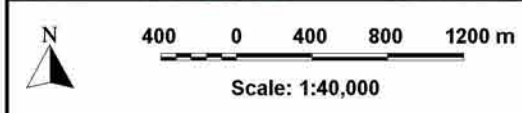
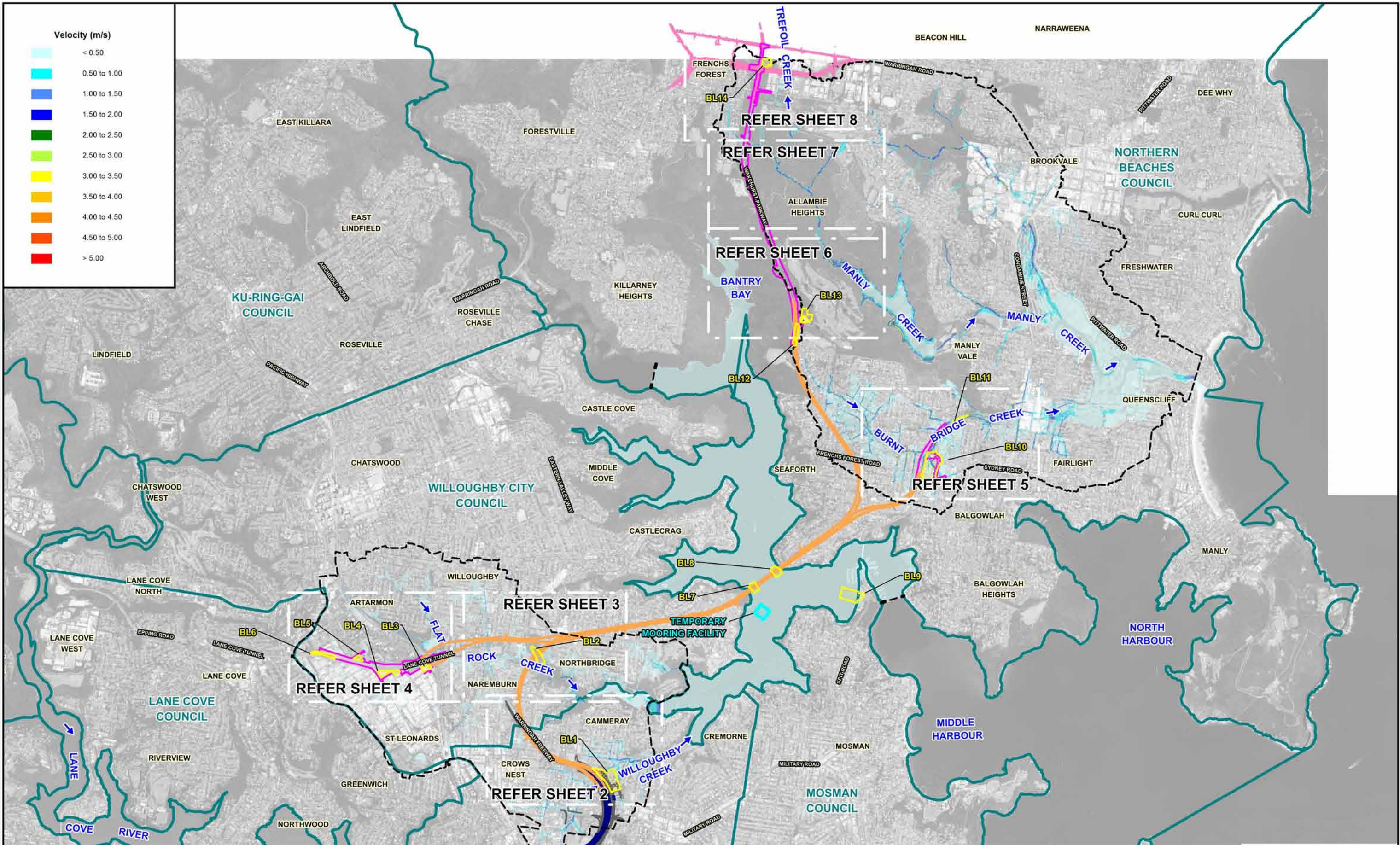


## **Annexure A**

**Figures showing maximum flow velocities and duration of inundation under present day and operational conditions 10% and 1% AEP storm events**





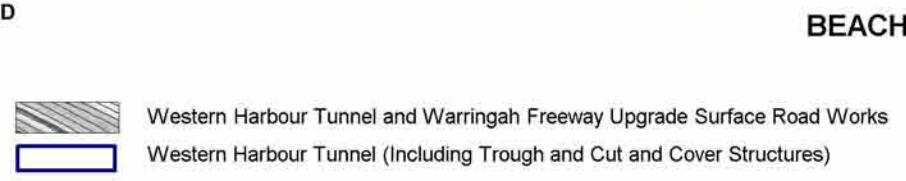
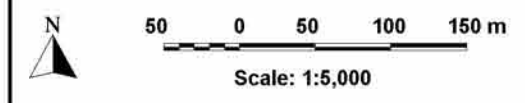
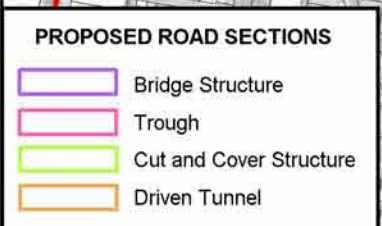
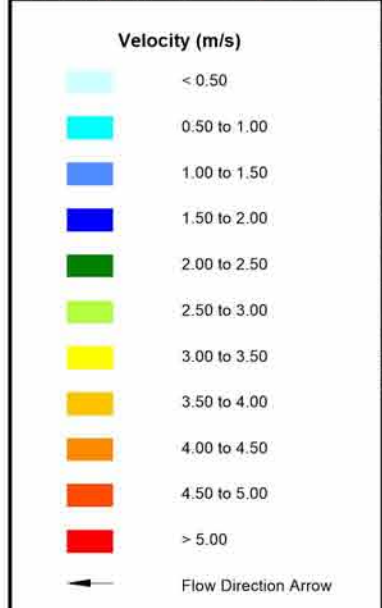
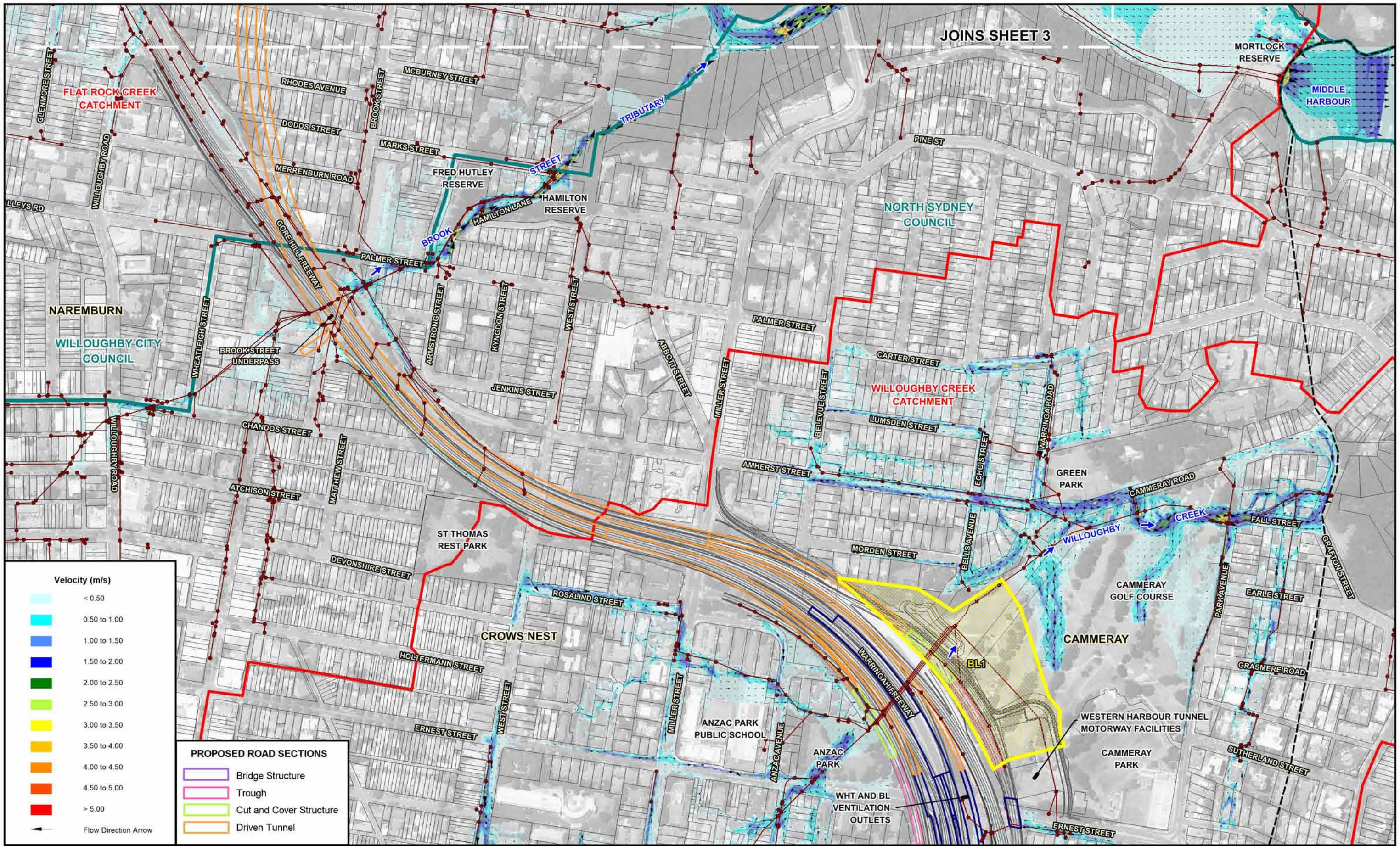
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - BL2 Construction Support Site and Identifier
  - Project Surface Road Works Footprint
  - Driven Tunnel
  - Northern Beaches Hospital Surface Road Works
  - Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
  - Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**



Figure A.1  
(Sheet 1 of 8)  
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT



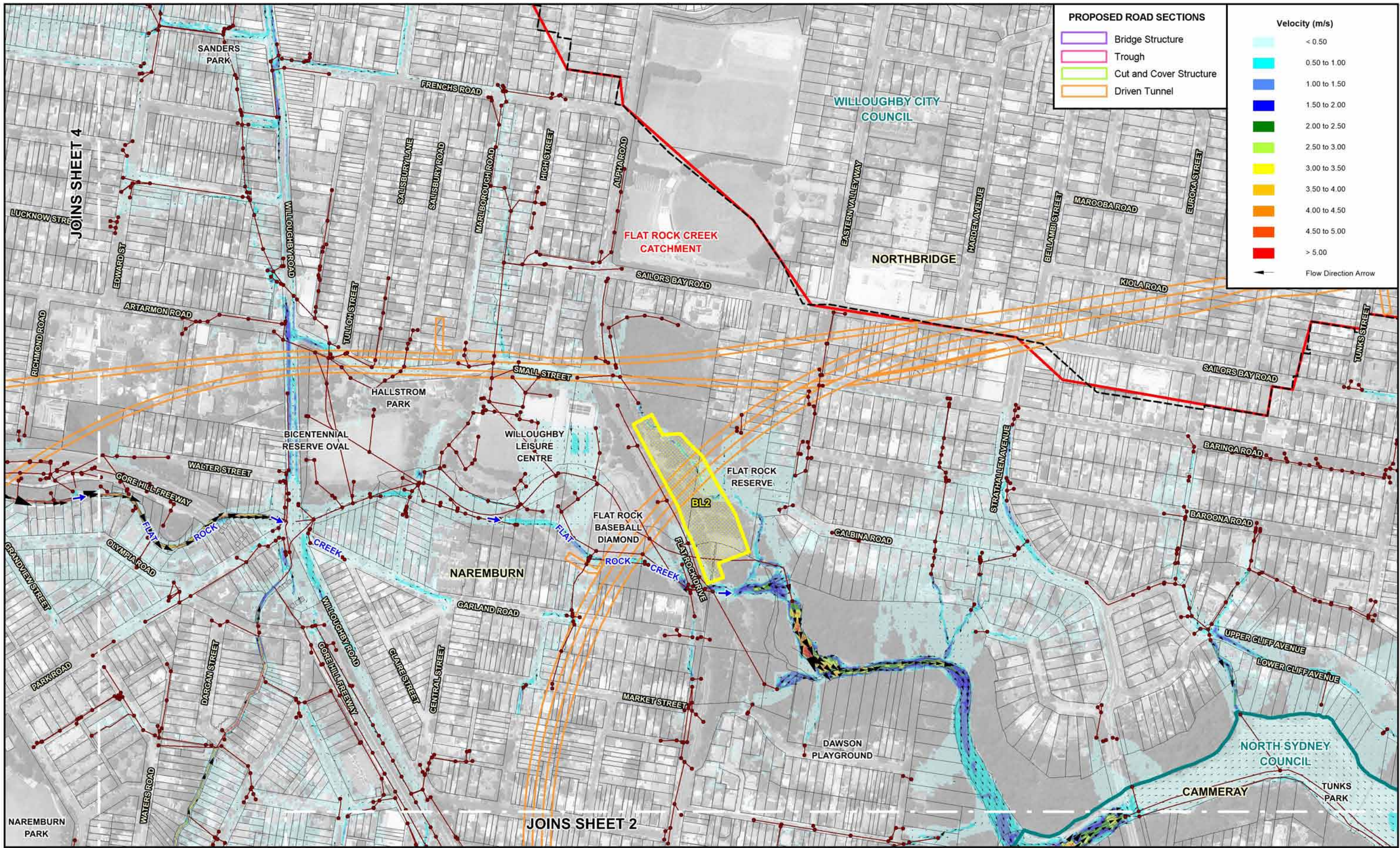


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT

Figure A.1  
(Sheet 2 of 8)





**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Velocity (m/s)**

- <math>< 0.50</math>
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.50
- 2.50 to 3.00
- 3.00 to 3.50
- 3.50 to 4.00
- 4.00 to 4.50
- 4.50 to 5.00
- > 5.00

← Flow Direction Arrow

**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Construction Support Site and Identifier

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.1  
(Sheet 3 of 8)  
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT

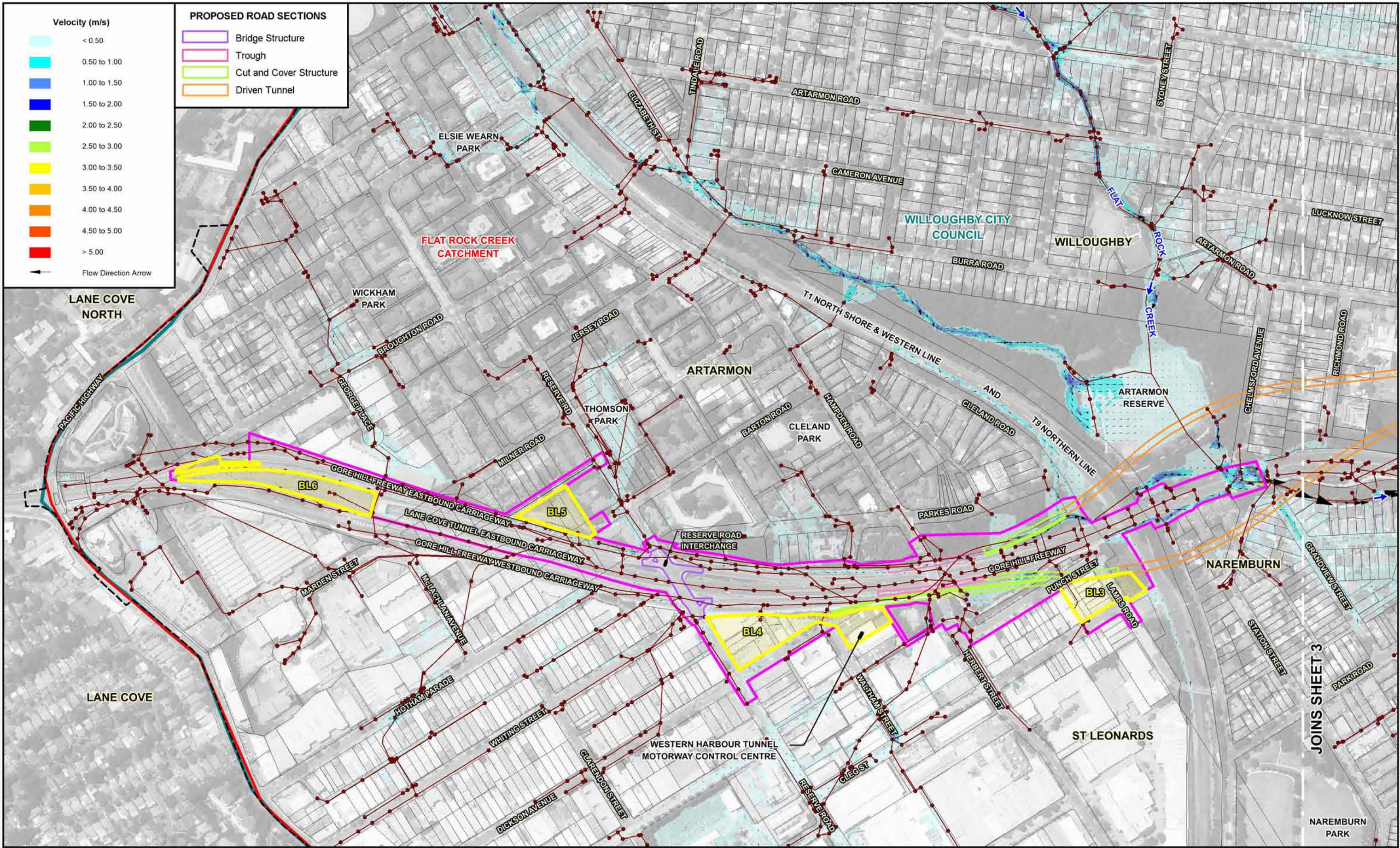
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50 0 50 100 150 m

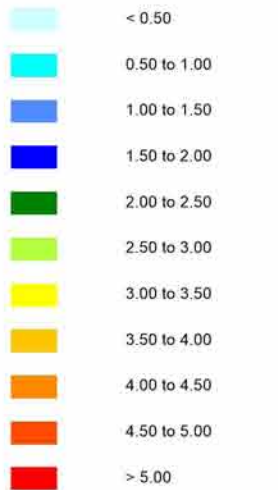
Scale: 1:5,000

**Lyall & Associates**





Velocity (m/s)



Flow Direction Arrow

PROPOSED ROAD SECTIONS

- ▭ Bridge Structure
- ▭ Trough
- ▭ Cut and Cover Structure
- ▭ Driven Tunnel

LANE COVE NORTH

LANE COVE

FLAT ROCK CREEK CATCHMENT

WILLOUGHBY CITY COUNCIL

WILLOUGHBY

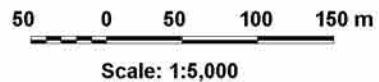
ARTARMON

NAREMBURN

ST LEONARDS

JOINS SHEET 3

NAREMBURN PARK



Scale: 1:5,000

LEGEND

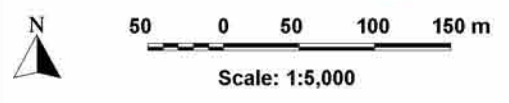
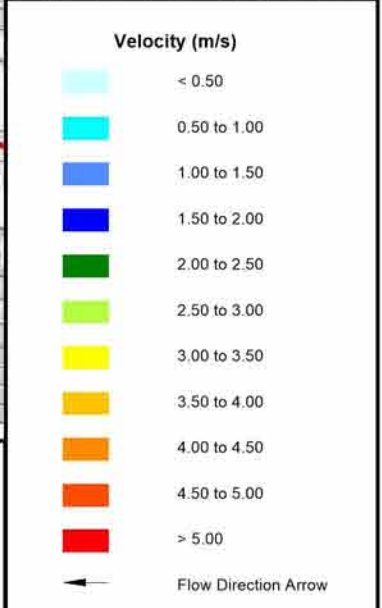
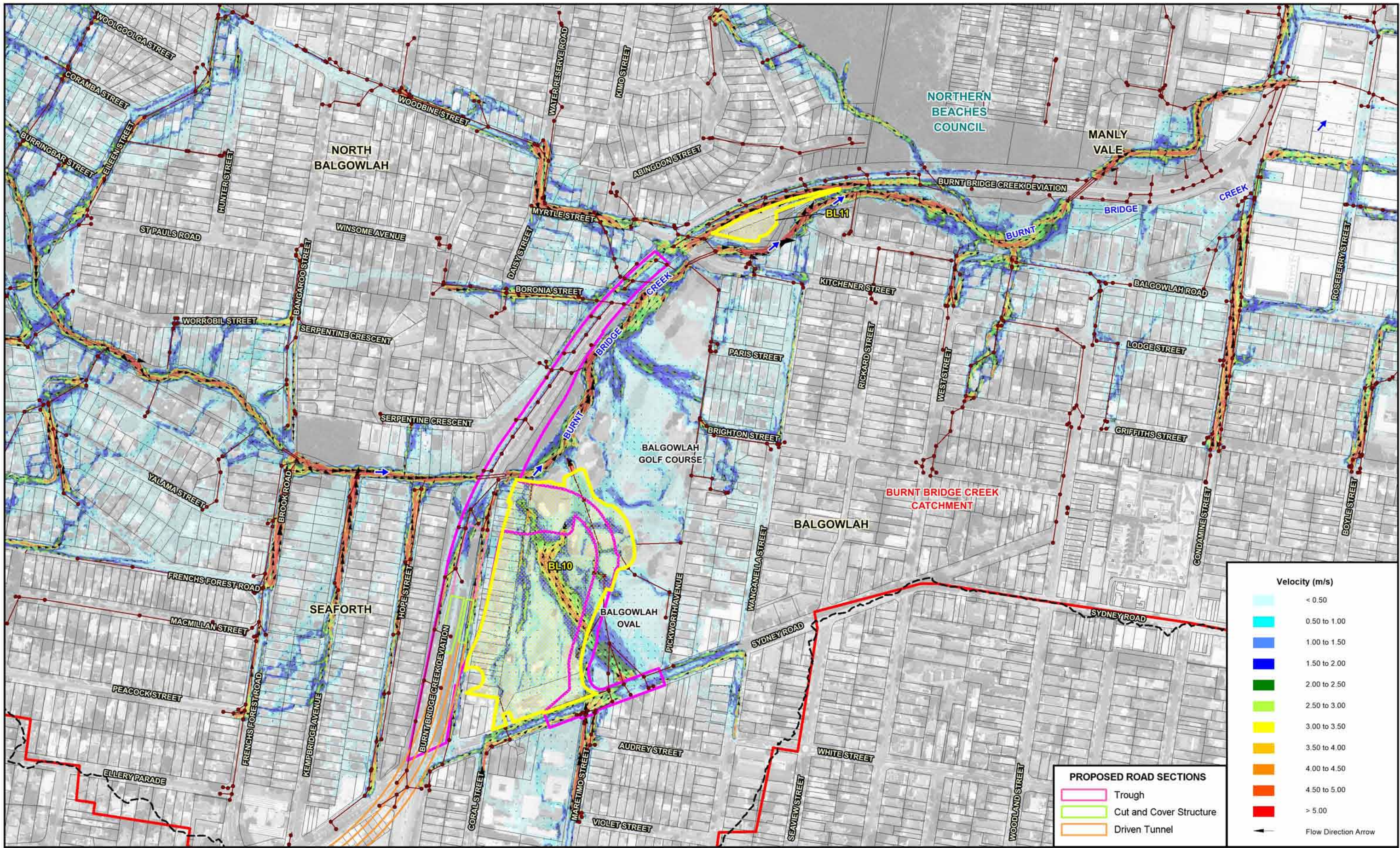
- - - Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- ▬ LGA Boundary
- ▬ Catchment Boundary
- ▭ Project Surface Road Works Footprint
- ▭ BL2 Construction Support Site and Identifier

BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT

Figure A.1 (Sheet 4 of 8)

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS 10% AEP EVENT

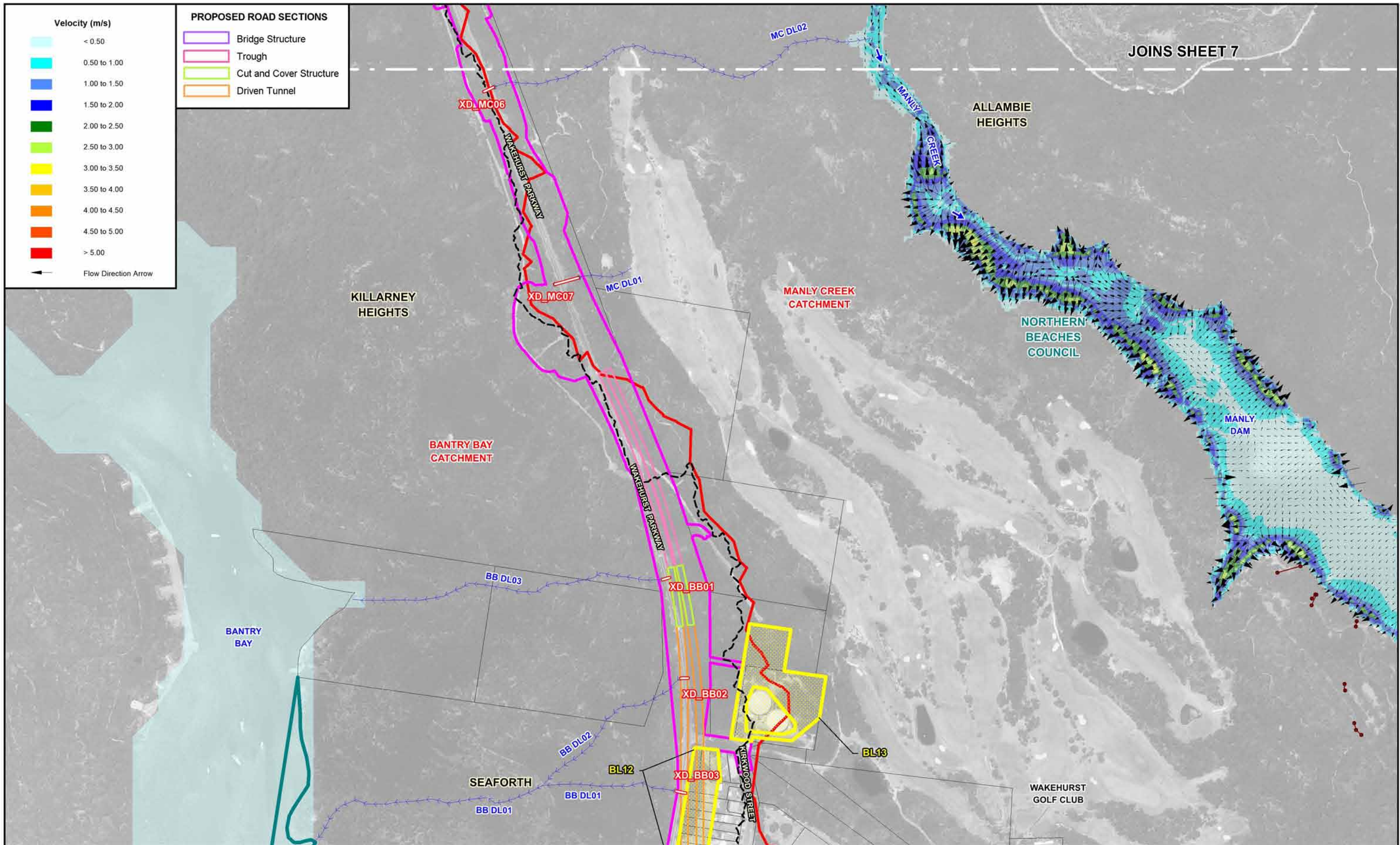




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.1  
(Sheet 5 of 8)  
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT





JOINS SHEET 7

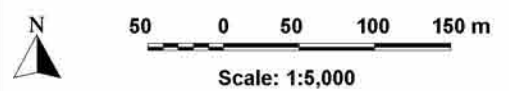
Velocity (m/s)



**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

Flow Direction Arrow



**LEGEND**

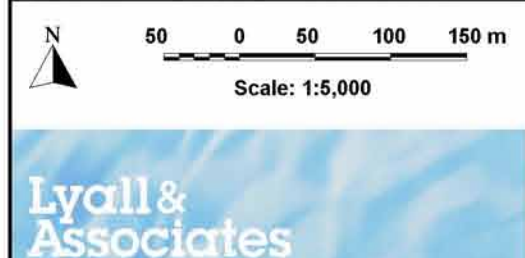
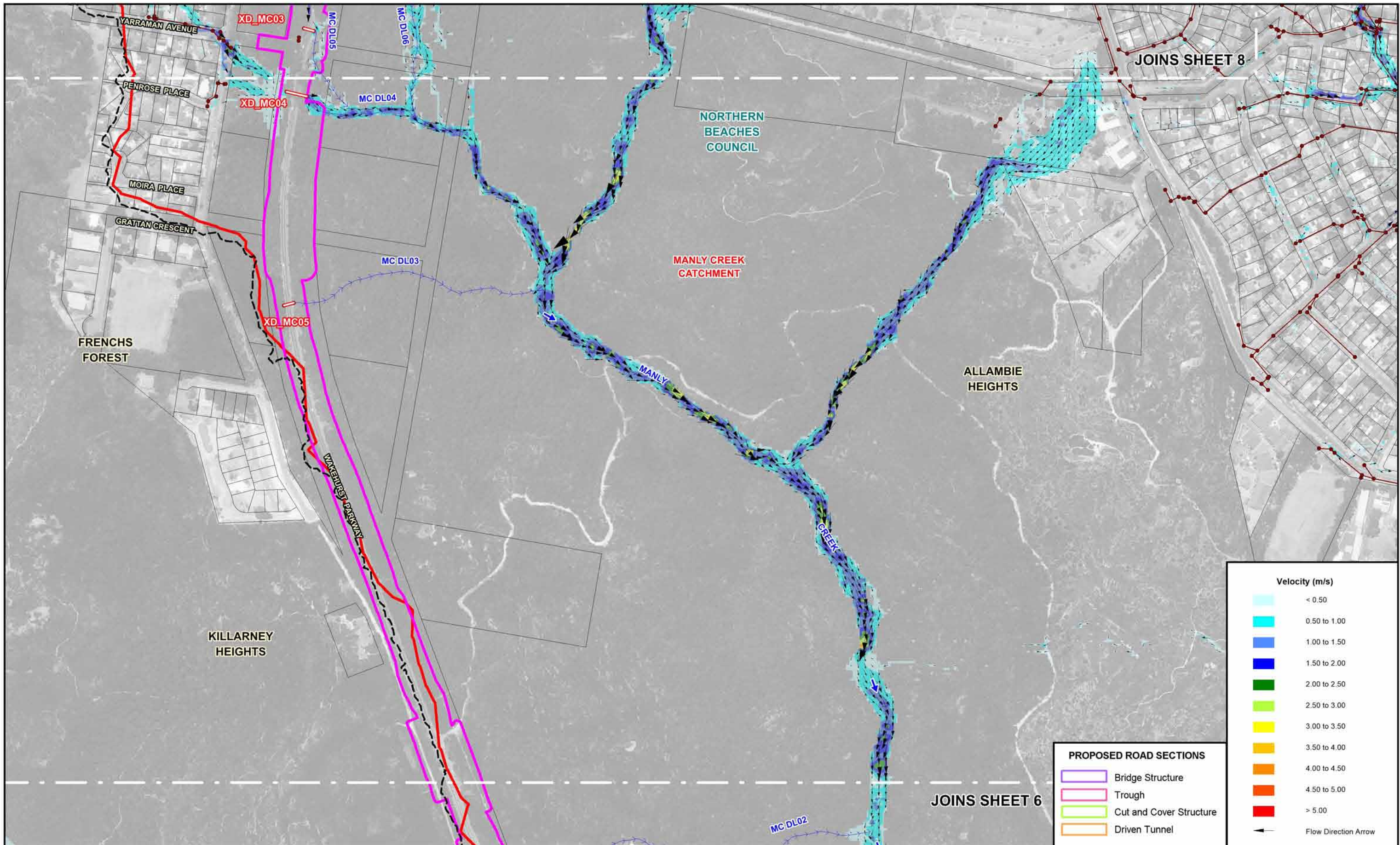
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint
- Construction Support Site and Identifier
- Existing Transverse Drainage and Identifier
- Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.1  
(Sheet 6 of 8)

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT





- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - XD\_MC03** Existing Transverse Drainage and Identifier
  - Existing Drainage Line

- PROPOSED ROAD SECTIONS**
- Bridge Structure
  - Trough
  - Cut and Cover Structure
  - Driven Tunnel

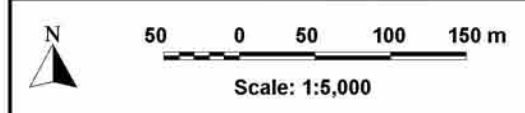
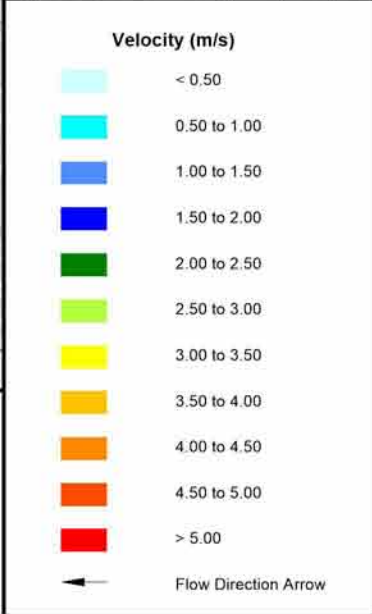
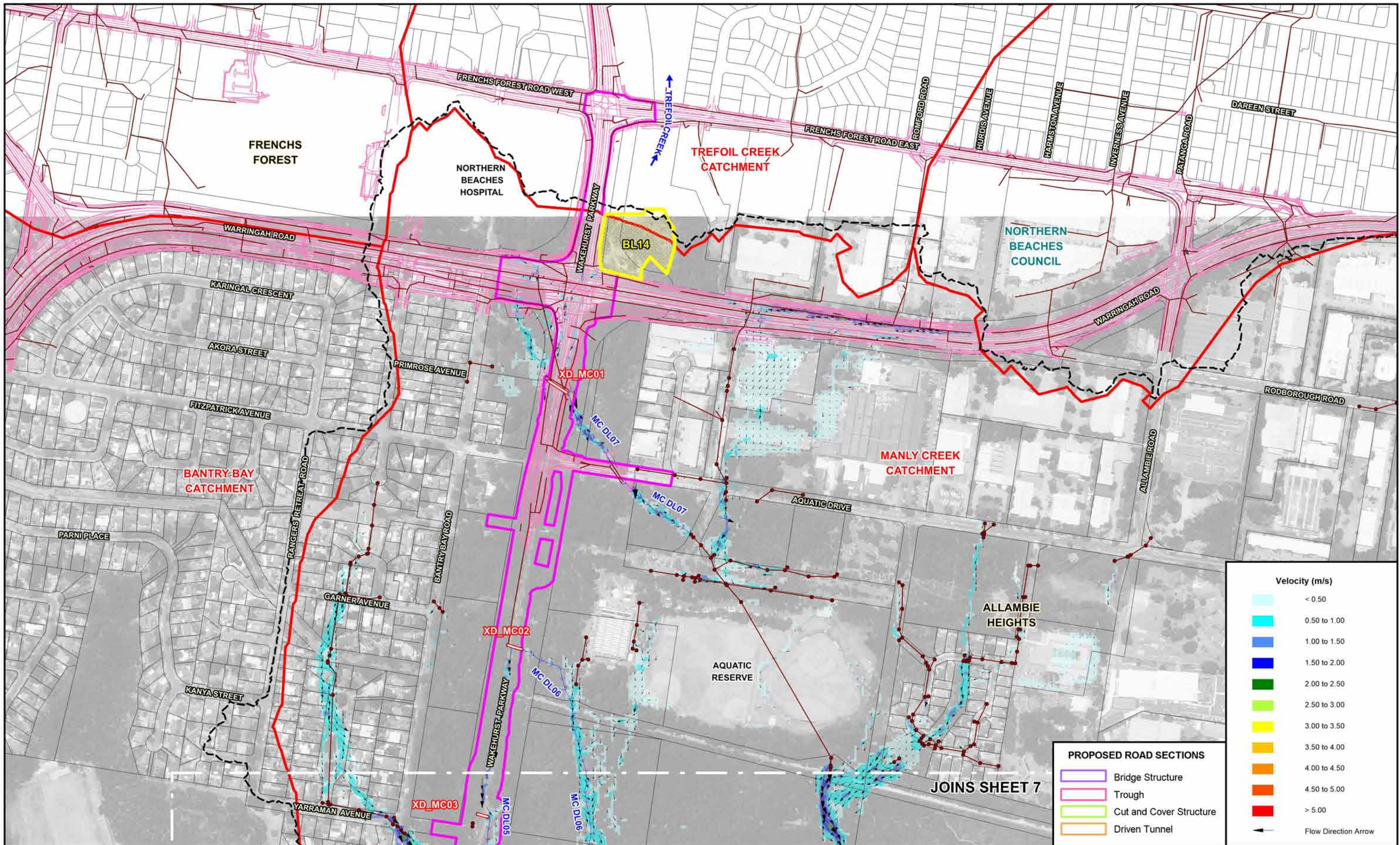
Velocity (m/s)	
	< 0.50
	0.50 to 1.00
	1.00 to 1.50
	1.50 to 2.00
	2.00 to 2.50
	2.50 to 3.00
	3.00 to 3.50
	3.50 to 4.00
	4.00 to 4.50
	4.50 to 5.00
	> 5.00
←	Flow Direction Arrow

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.1  
(Sheet 7 of 8)

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT





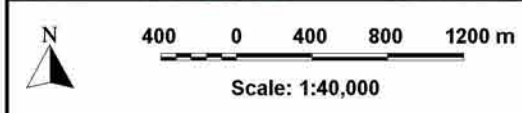
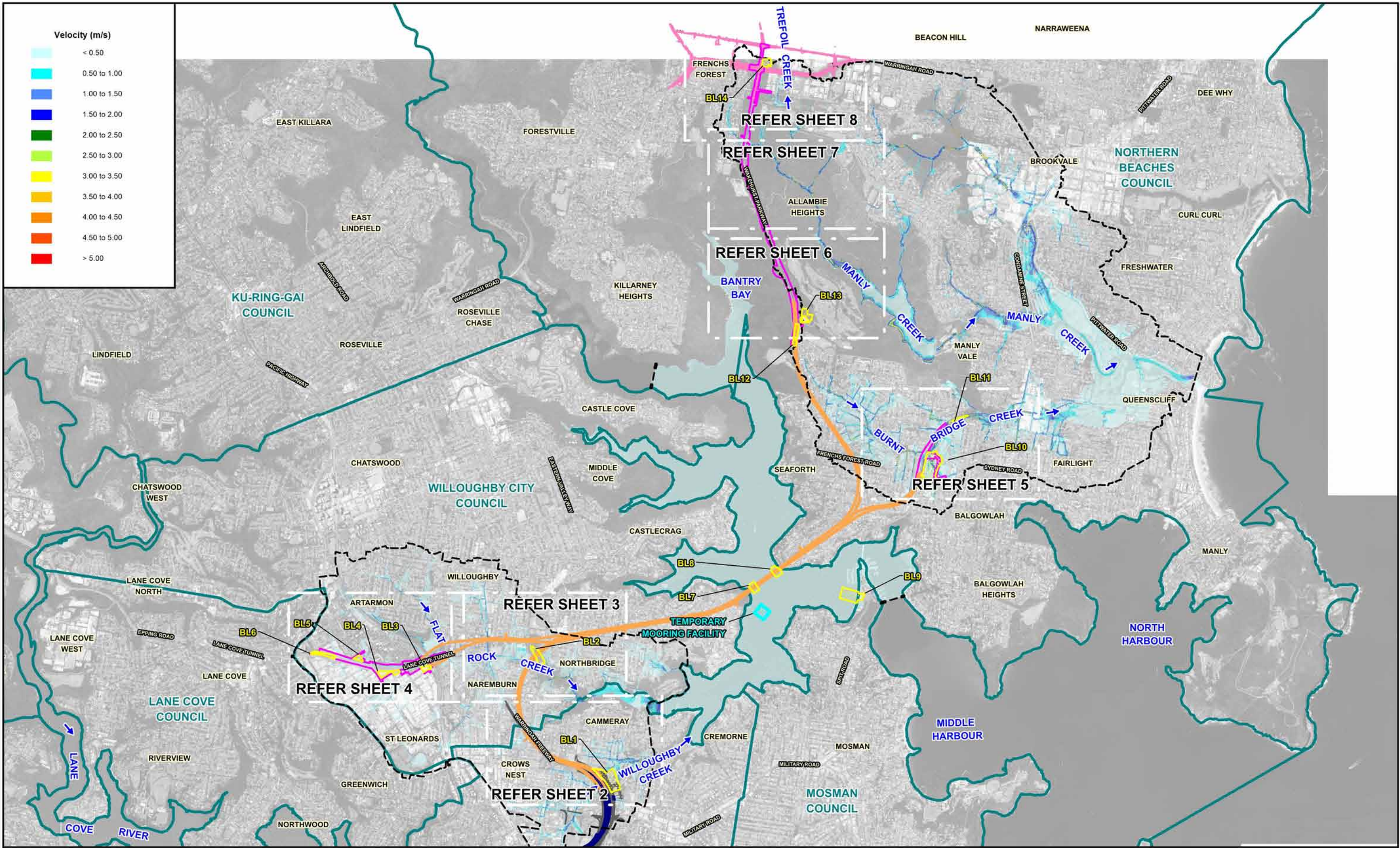
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - BL2 Construction Support Site and Identifier

- Project Surface Road Works Footprint
- Northern Beaches Hospital Surface Road Works
- XD\_MC03 Existing Transverse Drainage and Identifier
- Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.1  
(Sheet 8 of 8)  
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT





- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - BL2 Construction Support Site and Identifier
  - Project Surface Road Works Footprint

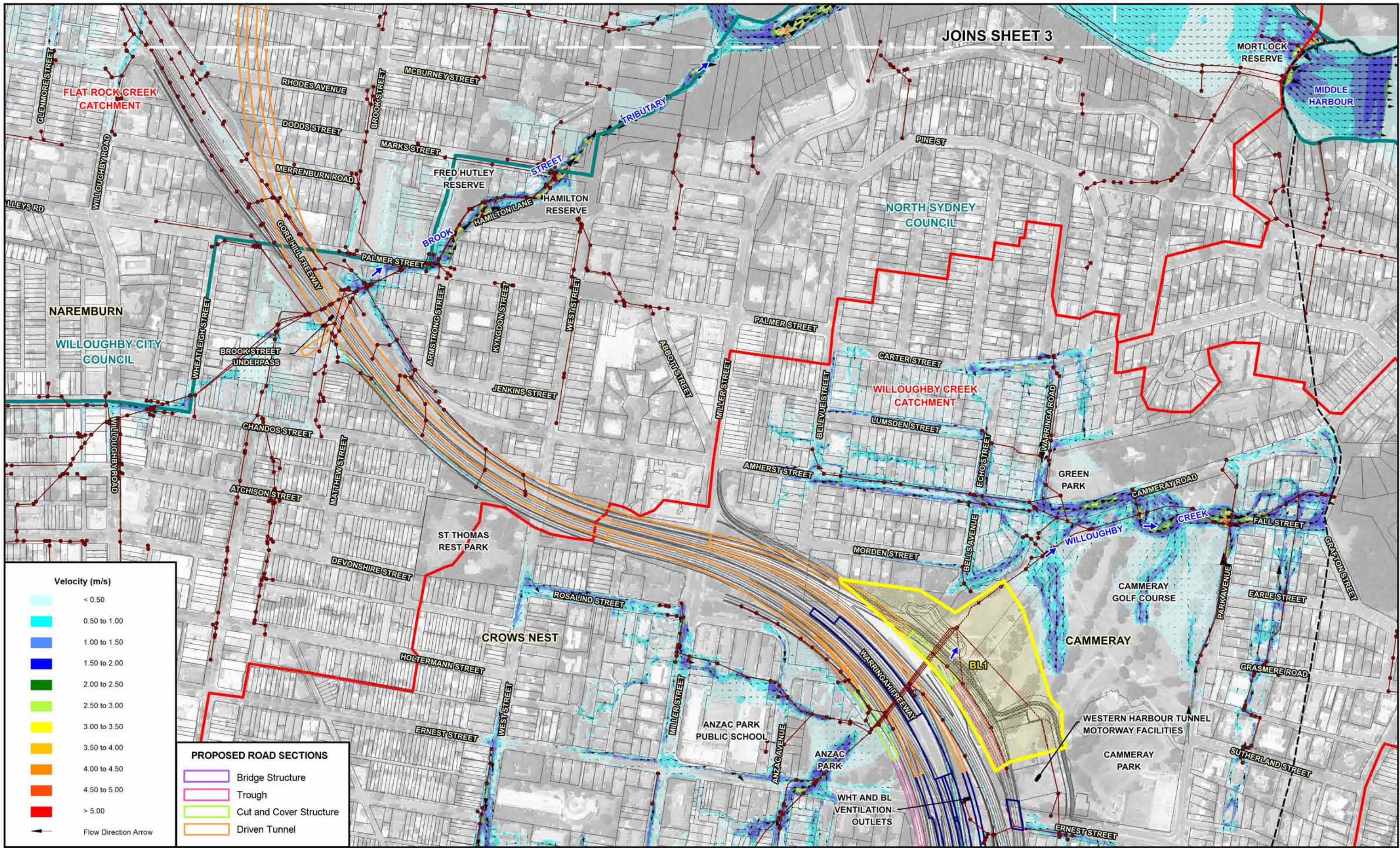
- Driven Tunnel
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.2  
(Sheet 1 of 8)

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





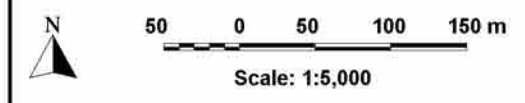
JOINS SHEET 3

Velocity (m/s)



PROPOSED ROAD SECTIONS

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel



- LEGEND
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Construction Support Site and Identifier

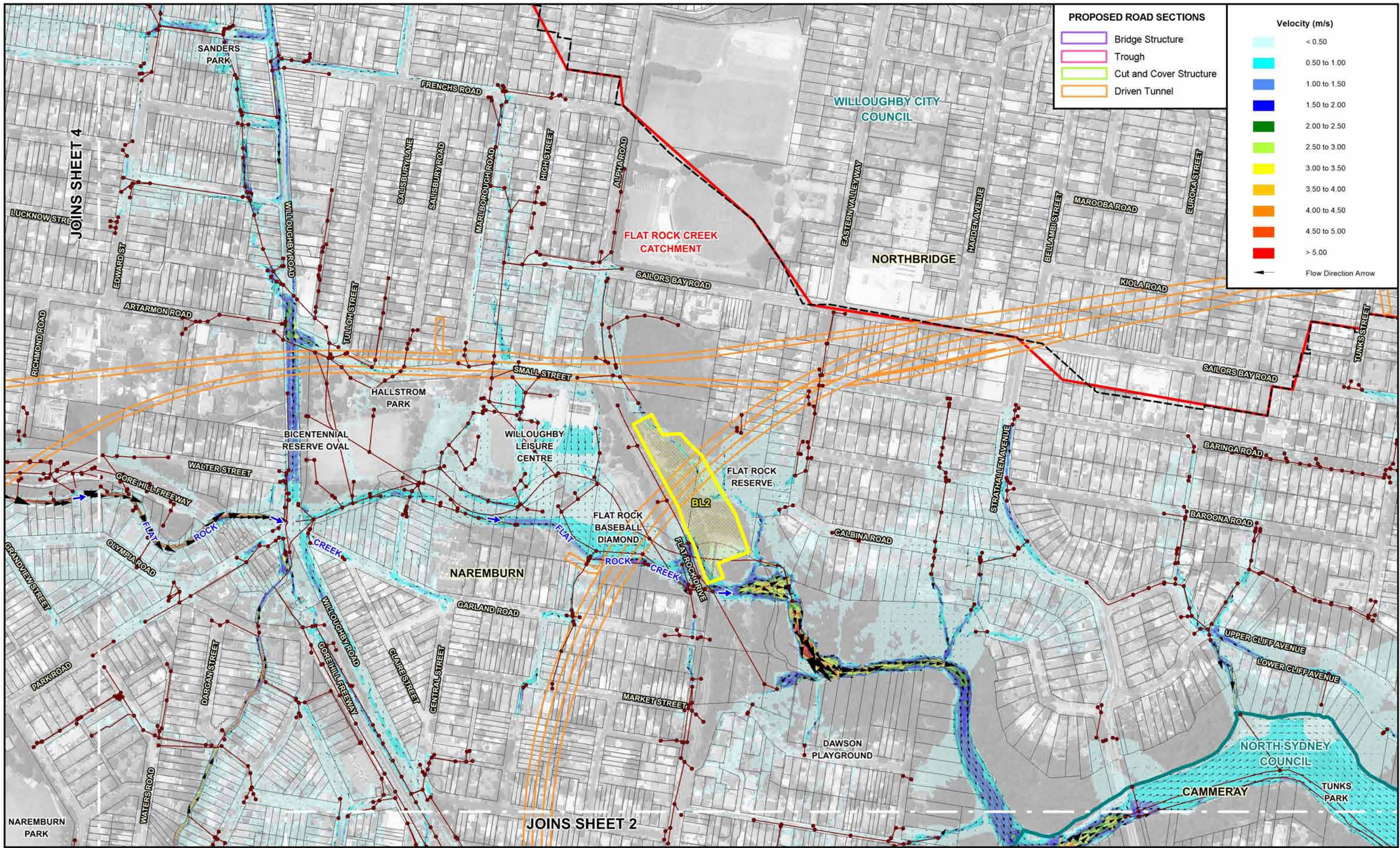
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT

Figure A.2  
(Sheet 2 of 8)





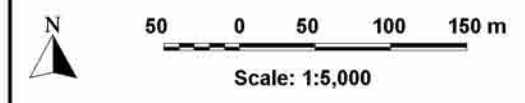
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Velocity (m/s)**

- <math>< 0.50</math>
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.50
- 2.50 to 3.00
- 3.00 to 3.50
- 3.50 to 4.00
- 4.00 to 4.50
- 4.50 to 5.00
- > 5.00

← Flow Direction Arrow



**LEGEND**

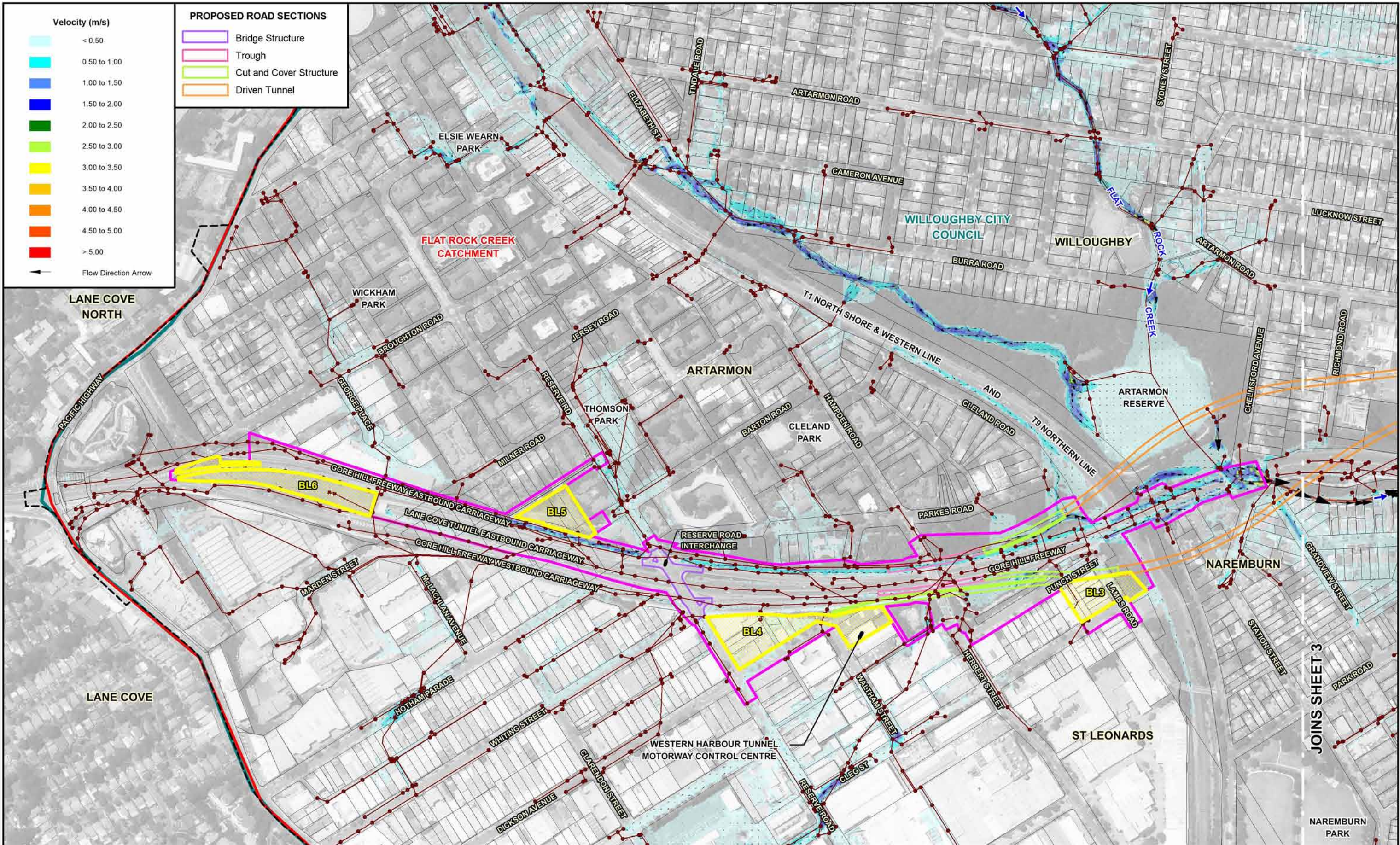
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- BL2 Construction Support Site and Identifier

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.2  
(Sheet 3 of 8)

**MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT**





LANE COVE NORTH

LANE COVE

FLAT ROCK CREEK CATCHMENT

WILLOUGHBY CITY COUNCIL

WILLOUGHBY

ARTARMON

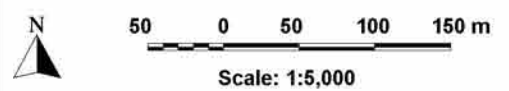
ARTARMON RESERVE

NAREMBURN

ST LEONARDS

JOINS SHEET 3

NAREMBURN PARK



**LEGEND**

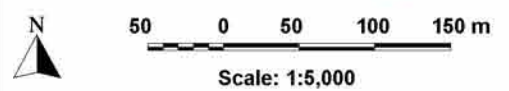
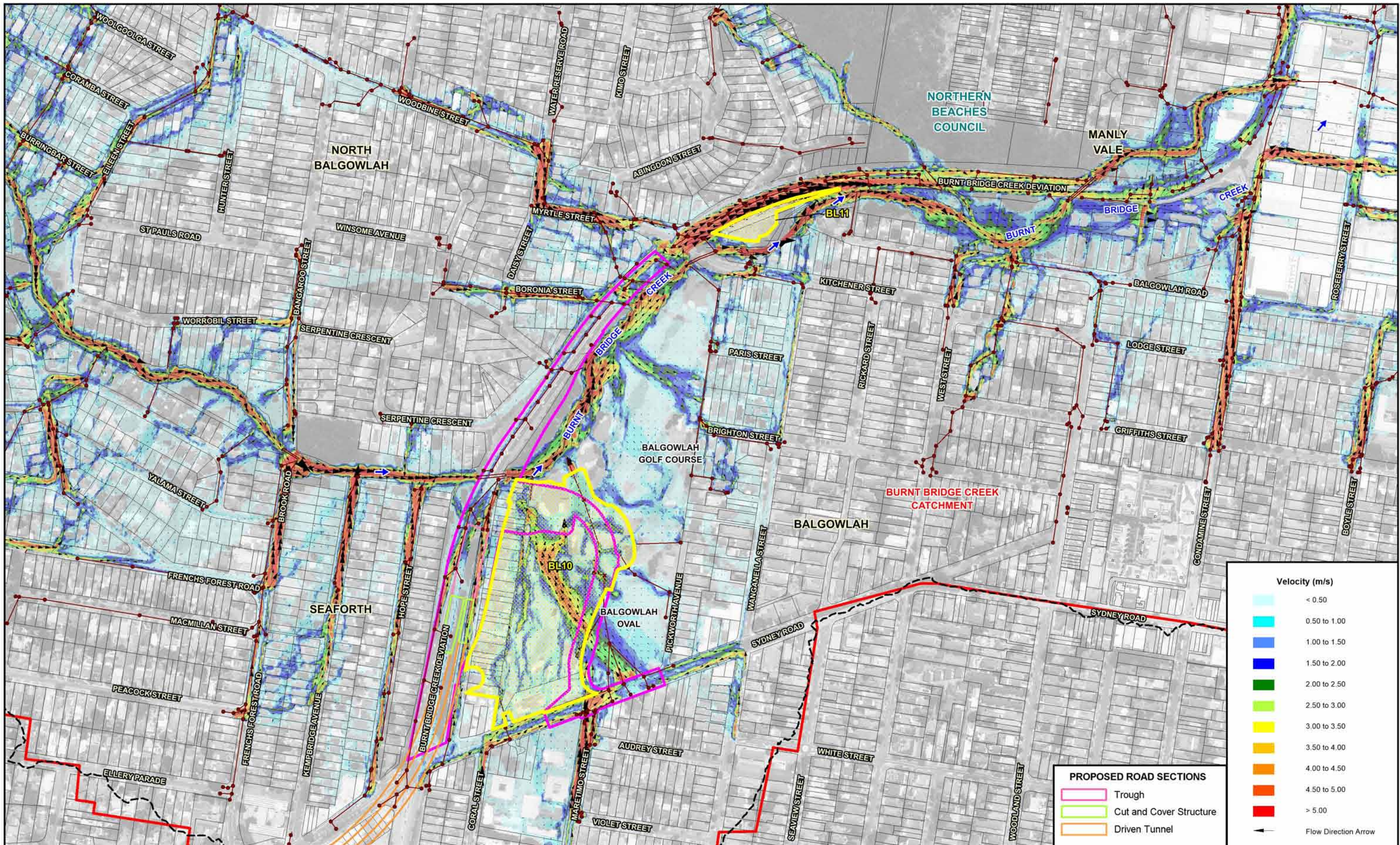
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint
- Construction Support Site and Identifier

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.2 (Sheet 4 of 8)  
 MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
 1% AEP EVENT







- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - BL10 Construction Support Site and Identifier

- PROPOSED ROAD SECTIONS**
- Trough
  - Cut and Cover Structure
  - Driven Tunnel

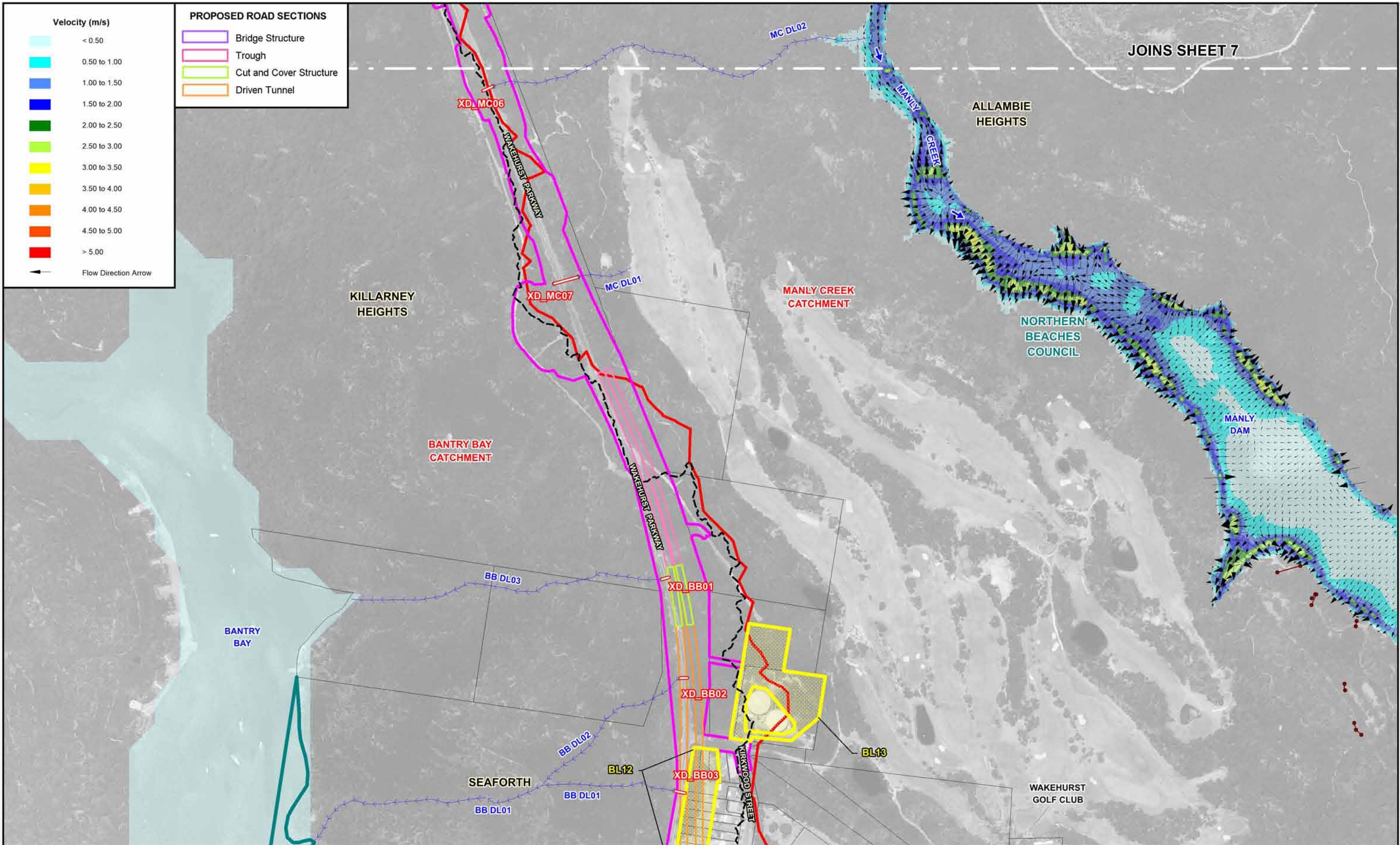
Velocity (m/s)	
<span style="color: lightblue;">■</span>	< 0.50
<span style="color: cyan;">■</span>	0.50 to 1.00
<span style="color: blue;">■</span>	1.00 to 1.50
<span style="color: darkblue;">■</span>	1.50 to 2.00
<span style="color: green;">■</span>	2.00 to 2.50
<span style="color: limegreen;">■</span>	2.50 to 3.00
<span style="color: yellow;">■</span>	3.00 to 3.50
<span style="color: orange;">■</span>	3.50 to 4.00
<span style="color: darkorange;">■</span>	4.00 to 4.50
<span style="color: red;">■</span>	4.50 to 5.00
<span style="color: darkred;">■</span>	> 5.00

