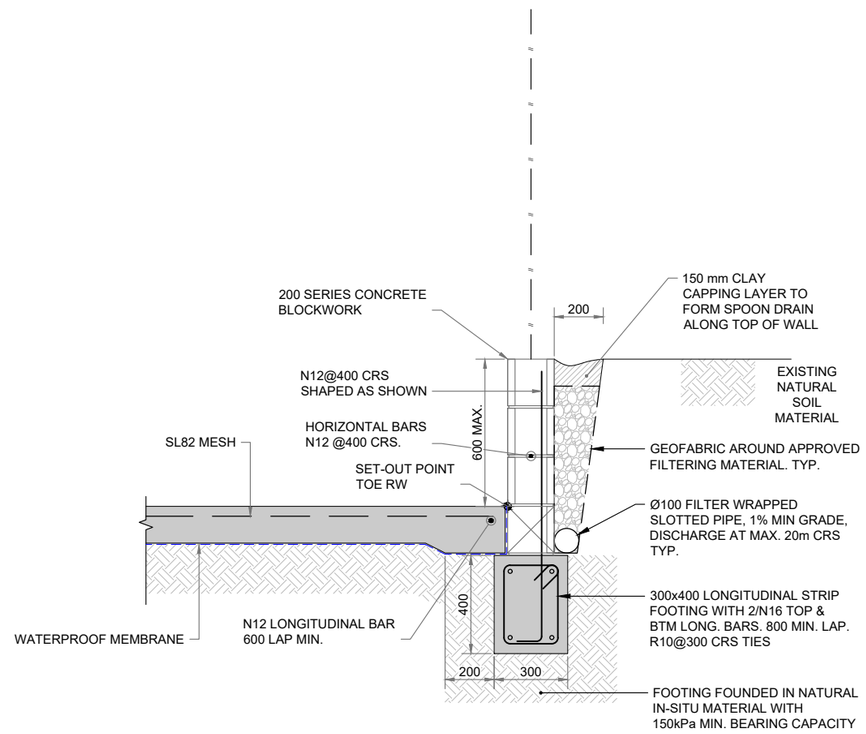
DRAWING NUMBER: CE26020-101-TC

ISSUE: A



PROPOSED RETAINING WALL RW1

SCALE 1:25



PROPOSED RETAINING WALL RW2

SCALE 1:25

0 0.0625 0.25m
0 0.1250 0.50m

1:12.5 (A1)
1:25 (A3)

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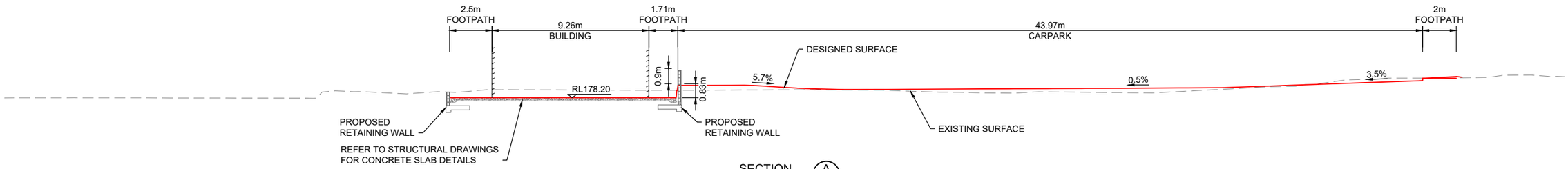
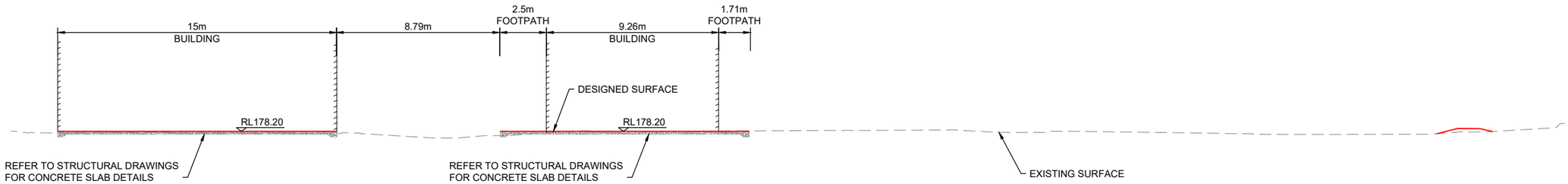
DRAWING TITLE: TYPICAL SECTIONS & DETAILS
SHEET 2 OF 2

DRAWING NUMBER: CE26020-102-TC

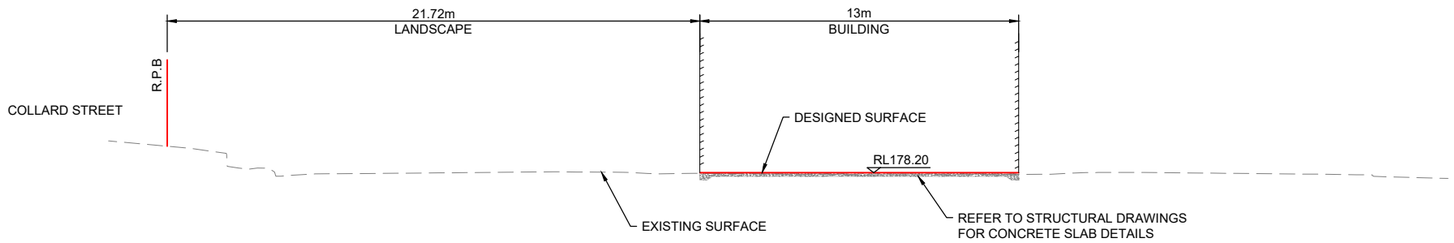
ISSUE: A



SECTION A
SCALE 1:250 300



SECTION B
SCALE 1:250 300



SECTION C
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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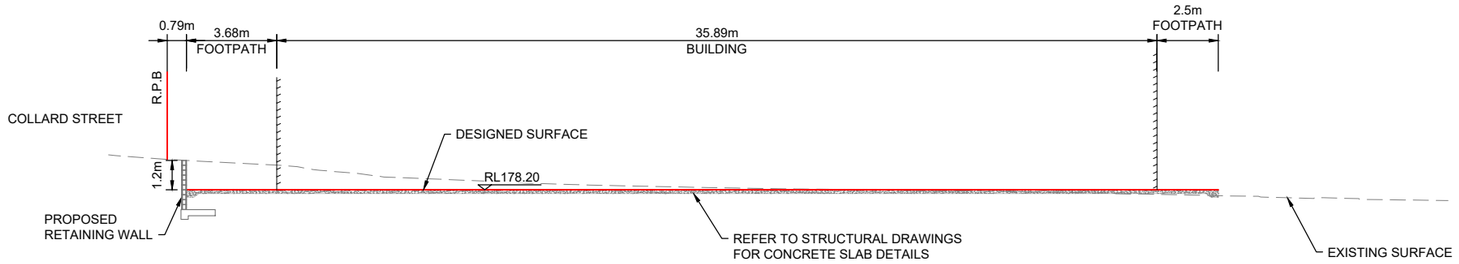
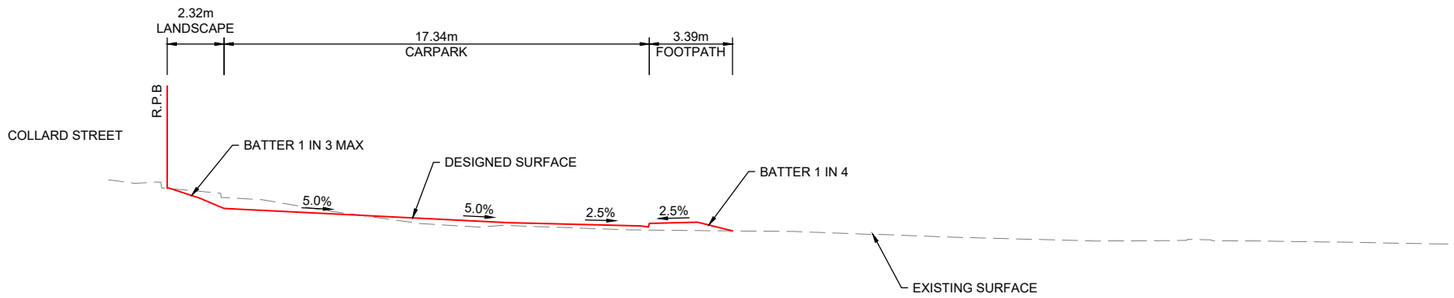
DRAWING TITLE: SITE SECTIONS
SHEET 1 OF 3

DRAWING NUMBER: CE26020-110-TC

ISSUE: A



SECTION D / 300
SCALE 1:250



SECTION E / 300
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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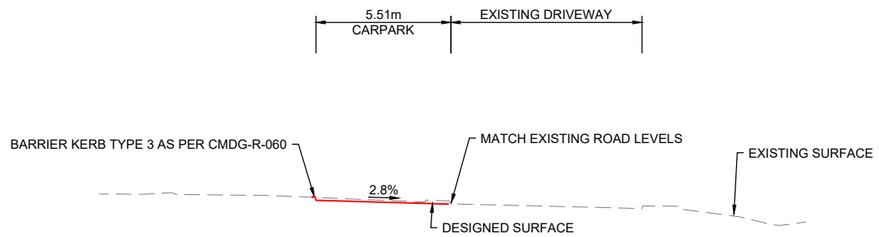
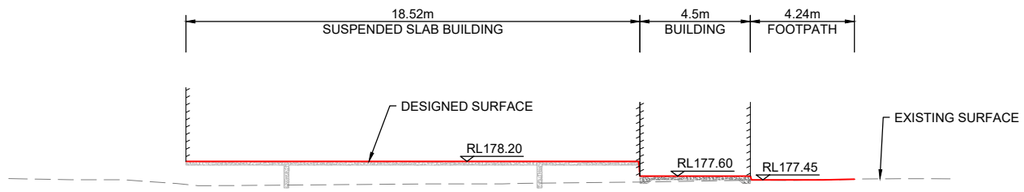
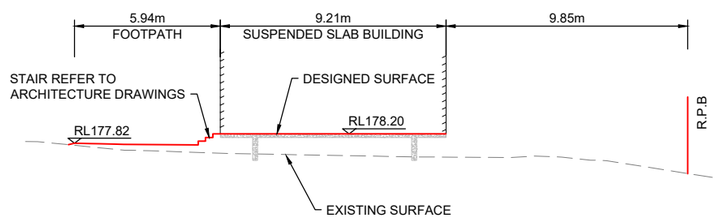


SECTION F
SCALE 1:250 300



SECTION G
SCALE 1:250 300



SECTION H
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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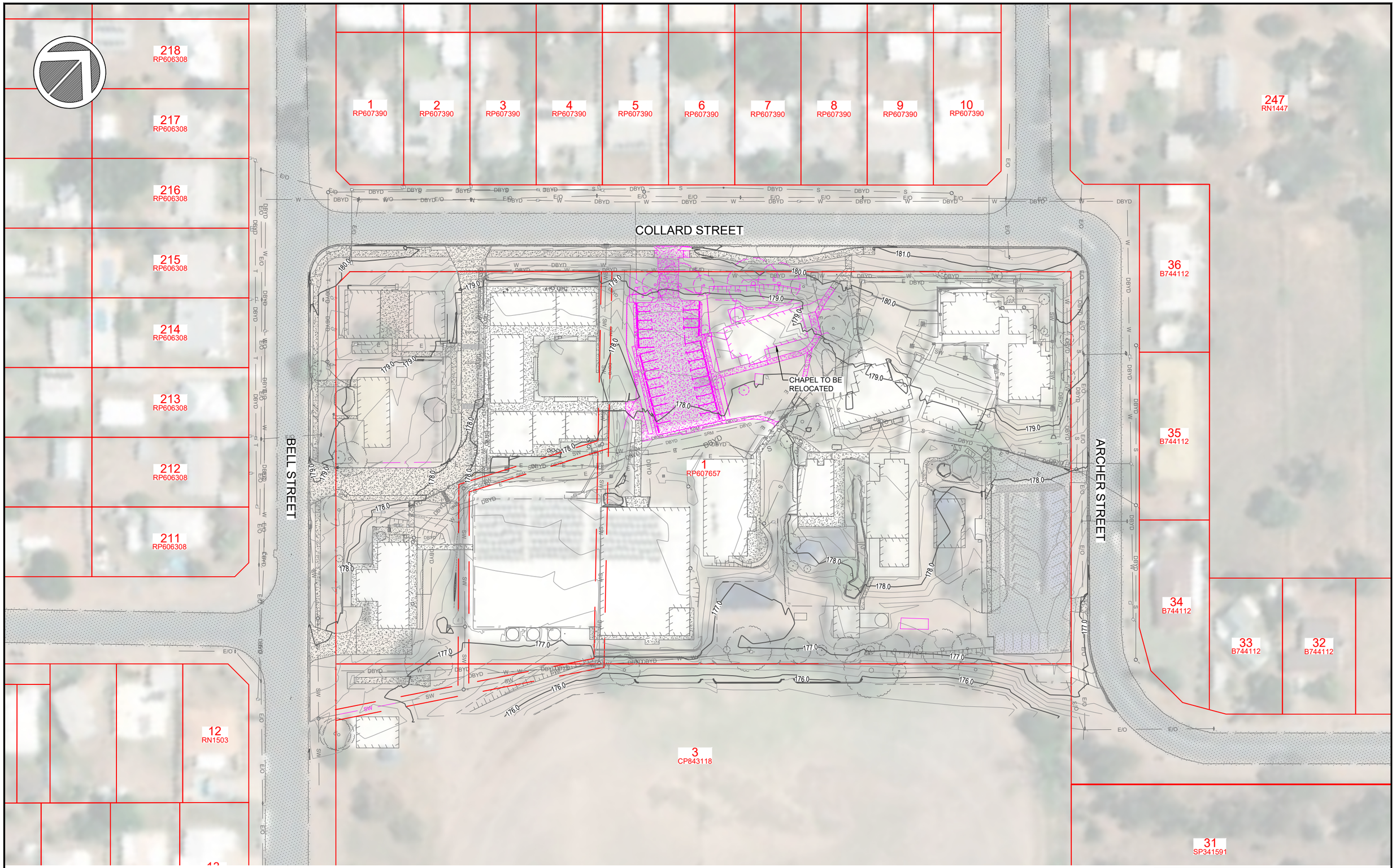
DRAWING TITLE: SITE SECTIONS
SHEET 3 OF 3

DRAWING NUMBER: CE26020-112-TC

ISSUE: A



EXISTING SITE OVERALL
LAYOUT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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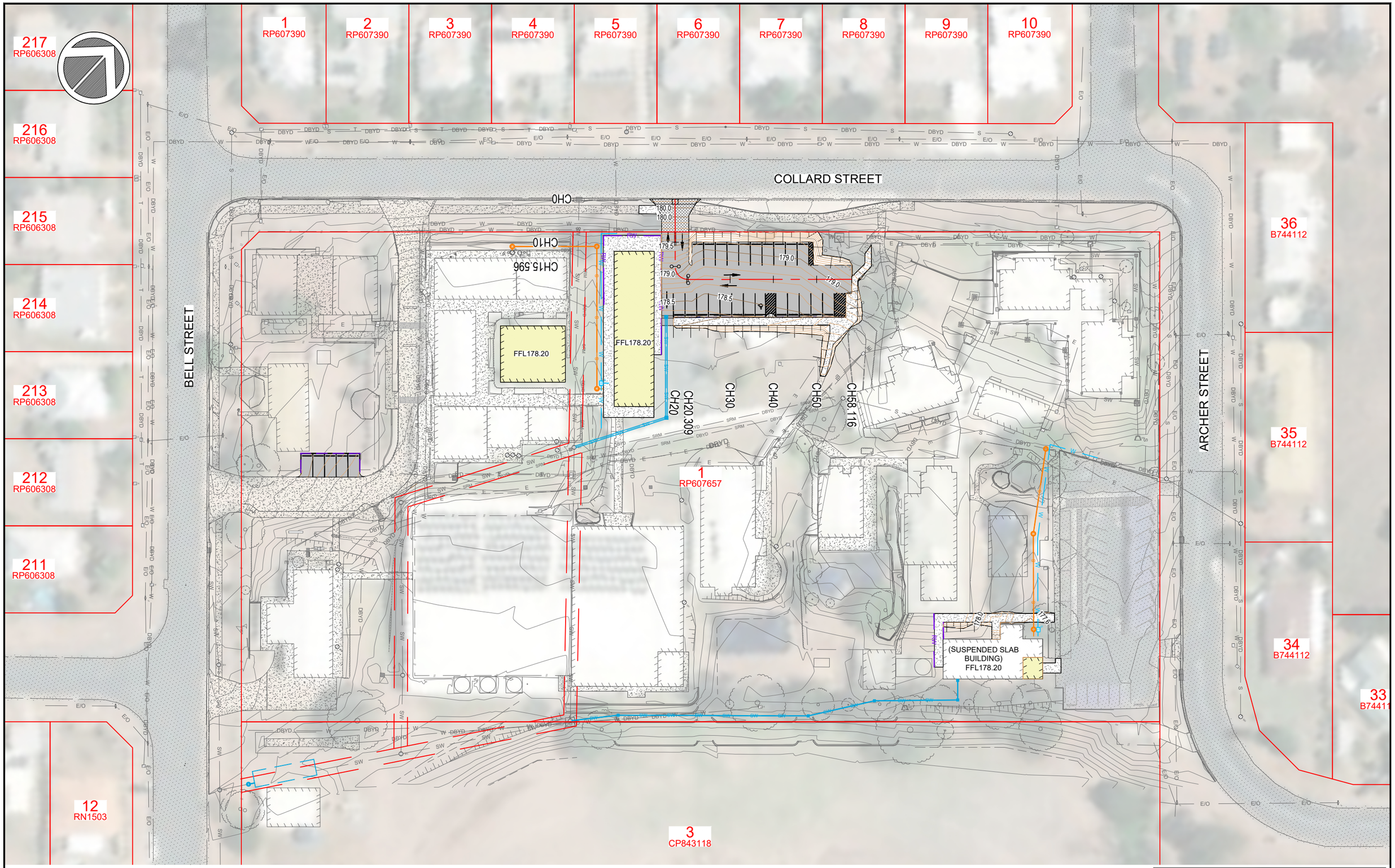
DRAWING TITLE
EXISTING SITE LAYOUT & DEMOLITION PLAN

DRAWING NUMBER
CE26020-200-AL

ISSUE
A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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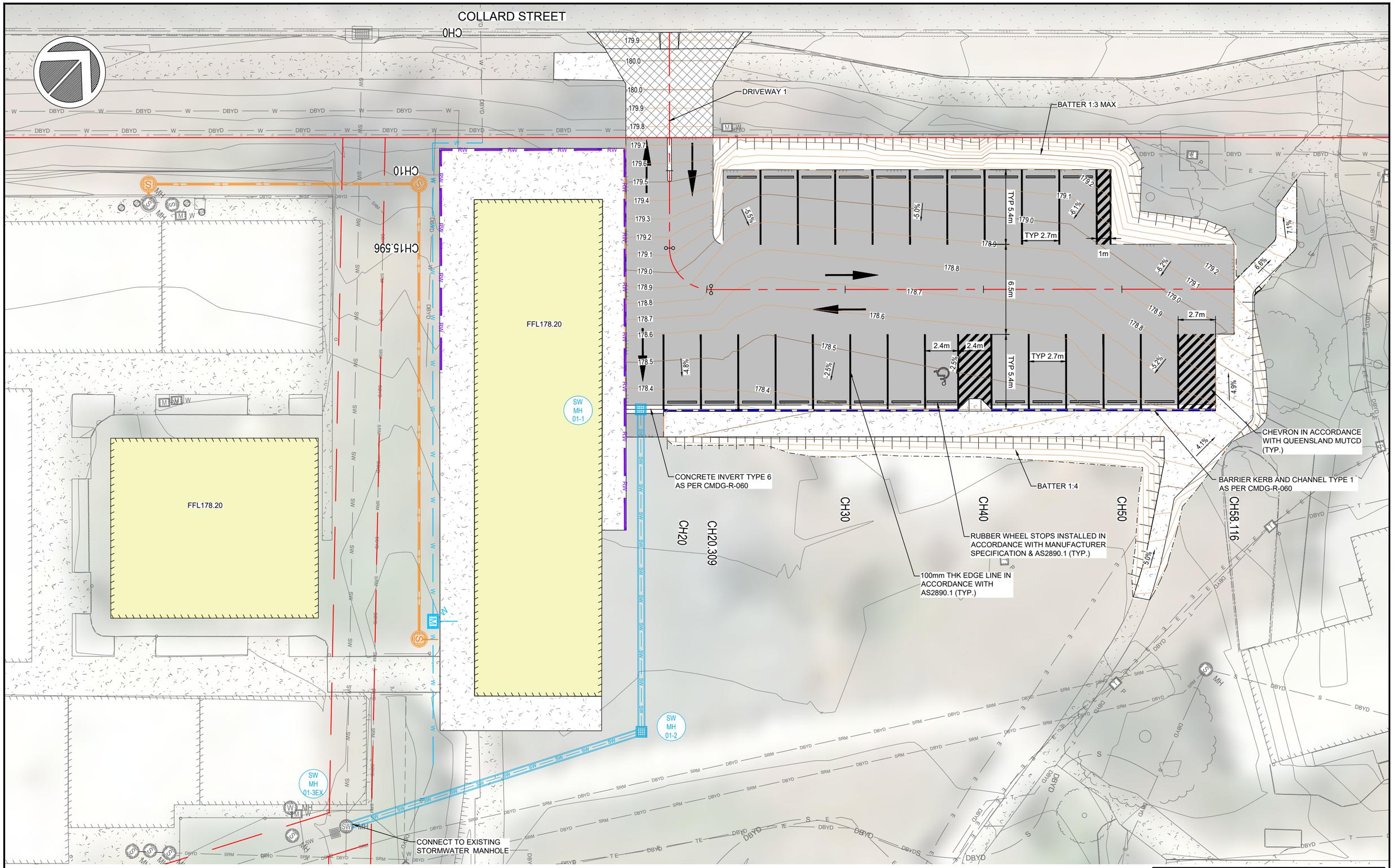
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT OVERALL LAYOUT PLAN

DRAWING NUMBER: CE26020-300-GA
ISSUE: A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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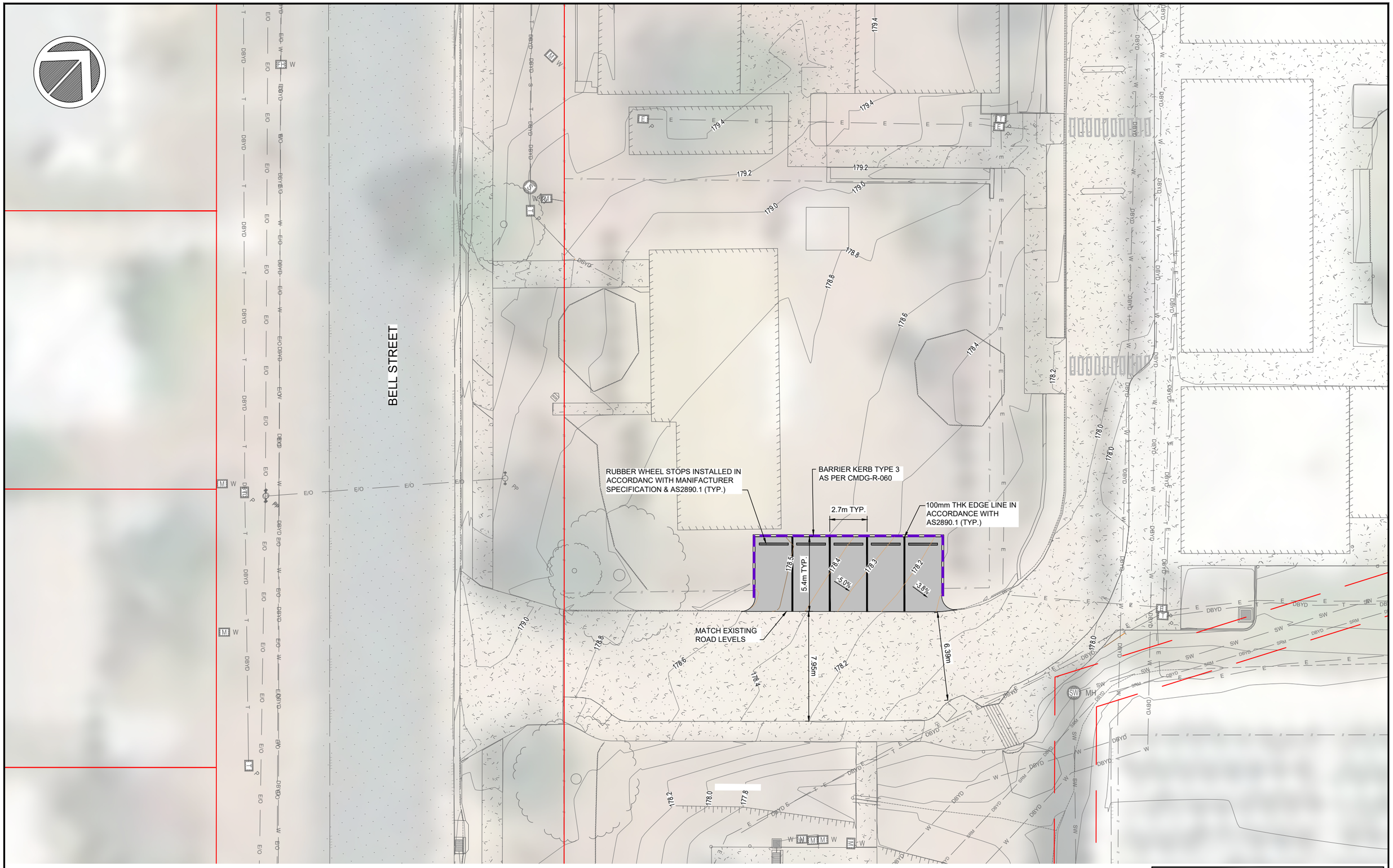
DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT
SHEET 1 OF 4

DRAWING NUMBER CE26020-301-GA
ISSUE A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 4

DRAWING NUMBER
CE26020-302-GA

ISSUE
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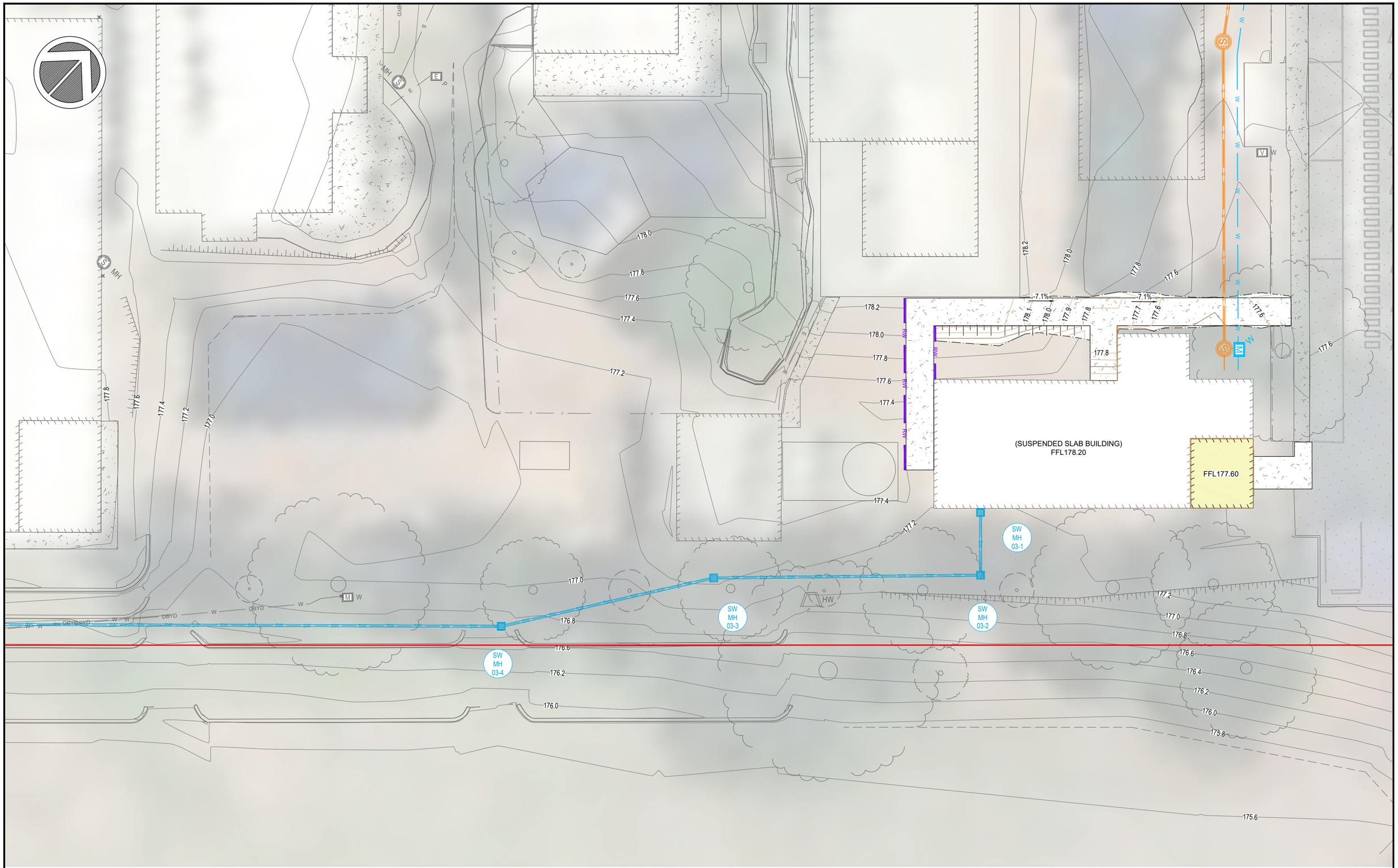

PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 4

DRAWING NUMBER CE26020-303-GA

ISSUE A

PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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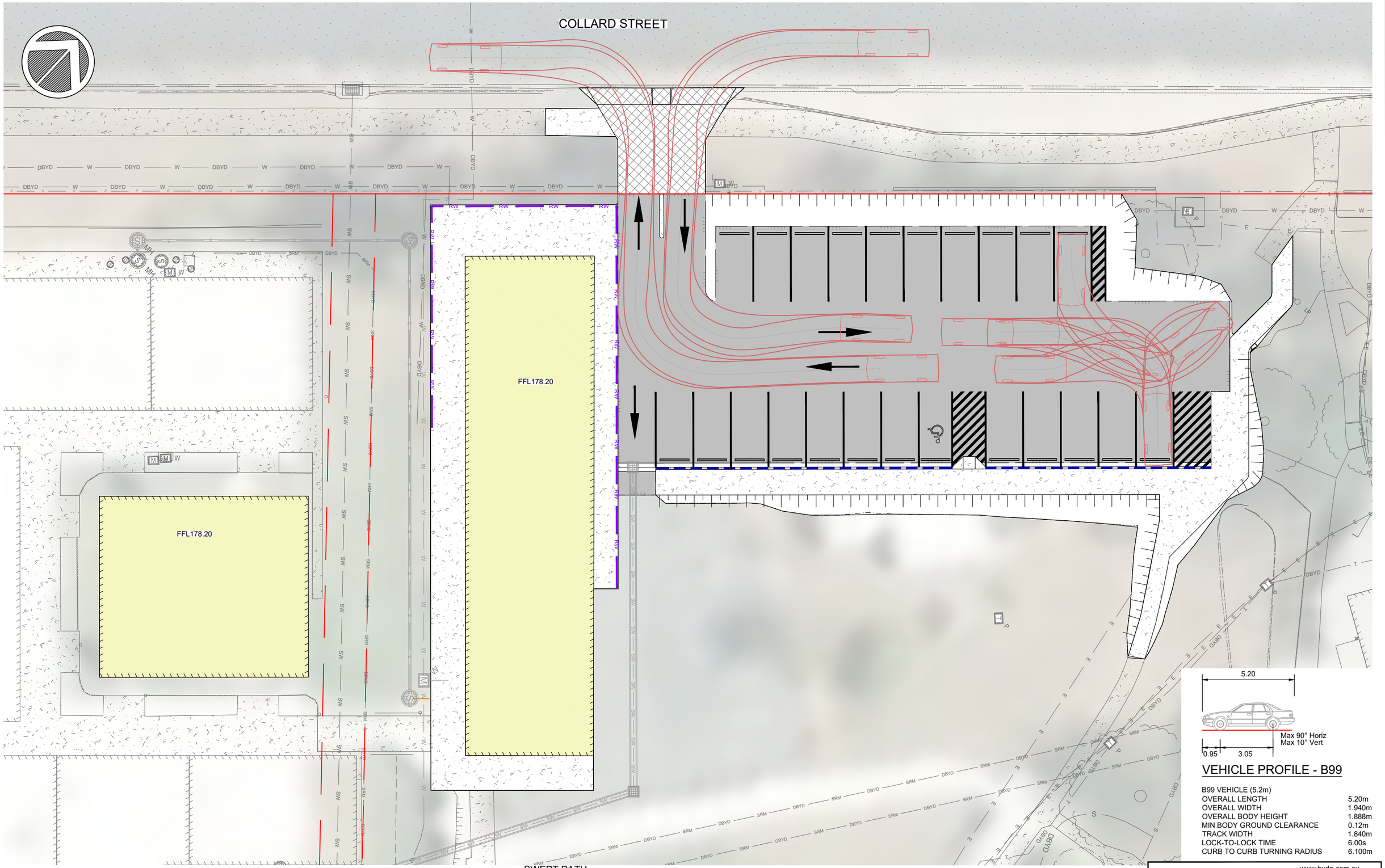
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 4

DRAWING NUMBER: CE26020-304-GA

ISSUE: A



VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
OVERALL LENGTH	5.20m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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AMENDMENTS

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PROJECT No.
CE26020

ISSUED FOR APPROVAL

APPROVED L Moloney RPEQ 33682

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CLIENT
REDEEMER LUTHERAN COLLEGE

PROJECT
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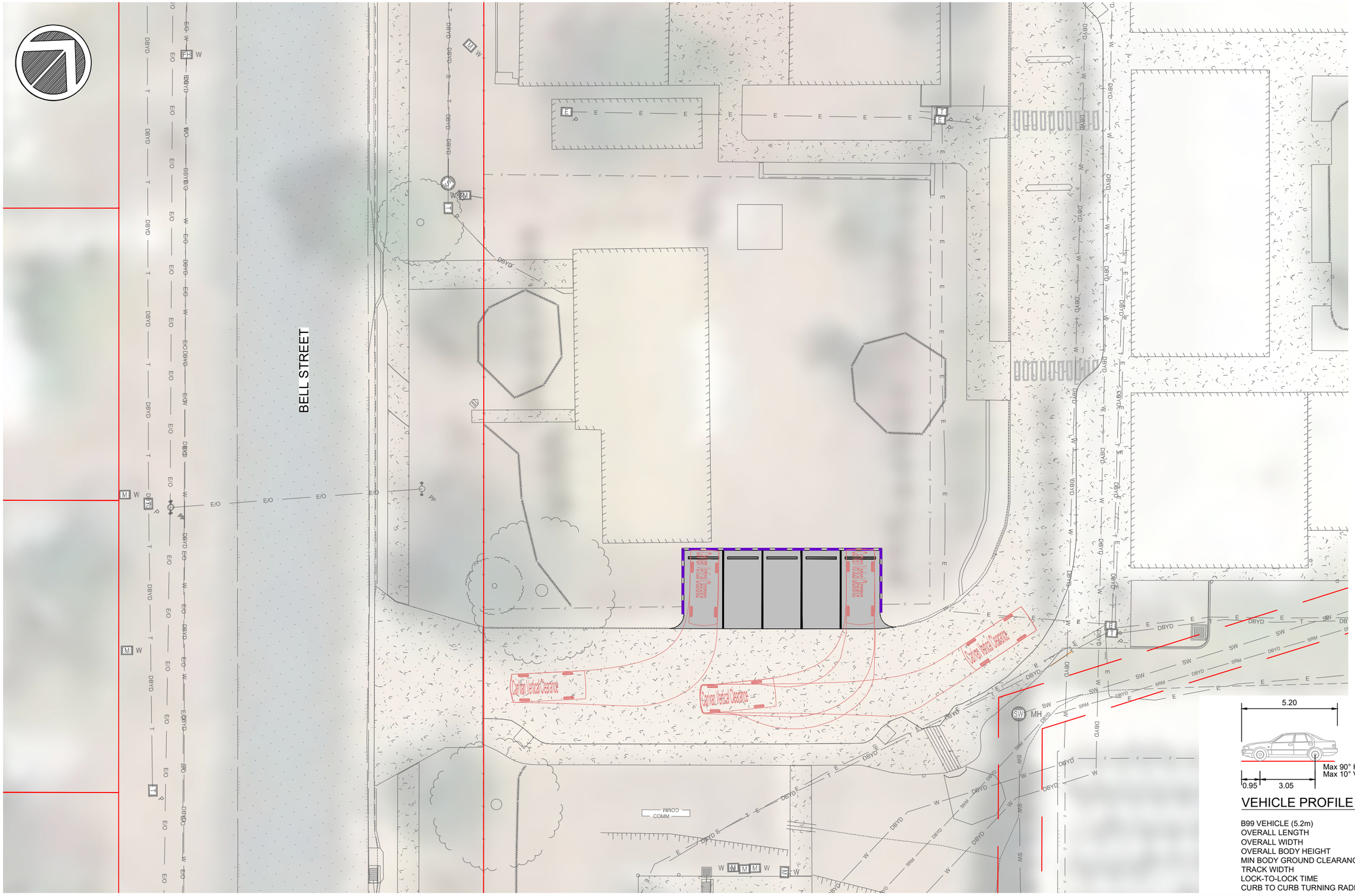
DRAWING TITLE
SWEPT PATH
CAR
SHEET 1 OF 2

DRAWING NUMBER
CE26020-311-GA

ISSUE
A



VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
OVERALL LENGTH	5.20m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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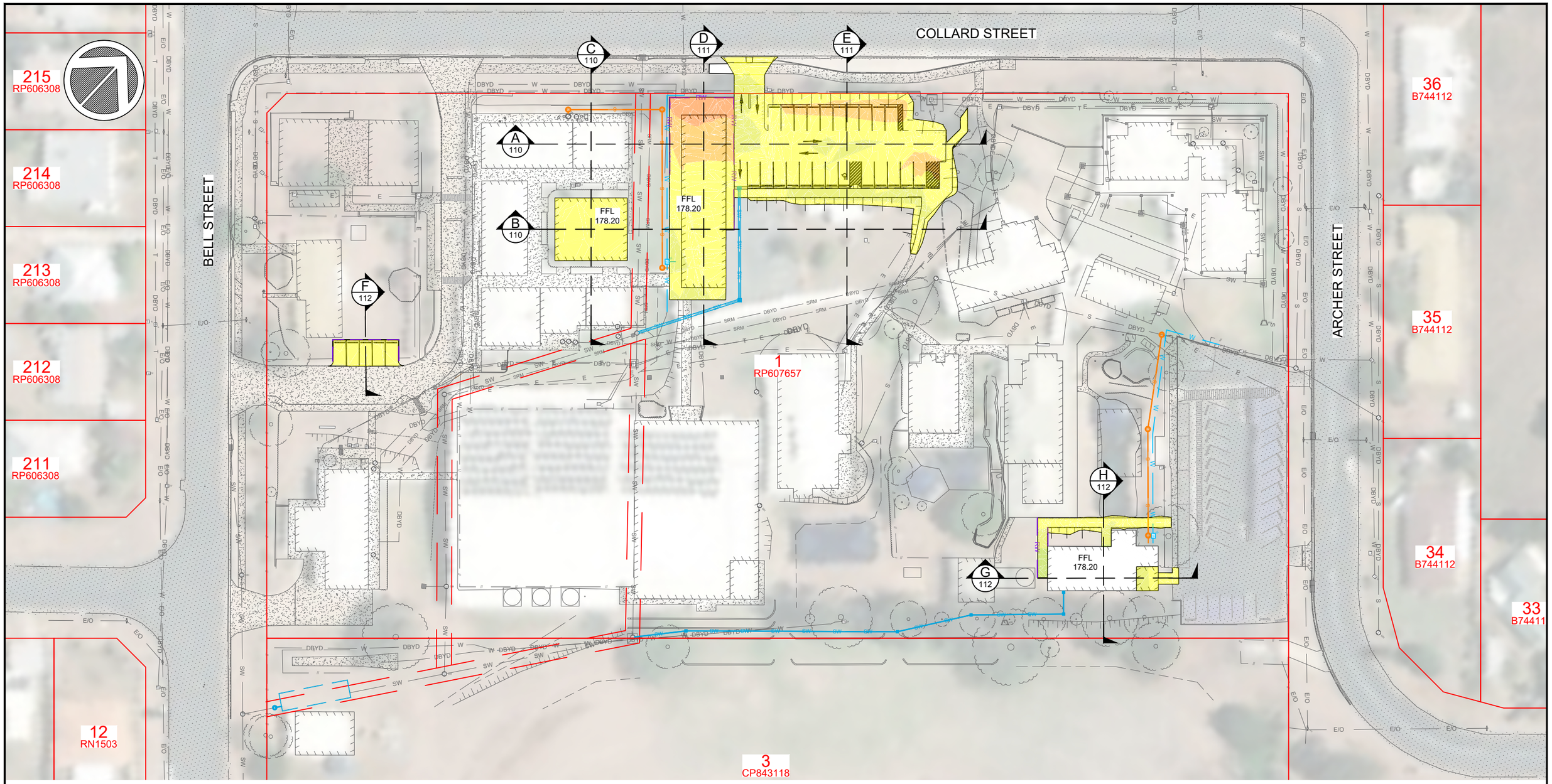
DRAWING TITLE
SWEPT PATH
CAR
SHEET 2 OF 2

DRAWING NUMBER
CE26020-312-GA

ISSUE
A



PROPOSED SITE
BULK EARTHWORKS
SCALE 1:800

CUT & FILL ELEVATION RANGE

No.	Color	Minimum Depth (m)	Maximum Depth (m)
1		-2.000	-1.500
2		-1.500	-1.000
3		-1.000	-0.500
4		-0.500	0.000
5		0.000	0.500
6		0.500	1.000
7		1.000	1.500
8		1.500	2.000
9		2.000	2.500

NOTES:
1. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
2. ALL FILL BATTERS TO BE 1 IN 4, 1 IN 2 MAY BE ADOPTED IN CONSTRAINED ENVIRONMENTS SUBJECT TO SUPERINTENDENTS APPROVAL.
3. WHERE WORKS ABUTS EXISTING, ALL WORK SHALL BE NEAT, SMOOTH, WORKMANLIKE AND TO THE SUPERINTENDENTS SATISFACTION.

CUT/FILL QUANTITIES:

TOPSOIL: THE PRINCIPAL CONTRACTOR SHALL ESTABLISH APPROPRIATE DEPTH FOR CLEARING & GRUBBING.

CUT TO FILL: 26 m³
CUT (REMOVAL FROM SITE): 483 m³
TOTAL VOLUME: 509 m³

PLEASE NOTE THE ABOVE QUANTITIES ARE 'TIGHT' QUANTITIES AND DO NOT CONSIDER BULKING FACTORS AND/OR PAVEMENT LAYERS.

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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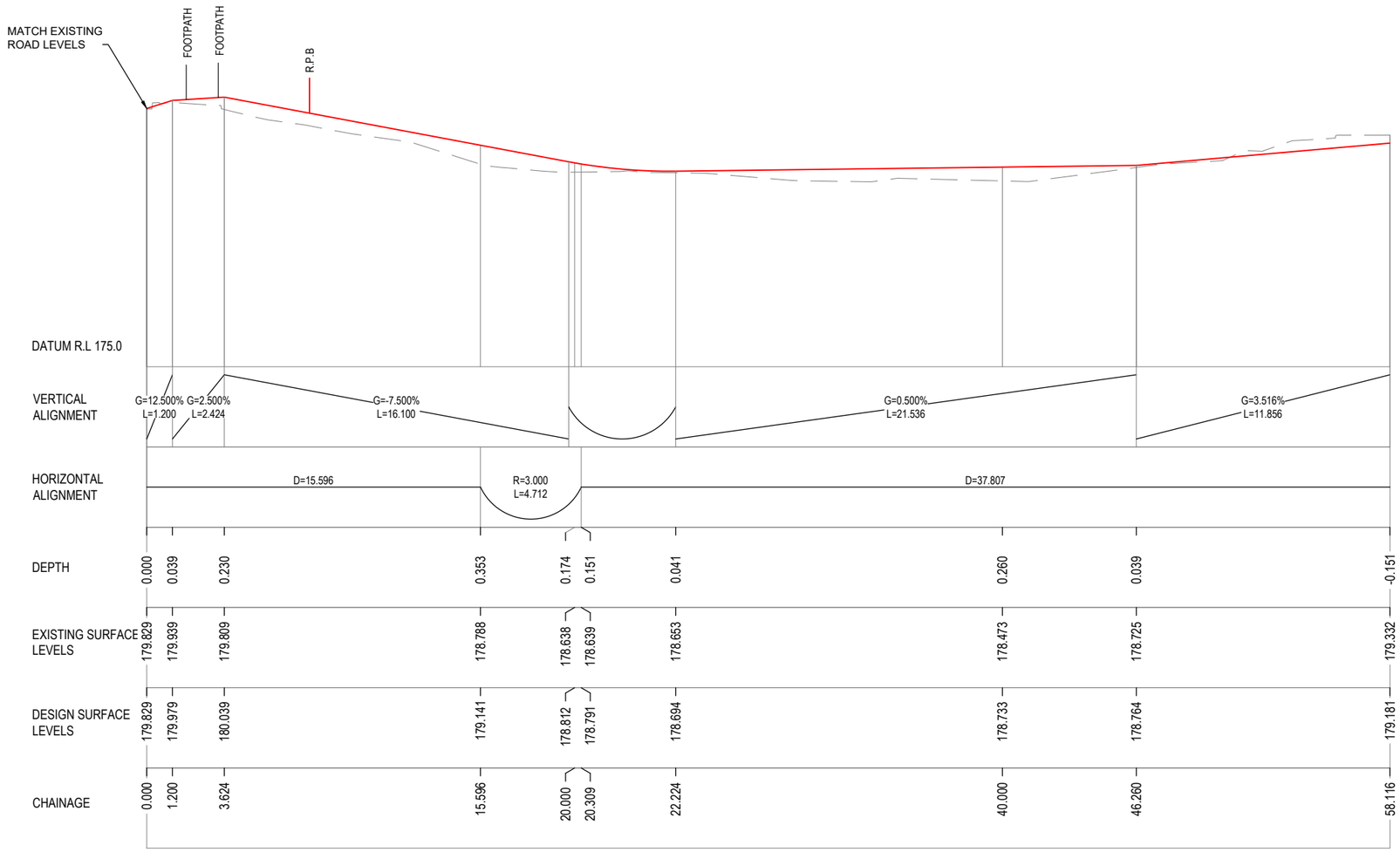
DRAWING TITLE: PROPOSED SITE BULK EARTHWORKS

DRAWING NUMBER: CE26020-400-GA
ISSUE: A



LONGITUDINAL SECTION - DRIVEWAY
SCALE - HORIZ 1:250, VERT. 1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No. CE26020

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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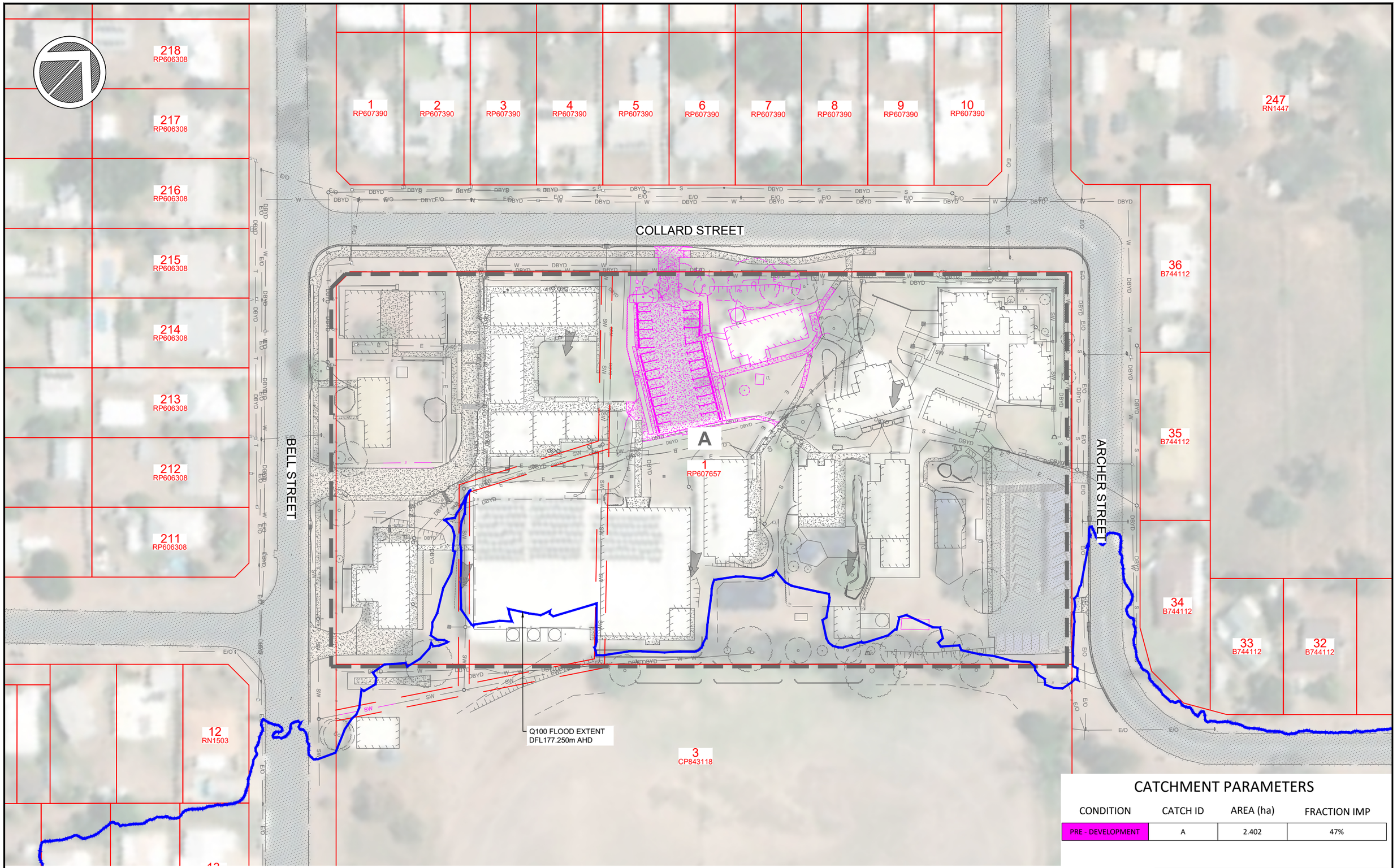
DRAWING TITLE: DRIVEWAY LONGITUDINAL SECTIONS

DRAWING NUMBER: CE26020-501-LS

ISSUE: A



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
PRE - DEVELOPMENT	A	2.402	47%

STORMWATER PRE-DEVLOPEMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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PROJECT
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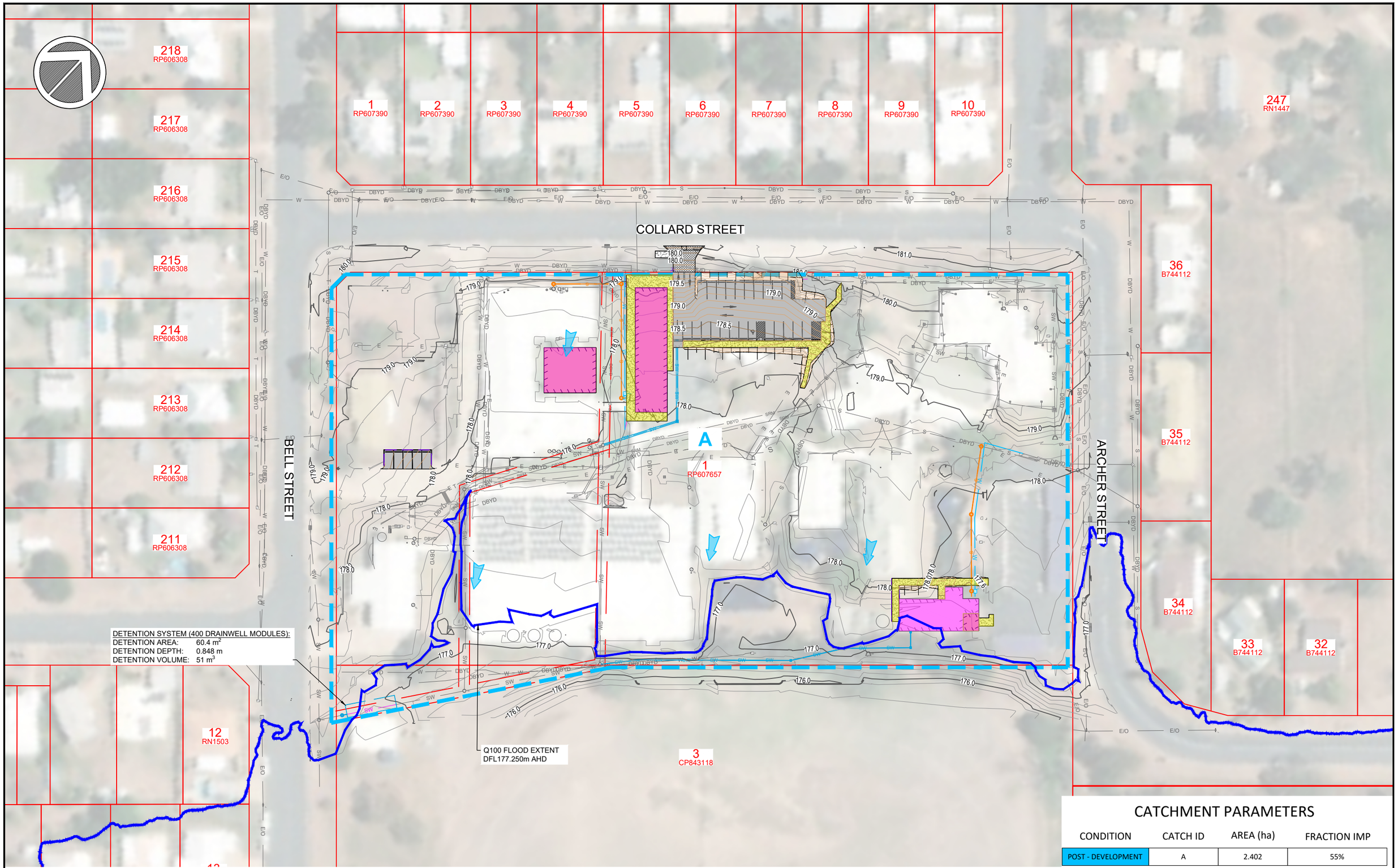
DRAWING TITLE
STORMWATER PRE-DEVLOPMENT CATCHMENT PLAN

DRAWING NUMBER: CE26020-600-DR
ISSUE: A



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
POST - DEVELOPMENT	A	2.402	55%

STORMWATER POST-DEVELOPMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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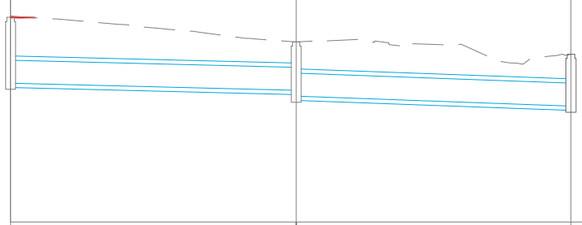
DRAWING TITLE: STORMWATER POST-DEVELOPMENT CATCHMENT PLAN

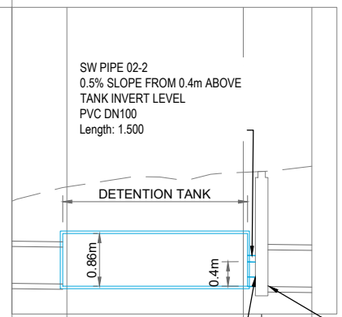
DRAWING NUMBER: CE26020-601-DR

ISSUE: A



STRUCTURE NAME	SW MH 01-1	SW MH 01-2	SW MH 01-3EX
STRUCTURE DESCRIPTION	600SQ FIELD INLET GRATE CL 'D' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	EXISTING MANHOLE
DATUM 175.000			
PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 01-1 Ø375 BMAX SN8 Length: 23.294	SW PIPE 01-2 Ø375 BMAX SN8 Length: 22.410	
GRADE %	0.50%	0.73%	
HGL & FLOW RATE			
KNOWN CAPACITY	0.179	0.216	
COVER	0.630	0.345 / 0.439	0.401
INVERT LEVEL	177.263	177.146 / 177.052	176.889
DESIGN LEVEL AT MH CL	178.338	177.936	177.735
EXISTING SURFACE	178.359	177.936	177.735
COORDINATES	N7299050.815 E248395.505	N7299033.760 E248411.371	N7299014.241 E248400.361
CHAINAGE	0.000	23.297	45.707

STORMWATER LINE 1
SCALE: H1:500 - V1:100



STRUCTURE NAME	SW DL 02-1	SW DT 02-1 / SW MH 02-2
STRUCTURE DESCRIPTION	DRAINWELL DETENTION OR APPROVED EQUIVALENT	DRAINWELL DETENTION OR APPROVED EQUIVALENT / 1050DIA ACCESS CHAMBER GRATE CL 'B' CMDG-D-030
DATUM 175.000		
PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 02-1 Ø600 EX PIPE Length: 4.492	SW PIPE 02-3 0.5% SLOPE FROM TANK INVERT LEVEL PVC DN150 Length: 1.500 / EX PIPE 02-4 Ø600 EX PIPE Length: 4.087
GRADE %	0.26%	0.50% 0.26%
HGL & FLOW RATE		
KNOWN CAPACITY	0.450	0.016 / 0.450
COVER	0.653 / 0.895	1.701 / 1.723 / 1.188 / 1.283
INVERT LEVEL	175.500 / 175.488	175.454 / 175.446 / 175.447 / 175.437
DESIGN LEVEL AT MH CL	177.072	177.310 / 177.324
EXISTING SURFACE	177.072	177.310 / 177.324
COORDINATES	N7298918.841 E248407.345	N7298907.201 E248398.909 / N7298905.987 E248398.029
CHAINAGE	0.000 / 4.492	18.867 / 24.454

STORMWATER LINE 2
SCALE: H1:500 - V1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

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PROJECT No. CE26020

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APPROVED L C Moloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

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DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2

DRAWING NUMBER: CE26020-611-DR
ISSUE: A

STRUCTURE NAME	SW MH 03-1	SW MH 03-2	SW MH 03-3	SW MH 03-4	SW MH 03-5	SW MH 03-4EX
STRUCTURE DESCRIPTION	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	EXISTING MANHOLE

DATUM 175.000

PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 03-1 Ø150 PVC Length: 4.523	SW PIPE 03-2 Ø150 PVC Length: 19.235	SW PIPE 03-3 Ø150 PVC Length: 15.703	SW PIPE 03-4 Ø150 PVC Length: 43.925	SW PIPE 03-5 Ø150 PVC Length: 11.126
GRADE %	2.41%	0.50%	1.33%	0.50%	0.50%
HGL & FLOW RATE					

KNOWN CAPACITY	0.034		0.016				0.025			0.016				0.016		
COVER	0.200	0.200	0.240			0.511	0.551		0.200	0.240			0.656	0.674	0.660	
INVERT LEVEL	176.828	176.719	176.679			176.583	176.543		176.333	176.293			176.074	176.056	176.000	
DESIGN LEVEL AT MH CL	177.183	177.107				177.248			176.688				176.885		176.815	
EXISTING SURFACE	177.183	177.074				177.248			176.688				176.885		176.815	
COORDINATES	N7299034.962 E248501.997	N7299031.644 E248505.071				N7299018.432 E248491.091			N7299005.470 E248482.226				N7298975.749 E248449.884		N7298967.289 E248442.657	
CHAINAGE	0.000	4.523				23.758			39.461				83.386		94.512	

STORMWATER LINE 3
SCALE: H1:500 - V1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

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APPROVED L Moloney RPEQ 33682

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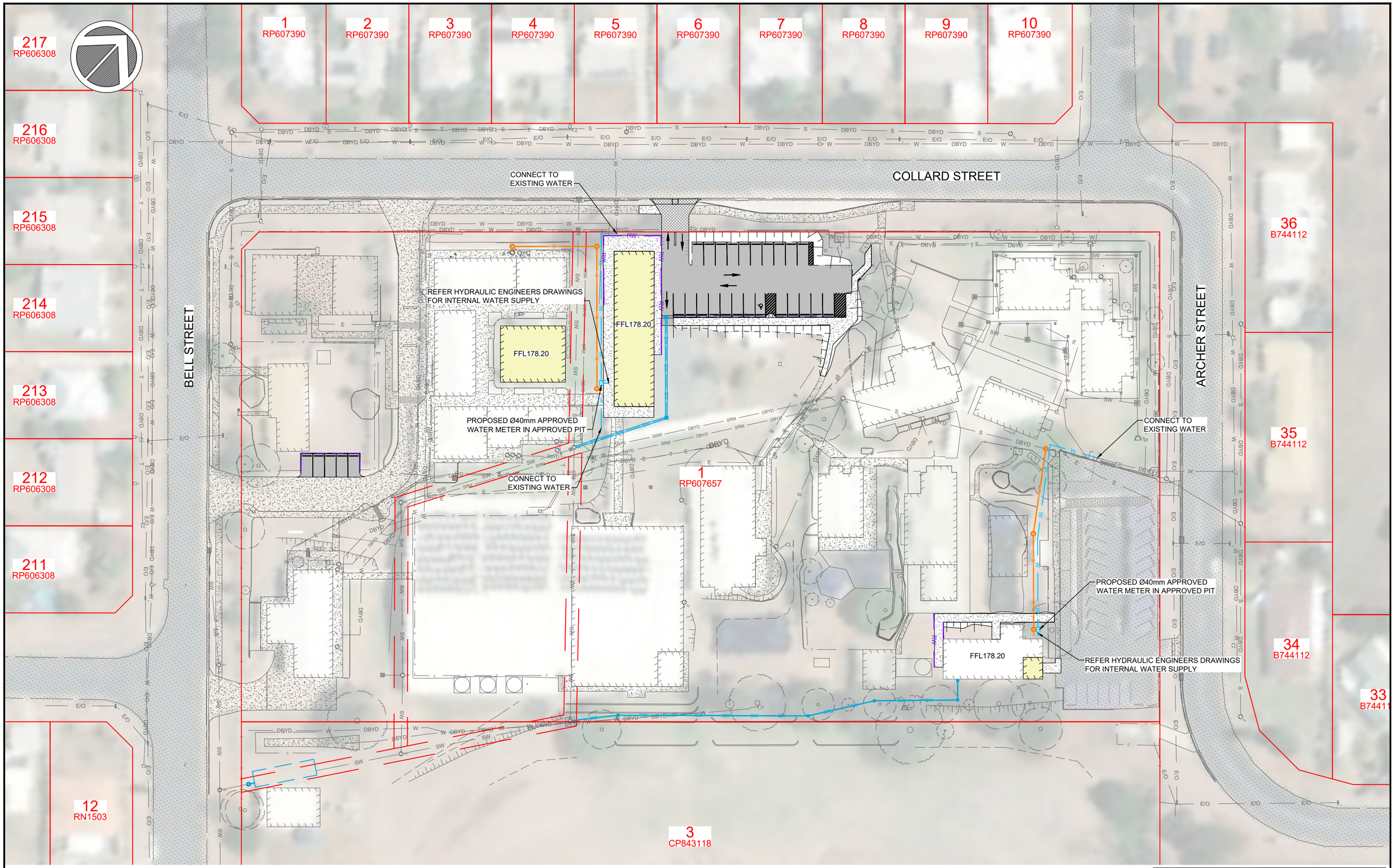
DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 2 OF 2

DRAWING NUMBER: CE26020-612-DR

ISSUE: A



PROPOSED SITE
WATER LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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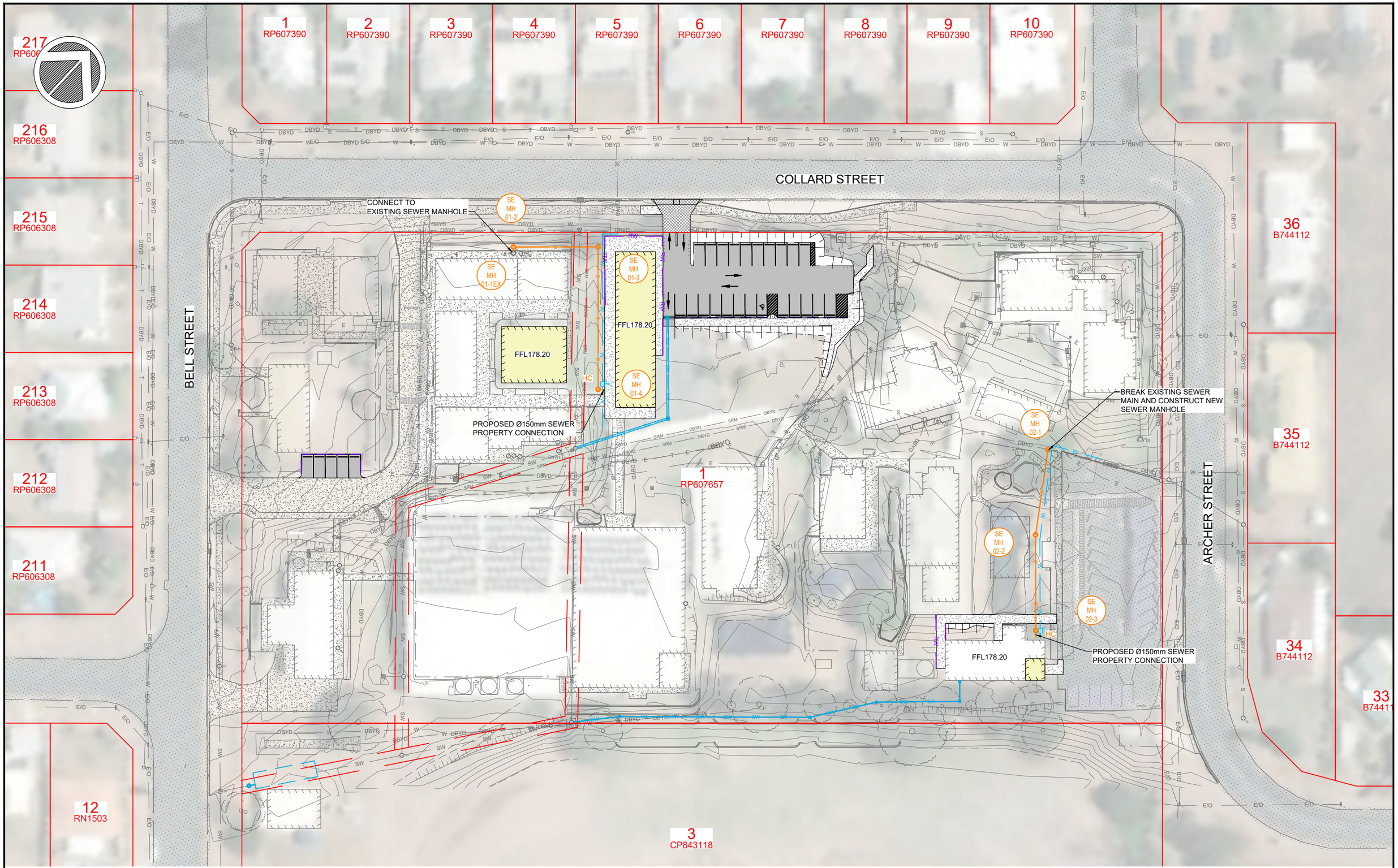
www.moloneyandsons.com.au

DRAWING TITLE: PROPOSED SITE WATER LAYOUT PLAN

DRAWING NUMBER: CE26020-700-WA

ISSUE: A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL

AMENDMENTS

DESIGN CHECK: vs
DRAWN CHECK: vt

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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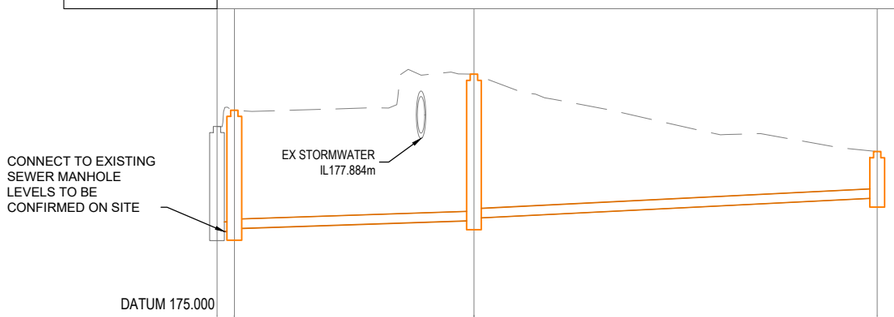
DRAWING TITLE: PROPOSED SITE SEWER LAYOUT PLAN

DRAWING NUMBER: CE26020-800-SEW
ISSUE: A

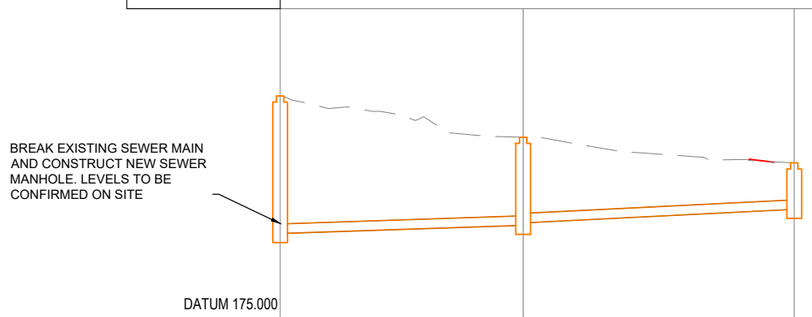
STRUCTURE NAME	SE MH 01-1EX	SE MH 01-2	SE MH 01-3	SE MH 01-4
MANHOLE TYPE	EXISTING	1050DIA	1050DIA	1050DIA
LID TYPE		CLS 'B'	CLS 'B'	CLS 'B'
DROP TYPE		TYPE 'A'	TYPE 'A'	
HC TYPE				
HC LOT No.				



COVER	1.557 1.814	1.774	2.230	2.190	0.600		
INVERT LEVEL	176.369 176.376	176.416	176.547	176.587	176.916		
DESIGN LEVEL AT MH CL	178.081	178.345	178.933		177.671		
EXISTING SURFACE	178.081	178.345	178.933		177.671		
COORDINATES	N7299037.557	E248359.311 N7299038.585 E248358.344	N7299051.876	E248372.659	N7299027.765	E248395.025	
CHAINAGE	0.000	1.422	20.955		53.842		

SEWER LINE 1
SCALE 1:500 HORIZONTAL - 1:100 VERTICAL

STRUCTURE NAME	SE MH 02-1	SE MH 02-2	SE MH 02-3
MANHOLE TYPE	1050DIA	1050DIA	1050DIA
LID TYPE	CLS 'B'	CLS 'D'	CLS 'D'
DROP TYPE	TYPE 'A'	TYPE 'A'	
HC TYPE			
HC LOT No.			



COVER	2.085	1.279	1.239	0.600		
INVERT LEVEL	176.338	176.471	176.511	176.732		
DESIGN LEVEL AT MH CL	178.578	177.905		177.487		
EXISTING SURFACE	178.578	177.905		177.487		
COORDINATES	N7299088.068 E248480.600	N7299071.718 E248491.798		N7299055.547	E248506.872	
CHAINAGE	0.000	19.817		41.924		

SEWER LINE 2
SCALE 1:500 HORIZONTAL - 1:100 VERTICAL

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)
0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
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PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED L Moloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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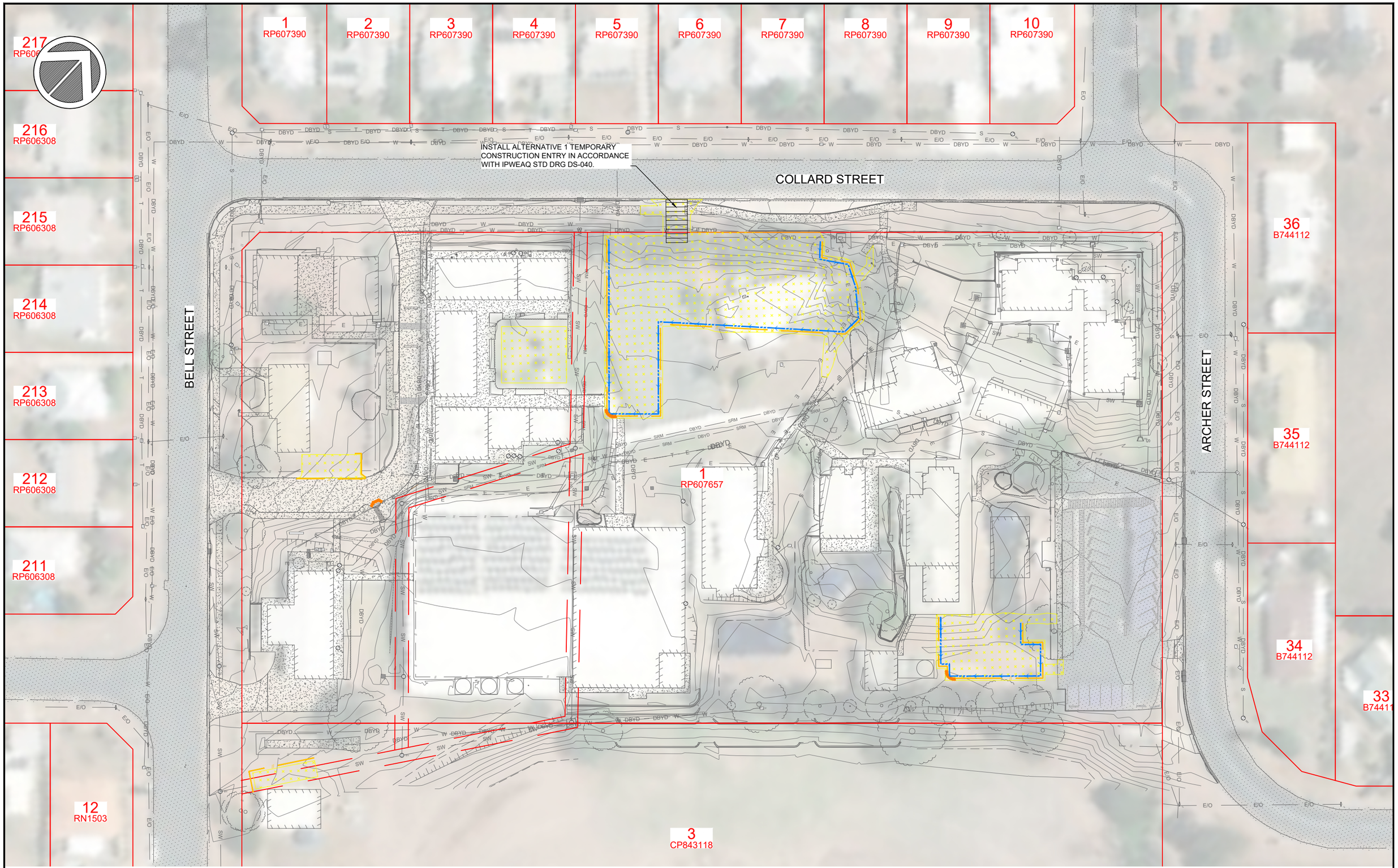
DRAWING TITLE: SEWER LONGITUDINAL SECTIONS

DRAWING NUMBER: CE26020-811-SEW
ISSUE: A



SEDIMENT & EROSION CONTROL PLAN

SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED RPEQ 33682

L C Moloney

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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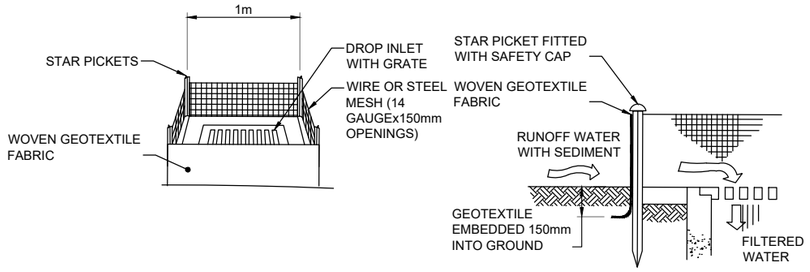
DRAWING TITLE: SEDIMENT & EROSION CONTROL PLAN

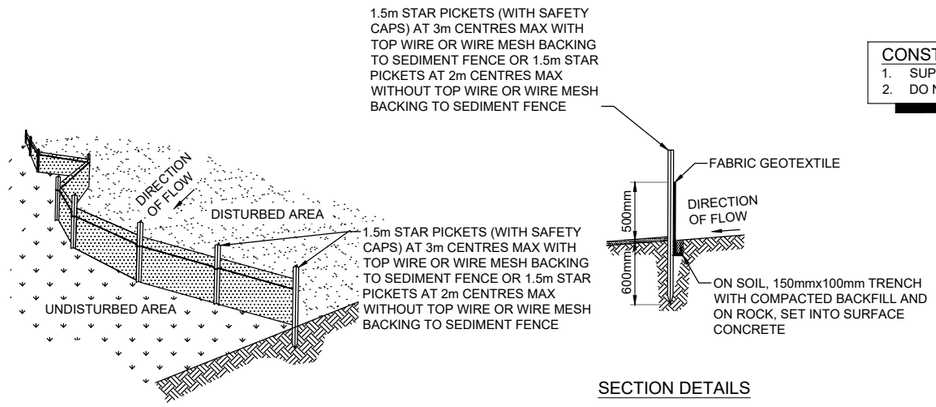
DRAWING NUMBER: CE26020-900-SE

ISSUE: A



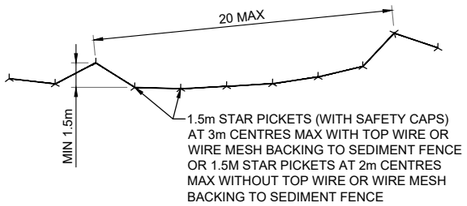
CONSTRUCTION NOTES
1. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1m CENTERS.
2. DO NOT COVER INLET WITH GEOTEXTILE.

GEOTEXTILE INLET FILTER
NOT TO SCALE



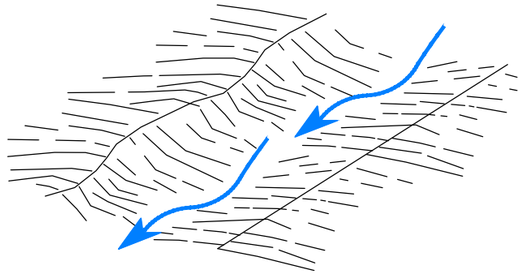
SECTION DETAILS

CONSTRUCTION NOTES
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AS DIRECTED ON SITE BY SUPERINTENDENT.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 3m APART.
3. DIG A 150mm DEEP TRENCH ALONG THE UP-SLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF SUPPORTING GEOTEXTILE TO UP-SLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

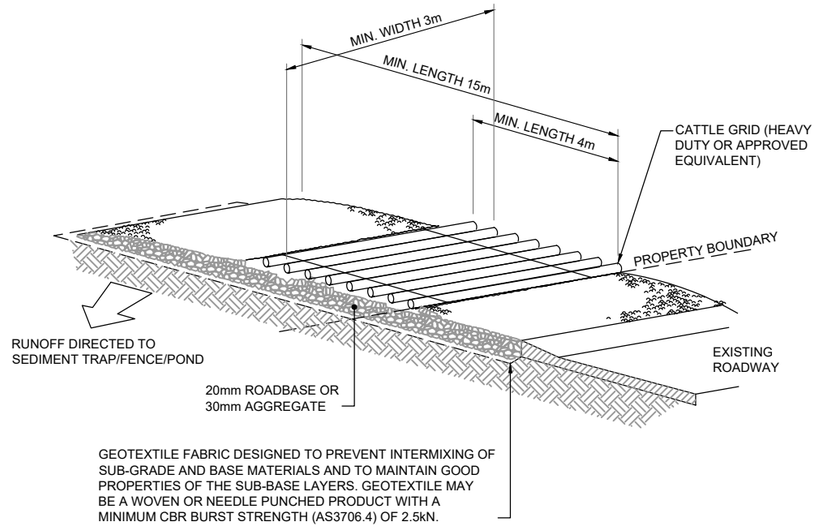


PLAN

GEOTEXTILE SEDIMENT FENCE
NOT TO SCALE

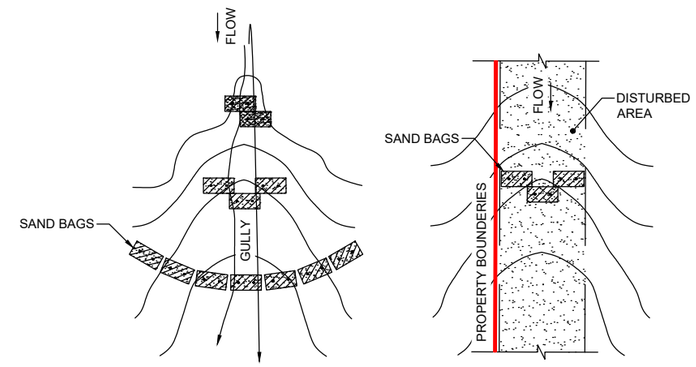


CLEAN WATER DIVERSION DRAIN
NOT TO SCALE



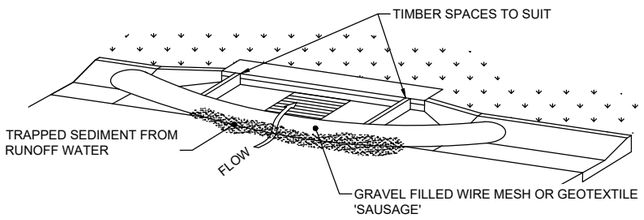
CONSTRUCTION NOTES
1. STRIP TOPSOIL AND LEVEL WORK AREA.
2. COMPACT IN-SITU SUB-GRADE MATERIAL.
3. COVER WORK AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROAD BASE MATERIAL OR 30mm AGGREGATE. MINIMUM LENGTH 15m OR TO BUILDING ALIGNMENT AND MINIMUM WIDTH 3m.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN INDICATIVE WORKS AREA TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP (i.e. SEDIMENT POND).

SHAKE - DOWN AREA / STABILIZED SITE ACCESS
NOT TO SCALE



NOTES
1. PROVIDE SAND BAGS ACROSS FLOW PATH. PROVIDE TURF AROUND SAND BAGS. EXTENT TO BE DETERMINED ON SITE BY SUPERINTENDENT.

SAND BAG CHECK DAM
NOT TO SCALE



CONSTRUCTION NOTES
1. FILTER TO BE INSTALLED ONLY WHERE SPECIFIED ON AN APPROVED SEDIMENT AND EROSION CONTROL PLAN.
2. INSTALL FILTERS TO KERB INLETS AT SAG POINTS ONLY.
3. 'SAUSAGE' TO BE FILLED WITH 25mm TO 50mm GRAVEL, SHAPED INTO AN ELLIPTICAL CROSS SECTION APPROX. 150mm HIGH AND 400mm WIDE AND BE NO LONGER THAN LENGTH OF INLET PIT.
4. TIMBER SPACERS TO PROVIDE MIN. 100mm GAP BETWEEN FILTER AND KERB INLET AND FORM SEAL WITH KERB TO PREVENT SEDIMENT BYPASSING FILTER.
5. GRAVEL FILLED SANDBAGS CAN BE USED AS A SUBSTITUTE FOR 'SAUSAGE'. SANDBAGS MUST BE FIRMLY PLACED AND INTERLOCKED TO PREVENT SEDIMENT PASSING BETWEEN THEM.

