

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Part 5 of 8

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix N Local drainage 1% AEP flood maps

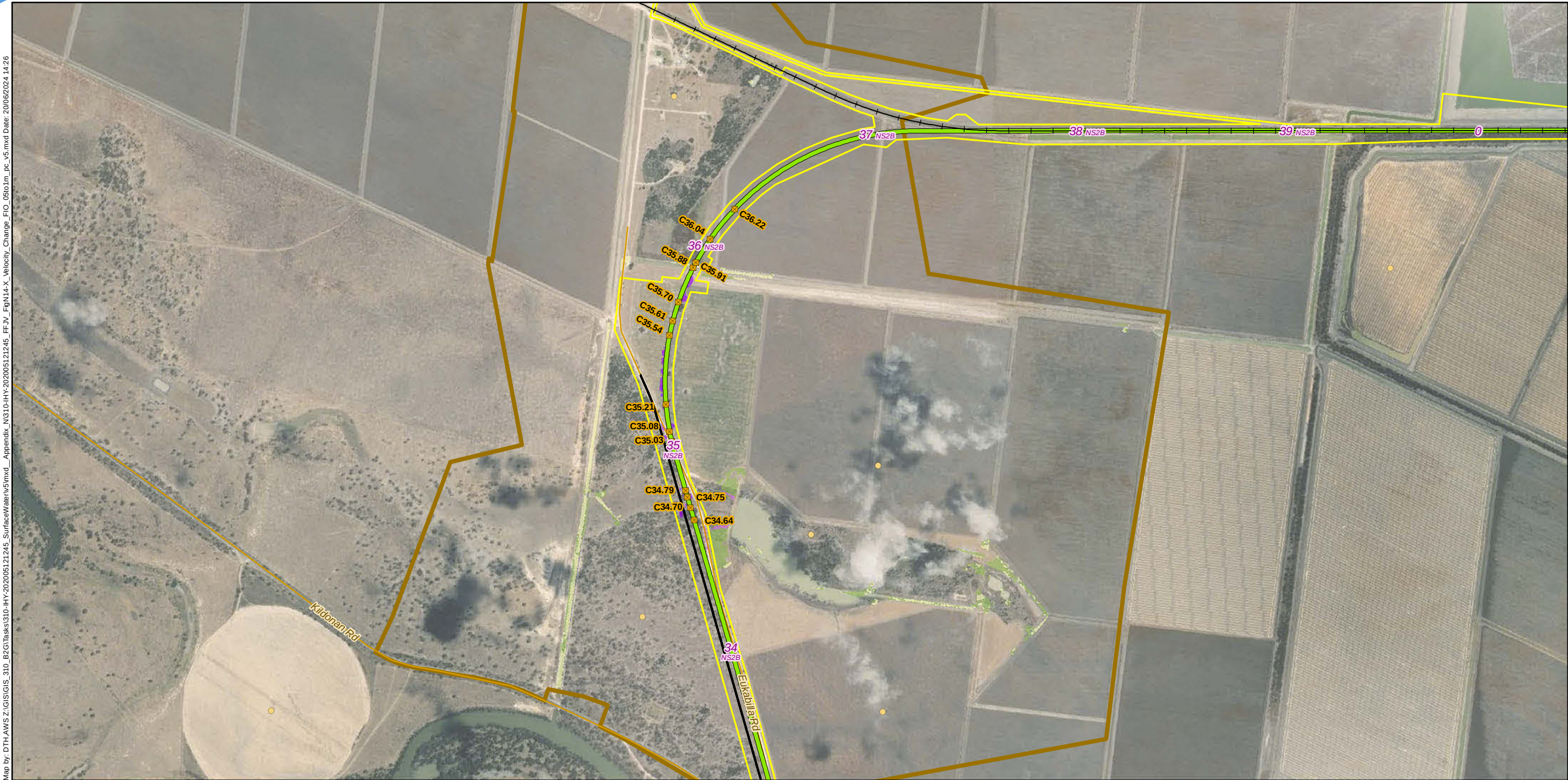
CONTINUED

BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix N

Local Drainage 1% AEP Flood Maps

Figure N1-1 to 48	1% AEP Event - Peak Water Levels - Existing Case
Figure N2-1 to 48	1% AEP Event - Peak Velocity - Existing Case
Figure N3-1 to 48	1% AEP Event - Peak Hazard - Existing Case
Figure N4-1 to 48	1% AEP Event - Peak Time of Inundation - Existing Case
Figure N5-1 to 48	1% AEP Event - Peak Water Levels - Developed Case
Figure N6-1 to 48	1% AEP Event - Peak Velocity - Developed Case
Figure N7-1 to 48	1% AEP Event - Peak Hazard - Developed Case
Figure N8-1 to 48	1% AEP Event - Peak Time of Inundation - Developed Case
Figure N9-1 to 48	1% AEP Event - Afflux
Figure N10-1 to 48	1% AEP Event - Change in Velocity
Figure N11-1 to 48	1% AEP Event - Change in Hazard
Figure N12-1 to 48	1% AEP Event - Change in Time of Inundation
Figure N13-1 to 48	1% AEP Event - Change in Velocity (<0.5m/s cutoff)
Figure N14-1 to 48	1% AEP Event - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)
Figure N15-1 to 48	1% AEP Event - Percentage Change in Velocity (<1.0m/s cutoff)
Figure N16-1 to 48	1% AEP Event - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)
Figure N17-1 to 48	1% AEP Event - Percentage Change in Time of Inundation
Figure N18-1 to 48	1% AEP Event - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

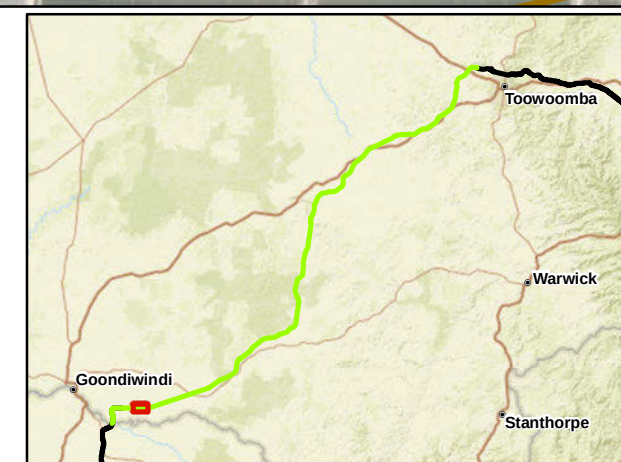
Figure N14 - page 1 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <0.5m/s and >1.0m/s have been cut off and are not displayed.

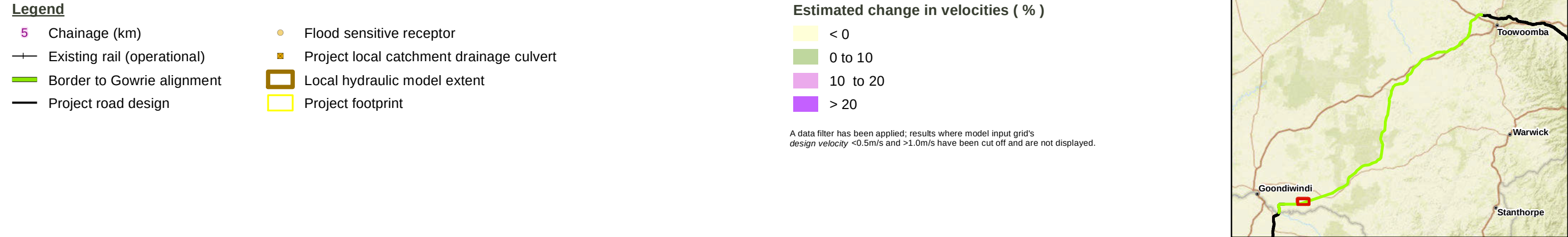


Future Freight
Integrating Community, Environment and Engineering

Border to Gowrie

Figure N14 - page 2 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



A3 scale: 1:20,000

0 0.2 0.4 0.6 0.8 1km



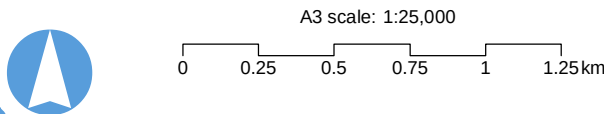
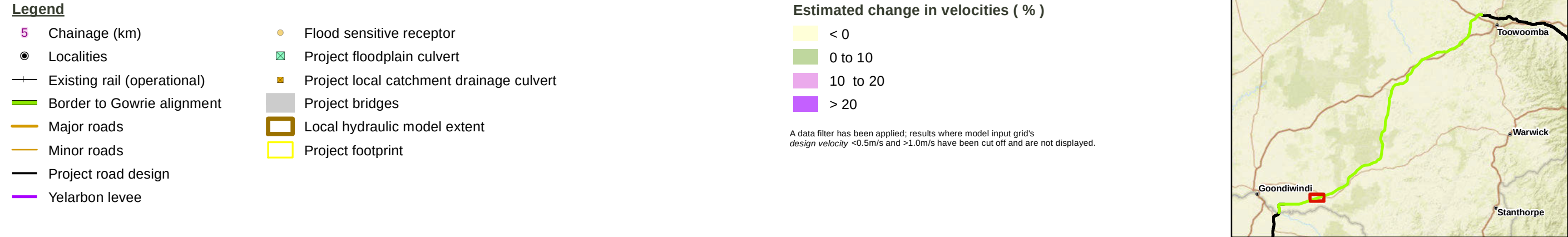
Future Freight
Integrating Community, Environment and Engineering

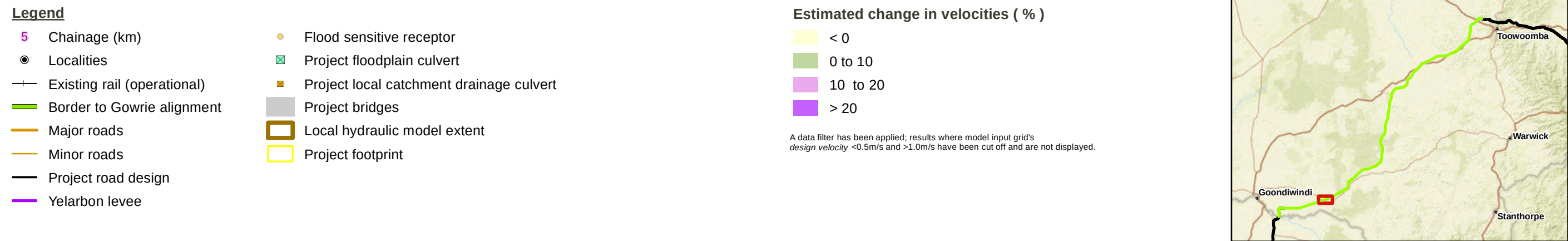
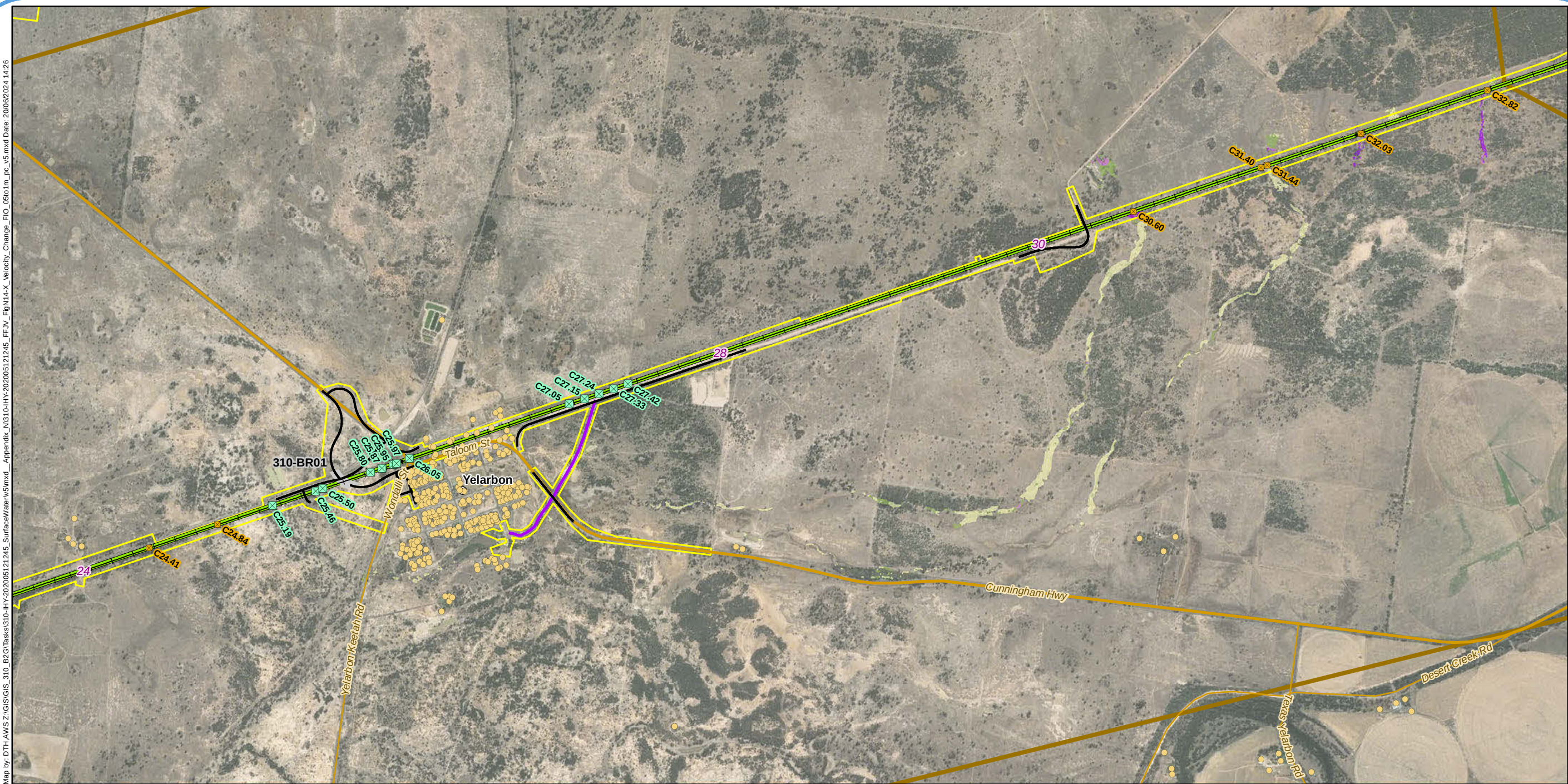
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 3 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)







Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 6 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <0.5m/s and >1.0m/s have been cut off and are not displayed.

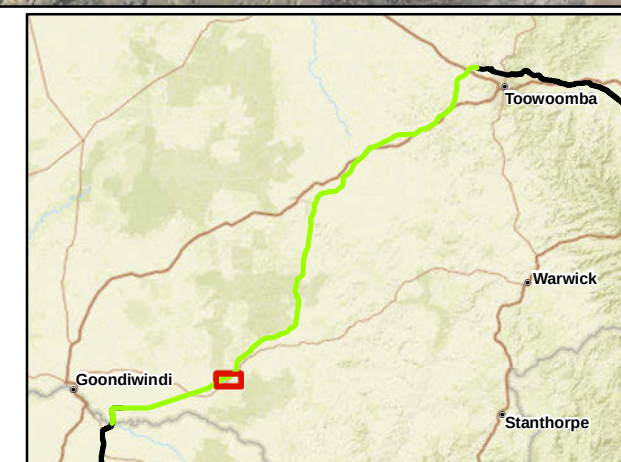
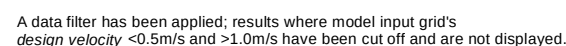


Figure N14 - page 7 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**



Future Freight
Integrating Community, Environment and Engineering

Border to Gowrie

Figure N14 - page 8 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

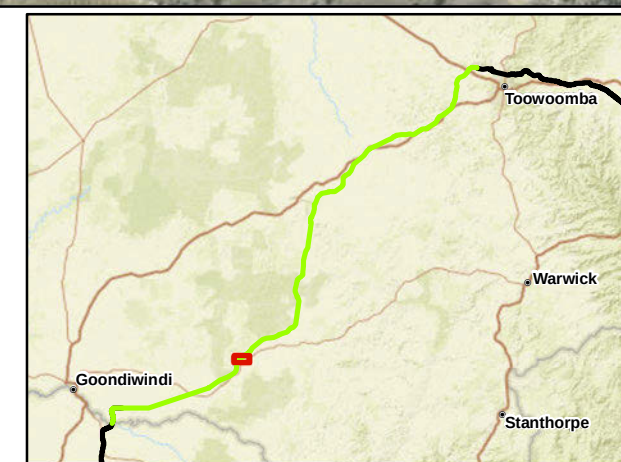
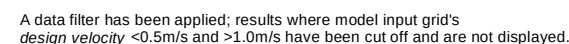
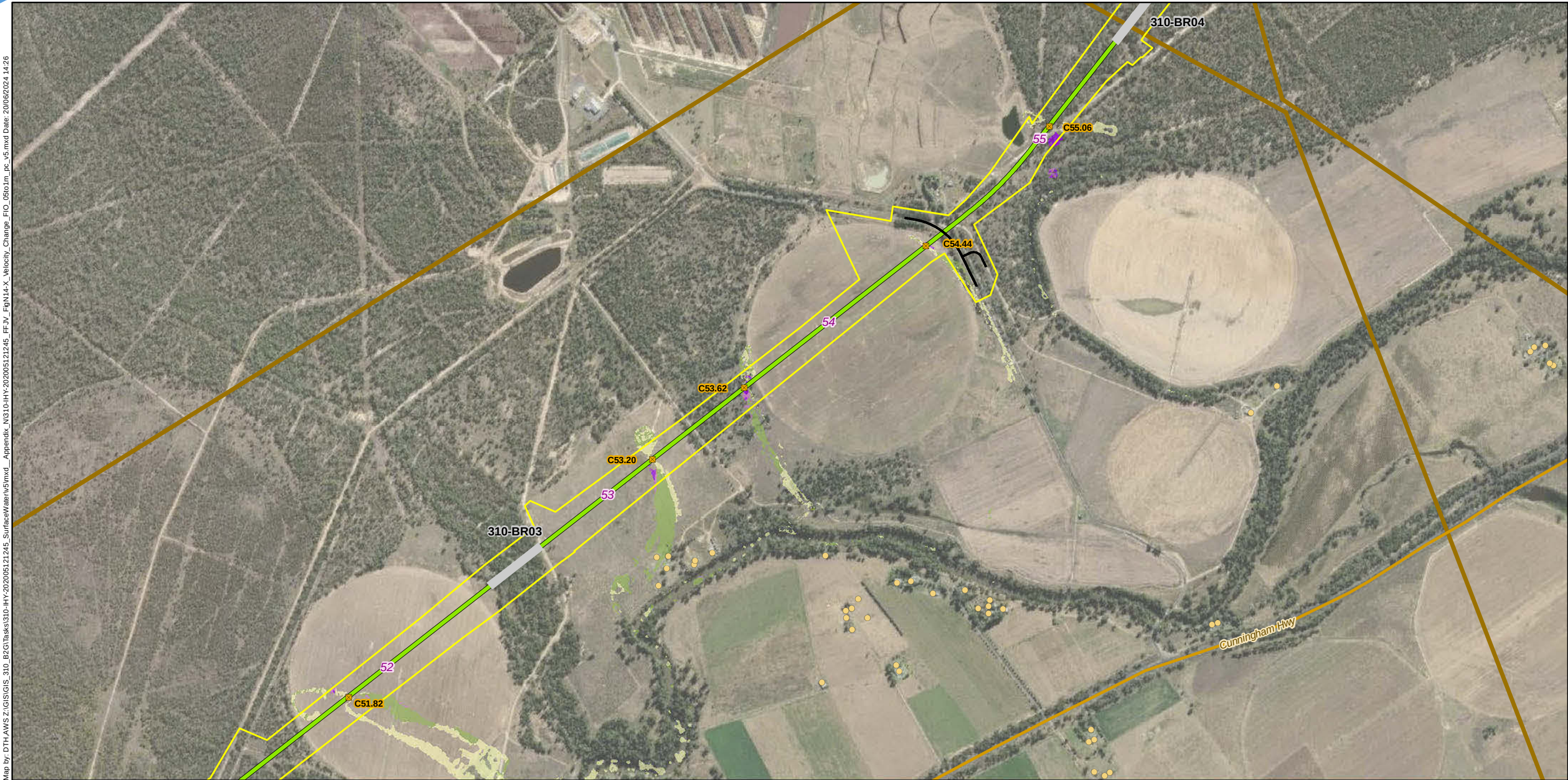


Figure N14 - page 9 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



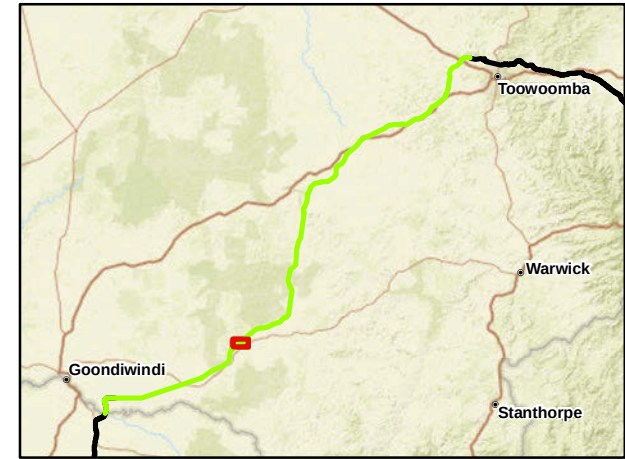
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

