TOOKER+ ASSOCIATES

Proposed New Eileen O'Connor Catholic School
Lot 9 Section 4 DP 3368
84 Gavenlock Road, Mardi
Catholic Schools Broken Bay

Environmental Impact Statement

SSD 67173718

FLOOD IMPACT AND RISK MANAGEMENT ASSESSMENT

June 2025

m 0409 912 631 e mark.tooker@tookerandassociates.com.au a 30 Walworth Avenue, Newport abn 39 619 046 070

Planning Secretary's Environmental Assessment Requirements

Development Details

Application No:	SSD-67173718
Project Name:	New Eileen O'Connor Catholic School
Location:	84 Gavenlock Road, Mardi NSW 2259 Lot 9 Section 4 DP3368 within Central Coast
Applicant:	Catholic Schools Broken Bay

The following documentation has been prepared to support the State Significant Development Application for the above project and in accordance with the Planning Secretary's Environmental Assessment Requirements (SEARS) dated 19th February 2024 as follows:

	Issue and Assessment Requirements	Relevant Section of this Report
14	**Flooding Risk:**	
	Identify any flood risk on-site having regard to adopted flood studies, the potential effects of climate change, and any relevant provisions of the NSW Floodplain Development Manual.	See Section 1-6 of this report - Flood Impact and Risk Management report by Tooker and Associates, Jun 25. Based on Wyong River Catchment Floodplain Risk Management Study and Plan, CC Council, Jan 2020

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1. INTRODUCTION

Construction, subdivision and operation of a new Catholic school for 200 students with special needs, comprising 20 general learning areas, flexible specialist learning areas, administration and staff facilities, library, hall, amenities and associated site preparation works, landscaping, play space and on-site car parking and kiss and drop, together with road upgrades for Keefers Glen.

The development has been classified as a State Significant Development (SSD-67173718) and the Planning Secretary's Environmental Assessment Requirements, among others, requires in Section 14 an assessment of flood impacts and risk management as per the Flood Development Manual (2023) and the Flood Risk Management Guideline LU01.

Tooker and Associates has been engaged to address the flood impact and risk management aspects associated with the proposed development.

2. SITE DESCRIPTION

The proposed site is within the north-western corner of the existing St Peter's Catholic School site at 84 Gavenlock Road, Mardi (Lot 9, Section 4 in Deposited Plan (DP) 3368). The proposed Eileen O'Connor Catholic School site (identified in red) will have an area of 1.284 hectares, with frontage to Keefers Glen.

The site is located within the catchments of Mardi Creek and Wyong River.

The site has a frontage to Keefers Glen for vehicular and pedestrian access to and from the site.

3. PROJECT STATEMENT

Catholic Schools Broken Bay (CSBB) is proposing construction of a new school for students with a disability at the purpose-built K-12 Eileen O'Connor Catholic School using land located in the north-western corner of St Peter's Catholic School at 84 Gavenlock Road, Mardi. The school will have capacity for 200 students and will provide education and allied health facilities.

The proposed development involves:

- Site establishment and benching

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- Construction of a part-two, part-three storey school campus comprising 20 General Learning Areas (GLA), flexible specialist learning areas, library, multipurpose hall, administration, staff facilities, storage, landscaping and playspaces
- Construction of two (2) new vehicle accessways from Keefers Glen and at-grade carpark (including bus parking) and covered drop off/pick up area
- Subdivision of land to create a new allotment for the school
- Widening of a portion of Keefers Glen

The proposed development will have a ground floor and first floor at RL 10.7m AHD and RL 14.3m AHD. The lower ground floor will be at RL 7.7m AHD and will be used mainly for infrastructure, storage and maintenance equipment (refer Figures 1 to 3).

4. FLOOD RISKS

The flood certificate provided by Central Coast Council nominates the following maximum flood levels at the site:

PMF RL 6.49m AHD

1% AEP RL 4.25m AHD

5% AEP RL 3.72m AHD

The Council's Wyong River Floodplain Risk Management Study and Plan prepared in January 2020 identified that the Wyong River catchment has been subjected to severe flooding since records started in 1949, 1964, 1977 and 2007. The highest peak flood level at Wyong Railway Bridge on Wyong River occurred in the 1949 flood and was estimated to be RL 4.2m AHD. This was similar to the Council's estimated 1% AEP (on average once every 100 years) for the site. The Council's estimated PMF flood level for the subject site is RL 6.49m AHD which is 2.24m higher than the 1% AEP flood. A PMF flood is very rare with an approximate average occurrence of once every 100,000 years.

The flood planning level from the flood certificate is RL 4.75m AHD. The flood planning level is the Council recommended minimum habitable floor level for the site however, the proposed development will have floor levels a minimum of 0.9m above the PMF. The development therefore is outside of the all the flood risks including the 1% AEP flood with added climate change effects out to year 2100.

The Council's Wyong River Floodplain Risk Management Study and Plan was prepared by Catchment Simulations Solutions in January 2020 (**the CSS report**) and provides all the flood risk and management data required by the Flood Risk Management Guideline LU01.

The proposed Eileen O'Connor Catholic School is located out of the PMF flood lands and as such, will not have any significant impact on the flood behaviour or be inundated by flood waters (refer Figure 4 for the 1% AEP plus climate change and Figure 5 for the PMF flood extents).

The flood risk for the site is that it could be isolated for long periods during floods when roads are cut by flooding. It has been classified as "flood isolated elevated" by the report. This is the risk for both the 1% AEP and PMF floods although the roads are cut much later for the 1% AEP compared to the PMF flood. The flood evacuation risk has been based on the PMF flood.

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There are two very different floods which can occur in the Mardi/Tuggerah area. This is demonstrated by the plots of flood levels for the two very different PMF floods at Wyong Bridge – 2 hr and 24 hr (refer Figure 6). The flood level response times in the 2 hr PMF are much quicker than for the 24 hr PMF flood.

The CSS report noted that the BoM provide a 6 hour flood warning for minor flooding at the Wyong Bridge which is for flood waters to reach RL 2.8m AHD at the bridge.

The first flood type is a flood in the Mardi Creek catchment which has a relatively small catchment and hence has what is called fast acting floods or flash flooding (PMF 2 hr). These floods occur over a short duration. The draft NSW government Shelter in Place Guidelines indicate that a shelter in place response is appropriate when sheltering in place is no longer than 6 hours. The Mardi Creek flooding falls into this category (PMF 2 hrs).

The PMF 2hrs flood response and hazard times/durations means that road access to the school is limited to between 1 and 2 hours after the start of rainfall. Flood evacuation to offsite facilities is not possible given the limited time available until access roads are cut by flood waters. Based on this data, the response for the school in the Mardi Creek floods (PMF 2hrs) should be to Shelter in Place at the school.

The flooding in the Wyong River is long duration (PMF 24 hrs). This is the worst case flood with a rare occurrence. The minimum flood warning time provided by BoM is 6 hours. After rain commences over the catchment, the road access to the school provides access (flood hazard up to H2) for between 11 and 18 hours with the minimum of 11hrs at location B (refer Figure 7). At Location B, the road is flood free for 6 hours after commencement of rainfall, rising to a flood hazard of H1 in a further 1 hour, rising to a flood hazard of H2 in a further 1 hour and remaining at H2 for a further 3 hours.

The recommended flood emergency responses in a long duration flood are detailed in the Flood Emergency Response Plan (Tooker and Associates FERP v7) but are summarised by the following:

1. Non school hours – message all parents once the BoM flood warning is provided to keep the school children at home;
2. School hours - message all parents once the BoM flood warning is provided to collect the children as soon as possible within three hours;
3. School hours – those children remaining after the first two actions above are to be bused to the Westfield Shopping Centre and remain under supervision until collected by their parents.

The available flood refuges mentioned in the CSS report are the Wyong Golf Club, Wyong RSL Club and Wyong Bowling Club. The report also mentions the Woodbury Park Community Centre as a possible flood refuge. The clubs however, would not be accessible in a severe flood from the proposed school. The Woodbury Park Community Centre would be a suitable refuge for a group of 50 – 90 persons. The community centre is within walking distance of the school however, it is in the same position as the school in that it will become an elevated isolated flood area. The likely refuge for a larger number of persons with access during floods would be the Westfield Shopping Centre. The evacuation route from the proposed school to the Westfield Shopping Centre would be to exit the school into Keefers Glen, head south along Woodbury Park Drive and turn left into Wyong Rd and then right into the shopping centre.

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The flood hazard along the route to the school and to the Westfield shopping centre are presented for the locations on Figure 7. Flood Hazard 1 (H1) is safe for all. Flood hazard 2 (H2) is unsafe for small cars. Flood hazard 3 (H3) is unsafe for vehicles, children and elderly people. The durations until these flood hazard categories are exceeded are presented for Locations A to G in Attachment A.

Location A is at the location of the entry and exit to St Peter's Catholic College. Locations B, C and E are the recommended vehicular route for access to the school and Westfield shopping centre from the proposed school during floods. Locations D and F are related to access to the shopping centre from Tonkiss St.

5. FLOOD RISK MANAGEMENT

A Flood Emergency Response Plan (Tooker and Associates FERP v6) has been prepared for the proposed school which is based on flooding behaviour for the PMF event (both short and long duration PMF). The School would arrange to receive the BoM flood warnings for Wyong Bridge which would provide a minimum warning time of 6 hours. The school would obtain water level data from the Wyong Bridge to determine if it was a short or long duration flooding. This would determine if evacuation of the site was necessary or whether shelter in place was the appropriate response. The school would notify parents and Assisted School Travel Program (ASTP) personnel outside of school times that the school would be closed and children should stay at home or if in school hours, that parents and ASTP personnel should collect their children within three hours. For those children remaining, they would be driven to the Westfield Shopping Centre so they could be collected by their parents or ASTP personnel.

The Plan would identify all aspects of flood management at the school. This plan should be integrated to the school's overall emergency management protocols and manuals.

