N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours
- Proposed Pump Location

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 14
(Sheet 2 of 2)

IMPACT OF STAGE 2 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1% AEP

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

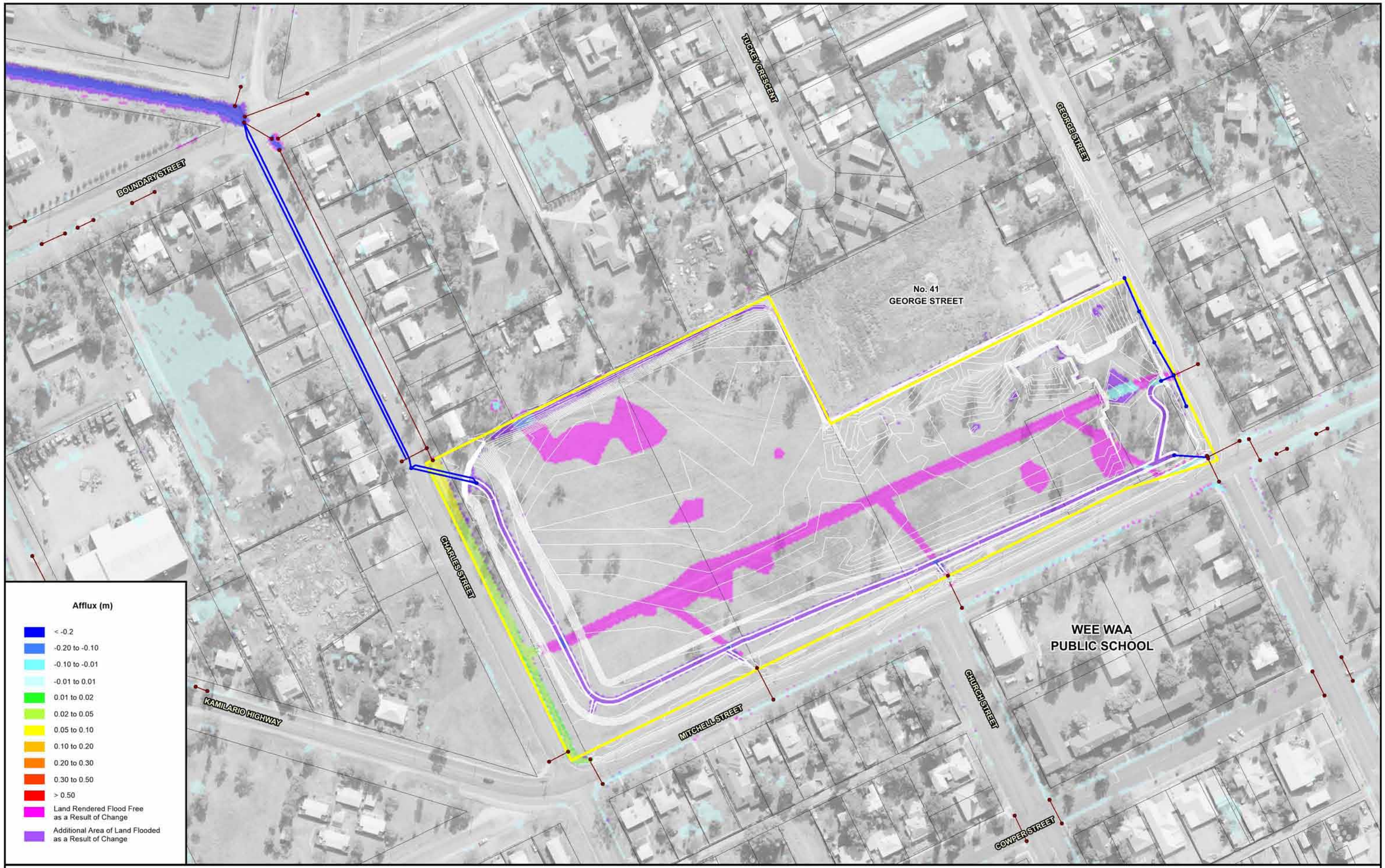
LEGEND

- Existing Levee Centre Line and Chainage
- Existing Flood Gate Location and Identifier
- Existing Pump Location and Identifier
- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 15
(Sheet 1 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1 EY



N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 15
(Sheet 2 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1 EY

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

RIVER
NAMOI
BILLABONG
QUINNS
MYALLA LANE
KILKENNY COURT
BOUNDARY STREET
JAMES HIBBENS AVENUE
CORMIE AVENUE
MAITLAND STREET
KAMILAROI HIGHWAY
ALMA STREET
RIVERS STREET
MITCHELL STREET
COOPER STREET
NELSON STREET
ROSE STREET
CHURCH STREET
CHARLES STREET
WARRIOR STREET
CHRISTY STREET
ALBION STREET
LOUIS STREET
BOOLCARROL ROAD
TRUCKING YARDS LANE
NARRABRI WEST WALGETT RAILWAY
CULGOORA ROAD
VERALEAP ROAD
O'BRIENS CHANNEL
BUNDOCK CREEK
WEE WAA LAGOON
WEE WAA GULLY
WEE WAA SHOWGROUND
COOK OVAL
WEE WAA HIGH SCHOOL
WEE WAA PUBLIC SCHOOL
NAMOI VALLEY CHRISTIAN SCHOOL
ST JOSEPH'S PRIMARY SCHOOL
WEE WAA DISTRICT HEALTH SERVICE
NAMOI COTTON CO-OP
REFER SHEET 2
FG_01 FG_02 FG_03 FG_04 FG_05 FG_06 FG_07 FG_08 FG_09 FG_10 FG_11 FG_12 FG_13 FG_14
P_01 P_02 P_03 P_04 P_05 P_06

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N
100 0 100 200 300 m
Scale: 1:10,000

LEGEND

- Existing Levee Centre Line and Chainage (1000 1100)
- FG_02 Existing Flood Gate Location and Identifier
- P_02 Existing Pump Location and Identifier
- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

Lyall & Associates

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 16
(Sheet 1 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
20% AEP

N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

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LEGEND

- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 16
(Sheet 2 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
20% AEP

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

REFER SHEET 2

RIVER
NAMOI
WEE WAA GULLY
WEE WAA
BILLABONG
QUINNS
CHANNEL
O'BRIENS
BUNDOCK
CREEK
LAGOON
MYALLA LANE
KILKENNY COURT
BOUNDARY STREET
GORMIE AVENUE
JAMES HIBBENS AVENUE
KAMILAROI HIGHWAY
MAITLAND STREET
RIVERS STREET
ALMA STREET
MITCHELL STREET
COWPER STREET
NELSON STREET
GEORGE STREET
ROSE STREET
CHURCH STREET
CHARLES STREET
WARRIOR STREET
CHRISTY STREET
ALBION STREET
LOUIS STREET
BOOLCARROL ROAD
TRUCKING YARDS LANE
NARRABRI WEST WALGETT RAILWAY
VERALEA ROAD
GULGOORA ROAD
WEE WAA SHOWGROUND
COOK OVAL
WEE WAA HIGH SCHOOL
WEE WAA PUBLIC SCHOOL
NAMOI VALLEY CHRISTIAN SCHOOL
ST JOSEPH'S PRIMARY SCHOOL
WEE WAA DISTRICT HEALTH SERVICE
NAMOI COTTON CO-OP

FG_01 FG_02 FG_03 FG_04 FG_05 FG_06 FG_07 FG_08 FG_09 FG_10 FG_11 FG_12 FG_13 FG_14
P_01 P_02 P_03 P_04 P_05 P_06

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N
100 0 100 200 300 m
Scale: 1:10,000

Lyall & Associates

LEGEND

- Existing Levee Centre Line and Chainage
- Existing Flood Gate Location and Identifier
- Existing Pump Location and Identifier
- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 17
(Sheet 1 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
5% AEP

N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

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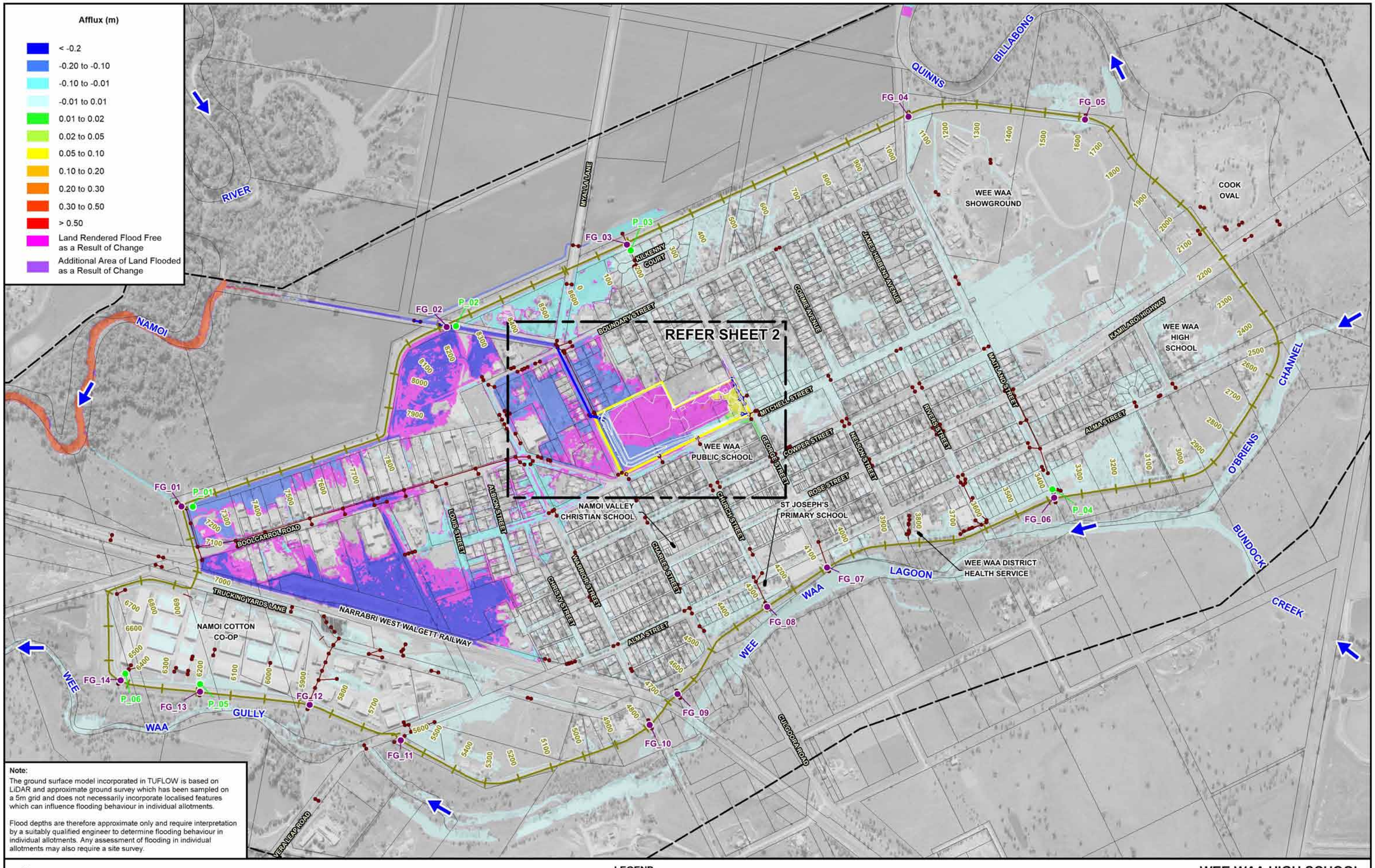
LEGEND

- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 17
(Sheet 2 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
5% AEP



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N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

LEGEND

- Existing Levee Centre Line and Chainage
- FG_02 Existing Flood Gate Location and Identifier
- P_02 Existing Pump Location and Identifier
- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 18
(Sheet 1 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1% AEP

BOUNDARY STREET
TUCKEY CRESCENT
GEORGE STREET
No. 41
GEORGE STREET
CHARLES STREET
KAMILARIO HIGHWAY
MITCHELL STREET
CHURCH STREET
COWPER STREET
WEE WAA
PUBLIC SCHOOL

Afflux (m)

- < -0.2
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 0.50
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change

N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Existing Drainage System
- Proposed Drainage System
- Construction Site Boundary
- Finished Surface Contours

WEE WAA HIGH SCHOOL
CONSTRUCTION STAGING FLOOD IMPACT ASSESSMENT

Figure 18
(Sheet 2 of 2)

IMPACT OF STAGE 3 SSD WORKS ON FLOOD BEHAVIOUR INTERNAL TO TOWN LEVEE
1% AEP

SCHEDULE 4 – Evidence of Consultation

From: Paul Nelson
Sent: Monday, 6 February 2023 2:52 PM
To: council@narrabri.nsw.gov.au
Cc: Rebecca Deegan; Alec Christofides; Michelle Henry; Jason McCosker; Nicola Carcary
Subject: RE: SSD 21854025 Wee Waa High School Conditions B24, B34

Hi NSC,

We note we have not received any comments relating to the below submission and will proceed under this new version of the document.

Feel free to advise if you have any questions.

Regards,
Paul

From: Paul Nelson
Sent: Thursday, 2 February 2023 1:47 AM
To: council@narrabri.nsw.gov.au
Cc: Rebecca Deegan <rebeccadeegan@built.com.au>; Alec Christofides <alecchristofides@built.com.au>; Michelle Henry <michelleh@narrabri.nsw.gov.au>; Jason McCosker <Jason.McCosker@tsamgt.com>; Nicola Carcary <Nicola.Carcary@tsamgt.com>
Subject: RE: SSD 21854025 Wee Waa High School Conditions B24, B34

Dear NSC,

We have conducted an internal review of the formally attached document and have made some minor changes to better reflect the site conditions.

We request that any review that NSC elects to undertake on the attached document that comments are returned by COB Friday 4th Feb 2023.

In addition to the final (complete) version of this document, we have attached a tracked changes of the SWMP in order to help understand the changes that have been made, noting we have now included 3 additional drawings to articulate the construction methodology staging on site.

Please note that due to the file size I have had to provide these via the below share link
https://www.dropbox.com/sh/3d9ld4mozq6jfzg/AABJlKk8rwsgrnYPzC8i7yaga?dl=0

I look forward to receiving any feedback on the attached.

Regards,
Paul Nelson

From: Paul Nelson
Sent: Friday, 2 December 2022 11:55 AM

To: council@narrabri.nsw.gov.au
Cc: Rebecca Deegan <rebeccadeegan@built.com.au>; Britney Pereira <britneypereira@built.com.au>; Michelle Henry <michelleh@narrabri.nsw.gov.au>; Paul Nelson <paulnelson@built.com.au>; Jason McCosker <Jason.McCosker@tsamgt.com>; Nicola Carcary <Nicola.Carcary@tsamgt.com>
Subject: RE: SSD 21854025 Wee Waa High School Conditions B24, B34

Hi NSC,

As we have not yet received any comments relating to the below submission of the Construction Soil & Water Management Plan, we will proceed based on the document as submitted.

We thank you for your time and will continue to liaise with NSC with other matters relating to the overall project.

Regards,
Paul

From: Paul Nelson
Sent: Friday, 25 November 2022 4:23 PM
To: 'council@narrabri.nsw.gov.au' <council@narrabri.nsw.gov.au>
Cc: Rebecca Deegan <rebeccadeegan@built.com.au>; Britney Pereira <britneypereira@built.com.au>; 'Michelle Henry' <michelleh@narrabri.nsw.gov.au>; Jason McCosker <Jason.McCosker@tsamgt.com>; Nicola Carcary <Nicola.Carcary@tsamgt.com>
Subject: RE: SSD 21854025 Wee Waa High School Conditions B24, B34

Hi NSC,

Please note that we now included the Flood Impact Assessment as an Appendices to the projects Construction Soil & Water Management Plan as per Condition B24 for SSD 21854025 Wee Waa High School.

We re-submitted this Management Plan with this additional information for Councils review and comment.

If you could please respond by Friday 2nd December 2022 or at your earliest convenience to confirm whether you wish to provide comment or not.

We will seek to engage via a virtual meeting prior to this time and have already made phone calls to council representatives in order to request this.

Regards,
Paul Nelson
0438 574 752

From: Paul Nelson
Sent: Tuesday, 15 November 2022 9:49 AM

To: council@narrabri.nsw.gov.au
Cc: Rebecca Deegan <rebeccadeegan@built.com.au>; Britney Pereira <britneypereira@built.com.au>; Michelle Henry <michelleh@narrabri.nsw.gov.au>
Subject: RE: SSD 21854025 Wee Waa High School Conditions B24, B34

Hi NSC,

Just confirming that the below consultation period has since ended and we have not received any comments from Council.

We will now proceed based on the information provided.

Regards,
Paul

From: Paul Nelson
Sent: Monday, 7 November 2022 10:44 PM
To: council@narrabri.nsw.gov.au
Cc: Rebecca Deegan <rebeccadeegan@built.com.au>; Britney Pereira <britneypereira@built.com.au>; Michelle Henry <michelleh@narrabri.nsw.gov.au>
Subject: SSD 21854025 Wee Waa High School Conditions B24, B34

Dear Narrabri Shire Council,

RE: Wee Waa High School – SSD 21854025

We submitted the following documents for NSC review & consultation in the development of this report for the above project.

1. Soil & Water Management Plan
2. Earthwork Management Plan

Due to size limitations on this email, we are submitted via a drop box link.

https://www.dropbox.com/sh/3d9ld4mozq6jfzg/AABJlKk8rwsgrnYPzC8i7yaga?dl=0

If you have any comments, can you please advise by COB on Friday 11th November 2022.

We welcome any feedback and happy discuss further prior to this date for any reason council may deem necessary.