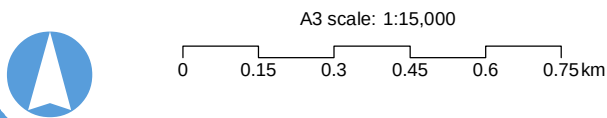
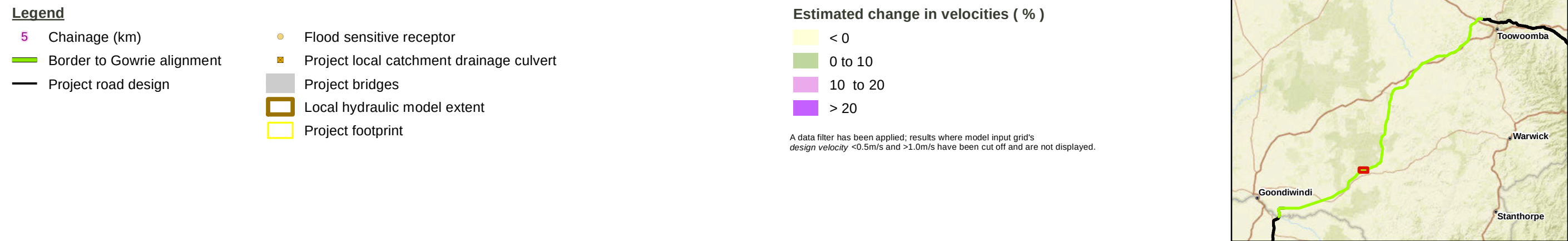
Estimated change in velocities (%)

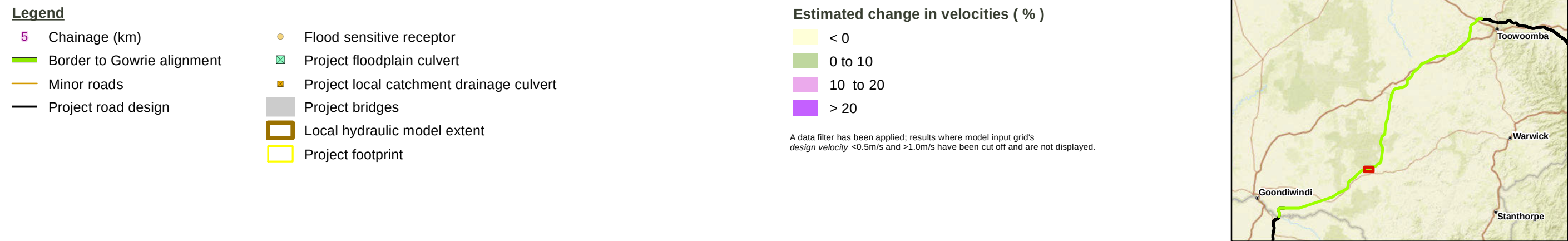
- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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





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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 12 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 13 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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

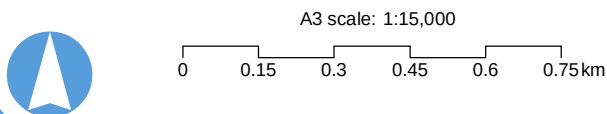
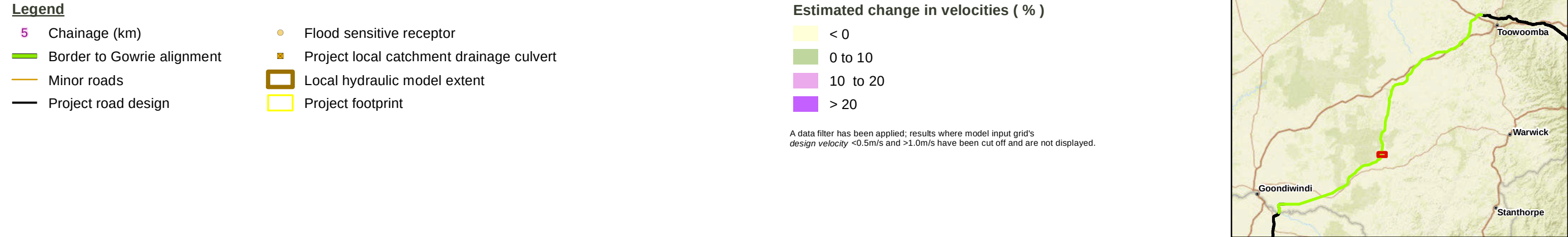


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 14 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 16 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

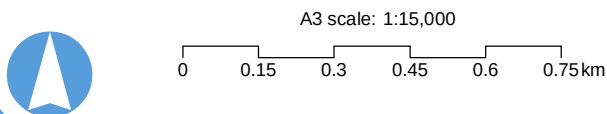
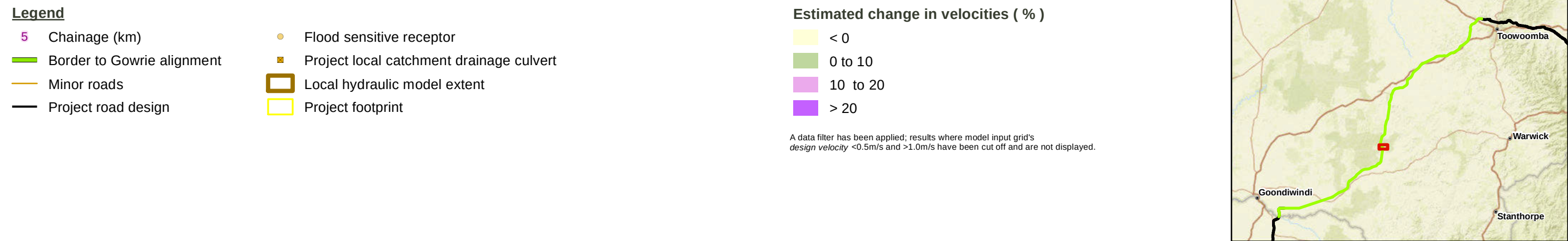


Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 17 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 19 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <0.5m/s and >1.0m/s have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N14 - page 20 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 21 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 22 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



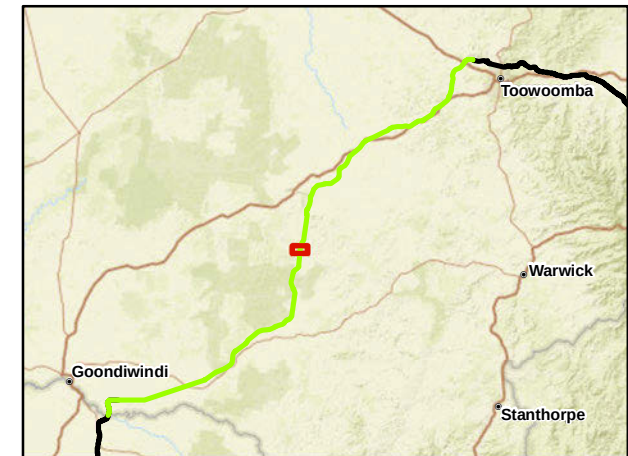
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 23 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



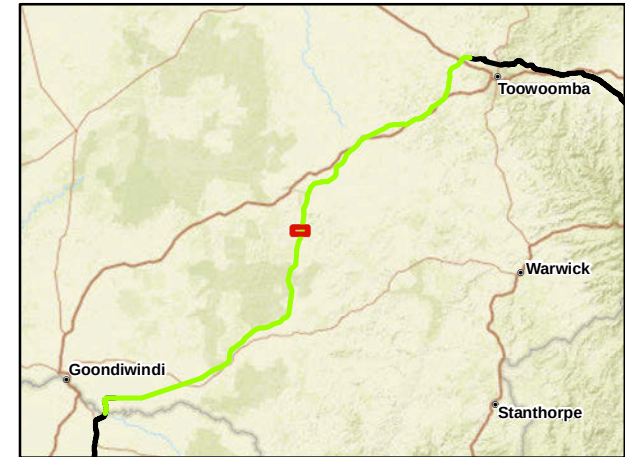
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 26 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



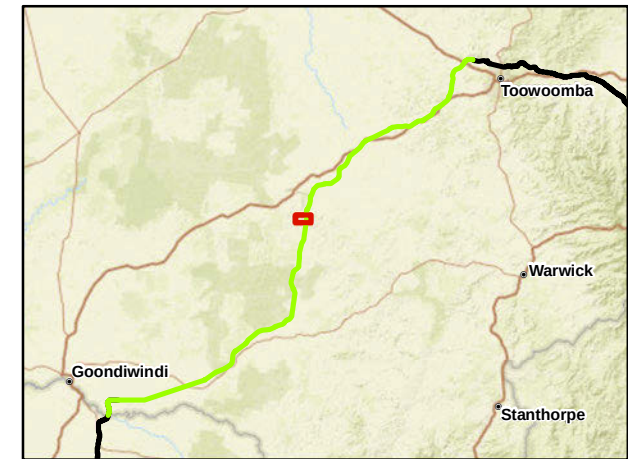
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

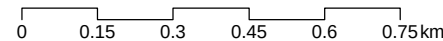
Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 27 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



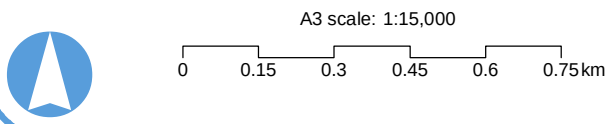
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.





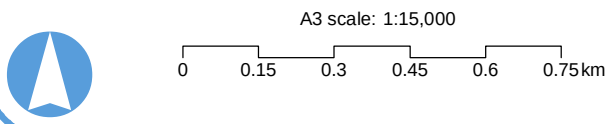
Legend

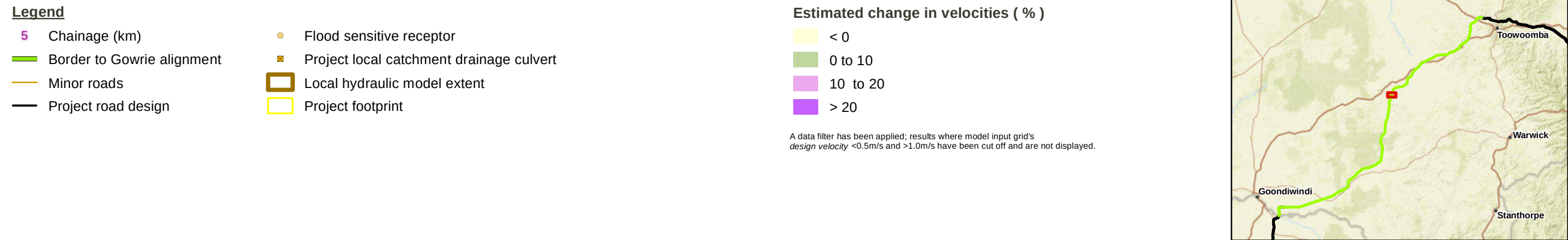
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

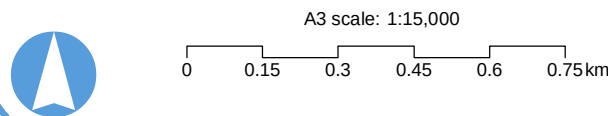
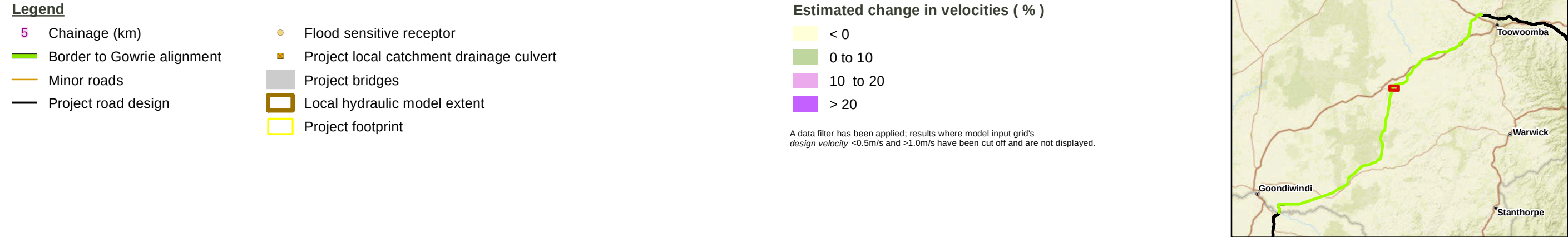
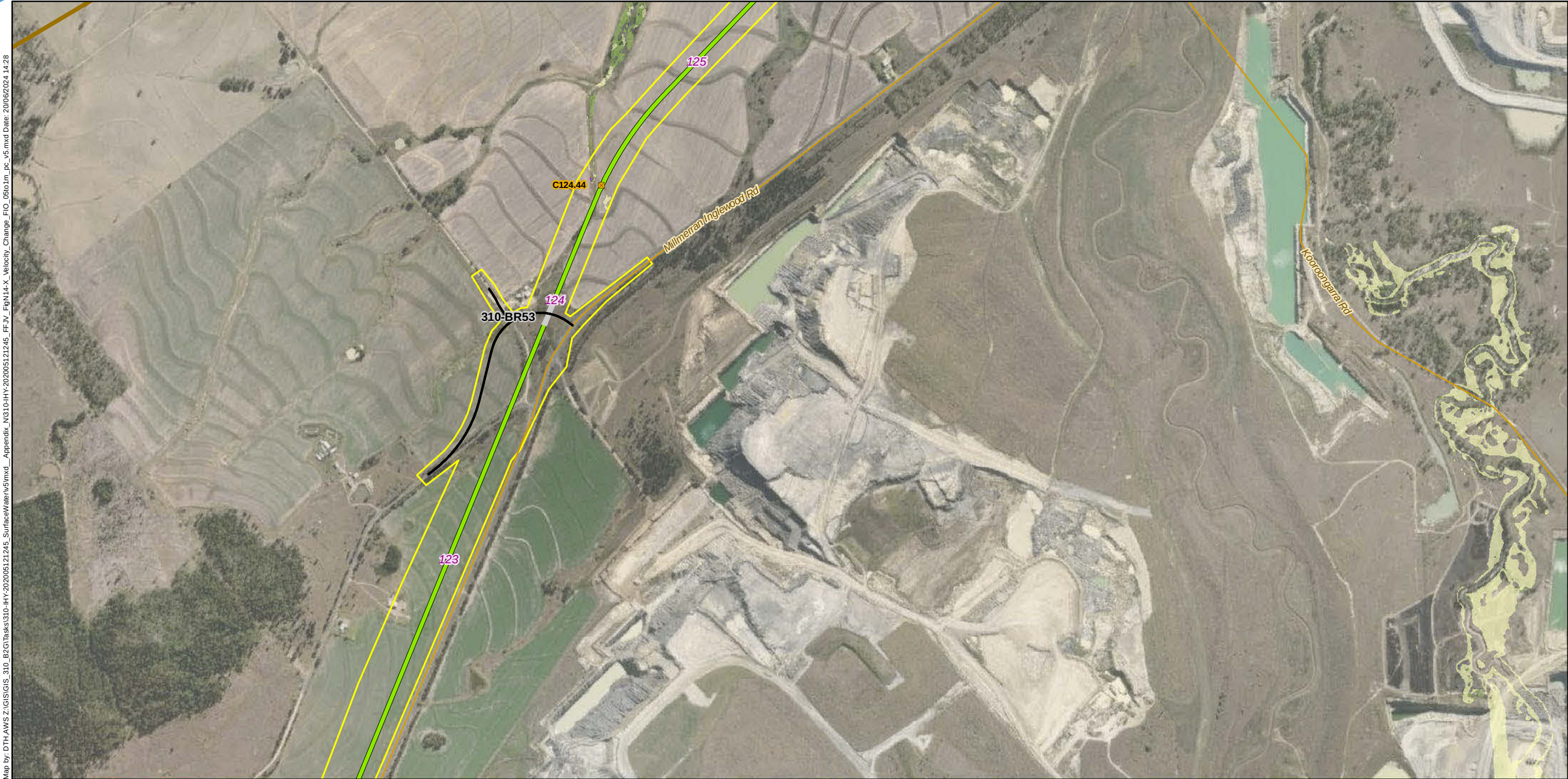
A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.

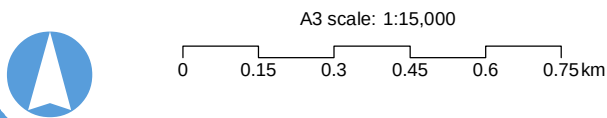
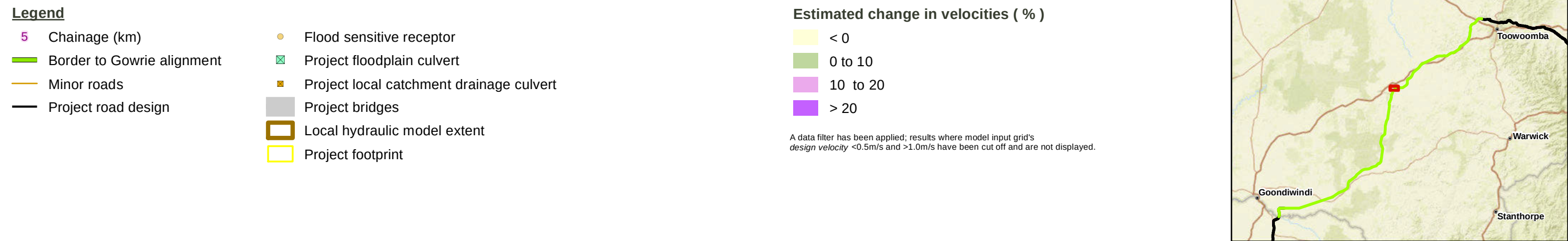
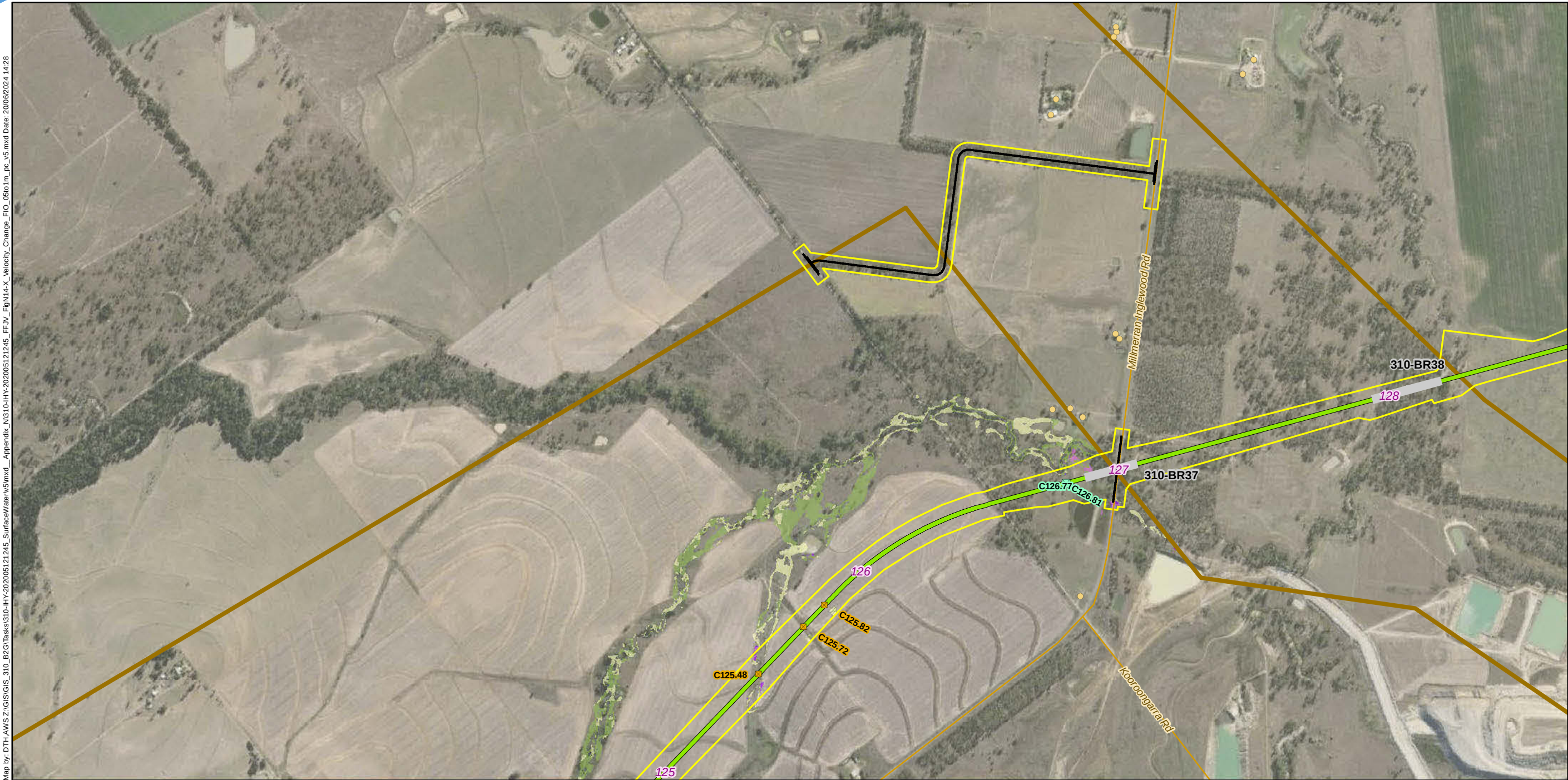


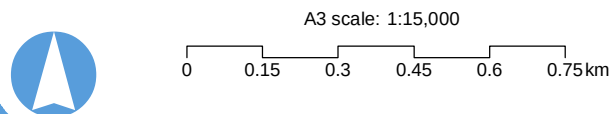
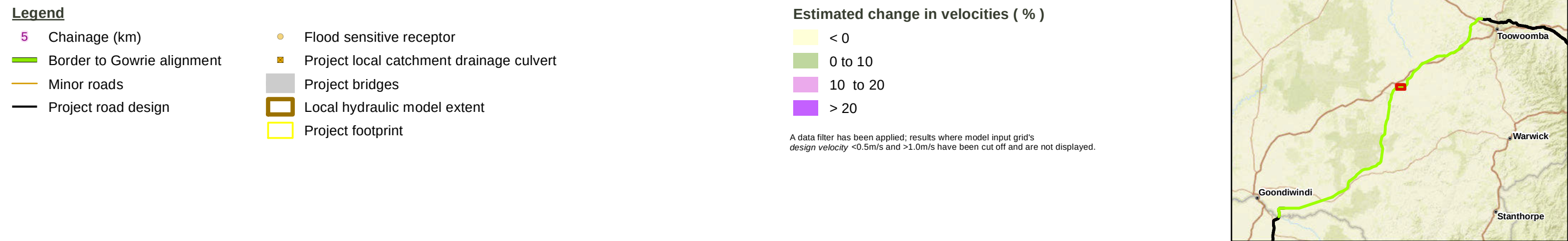


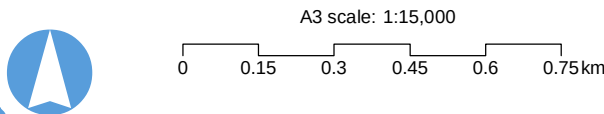
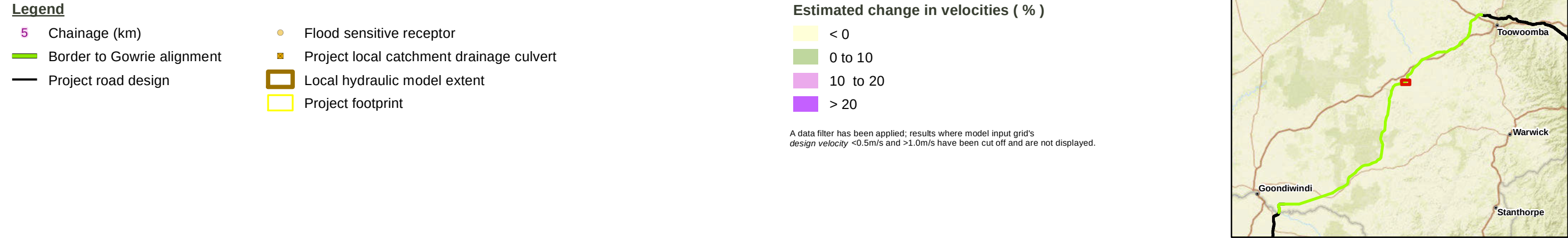
A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km











- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <0.5m/s and >1.0m/s have been cut off and are not displayed.

