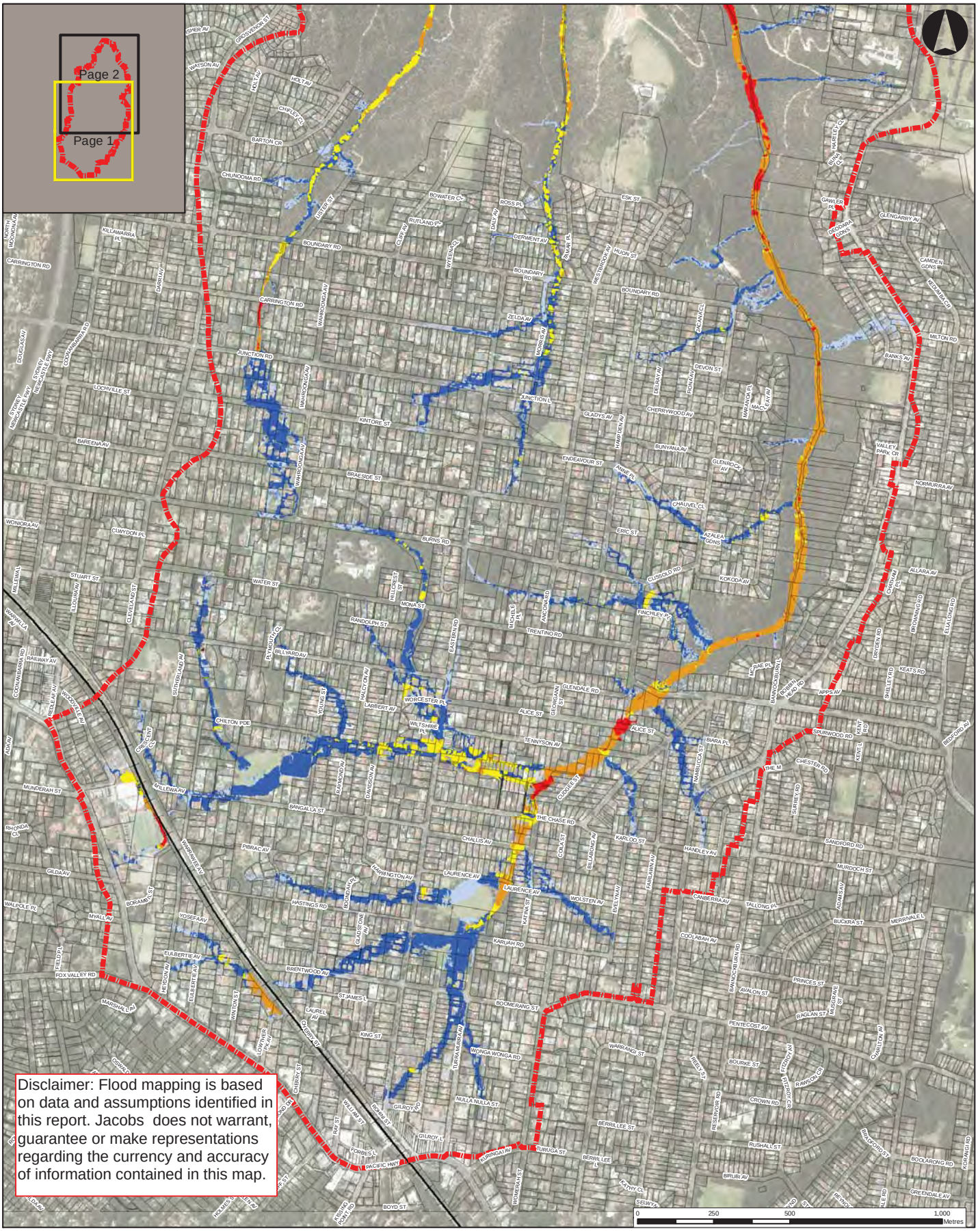
Appendix K. Climate Change Impact Mapping



Legend

- Study area
- Cadastre
- Railway

Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

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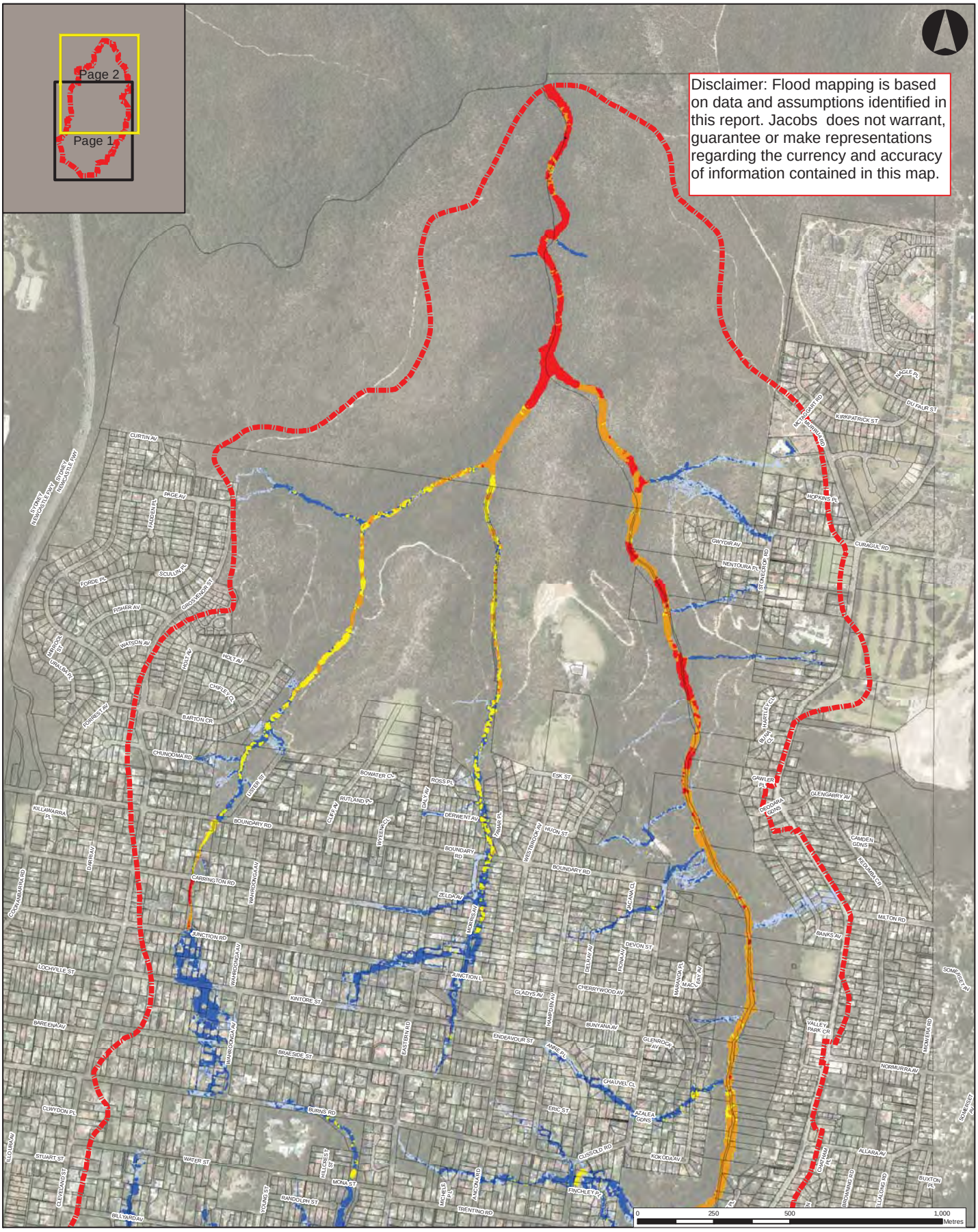
SHEET	Page 1 of 2		GDA 1994 MGA Zone 56
TITLE	1% AEP Event Climate Change Impact 10% Increase in Rainfall Intensity		
PROJECT	Lovers Jump Creek Flood Study Review		
DRAWN LC	PROJECT # IA159900	MAP # Map K-1	REV 1 VER 1
CHECK AH	DATE 22/02/2018		1:12,000 | A3



