

Operational Flood Emergency Management Plan

Glenwood High School

SCP Ref: S220004-GHS-CV-SW-RPT-04

Client Richard Crookes Construction

Project Glenwood High School

Date 20 December 2023

Revision table

Rev #	Date	Issue description	Prepared by	Reviewed by	Issued by
01	13/10/2023	For Information	PS	DY	DY
02	16/10/2023	For SES Review	PS	DY	DY
03	20/12/2023	Final Report	PS	DY	DY

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1 Introduction

SCP Consulting has been engaged by Richard Crookes Construction to prepare an **Operational Flood Emergency Management Plan (OFEMP)** for the proposed Glenwood High School (GHS) development to satisfy Condition D30 of the SSDA Conditions (reference: **SSD-23512960**).

Excerpt below:

Operational Flood Emergency Management Plan

D30. Prior the commencement of the operation, a Flood Emergency Management Plan must be submitted to the Certifier that:

- (a) has been prepared by a suitably qualified and experienced person(s);
- (b) is generally consistent with the Preliminary Flood Emergency Management Plan (Ref: 6393, Rev 4), prepared by Enstruct and dated 9 June 2022;
- (c) has been prepared in consultation with NSW State Emergency Service noting the limitations described in the NSW Floodplain Development Manual Appendix N, section N7;
- (d) incorporates and complies with all advice provided by NSW State Emergency Service at D30(b);
- (e) addresses the provisions of the *Floodplain Risk Management Guidelines* (EHG);
- (f) incorporates the following:
 - (i) the flood emergency management protocols for the operational phase of the development;
 - (ii) predicted flood levels within the site and within the adjoining road system and other public land expected to be used by students, staff and visitors;
 - (iii) details strategies such as early or pre-emptive school closure, and other management requirements where relevant and where consistent with SES advice;
 - (iv) provides clear emergency management triggers and responses;
 - (v) details of flood warning time and flood notification;
 - (vi) details assembly points and flood free routes where required;
 - (vii) identifies clear roles and responsibilities for emergency flood management within the school;
 - (viii) recognise that the NSW SES is the lead combat agency for floods and state that any flood response directive issued by the SES must be followed
 - (ix) provide clear messaging and communication protocols;
 - (x) includes clear requirements that the Plan be regularly reviewed; and
- (g) include details of awareness training for employees, contractors, visitors, students and caregivers and induction of new staff members.

Refer to below table for the sections that address the requirement under Condition 34(d):

ITEM ADDRESSED	RELEVANT SECTION
(a) has been prepared by a suitably qualified and experience person(s);	Appendix A
(b) is generally consistent with the Preliminary Flood Emergency Management Plan (Ref: 6393, Rev 4). Prepared by Enstruct and dated June 2022;	Section 3

ITEM ADDRESSED	RELEVANT SECTION
(c) has been prepared in consultation with NSW State Emergency Service noting the limitations described in the NSW Floodplain Development Manual Appendix N, section N7;	Appendix B
(d) incorporates and complies with all advice at D30 (b)	Section 3.2
(e) addresses the provisions of the Floodplain Risk Management Guidelines (EHG);	Section 3, 4, 5
(d)	Section 4
i) the flood emergency management protocols for operation phase of the development	
ii) predicted flood levels within the site and within the adjoining road system and other public land expected to be used by students and visitors;	Section 3
iii) details strategies such as early or pre-emptive school closure, and other management requirements where relevant and where consistent with SES advice;	Section 4, 5, 6
iv) provides clear emergency management triggers and responses;	Section 4.1
v) details assembly points and flood free routes where required;	Section 4.3
vi) identifies clear roles and responsibilities for emergency flood management within the school;	Section 4.2
vii) recognise that the NSW SES is the lead combat agency for floods and state that any flood response directive issued by the SES must be followed;	Section 6
ix) provide clear messaging and communication protocols;	Section 6.1, 6.2
x) include clear requirement that the Plan be regularly reviewed; and	Section 7
(g) include details of awareness training for employees, contractors, visitors, students and caregivers and induction of new staff members;	Section 5, 5.1

The purpose of this OFEMP is to promote a satisfactory awareness of expected flood behaviour and risks, identify measures to become flood prepared and recommended courses of action before, during, and after flood events.

This OFEMP relies on flood modelling and studies completed by Enstruct (reference: Glenwood High School – Civil Engineering Flood Study Report, dated 10/11/2021).

This OFEMP addresses the provisions of the Floodplain Risk Management Guidelines (EHG). Key measures related to preparedness, response and recovery are listed in Table 30 of the Flood Risk Management Guidelines MM01 – Flood Risk Management Measures.