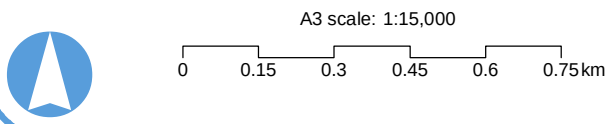
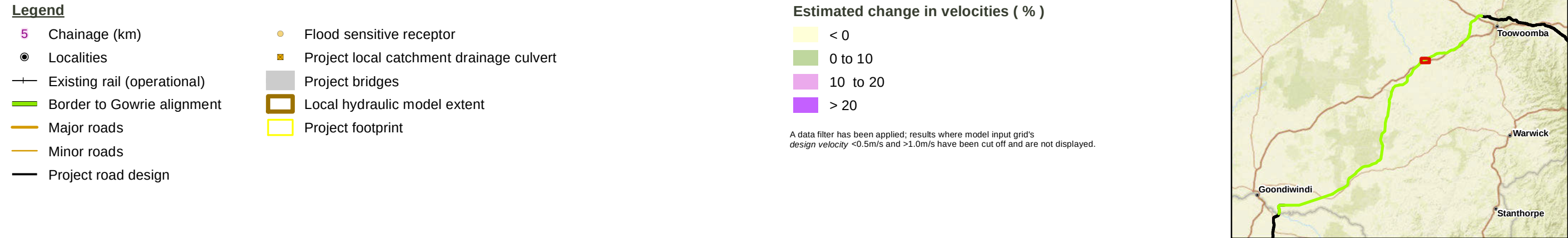


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N14 - page 35 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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

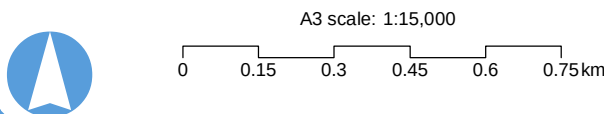
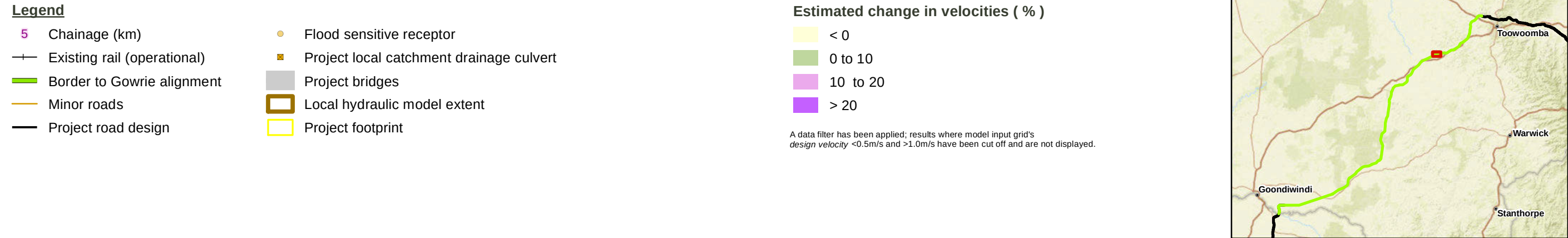


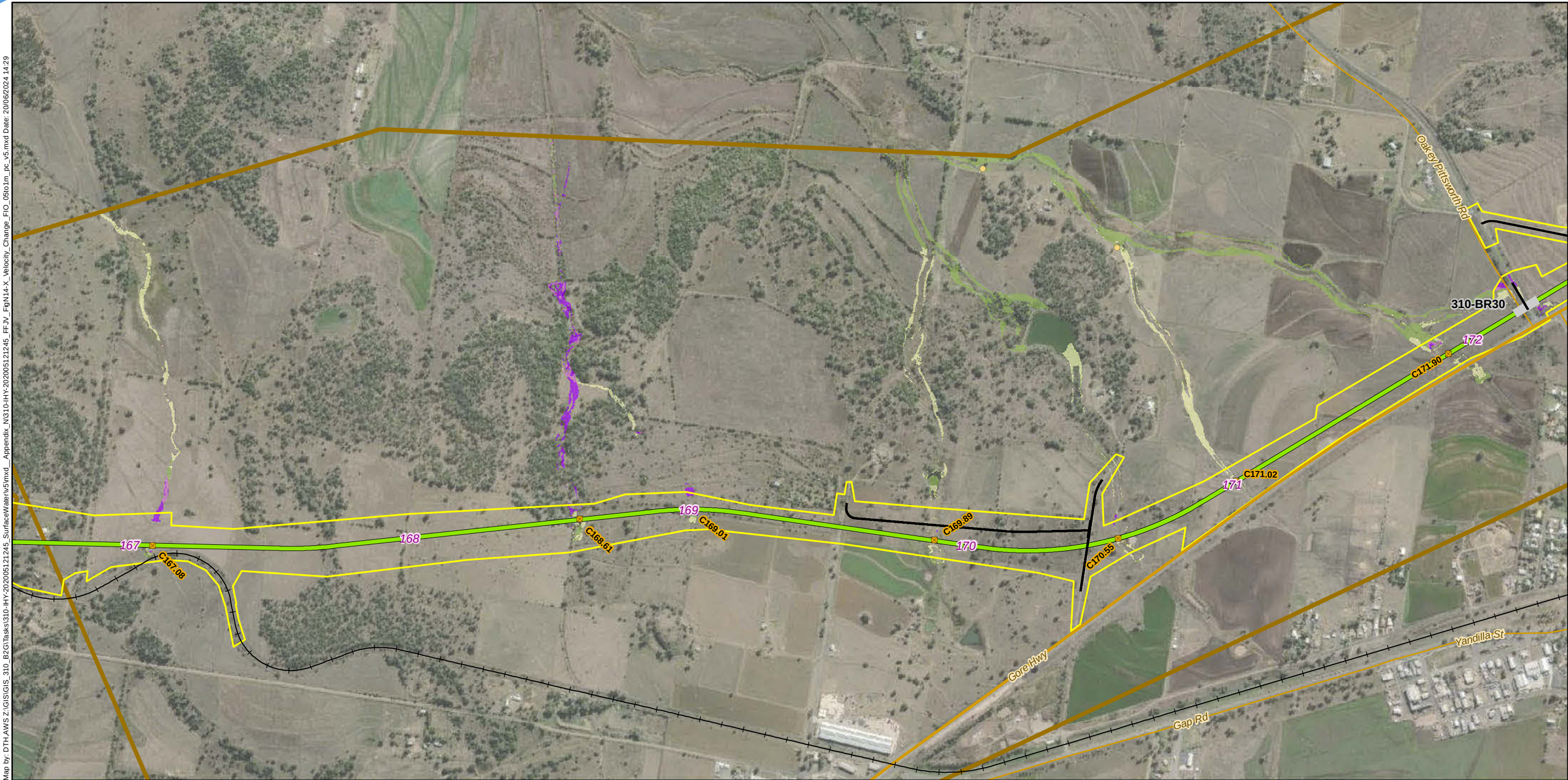
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 37 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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

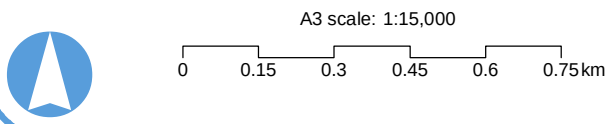
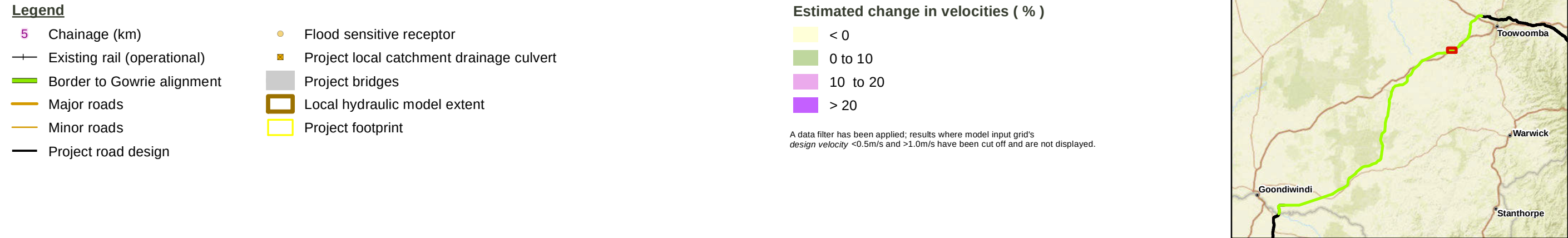


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 39 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





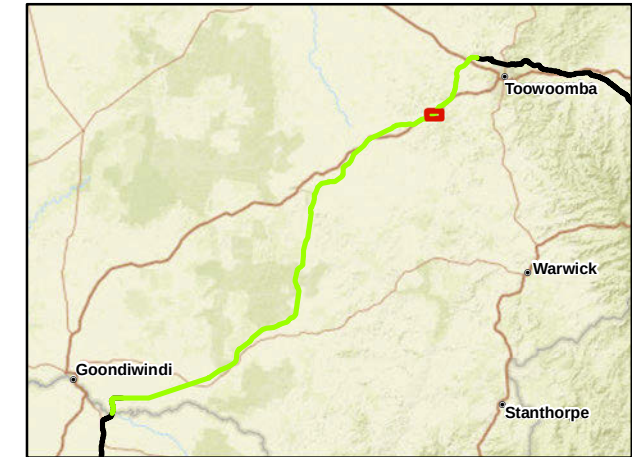
Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



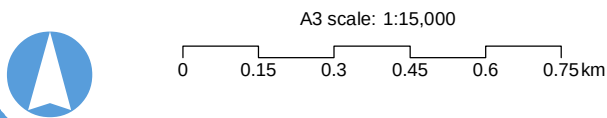
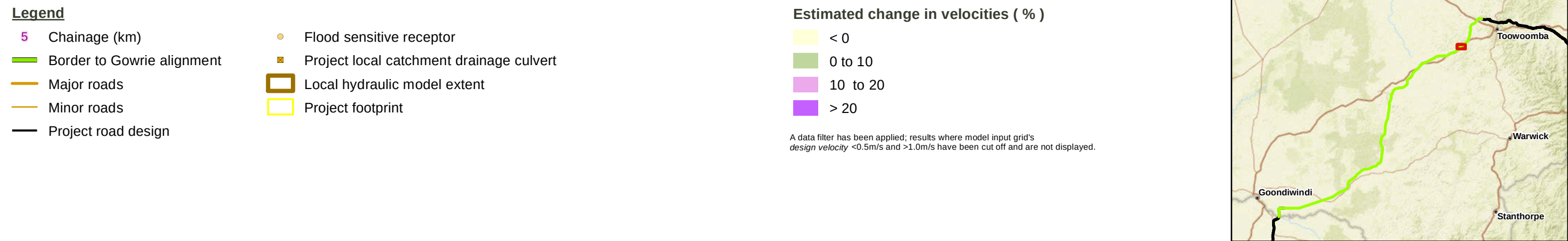
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 41 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



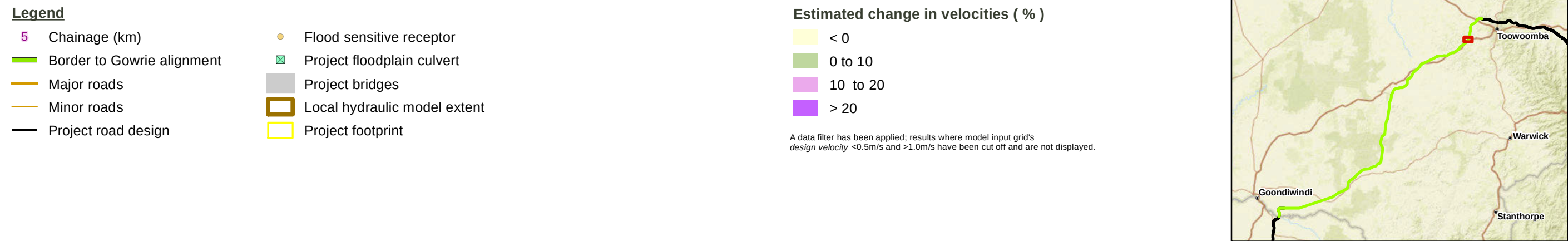
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 43 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



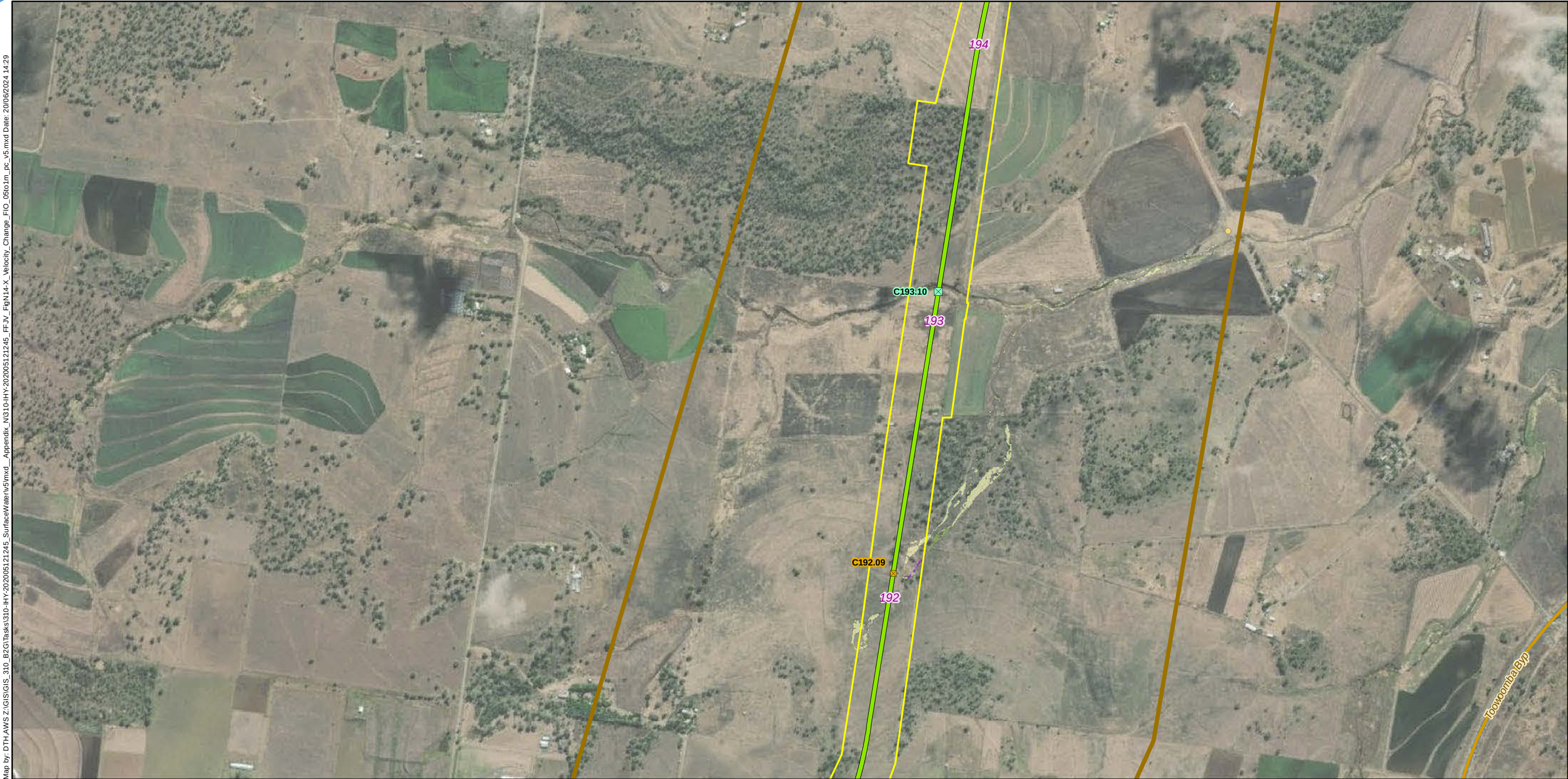
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 44 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 45 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <0.5m/s and >1.0m/s have been cut off and are not displayed.

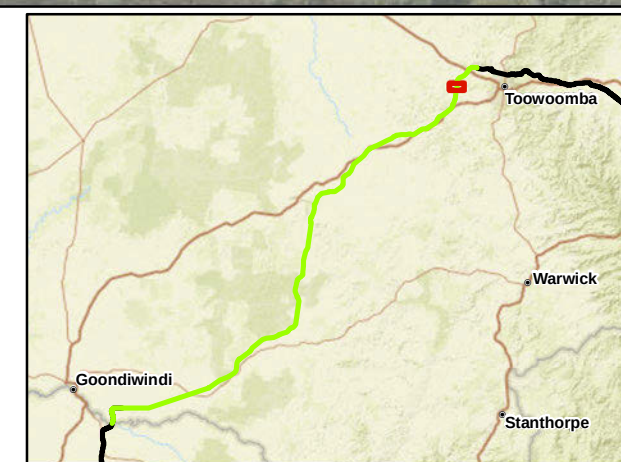
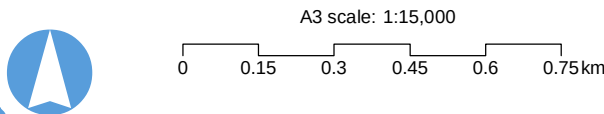
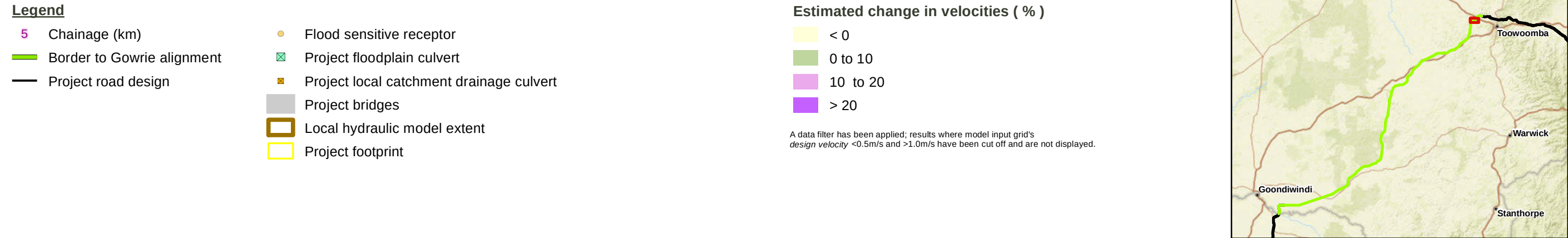
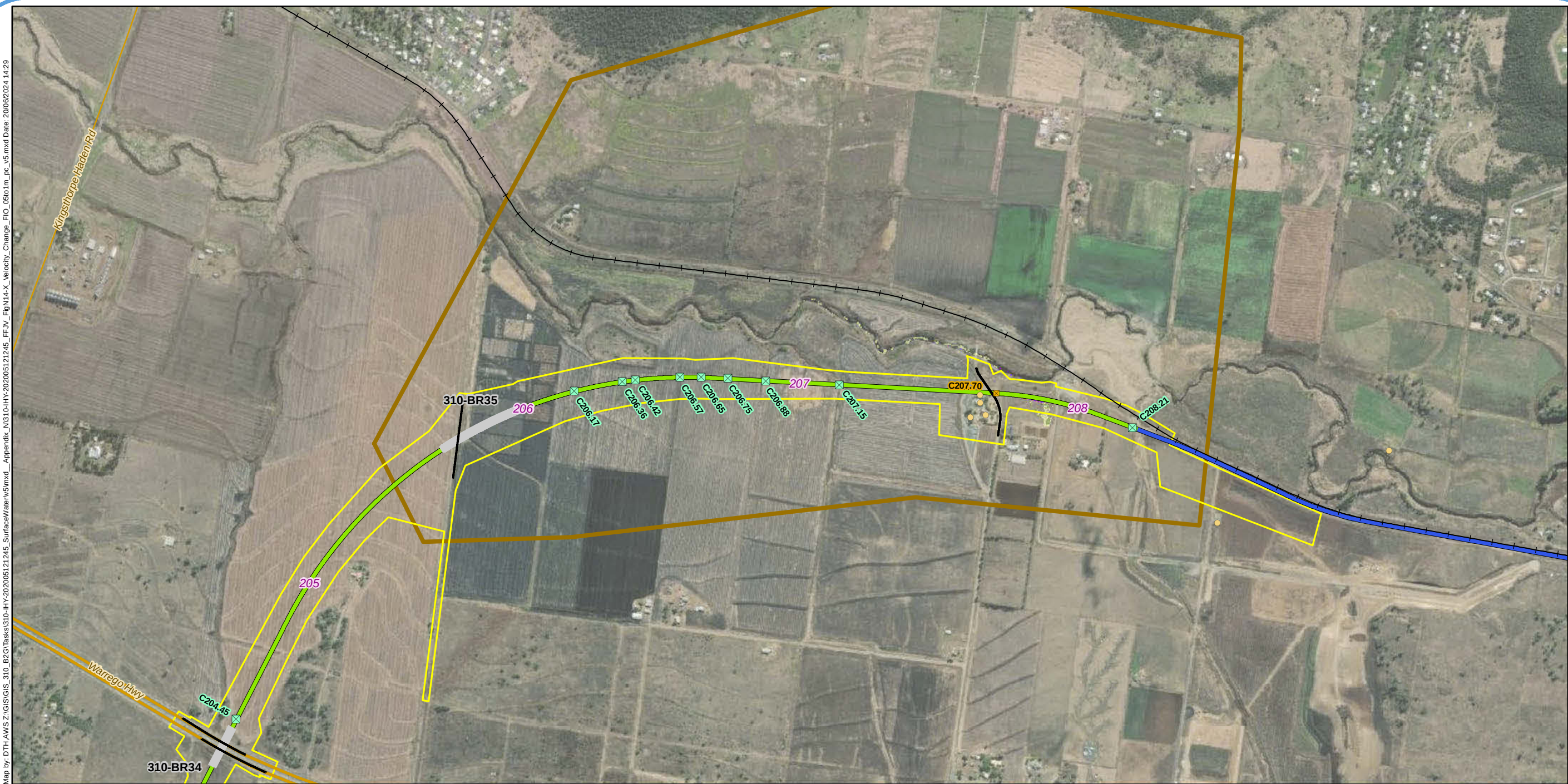


