Murwillumbah CBD Levee & Drainage Study

Final Report

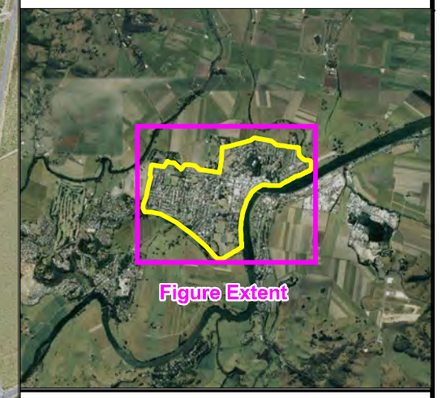
Volume 2 of 2: Figures

Revision 2
June 2018

Catchment Simulation Solutions

FIGURES

TWEED SHIRE COUNCIL



LEGEND

- Murwillumbah CBD Levee Study Area
- Levee 1 - Commerical Road
- Levee 2 - East Murwillumbah
- Levee 3 - Dorothy Street

Notes:

Aerial photograph date: 2015

N
W E
S

0 0.25 0.5
Km

Figure 1: Murwillumbah CBD Study Area

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

File Name: Fig1 - Murwillumbah CBD Levee Study Area.wor

Rous River

Mayal Creek

Murwillumbah Showground

Murwillumbah Sewage Treatment Plant

Murwillumbah District Hospital

Murwillumbah

Tweed River

Knox Park

South Murwillumbah

Murwillumbah High School

TWEED SHIRE COUNCIL

LEGEND

- Stormwater Pit from GIS
- Stormwater Pipe from GIS
- Stormwater Pit from Plans
- Stormwater Pipe from Plans

Levee Plans

- Levee 1 - Commercial Road
- Levee 2 - East Murwillumbah
- Levee 3 - Dorothy Street

Tweed Valley Flood Study 1% AEP Water Depths (m)

- < = 0.2
- 0.2 to 0.5
- 0.5 to 1.0
- 1.0 to 2.0
- 2.0 to 3.0
- > = 3.0

Notes:

Aerial photograph date: 2015

N W E S

0 0.25 0.5 Km

Figure 2: Extent of Available Information

Prepared By:

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

File Name: Fig2 - Extent of Available Information.wor

TWEED SHIRE COUNCIL

Rous River
Mayal Creek
George St
Ewing St
Murwillumbah Showground
Murwillumbah Sewage Treatment Plant
Murwillumbah District Hospital
Murwillumbah St
Murwillumbah
Barnby St
Dorothy St
Tumbulgum Rd
Murwillumbah St
Wollumbin St
Tweed River
William St
Nullum St
Knox Park
Byangum Rd
Condong St
South Murwillumbah
Tweed Valley Way
Murwillumbah High School

LEGEND

DEM (mAHD)

<= 0	10
1	20
2	30
3	40
4	>= 50
5	

Notes:

Aerial photograph date: 2015

N
W E
S

0 0.25 0.5
Km

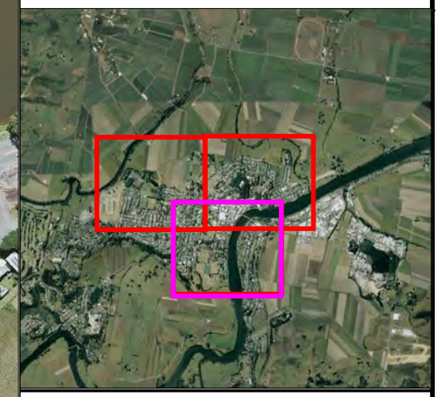
Figure 3: Digital Elevation Model

Prepared By:

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

File Name: Fig3 - Digital Elevation Model.wor

TWEED SHIRE COUNCIL



LEGEND

- Levee Alignment
- Levee Crest Elevation (mAHD)
- Culvert
- Stormwater Pit
- Pump Station
- Flood Gate

Pipe Diameter (m)

- <= 0.3
- 0.375
- 0.45
- 0.525
- 0.6
- >= 0.675

Notes:

Aerial photograph date: 2015

N W E S

0 0.15 0.3 Km

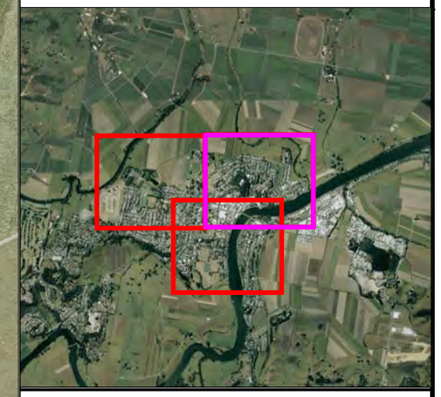
Figure 4.1: Commercial Road Levee and Drainage System

Prepared By:

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

File Name: Fig4.1 - Details of Existing Levee and Drainage System.wor

TWEED SHIRE COUNCIL



LEGEND

- Levee Alignment
- Levee Crest Elevation (mAHD)
- Culvert
- Stormwater Pit
- Pump Station
- Flood Gate

Pipe Diameter (m)

- <= 0.3
- 0.375
- 0.45
- 0.525
- 0.6
- >= 0.675

Notes:

Aerial photograph date: 2015

N W E S

0 0.15 0.3 Km

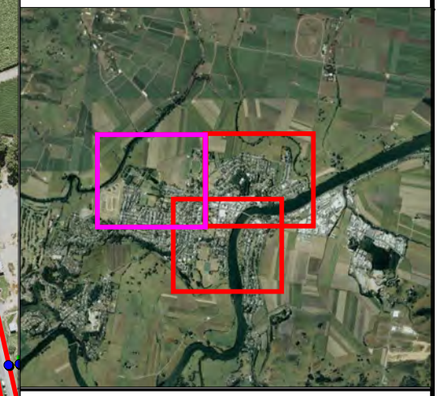
Figure 4.2: East Murwillumbah Levee and Drainage System

Prepared By:

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

File Name: Fig4.2 - Details of Existing Levee and Drainage System.wor

TWEED SHIRE COUNCIL



3.6m x 2.1m Box Culvert

Levee Crest Elevation of 4.9 mAHD

Murwillumbah St

Barnby St

Dorothy St

William St

Nullum St

LEGEND

- Levee Alignment
- Levee Crest Elevation (mAHD)
- Culvert
- Stormwater Pit
- Pump Station
- Flood Gate

Pipe Diameter (m)

- <= 0.3
- 0.375
- 0.45
- 0.525
- 0.6
- >= 0.675

Notes:

Aerial photograph date: 2015

N W E S

0 75 150

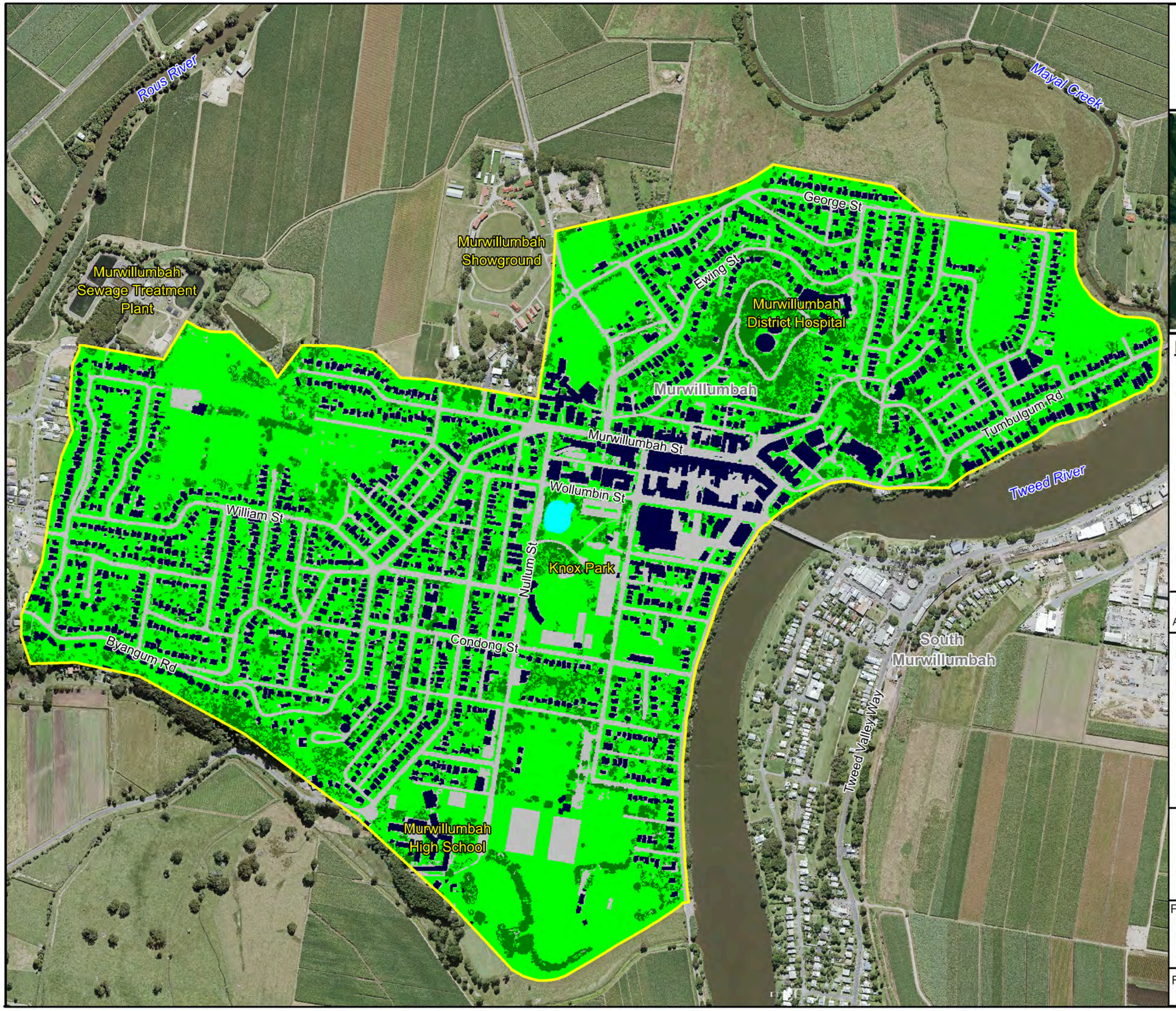
m

Figure 4.3: Dorothy Street Levee and Drainage System

Prepared By:

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

File Name: Fig4.3 - Details of Existing Levee and Drainage System.wor



TWEED SHIRE COUNCIL

LEGEND

Material

- Building
- Water
- Trees
- Grass
- Impervious

Notes:

Aerial photograph date: 2015

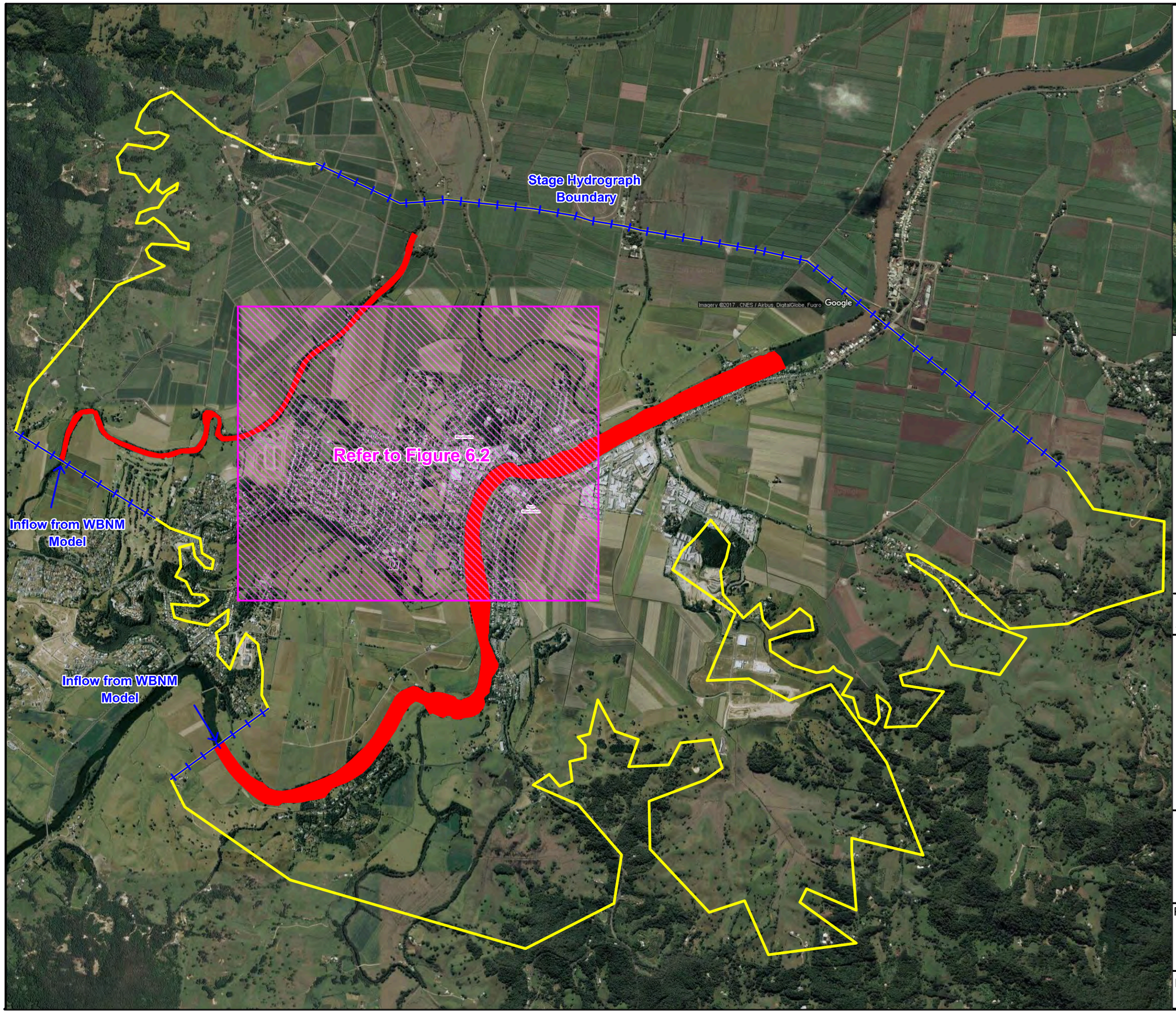
N
W E
S

0 0.25 0.5
Km

Figure 5: Remote Sensing Land Use Map

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

File Name: Fig5 - Remote Sensing Land Use Map.wor



TWEED SHIRE COUNCIL

LEGEND

- 2D Domain
- 1D Domain
- Boundary Condition

Notes:

Aerial photograph date: 2015

N
W E
S

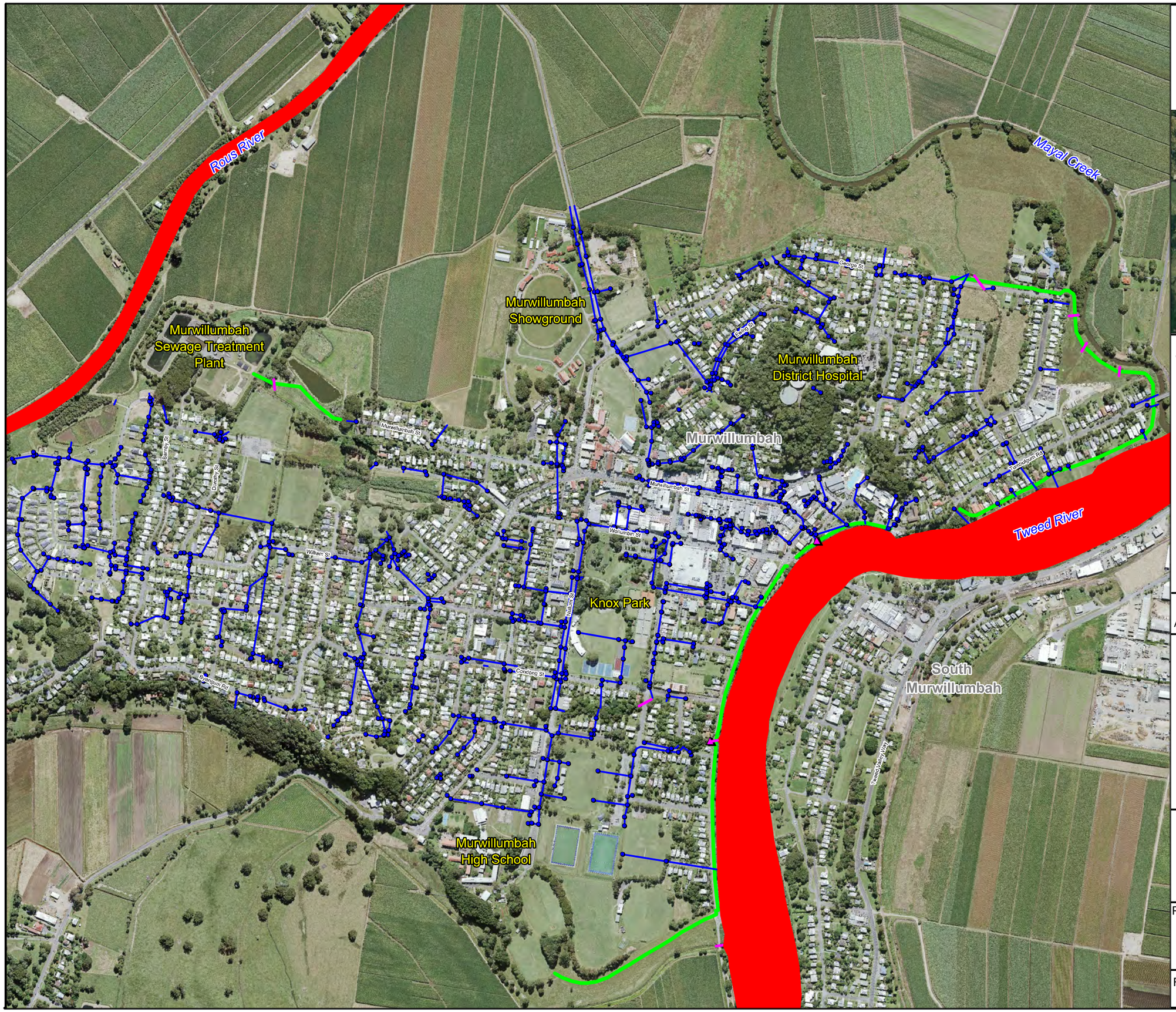
0 1.0 2.0
Km

Figure 6.1: TUFLOW Model Layout

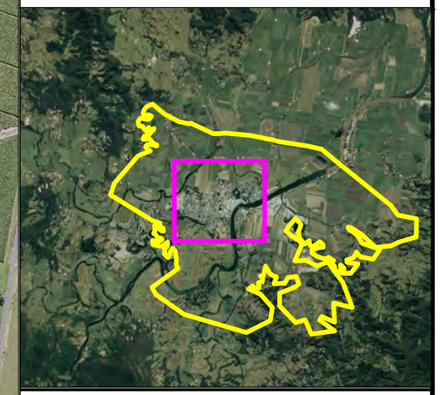
Prepared By:

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

File Name: Fig6.1 - TUFLOW Model Layout.wor



TWEED SHIRE COUNCIL



LEGEND

- 1D Domain
- Bridge
- Culvert
- Stormwater Pipe
- Stormwater Pit
- Stormwater Pump
- Levee Z Shape

Notes:

Aerial photograph date: 2015

N W E S

0 1.0 2.0

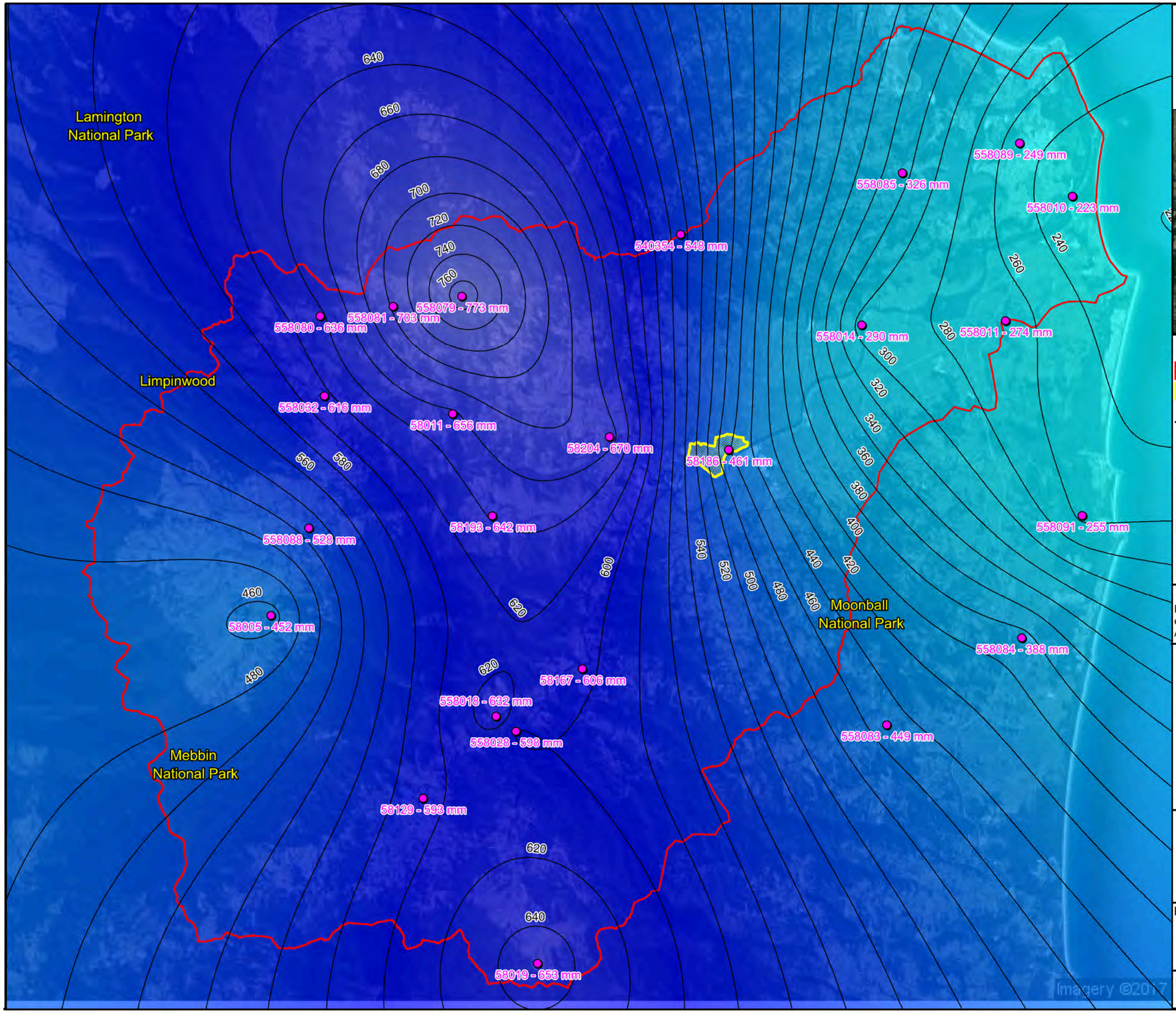
Km

Figure 6.2: TUFLOW Model Layout

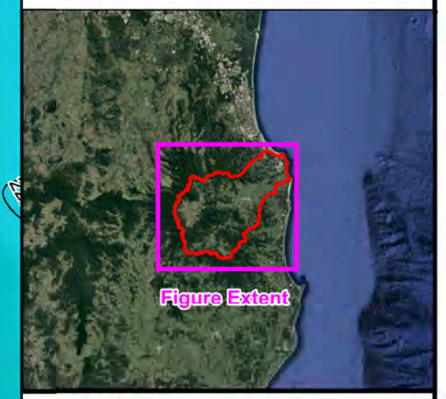
Prepared By:

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

File Name: Fig6.2 - TUFLOW Model Layout.wor



TWEED SHIRE COUNCIL



LEGEND

- Catchment Boundary
- Study Area
- Gauge Number - Rainfall (mm)
- Rainfall Isohyet (mm)

Rainfall Depth (mm)

- 0
- 200
- 400
- 600
- 800
- 1000

Notes:

Isohyets are calculated based on total rainfall for the entire duration of the storm.
Aerial photograph date: 2015.

N
W E
S

Scale 1:160,000 (at A3)

0 5 10
Km

Figure 7: Isohyet Map for 2017 Storm

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

File Name: Fig 7 Isohyet Map for 2017 Storm.wor

TWEED SHIRE COUNCIL

LEGEND

Survey Flood Mark Elevation (mAHD)

Simulated Water Level (mAHD)

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

Figure 8: Simulated Floodwater Depths & Levels for 2017 Flood

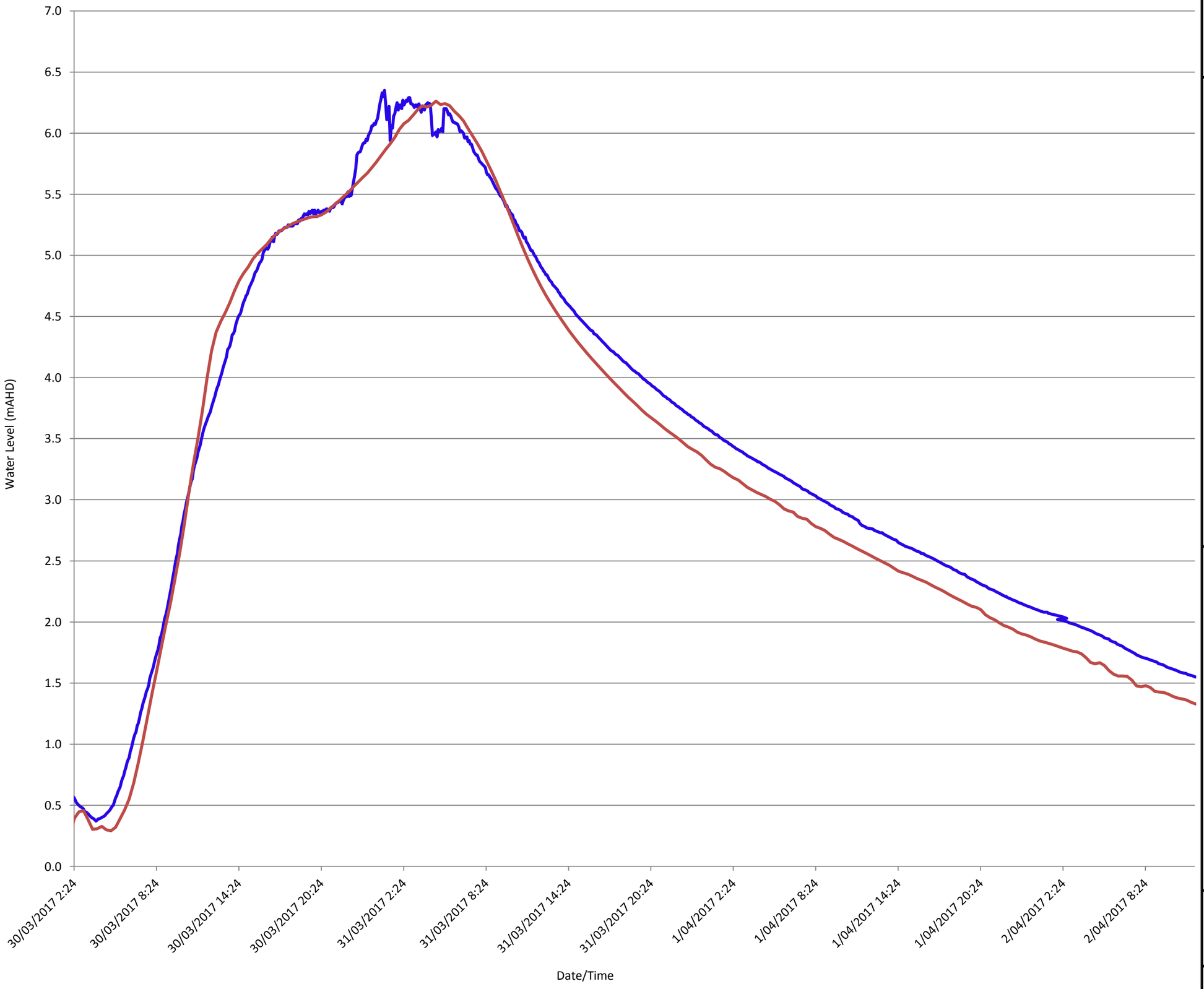
Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig8 - Flood Depths & Level for 2017 Flood.wor



TWEED SHIRE COUNCIL

LEGEND:

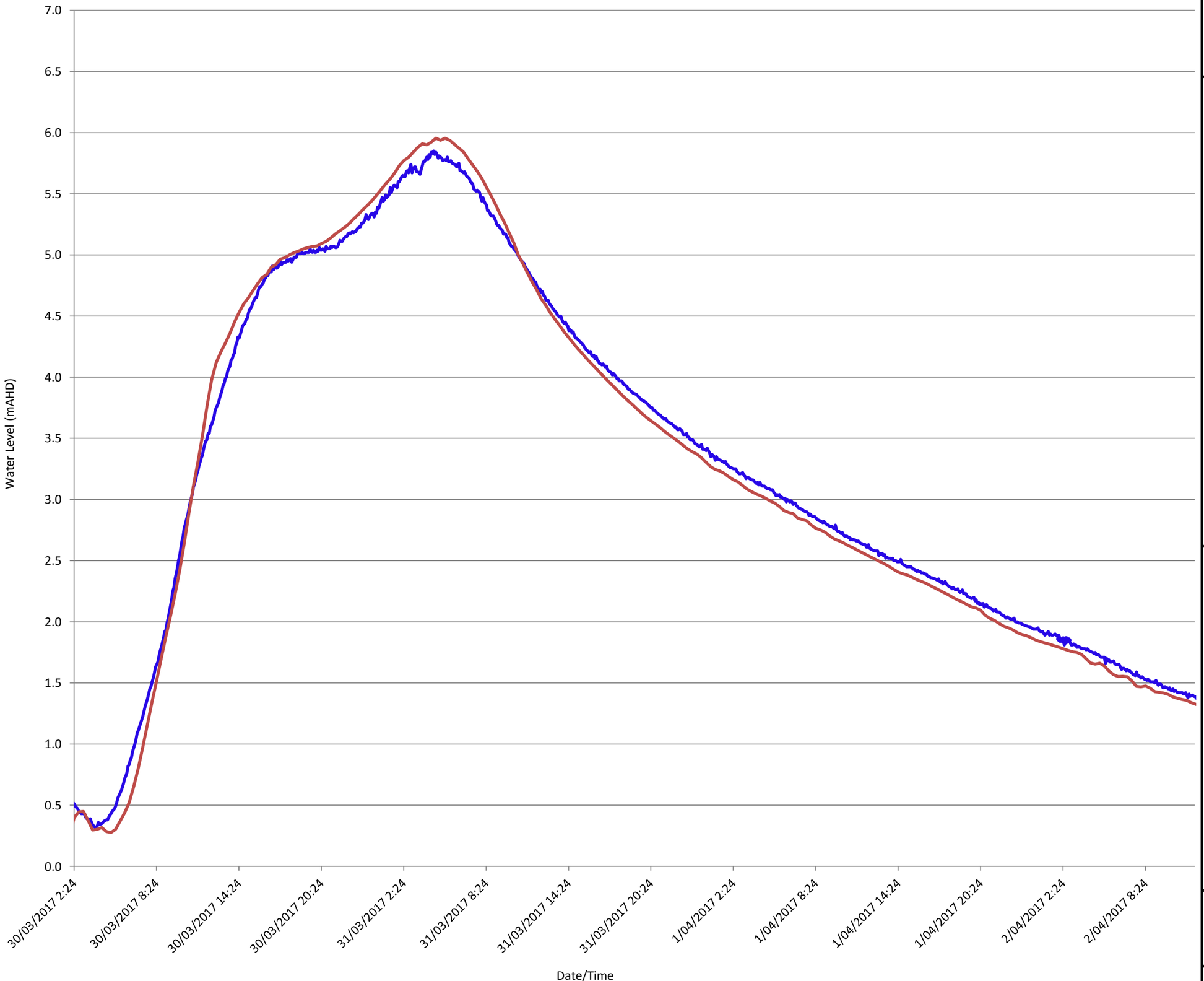
- Recorded Stage Hydrograph
- Simulated Stage Hydrograph

Notes:

Figure 9.1: Recorded and Simulated Stage Hydrographs for Tweed River at Murwillumbah Gauge for 2017 Flood

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: .xls



TWEED SHIRE COUNCIL

LEGEND:

- Recorded Stage Hydrograph
- Simulated Stage Hydrograph

Notes:

Figure 9.2: Recorded and Simulated Stage Hydrographs for Tweed River at Murwillumbah Bridge Gauge for 2017 Flood

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: .xls

TWEED SHIRE COUNCIL

Lamington National Park

Limpinwood

Mebbin National Park

Moonball National Park

470 480 490 500 510 490 460 440 420 430 450 460 410 400 390 380 360 370 390 360 350 340 330 320 310 300 290 270 260 250 240 230 220 210

558085 - 406 mm

558010 - 293 mm

540354 - 424 mm

558079 - 495 mm

558080 - 465 mm

558081 - 519 mm

558014 - 384 mm

558011 - 358 mm

558032 - 492 mm

58011 - 408 mm

558093 - 330 mm

58204 - 461 mm

58186 - 359 mm

558082 - 399 mm

58193 - 365 mm

558088 - 393 mm

58005 - 324 mm

58167 - 376 mm

558018 - 343 mm

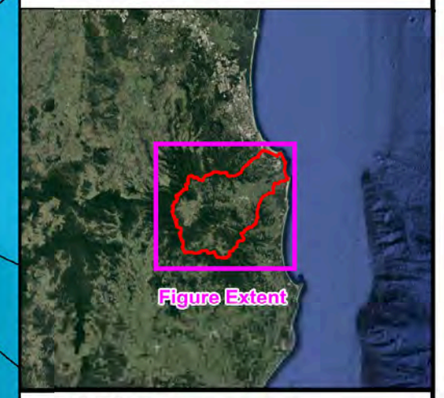
558028 - 353 mm

558083 - 338 mm

58129 - 239 mm

58148 - 201 mm

58019 - 270 mm



LEGEND

- Catchment Boundary
- Study Area
- Gauge Number - Rainfall (mm)
- Rainfall Isohyet (mm)

Rainfall Depth (mm)

- 0
- 200
- 400
- 600
- 800
- 1000

Notes:

Isohyets are calculated based on total rainfall for the entire duration of the storm.
Aerial photograph date: 2015.

