

APPENDIX D - PRE-SUBMISSION MEETING MINUTES

APPENDIX D - Minutes of pre-submission meeting with PCC

MINUTES



Issue date 1/07/2020
Issue to Penrith City Council
Issued by Arcadis
Subject 221 Luddenham, Orchard Hills – Flood Impact Modelling Strategy
Reference A0002-30051519
Client HBB Property
Meeting date 26/06/2020
Time 11:30am
Location On-Line Meeting – Teams
Present Darlan Castro – Arcadis
Alex Black – Arcadis
Mark Cremona – Arcadis
Mylvaganam Senthilvasan – Penrith City Council
Dr Elias Ishak – Penrith City Council
Danny Kataieh - HBB

ITEM	COMMENTS	ACTION
1	PCC can provide South Creek flood model – Arcadis to submit application and PCC will also add any additional files relevant to the assessment.	
2	Hydraulic Impact assessment for proposed development will be based on the following: Hydrology – XP-Rafts using ARR19 methodology Hydraulics – TUFLOW (Classic)	
3	Arcadis to assess and report on the following recurrence intervals: • 20 ARI • 100 ARI • 200 ARI • PMF Noting that Council's flood control considers events up to 100 year ARI and larger events will be used to inform Council on future emergency assessments.	
4	Model boundary has been agreed as follows: • Downstream – South Creek • Upstream – Generally downstream of the Warragamba pipeline. Arcadis will investigate pipeline impact of unimpeded flows to the model	

5	Arcadis to report on : • Afflux – Noting that > than 20mm is not accepted • Flood Hazards • Velocity and Velocity changes • Flood Storage • Flood difference mapping
6	Additional comments • All farm dams will be modelled as “full”
7	Whilst not part of the flood impact assessment Council raised that detention basins should be located outside of 100 Year ARI extents

APPENDIX E – H&H STORMWATER CONCEPT DESIGN

BULK EARTHWORKS QUANTITIES	
CUT	332,477 ± .00
FILL	687,839 ± .00
EXCESS OF FILL OVER CUT	355,362 ± .00

TORSION STRIPPING VALUE OF 200mm ACCOUNTED FOR IN CALCULATION

SCALE 1:4000

SURVEY
INFORMATION
SURVEYED BY
WATSDON BUCHAN
DATE: A.H.D.
ORIGIN OF LEVELS: SSM 22740 PL4.1

NETTLETONTRIBE

This drawing and design remain the property of Henry & Hymas and may not be copied in whole or in part without the prior written approval of Henry & Hymas.

Level 5,
79 Victoria Avenue
Chatterbox NSW 2067

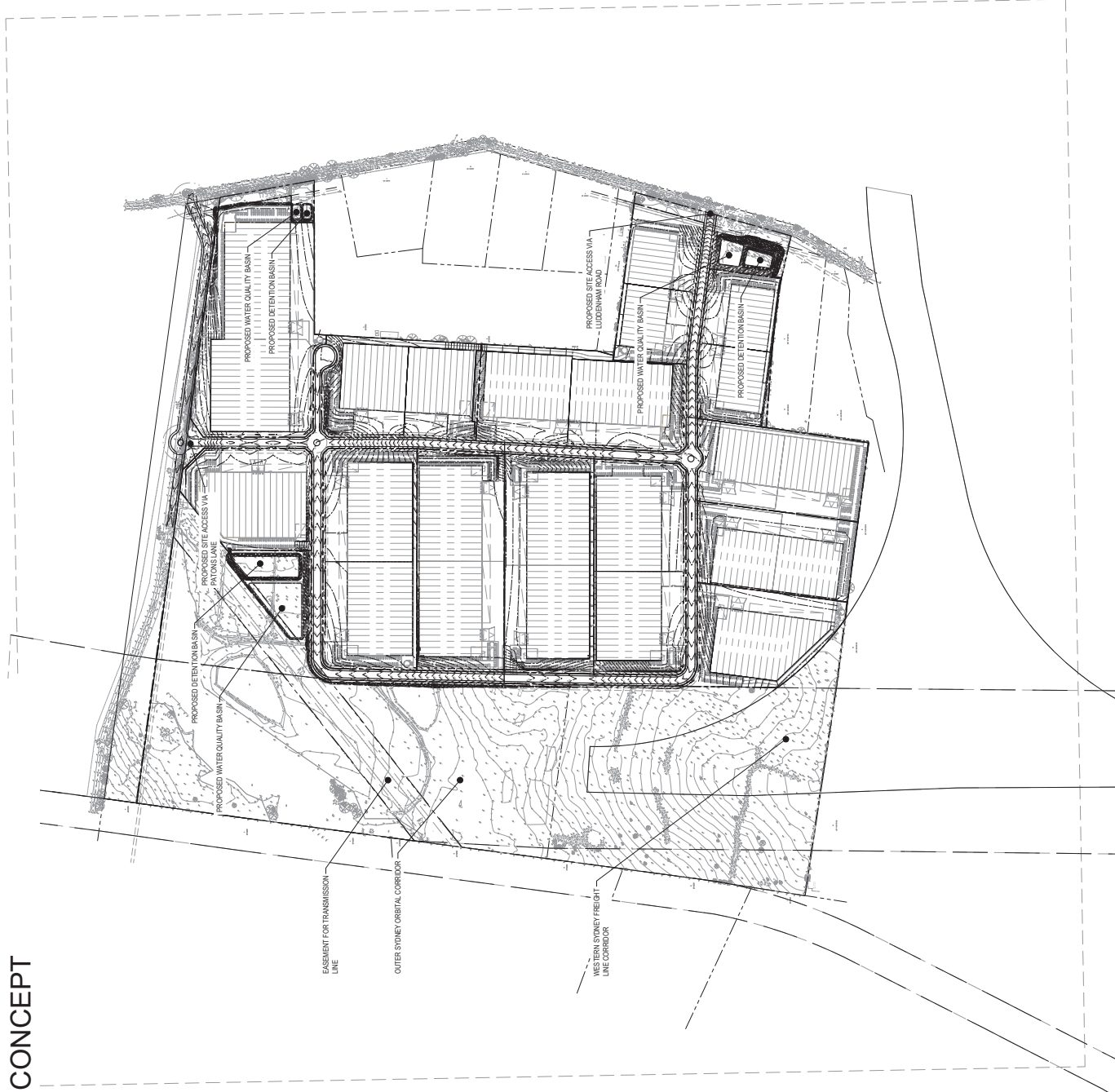
Telephone
+61 2 9417 8400
Facsimile
+61 2 9417 8337
Email
email@h3consult.com.au
Web

The logo for H3 CONSULT features a stylized blue and red circular emblem with a white 'H' and '3' inside, surrounded by the text 'H3 CONSULT' in a circular arrangement.

