

PARKES SHIRE COUNCIL

**BOGAN GATE
FLOOD STUDY**

OCTOBER 2024

VOLUME 2 – FIGURES

DRAFT REPORT FOR PUBLIC EXHIBITION

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LIST OF FIGURES (MAIN REPORT)

- 1.1 Location Plan

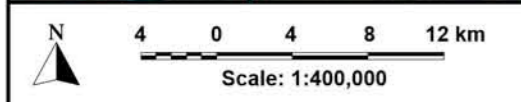
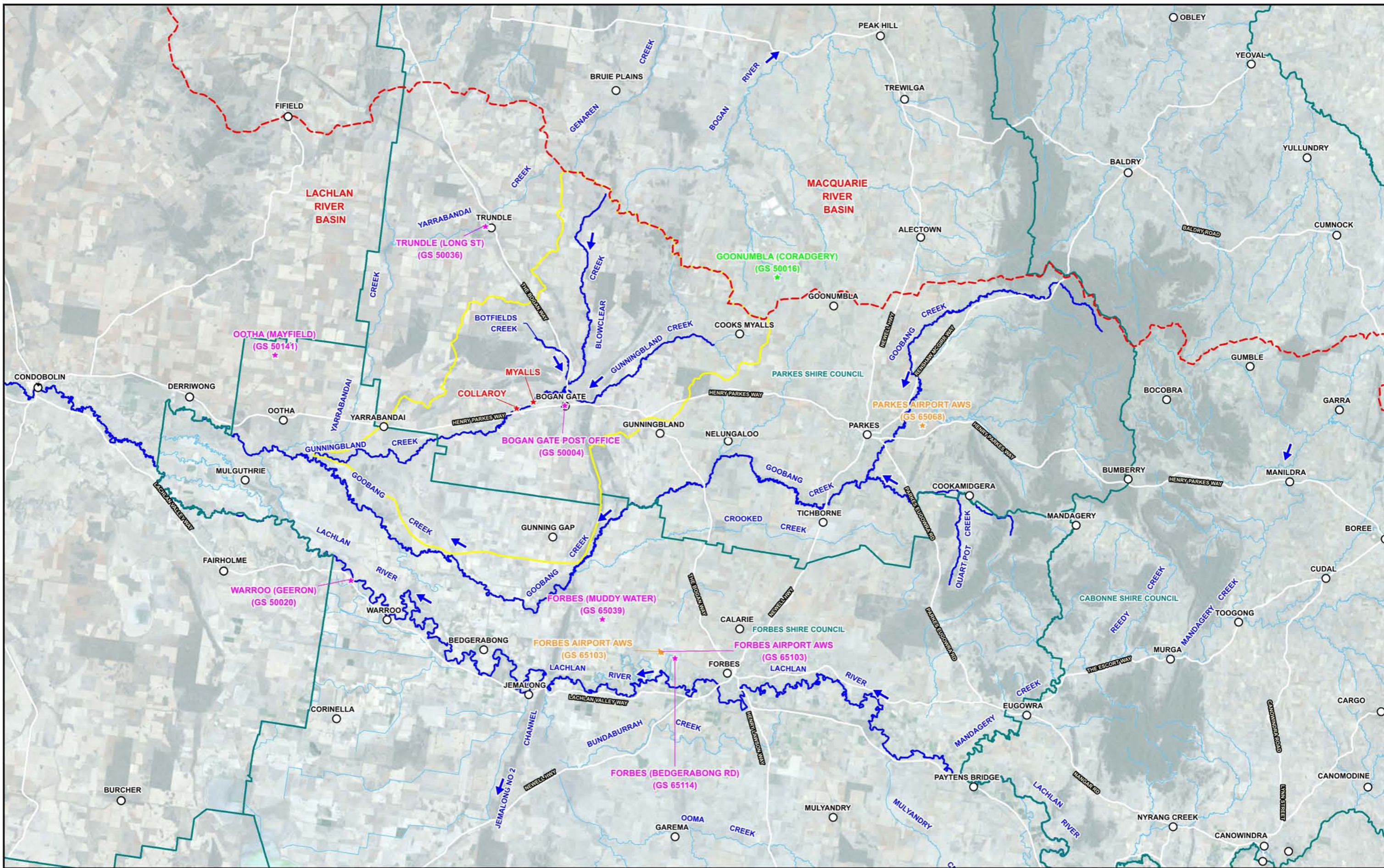
- 2.1 Catchment Plan
- 2.2 Existing Stormwater Drainage System at Bogan Gate (2 Sheets)
- 2.3 Intensity-Frequency-Duration Curves and Historic Rainfall (2 Sheets)
- 2.4 Cumulative Rainfall Historic Storm Events

- 3.1 Hydrologic Model Layout (2 Sheets)

- 4.1 TUFLOW Model Layout (2 Sheets)
- 4.2 TUFLOW Schematisation of Floodplain
- 4.3 TUFLOW Model Results – 1-2 March 2012 Storm Event (3 Sheets)
- 4.4 TUFLOW Model Results – 14 November 2022 Storm Event (3 Sheets)

- 5.1 Adjusted Probability Neutral Burst Initial Loss Values

- 6.1 TUFLOW Model Results – 20% AEP (3 Sheets)
- 6.2 TUFLOW Model Results – 10% AEP (3 Sheets)
- 6.3 TUFLOW Model Results – 5% AEP (3 Sheets)
- 6.4 TUFLOW Model Results – 2% AEP (3 Sheets)
- 6.5 TUFLOW Model Results – 1% AEP (3 Sheets)
- 6.6 TUFLOW Model Results – 0.5% AEP (3 Sheets)
- 6.7 TUFLOW Model Results – 0.2% AEP (3 Sheets)
- 6.8 TUFLOW Model Results – PMF (3 Sheets)
- 6.9 Longitudinal Section along Orange-Broken Hill Railway Line between Olive Grove Lane and Overland Road – Design Flood Events – Need to cut long section results for flood events
- 6.10 Stage Hydrographs – Design Storm Events (2 Sheets)
- 6.11 Flood Hazard Vulnerability Classification – 5% AEP (3 Sheets)
- 6.12 Flood Hazard Vulnerability Classification – 1% AEP (3 Sheets)
- 6.13 Flood Hazard Vulnerability Classification – 0.2% AEP (3 Sheets)
- 6.14 Flood Hazard Vulnerability Classification – PMF (3 Sheets)
- 6.15 Hydraulic Categorisation of Floodplain – 5% AEP (3 Sheets)
- 6.16 Hydraulic Categorisation of Floodplain – 1% AEP (3 Sheets)
- 6.17 Hydraulic Categorisation of Floodplain – 0.2% AEP (3 Sheets)
- 6.18 Hydraulic Categorisation of Floodplain – PMF (3 Sheets)
- 6.19 Sensitivity of Flood Behaviour to 20% Increase in Hydraulic Roughness Values – 1% AEP
- 6.20 Sensitivity of Flood Behaviour to Partial Blockage of Hydraulic Structures – 1% AEP
- 6.21 Sensitivity of Flood Behaviour to Removal of Henry Parkes Way and Orange-Broken Hill Railway Embankment between Olive Grove Lane and Overland Road – 1% AEP
- 6.22 Sensitivity of Flood Behaviour to 10% Increase in Rainfall Intensity – 1% AEP
- 6.23 Sensitivity of Flood Behaviour to 30% Increase in Rainfall Intensity – 1% AEP
- 6.24 Impact of Increased Rainfall Intensities on Extent of Flooding – 1% AEP
- 6.25 Interim Flood Planning Area – Main Stream Flooding and Major Overland Flow Affected Areas

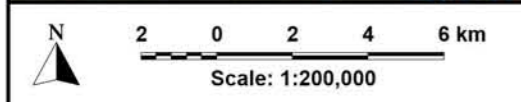
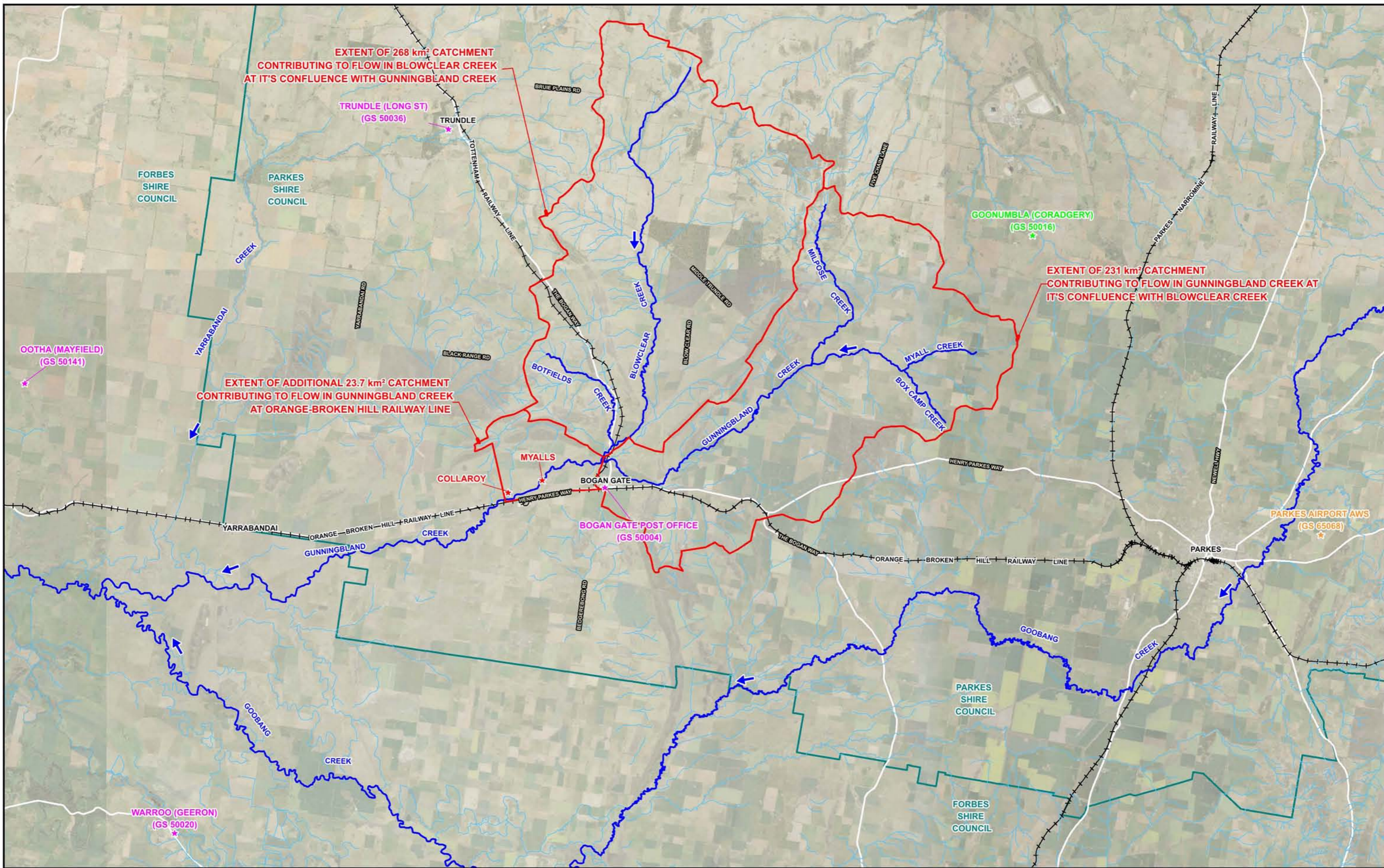


LEGEND

- ★ BoM All Weather Station (AWS)
- ★ BoM Daily Rainfall Station
- ★ BoM Flood Warning Network (FWN) Rain Gauge
- ★ Privately Owned Rain Gauge
- Study Catchment
- LGA Boundary
- River Basin Catchment Boundary

BOGAN GATE FLOOD STUDY

Figure 1.1

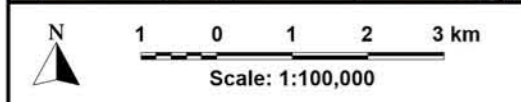
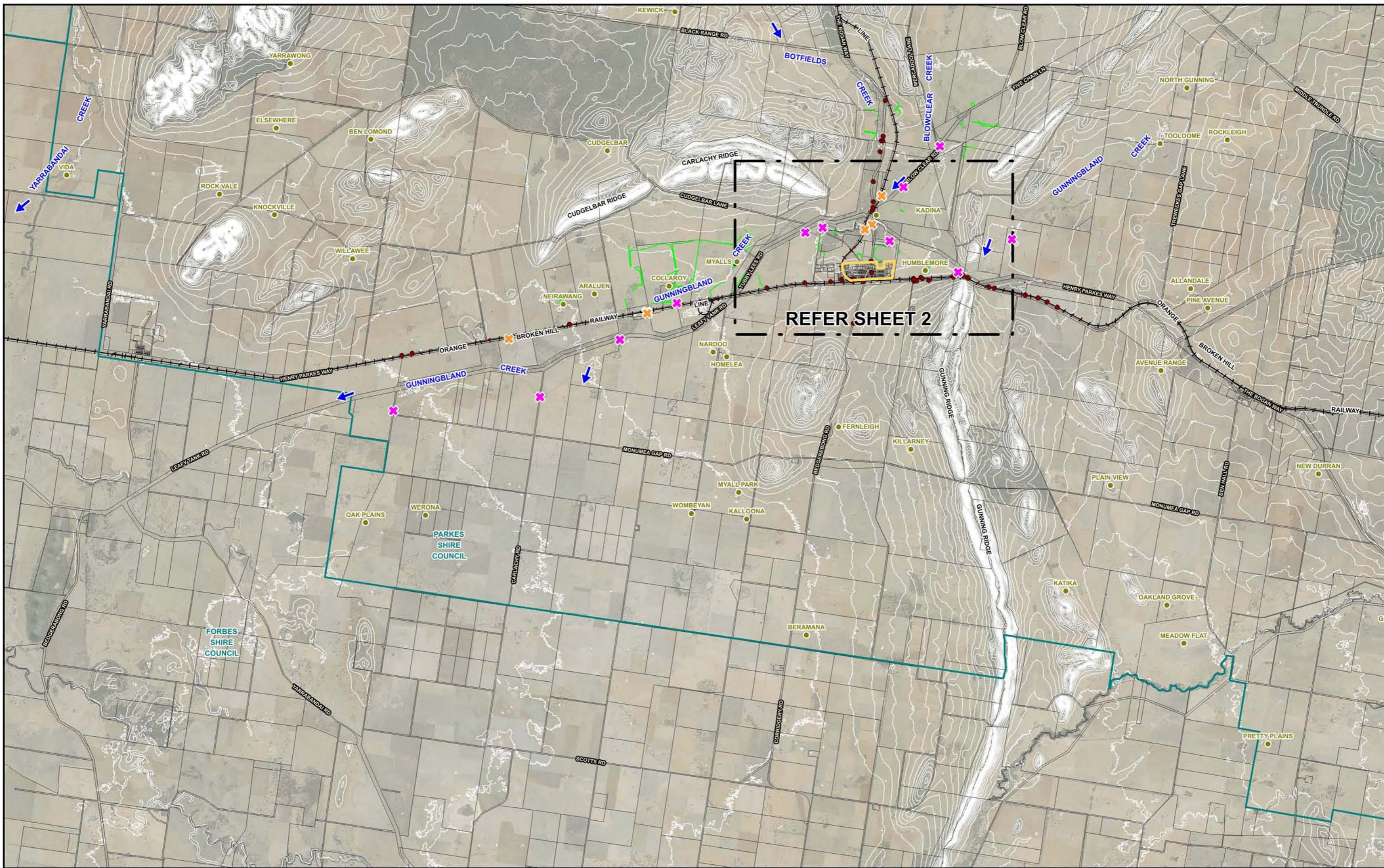


LEGEND

 LGA Boundary	 BoM All Weather Station (AWS)
 Catchment Boundary	 BoM Daily Rainfall Station
	 BoM Flood Warning Network (FWN) Rain Gauge
	 Privately Owned Rain Gauge

BOGAN GATE FLOOD STUDY

Figure 2.1



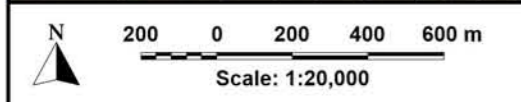
LEGEND

- LGA Boundary
- Rural Levee/Embankment
- Existing Stormwater Drainage System
- Natural Surface Elevation Contour (5m Interval)
- Village Centre
- Homestead
- ✕ Causeway
- ✕ Bridge/Major Culvert

BOGAN GATE FLOOD STUDY

Figure 2.2
(Sheet 1 of 2)

EXISTING STORMWATER DRAINAGE SYSTEM AT BOGAN GATE



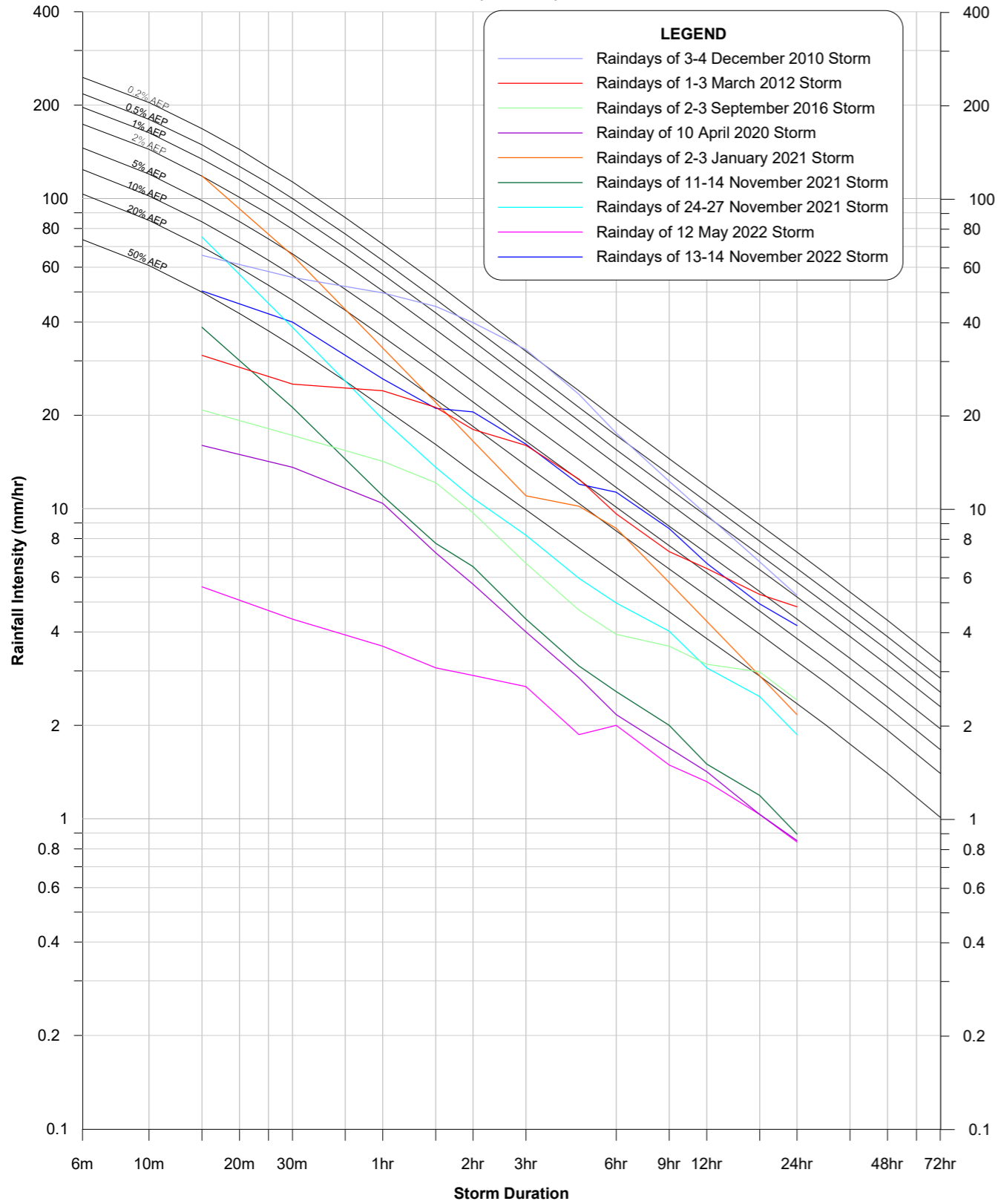
LEGEND

LGA Boundary	Village Centre
Rural Levee/Embankment	Homestead
Existing Stormwater Drainage System	Causeway
Natural Surface Elevation Contour (1m Interval)	Bridge/Major Culvert

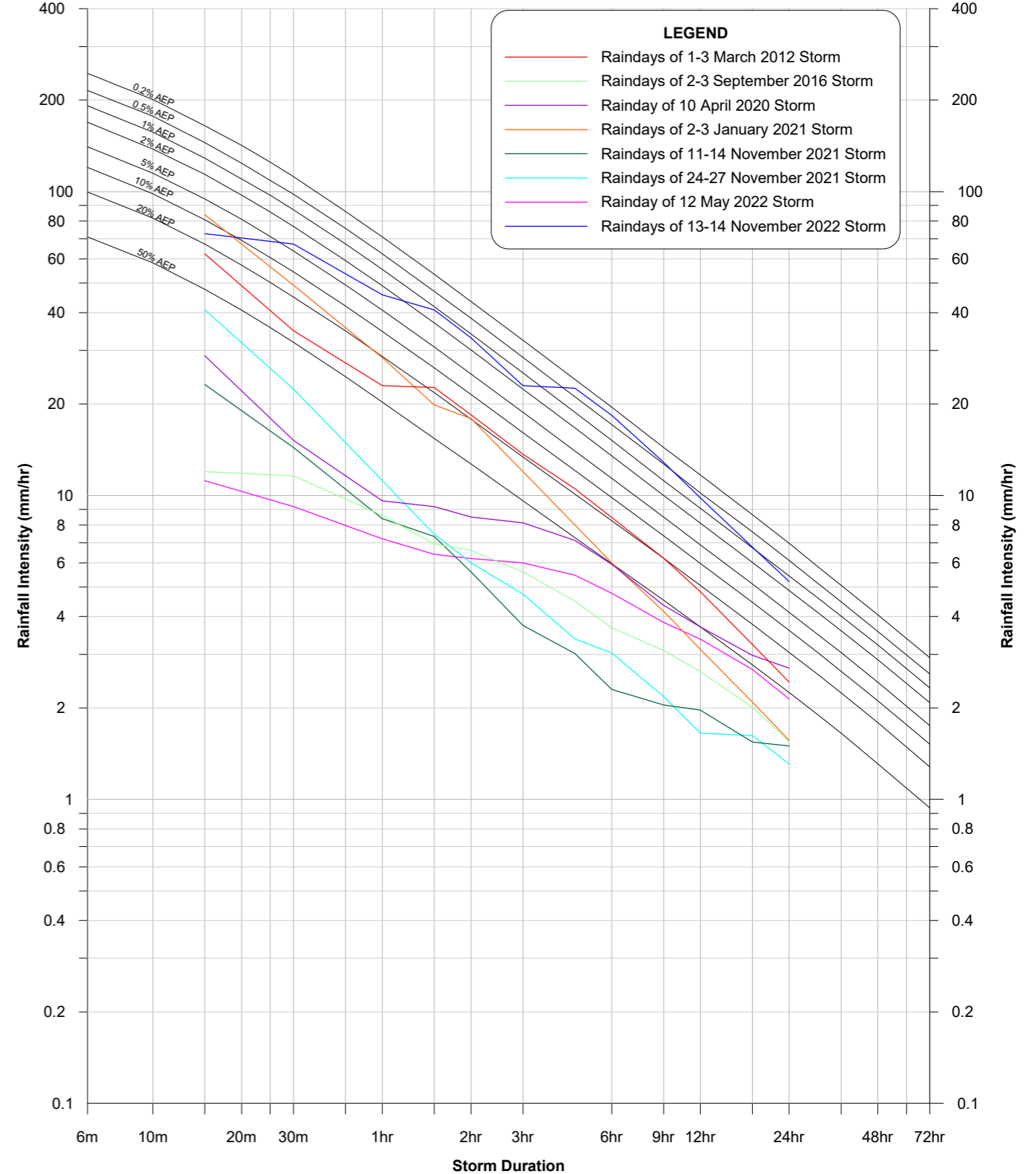
BOGAN GATE FLOOD STUDY

Figure 2.2
(Sheet 2 of 2)

**PARKES AIRPORT AWS
(GS 65068)**



**FORBES AIRPORT AWS
(GS 65103)**



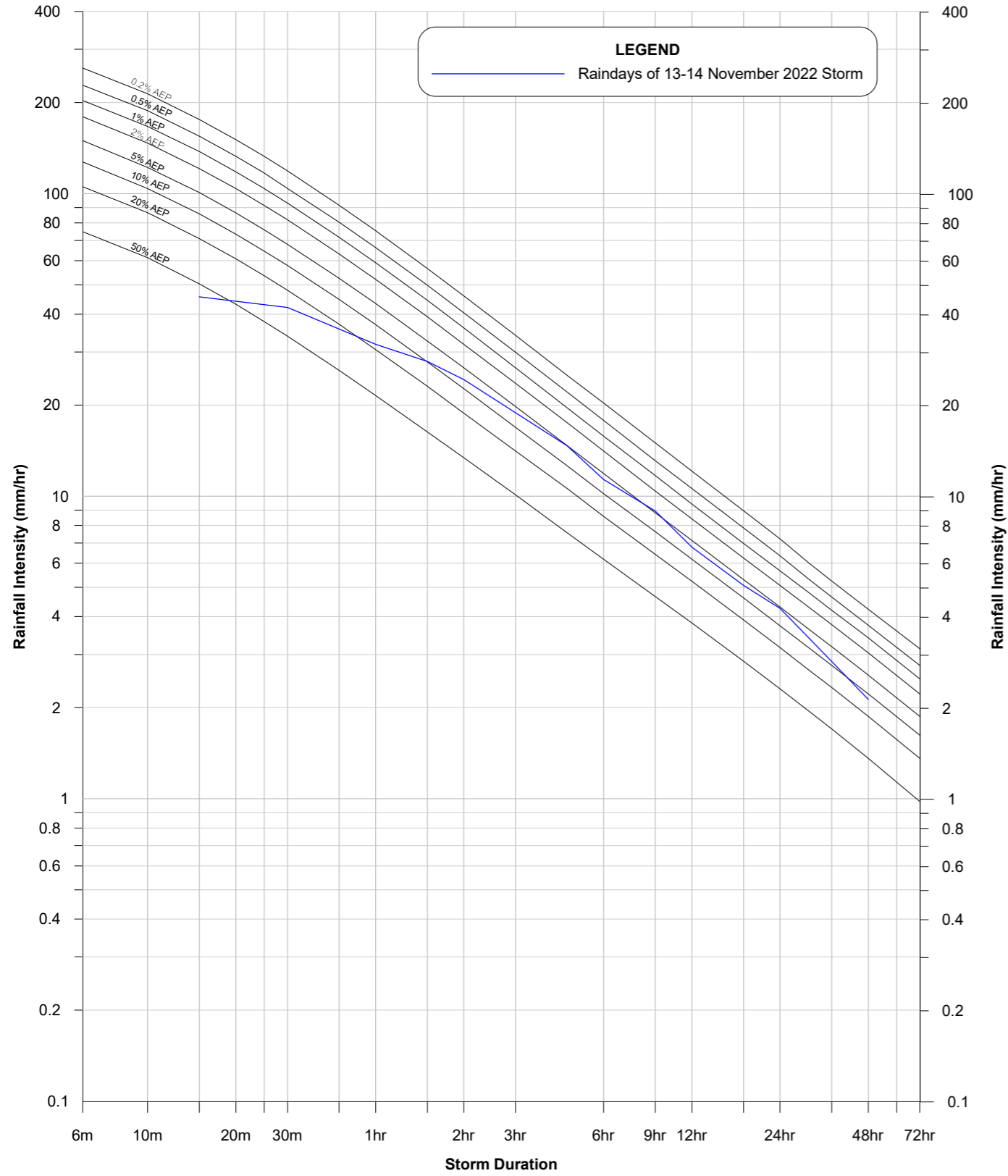
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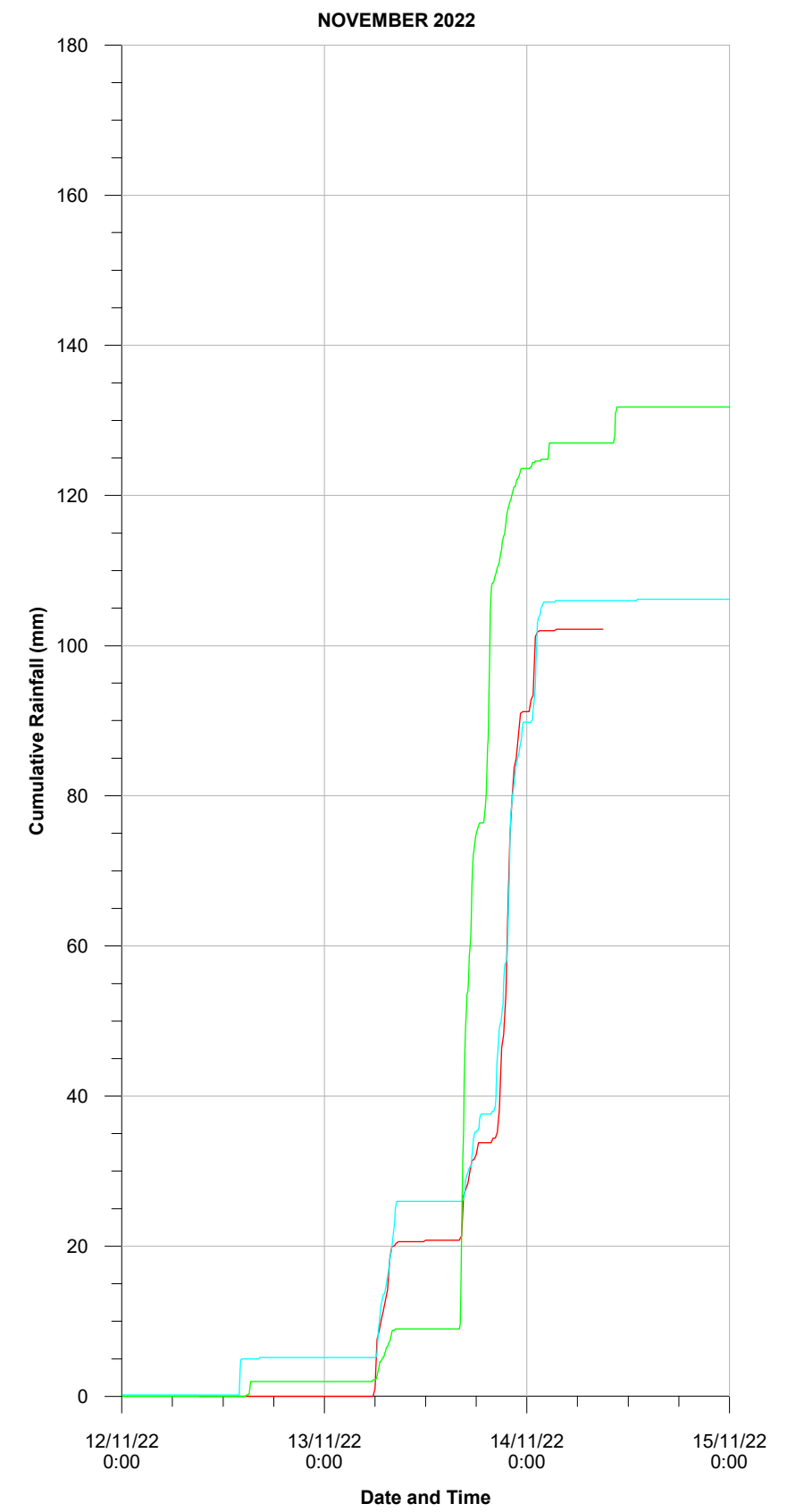
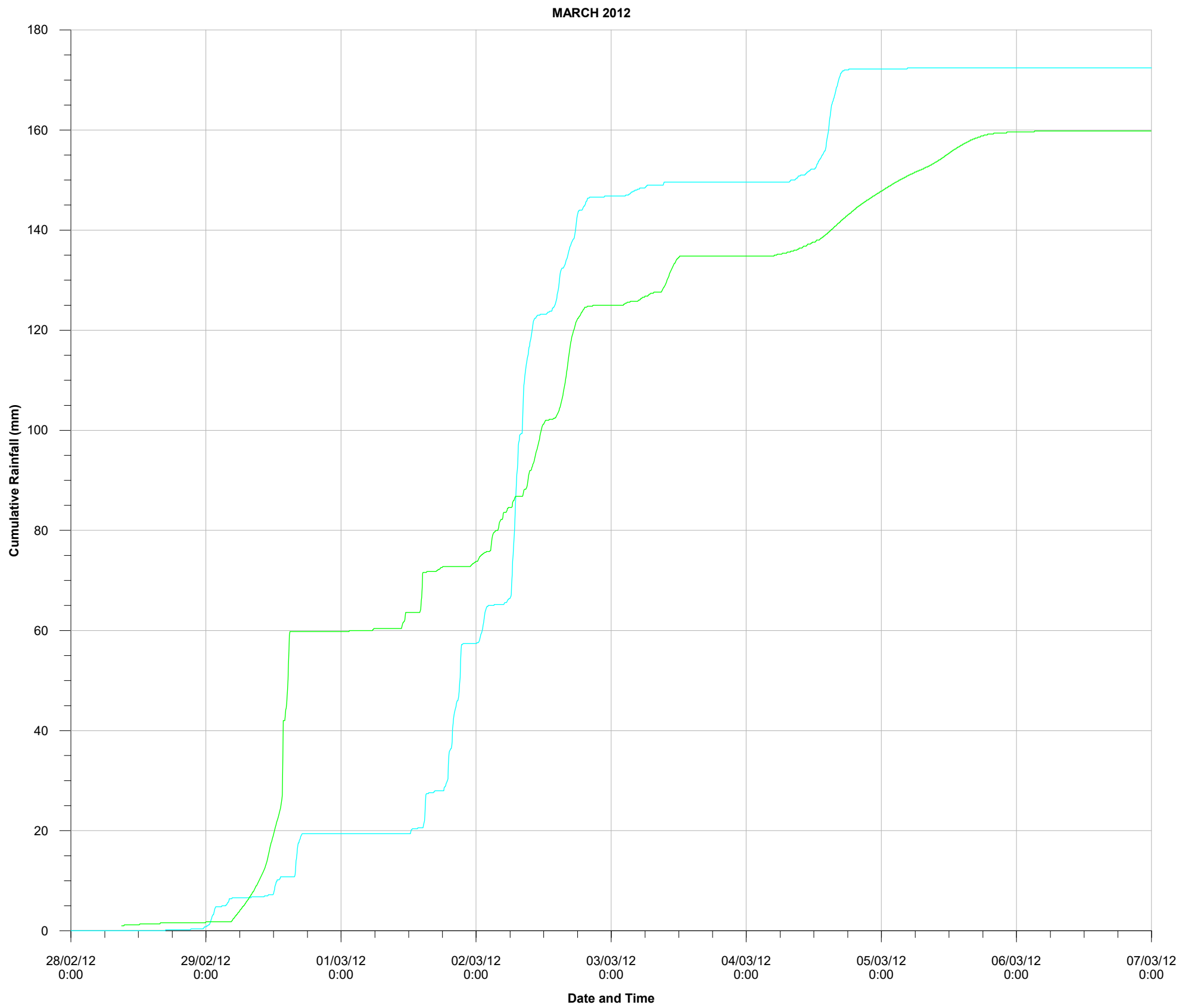
Figure 2.3
(Sheet 1 of 2)

INTENSITY-FREQUENCY-DURATION CURVES
AND HISTORIC RAINFALL



GOONUMBLA (CORADGERY)
(GS 50016)





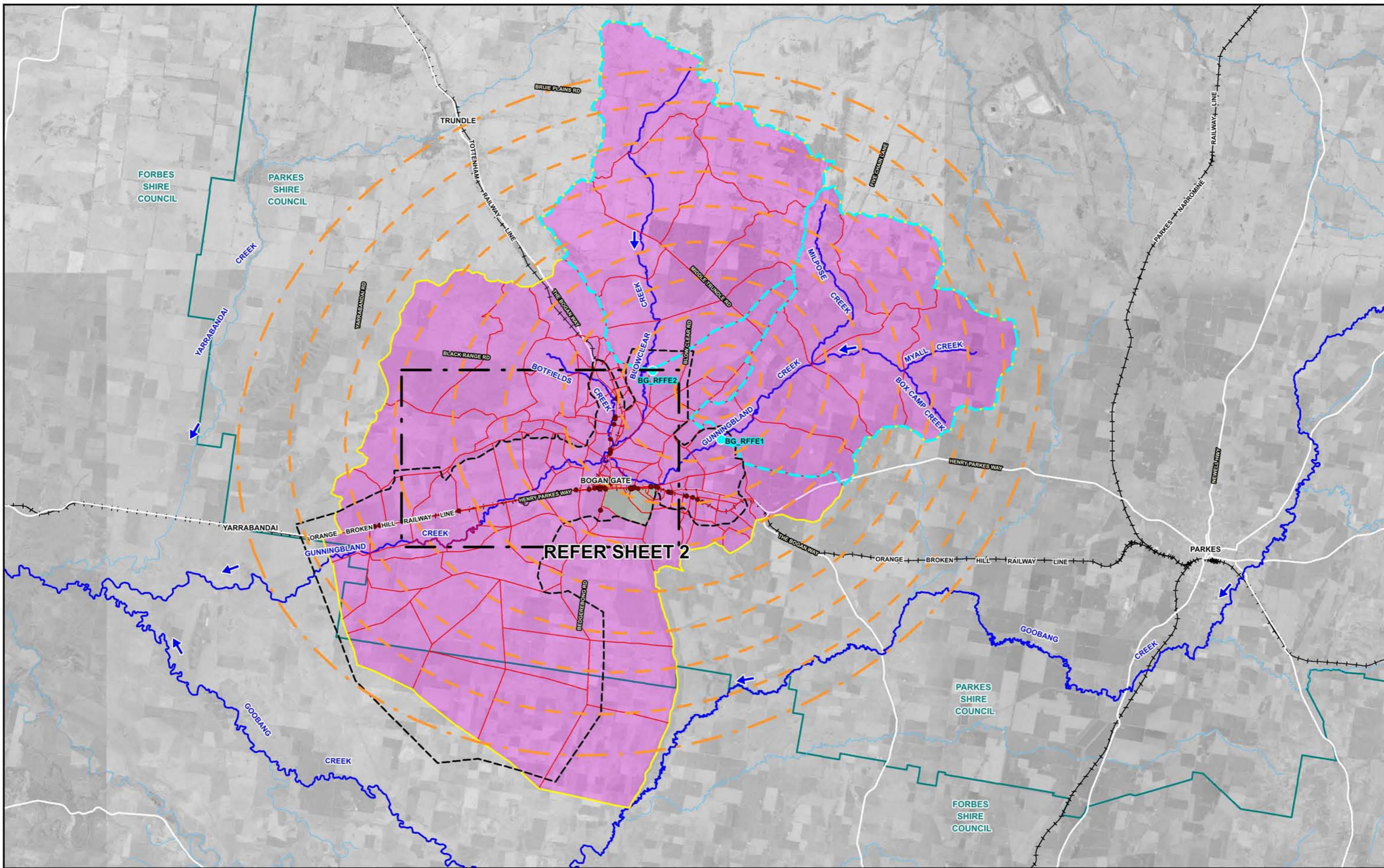
- LEGEND**
- Forbes Airport AWS (GS 65103)
 - Parkes Airport AWS (GS 65068)
 - Goonumbla (Coradgery) (GS 50016)



BOGAN GATE FLOOD STUDY

Figure 2.4

CUMULATIVE RAINFALL
HISTORIC STORM EVENTS



N

Scale: 1:200,000

LEGEND

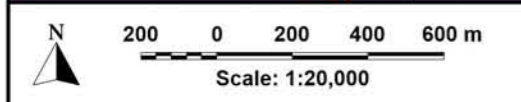
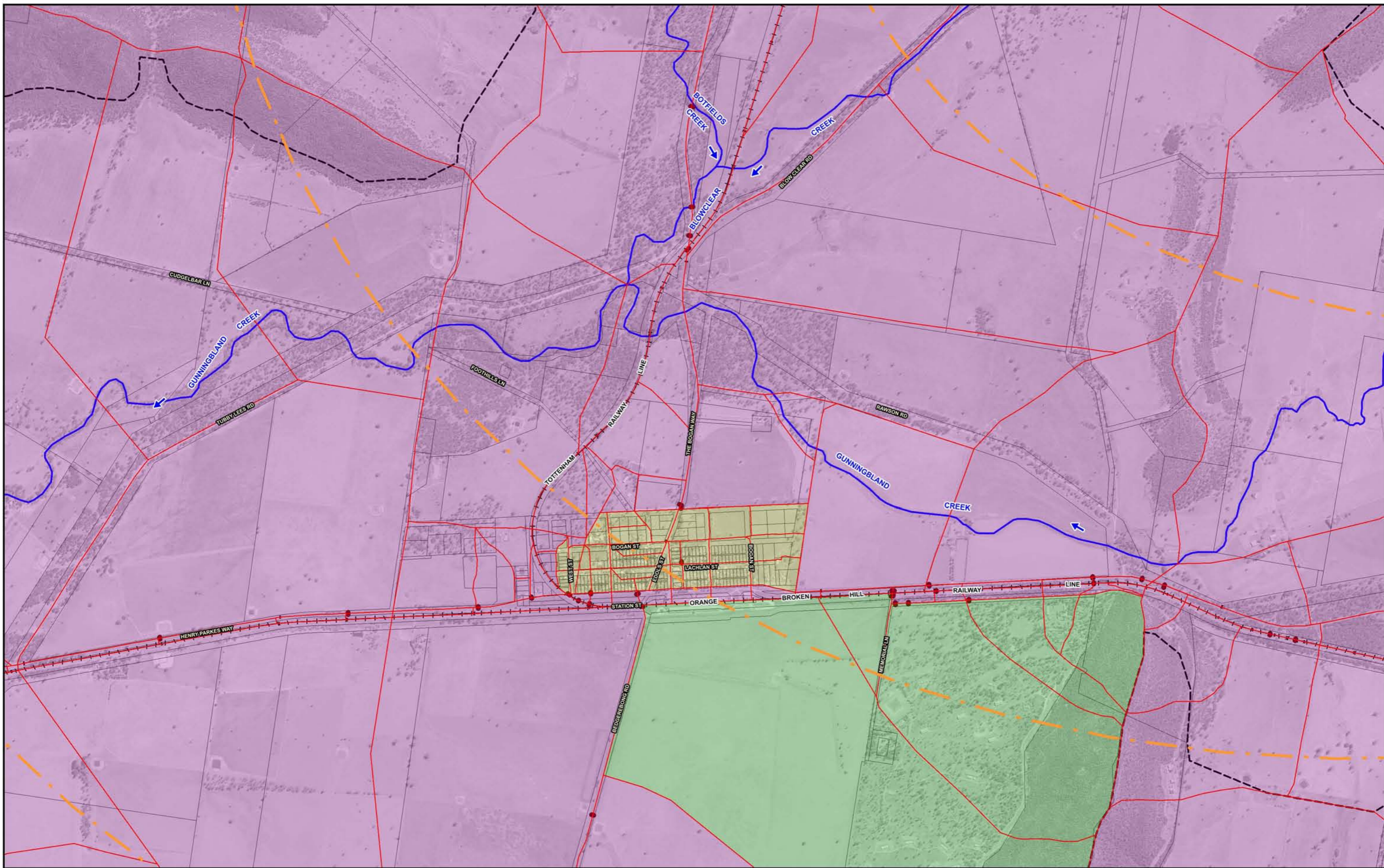
- LGA Boundary
- Study Catchment
- RAFTS Modelled Sub-Catchment
- ILSAX Modelled Sub-Catchment
- TUFLOW Modelled Sub-Catchment

- Two-Dimensional Model Boundary
- BG_RFFE1 Peak Flow Comparison Catchment and Identifier
- Modelled Stormwater Drainage System
- PMP Ellipses

BOGAN GATE FLOOD STUDY

Figure 3.1
(Sheet 1 of 2)

HYDROLOGIC MODEL LAYOUT



LEGEND	
	LGA Boundary
	Study Catchment
	RAFTS Modelled Sub-Catchment
	ILSAX Modelled Sub-Catchment
	TUFLOW Modelled Sub-Catchment
	Two-Dimensional Model Boundary
	Existing Stormwater Drainage System
	PMP Ellipses

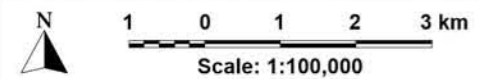
BOGAN GATE FLOOD STUDY

Figure 3.1
(Sheet 2 of 2)

HYDROLOGIC MODEL LAYOUT



TUFLOW MODEL BOUNDARY CONDITIONS	
	Two-Dimensional Model Boundary
	Inflow Boundary
	Inflow - Rain Boundary
	Inflow - Direct Rainfall
	Outflow - Rating Curve
	Quadtree Level 2 Mesh Refinement (6 m grid)
	Quadtree Level 2 Mesh Refinement (3 m grid)
ONE-DIMENSIONAL MODEL ELEMENTS	
	Headwall
	Pipe / Box Culvert
	Bridge
TUFLOW TOPOGRAPHIC MODIFIER	
	Rural Levee/Embankment

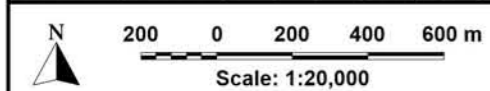


LEGEND	
	LGA Boundary
	Homesteads

BOGAN GATE FLOOD STUDY



Figure 4.1
(Sheet 1 of 2)



LEGEND
● Homesteads

BOGAN GATE FLOOD STUDY

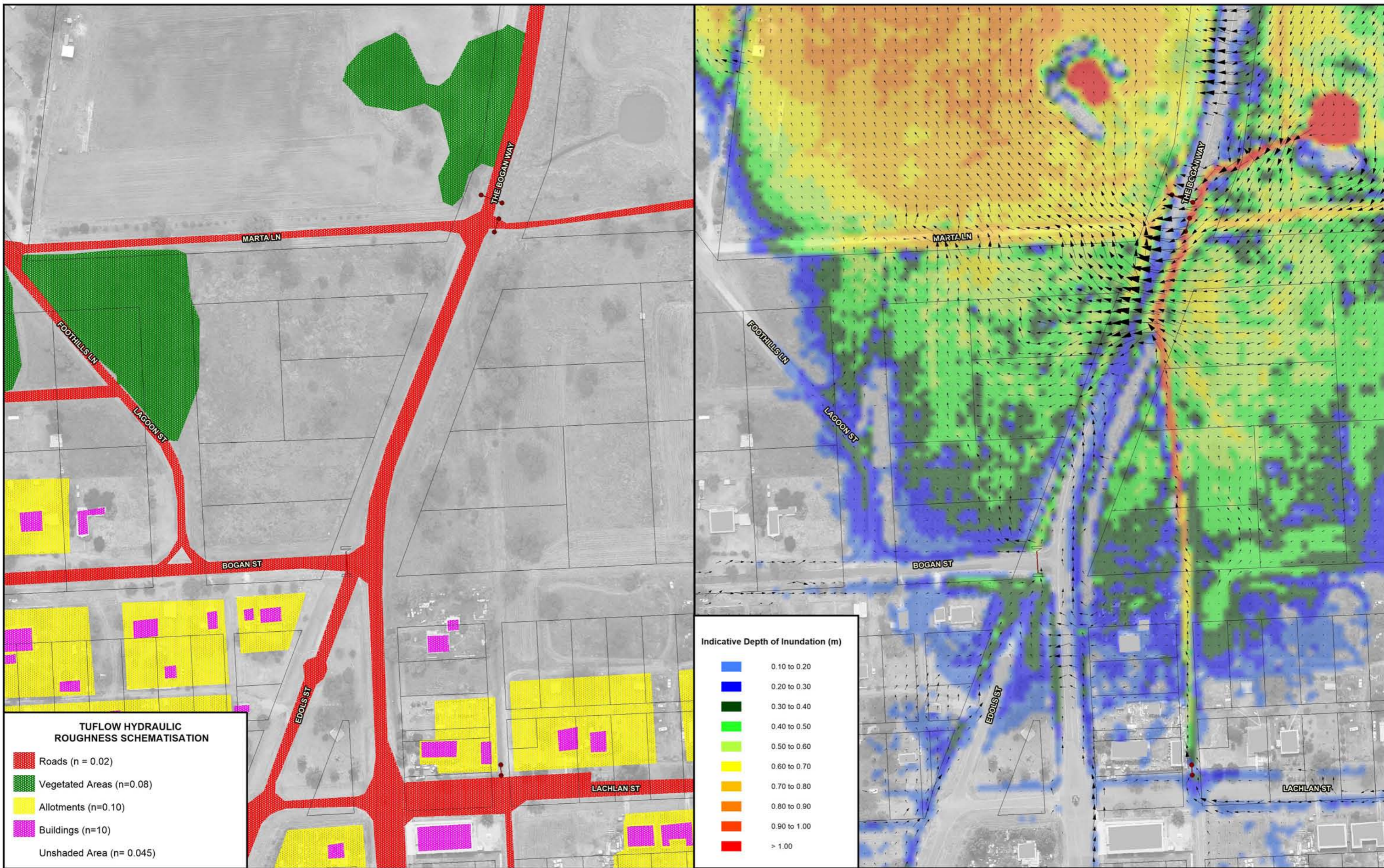


Figure 4.2

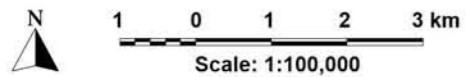


Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

REFER SHEET 2

BOGAN GATE FLOOD STUDY



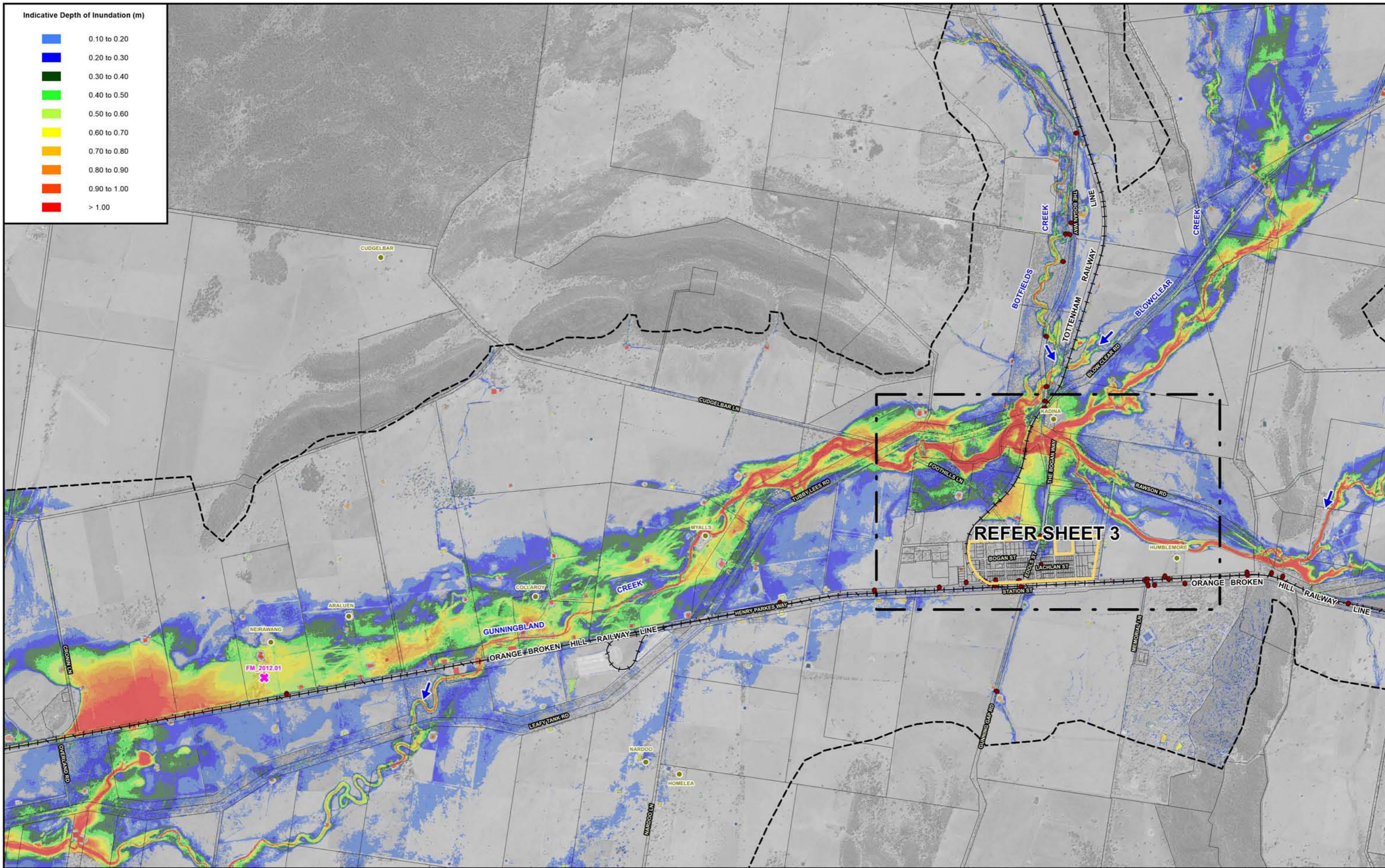
NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

The allotment boundaries shown are based on the NSW State Database obtained from the Six Maps online database and may not represent the true property boundaries in the study area.