Figure N14 - page 46 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)





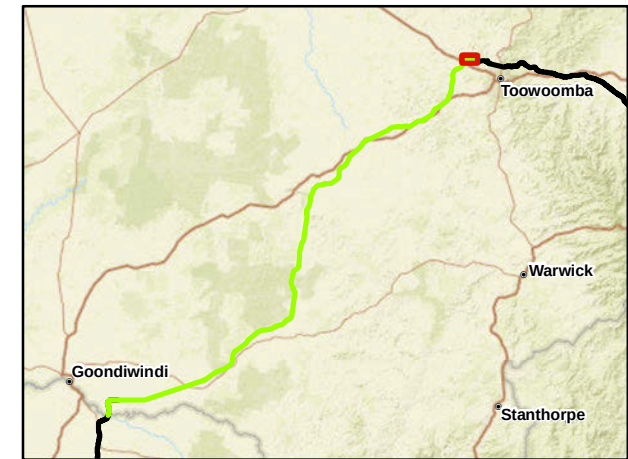
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <0.5m/s and >1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N14 - page 48 of 48:
1% AEP Event - Local Catchments - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:30



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 1 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_B2\Tasks\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:30



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 2 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

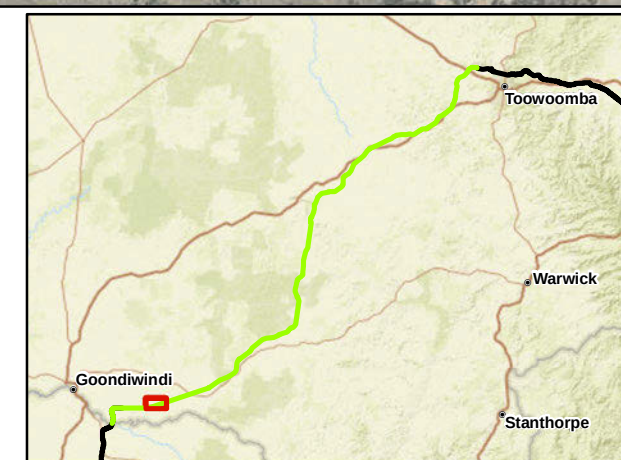


- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:20,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N15 - page 3 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



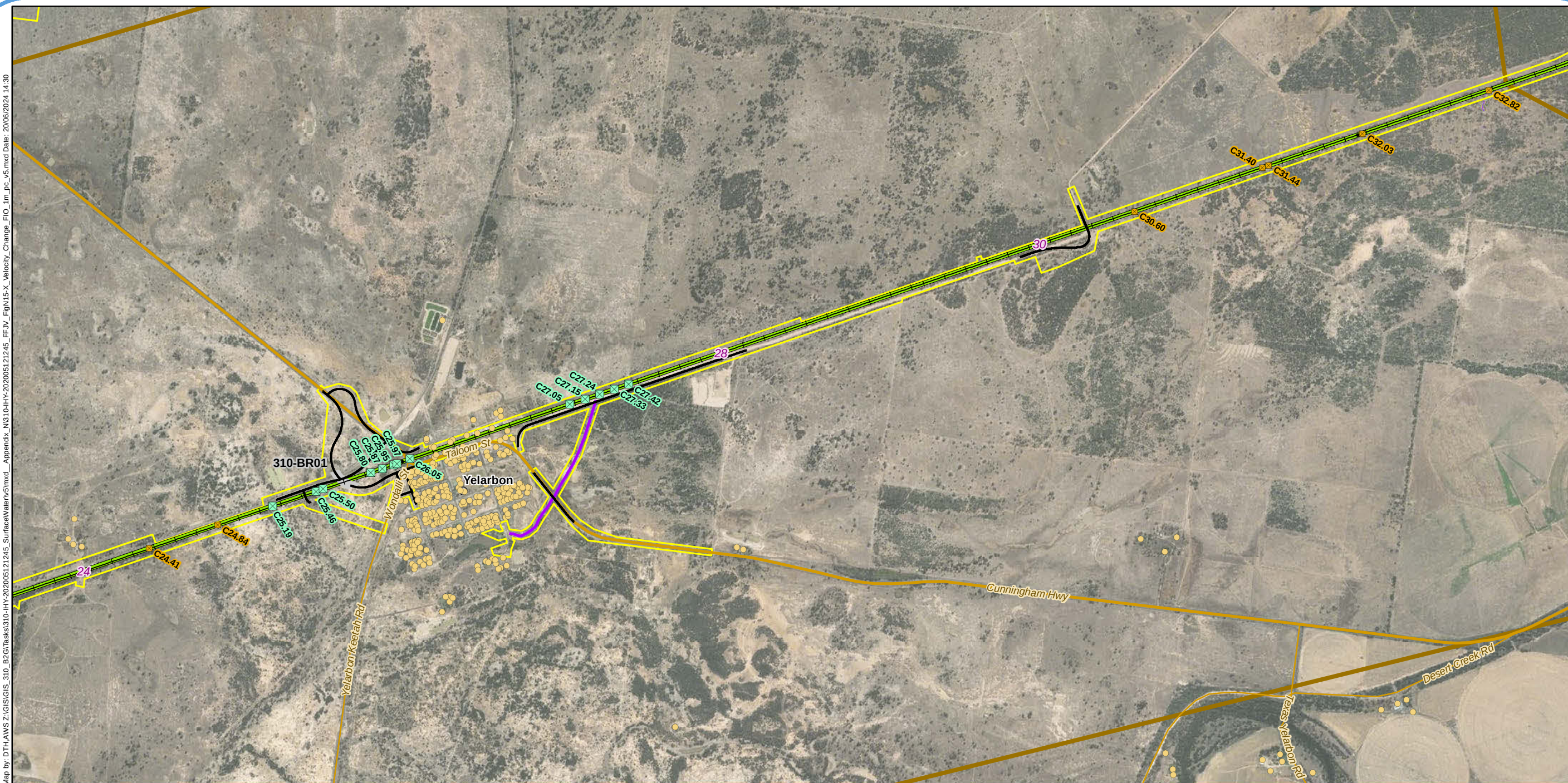
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 4 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:30



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

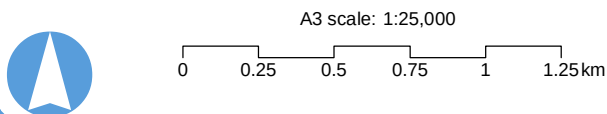
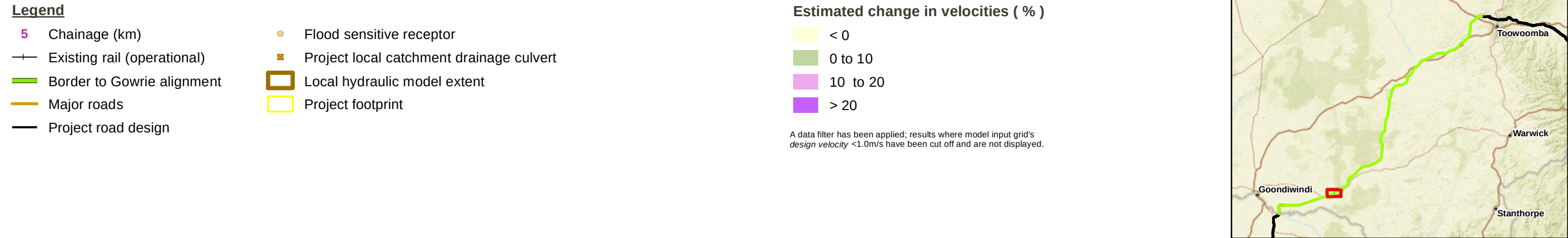


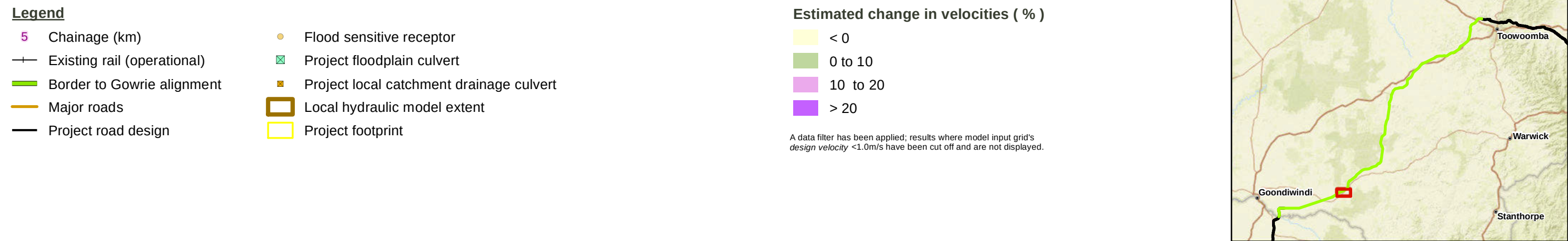
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 5 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 7 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

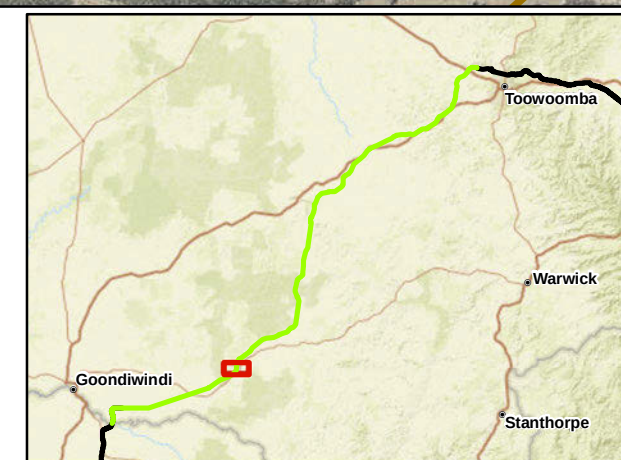
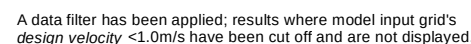


Figure N15 - page 8 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

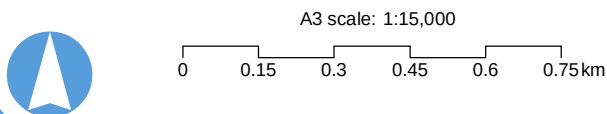
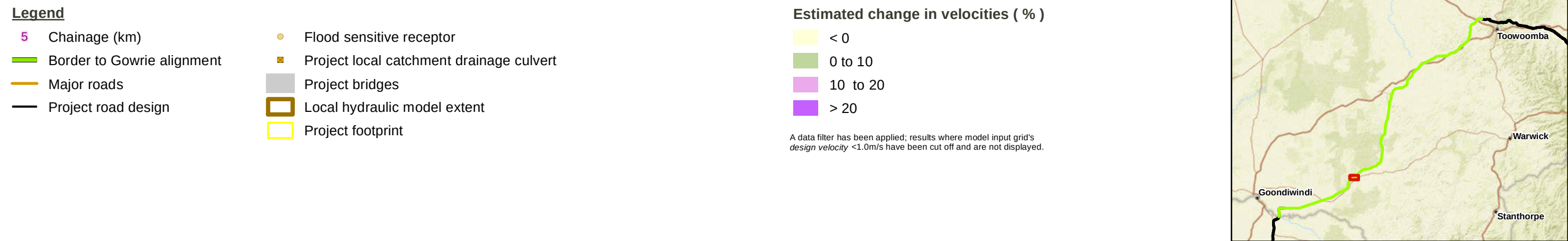
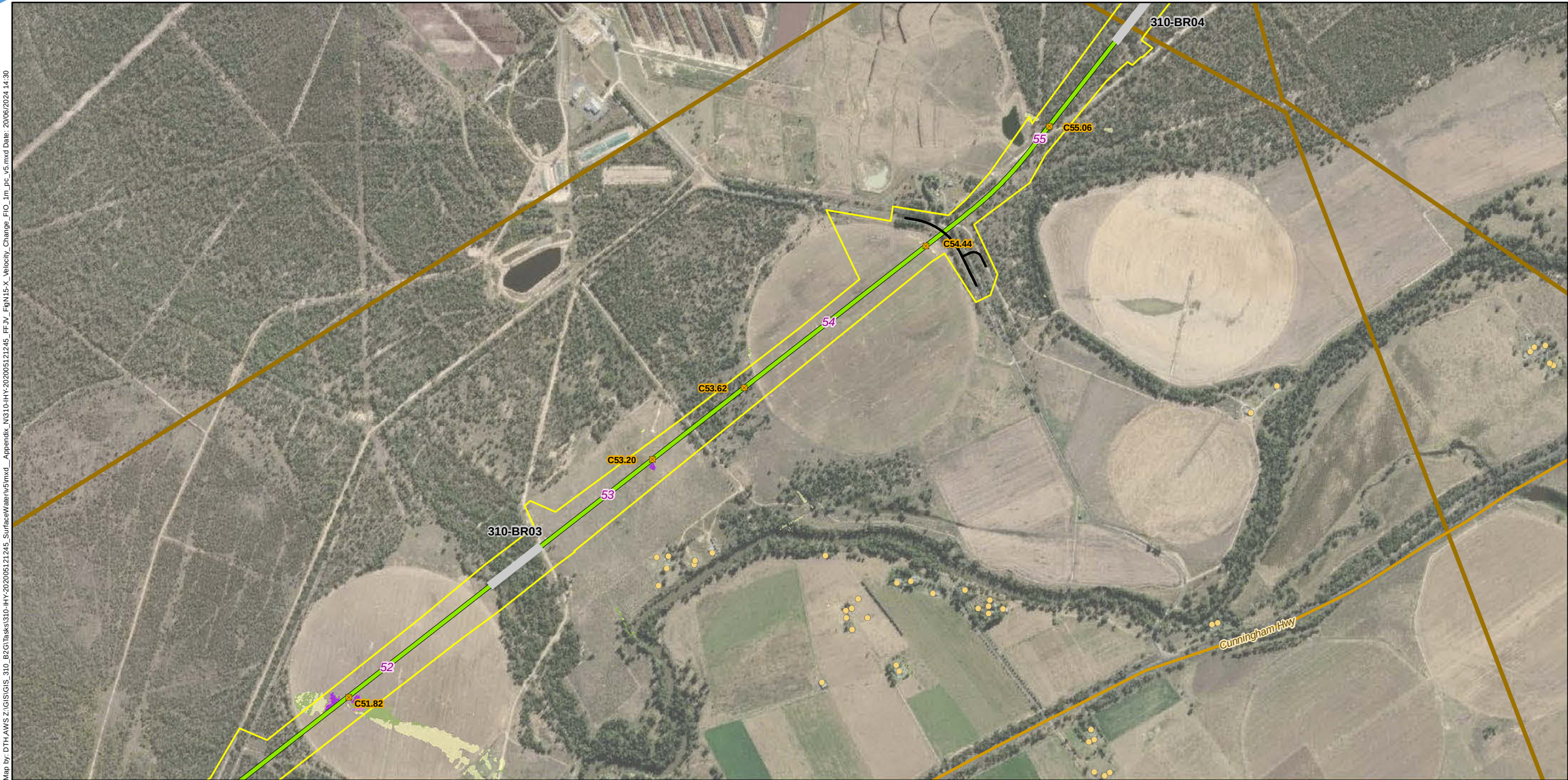
A map showing the proposed route from Toowoomba to Stanthorpe. The route is highlighted in green, starting from Toowoomba in the north, heading south, then turning east and then south again, ending near Stanthorpe. A red square icon is placed on the route between Goondiwindi and Stanthorpe. Other towns labeled include Toowoomba, Warwick, and Stanthorpe. The map also shows major roads and geographical features like rivers and hills.



Border to Gowrie

Figure N15 - page 9 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)





- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



Figure N15 - page 11 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



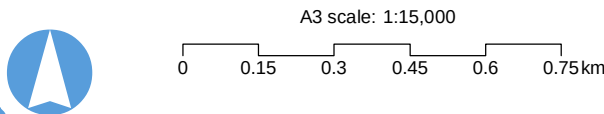
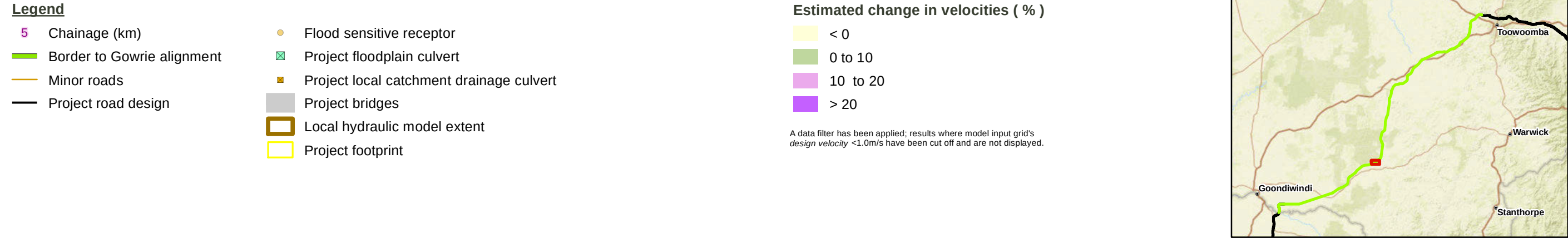
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

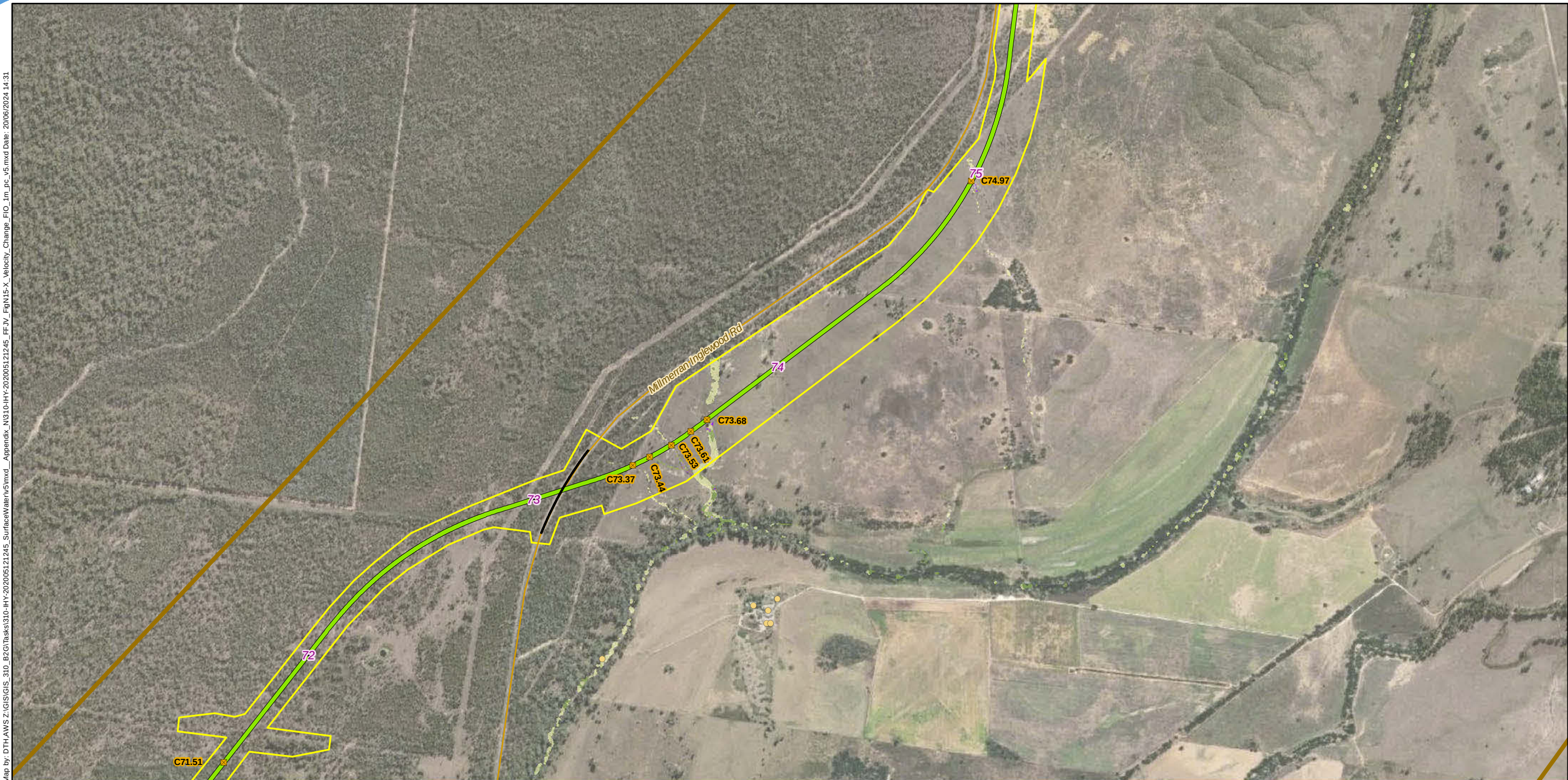
Border to Gowrie

Figure N15 - page 12 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:31



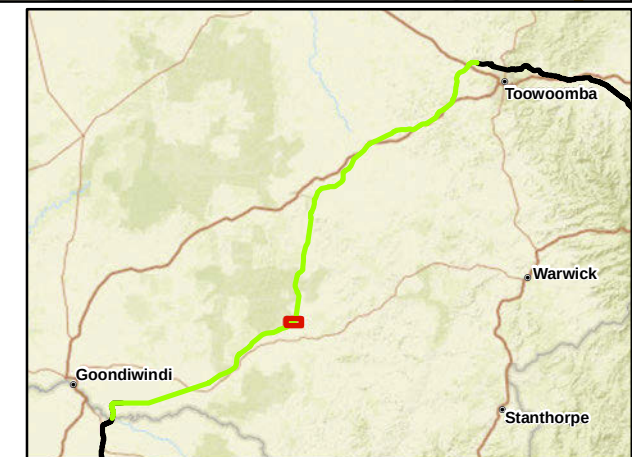
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 14 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