N W E S

Scale 1:160,000 (at A3)

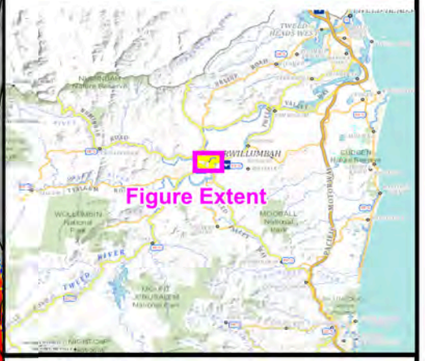
0 5 10 Km

Figure 10: Isohyet Map for 2012 Storm

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

File Name: Fig 10 Isohyet Map for 2012 Storm.wor

TWEED SHIRE COUNCIL



LEGEND

Survey Flood Mark Elevation (mAHD)

Simulated Water Level (mAHD)

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

Figure 11: Simulated Floodwater Depths & Levels for 2012 Flood

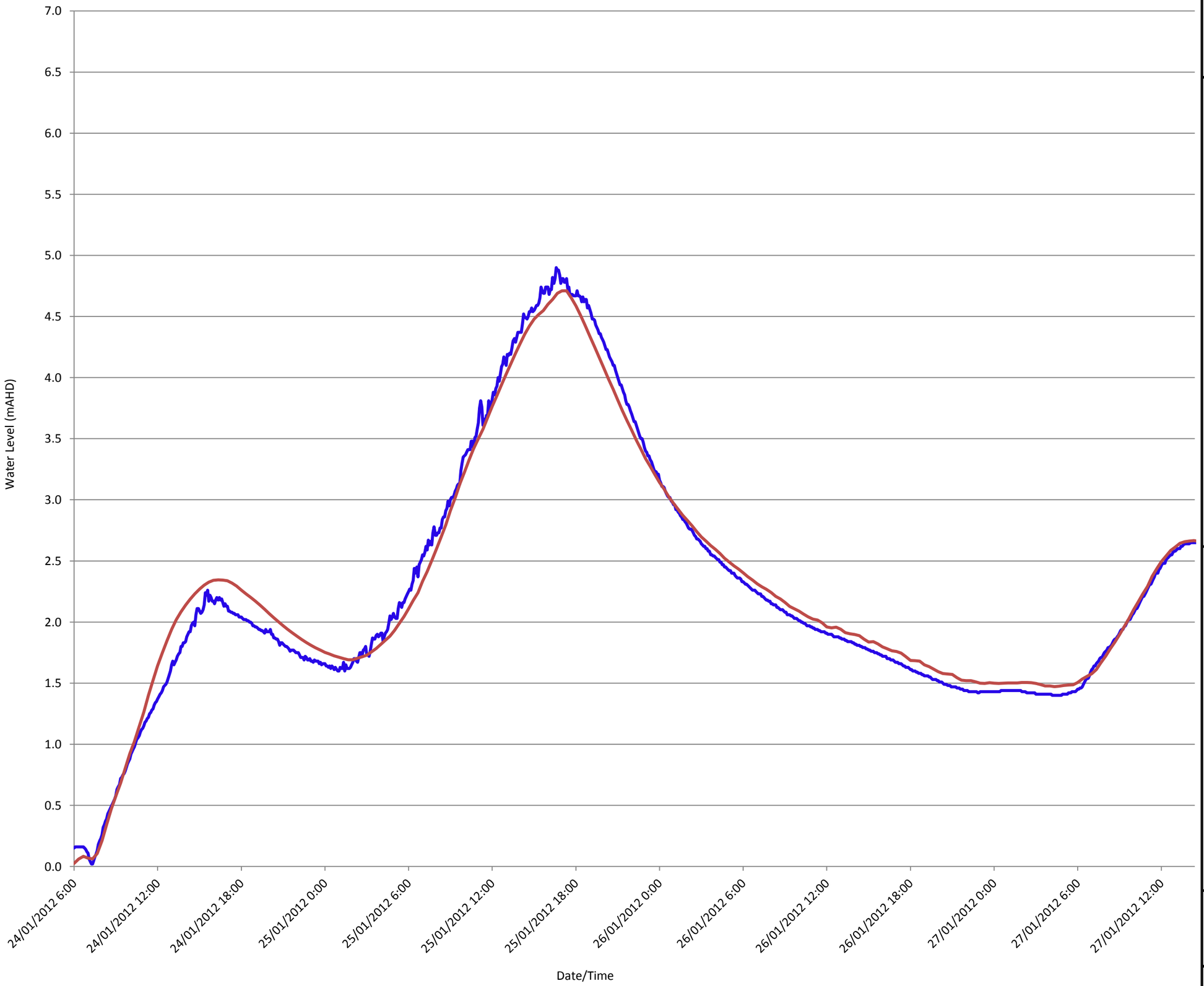
Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig11 - Flood Depths & Level for 2012 Flood.wor



TWEED SHIRE COUNCIL

LEGEND:

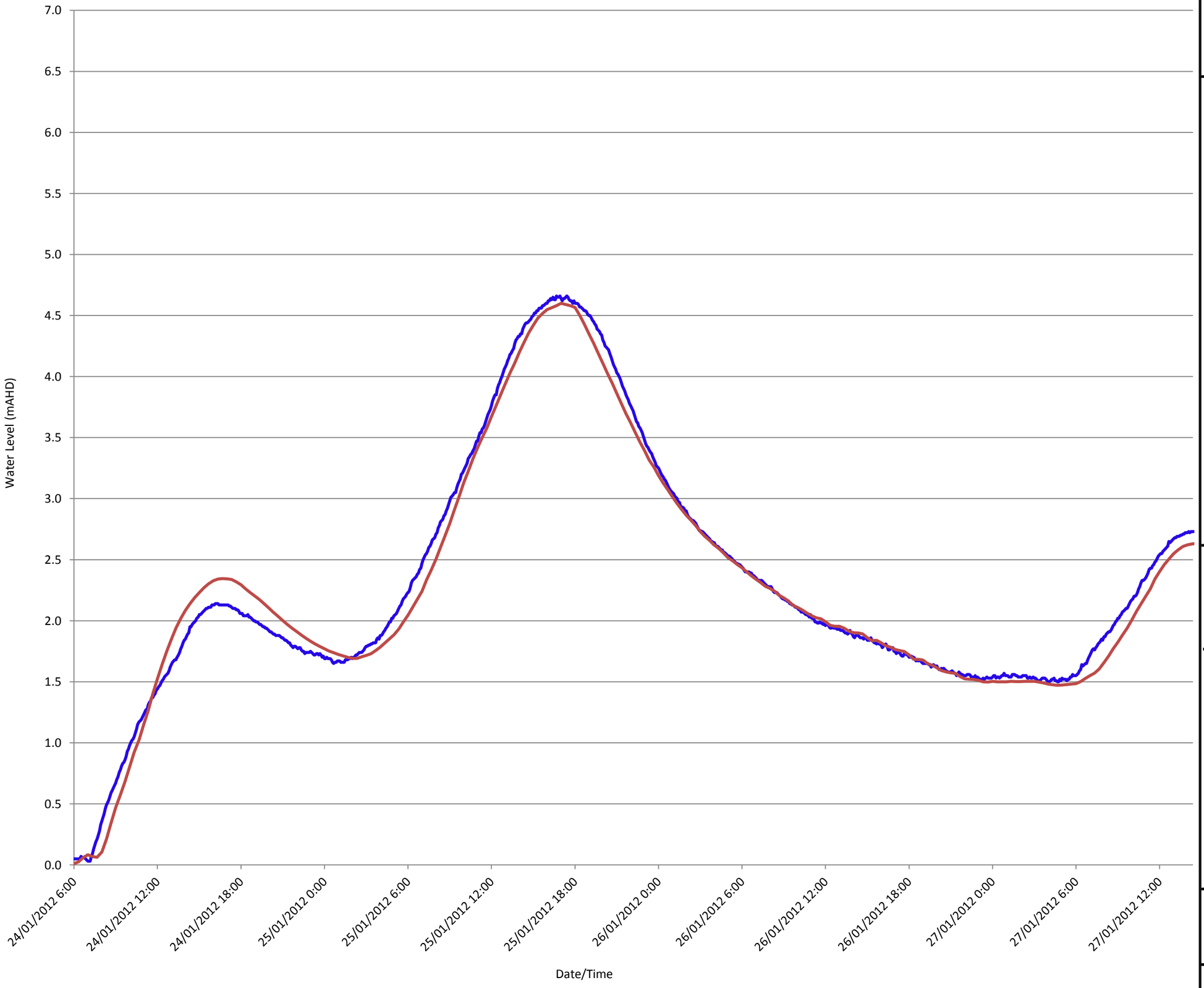
- Recorded Stage Hydrograph
- Simulated Stage Hydrograph

Notes:

Figure 12.1: Recorded and Simulated Stage Hydrographs for Tweed River at Murwillumbah Gauge for 2012 Flood

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: .xls



TWEED SHIRE COUNCIL

LEGEND:

- Recorded Stage Hydrograph
- Simulated Stage Hydrograph

Notes:

Figure 12.2: Recorded and Simulated Stage Hydrographs for Tweed River at Murwillumbah Bridge Gauge for 2012 Flood

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: .xls

Lamington
National Park

Limpinwood

Mebbin
National Park

Moonball
National Park

558085 - 365 mm

558010 - 361 mm

540354 - 326 mm

558080 - 292 mm

558011 - 302 mm

558032 - 310 mm

558093 - 279 mm

58186 - 268 mm

58193 - 339 mm

558088 - 292 mm

558028 - 283 mm

58129 - 292 mm

558083 - 271 mm

58148 - 304 mm

58019 - 335 mm

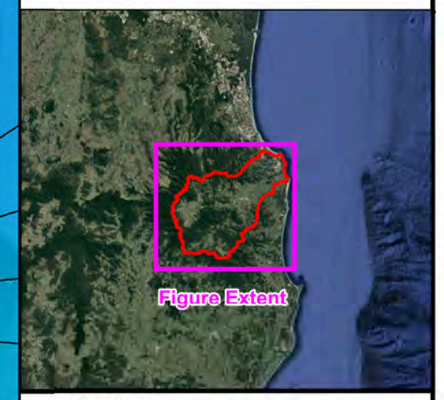
320 330 340 350 360 370

320 330 300 290 280 270 260 250

320 310 300 290

310 320 330

TWEED
SHIRE COUNCIL



LEGEND

- Catchment Boundary
- Study Area
- Gauge Number - Rainfall (mm)
- Rainfall Isohyet (mm)

Rainfall Depth (mm)

- 0
- 200
- 400
- 600
- 800
- 1000

Notes:

Isohyets are calculated based on total rainfall for the entire duration of the storm.
Aerial photograph date: 2015.

N
W E
S

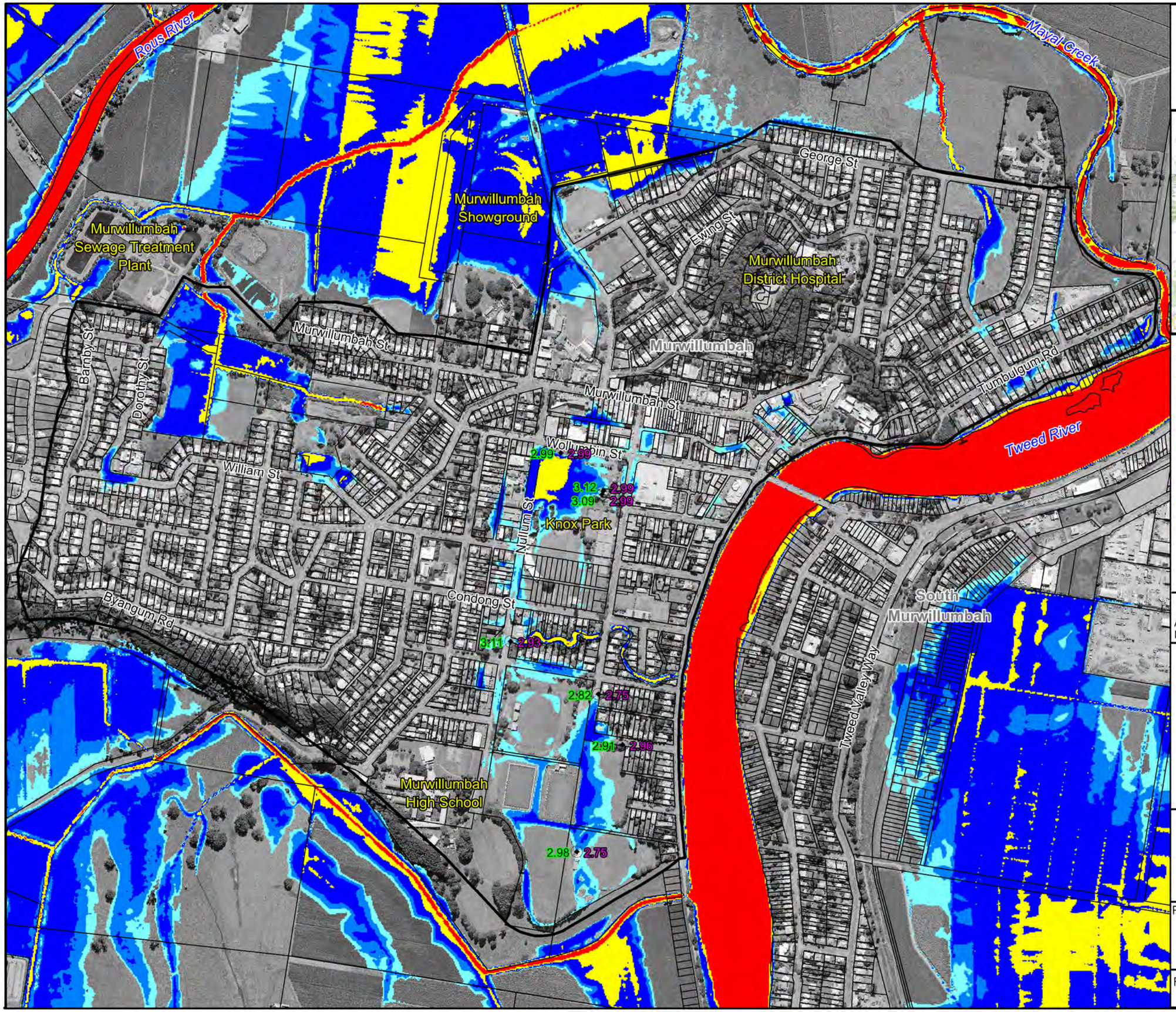
Scale 1:160,000 (at A3)

0 5 10
Km

**Figure 13:
Isohyet Map for
2016 Storm**

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

File Name: Fig 13 Isohyet Map for 2016 Storm.wor



TWEED SHIRE COUNCIL

LEGEND

Survey Flood Mark Elevation (mAHD)

Simulated Water Level (mAHD)

