

APPENDIX

Q2

INLAND  
RAIL 

# Hydrology and Flooding Technical Report—Volume II

Part 2 of 3

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

APPENDIX

# Q2

## Hydrology and Flooding Technical Report—Volume II

### **Appendix F** Bringalily Creek Flood Maps

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT



# Appendix F

## Bringalily Creek Flood Maps

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Map by: SV / DTH 2:10USGS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_Fig1-A\_Locality\_BRI.mxd Date: 22/07/2020 16:18



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Watercourses
- Minor roads
- Road design
- Project footprint



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



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**Border to Gowrie**  
**Figure F1-A:**  
**Locality plan - Bringalily Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_FigX4-B\_SurveyData.mxd Date: 22/07/2020 09:24



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Hydrologic model extent

LiDAR datasets (1m grid)  
 2015 ARTC LiDAR 1m



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km

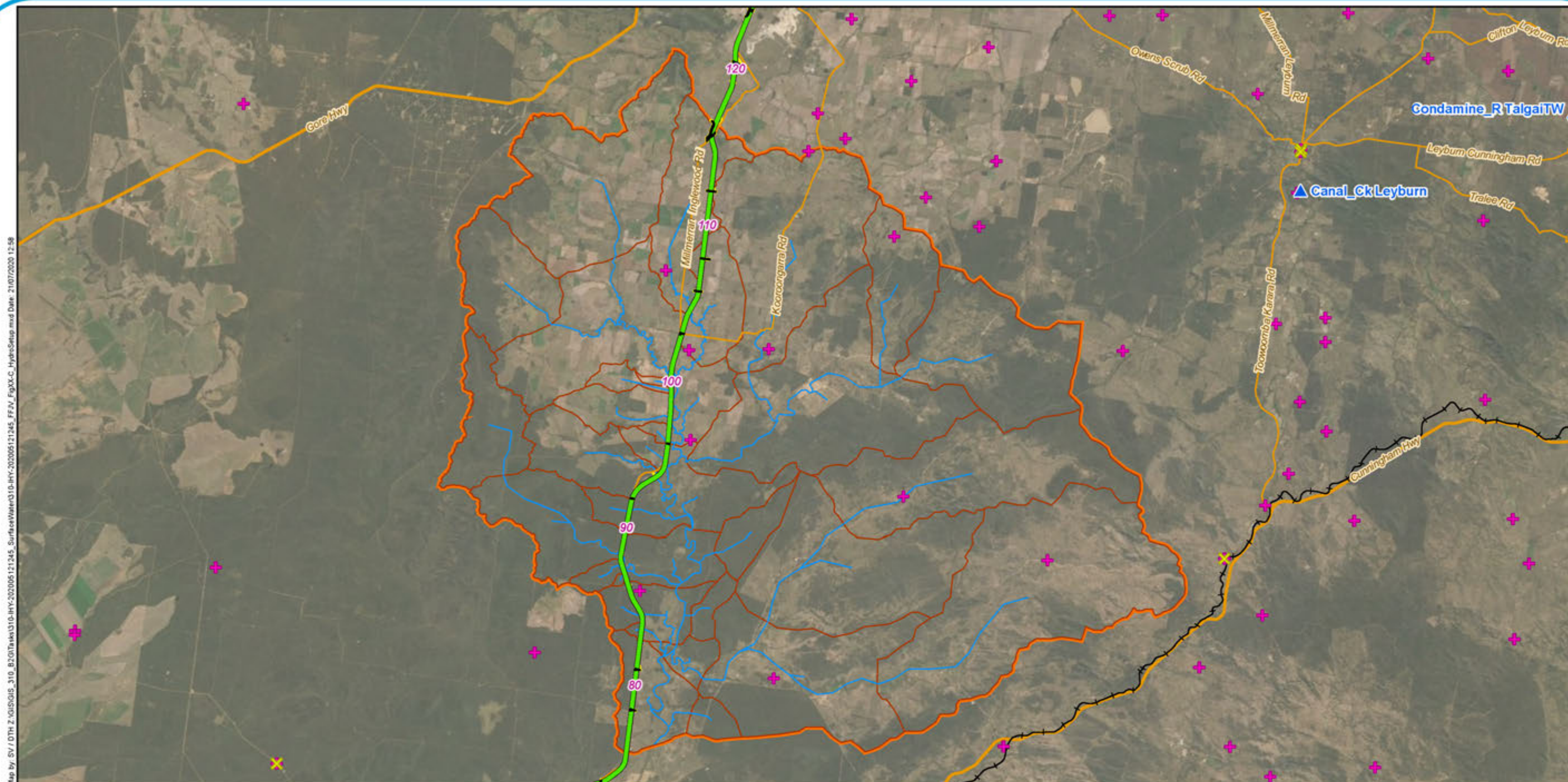


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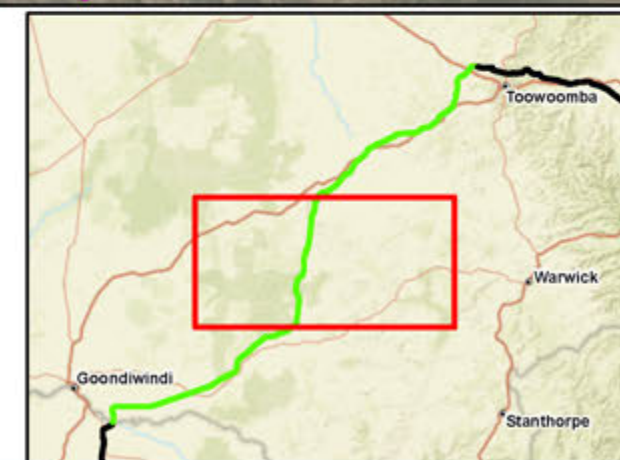
**Border to Gowrie**  
**Figure F1-B:**  
**Survey data - Bringalily Creek**





#### Legend

- |                             |                   |                         |                         |
|-----------------------------|-------------------|-------------------------|-------------------------|
| 5 Chainage (km)             | Major roads       | Catchment links         | Pluviograph stations    |
| Existing rail (operational) | Minor roads       | Sub-catchments          | Daily rainfall stations |
| Border to Gowrie alignment  | Road design       | Hydrologic model extent | Stream gauge locations  |
|                             | Project footprint |                         |                         |



A3 scale: 1:260,000  
 0 2.5 5 7.5 10 12.5 km



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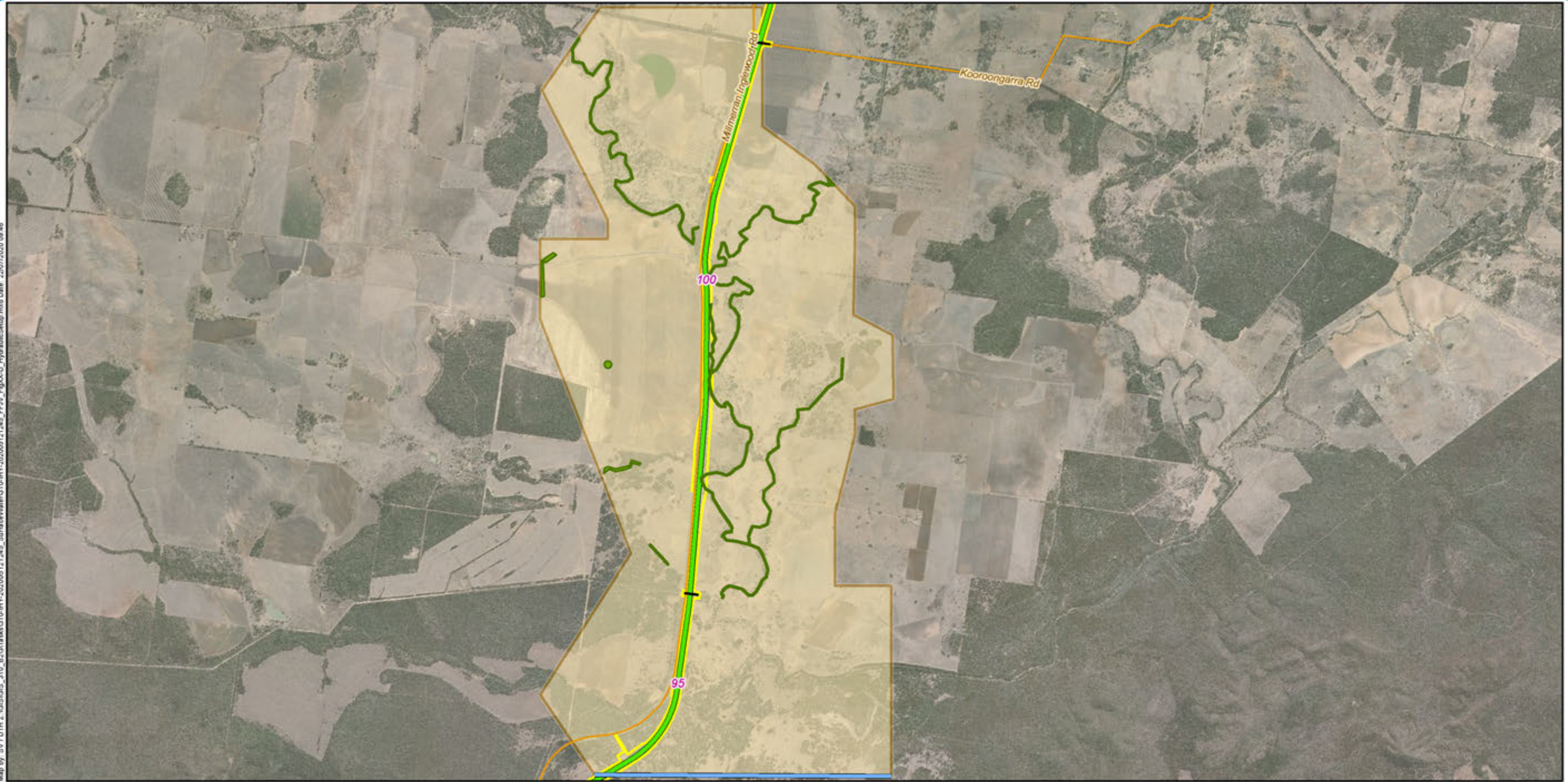
**Border to Gowrie**

**Figure F1-C:**

**Hydrologic model setup - Bringalily Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_FigD-D\_HydraulicSetup.mxd Date: 22/07/2020 09:48



#### Legend

- |                            |                   |                        |
|----------------------------|-------------------|------------------------|
| 5 Chainage (km)            | Minor roads       | Hydraulic model extent |
| Border to Gowrie alignment | Road design       | Outflow boundaries     |
|                            | Project footprint | Inflow boundaries      |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



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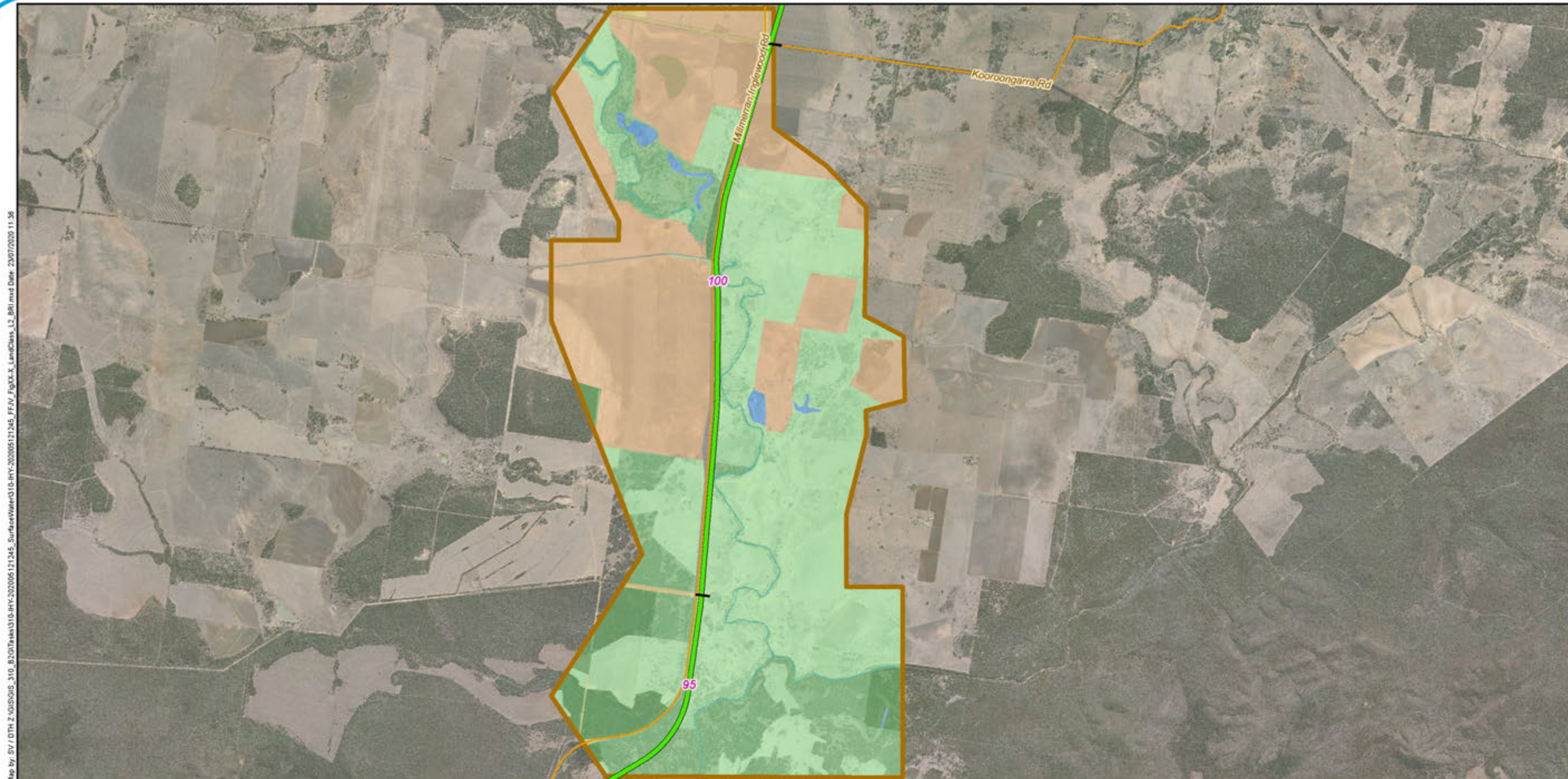
Issue date: 22/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F1-D:**

**Hydraulic model setup - Bringalily Creek**





#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design

Hydraulic model extent

#### Landuse classification

- |                                  |                                 |
|----------------------------------|---------------------------------|
| River (n=0.035)                  | Open space - mod veg (n=0.055)  |
| Sealed road corridor (n=0.015)   | Openspace - heavy veg (n=0.065) |
| Unsealed road corridor (n=0.025) | Riparian (n=0.040)              |
| Open space - min veg (n=0.045)   | Crop (n=0.109)                  |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



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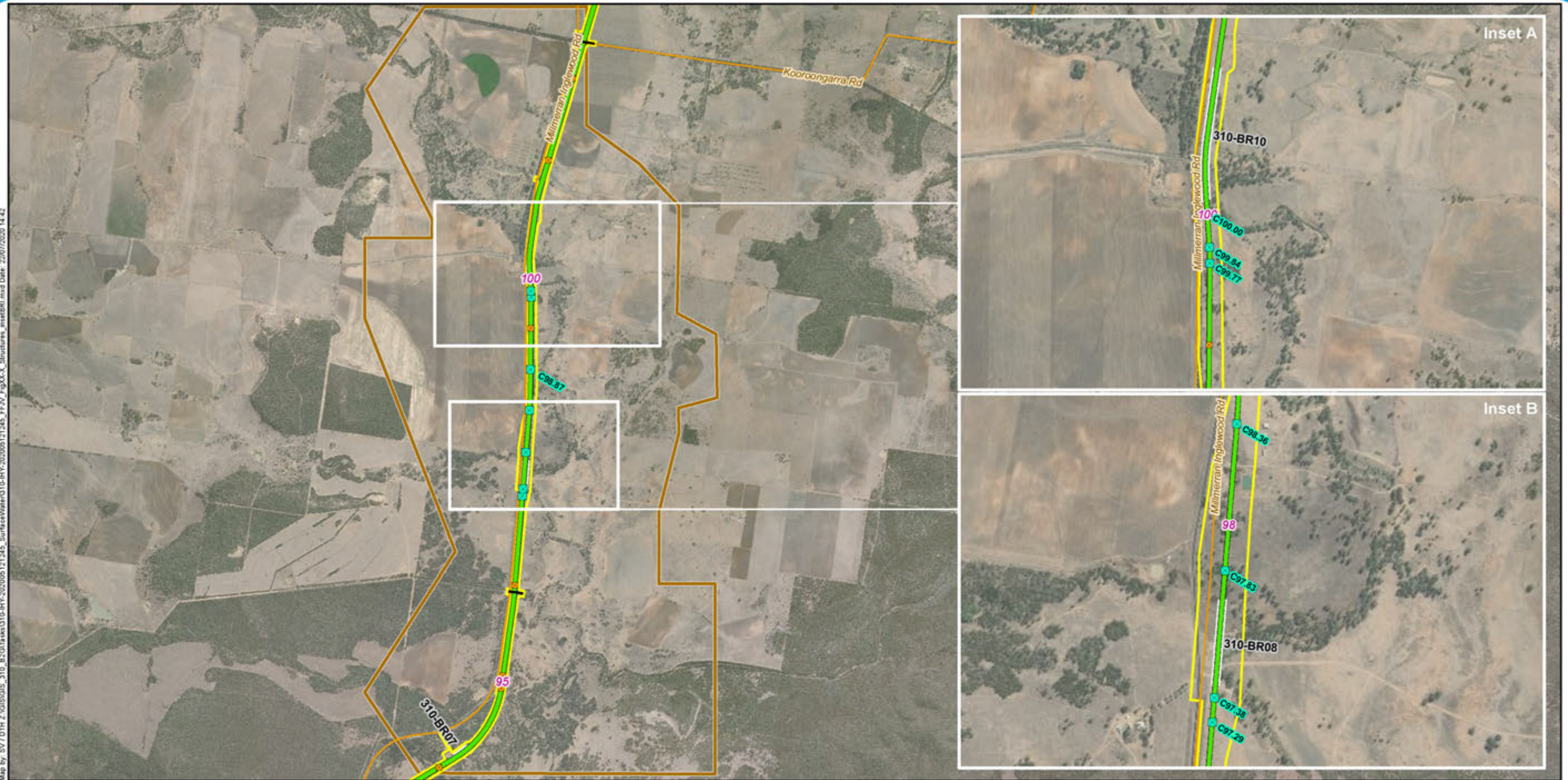
**Border to Gowrie**

**Figure F1-E:**

**Landuse classifications - Bringalily Creek**



Map by SV / DTH 2:10USGS\_310\_820Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3V\_FigX-X\_Structures\_insetBRI.mxd Date: 22/07/2020 14:42



#### Legend

- |                            |                        |
|----------------------------|------------------------|
| 5 Chainage (km)            | Minor roads            |
| Floodplain culvert         | Road design            |
| Local drainage culvert     | Project footprint      |
| Bridges                    | Hydraulic model extent |
| Border to Gowrie alignment |                        |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



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 Coordinate System: GDA 1994 MGA Zone 56

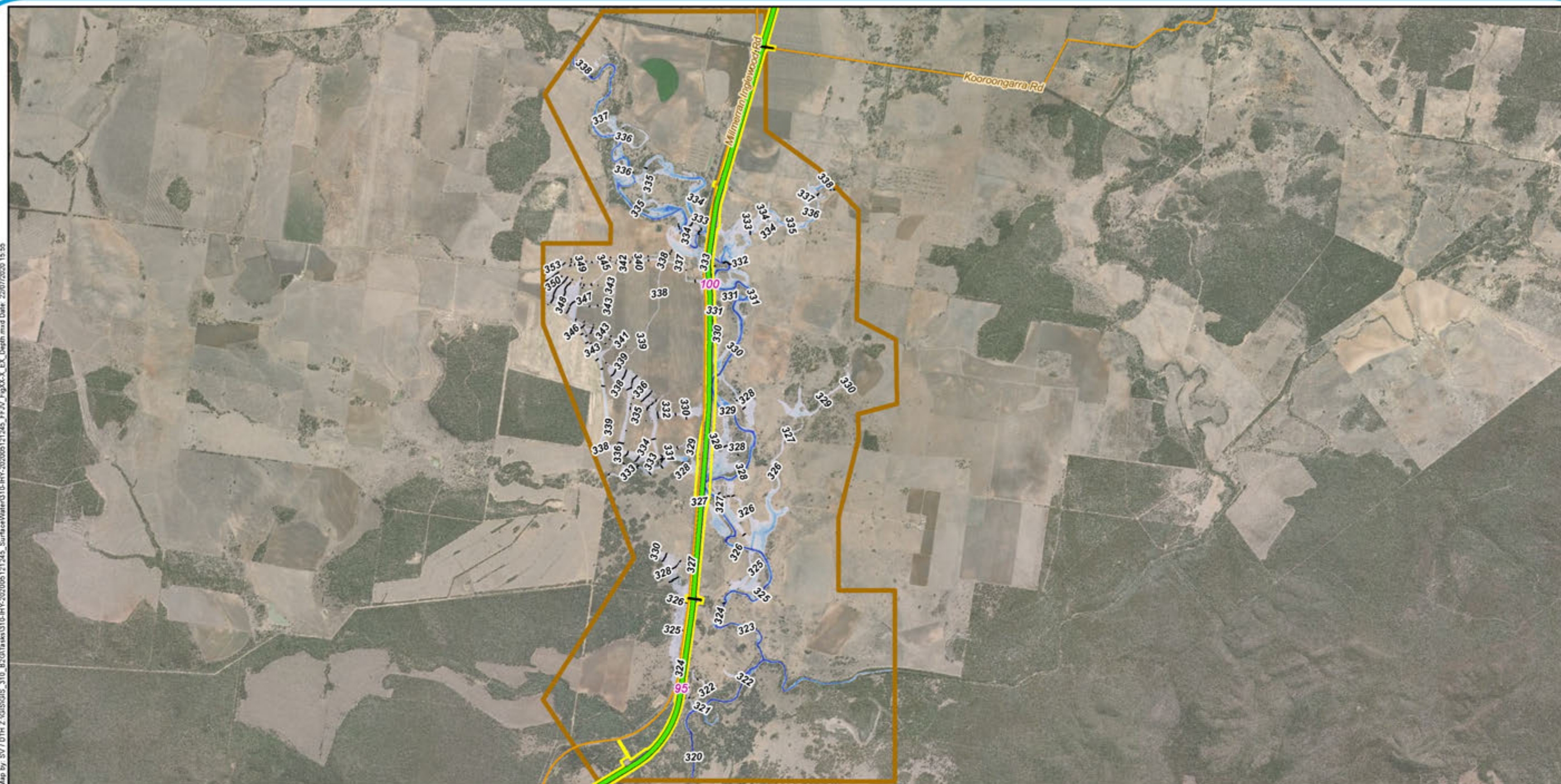
**Border to Gowrie**

**Figure F1-F:**

**Proposed design structures - Bringalily Creek**



Map by: SV / DTH 2:10USQGIS\_310\_B20TTask310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

## Depth (m)

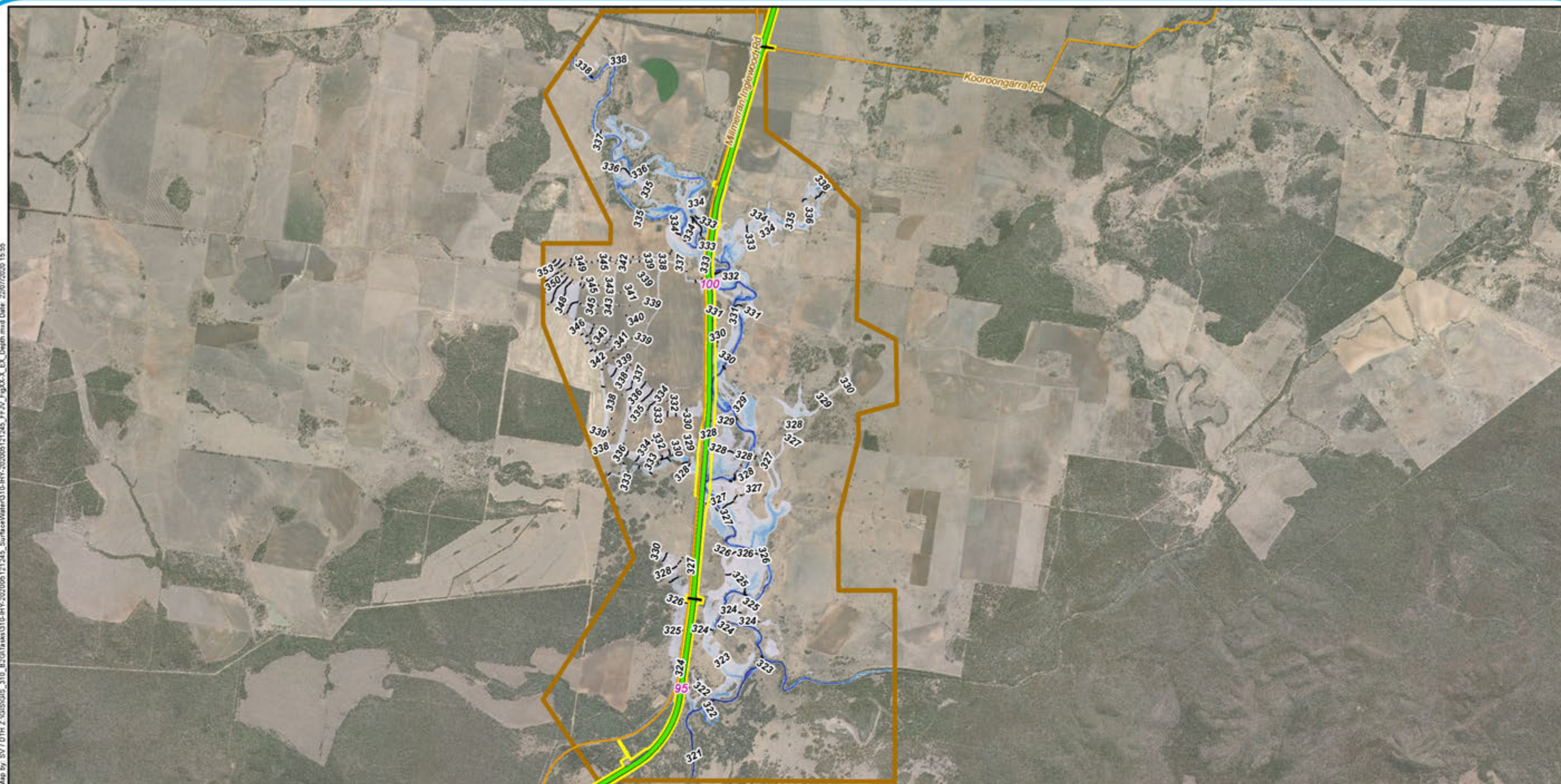
- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">□</span> 0 - 0.5   | <span style="color: blue;">□</span> 3.0 - 3.5          |
| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: blue;">□</span> 4.0 - 4.5          |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: blue;">□</span> 4.5 - 5.0          |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



Map by: SV / DTH 2:10USQGIS\_310\_B207Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

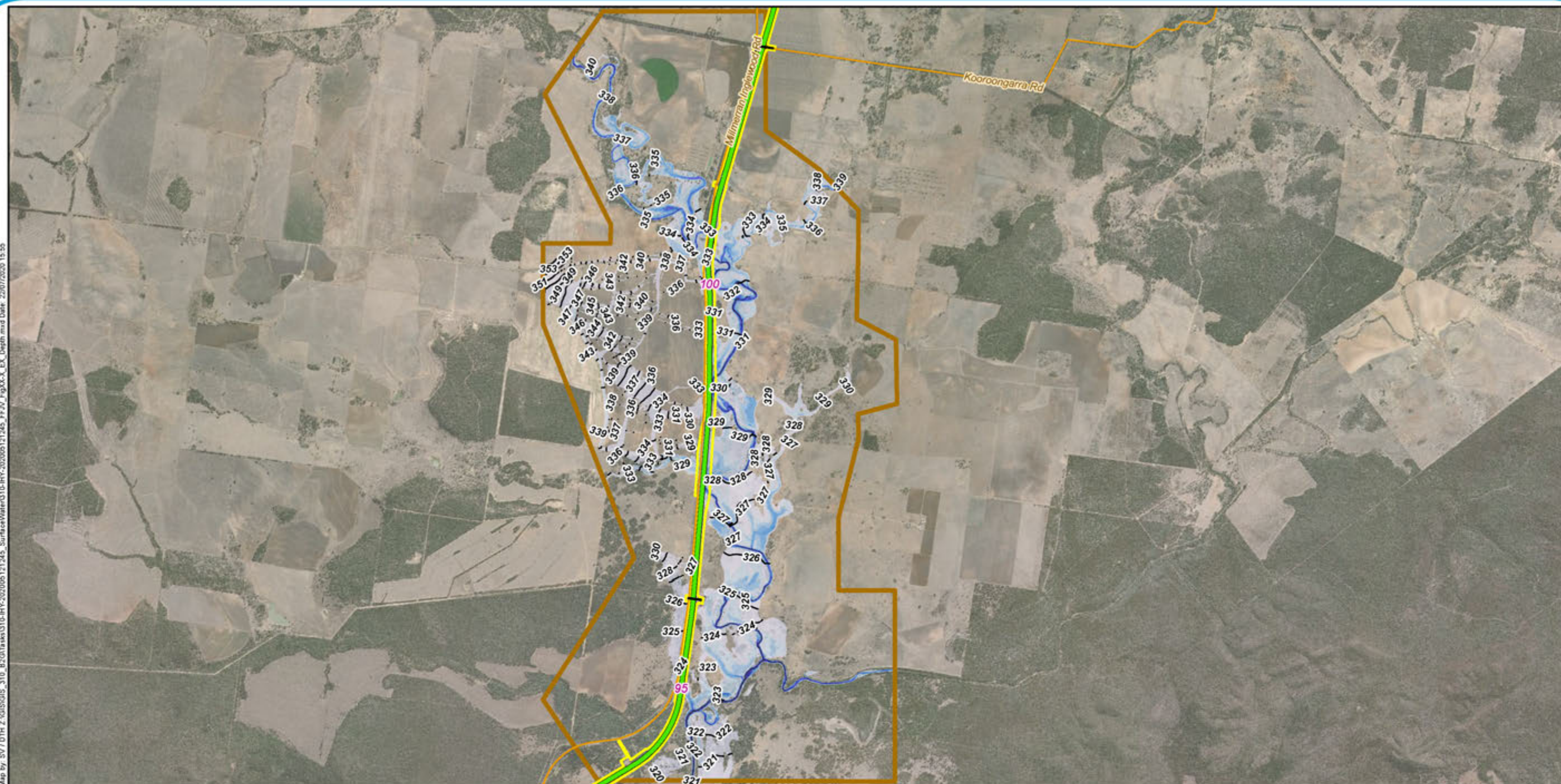
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| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: blue;">□</span> 4.0 - 4.5          |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: blue;">□</span> 4.5 - 5.0          |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5km



Map by SV / DTH 2:10USQGIS\_310\_B20TTask310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

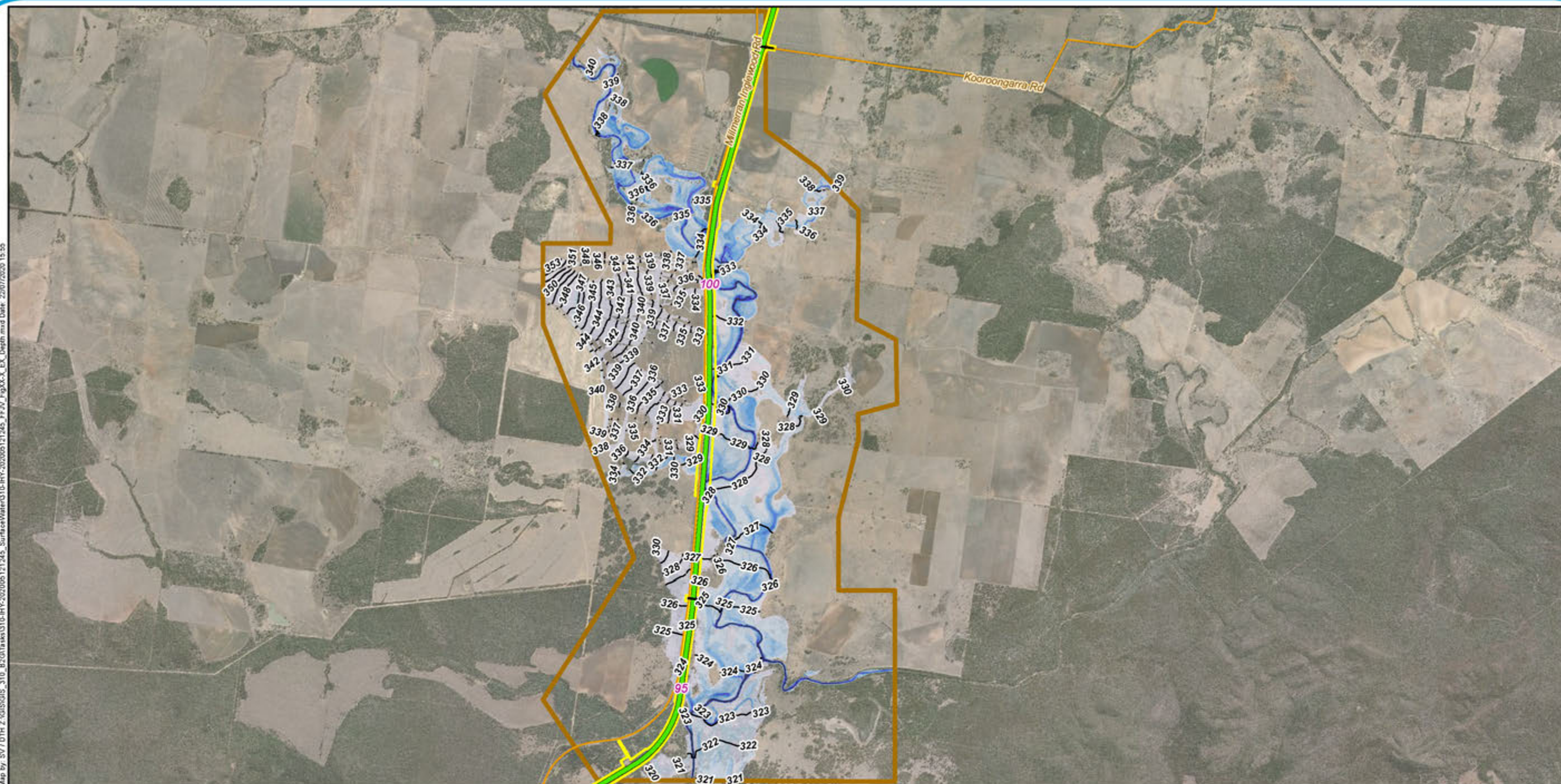
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|----------------------------------------------------|--------------------------------------------------------|
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| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: blue;">□</span> 4.0 - 4.5          |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: blue;">□</span> 4.5 - 5.0          |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: blue;">□</span> 2.5 - 3.0      | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5km



Map by SV / DTH 2:10USQGIS\_310\_B20TTask310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

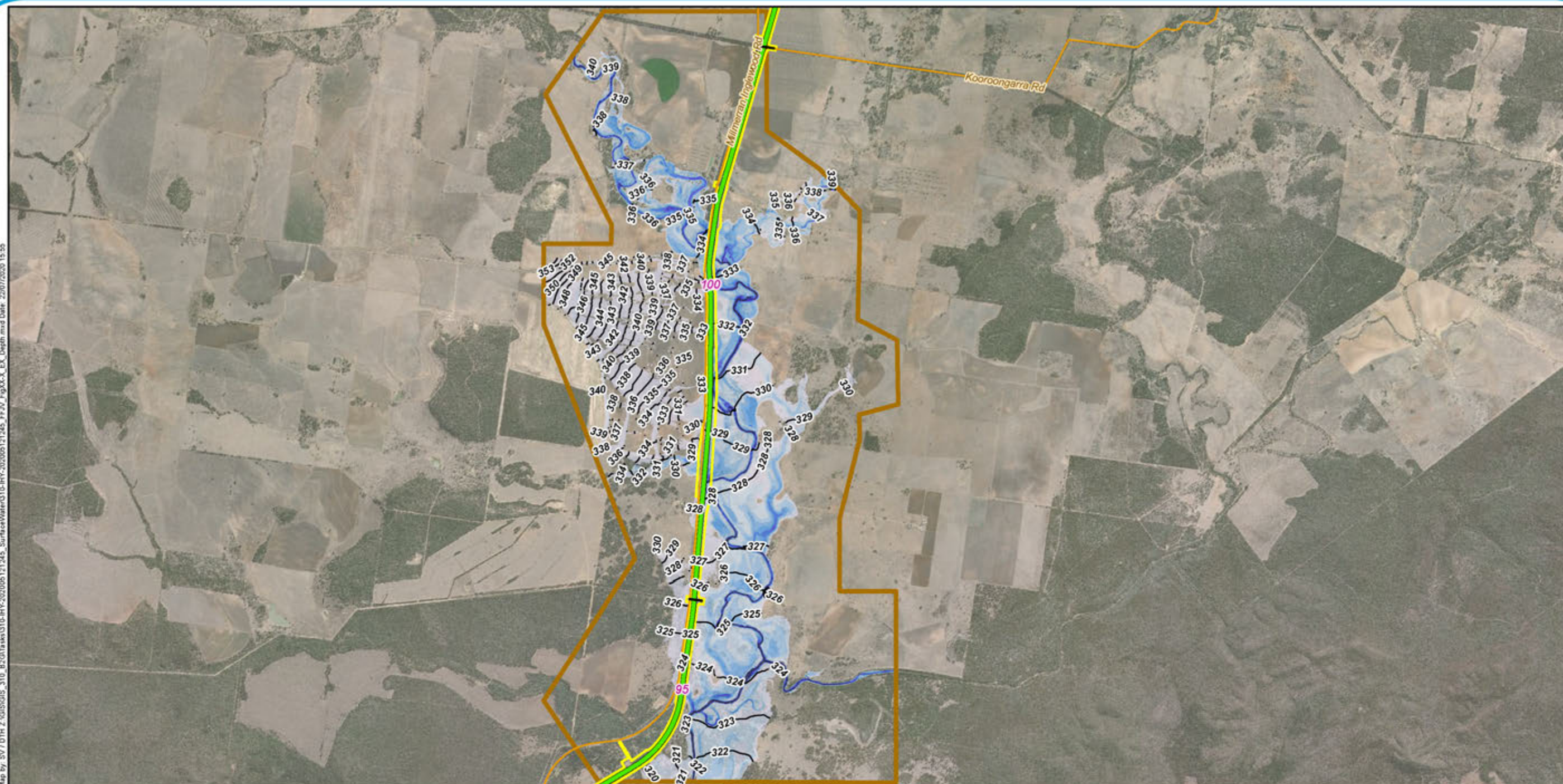
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| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



Map by SV / DTH 2:10USQGIS\_310\_8201Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

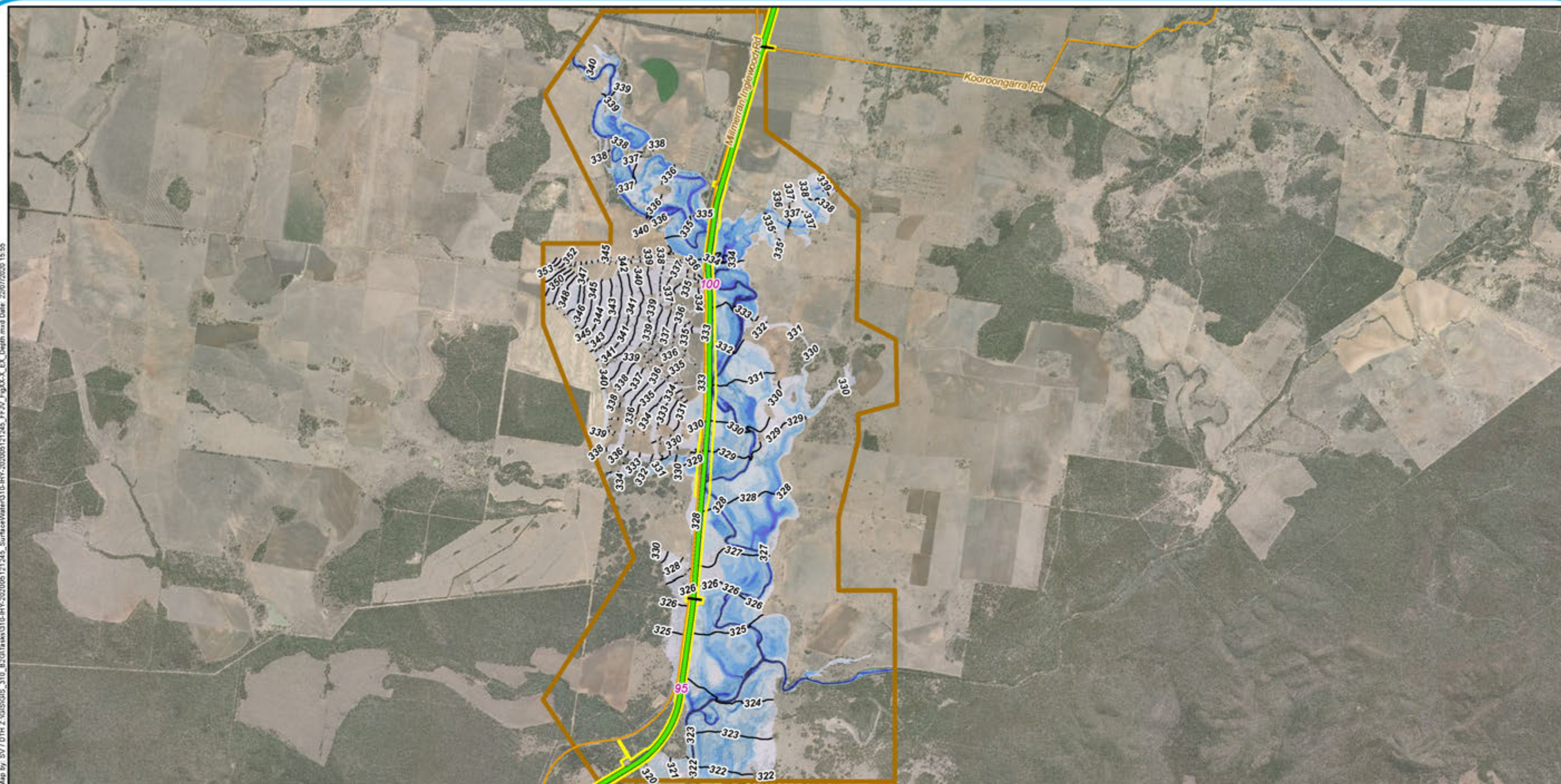
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| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
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| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



Map by SV / DTH 2:10USQGIS\_310\_B207Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

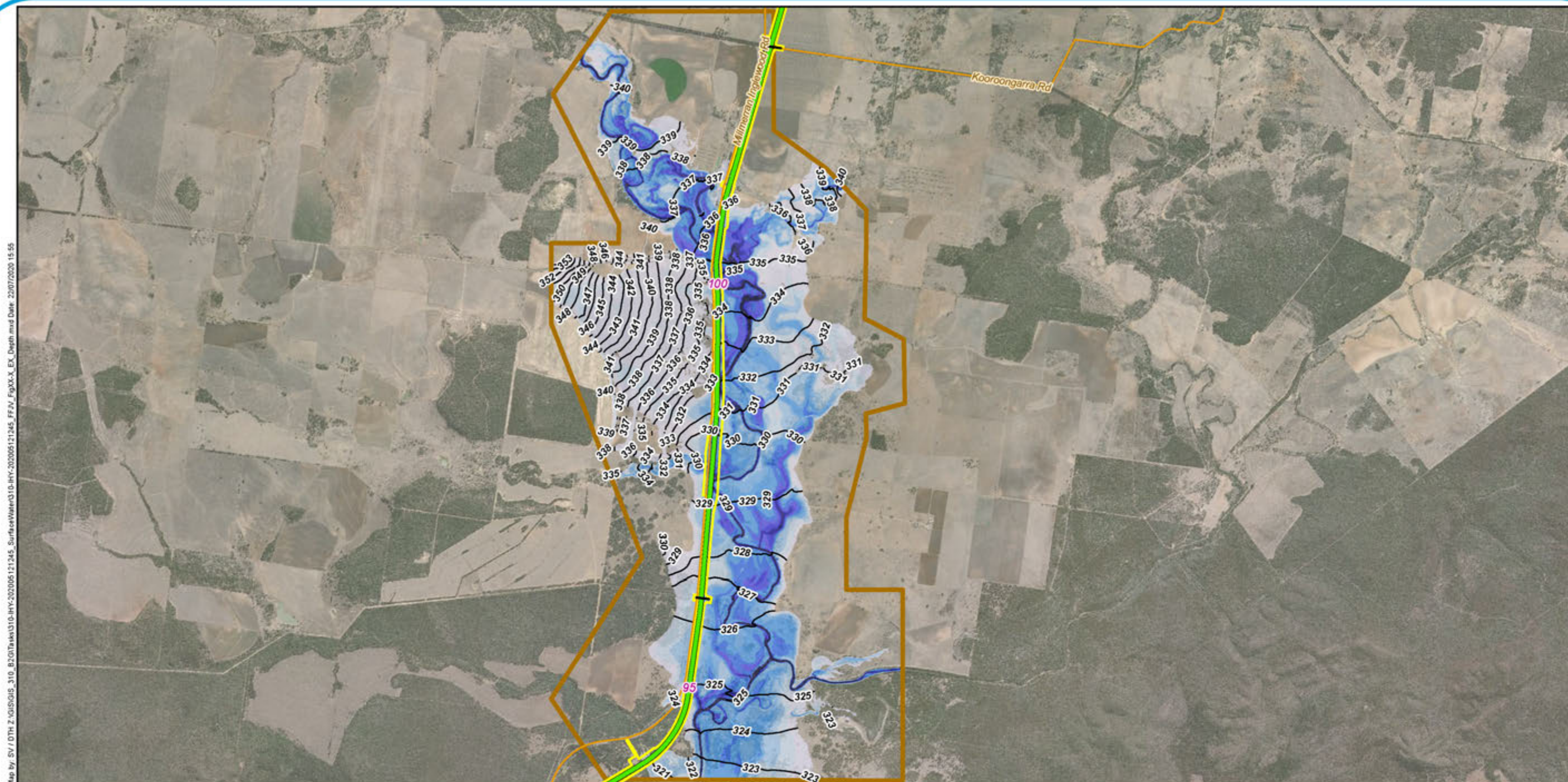
#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
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| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
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| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km





#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

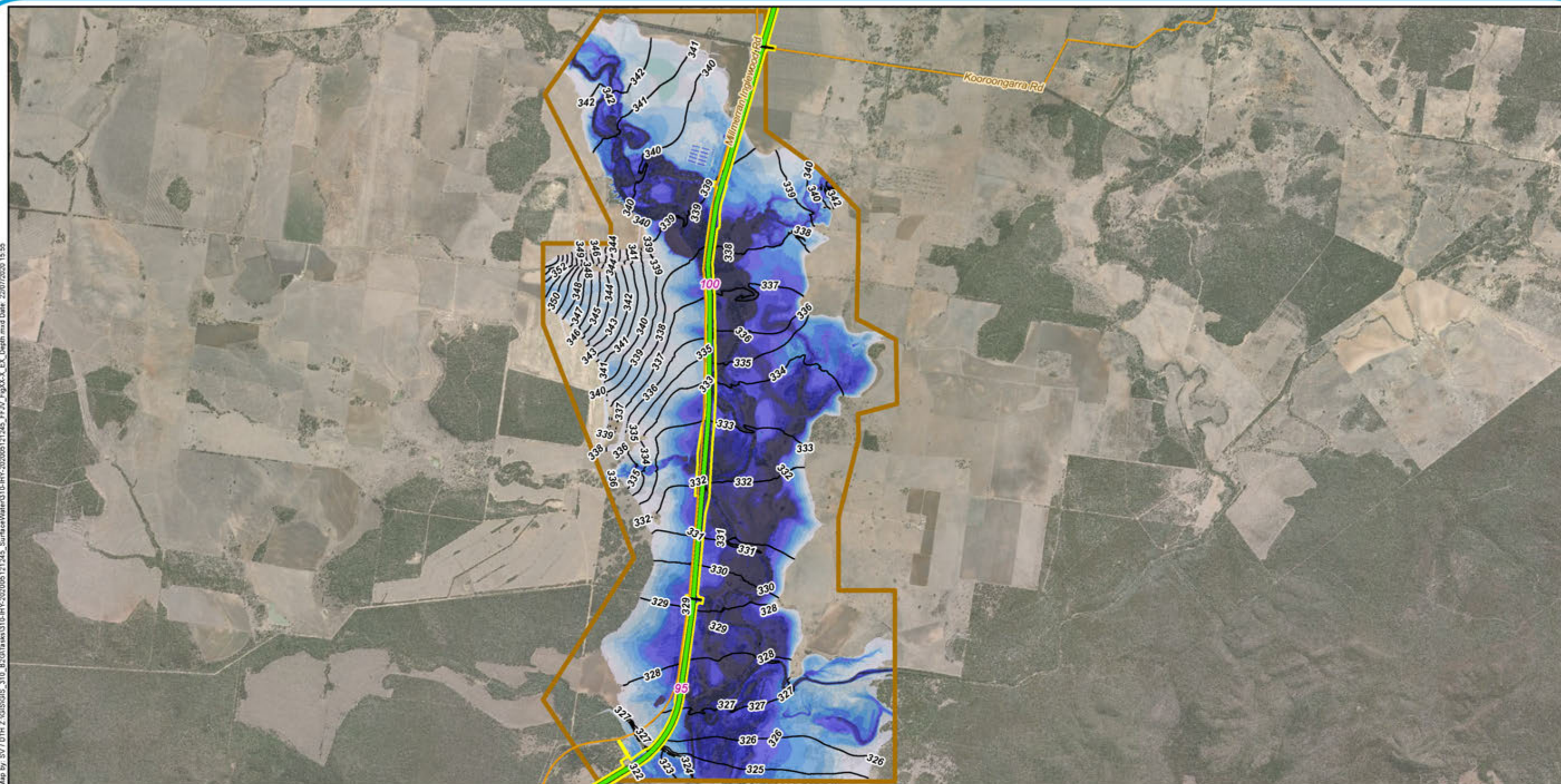
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|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
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| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
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| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5 km



Map by SV / DTH 2:10USGIS\_310\_B207Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">□</span> 0 - 0.5   | <span style="color: blue;">□</span> 3.0 - 3.5          |
| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: blue;">□</span> 4.0 - 4.5          |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: blue;">□</span> 4.5 - 5.0          |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5km



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Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

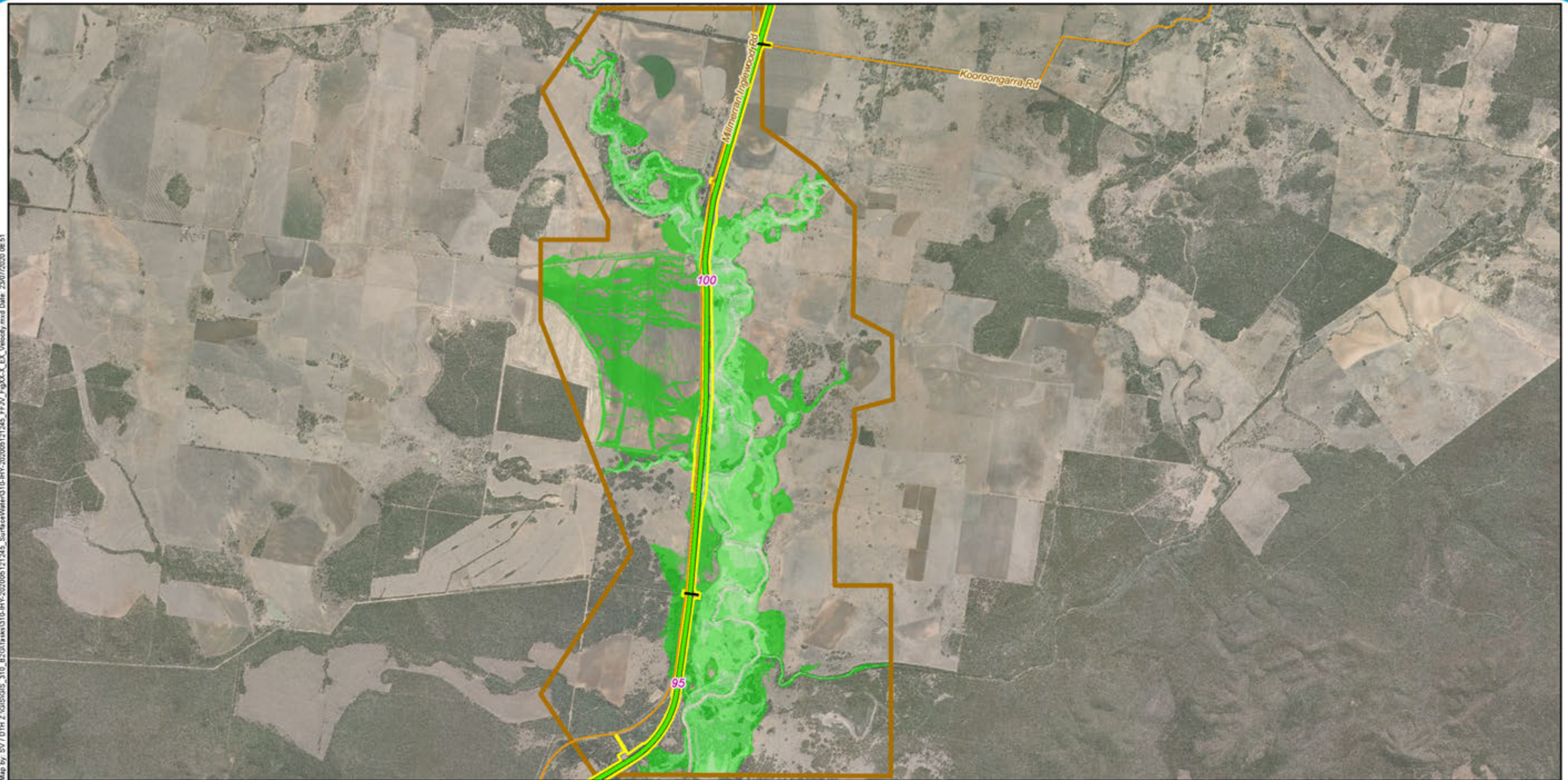
**Border to Gowrie**

**Figure F2-H:**

**PMF peak water levels - Existing Case - Bringalily Creek**



Map by SV / DTH 2:10USQGIS\_310\_B201Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig3A-X\_EX\_Velocity.mxd Date: 23/07/2020 08:51



### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

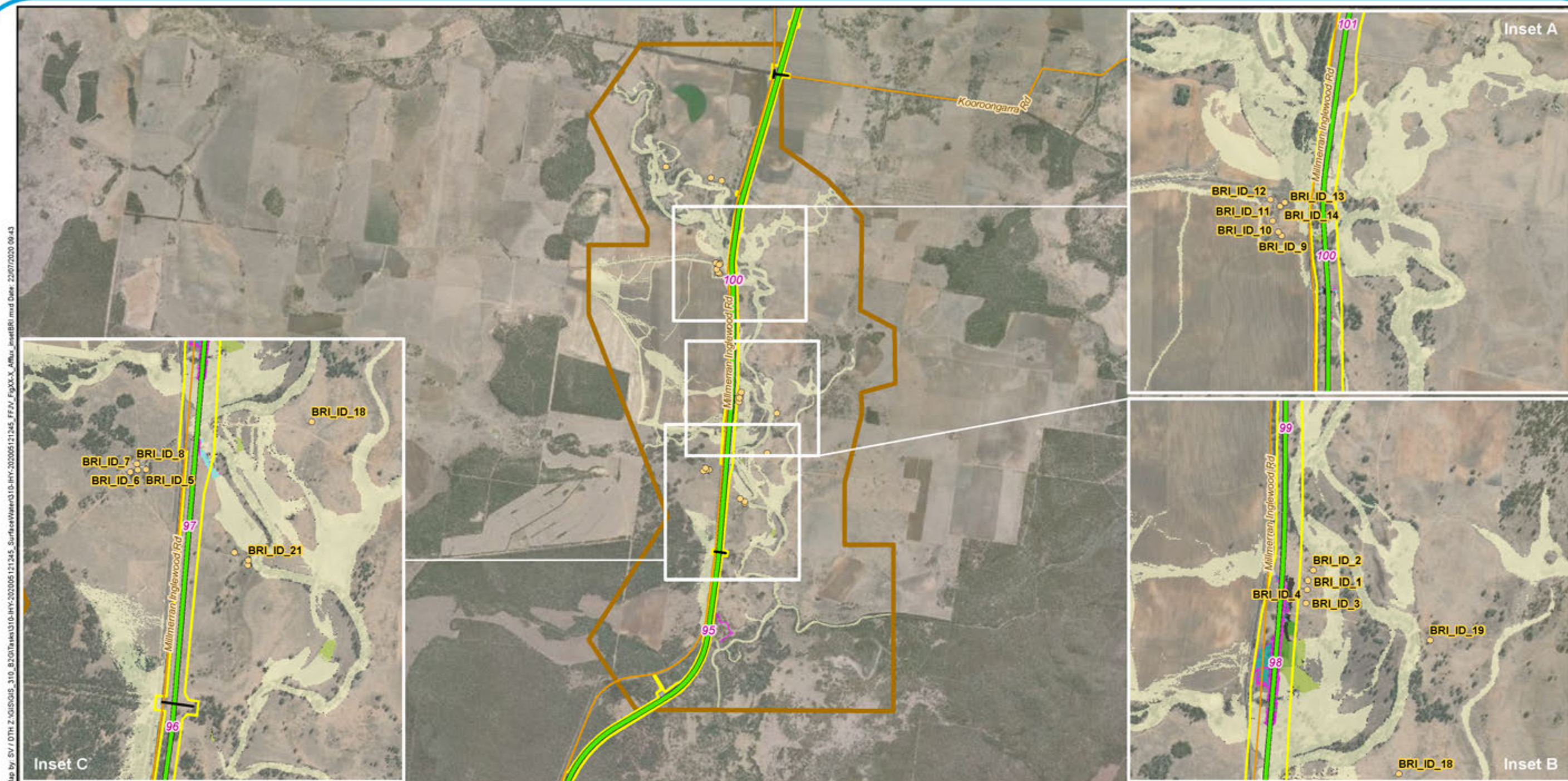
### Peak velocity (m/s)

|     |     |
|-----|-----|
| 0.0 | 3.0 |
| 0.5 | 3.5 |
| 1.0 | 4.0 |
| 1.5 | 4.5 |
| 2.0 | 5.0 |
| 2.5 |     |