6. CONCLUSIONS AND RECOMMENDATIONS

The proposed school is located outside flood affected lands and as such, will not be adversely affected by flood waters and will not adversely impact on flooding behaviour for adjacent sites.

The site has the potential for local roads to be flood affected and be isolated during severe floods. The response will be based on the PMF flood with shelter in place at the school site for short duration flooding where there is limited flood warning time and the roads are cut for less than 6 hours. This is in accord with the NSW Draft Shelter in Place guidelines. BoM will recognise this flooding because the rainfall will be intense and the response at Wyong Bridge will be quick and within 2 hours.

For longer duration floods (with no rise in water level at the Wyong Bridge within 4 hours), the response for the proposed school will be to:

1. Non school hours – message all parents once the BoM flood warning is provided to keep the school children at home;
2. School hours - message all parents once the BoM flood warning is provided to collect the children as soon as possible within three to four hours;
3. School hours – those children remaining after the first two actions above are to be bused to the Westfield Shopping Centre and remain under supervision until collected by their parents.

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The access to roads along the evacuation route will be available for up to 5 hours longer than the minimum 6 hours warning time. These warning and road access availability times are the worst case for the most severe PMF flood.

The proposed school needs to prepare and implement with annual training a flood emergency response plan.

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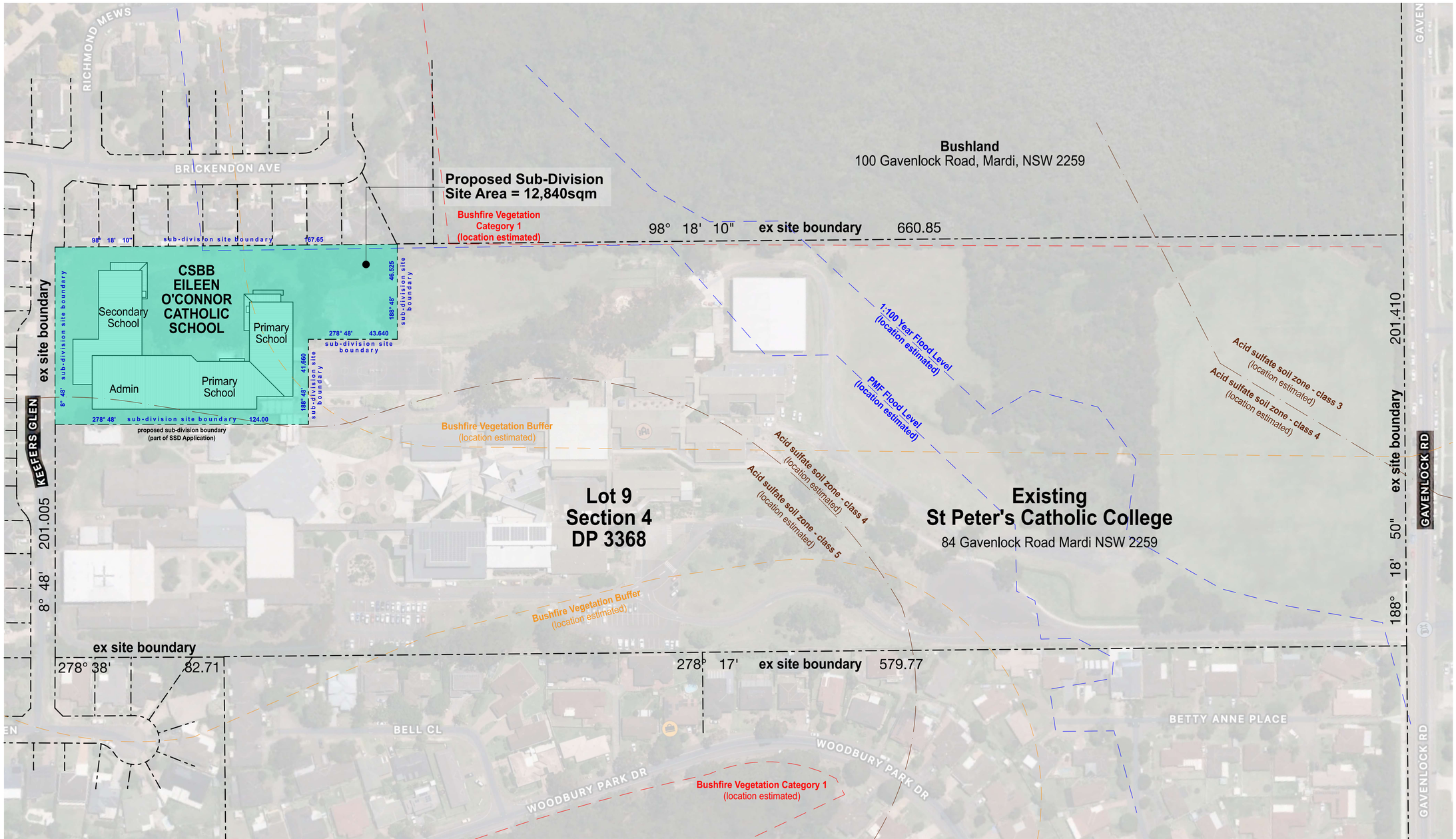
FIGURES

m 0409 912 631 e mark.tooker@tookerandassociates.com.au a 30 Walworth Avenue, Newport abn 39 619 046 070

FIGURE 1



01 **Site Context**
1:1000

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Rev	Issue	Date
P1	Prelim Issue for Co-ord	13/03/24
P2	Issue to QS	12/04/24
P3	Revised Design Issued for QS Cost Estimate	03/06/24
P4	Issue For Co-ordination	01/07/24
P5	Issue for Client Review & Co-ordination	15/11/24
P6	Issue for Consultant Co-ordination	19/12/24
P7	Issue for Consultant Co-ordination	10/03/25
P8	Issue for EIS Co-ordination & Client Approval	19/03/25

Amendments

Stanton Dahl Architects

Eileen O'Connor Catholic School

Catholic Schools Broken Bay (CSBB)
84 Gavenlock Road,
Mardi, NSW 2259

Drawn; RW
Checked; DM
Plot date; 19/3/2025

Scale;1:1000 as noted @ A1

Project No;
2637.20

Drawing No; A0101

Revision#; P8

Campus Plan

FIGURE 2

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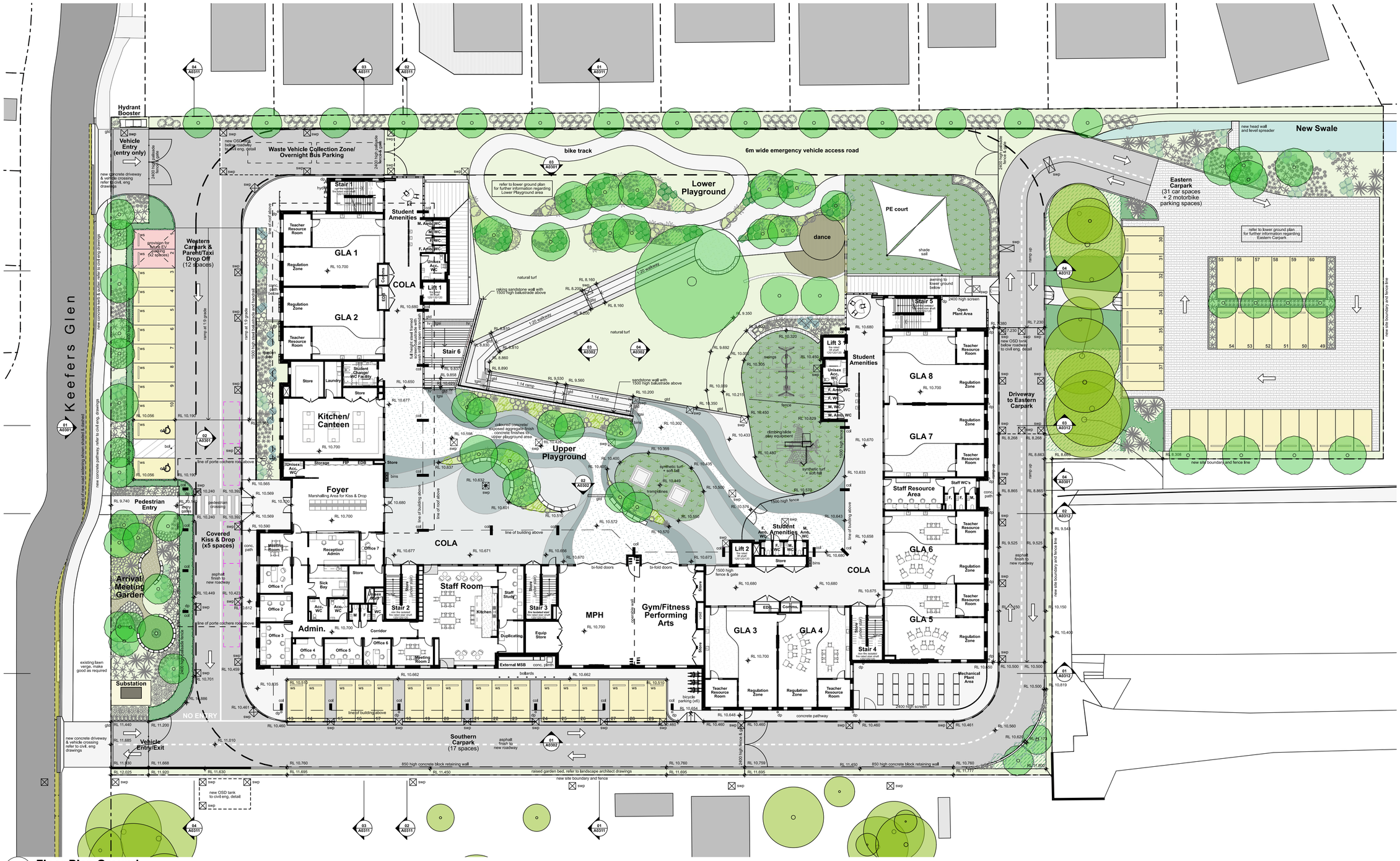