Excerpt below:

Table 30 Typical work needed to support preparedness, response and recovery options

Option	Upfront work	Ongoing work	Complementary work
Flood prediction and warning (Section 4.3.1)	Investigation, design and installation. Operation and maintenance manuals for gauges and information systems or networks.	Maintenance, operation, testing and calibration. Upgrade as technology and requirements change. Monitoring during floods.	Gauging during a flood. Interaction with EM and community awareness.
Review of local flood planning (Section 4.3.2)	Information gathering, investigation, analysis, strategy development, formalisation and communication.	Operational use. Review with changes in flood data and intelligence and FRM measures.	Interaction with flood warning, EM and community awareness.
Evacuation route capacity improvement (Section 4.3.3)	Investigation, design and construction.	Ongoing maintenance.	Interaction with flood warning, EM and community awareness.
Community flood awareness (Section 4.3.4)	Flood behaviour, exposure, impacts and evacuation limitations understood. Flood information available. Clear advice available on how to respond to a flood threat.	Maintain up-to-date advice with changes in knowledge and the implementation of FRM measures. Maintain through regular advice to the community.	Interaction with flood warning, EM, community awareness, FRM plan implementation and flood information through data collection or studies.
Capturing lessons learnt after a flood (Section 4.3.5)	Capture flood behaviour using marks, photos, videos, aerial footage, survey. Collate and report on information.	Securely store information and make it available (see Section 4.1) to inform the FRM, EM and land-use planning as relevant.	Communication with other relevant parties to coordinate and consolidate surveys and information capture and analysis.

Refer to below table for the sections that address the options listed in the above table:

ITEM ADDRESSED	RELEVANT SECTION
Flood prediction and warning	Section 4.1
Review of local flood planning	Section 3.1
Evacuation route capacity improvement	Section 4.3.2
Community flood awareness	Section 5
Capturing lessons learnt after a flood	Section 7

1.1 Site Context

The site is within the grounds of the existing Glenwood High School and is located on the corner of Glenwood Park Drive and Forman Avenue, Glenwood, NSW. The site is bound by residential development to the east (Glenwood Park Drive) and south (Forman Avenue). To the west and north of the site is Glenwood Reserve. Refer to Figure 1 for an aerial view of the site boundary.



Figure 1: Aerial View of Site Boundary (Source: Aerial Survey)

2 Abbreviations

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ARR	Australian Rainfall and Runoff
BCC	Blacktown City Council
BOM	Bureau of Meteorology
FFL	Finished Floor Level
FPL	Flood Planning Level
GHS	Glenwood High School
IL	Invert Level
L/s	Flow in Litres per second
m ³ /s	Flow in cu.m per second
OSD	On-Site Detention
PSD	Permissible Site Discharge
RL	Reduced Level

3 Flood Behaviour

3.1 Flooding Source and Extent

As per the Blacktown City Council Maps Online platform, the site is not identified as flood prone (refer **Figure 2**). The closest flooding extent from Corbin Reserve is considered high risk but is over 2 kilometres away from the site boundary of GHS.

Furthermore, as the site is not in a flood affected area and is not in proximity to any tidal affected or perennial watercourses, the site is not expected to be impacted by rising sea levels due to climate change.

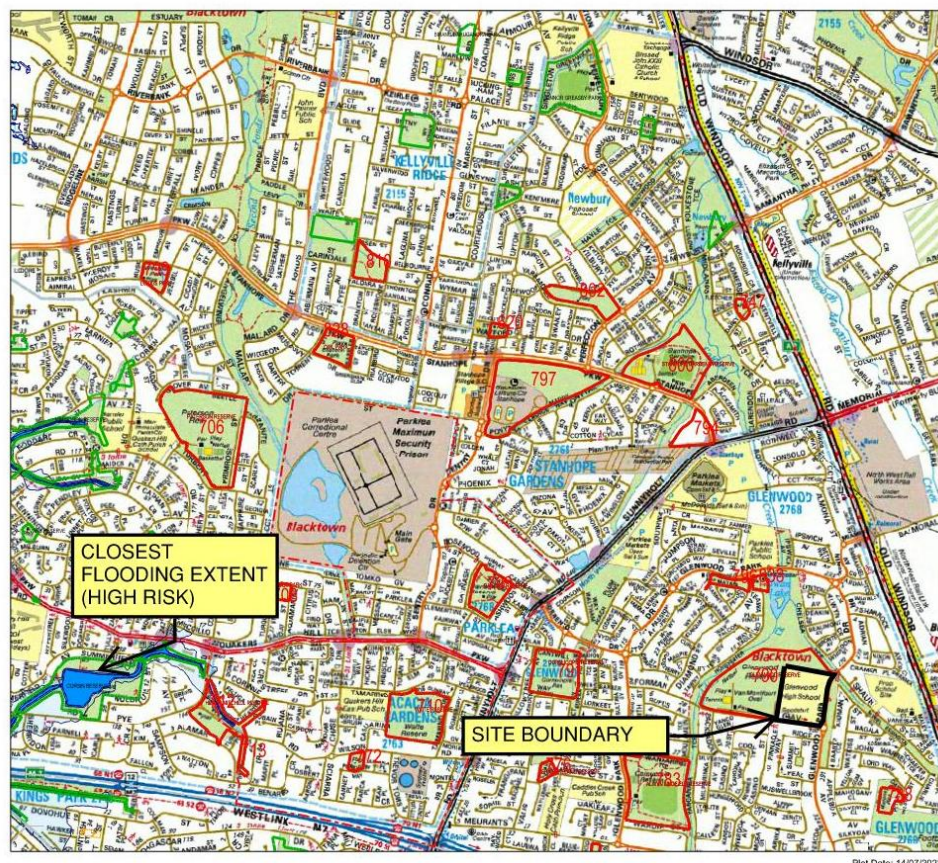


Figure 2: Flood Prone Land Extent (Source: BCC Online Maps)

