JORDAN SPRINGS PUBLIC SCHOOL

FLOOD RISK ASSESSMENT

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Jordan Springs Public School
Flood Risk Assessment

Richard Crookes Constructions

WSP
Level 27, 680 George Street
Sydney NSW 2000
GPO Box 5394
Sydney NSW 2001

Tel: +61 2 9272 5100
Fax: +61 2 9272 5101
wsp.com

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A	12/10/18	First draft
B	24/10/18	Second draft
C	14/12/2018	Issued for SSDA
D	11/01/2019	Re-issued for SSDA
E	25/01/2019	Revised architectural layout

	NAME	DATE	SIGNATURE
Prepared by:	Isabella See	10/01/2019	
Reviewed by:	Eric Lam	10/01/2019	
Approved by:	Stefan Spirig	25/01/2019	

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1 INTRODUCTION

1.1 OVERVIEW

This report/assessment has been prepared by WSP and accompanies the Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9354) for the new Jordan Springs Public School at 14-28 Cullen Avenue, Jordan Springs (the site).

The new school will cater for approximately 1,000 primary school students and 70 full-time staff upon completion. The proposal seeks consent for:

- Construction of a 2-storey library, administration and staff building (Block A) comprising:
  - School administrative spaces including reception;
  - Library with reading nooks, makers space and research pods;
  - Staff rooms and offices;
  - Special programs rooms;
  - Amenities;
  - Canteen;
  - Interview rooms; and
  - Presentation spaces.
- Construction of three 2-storey learning hubs containing 42 homebases comprising:
  - Collaborative learning spaces;
  - Learning studios;
  - Covered outdoor learning spaces;
  - Practical activity areas; and
  - Amenities.
- Construction of a single storey assembly hall (Block C) with a performance stage and integrated covered outdoor learning area (COLA). The assembly hall will have OOSH facilities and store room areas;
- Associated site landscaping and open space including associated fences throughout and sporting facilities;
- Pick-up and drop-off zone from Cullen Avenue;
- Pedestrian access points along both Cullen Avenue and Lakeside Parade;
- Construction of an at-grade carpark containing 62 spaces accessible from Lakeside Parade and 2 spaces accessible from Cullen Avenue;
- School signage to the front entrance; and
- New substation fronting Cullen Avenue.

All proposed school buildings will be connected by a double storey covered walkway providing integrated covered outdoor learning areas (COLAs).

The purpose of this Flood Risk Assessment is to review the flooding risk at the site and any additional impact to flooding or downstream of the site as a result of the proposed Jordan Springs Public School. The following tasks were carried out as part of this assessment:

- Review of previous technical flooding and drainage studies and analyses undertaken on water management for the site and wider region
- Summary of regional flood risk to the site (including climate change risk) based on existing studies
- Review of the drainage concept design to assess post development impact and what likely mitigations are required.
- Summary of the proposed concept drainage design on site to provide context with the regional flood risk and any external flows which may impact the site
- Consideration of applicable regional and local flood emergency evacuation plans and from the NSW State Emergency Service and Penrith City Council.

The assessment has been carried out based on existing available mapping and flooding studies. No additional flood modelling was undertaken for the site as part of this assessment.

1.2 RESPONSE TO SEARS

The Flood Risk Assessment is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18_9354. This table identifies the SEARs and relevant reference within this report.

Table 1-1 SEARs and Relevant Reference

SEARS ITEM	LOCATION ADDRESSED IN REPORT
16. Flooding	
Identify flood risk on-site (detailing the most recent flood studies for the project area) and consideration of any relevant provisions of the NSW Floodplain Development Manual (2005), including the potential effects of climate change, sea level rise and an increase in rainfall intensity. If there is a material flood risk, include design solutions for mitigation.	Section 3 and 5
Consider applicable regional and local flood emergency evacuation plans in consultation with the NSW State Emergency Service and Penrith City Council.	Section 4

2 SITE DESCRIPTION

The general site identification details are provided in Table 2-1. Figure 2-1 shows the location of the site.

Table 2-1 Summary of general site information

SITE ADDRESS	14-28 CULLEN AVENUE, JORDAN SPRINGS, NSW 2474
Site identification	Lot 22 DP 1194338
Local government area (LGA)	Penrith City Council
Site area (approximately)	28,360 m^2
Current site use	The site remains vacant at the current time with no development features present, with dense grass covering most of the property. Multiple large gravel patches are present around the gate entrances onto the site.
Surrounding land uses	A childcare centre is present immediately adjacent to the south west of the site, with residential properties surrounding the site to the north, west and south. A small creek is present on the eastern boundary line, with the Jordan Springs Dog Park beyond. A large manufactured lake is present to the south of the site on the other side of Cullen Avenue, with a small shopping centre present to the south west.
Proposed site use	The site is proposed to be developed into a primary school in the south-eastern portion with a playing field in the northern portion of the site.