Kind Regards,

Built

APPENDIX H - Biodiversity Management Sub-Plan

Wee Waa High School

Construction Biodiversity Management Sub-Plan

Built Pty Ltd c/- School Infrastructure NSW

ecological AUSTRALIA
A TETRA TECH COMPANY

1300 646 131
www.ecoaus.com.au

DOCUMENT TRACKING

Project Name	Wee Waa High School Construction Biodiversity Management Sub-Plan
Project Number	22COF-3568
Project Manager	Phoebe Smith
Prepared by	Kalya Abbey, Sam Oomens, Erin Hodgkin
Reviewed by	Phoebe Smith
Approved by	Kalya Abbey
Status	**Final**
Version Number	**V0c**
Last saved on	**16 November 2022**

This report should be cited as 'Eco Logical Australia 2022. *Wee Waa High School Construction Biodiversity Management Sub-Plan*. Prepared for Built Pty Ltd c/- School Infrastructure NSW.'

ACKNOWLEDGEMENTS

This document has been prepared by Eco Logical Australia Pty Ltd with support from Built Pty Ltd and School Infrastructure NSW.

Template 2.8.1

Contents

List of Figures

List of Tables

Abbreviations

Term	Meaning
BC Act	NSW *Biodiversity Conservation Act 2016*
BCS	NSW Department of Planning and Environment's Biodiversity, Conservation and Science Directorate
BMP	Biodiversity Management Plan (a separate document to be prepared prior to the commencement of operation)
CBMP	Construction Biodiversity Management Sub-Plan (this document)
CEMP	Construction Environmental Management Plan
CWD	Coarse Woody Debris
DCCEEW	Commonwealth Department of Climate Change, Energy, the Environment and Water
DPE	NSW Department of Planning and Environment
EIS	Environmental Impact Statement
ELA	Eco Logical Australia Pty Ltd
EMS	Environmental Management System
EP&A Act	NSW *Environmental Planning and Assessment Act 1979*
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
HBT	Hollow-bearing tree
SINSW	School Infrastructure NSW
SSD	State Significant Development

SSD Conditions of Consent

Condition	Requirements	Section this is addressed
SSD 21854025		
Schedule 2 Condition A2	**Terms of Consent** *Architectural plans prepared by SHAC*: • SSD1103 – Proposed Tree Removal Site Plan *Landscape Plan prepared by Moir Landscape Architecture* • LP03 Cultural Landscape	Refer to relevant documents
Schedule 2 Condition A9	**Evidence of Consultation** Where conditions of this consent require consultation with an identified party, the Applicant must: a. Consult with the relevant party prior to submitting the document for information or approval; and b. Provide details of the consultation undertaken including: i. The outcome of that consultation, matters resolved and unresolved; and Details of any disagreement remaining between the party consulted and the Applicant and how the Applicant has addressed the matters not resolved.	Appendix A
Schedule 2 Condition B1	Prior to commencement of construction, the relevant architectural and landscape plans referenced in Condition A2 must be amended and approved by the Planning Secretary. The amended plans must comply with the following requirements: c. i. include the provision of nest boxes suitable to native fauna likely to use the site	Section 5.2.2
Schedule 2 Condition B25	The Construction Biodiversity Management Sub-Plan must address, but not be limited to, the following: a. be prepared by a suitably qualified and experienced ecologist or bushland regeneration expert; b. be prepared in consultation with EHG. Documentary evidence must be provided on how this feedback has been considered and whether any changes have been made in response to this feedback c. identify areas of land where impacts on biodiversity are to be avoided as outlined in the Biodiversity Development Assessment Report V8, prepared by Ecological Australia and dated 22 August 2022 and set out how these areas will be protected from construction impacts; and d. set out the measures identified in the Biodiversity Development Assessment Report to minimise, mitigate and manage impacts on biodiversity, including but not limited to exclusion fencing, storage of material, timing of implementation of any measures and responsibility for delivery of the measures.	Section 1.4 Appendix B Appendix A Section 5.1 Section 5

1. Introduction

The new Wee Waa High School (the Project) will involve the construction of multiple facilities as part of a two-stream high school with a capacity of 200 students, including a new school building, sports facilities, environmental and cultural spaces and ancillary infrastructure, located in the New England region of NSW. State Significant Development Consent (SSD 21854025) under the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) was issued for the Project on 12 October 2022 to NSW Department of Education.

1.1. Purpose and scope

This Construction Biodiversity Management Sub-Plan (CBMP) has been prepared to fulfil the requirements of Part B, Condition B25 of SSD 21854025. Condition B25 requires the CBMP to include all measures to be undertaken to mitigate impacts to biodiversity detailed in the Biodiversity Development Assessment Report (BDAR) prepared for the Project Environmental Impact Statement (EIS), to ensure the Project is constructed and operated in accordance with the protection of biodiversity values identified and associated offsets.

The scope of the CBMP is for the construction phase of the Project. A separate operational Biodiversity Management Plan (BMP) will be prepared prior to the commencement of operation to fulfil the requirements of Condition D36 of SSD 21854025.

1.2. Objectives

This CBMP describes the biodiversity management measures that will be implemented to avoid, minimise, and mitigate impacts associated with the construction and operation of the High School. This CBMP has been written to complement other management plans for the Project and has been developed as a component of, and should be read in conjunction with, the Project Construction Environmental Management Plan (CEMP).

1.3. Consultation

Per the requirements of Part B, Condition B25 of SSD 21854025, consultation with the NSW Department of Planning and Environment (DPE) Environment and Heritage Group (EHG) will be undertaken through review of the lodged CEMP and CBMP. **Appendix A** provides a consultation log which will be updated detailing the outcomes of the consultation.

1.4. Qualifications of personnel

This CBMP has been prepared by Eco Logical Australia Pty Ltd (ELA). ELA has been assessed and certified as meeting the requirements of the below three standards for the following activities - Environmental Consulting Services and Land Management:

- ISO 9001:2015 Quality Management Systems
- ISO 14001:2015 Environmental Management Systems
- ISO 45001:2018 Occupational Health and Safety Management Systems.

CVs of key personnel are provided in **Appendix B**.

Figure 1: Site location within the Wee Waa Township

2. Project overview

The Project is located within the township of Wee Waa, approximately 40 km northeast of Narrabri in the Narrabri Shire Council Local Government Area (LGA).

The Project will involve the construction of a new high school with a capacity of up to approximately 200 students in a series of two-storey buildings, an Indigenous learning centre, sporting fields and associated civil and utilities works, with future capacity for 300 students subject to funding & service need.

The Project is located on vacant land adjacent to the existing Wee Waa Public School and will include:

- Two-storey built forms, fully accessible and equitable, including:
  - General learning spaces & learning support unit
  - Specialist spaces, including art, science, tas, hospitality, performance
  - Indigenous cultural centre
- Associated civil & utilities works
- Sporting fields, & outdoor sports courts
- 40 carparking spaces, bus bays, kiss & drop
- Wayfinding & signage
- Fencing and security.

The Project design has been developed to conform to the natural environment and site opportunities/constraints. The proposal will facilitate the efficient construction of a high-quality design that responds to the strategic need of the High School, whilst providing a high level of amenity to the future students and responding to the surrounding residential context and neighbouring public school.

The site access point on George Street, and staggered arrival schedules have been developed specifically to address road safety and provide adequate mitigation measures to be implemented to reduce impacts to road users and the community.

A full description of the Project is provided with the Environmental Impact Statement (EIS) and subsequent Submissions and Amendment Reports. This information can be accessed on the NSW Planning Portal website: https://www.planningportal.nsw.gov.au/major-projects/projects/new-wee-waa-high-school.

3. Legislative context

3.1. State approval

The Project was issued SSD Development Consent on SSD 21854025 12 October 2022.

3.2. Commonwealth

Under the EPBC Act, any action which "has, will have, or is likely to have a significant impact on a matter of Matter of National Environmental Significance (MNES)" may be considered a "controlled action" and require approval from the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). Impacts to MNES, specifically threatened species and ecological communities, was assessed in the Project BDAR, which concluded there would be no significant impacts. Therefore, the Project was not referred to DCCEEW for assessment.

4. Existing environment

4.1. Land use

The Project site is currently vacant land and is zoned R1 – General Residential (under Narrabri LEP 2012), characterised by flat, low-lying terrain featuring open grasslands across most of the site. Irregular patches of remnant woodland are present throughout. A constructed drainage line intersects the subject land from the west to east.

4.2. Vegetation

A total of 1.66 ha of native vegetation is mapped within the Project site, comprising one Plant Community Types (PCT) stratified into 2 Vegetation Zones based on vegetation condition, detailed below in Table 4-1.

Table 4-1: Vegetation zones

Vegetation Zone	Management Zone	PCT ID	PCT Name	Direct impact (ha)
1	-	40	Coolibah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains	0.63
2	A	40	Coolibah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains	0.87
	B (to be managed)	40	Coolibah open woodland wetland with chenopod/grassy ground cover on grey and brown clay floodplains	0.16
			Total native vegetation	**1.66**

4.2.1. Threatened Ecological Communities

All areas of PCT 40 conform to the '*Coolibah-Black Box Woodland in the Darling Riverine Plains, Brigalow Belt South, Cobar Peneplain and Mulga Lands Bioregions*' Endangered Ecological Community listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

4.2.2. Threatened flora

The impact area has been subject to threatened flora surveys targeting a range of species, however, surveys within the appropriate seasonal survey timing for some species was not possible. As such, four (4) threatened flora species have been identified as having the potential to occur within the Project site due to the presence of potential, although marginal, habitat:

- *Desmodium campylocaulon* (Creeping Tick-trefoil)
- *Digitaria porrecta* (Finger Panic Grass)
- *Homopholis belsonii* (Belson's Panic)
- *Lepidium monoplocoides* (Winged Peppercress).

4.2.3. Weeds

Three (3) State and/or regional priority weeds listed under the *North West Regional Strategic Weed Management Plan 2017 – 2022* have been recorded within the Project site, which are also Weeds of National Significance, listed below in Table 4-2. The Project site is consistent with the regional landscape and contains a variety of exotic species which may be considered environmental and / or agricultural weeds and will require management.

Table 4-2: Priority weeds recorded in the Project site

Scientific name	Common name	Regional Priority Weed (Northern Tablelands)	Weeds of National Significance (WONS)
Eragrostis curvula	African Lovegrass	Y	Y
Lycium ferocissimum	African Boxthorn	Y	Y
Parthenium hysterophorus	Parthenium Weed*	Y	Y

*Listed in the North West Reginal Strategic Weed Management document as requiring eradication. Local Land Services have been notified.

4.3. Fauna and Habitat

4.3.1. Fauna habitat

Fauna habitat within the impact area includes grassland, grassy woodland and forest in varying condition, hollow bearing trees, dense grass and cracking soils. The vegetation that occurs exists as an isolated patch and provides no habitat connectivity to areas outside the identified patch.

4.3.1.1. Vegetation

Vegetation varies from low to moderate condition within the impact area and contains seasonal flower resources, trees with hollows and fallen timber. In general, vegetation comprises patches of sparse mid-storey and areas of no canopy, and the groundcover interspersed with shrubs, native and exotic groundcover in the form of native grasses and forbs and other significant habitat features. Scattered throughout are medium to large trees, with some containing small-medium (<5-10 cm) hollows.

4.3.1.2. Key Fish Habitat

The development site does not involve impacts to Key Fish Habitat, nor does the Project involve harm to marine vegetation, dredging, reclamation or obstruction of fish passage.

4.3.1.3. Cleared/highly disturbed non-native vegetation

There is no non-native vegetation present within the Project Site.

4.3.2. Threatened and migratory fauna

Threatened fauna species known, or with the potential to occur in the impact area due to the presence of habitat, are listed below in Table 4-3. Habitat constraints are listed to demonstrate the type of habitat use (i.e. where foraging habitat only is present, this excludes breeding habitat for these species). It is noted that none of these species have been recorded in the Project area.

Table 4-3: Threatened fauna species with the potential to occur in the impact area

Species	Common Name	Habitat Constraints	NSW listing status	EPBC listing status
Anomalopus mackayi	Five-clawed Wormskink	Presence of cracking clay soils AND fallen/standing dead timber including logs, decomposing logs, tree roots & leaf litter.	E	V
Anseranas semipalmata	Magpie Goose	-	V	-
Antechinomys laniger	Kultarr	-	E	-
Artamus cyanopterus cyanopterus	Dusky Woodswallow	-	V	-
Aspidites ramsayi	Woma	-	V	-
Certhionyx variegatus	Pied Honeyeater	-	V	-
Chalinolobus picatus	Little Pied Bat	-	V	
Circus assimilis	Spotted Harrier	-	V	-
Daphoenositta chrysoptera	Varied Sittella	-	V	-
Desmodium campylocaulon	Creeping Tick-trefoil	-	E	-
Digitaria porrecta	Finger Panic Grass	-	E	-
Falco hypoleucos	Grey Falcon	-	E	-
Falco subniger	Black Falcon	-	V	-
Grantiella picta	Painted Honeyeater	Mistletoes present at a density of greater than five mistletoes per ha	V	-
Grus rubicunda	Brolga	-	V	-
Hamirostra melanosternon	Black-breasted Buzzard	-	V	-
Hieraaetus morphnoides	Little Eagle	-	V	-
Hirundapus caudacutus	White-throated Needletail	-	-	V

Species	Common Name	Habitat Constraints	NSW listing status	EPBC listing status
Homopholis belsonii	Belson's Panic	-	E	V
Lepidium monoplocoides	Winged Peppercress	-	E	E
Lophochroa leadbeateri	Major Mitchell's Cockatoo	-	V	-
Lophoictinia isura	Square-tailed Kite	-	V	-
Melanodryas cucullata cucullata	Hooded Robin (south-eastern form)	-	V	-
Ninox connivens	Barking Owl	-	V	-
Nyctophilus corbeni	Corben's Long-eared Bat	-	V	V
Phaps histrionica	Flock Bronzewing	-	E	-
Phascolarctos cinereus	Koala	-	V	V
Polytelis swainsonii	Superb Parrot	-	V	V
Pomatostomus Temporalis temporalis	Grey-crowned Babbler (eastern subspecies)	-	V	-
Rostratula australis	Australian Painted Snipe	--	E	E
Saccolaimus flaviventris	Yellow-bellied Sheathtail-bat	-	V	-
Sminthopsis macroura	Stripe-faced Dunnart	-	V	
Stagonopleura guttata	Diamond Firetail	-	V	-

Impacts to these species will be appropriately offset in accordance with the conditions of the NSW Development Consent SSD 21854025, through offsetting vegetation communities which are considered habitat for these species.

5. Biodiversity Management Measures

The biodiversity management measures proposed in this CBMP relate specifically to the Wee Waa High School construction and are designed specifically to address the requirements of Condition B25 of SSD 21854025 and the mitigation and management measures described in the Project BDAR. The biodiversity management measures detailed in this section include:

- Identifying impact boundaries
- Vegetation clearing protocols
- Weed control

5.1. Identifying impact boundaries

The detailed design developed by SINSW for the Development Consent identifies the impact boundaries, areas of vegetation to be retained, and trees to be retained, shown below in Figure 2.

Management Zone 2b is to be retained and is intended to be kept as close to its natural undisturbed state as possible so that the traditional practices of the Kamilaroi People can be practiced/demonstrated within the subject land. This retained vegetation is to be managed throughout the operational life of the Project in accordance with Condition D36 of SSD 21854025 (to be addressed in a separate operational BMP to be prepared prior to the commencement of operation).

Full impact is proposed in areas mapped as Management Zone 2a, which include the concrete pathway and low flow channel areas located in the centre of Management Zone 2b.

It is intended that the boundaries will be digitally captured and displayed within the Project survey and GIS databases. This data will be made available both digitally and in hard copy map format to inform and guide vegetation clearing.

The Construction Contractor(s) will be responsible for demarcating vegetation clearing boundaries based on the detailed design and construction requirements:

- Exclusion fencing in the form of temporary fencing or bunting is to be installed around Management Zone 2b prior to any ground disturbance to visually identify the impact boundary.
- Signage is to be erected on exclusion fencing to clearly demarcate Management Zone 2b as a “No-go Zone”.

Figure 2: Impact zones for vegetation clearing

5.2. Vegetation clearing

5.2.1. Pre-clearing survey

A survey of the identified impact area is to be undertaken by a suitably qualified ecologist prior to the commencement of the construction and prior to any vegetation clearing, to determine:

- The area of native vegetation to be cleared.
- The location of any Hollow-bearing trees (HBTs) is to be recorded using GPS. In addition:
    - Any HBTs to be cleared will be marked with flagging tape and an "H" spray painted onto two or three sides of the tree trunk with fluorescent paint.
    - HBTs immediately adjacent to and / or within the impact area that will be retained will be marked, for the establishment of an exclusion zone and protection from impacts. Note that the HBTs to be retained will be differentiated (marked differently (i.e. colour)) to those HBTs that are to be removed.
- Resident fauna or habitat features that may require active management prior to or during disturbance will be recorded using GPS (see active management protocols below). This may include:
    - actively nesting birds or mammals
    - habitat features including tree hollows or fallen logs that may contain roosts; nests, dreys or dens
    - suspected active microbat roosts.
- The presence of any previously unrecorded threatened flora or fauna species requiring management under the 'Unexpected finds' procedure detailed below.

Features identified in the pre-clearing survey will be recorded using handheld GPS. The use of a differential GPS unit will be considered where sensitive vegetation or features are identified to provide greater accuracy of the location.

Data collected in the pre-clearing inspection will be collated and reported by the Construction Contractor.

5.2.2. Vegetation clearing procedure

The Construction Contractor will be responsible for ensuring the clearing of vegetation is undertaken in accordance with the following key processes, detailed further in the sections below:

- The impact boundary is clearly identified as per Section 5.1 and Figure 2 above.
- The pre-clearing procedures detailed in Section 5.2.1 are completed prior to commencement of construction and prior to any vegetation clearing.
- Removal of HBTs is to be avoided during spring, to avoid the main breeding period for hollow-dependent fauna.
- Pruning of vegetation (in lieu of vegetation removal) should be considered wherever possible to reduce the area of vegetation to be cleared.

- Surface disturbance is to be minimised and no vegetation clearing is to occur outside the approved impact area footprint (further detailed below).
- Where a requirement for active fauna management is required from the pre-clearing inspections, for example, resident fauna including actively nesting birds or mammals, tree hollows that may contain roosts, nests or dens, or suspected active microbat roosts, a qualified ecologist/licenced wildlife handler is to supervise clearing activities and manage any impacts to fauna (Section 5.2.4).
- Where vegetation is cleared, large fallen logs and woody debris will be salvaged where it is considered appropriate for use in revegetation or habitat enhancement activities (for example, next boxes). For example, HBTs requiring removal and cleared larger woody debris will be relocated adjacent to the Management Zone 2b for potential re-use in accordance with the operational BMP (to be developed as previously referenced).