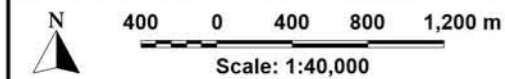
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Observed Flooding Behaviour and Identifier
- Homesteads



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
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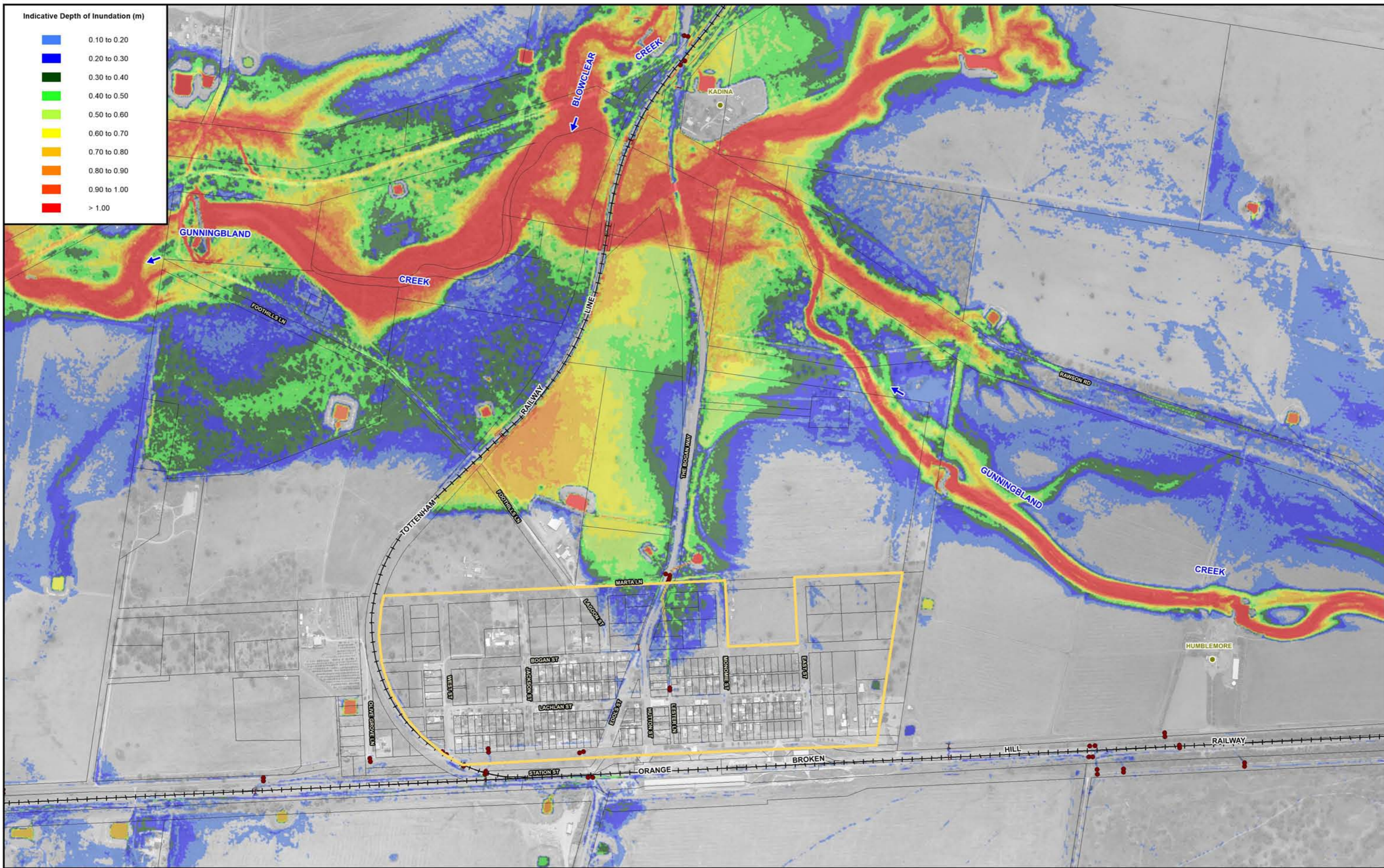
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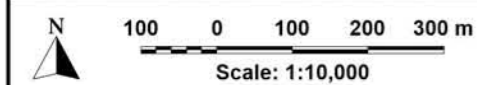
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- ▭ Village Centre
- FM_2012.01 x Observed Flooding Behaviour and Identifier
- Homesteads

BOGAN GATE FLOOD STUDY



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
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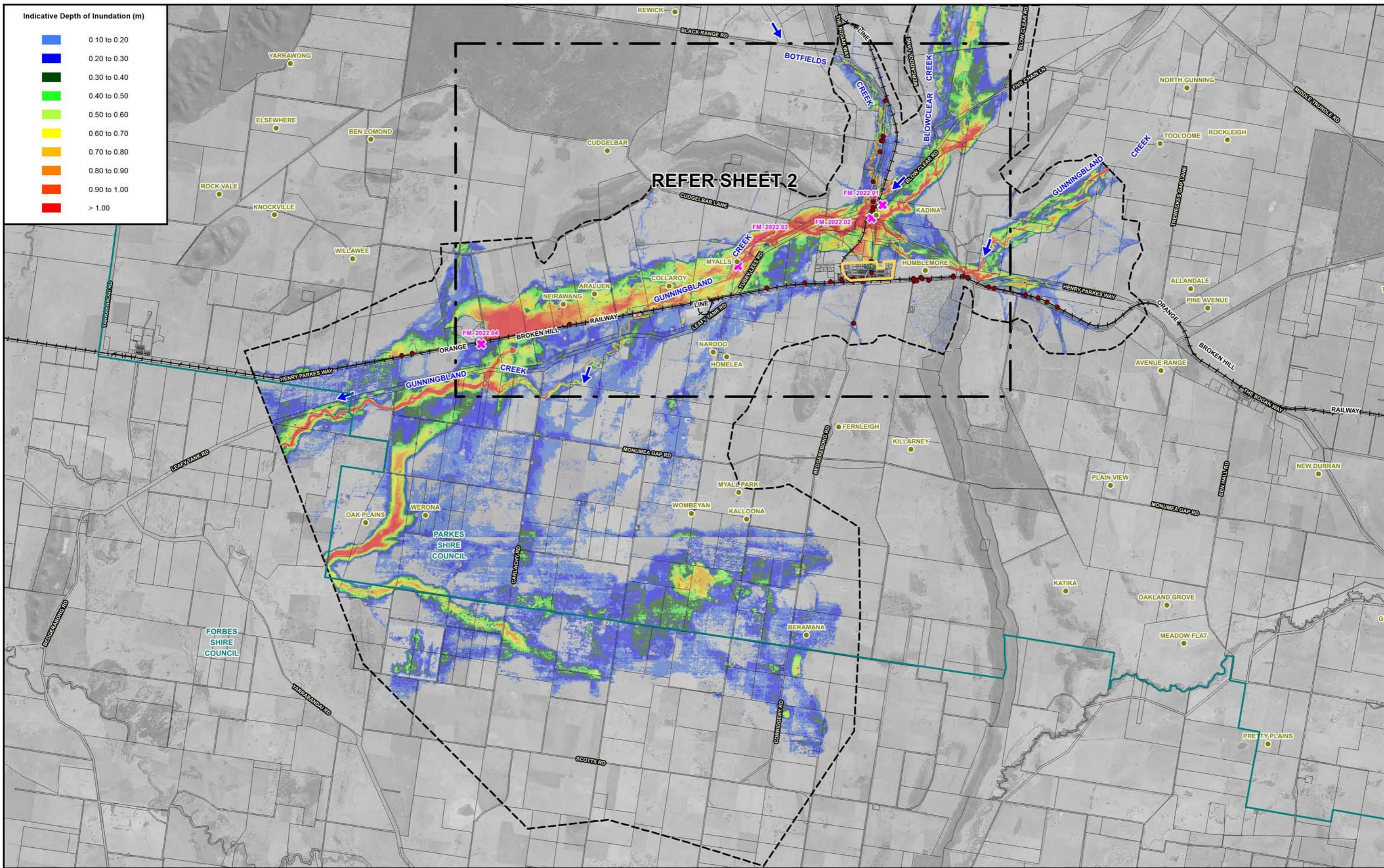
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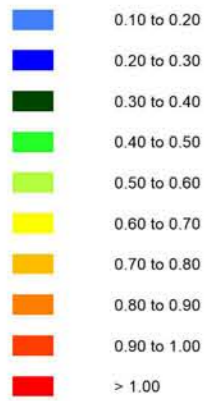
LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- ▭ Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY

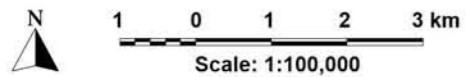


Indicative Depth of Inundation (m)



REFER SHEET 2

BOGAN GATE FLOOD STUDY



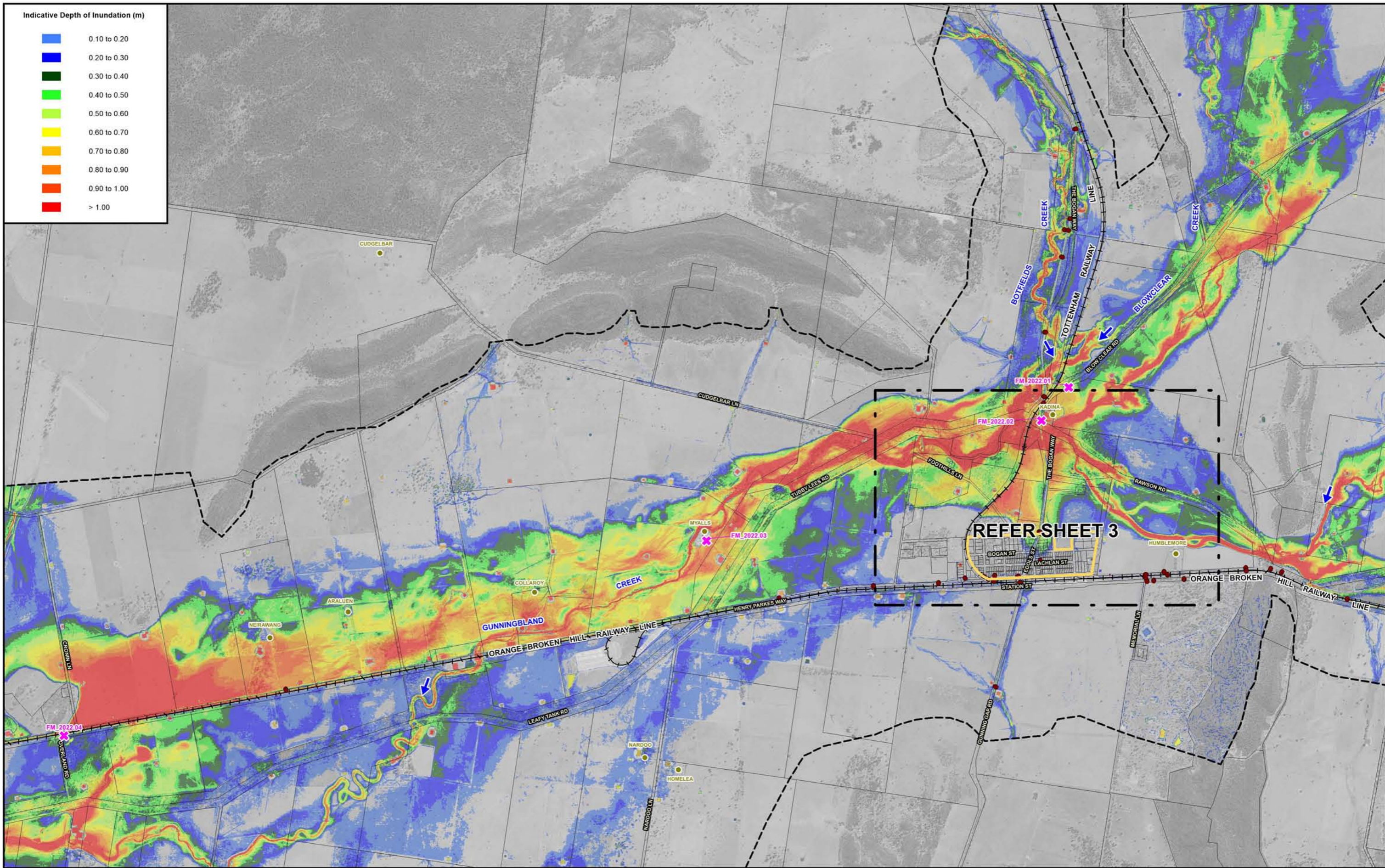
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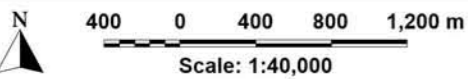
- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Observed Flooding Behaviour and Identifier
- Homesteads



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

REFER SHEET 3



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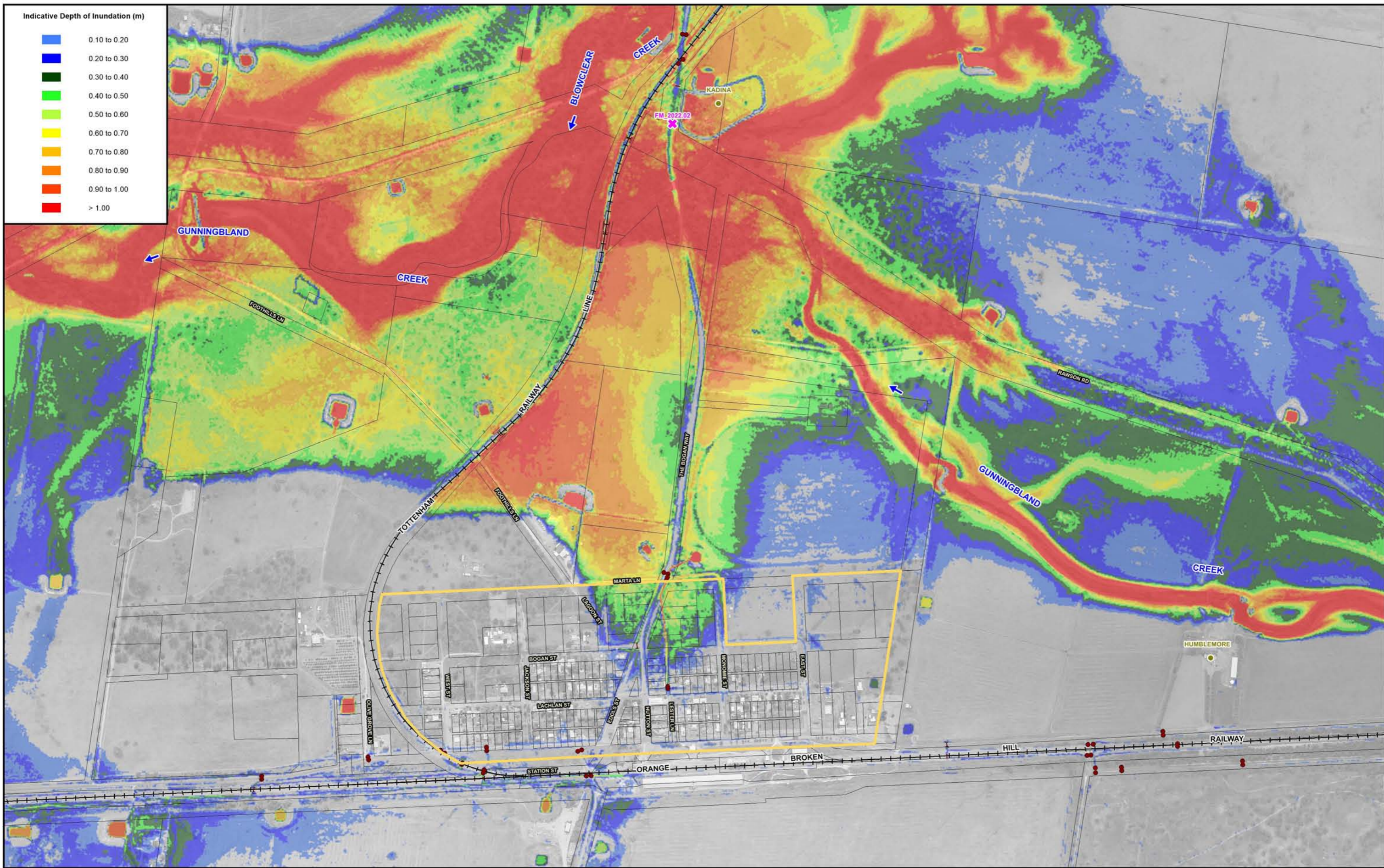
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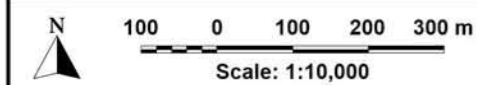
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- x Observed Flooding Behaviour and Identifier
- Homesteads

BOGAN GATE FLOOD STUDY



Indicative Depth of Inundation (m)

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- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
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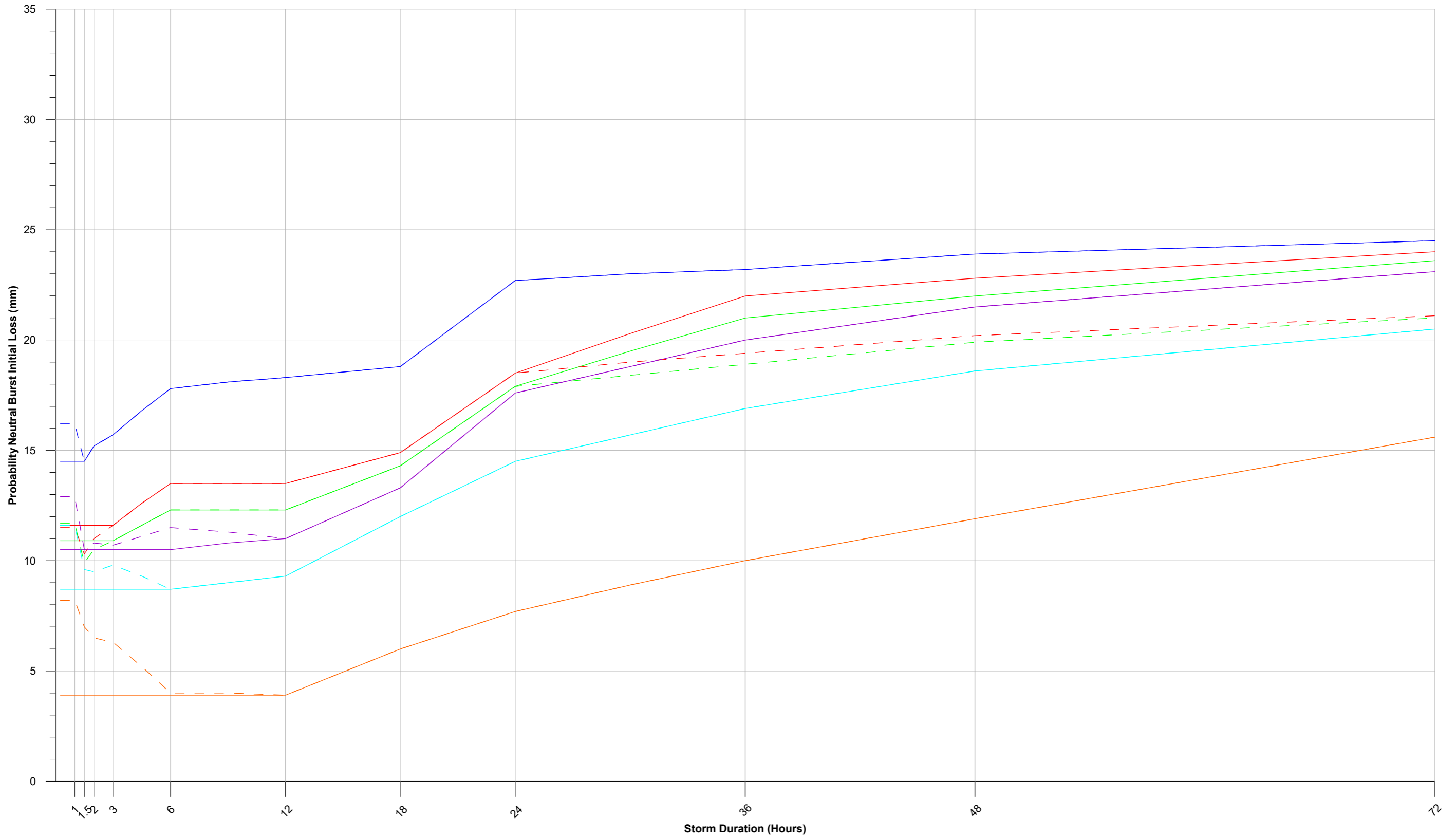
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LEGEND

- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- ▭ Village Centre
- FM_2022.02 Observed Flooding Behaviour and Identifier
- Homesteads

BOGAN GATE FLOOD STUDY



LEGEND

	Raw (Unadjusted) ARR Data Hub Loss Values	Adjusted ARR Data Hub Loss Values
50% AEP		
20% AEP		
10% AEP		
5% AEP		
2% AEP		
1% AEP		

BOGAN GATE FLOOD STUDY

Figure 5.1

ADJUSTED PROBABILITY NEUTRAL BURST INITIAL LOSS VALUES



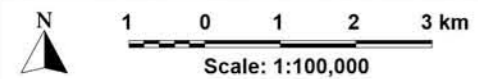


Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
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- 0.60 to 0.70
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- 0.90 to 1.00
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BOGAN GATE FLOOD STUDY



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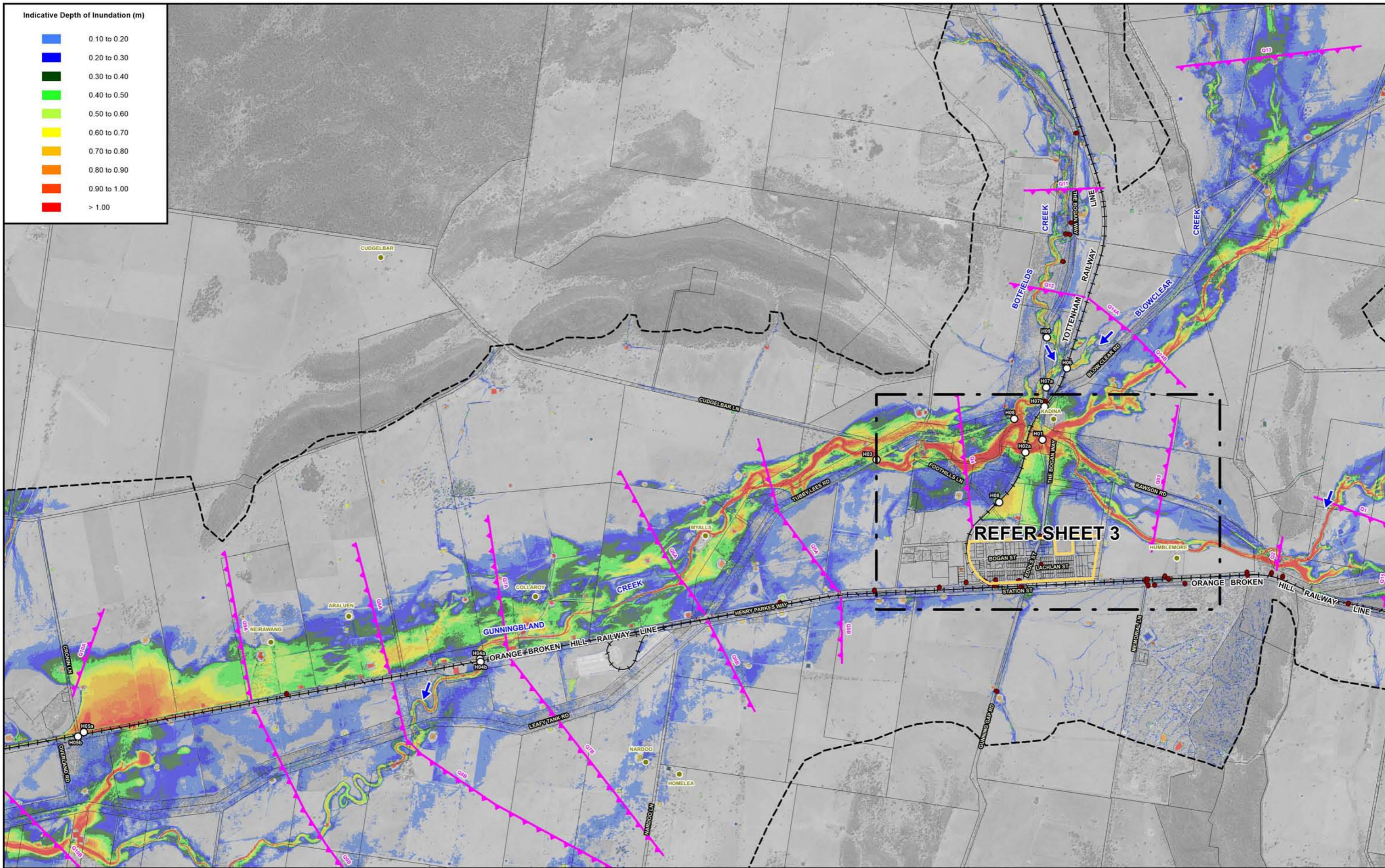
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LEGEND

- LGA Boundary
- - - Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

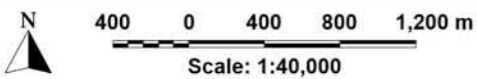
- ▲— Q01 Peak Flow Location and Identifier
- Q00 ○ Peak Flood Level Location and Identifier



Indicative Depth of Inundation (m)

- 0.10 to 0.20
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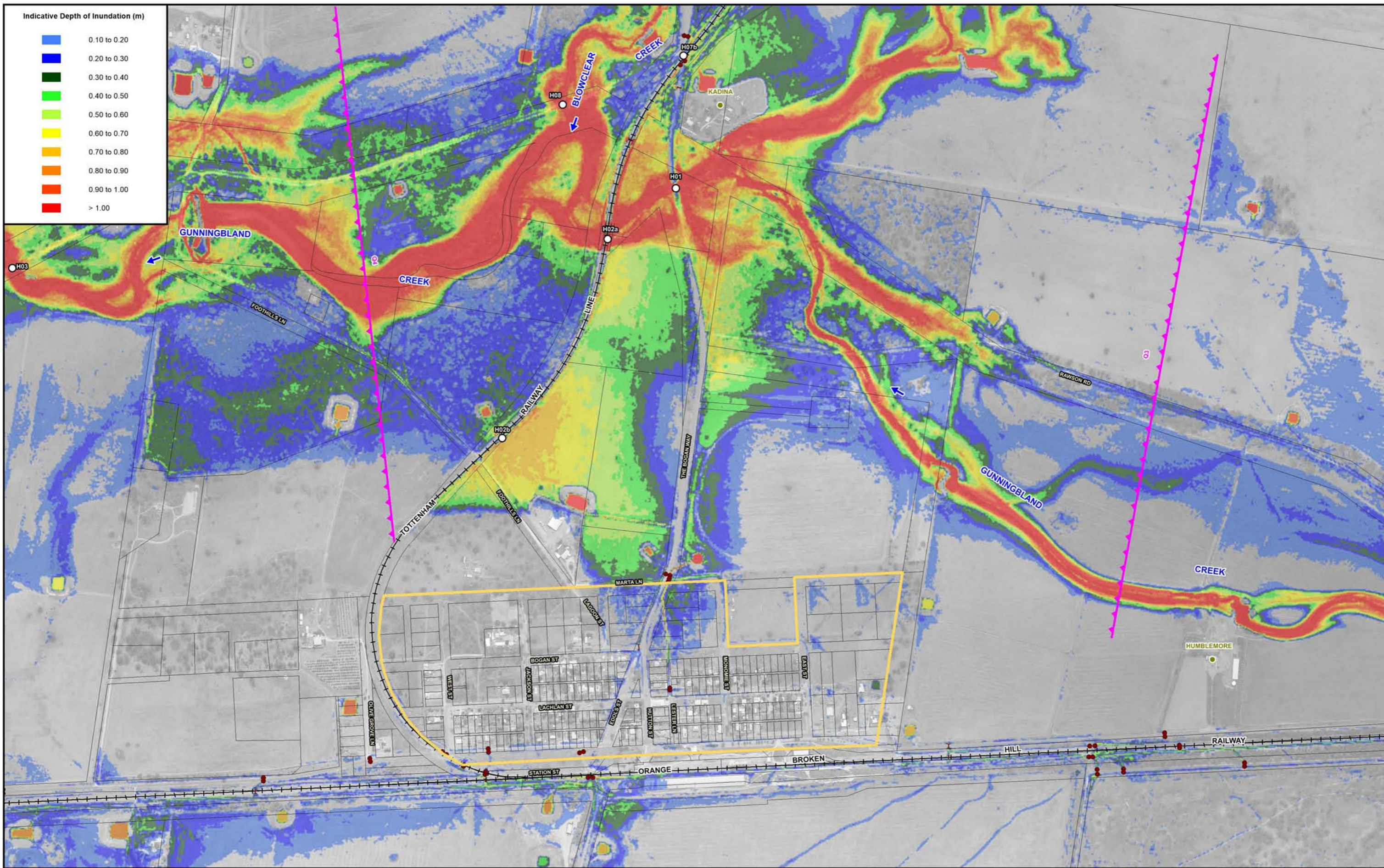
- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

- ▲ Q01 Peak Flow Location and Identifier
- H00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY

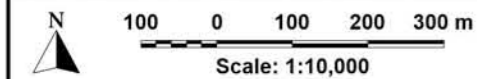
Lyll & Associates

Figure 6.1
(Sheet 2 of 3)
TUFLOW MODEL RESULTS
20% AEP



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
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- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

- Q01 Peak Flow Location and Identifier
- H01 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY

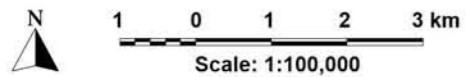


Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
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- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00

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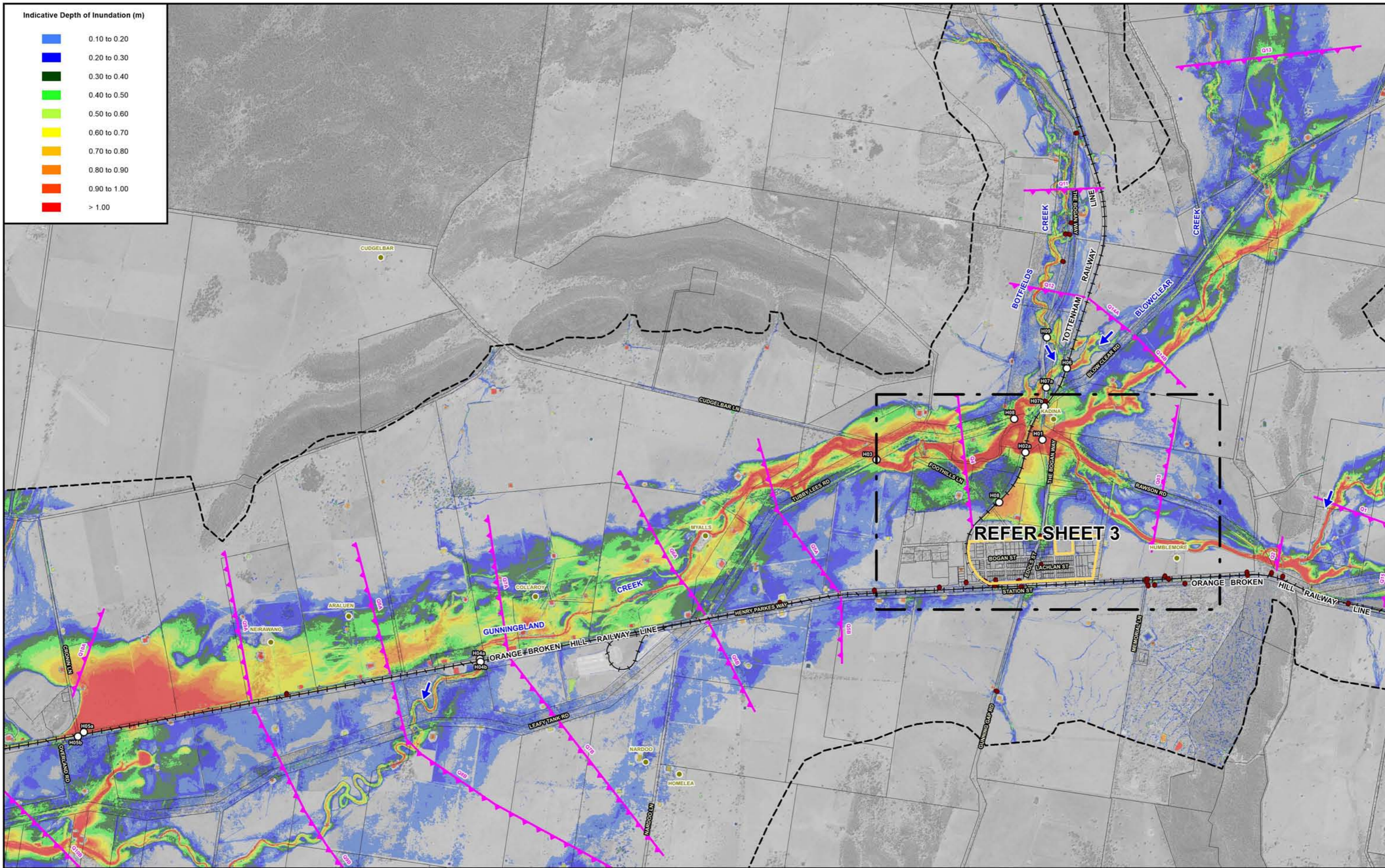
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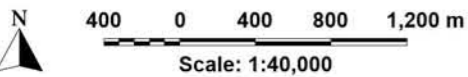
- ▲— Q01 Peak Flow Location and Identifier
- Q00 Peak Flood Level Location and Identifier



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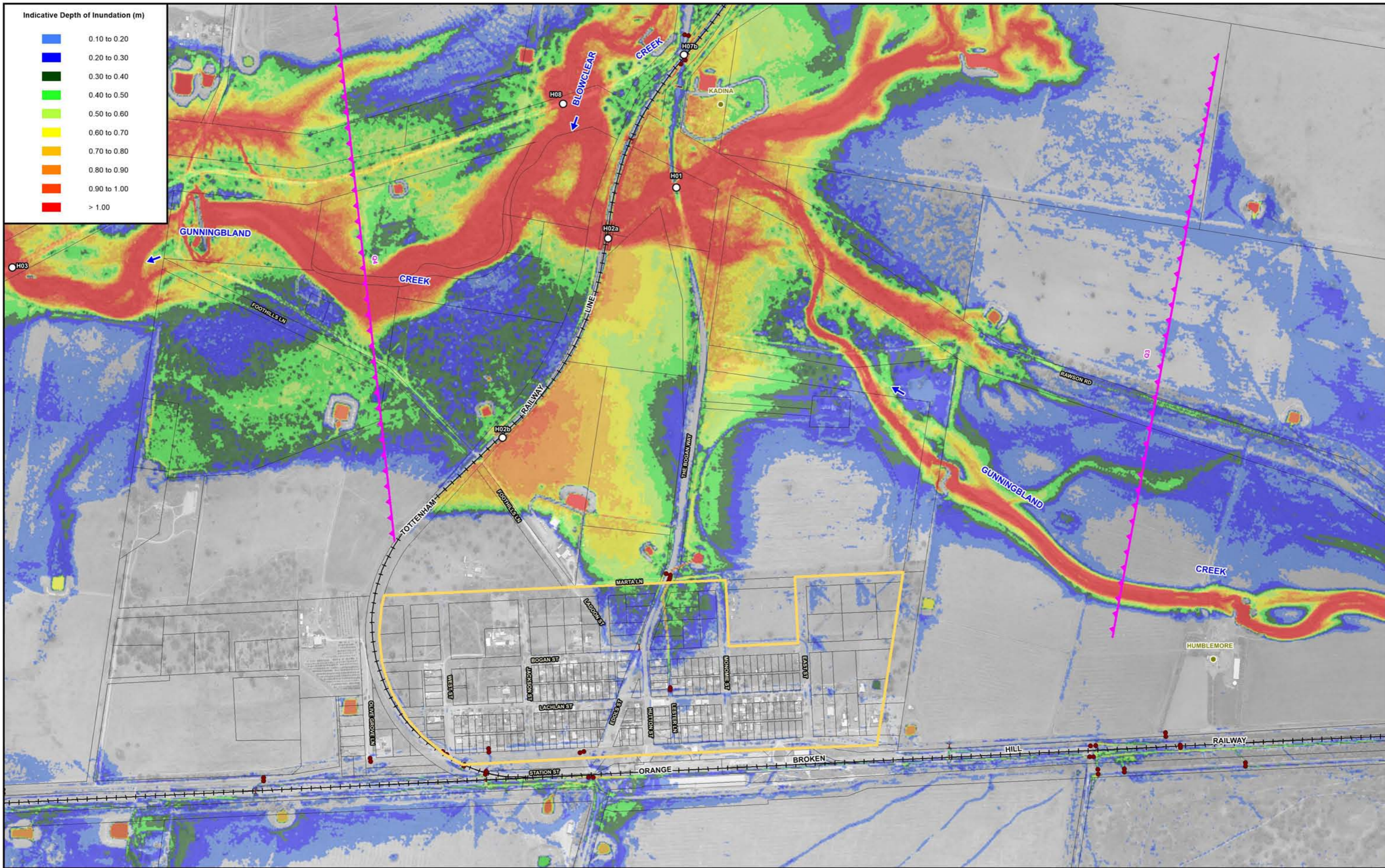
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 - Homesteads

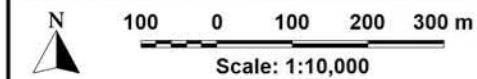
- Q01 Peak Flow Location and Identifier
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BOGAN GATE FLOOD STUDY



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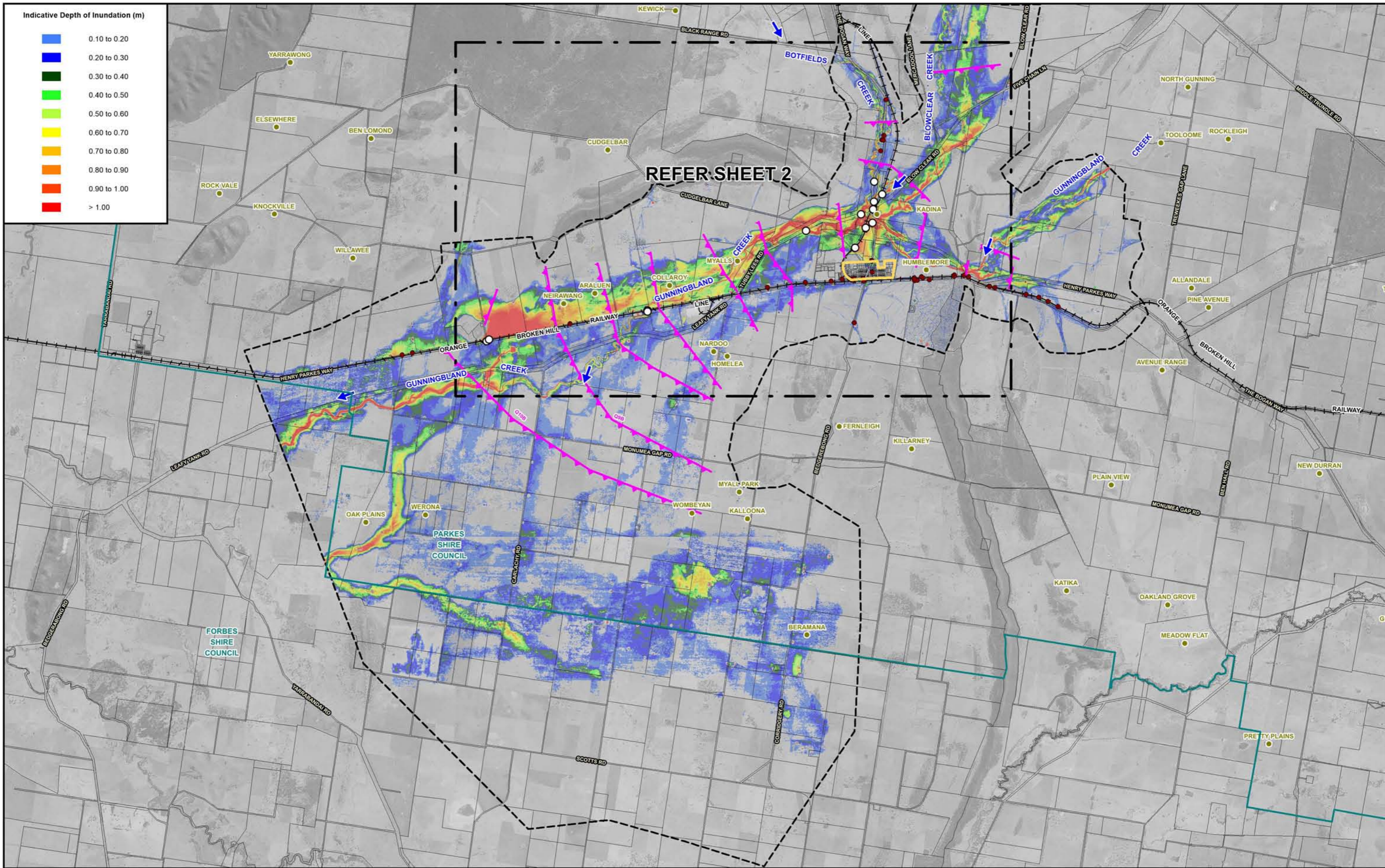
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- Village Centre
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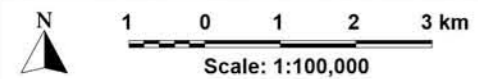


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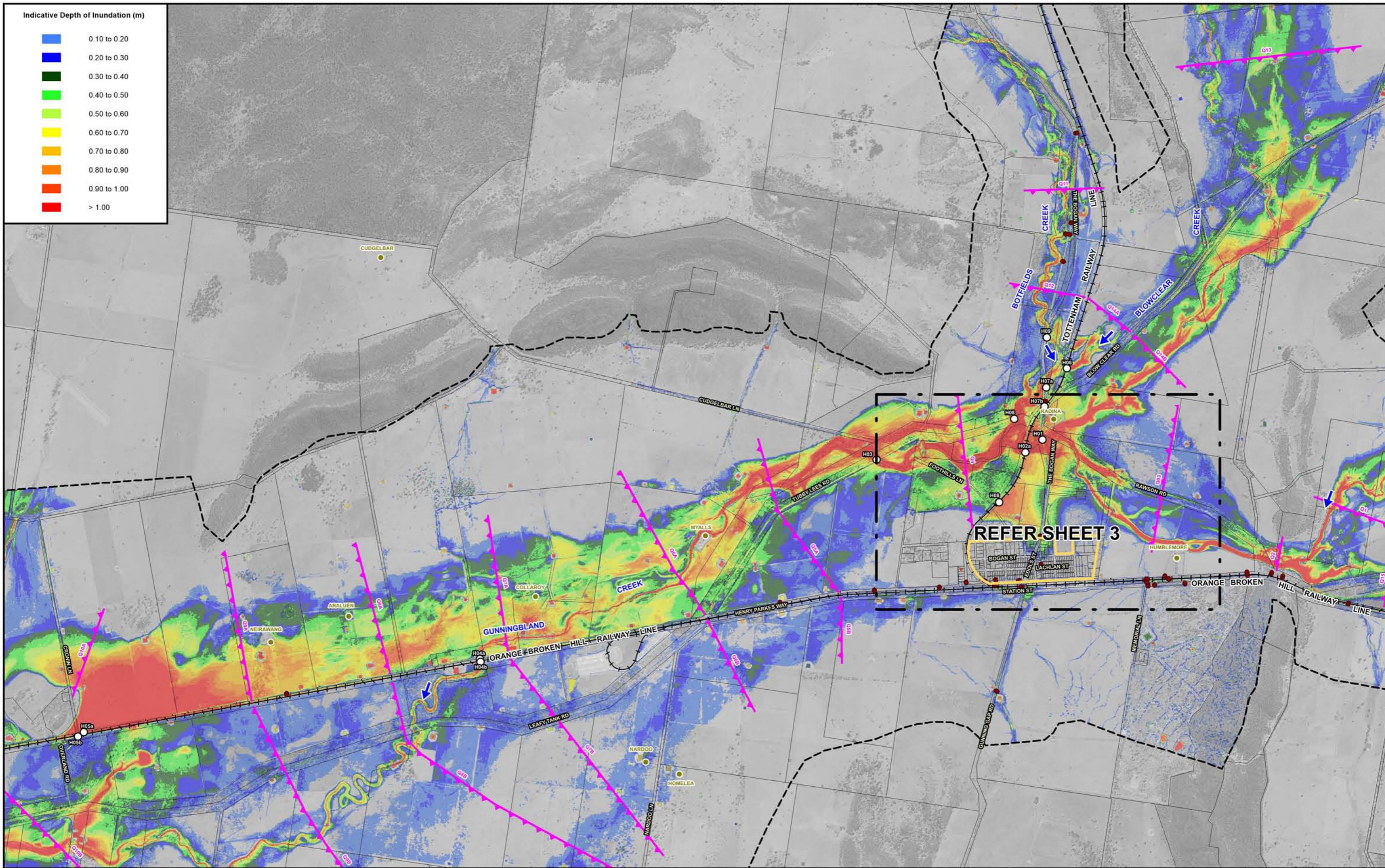
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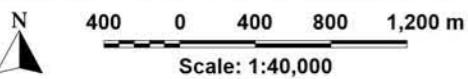
- ▲— Q01 Peak Flow Location and Identifier
- Q01 ○ Peak Flood Level Location and Identifier



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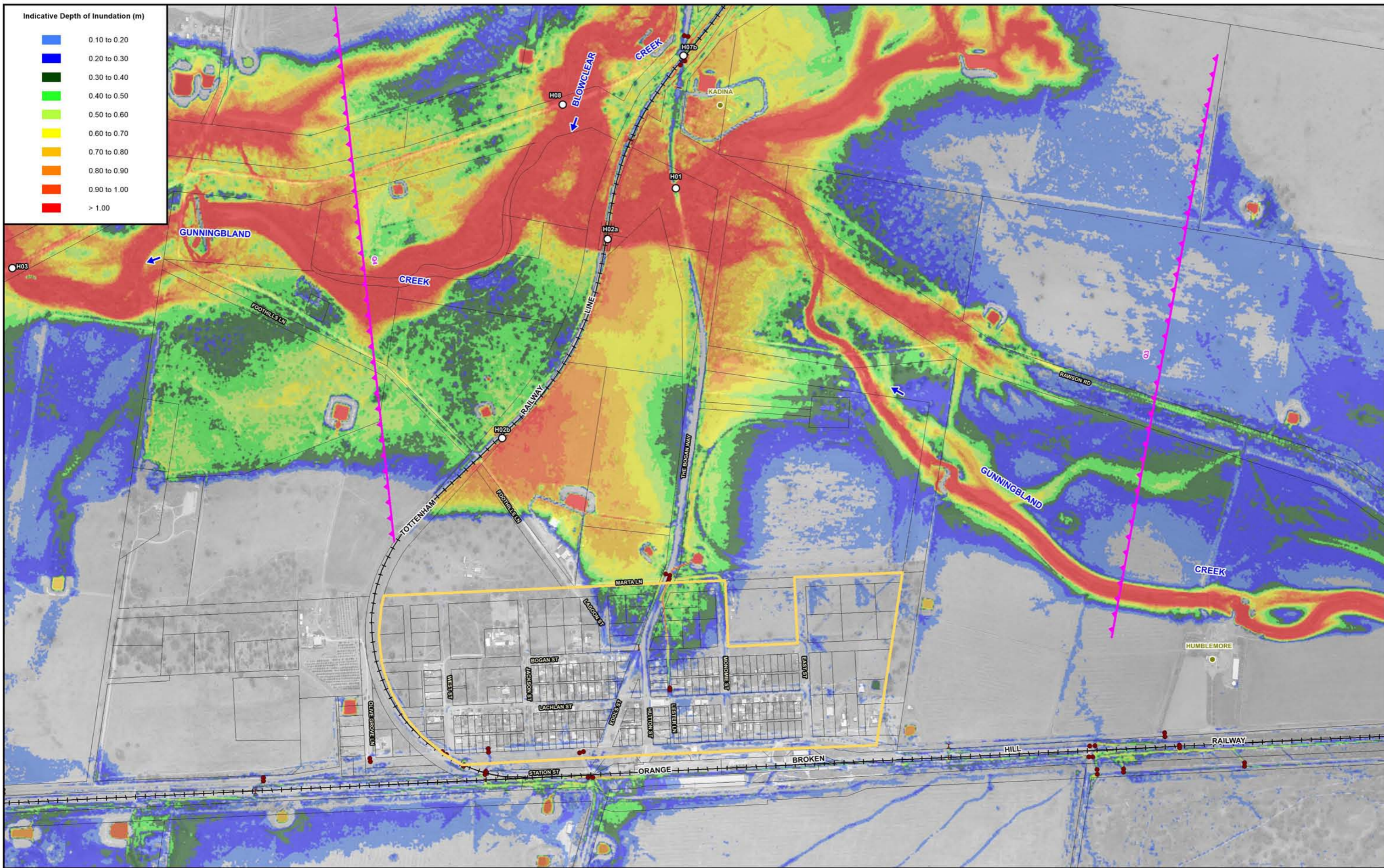
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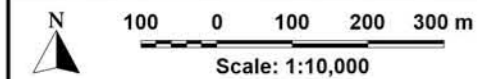
- Q01 Peak Flow Location and Identifier
- H00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY



Indicative Depth of Inundation (m)

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- 0.20 to 0.30
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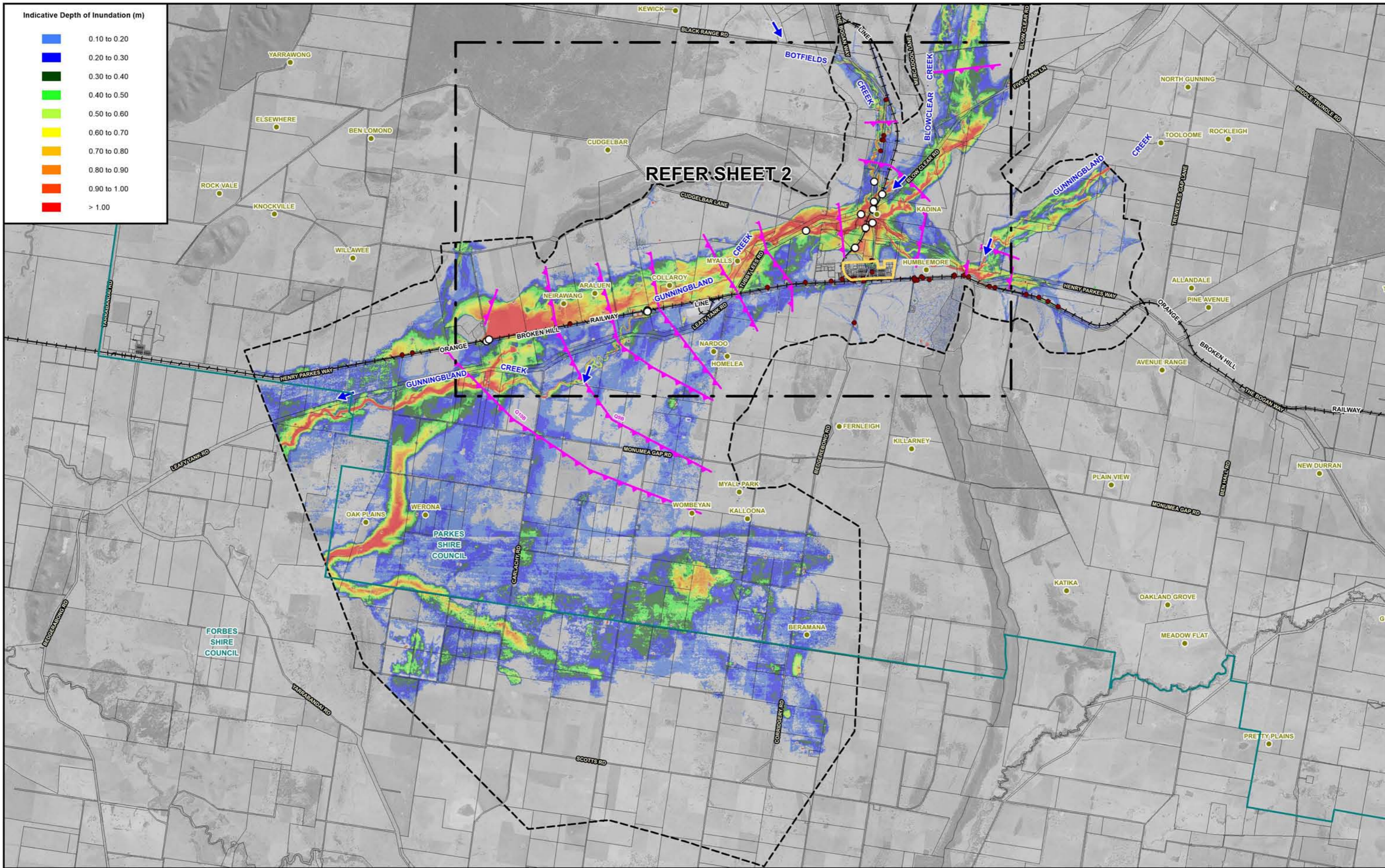
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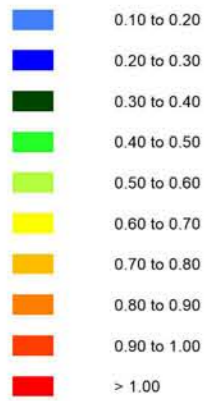
- LGA Boundary
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- ▭ Village Centre
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- Q01 Peak Flow Location and Identifier
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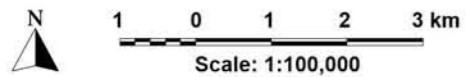