01 Floor Plan Ground
1:250

Legend (floor plans)
note: drawing may not contain all items listed below

ac	air conditioner condenser	comms	communications	fe	fire extinguisher	ht	hose tap	rw(1)	retaining wall (type)	wc	water closet
acc	accessible	conc	concrete	ffl	finished floor level	hwu	hot water unit	rwt	rainwater tank	wm	washing machine
adhc	adhc ageing, disability & home care	cpt	carpet	fhr	fire hose reel	hyd	hydrant	sc	steel column	wo	wall oven
amb	ambulant	ct	cooktop	fm	floor mat	lb	letter box	sfc	steel float concrete	ws	wheel stop
ap	access panel	dgpo	double general purpose outlet	FRL	Fire Resistance Level	lcd	lcd screen (wall mounted)	shr	shower	wt	wash trough
bal(1)	balustrade (type)	dp	downpipe	frz	freezer	lin	linen cupboard	sj	saw cut joint		
bfc	broom finish concrete	dw	dishwasher	fs	fridge space	mh	manhole	snk	sink		
bol	bollard	edb	electrical distribution board	ft	fence	mw	microwave	spd	spoon drain		
bsn(1)	basin (type)	fbx	floor box	fw	floor waste	nts	not to scale	sshr	safety shower		
cbus	c-bus control	fip	fire indicator panel	gb	garbage bin	o/a	overall	sv(1)	sheet vinyl (type)		
cfc	compressed fibre cement	ej	expansion joint	gpo	general purpose outlet	ofc	off form concrete	swp	stormwater pit		
cft	ceramic floor tile	ev	electric vehicle charging station	gt	gate	pav(1)	paving (type)	tfb	timber floorboards		
cj	control joint	ex.	existing	gtd	grated drain	pos	private open space	tgsi	tactile ground surface indicator		
cthl	clothes line	fb(1)	face brickwork	hlc	high level cupboard	rs	refridgerator space	u/b	under-bench oven		
col	column	fc	fibre cement	hr(1)	handrail (type)	rsh	recessed soap holder	vb	vanity bench		

Stanton Dahl & Associates Pty Limited. ABN 32 002 261 396
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Rev	Issue	Date
P11	Issue for Consultant Co-ordination	19/12/24
P12	Issue for Consultant Co-ordination	31/01/25
P13	Issue for Consultant Co-ordination	10/03/25
P14	Issue for Consultant Co-ordination	14/03/25
P15	Issue for EIS Co-ordination & Client Approval	19/03/25

Amendments

Stanton Dahl Architects

Eileen O'Connor Catholic School

CATHOLIC SCHOOLS Broken Bay

RP INFRASTRUCTURE

Eileen O'Connor Catholic School

Catholic Schools Broken Bay (CSBB)
84 Gavenlock Road,
Mardi, NSW 2259

Drawn; RW
Checked; DM
Plot date; 19/3/2025

Scale;1:250 as noted @ A1

Project No;
2637.20

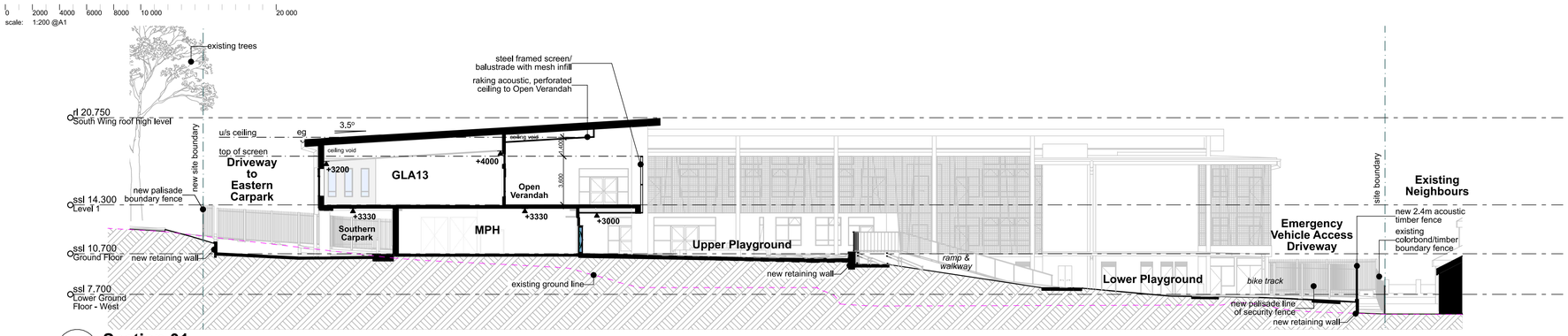
Drawing No; A0202

Revision#; P15

Floor Plan Ground

FIGURE 3

scale: 1:200 @A1



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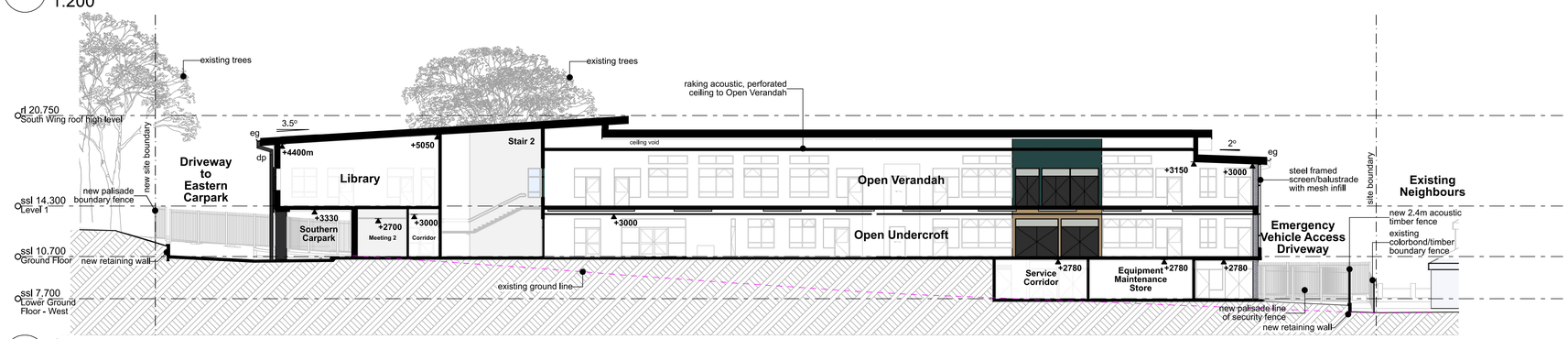

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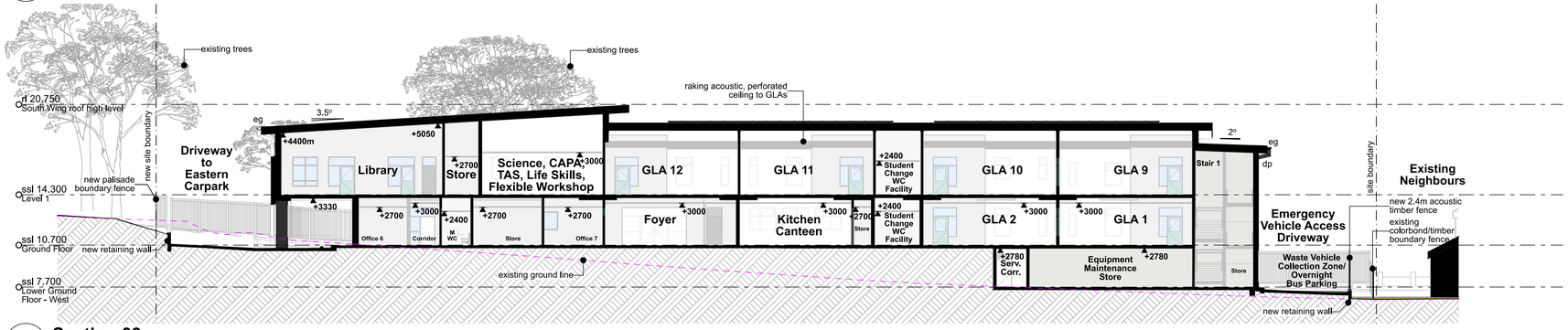

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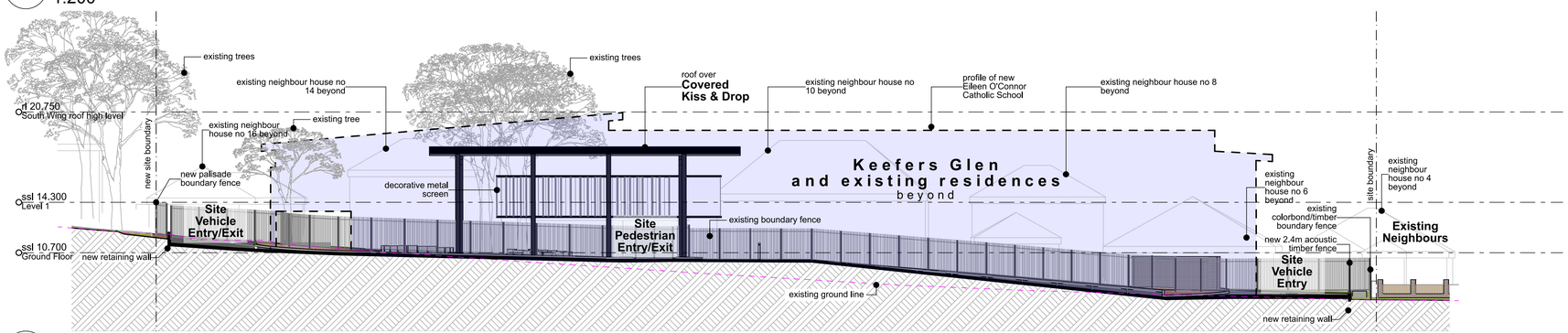