5.2.3. Protection outside the approved disturbance area

The Construction Contractor(s) will be responsible for ensuring the following mitigation measures are implemented to protect native vegetation and key fauna habitat outside of the approved disturbance area:

- Ensure clearing of vegetation is restricted to the impact area identified in the clearing boundaries detailed above in Section 5.1.
- Project vehicles and machinery are to remain within the designated impact areas.
- Laydown or temporary disturbance areas will be sited within the impact area, or in adjacent areas which are already disturbed (for example, driveways or stopping bays).
- Procedures to avoid the spread of weeds to adjacent areas will be implemented in accordance with Section 5.3.1.
- During clearing, care will be taken to prevent damage to adjacent tree roots that are not going to be impacted:
    - trenches will be dug at least 15 m away from the base of trees to minimise root interference, and outside of drip lines for vegetation to avoid unintended pruning.
    - Where possible, a minimum trench distance from the base of the tree should be achieved in accordance with the Tree Protection Zone formula (TPZ Australian Standard 4970-2009). The TPZ is calculated by multiplying the diameter at breast height (DBH – 130 cm above the ground) by twelve.

5.2.4. Fauna active management

Where a need for active fauna management has been determined from the pre-clearing inspections, a qualified ecologist/licenced wildlife handler is to be present during vegetation clearing activities.

In any area to be cleared, non-habitat vegetation should be cleared first. Any fauna habitat (or resident fauna including actively nesting birds) demarcated during the pre-clearing procedure is then to be left standing overnight as a minimum (ideally longer up to three days) to encourage the self-relocation of fauna that may be using the available habitat feature.

Hollow-bearing trees

HBTs may contain roosts, nests or dens for a range of species including mammals, birds and microbats. HBTs may include live trees and stags (dead standing trees with hollows). Clearing of HBTs should be avoided during spring wherever possible to avoid impacts to fauna. The following robust HBT clearing procedure is to be followed at all times:

- Removal of HBTs is to be avoided during spring, to avoid the main breeding period for hollow-dependent fauna.
- The pre-clearing procedure detailed in Section 5.2.1 is to be implemented and reviewed prior to the commencement of clearing to determine the location of HBTs and ensure all have been recorded and marked appropriately.
- Vegetation surrounding the HBT is to be cleared first, with the HBT left standing overnight (ideally longer up to three days) to encourage self-relocation of any fauna that may be using the hollow.
- Prior to clearing, HBTs should be shaken with machinery to encourage resident fauna to vacate the hollow and move to an alternative site. Relocation may be assisted by the supervising ecologist / fauna handler.
- HBTs should be soft pushed to the ground in order to reduce the impact to any remaining resident fauna.
    - Where fauna is known to remain within the hollow, an alternative method that may be considered is to lower cut sections of the tree using an arborist and crane.
- Preferentially, felled HBTs should be positioned on the ground so the entrance to the hollow faces upwards allowing any remaining resident fauna to exit.
- Felled HBTs are to be inspected by the supervising ecologist / fauna handler to confirm whether fauna have exited the tree.
- Felled HBTs are to be left overnight before mulching or relocating, to allow any remaining fauna time to exit, which will be confirmed by reinspection on the following day.

Arboreal mammals

In addition to HBTs, trees which provide habitat to arboreal mammals, may be considered habitat trees. Where the presence of arboreal mammals is suspected or known, clearing of these habitat trees will be managed by:

- clearing adjacent vegetation to allow time for the animal to self-relocate of its own accord
- where the animal remains in the tree, the supervising ecologist / fauna handler will be responsible for determining the appropriate method:
    - For species such as koala or other threatened species:
        - ensuring sufficient time is allowed for the animal to relocate
        - capture and relocation may be considered
    - Shaking the tree with machinery to be used during clearing activities to encourage the animal to move to an alternative location

- soft pushing the tree to the ground in order to reduce the likelihood of disturbance to the habitat feature/animal present
- inspection of the felled tree to confirm that the mammal has relocated.
- where the mammal is still present, leave the felled tree overnight to encourage the animal to relocate, which will be confirmed by reinspection on the following day.

Nesting birds

Trees should be inspected for nests immediately prior to clearing to ensure that the nest is not active. If the nest is not active, the tree can be cleared.

Where a nest is active, the birds present (generally fledglings) will be collected where safe and taken to a wildlife carer to be cared for, prior to later release. The nest will be removed from the tree and an inspection undertaken to confirm the nesting activity hasn't recommenced. If nesting has recommenced, then the nest will be removed again before any nest can be established and the tree then cleared.

5.2.5. General fauna management

Not specific to any type of habitat feature, fauna species or group, construction procedures will include measures to further minimise direct and indirect impacts to fauna including:

- Preparation (by the Construction Contractor) of a fauna rescue protocol that includes notification of local wildlife carers and a veterinarian should they be required during clearing.
- Temporary construction features such as trenches, and pits should be fenced/covered overnight and when not in use for construction. Open trenches will be checked twice daily by the Construction Contractor.
- All external lighting associated with the development uses best management practice for bat deterrence.
- Vehicle speed limits within the construction areas should be reduced to minimise fauna strike risk.
- Vehicle use will be restricted to the impact area.

5.2.6. Unexpected threatened species finds

If previously unrecorded threatened flora or fauna are identified during pre-clearing surveys or clearing activities, a qualified ecologist will be engaged to determine the significance of impacts and provide advice on approval requirements.

Works in these areas, where potential impacts to threatened species are identified, will not be undertaken until authorisation to proceed is provided by the relevant authority.

5.3. Control of weeds and feral pests

Control of weeds and feral pests during the construction phase will be the responsibility of the Construction Contractor. Following completion of the Project construction, management of weeds and feral pests will be the responsibility of the NSW Department of Education.

5.3.1. Weeds

Weeds previously recorded within the Project site are detailed above in Section 4.2.3. Disturbance activities may result in the spread of weed species present within the impact area, resulting in potential impacts to surrounding properties and areas of native vegetation. Weeds will be proactively managed in the impact area to avoid the spread of existing weeds and to manage any incursions which arise throughout construction and operation of the Project.

Weed management measures during construction will include:

- Prior to disturbance activities, a weed survey and assessment is to be undertaken in each work area by a person suitably qualified to identify weed species (e.g. ecologist, agronomist or Council weed officer).
- Weeds of National Significance and/or State and/or Priority weeds listed under the listed under the *North West Regional Strategic Weed Management Plan 2017 – 2022*[1] which were recorded in the BDAR, or previously unrecorded, must be notified and managed accordingly.
- Ensure all equipment, machinery and vehicles are free of weed seeds, mud, soil and organic matter before entering and exiting the works area.
- Imported construction materials including road base, gravel, topsoil for landscaping etc is to be sourced from reputable suppliers and certified free from weed species wherever possible.
- Regular inspections of work areas, material stockpiles, laydown areas and adjacent areas should be undertaken to monitor weed presence and identify any weed infestations which may require management.
- Control and management of weeds identified in work areas should be undertaken in accordance with the *North West Regional Strategic Weed Management Plan 2017-2022*[1] and the NSW *Pesticides Act 1999*.
- Any weed management activities undertaken will be documented by the Construction Contractor, with the following information being recorded:
    - The date, time and location of areas that have undergone weed control activities.
    - Methods used, including the names/brands of any chemicals used;
    - Issues encountered; and
    - Recommended frequency and methods for follow-up weed control.
- Where identified that weed control activities have not been effective, the method of control implemented will be reviewed prior to further management.

Ongoing weed management of Management Zone 2b will be detailed in the operational BMP to be prepared in accordance with SSD 21854025 Condition D36 prior to the commencement of operation.

5.3.2. Feral animals

A number of introduced vertebrate pest species are common to the region and have the potential to both compete with native species and cause considerable damage to land and vegetation.

[1] North West Regional Strategic Weed Management Plan 2017-2022 (nsw.gov.au)

Contamination and waste management will be managed in accordance with the Project CEMP. This will identify the waste management measures to be implemented to reduce opportunities for scavenging for animals such as foxes, wild dogs and feral cats.

The Project will cooperate with Narrabri Shire Council to facilitate existing and ongoing vertebrate pest control programs being undertaken on freehold land in the Project Site. Any vertebrate pest control activities undertaken will be done in accordance with the requirements of the Local Land Services.

6. Monitoring and reporting

Monitoring and reporting during the construction phase of the Project is required to measure the efficacy of the management measures detailed in this CBMP, and to provide a record of compliance with the Development Consent.

The minimum monitoring and reporting requirements for implementation of the CBMP are summarised below in Table 6-1**.**

Table 6-1: Monitoring and reporting

Monitoring factor	Section	Timing/Frequency	Reporting	Responsibility
Identification of impact boundaries				
Ensuring impact boundaries are clearly demarcated and adhered to through the installation of exclusion fencing and signage.	5.1	• Prior to commencement of construction • As required for the duration of construction	• Records to be kept of boundaries marked and recorded using GIS prior to construction.	Construction Contractor in accordance with architectural landscape plans.
Vegetation clearing				
Pre-clearing procedure	5.2.1	• Pre-clearing survey to be completed by ecologist prior to the commencement of construction	• Pre-clearing report	Construction Contractor in consultation with qualified ecologist.
Hollow-bearing trees	5.2.2	• Prior to commencement of vegetation clearing • As required for the duration of clearing, which may include daily monitoring where active fauna management is required.	• Records to be collated weekly: o The GPS location of all HBTs cleared o Any HBTs retained • All records to be collated at the completion of vegetation clearing.	Construction Contractor in consultation with qualified ecologist
Implementation of fauna active management protocols	5.2.2	As required for the duration of clearing, which may include daily monitoring where active fauna management is required.	• Records to be collated weekly: o The GPS location of all fauna or habitat features o Actions undertaken • All records to be collated at the completion of vegetation clearing.	Qualified ecologist / licenced fauna handler
Implementation of fauna rescue protocol	5.2.4	As required for the duration of clearing, which may include daily monitoring where active fauna management is required.	• Records to be collated weekly: o The GPS location of all fauna managed o Actions undertaken All records to be collated at the completion of vegetation clearing.	Qualified ecologist / licenced fauna handler

Monitoring factor	Section	Timing/Frequency	Reporting	Responsibility
Unexpected threatened species finds	5.2.6	As required	• The location of the find • The species and threatened status • Confirmation of stop work • Outcomes of assessment of significance • Outcome of regulatory agency consultation	Construction Contractor in consultation with qualified ecologist and the Proponent
Inspection of open trenches for trapped fauna	5.2.5	Prior to commencing work in a trench, as required	If fauna is identified	Construction Contractor in consultation with qualified ecologist
Placing laydown and temporary disturbance areas outside of no-go zones	5.1, 5.2.3	Daily / weekly	In the event of a nonconformance	Construction Contractor
No vegetation clearing is undertaken outside the impact area or areas marked as exclusion zones / no clearing	5.2.3	Daily / weekly	In the event of a nonconformance	Construction Contractor in consultation with the Proponent
Construction weed management				
Weed introduction, infestations and management	5.3	At least monthly or more frequently where weed infestations / management actions are required.	Records to be kept of weeds recorded and management actions taken. To be compiled monthly and at the completion of construction to inform ongoing operational weed management to be addressed in the operational BMP to be prepared in accordance with Condition D36.	Construction Contractor in consultation with the Proponent
Incident and nonconformance with CBMP and / or Project Development Consent		As required	In the event of a nonconformance or incident	Construction Contractor / Proponent
CBMP Review		At the completion of the construction, in response to a required change to measures	As required, including in accordance with the consultation process detailed in the consent condition.	The Proponent in consultation with the Construction Contractor

Monitoring factor	Section	Timing/Frequency	Reporting	Responsibility
		documented in the CBMP, or, annually at a minimum.		

Appendix A Consultation log

Date	Stakeholder	Format	Summary of outcomes
24/10/2022	Biodiversity and Conservation Science Directorate (BCS) of the Department of Planning and Environment (DPE), Dubbo	Phone call	Discussion on preferred mechanism for consultation / review of the CBMP. Preference is to send via email for review.
2/11/2022	BCS Dubbo	Email	Draft CBMP (v0d) submitted for review and comment
8/11/2022	BCS Dubbo	Letter (Attached below)	Minor amendments to references requested by BCS – updated within version E

NSW GOVERNMENT

Department of Planning and Environment

Our ref: DOC22/985758
Your ref: SSD 21854025

Paul Nelson
Design Manager
Built
paulnelson@built.com.au

Dear Paul

Wee Waa High School Construction Biodiversity Management Plan

Thank you for your e-mail dated 2 November 2022 to the Biodiversity, Conservation and Science Directorate (BCS) of the Department of Planning and Environment (DPE) inviting comments on the Wee Waa High School Construction Biodiversity Management Plan (CBMP).

BCS regards the CBMP to adequately fulfill the requirements of Part B, Condition B25 of SSD 21854025. We do, however suggest that there are two minor points that should be rectified:

- Section 5.2.3 states that "*Project vehicles and machinery are to remain within the impact area wherever practicable*" while Section 5.2.5 "*Vehicle use will be restricted to the impact area*". Section 5.2.3 should be amended to reflect the latter statement.
- Section 4.2.2 refers to the *Northern Tablelands Regional Strategic Weed Management Plan 2017 – 2022*. Elsewhere in the CBMP, Section 5.3.1 for example, reference is made to the *Central Tablelands Regional Strategic Weed Management Plan 2017 – 2022*. The appropriate document should be referenced consistently in the CBMP.

If you have any questions about this advice, please do not hesitate to contact David Geering, Senior Conservation Planning Officer, via david.geering@environment.nsw.gov.au or (02) 6883 5335.

Yours sincerely

Liz Mazzer
A/ Senior Team Leader Planning North West
Biodiversity, Conservation and Science Directorate

8 November 2022

Appendix B CVs of key personnel

Kalya Abbey **PRINCIPAL ENVIRONMENTAL CONSULTANT**

Kalya is a principal level consultant working within ELA's planning and approvals team, and is ELA's Mudgee and Central West NSW Operations Manager. Kalya's interests lie in providing strategic environmental advisory and planning services, specialising in projects within sensitive social and environmental settings. Kalya manages a range of projects across the energy, infrastructure and resource sectors, focusing on delivering value for all stakeholders from feasibility, development and construction through to operation.

Kalya holds a Bachelor of Science in Agriculture, majoring in land and water resource management from Charles Sturt University. She has 16 years' experience working in consulting, government and industry in the areas of impact assessment, offsets and post-approvals, monitoring and operational compliance.

Kalya's experience covers a diverse range of environmental management areas and industries, including renewables, mining, ports, coastal development, water and waste management and conservation.

QUALIFICATIONS

- Bachelor of Science (Agriculture), Charles Sturt University
- Certificate IV in Project Management, Australian Institute of Management

PROJECT EXPERIENCE

IMPACT ASSESSMENT AND APPROVALS

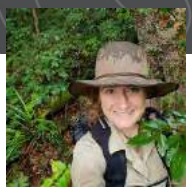
- Uungula Wind Farm Environmental Impact Statement, Modifications, post-approvals support (CWP Renewables 2017 - current)
- Crudine Ridge Wind Farm Modification, Biodiversity Development Assessment Review and Independent Planning Commission hearing (CWP Renewables 2019)
- Moolarben Coal Mines Modifications 14 and 15 and subsequent - Biodiversity (Moolarben Coal Operations 2017 -)
- Ulan Coal Mines Modification 4 Environmental Impact Statement (Ulan Coal Mines 2018)
- Wellington Bore Pipeline Review of Environmental Factors, Ecology and Heritage Assessment (Dubbo Regional Council 2021)
- Wollar Road Upgrade Review of Environmental Factors, Biodiversity Assessment and Munghorn Gap Blackspot Assessment (Mid-Western Regional Council 2020)
- Peak Gold Mine Preliminary Environmental Assessment, (New Gold Inc 2017)
- Mount Pleasant Operation Modification Fauna Assessment (MACH Energy 2017)
- Wambo Coal Mine Modification Fauna Impact Assessment (Wambo Coal Pty Ltd 2017)
- Environmental impact assessment and approvals, Bluff Coal Project (Carabella Resources 2013)
- Environmental Impact Statement Codrilla Coal Mine (Macarthur Coal 2011)
- Environmental impact assessment and approvals, Styx Basin (Currawong Coal 2011)

PLANNING AND MANAGEMENT

- Stubbo Solar Farm post-approval support and management planning (UPC/AC Renewables 2022)
- Uungula Wind Farm construction and operations management planning, biodviersty offse planning (CWP Renewables 2021 -)
- Ulan Coal Mines Modification 4 Offset Analysis and Credit Retirement Strategy (Ulan Coal Mines Pty Limited 2020)
- Central West Local Land Services Biodiversity Prioritisation Study (CWLLS 2019 – 2020)
- Crudine Ridge Wind Farm preparation and review of Biodiversity Management Plan (CWP Renewables 2018-2019)
- Roadside vegetation management implementation (Temora Shire Council 2019)
- Proposed cemetery planning and background studies (Queanbeyan-Palerang Regional Council 2018)
- Cudgegong River Flying-fox Camp Management Plan, Mid-Western Regional Council (2017)
- Environmental Management Plan, Blayney Shire Council Bridge Replacements (VEC 2017)
- State Assessment and Referral Agency project officer (Queensland Government 2013)
- Plan of Operations, Millennium Coal Mine (Peabody Energy Australia, 2009-2013)
- Exploration environmental planning and approvals (Macarthur Coal 2008 – 2011)
- Hamilton Island Waste Management System (Hamilton Island Enterprises 2010)

OPERATIONS AND COMPLIANCE

- Biodiversity Monitoring and Compliance Reporting (Moolarben Coal Operations, Ulan Coal Mines Limited, Wilpinjong Coal Pty Ltd, Narrabri Coal Operations Pty Ltd; 2016 - present)
- Crudine Ridge Wind Farm construction environmental management (Zenviron Pty Ltd 2018 – present)
- Peak Gold Mine Rehabilitation Cost Estimate review (New Gold Inc 2017)
- Compliance audit, Thomas Borthwick & Sons Abattoir (Queensland Government 2014)
- Compliance audit, Hay Point Coal Terminal (Queensland Government 2014)
- Compliance audit and compliance program, Whitsunday Sands Development (Queensland Government 2013 – 2014)
- Environmental Approval and Financial Assurance audit, Millennium Coal Mine (Peabody Energy 2009 – 2013)
- Secondment - Site environmental management and compliance, Hay Point Coal Terminal Expansion (Bechtel/BMA 2010)



Phoebe Smith **ECOLOGIST**

Phoebe joined the Eco Logical Australia (ELA) Coffs Harbour team in May 2021, bringing with her over five years' experience in the environmental industry with key skills in ecological survey including NSW Biodiversity Assessment Methodology (BAM), ecological restoration, bush regeneration, report production, project management and client relations. With project experience within the Greater Hunter, Phoebe has completed biodiversity assessments and monitoring projects in a variety of environments for various industries and stakeholders including private landholders, local councils, state government, housing development and infrastructure.