THE OVERALL PLAN

PRELIMINARY

Designing center	Designated	Date
Checked	N.H. asafzod	MARCH 2019
Approved	A. Francis	Stamp (B1) 1-4000



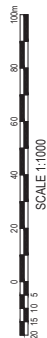


LEGEND

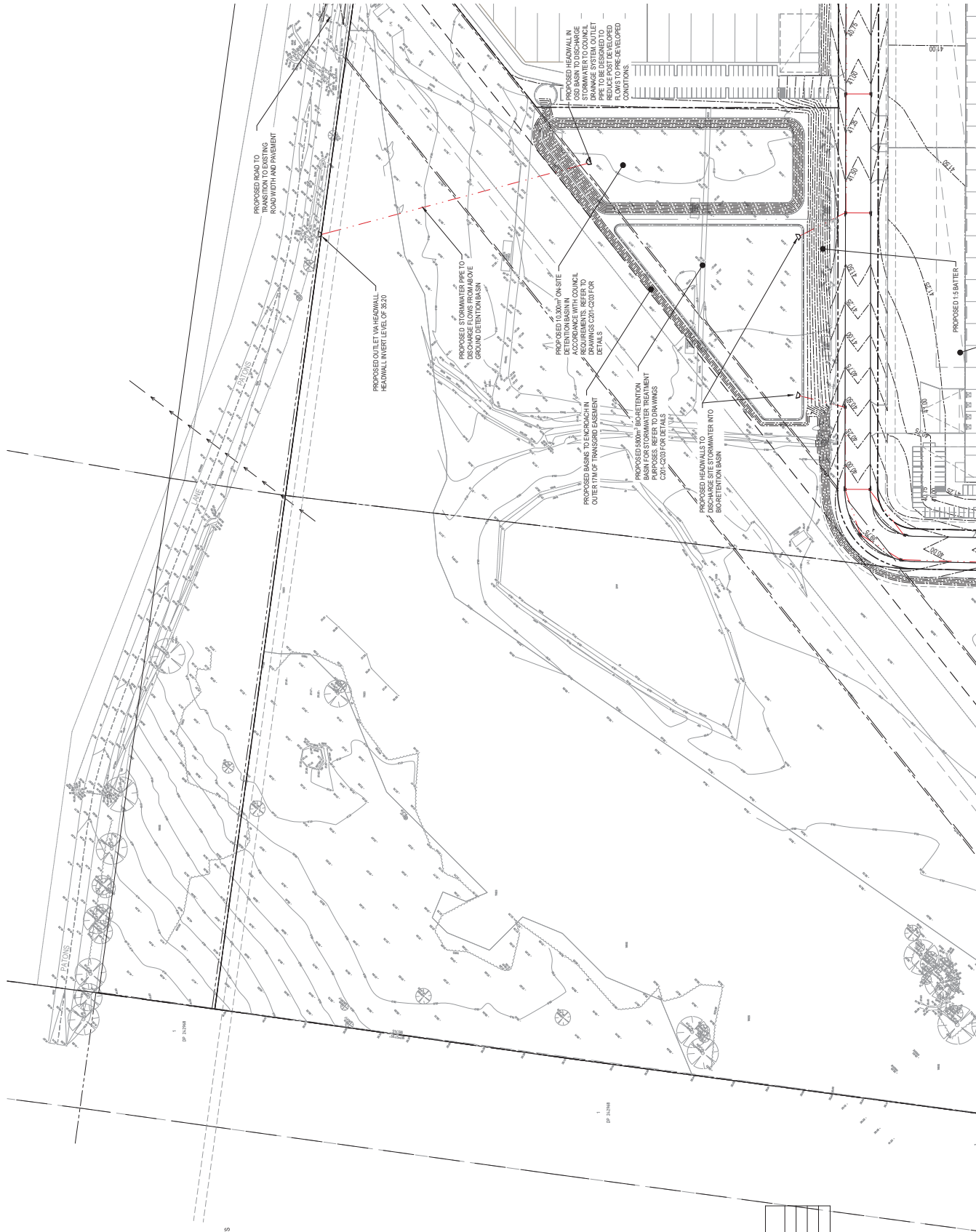
- PROPOSED STORMWATER PIPE
- PROPOSED BOUNDARY
- PROPOSED CONTOURS
- EXISTING CONTOURS
- PROPOSED LEVEL OMBRAGE & SAG PITS

BULK EARTHWORKS QUANTITIES	
OUT	32,471 m ³
FILL	67,631 m ³
EXCESS OF FILL OVER OUT	35,160 m ³
TOPSOIL STRIPPING VALUE OF 200mm ACCOUNTED FOR IN CALCULATION	

NOTE:
LEVELS AND SITE GRADING SHOWN ARE
PRELIMINARY ONLY AND ARE SUBJECT TO
CHANGE DURING THE DESIGN DEVELOPMENT
PHASE.



SCALE 1:1000



SURVEY INFORMATION	
SURVEYED BY	WATSON BUCHAN
DATE	14/04/2019
ORDER OF LEVELS	50M IZM RL 4.10

CLIENT	HB & B PROPERTY PTY LTD
PROJECT	NETTLETONTRIBE
This document is the property of HB & B Property Pty Ltd and may not be copied or used in any way without the prior written approval of HB & B Property Pty Ltd.	