A3 scale: 1:52,000  
 0 0.5 1 1.5 2 2.5km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

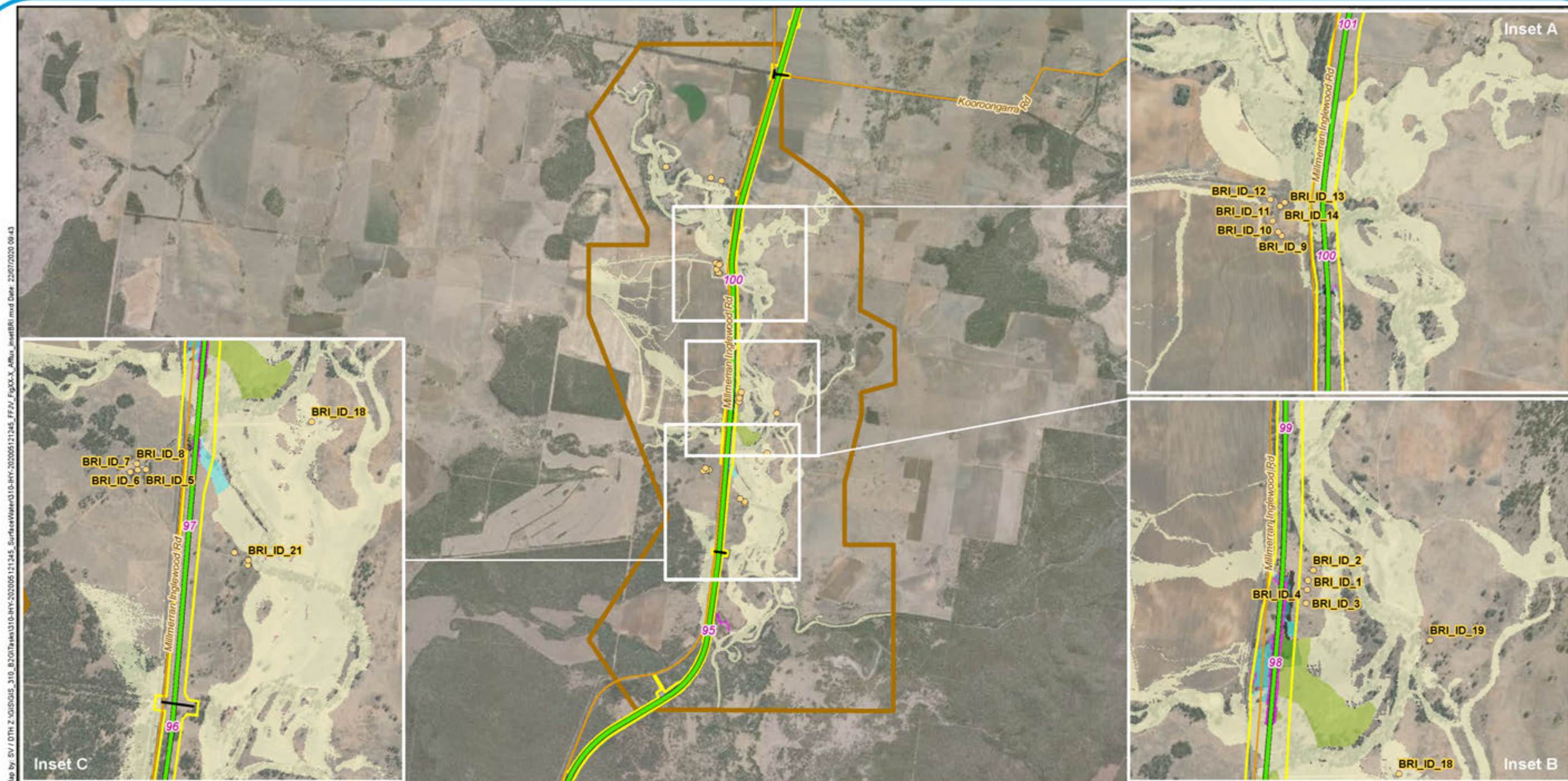
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: lightteal;">■</span> -0.20 to -0.10 | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: cyan;">■</span> -0.10 to -0.05      | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">■</span> -0.05 to -0.01 | <span style="color: darkgreen;">■</span> > 0.5          |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #000080; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #008080; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #3CB371; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #00CED1; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #228B22; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #40E0D0; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #006400; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #7FFFD4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #006400; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #FFFF00; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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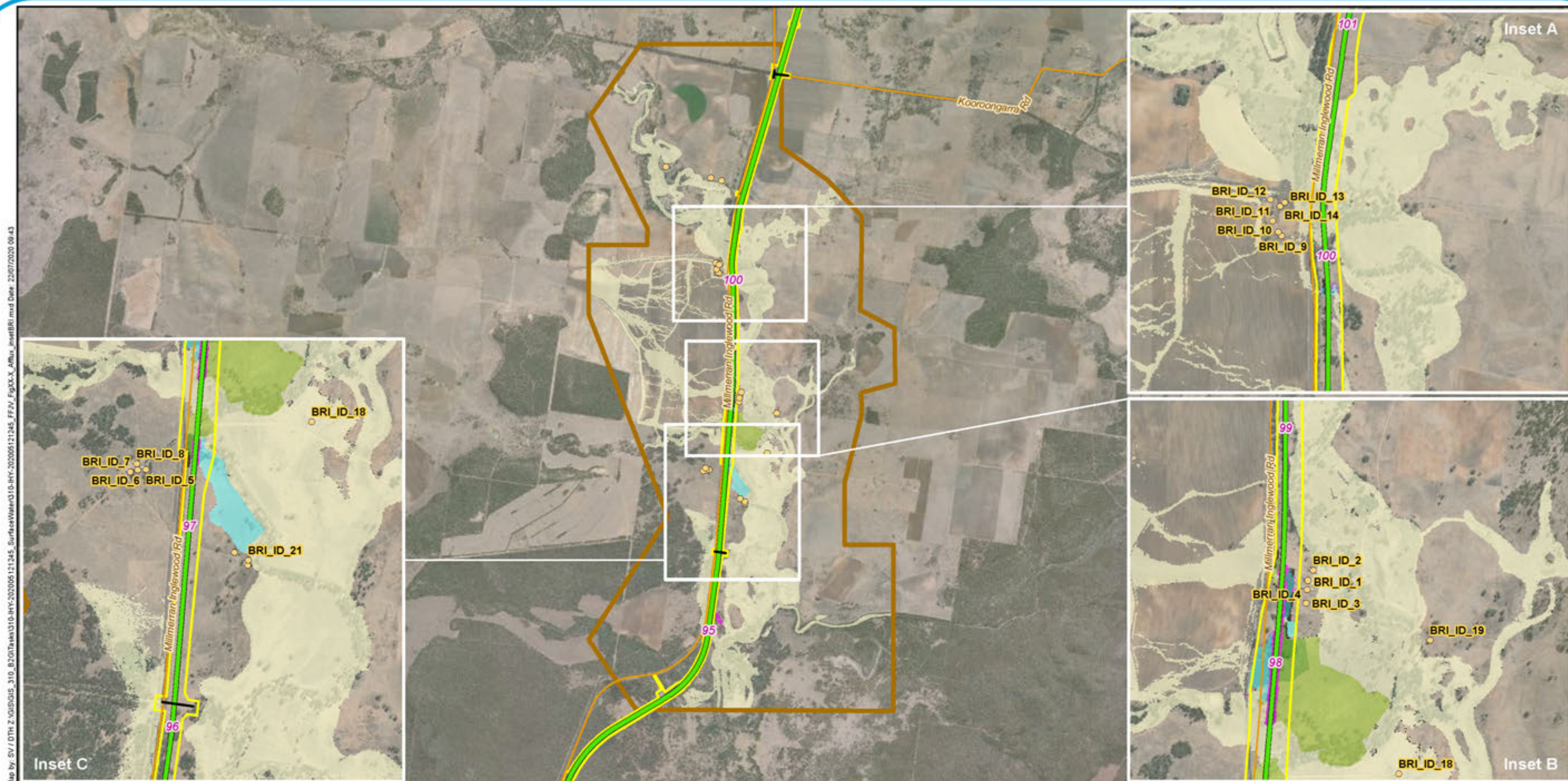
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F4-B:**

**10% AEP - design afflux - Bringalily Creek**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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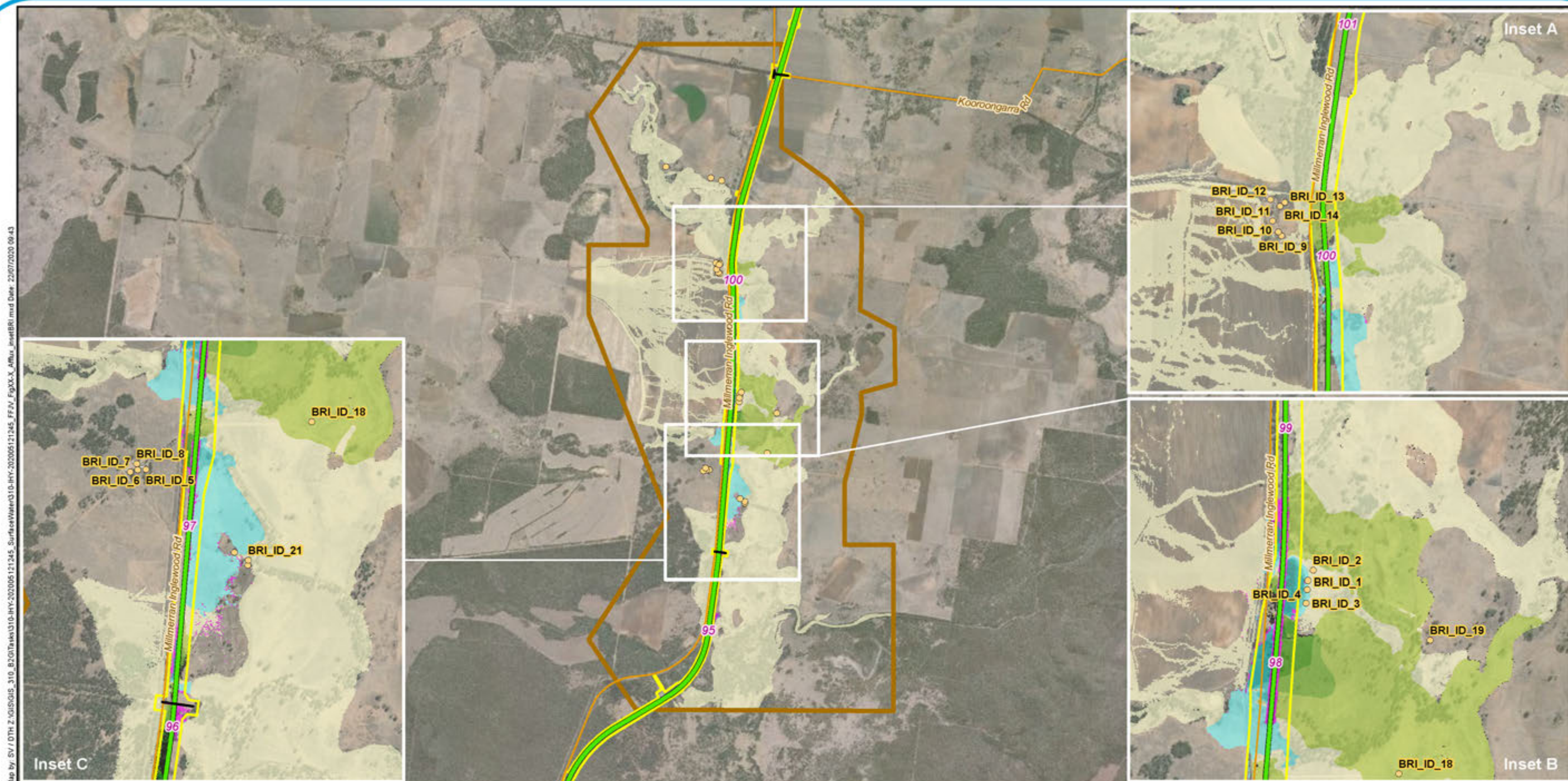
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F4-C:**

**5% AEP - design afflux - Bringalily Creek**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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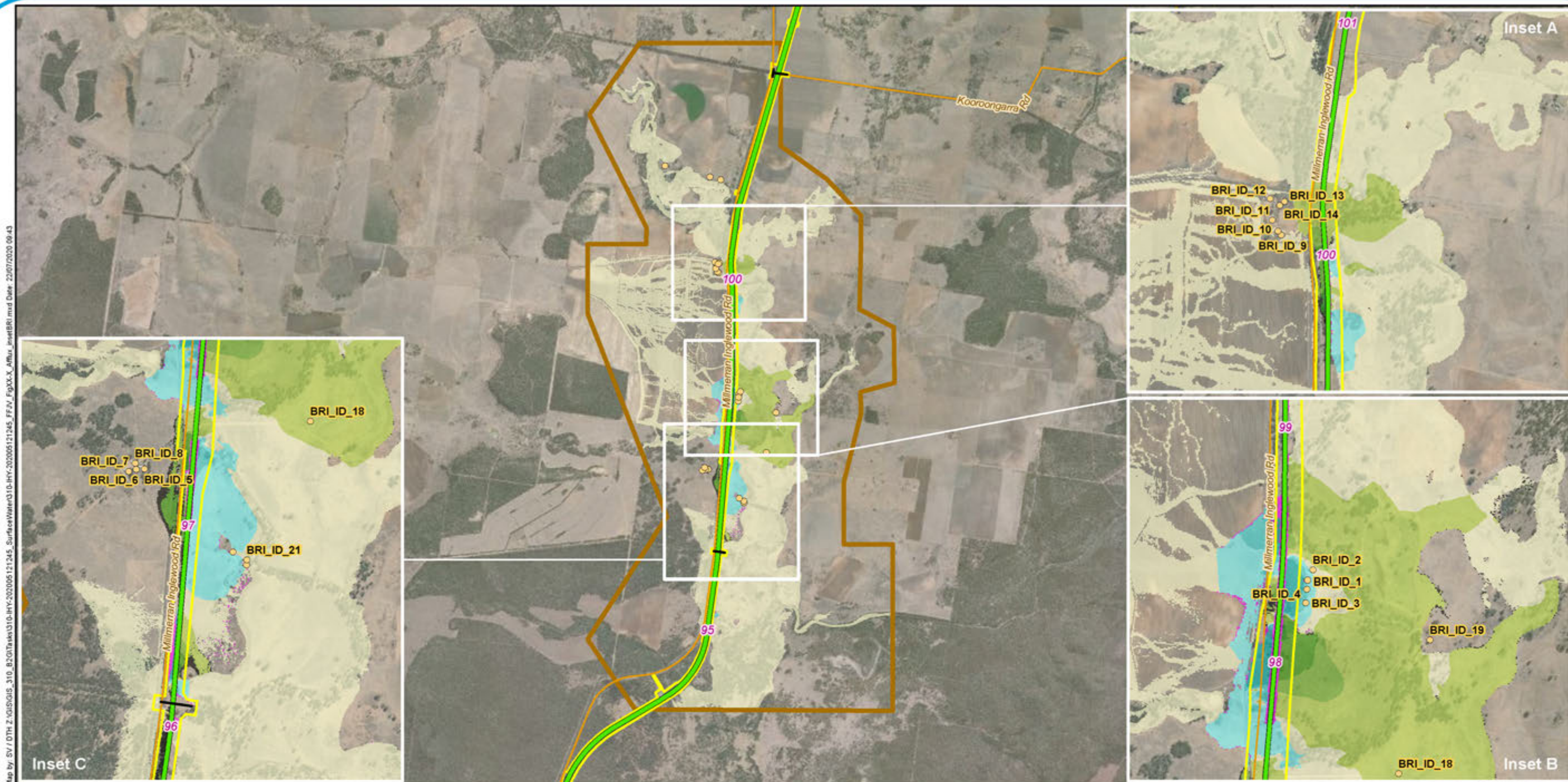
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F4-D:**

**2% AEP - design afflux - Bringalily Creek**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

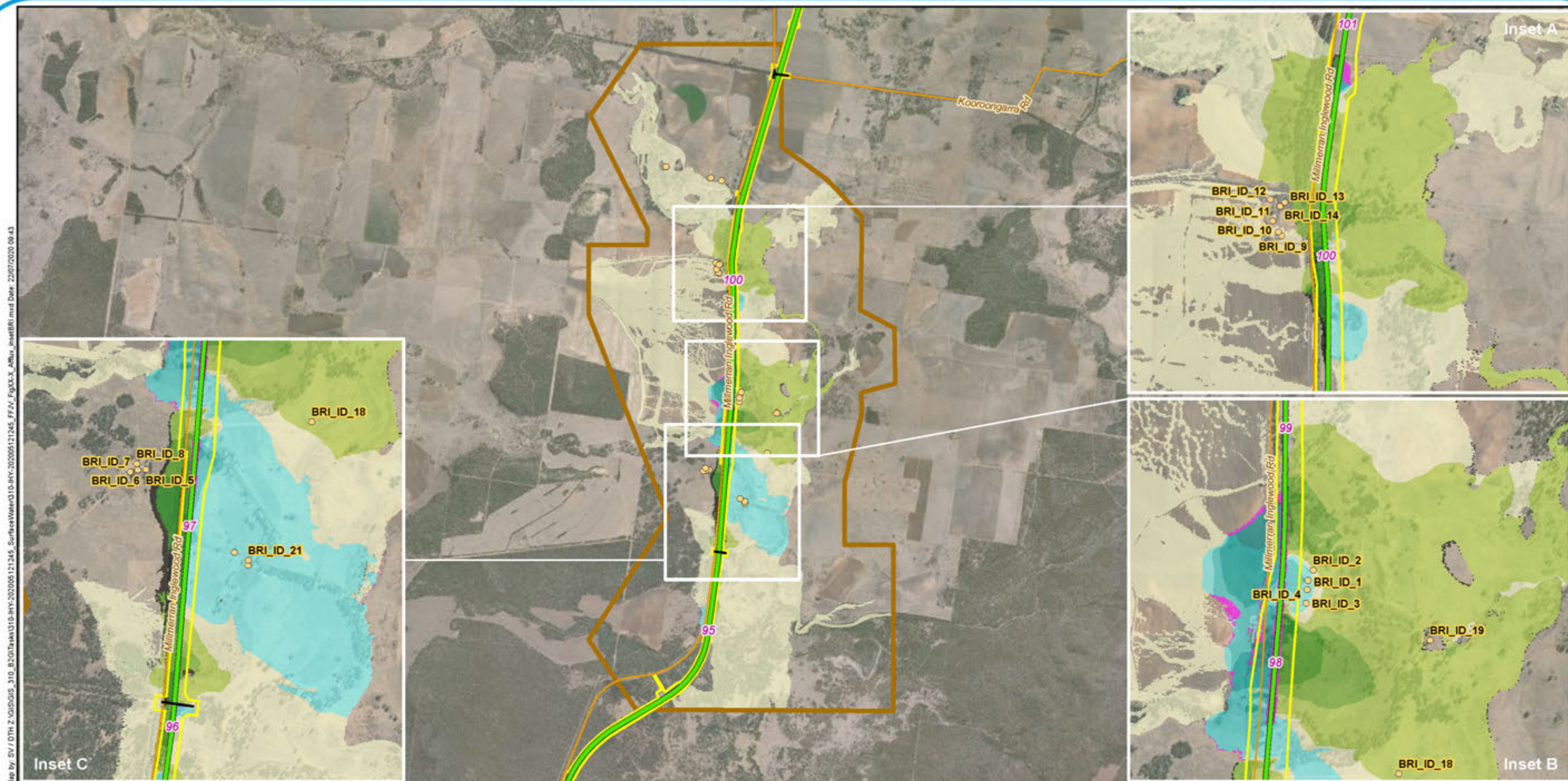
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkgreen;">■</span> > 0.5          |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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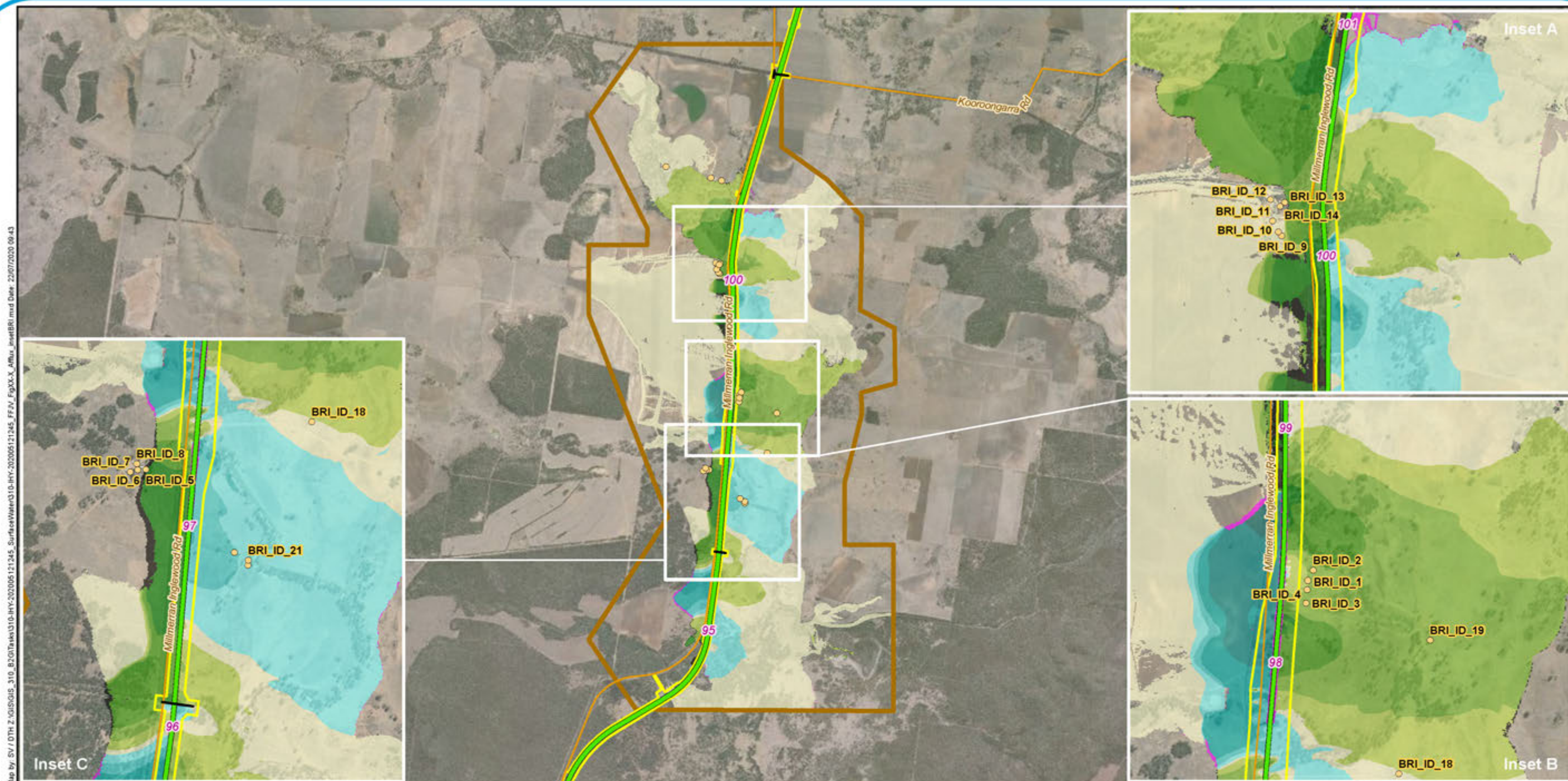
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F4-F:**

**1 in 2,000 AEP - design afflux - Bringalily Creek**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

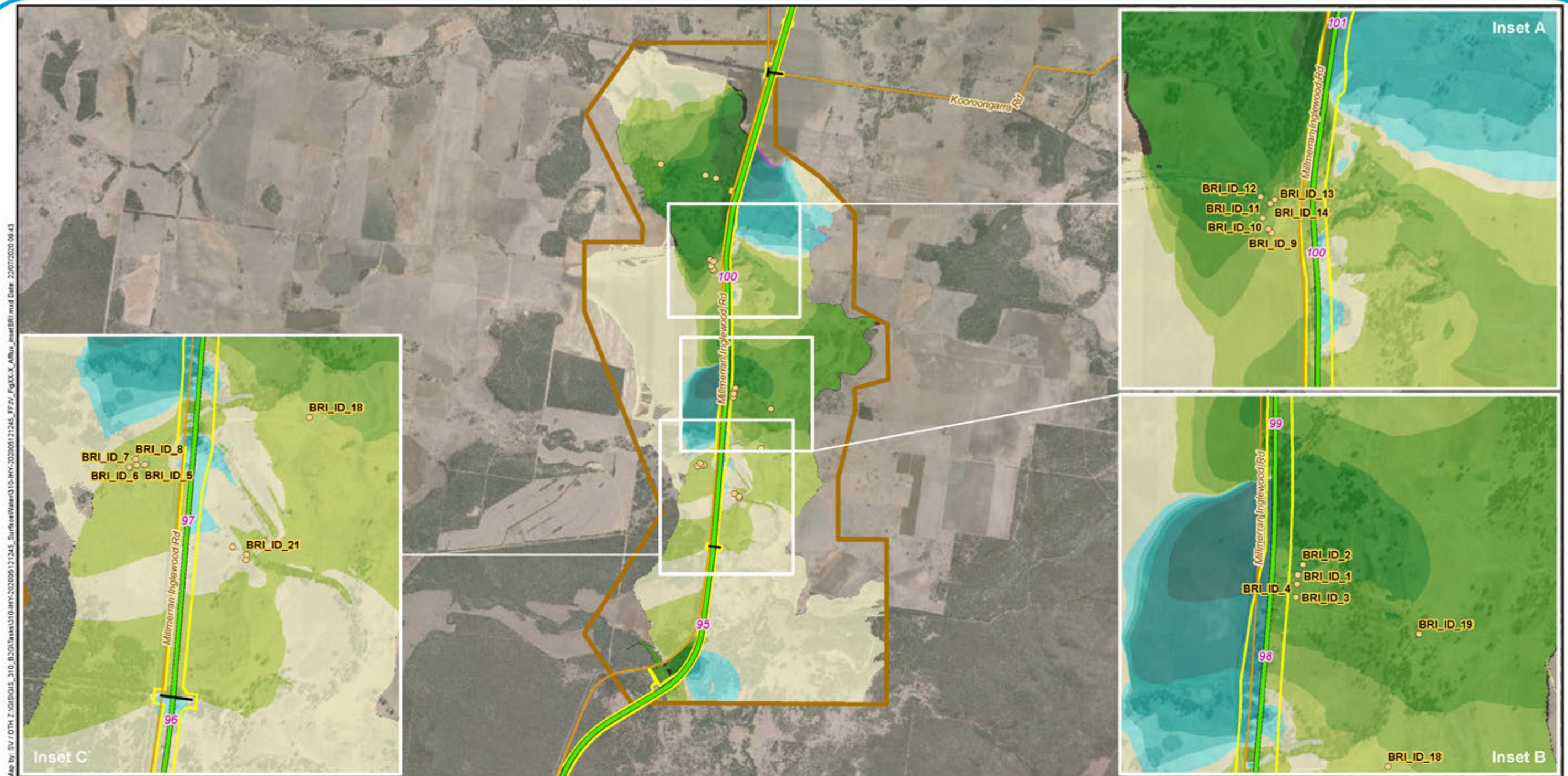
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

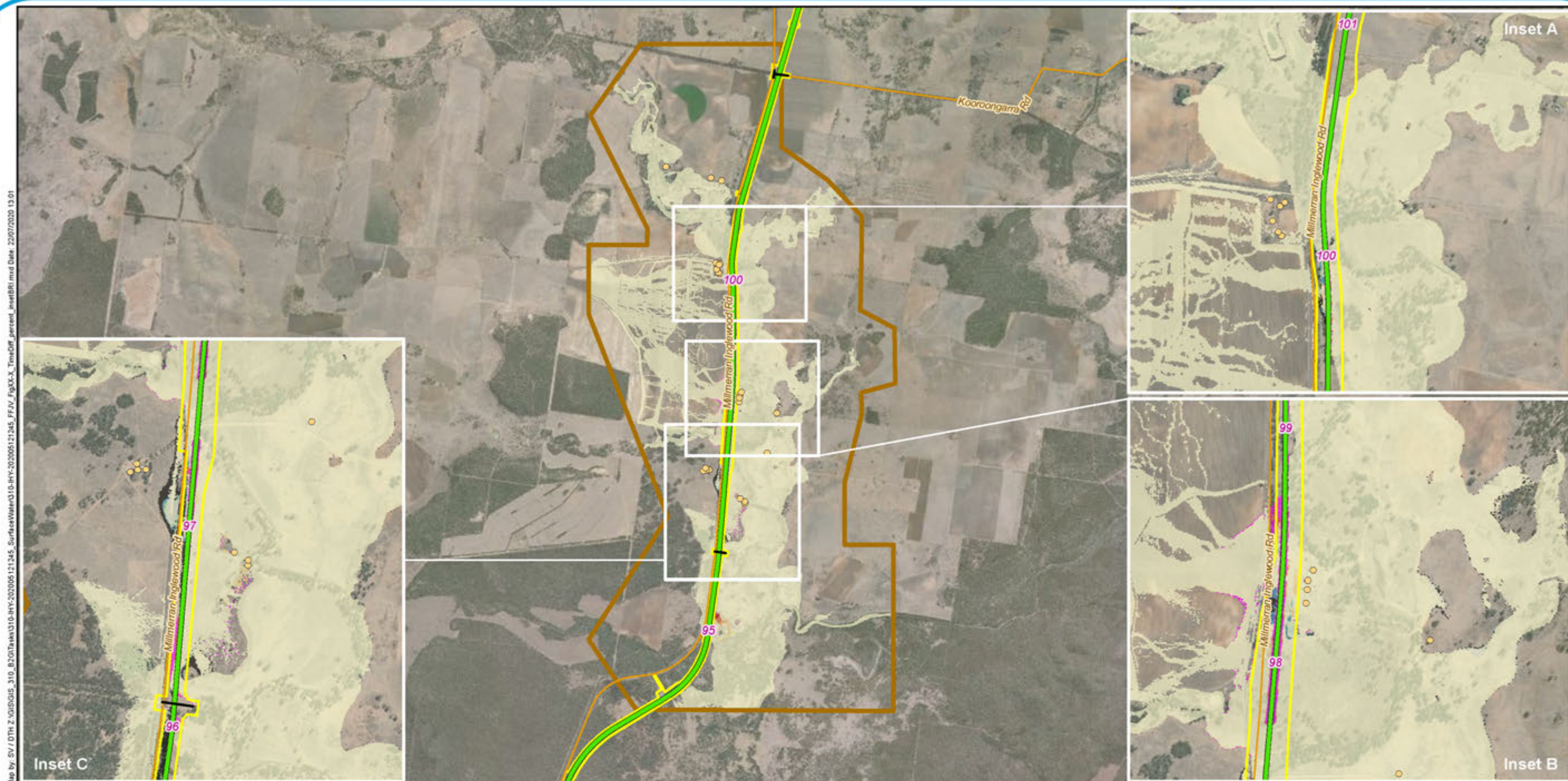
#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in Time of Inundation (percentage)

- |                                                              |                                                       |
|--------------------------------------------------------------|-------------------------------------------------------|
| <span style="color: red;">■</span> < -50%                    | <span style="color: lightgreen;">■</span> 10% to 20 % |
| <span style="color: orange;">■</span> -50% to -40%           | <span style="color: green;">■</span> 20% to 30 %      |
| <span style="color: yellow;">■</span> -40% to -30%           | <span style="color: teal;">■</span> 30% to 40 %       |
| <span style="color: lightyellow;">■</span> -30% to -20%      | <span style="color: blue;">■</span> 40% to 50 %       |
| <span style="color: yellowgreen;">■</span> -20% to -10%      | <span style="color: darkblue;">■</span> > 50%         |
| <span style="color: lightyellowgreen;">■</span> -10% to 10 % |                                                       |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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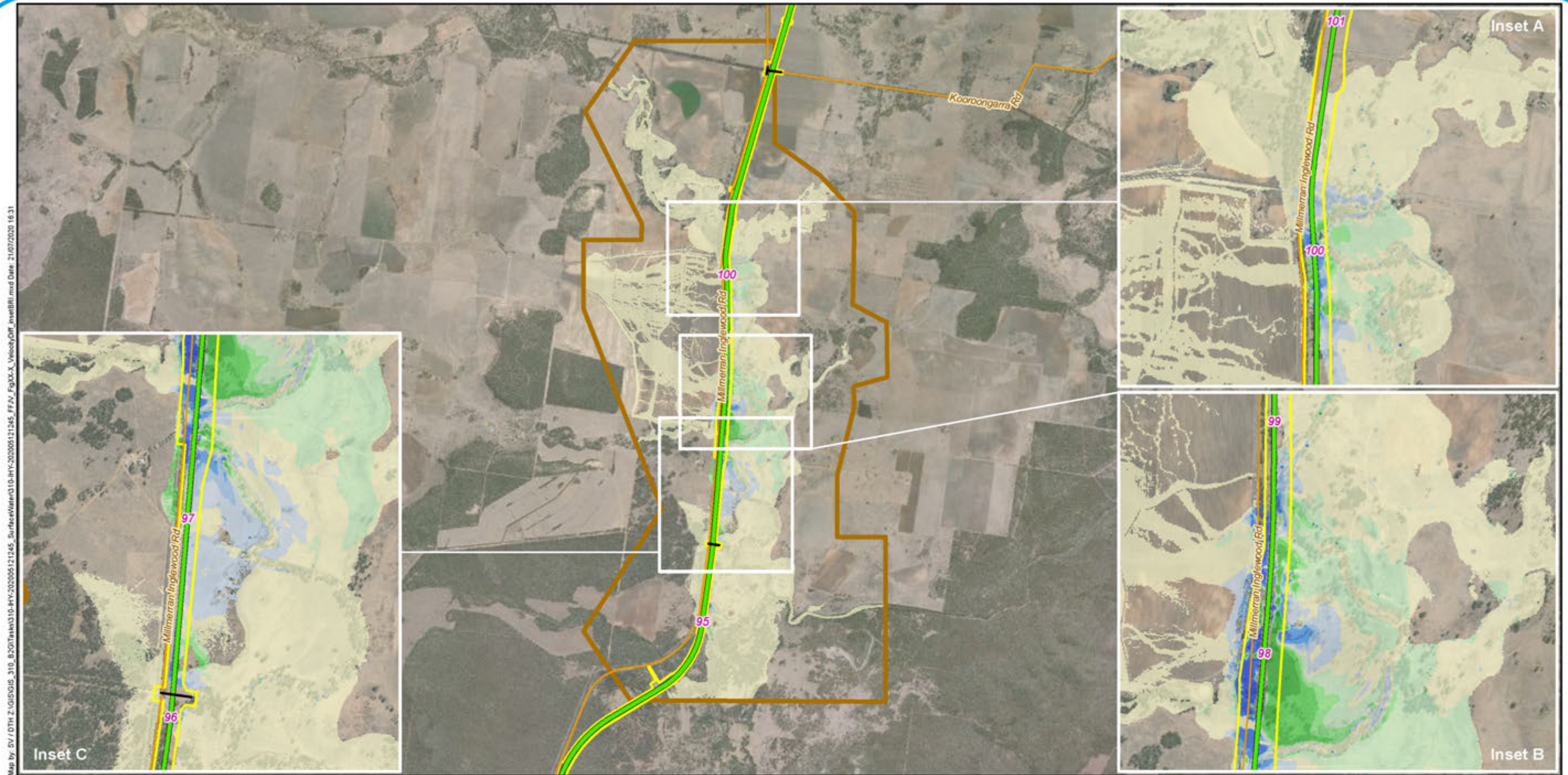
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F4-I:**

**1% AEP - change in time of inundation - Bringalily Creek**





**Legend**

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

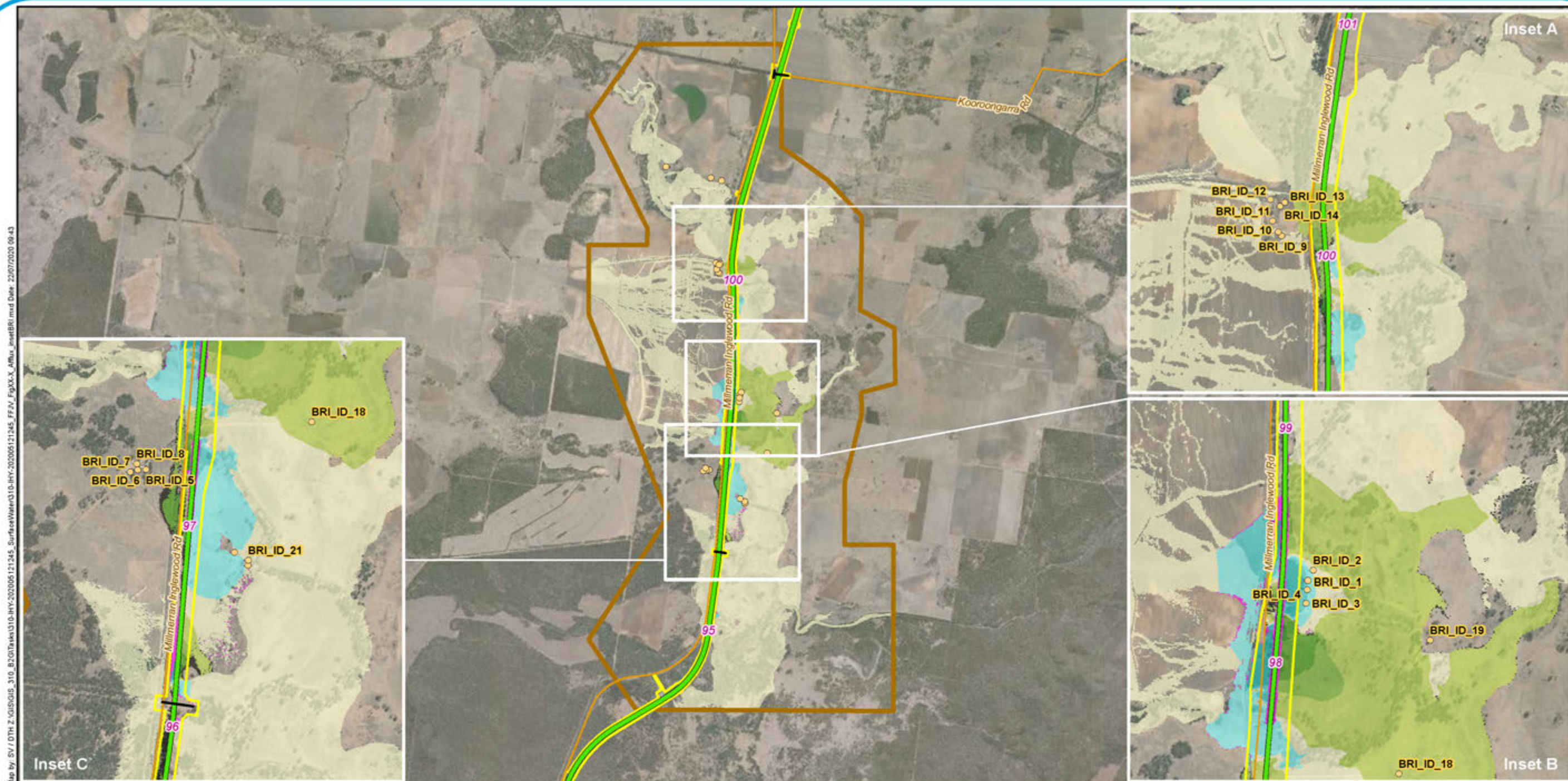
**Change in peak velocity (m/s)**

- |                |              |
|----------------|--------------|
| < -0.50        | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.50       |
| -0.01 to 0.01  |              |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km



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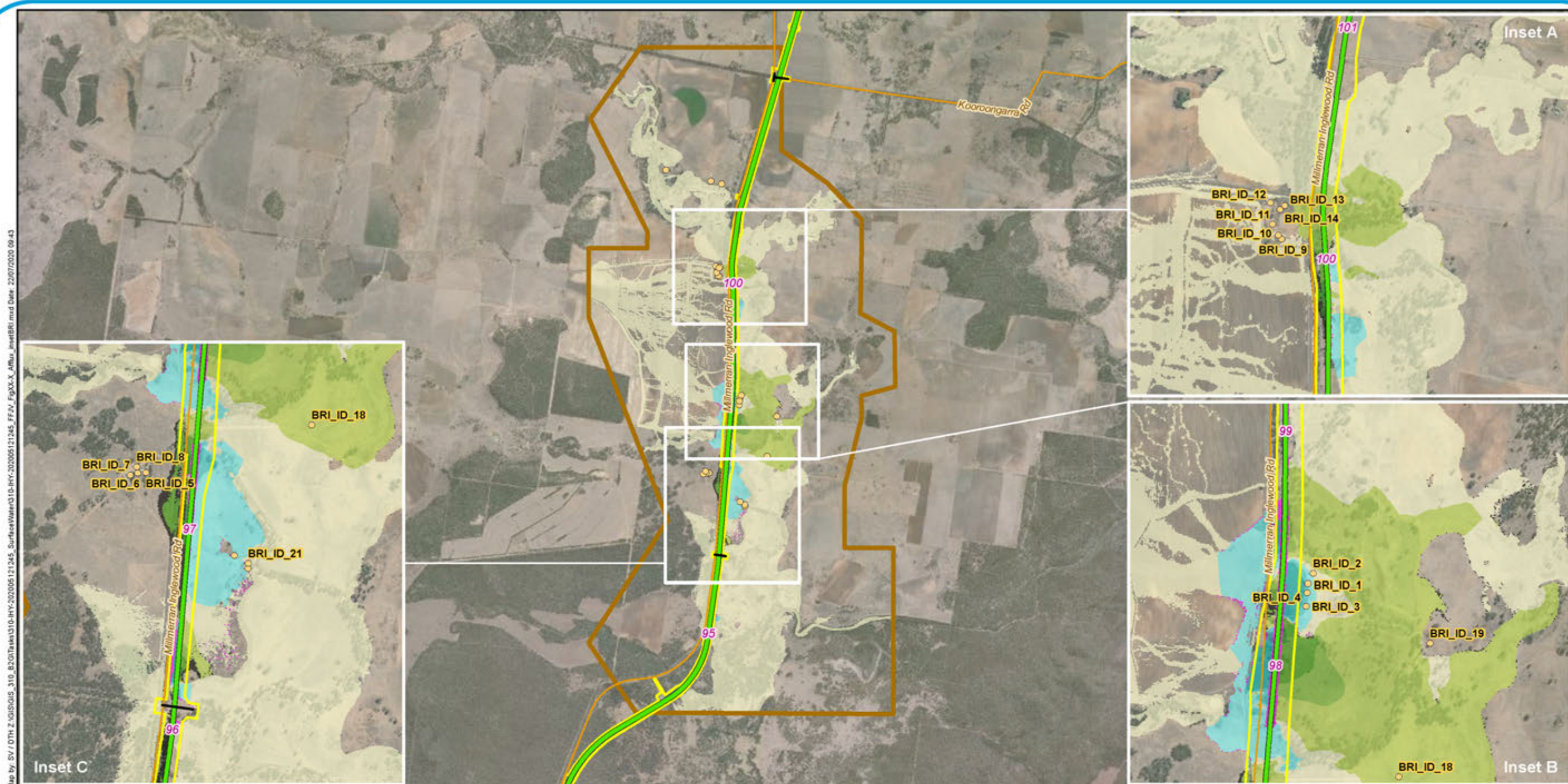
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure F5-A:**

**1% AEP sensitivity - 0% blockage - Bringalily Creek**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

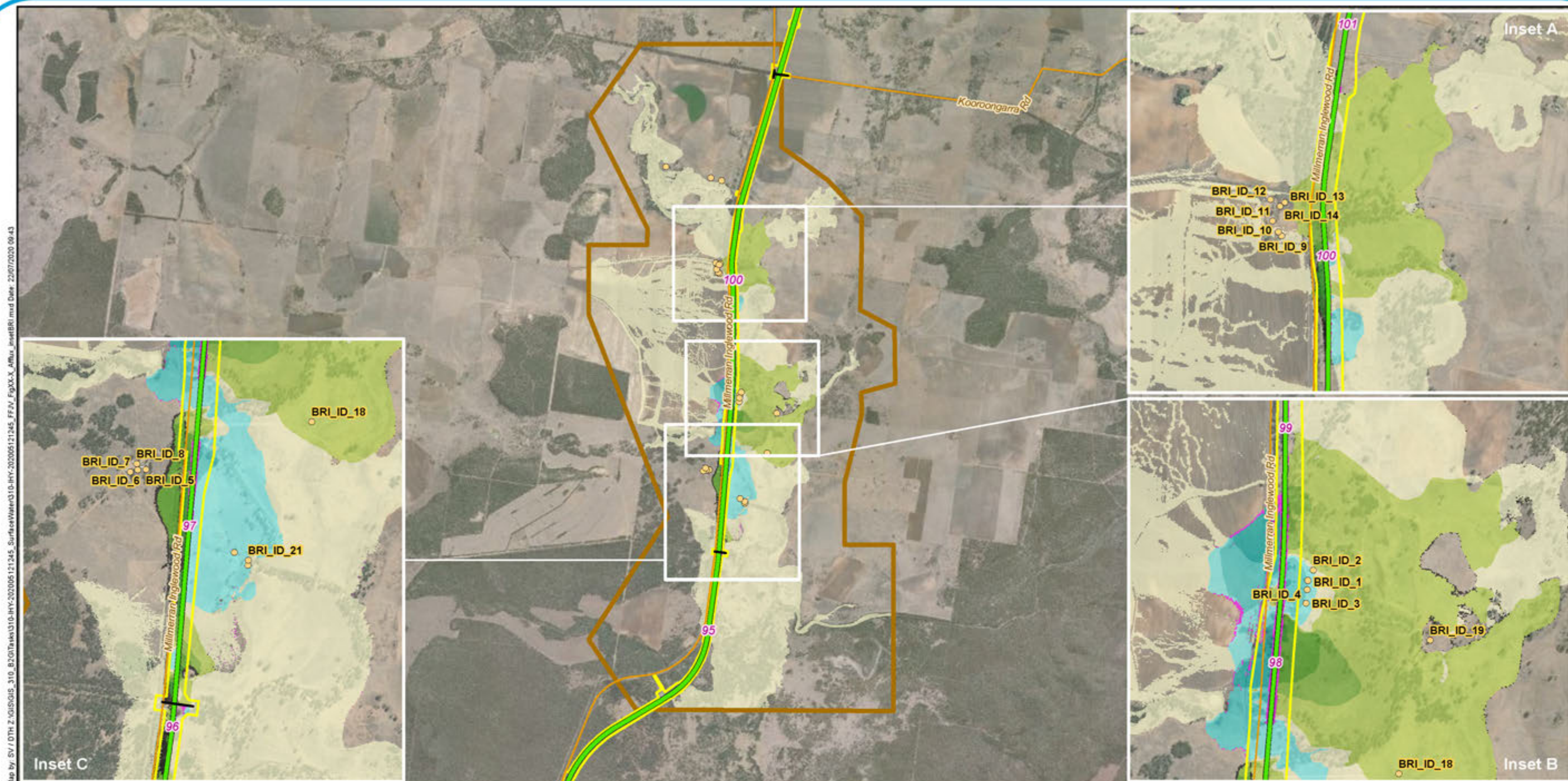
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:60,000  
 0 0.6 1.2 1.8 2.4 3km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: lightblue;">■</span> -0.20 to -0.10 | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: cyan;">■</span> -0.10 to -0.05      | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">■</span> -0.05 to -0.01 | <span style="color: darkgreen;">■</span> > 0.5          |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



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**Border to Gowrie**

**Figure F5-C:**

**1% AEP sensitivity - climate change RCP8.5 - peak water levels - Bringalily Creek**



APPENDIX

# Q2

## Hydrology and Flooding Technical Report—Volume II

### **Appendix G** Native Dog Creek Flood Maps

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT



# Appendix G

## Native Dog Creek Flood Maps

|             |                                                                |
|-------------|----------------------------------------------------------------|
| Figure G1-A | Locality plan                                                  |
| Figure G1-B | Survey data                                                    |
| Figure G1-C | Hydrologic model setup                                         |
| Figure G1-D | Hydraulic model setup                                          |
| Figure G1-E | Landuse classifications                                        |
| Figure G1-F | Proposed design structures                                     |
| Figure G2-A | 20% AEP peak water levels – Existing Case                      |
| Figure G2-B | 10% AEP peak water levels – Existing Case                      |
| Figure G2-C | 5% AEP peak water levels – Existing Case                       |
| Figure G2-D | 2% AEP peak water levels – Existing Case                       |
| Figure G2-E | 1% AEP peak water levels – Existing Case                       |
| Figure G2-F | 1 in 2,000 AEP peak water levels – Existing Case               |
| Figure G2-G | 1 in 10,000 AEP peak water levels – Existing Case              |
| Figure G2-H | PMF peak water levels – Existing Case                          |
| Figure G3-A | 1% AEP peak velocity – Existing Case                           |
| Figure G4-A | 20% AEP – design afflux                                        |
| Figure G4-B | 10% AEP – design afflux                                        |
| Figure G4-C | 5% AEP – design afflux                                         |
| Figure G4-D | 2% AEP – design afflux                                         |
| Figure G4-E | 1% AEP – design afflux                                         |
| Figure G4-F | 1 in 2,000 AEP – design afflux                                 |
| Figure G4-G | 1 in 10,000 AEP – design afflux                                |
| Figure G4-H | PMF – design afflux                                            |
| Figure G4-I | 1% AEP – change in time of inundation                          |
| Figure G4-J | 1% AEP – change in velocity                                    |
| Figure G5-A | 1% AEP sensitivity – climate change RCP8.5 – peak water levels |



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_Fig1-A\_Locality.mxd Date: 22/07/2020 19:20



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Watercourses
- Minor roads
- Road design
- Project footprint



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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**Border to Gowrie**

**Figure G1-A:**

**Locality plan - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_FigG1-B\_SurveyData.mxd Date: 22/07/2020 09:24



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Hydrologic model extent

#### LiDAR datasets (1m grid)

- 2015 ARTC LiDAR 1m



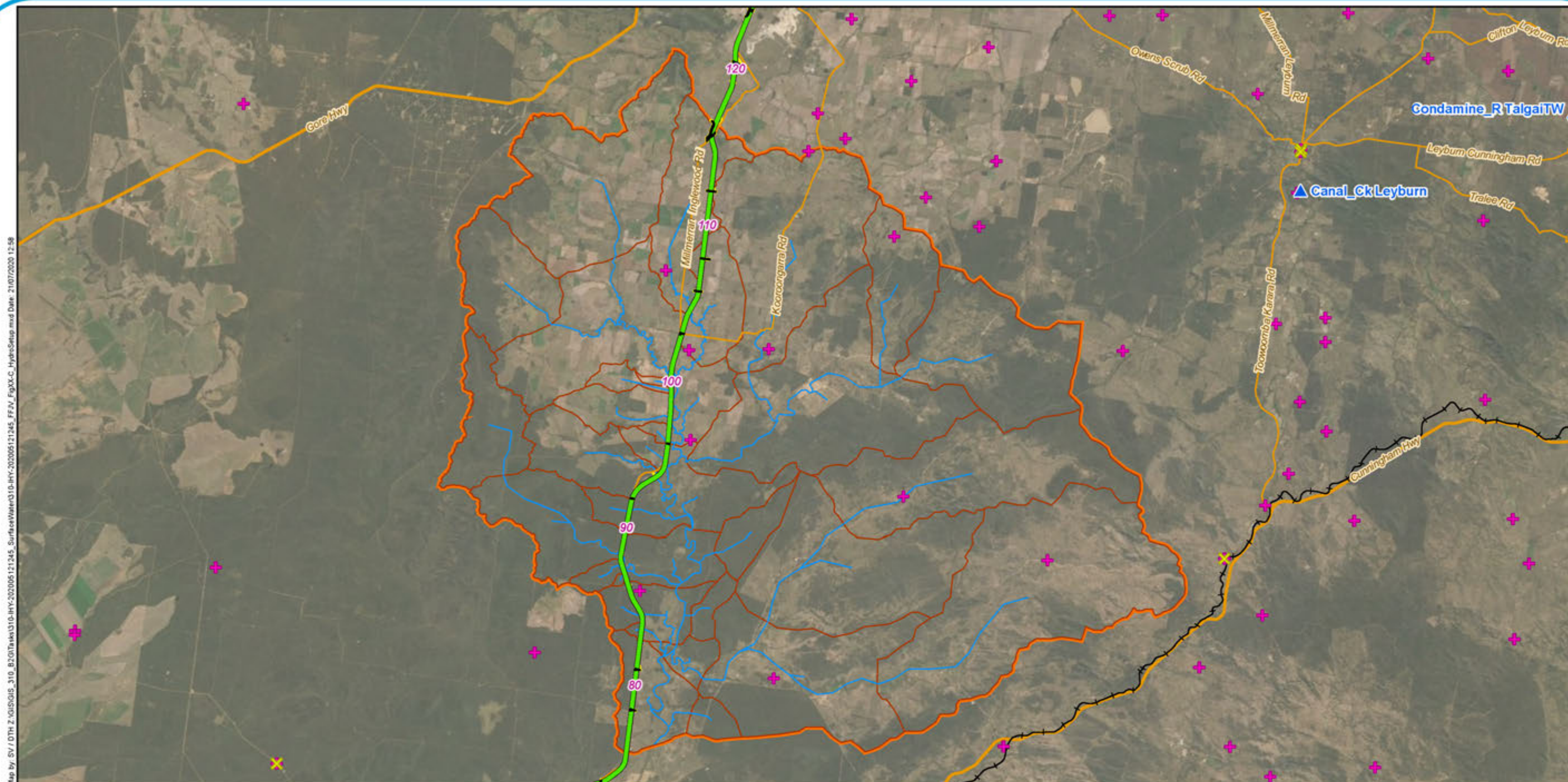
A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 22/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

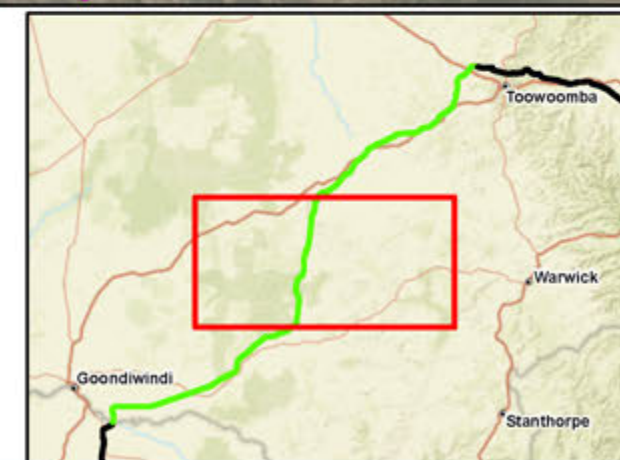
**Border to Gowrie**  
**Figure G1-B:**  
**Survey data - Native Dog Creek**





#### Legend

- |                             |                   |                         |                           |
|-----------------------------|-------------------|-------------------------|---------------------------|
| 5 Chainage (km)             | Major roads       | Catchment links         | X Pluviograph stations    |
| Existing rail (operational) | Minor roads       | Sub-catchments          | + Daily rainfall stations |
| Border to Gowrie alignment  | Road design       | Hydrologic model extent | ▲ Stream gauge locations  |
|                             | Project footprint |                         |                           |