Legend

- Study area
- Cadastre
- Railway

Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

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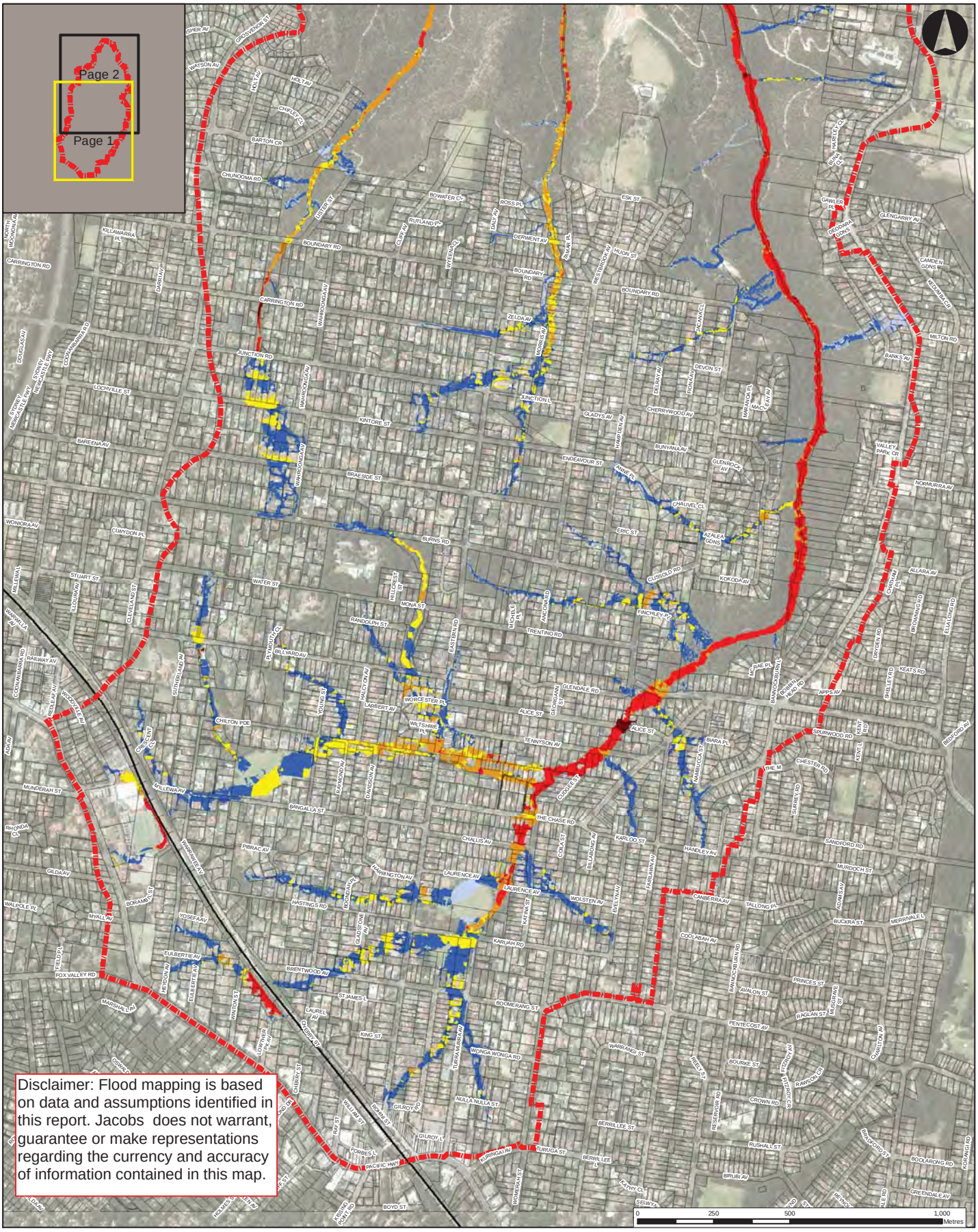
SHEET	Page 2 of 2		GDA 1994 MGA Zone 56
TITLE	1% AEP Event Climate Change Impact 10% Increase in Rainfall Intensity		
PROJECT	Lovers Jump Creek Flood Study Review		
DRAWN	LC	PROJECT # IA159900	MAP # Map K-1
CHECK	AH	DATE 22/02/2018	REV 1 VER 1
			1:12,000 | A3



Legend

- Study area
- Cadastre
- Railway

Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

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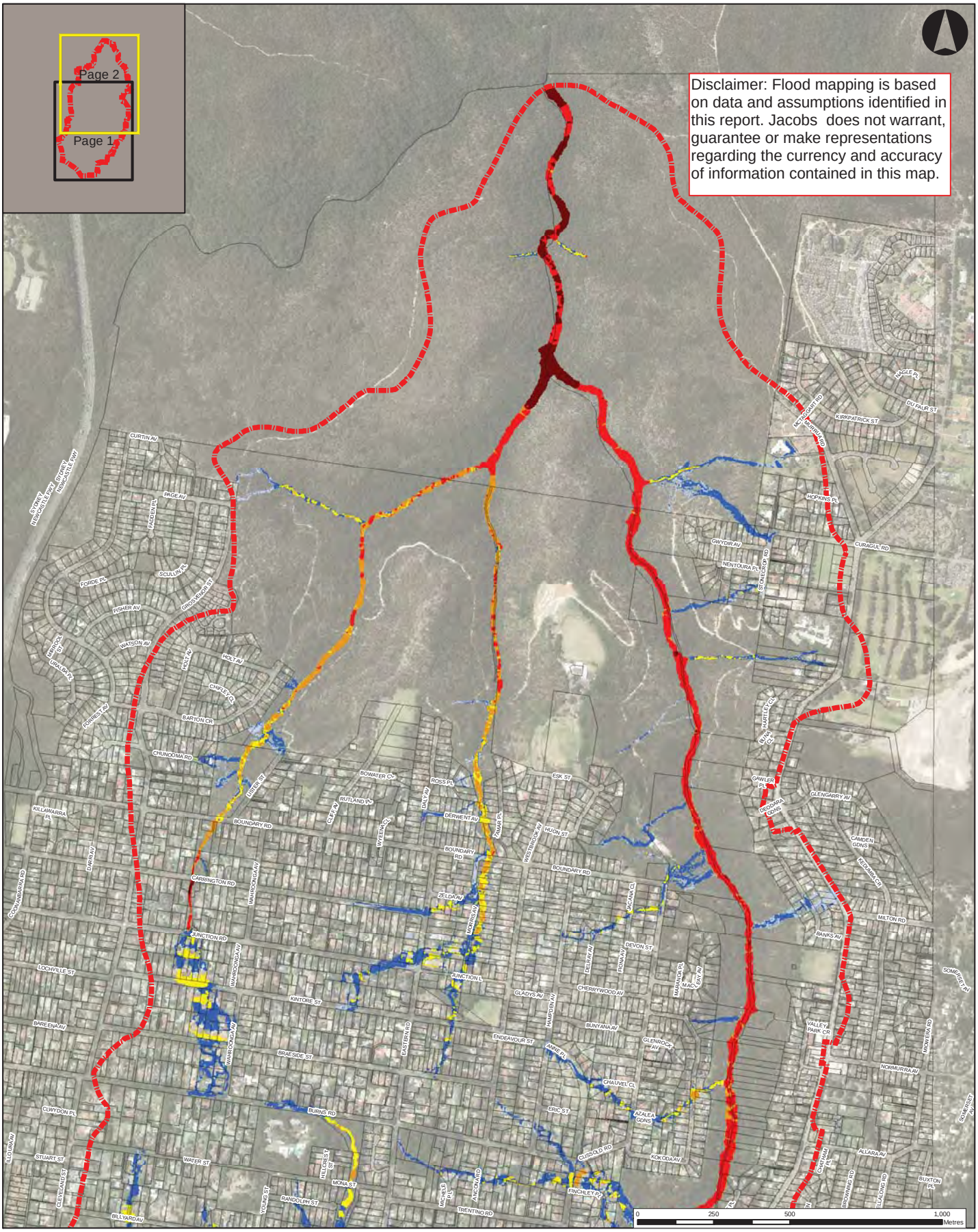
SHEET	Page 1 of 2	GDA 1994 MGA Zone 56	
TITLE	1% AEP Event Climate Change Impact 20% Increase in Rainfall Intensity		
PROJECT	Lovers Jump Creek Flood Study Review		
DRAWN	LC	PROJECT # IA159900	MAP # Map K-2
CHECK	AH	DATE 22/02/2018	REV 1 VER 1
			1:12,000 | A3



Legend

- Study area
- Cadastre
- Railway

Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

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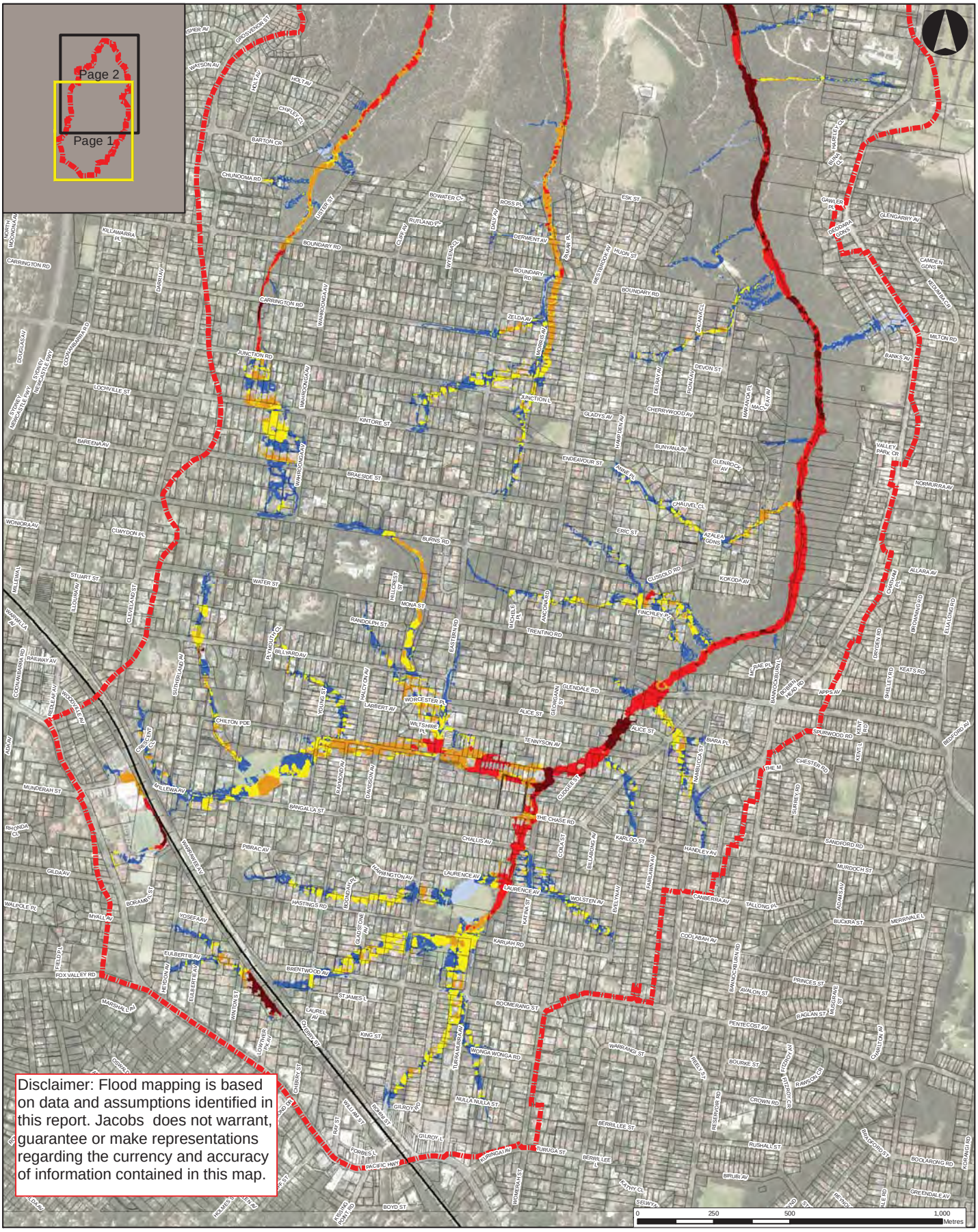
SHEET	Page 2 of 2 — GDA 1994 MGA Zone 56
TITLE	1% AEP Event Climate Change Impact 20% Increase in Rainfall Intensity
PROJECT	Lovers Jump Creek Flood Study Review