GEOTEXTILE GULLY INLET FILTER
NOT TO SCALE

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL
APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

MOLONEY & SONS ENGINEERING
design it. build it.
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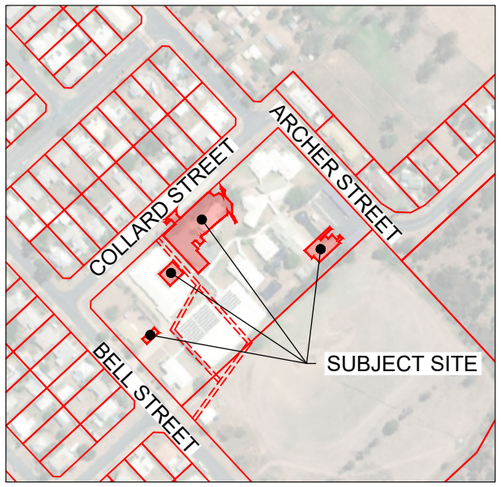
www.moloneyandsons.com.au

DRAWING TITLE: SEDIMENT & EROSION CONTROL PLAN TYPICAL DETAILS
DRAWING NUMBER: CE26020-910-SE
ISSUE: A

APPENDIX G: ENGINEERING DRAWINGS

REDEEMER LUTHERAN
COLLEGE STAGE 2A, 2 COLLARD ST.
BILOELA QLD 4715



LOCALITY PLAN
N.T.S

COMMERCIAL DEVELOPMENT
DESIGN FILE No: CE26020
DESIGN STANDARD: CMDG, IPWEA, SEQ & TMR

DESIGN TRAFFIC
ROAD CLASSIFICATION: DRIVEWAY
PAVEMENT DESIGN LIFE: 30 YRS
DESIGN SPEED: 5KM/H

STORMWATER/FLOOD DATA
NEW STRUCTURES & NETWORK, COMPLY WITH THE FOLLOWING:

MAJOR SYSTEM:	1% AEP
MINOR SYSTEM:	10% AEP
BLOCKAGE FACTOR:	0.5 ON INLETS

REFERENCE DESIGN REPORTS
STORMWATER REPORT: SBSMP REPORT REV A BY "Moloney & Sons Engineering" dated 20th May 2026.

GENERAL
1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE SUPERINTENDENT.
3. DO NOT SCALE FROM DRAWINGS.
4. ALL MATERIALS/CONSTRUCTION & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND THE LOCAL AUTHORITY'S STANDARD DRAWINGS AND BY-LAWS.
5. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
6. UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE LINE & LEVEL (DEPTH) OF ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCEMENT OF ANY EXCAVATION.
7. DISPERSIVE SOILS ARE NOT TO BE USED AS FILL/EMBANKMENT MATERIAL. ALL CONSTRUCTION & EARTHWORKS TO BE COMPLETED IN ACCORDANCE WITH THE SPECIFICATION LISTED AND UNDER LEVEL 1 SUPERVISION DURING EARTHWORKS.

CONTRACT SPECIFICATIONS
CMDG CONSTRUCTION SPECIFICATIONS:

CMDG C201	CONTROL OF TRAFFIC;
CMDG C211	CONTROL OF EROSION AND SEDIMENTATION;
CMDG C212	CLEARING AND GRUBBING;
CMDG C213	EARTHWORKS;
CMDG C220	STORMWATER DRAINAGE;
CMDG C221	PIPE DRAINAGE SPECIFICATION;
CMDG C223	DRAINAGE STRUCTURE;
CMDG C224	OPEN DRAINS;
CMDG C230	SUBSURFACE DRAINAGE;
CMDG C231	SUBSOIL AND FOUNDATION DRAINS;
CMDG C265	BOUNDARY FENCING;
CMDG C271	MINOR CONCRETE WORKS;
CMDG C273	LANDSCAPING;

STANDARD DRAWINGS
CMDG STANDARD DRAWINGS:

CMDG-D-010	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE
CMDG-D-022	FIELD INLET DETAILS
CMDG-D-030	ACCESS CHAMBER DETAILS, DIA 1050 TO 1500
CMDG-D-050	SEDIMENT CONTROL DEVICES SEDIMENT FENCE ENTRY EXIT SEDIMENT TRAP
CMDG-D-051	SEDIMENT CONTROL DEVICES, KERB AND FIELD INLETS, CHECK DAMS & STRAW BALE BANK
CMDG-R-042A	URBAN COMMERCIAL/ INDUSTRIAL DRIVEWAY
CMDG-R-060	STANDARD KERB AND CHANNEL PROFILES
CMDG-S-030	HOUSE CONNECTION BRANCHES;
CMDG-W-090	20 AND 25mm SERVICE AND WATER METER CONNECTIONS
CMDG-W-091	20, 25, 32 AND 40mm WATER METER DETAILS BELOW GROUND

IPWEAQ STANDARD DRAWINGS:

DRG RS-080	KERB AND CHANNEL PROFILES AND DIMENSIONS INCLUDING EDGE RESTRAINTS, MEDIAN & CHANNEL

DRAWING SCHEDULE

DOCUMENT TITLE	DOCUMENT NO.
COVER SHEET LOCALITY PLAN & DRG SCHEDULE	CE26020-001-CO
LEGEND	CE26020-002-CO
TYPICAL SECTIONS & DETAILS SHEET 1 OF 2	CE26020-101-TC
TYPICAL SECTIONS & DETAILS SHEET 2 OF 2	CE26020-102-TC
SITE SECTIONS SHEET 1 OF 3	CE26020-110-TC
SITE SECTIONS SHEET 2 OF 3	CE26020-111-TC
SITE SECTIONS SHEET 3 OF 3	CE26020-112-TC
EXISTING SITE LAYOUT & DEMOLITION PLAN	CE26020-200-AL
GENERAL ARRANGEMENT OVERALL LAYOUT PLAN	CE26020-300-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 1 OF 4	CE26020-301-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 4	CE26020-302-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 4	CE26020-303-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 4	CE26020-304-GA
SWEPT PATH CAR SHEET 1 OF 2	CE26020-311-GA
SWEPT PATH CAR SHEET 2 OF 2	CE26020-312-GA
PROPOSED SITE BULK EARTHWORKS	CE26020-400-GA
DRIVEWAY LONGITUDINAL SECTIONS	CE26020-501-LS
STORMWATER PRE - DEVELOPMENT CATCHMENT PLAN	CE26020-600-DR
STORMWATER POST - DEVELOPMENT CATCHMENT PLAN	CE26020-601-DR
STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2	CE26020-611-DR
STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2	CE26020-612-DR
PROPOSED SITE WATER LAYOUT PLAN	CE26020-700-WA
PROPOSED SITE SEWER LAYOUT PLAN	CE26020-800-SEW
SEWER LONGITUDINAL SECTIONS	CE26020-811-SEW
SEDIMENT & EROSION CONTROL PLAN	CE26020-900-SE
SEDIMENT & EROSION CONTROL PLAN TYPICAL DETAILS	CE26020-910-SE

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DETAIL SURVEY BY:
FREDRIKSEN MACLEAN & ASSOCIATES CONSULTING SURVEYORS
DATE SURVEYED 16/04/2026
SURVEY: MGA2020 ZONE 56 GRID

STANDARD DRAWINGS:
AUSTROADS DESIGN & TMR GUIDELINES / CAPRICORN MUNICIPAL DESIGN GUIDELINES / INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA)

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

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www.moloneyandsons.com.au

DRAWING TITLE: COVER SHEET LOCALITY PLAN & DRG SCHEDULE
DRAWING NUMBER: CE26020-001-CO
ISSUE: A

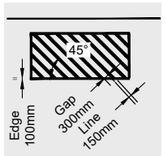
LEGEND

EXISTING SURVEY

- Existing Lot Boundary
- Existing Easement
- Existing Structure / Infrastructure to be Demolished
- Existing Edge of Bitumen
- Existing building
- Existing Top of Batter
- Existing Toe of Batter
- Existing Fence Line
- Existing Vegetation
- E — Existing Electricity
- E/O — Existing Overhead Electrical
- DBYD T — Existing DBYD Telecommunication
- DBYD S — Existing DBYD Sewer
- DBYD W — Existing DBYD Water
- SW — Existing Stormwater
- Existing Bitumen Surface
- Existing Footpath Concrete
- 12.0 — Existing Surface Contours Major
- 12.0 — Existing Surface Contours Minor
- S MH — Existing Sewer Structures
- SW MH — Existing Stormwater Structures
- T P — Existing Telstra Structures
- E P — Existing Electrical Structures
- PP — Existing Power Pole
- FH W M W — Existing Water Structures
- Existing Drainage Structures
- HW — Existing Stormwater Structures Headwall
- Existing Tree

PROPOSED

- Proposed Barrier Kerb And Channel Type 1
- Proposed Barrier Kerb Type 3
- Proposed Carpark Asphalt
- Proposed Concrete Driveway
- Proposed Footpath Concrete
- Proposed Building (By others)
- 12.0 — Proposed Surface Contours
- SW — Proposed Stormwater Pipe
- W — Proposed Water Pipe
- Proposed Stormwater Field inlet
- S — Proposed Sewer Manhole
- S — Proposed Sewer Pipe
- HC — Proposed Sewer House Connection
- W — Proposed Water Connection
- M W — Proposed Water Meter
- EL 100mm — Edge Line
- Chevron



SEDIMENT & EROSION CONTROL

- Proposed Catch Drain
- Proposed Sediment Fence
- Clearing & Grubbing
- Temporary Straw Filter Sock
- Temporary Construction Entry

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED RPEQ 33682

L Moloney

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

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DRAWING TITLE: LEGEND

DRAWING NUMBER: CE26020-002-CO

ISSUE: A

NOTES:

1. ALL PAVEMENT PROFILES ARE SUBJECT TO SUBGRADE TESTING OF ALL AREAS PRIOR TO COMMENCING WORKS AND APPROVED BY BANANA SHIRE COUNCIL AND SUPERINTENDENT.
2. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
3. ALL FILL BATTERS TO BE 1 IN 4, 1 IN 2 MAY BE ADOPTED IN CONSTRAINED ENVIRONMENTS SUBJECT TO SUPERINTENDENTS APPROVAL.
4. ALL BATTER SECTIONS ARE INDICATIVE ONLY. GEOTECHNICAL ENGINEERING ADVICE SHALL BE REQUIRED FOR ALL BATTER SLOPES TO ASSESS THE SUITABILITY OF EITHER THE CUT FACE OR FILL EMBANKMENT GEOMETRY. THE INSPECTIONS SHALL BE UNDERTAKEN BY REGISTERED GEOTECHNICAL ENGINEER. FLATTER OR STEEPER SLOPES MAY BE ADOPTED BASED ON THE RECOMMENDATIONS.
5. ALL DUMPED ROCK SHALL BE UNDERLAIN BY APPROVED GEOTEXTILE SUITABLE FOR SUBMERSION IN WATER. DUMPED ROCK SHALL COMPRISE ROCK MATERIAL WHICH IS NOT SUSCEPTIBLE TO BREAKDOWN UNDER WETTING & DRYING.
6. DUMPED ROCK SHOULD NOT BE SINGLE SIZED, BUT WELL GRADED MIXTURE DESIGNED TO ENSURE THAT ALL INTERSTICES BETWEEN LARGE ROCKS ARE FILLED WITH ROCK OF PROGRESSIVELY SMALLER SIZE.
7. THE THICKNESS OF THE DUMPED ROCK LAYER SHALL NOT BE LESS THAT $2.1xD_{50}$.
8. DUMPED ROCK SHALL BE PLACED IN A MANNER AS TO AVOID DAMAGE TO THE UNDERLYING GEOTEXTILE.
9. DUMPED ROCK SIZING IS BASED ON A MINIMUM SPECIFIC GRAVITY OF 2.50.
10. THE RATIO OF DUMPED ROCK LENGTH TO THICKNESS SHALL BE LESS THAN 2.0.
11. DISTURBANCE OF THE WATER COURSE BED AND BANKS SHALL BE KEPT WITHIN THE EXTENTS OF THE WORKS. ANY WORKS REQUIRED BEYOND THE EXTENTS OF THE WORKS SHALL BE COMPLETED TO COMPLEMENT THE DESIGN.
12. SEDIMENT AND EROSION CONTROL MEASURES APPROPRIATE FOR USE ADJACENT TO AND IN THE WATER COURSE SHALL BE USED TO PREVENT DOWNSTREAM CONTAMINATION AND SILTING.

PRELIMINARY PAVEMENT DESIGN:

TYPE	AREA	DESIGN	SURFACE SEAL	BASE COURSE	SUB-BASE	SUBGRADE REPLACEMENT	TOTAL PAVEMENT THICKNESS	COMMENTS
	780 m^2	FULL DEPTH PAVEMENT	ASPHALT 25mm DG10 (REFER NOTE 2)	150mm TYPE 2.1	150mm TYPE 2.3	200mm AT CBR15 SELECT FILL	525mm	COMPLETE BOX OUT AND PREP SUBGRADE
	58 m^2	CONCRETE PAVEMENT	N/A	175mm THK 32MPa CONCRETE WITH SL92 50mm TOP & EDGE COVER	N/A	N/A	175mm	COMPLETE BOX OUT AND PREP SUBGRADE
	450 m^2	CONCRETE FOOTPATH	N/A	100mm THK 32MPa CONCRETE WITH SL72 40mm TOP COVER				

1. ADOPTED CBR OF 1.5% AS PER CQ SOIL TESTING REPORT
2. PRIME AMC0

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APPROVED L Moloney RPEQ 33682

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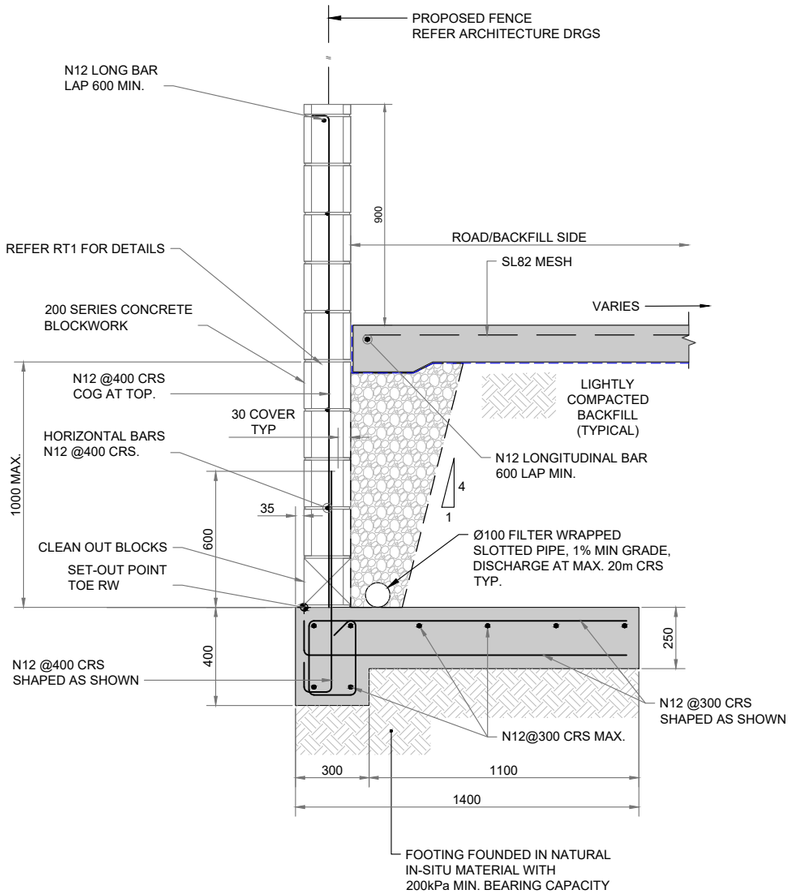
DRAWING TITLE: TYPICAL SECTIONS & DETAILS SHEET 1 OF 2

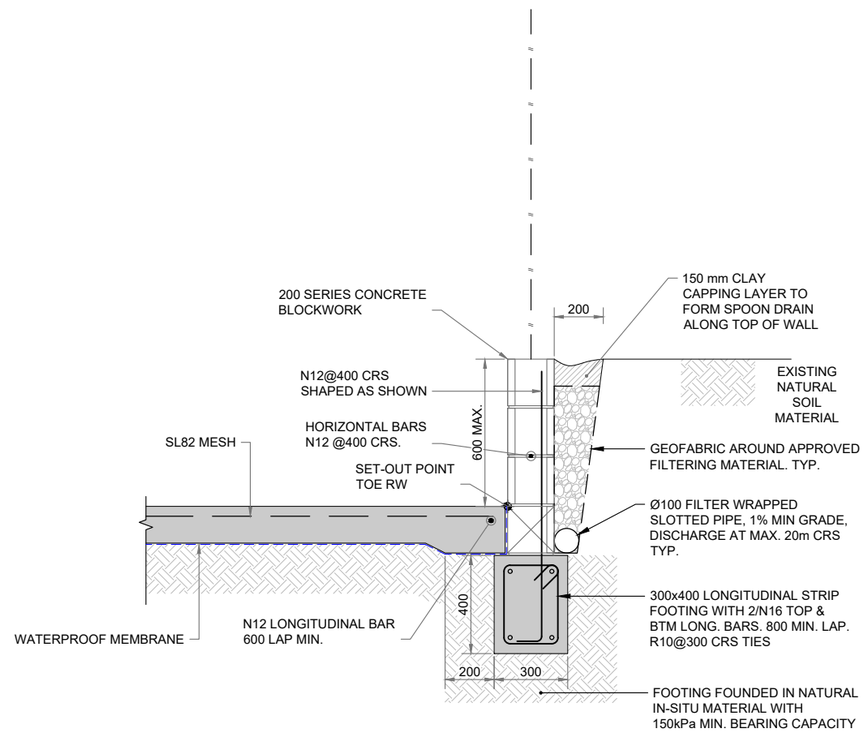
DRAWING NUMBER: CE26020-101-TC

ISSUE: A



PROPOSED RETAINING WALL RW1

SCALE 1:25



PROPOSED RETAINING WALL RW2

SCALE 1:25

0 0.0625 0.25m
0 0.1250 0.50m

1:12.5 (A1)
1:25 (A3)

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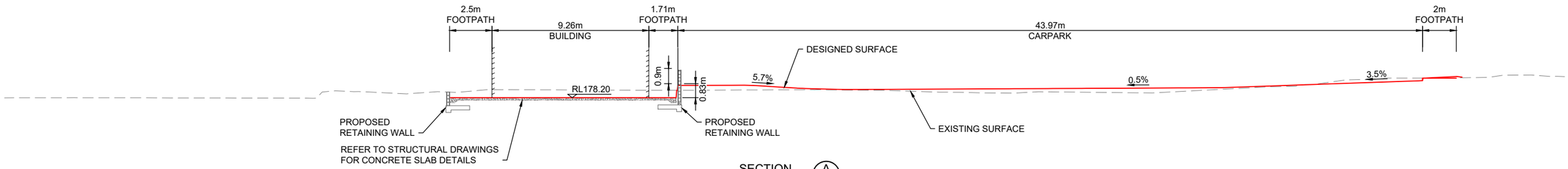
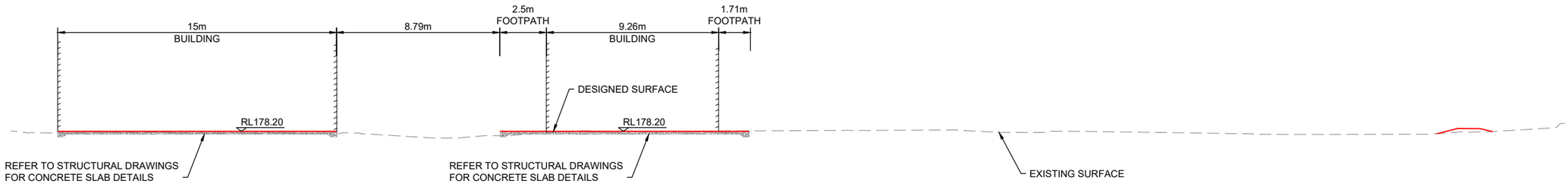
SHEET 2 OF 2

DRAWING NUMBER: CE26020-102-TC

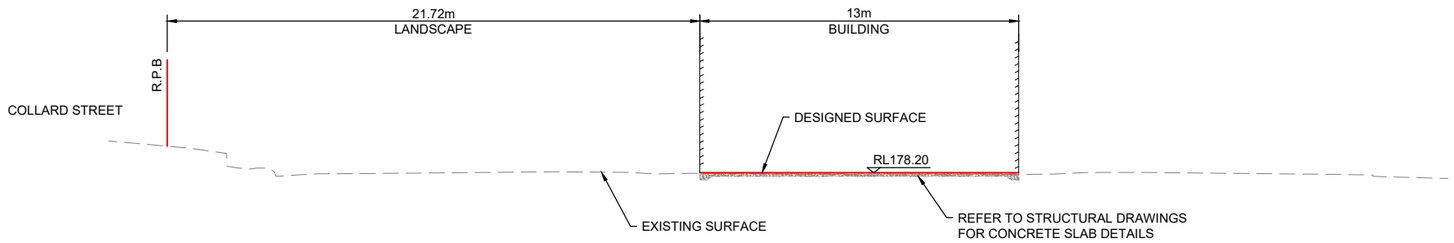
ISSUE: A



SECTION A
SCALE 1:250 300



SECTION B
SCALE 1:250 300



SECTION C
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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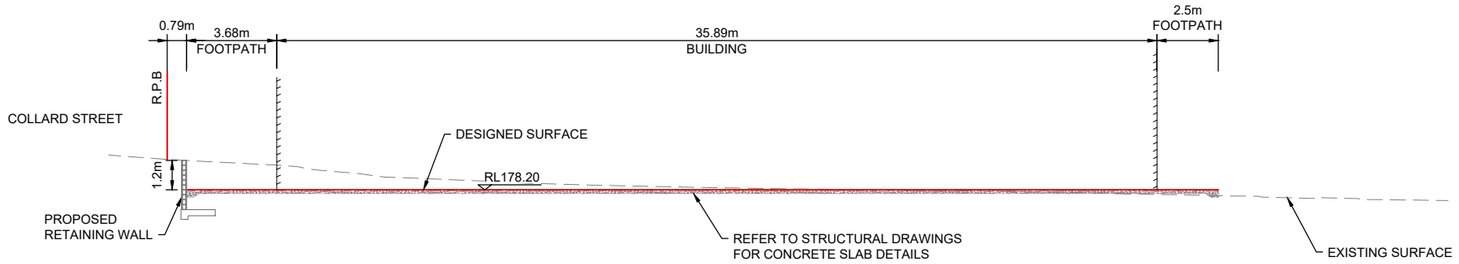
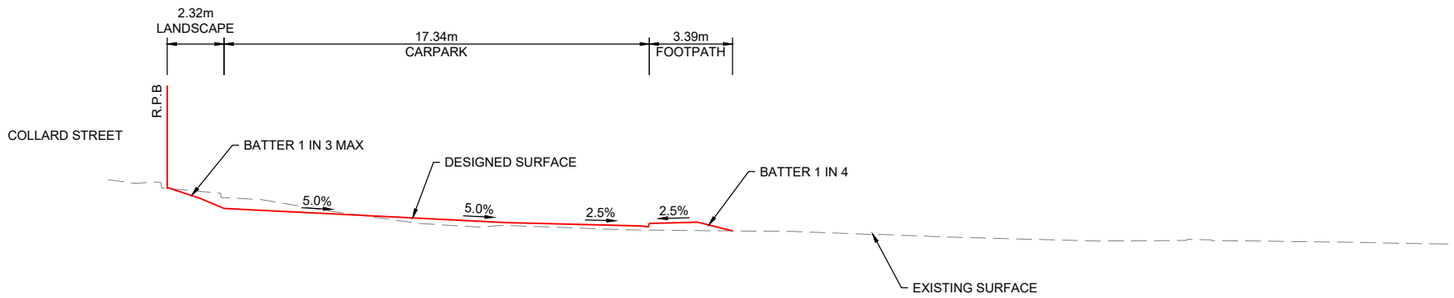
DRAWING TITLE: SITE SECTIONS
SHEET 1 OF 3

DRAWING NUMBER: CE26020-110-TC

ISSUE: A



SECTION D / 300
SCALE 1:250



SECTION E / 300
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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SHEET 2 OF 3

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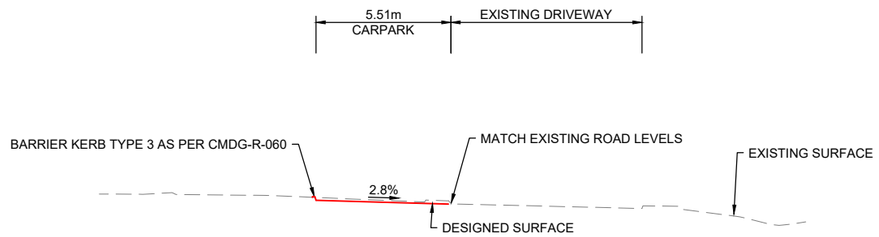
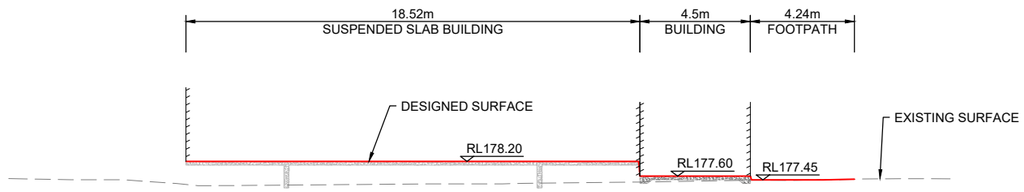
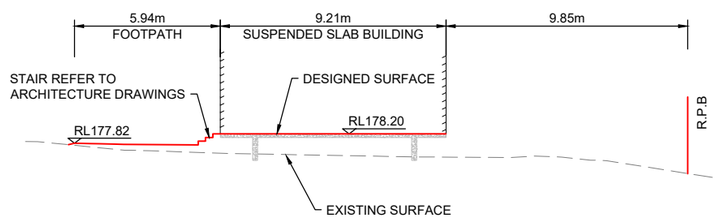


SECTION F
SCALE 1:250 300



SECTION G
SCALE 1:250 300



SECTION H
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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SHEET 3 OF 3

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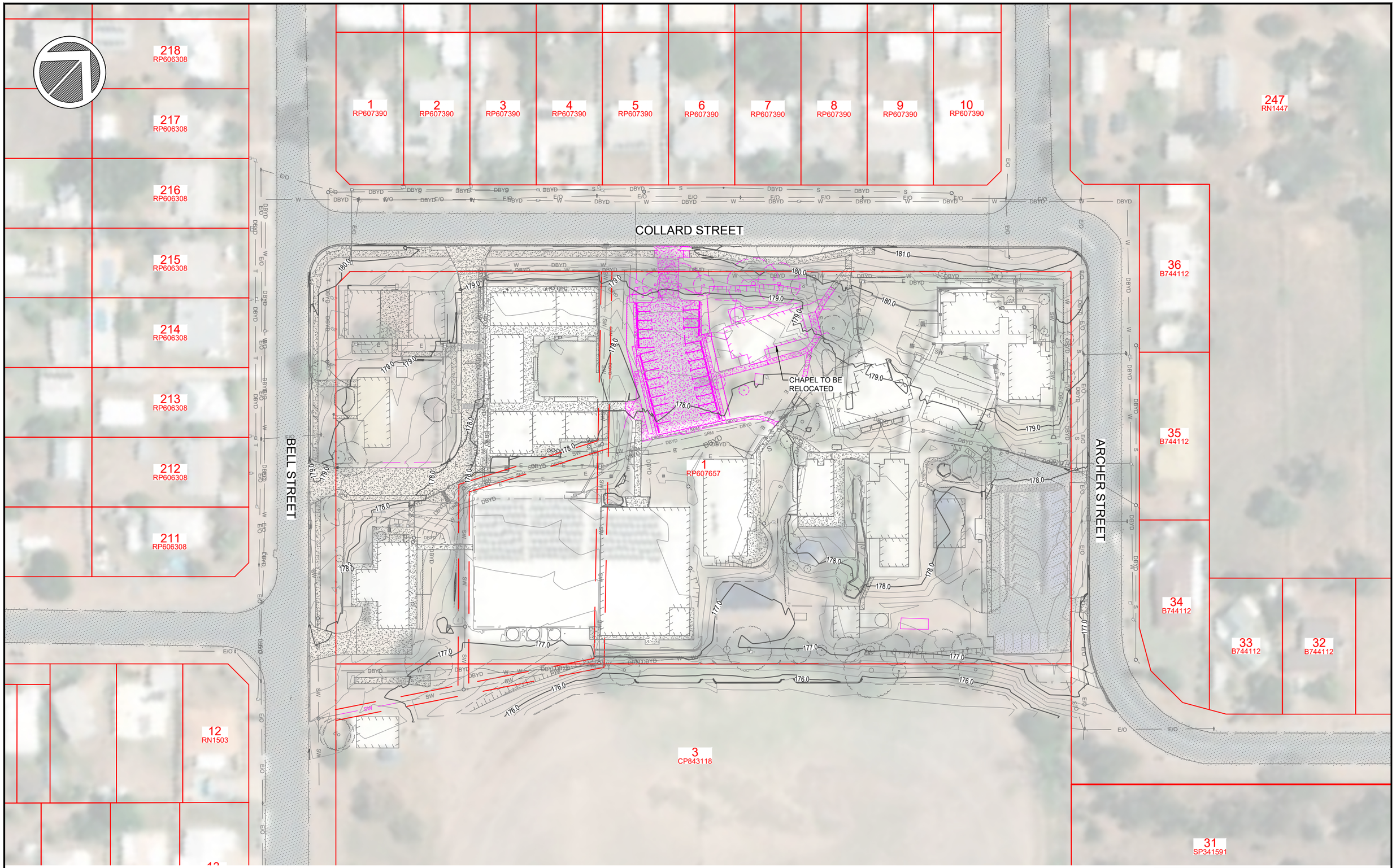
ISSUE: A



EXISTING SITE OVERALL
LAYOUT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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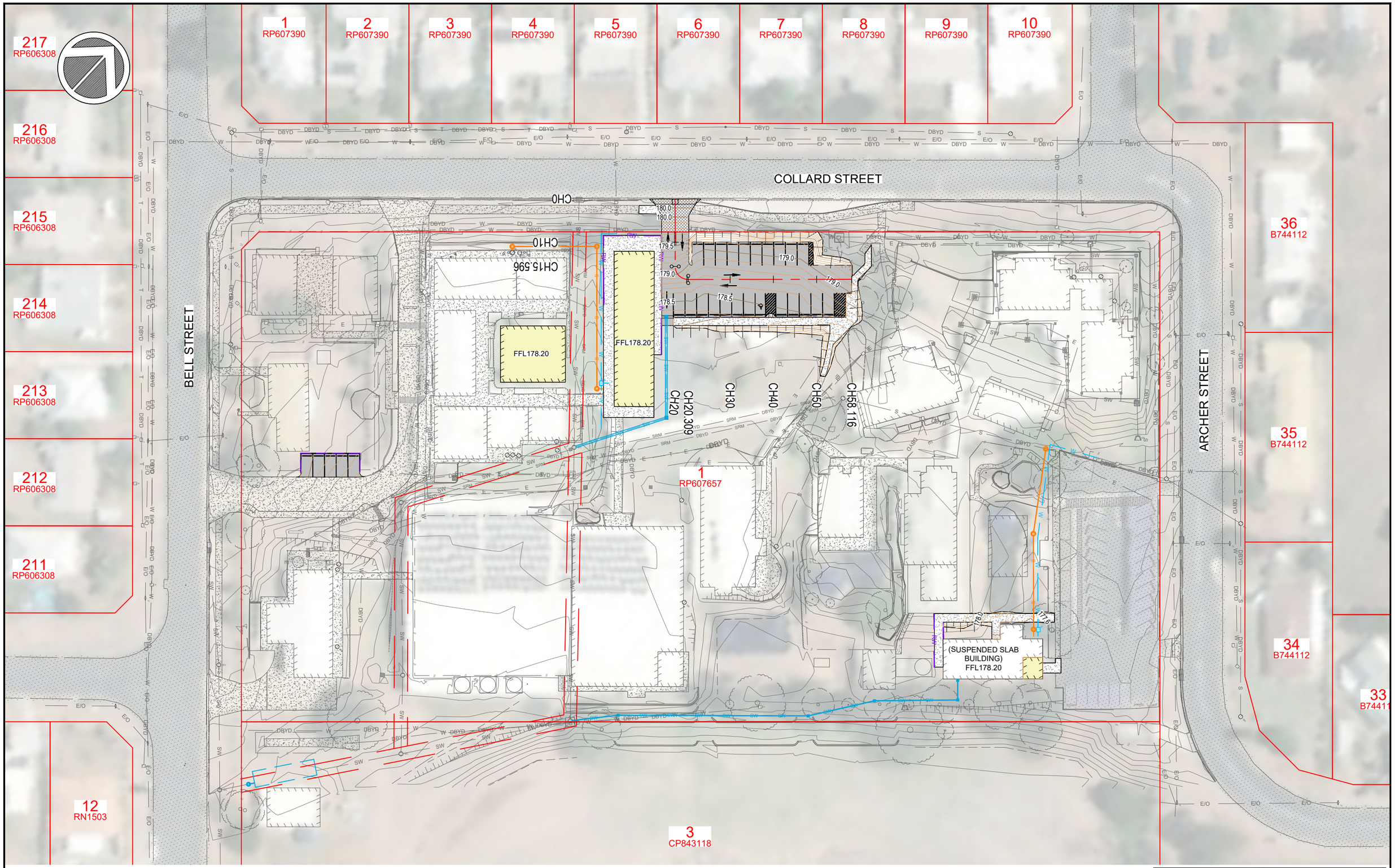
DRAWING TITLE
EXISTING SITE LAYOUT & DEMOLITION PLAN

DRAWING NUMBER
CE26020-200-AL

ISSUE
A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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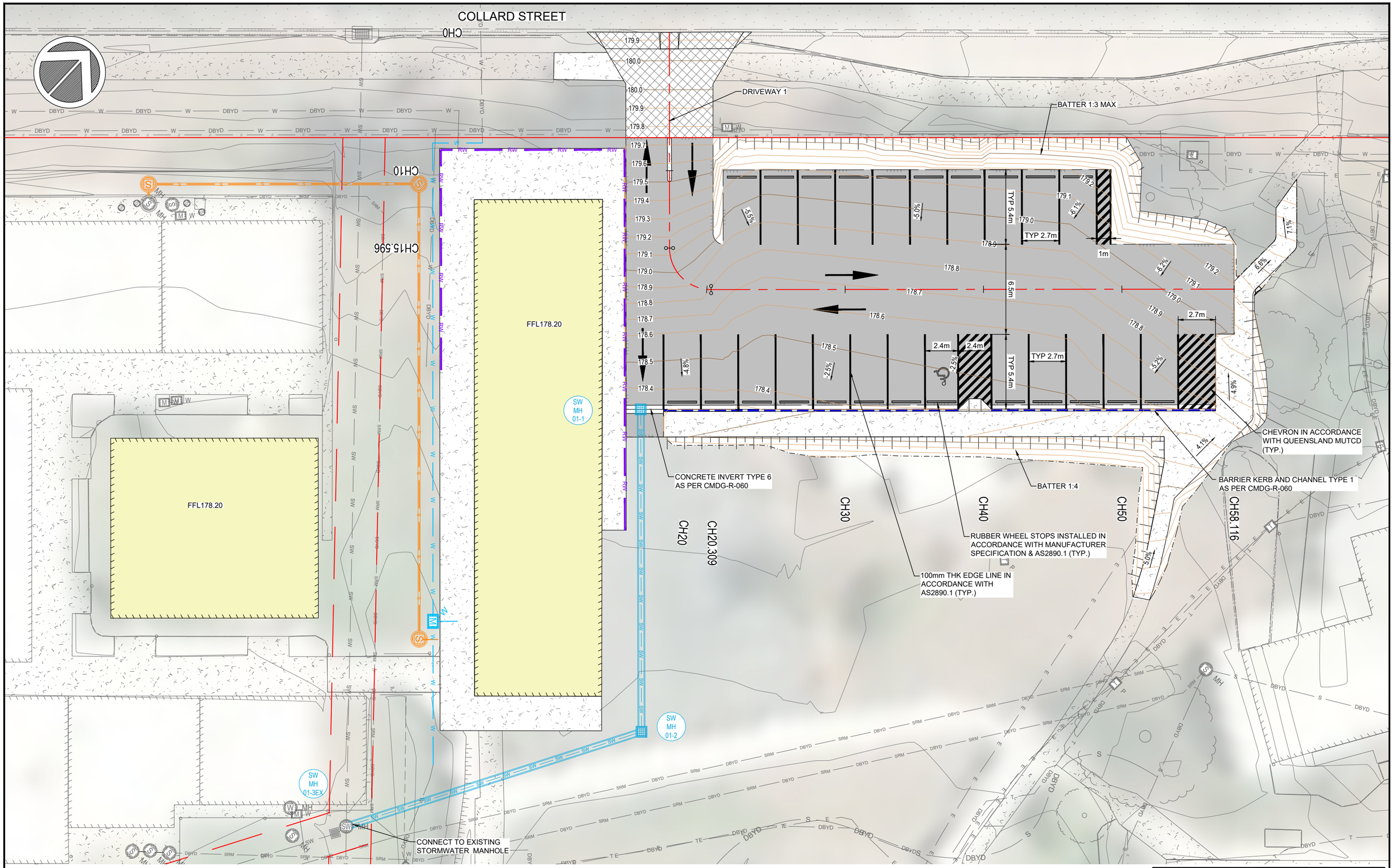
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT OVERALL LAYOUT PLAN

DRAWING NUMBER: CE26020-300-GA
ISSUE: A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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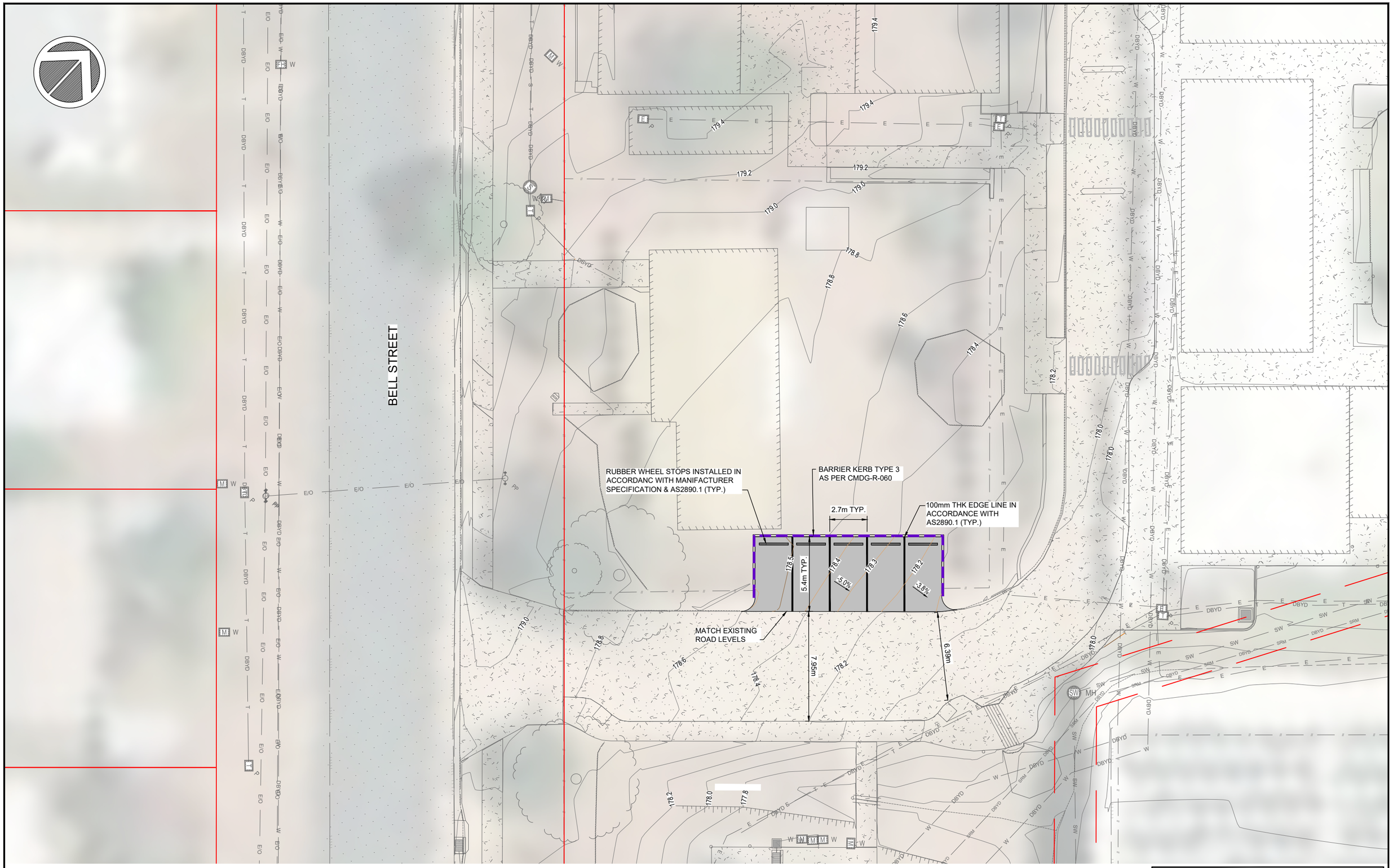
DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT
SHEET 1 OF 4

DRAWING NUMBER CE26020-301-GA
ISSUE A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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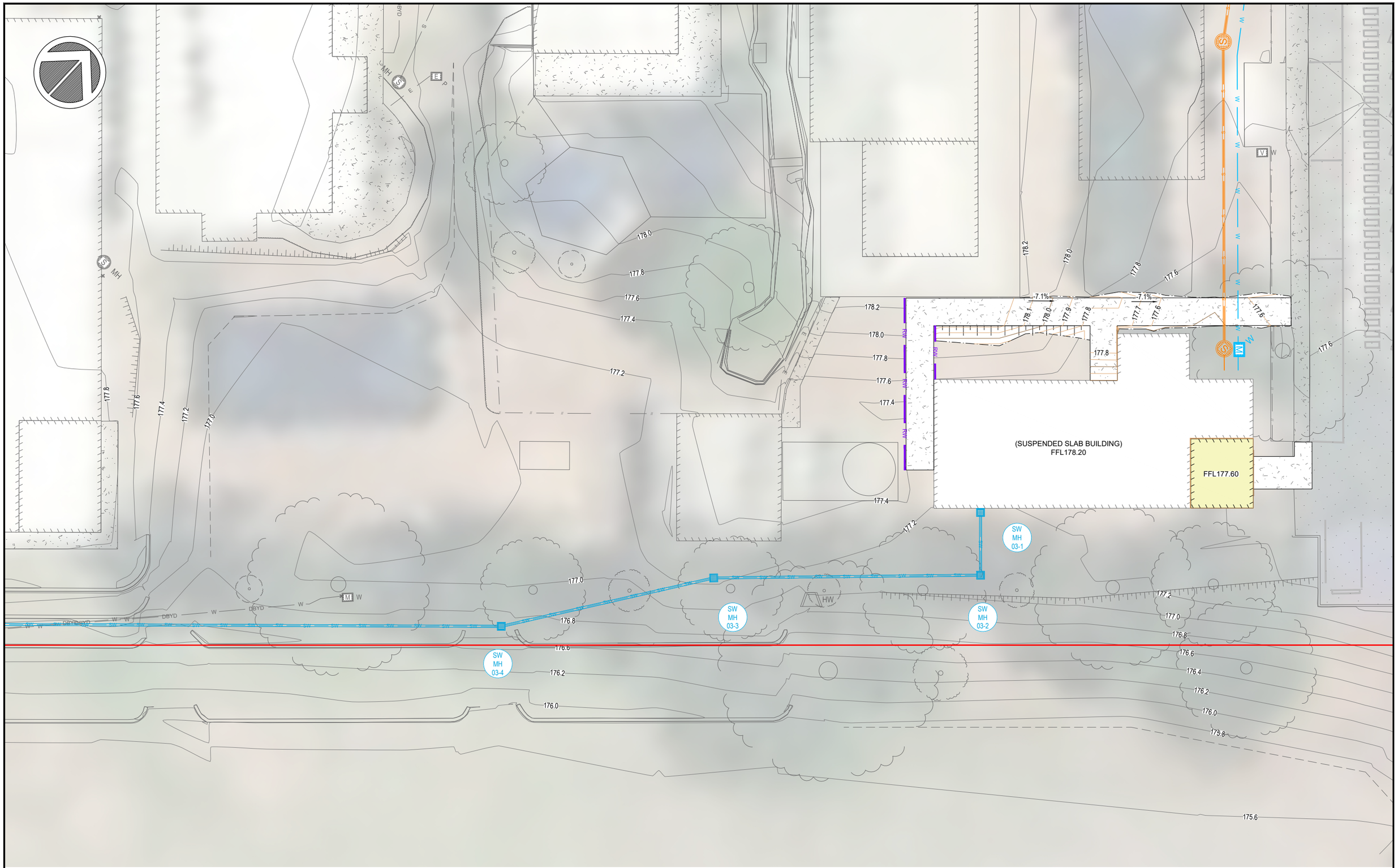
DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 4

DRAWING NUMBER
CE26020-302-GA

ISSUE
A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED RPEQ 33682
L Moloney
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
REDEEMER LUTHERAN COLLEGE

PROJECT
REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 4

DRAWING NUMBER CE26020-303-GA

ISSUE A

PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No. CE26020

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CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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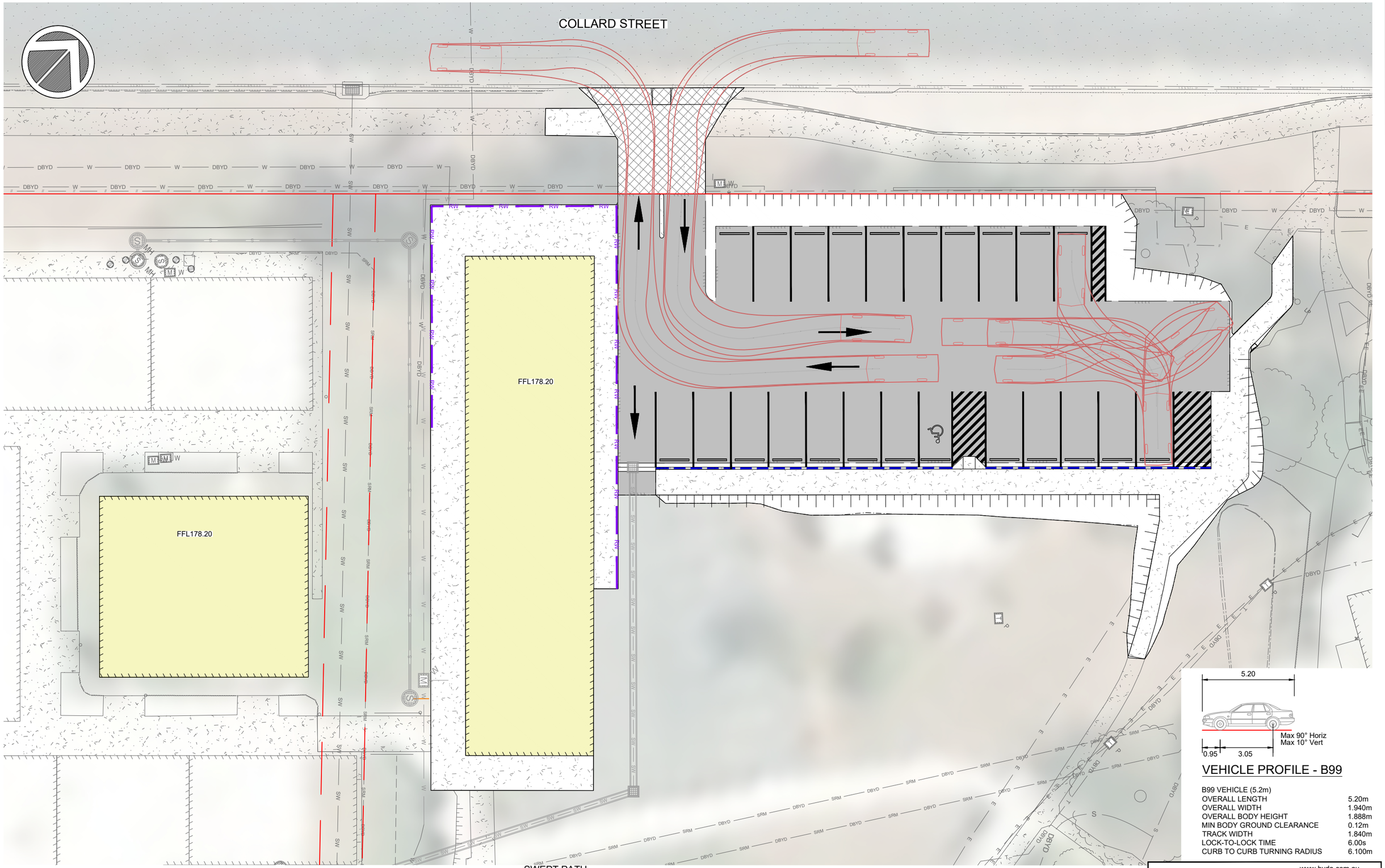
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 4

DRAWING NUMBER: CE26020-304-GA

ISSUE: A



VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
OVERALL LENGTH	5.20m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No.
CE26020

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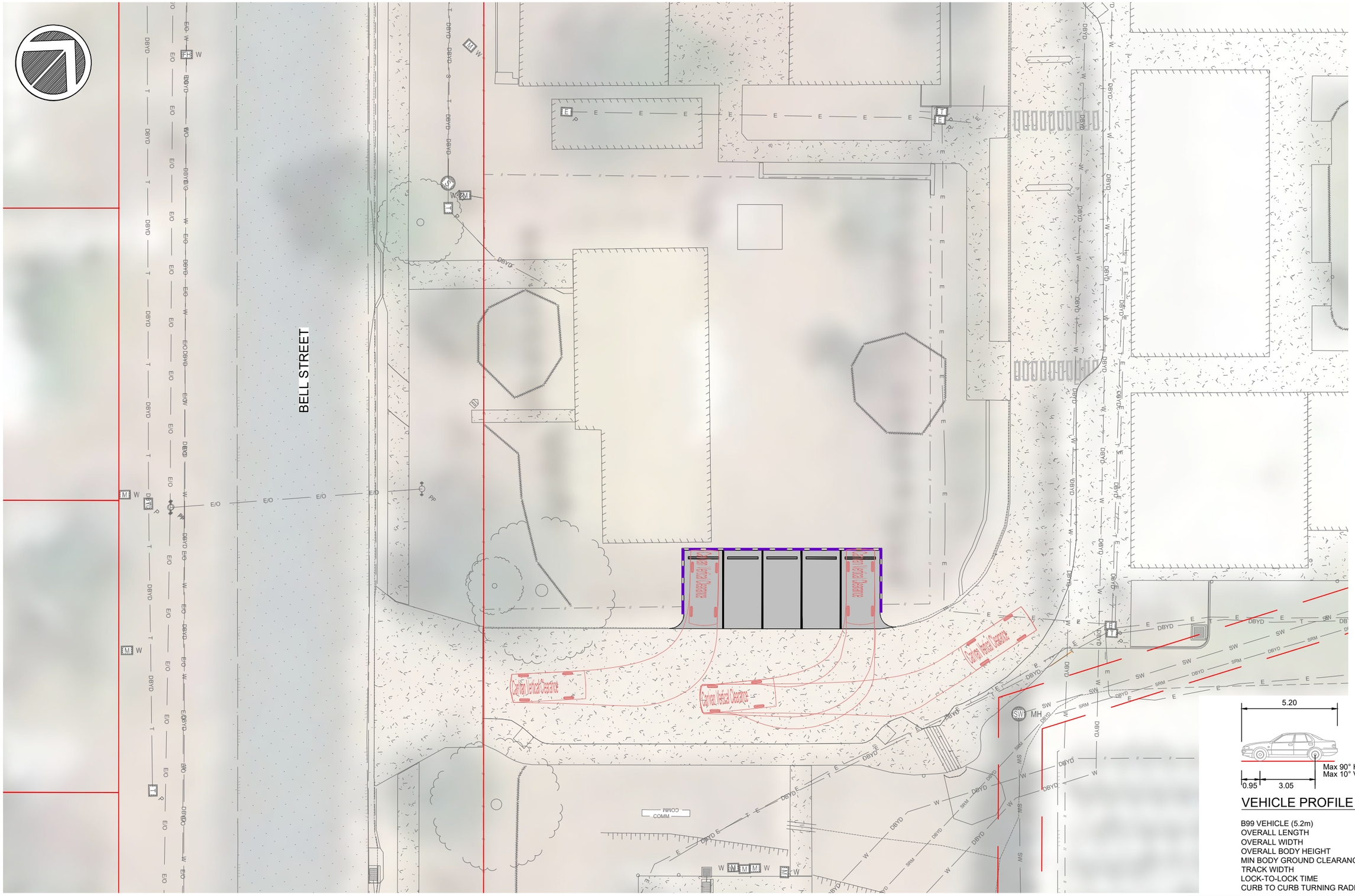
DRAWING TITLE
SWEPT PATH
CAR
SHEET 1 OF 2

DRAWING NUMBER
CE26020-311-GA

ISSUE
A



VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
OVERALL LENGTH	5.20m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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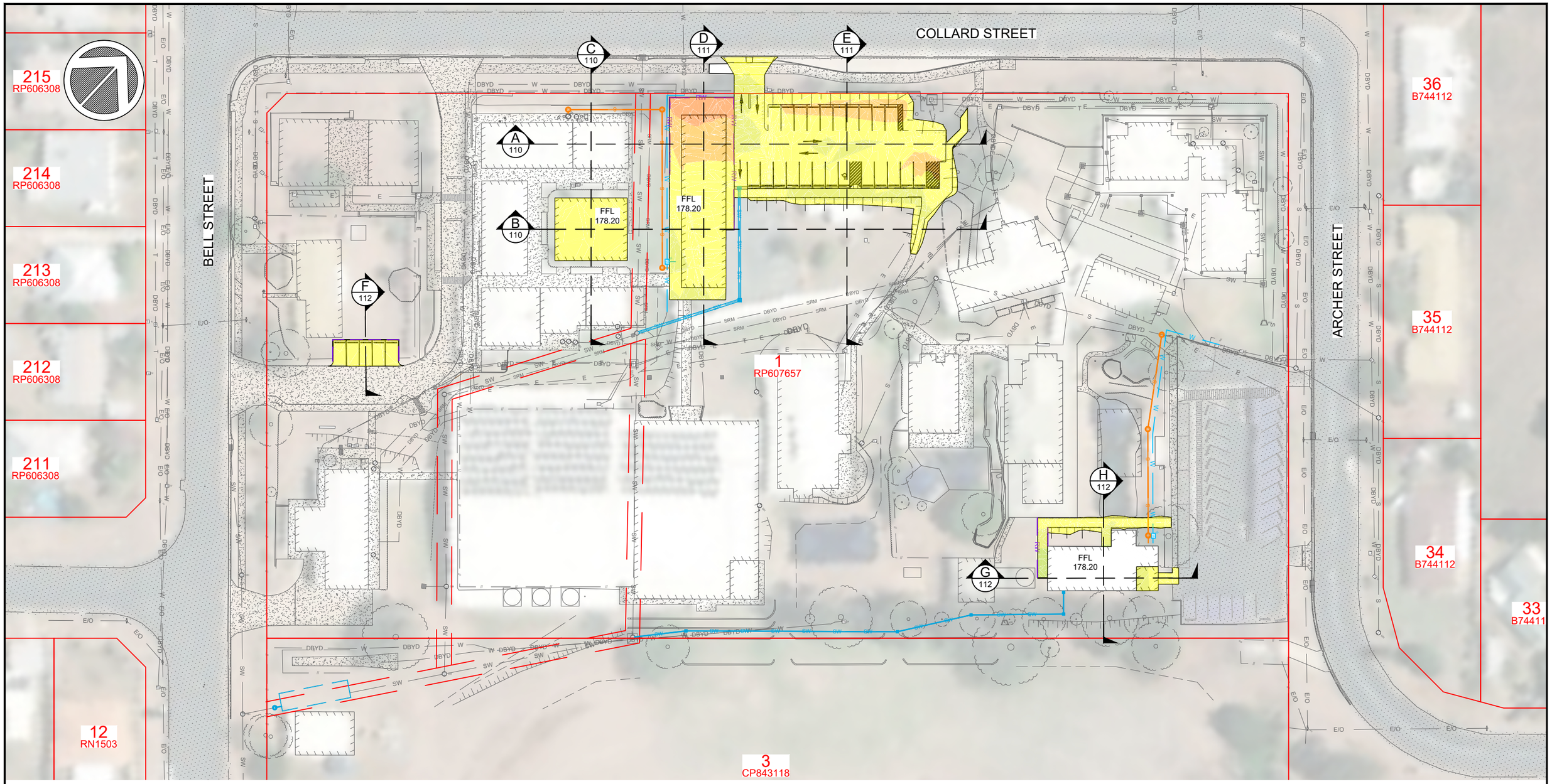
DRAWING TITLE
SWEPT PATH
CAR
SHEET 2 OF 2

DRAWING NUMBER
CE26020-312-GA

ISSUE
A



PROPOSED SITE
BULK EARTHWORKS
SCALE 1:800

CUT & FILL ELEVATION RANGE

No.	Color	Minimum Depth (m)	Maximum Depth (m)
1		-2.000	-1.500
2		-1.500	-1.000
3		-1.000	-0.500
4		-0.500	0.000
5		0.000	0.500
6		0.500	1.000
7		1.000	1.500
8		1.500	2.000
9		2.000	2.500

NOTES:
1. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
2. ALL FILL BATTERS TO BE 1 IN 4, 1 IN 2 MAY BE ADOPTED IN CONSTRAINED ENVIRONMENTS SUBJECT TO SUPERINTENDENTS APPROVAL.
3. WHERE WORKS ABUTS EXISTING, ALL WORK SHALL BE NEAT, SMOOTH, WORKMANLIKE AND TO THE SUPERINTENDENTS SATISFACTION.

CUT/FILL QUANTITIES:

TOPSOIL: THE PRINCIPAL CONTRACTOR SHALL ESTABLISH APPROPRIATE DEPTH FOR CLEARING & GRUBBING.

CUT TO FILL: 26 m³
CUT (REMOVAL FROM SITE): 483 m³
TOTAL VOLUME: 509 m³

PLEASE NOTE THE ABOVE QUANTITIES ARE 'TIGHT' QUANTITIES AND DO NOT CONSIDER BULKING FACTORS AND/OR PAVEMENT LAYERS.

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DATUM
PROJECT No. CE26020

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CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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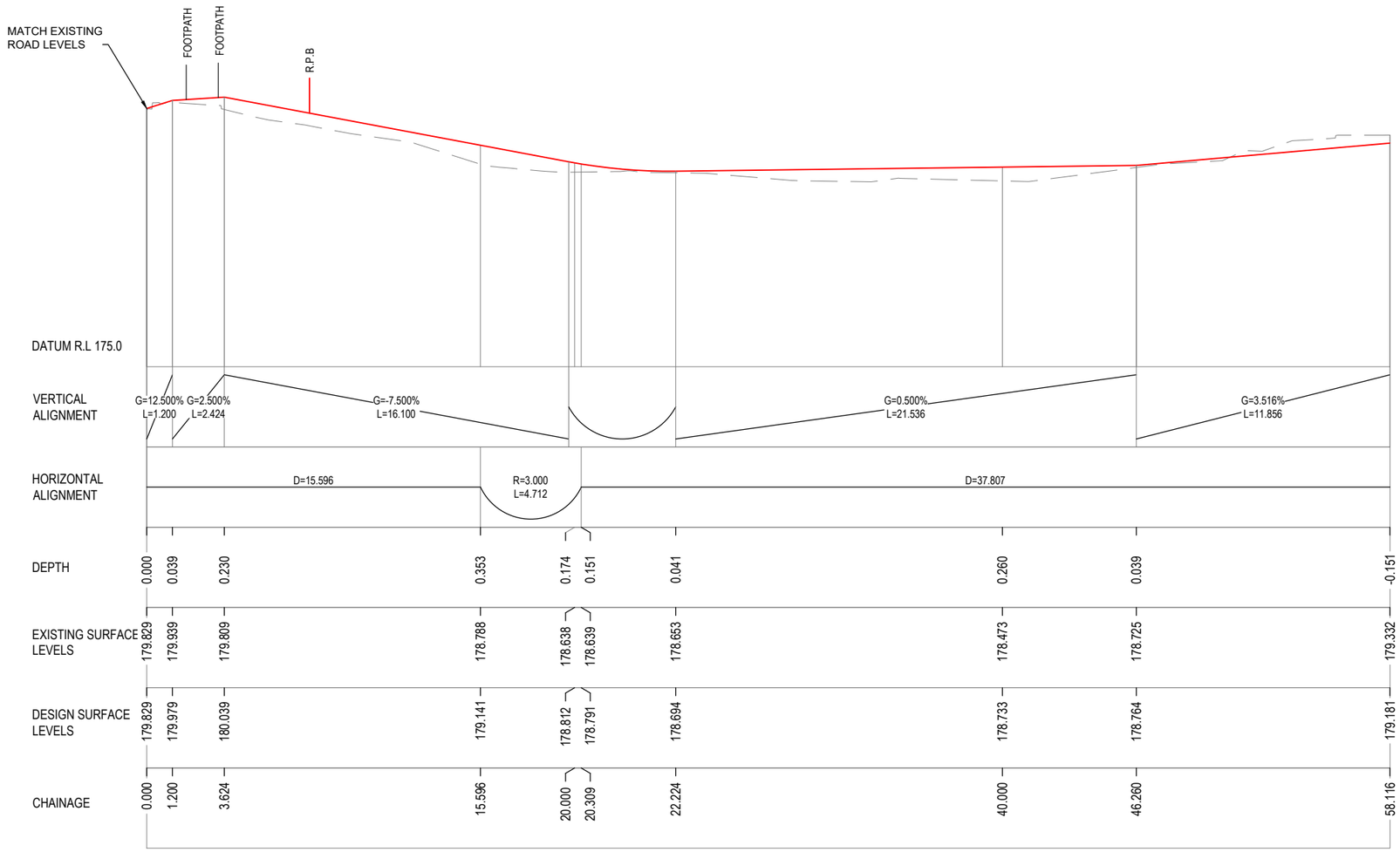
DRAWING TITLE: PROPOSED SITE BULK EARTHWORKS

DRAWING NUMBER: CE26020-400-GA
ISSUE: A



LONGITUDINAL SECTION - DRIVEWAY
SCALE - HORIZ 1:250, VERT. 1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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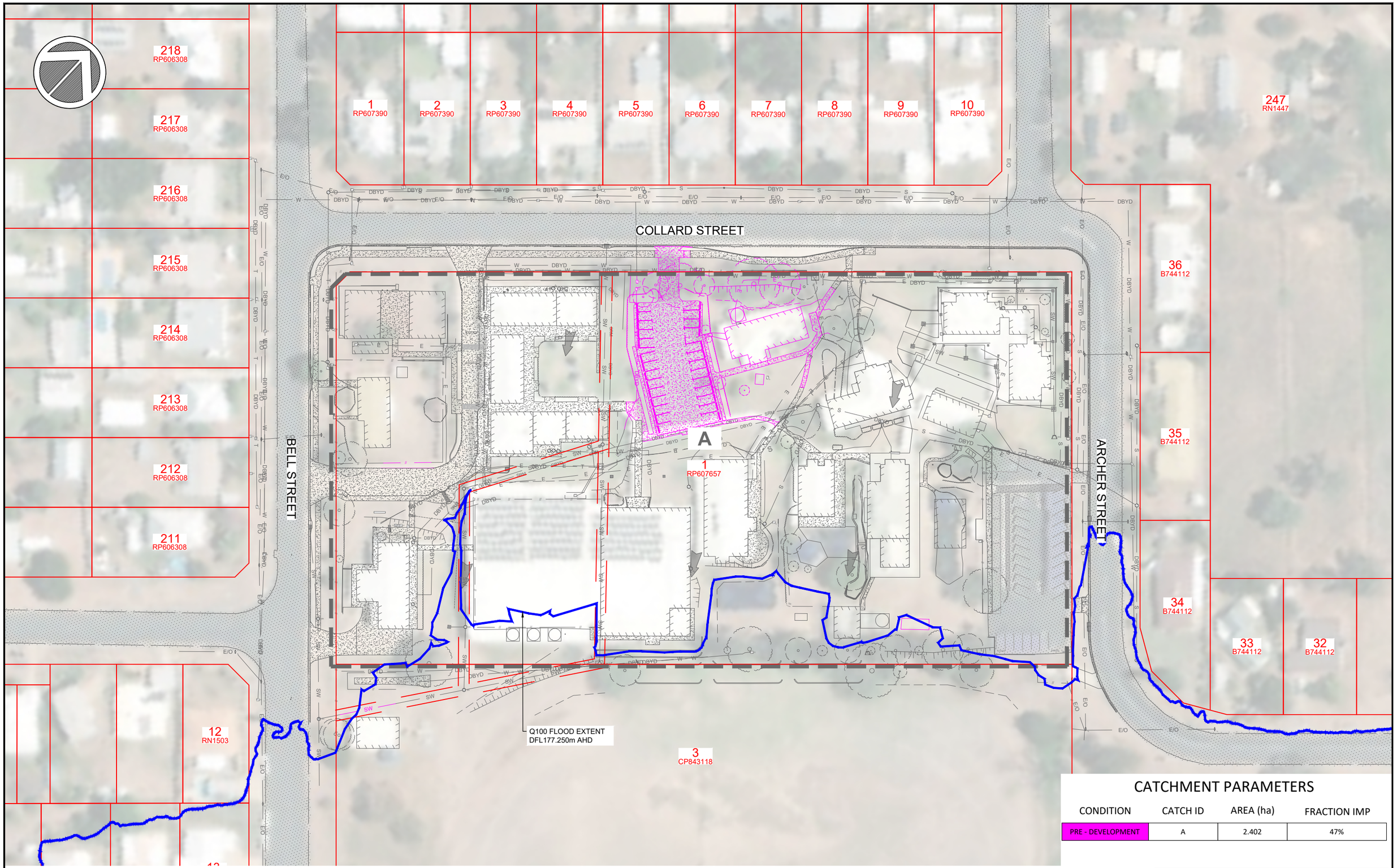
DRAWING TITLE: DRIVEWAY LONGITUDINAL SECTIONS

DRAWING NUMBER: CE26020-501-LS

ISSUE: A



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
PRE - DEVELOPMENT	A	2.402	47%

STORMWATER PRE-DEVLOPEMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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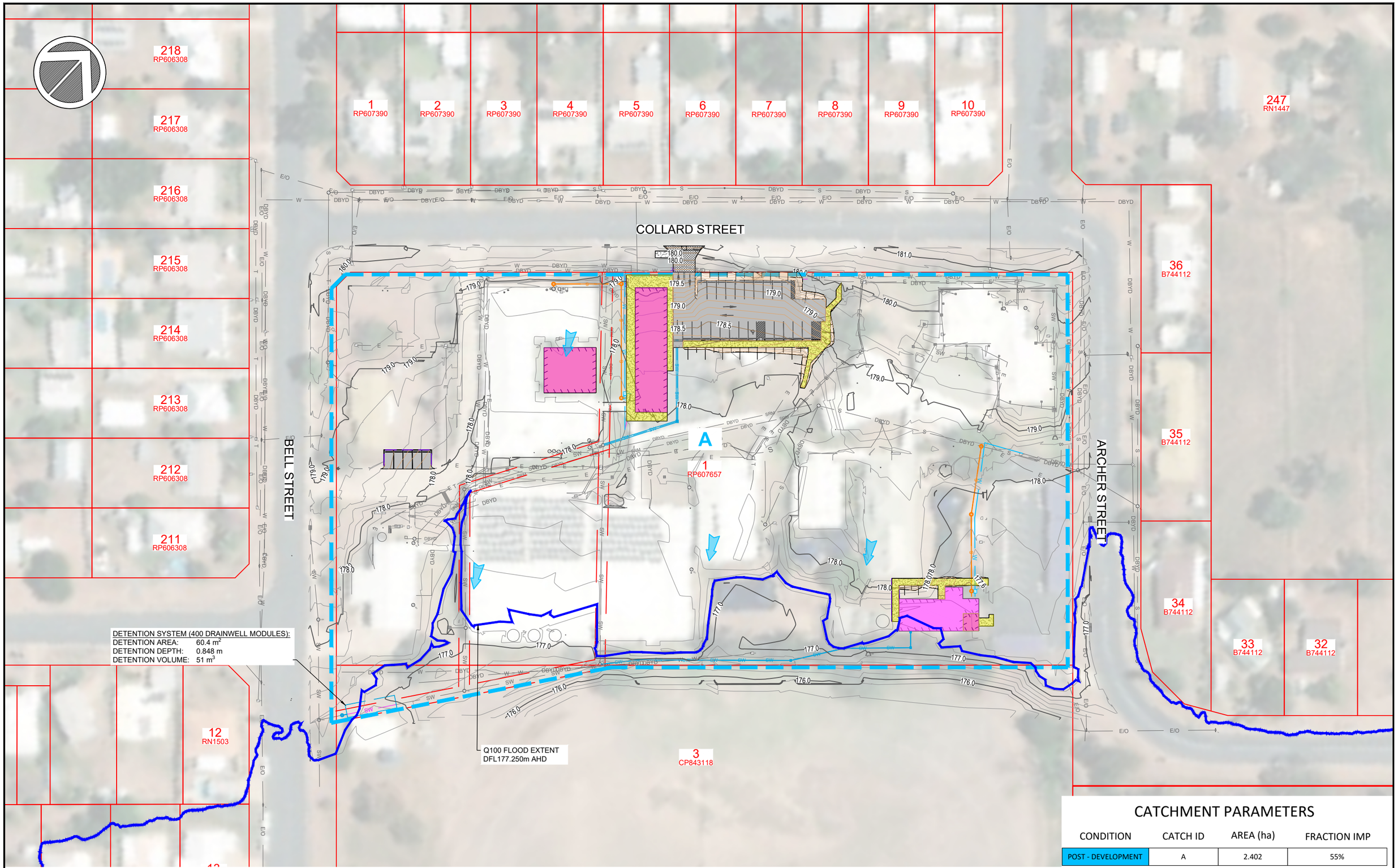
DRAWING TITLE
STORMWATER PRE-DEVLOPMENT CATCHMENT PLAN

DRAWING NUMBER: CE26020-600-DR
ISSUE: A



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
POST - DEVELOPMENT	A	2.402	55%

STORMWATER POST-DEVELOPMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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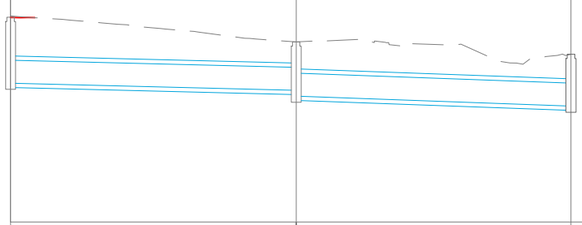
DRAWING TITLE: STORMWATER POST-DEVELOPMENT CATCHMENT PLAN

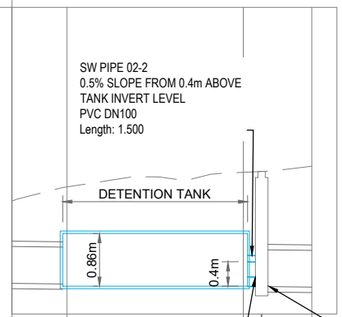
DRAWING NUMBER: CE26020-601-DR

ISSUE: A



STRUCTURE NAME	SW MH 01-1	SW MH 01-2	SW MH 01-3EX
STRUCTURE DESCRIPTION	600SQ FIELD INLET GRATE CL 'D' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	EXISTING MANHOLE
DATUM 175.000			
PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 01-1 Ø375 BMAX SN8 Length: 23.294	SW PIPE 01-2 Ø375 BMAX SN8 Length: 22.410	
GRADE %	0.50%	0.73%	
HGL & FLOW RATE			
KNOWN CAPACITY	0.179	0.216	
COVER	0.630	0.345 / 0.439	0.401
INVERT LEVEL	177.263	177.146 / 177.052	176.889
DESIGN LEVEL AT MH CL	178.338	177.936	177.735
EXISTING SURFACE	178.359	177.936	177.735
COORDINATES	N7299050.815 E248395.505	N7299033.760 E248411.371	N7299014.241 E248400.361
CHAINAGE	0.000	23.297	45.707

STORMWATER LINE 1
SCALE: H1:500 - V1:100



STRUCTURE NAME	SW DL 02-1	SW DT 02-1 / SW MH 02-2
STRUCTURE DESCRIPTION	DRAINWELL DETENTION OR APPROVED EQUIVALENT	DRAINWELL DETENTION OR APPROVED EQUIVALENT / 1050DIA ACCESS CHAMBER GRATE CL 'B' CMDG-D-030
DATUM 175.000		
PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 02-1 Ø600 EX PIPE Length: 4.492	SW PIPE 02-3 0.5% SLOPE FROM TANK INVERT LEVEL PVC DN150 Length: 1.500 / EX PIPE 02-4 Ø600 EX PIPE Length: 4.087
GRADE %	0.26%	0.50% 0.26%
HGL & FLOW RATE		
KNOWN CAPACITY	0.450	0.016 / 0.450
COVER	0.653 / 0.895	1.701 / 1.723 / 1.188 / 1.283
INVERT LEVEL	175.500 / 175.488	175.454 / 175.446 / 175.447 / 175.437
DESIGN LEVEL AT MH CL	177.072	177.310 / 177.324
EXISTING SURFACE	177.072	177.310 / 177.324
COORDINATES	N7298918.841 E248407.345	N7298907.201 E248398.909 / N7298905.987 E248398.029
CHAINAGE	0.000 / 4.492	18.867 / 24.454

STORMWATER LINE 2
SCALE: H1:500 - V1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

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DATUM
PROJECT No. CE26020

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APPROVED L C Moloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2

DRAWING NUMBER: CE26020-611-DR
ISSUE: A

STRUCTURE NAME	SW MH 03-1	SW MH 03-2	SW MH 03-3	SW MH 03-4	SW MH 03-5	SW MH 03-4EX
STRUCTURE DESCRIPTION	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022'	EXISTING MANHOLE

DATUM 175.000

PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 03-1 Ø150 PVC Length: 4.523	SW PIPE 03-2 Ø150 PVC Length: 19.235	SW PIPE 03-3 Ø150 PVC Length: 15.703	SW PIPE 03-4 Ø150 PVC Length: 43.925	SW PIPE 03-5 Ø150 PVC Length: 11.126
GRADE %	2.41%	0.50%	1.33%	0.50%	0.50%
HGL & FLOW RATE					

KNOWN CAPACITY	0.034		0.016				0.025			0.016				0.016		
COVER	0.200	0.200	0.240			0.511	0.551		0.200	0.240			0.656	0.674	0.660	
INVERT LEVEL	176.828	176.719	176.679			176.583	176.543		176.333	176.293			176.074	176.056	176.000	
DESIGN LEVEL AT MH CL	177.183	177.107				177.248			176.688				176.885		176.815	
EXISTING SURFACE	177.183	177.074				177.248			176.688				176.885		176.815	
COORDINATES	N7299034.962 E248501.997	N7299031.644 E248505.071				N7299018.432 E248491.091			N7299005.470 E248482.226				N7298975.749 E248449.884		N7298967.289 E248442.657	
CHAINAGE	0.000	4.523				23.758			39.461				83.386		94.512	

STORMWATER LINE 3
SCALE: H1:500 - V1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL

AMENDMENTS

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED L Moloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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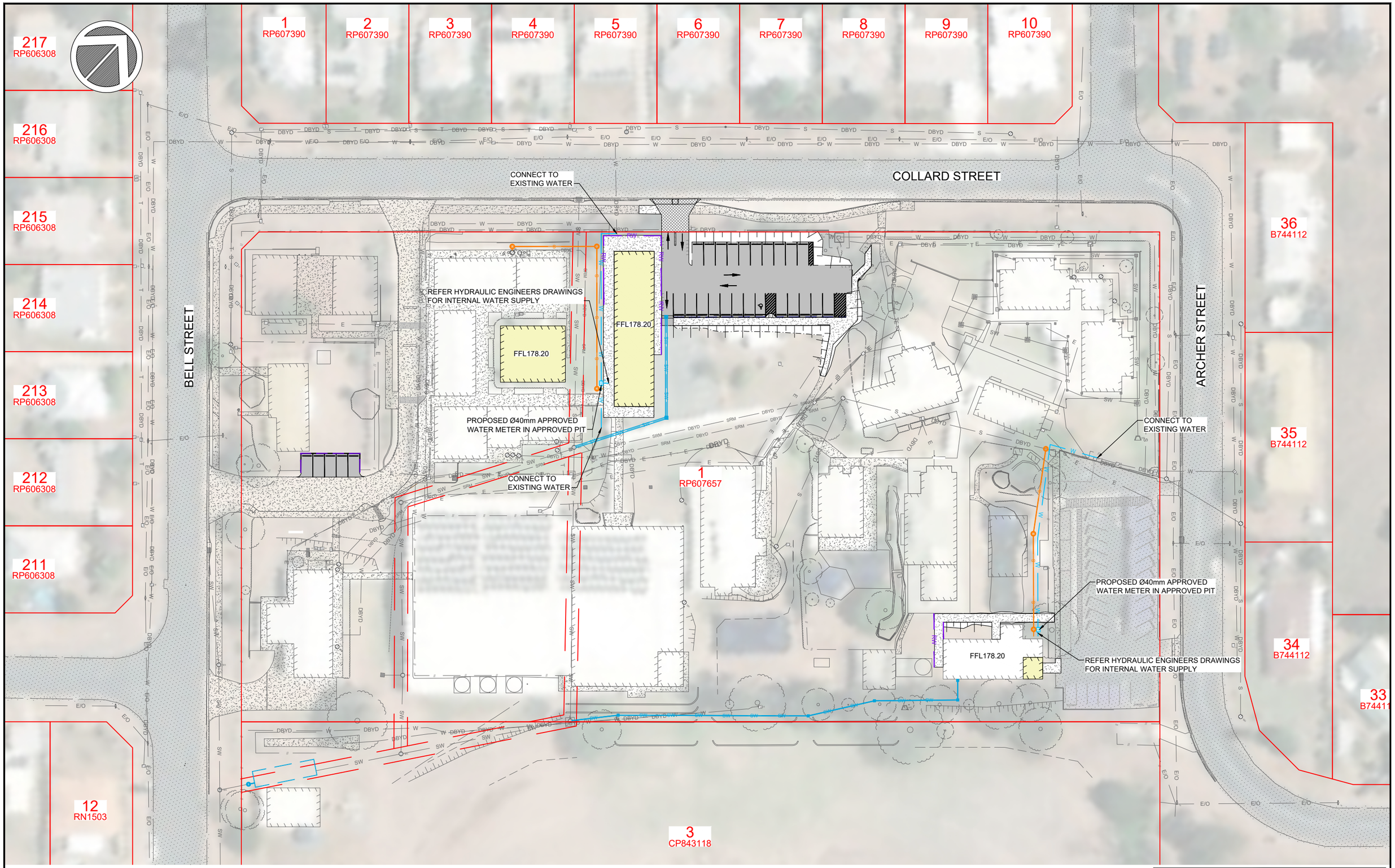
DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 2 OF 2

DRAWING NUMBER: CE26020-612-DR

ISSUE: A



PROPOSED SITE
WATER LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

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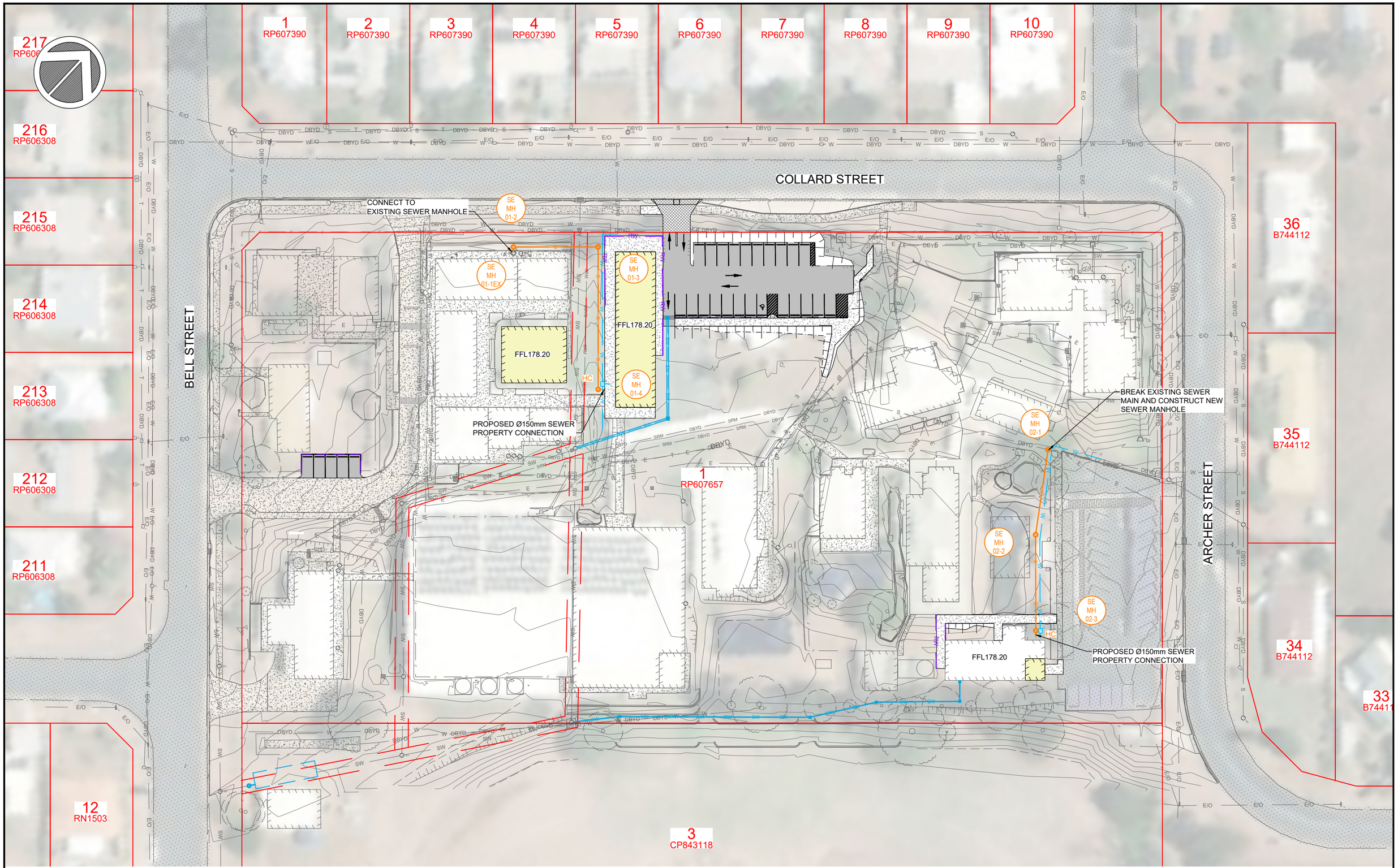
DRAWING TITLE: PROPOSED SITE WATER LAYOUT PLAN

DRAWING NUMBER: CE26020-700-WA

ISSUE: A



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DATUM
PROJECT No. CE26020

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APPROVED RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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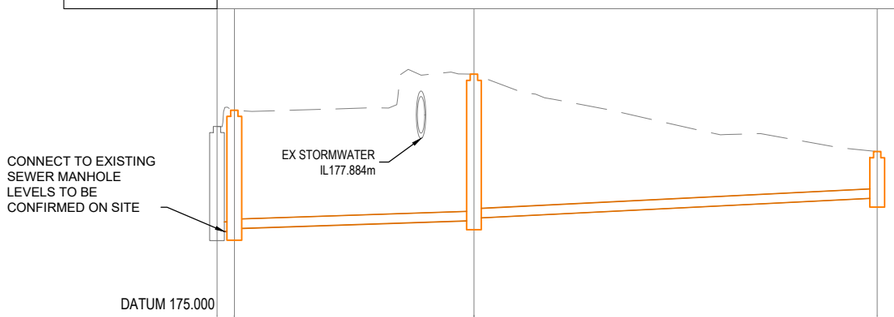
DRAWING TITLE: PROPOSED SITE SEWER LAYOUT PLAN

DRAWING NUMBER: CE26020-800-SEW
ISSUE: A

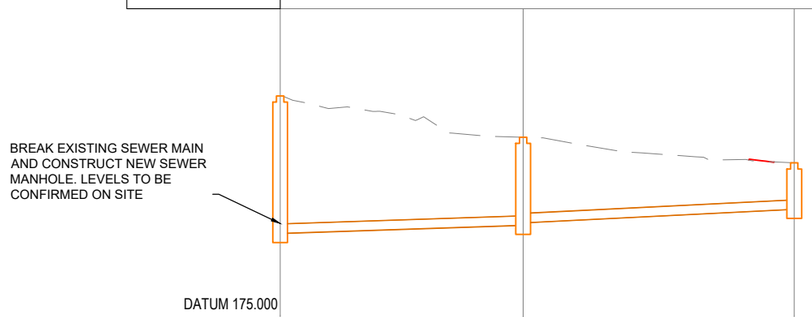
STRUCTURE NAME	SE MH 01-1EX	SE MH 01-2	SE MH 01-3	SE MH 01-4
MANHOLE TYPE	EXISTING	1050DIA	1050DIA	1050DIA
LID TYPE		CLS 'B'	CLS 'B'	CLS 'B'
DROP TYPE		TYPE 'A'	TYPE 'A'	
HC TYPE				
HC LOT No.				