A3 scale: 1:260,000  
 0 2.5 5 7.5 10 12.5 km



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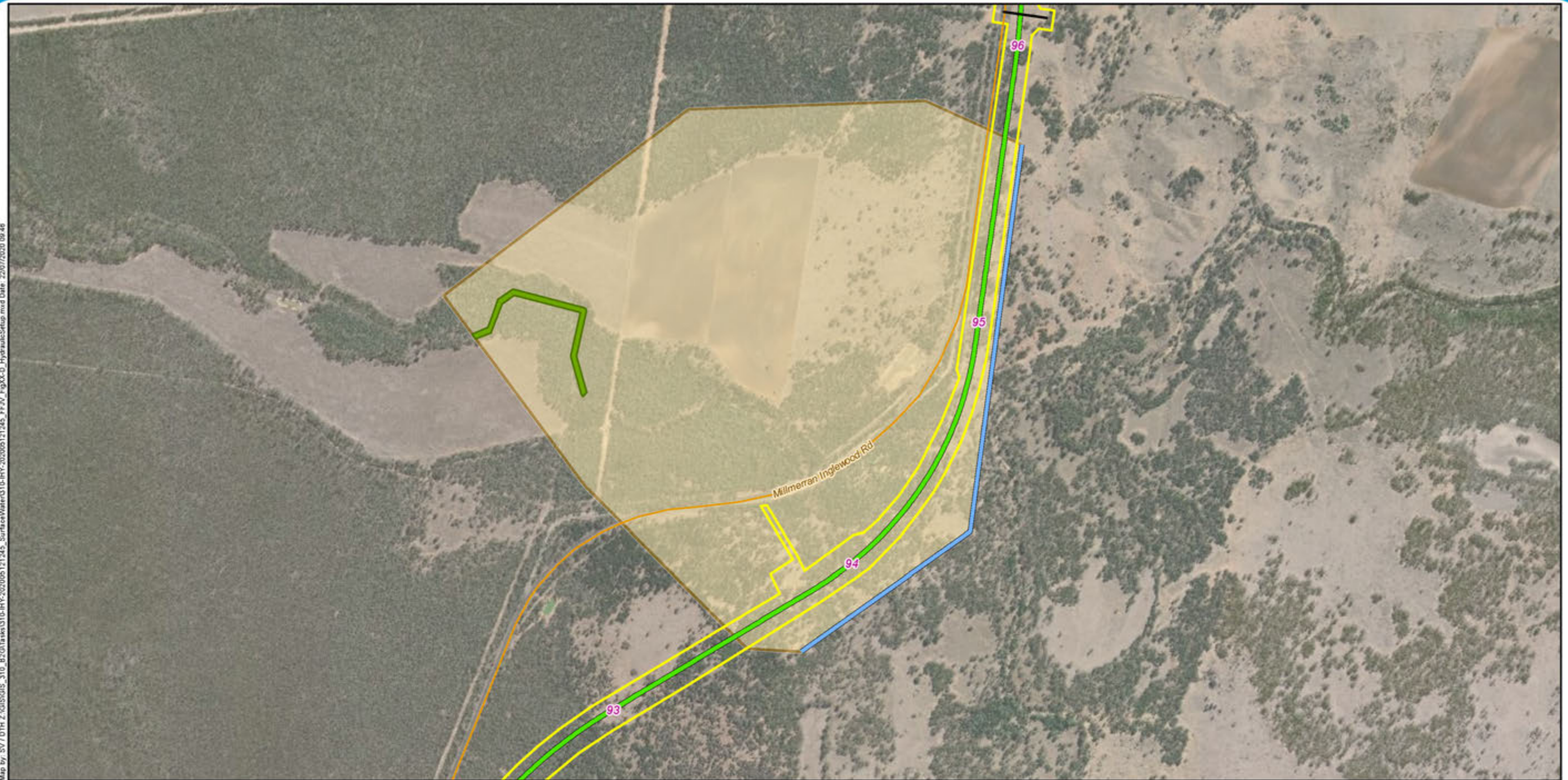
**Border to Gowrie**

**Figure G1-C:**

**Hydrologic model setup - Native Dog Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_FigG1-D\_HydraulicSetup.mxd Date: 22/07/2020 09:48



**Legend**

- |                            |                   |                        |
|----------------------------|-------------------|------------------------|
| 5 Chainage (km)            | Minor roads       | Hydraulic model extent |
| Border to Gowrie alignment | Road design       | Outflow boundaries     |
|                            | Project footprint | Inflow boundaries      |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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 Coordinate System: GDA 1994 MGA Zone 56

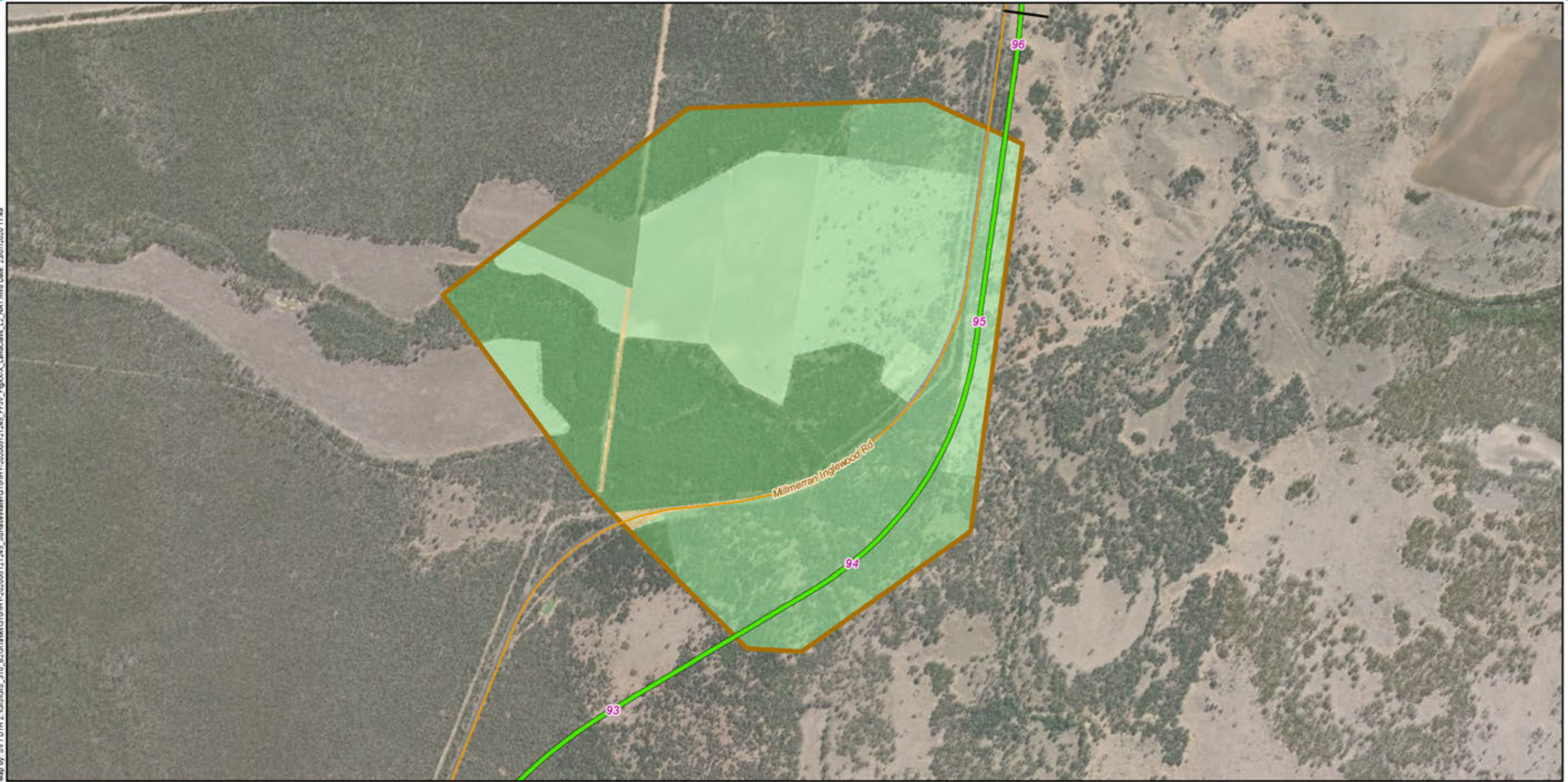
**Border to Gowrie**

**Figure G1-D:**

**Hydraulic model setup - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FFJV\_FigG1-E\_LandClass\_12\_NAT.mxd Date: 23/07/2020 11:49



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design

  Hydraulic model extent

#### Landuse classification

- Sealed road corridor (n=0.015)
- Unsealed road corridor (n=0.025)
- Open space - min veg (n=0.045)
- Open space - mod veg (n=0.055)
- Openspace - heavy veg (n=0.065)



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure G1-E:**

**Landuse classifications - Native Dog Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigG1-F\_Structures.mxd Date: 22/07/2020 15:11



#### Legend

- |                            |                        |
|----------------------------|------------------------|
| 5 Chainage (km)            | Minor roads            |
| Floodplain culvert         | Road design            |
| Local drainage culvert     | Project footprint      |
| Bridges                    | Hydraulic model extent |
| Border to Gowrie alignment |                        |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
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**Border to Gowrie**

**Figure G1-F:**

**Proposed design structures - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint

Hydraulic model extent

#### Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">■</span> 0 - 0.5   | <span style="color: blue;">■</span> 3.0 - 3.5          |
| <span style="color: lightblue;">■</span> 0.5 - 1.0 | <span style="color: blue;">■</span> 3.5 - 4.0          |
| <span style="color: lightblue;">■</span> 1.0 - 1.5 | <span style="color: blue;">■</span> 4.0 - 4.5          |
| <span style="color: lightblue;">■</span> 1.5 - 2.0 | <span style="color: blue;">■</span> 4.5 - 5.0          |
| <span style="color: lightblue;">■</span> 2.0 - 2.5 | <span style="color: blue;">■</span> > 5.0              |
| <span style="color: blue;">■</span> 2.5 - 3.0      | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigG2-D\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                                                                                                       |                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #f0f0f0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0 - 0.5   | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 - 3.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #6495ed; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #4682b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USQGIS\_310\_820Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">—</span> 0 - 0.5   | <span style="color: darkblue;">—</span> 3.0 - 3.5      |
| <span style="color: lightblue;">—</span> 0.5 - 1.0 | <span style="color: darkblue;">—</span> 3.5 - 4.0      |
| <span style="color: lightblue;">—</span> 1.0 - 1.5 | <span style="color: darkblue;">—</span> 4.0 - 4.5      |
| <span style="color: lightblue;">—</span> 1.5 - 2.0 | <span style="color: darkblue;">—</span> 4.5 - 5.0      |
| <span style="color: lightblue;">—</span> 2.0 - 2.5 | <span style="color: darkblue;">—</span> > 5.0          |
| <span style="color: lightblue;">—</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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 Integrating Community, Environment and Engineering

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**Border to Gowrie**

**Figure G2-E:**

**1% AEP peak water levels - Existing Case - Native Dog Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigG2-F\_EX\_Depth.mxd Date: 22/07/2020 15:55



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

## Depth (m)

- |                                                                                                                                       |                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #f0f0f0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0 - 0.5   | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 - 3.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #6495ed; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #4682b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
 Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure G2-F:**

**1 in 2,000 AEP peak water levels - Existing Case - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_FigG2-G\_EX\_Depth.mxd Date: 22/07/2020 15:55



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

## Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">□</span> 0 - 0.5   | <span style="color: blue;">□</span> 3.0 - 3.5          |
| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: blue;">□</span> 3.5 - 4.0          |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: blue;">□</span> 4.0 - 4.5          |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: blue;">□</span> 4.5 - 5.0          |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: blue;">□</span> > 5.0              |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

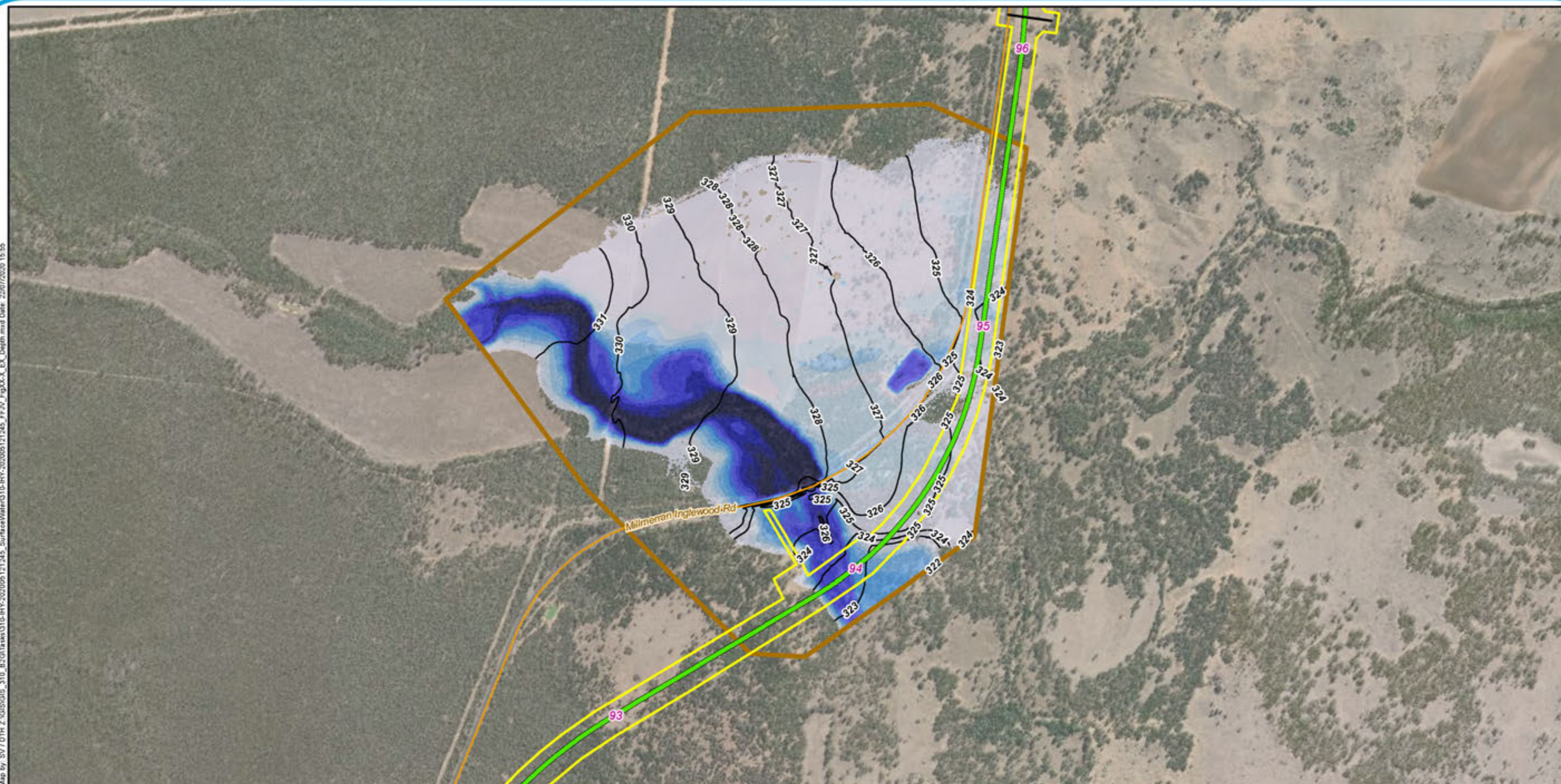
Border to Gowrie

Figure G2-G:

1 in 10,000 AEP peak water levels - Existing Case - Native Dog Creek



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_FigG2-H\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

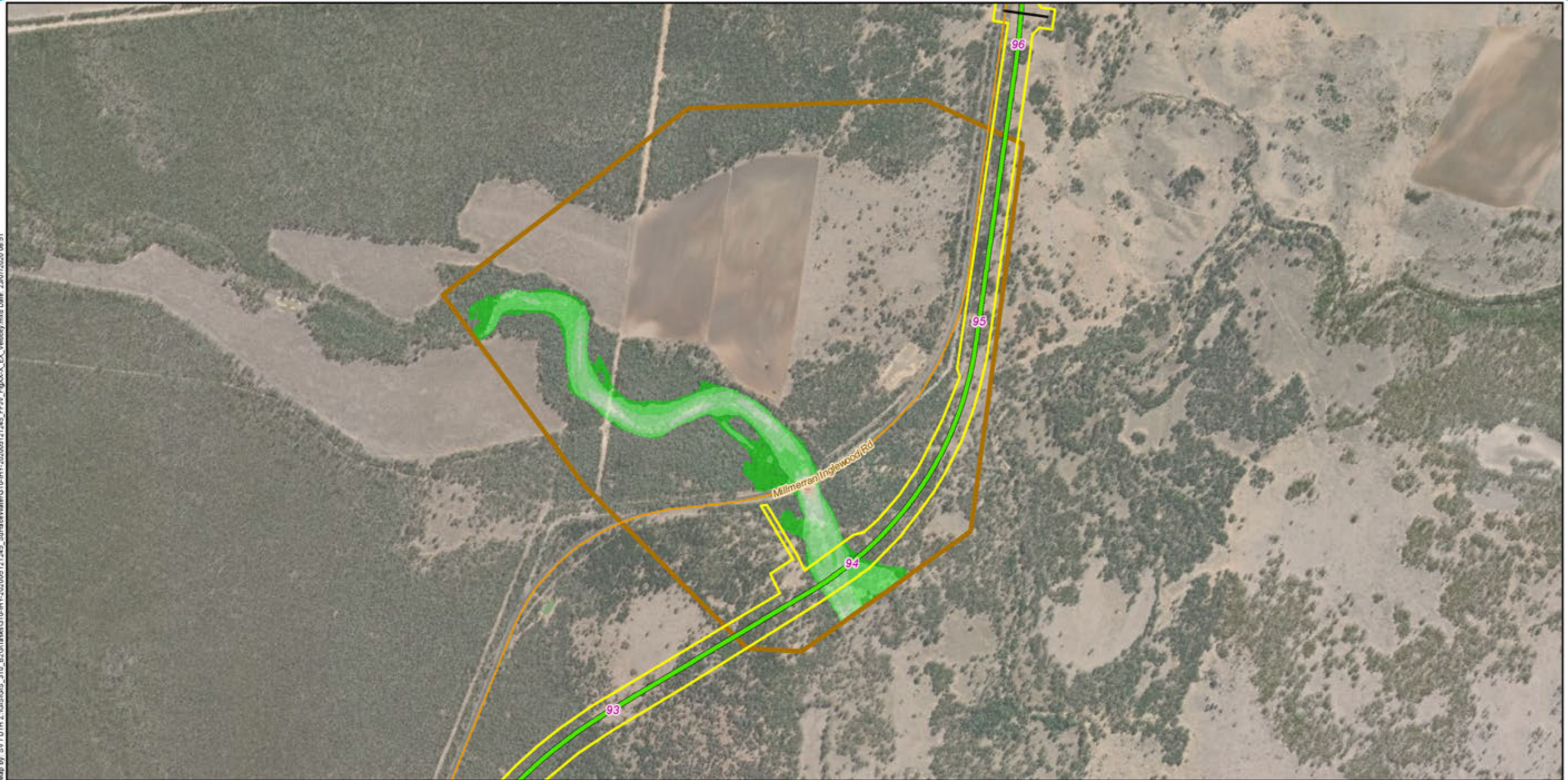
- |                                                             |                                                             |
|-------------------------------------------------------------|-------------------------------------------------------------|
| <span style="background-color: #e0e0ff;"> </span> 0 - 0.5   | <span style="background-color: #4040ff;"> </span> 3.0 - 3.5 |
| <span style="background-color: #c0c0ff;"> </span> 0.5 - 1.0 | <span style="background-color: #3030ff;"> </span> 3.5 - 4.0 |
| <span style="background-color: #a0a0ff;"> </span> 1.0 - 1.5 | <span style="background-color: #2020ff;"> </span> 4.0 - 4.5 |
| <span style="background-color: #8080ff;"> </span> 1.5 - 2.0 | <span style="background-color: #1010ff;"> </span> 4.5 - 5.0 |
| <span style="background-color: #6060ff;"> </span> 2.0 - 2.5 | <span style="background-color: #0000ff;"> </span> > 5.0     |
| <span style="background-color: #4040ff;"> </span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)      |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig3A-X\_EX\_Velocity.mxd Date: 23/07/2020 08:51



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Peak velocity (m/s)

|                                                |                                              |
|------------------------------------------------|----------------------------------------------|
| <span style="color: green;">■</span> 0.0       | <span style="color: lightblue;">■</span> 3.0 |
| <span style="color: lightgreen;">■</span> 0.5  | <span style="color: pink;">■</span> 3.5      |
| <span style="color: yellowgreen;">■</span> 1.0 | <span style="color: orange;">■</span> 4.0    |
| <span style="color: limegreen;">■</span> 1.5   | <span style="color: red;">■</span> 4.5       |
| <span style="color: lightyellow;">■</span> 2.0 | <span style="color: brown;">■</span> 5.0     |
| <span style="color: yellow;">■</span> 2.5      |                                              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
 Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure G3-A:**

**1% AEP peak velocity - Existing Case - Native Dog Creek**



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# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

## Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF JV\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF JV\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
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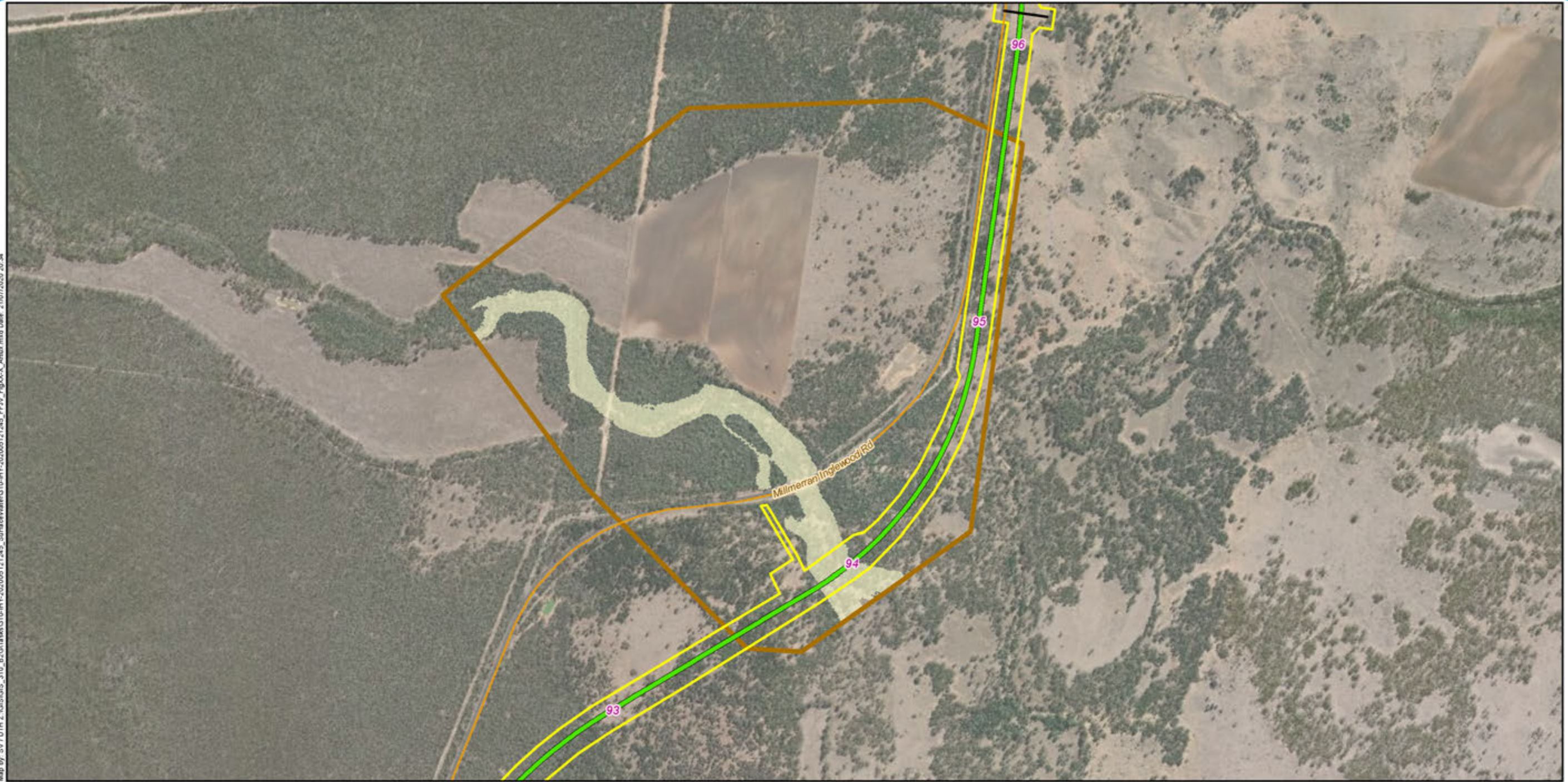
**Border to Gowrie**

**Figure G4-C:**

**5% AEP - design afflux - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF JV\_FigDoc-X\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
 Integrating Community, Environment and Engineering

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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure G4-D:**

**2% AEP - design afflux - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF JV\_FigDoc-X\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
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**Border to Gowrie**

**Figure G4-F:**

**1 in 2,000 AEP - design afflux - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF JV\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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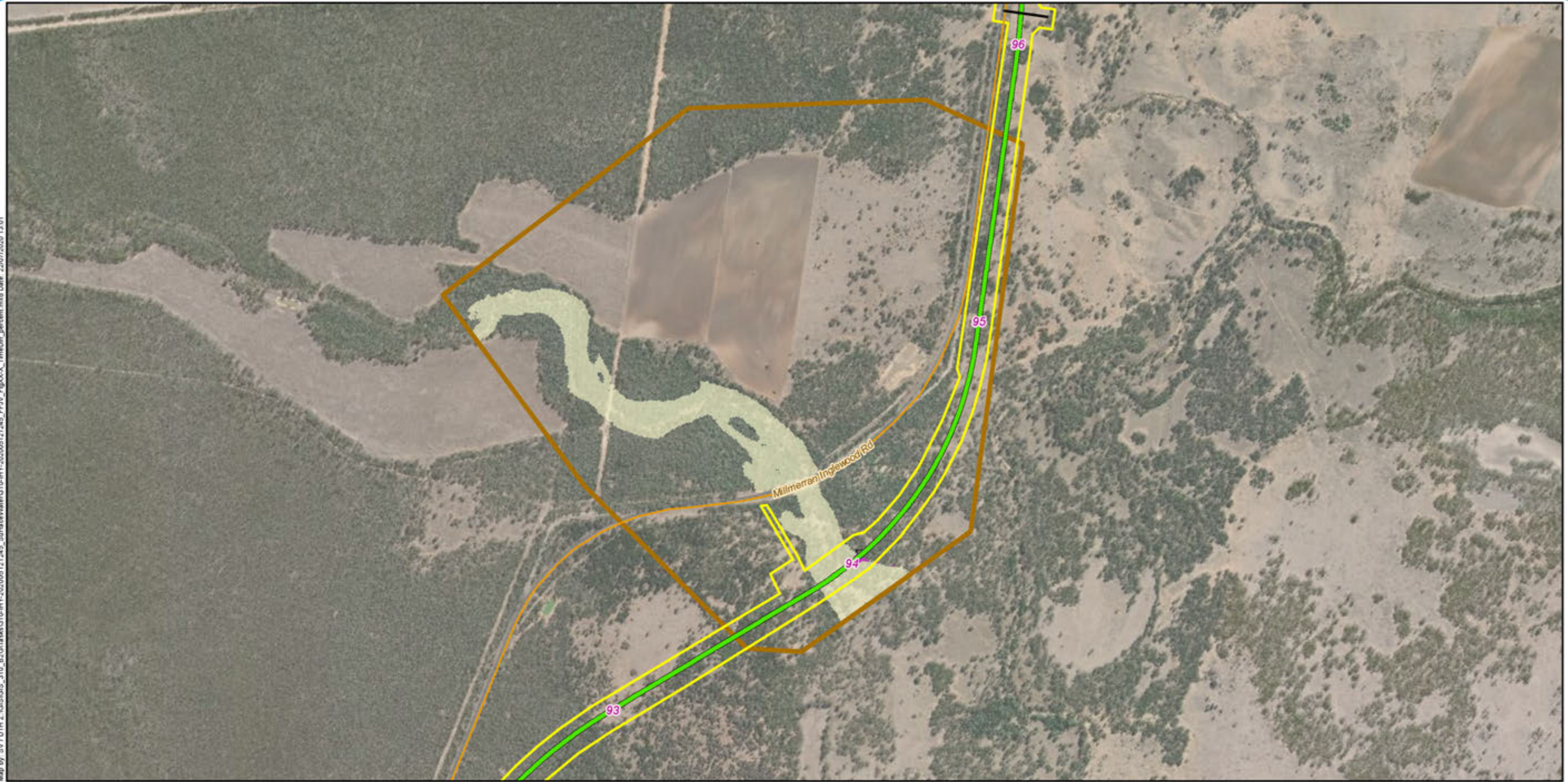
**Border to Gowrie**

**Figure G4-H:**

**PMF - design afflux - Native Dog Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF JV\_FigG4-I\_TimeDiff\_percent.mxd Date: 22/07/2020 13:01



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in Time of Inundation (percentage)

- |              |            |
|--------------|------------|
| < -50%       | 10% to 20% |
| -50% to -40% | 20% to 30% |
| -40% to -30% | 30% to 40% |
| -30% to -20% | 40% to 50% |
| -20% to -10% | > 50%      |
| -10% to 10%  |            |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
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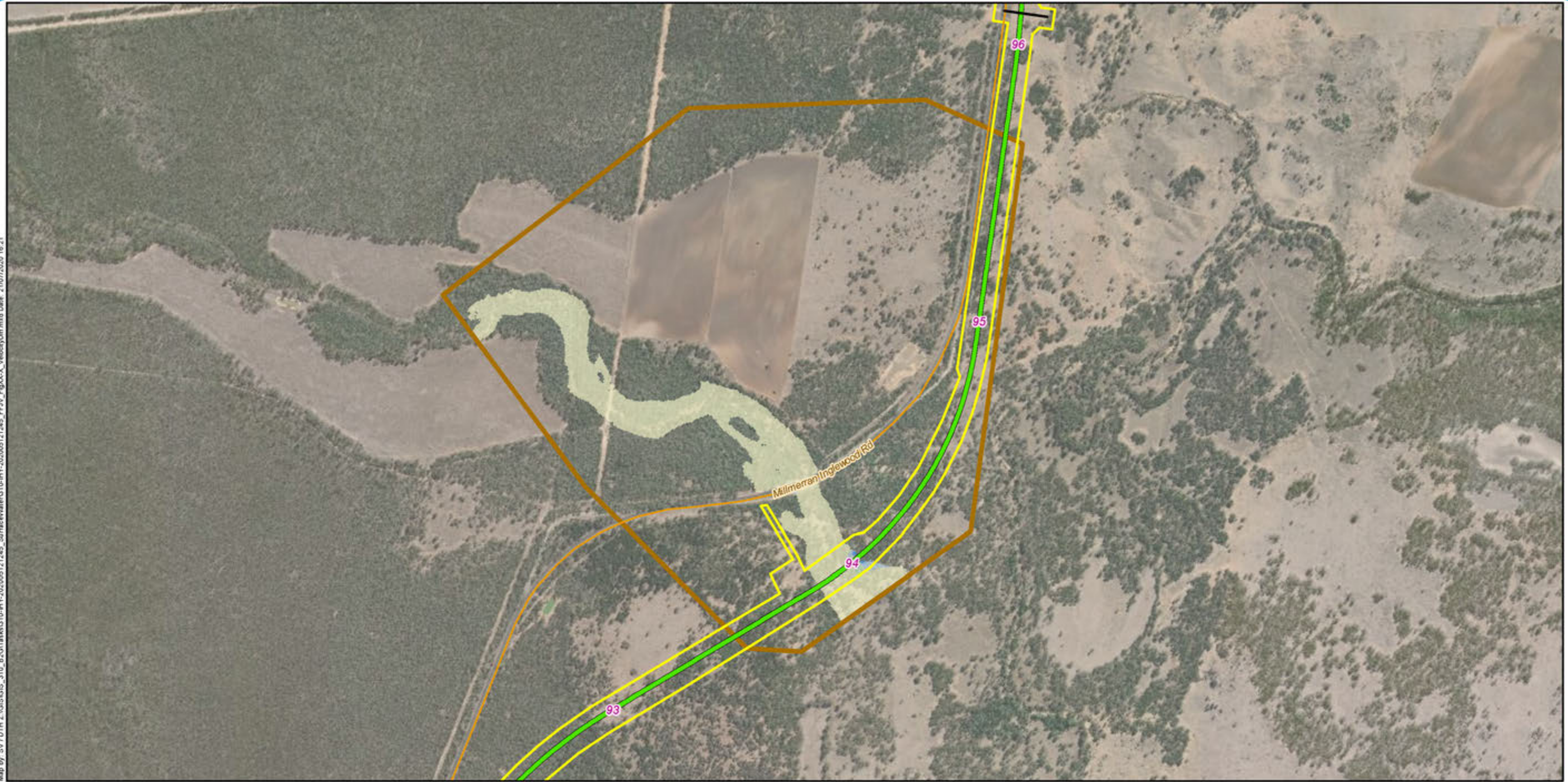
**Border to Gowrie**

**Figure G4-I:**

**1% AEP - change in time of inundation - Native Dog Creek**



Map by SV / DTH 21/07/2020 16:21  
 8207Task310-HY-20200512145\_SurfaceWater310-HY-20200512145\_FF\_AV\_FigXX-X\_VelocityOff.mxd Date: 21/07/2020 16:21



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Change in peak velocity (m/s)

- |                |              |
|----------------|--------------|
| < -0.50        | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.50       |
| -0.01 to 0.01  |              |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



**Future Freight**  
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 Coordinate System: GDA 1994 MGA Zone 56

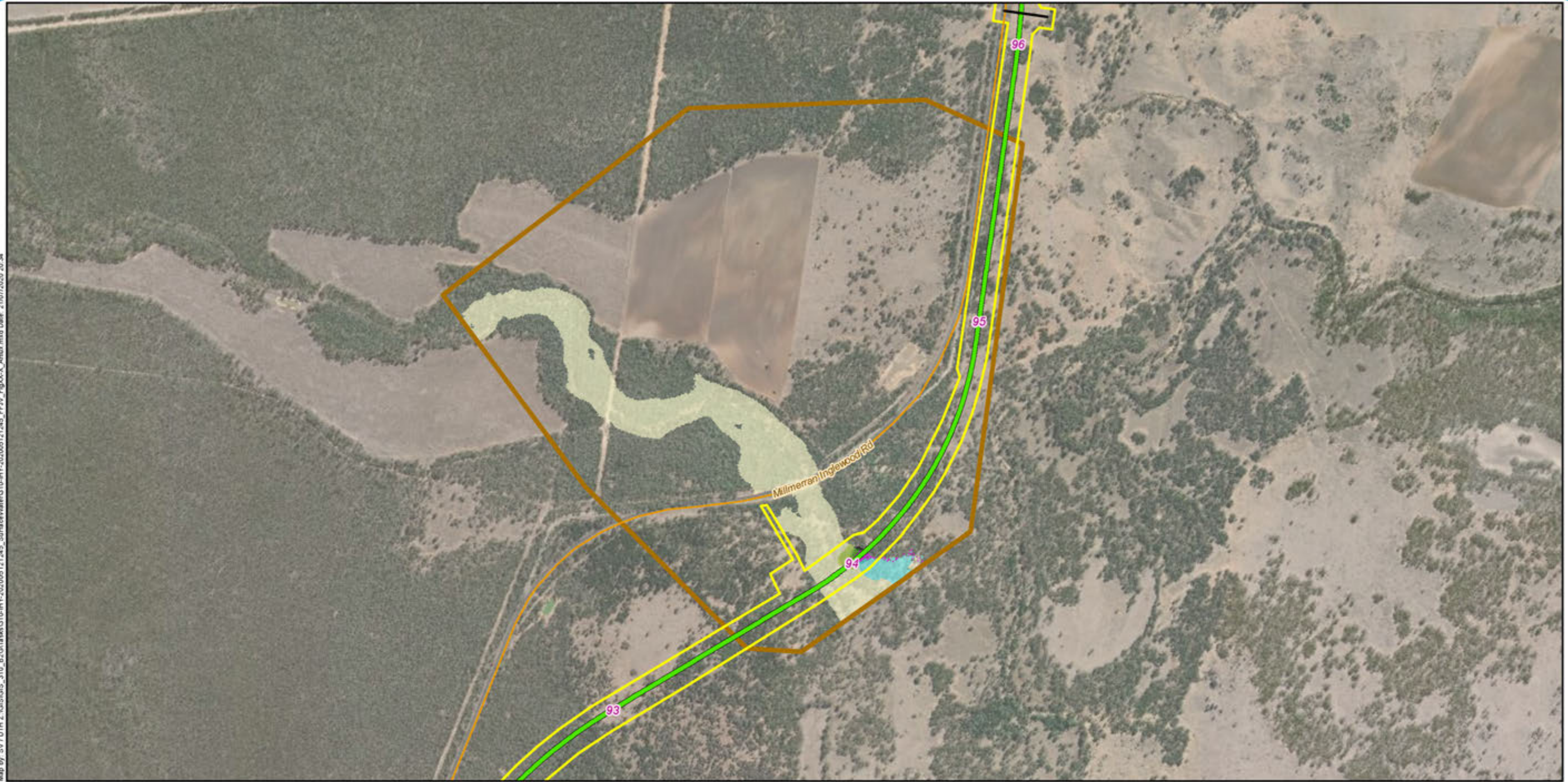
**Border to Gowrie**

**Figure G4-J:**

**1% AEP - change in velocity - Native Dog Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF.VN\_FigDocX\_Affix.mxd Date: 21/07/2020 20:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: lightteal;">■</span> -0.20 to -0.10 | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: cyan;">■</span> -0.10 to -0.05      | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">■</span> -0.05 to -0.01 | <span style="color: darkgreen;">■</span> > 0.5          |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:15,000  
 0 0.15 0.3 0.45 0.6 0.75 km



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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure G5-A:**

**1% AEP sensitivity - climate change RCP8.5 - peak water levels - Native Dog Creek**



APPENDIX

# Q2

## Hydrology and Flooding Technical Report—Volume II

### **Appendix H** Cattle Creek Flood Maps

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT



# Appendix H

## Cattle Creek Flood Maps

|             |                                                                |
|-------------|----------------------------------------------------------------|
| Figure H1-A | Locality plan                                                  |
| Figure H1-B | Survey data                                                    |
| Figure H1-C | Hydrologic model setup                                         |
| Figure H1-D | Hydraulic model setup                                          |
| Figure H1-E | Landuse classifications                                        |
| Figure H1-F | Proposed design structures                                     |
| Figure H2-A | 20% AEP peak water levels – Existing Case                      |
| Figure H2-B | 10% AEP peak water levels – Existing Case                      |
| Figure H2-C | 5% AEP peak water levels – Existing Case                       |
| Figure H2-D | 2% AEP peak water levels – Existing Case                       |
| Figure H2-E | 1% AEP peak water levels – Existing Case                       |
| Figure H2-F | 1 in 2,000 AEP peak water levels – Existing Case               |
| Figure H2-G | 1 in 10,000 AEP peak water levels – Existing Case              |
| Figure H2-H | PMF peak water levels – Existing Case                          |
| Figure H3-A | 1% AEP peak velocity – Existing Case                           |
| Figure H4-A | 20% AEP – design afflux                                        |
| Figure H4-B | 10% AEP – design afflux                                        |
| Figure H4-C | 5% AEP – design afflux                                         |
| Figure H4-D | 2% AEP – design afflux                                         |
| Figure H4-E | 1% AEP – design afflux                                         |
| Figure H4-F | 1 in 2,000 AEP – design afflux                                 |
| Figure H4-G | 1 in 10,000 AEP – design afflux                                |
| Figure H4-H | PMF – design afflux                                            |
| Figure H4-I | 1% AEP – change in time of inundation                          |
| Figure H4-J | 1% AEP – change in velocity                                    |
| Figure H5-A | 1% AEP sensitivity – 0% blockage                               |
| Figure H5-B | 1% AEP sensitivity – 50% blockage                              |
| Figure H5-C | 1% AEP sensitivity – climate change RCP8.5 – peak water levels |



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_FigH1-A\_Locality CAT.mxd Date: 23/07/2020 10:34



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Watercourses
- Minor roads
- Project footprint



A3 scale: 1:20,000  
 0 0.2 0.4 0.6 0.8 1km



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**Border to Gowrie**  
**Figure H1-A:**  
**Locality plan - Cattle Creek**



Map by SV / DTH 2:10USGS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_FigX-B\_SurveyDataCAT.mxd Date: 22/07/2020 09:20



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Hydrologic model extent

#### LiDAR datasets (1m grid)

- 2015 ARTC LiDAR 1m



A3 scale: 1:20,000  
 0 0.2 0.4 0.6 0.8 1km

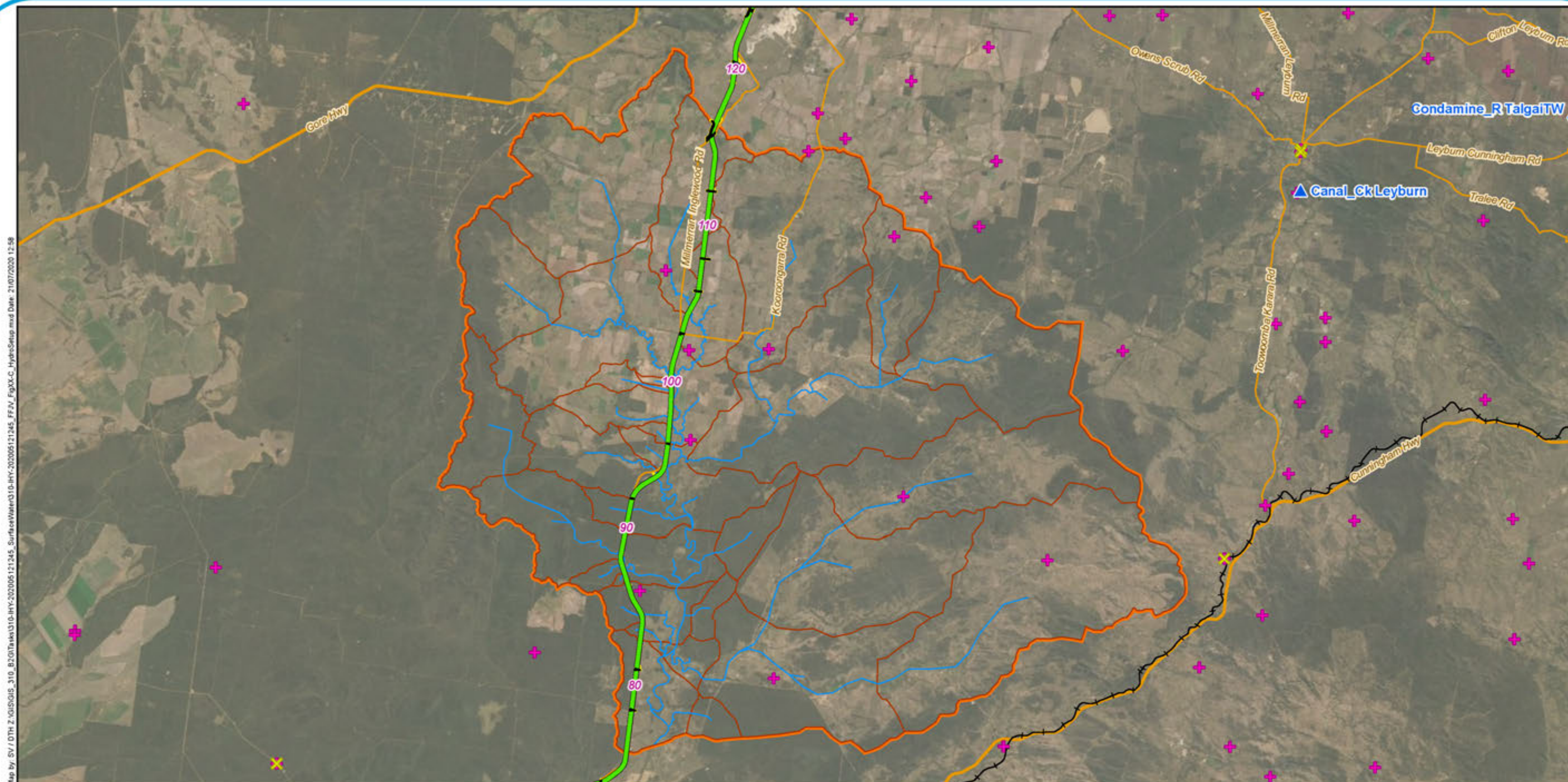


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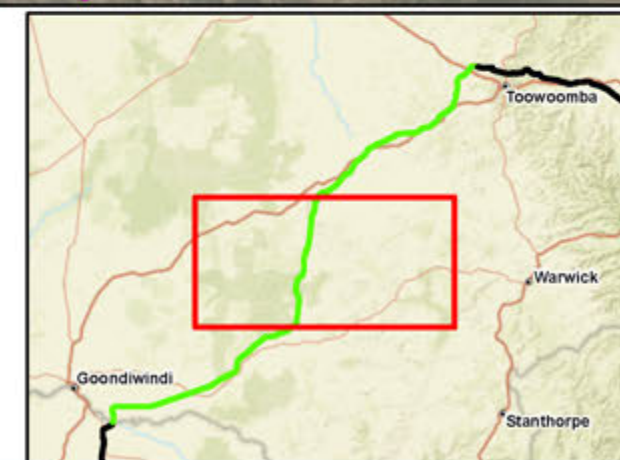
**Border to Gowrie**  
**Figure H1-B:**  
**Survey data - Cattle Creek**





#### Legend

- |                             |                   |                         |                         |
|-----------------------------|-------------------|-------------------------|-------------------------|
| 5 Chainage (km)             | Major roads       | Catchment links         | Pluviograph stations    |
| Existing rail (operational) | Minor roads       | Sub-catchments          | Daily rainfall stations |
| Border to Gowrie alignment  | Road design       | Hydrologic model extent | Stream gauge locations  |
|                             | Project footprint |                         |                         |



A3 scale: 1:260,000  
 0 2.5 5 7.5 10 12.5 km



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**Border to Gowrie**

**Figure H1-C:**

**Hydrologic model setup - Cattle Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_FigX-D\_HydraulicSetup.mxd Date: 22/07/2020 09:48



#### Legend

- |                            |                   |                        |
|----------------------------|-------------------|------------------------|
| 5 Chainage (km)            | Minor roads       | Hydraulic model extent |
| Border to Gowrie alignment | Project footprint | Outflow boundaries     |
|                            |                   | Inflow boundaries      |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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**Border to Gowrie**  
**Figure H1-D:**  
**Hydraulic model setup - Cattle Creek**



Map by SV / DTH 2:10:50GIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF JV\_Fig00-X\_LandClass\_L2\_CAT.mxd Date: 23/07/2020 11:39



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads

Hydraulic model extent

#### Landuse classification

- Sealed road corridor (n=0.015)
- Openspace - heavy veg (n=0.065)



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by: SV / DTH 2:10USQIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_FigX-X\_Structures.mxd Date: 22/07/2020 15:11



#### Legend

- |                            |                        |
|----------------------------|------------------------|
| 5 Chainage (km)            | Minor roads            |
| Floodplain culvert         | Project footprint      |
| Local drainage culvert     | Hydraulic model extent |
| Bridges                    |                        |
| Border to Gowrie alignment |                        |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure H1-F:**

**Proposed design structures - Cattle Creek**



Map by SV / DTH 2:10USGS\_310\_820Tasks310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                                                                                                       |                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #e0e0ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0 - 0.5   | <span style="background-color: #8080ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 - 3.5 |
| <span style="background-color: #c0c0ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4040ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #a0a0ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #2020ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #8080ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #0000ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #6060ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #000080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4040ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="border-bottom: 1px solid black; display: inline-block; width: 20px;"></span> 1m contour (mAHD)                           |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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**Border to Gowrie**

**Figure H2-A:**

**20% AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

## Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by SV / DTH 2:10USGS\_310\_820Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">□</span> 0 - 0.5   | <span style="color: darkblue;">□</span> 3.0 - 3.5      |
| <span style="color: lightblue;">□</span> 0.5 - 1.0 | <span style="color: darkblue;">□</span> 3.5 - 4.0      |
| <span style="color: lightblue;">□</span> 1.0 - 1.5 | <span style="color: darkblue;">□</span> 4.0 - 4.5      |
| <span style="color: lightblue;">□</span> 1.5 - 2.0 | <span style="color: darkblue;">□</span> 4.5 - 5.0      |
| <span style="color: lightblue;">□</span> 2.0 - 2.5 | <span style="color: darkblue;">□</span> > 5.0          |
| <span style="color: lightblue;">□</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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**Border to Gowrie**

**Figure H2-C:**

**5% AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USGIS\_310\_R20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure H2-D:**

**2% AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USGS\_310\_820Tasks310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                                                                                                       |                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #f0f0f0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0 - 0.5   | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 - 3.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
 Integrating Community, Environment and Engineering

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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure H2-E:**

**1% AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USQGIS\_310\_R201Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

## Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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 Coordinate System: GDA 1994 MGA Zone 56

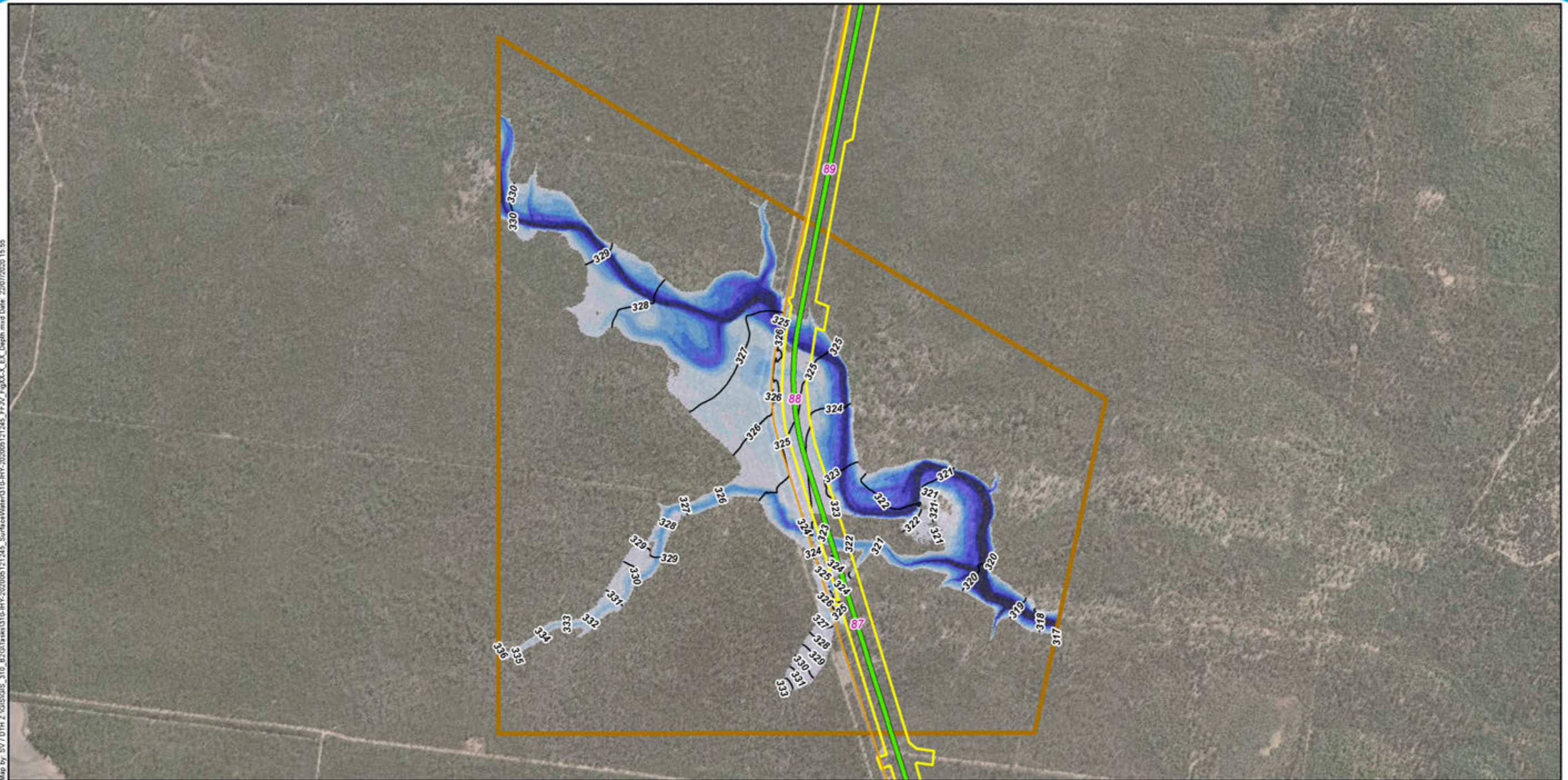
**Border to Gowrie**

**Figure H2-F:**

**1 in 2,000 AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USQIS\_310\_820Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

|                                                                                                                                                               |                                                                                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #f0f0f0; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 0 - 0.5   | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 3.0 - 3.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 4.0 - 4.5 |
| <span style="background-color: #6495ed; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 4.5 - 5.0 |
| <span style="background-color: #4682b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> > 5.0     |
| <span style="background-color: #1e90ff; border: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 2.5 - 3.0 | <span style="border-bottom: 1px solid black; display: inline-block; width: 15px; height: 10px; vertical-align: middle;"></span> 1m contour (mAHD)             |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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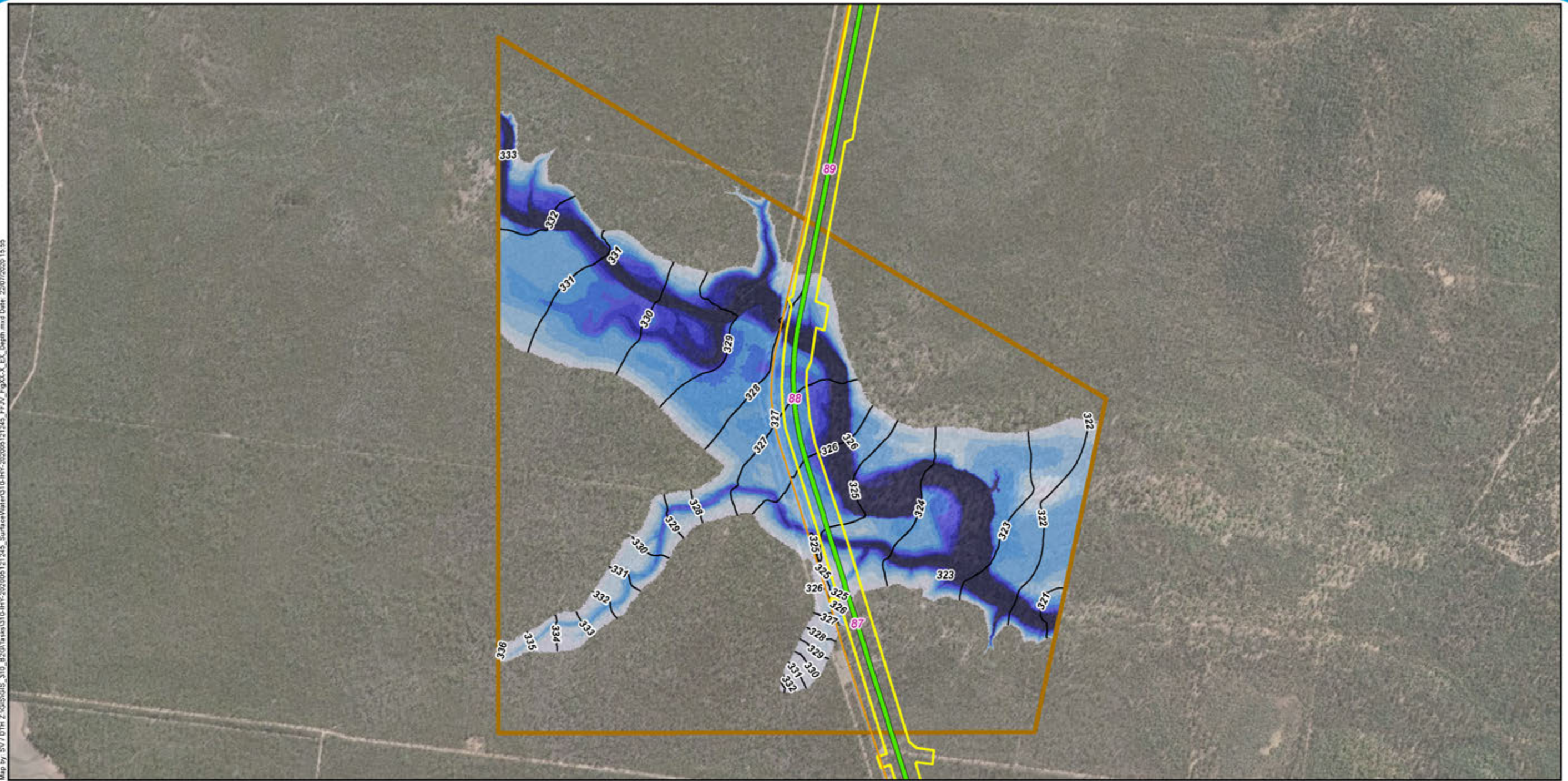
**Border to Gowrie**