Indicative Depth of Inundation (m)



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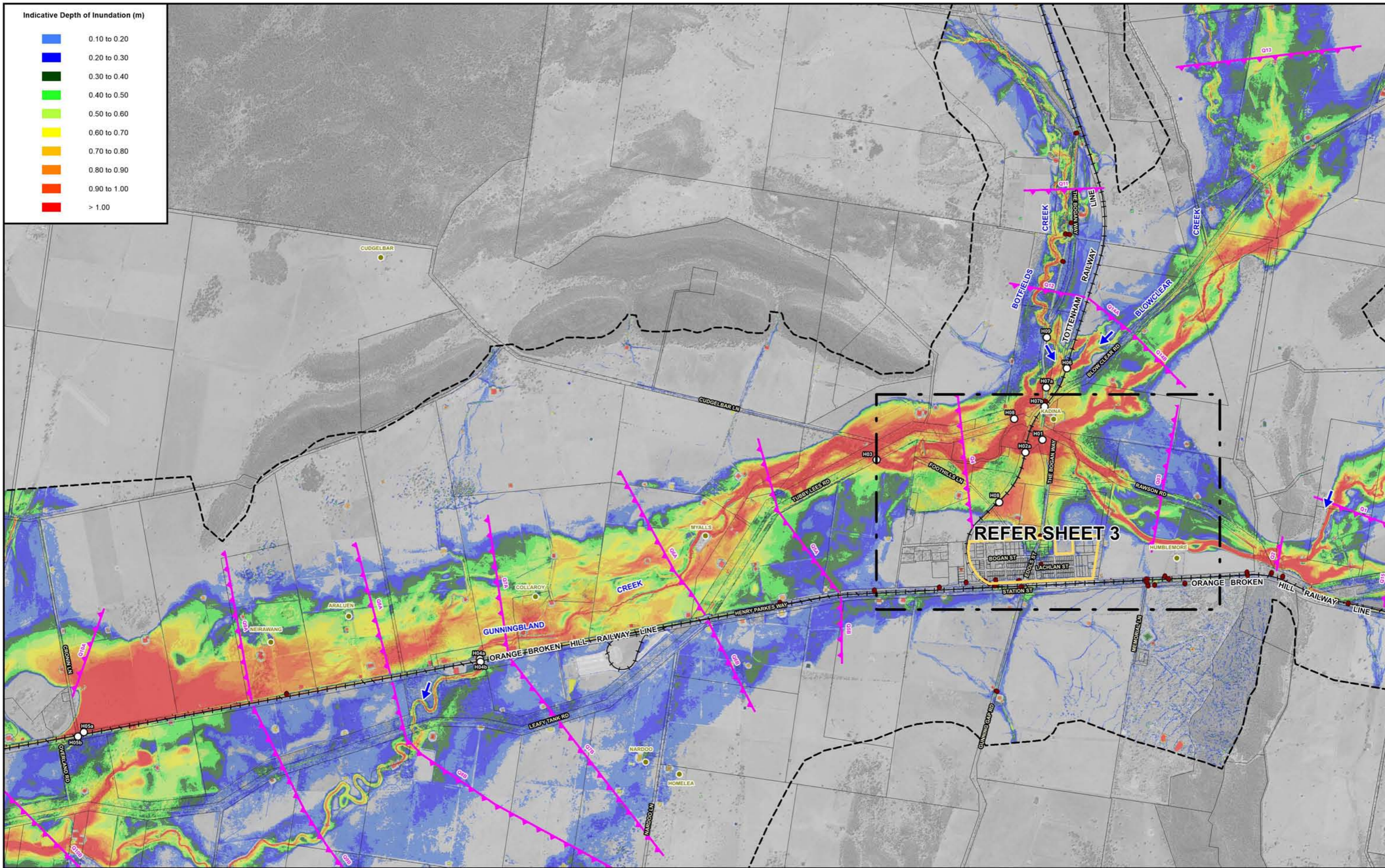
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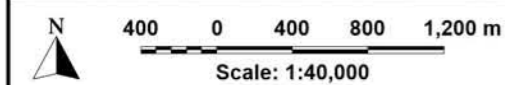
- Peak Flow Location and Identifier
- Peak Flood Level Location and Identifier



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
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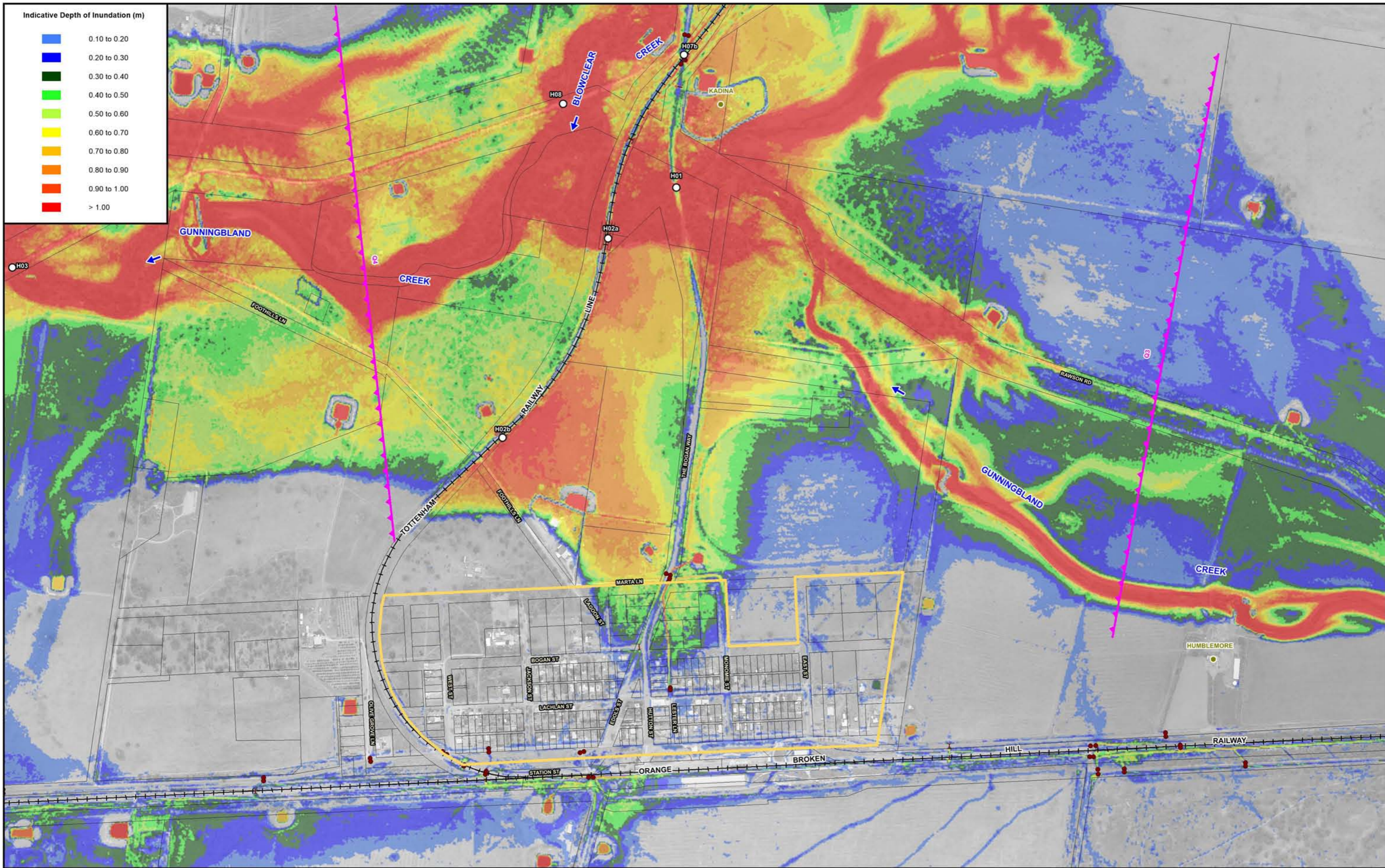
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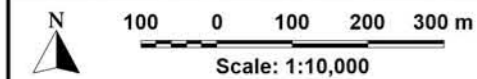
- Q01 Peak Flow Location and Identifier
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BOGAN GATE FLOOD STUDY



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- 0.10 to 0.20
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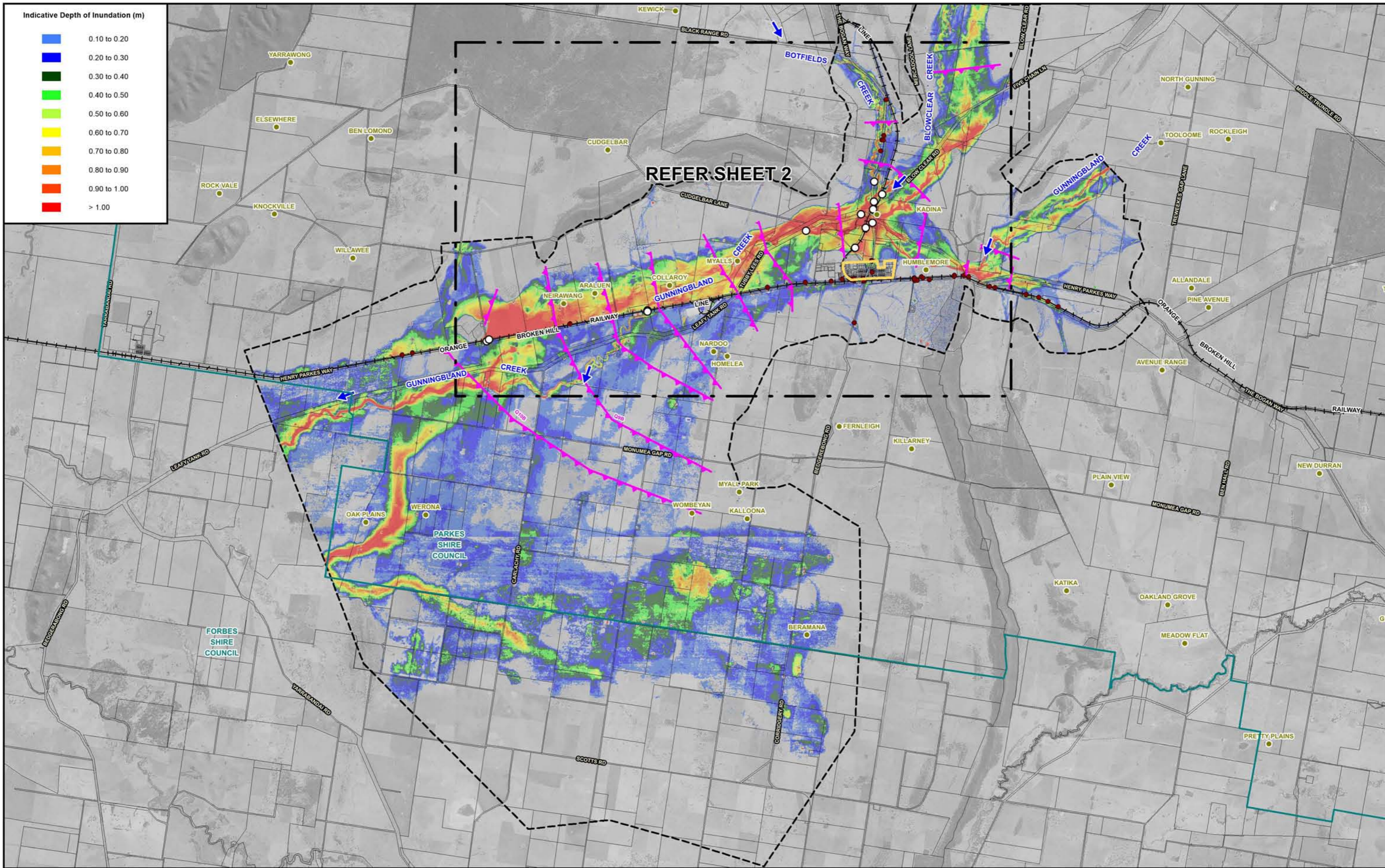
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- Q01 Peak Flow Location and Identifier
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BOGAN GATE FLOOD STUDY

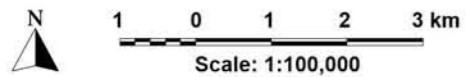


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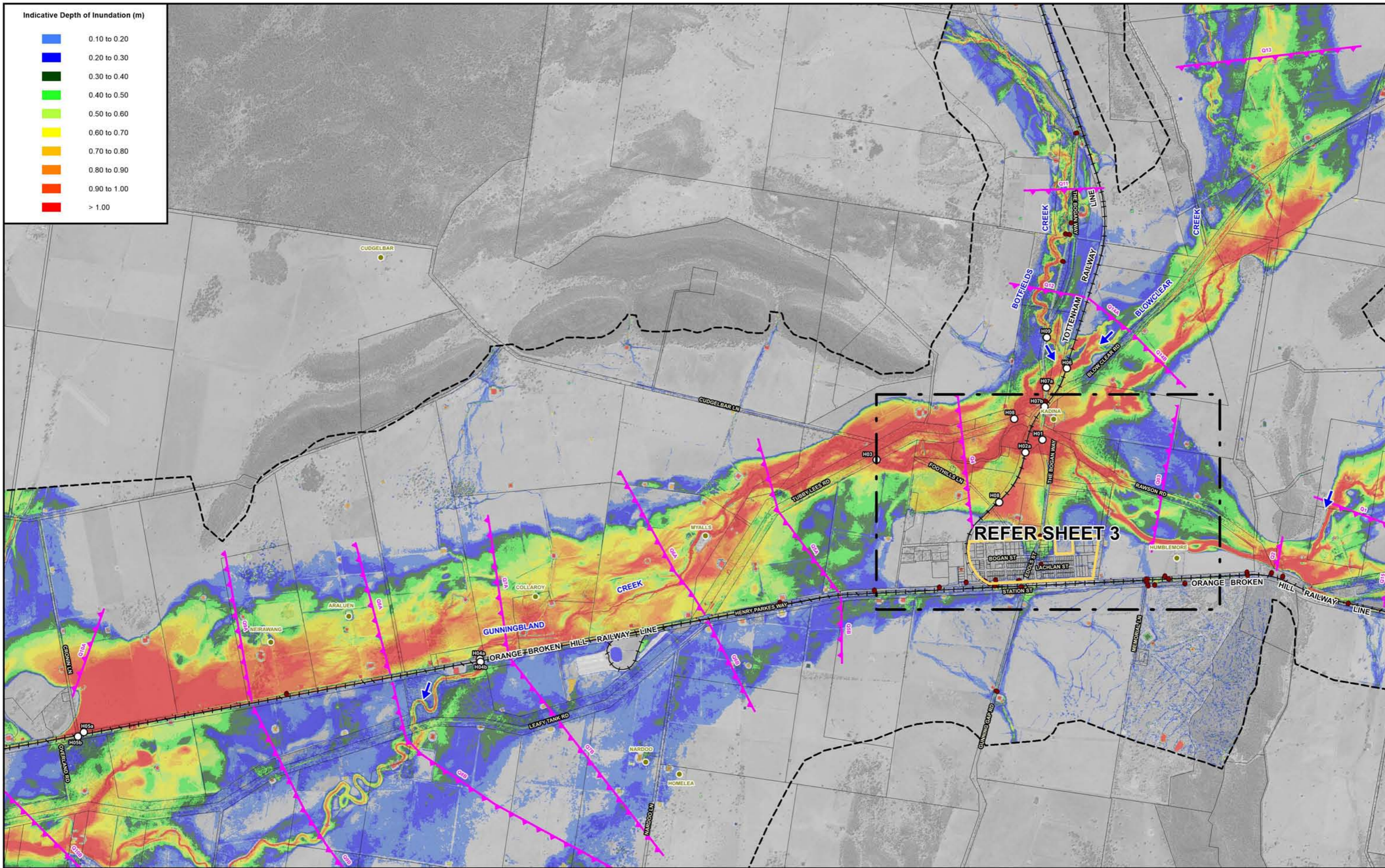
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- Homesteads

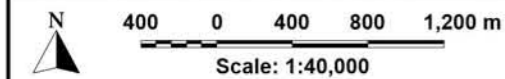
- Q01 Peak Flow Location and Identifier
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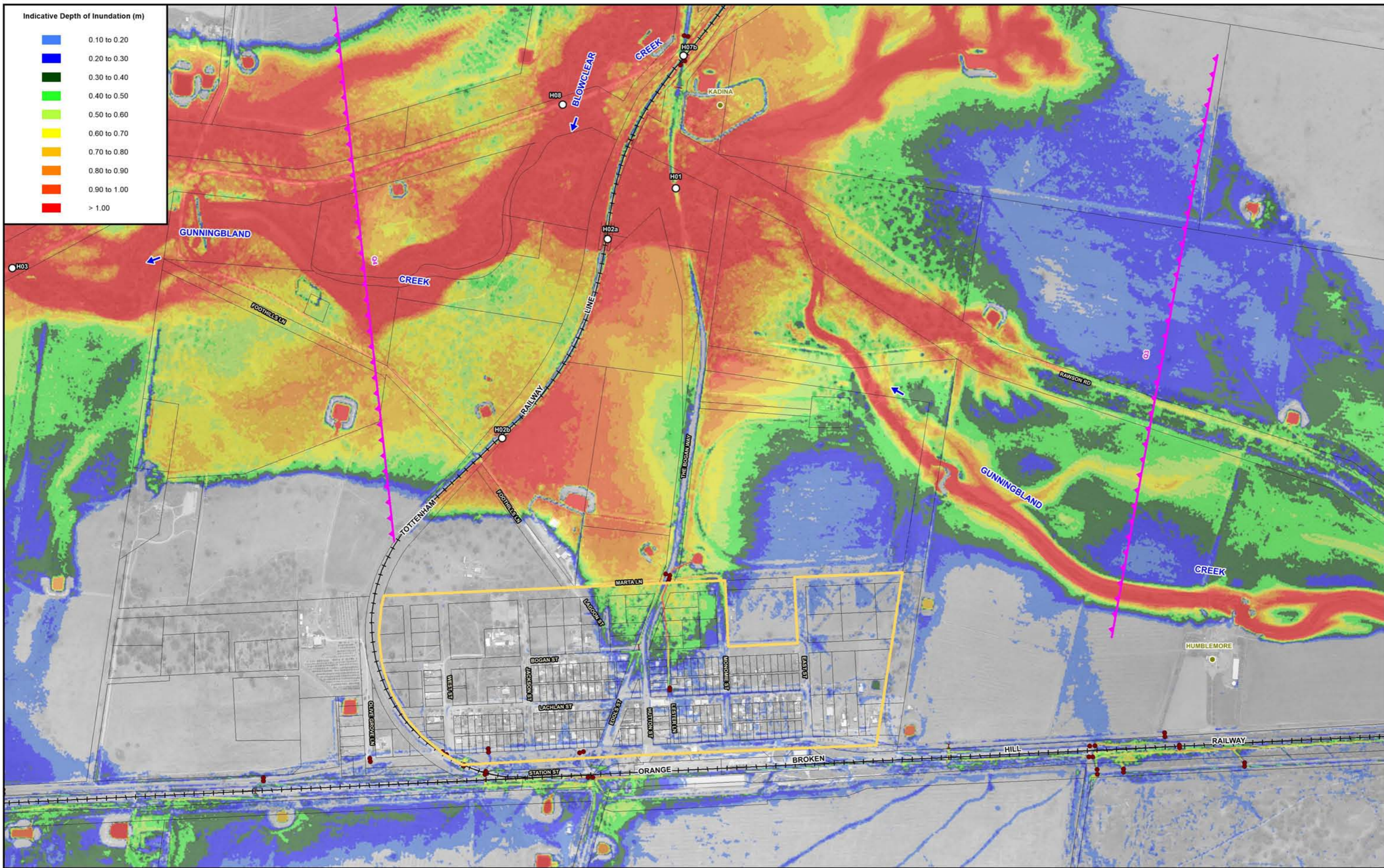
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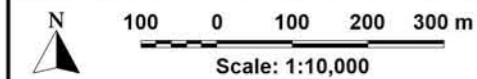
Lyall & Associates

Figure 6.5
(Sheet 2 of 3)
TUFLOW MODEL RESULTS
1% AEP



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
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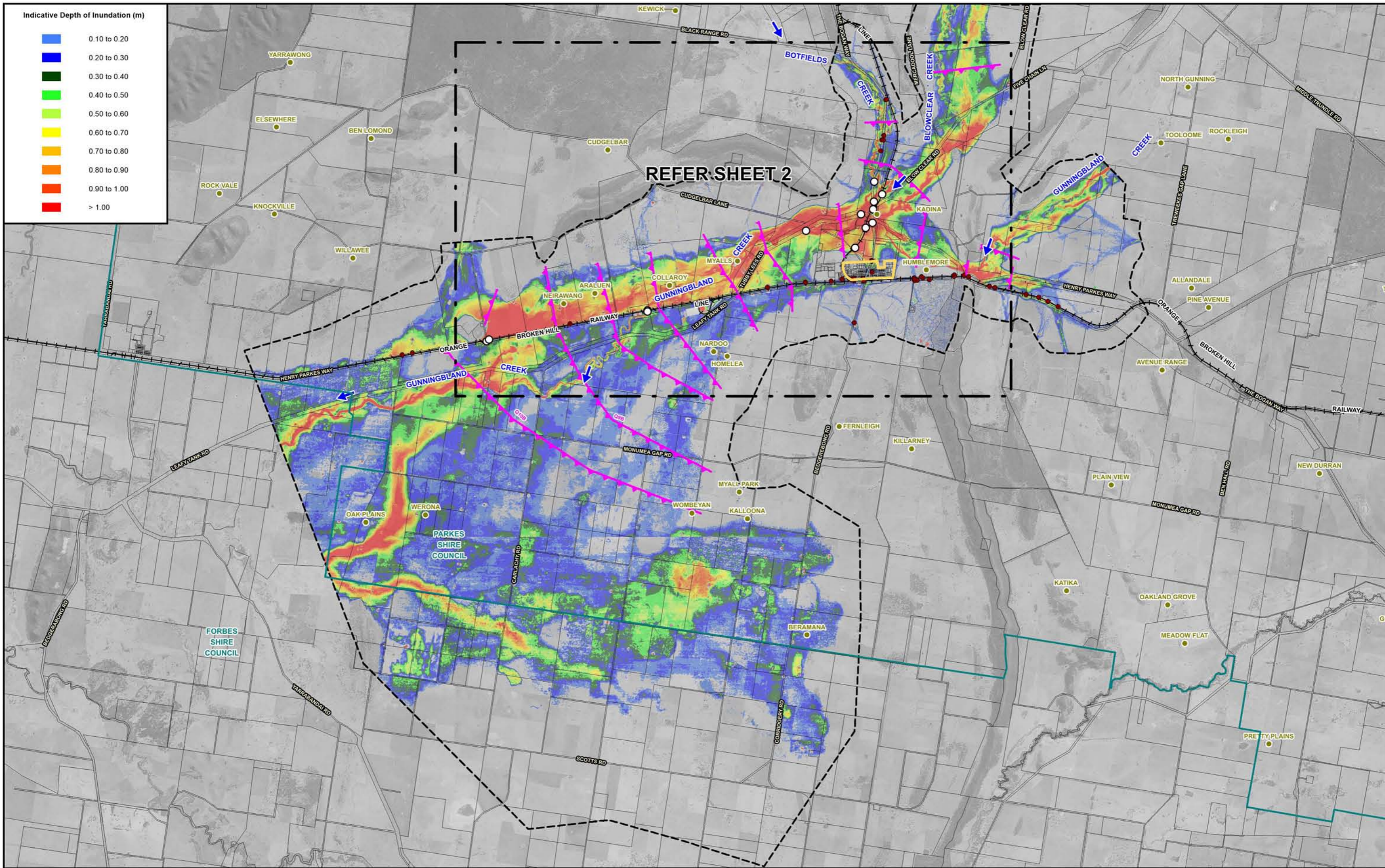
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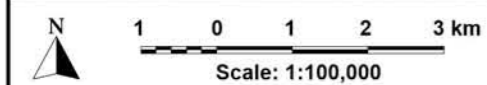
BOGAN GATE FLOOD STUDY



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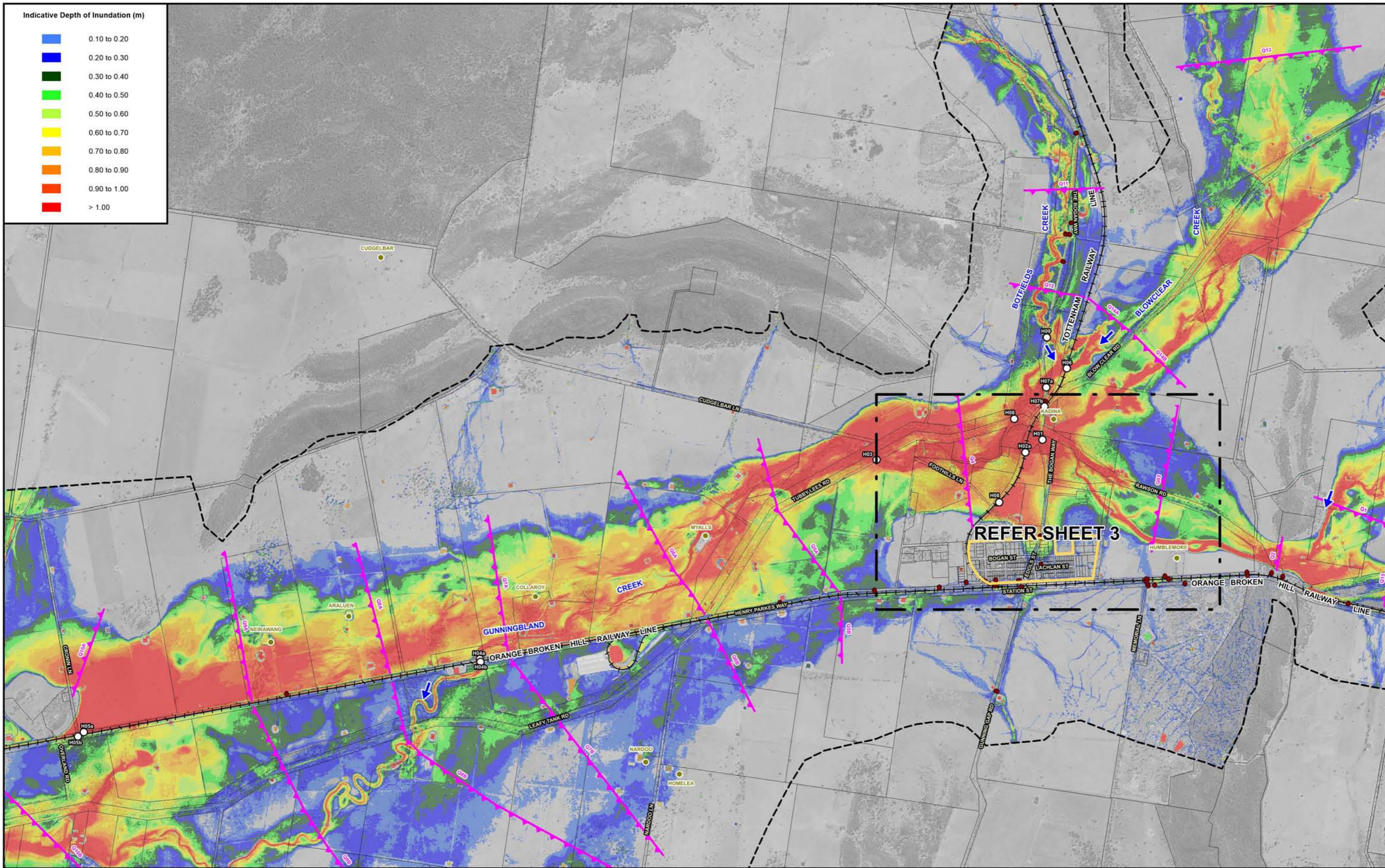
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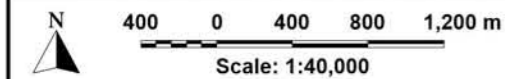
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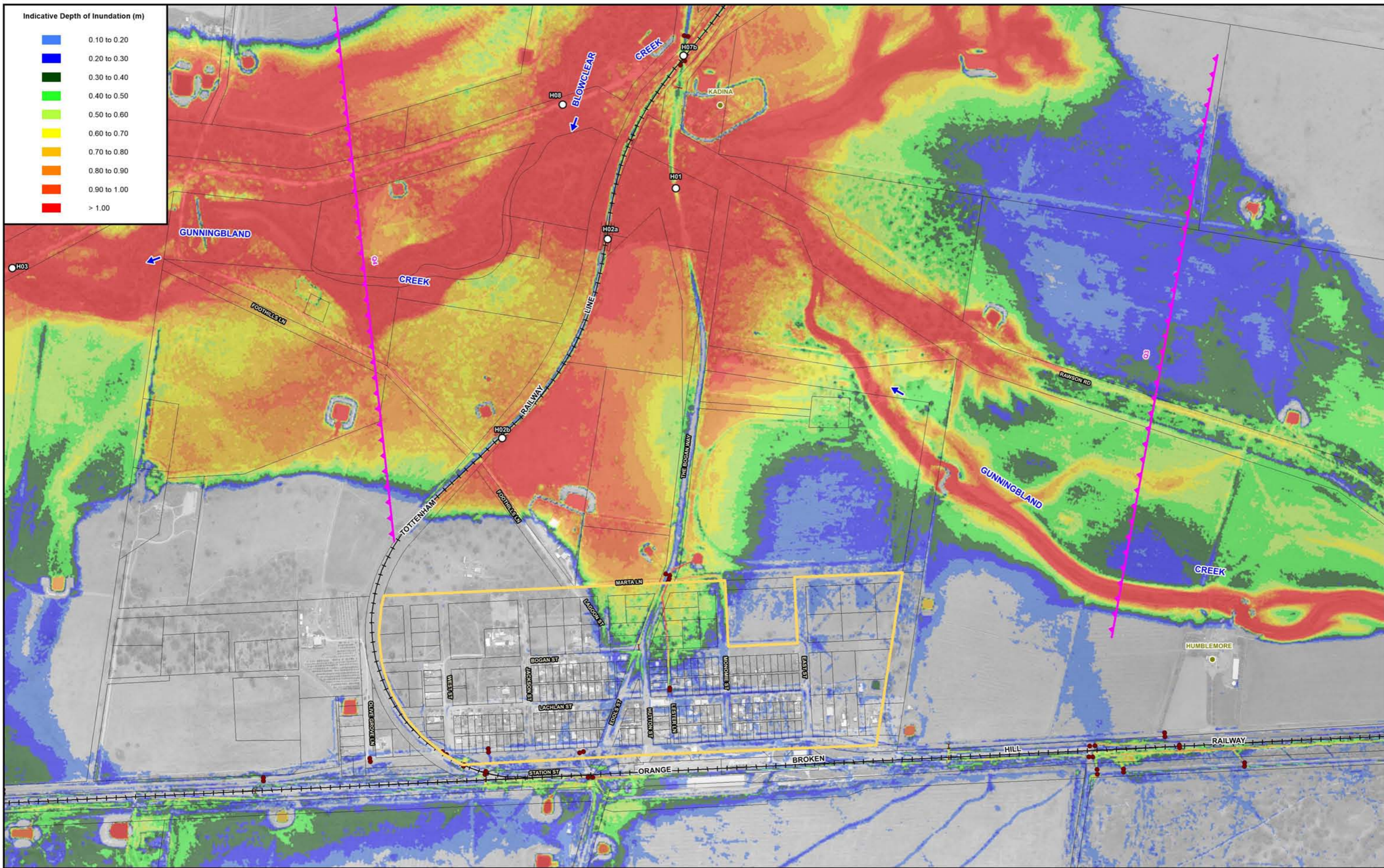
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- Village Centre
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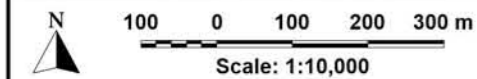
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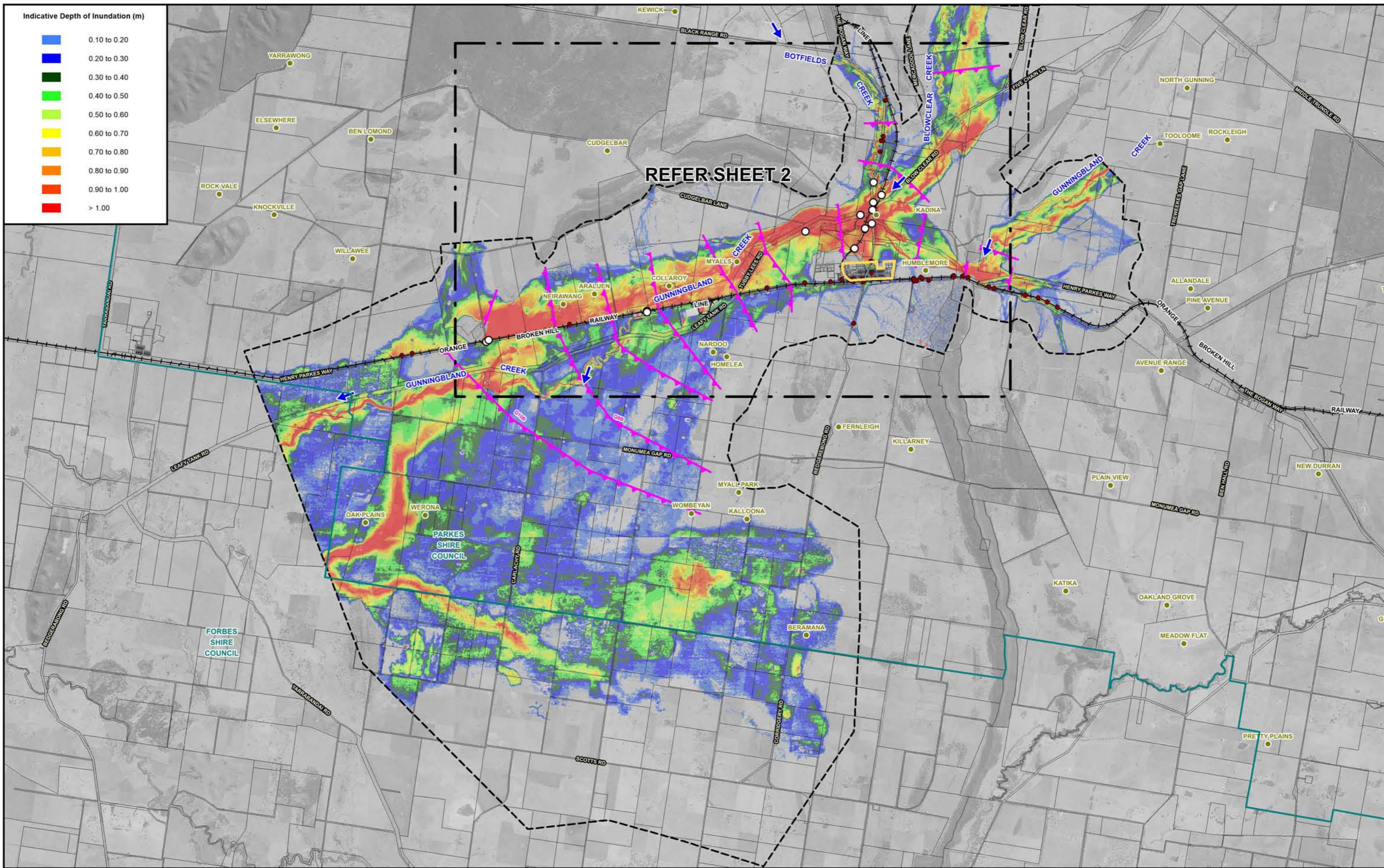
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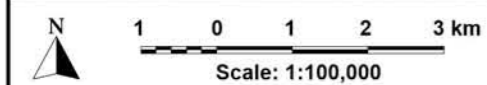
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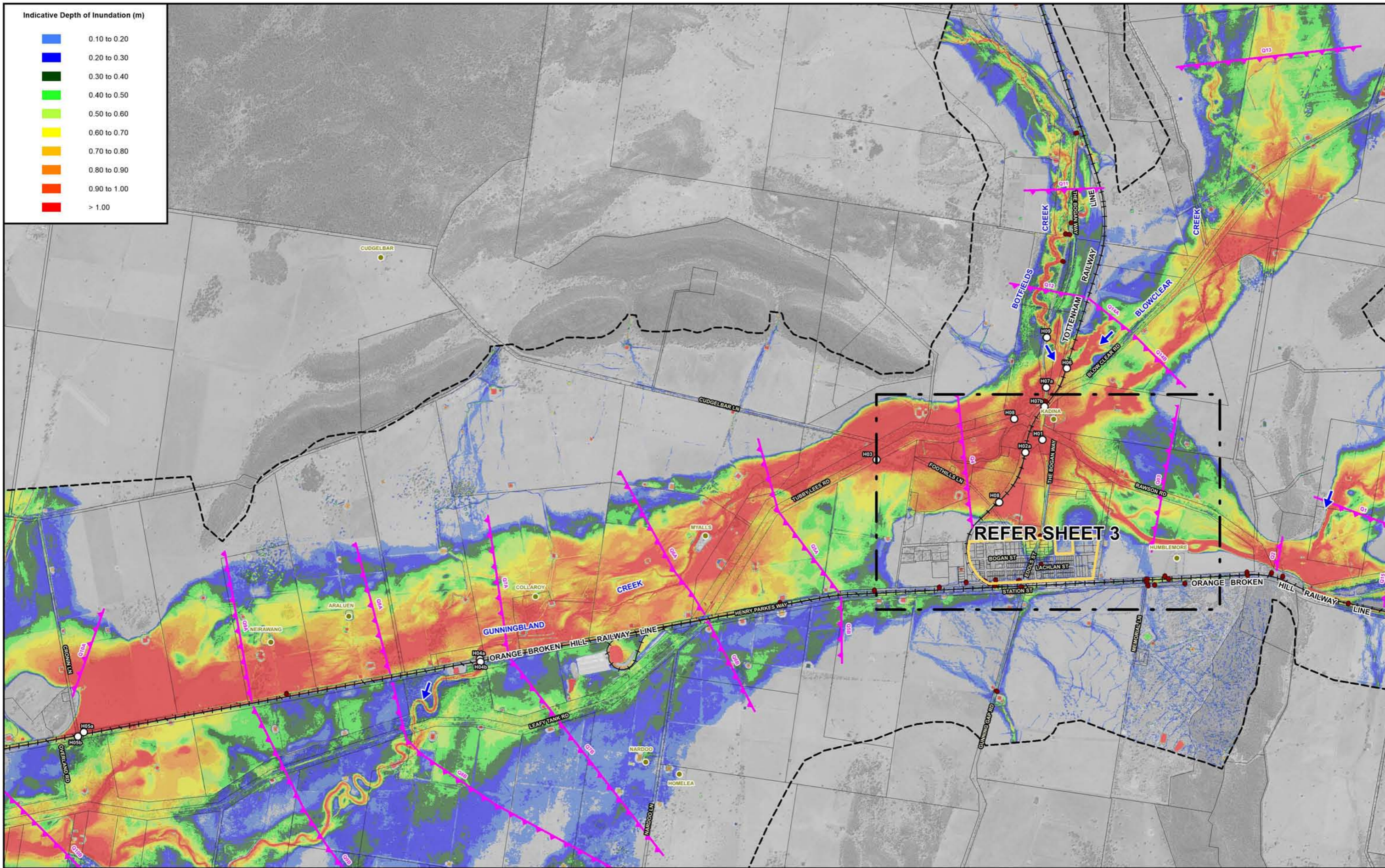
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- ▭ Village Centre
- Homesteads

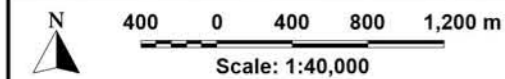
- Q01 Peak Flow Location and Identifier
- R00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00



NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

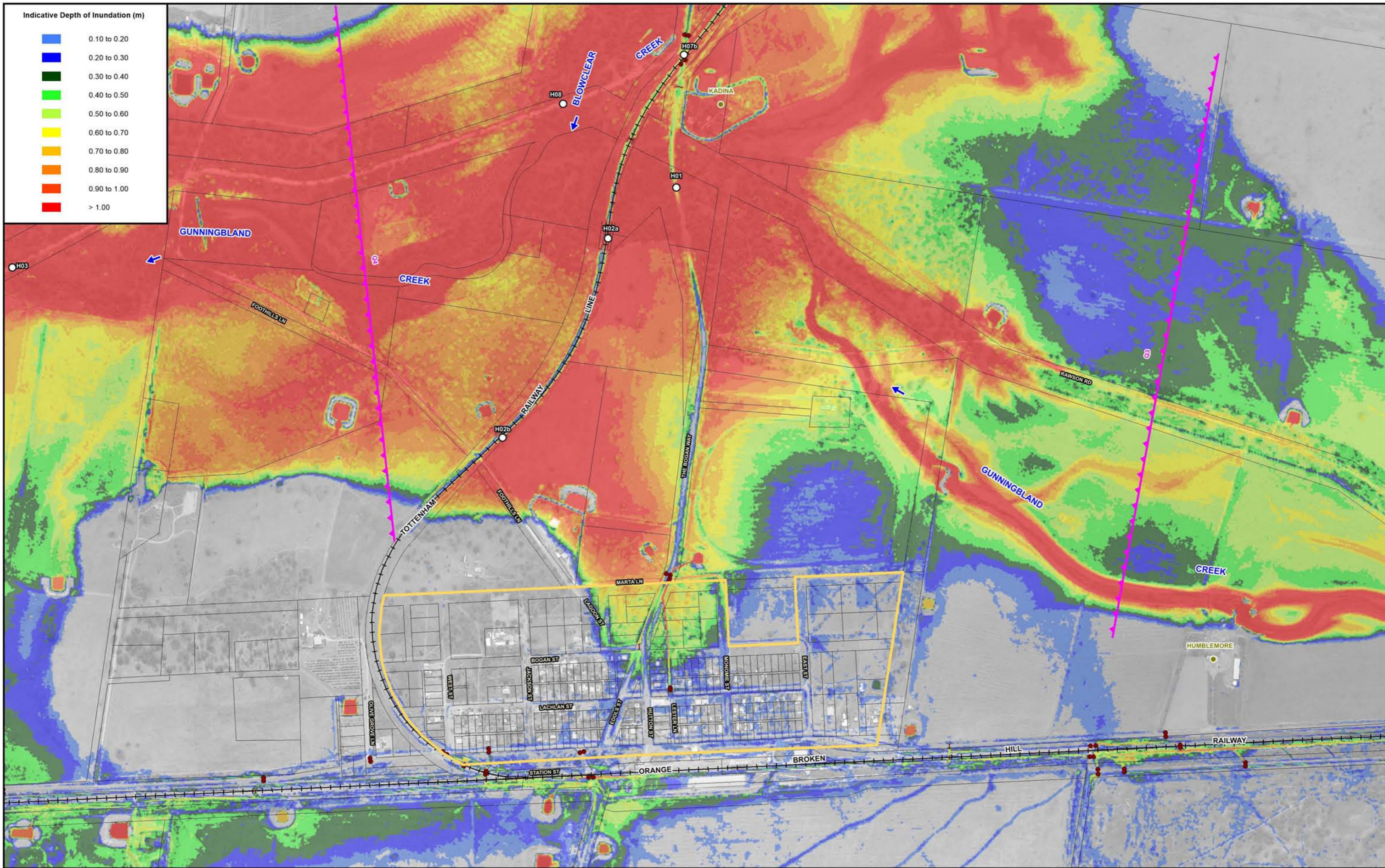
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LEGEND

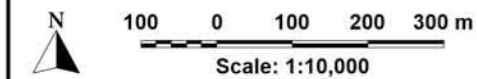
- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

- Q01 Peak Flow Location and Identifier
- H01 Peak Flood Level Location and Identifier



Indicative Depth of Inundation (m)

- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00



NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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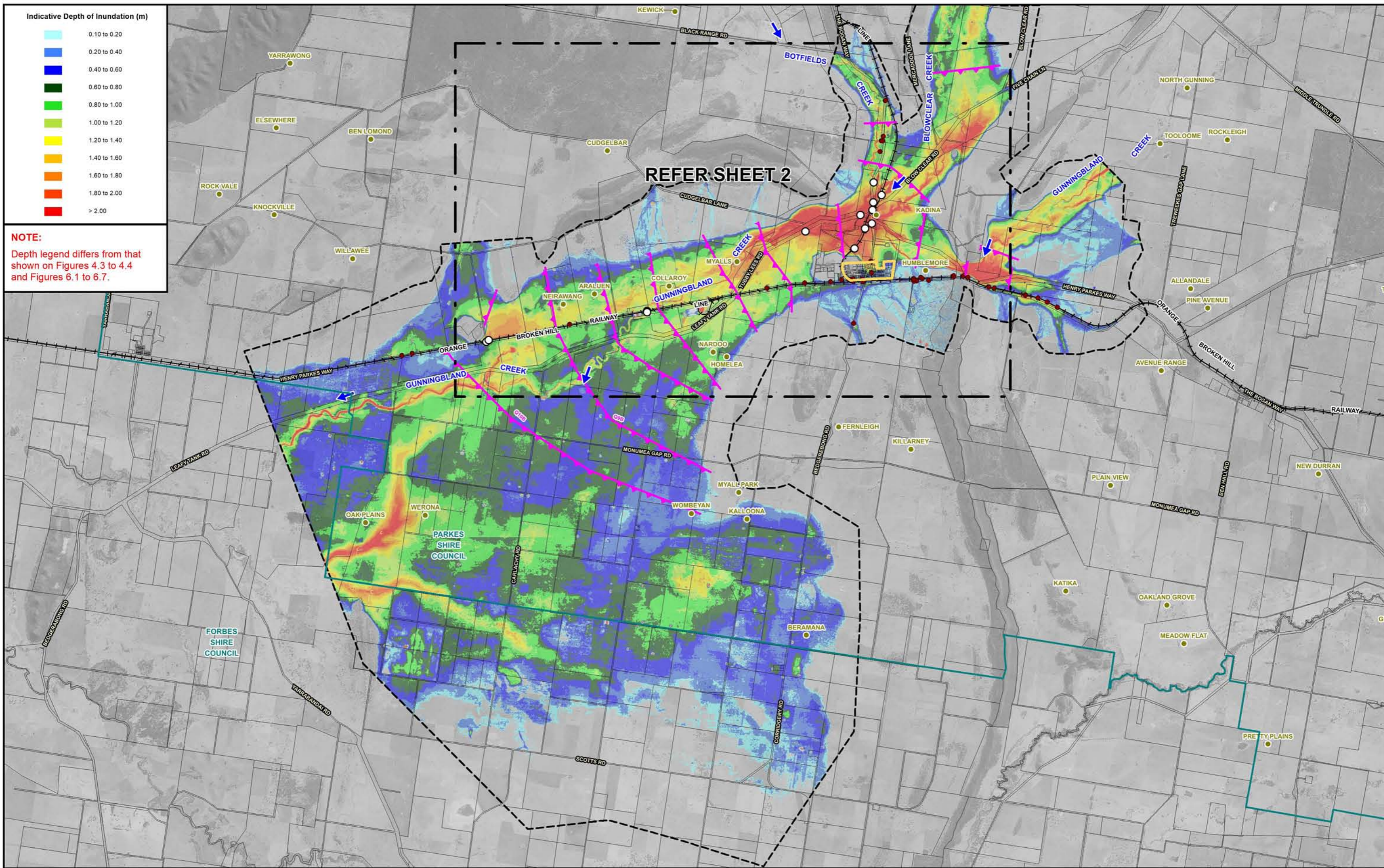
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LEGEND

- LGA Boundary
- - - Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- ▭ Village Centre
- Homesteads

- Q01 Peak Flow Location and Identifier
- H00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY



Scale: 1:100,000

1 0 1 2 3 km

Lyall & Associates

NOTE:
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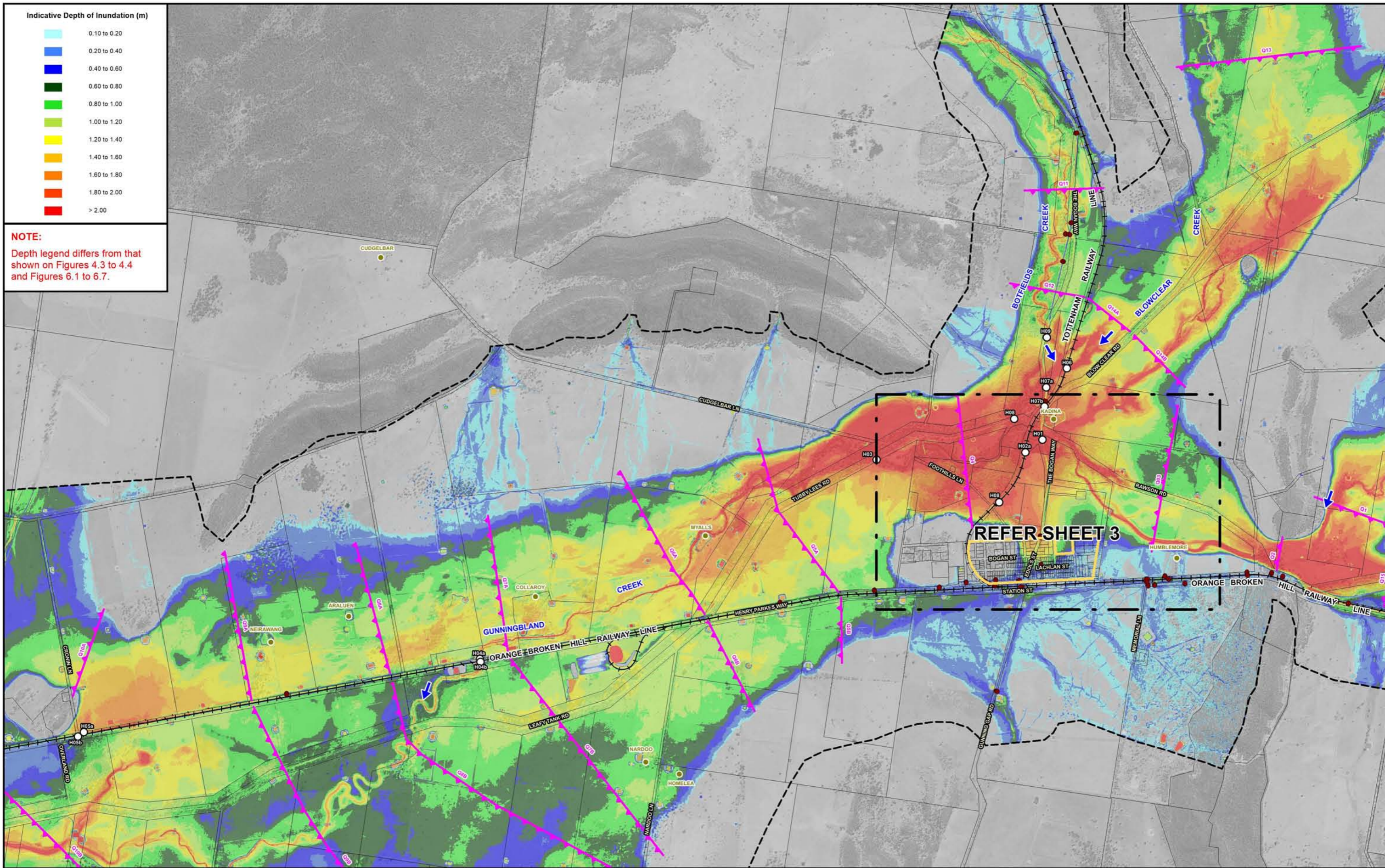
LEGEND

- LGA Boundary
- - - Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- ▭ Village Centre
- Homesteads

- Q01 Peak Flow Location and Identifier
- Q00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY

Figure 6.8
(Sheet 1 of 3)
TUFLOW MODEL RESULTS
PMF

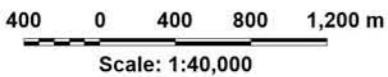


Indicative Depth of Inundation (m)



NOTE:

Depth legend differs from that shown on Figures 4.3 to 4.4 and Figures 6.1 to 6.7.



NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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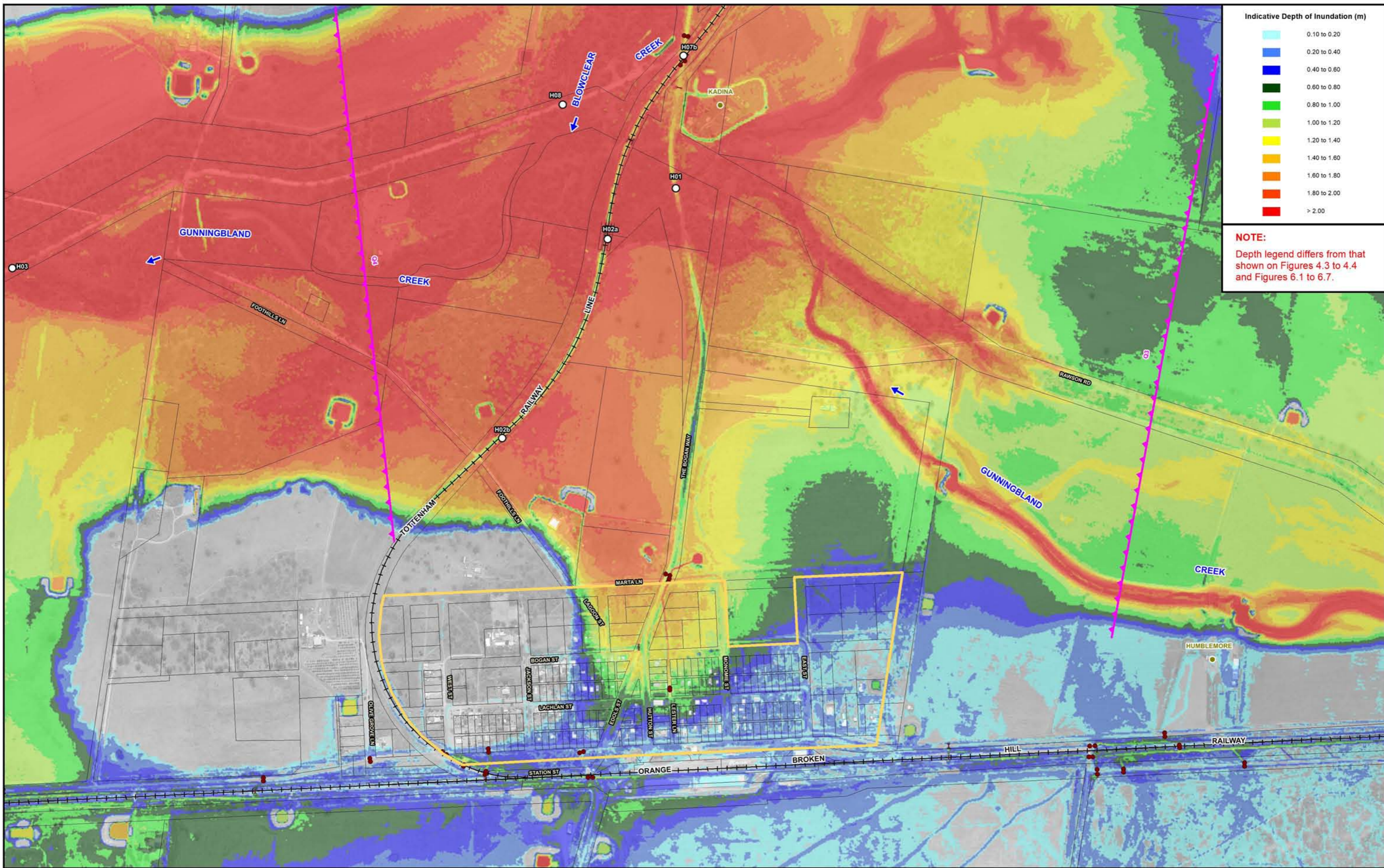
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LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

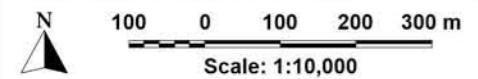
- Q01 Peak Flow Location and Identifier
- H00 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY



Indicative Depth of Inundation (m)	
Light Blue	0.10 to 0.20
Blue	0.20 to 0.40
Dark Blue	0.40 to 0.60
Green	0.60 to 0.80
Light Green	0.80 to 1.00
Yellow-Green	1.00 to 1.20
Yellow	1.20 to 1.40
Orange	1.40 to 1.60
Red-Orange	1.60 to 1.80
Red	1.80 to 2.00
Dark Red	> 2.00

NOTE:
Depth legend differs from that shown on Figures 4.3 to 4.4 and Figures 6.1 to 6.7.



NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

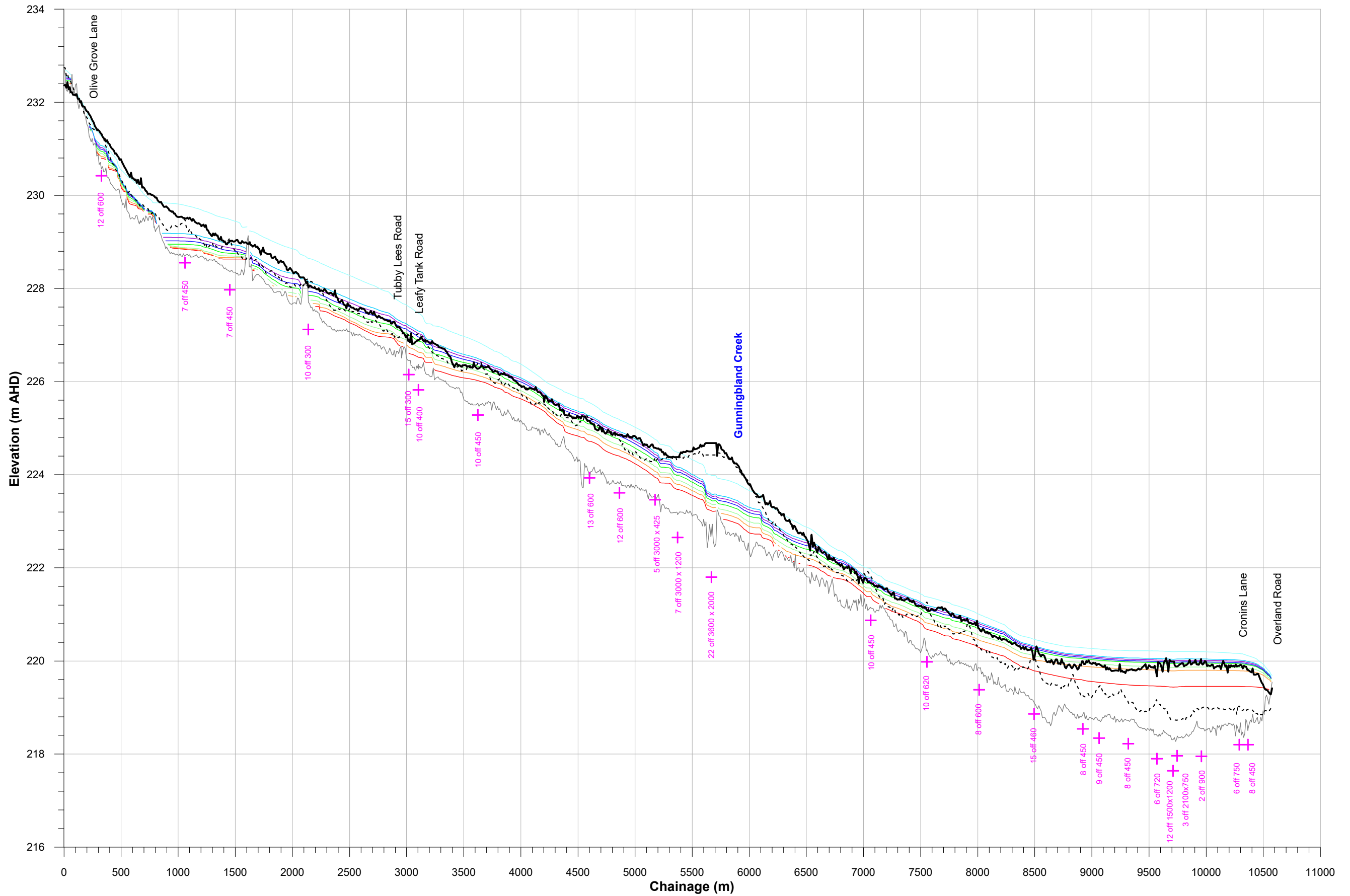
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

- Q01 Peak Flow Location and Identifier
- H01 Peak Flood Level Location and Identifier

BOGAN GATE FLOOD STUDY



LEGEND

	PMF		10% AEP
	0.2% AEP		20% AEP
	0.5% AEP		Railway
	1% AEP		Floodplain on Northern Side of Henry Parkes Way
	2% AEP		Henry Parkes Way
	5% AEP		Invert of Drainage Structure Beneath Railway Enhancement

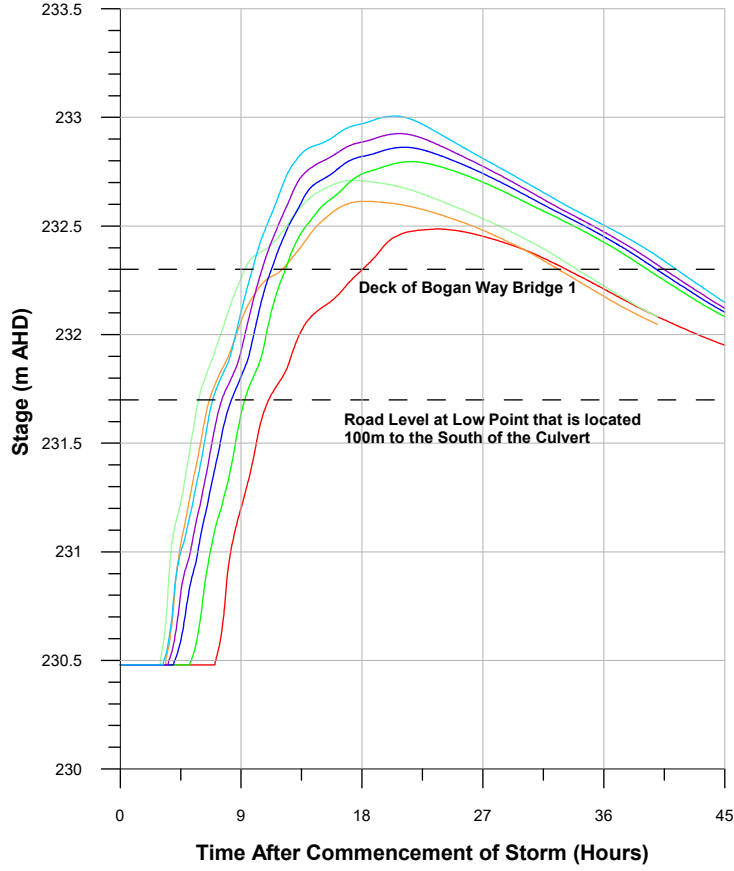
BOGAN GATE FLOOD STUDY

Figure 6.9

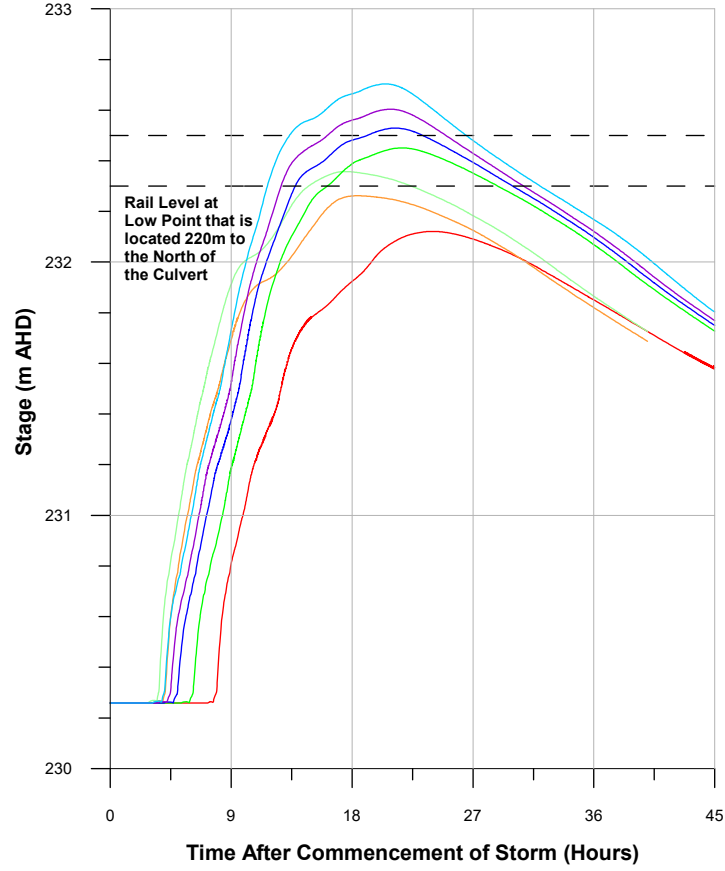
LONGITUDINAL SECTION ALONG ORANGE - BROKEN HILL RAILWAY LINE
DESIGN FLOOD EVENTS



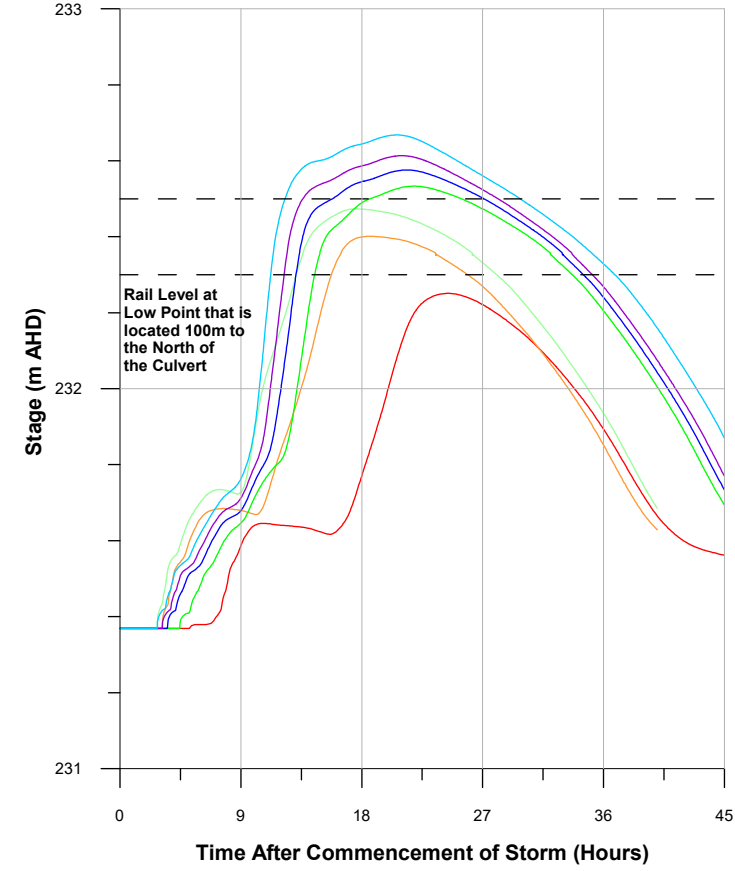
H01 - THE BOGAN WAY CROSSING OF GUNNINGBLAND CREEK



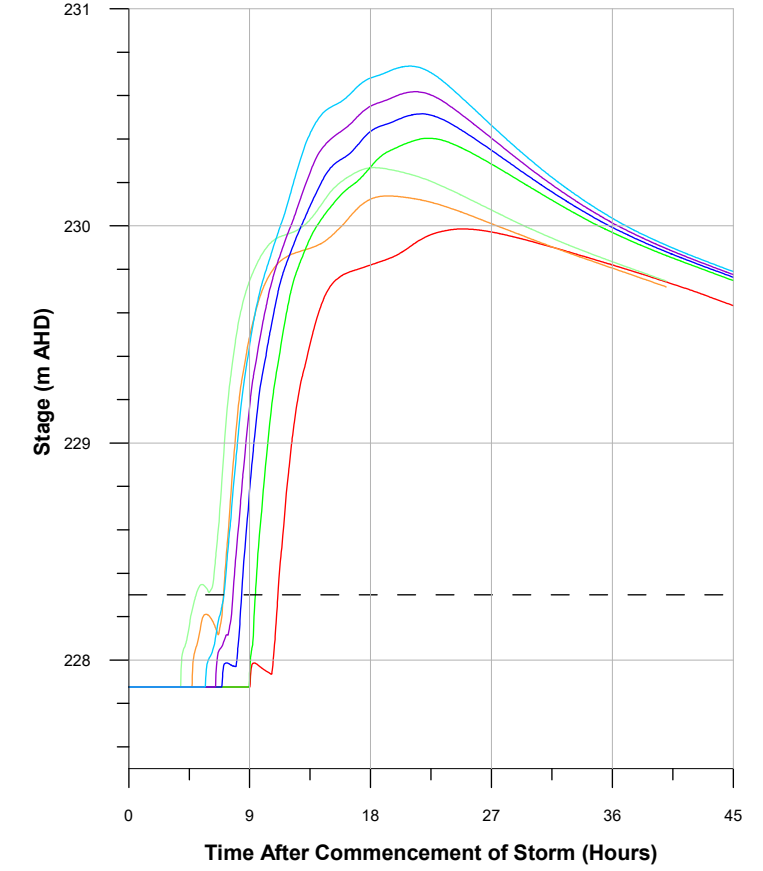
H02a - TOTTENHAM RAILWAY LINE CROSSING OF GUNNINGBLAND CREEK



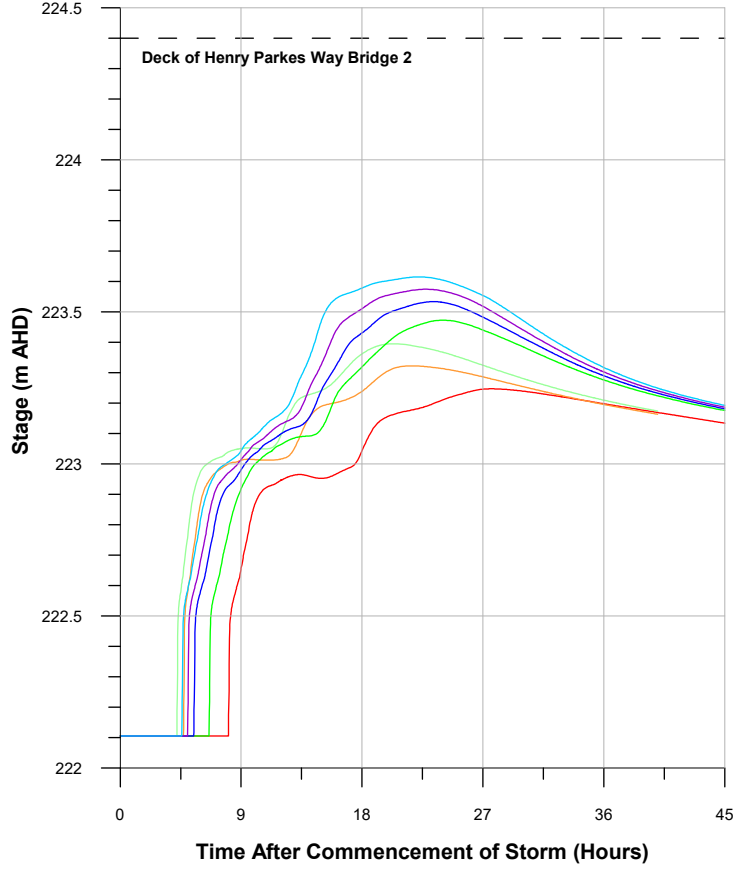
H02b - TOTTENHAM RAILWAY LINE CROSSING OF GUNNINGBLAND CREEK



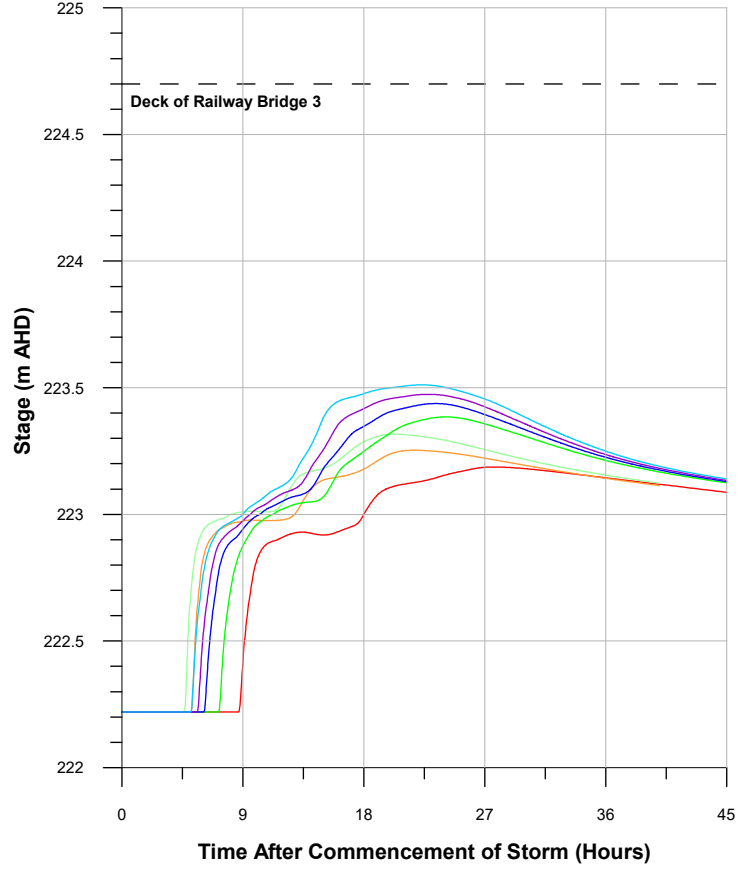
H03 - TUBBY LEES ROAD CROSSING OF GUNNINGBLAND CREEK



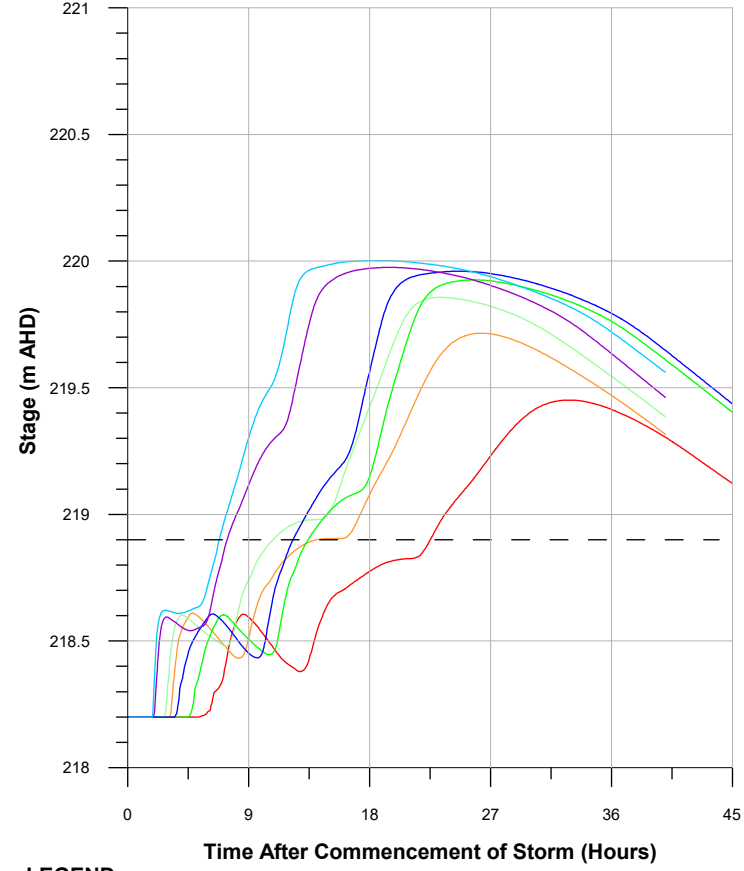
H04a - HENRY PARKES WAY CROSSING OF GUNNINGBLAND CREEK



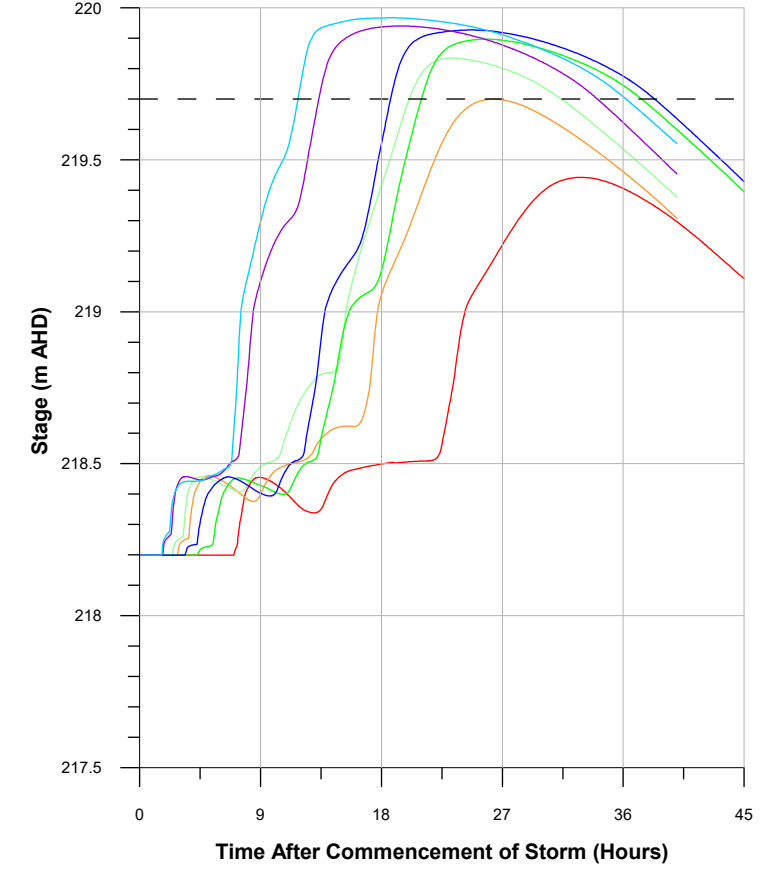
H04b - ORANGE BROKEN HILL RAILWAY CROSSING OF GUNNINGBLAND CREEK



H05a - HENRY PARKES WAY CROSSING OF GUNNINGBLAND CREEK RIGHT OVERBANK AREA



H05b - ORANGE BROKEN HILL RAILWAY CROSSING OF GUNNINGBLAND CREEK RIGHT OVERBANK AREA

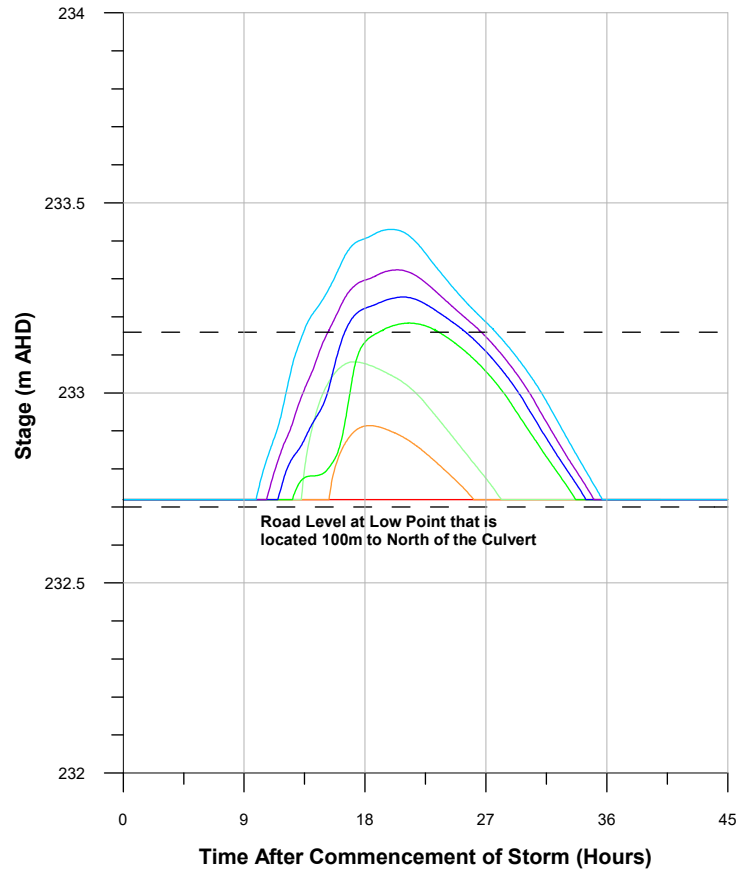


- LEGEND**
- Road/Rail Level
 - 0.2% AEP
 - 0.5% AEP
 - 1% AEP
 - 2% AEP
 - 5% AEP
 - 10% AEP
 - 20% AEP

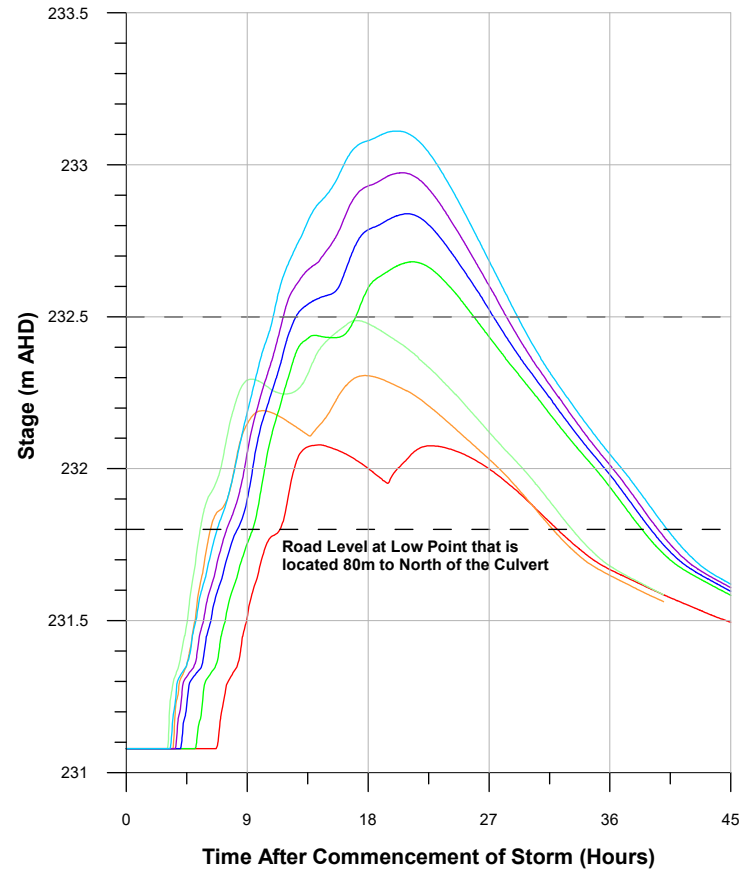
NOTES:
Refer Figures 6.1 to 6.8 for Peak Flood Level Locations.



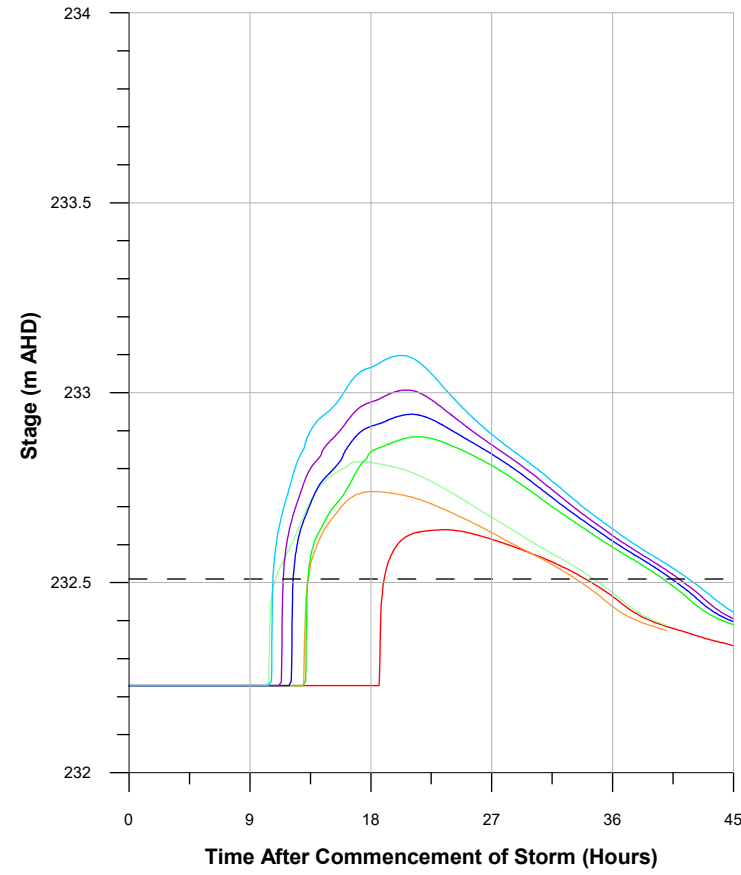
H06 - TOTTENHAM RAILWAY CROSSING OF BLOWCLEAR CREEK



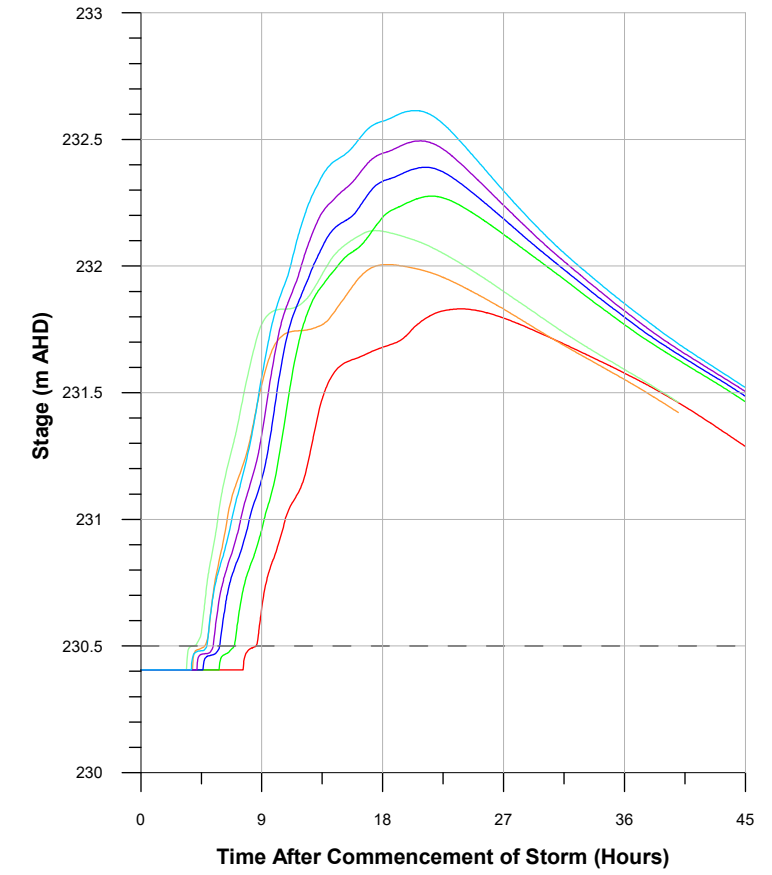
H07a - THE BOGAN WAY CROSSING OF BLOWCLEAR CREEK



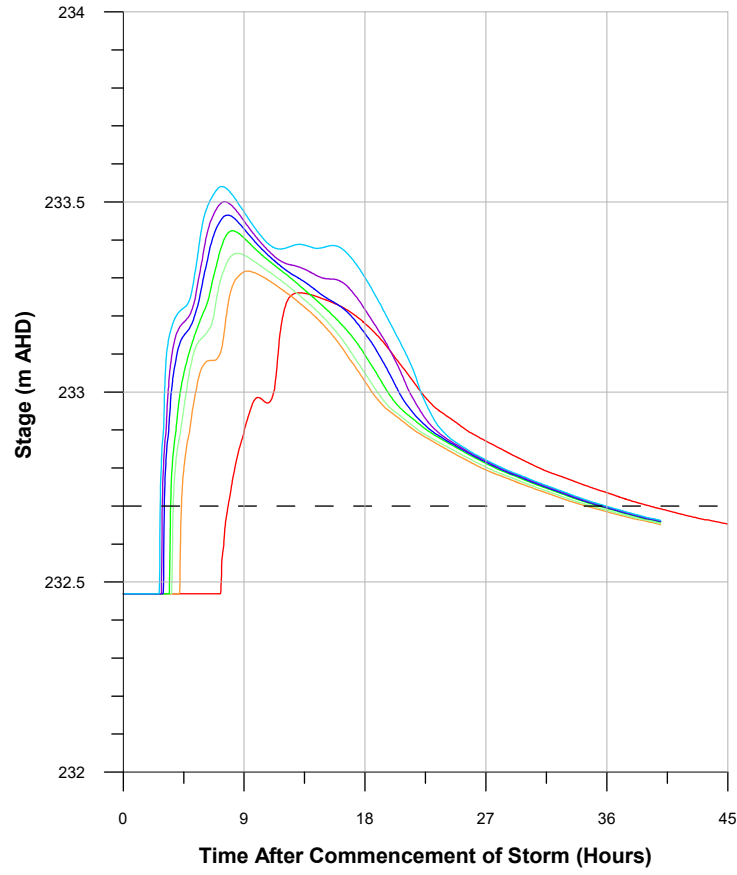
H07b - THE BOGAN WAY/ TOTTENHAM RAILWAY LEVEL CROSSING



H08 - LEAFY TANK ROAD CROSSING OF BLOWCLEAR CREEK



H09 - THE BOGAN WAY CROSSING OF BOTFIELDS CREEK



LEGEND

---	Road/Rail Level	—	2% AEP
—	0.2% AEP	—	5% AEP
—	0.5% AEP	—	10% AEP
—	1% AEP	—	20% AEP

NOTES:
Refer Figures 6.1 to 6.8 for Peak Flood Level Locations.

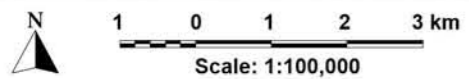




FLOOD HAZARD VULNERABILITY CLASSIFICATION

■ H1	Generally safe for vehicles, people and buildings.
■ H2	Unsafe for small vehicles.
■ H3	Unsafe for vehicles, children and the elderly.
■ H4	Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
■ H5	Unsafe for vehicles and people. All building types considered vulnerable to failure.
■ H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.

REFER SHEET 2



NOTE:
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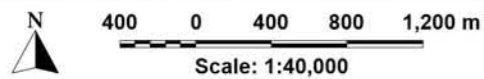
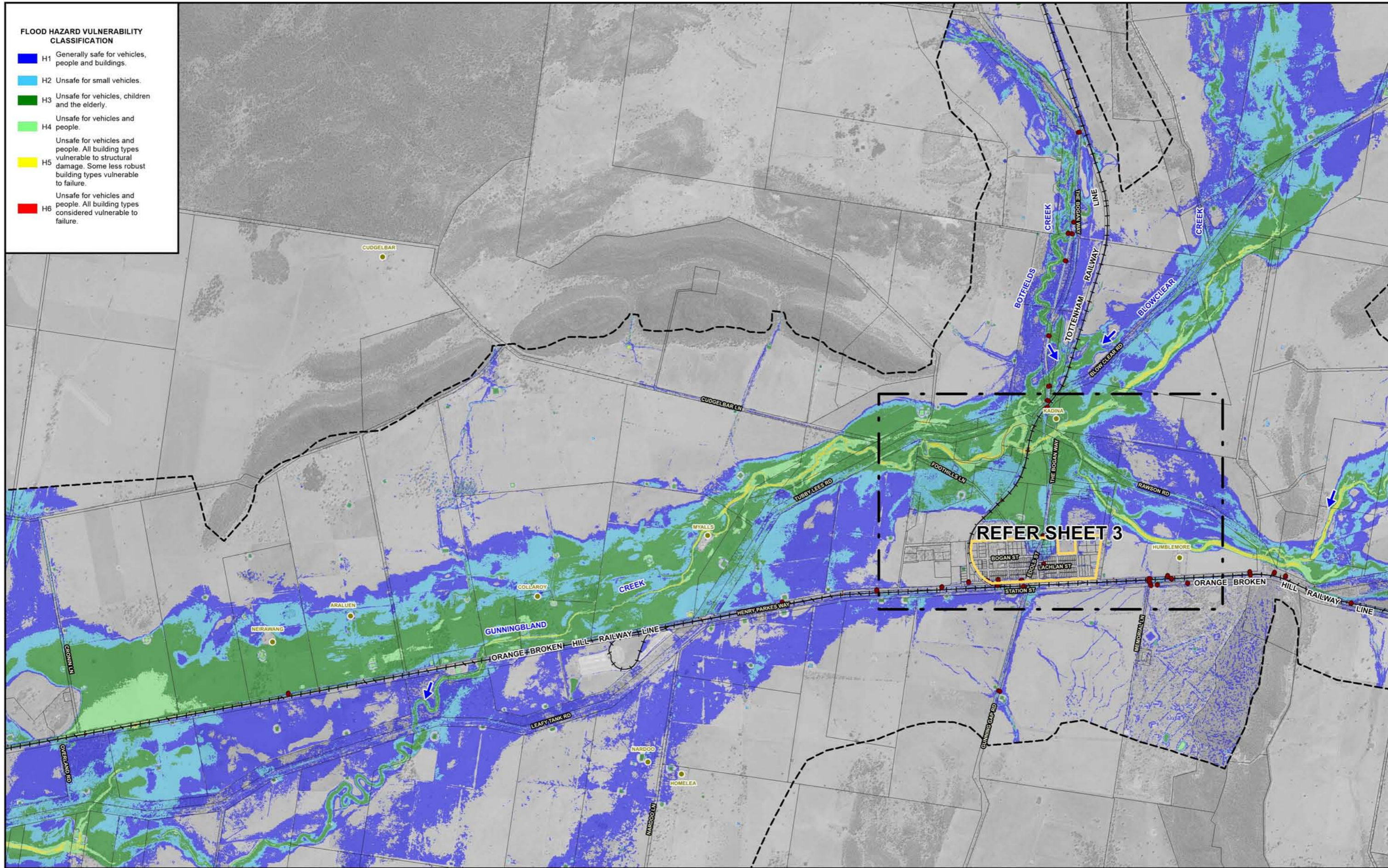
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY

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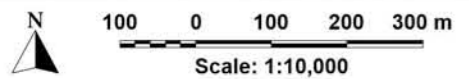
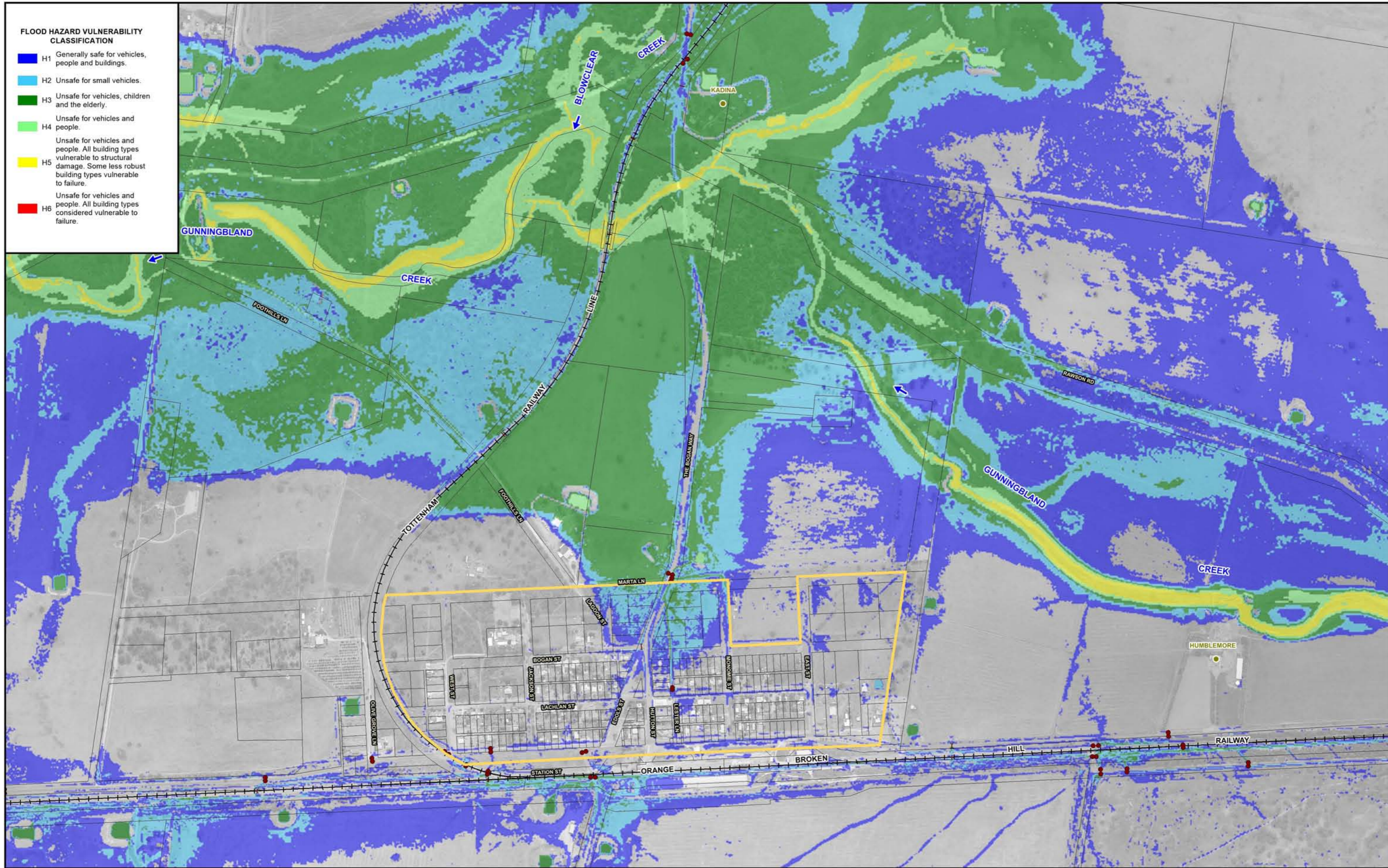
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY

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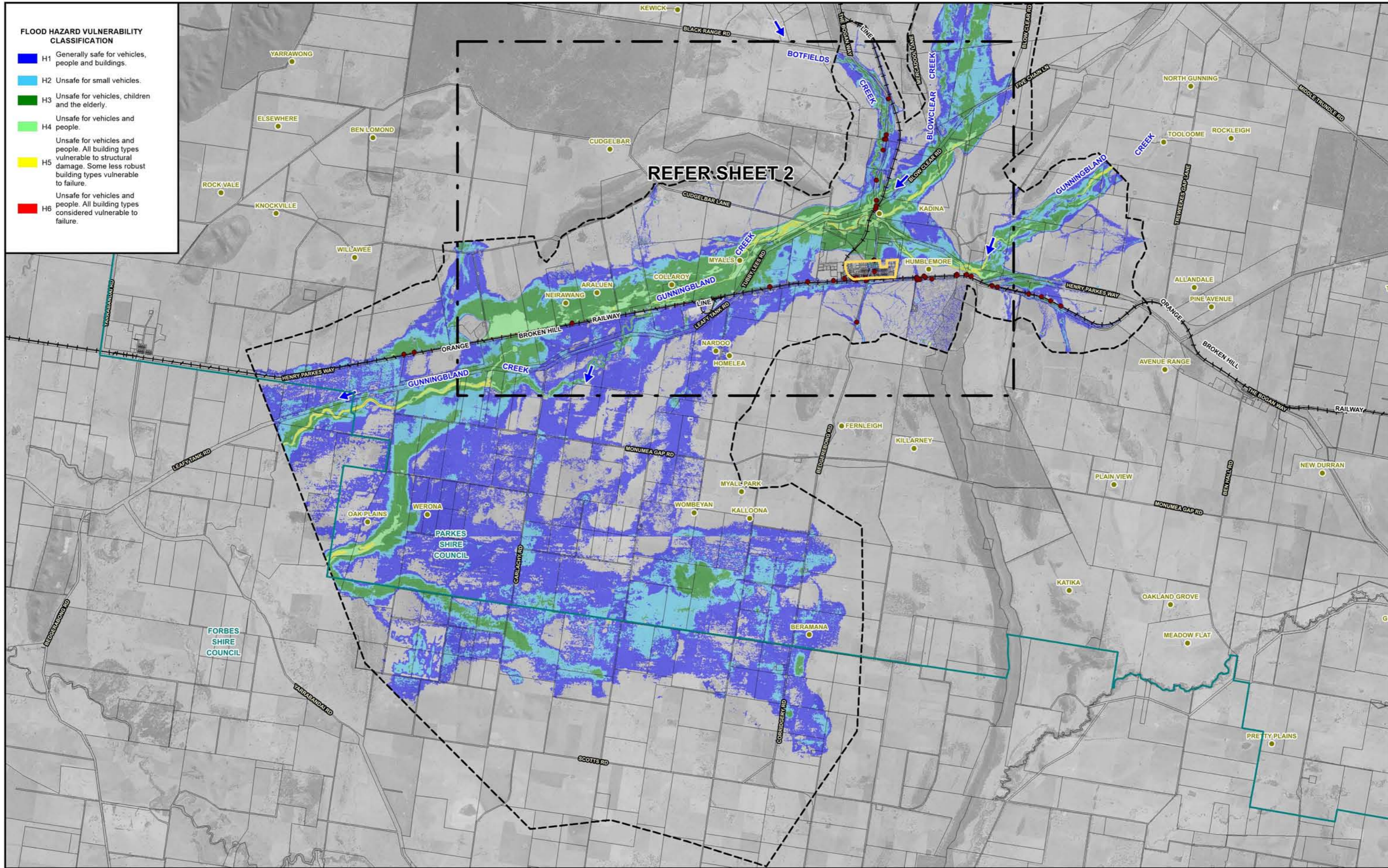
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 - Homesteads

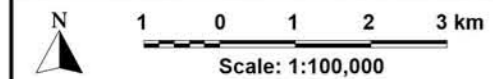
BOGAN GATE FLOOD STUDY



FLOOD HAZARD VULNERABILITY CLASSIFICATION

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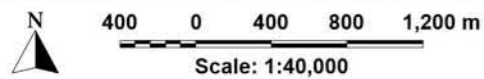
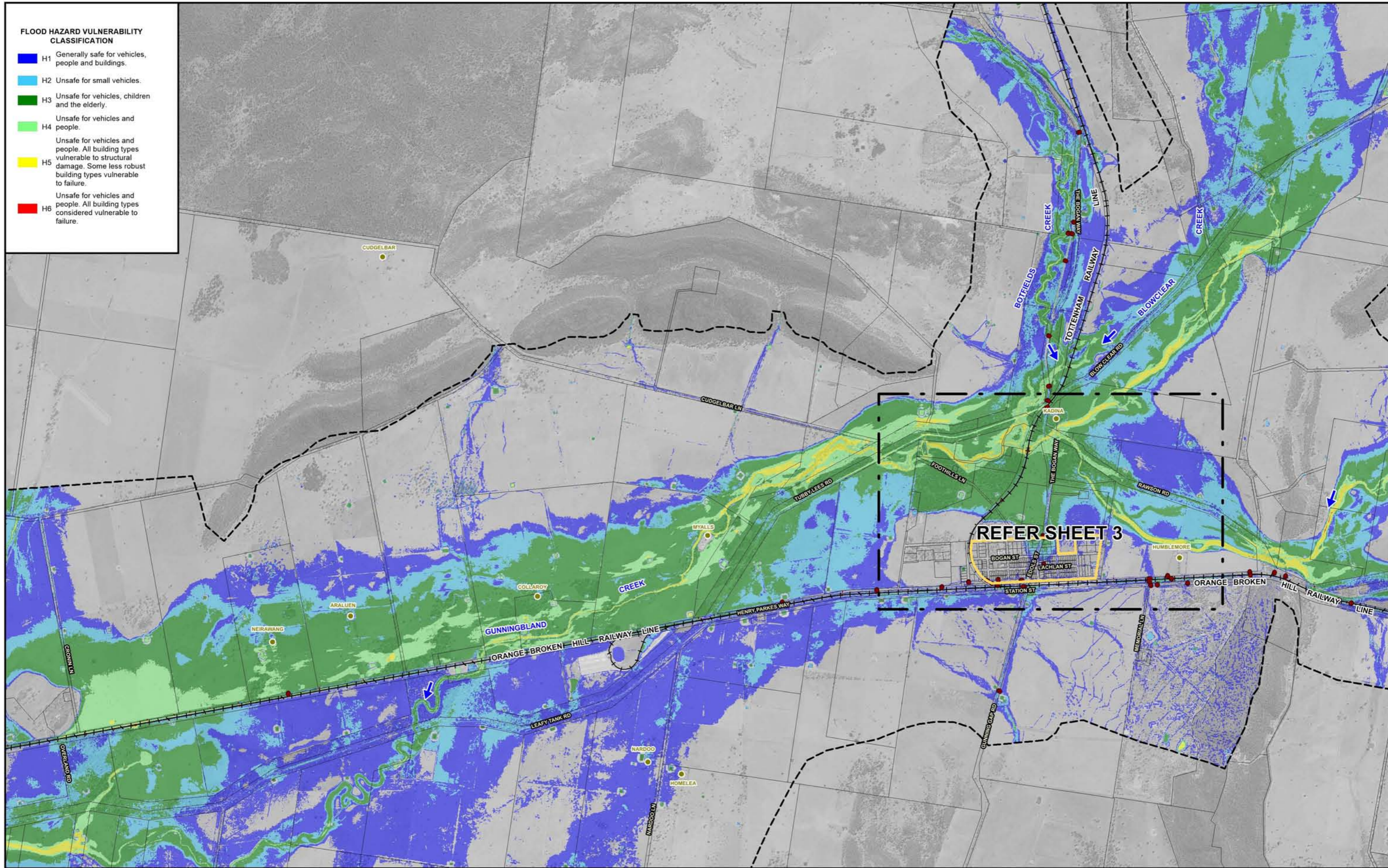
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
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BOGAN GATE FLOOD STUDY