DRAWN	PROJECT #	MAP #	REV	VER
LC	IA159900	Map K-2	1	1
CHECK	DATE			
AH	22/02/2018		1:12,000 | A3	



Legend

- Study area
- Cadastre
- Railway

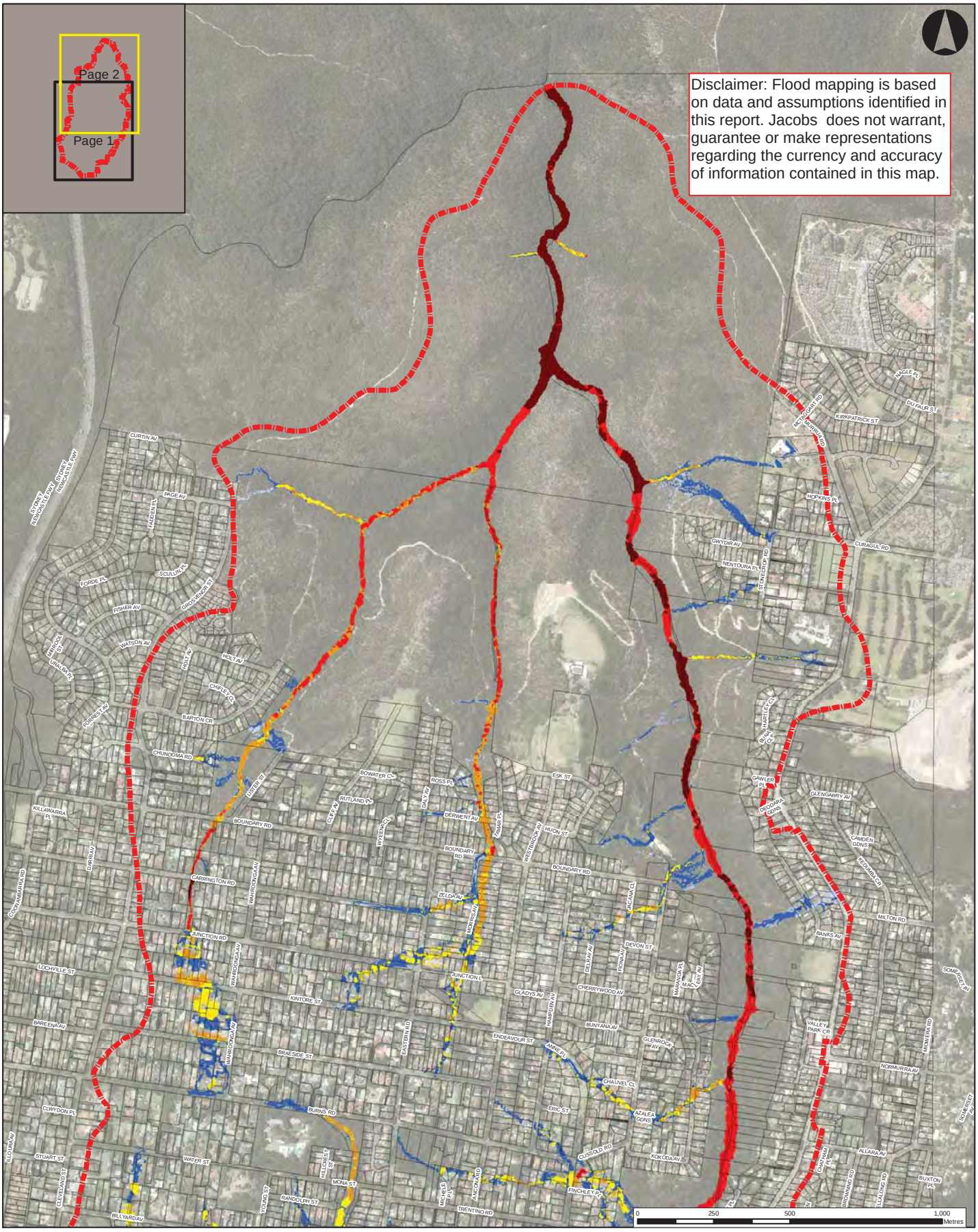
Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

JACOBS

SHEET	Page 1 of 2	GDA 1994 MGA Zone 56	
TITLE	1% AEP Event Climate Change Impact 30% Increase in Rainfall Intensity		
PROJECT	Lovers Jump Creek Flood Study Review		
DRAWN LC	PROJECT # IA159900	MAP # Map K-3	REV 1 VER 1
CHECK AH	DATE 22/02/2018		1:12,000 | A3



Legend

- Study area
- Cadastre
- Railway

Climate change difference raster

Change in 1% AEP Flood Level (m)

- < 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.2
- 0.2 - 0.5
- 0.5 - 1.5

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SHEET	Page 2 of 2	GDA 1994 MGA Zone 56	
TITLE	1% AEP Event Climate Change Impact 30% Increase in Rainfall Intensity		
PROJECT	Lovers Jump Creek Flood Study Review		
DRAWN	LC	PROJECT # IA159900	MAP # Map K-3
CHECK	AH	DATE 22/02/2018	REV 1 VER 1
			1:12,000 | A3