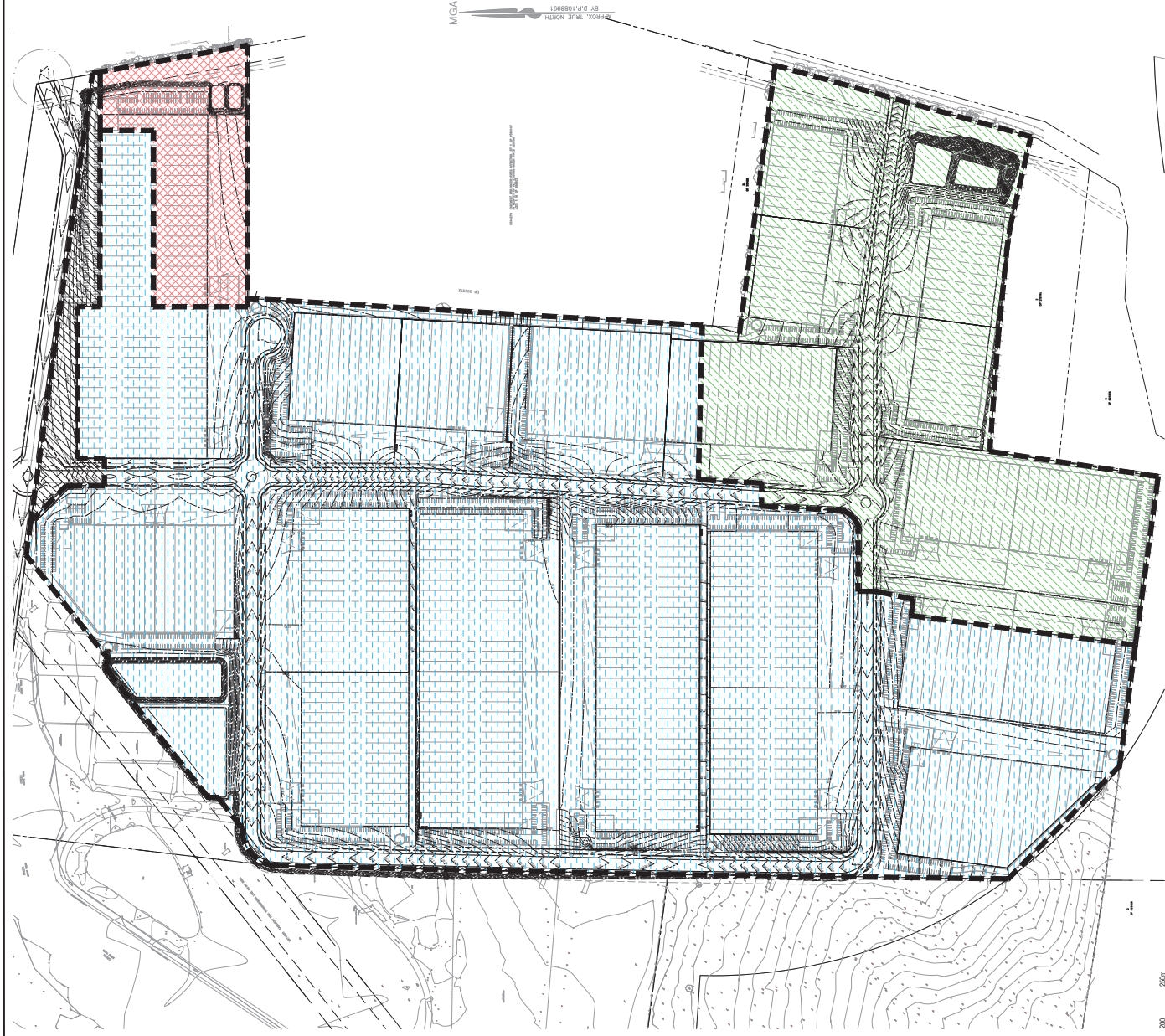
Level 5, 5th Floor 100 Williamstown Road Melbourne VIC 3207	Phone +61 3 9477 8400 +61 3 9477 8337 email@hbsb.com.au www.hbsbproperty.com.au
---	---



PROPOSED INDUSTRIAL SUBDIVISION 221-227 & 289-317 LUDENHAM ROAD ORCHARD HILLS	DATE 22/04/2019
DETAIL PLAN SHEET 1 OF 6	REVISION 1:1000

PRELIMINARY

DATE	22/04/2019
DESIGNER	N. H. H. H.
CHECKED	N. H. H. H.
APPROVED	N. H. H. H.
SCALE	1:1000
PROJECT	19221_SK_C101
SHEET	02



TOTAL AREA = 81.17 ha

CATCHMENT TO BASIN 1
AREA = 57.45 ha

CATCHMENT TO BASIN 2
AREA = 3.39 ha

CATCHMENT TO BASIN 3
AREA = 18.824 ha

BYPASS
AREA = 1.50 ha

STORMWATER CATCHMENT PLAN

SCALE 1:2500



SURVEY INFORMATION	
SURVEYED BY	WATSON BUCHAN
DATE	2014.04.04
ORDER OF LINES	SEE ZONE B/L 1 B

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015
DATE	11/03/2015

ISSUED FOR APPROVAL

PROPOSED INDUSTRIAL SUBDIVISION 221-227 & 289-317 LUDDENHAM ROAD ORCHARD HILLS	PROPOSED STORMWATER CATCHMENT PLAN
---	---------------------------------------

19221_SK_C250	04
---------------	----

APPENDIX F – ARR_DATAHUB AND PMP ESTIMATE

APPENDIX F - ARR_DATAHUB & PMP ESTIMATE

Results - ARR Data Hub
[STARTTXT]

Input Data Information
[INPUTDATA]
Latitude -33.8211
Longitude 150.7517
[END_INPUTDATA]

River Region
[RIVREG]
Division South East Coast (NSW)
River Number 12
River Name Hawkesbury River
[RIVREG_META]
Time Accessed 24 August 2020 11:05AM
Version 2016_v1
[END_RIVREG]

ARF Parameters
[LONGARF]
Zone SE Coast
a 0.06
b 0.361
c 0
d 0.317
e 8.11E-05
f 0.651
g 0
h 0
i 0
[LONGARF_META]
Time Accessed 24 August 2020 11:05AM
Version 2016_v1
[END_LONGARF]

Storm Losses
[LOSSES]
ID 1914
Storm Initial Losses (mm) 41
Storm Continuing Losses (mm/h) 2.3
[LOSSES_META]
Time Accessed 24 August 2020 11:05AM
Version 2016_v1
[END_LOSSES]

Temporal Patterns
[TP]
code ECsouth
Label East Coast South
[TP_META]
Time Accessed 24 August 2020 11:05AM
Version 2016_v2
[END_TP]

Areal Temporal Patterns
[ATP]
code ECsouth
arealabel East Coast South
[ATP_META]
Time Accessed 24 August 2020 11:05AM
Version 2016_v2
[END_ATP]

Median Preburst Depths and Ratios
[PREBURST]
min (h)\AEP(%)
50 20 10 5 2 1
60 (1.0) 1.7 (0.065) 1.4 (0.038) 1.2 (0.026) 0.9 (0.018) 2.6 (0.043) 3.9 (0.057)
90 (1.5) 0.6 (0.019) 1.0 (0.023) 1.2 (0.025) 1.5 (0.026) 1.1 (0.016) 0.9 (0.011)
120 (2.0) 0.0 (0.000) 0.2 (0.004) 0.3 (0.006) 0.4 (0.007) 1.2 (0.017) 1.9 (0.022)
180 (3.0) 1.7 (0.046) 3.2 (0.062) 4.1 (0.068) 5.0 (0.072) 3.6 (0.043) 2.5 (0.027)
360 (6.0) 3.8 (0.080) 10.9 (0.168) 15.6 (0.202) 20.1 (0.224) 17.5 (0.163) 15.5 (0.127)
720 (12.0) 1.5 (0.024) 5.8 (0.066) 8.6 (0.083) 11.3 (0.093) 16.8 (0.116) 21.0 (0.127)
1080 (18.0) 1.4 (0.019) 6.3 (0.060) 9.5 (0.076) 12.6 (0.086) 15.9 (0.090) 18.4 (0.092)
1440 (24.0) 0.0 (0.000) 4.1 (0.034) 6.8 (0.047) 9.4 (0.056) 11.4 (0.056) 13.0 (0.057)
2160 (36.0) 0.0 (0.000) 2.1 (0.015) 3.5 (0.021) 4.9 (0.024) 5.7 (0.023) 6.3 (0.023)
2880 (48.0) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.5 (0.002) 0.8 (0.003)
4320 (72.0) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000)
[PREBURST_META]
Time Accessed 24 August 2020 11:05AM
Version 2018_v1
Note Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.
[END_PREBURST]