As per Blacktown Local Overland Flow Path Study, it is noted that the school has been partially identified to be affected by the 10% AEP overland flow path. (refer **Figure 3**). Also overland flow is not categorised as flooding, consideration has been given in preparation for this report.

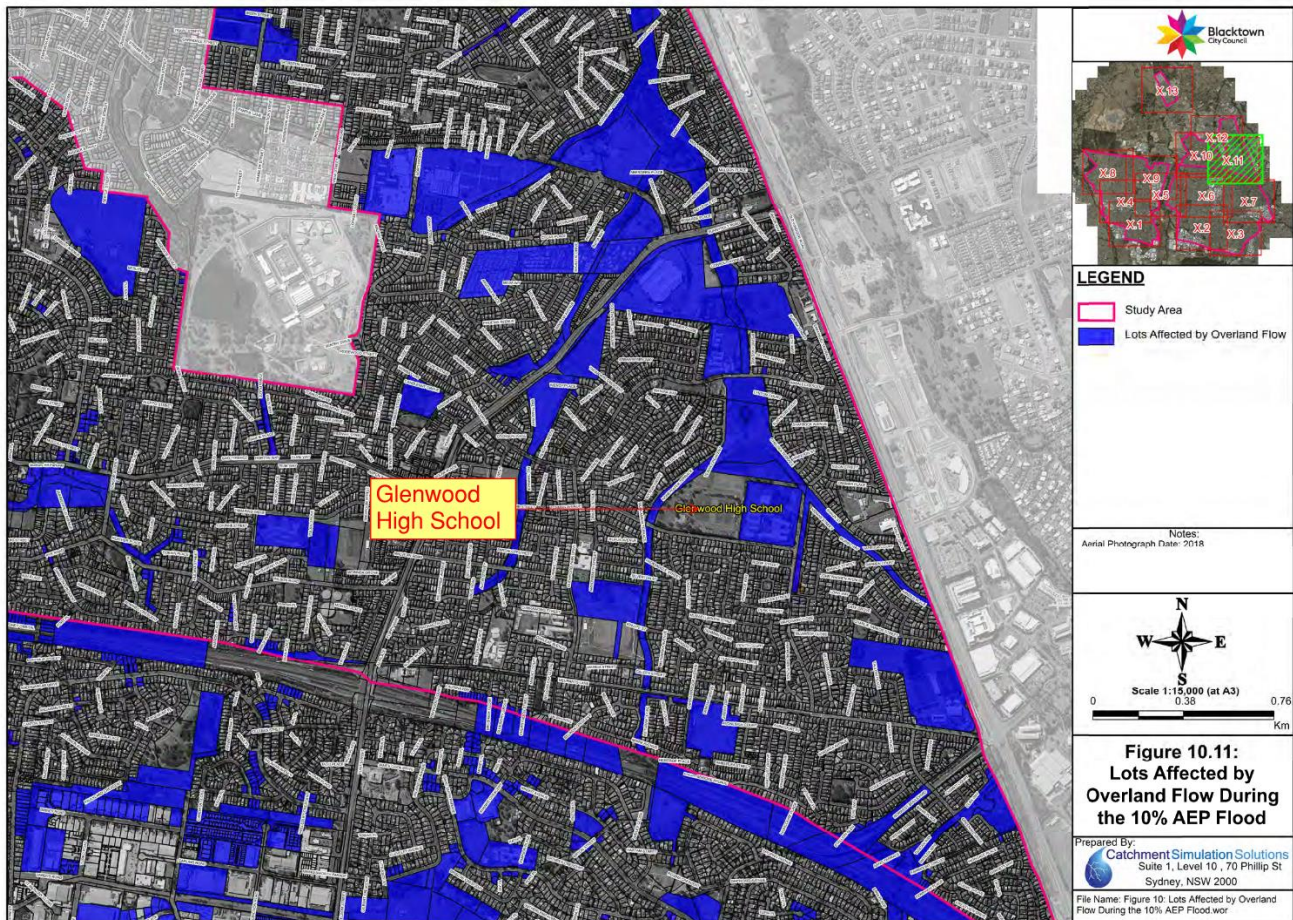


Figure 3 Lots Affected by 10% AEP Overland Flow (Source: Blacktown Local Overland Flow Path Study Revision 2 Volume 2)

3.2 Flood Categorisation

The school site is designated as a **Low Hazard Risk** area due to the predicted extents of the 1% AEP flood as shown in Figure 3. The development site is approximately 50m away from the 1% AEP flood extent within Glenwood Reserve to the north. The development site is also generally RL 64.00 to 60.90. This is at least 1.6m above the adjacent flood level in Glenwood Reserve of RL 58.30.