← Flow Direction Arrow

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.2  
(Sheet 5 of 8)  
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





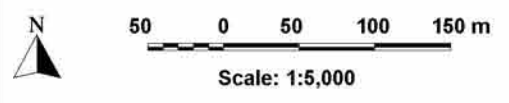
JOINS SHEET 7

Velocity (m/s)



**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint
- Construction Support Site and Identifier
- Existing Transverse Drainage and Identifier
- Existing Drainage Line

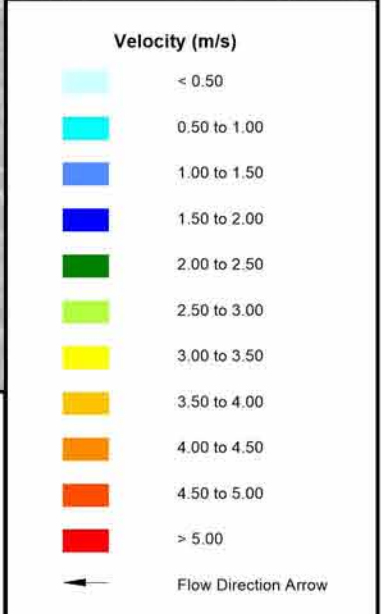
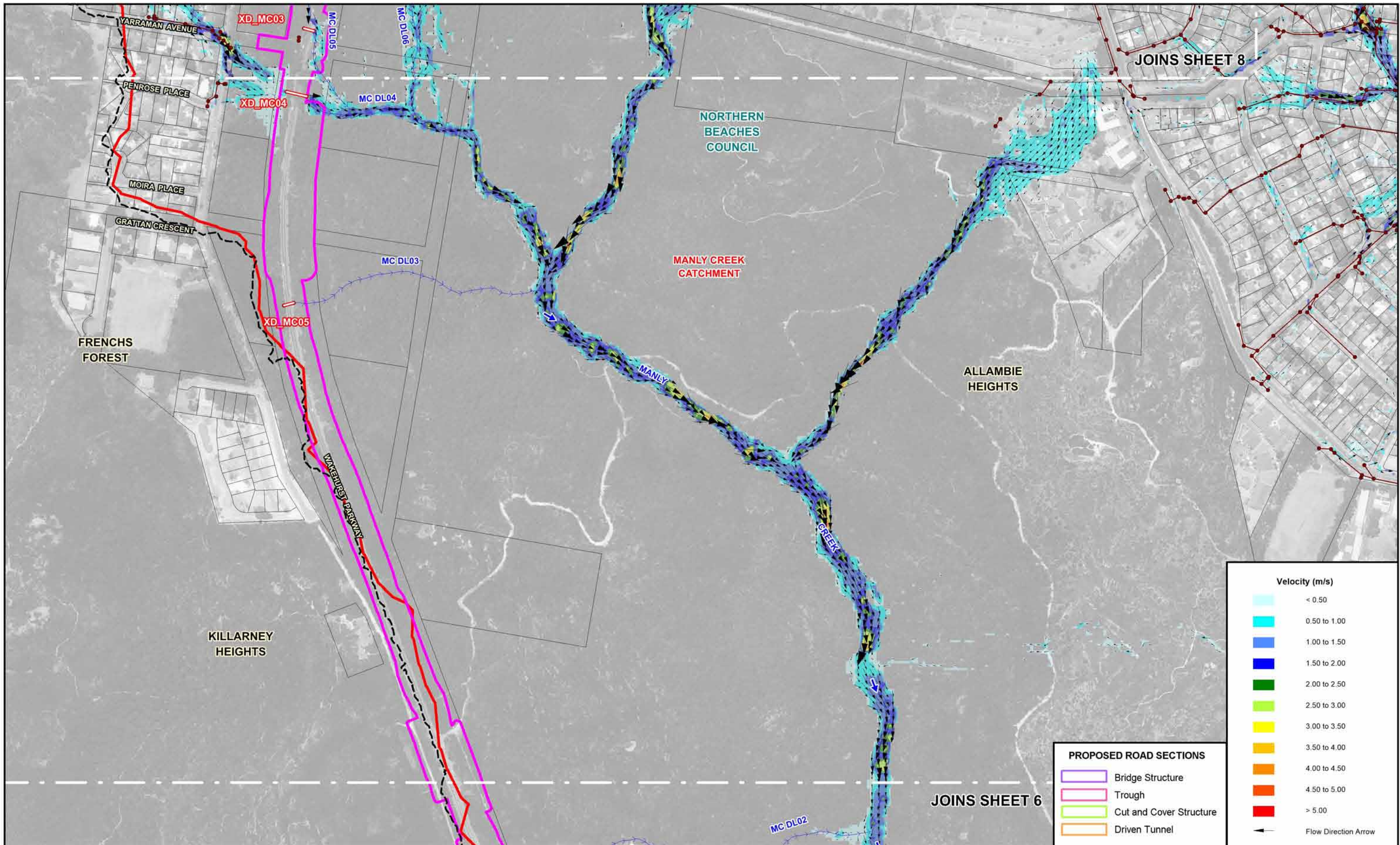
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.2  
(Sheet 6 of 8)

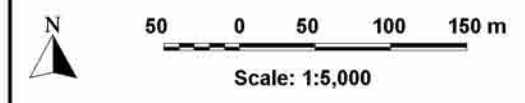
MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT







PROPOSED ROAD SECTIONS	
	Bridge Structure
	Trough
	Cut and Cover Structure
	Driven Tunnel



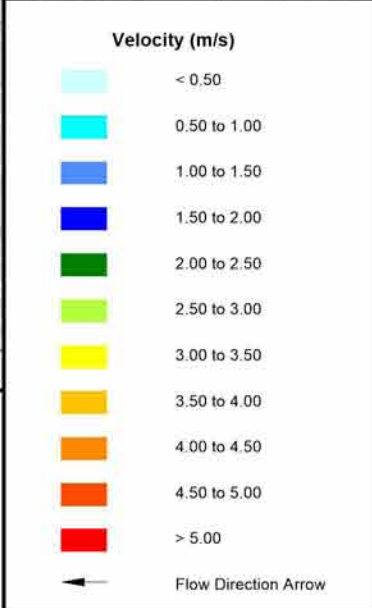
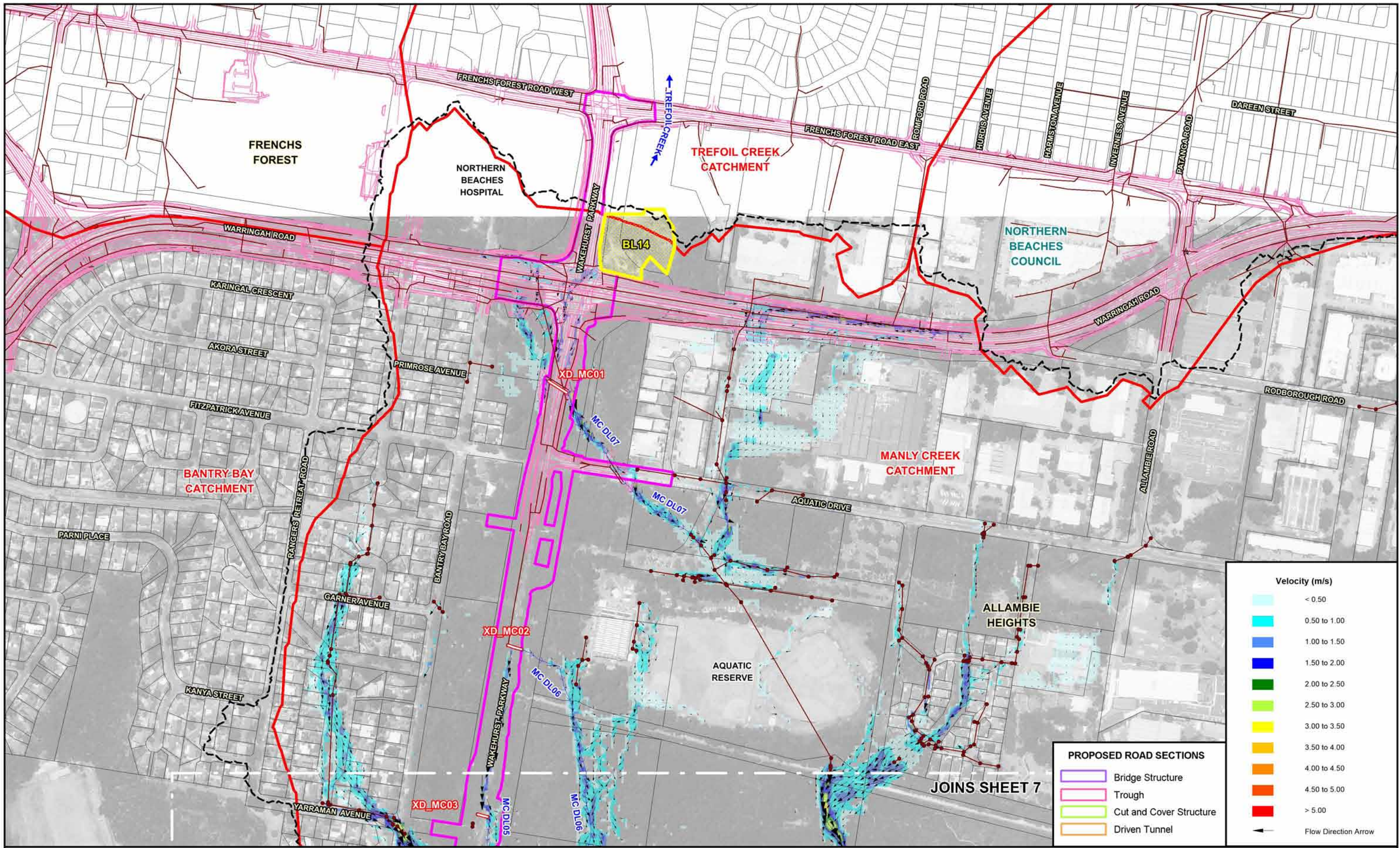
LEGEND	
	Limit of Main Stream Flooding and Major Overland Flow Mapping
	Existing Drainage System
	LGA Boundary
	Catchment Boundary
	Project Surface Road Works Footprint
	Existing Transverse Drainage and Identifier
	Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

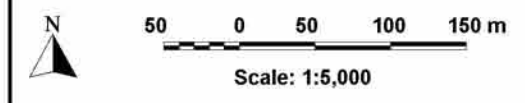
Figure A.2  
(Sheet 7 of 8)

MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





PROPOSED ROAD SECTIONS	
<span style="border: 1px solid purple; display: inline-block; width: 15px; height: 10px;"></span>	Bridge Structure
<span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span>	Trough
<span style="border: 1px solid lightgreen; display: inline-block; width: 15px; height: 10px;"></span>	Cut and Cover Structure
<span style="border: 1px solid orange; display: inline-block; width: 15px; height: 10px;"></span>	Driven Tunnel



LEGEND	
<span style="border-top: 1px dashed black; width: 20px; display: inline-block;"></span>	Limit of Main Stream Flooding and Major Overland Flow Mapping
<span style="color: red; font-size: 2px;">●</span>	Existing Drainage System
<span style="border-bottom: 1px solid green; width: 20px; display: inline-block;"></span>	LGA Boundary
<span style="border-bottom: 1px solid red; width: 20px; display: inline-block;"></span>	Catchment Boundary
<span style="border: 1px solid yellow; display: inline-block; width: 10px; height: 10px;"></span>	Construction Support Site and Identifier

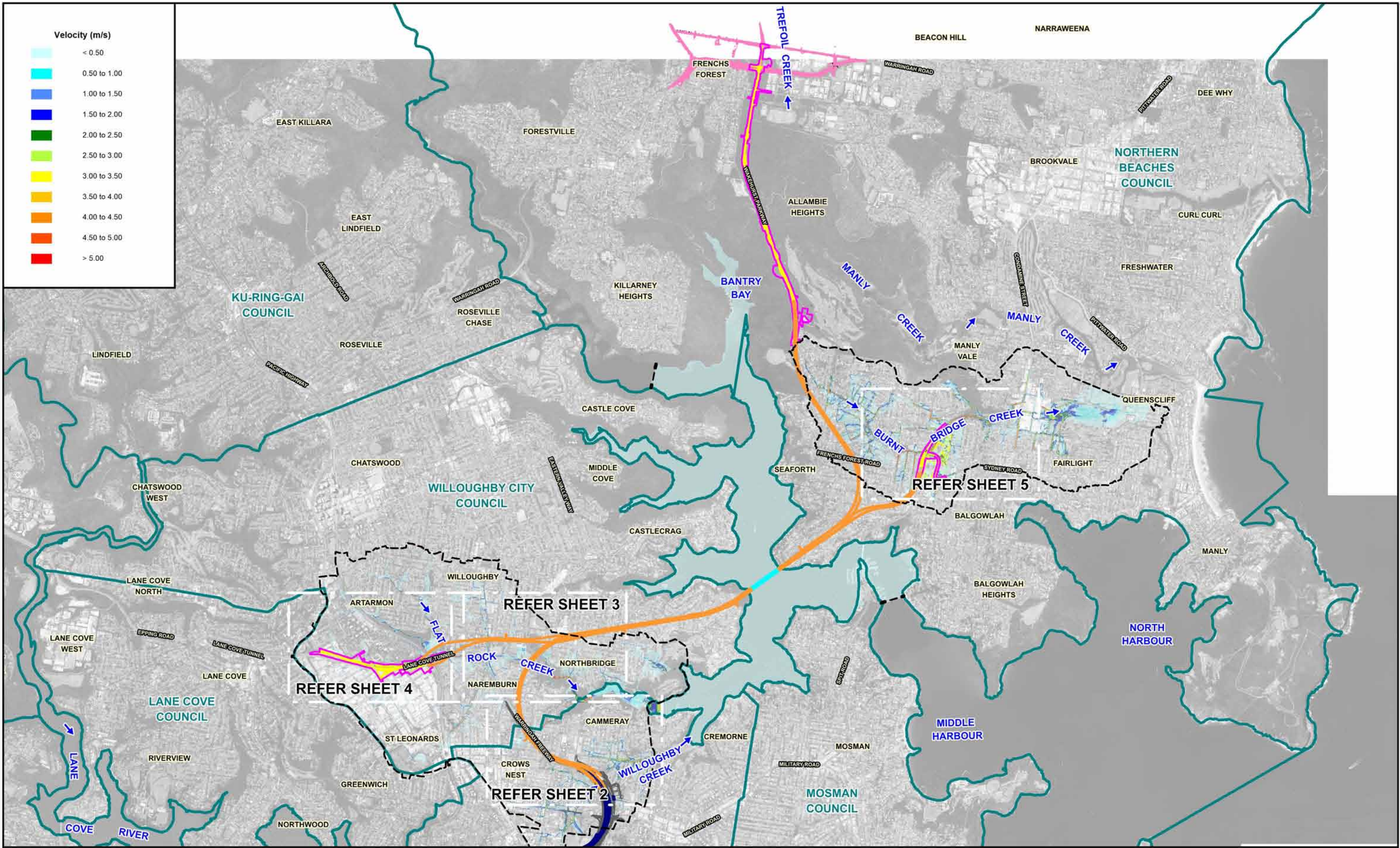
<span style="border: 1px solid purple; display: inline-block; width: 15px; height: 10px;"></span>	Project Surface Road Works Footprint
<span style="border: 1px solid pink; display: inline-block; width: 15px; height: 10px;"></span>	Northern Beaches Hospital Surface Road Works
<span style="border-bottom: 1px solid red; width: 20px; display: inline-block;"></span>	Existing Transverse Drainage and Identifier
<span style="color: blue; font-size: 2px;">→</span>	Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

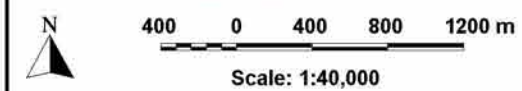
Figure A.2  
(Sheet 8 of 8)

**MAXIMUM FLOW VELOCITIES UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT**





Velocity (m/s)



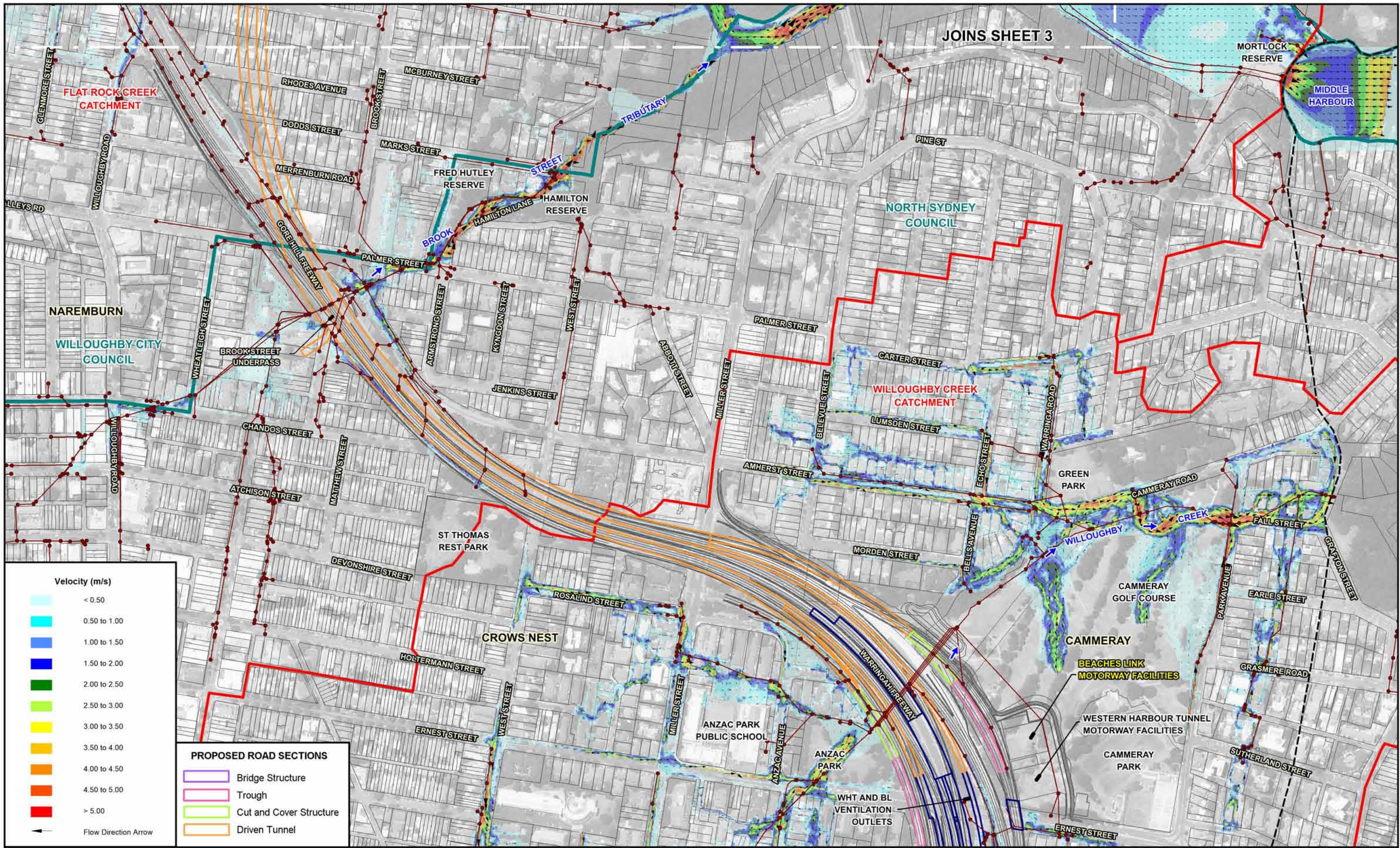
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.3  
(Sheet 1 of 5)  
MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT





JOINS SHEET 3

Velocity (m/s)



PROPOSED ROAD SECTIONS

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

LEGEND

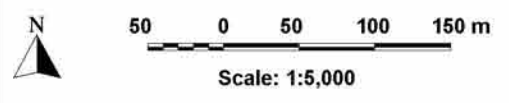
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint

- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

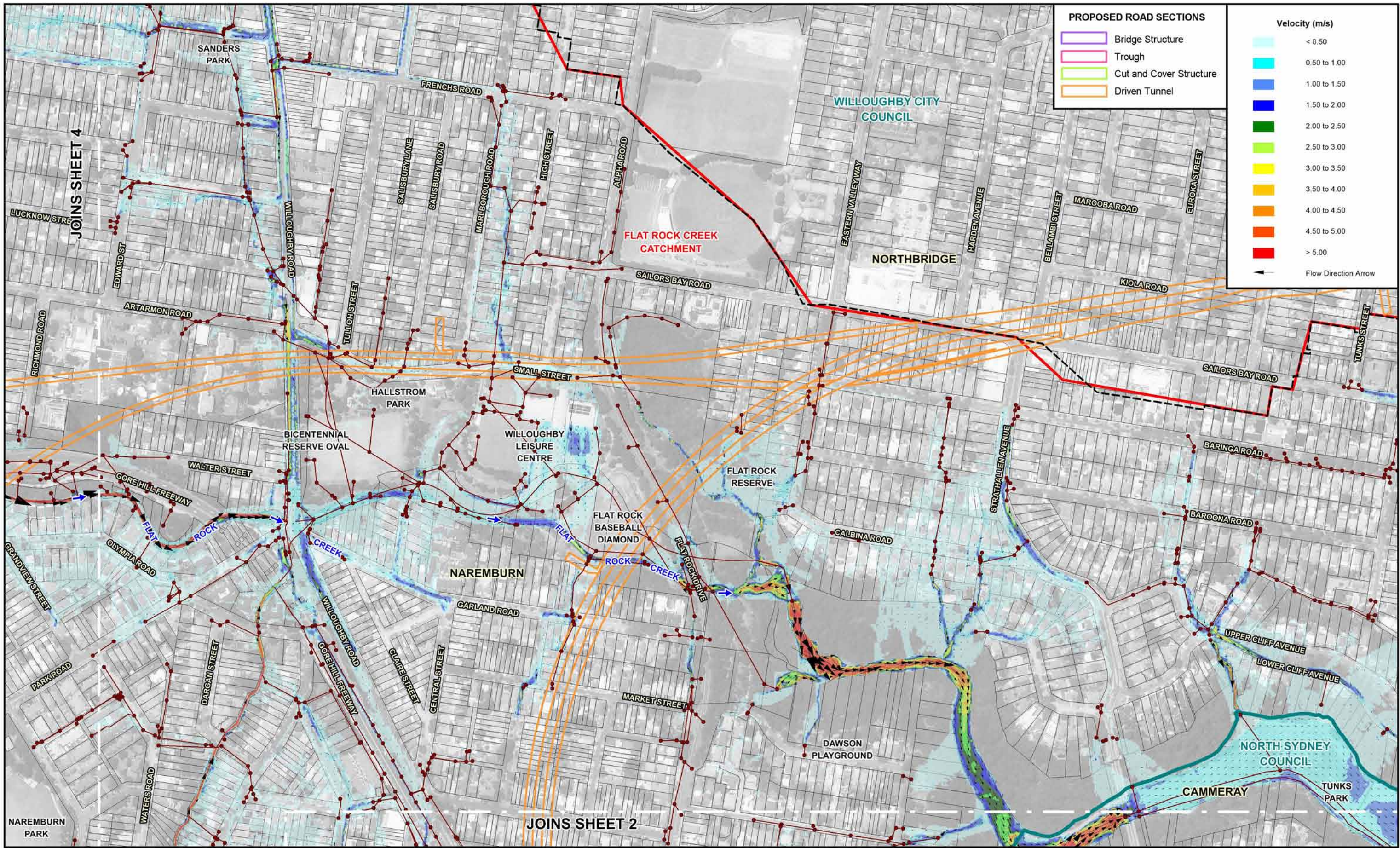
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.3  
(Sheet 2 of 5)

MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT







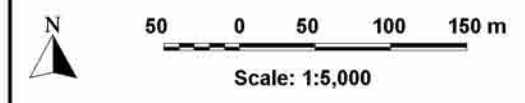
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Velocity (m/s)**

- <math>< 0.50</math>
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.50
- 2.50 to 3.00
- 3.00 to 3.50
- 3.50 to 4.00
- 4.00 to 4.50
- 4.50 to 5.00
- > 5.00

← Flow Direction Arrow



**LEGEND**

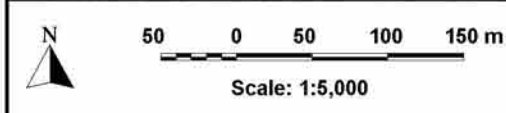
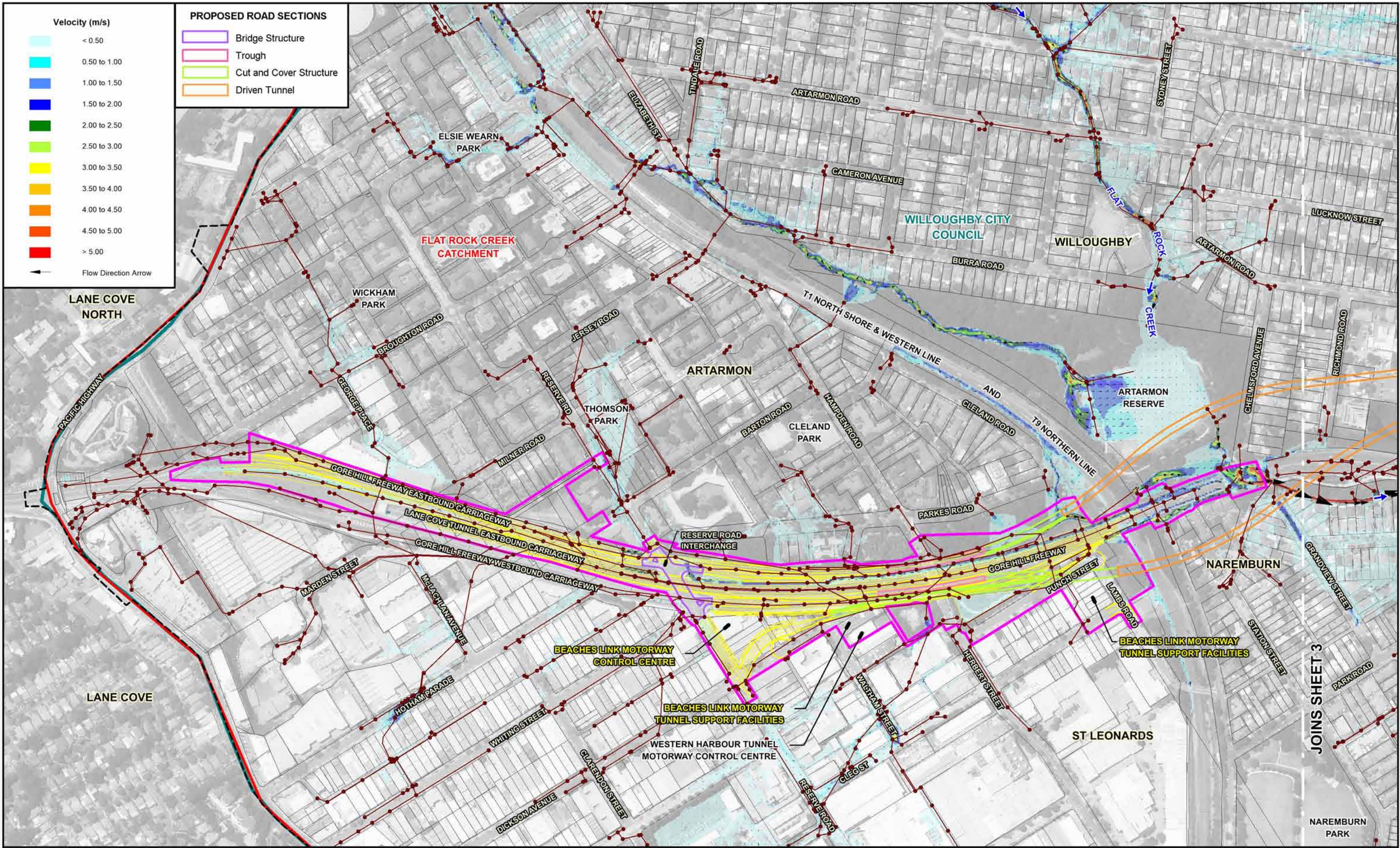
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.3  
(Sheet 3 of 5)

MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT





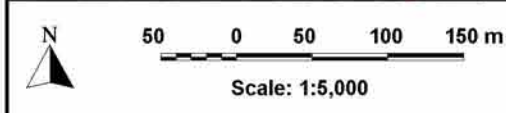
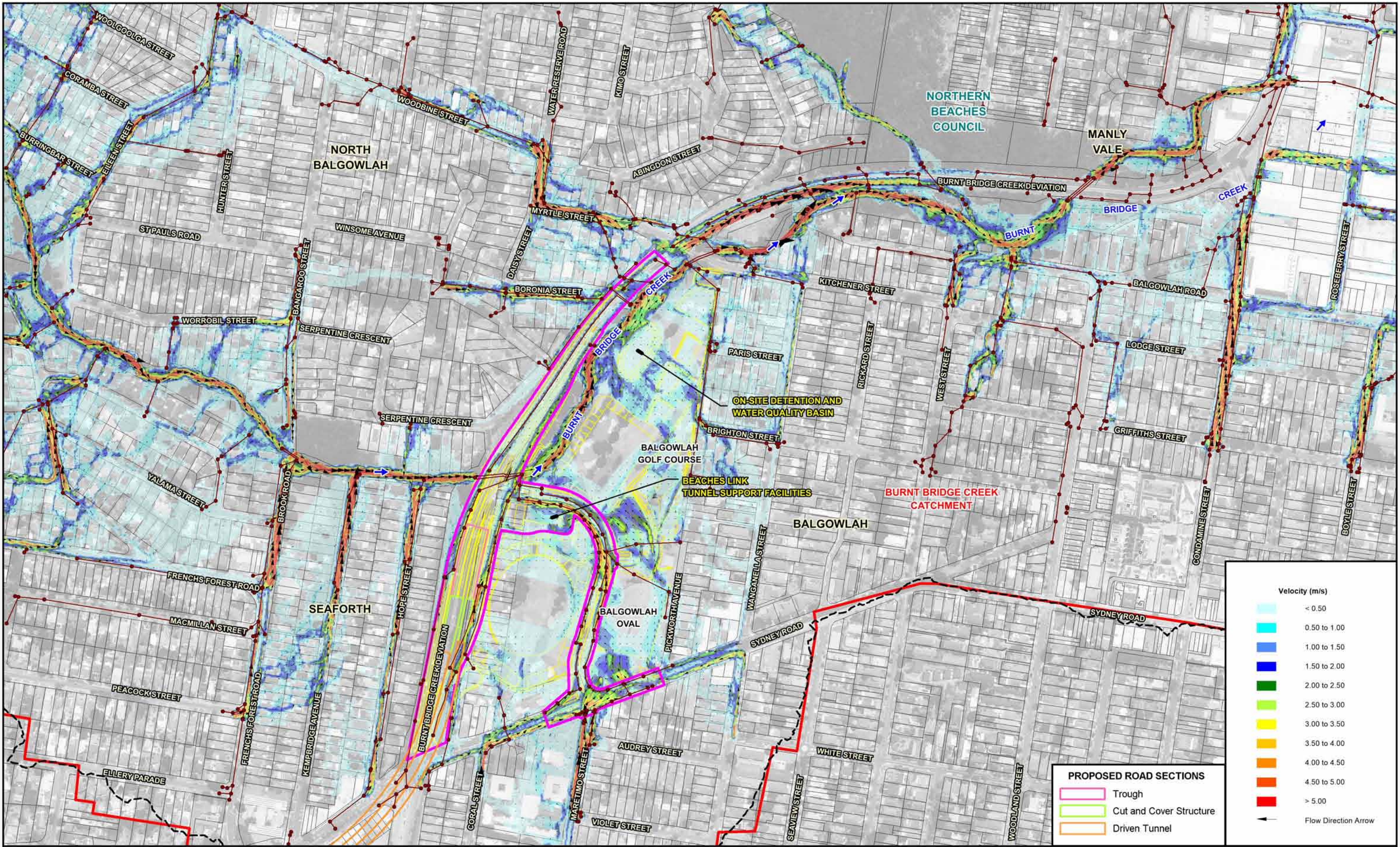
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint

Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.3 (Sheet 4 of 5)  
**MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS 10% AEP EVENT**



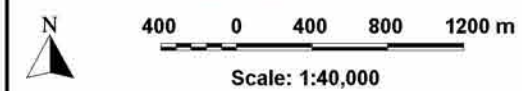
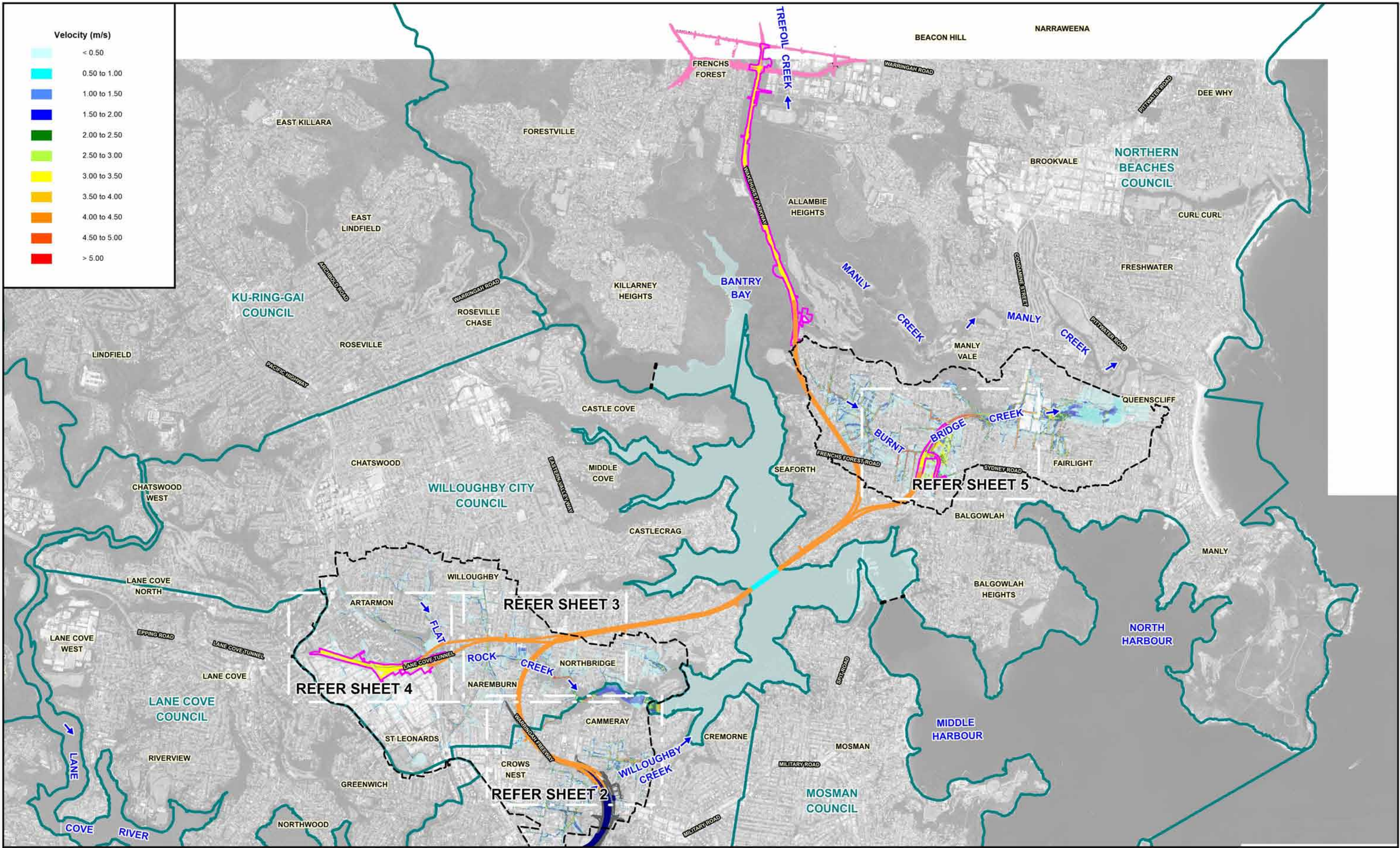


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.3 (Sheet 5 of 5)  
**MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS 10% AEP EVENT**





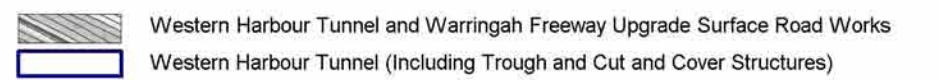
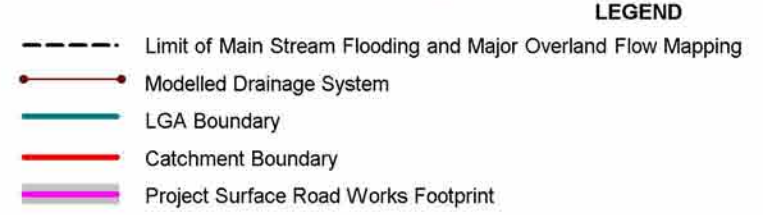
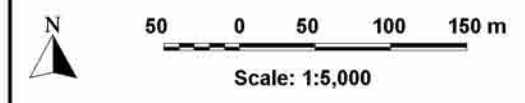
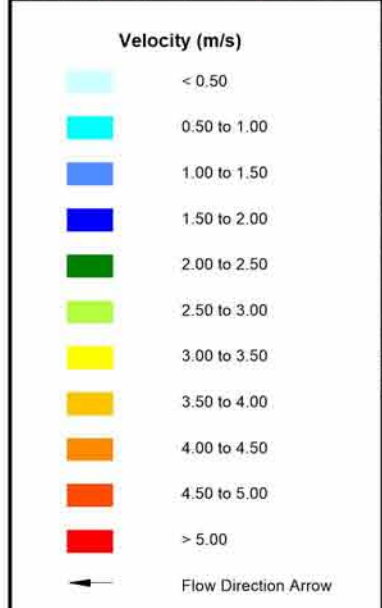
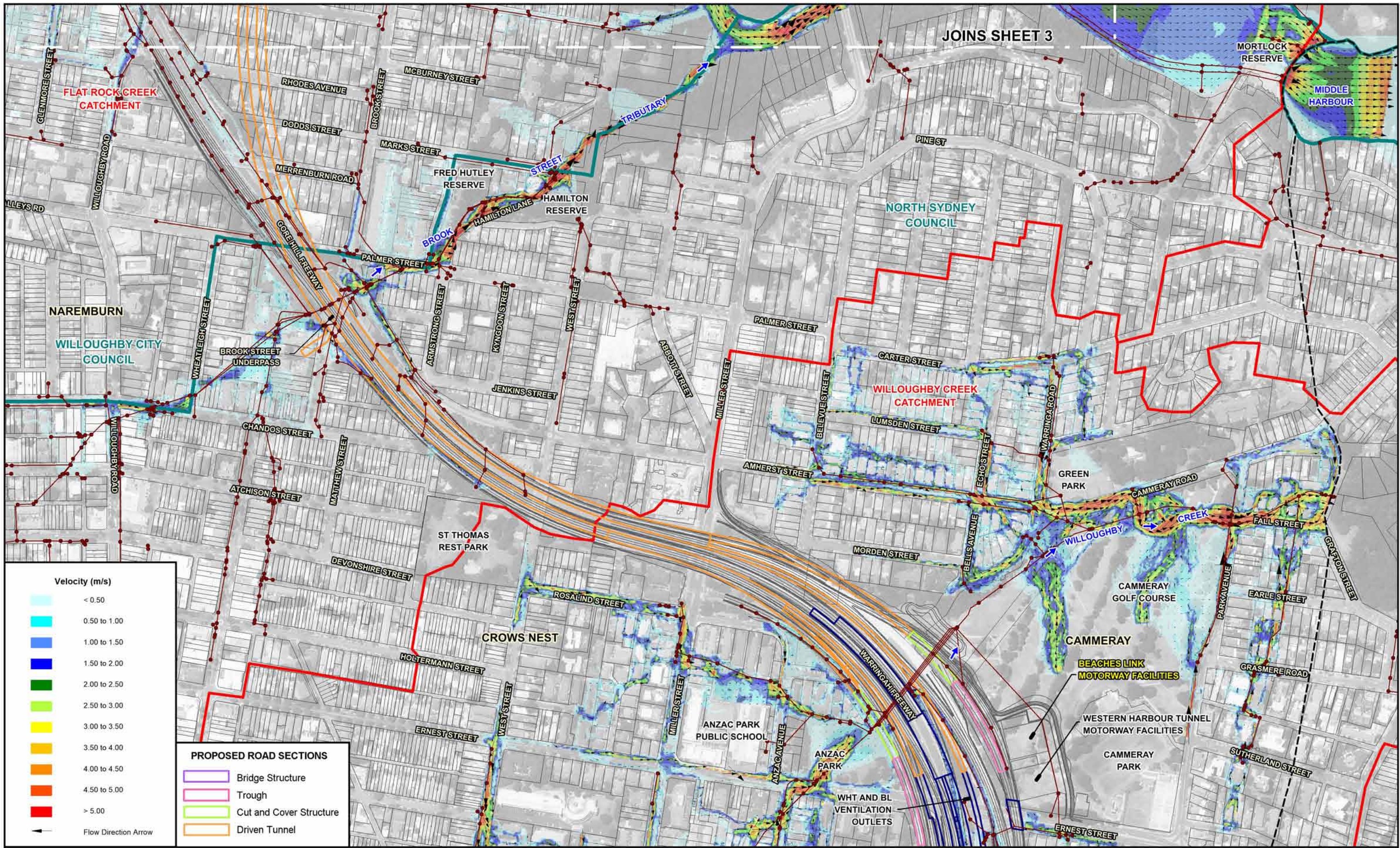
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.4  
(Sheet 1 of 5)  
MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT



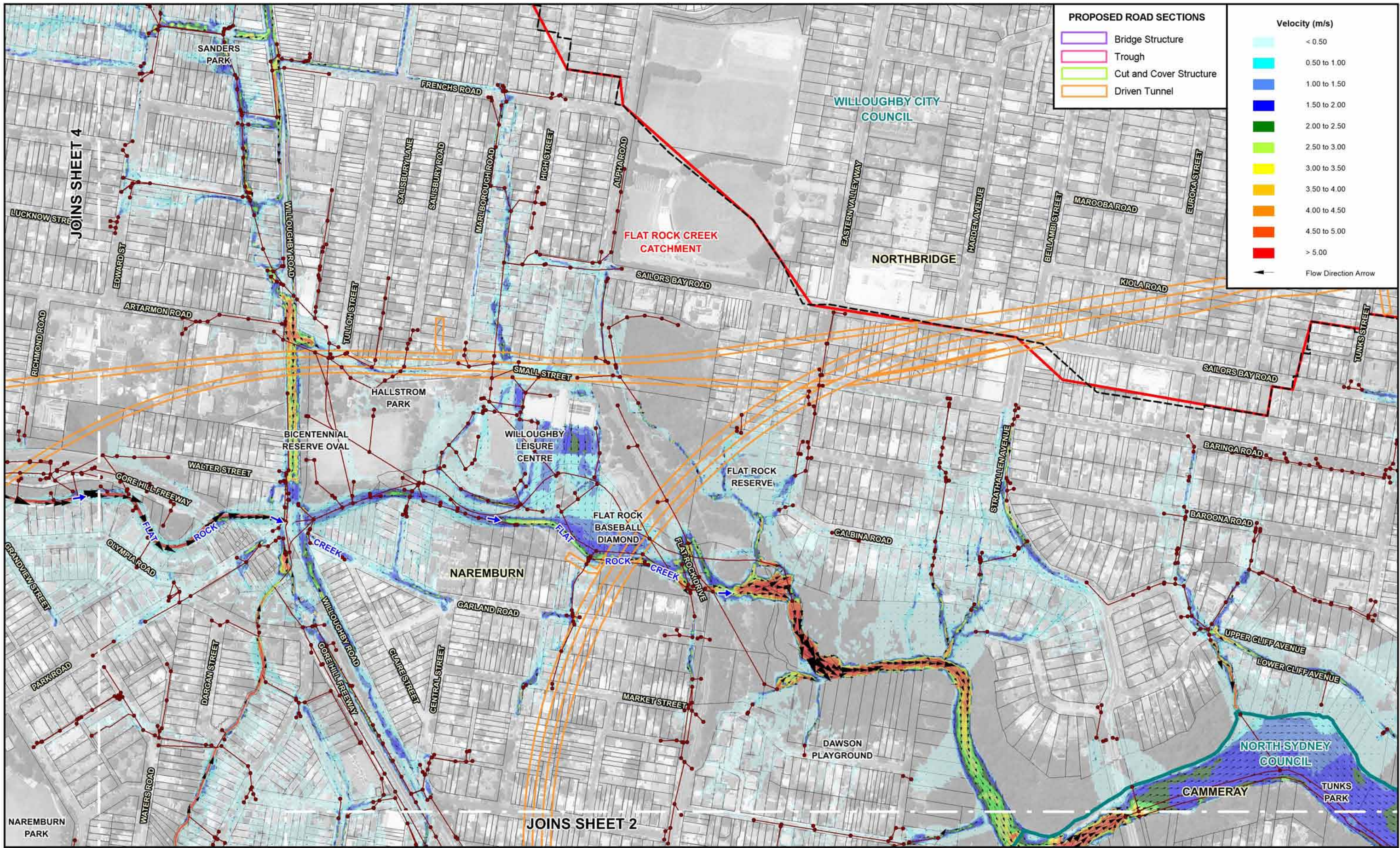


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.4  
(Sheet 2 of 5)

MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT





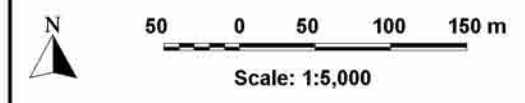
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Velocity (m/s)**

- <math>< 0.50</math>
- 0.50 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- 2.00 to 2.50
- 2.50 to 3.00
- 3.00 to 3.50
- 3.50 to 4.00
- 4.00 to 4.50
- 4.50 to 5.00
- > 5.00

← Flow Direction Arrow



**LEGEND**

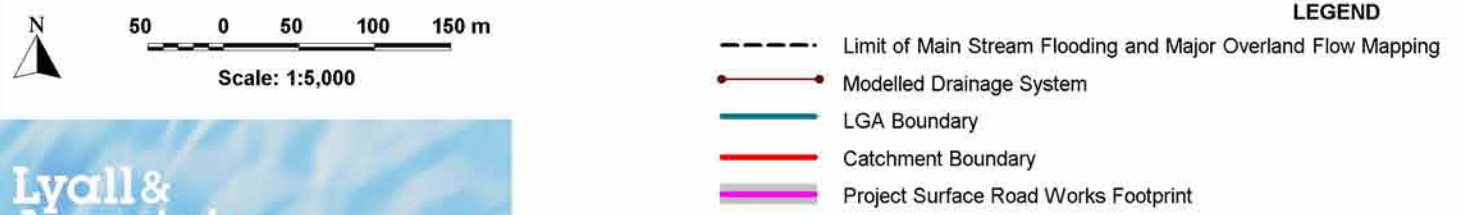
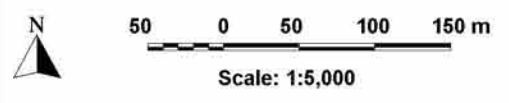
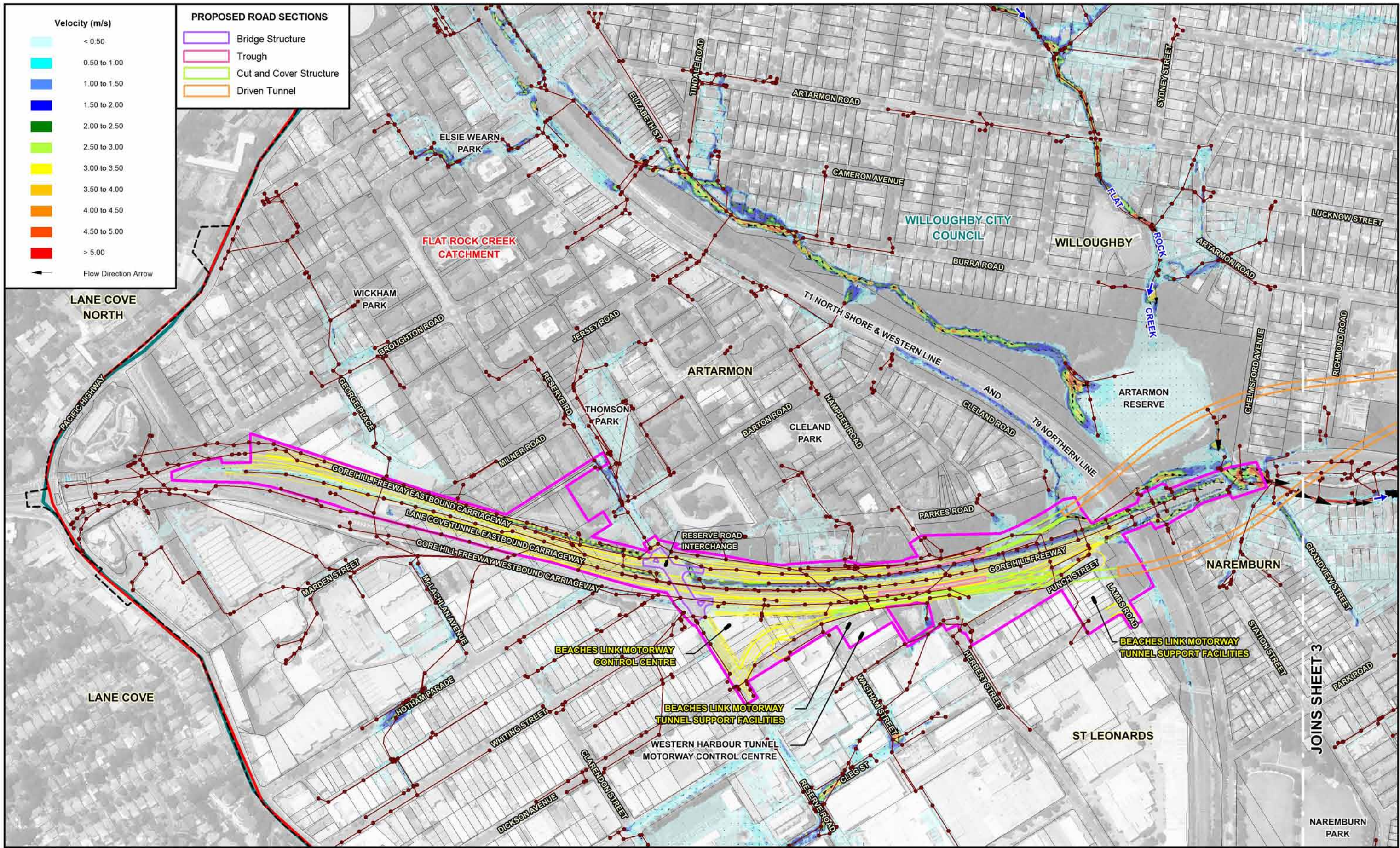
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**



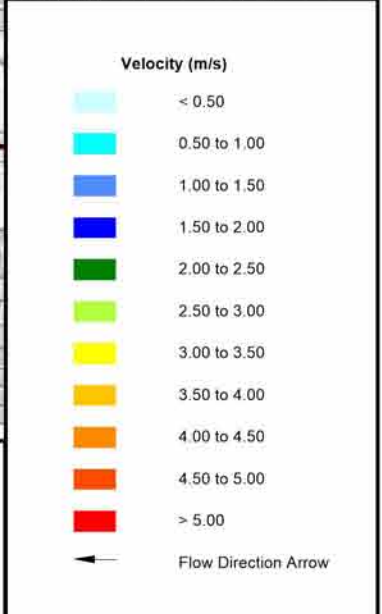
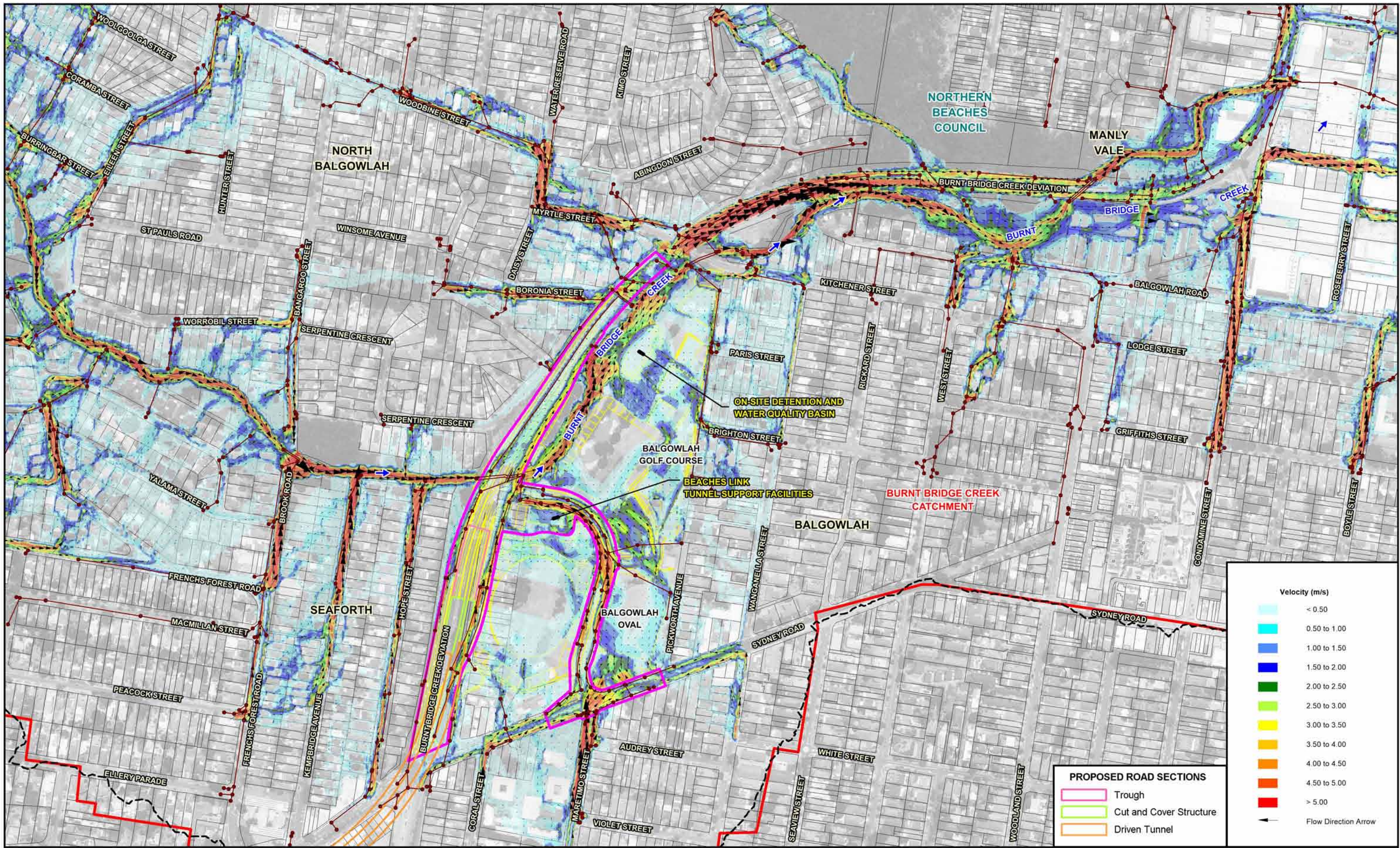
Figure A.4  
(Sheet 3 of 5)  
MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT





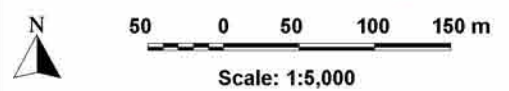
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**





**PROPOSED ROAD SECTIONS**

- Trough
- Cut and Cover Structure
- Driven Tunnel



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint

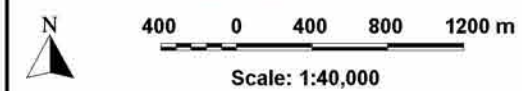
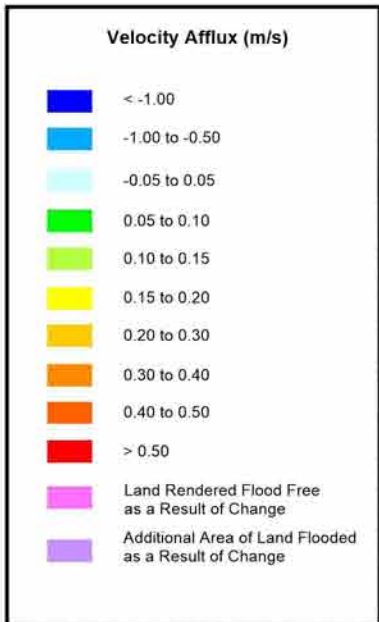
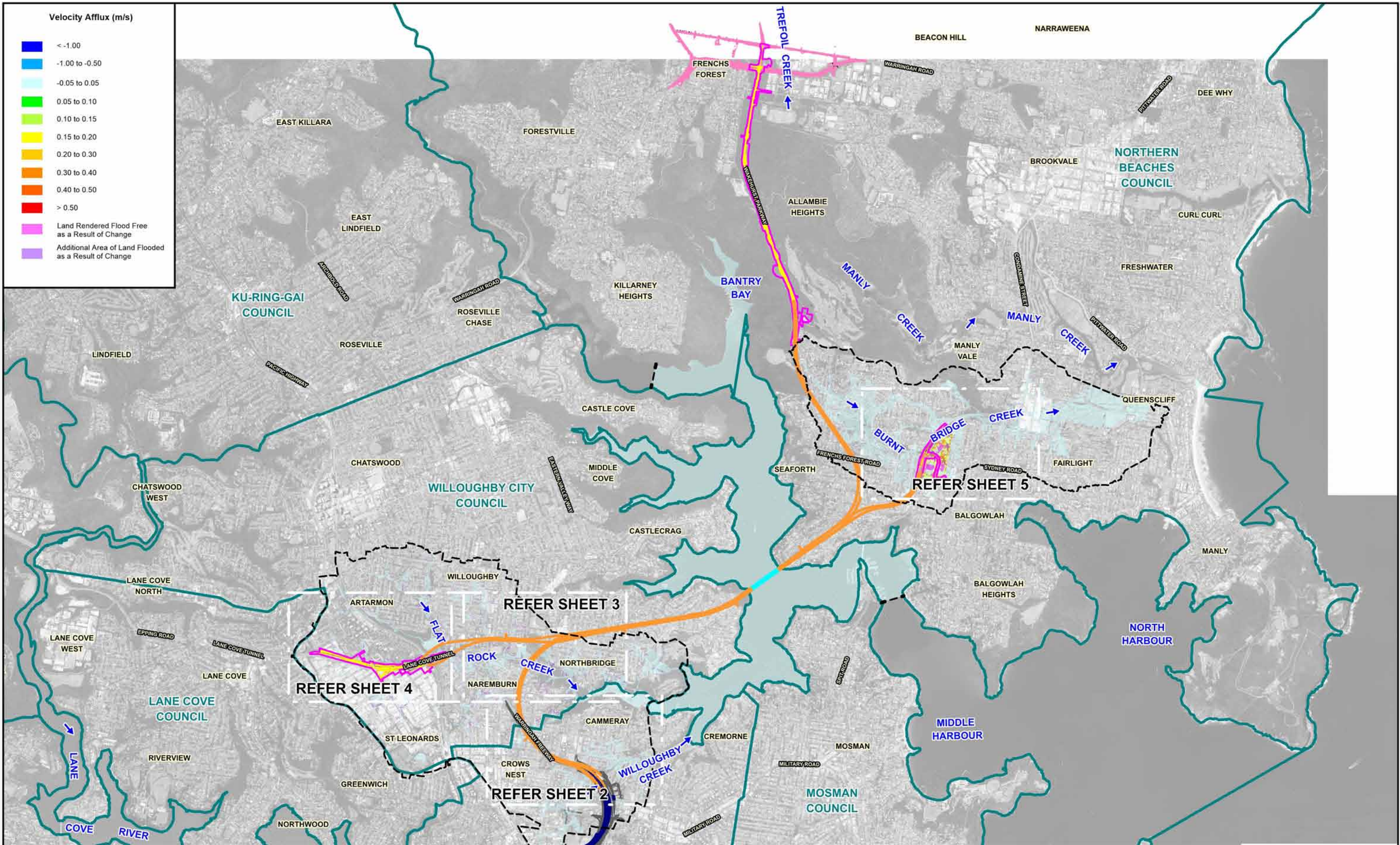
Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.4  
(Sheet 5 of 5)