10% Preburst Depths
[PREBURST10]
min (h)\AEP(%)
50 20 10 5 2 1
60 (1.0) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000)
90 (1.5) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000)
120 (2.0) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000) 0.0 (0.000)

180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
[PREBURST10_META]						
Time Accessed						
Version						
Note						
[END_PREBURST10]						

24 August 2020 11:05AM
2018_v1
Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

25% Preburst Depths						
[PREBURST25]						
min (h)\AEP(%)		50	20	10	5	2 1
60 (1.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
90 (1.5)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
120 (2.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
180 (3.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
360 (6.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
720 (12.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1080 (18.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
1440 (24.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2160 (36.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
2880 (48.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
4320 (72.0)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)	0.0 (0.000)
[PREBURST25_META]						
Time Accessed						
Version						
Note						
[END_PREBURST25]						

24 August 2020 11:05AM
2018_v1
Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

75% Preburst Depths						
[PREBURST75]						
min (h)\AEP(%)		50	20	10	5	2 1
60 (1.0)	16.8 (0.639)	16.9 (0.462)	16.9 (0.387)	17.0 (0.333)	21.4 (0.352)	24.7 (0.360)
90 (1.5)	12.8 (0.429)	16.2 (0.393)	18.4 (0.375)	20.5 (0.359)	19.4 (0.285)	18.5 (0.241)
120 (2.0)	9.3 (0.285)	20.3 (0.454)	27.5 (0.517)	34.4 (0.557)	30.8 (0.417)	28.1 (0.336)
180 (3.0)	27.4 (0.733)	36.4 (0.721)	42.5 (0.706)	48.2 (0.689)	44.4 (0.530)	41.5 (0.438)
360 (6.0)	21.4 (0.446)	40.4 (0.623)	53.0 (0.687)	65.0 (0.725)	76.0 (0.706)	84.2 (0.690)
720 (12.0)	30.1 (0.474)	36.1 (0.416)	40.1 (0.386)	43.9 (0.362)	56.5 (0.388)	66.0 (0.400)
1080 (18.0)	22.4 (0.297)	33.8 (0.324)	41.4 (0.330)	48.6 (0.331)	55.0 (0.312)	59.7 (0.299)
1440 (24.0)	14.4 (0.170)	25.0 (0.210)	32.0 (0.223)	38.8 (0.230)	41.1 (0.203)	42.8 (0.187)
2160 (36.0)	11.5 (0.116)	17.7 (0.125)	21.9 (0.127)	25.8 (0.127)	34.8 (0.143)	41.5 (0.151)
2880 (48.0)	3.7 (0.034)	5.4 (0.034)	6.5 (0.034)	7.6 (0.033)	12.4 (0.045)	16.0 (0.052)
4320 (72.0)	0.0 (0.000)	0.4 (0.002)	0.7 (0.003)	1.0 (0.004)	7.9 (0.025)	13.1 (0.037)
[PREBURST75_META]						
Time Accessed						
Version						
Note						
[END_PREBURST75]						

24 August 2020 11:05AM
2018_v1
Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

90% Preburst Depths						
[PREBURST90]						
min (h)\AEP(%)		50	20	10	5	2 1
60 (1.0)	42.3 (1.603)	47.2 (1.291)	50.4 (1.154)	53.6 (1.052)	80.4 (1.324)	100.5 (1.466)
90 (1.5)	36.6 (1.226)	56.2 (1.368)	69.1 (1.411)	81.5 (1.429)	72.6 (1.067)	65.9 (0.857)
120 (2.0)	54.1 (1.656)	91.9 (2.060)	117.0 (2.200)	141.0 (2.279)	127.7 (1.728)	117.7 (1.408)
180 (3.0)	54.0 (1.446)	85.1 (1.683)	105.8 (1.759)	125.6 (1.795)	116.7 (1.394)	110.0 (1.161)
360 (6.0)	51.5 (1.074)	82.5 (1.273)	103.0 (1.337)	122.7 (1.368)	134.4 (1.250)	143.2 (1.174)
720 (12.0)	52.0 (0.818)	75.2 (0.866)	90.7 (0.874)	105.4 (0.870)	119.2 (0.819)	129.6 (0.786)
1080 (18.0)	47.1 (0.625)	64.9 (0.622)	76.8 (0.612)	88.1 (0.600)	104.1 (0.590)	116.1 (0.581)
1440 (24.0)	31.0 (0.365)	44.2 (0.372)	53.0 (0.369)	61.5 (0.364)	75.5 (0.373)	86.1 (0.376)
2160 (36.0)	38.1 (0.383)	44.6 (0.314)	48.9 (0.284)	53.0 (0.261)	72.7 (0.298)	87.4 (0.318)
2880 (48.0)	23.1 (0.210)	22.2 (0.140)	21.6 (0.111)	21.0 (0.092)	50.7 (0.185)	73.0 (0.236)
4320 (72.0)	6.0 (0.048)	19.3 (0.106)	28.2 (0.127)	36.7 (0.139)	38.5 (0.122)	39.9 (0.112)
[PREBURST90_META]						
Time Accessed						
Version						
Note						
[END_PREBURST90]						

24 August 2020 11:05AM
2018_v1
Preburst interpolation methods for catchment wide preburst has been slightly altered. Point values remain unchanged.

Interim Climate Change Factors			
[CCF]			
	RCP 4.5	RCP6	RCP 8.5
2030	0.869 (4.3%)	0.783 (3.9%)	0.983 (4.9%)
2040	1.057 (5.3%)	1.014 (5.1%)	1.349 (6.8%)
2050	1.272 (6.4%)	1.236 (6.2%)	1.773 (9.0%)
2060	1.488 (7.5%)	1.458 (7.4%)	2.237 (11.5%)
2070	1.676 (8.5%)	1.691 (8.6%)	2.722 (14.2%)
2080	1.810 (9.2%)	1.944 (9.9%)	3.209 (16.9%)
2090	1.862 (9.5%)	2.227 (11.5%)	3.679 (19.7%)
[CCF_META]			
Time Accessed			
Version			
Note			
[END_CCF]			

24 August 2020 11:05AM
2019_v1
ARR recommends the use of RCP4.5 and RCP 8.5 values. These have been updated to the values that can be found on the climate change in Australia we

Probability Neutral Burst Initial Loss						
[BURSTIL]						
min (h)\AEP(%)		50	20	10	5	2 1

60 (1.0)	26.3	18.4	16.6	16.7	15.3	12.2
90 (1.5)	29.8	20.2	17.2	16.7	15.5	15
120 (2.0)	32.6	17.6	15.4	14.7	13.3	12.7
180 (3.0)	31.6	16.6	14.4	14.3	13.5	10.1
360 (6.0)	31	17.7	15	13.5	11.5	7
720 (12.0)	31.5	21.8	20.4	19	16.9	9.3
1080 (18.0)	33.7	24.5	23	21.5	18.6	11.4
1440 (24.0)	38.3	29.9	28	27.6	24.7	15.8
2160 (36.0)	39.3	32.7	31.7	32.4	27.9	13.6
2880 (48.0)	44.4	38.9	38.9	42.9	34.4	17.1
4320 (72.0)	48.3	42.1	40.8	45.4	37.8	25.5