Flood results demonstrate that the proposed new building location is not susceptible to flooding during the 1% AEP, 0.5% AEP and 0.2% AEP flood events as the flood water is contained within the road reserve of Glenwood Park Drive and the drainage channel/water course. Minor flooding is observed in the PMF flood event. A maximum flood depth of 0.5m is expected throughout the school campus with between 0-0.5m of flooding through the Main Works Building area during the PMF.

Refer to Figure 3, Figure 4, Figure 5 and Figure 6 for the 1% AEP, 0.5%, AEP 0.2% AEP and PMF flood extents, respectively. The critical storm duration has not been identified in the project flood report however based on the site being in an urban environment it is understood that flood presented below would occur as flash flooding over the course of minutes and hours rather than days.



Figure 4: 1% AEP Flood Extent and Levels (Source: Enstruct)



Figure 5: 0.5% AEP Flood Extent and Levels (Source: Enstruct)



Figure 6: 0.2% AEP Flood Extent and Levels (Source: Enstruct)



Figure 7: PMF Flood Extent and Levels (Source: Enstruct)

In accordance with the Floodplain Risk Management Guidelines, the site can be categorised in an emergency response planning (ERP) context for the following events:-

- 20% AEP: Indirectly Affected Areas (IAA)
- 1% AEP: Indirectly Affected Areas (IAA)
- PMF: Areas with Overland Escape Routes (OER)

IAs are areas which are outside the limit of flooding and therefore will not be inundated nor will they lose road access. However, they may be indirectly affected as a result of flood damaged infrastructure or due to the loss of transport links, electricity supply, water supply, sewerage or telecommunications services and therefore may require resupply or evacuation.

OERs are areas where access roads to flood free land cross lower lying flood prone land. Evacuation can take place by road only until access roads are closed by floodwater. Escape from rising flood water is possible but only by walking overland to higher ground. Anyone not able to walk must be able to be reached by boat or aircraft.

4 Flood Response

4.1 Flood and Evacuation Warnings

A network of rainfall gauge stations is maintained throughout the Georges River and Woronora River catchment (Flood Watch Area No. 54). These stations provide information to the Bureau of Meteorology (BOM) as one source of information informing their flood warning system.

BOM should issue flash flood warnings through radio, television and through their website: <http://bom.gov.au>. Additionally, the NSW State Emergency Service (SES) may issue a flood bulletin, evacuation warning or evacuation order.

The BOM warning types are as follows:

4.1.1 Flood Watch

A 'flood watch' is issued when forecast rainfall suggests that local flash flooding and/or riverine flooding is possible. The purpose of a flood watch is to provide early advice of a developing situation that may lead to flooding. A flood watch isn't a warning of imminent flooding.

A flood watch can be issued up to four (4) days in advance of expected flooding. Flood watches are updated daily (minimum) and are finalised once all areas covered by flood warnings, or the risk of flooding has passed.

4.1.2 Flood Warning

A 'flood warning' is issued when flooding is expected at a particular location. Flood warnings are more targeted and are issued for specific catchments and locations within catchments. The severity of the flood is also forecasted in each flood warning as minor, moderate or major.

- Minor flooding: causes inconvenience, low-lying areas next to water courses are inundated, minor roads closed and low-level bridges submerged.
- Moderate flooding: evacuation may be required, traffic routes may be affected, some buildings may be affected above floor level.
- Major flooding: evacuation may be required, many buildings affected above floor level, traffic routes closed, utility services may be affected.

Flood warnings cover larger rivers that take more than six hours to respond to rainfall.

4.1.3 Severe Weather Warning

BOM does not issue warnings for flash flooding. Instead, a Severe Weather Warning may be issued. Severe weather warnings are provided for potentially hazardous or dangerous weather including very heavy rain that may lead to flash flooding. They are issued whenever severe weather is occurring or is expected to develop or move into an area.

This type of warning is anticipated to be the main trigger for flood response protocols to be implemented on this project due to the flash nature of flooding that could occur.

4.2 Flood Response Personnel

Flood wardens are to be appointed who will be available to monitor river/creek and rainfall conditions and who will have access to contact details for all personnel on site. It is recommended that the flood wardens be persons who are frequently on site and who are familiar with the daily

school activities and operations. The flood wardens shall be rostered to ensure at least one flood warden is on campus on any school operation days.

4.3 Assembly and Evacuation Routes

4.3.1 Emergency Assembly Area

The southern of the campus has been nominated as the emergency assembly point as shown in **Figure 7**. Levels in this area are approximately RL 66 mAHD. This is at least 8 m above the adjacent 1% AEP flood level. This location is easily accessible and within view of students, staff and visitors.