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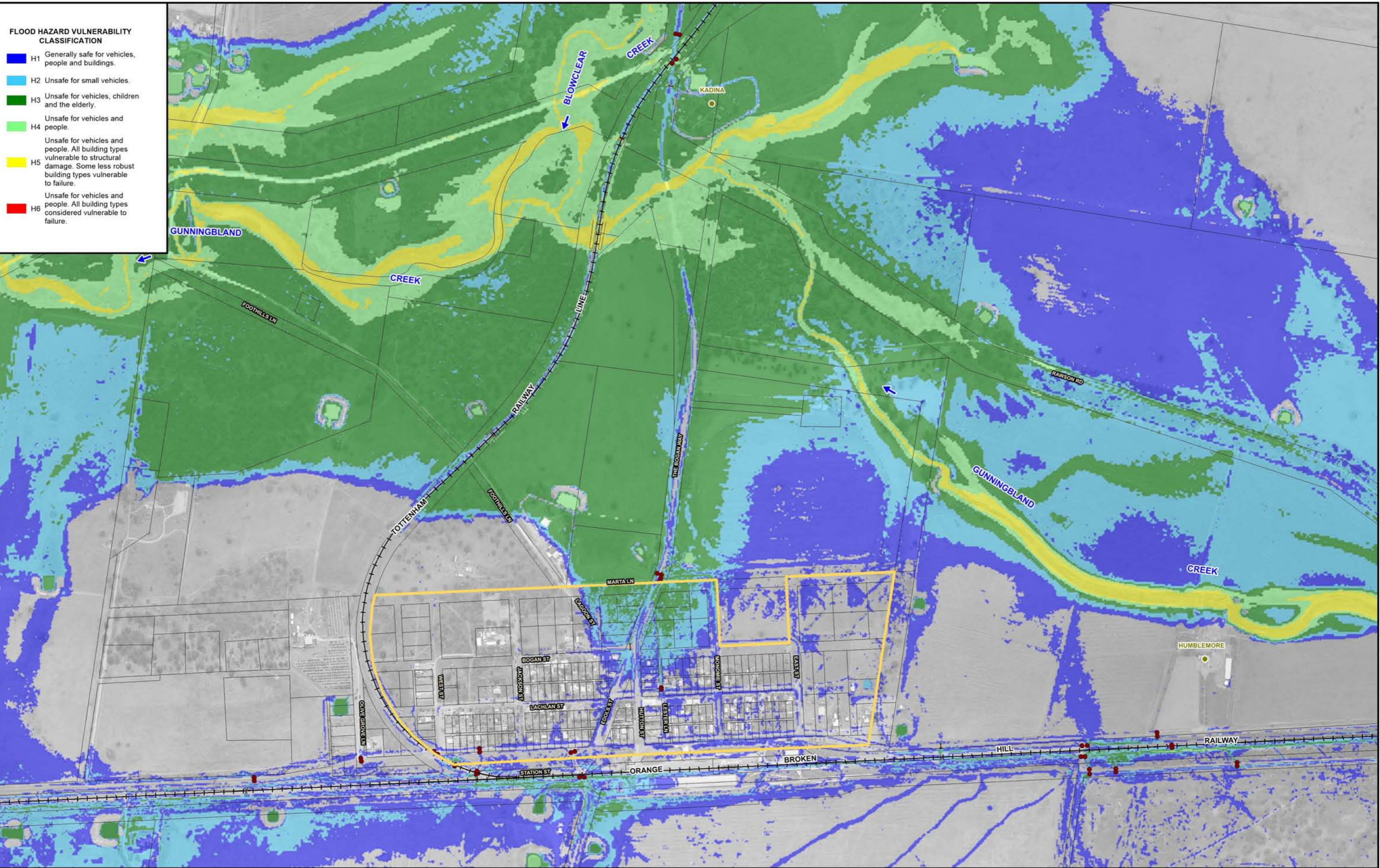
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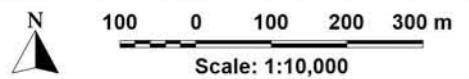
- LEGEND**
- LGA Boundary
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BOGAN GATE FLOOD STUDY



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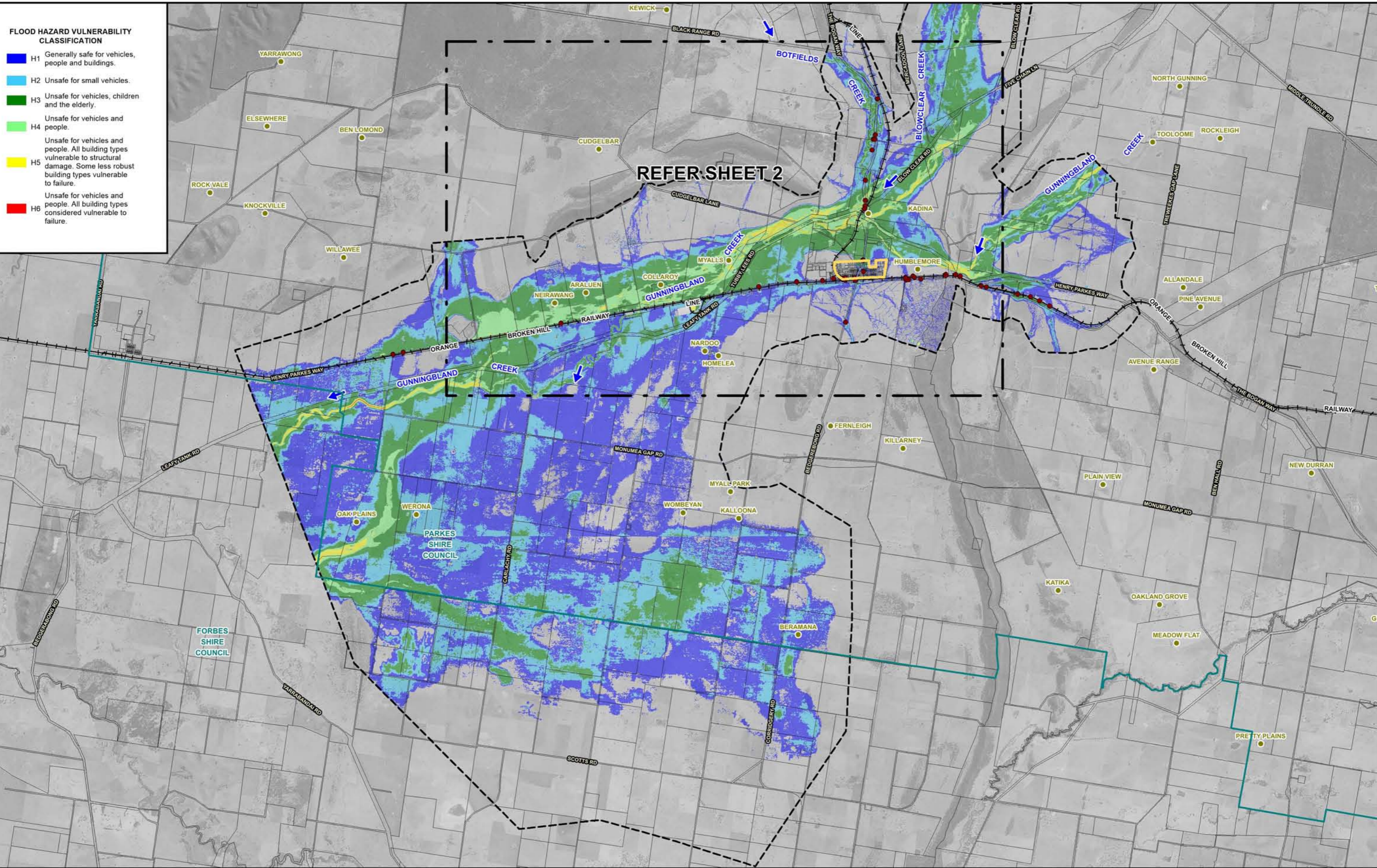
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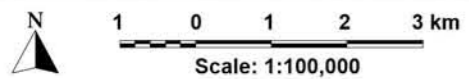
LEGEND

—	LGA Boundary
- - -	Two-Dimensional Model Boundary
●	Modelled Stormwater Drainage System
	Village Centre
●	Homesteads

BOGAN GATE FLOOD STUDY



- FLOOD HAZARD VULNERABILITY CLASSIFICATION**
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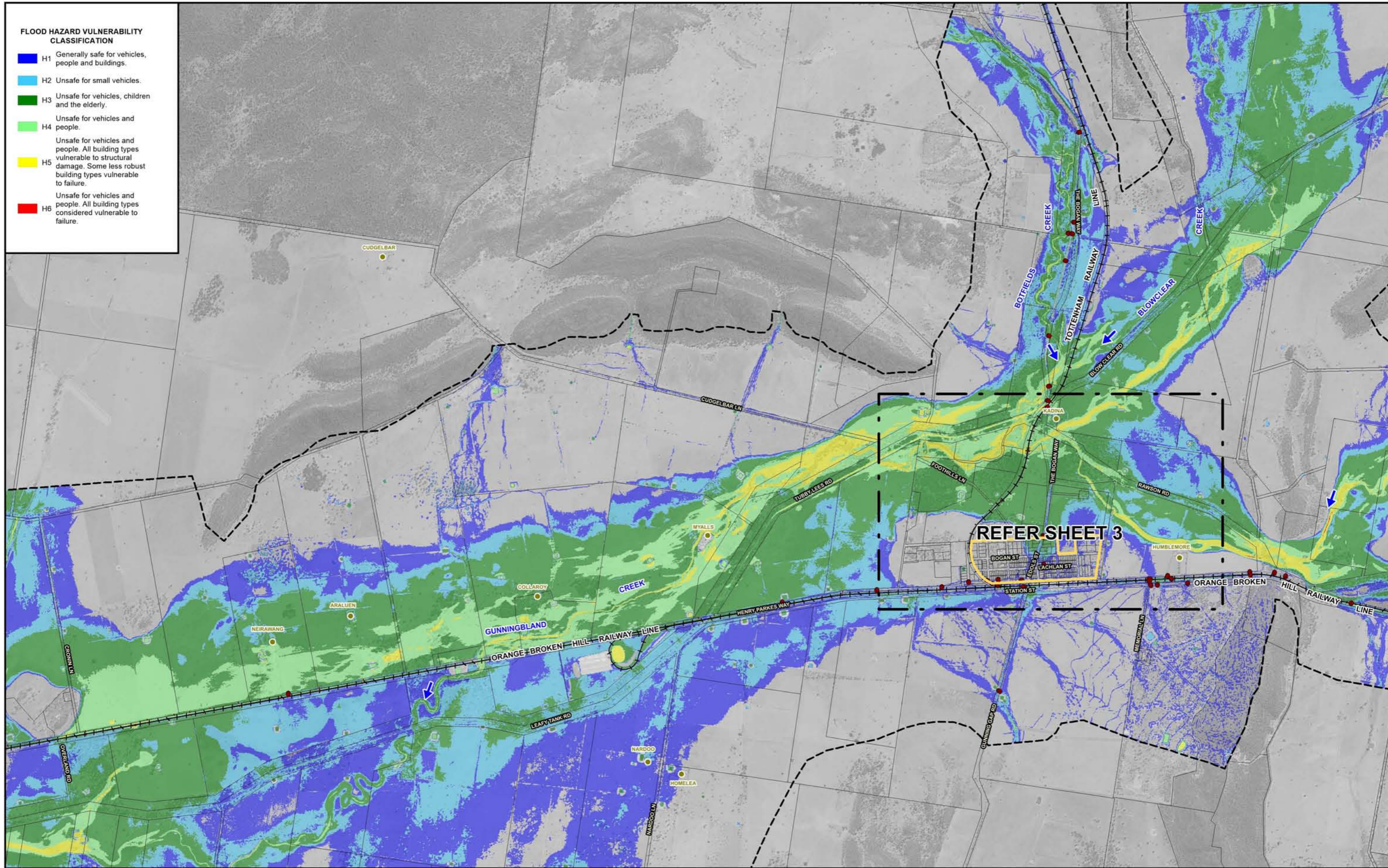
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 - Modelled Stormwater Drainage System
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 - Homesteads

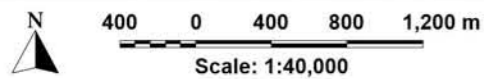
BOGAN GATE FLOOD STUDY

FLOOD HAZARD VULNERABILITY CLASSIFICATION

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REFER SHEET 3



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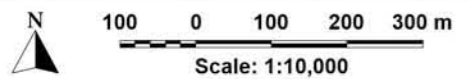
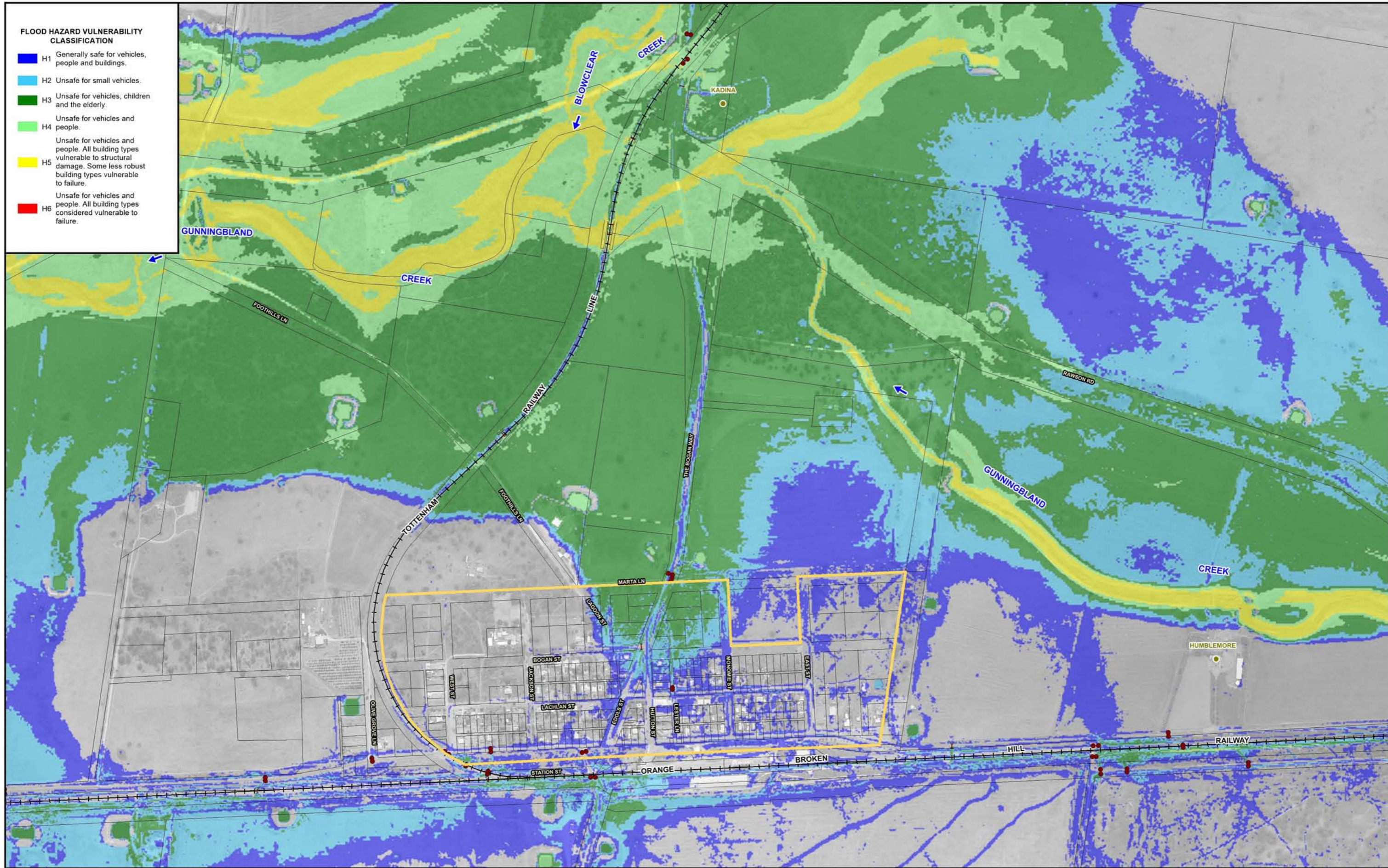
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY

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- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.



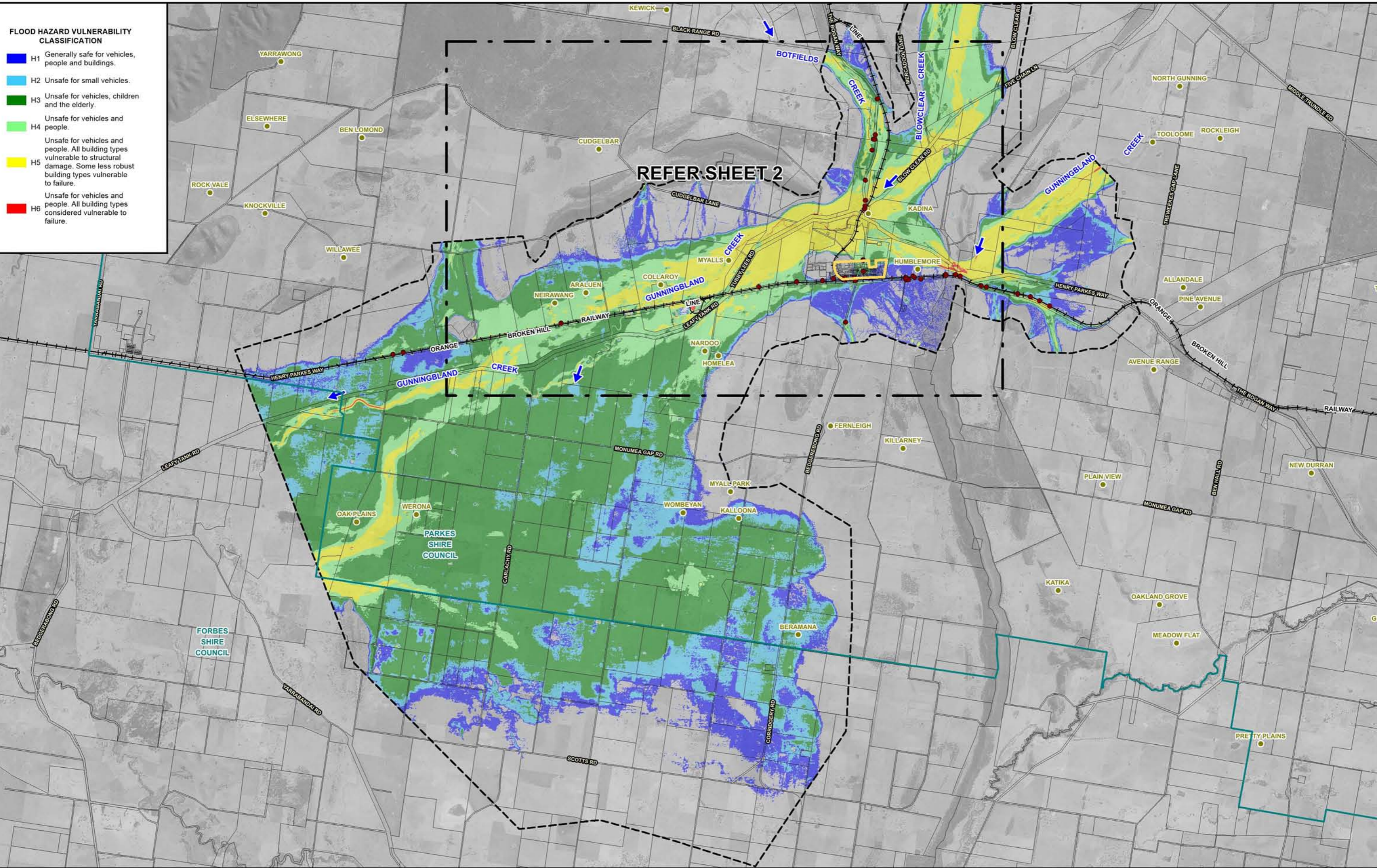
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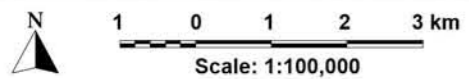
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 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY



- FLOOD HAZARD VULNERABILITY CLASSIFICATION**
- H1 Generally safe for vehicles, people and buildings.
 - H2 Unsafe for small vehicles.
 - H3 Unsafe for vehicles, children and the elderly.
 - H4 Unsafe for vehicles and people.
 - H5 Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.
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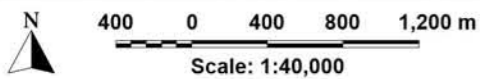
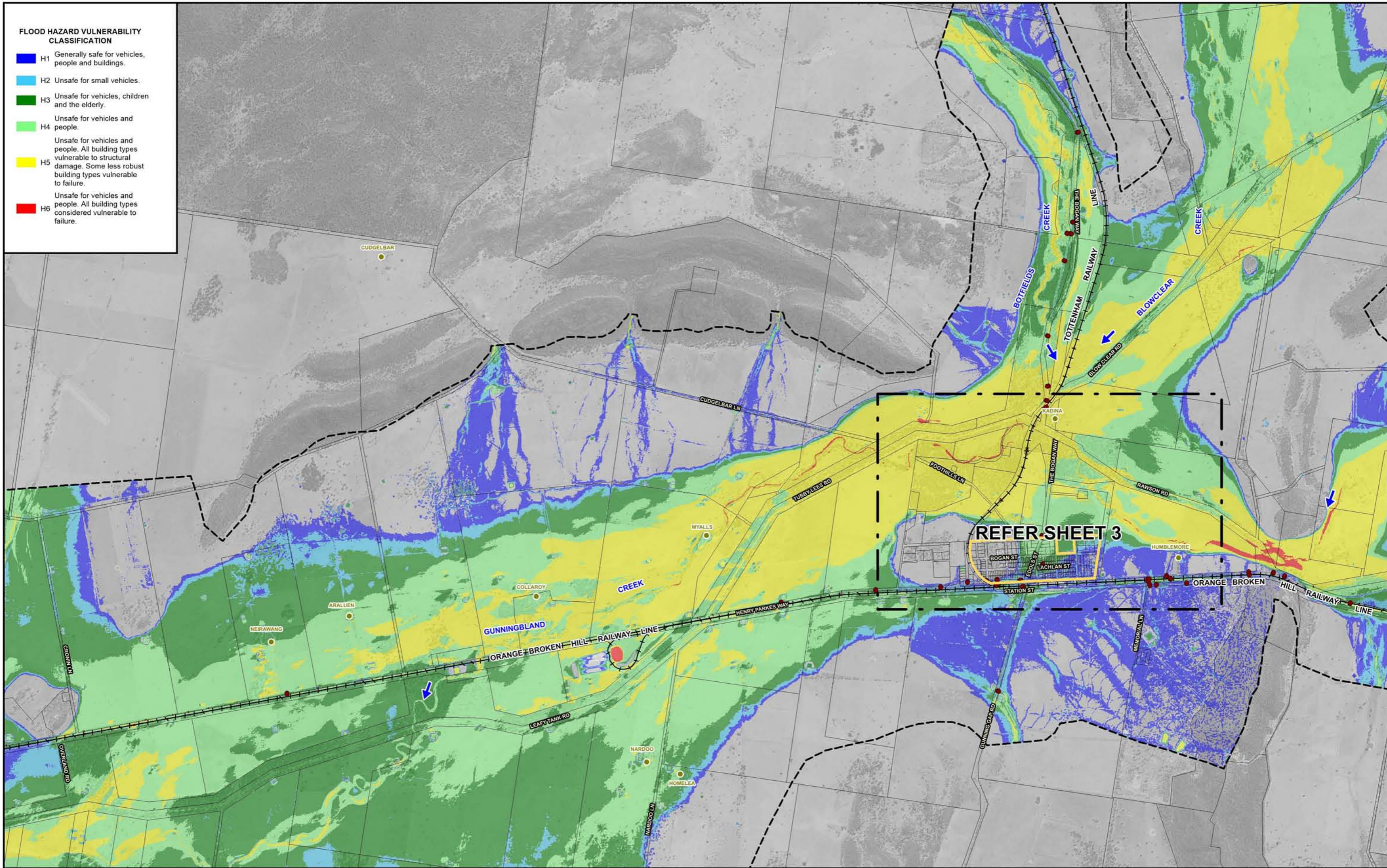
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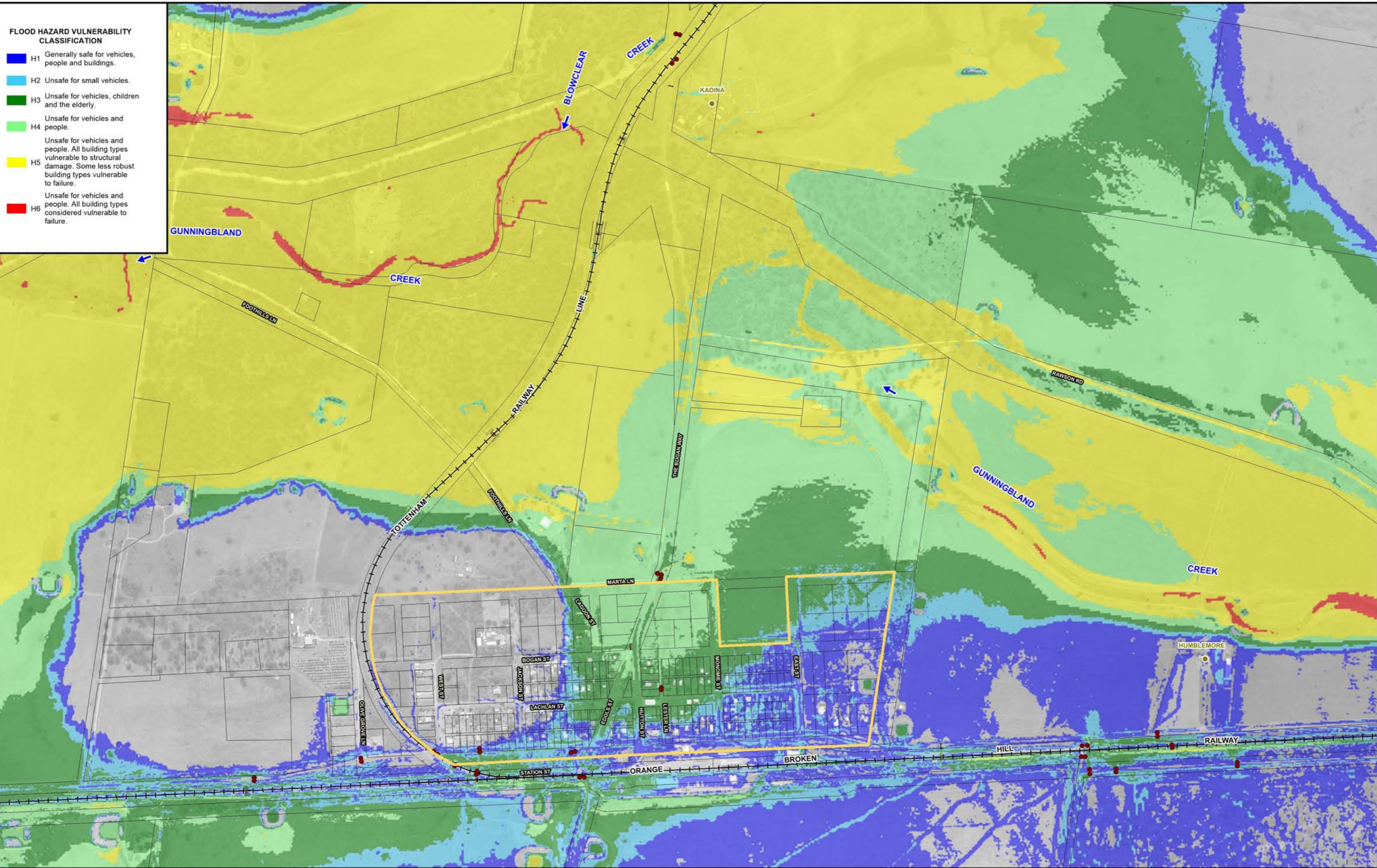
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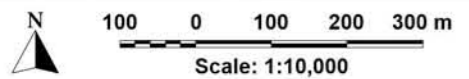
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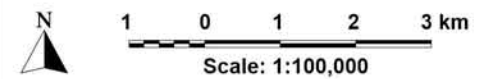
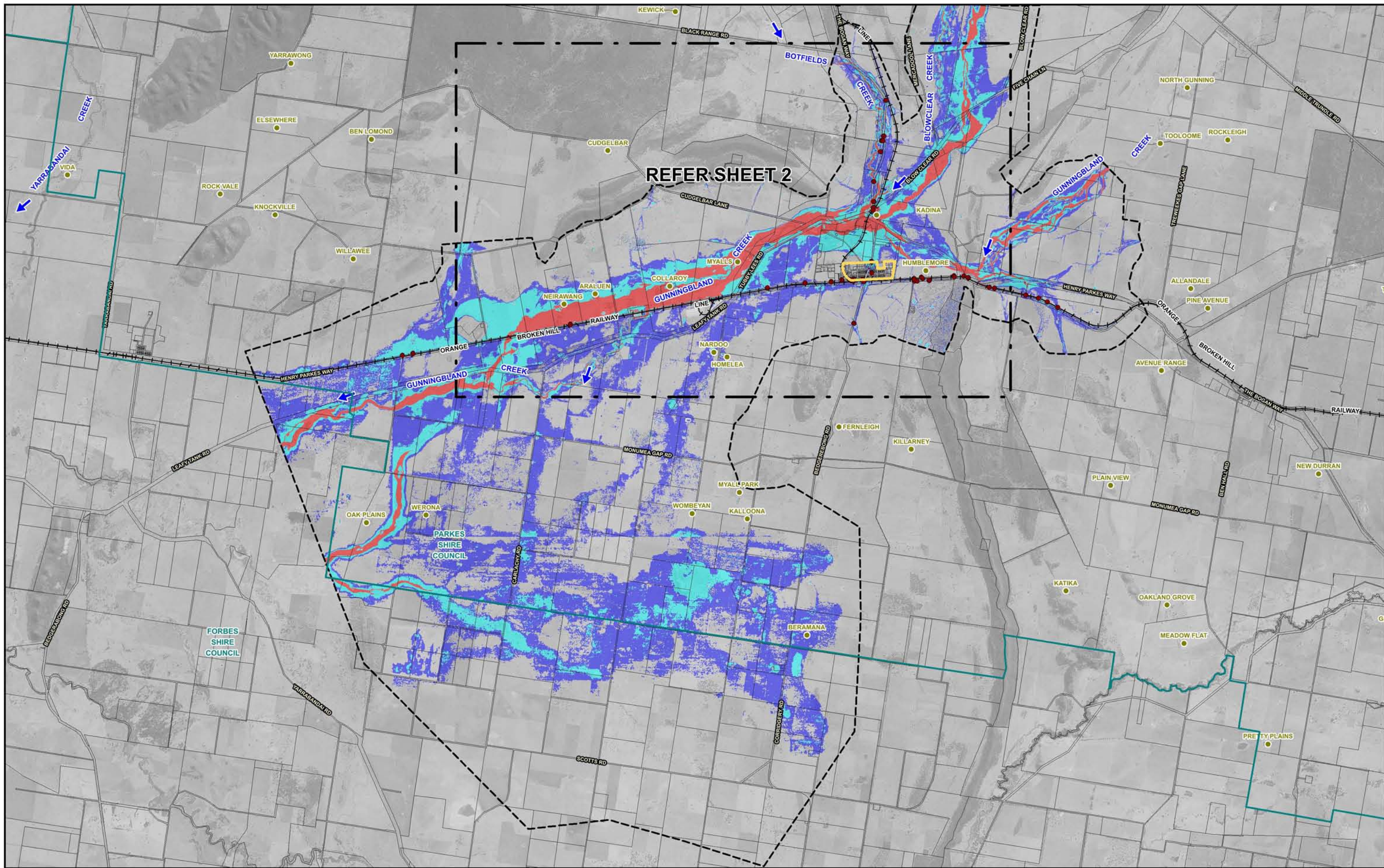
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BOGAN GATE FLOOD STUDY



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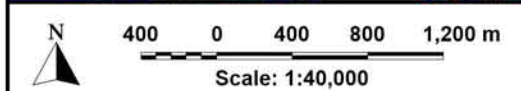
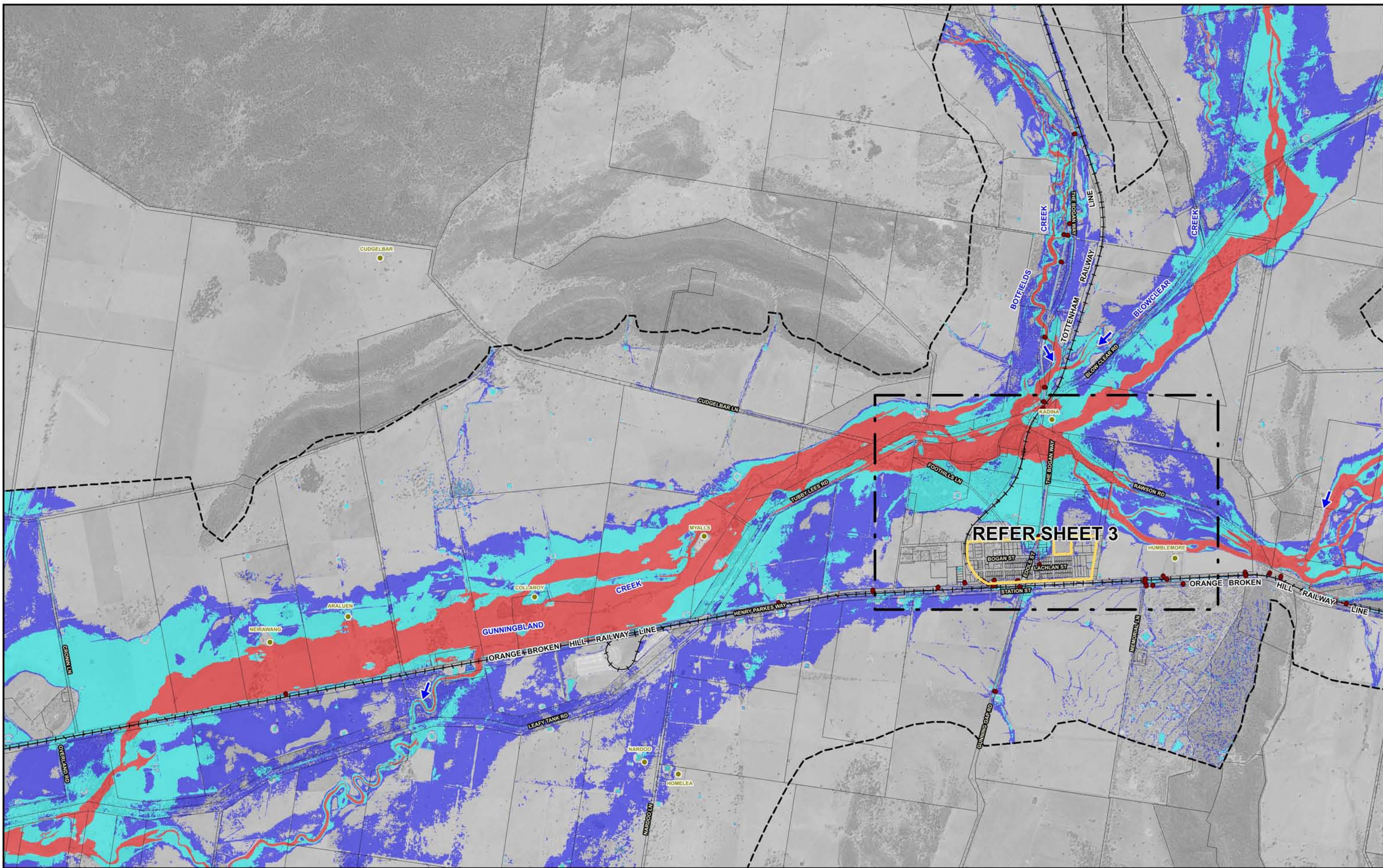
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BOGAN GATE FLOOD STUDY



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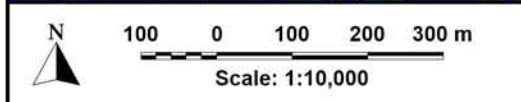
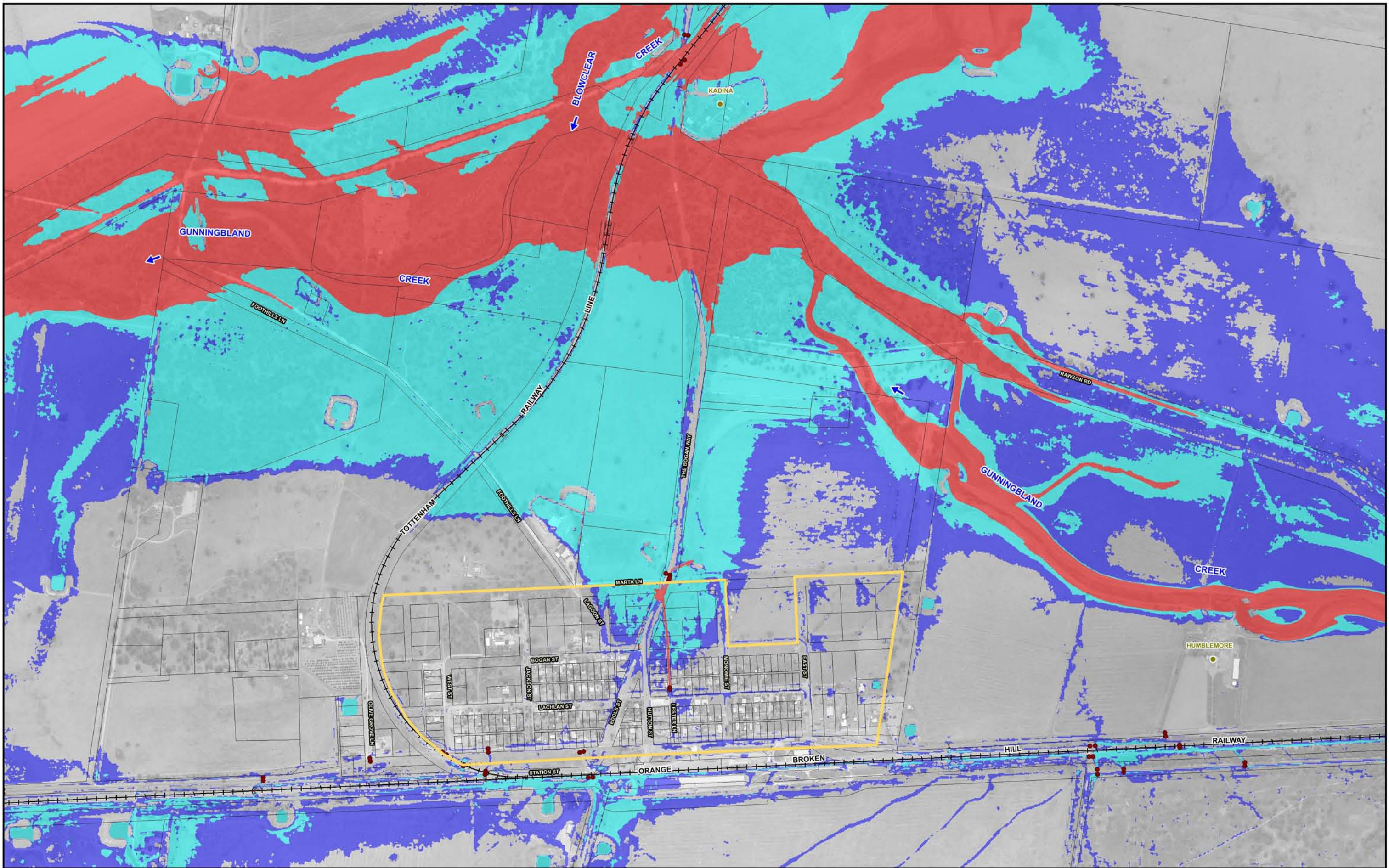
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BOGAN GATE FLOOD STUDY

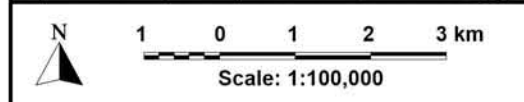
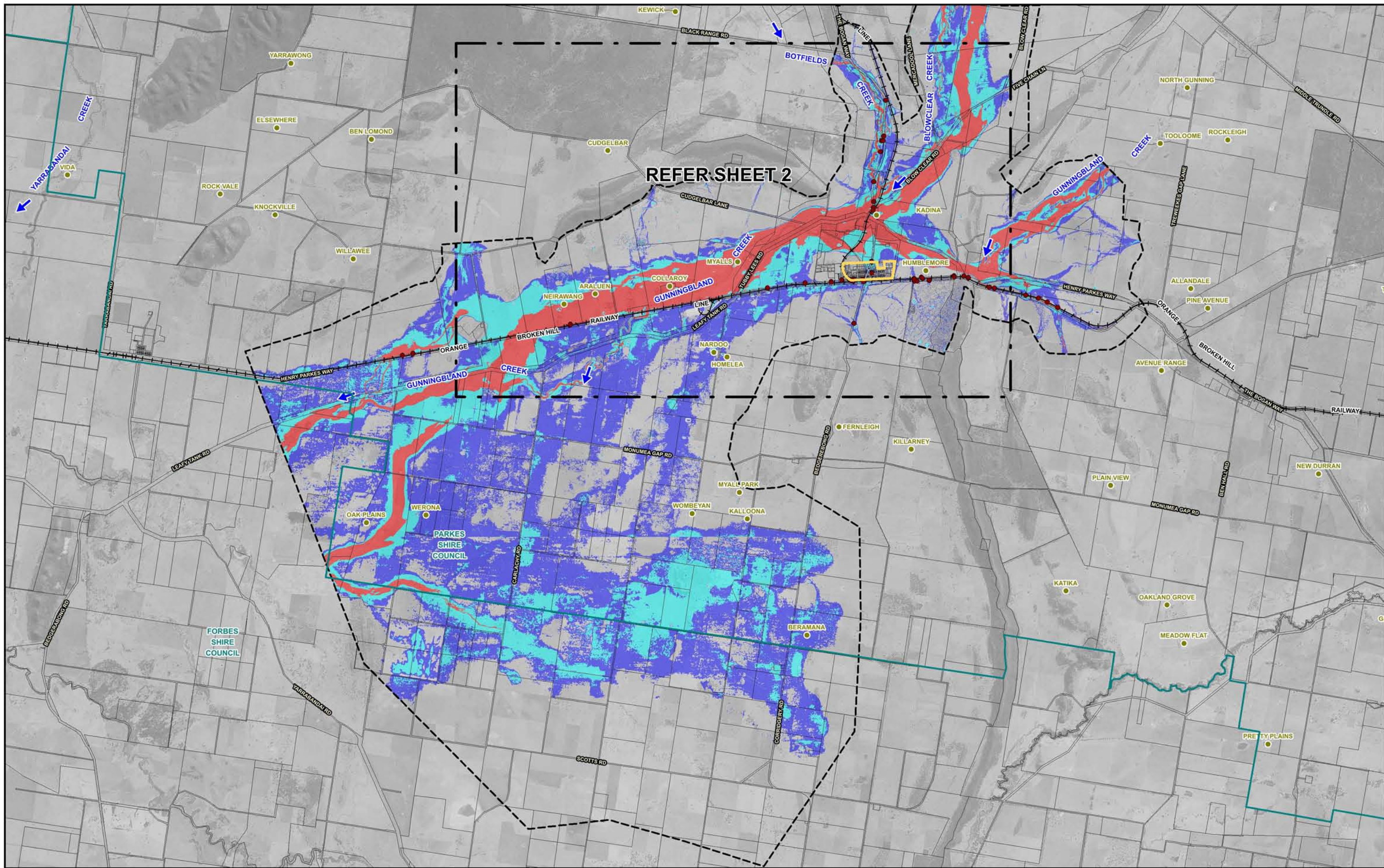


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BOGAN GATE FLOOD STUDY



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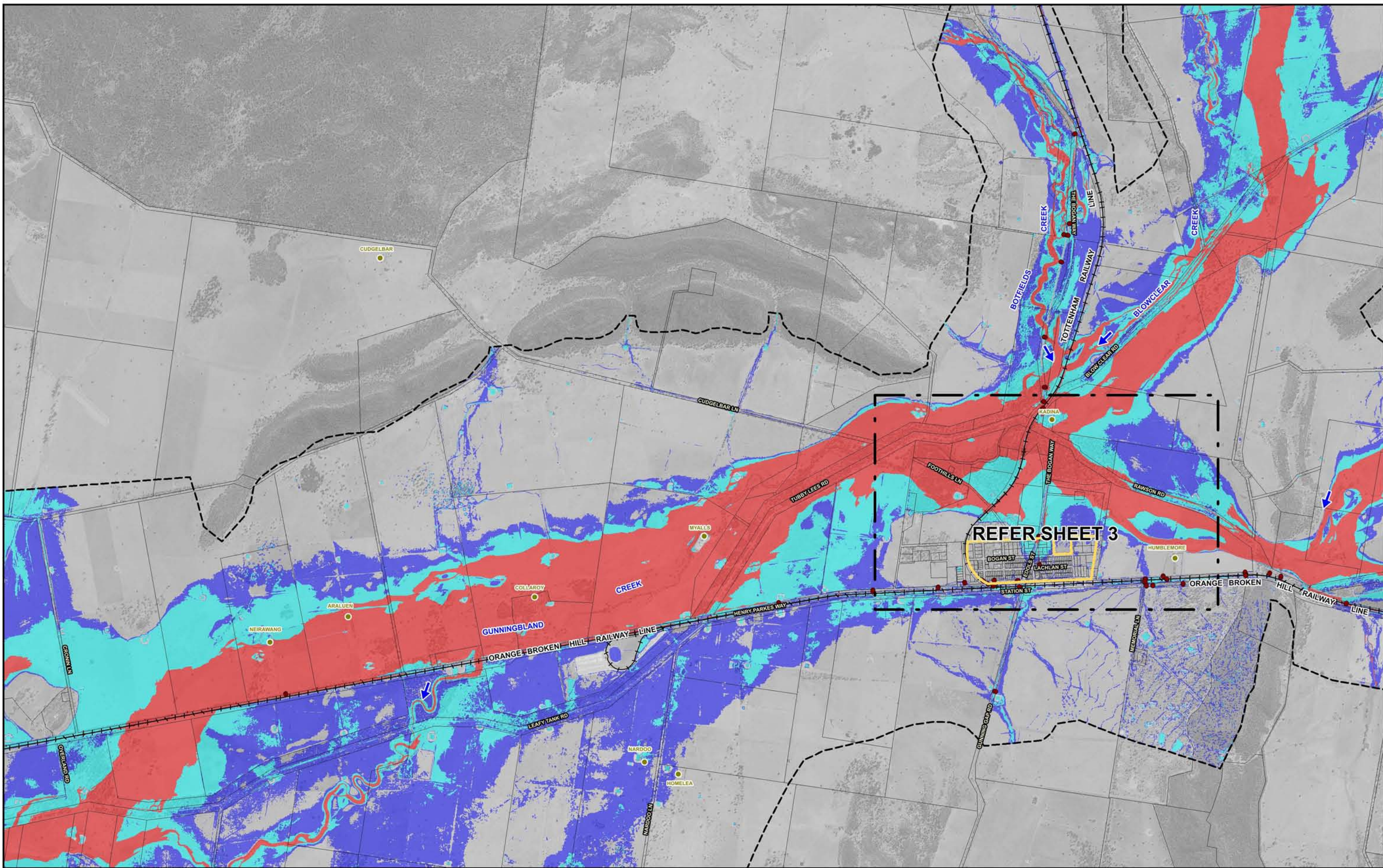
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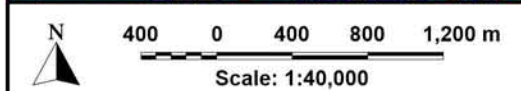
LEGEND

- LGA Boundary
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- Village Centre
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- Flood Fringe

BOGAN GATE FLOOD STUDY



REFER SHEET 3



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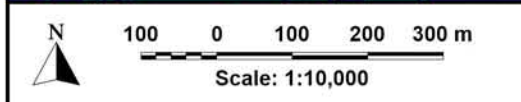
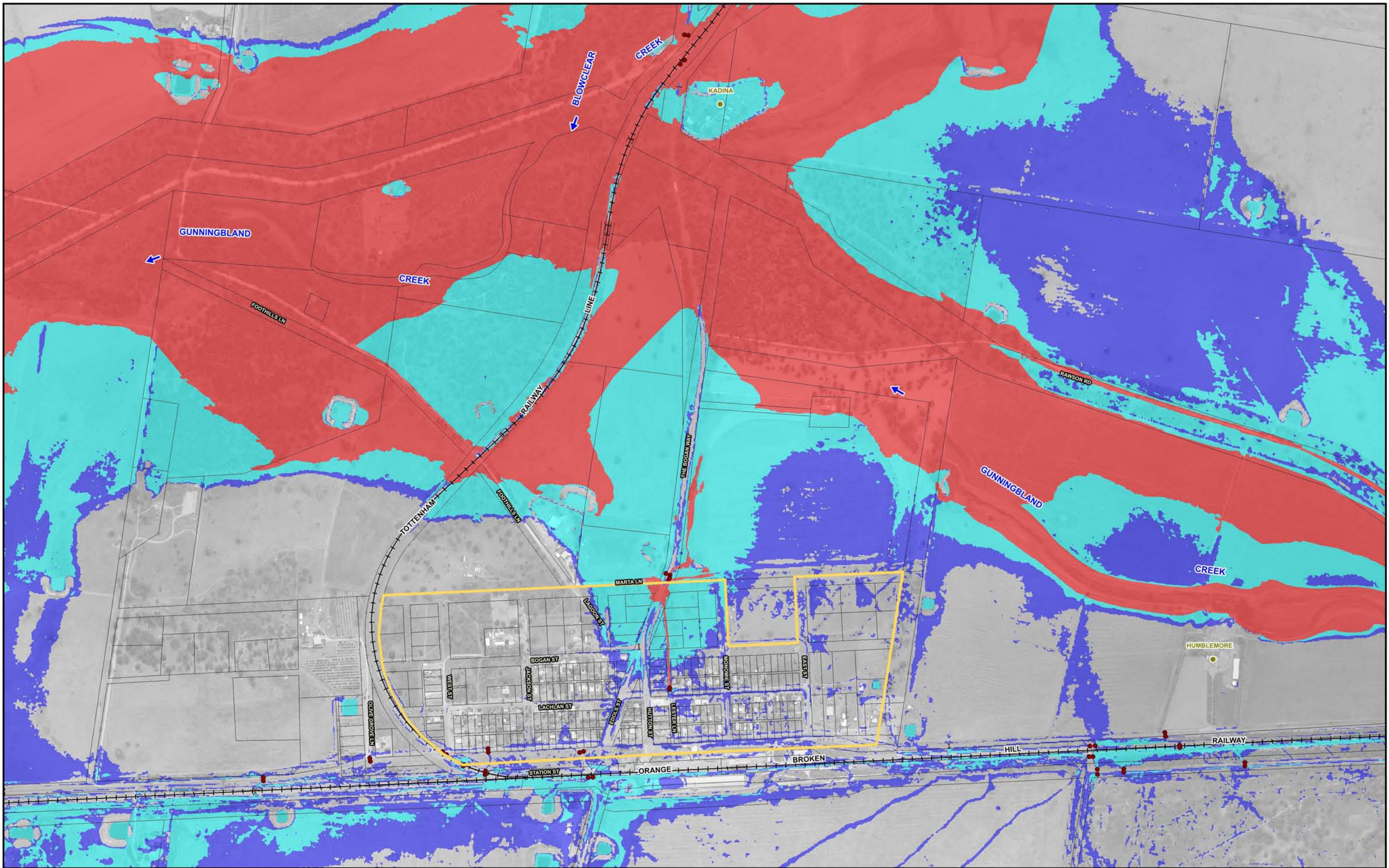
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BOGAN GATE FLOOD STUDY