COVER	1.557 1.814	1.774	2.230	2.190	0.600		
INVERT LEVEL	176.369 176.376	176.416	176.547	176.587	176.916		
DESIGN LEVEL AT MH CL	178.081	178.345	178.933		177.671		
EXISTING SURFACE	178.081	178.345	178.933		177.671		
COORDINATES	N7299037.557	E248359.311 N7299038.585 E248358.344	N7299051.876	E248372.659	N7299027.765	E248395.025	
CHAINAGE	0.000	1.422	20.955		53.842		

SEWER LINE 1
SCALE 1:500 HORIZONTAL - 1:100 VERTICAL

STRUCTURE NAME	SE MH 02-1	SE MH 02-2	SE MH 02-3
MANHOLE TYPE	1050DIA	1050DIA	1050DIA
LID TYPE	CLS 'B'	CLS 'D'	CLS 'D'
DROP TYPE	TYPE 'A'	TYPE 'A'	
HC TYPE			
HC LOT No.			



COVER	2.085	1.279	1.239	0.600		
INVERT LEVEL	176.338	176.471	176.511	176.732		
DESIGN LEVEL AT MH CL	178.578	177.905		177.487		
EXISTING SURFACE	178.578	177.905		177.487		
COORDINATES	N7299088.068 E248480.600	N7299071.718 E248491.798		N7299055.547	E248506.872	
CHAINAGE	0.000	19.817		41.924		

SEWER LINE 2
SCALE 1:500 HORIZONTAL - 1:100 VERTICAL

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)
0 1.25 5.0m
0 2.50 10.0m
1:250 (A1)
1:500 (A3)

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED L Moloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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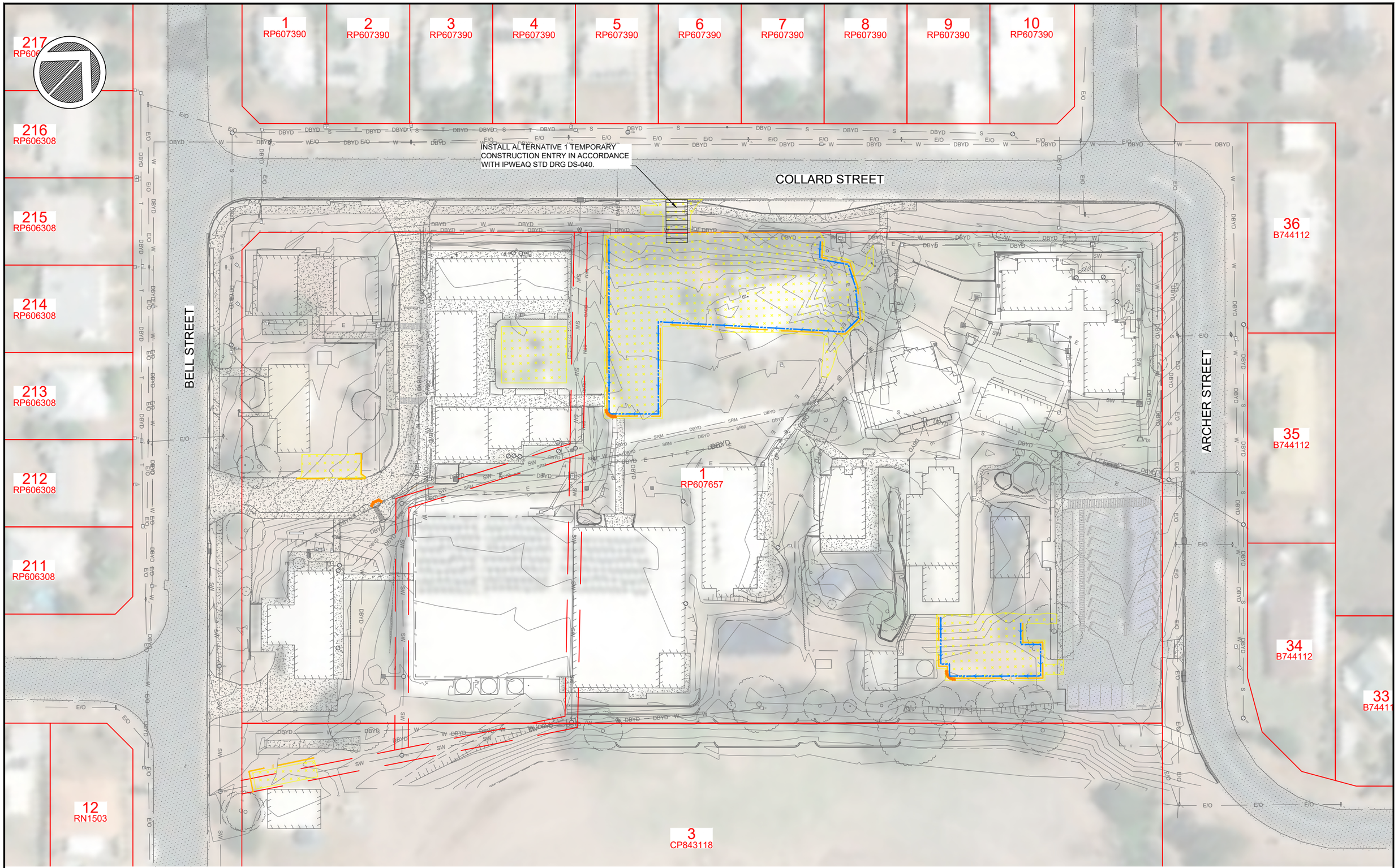
DRAWING TITLE: SEWER LONGITUDINAL SECTIONS

DRAWING NUMBER: CE26020-811-SEW
ISSUE: A



SEDIMENT & EROSION CONTROL PLAN

SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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APPROVED RPEQ 33682

L C Moloney

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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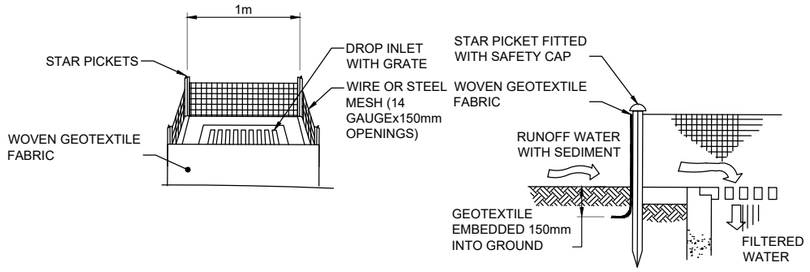
DRAWING TITLE: SEDIMENT & EROSION CONTROL PLAN

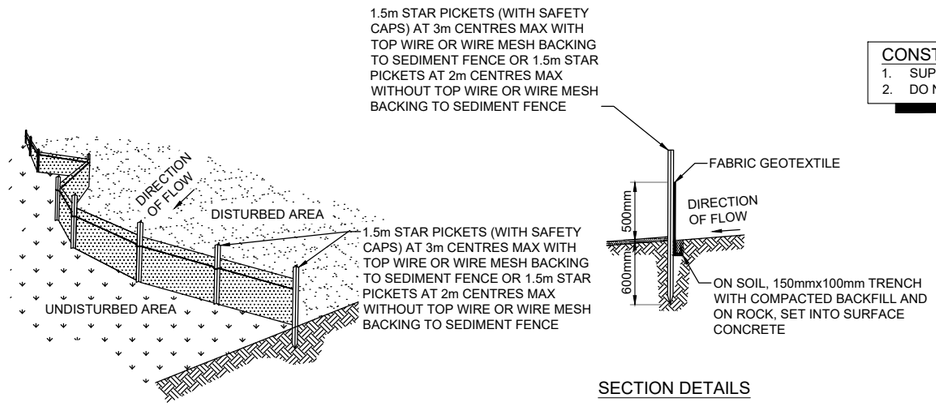
DRAWING NUMBER: CE26020-900-SE

ISSUE: A



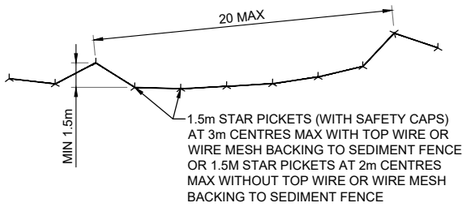
CONSTRUCTION NOTES
1. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1m CENTERS.
2. DO NOT COVER INLET WITH GEOTEXTILE.

GEOTEXTILE INLET FILTER
NOT TO SCALE



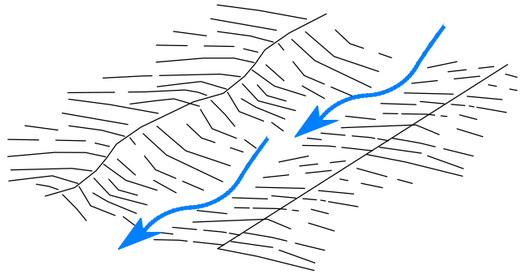
SECTION DETAILS

CONSTRUCTION NOTES
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AS DIRECTED ON SITE BY SUPERINTENDENT.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 3m APART.
3. DIG A 150mm DEEP TRENCH ALONG THE UP-SLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF SUPPORTING GEOTEXTILE TO UP-SLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

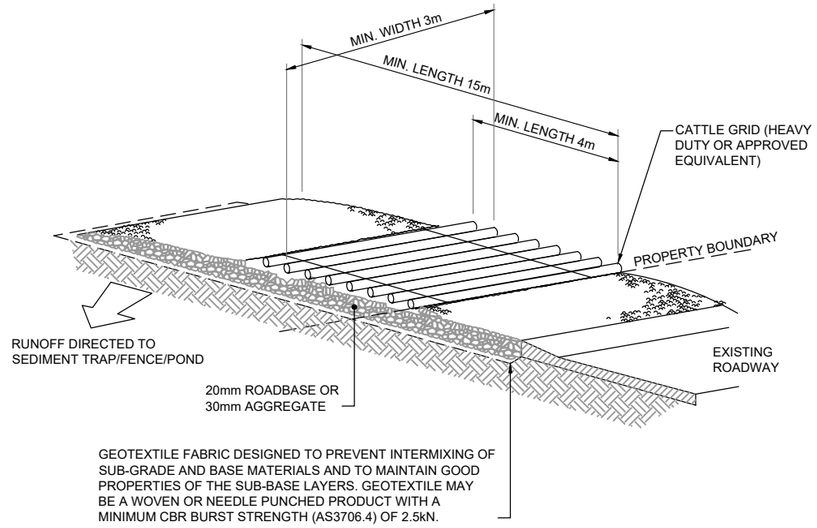


PLAN

GEOTEXTILE SEDIMENT FENCE
NOT TO SCALE

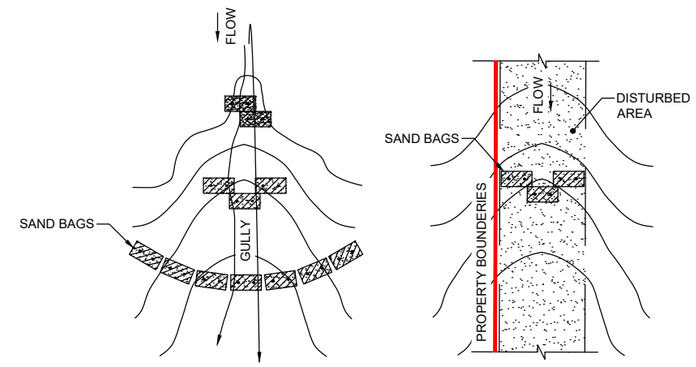


CLEAN WATER DIVERSION DRAIN
NOT TO SCALE



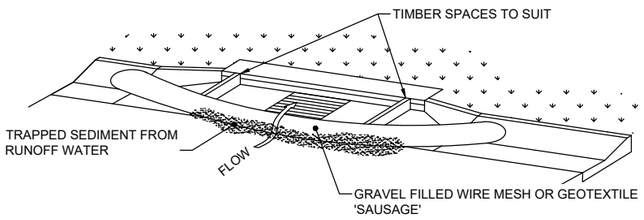
CONSTRUCTION NOTES
1. STRIP TOPSOIL AND LEVEL WORK AREA.
2. COMPACT IN-SITU SUB-GRADE MATERIAL.
3. COVER WORK AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROAD BASE MATERIAL OR 30mm AGGREGATE. MINIMUM LENGTH 15m OR TO BUILDING ALIGNMENT AND MINIMUM WIDTH 3m.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN INDICATIVE WORKS AREA TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP (i.e. SEDIMENT POND).

SHAKE - DOWN AREA / STABILIZED SITE ACCESS
NOT TO SCALE



NOTES
1. PROVIDE SAND BAGS ACROSS FLOW PATH. PROVIDE TURF AROUND SAND BAGS. EXTENT TO BE DETERMINED ON SITE BY SUPERINTENDENT.

SAND BAG CHECK DAM
NOT TO SCALE



CONSTRUCTION NOTES
1. FILTER TO BE INSTALLED ONLY WHERE SPECIFIED ON AN APPROVED SEDIMENT AND EROSION CONTROL PLAN.
2. INSTALL FILTERS TO KERB INLETS AT SAG POINTS ONLY.
3. 'SAUSAGE' TO BE FILLED WITH 25mm TO 50mm GRAVEL, SHAPED INTO AN ELLIPTICAL CROSS SECTION APPROX. 150mm HIGH AND 400mm WIDE AND BE NO LONGER THAN LENGTH OF INLET PIT.
4. TIMBER SPACERS TO PROVIDE MIN. 100mm GAP BETWEEN FILTER AND KERB INLET AND FORM SEAL WITH KERB TO PREVENT SEDIMENT BYPASSING FILTER.
5. GRAVEL FILLED SANDBAGS CAN BE USED AS A SUBSTITUTE FOR 'SAUSAGE'. SANDBAGS MUST BE FIRMLY PLACED AND INTERLOCKED TO PREVENT SEDIMENT PASSING BETWEEN THEM.

GEOTEXTILE GULLY INLET FILTER
NOT TO SCALE

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL
APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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DRAWING TITLE: SEDIMENT & EROSION CONTROL PLAN TYPICAL DETAILS
DRAWING NUMBER: CE26020-910-SE
ISSUE: A

DA Form 1 – Development application details

Approved form (version 1.6 effective 2 August 2024) made under section 282 of the Planning Act 2016.

This form **must** be used to make a development application **involving code assessment or impact assessment**, except when applying for development involving only building work.

For a development application involving **building work only**, use *DA Form 2 – Building work details*.

For a development application involving **building work associated with any other type of assessable development (i.e. material change of use, operational work or reconfiguring a lot)**, use this form (*DA Form 1*) **and** parts 4 to 6 of *DA Form 2 – Building work details.*

Unless stated otherwise, all parts of this form **must** be completed in full and all required supporting information **must** accompany the development application.

One or more additional pages may be attached as a schedule to this development application if there is insufficient space on the form to include all the necessary information.

This form and any other form relevant to the development application must be used to make a development application relating to strategic port land and Brisbane core port land under the *Transport Infrastructure Act 1994*, and airport land under the *Airport Assets (Restructuring and Disposal) Act 2008.* For the purpose of assessing a development application relating to strategic port land and Brisbane core port land, any reference to a planning scheme is taken to mean a land use plan for the strategic port land, Brisbane port land use plan for Brisbane core port land, or a land use plan for airport land.

Note: *All terms used in this form have the meaning given under the Planning Act 2016, the Planning Regulation 2017, or the Development Assessment Rules (DA Rules).*

PART 1 – APPLICANT DETAILS

1) Applicant details	
Applicant name(s) (*individual or company full name*)	Lutheran Church of Australia Queensland District T/A Redeemer Lutheran College Biloela
Contact name *(only applicable for companies)*	Reel Planning - Tim O'Leary
Postal address *(P.O. Box or street address)*	1/9 Camford Street
Suburb	Milton
State	QLD
Postcode	4101
Country	Australia
Contact number	
Email address *(non-mandatory)*	
Mobile number *(non-mandatory)*	
Fax number *(non-mandatory)*	
Applicant's reference number(s) *(if applicable)*	
1.1) Home-based business	
☐ Personal details to remain private in accordance with section 264(6) of *Planning Act 2016*	

2) Owner's consent
2.1) Is written consent of the owner required for this development application?
☒ Yes – the written consent of the owner(s) is attached to this development application ☐ No – proceed to 3)

Queensland Government

PART 2 – LOCATION DETAILS

3) Location of the premises *(complete 3.1) or 3.2), and 3.3) as applicable)*

***Note**: Provide details below and attach a site plan for any or all premises part of the development application. For further information, see DA Forms Guide: Relevant plans.*

3.1) Street address and lot on plan

☒ Street address **AND** lot on plan (*all lots must be listed*), ***or***

☐ Street address **AND** lot on plan for an adjoining or adjacent property of the premises *(appropriate for development in water but adjoining or adjacent to land e.g. jetty, pontoon. All lots must be listed).*

a)	Unit No.	Street No.	Street Name and Type	Suburb
		2	Collard Street	Biloela
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)
	4715	1	RP607657	Banana Shire Council
b)	Unit No.	Street No.	Street Name and Type	Suburb
	Postcode	Lot No.	Plan Type and Number *(e.g. RP, SP)*	Local Government Area(s)

3.2) Coordinates of premises *(appropriate for development in remote areas, over part of a lot or in water not adjoining or adjacent to land e.g. channel dredging in Moreton Bay)*

***Note**: Place each set of coordinates in a separate row.*

☐ Coordinates of premises by longitude and latitude

Longitude(s)	Latitude(s)	Datum	Local Government Area(s) *(if applicable)*
		☐ WGS84 ☐ GDA94 ☐ Other:	

☐ Coordinates of premises by easting and northing

Easting(s)	Northing(s)	Zone Ref.	Datum	Local Government Area(s) *(if applicable)*
		☐ 54 ☐ 55 ☐ 56	☐ WGS84 ☐ GDA94 ☐ Other:	

3.3) Additional premises

☐ Additional premises are relevant to this development application and the details of these premises have been attached in a schedule to this development application

☒ Not required

4) Identify any of the following that apply to the premises and provide any relevant details

☐ In or adjacent to a water body or watercourse or in or above an aquifer

Name of water body, watercourse or aquifer:	

☐ On strategic port land under the *Transport Infrastructure Act 1994*

Lot on plan description of strategic port land:	
Name of port authority for the lot:	

☐ In a tidal area

Name of local government for the tidal area *(if applicable)*:	
Name of port authority for tidal area *(if applicable)*	

☐ On airport land under the *Airport Assets (Restructuring and Disposal) Act 2008*	
Name of airport:	
☐ Listed on the Environmental Management Register (EMR) under the *Environmental Protection Act 1994*	
EMR site identification:	
☐ Listed on the Contaminated Land Register (CLR) under the *Environmental Protection Act 1994*	
CLR site identification:	

5) Are there any existing easements over the premises?

Note: Easement uses vary throughout Queensland and are to be identified correctly and accurately. For further information on easements and how they may affect the proposed development, see DA Forms Guide.

☐ Yes – All easement locations, types and dimensions are included in plans submitted with this development application

☒ No

PART 3 – DEVELOPMENT DETAILS

Section 1 – Aspects of development

6.1) Provide details about the first development aspect			
a) What is the type of development? *(tick only one box)*			
☒ Material change of use	☐ Reconfiguring a lot	☐ Operational work	☐ Building work
b) What is the approval type? *(tick only one box)*			
☒ Development permit	☐ Preliminary approval	☐ Preliminary approval that includes a variation approval	
c) What is the level of assessment?			
☐ Code assessment	☒ Impact assessment *(requires public notification)*		
d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:			
Educational Establishment			
e) Relevant plans ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms guide: Relevant plans.*			
☒ Relevant plans of the proposed development are attached to the development application			
6.2) Provide details about the second development aspect			
a) What is the type of development? *(tick only one box)*			
☐ Material change of use	☐ Reconfiguring a lot	☐ Operational work	☐ Building work
b) What is the approval type? *(tick only one box)*			
☐ Development permit	☐ Preliminary approval	☐ Preliminary approval that includes a variation approval	
c) What is the level of assessment?			
☐ Code assessment	☐ Impact assessment *(requires public notification)*		
d) Provide a brief description of the proposal *(e.g. 6 unit apartment building defined as multi-unit dwelling, reconfiguration of 1 lot into 3 lots)*:			
e) Relevant plans ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*			
☐ Relevant plans of the proposed development are attached to the development application			

6.3) Additional aspects of development
☐ Additional aspects of development are relevant to this development application and the details for these aspects that would be required under Part 3 Section 1 of this form have been attached to this development application
☒ Not required
6.4) Is the application for State facilitated development?
☐ Yes - Has a notice of declaration been given by the Minister?
☒ No

Section 2 – Further development details

7) Does the proposed development application involve any of the following?	
Material change of use	☒ Yes – complete division 1 if assessable against a local planning instrument
Reconfiguring a lot	☐ Yes – complete division 2
Operational work	☐ Yes – complete division 3
Building work	☐ Yes – complete *DA Form 2 – Building work details*

Division 1 – Material change of use

***Note**: This division is only required to be completed if any part of the development application involves a material change of use assessable against a local planning instrument.*

8.1) Describe the proposed material change of use			
Provide a general description of the proposed use	Provide the planning scheme definition *(include each definition in a new row)*	Number of dwelling units *(if applicable)*	Gross floor area (m^2) *(if applicable)*
School extension	Educational Establishment		251.7

8.2) Does the proposed use involve the use of existing buildings on the premises?
☒ Yes
☐ No

8.3) Does the proposed development relate to temporary accepted development under the Planning Regulation?	
☐ Yes – provide details below or include details in a schedule to this development application	
☒ No	
Provide a general description of the temporary accepted development	Specify the stated period dates under the Planning Regulation

Division 2 – Reconfiguring a lot

***Note**: This division is only required to be completed if any part of the development application involves reconfiguring a lot.*

9.1) What is the total number of existing lots making up the premises?

9.2) What is the nature of the lot reconfiguration? *(tick all applicable boxes)*	
☐ Subdivision *(complete 10)*	☐ Dividing land into parts by agreement *(complete 11)*
☐ Boundary realignment *(complete 12)*	☐ Creating or changing an easement giving access to a lot from a constructed road *(complete 13)*

10) Subdivision				
10.1) For this development, how many lots are being created and what is the intended use of those lots:				
Intended use of lots created	Residential	Commercial	Industrial	Other, please specify:
Number of lots created				

10.2) Will the subdivision be staged?	
☐ Yes – provide additional details below ☐ No	
How many stages will the works include?	
What stage(s) will this development application apply to?	

11) Dividing land into parts by agreement – how many parts are being created and what is the intended use of the parts?				
Intended use of parts created	Residential	Commercial	Industrial	Other, please specify:
Number of parts created				

12) Boundary realignment			
12.1) What are the current and proposed areas for each lot comprising the premises?			
Current lot		Proposed lot	
Lot on plan description	Area (m^2)	Lot on plan description	Area (m^2)
12.2) What is the reason for the boundary realignment?			

13) What are the dimensions and nature of any existing easements being changed and/or any proposed easement? *(attach schedule if there are more than two easements)*				
Existing or proposed?	Width (m)	Length (m)	Purpose of the easement? *(e.g. pedestrian access)*	Identify the land/lot(s) benefitted by the easement

Division 3 – Operational work

***Note**: This division is only required to be completed if any part of the development application involves operational work.*

14.1) What is the nature of the operational work?		
☐ Road work	☐ Stormwater	☐ Water infrastructure
☐ Drainage work	☐ Earthworks	☐ Sewage infrastructure
☐ Landscaping	☐ Signage	☐ Clearing vegetation
☐ Other – please specify:		

14.2) Is the operational work necessary to facilitate the creation of new lots? *(e.g. subdivision)*	
☐ Yes – specify number of new lots:	
☐ No	

14.3) What is the monetary value of the proposed operational work? *(include GST, materials and labour)*
$

PART 4 – ASSESSMENT MANAGER DETAILS

15) Identify the assessment manager(s) who will be assessing this development application
Banana Shire Council
16) Has the local government agreed to apply a superseded planning scheme for this development application?
☐ Yes – a copy of the decision notice is attached to this development application ☐ The local government is taken to have agreed to the superseded planning scheme request – relevant documents attached ☒ No

PART 5 – REFERRAL DETAILS

17) Does this development application include any aspects that have any referral requirements? ***Note**: A development application will require referral if prescribed by the* Planning Regulation 2017.
☒ No, there are no referral requirements relevant to any development aspects identified in this development application – proceed to Part 6
Matters requiring referral to the **Chief Executive of the *Planning Act 2016*:** ☐ Clearing native vegetation ☐ Contaminated land *(unexploded ordnance)* ☐ Environmentally relevant activities (ERA) *(only if the ERA has not been devolved to a local government)* ☐ Fisheries – aquaculture ☐ Fisheries – declared fish habitat area ☐ Fisheries – marine plants ☐ Fisheries – waterway barrier works ☐ Hazardous chemical facilities ☐ Heritage places – Queensland heritage place *(on or near a Queensland heritage place)* ☐ Infrastructure-related referrals – designated premises ☐ Infrastructure-related referrals – state transport infrastructure ☐ Infrastructure-related referrals – State transport corridor and future State transport corridor ☐ Infrastructure-related referrals – State-controlled transport tunnels and future state-controlled transport tunnels ☐ Infrastructure-related referrals – near a state-controlled road intersection ☐ Koala habitat in SEQ region – interfering with koala habitat in koala habitat areas outside koala priority areas ☐ Koala habitat in SEQ region – key resource areas ☐ Ports – Brisbane core port land – near a State transport corridor or future State transport corridor ☐ Ports – Brisbane core port land – environmentally relevant activity (ERA) ☐ Ports – Brisbane core port land – tidal works or work in a coastal management district ☐ Ports – Brisbane core port land – hazardous chemical facility ☐ Ports – Brisbane core port land – taking or interfering with water ☐ Ports – Brisbane core port land – referable dams ☐ Ports – Brisbane core port land – fisheries ☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)* ☐ SEQ development area ☐ SEQ regional landscape and rural production area or SEQ rural living area – tourist activity or sport and recreation activity ☐ SEQ regional landscape and rural production area or SEQ rural living area – community activity ☐ SEQ regional landscape and rural production area or SEQ rural living area – indoor recreation ☐ SEQ regional landscape and rural production area or SEQ rural living area – urban activity ☐ SEQ regional landscape and rural production area or SEQ rural living area – combined use ☐ SEQ northern inter-urban break – tourist activity or sport and recreation activity

☐ SEQ northern inter-urban break – community activity
☐ SEQ northern inter-urban break – indoor recreation
☐ SEQ northern inter-urban break – urban activity
☐ SEQ northern inter-urban break – combined use
☐ Tidal works or works in a coastal management district
☐ Reconfiguring a lot in a coastal management district or for a canal
☐ Erosion prone area in a coastal management district
☐ Urban design
☐ Water-related development – taking or interfering with water
☐ Water-related development – removing quarry material *(from a watercourse or lake)*
☐ Water-related development – referable dams
☐ Water-related development –levees *(category 3 levees only)*
☐ Wetland protection area

Matters requiring referral to the **local government:**
☐ Airport land
☐ Environmentally relevant activities (ERA) (*only if the ERA has been devolved to local government)*
☐ Heritage places – Local heritage places

Matters requiring referral to the **Chief Executive of the distribution entity or transmission entity:**
☐ Infrastructure-related referrals – Electricity infrastructure

Matters requiring referral to:
- The **Chief Executive of the holder of the licence**, if not an individual
- The **holder of the licence**, if the holder of the licence is an individual

☐ Infrastructure-related referrals – Oil and gas infrastructure

Matters requiring referral to the **Brisbane City Council:**
☐ Ports – Brisbane core port land

Matters requiring referral to the **Minister responsible for administering the *Transport Infrastructure Act 1994*:**
☐ Ports – Brisbane core port land *(where inconsistent with the Brisbane port LUP for transport reasons)*
☐ Ports – Strategic port land

Matters requiring referral to the **relevant port operator**, if applicant is not port operator**:**
☐ Ports – Land within Port of Brisbane's port limits *(below high-water mark)*

Matters requiring referral to the **Chief Executive of the relevant port authority:**
☐ Ports – Land within limits of another port *(below high-water mark)*

Matters requiring referral to the **Gold Coast Waterways Authority:**
☐ Tidal works or work in a coastal management district *(in Gold Coast waters)*

Matters requiring referral to the **Queensland Fire and Emergency Service:**
☐ Tidal works or work in a coastal management district *(involving a marina (more than six vessel berths))*

18) Has any referral agency provided a referral response for this development application?

☐ Yes – referral response(s) received and listed below are attached to this development application
☒ No

Referral requirement	Referral agency	Date of referral response

Identify and describe any changes made to the proposed development application that was the subject of the referral response and this development application, or include details in a schedule to this development application *(if applicable).*

PART 6 – INFORMATION REQUEST

19) Information request under the DA Rules

☒ I agree to receive an information request if determined necessary for this development application

☐ I do not agree to accept an information request for this development application

***Note**: By not agreeing to accept an information request I, the applicant, acknowledge:*

- *that this development application will be assessed and decided based on the information provided when making this development application and the assessment manager and any referral agencies relevant to the development application are not obligated under the DA Rules to accept any additional information provided by the applicant for the development application unless agreed to by the relevant parties*
- *Part 3 under Chapter 1 of the DA Rules will still apply if the application is an application listed under section 11.3 of the DA Rules or*
- *Part 2under Chapter 2 of the DA Rules will still apply if the application is for state facilitated development*

Further advice about information requests is contained in the DA Forms Guide.

PART 7 – FURTHER DETAILS

20) Are there any associated development applications or current approvals? *(e.g. a preliminary approval)*

☒ Yes – provide details below or include details in a schedule to this development application

☐ No

List of approval/development application references	Reference number	Date	Assessment manager
☒ Approval ☐ Development application	MCU002-23/24	20 November 2023	Banana Shire Council
☐ Approval ☐ Development application			

21) Has the portable long service leave levy been paid? *(only applicable to development applications involving building work or operational work)*

☐ Yes – a copy of the receipted QLeave form is attached to this development application

☐ No – I, the applicant will provide evidence that the portable long service leave levy has been paid before the assessment manager decides the development application. I acknowledge that the assessment manager may give a development approval only if I provide evidence that the portable long service leave levy has been paid

☒ Not applicable *(e.g. building and construction work is less than $150,000 excluding GST)*

Amount paid	Date paid (dd/mm/yy)	QLeave levy number (A, B or E)
$		

22) Is this development application in response to a show cause notice or required as a result of an enforcement notice?

☐ Yes – show cause or enforcement notice is attached

☒ No

23) Further legislative requirements

Environmentally relevant activities

23.1) Is this development application also taken to be an application for an environmental authority for an **Environmentally Relevant Activity (ERA)** under section 115 of the *Environmental Protection Act 1994*?

☐ Yes – the required attachment (form ESR/2015/1791) for an application for an environmental authority accompanies this development application, and details are provided in the table below

☒ No

***Note**: Application for an environmental authority can be found by searching "ESR/2015/1791" as a search term at www.qld.gov.au. An ERA requires an environmental authority to operate. See www.business.qld.gov.au for further information.*

Proposed ERA number:		Proposed ERA threshold:	
Proposed ERA name:			

☐ Multiple ERAs are applicable to this development application and the details have been attached in a schedule to this development application.

Hazardous chemical facilities

23.2) Is this development application for a **hazardous chemical facility**?

☐ Yes – *Form 536: Notification of a facility exceeding 10% of schedule 15 threshold* is attached to this development application

☒ No

***Note**: See www.business.qld.gov.au for further information about hazardous chemical notifications.*

Clearing native vegetation

23.3) Does this development application involve **clearing native vegetation** that requires written confirmation that the chief executive of the *Vegetation Management Act 1999* is satisfied the clearing is for a relevant purpose under section 22A of the *Vegetation Management Act 1999*?

☐ Yes – this development application includes written confirmation from the chief executive of the *Vegetation Management Act 1999* (s22A determination)

☒ No

***Note**: 1. Where a development application for operational work or material change of use requires a s22A determination and this is not included, the development application is prohibited development.*
2. See https://www.qld.gov.au/environment/land/vegetation/applying for further information on how to obtain a s22A determination.

Environmental offsets

23.4) Is this development application taken to be a prescribed activity that may have a significant residual impact on a **prescribed environmental matter** under the *Environmental Offsets Act 2014*?

☐ Yes – I acknowledge that an environmental offset must be provided for any prescribed activity assessed as having a significant residual impact on a prescribed environmental matter

☒ No

***Note**: The environmental offset section of the Queensland Government's website can be accessed at www.qld.gov.au for further information on environmental offsets.*

Koala habitat in SEQ Region

23.5) Does this development application involve a material change of use, reconfiguring a lot or operational work which is assessable development under Schedule 10, Part 10 of the Planning Regulation 2017?

☐ Yes – the development application involves premises in the koala habitat area in the koala priority area

☐ Yes – the development application involves premises in the koala habitat area outside the koala priority area

☒ No

***Note**: If a koala habitat area determination has been obtained for this premises and is current over the land, it should be provided as part of this development application. See koala habitat area guidance materials at www.desi.qld.gov.au for further information.*

Water resources

23.6) Does this development application involve **taking or interfering with underground water through an artesian or subartesian bore, taking or interfering with water in a watercourse, lake or spring, or taking overland flow water under the *Water Act 2000***?

☐ Yes – the relevant template is completed and attached to this development application and I acknowledge that a relevant authorisation or licence under the *Water Act 2000* may be required prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au for further information.*

DA templates are available from planning.statedevelopment.qld.gov.au. If the development application involves:

- *Taking or interfering with underground water through an artesian or subartesian bore: complete DA Form 1 Template 1*
- *Taking or interfering with water in a watercourse, lake or spring: complete DA Form1 Template 2*
- *Taking overland flow water: complete DA Form 1 Template 3.*

Waterway barrier works

23.7) Does this application involve **waterway barrier works?**

☐ Yes – the relevant template is completed and attached to this development application

☒ No

DA templates are available from planning.statedevelopment.qld.gov.au. For a development application involving waterway barrier works, complete DA Form 1 Template 4.

Marine activities

23.8) Does this development application involve **aquaculture, works within a declared fish habitat area or removal, disturbance or destruction of marine plants?**

☐ Yes – an associated *resource* allocation authority is attached to this development application, if required under the *Fisheries Act 1994*

☒ No

***Note**: See guidance materials at www.daf.qld.gov.au for further information.*

Quarry materials from a watercourse or lake

23.9) Does this development application involve the **removal of quarry materials from a watercourse or lake** under the *Water Act 2000?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Resources at www.resources.qld.gov.au and www.business.qld.gov.au for further information.*

Quarry materials from land under tidal waters

23.10) Does this development application involve the **removal of quarry materials from land under tidal water** under the *Coastal Protection and Management Act 1995?*

☐ Yes – I acknowledge that a quarry material allocation notice must be obtained prior to commencing development

☒ No

***Note**: Contact the Department of Environment, Science and Innovation at www.desi.qld.gov.au for further information.*

Referable dams

23.11) Does this development application involve a **referable dam** required to be failure impact assessed under section 343 of the *Water Supply (Safety and Reliability) Act 2008* (the Water Supply Act)?

☐ Yes – the 'Notice Accepting a Failure Impact Assessment' from the chief executive administering the Water Supply Act is attached to this development application

☒ No

***Note**: See guidance materials at www.resources.qld.gov.au for further information.*

Tidal work or development within a coastal management district

23.12) Does this development application involve **tidal work or development in a coastal management district**?

☐ Yes – the following is included with this development application:

- ☐ Evidence the proposal meets the code for assessable development that is prescribed tidal work *(only required if application involves prescribed tidal work)*
- ☐ A certificate of title

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for further information.*

Queensland and local heritage places

23.13) Does this development application propose development on or adjoining a place entered in the **Queensland heritage register** or on a place entered in a local government's **Local Heritage Register**?

☐ Yes – details of the heritage place are provided in the table below

☒ No

***Note**: See guidance materials at www.desi.qld.gov.au for information requirements regarding development of Queensland heritage places.*

For a heritage place that has cultural heritage significance as a local heritage place and a Queensland heritage place, provisions are in place under the Planning Act 2016 that limit a local categorising instrument from including an assessment benchmark about the effect or impact of, development on the stated cultural heritage significance of that place. See guidance materials at www.planning.statedevelopment.qldgov.au for information regarding assessment of Queensland heritage places.

Name of the heritage place:		Place ID:	

Decision under section 62 of the *Transport Infrastructure Act 1994*

23.14) Does this development application involve new or changed access to a state-controlled road?

☐ Yes – this application will be taken to be an application for a decision under section 62 of the *Transport Infrastructure Act 1994* (subject to the conditions in section 75 of the *Transport Infrastructure Act 1994* being satisfied)

☒ No

Walkable neighbourhoods assessment benchmarks under Schedule 12A of the Planning Regulation

23.15) Does this development application involve reconfiguring a lot into 2 or more lots in certain residential zones (except rural residential zones), where at least one road is created or extended?

☐ Yes – Schedule 12A is applicable to the development application and the assessment benchmarks contained in schedule 12A have been considered

☒ No

***Note**: See guidance materials at www.planning.statedevelopment.qld.gov.au for further information.*

PART 8 – CHECKLIST AND APPLICANT DECLARATION

24) Development application checklist	
I have identified the assessment manager in question 15 and all relevant referral requirement(s) in question 17 ***Note**: See the Planning Regulation 2017 for referral requirements*	☒ Yes
If building work is associated with the proposed development, Parts 4 to 6 of *DA Form 2 – Building work details* have been completed and attached to this development application	☐ Yes ☒ Not applicable
Supporting information addressing any applicable assessment benchmarks is with the development application ***Note**: This is a mandatory requirement and includes any relevant templates under question 23, a planning report and any technical reports required by the relevant categorising instruments (e.g. local government planning schemes, State Planning Policy, State Development Assessment Provisions). For further information, see DA Forms Guide: Planning Report Template.*	☒ Yes
Relevant plans of the development are attached to this development application ***Note**: Relevant plans are required to be submitted for all aspects of this development application. For further information, see DA Forms Guide: Relevant plans.*	☒ Yes
The portable long service leave levy for QLeave has been paid, or will be paid before a development permit is issued *(see 21)*	☐ Yes ☒ Not applicable

25) Applicant declaration
☒ By making this development application, I declare that all information in this development application is true and correct ☒ Where an email address is provided in Part 1 of this form, I consent to receive future electronic communications from the assessment manager and any referral agency for the development application where written information is required or permitted pursuant to sections 11 and 12 of the *Electronic Transactions Act 2001* ***Note**: It is unlawful to intentionally provide false or misleading information.*
Privacy – Personal information collected in this form will be used by the assessment manager and/or chosen assessment manager, any relevant referral agency and/or building certifier (including any professional advisers which may be engaged by those entities) while processing, assessing and deciding the development application. All information relating to this development application may be available for inspection and purchase, and/or published on the assessment manager's and/or referral agency's website. Personal information will not be disclosed for a purpose unrelated to the *Planning Act 2016*, Planning Regulation 2017 and the DA Rules except where: • such disclosure is in accordance with the provisions about public access to documents contained in the *Planning Act 2016* and the Planning Regulation 2017, and the access rules made under the *Planning Act 2016* and Planning Regulation 2017; or • required by other legislation (including the *Right to Information Act 2009*); or • otherwise required by law. This information may be stored in relevant databases. The information collected will be retained as required by the *Public Records Act 2002.*

PART 9 – FOR COMPLETION OF THE ASSESSMENT MANAGER – FOR OFFICE USE ONLY

Date received:		Reference number(s):	

Notification of engagement of alternative assessment manager	
Prescribed assessment manager	
Name of chosen assessment manager	
Date chosen assessment manager engaged	
Contact number of chosen assessment manager	
Relevant licence number(s) of chosen assessment manager	

QLeave notification and payment *Note: For completion by assessment manager if applicable*			
Description of the work			
QLeave project number			
Amount paid ($)		Date paid (dd/mm/yy)	
Date receipted form sighted by assessment manager			
Name of officer who sighted the form			

Company owner's consent to the making of a development application under the *Planning Act 2016*

I, Trevor John Ruthenberg

[*Insert name in full.*]

District Executive Officer of the company mentioned below.

[*Delete the above where company owner's consent must come from both director and director/secretary*]

I, Dr Mark Vainikka

[*Insert name in full.*]

Bishop of the company mentioned below.

and I,

[*Insert name in full.*

[*Insert position in full—i.e. another director, or a company secretary.*]

Delete the above two boxes where there is a sole director/secretary for the company giving the owner's consent.

Of Lutheran Church of Australia Queensland District

[*Insert name of company and ACN.*]

the company being the owner of the premises identified as follows:

2 Collard Street, Biloela (1RP607657 and Lot 3 on CP843118)

consent to the making of a development application under the *Planning Act 2016* by:

REDEEMER LUTHERAN COLLEGE BILOELA

The Planning Act 2016 is administered by the Department of Local Government, Infrastructure and Planning, Queensland Government.

on the premises described above for:

Material Change of Use for an Educational Establishment

Company seal *[if used]*

Company Name and ACN: ....
..... Signature of Sole Director/Secretary
..... Date

[Delete the above where company owner's consent must come from both director and director/secretary.]

Company Name and ACN: ..... Lutheran Church of Australia Queensland District	
..... Signature of District Executive Officer – Trevor Ruthenberg	..... Signature of Bishop – Dr Mark Vainikka
..... Date	..... Date

[Delete the above where there is a sole director/secretary for the company giving the owner's consent.]

Council Chambers
62 Valentine Plains Road
Valentine Plains
Biloela Qld 4715

All Correspondence to
Chief Executive Officer
PO Box 412
Biloela Qld 4715

Phone 07 4992 9500
Fax 07 4992 3493
enquiries@banana.qld.gov.au
www.banana.qld.gov.au
ABN 85 946 116 646

Banana SHIRE
SHIRE OF OPPORTUNITY

Your Reference: ---
Our Reference: AL: GR: mw: 26-06 (FID98870, MCU013-25/26, FID9803, 13001037)
Contact: enquiries@banana.qld.gov.au

25 June 2026

Lutheran Church of Australia Queendland District
T/A Redeemer Lutheran College
C/- Reel Planning Pty Ltd
Attn: Tim O'Leary
Unit 1, 9 Camford Street
MILTON QLD 4064

Dear Sir

Confirmation Notice
Planning Act 2016 Section 68(1)
Development Assessment Rules Section 2

Application Number:	MCU013-25/26
Description:	Material Change of Use – Educational establishment (Extension to existing)
Level of Assessment:	Impact assessable
Site Address:	2 Collard Street, BILOELA
Lot & Plan Details:	Lot 1 on RP607657
Relevant Planning Scheme:	*Banana Shire Council Planning Scheme 2021*

The development application described above was received by Council on 2 June 2026 and determined to be properly made on 11 June 2026.

1. Details of the Application

The application seeks development approval for:

	Planning Regulation 2017	**Development Permit**	**Preliminary Approval**
Material Change of Use – Educational establishment (Extension to existing)	Section 20 – Assessable development	☒	☐

2. Referral Agencies

The development application does not require referral.

3. Public Notification

Public notification is required for this application under Section 68(1) of the *Planning Act 2016*. This includes advising adjoining owners, placing a public notice in the paper circulating in the area and placing a sign on each street frontage of the site.

Please note that public notification is required to be undertaken within legislative timeframes. This will be at least 15 business days. You can electronically access public notification templates, the *Development Assessment Rules,* and the *Planning Act 2016* on the State Planning Department's website.

Failure to commence public notification or provide a Notice of Compliance within the legislative timeframes will result in your application lapsing.

Please find attached the adjoining owner's details to assist with public notification.

4. Information Request

An information request will be made by the assessment manager.

If you find an inaccuracy in any of the information provided above or have a query or seek clarification about any of these details, please contact Council's Development Services section on (07) 4992 9500, quoting application number MCU013-25/26

Yours Sincerely

Anthony Lipsys
DIRECTOR COUNCIL SERVICES

ENC Attachment 1 - Adjoining owner details
Attachment 2 – Adjoining Owner Details

Attachment 1

MCU013-25/26 Adjoining Land Owners Details

Lot & Plan:	3CP843118
Name:	Lutheran Church of Australia (QLD Branch) C/- The Secretary

This publication has been produced by Banana Shire Council and is based on cadastral data provided by and used with the permission of the Department of Natural Resources and Mines [2026].

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0 100
metres

Scale 1 : 2,800 (A4 Original Size)
Transverse Mercator projection, GDA94, MGA Zone 56

Attachment 2 - Adjoining Land Owner Map

Banana SHIRE

Printed: 25 Jun 2026

Council Chambers
62 Valentine Plains Road
Valentine Plains
Biloela Qld 4715

All Correspondence to
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PO Box 412
Biloela Qld 4715

Phone 07 4992 9500
Fax 07 4992 3493
enquiries@banana.qld.gov.au
www.banana.qld.gov.au
ABN 85 946 116 646

Banana SHIRE
SHIRE OF OPPORTUNITY

Your Reference: ---
Our Reference: AL: GR: mw: 26-06 (FID98870, MCU013-25/26, FID9803, 13001037)
Contact: enquiries@banana.qld.gov.au

25 June 2026

Lutheran Church of Australia Queendland District
T/A Redeemer Lutheran College
C/- Reel Planning Pty Ltd
Attn: Tim O'Leary
Unit 1, 9 Camford Street
MILTON QLD 4064

Dear Sir

Information Request
Planning Act 2016 Section 68(1)
Development Assessment Rules Part 3

Application Number:	MCU013-25/26
Description:	Material Change of Use – Educational establishment (Extension to existing)
Level of Assessment:	Impact assessable
Site Address:	2 Collard Street, BILOELA
Lot & Plan Details:	Lot 1 on RP607657
Relevant Planning Scheme:	*Banana Shire Council Planning Scheme 2021*

Council has received the above-mentioned development application and advise that the following further information is required to properly assess the application.

1. Planning

1.1 Community Facilities Zone Code

1.1.1 *PO11 – Servicing*

The submitted Engineering Services Report addresses demand but does not address capacity of the existing water supply and sewer networks. Refer to items 1.3.1 and 1.3.2 below.

Information requested

Please provide additional information demonstrating that the water supply and sewer networks have suitable capacity to service the ultimate development demand. Refer to items 1.3.1 and 1.3.2 below.

1.2 Development Design Code

1.2.1 *PO24 – Water supply infrastructure (if in a water supply area)*

The submitted Engineering Services Report addresses demand but does not address capacity of the existing water supply network. Refer to item 1.3.2 below.

Information requested

Please provide additional information demonstrating that the water supply network has suitable capacity to service the ultimate development demand. Refer to item 1.3.2 below.

1.2.2 *PO27 – Sewerage infrastructure (if in a reticulated sewerage area)*

The submitted Engineering Services Report addresses demand but does not address capacity of the existing sewer network. Refer to item 1.3.1 below.

Information requested

Please provide additional information demonstrating that the sewer network has suitable capacity to service the ultimate development demand. Refer to item 1.3.1 below.

1.2.3 *PO33 – Stormwater drainage*

The response to PO33 states: *'A Site Based Stormwater Management Plan has been prepared to demonstrate that stormwater will be managed to ensure it does not cause nuisance to people and property."*

The Plan concludes that mitigation measures are required and states that: *"...no actionable damage and/or nuisance would be generated to the subject property or external/neighboring property's and downstream infrastructure as a direct result of this development being approved."*

Council is not satisfied that sufficient information has been provided to demonstrate compliance with PO33(a) and PO33(c).

Council is aware of an existing drainage issue associated with the stormwater manhole located within the school oval. During major rainfall events, the manhole surcharges, resulting in significant erosion within the school grounds and overland sheet flow entering downstream properties. The observed surcharge indicates that the existing stormwater network may not have sufficient capacity to adequately convey stormwater runoff during major storm events.

The submitted information does not adequately assess the capacity of the existing stormwater infrastructure having regard to the proposed ultimate development scenario, nor does it demonstrate that the development will not adversely impact surrounding

properties or downstream infrastructure.

Information requested
Please provide additional information including a revised response to PO33(a) and PO33(c) that:

1. Assesses the capacity of the existing stormwater drainage network to accommodate runoff generated by the ultimate development scenario;
2. Quantifies the impact of the proposed development on the existing stormwater system, including the identified surcharge location within the school oval;
3. Demonstrates that stormwater runoff from the development will not result in nuisance, erosion, property damage, or adverse impacts to downstream properties and infrastructure; and
4. Identifies and details any upgrades, augmentation works, or other mitigation measures required to address the existing surcharge issue and accommodate stormwater flows generated by the development.

1.3 Planning Report

1.3.1 *Appendix F – Engineering Services Report – 3.2 Sewer Demand*

The report concludes *'The existing sewer reticulation network is considered capable of servicing the proposed staged development.'* However, no evidence is provided to support that conclusion.

The report acknowledges that *'The exact location, depth, capacity and configuration of the existing sewer assets... will be confirmed during detailed design.'* If the capacity of the existing network is unknown, it is difficult to see how a conclusion regarding servicing capability can be reached.

The report calculates the proposed development will increase demand by approximately 24% over existing demand. But it does not demonstrate that the network can deliver that demand and maintain levels of service for existing users.

Without that information, the servicing conclusion remains an assumption rather than an evidence-based assessment.

Information requested
Please provide a sewer network capacity assessment demonstrating that the existing reticulation system and downstream infrastructure can accommodate the ultimate development demand.

1.3.2 *Appendix F – Engineering Services Report – 4.2 Water Demand*

The report calculates demand but does not demonstrate that the network can actually supply it. It simply states, *'The proposed*

development will be serviced via connection to the existing potable water reticulation network located within Archer Street.'

The report demonstrates how much water the school may require (approximately 24.2% increase over existing demand). But it does not demonstrate that the network can deliver that demand at acceptable pressures and flows and maintain levels of service for existing users.

Without a complete assessment, the conclusion that the development can be serviced by reticulated water is not fully substantiated.

Information requested
Please provide documentary evidence that confirms sufficient capacity exists in the water supply network to meet the supply demands of the ultimate development, including consideration of fire flows.

2. Plans/Drawings

2.1 Drawings CE26020-300-SEW; CE26020-301-SEW; and CE26020-811 SEW indicate connection to an existing sewer manhole shown as SE MH 01-1EX. Councils records indicate that this existing infrastructure is a pump well.

Information requested
Please provide documentary evidence that the existing pump well is appropriately designed and equipped to handle the additional loading to be imposed by the proposed development/fixtures and the ultimate development scenario.

Responding to the Information Request

The applicant must give notice to the Assessment Manager (in this instance Banana Shire Council) that either:

1. All the information requested will be provided
2. Part of the information requested will be provided
3. None of the information requested will be provided

Your written response to this information request must be provided on or before **25 September 2026**, and forwarded to either:

Email: enquiries@banana.qld.gov.au; or

Post: Banana Shire Council
Development Services Section
PO Box 412
BILOELA QLD 4715

The assessment of your application will be based on the information provided. It is recommended that you provide all the information requested in accordance with section 13 of the Development Assessment Rules.

If you do not provide a response before the above due date (or a further agreed period), it will be taken as if you have decided not to respond to the information request and Council will continue with the assessment of your application without the information requested.

Should you require further assistance in relation to this matter, please contact Council's Development Services team on (07) 4992 9500, quoting application number MCU013-25/26.

Yours Sincerely

Anthony Lipsys
DIRECTOR COUNCIL SERVICES

20 August 2026

The Chief Executive Officer
Banana Shire Council
PO Box 412
Biloela QLD 4715

Attention: Anthony Lipsys

Via email: enquiries@banana.qld.gov.au

Dear Anthony,

RE: RESPONSE TO INFORMATION REQUEST – MATERIAL CHANGE OF USE FOR EDUCATIONAL ESTABLISHMENT (EXTENSION TO EXISTING) AT 2 COLLARD STREET, BILOELA
COUNCIL REF: MCU013-25/26

Reference is made to the abovementioned development application and Council's Information Request dated 25 June 2026. In accordance with Section 13.2 of the DA Rules, we provide a full response to the matters raised, and request that Council proceed with assessment of the application.

In support of this response, the following information is provided:

- Engineering Response (**Attachment A**);
- Engineering Services Report (**Attachment B**); and
- Site Based Stormwater Management Plan (**Attachment C**).

We note that the information request seeks information regarding the ultimate development of the site rather than the Stage 2A works that have been applied for. We would like to reiterate that the application is limited to the Stage 2A works and that future Material change of use applications will be lodged for subsequent stages. These future applications will be supported by engineering reporting.

1. Planning

1.1 Community Facility Zone Code

1.1.1 PO11 – Servicing

Please see attached Engineering Response and updated Engineering Services Report which considers capacity, demand and any upgrades required.

1.2 Development Design Code

1.2.1 PO24 – Water supply infrastructure (if in a water supply area)

Please see attached Engineering Response and updated Engineering Services Report which confirms the network has sufficient capacity for the Stage 2A works.

1.2.2 PO27 – Sewer infrastructure (if in a reticulated sewerage area)

Please see attached Engineering Response and updated Engineering Services Report which confirms the network has sufficient capacity for the Stage 2A works.

1.2.3 PO33 – Stormwater drainage

Please see attached updated Site Based Stormwater Management Plan which confirms stormwater will be managed to ensure it does not cause nuisance to people and property.

1.3 Planning Report

1.3.1 Appendix F – Engineering Services Report – 3.2 Sewer Demand

Please see attached Engineering Response and updated Engineering Services Report which considers capacity, demand and any upgrades required.

1.3.2 Appendix F – Engineering Services Report – 4.2 Water Demand

Please see attached Engineering Response and updated Engineering Services Report which considers capacity, demand and any upgrades required.

2. Plans/Drawings

2.1 Plan clarification

Please see attached Engineering Services Report which provides amended sewer drawings which correctly identify the sewer pump well.

Fee Refund

Please see attached Charity Registration document (**Attachment D)** that confirms the applicant is a registered charity. In accordance with the Banana Shire Council Fees & Charges 2026/2027, Charitable & non-profit organisations are required to pay 25% of the scheduled fee. Noting that the applicant has paid 100% of the fee, we hereby request that 75% of the fee paid is refunded.

Thank you for your attention to this matter. We anticipate that this information is sufficient for your purposes and ask that you proceed with the assessment of this application.

Should you have any queries, please do not hesitate to contact Tim O'Leary

Yours sincerely,

Tim O'Leary
Principal Town Planner
REEL PLANNING

Our Ref: CE26020 - Information Response Letter
Contact: Lloyd Moloney/Vini Safatle

Banana Shire Council
Development Services
62 Valentine Plains Road
Biloela QLD 4715

14 August 2026

Attention: Development Assessment Manager

MCU013-25/26 – INFORMATION REQUEST

RE: MCU013-25/26 - DEVELOPMENT PERMIT FOR MATERIAL CHANGE OF USE
EDUCATIONAL ESTABLISHMENT (EXTENSION TO EXISTING)
2 COLLARD STREET, BILOELA
LOT 1 RP607657

On behalf of our client, The Lutheran Church of Australia Queensland District T/A Redeemer Lutheran College, c/- Reel Planning Pty Ltd, Moloney & Sons Engineering ("MSE") hereby submits this response to Banana Shire Council's Information Request dated 25 June 2026 relating to Development Application MCU013-25/26 and MSE response is as follows:

BSC Information Request:

1. Planning
1.1 Community Facilities Zone Code
1.1.1. P011 – Servicing
The submitted Engineering Services Report addresses demand but does not address the capacity of the existing water supply and sewer networks. Refer to Items 1.3.1 and 1.3.2 below.

Information Requested
Please provide additional information demonstrating that the water supply and sewer networks have suitable capacity to service the ultimate development demand. Refer to Items 1.3.1 and 1.3.2 below.

MSE Response:

The Engineering Services Report has been reviewed and amended to clarify the scope of the servicing assessment. The report quantifies the estimated water supply and sewerage demands for the ultimate development, while the engineering and hydraulic services drawings submitted with this application relate to the proposed Stage 2A works only.

Sections 3.2 and 4.2 of the Engineering Services Report have been revised to clarify the assumptions adopted for the assessment and the extent of the servicing investigations undertaken. Refer to Items 1.3.1 and 1.3.2 for further details.

BSC Information Request:

1.2 Development Design Code
1.2.1. P024 – Water Supply Infrastructure (Water Supply Area)

The submitted Engineering Services Report (ESR) quantifies the projected water demand associated with the proposed development; however, it does not demonstrate that the existing reticulated water supply network has sufficient capacity to accommodate the ultimate development demand. Refer to Section 1.3.2 below.

Information Requested
Provide additional information demonstrating that the existing water supply network has sufficient capacity to service the ultimate development demand. Refer to Section 1.3.2 below.

MSE Response:

The Engineering Services Report has been reviewed and amended in response to Council's comments.

Section 4.2 – Water Demand has been revised to clarify the scope of the assessment undertaken and the basis of the servicing assessment presented within the report. Additional water supply demand generated by the proposed Stage2A development is insignificant and it is unreasonable for a full analysis of the external water reticulation network be undertaken.

It is noted that pressure test reports have been obtained that demonstrate that the existing network static pressures exceed 500kPa and therefore meet CMDG requirements, as documented in the Engineering Services Report.

Refer to the revised Engineering Services Report and the response provided under Item 1.3.2.

BSC Information Request:

1.2.2. P027 – Sewerage Infrastructure (Reticulated Sewerage Area)
The submitted Engineering Services Report (ESR) quantifies the projected wastewater demand associated with the proposed development; however, it does not demonstrate that the existing sewer reticulation network has sufficient capacity to accommodate the ultimate development demand. Refer to Section 1.3.1 below.

Information Requested
Provide additional information demonstrating that the existing sewer reticulation network has sufficient capacity to service the ultimate development demand. Refer to Section 1.3.1 below.

MSE Response:

The Engineering Services Report has been reviewed and amended in response to Council's comments.

Section 3.2 – Sewer Demand has been revised to clarify the scope of the assessment undertaken and the basis of the servicing assessment presented within the report. Additional wastewater demand generated by the proposed Stage2A development is insignificant and it is unreasonable for a full analysis of the external sewer reticulation network be undertaken. The report further confirms that the existing sewer connection has sufficient capacity.

Refer to the revised Engineering Services Report and the response provided under Item 1.3.1.

BSC Information Request:

1.2.3. P033 – Stormwater Drainage
The response to P033 states: "A Site Based Stormwater Management Plan has been prepared to demonstrate that stormwater will be managed to ensure it does not cause nuisance to people and property."

The Plan concludes that mitigation measures are required and states that: "…no actionable damage and/or nuisance would be generated to the subject property or external/neighbouring property's and downstream infrastructure as a direct result of this development being approved."

Council is not satisfied that sufficient information has been provided to demonstrate compliance with P033(a) and P033(c) Council is aware of an existing drainage issue associated with the stormwater manhole located within the school oval. During major rainfall events, the manhole surcharges, resulting in significant erosion within the school grounds and overland sheet flow entering downstream properties. The observed surcharge indicates that the existing stormwater network may not have sufficient capacity to adequately convey stormwater runoff during major storm events.

The submitted information does not adequately assess the capacity of the existing stormwater infrastructure having regard to the proposed ultimate development scenario, nor does it demonstrate that the development will not adversely impact surrounding properties or downstream infrastructure.

Information Requested
Please provide additional information including a revised response to P033(a) and P033(c) that:

1. *Assesses the capacity of the existing stormwater drainage network to accommodate runoff generated by the ultimate development scenario;*
2. *Quantifies the impact of the proposed development on the existing stormwater system, including the identified surcharge location within the school oval;*
3. *Demonstrates that stormwater runoff from the development will not result in nuisance, erosion, property damage, or adverse impacts to downstream properties and infrastructure; and*
4. *Identifies and details any upgrades, augmentation works, or other mitigation measures required to address the existing surcharge issue and accommodate stormwater flows generated by the development.*

MSE Response:

The Site Based Stormwater Management Plan (SBSMP) has been reviewed and amended in response to Council's comments.

The SBSMP has been updated to further clarify the stormwater management strategy adopted for the proposed development, to demonstrate that stormwater will be managed to ensure it does not cause nuisance to people and property. The SBSMP model was developed using a conservative approach, incorporating all external catchment flows and the existing stormwater drainage network. The assessment also considered flows within the drainage system, overland flow paths, and conditions downstream of the site. Regarding the specific points raised above we note as follows:

1. The revised pre and post development analysis, which now includes the external catchment shows that no significant net increase is predicted by the minor increase in impervious area (~4%) associated with the proposed Stage 2A development, the subject of this application. Analysis of the ultimate development has not been undertaken due to uncertainty with the scope and/or timing of future stages and will be the subject of future application/s and is therefore not relevant to this application
2. As noted above, no significant net increase in runoff is predicted by the modelling undertaken, existing pipe network and overland flow paths will be maintained. Refer also drawing CE26020-113-TC containing cross-sections of the existing overland flow path through the site with 1%AEP flows contained and below adjoining building FFL's.
3. Again, no significant net increase in runoff is predicted, existing pipe network and overland flow paths will be maintained and as such the proposed Stage 2A development will not result in nuisance, erosion, property damage, or adverse impacts to downstream properties and infrastructure. Refer to the 2D modelling undertaken that demonstrates no change in downstream discharge characteristics (location/extent/depth etc).
4. While detailed design is still to be completed for the proposed additional internal stormwater drainage, preliminary design has been undertaken to assess the existing piped network drainage capacity (refer CE26020-612-DR). It would appear that the main line conveying both external and internal flows may has only been sized to accommodate 50%AEP (Q2) flows from the external catchment with the balance

conveyed via overland flow. It is proposed to modify the existing manhole with a grated domed lid and grouted stone pitching surround. Further detailed assessment of the existing stormwater network capacity, downstream infrastructure and associated Council assets will be addressed during the Operational Works (OPW) phase, where required by Council.

Refer to the revised Site Based Stormwater Management Plan for further details.

BSC Information Request:

1.3 Planning Report
1.3.1 Appendix F – Engineering Services Report – 3.2 Sewer Demand
The report concludes 'The existing sewer reticulation network is considered capable of servicing the proposed staged development.' However, no evidence is provided to support that conclusion.

The report acknowledges that 'The exact location, depth, capacity and configuration of the existing sewer assets... will be confirmed during detailed design.' If the capacity of the existing network is unknown, it is difficult to see how a conclusion regarding servicing capability can be reached.

The report calculates the proposed development will increase demand by approximately 24% over existing demand. But it does not demonstrate that the network can deliver that demand and maintain levels of service for existing users.

Without that information, the servicing conclusion remains an assumption rather than an evidence-based assessment.

Information requested
Please provide a sewer network capacity assessment demonstrating that the existing reticulation system and downstream infrastructure can accommodate the ultimate development demand.

MSE Response:

Section 3.2 – Sewer Demand of the Engineering Services Report has been reviewed and amended to clarify the scope of the sewer servicing assessment undertaken for this application.

The purpose of the assessment is to quantify the anticipated wastewater demand associated with the proposed ultimate development and identify the proposed servicing strategy. The report has been amended to remove any implication that a detailed hydraulic capacity assessment of Council's existing sewer reticulation network has been undertaken nor reasonable based on the insignificant increase in demand.

The Engineering Services Report also clarifies that the engineering and hydraulic drawings submitted with this application relate to the proposed Stage 2A works only, while the sewer demand calculations have been prepared for the ultimate development scenario for planning purposes.

Any detailed assessment of the existing sewer reticulation network capacity, downstream infrastructure and associated Council assets will be addressed during the Operational Works (OPW) phase, where required by Council.

Refer to the revised Engineering Services Report for further details.

BSC Information Request:

1.3.2 Appendix F – Engineering Services Report – 4.2 Water Demand
The report calculates demand but does not demonstrate that the network can actually supply it. It simply states, 'The proposed development will be serviced via connection to the existing potable water reticulation network located within Archer Street.'

The report demonstrates how much water the school may require (approximately 24.2% increase over existing demand). But it does not demonstrate that the network can deliver that demand at acceptable pressures and flows and maintain levels of service for existing users.

Without a complete assessment, the conclusion that the development can be serviced by reticulated water is not fully substantiated.

Information requested
Please provide documentary evidence that confirms sufficient capacity exists in the water supply network to meet the supply demands of the ultimate development, including consideration of fire flows.

MSE Response:

Section 4.2 – Water Demand of the Engineering Services Report has been reviewed and amended to clarify the scope of the water servicing assessment undertaken for this application.

The purpose of the assessment is to quantify the anticipated potable water demand associated with the proposed ultimate development and identify the proposed servicing strategy. The report has been amended to clarify that a detailed hydraulic assessment of Council's existing water supply network, including network capacity, operating pressures and fire flow availability, has not been undertaken as part of this assessment nor reasonable based on the insignificant increase in demand.

The Engineering Services Report also clarifies that the engineering and hydraulic drawings submitted with this application relate to the proposed Stage 2A works only, while the water demand calculations have been prepared for the ultimate development scenario for planning purposes.

Any detailed assessment of the existing water supply network capacity, including confirmation of available fire flows and any network augmentation requirements, will be addressed during the Operational Works (OPW) phase, where required by Council.

Refer to the revised Engineering Services Report for further details.

BSC Information Request:

2. Plans/Drawings
2.1 Drawings CE26020-300-SEW; CE26020-301-SEW; and CE26020-811 SEW indicate connection to an existing sewer manhole shown as SE MH 01-1EX. Councils records indicate that this existing infrastructure is a pump well.

Information requested
Please provide documentary evidence that the existing pump well is appropriately designed and equipped to handle the additional loading to be imposed by the proposed development/fixtures and the ultimate development scenario.

MSE Response:

The sewer drawings have been reviewed in response to Council's comments and have been amended to correctly identify the existing asset as an existing sewer pump well, in accordance with Council records.

The proposed sewer servicing strategy for Stage 2A remains subject to confirmation of the existing pump well configuration, levels and available capacity during the detailed Operational Works (OPW) design phase.

MSE has not undertaken a detailed assessment of the pump well capacity as part of the MCU submission, as this requires Council asset information, pump operating data, wet well configuration, existing loading and downstream infrastructure details.

Any required modifications, upgrades or augmentation works associated with the existing pump well will be addressed as part of the OPW documentation in consultation with Council.

We thank you for your continued assistance with this project and for the efforts that have been expended to reach a mutually agreeable outcome. If you should have any questions at all, please do not hesitate to contact our office and speak with the undersigned.

Yours sincerely

LCMoloney

Lloyd Moloney
Managing Director RPEQ 33682
for & on behalf of

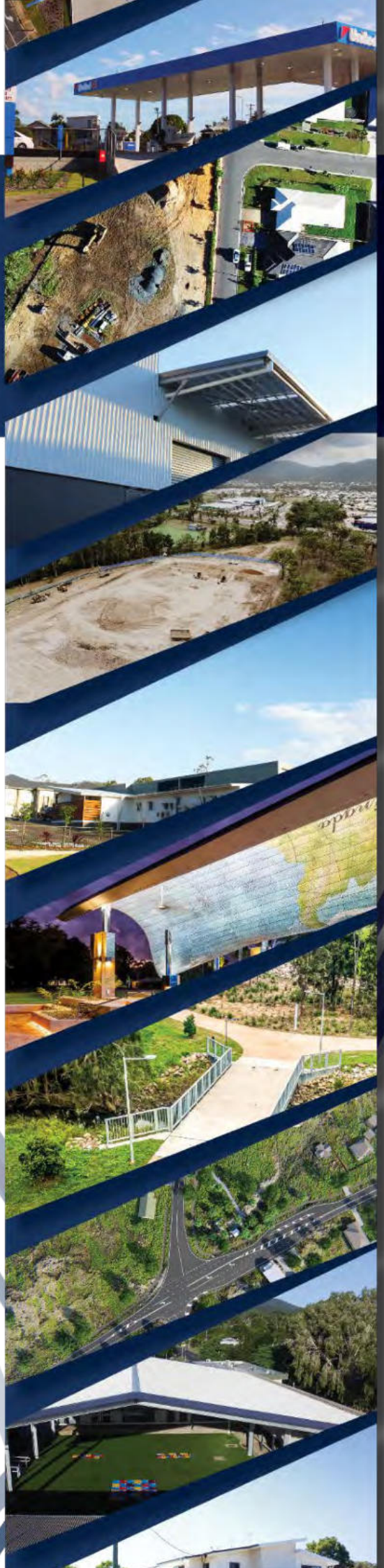
MOLONEY & SONS™
ENGINEERING

Encl. Appendix A – Engineering Services Report – Revision B
Appendix B – Engineering Drawings – Revision B
Appendix C – Site Based Stormwater Management Plan - Revision B

cc. Mr Tim O'Leary c/- Reel Planning Pty Ltd

Appendix A – Engineering Services Report

MOLONEY & SONS™
ENGINEERING



ENGINEERING SERVICES REPORT

MASTERPLAN EXPANSIONS

2 Collard Street, Biloela QLD 4715

REDEEMER LUTHERAN COLLEGE

12 August 2026

CE26020 – Engineering Services Report - Revision B
Contract No. CE26020 – 2 Collard Street, Biloela

A/ PO BOX 3203 RED HILL ROCKHAMPTON Q 4701
MOLONEY & SONS
ABN: 39 133 970 689

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Moloney & Sons Engineering™
Po Box 3203
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2026

DOCUMENT CONTROL:

Issue	*Date*	*Issue Description*	*Author*	*Checked*	*Approved*	*Certified/RPEQ*
A	*29/05/2026*	*Issued for Approval*	*AB*	*VS*	*LM*	*RPEQ:33682*
B	*12/08/2026*	*Issued for Approval*	*AB*	*TA*	*LM*	*RPEQ:33682*

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1. Introduction

1.1. Background

Moloney & Sons Engineering (MSE) has been engaged by Redeemer Lutheran College to prepare this Engineering Services Report (ESR) in support of the proposed development located at 2 Collard Street, Biloela QLD 4715.

The subject site comprises the existing Redeemer Lutheran College campus and is legally described as Lot 1 on RP607657. The site is situated within an established urban area of Biloela and is bounded generally by Collard Street to the north, Bell Street to the west and Archer Street to the east.

The proposed Stage 2A development comprises expansion and upgrade work to the existing College campus, including new educational facilities, internal access roads, car parking areas, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil works.

The proposed civil works have been developed to support the future operational requirements of the College and improve internal circulation, site functionality and servicing infrastructure throughout the campus.

This report has been prepared to provide a preliminary engineering assessment of the proposed development and to demonstrate that the site can be appropriately serviced by existing and proposed infrastructure networks, subject to detailed design and relevant authority approvals.

The proposed development site is illustrated as *Figure 1 Subject Site Locality.*

Figure 1 Subject Site Locality

1.2. Existing Development Site

The existing College campus currently accommodates a range of educational buildings, administration areas, internal access driveways, parking areas, landscaped areas and associated school infrastructure.

The site has frontage to Collard Street, Bell Street and Archer Street, with existing access arrangements servicing student, staff, visitor and service vehicle movements associated with the ongoing operation of the College.

Existing infrastructure services, including water supply, sewerage, stormwater drainage, electricity and telecommunications, are available within the surrounding road reserve network adjacent to the site.

The existing development layout and surrounding infrastructure network provide a suitable basis for the proposed expansion and upgrade works associated with the College masterplan development.

1.3. Existing Topography

The subject site comprises an existing developed educational facility with established building platforms, internal access driveways, parking areas and landscaped open space.

Based on the available survey information and concept civil design drawings, the site generally falls across the development area with localised level differences requiring retaining walls, batter transitions and associated earthworks to achieve the proposed finished surface levels.

The proposed development includes localised cut and fills earthworks associated with the construction of new building platforms, internal access roads, parking areas, footpaths and drainage infrastructure.

Concept earthworks drawings indicate that retaining walls will be required in selected areas of the site to accommodate finished level transitions and improve site functionality. Preliminary cut and fill quantities have also been identified as part of the proposed civil works. Existing overland flow paths and site grading characteristics have been considered as part of the preliminary stormwater design to facilitate lawful stormwater conveyance throughout the development site.

Detailed earthworks design; final grading and stormwater management measures will be confirmed during detailed design and construction documentation phases.

1.4. Proposed Development

The proposed development comprises a staged expansion of the existing Redeemer Lutheran College campus located at 2 Collard Street, Biloela. The masterplan development has been prepared by BEAT Architects and includes a combination of new educational facilities, refurbishment and repurposing of existing buildings, parking upgrades, internal access improvements and associated civil infrastructure works.

Based on the current concept design drawings, the proposed works generally include:

- new educational building facilities,
- internal access roads and circulation areas,
- additional car parking areas,
- pedestrian footpaths and external hardstand areas,

- retaining walls and associated earthworks,
- stormwater drainage infrastructure,
- sewer servicing works, and
- associated utility servicing infrastructure.

The proposed development layout is illustrated as *Figure 2* Proposed Development.

Figure 2 Proposed Development (Stage 2A)

The proposed development is intended to be delivered in multiple stages to accommodate future growth of the College and associated increases in student and staff population over time.

The proposed staging arrangement prepared by BEAT Architects is illustrated in *Figure 3*.

Figure 3 Proposed Staging Masterplan

The proposed masterplan includes staged expansion works identified as Stage 1, Stage 2A, Stage 2B, Stage 3, Stage 4 and future indicative Stage 5 and Stage 6 development areas. The future stages generally comprise additional educational buildings, specialist learning areas, covered play spaces and supporting campus infrastructure.

Stage 1 works generally include additional modular classroom facilities, staff parking and associated pedestrian connectivity upgrades. Stage 2A and Stage 2B works primarily comprise additional secondary learning facilities, administration buildings, covered areas and associated access improvements. Future stages include additional educational buildings, specialist teaching facilities and associated campus expansion works.

The proposed development layout, access arrangements and indicative staging framework have been considered as part of this Engineering Services Report for the purposes of assessing the servicing requirements associated with the ultimate masterplan development.

2. Earthworks

2.1. Civil Design

Localised earthworks are proposed throughout the development site to facilitate the construction of the proposed educational facilities, internal access roads, parking areas, footpaths and associated infrastructure. The concept civil design has considered the existing site topography, surrounding road interfaces and proposed finished surface levels to achieve suitable vehicle manoeuvring, pedestrian connectivity and stormwater drainage outcomes throughout the site. The proposed works generally include:

- cut and fill earthworks,
- pavement preparation,
- retaining walls,
- localised batter transitions, and
- site grading works.

Figure 4 illustrates the proposed earthworks and civil design layout associated with the development.

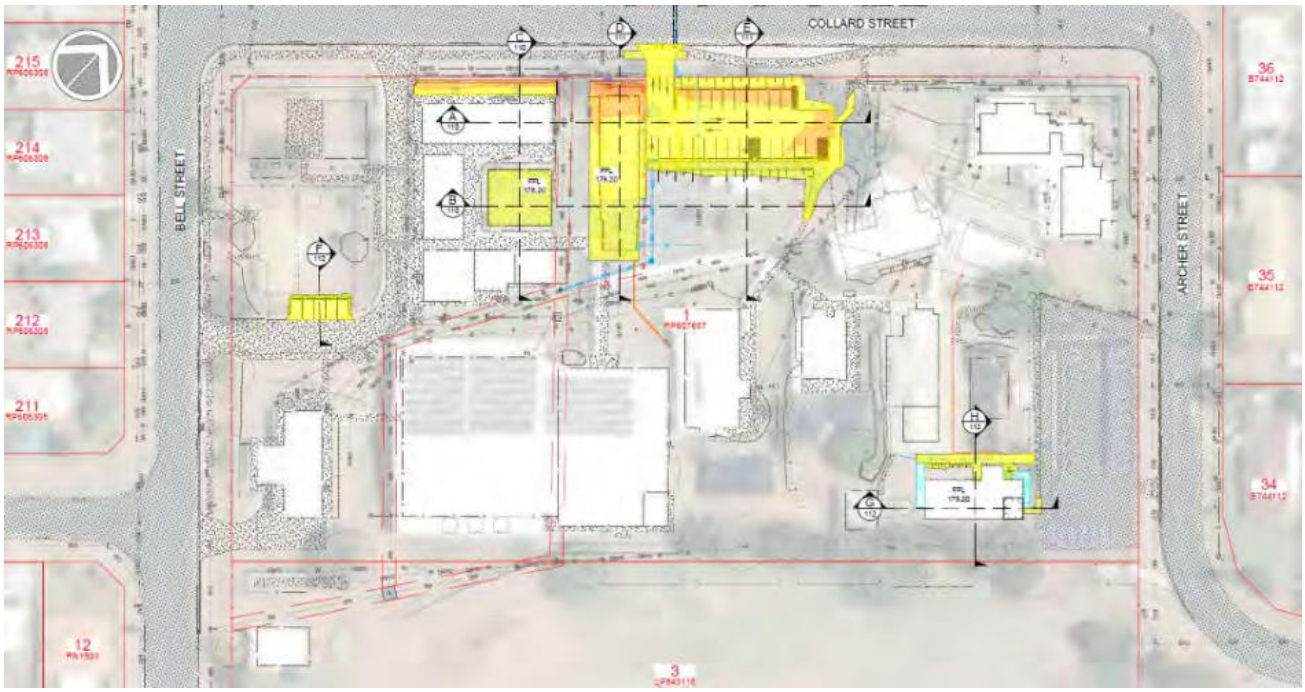


Figure 4 Proposed Earthworks Layout and Cut/Fill Depth Range.

Preliminary earthworks quantities identified within the concept civil design drawings are summarised in *Table 1*

Table 1 Proposed Earthworks Volumes for the Proposed Upgrades & Master Plan Expansion

Land Use	Cut to Fill (m³)	Cut (Spoil off from Site) (m³)	Total Volume (m³)
Proposed Educational Development	66	482	548

The proposed finished levels have been developed to integrate with the existing surrounding road network, including Collard Street, Bell Street and Archer Street, whilst also facilitating suitable drainage outcomes throughout the site.

Detailed earthworks design, retaining wall design and final grading arrangements are as documented in the engineering drawings in Appendix A.

2.2. Erosion & Sediment Control

Erosion and sediment control measures are implemented during construction to minimise the potential for sediment migration and environmental impacts associated with the proposed works.

Concept erosion and sediment control measures are identified and illustrated on the *MSE Engineering Drawings* in Appendix A. The proposed concept measures generally include:

- stabilised construction access points,
- sediment fencing,
- inlet protection,
- stockpile management,
- diversion controls, and
- progressive stabilisation of disturbed areas.

The final detailed Erosion and Sediment Control Plan (ESCP) and associated design requirements form part of the Operational Works stage and future construction documentation process, in accordance with relevant local authority requirements and applicable industry guidelines are as documented in the engineering drawings in Appendix A.

3. Sewer Reticulation

3.1. Existing Sewer Reticulation

The subject site is located within the Banana Shire Council wastewater servicing area and is understood to be connected to the existing sewer reticulation network servicing the Biloela township.

Based on available information, existing sewer infrastructure is located within the surrounding road network, including Collard Street, Bell Street and Archer Street. The presence of this infrastructure indicates that the site is positioned within an established sewer catchment and is capable of being serviced by the existing network. It is understood that the site is currently connected to the exiting sewer network via a maintenance hole in Archer Street. The site is internally serviced via a combination of gravity and pumped/rising sanitary drainage systems.

The exact location, depth, capacity and configuration of the existing sewer assets, including nearby manholes and connection points, will be confirmed during detailed design and through Dial Before You Dig (DBYD) enquiries and/or Council records.

Accordingly, sewer servicing to the subject land is considered feasible in principle, subject to detailed design and approval by Banana Shire Council. The Stage 2A proposed development will create insignificant additional demand on the existing infrastructure.

3.2. Sewer Design Demands Calculation

The sewerage demand for the proposed development has been calculated generally in accordance with:

- Capricorn Municipal Development Guidelines (CMDG) D12 – Sewerage Design
- Table D12.07.01 – Design Average Dry Weather Flow (ADWF)

Equivalent Population (EP) for the development has been determined based on the projected student and staff population associated with the staged masterplan development prepared by BEAT Architects. The adopted EP values for each development stage are summarised in *Table 2*

The Existing Sewer System Design Calculation is summarised in *Table 3.* and the Ultimate Sewer System Design Demand Summary for the staged development summarised in *Table 4.*

Table 2 Equivalent Persons (EPS), Summary for Proposed Development Staging

Development Stage	Students	Staff	Equivalent Persons (EPs)
Existing Development	346	50	396
Stage 1 – 2 New GLAs	363	51	414
Stage 2A – 3 New GLAs	389	52	441
Stage 2B – Administration Expansion	408	52	460
Stage 3 – Internal Conversions & Specialist Spaces	423	52	475
Stage 4 – 2 Gla's & Drama Rooms	440	52	492

The sewer servicing demands associated with the proposed development have been assessed based on the ultimate development scenario to ensure adequate servicing capacity is available for the future expansion of the College campus.

Detailed sewer design calculations, including ADWF, PDWF and WWF, are provided within the following sections of this report.

Table 3 Sewerage Existing System Design

Item/Source	Value/Description
Average Dry Weather Flow (ADWF)	ADWF = 200 L/EP/day × 396 EP = 79,200 L/day or 0.92 L/s
Peak Dry Weather Flow (PDWF)	PDWF=2.5×79,200=198,000L/day or 2.29 L/s
Wet Weather Flow (WWF)	WWF=5×79,200=396,000L/day = 4.58L/s

Table 4 Sewerage Ultimate System Design

Development Stage	ADWF (L/day) - (L/Sec)	PDWF (L/day) - (L/Sec)	WWF (L/day) - (L/Sec)
Stage 1 – 2 New GLAs	82,800 – 0.96	207,000 – 2.40	414,000 – 4.79
Stage 2A – 3 New GLAs	88,200 – 1.02	220,500 – 2.55	441,000 – 5.10
Stage 2B – Administration Expansion	92,000 – 1.06	230,000 – 2.66	460,000 – 5.32
Stage 3 – Internal Conversions & Specialist Spaces	95,000 - 1.10	237,500 – 2.75	475,000 – 5.50
Stage 4 – 2 Gla's & Drama Rooms	98,400 – 1.14	246,000 – 2.85	492,000 – 5.69

Where:

- ADWF = Average Dry Weather Flow.
- PDWF = Peak Dry Weather Flow; and
- WWF = Wet Weather Flow.