Figure 2-1 Site location

Source: Six Maps, 2018

2.1 TOPOGRAPHY AND SURFACE WATER DRAINAGE

The site is situated at approximately 40 metres Australian Height Datum (mAHD) and slopes towards the south. This is generally consistent with the level of the surrounding properties. The site appears to have a low potential for flooding, based on the Council's flood planning map as well as the lack of significantly sized water bodies surrounding the site.

The nearest surface water body is a small unnamed creek adjacent to the eastern boundary which terminates in an unnamed manmade lake approximately 150 metres to the south of the site.

2.2 PROPOSED JORDAN SPRINGS PUBLIC SCHOOL

The proposed Jordan Springs Public School would include five new school buildings, covered outdoor learning areas, covered walkways, paved and unpaved outdoor activity areas and an at-grade staff car park as described in Section 1.1. Figure 2-2 shows the proposed school layout.

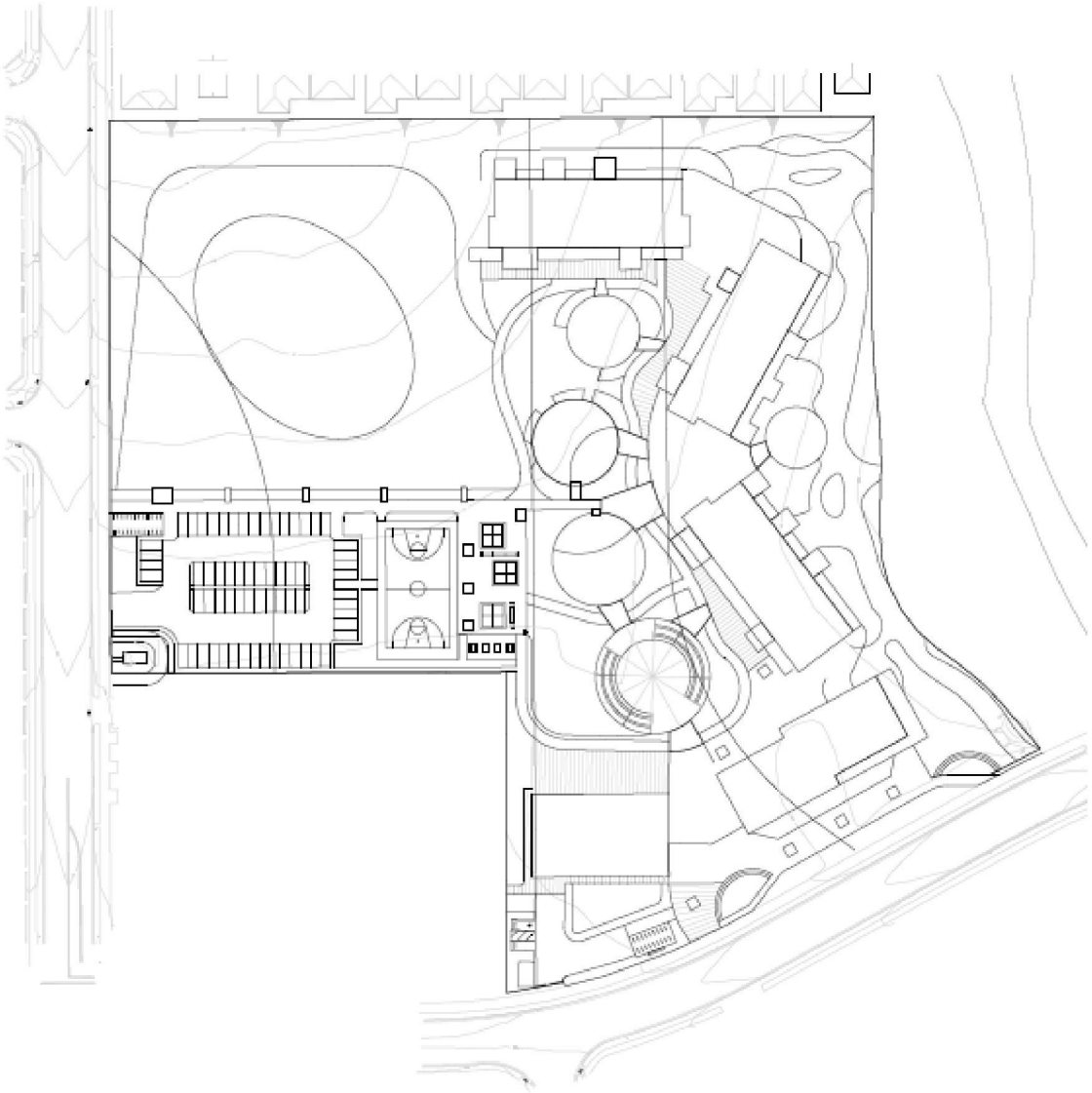


Figure 2-2 Proposed Jordan Springs Public School

Source: Group GSA, 2019

3 FLOOD RISK

A review of relevant local, state and regional planning instruments, and literature was carried out to identify the likely flooding risk of the site. Legislation, mapping and previous studies reviewed include:

- Hawkesbury-Nepean Emergency Flood Plan (NSW State Emergency Services, 2015).
- Penrith Local Environmental Plan 2010
- Penrith City Council Development Control Plan (DCP) 2014
- NSW Floodplain Development Manual (Department of Infrastructure, Planning and Natural Resources, 2005)
- Sydney Regional Environmental Plan No 30 – St Marys
- Updated South Creek Flood Study (Worley Parsons, 2015)

Figure 3-1 shows that the site is not located within flood prone land as identified by the Sydney Regional Environmental Plan No 30 – St Marys. In addition, the site is not identified as flood prone by any other local or regional flood studies (refer to Appendix A for flood maps from the reviewed studies). As such no further flood modelling for the site was carried out as part of this assessment.

3.1 CLIMATE CHANGE

The NSW Floodplain Development Manual (2005) requires flood studies and floodplain risk management studies to consider changes to rainfall intensities, extreme rainfall events and sea level rise as a result climate change. In the Sydney Metropolitan area climate change impacts are assessed as an increase of up to 14% in rainfall intensity simulations (DECCW, 2007). While the site would be impacted by increases to rainfall intensity, the site is not located within proximity of flood prone areas.

The site is not located in a coastal region and as such would be unlikely to be impacted by increases to sea level due to climate change.

3.2 CONSULTATION

Penrith City Council were contacted via phone to confirm flood risk and request any further known drainage or flooding issues. Confirmation was given that the site is not coded as being flood affected and that no specific flood letter would be required for the site.