04 Section 04
1:200

Legend (elevation & sections)
note: drawing may not contain all items listed below

ald	aluminium framed glazed door suite
alw	aluminium framed window
dms	decorative metal screen
dp	downpipe
eg	eaves gutter
egl	existing ground line
fb	face brickwork
lwc	lightweight cladding
mdr	metal deck roof
rw	retaining wall
wh	window sunhood

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P6	Issue for Consultant Co-ordination	19/12/24
P7	Issue for Consultant Co-ordination	10/03/25
P8	Issue for EIS Co-ordination & Client Approval	19/03/25

Amendments

Stanton Dahl Architects

Eileen O'Connor Catholic School

CATHOLIC SCHOOLS Broken Bay

RP INFRASTRUCTURE

Eileen O'Connor Catholic School

Catholic Schools Broken Bay (CSBB)
84 Gavenlock Road,
Mardi, NSW 2259

Drawn; RW
Checked; DM
Plot date; 19/3/2025

Scale;1:200 as noted @ A1

Project No;
2637.20

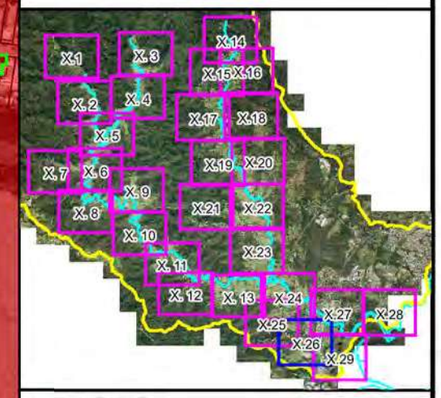
Drawing No; A0311

Revision#; P8

Sections 1

FIGURE 4

Central Coast Council



Subject site

Old Maitland Road

Mardi Dam

Woodbury Park Drive

Gavenlock Road

Pacific Motorway

Pacific Highway

Mardi

Wyong Road

MARDI CK

Mardi Creek

Tuggerah

Lake Road

LEGEND

- Existing 1%AEP Inundation Extent
- 1%AEP Inundation Extent with 30% Increase in Rainfall and 0.9m Increase in Tuggerah Lake Level

Notes:
Aerial photograph dated 2014

N
W E
S

Scale 1:10,000 (at A3)

0 0.25 0.5 Km

Figure A17.26: Peak 1% AEP Flood Extent 30% increase in Rainfall & 0.9m Increase in Tuggerah Lake Level

Prepared By:

Catchment Simulation Solutions
Suite 2.01, 210 George St
Sydney, NSW 2000

File Name: Figure A17.26 CC30 1%AEP.wor

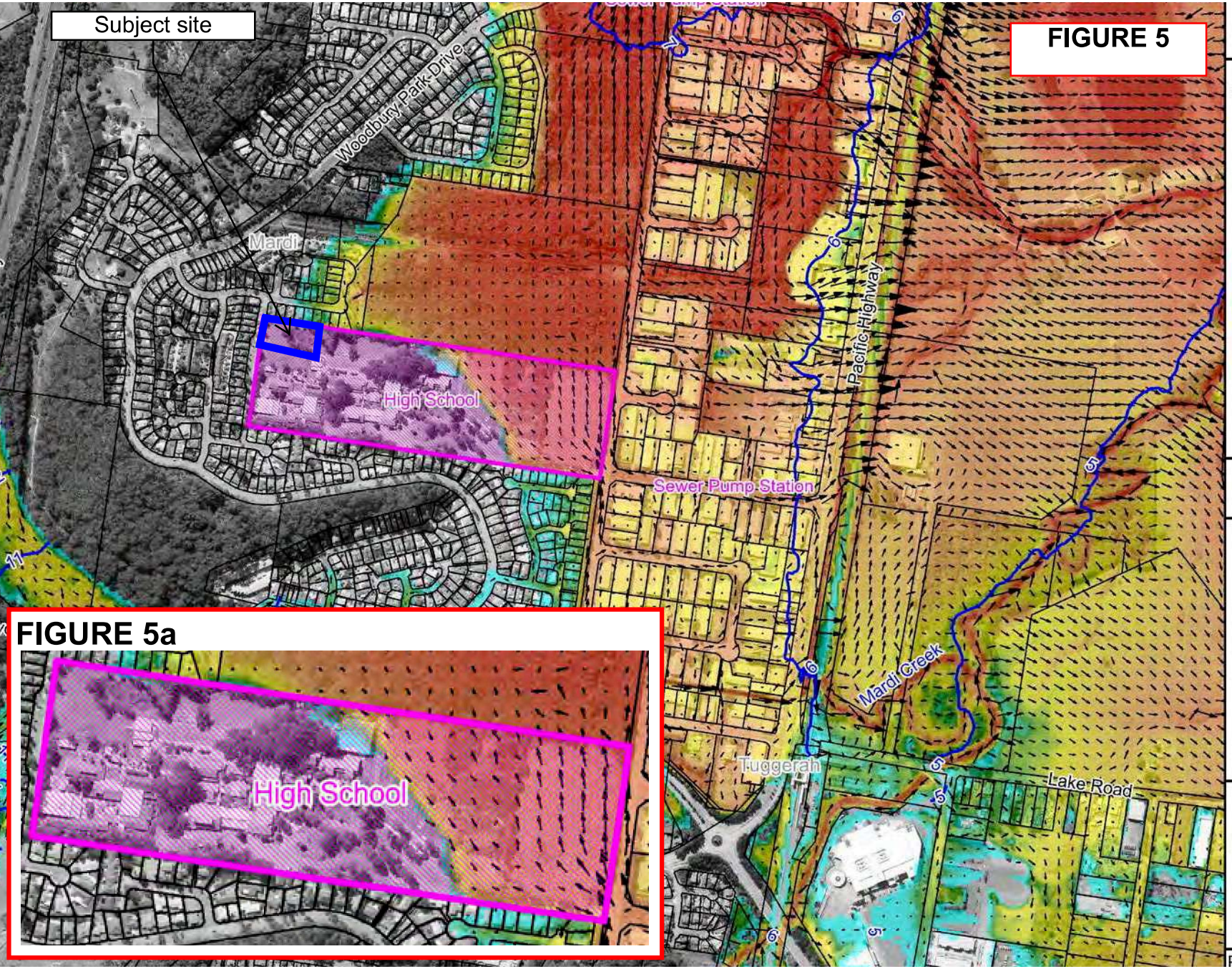


FIGURE 5

FIGURE 5a

LEGEND

- 6 — Peak Water Level Contour (mAHD)
- Critical Facility

Depths (m)	Velocity Vector (m/s)
< = 0.2	1 m/s
0.5	2 m/s
1.0	4 m/s
2.0	
3.0	

Notes:
Aerial photograph dated 2014

N
W E
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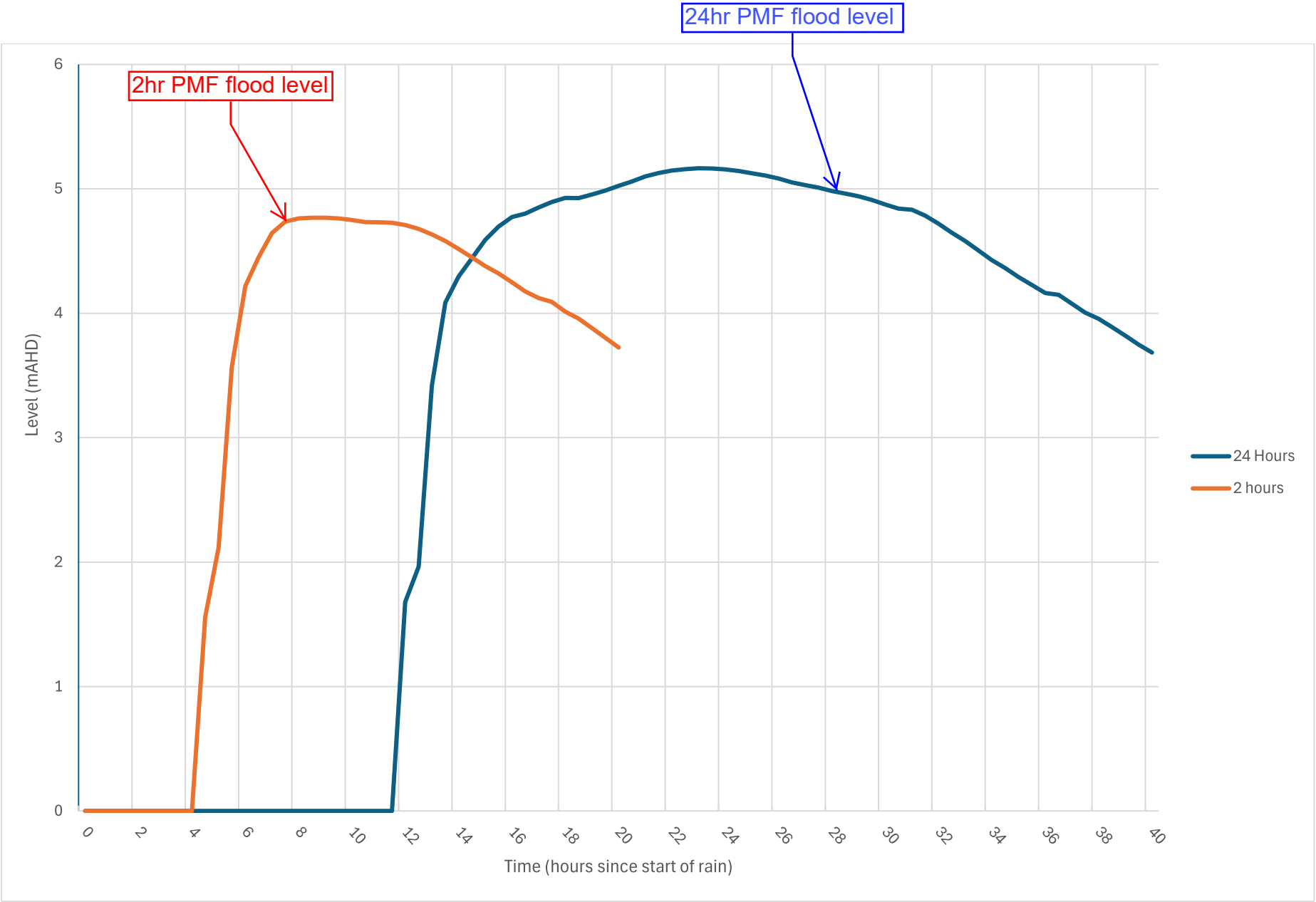
Scale 1:10,000 (at A3)