The above sewer design demands have been calculated based on an adopted Average Dry Weather Flow of 200L/EP/day in accordance with CMDG D12 – Sewerage Design. Peak flow factors have been applied to determine the design loading associated with the proposed staged development.

The sewer demand calculations presented in this section have been undertaken to quantify the projected wastewater loading associated with the existing College population, staging and the ultimate masterplan development.

The adopted design flows establish the anticipated sewer servicing demand generated by the proposed development and provide the basis for the internal sewer reticulation design.

The existing 150dia sewer property connection has a capacity of approximately 15L/s which is more than sufficient to accommodate the current Stage 2A development (WWF = 5.10L/s) and ultimate planned development (WWF = 5.69 L/s).

The proposed sewer servicing layout for Stage 2A is illustrated in *APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS* and *APPENDIX B – MRP HYDRAULIC DRAWINGS*.

3.3. Proposed Sewerage

The proposed Stage 2A development will be serviced by augmentation to the existing gravity and pumped/rising sanitary drainage systems that already connect to the existing sewer infrastructure adjacent to the site in Archer Street.

Based on the proposed internal sanitary drainage layout drawings, the works generally comprise a new gravity sanitary drain to service the new Block P classrooms and an additional internal pump/rising sanitary main to service the relocated chapel building.

The proposed sewer reticulation network has been configured to accommodate the proposed staged development and, where required, the ultimate sewer demand identified in *Section 3.2*

Final sewer/sanitary infrastructure design, including pipe grades, invert levels, cover, maintenance hole configuration and connection details for Stage 2A is illustrated in *APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS* and *APPENDIX B – MRP HYDRAULIC DRAWINGS*, refer extract in Figure 5 below.

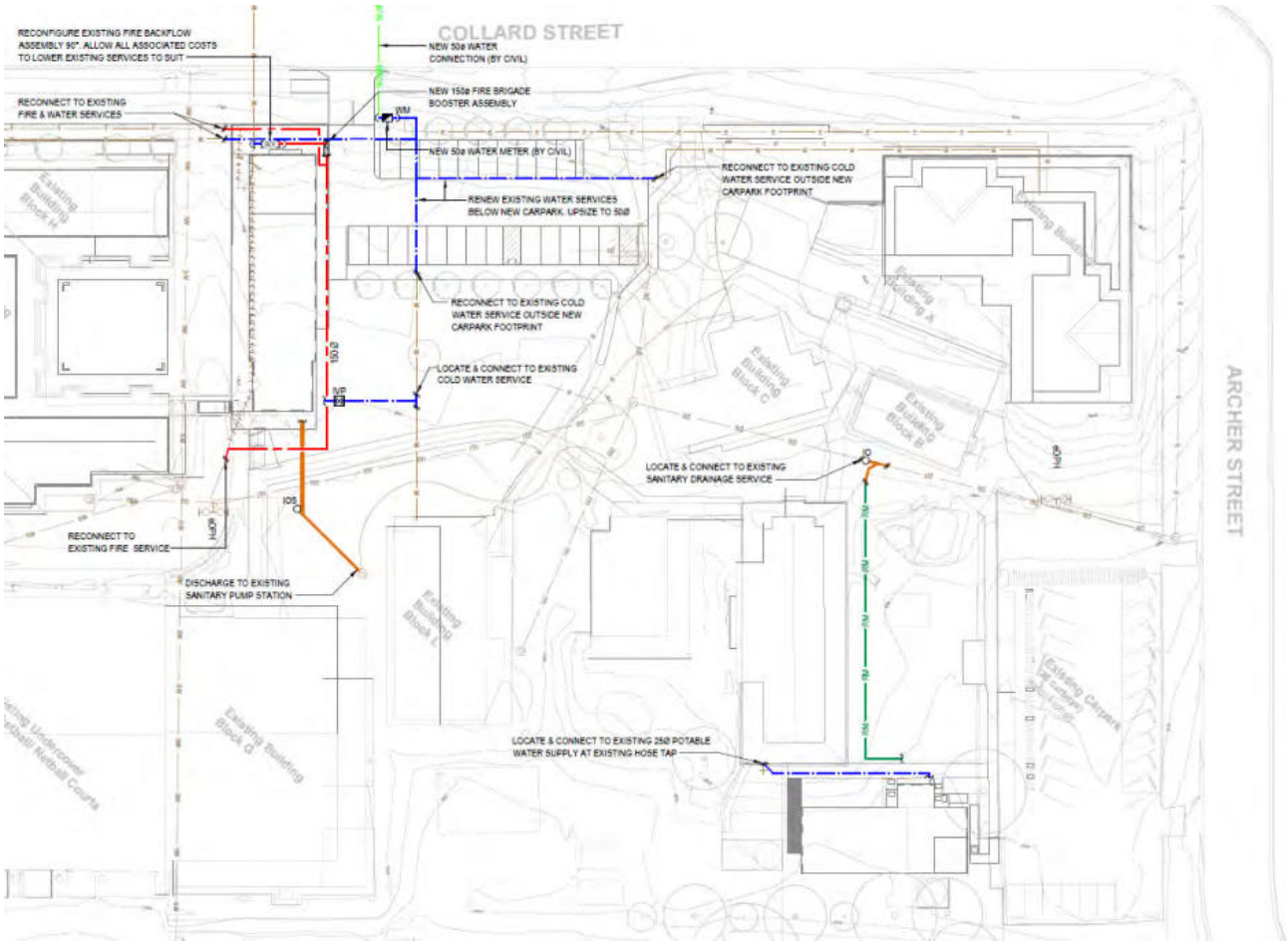


Figure 5 Proposed Stage 2A Sewer Layout Plan

4. Water Supply

4.1. Existing Water Supply

The subject site is located within an established serviced area and is currently adjacent to existing potable water infrastructure.

Review of the available servicing information and preliminary design drawings indicates the presence of an existing water reticulation network within the surrounding road reserve, capable of servicing the proposed development. Existing water infrastructure is understood to include an existing water main located adjacent to the site frontage, with proposed connection points identified within the servicing layout drawings.

4.2. Water Design Demands Calculation

Water demand for the proposed school expansion has been calculated generally in accordance with the *Capricorn Municipal Development Guidelines (CMDG) D11 – Water Supply Network, specifically Section D11.07 – Design Demands and Table D11.07.01 – Design Demands.*

Equivalent Population (EP) for the development has been determined based on the projected student and staff population associated with the staged masterplan development prepared by BEAT Architects. The adopted EP values for each development stage are summarised in *Table 2.* In accordance with *CMDG D11 Table D11.07.01*, the following water demand criteria have been adopted for the proposed development:

- Average Day Demand (AD) = 650 L/EP/day
- Peak Day Demand (PD) = 2.25 × AD
- Peak Hour Demand (PH) = PD / 12

The Existing Water Demand Summary is provided in *Table 5* and the Ultimate Water Demand Summary for the staged development is provided in *Table 6.*

Table 5 Water Existing System Design

Item/Source	Value/Description
Average Day Demand (AD)	AD = 650 L/EP/day × 396 EP = 257,400 L/day = 2.98 L/s
Peak Day Demand (PD)	PD=2.25×257,400 = 579,150L/day = 6.703L/s
Peak Hour Demand (PH)	PH=1/12 × 579,150L/day = 48,263 L/hr = 13.41 L/s

Table 6 Water Ultimate System Design Summary

Development Stage	AD (L/day) – (L/sec)	PD (L/day) – (L/sec)	PH (L/hr) – (L/sec)
Stage 1 – 2 New GLAs	269,100 – 3.115	605,475 – 7.008	50,456 – 14.016
Stage 2A – 3 New GLAs	286,650 – 3.318	644,963 – 7.465	53,747 – 14.930
Stage 2B – Administration Expansion	299,000 – 3.461	672,750 – 7.786	56,063 – 15.573
Stage 3 – Internal Conversions & Specialist Spaces	308,750 – 3.573	694,688 – 8.040	57,891 – 16.081
Stage 4 – 2 Gla's & Drama Rooms	319,800 – 3.701	719,550 – 8.328	59,963 – 16.656

4.3. Proposed Water Supply

The proposed Stage 2A and ultimate development will be serviced via an upgraded connection to the existing potable water reticulation network located within Collard Street adjacent to the site.

Based on the proposed water servicing layout, the proposed works include a new Ø50mm water service connection extending from the existing water main within the road reserve to the proposed development area. The final connection location and existing service levels are to be confirmed on site during construction phases.

The proposed water servicing arrangement includes a new Ø50mm approved water meter within an approved meter pit located adjacent to the proposed development. Internal building water supply infrastructure will be designed and coordinated by the Hydraulic Engineer as part of the detailed building services design. It is also proposed to reconfigure the internal fire services to accommodate the new classroom building, this will include reconfiguring the existing fire backflow assembly, realign/lower pipework to accommodate the new building and reconfigured carpark and the provision of a fire booster cabinet.

The proposed water reticulation has been developed to accommodate the staged masterplan expansion of the College and provide suitable servicing capacity for the ultimate development scenario identified within this report.

Final water infrastructure design, including pipe sizing, meter requirements, valve arrangements, connection details and construction requirements, will be confirmed during detailed design and authority approval phases. Due to the insignificant increase in demand, no augmentation of council water supply network is deemed required. Furthermore, pressure test reports have been obtained that demonstrate that the existing network static pressures exceed 500kPa and therefore meet CMDG requirements. *Refer APPENDIX C - FIRE SERVICE PRESSURE TESTING RECORDS*.

The proposed water supply servicing layout for Stage 2A is illustrated in *APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS* and *APPENDIX B – MRP HYDRAULIC DRAWINGS*, refer extract in Figure 6 below.

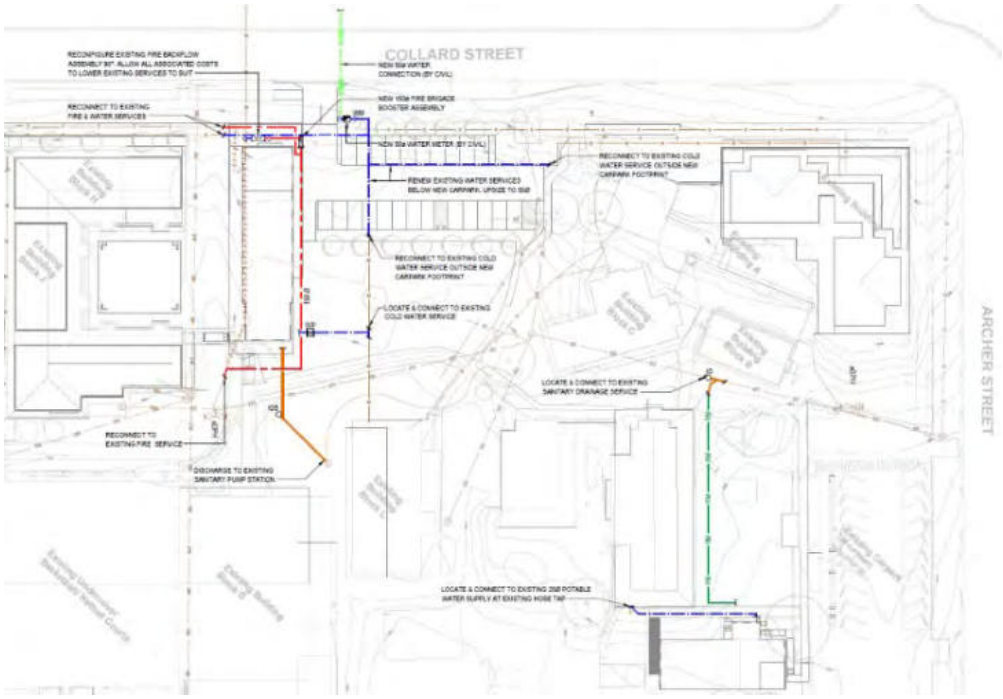


Figure 6 Proposed Stage 2A Water Reticulation Layout Plan

5. Access & Roadworks

5.1. Existing Access

The subject site currently obtains vehicle access from *Collard Street*, *Bell Street*, and *Archer Street* via the existing internal driveway network servicing the existing College campus.

The surrounding road network generally comprises sealed local roads within an established urban environment servicing the surrounding residential area and existing educational facilities.

Existing on-site access arrangements currently provide vehicle circulation, staff parking, student drop-off/pick-up functionality, and servicing access associated with the operation of the College.

Based on the current proposed development layout, the existing access arrangements from *Bell Street* and *Archer Street* remain unchanged as part of the proposed development works. The proposed access upgrade works are limited to the existing *Collard Street* frontage and associated internal vehicle circulation areas.

The existing surrounding road network is considered capable of accommodating the anticipated traffic movements associated with the proposed staged expansion of the College, subject to detailed design and operational assessment where required.

Figure 7 Existing Collard Street / College Access

5.2. Proposed Access & Roadworks

The proposed development includes upgrades to the existing internal access and parking arrangements associated with the staged expansion of the College campus.

Based on the current concept design, the proposed works generally include:

- upgrades to the existing Collard Street access arrangement.
- internal vehicle circulation improvements.

- additional car parking areas.
- pedestrian pathway connections.
- associated access and manoeuvring areas servicing the proposed educational facilities.

No new driveway access is currently proposed from Bell Street as part of the proposed development works.

The proposed access and parking layout has been developed to support the staged masterplan development while maintaining suitable vehicle manoeuvring, pedestrian connectivity and operational functionality across the site.

Final access design details, including driveway geometry, parking layout, pavement design, pedestrian connectivity and associated line marking/signage requirements, are as documented in the engineering drawings in Appendix A.

6. Flooding

Flood information provided by Banana Shire Council for Lot 1 on RP607657, being the subject site at 2 Collard Street, Biloela, has been reviewed as part of this Engineering Services Report. The Council flood advice is based on the Callide Valley Flood Model prepared by Kellogg Brown & Root (KBR) for Banana Shire Council.

The Council flood information indicates that the subject site is not identified as being affected by the 10 year ARI, 20 year ARI, 50 year ARI, 100 year ARI or 2013 flood events. Flood impact to the property is identified only under the 100 year ARI plus climate change flood model scenario. Under this scenario, Council's flood information identifies a maximum flood level of RL 177.25 m AHD and a maximum modelled flood depth of 1.08 m.

Maximum Flood Depths - 100yr ARI Flood

Maximum Flood Depths – 100+ccyr ARI Flood

Figure 8: Banana Shire Council Flood Modelling Extract – 100 year ARI and 100 year ARI plus Climate Change Flood Events

The proposed Stage 2A works and broader masterplan upgrades are located within the existing developed school campus and comprise new educational facilities, access and parking upgrades, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil servicing works. The current civil engineering drawings nominate proposed building and platform levels above the reported 100 year ARI plus climate change flood level of RL 177.25 m AHD, including the principal proposed building FFL of RL 178.20 m AHD. Where lower finished floor levels are nominated, including RL 177.60 m AHD, these levels remain above the reported 100 year ARI plus climate change flood level, subject to final confirmation during detailed design.

On this basis, the proposed development is not expected to be adversely affected by the modelled flood level and is not expected to increase flood risk to adjoining properties. The proposed earthworks are localised and are primarily associated with site grading, pavement preparation, building platform formation, retaining wall transitions and stormwater drainage infrastructure. Preliminary earthworks quantities mentioned in *Section 2.1* indicate that the proposed works include approximately 26 m^3 of cut-to-fill and approximately 499 m^3 of material to be removed from site. Accordingly, the proposed works are not expected to materially reduce available flood storage.

The proposed stormwater drainage design incorporates internal drainage infrastructure and detention measures to manage runoff from the developed catchment prior to discharge to the downstream stormwater network. Final stormwater and flood-related design details will be confirmed during the Operational Works / detailed design stage and remain subject to Council approval. Refer also to the Site Based Stormwater Management Plan prepared by Moloney and Sons Engineering for further information.

Based on the available Council flood information and the current civil design, the proposed development is not expected to result in adverse flood impacts, unacceptable flood immunity outcomes, or a material reduction in flood storage.

7. Electricity

7.1. Existing Electricity

Electricity servicing for the subject site is available from the existing electrical distribution network within the surrounding Biloela area.

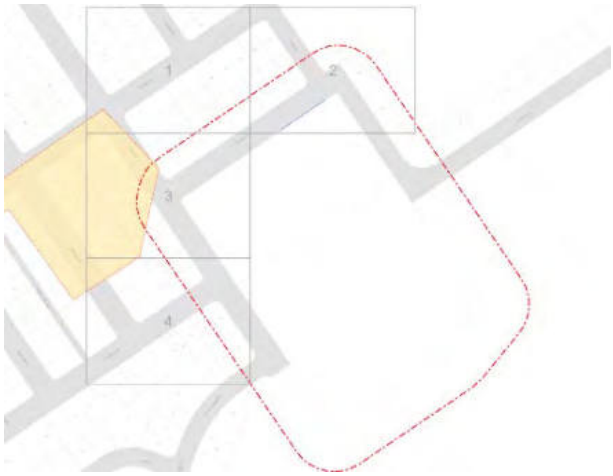
Based on available mapping and aerial information, existing electricity infrastructure is located within the surrounding road corridors, including Collard Street, Bell Street and Archer Street adjacent to the site. The surrounding network is understood to service the existing Redeemer Lutheran College campus and adjoining residential development.

The presence of established electrical infrastructure surrounding the site indicates that the proposed development is located within an existing electricity service area and is capable of being connected to the local distribution network.

The exact location, capacity and configuration of the existing electrical infrastructure, including any overhead and underground assets, transformers and connection points, will be confirmed during detailed design and consultation with the relevant electricity authority.

Any required augmentation, relocation, or extension of the existing network associated with the proposed development will be determined during detailed design and subject to approval by the relevant electricity authority.

Accordingly, electricity supply to the subject land is considered feasible in principle, subject to detailed design and approval by the relevant electricity service provider. Refer to *Figure 9.*



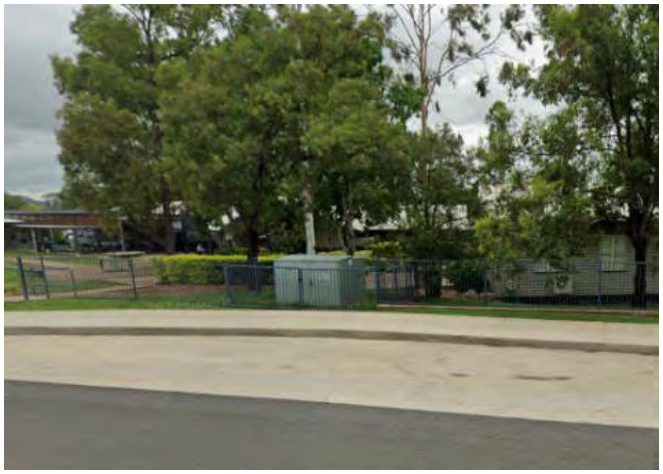


Figure 9 Existing Electricity Network & Pad Mount Transformer Servicing the Site

7.2. Proposed Electricity

The proposed development will be serviced via extension and/or augmentation of the existing internal electricity distribution network to support the future operation of the Redeemer Lutheran College expansion areas.

Electrical servicing will be provided to the proposed educational buildings, administration areas, amenities, parking areas and associated infrastructure throughout the development site.

The proposed internal electrical reticulation network will generally be arranged within the internal development areas and road corridors to provide efficient distribution throughout the site.

The final internal network configuration, including any required conduits, switchboards, underground reticulation and connection points, will be determined during detailed electrical design and in consultation with the relevant electricity authority.

All electrical infrastructure will be designed and constructed in accordance with applicable Queensland standards and service authority requirements.

Accordingly, the proposed electrical servicing arrangement demonstrates that the development can be effectively supplied with electricity, subject to detailed design and final approval (if required) by the relevant electricity authority.

8. Communications

8.1. Existing Telecommunications

Telecommunications service for the subject site is available from the existing communications infrastructure located within the surrounding Biloela urban area.

Based on available utility mapping and surrounding development infrastructure, existing telecommunications assets are located within the adjacent road corridors, including Collard Street, Bell Street and Archer Street surrounding the subject site.

The surrounding telecommunications network is understood to service the existing Redeemer Lutheran College campus and adjoining residential development areas. Existing infrastructure generally comprises underground telecommunications conduits, pits and associated reticulation infrastructure within the surrounding road reserve.

The presence of established telecommunications infrastructure adjacent to the site indicates that the proposed development is located within an existing serviced area and is capable of being connected to the existing network.

The exact location, capacity and configuration of the existing telecommunications infrastructure, including any NBN Co and/or Telstra assets, will be confirmed during detailed design and consultation with the relevant service providers.

Accordingly, telecommunications servicing to the subject land is considered feasible in principle, subject to detailed design and approval (if required) by the relevant telecommunications authorities.

Please refer to *Figure 10*

Figure 10 Existing NBN Telecommunication

8.2. Proposed Telecommunications

The proposed development will be serviced by extension and/or augmentation of the existing internal telecommunications infrastructure to support the future operation of the Redeemer Lutheran College expansion areas.

Telecommunications infrastructure will be provided to service the proposed educational buildings, administration areas and associated facilities throughout the development site.

The proposed telecommunications reticulation network will generally be arranged within the internal development areas and service corridors to provide efficient connectivity throughout the site.

The final network configuration, including conduit alignments, pit locations, service connections and associated communications infrastructure, will be determined during detailed design and (if required) in consultation with the relevant telecommunications providers.

All telecommunications infrastructure will be designed and constructed in accordance with applicable Australian Standards and relevant authority requirements.

Accordingly, the proposed telecommunications servicing arrangement demonstrates that the development can be effectively connected to the existing communications network, subject to detailed design and (if required) final approval by the relevant telecommunications authorities.

9. Summary

This Engineering Services Report has been prepared to provide a preliminary assessment of the infrastructure servicing requirements required to support the proposed staged expansion works and broader masterplan development for Redeemer Lutheran College located at 2 Collard Street, Biloela QLD.

The assessment confirms that the subject site is located within an established urban area serviced by existing infrastructure networks and is considered capable of accommodating the proposed development, subject to detailed design and relevant authority approvals.

The key findings of this report are summarised as follows:

- Earthworks:
  Preliminary assessment indicates that the proposed development can be suitably integrated within the existing site topography, subject to detailed earthworks design, grading and stormwater management considerations.
- Sewer Reticulation:
  Existing sewer infrastructure is available within the surrounding road network and is considered capable of servicing the proposed College expansion. Preliminary sewer demand calculations indicate that the development can be accommodated within the existing servicing framework, subject to detailed design and authority approval.
- Water Supply:
  Potable water infrastructure is available adjacent to the site within the surrounding road network. Preliminary water demand assessment indicates that the proposed development can be effectively serviced by the existing reticulation network, subject to detailed hydraulic design and final approval by the relevant authority.
- Access & Roadworks:
  The site currently benefits from established access arrangements via Collard Street, Bell Street and Archer Street servicing the existing College campus. The proposed development includes upgrades to the Collard Street access arrangement, internal circulation network, pedestrian connectivity and additional parking areas to support the operational requirements and future expansion of the College. The surrounding road network is considered capable of accommodating the anticipated traffic movements associated with the proposed staged development, subject to detailed design and operational assessment where required.
- Flooding:
  Council flood information indicates that the subject site is not affected by the 10 year ARI, 20 year ARI, 50 year ARI, 100 year ARI or 2013 flood events, with flood impact identified only under the 100 year ARI plus climate change model. The proposed building finished floor levels are above the reported 100 year ARI plus climate change flood level, and the proposed localised earthworks are not expected to materially reduce flood storage or result in adverse flood impacts.
- Electricity:
  Existing electricity infrastructure is available surrounding the site and is considered capable of servicing the proposed development through extension and augmentation where required, subject to detailed design and approval by the relevant electricity authority.
- Telecommunications:
  Existing telecommunications infrastructure is located within the surrounding road reserve and can be extended to service the proposed development. Final service arrangements will be confirmed during detailed design in consultation with the relevant telecommunications providers.

Overall, the proposed development is considered capable of being appropriately serviced by the existing and proposed infrastructure networks in a coordinated and practical manner. Detailed design, confirmation of servicing arrangements and relevant authority approvals will be required prior to construction and future development stages.

APPENDIX A – MOLONEY & SONS ENGINEERING DRAWINGS

APPENDIX B – MRP HYDRAULIC DRAWINGS

HYDRAULIC SERVICES

REDEEMER LUTHERAN COLLEGE - STAGE 2A

8 BELL ST

BILOELA, QLD, 4715

Lot 1 on RP607657

Banana Shire Council

PROJECT NOTES

General Notes

1. THE CONTRACTOR IS OBLIGATED TO INSPECT THE SITE & BE SATISFIED AS TO THE CONDITIONS UNDER WHICH THE WORK WILL BE CARRIED OUT PRIOR TO THE SUBMISSION OF A TENDER OFFER.
2. DO NOT SCALE DRAWINGS, REFER TO ARCHITECTURAL DRAWINGS FOR ALL SET-OUT DIMENSIONS.
3. THE CONTRACTOR SHALL ALLOW TO SUPPLY & INSTALL ALL SANITARY FIXTURES, TAPWARE, APPLIANCES, EQUIPMENT & ASSOCIATED ACCESSORIES. REFER TO FITTING, FIXTURES AND EQUIPMENT SCHEDULE PROVIDED BY OTHER.
4. LAYOUTS OF SERVICE LINES, PLANT AND EQUIPMENT SHOWN ON THE DRAWINGS ARE DIAGRAMMATIC ONLY EXCEPT WHERE FIGURED DIMENSIONS ARE PROVIDED OR CALCULABLE.
5. PROVIDE ALL FIXTURES, FITTINGS, BOLTS, BRACKETS, HANGERS, PUTTY, MASTIC, SILICON FILLERS, CEMENT & SUNDRY MATERIALS NECESSARY TO COMPLETE THE WORKS.
6. PROVIDE SUFFICIENT UNIONS, FLANGES & ISOLATING VALVES TO FACILITATE SATISFACTORY REMOVAL OF PIPING & FITTINGS FOR MAINTENANCE OR REPAIRS.
7. SEAL PENETRATIONS WITH A SYSTEM CONFORMING TO AS4072.1
8. PROVIDE ACCESS PANELS FOR SATISFACTORY INSPECTION OF IO'S AT THE BASE OF ALL STACKS AND AT ANY FLOOR LEVEL WHERE NECESSARY FOR INSPECTION AND TESTING.
9. ALL WORK UNDERTAKEN ON THE SITE BY THE CONTRACTOR IS TO COMPLY WITH THE REQUIREMENTS OF THE WORKPLACE HEALTH & SAFETY REGULATIONS.
10. PRIOR TO COMMENCEMENT OF WORK, THE CONTRACTOR SHALL LIAISE DIRECTLY WITH THE APPROPRIATE AUTHORITIES & SHALL ASCERTAIN THE EXACT POSITIONS OF ALL SERVICES. THE CONTRACTOR SHALL NOT WORK NEAR THESE SERVICES WITHOUT THE PERSONAL SUPERVISION OR THE WRITTEN PERMISSION OF THE RELEVANT AUTHORITIES.
11. DATUM FROM WHICH LEVELS HAVE BEEN CALCULATED - A.H.D.
12. A SEPARATE HYDRAULIC SERVICES SPECIFICATION FORMS PART OF THIS DOCUMENT PACKAGE AND SHALL BE READ IN CONJUNCTION WITH THESE DRAWINGS.
13. USE OF MRP INTELLECTUAL PROPERTY
ALL MRP HYDRAULIC & FIRE SERVICES CONSULTANTS INTELLECTUAL PROPERTY, INCLUDING LOGOS, TRADEMARKS, DRAWING TITLEBLOCKS, DETAILS AND RELATED DESIGN ELEMENTS ARE PROTECTED AND MUST NOT BE USED, REPRODUCED, OR MODIFIED WITHOUT PROPER AUTHORIZATION FROM MRP HYDRAULIC & FIRE SERVICES CONSULTANTS. THIS INCLUDES THE REUSE OF DRAWING TITLEBLOCKS, BRANDING ELEMENTS AND DETAILS WHICH ARE DEVELOPED SPECIFICALLY FOR COMPANY PROJECTS AND ARE RESERVED FOR OFFICIAL AND APPROVED DOCUMENTATION ONLY. ALL DESIGNS, DOCUMENTS, AND TECHNICAL CONTENT PRODUCED BY MRP HYDRAULIC & FIRE SERVICES CONSULTANTS ARE CONSIDERED INTELLECTUAL PROPERTY AND MAY BE PROTECTED UNDER COPYRIGHT, TRADEMARK, OR PATENT LAWS. THESE RIGHTS MUST BE RESPECTED AT ALL TIMES. UNAUTHORIZED DISTRIBUTION OR ADAPTATION IS STRICTLY PROHIBITED. UNAUTHORIZED USE OF THESE ASSETS MAY VIOLATE CORPORATE POLICIES AND COULD RESULT IN DISCIPLINARY OR LEGAL ACTION.

Authority Requirements

1. THESE DOCUMENTS MUST BE READ IN CONJUNCTION WITH THE STAMPED APPROVED PLANS AND PLUMBING DRAINAGE AND COMPLIANCE PERMIT CONDITIONS (INCLUDING AMENDMENTS).
2. ALL PLUMBING AND DRAINAGE WORK OR ON-SITE SEWERAGE WORK MUST COMPLY WITH THE COUNCILS LOCAL LAWS AND POLICIES AND RELATED DEVELOPMENT PERMIT CONDITIONS.
3. THE CONTRACTOR SHALL PAY ALL FEES IN CONNECTION WITH APPROVALS, UTILITY PROVIDER CONSTRUCTION COSTS, TESTS & INSPECTIONS, ETC.
4. PROVIDE ALL NECESSARY TESTING OF THE SERVICES SHOWN ON THE DRAWINGS AS REQUIRED BY THE RESPECTIVE AUTHORITIES.
5. IF ANY DOUBTS EXIST AS TO WHETHER A SECTION OF THE DESIGN IS ABLE TO COMPLY WITH THE RELEVANT AUTHORITY'S REGULATIONS, THE SUPERINTENDENT SHALL BE NOTIFIED PRIOR TO COMMENCEMENT OF ANY WORKS. NO CONSIDERATION OF CLAIM FOR REDUNDANT WORK SHALL BE GIVEN IF THE SUPERINTENDENT IS NOT NOTIFIED.
6. CONTRACTOR TO ALLOW FOR COST OF SEWER & WATER CONNECTION TO SITE.
7. CONTRACTOR TO ALLOW ALL COST FOR PREPARATION OF 'AS CONSTRUCTED DRAWINGS' PRESENTED TO THE SAME STANDARD AS THE APPROVED PLANS.

Minor Works

1. MINOR WORK TO BE INCLUDED.
   a. PROVIDE MINOR WORKS WHICH ARE REQUIRED, OR MINOR PARTS WHICH ARE NECESSARY, FOR THE COMPLETION OF THE WORK(S) NECESSARY TO PRODUCE A COMPLETE AND OPERATIONAL SYSTEM WITHOUT ADDITIONAL COST TO THE CONTRACT.
   b. PROVIDE TEMPORARY CONSTRUCTION PHASE DIVERSION WORKS TO MAINTAIN SERVICE AND FUNCTION OF EXISTING OPERATIONAL FACILITIES ON-SITE WHETHER DOCUMENTED OR OTHERWISE.

Existing Services

1. NO WARRANTY IS GIVEN TO THE COMPLETENESS OR ACCURACY OF EXISTING SERVICES INFORMATION WHETHER DOCUMENTED OR OTHERWISE. WHERE CONNECTION IS REQUIRED TO EXISTING SERVICES THE CONTRACTOR SHALL ALLOW ALL COSTS TO HIRE OR PURCHASE EQUIPMENT NECESSARY TO VERIFY THE PRECISE LOCATION AND DEPTH OF THE EXISTING SERVICE CONNECTION POINT PRIOR TO THE INSTALLATION OF ANY ASSOCIATED WORKS.
2. EXISTING SERVICES HAVE BEEN DRAWN FROM HISTORICAL RECORDS AND ARE INDICATIVE ONLY. CONTRACTOR TO LOCATE, TRACE AND VERIFY BEFORE COMMENCING ANY ASSOCIATED WORKS.
3. ALLOW ALL COSTS TO PROTECT AND/OR REPAIR EXISTING RETAINED SERVICES IMPACTED BY CONSTRUCTION PHASE ACTIVITIES.

Coordination

THE CONTRACTOR SHALL COORDINATE ALL PIPEWORK WITH THE OTHER TRADE SERVICES PRIOR TO COMMENCEMENT OF ANY WORK.

1. PROVIDE COMPLETE COORDINATION WITH ALL OTHER SUBCONTRACTORS AND THE MANAGING CONTRACTOR. FIT INTO CONSTRAINTS PROVIDED BY ARCHITECTURAL AND OTHER SERVICES ELEMENTS AND REFLECTED IN THE DESIGNED LAYOUT, INCLUDING: FITTING IN TO DESIGNATED CEILING ZONES, DUCTS WALL CAVITIES AND ROOMS.
2. THE HYDRAULIC SERVICES CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ALL TRADES AND TRADE DOCUMENTATION PACKAGES ON-SITE BEFORE THE COMMENCEMENT OF INSTALLATION INCLUDING BUT NOT LIMITED TO:
   - STRUCTURAL SLABS, FOOTINGS, BEAMS & COLUMNS.
   - CIVIL STORMWATER.
   - MECHANICAL A/C DUCT & TUNDISH LOCATIONS.
   - ELECTRICAL CABLE TRAYS & HIGH-VOLTAGE IN-GROUND CONDUITS.

Cross Reference

1. THESE HYDRAULIC AND WET FIRE SERVICES DRAWINGS AND ASSOCIATED PERFORMANCE SPECIFICATIONS (IF APPLICABLE) SHALL BE READ IN CONJUNCTION WITH ALL OTHER ARCHITECTURAL, STRUCTURAL, CIVIL, MECHANICAL, LANDSCAPE, IRRIGATION, ELECTRICAL AND OTHER DRAWINGS, SPECIFICATIONS, CONTRACT DOCUMENTS AND WITH SUCH OTHER WRITTEN INSTRUCTION THAT MAY BE ISSUED DURING THE COURSE OF THE CONTRACT.

   REQUIREMENT: CONFORM TO THE FOLLOWING:
   - PRINCIPLE PROJECT REQUIREMENTS (PPR)
   - FIRE ENGINEERING BRIEF / REPORT (FEB/FER)

National Construction Code (NCC)

BUILDING INFORMATION

BUILDING CLASSIFICATION:
STOREYS CONTAINED:
RISE IN STOREY:
EFFECTIVE HEIGHT: <25m
>25m

1. ALL WORKS TO COMPLY WITH THE REQUIREMENTS OF **NCC**. IN PARTICULAR:

VOLUME 1 - NCC CLASS 2 TO 9 BUILDINGS

PART E: SERVICES & EQUIPMENT
1. PROVIDE FIRE HYDRANTS IN ACCORDANCE WITH E1D2 - HYDRANTS
2. PROVIDE FIRE HOSE REELS IN ACCORDANCE WITH E1D3 - FIRE HOSE REELS
3. PROVIDE FIRE SPRINKLERS IN ACCORDANCE WITH E1D4 - SPRINKLERS TO E1D12 - WHERE SPRINKLERS ARE REQUIRED. ADDITIONAL REQUIREMENTS, INCLUDING SPECIFICATION 17 & 18 (AS APPLICABLE)

PART F: HEALTH AND AMENITY
1. HOT & WARM WATER SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH F410 - MICROBIAL (LEGIONELLA) CONTROL.
2. PROVIDE ACOUSTIC SEPARATION FOR INTERNAL SERVICES (SOIL, WASTE OR WATER SUPPLY PIPES) IN ACCORDANCE WITH F7D7.
3. PROVIDE FLEXIBLE COUPLINGS BETWEEN ANY CIRCULATING (OR OTHER) PUMP AND THE CONNECTING SERVICE PIPES IN ACCORDANCE WITH F7D8)

PART J: ENERGY MONITORING
1. CENTRALISED HOT WATER PLANT APPLICATIONS:
   A. FOR BUILDINGS WITH A FLOOR AREA OF MORE THAN 2,500m². PROVIDE ENERGY METERS CONFIGURED TO ENABLE INDIVIDUAL TIME-OF-USE ENERGY CONSUMPTION DATA RECORDING IN ACCORDANCE WITH PART J9D3 (EXCEPTIONS APPLY TO CLASS 2 BUILDINGS IN QUEENSLAND)
2. HOT WATER SUPPLY SYSTEMS TO SATISFY THE REQUIREMENTS OF NCC PART J8D2 AND AS/NZS 3500.4 SECTION 8.

Compliance, Standards and Codes

GENERAL CODES:
- QUEENSLAND PLUMBING AND WASTEWATER CODE (QPW CODE)
- QUEENSLAND DEVELOPMENT CODE (QDC)
- PLUMBING AND DRAINAGE ACT - 2018
- PLUMBING AND DRAINAGE REGULATION 2019
- NATIONAL CONSTRUCTION CODE - NCC2022
  a. VOL 1 - CLASS 2 TO 9 BUILDINGS
  b. VOL 2 - CLASS 1 AND 10 BUILDINGS
  c. VOL 3 - PLUMBING CODE OF AUSTRALIA

- AS/NZS 3500.0 : 2021
- AS/NZS 3500.1 : 2021
- AS/NZS 3500.2 : 2021
- AS/NZS 3500.3 : 2021
- AS/NZS 3500.4 : 2021
- AS 2419.1 : 2021
- AS 2441 : 2005
- AS 2444 : 2001
- AS 5601: 2013
- FPAS101D
- FPAA101H
- STANDARD AUSTRALIA HB 230-2008

Authorised Products

1. PRODUCTS LISTED IN THE WATER MARK PRODUCT DATABASE, UNLESS OTHERWISE REQUIRED BY THE NETWORK UTILITY OPERATOR.
2. PROVIDE ALL PLUMBING AND DRAINAGE PRODUCTS IN ACCORDANCE WITH THE ABCB WATERMARK CERTIFICATION SCHEME.
3. ANY REFERENCE WITHIN THE SPECIFICATION TO PROPRIETARY BRAND NAMES OR TO A PARTICULAR MANUFACTURED PRODUCT WITHOUT THE USE OF "OR EQUAL" IS TO BE INTERPRETED THAT THE PARTICULAR ARTICLE OR PRODUCT IS THE ONLY ONE TO BE SUPPLIED OR USED.

   DEFINITION: A PROPRIETARY ITEM SHALL BE ANY ITEM IDENTIFIED BY GRAPHIC REPRESENTATION ON THE DRAWINGS, OR BY NAMING ONE OR MORE OF THE FOLLOWING: MANUFACTURER, SUPPLIER, INSTALLER, TRADE NAME, BRAND NAME, CATALOGUE OR REFERENCE NUMBER, AND THE LIKE.

Substitution

1. IDENTIFIED PROPRIETARY ITEMS: IDENTIFICATION OF THE PROPRIETARY ITEM DOES NOT NECESSARILY IMPLY EXCLUSIVE PREFERENCE FOR THE ITEM AS IDENTIFIED, BUT INDICATES THE NECESSARY PROPERTIES OF THE ITEM. ALTERNATIVES: IF ALTERNATIVES TO THE DOCUMENTED PRODUCTS, METHODS OR SYSTEMS ARE PROPOSED, SUBMIT SUFFICIENT INFORMATION TO PERMIT EVALUATION OF THE PROPOSED ALTERNATIVES, INCLUDING:

   - EVIDENCE THAT THE PERFORMANCE IS EQUAL TO OR GREATER THAN THE SPECIFIED.
   - EVIDENCE OF CONFORMITY TO THE CITED STANDARDS.
   - ESSENTIAL TECHNICAL INFORMATION, IN ENGLISH.
   - REASONS FOR THE PROPOSED SUBSTITUTIONS.
   - STATEMENT OF THE EXTENT OF REVISIONS TO THE CONTRACT DOCUMENTS.
   - STATEMENT OF THE EXTENT OF REVISIONS TO THE CONSTRUCTION PROGRAM.
   - STATEMENT OF COST IMPLICATIONS INCLUDING COSTS OUTSIDE THE CONTRACT.
   - STATEMENT OF CONSEQUENT ALTERATIONS TO OTHER PARTS OF THE WORKS.

AVAILABILITY: IF THE DOCUMENTED PRODUCTS OR SYSTEMS ARE UNAVAILABLE WITHIN THE TIME CONSTRAINTS OF THE CONSTRUCTION PROGRAM, SUBMIT EVIDENCE. CRITERIA: IF THE SUBSTITUTION IS FOR ANY REASON OTHER THAN UNAVAILABILITY, SUBMIT EVIDENCE THAT THE SUBSTITUTION:
- IS OF NET ENHANCED VALUE TO THE PRINCIPAL.
- IS CONSISTENT WITH THE CONTRACT DOCUMENTS AND IS AS EFFECTUAL AS THE IDENTIFIED ITEM, DETAIL OR METHOD.

Manufacturers' or Suppliers' Recommendations

1. PROVIDE, SELECT (IF NO SELECTION IS GIVEN) TRANSPORT, DELIVER, STORE, HANDLE, PROTECT, FINISH, ADJUST AND PREPARE FOR USE, MANUFACTURED ITEMS IN ACCORDANCE WITH THE CURRENT WRITTEN RECOMMENDATIONS AND INSTRUCTIONS OF THE MANUFACTURER OR SUPPLIER.

Certification

1. PROVIDE CERTIFICATION THAT THE PLANT AND EQUIPMENT SUBMITTED MEETS ALL REQUIREMENTS AND CAPACITIES OF THE CONTRACT DOCUMENTS EXCEPT FOR DEPARTURES THAT ARE IDENTIFIED IN THE SUBMISSION.
2. PROVIDE ALL WARRANTIES, TECHNICAL DATA, TESTING CERTIFICATES, ASPECT & COMPLIANCE CERTIFICATES PRIOR TO HANDOVER.
3. OBTAIN CERTIFICATES FROM THE RELEVANT AUTHORITIES INDICATING SATISFACTORY COMPLETION OF SERVICES & HAND OVER TO THE SUPERINTENDENT BEFORE APPLICATION FOR CERTIFICATE OF PRACTICAL COMPLETION.

Queensland Development Code (QDC)

1. **MP 1.4 - BUILDING OVER OR NEAR RELEVANT INFRASTRUCTURE**
2. **MP 2.1 - FIRE SAFETY IN BUDGET ACCOMMODATION BUILDINGS**
3. **MP 2.2 - FIRE SAFETY IN RESIDENTIAL CARE BUILDINGS**
4. **MP 2.3 - FIRE SAFETY IN EXISTING RESIDENTIAL CARE BUILDINGS**
5. **MP 3.5 - CONSTRUCTION OF BUILDINGS IN FLOOD HAZARD AREAS**
6. **MP 3.7 - FARM BUILDINGS**
7. **MP 4.1 - SUSTAINABLE BUILDINGS**
8. **MP 4.2 - RAINWATER TANKS AND OTHER SUPPLEMENTARY WATER SUPPLY SYSTEMS**
9. **MP 4.3 - SUPPLEMENTARY WATER SOURCES - COMMERCIAL BUILDINGS**
10. **MP 4.5- LIVABLE DWELLINGS AND GRADING TO FLOOR WASTES**
11. **MP 5.5 - PRIVATE HEALTH FACILITIES**
12. **MP 6.1 - COMMISSIONING AND MAINTENANCE OF FIRE SAFETY INSTALLATIONS**

Differential Movement

1. SOIL CLASSIFICATION: 'TBC'
2. GENERAL: IF THE GEOTECHNICAL SITE INVESTIGATION REPORT PREDICTS DIFFERENTIAL MOVEMENTS BETWEEN BUILDINGS AND THE GROUND IN WHICH PIPES OR CONDUITS ARE BURIED, PROVIDE MOVEMENT CONTROL JOINTS IN THE PIPES OR CONDUITS.
   - MAGNITUDE: ACCOMMODATE THE PREDICTED MOVEMENTS.
3. PROVIDE MOVEMENT CONTROL JOINTS AS REQUIRED & IN ACCORDANCE WITH THE GEOTECHNICAL REPORT, THE SITE SOIL CLASSIFICATION, MANUFACTURERS RECOMMENDATIONS AND AS3500.2

Vibration Suppression

1. GENERAL: MINIMISE THE TRANSMISSION OF VIBRATION FROM ROTATING OR RECIPROCATING EQUIPMENT TO OTHER BUILDING ELEMENTS.
2. CONNECTIONS: PROVIDE FLEXIBLE CONNECTIONS TO ROTATING MACHINERY AND ASSEMBLIES CONTAINING ROTATING MACHINERY.
   - ISOLATE PIPES BY INCORPORATING SUFFICIENT FLEXIBILITY INTO THE PIPING OR BY USE OF PROPRIETARY FLEXIBLE PIPE CONNECTIONS INSTALLED SO THAT NO STRESS IS PLACED ON PIPES DUE TO END REACTION.

Seismic Restraint

1. ARRANGE ALL COMPONENTS, OTHER THAN SERVICE ITEMS EXEMPT IN AS 1170.4 TO RESIST SEISMIC LOADS DETERMINED IN ACCORDANCE WITH AS 1170.4. SECURELY FIX ALL PLANT AND EQUIPMENT TO THE BUILDING STRUCTURE. DO NOT RELY ON GRAVITY AND/OR FRICTION TO RESIST SEISMIC FORCES. ANTI-VIBRATION MOUNTS: USE HORIZONTALLY RESTRAINED TYPE. COMPONENTS: DO NOT USE COMPONENTS THAT WILL BE DAMAGED BY SEISMIC EVENTS.

NCC (2022) C3D8 - Separation by Fire Walls

1. FOR THE AVOIDANCE OF TRIGGERING NCC E1.D2 - FIRE HYDRANTS (BUILDINGS OVER 500m²) SEPARATION OF BUILDINGS BY FIRE WALLS SHALL COMPLY WITH NCC 2022 C3D8 (1)(2) & (3).

Siphonic Stormwater Services

1. SIPHONIC DRAINAGE TO BE DESIGN AND INSTALLED BY A LICENSED CONTRACTOR. CONTACT GEBERIT PRODUCT SPECIALIST. RODNEY PETERSEN on 0417729 091

Piping

1. GENERAL: INSTALL PIPING IN STRAIGHT LINES AT UNIFORM GRADES WITH NO SAGS.
2. ARRANGE TO PREVENT AIR LOCKS AND SO THAT PIPEWORK REMAINS FREE FROM VIBRATION AND WATER HAMMER.
3. PROVIDE SUFFICINT UNIONS, FLANGES AND ISOLATING VALVES TO ALLOW REMOVAL OF PIPING AND FITTINGS FOR MAINTENANCE OR REPLACEMENT OF PLANT WHETHER DOCUMENTED OR OTHERWISE.
4. COVER PLATES: WHERE EXPOSED PIPING EMERGES FROM WALL, FLOOR OR CEILING FINISHES, PROVIDE COVER PLATES OF STAINLESS STEEL OR NON-FERROUS METAL FINISHES TO MATCH THE PIPING.
5. DISSIMILAR METALS: PREVENT DIRECT CONTACT BETWEEN INCOMPATIBLE METALS. WHERE REQUIRED JOIN DISSIMILAR METALS WITH FITTINGS OF ELECTROLYTICALLY COMPATIBLE MATERIAL.
6. TEMPORARY CAPPING: DURING CONSTRUCTION PROTECT OPEN ENDS OF PIPE WITH METAL OR PLASTIC COVERS OR CAPS.

Pipe Supports, Fixings & Hangers

1. FASTENERS: USE PROPRIETARY FASTENERS CAPABLE OF TRANSMITTING THE LOADS IMPOSED, AND SUFFICIENT TO ENSURE THE RIGIDITY OF THE ASSEMBLY.
2. STAINLESS STEEL: USE 316 STAINLESS STEEL COMPONENTS (INCLUDING FASTENERS AND ANCHORS) FOR ALL APPLICATIONS, IF:
   - LOCATED EXTERNALLY.
   - EXPOSED TO WEATHER.
   - EMBEDDED IN MASONRY.
3. GALVANIZING: USE GALVANIZED MILD STEEL COMPONENTS (INCLUDING FASTENERS AND ANCHORS) TO AS1214 OR AS/NZS 4680 AS APPROPRIATE, IF:
   - EXPOSED TO OR IN AIR SPACES BEHIND THE EXTERNAL LEAF OF MASONRY WALLS.
   - IN CONTACT WITH CHEMICALLY TREATED TIMBER, OTHER THAN CCA.
4. ACOUSTIC PIPE: USE PROPRIETARY ACOUSTIC SUPPORTS AND FIXINGS.
5. VERTICAL PIPES: PROVIDE ANCHORS AND GUIDES TO MAINTAIN LONG PIPES IN POSITION, AND SUPPORTS TO BALANCE THE MASS OF THE PIPE AND ITS CONTENTS.
6. DISSIMILAR METALS: IF PIPE AND SUPPORT MATERIALS ARE DISSIMILAR, PROVIDE INDUSTRIAL GRADE ELECTRICALLY NON-CONDUCTIVE MATERIAL SECURELY BONDED TO THE PIPE TO SEPARATE THEM. PROVIDE FIXINGS OF ELECTROLYTICALLY COMPATIBLE MATERIAL.
7. ALL PIPES SHALL BE ADEQUATELY SUPPORTED & SECURED IN ACCORDANCE WITH THE PRESCRIPTIVE AUSTRALIAN STANDARD REQUIREMENTS SPECIFIC TO THE APPLICATION.

Pipework Treatment

1. ALL EXPOSED HYDRAULIC SERVICES PIPEWORK & FITTINGS INCLUDING TRAPS, WASTE PIPES, WATER SERVICES, VALVES & FITTINGS TO BE CHROME PLATED COPPER TUBE.
   FLANGES: WHERE A CHROME PLATED SERVICE PASS THROUGH A WALL, FLOOR OR CEILING PROVIDE A CHROMIUM PLATED DOMED FLANGE.
   EXCEPTIONS: CHROMIUM PLATING NOT REQUIRED FOR SERVICES LOCATED WITHIN PLANT ROOMS, SERVICE DUCTS OR ENCLOSED CUPBOARD SPACES.
2. ACOUSTIC TREATMENT: CONFORM TO ACOUSTIC SPECIALIST RECOMMENDATIONS FOR PIPE FIXING AND ACOUSTIC INSULATION.
   PROVIDE ACOUSTIC INSULATION TO PLUMBING & DRAINAGE SYSTEMS IN ACCORDANCE WITH NCC VOLUME 3 PART D1D3 AND ANY PROJECT SPECIFIC ACOUSTIC REPORT.
3. UNDERGROUND METAL PIPING: PROVIDE CORROSION PROTECTION FOR THE FOLLOWING:
   - UNDERGROUND FERROUS PIPING
   - UNDERGROUND NON-FERROUS METAL PIPING IN CORROSIVE ENVIRONMENTS.

   PROTECTION METHODS: CONTINUOUS WRAPPING USING PROPRIETARY PETROLEUM TAPING MATERIALS.

Stormwater Drainage

1. THE WHOLE OF THE STORMWATER DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH THE NATIONAL CONSTRUCTION CODE (NCC), AS/NZS 3500.3, & THE LOCAL GOVERNMENT GUIDELINES & REGULATIONS, & THE QUEENSLAND DEVELOPMENT CODE (QDC).
2. ALL DOWNPIPES AND STORMWATER DRAINAGE SHALL BE FREE OF LEAKS WHEN TESTED IN ACCORDANCE WITH AS/NZS 3500.3.
3. SUPPORT WATER STORAGE TANKS IN SUCH A MANNER THAT NO LOAD IS TRANSMITTED TO ANY OF THE ATTACHED PIPES.
4. FOR ROOF CATCHMENT IN CONNECTION WITH RAINWATER TANKS:
   4.1. INSTALL RAINWATER SYSTEMS & EQUIPMENT IN ACCORDANCE WITH STANDARDS AUSTRALIA HB 230 "RAINWATER TANK DESIGN & INSTALLATION HANDBOOK".
   4.2. PROVIDE "GUTTER GUARD" OR SCREENED DOWNPIPE RAINHEADS HAVING 4 - 6mm SCREEN MESH TO PREVENT LEAVES FROM ENTERING THE DOWNPIPE. SCREEN MESH TO BE FIRE RESISTANT, COLOUR MATCHED AND COMPATIBLE WITH ROOF AND GUTTER MATERIAL AND PROFILE.
   4.3. ALL DRAINAGE PIPEWORK AND FITTINGS ON THE INLET SIDE OF THE STORAGE TANK SHALL BE uPVC CLASS DWV HAVING WATER TIGHT JOINTS FORMED WITH THE USE OF SOLVENT CEMENT AND PRIMING FLUID (UNO).
5. TANKS TO INCLUDE:
   5.1. MOSQUITO PROOF SCREENS NOT COARSER THAN 1mm APERTURE MESH "OR" FLAP VALVES AT EVERY OPENING OF THE TANK TO PREVENT MOSQUITOS BREEDING IN THE TANK.
   5.2. WATER TIGHT CONNECTIONS.
6. WET PIPE SYSTEMS IN CONNECTION WITH RAINWATER TANKS::
   6.1. PROVIDE RAIN WATER HEADS WITH MOSQUITO PROOF SCREENS NOT COARSER THAN 1mm APERTURE MESH AT EACH DOWNPIPE IN CONNECTION WITH THE RAINWATER TANKS "OR"
   6.2. PROVIDE A FIRST FLUSH DEVICE CAPABLE OF AUTOMATICALLY DEWATERING THE 'WET PIPE' SYSTEM.

Drainage - General

1. ALL INSPECTION OPENINGS TO BE BROUGHT TO THE SURFACE & CAPPED WITH A BOLTED TRAP SCREW IN A CONCRETE SURROUND TO LOCAL AUTHORITY APPROVAL.
2. ARRANGE ALL COMPONENTS, OTHER THAN SERVICE ITEMS EXEMPTED IN AS 1170.4 TO SEISMIC LOADS DETERMINED PER AS 1170.4. SECURELY FIX ALL PLANT AND EQUIPMENT TO THE BUILDING STRUCTURE. DO NOT RELY ON GRAVITY AND/OR FRICTION TO RESIST SEISMIC FORCES. ANTI-VIBRATION MOUNTS: USE HORIZONTALLY RESTRAINED TYPE. COMPONENTS: DO NOT USE COMPONENTS THAT WILL BE DAMAGED BY EARTHQUAKE CONDITIONS. PROTECT SYSTEMS AGAINST THE ADVERSE EFFECTS OF COMPONENTS SUCH AS MERCURY SWITCHES THAT, ALTHOUGH NOT DAMAGED BY EARTHQUAKE, MAY MALFUNCTION.
3. BEDDING DRAINAGE SERVICES SHALL BE SURROUNDED WITH NOT LESS THAN 75MM OF COMPACTED SAND OR WASHED 5MM SCREENING, WITH NO HARD-EDGED OBJECT TO COME IN CONTACT WITH OR REST AGAINST ANY PIPE OR FITTING.
4. WHERE PIPES ARE LAID IN FILL, BEDDING SHALL BE CARRIED OUT IN LAYERS NOT EXCEEDING 300MM (LOOSE) IN DEPTH AND SHALL BE COMPACTED UNTIL THE COMPACTION IS NOT LESS THAN 98% OF THE MATERIALS MAXIMUM COMPACTION WHEN TESTED IN ACCORDANCE WITH AS 1289 (MODIFIED COMPACTION). TESTING SHALL BE CARRIED OUT AFTER EACH ALTERNATE LAYER AND CERTIFICATES MADE AVAILABLE CERTIFYING THAT THE REQUIRED COMPACTION HAS BEEN ACHIEVED.
5. WHERE SERVICES ARE CAST WITHIN THE BUILDING STRUCTURE THE PIPING MATERIAL MUST BE HDPE OR SOLVENT WELD UPVC WITH A STIFFNESS RATING OF SN10 (MIN). PROVIDE SUITABLE PIPE PROTECTION IN THE FORM OF LAGGING - DOUBLE WRAPPED WITH LOW DENSITY POLYETHYLENE CLOSED CELL FOAM (OR EQUAL) WITH TAPED JOINTS TO SAFEGUARD THE INTEGRITY OF THE PIPE, PERMIT EXPANSION, CONTRACTION & PROVIDE THERMAL PROTECTION. CAST-IN SERVICES SHALL BE FILLED WITH WATER DURING CONCRETE POUR & WATER LEVELS ARE TO BE MONITORED & MAINTAINED FOR A PERIOD OF 24 HOURS THEREAFTER.
6. PROVIDE MOVEMENT CONTROL JOINTS PER MANUFACTURES RECOMMENDATIONS TO ACCOMMODATE ANTICIPATED MOVEMENT. (REFER GEOTECHNICAL REPORT).

Backfill - General

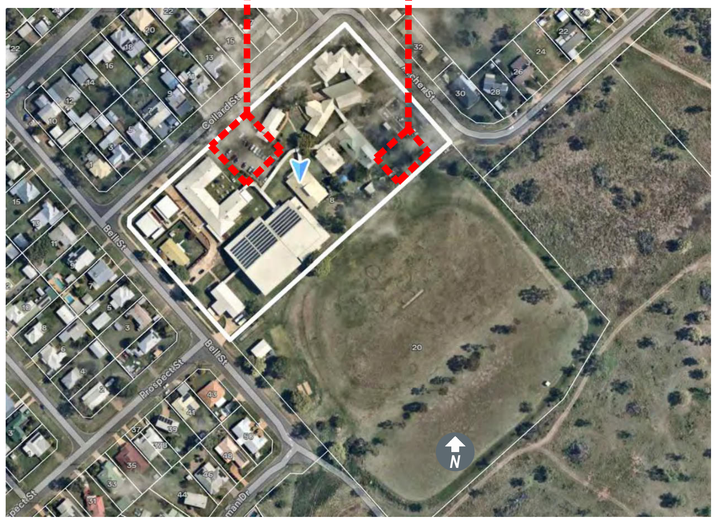
1. AFTER INSPECTION, TESTING AND APPROVAL, BACKFILL ALL TRENCHING. BACKFILL SHALL BE FREE FROM BUILDERS WASTE, BRICKS, CONCRETE PIECES, ROCK OR HARD MATTER LARGER THAN 25MM, AND SOIL LUMPS LARGER THAN 75MM. TESTING SHALL BE CARRIED OUT AFTER EACH ALTERNATE LAYER, AND CERTIFICATES PROVIDED CERTIFYING THAT THE REQUIRED COMPACTION HAS BEEN ACHIEVED.

WHERE SERVICES ARE LAID:
A) IN A PUBLIC ROADWAY, BACKFILL SHALL BE PLACED PER THE ROAD AUTHORITY'S CIVIL CONSTRUCTION SPECIFICATION.
B) IN A PRIVATE ROADWAY OR DRIVEWAY, BACKFILL TO THE UNDERSIDE OF THE PAVEMENT WITH FINE GRANULAR MATERIAL OR ROAD BASE IN LAYERS NOT EXCEEDING 150MM (LOOSE) IN DEPTH AND SHALL BE COMPACTED UNTIL THE COMPACTION IS NOT LESS THAN 98% OF THE STANDARD DRY DENSITY PER AS 1289.
C) ELSEWHERE BACKFILL SHALL BE APPROVED EXCAVATED OR APPROVED FILL MATERIAL CARRIED OUT IN LAYERS NOT EXCEEDING 300MM (LOOSE) IN DEPTH AND SHALL BE COMPACTED UNTIL THE COMPACTION IS NOT LESS THAN 98% OF THE MATERIAL MAXIMUM COMPACTION WHEN TESTED PER AS 1289.

Plumbing / Sanitary Drainage / Trade Waste

1. THE WHOLE OF THE PLUMBING & DRAINAGE WORKS SHALL BE IN ACCORDANCE WITH THE PLUMBING & DRAINAGE ACT, NATIONAL CONSTRUCTION CODE (NCC) -*PLUMBING CODE OF AUSTRALIA*, AS/NZS 3500.2 & THE SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY.
2. ALL DRAINAGE SHALL BE 100Ø AT A GRADE OF 1:60 MINIMUM UNLESS NOTED OTHERWISE.
3. ALL VENT PIPES SHALL TERMINATE ABOVE ROOF IN ACCORDANCE WITH AS/NZS 3500.2.
4. THE CONTRACTOR IS TO VERIFY THE POSITIONS OF ALL DRAINAGE PIPES & SERVICE LINES & THAT THE INVERT & SURFACE LEVELS ARE CORRECT BEFORE COMMENCING WORKS.
5. FLOOR WASTES SHALL CONSIST OF A SELF-CLEANSING 'P' TRAP & RISER WITH SCREWED CHROME PLATED BRASS GRATE SET AT A LEVEL TO ENSURE ADEQUATE DRAINAGE OF ALL FLOOR AREAS.
6. PROVIDE AN ANTI-FOAMING DEVICE TO ANY FWG RECEIVING WASTE DISCHARGE FROM LAUNDRY TUBS AND/OR WASHING MACHINES.
7. THE CONTRACTOR SHALL ALLOW TO PROVIDE TEST GATES FOR THE SATISFACTORY TESTING OF THE SYSTEM.
8. PROVIDE BOTTLE TRAPS WHERE BASIN OUTLETS ARE EXPOSED.
9. CONCEAL BASIN FIXTURE DISCHARGE PIPES WITHIN WALL CAVITIES.

AREA OF WORKS



LOCALITY MAP
SCALE: NTS AT SHEET A1

DATE	STAGE	DESCRIPTION	REV NO.	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT \ BUILDING DESIGNER: BEAT ARCHITECTS

CLIENT

HYDRAULIC CONSULTANT:

MRP HYDRAULIC & FIRE SERVICES CONSULTANTS PTY LTD
■ BRISBANE □ SUNSHINE COAST □ CAIRNS
A: Unit 1/63 Annerley Rd, Woolloongabba, QLD PO Box 8143, Woolloongabba, QLD, 4102
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W: mrp.com.au
BSA: 1137134 ABN: 23 126 270 326 QBCC: 1137134

PROJECT DESCRIPTION & ADDRESS
REDEEMER LUTHERAN COLLEGE
STAGE 2A
8 BELL ST, BILOELA, QLD, 4715
LOT 1ON RP607657

VERIFIED BY:	DATE
AG	28.07.26
DESIGNER	DATE
AG	28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION
COVER SHEET
NOTES & LOCALITY PLAN

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW
NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
26-0407	NTS	A1
SHEET NUMBER	REVISION NUMBER	
H-101	01	

Water Services - General

1. THE WHOLE OF THE WATER SERVICE WORKS SHALL BE IN ACCORDANCE WITH THE NATIONAL CONSTRUCTION CODE (*PLUMBING CODE OF AUSTRALIA*), AS/NZS 3500.1 & THE SPECIFIC REQUIREMENTS OF THE LOCAL AUTHORITY.
2. ALLOW TO SUPPLY & RETICULATE 15Ø COLD WATER SUPPLY TO A SINGLE FIXTURE & 20Ø OR GREATER TO TWO OR MORE FIXTURES (UNO).
3. HOT WATER RETICULATION PIPEWORK SHALL BE 15Ø LAGGED TUBING TO EACH FIXTURE OUTLET (UNO). NOTE THAT A 20Ø CONNECTION SHALL BE REQUIRED TO BOTH THE INLET & THE OUTLET OF THE HOT WATER UNIT (UNO).
4. WATER SUPPLY PIPE SIZES SPECIFIED ON THESE DRAWINGS ARE BASED ON CALCULATIONS FOR PIPES HAVING EQUIVALENT DIMENSIONAL AND FLOW CHARACTERISTICS TO THAT OF TYPE B COPPER TUBE. WHERE ALTERNATIVE MATERIALS ARE USED AN EQUIVALENT PIPE SIZE APPROPRIATE TO THE MATERIAL BEING USED SHALL BE SELECTED.
5. PROVIDE A PLV WHERE WATER PRESSURE EXCEEDS 500kPa AT ANY OUTLET.
6. WHEREVER POSSIBLE PIPES SHALL BE RUN PARALLEL WITH THE ADJACENT STRUCTURE AND/OR SERVICES. ALL BRANCH LINES TO BE TAKEN OFF AT RIGHT ANGLES.
7. ON COMPLETION ALL PIPING SHALL BE SUBJECT TO A PRESSURE TEST OF 1500kPa FOR A PERIOD OF TWO HOURS. ANY DEFECTS FOUND IN THE SYSTEM SHALL BE REMEDIED & THE TEST REAPPLIED.
8. WATER METERS SHALL BE PURCHASED FROM LOCAL AUTHORITY OR LOCAL AUTHORITY SUPPLIER.
9. METER AND VALVE PATH BOXES INSTALLED IN HARDPAVED AREAS SHALL BE FITTED WITH CAST IRON ACCESS COVERS.
10. ALL HC's SHALL BE FITTED WITH VACUUM BREAKER VALVES.
11. CONFIGURE PIPE GEOMETRY TO ENSURE HOT WATER UNIT ISOLATION VALVES, THERMOSTATIC MIXING VALVES & TESTABLE BACKFLOW DEVICES ARE READILY ACCESSIBLE (NO HIGHER THAN 1.6m ABOVE FFL)

Materials

1. WATER SUPPLY PIPE SIZES SPECIFIED ON THESE DRAWINGS ARE BASED ON CALCULATIONS FOR PIPES HAVING EQUIVALENT DIMENSIONAL AND FLOW CHARACTERISTICS TO THAT OF TYPE B COPPER TUBE. WHERE ALTERNATIVE MATERIALS ARE USED AN EQUIVALENT PIPE SIZE APPROPRIATE TO THE MATERIAL BEING USED SHALL BE SELECTED.
2. GAS SERVICE PIPE SIZES ARE BASED ON NOMINAL DIAMETERS STATED IN AS/NZS 5601 FOR THE MATERIAL SELECTIONS NOMINATED BELOW.
3.

COLD WATER	COPPER TYPE 'B'*
HOT WATER	COPPER TYPE 'B'*
SANITARY DRAINAGE \ PLUMBING	uPVC DWV
TRADE WASTE	HDPE
STORMWATER	uPVC / SWJ
FIRE (IN-GROUND)	uPVC PRESSURE PIPE CLASS 'M' OR 'O'
FIRE (ABOVE-GROUND)	GALVANISED STEEL
RISING MAIN	PVC (CLASS 12)
GAS (IN-GROUND)	CROSS LINKED POLYETHYLENE
GAS (ABOVE-GROUND)	COPPER TYPE 'B'

* PIPE AND FITTING MATERIALS MAY BE SUBSTITUTED PROVIDED ALTERNATIVE MATERIALS ARE AUTHORIZED FOR USE IN ACCORDANCE WITH THE PLUMBING CODE OF AUSTRALIA (PCA). FOR WATER SERVICES REFER ALSO: AS/NZS3500.1 SECTION 2 - MATERIALS AND PRODUCTS AND APPENDIX B - DEMONSTRATING PRODUCTS AND MATERIALS ARE FIT FOR PURPOSE.

Hydrant System Design Parameters

BUILDING FLOOR AREA	>500m² <1000m²
LARGEST FIRE COMPARTMENT FLOOR AREA	>500m² <1000m²
NUMBER OF FIRE HYDRANTS REQUIRED TO FLOW SIMULTANEOUSLY	# @ 10l/s)

Fire Hydrant Services

1. FIRE HYDRANT SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH AS2419 EXCEPT WHERE VARIED IN ACCORDANCE WITH NCC SPECIFICATION 18..
2. HYDRANT LANDING VALVES SHALL BE COMPATIBLE WITH QLD ROUND THREAD PATTERN.
3. ATTACH NOTICE OF TEST/WORKING PRESSURES & BLOCK PLAN OF INSTALLED FIRE SERVICES SYSTEM WITHIN BOOSTER CABINET IN ACCORDANCE WITH AS2419.1 SECTION 11 - ANCILLARY EQUIPMENT, SIGNAGE AND BASELINE DATA.
4. NON CERTIFIED MATERIAL USED FOR THE SOLE PURPOSE OF A FIRE SERVICE INSTALLATION SHALL BE INSTALLED DOWNSTREAM OF A TESTABLE BACKFLOW PREVENTION DEVICE AND/OR AS DIRECTED BY THE LOCAL AUTHORITY.
5. PROVIDE HYDRANT PROTECTION IN ACCORDANCE WITH AS2419.1 SECTION 3.5.5 PROTECTION OF FIRE HYDRANTS.
6. HYDRANTS (INCLUDING FIRE BRIGADE BOOSTER ASSEMBLIES) SHALL BE POSITIONED NOT LESS THAN 10m AWAY FROM HIGH VOLTAGE ELECTRICAL EQUIPMENT, LPG CYLINDERS & OTHER COMBUSTIBLE STORAGE.
7. PROVIDE HYDRANT SYSTEM PIPES, VALVES, FITTING AND PIPE SUPPORT IN ACCORDANCE WITH AS2419.1 SECTION 9 AND 10.
8. FIRE SYSTEM PUMPS AND ASSOCIATED EQUIPMENT SHALL BE PROVIDED IN ACCORDANCE WITH AS2941.
9. FIRE HYDRANTS AND FIRE HOSE REELS MUST BE SEALED. THE SEAL MAY ONLY BE BROKEN FOR FIRE FIGHTING OR MAINTENANCE PURPOSES.
10. FINAL FLOW AND PRESSURE TEST AND PERFORMANCE CERTIFICATION OF ANY FIRE SYSTEM ASSOCIATED WITH THIS DEVELOPMENT ARE THE RESPONSIBILITY OF THE CONTRACTOR.
11. PIPE AND PIPE FITTINGS SHALL BE ADEQUATELY RESTRAINED WITH THRUST BLOCKS. THRUST BLOCKS SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH AS3500.1 CLAUSE 5.9. PLUMBING CONTRACTOR TO SEEK ADVICE FROM A QUALIFIED GEO-TECHNICAL ENGINEER FOR THE CONSTRUCTION OF THRUST BLOCKS.
12. ALL DRY HYDRANT SYSTEMS SHALL BE PROVIDED WITH A HYDRANT BOOSTER CABINET, RECESS OR ENCLOSURE.
13. DOORS ON ALL HYDRANT BOOSTER CABINETS, RECESSES OR ENCLOSURES SHALL HAVE SIGNAGE AFFIXED AS FOLLOWS: **"DRY FIRE HYDRANT BOOSTER INLET"** & SHALL BE 50MM MINIMUM LETTERING ON A CONTRASTING BACKGROUND.
14. ALL DRY HYDRANT SYSTEMS SHALL HAVE A BLOCK PLAN INCLUDING DETAILS AS PER AS2419.1 CLAUSE 11.5 - BLOCK PLAN (BASE LINE DATA)
15. ANY LABEL, SIGN OR LOCATION PLATE TO BE ETCHED, ENGRAVED OR PRINTED ON PLASTIC & CLEARLY VISIBLE & READABLE AT THE EXPECTED VIEWING DISTANCE.
16. EACH HYDRANT VALVE SHALL HAVE, IN A PROMINENT POSITION ADJACENT TO EACH HYDRANT VALVE (WITHIN 200MM) A PERMANENTLY AFFIXED & ENGRAVED SIGN CLEARLY VISIBLE WHEN FACING THE HYDRANT. SIGNS SHALL BE IN 25MM MINIMUM LETTERING ON A CONTRASTING BACKGROUND THAT READS **"DRY FIRE HYDRANT SYSTEM MUST BE BOOSTED PRIOR TO ANY FIRE FIGHTING"**
17. A TEST FACILITY IS TO BE PROVIDED AS PER AS2419.1 AT THE MOST DISADVANTAGED HYDRANT & IN EACH PRESSURE ZONE &/OR TOWER OF A UNITED BUILDING.
18. PROVIDE A COMPLETED FORM 71 PRIOR TO QUEENSLAND FIRE DEPARTMENT INSPECTION STAGE.

Symbols

- SERVICE No.
- SERVICE NAME (ST)
- SERVICE SIZE (150)
- DOWNPIPE SPREADER
- HOT & COLD WATER POINT
- WATER POINT
- GAS POINT
- RELIEF VALVE
- STOP VALVE
- ISOLATION VALVE
- ISOLATION VALVE IN PATH BOX
- MONITORING VALVE
- PRESSURE LIMITING VALVE
- WATER METER
- NON-RETURN VALVE or CHECK VALVE
- STRAINER
- UNION
- THERMOSTATIC MIXING VALVE
- TEMPERING VALVE
- PRESSURE GAUGE
- BEAM PENETRATION
- FLAP VALVE
- HOSE COCK
- OVERFLOW RELIEF GULLY
- PUMP
- 36m FIRE HOSE REEL
- DUAL PILLAR HYDRANT
- HOT WATER FLOW DIRECTION
- SINGLE TESTABLE CHECK VALVE ASSEMBLY INCLUDING ISOLATION VALVES AND LINE STRAINER (STC)
- DOUBLE CHECK VALVE ASSEMBLY INCLUDING ISOLATION VALVES AND LINE STRAINER (DCV)
- REDUCE PRESSURE ZONE DEVICE ASSEMBLY INCLUDING ISOLATION VALVES AND LINE STRAINER (RPZD)
- GAS REGULATOR
- GAS REGULATOR with OPSO
- OPSO VALVE
- END CAP
- TUNDISH
- AIR ADMITTANCE VALVE
- DROPPER (INLINE)
- DROPPER
- RISER / WASTE POINT
- BUCKET TRAP
- SWIVEL / EXPANSION JOINT

Linetypes - Existing

b	BEER LINE
bw	BORE WATER
w	COLD WATER
c	COMMUNICATIONS
ca	COMPRESSED AIR
e	ELECTRICAL
f	FIRE SERVICE
g	GAS SERVICE
hw	HOT WATER
haf	HOT WATER FLOW
hwr	HOT WATER RETURN
ir	IRRIGATION
ndw	NON DRINKING COLD WATER
ndh	NON DRINKING HOT WATER
o	OXYGEN LINE
ro	REVERSE OSMOSIS
rcw	RECYCLED COLD WATER
rm	RISING MAIN
rwd	ROOF WATER DRAINAGE
rw	ROOF WATER RETICULATION
sd	SANITARY DRAINAGE
sp	SANITARY PLUMBING
s	SEWER
scw	SOFT COLD WATER
shw	SOFT HOT WATER
sw	STORMWATER
ss	SUB SOIL (AGI)
ts	TANK SUCTION
t	TEPID WATER
tw	TRADEWASTE
v	VENT

Linetypes - Proposed

B	BEER LINE
BW	BORE WATER
	CAST IN PIPEWORK
	COLD WATER
CA	COMPRESSED AIR
	FIRE SERVICE
	FIRE HYDRANT COVERAGE
	FIRE HOSE REEL COVERAGE
G	GAS SERVICE
	HEAT TRACE
	HOT WATER
IR	IRRIGATION
NDW	NON DRINKING COLD WATER
NDH	NON DRINKING HOT WATER
O	OXYGEN LINE
RO	REVERSE OSMOSIS
RM	RISING MAIN
RWD	RAIN WATER DRAINAGE
RW	RAIN WATER RETICULATION
RCW	RECYCLED COLD WATER
	SANITARY DRAINAGE / PLUMBING
SCW	SOFT COLD WATER
SHW	SOFT HOT WATER
	SUB SOIL (AGI)
TS	TANK SUCTION
T	TEPID WATER
TW	TRADEWASTE
	VENT
	REDUNDANT SERVICES

Linetypes - Services by Other's

C-RM	CIVIL - RISING MAIN
C-S	CIVIL - SEWER MAIN
C-SW	CIVIL - STORMWATER MAIN
C-W	CIVIL - WATER MAIN
NUGB	NEW UTILITY GAS BRANCH
NUSB	NEW UTILITY SEWER BRANCH
NUWB	NEW UTILITY WATER BRANCH
M	MECHANICAL (CONDENSATE DRAIN)

NOTE:- SOIL CLASSIFICATION 'CLASS #'
PROVIDE MOVEMENT CONTROL JOINTS AS REQUIRED & IN ACCORDANCE WITH THE GEOTECHNICAL REPORT, THE SITE SOIL CLASSIFICATION AND AS3500.2 - REFER H-### FOR TYPICAL MOVEMENT CONTROL DETAILS & DIFFERENTIAL MOVEMENT TABLE IF REQUIRED

NOTE: PROVIDE ACOUSTIC INSULATION TO PREVENT UNDUE NOISE FROM PLUMBING & DRAINAGE SYSTEMS IN ACCORDANCE WITH NCC 2022

NOTE: BACKFLOW PREVENTION DEVICES TO BE IN ACCORDANCE WITH AS/NZS3500.1.2021 SECTION 4 & THE PCA 2022 PART B5. CONTACT LOCAL COUNCIL PLUMBING DEPARTMENT FOR FURTHER INFORMATION REGARDING SPECIFIC BACKFLOW REQUIREMENTS FOR INDIVIDUAL APPLIANCES.