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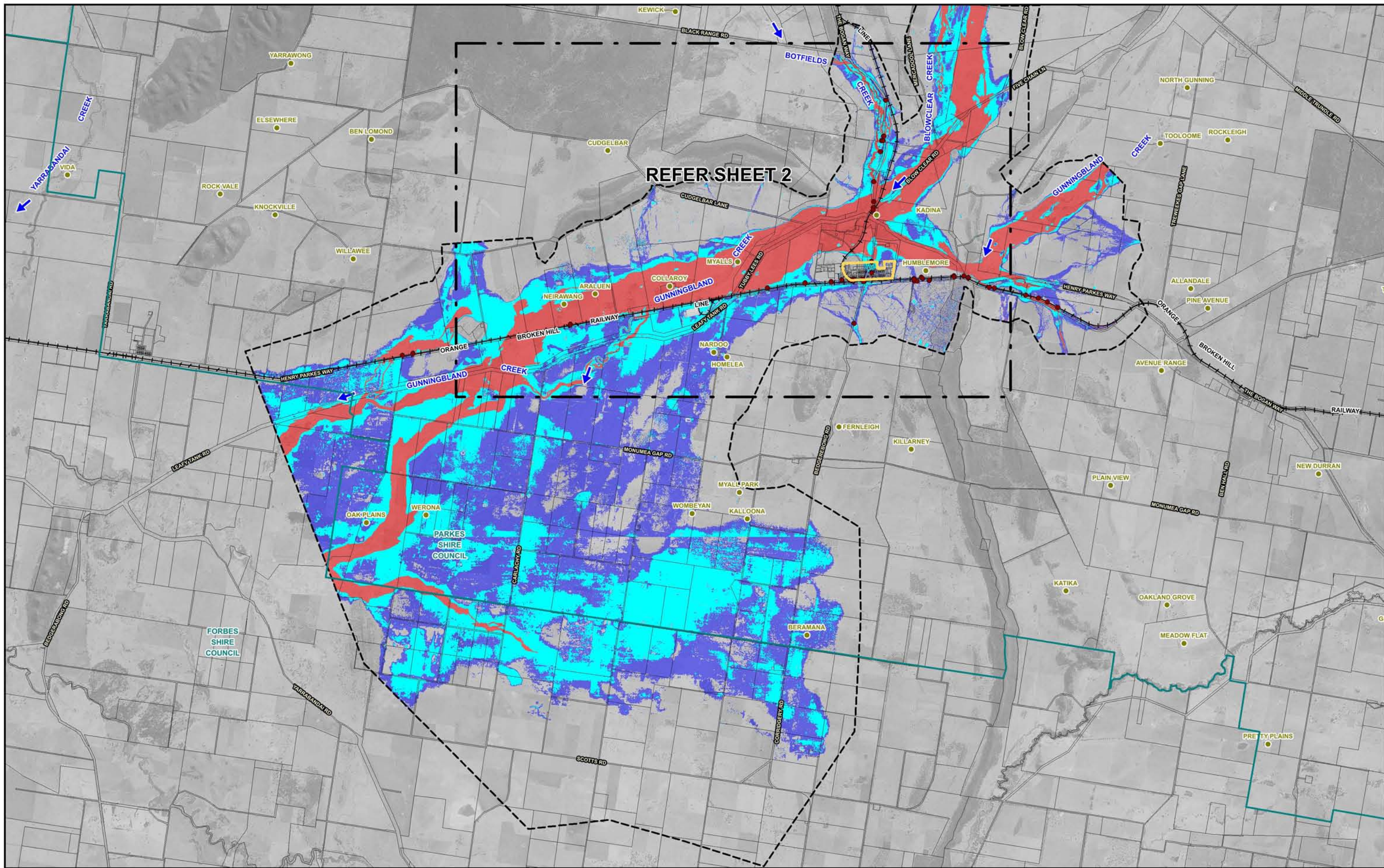
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BOGAN GATE FLOOD STUDY



REFER SHEET 2

LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads
- Floodway
- Flood Storage
- Flood Fringe

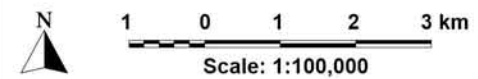
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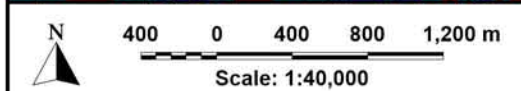
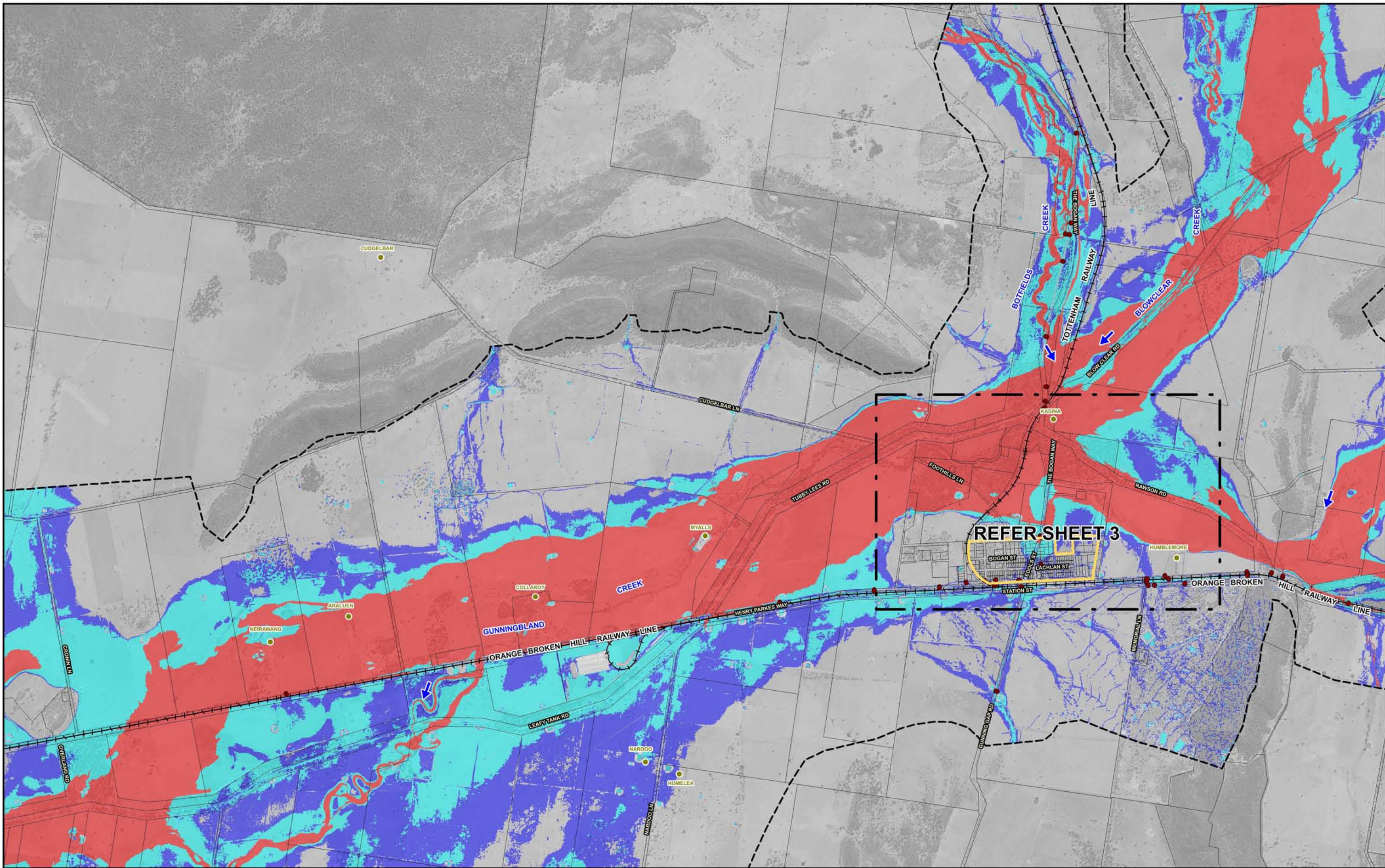
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BOGAN GATE FLOOD STUDY



Lyll & Associates

Figure 6.17
(Sheet 1 of 3)
HYDRAULIC CATEGORISATION OF FLOODPLAIN
0.2% AEP



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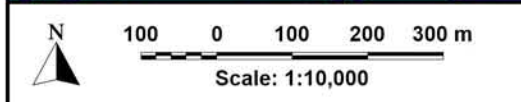
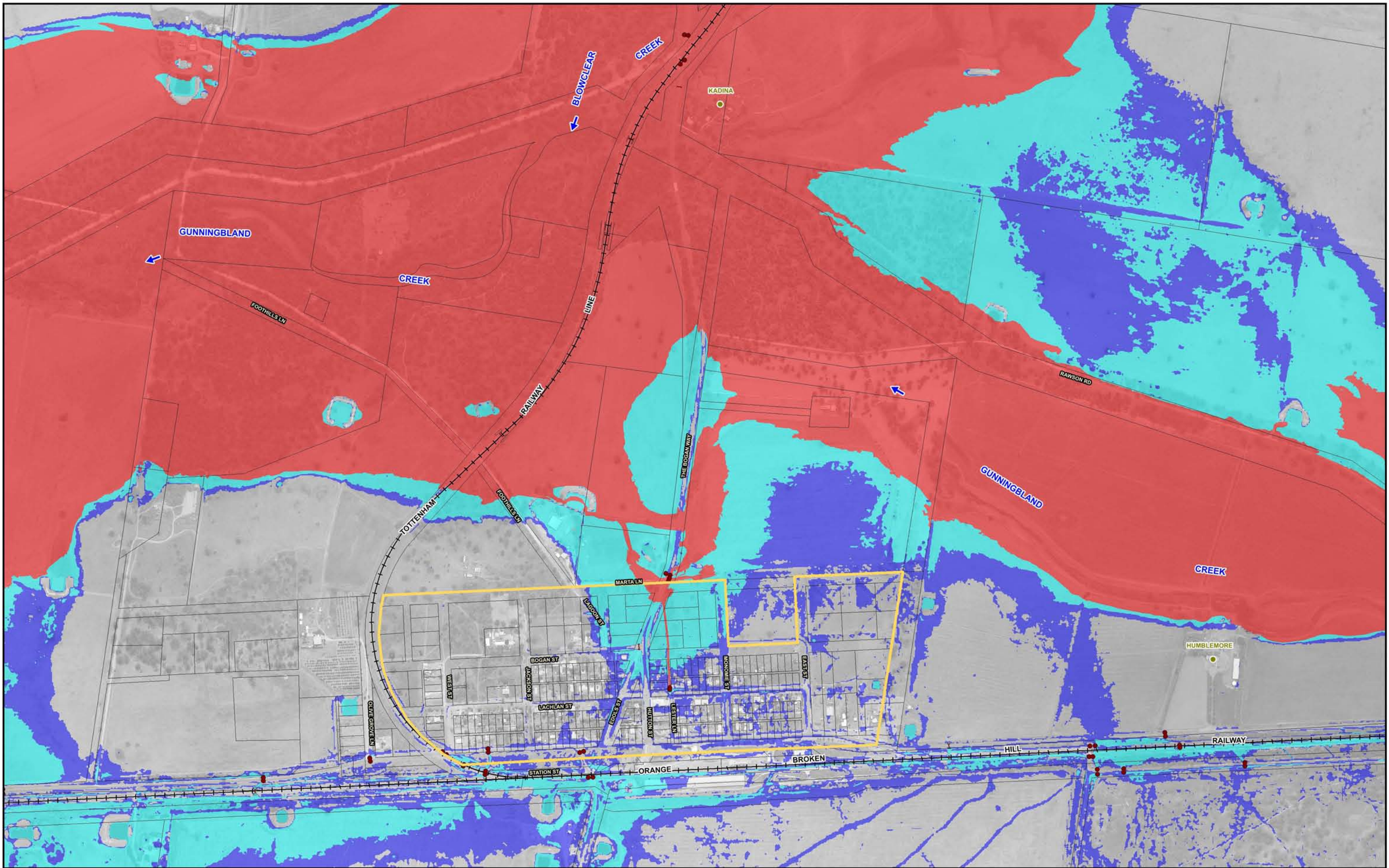
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BOGAN GATE FLOOD STUDY



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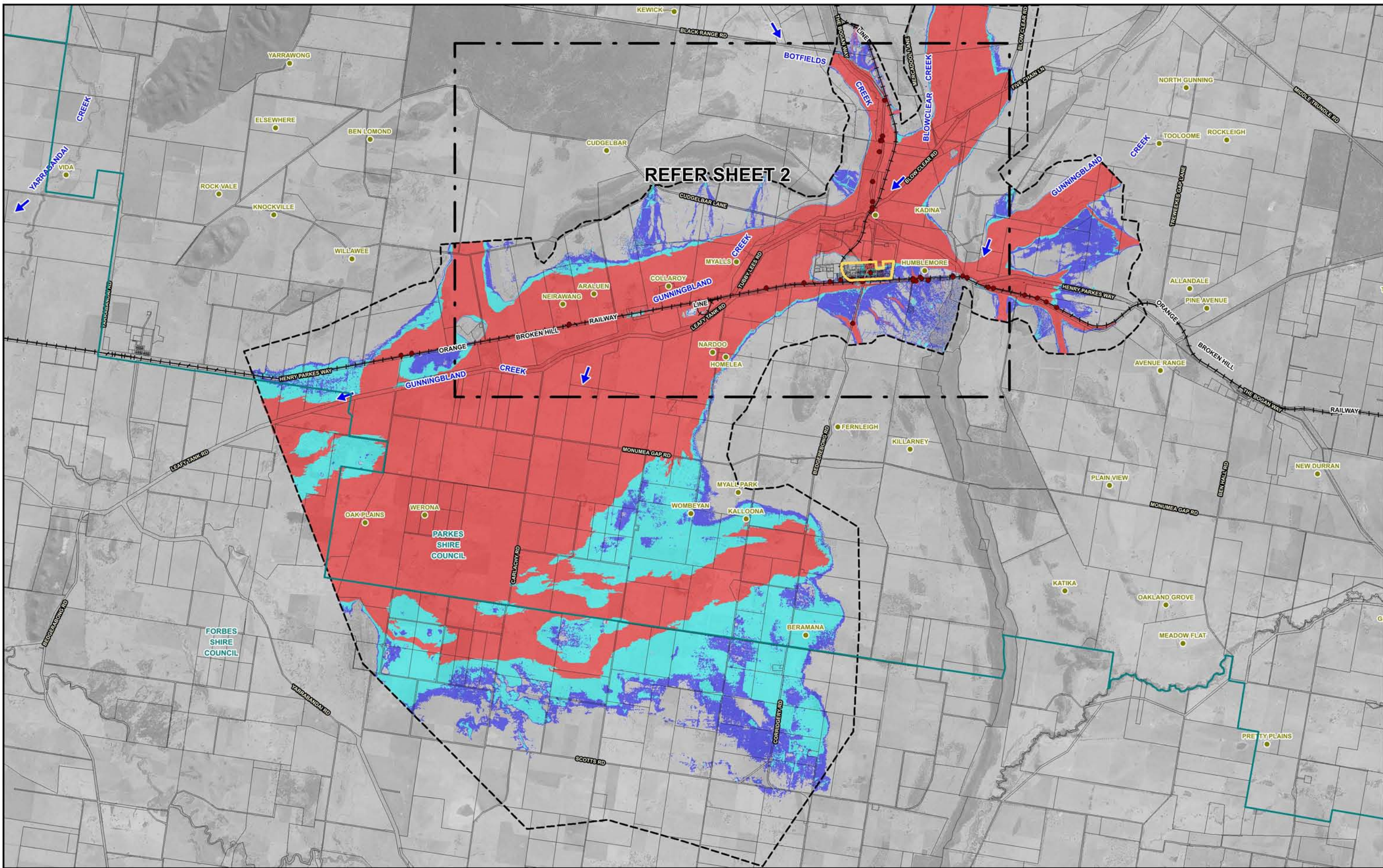
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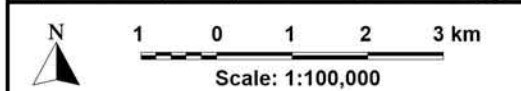
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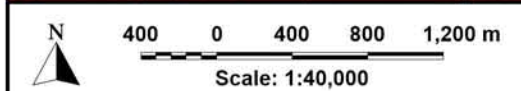
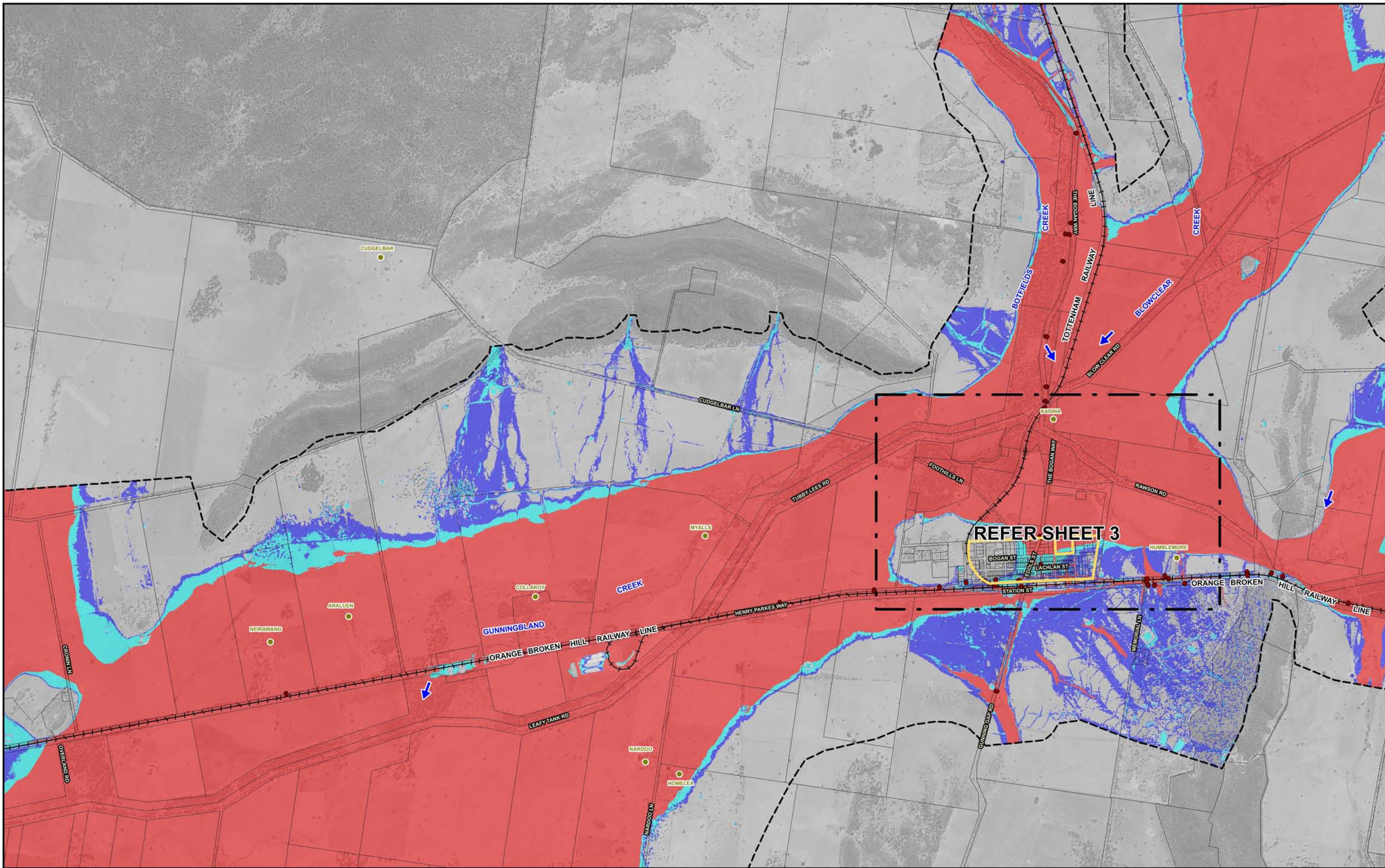
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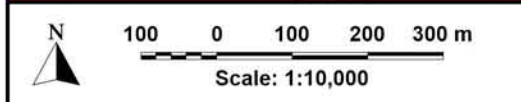
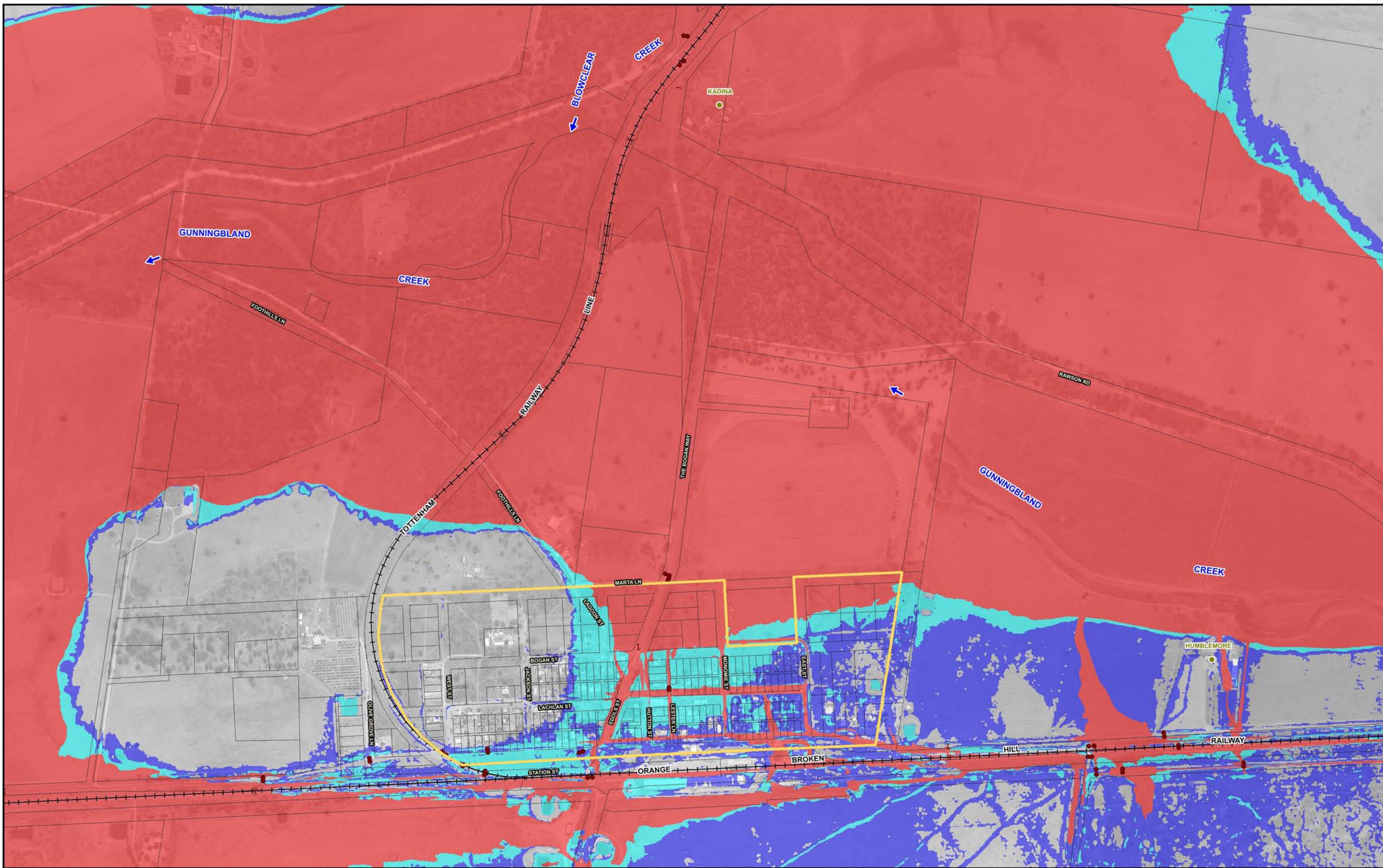
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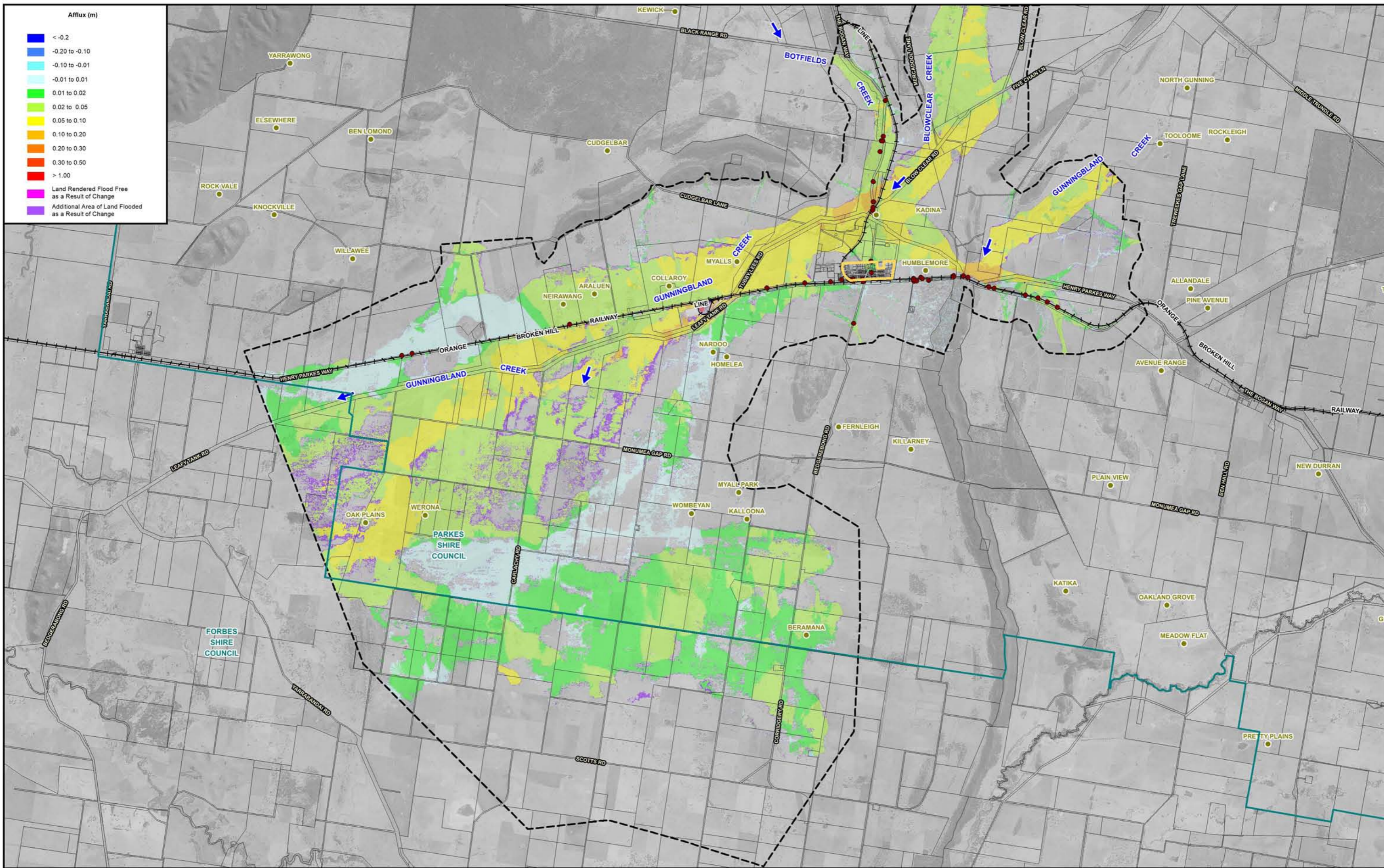
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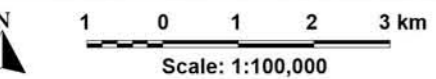
BOGAN GATE FLOOD STUDY



Afflux (m)

Blue	< -0.2
Dark Blue	-0.20 to -0.10
Cyan	-0.10 to -0.01
Light Cyan	-0.01 to 0.01
Green	0.01 to 0.02
Light Green	0.02 to 0.05
Yellow	0.05 to 0.10
Orange	0.10 to 0.20
Dark Orange	0.20 to 0.30
Red	0.30 to 0.50
Dark Red	> 1.00

Land Rendered Flood Free as a Result of Change
 Additional Area of Land Flooded as a Result of Change



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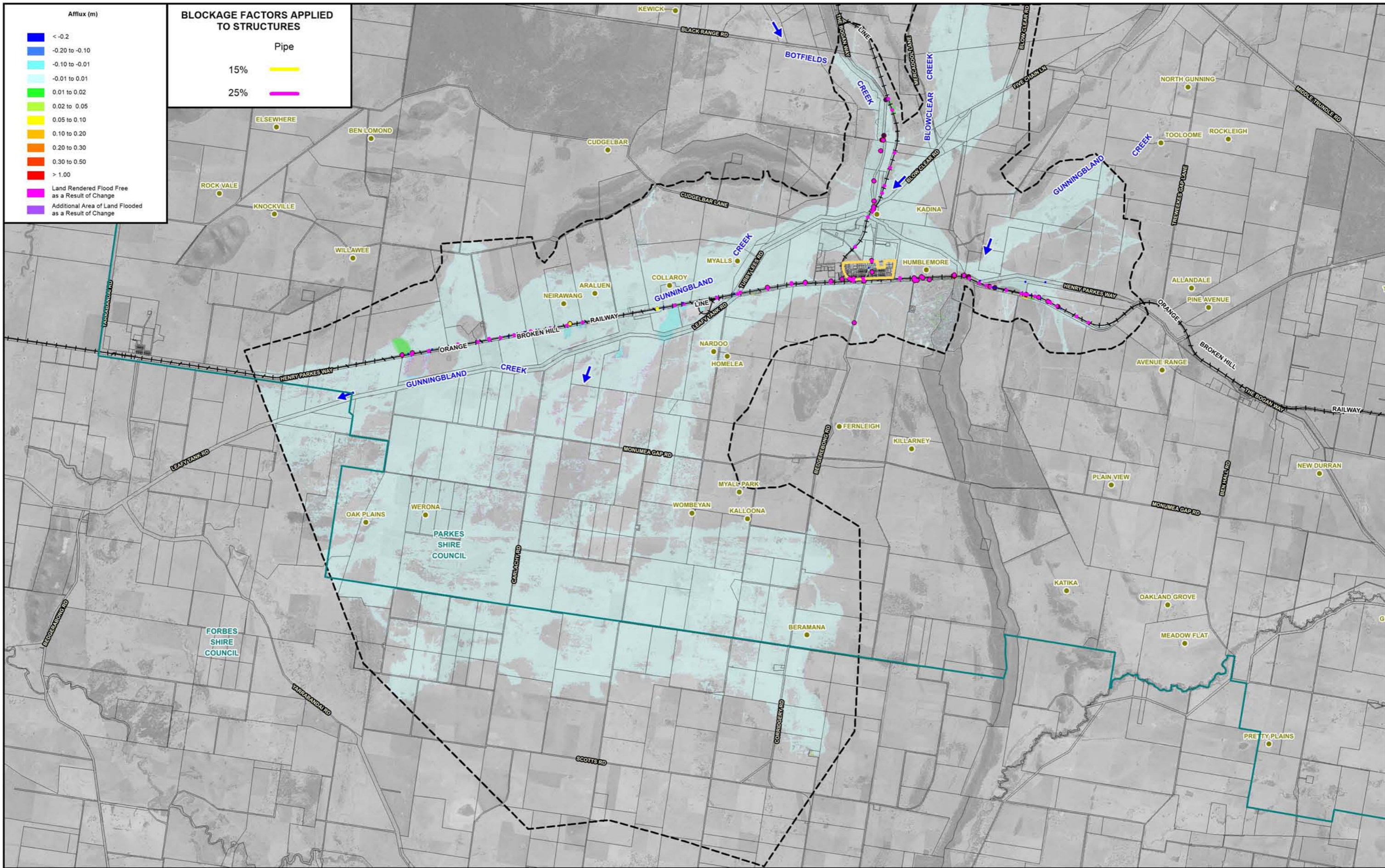
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BOGAN GATE FLOOD STUDY

Figure 6.19

**SENSITIVITY OF FLOOD BEHAVIOUR TO 20% INCREASE IN HYDRAULIC ROUGHNESS VALUES
 1% AEP**



BLOCKAGE FACTORS APPLIED TO STRUCTURES

Pipe

15% —

25% —

Afflux (m)

- <math><-0.2</math>
- -0.20 to -0.10
- -0.10 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.05
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.50
- > 1.00

■ Land Rendered Flood Free as a Result of Change
■ Additional Area of Land Flooded as a Result of Change

LEGEND

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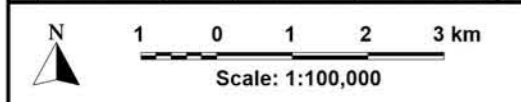
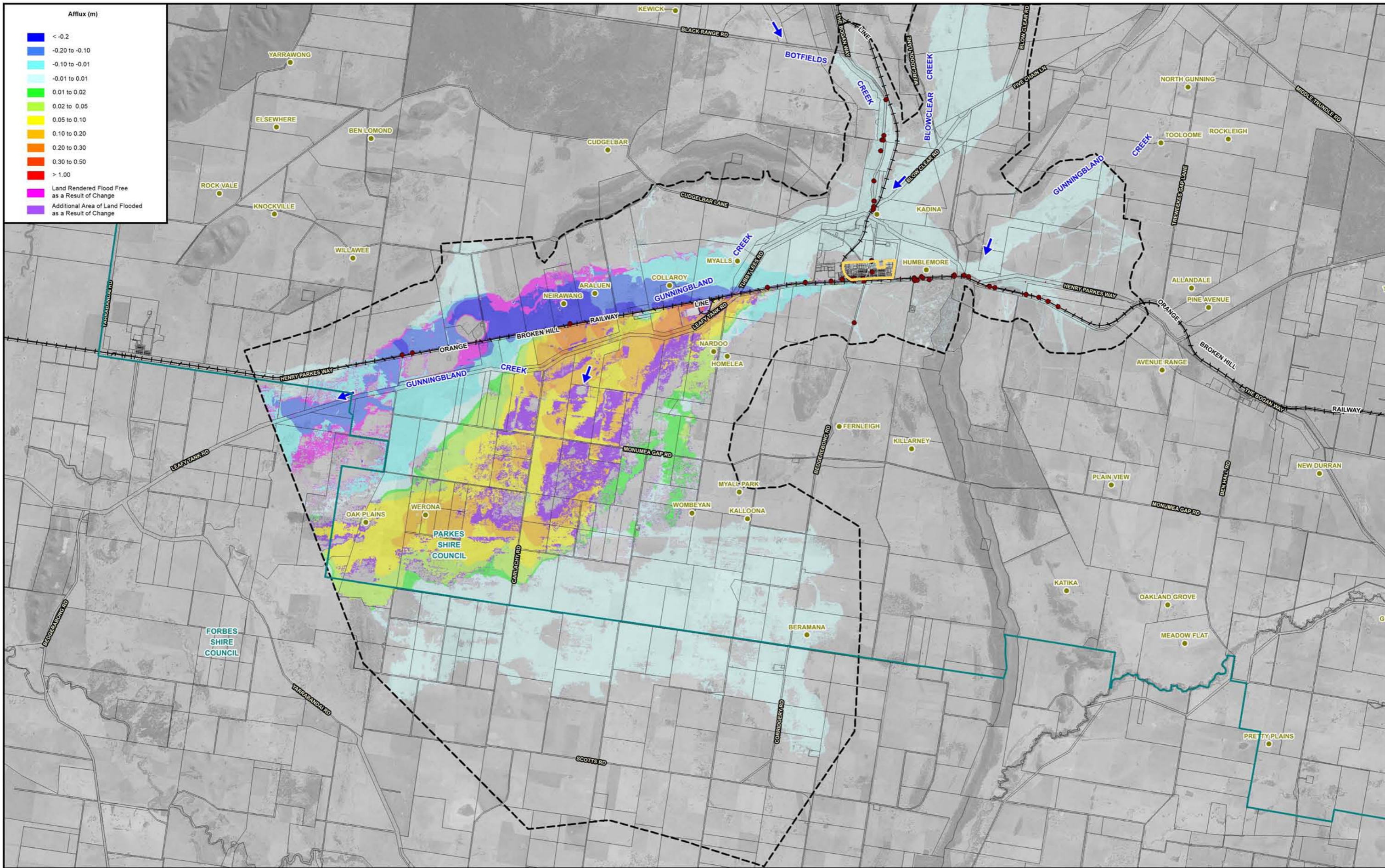
Scale: 1:100,000

1 0 1 2 3 km

Lyll & Associates

BOGAN GATE FLOOD STUDY

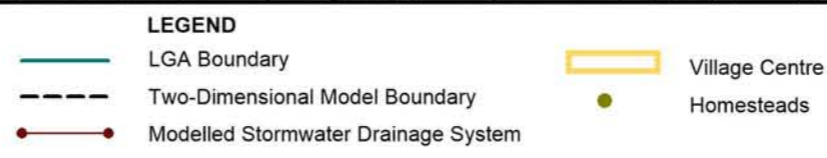
Figure 6.20
SENSITIVITY OF FLOOD BEHAVIOUR TO PARTIAL BLOCKAGE OF HYDRAULIC STRUCTURES
 1% AEP



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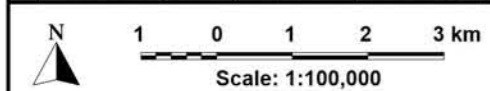
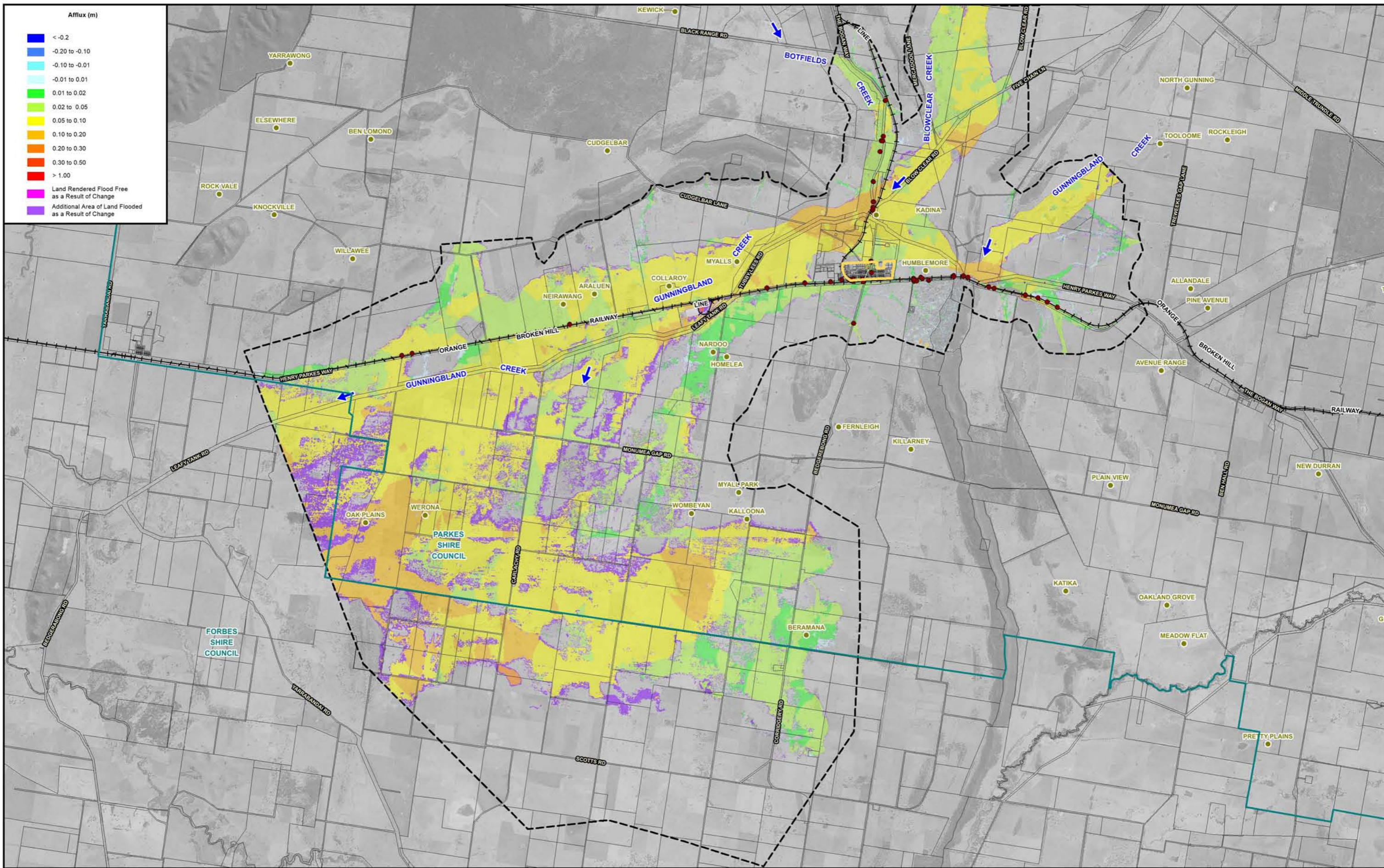
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BOGAN GATE FLOOD STUDY

Figure 6.21



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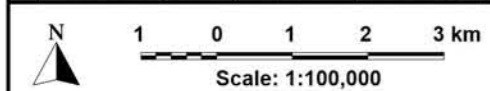
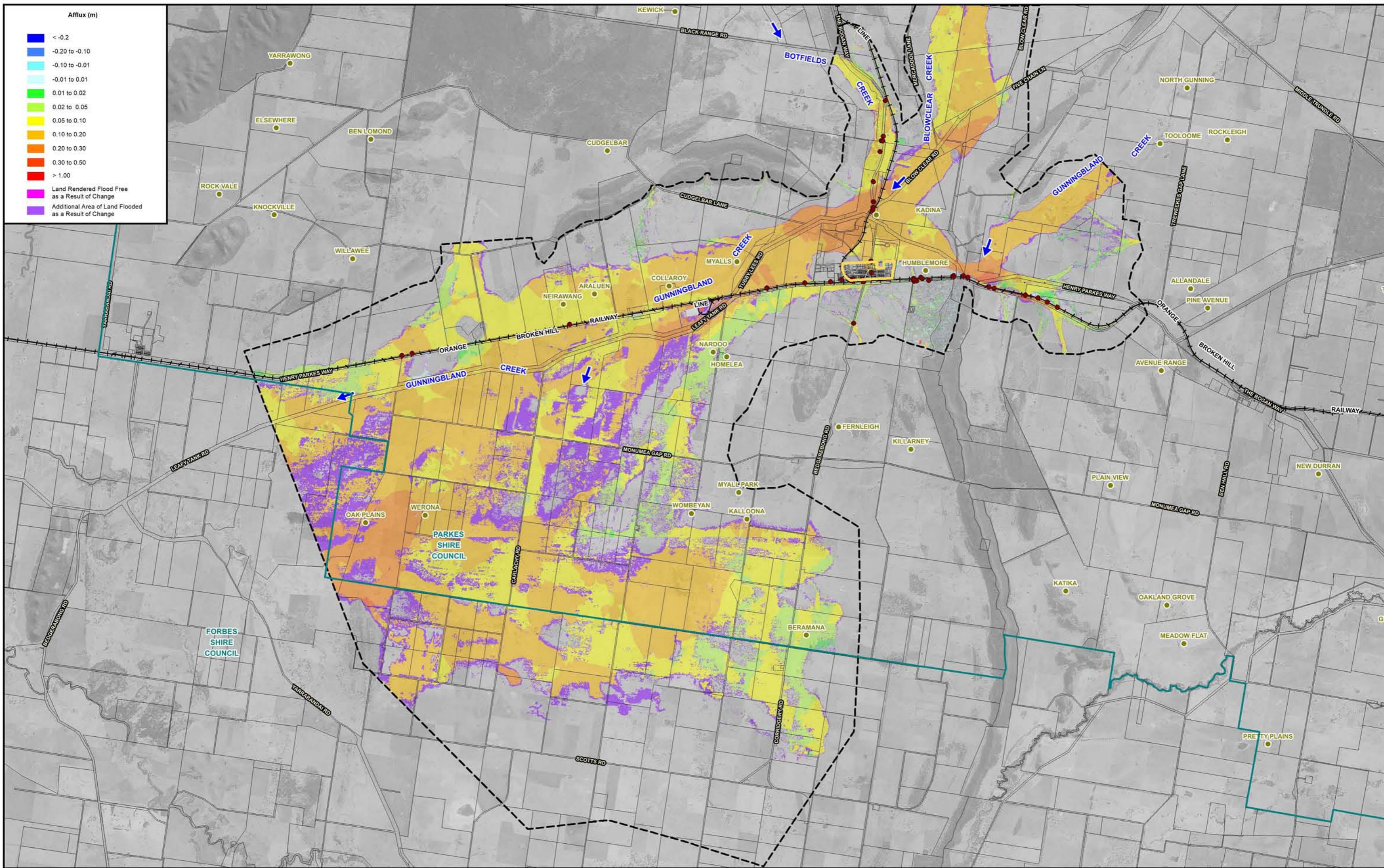
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- LEGEND**
- LGA Boundary
 - - - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - ▭ Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY

Figure 6.22

**SENSITIVITY OF FLOOD BEHAVIOUR TO 10% INCREASE IN RAINFALL INTENSITY
1% AEP**



NOTE:
The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

Flood depths are therefore approximate only and require interpretation by a suitably qualified engineer to determine flooding behaviour in individual allotments. Any assessment of flooding in individual allotments may also require a site survey.

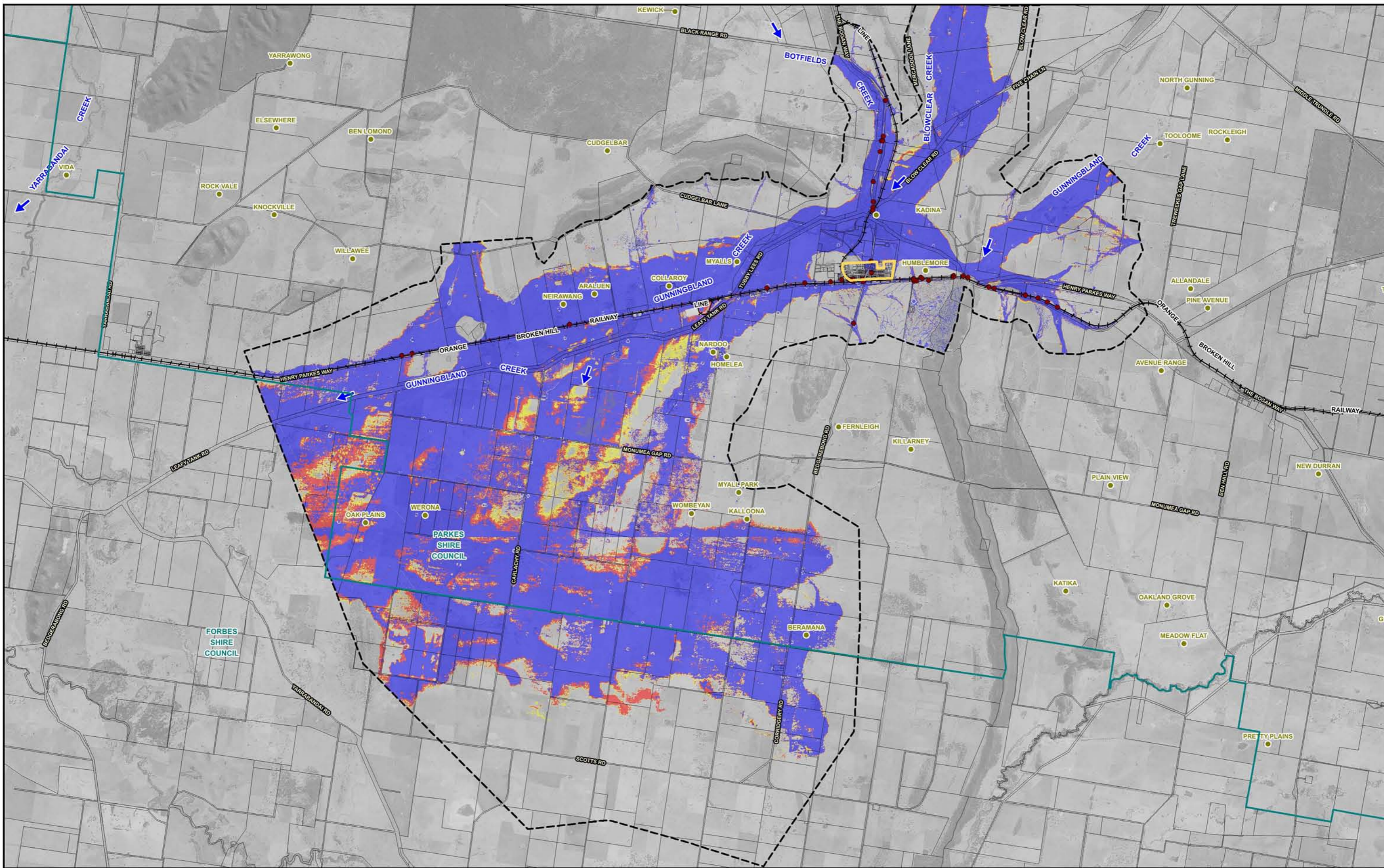
The allotment boundaries shown are based on the NSW State Database obtained from the Six Maps online database and may not represent the true property boundaries in the study area.



- LEGEND**
- LGA Boundary
 - - - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - ▭ Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY

Figure 6.23

SENSITIVITY OF FLOOD BEHAVIOUR TO 30% INCREASE IN RAINFALL INTENSITY
1% AEP






 Scale: 1:100,000

NOTE:
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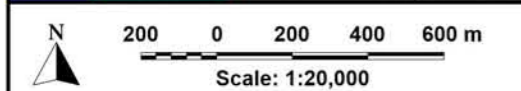
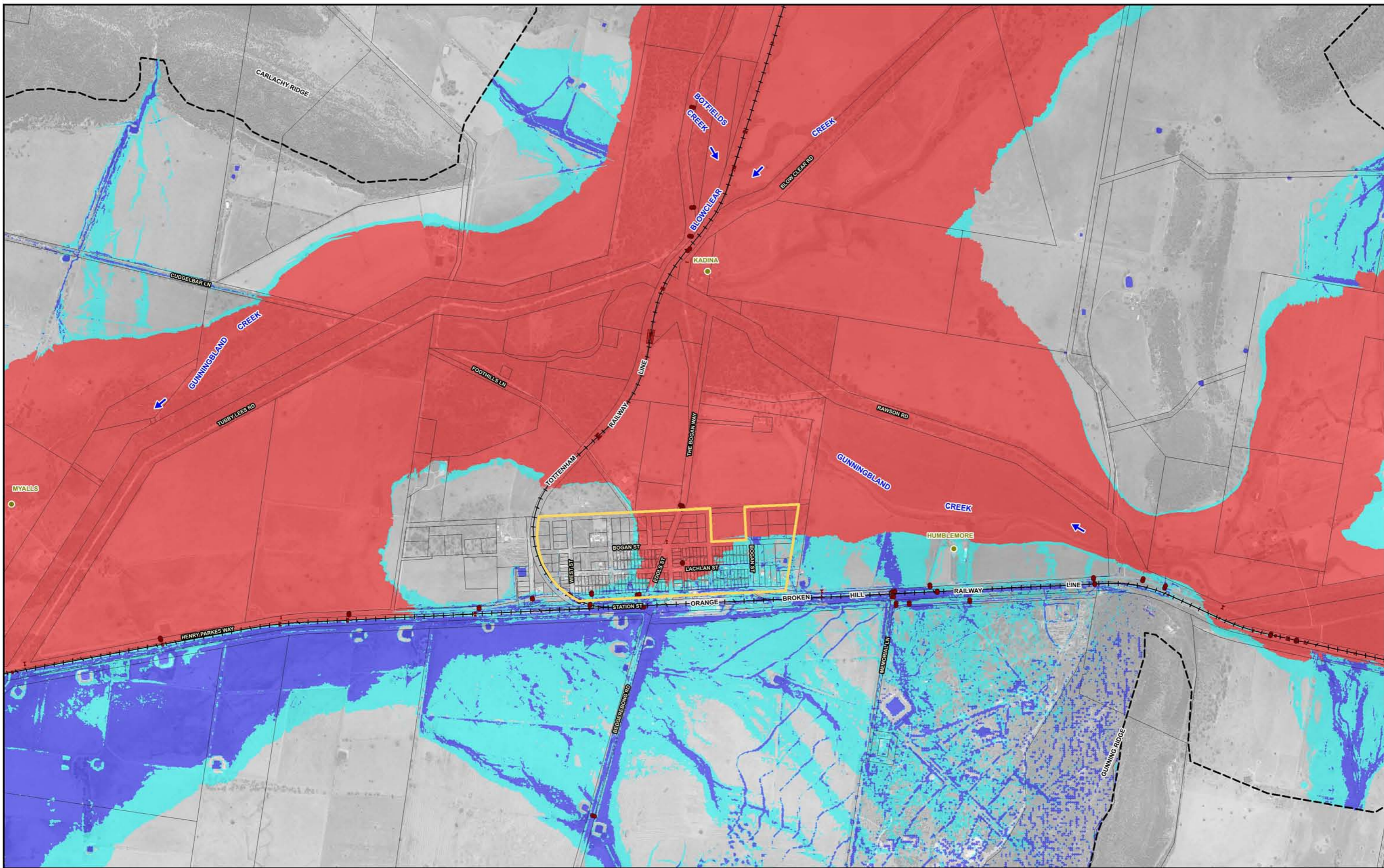
- LEGEND**
-  LGA Boundary
 -  Two-Dimensional Model Boundary
 -  Modelled Stormwater Drainage System
 -  Village Centre
 -  Homesteads

-  1% AEP
-  1% AEP Rainfall Increased by 10%
-  1% AEP Rainfall Increased by 30%

BOGAN GATE FLOOD STUDY

**IMPACT OF INCREASED RAINFALL INTENSITIES ON EXTENT OF FLOODING
 1% AEP**

Figure 6.24



NOTE:
 The ground surface model incorporated in TUFLOW is based on LiDAR survey which has been sampled on a 3 m (min) grid and does not necessarily incorporate localised features which can influence flooding behaviour in individual allotments.