Phoebe has a good understanding of NSW biodiversity legislation with extensive experience in implementing the BAM (including the design and undertaking of on-ground field survey and report production), and Vegetation Management Plans in accordance with Council guidelines and the Biosecurity Act 2015.

Phoebe is experienced in the design and implementation of biodiversity monitoring programmes, particularly in accordance with the BAM for a variety of flora, fauna and ecological communities. Phoebe recently became a BAM Accredited Assessor (BAAS21011) in July 2021.

Phoebe's primary skills include planning, preparation, and implementation of surveys under the BAM, involving plot-based floristic surveys (BAM Plots), terrestrial and arboreal mammal surveys, Plant Community Type (PCT) and Vegetation Zone delineation mapping, targeted threatened species surveys and plot-based monitoring.

Other skills include; Nestbox installation/monitoring, spotter/catcher works, and report production including; Vegetation Management Plans (VMPs), Vegetation and Habitat Management Plans (VHMPs), Test of Significance (5-Part Test), Biodiversity Development Assessment Reports (BDARs), and preliminary works for Biodiversity Stewardship Site Assessment Reports

QUALIFICATIONS

- Bachelor of Environmental Science & Management (Honours) – Southern Cross University, 2013
- Master of Environmental Management & Sustainability (Natural Systems Management) – University of Newcastle, 2017
- BAM Assessor Accreditation, 2021
- First Aid Certificate, 2020
- Chainsaw Operations – Basic Tree Felling, 2016
- Occupational Health and Safety Construction Induction (White Card), 2015
- Working with Children Check, 2016
- Working Safely at Heights, 2017

PROJECT EXPERIENCE

Developments

- BDARs – Project Ecologist for several major and small BDAR assessments in and around the Hunter, Coffs Harbour and broader NSW North Coast region.
- Ecological Advice/Constraints & Opportunities – Project Manager and Team Leader for numerous sites within the Sydney, Hunter, MidCoast, Port Stephens and NSW North Coast regions.
- Watagan Park, Cooranbong – Ongoing field surveys, habitat assessments (ecological pre-clearance surveys and clearing supervision), targeted threatened flora surveys, threatened flora translocation, nestbox installation and monitoring, compliance monitoring, and on-ground environmental restoration.

- Huntlee, North Rothbury NSW - Vegetation Management Plans, Weed Density Map and a Creek Rehabilitation Management Plan. Biannual nest box installation and monitoring, targeted threatened species monitoring, pre-clearance surveys and tree felling supervision, and prepared and delivered multiple Biodiversity Assessment Reports involving high detailed flora and fauna surveys, threatened species surveys and vegetation community mapping.

Rehabilitation/Conservation

- VMPs - Project Ecologist for both fieldwork and author of various VMPs within the Hunter Region including Newcastle, Lake Macquarie, MidCoast, Cessnock, Maitland and Central Coast City Council's. VMP reports and fieldwork area guided by Council guidelines and the Water Management and Biosecurity Acts.
- Pindimar/Bundabah, NSW - Ecological Restoration Plan developed in response to the illegal clearing of 17.3ha of native vegetation. Assisted in undertaking targeted threatened flora survey that resulted in a large population (over 200) of *Cryptostylis hunteriana* being recorded. Other species recorded include *Angophora inopina, Grevillea parviflora* subsp. *parviflora, Melaleuca groveana* and *Tetratheca juncea*. Biodiversity Assessments, which involved both flora and fauna surveys within a large contiguous tract of native vegetation.
- Watagan Park, Cooranbong - Report writing including the production of a Rehabilitation Plan for two Environmental Conservation Areas for the implementation and delivery of approximately 120 hectares of conservation land to Lake Macquarie City Council in accordance with an EPBC approval as part of a major residential development. Monitoring and reporting of restoration works undertaken in accordance with the approved Rehabilitation Plan.
- Office of Environment & Heritage (SoS Program)
    - Undertake systematic threatened species surveys (electric blanket) for several parcels of land in the North Rothbury area that is the known location of the Critically Endangered *Persoonia pauciflora*.
    - Assist with threatened species surveys under the Save Our Species program for the Vulnerable *Asperula asthenes* in the MidCoast area (Willi Willi National Park, Goonook Nature Reserve, Bachelor State Forest, New England National Park and Forster). Produce SoS Management Site Report detailing the species preferred habitat including vegetation communities, landforms, aspect, elevation, hydrology and disturbance

- BSSAR – Preliminary on-ground field work for a potential BSSAR sites in the Lake Macquarie LGA. Vegetation delineation, BAM Plots, PCT identification, targeted threatened species surveys, preliminary BAM calculator data entry.

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APPENDIX I - Construction Flood Emergency Response Plan

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

NOVEMBER 2022

Job No: GC554 File: WWHS_ConstructionFERP_[Final]	Date: November 2022 Rev No: 1.1	Principals: SAB Authors: SAB/GPS

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APPENDICES

LIST OF FIGURES

SSD CONDITIONS MATRIX – SSD 21854025

Condition No.	Description	Reference
B26	The Construction Flood Emergency Response Sub-Plan must address, but not be limited to, the following: (a) be prepared by a suitably qualified and experienced person(s); (b) address the provisions of the *Floodplain Risk Management Guidelines* (EHG); (c) include details of: (i) the flood emergency responses for the construction phase of the development; (ii) predicted flood levels; (iii) flood warning time and flood notification; (iv) assembly points and evacuation routes; (v) evacuation and refuge protocols; and (vi) awareness training for employees and contractors, and users/visitor	Refer to the following sections of the Construction FERP: (a) Appendix E (b) Section 1.1 (c)(i) Chapter 5 and Appendices A and B (c)(ii) Sections 3.1.1 and 3.1.2 (c)(iii) Sections 3.1.1, 3.1.3 and 3.1.4 (c)(iv) Section 1.5 (c)(v) Chapter 5 and Appendix A (c)(vi) Chapter 5 and Appendix B
B27	Prior to the commencement of construction, the Applicant must prepare and implement for the duration of construction: (a) flood warning and notification procedures for construction workers on site; and (b) evacuation and refuge protocols for construction workers	Refer to the following sections of the Construction FERP: (a) Chapter 5 and Appendices A and B (b) Chapter 5 and Appendices A and B

1 INTRODUCTION

1.1 Background

Built Pty Ltd has been engaged by the NSW Government to construct the new Wee Waa High School. The construction site is located on the Kamilaroi Highway (Mitchell Street) between George Street and Charles Street.

The construction site is traversed by drainage swales and the site is subject to flooding when local catchment rainfall runoff volumes exceed the capacity of the drains. More broadly, Wee Waa lies on the Namoi River floodplain. While the township is protected by a ring levee which provides protection from Namoi River flooding, local catchment drainage capacities can be influenced by elevated river levels outside the levee. Flooding of the broader floodplain is also relevant to flood safety and evacuation.

Lyall and Associates has previously investigated the flood risk to the site and provided a comprehensive overview of flood risk in Wee Waa and more specifically at the construction site, the findings of which are set out in the following two documents:

- *Wee Waa Levee Risk Management Study and Plan* (Lyall and Associates, 2019);
- *Wee Waa High School Technical Working Paper: Flooding* (Lyall & Associates, 2021).

Built Pty Ltd engaged Lyall and Associates to prepare this Construction Flood Emergency Response Sub-Plan (**Construction FERP**) for the construction site based on the findings of the levee risk management plan. The Construction FERP is intended to satisfactorily manage flood risks on the site during project construction. The Construction FERP addresses the provisions of the *Floodplain Risk Management Guidelines.*

1.2 Locality

The construction site is located at 105 -1 07 Mitchell Street, Wee Waa and is bounded by:

- George Street to the east
- Charles Street to the west and residential lots to the north.

The township of Wee Waa is located on the Namoi River floodplain about 34 km west (downstream) of Narrabri. **Figure 1** shows the location of Wee Waa on the Namoi River floodplain, while **Figure 2**, sheet 1 shows the location of the construction site within the township.

1.3 Topography

The ground levels in the site range from 190 m AHD to 191.5 m AHD. Drainage of the site slopes gently from east to west. Water draining across the site enters a piped drainage system in the north-western corner of the site.

1.4 Proposed Works

The proposed works comprise the construction of a new high school (**the proposal**) and associated flood mitigation works (**FMW**). The key features of the proposal are shown on **Figure 2**, sheet 2 and comprise the following:

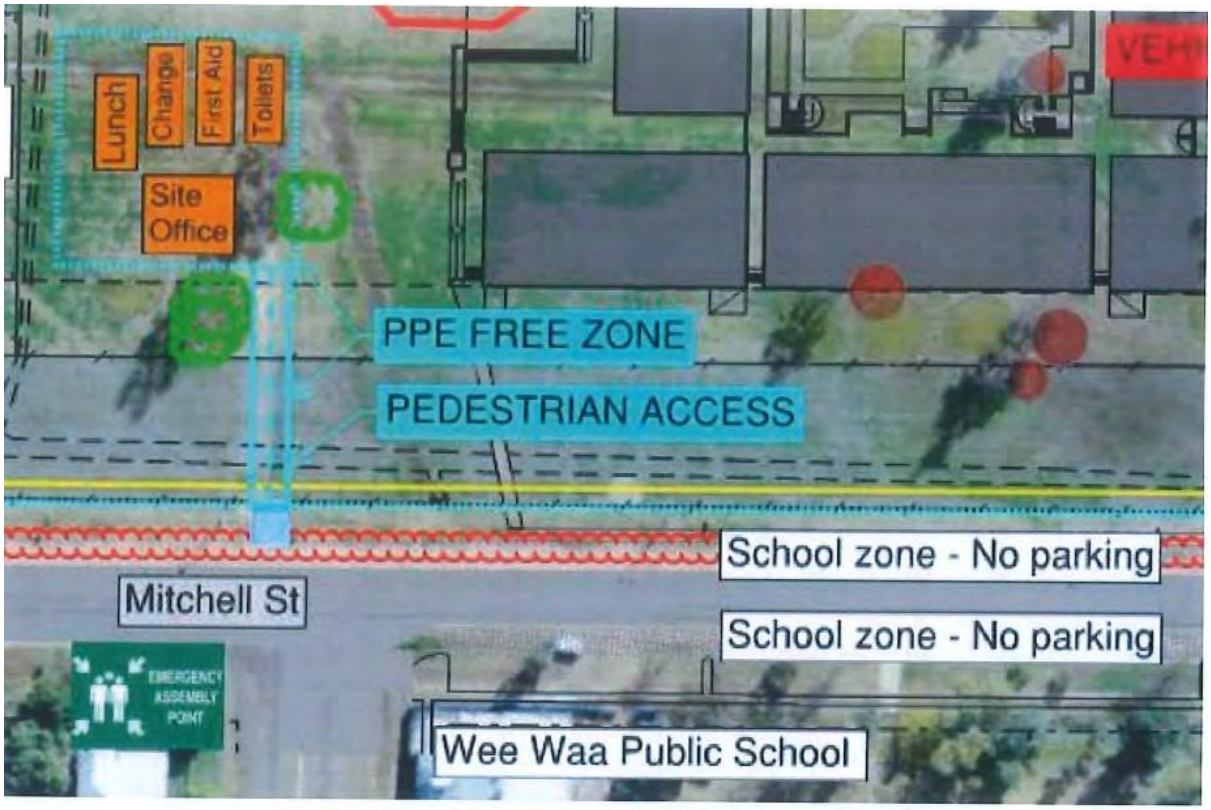
- A new two-storey school building arranged in a U-shape courtyard typology, including teaching spaces, library/admin, staff facilities, and a multi-purpose gymnasium/hall.
- A Covered Outdoor Learning Area (COLA).
- One grass sport field with a perimeter running track and asphalt playing courts.
- A standalone single-storey Agricultural and Environment Centre building.
- A standalone single-storey Aboriginal Education Community and Learning Centre.
- Internal vehicular access from George Street running east-west through the site.
- Augmentations to the road network as required to ensure road safety, including a dedicated drop off/pickup area and bus bay along George Street.
- Removal of trees as required and retention where possible.
- Installation of landscaping, additional tree planting and fencing to integrate with the design of the new school.
- Installation and augmentation of associated services infrastructure to service the new school.

1.5 Site Infrastructure

The site office, lunch room and other site facilities are located onsite and accessed from Mitchell Street by a temporary entrance driveway. As shown on the illustration over, the Emergency Assembly Point is offsite on the corner of Mitchell Street and Church Street.

1.6 Construction Hours

Normal working hours on site are Monday to Friday 7 am to 6 pm and Saturday from 8 am to 1 pm. The site is closed Sundays and for public holidays. All employees and contractors on site are adults and have been inducted to the site. Any visitors to the site are accompanied at all times by the site manager. The maximum number of employees and contractors on site at any time is 60 workers.



1.7 This Construction FERP

This Construction FERP identifies the flood risks at the site and how these should be managed. **Section 2** describes the ways that the site could be affected by flooding. **Section 3** lists the flood forecasts and warnings relevant to the site. **Section 4** provides an overview of the flood emergency response plan and responsibilities. **Section 5** provides an explanation of triggers for applying the Construction FERP and the actions to take for various stages of a flood. **Appendix A** provides a flood actions checklist, **Appendix B** sets out suggested flood emergency messaging, **Appendix C** lists items for a flood emergency kit to be kept on-site and **Appendix D** provides a suggested emergency contact list for onsite use.

2 FLOOD BEHAVIOUR

2.1 Flood Generating Weather

Inland areas of NSW mostly receive flood producing rain when weather systems originating in the tropics move south, forming a series of linked, low pressure troughs over the continent. These trough systems tend to drag moisture laden air from the tropics southward from the Gulf of Carpentaria through inland QLD and NSW. Unstable atmospheric conditions predominate and can produce widespread rainfall and severe thunderstorms.

Such depressions can develop any time of the year but are most likely when sea surface temperatures are high and therefore these events usually occur in the summer months and the first half of the year. Flooding is more prevalent in La Nina years when rainfall is significantly higher than the average annual rainfall.

We are currently in a La Nina cycle and storm activity with heavy rainfalls is likely to occur over the next few months while La Nina conditions persist.

2.2 Flood Probabilities

The relative size of a flood is described in terms of its probability (or frequency) of occurring. The frequency of floods is generally referred to in terms of their Annual Exceedance Probability (**AEP**) or Average Recurrence Interval (**ARI**). For example, for a flood magnitude having ten per cent AEP, there is a ten per cent probability (or 1 in 10 chance) that there would be floods of greater magnitude each year. As another example, for a flood having a 10 year ARI, there would be floods of equal or greater magnitude once in ten years on average. The approximate correspondence between these two naming systems is provided in the table below.

Annual Exceedance Probability (AEP) per cent	Average Recurrence Interval (ARI) years
0.2	500
0.5	200
1	100
5	20
20	5

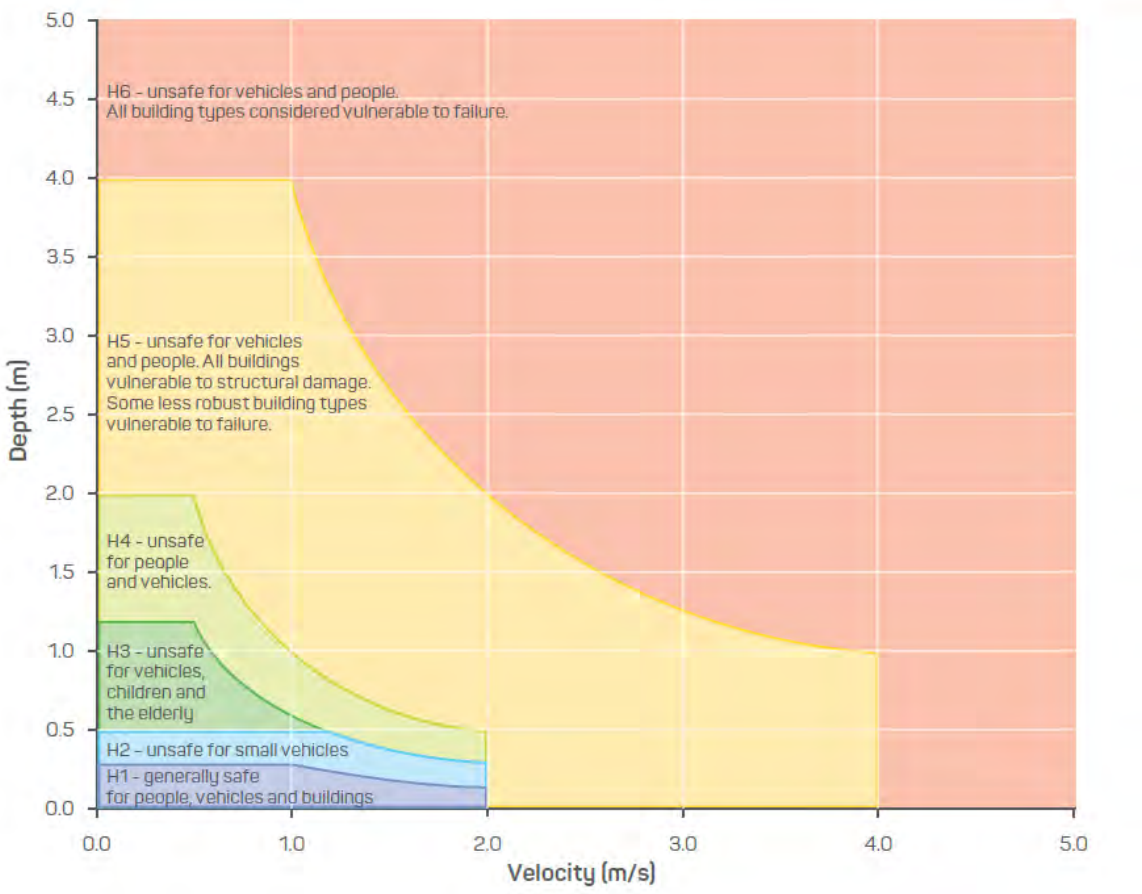
In this Construction FERP, the frequency of floods is referred to in terms of their AEP, for example a 1% AEP flood.