0 0.25 0.5 Km

Figure A4.26: Peak Floodwater Depths, Velocities and Levels for the PMF

Prepared By:

FIGURE 6



Flood Types - Short and Long Duration Response Times

FIGURE 7

Westfield Shopping Centre Flood Refuge

Flood Hazard Locations along Evacuation Route to Westfield Shopping Centre

ATTACHMENT A

PMF flood hazard behaviour

Long and short duration floods

Source – Catchment Simulation Solutions Pty Ltd

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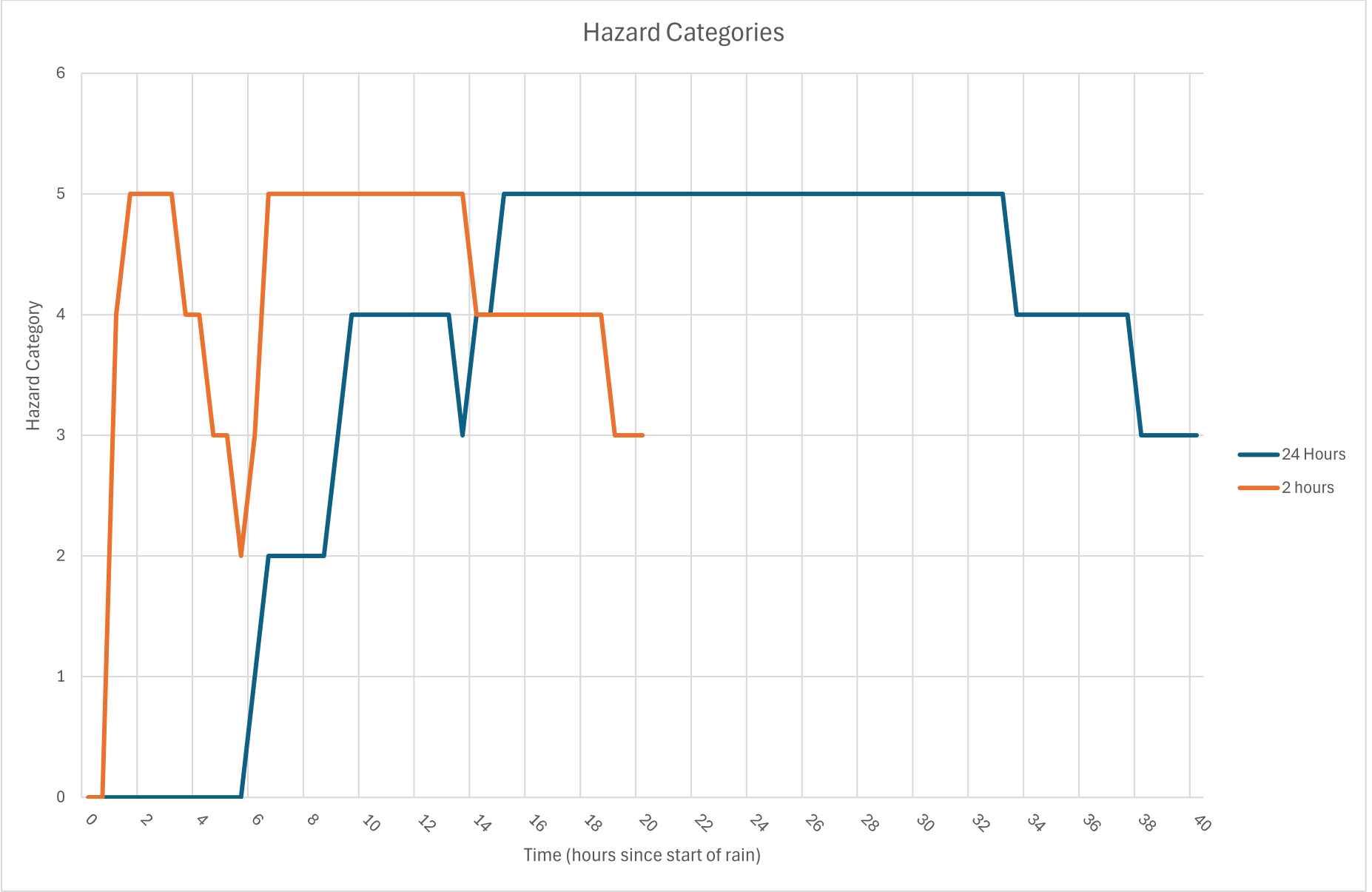
LOCATION A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Hazard Category
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1
2
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8
10
12
14
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26
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32
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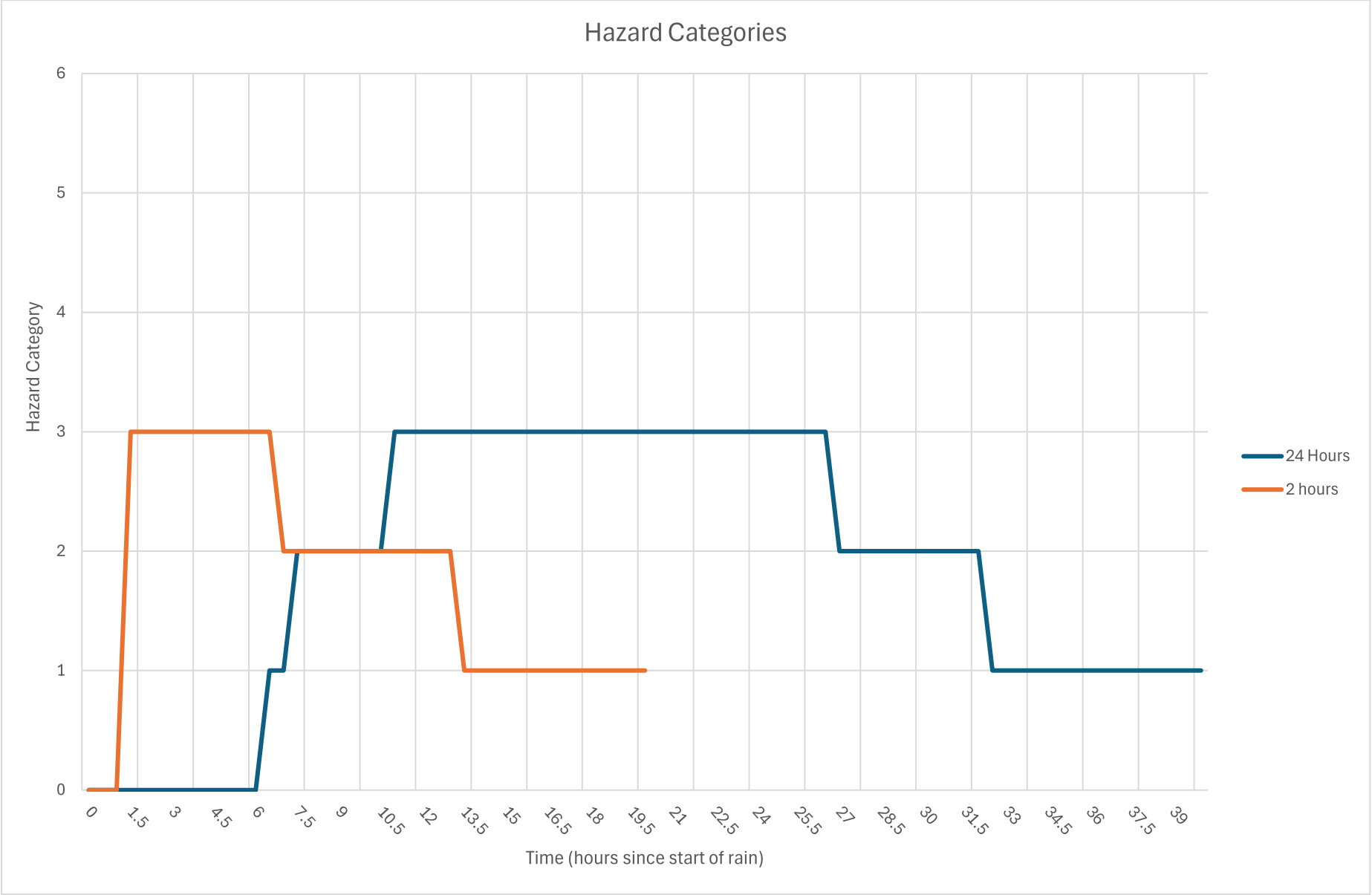
36
38
40
Time (hours since start of rain)
24 Hours
2 hours