**MAXIMUM FLOW VELOCITIES UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT**





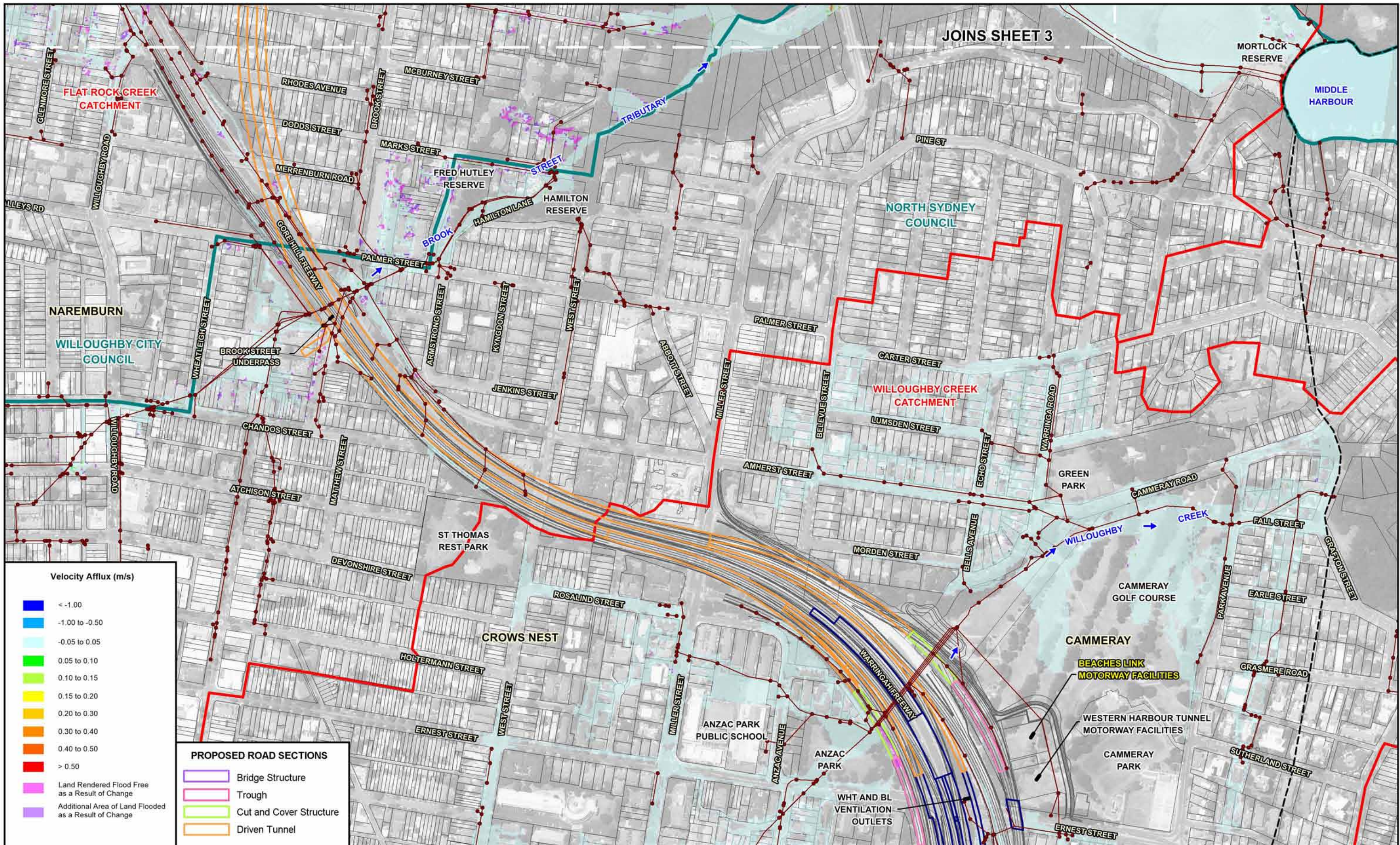
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.5  
(Sheet 1 of 5)  
**IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
10% AEP EVENT**





JOINS SHEET 3

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

CROWS NEST

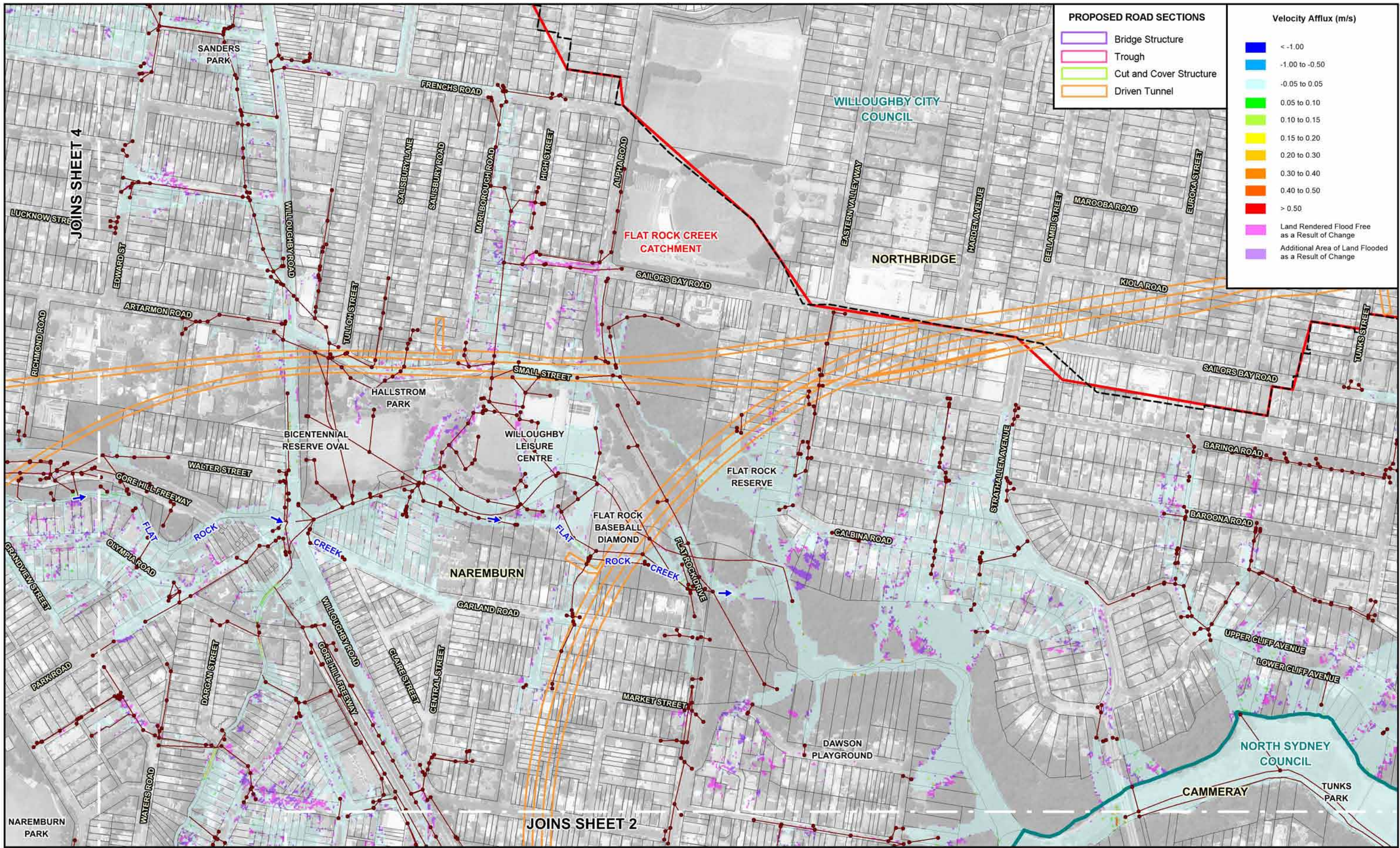
CAMMERAY

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

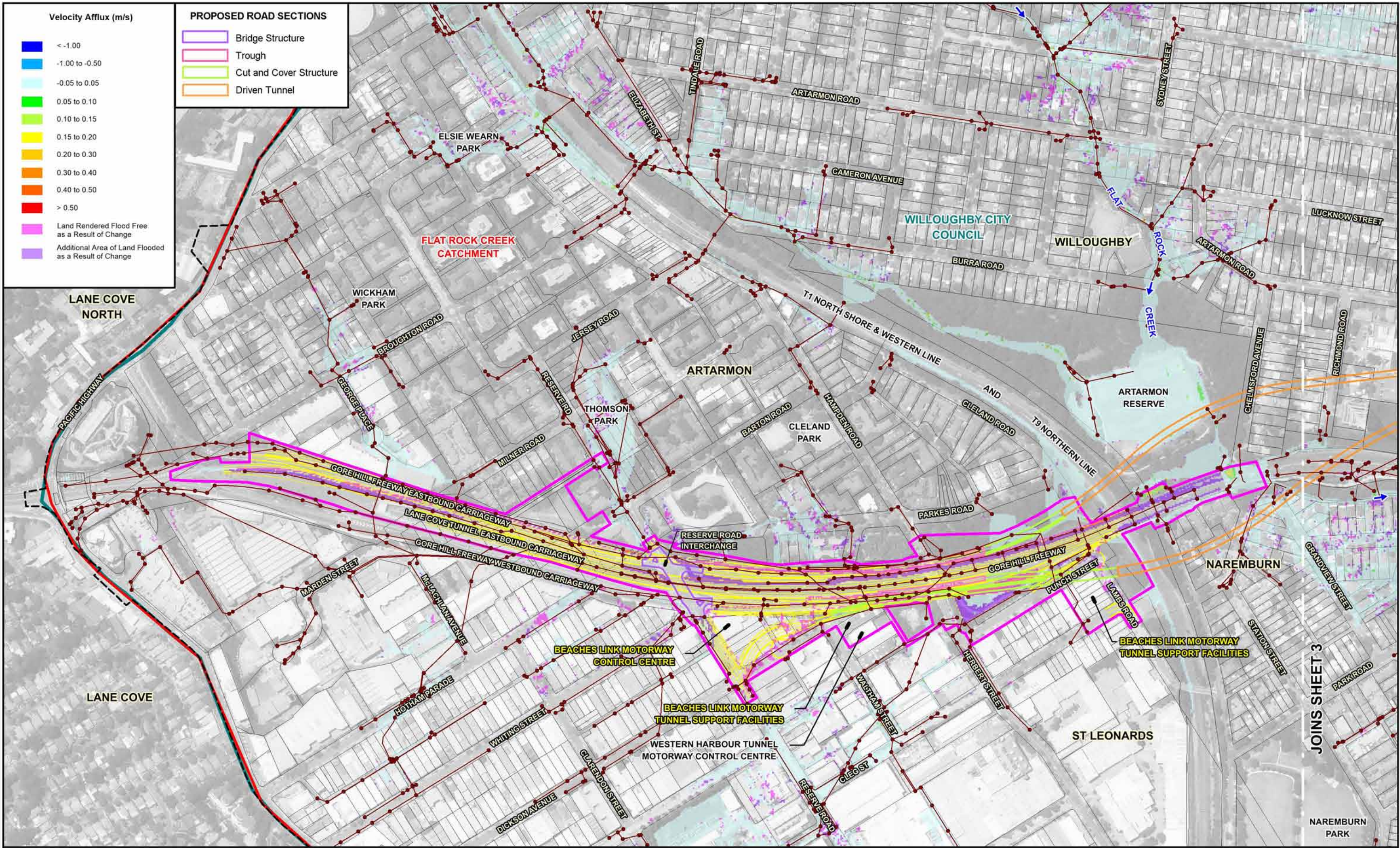
Figure A.5  
(Sheet 2 of 5)

IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
10% AEP EVENT







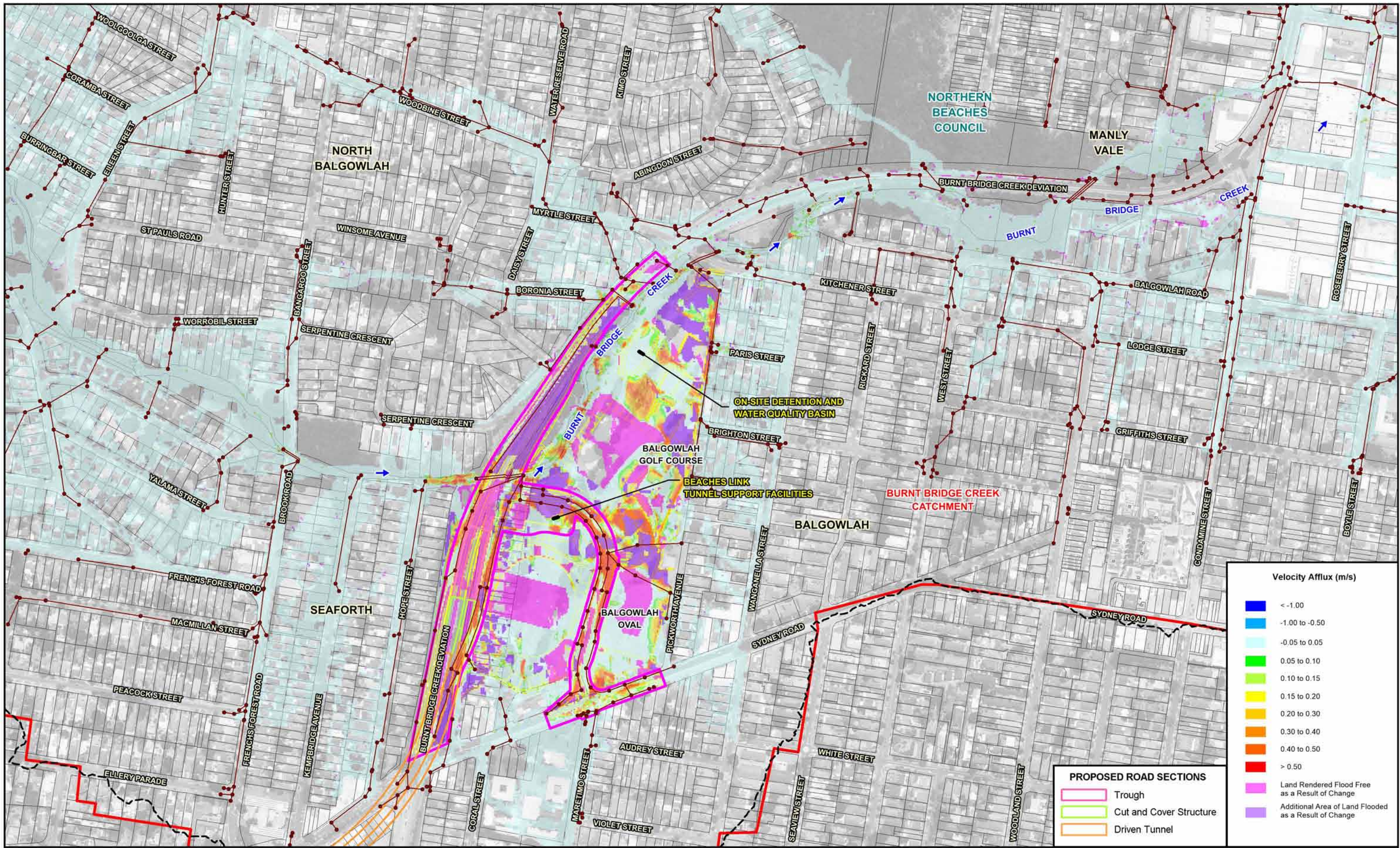


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.5  
(Sheet 4 of 5)

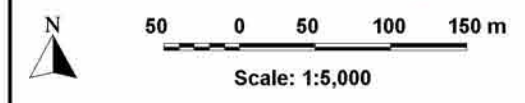
IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
10% AEP EVENT





Velocity Afflux (m/s)	
Blue	< -1.00
Light Blue	-1.00 to -0.50
White	-0.05 to 0.05
Light Green	0.05 to 0.10
Yellow-Green	0.10 to 0.15
Yellow	0.15 to 0.20
Orange	0.20 to 0.30
Dark Orange	0.30 to 0.40
Red-Orange	0.40 to 0.50
Red	> 0.50
Pink	Land Rendered Flood Free as a Result of Change
Purple	Additional Area of Land Flooded as a Result of Change

PROPOSED ROAD SECTIONS	
Pink outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel



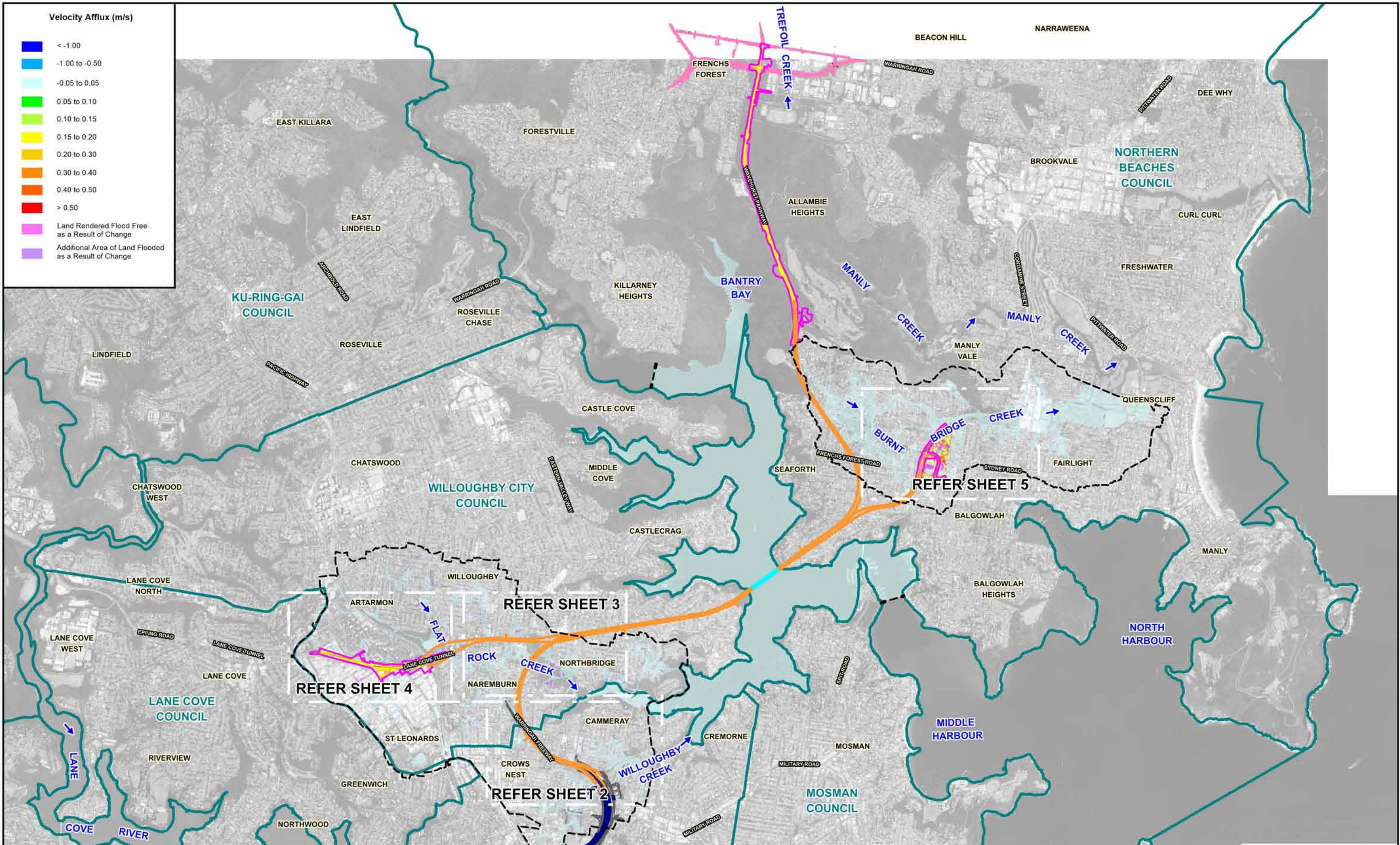
LEGEND	
Black dashed line	Limit of Main Stream Flooding and Major Overland Flow Mapping
Red line with dots	Modelled Drainage System
Blue line	LGA Boundary
Red line	Catchment Boundary
Pink outline	Project Surface Road Works Footprint
Yellow and blue shaded area	Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

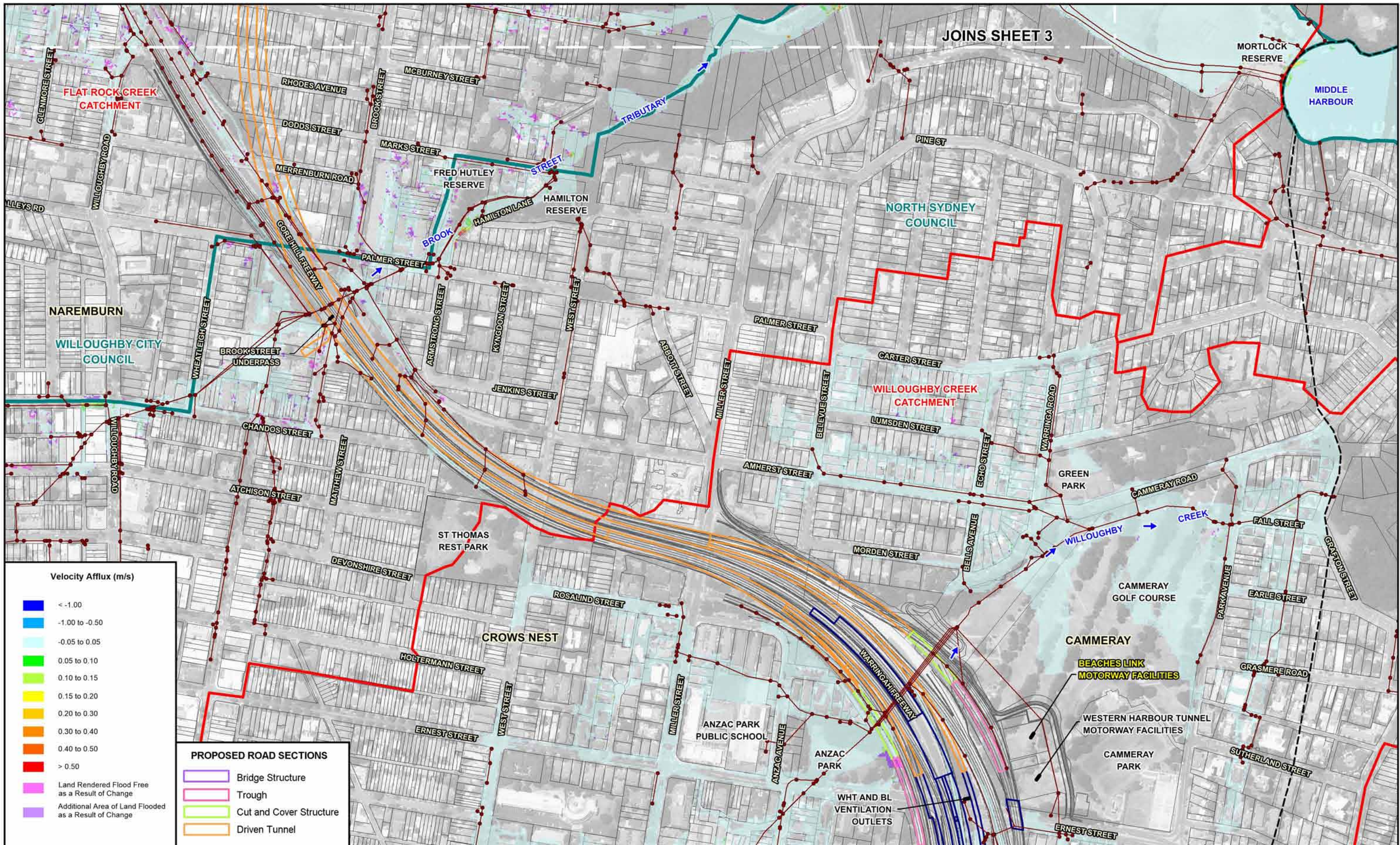
Figure A.5  
(Sheet 5 of 5)

IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
10% AEP EVENT









JOINS SHEET 3

MORTLOCK RESERVE

MIDDLE HARBOUR

FLAT ROCK CREEK CATCHMENT

RHODES AVENUE

MCBURNEY STREET

TRIBUTARY

DODDS STREET

BROOK STREET

MARKS STREET

FRED HUTLEY RESERVE

HAMILTON RESERVE

HAMILTON LANE

PALMER STREET

ARISTON STREET

KYNGON STREET

WEST STREET

ABBOTT STREET

NORTH SYDNEY COUNCIL

NAREMBURN

WILLOUGHBY CITY COUNCIL

BROOK STREET UNDERPASS

WHEATLEIGH STREET

CHANDOS STREET

ATCHISON STREET

MATHEW STREET

DEVONSHIRE STREET

ST THOMAS REST PARK

ROSALIND STREET

CROWS NEST

HOLTERMANN STREET

ERNEST STREET

WEST STREET

MILLER STREET

ANZAC PARK PUBLIC SCHOOL

ANZAC AVENUE

ANZAC PARK

WHT AND BL VENTILATION OUTLETS

MORDEN STREET

AMHERST STREET

BELEVUE STREET

CARTER STREET

LUMSDEN STREET

ECHO STREET

WARRINGAH ROAD

GREEN PARK

CAMMERAY ROAD

WILLOUGHBY CREEK

FALL STREET

GRAFTON STREET

CAMMERAY

BEACHES LINK MOTORWAY FACILITIES

WESTERN HARBOUR TUNNEL MOTORWAY FACILITIES

CAMMERAY PARK

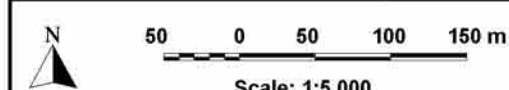
GRASMERE ROAD

PARK AVENUE

EARLE STREET

SUTHERLAND STREET

ERNEST STREET

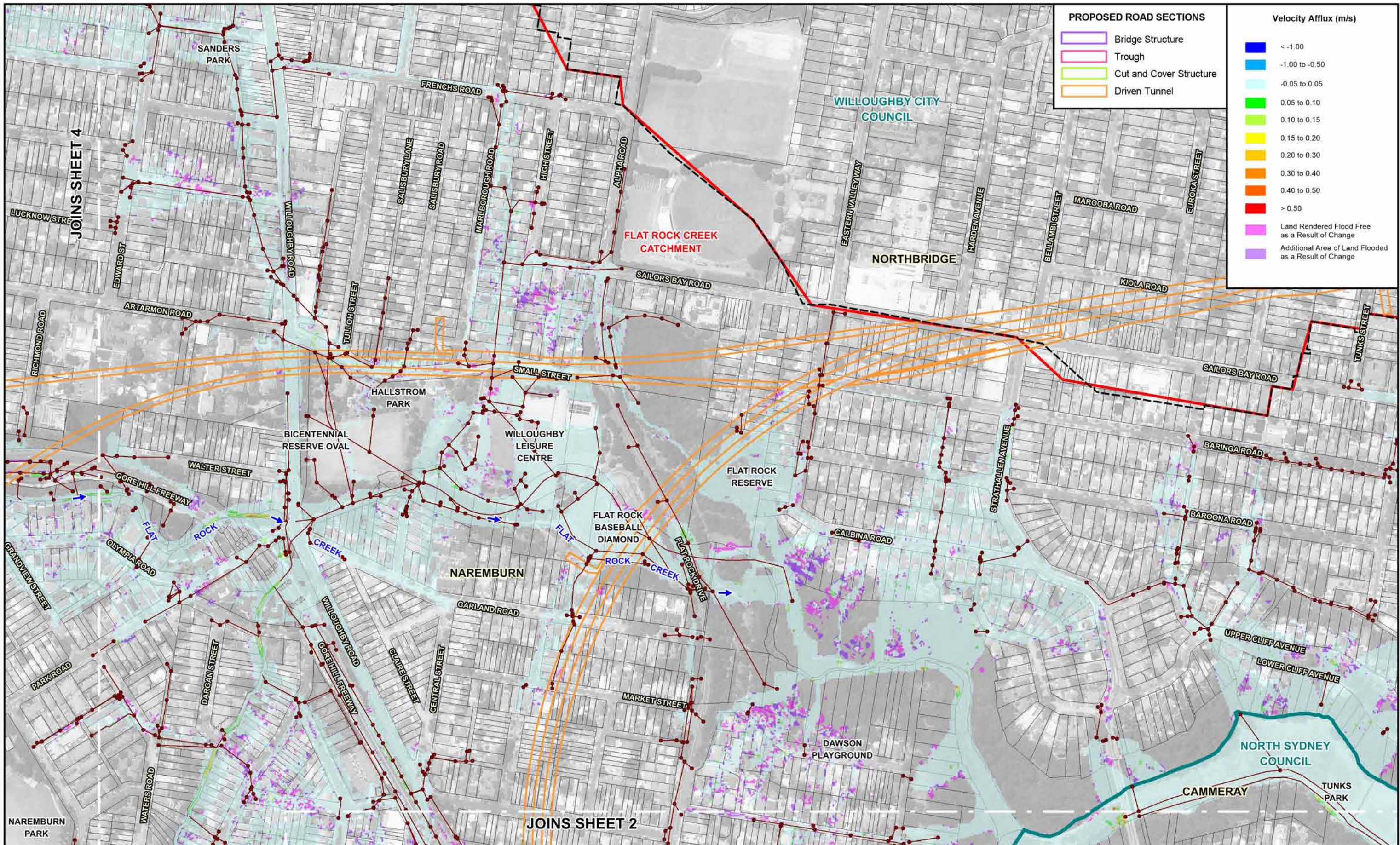


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.6 (Sheet 2 of 5)

IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES 1% AEP EVENT





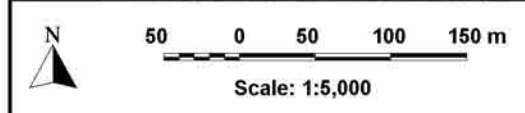
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Velocity Afflux (m/s)**

- < -1.00
- 1.00 to -0.50
- 0.05 to 0.05
- 0.05 to 0.10
- 0.10 to 0.15
- 0.15 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- > 0.50

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



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

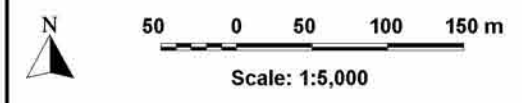
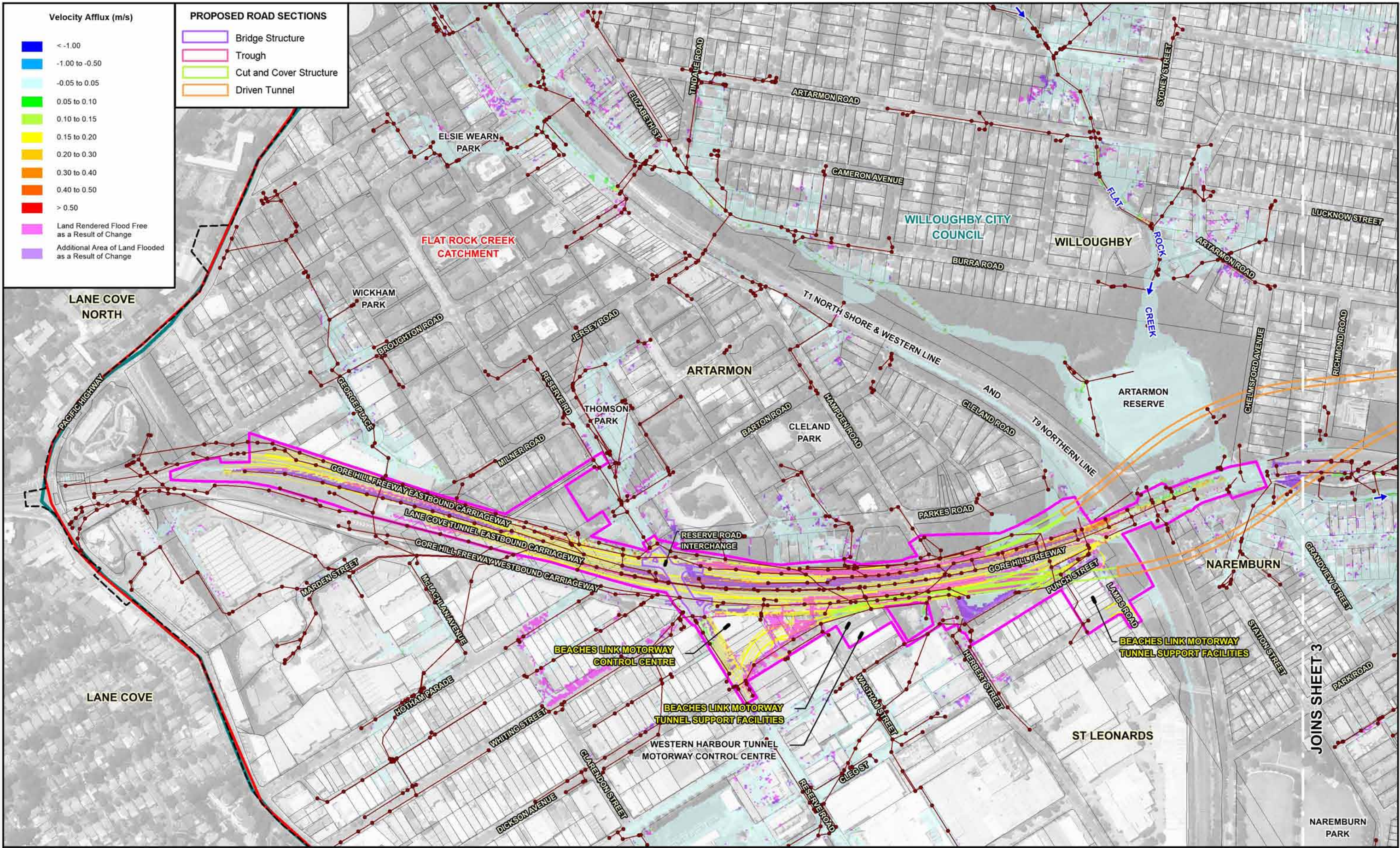
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.6  
(Sheet 3 of 5)

IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
1% AEP EVENT







**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

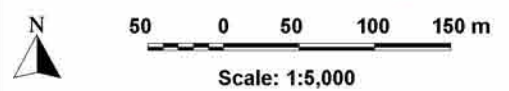
Figure A.6  
(Sheet 4 of 5)  
IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
1% AEP EVENT





Velocity Afflux (m/s)	
Blue	< -1.00
Light Blue	-1.00 to -0.50
White	-0.05 to 0.05
Light Green	0.05 to 0.10
Yellow-Green	0.10 to 0.15
Yellow	0.15 to 0.20
Orange	0.20 to 0.30
Red-Orange	0.30 to 0.40
Red	0.40 to 0.50
Dark Red	> 0.50
Pink	Land Rendered Flood Free as a Result of Change
Purple	Additional Area of Land Flooded as a Result of Change

PROPOSED ROAD SECTIONS	
Blue outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel



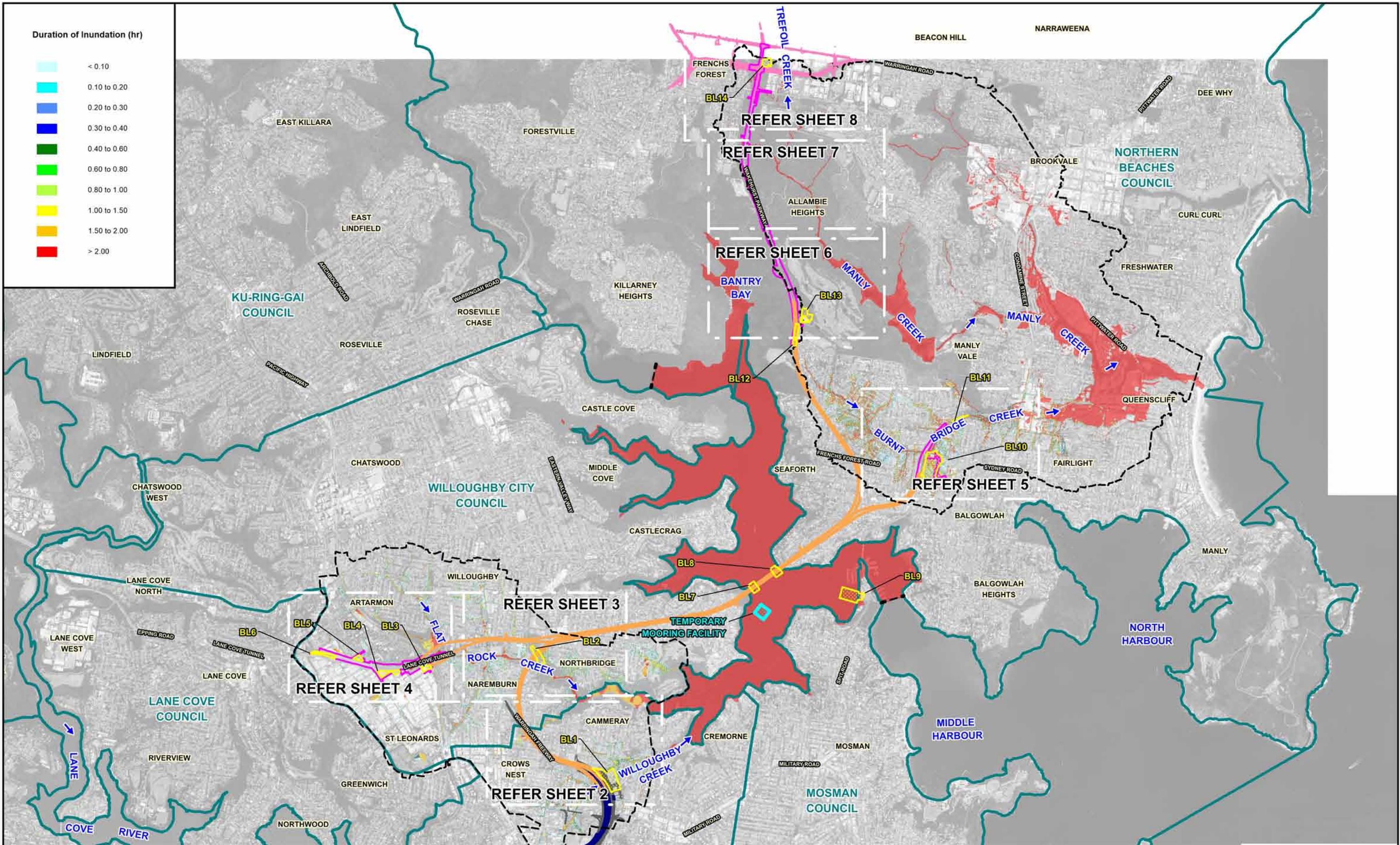
LEGEND	
Black dashed line	Limit of Main Stream Flooding and Major Overland Flow Mapping
Red line with dots	Modelled Drainage System
Blue line	LGA Boundary
Red line	Catchment Boundary
Blue outline	Project Surface Road Works Footprint
Yellow and blue shaded area	Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

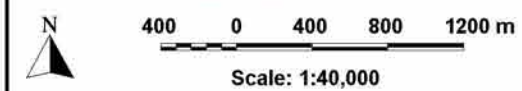
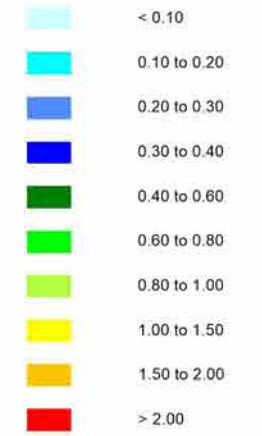
Figure A.6  
(Sheet 5 of 5)

IMPACT OF PROJECT OPERATION ON MAXIMUM FLOW VELOCITIES  
1% AEP EVENT





Duration of Inundation (hr)



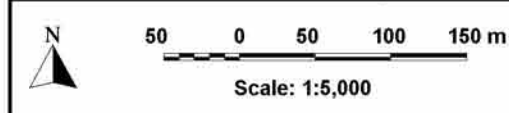
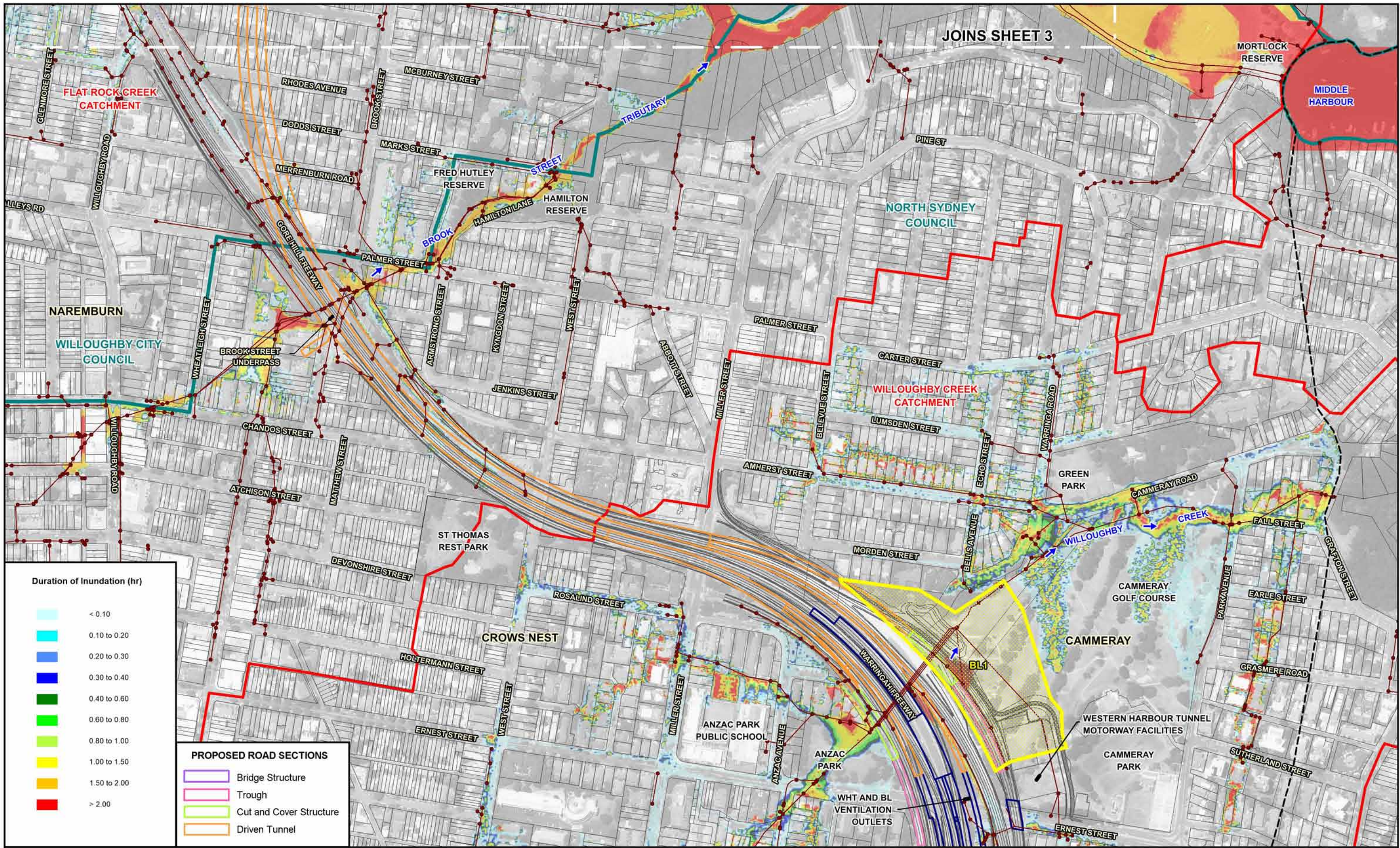
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - BL2 Construction Support Site and Identifier
  - Project Surface Road Works Footprint

- Driven Tunnel
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.7  
(Sheet 1 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT





**LEGEND**

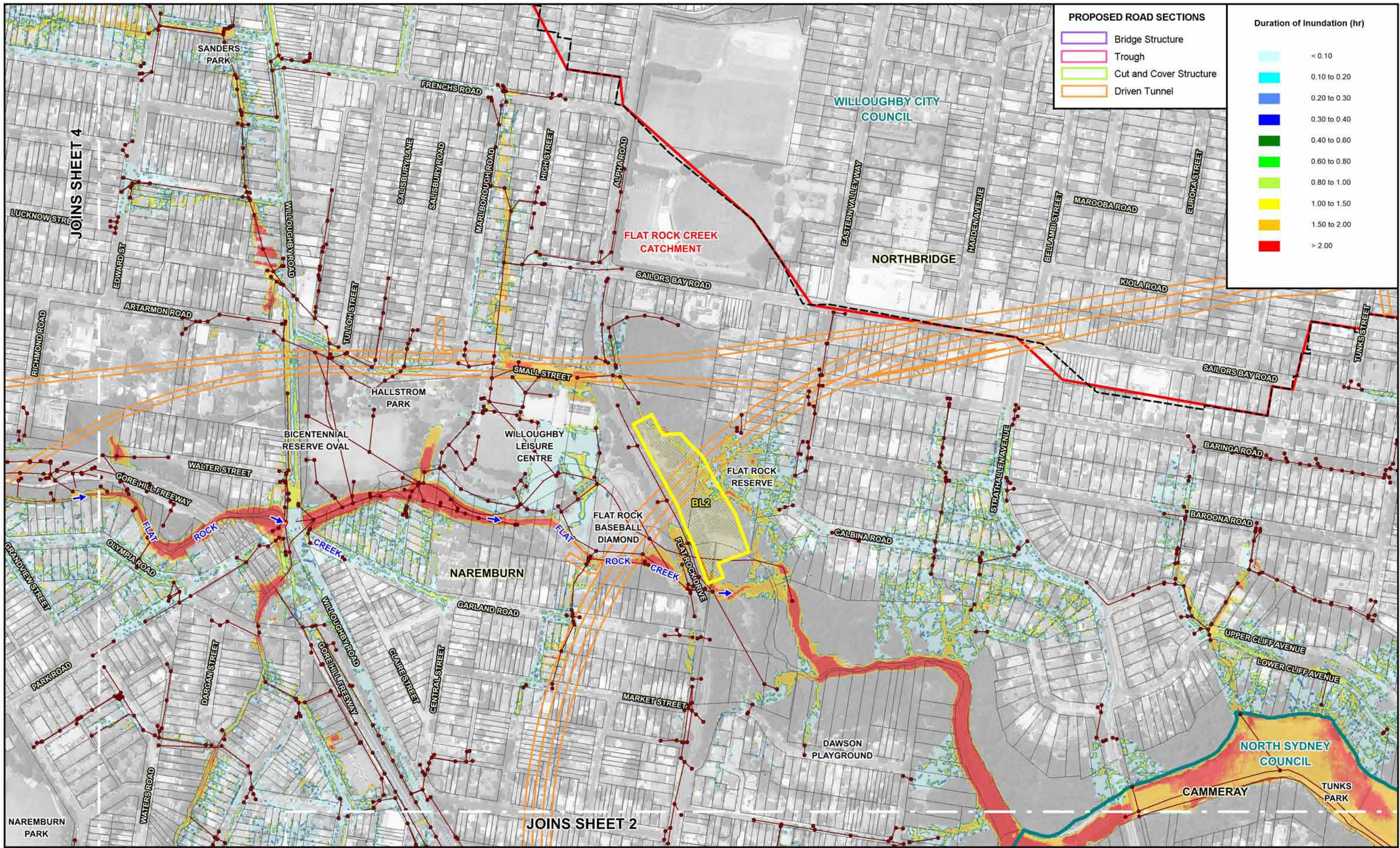
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint
- Construction Support Site and Identifier
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

**DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS 10% AEP EVENT**

Figure A.7 (Sheet 2 of 8)



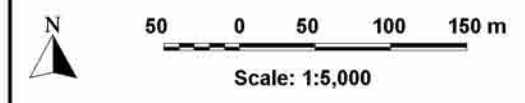


**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Duration of Inundation (hr)**

- < 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- > 2.00



- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - BL2 Construction Support Site and Identifier

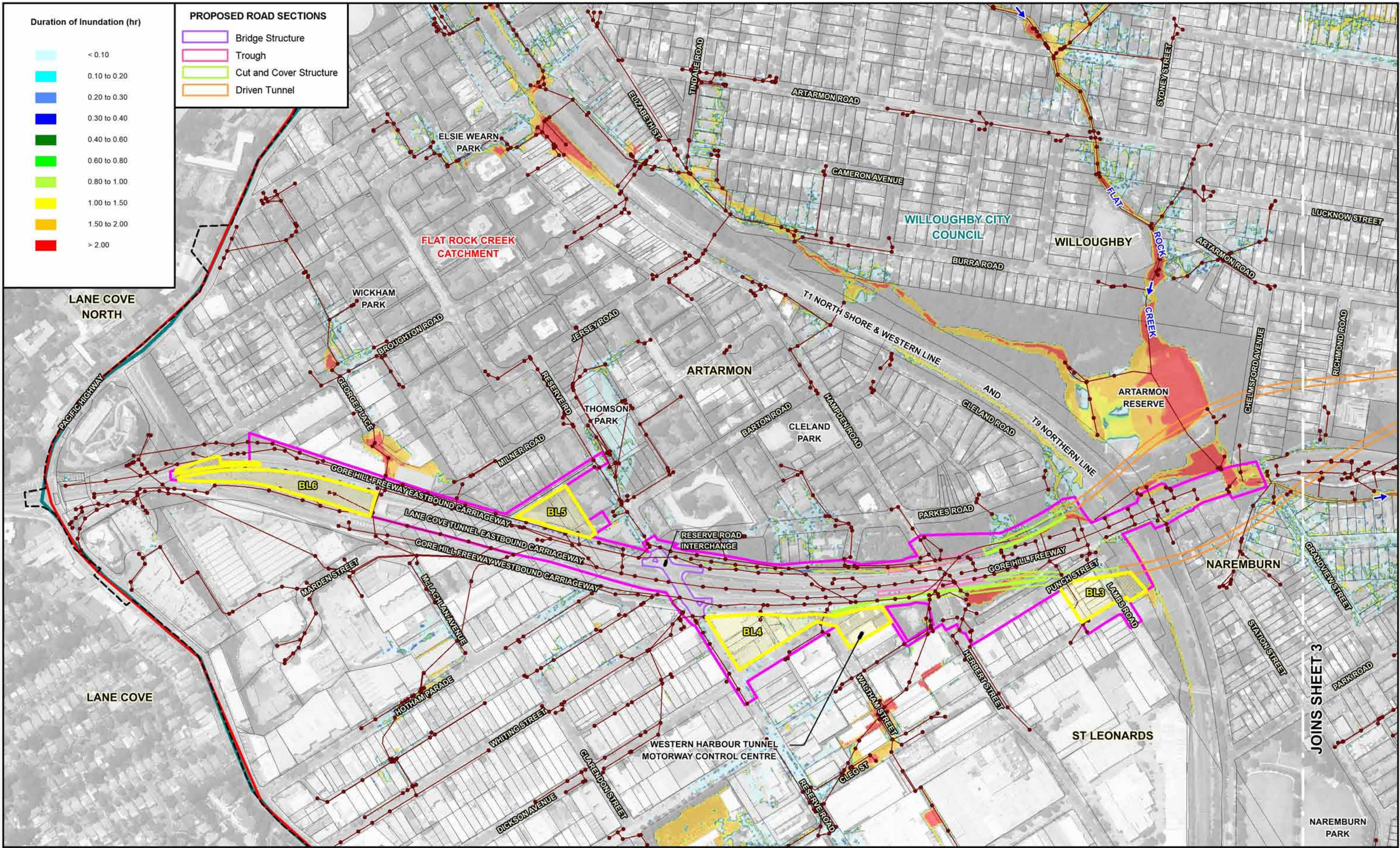
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.7  
(Sheet 3 of 8)

DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT



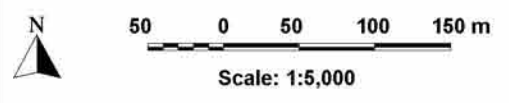




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.7  
(Sheet 4 of 8)

DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT



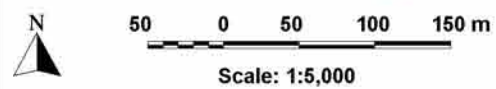




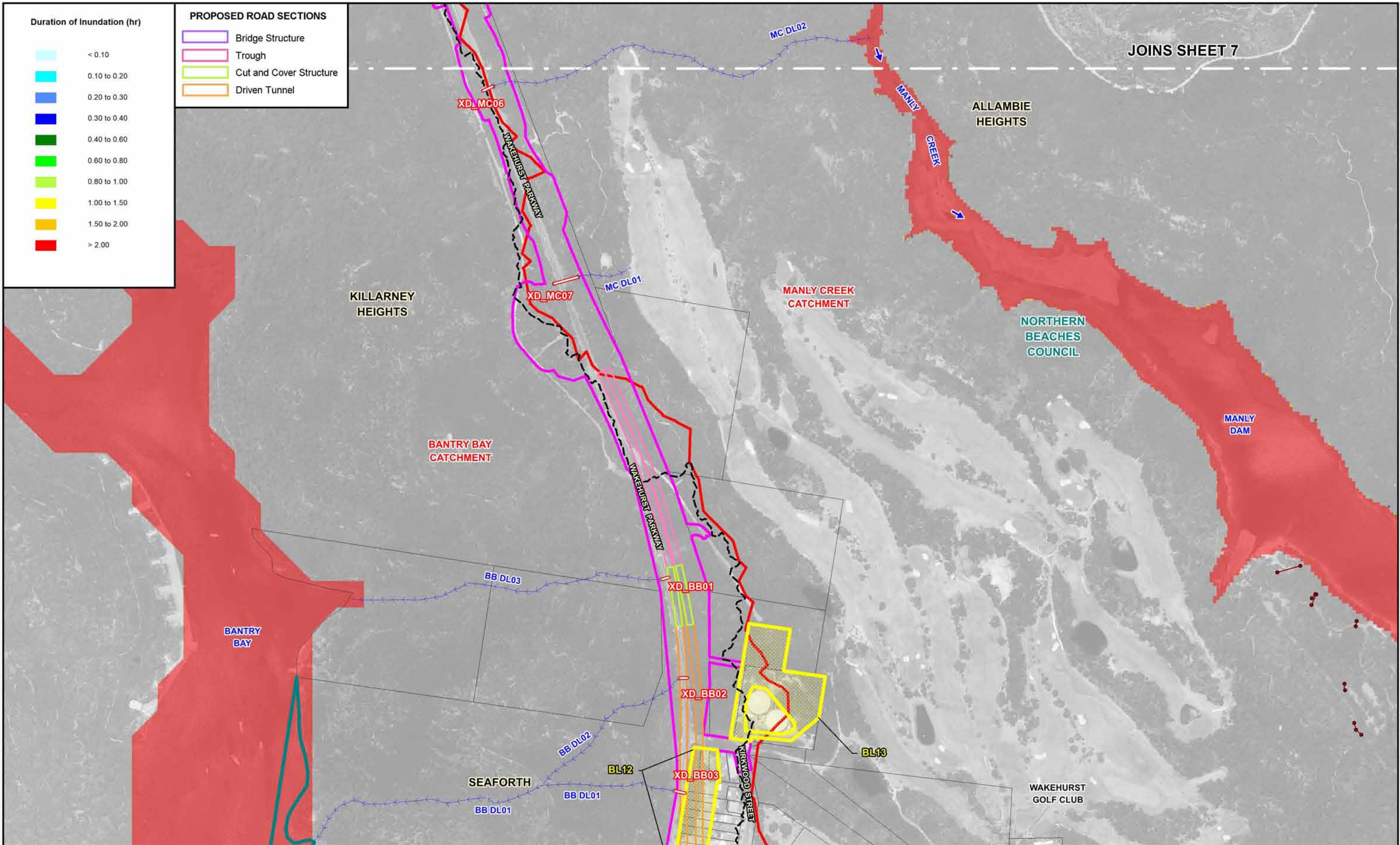
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.7  
(Sheet 5 of 8)

DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT







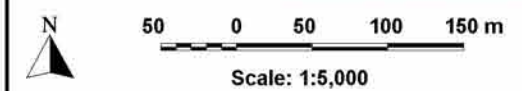
JOINS SHEET 7

Duration of Inundation (hr)

- <math>< 0.10</math>
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- > 2.00

PROPOSED ROAD SECTIONS

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

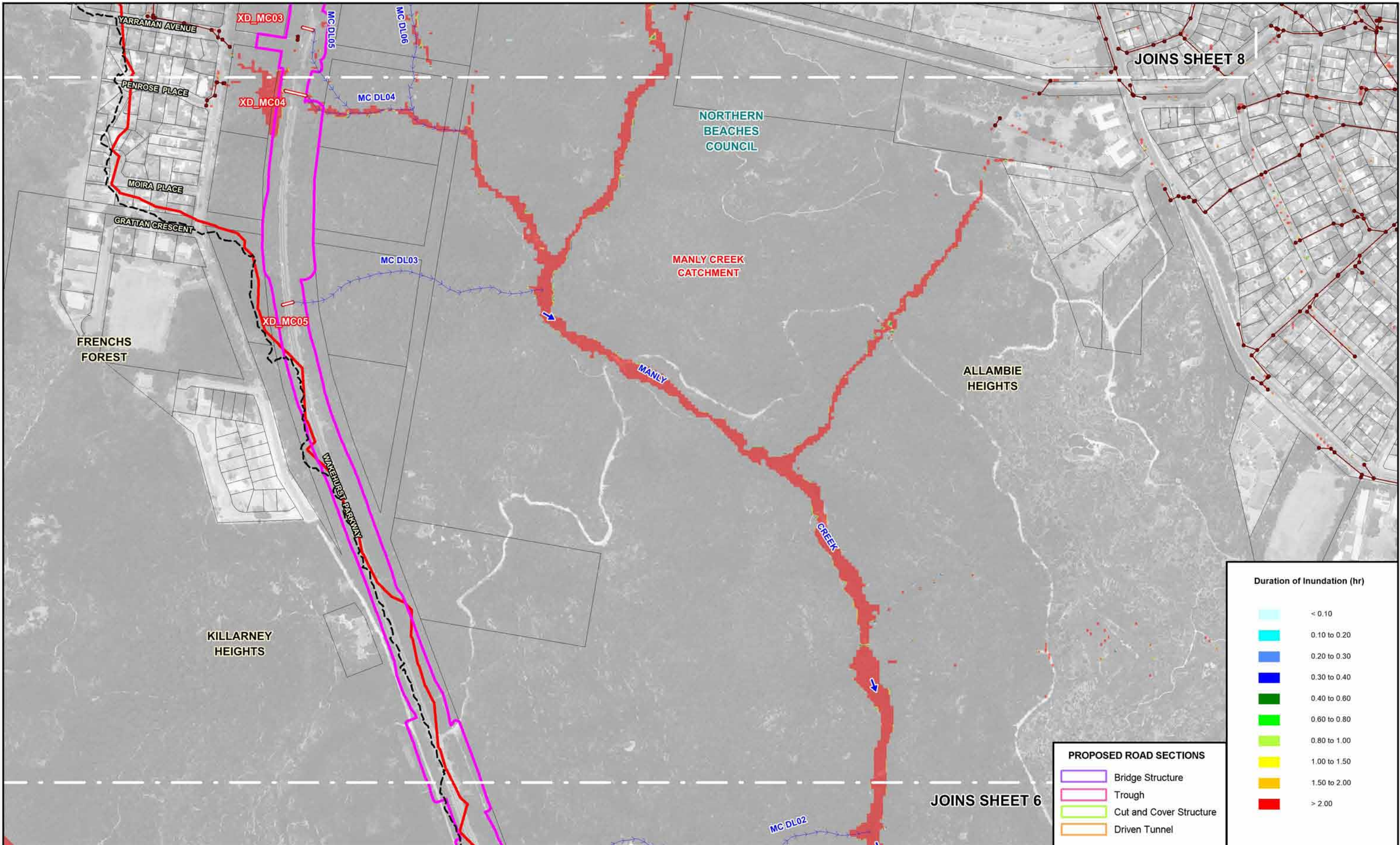


- LEGEND
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - BL2 Construction Support Site and Identifier
  - XD\_BB03 Existing Transverse Drainage and Identifier
  - Existing Drainage Line

BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure A.7  
(Sheet 6 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT









Duration of Inundation (hr)	
<span style="color: cyan;">■</span>	< 0.10
<span style="color: lightblue;">■</span>	0.10 to 0.20
<span style="color: blue;">■</span>	0.20 to 0.30
<span style="color: darkblue;">■</span>	0.30 to 0.40
<span style="color: green;">■</span>	0.40 to 0.60
<span style="color: limegreen;">■</span>	0.60 to 0.80
<span style="color: yellowgreen;">■</span>	0.80 to 1.00
<span style="color: yellow;">■</span>	1.00 to 1.50
<span style="color: orange;">■</span>	1.50 to 2.00
<span style="color: red;">■</span>	> 2.00

PROPOSED ROAD SECTIONS	
<span style="border: 1px solid purple; padding: 2px;"> </span>	Bridge Structure
<span style="border: 1px solid pink; padding: 2px;"> </span>	Trough
<span style="border: 1px solid lightgreen; padding: 2px;"> </span>	Cut and Cover Structure
<span style="border: 1px solid orange; padding: 2px;"> </span>	Driven Tunnel



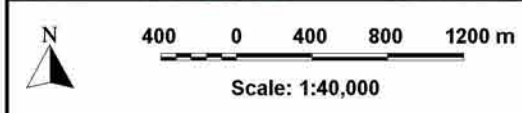
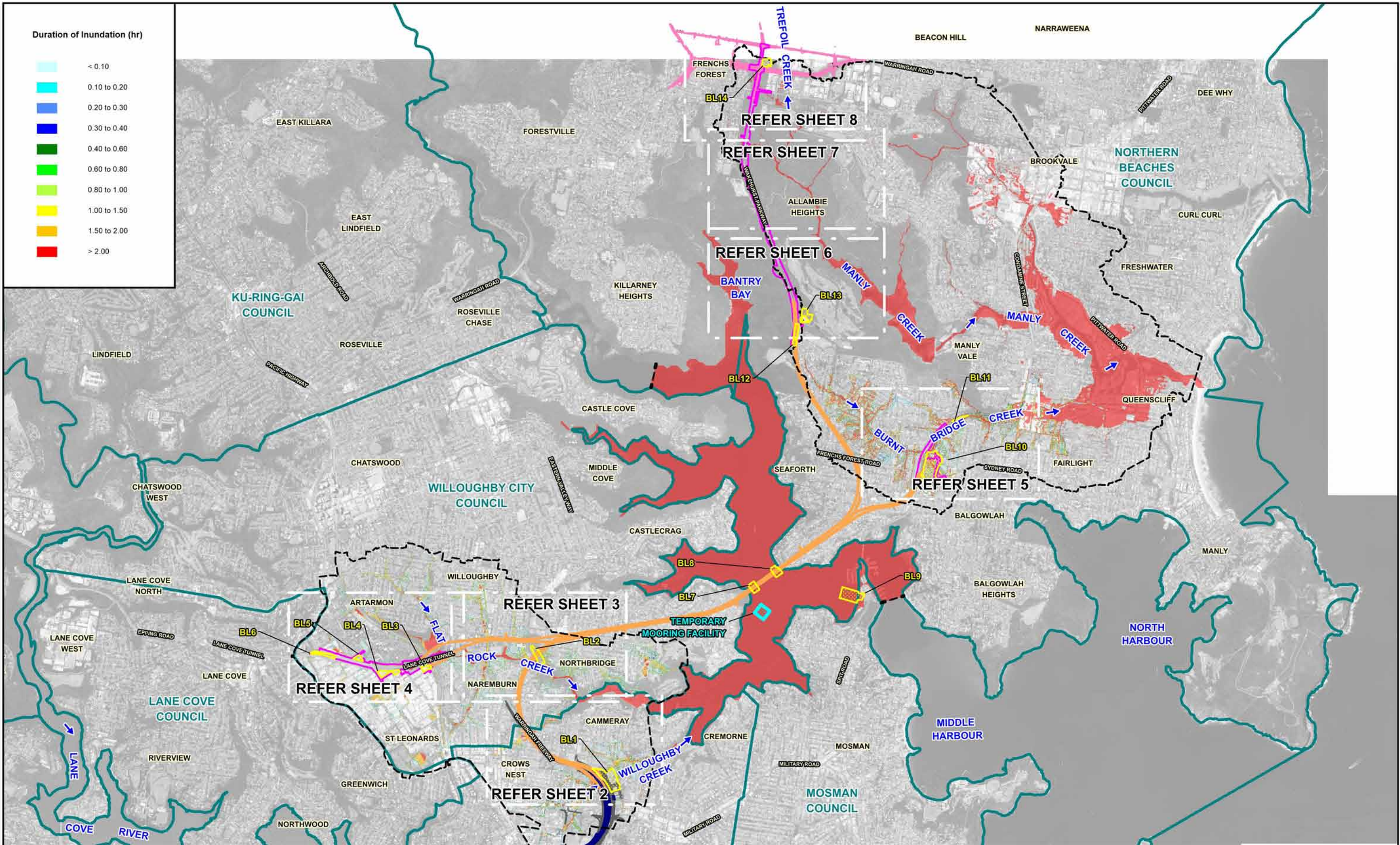
LEGEND	
<span style="border-top: 1px dashed black; width: 20px; display: inline-block;"></span>	Limit of Main Stream Flooding and Major Overland Flow Mapping
<span style="color: brown;">●</span>	Existing Drainage System
<span style="border-top: 1px solid green; width: 20px; display: inline-block;"></span>	LGA Boundary
<span style="border-top: 1px solid red; width: 20px; display: inline-block;"></span>	Catchment Boundary
<span style="border: 1px solid yellow; padding: 2px;">BL2</span>	Construction Support Site and Identifier

<span style="border: 1px solid purple; width: 20px; height: 10px; display: inline-block;"></span>	Project Surface Road Works Footprint
<span style="border: 1px solid pink; width: 20px; height: 10px; display: inline-block;"></span>	Northern Beaches Hospital Surface Road Works
<span style="color: brown; text-decoration: underline;">XD_MC03</span>	Existing Transverse Drainage and Identifier
<span style="color: blue;">→→→</span>	Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.7  
(Sheet 8 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
10% AEP EVENT



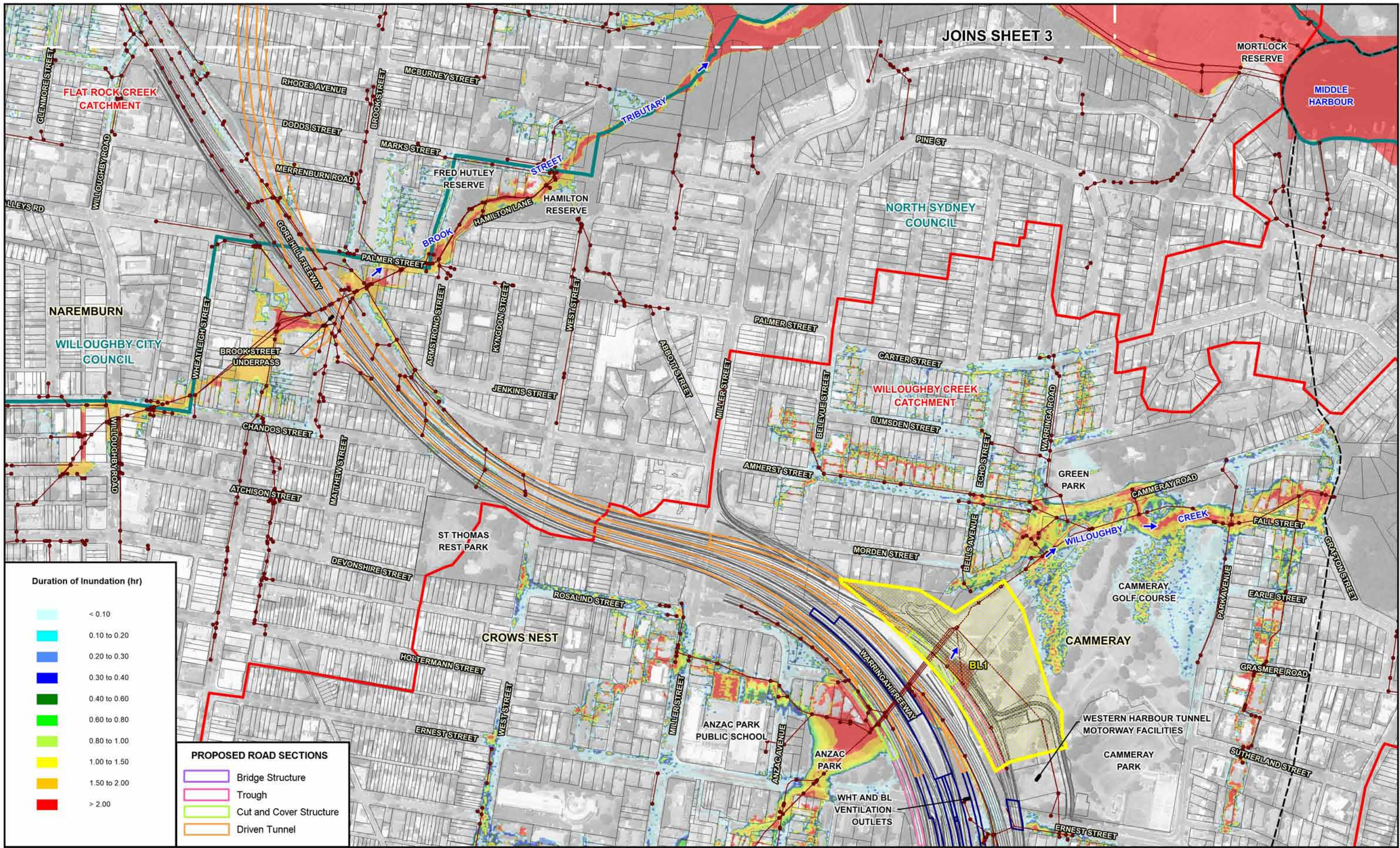


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - BL2 Construction Support Site and Identifier
  - Project Surface Road Works Footprint
  - Driven Tunnel
  - Northern Beaches Hospital Surface Road Works
  - Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
  - Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.8  
(Sheet 1 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





JOINS SHEET 3

MORTLOCK RESERVE  
MIDDLE HARBOUR

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

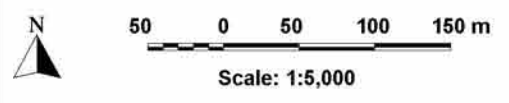
CROWS NEST

CAMMERAY

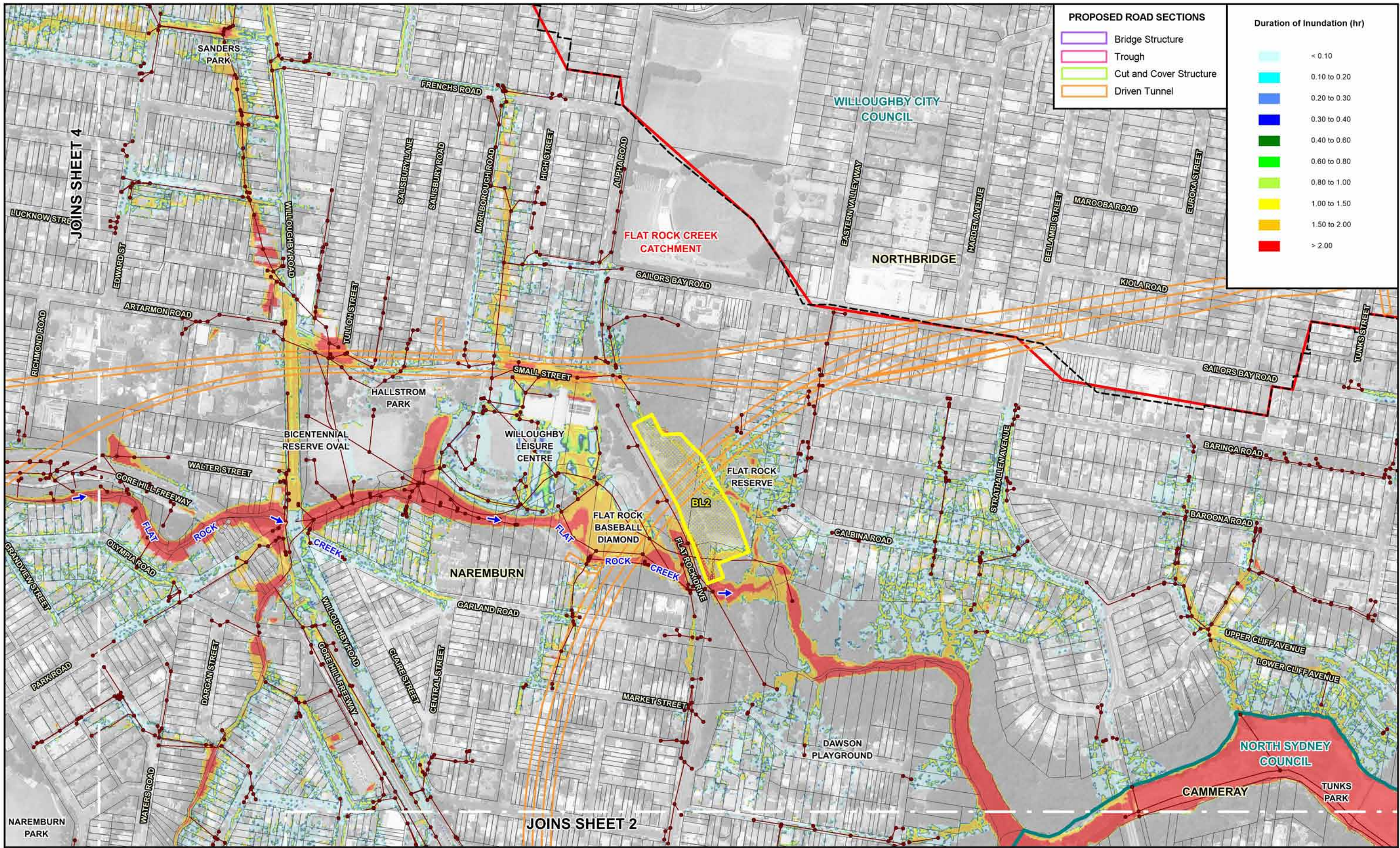
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.8  
(Sheet 2 of 8)

DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





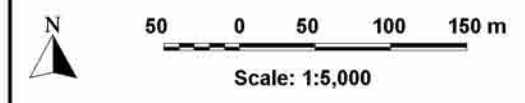


**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Duration of Inundation (hr)**

- <math>< 0.10</math>
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- > 2.00



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Construction Support Site and Identifier

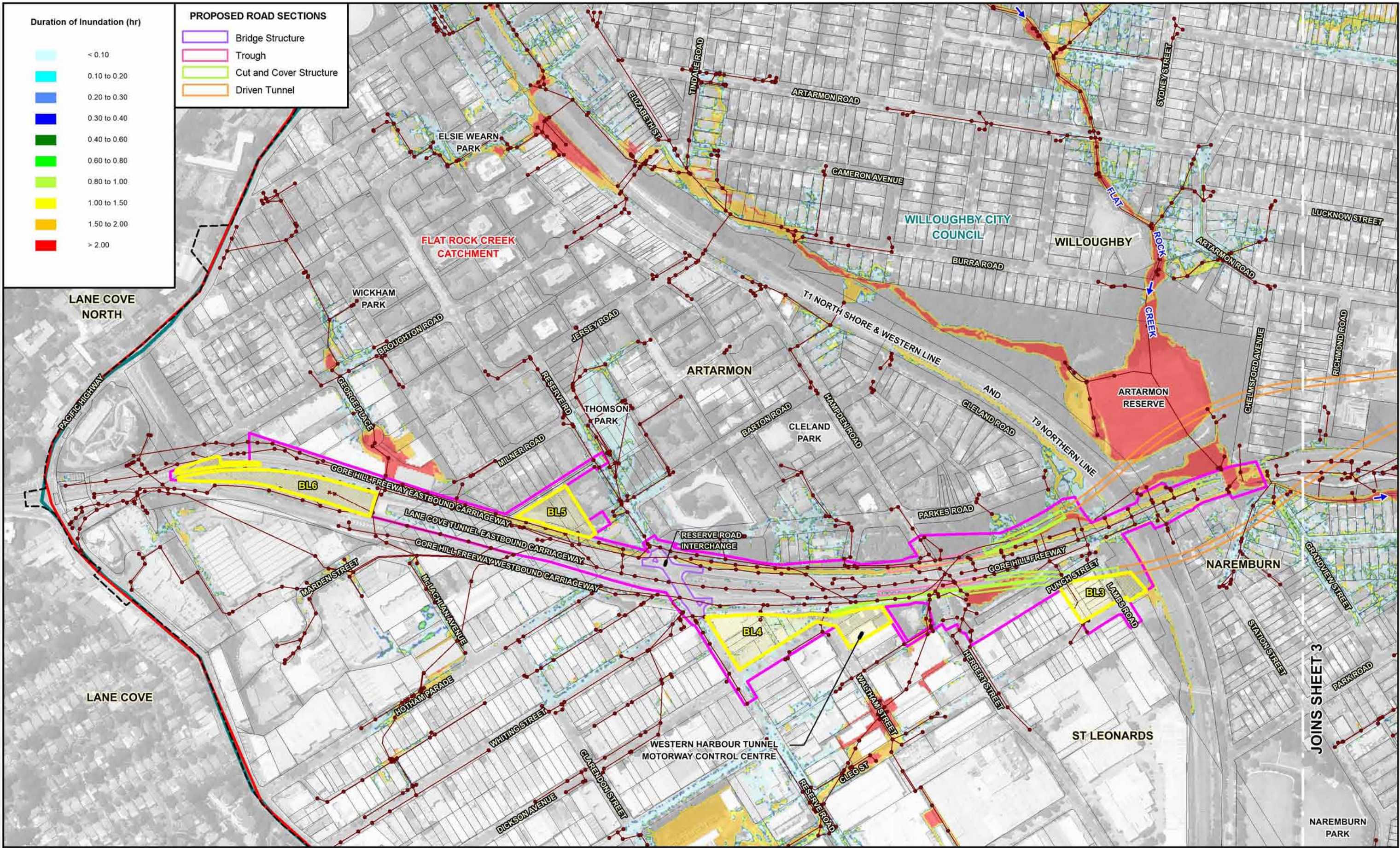
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.8  
(Sheet 3 of 8)

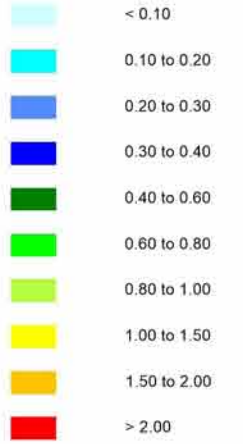
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT







Duration of Inundation (hr)



PROPOSED ROAD SECTIONS



LANE COVE NORTH

LANE COVE

FLAT ROCK CREEK CATCHMENT

WILLOUGHBY CITY COUNCIL

WILLOUGHBY

ARTARMON

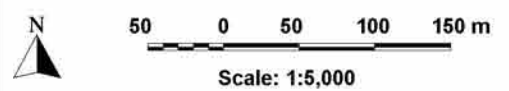
ARTARMON RESERVE

NAREMBURN

ST LEONARDS

JOINS SHEET 3

NAREMBURN PARK



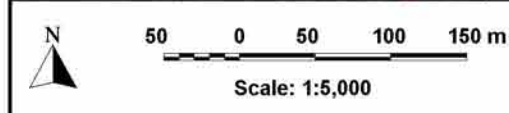
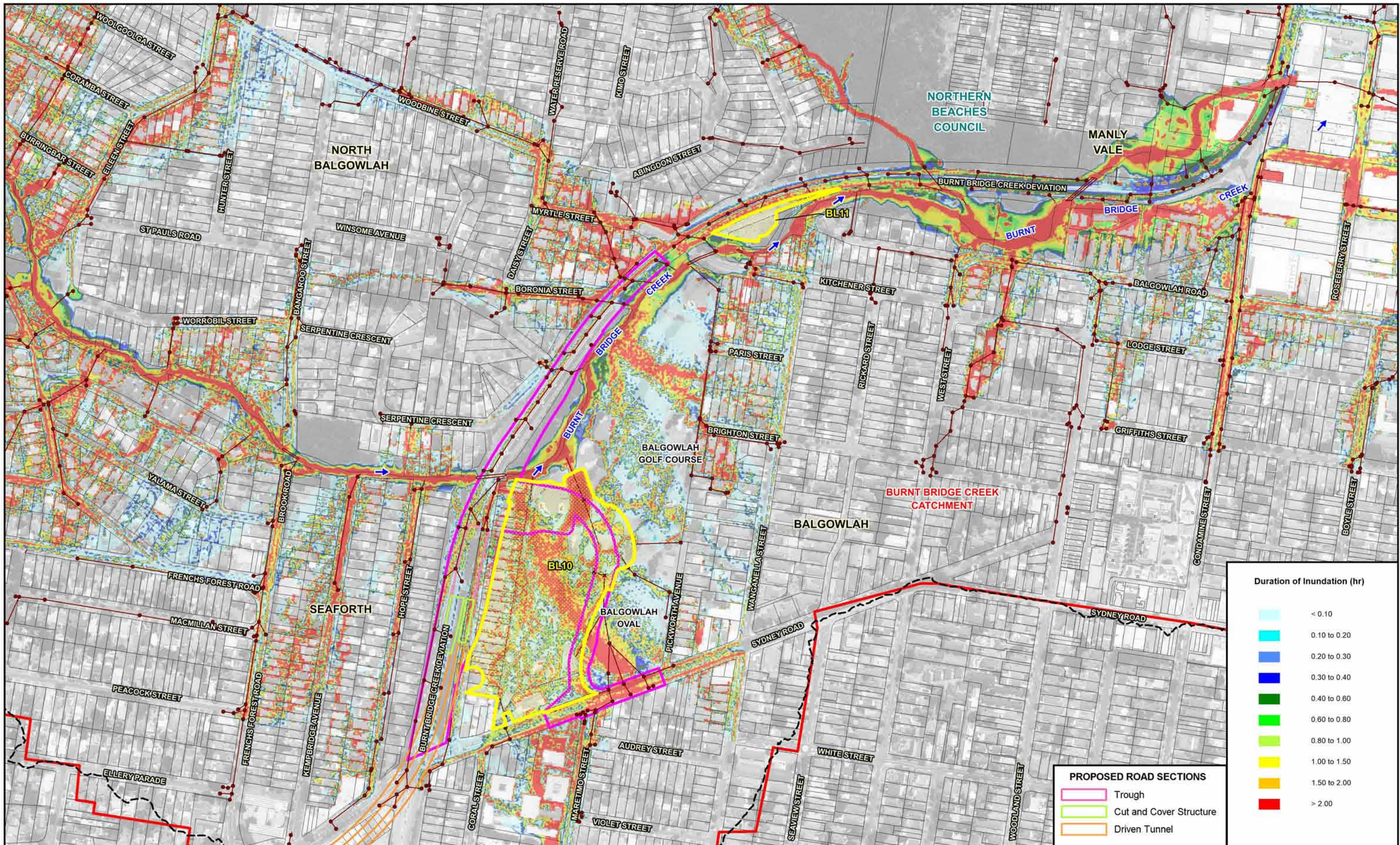
LEGEND

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint
- BL2 Construction Support Site and Identifier

BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT

Figure A.8 (Sheet 4 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT



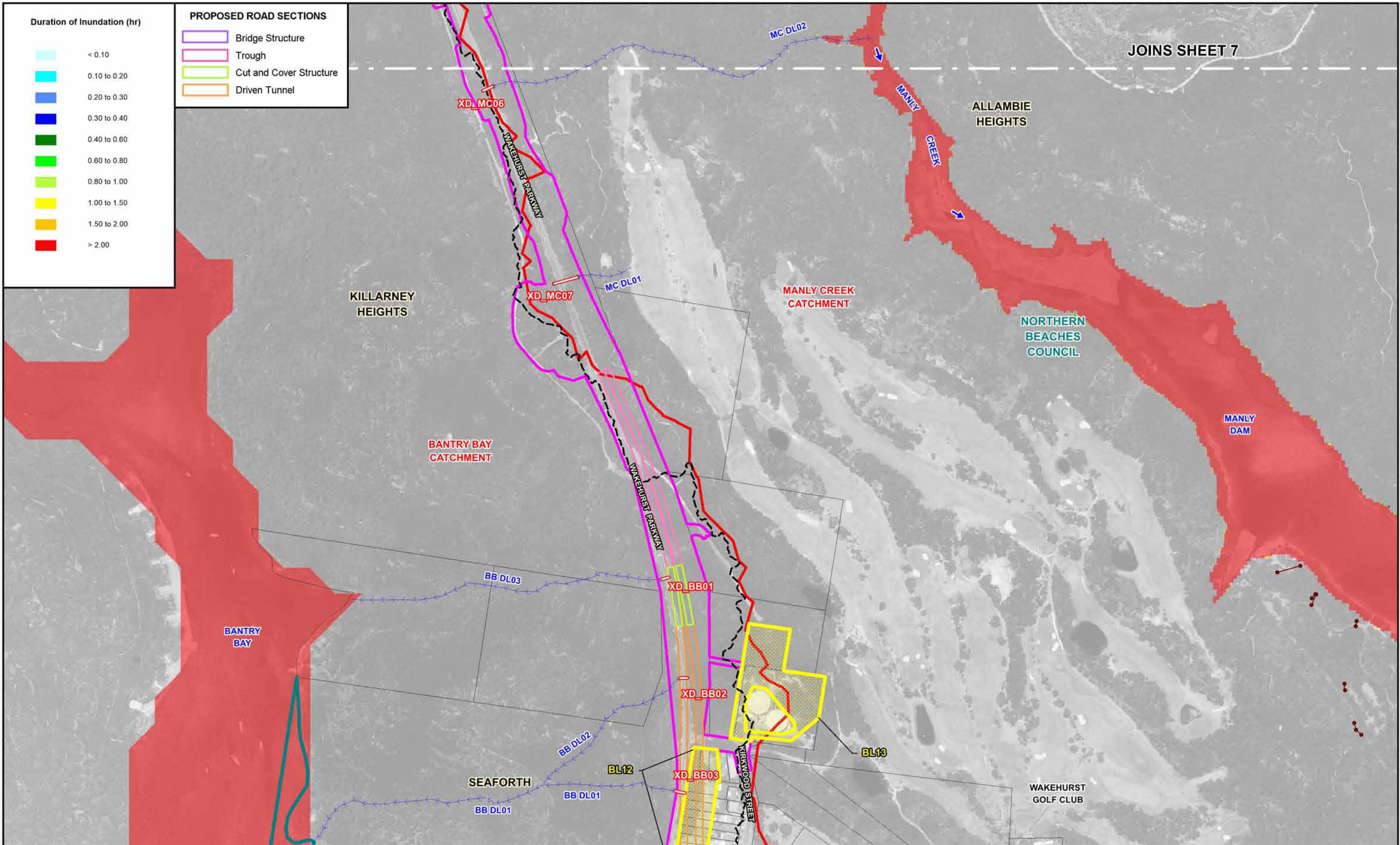


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Construction Support Site and Identifier

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.8  
(Sheet 5 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





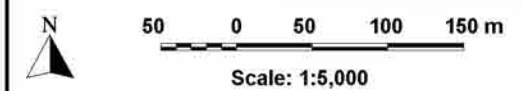
JOINS SHEET 7

Duration of Inundation (hr)

- <math>< 0.10</math>
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- > 2.00

PROPOSED ROAD SECTIONS

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

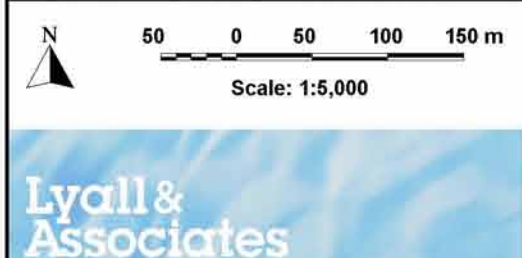
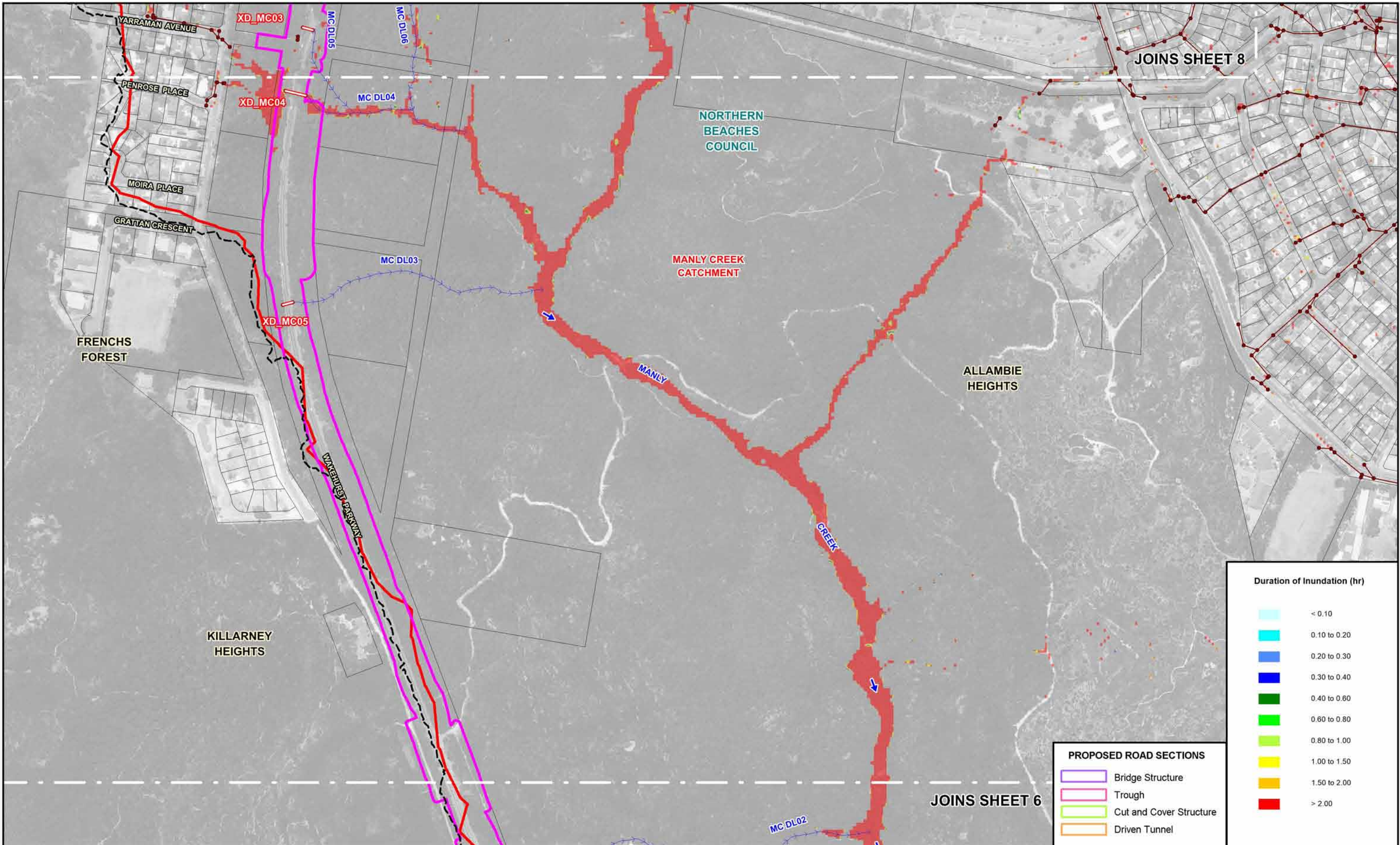


- LEGEND
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Construction Support Site and Identifier
  - Existing Transverse Drainage and Identifier
  - Existing Drainage Line

BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure A.8  
(Sheet 6 of 8)  
DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





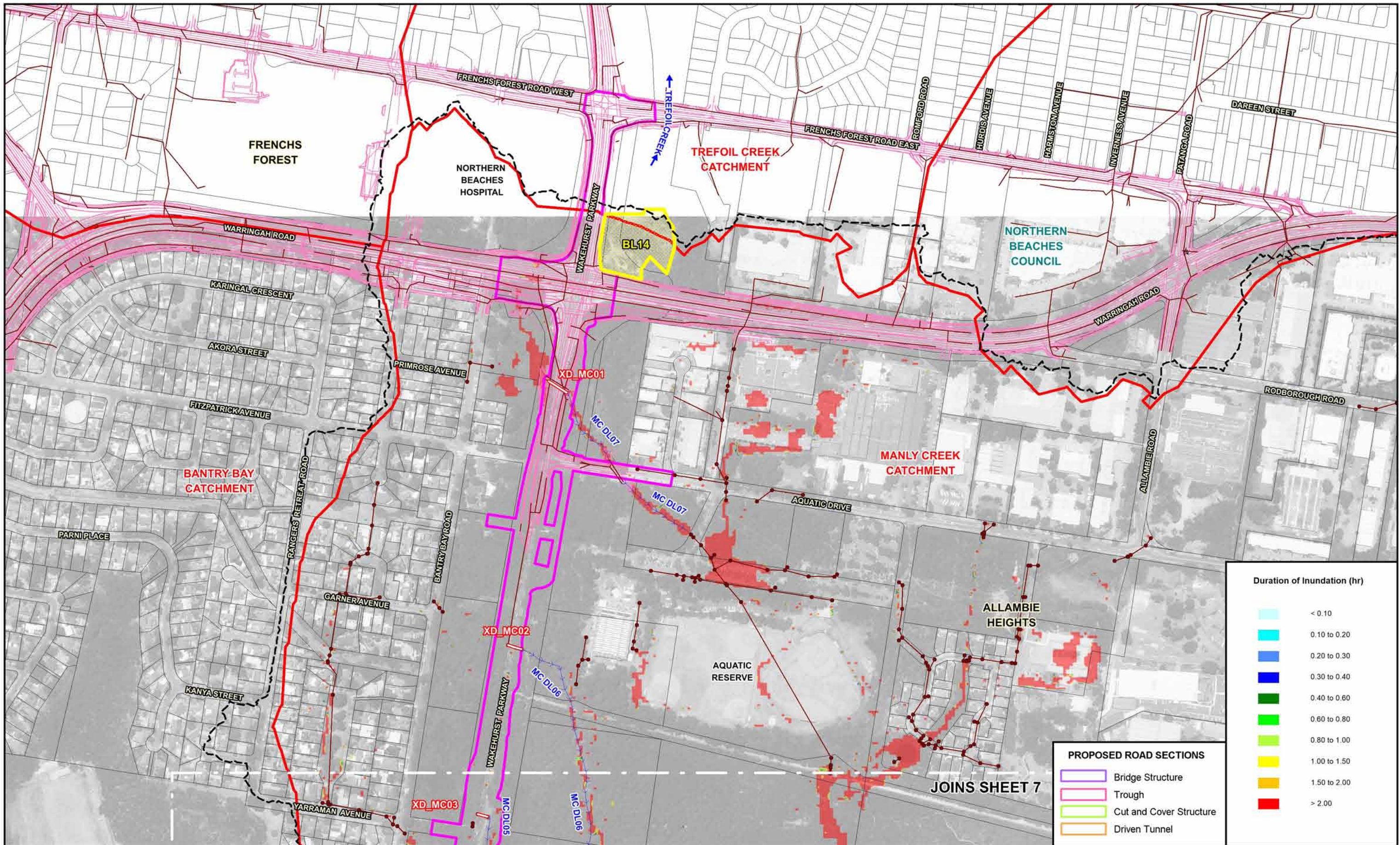
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - XD\_MC03 Existing Transverse Drainage and Identifier
  - Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.8  
(Sheet 7 of 8)

DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT





N

50 0 50 100 150 m

Scale: 1:5,000

- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Existing Drainage System
  - LGA Boundary
  - Catchment Boundary
  - BL2 Construction Support Site and Identifier

- Project Surface Road Works Footprint
- Northern Beaches Hospital Surface Road Works
- XD\_MC03 Existing Transverse Drainage and Identifier
- Existing Drainage Line

- PROPOSED ROAD SECTIONS**
- Bridge Structure
  - Trough
  - Cut and Cover Structure
  - Driven Tunnel

**Duration of Inundation (hr)**

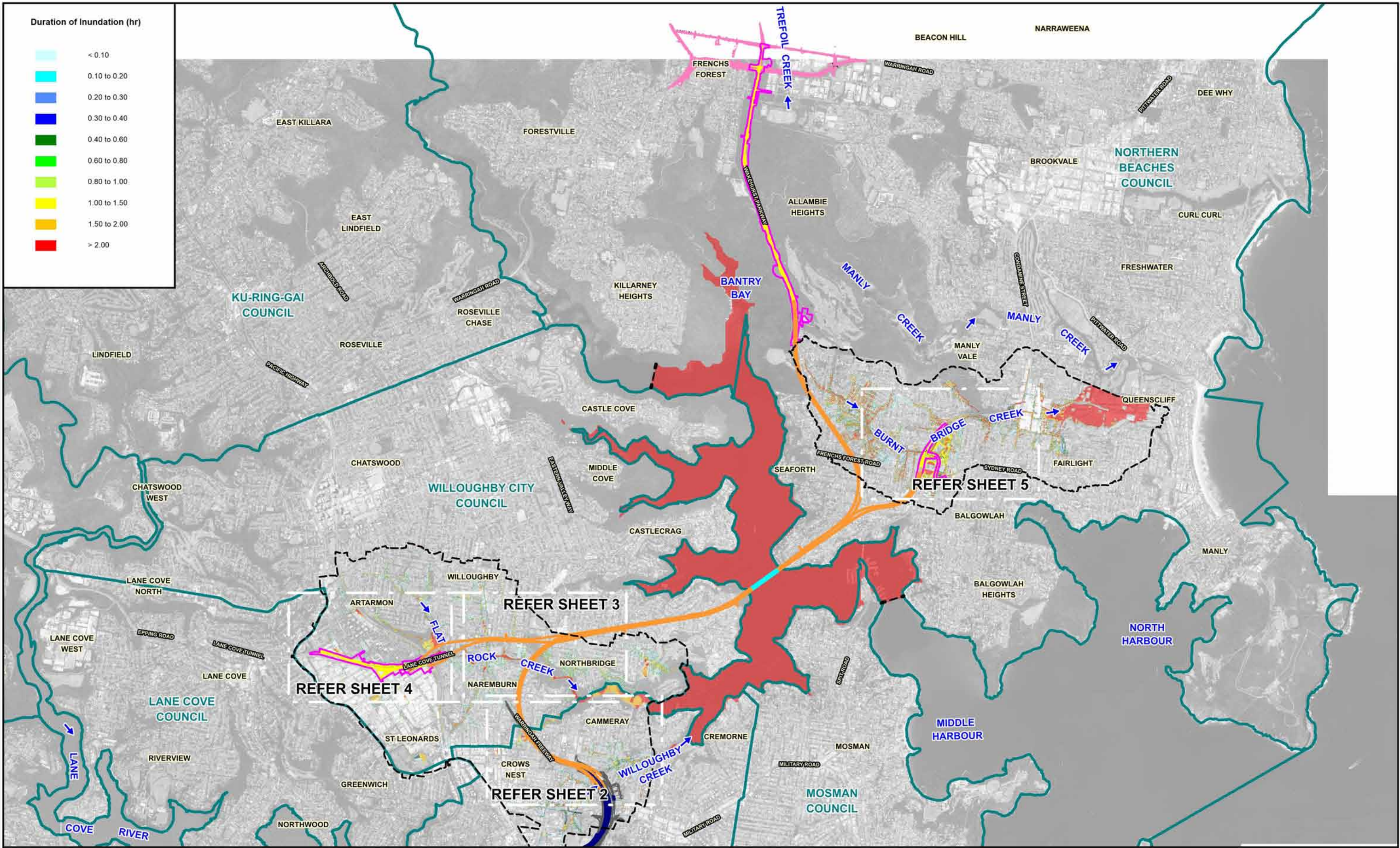
< 0.10
0.10 to 0.20
0.20 to 0.30
0.30 to 0.40
0.40 to 0.60
0.60 to 0.80
0.80 to 1.00
1.00 to 1.50
1.50 to 2.00
> 2.00

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

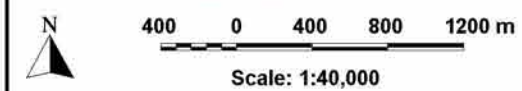
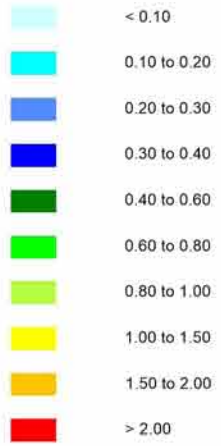
Figure A.8  
(Sheet 8 of 8)

**DURATION OF INUNDATION UNDER PRESENT DAY CONDITIONS  
1% AEP EVENT**





Duration of Inundation (hr)



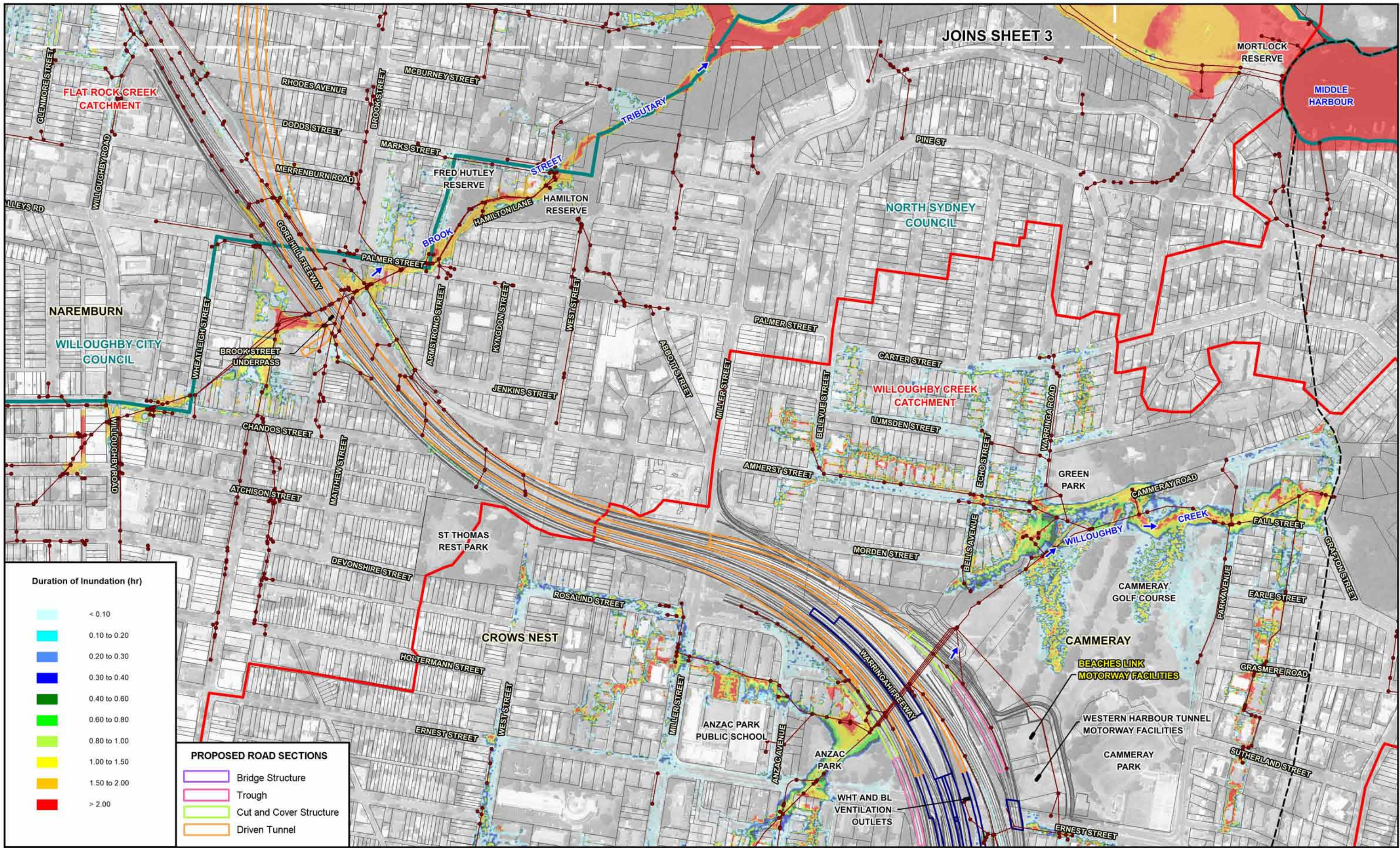
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.9  
(Sheet 1 of 5)  
DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT





JOINS SHEET 3

MORTLOCK RESERVE  
MIDDLE HARBOUR

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

CROWS NEST

CAMMERAY

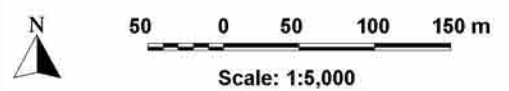
BEACHES LINK MOTORWAY FACILITIES

WESTERN HARBOUR TUNNEL MOTORWAY FACILITIES

CAMMERAY PARK

- Duration of Inundation (hr)
- <math>< 0.10</math>
  - 0.10 to 0.20
  - 0.20 to 0.30
  - 0.30 to 0.40
  - 0.40 to 0.60
  - 0.60 to 0.80
  - 0.80 to 1.00
  - 1.00 to 1.50
  - 1.50 to 2.00
  - > 2.00

- PROPOSED ROAD SECTIONS
- Bridge Structure
  - Trough
  - Cut and Cover Structure
  - Driven Tunnel



- LEGEND
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint

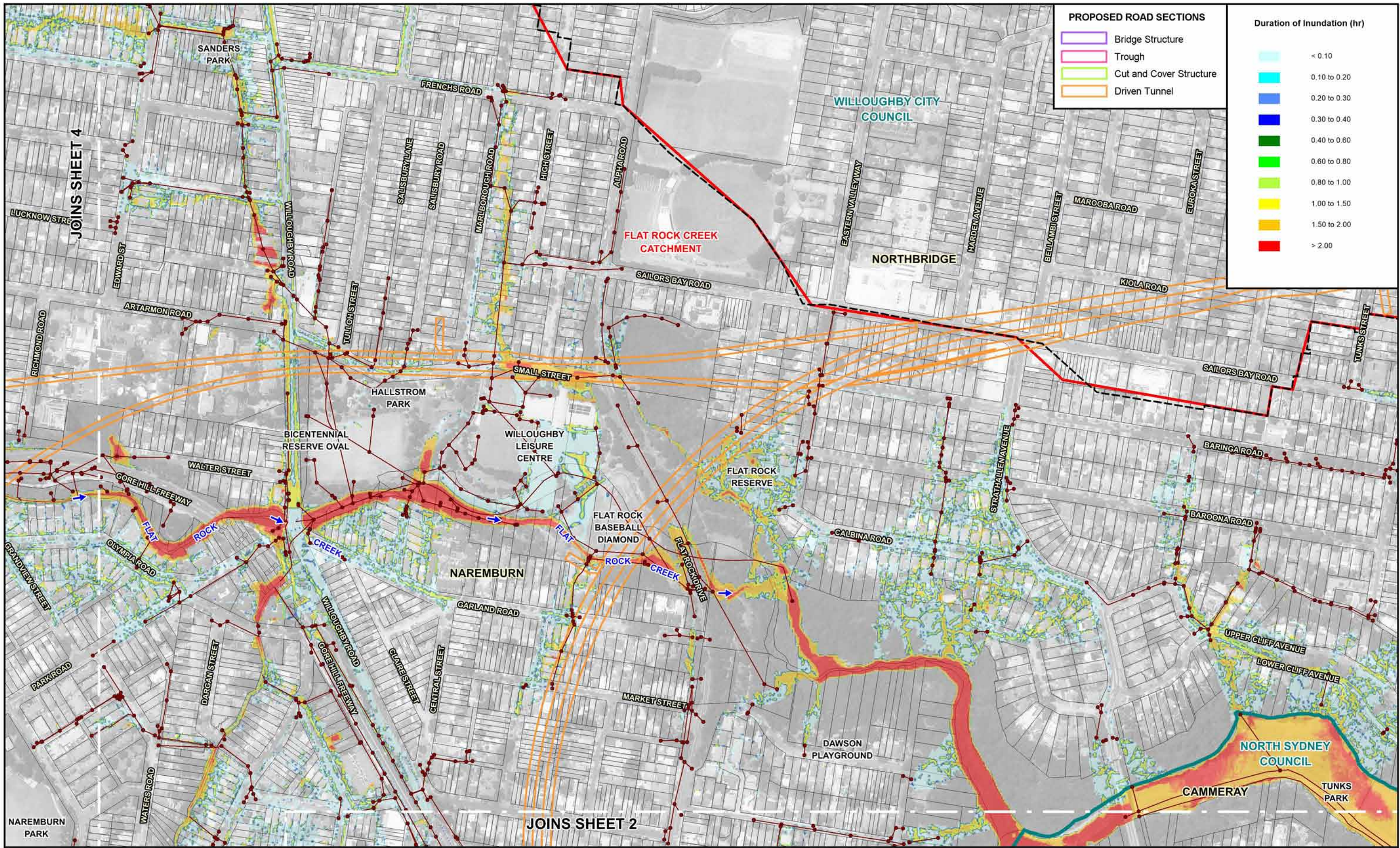
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure A.9  
(Sheet 2 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT

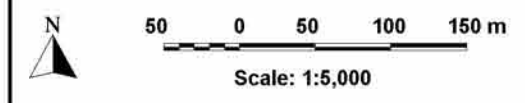




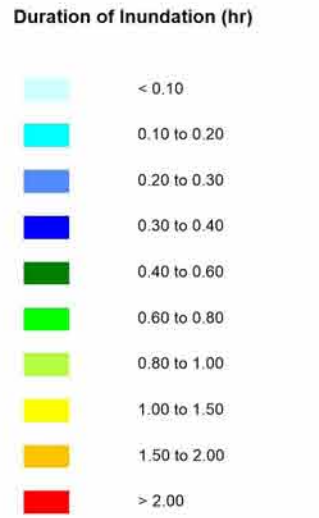
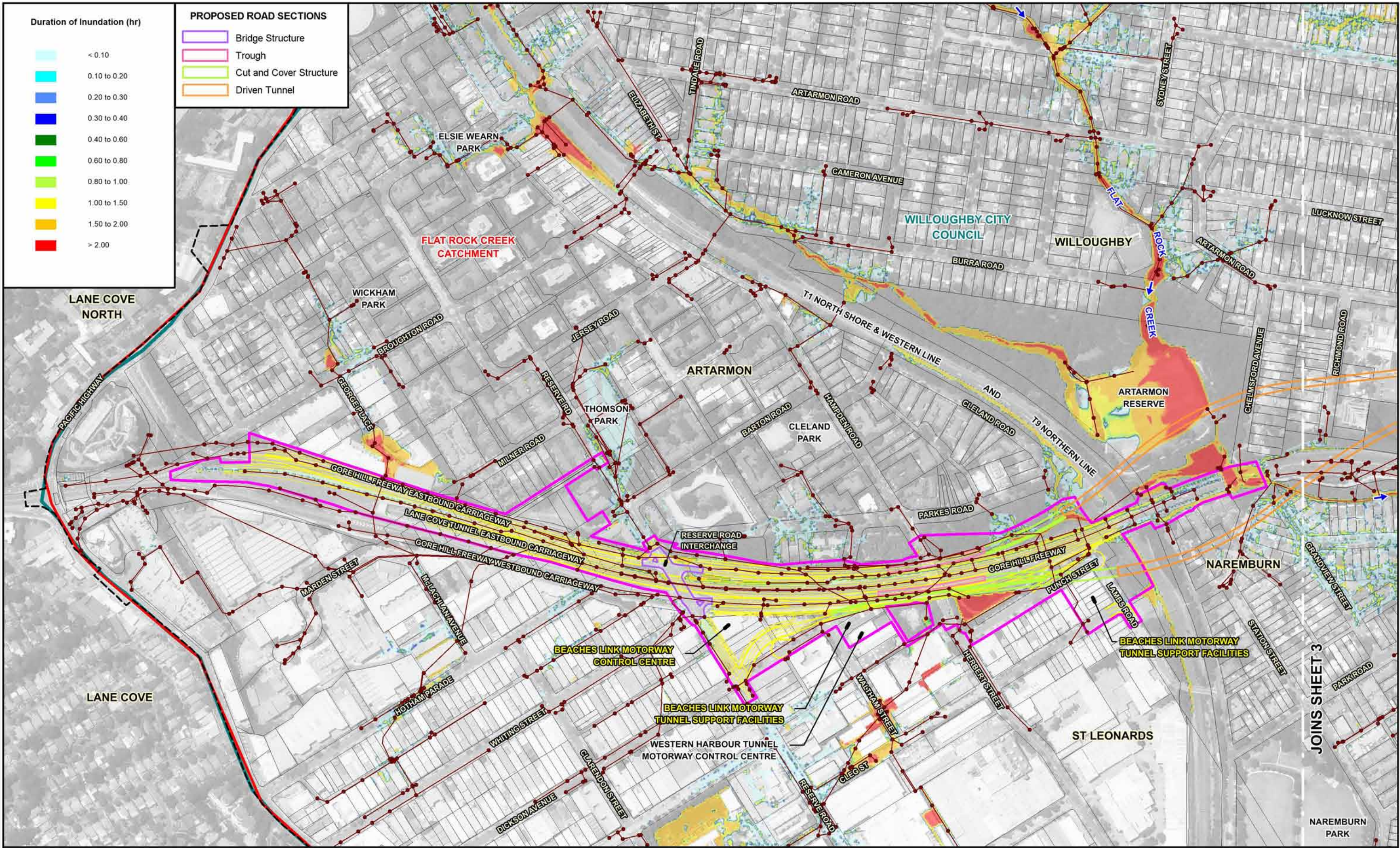
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.9  
(Sheet 3 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT







LANE COVE NORTH

LANE COVE

FLAT ROCK CREEK CATCHMENT

WILLOUGHBY CITY COUNCIL

WILLOUGHBY

ARTARMON

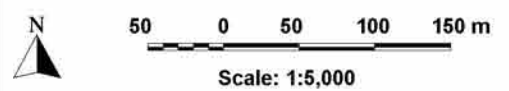
ARTARMON RESERVE

NAREMBURN

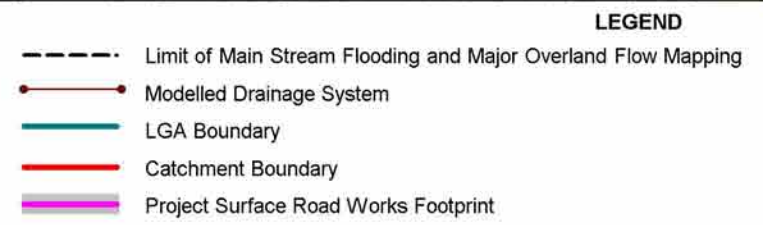
ST LEONARDS

JOINS SHEET 3

NAREMBURN PARK



Lyall & Associates

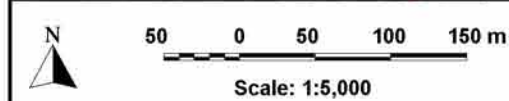


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.9 (Sheet 4 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS 10% AEP EVENT





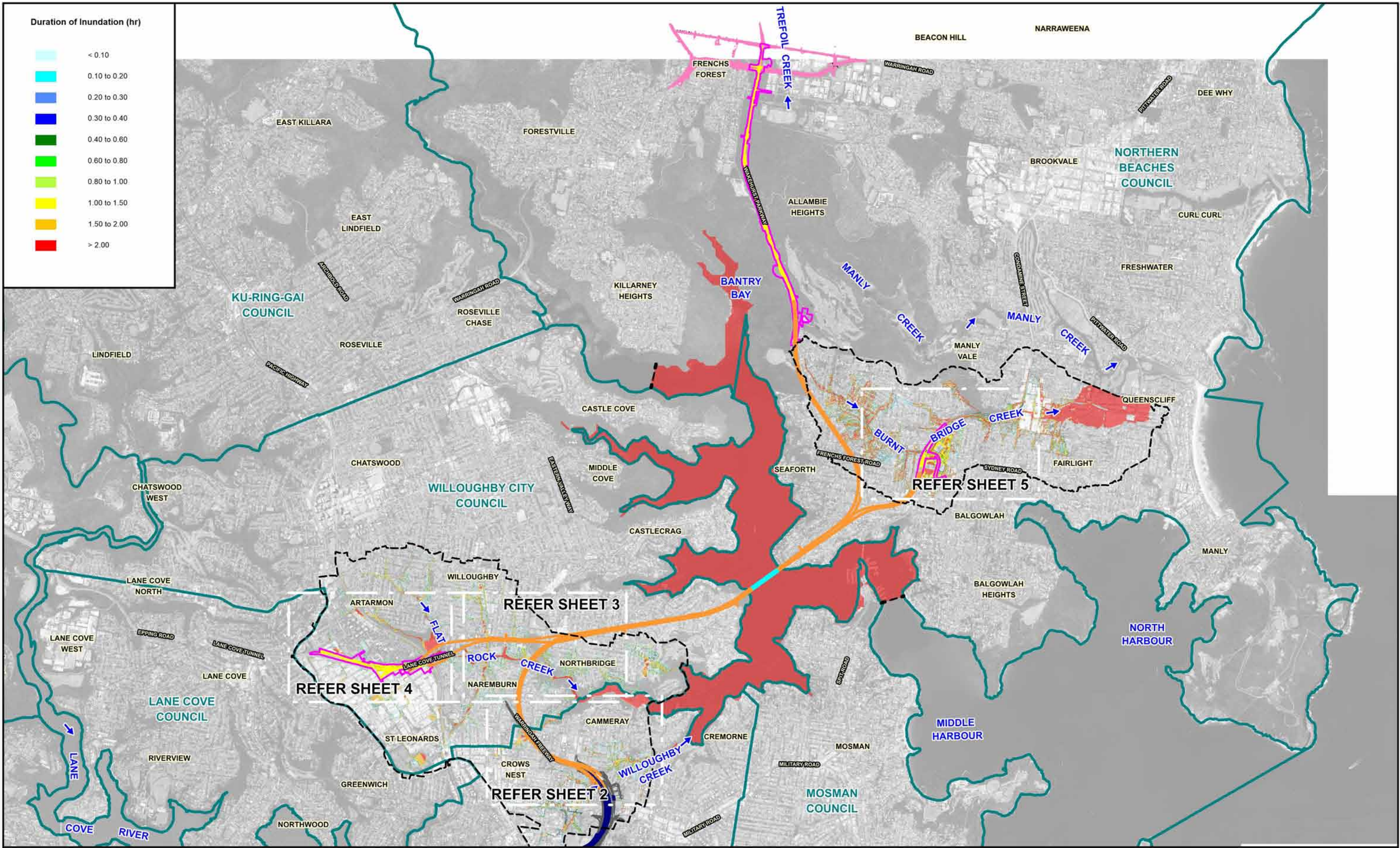
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

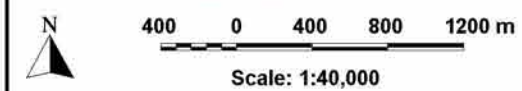
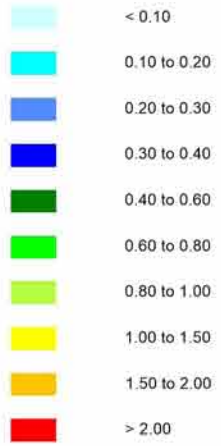
Figure A.9  
(Sheet 5 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
10% AEP EVENT





Duration of Inundation (hr)