Appendix L. Impacts of ARR 2016 and At-Site Design Rainfall on flood behaviour

L.1 Comparisons of ARR 1987, ARR 2016 and At-Site Design Rainfall Estimates

Figure L-1 Design Rainfall Comparison – 30 minute storm duration

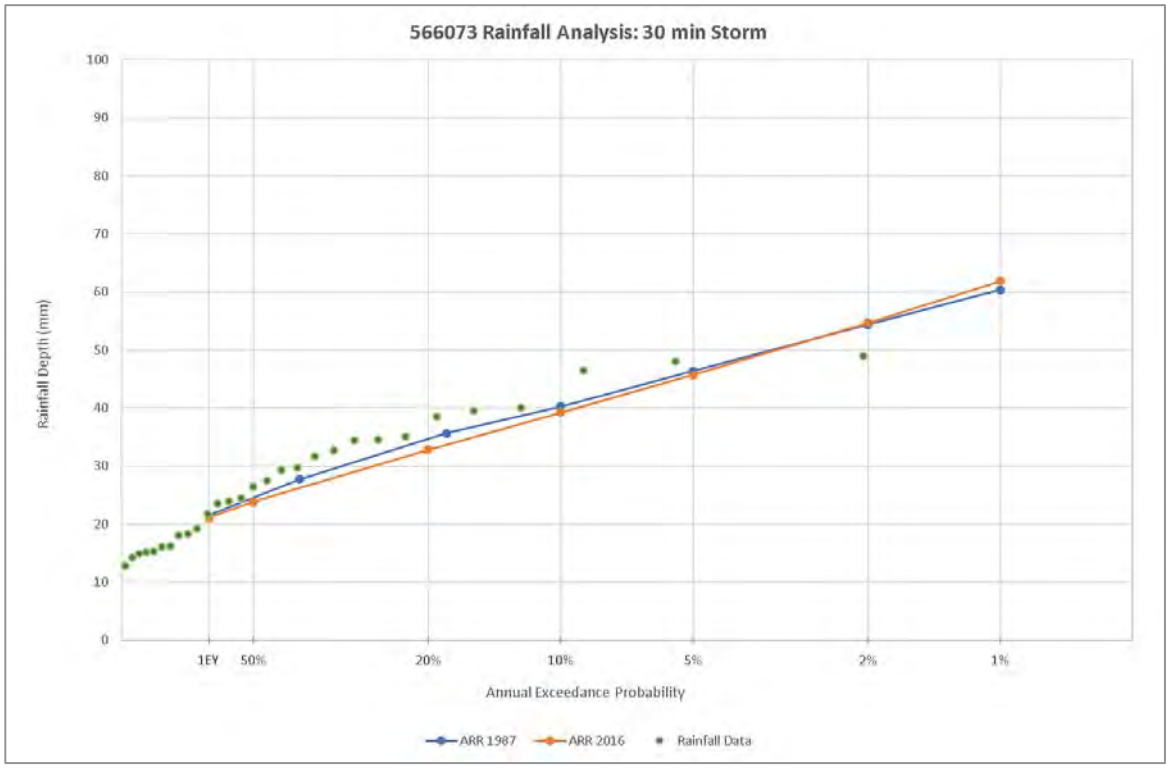


Figure L-2 Design Rainfall Comparison – 60 minute storm duration

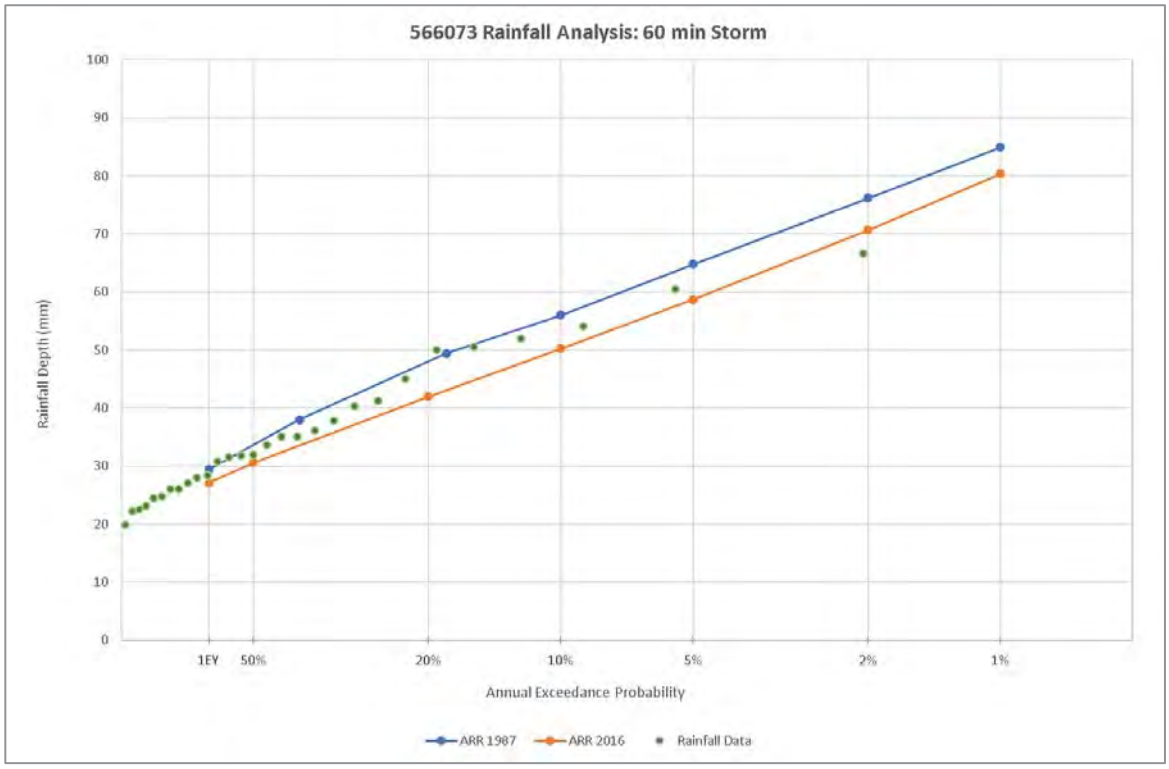


Figure L-3 Design Rainfall Comparison – 90 minute storm duration