**Figure H2-G:**

**1 in 10,000 AEP peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USQIS\_310\_R201Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Depth (m)

- |                                                                                                                                       |                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #f0f0f0; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0 - 0.5   | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 - 3.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #b0c4de; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
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**Border to Gowrie**

**Figure H2-H:**

**PMF peak water levels - Existing Case - Cattle Creek**



Map by SV / DTH 2:10USQGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF3N\_Fig00-X\_EX\_Velocity.mxd Date: 23/07/2020 08:51



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Peak velocity (m/s)

|                                                                                                                                 |                                                                                                                                 |
|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #006400; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.0 | <span style="background-color: #f08080; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.0 |
| <span style="background-color: #32cd32; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 | <span style="background-color: #ffa07a; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 |
| <span style="background-color: #90ee90; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 | <span style="background-color: #ff4500; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 |
| <span style="background-color: #7fffd4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 | <span style="background-color: #8b0000; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 |
| <span style="background-color: #4682b4; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 | <span style="background-color: #2f4f4f; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 5.0 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 |                                                                                                                                 |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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**Border to Gowrie**

**Figure H3-A:**

**1% AEP peak velocity - Existing Case - Cattle Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



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**Border to Gowrie**

**Figure H4-A:**

**20% AEP - design afflux - Cattle Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
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**Border to Gowrie**

**Figure H4-B:**

**10% AEP - design afflux - Cattle Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
Coordinate System: GDA 1994 MGA Zone 56

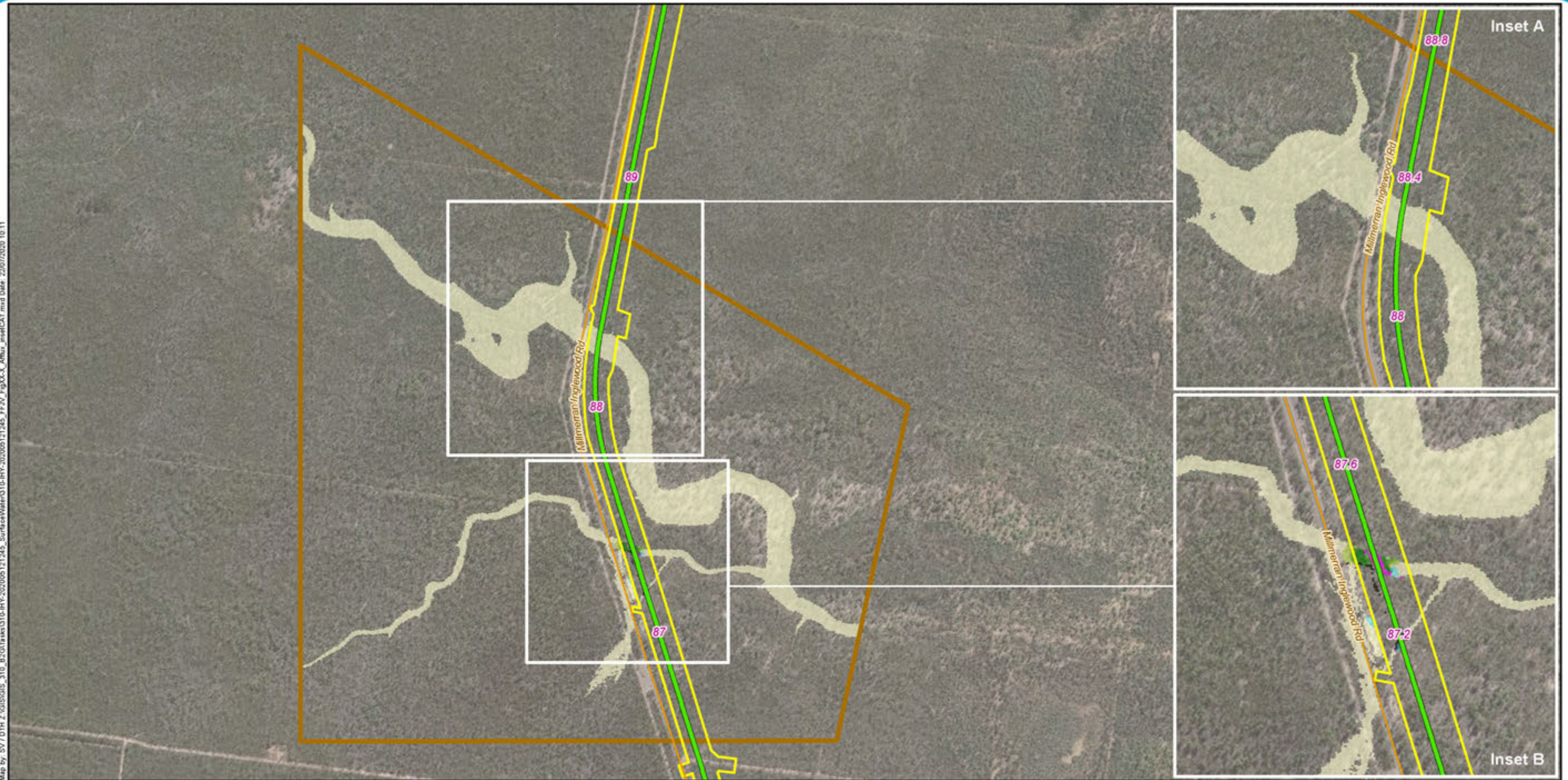
**Border to Gowrie**

**Figure H4-D:**

**2% AEP - design afflux - Cattle Creek**



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

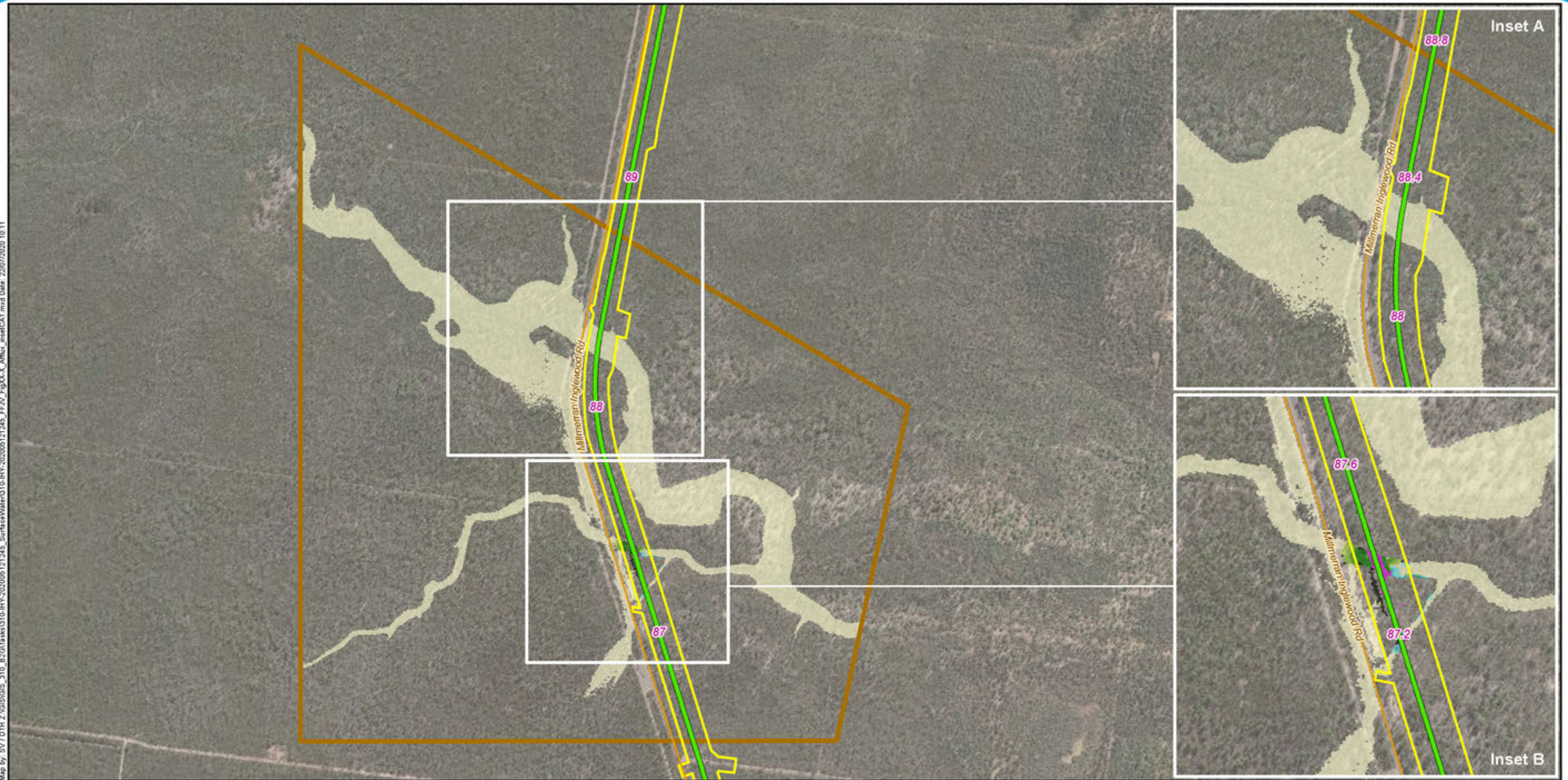
- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
Coordinate System: GDA 1994 MGA Zone 56

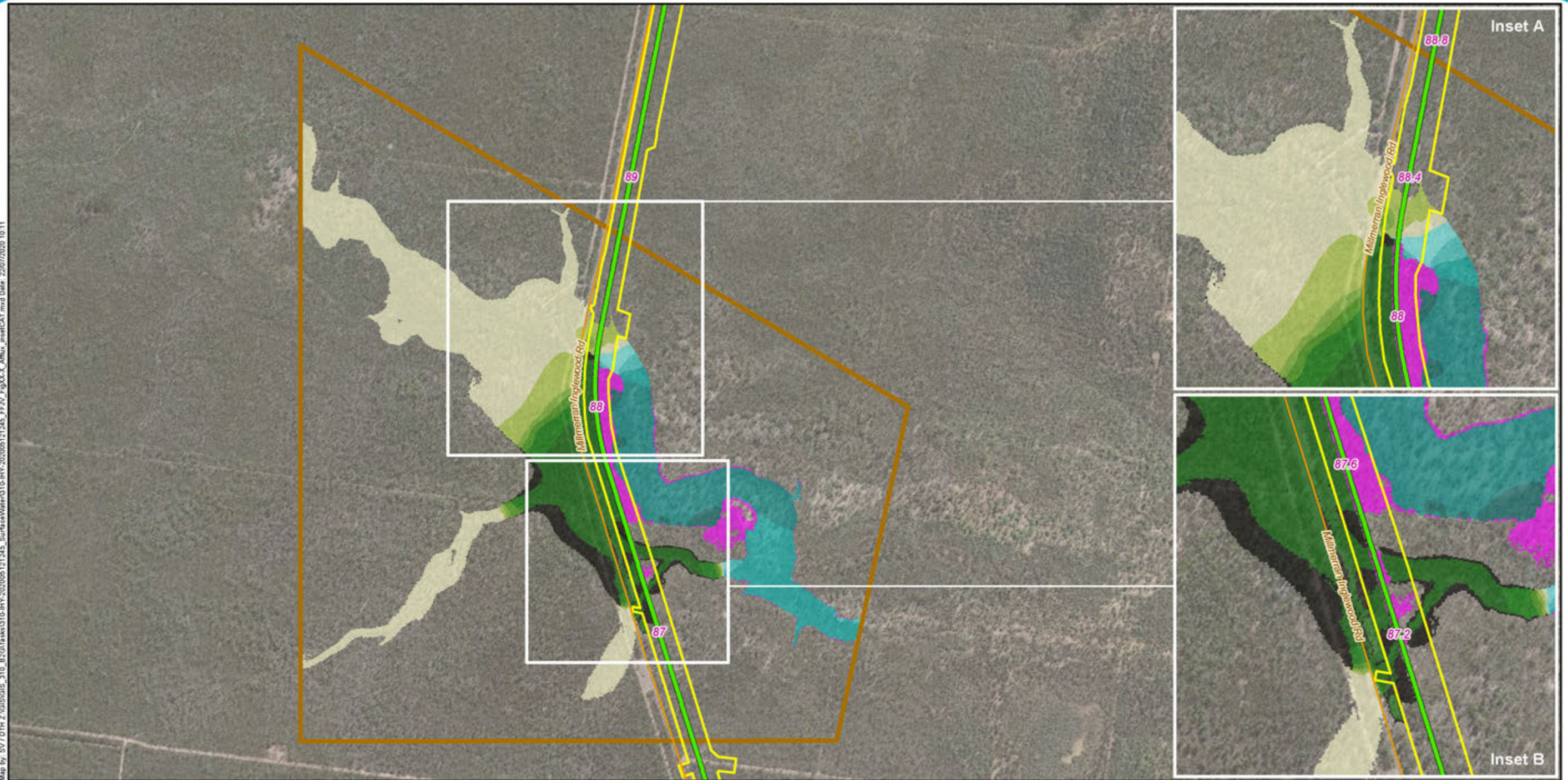
**Border to Gowrie**

**Figure H4-F:**

**1 in 2,000 AEP - design afflux - Cattle Creek**



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by: SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF\_N\_FigXX-X\_Afflu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

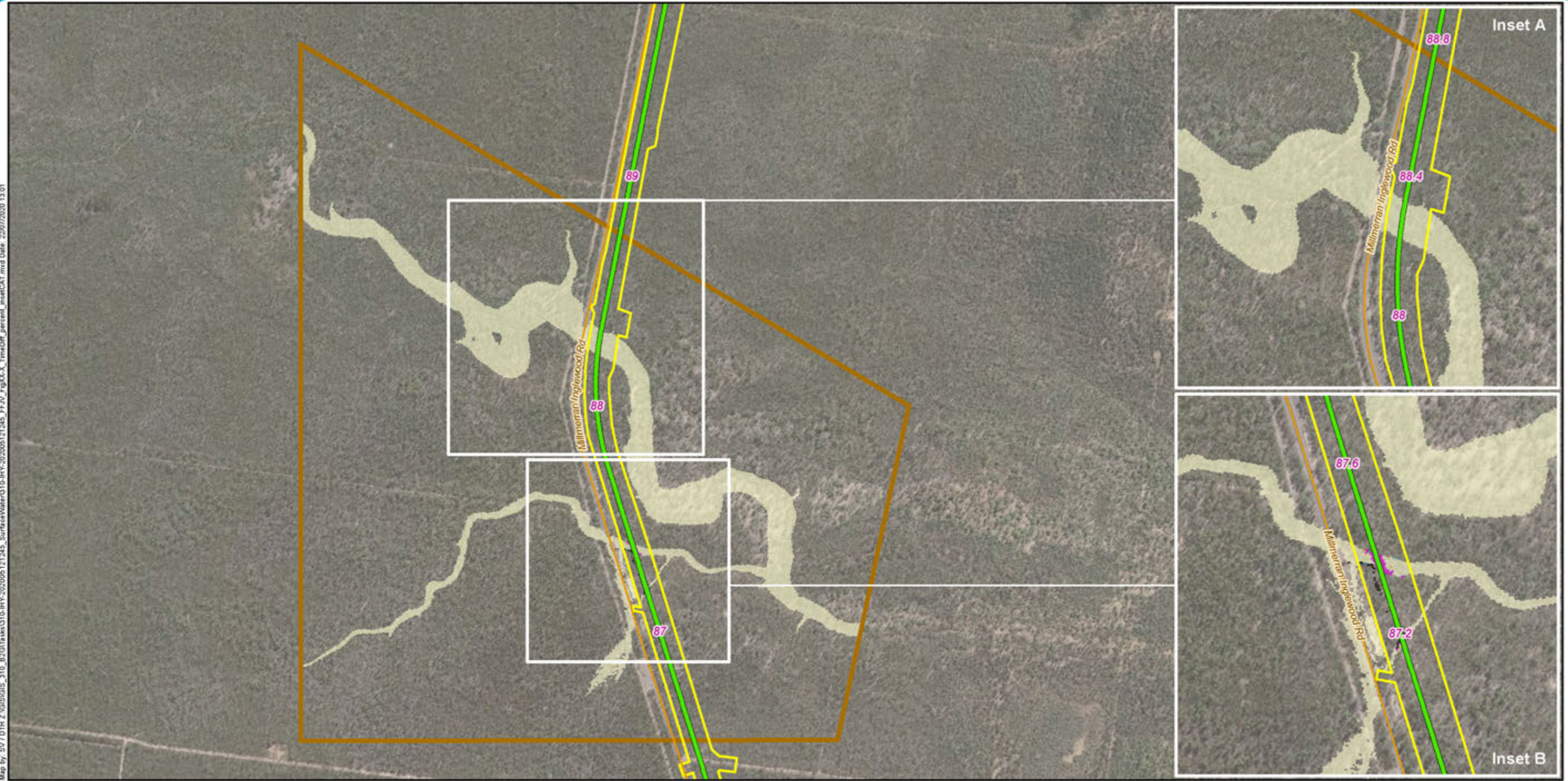
- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by: SV / DTH 2:10USGIS\_310\_B20Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF JV\_FigXX-X\_TimeDiff\_percent\_insetCAT.mxd Date: 20/07/2020 13:01



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in Time of Inundation (percentage)

- |              |             |
|--------------|-------------|
| < -50%       | 10% to 20 % |
| -50% to -40% | 20% to 30 % |
| -40% to -30% | 30% to 40 % |
| -30% to -20% | 40% to 50 % |
| -20% to -10% | > 50%       |
| -10% to 10 % |             |



A3 scale: 1:18,000  
0 0.15 0.3 0.45 0.6 0.75km



**Future Freight**  
Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
Coordinate System: GDA 1994 MGA Zone 56

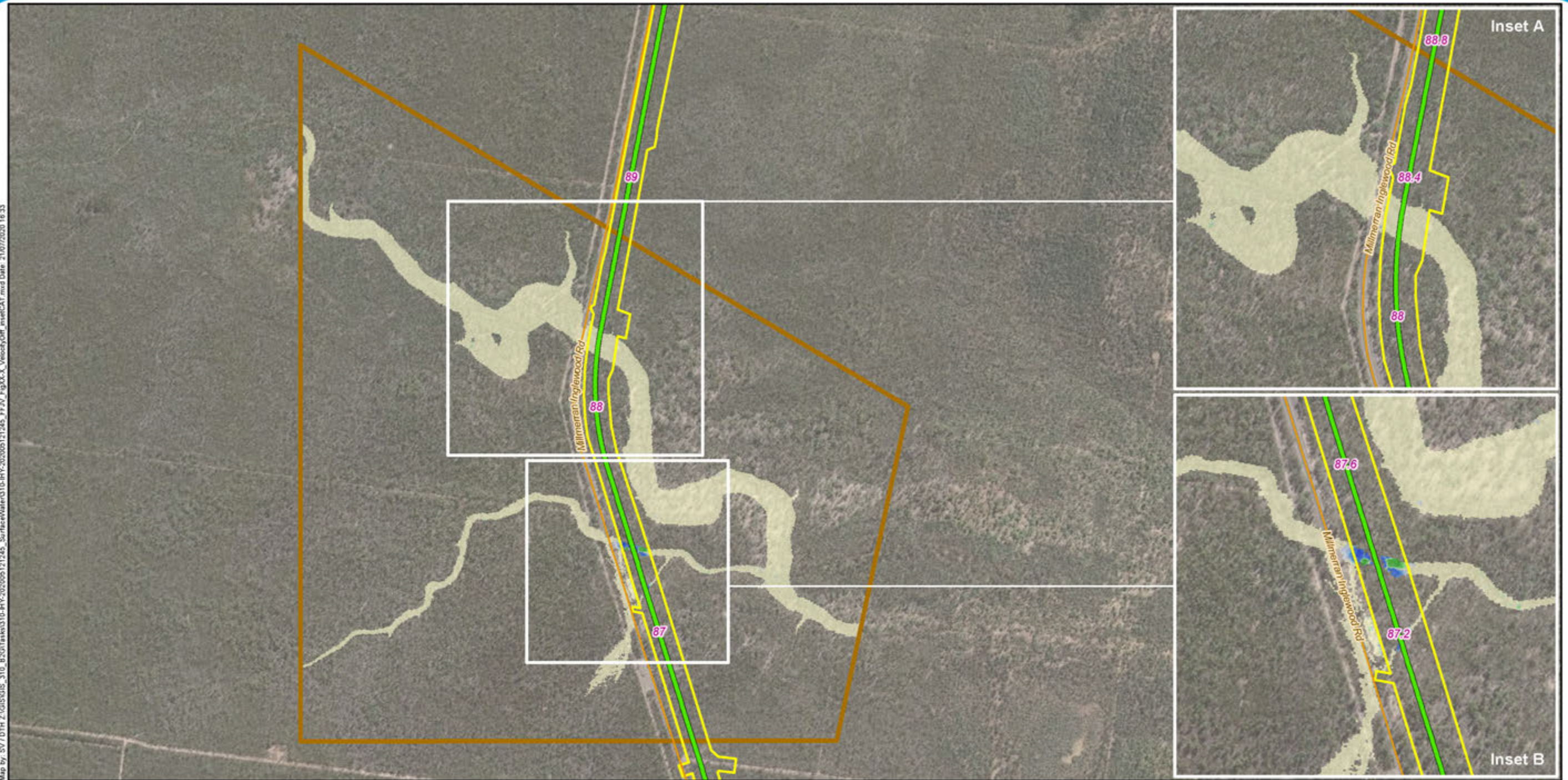
**Border to Gowrie**

**Figure H4-I:**

**1% AEP - change in time of inundation - Cattle Creek**



Map by SV / DTH 2:10USGIS\_310\_820Task310-HY-20200512145\_SurfaceWater310-HY-20200512145\_FF\_AV\_FigXX-X\_VeodyOff\_InsetCAT.mxd Date: 21/07/2020 16:33



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent

#### Change in peak velocity (m/s)

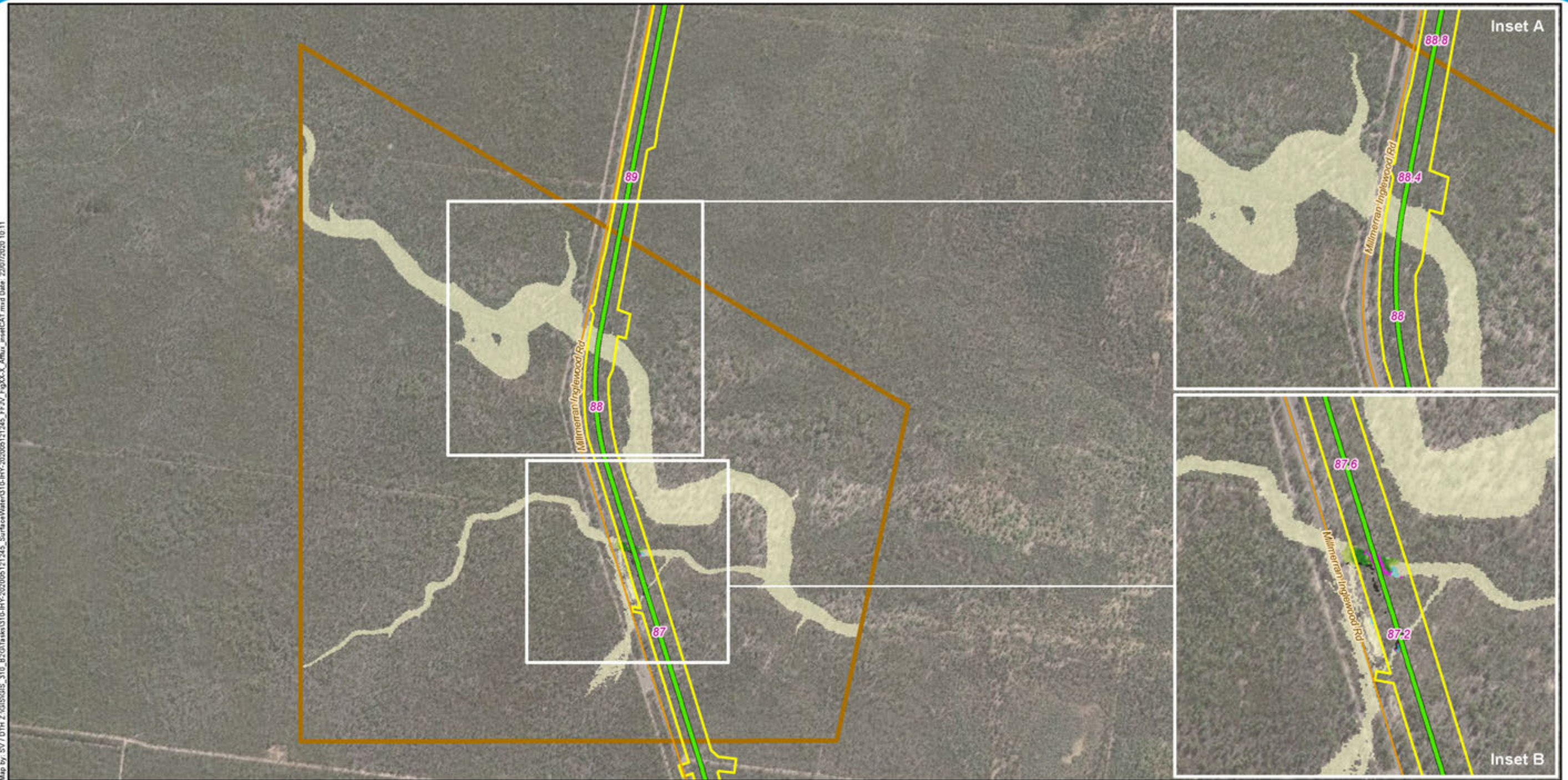
- |                                                                                                                                          |                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> < -0.50         | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.01 to 0.05 |
| <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> -0.50 to -0.20  | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.05 to 0.10 |
| <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> -0.20 to -0.10  | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.10 to 0.20 |
| <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> -0.10 to -0.05  | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.20 to 0.50 |
| <span style="background-color: blue; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> -0.05 to -0.01  | <span style="background-color: lightgreen; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 0.50       |
| <span style="background-color: yellow; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> -0.01 to 0.01 |                                                                                                                                             |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Altu\_insetCAT.mxd Date: 22/07/2020 10:11



# Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

## Change in peak water levels (m)

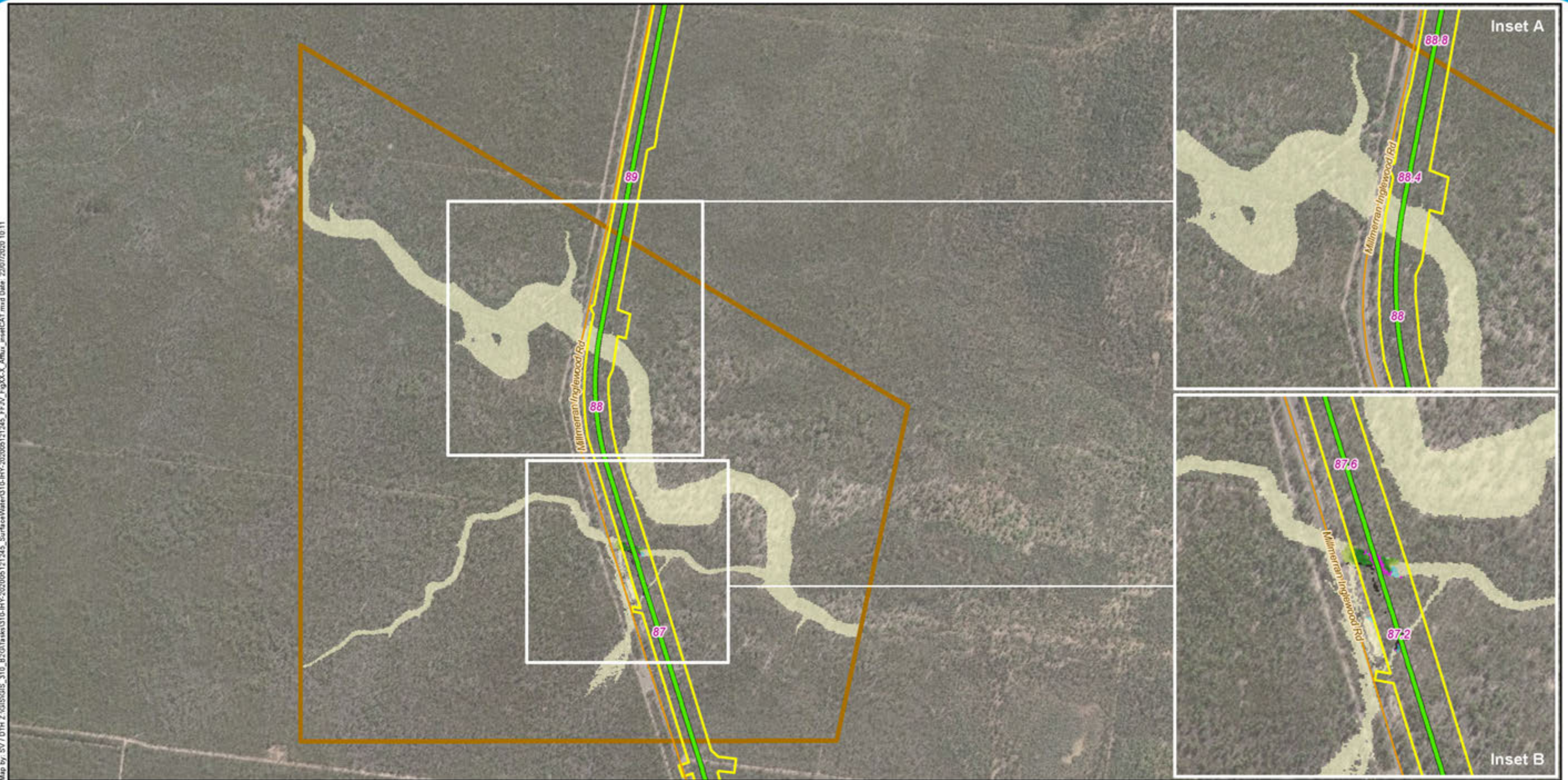
- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by SV / DTH 2:10USGIS\_310\_B20Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Altu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



Map by SV / DTH 2:10USGIS\_310\_B20Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-X\_Altu\_insetCAT.mxd Date: 22/07/2020 10:11



#### Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:18,000  
 0 0.15 0.3 0.45 0.6 0.75km



APPENDIX

# Q2

## Hydrology and Flooding Technical Report—Volume II

### **Appendix I**      Pariagara Creek Flood Maps

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT



# Appendix I

## Pariagara Creek Flood Maps

|             |                                                                |
|-------------|----------------------------------------------------------------|
| Figure I1-A | Locality plan                                                  |
| Figure I1-B | Survey data                                                    |
| Figure I1-C | Hydrologic model setup                                         |
| Figure I1-D | Hydraulic model setup                                          |
| Figure I1-E | Landuse classifications                                        |
| Figure I1-F | Proposed design structures                                     |
| Figure I2-A | 20% AEP peak water levels – Existing Case                      |
| Figure I2-B | 10% AEP peak water levels – Existing Case                      |
| Figure I2-C | 5% AEP peak water levels – Existing Case                       |
| Figure I2-D | 2% AEP peak water levels – Existing Case                       |
| Figure I2-E | 1% AEP peak water levels – Existing Case                       |
| Figure I2-F | 1 in 2,000 AEP peak water levels – Existing Case               |
| Figure I2-G | 1 in 10,000 AEP peak water levels – Existing Case              |
| Figure I2-H | PMF peak water levels – Existing Case                          |
| Figure I3-A | 1% AEP peak velocity – Existing Case                           |
| Figure I4-A | 20% AEP – design afflux                                        |
| Figure I4-B | 10% AEP – design afflux                                        |
| Figure I4-C | 5% AEP – design afflux                                         |
| Figure I4-D | 2% AEP – design afflux                                         |
| Figure I4-E | 1% AEP – design afflux                                         |
| Figure I4-F | 1 in 2,000 AEP – design afflux                                 |
| Figure I4-G | 1 in 10,000 AEP – design afflux                                |
| Figure I4-H | PMF – design afflux                                            |
| Figure I4-I | 1% AEP – change in time of inundation                          |
| Figure I4-J | 1% AEP – change in velocity                                    |
| Figure I5-A | 1% AEP sensitivity – 0% blockage                               |
| Figure I5-B | 1% AEP sensitivity – 50% blockage                              |
| Figure I5-C | 1% AEP sensitivity – climate change RCP4.5 – peak water levels |



Map by SV / DTH 2:10:50GIS\_310\_B20Takes310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_Fig1-A\_Locality.mxd Date: 22/07/2020 19:20



#### Legend

- |                             |                   |
|-----------------------------|-------------------|
| 5 Chainage (km)             | Watercourses      |
| Existing rail (operational) | Major roads       |
| Border to Gowrie alignment  | Minor roads       |
|                             | Road design       |
|                             | Project footprint |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



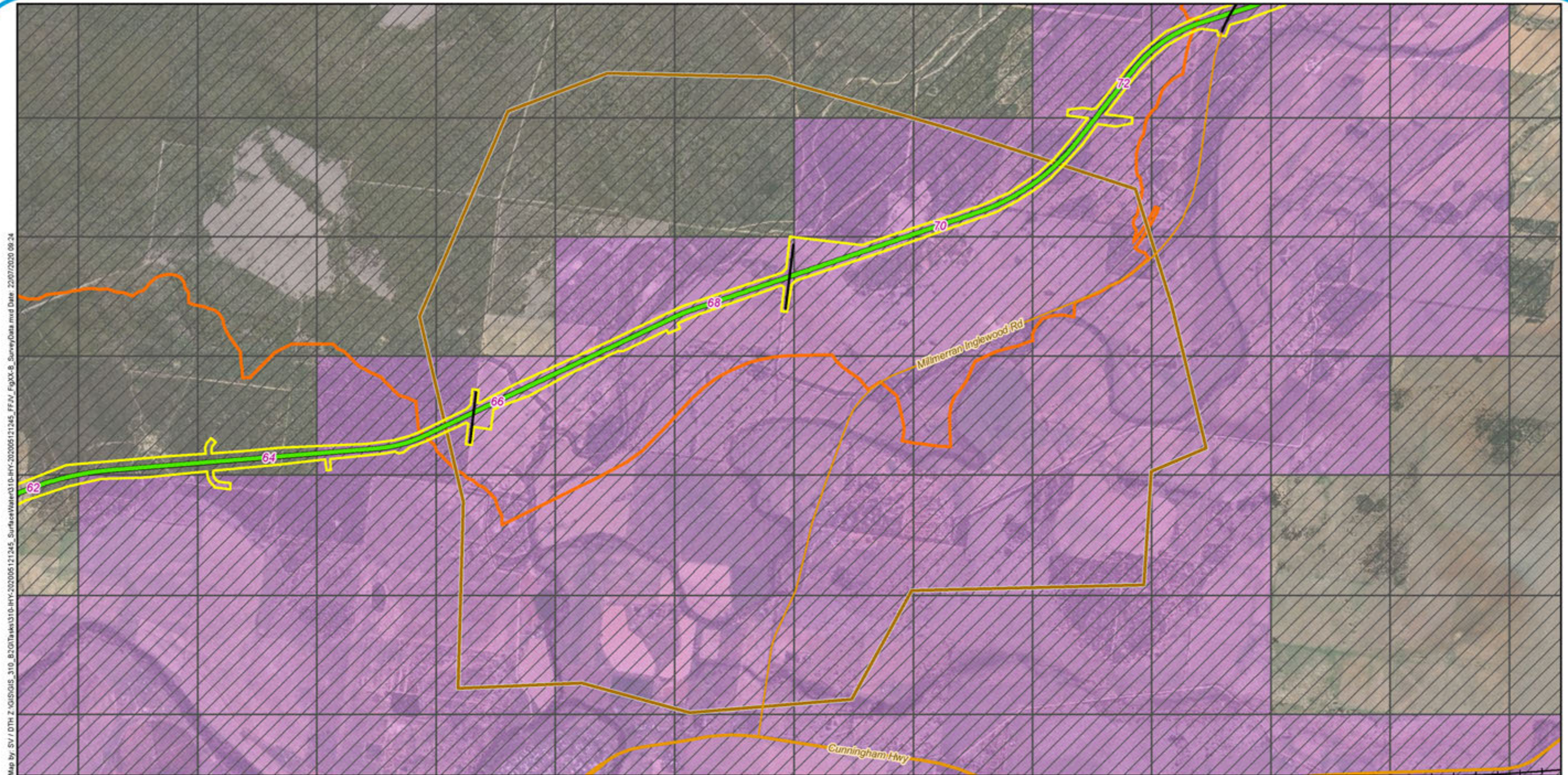
**Future Freight**  
 Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure I1-A:**  
**Locality plan - Pariagara Creek**





#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Hydrologic model extent

#### LiDAR datasets (1m grid)

- Inland Towns Stage 2 2011
- 2015 ARTC LiDAR 1m



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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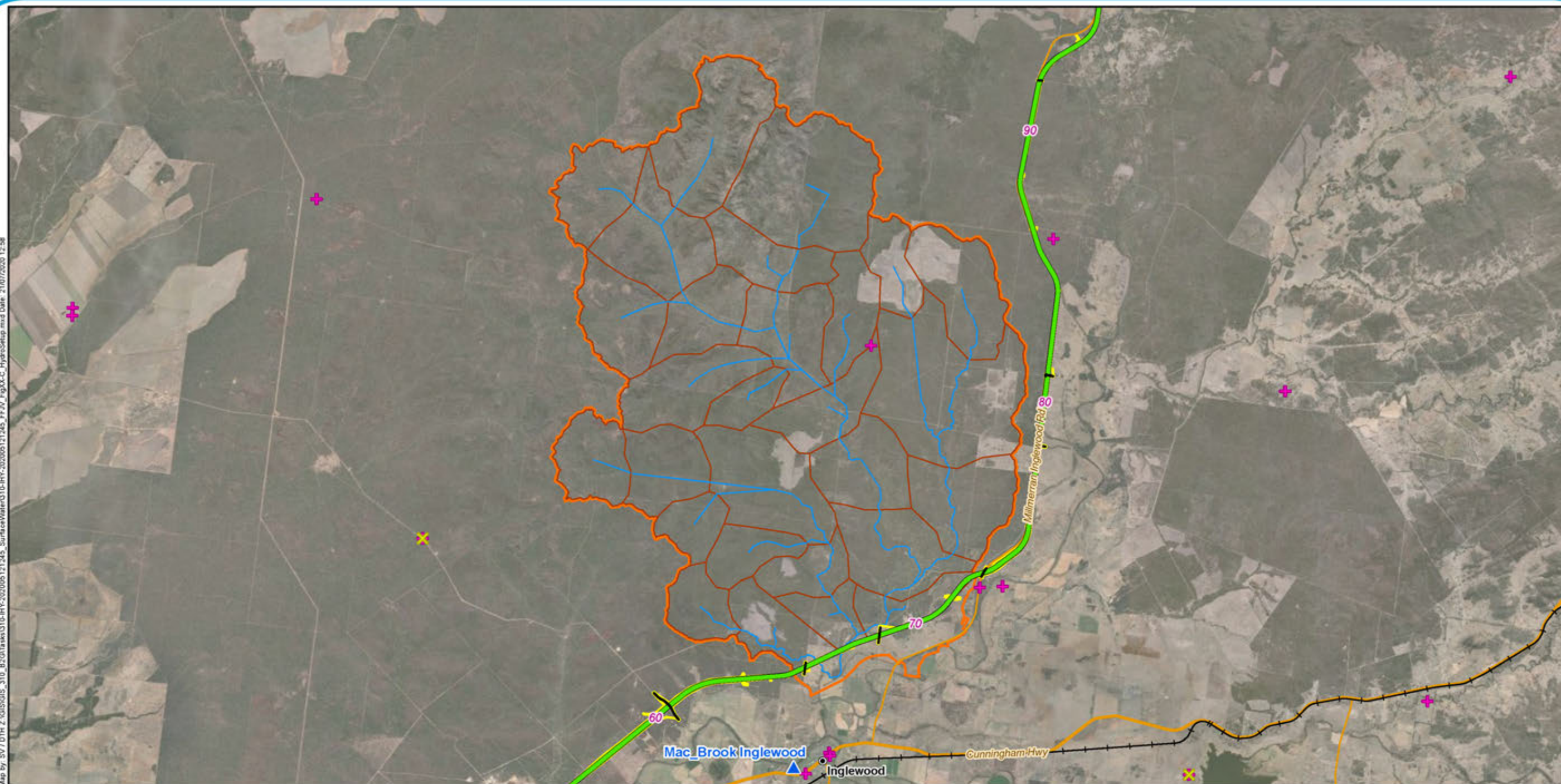
Issue date: 22/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure I1-B:**  
**Survey data - Pariagara Creek**



Map by SV / DTH 2:101501010\_310\_8201Task1310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3N\_Fig04-C\_HydroSetup.mxd Date: 21/07/2020 12:58



#### Legend

- |                             |                   |                         |                         |
|-----------------------------|-------------------|-------------------------|-------------------------|
| 5 Chainage (km)             | Major roads       | Catchment links         | Pluviograph stations    |
| Localities                  | Minor roads       | Sub-catchments          | Daily rainfall stations |
| Existing rail (operational) | Road design       | Hydrologic model extent | Stream gauge locations  |
| Border to Gowrie alignment  | Project footprint |                         |                         |



A3 scale: 1:150,000  
 0 1.5 3 4.5 6 7.5km



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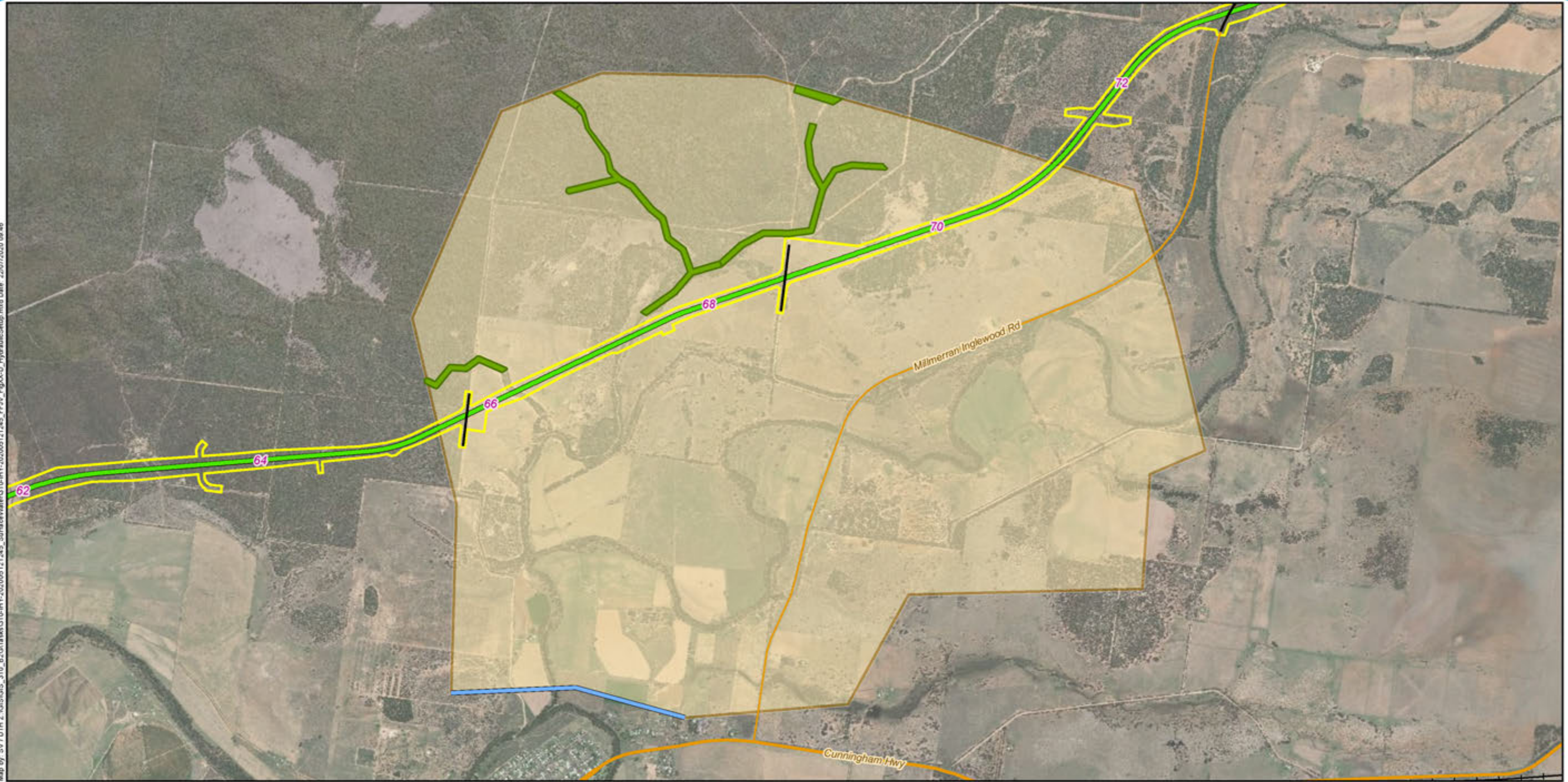
**Border to Gowrie**

**Figure I1-C:**

**Hydrologic model setup - Pariagara Creek**



Map by SV / DTH 2:10USGIS\_310\_820Task310-HY-202006121245\_SurfaceWater310-HY-202006121245\_FF3V\_FigX-D\_HydraulicSetup.mxd Date: 22/07/2020 09:48



#### Legend

- |                             |                   |                        |
|-----------------------------|-------------------|------------------------|
| 5 Chainage (km)             | Major roads       | Hydraulic model extent |
| Existing rail (operational) | Minor roads       | Outflow boundaries     |
| Border to Gowrie alignment  | Road design       | Inflow boundaries      |
|                             | Project footprint |                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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Issue date: 22/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

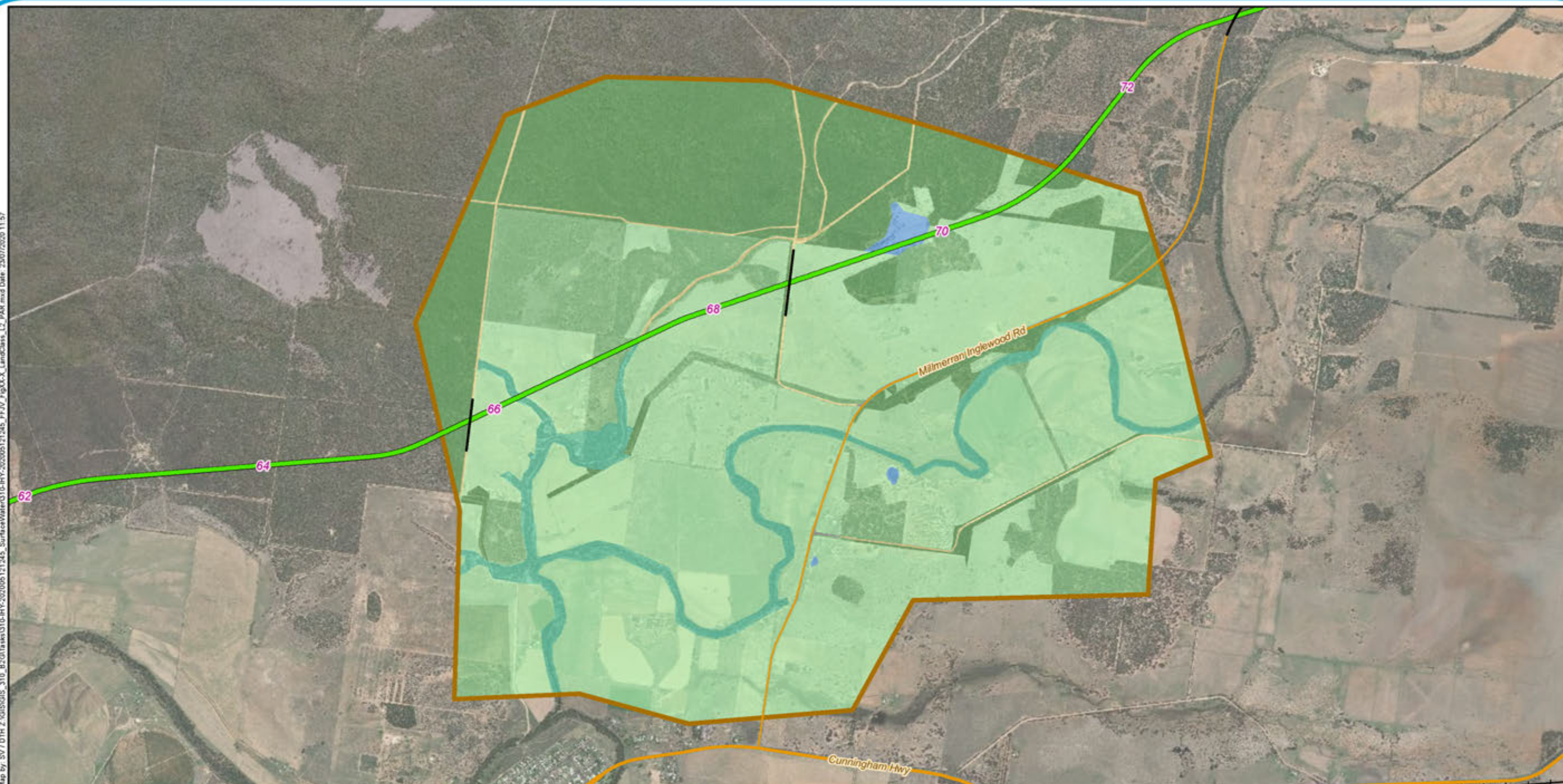
**Border to Gowrie**

**Figure I1-D:**

**Hydraulic model setup - Pariagara Creek**



Map by SV / DTH 2:10USGIS\_310\_820Task310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FFJV\_Fig00-X\_LandClass\_12\_PAR.mxd Date: 23/07/2020 11:57



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Hydraulic model extent

#### Landuse classification

- River (n=0.035)
- Sealed road corridor (n=0.015)
- Unsealed road corridor (n=0.025)
- Open space - min veg (n=0.045)
- Open space - mod veg (n=0.055)
- Openspace - heavy veg (n=0.065)
- Riparian (n=0.040)



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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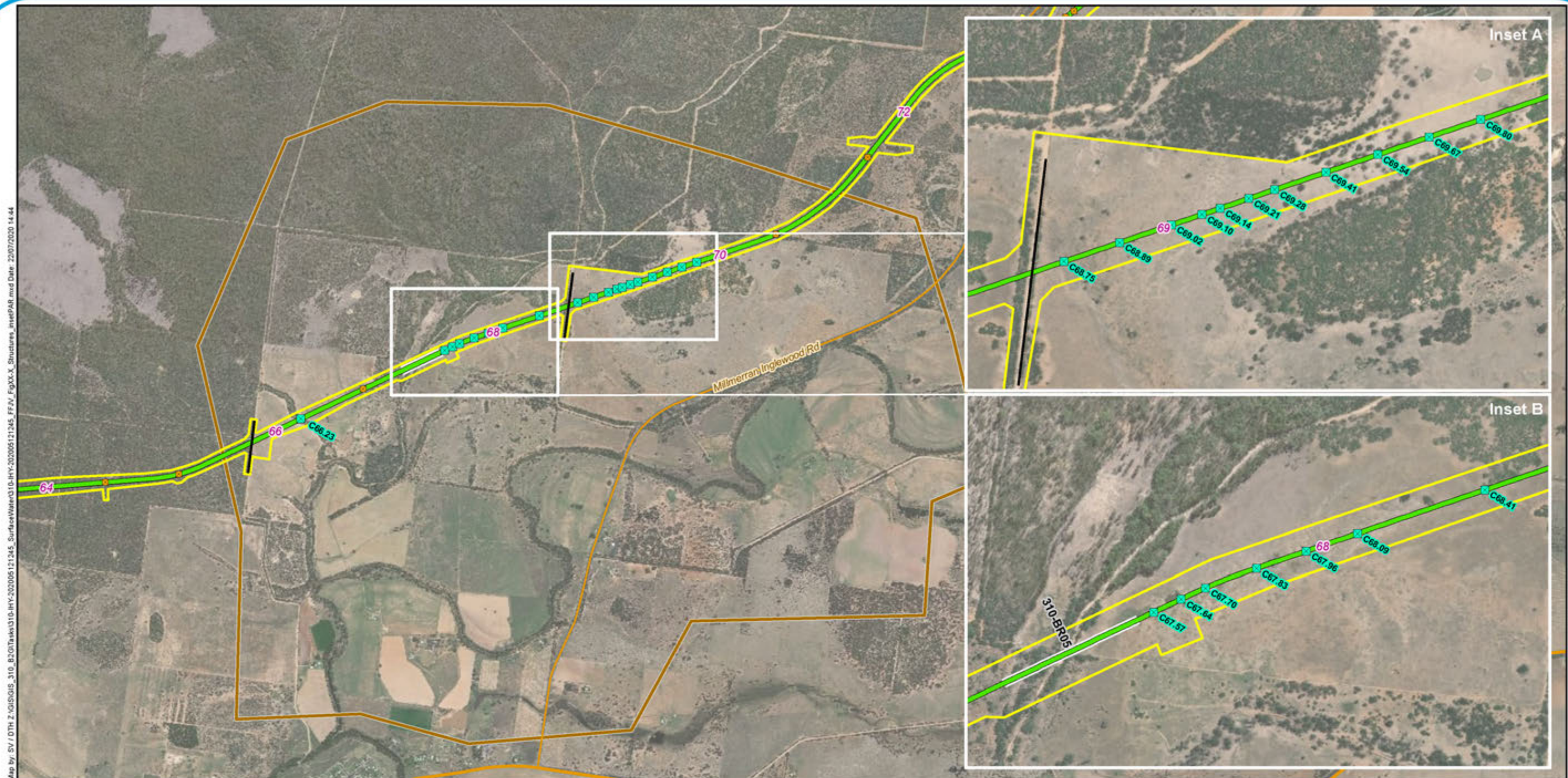
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure I1-E:**

**Landuse classifications - Pariagara Creek**





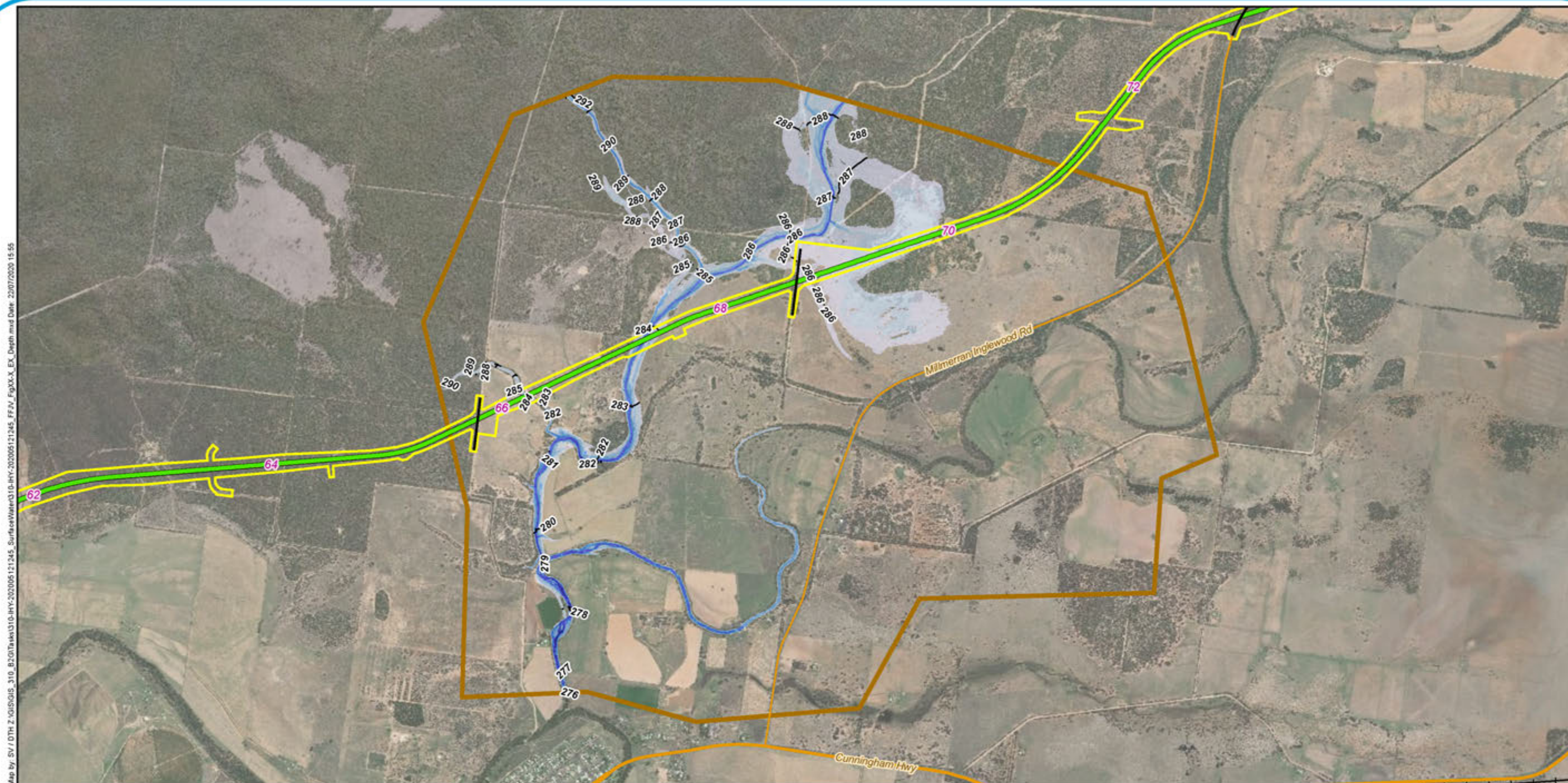
#### Legend

- |                            |                        |
|----------------------------|------------------------|
| 5 Chainage (km)            | Major roads            |
| Floodplain culvert         | Minor roads            |
| Local drainage culvert     | Road design            |
| Bridges                    | Project footprint      |
| Border to Gowrie alignment | Hydraulic model extent |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km