NOTE: ALL FIXTURES, APPLIANCE & APPARATUS CONNECTED TO THE PLUMBING SYSTEM ARE REQUIRED TO HAVE WATERMARK CERTIFICATION OR COMPLY WITH THE PLUMBING CODE OF AUSTRALIA PART A2

NOTE: EXISTING SERVICES HAVE BEEN DRAWN FROM HISTORICAL RECORDS AND ARE INDICATIVE ONLY. CONTRACTOR TO LOCATE, TRACE AND VERIFY BEFORE COMMENCING ANY ASSOCIATED WORKS

Abbreviations

AAV	Air Admittance Valve
AP	Access Pit
A/P	Access Panel
ASD	Automatic Switching Device
B	Basin
BID	Bidet
BM	Bain Marie
BT	Bucket Trap
BTH	Bath
BWU	Boiling Water Unit
CHVP	Chamber Vent Pipe
CIJU	Cast Iron Jump Up
CIP	Cast Iron Pipe
CM	Coffee Machine
CON	Connector
CON-W	Condensate Waste
CP	Chrome Plated
CSK	Cleaners Sink
CSWP	Civil Stormwater Pit
CV	Check Valve
CWM	Clothes Washing Machine
CU	Copper
DBA	Dry Basket Arrestor
DCV	Double Check Valve
DUAL-CV	Dual Check Valve
DF	Drinking Fountain
DG	Disconnector Gully
DP	Down Pipe
DPH	Double Pillar Hydrant
DS/IL	Down Stream Invert Level
DSD	Door Still Drain
DW	Dishwasher
ED	Elevated Drainage
EPD	Elevated Drainage Stack
eFH	Existing Fire Hydrant
eFHR	Existing Fire Hose Reel
EJ	Expansion Joint
e	Existing
eB	Existing Basin
eBTH	Existing Bath
eCSK	Existing Cleaner Sink
eIC	Existing Inspection Chamber
eIO	Existing Inspection Outlet
eIOS	Existing Inspection Outlet to Surface
eIV	Existing Isolation Valve
eIVP	Existing Isolation Valve in Path Box
eSHR	Existing Shower
eSK	Existing Sink
eSWP	Existing Stormwater Pit
eSWRG	Existing Stormwater Road Gully
eUR	Existing Urinal
eVC	Existing Vent Cowl
eWC	Existing Water Closet
FC	Fume Cupboard
FFL	Finished Floor Level
FFP	First Flush Pit
FH	Fire Hydrant
FHR	Fire Hose Reel
FI	Field Inlet
FRC	Fibre Reinforced Cement
FRS	Flushing Rim Sink
FSL	Finished Surface Level
FU	Fixture Unit Rating
FW	Floor Waste
FWG	Floor Waste Gully
G	Gully
GD	Grated Drain
GIT	Grease Interceptor Trap
GL	Ground Level
GPT	Gross Pollutant Trap
GRW	Glazed Earthen Ware
GTV	Grease Trap Vent
GV	Gate Valve
HC	Hose Cock
HCVB	Hose Connection Vacuum Breaker
HD	Heavy Duty
HDG	Hot Dipped Galvanised
HW	Hot Water
HWU	Hot Water Unit
HV	Hydrant Valve
HYD	Hydrant
IC	Inspection Chamber
IL	Invert Level
IM	Ice Machine
IO	Inspection Opening
IOS	Inspection Opening To Surface
IP	Inflow Pit
IRV	Irrigation Isolation Valve
IV	Isolation Valve
IWD	Independent Waste Dropper
JU	Jump Up
LC	Lock Closed
LD	Light Duty
LO	Lock Open
LT	Laundry Tub
LPG	Liquefied Petroleum Gas
MD	Medium Duty
MH	Manhole
NRV	Non Return Valve
OIT	Oil Interceptor Trap
OP	Overflow Pit
ORG	Overflow Relief Gully
P&ST	Paint and Silt Trap
PG	Pipe Guard
PLG	PLAZZI GULLY (80x50)
PLV	Pressure Limiting Valve
POLY	Polythene
POM	Pulse Outlet Meter Assembly
PRV	Pressure Relief Valve
PRDV	Pressure Reduction Valve
PSM	Permanent Survey Mark
PVC	Polyvinyl Chloride
PW	Pump Well
RBT	Registered Break Tank
RCP	Reinforced Concrete Pipe
RDF	Refrigerated Drinking Fountain
RL	Reduced Level
RPZD	Reduced Pressure Zone Device
RRJ	Rubber Ring Joint
RV	Relief Vent
RW	Retaining Wall
RWC	Refrigerated Water Cooler
SC	Stop Cock
SCRC	Sunshine Coast Regional Council
SCV	Single Check Valve
SD	Spoon Drain
SDO	Spoon Drain Outlet
SEW	Sewer
SEPTIC	Septic Tank
SH	Slop Hopper
SHR	Shower
SJ	Sealed Junction
SK	Sink
SL	Surface Level
SMH	Sewer Manhole
SP	Surcharge Pit
SSD	Subsoil Drain
ST	Stack
STY	Safe Tray
SW	Stormwater Drain
SWMH	Stormwater Manhole
SWD	Safe Waste Drain
TG	Trench Grate
TBM	Temporary Bench Mark
TD	Tundish
TTD	Trapped Tundish
TG	Test Gate
TMV	Thermostatic Mixing Valve
TOG	Top of Grate
TWS	Trade Waste Stack
TWVP	Trade Waste Vent Pipe
TV	Tempering Valve
UR	Urinal
UNO	Unless Noted Otherwise
uPVC	Unplasticised Polyvinyl Chloride
USD	Under SPA Drain
US/IL	Up Stream Invert Level
VP	Vent Pipe
VBV	Vacuum Break Valve
VC	Vent Cowl
VCP	Vitrified Clay Pipe
VDCV	Vented Double Check Valve
WC	Water Closet
WDH	Wash Down Hose Cock
WM	Water Meter
WT	Wash Trough

DATE	STAGE	DESCRIPTION	REV NO	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT | BUILDING DESIGNER: BEAT ARCHITECTS

CLIENT

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MRP HYDRAULIC & FIRE SERVICES CONSULTANTS PTY LTD
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P: (07) 3452 1400
E: operations@mrp.com.au
W: mrp.com.au
BSA: 1137134 ABN: 23 126 270 326 QBCC: 1137134

PROJECT DESCRIPTION & ADDRESS
REDEEMER LUTHERAN COLLEGE STAGE 2A
8 BELL ST, BILOELA, QLD, 4715
LOT 1ON RP607657

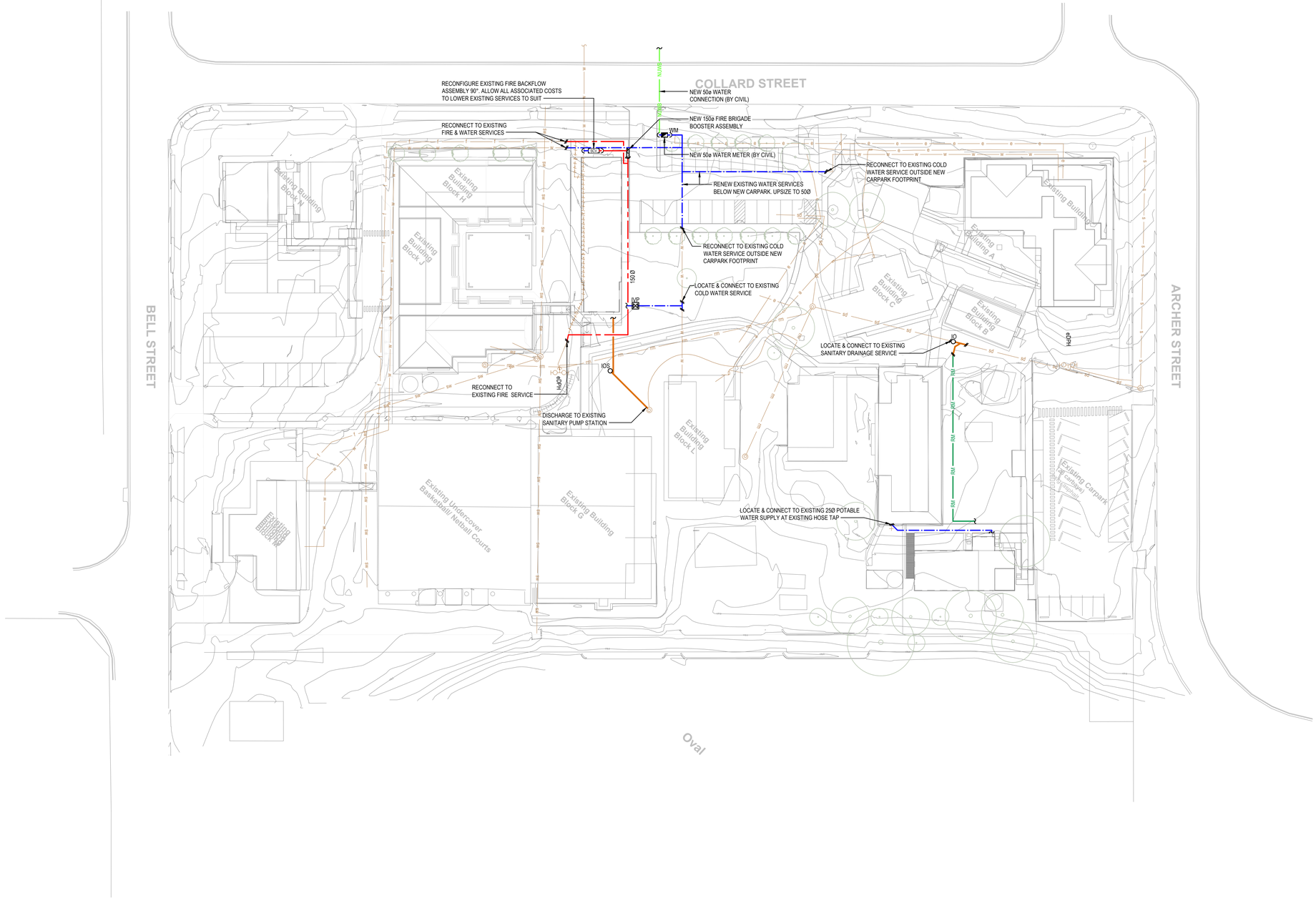
VERIFIED BY: AG | DATE 28.07.26
DESIGNER: AG | DATE 28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION
COVER SHEET
NOTES & LEGENDS

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW
NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
26-0407	NTS	A1
SHEET NUMBER H-102	REVISION NUMBER 01	



DATE	STAGE	DESCRIPTION	REV NO	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT \ BUILDING DESIGNER

BEAT ARCHITECTS

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PROJECT DESCRIPTION & ADDRESS

REDEEMER LUTHERAN COLLEGE STAGE 2A

8 BELL ST, BILOELA, QLD, 4715

LOT 1ON RP607657

VERIFIED BY:	DATE
AG	28.07.26
DESIGNER	DATE
AG	28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION

SITE PLAN

HYDRAULIC SERVICES

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW

NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
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SHEET NUMBER	REVISION NUMBER	
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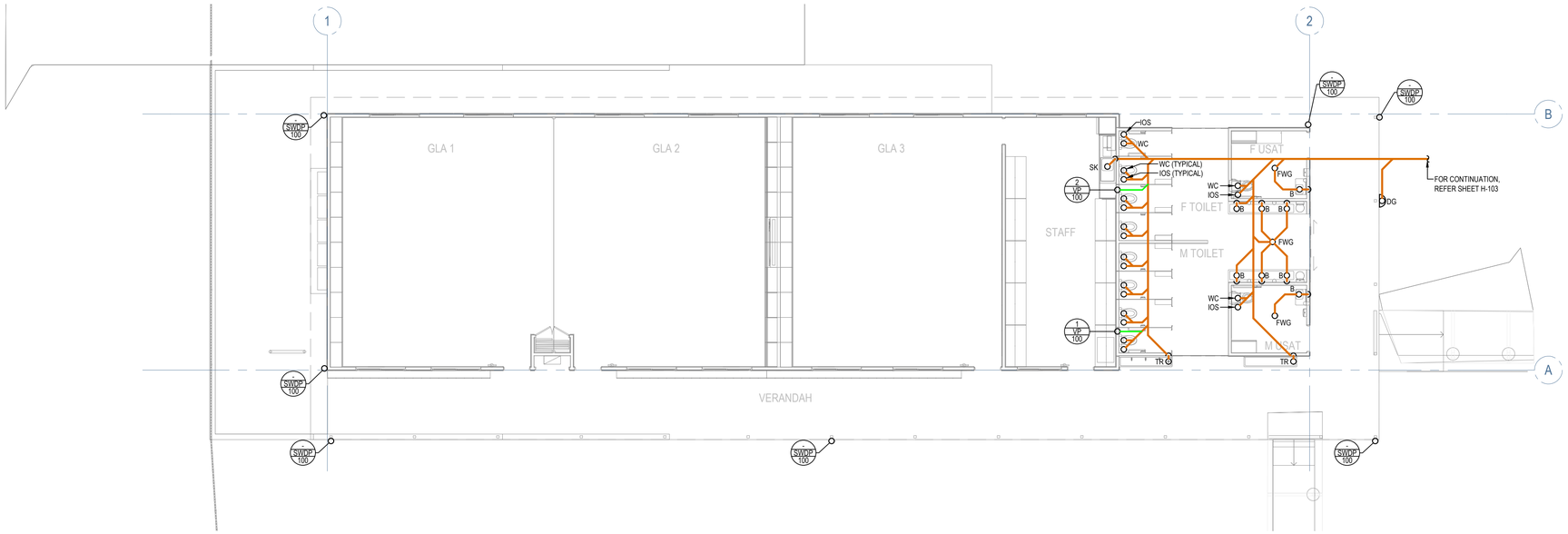

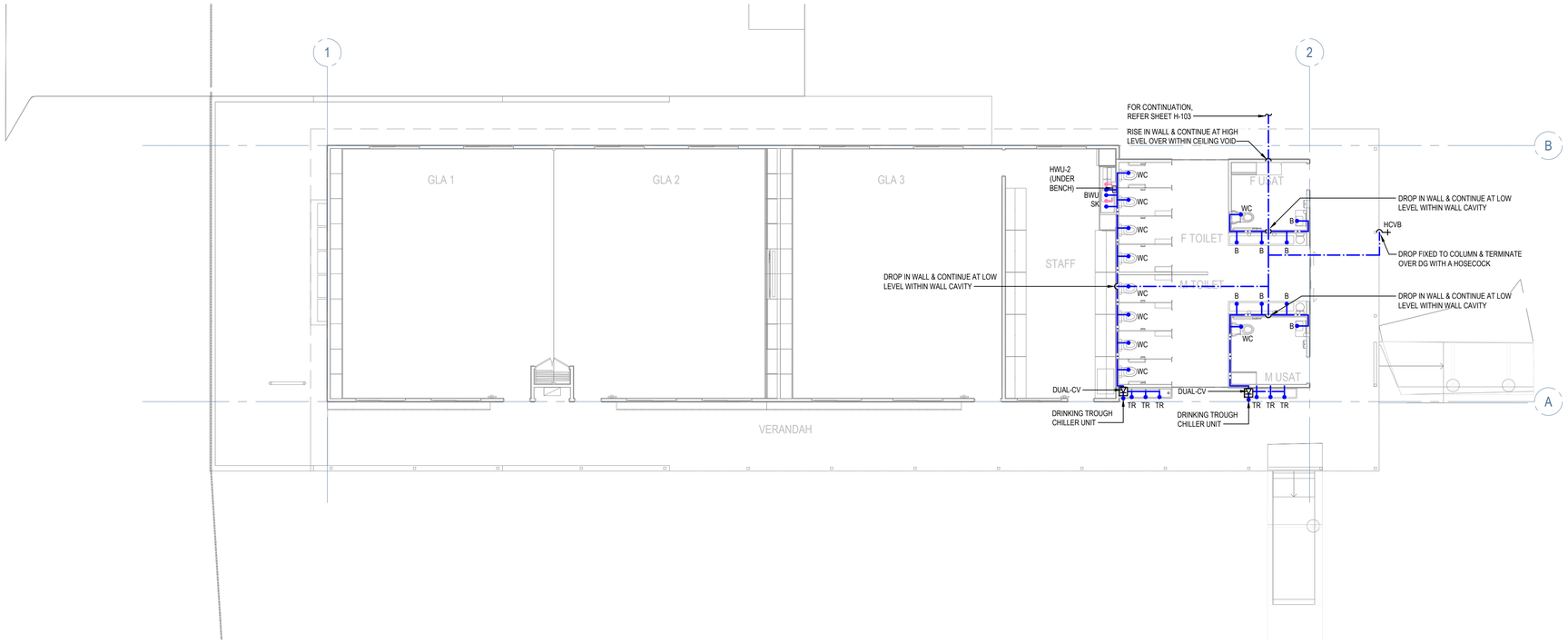

DATE	STAGE	DESCRIPTION	REV NO	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT \ BUILDING DESIGNER

BEAT ARCHITECTS

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8 BELL ST, BILOELA, QLD, 4715

LOT 1ON RP607657

VERIFIED BY:	DATE
AG	28.07.26
DESIGNER	**DATE**
AG	28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION

BLOCK P

GROUND FLOOR

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW

NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
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SHEET NUMBER	**REVISION NUMBER**	
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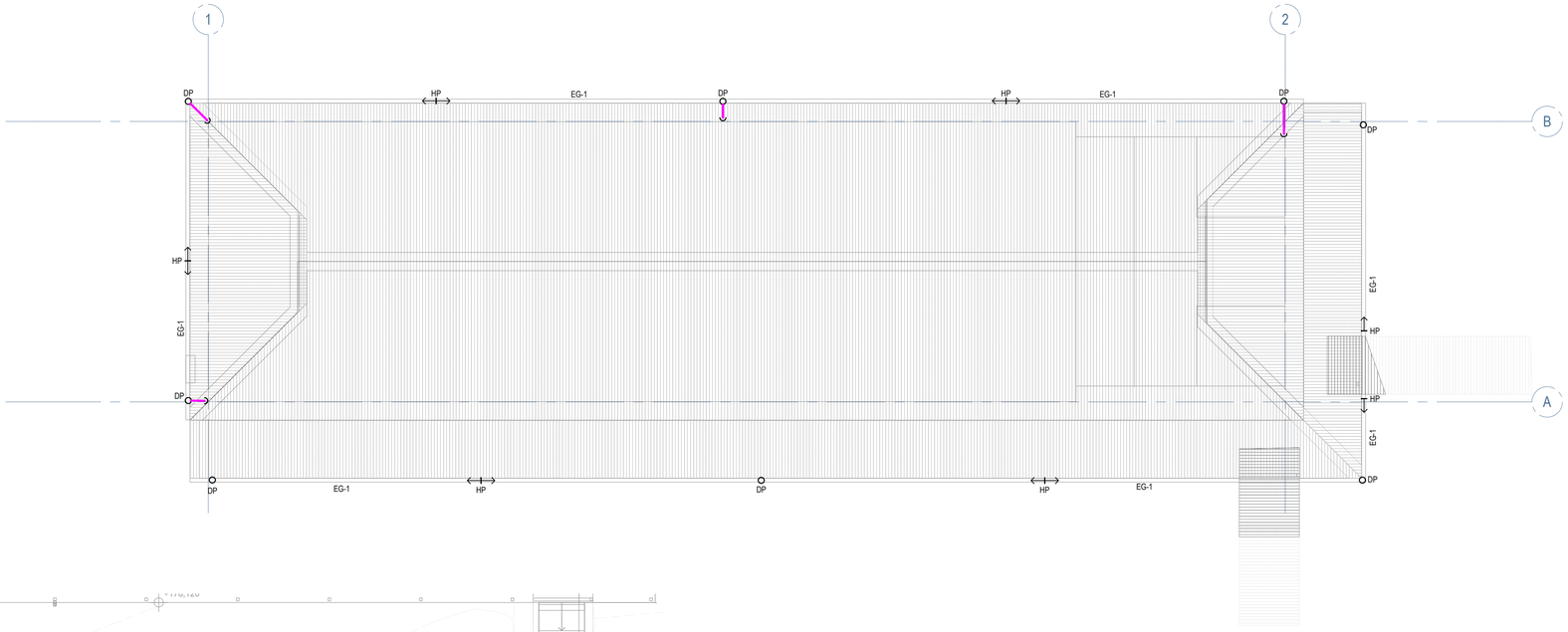

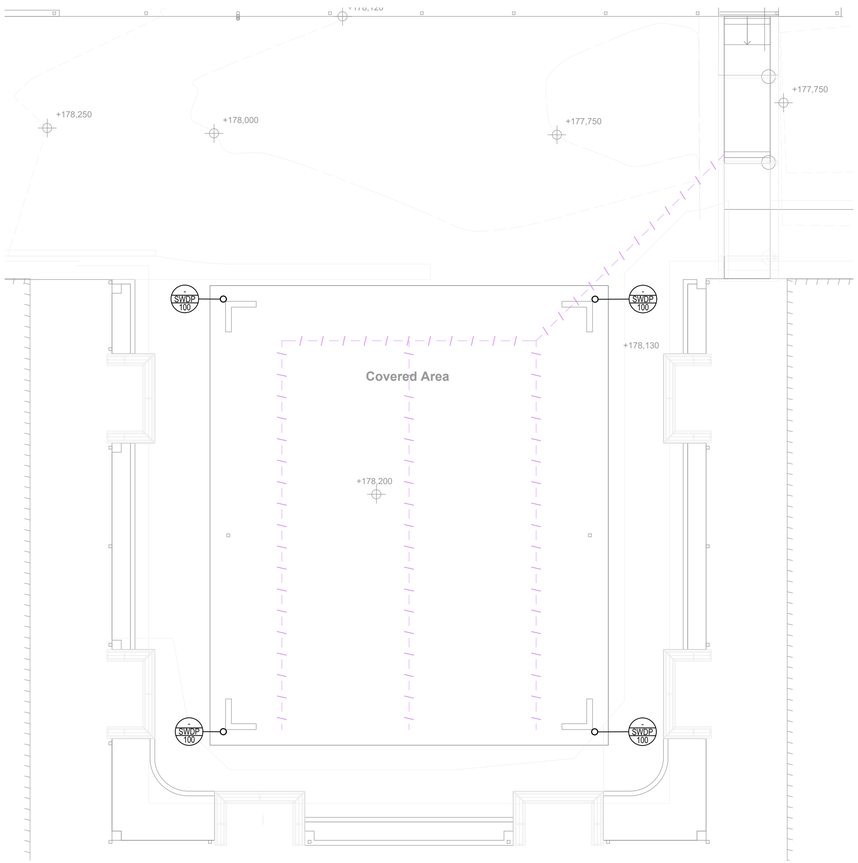

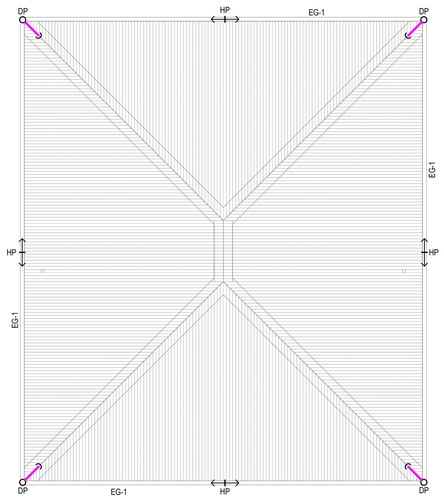

DATE	STAGE	DESCRIPTION	REV NO	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT I BUILDING DESIGNER

BEAT ARCHITECTS

CLIENT

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PROJECT DESCRIPTION & ADDRESS

REDEEMER LUTHERAN COLLEGE STAGE 2A

8 BELL ST, BILOELA, QLD, 4715

LOT 1ON RP607657

VERIFIED BY:	DATE
AG	28.07.26
DESIGNER	DATE
AG	28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION

BLOCK P & COVERED AREA

ROOF PLAN

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW

NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
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SHEET NUMBER	REVISION NUMBER	
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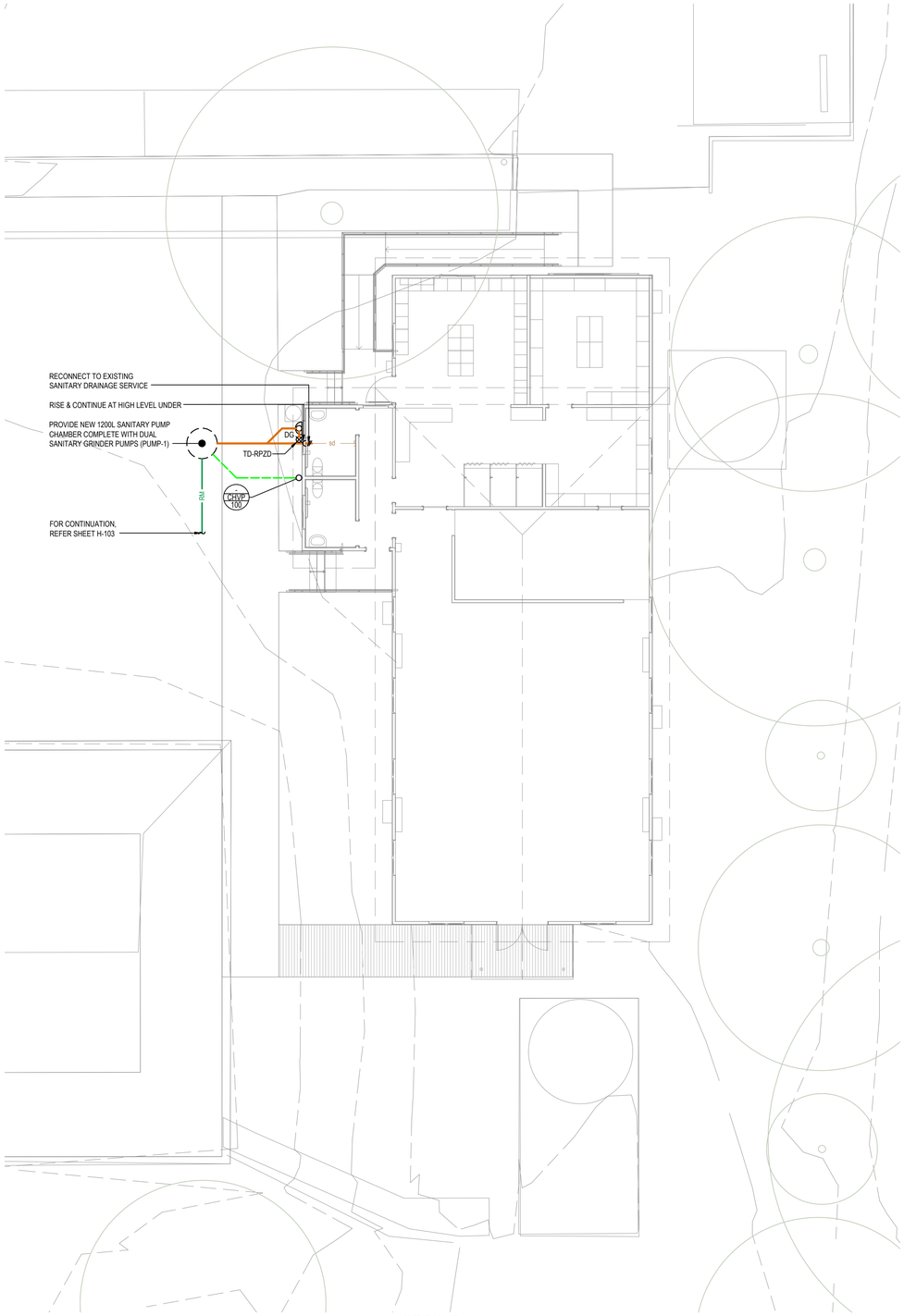
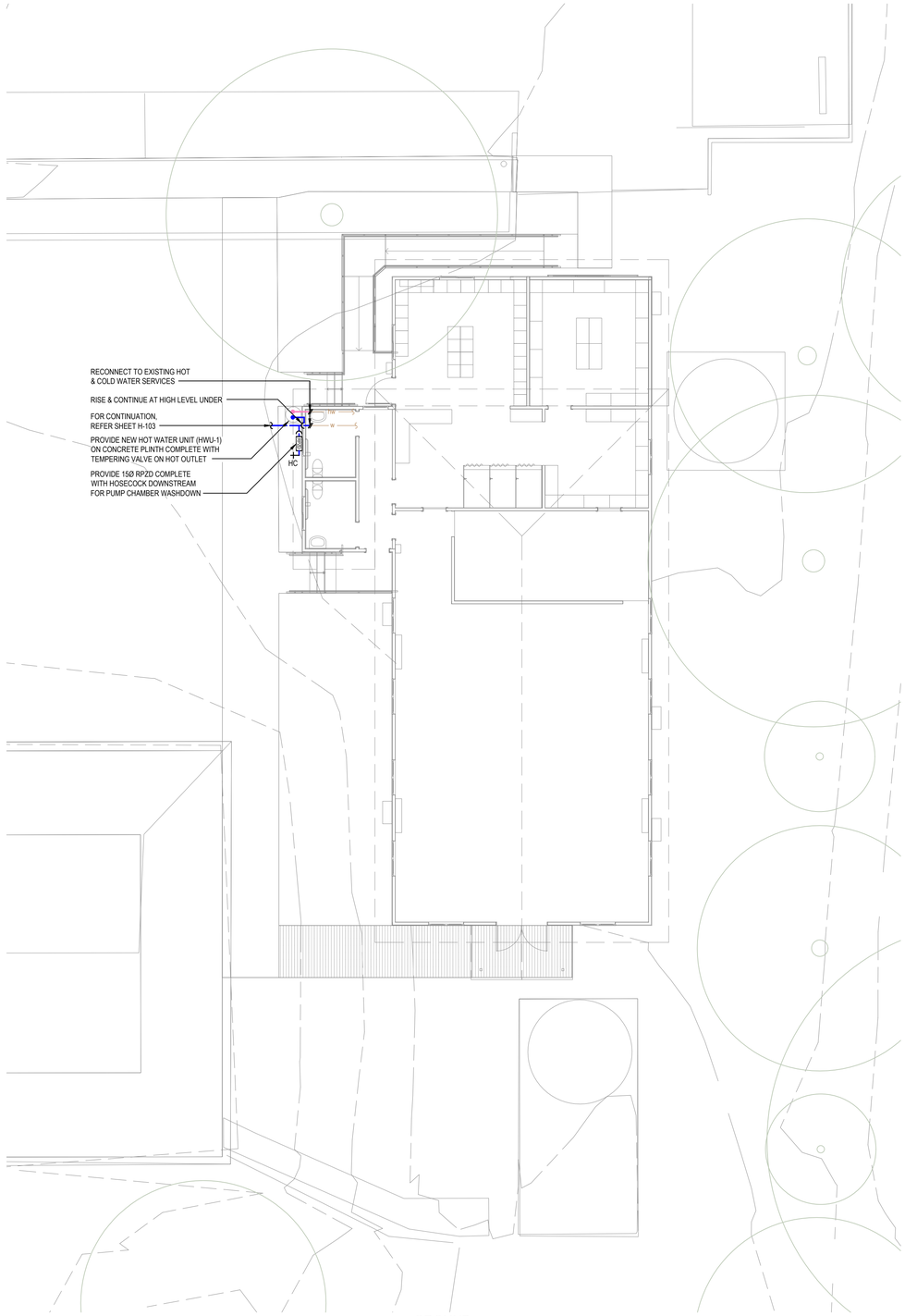


GROUND
DRAINAGE
SCALE: NTS AT SHEET A1



GROUND
WATER
SCALE: NTS AT SHEET A1

DATE	STAGE	DESCRIPTION	REV NO.	AUTH
28.07.26	DD	DESIGN DEVELOPMENT ISSUE	01	AG

ARCHITECT | BUILDING DESIGNER

BEAT ARCHITECTS

CLIENT

HYDRAULIC CONSULTANT

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W: mrp.com.au
BSA: 1137134 ABN: 23 126 270 326 QBCC: 1137134

PROJECT DESCRIPTION & ADDRESS

REDEEMER LUTHERAN COLLEGE
STAGE 2A
8 BELL ST, BILOELA, QLD, 4715
LOT 1ON RP607657

VERIFIED BY:	DATE
AG	28.07.26
DESIGNER	DATE
AG	28.07.26

HYDRAULIC SERVICE SHEET DESCRIPTION

RELOCATED CHAPEL
HYDRAULIC SERVICES

NOTE: DRAWING SHOULD BE PRINTED IN COLOUR

PRELIMINARY REVIEW
NOT FOR APPROVAL, TENDER OR CONSTRUCTION

PROJECT NUMBER	SCALE	SHEET SIZE
26-0407	1:100	A1
SHEET NUMBER	REVISION NUMBER	
H-203	01	

APPENDIX C – FIRE SERVICE PRESSURE TESTING RECORDS

Form 72—fire hydrant and sprinkler system periodic testing and maintenance

This form is to be used for the purpose of maintenance to water based fire safety installations, as required by the Queensland Development Code – Mandatory Part (MP) 6.1, which is a building assessment provision under the *Building Act 1975*, section 30. This form is also to be used in accordance with the 'Fire hydrant and sprinkler system commissioning and periodic maintenance procedure', defined in MP 6.1 as the 'Relevant procedure'. Please note that this form does not comprise all maintenance requirements—this form is only for collecting results for maintenance for some sections of the Australian Standards referred to and in each case, further testing is required.

Part A—Test details

Site name	Biloela Lutheran College		
Site address	2 Collard st Biloela QLD 4715		
Contractor	WORMALD		
Test details	Test date: 18·03·22	Maintenance test:	Annual / 5 year
	Time:	fire hydrant	☑ / ☐
		fire sprinkler	☐ / ☐
		combined	☐ / ☐

Part B—Hydrant hydrostatic test PASS ☐ FAIL ☐

(refer to the required pressure specification for periodic testing (as applicable) as per AS2419.1 or AS1851.

Boost pressure	kPa	Test pressure	kPa		
Duration of test	mins	End of test pressure	kPa	Loss (if any):	l/min

Comments: N/A – Hydrants on domestic water supply.

Part C—Hydrant test equipment/pressure gauges

If using more devices, provide details in the Notes section below or complete another form. The correction factor must be kPa or a percentage.

Flow measuring device	Orifice ☐ Part C not required for orifice testing	Mechanical ☑ Calibrated: 14.09.21	Electro magnetic ☐ Calibrated: / /

	[redacted]/gauge 1	Device/[redacted]2	Device/gauge 3	Device/gauge 4
Serial number	Unknown	WF01632		
Date calibrated	08·06·21	14·09·21		
Correction certificate	01805	118751-2		
65/100/150 mm face	150	65		
Digital reader	N/A	N/A		
Increments (kPa)	10	1 L/S		

Part D—Hydrant system flow test PASS ☑ FAIL ☐

This part relates to tests under Section 4 of AS1851. If pressure/flow rates do not meet the fire system design criteria and there are no on-site problems, contact the relevant water service provider to ascertain if there are any problems with the water system network. In the table below, please record the pressure readings obtained during the hydrant system flow test.

Hydrant 1 location	Archer St East End	Hydrant 3 location	
Hydrant 2 location		Hydrant 4 location	
System requirements	l/s at Unknown kPa	Static pressure	530 kPa
On-site pump set installed	Yes ☐		No ☑

Pressure zone number:	Size/flow rate	Device/gauge no. (Part C)	Hydrant 1 only	Hydrants 1 and 2	Hydrants 1, 2 and 3	Hydrants 1, 2, 3 and 4
Nozzles	19 mm		kPa	kPa	kPa	kPa
	22 mm		kPa	kPa	kPa	kPa
	25 mm		kPa	kPa	kPa	kPa
Other portable testing devices	5 L/s		kPa	kPa	kPa	kPa
	10 L/s	1-2	500 kPa	kPa	kPa	kPa
	15 L/s	1-2	460 kPa	kPa	kPa	kPa
	20 L/s	1-2	420 kPa	kPa	kPa	kPa
	30 L/s	1-2	N/A kPa	kPa	kPa	kPa
	System achieved: 29 L/s at 300 kPa					

ing Codes Queensland
ment of Housing and Public Works

Queensland Government

Collard Street Fire Service Testing

Form 72—fire hydrant and sprinkler system periodic testing and maintenance

Version 1 – July 2014

This form is to be used for the purposes of maintenance in water based fire safety installations, as required by the Queensland Development Code – Mandatory Part (MP) 6.1, which is a building assessment provision under the *Building Act 1975*, section 30. This form is also to be used in accordance with the 'fire hydrant and sprinkler system commissioning and periodic maintenance procedure', defined in MP 6.1 as the 'Relevant procedure'. Please note that this form does not comprise all maintenance requirements—this form is only for collecting results for maintenance for some sections of the Australian Standards referred to and in such case, further testing is required.

Part A—Test details

Site name	Biloela Lutheran College
Site address	2 Collard st Biloela QLD 4715
Contractor	WORMALD
Test details	Test date: 18.03.22
	Time:
	Maintenance test: Annual / 5 year — fire hydrant ☑ ☐; fire sprinkler ☐ ☐; combined ☐ ☐

Part B—Hydrant hydrostatic test PASS ☐ FAIL ☐

Refer to the required pressure specification for periodic testing (as applicable) as per AS2419.1 or AS1851.

Boost pressure	kPa	Test pressure	kPa		
Duration of test	mins	End of test pressure	kPa	Loss (if any):	L/min

Comments: N/A – Hydrants on domestic water supply.

Part C—Hydrant test equipment/pressure gauges

If using more devices, provide details in the Notes section below or complete another form. The correction factor must be kPa or a percentage.

Flow measuring device	Orifice ☐ Part C not required for orifice testing	Mechanical ☑ Calibrated: 14/09/21	Electro magnetic ☐ Calibrated: / /	
	Device/gauge 1	Device/gauge 2	Device/gauge 3	Device/gauge 4
Serial number	Unknown	WF01632		
Date calibrated	08.06.21	14.09.21		
Correction certificate	01805	118751-2		
65/100/150 mm face	150	65		
Digital reader	N/A	N/A		
Increments (kPa)	10	1 L/S		

Part D—Hydrant system flow test PASS ☑ FAIL ☐

This part relates to tests under Section 4 of AS1851. If pressure/flow rates do not meet the fire system design criteria and there are no on-site problems, contact the relevant water service provider to ascertain if there are any problems with the water system network. In the table below, please record the pressure readings obtained during the hydrant system flow test.

Hydrant 1 location	Bell St West End.	Hydrant 3 location	
Hydrant 2 location		Hydrant 4 location	
System requirements	L/s unknown kPa	Static pressure	540 kPa
On-site pump set installed	Yes ☐		No ☑

Pressure zone number:	Size/flow rate	Device/gauge no. (Part C)	Hydrant 1 only	Hydrants 1 and 2	Hydrants 1, 2 and 3	Hydrants 1, 2, 3 and 4
Nozzles	19 mm		kPa	kPa	kPa	kPa
	22 mm		kPa	kPa	kPa	kPa
	25 mm		kPa	kPa	kPa	kPa
Other portable testing devices	5 L/s		kPa	kPa	kPa	kPa
	10 L/s	1&2	490 kPa	kPa	kPa	kPa
	15 L/s	1&2	470 kPa	kPa	kPa	kPa
	20 L/s	1&2	430 kPa	kPa	kPa	kPa
	30 L/s	1&2	330 kPa	kPa	kPa	kPa

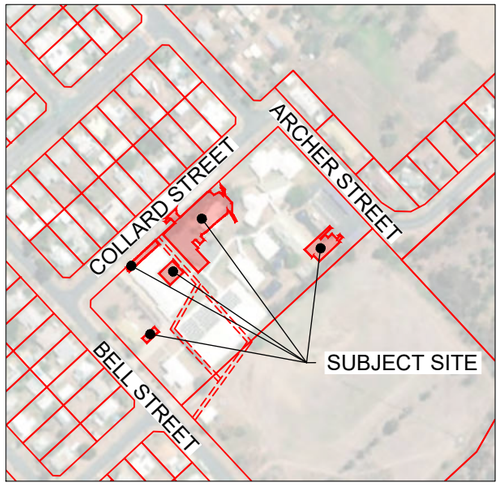
System achieved: 32 L/s at 280 kPa

Building Codes Queensland
Department of Housing and Public Works

Queensland Government

Appendix B – Engineering Drawings

REDEEMER LUTHERAN
COLLEGE STAGE 2A, 2 COLLARD ST.
BILOELA QLD 4715



LOCALITY PLAN
N.T.S

COMMERCIAL DEVELOPMENT
DESIGN FILE No: CE26020
DESIGN STANDARD: CMDG, IPWEA, SEQ & TMR

DESIGN TRAFFIC
ROAD CLASSIFICATION: DRIVEWAY
PAVEMENT DESIGN LIFE: 30 YRS
DESIGN SPEED: 5KM/H

STORMWATER/FLOOD DATA
NEW STRUCTURES & NETWORK, COMPLY WITH THE FOLLOWING:

MAJOR SYSTEM:	1% AEP
MINOR SYSTEM:	10% AEP
BLOCKAGE FACTOR:	0.5 ON INLETS

REFERENCE DESIGN REPORTS
STORMWATER REPORT: SBSMP REPORT REV A BY "Moloney & Sons Engineering" dated 20th May 2026.

GENERAL
1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL OTHER CONSULTANTS DRAWINGS AND SPECIFICATIONS.
2. BEFORE PROCEEDING WITH THE WORK ANY DISCREPANCIES IN THE CONTRACT DOCUMENTS SHALL BE REFERRED FOR DECISION TO THE SUPERINTENDENT.
3. DO NOT SCALE FROM DRAWINGS.
4. ALL MATERIALS/CONSTRUCTION & WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS AND THE LOCAL AUTHORITY'S STANDARD DRAWINGS AND BY-LAWS.
5. THE CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL RELEVANT APPROVALS PRIOR TO COMMENCEMENT OF WORKS.
6. UNDERGROUND SERVICE LOCATIONS SHOWN ON THIS PLAN HAVE BEEN DETERMINED BY FIELD SURVEY AND/OR OFFICE RECORDS, AND MAY NOT REPRESENT ALL SERVICES OR EXACT LOCATIONS. THE CONTRACTOR MUST ACCURATELY LOCATE LINE & LEVEL (DEPTH) OF ALL SERVICES LIKELY TO BE ENCOUNTERED DURING CONSTRUCTION, PRIOR TO COMMENCEMENT OF ANY EXCAVATION.
7. DISPERSIVE SOILS ARE NOT TO BE USED AS FILL/EMBANKMENT MATERIAL. ALL CONSTRUCTION & EARTHWORKS TO BE COMPLETED IN ACCORDANCE WITH THE SPECIFICATION LISTED AND UNDER LEVEL 1 SUPERVISION DURING EARTHWORKS.

CONTRACT SPECIFICATIONS
CMDG CONSTRUCTION SPECIFICATIONS:

CMDG C201	CONTROL OF TRAFFIC;
CMDG C211	CONTROL OF EROSION AND SEDIMENTATION;
CMDG C212	CLEARING AND GRUBBING;
CMDG C213	EARTHWORKS;
CMDG C220	STORMWATER DRAINAGE;
CMDG C221	PIPE DRAINAGE SPECIFICATION;
CMDG C223	DRAINAGE STRUCTURE;
CMDG C224	OPEN DRAINS;
CMDG C230	SUBSURFACE DRAINAGE;
CMDG C231	SUBSOIL AND FOUNDATION DRAINS;
CMDG C265	BOUNDARY FENCING;
CMDG C271	MINOR CONCRETE WORKS;
CMDG C273	LANDSCAPING;
CMDG D11	WATER DESIGN;
CMDG D12	SEWERAGE DESIGN

STANDARD DRAWINGS
CMDG STANDARD DRAWINGS:

CMDG-D-010	EXCAVATION, BEDDING AND BACKFILLING OF CONCRETE
CMDG-D-022	FIELD INLET DETAILS
CMDG-D-030	ACCESS CHAMBER DETAILS, DIA 1050 TO 1500
CMDG-D-050	SEDIMENT CONTROL DEVICES SEDIMENT FENCE ENTRY EXIT SEDIMENT TRAP
CMDG-D-051	SEDIMENT CONTROL DEVICES, KERB AND FIELD INLETS, CHECK DAMS & STRAW BALE BANK
CMDG-R-042A	URBAN COMMERCIAL/ INDUSTRIAL DRIVEWAY
CMDG-R-060	STANDARD KERB AND CHANNEL PROFILES
CMDG-S-030	HOUSE CONNECTION BRANCHES;
CMDG-W-090	20 AND 25mm SERVICE AND WATER METER CONNECTIONS
CMDG-W-091	20, 25, 32 AND 40mm WATER METER DETAILS BELOW GROUND
CMDG-W-091	20, 25, 32 AND 40mm WATER METER DETAILS BELOW GROUND
CMDG-W-094	50, 80, 100, 150 and 200mm WATER METER CONNECTIONS

IPWEAQ STANDARD DRAWINGS:

DRG RS-080	KERB AND CHANNEL PROFILES AND DIMENSIONS INCLUDING EDGE RESTRAINTS, MEDIAN & CHANNEL

DRAWING SCHEDULE

DOCUMENT TITLE	DOCUMENT NO.
COVER SHEET LOCALITY PLAN & DRG SCHEDULE	CE26020-001-CO
LEGEND	CE26020-002-CO
TYPICAL SECTIONS & DETAILS SHEET 1 OF 3	CE26020-101-TC
TYPICAL SECTIONS & DETAILS SHEET 2 OF 3	CE26020-102-TC
TYPICAL SECTIONS & DETAILS SHEET 3 OF 3	CE26020-103-TC
SITE SECTIONS SHEET 1 OF 4	CE26020-110-TC
SITE SECTIONS SHEET 2 OF 4	CE26020-111-TC
SITE SECTIONS SHEET 3 OF 4	CE26020-112-TC
SITE SECTIONS SHEET 4 OF 4	CE26020-113-TC
EXISTING SITE LAYOUT & DEMOLITION PLAN	CE26020-200-AL
GENERAL ARRANGEMENT OVERALL LAYOUT PLAN	CE26020-300-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 1 OF 5	CE26020-301-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 5	CE26020-302-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 5	CE26020-303-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 5	CE26020-304-GA
PROPOSED SITE GENERAL ARRANGEMENT SHEET 5 OF 5	CE26020-305-GA
SWEPT PATH CAR SHEET 1 OF 2	CE26020-311-GA
SWEPT PATH CAR SHEET 2 OF 2	CE26020-312-GA
PROPOSED SITE JOINTING LAYOUT PLAN	CE26020-321-GA
PROPOSED SITE BULK EARTHWORKS	CE26020-400-GA
DRIVEWAY LONGITUDINAL SECTIONS SHEET 1 OF 2	CE26020-501-LS
DRIVEWAY LONGITUDINAL SECTIONS SHEET 2 OF 2	CE26020-502-LS
STORMWATER PRE - DEVELOPMENT CATCHMENT PLAN	CE26020-600-DR
STORMWATER POST - DEVELOPMENT CATCHMENT PLAN	CE26020-601-DR
STORMWATER LONGITUDINAL SECTIONS - SHEET 1 OF 2	CE26020-611-DR
STORMWATER LONGITUDINAL SECTIONS - SHEET 2 OF 2	CE26020-612-DR
PROPOSED SITE WATER LAYOUT PLAN	CE26020-700-WA
PROPOSED SITE SEWER LAYOUT PLAN	CE26020-800-SEW
SEDIMENT & EROSION CONTROL PLAN	CE26020-900-SE
SEDIMENT & EROSION CONTROL PLAN TYPICAL DETAILS	CE26020-910-SE

DETAIL SURVEY BY:
FREDRIKSEN MACLEAN & ASSOCIATES CONSULTING SURVEYORS
DATE SURVEYED 16/04/2026
SURVEY: MGA2020 ZONE 56 GRID

STANDARD DRAWINGS:
AUSTROADS DESIGN & TMR GUIDELINES / CAPRICORN MUNICIPAL DESIGN GUIDELINES / INSTITUTE OF PUBLIC WORKS ENGINEERING AUSTRALIA (IPWEA)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
B	LM	AWE	22/07/26	50% DETAILED DESIGN
C	LM	AWE	04/08/26	100% DETAILED DESIGN

AMENDMENTS

DESIGN CHECK: vs
DRAWN CHECK: vt

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A 2 COLLARD ST. BILOELA QLD

MOLONEY & SONS ENGINEERING design it. build it.
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
www.moloneyandsons.com.au

DRAWING TITLE: COVER SHEET LOCALITY PLAN & DRG SCHEDULE
DRAWING NUMBER: CE26020-001-CO
ISSUE: C

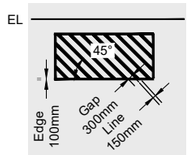
LEGEND

EXISTING SURVEY

- Existing Lot Boundary
- Existing Easement
- Existing Structure / Infrastructure to be Demolished
- Existing Edge of Bitumen
- Existing building
- Existing Top of Batter
- Existing Toe of Batter
- Existing Fence Line
- Existing Vegetation
- E — Existing Electricity
- E/O — Existing Overhead Electrical
- DBYD — T — Existing DBYD Telecommunication
- DBYD — S — Existing DBYD Sewer
- DBYD — W — Existing DBYD Water
- SW — Existing Stormwater
- DBYD — SRM — Existing DBYB Sewer Rising Main
- Existing Bitumen Surface
- Existing Footpath Concrete
- 12.0 — Existing Surface Contours Major
- 12.0 — Existing Surface Contours Minor
- S MH — Existing Sewer Structures
- SW MH — Existing Stormwater Structures
- T P — Existing Telstra Structures
- E P — Existing Electrical Structures
- PP — Existing Power Pole
- FH W M W — Existing Water Structures
- Existing Drainage Structures
- HW — Existing Stormwater Structures Headwall
- Existing Tree

PROPOSED

- Proposed Barrier Kerb Type 3
- Proposed Concrete Driveway
- Proposed Footpath Concrete
- Proposed Footpath Integrated With Building Slab
- Proposed Building
- Proposed Scour Protection
- Proposed Landscaping (By others)
- RW — RW — Proposed Retaining Type 1
- Proposed Retaining Type 2
- RW — RW — Proposed Retaining Wall By Structural Engineer
- 12.0 — Proposed Surface Contours
- SW — SW — Proposed Stormwater Pipe
- DS — Proposed Subsoil Drainage
- W — Proposed Water Pipe
- W — Proposed Fire Water Pipe By Hydraulic Engineer
- Proposed Stormwater Field inlet
- S — Proposed Sewer Manhole
- S — Proposed Sewer Pipe
- SRM — Proposed Sewer Rising Main Pipe
- HC — Proposed Sewer House Connection
- W — Proposed Water Connection
- M W — Proposed Water Meter
- TW — Top Of Wall Level
- BW — Bottom Of Wall Level
- RL — Design Level
- FFL — Finish Floor Level



- 100mm — Edge Line
- Chevron

SEDIMENT & EROSION CONTROL

- Proposed Catch Drain
- Proposed Sediment Fence
- Clearing & Grubbing
- Temporary Straw Filter Sock
- Temporary Check Dam
- Temporary Construction Entry

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		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		LM	AWE	03/26	
AMENDMENTS	A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
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DESIGN CHECK: us

DRAWN CHECK: ut

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

MOLONEY & SONS ENGINEERING
design it. build it.
P.O. Box 3203 RED HILL ROCKHAMPTON, Q 4701
www.moloneyandsons.com.au

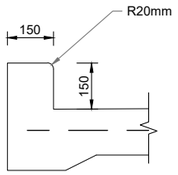
DRAWING TITLE: LEGEND

DRAWING NUMBER: CE26020-002-CO

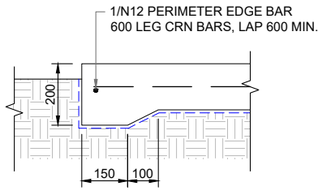
ISSUE: C

GENERAL NOTES:

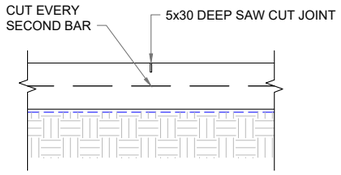
1. ALL PAVEMENT PROFILES ARE SUBJECT TO SUBGRADE TESTING OF ALL AREAS PRIOR TO COMMENCING WORKS AND APPROVED BY SUPERINTENDENT.
2. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
3. ALL BATTER SECTIONS ARE INDICATIVE ONLY. GEOTECHNICAL ENGINEERING ADVICE SHALL BE REQUIRED FOR ALL BATTER SLOPES TO ASSESS THE SUITABILITY OF EITHER THE CUT FACE OR FILL EMBANKMENT GEOMETRY. THE INSPECTIONS SHALL BE UNDERTAKEN BY REGISTERED GEOTECHNICAL ENGINEER. FLATTER OR STEEPER SLOPES MAY BE ADOPTED BASED ON THE RECOMMENDATIONS.



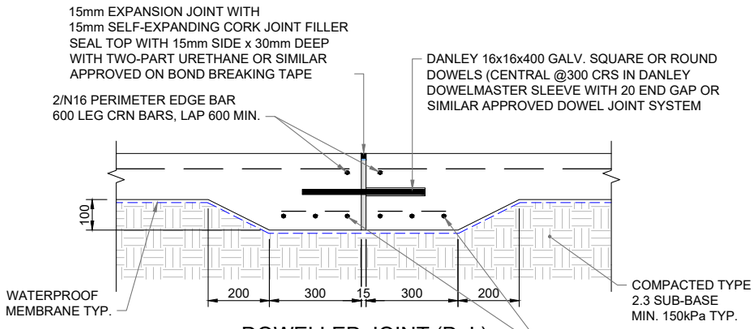
KERB K3 DETAIL
SCALE 1:20



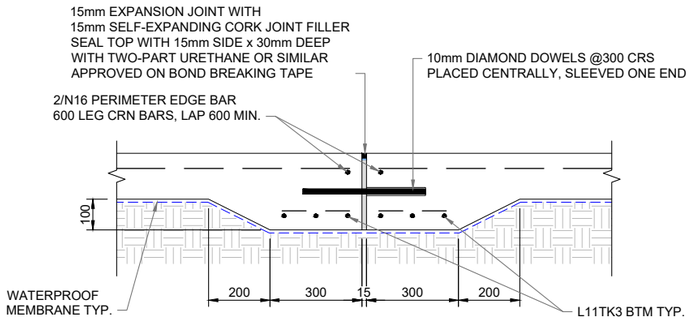
ET1 EDGE THICKENING
SCALE 1:20



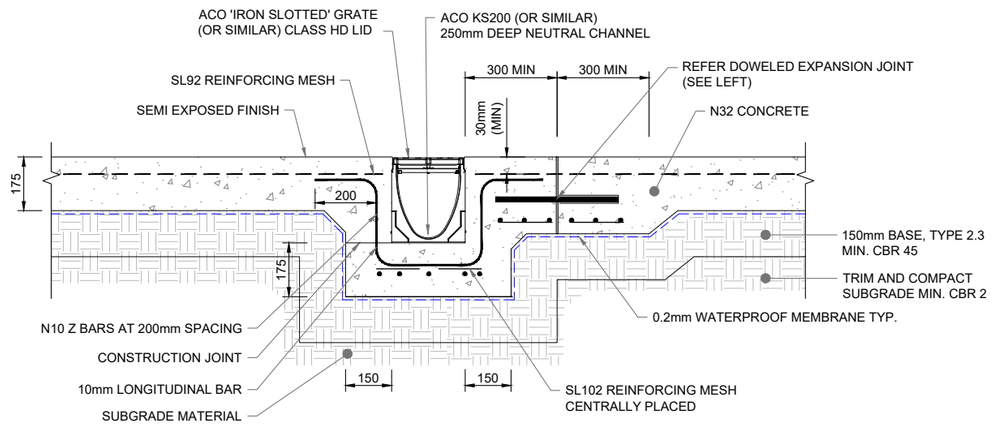
SAW CUT JOINT (S.J.)
SCALE 1:20



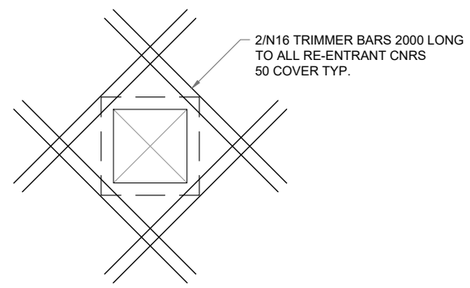
DOWELLED JOINT (D.J.)
SCALE 1:20



EXPANSION JOINT (E.J.)
SCALE 1:20



ACO DRAIN DETAIL
SCALE 1:20



TYPICAL SUMP PIT DETAIL (PLAN VIEW)
SCALE 1:50

PRELIMINARY PAVEMENT DESIGN:

TYPE	AREA	DESIGN	SURFACE SEAL	BASE COURSE	SUB-BASE	SUBGRADE REPLACEMENT	TOTAL PAVEMENT THICKNESS	COMMENTS
	846 m^2	CONCRETE PAVEMENT	N/A	175mm THK 32MPa CONCRETE WITH SL92 50mm TOP & EDGE COVER	150mm THK TYPE 2.3	N/A	325mm	COMPLETE BOX OUT AND PREP SUBGRADE
	257 m^2	CONCRETE FOOTPATH	N/A	100mm THK 32MPa CONCRETE WITH SL72 40mm TOP COVER				

1. ADOPTED CBR OF 3% AS PER CQ SOIL TESTING REPORT

0 0.125 0.5m
0 0.250 1.0m
1:25 (A1)
1:50 (A3)

0 0.05 0.2m
0 0.10 0.4m
1:10 (A1)
1:20 (A3)

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
	LM	AWE	03/26	
A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
B	LM	AWE	22/07/26	50% DETAILED DESIGN
C	LM	AWE	04/08/26	100% DETAILED DESIGN

AMENDMENTS

DESIGN CHECK: vs
DRAWN CHECK: vt

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

MOLONEY & SONS ENGINEERING
design it. build it.
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www.moloneyandsons.com.au

DRAWING TITLE: TYPICAL SECTIONS & DETAILS SHEET 1 OF 3
DRAWING NUMBER: CE26020-101-TC
ISSUE: C

MATERIAL NOTES:

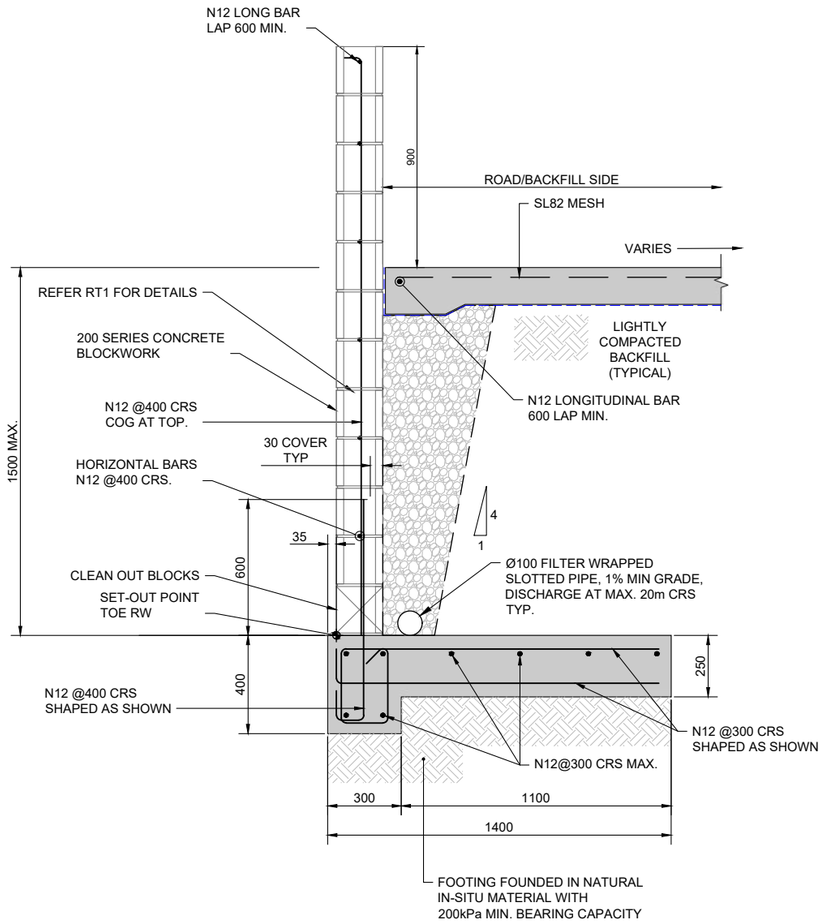
1. DESIGNED IN ACCORDANCE WITH:
   1.1. AS 4678-2002 - EARTH RETAINING STRUCTURES.
   1.2. AS 3600-2018 - CONCRETE STRUCTURES.
   1.3. AS 1170-2011 - STRUCTURAL DESIGN ACTIONS.
2. DESIGN PARAMETERS IN NOTE 3 ARE ASSUMED. THIS ASSUMPTIONS NEED TO BE VERIFIED AND CERTIFIED FOR A REGISTERED GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION. IN CASE OF DIFFERENCE, THE APPROVED DESIGN PARAMETERS MUST BE REPORTED TO THE DESIGNED FOR DESIGN VERIFICATION.
3. ASSUMED DESIGN SOIL PARAMETERS FOR STIFF TO HARD SANDY CLAY AND SILTY CLAY, AS PRESENTED BELOW:
   - RETAINED SOIL PARAMETERS:
     A. FRICTION ANGLE, ϕ=26°
     B. UNSATURATED UNIT WEIGHT, γ=18 kN/m³
   - SURCHARGE LOADS:
     A. DEAD LOAD=0kPa
     B. LIVE LOAD=10kPa
   - MINIMUM BEARING CAPACITY = 150kPa
4. CONCRETE: ALL CONCRETE SHALL BE OF MINIMUM 32 MPa COMPRESSIVE STRENGTH AND CONTAIN A MAXIMUM AGGREGATE SIZE OF 20mm.
5. FOOTING/PIER CONCRETE SHALL BE MINIMUM 32 MPa IN STRENGTH AND PROVIDE AT LEAST 50mm COVER TO STEEL ELEMENTS.
6. DRAINAGE PIPE: 100mm, FILTER WRAPPED (SOCKED) PERFORATED OR SLOTTED PVC OR CORRUGATED HDPE PIPE MANUFACTURED IN ACCORDANCE WITH AS/NZS 2566.
7. ALL SURFACE AND SUBSURFACE DRAINAGE SHALL BE DESIGNED IN ACCORDANCE WITH AS 4678-2002.
8. FILTER FABRIC: PROFAB AS140 NON-WOVEN GEOTEXTILE OR EQUIVALENT.

CONSTRUCTION NOTES:

1. INSTALL DRAINAGE PIPE AT THE LOWEST POSSIBLE ELEVATION AND MAINTAIN A 2% FALL TO DISCHARGE AWAY FROM WALL FOUNDATION AND AT MAX. 20m CRS.
2. BACKFILL MUST BE LIGHTLY COMPACTED, OTHERWISE THE DESIGNER MUST BE CONTACTED FOR VERIFICATION.
3. RECOMMENDATIONS SPECIFICALLY APPLICABLE TO REINFORCED MASONRY RETAINING WALLS AS FOLLOW:
   A. CLEANOUT OPENINGS SHOULD BE PROVIDED IN THE BOTTOM COURSE, TO PERMIT REMOVAL OF MORTAR FINS AND MUST BE CLOSED BEFORE GROUTING.
   B. WEEPHOLES CAN BE FORMED BY LEAVING OUT MORTAR IN THE VERTICAL JOINT AT THE REQUIRED LOCATION.
   C. MORTAR PROJECTION INTO THE CORES SHOULD BE REMOVED, EITHER AS THE BLOCKS ARE LAID, OR BY RODDING AFTER THE MORTAR HAS SET. DEBRIS SHOULD BE REMOVED FROM THE CORES THROUGHOUT THE CLEANOUT OPENINGS.
   D. REINFORCEMENT MUST BE POSITIONED ACCURATELY AND TIED SECURELY BEFORE PLACING CONCRETE OR GROUT. VERTICAL REINFORCING BARS, INCLUDING STARTER BARS, SHOULD BE AS CLOSE TO THE BACK FACE OF THE WALLS AS POSSIBLE, CONSISTENT WITH COVER REQUIREMENTS.
6. RECOMMENDATIONS SPECIFICALLY APPLICABLE TO GROUTING AS FOLLOW:
   A. CLOSE CLEANOUT OPENINGS.
   B. PLACE GROUT. IT IS RECOMMENDED THAT WHENEVER AVAILABLE, READY-MIXED GROUT TO WORKABILITY SPECIFICATION GIVEN IN AS3700 2018 SHOULD BE USED. SITE MIXED GROUT, IF USED SHOULD BE MIXED THOROUGHLY IN A TILTING DRUM TYPE PADDLE MIXER TO THE SAME SPECIFICATION AS READY-MIXED GROUT.
   C. ALL CORES MUST BE FILLED WITH GROUT, WHETHER REINFORCED OR NOT. THIS IS ESSENTIAL, TO BOND AND PROTECT HORIZONTAL REINFORCEMENT, AND GIVE MAXIMUM WEIGHT FOR STABILITY.
   D. THE GROUT SHOULD BE COMPACTED THOROUGHLY SO THAT VOIDS ARE NOT LEFT. COMPACTION MAY BE RODDING WITH A PLAIN ROUND BAR (DO NOT USE MAIN VERTICAL REINFORCING BARS OR OTHER DEFORMED BARS) OR WITH A HIGH FREQUENCY PENCIL VIBRATOR, USED CAREFULLY.
7. CONTROL JOINTS AS FOLLOWS:
   A. FOR EXTERNAL BLOCK RETAINING WALL WHICH DOES NOT FORM PART OF THE DWELLING, A STRAIGHT WALL FULLY REINFORCED SHOULD HAVE A VERTICAL CONTROL JOINT AT 14m MAXIMUM SPACES.
   B. IF RETAINING WALL IS PAINTED FOR AESTHETIC PART OF DWELLING, USE A FLEXIBLE SEALING PAINT OVER BLOCK UNITS OR OVER RENDERING. INSTALL WATERPROOFING ON THE OTHER SIDE OF WALL WHERE FILL MATERIAL IS GOING, OR UNDER GARDEN SOIL BEHIND THE WALL.
8. WALL CONSTRUCTION TOLERANCES:
   A. VERTICAL ALIGNMENT PLUS OR MINUS 20mm OVER ANY 3m DISTANCE, WITH A MAXIMUM DIFFERENTIAL OF 50mm OVER THE LENGTH OF THE WALL.
   B. HORIZONTAL LOCATION CONTROL FROM GRADING PLAN.
   C. STRAIGHT LINES: PLUS OR MINUS 20mm OVER ANY 3m DISTANCE, WITH MAXIMUM DIFFERENTIAL OF 50mm OVER THE LENGTH OF THE WALL.

GENERAL NOTES:

1. ALL FOOTINGS/DEPTHS ARE TO BE INSPECTED BY A REGISTERED ENGINEER OF QUEENSLAND PRIOR TO CONCRETE AND BACKFILL.
2. GEOTECHNICAL ENGINEERING ADVICE WILL BE REQUIRED FOR ALL BATTER SLOPES FOLLOWING EXCAVATION TO ASSESS THE SLOPE STABILITY/SUITABILITY OF EITHER THE CUT FACE OR FILL EMBANKMENT, PRIOR TO PLACEMENT/INSTALLTION OF PROPOSED RETAINING WALL STRUCTURE. THE INSPECTIONS SHALL BE UNDERTAKEN BY REGISTERED GEOTECHNICAL ENGINEER. FLATTER OR STEEPER SLOPES MAY BE ADOPTED BASE ON THE RECOMMENDATIONS.
3. ANY CHANGES TO THE SUBJECT DESIGN AND/OR MATERIALS MUST BE APPROVED BY THE PRINCIPAL SUPERINTENDENT.
4. DISPERSIVE SOILS ARE NOT TO BE USED AS EMBANKMENT MATERIAL. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CURRENT CMDG CONSTRUCTION SPECIFICATIONS AND GUIDELINES.
5. LOADS EXCEEDING THE DESIGN LIVE LOAD WITHIN A DISTANCE BEHIND THE RETAINING WALL EQUAL TO 1.5 TIMES THE HEIGHT OF THE RETAINING WALL MUST BE PIERED BELOW STRUCTURAL LOAD LINE.
6. NO MACHINERY EXCEEDING DESIGN LIVE LOADS TO BE TAKEN WITHIN DISTANCE OF 1.5 TIMES THE HEIGHT OF THE WALL.
7. IN ADDITION TO NOTE 1 AND 2 ABOVE, NO MACHINERY GREATER THAN 1.5T ALLOWABLE WITHIN A DISTANCE OF 1.5m DIRECTLY BEHIND RETAINING WALL.
8. NO EXCAVATIONS SHALL BE MADE WITHIN THE 'ZONE OF INFLUENCE EXTENDING 45° DOWN FROM THE LOWERMOST SLEEPER.
9. LOCATION OF THE RETAINING WALL IN RELATION TO PROPERTY LINES, UTILITY EASEMENTS, WATERSHED EASEMENTS, OR ANY OTHER TYPE OF EASEMENTS ARE THE RESPONSIBILITY OF THE OWNER. THE ENGINEER OF RECORD ASSUMES NO LIABILITY FOR THE LOCATION OF THE RETAINING WALLS, OR IF CONSTRUCTION OF THE PROPOSED CONCRETE SLEEPER RETAINING WALLS ENCROACHES ANY PROPERTY LINES OR EASEMENTS.
10. RETAINING WALL SETOUT INFORMATION IS PROVIDED IN THE PROJECT CIVIL PLANS.
11. ALL EXCAVATIONS MUST BE DONE IN ACCORDANCE WITH THE RECOMMENDATIONS PROVIDED IN CQ SOIL TESTING CQ 27747 DATED 04/04/25.
12. IF CONDITIONS VARY IN THE FIELD FROM THOSE SHOWN ON THIS PLAN, THE ENGINEER OF RECORD MUST BE NOTIFIED PRIOR TO CONSTRUCTION OF THE RETAINING WALLS TO REVIEW THE DESIGN AND / OR PLANS.
13. MODIFICATIONS TO THE DESIGN AND / OR PLANS MAY BE REQUIRED, AND MAY TAKE UP TO TEN BUSINESS DAYS TO COMPLETE.
14. IF THERE ARE DISCREPANCIES BETWEEN ANY INFORMATION ON THESE PLANS AND INFORMATION IN THE PROJECT SPECIFICATIONS, MSE SHOULD BE NOTIFIED BEFORE CONSTRUCTION COMMENCES.
15. FILL FOUNDATION SHALL BE LEVEL 1. COMPLIANT TO TABLE 5.1 OF AS3798 AND TESTING FREQUENCIES OF FILL COMPLIES WITH TABLE 8.1 OF AS 3798 AND SHALL BE THE RESPONSIBILITY OF THE SITE SUPERINTENDENT.
16. ALL DIMENSIONS IN MILLIMETRES UNLESS NOTED OTHERWISE.
17. FENCING ON THE TOP OF THE WALL IS NOT CONSIDERED IN THIS DESIGN.



PROPOSED RETAINING WALL TYPE 1

SCALE 1:25

0 0.0625 0.25m
0 0.1250 0.50m
1:12.5 (A1)
1:25 (A3)

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FIRST ISSUE		CALCS	DRAWN	DATE	AMENDMENT DETAILS
		LM	AWE	03/26	
AMENDMENTS	A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
	B	LM	AWE	22/07/26	50% DETAILED DESIGN
	C	LM	AWE	04/08/26	100% DETAILED DESIGN

DESIGN CHECK: vs

DRAWN CHECK: vt

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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DRAWING TITLE: TYPICAL SECTIONS & DETAILS SHEET 2 OF 3

DRAWING NUMBER: CE26020-102-TC

ISSUE: C

MATERIAL NOTES:

1. THE DESIGN SOIL PARAMETERS HAVE BEEN ADOPTED BASED ON THE GEOTECHNICAL REPORT AS OUTLINED IN ITEM 3 .
2. DESIGN AND CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE FOLLOWING STANDARDS:
   - AS 4678-2002 - EARTH RETAINING STRUCTURES.
   - AS 3600-2018 - CONCRETE STRUCTURES.
   - AS 1170-2011 - STRUCTURAL DESIGN ACTIONS.
3. THE FOLLOWING DESIGN SOIL PARAMETERS ARE BASED UPON THE GEOTECHNICAL INVESTIGATION & LANDSLIDE RISK ASSESSMENT REPORT DEFINED WITH JOB No. CQ31189-REV C DATED ON 26th JUNE 2026 BY CQ SOIL TESTING:
   - BACKFILL UNIT WEIGHT, γ=18 kN/m³
   - COHESIONLESS MATERIAL, c=0.0 kPa.
   - FRICTION ANGLE, ϕ=34°
   - MAXIMUM ACTIVE PRESURE, K_a=0.312
4. DESIGN LOADS:
   - PERMANENT SURCHARGE LOAD ON RETAINING WALL=0.0 kPa
   - ALLOWABLE IMPOSED SURCHARGE LOAD=5.0 kPa
5. COMPACTION: ONLY LIGHT COMPACTION IN ACCORDANCE WITH AS 4678 SHALL BE PERMITTED BEHIND THE RETAINING WALL.
6. THE GLOBAL STABILITY OF THE RETAINING WALLS HAS BEEN VERIFIED IN THE GEOTECHNICAL INVESTIGATION & LANDSLIDE RISK ASSESSMENT REPORT, JOB NO. CQ31189-REV C, DATED 26 JUNE 2026, PREPARED BY CQ SOIL TESTING. ALL RECOMMENDATIONS AND REQUIREMENTS CONTAINED IN THAT REPORT SHALL BE IMPLEMENTED TO ENSURE THE GLOBAL STABILITY OF THE RETAINING WALLS IS MAINTAINED.
7. ANY LOADS EXCEEDING THE ALLOWABLE SURCHARGE SHALL BE SUPPORTED BY FOUNDATIONS EXTENDING A MINIMUM OF 0.5 m INTO THE WEATHERED ROCK STRATA.

RETAINING WALL BLOCK NOTES

1. THE PROPOSED RETAINING WALL BLOCKS SHALL BE CONCRETE BLOCK 600x600x1500mm OR APPROVED EQUIVALENT RETAINING WALL.
2. APPROVED EQUIVALENT SYSTEMS MAY BE USED SUBJECT TO DESIGN VERIFICATION AND CERTIFICATION BY A REGISTERED ENGINEER.
3. THIS DESIGN IS BASED ON A CLASS 'B' RETAINING WALL WITH NO VEHICULAR LOADING APPLIED WITHIN THE INFLUENCE ZONE OF THE WALL.
4. INSTALLATION SHALL BE CARRIED OUT IN ACCORDANCE WITH THE MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.

FOUNDATION NOTES

1. THE MINIMUM ALLOWABLE FOUNDATION BEARING PRESSURE SHALL BE 150 KPa.
2. THE FOUNDATION STRATA SHALL BE INSPECTED, VERIFIED, AND APPROVED BY A REGISTERED GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.
3. ANY UNSUITABLE MATERIAL BELOW FOUNDATION LEVEL SHALL BE REMOVED AND REPLACED WITH CLASS 1 SELECTED FILL. FOUNDATION MATERIALS SHALL BE VERIFIED BY A REGISTERED GEOTECHNICAL ENGINEER.
4. THE FOUNDATION BASE SHALL BE TRIMMED AND LEVELLED PRIOR TO PLACEMENT OF THE RETAINING WALL BLOCKS.

CONSTRUCTION SEQUENCE

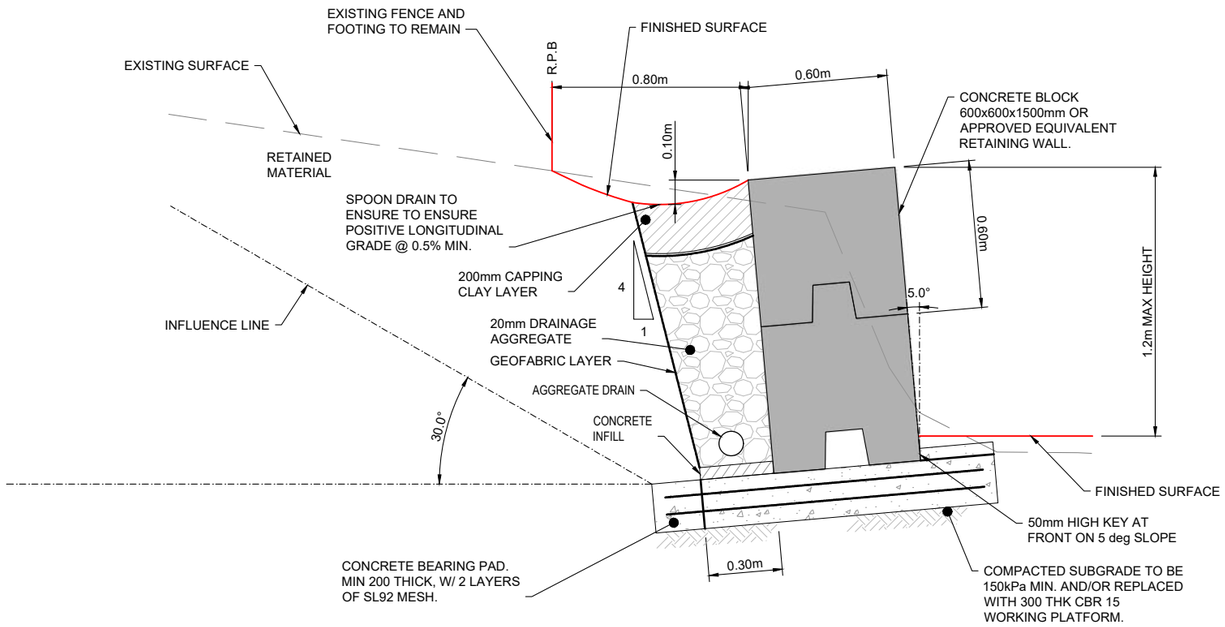
1. ANY EXISTING UTILITIES WITHIN THE VICINITY OF THE WORKS SHALL BE IDENTIFIED AND RELOCATED PRIOR TO COMMENCEMENT OF EXCAVATION.
2. EXCAVATE TO THE REQUIRED FOUNDATION LEVEL. TEMPORARY EXCAVATION STABILITY AND BATTER PROFILES SHALL BE ASSESSED BY A SUITABLY REGISTERED GEOTECHNICAL ENGINEER.
3. COMPACT THE SUBGRADE TO ACHIEVE A MINIMUM ALLOWABLE BEARING CAPACITY OF 150 kPa. IF THE SUBGRADE IS DEEMED UNSUITABLE, REMOVE AND REPLACE WITH 300 mm THICK CBR15 ENGINEERED FILL.
4. PLACE THE LEVELLING / BEARING PAD IN ACCORDANCE WITH THE APPROVED DETAILS.
5. INSTALL THE FIRST LAYER OF RETAINING WALL BLOCKS, ENSURING ALIGNMENT AND LEVEL TOLERANCES ARE MAINTAINED.
6. INSTALL GEOTEXTILE FABRIC AND DRAINAGE MATERIAL IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
7. COMPLETE BLOCK INSTALLATION WITH PROGRESSIVE BACKFILLING AND LIGHT MECHANICAL COMPACTION IN ACCORDANCE WITH PROJECT SPECIFICATIONS.

GENERAL NOTES:

1. ALL FOOTING LEVELS AND FOUNDING CONDITIONS SHALL BE INSPECTED AND APPROVED BY A REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND (RPEQ) PRIOR TO PLACEMENT OF CONCRETE OR BACKFILL.
2. GEOTECHNICAL ENGINEERING ADVICE SHALL BE OBTAINED FOR ALL BATTER SLOPES FOLLOWING EXCAVATION TO ASSESS THE STABILITY AND SUITABILITY OF CUT FACES AND/OR FILL EMBANKMENTS PRIOR TO CONSTRUCTION OF THE PROPOSED RETAINING WALL. INSPECTIONS SHALL BE UNDERTAKEN BY A REGISTERED GEOTECHNICAL ENGINEER. BATTER SLOPES MAY BE MODIFIED SUBJECT TO GEOTECHNICAL RECOMMENDATIONS.
3. ANY CHANGES TO THE SUBJECT DESIGN AND/OR MATERIALS MUST BE APPROVED BY THE PRINCIPAL SUPERINTENDENT.
4. DISPERSIVE SOILS SHALL NOT BE USED AS EMBANKMENT MATERIAL. ALL CONSTRUCTION SHALL BE CARRIED OUT IN ACCORDANCE WITH CURRENT CMDG CONSTRUCTION SPECIFICATIONS AND GUIDELINES.
5. ANY LOADS EXCEEDING THE DESIGN SURCHARGE LOAD LOCATED WITHIN A DISTANCE EQUAL TO 1.5 TIMES THE RETAINED WALL HEIGHT BEHIND THE WALL SHALL BE SUPPORTED ON PIERS FOUNDED BELOW THE WALL INFLUENCE LINE.
6. NO MACHINERY EXCEEDING THE DESIGN SURCHARGE LOAD SHALL OPERATE WITHIN A DISTANCE EQUAL TO 1.5 TIMES THE WALL HEIGHT MEASURED FROM THE REAR OF THE WALL.
7. ONLY LIGHT COMPACTION EQUIPMENT SHALL BE USED WITHIN 1.5 m OF THE RETAINING WALL. HEAVY OR VIBRATORY COMPACTION EQUIPMENT SHALL NOT BE USED WITHIN THE WALL INFLUENCE ZONE.
8. NO EXCAVATION SHALL BE UNDERTAKEN WITHIN THE ZONE OF INFLUENCE PROJECTED AT 30° DOWNWARD FROM THE BASE OF THE LOWEST RETAINING WALL BLOCK.
9. THE LOCATION OF THE RETAINING WALL RELATIVE TO PROPERTY BOUNDARIES, EASEMENTS, SERVICES, AND OTHER SITE CONSTRAINTS SHALL BE THE RESPONSIBILITY OF THE OWNER AND/OR CONTRACTOR. THE ENGINEER OF RECORD ACCEPTS NO LIABILITY FOR WALL LOCATION OR ENCROACHMENT ON PROPERTY BOUNDARIES OR EASEMENTS.
10. RETAINING WALL SETOUT INFORMATION SHALL BE IN ACCORDANCE WITH THE PROJECT CIVIL DRAWINGS.
11. IF SITE CONDITIONS DIFFER FROM THOSE ASSUMED IN THE DESIGN OR SHOWN ON THESE DRAWINGS, THE ENGINEER OF RECORD SHALL BE NOTIFIED PRIOR TO CONSTRUCTION TO REVIEW THE DESIGN. DESIGN MODIFICATIONS MAY BE REQUIRED.
12. IF ANY DISCREPANCIES EXIST BETWEEN THESE DRAWINGS AND THE PROJECT SPECIFICATIONS, MSE SHALL BE NOTIFIED PRIOR TO COMMENCEMENT OF CONSTRUCTION.
13. FILL USED FOR FOUNDATIONS SHALL COMPLY WITH LEVEL 1 REQUIREMENTS OF AS 3798. TESTING FREQUENCIES SHALL COMPLY WITH TABLE 8.1 OF AS 3798 AND SHALL BE THE RESPONSIBILITY OF THE SITE SUPERINTENDENT.
14. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS NOTED OTHERWISE.
15. FENCING, BARRIERS, OR OTHER STRUCTURES LOCATED AT THE TOP OF THE WALL HAVE NOT BEEN CONSIDERED IN THIS DESIGN UNLESS NOTED OTHERWISE.

PRECAST MASS CONCRETE BLOCK:

1. ALL PRECAST CONCRETE ELEMENTS SHALL BE DESIGNED, MANUFACTURED, AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING STANDARDS AND THE MANUFACTURER'S SPECIFICATIONS:
   - AS 3600-2018 — CONCRETE STRUCTURES
   - AS 3700-2018 — MASONRY STRUCTURES
   - AS 3850 SERIES — PREFABRICATED CONCRETE ELEMENTS
2. ALL ASSOCIATED CONCRETE WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE RELEVANT CONCRETE DRAWINGS AND SPECIFICATIONS.
3. THE PRECAST CONCRETE ELEMENTS HAVE BEEN DESIGNED FOR FINAL IN-SERVICE LOADING CONDITIONS ONLY. THE CONTRACTOR SHALL BE RESPONSIBLE LIFTING, HANDLING, TEMPORARY SUPPORT, TRANSPORT, AND ERECTION DESIGN.
4. MASS CONCRETE INTERLOCKING BLOCKS SHALL COMPLY WITH THE FOLLOWING:
   - BLOCKS SHALL BE MANUFACTURED IN ACCORDANCE WITH SECTION 11 OF AS 3700 AS A MINIMUM REQUIREMENT.
   - ALL BLOCKS SHALL BE INSTALLED IN AN INTERLOCKING STRETCHER BOND PATTERN AND BONDED AT INTERSECTIONS AND CORNERS UNLESS NOTED OTHERWISE.
5. PROPRIETARY PRODUCTS SHALL COMPLY WITH THE FOLLOWING:
   - ANY PROPOSED SUBSTITUTE PRODUCT SHALL BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO USE.
   - THE CONTRACTOR SHALL REVIEW AND COMPLY WITH ALL MANUFACTURER'S SPECIFICATIONS, RECOMMENDATIONS, AND INSTALLATION REQUIREMENTS PRIOR TO USE OF PROPRIETARY PRODUCTS.