The largest flood that can occur is referred to as the Probable Maximum Flood (**PMF**) which occurs as a result of the Probable Maximum Precipitation (**PMP**) occurring over an area. Although it has a very low probability of occurring in any given year, floods approaching a PMF have been recorded. The PMP is the result of the optimum combination of the available moisture in the atmosphere and the efficiency of the storm mechanism as regards to rainfall production. The PMF is defined as the upper limiting value of floods that could reasonably be expected to occur and defines the extent of flood prone land (i.e. the floodplain).

Reference is also made in this Construction FERP to the Extreme Flood. It approximates the PMF and defines the upper limit of flooding that could reasonably be expected to occur on the broader Namoi River floodplain. The discharge hydrographs of the Extreme Flood were derived by applying a multiplication factor of three (3) to the corresponding 1% AEP discharge hydrographs.

2.3 Flood Hazard

Flood hazard represents the impact that flooding would have on people, vehicles and buildings and is usually represented by a combination of depth and velocity. The illustration below illustrates the current understanding of flood hazard in Australia for various combinations of flood depth and velocity. The illustration is taken from *Handbook 7: Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia* (Handbook 7) (AIDR 2017), noting that the same approach is documented in *Australian Rainfall and Runoff* (Geoscience Australia, 2019). It describes six flood hazard categories according to the stability of people, vehicles and buildings, and shows the relationship between velocity and depth that has been used to define the flood hazard vulnerability of the area internal to the Town Levee for a 1% AEP local catchment flood event.



2.4 Flood Behaviour at the Construction Site

Wee Waa is protected from Namoi River flooding by the Town Levee. Previous investigations found that while the Town Levee would not be overtopped for Namoi River floods up to about 0.2% AEP in magnitude, the construction site would still be subject to relatively frequent inundation as a result of local catchment runoff.

2.4.1 Local Catchment Flooding

Flooding may occur inside the Town Levee due to heavy local rainfall. **Figure 4** shows the layout of the stormwater drainage system internal and external to the Town Levee, while **Figure 5** shows greater detail in the vicinity of the construction site.

Runoff generated by relatively frequent storm events discharges to the construction site via a series of small diameter pipes which cross George Street, Mitchell Street and Charles Street. A network of shallow channels has been built to convey this flow through to the north-west corner of the construction site where twin 600 millimetre diameter pipes run in a northerly direction along the eastern side of Charles Street. The shape, size and location of the drainage of the site is to be upgraded as part of the construction design.

Flow conveyed in the twin 600 millimetre diameter pipes discharges to a short section of channel which is located in the south-east corner of the intersection of Charles Street and Boundary Street, before being conveyed across the latter mentioned road via twin 1050 millimetre diameter pipes.

Flow discharging from the twin 1050 millimetre diameter pipes is conveyed to the Namoi River via an engineered channel which is about 15 metres in width and 1 metre in depth. Flow in the engineered channel is conveyed through the Town Levee via a single 750 millimetre diameter pipe. A penstock gate is fitted to the single 750 millimetre diameter pipe which is closed during periods of elevated water levels on the Namoi River floodplain (**penstock gate**). A pipe(s) of unknown diameter is also located beneath an unsealed access track that crosses the engineered channel a distance of about 60 m to the north of the Town Levee.

The predicted flood depths and extent of flooding for a local catchment 1% AEP flood event internal to the Town Levee is shown in **Figure 3** (2 sheets). The flood hazard at the portion of the construction site that is located internal to the Town Levee is shown in **Figure 4**.

The key features of local catchment flooding in the vicinity of the construction site are as follows:

- An overland flow path develops along Mitchell Street which extends upstream (east) of the construction site as far as the Wee Waa Showground.
- Flooding on the construction site is generally of a ponding nature, with depths of inundation controlled by the capacity of the twin 600 millimetre diameter pipes which extend north from its north-west corner in combination with the elevation of Charles Street which is generally about 0.5 metres higher than natural surface levels internal to the construction site. As a result, depths of inundation remote from the network of low flow channels are a maximum of about 0.4 metres in a 20% AEP local catchment flood event, increasing to a maximum of about 0.5 metres in a 1% AEP local catchment flood event.
- The peak 1% AEP flood level on the construction site is a maximum of RL 191.0 m AHD.
- Peak flows discharging through the construction site increase from about 1 cubic metres per second during a 20% AEP local catchment flood event to about 4 cubic metres per second during a 1% AEP local catchment flood event.

- Flow velocities on the construction site are highest during more frequent local catchment flood events when backwater effects from the twin 600 millimetre diameter pipes are less. For example, maximum flow velocities remote from the network of low flow channels generally reduce from a maximum of about 0.3 metres per second during a 20% AEP event to less than 0.15 metres per second during a 1% AEP event.
- Depths of inundation on the construction site would generally exceed 1 metre during a PMF event, with flow velocities generally not exceeding about 0.4 metres per second.
- The construction site generally functions as a flood storage area during a 1% AEP local catchment flood event, with floodway areas limited to the network of low flow channels which run through it.
- The flood hazard vulnerability classification on the construction site would generally be no higher than H2 (generally safe for people, but unsafe for small vehicles) during a 1% AEP local catchment flood event, with the exception that H3 (unsafe for vehicles, children and the elderly) conditions would be present along the network of low flow channels which run through it. Isolated pockets of H3 type conditions areas are also shown to be present, generally in the north-western portion of construction site. Flood hazard areas would change as earth moving on the site forms the design channels.

2.4.2 Namoi River Flooding

Flooding in the wider Namoi River catchment can isolate Wee Waa for days to weeks at a time. Flooding patterns on the Namoi River at Wee Waa are largely dependent on the source of the flow. For example, floodwater originating from the upper Namoi River catchment commences to spread out across the wider Namoi River floodplain near the Myall Vale homestead which is located about 10 km upstream of the township. At this location major outflows occur from the river, with the largest breakout occurring toward the north.

The floodwater that moves north from Myall Vale inundates large tracts of land on the north-western floodplain, through Spring Plains to the Doreen area and eventually into Pian Creek, while the floodwater which breaks to the south develops a flood runner along the side of the Kamilaroi Highway. The flow which breaks out to the south initially runs alongside the road before entering O'Briens Channel and then Wee Waa Lagoon. Wee Waa is effectively isolated by road once this flow breakout develops.

Immediately upstream and downstream of Wee Waa flood flows leave the Namoi River via a number of effluent streams, the most significant of which are Gunidgera and Pian Creeks. With the exception of 'high' ridges which are located adjacent to and to the north of Pian Creek, virtually all of the land to the west of Wee Waa is inundated during a major flood.

An alternative flood pattern is caused by local catchment runoff from the streams draining the south-western slopes of the Nandewar Ranges to the east of Narrabri. Spring, Bobbiwaa and Galathera Creeks form the main drainage patterns of this region. All have quite small channels and when in flood, spread over wide areas of agricultural land. The majority of the flood flow generated by the local catchment does not join the Namoi River, but rather turns to the northwest where it ultimately joins flow in the Thalaba Creek system.

While the Pilliga Road can be cut by backwater flooding from the Namoi River, runoff from the Pilliga Scrub area can be sufficient to inundate the low level causeway crossing of Wee Waa Lagoon.

The key features of Namoi River flooding at Wee Waa are as follows:

- All major roads out of Wee Waa would be cut by major Namoi River flooding.
- While floodwater would generally not exceed 1.2 m depth along the northern side of the Town Levee during a 5% AEP flood, it would exceed 2 m depth along its southern side. Riverine type flooding will restrict the capacity of local drainage internal to the Town Levee. Pumps will be required to reduce local catchment inundation inside the levee when the Namoi is in flood.
- Namoi River flooding is unlikely to overtop the Town Levee except for the most extreme floods when depths of inundation at the construction site would exceed 2 metres.

Figure 5 (2 sheets) shows the indicative extent and depth of inundation on the Namoi River floodplain in the vicinity of Wee Waa, while **Figure 6** shows the flood hazard at the portion of the construction site that is located external to the Town Levee for a 1% AEP Namoi River flood.

Figure 1 shows the location of the existing network of stream gauges that are located on the Namoi River floodplain in the vicinity of Wee Waa, while **Table 2.1** sets out their period of record.

TABLE 2.1
STREAM GAUGE DATA AT WEE WAA(1)

Station Number	Gauge Name	Period of Record
419002	Namoi River at Narrabri	January 1982 to date
419003	Narrabri Creek at Narrabri	August 1891 to date
419039	Namoi River at Mollee	September 1965 to date
419900	Namoi River at Glencoe	May 1995 to date
419060	Namoi River at Gunidgera Weir – Storage Gauge	November 1975 to date
419059	Namoi River at Downstream Gunidgera Weir	April 1976 to date
419061	Gunudgera Creek at Downstream Regulator	July 1975 to date

1. Refer **Figure 1** for location of stream gauges that are currently in operation at Wee Waa.

Table 2.2 over the page sets out the peak heights on the nearby *Namoi River at Glencoe* stream gauge (GS 419900) (**Glencoe stream gauge**) relative to the elevation of the existing low points in the Town Levee.

2.5 Rate of Rise and Duration

2.5.1 Local Catchment Floods

Flooding inside the Town Levee due to local rainfall runoff could be classified as 'flash flooding'. Flash floods occur in response to intense bursts of rainfall such as that experienced in severe thunderstorms. Local catchment inundation could occur within minutes of an extreme rainfall burst and as a result, there would be no time to issue a warning prior to the rainfall occurring. The Bureau of Meteorology (**the Bureau**) typically provides advanced warning of meteorological conditions that might produce extreme rainfall events. Workers on the construction site should be prepared to evacuate the site in the event of heavy rainfall.

TABLE 2.2
PEAK HEIGHTS ON GLENCOE STREAM GAUGE CORRESPONDING WITH LOW POINTS ALONG TOWN LEVEE(1)

Location	Town Levee Chainage(2)	Peak Height on Glencoe Stream Gauge when Low Point First Overtopped (m)
Narrabri West Walgett Railway	4700	7.40(3)
Narrabri West Walgett Railway	7000	7.89(3)
Kamilaroi Highway	2200	8.70
Vera Leap Road	5600	8.78
Myalla Lane	8600	8.98

1. Source: Lyall & Associates, 2019
2. Refer **Figure 2**, sheet 2 for Town Levee Chainages
3. Gauge level corresponds to the level of the rail line. Concrete flood barriers which are about 1.5 m in height are installed at the location of the rail crossings during a flood event.

Local catchment flooding could also occur in response to an extreme rainfall burst concurrent with Namoi River flooding. Inundation of the site may occur more quickly and for smaller rainfall events due to restrictions to the drainage system when flood levels outside the Town Levee result in the closure of the penstock gate.

For the purposes of flood emergency response planning, it would be reasonable to assume that the site could be isolated by flooding within 15 minutes of extreme rainfall occurring.

2.5.2 Namoi River Floods

Namoi River floods typically occur due to wider spread rainfall in the upper catchment to the east. Since the catchment is large, floodwaters take more time to accumulate and travel downstream to Wee Waa. Namoi River flooding at Wee Waa usually occurs during La Nina wet periods. Flooding in Wee Waa would also typically be associated with releases from Keepit Dam in the upper catchment. As a result, Wee Waa usually has up to three days warning of a peak flood height, as well as up to two days warning of when the town may be isolated by road. Isolation of the town may be ongoing for days to weeks at a time, depending on the duration of the rainfall over the wider catchment.

2.6 Potential Flood Risks at the Construction Site

While the construction of the works would significantly reduce the extent, depth and duration of inundation on the site, especially for the more frequent events, there is still the potential for floodwater to impact construction activities. Without the implementation of appropriate management measures, the inundation of the construction site by floodwater has the potential to:

- Cause damage to the proposal works and delays in construction programming
- Inundate site sheds and limit access to the site
- Pose a safety risk to construction workers
- Detrimentally impact the downstream waterways through the transport of sediments and construction materials by floodwaters
- Obstruct the passage of floodwater and overland flow through the provision of temporary measures such as site sheds and stockpiles, which in turn could exacerbate flooding conditions in existing development located outside the construction footprint.

3 FLOOD FORECASTS AND WARNINGS

3.1 Flood Warning

Monitoring the weather forecasts and warnings is an important step in managing the flood risks at the site.

3.1.1 General Bureau of Meteorology Warnings and Data

The Bureau forecasts rainfall and publishes maps which can be used to estimate the amount of rain expected to fall over the next eight and four days, as well as the next 24 hours. This information is available at: http://www.bom.gov.au/jsp/watl/rainfall/pme.jsp. This provides an indication as to whether significant rainfall is expected in the region and can be used to place workers on alert. New South Wales Weather Warnings are issued by the Bureau and can be found at the following link:

http://www.bom.gov.au/nsw/warnings/

Key warnings which staff will need to look out for include Severe Weather Warnings, Flash Flood Warnings (local catchment) or Flood Warnings for riverine floods.

A **Flood Warning** is issued when the Bureau is more certain that flooding is expected, often when rainfall has started to fall. Flood Warnings are more targeted and are issued for specific catchments or even sub-catchments in some of the larger river basins. Flood Warnings will generally include specific predictions of the severity of expected flooding.

The radar service on the BoM website also shows current rainfall location and intensities. The radar station to be used for the site would be the Namoi (Blackjack Mountain) Radar Loop radar at:

http://www.bom.gov.au/products/IDR693.loop.shtml#skip

The Bureau also provides information on river levels. General information about recent rainfalls and river levels in the Namoi catchment can be observed at the following link:

http://www.bom.gov.au/nsw/flood/northwest.shtml.

It will be the responsibility of the Site Manager to monitor these daily and more frequently when a relevant warning has been issued.

3.1.2 Observed Flood Levels

Flood levels at the Glencoe gauge at Wee Waa and for Narrabri Creek gauge can respectively be observed at the following links:

http://www.bom.gov.au/fwo/IDN60235/IDN60235.053105.plt.shtml

http://www.bom.gov.au/fwo/IDN60235/IDN60235.054152.plt.shtml.

Flood levels at these gauges are related to three flood thresholds: Minor Flooding, Moderate Flooding and Major Flooding. The Bureau definitions for these thresholds are provided below:

Minor flooding

Causes inconvenience. Low-lying areas next to water courses are inundated. Minor roads may be closed and low-level bridges submerged. In rural areas, removal of stock and equipment may be required.

Moderate flooding

In addition to the above, the area of inundation is more substantial. Main traffic routes may be affected. Some buildings may be affected above the floor level. Evacuation of flood affected areas may be required. In rural areas removal of stock is required.

Major flooding

In addition to the above, extensive rural areas and/or urban areas are inundated. Many buildings may be affected above the floor level. Properties and towns are likely to be isolated and major rail and traffic routes closed. Evacuation of flood affected areas may be required. Utility services may be impacted.

Note the following key levels gauge levels at the Glencoe gauge:

- Kamilaroi Highway closes at gauge height 6.5 m
- Yarrie Lake Road closes at gauge height 6.7 m

At flood levels at or above 6.7 m Wee Waa will be isolated to road traffic.