#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

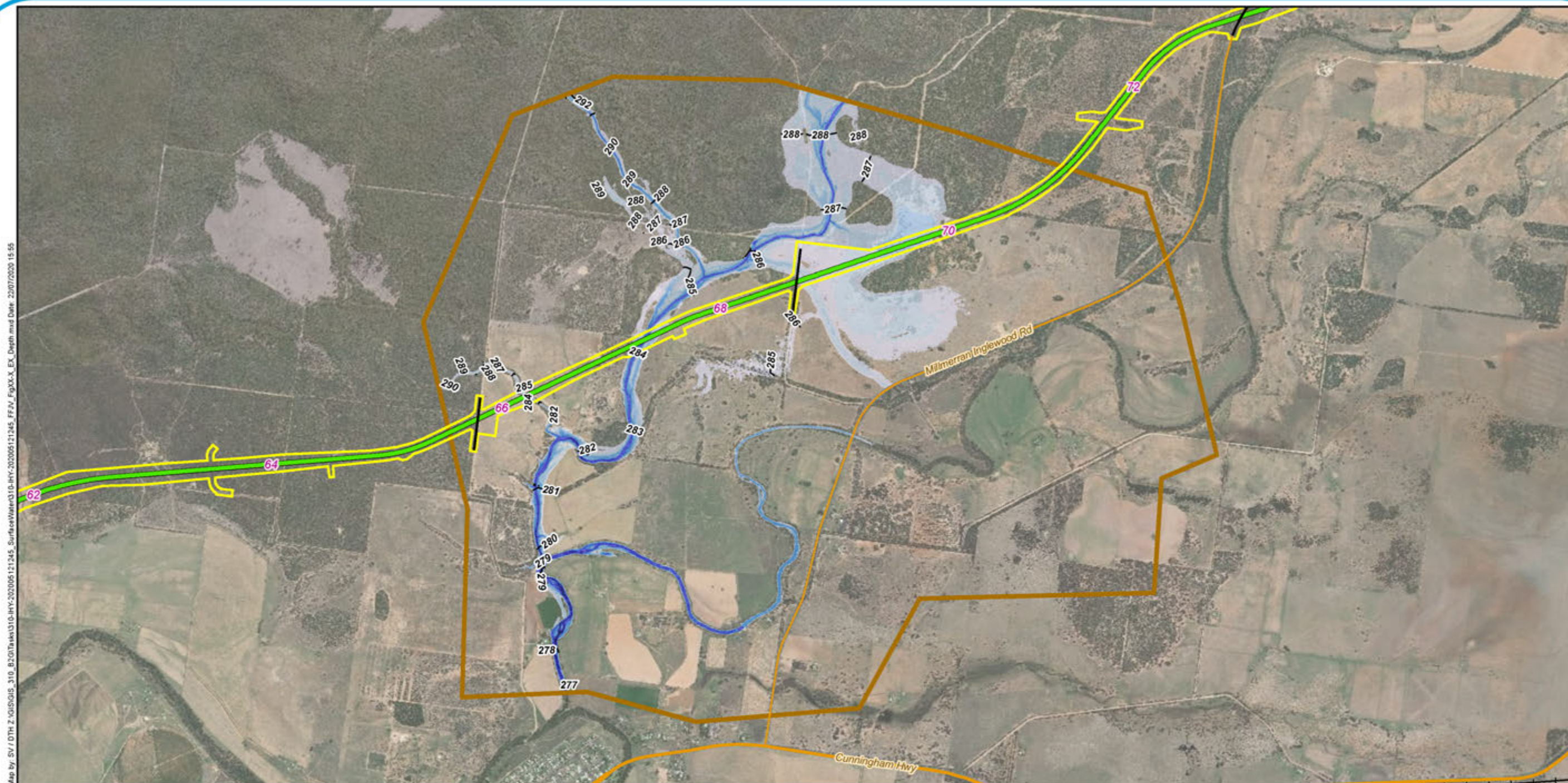
#### Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km





#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

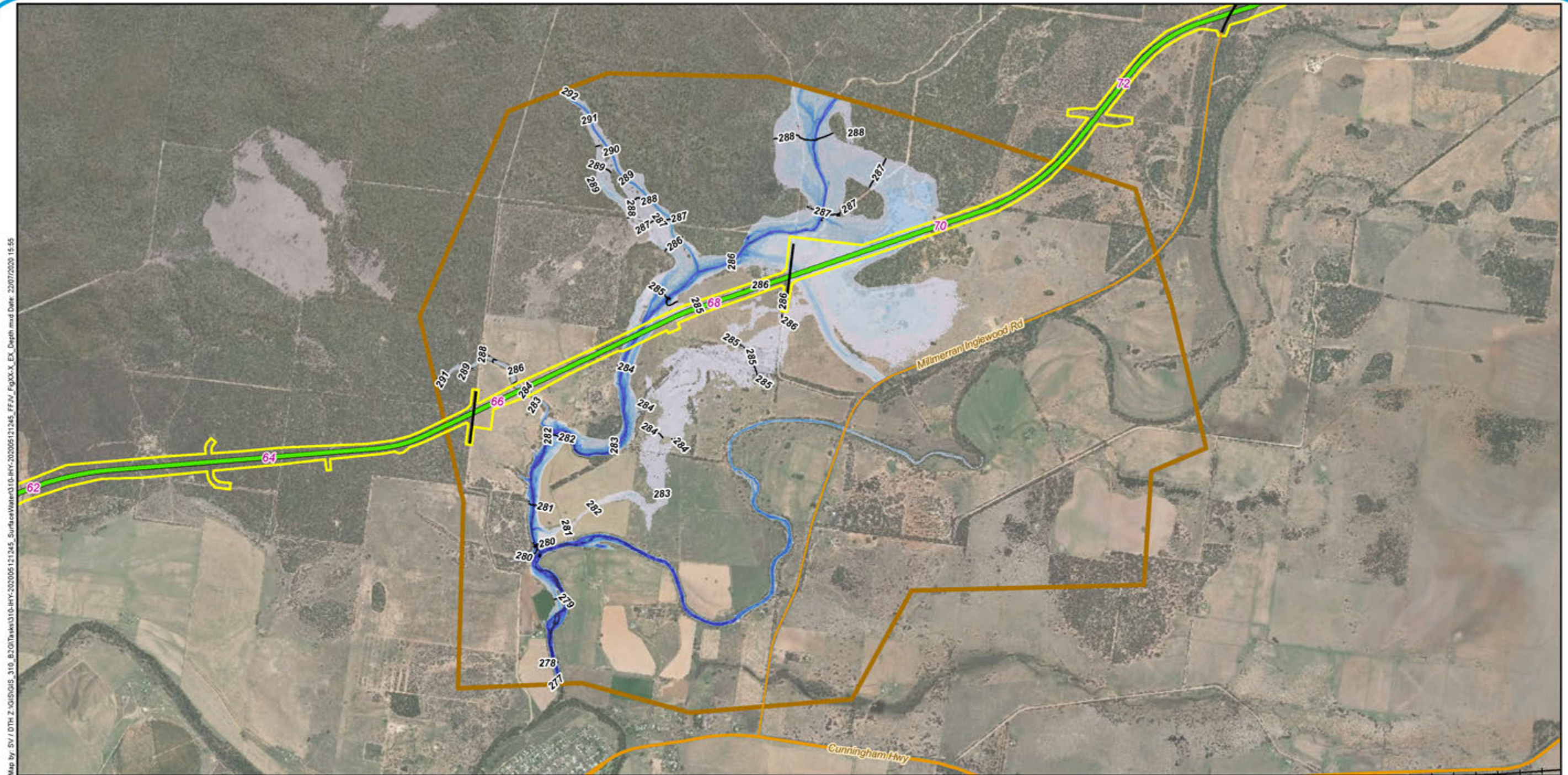
#### Depth (m)

- |           |                   |
|-----------|-------------------|
| 0 - 0.5   | 3.0 - 3.5         |
| 0.5 - 1.0 | 3.5 - 4.0         |
| 1.0 - 1.5 | 4.0 - 4.5         |
| 1.5 - 2.0 | 4.5 - 5.0         |
| 2.0 - 2.5 | > 5.0             |
| 2.5 - 3.0 | 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km





#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

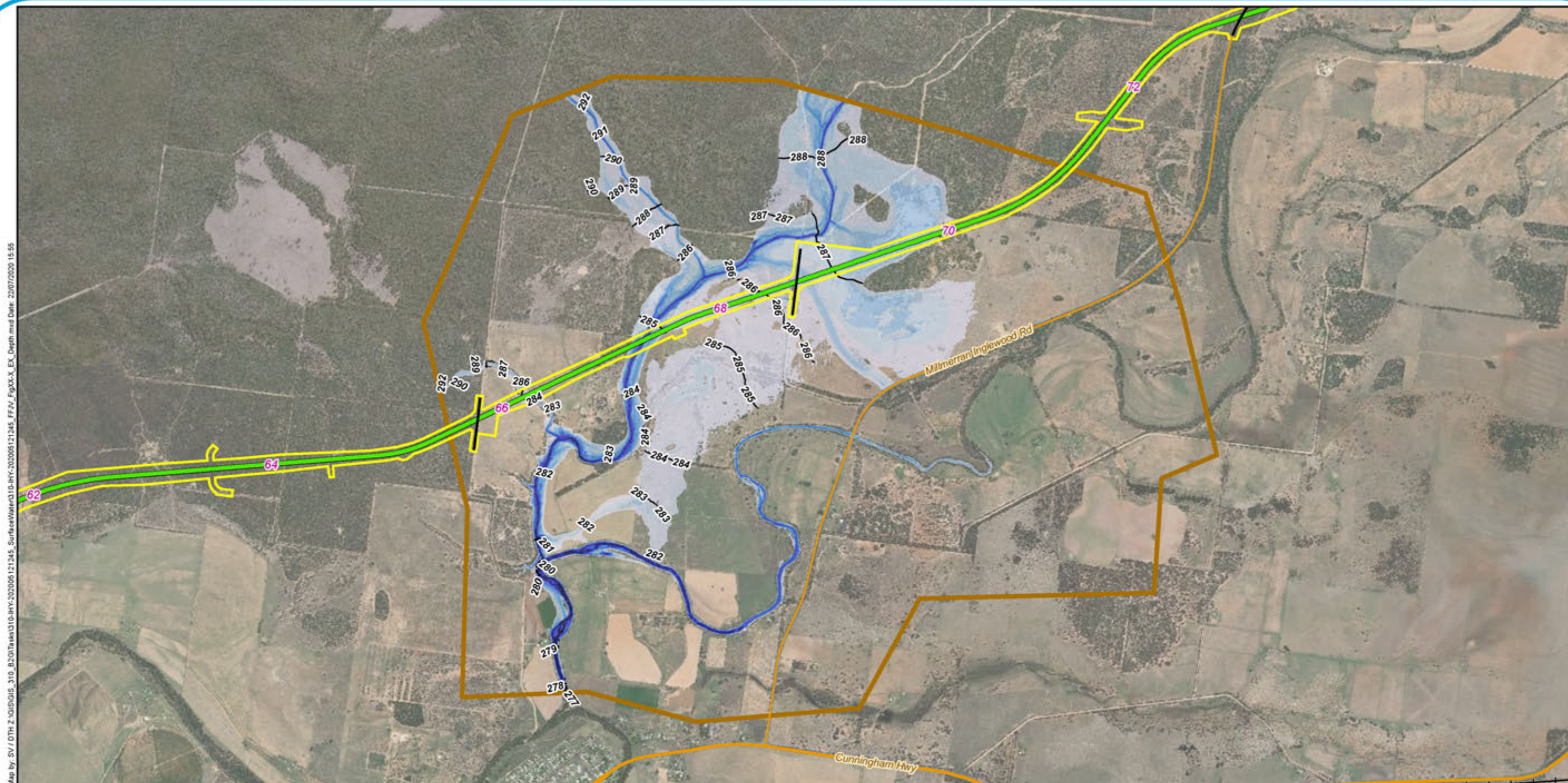
#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
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| <span style="color: lightblue;">—</span> 0.5 - 1.0 | <span style="color: blue;">—</span> 3.5 - 4.0          |
| <span style="color: lightblue;">—</span> 1.0 - 1.5 | <span style="color: blue;">—</span> 4.0 - 4.5          |
| <span style="color: lightblue;">—</span> 1.5 - 2.0 | <span style="color: blue;">—</span> 4.5 - 5.0          |
| <span style="color: lightblue;">—</span> 2.0 - 2.5 | <span style="color: blue;">—</span> > 5.0              |
| <span style="color: lightblue;">—</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km





#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

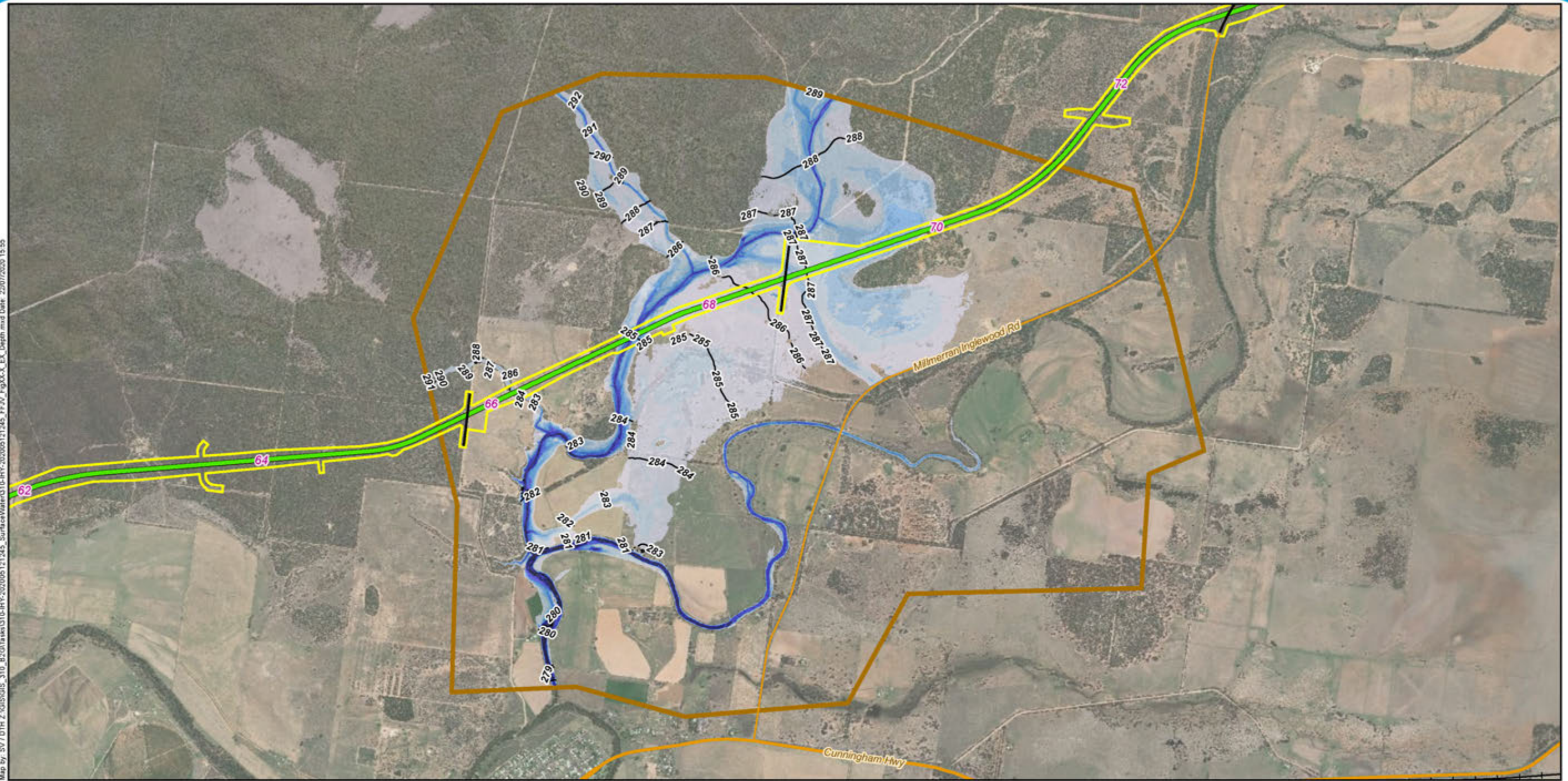
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|----------------------------------------------------|--------------------------------------------------------|
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| <span style="color: lightblue;">—</span> 0.5 - 1.0 | <span style="color: blue;">—</span> 3.5 - 4.0          |
| <span style="color: lightblue;">—</span> 1.0 - 1.5 | <span style="color: blue;">—</span> 4.0 - 4.5          |
| <span style="color: lightblue;">—</span> 1.5 - 2.0 | <span style="color: blue;">—</span> 4.5 - 5.0          |
| <span style="color: lightblue;">—</span> 2.0 - 2.5 | <span style="color: blue;">—</span> > 5.0              |
| <span style="color: blue;">—</span> 2.5 - 3.0      | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_820Task1310-HY-202006121245\_SurfaceWaterD10-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

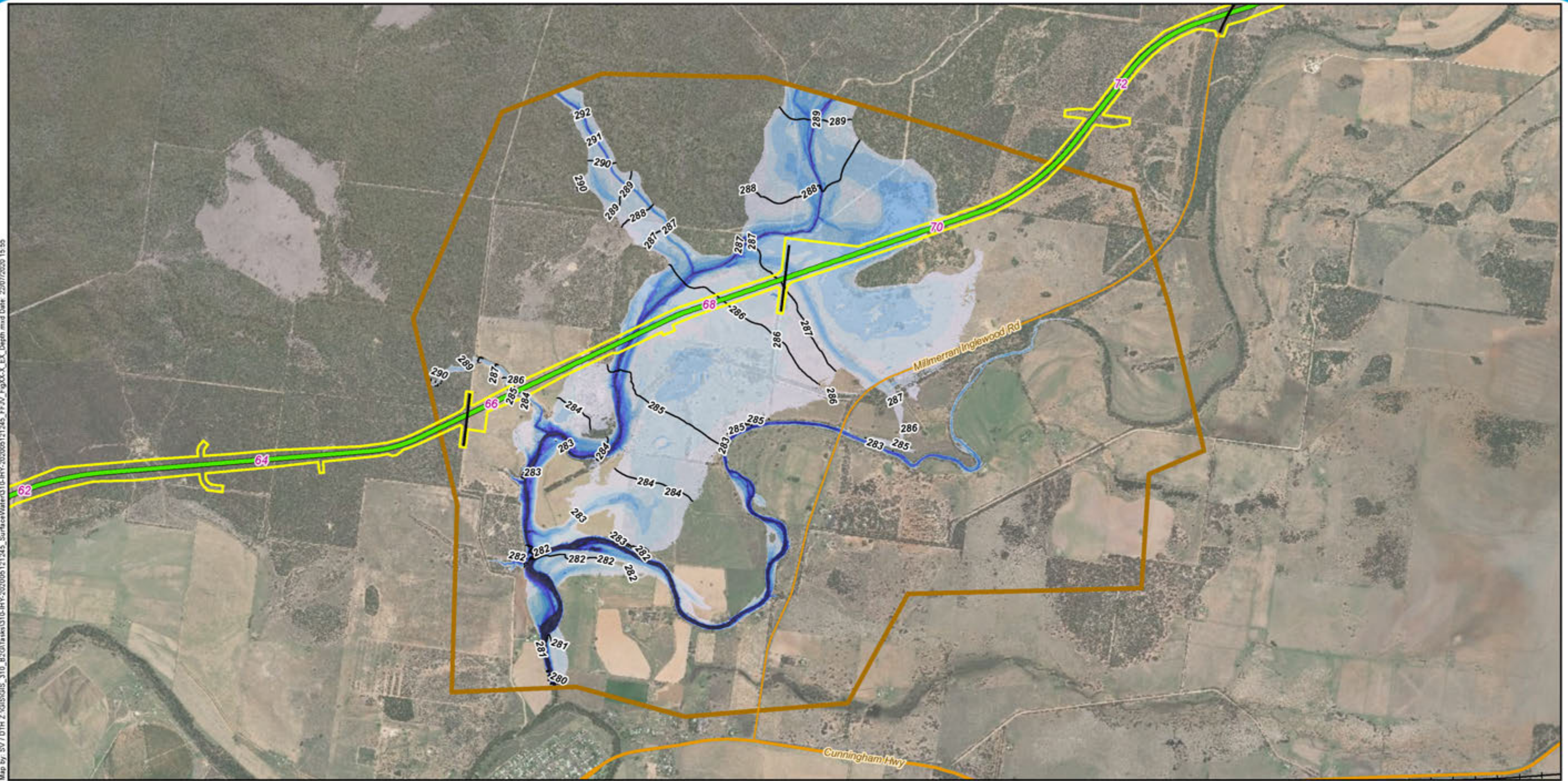
- |           |                     |
|-----------|---------------------|
| 0 - 0.5   | 3.0 - 3.5           |
| 0.5 - 1.0 | 3.5 - 4.0           |
| 1.0 - 1.5 | 4.0 - 4.5           |
| 1.5 - 2.0 | 4.5 - 5.0           |
| 2.0 - 2.5 | > 5.0               |
| 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202006121245\_SurfaceWaterD10-HY-202006121245\_FF3V\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Depth (m)

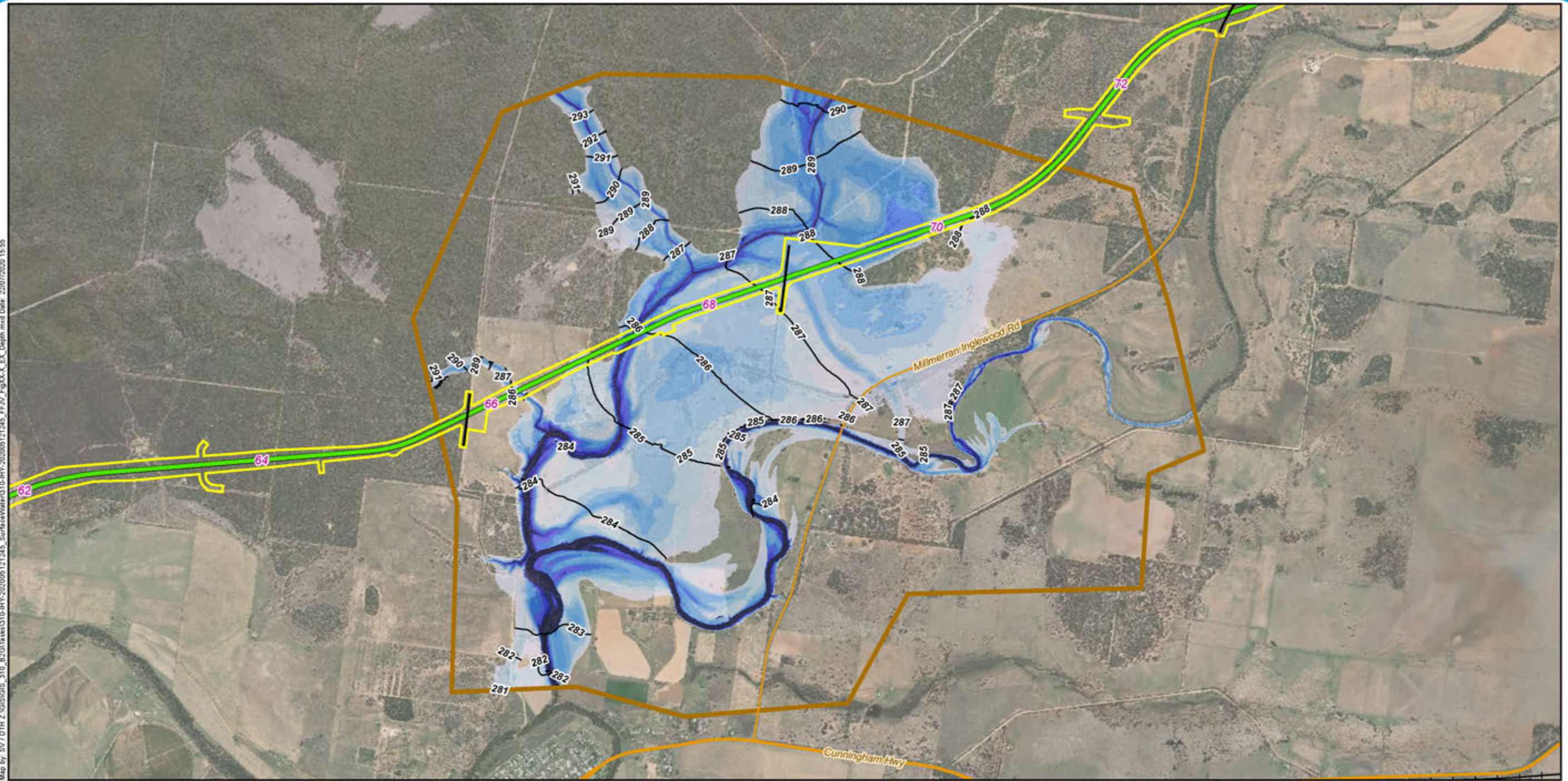
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| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 0.5 - 1.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 3.5 - 4.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.0 - 1.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.0 - 4.5 |
| <span style="background-color: #add8e6; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 1.5 - 2.0 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 4.5 - 5.0 |
| <span style="background-color: #87ceeb; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.0 - 2.5 | <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> > 5.0     |
| <span style="background-color: #4169e1; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD)                                                                                |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_8207Task1310-HY-202006121245\_SurfaceWaterD10-HY-202006121245\_FF3N\_Fig00-X\_EX\_Depth.mxd Date: 22/07/2020 15:55



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

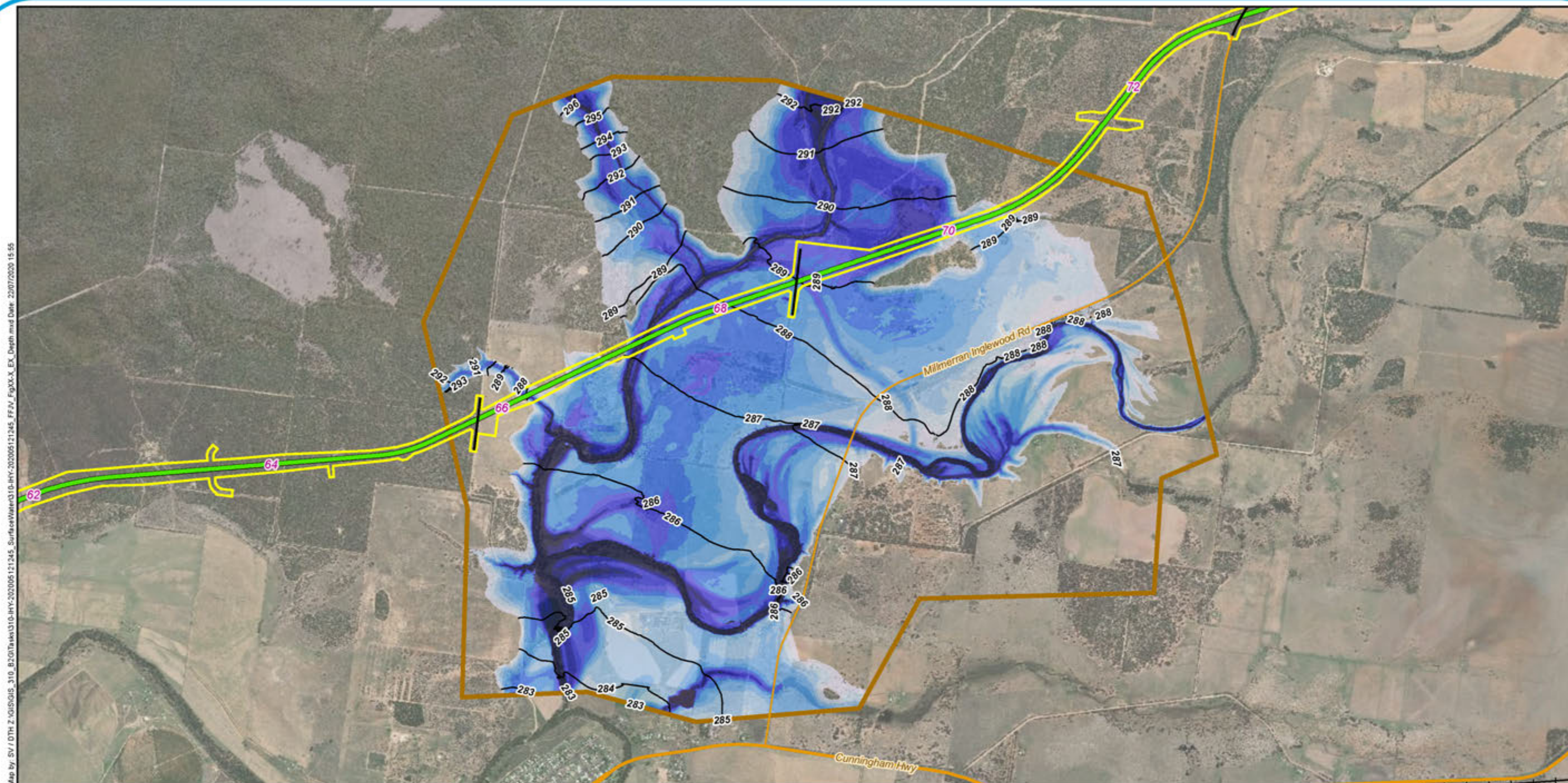
#### Depth (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
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| <span style="color: lightblue;">—</span> 0.5 - 1.0 | <span style="color: blue;">—</span> 3.5 - 4.0          |
| <span style="color: lightblue;">—</span> 1.0 - 1.5 | <span style="color: blue;">—</span> 4.0 - 4.5          |
| <span style="color: lightblue;">—</span> 1.5 - 2.0 | <span style="color: blue;">—</span> 4.5 - 5.0          |
| <span style="color: lightblue;">—</span> 2.0 - 2.5 | <span style="color: blue;">—</span> > 5.0              |
| <span style="color: lightblue;">—</span> 2.5 - 3.0 | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km





# Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

## Depth (m)

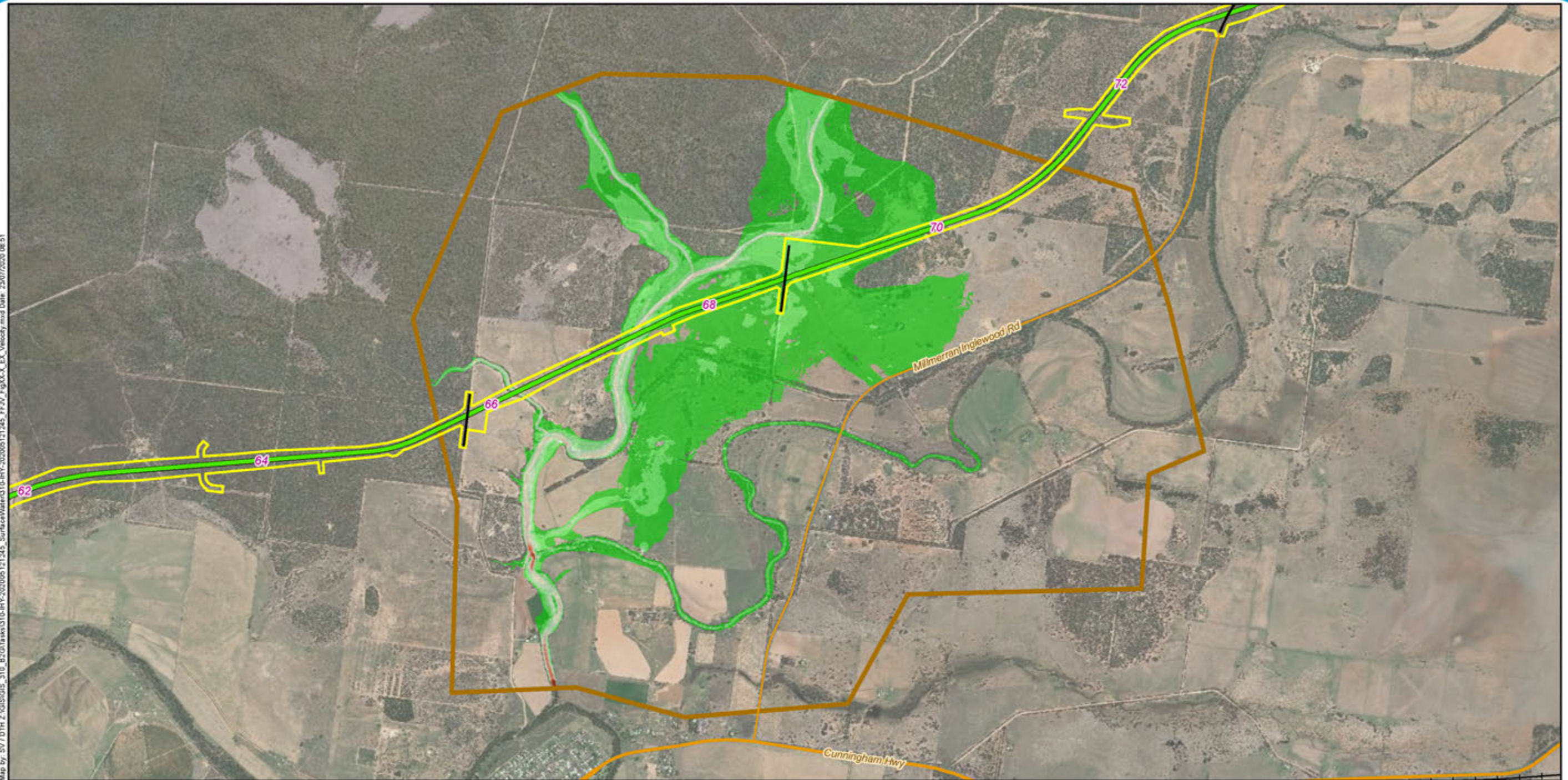
- |                                                  |                                                        |
|--------------------------------------------------|--------------------------------------------------------|
| <span style="color: lightblue;">0 - 0.5</span>   | <span style="color: blue;">3.0 - 3.5</span>            |
| <span style="color: lightblue;">0.5 - 1.0</span> | <span style="color: blue;">3.5 - 4.0</span>            |
| <span style="color: lightblue;">1.0 - 1.5</span> | <span style="color: blue;">4.0 - 4.5</span>            |
| <span style="color: lightblue;">1.5 - 2.0</span> | <span style="color: blue;">4.5 - 5.0</span>            |
| <span style="color: lightblue;">2.0 - 2.5</span> | <span style="color: blue;">&gt; 5.0</span>             |
| <span style="color: lightblue;">2.5 - 3.0</span> | <span style="color: black;">—</span> 1m contour (mAHD) |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:1015015, 310\_8201Task1310-HY-202006121245\_SurfaceWaterD10-HY-202006121245\_FF3V\_Fig00-X\_EX\_Velocity.mxd Date: 23/07/2020 08:51



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Peak velocity (m/s)

|     |     |
|-----|-----|
| 0.0 | 3.0 |
| 0.5 | 3.5 |
| 1.0 | 4.0 |
| 1.5 | 4.5 |
| 2.0 | 5.0 |
| 2.5 |     |



A3 scale: 1:35,000  
0 0.35 0.7 1.05 1.4 1.75 km



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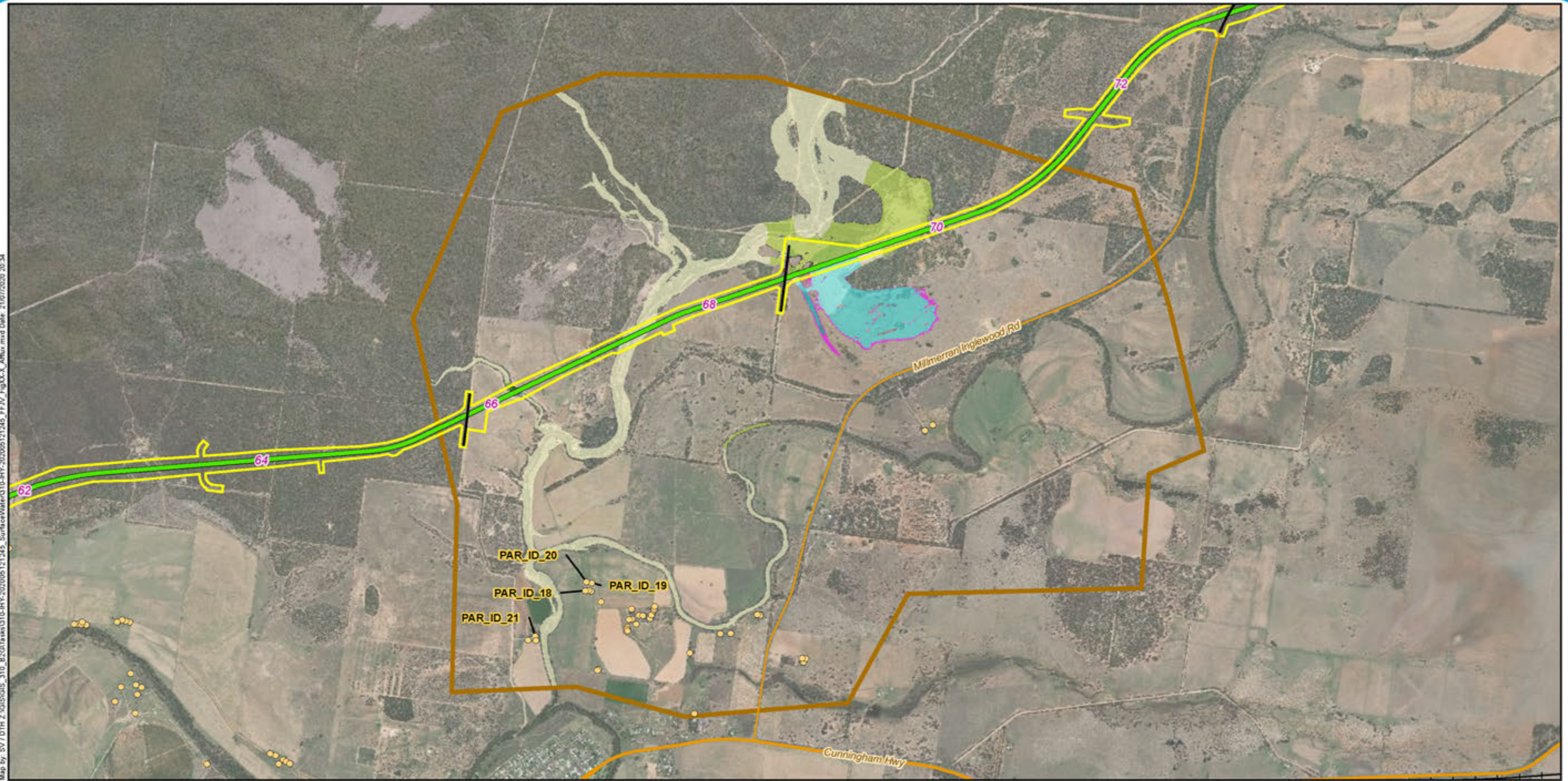
**Border to Gowrie**

**Figure I3-A:**

**1% AEP peak velocity - Existing Case - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_8201Task1310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05  |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10       |
| <span style="color: lightblue;">—</span> -0.20 to -0.10 | <span style="color: darkgreen;">—</span> 0.10 to 0.20   |
| <span style="color: cyan;">—</span> -0.10 to -0.05      | <span style="color: forestgreen;">—</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">—</span> -0.05 to -0.01 | <span style="color: darkslategrey;">—</span> > 0.5      |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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 Coordinate System: GDA 1994 MGA Zone 56

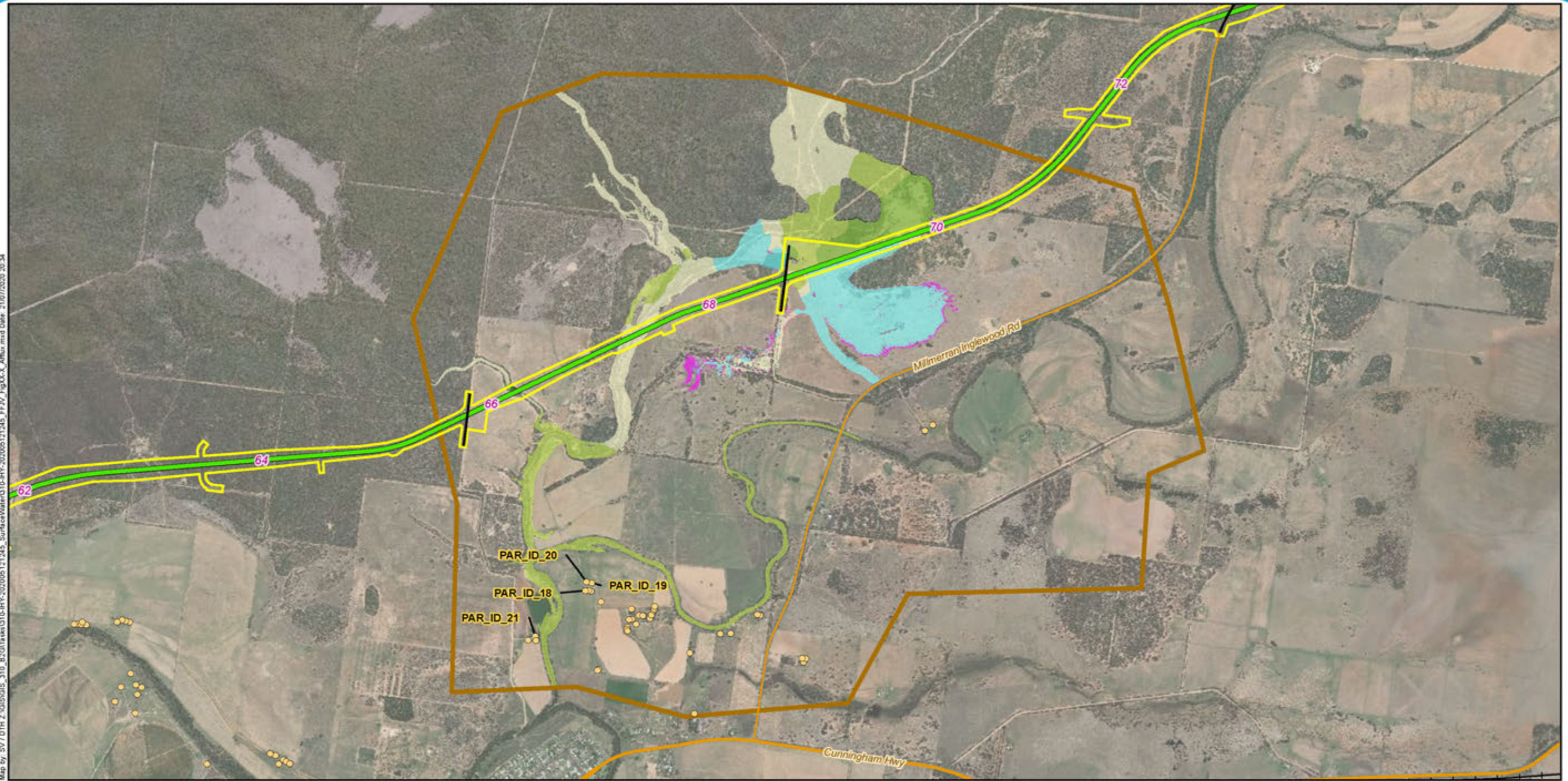
**Border to Gowrie**

**Figure I4-A:**

**20% AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF\_VN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: cyan;">—</span> -0.05 to -0.01      | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

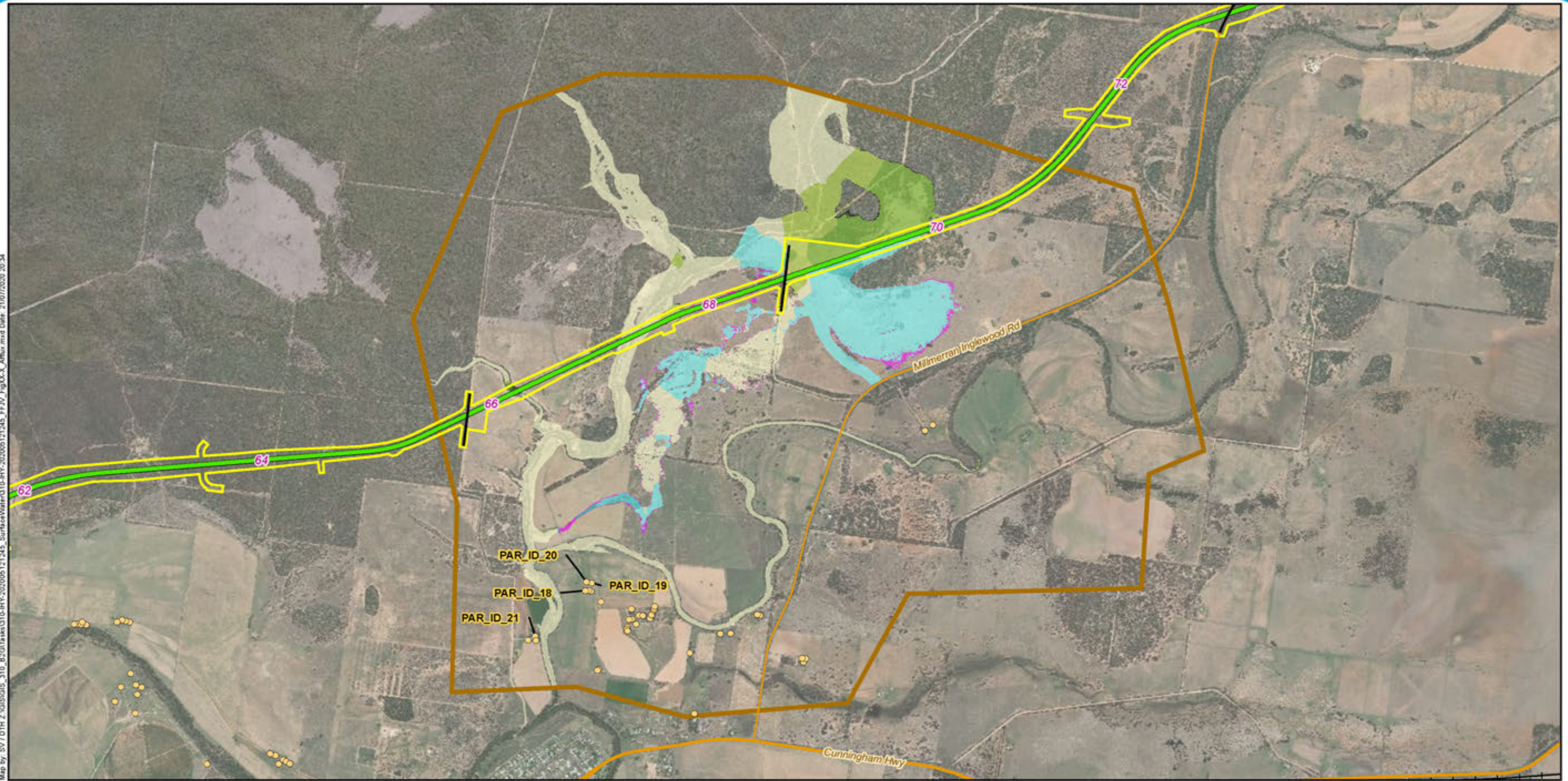
**Border to Gowrie**

**Figure I4-B:**

**10% AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_8201Task1310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

|  |                |  |              |
|--|----------------|--|--------------|
|  | < -0.5         |  | 0.01 to 0.05 |
|  | -0.50 to -0.20 |  | 0.05 to 0.10 |
|  | -0.20 to -0.10 |  | 0.10 to 0.20 |
|  | -0.10 to -0.05 |  | 0.20 to 0.50 |
|  | -0.05 to -0.01 |  | > 0.5        |
|  | -0.01 to 0.01  |  |              |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



**Future Freight**  
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 Coordinate System: GDA 1994 MGA Zone 56

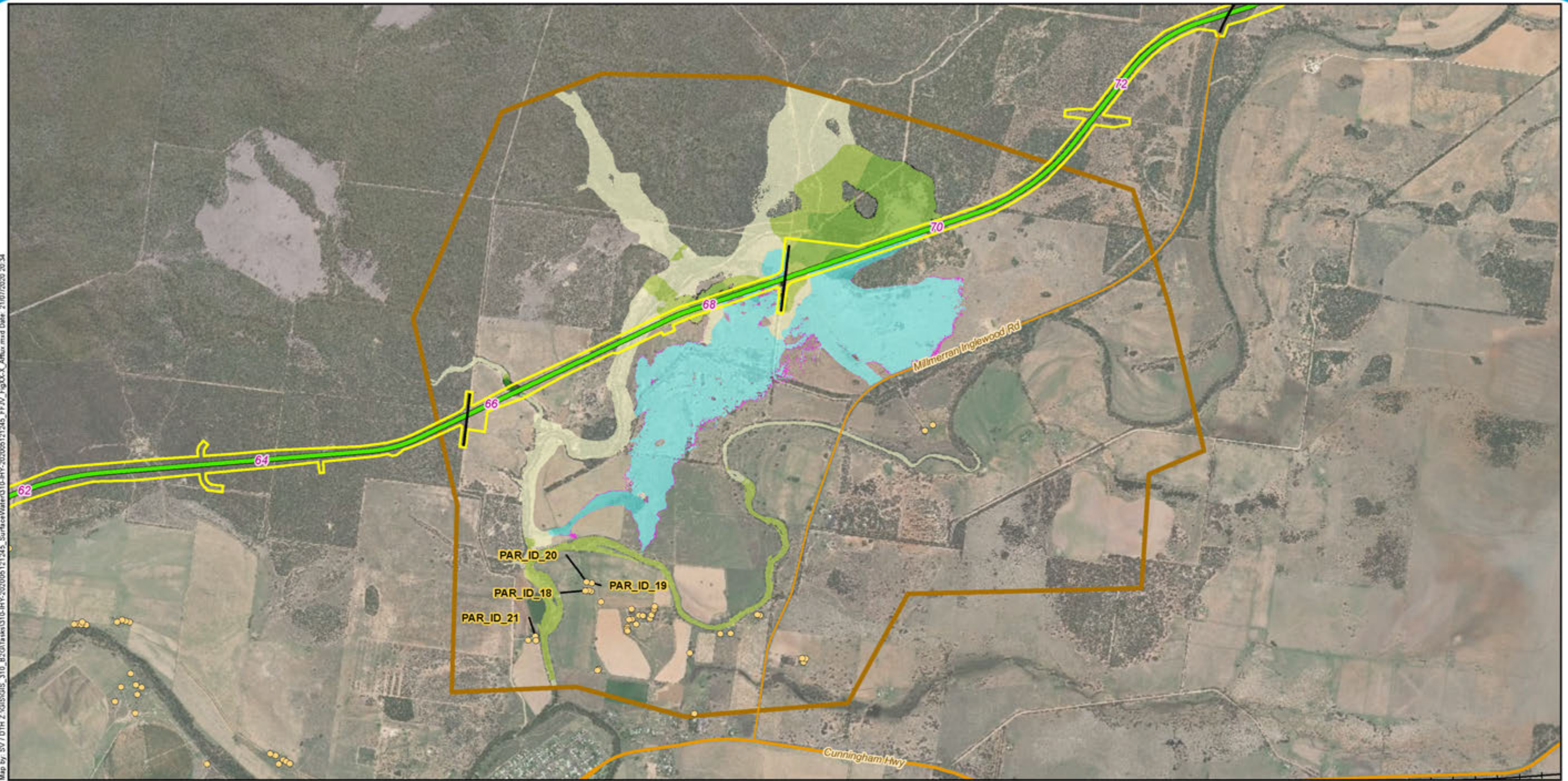
**Border to Gowrie**

**Figure I4-C:**

**5% AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_820Task1310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: cyan;">—</span> -0.05 to -0.01      | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



**Future Freight**  
 Integrating Community, Environment and Engineering

Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

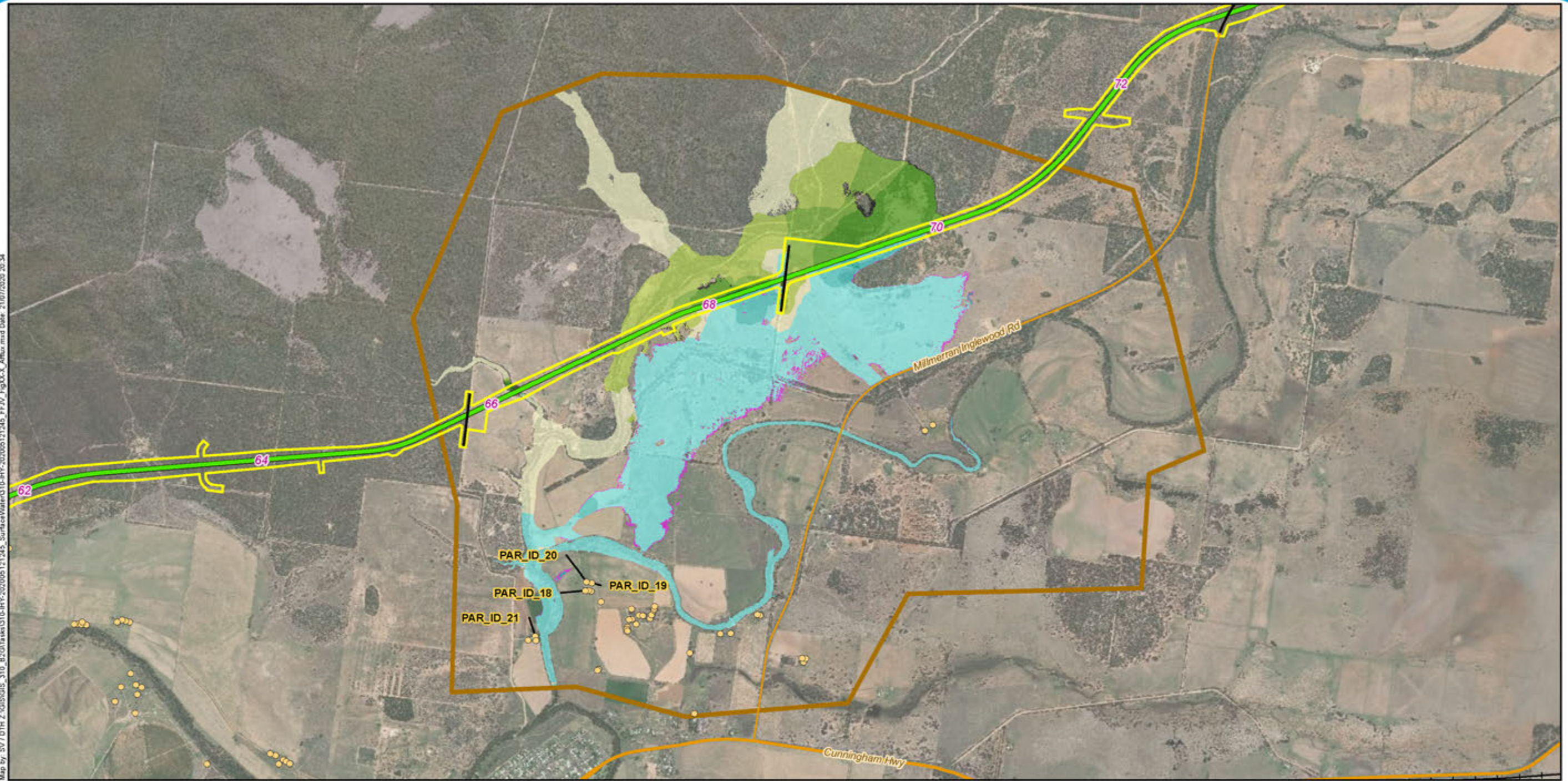
**Border to Gowrie**

**Figure I4-D:**

**2% AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

|                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05  |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10       |
| <span style="color: lightblue;">—</span> -0.20 to -0.10 | <span style="color: darkgreen;">—</span> 0.10 to 0.20   |
| <span style="color: cyan;">—</span> -0.10 to -0.05      | <span style="color: forestgreen;">—</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">—</span> -0.05 to -0.01 | <span style="color: darkslategrey;">—</span> > 0.5      |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