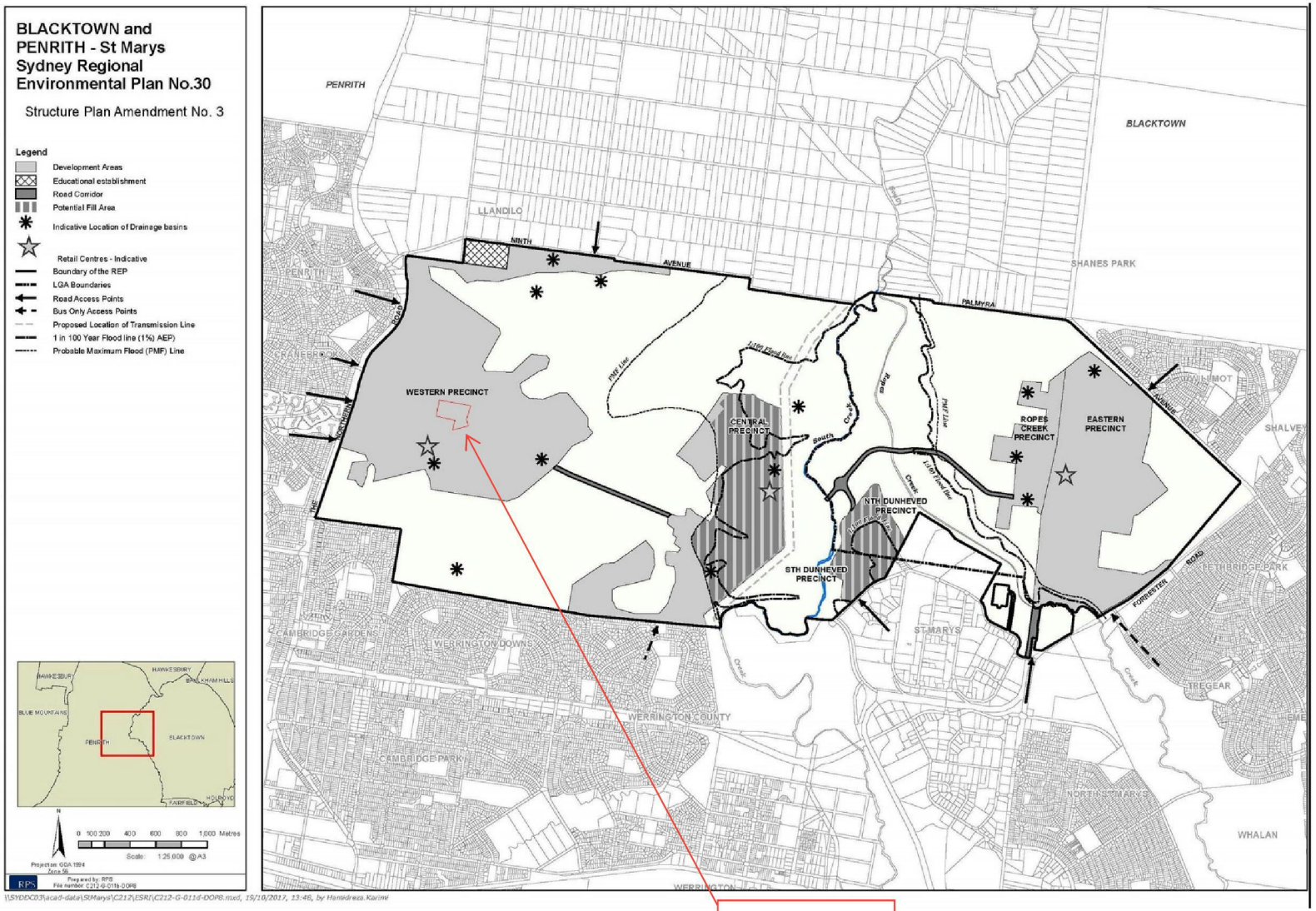


Figure 3-1 Sydney Regional Environmental Plan No 30 - St Marys Structure Plan

Source: NSW Department of Planning & Environment, 2018

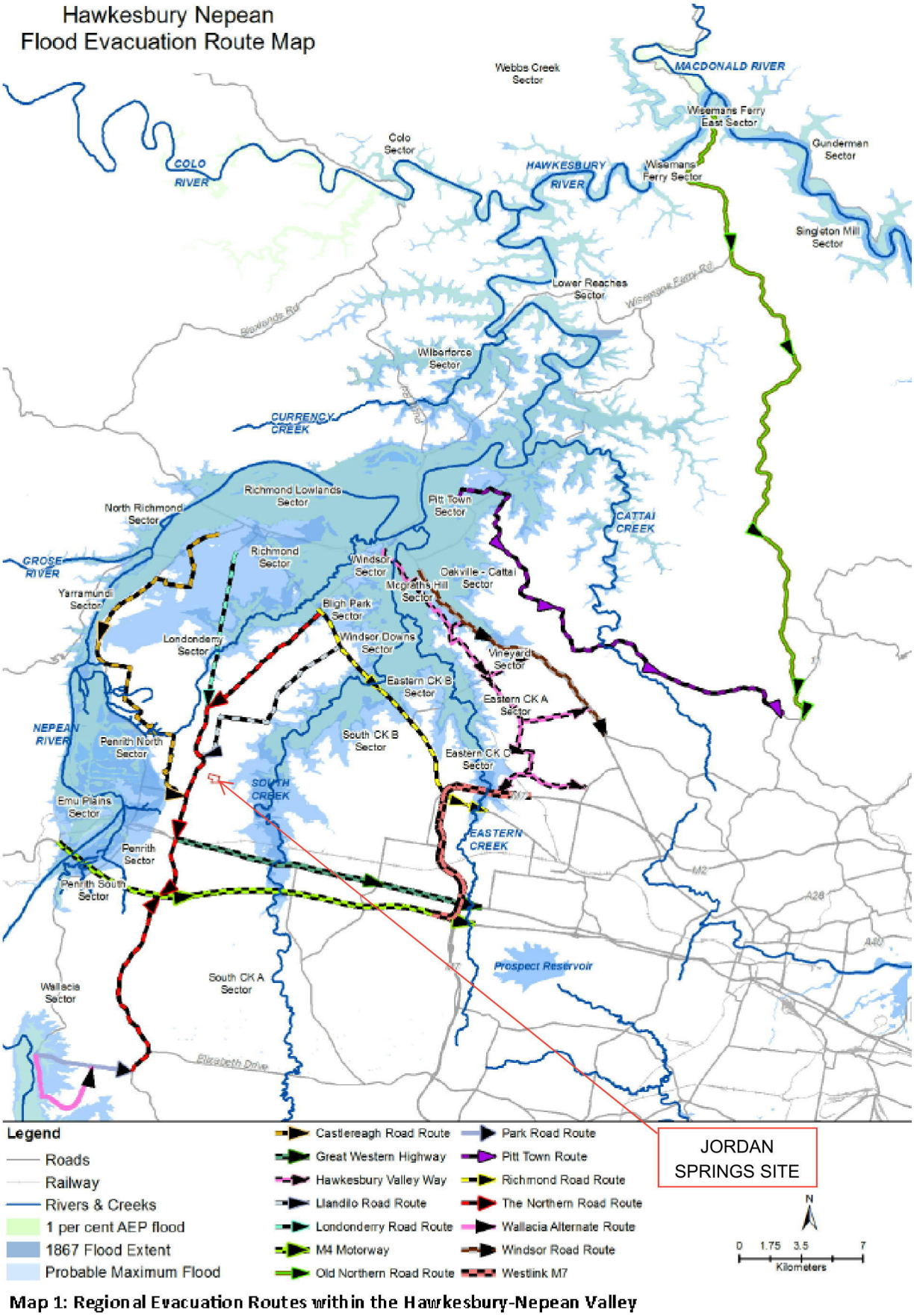
4 EMERGENCY EVACUATION ROUTES

To assist in ensuring minimising flooding impacts to communities, the NSW government's Floodplain Development Manual (2005) recommends that new residential development be located preferably on land at or above the 1% or 1 in 100 AEP flood level plus freeboard. The proposed Jordan Springs Public School is identified as critical