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

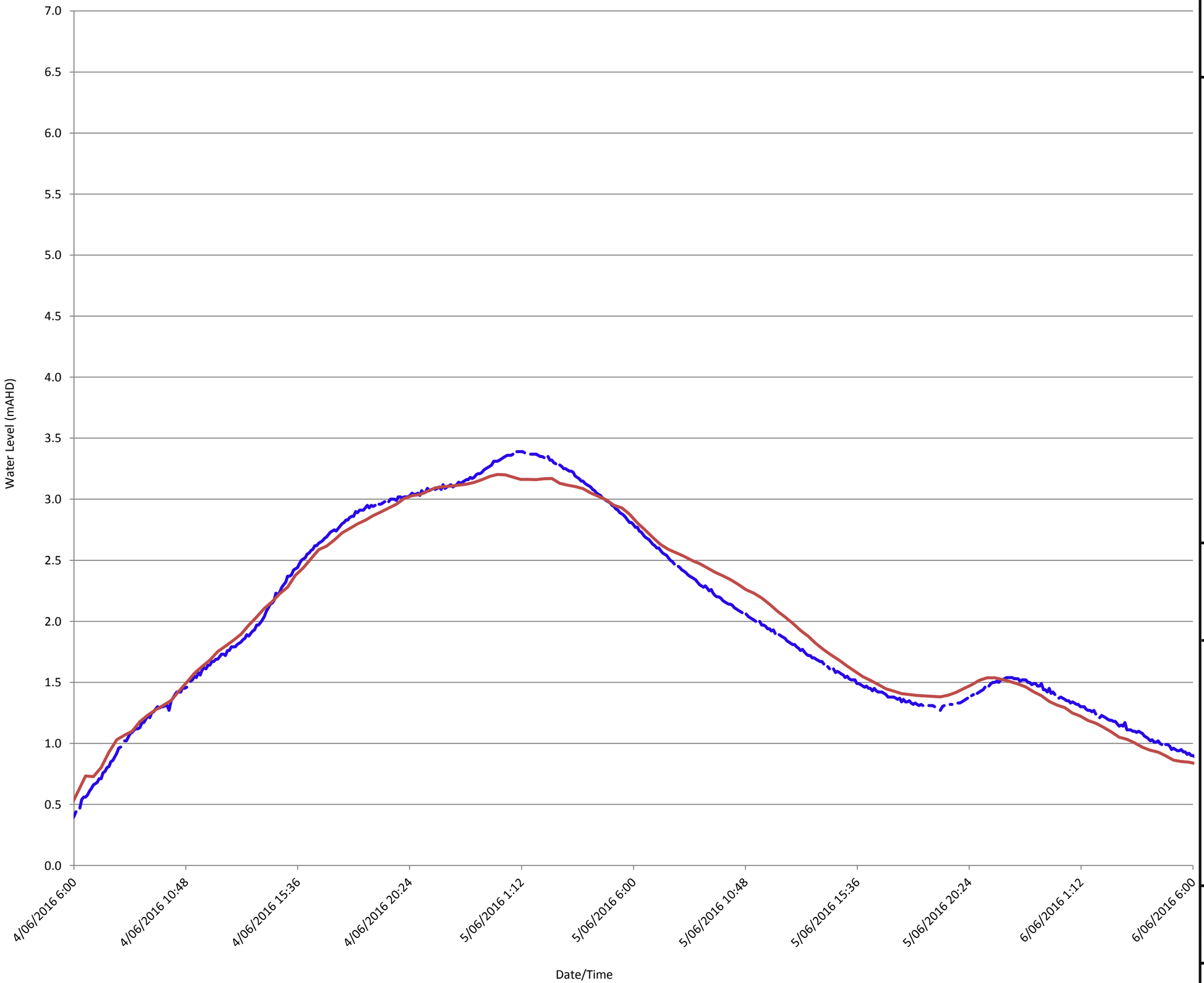
0 0.25 0.5 Km

Figure 14: Simulated Floodwater Depths & Levels for 2016 Flood

Prepared By:

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

File Name: Fig14 - Flood Depths & Level for 2016 Flood.wor



TWEED SHIRE COUNCIL

LEGEND:

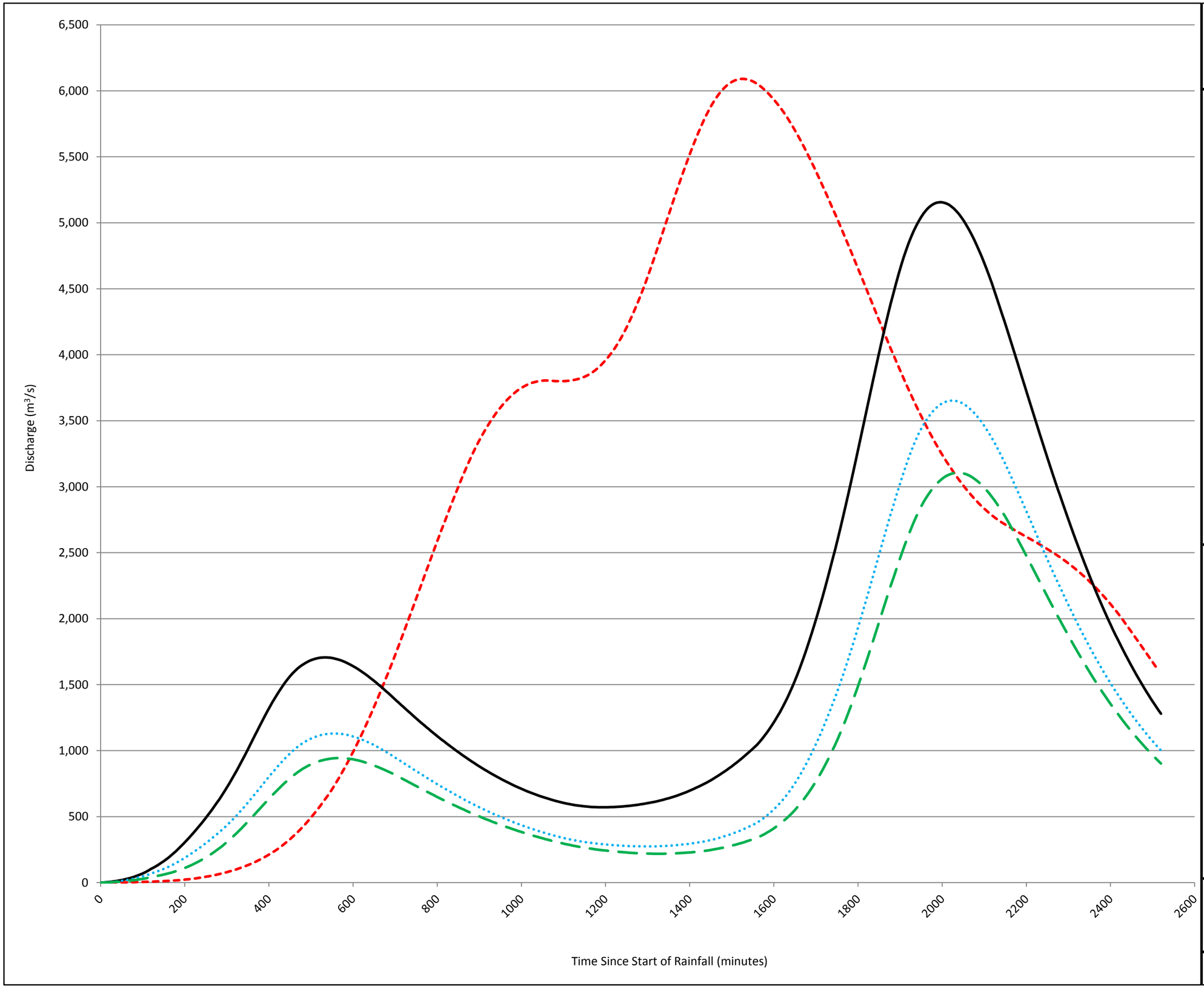
- Recorded Stage Hydrograph
- Simulated Stage Hydrograph

Notes:

Figure 15.1: Recorded and Simulated Stage Hydrographs for Tweed River at Murwillumbah Bridge Gauge for 2016 Flood

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: .xls



TWEED SHIRE COUNCIL

LEGEND:

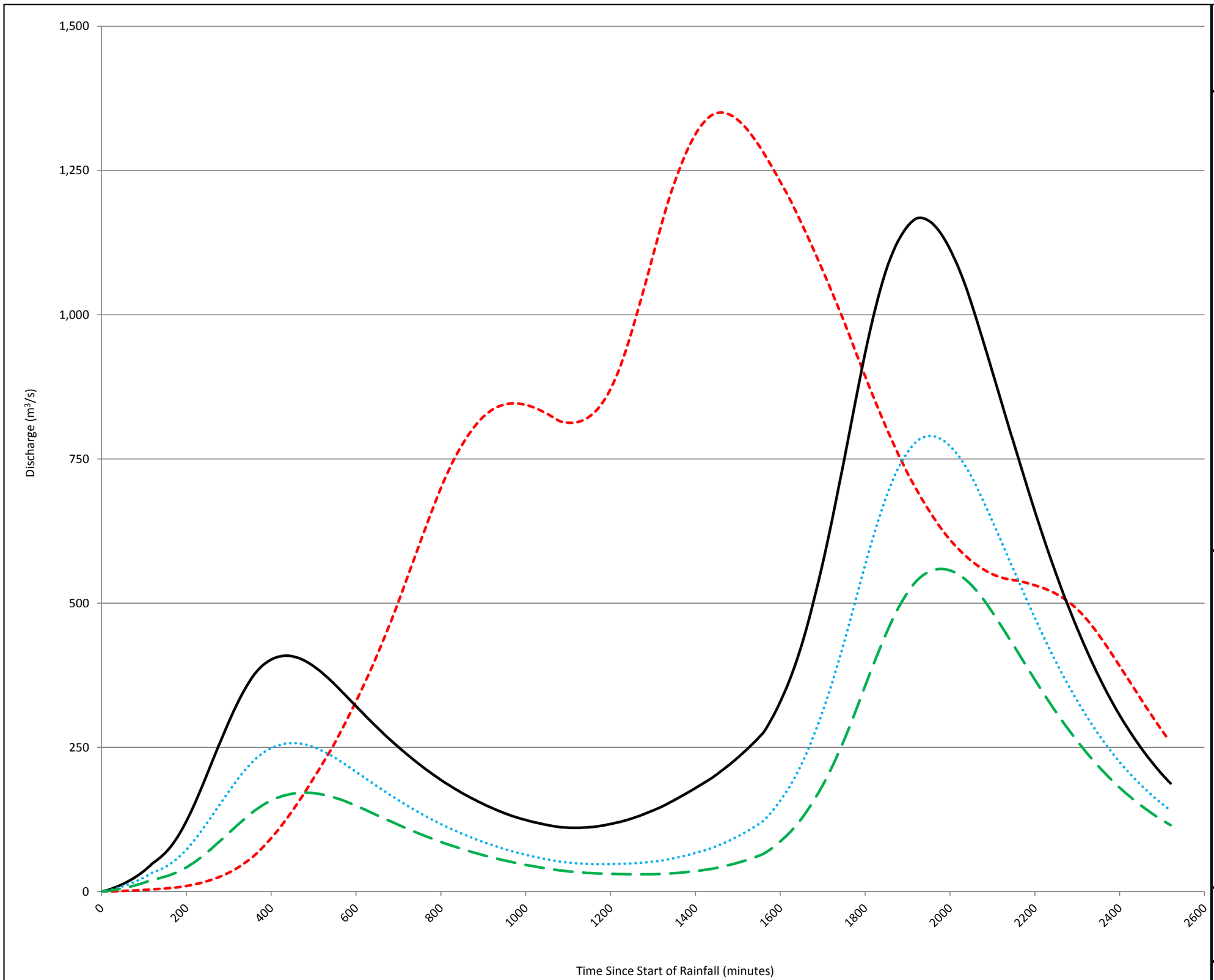
- 0.2% AEP Discharge Hydrograph
- 1% AEP Discharge Hydrograph
- 5% AEP Discharge Hydrograph
- 20% AEP Discharge Hydrograph

Notes:

Figure 16.1: Design Flow Hydrographs: Tweed River at Murwillumbah

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: Murwillumbah Design Flow Hydrographs .xls



TWEED SHIRE COUNCIL

LEGEND:

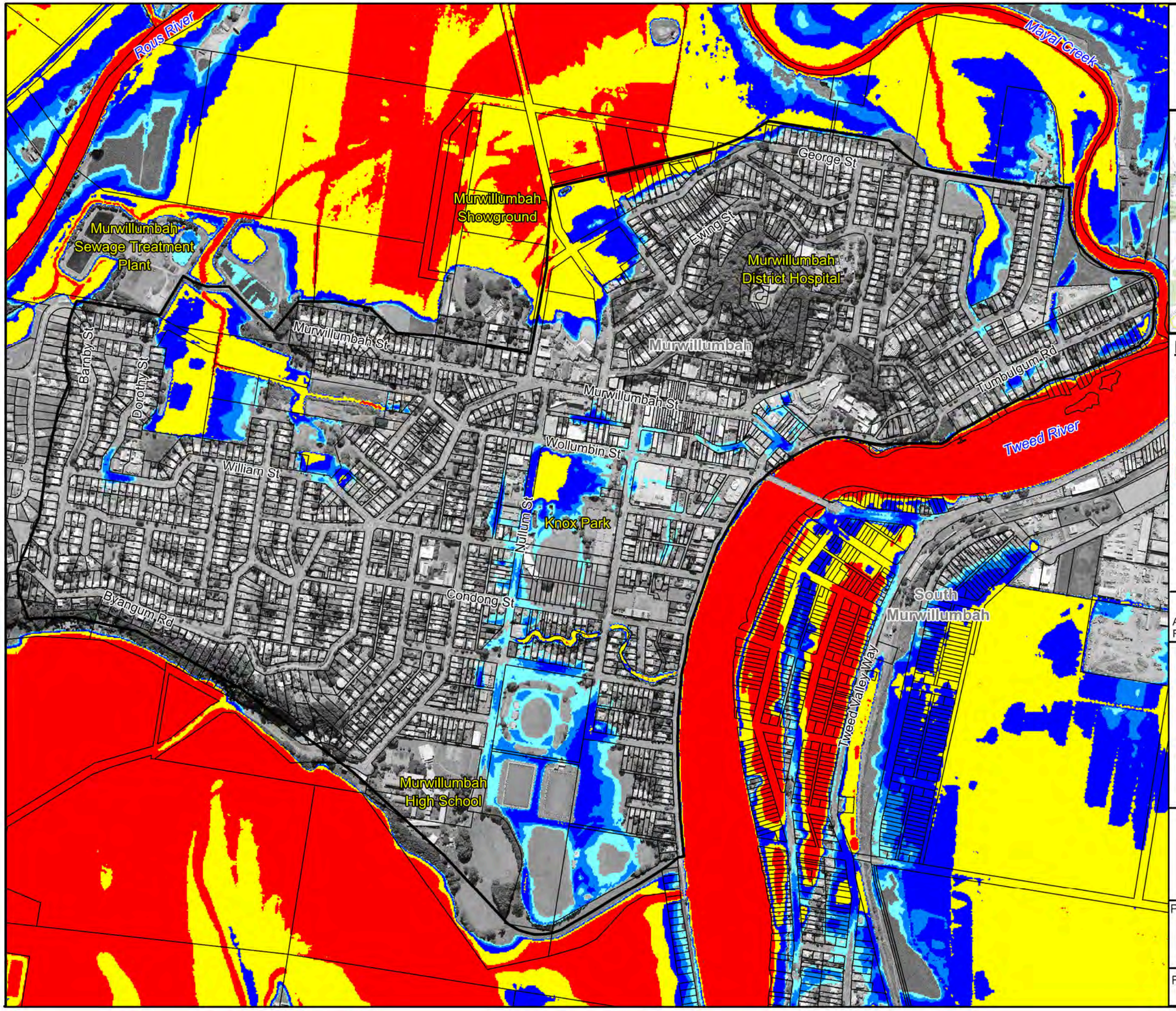
- 0.2% AEP Discharge Hydrograph
- 1% AEP Discharge Hydrograph
- 5% AEP Discharge Hydrograph
- 20% AEP Discharge Hydrograph

Notes:

Figure 16.2: Design Flow Hydrographs: Rous River at Murwillumbah

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: Murwillumbah Design Flow Hydrographs .xls