RETAINING WALL TYPE 2 AT CUT LOCATION
MAX 1.2m CONCRETE BLOCK OR APPROVED EQUIVALENT
TYPICAL SECTION
SCALE 1:25

0 0.0625 0.25m
0 0.1250 0.50m
1:12.5 (A1)
1:25 (A3)

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		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		LM	AWE	03/26	
AMENDMENTS	A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
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DESIGN CHECK: us
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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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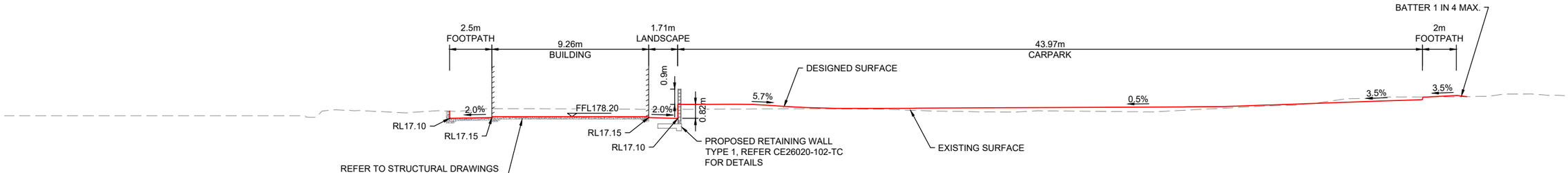
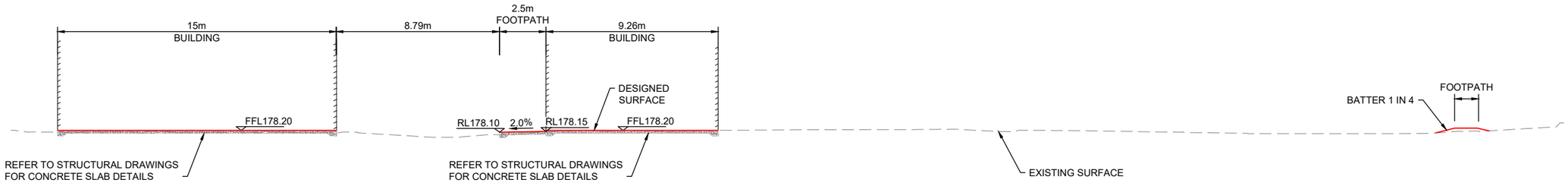
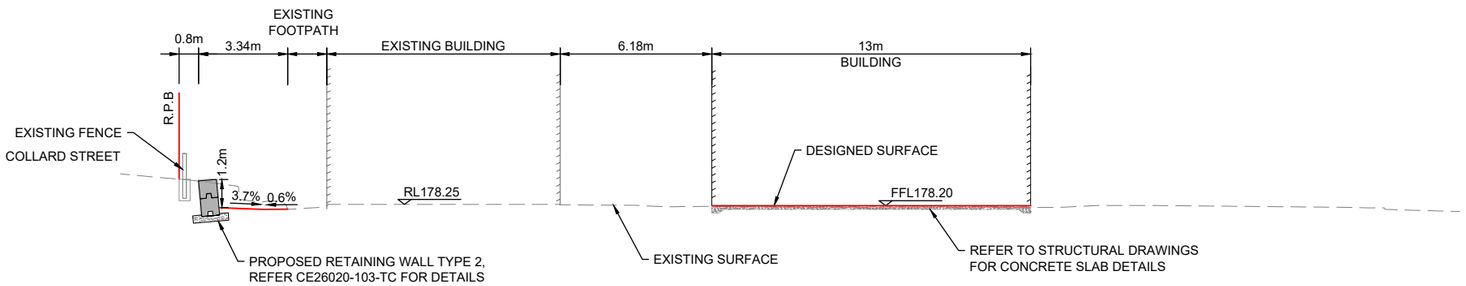
DRAWING TITLE: TYPICAL SECTIONS & DETAILS SHEET 3 OF 3
DRAWING NUMBER: CE26020-103-TC
ISSUE: C



SECTION A
SCALE 1:250 300



SECTION B
SCALE 1:250 300



SECTION C
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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AMENDMENTS

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APPROVED LCMoloney RPEQ 33682
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CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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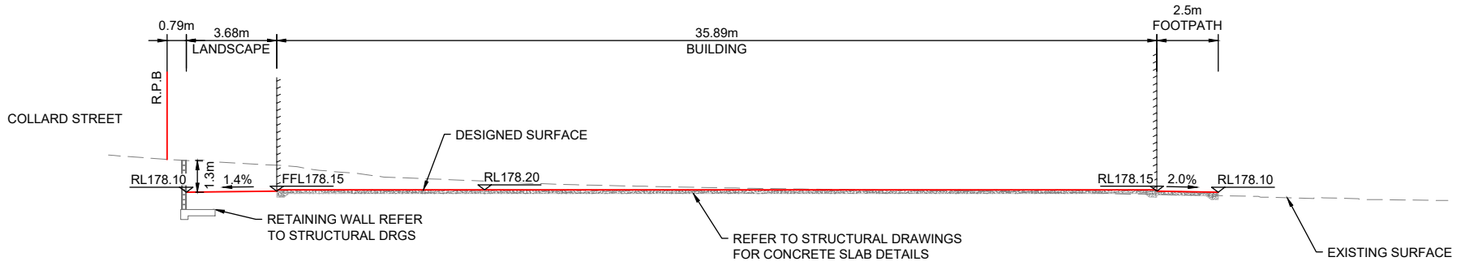
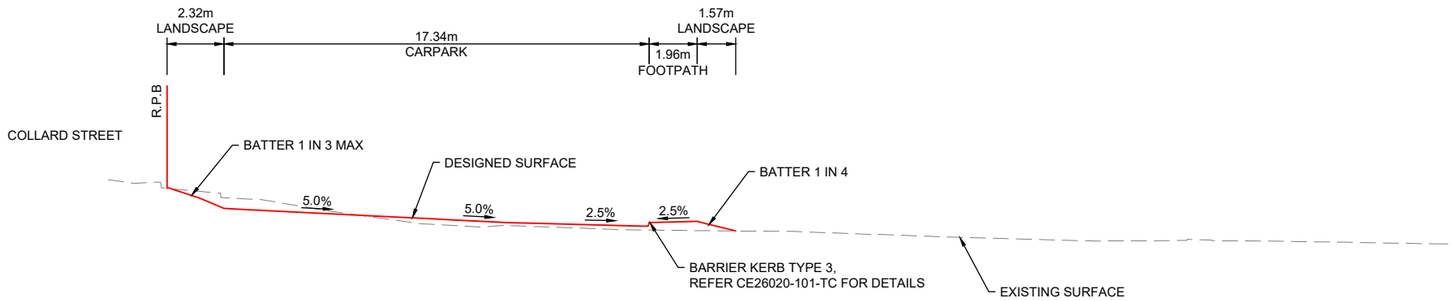
DRAWING TITLE: SITE SECTIONS
SHEET 1 OF 4

DRAWING NUMBER: CE26020-110-TC
ISSUE: C



SECTION D
SCALE 1:250 300



SECTION E
SCALE 1:250 300

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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CLIENT
REDEEMER LUTHERAN COLLEGE

PROJECT
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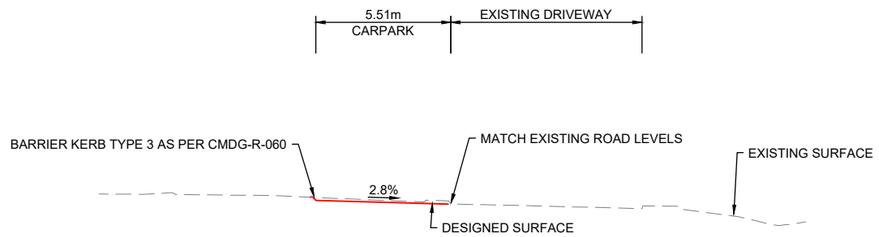
DRAWING TITLE
SITE SECTIONS
SHEET 2 OF 4

DRAWING NUMBER
CE26020-111-TC

ISSUE
C



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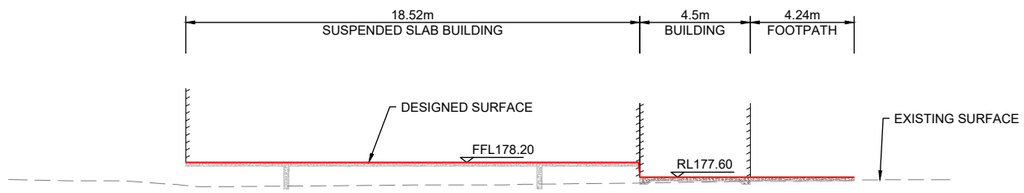
SCALE 1:250



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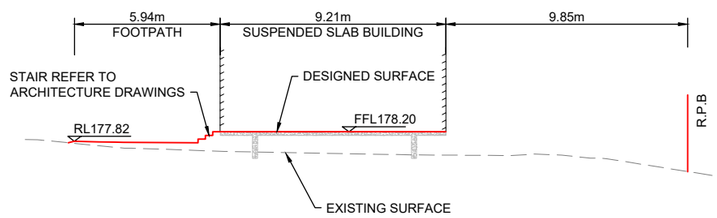

SECTION H 300
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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DESIGN CHECK: us
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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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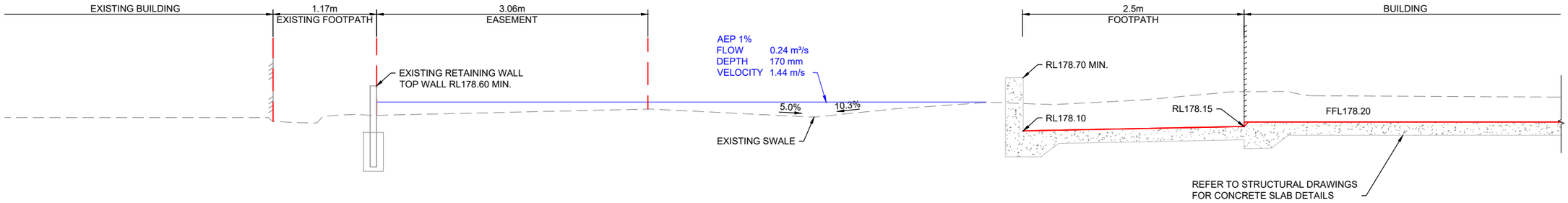
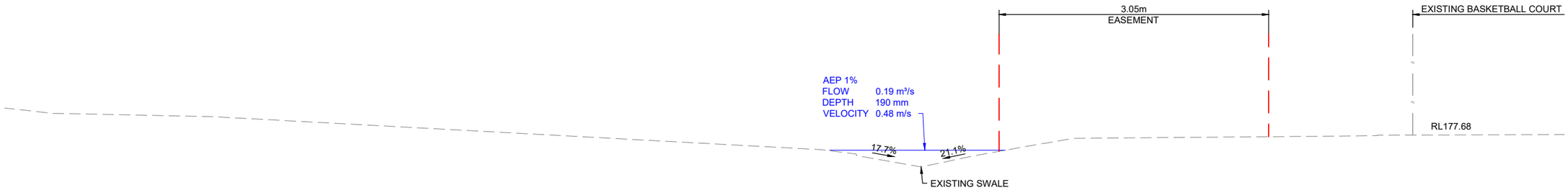
DRAWING TITLE: SITE SECTIONS
SHEET 3 OF 4

DRAWING NUMBER: CE26020-112-TC
ISSUE: C



SECTION 1 / 400
SCALE 1:50



SECTION 2 / 400
SCALE 1:50

0 0.125 0.5m
0 0.250 1.0m
1:25 (A1)
1:50 (A3)

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FIRST ISSUE	CALCS	DRAWN	DATE	AMENDMENT DETAILS
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AMENDMENTS

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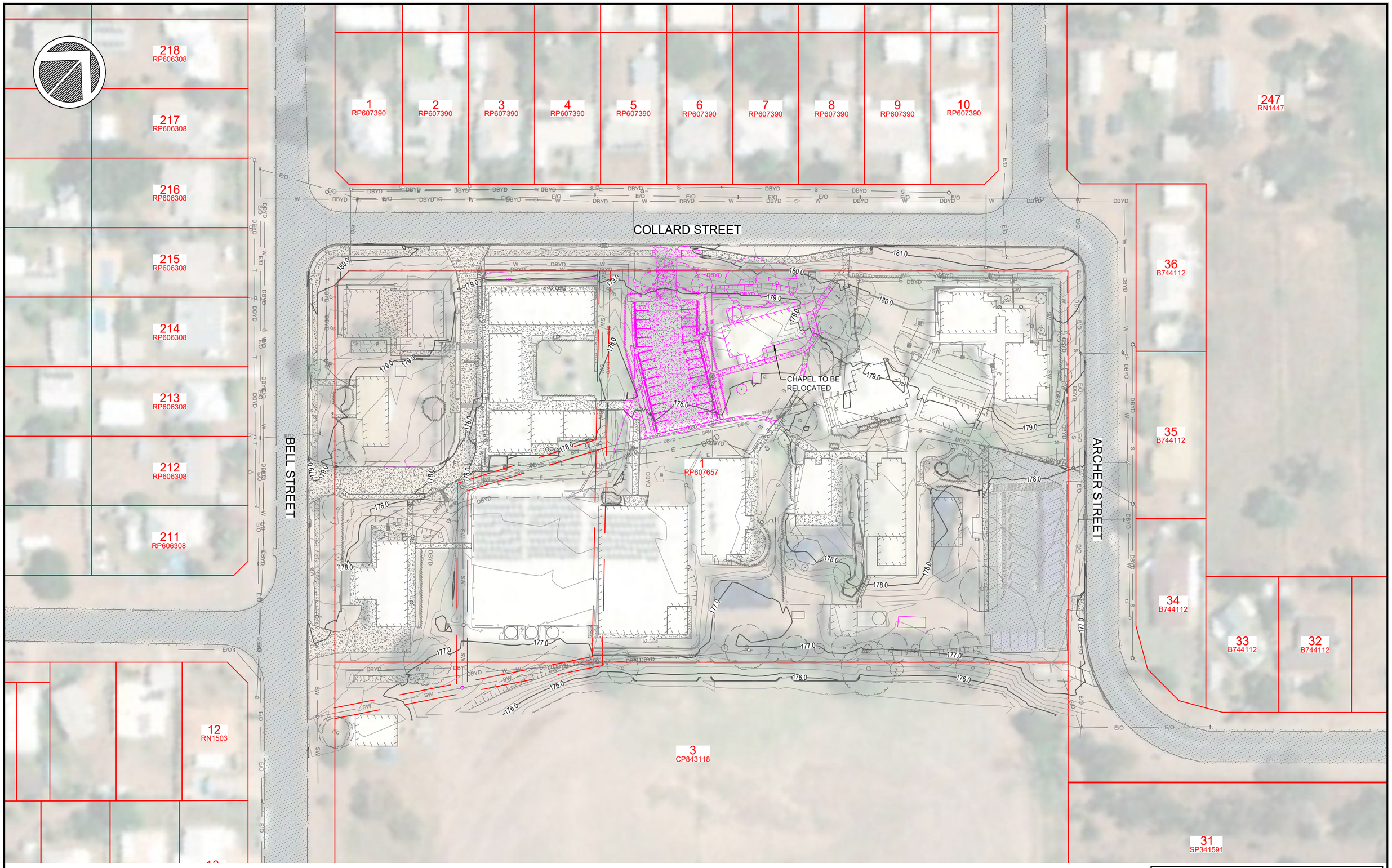
DRAWING TITLE
SITE SECTIONS
SHEET 4 OF 4

DRAWING NUMBER
CE26020-113-TC

ISSUE
A



EXISTING SITE OVERALL
LAYOUT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

ALL UNDERGROUND SERVICES SHOULD BE LOCATED ON SITE BEFORE ANY WORK IS COMMENCED

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		CALCS	DRAWN	DATE	AMENDMENT DETAILS
FIRST ISSUE		LM	AWE	03/26	
AMENDMENTS	A	LM	AWE	29/05/26	ISSUED FOR APPROVAL
	B	LM	AWE	22/07/26	50% DETAILED DESIGN
	C	LM	AWE	04/08/26	100% DETAILED DESIGN

DESIGN CHECK: vs
DRAWN CHECK: vt

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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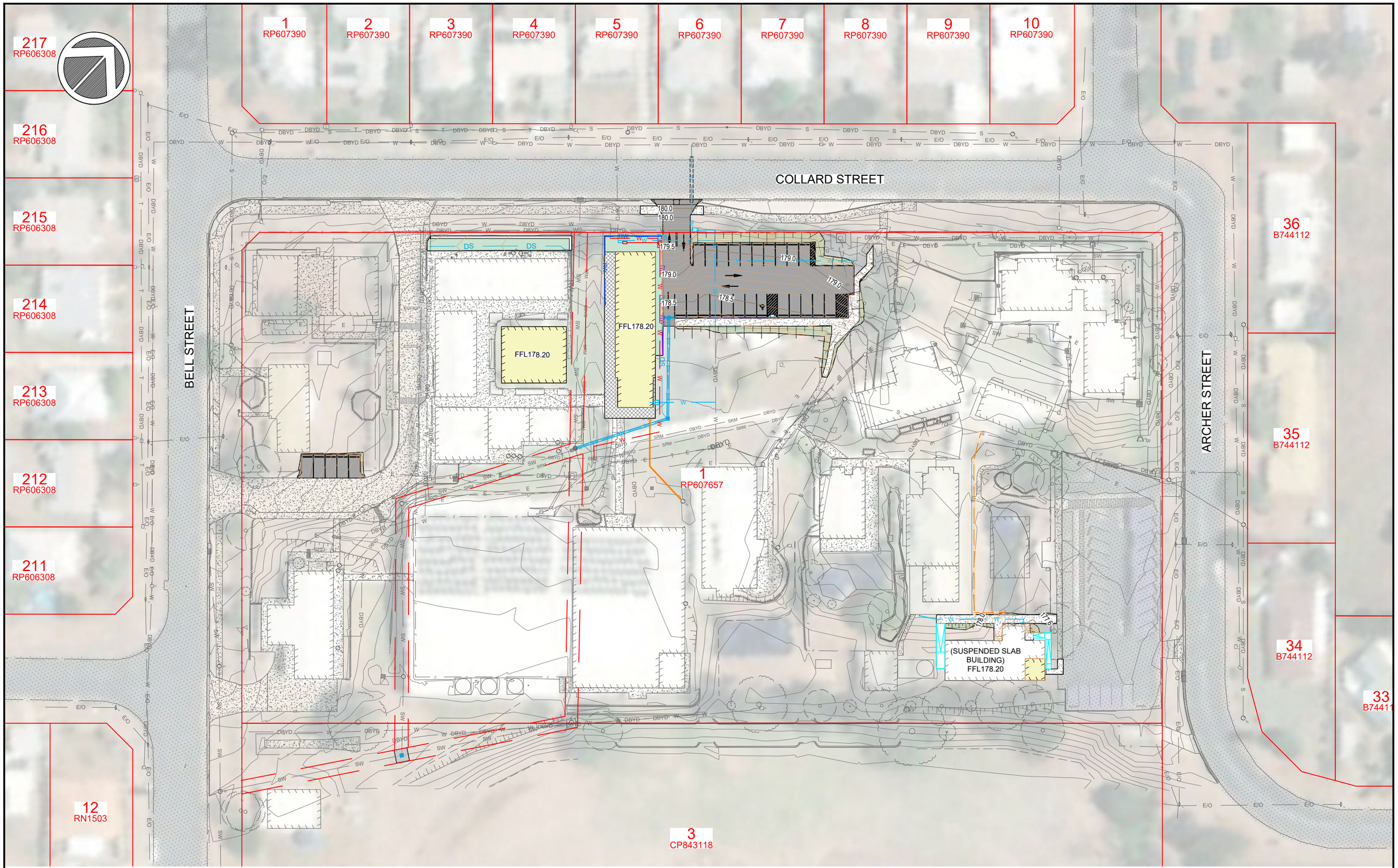
DRAWING TITLE: EXISTING SITE LAYOUT & DEMOLITION PLAN

DRAWING NUMBER: CE26020-200-AL

ISSUE: C



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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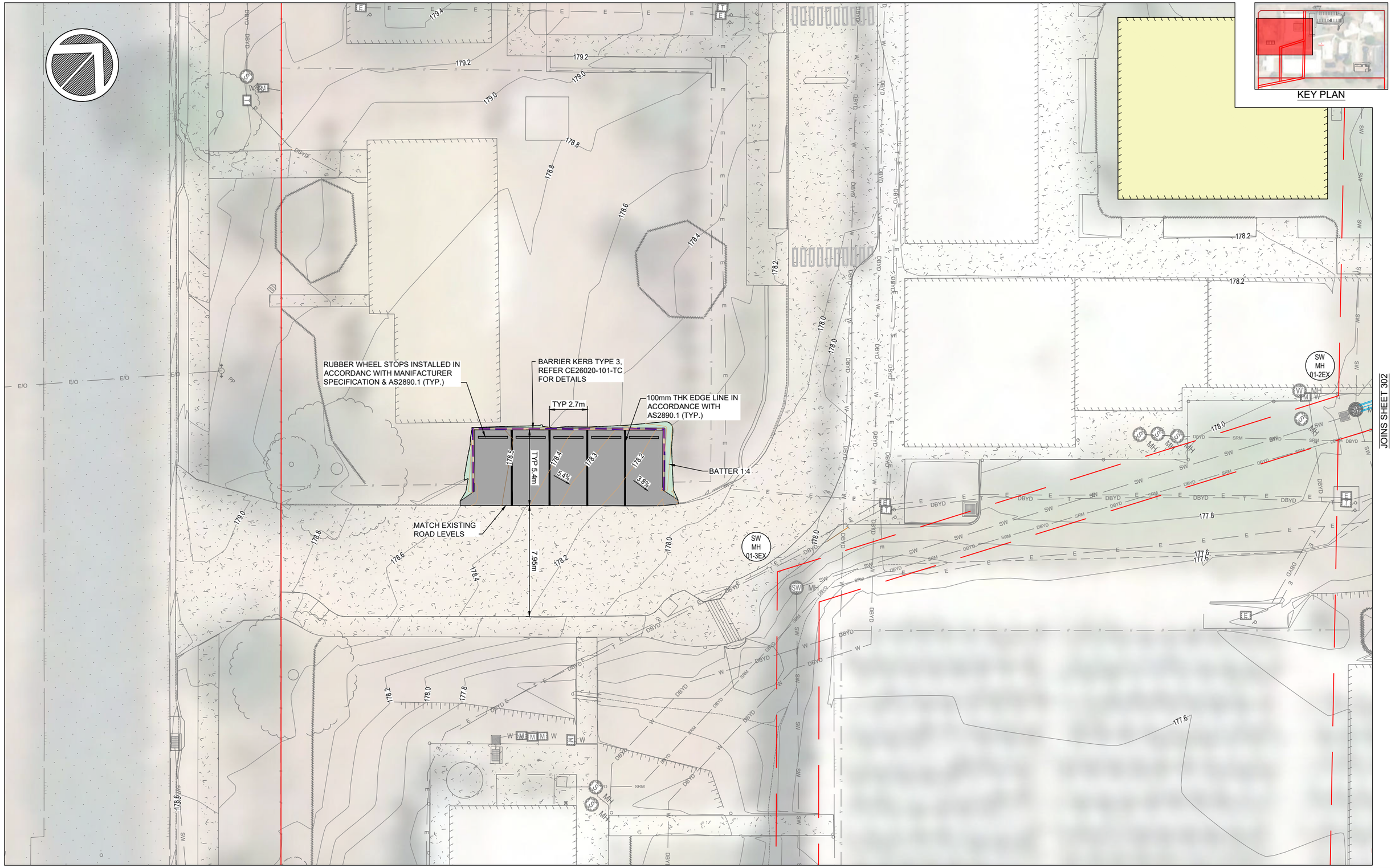
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT OVERALL LAYOUT PLAN

DRAWING NUMBER: CE26020-300-GA

ISSUE: C



PROPOSED SITE GENERAL ARRANGEMENT
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

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CLIENT: REDEEMER LUTHERAN COLLEGE

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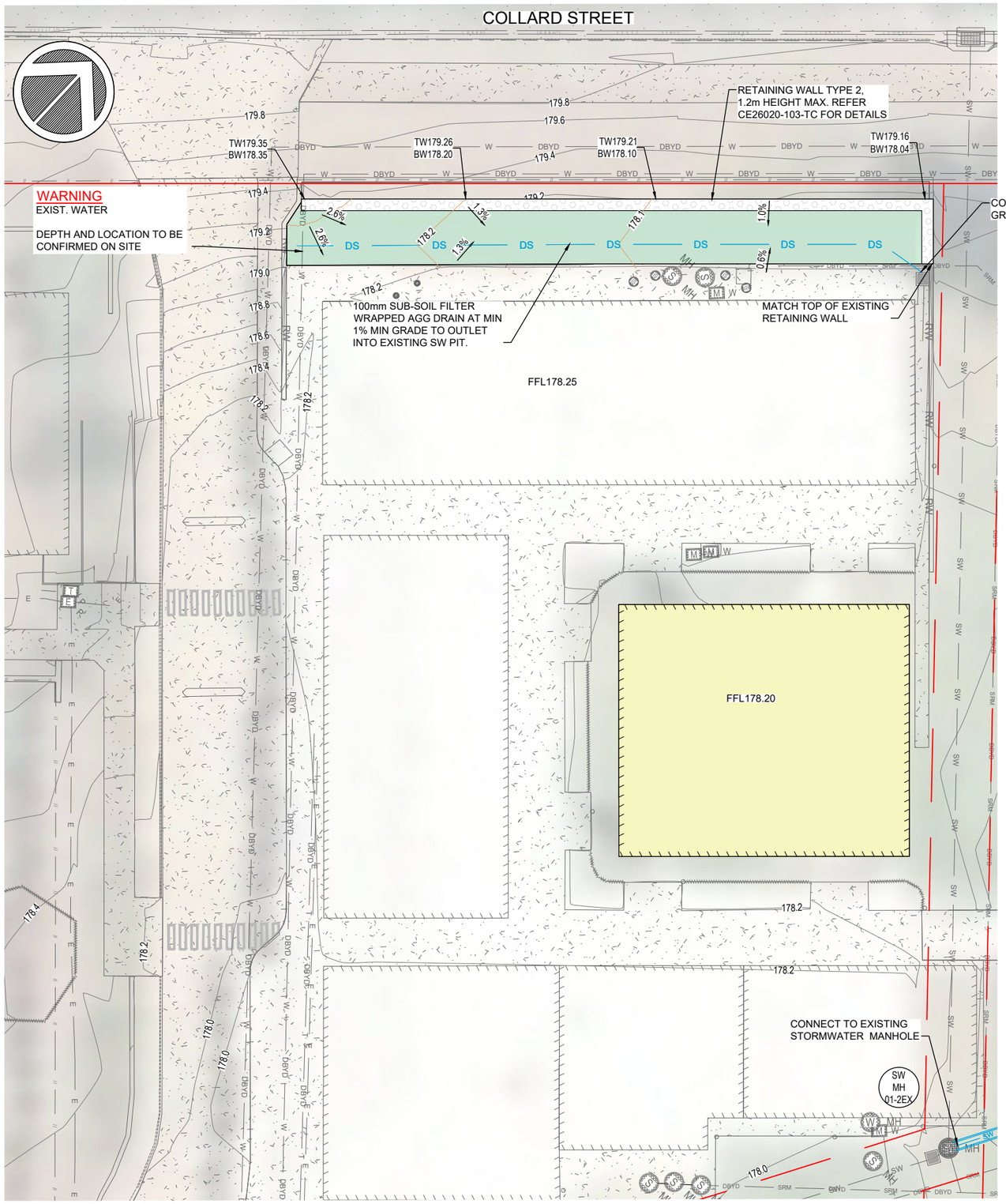
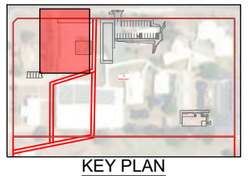
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 1 OF 5

DRAWING NUMBER: CE26020-301-GA

ISSUE: C





PROPOSED SITE GENERAL ARRANGEMENT
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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SHOULD BE LOCATED ON SITE
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PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT
REDEEMER LUTHERAN COLLEGE

PROJECT
REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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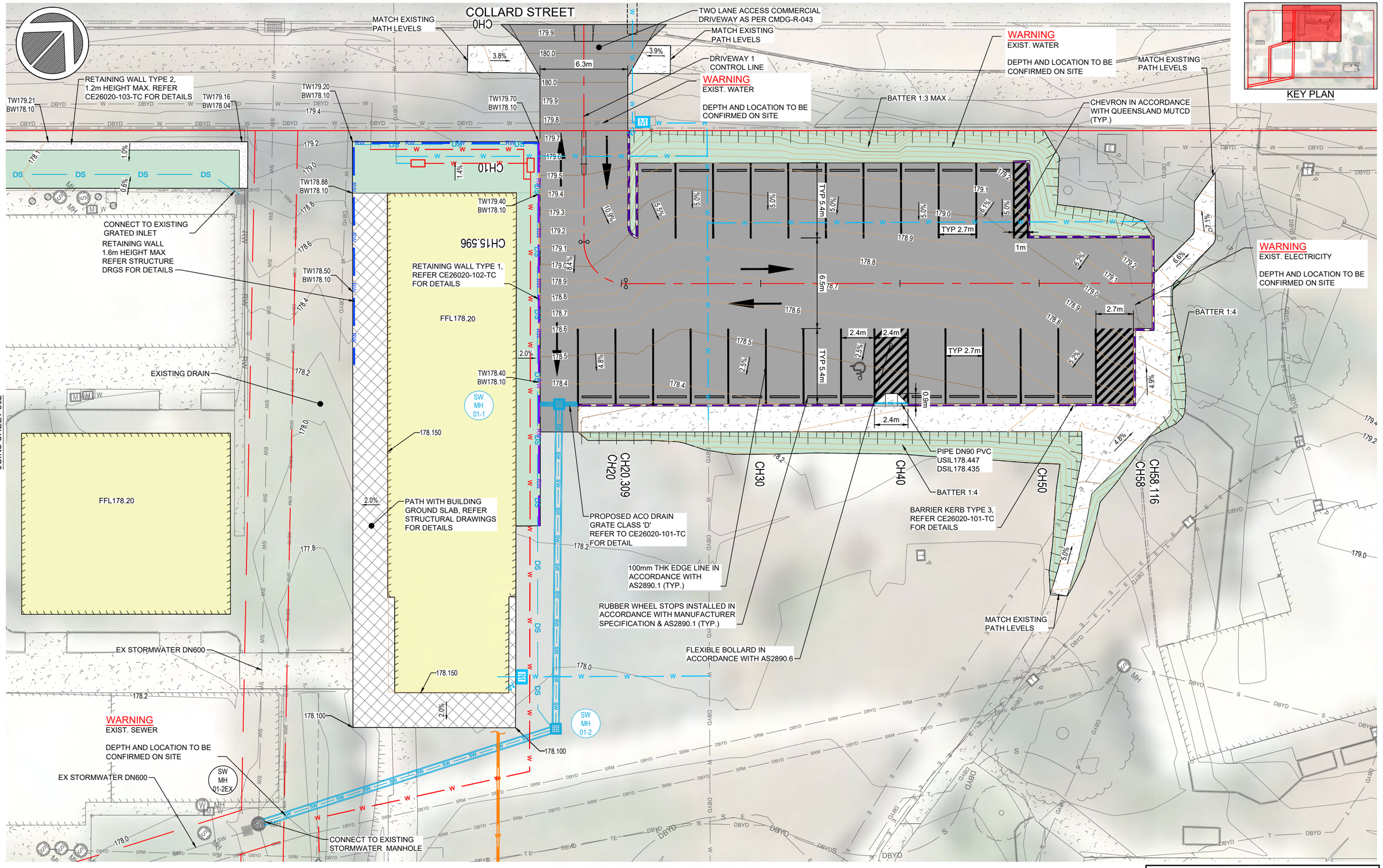
DRAWING TITLE
PROPOSED SITE GENERAL ARRANGEMENT SHEET 2 OF 5

DRAWING NUMBER CE26020-302-GA

ISSUE C



PROPOSED SITE GENERAL ARRANGEMENT
LAYOUT PLAN

SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No. CE26020

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CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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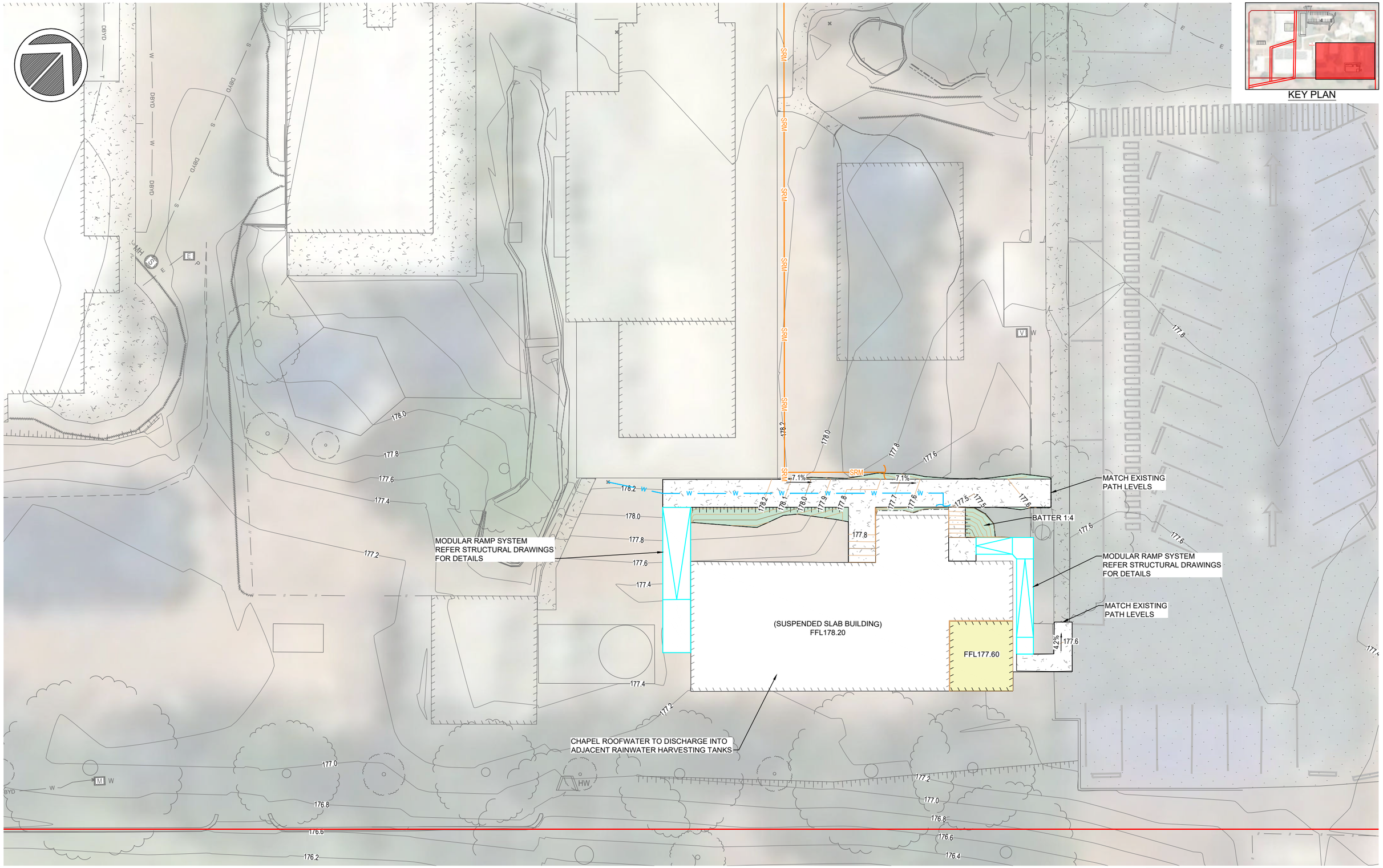
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 3 OF 5

DRAWING NUMBER: CE26020-303-GA

ISSUE: C



PROPOSED SITE GENERAL ARRANGEMENT
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No. CE26020

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CLIENT: REDEEMER LUTHERAN COLLEGE

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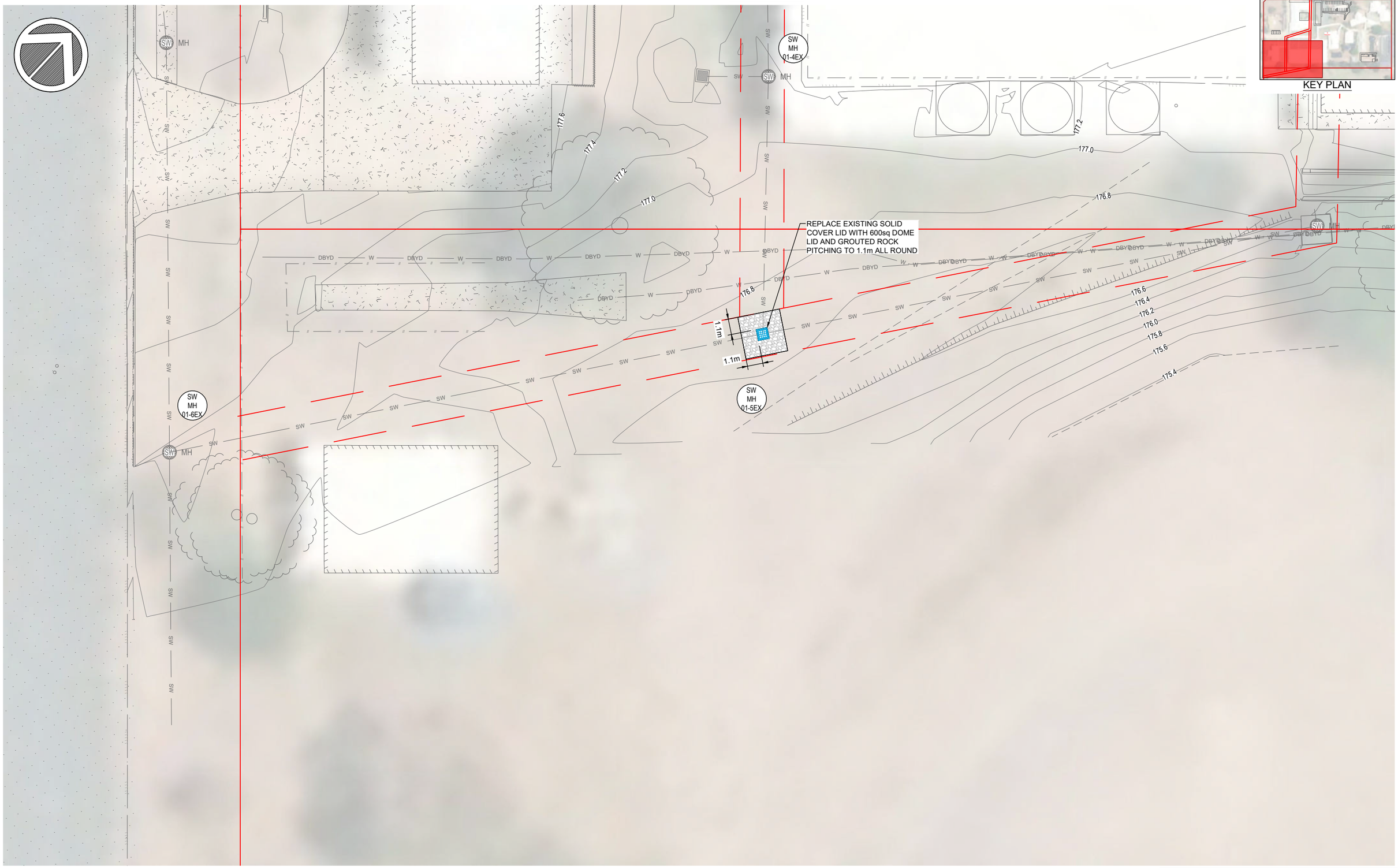
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 4 OF 5

DRAWING NUMBER: CE26020-304-GA
ISSUE: C

JOINS SHEET 301



PROPOSED SITE GENERAL ARRANGEMENT
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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PROJECT No. CE26020

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CLIENT: REDEEMER LUTHERAN COLLEGE

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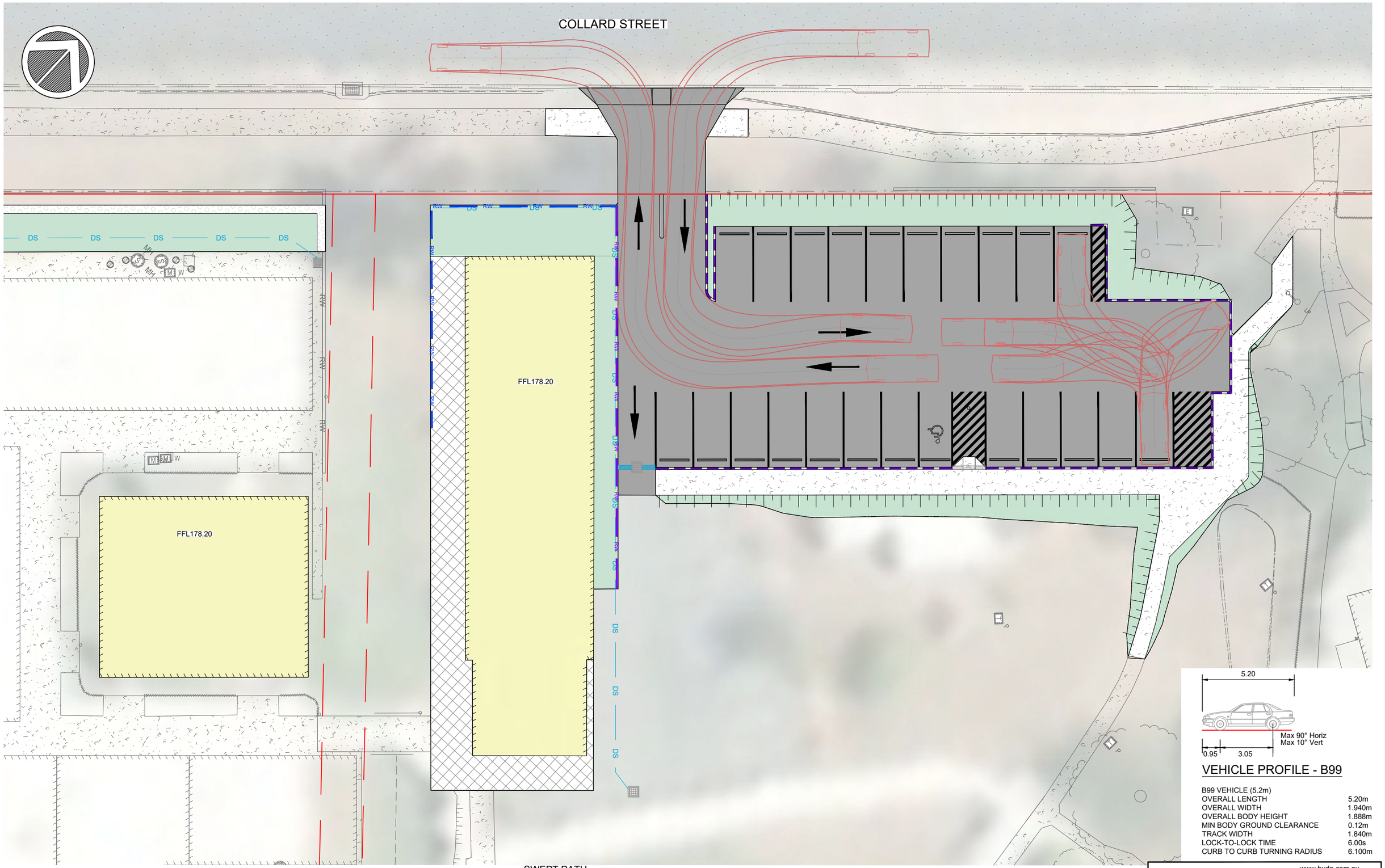
DRAWING TITLE: PROPOSED SITE GENERAL ARRANGEMENT SHEET 5 OF 5

DRAWING NUMBER: CE26020-305-GA

ISSUE: C



VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
OVERALL LENGTH	5.20m
OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN
SCALE 1:250

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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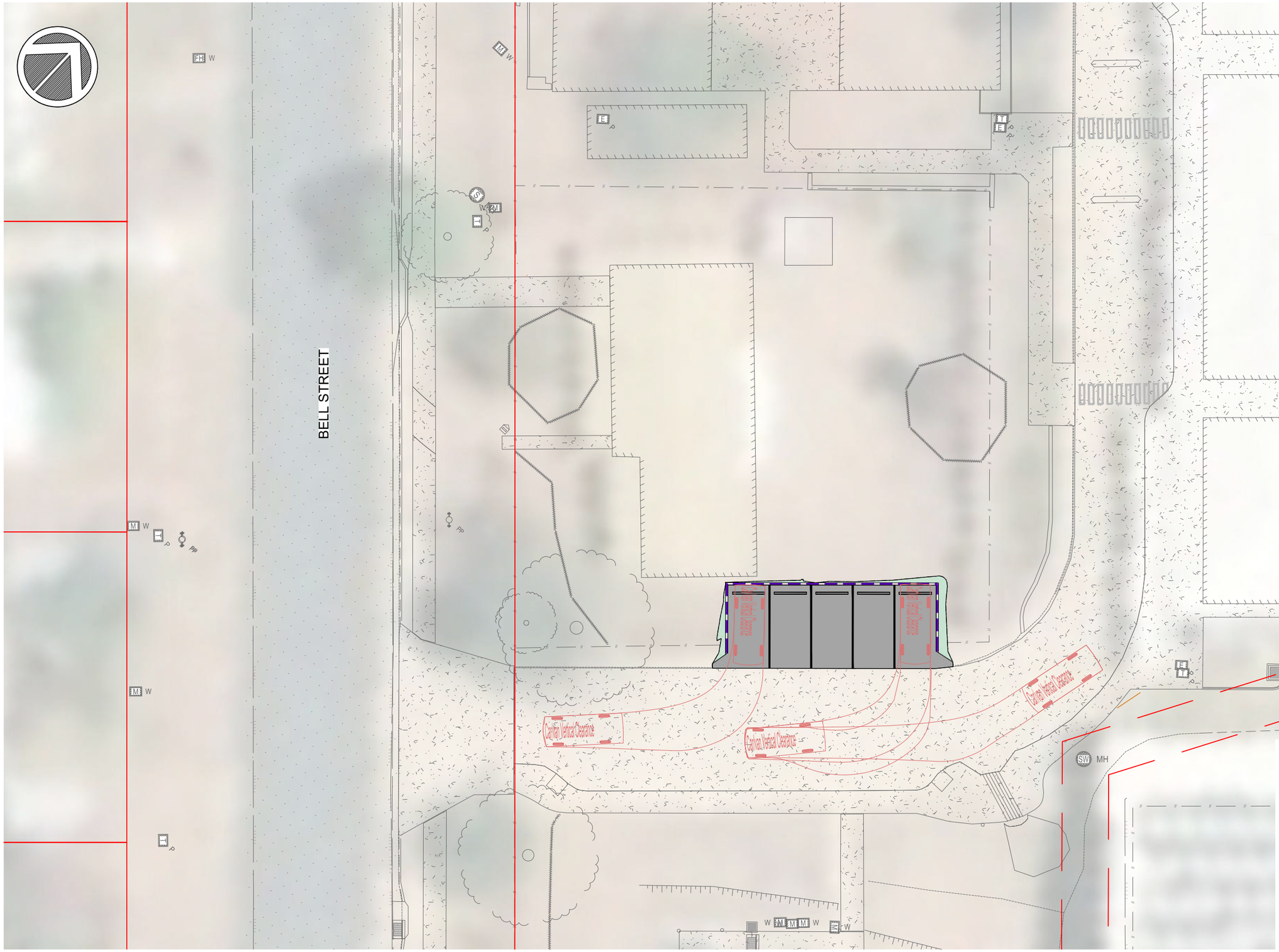
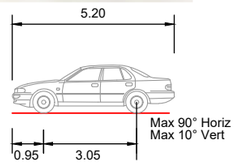
DRAWING TITLE: SWEPT PATH CAR SHEET 1 OF 2

DRAWING NUMBER: CE26020-311-GA

ISSUE: C





VEHICLE PROFILE - B99

B99 VEHICLE (5.2m)	
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OVERALL WIDTH	1.940m
OVERALL BODY HEIGHT	1.888m
MIN BODY GROUND CLEARANCE	0.12m
TRACK WIDTH	1.840m
LOCK-TO-LOCK TIME	6.00s
CURB TO CURB TURNING RADIUS	6.100m

SWEPT PATH
LAYOUT PLAN

SCALE 1:250

0 0.625 2.5m 1:125 (A1)
0 1.250 5.0m 1:250 (A3)

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FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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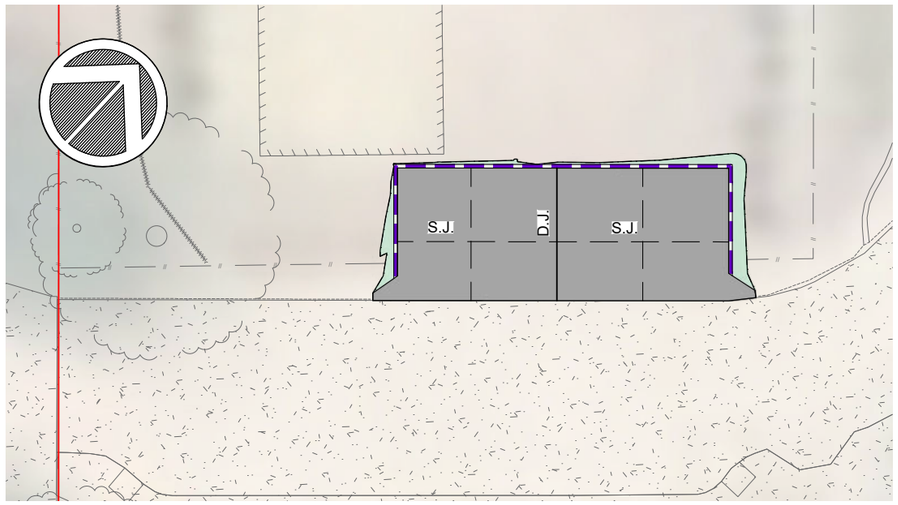
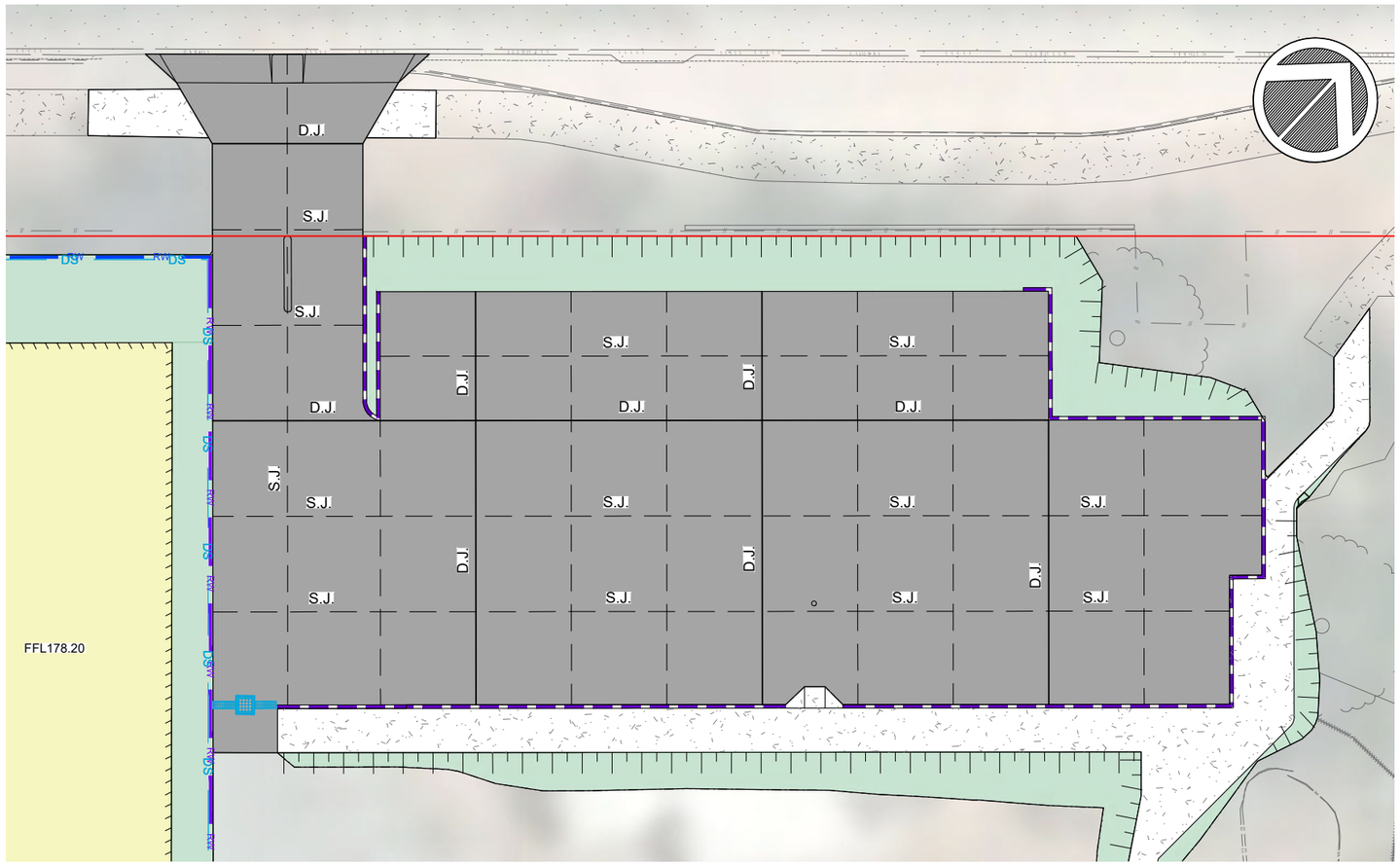
DRAWING TITLE: SWEPT PATH CAR SHEET 2 OF 2

DRAWING NUMBER: CE26020-312-GA

ISSUE: C

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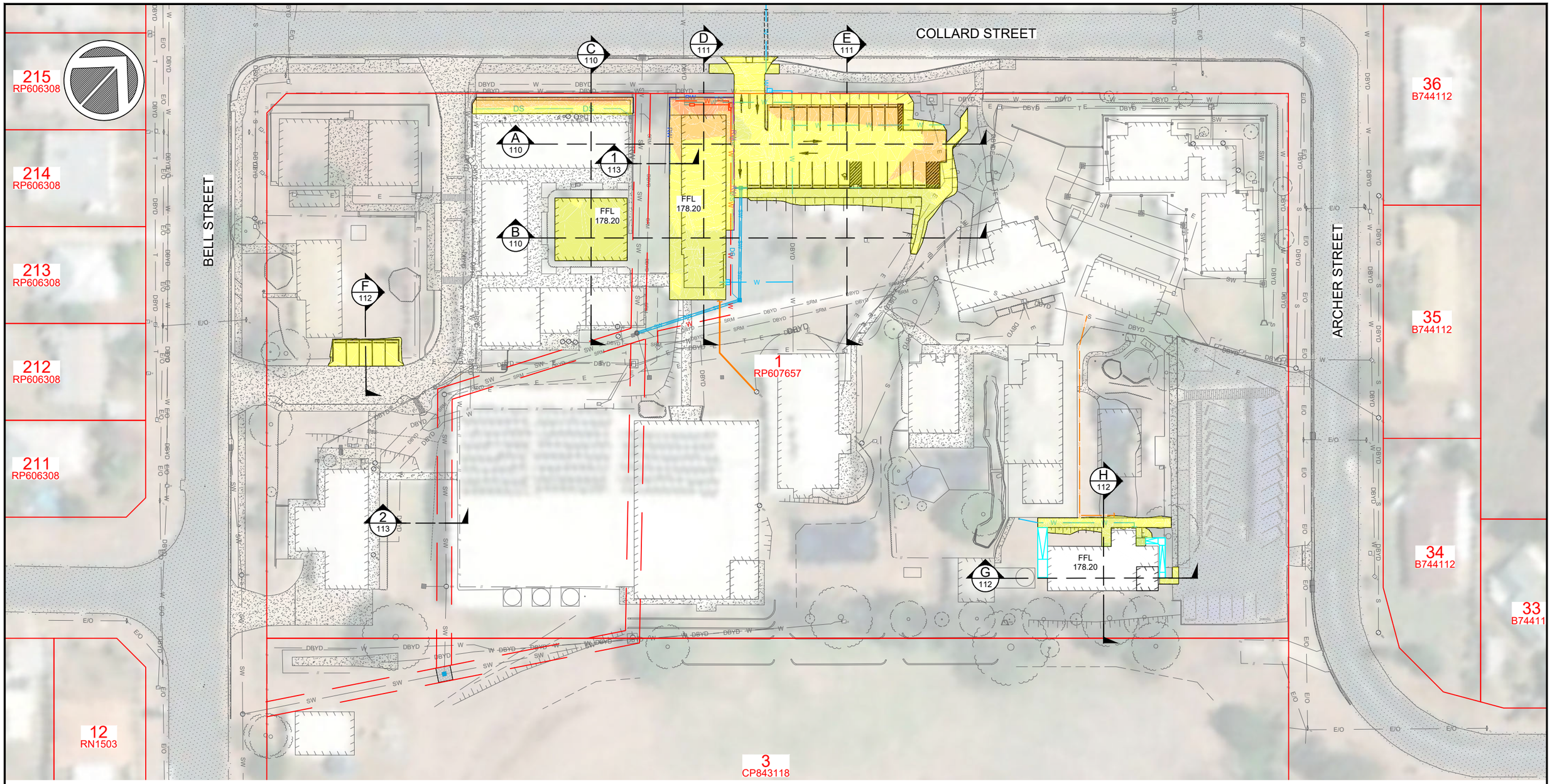
S.J.
D.J.
S.J.
D.J.
S.J.



PROPOSED SITE
BULK EARTHWORKS
SCALE 1:800

CUT & FILL ELEVATION RANGE

No.	Color	Minimum Depth (m)	Maximum Depth (m)
1		-2.000	-1.500
2		-1.500	-1.000
3		-1.000	-0.500
4		-0.500	0.000
5		0.000	0.500
6		0.500	1.000
7		1.000	1.500
8		1.500	2.000
9		2.000	2.500

NOTES:
1. EXISTING IN-SITU CUT MATERIAL MAY BE USED FOR EMBANKMENT/SELECT FILL LAYERS, HOWEVER MUST COMPLY WITH SPECIFICATION TESTING REQUIREMENTS AND ENSURE DISPERSIVE SOILS ARE NOT TO BE USED. ALL CONSTRUCTION TO BE DONE IN ACCORDANCE WITH CONTRACT SPECIFICATIONS AND TECHNICAL STANDARDS.
2. ALL FILL BATTERS TO BE 1 IN 4, 1 IN 2 MAY BE ADOPTED IN CONSTRAINED ENVIRONMENTS SUBJECT TO SUPERINTENDENTS APPROVAL.
3. WHERE WORKS ABUTS EXISTING, ALL WORK SHALL BE NEAT, SMOOTH, WORKMANLIKE AND TO THE SUPERINTENDENTS SATISFACTION.

CUT/FILL QUANTITIES:

TOPSOIL: THE PRINCIPAL CONTRACTOR SHALL ESTABLISH APPROPRIATE DEPTH FOR CLEARING & GRUBBING.

CUT TO FILL: 66 m³
CUT (REMOVAL FROM SITE): 482 m³
TOTAL VOLUME: 548 m³

PLEASE NOTE THE ABOVE QUANTITIES ARE 'TIGHT' QUANTITIES AND DO NOT CONSIDER BULKING FACTORS AND/OR PAVEMENT LAYERS.

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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AMENDMENTS

DESIGN CHECK: vs
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PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE

PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
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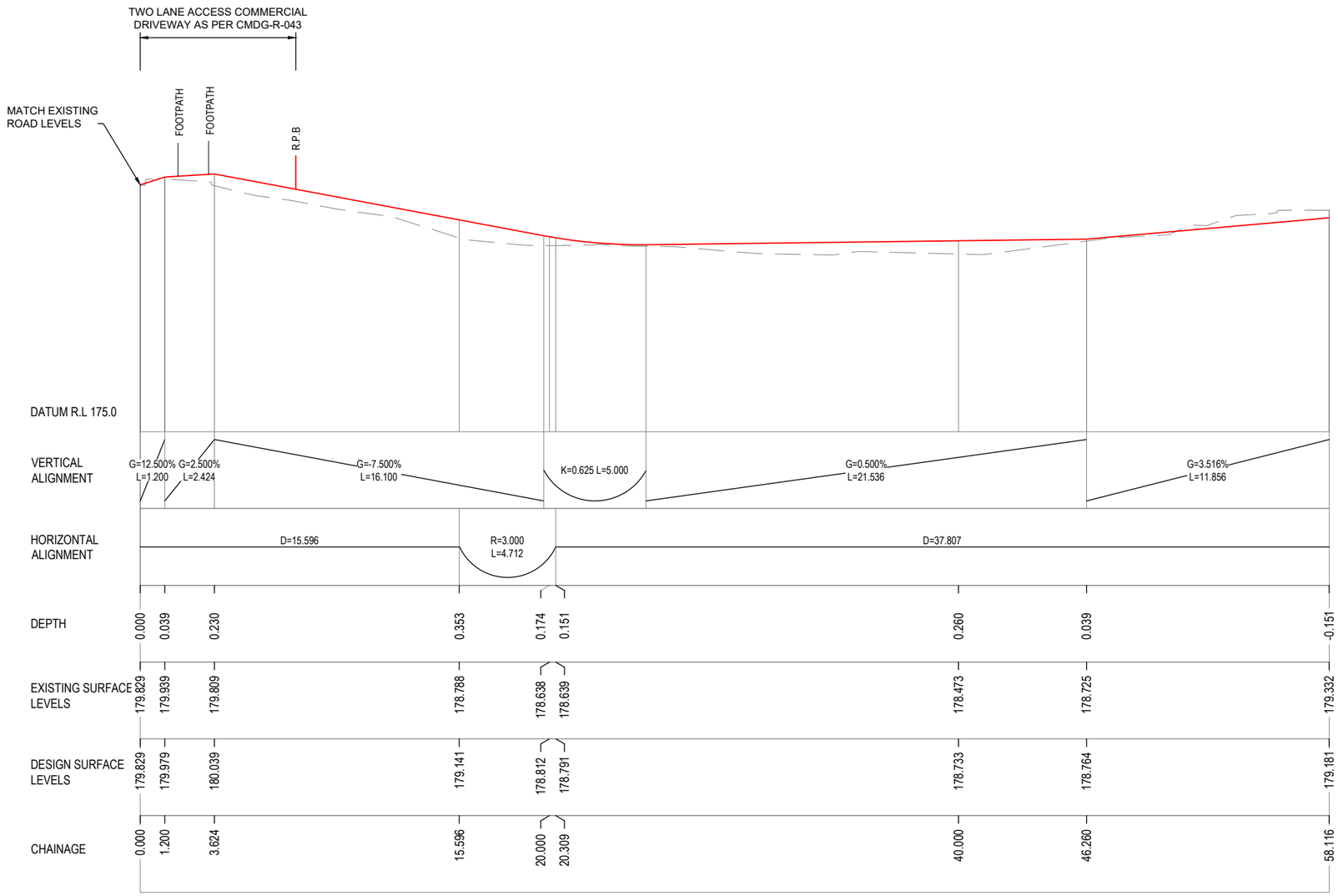
DRAWING TITLE: PROPOSED SITE BULK EARTHWORKS

DRAWING NUMBER: CE26020-400-GA

ISSUE: C



LONGITUDINAL SECTION - DRIVEWAY
SCALE - HORIZ 1:250, VERT. 1:100

0 0.25 1.0m
0 0.50 2.0m
1:50 (A1)
1:100 (A3)

0 0.625 2.5m
0 1.250 5.0m
1:125 (A1)
1:250 (A3)

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DATUM

PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682

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PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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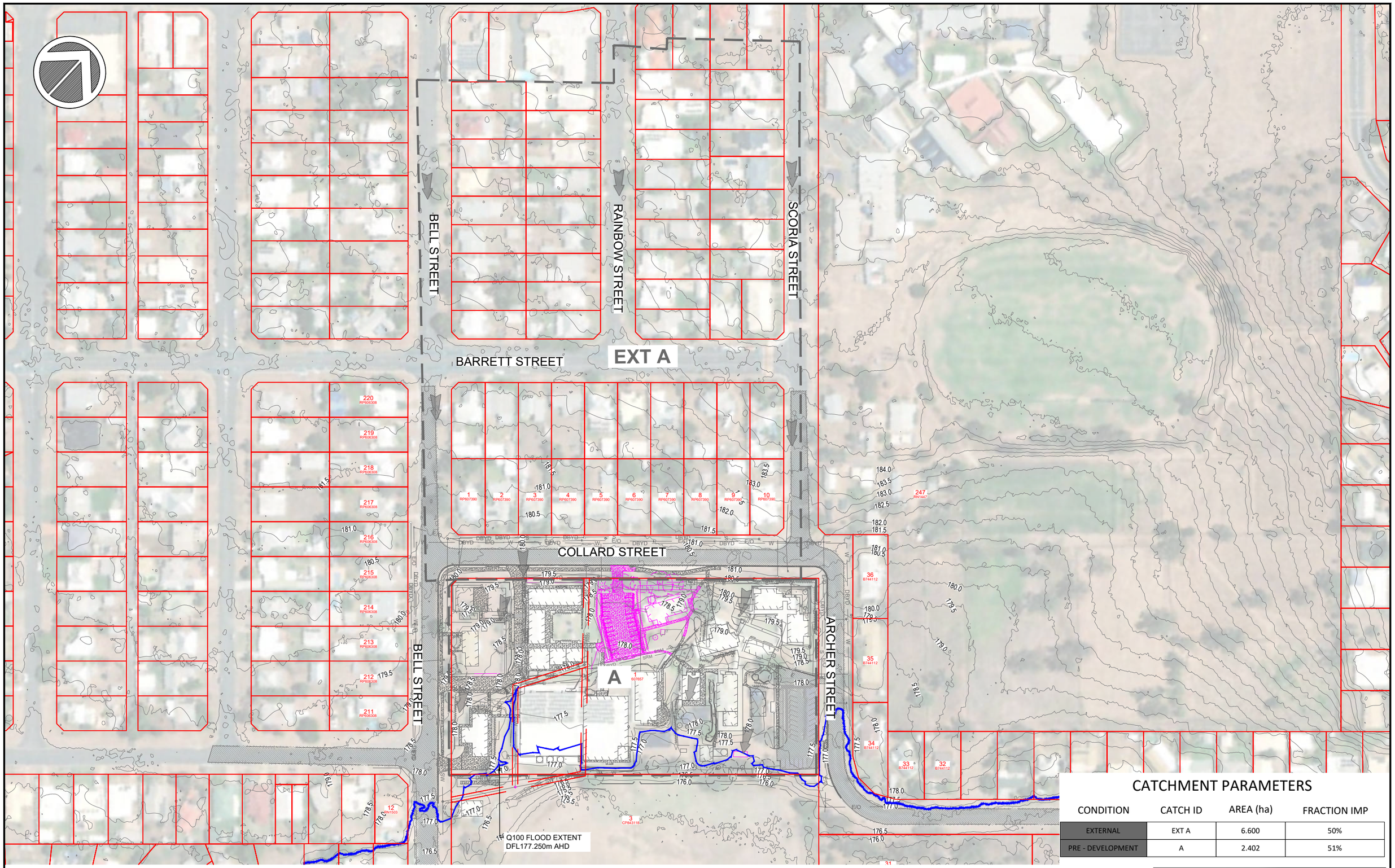
DRAWING TITLE: DRIVEWAY LONGITUDINAL SECTIONS

DRAWING NUMBER: CE26020-501-LS

ISSUE: C



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
EXTERNAL	EXT A	6.600	50%
PRE - DEVELOPMENT	A	2.402	51%

STORMWATER PRE-DEVLOPEMENT
CATCHMENT PLAN
SCALE 1:1000

0 5.0 20.0m
0 10.0 40.0m
1:1000 (A1)
1:2000 (A3)

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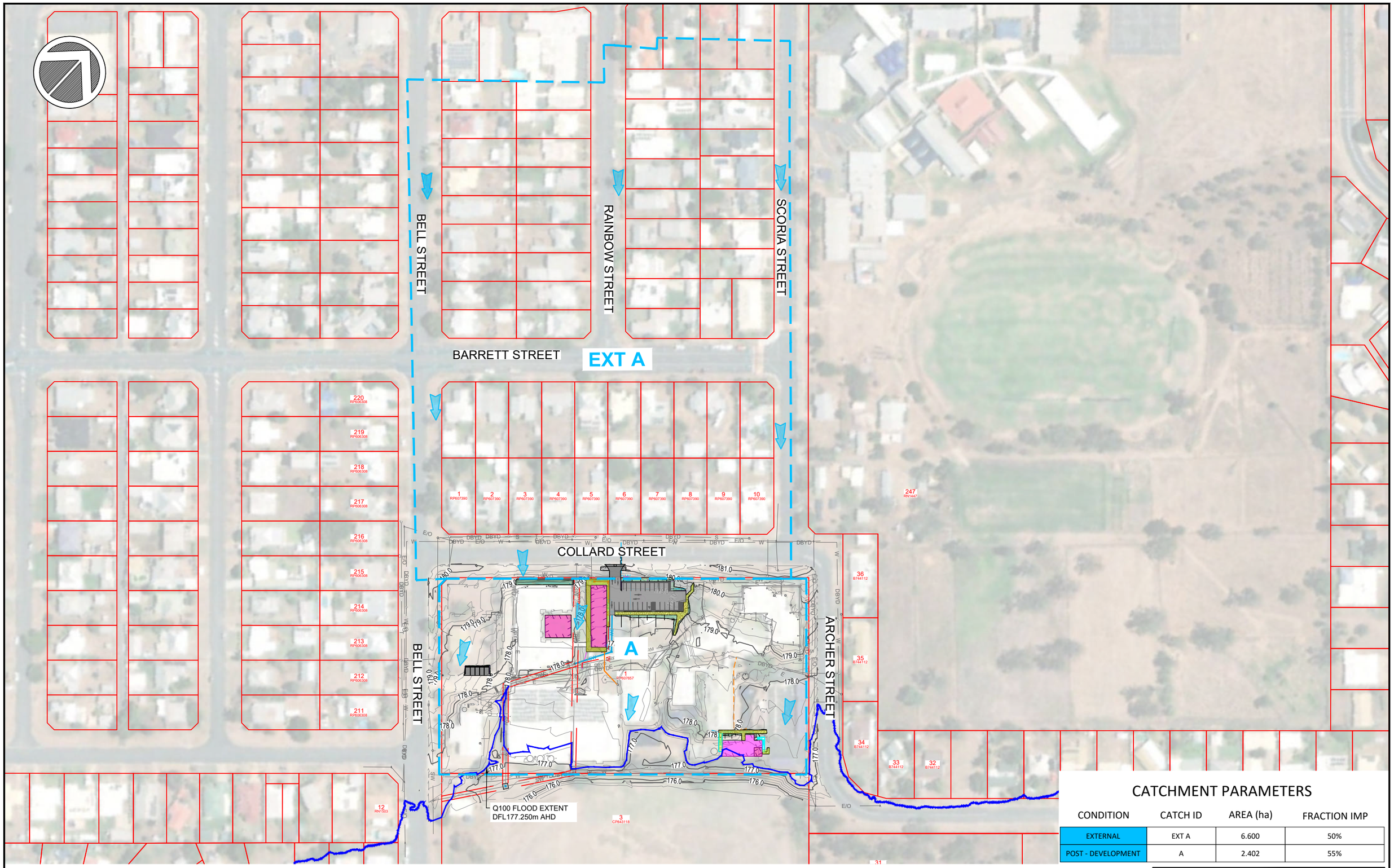
DRAWING TITLE: STORMWATER PRE-DEVLOPMENT CATCHMENT PLAN

DRAWING NUMBER: CE26020-600-DR
ISSUE: C



CATCHMENT PARAMETERS

CONDITION	CATCH ID	AREA (ha)	FRACTION IMP
EXTERNAL	EXT A	6.600	50%
POST - DEVELOPMENT	A	2.402	55%

STORMWATER POST-DEVELOPMENT
CATCHMENT PLAN
SCALE 1:1000

0 2.5 10.0m
0 5.0 20.0m
1:500 (A1)
1:1000 (A3)

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AMENDMENTS

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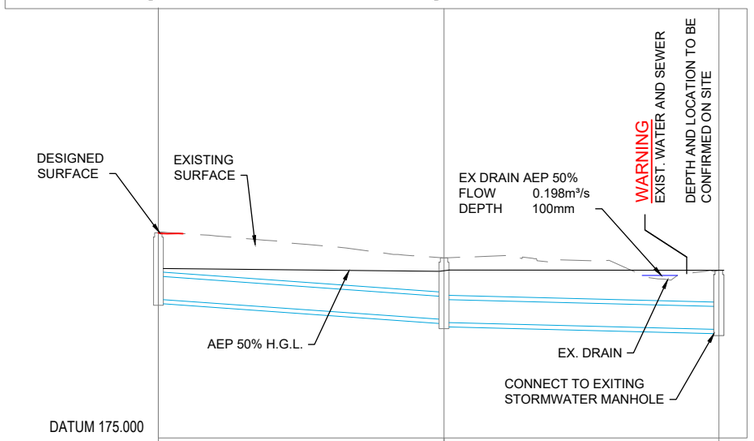
DRAWING TITLE: STORMWATER POST-DEVELOPMENT CATCHMENT PLAN

DRAWING NUMBER: CE26020-601-DR
ISSUE: C

STRUCTURE NAME	SW MH 01-1	SW MH 01-2	SW MH 01-1EX
STRUCTURE DESCRIPTION	600SQ FIELD INLET GRATE CL 'D' CMDG-D-022	600SQ FIELD INLET GRATE CL 'B' CMDG-D-022	EXISTING MANHOLE



PIPE DETAILS (CL to CL LENGTHS)		SW PIPE 01-1 Ø375 BMAX SN8 Length: 23.299		SW PIPE 01-2 Ø375 BMAX SN8 Length: 22.410		
GRADE %		1.42%		0.50%		
HGL & FLOW RATE	177.76	0.024	177.72	177.74 0.024	177.74	
KNOWN CAPACITY	0.302			0.179		
COVER	0.636		0.559	0.609	0.520	
INVERT LEVEL	177.263		176.932	176.882	176.770	
DESIGN LEVEL AT MH CL	178.344		177.936		177.735	
EXISTING SURFACE	178.363		177.936		177.735	
COORDINATES	N7299051.018 E248395.719		N7299033.760 E248411.371		N7299014.241 E248400.361	
CHAINAGE	0.000		23.299		45.708	

STORMWATER LINE 1
SCALE: H1:500 - V1:100

0 0.25 1.0m 1:50 (A1) 1:100 (A3)
0 0.50 2.0m

0 1.25 5.0m 1:250 (A1) 1:500 (A3)
0 2.50 10.0m

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DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 1 OF 2

DRAWING NUMBER: CE26020-611-DR

ISSUE: C

STRUCTURE NAME	SW MH 01-1EX	SW MH 01-2EX	SW MH 01-3EX	SW MH 01-4EX	SW MH 01-5EX	SW MH 01-6EX
STRUCTURE DESCRIPTION	EXISTING MANHOLE	FIELD INLET GRATE	EXISTING MANHOLE	EXISTING MANHOLE	EXISTING MANHOLE	EXISTING MANHOLE

DATUM 175.000

PIPE DETAILS (CL to CL LENGTHS)	SW PIPE 01-1EX Ø600 EXISTING PIPE Length: 1.118	SW PIPE 01-2EX Ø600 EXISTING PIPE Length: 40.914	SW PIPE 01-3EX Ø600 EXISTING PIPE Length: 39.917	SW PIPE 01-4EX Ø600 EXISTING PIPE Length: 18.170	SW PIPE 01-5 EX Ø600 EXISTING PIPE Length: 42.718
GRADE %	0.89%	0.83%	1.45%	1.45%	0.26%

HGL & FLOW RATE												
177.79	178.10			177.56	177.56			177.03	177.03		176.73	176.76		176.76
177.78														
0.616		0.709				0.705				0.786			0.803	

KNOWN CAPACITY	0.581					0.738				0.738			0.312	
0.317	0.560													
0.367														
COVER	0.367			0.532	0.532			0.658	0.658		0.506	0.506		1.297
176.730														
176.720														
INVERT LEVEL	176.720			176.380	176.380			175.803	175.803		175.540	175.540		175.430
DESIGN LEVEL AT MH CL	177.735			177.600				177.149			176.734			177.415
	177.775													
EXISTING SURFACE	177.735			177.600				177.149			176.734			177.415
	177.775													
COORDINATES	N7299014.241			N7298977.700				N7298948.693			N7298935.093			N7298900.504
	E248408.367			E248379.652				E248407.074			E248419.124			E248394.055
	E248400.049													
CHAINAGE	0.000	1.118		42.032				81.949			100.120			142.838

STORMWATER LINE 1EX
SCALE: H1:500 - V1:100

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0 0.25 1.0m 1:50 (A1) 1:100 (A3)
0 0.50 2.0m

0 1.25 5.0m 1:250 (A1) 1:500 (A3)
0 2.50 10.0m

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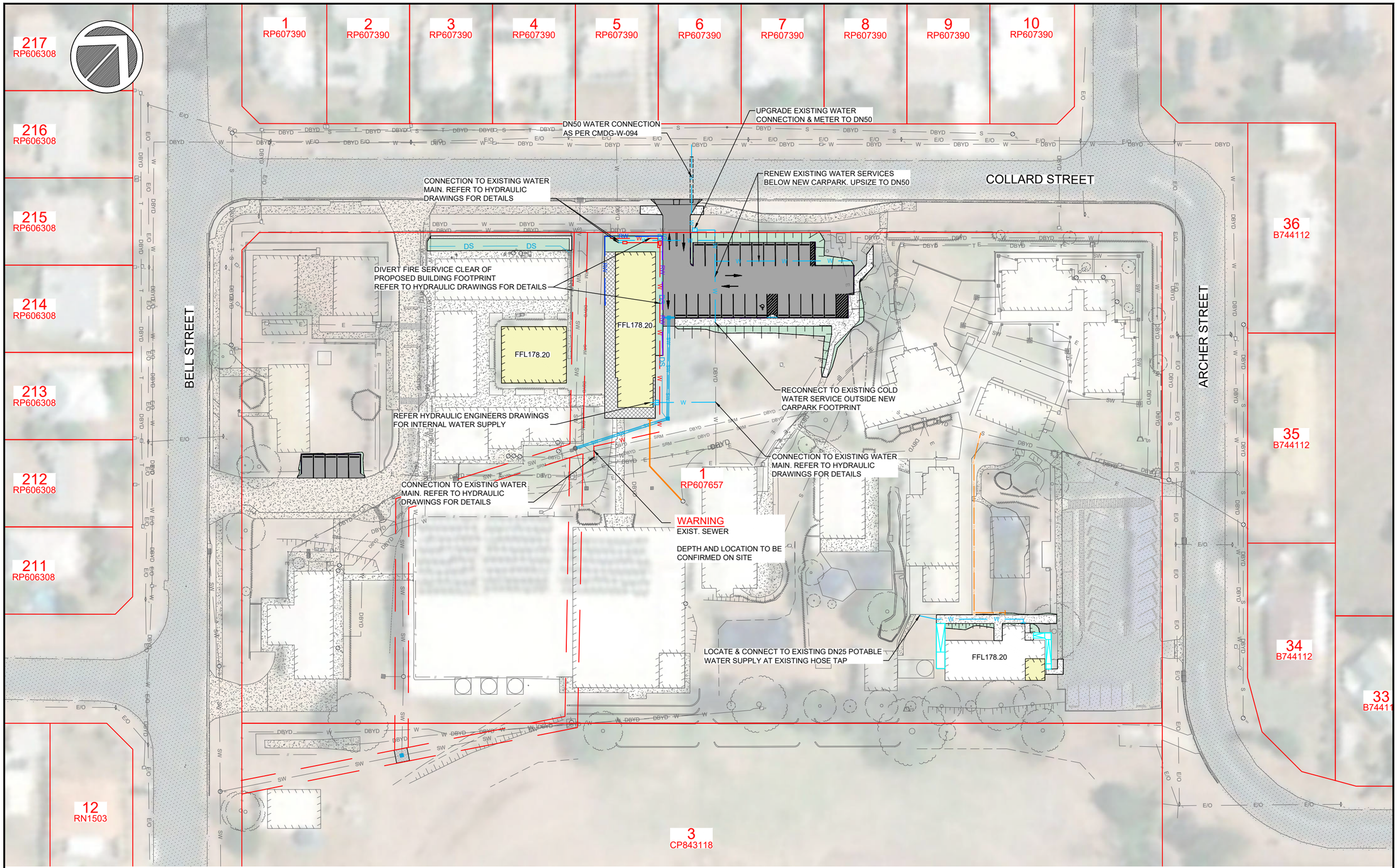
DRAWING TITLE: STORMWATER LONGITUDINAL SECTIONS SHEET 2 OF 2

DRAWING NUMBER: CE26020-612-DR

ISSUE: C



PROPOSED SITE
WATER LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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PROJECT
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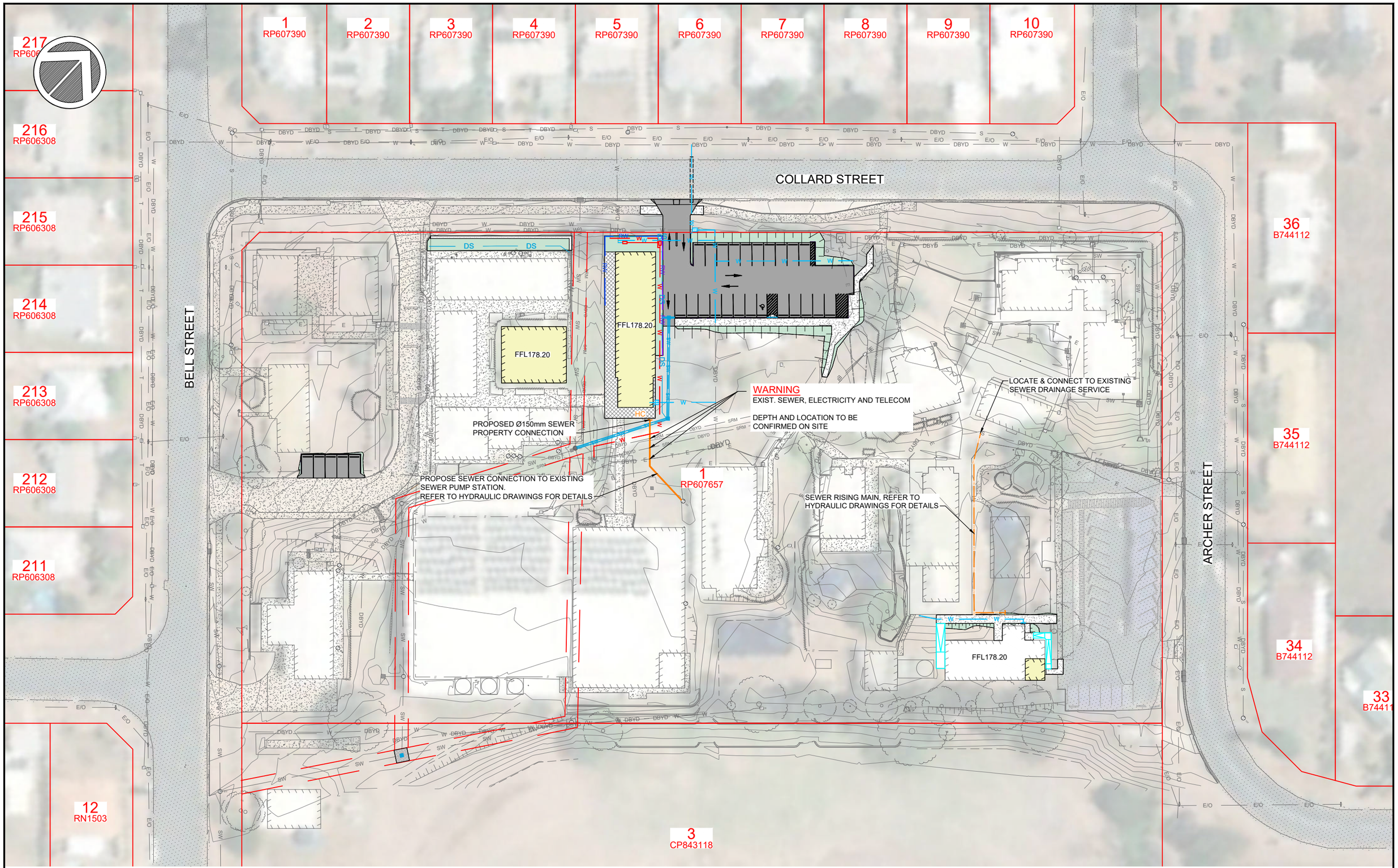
DRAWING TITLE
PROPOSED SITE
WATER LAYOUT PLAN

DRAWING NUMBER CE26020-700-WA
ISSUE C



PROPOSED SITE GENERAL ARRANGEMENT
OVERALL LAYOUT PLAN
SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m
1:400 (A1)
1:800 (A3)

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DRAWING TITLE: PROPOSED SITE SEWER LAYOUT PLAN

DRAWING NUMBER: CE26020-800-SEW

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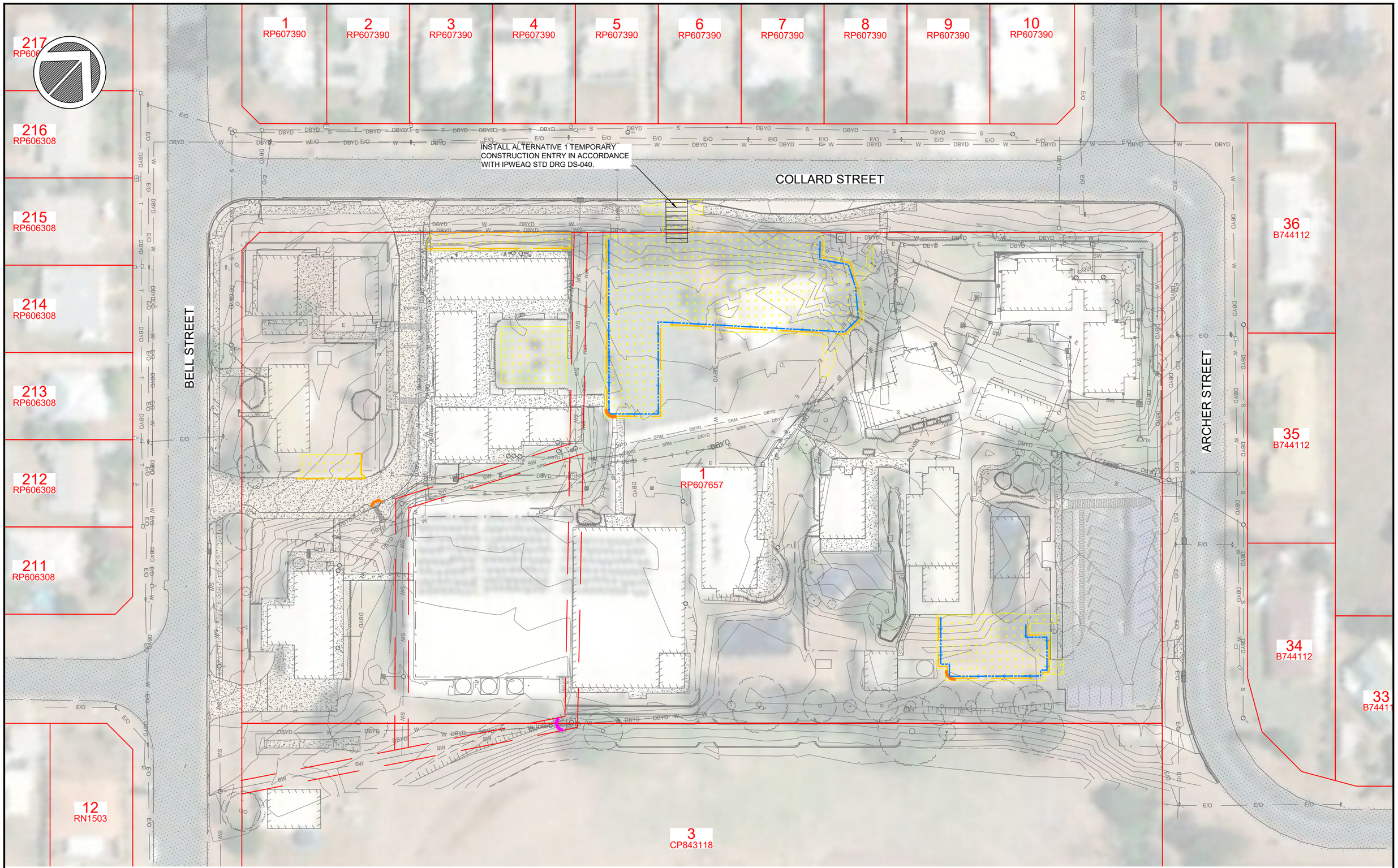

SEDIMENT & EROSION CONTROL PLAN

SCALE 1:800

0 2.0 8.0m
0 4.0 16.0m

1:400 (A1)
1:800 (A3)

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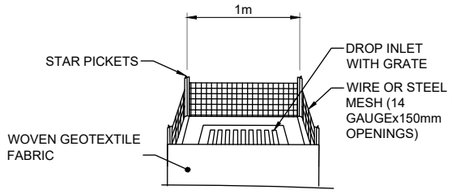
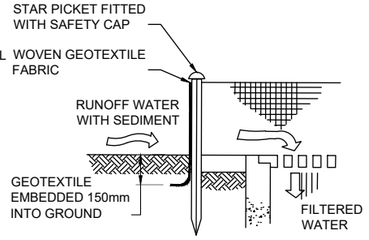
DRAWING TITLE: SEDIMENT & EROSION CONTROL PLAN

DRAWING NUMBER: CE26020-900-SE

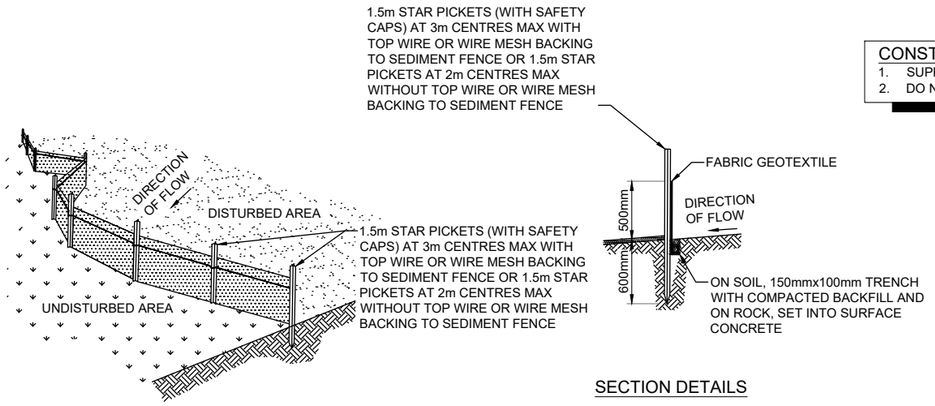
ISSUE: C





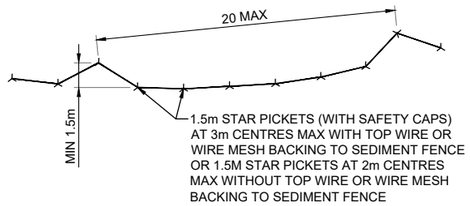
CONSTRUCTION NOTES
1. SUPPORT GEOTEXTILE WITH MESH TIED TO POSTS AT 1m CENTERS.
2. DO NOT COVER INLET WITH GEOTEXTILE.