LOCATION B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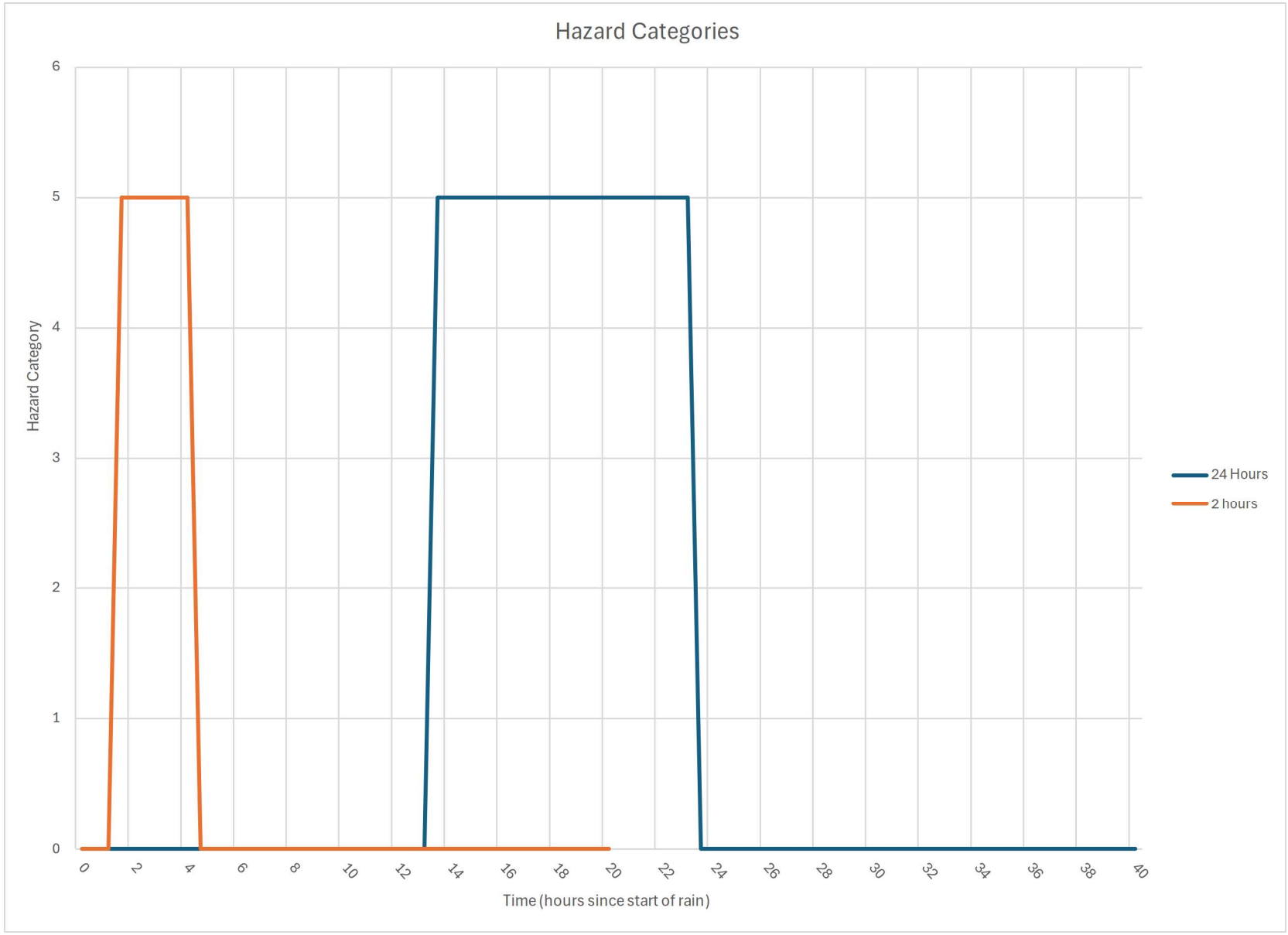
39
Time (hours since start of rain)
24 Hours
2 hours

LOCATION C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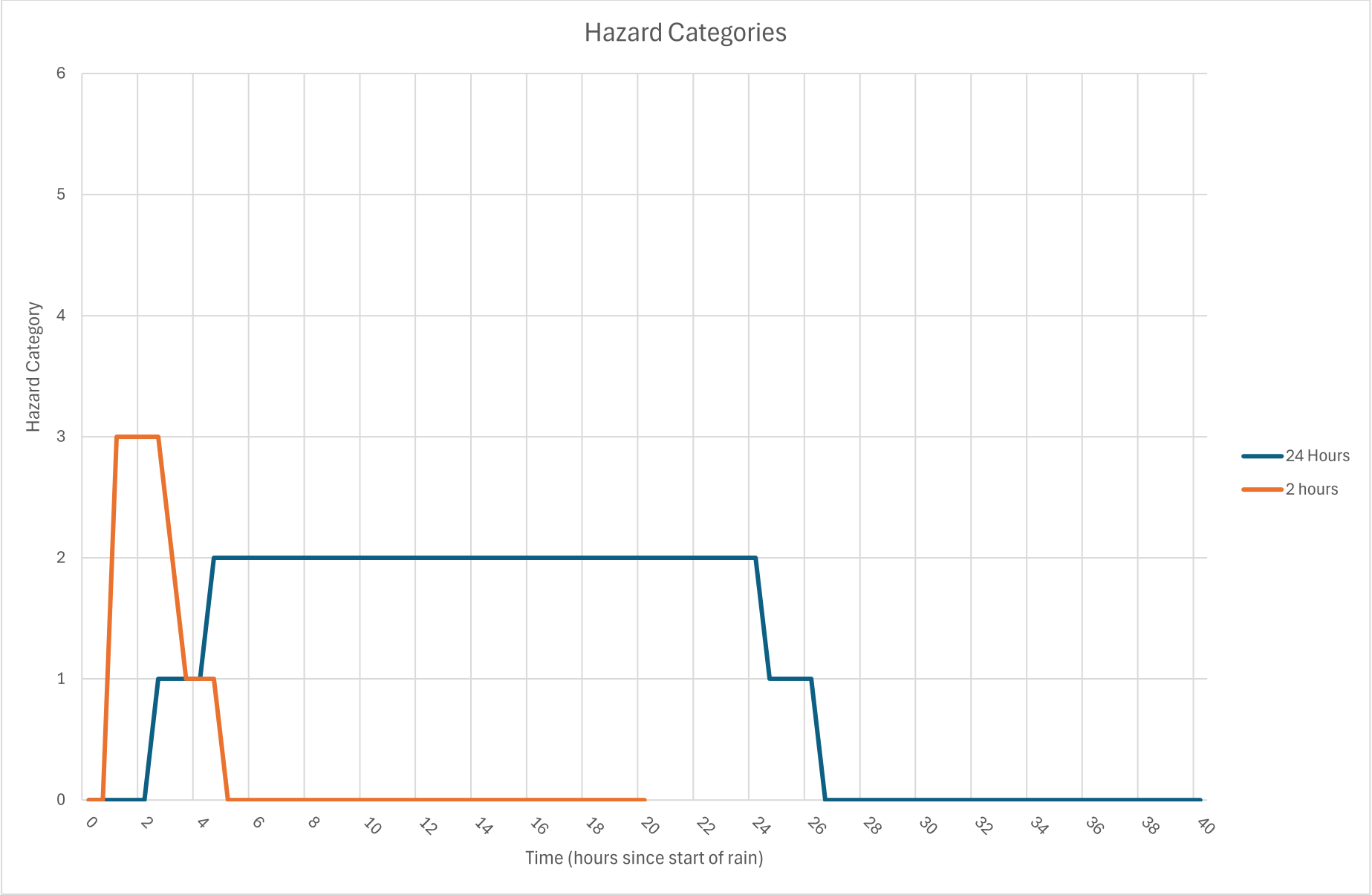
Time (hours since start of rain)
24 Hours
2 hours

LOCATION D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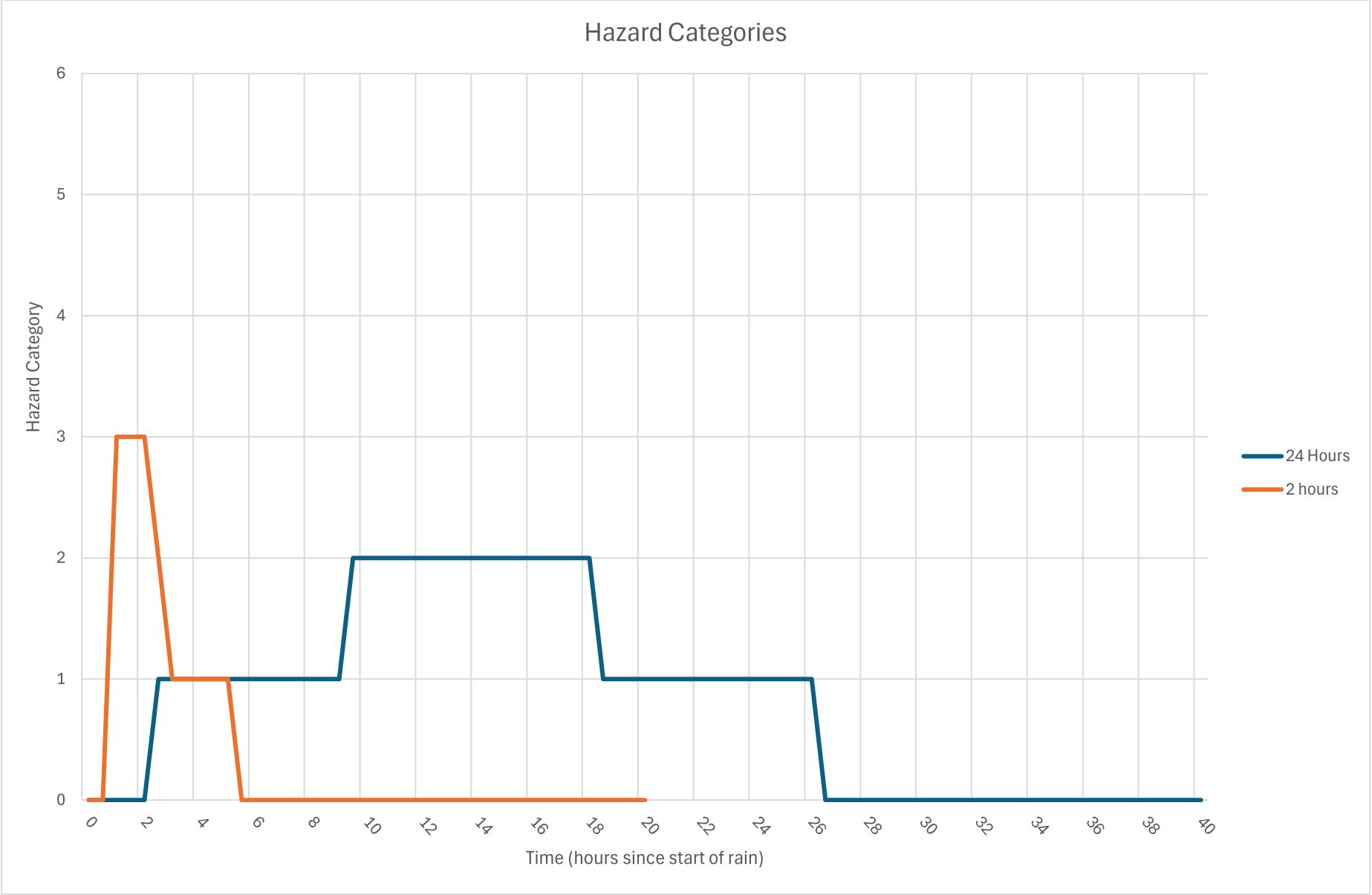
Time (hours since start of rain)
24 Hours
2 hours