TWEED SHIRE COUNCIL

LEGEND

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

N
W E
S

0 0.25 0.5
Km

Figure 17: Floodwater Depths for the 20% AEP Flood

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

File Name: Fig17 - Flood Depths 20AEP.wor

TWEED SHIRE COUNCIL

LEGEND

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N

W E

S

0 0.25 0.5

Km

Figure 18: Floodwater Depths for the 5% AEP Flood

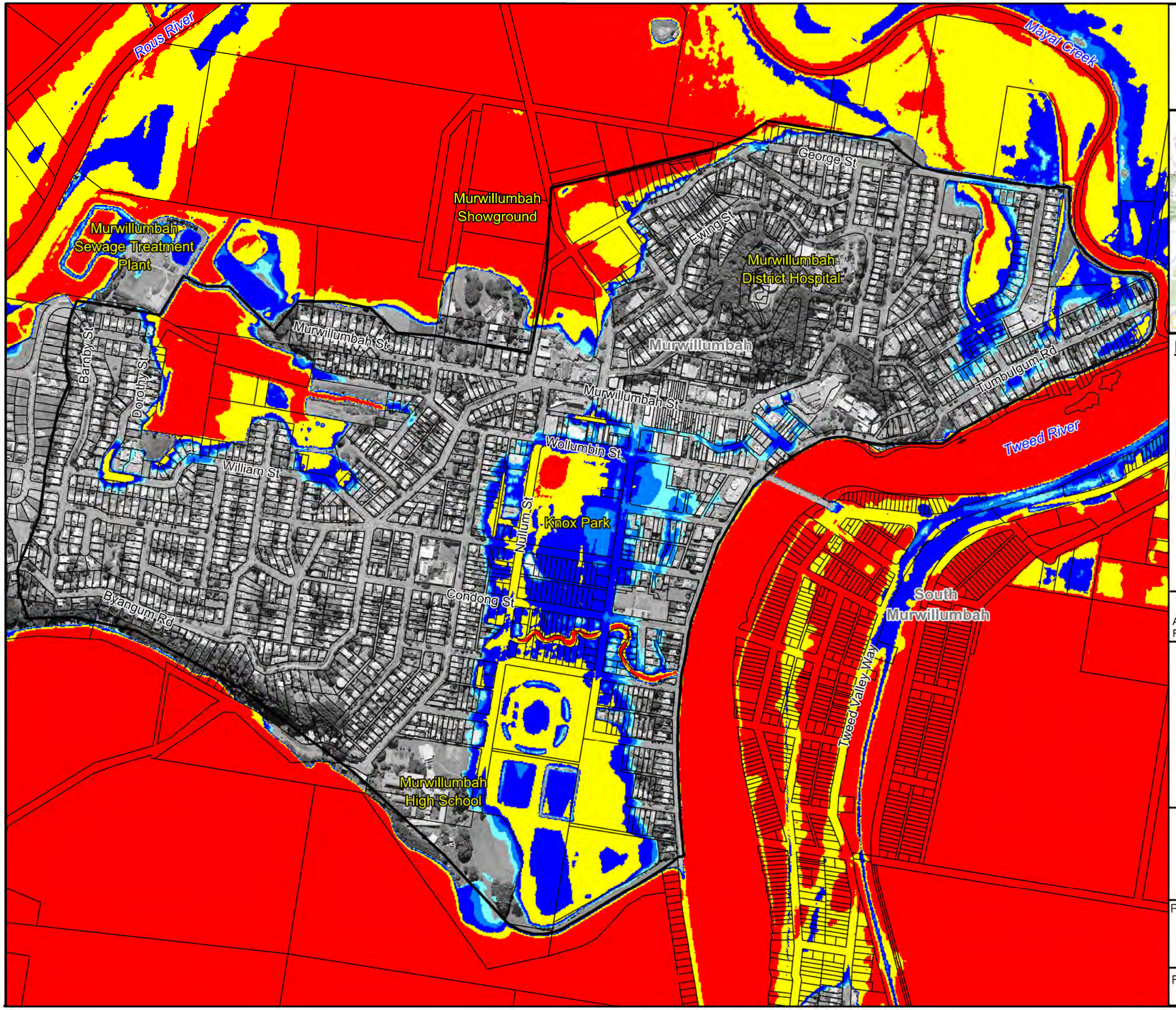
Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig18 - Flood Depths 5AEP.wor



TWEED SHIRE COUNCIL

LEGEND

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

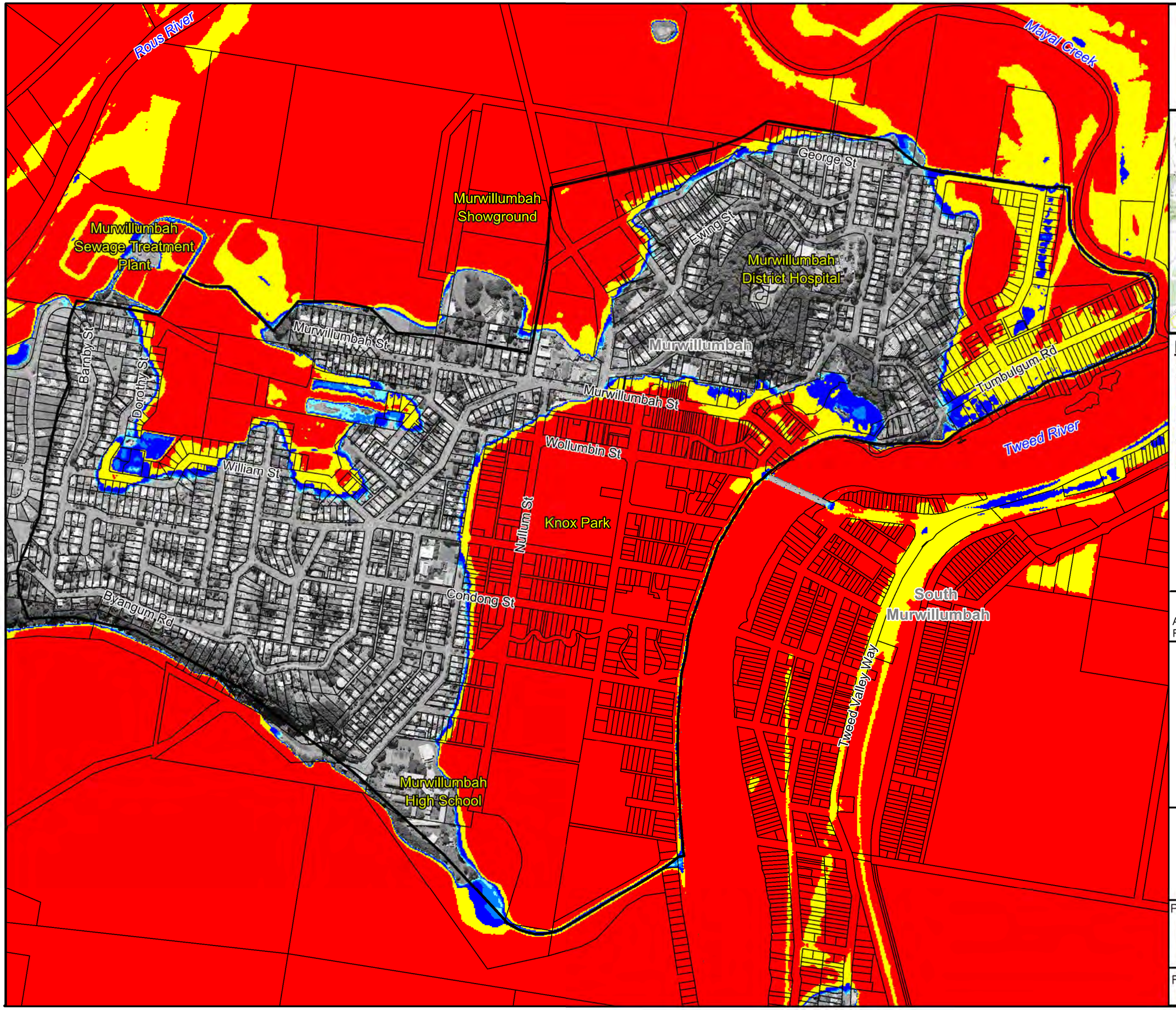
N
W E
S

0 0.25 0.5
Km

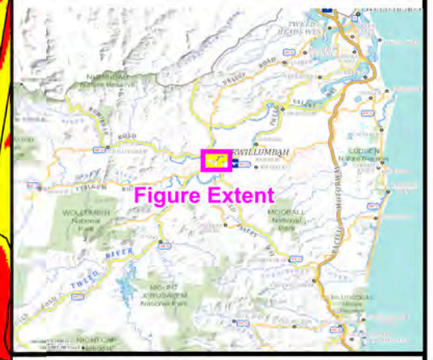
Figure 19: Floodwater Depths for the 1% AEP Flood

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

File Name: Fig19 - Flood Depths 1AEP.wor



TWEED SHIRE COUNCIL



LEGEND

Depths (m)

- 0.15 - 0.3
- 0.3 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

N
W E
S

0 0.25 0.5
Km

Figure 20: Floodwater Depths for the 0.2% AEP Flood

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

File Name: Fig20 - Flood Depths 02AEP.wor

TWEED SHIRE COUNCIL

LEGEND

2 Flood Level (mAHD)

Flood Level (mAHD)

=< 2.0	5.0
2.5	6.0
3.0	8.0
3.5	10.0
4.0	>= 15.0
4.5	

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

Figure 21: Floodwater Levels for the 20% AEP Flood

Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig21 - Flood Levels 20AEP.wor

TWEED SHIRE COUNCIL

LEGEND

2 Flood Level (mAHD)

Flood Level (mAHD)

=< 2.0	5.0
2.5	6.0
3.0	8.0
3.5	10.0
4.0	>= 15.0
4.5	

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

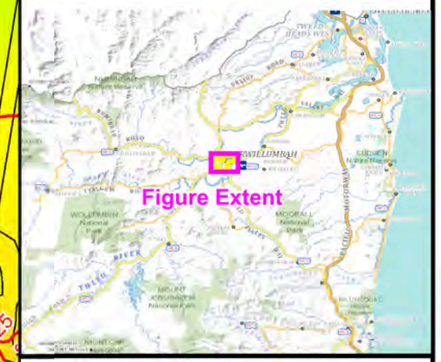
Figure 22: Floodwater Levels for the 5% AEP Flood

Prepared By:

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

File Name: Fig22 - Flood Levels 5AEP.wor

TWEED SHIRE COUNCIL



LEGEND

2 Flood Level (mAHD)

Flood Level (mAHD)

=< 2.0	5.0
2.5	6.0
3.0	8.0
3.5	10.0
4.0	>= 15.0
4.5	

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

Figure 23: Floodwater Levels for the 1%AEP Flood

Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig23 - Flood Levels 1AEP.wor

TWEED SHIRE COUNCIL

LEGEND

2 Flood Level (mAHD)

Flood Level (mAHD)

=< 2.0	5.0
2.5	6.0
3.0	8.0
3.5	10.0
4.0	>= 15.0
4.5	

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N W E S

0 0.25 0.5 Km

Figure 24: Floodwater Levels for the 0.2% AEP Flood

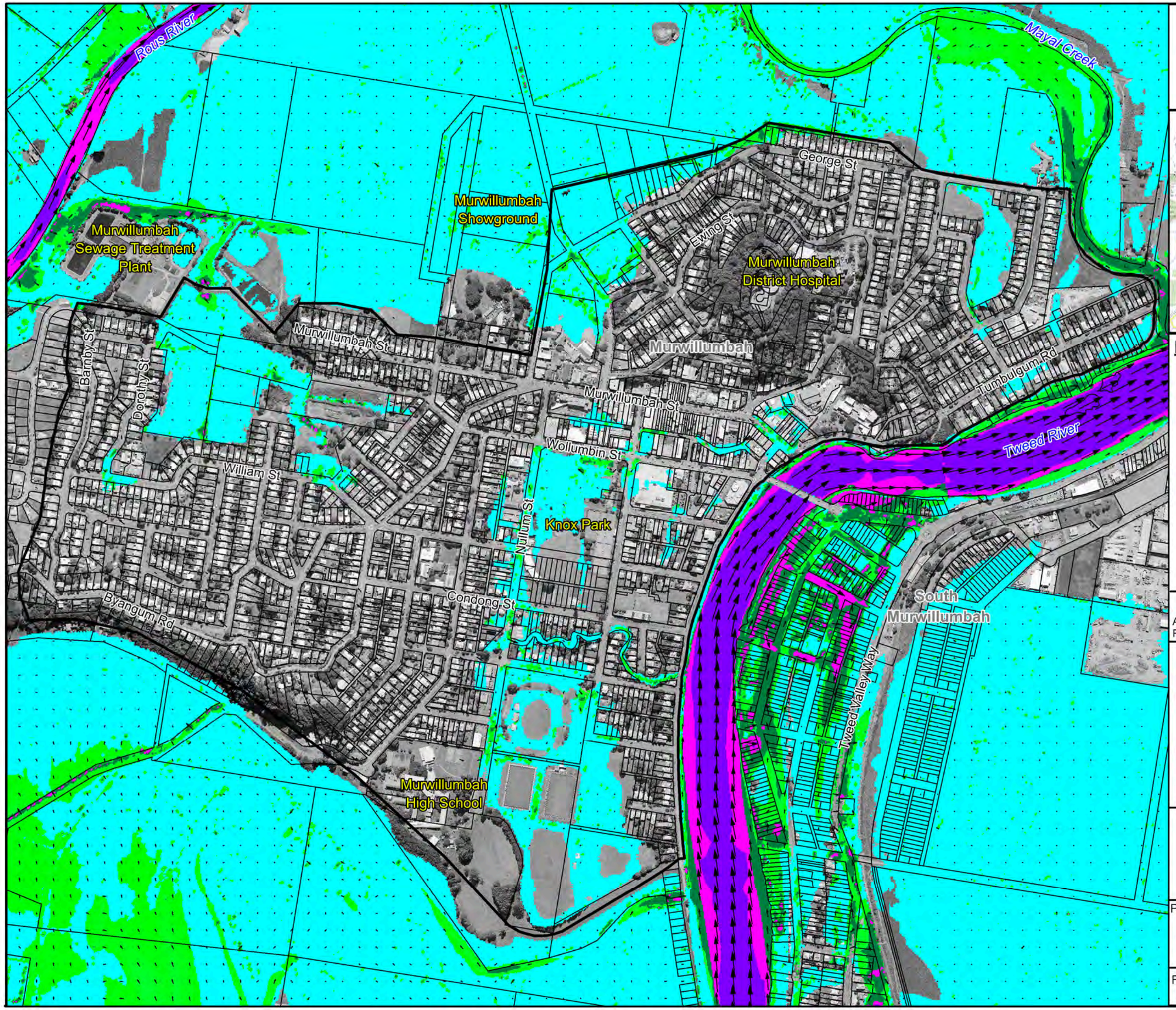
Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig24 - Flood Levels 02AEP.wor



TWEED SHIRE COUNCIL

LEGEND

Velocity (m/s)

- 0.0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Velocity Vectors

- 1 m/s
- 2 m/s
- 4 m/s

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

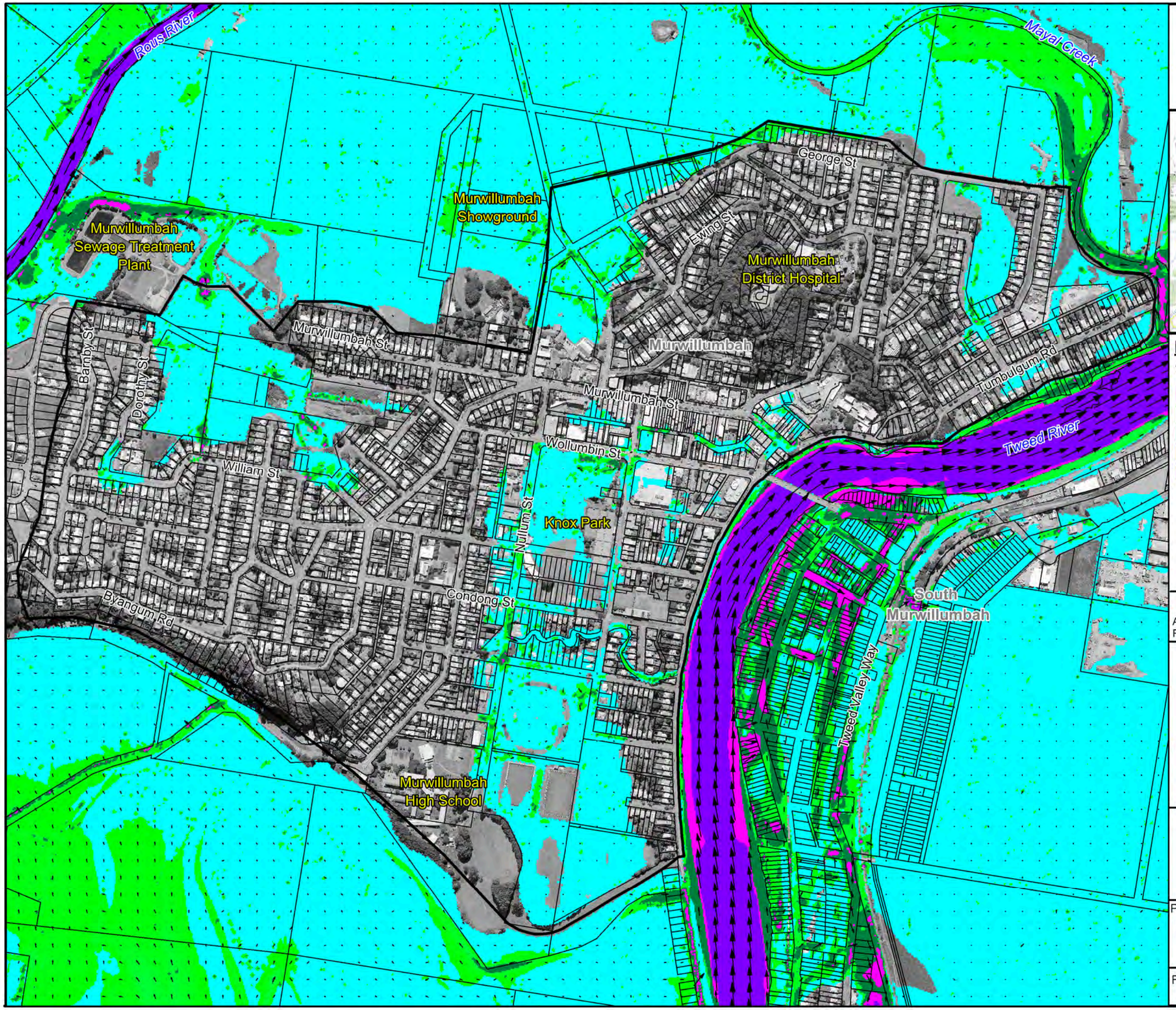
N
W E
S

0 0.25 0.5
Km

Figure 25: Floodwater Velocities for the 20% AEP Flood

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

File Name: Fig25 - Flood Vel 20AEP.wor



TWEED SHIRE COUNCIL

LEGEND

Velocity (m/s)