3.1.3 NSW SES

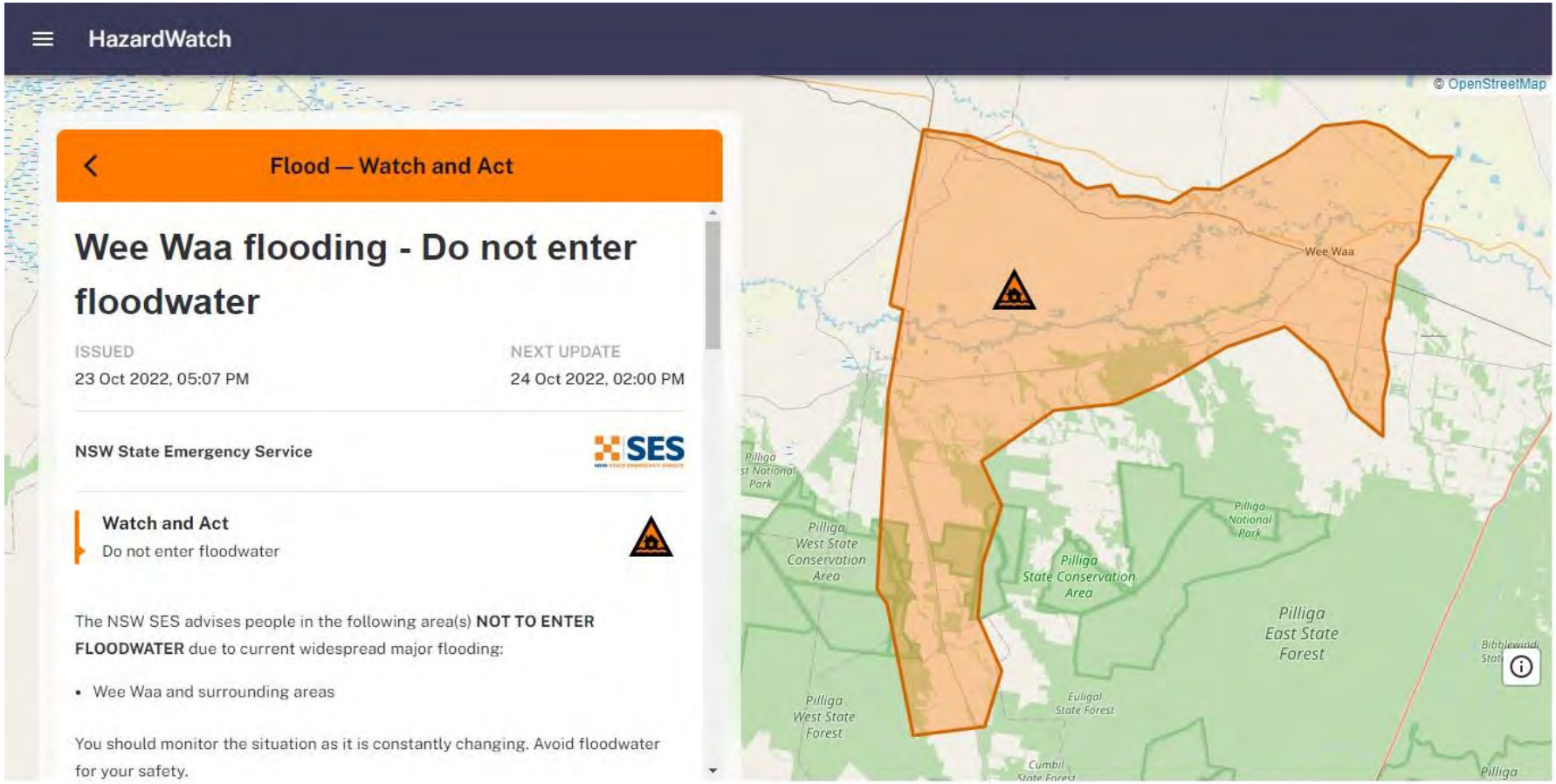
The NSW State Emergency Service (**NSW SES**) provides up to date flood information on its HazardWatch system (https://www.ses.nsw.gov.au/) Hazardwatch provides up to date information and advice for the Wee Waa area. An example of the Hazardwatch site is provided in illustration over. This site provides information on flood preparation, evacuation orders, road closures and more general advice on good practice during floods.

The NSW SES can also be followed on social media @NSWSES

For emergency help in floods and storms call the NSW State Emergency Service on 132 500. In life threatening situations, call Triple Zero (000) immediately.

3.1.4 Live Traffic NSW

Up to date information on traffic and road closures can be found at livetraffic.com.au or 132 701.


HazardWatch
Flood — Watch and Act
Wee Waa flooding - Do not enter floodwater
ISSUED
23 Oct 2022, 05:07 PM
NEXT UPDATE
24 Oct 2022, 02:00 PM
NSW State Emergency Service
SES
Watch and Act
Do not enter floodwater
The NSW SES advises people in the following area(s) NOT TO ENTER FLOODWATER due to current widespread major flooding:
• Wee Waa and surrounding areas
You should monitor the situation as it is constantly changing. Avoid floodwater for your safety.
© OpenStreetMap
Wee Waa
Pilliga National Park
Pilliga West State Conservation Area
Pilliga State Conservation Area
Pilliga National Park
Pilliga East State Forest
Pilliga West State Forest
Euligal State Forest
Cumbil State Forest
Pilliga
For emergency help in floods and storms, call the NSW State Emergency Service: 132 500 · In life threatening situations call triple zero: 000

4 FLOODPLAIN EMERGENCY RESPONSE

4.1 Emergency Response Philosophy

This Construction FERP recognises that protection of life is of critical and primary importance.

Consistent with any emergency protocol, the protection of all lives is the first priority, the comfort of staff and visitors is second, and protection of site property is third.

Whilst there may be financial consequences arising from flood events, the Site Manager has full knowledge that there is a possibility that flooding will enter the site during the expected construction period.

It is incumbent on the owners and operators of the site to take all necessary measures outside of this Construction FERP to manage the financial risks which flooding poses. This Construction FERP is principally concerned with the safety of staff and contractors at the site. All flood emergency responses undertaken by the staff are to recognise the primacy of life and wellbeing over profitability.

The proposed response to a flood is that the site should be evacuated and secured under the guidance of the Site Manager until flooding has receded to a safe level enabling activities to resume.

4.2 Site Management

The construction site will have a clear management structure, comprising a Site Manager and subordinate staff. As such, the Site Manager will be ultimately responsible for ensuring every part of this Construction FERP is implemented. The Site Manager may delegate responsibilities to a designated person who can, when required, monitor weather forecasts, ensure basic measures are in place and issue the necessary warnings and actions when flooding reaches the relevant trigger levels.

5 FLOOD EMERGENCY MANAGEMENT PLAN

5.1 Management Actions

Management actions which are applicable to the entire site are included in the following sections. **Appendix A** summarises all of the following actions as a check list to be used before, during and after a flood. **Appendix B** sets out messages for staff and contractors to be communicated via SMS, by (website/social media?) and by telephone in various situations. **Appendix C** contains items which should always be kept on site in case of flood.

5.1.1 Before a Flood

Trigger for Action:

Always

Actions:

- All staff and contractors will be made aware during staff inductions of the possibility of flooding and the procedures to be followed if a flood were to occur.
- A fully charged and functional mobile phone will be kept in the site office whenever the site is occupied.
- A computer with internet access and at least two hours independent power supply will be kept on site whenever the site is occupied
- An emergency contact sheet will be kept on site. A suggested format for these details and other necessary contact details is provided in Appendix D.
- Management will maintain an emergency kit including a portable radio and torch with spare batteries and a first aid kit on site.
- The weather forecast and warnings will be checked each morning when the site opens.

5.1.2 When a Flood is Possible

Triggers for Action:

The Bureau issues a severe weather warning possibly including a severe thunderstorm warning or flash flood warning for Wee Waa area,

OR

The Bureau issues a Flood Warning for the Namoi River,

OR

Intense rainfall

Actions:

The Site Manager responsible for forecast and observation monitoring will monitor forecasts, severe weather warnings, weather radar, and water levels at the Glencoe Gauge and water levels on site at least every hour to monitor approaching floodwaters.

5.1.3 During a Flood

Triggers for Action:

The Bureau issues a Major Flood Warning for the Namoi River,

OR

Flood water is observed approaching the site

Actions:

Major Flood Warning for the Namoi River

The Site Manager or delegate will contact all staff and contractors including those not on site and inform them that Wee Waa will be isolated. Staff on site should follow the directions of the local NSW SES. Staff outside of Wee Waa should not attempt to come to site until advised that flooding has subsided.

Flood water is observed approaching the site

The Site Manager or delegate will contact all staff and contractors including those not on site to advise that the local streets are flooding and not to come to the site until advised that flooding has subsided. The Site Manager or delegate will evacuate and secure the site. The Site Manager or delegate will start the sump pump at the trash rack and monitor it every hour.

5.1.4 After a Flood

Trigger for Action:

For Namoi River flooding the Bureau advises river levels will recede below the major river level AND emergency services advise roads to Wee Waa are open and safe for traffic

For local catchment flooding floodwaters have receded in the surrounding streets,

OR

When emergency services give the all-clear to return to the site

Actions:

- The Site Manager will notify all staff and contractors that the local flood threat has passed and that main roads are open but that other roads may be affected by flooding or debris and they must not drive or walk through floodwaters.
- No staff will be allowed to return to site until floodwaters have subsided and the emergency services have given the all clear to return
- All flood affected parts of the site will be inspected by the Site Manager and declared safe prior to staff and contractors being given the all-clear to return.

- A hazard assessment will be undertaken for the clean-up, safe work methods statements will be prepared and personal protective equipment supplied consistent with the known hazards which can be associated with floods:
    - Slips, trips and falls
    - Sharp debris
    - Venomous animals
    - Contaminated water and sediments
- Following the re-commencement of site activities, a de-brief will be held with key management staff and may involve Council flood staff. The flood event and response, including the use of this Plan and any emergency procedures will be reviewed.
- Changes may be made to this Construction FERP and the requirements for future emergency response should the review identify any improvements which may be made.

6 REFERENCES

AIDR (Australian Institute for Disaster Resilience), 2017. ***"Managing the Floodplain: A Guide ti best practice in Flood Risk Management in Australia"***

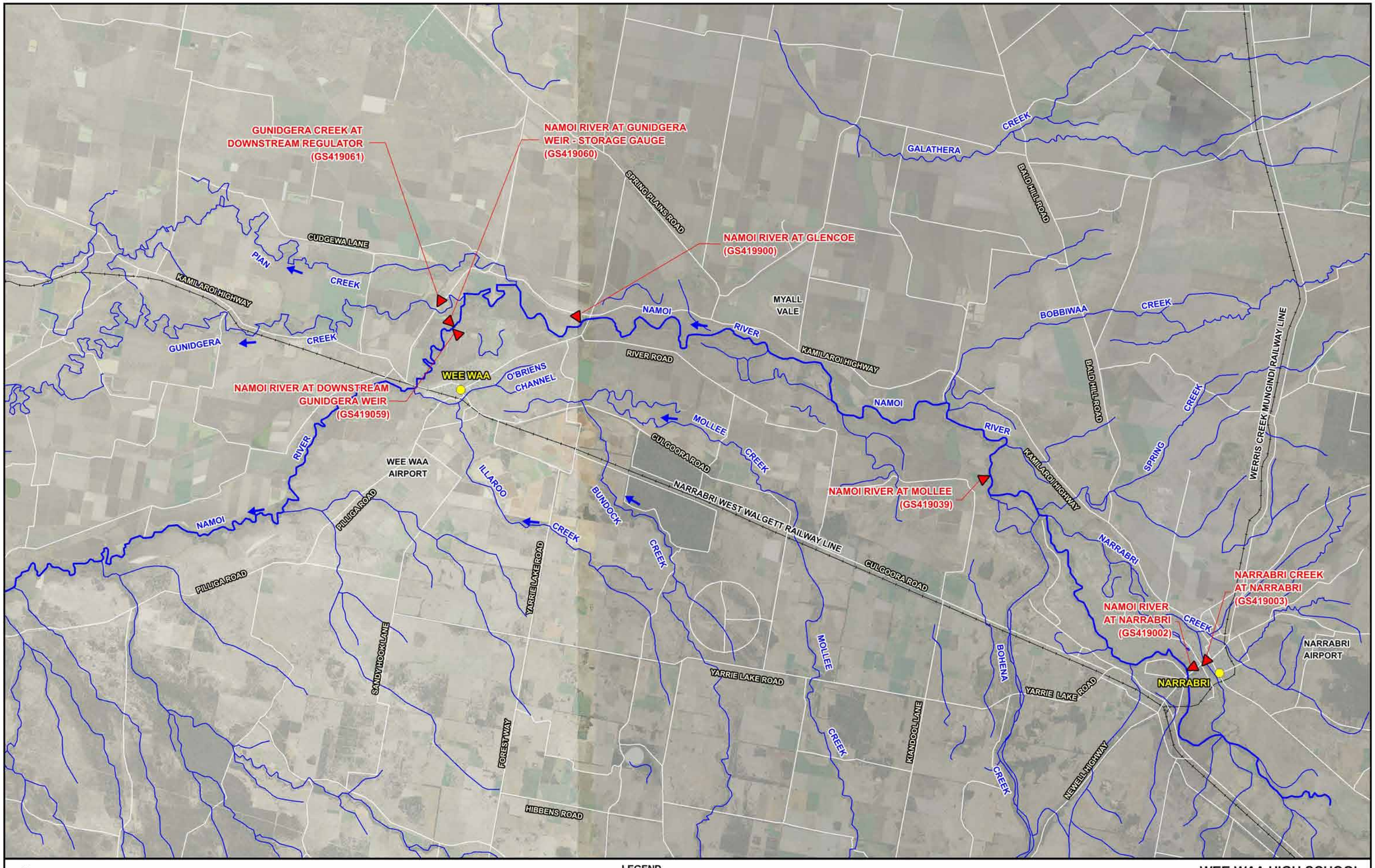
Lyall & Associates, 2019. *"**Wee Waa Levee Risk Management Study and Plan**"*

Lyall & Associates, 2021. "***Wee Waa High School Technical Working Paper: Flooding***"

NSW SES (2015) ***"Narrabri Shire Flood Emergency Sub Plan"**.*

Geoscience Australia (2019) ***"Australian Rainfall and Runoff – A Guide to Flood Estimation"***

FIGURES



N

1.5 0 1.5 3.0 4.5 km

Scale: 1:150,000

LEGEND

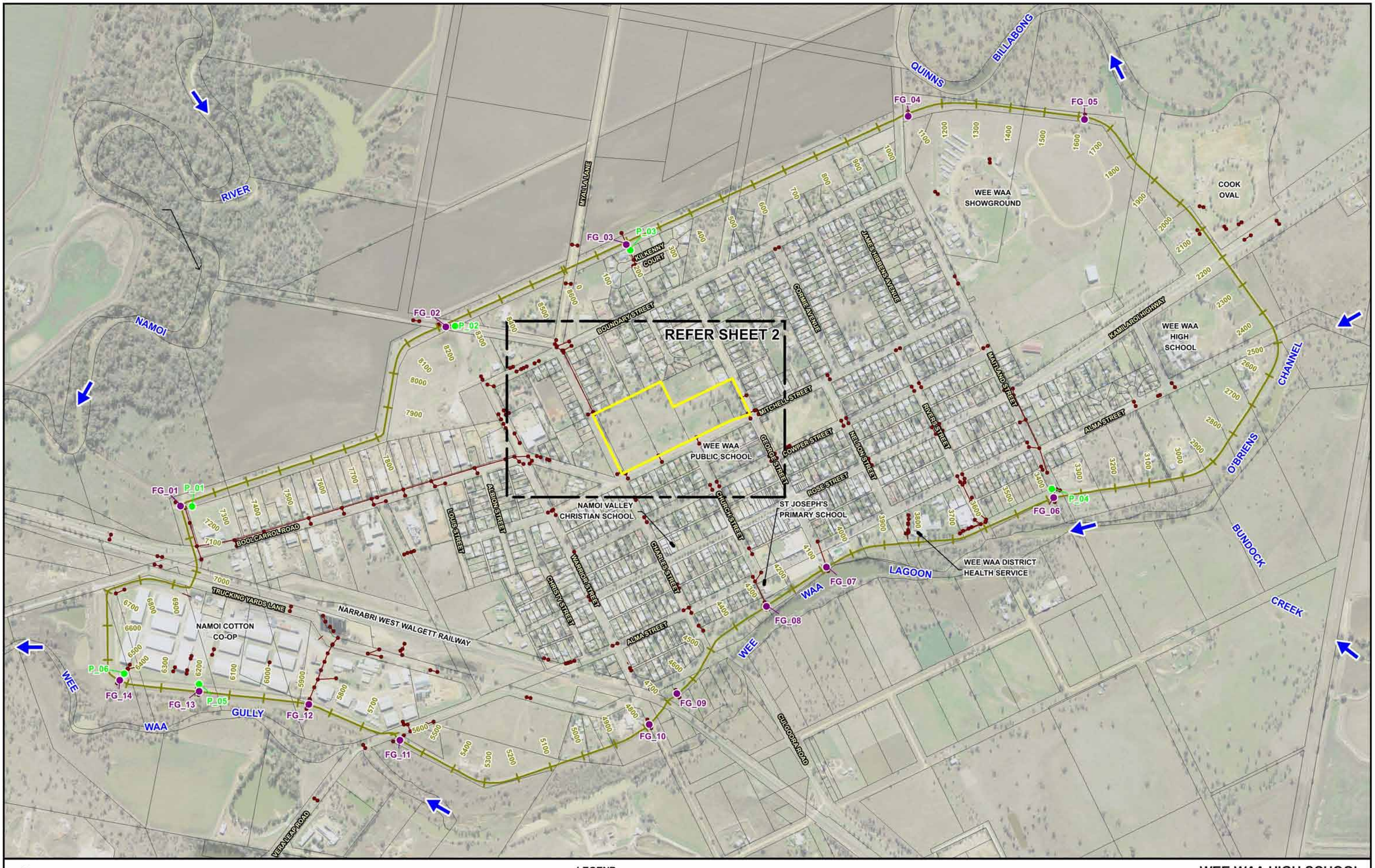
WaterNSW Stream Gauge

Lyall & Associates

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 1

LOCATION PLAN

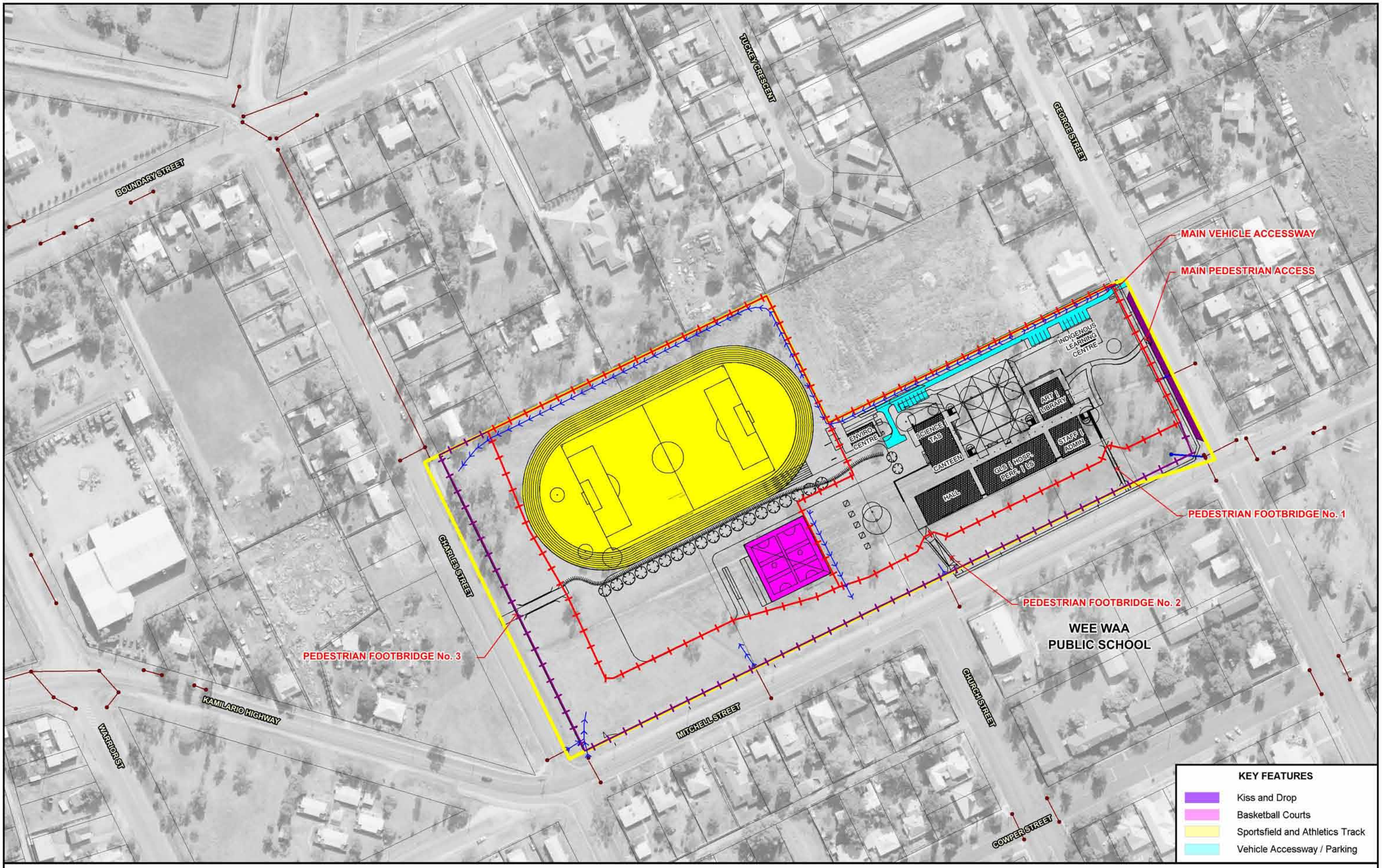


Lyall & Associates

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 2
(Sheet 1 of 2)