GEOTEXTILE INLET FILTER
NOT TO SCALE



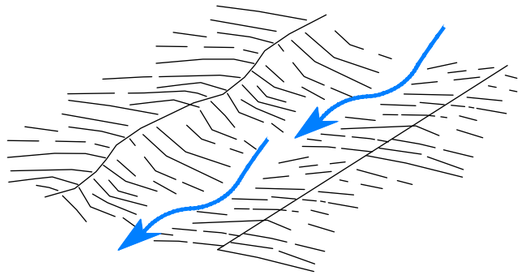
SECTION DETAILS

CONSTRUCTION NOTES
1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AS DIRECTED ON SITE BY SUPERINTENDENT.
2. DRIVE 1.5m LONG STAR PICKETS INTO GROUND, 3m APART.
3. DIG A 150mm DEEP TRENCH ALONG THE UP-SLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC.
5. FIX SELF SUPPORTING GEOTEXTILE TO UP-SLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY GEOTEXTILE MANUFACTURER.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.

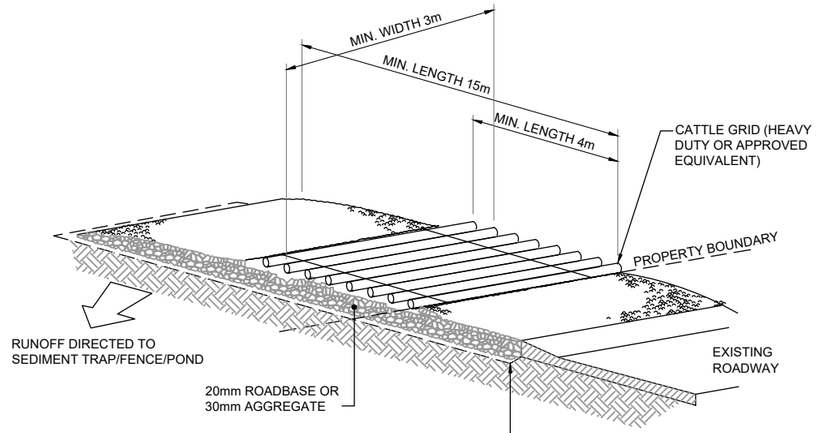


PLAN

GEOTEXTILE SEDIMENT FENCE
NOT TO SCALE

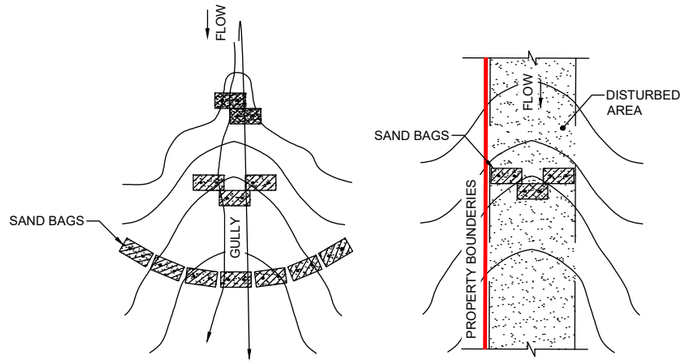


CLEAN WATER DIVERSION DRAIN
NOT TO SCALE



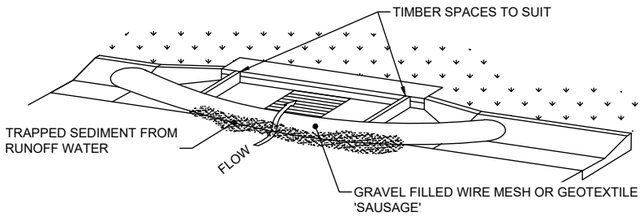
CONSTRUCTION NOTES
1. STRIP TOPSOIL AND LEVEL WORK AREA.
2. COMPACT IN-SITU SUB-GRADE MATERIAL.
3. COVER WORK AREA WITH NEEDLE-PUNCHED GEOTEXTILE.
4. CONSTRUCT 200mm THICK PAD OVER GEOTEXTILE USING ROAD BASE MATERIAL OR 30mm AGGREGATE. MINIMUM LENGTH 15m OR TO BUILDING ALIGNMENT AND MINIMUM WIDTH 3m.
5. CONSTRUCT HUMP IMMEDIATELY WITHIN INDICATIVE WORKS AREA TO DIVERT WATER TO A SEDIMENT FENCE OR OTHER SEDIMENT TRAP (i.e. SEDIMENT POND).

SHAKE - DOWN AREA / STABILIZED SITE ACCESS
NOT TO SCALE



NOTES
1. PROVIDE SAND BAGS ACROSS FLOW PATH. PROVIDE TURF AROUND SAND BAGS. EXTENT TO BE DETERMINED ON SITE BY SUPERINTENDENT.

SAND BAG CHECK DAM
NOT TO SCALE



CONSTRUCTION NOTES
1. FILTER TO BE INSTALLED ONLY WHERE SPECIFIED ON AN APPROVED SEDIMENT AND EROSION CONTROL PLAN.
2. INSTALL FILTERS TO KERB INLETS AT SAG POINTS ONLY.
3. 'SAUSAGE' TO BE FILLED WITH 25mm TO 50mm GRAVEL, SHAPED INTO AN ELLIPTICAL CROSS SECTION APPROX. 150mm HIGH AND 400mm WIDE AND BE NO LONGER THAN LENGTH OF INLET PIT.
4. TIMBER SPACERS TO PROVIDE MIN. 100mm GAP BETWEEN FILTER AND KERB INLET AND FORM SEAL WITH KERB TO PREVENT SEDIMENT BYPASSING FILTER.
5. GRAVEL FILLED SANDBAGS CAN BE USED AS A SUBSTITUTE FOR 'SAUSAGE'. SANDBAGS MUST BE FIRMLY PLACED AND INTERLOCKED TO PREVENT SEDIMENT PASSING BETWEEN THEM.

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	LM	AWE	03/26	
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C	LM	AWE	04/08/26	100% DETAILED DESIGN

AMENDMENTS

DESIGN CHECK: us
DRAWN CHECK: ut

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DATUM
PROJECT No. CE26020

ISSUED FOR APPROVAL

APPROVED LCMoloney RPEQ 33682
FOR & ON BEHALF OF MOLONEY & SONS ENGINEERING

CLIENT: REDEEMER LUTHERAN COLLEGE
PROJECT: REDEEMER LUTHERAN COLLEGE STAGE 2A
2 COLLARD ST. BILOELA QLD

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Appendix C – Site Based Stormwater Management Plan

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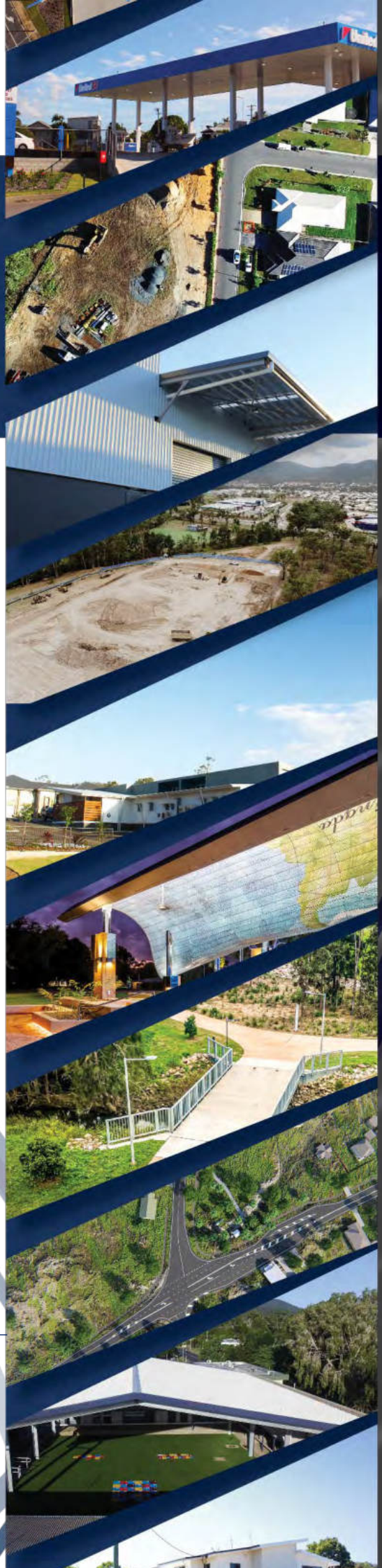

SITE BASED STORMWATER MANAGEMENT PLAN

2 Collard Street, Biloela QLD 4715

REDEEMER LUTHERAN COLLEGE

14 August 2026

CE26020.1 – SBSMP

Contract No. CE26020.1

A/ PO BOX 3203 RED HILL ROCKHAMPTON Q 4701
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1. INTRODUCTION

1.1. PROJECT COMMISSION

Moloney & Sons Engineering was commissioned by Redeemer Lutheran College to prepare a Site Based Stormwater Management Plan (SBSWMP) in support of the Stage 2A expansion and upgrade work to the existing College campus at Lot 1 on RP607657; known as 2 Collard Street, Biloela QLD 4715.

The total site occupies an area of approximately 2.402 hectares. The Site is located within the Banana Shire Council and has a Land Use Zoning of "Community Facilities". The proposed development comprises expansion and upgrade work to the existing College campus, including new educational facilities, internal access roads, car parking areas, pedestrian infrastructure, retaining walls, stormwater drainage infrastructure and associated civil works.

1.2. PROJECT BACKGROUND

1.2.1. PROJECT LOCATION

The subject site is accessed off 2 Collard Street, Biloela QLD 4715 (at Lot 1 on RP607657), is zoned Community Facilities in the suburb of Biloela QLD 4715 and has an area of 2.402 hectares.

The site is bounded by established road frontage to Collard Street to the north-west, Bell Street to the south-west, Archer Street to the north-east and rural lot to the south.

Please refer to *Figure 1* which shows the site location.

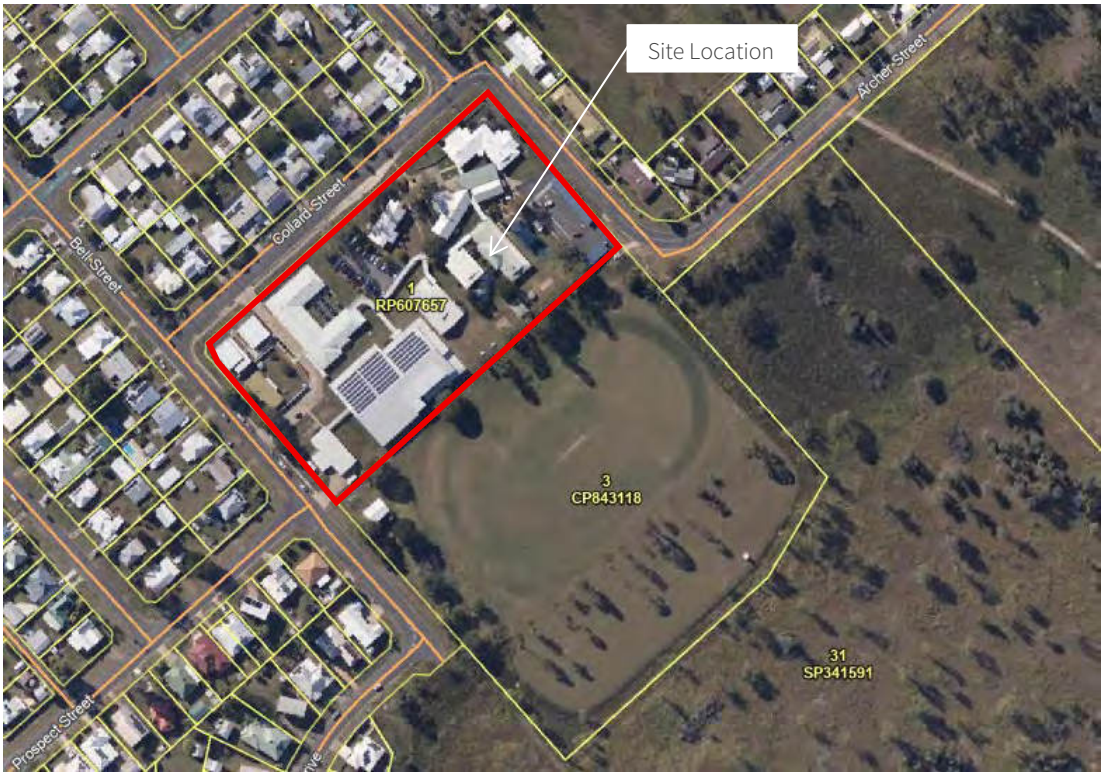

Figure 1: Locality Plan (Source: Queensland Globe)

1.2.2. Existing Site and Land Use

At the time of writing this report, the existing College campus currently accommodates a range of educational buildings, administration areas, internal access driveways, parking areas, landscaped areas and associated school infrastructure.

Based on the available contour information, the site generally falls across the development area with localised level differences requiring retaining walls, batter transitions and associated earthworks to achieve the proposed finished surface levels.

A topographical map of the site is illustrated in *Figure 2.*

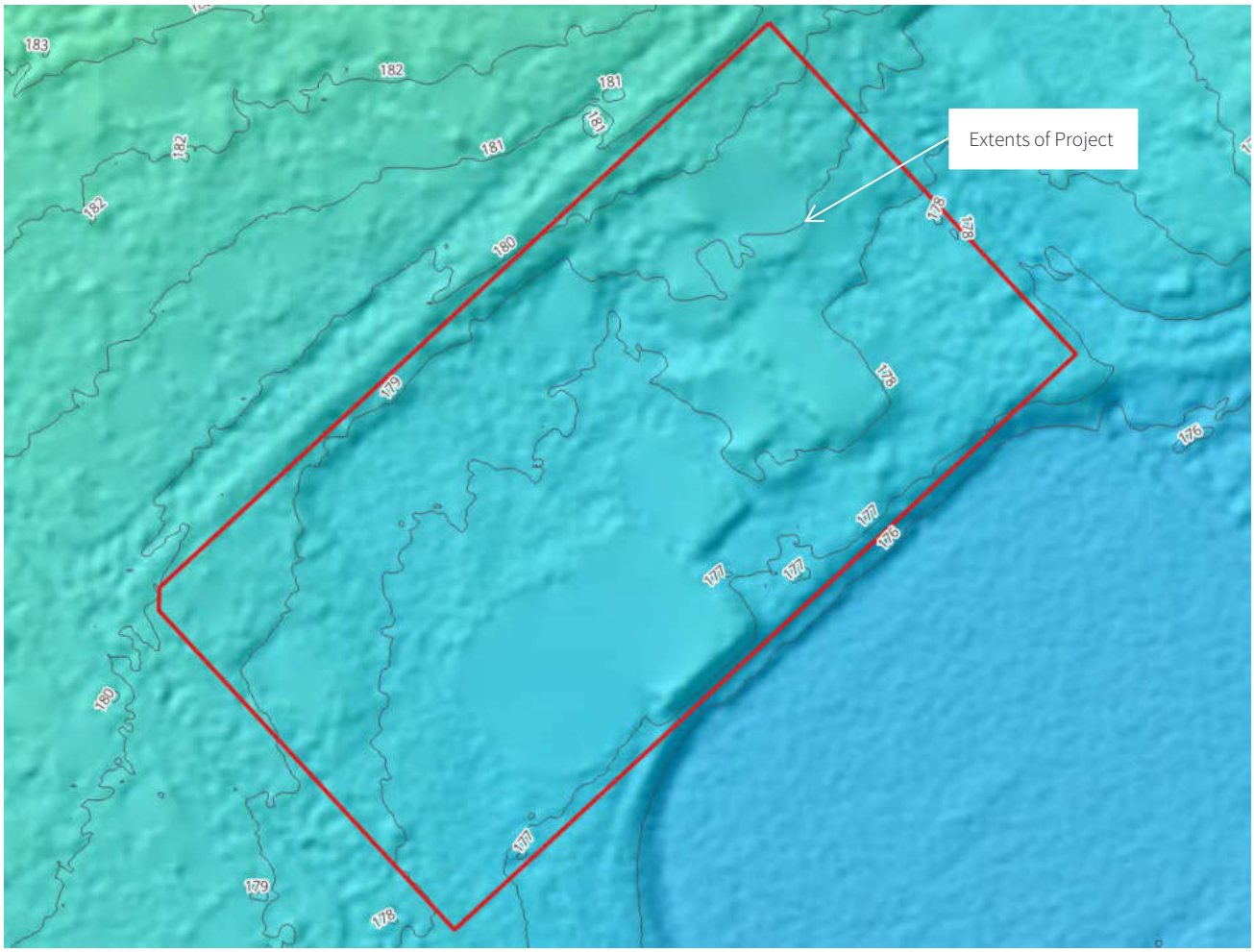

Figure 2: Site Elevation

1.3. Description of Proposed Project

The proposed development comprises the Stage 2A expansion and upgrade work to the existing Redeemer Lutheran College campus located at 2 Collard Street, Biloela QLD.

The proposed development has been designed to improve the operational functionality of the College and support future educational and campus requirements.

Please refer to the Proposed Site General Arrangement included as *APPENDIX A – Proposed Layout (Stage 2A)* for further details of the proposed layout.

1.4. Proposed Conceptual Drainage

It is proposed that stormwater flows generated from the proposed development area will be captured by the proposed drainage system, then will be conveyed to the existing internal stormwater network. The Legal Point of Discharge (LPoD) of the proposed development will be the existing stormwater drainage network of the southern site boundary.

2. SITE HYDROLOGY

2.1. Background

This section of the SBSWMP defines the method and parameters applied in the hydrological assessment of the location to simulate the expected flow pattern and maximum discharge at the Lawful Point of Discharge (LPoD).

For evaluating the peak flow rates before and after development, a Rational Method computation is presented as a reference.

The Rational Method, as discussed in Section 4.3 of the Queensland Urban Drainage Manual 2017 (i.e. QUDM), is a feasible and reliable method for approximation, owing to its adaptability to the available data and its ability to generate suitable approximations of the maximum site discharge based on the data inputs mentioned below:

- specific intensity frequency duration (IFD) data;
- length/type of flow path;
- contributing catchment areas; and
- coefficient of discharge.

Intensity Frequency Duration (IFD) data for the hydrologic modelling was obtained from the Bureau of Meteorology website. The IFD data is summarised in *Table 1*.

Table 1: Intensity Frequency Duration Data

Duration (min)	63 % (mm/hr)	0.5 EY (mm/hr)	0.2 EY (mm/hr)	10 % (mm/hr)	5 % (mm/hr)	2 % (mm/hr)	1 % (mm/hr)
5	106.00	131.00	158.00	180.00	204.00	235.00	259.00
10	87.20	107.00	129.00	145.00	164.00	189.00	208.00
15	74.20	91.40	110.00	124.00	140.00	161.00	177.00
20	64.80	79.80	95.80	109.00	123.00	142.00	156.00
25	57.60	71.00	85.40	96.90	110.00	127.00	140.00
30	51.90	64.00	77.10	87.70	99.50	115.00	127.00
45	40.30	49.70	60.10	68.70	78.20	90.80	101.00
60	33.10	40.90	49.60	56.70	64.70	75.50	83.80

2.2. Pre-Development SCENARIO

2.2.1. Catchment Definition

The pre-development catchments have been analysed as a catchment with contributing areas of 2.402 hectares. The catchment boundary and LPoD for the pre-development plan is shown in Moloney & Sons Engineering Drawing CE26020-600-DR in *APPENDIX B – Stormwater Catchment Plan Drawings*.

2.2.2. Rational Method

The pre-development coefficient of runoff (C year) was determined on the fraction impervious method specified in *QUDM*. For the purposes of this report and in order to establish an effective and accurate modelling and analysis approach and based on the detailed survey information provided at the time of this report, the pre-development catchment have adopted a fraction impervious of 51% respectively.

Using the Rational Method, C_{10} value of 0.72 have been adopted for the catchment in one (1) stages, and a corresponding 60 minute ten-year rainfall intensity (I_{10}) of 56.70 mm/hr was calculated.

The Time of Concentration for the pre developed catchments has been calculated in accordance with QUDM Table 4.6.3 – Recommended roof drainage system travel times as *Table 2*.

Table 2: Pre-Development Time of Concentration

Catchment	Standard Inlet Time	Pipe Flow Time	Total ToC
Pre A+Stage 1	15 mins	-	15 minutes

The pre-development peak flow rates have been calculated for the selected storms, by utilising the Bureau of Meteorology IFD data design rainfall intensities.

To determine the design peak flow rates for the site, the Rational Method (I.e. Q = 2.78 x 10-3 CIA) has been applied.

The coefficient of runoff, time of concentration and peak flow rate are presented in *Table 3* for the standard Annual Exceedance Probability (AEP) design storms of 39%, 10%, 5% and 1% (corresponding to the 2, 10, 20 and 100 year Average Recurrence Interval (ARI) storms).

Table 3: Pre Development Peak Flow Estimation – Rational Method

PRE – DEVELOPMENT SCENARIO					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.61	0.72	0.76	0.86
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.37	0.60	0.71	1.02

2.3. Post-Development SCENARIO

2.3.1. Catchment Definition

The post-development catchments will be analysis as catchment A with contributing areas of 2.402 hectares.

It is proposed that stormwater flows generated from the proposed development area will be captured by the proposed drainage system, then will be conveyed to the existing stormwater network. The Legal Point of Discharge (LPoD) of the proposed development will be the existing stormwater drainage network of the southern site boundary.

The catchment boundary and LPoD for the post-development plan is shown in CE26020-601-DR in *APPENDIX B – Stormwater Catchment Plan Drawings*.

2.3.2. Rational Method

The post-development coefficient of runoff (C year) was determined based on the fraction impervious method specified in *QUDM*.

Based on the provided layout, the post-development catchment has fraction impervious of 55% for post Stage 2A.

The Time of Concentration for the post developed catchments has been calculated in accordance with QUDM Table 4.6.3 – Recommended roof drainage system travel times, refer *Table 4* below.

Table 4: Post Development Time of Concentration

Catchment	Standard Inlet Time	Pipe Flow Time	Total ToC
Post only Stage 2A	15 mins	-	15 minutes

The peak flow rates for the post development scenario have been calculated for the selected storms by utilising the Bureau of Meteorology IFD Data design rainfall intensities. Similar to pre-development peak flow calculations, the Rational Method (i.e. Q = 2.78 x 10-3 CIA) has been applied been applied for the post-development scenario.

The coefficient of runoff, time of concentration and peak flow rate are presented in *Table 5* for the standard Annual Exceedance Probability (AEP) design storms of 39%, 10%, 5% and 1% (corresponding to the 2, 10, 20 and 100 year Average Recurrence Interval (ARI) storms).

Table 5: Post Development Peak Flow Estimation – Rational Method

POST – DEVELOPMENT SCENARIO (STAGE 2A ONLY)					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.62	0.73	0.77	0.88
Area of Catchment (ha)	A	2.402	2.402	2.402	2.402
Average Rainfall Intensity (mm/h)	I	91.4	124.0	140.0	177.0
Peak Flow Rate (m3/s)	Q	0.38	0.60	0.72	1.04

2.4. Change in Flow Rates

Rational Method assessment aims to evaluate the change in flow rates calculated from the pre and post development catchments. From Table 3 and Table 5, the peak flow rate for AEP design storms of 39%, 10%, 5% and 1% are compared in *Table 6*.

Table 6: Change in Peak Flow Rate

PRE + STAGE 1 and POST ONLY STAGE 2A					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Pre-Developed Peak Flow Rate (m3/s)	Q	0.37	0.60	0.71	1.02
Post-Developed Peak Flow Rate (m3/s)	Q	0.38	0.60	0.72	1.04
Change in Peak Flow Rates (m3/s)	Q	0.01	0.0	0.01	0.02

Table 6 shows that the post-catchment A has demonstrated via a Rational Method assessment an insignificant increase in peak flow rates discharging from the site, therefore on-site detention is not required to mitigate flows to pre development conditions.

2.5. External Catchment

An assessment was conducted on the subject site and its vicinity to identify any external catchments that could potentially impact the site. External catchment has been determined through external contours and infrastructure.

Based on the contours sourced from ELVIS data, there is an external catchment that discharges stormwater flows (pipe and overland flow from Collard Street) to the subject site.

This external catchment is termed EXT A with a contributing area of 6.600 ha.

The location of the external catchment, in relation to the subject site, is detailed in *APPENDIX B – Stormwater Catchment Plan Drawings.*

Table 7 below represents the peak discharge in the external catchment calculated by Rational Method.

Table 7: Post Development Peak Flow Estimation – Rational Method

Ext Catchment Flows					
Annual Exceedance Probability	AEP	39%	10%	5%	1%
Coefficient of Runoff	C	0.61	0.72	0.76	0.86
Area of Catchment EXT A (ha)	A	2.724	2.724	2.724	2.724
Average Rainfall Intensity (mm/h)	I	86.4	117	133	168
Peak Flow Rate (m3/s)	Q	0.400	0.637	0.761	1.098

The existing peak runoff and overland flow paths of the external contributing catchment remains unchanged by the proposed works. All contributing external catchments will maintain their pre-development LPoD and the subject works have been designed to ensure all overland flow paths are accepted within the boundaries of the subject site and directed to their LPoD, whilst mitigating any concentrated flows and adverse scour/erosion run-off effects due to the designs proposed site grading and surface materials.

3. STORMWATER QUANTITY MANAGEMENT PLAN

3.1. WATER QUANTITY OBJECTIVES

The following objective has been set for post development stormwater discharge from the site:

- No net increase in peak flows from the subject site, for all durations up to the 1% AEP design storm event, during the post-developed condition.

This objective shall be demonstrated through hydrologic and hydraulic models. XP-SWMM has been used to mitigate any increase in total site discharge rates.

3.2. STORMWATER MITIGATION

Stormwater runoff within the site will be directed to the existing stormwater network before being discharged to the respective Lawful Point of Discharge (LPoD). Stormwater flow generated from the new development will be discharged to the LPoDs and will not result in a significant increase compared with the predevelopment rates.

Major & Minor Systems have been classified and adopted in accordance with Queensland Urban Drainage Manual (QUDM) guideline as 1% AEP & 39% AEP (2yr ARI) respectively.

3.3. 1D MODELLING ASSUMPTIONS & METHODOLOGY

The following modelling assumptions were used to create the XP-SWMM Models

- Two (2) separate scenarios were generated, which were:
  - Pre-Development (which included all points of discharge); and
  - Post-Development (which included all points of discharge).
- Each model included runoff nodes for each contributing sub-catchment (including external contributing catchment).
- The sub-catchment areas were split into school campus land uses with absolute values adopted for percentages impervious as specified in *Table 8.*
- Infiltration uniform losses were applied to the pervious areas of the sub-catchments
- The models were run at various durations for a constant ARI to determine the critical storm event.

The XP-SWMM model schematic is shown in *Figure 3* & *Figure 4*

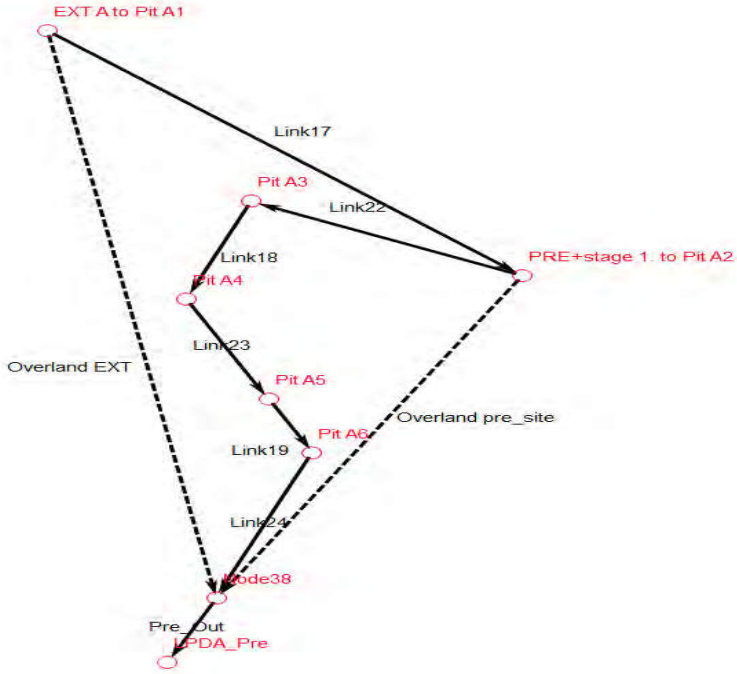

Figure 3: Existing model layout

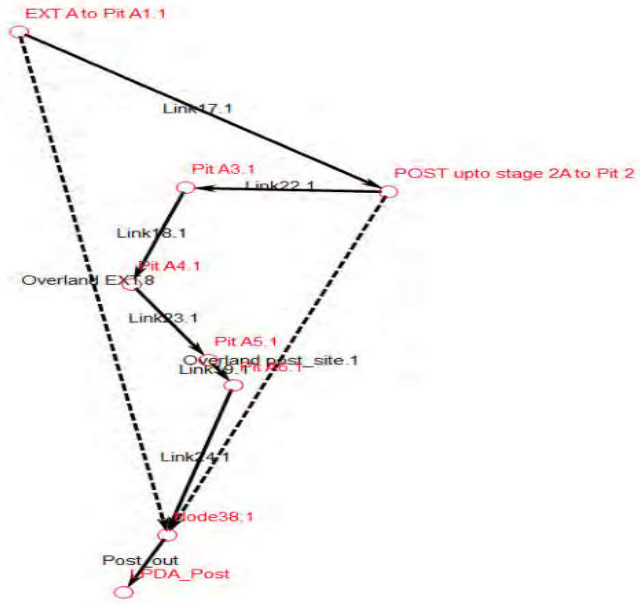

Figure 4: Development model layout

3.4. XP-SWMM Input Parameters

In this study, the "Laurenson" routing method was applied to XP-SWMM for hydrograph generation. To enable this method to be used, each catchment must be split into pervious (undeveloped) and impervious (developed) portions. Adopted parameters for the Laurenson routing method included:

The fraction impervious has been determined by analysis of aerial photographs and the proposed development layout;

- Manning Roughness coefficient (n):
  - Pervious portion: 0.035;
  - Impervious portion: 0.015.

AR&R 2019 Initial Loss (IL) and Continuing Losses (CL) have been applied to the hydrologic model. Details of IL and CL parameters applied in the XP-SWMM model are presented in *Table 8*.

Table 8: Adopted Initial & Continuing Losses

Impervious Area		Pervious Area	
IL (mm)	CL (mm/hr)	IL (mm)	CL (mm/hr)
0	0	10	2

Analysis of the catchment has been undertaken to determine the average slope, with the results of this being applied to the model.

Table 9: Catchment Parameters

Scenario	Catchment	Impervious Area			Pervious Area		
		Area (ha)	Fraction Impervious (%)	Slope (m/m)	Area (ha)	Fraction Impervious (%)	Slope (m/m)
Pre-Development	EXT A	1.362	100 %	2.5%	1.362	0%	2.5%
Pre-Development	PRE A	1.232	100 %	2%	1.170	0%	2%
Post-Development	POST (STAGE 2A ONLY)	1.321	100 %	2%	1.081	0%	2%

3.5. XP-SWMM Analysis

A XP-SWMM model has been adopted at the preliminary planning stage to ensure that the storage volume is estimated with a higher degree of confidence. Laurenson's Hydrology has been used as the routing method within XP-SWMM. Sub-catchment routing in this method is carried out using the Muskingum procedure, which is a storage routing method based on the storage equation.

A range of storm events up to 1% AEP design storm events were analysed for all standard durations ranging from 10 minutes to 360 minutes. The combined peak discharge rates for the site calculated by the XP-SWMM model are shown below for both scenarios.

A comparison between the peak discharge values obtained for the 1% through to the 39% AEP storm events using the Rational Method and the XP-SWMM model is contained in *Table 10.* As can be seen, the peak discharges generated by the XP-SWMM model mostly compare well (~20% difference) to the values obtained from Rational Method calculations and are therefore considered appropriate for subsequent hydraulic analysis. It is noted that where higher differences occur this will result in a conservative approach.

Table 10: Rational Method vs XP-SWMM Generated Peak Discharges for LPD A

PRE-DEVELOPMENT							POST-DEVELOPMENT- STAGE 2A ONLY				
Event (ARI)	Event (AEP %)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)	Critical storm & temp pattern	Catch id	Rational method (m3/s)	XP-SWMM (m3/s)	Diff (%)
100	1	ECN_1pct_30 min_8	LPD A	1.968	1.852	-6%	ECN_1pct_30 min_7	LPD A	1.968	1.866	-5%
50	2	ECN_2pct_30 min_7	LPD A	1.710	1.648	-4%	ECN_2pct_30 min_1	LPD A	1.710	1.663	-3%
20	5	ECN_5pct_30 min_4	LPD A	1.356	1.358	0%	ECN_5pct_30 min_2	LPD A	1.356	1.375	1%
10	10	ECN_10pct_30 min_4	LPD A	1.138	1.166	2%	ECN_10pct_3 0min_4	LPD A	1.138	1.176	3%
5	20	ECN_0.2EY_30 min_9	LPD A	0.956	1.038	8%	ECN_0.2EY_3 0min_9	LPD A	0.956	1.057	10%
2	39	ECN_0.5EY_30 min_9	LPD A	0.714	0.778	8%	ECN_0.5EY_3 0min_9	LPD A	0.714	0.798	11%

The proposed development has demonstrated via a XP-SWMM assessment that an insignificant increase (>20l/s) in peak flow rates discharging from Catchments A is anticipated, therefore On-Site Detention (OSD) is deemed not required to mitigate flows to pre-development conditions. It is also noted that onsite rainwater capture and reuse systems have not been included in the modelling and therefore is conservative. A comparison of the pre-development and mitigated flow rates is shown in *Table 11*.

Table 11: Comparison of Pre – Mitigated flow rates – Extracted from XP-SWMM Model (m3/s)

PRE and POST ONLY STAGE 2A						
Annual Exceedance Probability	0.5EY	0.2EY	10%	5%	2%	1%
Pre Development	0.78	1.04	1.17	1.36	1.65	1.85
Post Development (Unmitigated)	0.80	1.06	1.18	1.38	1.66	1.87

The hydrograph for the critical duration of the Mitigated 1% AEP storm event compared against the pre and post development is shown in *Figure 5* to *Figure 5*

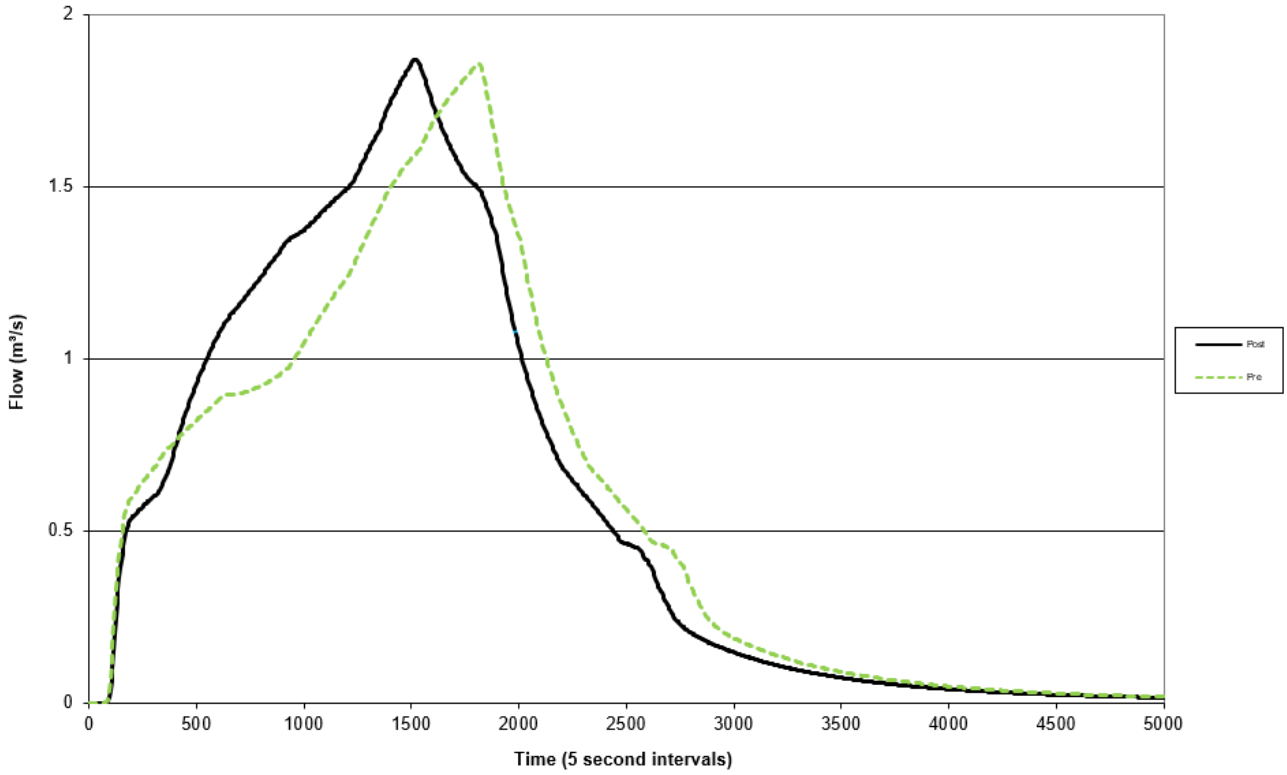

Figure 5: Pre, Post and Mitigated Flow Rates for the 1% AEP Design Storm Event at LPD A

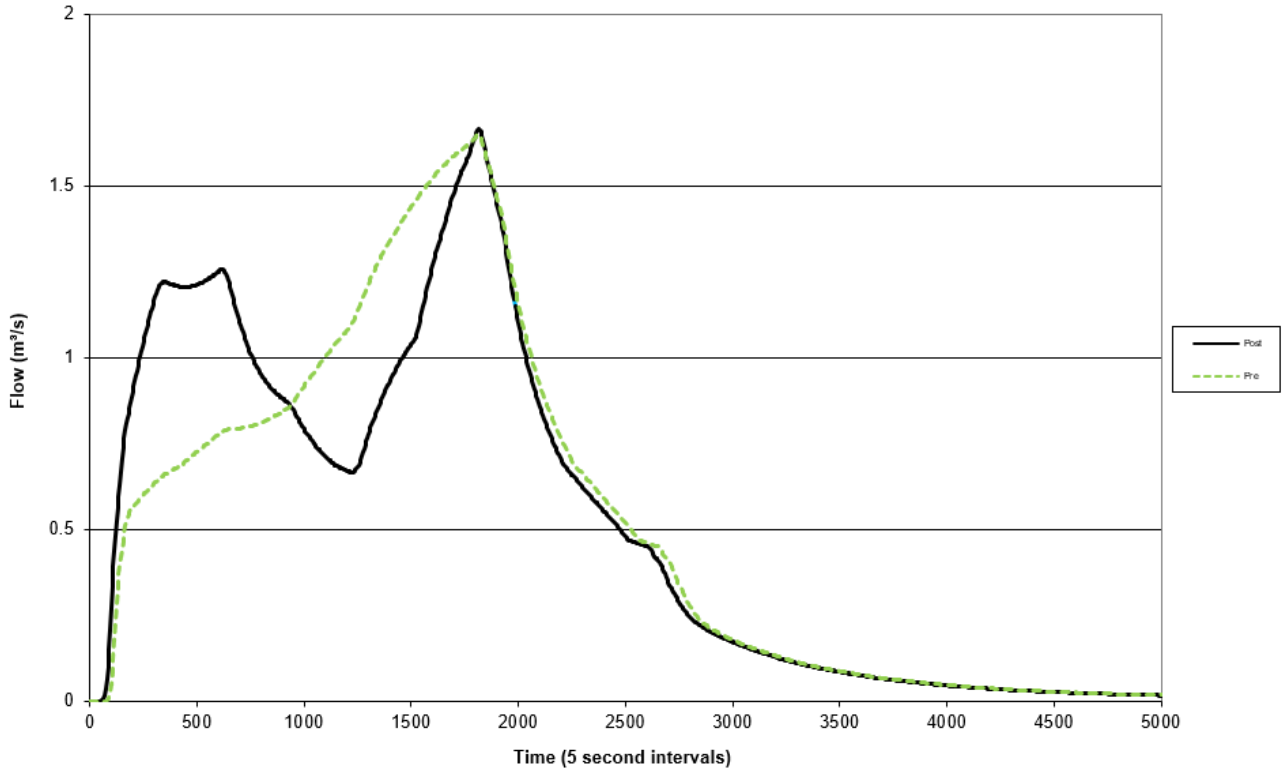

Figure 6: Pre, Post and Mitigated Flow Rates for the 2% AEP Design Storm Event at LPD A

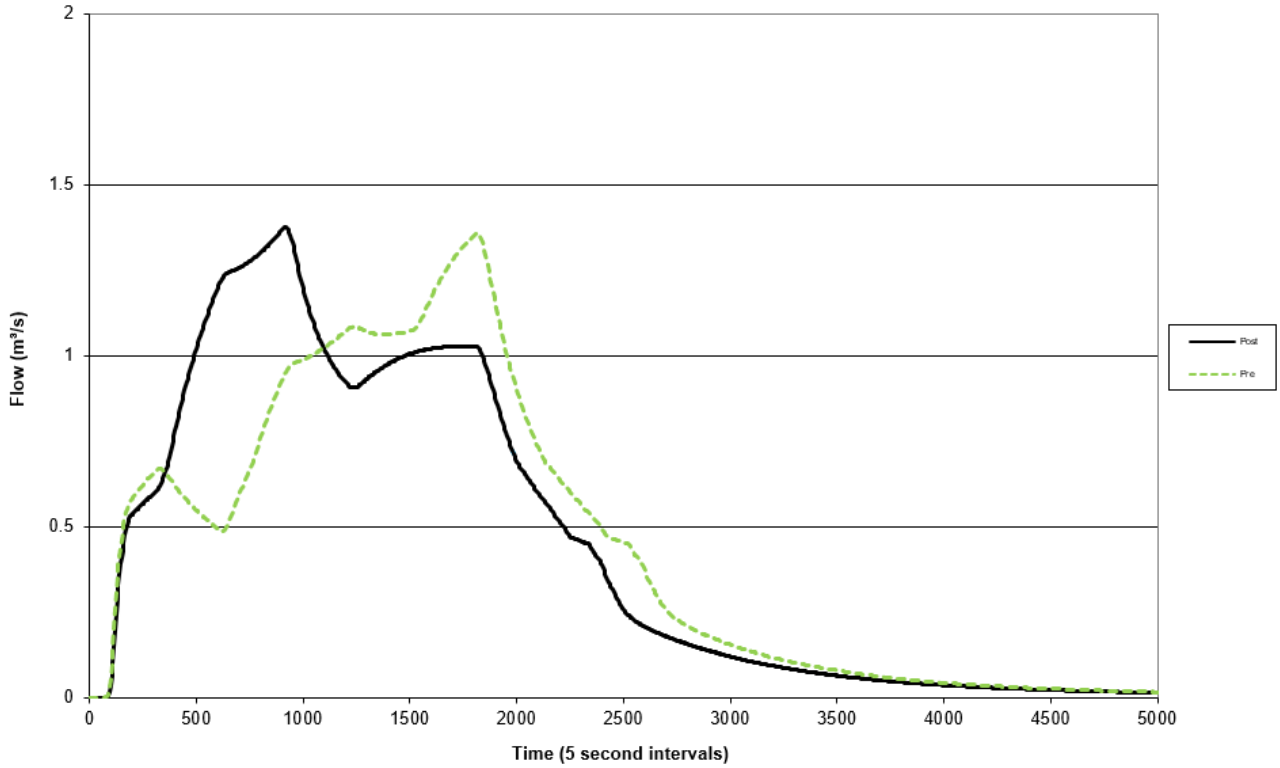

Figure 7: Pre, Post and Mitigated Flow Rates for the 5% AEP Design Storm Event at LPD A

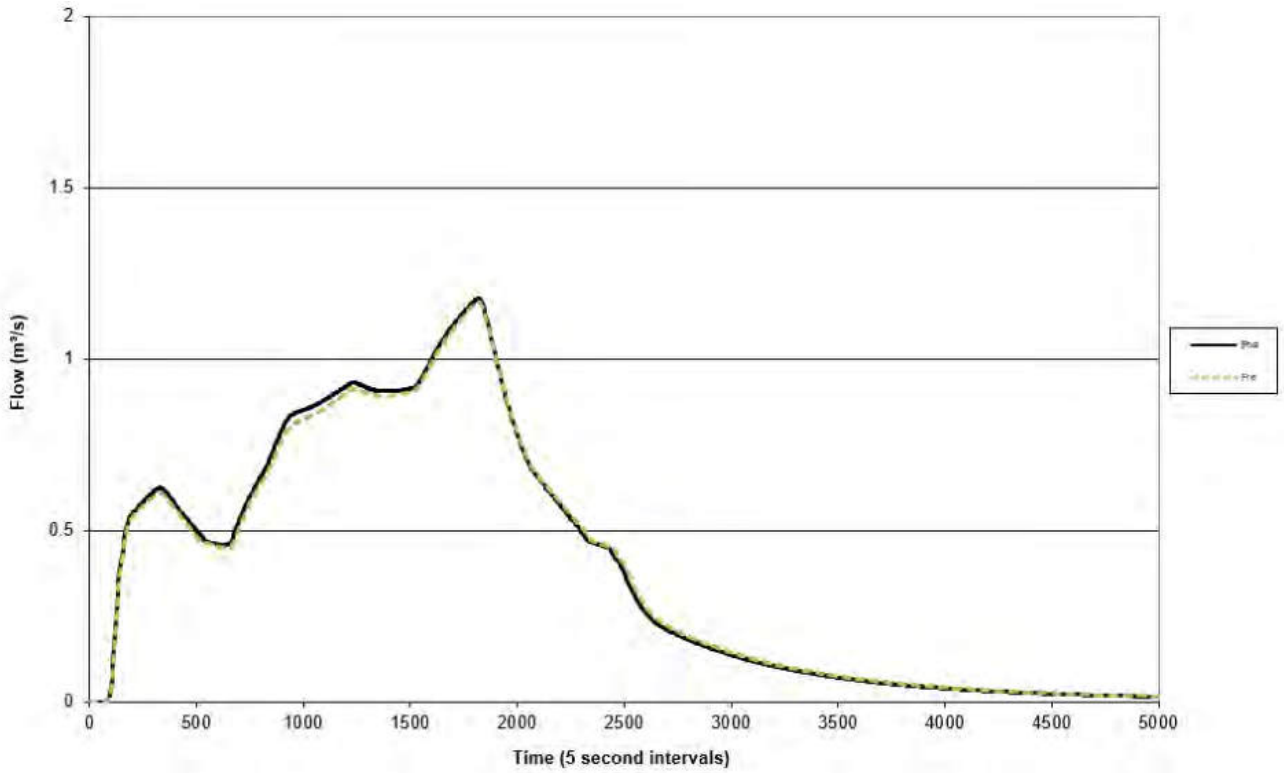

Figure 8: Pre, Post and Mitigated Flow Rates for the 10% AEP Design Storm Event at LPD A

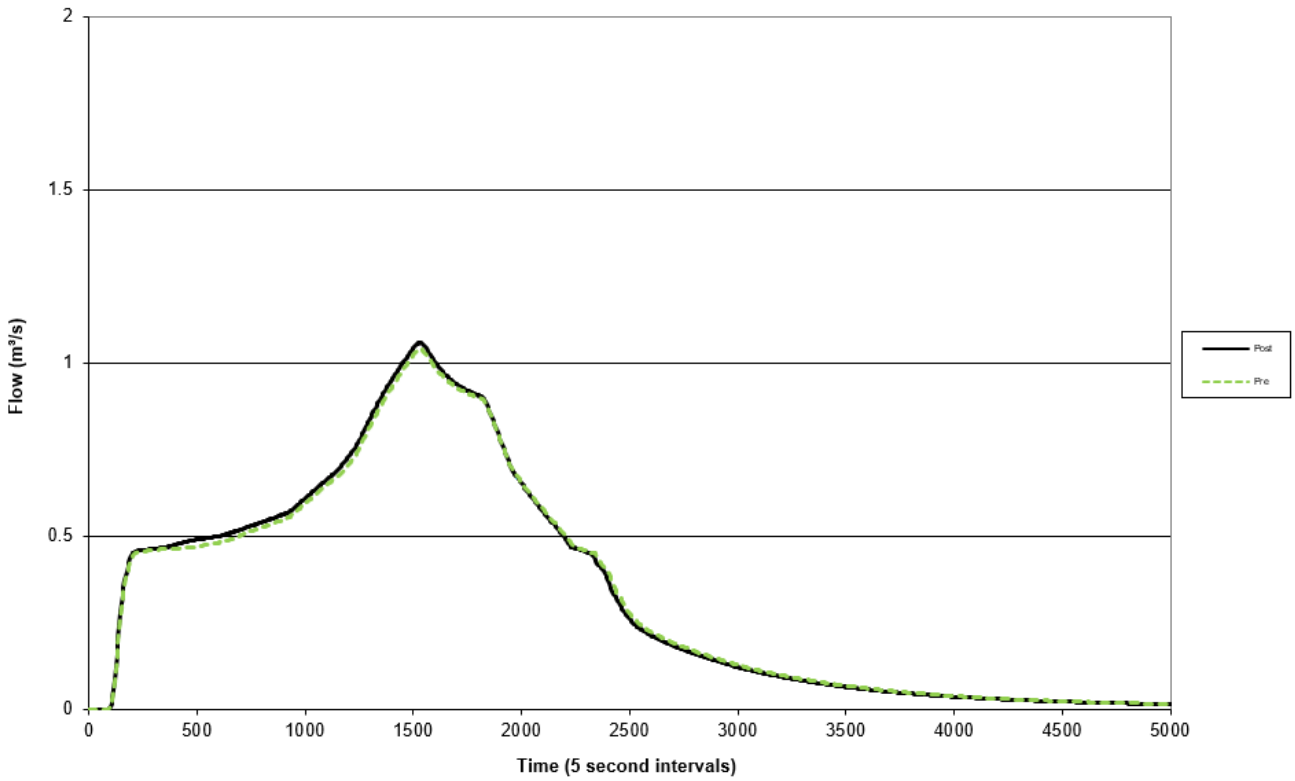

Figure 9: Pre, Post and Mitigated Flow Rates for the 0.2EY Design Storm Event at LPD A

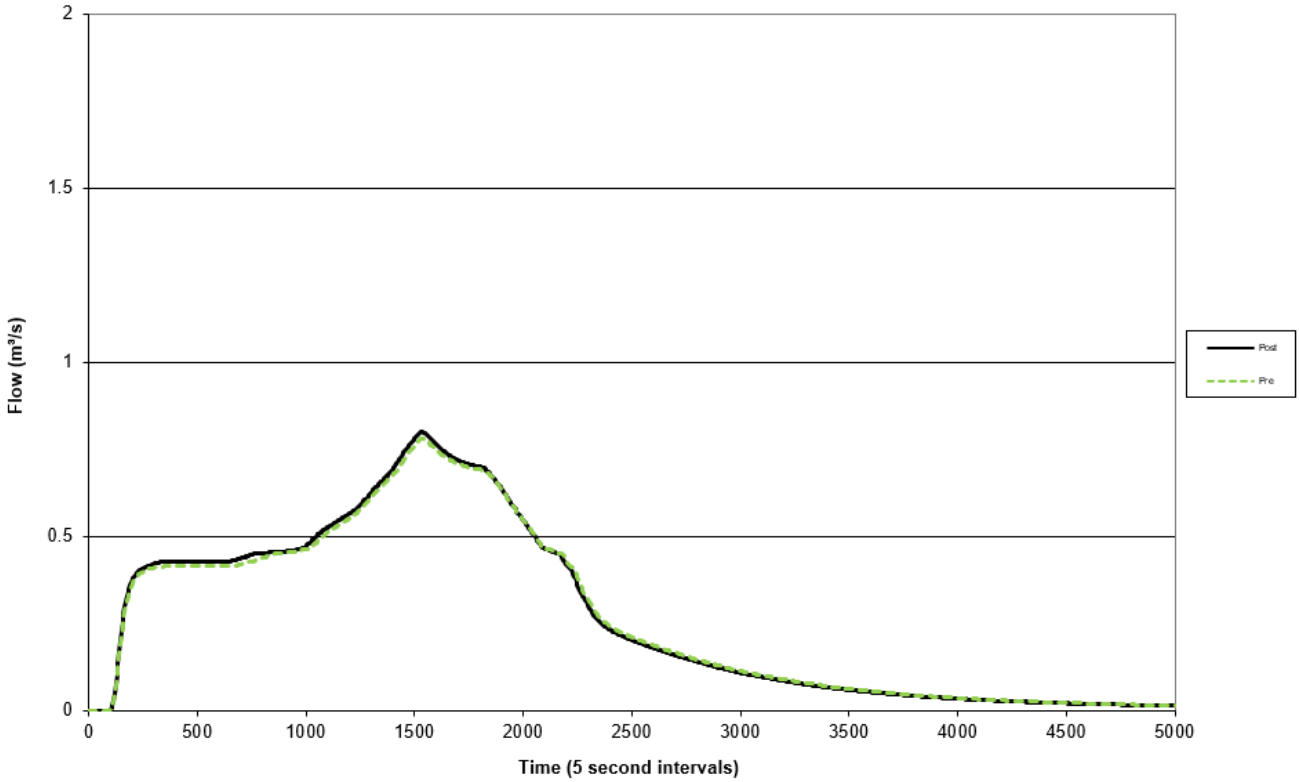

Figure 10: Pre, Post and Mitigated Flow Rates for the 0.5EY Design Storm Event at LPD A

4. STORMWATER QUALITY MANAGEMENT PLAN

4.1. SUMMARY

In accordance with the State Planning Policy for Healthy Waterways Section 2.7, the policy does not apply to the material change of use or operational works to the land less than 2,500m^2 or the creation of less than 6 residential allotments. Therefore, as Stage 2A only covers the proposed buildings and car park, with a total area of less than 2,500 m^2, there is no deemed requirement for water quality management in accordance with Healthy Waterways for Stage 2A.

5. OVERLAND FLOW HYDRAULIC ASSESSMENT

5.1. Methodology

Only local direct-rainfall flood modelling has been undertaken as part of this Hydraulic Impact Assessment within the bounds of the site and the small external contributing catchments (model extent). There is no regional flooding influence on site and therefore has not been undertaken.

The TUFLOW modelling package (software created by BMT WBM) was used to setup the hydrological inputs for a direct rain-on-grid approach for hydraulic modelling assessment.

The hydrological component of this assessment was undertaken in accordance with Australian Rainfall & Runoff 2019 (ARR 2019) principles and used the following parameters

5.2. Catchment characteristics

The direct rain-on-grid approach in TUFLOW allows the user to define the bounds of the overall contributing catchment and define the rainfall to be set across the entire model domain. Therefore, no separate catchments have been delineated for the assessment of this model.

The entire boundary shown below in *Figure 3* defined by a pink line is the modelled area that has applied a 'local' rainfall boundary which encompasses the site (in black dotted line) and all potential contributing catchments. Note the majority of water acts as sheet flow across the site from west to east direction.

The modelled Lawful Point of Discharge (LPD) has been shown in green dotted lines in the south.

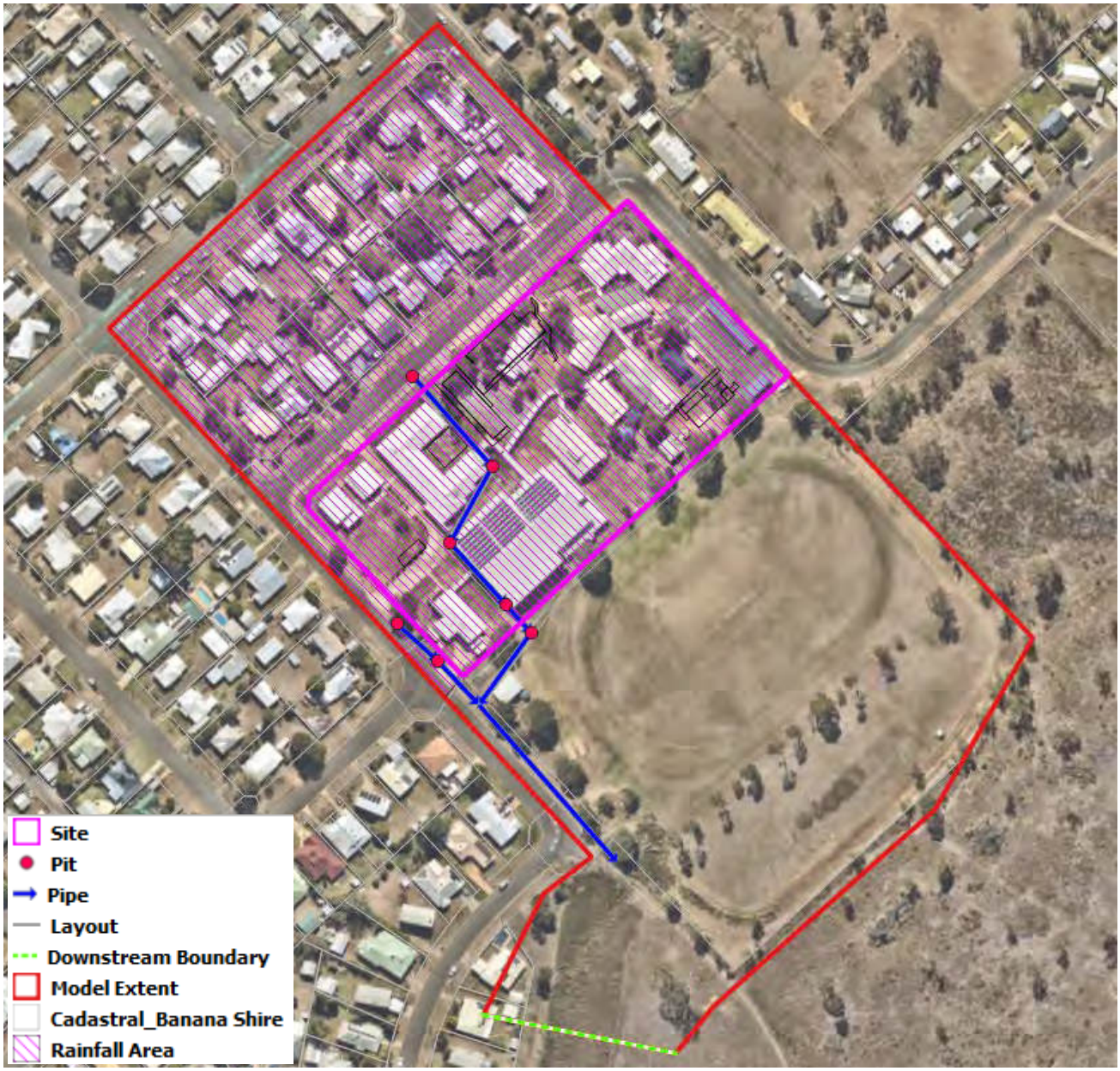

Figure 11 Rainfall Area

5.3. Rainfall data

Bureau of Meteorology (BOM) Intensity Frequency Duration (IFD) program and the ARR Data Hub were used to generate the rainfall intensities and ensemble patterns for the study area. By applying the ARR 2019 hydrologic methods, we have ensured this study is providing the best available information on design flood estimation. Table 12 provides the IFD data (rainfall depth) applied to this assessment.

Table 12 BOM Intensity Frequency Duration Rainfall Depth

Duration	50%	20%	10%	5%	2%	1%
10 min	16.1	21	24.2	27.4	31.5	34.6
15 min	20.6	26.8	31	35	40.3	44.3
20 min	24	31.3	36.2	41	47.2	51.9
25 min	26.6	34.9	40.4	45.8	52.8	58.2
30 min	28.8	37.8	43.9	49.8	57.5	63.5
45 min	33.6	44.2	51.5	58.6	68.1	75.4
60 min	36.8	48.6	56.7	64.7	75.5	83.8
90 min	41.1	54.4	63.7	72.9	85.3	95.1
120 min	44	58.2	68.3	78.3	91.9	103
180 min	47.8	63.3	74.4	85.5	101	113
270 min	51.8	68.5	80.5	92.8	110	123
360 min	54.7	72.4	85.1	98.3	117	131
540 min	59.3	78.7	92.6	107	128	144
720 min	63	83.9	99	115	137	156
1080 min	69.1	92.8	110	129	155	176

5.4. Objectives

The purpose of this overland flow assessment is to determine flood levels for the 0.5EY, 0.2EY, 10%, 5%, 2% and 1% Annual Exceedance Probability (AEP) design events and to demonstrate that the proposed development would not significantly increase flood risk to adjoining/downstream properties.

To carry out this assessment, the TUFLOW hydraulic software model, which comprises both 1D and 2D elements, has been utilized. The design terrain (i.e., Digital Terrain Model) of the study area has been represented by a grid of 2D cells, enabling flows in excess of channel capacity or pipe network to spread out along the floodway in the 2D domain as dictated by the topography. Refined ROG methodology of TUFLOW (Version 2023-03-AA, HPC-GPU solver) was used for this analysis according to the recommendation from the report.

The hydraulic structures (such as minor culvert networks) have been modeled as 1D elements, dynamically linked to the 2D elements. The TUFLOW model calculates the capacity of the 1D element, and when exceeded, the surcharged flow is transferred to the 2D model.

The model can provide information such as flood levels, discharge, and velocity at required locations, as functions of time. TUFLOW is an industry-standard model for two-dimensional river analysis, used to estimate flood characteristics such as flood level, velocity, and depth, and assess any potential impacts of the proposed development on the surrounding properties.

5.5. 2D Model Set-Up

5.5.1. Digital Elevation and Model Extent

The digital elevation model used in the pre-development TUFLOW model is a combination of the Lidar data and site survey plan.

For the Post-development scenario, the proposed modification in surface level and hydraulic roughness is included into the model based on the proposed sub-division layout.

5.5.2. Resolution and Time Step

The grid size is based on model efficiency and size constraints for the extents of the model.

A grid size of 1 metre x 1 metre has been adopted to maintain stability in the TUFLOW model for all scenarios.

5.5.3. Roughness

Model parameters were selected based on best management practices (ARR16 methodology). The hydraulic roughness values were determined using land-use categories and aerial photography captured during the LiDAR survey. The adopted roughness values are presented in Table 13.

Table 13 Adopted Roughness Values

Land Cover Type	Manning's Roughness (n)
Buildings	0.4
Roads	0.02
Proposed Open space/ground	0.04

5.6. Results of Pre-Development

The results of the pre - development scenario, are reflected in Figure 12 to Figure 14 (below) showing the peak flood depths, velocities and flood extents in the vicinity of the subject site for the 1% AEP (1 in 100 year) design flood event.

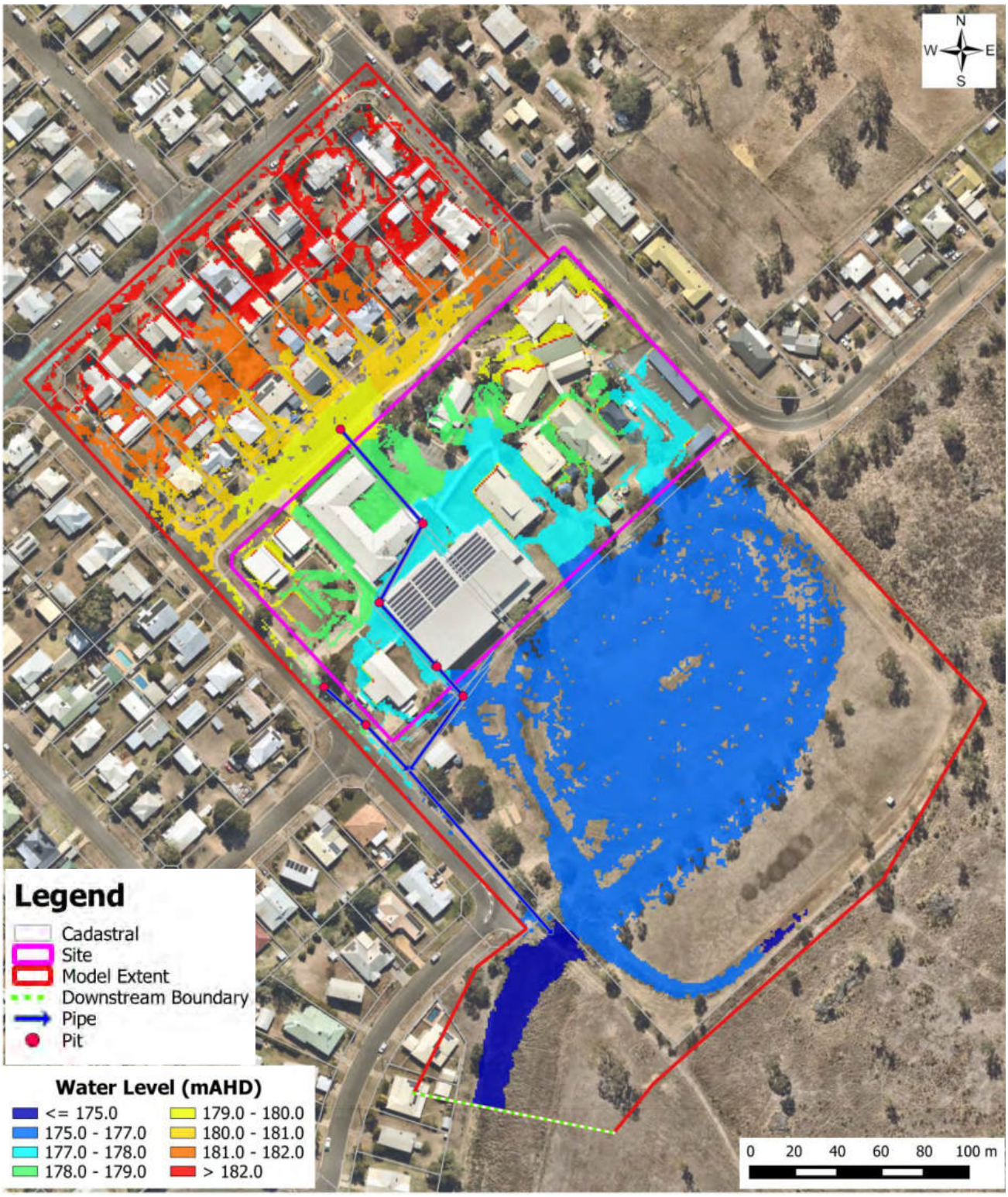

Figure 12: Pre-Development Maximum Water Level– 1%AEP

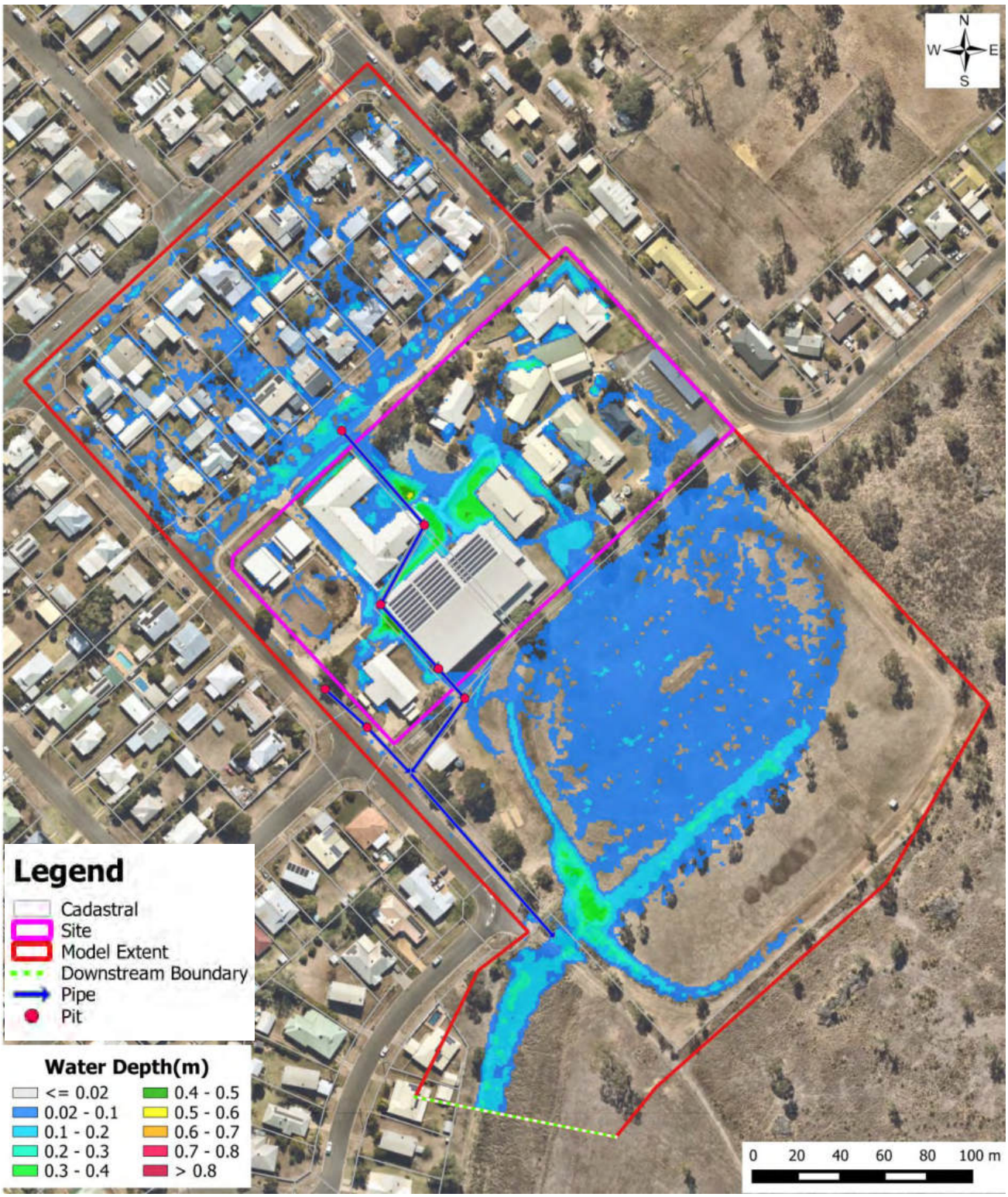

Figure 13: Pre-Development Maximum Water Depth– 1%AEP

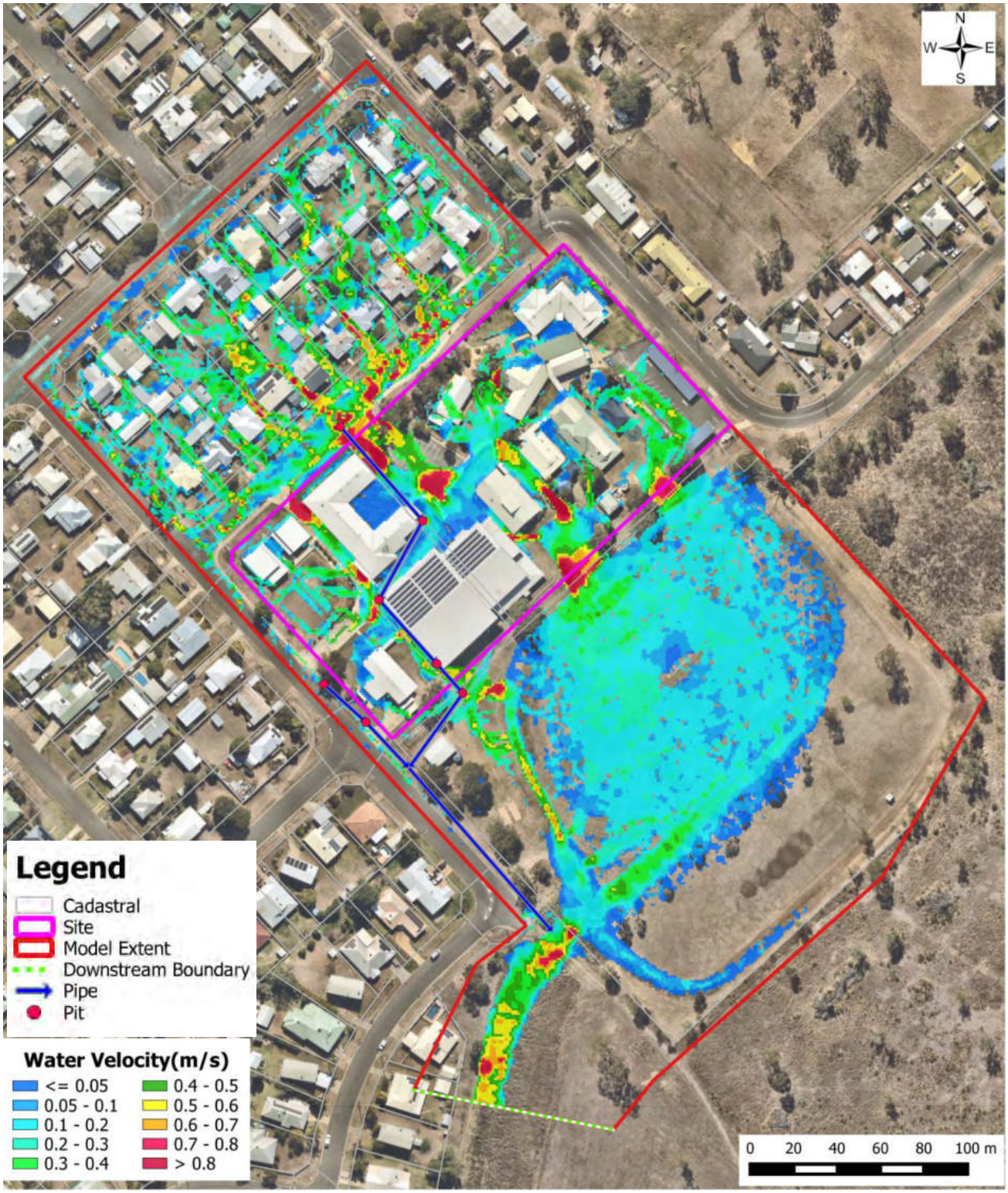

Figure 14: Pre-Development Maximum Water Velocity– 1%AEP

5.7. Results of Post-Development

Results of the post development scenario, are reflected in Figure 15 to Figure 17 (below) showing the peak flood depths, velocities and flood extents in the vicinity of the subject site for the 1% AEP (1 in 100 year) design flood event.

The results indicate that:

- The proposed and existing pad locations are not subject to flooding.
- The flood extent in the surrounding areas changes only marginally compared with the existing conditions, indicating that the proposed development does not result in any significant increase in off-site flood impacts.

Refer also drawing CE26020-113-TC containing cross-sections of the existing overland flow path through the site with 1%AEP flows contained and below adjoining building FFL's.

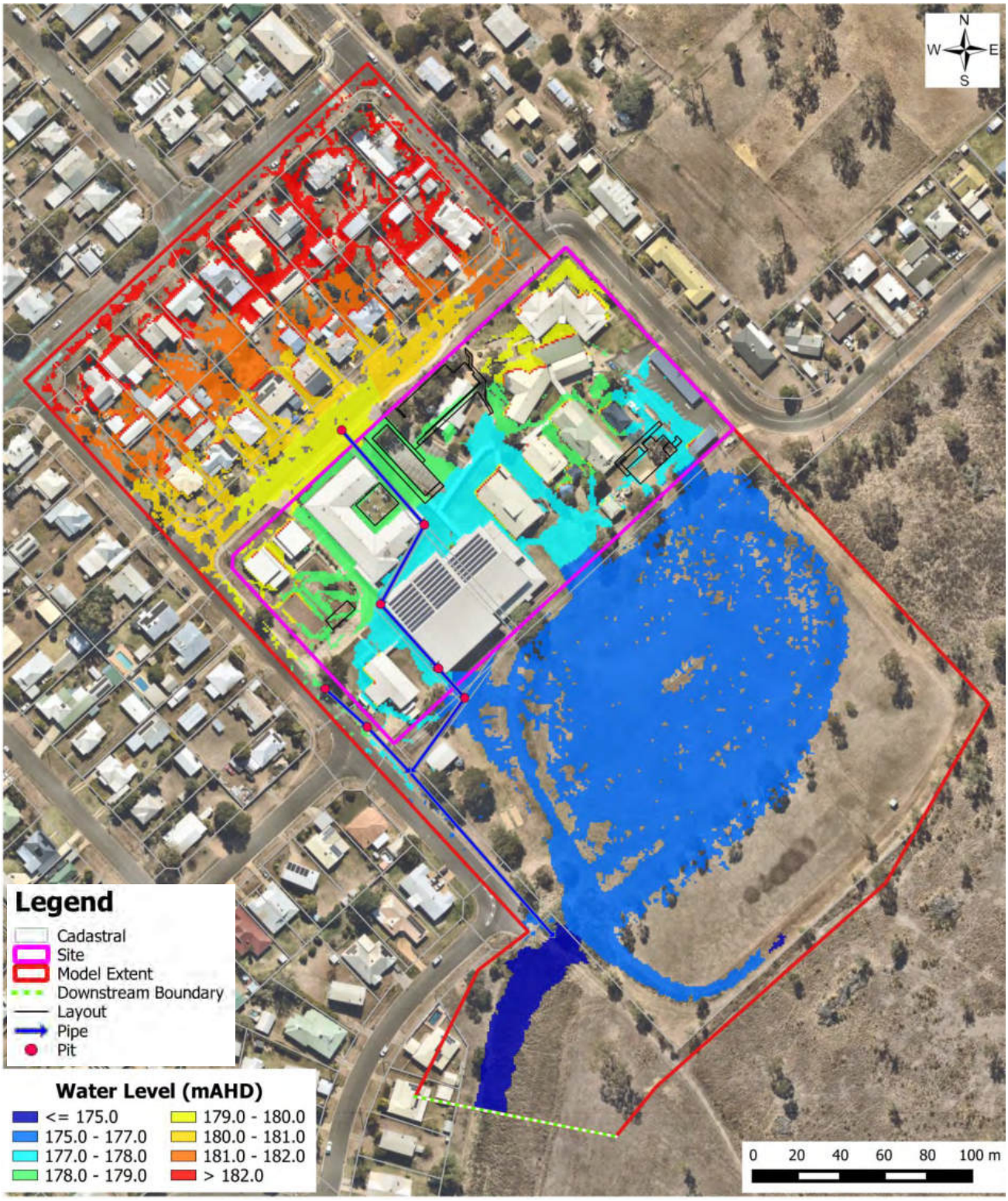

Figure 15: Post-Development Maximum Water Level– 1%AEP

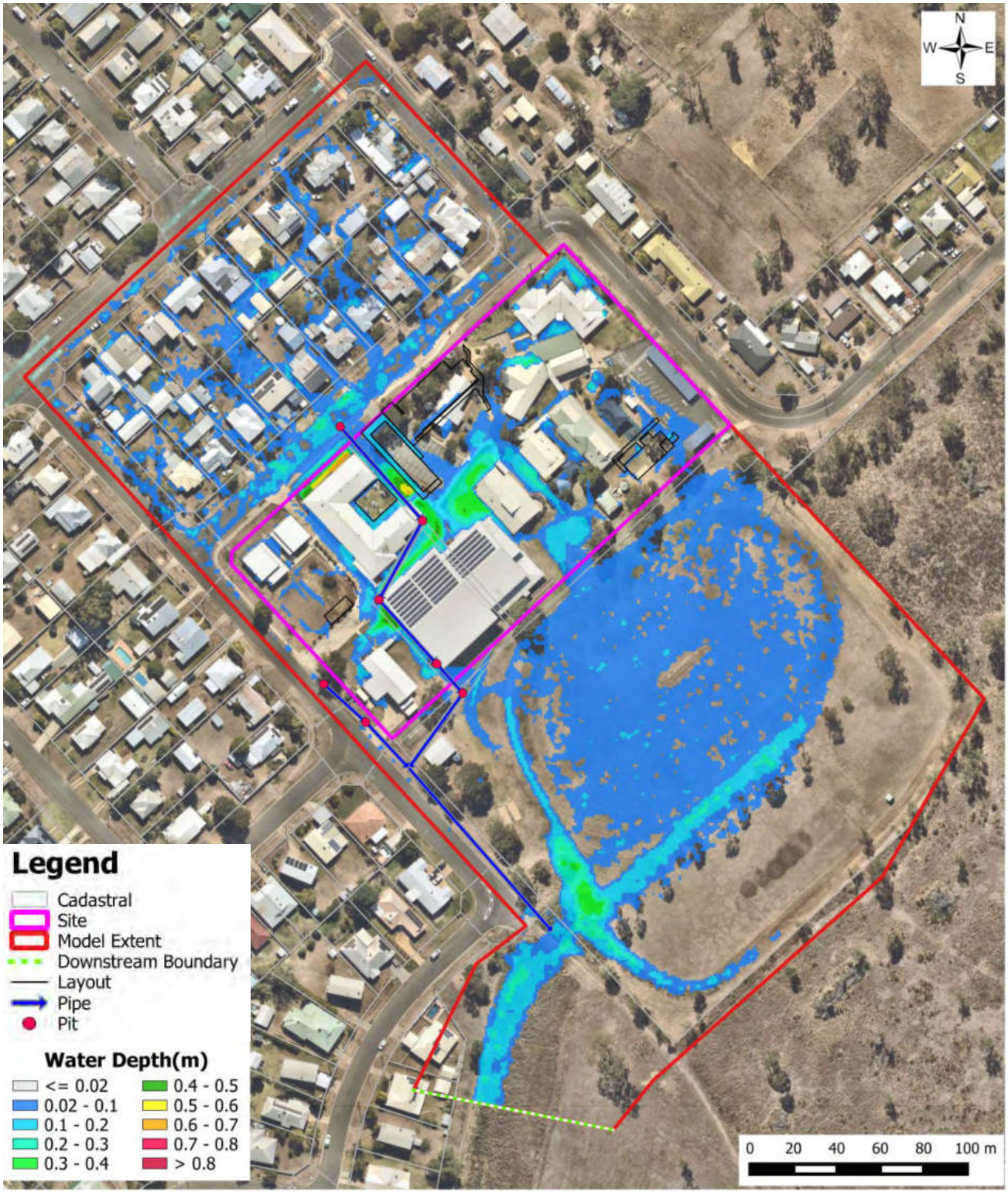

Figure 16: Post-Development Maximum Water Depth– 1%AEP

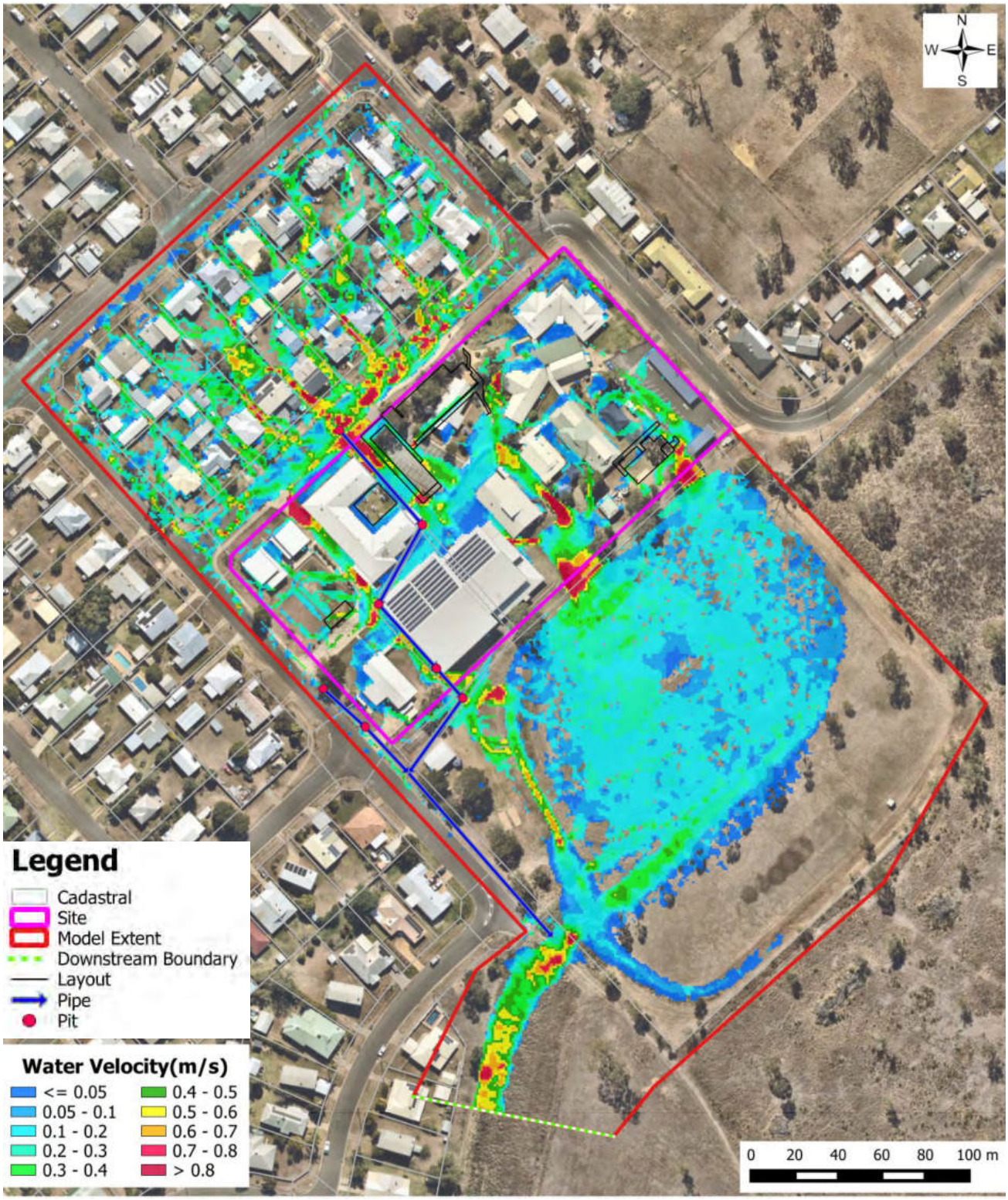

Figure 17: Post-Development Maximum Water Velocity– 1%AEP

5.8. Flood Assessment

In this assessment, the proposed development does not cause any adverse afflux at neighbouring privately owned properties for all events up to the 1% AEP event.