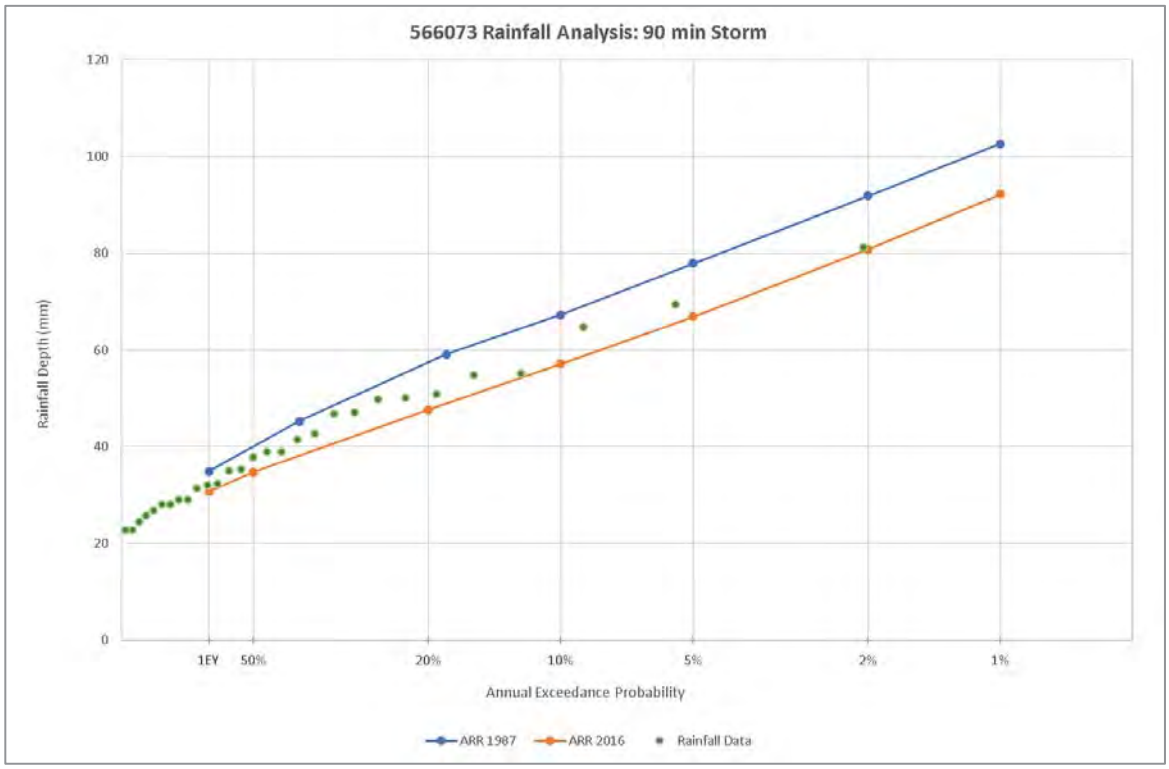


Figure L-4 Design Rainfall Comparison – 120 minute storm duration

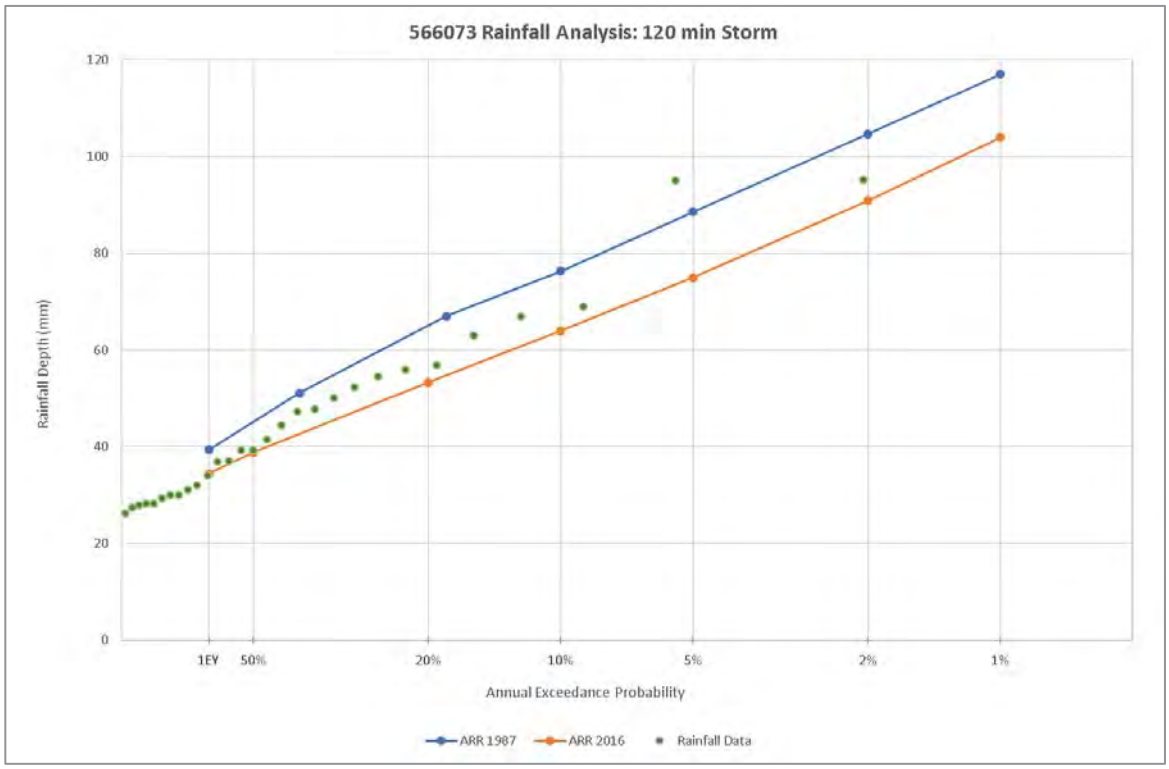


Figure L-5 Design Rainfall Comparison – 180 minute storm duration

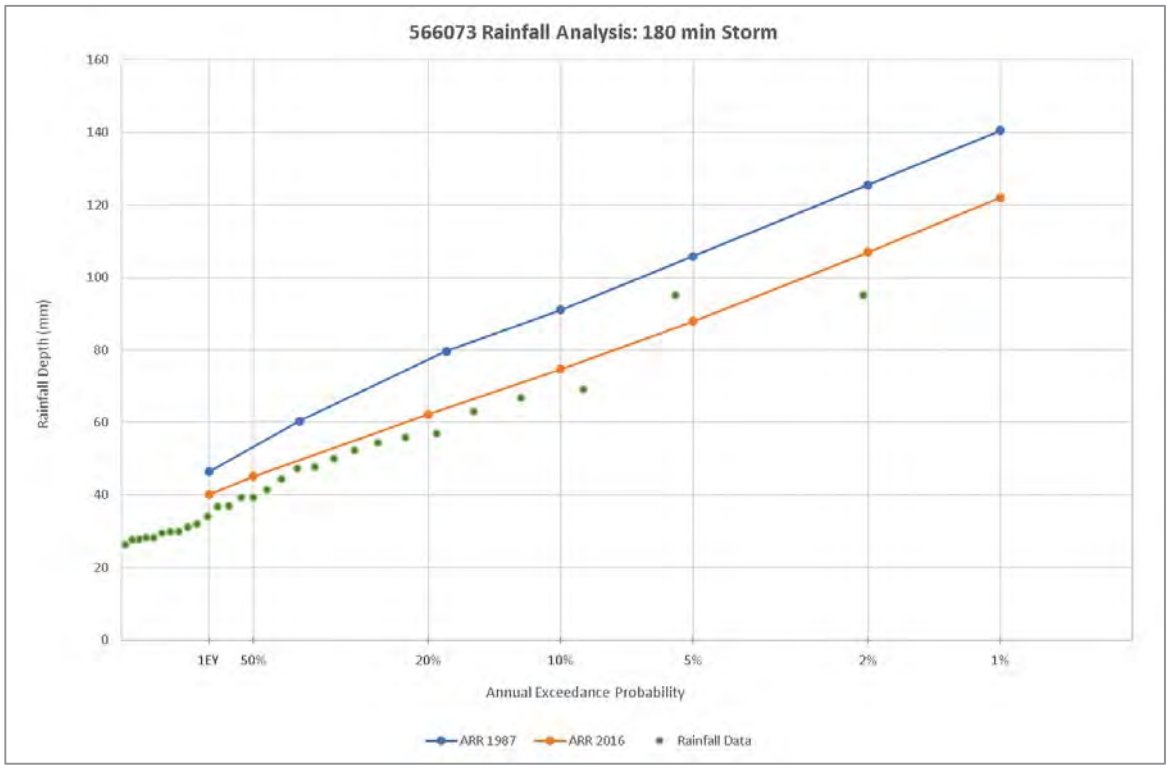
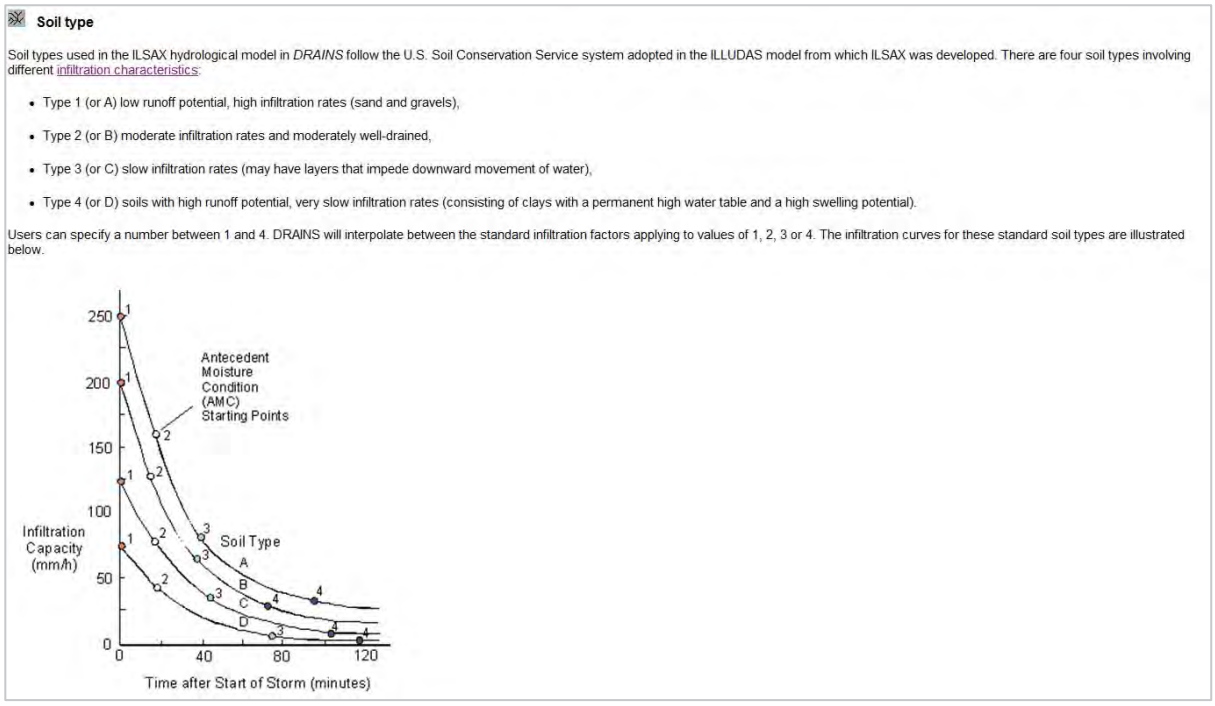


Figure L-6 – Traditional DRAINS rainfall infiltration losses (Horton infiltration). Source: DRAINS User Manual (2018)