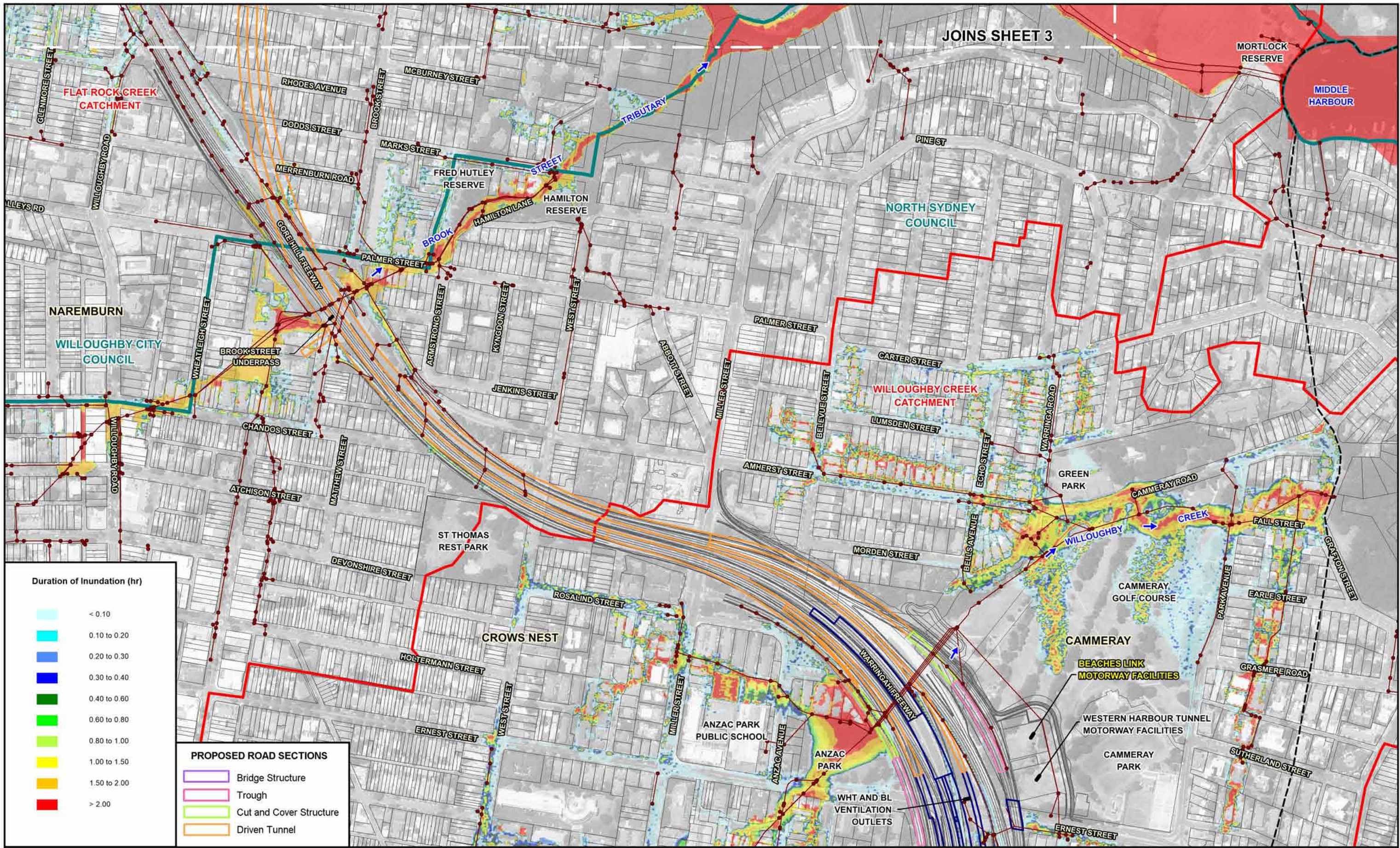
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.10  
(Sheet 1 of 5)  
DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT





JOINS SHEET 3

MORTLOCK RESERVE  
MIDDLE HARBOUR

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

CROWS NEST

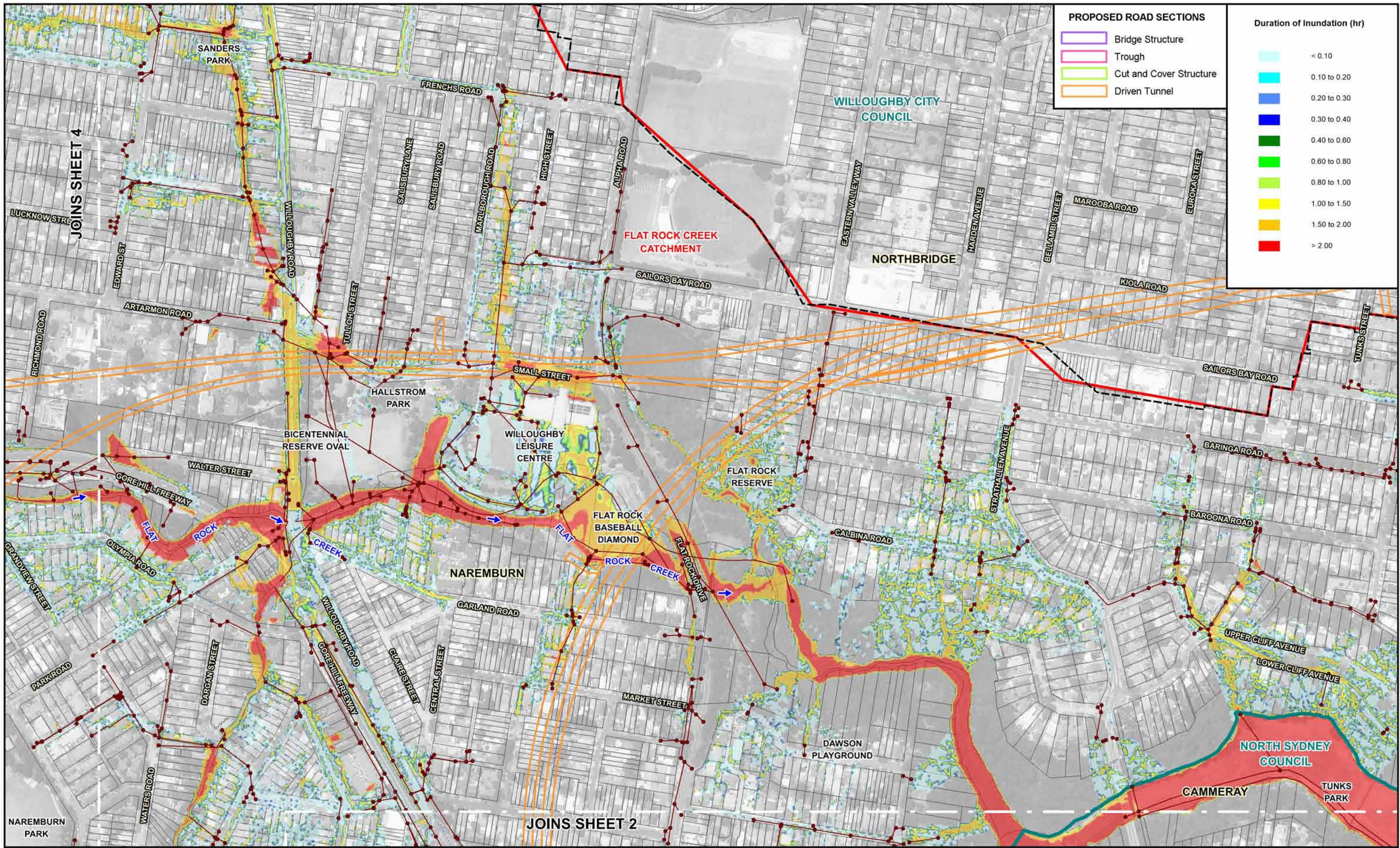
CAMMERAY

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.10  
(Sheet 2 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT



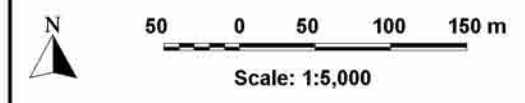


**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Duration of Inundation (hr)**

- < 0.10
- 0.10 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.60
- 0.60 to 0.80
- 0.80 to 1.00
- 1.00 to 1.50
- 1.50 to 2.00
- > 2.00



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

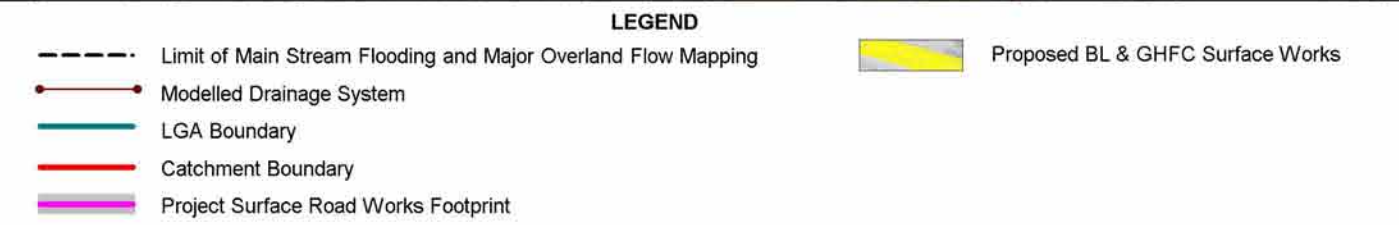
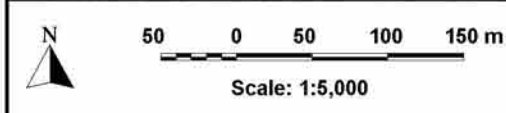
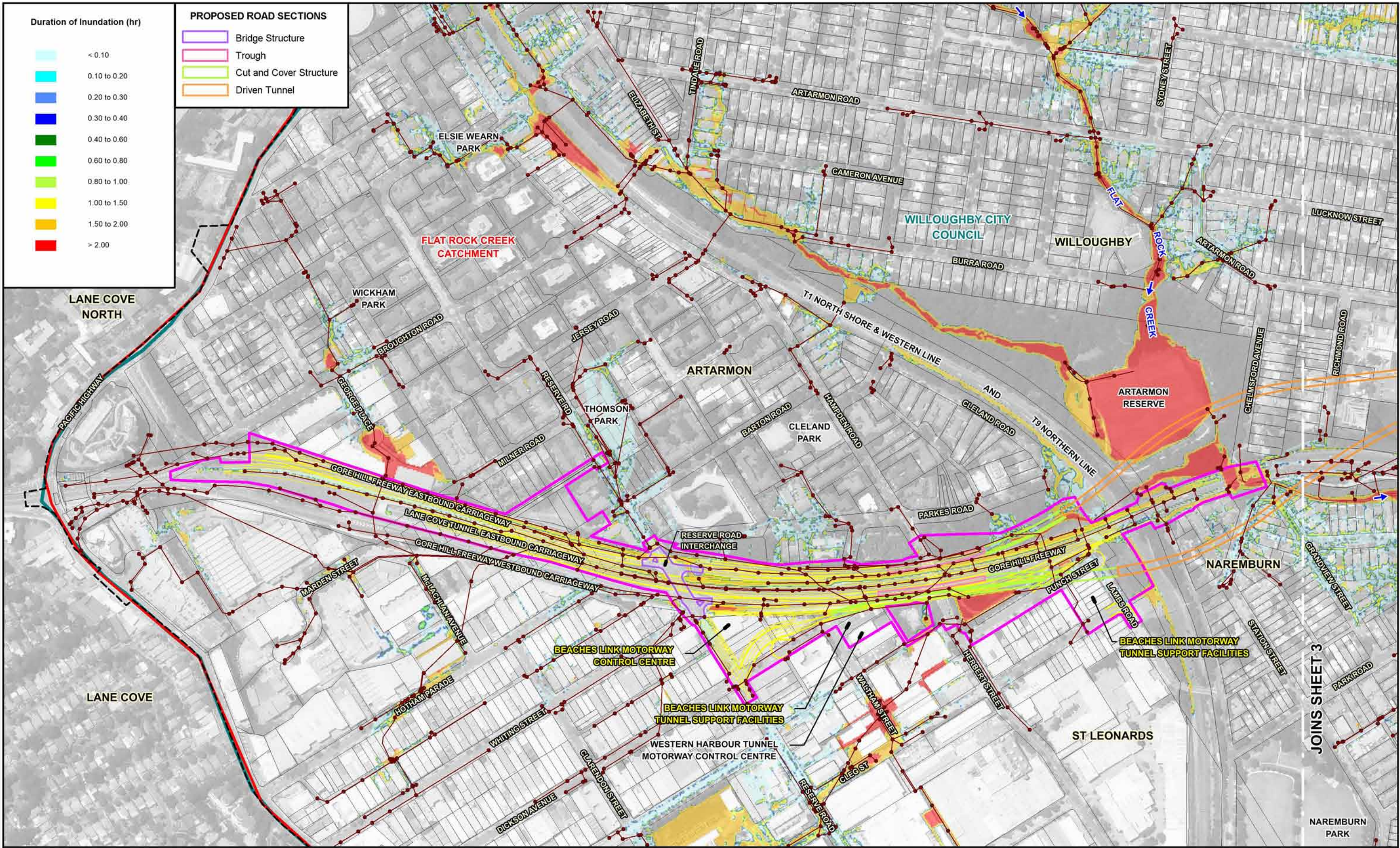
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.10  
(Sheet 3 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT



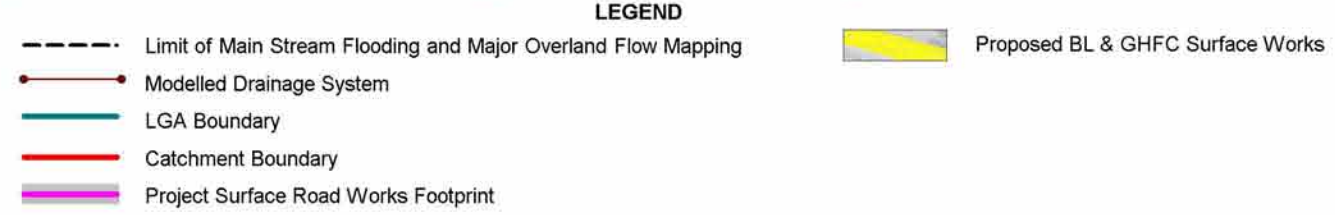
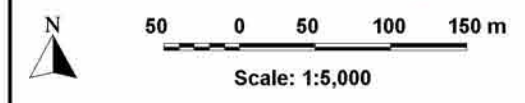
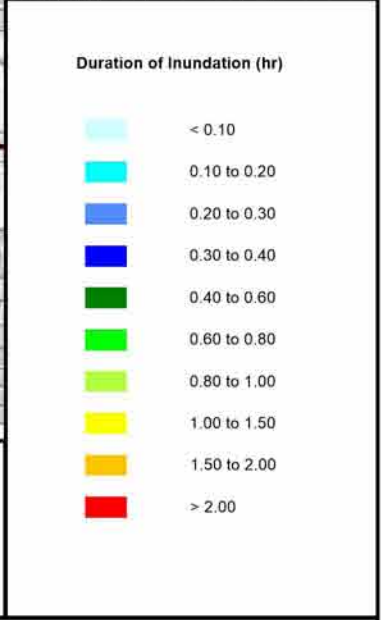




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.10 (Sheet 4 of 5)  
 DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
 1% AEP EVENT



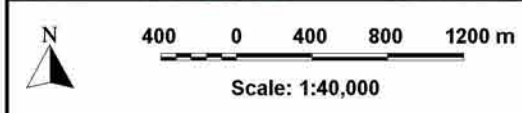
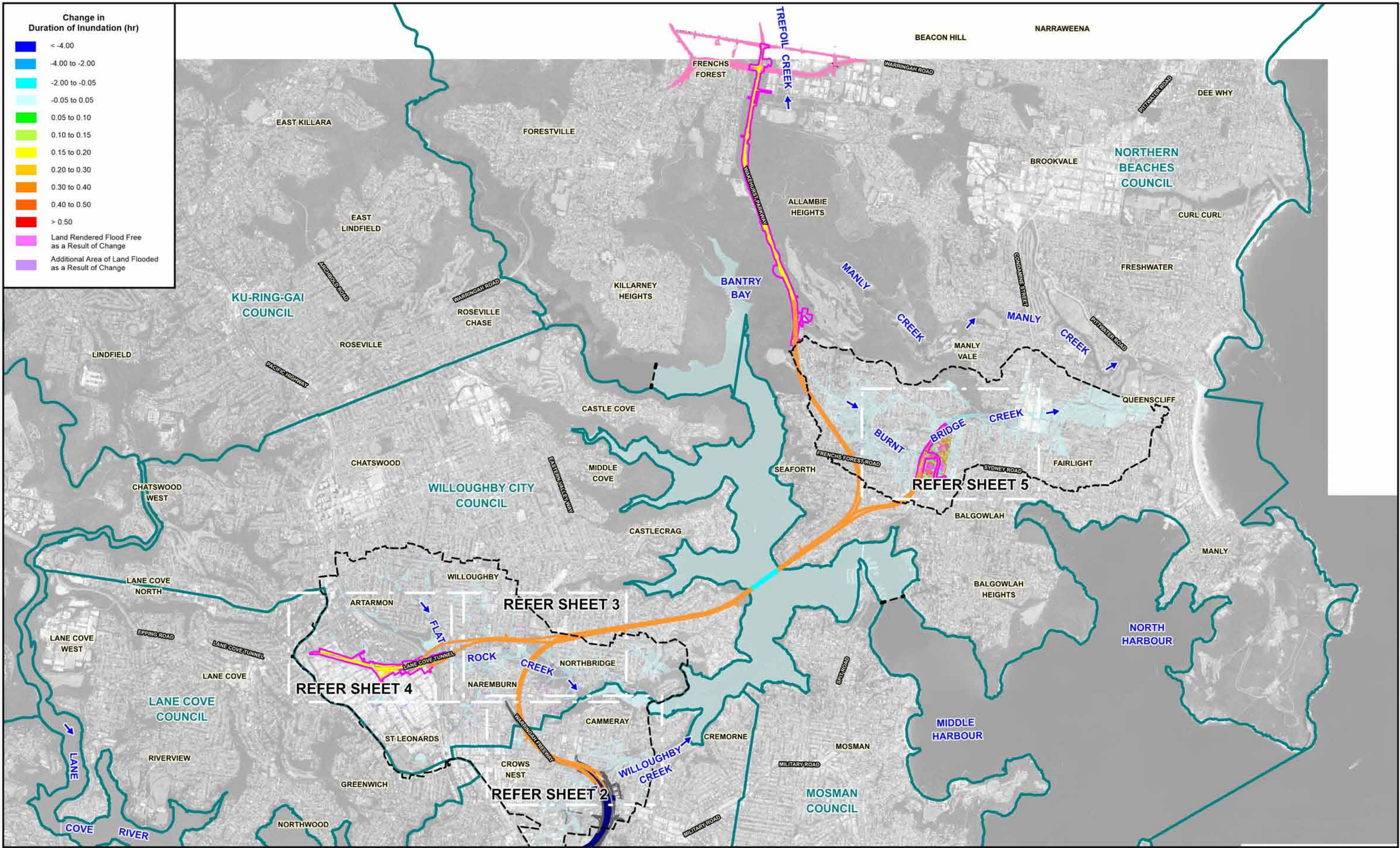


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.10  
(Sheet 5 of 5)

DURATION OF INUNDATION UNDER OPERATIONAL CONDITIONS  
1% AEP EVENT



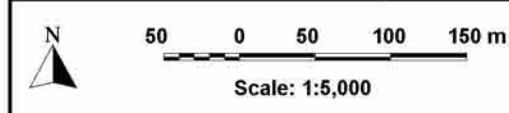
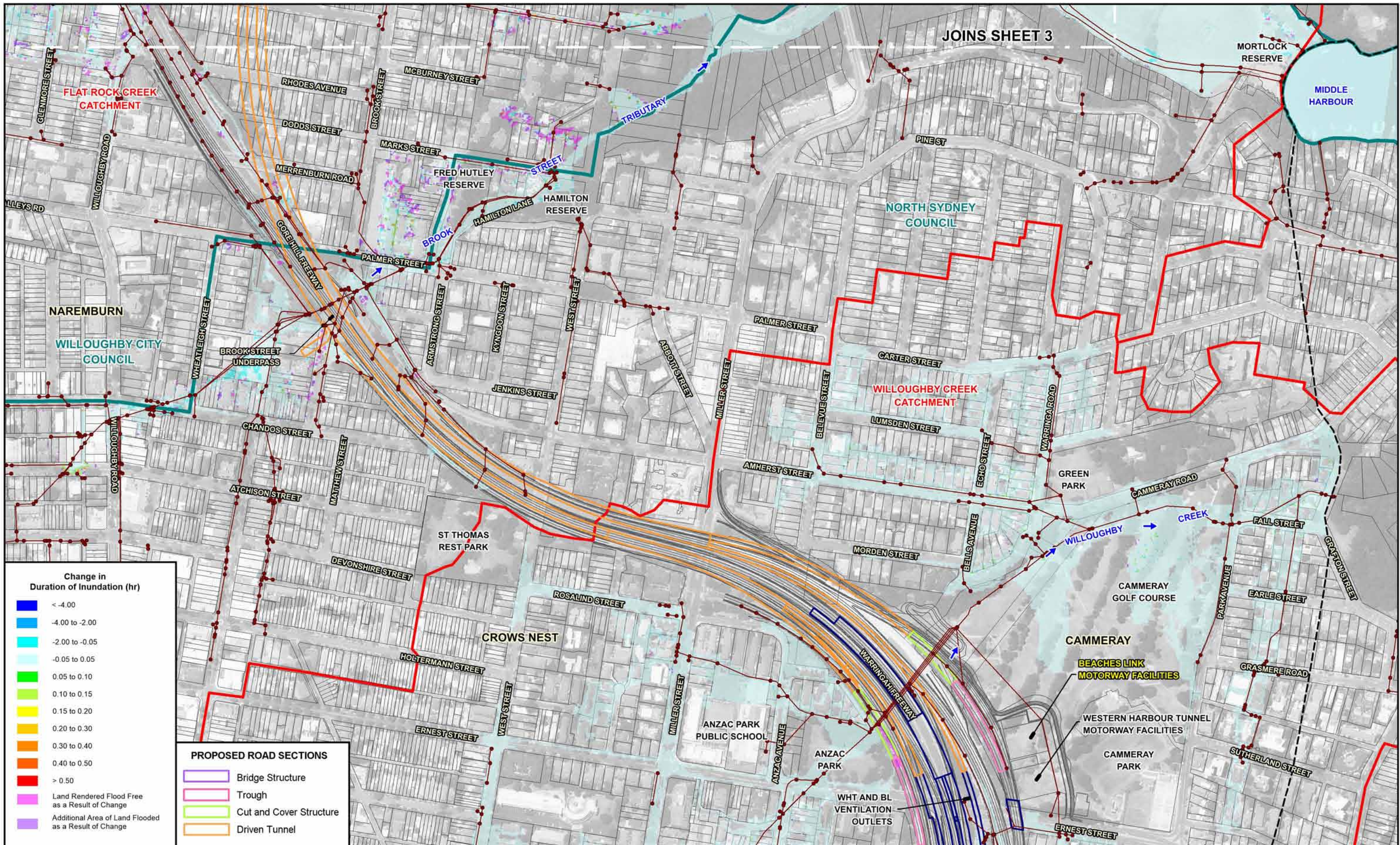


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

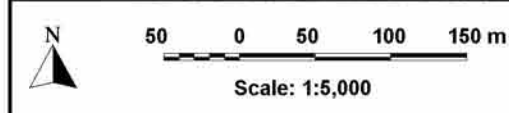
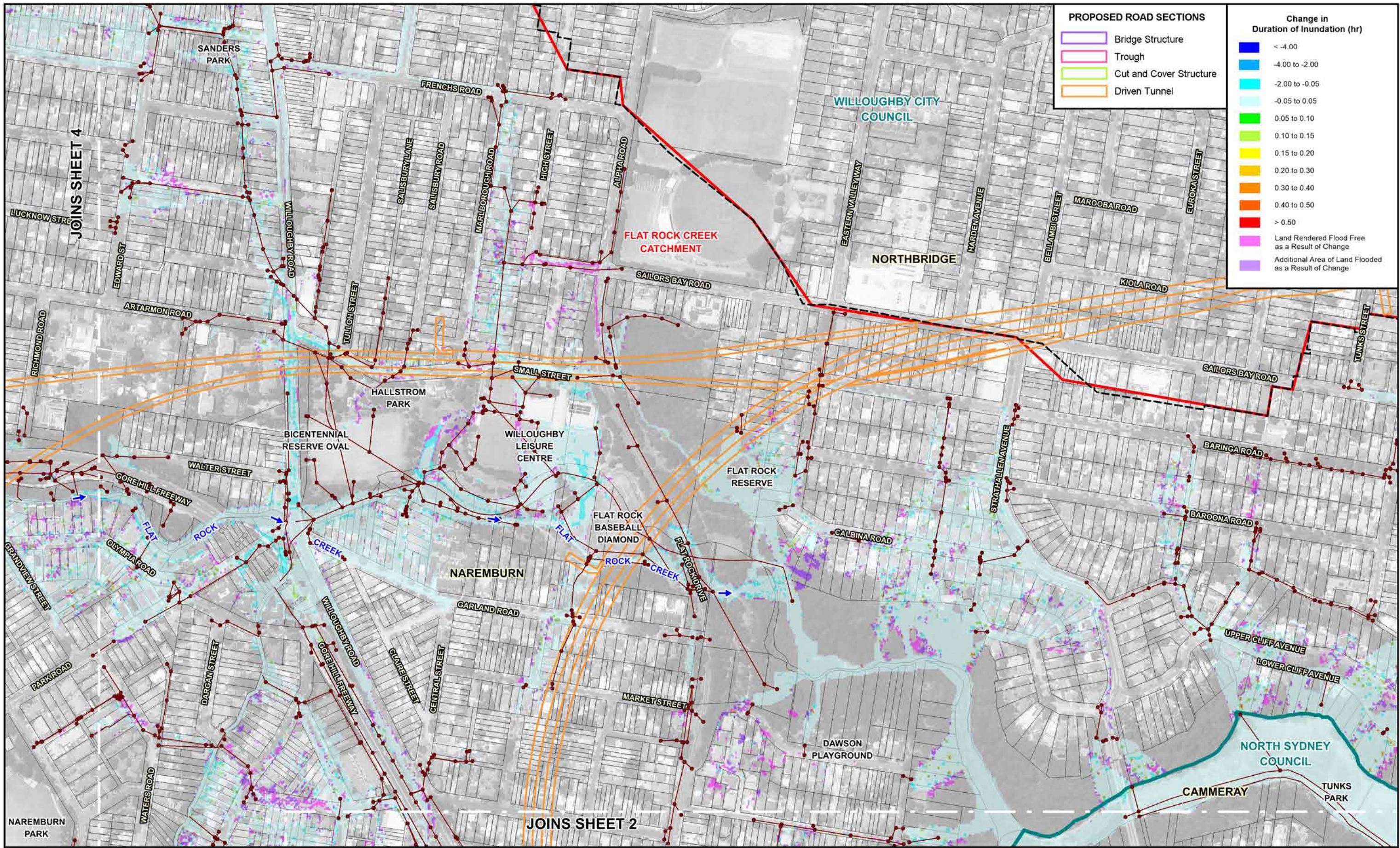




- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint

- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)



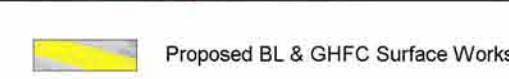
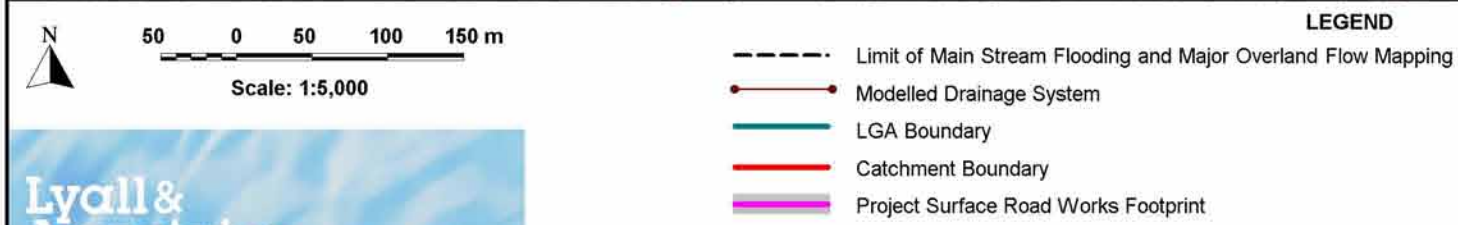
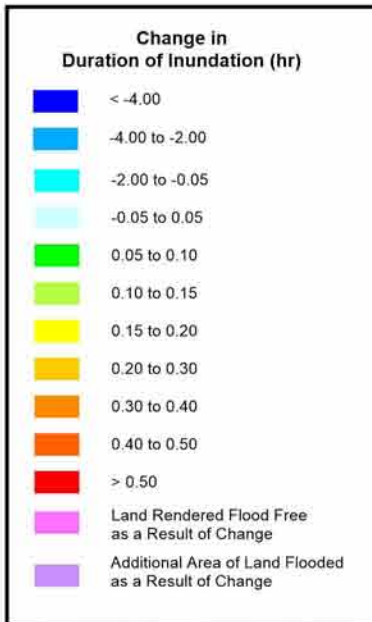
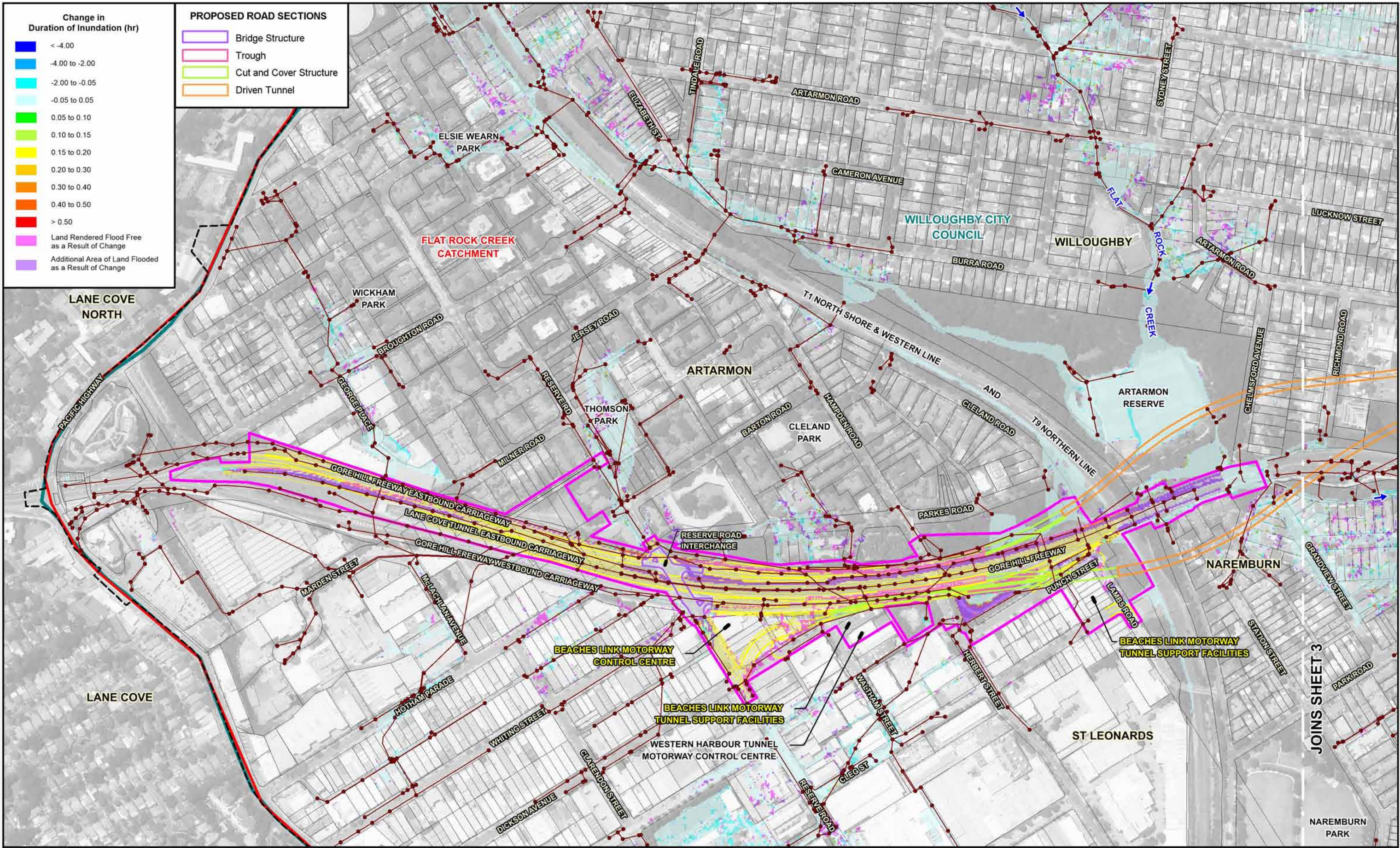


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.11  
(Sheet 3 of 5)  
IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION  
10% AEP EVENT



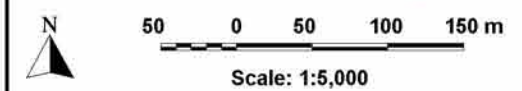
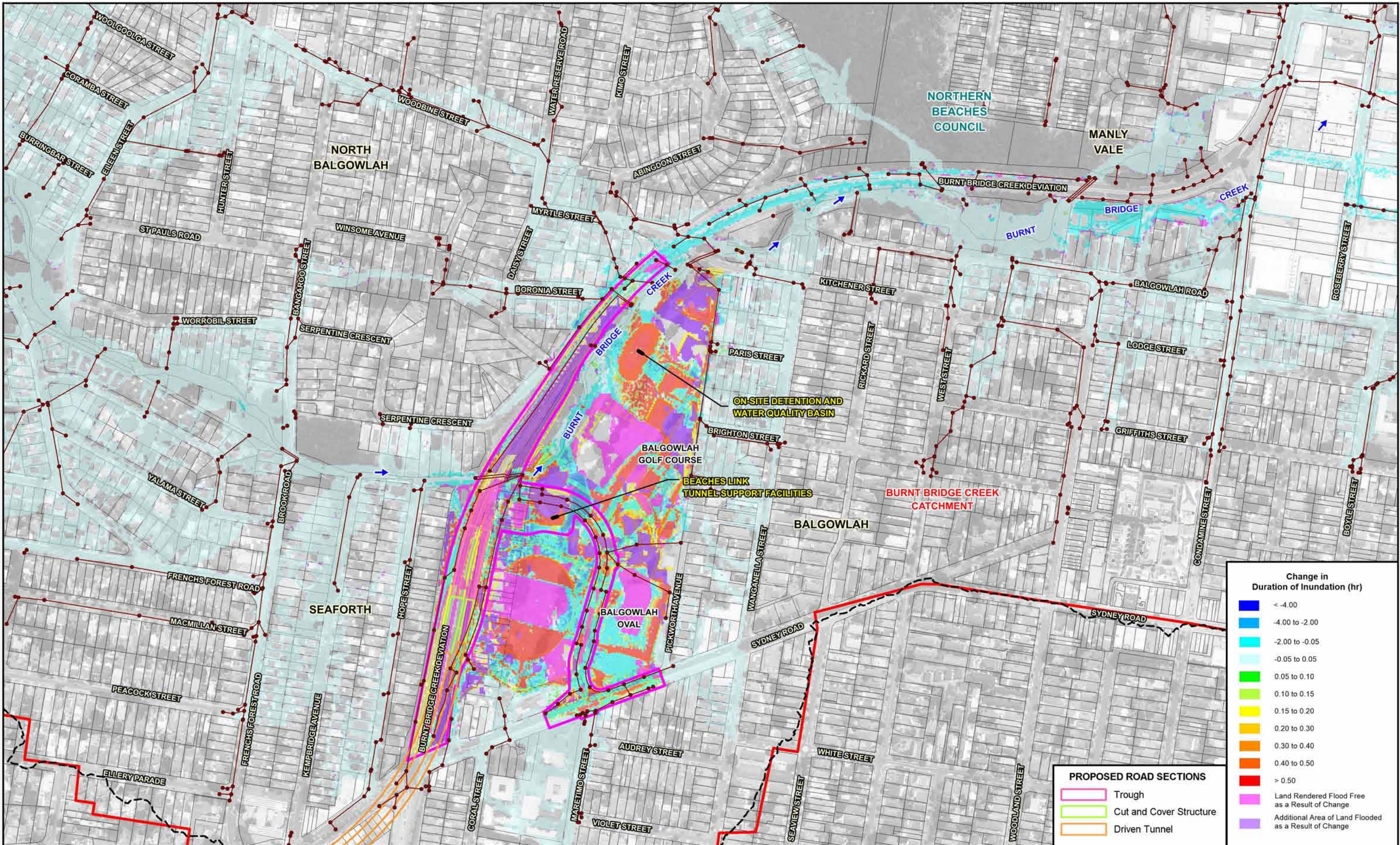


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.11 (Sheet 4 of 5)

IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION 10% AEP EVENT





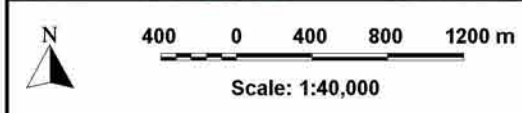
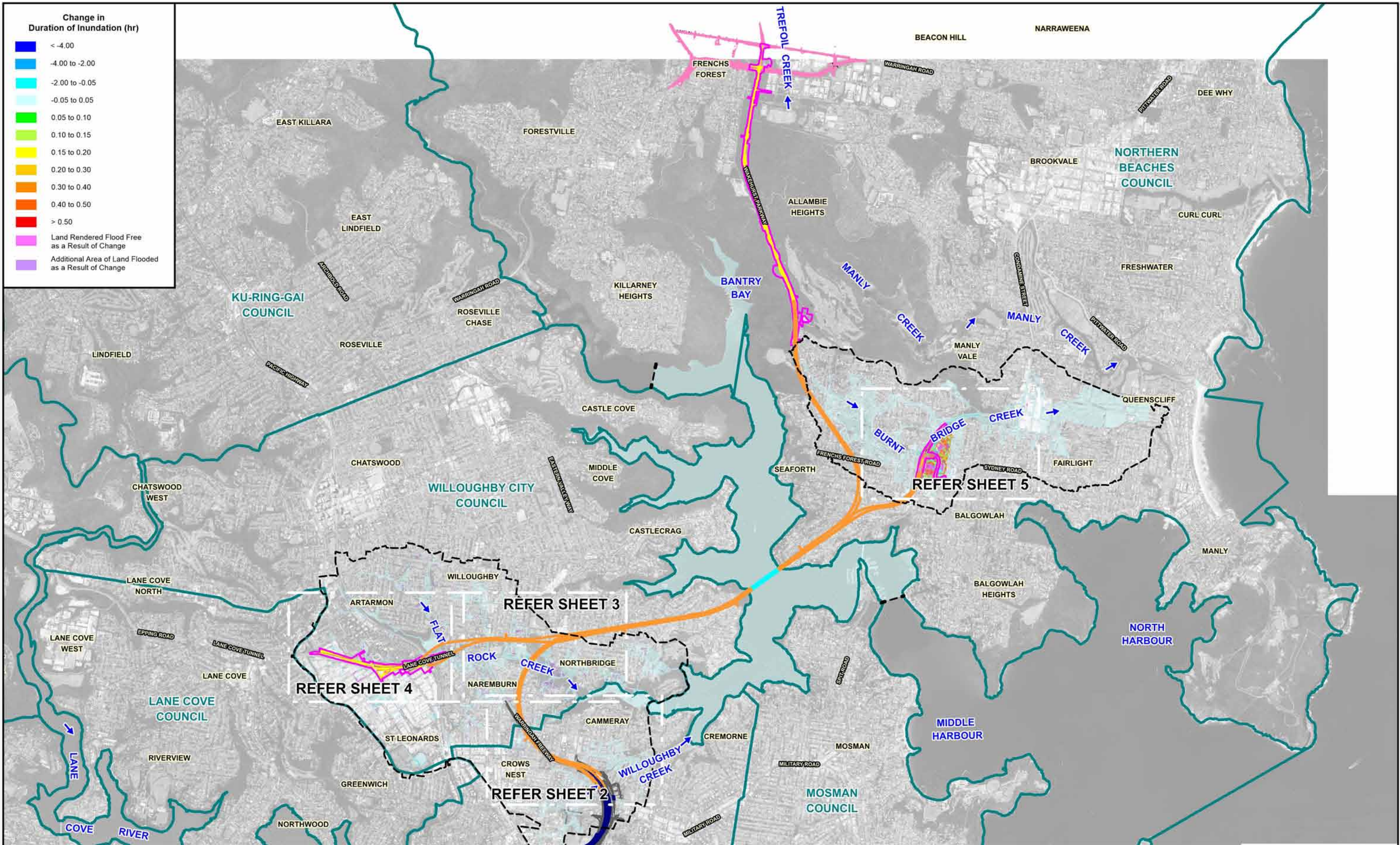
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.11  
(Sheet 5 of 5)

IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION  
10% AEP EVENT





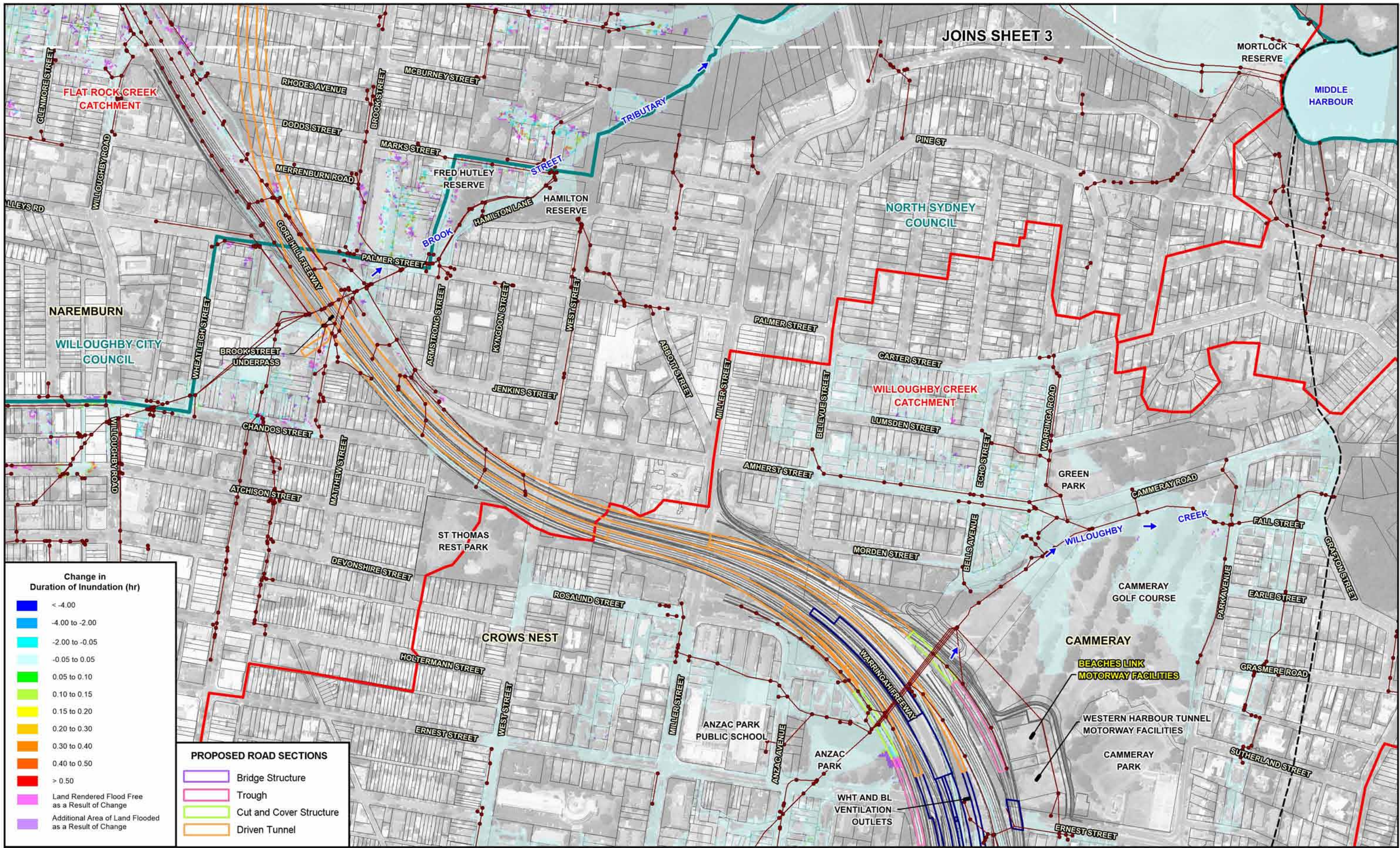
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

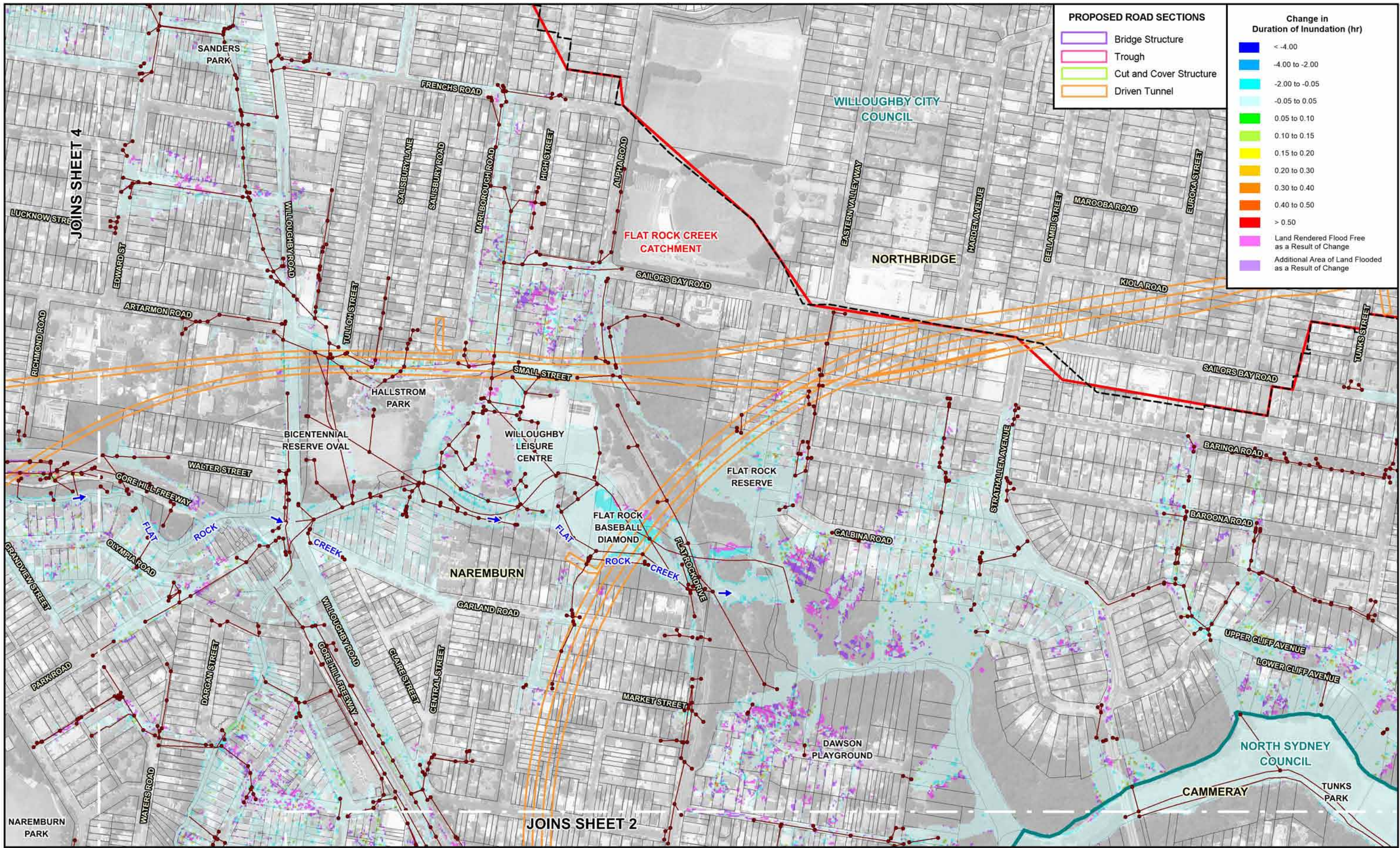
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.12  
(Sheet 1 of 5)  
IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION  
1% AEP EVENT









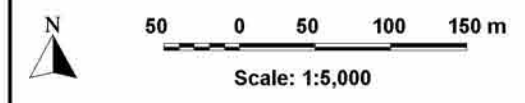
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Change in Duration of Inundation (hr)**

- < -4.00
- 4.00 to -2.00
- 2.00 to -0.05
- 0.05 to 0.05
- 0.05 to 0.10
- 0.10 to 0.15
- 0.15 to 0.20
- 0.20 to 0.30
- 0.30 to 0.40
- 0.40 to 0.50
- > 0.50

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

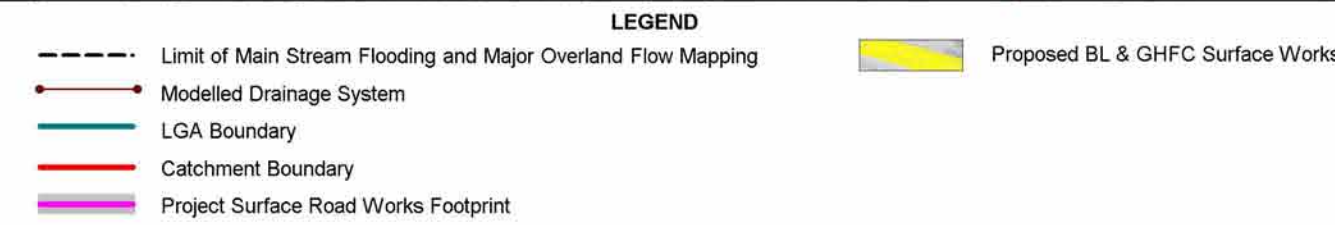
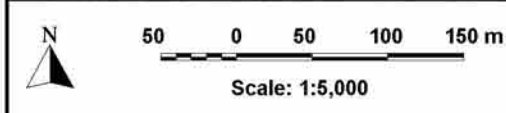
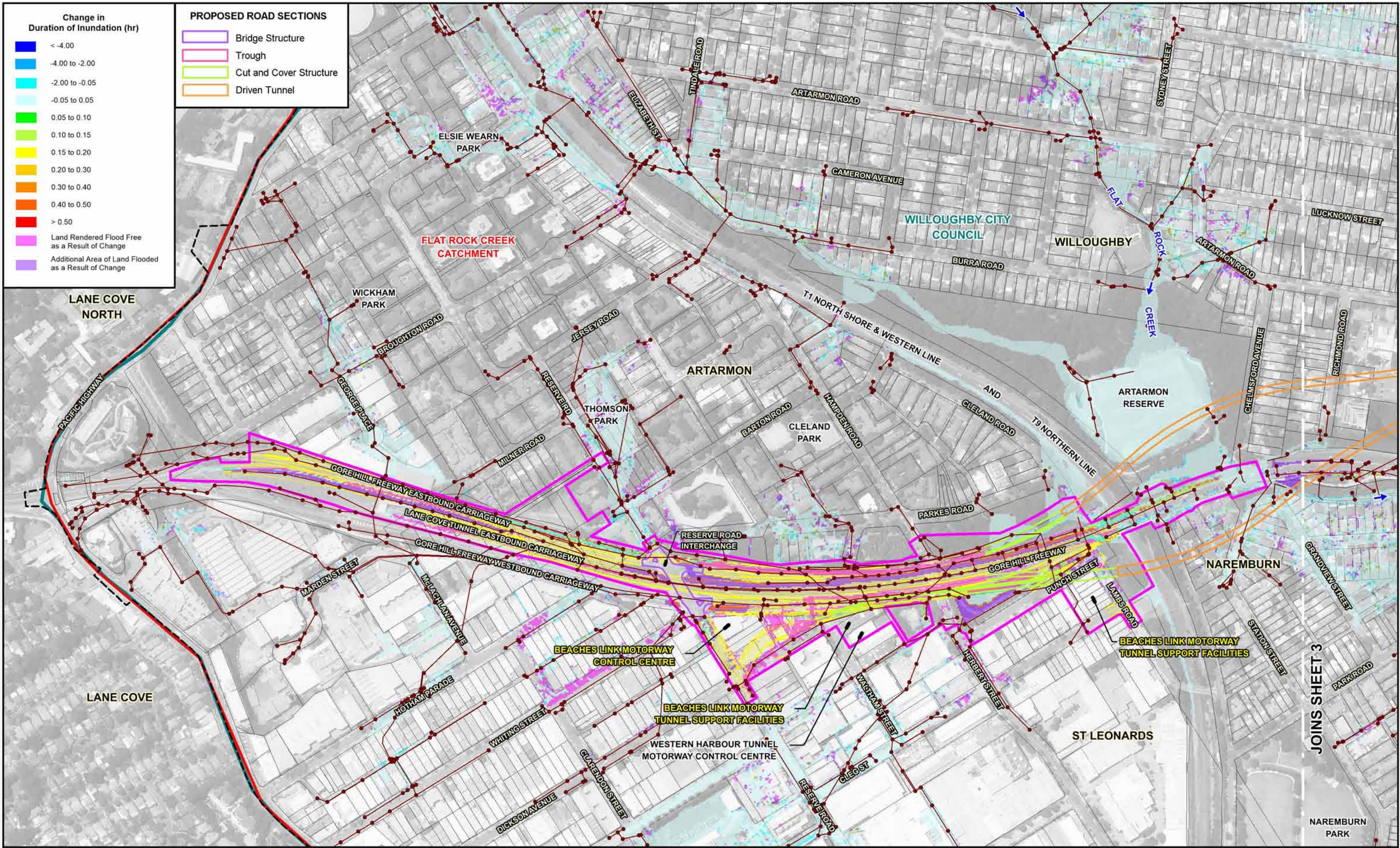


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**





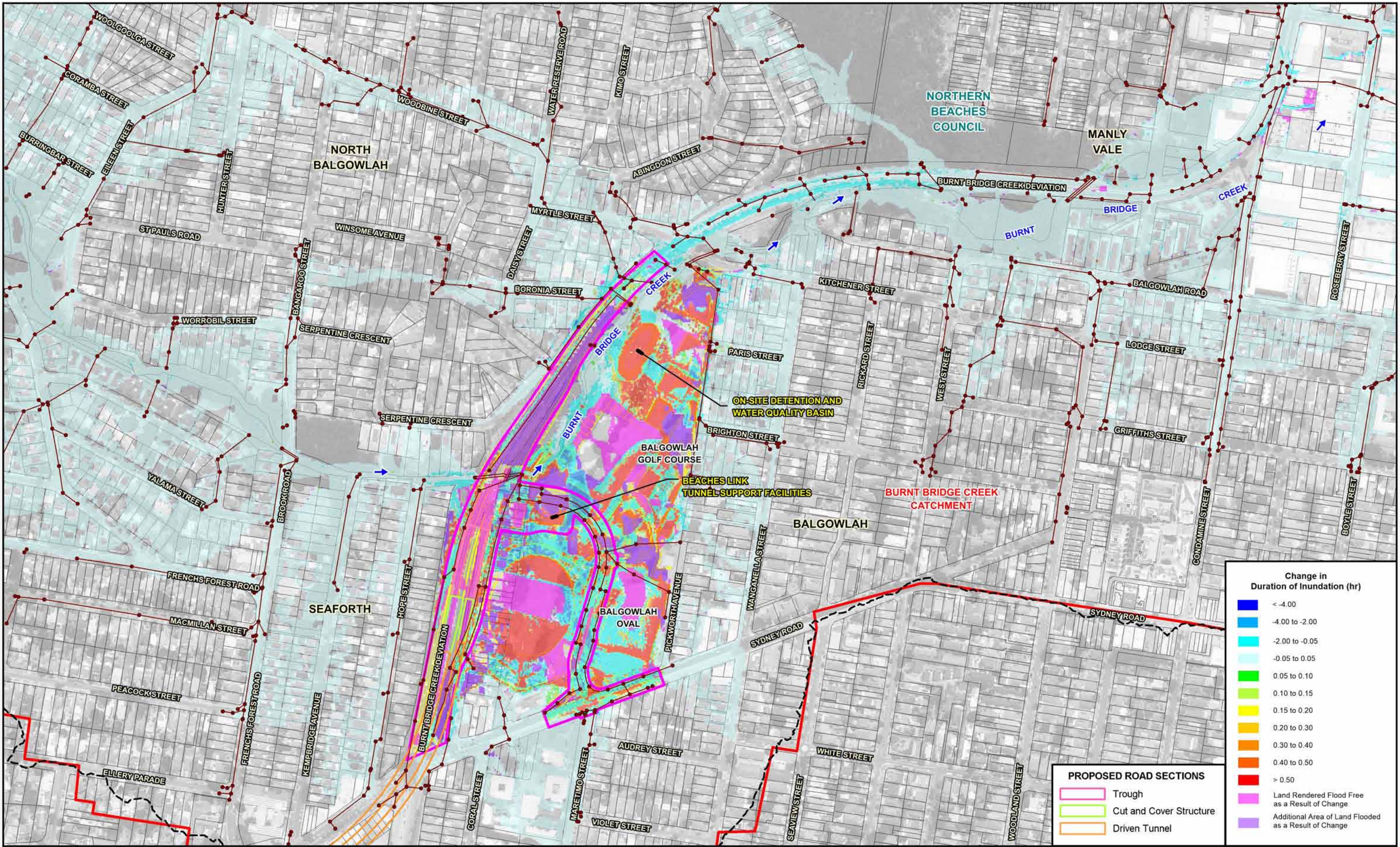


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure A.12 (Sheet 4 of 5)

IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION 1% AEP EVENT





**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

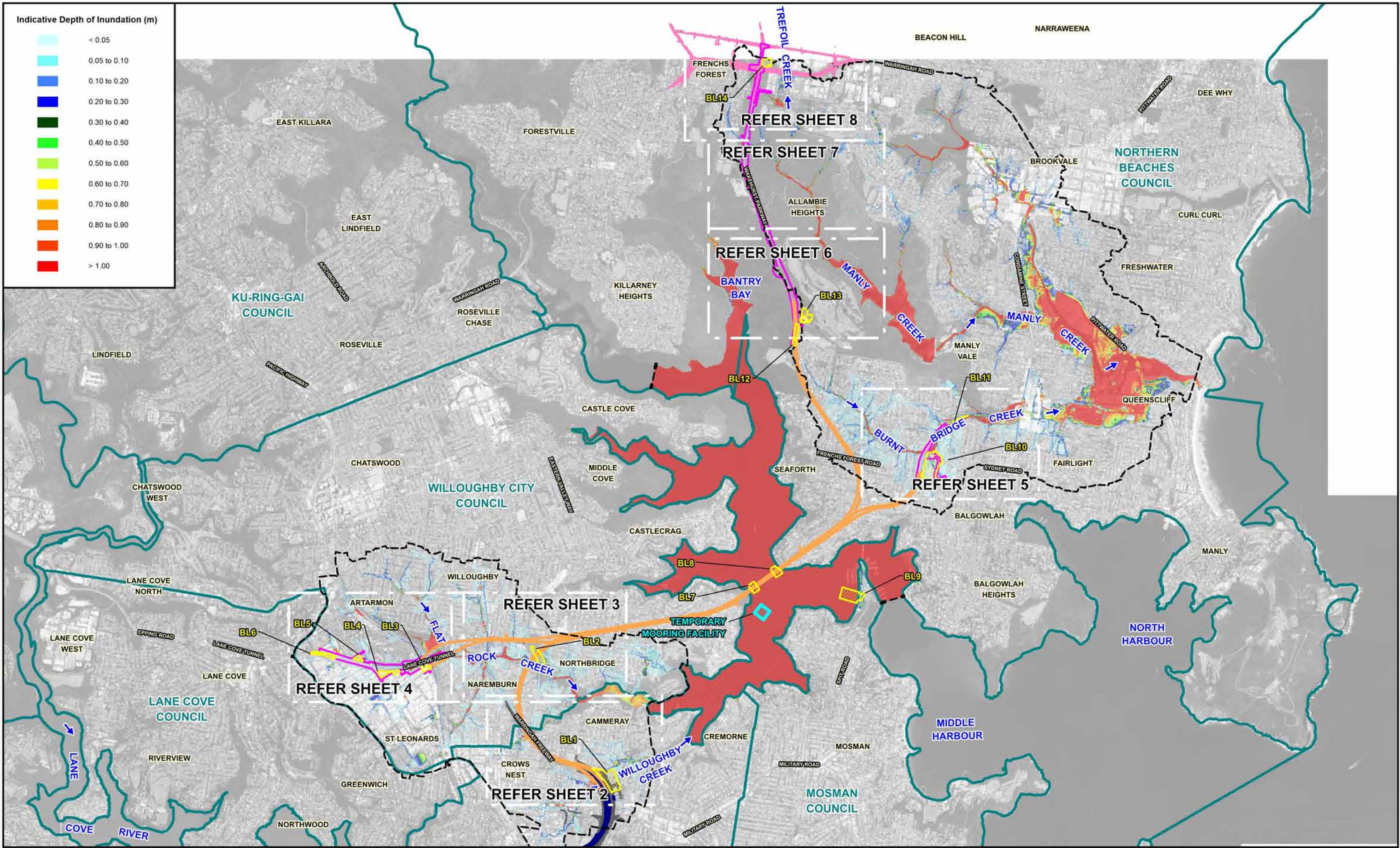
Figure A.12  
(Sheet 5 of 5)