There is a small area of afflux at the downstream community lot. However, the afflux does not affect any existing buildings on this lot. Also, the study area and assessment of the existing drainage system will not be affected

The afflux assessment results are reflected in Figure 18 to Figure 19 for 1%AEP event; all the remaining events are shown in Appendix C.

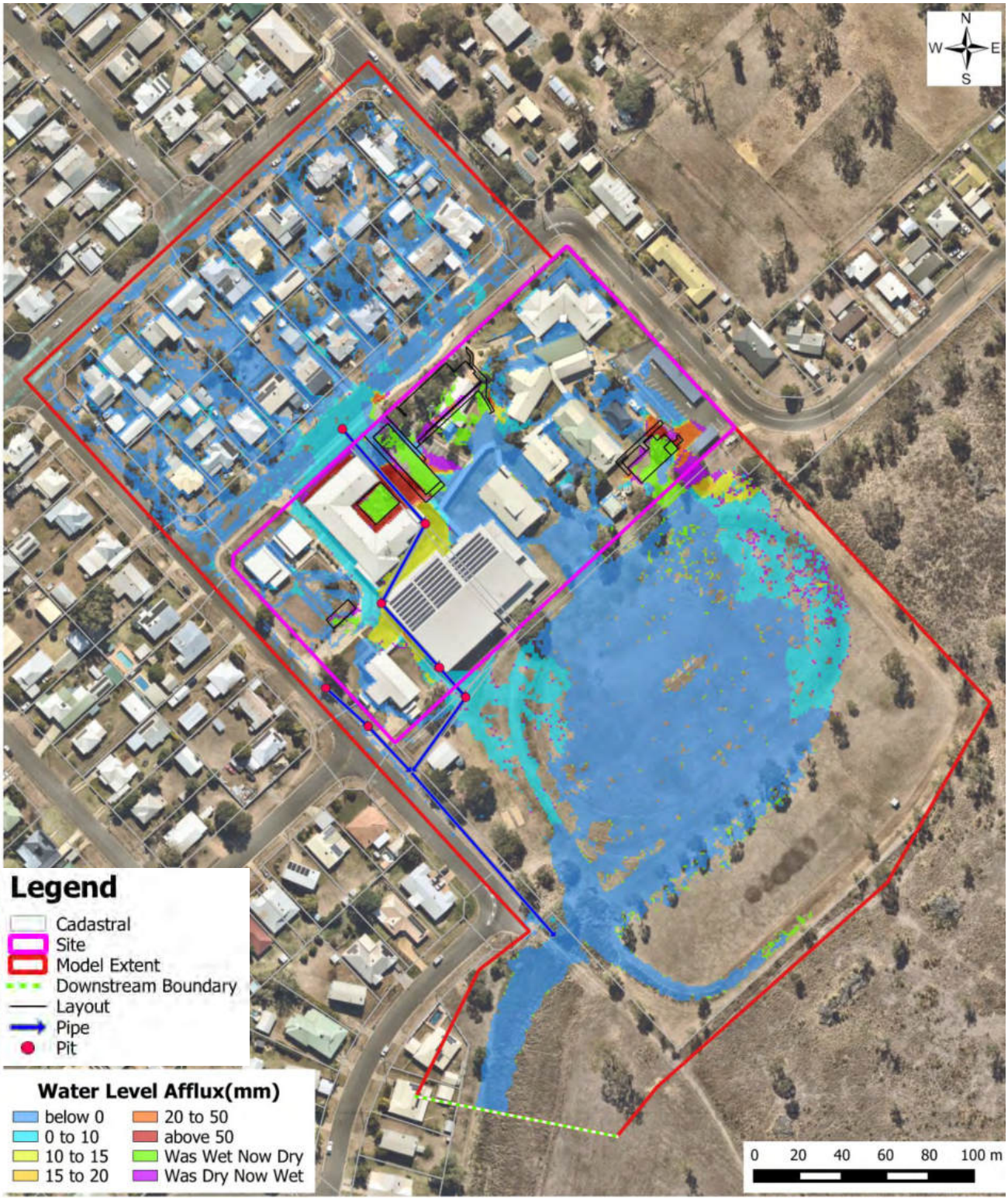

Figure 18: Post-Development Water Level Afflux– 1%AEP

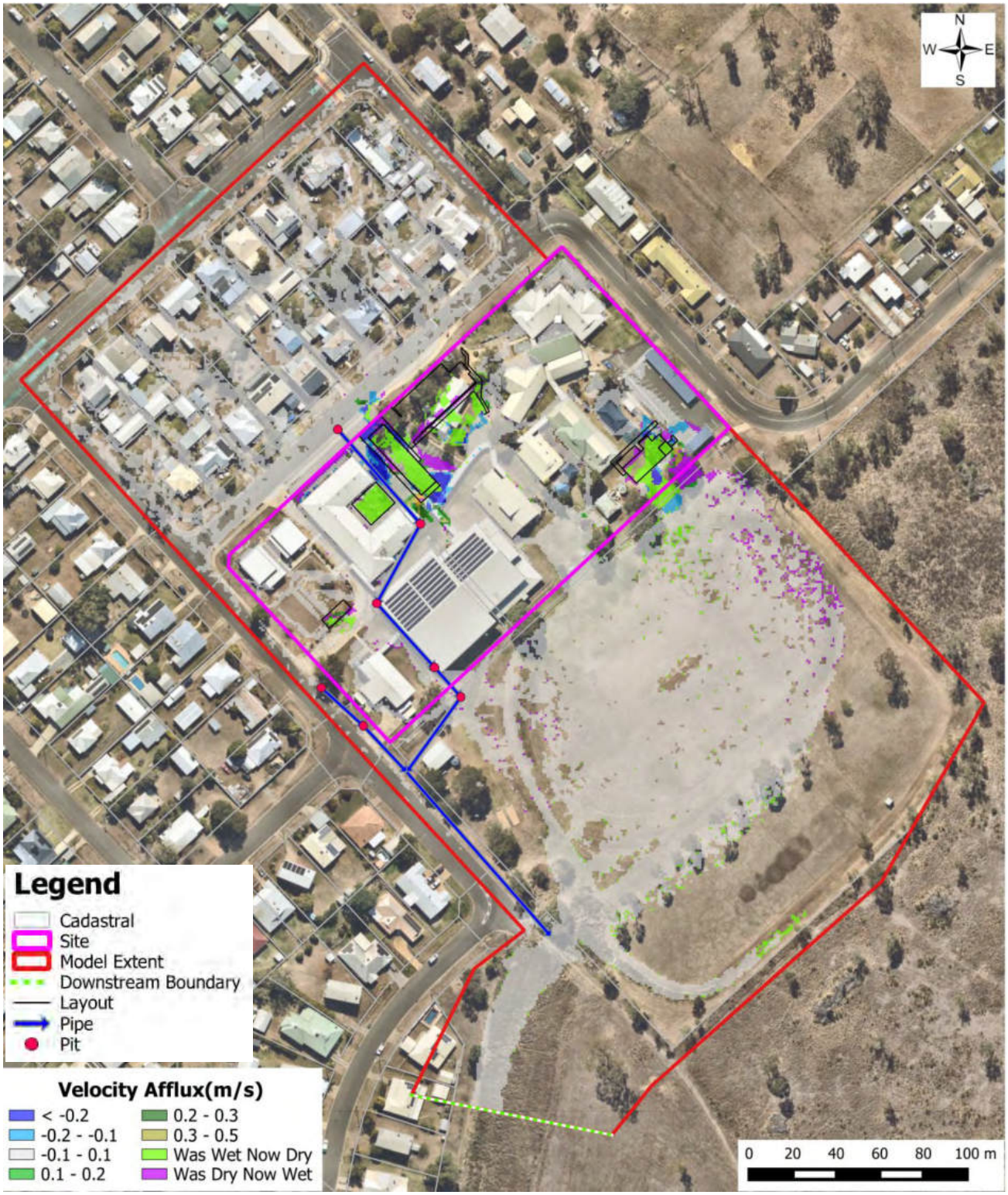

Figure 19: Post-Development Water Velocity Afflux– 1%AEP

6. CONCLUSION

This Site Based Stormwater Management Plan has been prepared in support of Redeemer Lutheran College at 2 Collard Street, Biloela QLD 4715.

A hydrological analysis demonstrated that the anticipated post-development peak flow rates discharging from the site are only marginally higher than the pre-development flow rates. Therefore On-Site Detention (OSD) is not required to mitigate flows to pre-development conditions.

After reviewing the modelling results and subject to the detailed design and construction of the proposed stormwater management infrastructure, MSE are of the opinion that no actionable damage and/or nuisance would be generated to the subject property nor any external/neighbouring property's or downstream infrastructure as a direct result of this proposed development being approved.

The assessment results demonstrate no changes in peak water levels exceeding 10mm or peak water velocities exceeding 0.1 m/s associated with the proposed development for 1% design events. Affluxes are considered acceptable, indicating that the proposed development is unlikely to significantly change the existing hydrodynamic function of the floodplain upstream or downstream of the subject site.

APPENDIX A – PROPOSED LAYOUT (STAGE 2A)

APPENDIX B – STORMWATER CATCHMENT PLAN DRAWINGS

APPENDIX C – FLOOD IMPACT ASSESSMENT PLANS

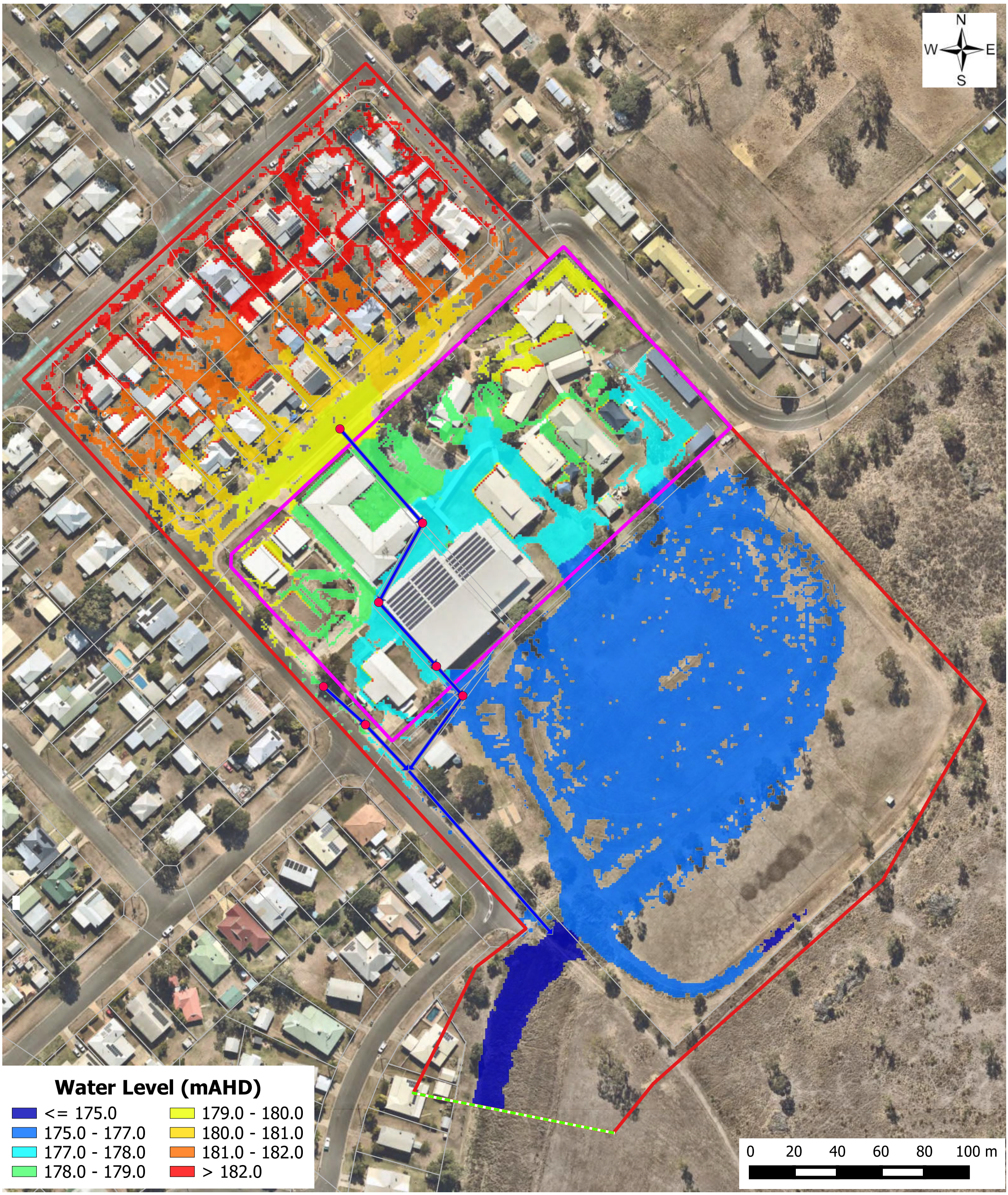

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Figure A01
Existing Case
1% AEP
Peak Floodwater Level

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
- Model Extent
- Downstream Boundary
- Pipe
- Pit

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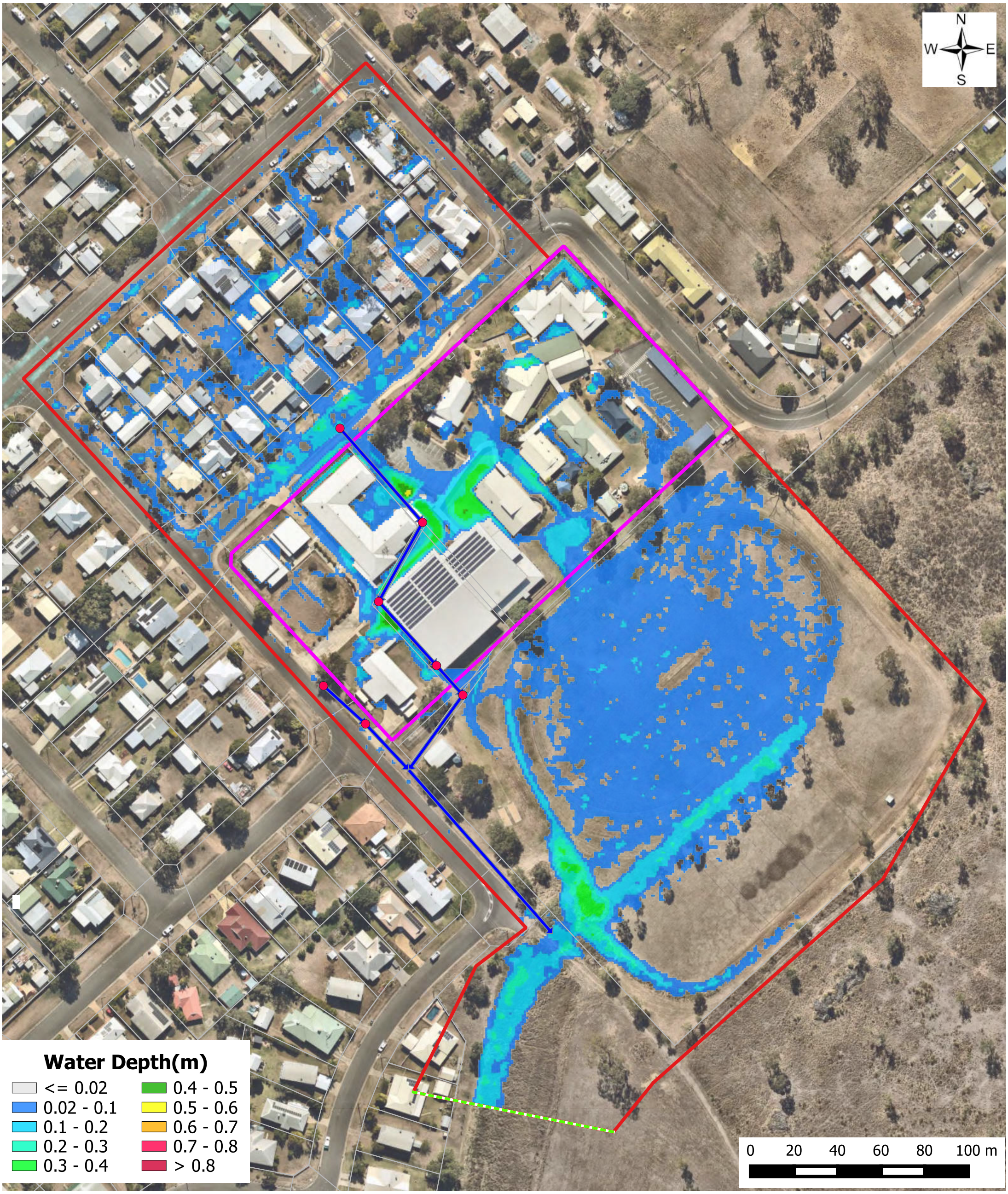

Figure A02
Existing Case
1% AEP
Peak Floodwater Depth

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
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- Model Extent
- Downstream Boundary
- Pipe
- Pit

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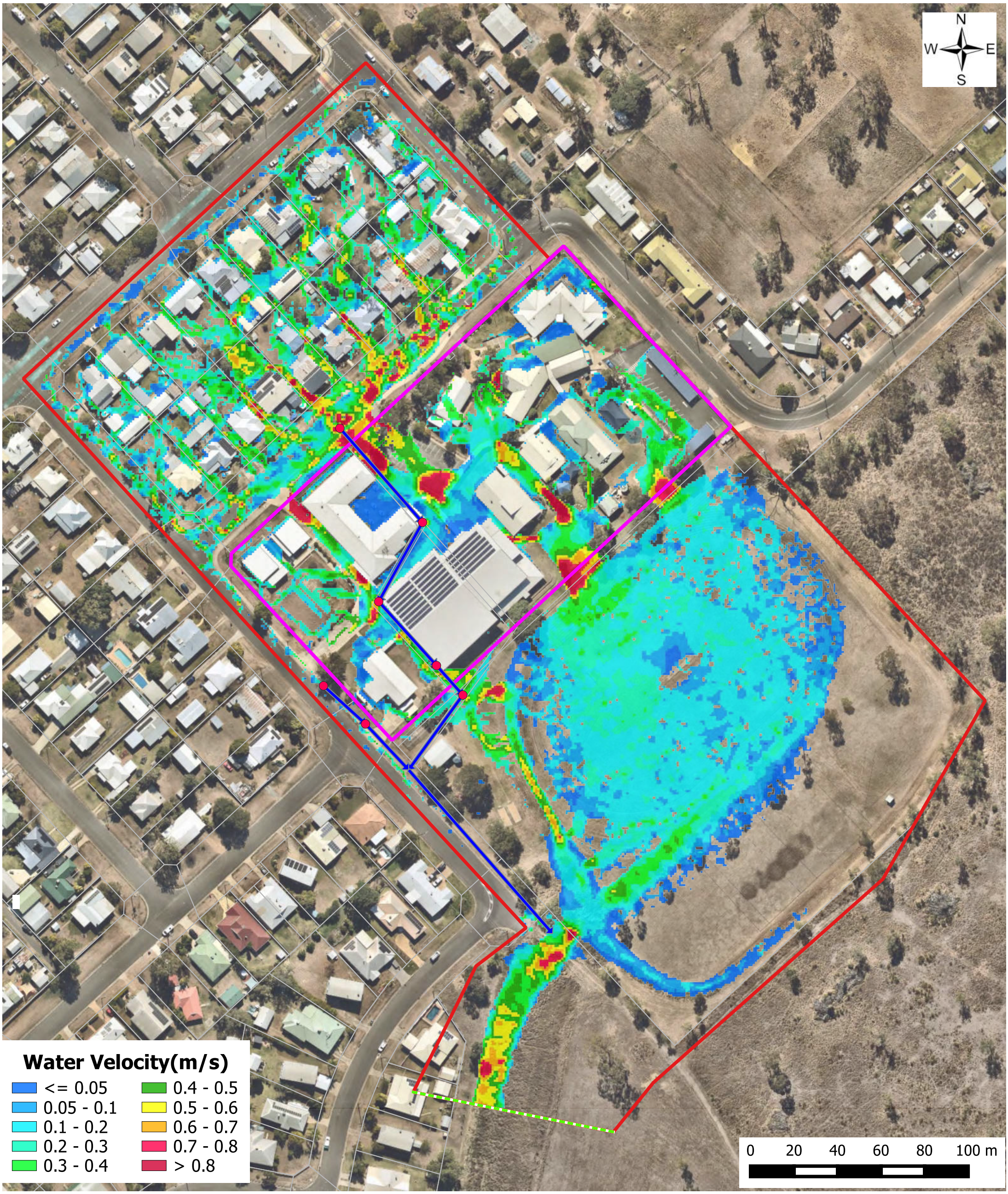

Figure A03
Existing Case
1% AEP
Peak Floodwater Velocity

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

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- Model Extent
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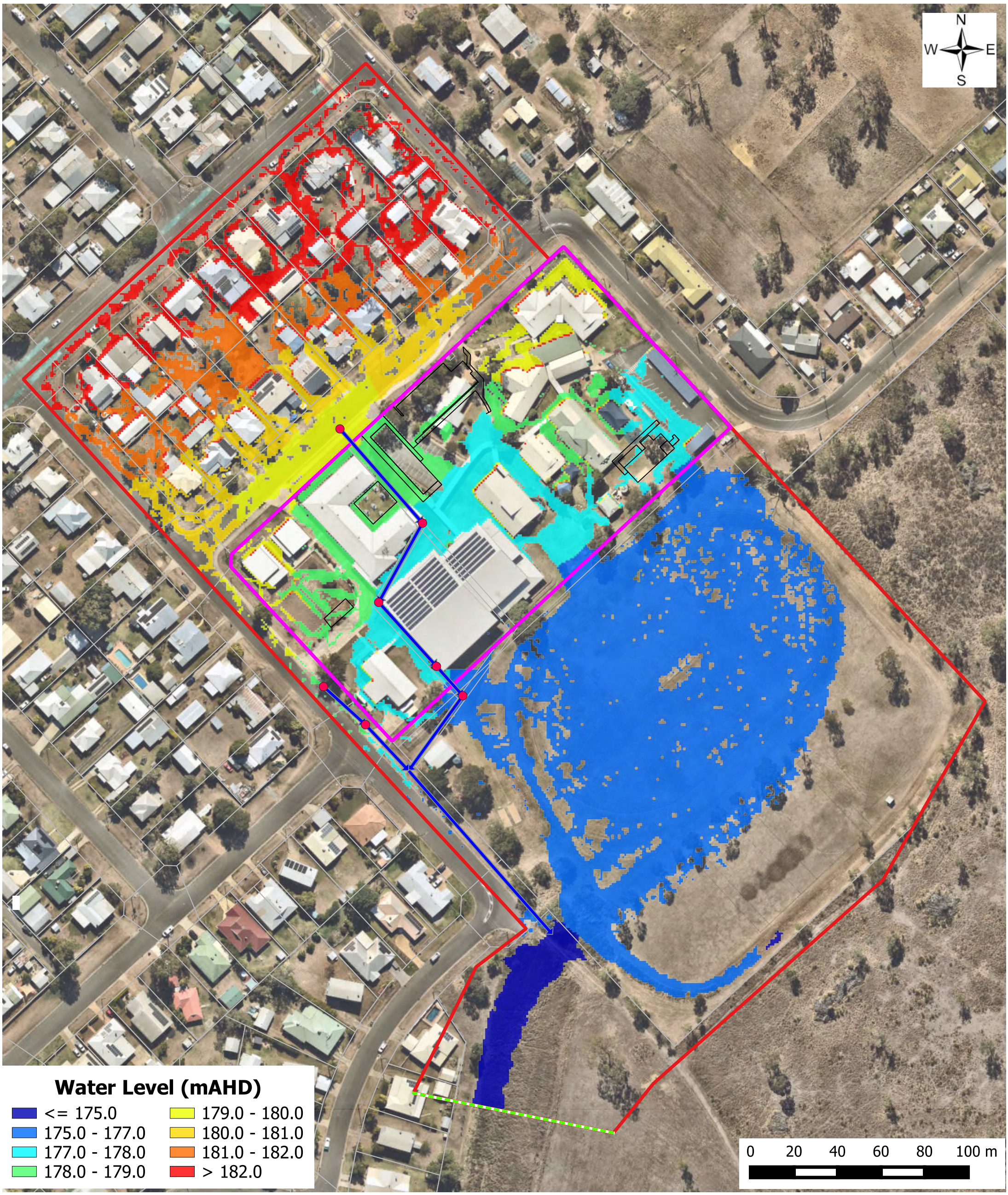

Figure B01
Developed Case
1% AEP
Peak Floodwater Level

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
- Model Extent
- Downstream Boundary
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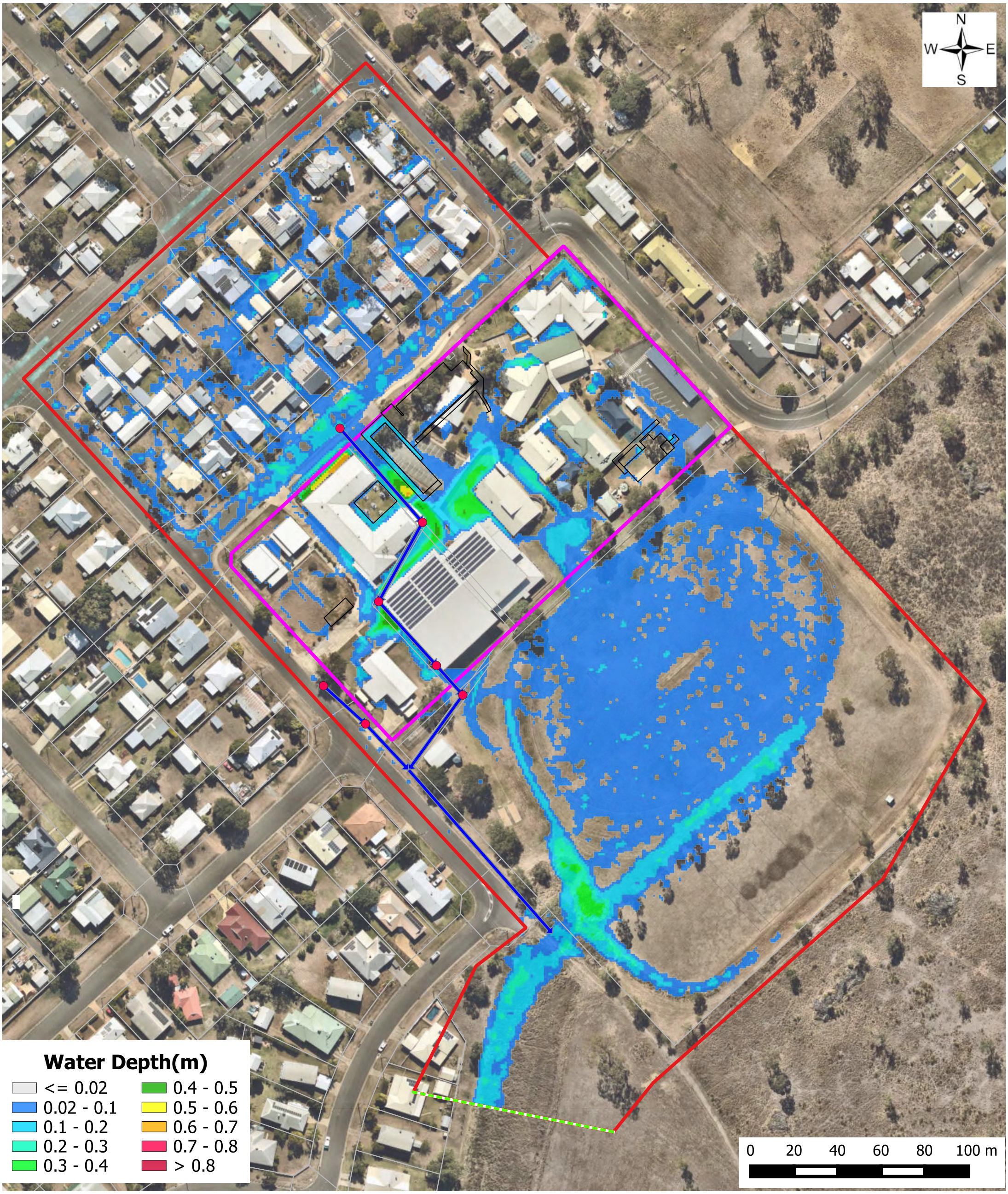

Figure B02
Developed Case
1% AEP
Peak Floodwater Depth

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
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- Pipe
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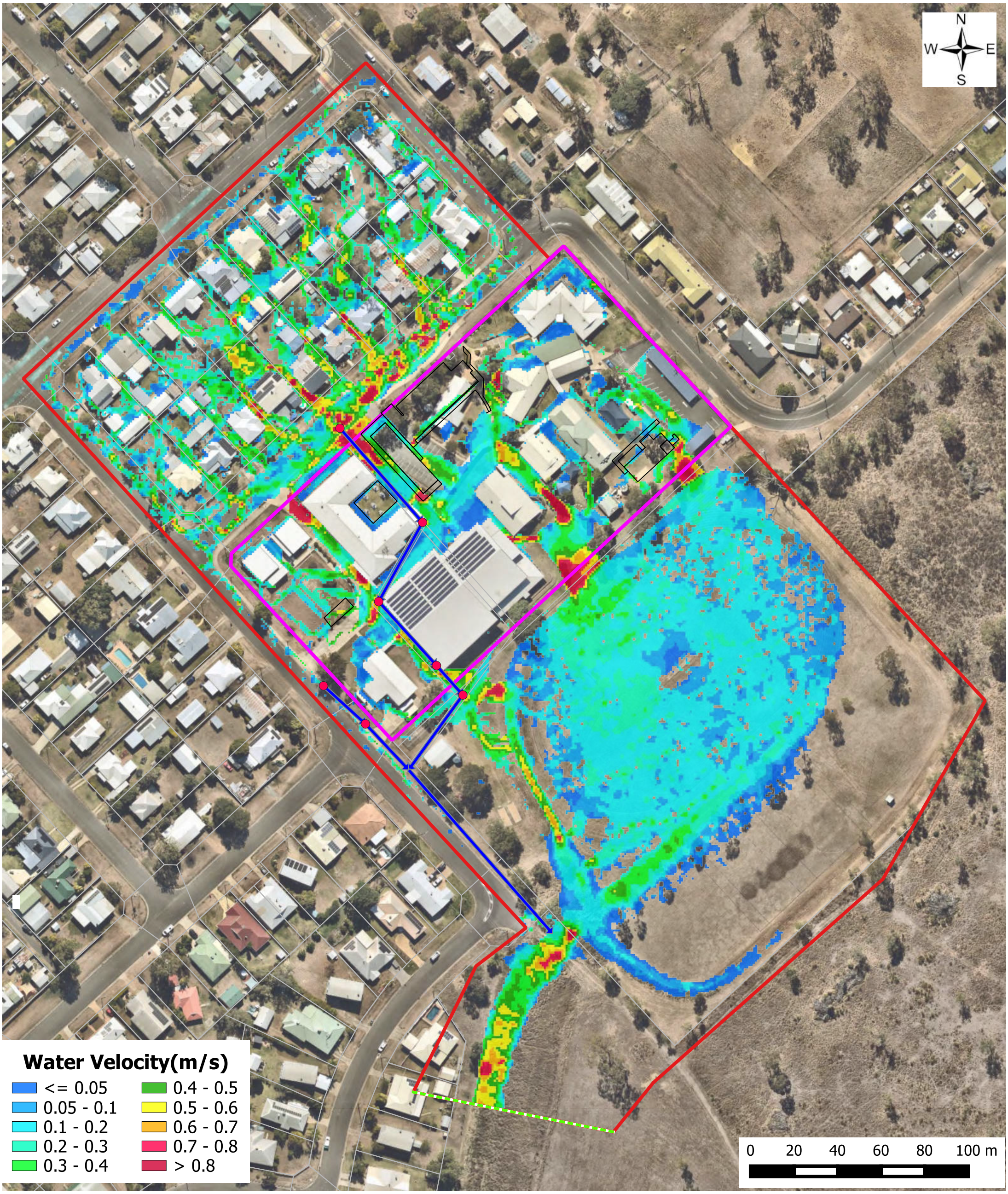

Figure B03
Developed Case
1% AEP
Peak Floodwater Velocity

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
- Model Extent
- Downstream Boundary
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- Pit
- Layout

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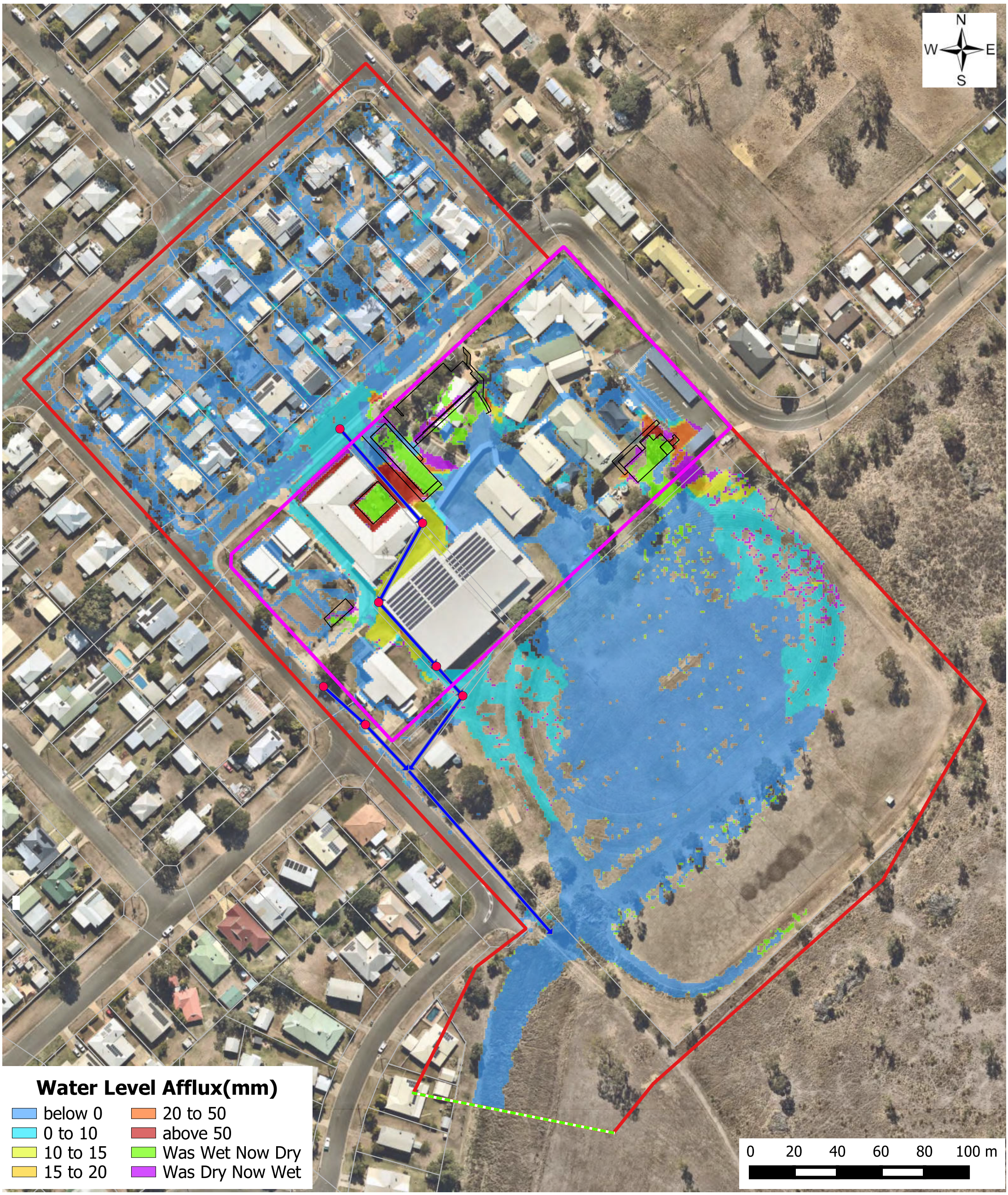

Figure C01
Developed Case
1% AEP
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
- Model Extent
- Downstream Boundary
- Layout
- Pipe
- Pit

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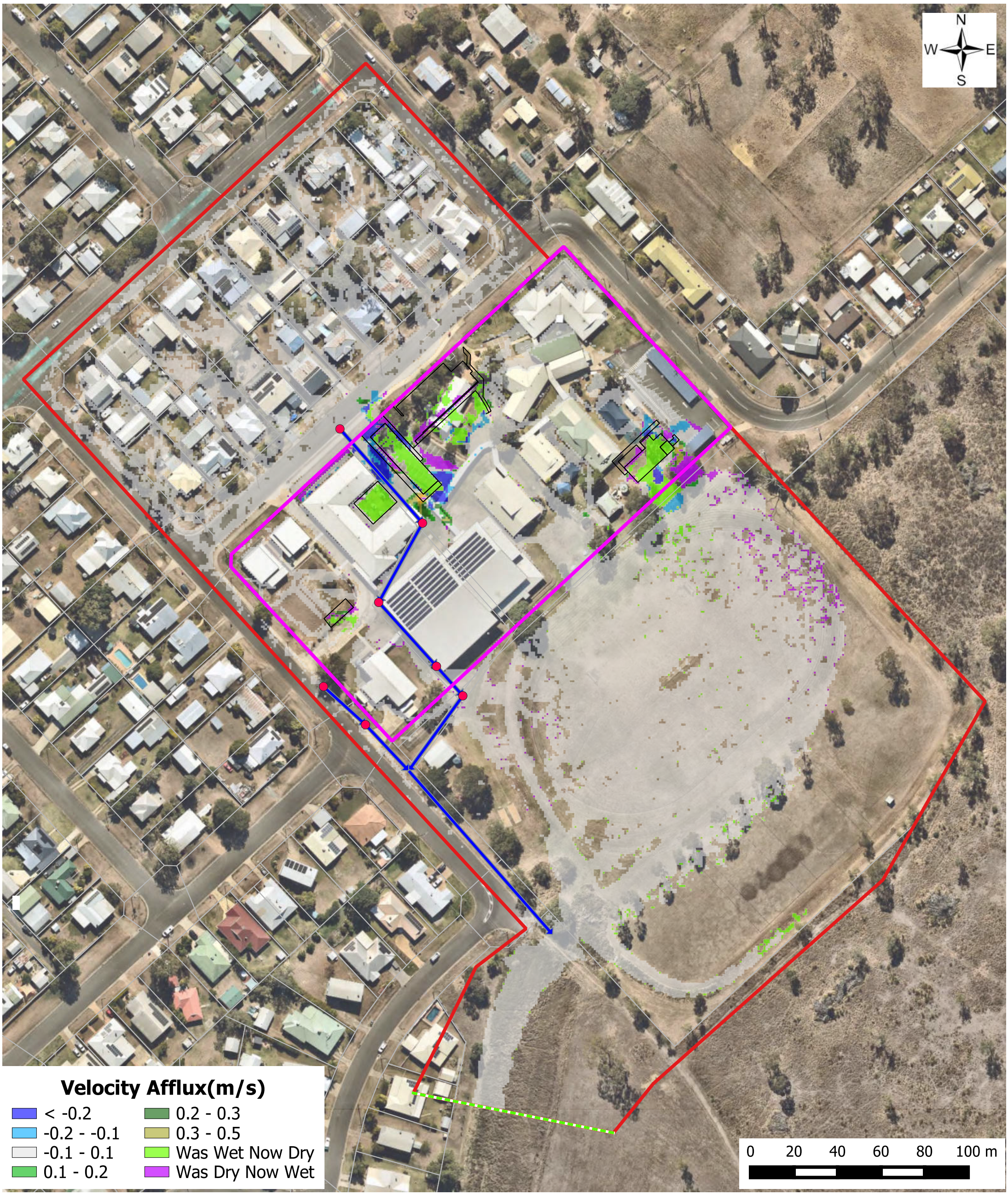

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Figure C02
Developed Case
1% AEP
Floodwater Velocity Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
- Model Extent
- Downstream Boundary
- Layout
- Pipe
- Pit

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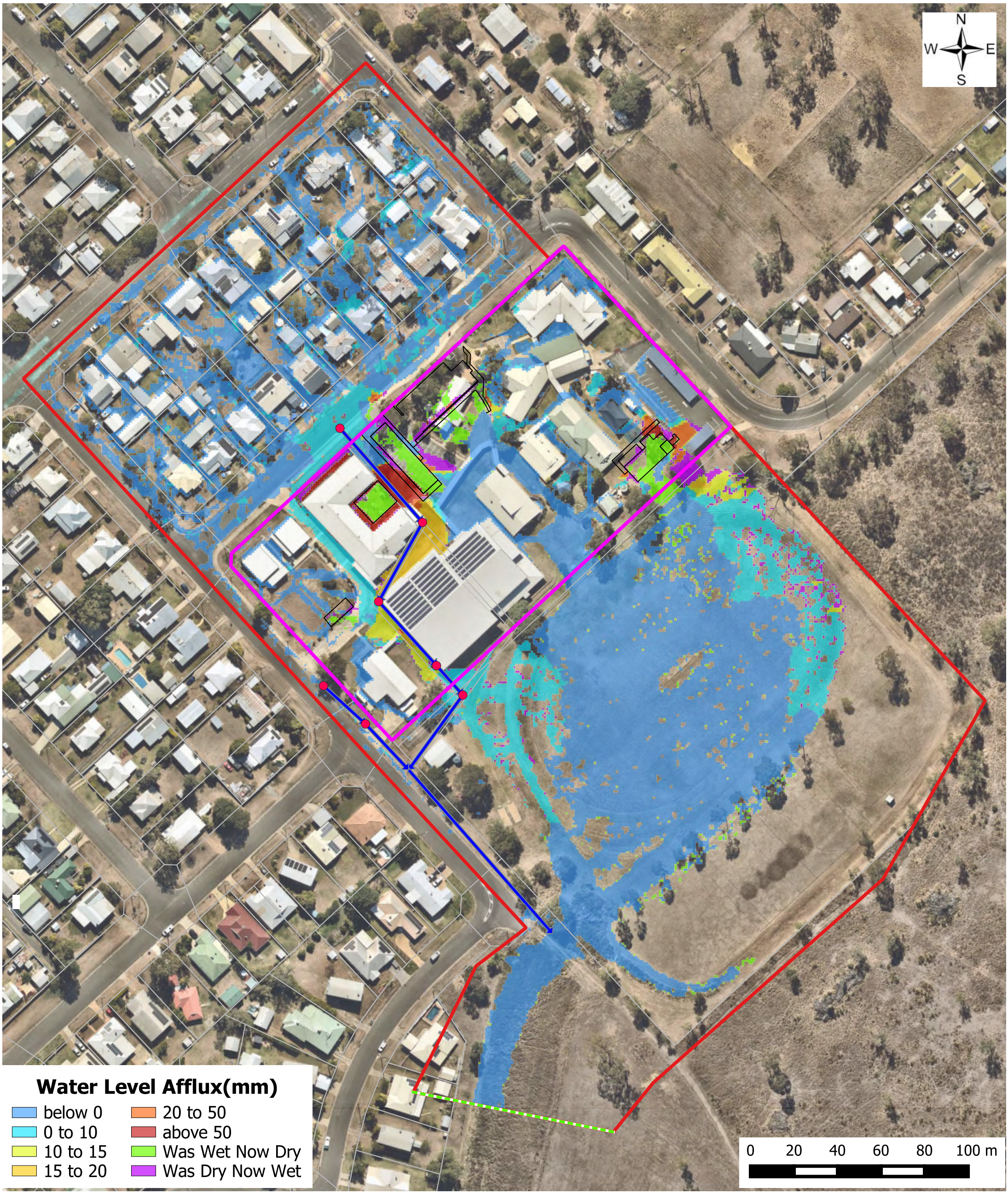

Figure C03
Developed Case
2% AEP
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
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- Downstream Boundary
- Layout
- Pipe
- Pit

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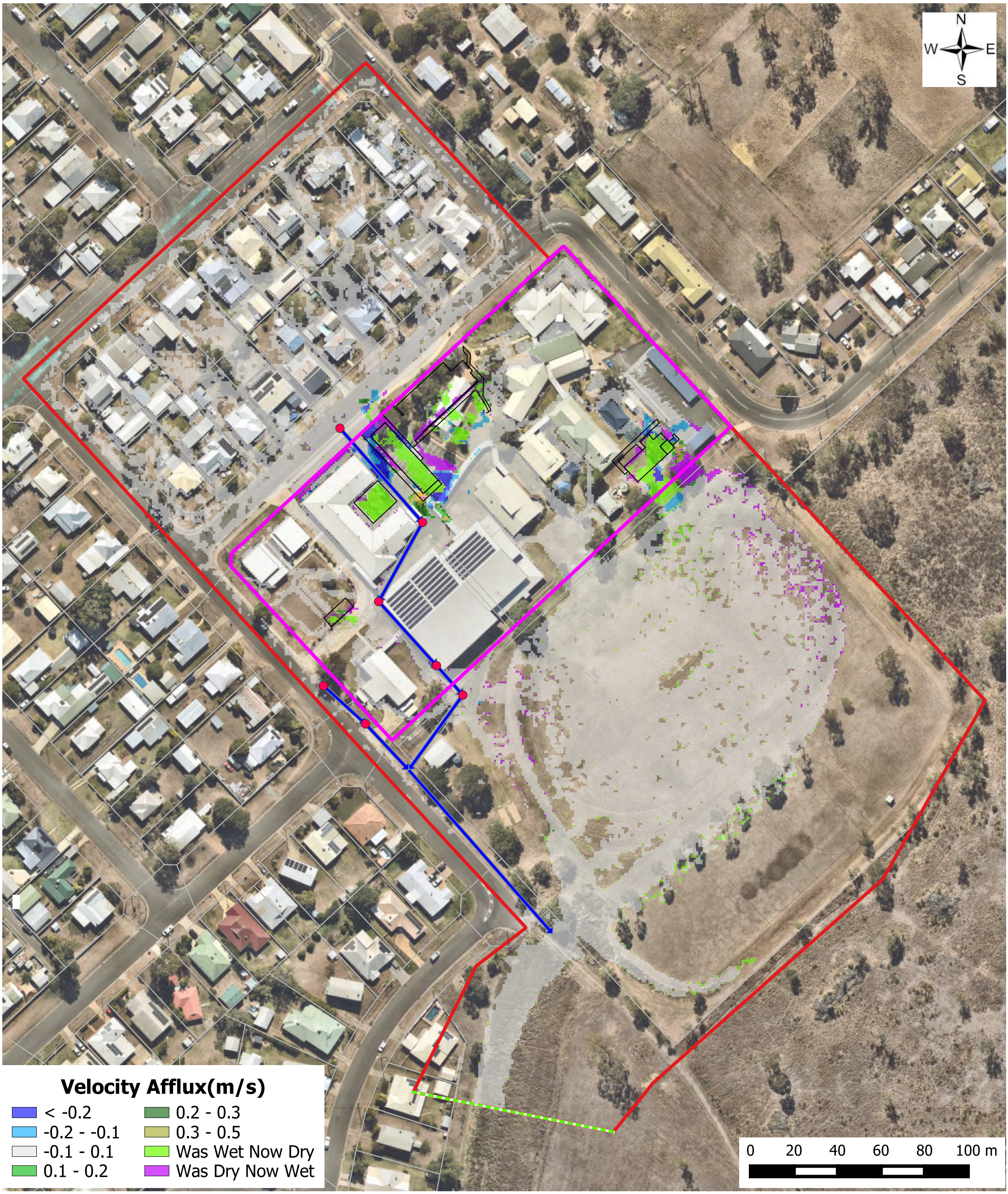

Figure C04
Developed Case
2% AEP
Floodwater Velocity Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
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- Pipe
- Pit

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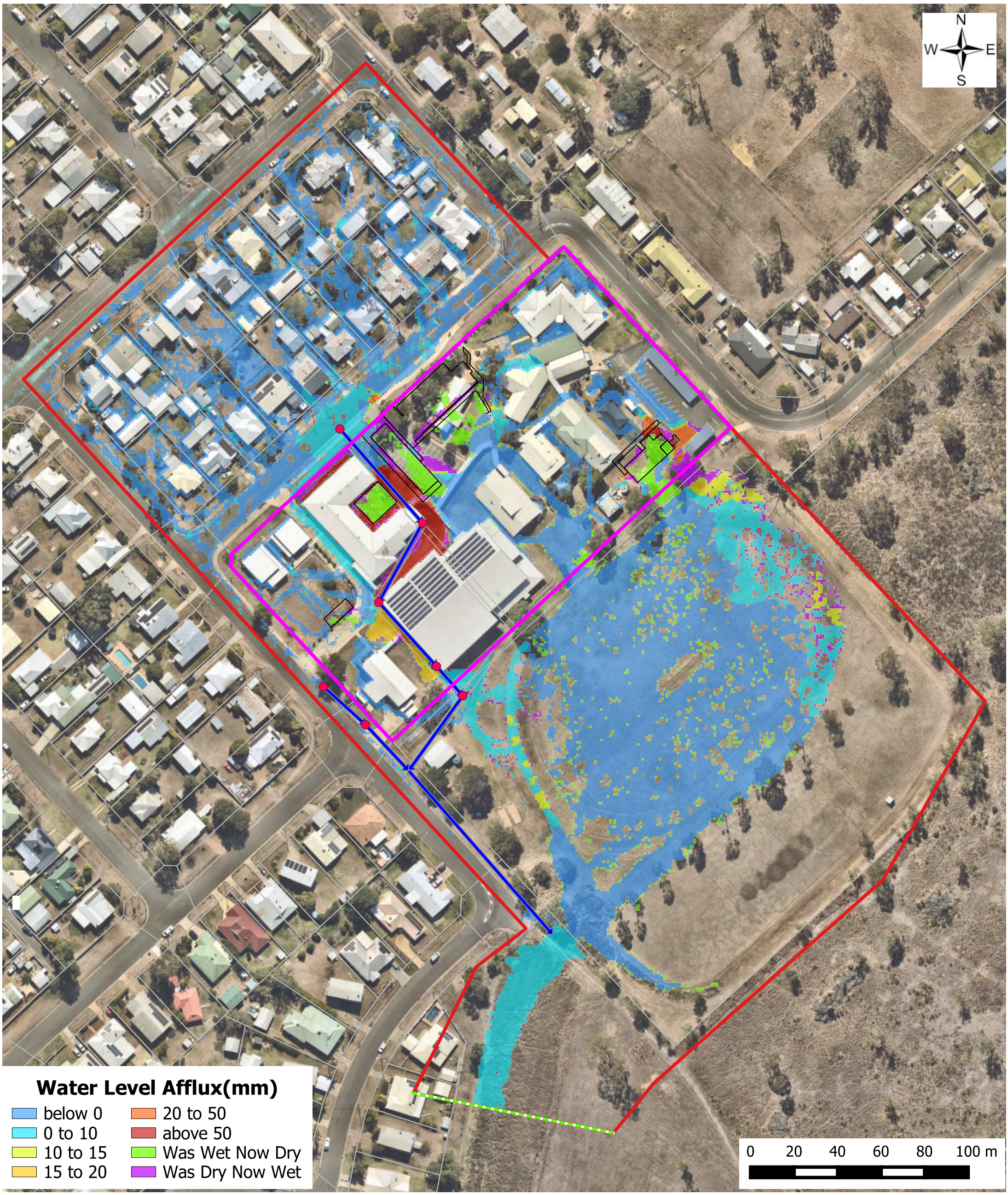

Figure C05
Developed Case
5% AEP
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
- Site
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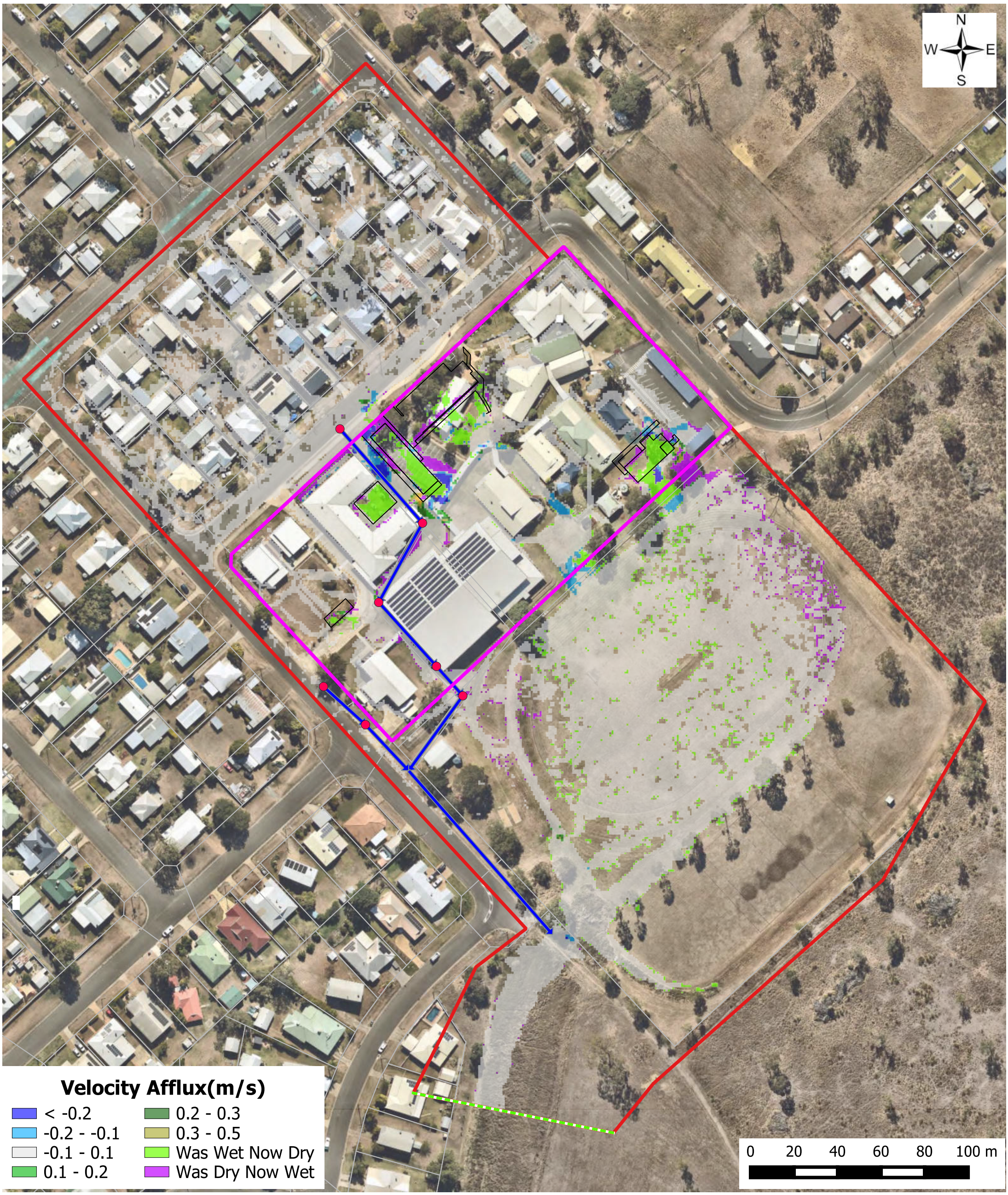

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Figure C06
Developed Case
5% AEP
Floodwater Velocity Afflux

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Legend

- Cadastral
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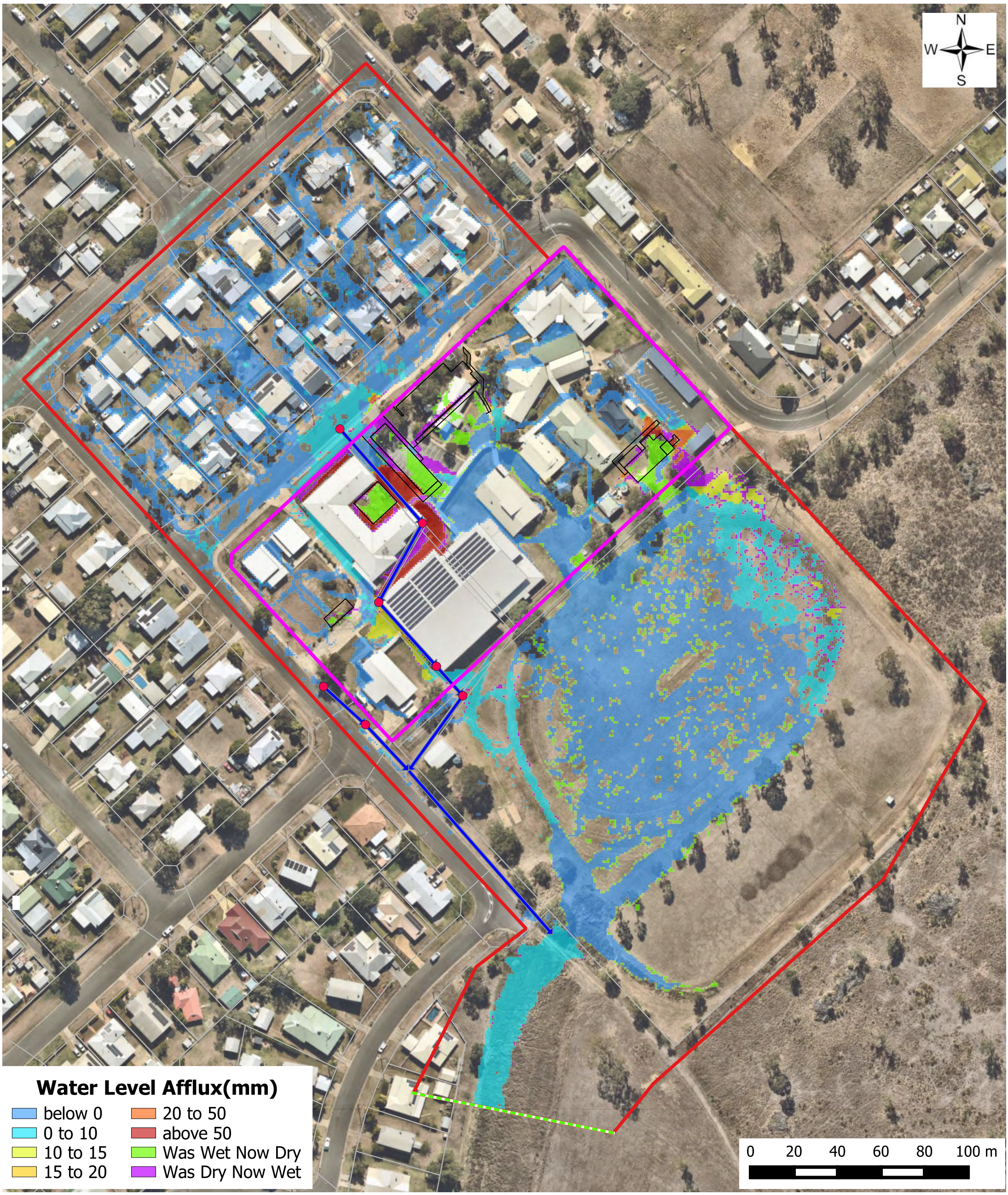

Figure C07
Developed Case
10% AEP
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
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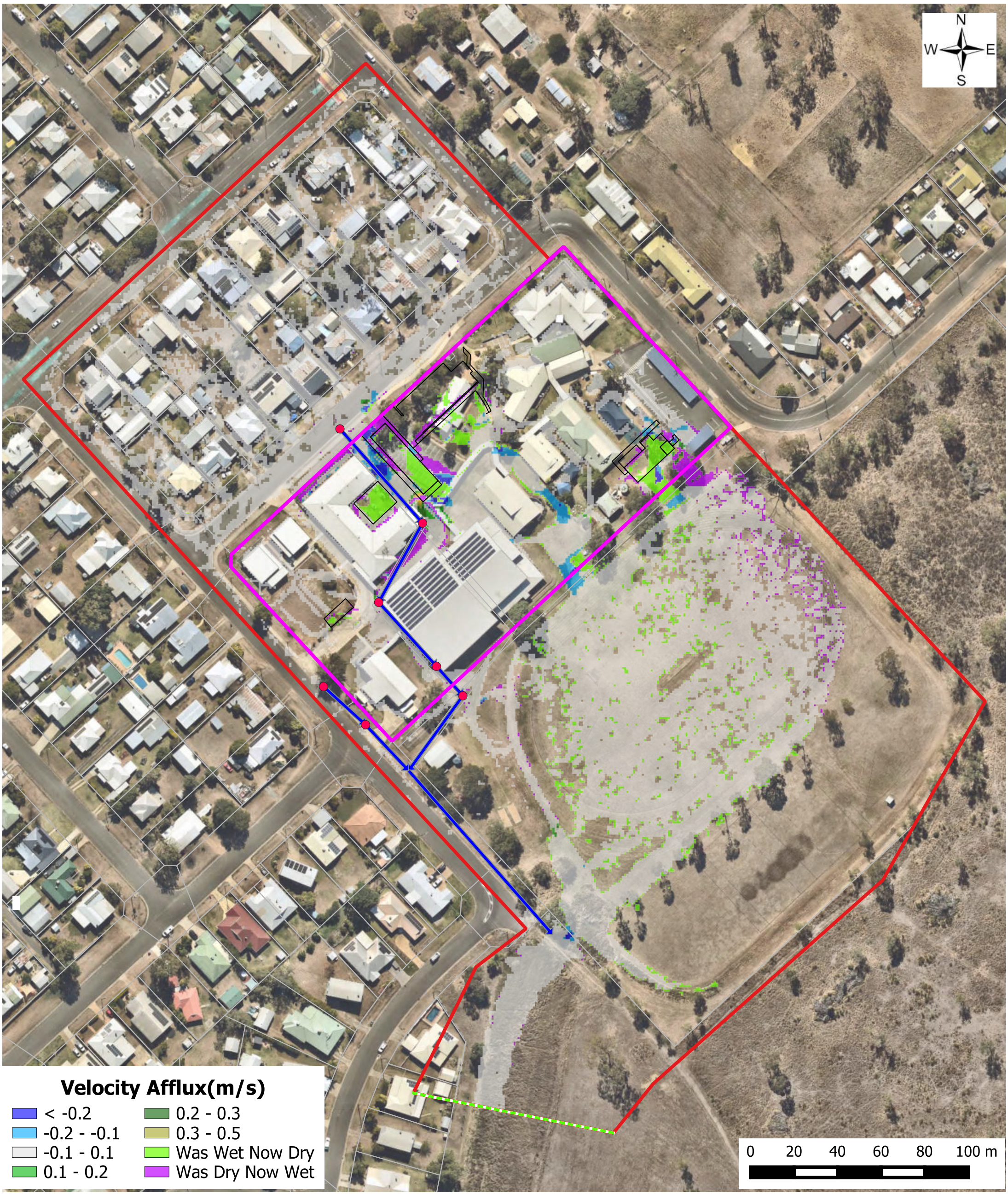

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Figure C08
Developed Case
10% AEP
Floodwater Velocity Afflux

PROJECTION: GDA94 / MGA ZONE 56
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DATE: August.2026

Legend

- Cadastral
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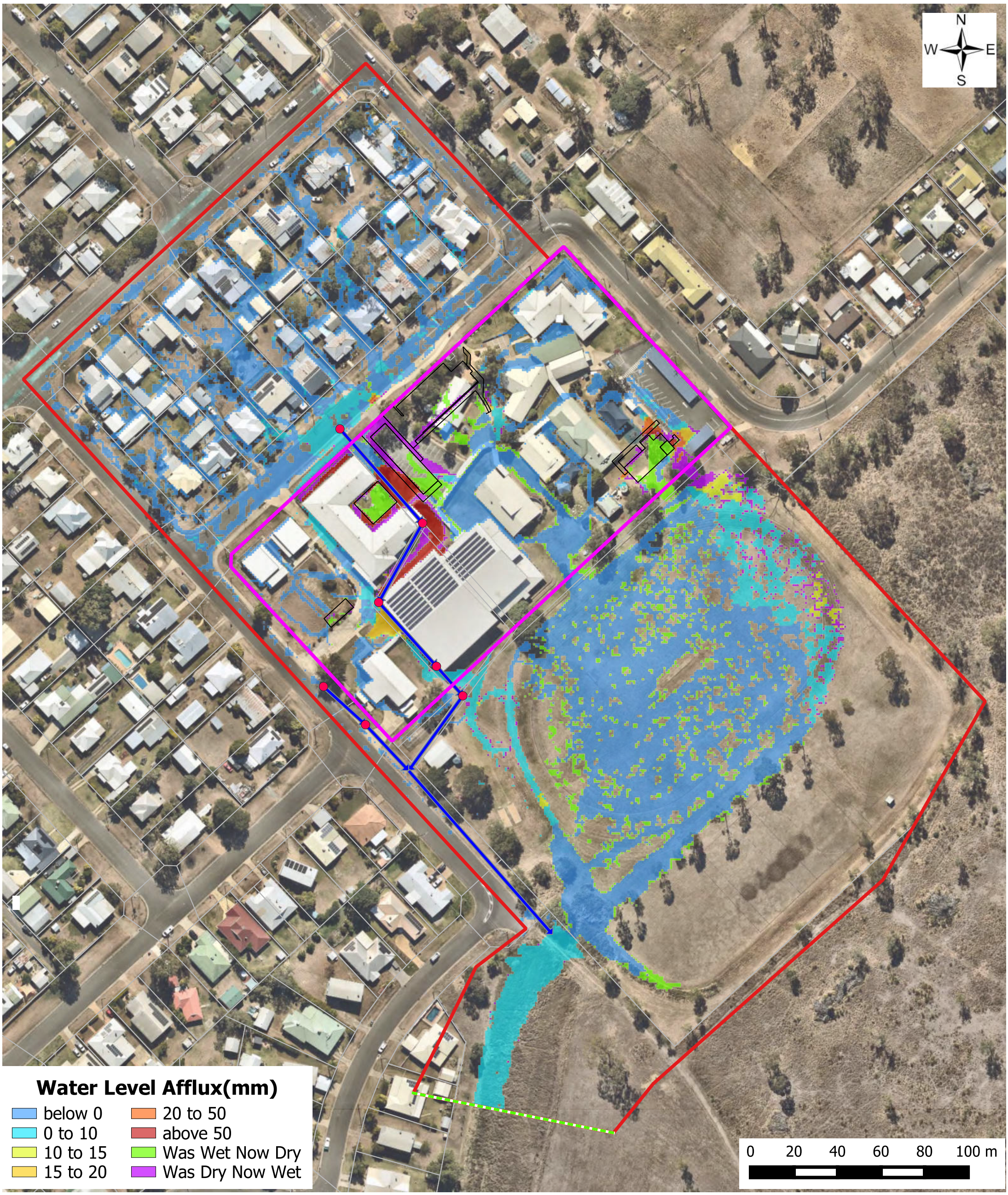

Figure C09
Developed Case
0.2EY
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
DATE: August.2026

Legend

- Cadastral
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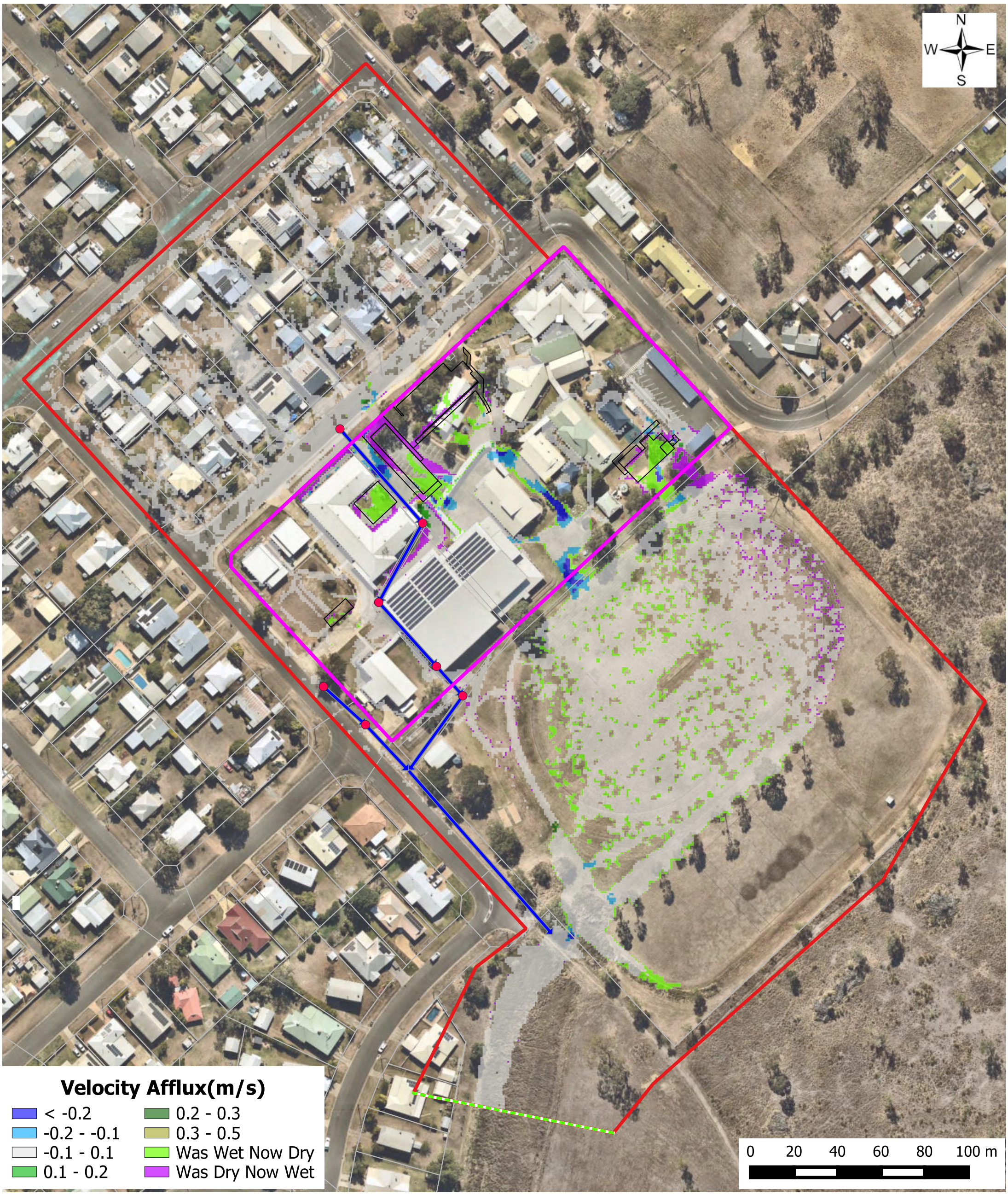

Figure C10
Developed Case
0.2EY
Floodwater Velocity Afflux

PROJECTION: GDA94 / MGA ZONE 56
PROJECT: CE26020 - Biloela Lutheran College
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Legend

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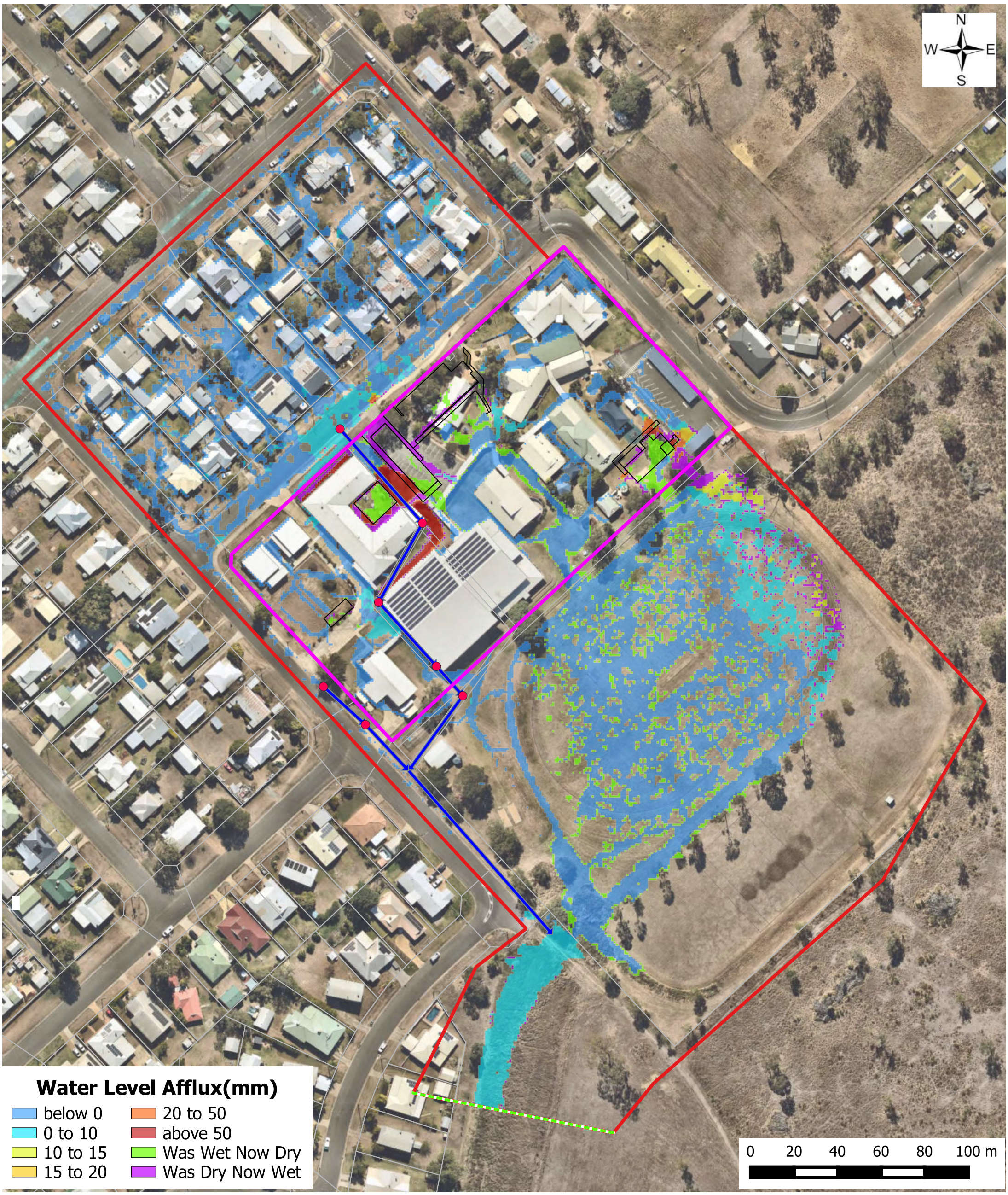

Figure C11
Developed Case
0.5EY
Peak Floodwater Level Afflux

PROJECTION: GDA94 / MGA ZONE 56
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DATE: August.2026

Legend

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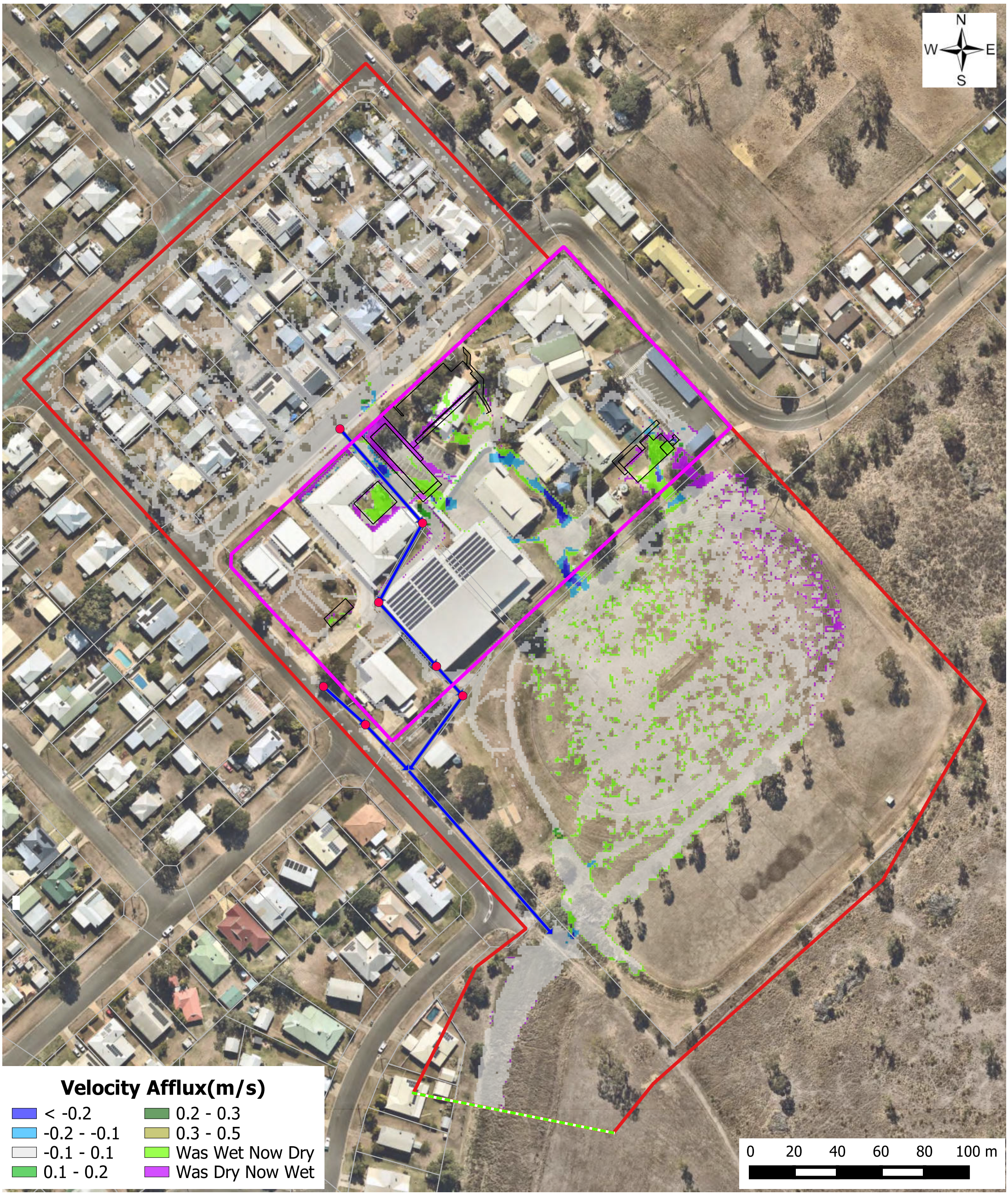

Figure C12
Developed Case
0.5EY
Floodwater Velocity Afflux

PROJECTION: GDA94 / MGA ZONE 56
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DATE: August.2026

Legend

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Australian Government

Australian Charities and Not-for-profits Commission

THIS CERTIFIES THAT

Lutheran Church Of Australia Queensland District

ABN: 44002611905

HAS BEEN REGISTERED BY THE

Australian Charities and Not-for-profits Commission

ON THE DATE OF

03/12/2012

CERTIFIED BY

Sue Woodward AM

Commissioner

Australian Charities and Not-for-profits Commission

For information about the current registration status of this charity, check the ACNC Charity Register at acnc.gov.au/charity