[BURSTIL_META]

Time Accessed

24 August 2020 11:05AM

Version

2018_v1

Note

As this point is in NSW the advice provided on losses and pre-burst on the /nsw_specific NSW Specific Tab of the ARR Data Hub is to be c

[END_BURSTIL]Transformational Pre-burst Rainfall

[PREBURST_TRANS]

min (h)\AEP(%)	50	20	10	5	2	1
60 (1.0)	14.7	22.6	24.4	24.3	25.7	28.8
90 (1.5)	11.2	20.8	23.8	24.3	25.5	26
120 (2.0)	8.4	23.4	25.6	26.3	27.7	28.3
180 (3.0)	9.4	24.4	26.6	26.7	27.5	30.9
360 (6.0)	10	23.3	26	27.5	29.5	34
720 (12.0)	9.5	19.2	20.6	22	24.1	31.7
1080 (18.0)	7.3	16.5	18	19.5	22.4	29.6
1440 (24.0)	2.7	11.1	13	13.4	16.3	25.2
2160 (36.0)	1.7	8.3	9.3	8.6	13.1	27.4
2880 (48.0)	0	2.1	2.1	0	6.6	23.9
4320 (72.0)	0	0	0.2	0	3.2	15.5

[PREBURST_TRANS_META]

The tranformational pre-burst is intended for software suppliers in the NSW area and is simply the Initial Loss - Burst Initial Loss. It is not appropriate to use these values if considering a calibrated initial l

[END_PREBURST_TRANS]

PMP IFD File creeated by CatchmentSIM

IFD Design Rainfall Depth (mm)

Issued: 26/10/2018

Location

Label: PMP(GSDM)

Requested coordi Latitude -42.6766 Longitude 147.5711

Duration	Duration in min	Annual Exceedance Probability (AEP)		
		PMP(A)	PMP(B)	PMP(C)
15 min	15	164.50	144.92	130.94
30 min	30	238.00	214.50	194.53
45 min	45	300.30	273.87	247.62
1 hour	60	348.60	319.23	293.82
1.5 hour	90	398.30	365.01	335.38
2 hour	120	443.80	408.55	377.70
2.5 hour	150	472.50	435.30	401.45
3 hour	180	498.40	456.30	420.29
4 hour	240	544.60	504.46	469.67
5 hour	300	587.30	542.26	505.31
6 hour	360	620.20	574.18	537.51

APPENDIX G – DRAINS MODELLING AND BASIN PARAMETERS

APPENDIX G - DRAINS MODELLING PROJEC SITE

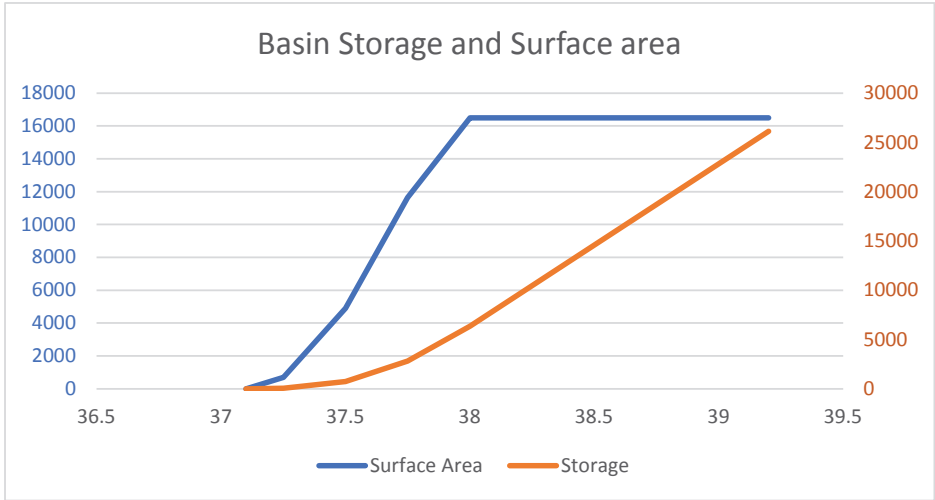
BASIN 2 - Outlet Information (Extracted from "Penrith OSd design rev6.drn")