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- LEGEND**
- Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

- Main Stream Flooding Flood Planning Area
- Outer Floodplain
- Major Overland Flow Flood Planning Area

BOGAN GATE FLOOD STUDY

Figure 6.25

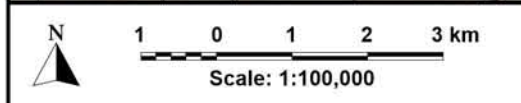
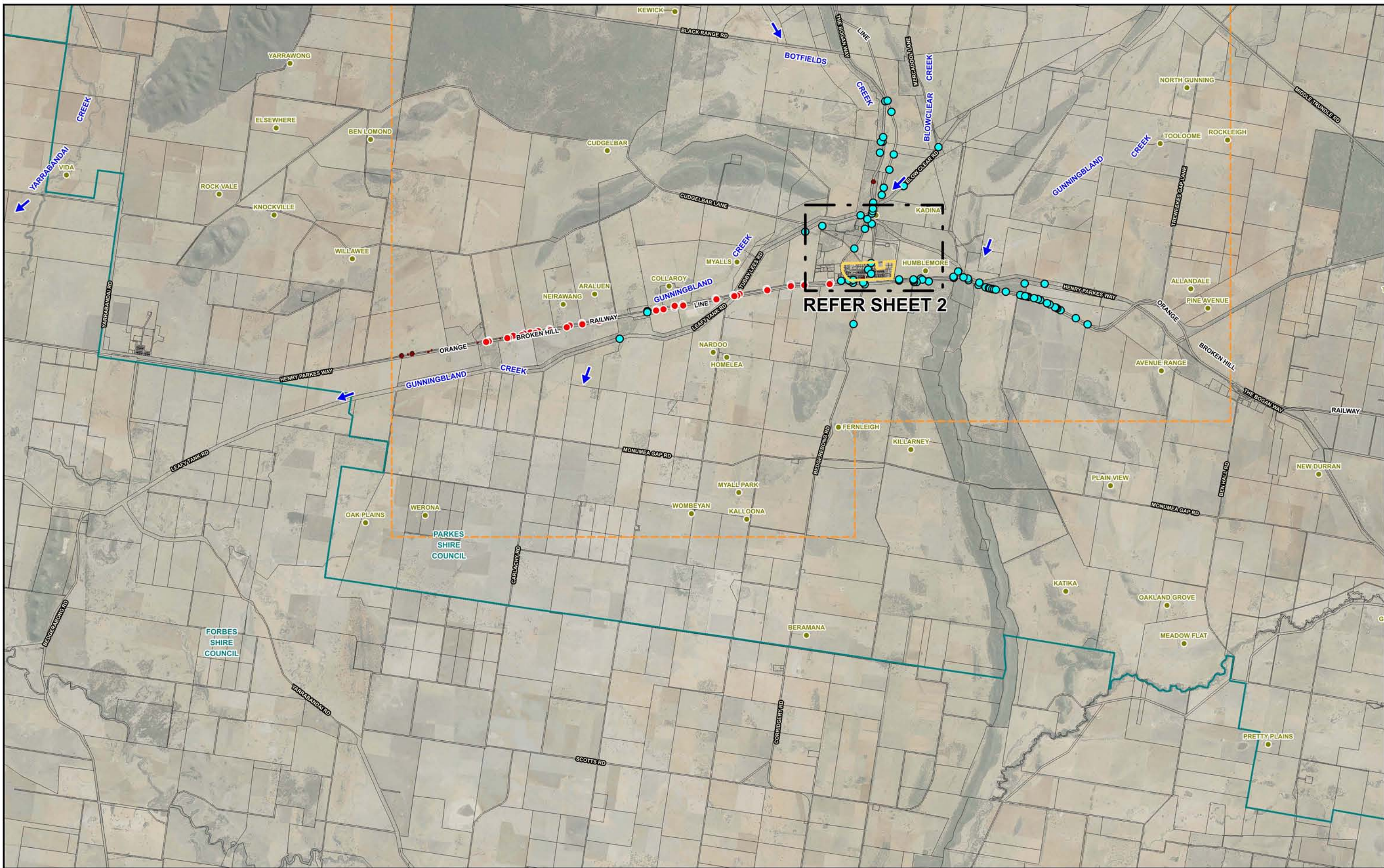
DRAFT REPORT FOR PUBLIC EXHIBITION

**APPENDIX B
DETAILS OF AVAILABLE DATA**

LIST OF FIGURES (APPENDIX B)

B1.1 Location and Source of Data (2 Sheets)

DRAFT REPORT FOR PUBLIC EXHIBITION



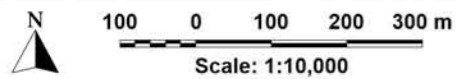
LEGEND

- LGA Boundary
- Village Centre
- Homestead
- Surveyed Pipe/Box Culvert (Arnell Surveying)
- Surveyed Pipe/Box Culvert (KBR, 2017)
- Extent of BoganGate202203 LiDAR Survey Data

BOGAN GATE FLOOD STUDY

Figure B1.1
(Sheet 1 of 2)

LOCATION AND SOURCE OF DATA



- LEGEND**
- Village Centre
 - Surveyed Pipe/Box Culvert (Ardnell Surveying)
 - Surveyed Pipe/Box Culvert (KBR, 2017)
 - Homestead

BOGAN GATE FLOOD STUDY

Figure B1.1
(Sheet 2 of 2)

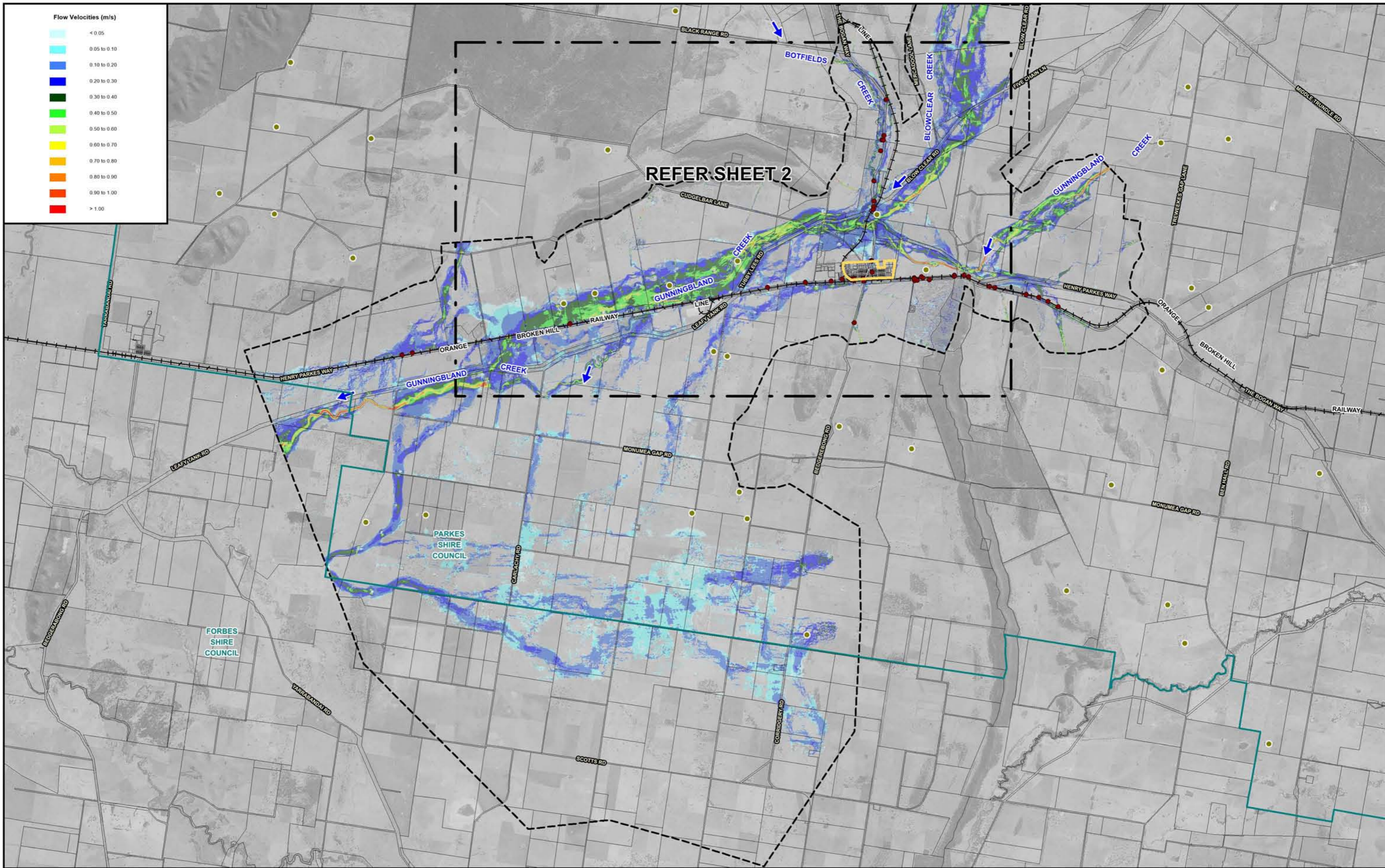
DRAFT REPORT FOR PUBLIC EXHIBITION

APPENDIX H
DESIGN MAXIMUM FLOW VELOCITY MAPS

LIST OF FIGURES (APPENDIX H)

- H1.1. Maximum Flow Velocities – 20% AEP (3 Sheets)
- H1.2. Maximum Flow Velocities – 10% AEP (3 Sheets)
- H1.3. Maximum Flow Velocities – 5% AEP (3 Sheets)
- H1.4. Maximum Flow Velocities – 2% AEP (3 Sheets)
- H1.5. Maximum Flow Velocities – 1% AEP (3 Sheets)
- H1.6. Maximum Flow Velocities – 0.5% AEP (3 Sheets)
- H1.7. Maximum Flow Velocities – 0.2% AEP (3 Sheets)
- H1.8. Maximum Flow Velocities – PMF (3 Sheets)

DRAFT REPORT FOR PUBLIC EXHIBITION

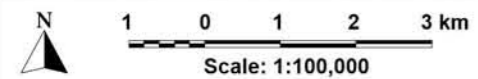


Flow Velocities (m/s)



REFER SHEET 2

BOGAN GATE FLOOD STUDY



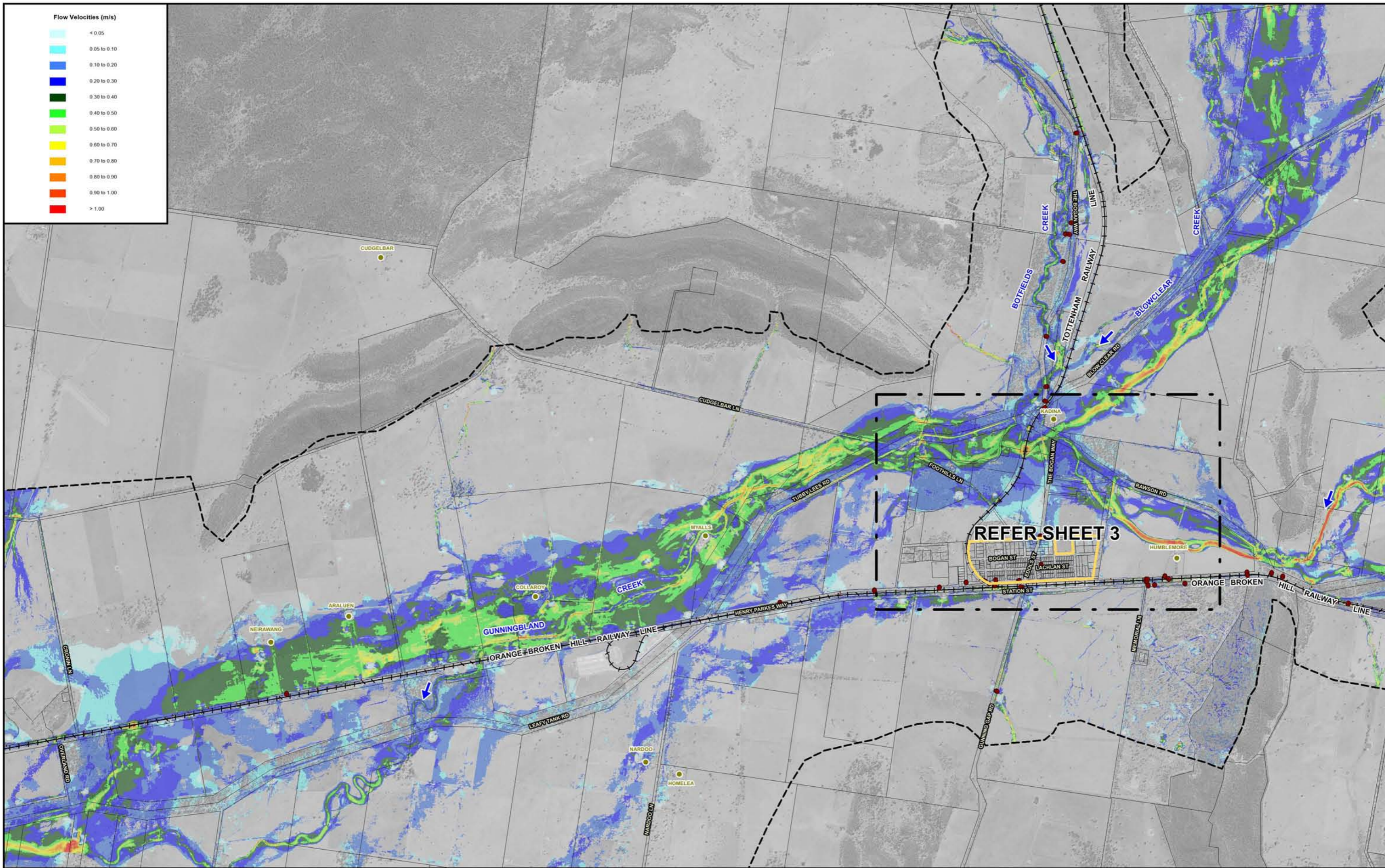
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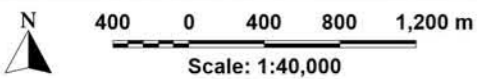
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LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads



Flow Velocities (m/s)



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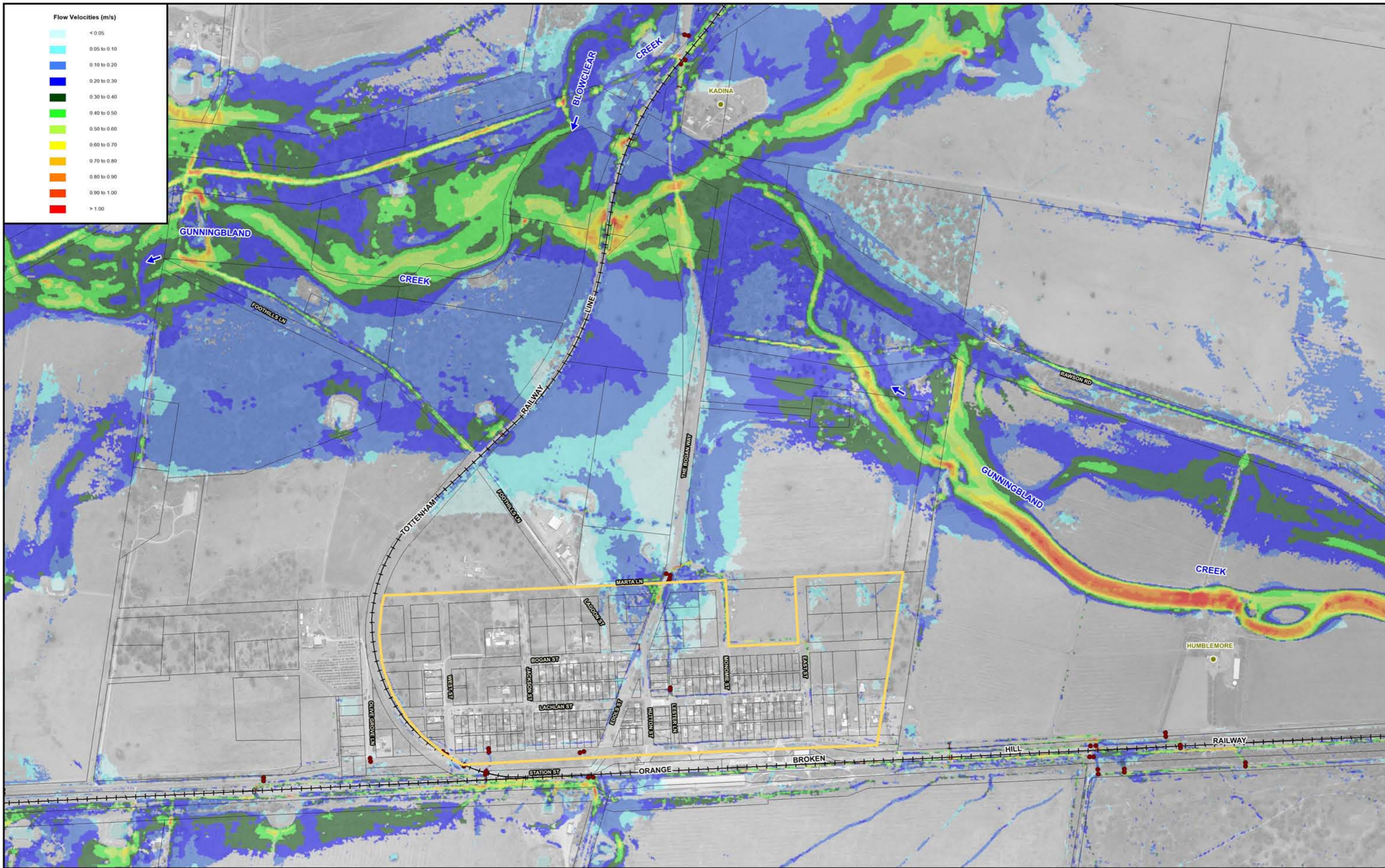
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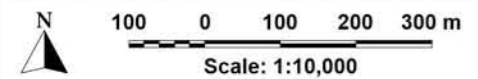
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY



Flow Velocities (m/s)



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 - Modelled Stormwater Drainage System
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BOGAN GATE FLOOD STUDY

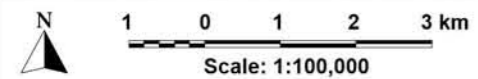


Flow Velocities (m/s)



REFER SHEET 2

BOGAN GATE FLOOD STUDY



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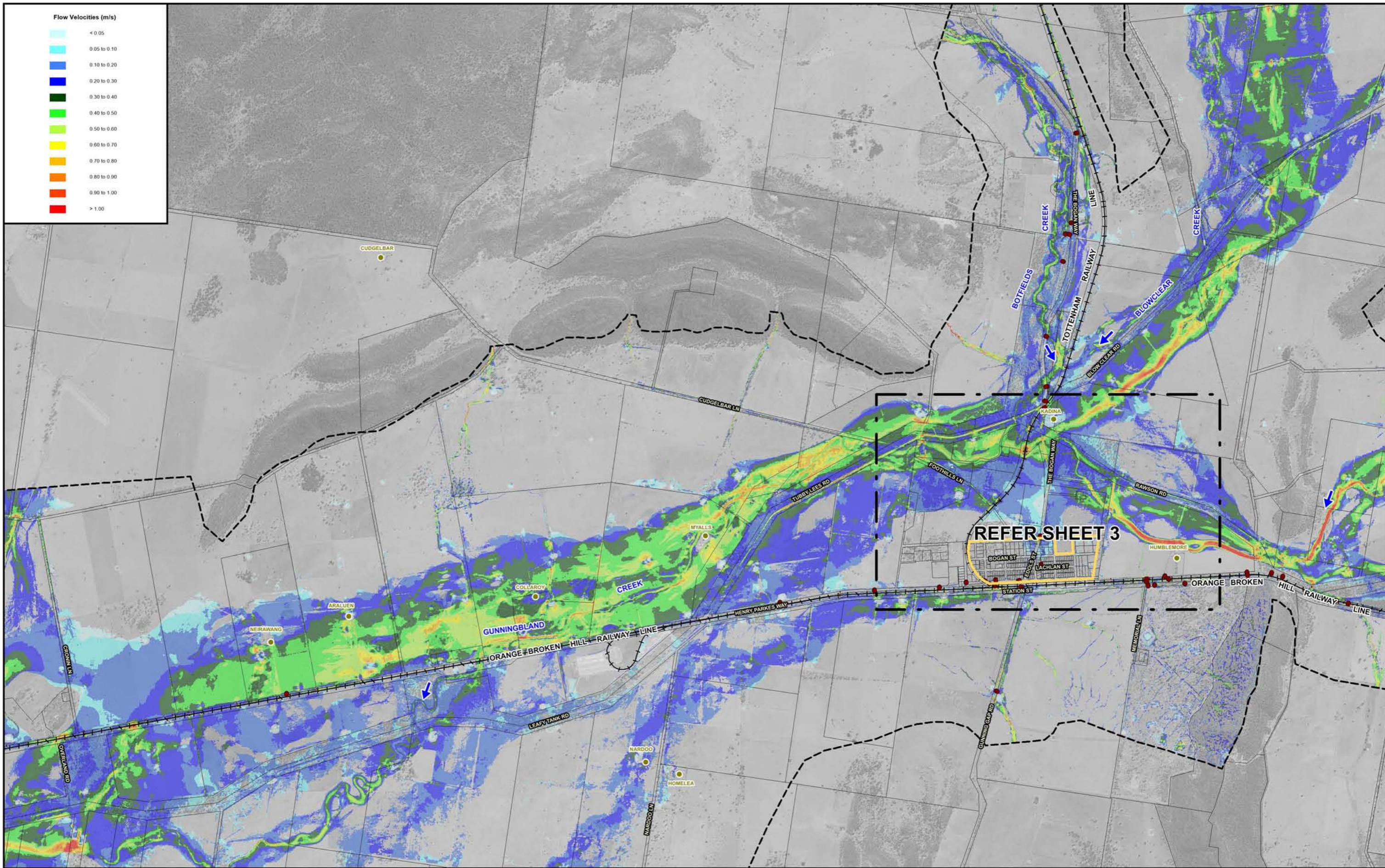
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- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

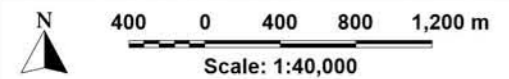
Figure H1.2
(Sheet 1 of 3)

**MAXIMUM FLOW VELOCITIES
10% AEP**



Flow Velocities (m/s)

- <math>< 0.05</math>
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00



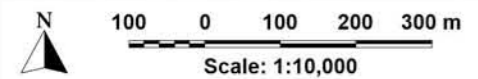
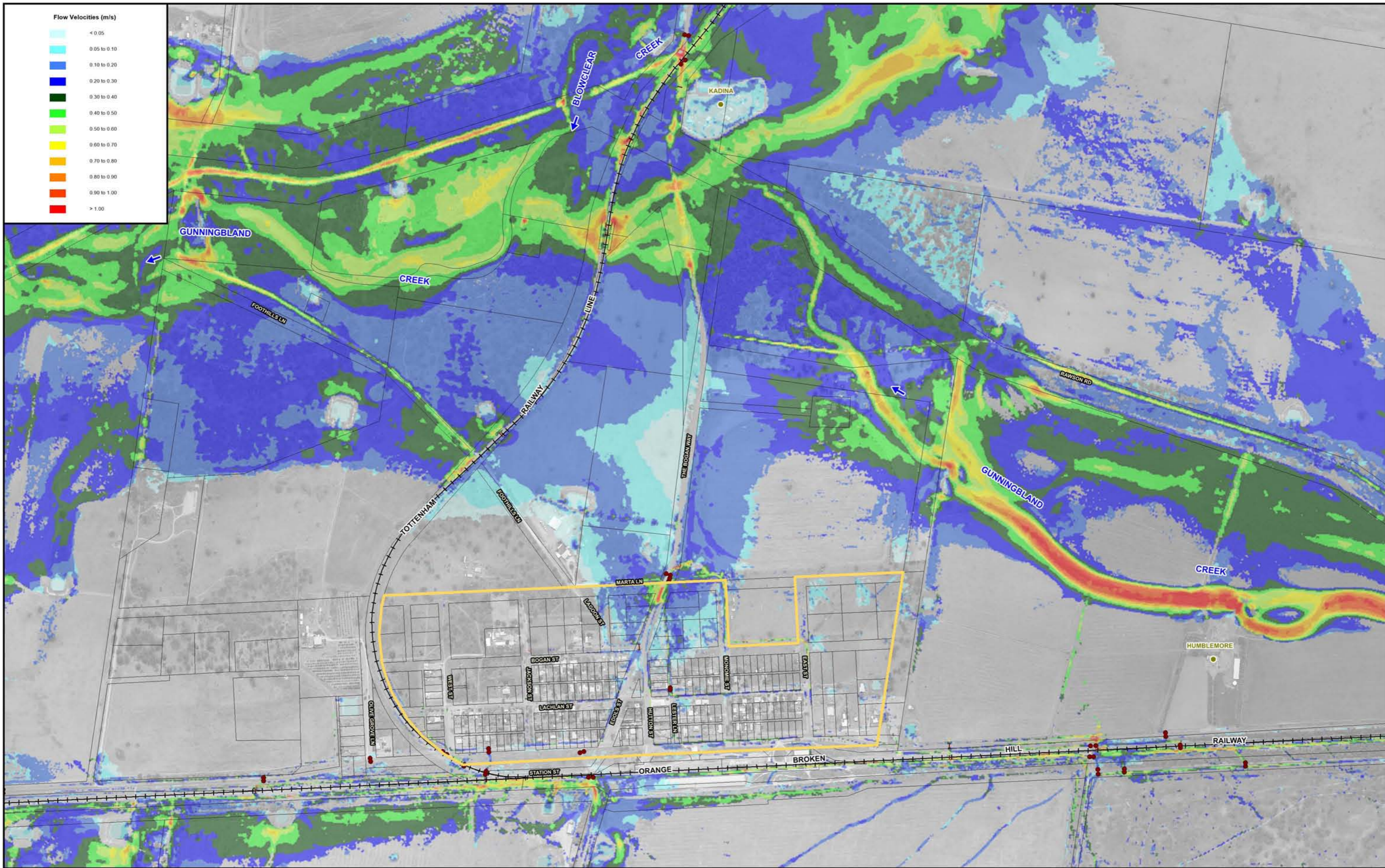
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY



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 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY

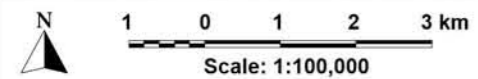


Flow Velocities (m/s)



REFER SHEET 2

BOGAN GATE FLOOD STUDY



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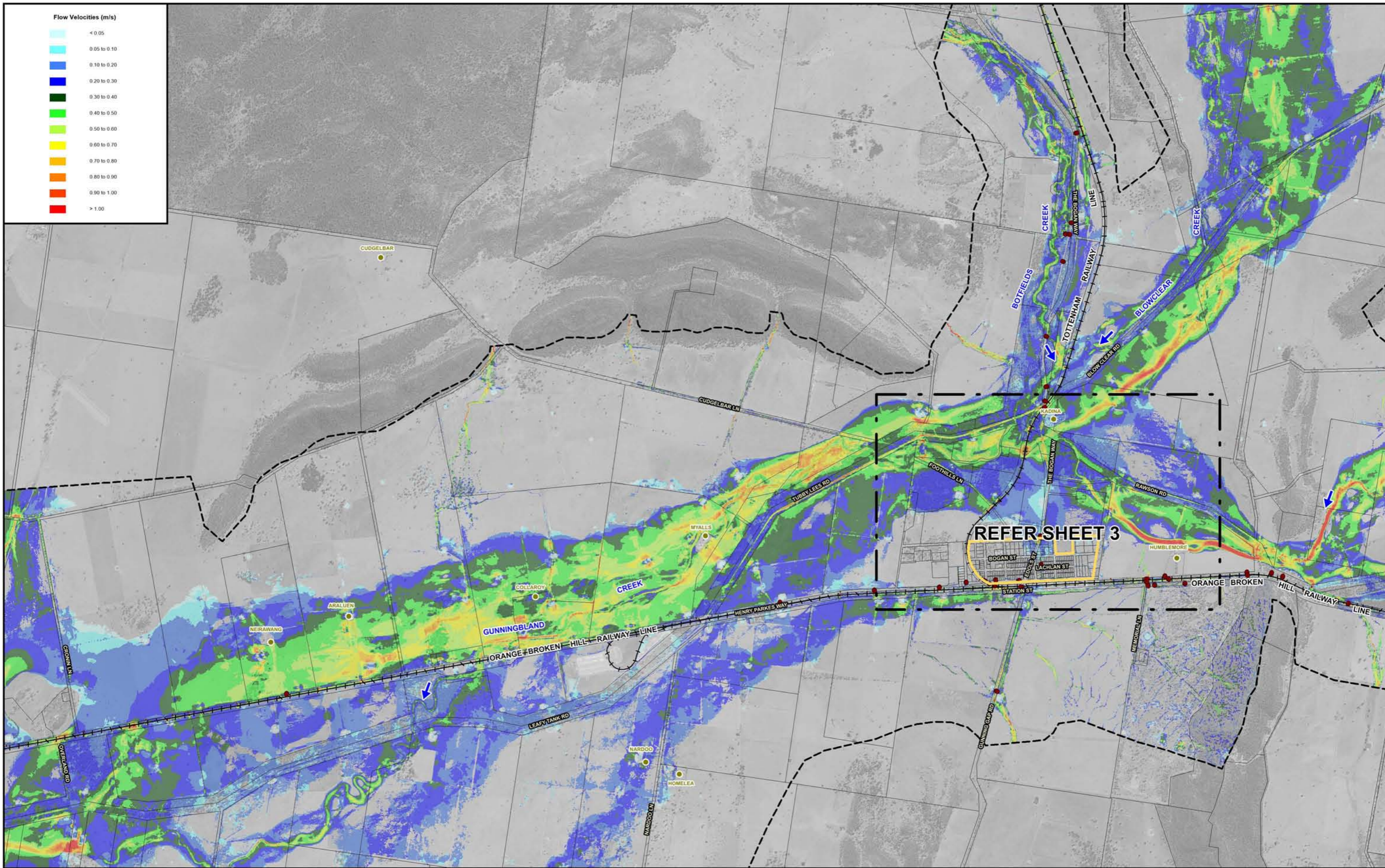
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LEGEND

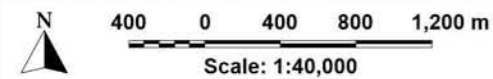
- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

Figure H1.3
(Sheet 1 of 3)

MAXIMUM FLOW VELOCITIES
5% AEP



Flow Velocities (m/s)



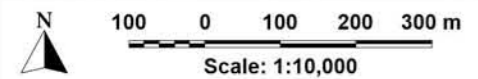
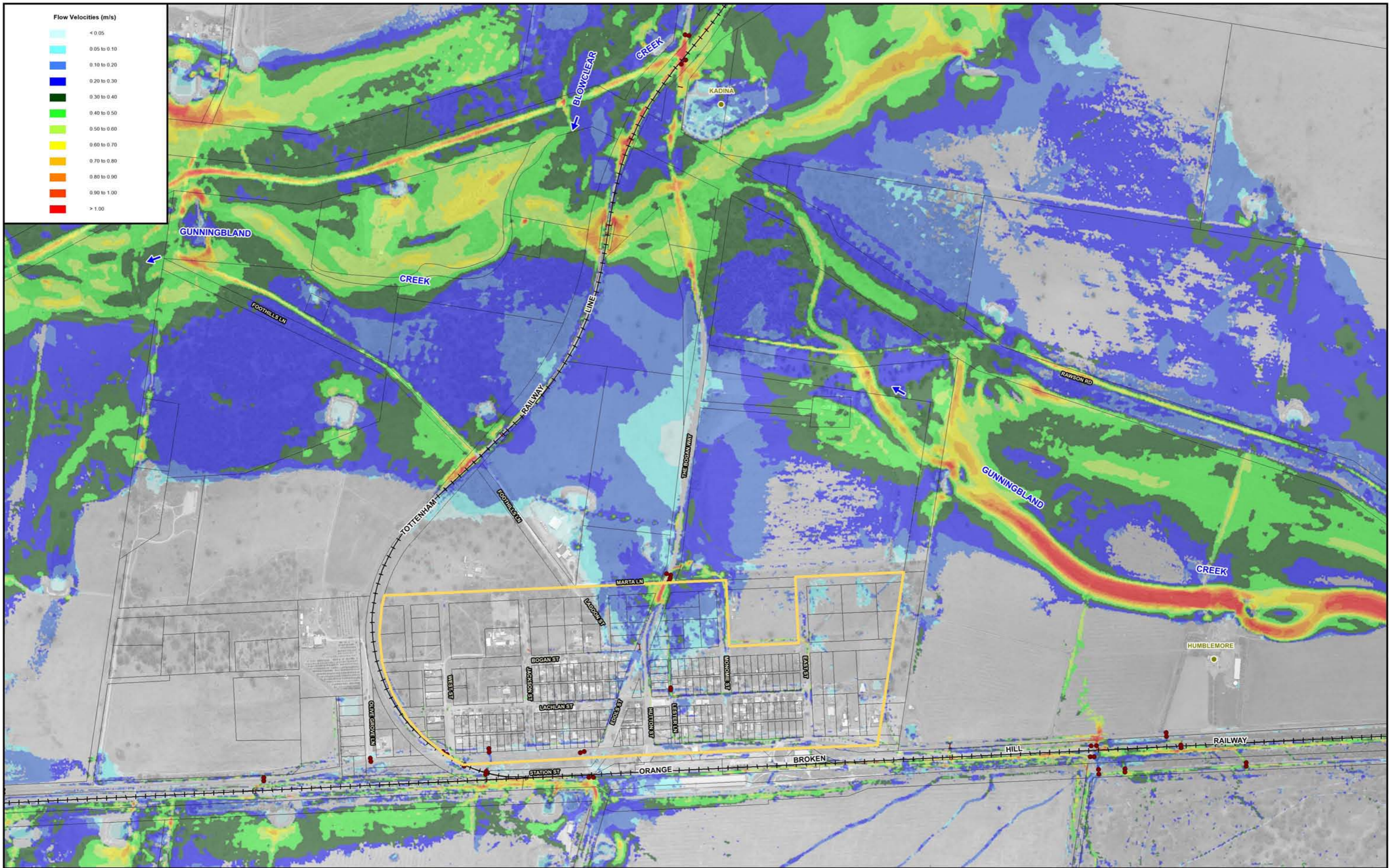
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY



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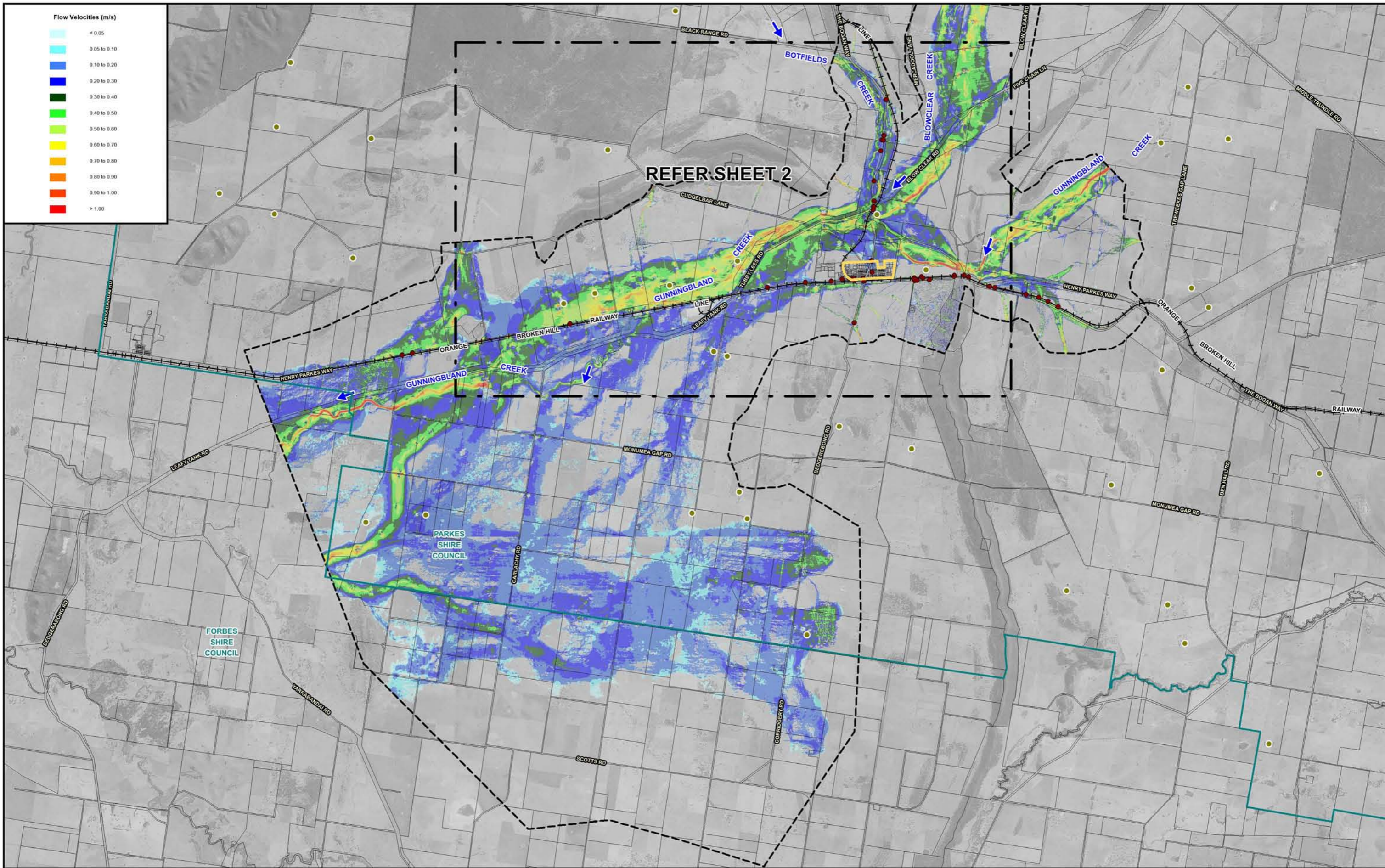
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY

Figure H1.3
(Sheet 3 of 3)

**MAXIMUM FLOW VELOCITIES
5% AEP**

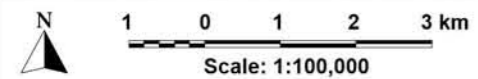


Flow Velocities (m/s)



REFER SHEET 2

BOGAN GATE FLOOD STUDY



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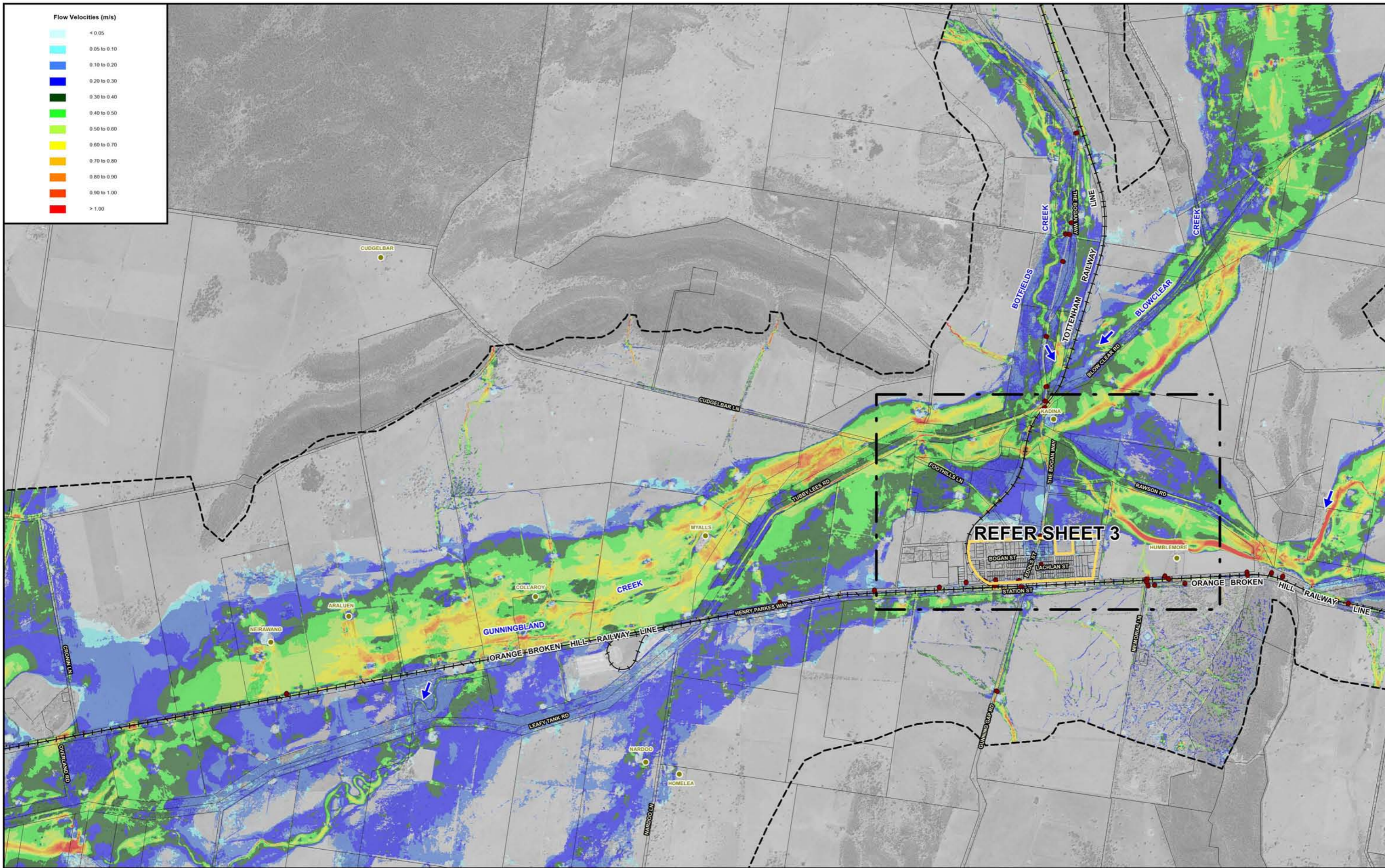
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LEGEND

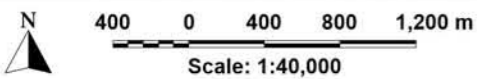
- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

Figure H1.4
(Sheet 1 of 3)

MAXIMUM FLOW VELOCITIES
2% AEP



Flow Velocities (m/s)



NOTE:
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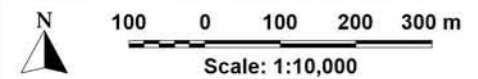
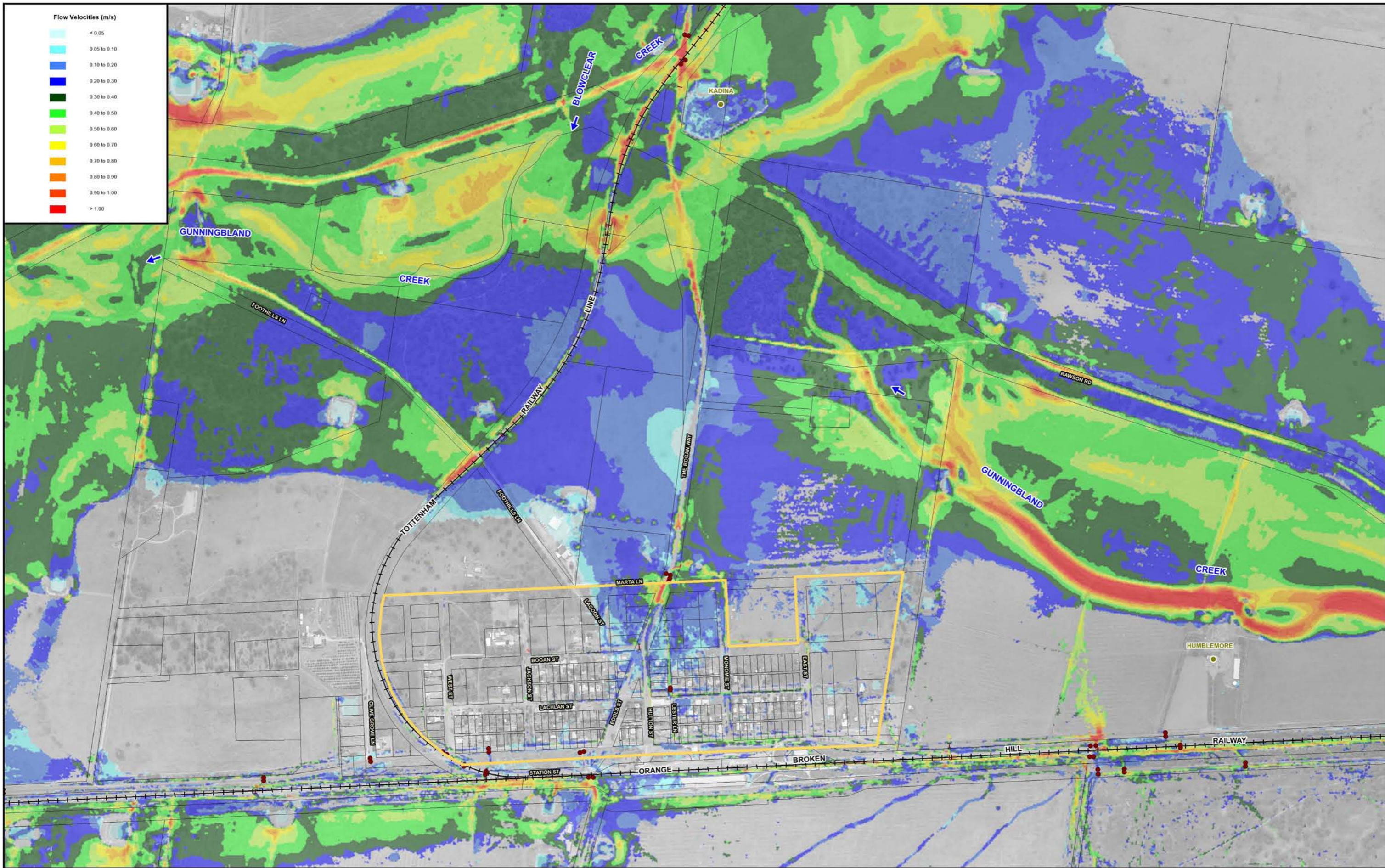
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LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY



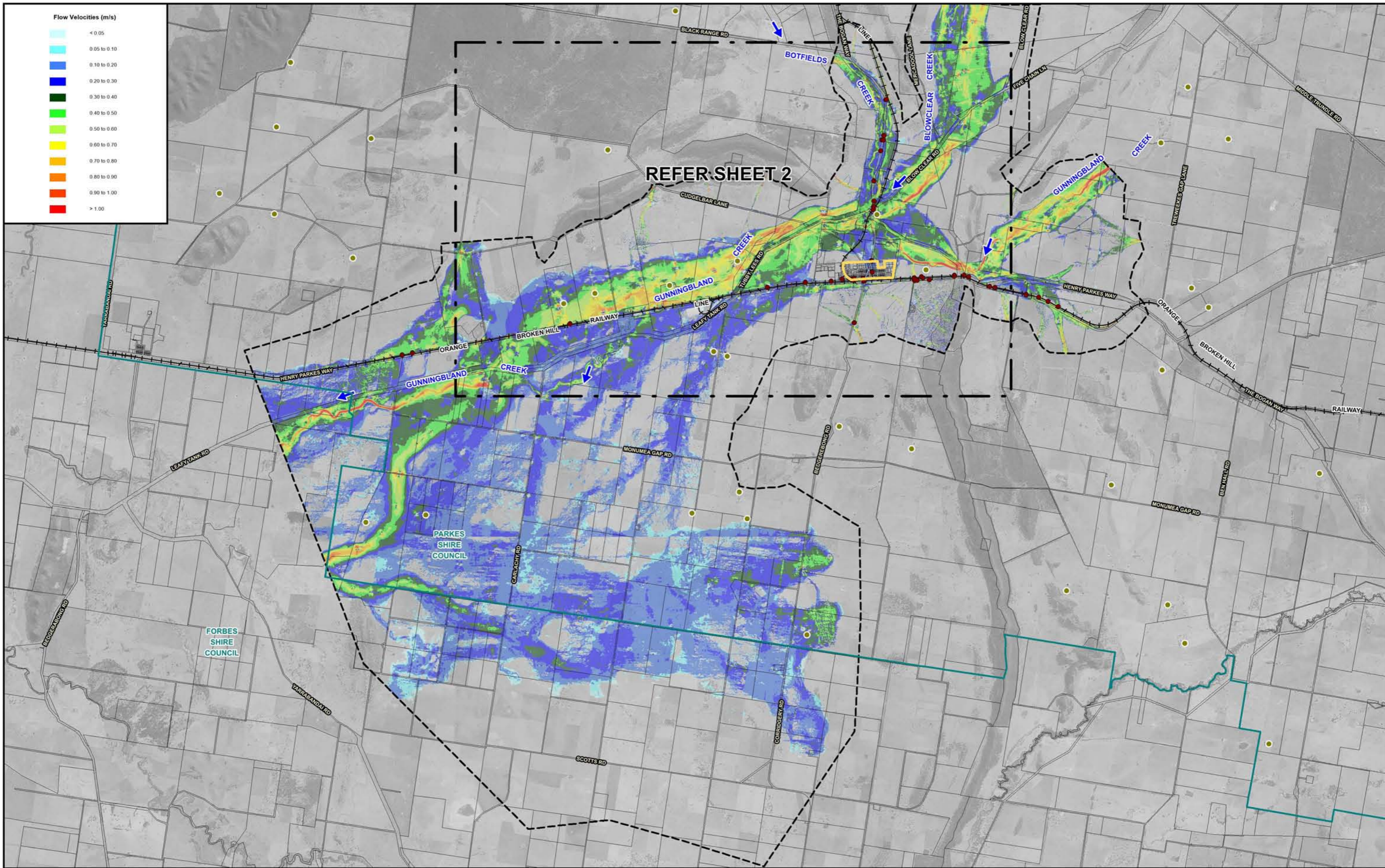
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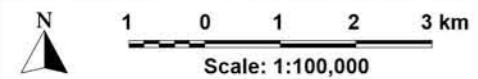
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- LEGEND**
- LGA Boundary
 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

BOGAN GATE FLOOD STUDY



REFER SHEET 2



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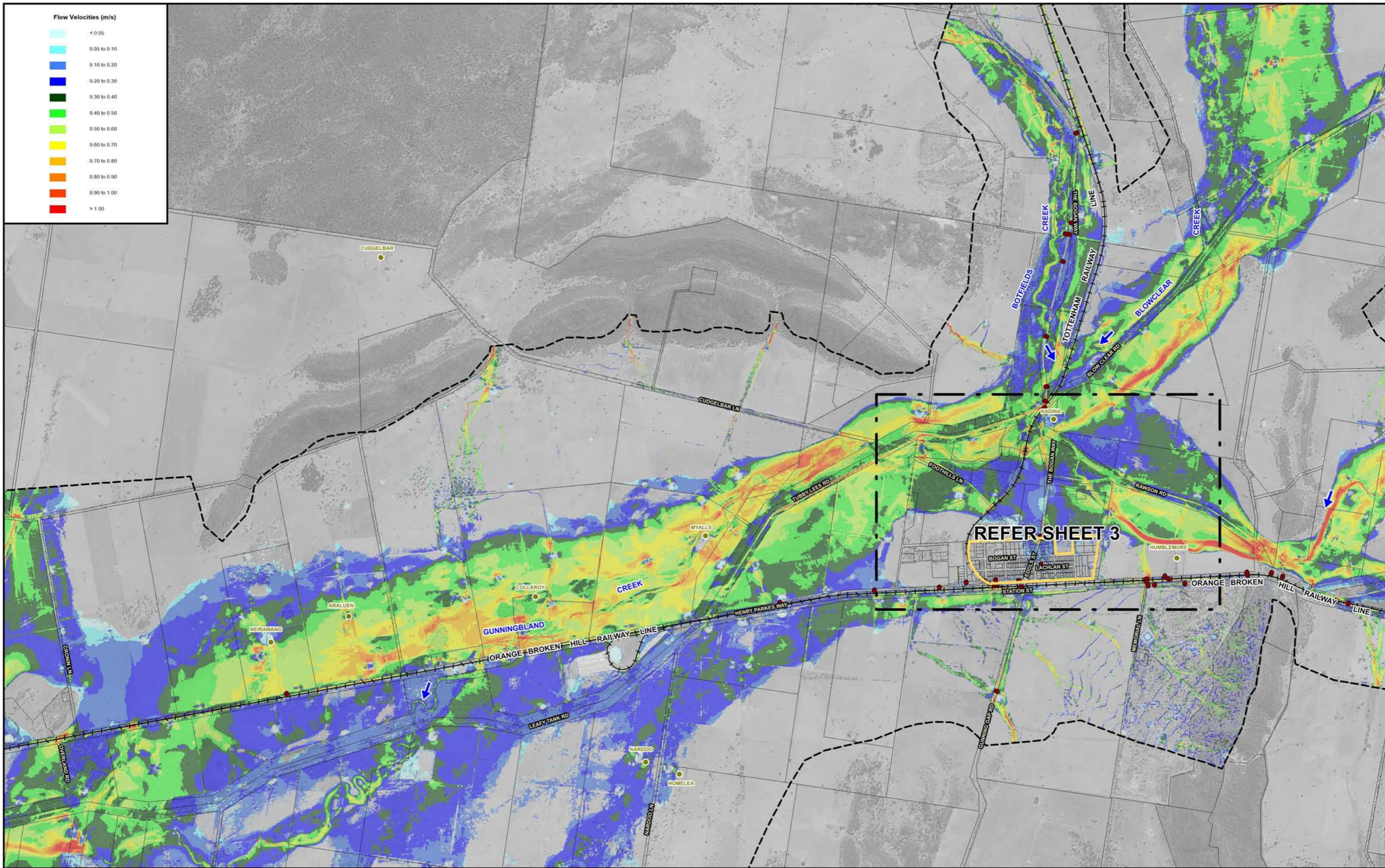
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- LGA Boundary
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 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

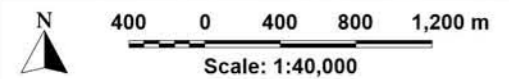
BOGAN GATE FLOOD STUDY

Figure H1.5
(Sheet 1 of 3)