Once everyone has assembled and been accounted for, evacuation will be undertaken as required to the agreed refuge location.

4.3.2 Evacuation Route

It is recommended to evacuate to the quadrangle in the existing site, as this is further away from the flooded area including Glenwood Reserve. students, staff and visitors are then to evacuate in a southerly direction, towards Forman Avenue, away from expected flood waters in up to the PMF flood events.

It is unlikely that students, staff and visitors will be on campus during a PMF event. It is expected that school will be suspended well ahead of the PMF event occurring. students, staff and visitors will be required to evacuate in a PMF event prior to inundation occurring.

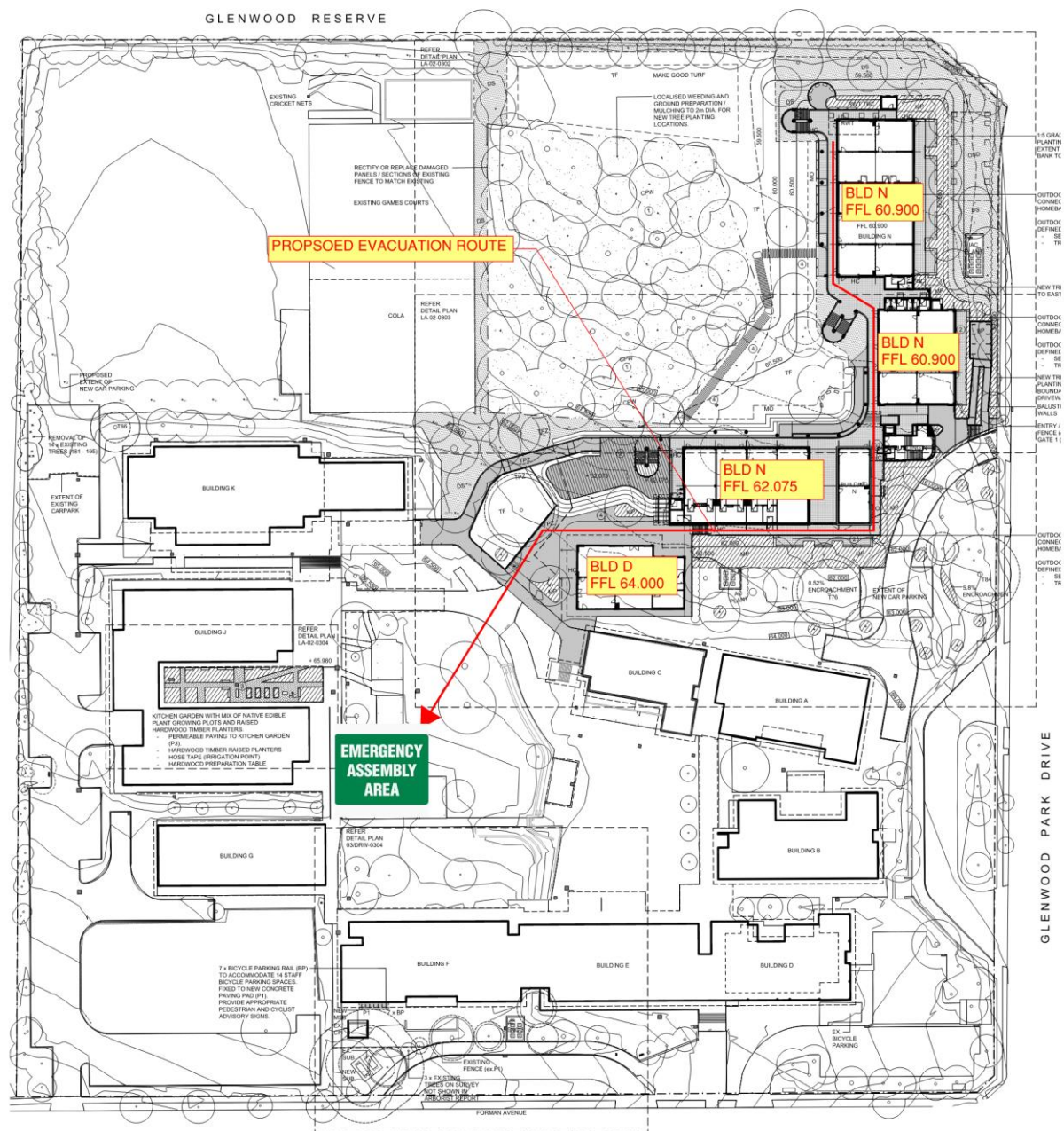


Figure 8: Proposed Emergency Assembly Area and Evacuation Route

4.4 Emergency Contact

For emergency assistance during flood events, contact SES on 132 500.

If a life-threatening situation emerges, contact Police, Fire and/or Ambulance on 000.

5 Flood Response Preparation

All school staff and students are to be familiar with the contents of the OFEMP. Reading of the OFEMP should be part of the site induction of all visitors and contractors.