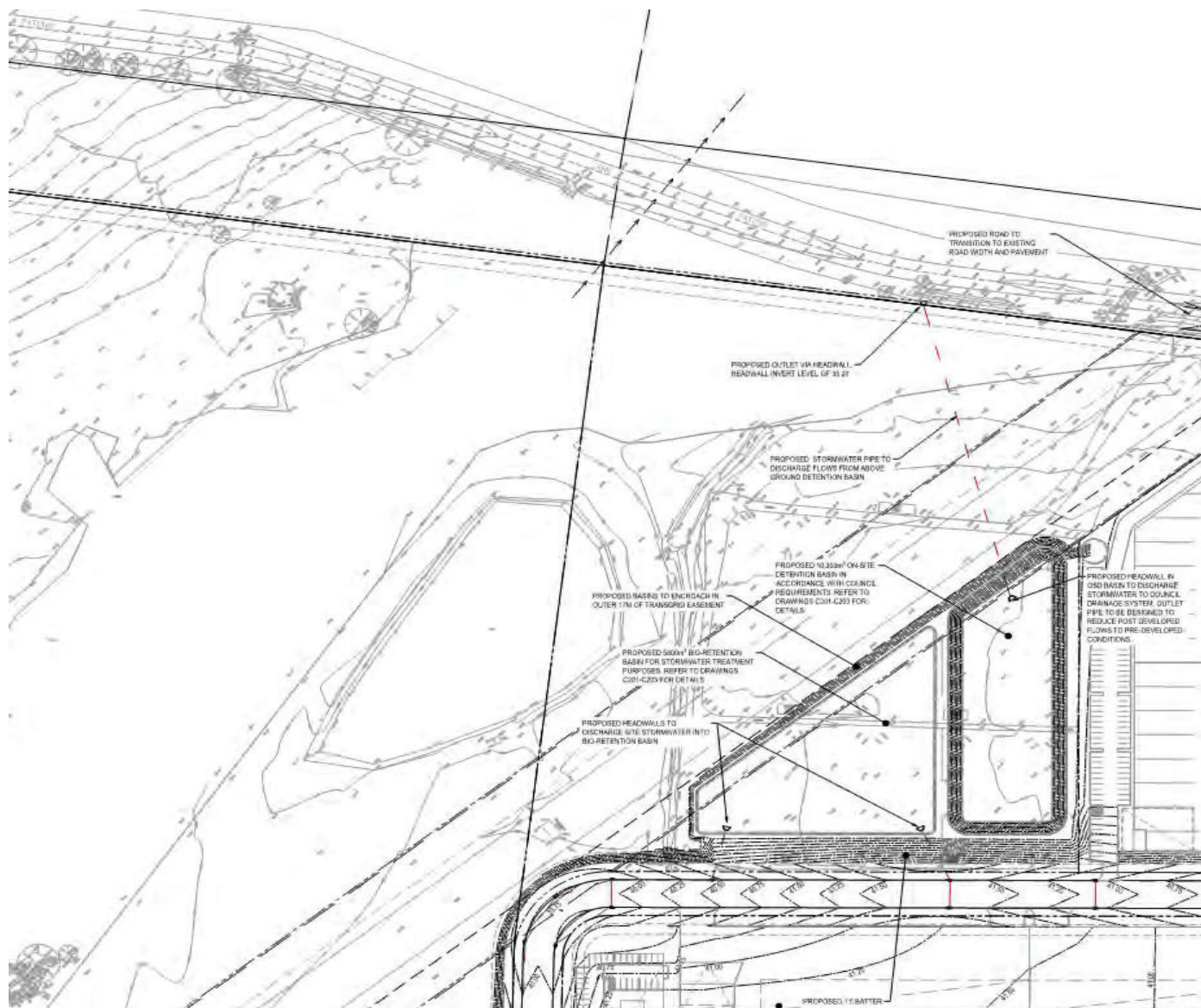
Table 1 - Outlet parameters

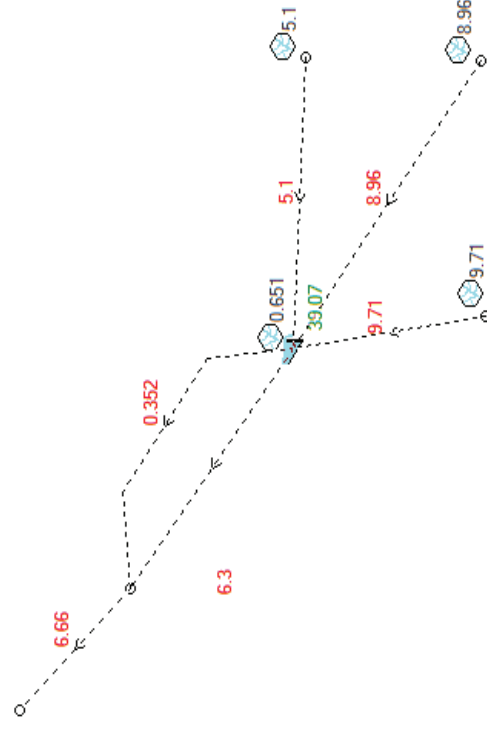
Parameters	Values	Remarks
Basin Invert	37.10	
Basin Storage	See table 2	
Outlet Orifice	-	
Outlet Conduit 1	4 x 0.450 dia	
Outlet Conduit 2	4 x 0.525 dia	
Spillway - Operation (W1)	-	
Spillway - Weir elevation	39.05	
Spillway - Weir length	5.00	
Spillway - Coefficient	2.00	
Spillway - Emergency (OF1)	39.20	
Spillway - Weir elevation	39.20	
Spillway - Weir length	50.00	
Spillway - Coefficient	2.00	

Table 2 - stage storage relationship

Level	Surface Area	Inc Vol	Storage	Remark
37.1	0.00		0.00	
37.25	700.00	52.50	52.50	
37.5	4900.00	700.00	752.50	
37.75	11644.00	2068.00	2820.50	
38	16500.00	3518.00	6338.50	
39.2	16500.00	19800.00	26138.50	Extrapolation







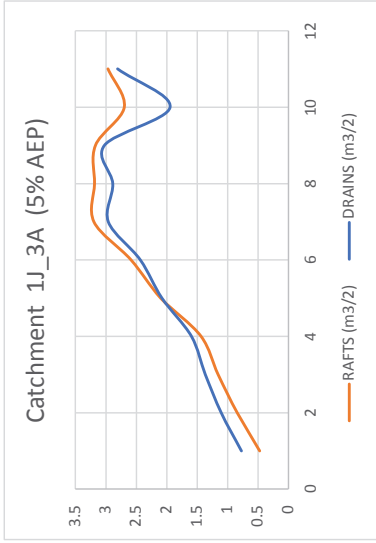
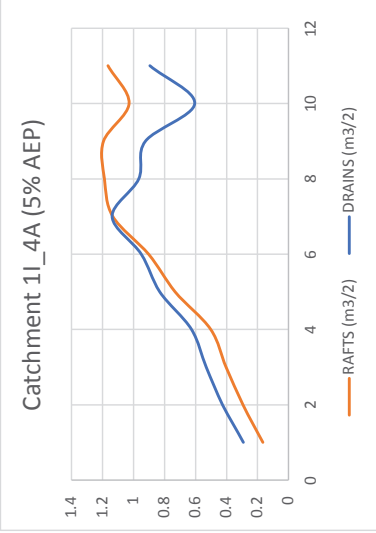
Existing Condition Model

Developed Condition Model

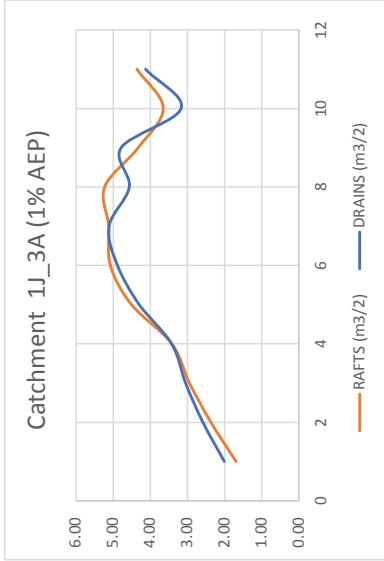
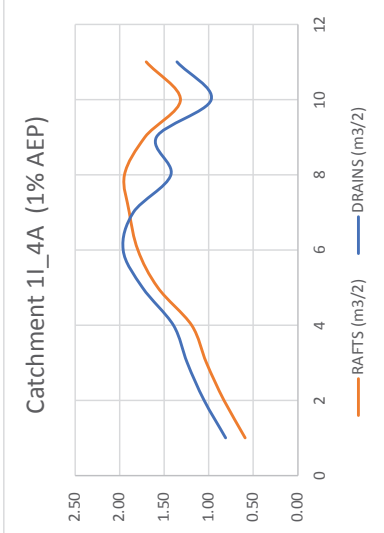
CALIBRATION OF DRAINS MDOELLING

DRAINS modelling is calibrated against the XP-RAFTS modelling results for the local catchments from the project site

	5% AEP				
	Catchment 1I_4A			Catchment 1J_3A	
	RAFTS (m3/2)	DRAINS (m3/2)	Difference (m3/2)	RAFTS (m3/2)	Difference (m3/2)
Duration					
15 min	0.165	0.29	0.13	0.472	0.774
20 min	0.293	0.425	0.13	0.84	1.106
25 min	0.403	0.531	0.13	1.156	1.364
30 min	0.501	0.626	0.13	1.437	1.595
45 min	0.731	0.83	0.10	2.095	2.078
1 hr	0.903	0.949	0.05	2.587	2.436
1.5 hr	1.133	1.138	0.00	3.194	2.958
2 hr	1.188	0.966	-0.22	3.185	2.887
3 hr	1.194	0.924	-0.27	3.171	3.022
4.5 hr	1.029	0.604	-0.43	2.697	1.946
6 hr	1.164	0.894	-0.27	2.966	2.809