LOCATION E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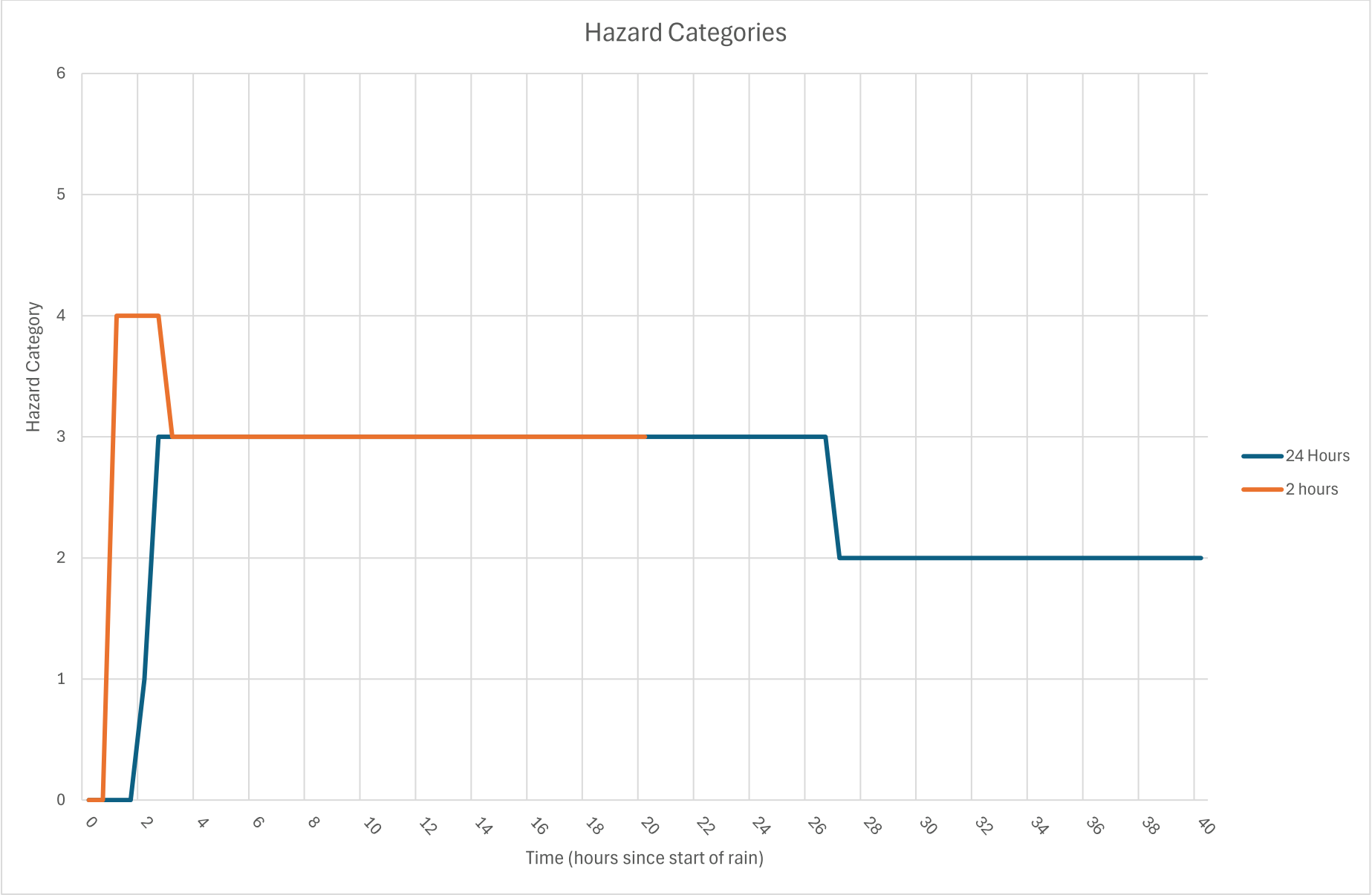
Time (hours since start of rain)
24 Hours
2 hours

LOCATION F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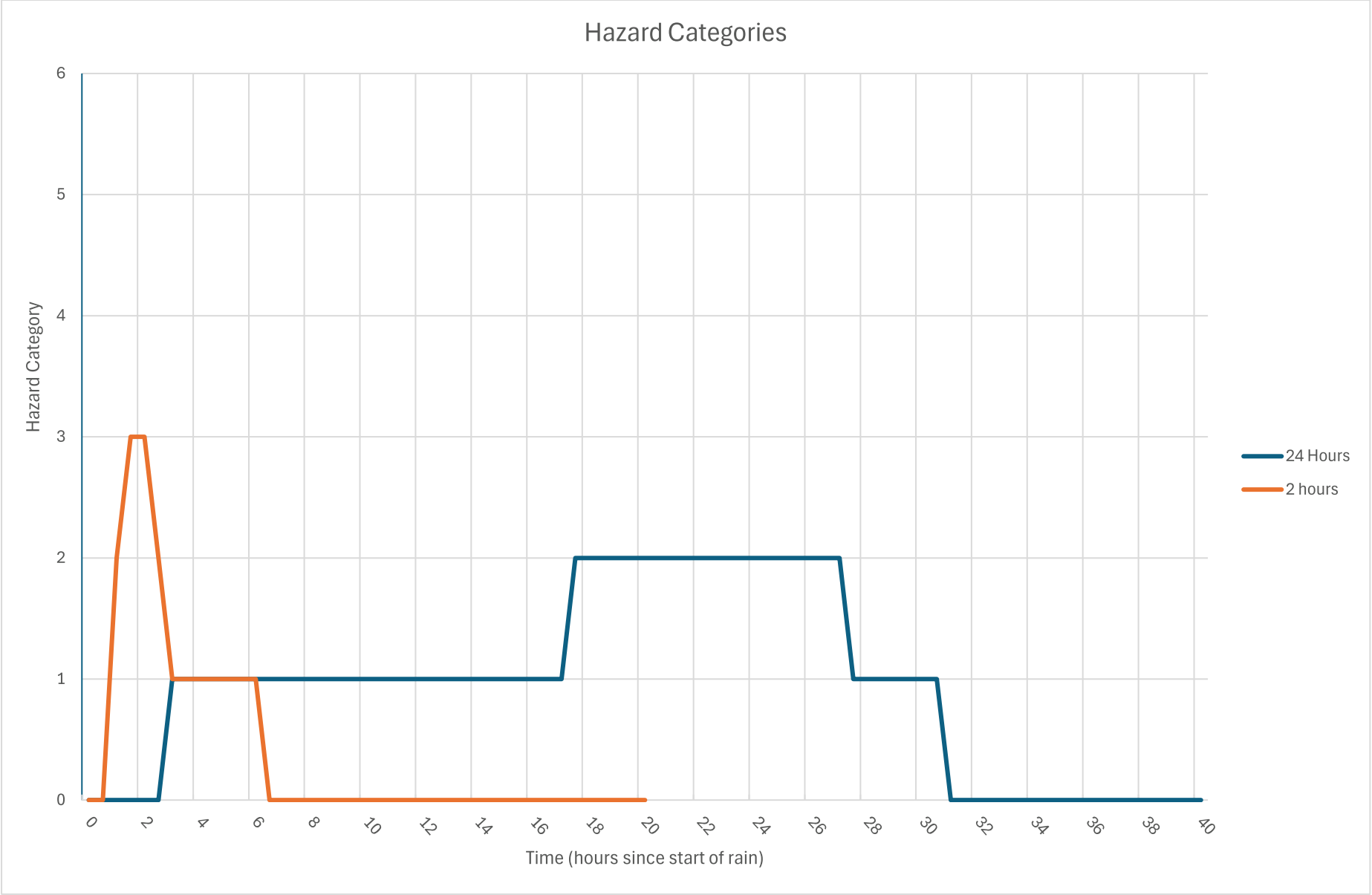
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
38
40
Time (hours since start of rain)
24 Hours
2 hours