KEY FEATURES OF THE PROPOSAL AND FMW



N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

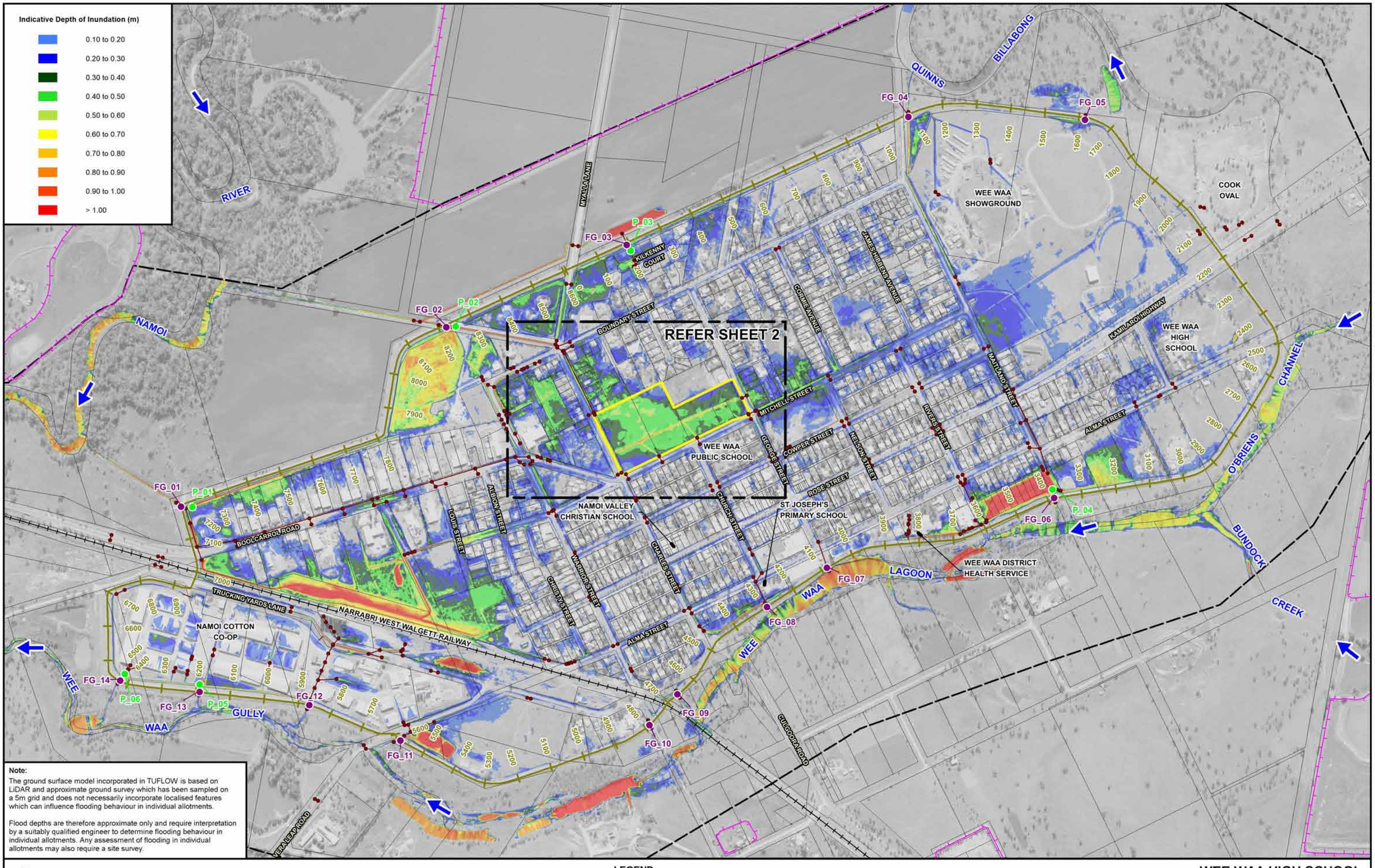
LEGEND

- Existing Drainage System
- Proposed Drainage System
- Proposed 1.2 m High Perimeter Fence
- Proposed 2.1 m High Perimeter Fence
- Proposed Grassed Catch Drain / Swale
- Construction Site Boundary
- Proposal Design Strings
- Proposal Building Footprint

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 2
(Sheet 2 of 2)

KEY FEATURES OF THE PROPOSAL AND FMW



Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

LEGEND

- Existing Levee Centre Line and Chainage
- Existing Rural Levees on Namoi River Floodplain
- Existing Flood Gate Location and Identifier
- Existing Pump Location and Identifier
- Two-Dimensional Model Extent
- Modelled Stormwater Network
- Construction Site Boundary

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 3
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

BOUNDARY STREET

TUCKEY CRESCENT

GEORGE STREET

CHARLES STREET

KAMILARIO HIGHWAY

MITCHELL STREET

CHURCH STREET

COWPER STREET

WEE WAA
PUBLIC SCHOOL

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:
The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Modelled Stormwater Network
- Construction Site Boundary

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 3
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION INTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

BOUNDARY STREET

TUCKEY CRESCENT

GEORGE STREET

CHARLES STREET

KAMILARIO HIGHWAY

MITCHELL STREET

CHURCH STREET

COWPER STREET

WEE WAA
PUBLIC SCHOOL

FLOOD HAZARD VULNERABILITY CLASSIFICATION

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

N

20 0 20 40 60 m

Scale: 1:2,000

Lyall & Associates

Note:

The ground surface model incorporated in TUFLOW is based on LiDAR and approximate ground survey which has been sampled on a 5m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

LEGEND

- Modelled Stormwater Network
- Construction Site Boundary

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 4

FLOOD HAZARD VULNERABILITY CATEGORISATION IN VICINITY OF THE PROPOSAL AND FMW
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.20
- 1.20 to 1.40
- 1.40 to 1.60
- 1.60 to 2.00
- > 2.00

PIAN CREEK
GUNIDGERA CREEK
NAMOI RIVER AT GLENCOE (GS419900)
NAMOI RIVER
RIVER ROAD
YULADUNNA LANE
CUDGEWA LANE
COTTON LANE
MYALLA LANE
GOLF CLUB ROAD
KAMILAROI HIGHWAY
NARRABRI WEST-WALGETT RAILWAY
QUINNS BILLABONG
O'BRIENS CHANNEL
GARDENS ROAD
WEE WAA GULLY
WEE WAA LAGOON
LEAP ROAD
VERA
OLD PILLIGA ROAD
BUNDOCK CREEK
CULGOORA ROAD
CARPENDORE CREEK
MOLLEE CREEK
ILLAROO CREEK
NICHOLSON'S AIRPORT
THE PINES
YARRIE LAKE ROAD
LYNCHS LANE
SANDY HOOK LANE
PILLIGA ROAD

Note:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 20m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

N

600 0 600 1200 1800 m

Scale: 1:60,000

Lyall & Associates

LEGEND

- Two-Dimensional Model Boundary
- Water Surface Elevation Contours (m AHD)
- WaterNSW Stream Gauge
- Existing Town Levee Centre Line
- Existing Rural Levees on Namoi River Floodplain
- Construction Site Boundary

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 5
(Sheet 1 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION EXTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.20
- 1.20 to 1.40
- 1.40 to 1.60
- 1.60 to 1.80
- 1.80 to 2.00
- > 2.00

Note:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 20m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

LEGEND

- Existing Town Levee Centre Line and Chainage
- Construction Site Boundary
- Existing Flood Gate Location and Identifier
- Existing Pump Location and Identifier
- Modelled Stormwater Network
- Water Surface Elevation Contours (m AHD)
- Existing Rural Levees on Namoi River Floodplain

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 5
(Sheet 2 of 2)

INDICATIVE EXTENT AND DEPTH OF INUNDATION EXTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

FLOOD HAZARD VULNERABILITY CLASSIFICATION

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

RIVER
NAMOI
QUINNS
BILLABONG
CHANNEL
O'BRIENS
BUNDOCK
CREEK
LAGOON
WAA
WEE
GULLY
MYALLA LANE
KILKENNY COURT
BOUNDARY STREET
CORMIE AVENUE
JAMES HIBBENS AVENUE
MITCHELL STREET
GEORGE STREET
GOWER STREET
NELSON STREET
RIVERS STREET
MAITLAND STREET
ALMA STREET
KAMILAROI HIGHWAY
ROSE STREET
CHURCH STREET
CHARLES STREET
WARRIOR STREET
CHRISTY STREET
ALBION STREET
LOUIS STREET
BOOLCARROL ROAD
TRUCKING YARDS LANE
NARRABRI WEST WALGETT RAILWAY
GULGOORA ROAD
VERA LEAP ROAD
WEE WAA SHOWGROUND
COOK OVAL
WEE WAA HIGH SCHOOL
WEE WAA PUBLIC SCHOOL
NAMOI VALLEY CHRISTIAN SCHOOL
ST JOSEPH'S PRIMARY SCHOOL
WEE WAA DISTRICT HEALTH SERVICE
NAMOI COTTON CO-OP
FG_01 FG_02 FG_03 FG_04 FG_05 FG_06 FG_07 FG_08 FG_09 FG_10 FG_11 FG_12 FG_13 FG_14
P_01 P_02 P_03 P_04 P_05 P_06

Note:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 20m grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

N

100 0 100 200 300 m

Scale: 1:10,000

Lyall & Associates

LEGEND

- Existing Town Levee Centre Line and Chainage (1000 / 1100)
- Construction Site Boundary
- Existing Flood Gate Location and Identifier (FG_01)
- Existing Pump Location and Identifier (P_01)
- Modelled Stormwater Network
- Existing Rural Levees on Namoi River Floodplain

WEE WAA HIGH SCHOOL
CONSTRUCTION FLOOD EMERGENCY RESPONSE SUB-PLAN

Figure 6

FLOOD HAZARD VULNERABILITY CATEGORISATION EXTERNAL TO TOWN LEVEE
PRE-PROPOSAL AND FMW CONDITIONS - 1% AEP

APPENDIX A - FLOOD ACTIONS CHECKLIST

Before a flood				
Trigger for action	Site status	Action	Responsible	What is needed
Always	At any time	All staff and contractors will be made aware during staff inductions of the possibility of flooding and the procedures to be followed if a flood were to occur.	Site Manager	Hard and soft copies of emergency contact details Staff induction
		A fully charged and functional mobile phone will be kept in the site office whenever the site is occupied	Site Manager	Mobile phone, internet connection
		A computer with internet access and at least two hours independent power supply will be kept on site whenever the site is occupied	Site Manager	Computer or tablet with SIM card, charger and internet access
		An emergency contact sheet will be kept on site	Site Manager	Hard and soft copy of emergency contact details
		Management will maintain an emergency kit including a portable radio and torch with spare batteries and a first aid kit on site	Site Manager	Emergency kit
		The weather forecast and warnings will be checked each morning when the site opens	Site Manager	Internet access

When a flood is possible				
Trigger for action	Site status	Action	Responsible	What is needed
Bureau of Meteorology issues a severe weather warning possibly including a severe thunderstorm warning or flash flood warning for Wee Waa area OR Bureau of Meteorology issues a Flood Warning for the Namoi River, OR Flood water is observed approaching the site	Active	Monitor forecasts, severe weather warnings, weather radar, and water levels at the Glencoe Gauge and water levels on site at least every hour to monitor approaching floodwaters	Site Manager	Internet access

During a flood				
Trigger for action	Site status	Action	Responsible	What is needed
Bureau of Meteorology issues a Major Flood Warning for the Namoi River	Active	Contact all staff and contractors including those not on site and inform them that Wee Waa will be isolated. Staff on site should follow the directions of the local NSW SES. Staff outside of Wee Waa should not attempt to come to site until advised that flooding has subsided.	Site Manager	Mobile phone
Flood water is observed approaching the site	Active	Contact all staff and contractors including those not on site to advise that the local streets are flooding and not to come to the site until advised that flooding has subsided.	Site Manager	Mobile phone
		Evacuate and secure the site.	Site Manager	
		Start the sump pump at the trash rack and monitor it every hour.	Site Manager	

After a flood				
Trigger for action	Site status	Action	Responsible	What is needed
For Namoi River flooding the Bureau of Meteorology advises river levels will recede below the major river level AND emergency services advise roads to Wee Waa are open and safe for traffic For local catchment flooding floodwaters have receded in the surrounding streets OR When emergency services give the all-clear to return to the site	Closed	Notify all staff and contractors that the local flood threat has passed and that main roads are open but that other roads may be affected by flooding or debris and they must not drive or walk through floodwaters	Site Manager	Mobile phone
		No staff will be allowed to return to site until floodwaters have subsided and the emergency services have given the all clear to return	Site Manager	
		All flood affected parts of the site will be inspected by the Site Manager and declared safe prior to staff and contractors being given the all-clear to return	Site Manager	
		A hazard assessment will be undertaken for the clean-up, safe work methods statements will be prepared and personal protective equipment supplied consistent with the known hazards which can be associated with floods: – Slips, trips and falls – Sharp debris – Venomous animals – Contaminated water and sediments	Site Manager	
		Following the re-commencement of site activities, a de-brief will be held with key	Site Manager	

		management staff and may involve Council flood staff. The flood event and response, including the use of this Plan and any emergency procedures will be reviewed.		
		Changes may be made to the Plan and the requirements for future emergency response should the review identify any improvements which may be made	Site Manager	

APPENDIX B – FLOOD EMERGENCY MESSAGES

General Information included in the site induction

The construction site is on a local floodplain and as a consequence can be flooded. Access to the site can be cut when local flooding occurs and if flooded, the site will be evacuated. Local catchment flooding nearby the site may only last for a few hours.

More broadly, Wee Waa can become isolated when the Namoi River is in flood. When Wee Waa is isolated you should not attempt to either come to Wee Waa or leave Wee Waa until the Site Manager, informed by the NSW SES, contacts you and informs you it is safe to come to site.

The site has a comprehensive emergency response plan to deal with all possible emergency situations including flooding.

If a flood affects the site, we will implement our flood emergency response plan to ensure the safety of everyone. We will advise staff and contractors not to try and access the site as it is never safer to drive or walk through floodwaters.

Situation: The site is closed due to local flooding

SMS: There is currently flooding in the vicinity of our site. Site will be closed today. Please do not come to work today. Please confirm receipt by responding YES

Staff who do not respond should be followed up with a telephone call

Situation: Bureau of Meteorology issues a major flood warning

SMS: The Bureau of Meteorology has issued a Major Flood Warning for the Namoi River. All major roads to Wee Waa are cut by floodwaters and closed to traffic. If you are outside Wee Waa do not attempt to come to site. If you are in in Wee Waa please follow the advice of the NSW SES. Never drive or walk through floodwaters. Please confirm receipt by responding YES

Staff who do not respond should be followed up with a telephone call

Situation: After a flood. Flooding has receded and it is safe to return to site

SMS: It is now safe to return to site. Please check your local conditions and remember that it's never safe to drive through floodwaters,

APPENDIX C – FLOOD EMERGENCY ITEMS

Item	Date Checked
Fully charged mobile phone with internet access capabilities	
A computer with internet access and at least two hours independent power supply	
A computer printer	
Soft copies of up-to-date staff and parent/carer contact lists (these can be printed at the start of a flood emergency)	
Flood Emergency Kit - a plastic container clearly marked including • Printed copy of the latest version of this Construction FERP • Two battery operated torches with in-date batteries in each and a set of in-date spare batteries for each • A battery-operated portable radio to listen to ABC radio (100.7 AM) for flood and other warning broadcasts. This must have in-date batteries and a set of in-date spare	

APPENDIX D - EMERGENCY CONTACT LISTS

Note: *This Emergency Contacts List needs to be completed and maintained by management*

Name	Organisation	Role	Contact
	Emergency Services	Fire/ambulance/police	000
	Local Police	Emergency help	000 Direct Police line: 131 444
	State Emergency Service	Emergency Help	132 500
	Bureau of Meteorology	Weather and Flood Warnings	1300 659 218
	Wee Waa Hospital	Medical	02 6795 0400
		Telecommunications	TBA
		Waste Disposal	TBA

APPENDIX E - CURRICULA VITAE OF SUITABLY QUALIFIED AND EXPERIENCED PERSON

LYALL & ASSOCIATES
CONSULTING WATER ENGINEERS

SCOTT BUTTON

YEAR OF BIRTH	:	1971
PROFESSION	:	ENGINEERING
POSITION IN FIRM	:	WATER RESOURCES ENGINEER
NATIONALITY	:	AUSTRALIAN
LANGUAGES	:	ENGLISH

EDUCATION AND PROFESSIONAL QUALIFICATIONS

Master of Engineering Science (University of New South Wales)	1998
Bachelor of Civil Engineering (Hons) (University of New South Wales)	1992

Member, Institution of Engineers Australia

Representative, Sydney Division, Water Engineering Panel

PROFESSIONAL HISTORY

Present	Principal, Lyall & Associates Consulting Water Engineers
1999 - 2001	Hyder Consulting, NSW
1993 - 1999	Lyall & Macoun Consulting Engineers

KEY EXPERIENCE

Scott Button has over 25 years' experience in consulting engineering in the water engineering field. In 1993 he joined Lyall & Macoun Consulting Engineers which was formed in 1983 by Brian Lyall and Ken Macoun. In 1999 he joined Hyder Consulting and held the position of manager of the Water Resources Group for a period of two years. He then rejoined Brian Lyall as a principal of Lyall & Associates Consulting Water Engineers in 2001.