5.1 Evacuation Drills

Evacuation drills are designed to increase flood awareness. Evacuation drills are to be undertaken within the first month of every school semester to familiarise all staff and students with the procedures when responding to a flood event.

The evacuation drills shall ensure all staff and students are to be aware of the emergency assembly point and the emergency refuge point.

5.2 Flood Emergency Kit

The SES recommends that the following items are prepared in a flood emergency kit:

- Air horn and handheld loudspeaker
- Portable radios with spare batteries
- A torch with spare batteries
- A first aid kit
- Candles and waterproof matches
- Waterproof bag for valuables

When leaving or evacuating, the following are to be placed into the emergency kit:

- Sign in book for visitors and contractors
- Individual Health Care items such as asthma puffers, diabetes medication and Epi pens, etc.
- Drinking water and non-perishable food items.

The flood emergency kit should be kept in a waterproof container in an easily accessible location. The contents of the kit and management during a flood event will be the responsibility of the **Flood Wardens**.

The flood emergency kit is to be checked periodically (monthly) to ensure all items are in suitable working order.

5.3 Monitoring of Weather

It is the responsibility of the Flood Wardens to monitor the weather situation to be aware if any warnings have been issued. This is to be actioned by checking of radio, television and the BOM website.

6 Flood Response Actions

Note the NSW SES is the lead combat agency for floods. Any flood response directive issued by the SES shall take precedence over this OFEMP and must be followed;

6.1 Before Flooding

In order to mitigate the risk to life of students, staff and visitors, it is recommended that school be suspended when Severe Weather Warning for heavy rain is issued by the Bureau of Meteorology, or on any day there is reasonable chance of rainfall up to 150mm (i.e. greater than 50% of rainfall of 100-150mm). This number represents the amount of rainfall required to produce a 1% AEP flood event.

It is also recommended that all students are to remain inside the school buildings during 10% AEP storm events (i.e. greater than 50% of rainfall of 70-100mm) to mitigate risk associated with local overland flow.

The Flood Warden is responsible for reviewing weather forecasts daily and distributing notification of cancellation of staff and contractors.

Consideration should also be given to:

- Securing objects/plant that are likely to float and cause damage.
- Turning off mains power, water and gas
- Relocating chemicals above the predicted water level

6.2 During Flooding

If a flood warning is issued:

- Flood Warden to activate project siren/hooter to raise alarm.
- Flood Warden to collect attendance register.
- Flood Warden to emergency assembly point
- Flood Warden to conduct roll call to establish if anyone is missing.
- Evacuate to refuge point as required.
- Wait at refuge point until the flooding has passed.
- Maintain regular communication with staff and contractors.

6.3 After Flooding

Once flooding is cleared and the Possible Rainfall is less than 150mm as issued by Bureau of Meteorology

- A thorough check of services such as electricity, sewer, water and gas should be undertaken by qualified persons.
- Advice should be sought from a suitably qualified engineer as to the structural integrity of surrounding buildings.
- Personal protective equipment should be worn during the clean and disinfection should be used.

7 Revision of the OFEMP

This plan should be revised if the expected flood behaviour within the catchment changes.

The OFEMP should also be reviewed periodically and updated to reflect school activities and/or changes in personnel on campus.

Flood levels and damages to be recorded and reported to the local authority, SES and BOM. Incidents during the flooding and evacuation are to be recorded and reported to a suitably qualified person to review and update the OFEMP.

8 References

1. Blacktown City Council (2022, June 29) *BCC MapsOnline*, Blacktown City Council, <https://maps.blacktown.nsw.gov.au/>
2. Blacktown Local Overland Flow Path Study Revision 2
https://flooddata.ses.nsw.gov.au/dataset/report_1
3. Bureau of Meteorology (2022, June 29) *Flood Warning Services*. Bureau of Meteorology.
<http://www.bom.gov.au/water/floods/floodWarningServices.shtml>
4. Department of Environment and Climate Change (2007) *Flood Emergency Response Planning Classification of Communities*, Department of Environment and Climate Change,
<https://www.environment.nsw.gov.au/-/media/OEH/Corporate-Site/Documents/Water/Floodplains/floodplain-risk-management-guideline-flood-emergency-response-160732.pdf?la=en&hash=07081CD0D12ABA36C56C7BDBBA4F829FA2D86738>
5. Department of Planning and Environment (2022, June 29) *Floodplain Risk Management Guidelines*, Department of Planning and Environment,
<https://www.environment.nsw.gov.au/topics/water/floodplains/floodplain-guidelines>
6. Enstruct (2021), Glenwood High School – Civil Engineering Flood Study Report
7. NSW State Emergency Service (2022, June 29) *Emergency Kit*. NSW State Emergency Service. <https://www.ses.nsw.gov.au/floodsafe/prepare-your-home/emergency-kit/>

Appendix A – CV



Derek Yang

Associate Director

Bachelor of Engineering (Civil), Member, Institute of Engineers Australia (MIEA), National Engineering Register (NER), Chartered Professional Engineer (CPEng), Registered Professional Engineer in Queensland (RPEQ), Building Design Practitioner – NSW, Class 2 (DEP), Professional Engineer – NSW, Class 2 (PRE), Master of Project Management (USYD, 2021-2027)

Skills & Expertise

- Stormwater Drainage
- Flood Mitigation
- Traffic Management
- Earthworks
- Pavements
- WSUD

Profile

A chartered professional engineer registered on the National Engineers Register. Experienced in multidisciplinary projects in public and private sectors including residential, commercial, industrial, education, hospitals, defence, public domains etc.