LOCATION G


Hazard Categories
Hazard Category
0
1
2
3
4
5
6
0
2
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16
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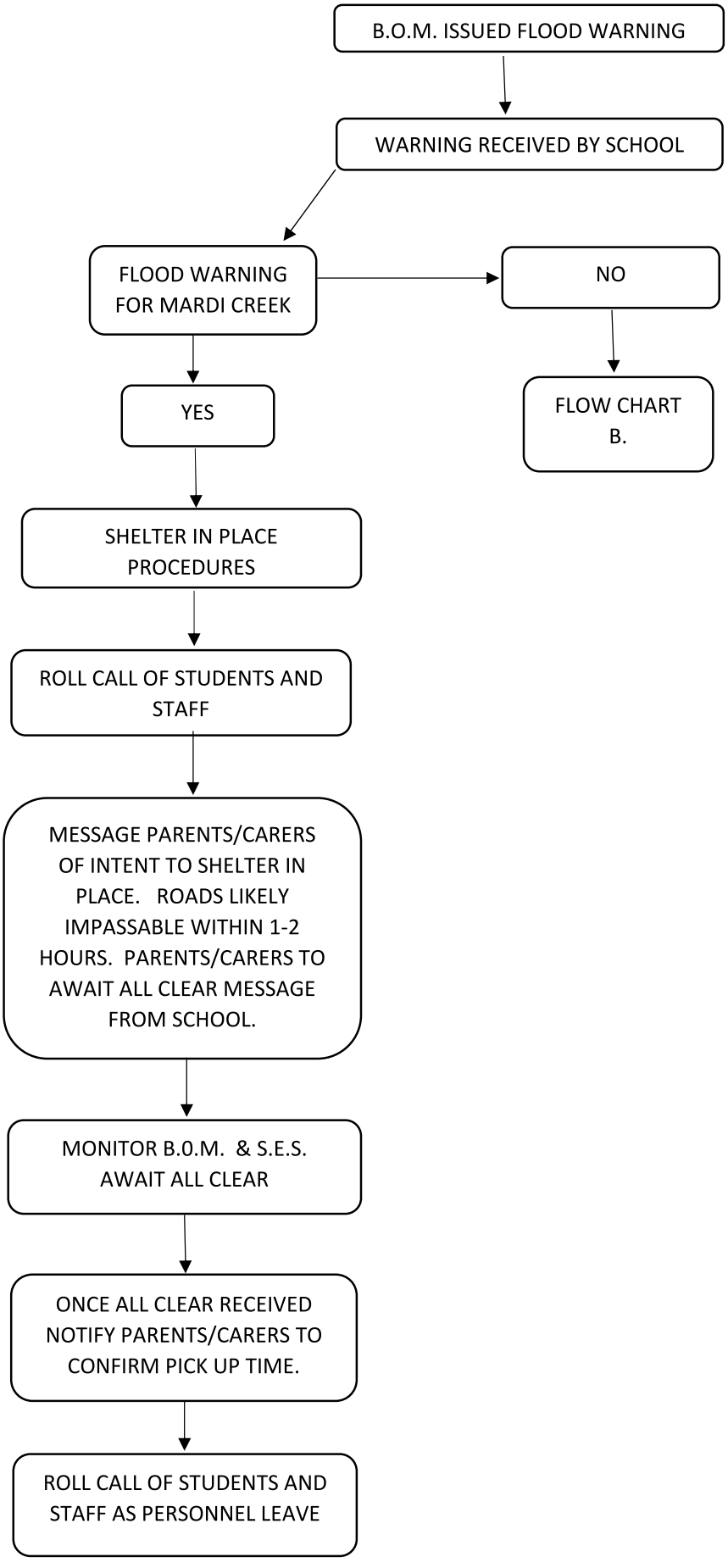
22
24
26
28
30
32
34
36
38
40
Time (hours since start of rain)
24 Hours
2 hours

ATTACHMENT B

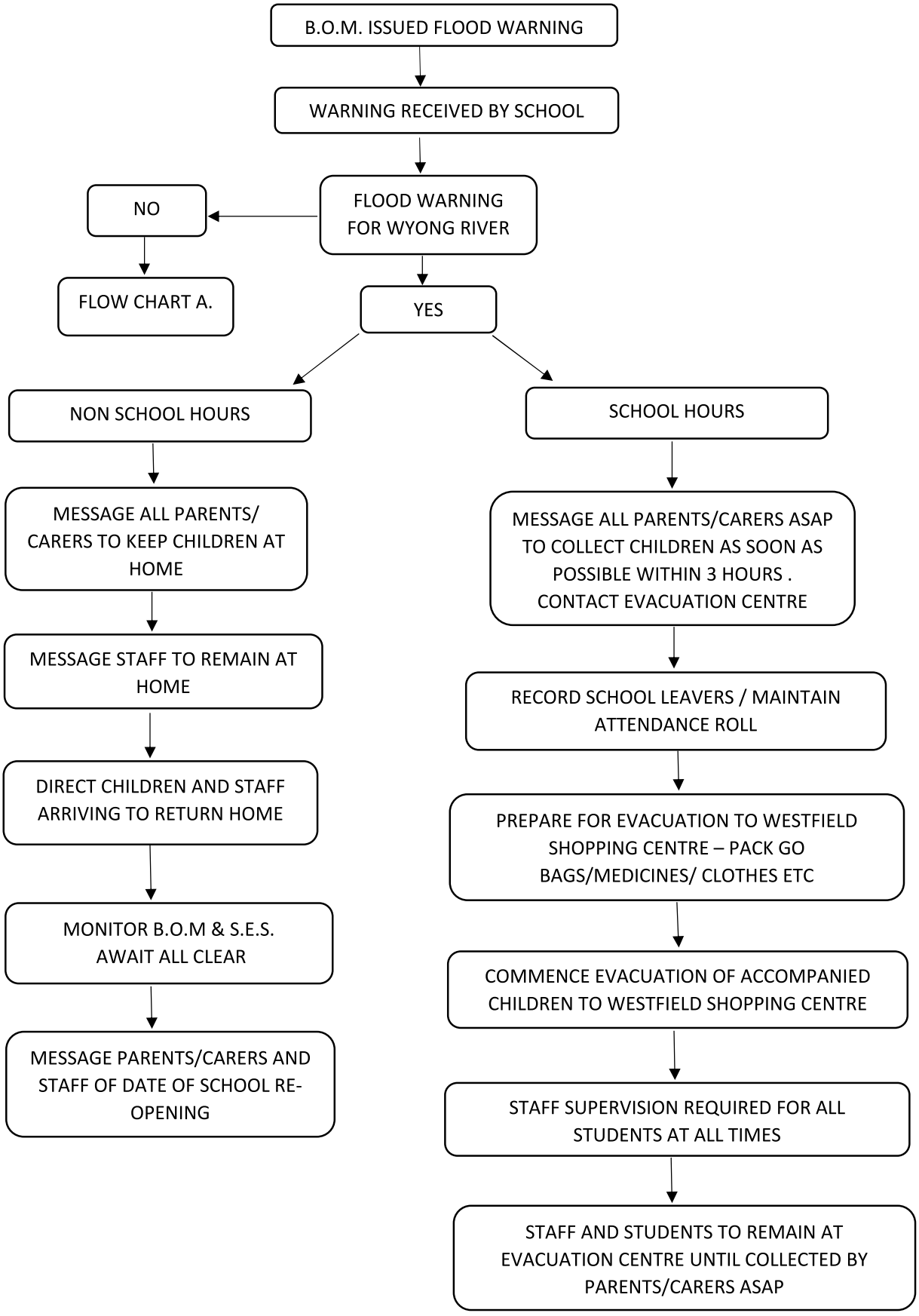
Flood Emergency Decision Flow Charts

m 0409 912 631 e mark.tooker@tookerandassociates.com.au a 30 Walworth Avenue, Newport abn 39 619 046 070

FLOW CHART A


B.O.M. ISSUED FLOOD WARNING
WARNING RECEIVED BY SCHOOL
FLOOD WARNING FOR MARDI CREEK
NO
FLOW CHART B.
YES
SHELTER IN PLACE PROCEDURES
ROLL CALL OF STUDENTS AND STAFF
MESSAGE PARENTS/CARERS OF INTENT TO SHELTER IN PLACE. ROADS LIKELY IMPASSABLE WITHIN 1-2 HOURS. PARENTS/CARERS TO AWAIT ALL CLEAR MESSAGE FROM SCHOOL.
MONITOR B.0.M. & S.E.S. AWAIT ALL CLEAR
ONCE ALL CLEAR RECEIVED NOTIFY PARENTS/CARERS TO CONFIRM PICK UP TIME.
ROLL CALL OF STUDENTS AND STAFF AS PERSONNEL LEAVE

FLOW CHART B.


B.O.M. ISSUED FLOOD WARNING
WARNING RECEIVED BY SCHOOL
FLOOD WARNING FOR WYONG RIVER
NO
FLOW CHART A.
YES
NON SCHOOL HOURS
MESSAGE ALL PARENTS/ CARERS TO KEEP CHILDREN AT HOME
MESSAGE STAFF TO REMAIN AT HOME
DIRECT CHILDREN AND STAFF ARRIVING TO RETURN HOME
MONITOR B.O.M & S.E.S. AWAIT ALL CLEAR
MESSAGE PARENTS/CARERS AND STAFF OF DATE OF SCHOOL RE-OPENING
SCHOOL HOURS
MESSAGE ALL PARENTS/CARERS ASAP TO COLLECT CHILDREN AS SOON AS POSSIBLE WITHIN 3 HOURS . CONTACT EVACUATION CENTRE
RECORD SCHOOL LEAVERS / MAINTAIN ATTENDANCE ROLL
PREPARE FOR EVACUATION TO WESTFIELD SHOPPING CENTRE – PACK GO BAGS/MEDICINES/ CLOTHES ETC
COMMENCE EVACUATION OF ACCOMPANIED CHILDREN TO WESTFIELD SHOPPING CENTRE
STAFF SUPERVISION REQUIRED FOR ALL STUDENTS AT ALL TIMES
STAFF AND STUDENTS TO REMAIN AT EVACUATION CENTRE UNTIL COLLECTED BY PARENTS/CARERS ASAP