	1% AEP				
	Catchment 1I_4A			Catchment 1J_3A	
	RAFTS (m3/2)	DRAINS (m3/2)	Difference (m3/2)	RAFTS (m3/2)	Difference (m3/2)
Duration					
15 min	0.59	0.81	0.22	1.69	2.01
20 min	0.83	1.05	0.22	2.37	2.59
25 min	1.03	1.24	0.22	2.94	3.05
30 min	1.19	1.40	0.21	3.42	3.43
45 min	1.57	1.74	0.17	4.51	4.30
1 hr	1.80	1.96	0.17	5.08	4.88
1.5 hr	1.89	1.84	-0.05	5.12	5.11
2 hr	1.94	1.42	-0.52	5.23	4.56
3 hr	1.72	1.59	-0.13	4.32	4.78
4.5 hr	1.32	0.97	-0.35	3.65	3.17
6 hr	1.70	1.36	-0.35	4.36	4.13



APPENDIX H – CROSS DRAINAGE STRUCTURES

APPENDIX H - CROSS DRAINAGE STRUCTURES



Figure 1 – Estimate of Main Culvert Dimension under Warragamba Pipeline



Photo 1 – 0.525m RCP – Paton Lane



Photo 2 – 3x1.5m RCPs Paton Lane

APPENDIX I - WARRAGAMBA PIPELINE

APPENDIX I - WARRAGAMBA PIPELINE ARRANGEMENT



Figure H.1 – Warragamba Pipeline east of Luddenham Road



Figure H.2 – Typical Warragamba pipeline arrangement (Photo source tenders.nsw.gov.au)

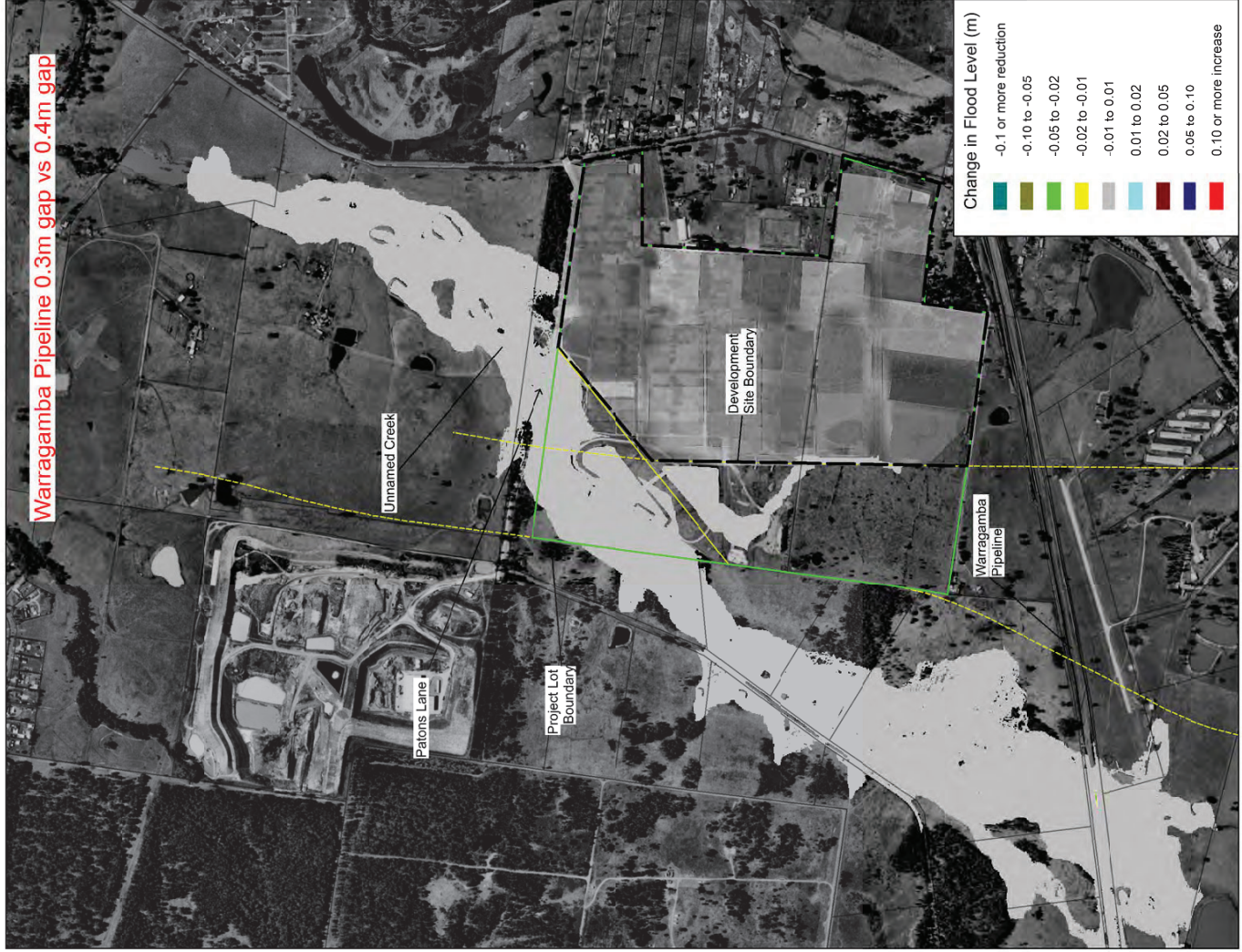


Figure H.3 – Typical Warragamba pipeline arrangement near plinth, estimated gap 0.5m (Photo source tenders.nsw.gov.au)



Figure H.4 – Typical Warragamba pipeline arrangement near plinth, estimated gap 0.3m (Photo source tenders.nsw.gov.au)