IMPACT OF PROJECT OPERATION ON DURATION OF INUNDATION  
1% AEP EVENT

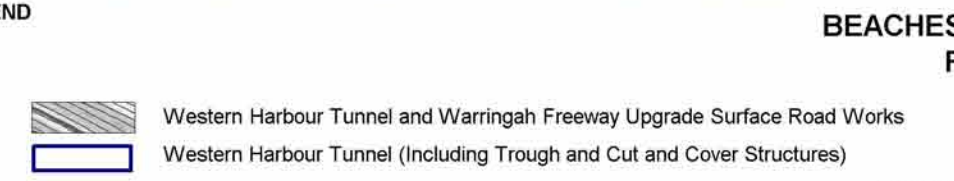
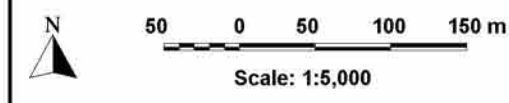
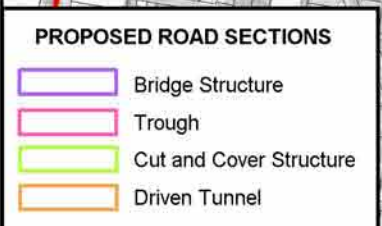
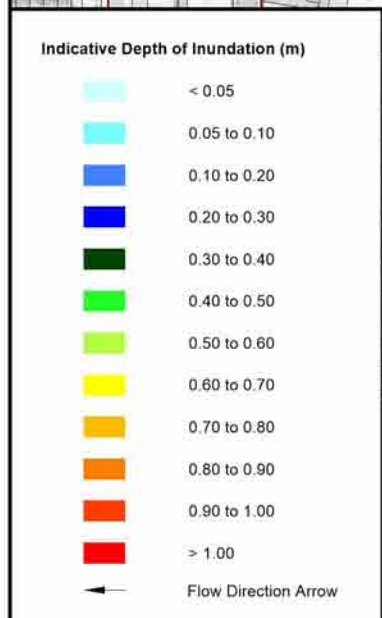
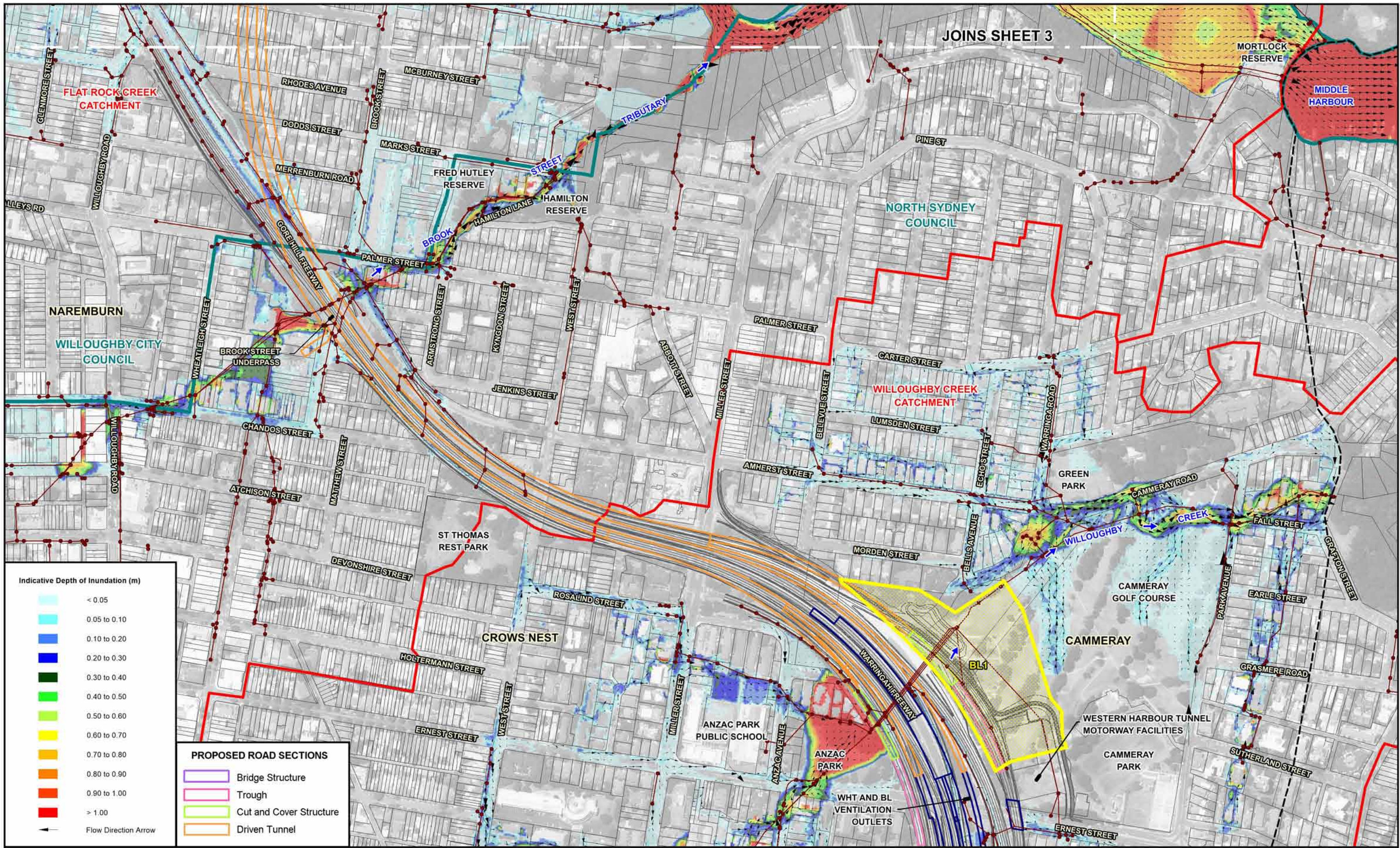


**Annexure B**  
**Figures showing flood behaviour under present day and operational**  
**conditions 0.5% and 0.2% AEP storm events**





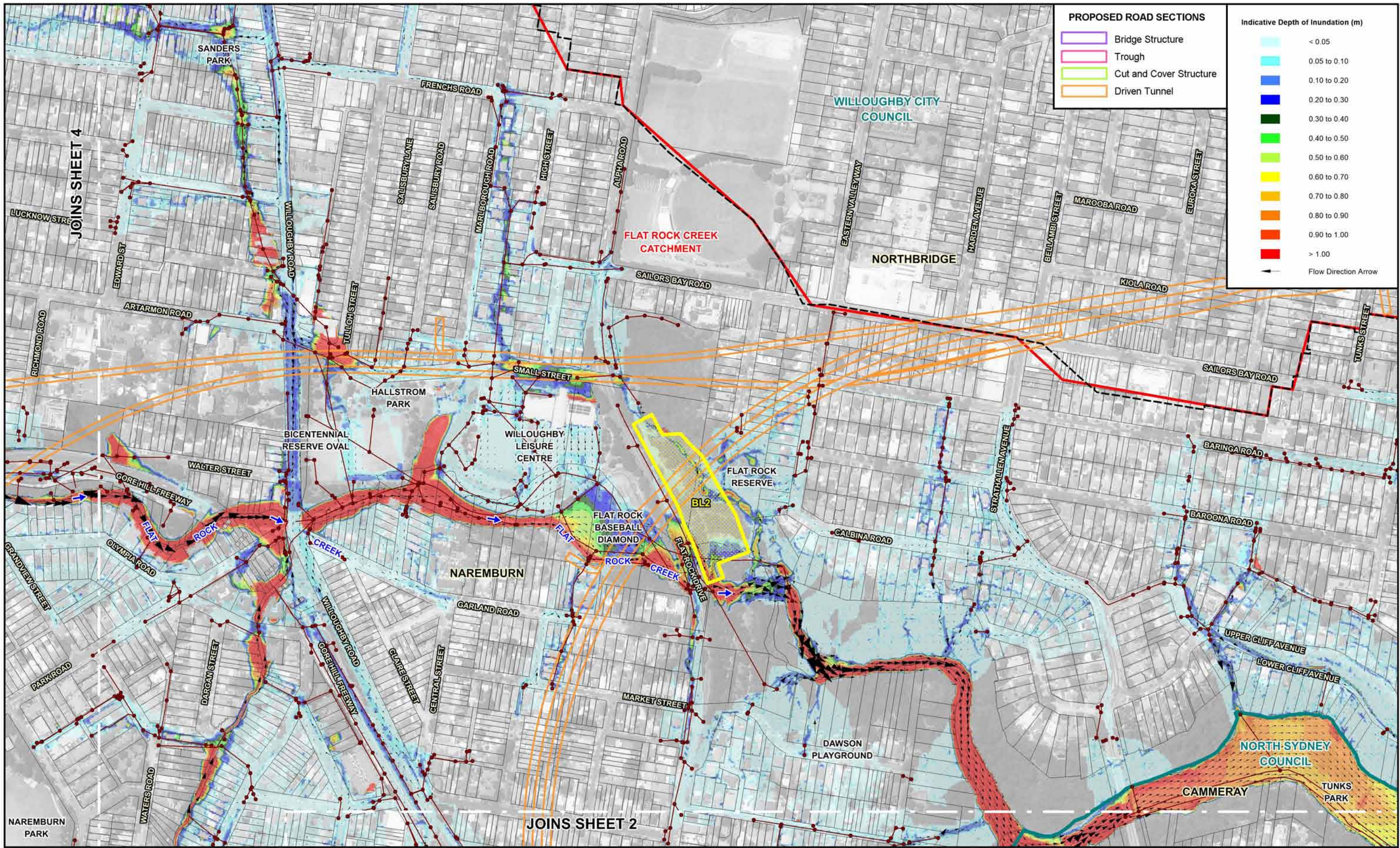




BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure B.1  
(Sheet 2 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT





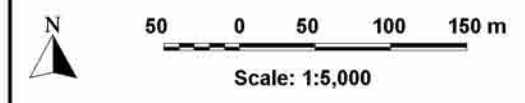
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Indicative Depth of Inundation (m)**

- < 0.05
- 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

← Flow Direction Arrow



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- BL2 Construction Support Site and Identifier

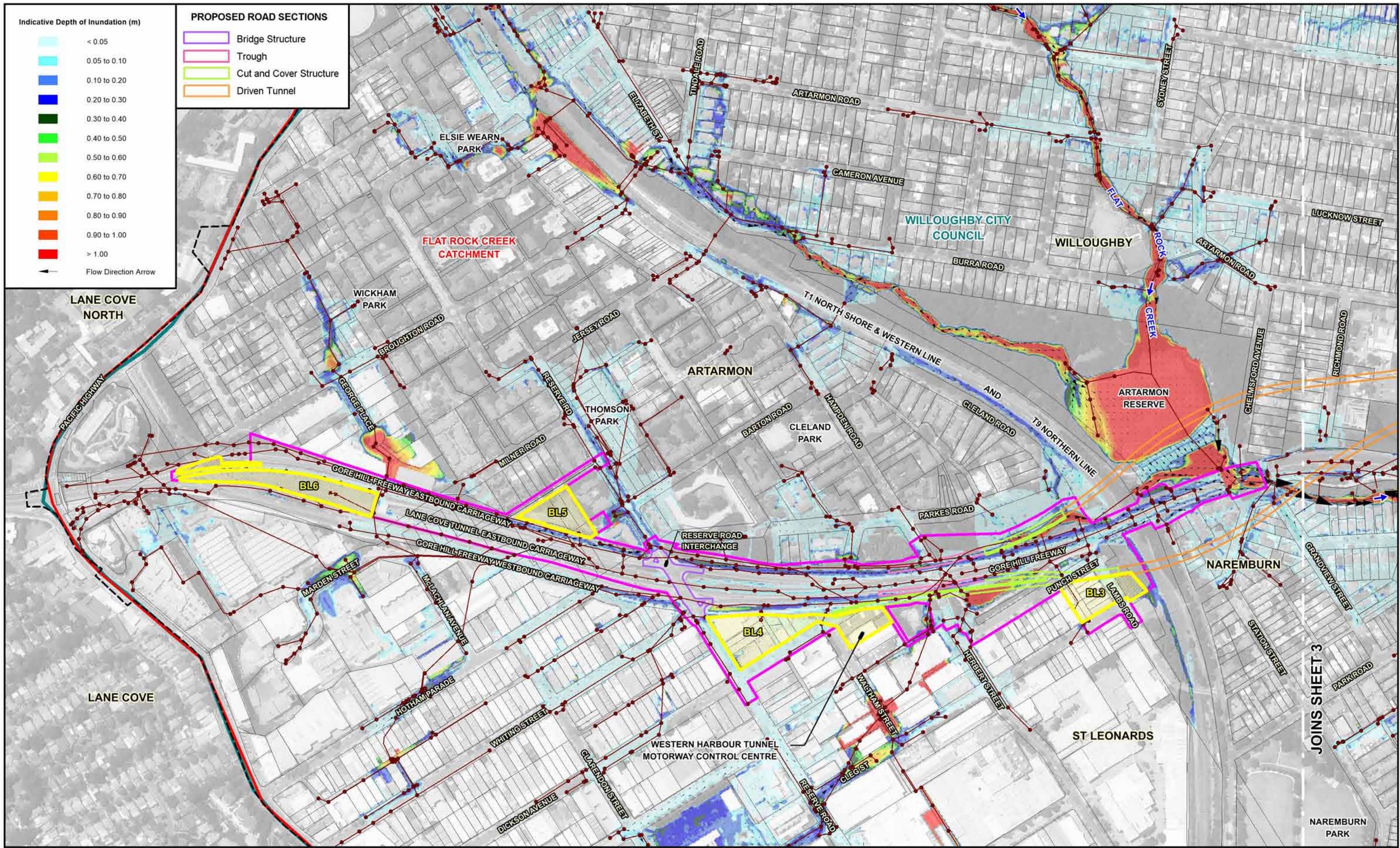
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.1  
(Sheet 3 of 8)

FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT

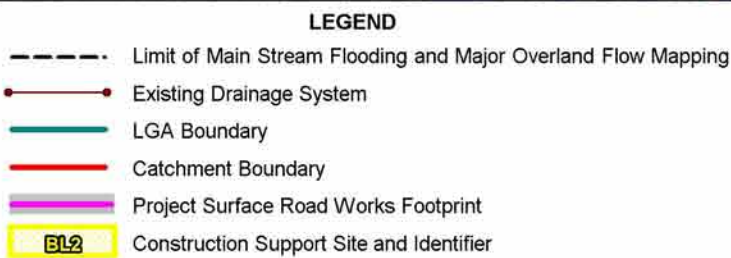
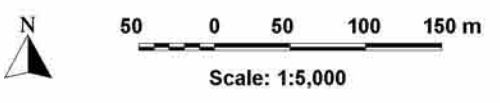






LANE COVE NORTH

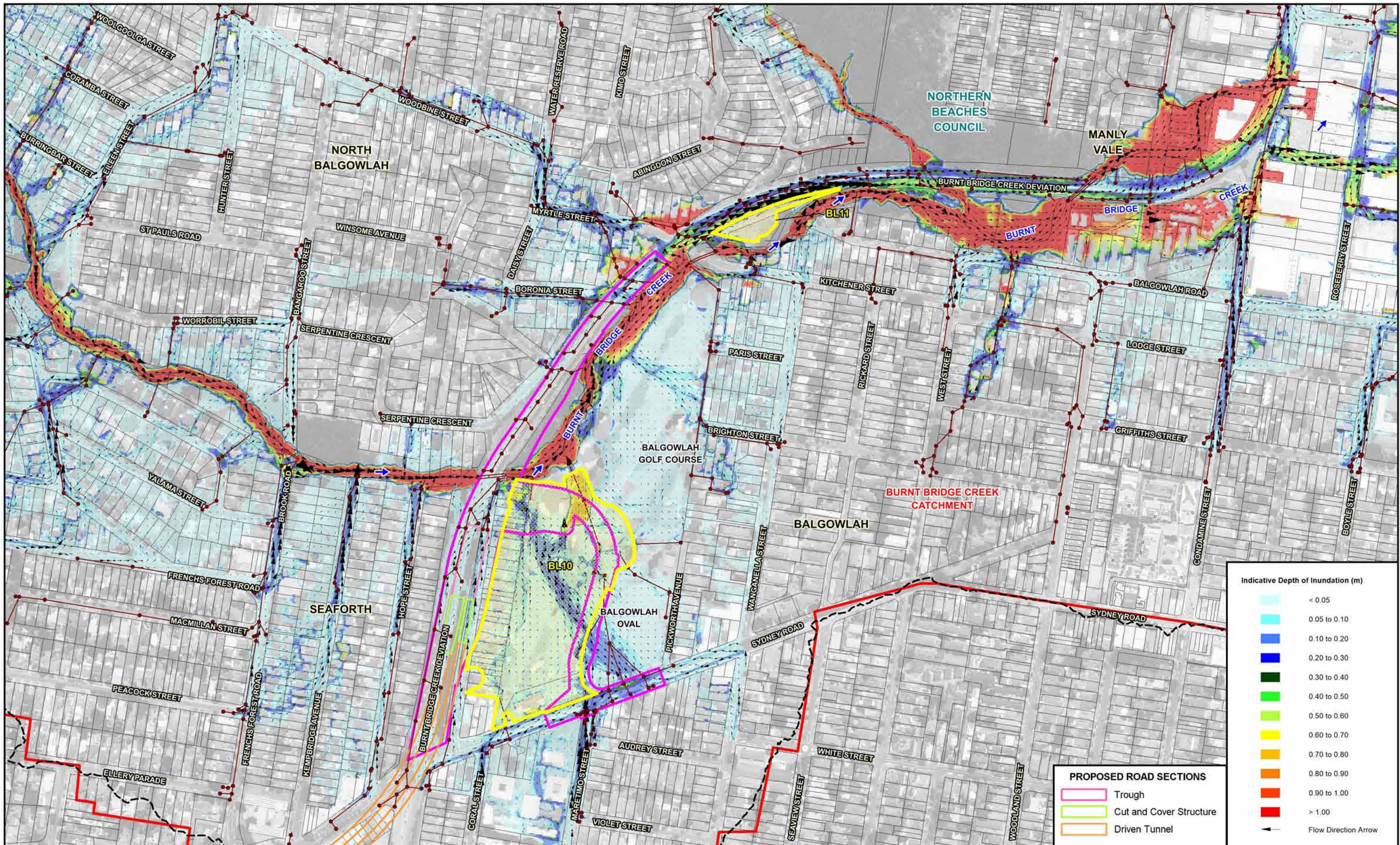
LANE COVE



BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure B.1  
(Sheet 4 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT





**Indicative Depth of Inundation (m)**

<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

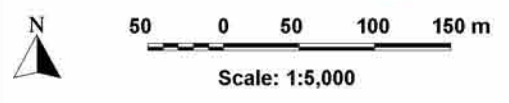
Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

[Pink line]	Trough
[Green line]	Cut and Cover Structure
[Orange line]	Driven Tunnel

**LEGEND**

[Dashed line]	Limit of Main Stream Flooding and Major Overland Flow Mapping
[Red line]	Existing Drainage System
[Blue line]	LGA Boundary
[Red line]	Catchment Boundary
[Pink line]	Project Surface Road Works Footprint
[Yellow box]	Construction Support Site and Identifier

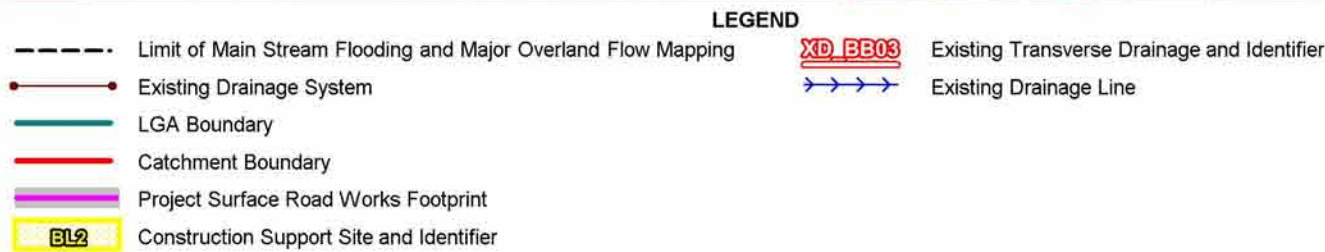
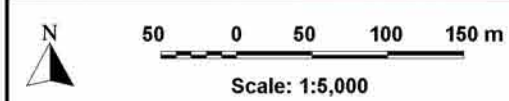
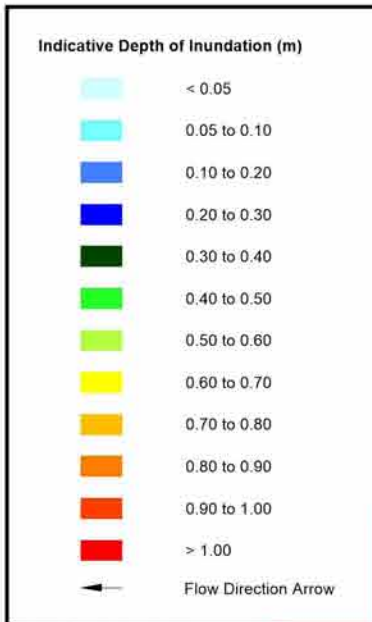
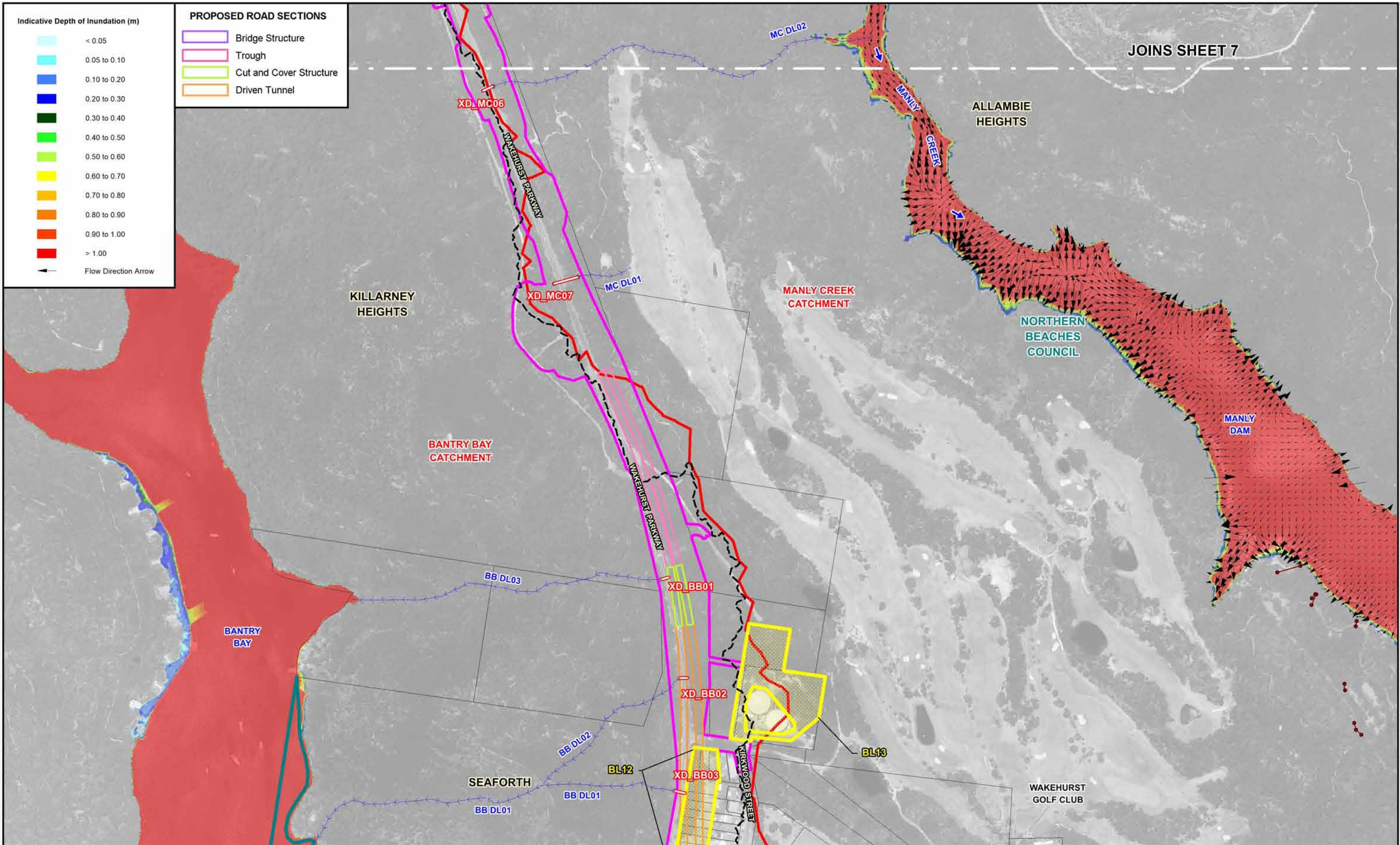


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.1  
(Sheet 5 of 8)

FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT

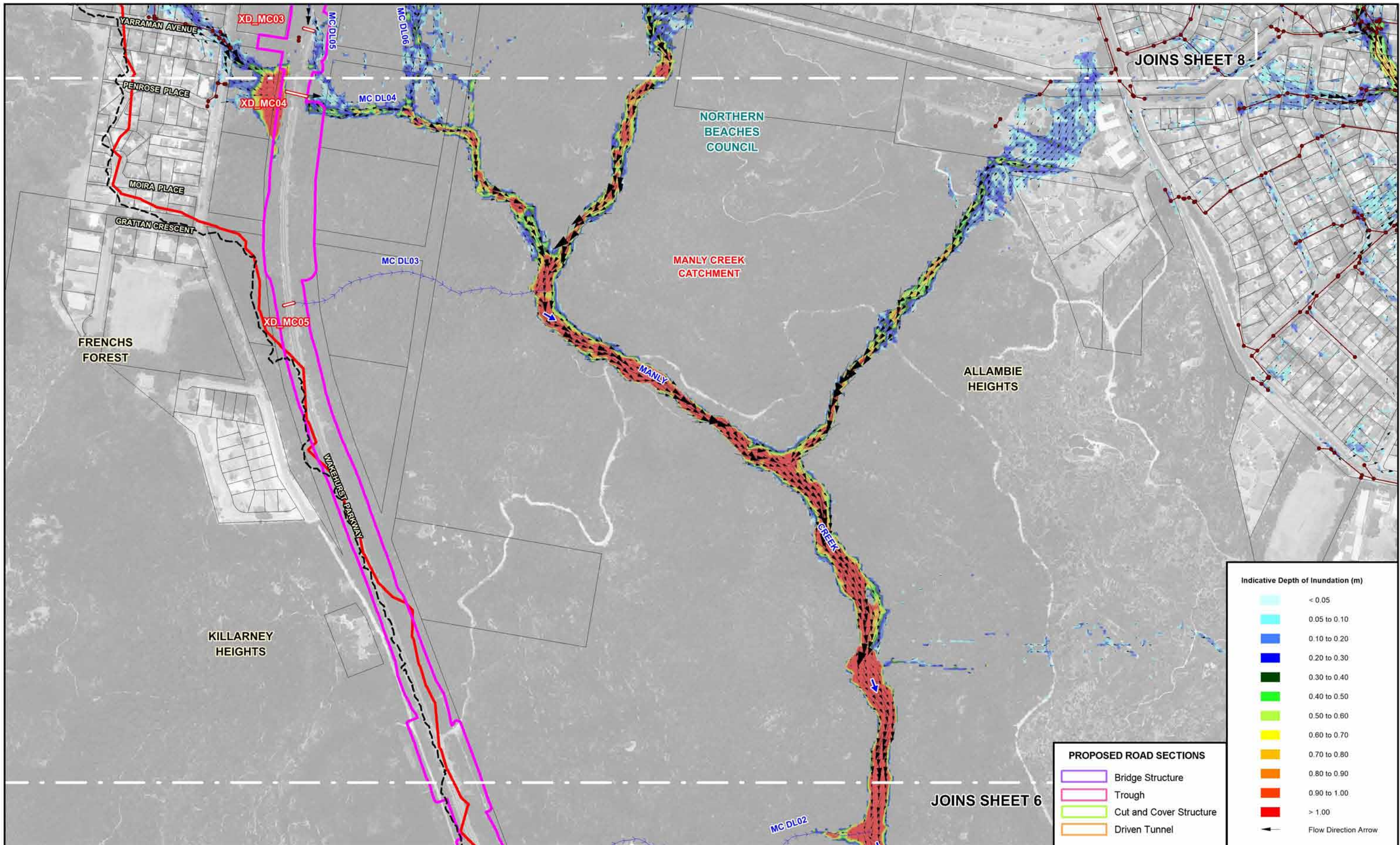




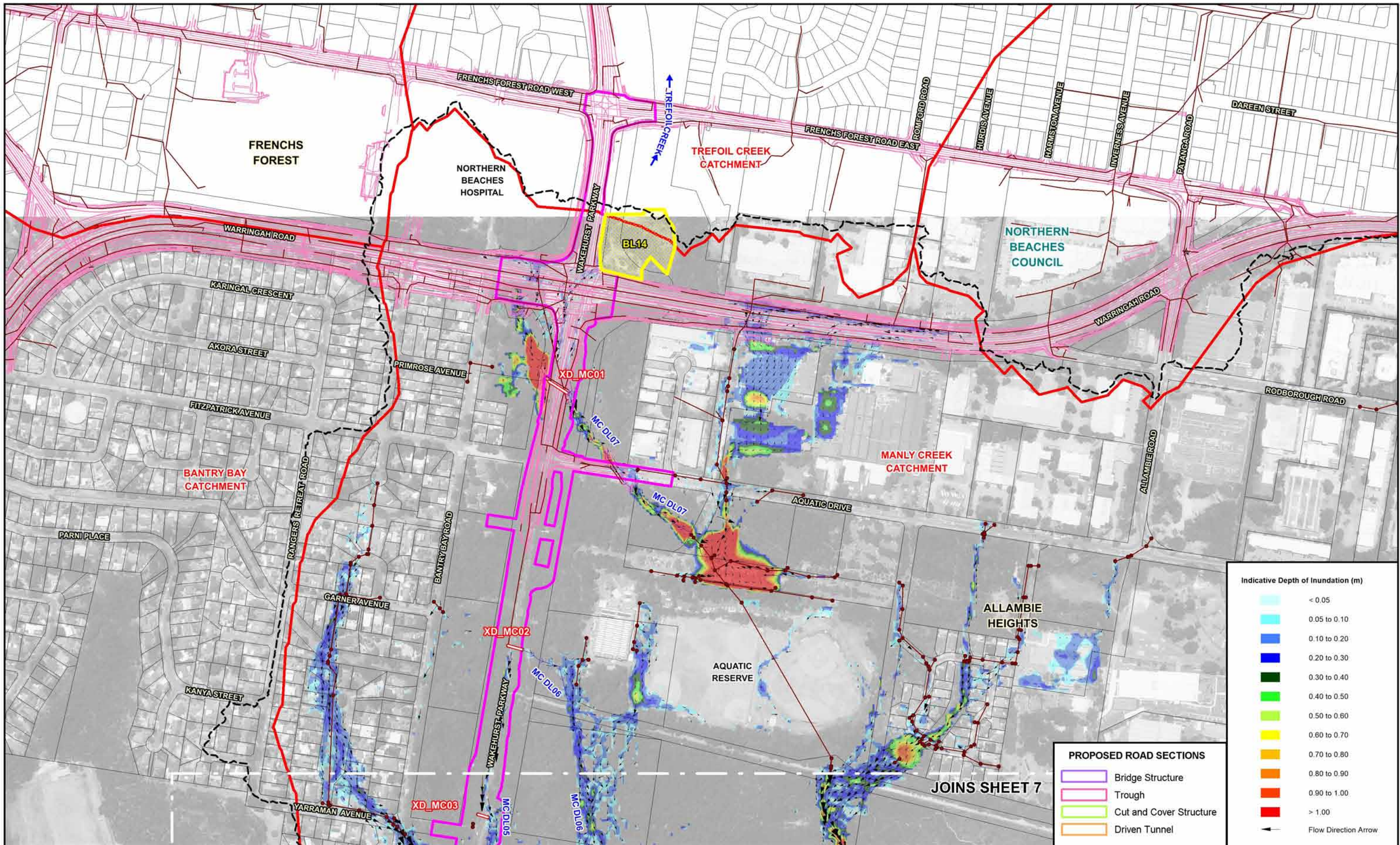
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.1  
(Sheet 6 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT









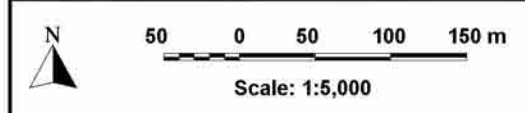
**Indicative Depth of Inundation (m)**

< 0.05
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

Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

Bridge Structure
Trough
Cut and Cover Structure
Driven Tunnel



**LEGEND**

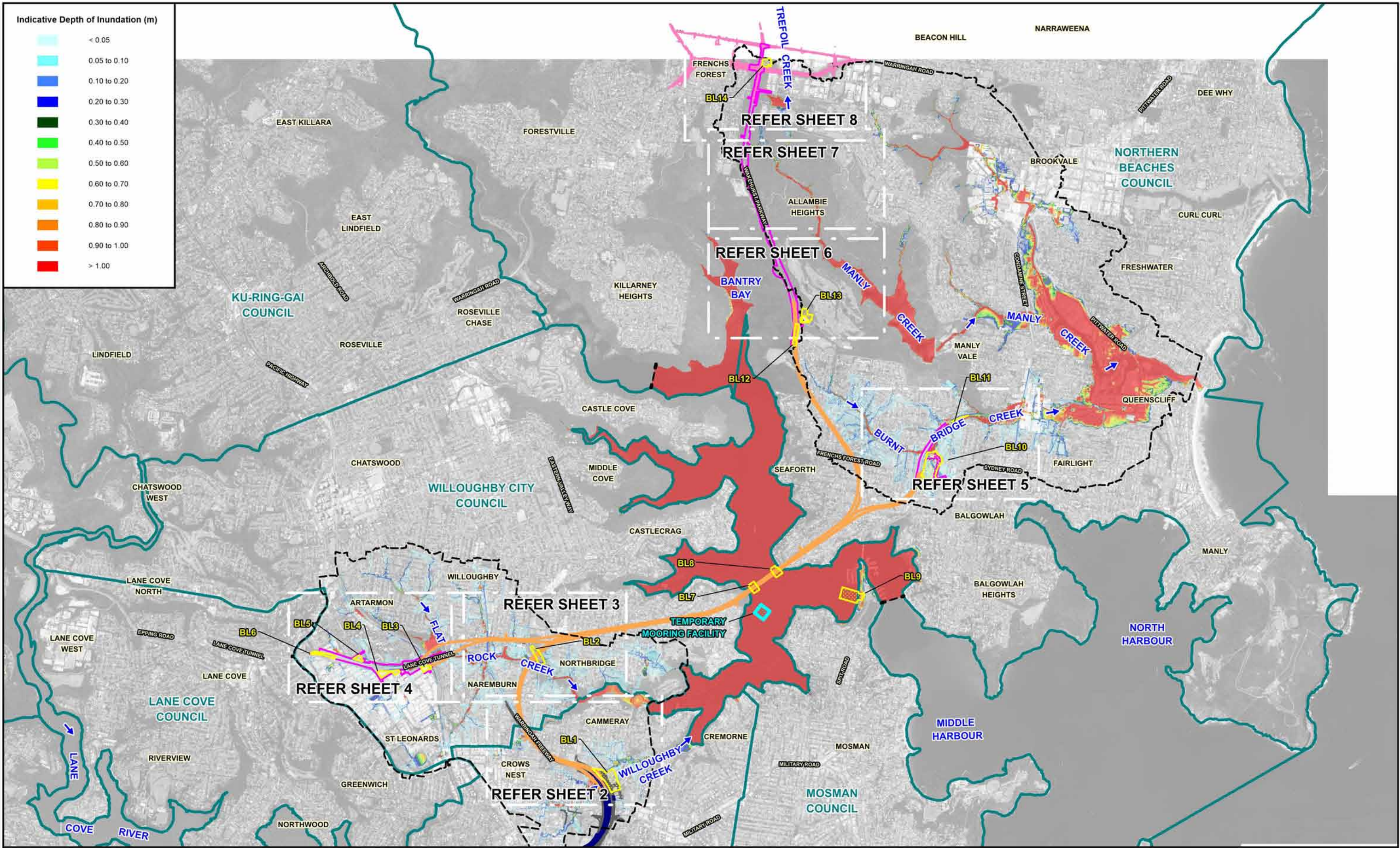
--- Limit of Main Stream Flooding and Major Overland Flow Mapping
● Existing Drainage System
— LGA Boundary
— Catchment Boundary
BL2 Construction Support Site and Identifier

Project Surface Road Works Footprint
Northern Beaches Hospital Surface Road Works
XD_MC03 Existing Transverse Drainage and Identifier
Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.1  
(Sheet 8 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.5% AEP EVENT





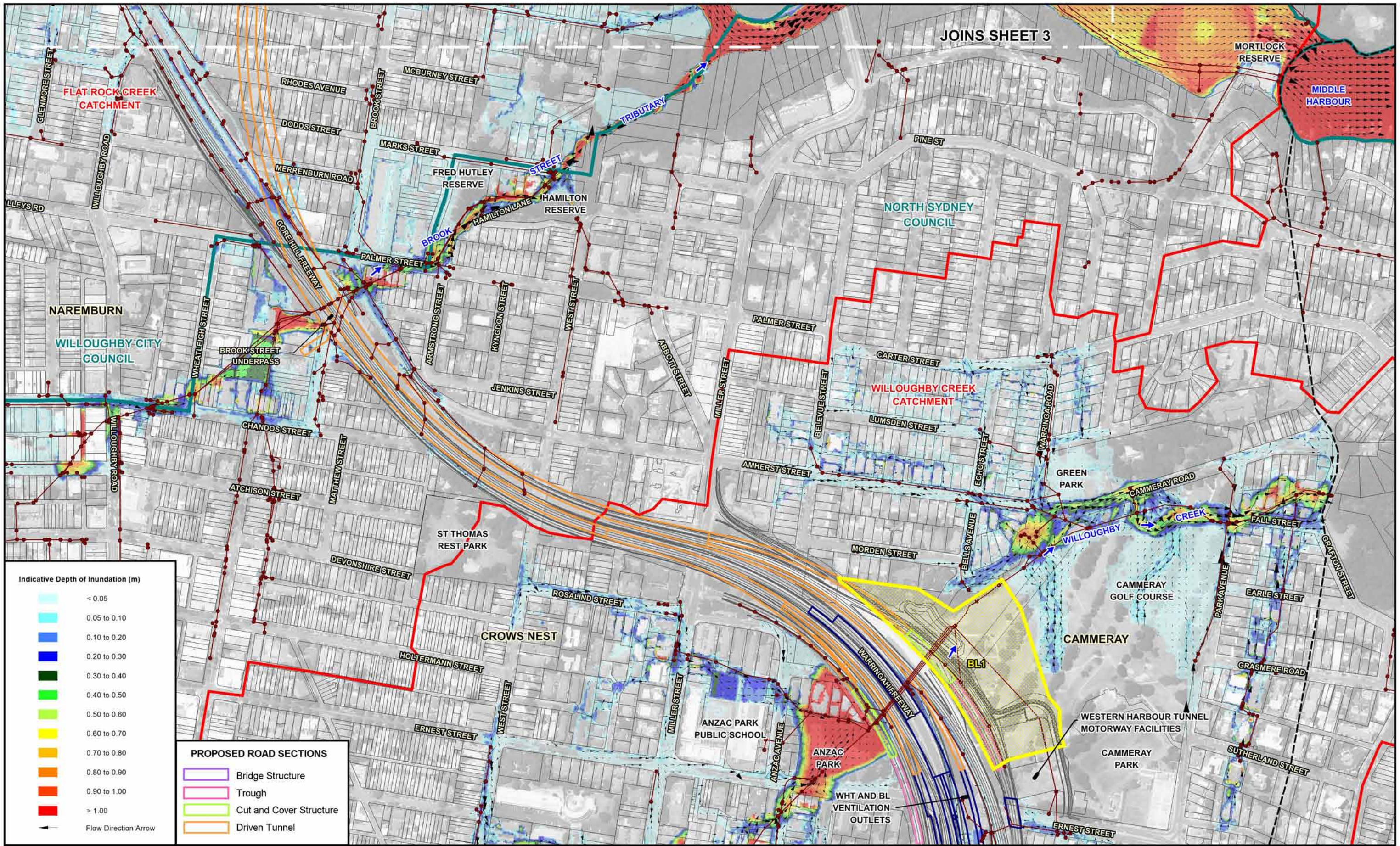
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Limit of Estuarine Flood Mapping
- LGA Boundary
- Construction Support Site and Identifier

- Project Surface Road Works Footprint
- Driven Tunnel
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
 (Sheet 1 of 8)  
**FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
 0.2% AEP EVENT**



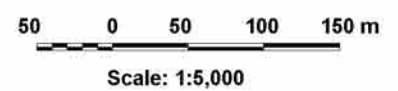


JOINS SHEET 3

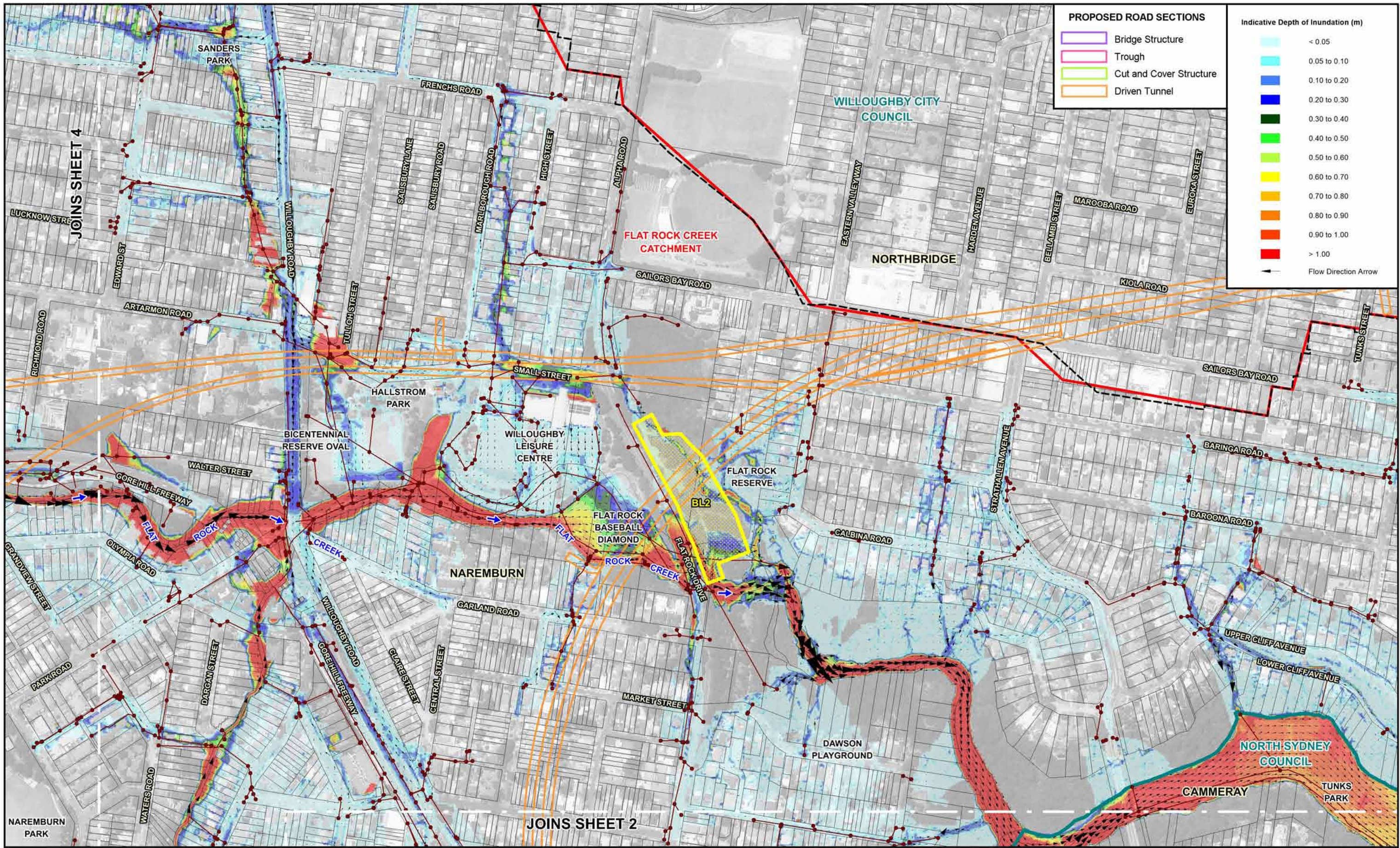
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 2 of 8)

FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT







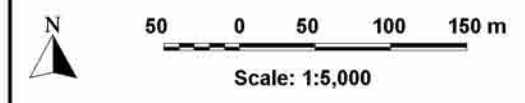
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Indicative Depth of Inundation (m)**

- <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

← Flow Direction Arrow



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Existing Drainage System
- LGA Boundary
- Catchment Boundary
- Construction Support Site and Identifier

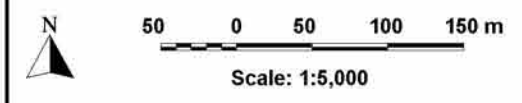
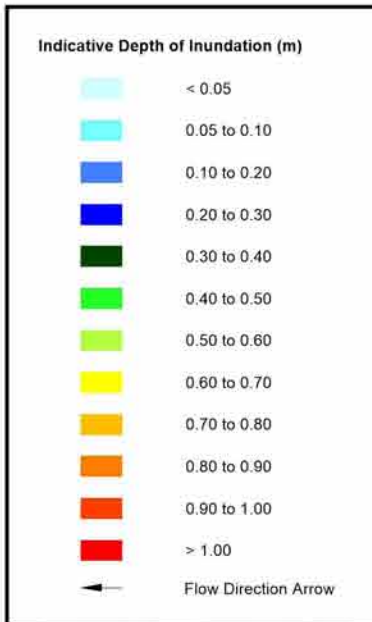
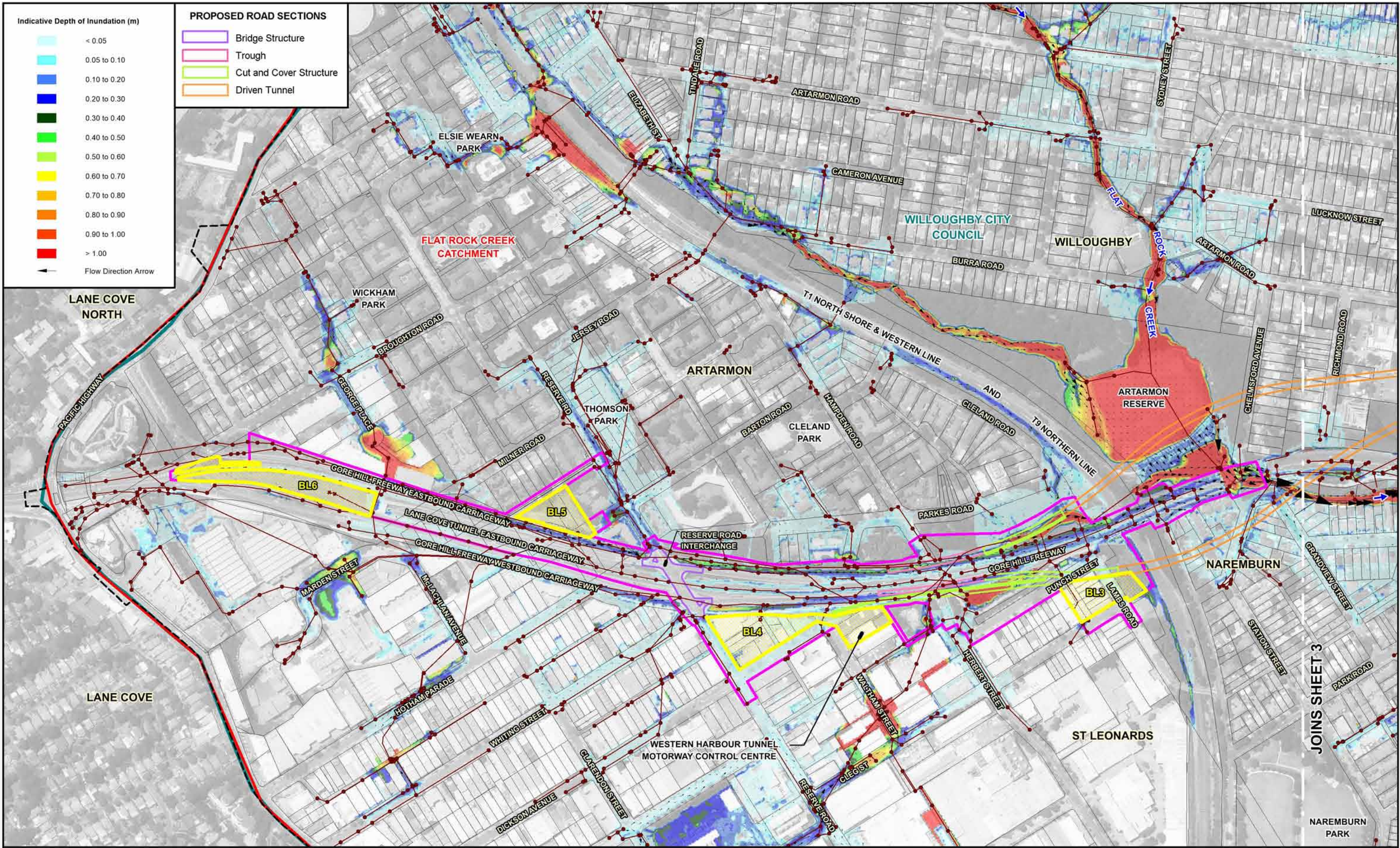
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 3 of 8)

FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT



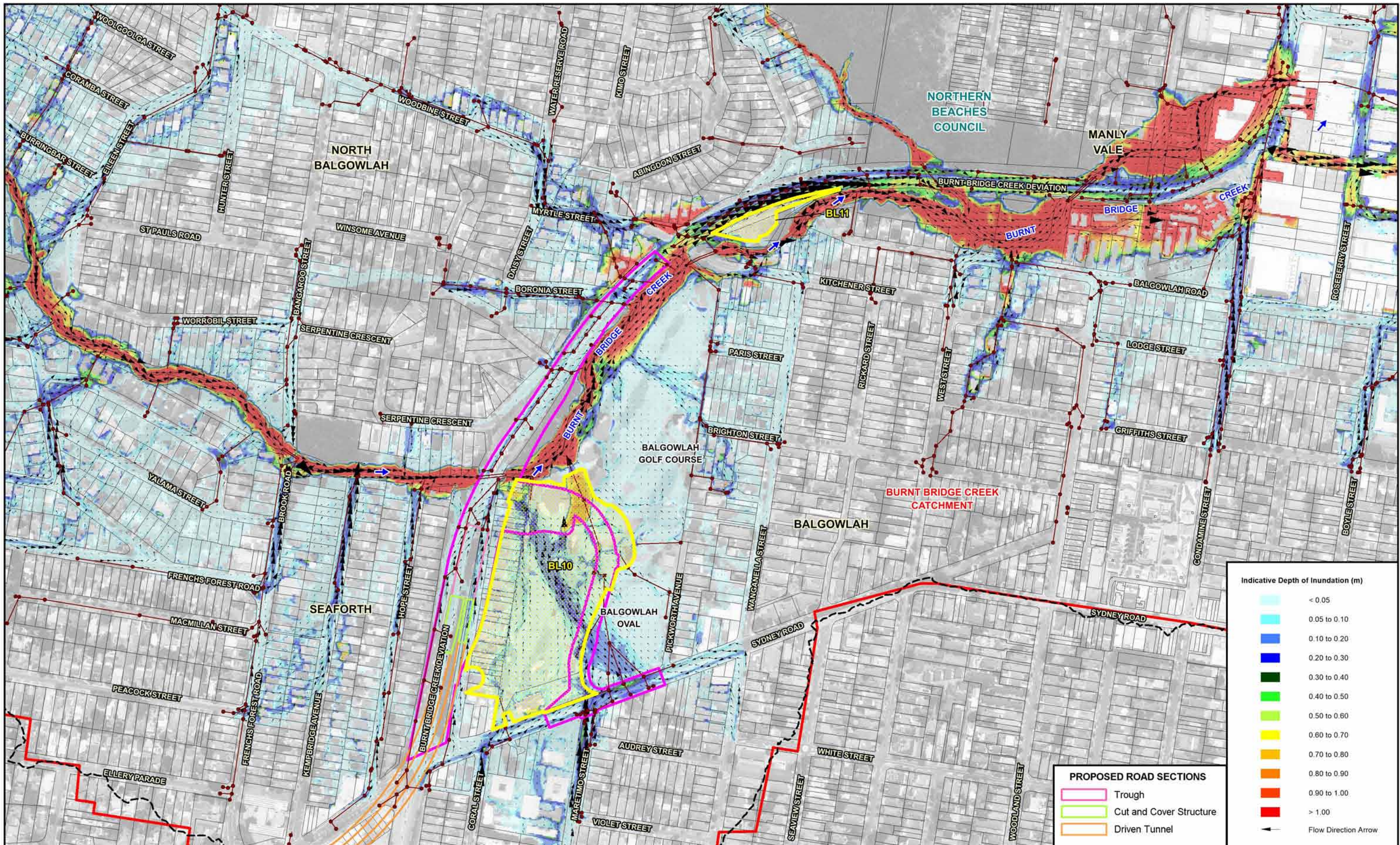




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 4 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT





**Indicative Depth of Inundation (m)**

<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

Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

[Pink line]	Trough
[Green line]	Cut and Cover Structure
[Orange line]	Driven Tunnel

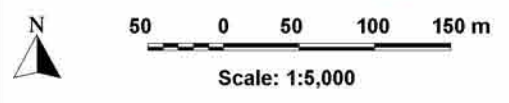
**LEGEND**

[Dashed line]	Limit of Main Stream Flooding and Major Overland Flow Mapping
[Red line]	Existing Drainage System
[Blue line]	LGA Boundary
[Red line]	Catchment Boundary
[Pink area]	Project Surface Road Works Footprint
[Yellow area]	Construction Support Site and Identifier

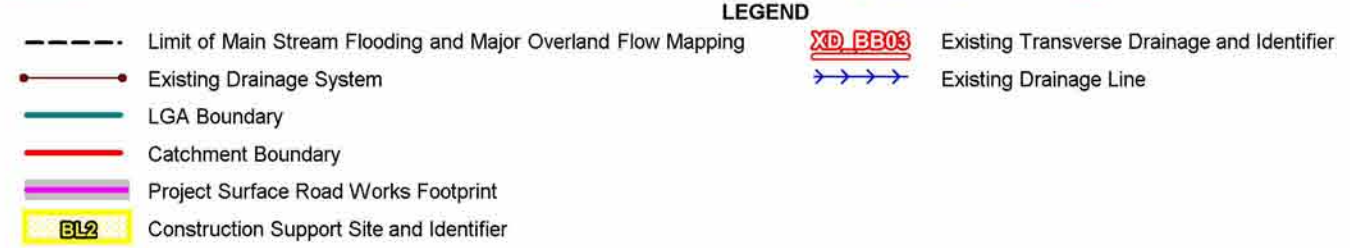
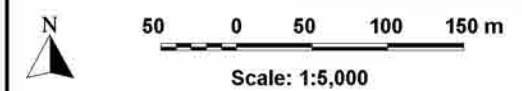
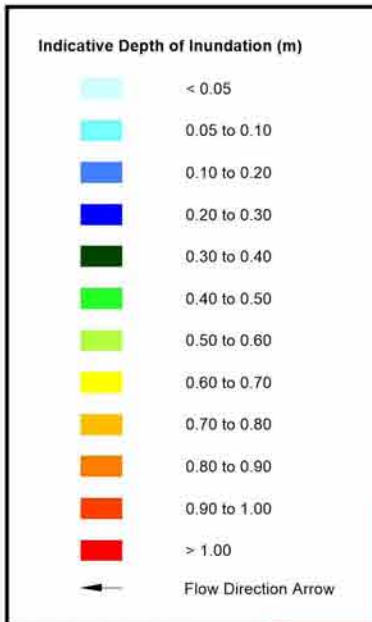
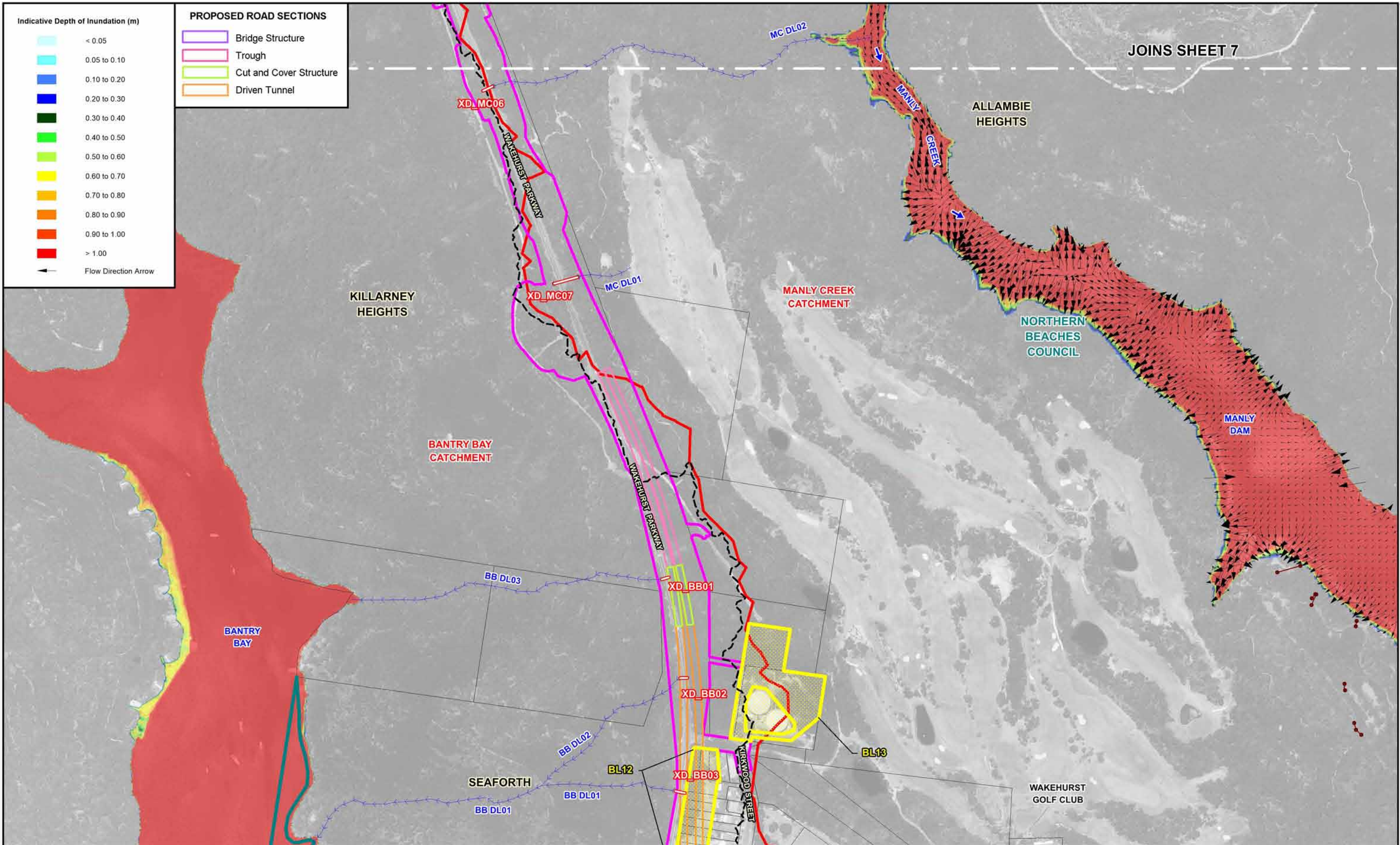
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 5 of 8)

FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT



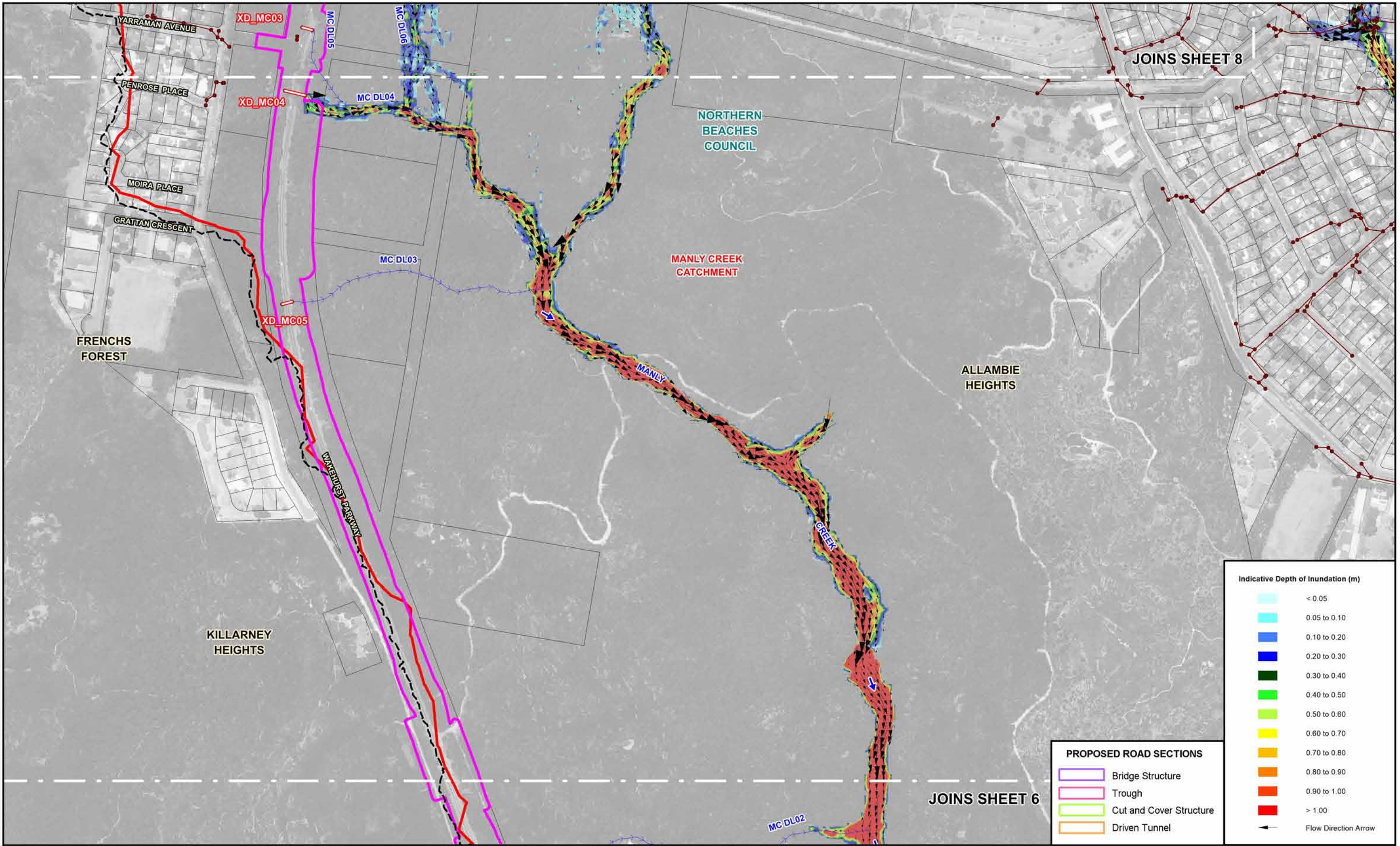




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

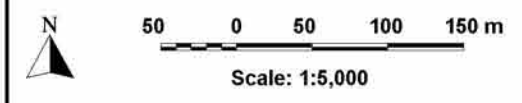
Figure B.2  
(Sheet 6 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT





Indicative Depth of Inundation (m)	
	< 0.05
	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
	Flow Direction Arrow

PROPOSED ROAD SECTIONS	
	Bridge Structure
	Trough
	Cut and Cover Structure
	Driven Tunnel

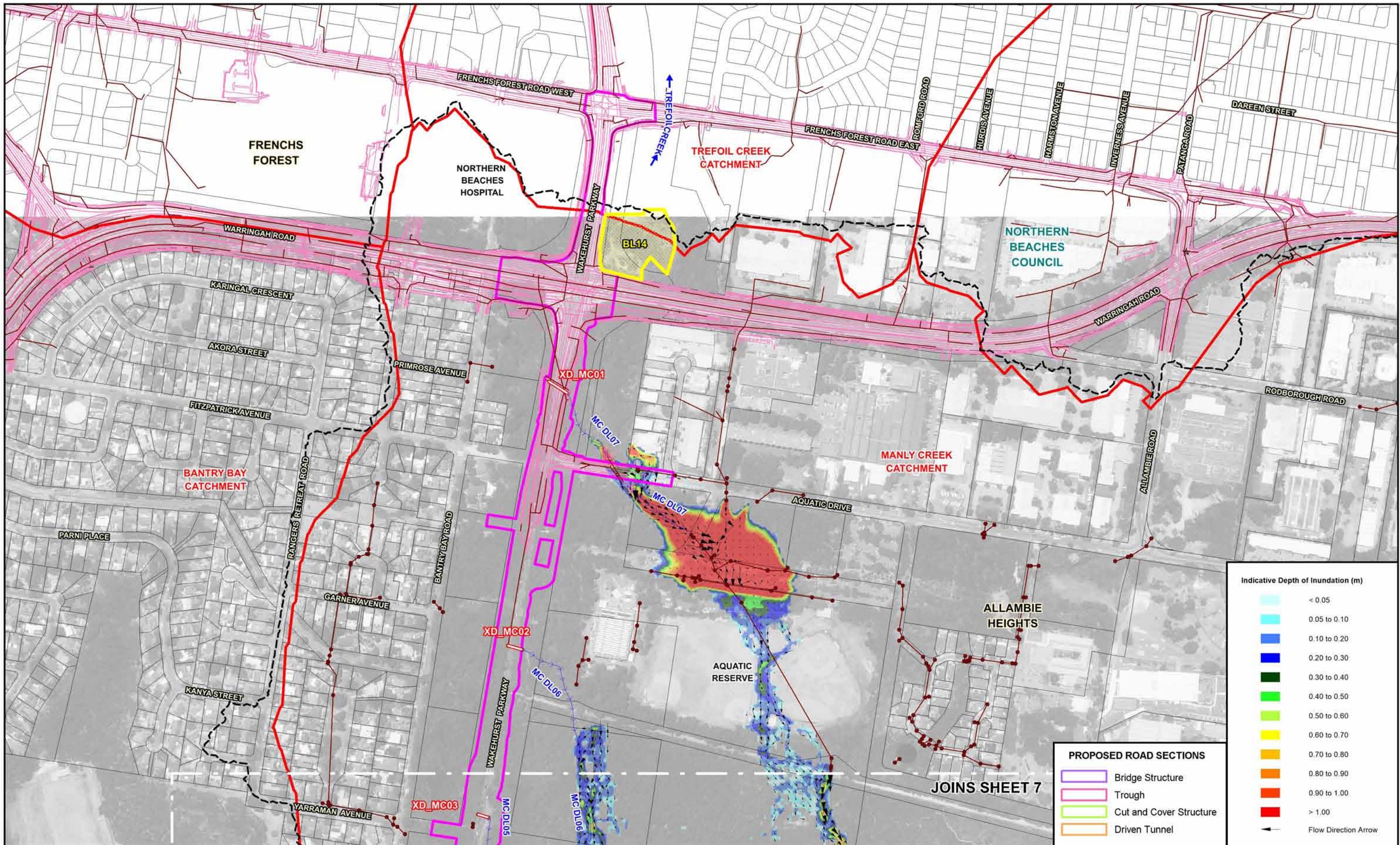


LEGEND	
	Limit of Main Stream Flooding and Major Overland Flow Mapping
	Existing Drainage System
	LGA Boundary
	Catchment Boundary
	Project Surface Road Works Footprint
	Existing Transverse Drainage and Identifier
	Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 7 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT





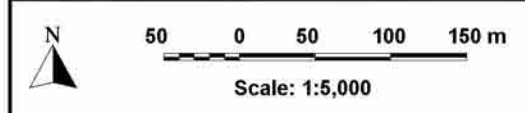
**Indicative Depth of Inundation (m)**

< 0.05
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

Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

Bridge Structure
Trough
Cut and Cover Structure
Driven Tunnel



**LEGEND**

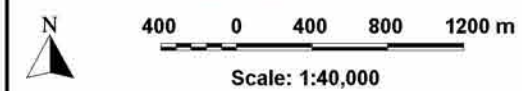
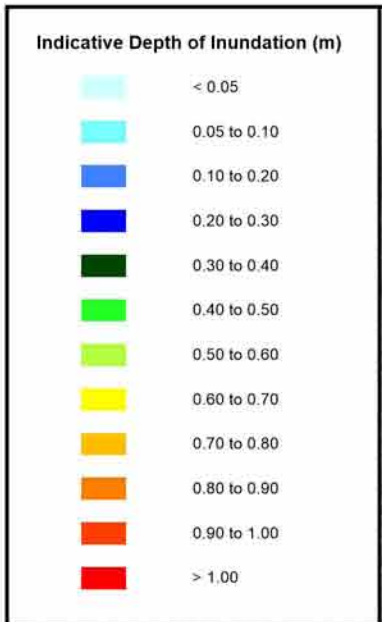
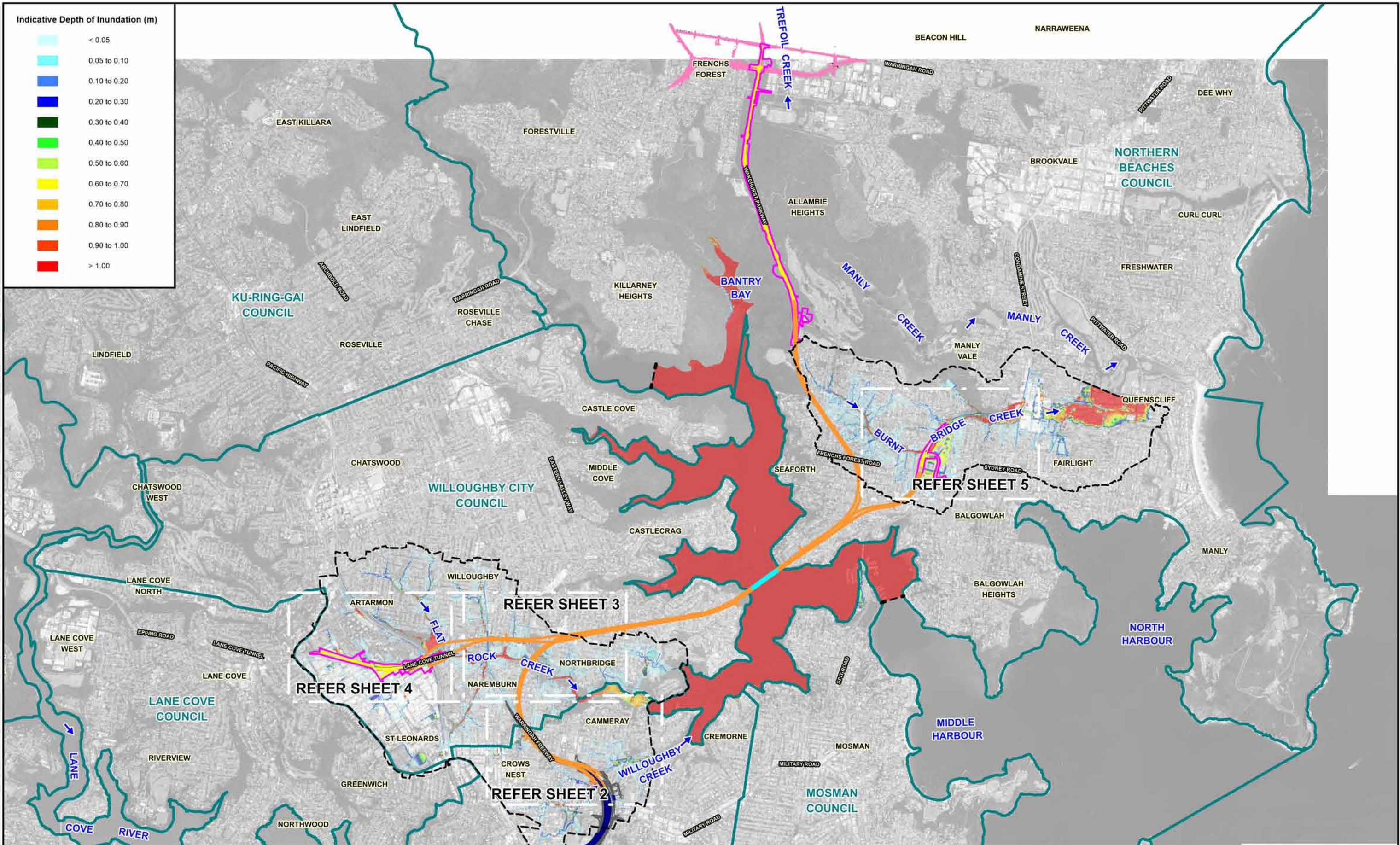
Limit of Main Stream Flooding and Major Overland Flow Mapping
Existing Drainage System
LGA Boundary
Catchment Boundary
Construction Support Site and Identifier

Project Surface Road Works Footprint
Northern Beaches Hospital Surface Road Works
Existing Transverse Drainage and Identifier
Existing Drainage Line

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.2  
(Sheet 8 of 8)  
FLOODING PATTERNS UNDER PRESENT DAY CONDITIONS  
0.2% AEP EVENT





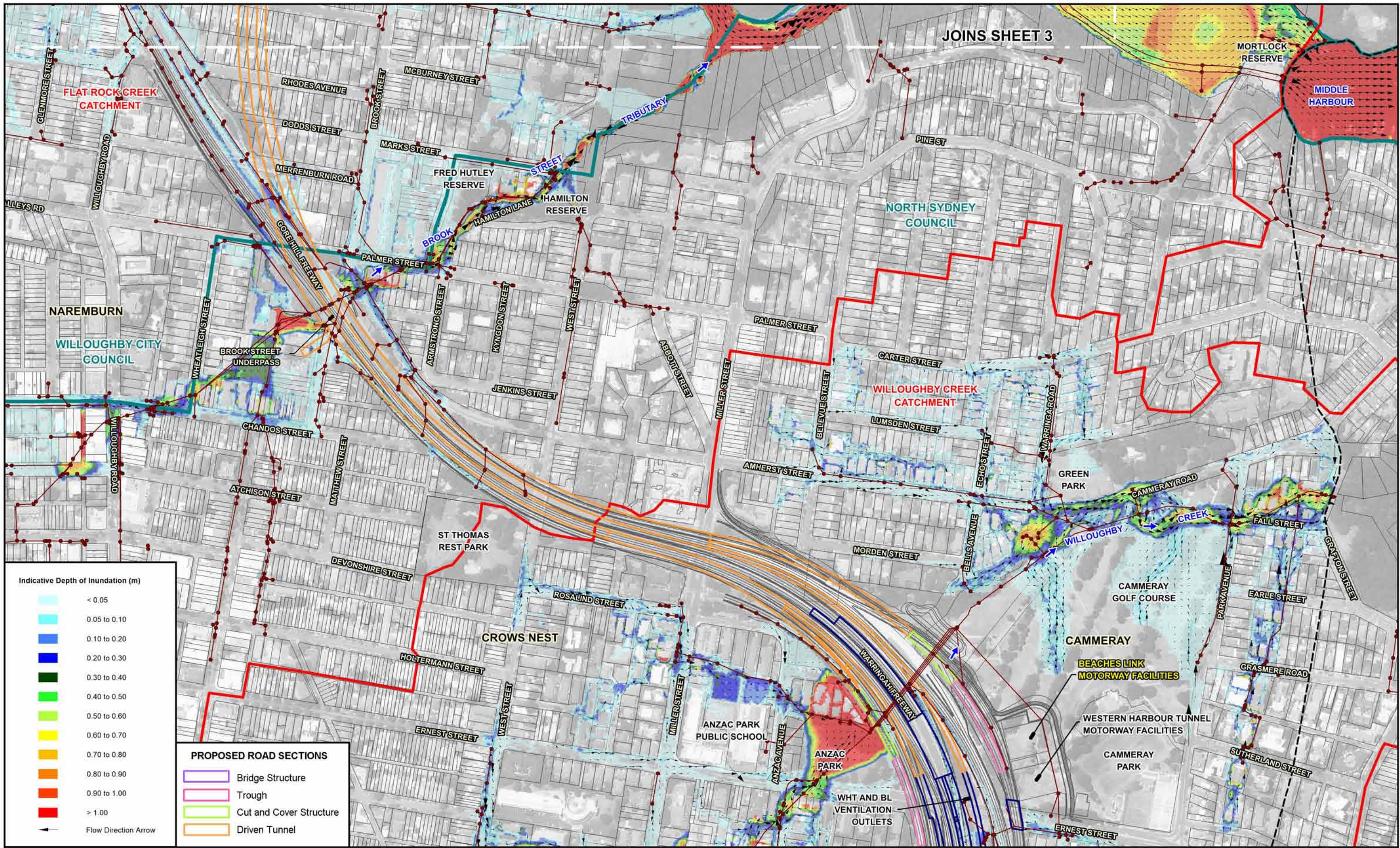
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.3  
(Sheet 1 of 5)  
FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.5% AEP EVENT





JOINS SHEET 3

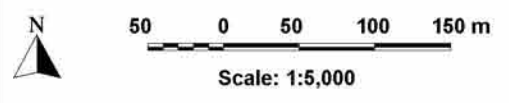
Indicative Depth of Inundation (m)

Light Blue	< 0.05
Light Cyan	0.05 to 0.10
Blue	0.10 to 0.20
Dark Blue	0.20 to 0.30
Green	0.30 to 0.40
Light Green	0.40 to 0.50
Yellow-Green	0.50 to 0.60
Yellow	0.60 to 0.70
Orange	0.70 to 0.80
Red-Orange	0.80 to 0.90
Red	0.90 to 1.00
Dark Red	> 1.00

Flow Direction Arrow

PROPOSED ROAD SECTIONS

Blue outline	Bridge Structure
Pink outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel



LEGEND

Black dashed line	Limit of Main Stream Flooding and Major Overland Flow Mapping
Red line with dots	Modelled Drainage System
Blue line	LGA Boundary
Red line	Catchment Boundary
Purple line	Project Surface Road Works Footprint

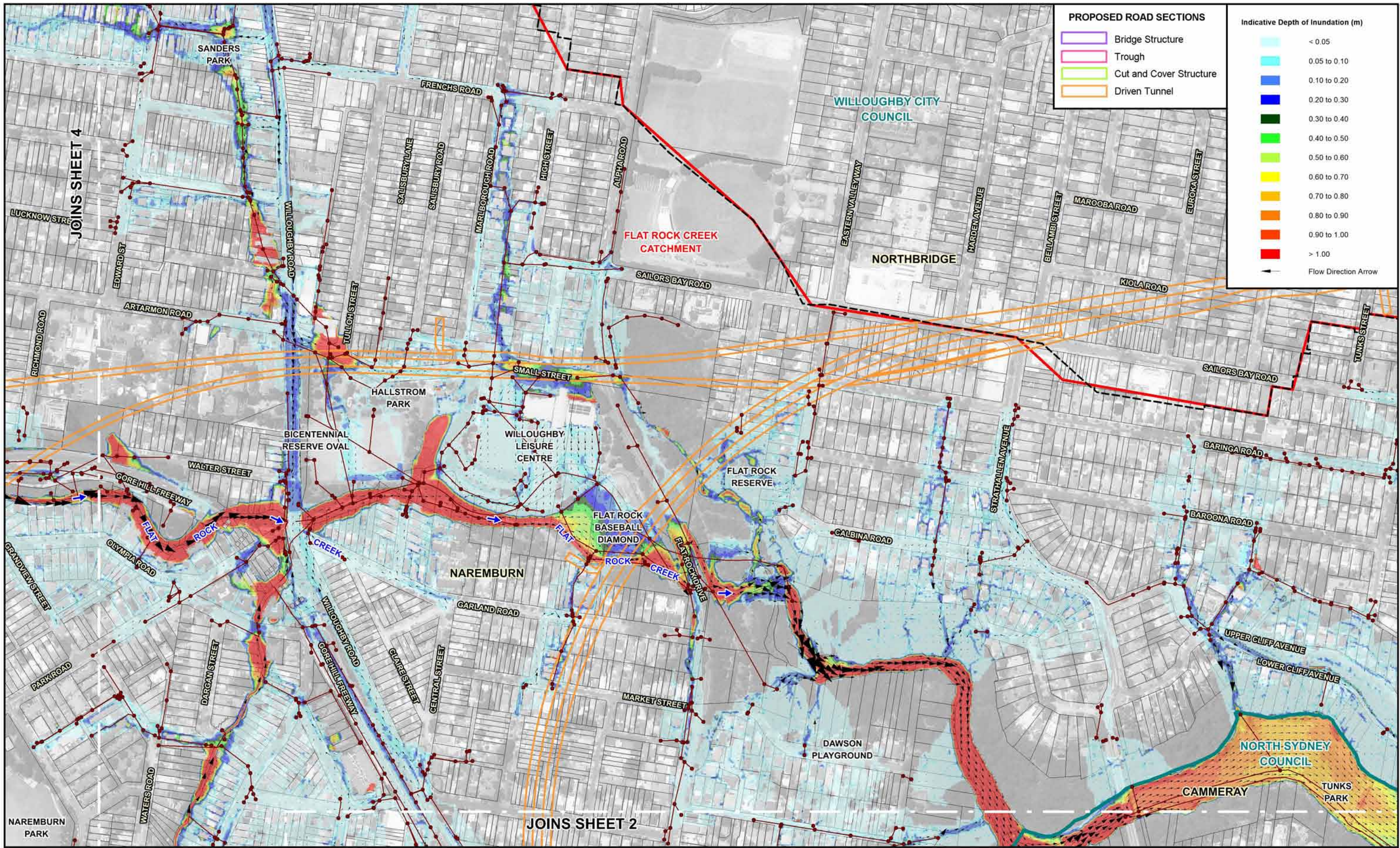
Grey hatched area	Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
Blue hatched area	Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.3  
(Sheet 2 of 5)

FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.5% AEP EVENT





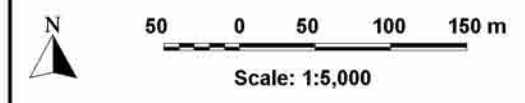
**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Indicative Depth of Inundation (m)**

- < 0.05
- 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

← Flow Direction Arrow



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

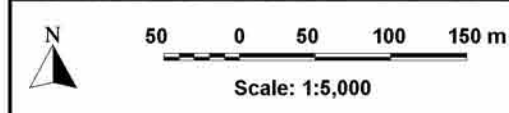
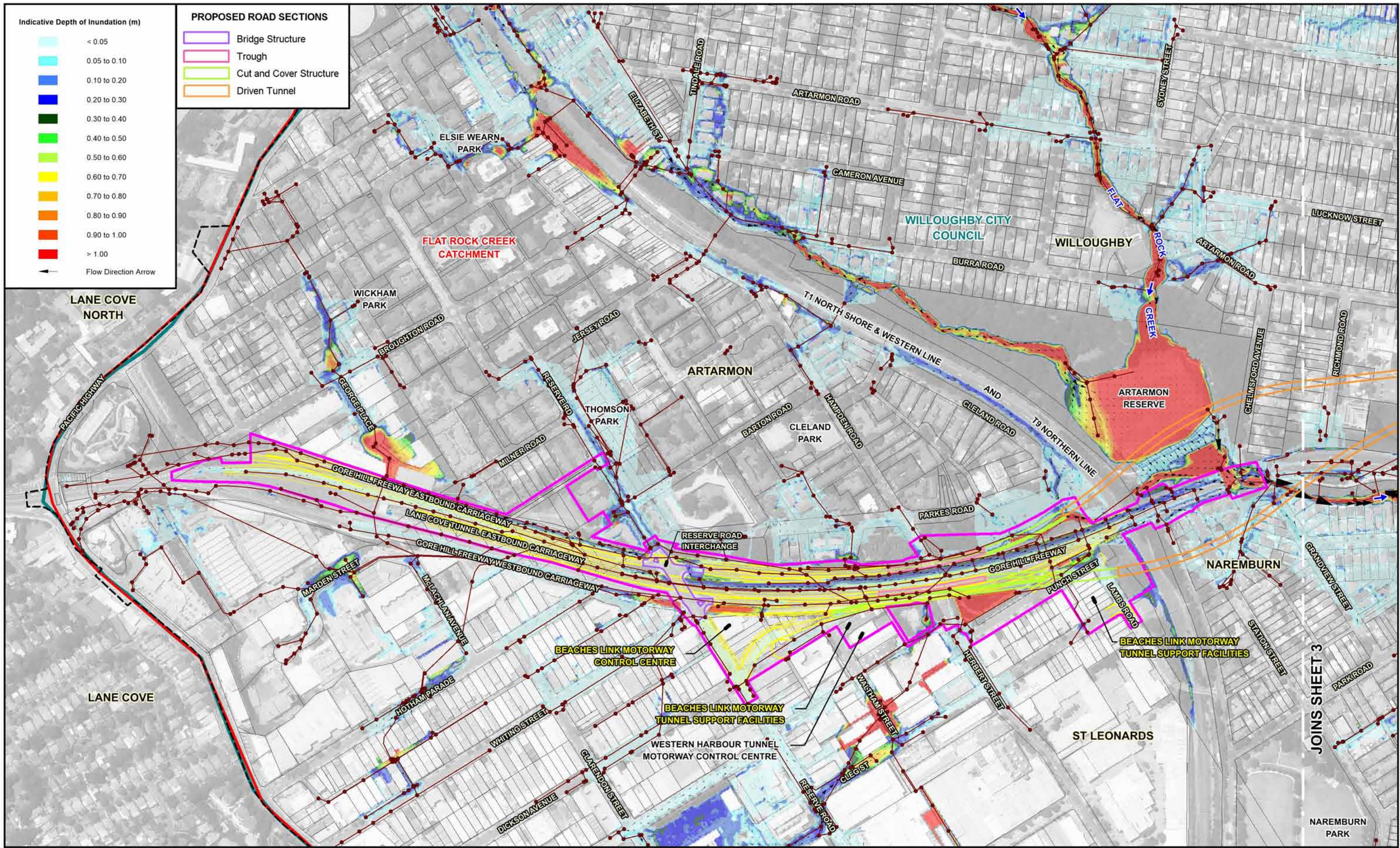
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.3  
(Sheet 3 of 5)

FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.5% AEP EVENT







**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

**Indicative Depth of Inundation (m)**

- < 0.05
- 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

Flow Direction Arrow

**LEGEND**

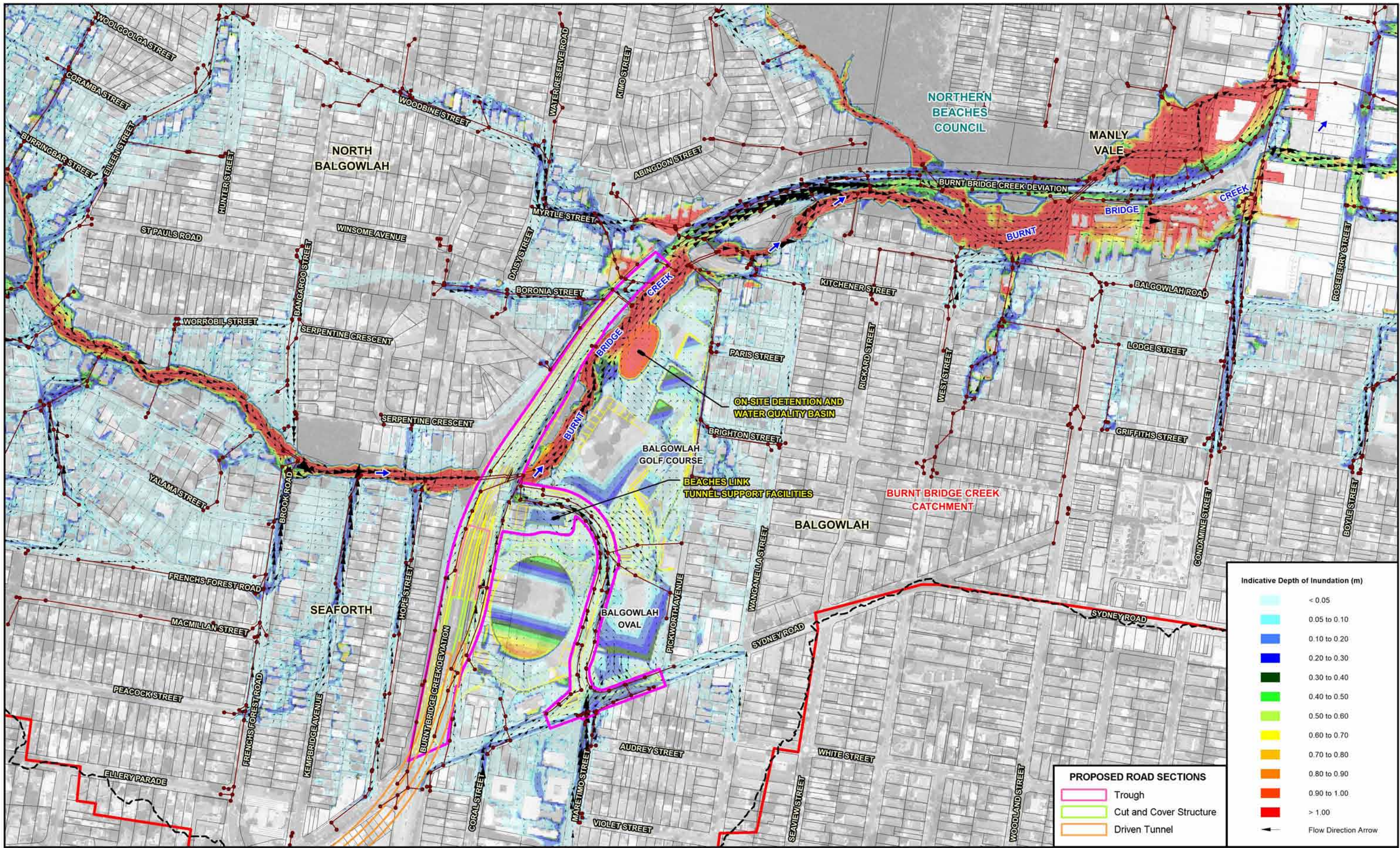
- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint

Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.3  
(Sheet 4 of 5)  
FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.5% AEP EVENT





**Indicative Depth of Inundation (m)**

< 0.05
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

Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

(Pink line)	Trough
(Green line)	Cut and Cover Structure
(Orange line)	Driven Tunnel

**LEGEND**

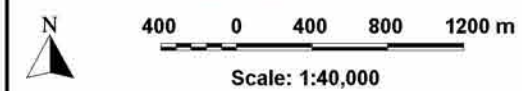
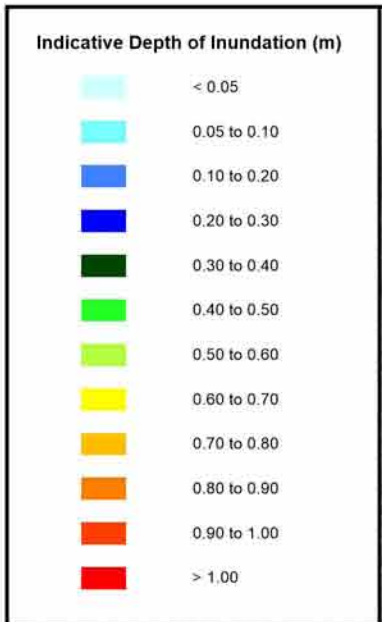
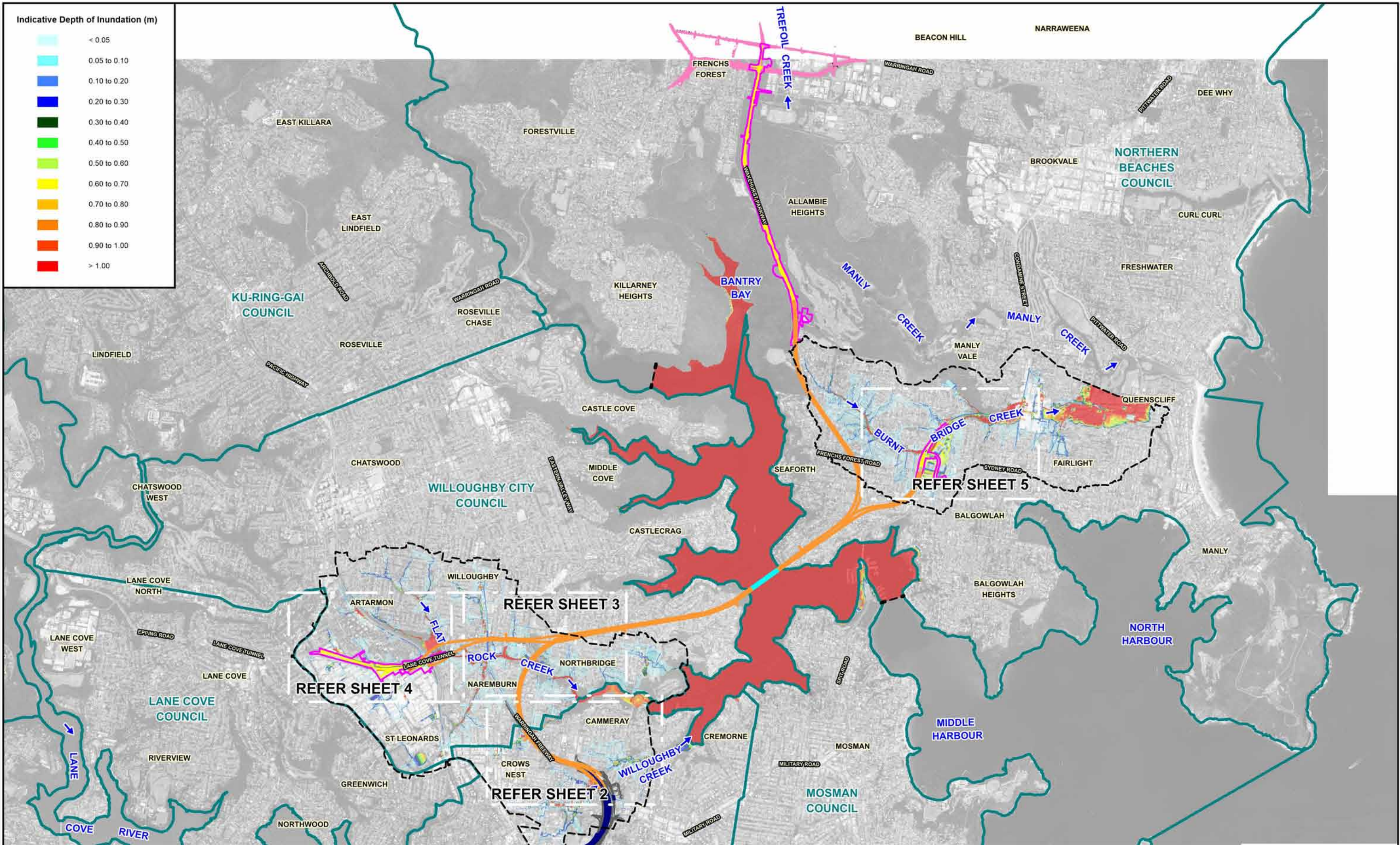
(Dashed black line)	Limit of Main Stream Flooding and Major Overland Flow Mapping
(Red line with dots)	Modelled Drainage System
(Blue line)	LGA Boundary
(Red line)	Catchment Boundary
(Pink line)	Project Surface Road Works Footprint
(Yellow and blue shaded area)	Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.3  
(Sheet 5 of 5)

FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.5% AEP EVENT





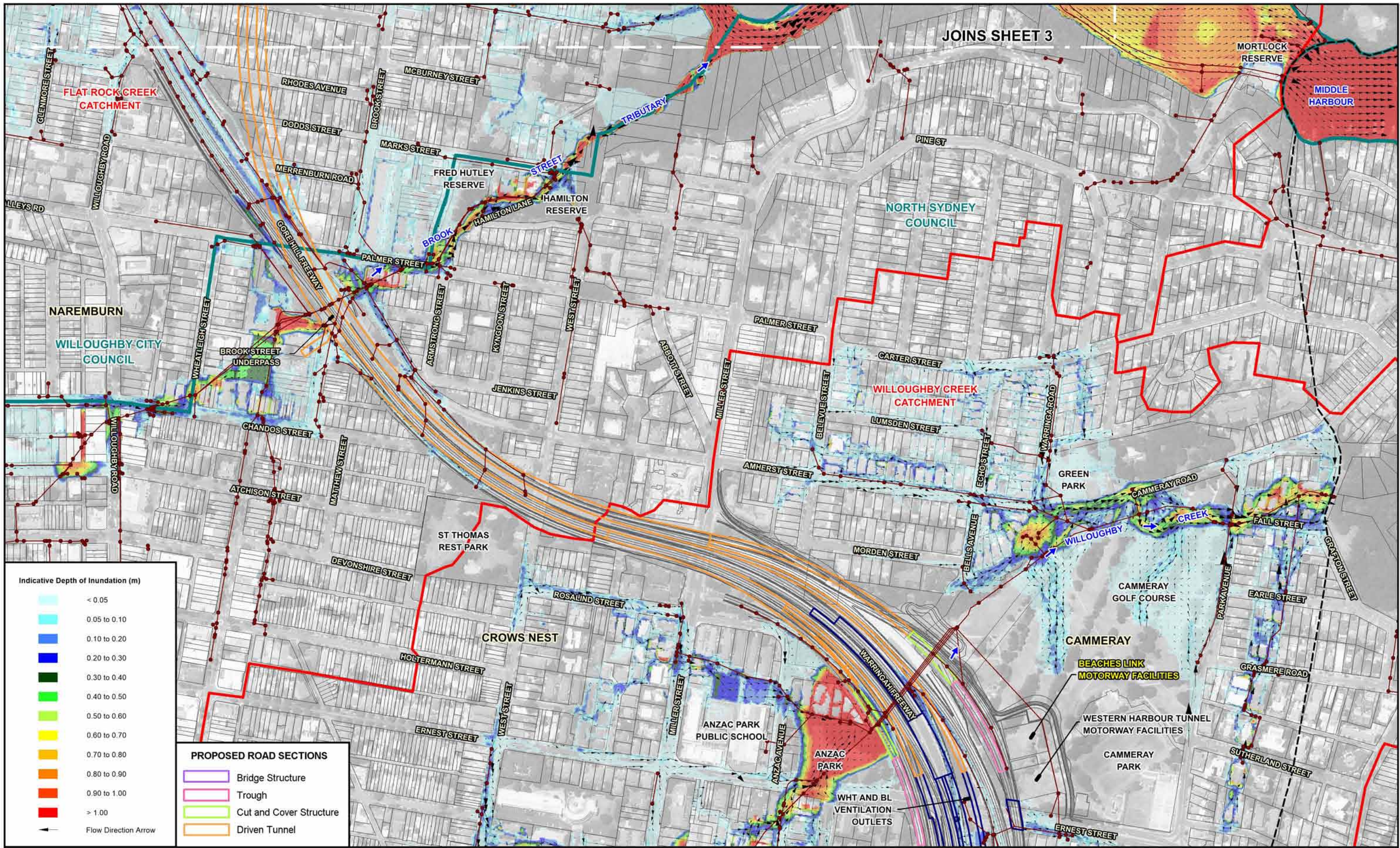
- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.4  
(Sheet 1 of 5)  
FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.2% AEP EVENT





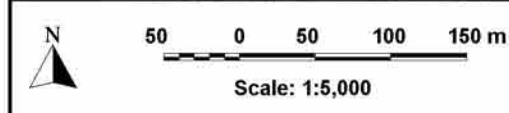
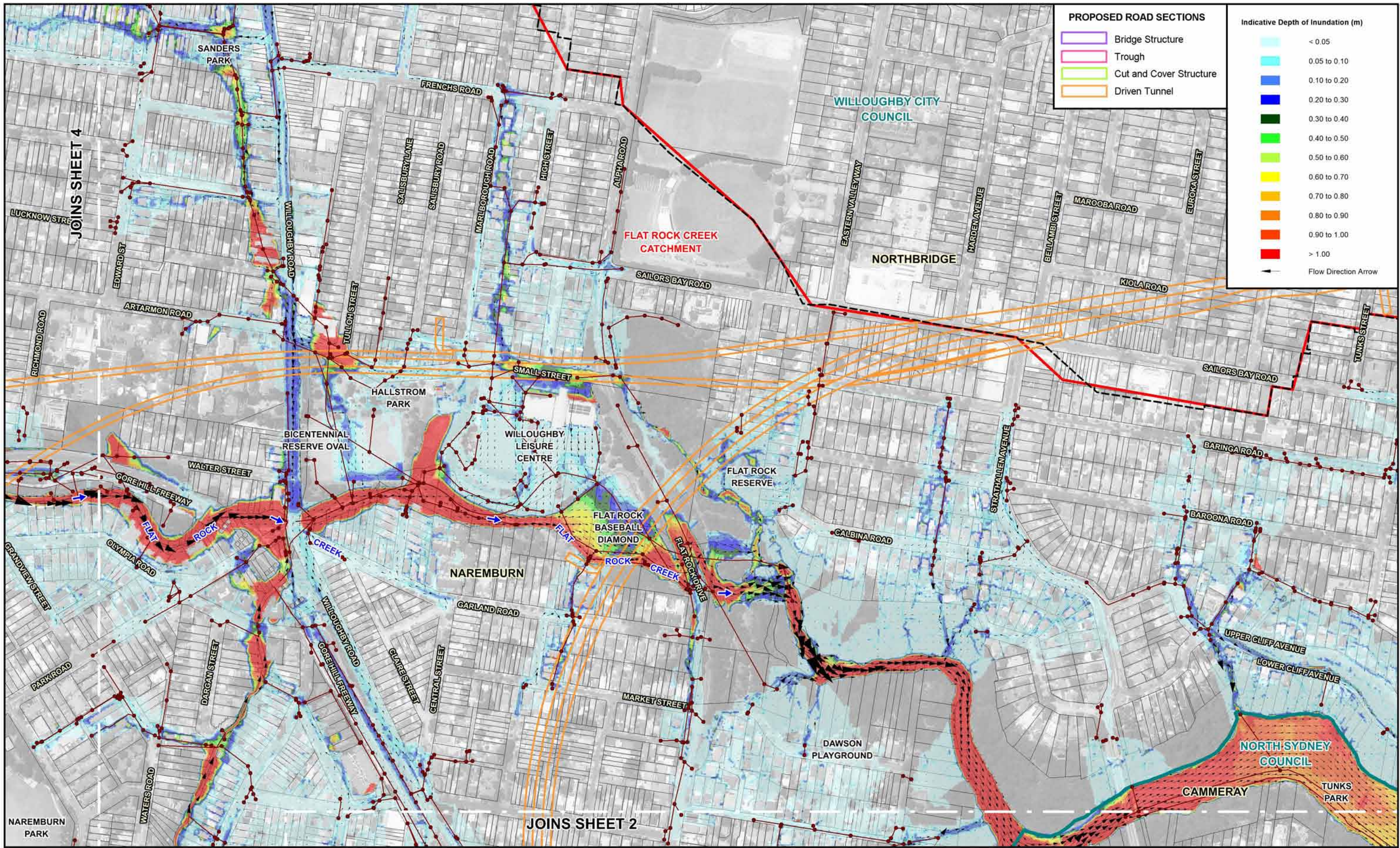
JOINS SHEET 3

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.4  
(Sheet 2 of 5)

FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.2% AEP EVENT



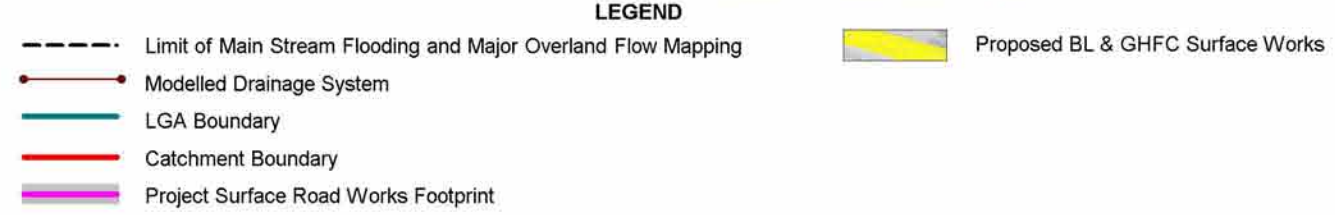
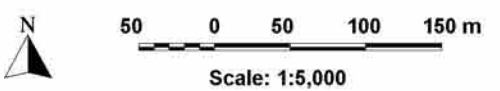
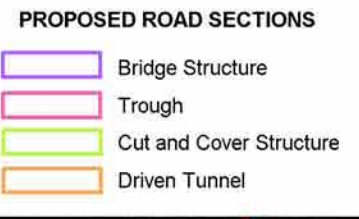
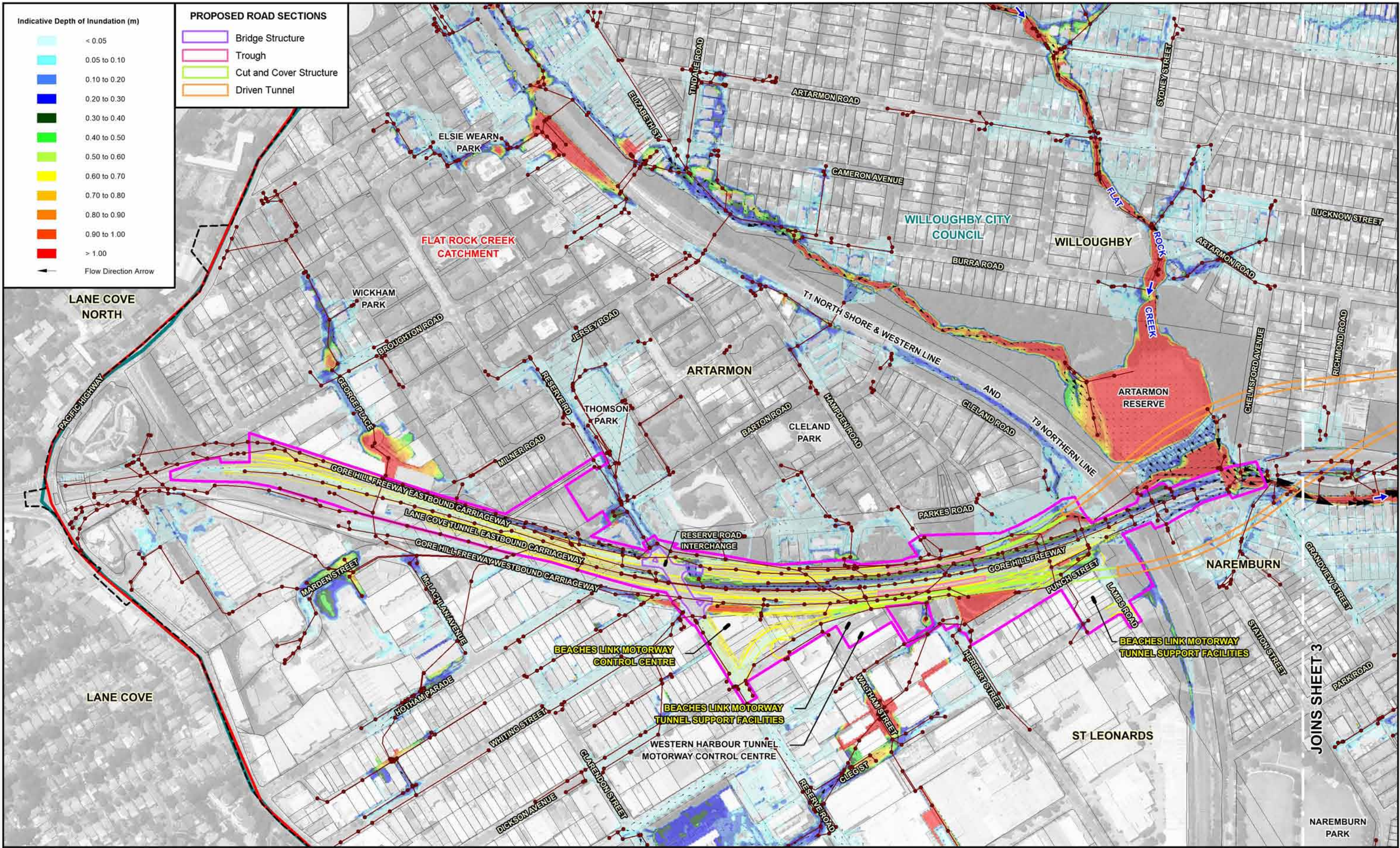


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.4  
(Sheet 3 of 5)  
FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.2% AEP EVENT



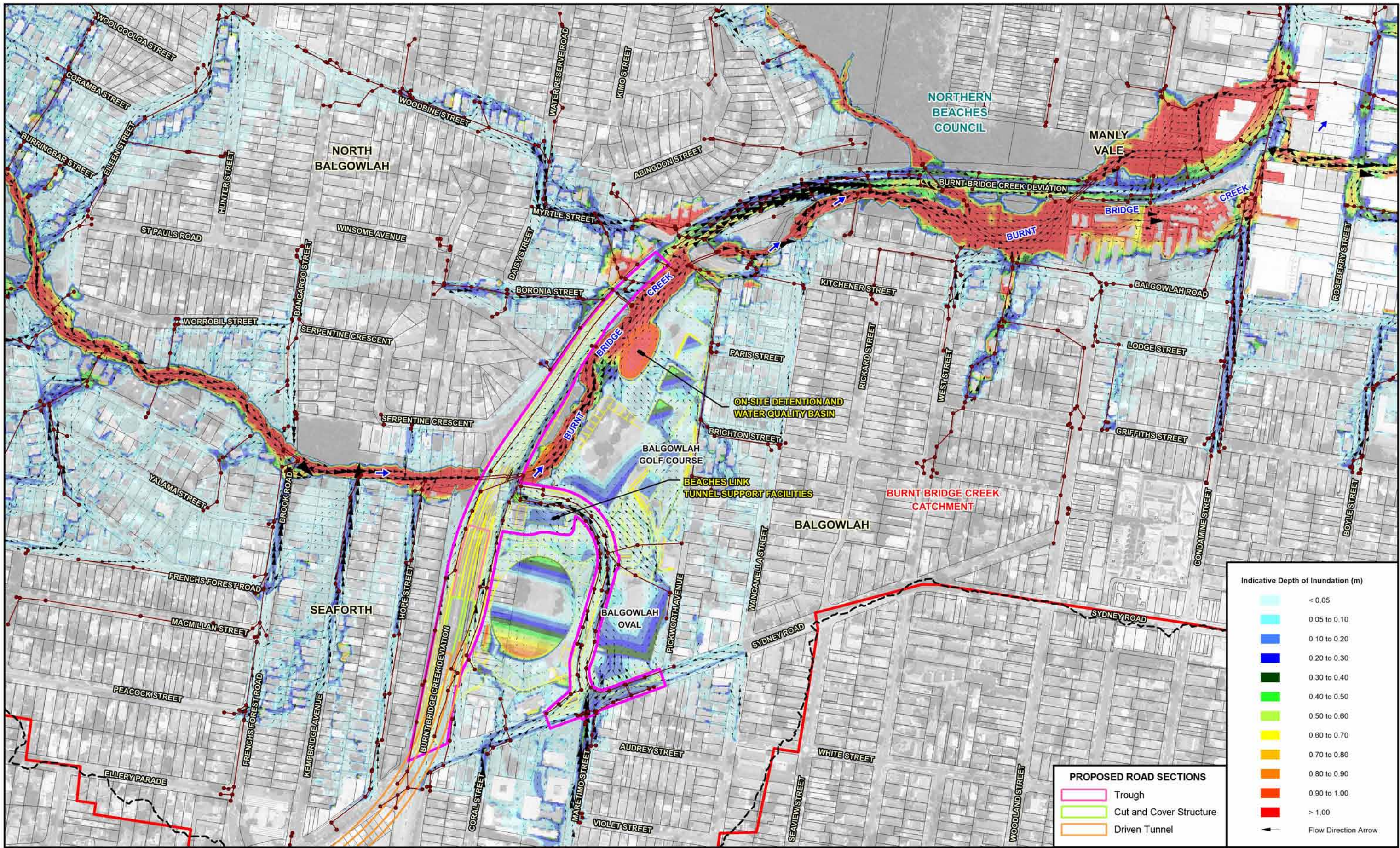


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.4 (Sheet 4 of 5)  
FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.2% AEP EVENT







**Indicative Depth of Inundation (m)**

Lightest Blue	< 0.05
Light Blue	0.05 to 0.10
Medium Blue	0.10 to 0.20
Dark Blue	0.20 to 0.30
Dark Green	0.30 to 0.40
Green	0.40 to 0.50
Light Green	0.50 to 0.60
Yellow-Green	0.60 to 0.70
Yellow	0.70 to 0.80
Orange	0.80 to 0.90
Red-Orange	0.90 to 1.00
Red	> 1.00

Flow Direction Arrow

**PROPOSED ROAD SECTIONS**

Pink line	Trough
Light Green line	Cut and Cover Structure
Orange line	Driven Tunnel

**LEGEND**

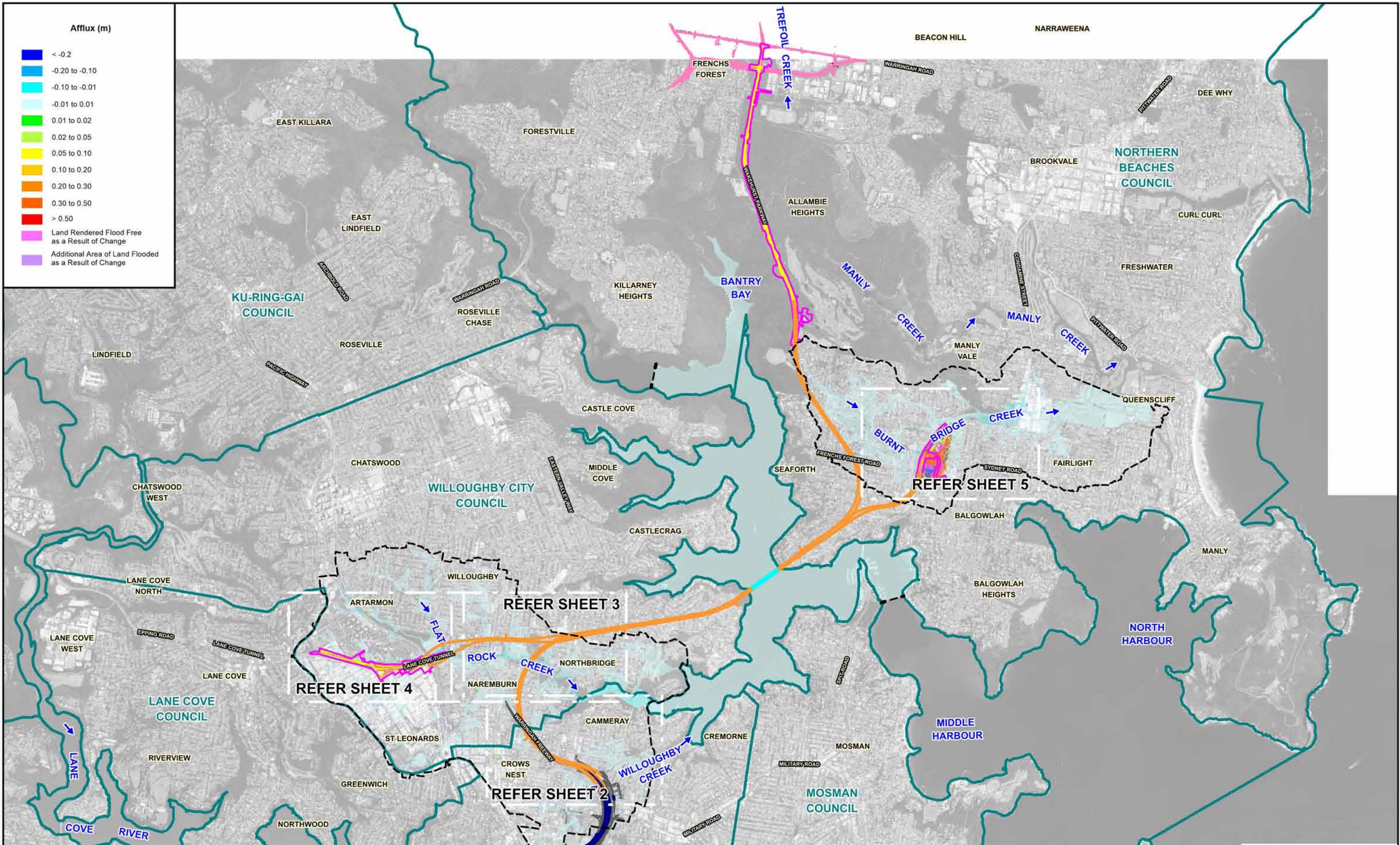
Black dashed line	Limit of Main Stream Flooding and Major Overland Flow Mapping
Red line with dots	Modelled Drainage System
Blue line	LGA Boundary
Red line	Catchment Boundary
Pink line	Project Surface Road Works Footprint
Yellow and blue shaded area	Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.4  
(Sheet 5 of 5)

FLOODING PATTERNS UNDER OPERATIONAL CONDITIONS  
0.2% AEP EVENT





400 0 400 800 1200 m  
Scale: 1:40,000

- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - - - Limit of Estuarine Flood Mapping
  - LGA Boundary
  - Project Surface Road Works Footprint
  - Driven Tunnel

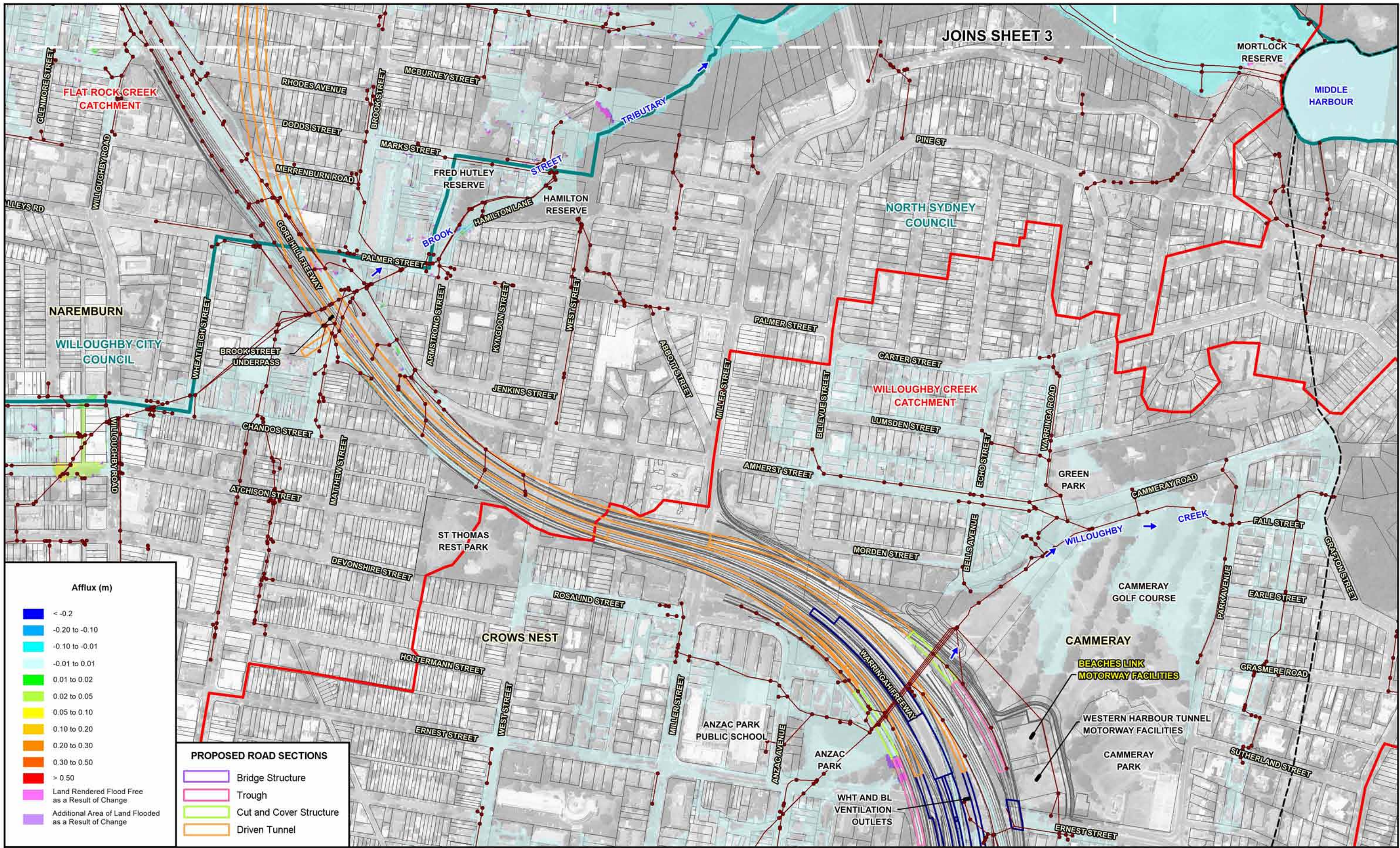
- Proposed BL & GHFC Surface Works
- Northern Beaches Hospital Surface Road Works
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.5  
(Sheet 1 of 5)

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.5% AEP EVENT





JOINS SHEET 3

MORTLOCK RESERVE  
MIDDLE HARBOUR

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

WILLOUGHBY CREEK

CAMMERAY

BEACHES LINK MOTORWAY FACILITIES

WESTERN HARBOUR TUNNEL MOTORWAY FACILITIES

CAMMERAY PARK

Afflux (m)

- █ < -0.2
- █ -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
- █ > 0.50

PROPOSED ROAD SECTIONS

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

Land Rendered Flood Free as a Result of Change

Additional Area of Land Flooded as a Result of Change

LEGEND

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint

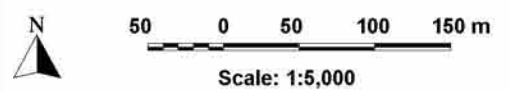


Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works  
Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