L.2 Comparison of ARR 2016 and ARR 1987 Peak Flows

Figure L-7 – Selected locations for analysis of ARR 2016 peak flows

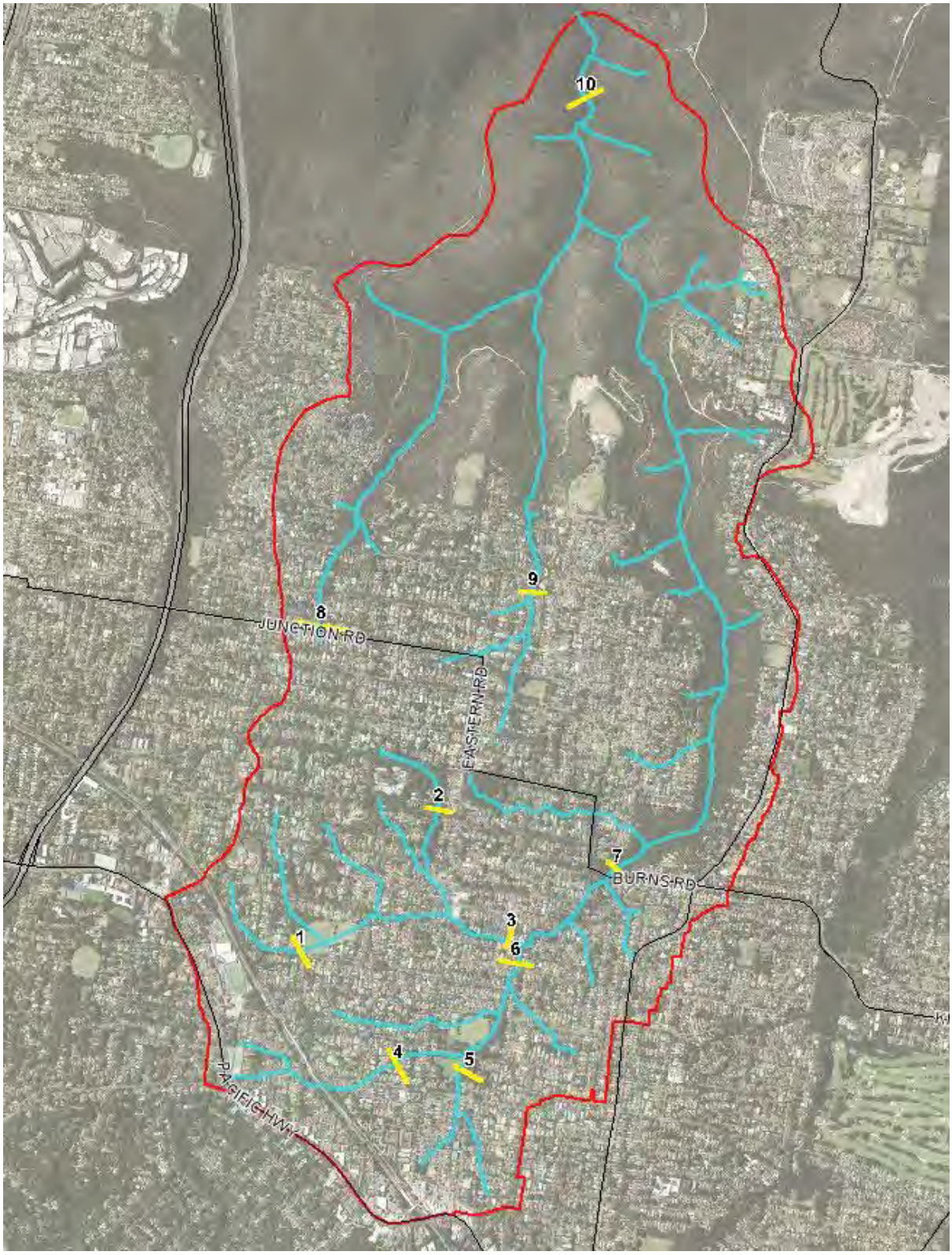


Figure L-8 – Site 1 ARR 2016 flow box plots

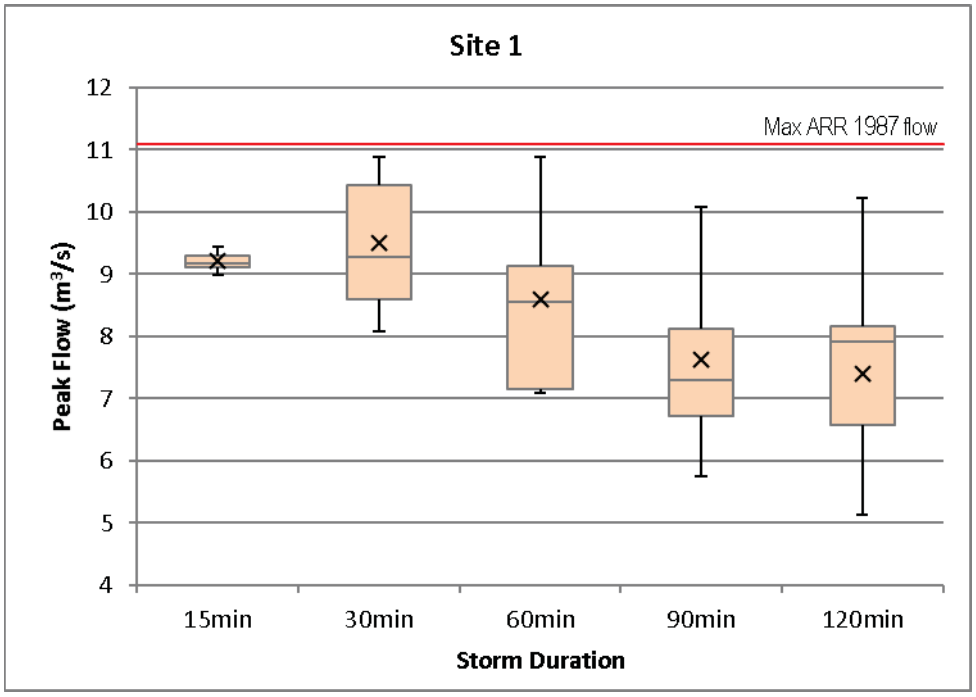


Figure L-9 – Site 2 ARR 2016 flow box plots

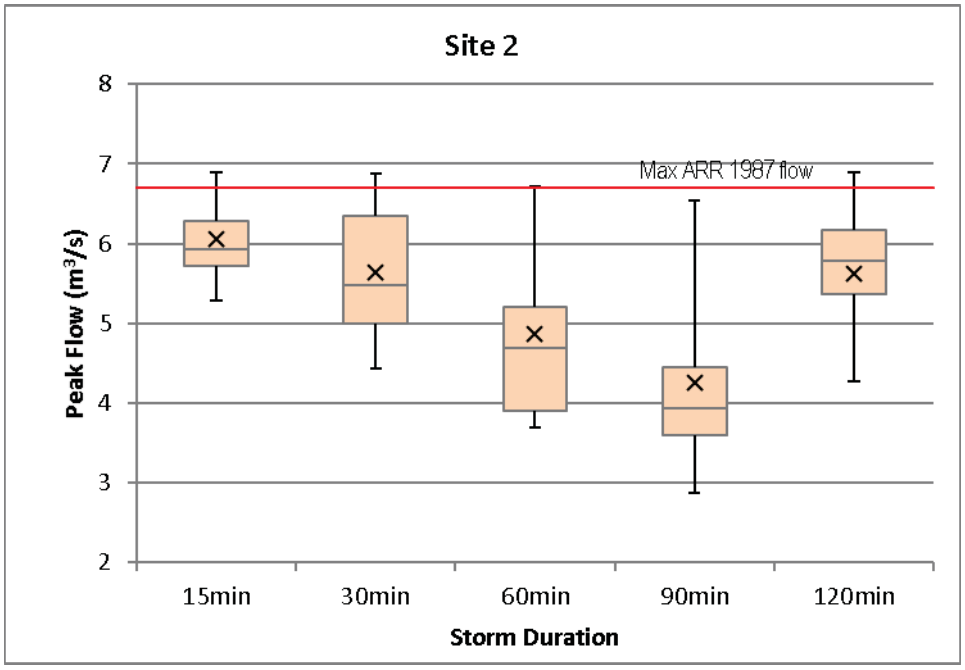


Figure L-10 – Site 3 ARR 2016 flow box plots

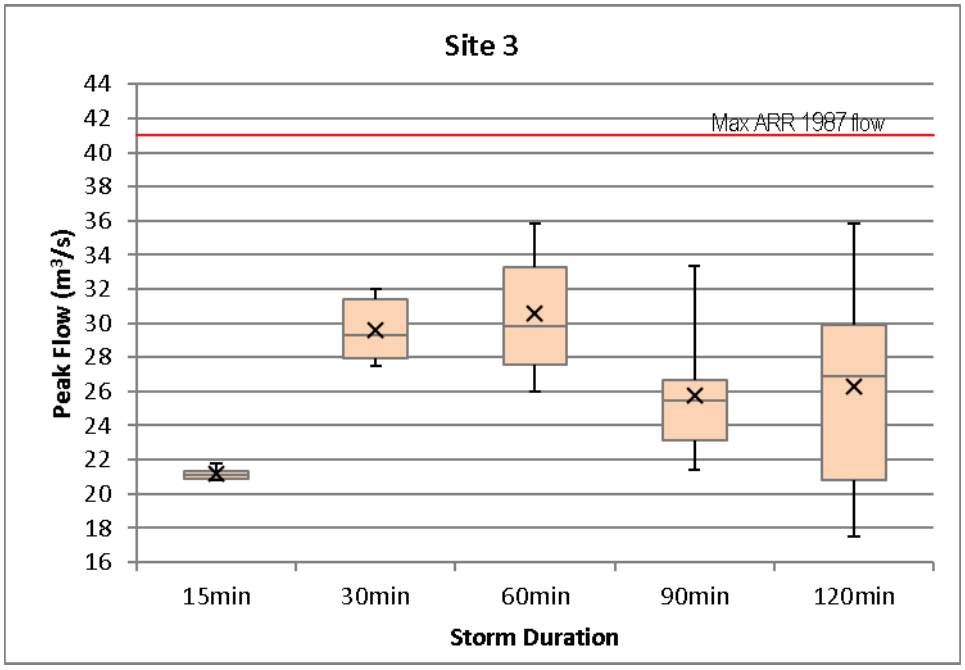


Figure L-11 – Site 4 ARR 2016 flow box plots

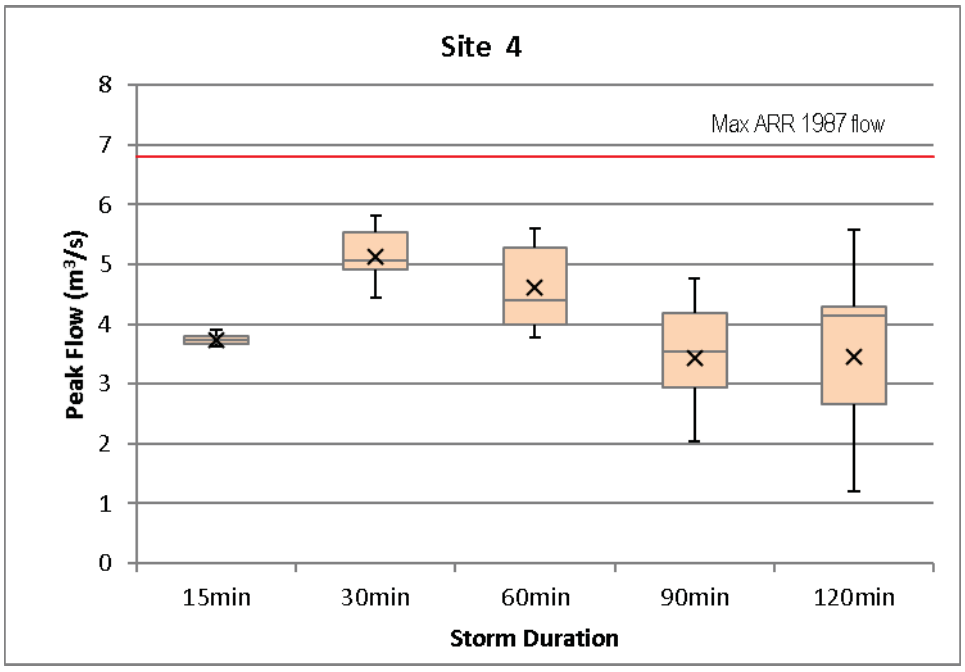


Figure L-12 – Site 5 ARR 2016 flow box plots

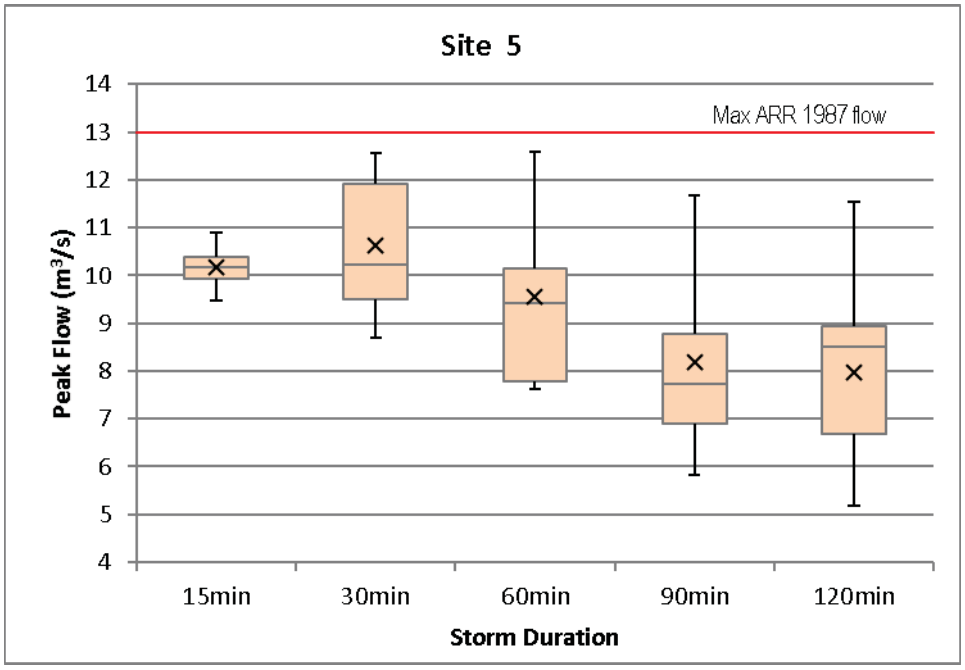


Figure L-13 – Site 6 ARR 2016 flow box plots

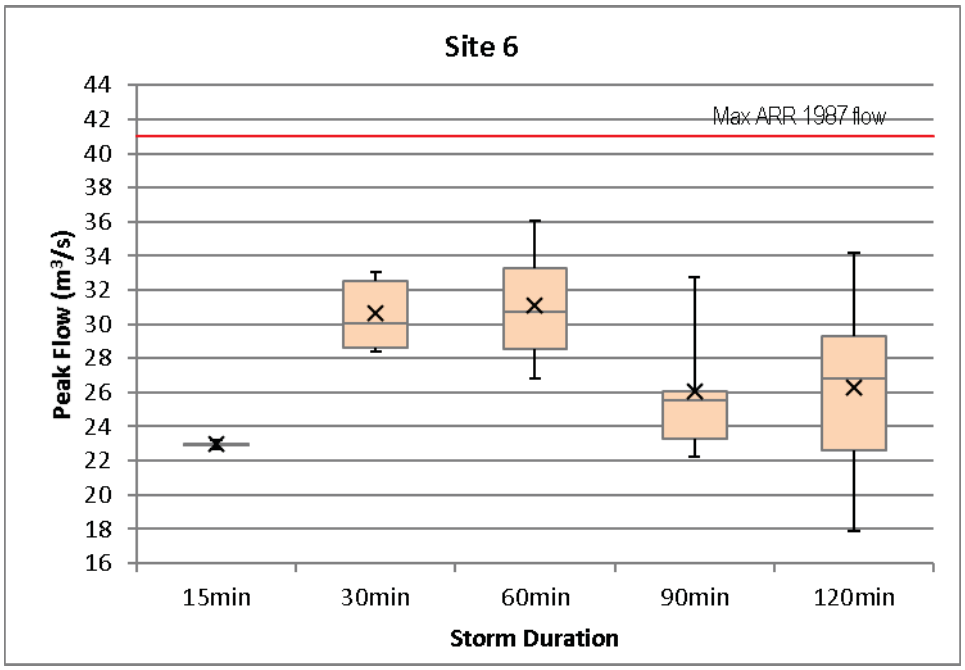


Figure L-14 – Site 7 ARR 2016 flow box plots

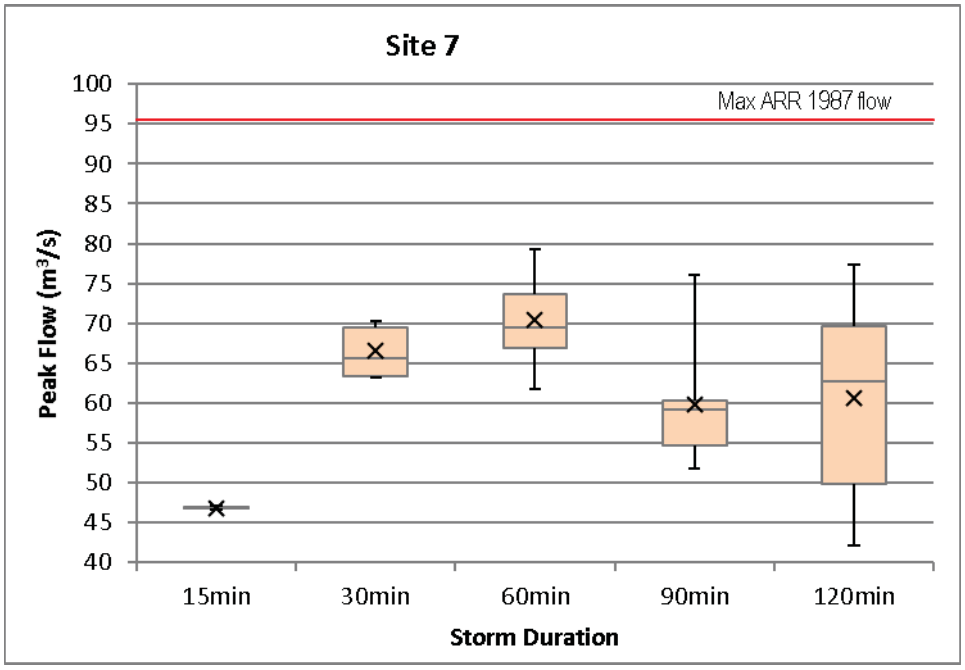


Figure L-15 – Site 8 ARR 2016 flow box plots