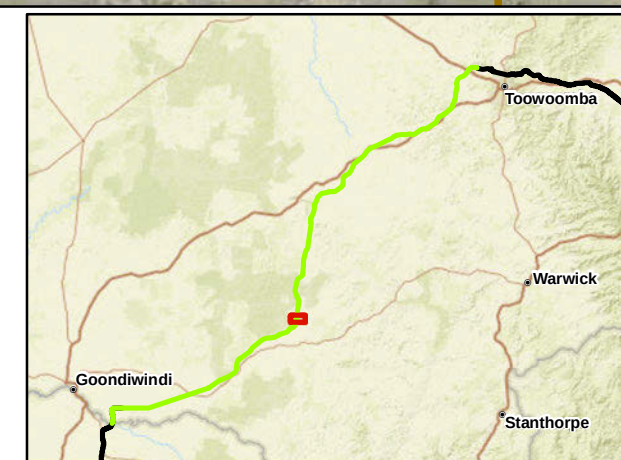
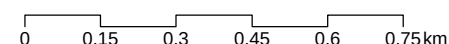


Figure N15 - page 15 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

A3 scale: 1:15.000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56



- Estimated change in velocities (%)**

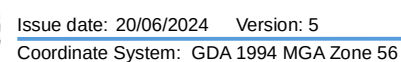
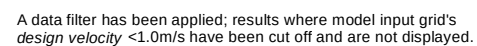


Figure N15 - page 16 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vnxmxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:31



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 17 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



5 Chainage (km)

Border to Gowrie alignment

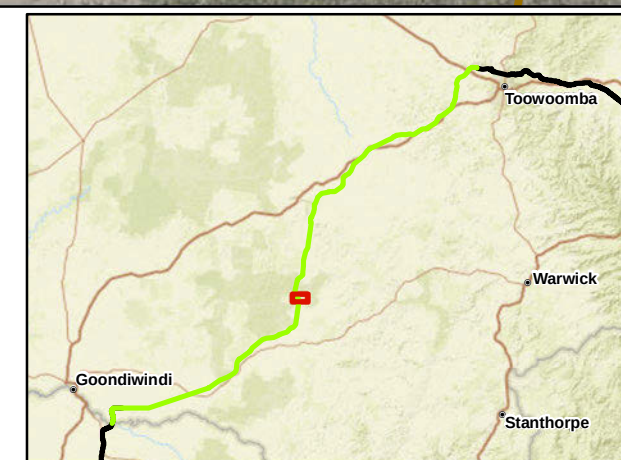
Minor roads

Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

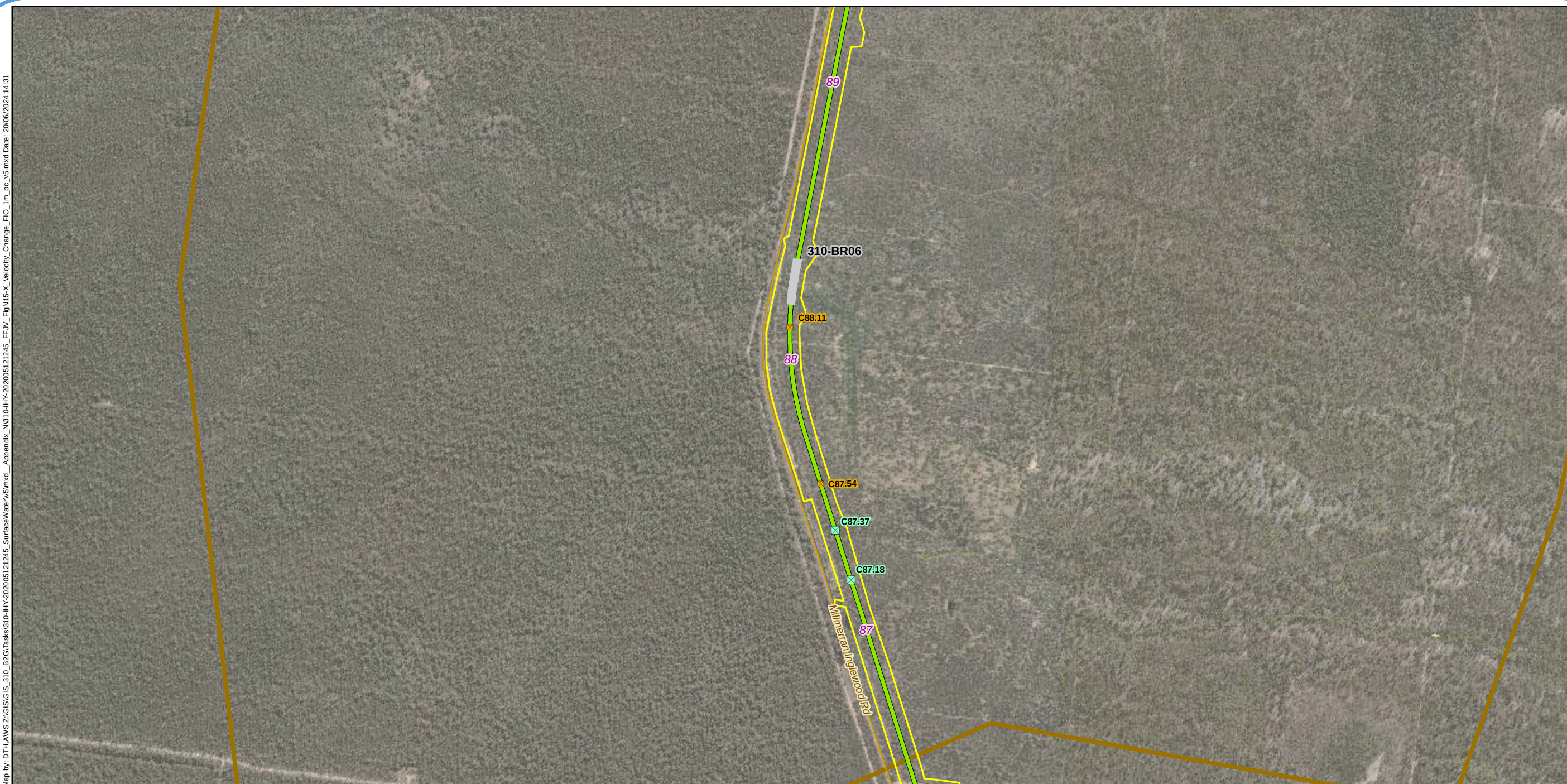


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N15 - page 18 of 48:

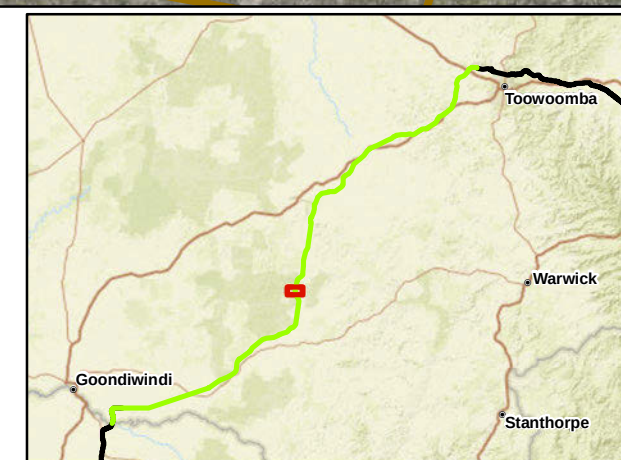
1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



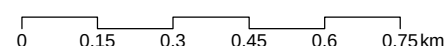
5	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Minor roads		Project local catchment drainage culvert
	Project road design		Project bridges
			Local hydraulic model extent
			Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N15 - page 19 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

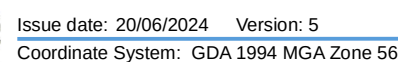


Figure N15 - page 20 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:31



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 21 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

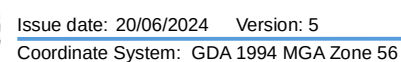


Figure N15 - page 22 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_IV310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:31



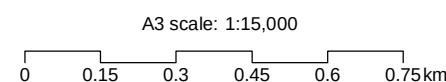
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.





- Estimated change in velocities (%)**

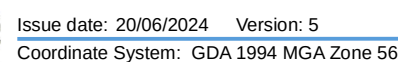
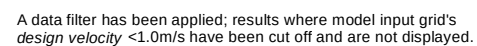


Figure N15 - page 24 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

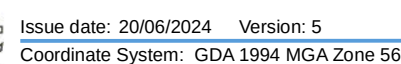
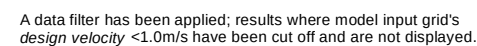


Figure N15 - page 25 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



 Chainage (km)
 Flood sensitive receptor

 Border to Gowrie alignment
 Project local catchment drainage culvert

 Minor roads
 Local hydraulic model extent

 Project road design
 Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The terrain is depicted with green and brown shading, and a network of roads is shown in red and black lines.



Border to Gowrie

Figure N15 - page 26 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:32



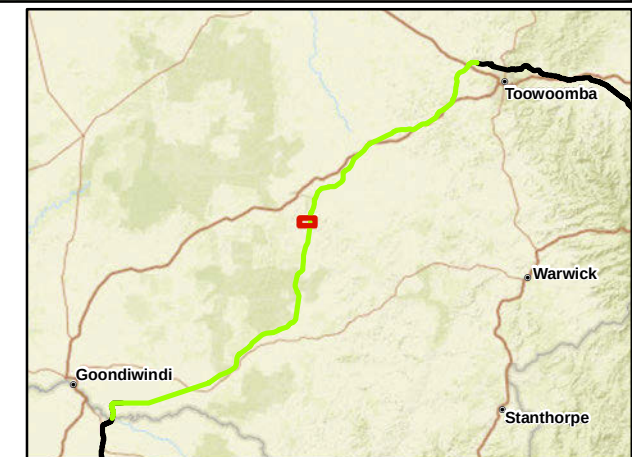
Legend

- | | |
|----------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| Border to Gowrie alignment | ■ Project local catchment drainage culvert |
| Minor roads | Local hydraulic model extent |
| Project road design | Project footprint |

Estimated change in velocities (%)

- | |
|----------|
| < 0 |
| 0 to 10 |
| 10 to 20 |
| > 20 |

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 27 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:32



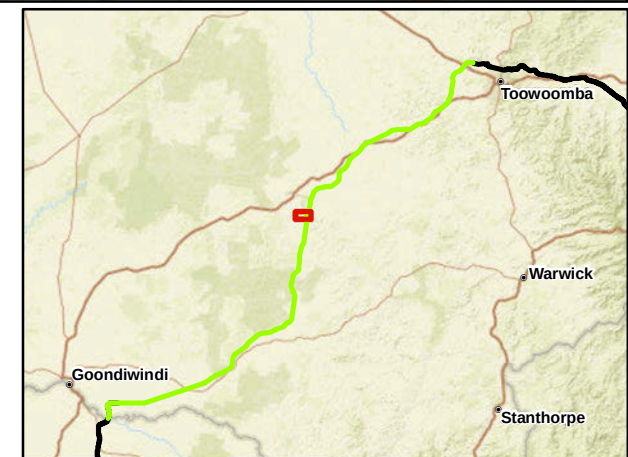
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 28 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

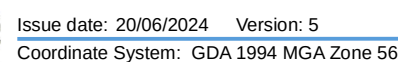
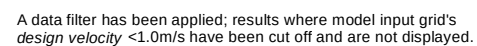
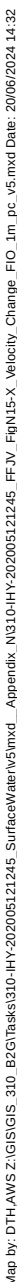


Figure N15 - page 29 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



■ Chainage (km)
■ Border to Gowrie alignment
■ Minor roads
■ Project road design

● Flood sensitive receptor
■ Project local catchment drainage culvert
 Local hydraulic model extent
 Project footprint

	< 0
	0 to 10
	10 to 20
	> 20

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

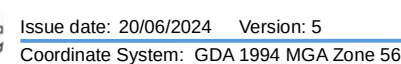
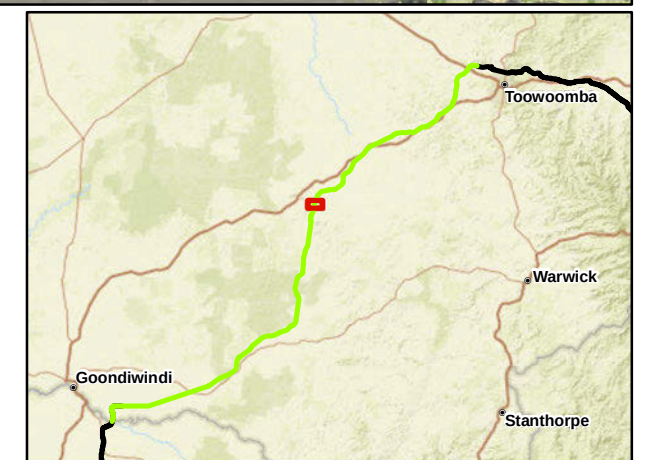
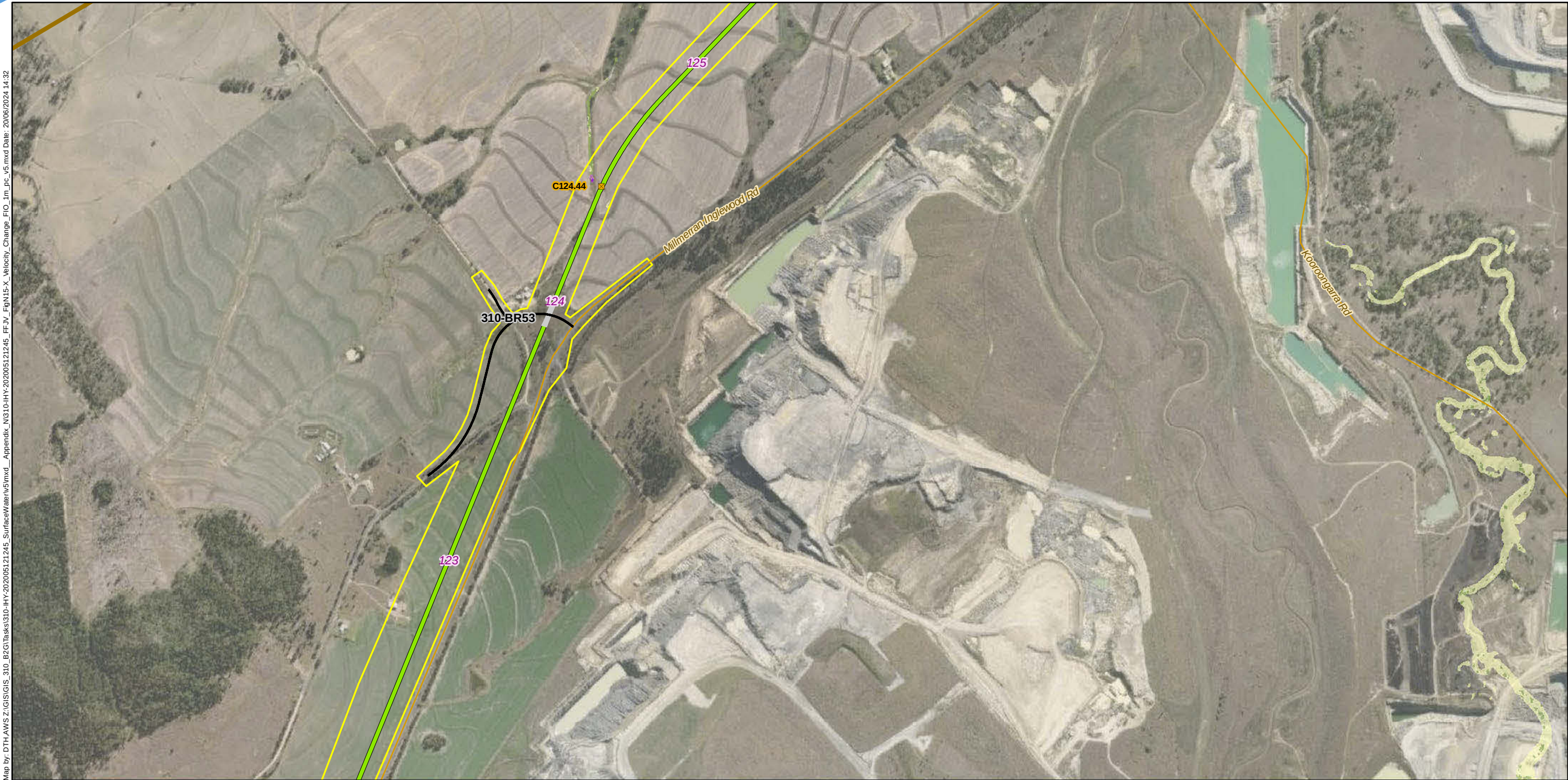


Figure N15 - page 30 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:32



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 31 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

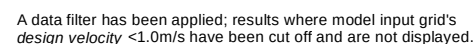
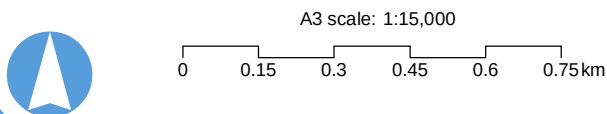
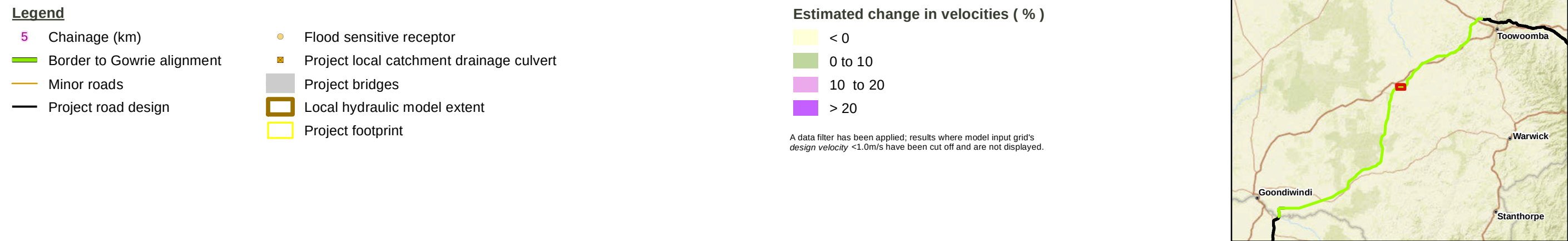


Figure N15 - page 32 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:32



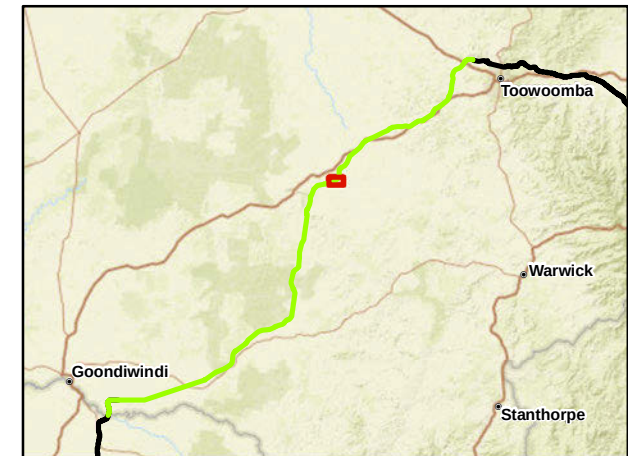
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



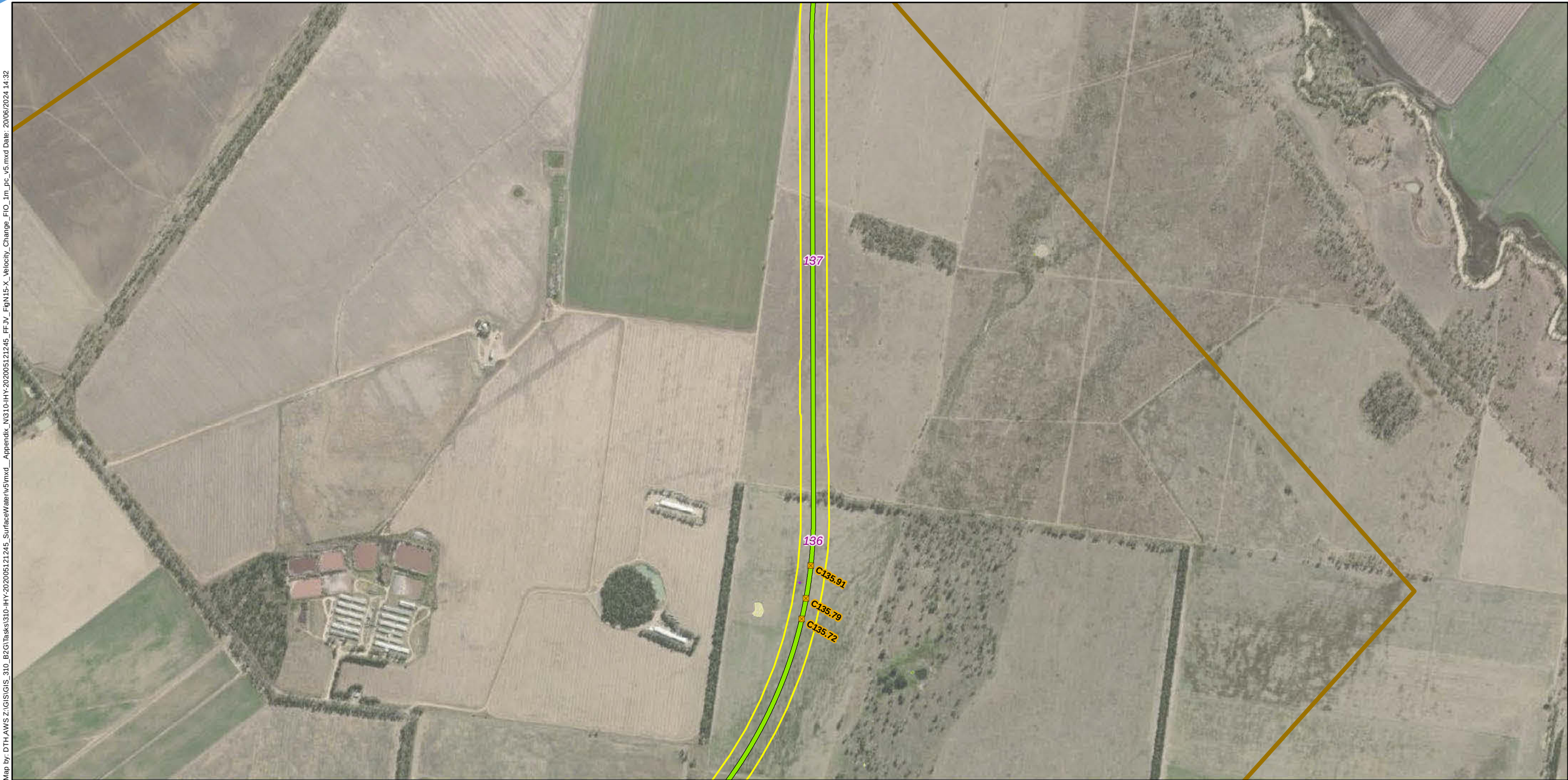
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 34 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:32