APPENDIX J – SENSITIVITY OF WARRAGAMBA PIPELINE ASSUMPTIONS



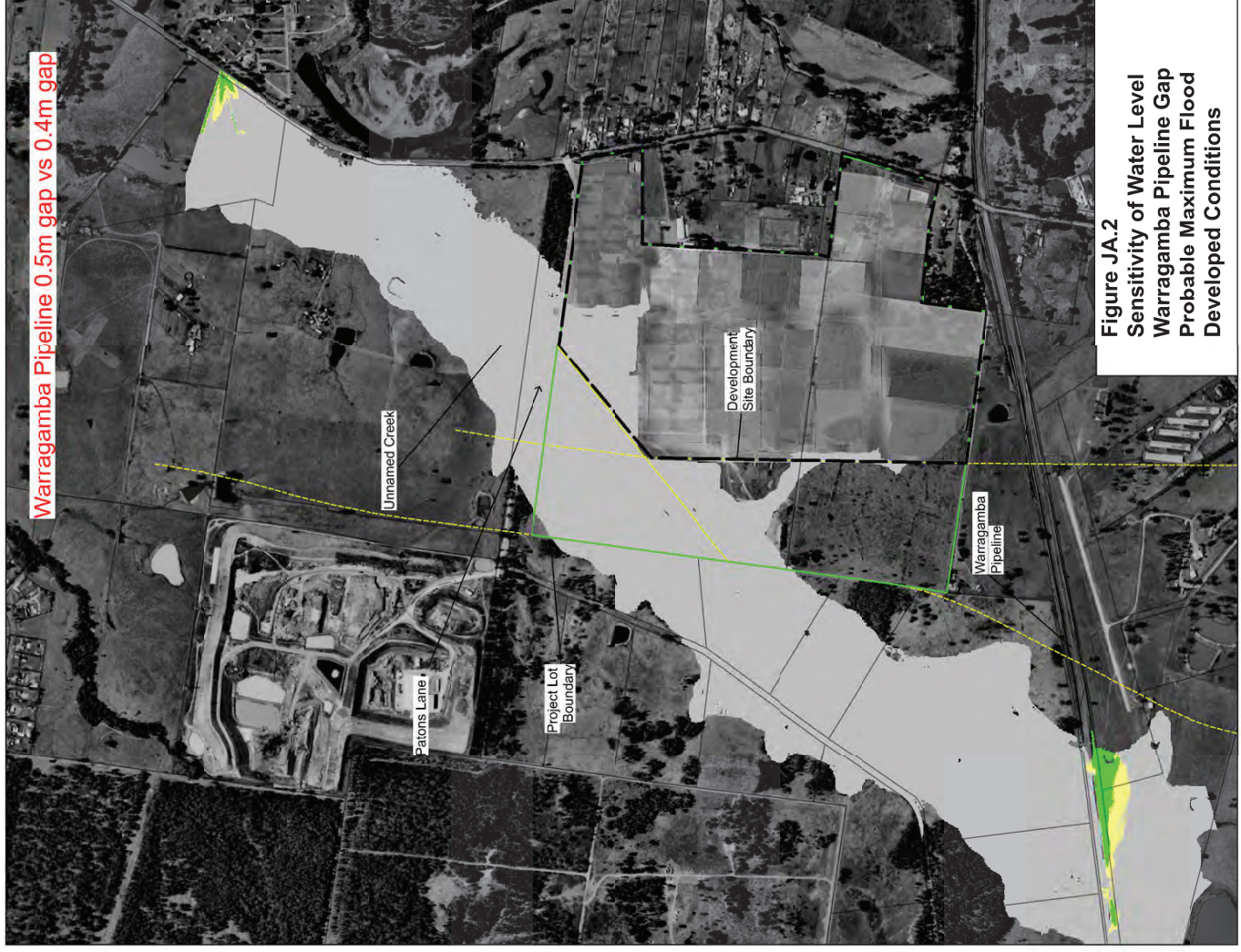
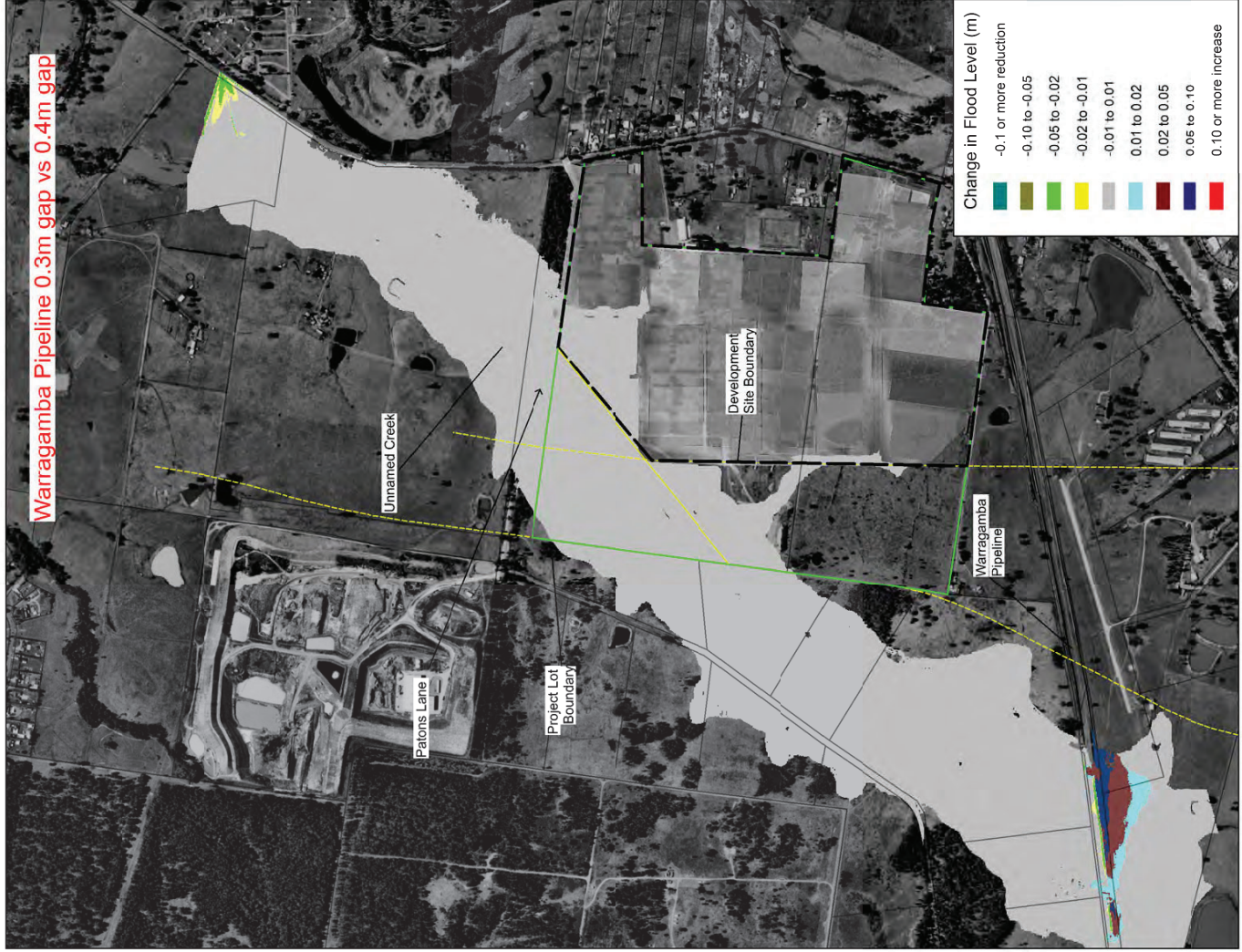


Figure JA.2
Sensitivity of Water Level
Warragamba Pipeline Gap
Probable Maximum Flood
Developed Conditions