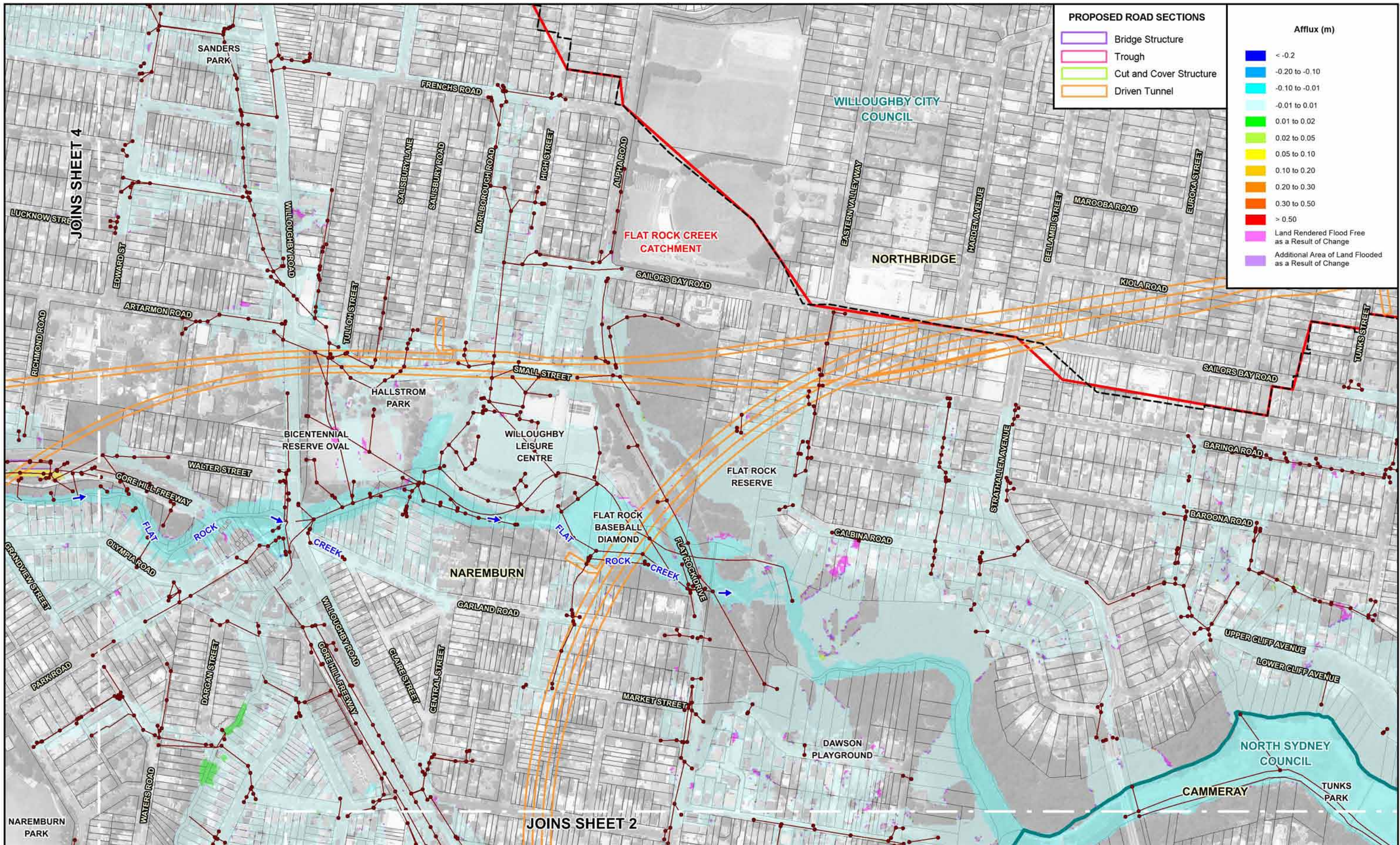
BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT

Figure B.5  
(Sheet 2 of 5)

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.5% AEP EVENT





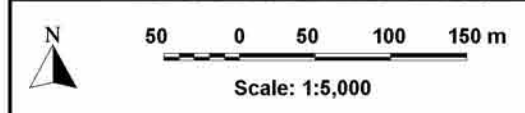


**PROPOSED ROAD SECTIONS**

- Bridge Structure
- Trough
- Cut and Cover Structure
- Driven Tunnel

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



**LEGEND**

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary

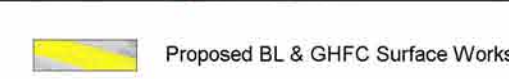
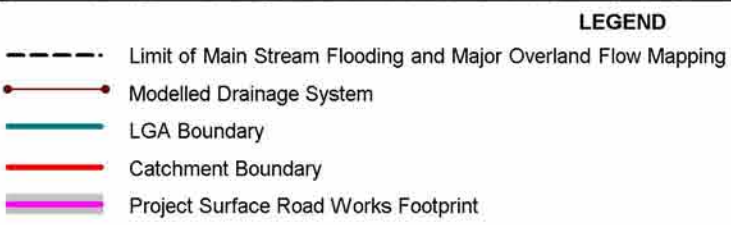
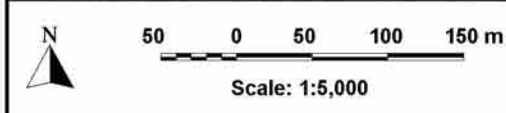
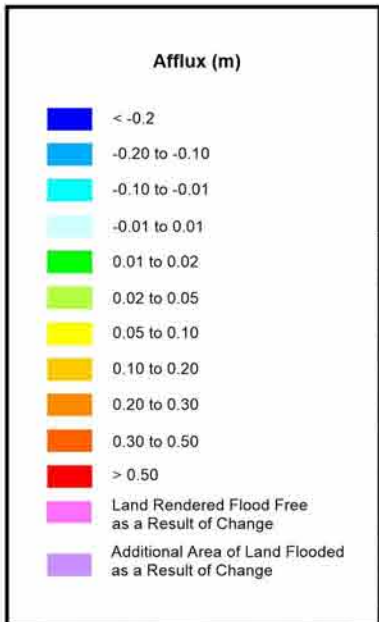
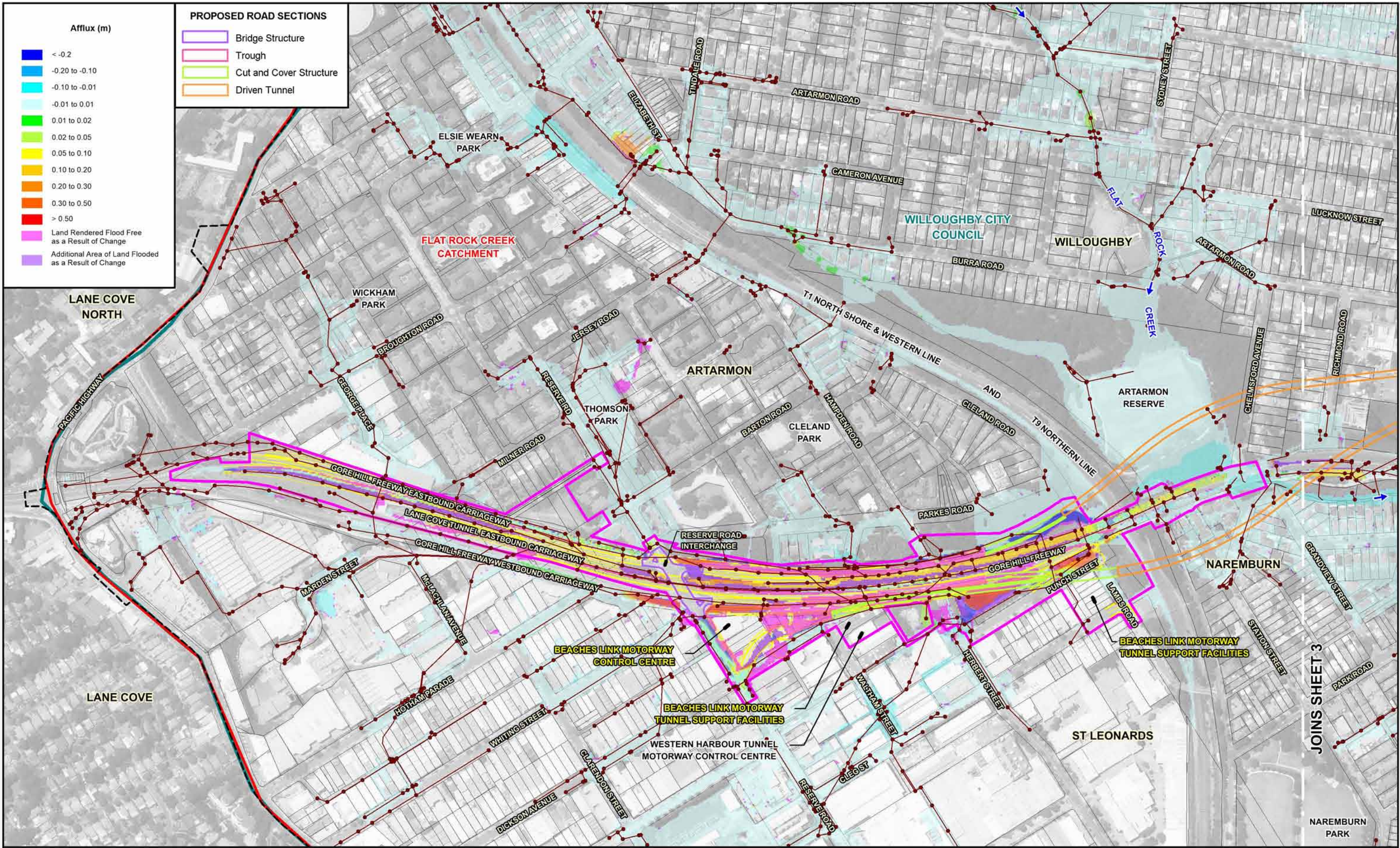
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.5  
(Sheet 3 of 5)

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.5% AEP EVENT



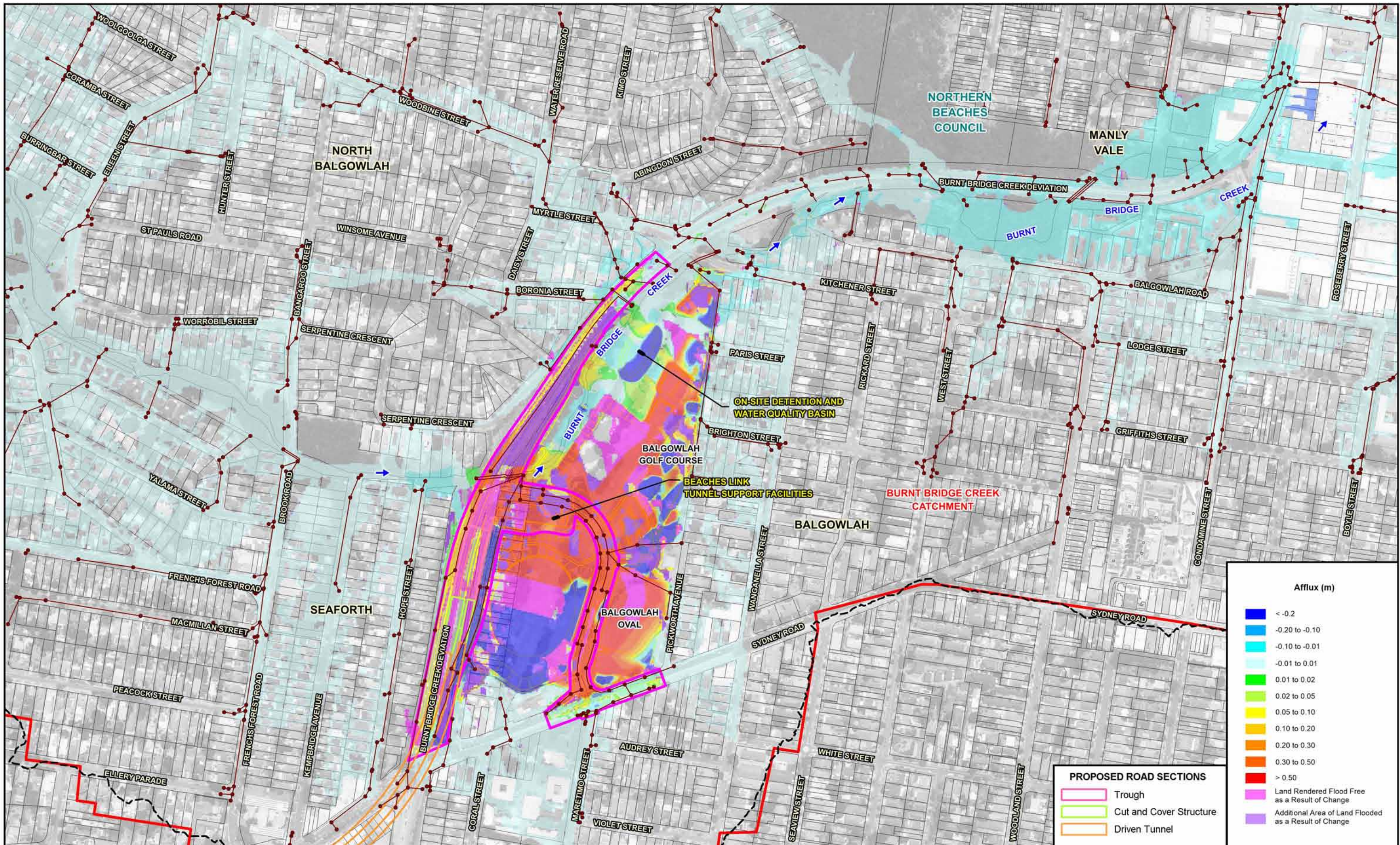




**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

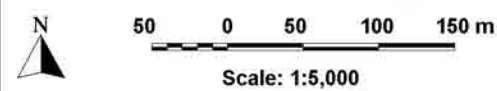
Figure B.5  
 (Sheet 4 of 5)  
 IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
 0.5% AEP EVENT





Afflux (m)	
Dark Blue	< -0.2
Light Blue	-0.20 to -0.10
Cyan	-0.10 to -0.01
White	-0.01 to 0.01
Light Green	0.01 to 0.02
Yellow-Green	0.02 to 0.05
Yellow	0.05 to 0.10
Orange	0.10 to 0.20
Red-Orange	0.20 to 0.30
Red	0.30 to 0.50
Light Purple	> 0.50
Light Purple	Land Rendered Flood Free as a Result of Change
Dark Purple	Additional Area of Land Flooded as a Result of Change

PROPOSED ROAD SECTIONS	
Blue outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel

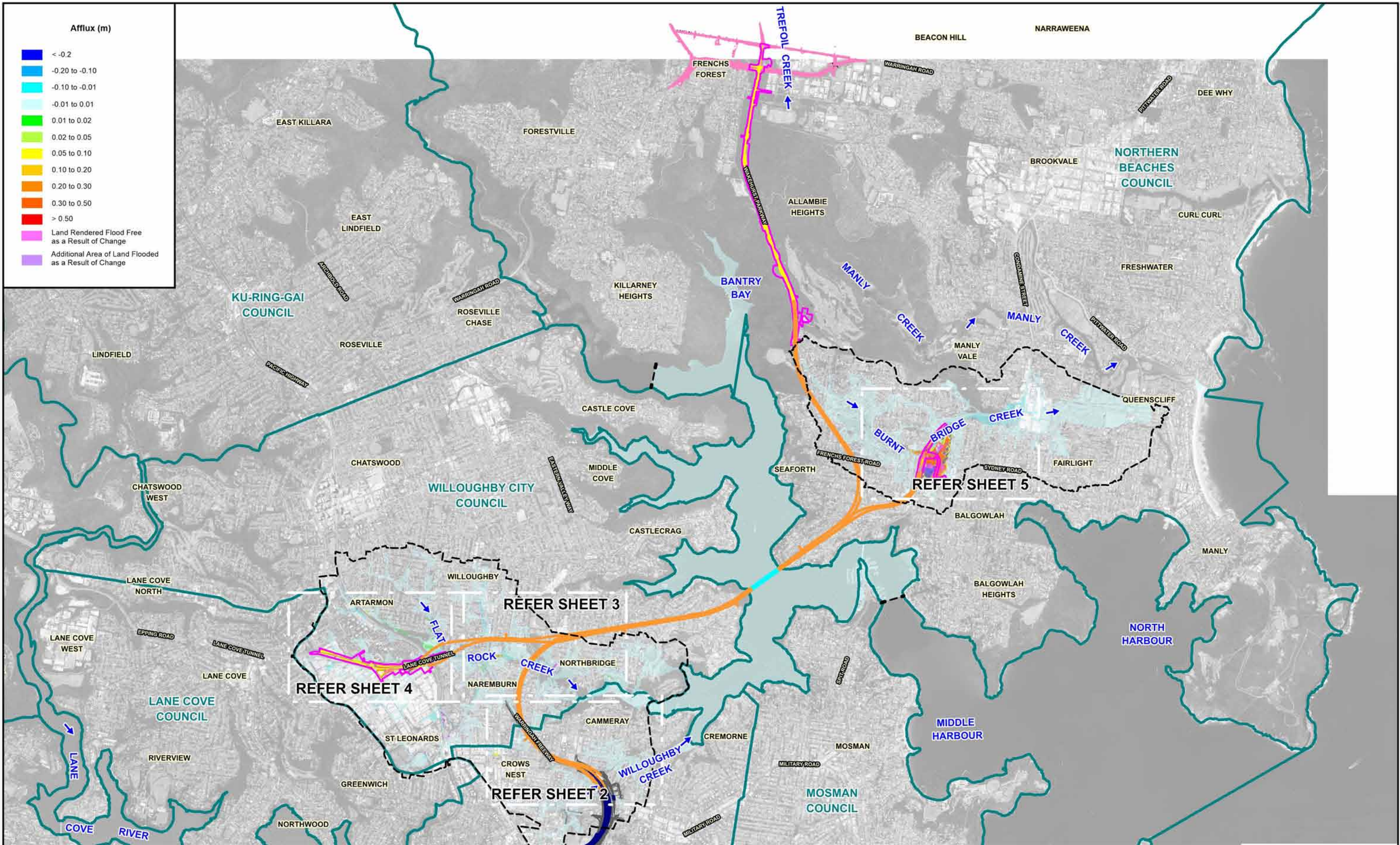


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint
  - Proposed BL & GHFC Surface Works

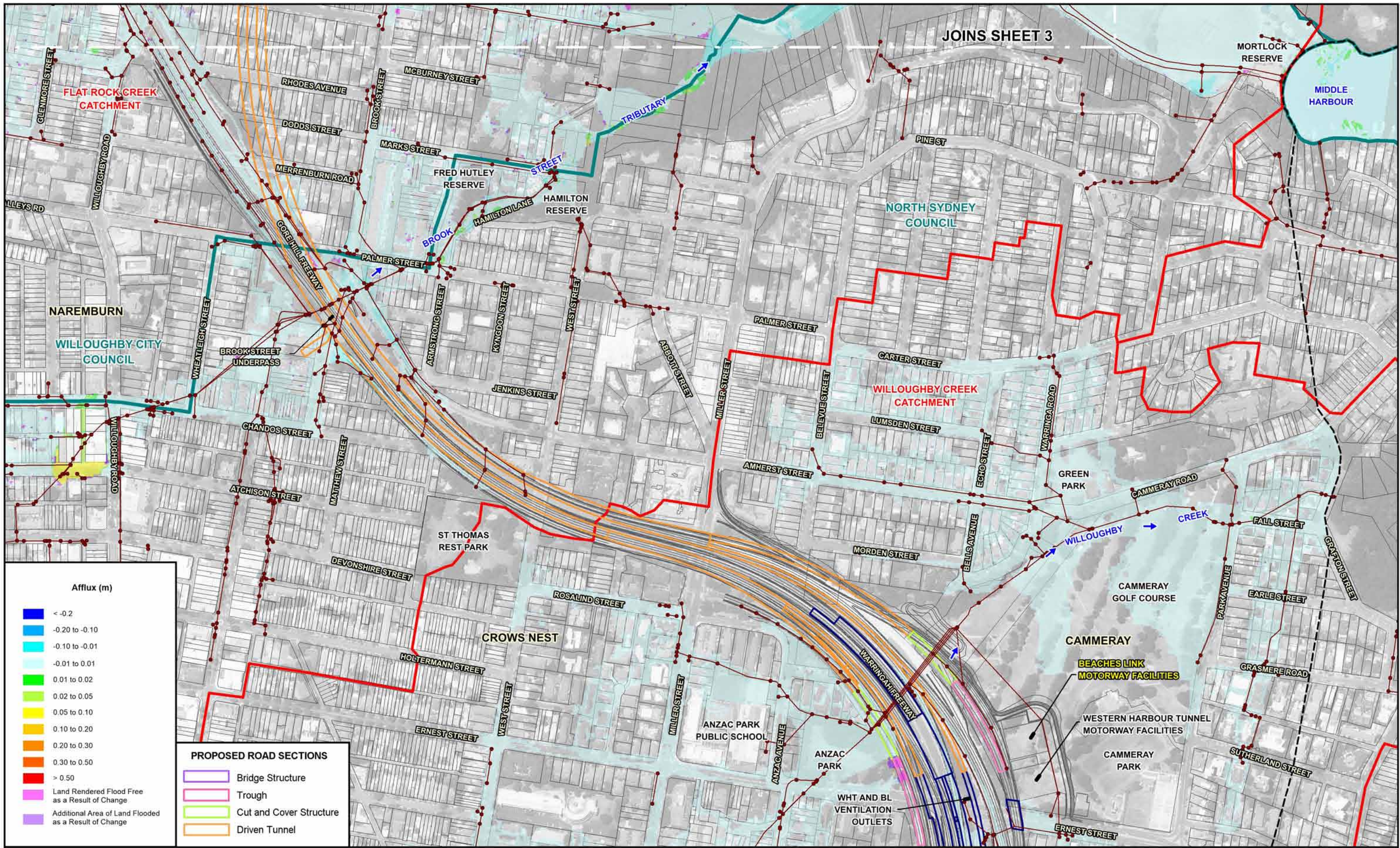
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.5  
(Sheet 5 of 5)  
IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.5% AEP EVENT





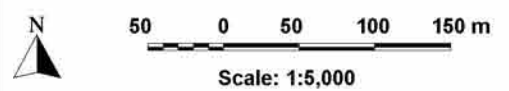




JOINS SHEET 3

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
  - > 0.50
- PROPOSED ROAD SECTIONS**
- Bridge Structure
  - Trough
  - Cut and Cover Structure
  - Driven Tunnel
- Land Rendered Flood Free as a Result of Change
  - Additional Area of Land Flooded as a Result of Change



- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint

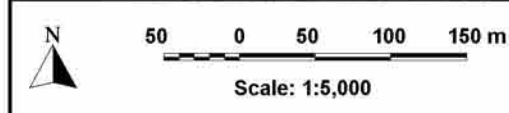
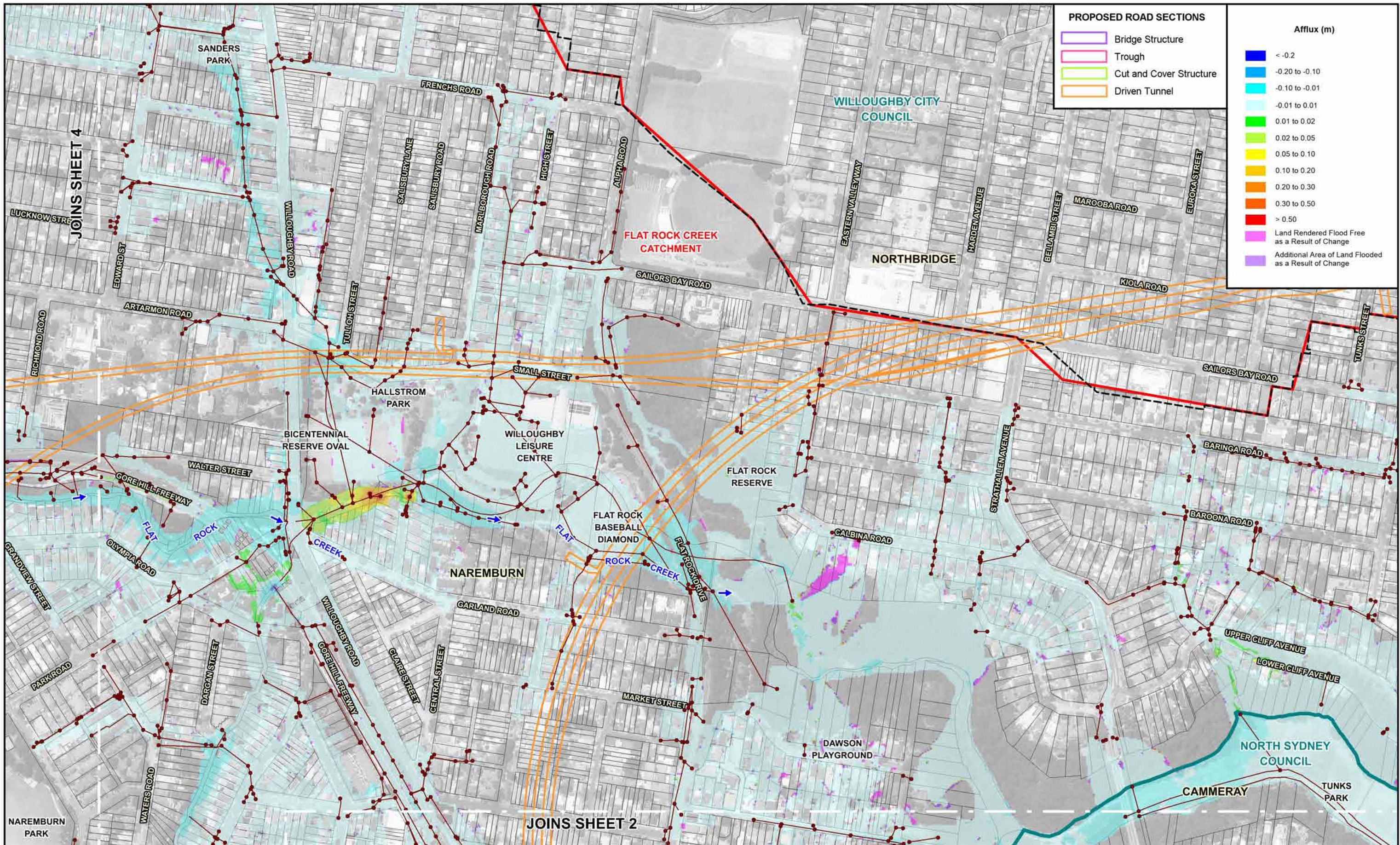
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.6  
(Sheet 2 of 5)

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.2% AEP EVENT



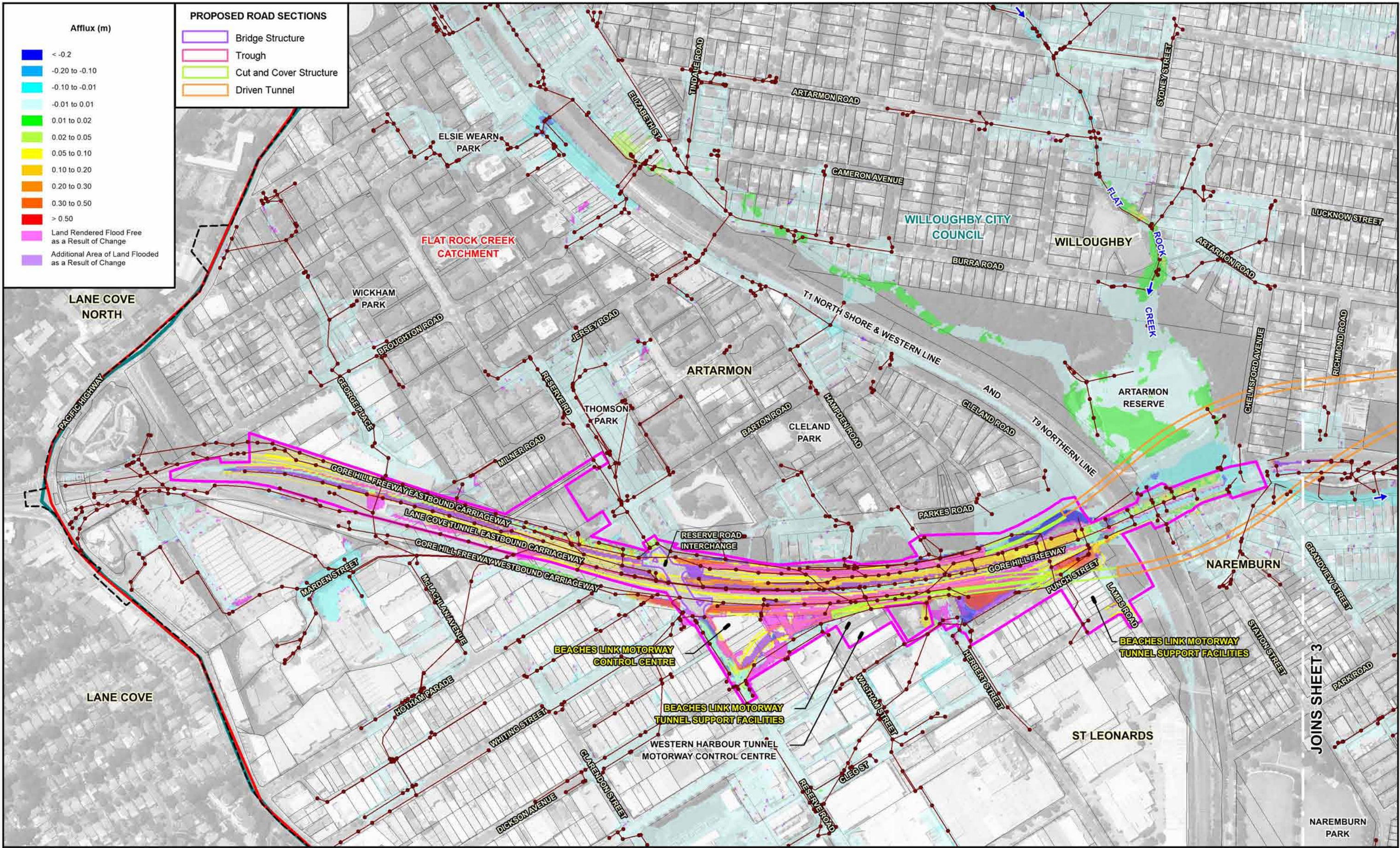


- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.6  
(Sheet 3 of 5)  
IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.2% AEP EVENT



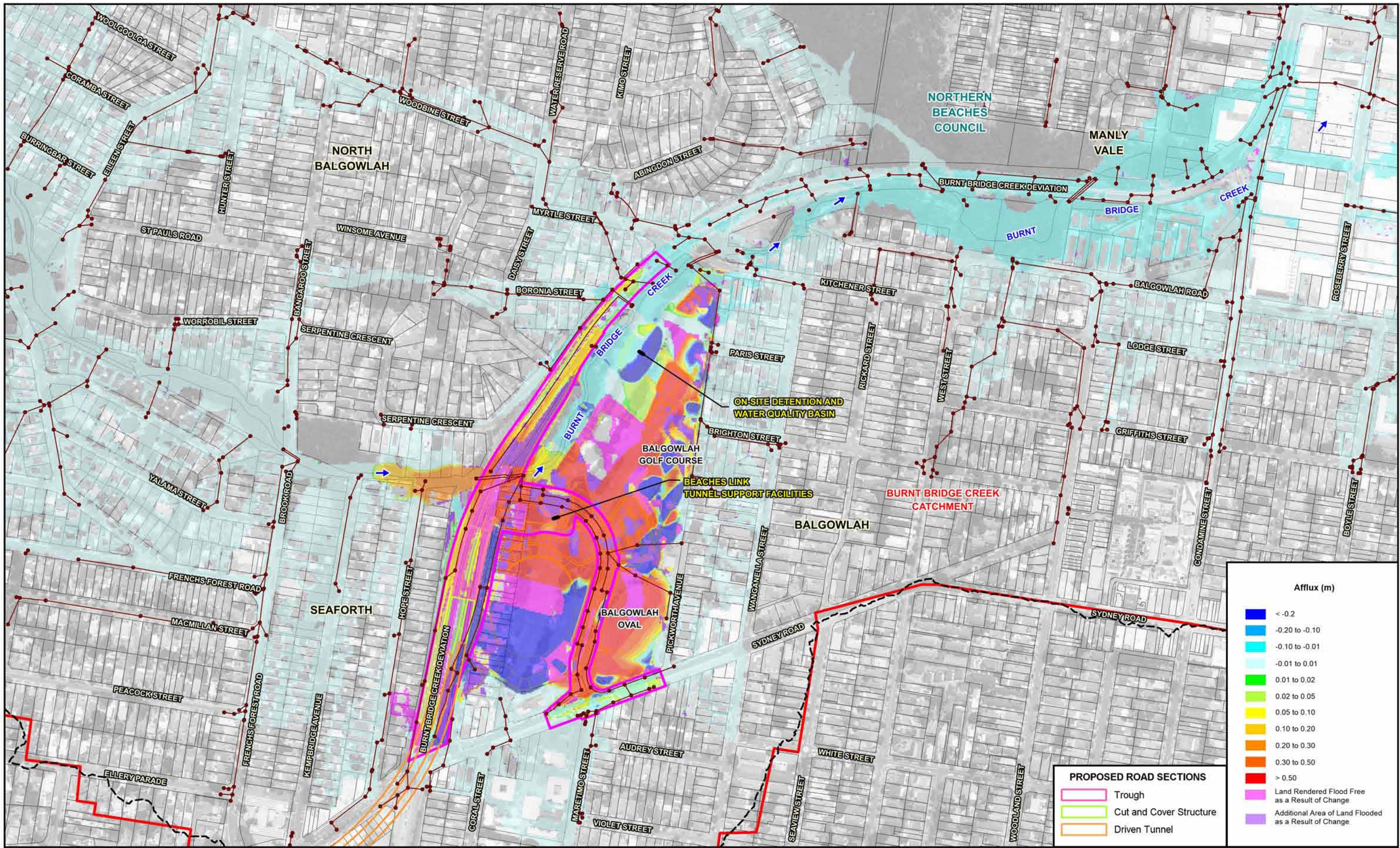


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.6  
(Sheet 4 of 5)

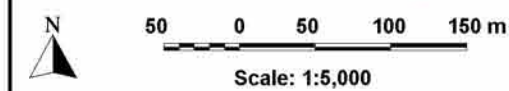
IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR  
0.2% AEP EVENT





Afflux (m)	
Blue	< -0.2
Light Blue	-0.20 to -0.10
Light Cyan	-0.10 to -0.01
White	-0.01 to 0.01
Light Green	0.01 to 0.02
Yellow-Green	0.02 to 0.05
Yellow	0.05 to 0.10
Orange	0.10 to 0.20
Red-Orange	0.20 to 0.30
Red	0.30 to 0.50
Dark Red	> 0.50
Pink	Land Rendered Flood Free as a Result of Change
Purple	Additional Area of Land Flooded as a Result of Change

PROPOSED ROAD SECTIONS	
Blue outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel



- LEGEND**
- Limit of Main Stream Flooding and Major Overland Flow Mapping
  - Modelled Drainage System
  - LGA Boundary
  - Catchment Boundary
  - Project Surface Road Works Footprint

Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure B.6 (Sheet 5 of 5)

IMPACT OF PROJECT OPERATION ON FLOOD BEHAVIOUR 0.2% AEP EVENT

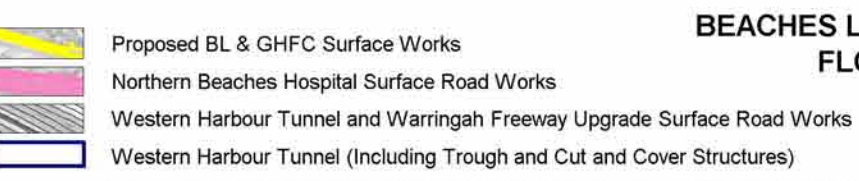
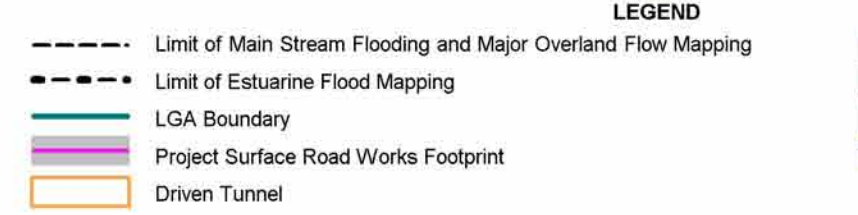
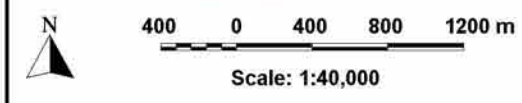
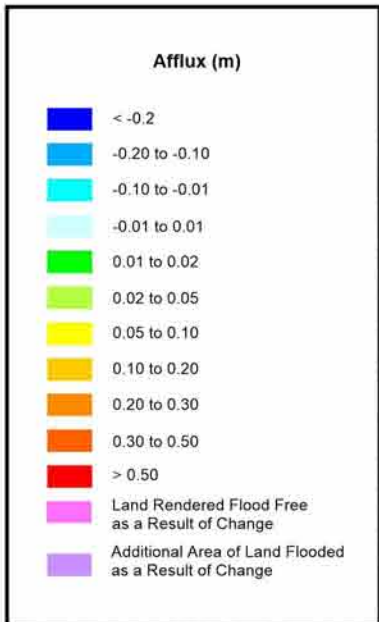
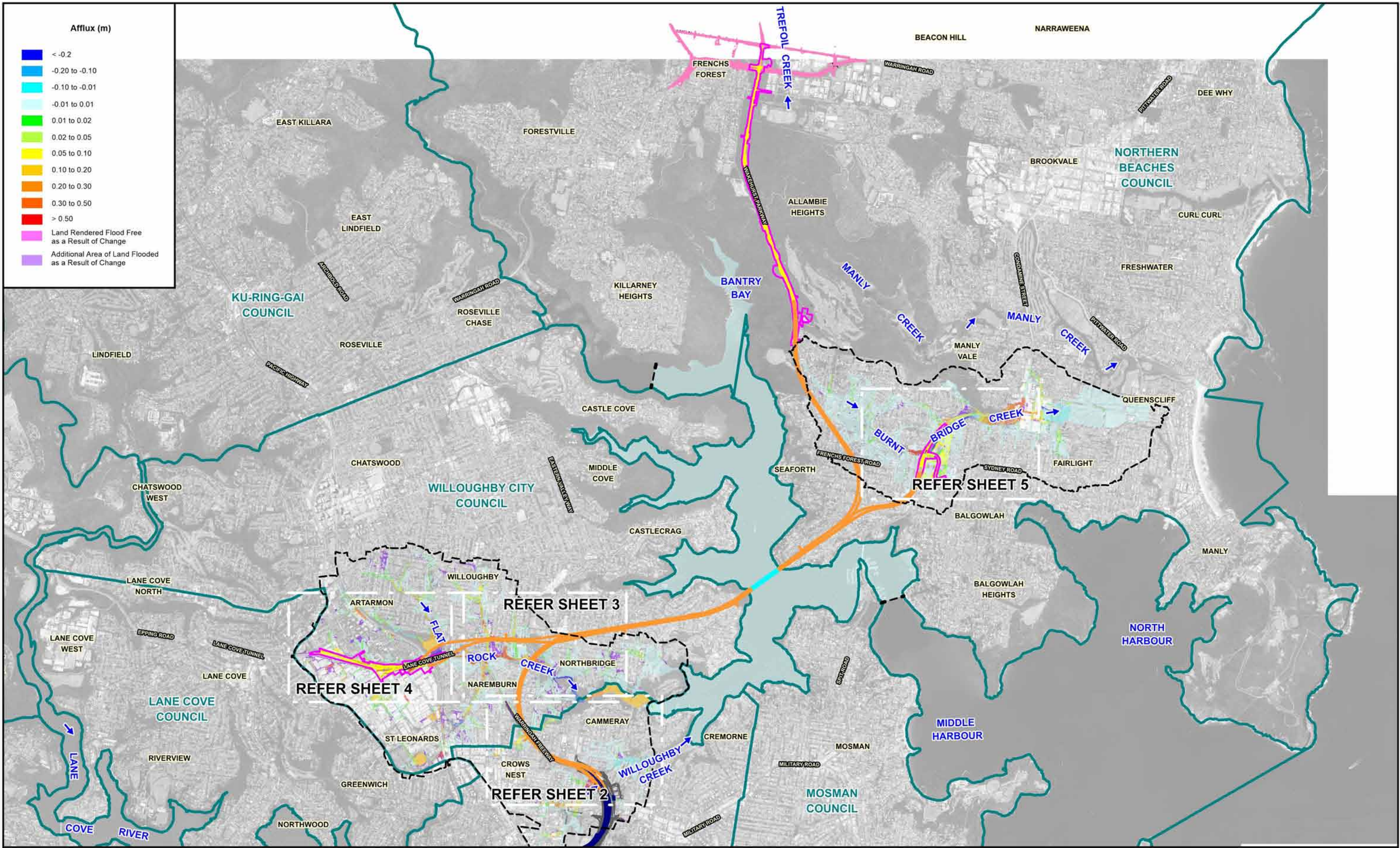




### **Annexure C**

**Figures showing impact of a partial blockage of the local stormwater drainage system on flood behaviour – 1% AEP**



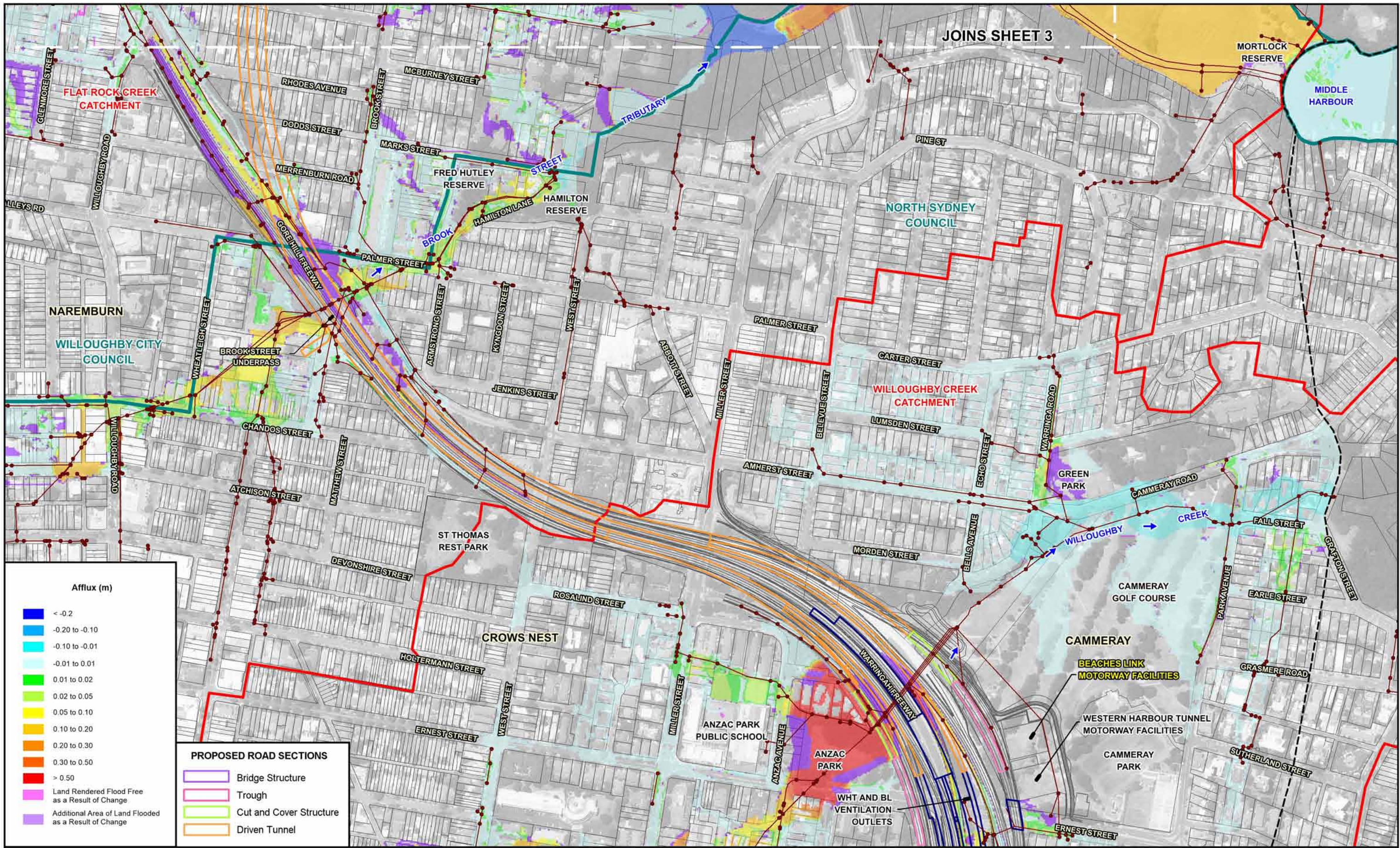


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure C.1  
(Sheet 1 of 5)

IMPACT OF PARTIAL BLOCKAGE OF THE LOCAL STORMWATER DRAINAGE SYSTEM ON FLOOD BEHAVIOUR  
1% AEP EVENT





JOINS SHEET 3

MORTLOCK RESERVE  
MIDDLE HARBOUR

NORTH SYDNEY COUNCIL

NAREMBURN  
WILLOUGHBY CITY COUNCIL

WILLOUGHBY CREEK CATCHMENT

CAMMERAY  
BEACHES LINK MOTORWAY FACILITIES

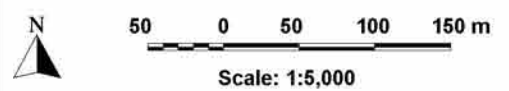
CROWS NEST

WESTERN HARBOUR TUNNEL MOTORWAY FACILITIES  
CAMMERAY PARK

ANZAC PARK PUBLIC SCHOOL  
ANZAC PARK

Afflux (m)

- < -0.2
  - -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
  - > 0.50
- PROPOSED ROAD SECTIONS**
- Bridge Structure
  - Trough
  - Cut and Cover Structure
  - Driven Tunnel
- Land Rendered Flood Free as a Result of Change
- Additional Area of Land Flooded as a Result of Change



**Lyall & Associates**

LEGEND

- Limit of Main Stream Flooding and Major Overland Flow Mapping
- Modelled Drainage System
- LGA Boundary
- Catchment Boundary
- Project Surface Road Works Footprint

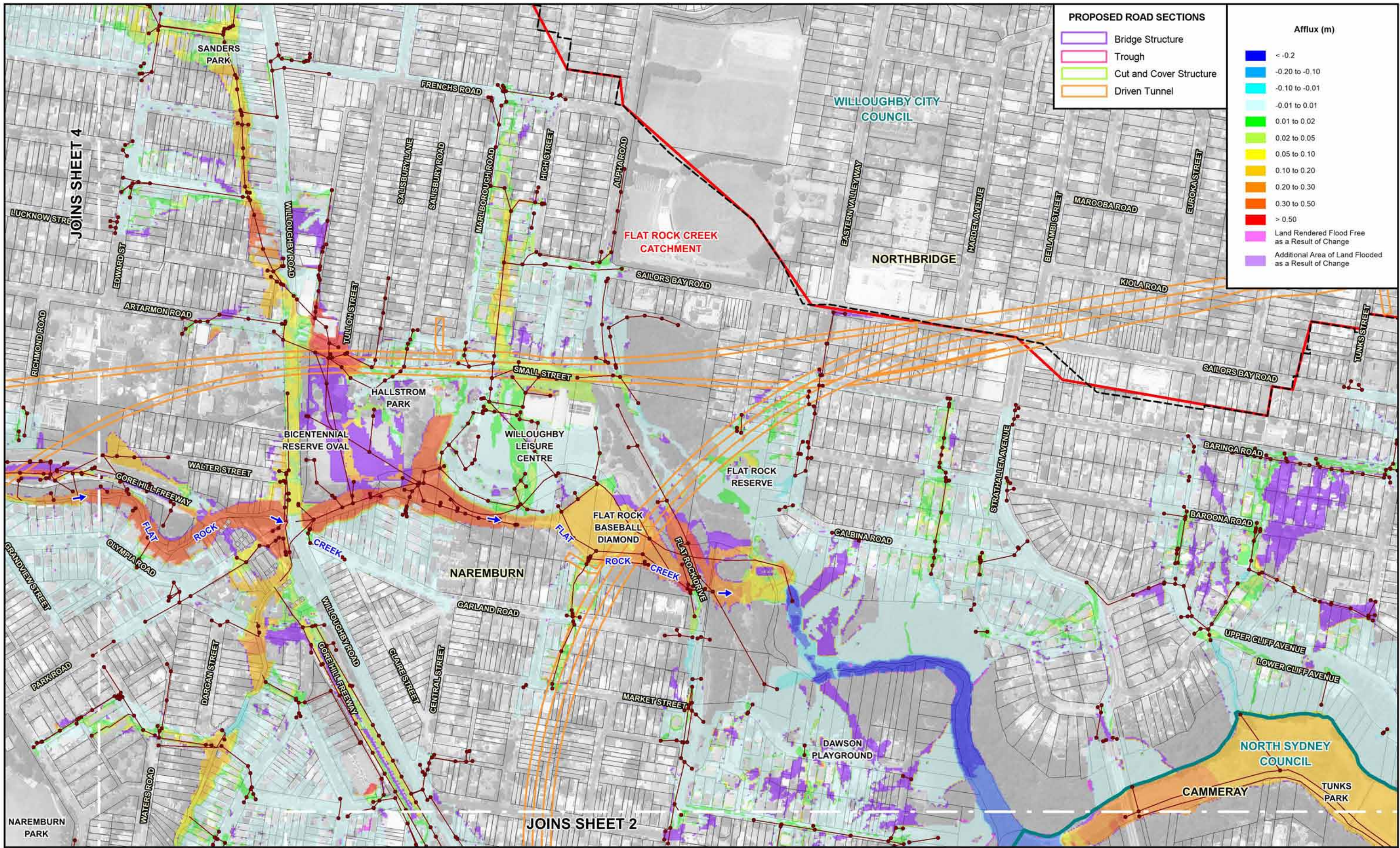
- Western Harbour Tunnel and Warringah Freeway Upgrade Surface Road Works
- Western Harbour Tunnel (Including Trough and Cut and Cover Structures)

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure C.1  
(Sheet 2 of 5)

IMPACT OF PARTIAL BLOCKAGE OF THE LOCAL STORMWATER DRAINAGE SYSTEM ON FLOOD BEHAVIOUR  
1% AEP EVENT

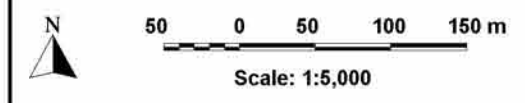




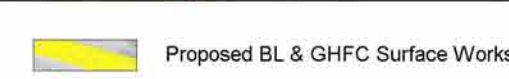
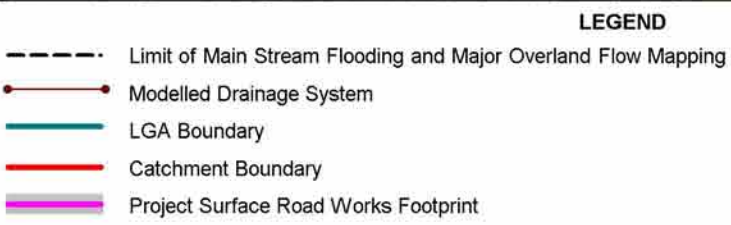
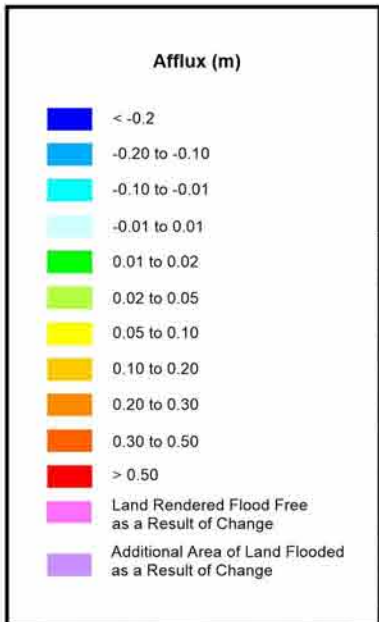
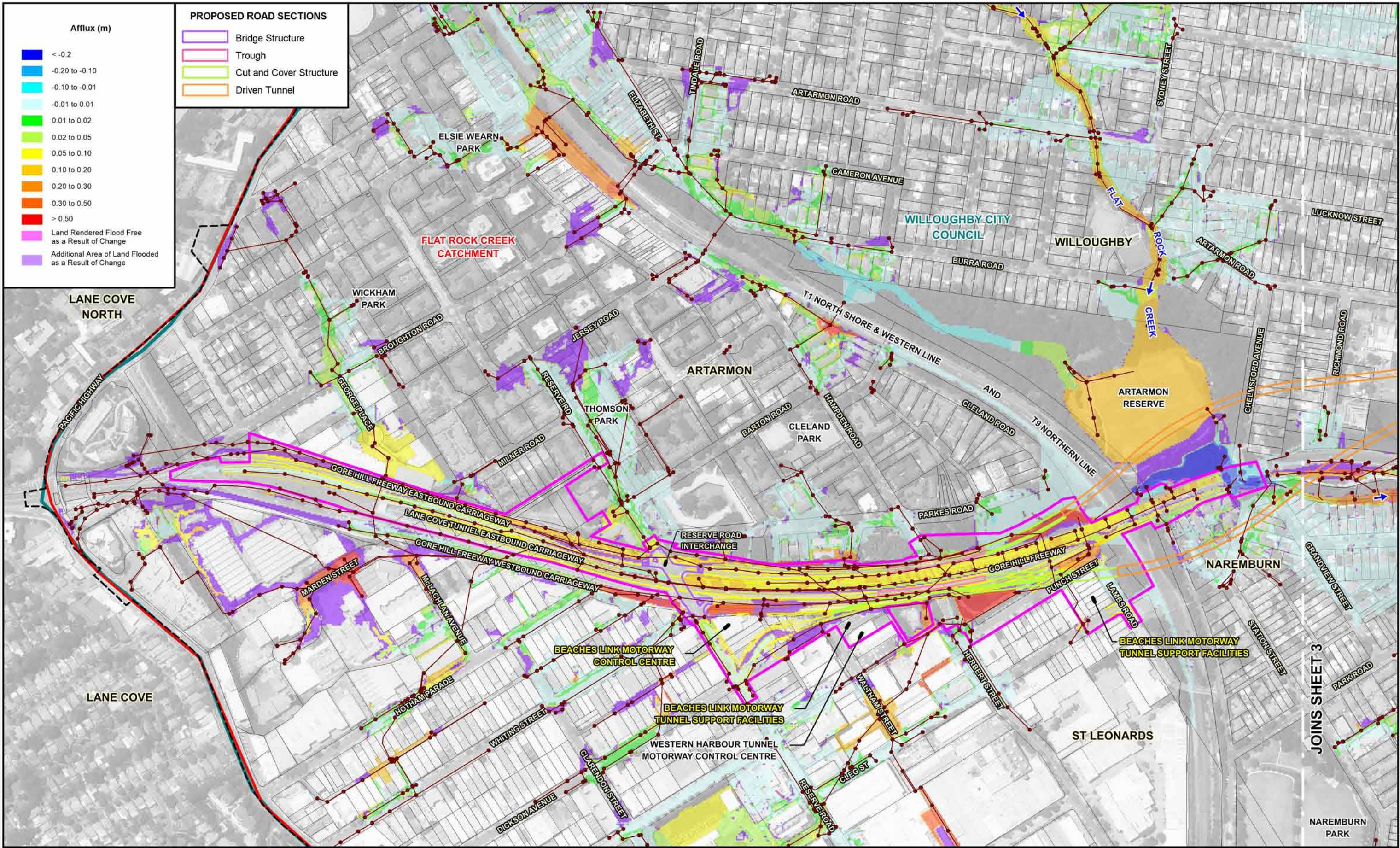
**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure C.1  
(Sheet 3 of 5)

IMPACT OF PARTIAL BLOCKAGE OF THE LOCAL STORMWATER DRAINAGE SYSTEM ON FLOOD BEHAVIOUR  
1% AEP EVENT





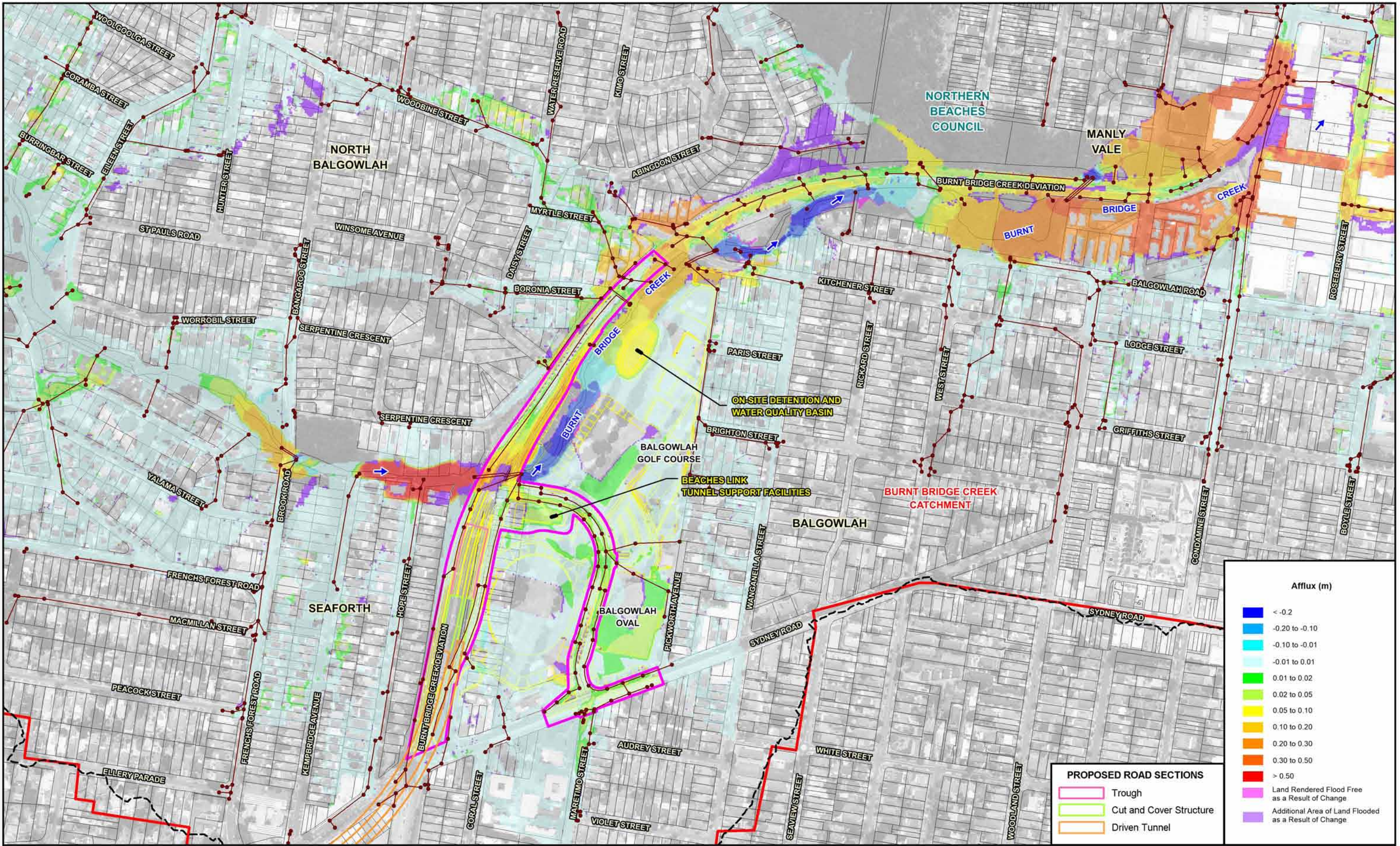


**BEACHES LINK AND GORE HILL FREEWAY CONNECTION FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure C.1  
(Sheet 4 of 5)

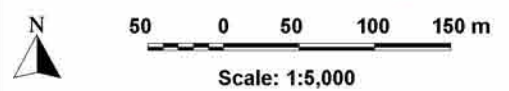
IMPACT OF PARTIAL BLOCKAGE OF THE LOCAL STORMWATER DRAINAGE SYSTEM ON FLOOD BEHAVIOUR  
1% AEP EVENT





Afflux (m)	
Blue	<math>< -0.2</math>
Light Blue	<math>-0.20 \text{ to } -0.10</math>
Light Cyan	<math>-0.10 \text{ to } -0.01</math>
White	<math>-0.01 \text{ to } 0.01</math>
Light Green	<math>0.01 \text{ to } 0.02</math>
Yellow-Green	<math>0.02 \text{ to } 0.05</math>
Yellow	<math>0.05 \text{ to } 0.10</math>
Orange	<math>0.10 \text{ to } 0.20</math>
Dark Orange	<math>0.20 \text{ to } 0.30</math>
Red-Orange	<math>0.30 \text{ to } 0.50</math>
Red	> 0.50
Pink	Land Rendered Flood Free as a Result of Change
Purple	Additional Area of Land Flooded as a Result of Change

PROPOSED ROAD SECTIONS	
Pink outline	Trough
Green outline	Cut and Cover Structure
Orange outline	Driven Tunnel



LEGEND	
Black dashed line	Limit of Main Stream Flooding and Major Overland Flow Mapping
Red line with dots	Modelled Drainage System
Blue line	LGA Boundary
Red line	Catchment Boundary
Pink outline	Project Surface Road Works Footprint
Yellow area	Proposed BL & GHFC Surface Works

**BEACHES LINK AND GORE HILL FREEWAY CONNECTION  
FLOODING AND DRAINAGE TECHNICAL REPORT**

Figure C.1  
(Sheet 5 of 5)

IMPACT OF PARTIAL BLOCKAGE OF THE LOCAL STORMWATER DRAINAGE SYSTEM ON FLOOD BEHAVIOUR  
1% AEP EVENT