Scott Button has been involved in a number of investigation and design projects within NSW, with key experience in water resources investigations; hydrologic and hydraulic modelling including extensive use of the MIKE 11; RMA-2, TUFLOW, DRAINS, HEC-RAS, RAFTS and RORB software, highway, tunnel and urban drainage investigation and design; storm water management; river engineering, wetland design and creek rehabilitation, catchment yield and water balance investigations using the BOUGHTON daily water yield model.

His work has also included flood and floodplain risk management studies for both coastal and inland river systems involving damage assessment, flood mitigation measures and use of GIS software. As part of these studies he has been extensively involved in the community consultation process.

He has also acted as an Expert Witness in several New South Wales Land & Environment Court matters, as well as one Victorian Civil and Administrative Tribunal matter.

DETAILED SUMMARY

- Flood Study and Floodplain Risk Management Studies jointly sponsored by the relevant councils and the Department of Planning, Industry and Environment at Gunnedah, Wee Waa, Tamworth, Narrandera, Young, Condobolin, Adelong, Tarcutta, Ladysmith, Uranquinty, Adelong, Wollongong, Queanbeyan, Eugowra, Mudgee, Orange, Narromine, Armidale, Quirindi, Grenfell, Gilgandra, Armidale, Wellington, Liverpool, Penrith, Bankstown, Wollongong and Willoughby LGA's (using the RAFTS, RORB, DRAINS, MIKE 11, HEC-RAS, TUFLOW modelling packages).

- Flood Study for Third Crossing of Hunter River (2009) using TUFLOW and later, detailed design of drainage and scour protection measures for RTA.
- Flood Study of the impacts of upgrading the Gore Hill Freeway on flooding on Flat Rock Creek, involving hydrologic and hydraulic modelling by DRAINS and HEC-RAS (2004).
- Flood Study on Auburn Road Catchment Regents Park for Bankstown Council using TUFLOW hydraulic modelling software.
- Flood Study at Box Road Taren Point for development proposal using TUFLOW hydraulic modelling software.
- Flood investigation for Cowra and Gooloogong using MIKE 11 and HEC-RAS.
- Windeyers Creek Flood Study including hydraulic modelling by MIKE 11.
- Upper Nepean River and Tributaries Flood Study involving hydrologic modelling using RORB and hydraulic modelling by MIKE 11;
- Bowmans Crossing Flood Study involving flood frequency analysis and hydraulic modelling of the bridge crossing on the Hunter River by HEC-RAS and two-dimensional finite element modelling.
- Concept and detailed design of pavement drainage and flood retention basins for the upgrade of the Great Western Highway where it crossed the Blue Mountains, for RTA.
- Investigations into cross drainage requirements for the proposed North-West Bus Transitway, an upgraded section of Cowpasture Road north of the Westlink M7 Motorway and Hoxton Park Road west of the Liverpool to Parramatta Bus Transitway, for RTA.
- Detail Design of Pavement and Cross Drainage for Sections 3 and 6 Liverpool-Parramatta Bus Transitway, for RTA.
- Detailed design of constructed wetlands and documentation of creek rehabilitation works along 3 km of the new M5 East Motorway; Ploughmans Creek in Orange, Hammondville Sports Park and Angus Creek at Rooty Hill.
- Investigation of impacts on local drainage systems and flooding of the M2-Gore Hill Freeway Extension and Cross City Tunnel.
- Design of tunnel drainage systems for the M5 East Motorway and Blacktown Bus Transitway, including design of in-tunnel incident management control systems.
- Detailed hydraulic modelling of floodplains traversed by 37km Western Sydney Orbital (M7).
- Flood Study of Lane Cove River to assist in the design of cofferdam works for the Parramatta Rail Link. Development of a Flood Warning System which would be implemented during the construction of the cut and cover tunnel across the river.
- Detailed design of Pavement and Cross Drainage for Liverpool-Parramatta Bus Transitway.
- Investigation and design of trunk drainage systems servicing the South West Sector of Sydney Airport.
- Investigation and design of water quality control structures for urban catchments including Davies Road Padstow; Beresford Avenue Chatswood and Flat Rock Creek Artarmon.
- Daily water balance model studies for assessing the feasibility of wetlands, water storage dams, waste storage facilities, stormwater re-use schemes and mining projects.

APPENDIX J - External Lighting Compliance Certificate

14 October 2022

TAMWORTH | NEWCASTLE | MID NORTH COAST | NORTHWEST

Carter & Osborne Holdings PTY LTD | ABN. 29 622 458 344
3 Wallamore Rd TAMWORTH NSW 2340 | Lic No. 232482C
P. 02 6765 4158 | E. office@carterosborne.com.au

DESIGN STATEMENT

Carter & Osborne Electrical formally endorse the attached nominate design statement below provide by Electrical Projects Australia.

Titled: DESIGN STATEMENT SSDA CERTIFICATE ELECTRICAL SERVICES

Dated – 13th October 2022

Scott Day
Senior Project Manager

Electrical Projects Australia Pty Limited
386 Maitland Road
MAYFIELD NSW 2303
02 4967 5999
mail@electricalprojectsaustralia.com.au
ABN 72 053 112 502

Thursday, 13th October 2022

Carter & Osborne Electrical
3 Wallamore Road
TAMWORTH NSW 2340

Re: DESIGN STATEMENT SSDA CERTIFICATE
ELECTRICAL SERVICES

Project Address: 105 – 107 Mitchell Street, Wee Waa NSW 2388

Project Name: Wee Waa High School

Pursuant to the provisions of Environmental Planning and Assessment Act 1979 (NSW) in respect of the above project –

I, Mathew Campbell,
of Electrical Projects Australia
at 386, Maitland Road, Newcastle

hereby certify that;

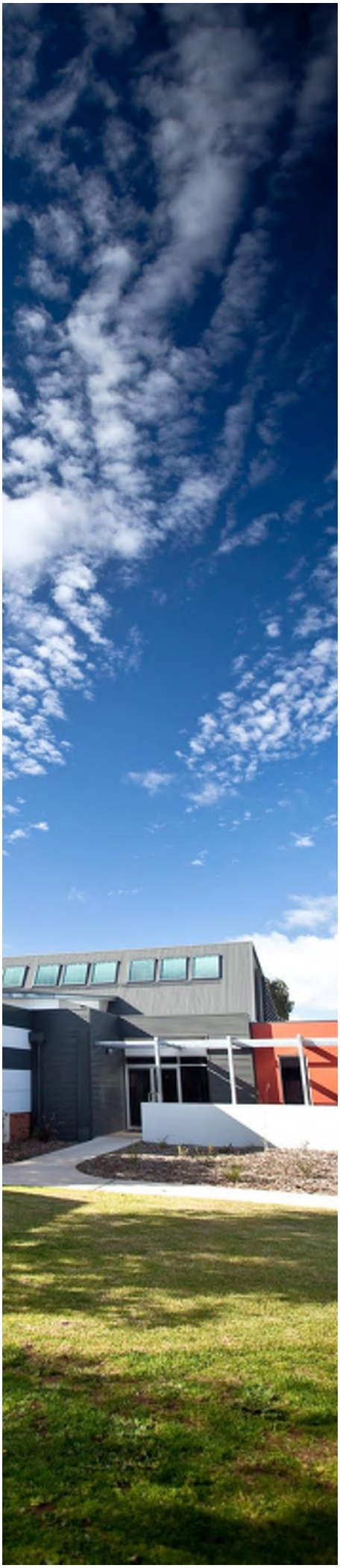
- I am a practicing electrical engineer.
- My relevant qualifications are: B.Eng Electrical
- The electrical elements of the building are designed in accordance with;
    - SSDA Condition B18
    - AS/NZS 1158.3.1-2005 & AS/NZS 1158.3.1-2020 Pedestrian Area (Category P) Lighting,
    - AS4282-2019 Control of Effects of Obtrusive lighting
    - State Significant Development Application (SSDA) 21854025
    - Appendix FF - Lighting Strategy Report – Marline Building Services
    - NSW Dark Sky Planning Guideline 2016

Signed: 13/10/2022

On behalf of Electrical Projects Australia

Built

APPENDIX K - Site Investigation Executive Summary



Detailed Site Investigation

Wee Waa High School
105-107 Mitchell Street
Wee Waa NSW

(Our Reference:35754 ER02)

Disclaimer

This report has been prepared solely for NSW Department of Education in accordance with the scope provided by the client and for the purpose(s) as outlined throughout this report.

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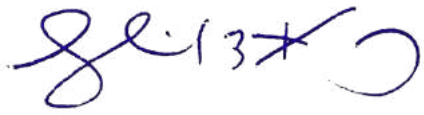
Project Name:	Detailed Site Investigation - Wee Waa High School, 105-107 Mitchell Street, Wee Waa, NSW
Client:	NSW Department of Education
Project No.	35754
Report Reference	35754 ER02
Date:	28/09/2021
Revision:	Final

Prepared by:	**Reviewed by:**
	
Nardus Potgieter MSc(Chem) Environmental Scientist	Jim Sarantzouklis MAIBS MEHA RPIA Director

EXECUTIVE SUMMARY

Barnson was engaged by the NSW Department of Education to carry out a detailed contaminated site investigation in support of the proposed Wee Waa High School development, at 105-107 Mitchell Street, Wee Waa, NSW.

The detailed investigation was undertaken in order to confirm and further investigate the findings of a preliminary site contamination investigation of the property carried out in April 2021, which identified asbestos containing materials as well as elevated levels of heavy metals and poly-aromatic hydrocarbons (PAHs) in samples of surface soil collected from the site. The preliminary site contamination investigation report identified concentrations of lead and zinc that exceeded health-risk and ecological screening values in samples of soil collected in a specific (hot spot) area of the Subject Site. The detailed investigation therefore focussed on the hot spot which is located in the northern portion of Lot 124 DP 757125, and referred to as the Primary Investigation Area.

A review of the available historical information (including contaminated sites databases and aerial photographs) and the findings of the preliminary site investigation concluded that the potential for significant environmental contamination to be present at the site to be low.

A site inspection, supplemented with confirmatory sampling and analysis, was conducted to identify the source of the contamination, determine the average concentrations of lead and zinc in the study area and identify and delineate any hot spot areas. Results of the chemical analysis of the surface soil samples confirm the findings of the preliminary site investigation, finding measurable concentrations of heavy metals, and hydrocarbon compounds and identifying concentrations of lead (Pb) and zinc exceeded the screening levels used in the assessment.

A source-pathway-receptor analysis and refinement of the existing conceptual site model (CSM) indicated the most likely sources of the observed contamination to be lead based paint and galvanised metal that formed part of structures that previously occupied the area or demolition waste that was subsequently disposed of at the site.

The main routes of exposure to these contaminants are through inhalation and ingestion. Surface soil is the only media likely to be contaminated with lead and secondary pathways that have the potential to expose humans to the contaminants include ingestion of contaminated garden crops and animal products. Exposure to elevated concentrations of zinc was assessed as presenting no risk to the health of humans visiting the area. The risks associated with the elevated zinc concentrations relate mainly to impacts to aquatic species and it is reasoned that the location and physical properties of the Investigation Area limit any possibility of risk to the ecology.

The most likely receptors identified for the Primary Investigation Area are visitors to the Subject Site, including students, teachers and parents. Evaluation of the potential for sensitive receptors to be exposed to contaminated soil at the Investigation Area concludes that exposure is possible but does not pose an immediate health risk as exposure to the contaminated soil can be appropriately managed. However, lowering the concentration of hazardous contaminants present in the soil is preferable as the dispersion of the contamination to uncontaminated areas of the Subject Site or even off-site is a concern.

Based on the findings of the further site investigation it is concluded that the Subject Site is suitable for the proposed development, but that use of the area where contamination was detected is subject to removal of fibre cement fragments present in the area and the

implementation of a procedure to either lower the concentration of or lower the likelihood of exposure (i.e. application of soil cover) to the lead (Pb) present in the identified area of the Site.

The following recommendations are made in this regard:

- It is recommended that access to the contaminated area be restricted and that procedures be put in place to prevent the dispersion of contaminated soil to other areas of the Subject Site.
- Based on the findings of the further site investigation it is concluded that the Subject Site is suitable for the proposed development, as there are no contaminants present at the site which are likely to present an immediate risk of impact to the health of humans or the environment from the proposed activities.
- Development of the Investigation Area as part of a playing field is subject to the removal of fibre cement fragments from the surface of the site.
- It is recommended that a Remediation Action Plan (RAP) be developed to inform the removal of the fibre cement fragments from the surface of the site and provide recommendations for the appropriate application of fill as barrier over the contaminated soil.
- It is further recommended that Preliminary Long-term Environmental Management Plan (LEMP) be developed to provide recommendations for the long-term management of the containment.
- A Construction Environmental Management Plan (CEMP) is recommended to be prepared prior to any earth works being commenced. The purpose of the CEMP is for the management of contaminated soil as well as for the management of any excavated soils (which could include contaminated soils) and should include procedures for the classification of the soils as well as for the implementation of sediment and erosion controls for stockpiling of excavated soils.

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APPENDIX L - Site Layout Plan

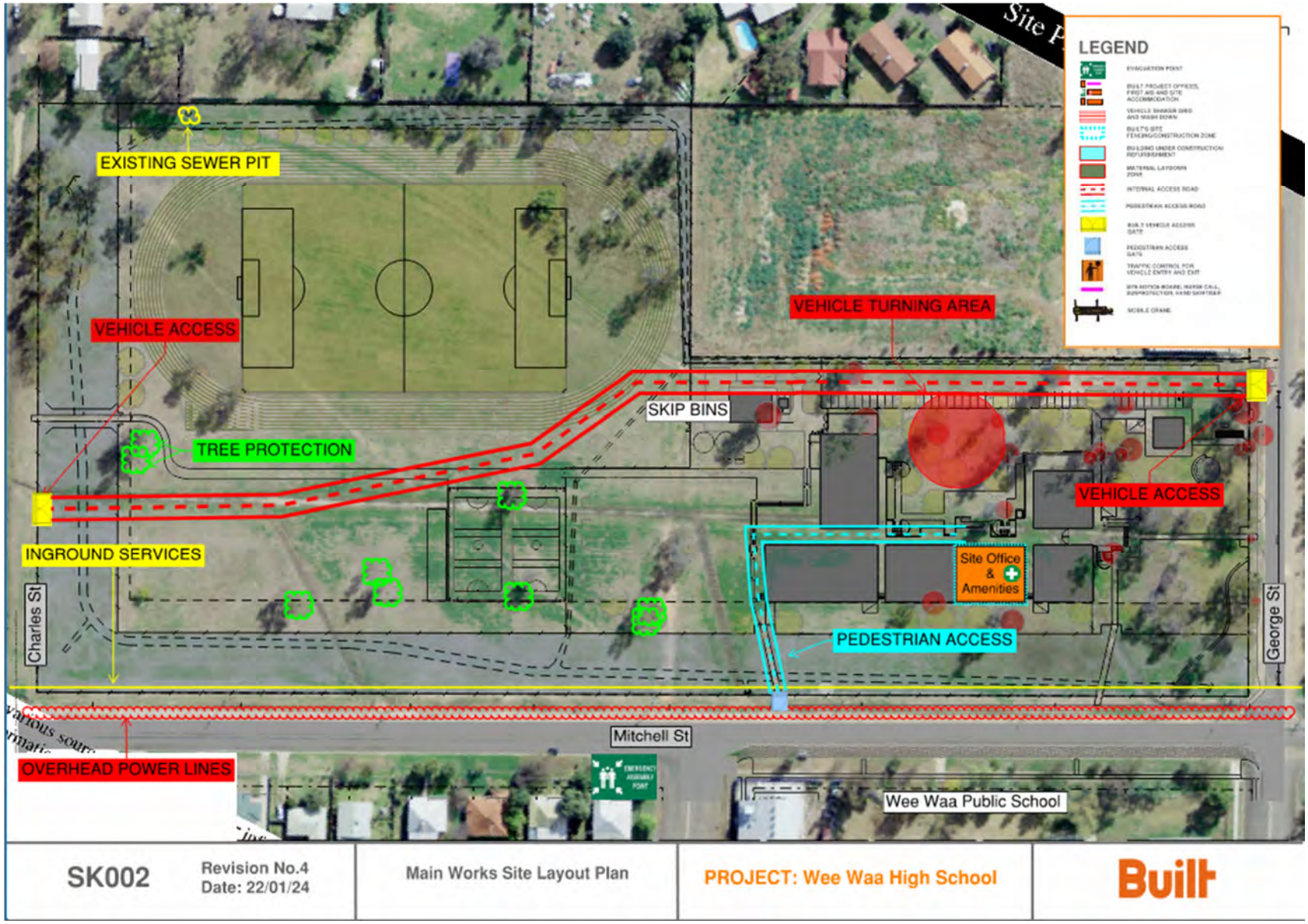

Figure 5 - Site Layout Plan