Project Experience

- Liverpool Hospital and Academic Precinct – NSW Health
- Arncliffe Town Centre Upgrade
- Springwood Town Centre Upgrade
- Roberts Park – Canterbury Bankstown Council
- Stringer Reserve – The Hills Shire Council
- Aquatopia Stage 4 and 5 – Fairfield City Council
- Stante Reserve – Liverpool City Council
- HMAS Albatross and Creswell Road Remediation
- Jervis Bay Airfield Refuelling Project – Defence
- HMAS Albatross Tactical Air Navigation Relocation– Defence
- All Saints Catholic School Liverpool
- Marist Catholic School – South Hurstville
- Fairvale Public School – Department of Education
- Greystane High School – Department of Education
- 32 – Storey Hotel on Pitt St
- Canterbury South Public School - – NSW Government
- Dapto Medical Centre – NSW Health
- Showroom at Boundary Road, Peakhurst
- Childcare centre at McEvoy Street, Dapto
- Factory unit at Heath Road, Blakehurst
- Industrial complex at York Road, Ingleburn

Appendix B - SES Recommendations

Our Ref: ID2163

Your Ref:

17 November 2023

Derek Yang
SCP Consulting Pty Ltd
Level 20, 1 Market Street
Sydney NSW 2000

email: derek.yang@scpconsult.com.au

CC: shelly.stingmore@one.ses.nsw.gov.au

Dear Derek,

Flood Emergency Management Plan for Glenwood High School

Thank you for the opportunity to provide comment on the Flood Emergency Management Plan (FEMP) for the proposed development at Glenwood High School.

The NSW State Emergency Service (NSW SES) is the agency responsible for dealing with floods, storms and tsunamis in NSW. This role includes, planning for, responding to and coordinating the initial recovery from floods. As such, the NSW SES has an interest in the public safety aspects of the development of flood prone land, particularly the potential for changes to land use to either exacerbate existing flood risk or create new flood risk for communities in NSW.

As detailed in our previous advice dated 23 May 2022 and 15 December 2021, It is the preference of NSW SES that all schools follow the application of sound land use planning and flood risk management in accordance with the Flood Prone Land Policy, the Flood Risk Management Manual 2023 (the Manual) and supporting guidelines. This includes site design and stormwater management measures that minimise any risk to the community. Furthermore, schools or sections of schools that are at known risk of flooding or isolation are closed prior to flooding commencing and when there is an indication that flooding is likely, for example, when there is a flood warning.

The NSW SES has reviewed the proposed FERP and the flood risk information available to the NSW SES (e.g. Hawkesbury Nepean Flood Plan, Blacktown Local Flood Plan, Flood Studies etc.), noting the proposed development is at risk of flooding in a 10% Annual Exceedance Probability (AEP) overland flow flood¹ and the adjacent roads may be cut by floodwaters, with overland flow expected to affect Glenwood Park Drive in a 20% AEP flood.²

As detailed in the Support for Emergency Management Planning, the NSW SES is opposed to the imposition of development consent conditions requiring private flood evacuation plans

¹ Blacktown Local Overland Flow Path Study Revision 2 Volume 2, May 2020, Figure 10.11, page 108

² Blacktown Local Overland Flow Path Study Revision 2 Volume 2, May 2020, Figure 9.11, page 95

rather than the application of sound land use planning and flood risk management. The NSW SES also does not have statutory authority to endorse or approve flood emergency response plans, however provides the following advice based on the principles outlined in the Guidelines as detailed in Attachment A.

In summary we:

- **Recommend** incorporating overland flow flood information into both the flood report and the FEMP, as the site is affected by overland flow during a 10% AEP flood.³ This was also previously noted in DPIE EES's Response to EIS document.⁴
- **Note** that the primary strategy recommended in the FEMP is to suspend the school prior to the start of the school day if the forecast rainfall is greater than 50% chance of between 100-150mm. However, this is stated to be based on the 1% AEP flooding in the report, which does not include overland flood modelling.
- **Recommend** including an additional trigger for activating the FEMP, such as a Severe Weather Warning for very heavy rain that may lead to flash flooding, as issued by the Bureau of Meteorology.
- **Recommend** reconsidering the location of the Emergency Assembly Area, as we note this is located within the PMF flood extent and is therefore may not provide a flood free route.
- **Recommend** rewording section 6.3 of the FEMP to remove references to "All Clear", as there are currently no detailed warnings provided for Cattai Creek (or Caddies Creek). Additionally, although there is no formal warning system, under the Australian Warning System (AWS) the terminology "All Clear" is no longer used by NSW SES. Refer to the [Australian Warning System](#) Website for further information.