- 0.0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Velocity Vectors

- 1 m/s
- 2 m/s
- 4 m/s

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

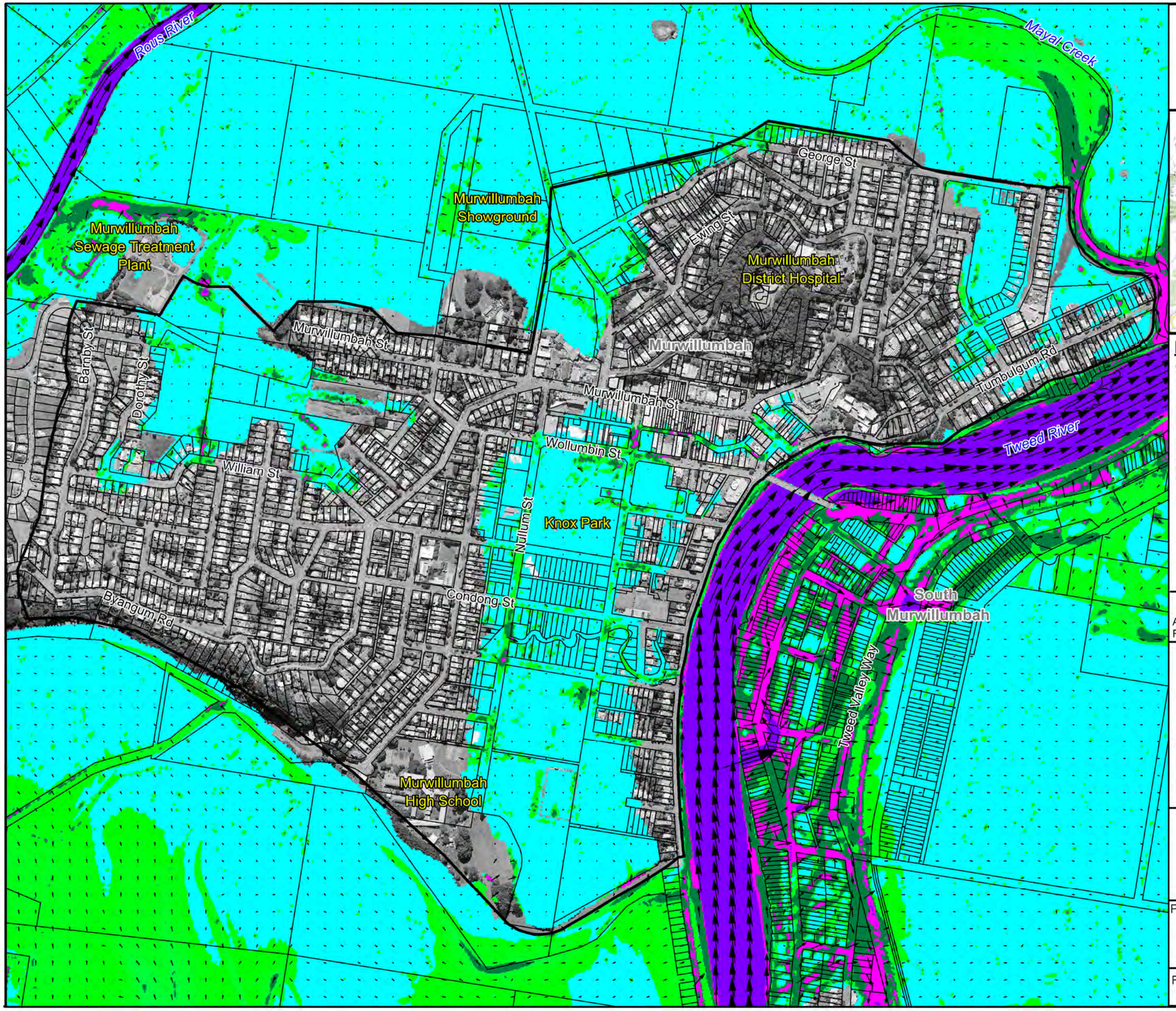
N W E S

0 0.25 0.5 Km

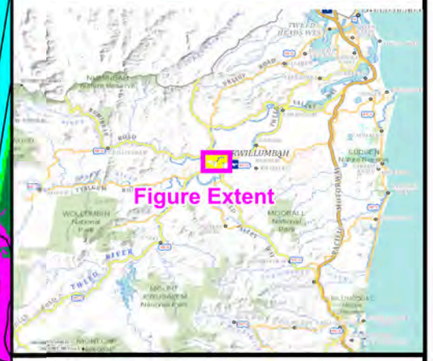
Figure 26: Floodwater Velocities for the 5% AEP Flood

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

File Name: Fig26 - Flood Vel for 5AEP.wor



TWEED SHIRE COUNCIL



LEGEND

Velocity (m/s)

- 0.0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Velocity Vectors

- 1 m/s
- 2 m/s
- 4 m/s

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

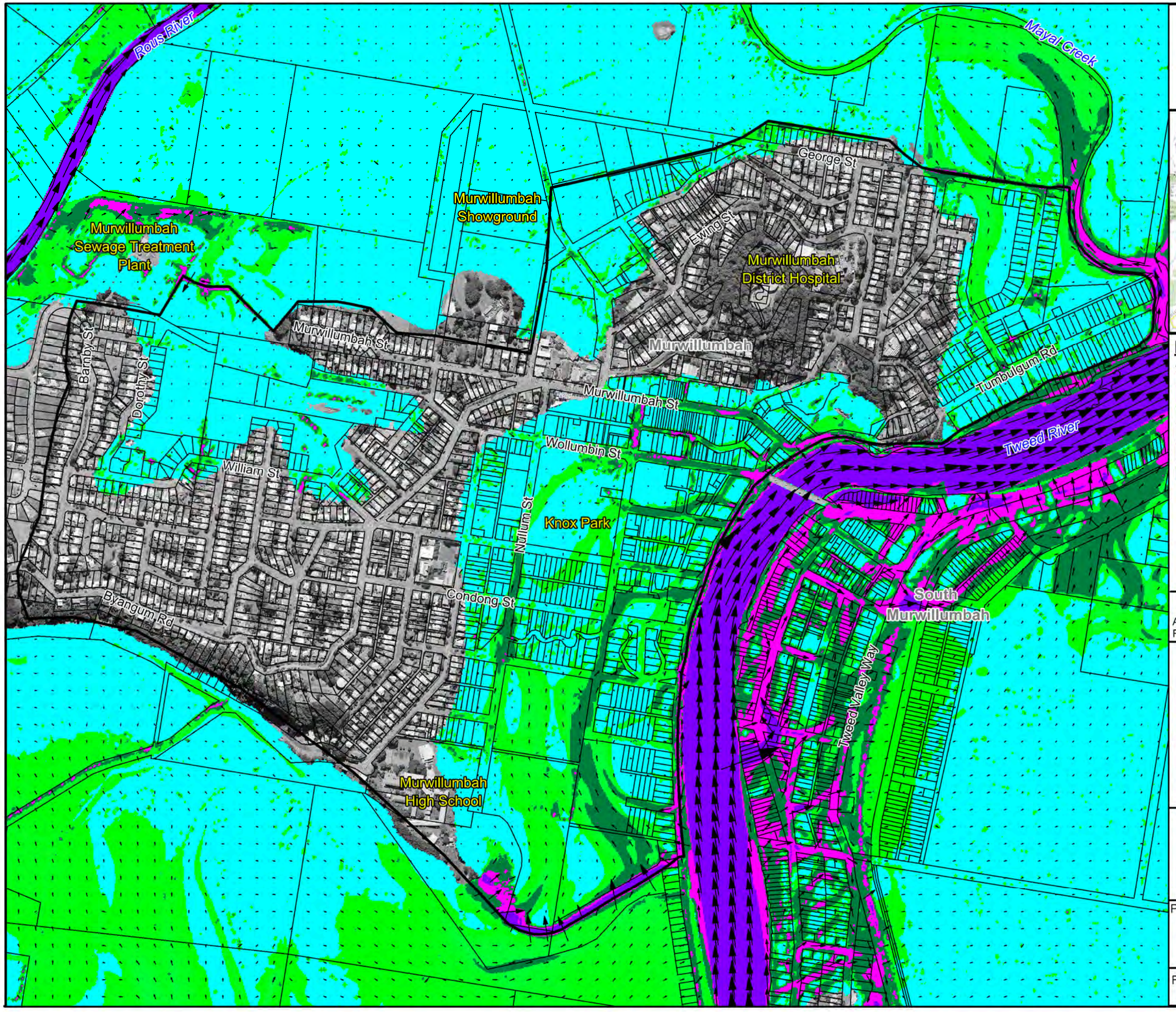
N W E S

0 0.25 0.5 Km

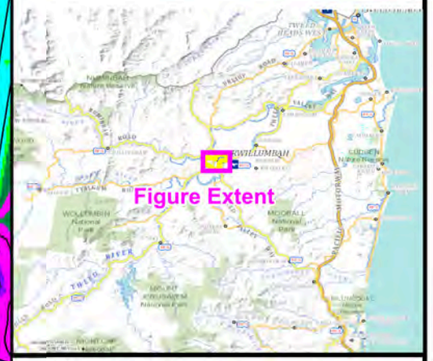
Figure 27: Floodwater Velocities for the 1% AEP Flood

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

File Name: Fig27 - Flood Vel 1AEP.wor



TWEED SHIRE COUNCIL



LEGEND

Velocity (m/s)

- 0.0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- >= 2.0

Velocity Vectors

- 1 m/s
- 2 m/s
- 4 m/s

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

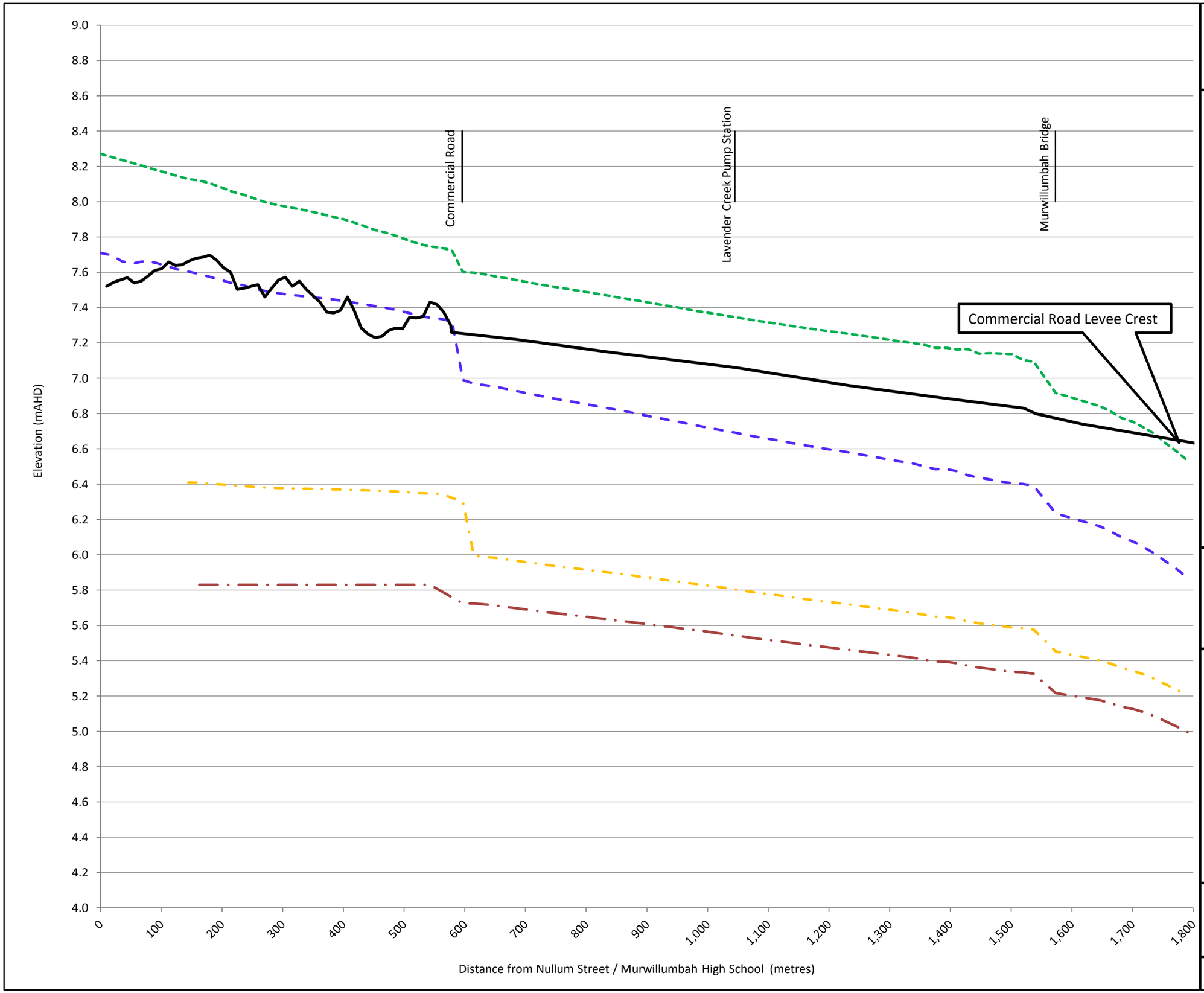
N W E S

0 0.25 0.5 Km

Figure 28: Floodwater Velocities for the 0.2% AEP Flood

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

File Name: Fig28 - Flood Vel 02AEP.wor



TWEED SHIRE COUNCIL

LEGEND:

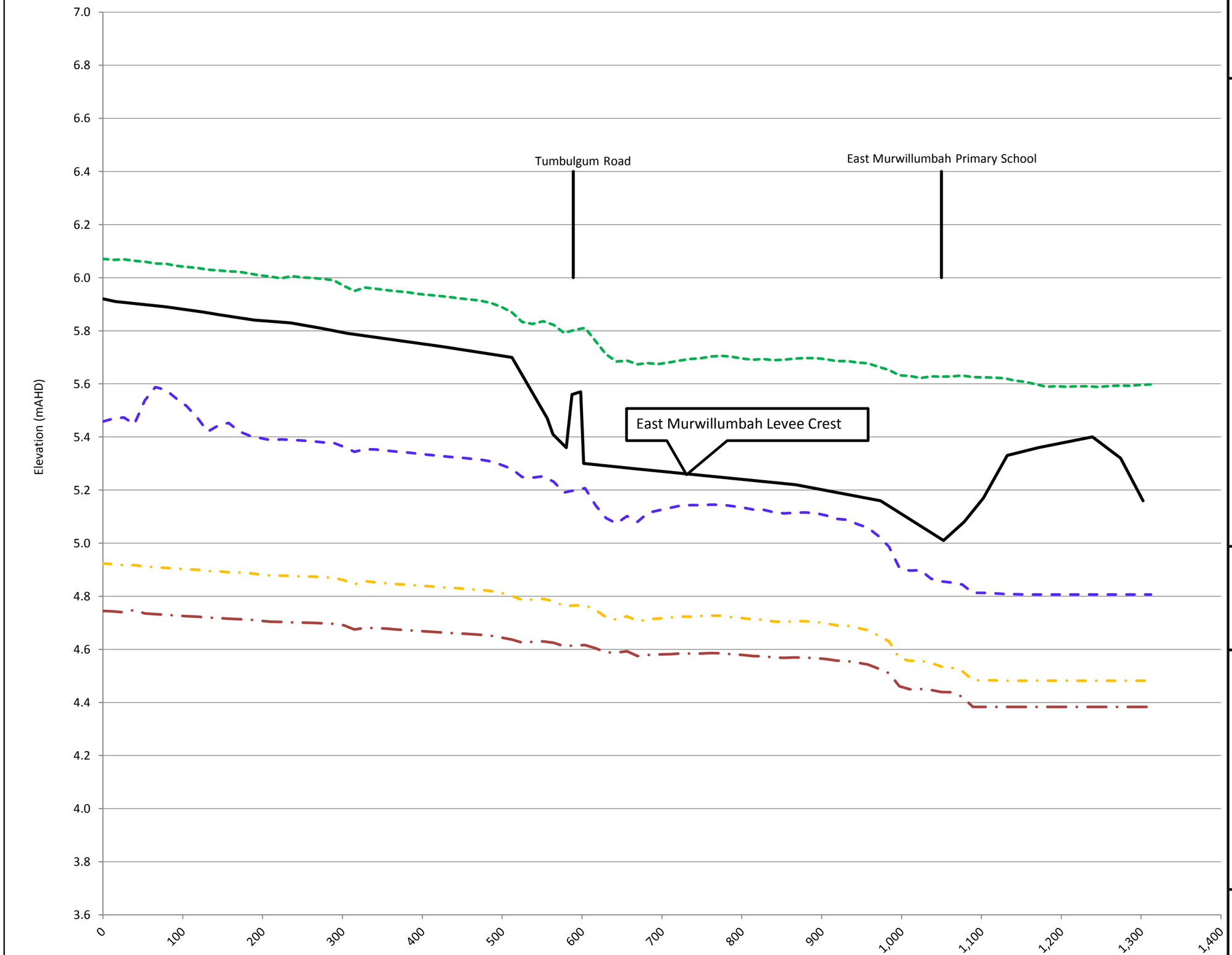
- 0.2% AEP Water Surface Profile
- 1% AEP Water Surface Profile
- 5% AEP Water Surface Profile
- 20% AEP Water Surface Profile