infrastructure (education facility) and as such this standard is adopted. The proposed Jordan Springs Public School site complies with this requirement and as such minimises the potential requirement for evacuation in flooding events.

4.1 HAWKESBURY-NEPEAN FLOOD EMERGENCY FLOOD PLAN

The Hawkesbury-Nepean Flood Plan (NSW State Emergency Service, 2015) is a sub-plan of the NSW State Emergency Management Plan and is the regional flood plan Penrith area and other surrounding local government areas.

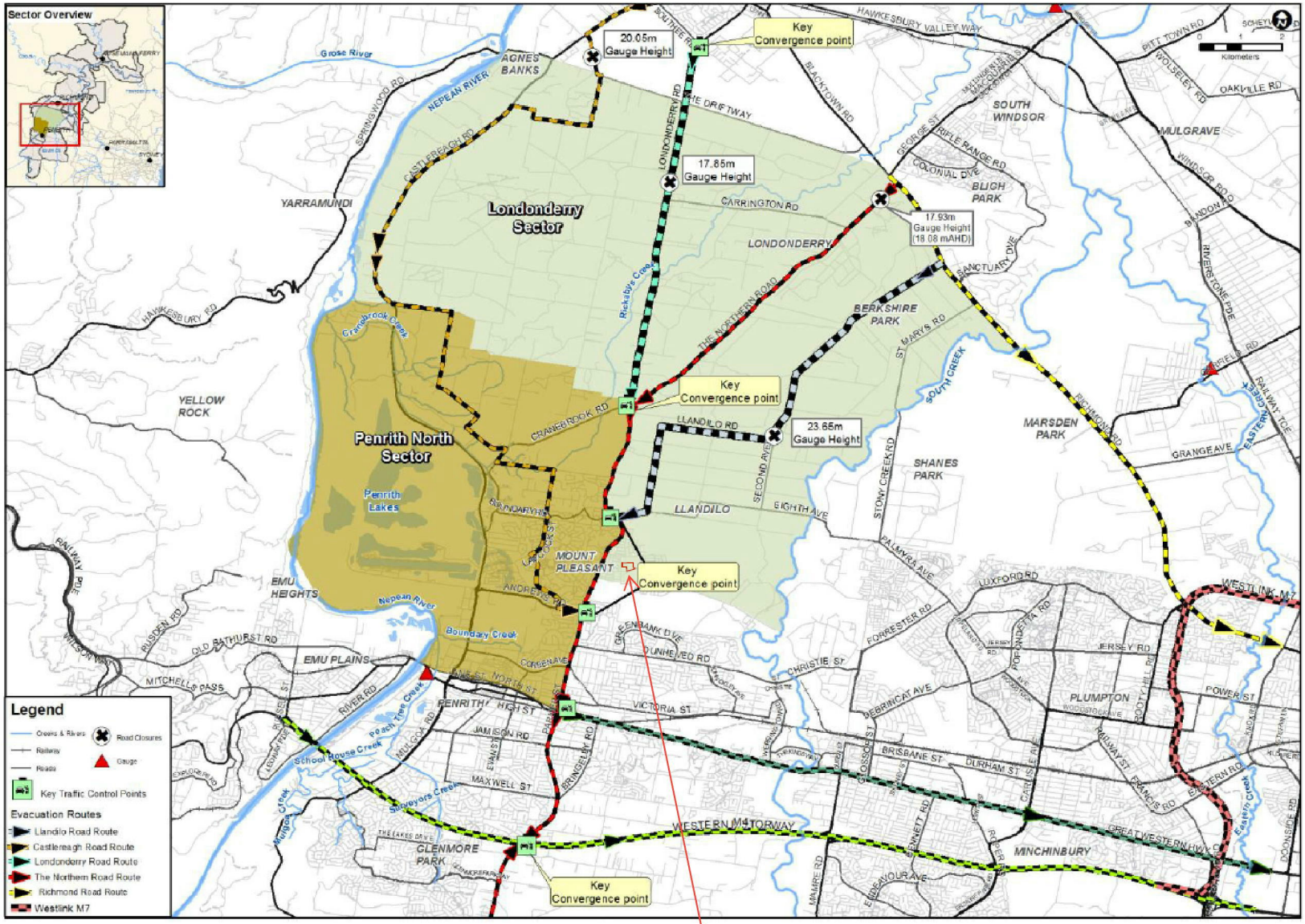
The Plan describes prevention and preparedness measures for flood operation and recovery actions in the Hawkesbury-Nepean Valley. It provides mapping of the Probable Maximum Flood event throughout the catchment and evacuation routes as shown on Figure 4-1. The Jordan Springs site is located nearest to the Londonderry and Penrith North Sectors. It located outside the Probably Maximum Flood extent, however in the event of required evacuation would utilise the Northern Road Route as shown on Figure 4-2. Site preparedness and evacuation plans would be prepared in line with the Hawkesbury- Nepean Flood Plan.