Please feel free to contact Claire Flashman via email at rra@ses.nsw.gov.au should you wish to discuss any of the matters raised in this correspondence. The NSW SES would also be interested in receiving future correspondence regarding the outcome of this referral via this email address.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Elspeth O'Shannessy', with a horizontal line drawn underneath.

Elspeth O'Shannessy
Manager Emergency Risk Assessment
NSW State Emergency Service

³ Blacktown Local Overland Flow Path Study Revision 2 Volume 2, May 2020, Figure 10.11, page 108

⁴ EES Response to EIS, 2021, NSW Department of Planning, Industry and Environment – Environment, Energy and Science Group, page 2

ATTACHMENT A: Principles Outlined in the Support for Emergency Management Planning Guideline⁵

Principle 1 Any proposed Emergency Management strategy should be compatible with any existing community Emergency Management strategy.

Any proposed Emergency Management strategy for an area should be compatible with the evacuation strategies identified in the relevant local or state flood plan or by the NSW SES.

We note that Section 6 of the FEMP states that *“it is recommended that school be suspended on any day there is reasonable change of rainfall up to 150mm (i.e. greater than 50% change of rainfall 100-150mm).”*⁶ We recommend that an additional trigger for closure of the school prior to the start of the school day should be a Severe Weather Warning for very heavy rain that may lead to flash flooding, as issued by the Bureau of Meteorology. Further information on Severe Weather Warning Services can be found on the Bureau of Meteorology’s website.⁷

Principle 2 Decisions should be informed by understanding the full range of risks to the community.

Decisions relating to future development should be risk-based and ensure Emergency Management risks to the community of the full range of floods are effectively understood and managed.

It is noted that the site itself is prone to flooding in a 10% AEP overland flow flood event⁸, or a PMF riverine flood event⁹. The local and regional road network is also prone to local and riverine flooding and would require caregivers to ensure they have adequate time to collect the children prior to the roads becoming flooded. As this age group of students are largely unable to self-evacuate, the evacuation time would require additional travel time required for caregivers to reach the building prior to access becoming affected and proceed to safety. **Evacuation must not require people to drive or walk through flood water.** Therefore ideally the school would be closed prior to the impact of flooding.

⁵ NSW Government. 2023. Principles Outlined in the Support for Emergency Management Planning Guideline

⁶ Operational Flood Emergency Management Plan – Glenwood High School, 16 October 2023, Section 6.1, page 15

⁷ Severe Weather Warning Services, Bureau of Meteorology. Website available at: http://www.bom.gov.au/weather-services/severe-weather-knowledge-centre/WarningsInformation_SW_SWW.shtml

⁸ Blacktown Local Overland Flow Path Study Revision 2 Volume 2, May 2020, Figure 10.11, page 108

⁹ Glenwood High School Early Works Flood Report, 2021, Enstruct, Section 4.3, Figure 10: PMF Flood Levels, page 10

Principle 3 Development of the floodplain does not impact on the ability of the existing community to safely and effectively respond to a flood.

The ability of the existing community to effectively respond (including self-evacuating) within the available timeframe on available infrastructure is to be maintained. It is not to be impacted on by the cumulative impact of new development. Consideration should also be given to the impacts of localised flooding on evacuation routes.

Principle 4 Decisions on redevelopment within the floodplain does not increase risk to life from flooding.

Managing flood risks requires careful consideration of development type, likely users, and their ability respond to minimise their risks. This includes consideration of:

- Isolation – There is no known safe period of isolation in a flood, the longer the period of isolation the greater the risk to occupants who are isolated.
- Secondary risks – This includes fire and medical emergencies that can impact on the safety of people isolated by floodwater. The potential risk to occupants needs to be considered and managed in decision-making.
- Consideration of human behaviour – The behaviour of individuals such as choosing not to remain isolated from their family or social network in a building on a floor above the PMF for an extended flood duration or attempting to return to a building during a flood, needs to be considered in the Emergency Management strategy.

Principle 5 Risks faced by the itinerant population need to be managed.

Any Emergency Management strategy needs to consider people visiting the area or using a development.

Principle 6 Recognise the need for effective flood warning and associated limitations.

An effective flood warning strategy with clear and concise messaging understood by the community is key to providing the community an opportunity to respond to a flood threat in an appropriate and timely manner.

Principle 7 Ongoing community awareness of flooding is critical to assist effective emergency response.

In terms of the current proposal, the flood risk at the site and actions that should be undertaken to reduce the potential risk to life should be clearly communicated to all site users, for example through signage and emergency drills, during and after the construction phase.