Notes:

Figure 29.1: Design Water Surface Profiles for Commercial Road Levee

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: Murwillumbah Levee & WSP.xls



TWEED SHIRE COUNCIL

LEGEND:

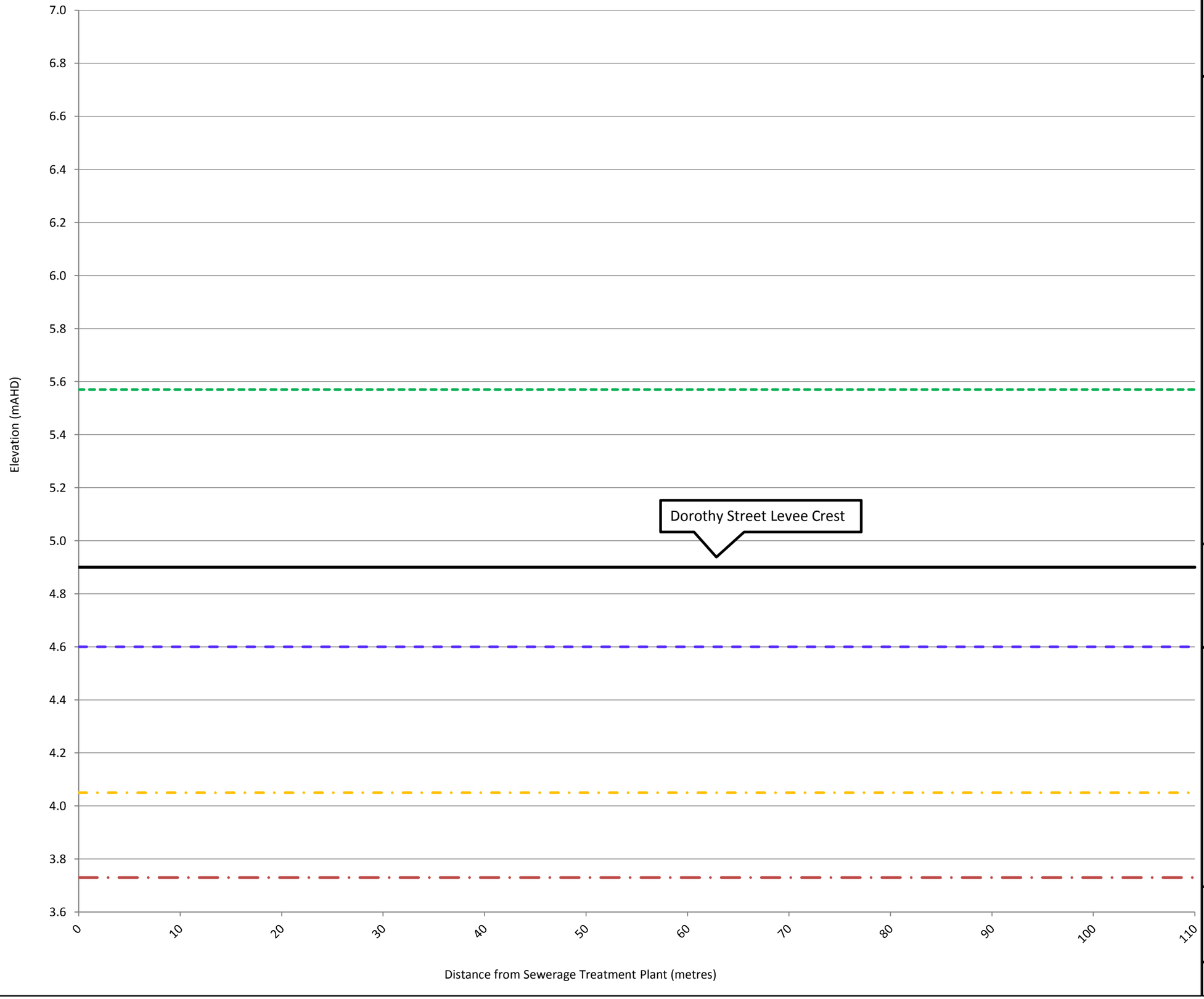
- 0.2% AEP Water Surface Profile
- 1% AEP Water Surface Profile
- 5% AEP Water Surface Profile
- 20% AEP Water Surface Profile

Notes:

Figure 29.2:
Design Water Surface Profiles for East Murwillumbah Levee

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: Murwillumbah Levee & WSP.xls



TWEED SHIRE COUNCIL

LEGEND:

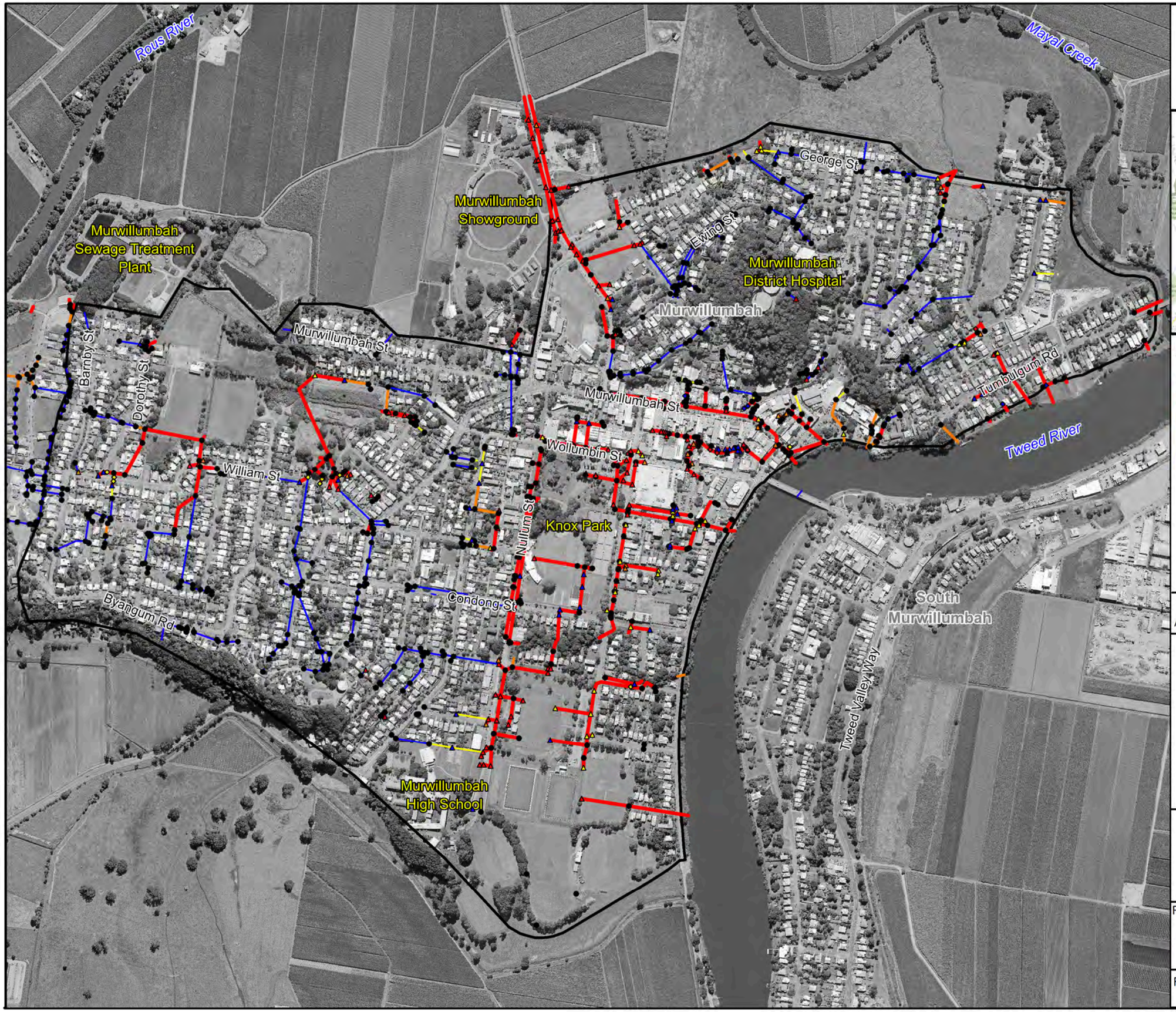
- 0.2% AEP Water Surface Profile
- 1% AEP Water Surface Profile
- 5% AEP Water Surface Profile
- 20% AEP Water Surface Profile

Notes:

Figure 29.3: Design Water Surface Profiles for Dorothy Stree Levee

Prepared By:
Catchment Simulation Solutions
Suite 2.01, 210 George Street
Sydney, NSW, 2000

File Name: Murwillumbah Levee & WSP.xls



TWEED SHIRE COUNCIL

LEGEND

Failure AEP	Pit Failure Type
>= 20% AEP	No Failure
5% AEP	Surcharge
1% AEP	Ponding
<= 0.2% AEP	

Notes:

Aerial photograph date: 2015

N W E S

0 0.25 0.5 Km

Figure 30: Stormwater Capacity Maps

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

File Name: Fig30 - Stormwater Capacity Maps.wor

TWEED SHIRE COUNCIL

LEGEND

Hazard Categories

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

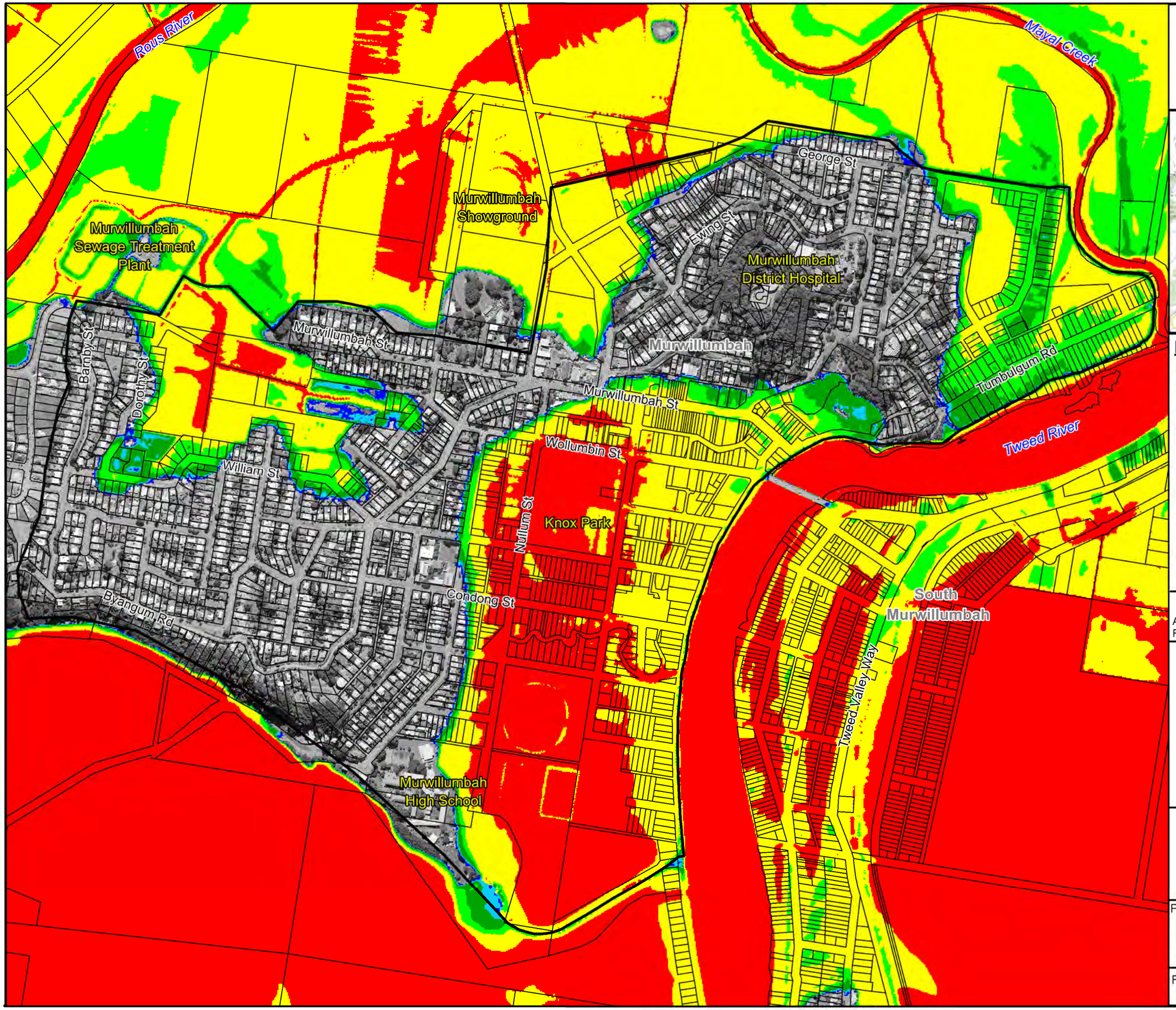
N
W E
S

0 0.25 0.5
Km

Figure 31:
Hazard Categories for the 1% AEP Flood

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

File Name: Fig31 - Hazard Categories for 1AEP.wor



TWEED SHIRE COUNCIL

LEGEND

Hazard Categories

- H1
- H2
- H3
- H4
- H5
- H6

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

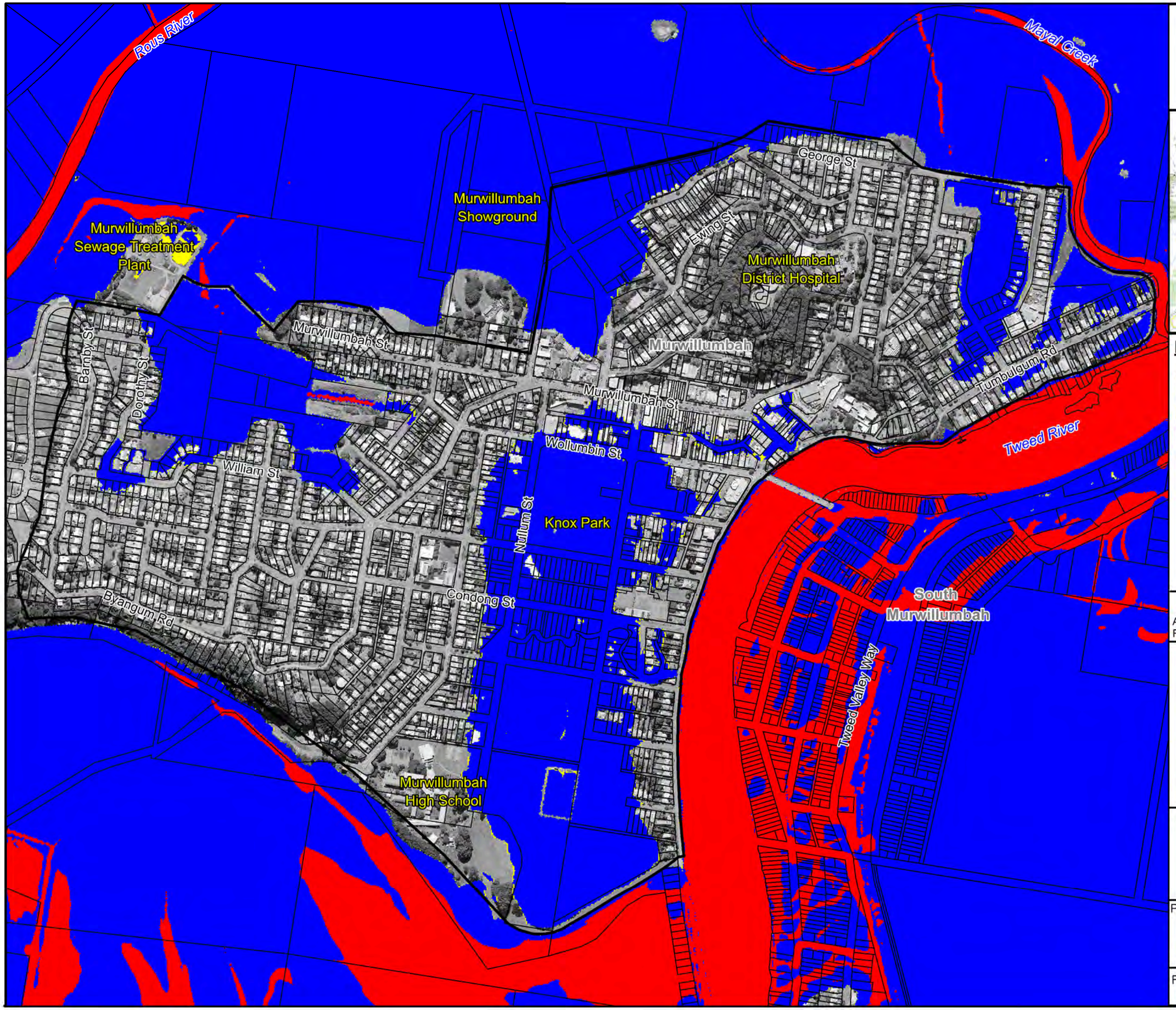
N
W E
S

0 0.25 0.5
Km

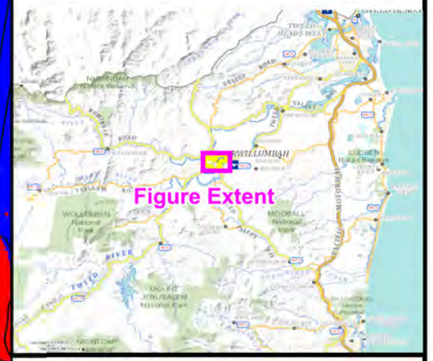
Figure 32:
Hazard Categories for the 0.2% AEP Flood