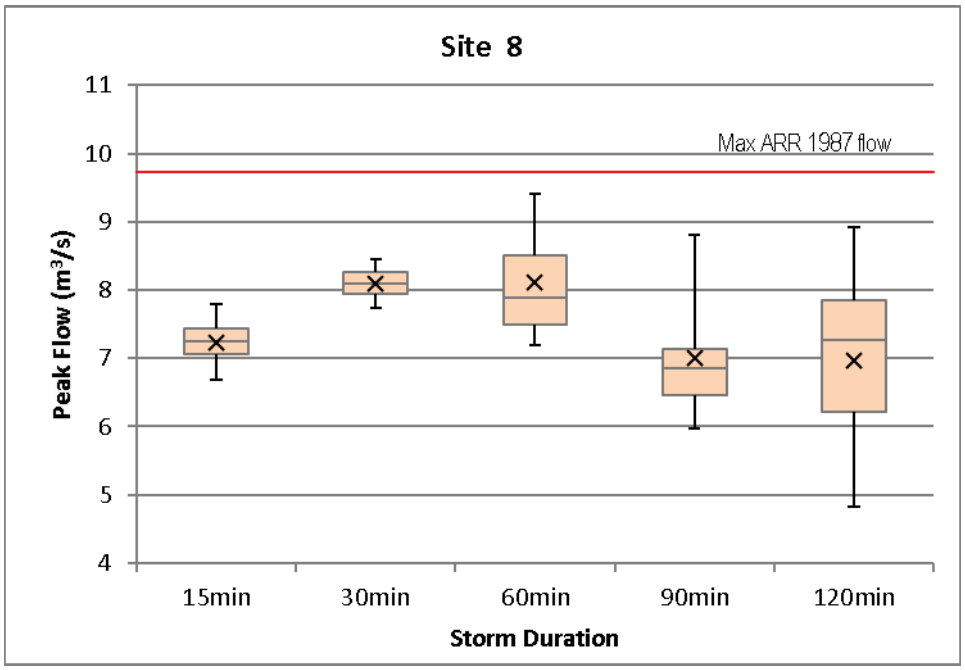


Figure L-16 – Site 9 ARR 2016 flow box plots

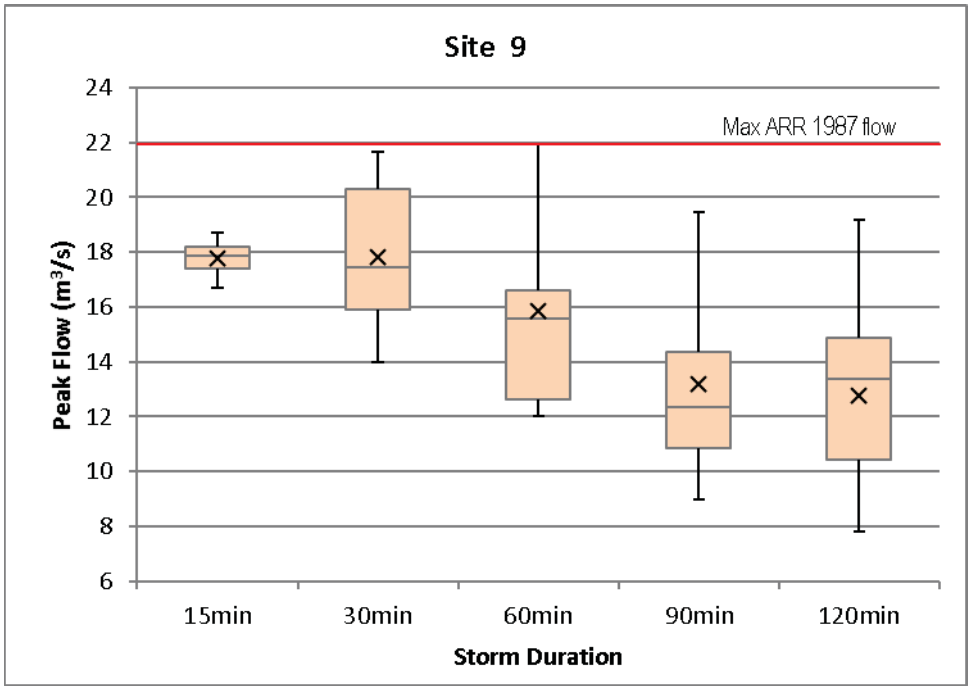
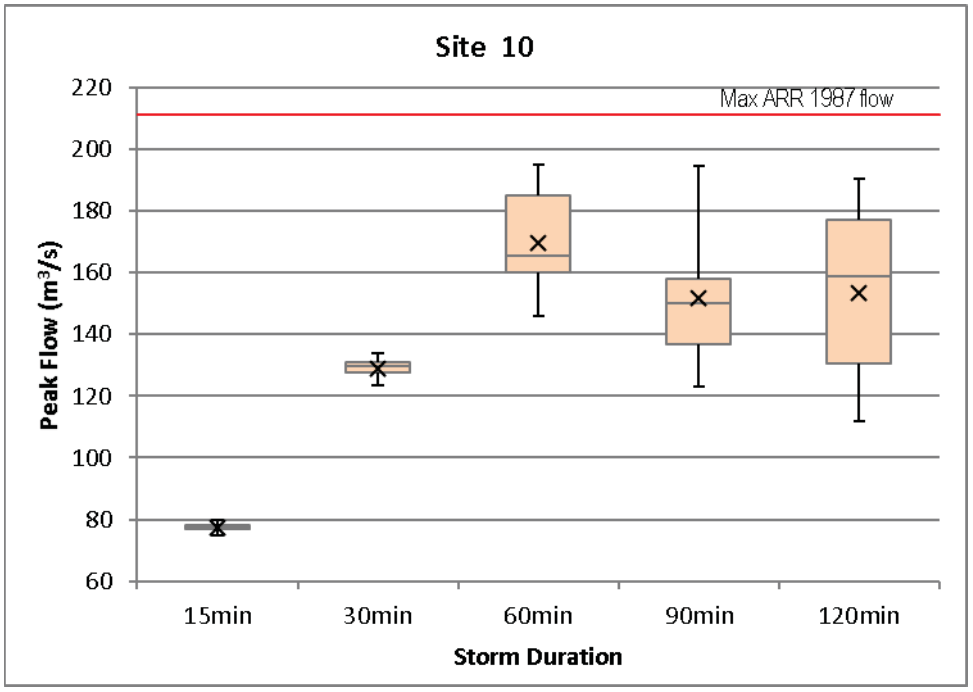
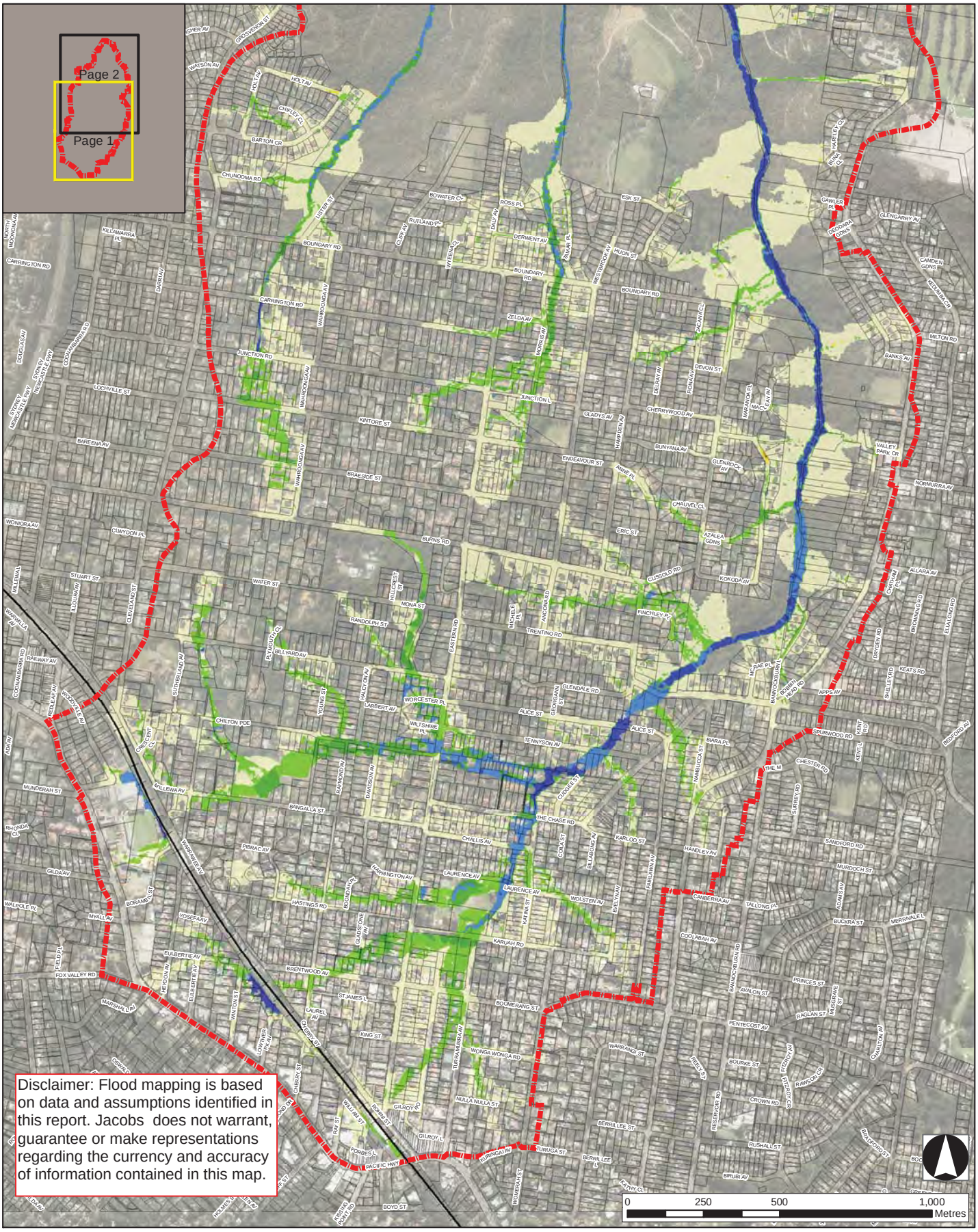


Figure L-17 – Site 10 ARR 2016 flow box plots





Legend

Difference in Flood Level (m)

- < -0.25
- -0.25 - -0.1
- -0.1 - -0.05
- -0.05 - -0.01
- -0.01 - 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.25
- > 0.25

- Study area
- Cadastre
- Railway

Note: Mapping represents difference in 1% AEP flood level between ARR 2016 and ARR 1987 hydrology. Negative values indicate that ARR 2016 flood levels are lower than ARR 1987 flood levels.

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SHEET	Page 1 of 2	GDA 1994 MGA Zone 56	
TITLE	**ARR 2016 Sensitivity - Change in 1% AEP Peak Flood Levels**		