**Future Freight**  
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Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

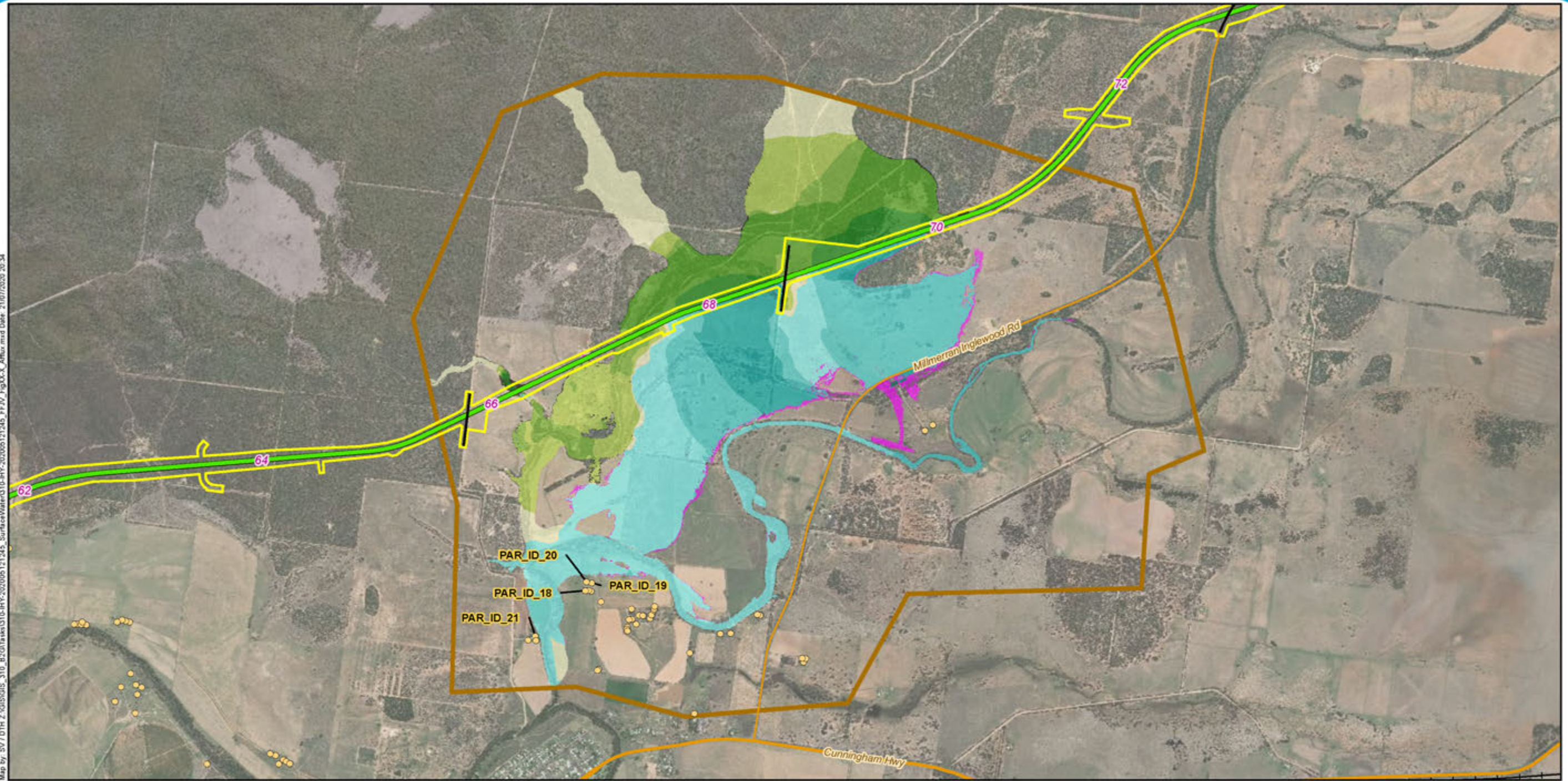
**Border to Gowrie**

**Figure I4-E:**

**1% AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: cyan;">—</span> -0.05 to -0.01      | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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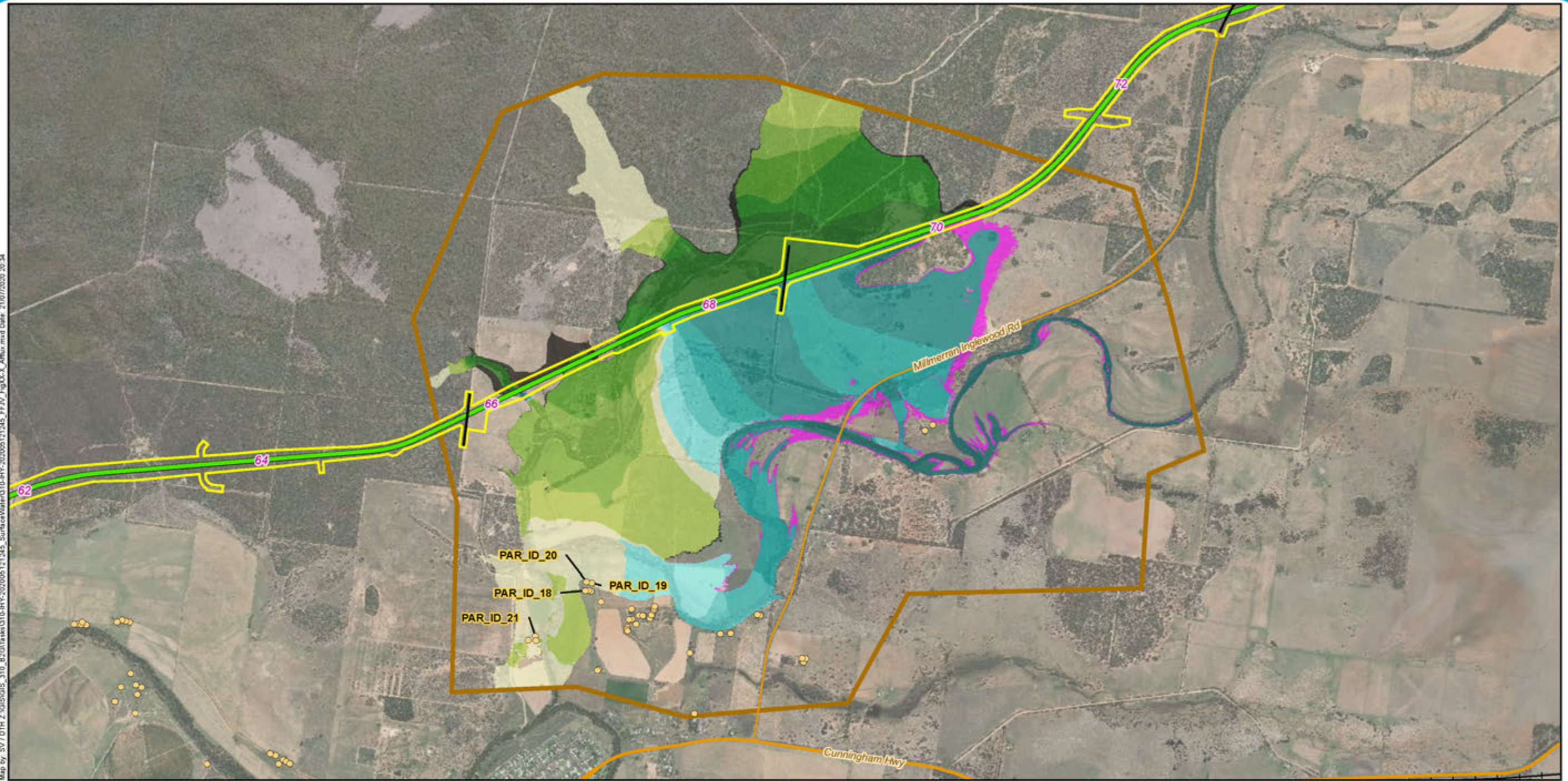
**Border to Gowrie**

**Figure I4-F:**

**1 in 2,000 AEP - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_8201Task1310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

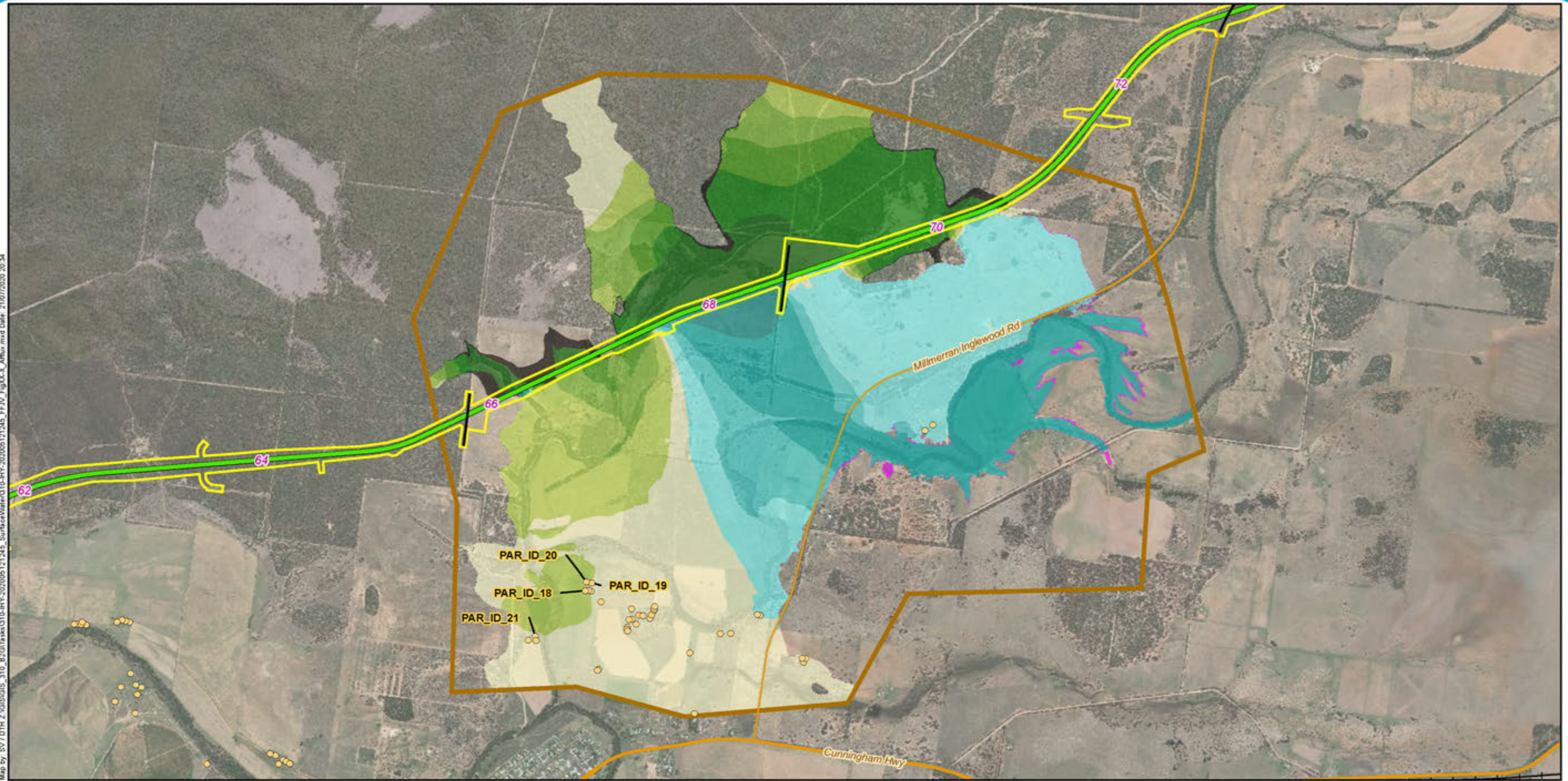
|                |              |
|----------------|--------------|
| < -0.5         | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.5        |
| -0.01 to 0.01  |              |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF JV\_FigDocX\_Afflux.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #008080; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #3CB371; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #20B2AA; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #228B22; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #AFEEEE; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #008000; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #7FFFD4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #006400; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #FFFFE0; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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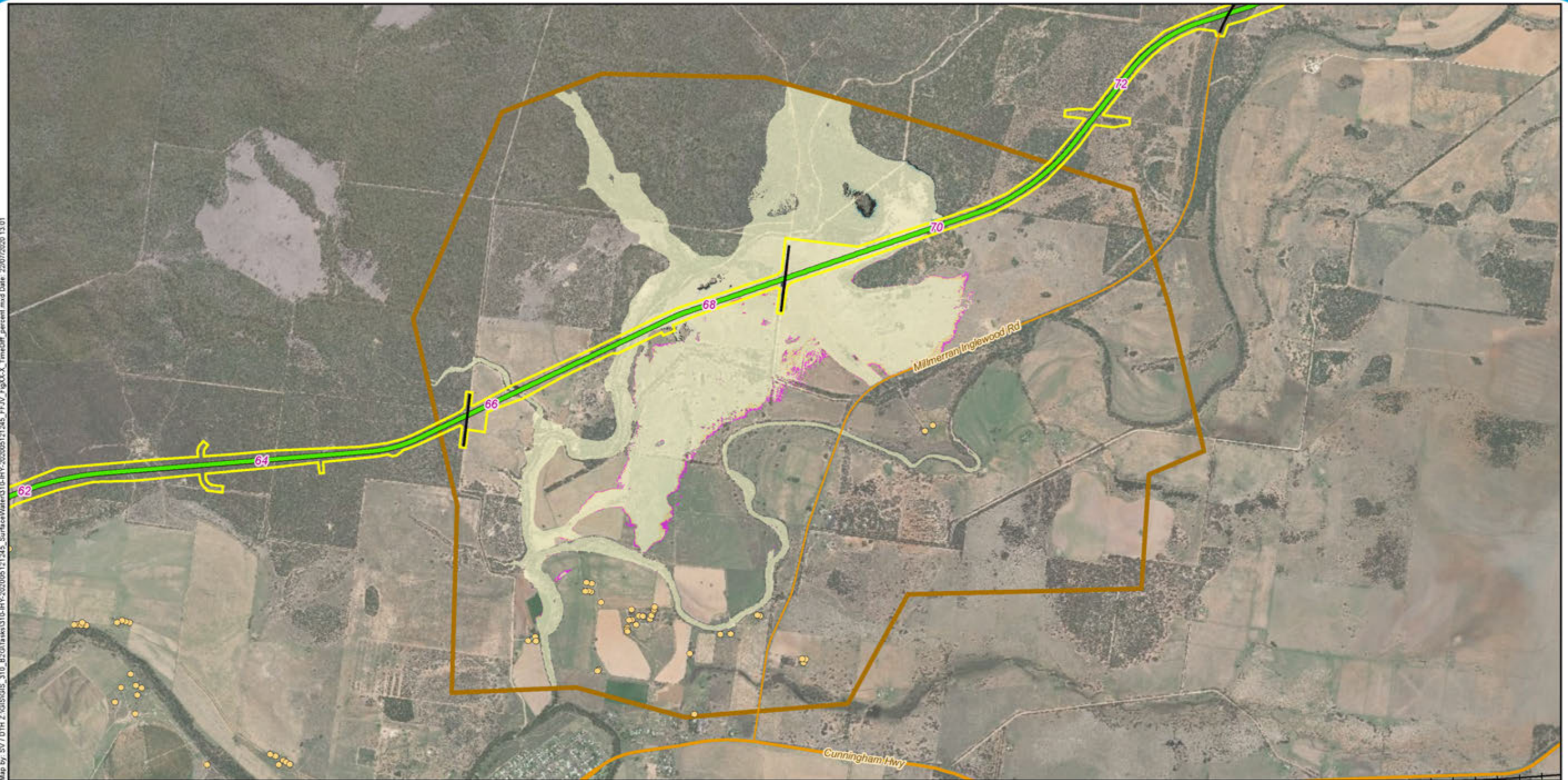
**Border to Gowrie**

**Figure I4-H:**

**PMF - design afflux - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_8201Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF JV\_Fig00-X\_TimeDiff\_Percent.mxd Date: 22/07/2020 13:01



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in Time of Inundation (percentage)

- |                                                          |                                                       |
|----------------------------------------------------------|-------------------------------------------------------|
| <span style="color: darkred;">■</span> < -50%            | <span style="color: lightgreen;">■</span> 10% to 20 % |
| <span style="color: red;">■</span> -50% to -40%          | <span style="color: green;">■</span> 20% to 30 %      |
| <span style="color: orange;">■</span> -40% to -30%       | <span style="color: teal;">■</span> 30% to 40 %       |
| <span style="color: yelloworange;">■</span> -30% to -20% | <span style="color: blue;">■</span> 40% to 50 %       |
| <span style="color: yellow;">■</span> -20% to -10%       | <span style="color: darkblue;">■</span> > 50%         |
| <span style="color: lightyellow;">■</span> -10% to 10 %  |                                                       |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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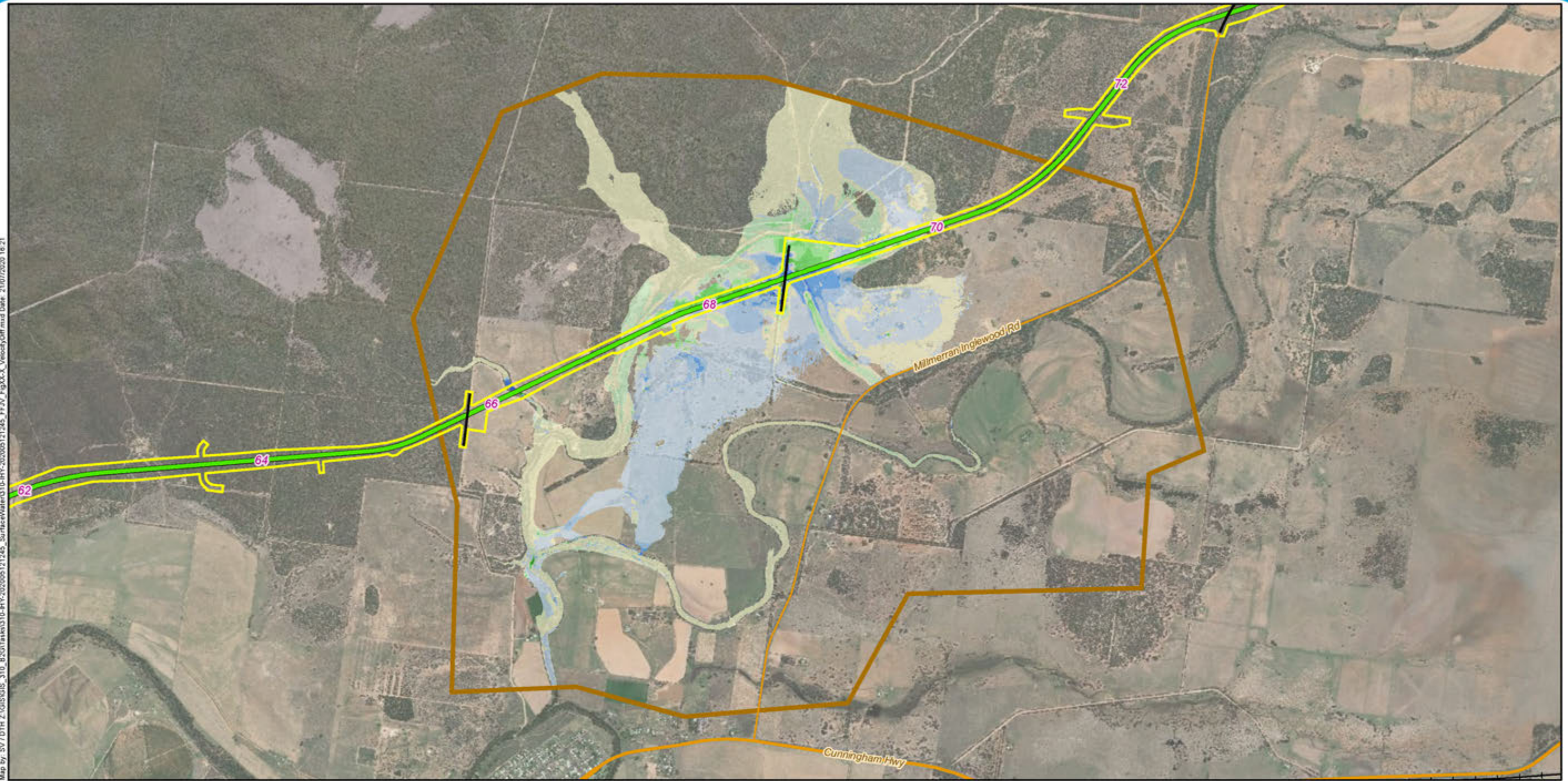
**Border to Gowrie**

**Figure I4-I:**

**1% AEP - change in time of inundation - Pariagara Creek**



Map by SV / DTH 21/07/2020 16:21  
 B2020Task310-HY-20200512145\_SurfaceWater310-HY-20200512145\_FF\_AV\_FigXX-X\_VelocityOff.mxd Date: 21/07/2020 16:21



#### Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent

#### Change in peak velocity (m/s)

- |                |              |
|----------------|--------------|
| < -0.50        | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.50       |
| -0.01 to 0.01  |              |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75km



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Issue date: 21/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

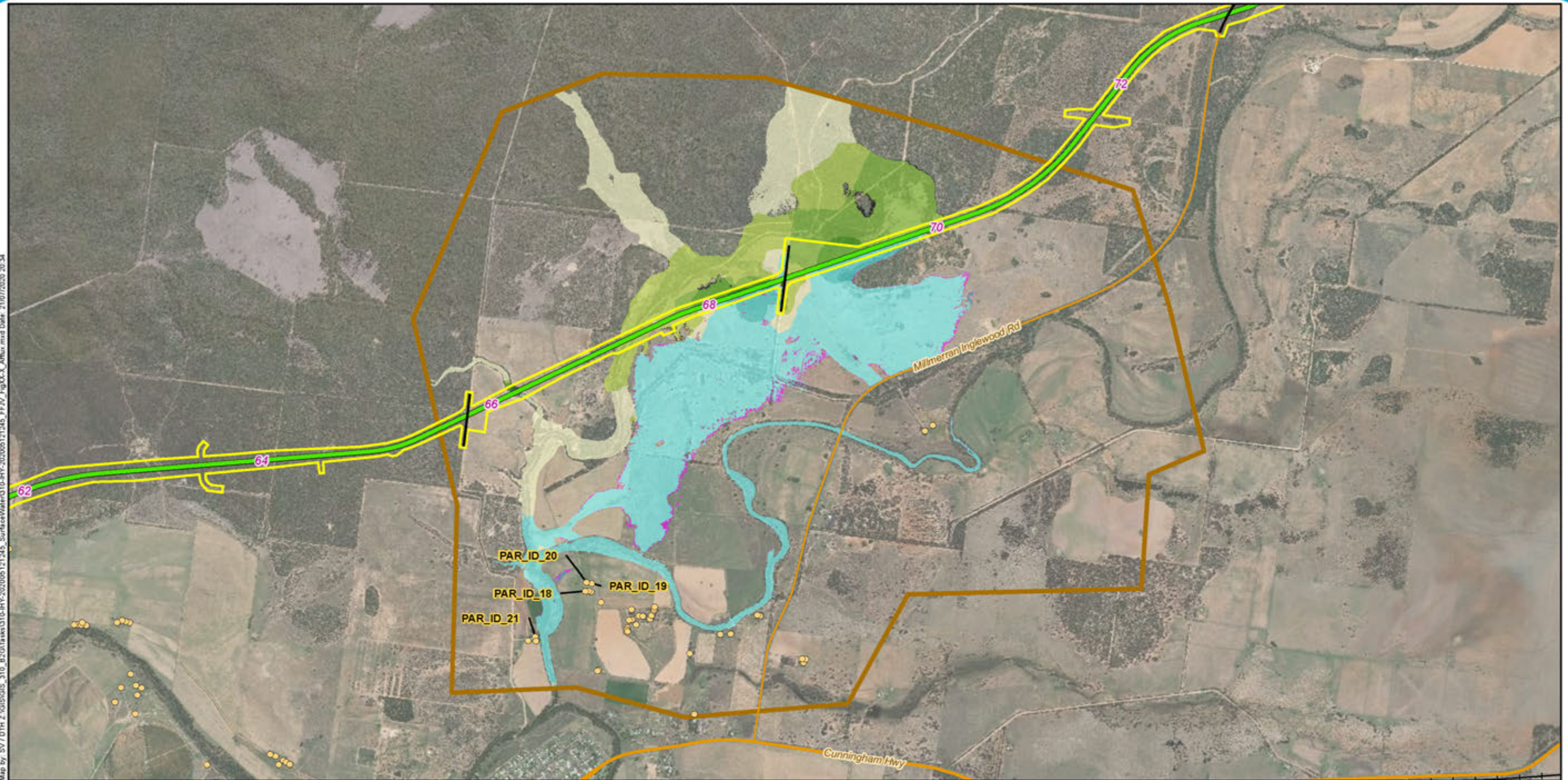
**Border to Gowrie**

**Figure I4-J:**

**1% AEP - change in velocity - Pariagara Creek**



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF.FIN\_FigDocX\_Affix.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

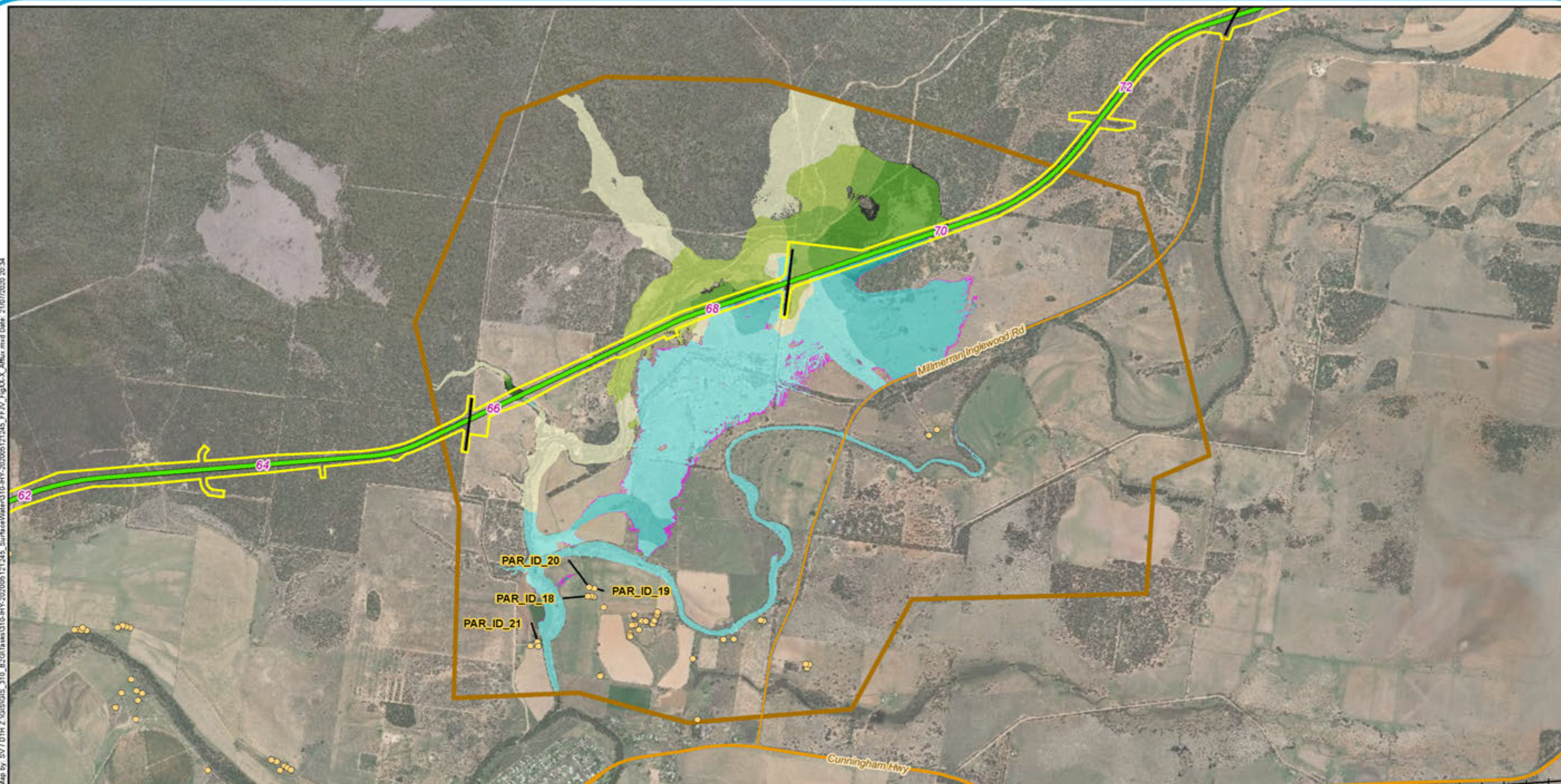
- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: cyan;">—</span> -0.05 to -0.01      | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_820Task310-HY-202005121245\_SurfaceWater310-HY-202005121245\_FF.FIN\_FigDocX\_Affix.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

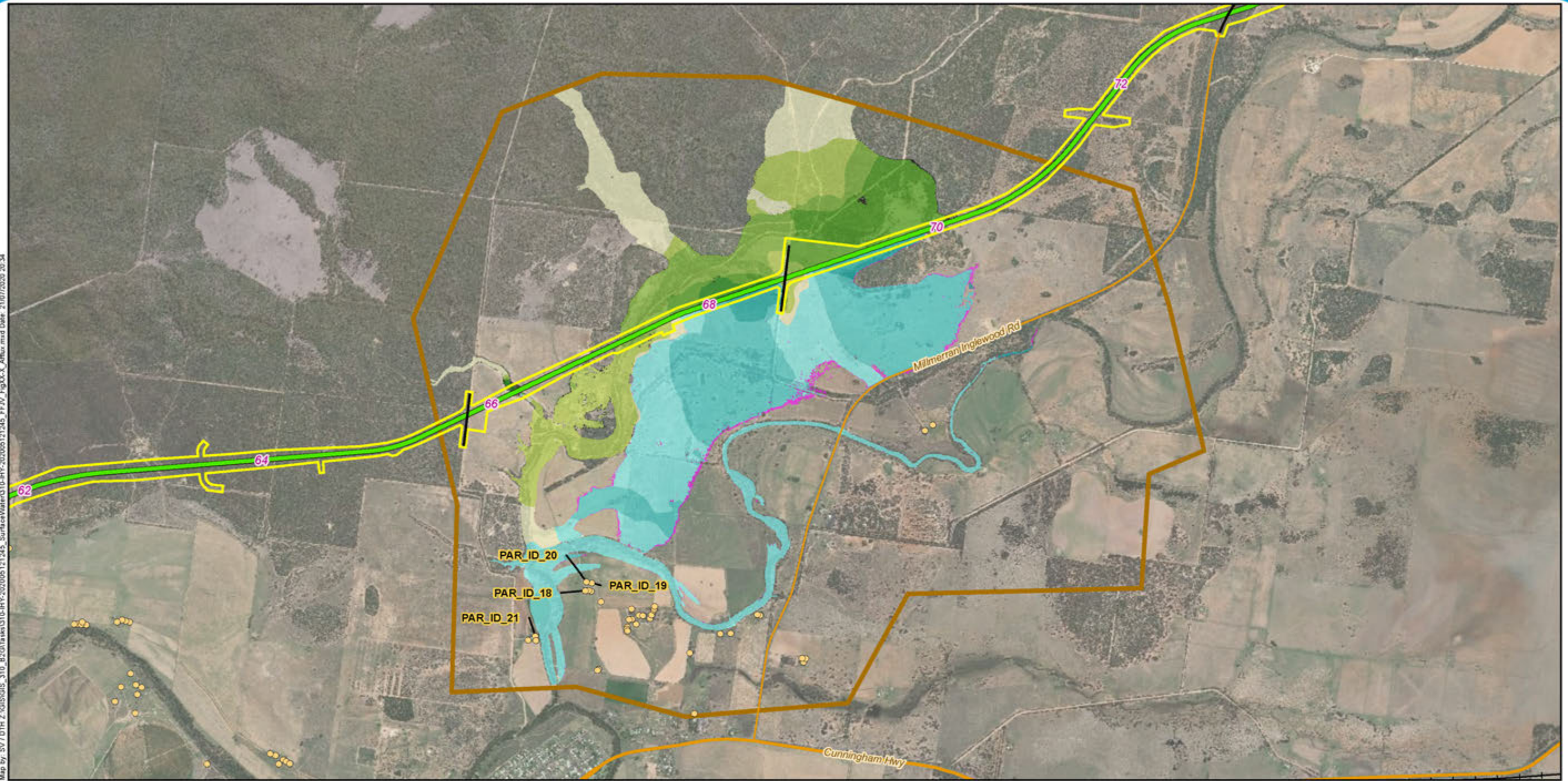
|                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: lightcyan;">—</span> -0.05 to -0.01 | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



Map by SV / DTH 2:10USGS, 310\_8201Task1310-HY-202005121245\_SurfaceWaterD10-HY-202005121245\_FF\_VN\_FigDocX\_Affix.mxd Date: 21/07/2020 20:34



#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

|                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20  |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: darkgreen;">—</span> 0.20 to 0.50  |
| <span style="color: lightcyan;">—</span> -0.05 to -0.01 | <span style="color: darkgreen;">—</span> > 0.5         |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:35,000  
 0 0.35 0.7 1.05 1.4 1.75 km



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Border to Gowrie

Figure I5-C:

1% AEP sensitivity - climate change RCP8.5 - peak water levels - Pariagara Creek



APPENDIX

# Q2

## Hydrology and Flooding Technical Report—Volume II

### **Appendix J** Macintyre Brook—Yelarbon to Inglewood Flood Maps

INLAND RAIL—BORDER TO GOWRIE ENVIRONMENTAL IMPACT STATEMENT

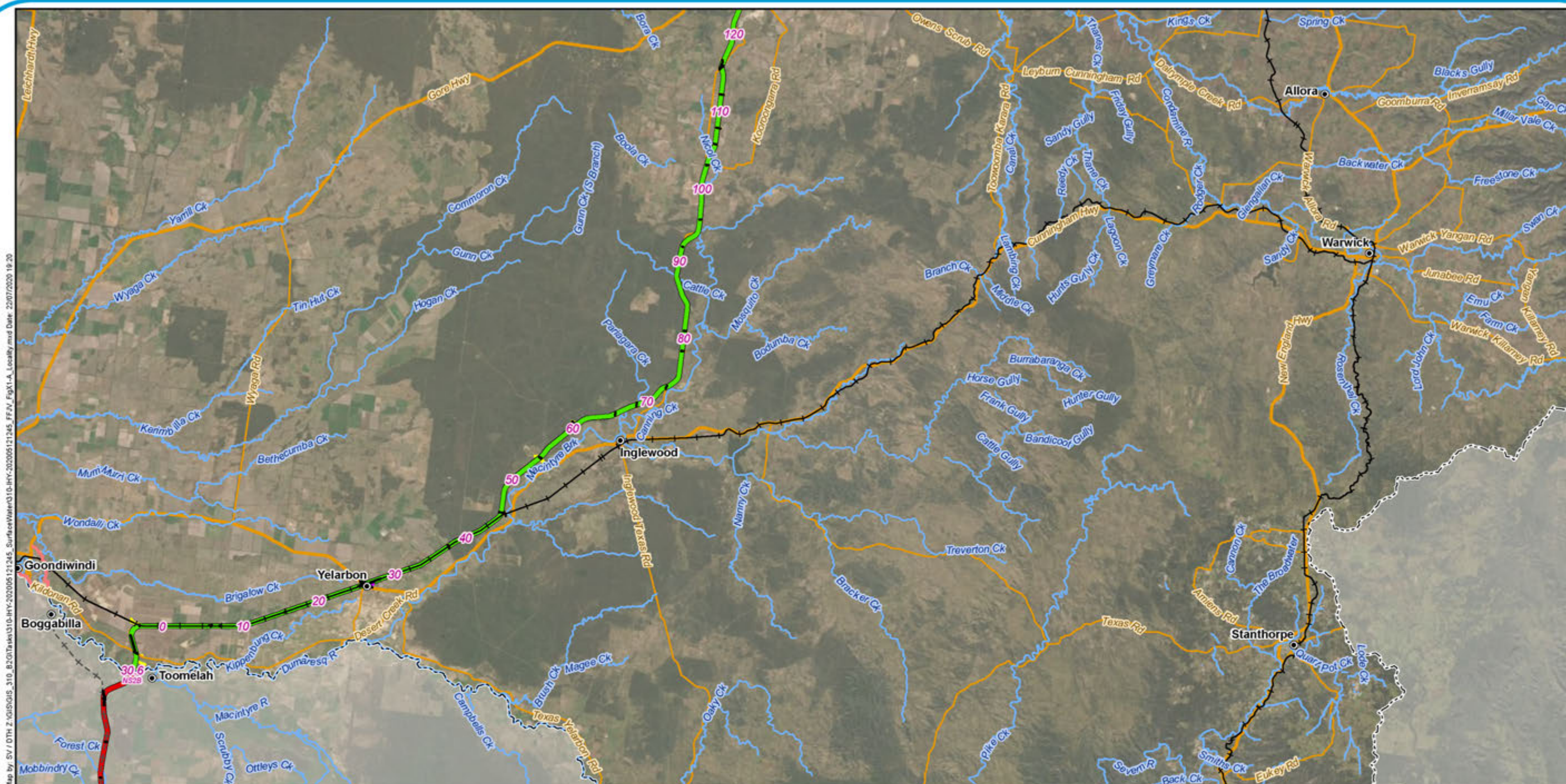


# Appendix J

## Macintyre Brook - Yelarbon to Inglewood Flood Maps

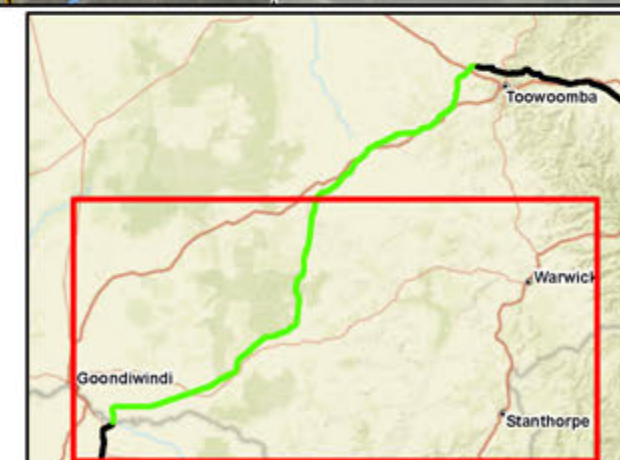
|              |                                                                |
|--------------|----------------------------------------------------------------|
| Figure J1-A  | Locality plan                                                  |
| Figure J1-B  | Survey data                                                    |
| Figure J1-C  | Hydrologic model setup                                         |
| Figure J1-D  | Hydraulic model setup                                          |
| Figure J1-E  | Landuse classifications                                        |
| Figure J1-F1 | Proposed design structures                                     |
| Figure J1-F2 | Proposed design structures                                     |
| Figure J1-F3 | Proposed design structures                                     |
| Figure J2-A  | 20% AEP peak water levels – Existing Case                      |
| Figure J2-B  | 10% AEP peak water levels – Existing Case                      |
| Figure J2-C  | 5% AEP peak water levels – Existing Case                       |
| Figure J2-D  | 2% AEP peak water levels – Existing Case                       |
| Figure J2-E  | 1% AEP peak water levels – Existing Case                       |
| Figure J2-F  | 1 in 2,000 AEP peak water levels – Existing Case               |
| Figure J2-G  | 1 in 10,000 AEP peak water levels – Existing Case              |
| Figure J2-H  | PMF peak water levels – Existing Case                          |
| Figure J3-A  | 1% AEP peak velocity – Existing Case                           |
| Figure J4-A  | 20% AEP – design afflux                                        |
| Figure J4-B  | 10% AEP – design afflux                                        |
| Figure J4-C  | 5% AEP – design afflux                                         |
| Figure J4-D  | 2% AEP – design afflux                                         |
| Figure J4-E  | 1% AEP – design afflux                                         |
| Figure J4-F  | 1 in 2,000 AEP – design afflux                                 |
| Figure J4-G  | 1 in 10,000 AEP – design afflux                                |
| Figure J4-H  | PMF – design afflux                                            |
| Figure J4-I  | 1% AEP – change in time of inundation                          |
| Figure J4-J  | 1% AEP – change in velocity                                    |
| Figure J5-A  | 1% AEP sensitivity – 0% blockage                               |
| Figure J5-B  | 1% AEP sensitivity – 50% blockage                              |
| Figure J5-C  | 1% AEP sensitivity – climate change RCP8.5 – peak water levels |





#### Legend

- |                                          |                   |
|------------------------------------------|-------------------|
| 5 Chainage (km)                          | Watercourses      |
| ● Localities                             | Major roads       |
| — Existing rail (operational)            | Minor roads       |
| — Border to Gowrie alignment             | Road design       |
| — North Star to NSW/QLD border alignment | NSW/QLD border    |
|                                          | Yelarbon levee    |
|                                          | Goondiwindi levee |
|                                          | Project footprint |



A3 scale: 1:525,000  
 0 5 10 15 20 25km

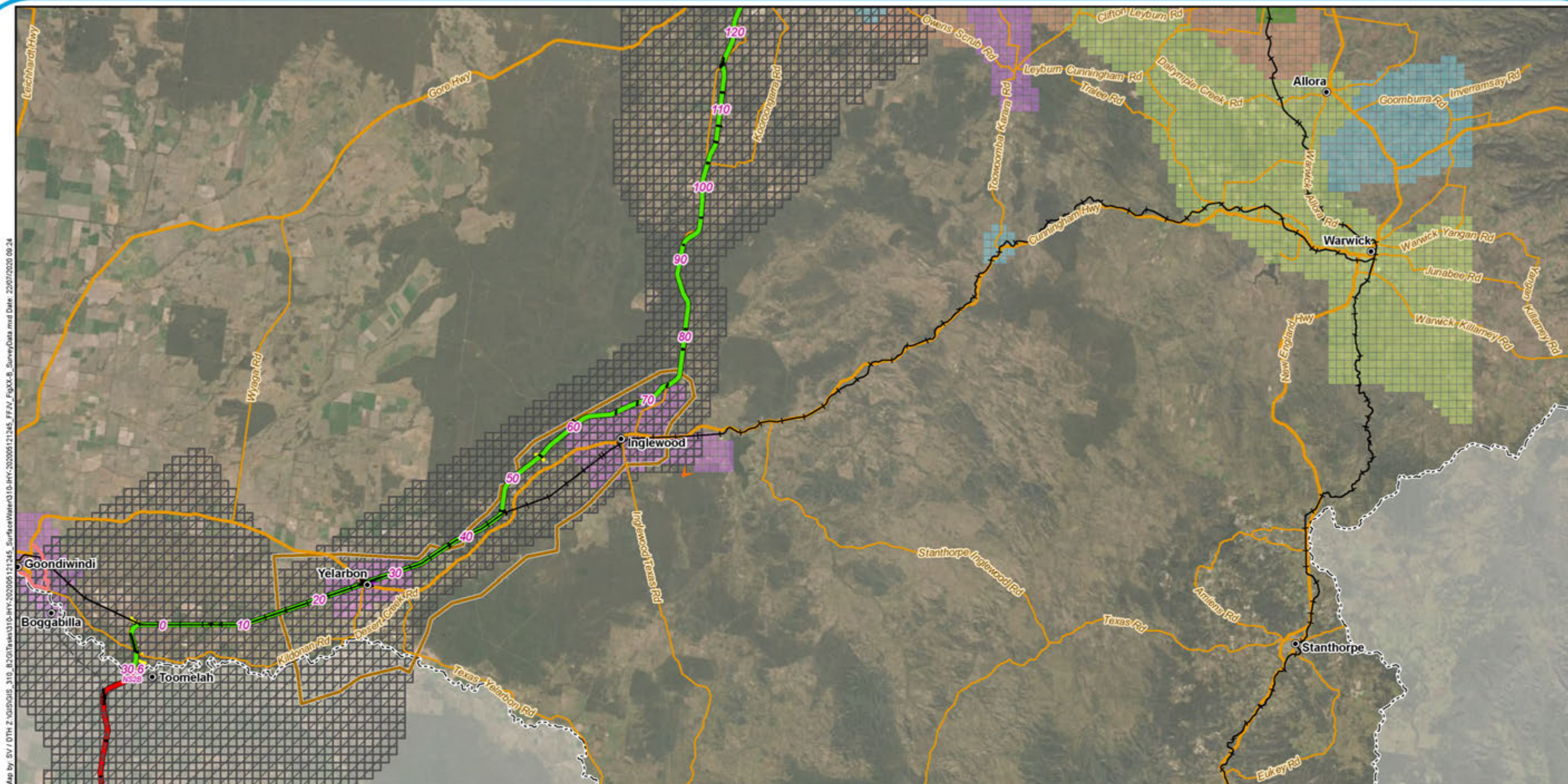


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**Border to Gowrie**  
**Figure J1-A:**  
**Locality plan - Macintyre Brook**



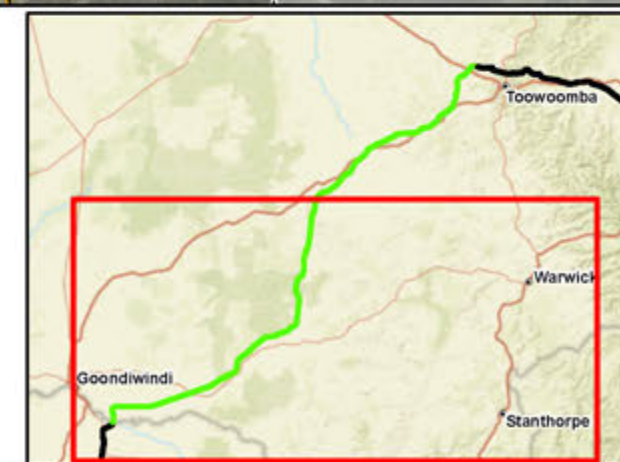


#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Yelarbon levee
- Goondiwindi levee
- Project footprint
- Hydraulic model extent
- Hydrologic model extent

#### LiDAR datasets (1m grid)

- Inland Towns Stage 2 2011
- Inland Towns Stage 4 2012
- Inland Towns Stage 6 2014
- Southern Downs 2010
- Toowoomba 2010
- 2015 ARTC LiDAR 1m



A3 scale: 1:525,000  
 0 5 10 15 20 25km

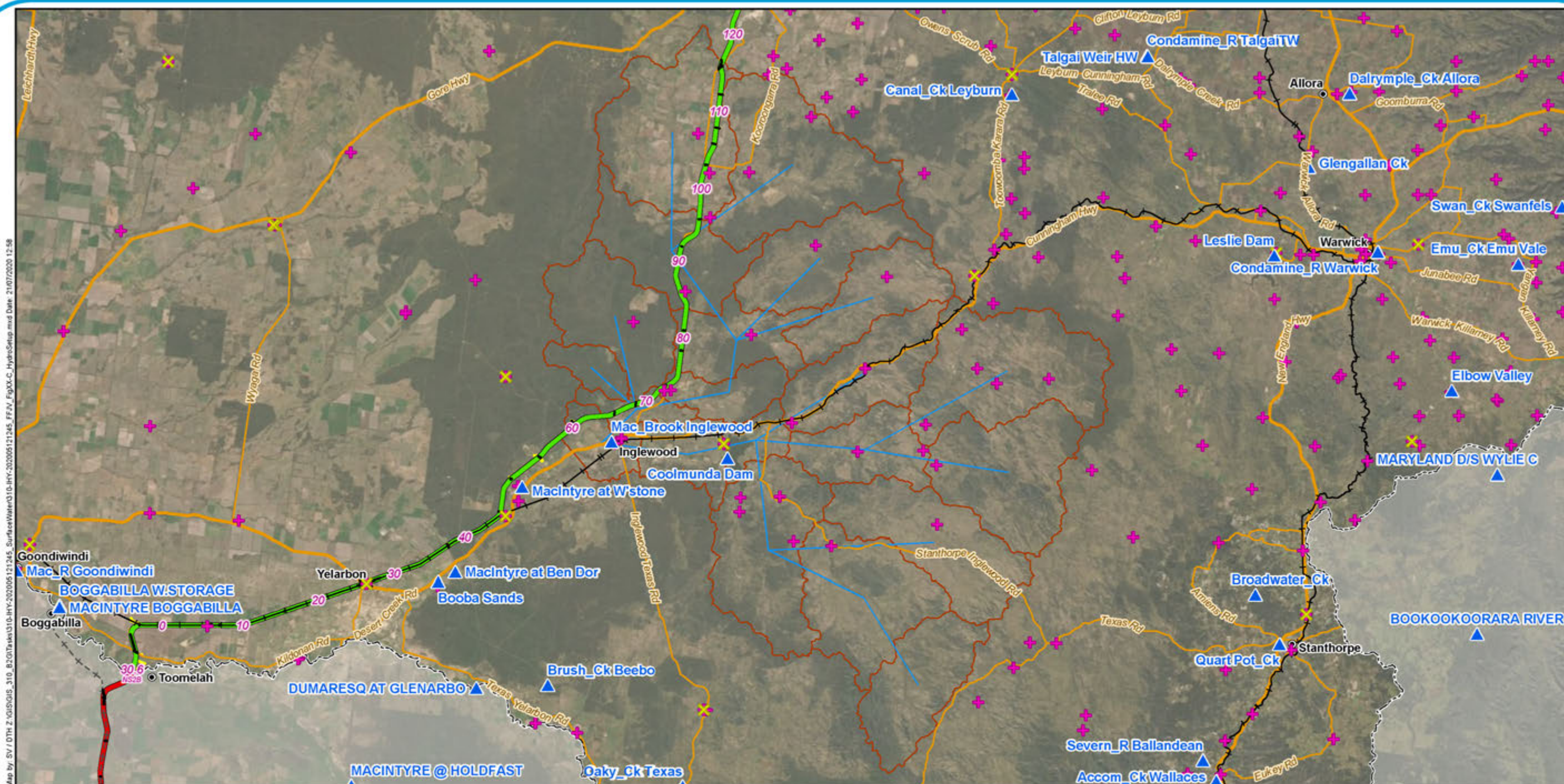


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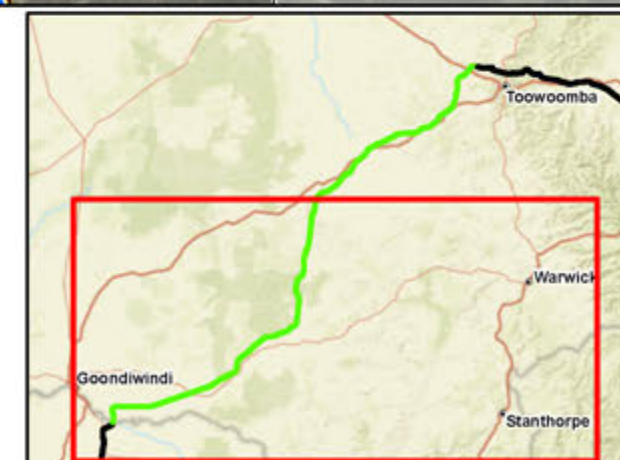
**Border to Gowrie**  
**Figure J1-B:**  
**Survey data - Macintyre Brook**





#### Legend

- |                                        |                   |                         |                         |
|----------------------------------------|-------------------|-------------------------|-------------------------|
| 5 Chainage (km)                        | Major roads       | Catchment links         | Pluviograph stations    |
| Localities                             | Minor roads       | Sub-catchments          | Daily rainfall stations |
| Existing rail (operational)            | Road design       | Hydrologic model extent | Stream gauge locations  |
| Border to Gowrie alignment             | NSW/QLD border    |                         |                         |
| North Star to NSW/QLD border alignment | Project footprint |                         |                         |



A3 scale: 1:525,000  
 0 5 10 15 20 25km



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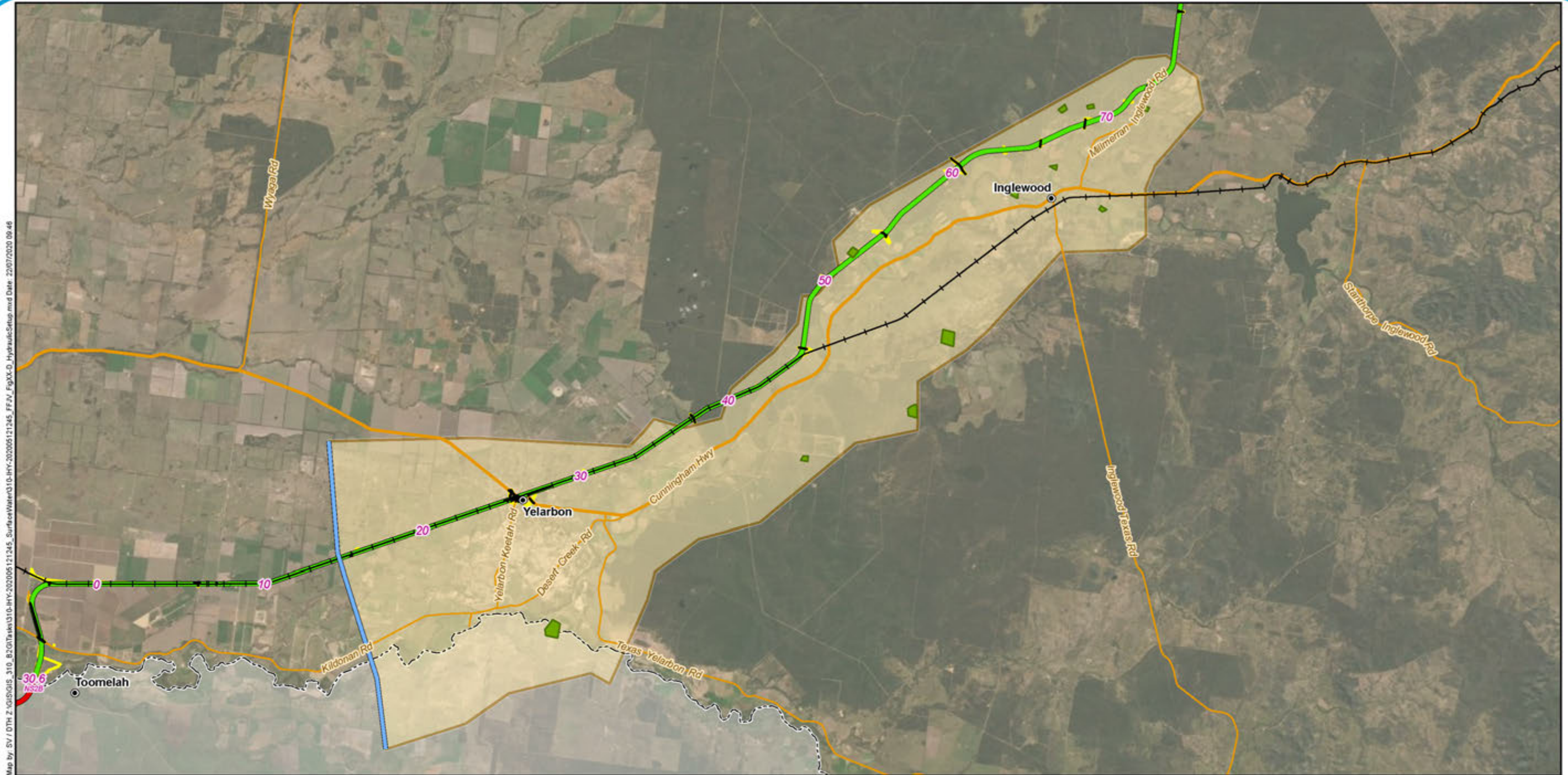
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J1-C:**

**Hydrologic model setup - Macintyre Brook**





#### Legend

- |                                        |                   |                        |
|----------------------------------------|-------------------|------------------------|
| 5 Chainage (km)                        | Major roads       | Hydraulic model extent |
| Localities                             | Minor roads       | Outflow boundaries     |
| Existing rail (operational)            | Road design       | Inflow boundaries      |
| Border to Gowrie alignment             | NSW/QLD border    |                        |
| North Star to NSW/QLD border alignment | Project footprint |                        |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