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

File Name: Fig32 - Hazard Categories for 0.2AEP.wor



TWEED SHIRE COUNCIL



LEGEND

Hydraulic Categories

- Flood Fringe
- Flood Storage
- Floodway

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

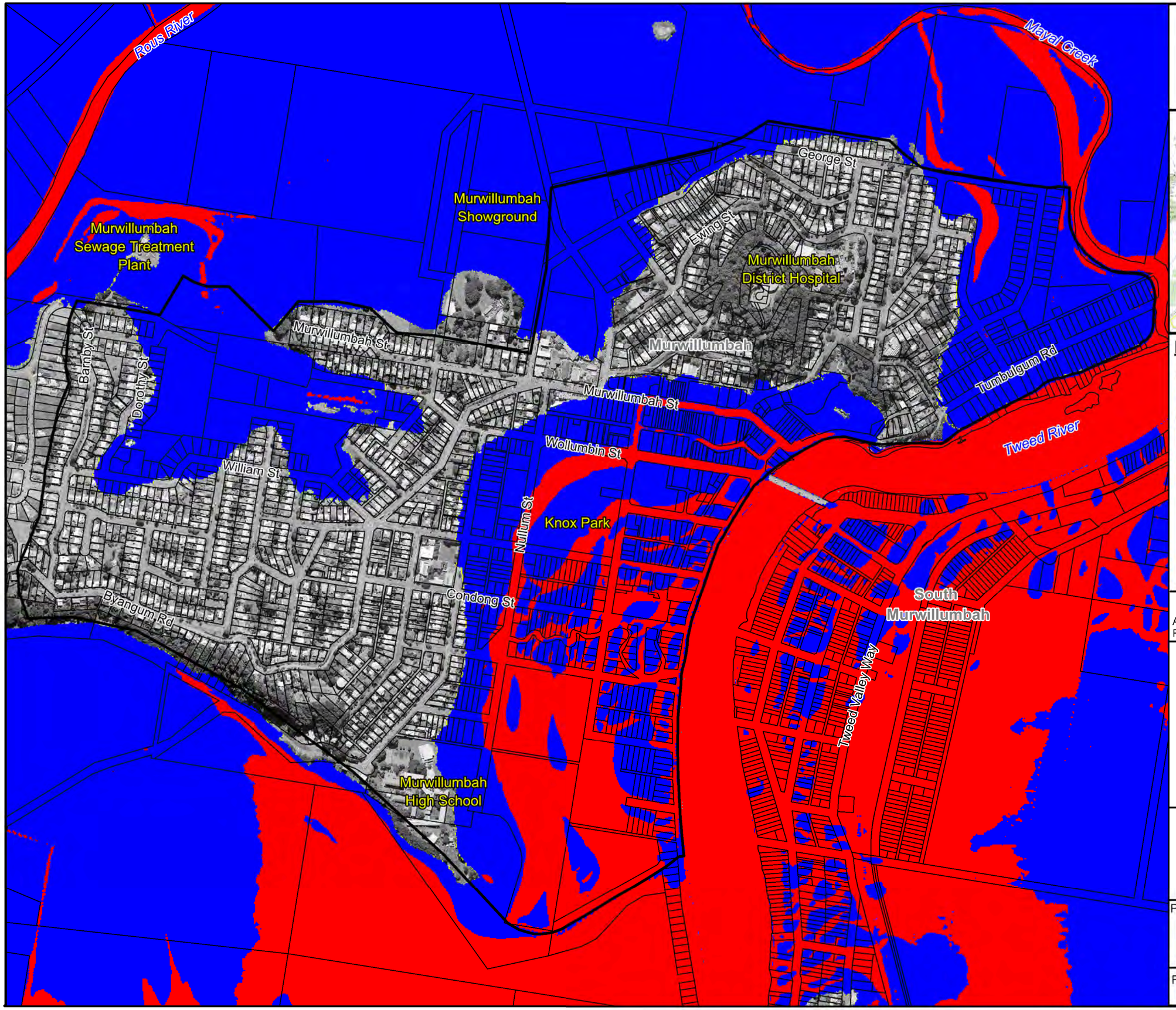
N
W E
S

0 0.25 0.5
Km

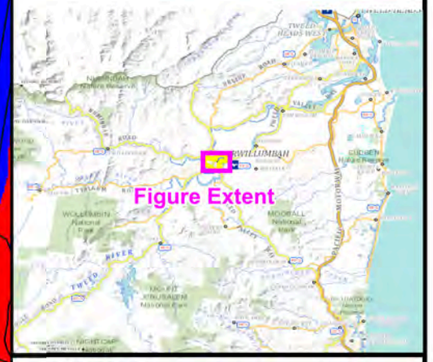
Figure 33: Hydraulic Categories for the 1% AEP Flood

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

File Name: Fig33 - Hydraulic Categories for the 1% AEP Flood.wor



TWEED SHIRE COUNCIL



LEGEND

Hydraulic Categories

- Flood Fringe
- Flood Storage
- Floodway

Notes:

Aerial photograph date: 2015
Results only shown where depths are above 0.15m

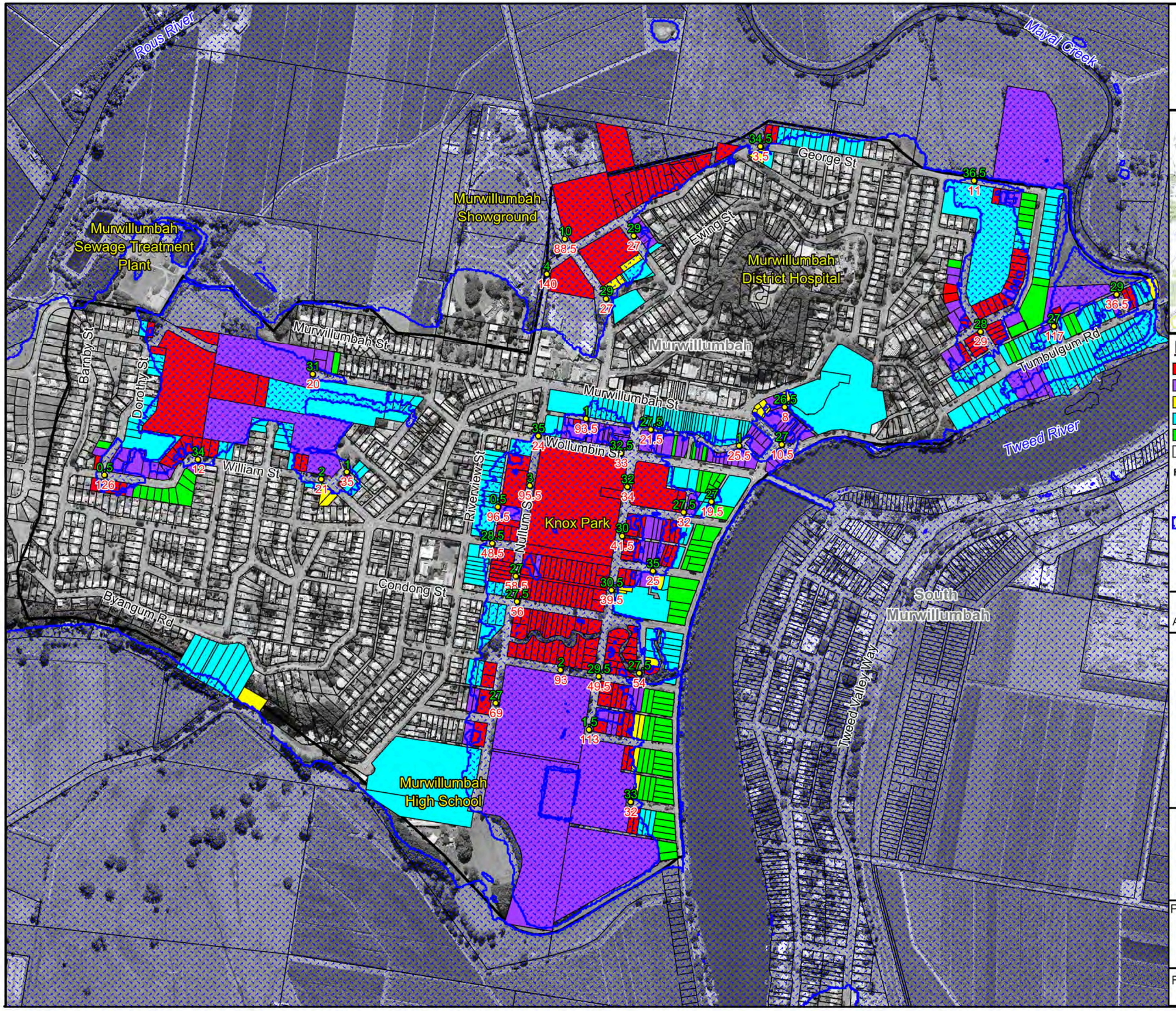
N
W E
S

0 0.25 0.5
Km

Figure 34: Hydraulic Categories for the 0.2% AEP Flood

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

File Name: Fig34 - Hydraulic Categories for 0.2% AEP Flood.wor



LEGEND

- Flooded Isolated Submerged
- Flooded Isolated Elevated
- Flooded Exit Route Overland Escape Route
- Flooded Exit Rising Road Egress
- Indirect Consequences
- No Flood Impacts

Road Overtopping Location

- 1.5 — Time of road first cut (hours)
- 0.5 — Duration of inundation (hours)
- Flood Extent

Notes:

Aerial photograph date: 2015

N W E S

0 0.25 0.5 Km

Figure 35: Preliminary Emergency Response Classifications for the 1% AEP Flood

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

File Name: Fig35 - ERC 1%AEP Flood .wor

TWEED SHIRE COUNCIL

LEGEND

- Flooded Isolated Submerged
- Flooded Isolated Elevated
- Flooded Exit Route Overland Escape Route
- Flooded Exit Rising Road Egress
- Indirect Consequences
- No Flood Impacts

Road Overtopping Location

- 1.5 Time of road first cut (hours)
- 0.5 Duration of inundation (hours)
- Flood Extent

Notes:

Aerial photograph date: 2015

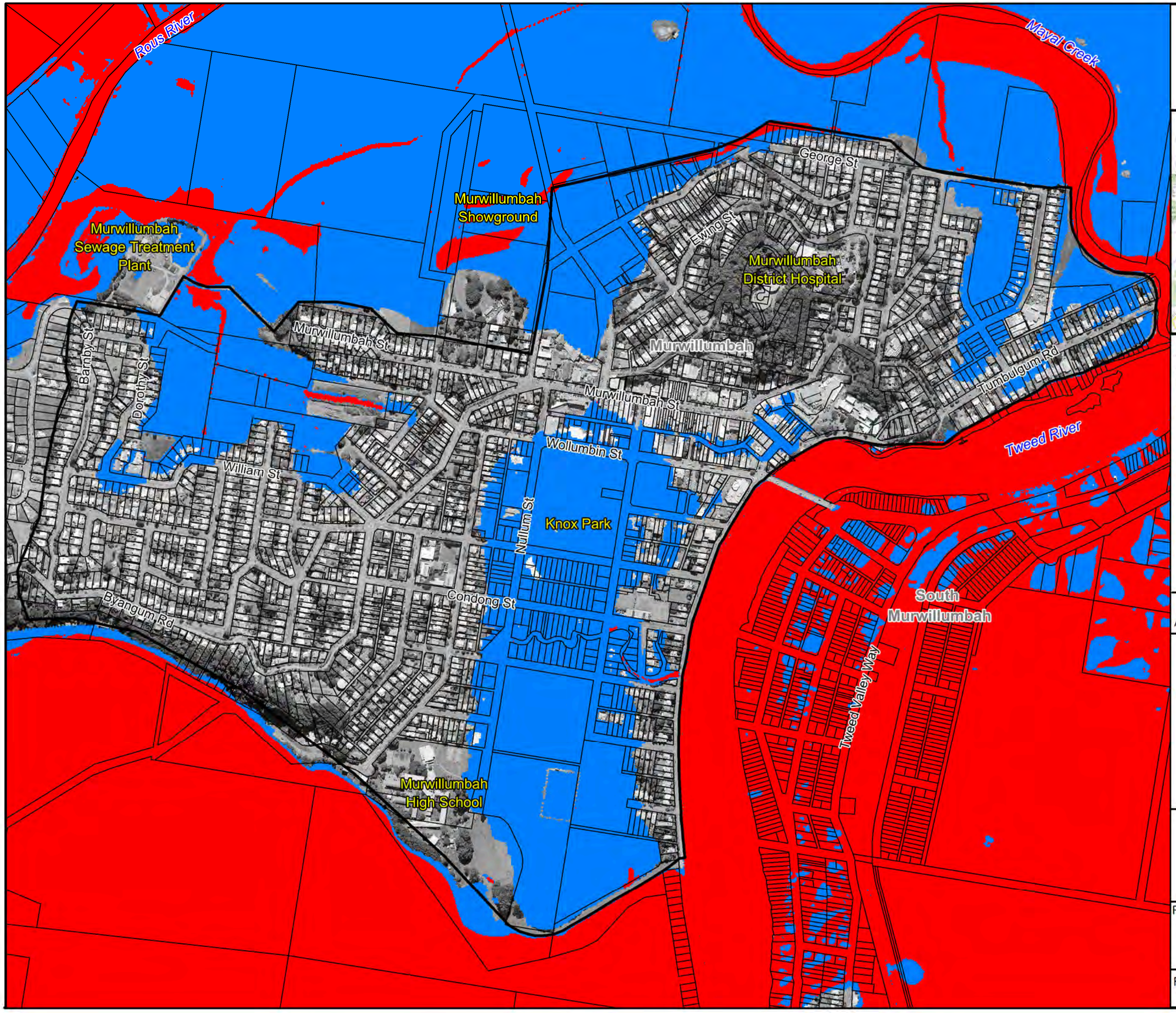
N W E S

0 0.25 0.5 Km

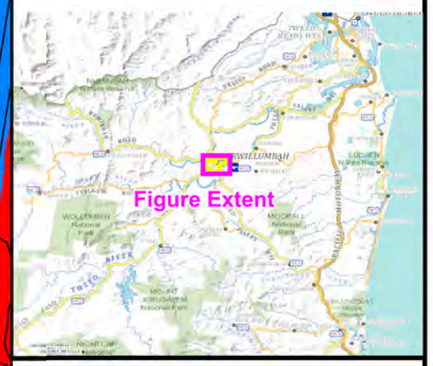
Figure 36: Preliminary Emergency Response Classifications for the 0.2% AEP Flood

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

File Name: Fig36 - ERC 50.2% AEP Flood .wor



TWEED SHIRE COUNCIL



LEGEND

Velocity Depth Product (m2/s)

- <= 0.3 "Low Flow Area"
- > 0.3 "High Flow Area"

Notes:

Aerial photograph date: 2015

N
W E
S

0 0.25 0.5 Km

Figure 37: High Flow Map for the 1% AEP Flood

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

File Name: Fig37 - High Flow Map.wor

TWEED SHIRE COUNCIL

Murwillumbah

Murwillumbah St

Murwillumbah St

William St

Riverview St

Wollumbin St

Nullum St

Knox Park

Condong St

LEGEND

- R3 Zone
- Existing Increased Density Area
- Additional Increased Density Area

Flood Planning Constraint Category

1a	2d
1b	2e
2a	3
2b	4
2c	

Notes:

Aerial photograph date: 2015

Results only shown where depths are above 0.15m

N

W E

S

0 0.1 0.2

Km

Figure 38: Flood Planning Constraint Map

Prepared By:

Catchment Simulation Solutions

Suite 2.01, 210 George St

Sydney, NSW 2000

File Name: Fig38 - Flood Planning Constraint Map.wor