Map 1: Regional Evacuation Routes within the Hawkesbury-Nepean Valley

Figure 4-1 Hawkesbury-Nepean Catchment Probable Maximum Flood extents and Evacuation routes

Source: Hawkesbury-Nepean Flood Emergency Sub Plan, NSW State Emergency Service, 2015



Map 9: Londonderry and Penrith North - Evacuation Routes

JORDAN SPRINGS SITE

Figure 4-2 Site evacuation routes

Source: Hawkesbury-Nepean Flood Emergency Sub Plan, NSW State Emergency Service, 2015

5 STORMWATER MANAGEMENT

5.1 PROPOSED STORMWATER DRAINAGE SYSTEM

Stormwater controls are included in the concept design to ensure that the proposed Jordan Springs Public School does not adversely impact on stormwater flows and water quality downstream of the site. The proposed stormwater drainage and water quality treatment system has been designed in accordance with the following guidance documents:

- AS3500 – 'National Plumbing and Drainage Code' – Part 3: Stormwater Drainage
- Australian Rainfall and Runoff, 2016 – Parts 1 & 2
- Penrith City Council – Water Sensitive Urban Design (WSUD) Policy, December 2013
- Penrith City Council WSUD Technical Guidelines, June 2015
- Guidelines for development adjoining land and water managed by DECCW (OEH, 2013).

A piped stormwater drainage system will be provided to collect all concentrated flows from the proposed buildings and hardstand surfaces. The piped drainage system is designed for the 1 in 20 year ARI with adequate provision for overflow for a 1 in 100 year ARI event. The site will drain to a bio-retention basin on the south-east corner of the site which will discharge to the creek at the eastern boundary of the site.

No on-site detention has been provided for the site. Consultation with the Penrith City Council, carried out for the Concept Tender (WSP 2017), confirmed that on-site detention is not required for the development as detention is catered for in a regional basin downstream. A 100m^3 rainwater tank is also included to collect water from the roof for re-use on site and to reduce run-off from site.

Further details of the proposed system are provided in the *Stormwater Management Report* (WSP, 2019).

5.1.1 OVERLAND FLOW PATHS

The proposed stormwater drainage system is designed to collect all concentrated flows and provides for overflow for the 1 in 100 year ARI event.

6 CONCLUSION

The site is not identified as flood prone by state, regional or local mapping.

Stormwater from the site will be collected and treated before discharging to the nearby creek. The concept stormwater drainage and management system is designed for the 1 in 20 year ARI event and is not anticipated to adversely impact on stormwater flows and water quality of the stormwater system downstream of the site.

Overland flow strategy for the site will be confirmed during the detailed design phase and will be designed to maintain flow direction and cater for the 100 year ARI storm event.