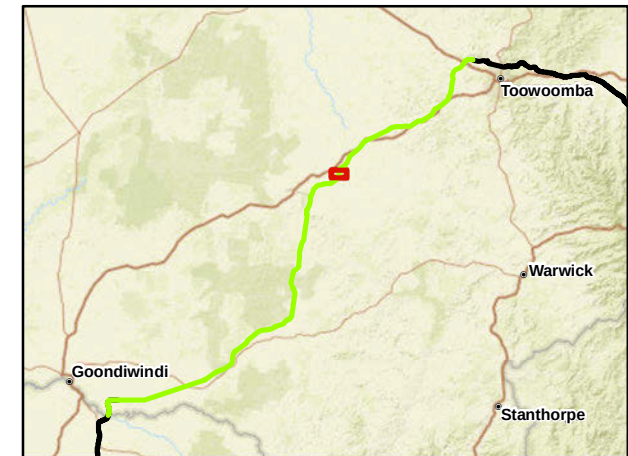
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

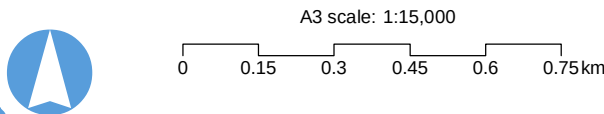
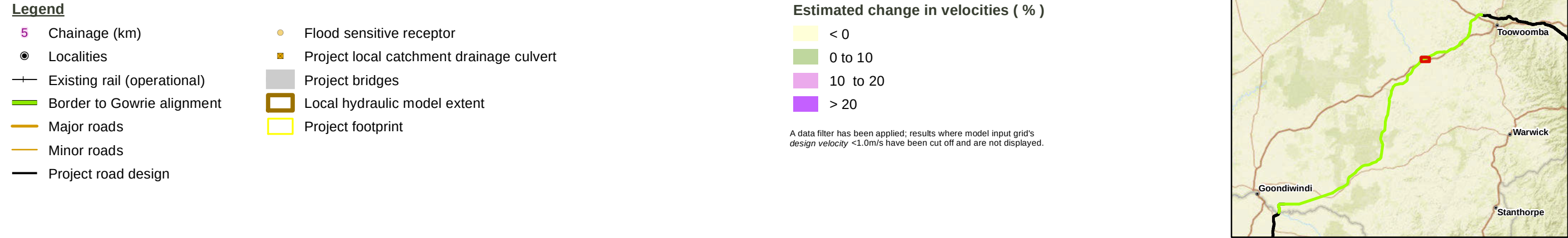


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 35 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



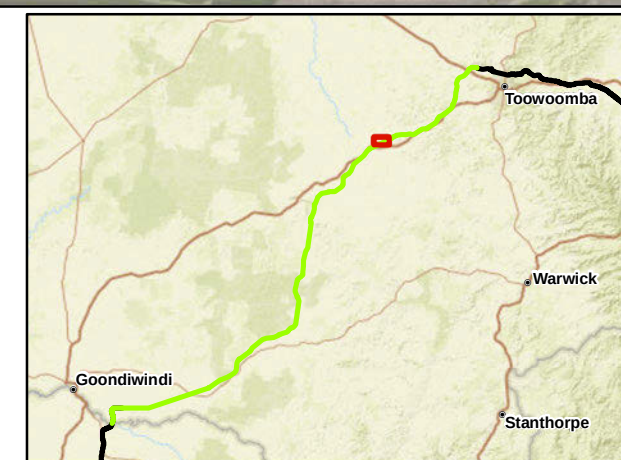


- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design

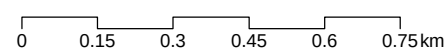
- Estimated change in velocities (%)**

- | | |
|---|----------|
|  | < 0 |
|  | 0 to 10 |
|  | 10 to 20 |
|  | > 20 |

A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.



A3 scale: 1:15,000



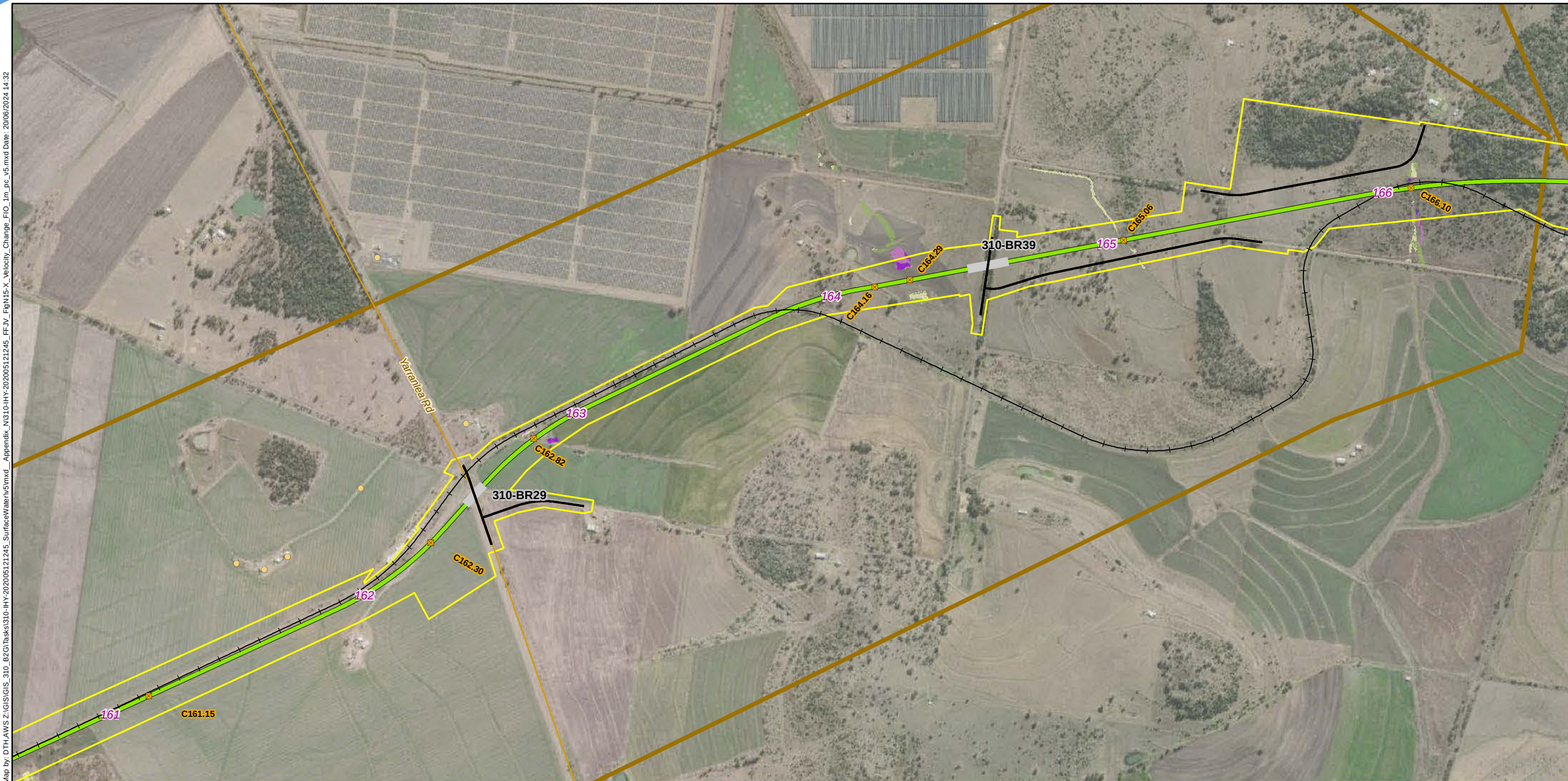
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N15 - page 37 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_BR2\GIS\310-HY-202005121245_SurfaceWater\5mxd Appendix_N15\10-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:32



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 38 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

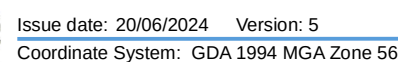
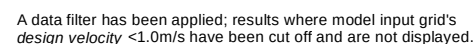


Figure N15 - page 39 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:32



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 40 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:33



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 41 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

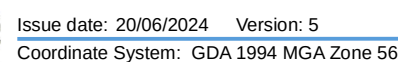
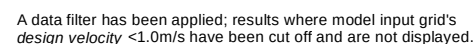


Figure N15 - page 42 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v6.mxd Date: 20/06/2024 14:33



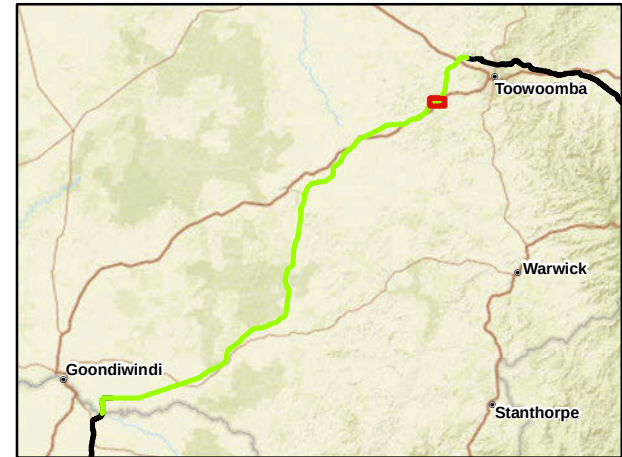
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 43 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_IV\310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:33



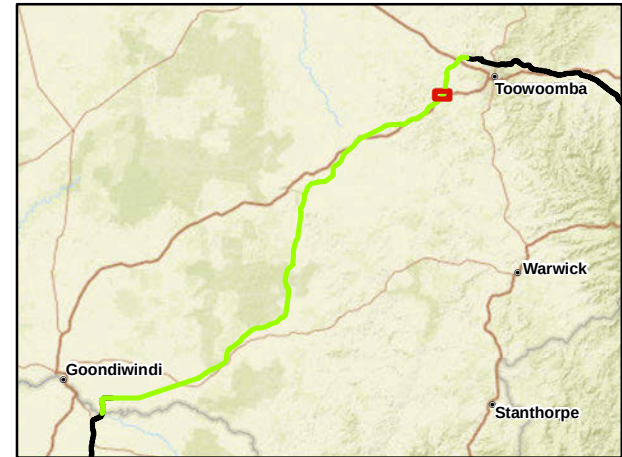
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

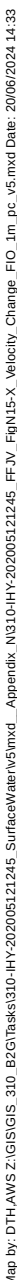


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 44 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



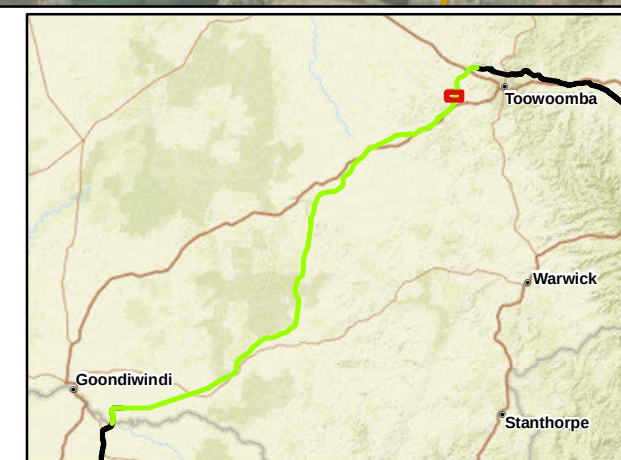
Legend

- ### Legend

Estimated change in velocities (%)

- Estimated change in velocities (%)**

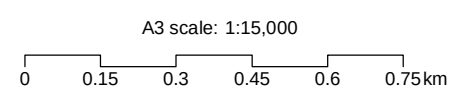
Estimated change in velocities (%)



A3 scale: 1:15,000



0 0.15 0.3 0.45 0.6 0.75km



Future Freight
Integrating Community, Environment and Engineering

Border to Gowrie

Figure N15 - page 45 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



- Estimated change in velocities (%)**

- A data filter has been applied; results where model input grid's *design velocity* <1.0m/s have been cut off and are not displayed.

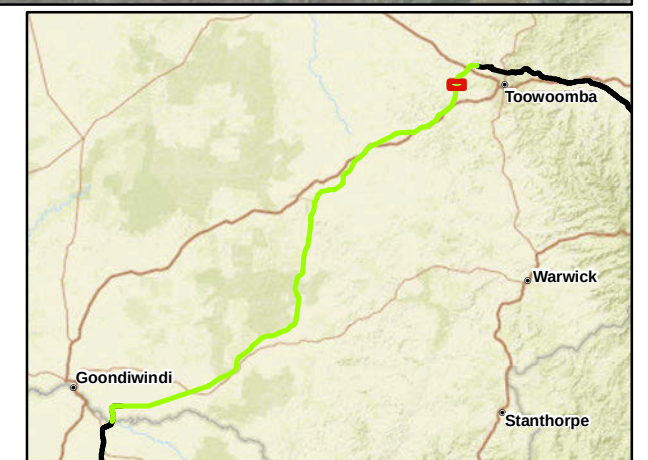


Figure N15 - page 46 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWaterV5.mxd Appendix_310-HY-202005121245_FF\JV_FigN15-X_Velocity_Change_FIO_1m_pc_v5.mxd Date: 20/06/2024 14:33



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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

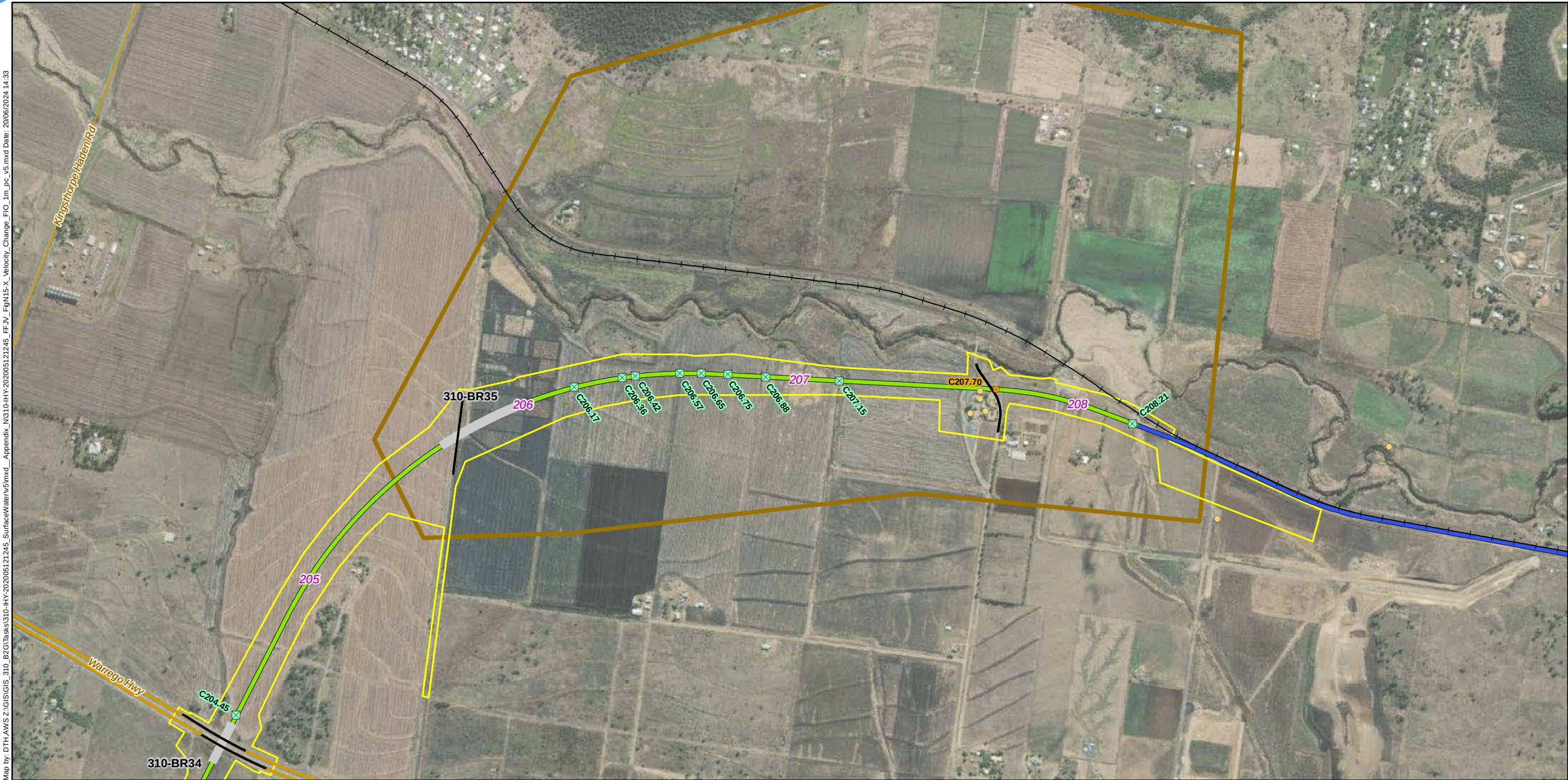


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 47 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocities (%)

- < 0
- 0 to 10
- 10 to 20
- > 20

A data filter has been applied; results where model input grid's design velocity <1.0m/s have been cut off and are not displayed.



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



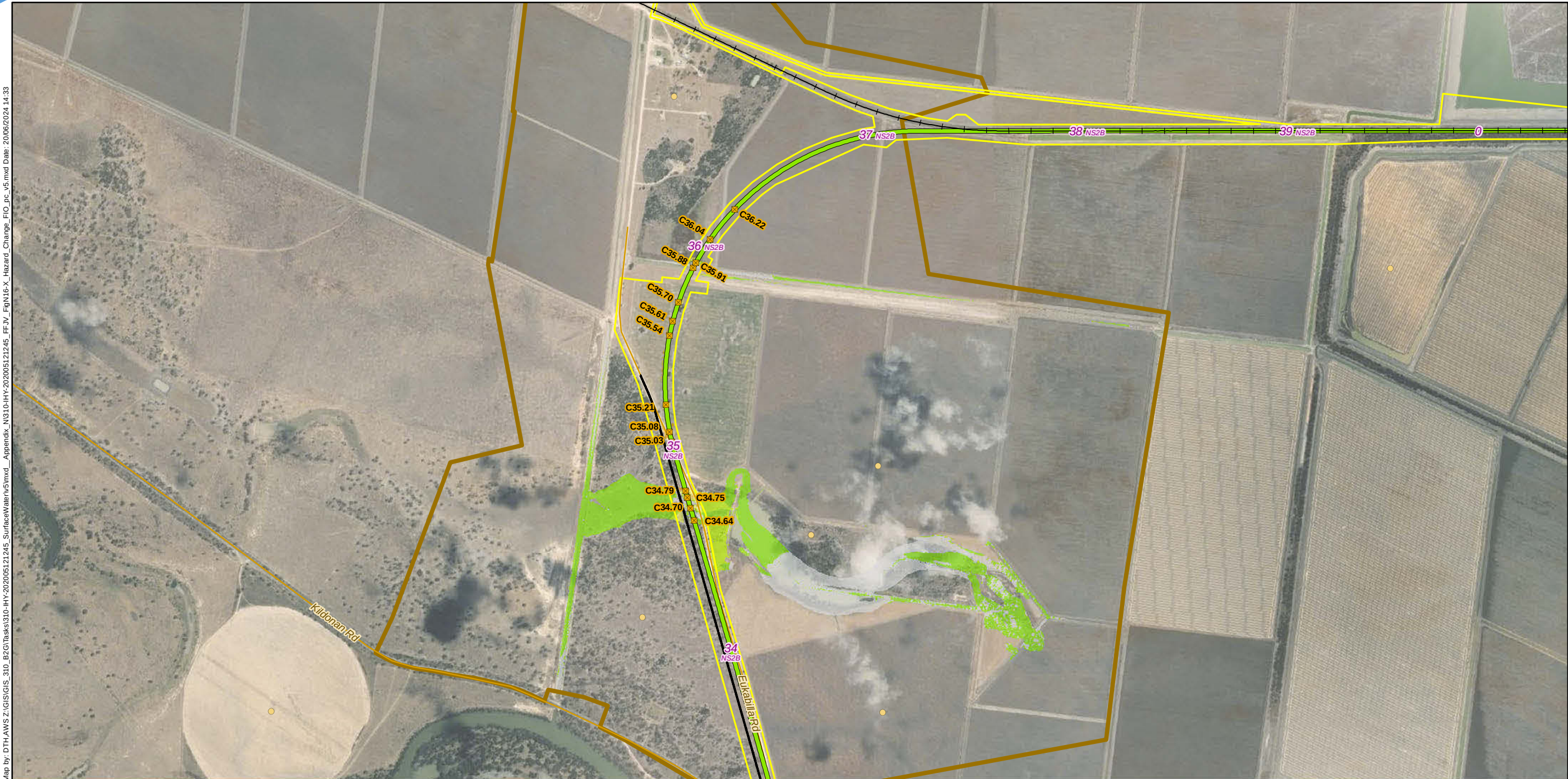
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N15 - page 48 of 48:

1% AEP Event - Local Catchments - Percentage Change in Velocity (<1.0m/s cutoff)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:33



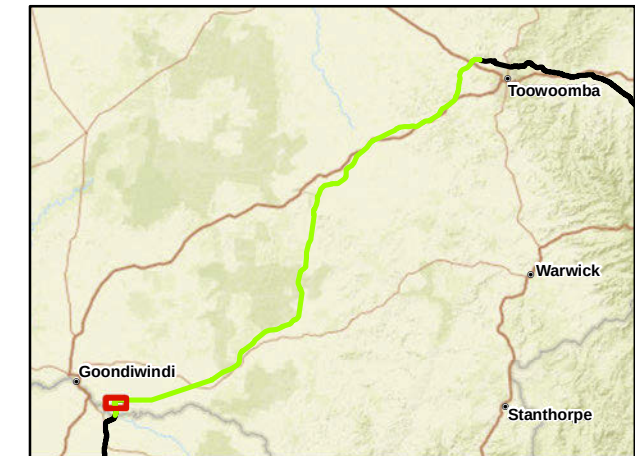
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 1 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



 Chainage (km)
 Flood sensitive receptor

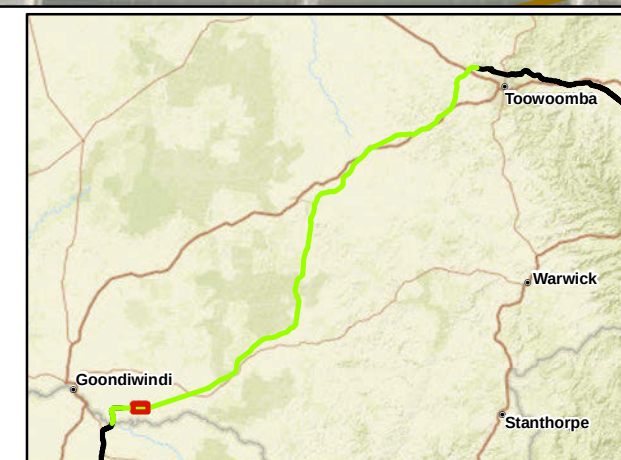
 Existing rail (operational)
 Project local catchment drainage culvert

 Border to Gowrie alignment
 Local hydraulic model extent

 Project road design
 Project footprint

■ < 0%
 ■ 0% to 10%
 ■ 10% to 20%
 ■ 20% to 50%
 ■ 50% to 100%
 ■ > 100%

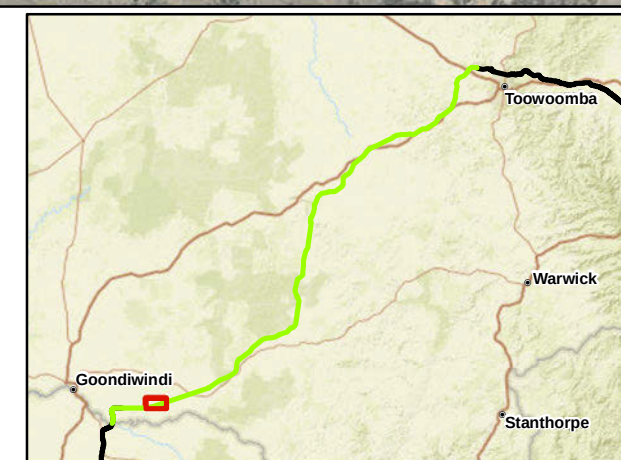
A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.





- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:20,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N16 - page 3 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:33



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



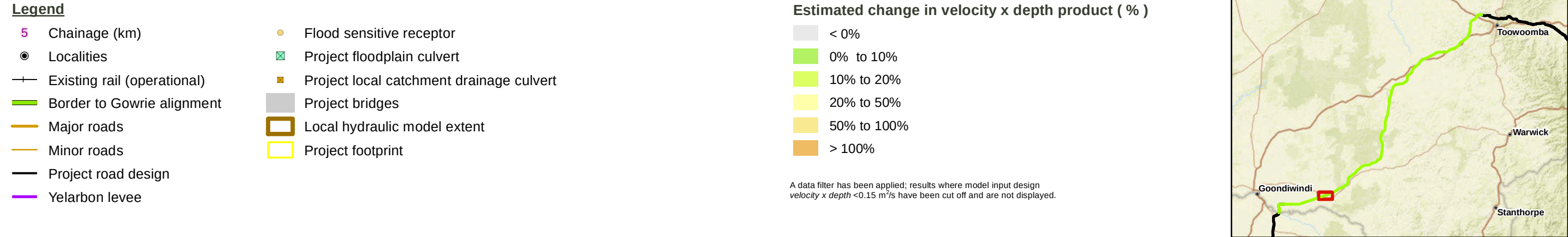
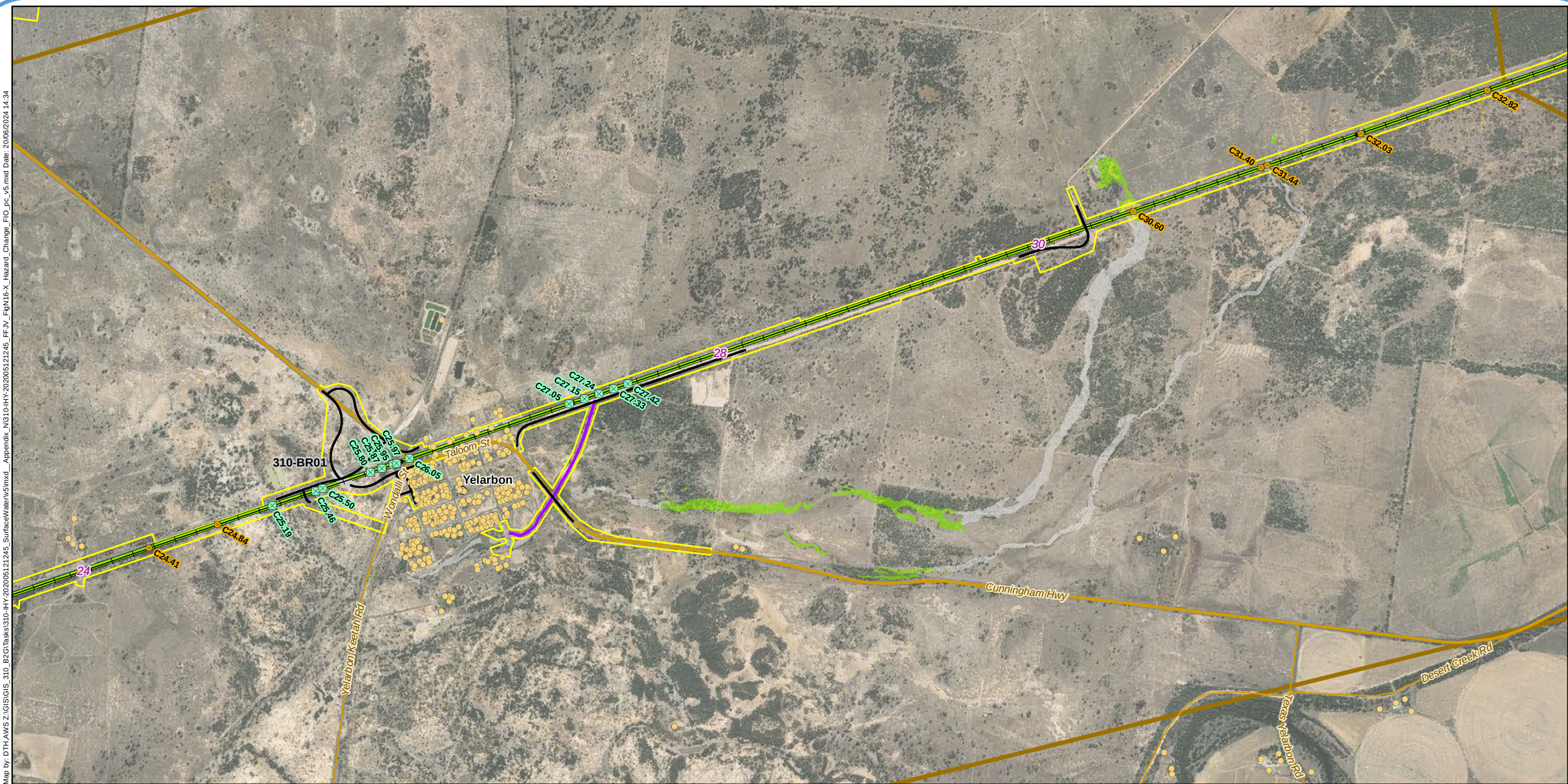
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 4 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



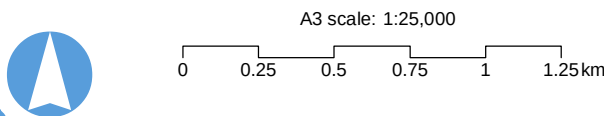
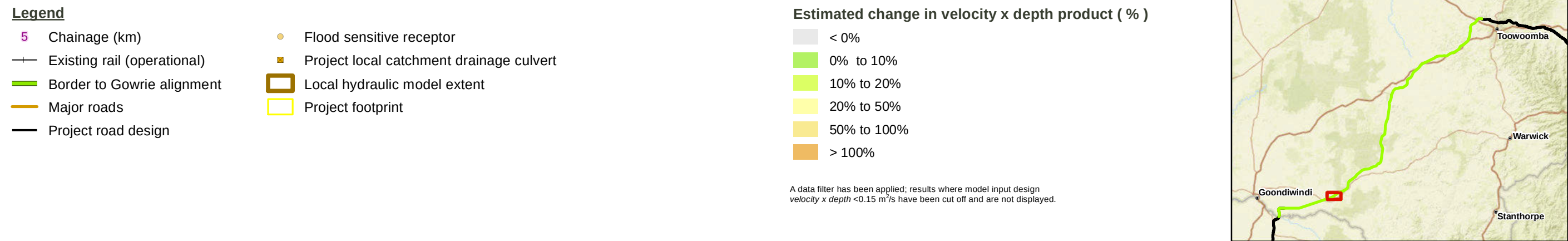
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 5 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

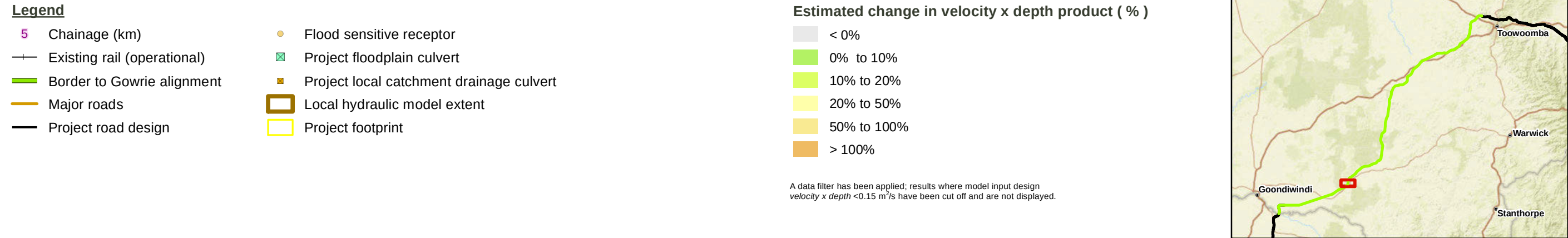


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 7 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 8 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.

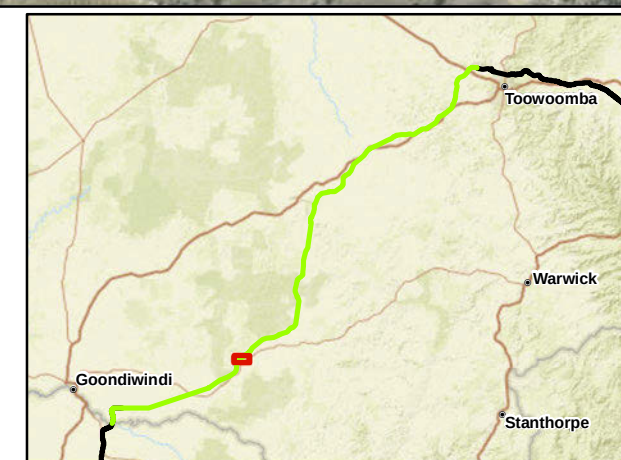


Figure N16 - page 9 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:34



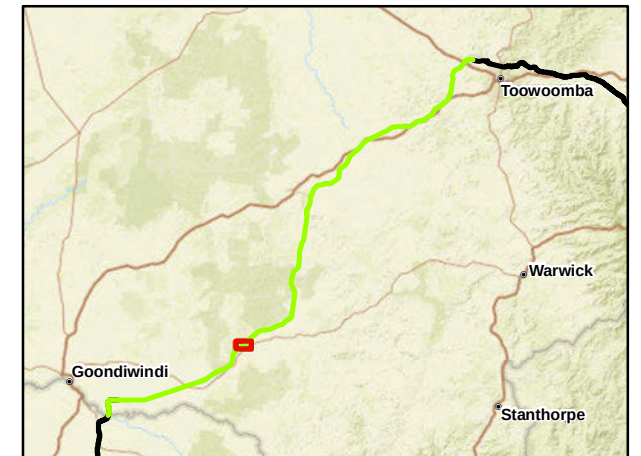
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 10 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

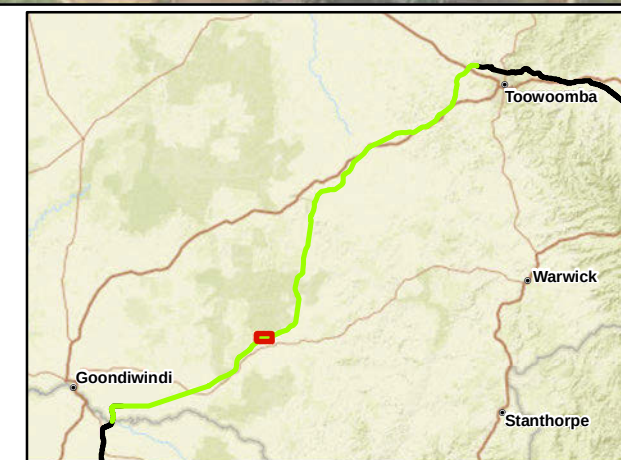


Figure N16 - page 11 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

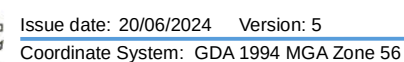


Figure N16 - page 12 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

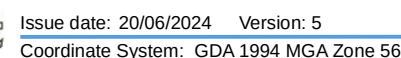
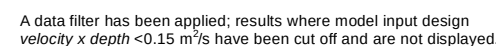


Figure N16 - page 13 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N16\16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:34



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 14 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

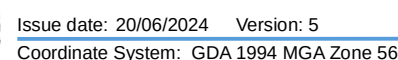


Figure N16 - page 15 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N16\16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:34



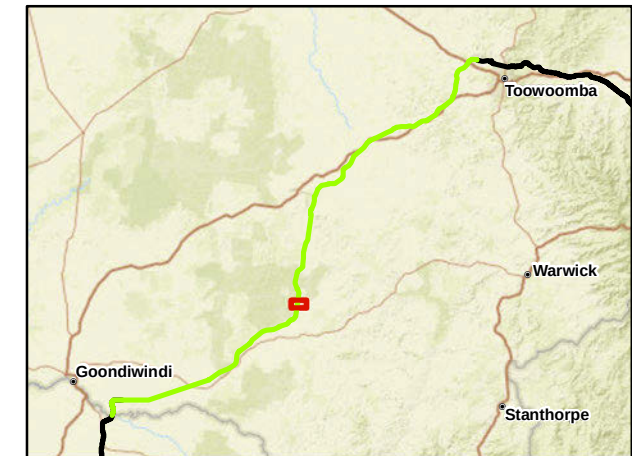
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 16 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:34



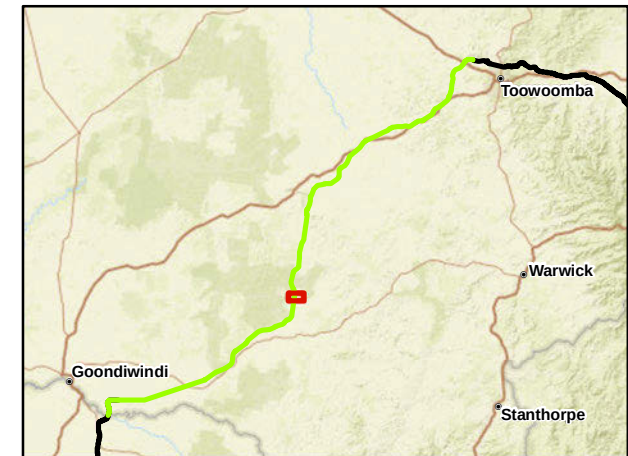
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

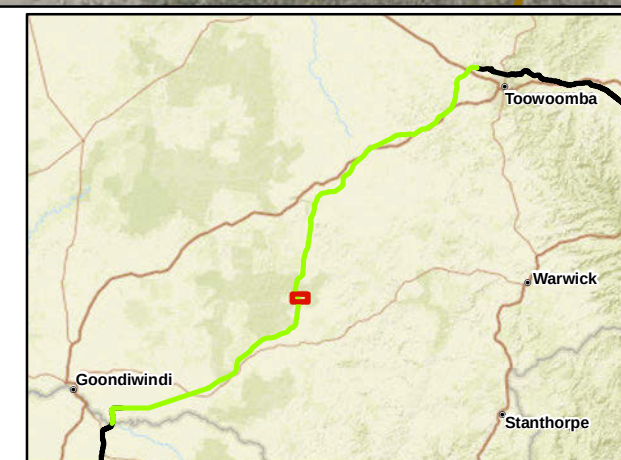
Border to Gowrie

Figure N16 - page 17 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

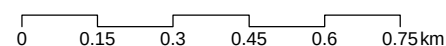


- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N16 - page 18 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.

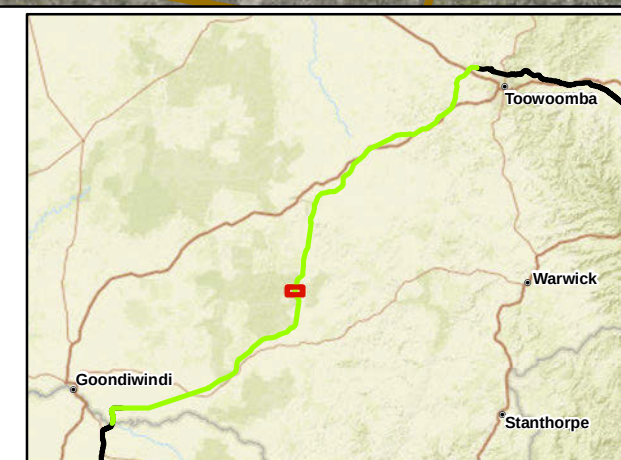


Figure N16 - page 19 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

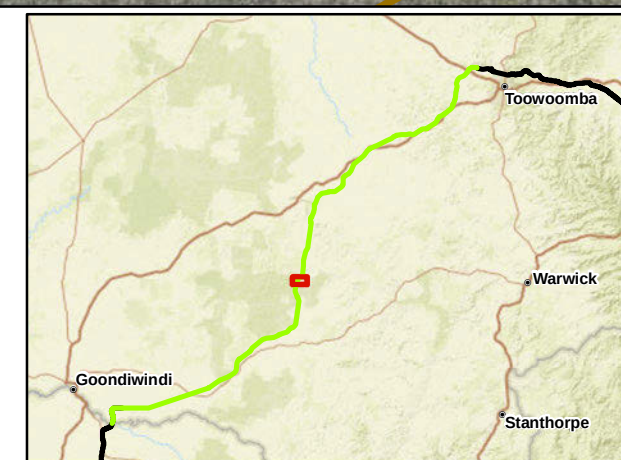


Figure N16 - page 20 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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

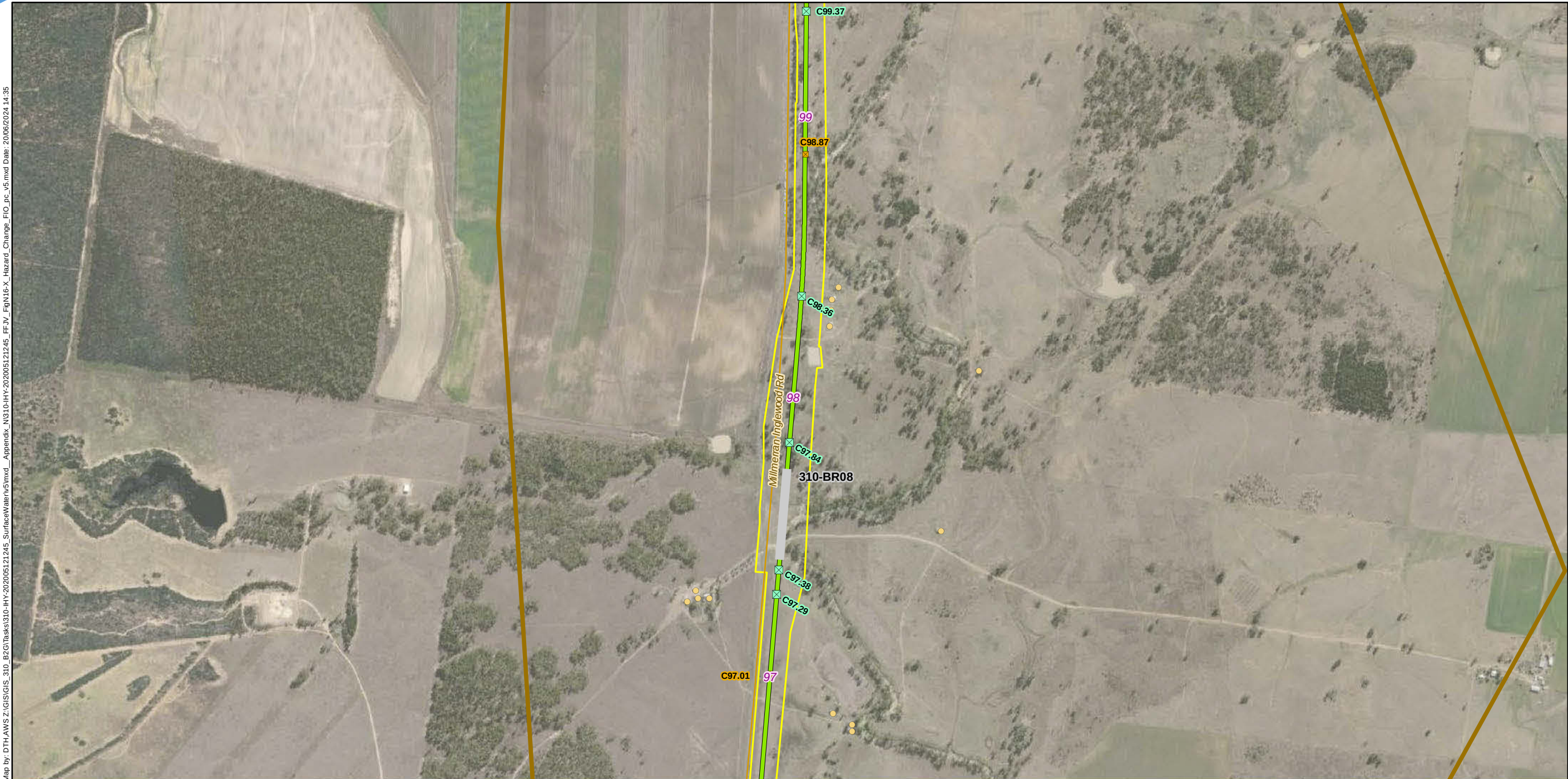


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 21 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 22 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N16 - page 23 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