**MAXIMUM FLOW VELOCITIES
1% AEP**



Flow Velocities (m/s)



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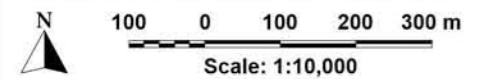
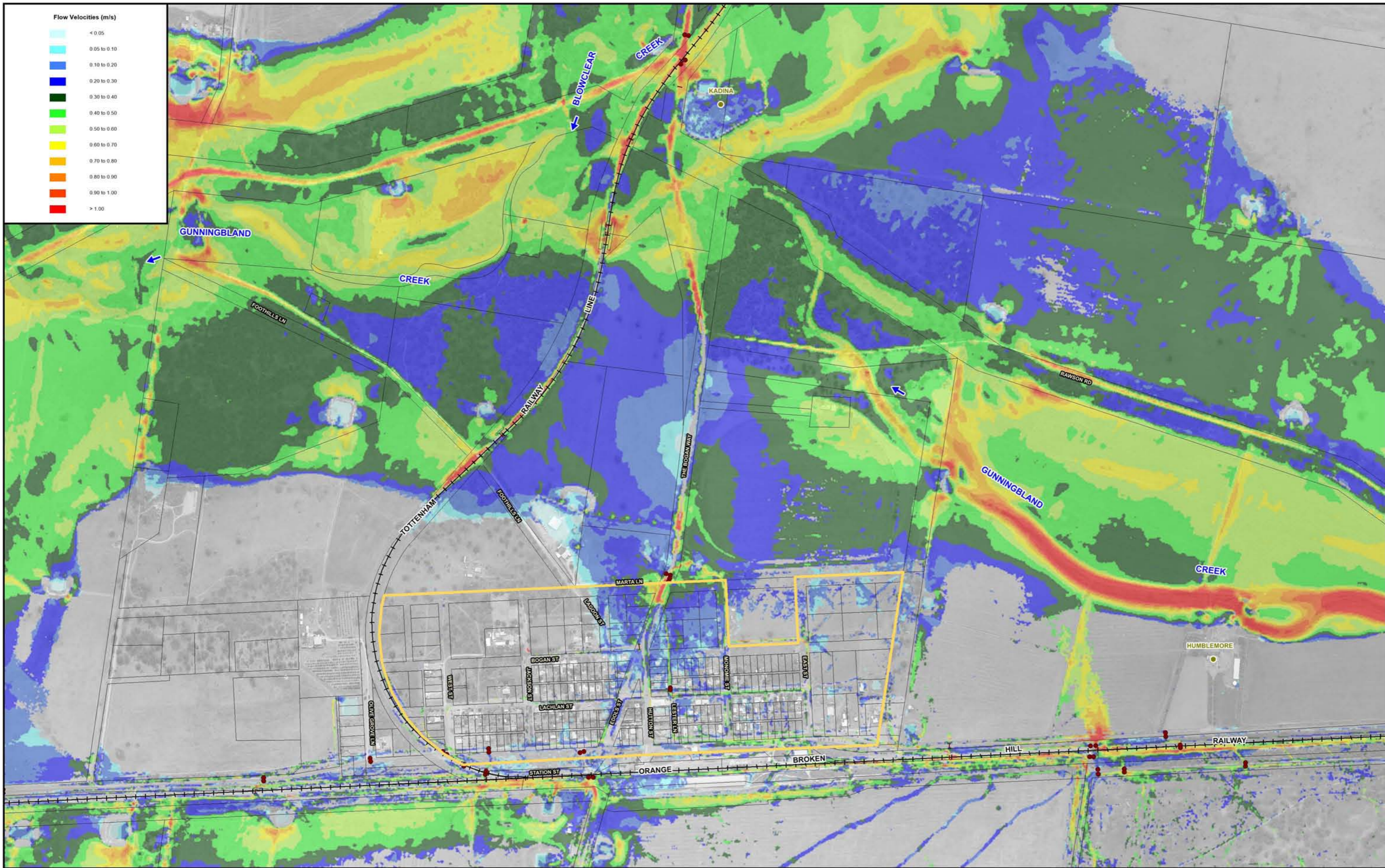
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LEGEND

- LGA Boundary
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BOGAN GATE FLOOD STUDY



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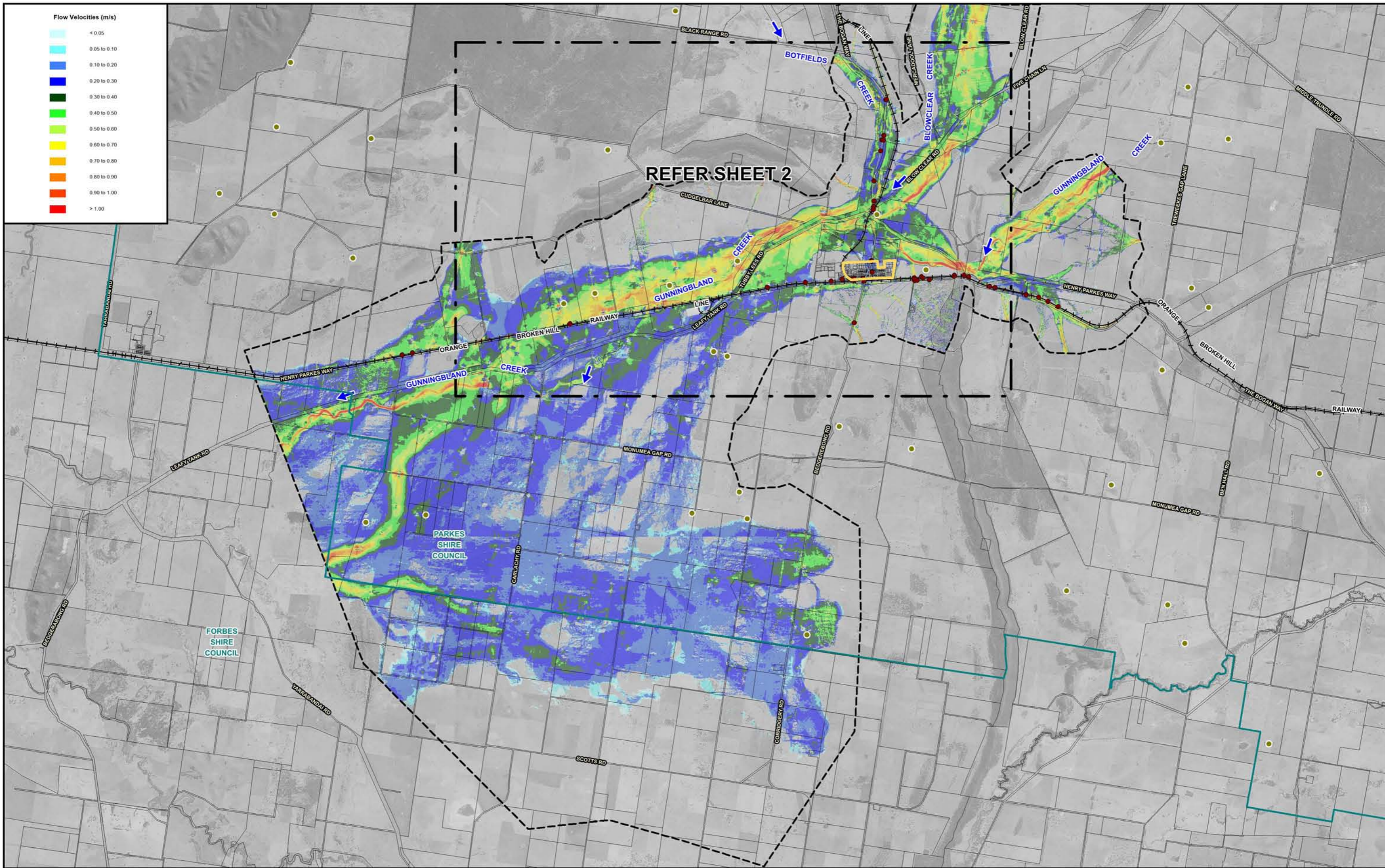
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 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

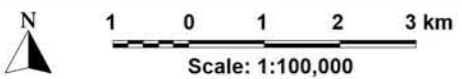
BOGAN GATE FLOOD STUDY

Figure H1.5
(Sheet 3 of 3)

MAXIMUM FLOW VELOCITIES
1% AEP



REFER SHEET 2



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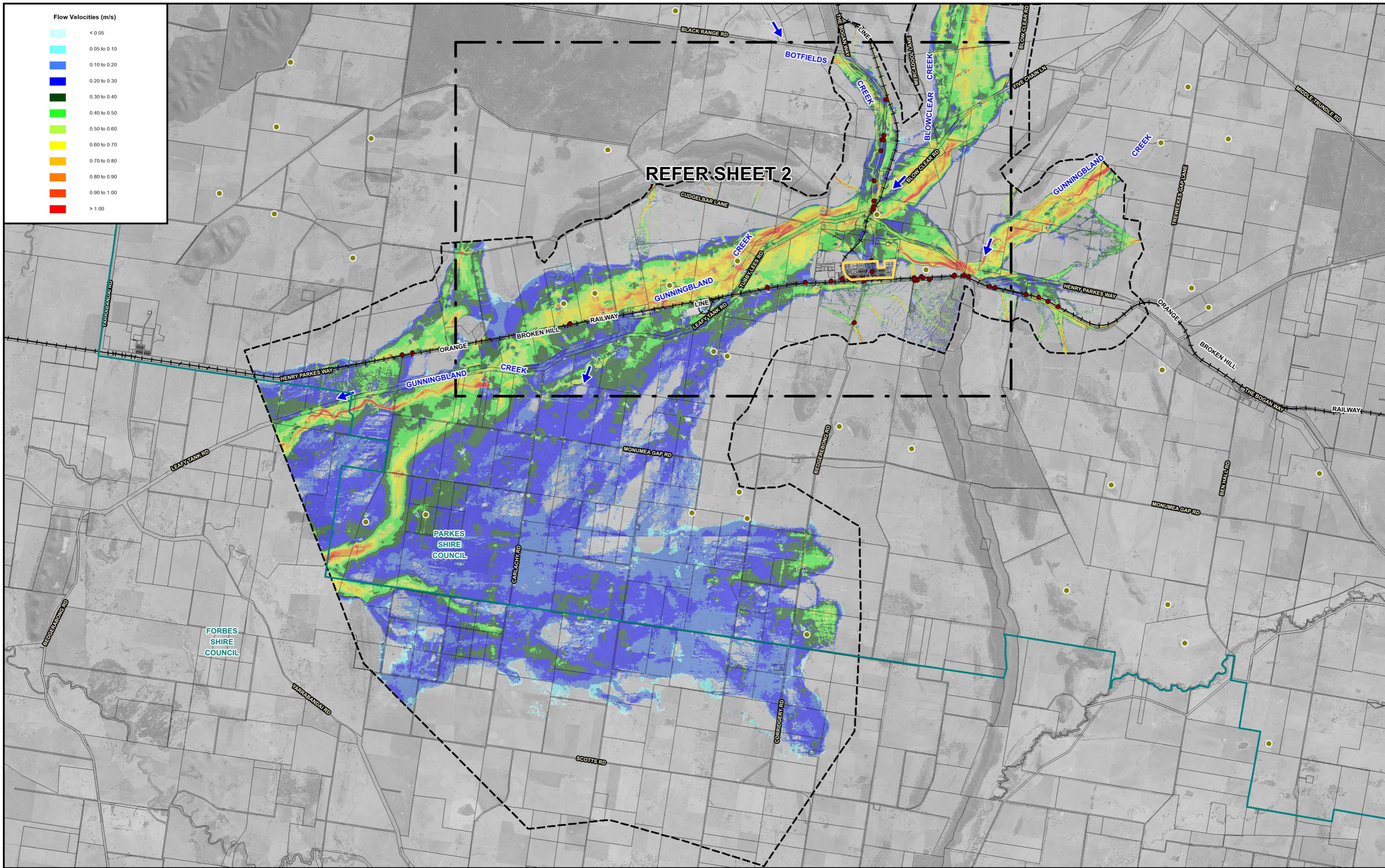
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 - Two-Dimensional Model Boundary
 - Modelled Stormwater Drainage System
 - Village Centre
 - Homesteads

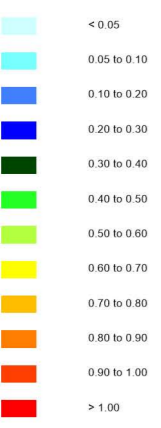
BOGAN GATE FLOOD STUDY

Figure H1.6
(Sheet 1 of 3)

MAXIMUM FLOW VELOCITIES
0.5% AEP



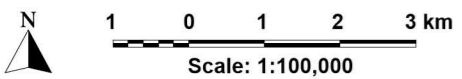
Flow Velocities (m/s)



REFER SHEET 2

PARKES SHIRE COUNCIL

FORBES SHIRE COUNCIL



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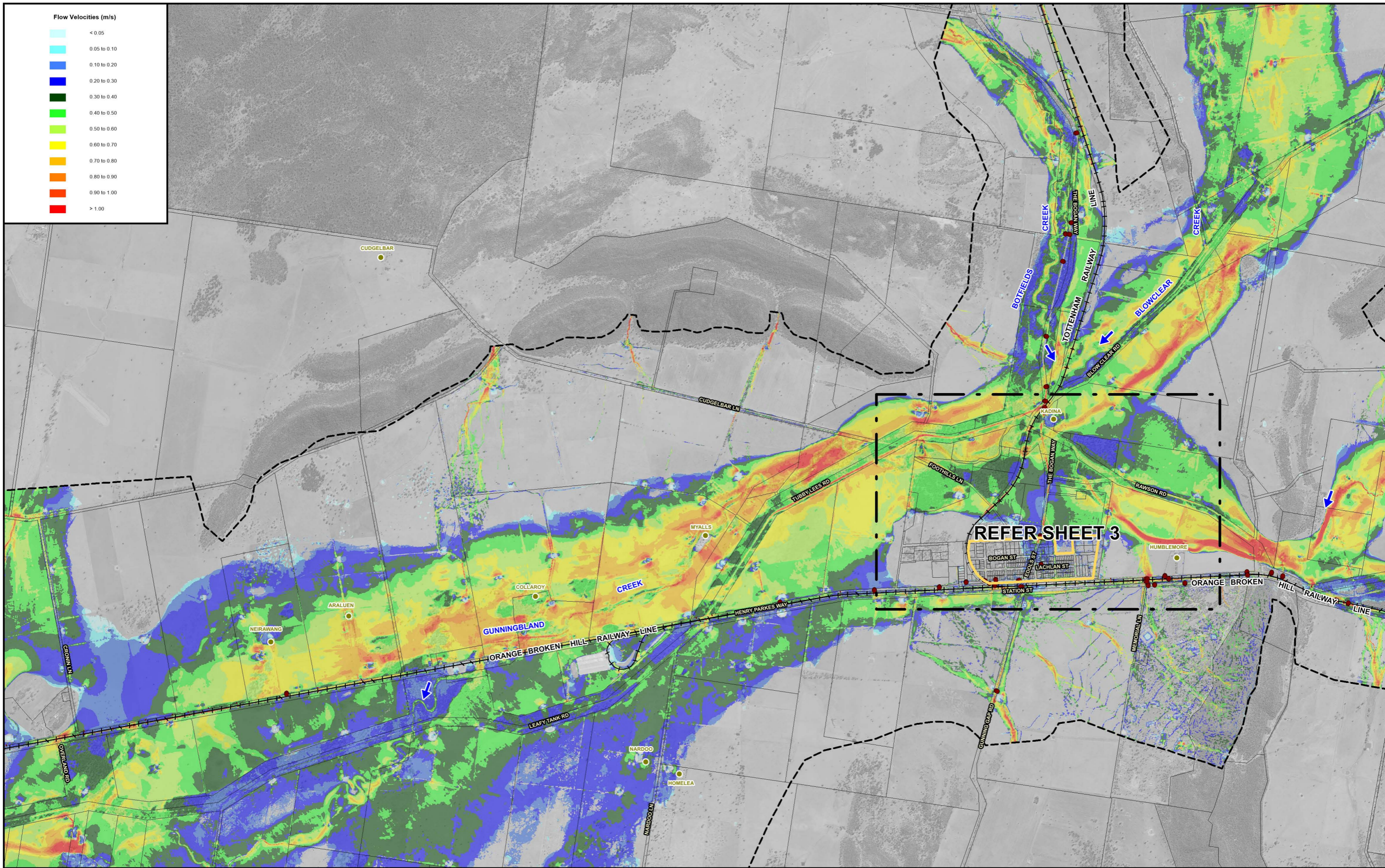
LEGEND

- LGA Boundary
- Two-Dimensional Model Boundary
- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY

Figure H1.7
(Sheet 1 of 3)

MAXIMUM FLOW VELOCITIES
0.2% AEP



Flow Velocities (m/s)

- <math>< 0.05</math>
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00



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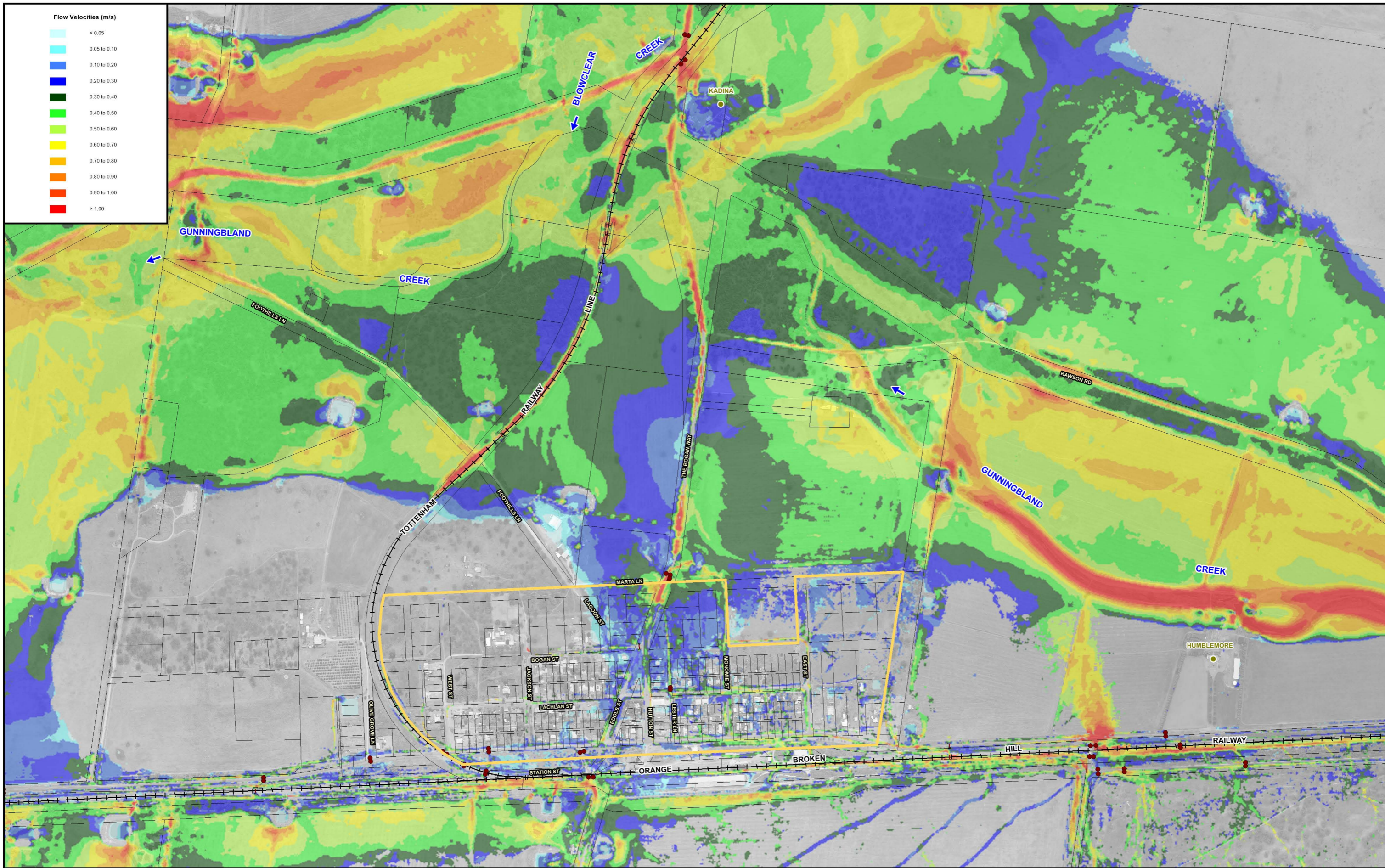
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LEGEND

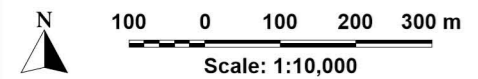
- LGA Boundary
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- Modelled Stormwater Drainage System
- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY



Flow Velocities (m/s)

- <math>< 0.05</math>
- 0.05 to 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
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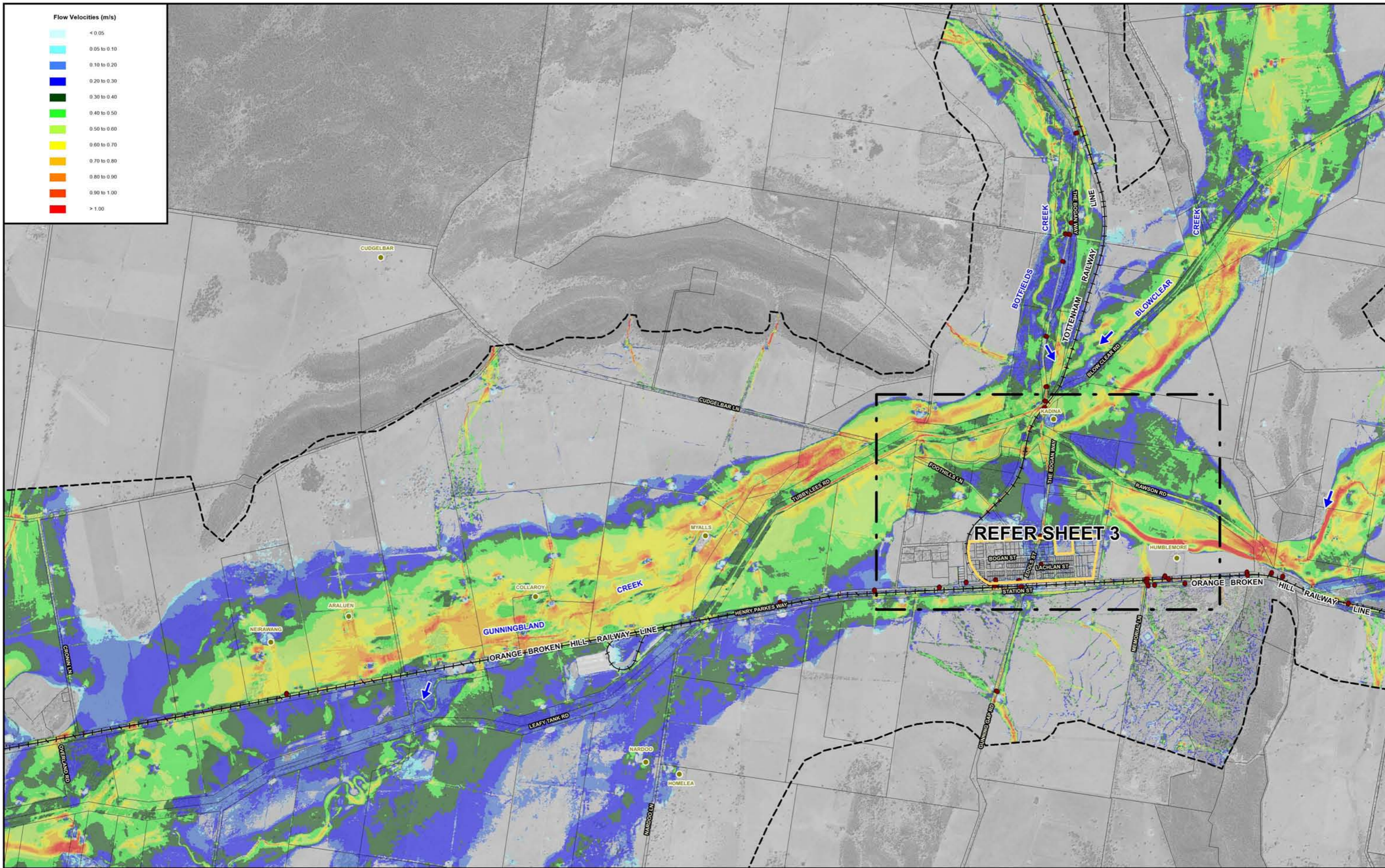
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- Village Centre
- Homesteads

BOGAN GATE FLOOD STUDY

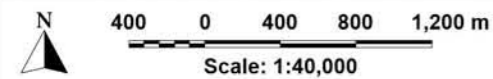
Figure H1.7
(Sheet 3 of 3)

MAXIMUM FLOW VELOCITIES
0.2% AEP



Flow Velocities (m/s)

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- 0.05 to 0.10
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- 0.50 to 0.60
- 0.60 to 0.70
- 0.70 to 0.80
- 0.80 to 0.90
- 0.90 to 1.00
- > 1.00



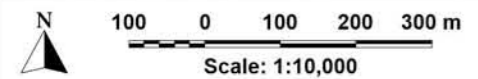
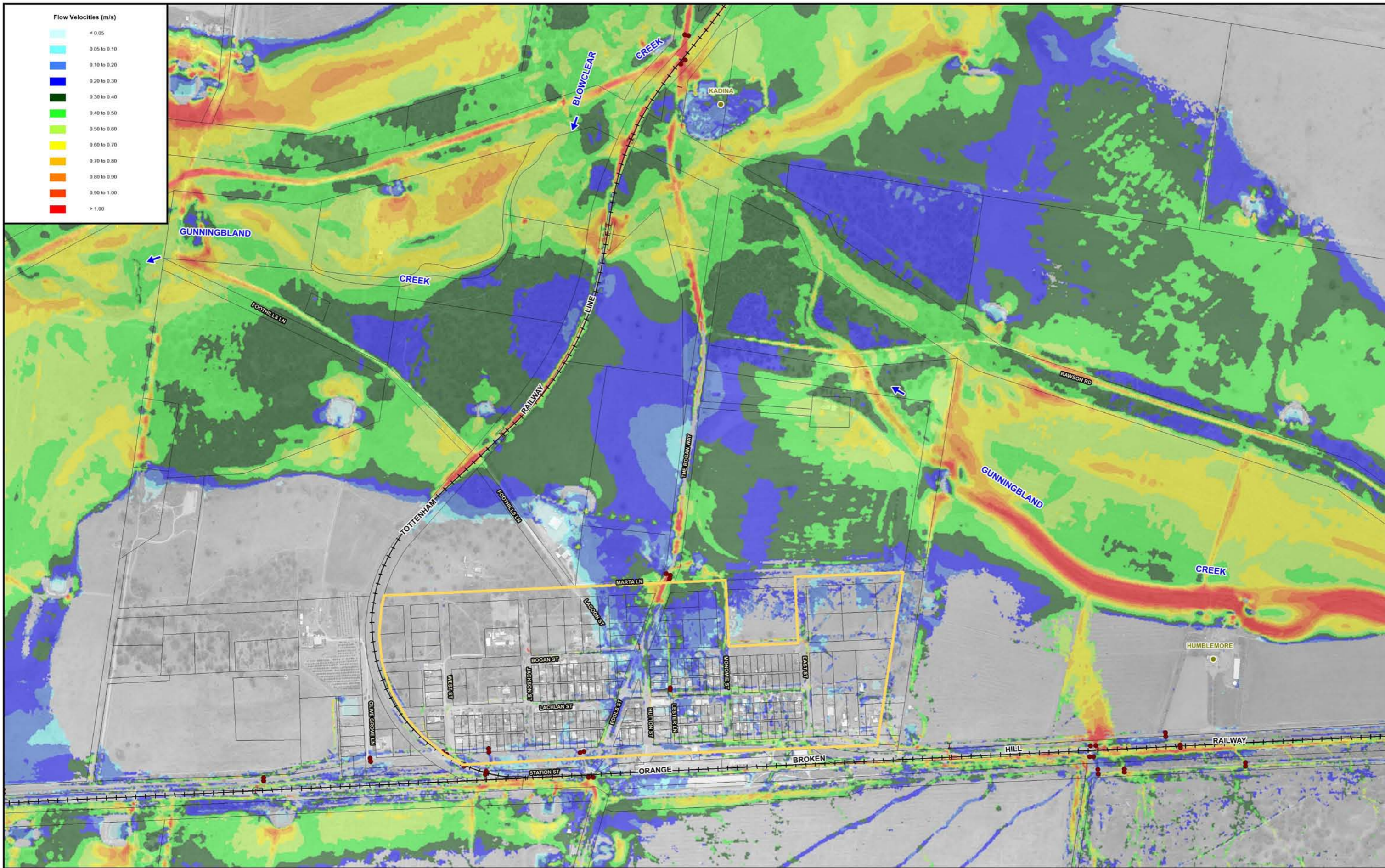
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- Village Centre
- Homesteads



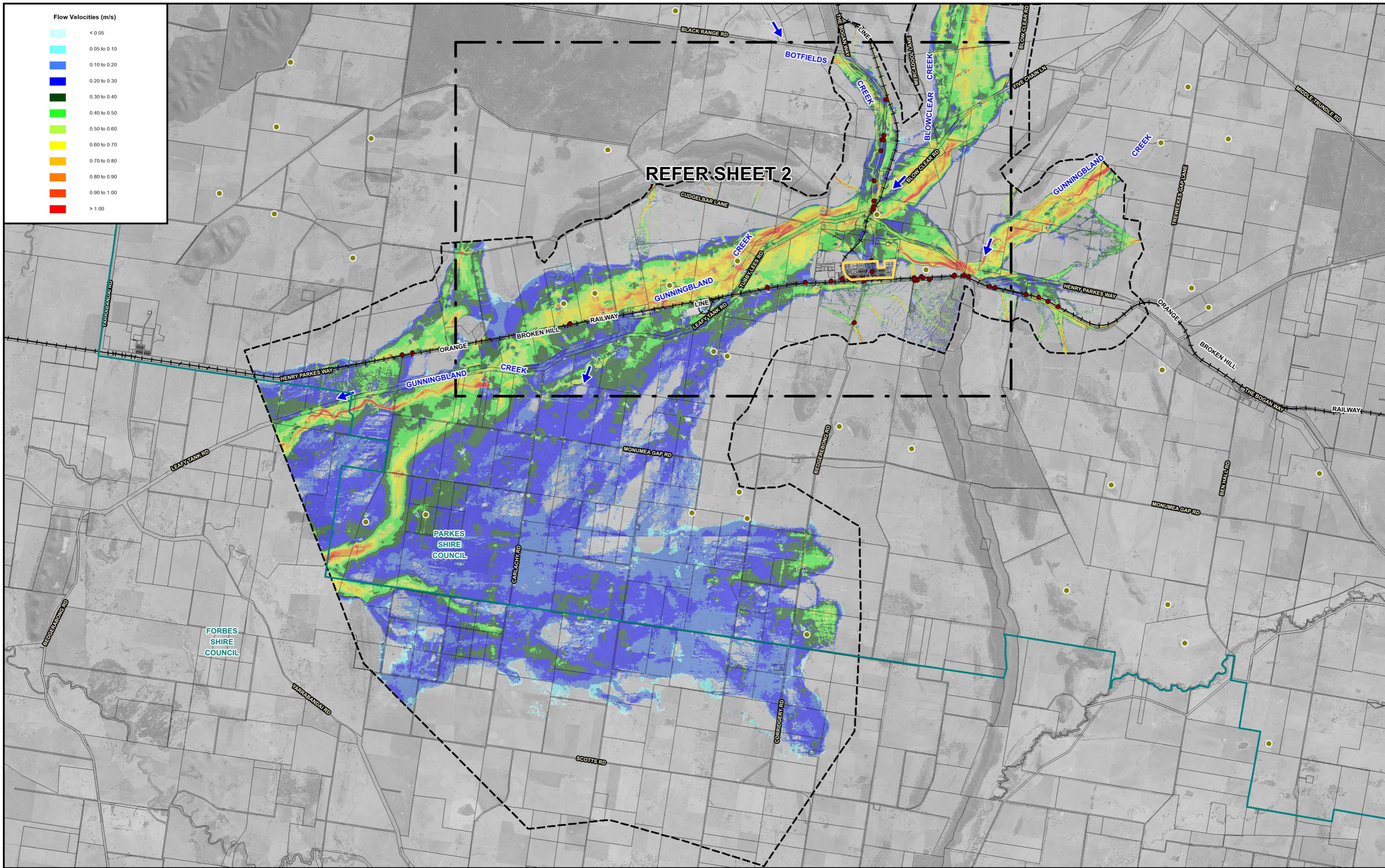
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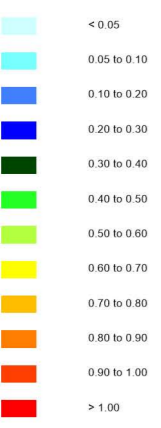
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BOGAN GATE FLOOD STUDY



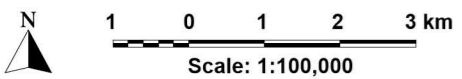
Flow Velocities (m/s)



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PARKES SHIRE COUNCIL

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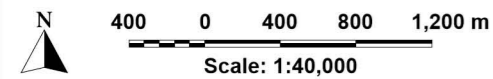
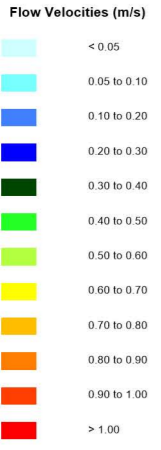
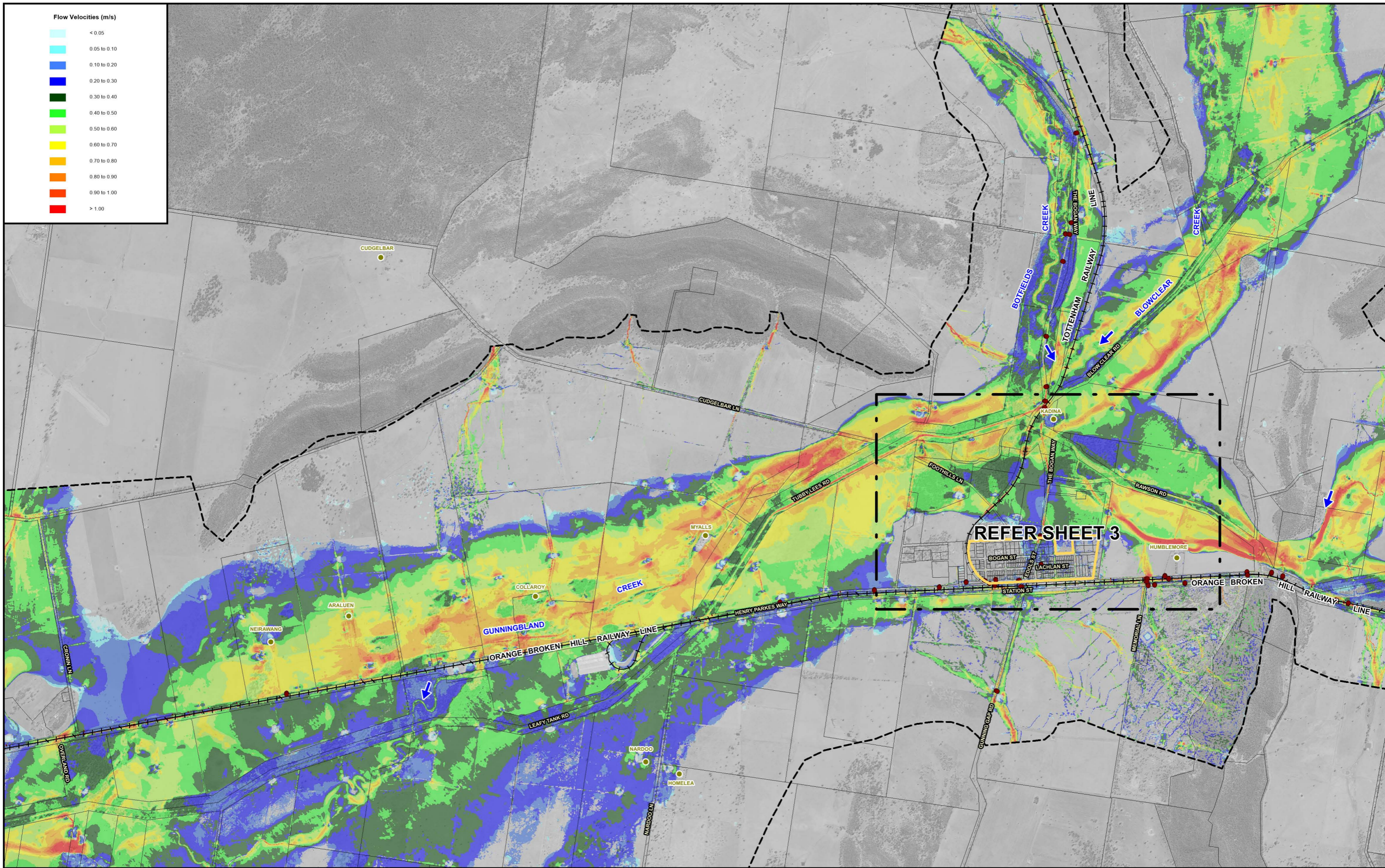
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BOGAN GATE FLOOD STUDY

Figure H1.7
(Sheet 1 of 3)

MAXIMUM FLOW VELOCITIES
0.2% AEP



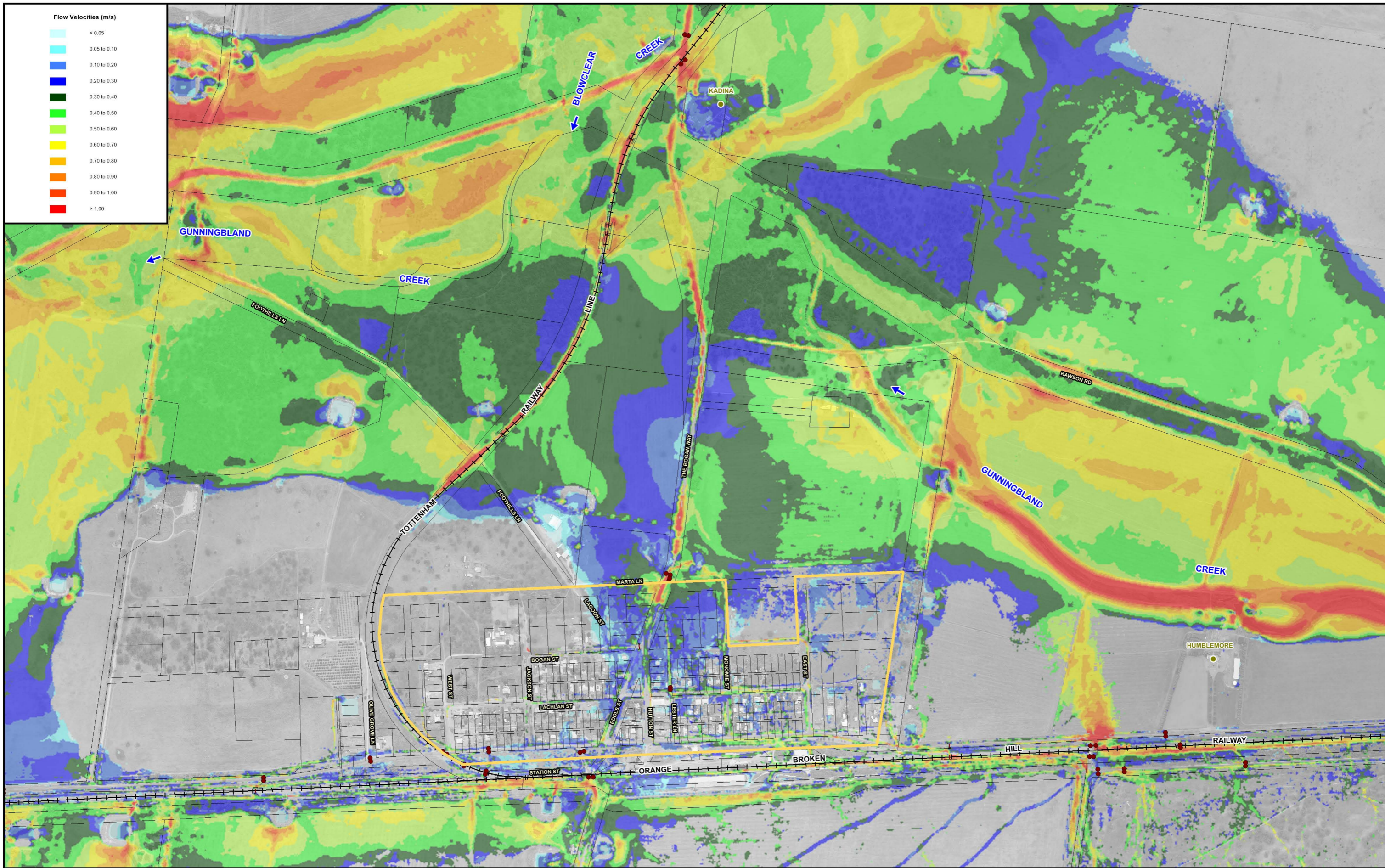
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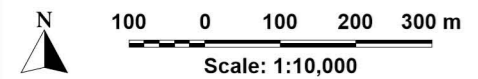
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BOGAN GATE FLOOD STUDY



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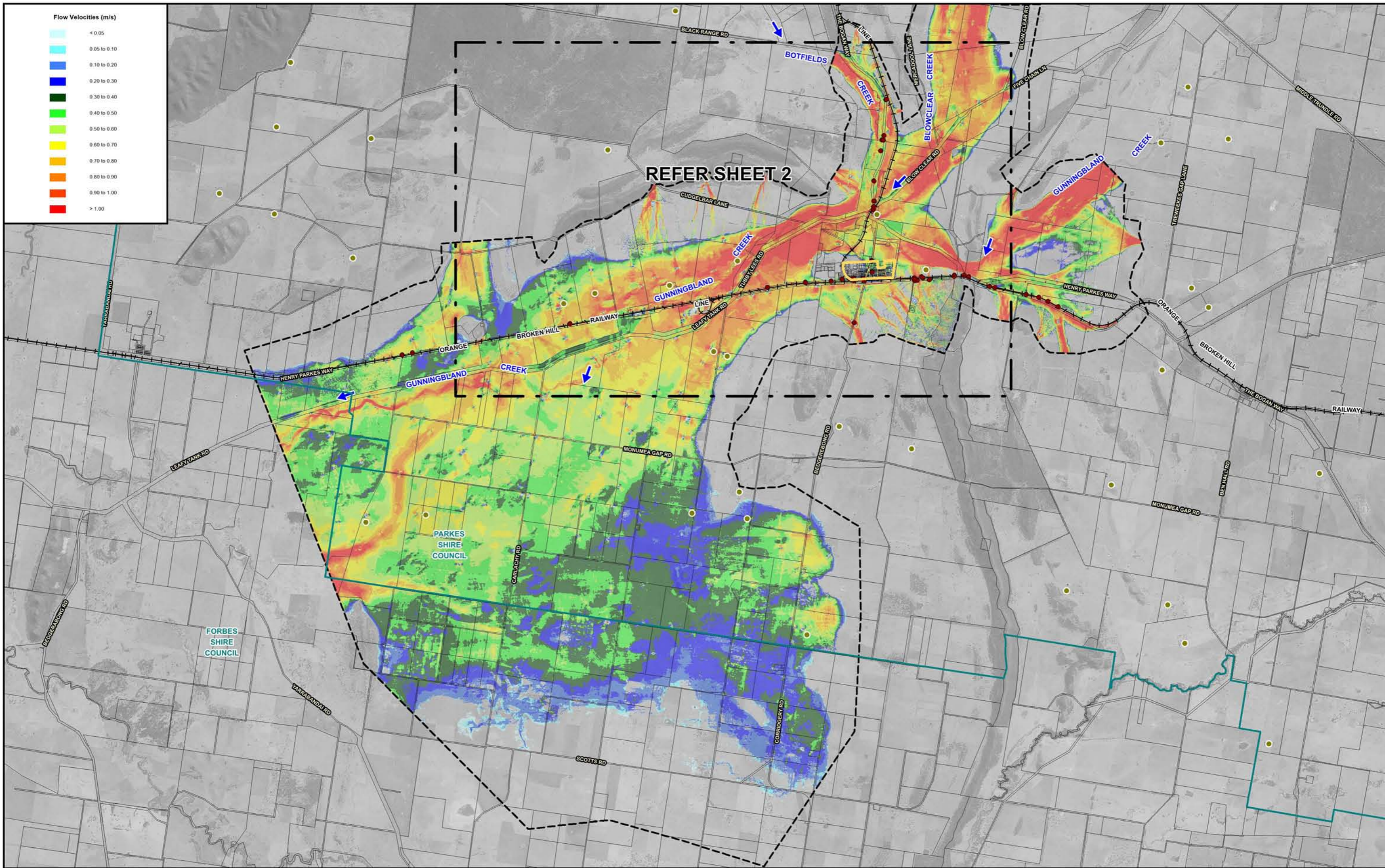
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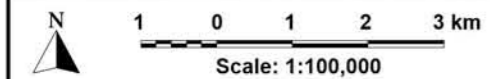
BOGAN GATE FLOOD STUDY

Figure H1.7
(Sheet 3 of 3)

MAXIMUM FLOW VELOCITIES
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REFER SHEET 2



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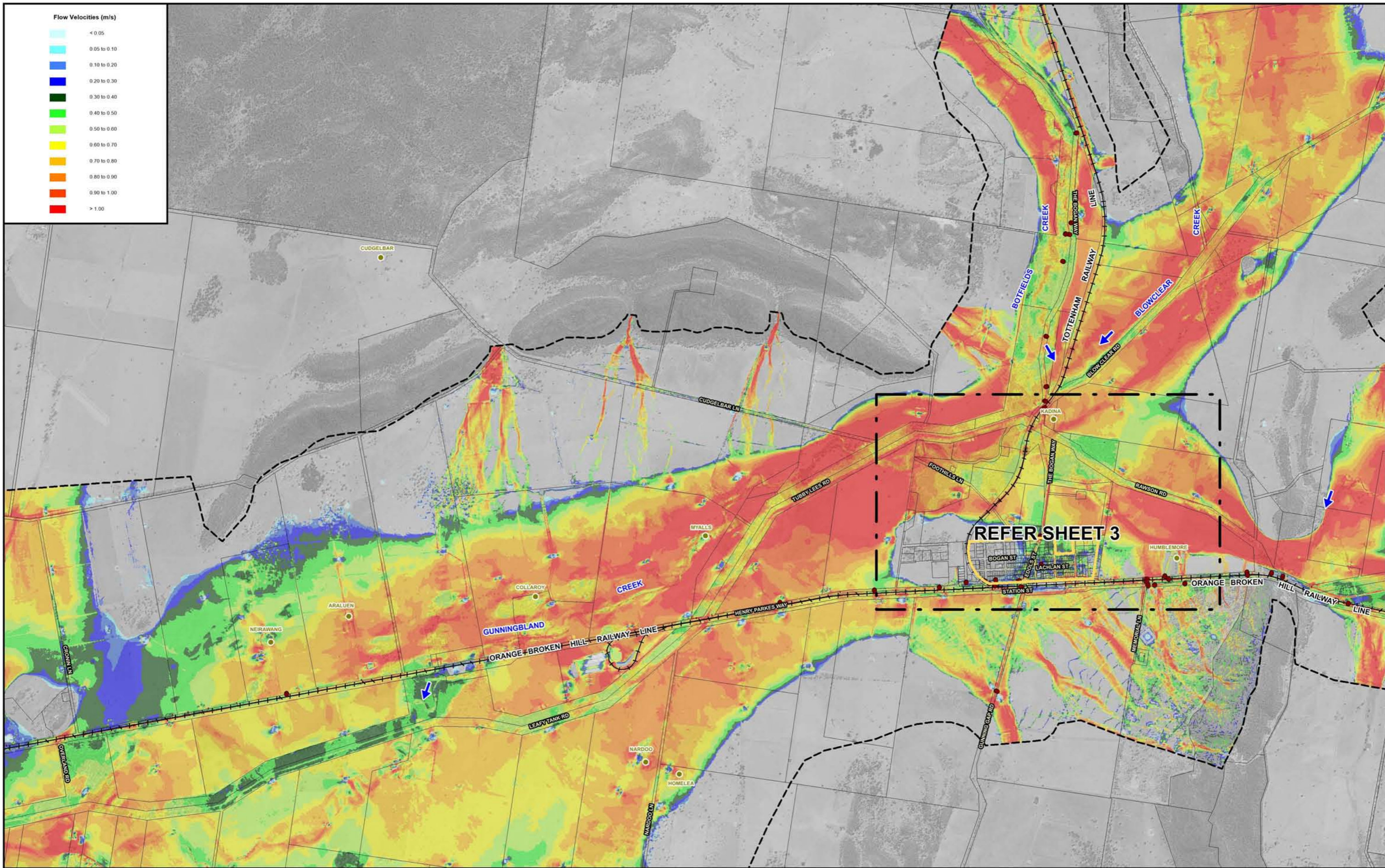
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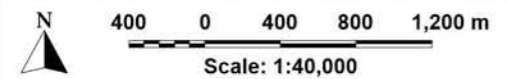
BOGAN GATE FLOOD STUDY

Figure H1.8
(Sheet 1 of 3)

**MAXIMUM FLOW VELOCITIES
PMF**



Flow Velocities (m/s)



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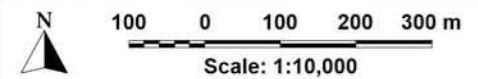
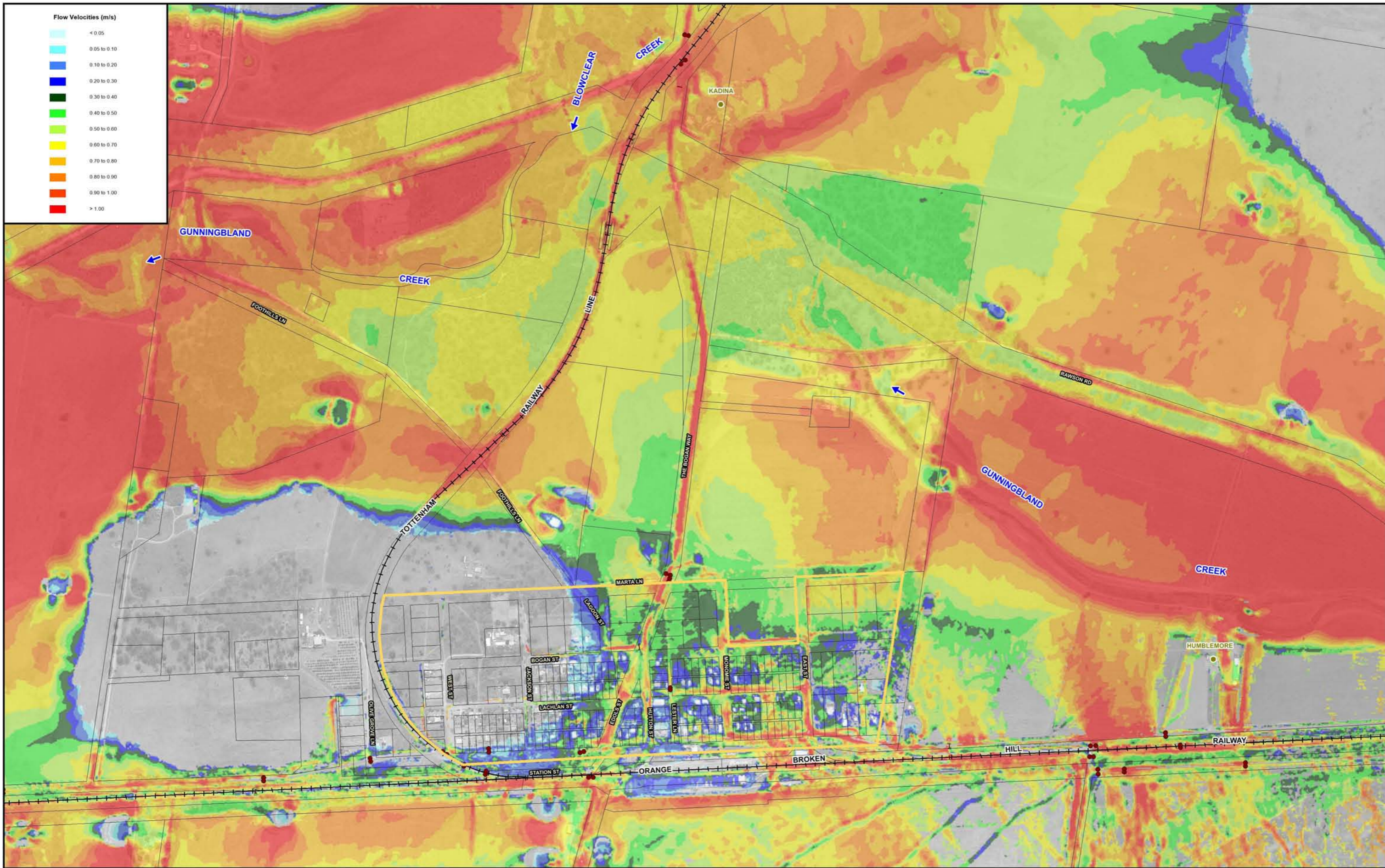
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BOGAN GATE FLOOD STUDY

Figure H1.8
(Sheet 3 of 3)

**MAXIMUM FLOW VELOCITIES
PMF**