7 LIMITATIONS

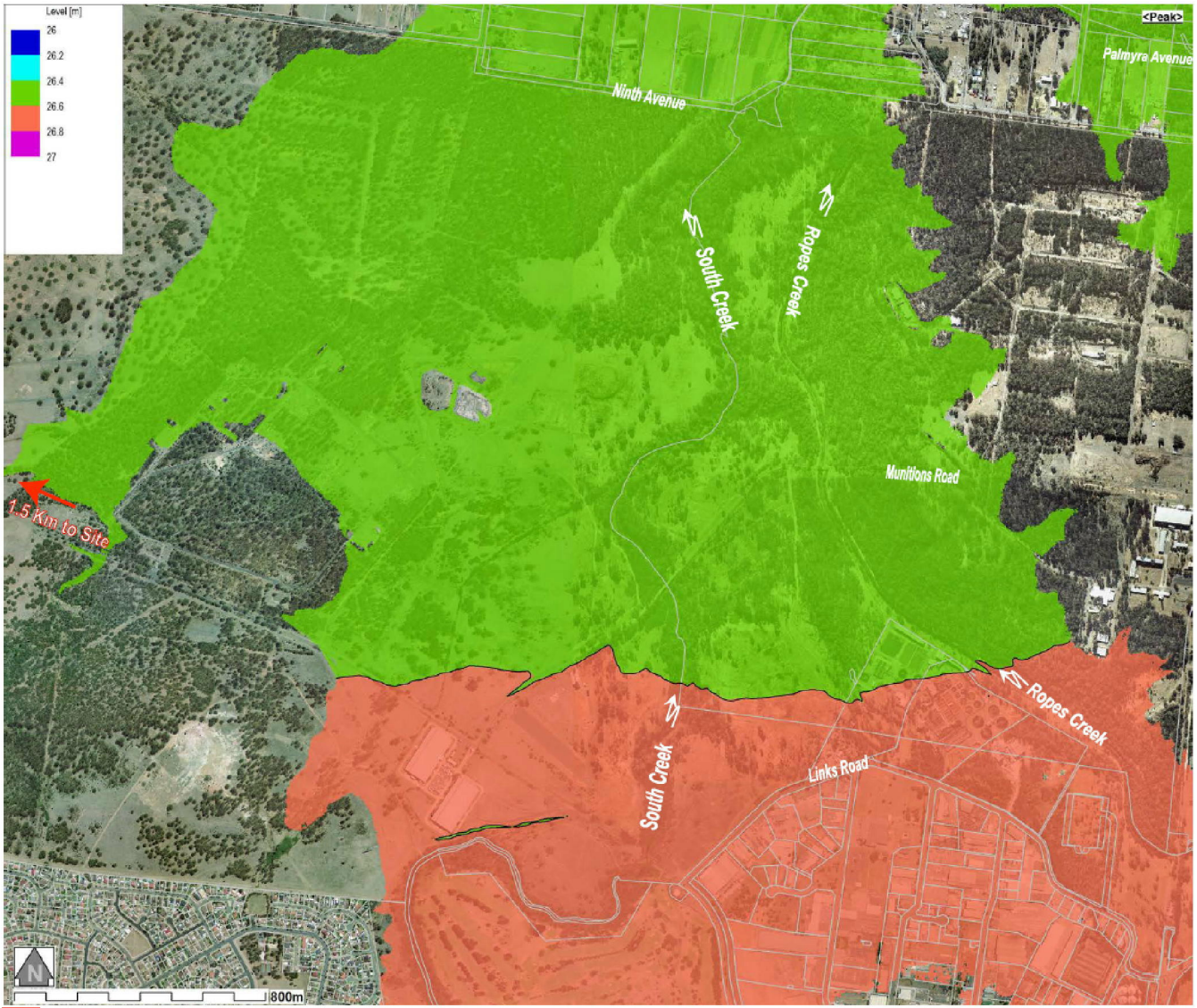
This report was prepared based on publicly available information. WSP takes no responsibility for accuracy or completeness of this information.