PROJECT	Lovers Jump Creek FloodStudy Review		
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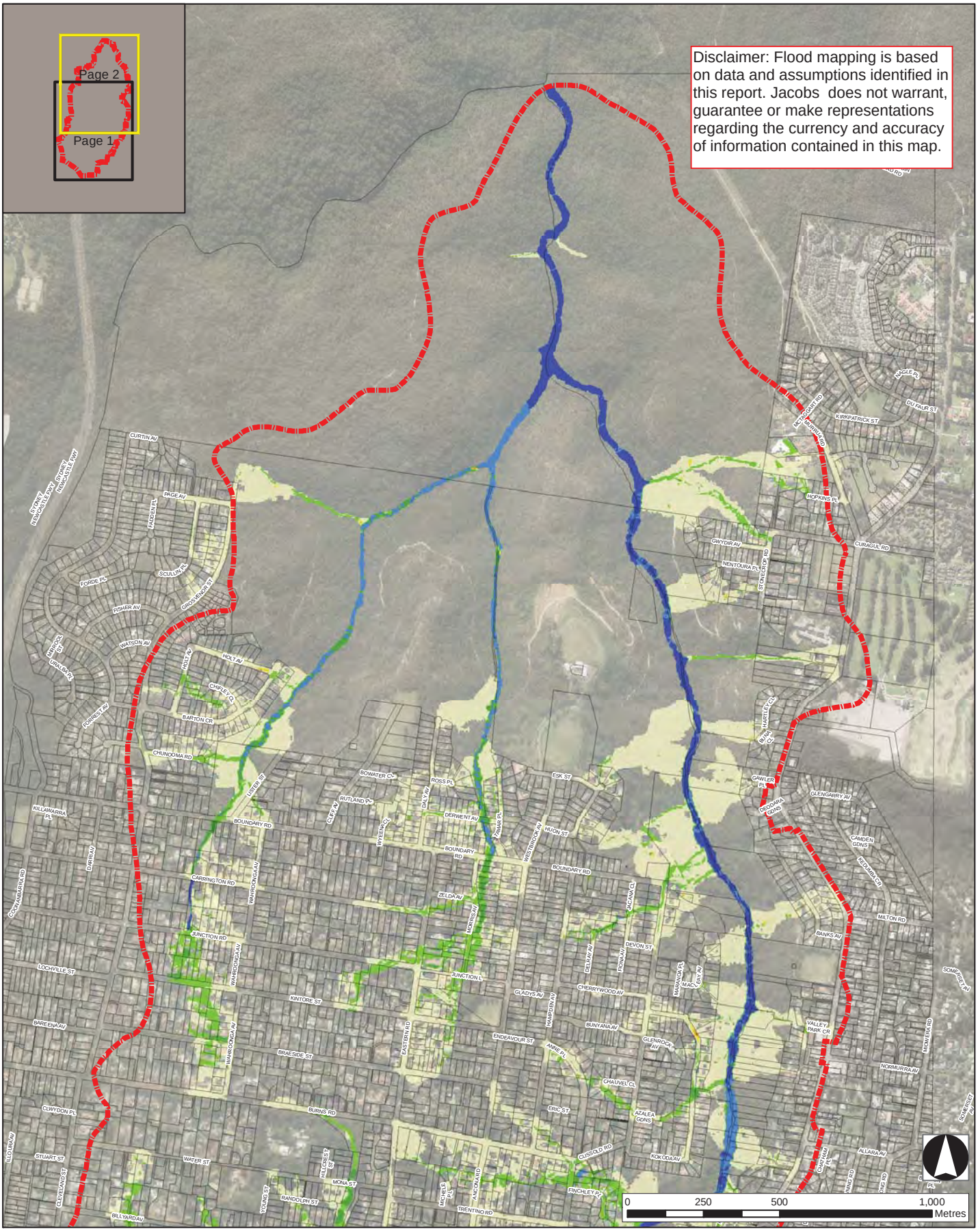

Legend

Difference in Flood Level (m)

- < -0.25
- -0.25 - -0.1
- -0.1 - -0.05
- -0.05 - -0.01
- -0.01 - 0.01
- 0.01 - 0.05
- 0.05 - 0.1
- 0.1 - 0.25
- > 0.25

- Study area
- Cadastre
- Railway

Note: Mapping represents difference in 1% AEP flood level between ARR 2016 and ARR 1987 hydrology. Negative values indicate that ARR 2016 flood levels are lower than ARR 1987 flood levels.

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SHEET	Page 2 of 2	GDA 1994 MGA Zone 56	
TITLE	**ARR 2016 Sensitivity - Change in 1% AEP Peak Flood Levels**		
PROJECT	Lovers Jump Creek FloodStudy Review		
DRAWN LC	PROJECT # IA159900	MAP # Map L-1	REV 1 VER 1
CHECK AH	DATE 22/02/2018		1:12,000 | A3