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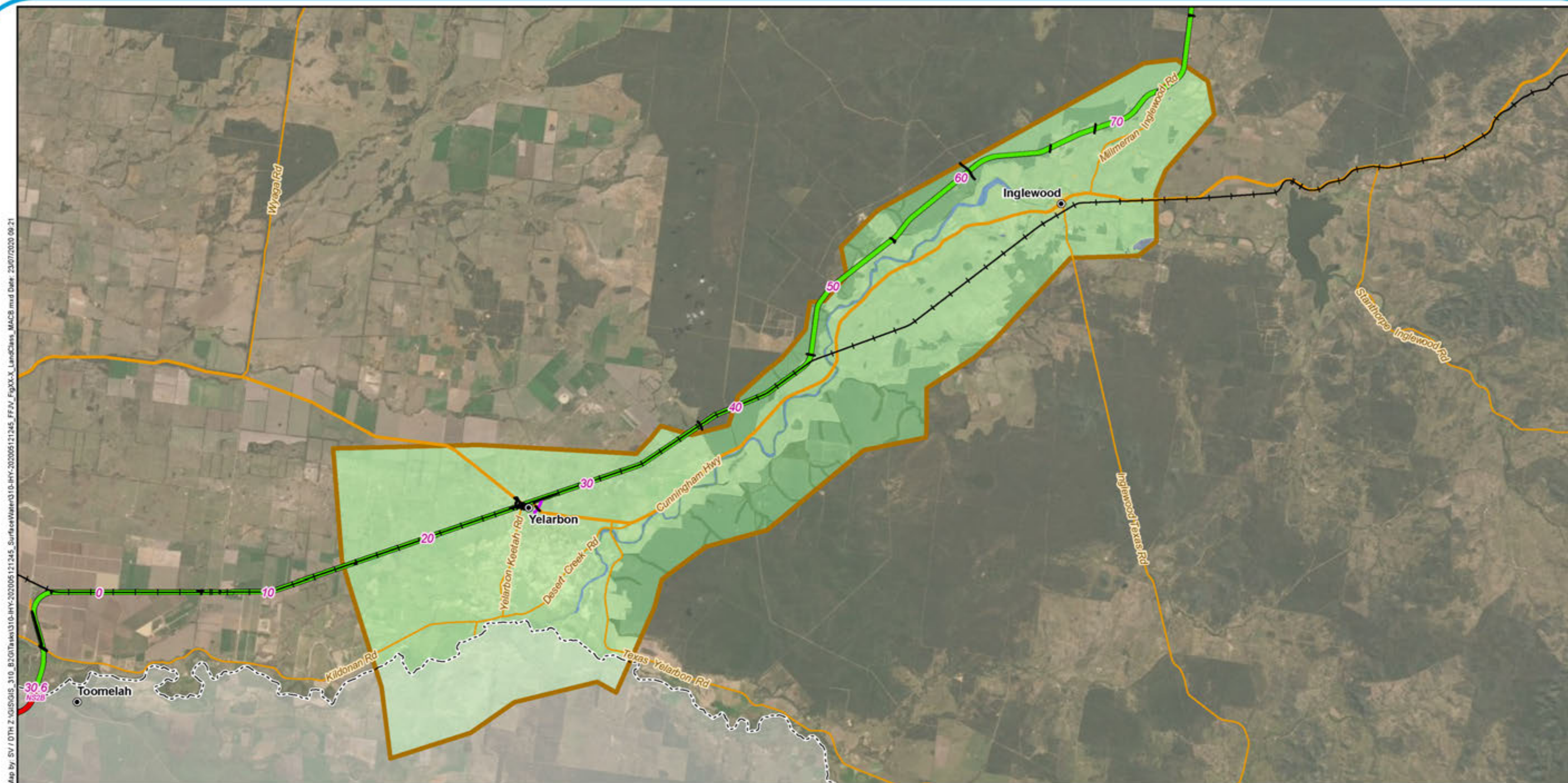
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**Border to Gowrie**

**Figure J1-D:**

**Hydraulic model setup - Macintyre Brook**





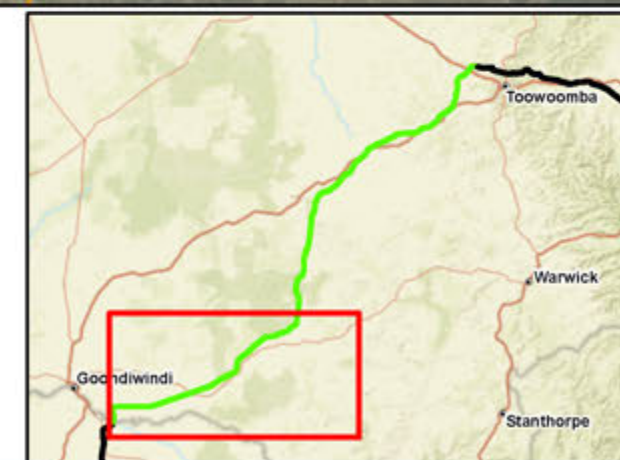
#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border

- Hydraulic model extent
- Yelarbon levee

#### Landuse classification

- River channel (n=0.030)
- Floodplain 1 (n=0.060)
- Floodplain 3 (n=0.120)
- Dense vegetation (n=0.080)
- Waterbodies (n=0.020)
- Buildings (n=0.040)



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



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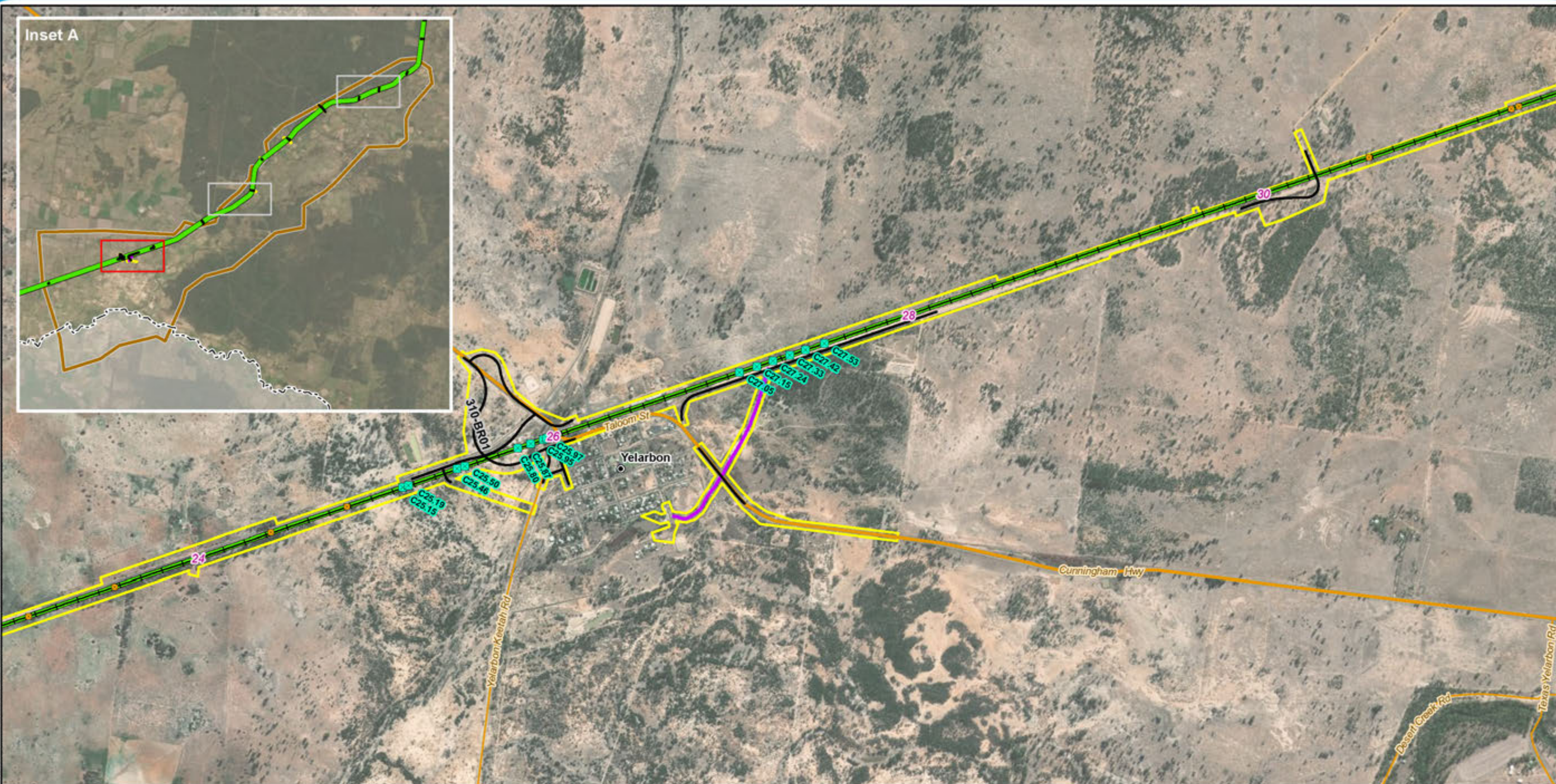
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J1-E:**

**Landuse classifications - Macintyre Brook**





#### Legend

- |                             |                        |
|-----------------------------|------------------------|
| 5 Chainage (km)             | Major roads            |
| Localities                  | Minor roads            |
| Floodplain culvert          | Road design            |
| Local drainage culvert      | Yelarbon levee         |
| Bridges                     | Project footprint      |
| Existing rail (operational) | Hydraulic model extent |
| Border to Gowrie alignment  |                        |



A3 scale: 1:22,500  
 0 0.2 0.4 0.6 0.8 1 km



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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J1-F-1:**

**Proposed design structures - Macintyre Brook**





#### Legend

- 5 Chainage (km)
- Floodplain culvert
- Local drainage culvert
- Bridges
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Road design
- Project footprint
- Hydraulic model extent



A3 scale: 1:22,500  
 0 0.2 0.4 0.6 0.8 1 km



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 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J1-F-2:**

**Proposed design structures - Macintyre Brook**





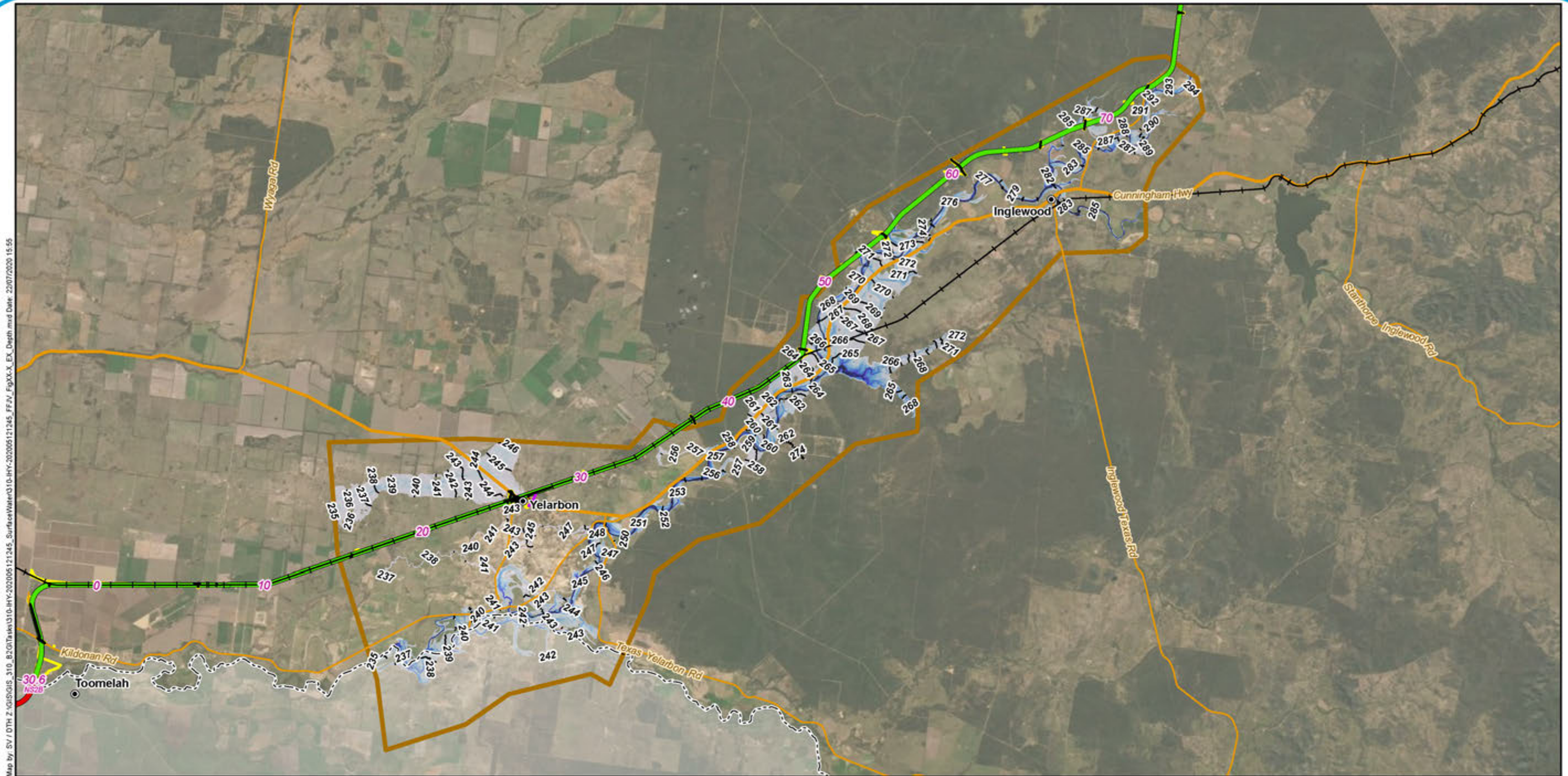
#### Legend

- 5 Chainage (km)
- Floodplain culvert
- Local drainage culvert
- Bridges
- Border to Gowrie alignment
- Minor roads
- Road design
- Project footprint
- Hydraulic model extent



A3 scale: 1:22,500  
 0 0.2 0.4 0.6 0.8 1 km





#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

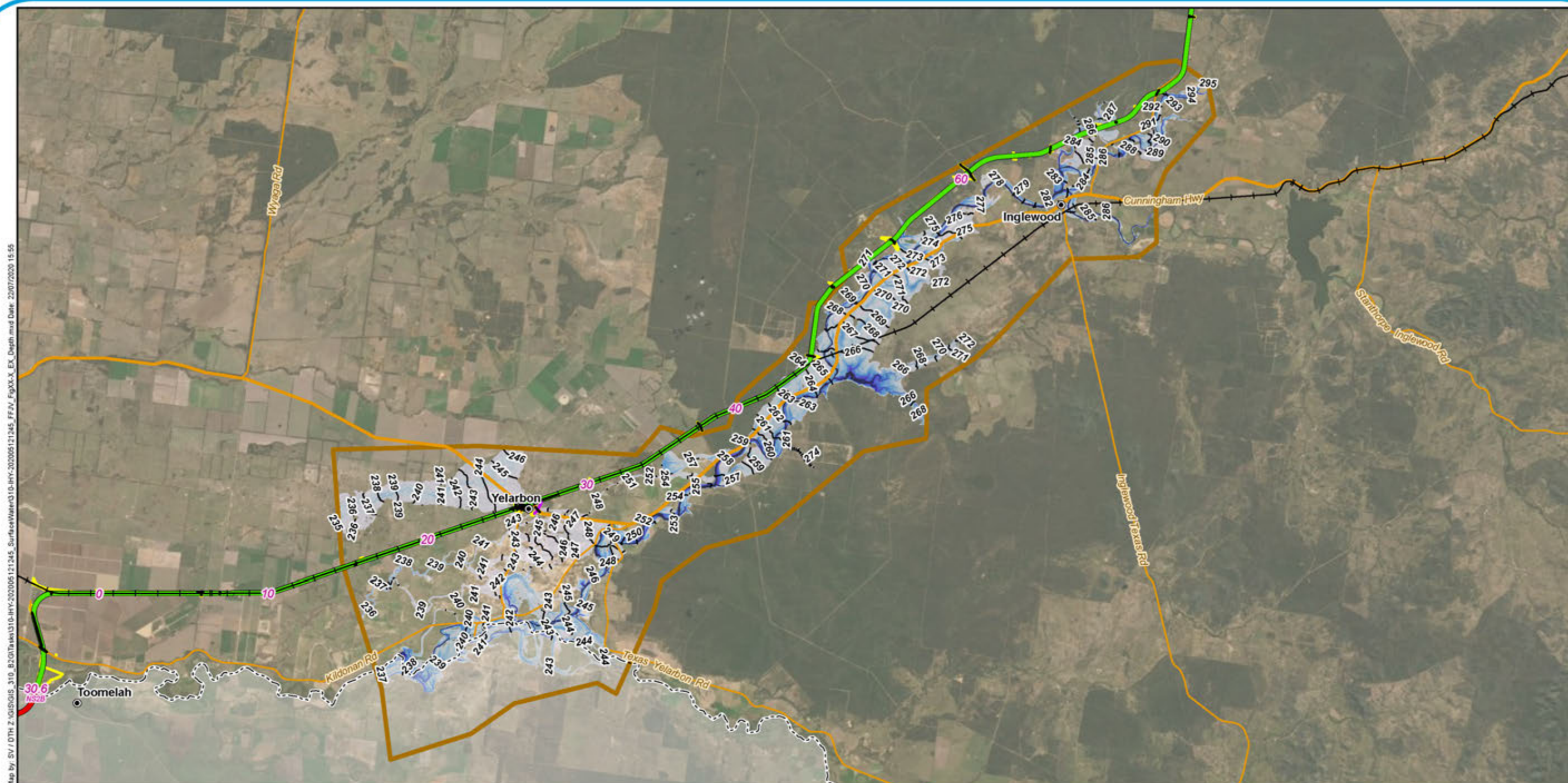
#### Depth (m)

- |             |                     |
|-------------|---------------------|
| □ 0 - 0.5   | □ 3.0 - 3.5         |
| □ 0.5 - 1.0 | □ 3.5 - 4.0         |
| □ 1.0 - 1.5 | □ 4.0 - 4.5         |
| □ 1.5 - 2.0 | □ 4.5 - 5.0         |
| □ 2.0 - 2.5 | □ > 5.0             |
| □ 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





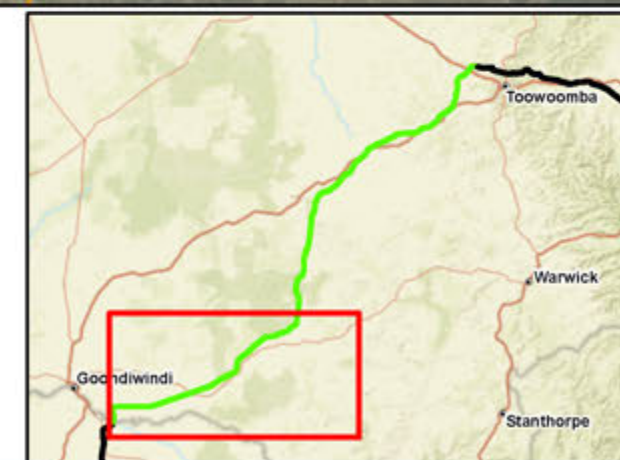
#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

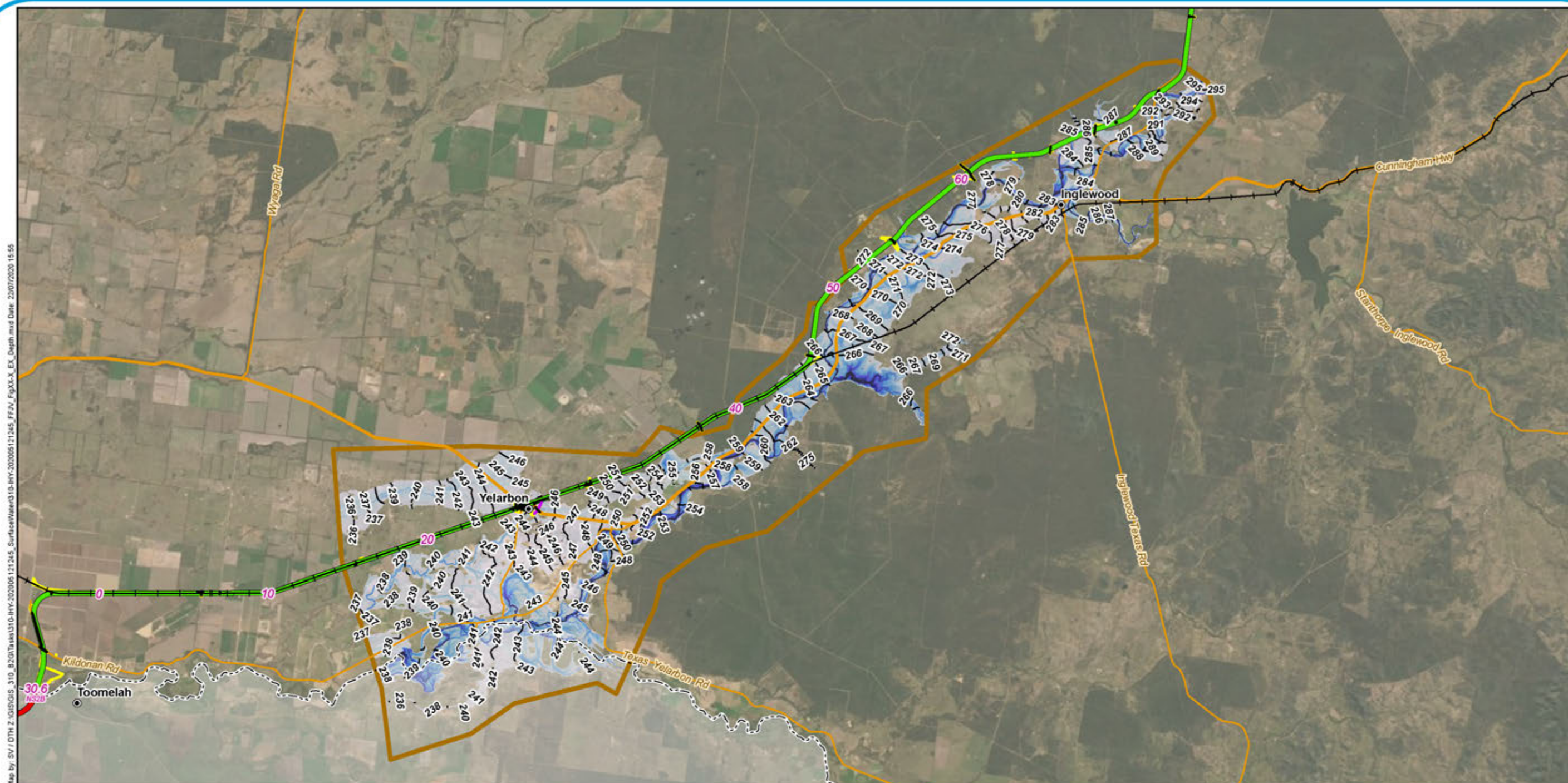
#### Depth (m)

- |           |                     |
|-----------|---------------------|
| 0 - 0.5   | 3.0 - 3.5           |
| 0.5 - 1.0 | 3.5 - 4.0           |
| 1.0 - 1.5 | 4.0 - 4.5           |
| 1.5 - 2.0 | 4.5 - 5.0           |
| 2.0 - 2.5 | > 5.0               |
| 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





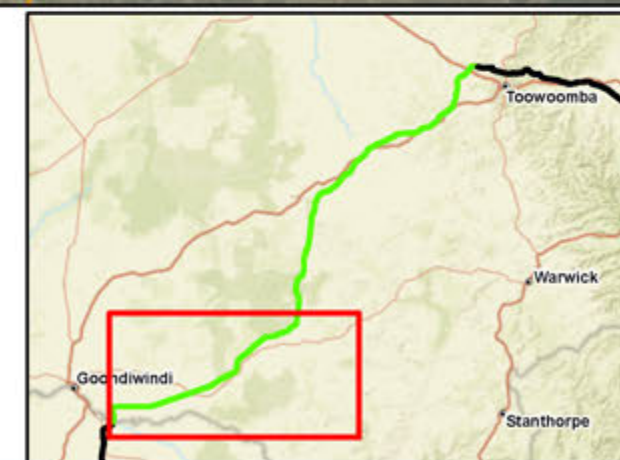
#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

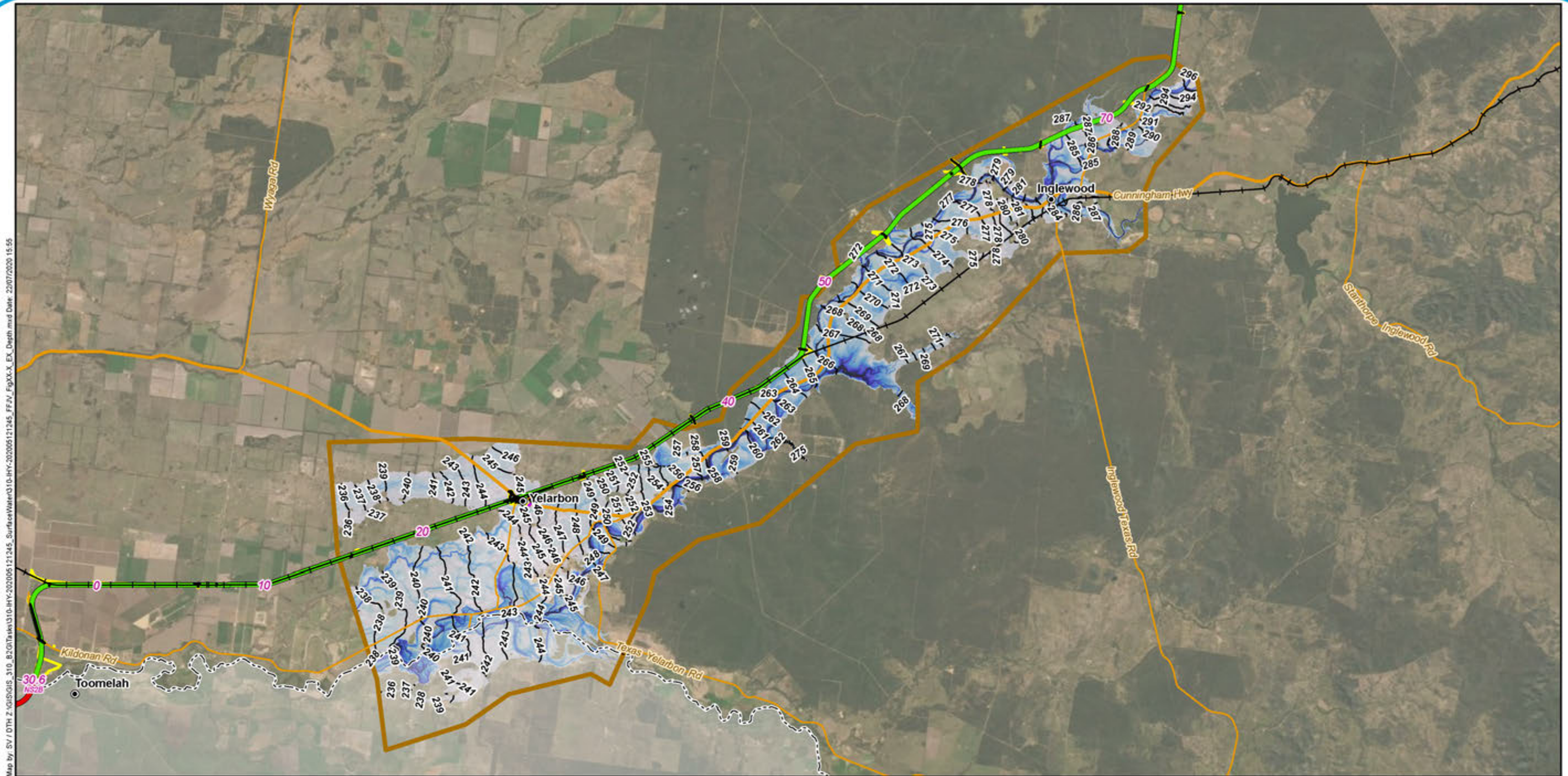
#### Depth (m)

- |             |                     |
|-------------|---------------------|
| □ 0 - 0.5   | □ 3.0 - 3.5         |
| □ 0.5 - 1.0 | □ 3.5 - 4.0         |
| □ 1.0 - 1.5 | □ 4.0 - 4.5         |
| □ 1.5 - 2.0 | □ 4.5 - 5.0         |
| □ 2.0 - 2.5 | □ > 5.0             |
| □ 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

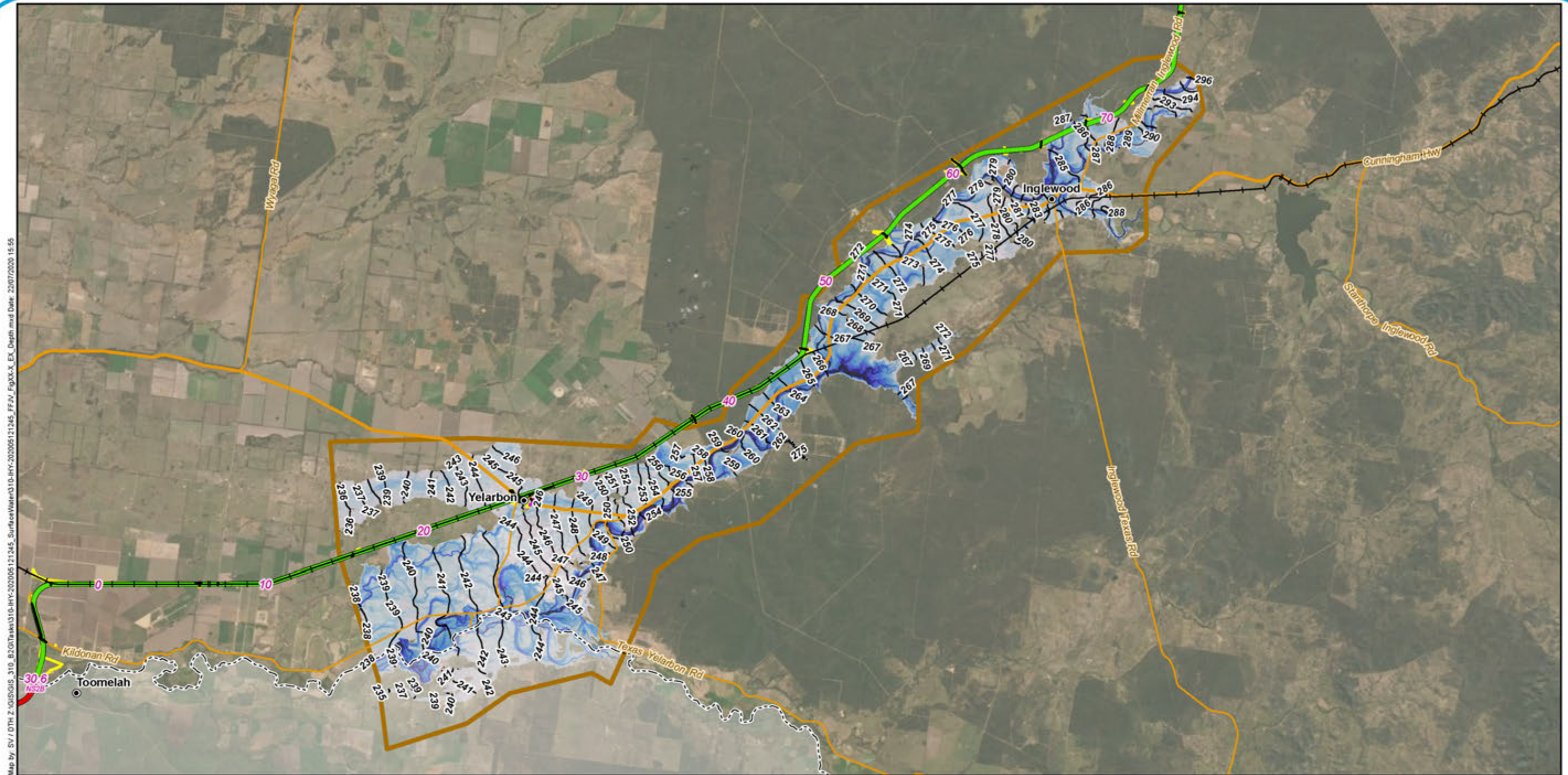
#### Depth (m)

- |           |                     |
|-----------|---------------------|
| 0 - 0.5   | 3.0 - 3.5           |
| 0.5 - 1.0 | 3.5 - 4.0           |
| 1.0 - 1.5 | 4.0 - 4.5           |
| 1.5 - 2.0 | 4.5 - 5.0           |
| 2.0 - 2.5 | > 5.0               |
| 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

#### Depth (m)

- |             |                     |
|-------------|---------------------|
| □ 0 - 0.5   | □ 3.0 - 3.5         |
| □ 0.5 - 1.0 | □ 3.5 - 4.0         |
| □ 1.0 - 1.5 | □ 4.0 - 4.5         |
| □ 1.5 - 2.0 | □ 4.5 - 5.0         |
| □ 2.0 - 2.5 | □ > 5.0             |
| □ 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



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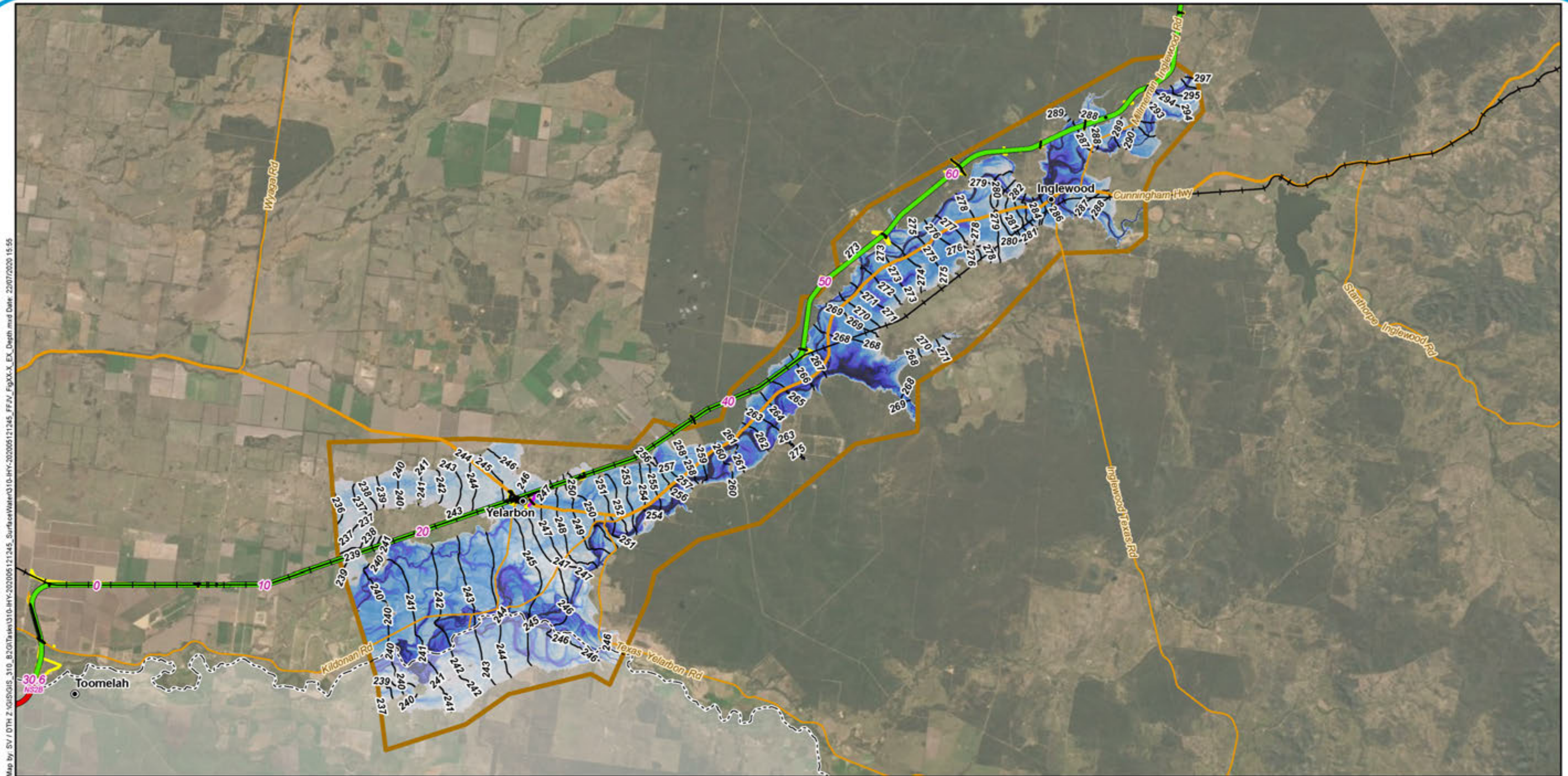
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J2-E:**

**1% AEP peak water levels - Existing Case - Macintyre Brook**





#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

#### Depth (m)

- |           |                     |
|-----------|---------------------|
| 0 - 0.5   | 3.0 - 3.5           |
| 0.5 - 1.0 | 3.5 - 4.0           |
| 1.0 - 1.5 | 4.0 - 4.5           |
| 1.5 - 2.0 | 4.5 - 5.0           |
| 2.0 - 2.5 | > 5.0               |
| 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



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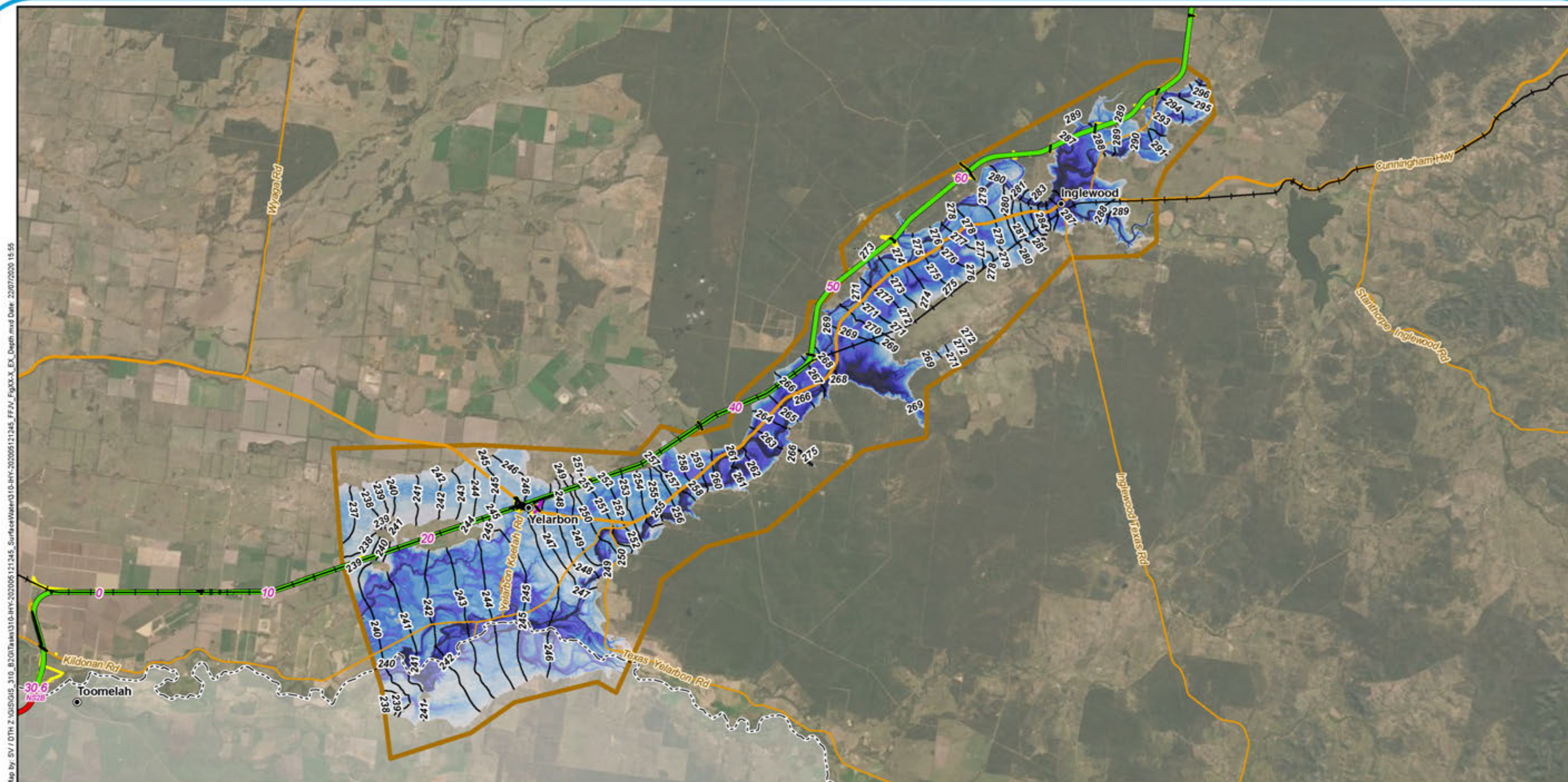
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J2-F:**

**1 in 2,000 AEP peak water levels - Existing Case - Macintyre Brook**





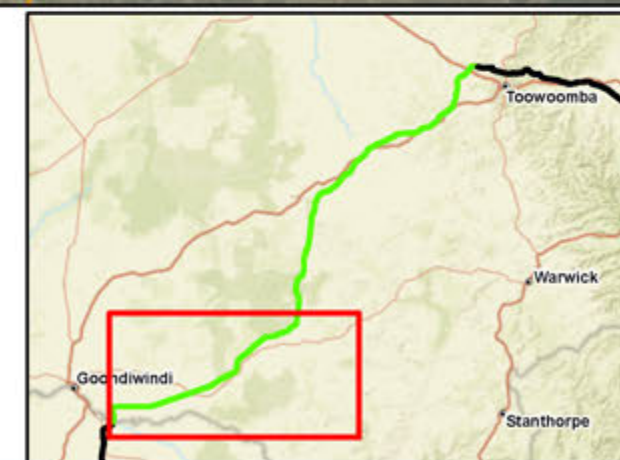
#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

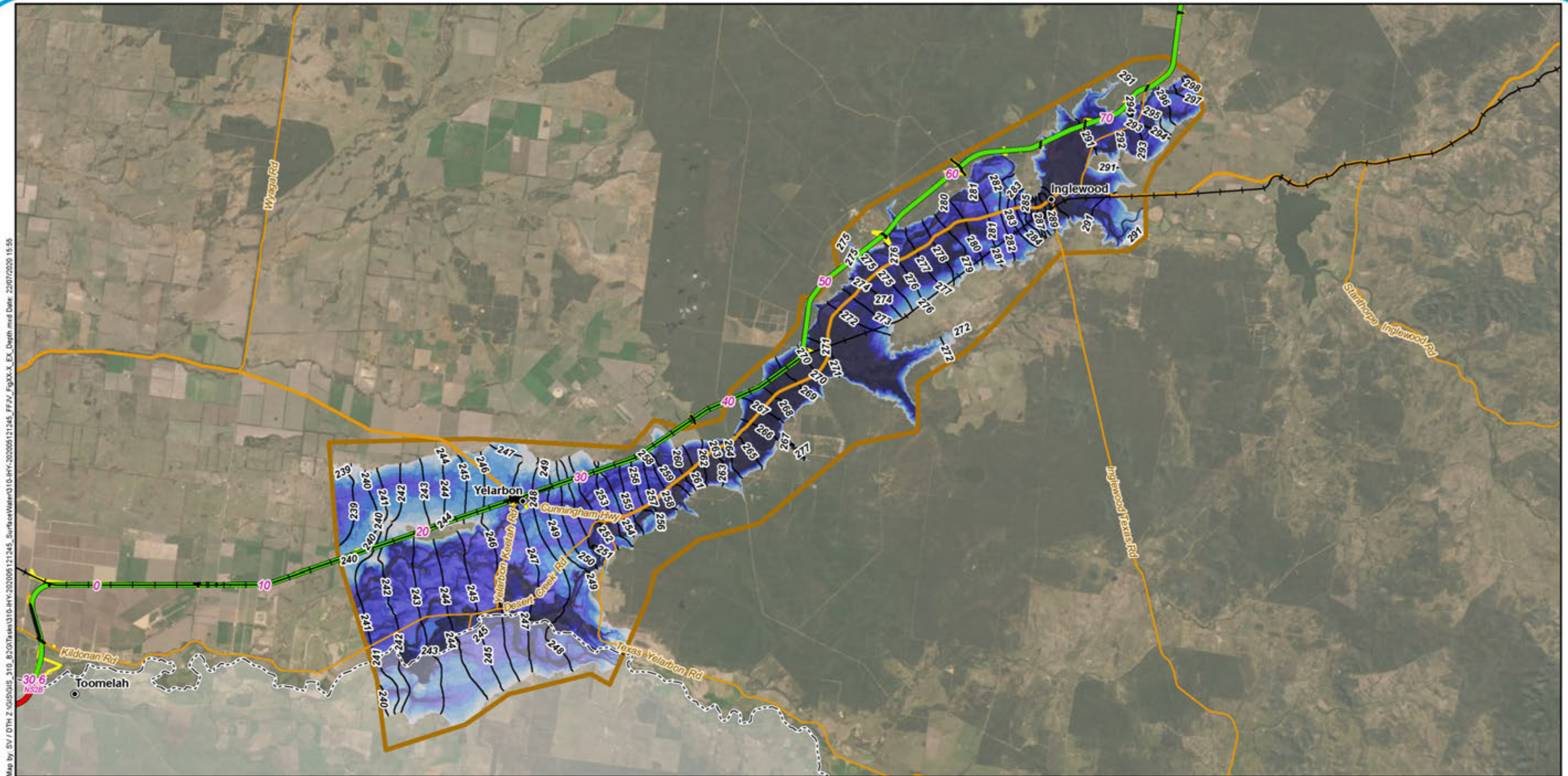
#### Depth (m)

- |           |                     |
|-----------|---------------------|
| 0 - 0.5   | 3.0 - 3.5           |
| 0.5 - 1.0 | 3.5 - 4.0           |
| 1.0 - 1.5 | 4.0 - 4.5           |
| 1.5 - 2.0 | 4.5 - 5.0           |
| 2.0 - 2.5 | > 5.0               |
| 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





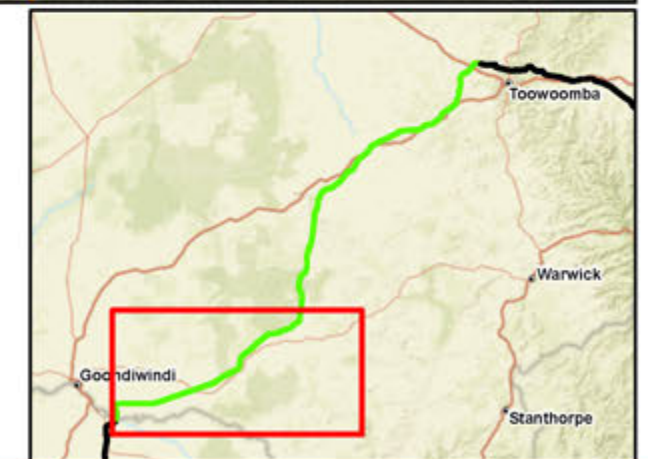
#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

#### Depth (m)

- |             |                     |
|-------------|---------------------|
| □ 0 - 0.5   | □ 3.0 - 3.5         |
| □ 0.5 - 1.0 | □ 3.5 - 4.0         |
| □ 1.0 - 1.5 | □ 4.0 - 4.5         |
| □ 1.5 - 2.0 | □ 4.5 - 5.0         |
| □ 2.0 - 2.5 | □ > 5.0             |
| □ 2.5 - 3.0 | — 1m contour (mAHD) |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



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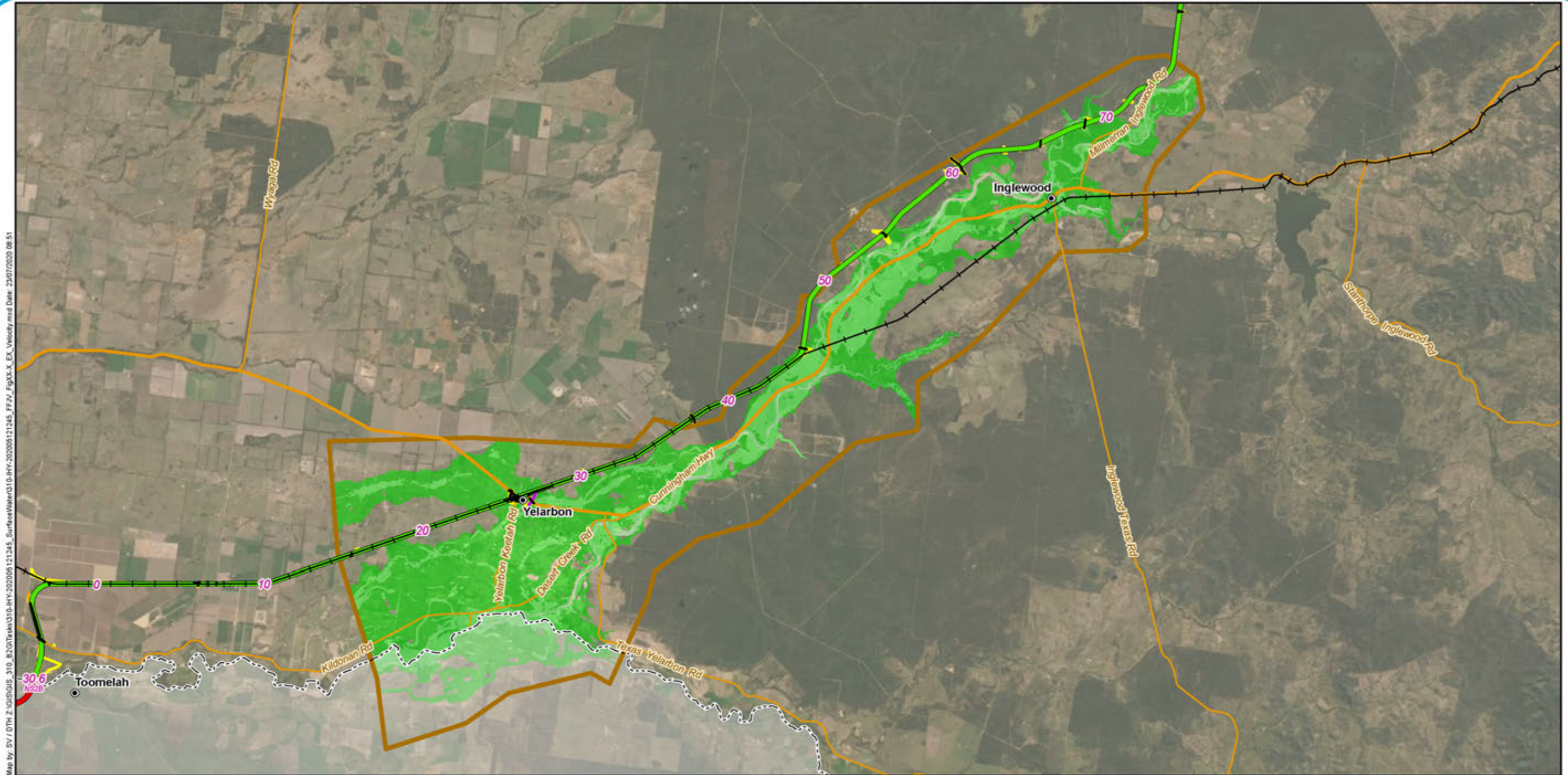
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J2-H:**

**PMF peak water levels - Existing Case - Macintyre Brook**





#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- North Star to NSW/QLD border alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint

- Hydraulic model extent
- Yelarbon levee

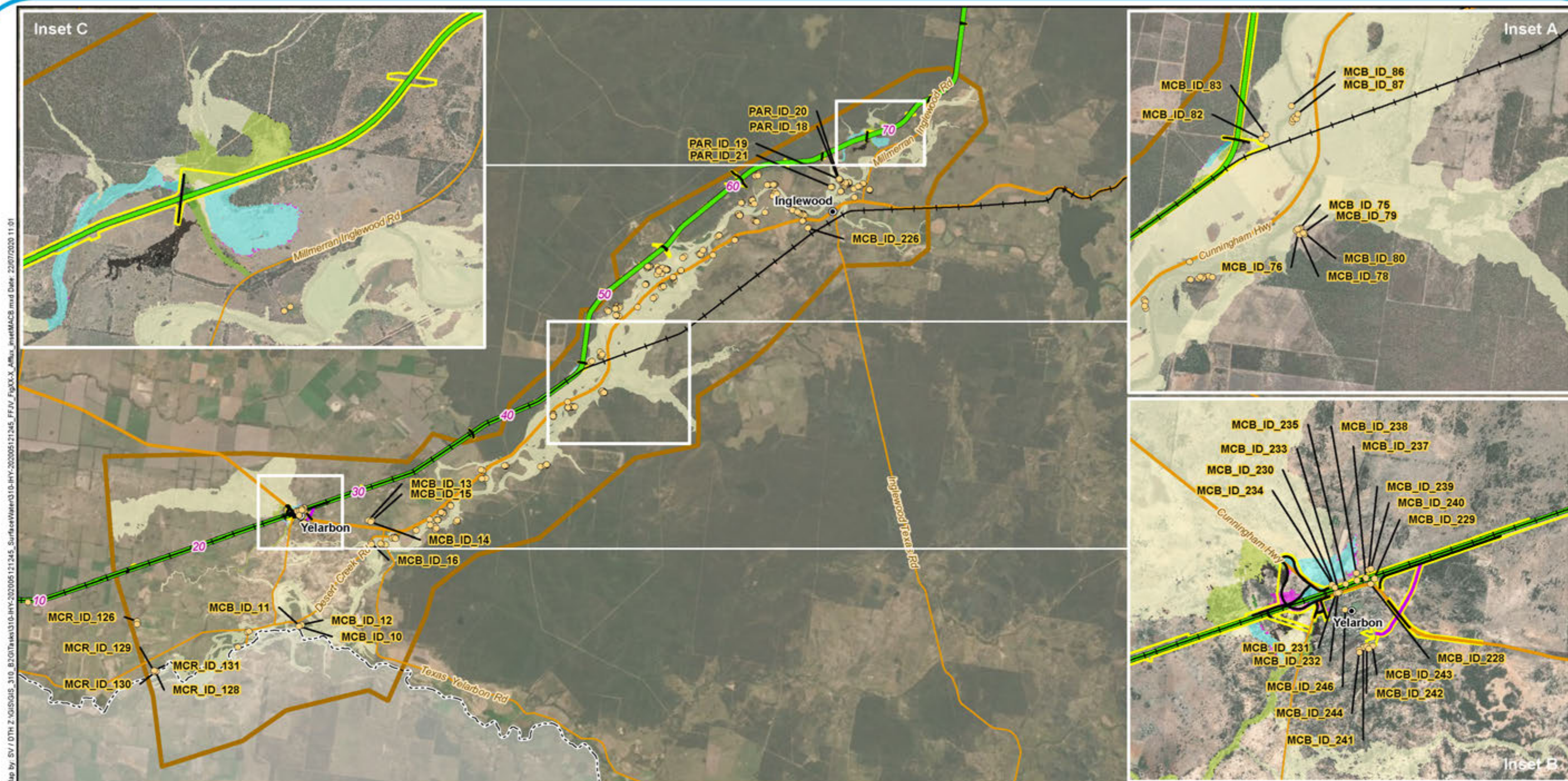
#### Peak velocity (m/s)

|     |     |
|-----|-----|
| 0.0 | 3.0 |
| 0.5 | 3.5 |
| 1.0 | 4.0 |
| 1.5 | 4.5 |
| 2.0 | 5.0 |
| 2.5 |     |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

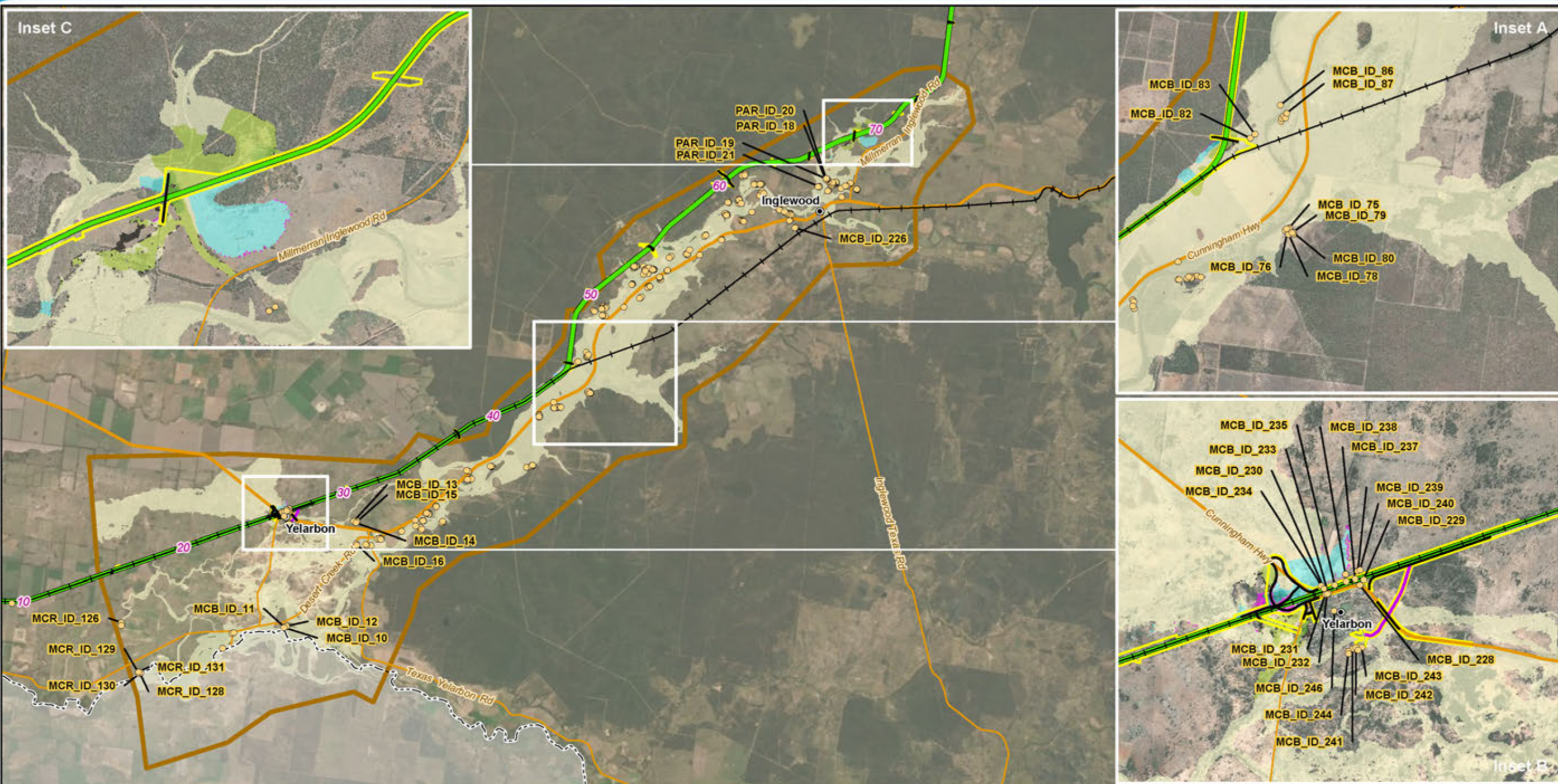
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