BIBLIOGRAPHY

- Department of Environment and Climate Change, (2013), Guidelines for development adjoining land and water managed by Department of Environment and Climate Change
- Department of Environment and Climate Change, (2007), Floodplain Risk Management Guideline - Practical Consideration of Climate Change
- Department of Infrastructure, Planning and Natural Resources, (2005), NSW Floodplain Development Manual
- NSW State Emergency Services, (2015), Hawkesbury-Nepean Flood Plan
- Penrith Local Environmental Plan 2010
- Penrith City Council, (2015), WSUD Technical Guidelines,
- Penrith City Council, (2014), Development Control Plan
- Penrith City Council, (2013), Water Sensitive Urban Design (WSUD) Policy
- Worley Parsons, (2015), Updated South Creek Flood Study

APPENDIX A

REGIONAL FLOODING MAPS



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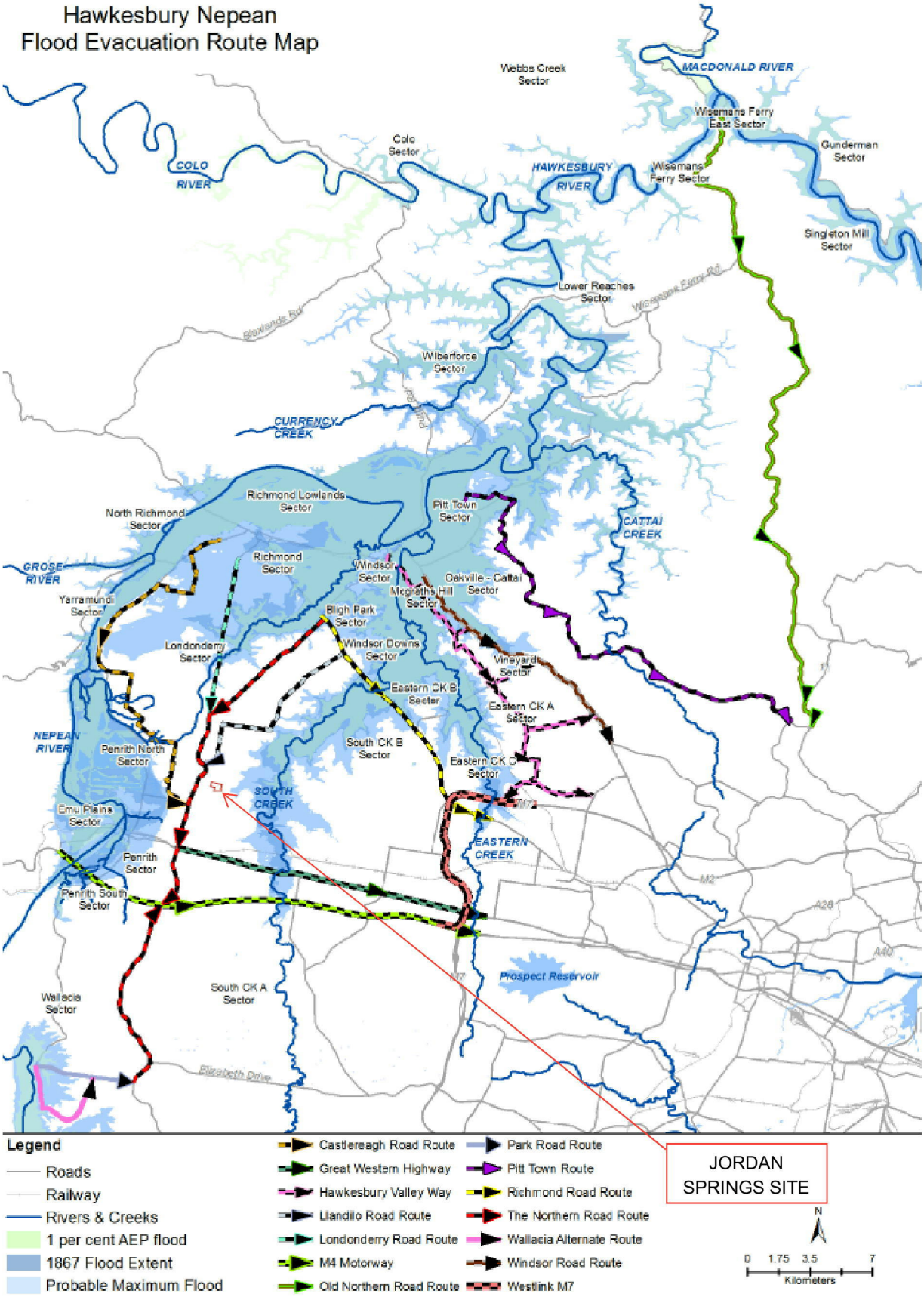
resources & energy
Rpt6033- South Creek Flood Study
fig6033rig150113-Fig 6.61-Peak PMF Levels (9 of 17).doc

PREDICTED FLOOD LEVELS AT THE
PEAK OF THE PROBABLE MAXIMUM FLOOD
[EXTENT 9 OF 17]

Source: Updated South Creek Flood Study, Worley Parsons, 2015



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Source: Hawkesbury-Nepean Emergency Flood Plan, NSW State Emergency Service, 2015