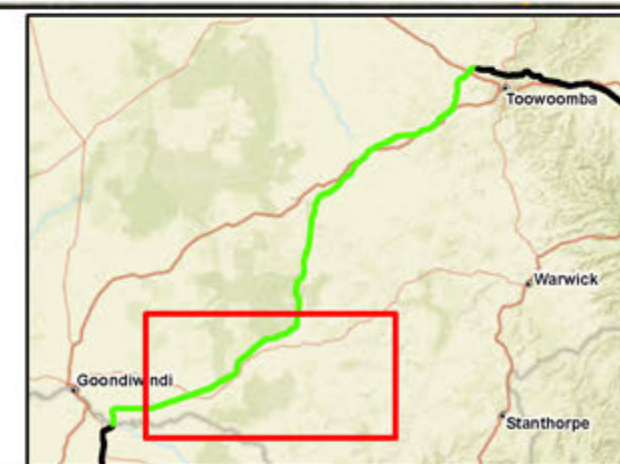


### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

### Change in peak water levels (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: teal;">■</span> < -0.5         | <span style="color: lightgreen;">■</span> 0.01 to 0.05 |
| <span style="color: teal;">■</span> -0.50 to -0.20 | <span style="color: lightgreen;">■</span> 0.05 to 0.10 |
| <span style="color: teal;">■</span> -0.20 to -0.10 | <span style="color: lightgreen;">■</span> 0.10 to 0.20 |
| <span style="color: teal;">■</span> -0.10 to -0.05 | <span style="color: lightgreen;">■</span> 0.20 to 0.50 |
| <span style="color: teal;">■</span> -0.05 to -0.01 | <span style="color: lightgreen;">■</span> > 0.5        |
| <span style="color: teal;">■</span> -0.01 to 0.01  |                                                        |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



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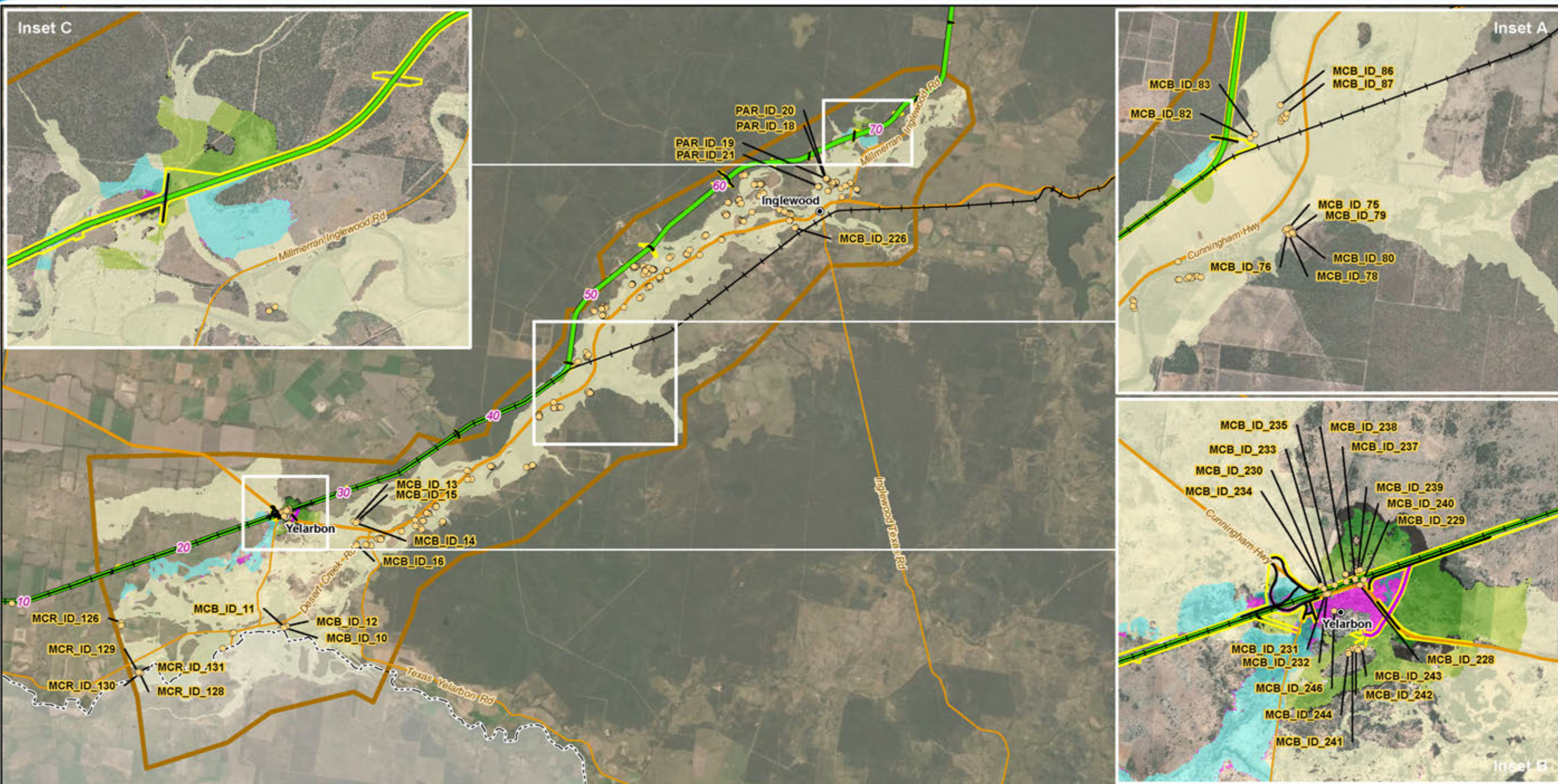
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J4-B:**

**10% AEP - design afflux - Macintyre Brook**



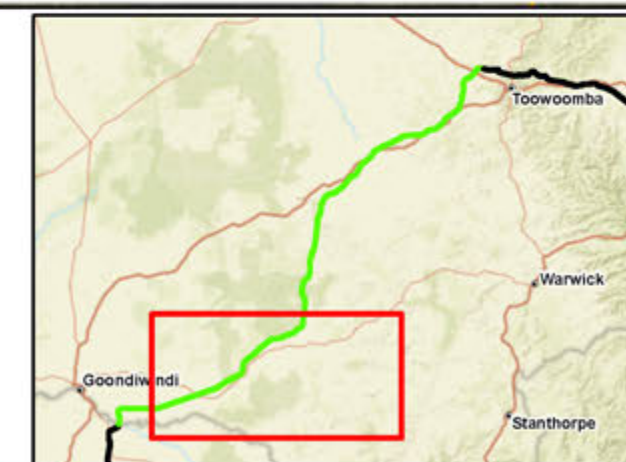


# Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

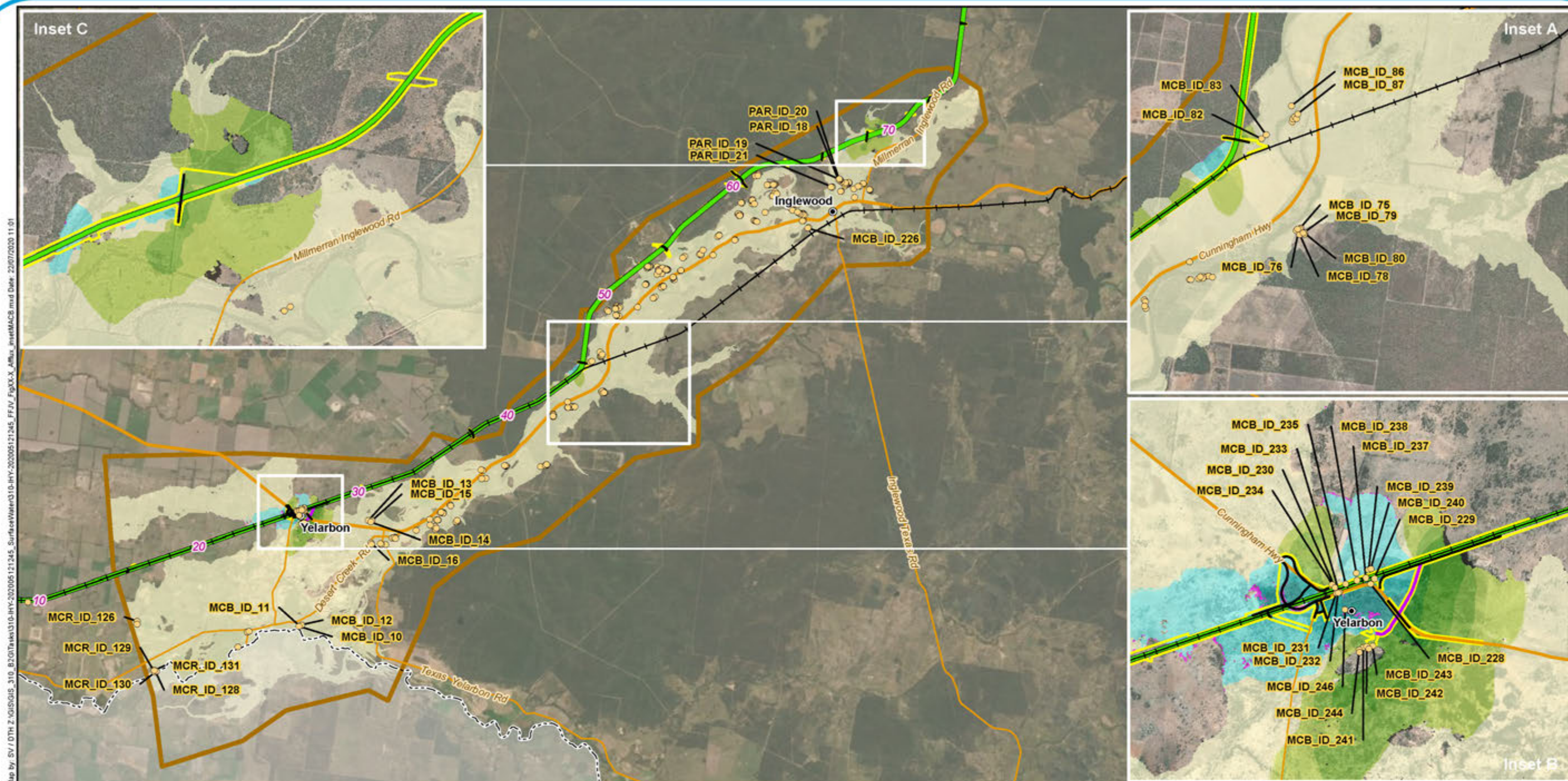
## Change in peak water levels (m)

- |                                                         |                                                        |
|---------------------------------------------------------|--------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10      |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: green;">—</span> 0.10 to 0.20      |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: green;">—</span> 0.20 to 0.50      |
| <span style="color: cyan;">—</span> -0.05 to -0.01      | <span style="color: green;">—</span> > 0.5             |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                        |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: lightblue;">■</span> -0.20 to -0.10 | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: cyan;">■</span> -0.10 to -0.05      | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">■</span> -0.05 to -0.01 | <span style="color: darkgreen;">■</span> > 0.5          |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



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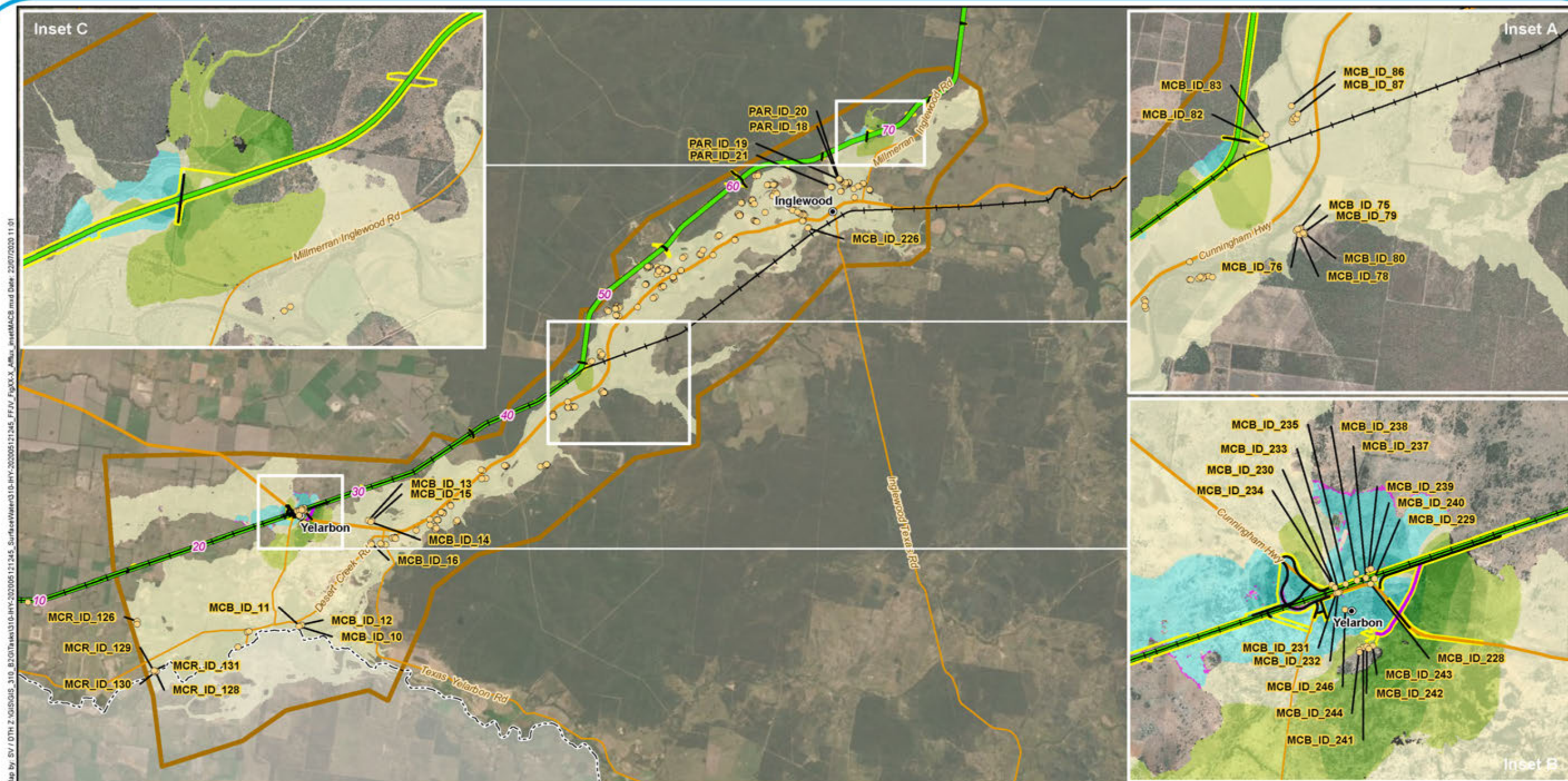
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J4-D:**

**2% AEP - design afflux - Macintyre Brook**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #FFFFE0; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



**Future Freight**  
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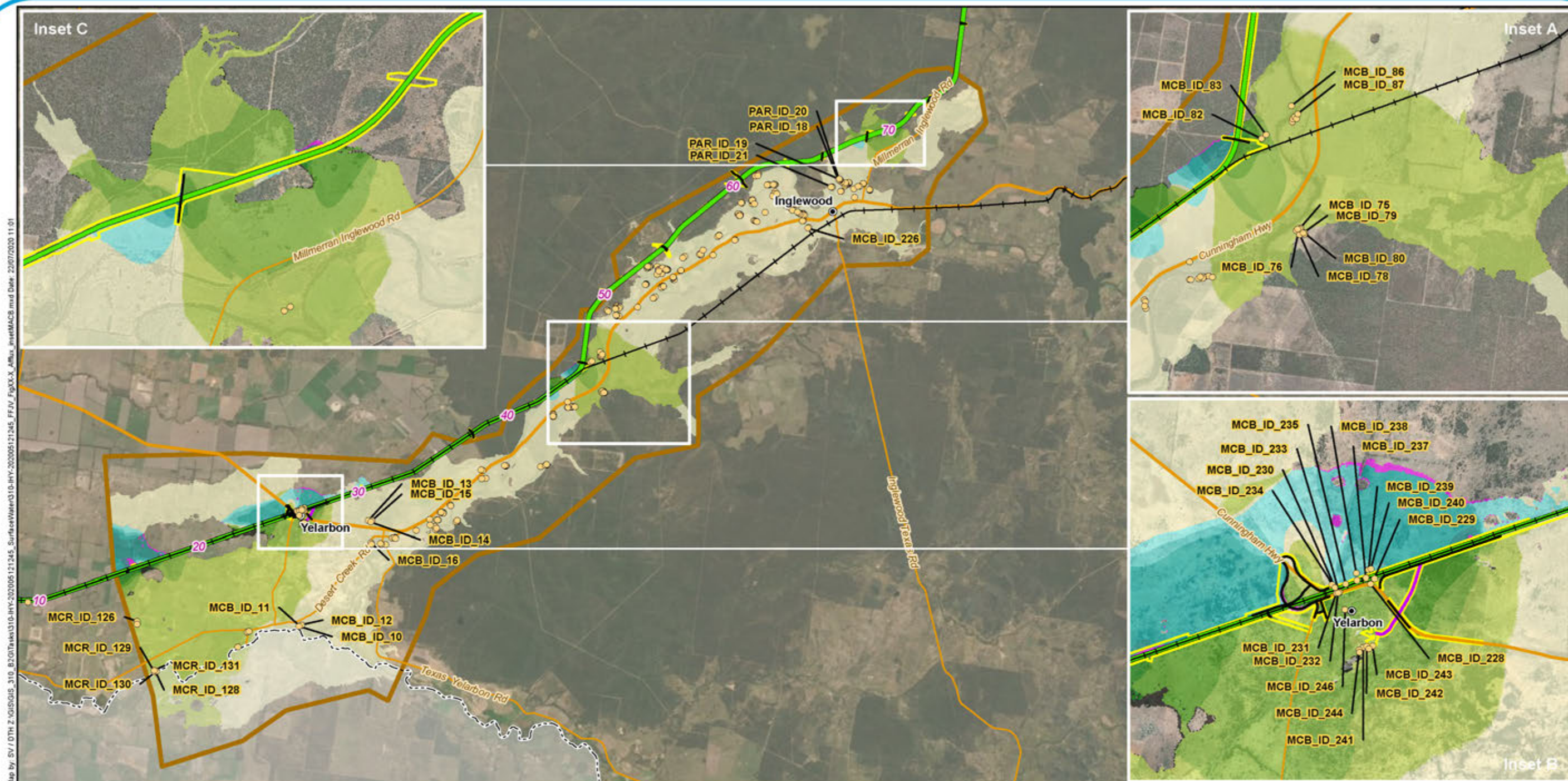
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J4-E:**

**1% AEP - design afflux - Macintyre Brook**





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

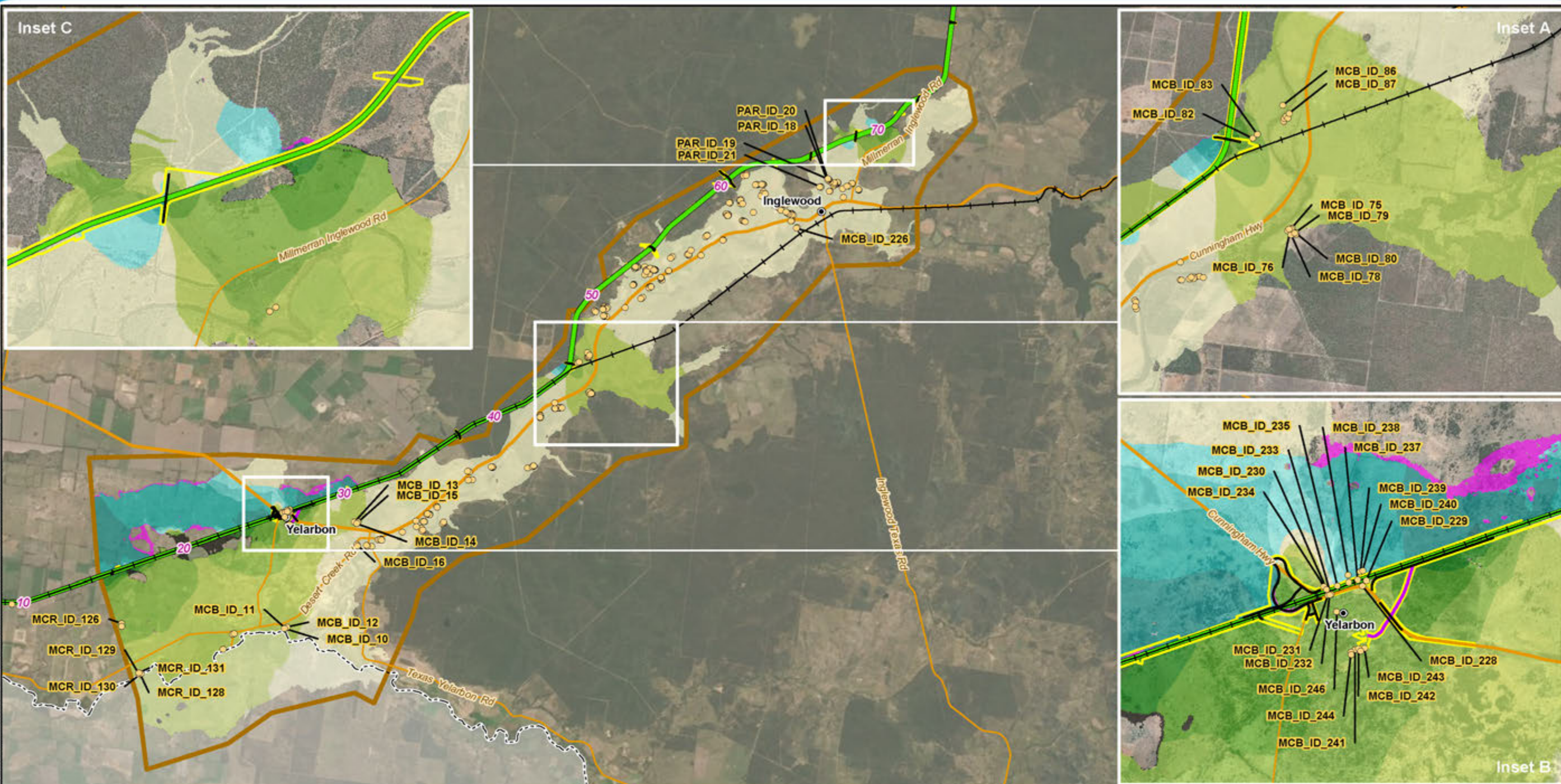
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05  |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10       |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20   |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: forestgreen;">—</span> 0.20 to 0.50 |
| <span style="color: skyblue;">—</span> -0.05 to -0.01   | <span style="color: darkslategrey;">—</span> > 0.5      |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
0 2.5 5 7.5 10 12.5km





#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: lightblue;">■</span> -0.20 to -0.10 | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: cyan;">■</span> -0.10 to -0.05      | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: lightcyan;">■</span> -0.05 to -0.01 | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



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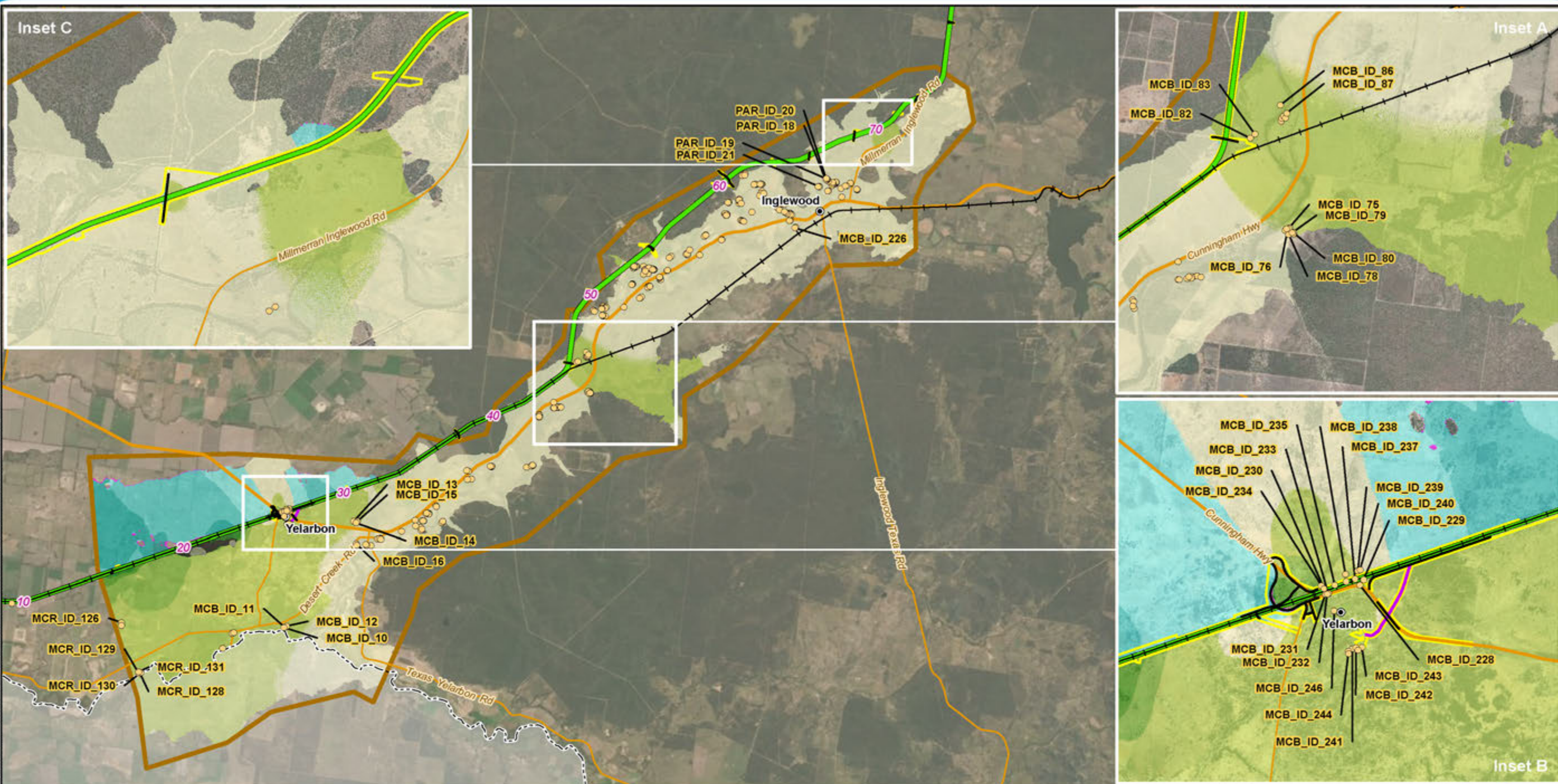
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J4-G:**

**1 in 10,000 AEP - design afflux - Macintyre Brook**



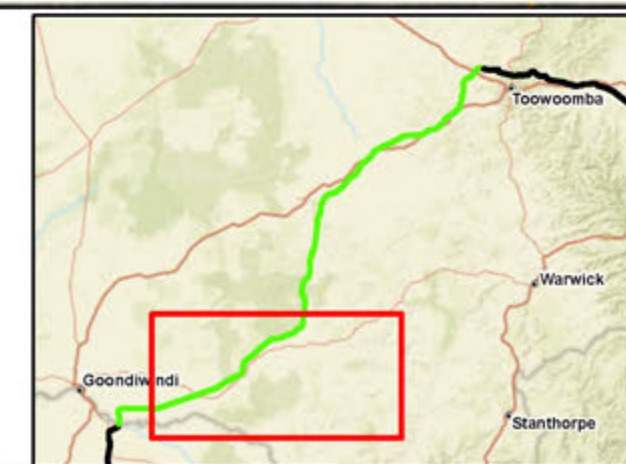


#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
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- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

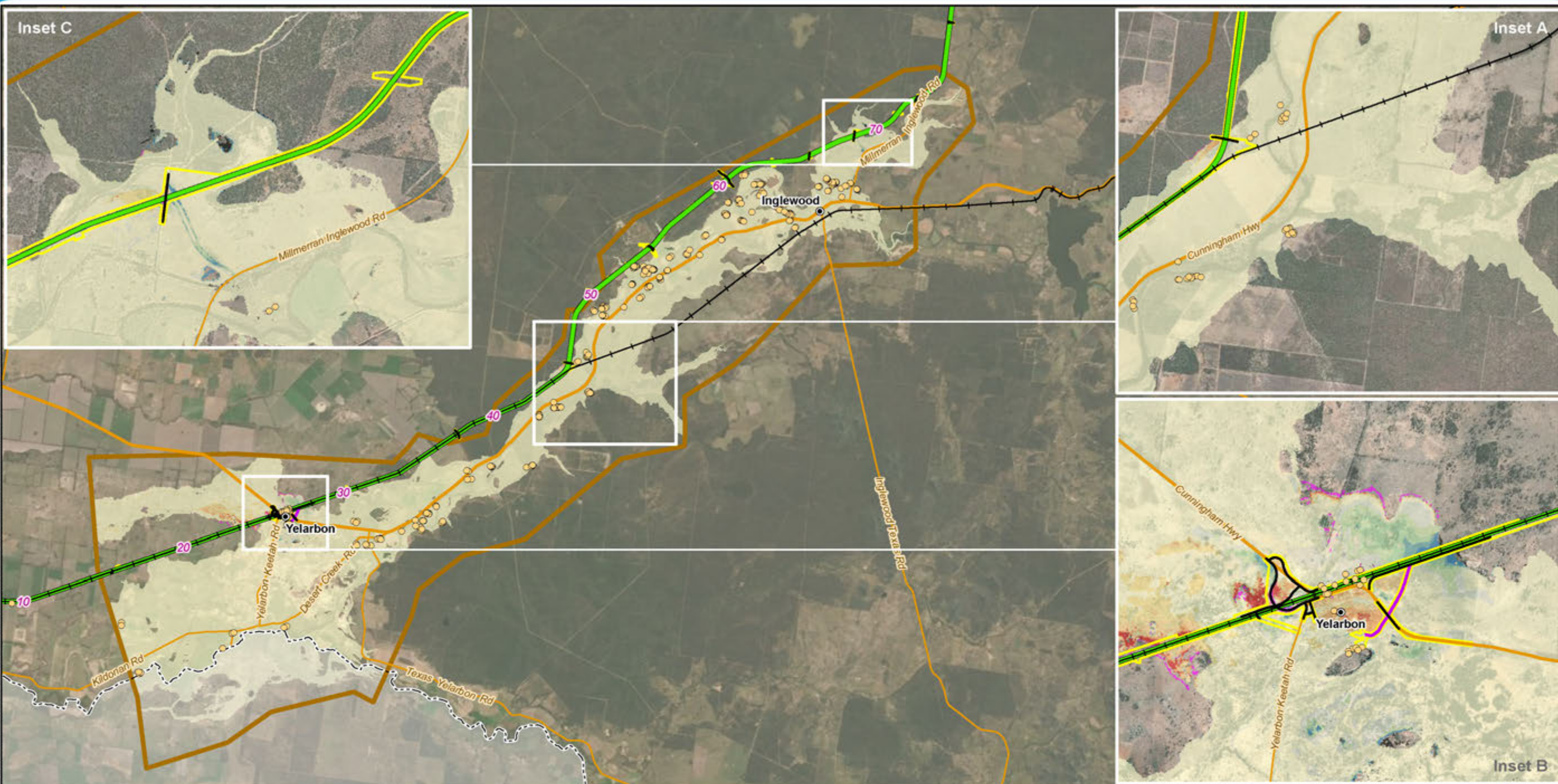
#### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">—</span> < -0.5          | <span style="color: lightgreen;">—</span> 0.01 to 0.05  |
| <span style="color: teal;">—</span> -0.50 to -0.20      | <span style="color: green;">—</span> 0.05 to 0.10       |
| <span style="color: cyan;">—</span> -0.20 to -0.10      | <span style="color: darkgreen;">—</span> 0.10 to 0.20   |
| <span style="color: lightblue;">—</span> -0.10 to -0.05 | <span style="color: forestgreen;">—</span> 0.20 to 0.50 |
| <span style="color: skyblue;">—</span> -0.05 to -0.01   | <span style="color: darkslategrey;">—</span> > 0.5      |
| <span style="color: yellow;">—</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



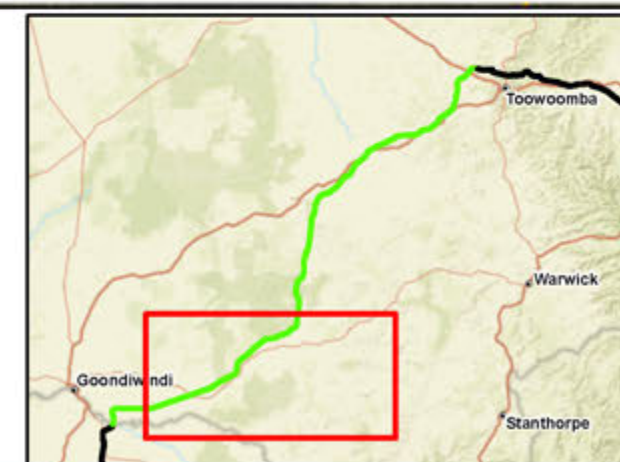


#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
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- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

#### Change in Time of Inundation (percentage)

- |                                                         |                                                      |
|---------------------------------------------------------|------------------------------------------------------|
| <span style="color: red;">■</span> < -50%               | <span style="color: lightgreen;">■</span> 10% to 20% |
| <span style="color: orange;">■</span> -50% to -40%      | <span style="color: green;">■</span> 20% to 30%      |
| <span style="color: yellow;">■</span> -40% to -30%      | <span style="color: teal;">■</span> 30% to 40%       |
| <span style="color: lightyellow;">■</span> -30% to -20% | <span style="color: blue;">■</span> 40% to 50%       |
| <span style="color: yellow;">■</span> -20% to -10%      | <span style="color: darkblue;">■</span> > 50%        |
| <span style="color: lightyellow;">■</span> -10% to 10%  |                                                      |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



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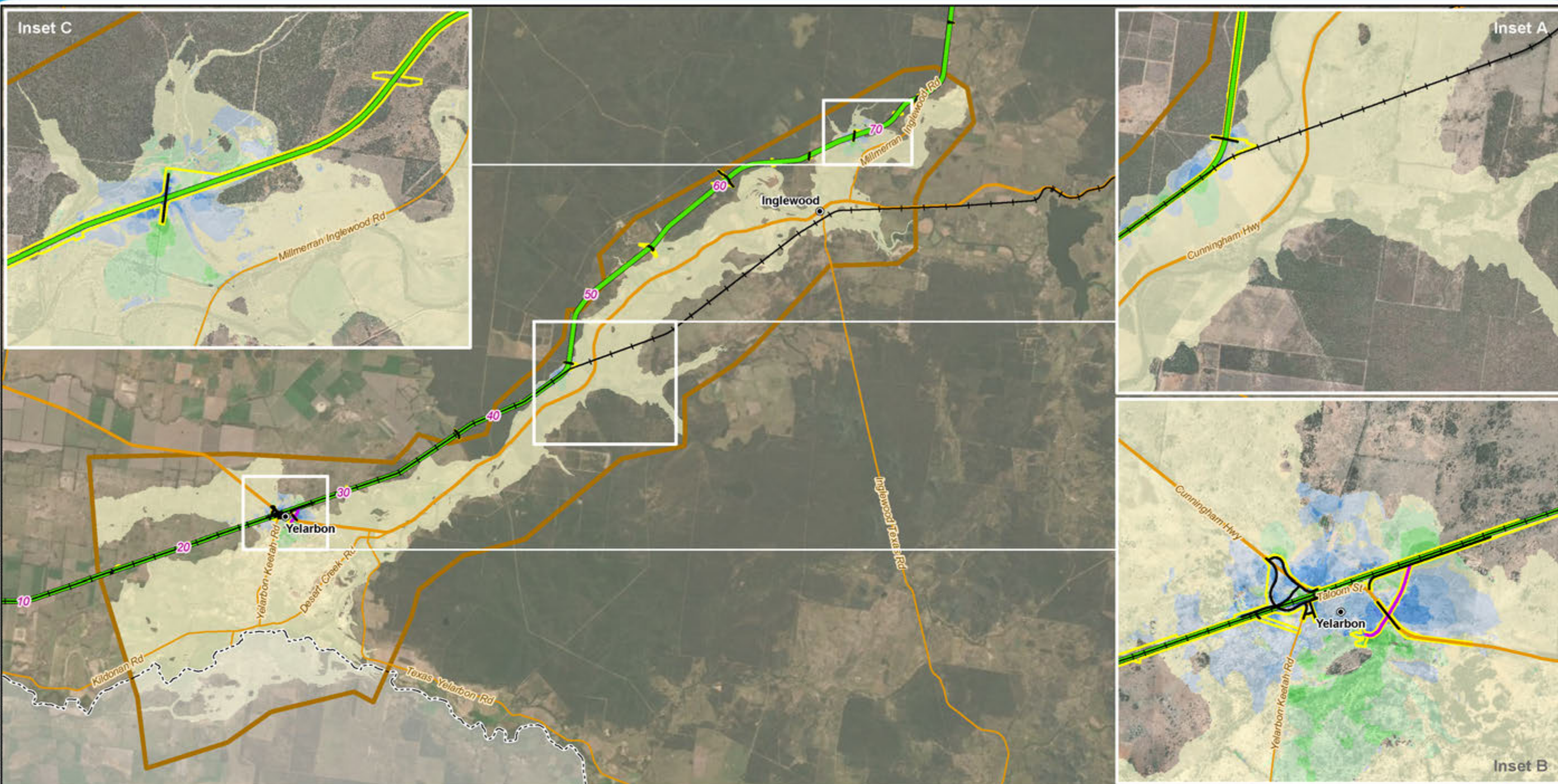
Issue date: 20/07/2020 Version: 1  
 Coordinate System: GDA 1994 MGA Zone 56

**Border to Gowrie**

**Figure J4-I:**

**1% AEP - change in time of inundation - Macintyre Brook**



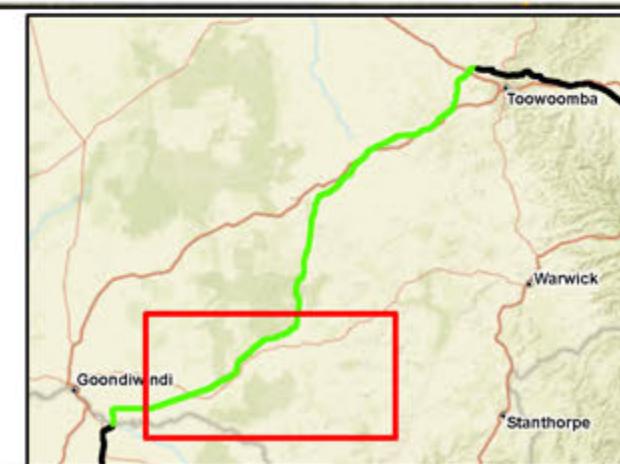


#### Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
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- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee

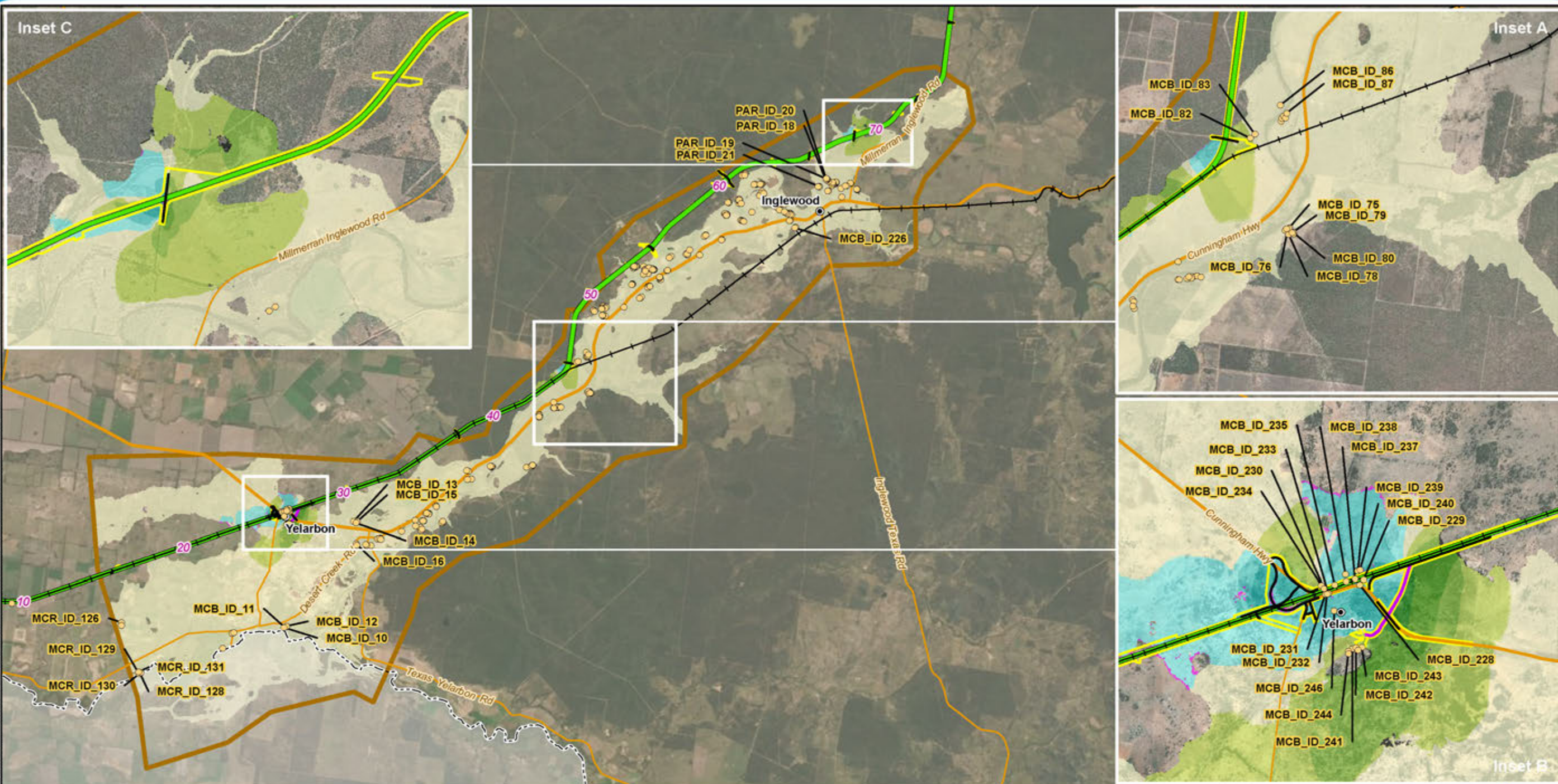
#### Change in peak velocity (m/s)

- |                |              |
|----------------|--------------|
| < -0.50        | 0.01 to 0.05 |
| -0.50 to -0.20 | 0.05 to 0.10 |
| -0.20 to -0.10 | 0.10 to 0.20 |
| -0.10 to -0.05 | 0.20 to 0.50 |
| -0.05 to -0.01 | > 0.50       |
| -0.01 to 0.01  |              |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5 km



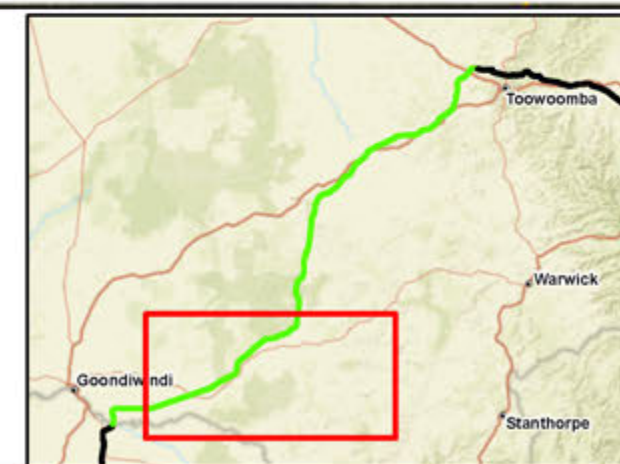


### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

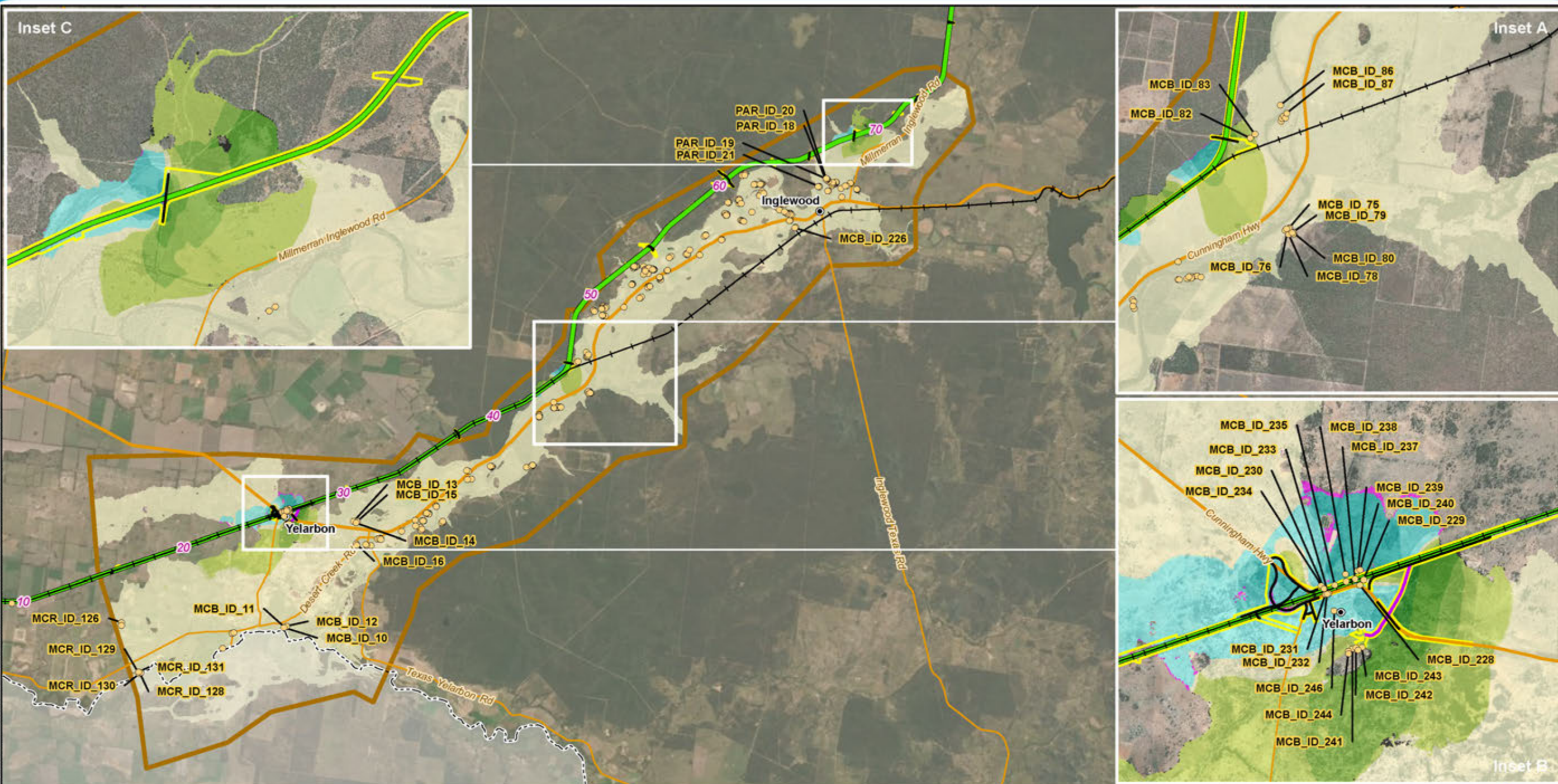
### Change in peak water levels (m)

- |                                                         |                                                         |
|---------------------------------------------------------|---------------------------------------------------------|
| <span style="color: darkblue;">■</span> < -0.5          | <span style="color: lightgreen;">■</span> 0.01 to 0.05  |
| <span style="color: teal;">■</span> -0.50 to -0.20      | <span style="color: green;">■</span> 0.05 to 0.10       |
| <span style="color: cyan;">■</span> -0.20 to -0.10      | <span style="color: darkgreen;">■</span> 0.10 to 0.20   |
| <span style="color: lightblue;">■</span> -0.10 to -0.05 | <span style="color: forestgreen;">■</span> 0.20 to 0.50 |
| <span style="color: skyblue;">■</span> -0.05 to -0.01   | <span style="color: darkslategrey;">■</span> > 0.5      |
| <span style="color: yellow;">■</span> -0.01 to 0.01     |                                                         |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km



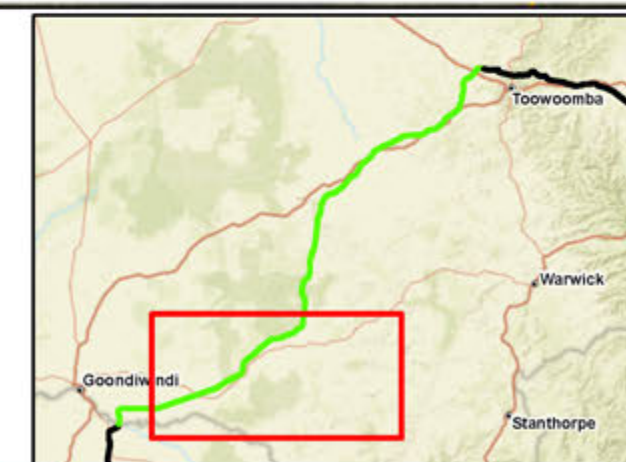


#### Legend

- Flood sensitive receptor
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Road design
- NSW/QLD border
- Project footprint
- Hydraulic model extent
- Yelarbon levee
- Was Wet Now Dry
- Was Dry Now Wet

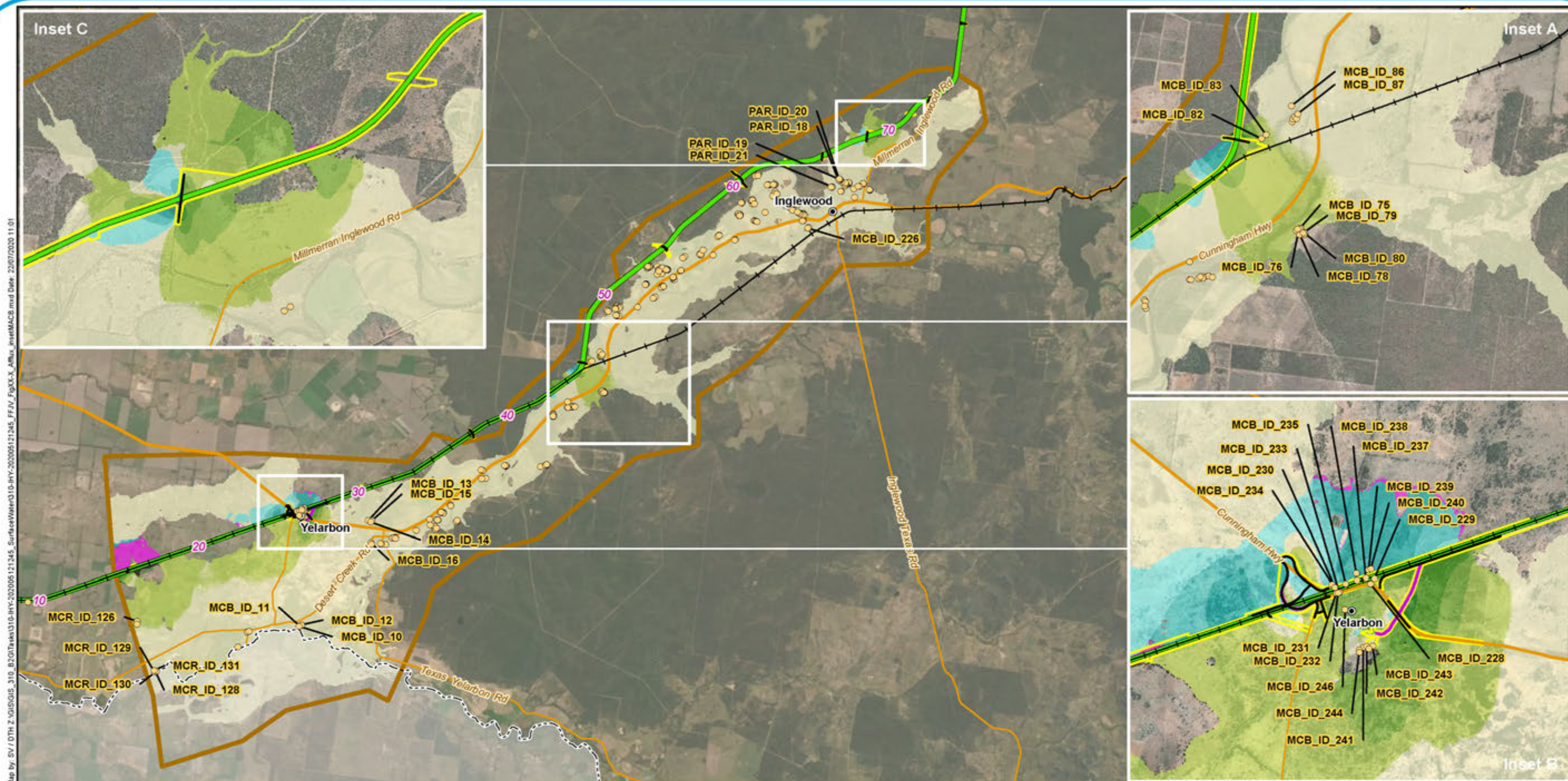
#### Change in peak water levels (m)

- |                                                                                                                   |                                                                                                                 |
|-------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> < -0.5         | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.01 to 0.05 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.50 to -0.20 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.05 to 0.10 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.20 to -0.10 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.10 to 0.20 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.10 to -0.05 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> 0.20 to 0.50 |
| <span style="background-color: #4682B4; width: 10px; height: 10px; display: inline-block;"></span> -0.05 to -0.01 | <span style="background-color: #90EE90; width: 10px; height: 10px; display: inline-block;"></span> > 0.5        |
| <span style="background-color: #FFFFE0; width: 10px; height: 10px; display: inline-block;"></span> -0.01 to 0.01  |                                                                                                                 |



A3 scale: 1:250,000  
 0 2.5 5 7.5 10 12.5km





#### Legend

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- Was Dry Now Wet

#### Change in peak water levels (m)

- |                                                    |                                                        |
|----------------------------------------------------|--------------------------------------------------------|
| <span style="color: teal;">—</span> < -0.5         | <span style="color: lightgreen;">—</span> 0.01 to 0.05 |
| <span style="color: teal;">—</span> -0.50 to -0.20 | <span style="color: lightgreen;">—</span> 0.05 to 0.10 |
| <span style="color: teal;">—</span> -0.20 to -0.10 | <span style="color: lightgreen;">—</span> 0.10 to 0.20 |
| <span style="color: teal;">—</span> -0.10 to -0.05 | <span style="color: lightgreen;">—</span> 0.20 to 0.50 |
| <span style="color: teal;">—</span> -0.05 to -0.01 | <span style="color: lightgreen;">—</span> > 0.5        |
| <span style="color: teal;">—</span> -0.01 to 0.01  |                                                        |



A3 scale: 1:250,000  
0 2.5 5 7.5 10 12.5km



**Future Freight**  
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Issue date: 20/07/2020 Version: 1  
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**Border to Gowrie**

**Figure J5-C:**

**1% AEP sensitivity - climate change RCP8.5 - peak water levels - Macintyre Brook**