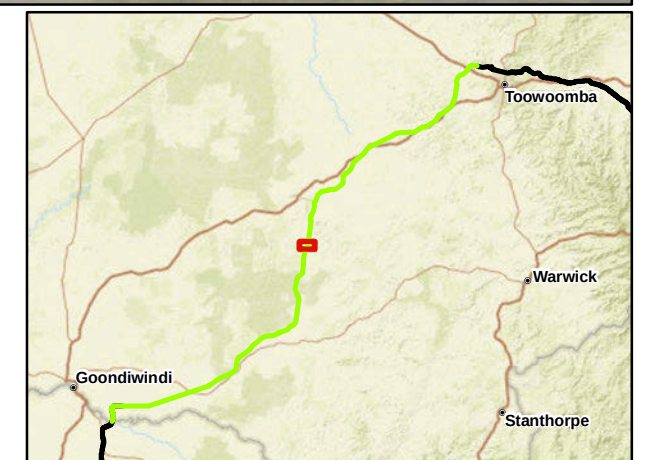
Legend

- ### Legend
- | | | | |
|---|----------------------------|---|--|
| 5 | Chainage (km) |  | Flood sensitive receptor |
|  | Border to Gowrie alignment |  | Project floodplain culvert |
|  | Minor roads |  | Project local catchment drainage culvert |
|  | Project road design |  | Project bridges |
| | |  | Local hydraulic model extent |
| | |  | Project footprint |

Estimated change in velocity x depth product (%)

- Estimated change in velocity x depth product (%)**
- < 0%
 - 0% to 10%
 - 10% to 20%
 - 20% to 50%
 - 50% to 100%
 - > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km





- Estimated change in velocity x depth product (%)

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

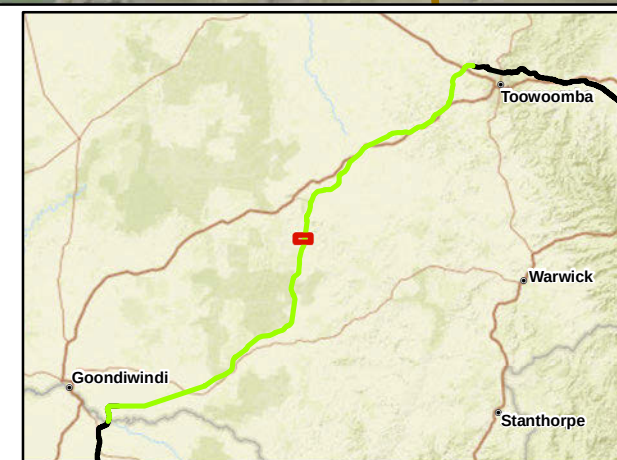


Figure N16 - page 25 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



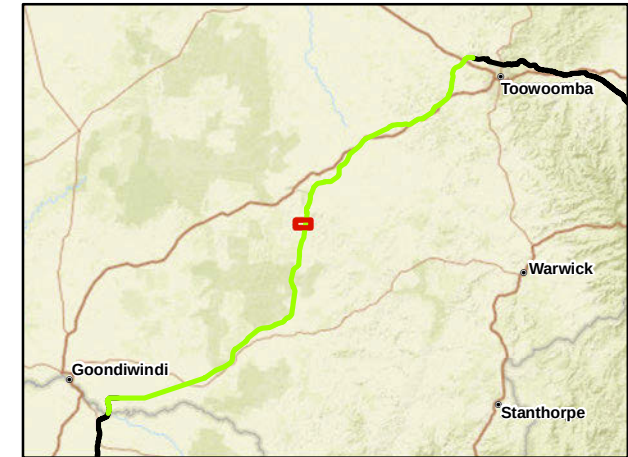
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 26 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Future Freight
Integrating Community, Environment and Engineering

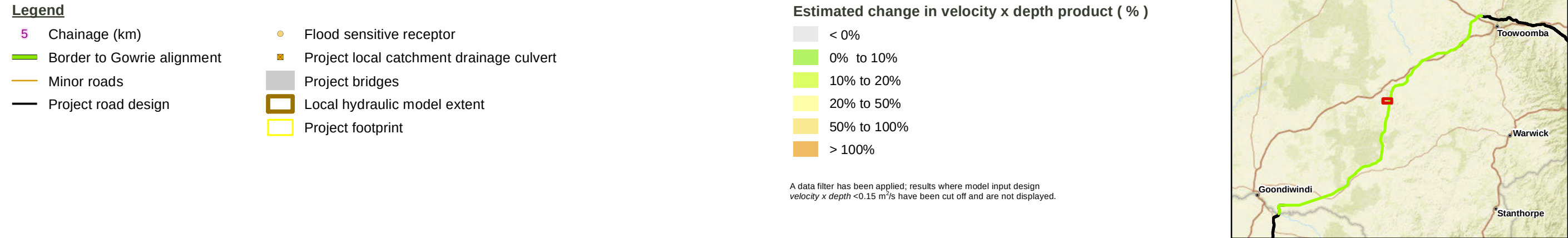
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 27 of 48:

1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



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

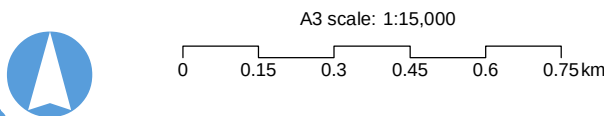
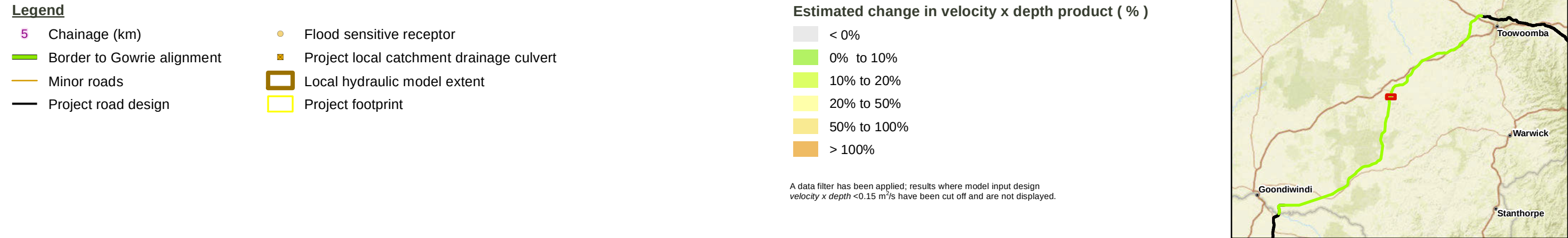


Future Freight
Integrating Community, Environment and Engineering

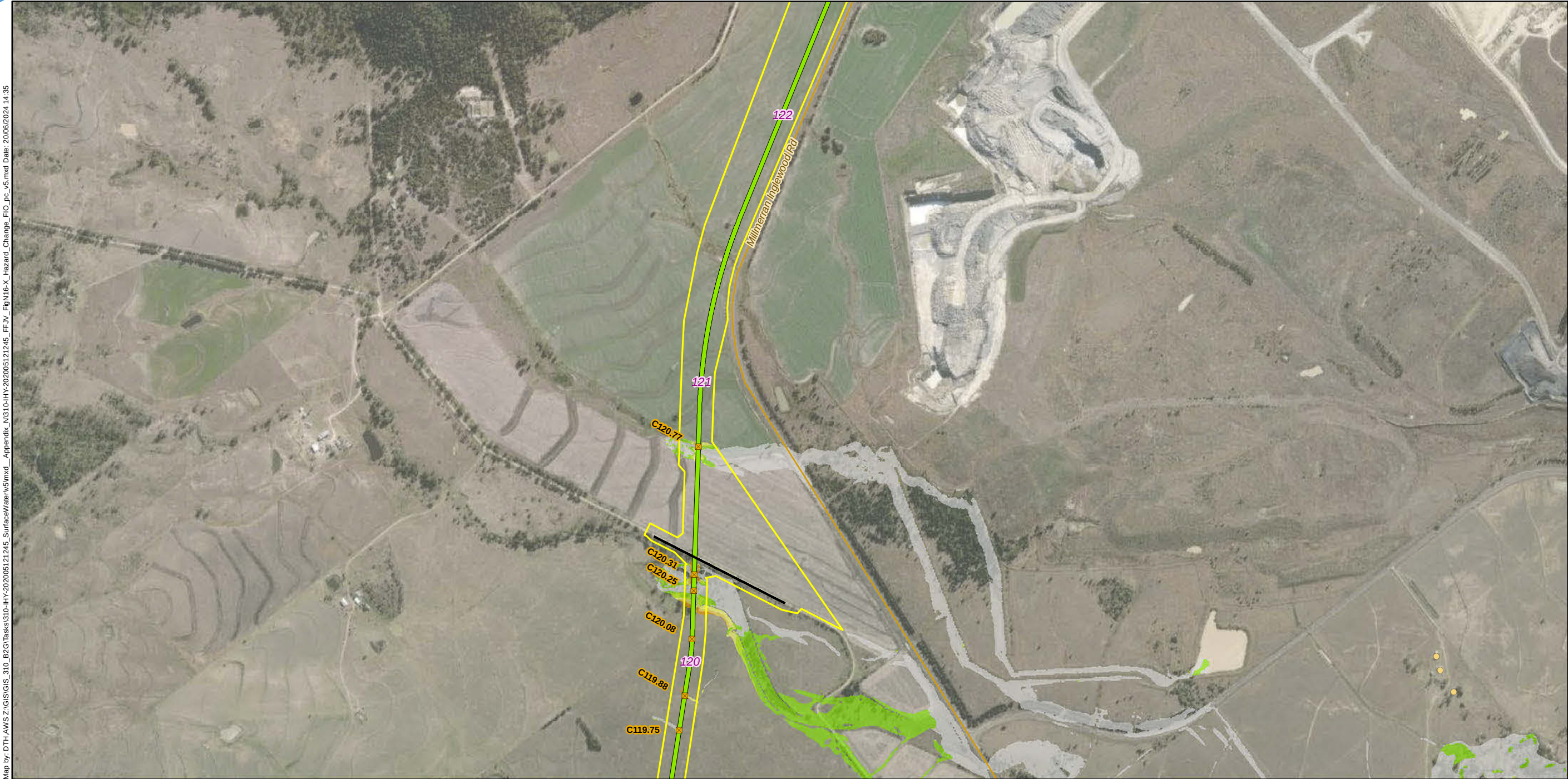
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 28 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:35



Legend

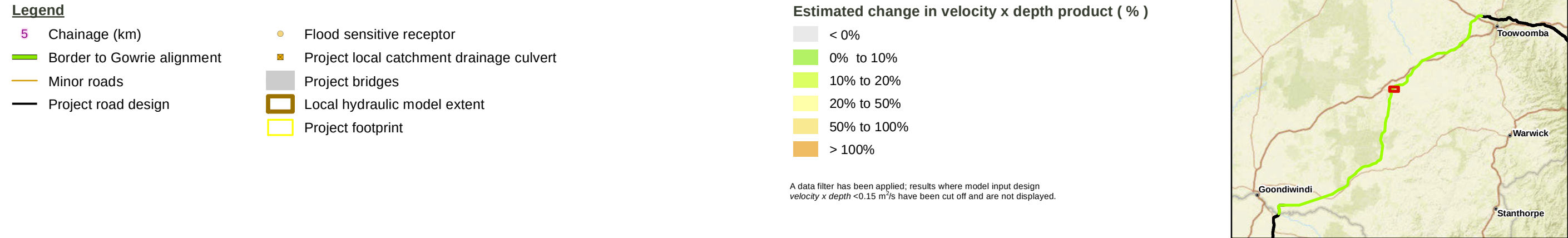
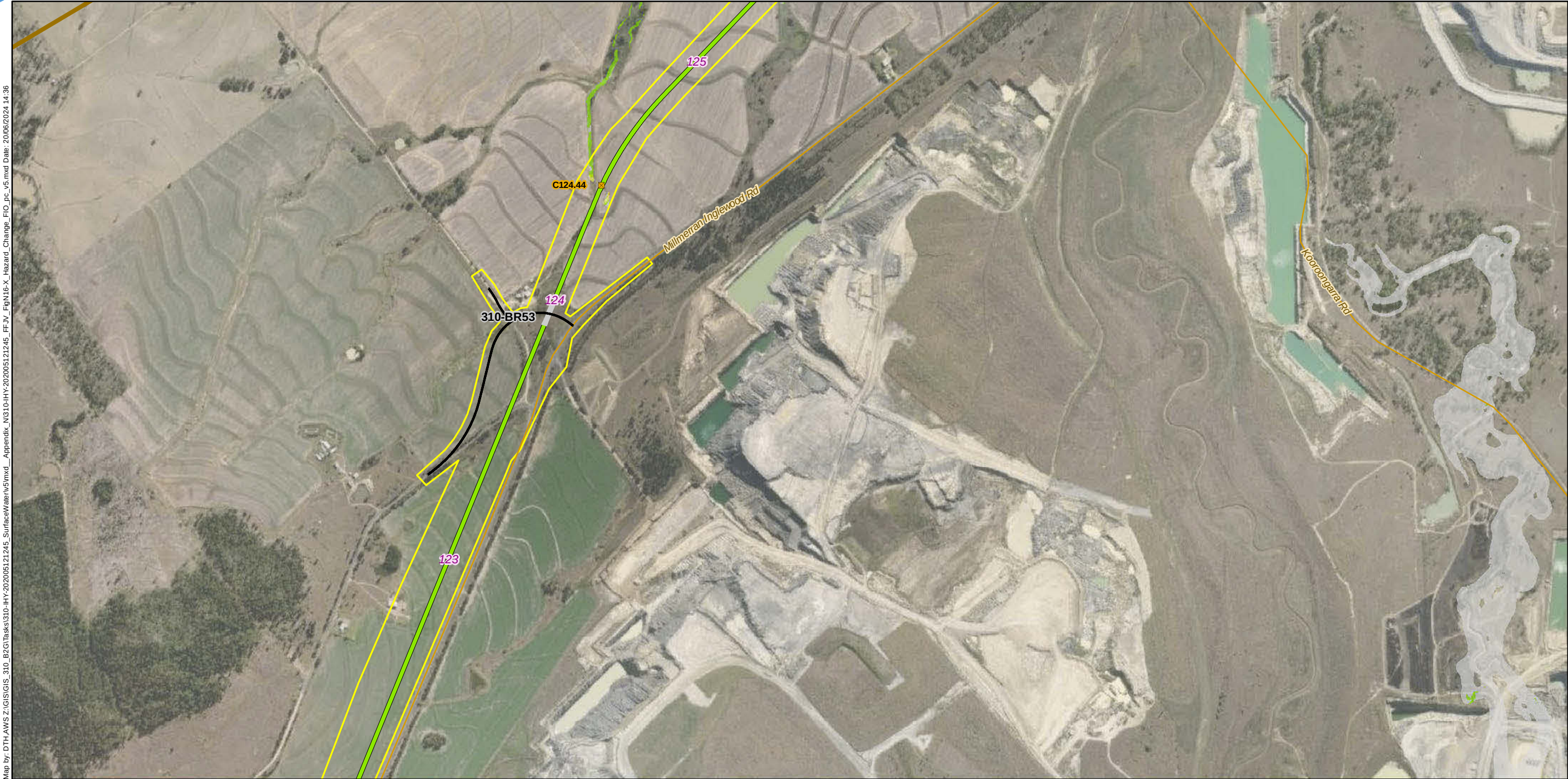
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

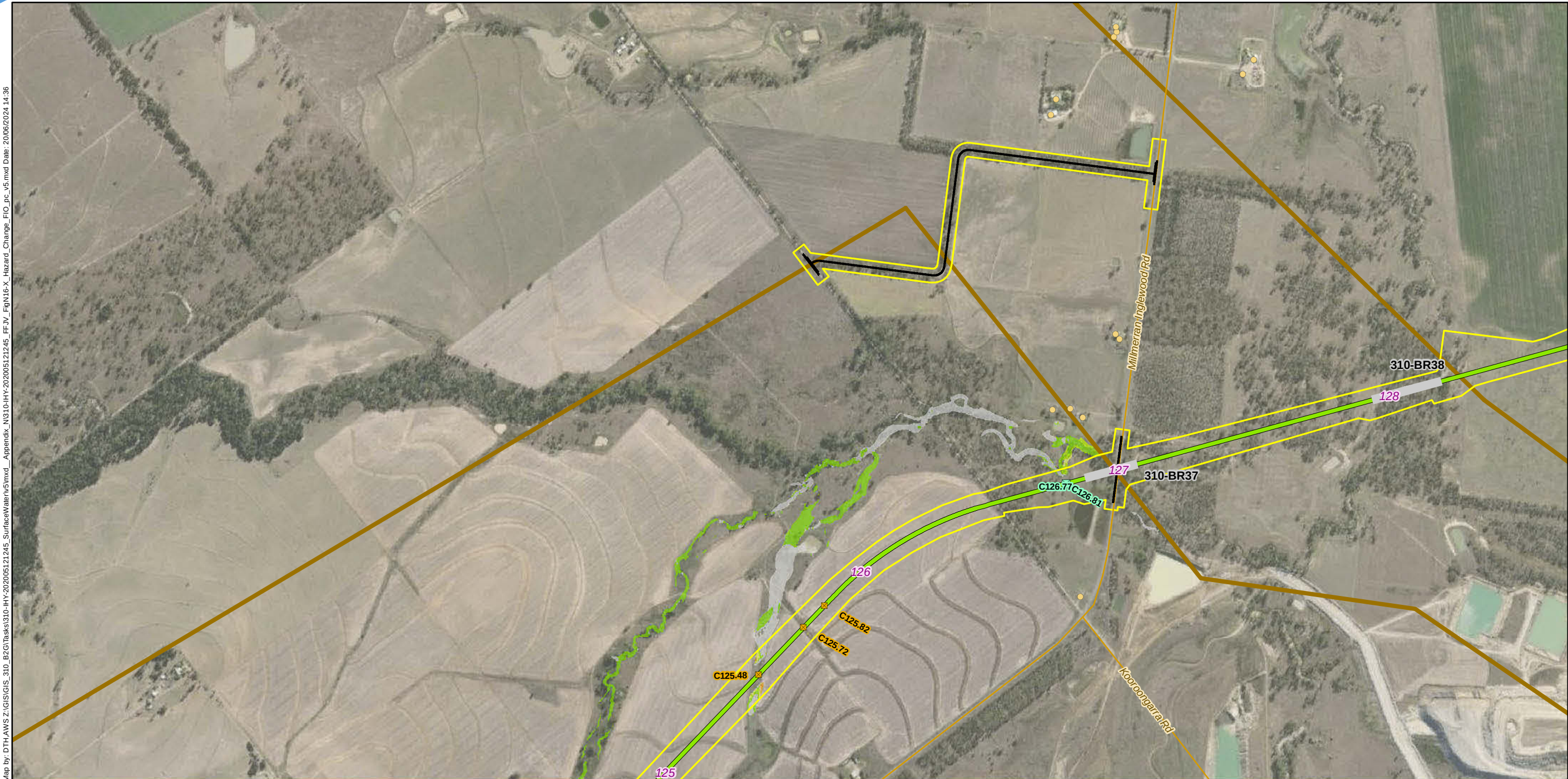
- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.





Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



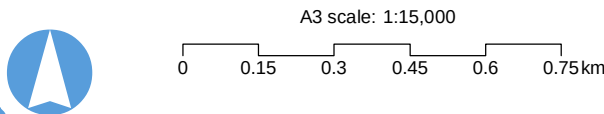
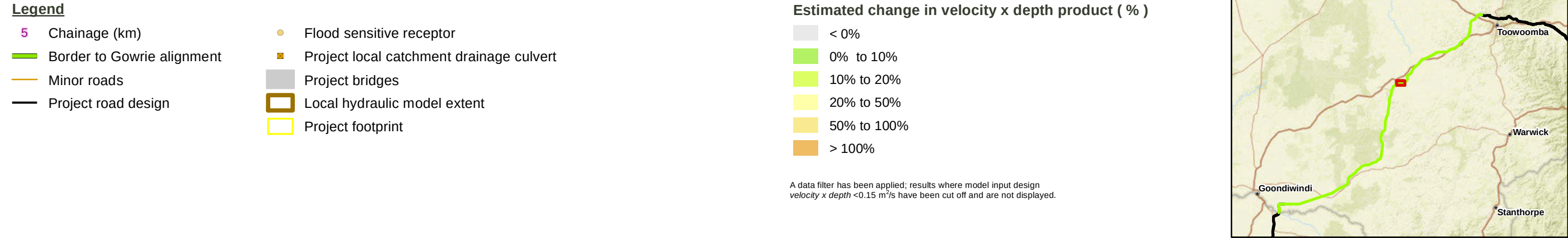
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 32 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



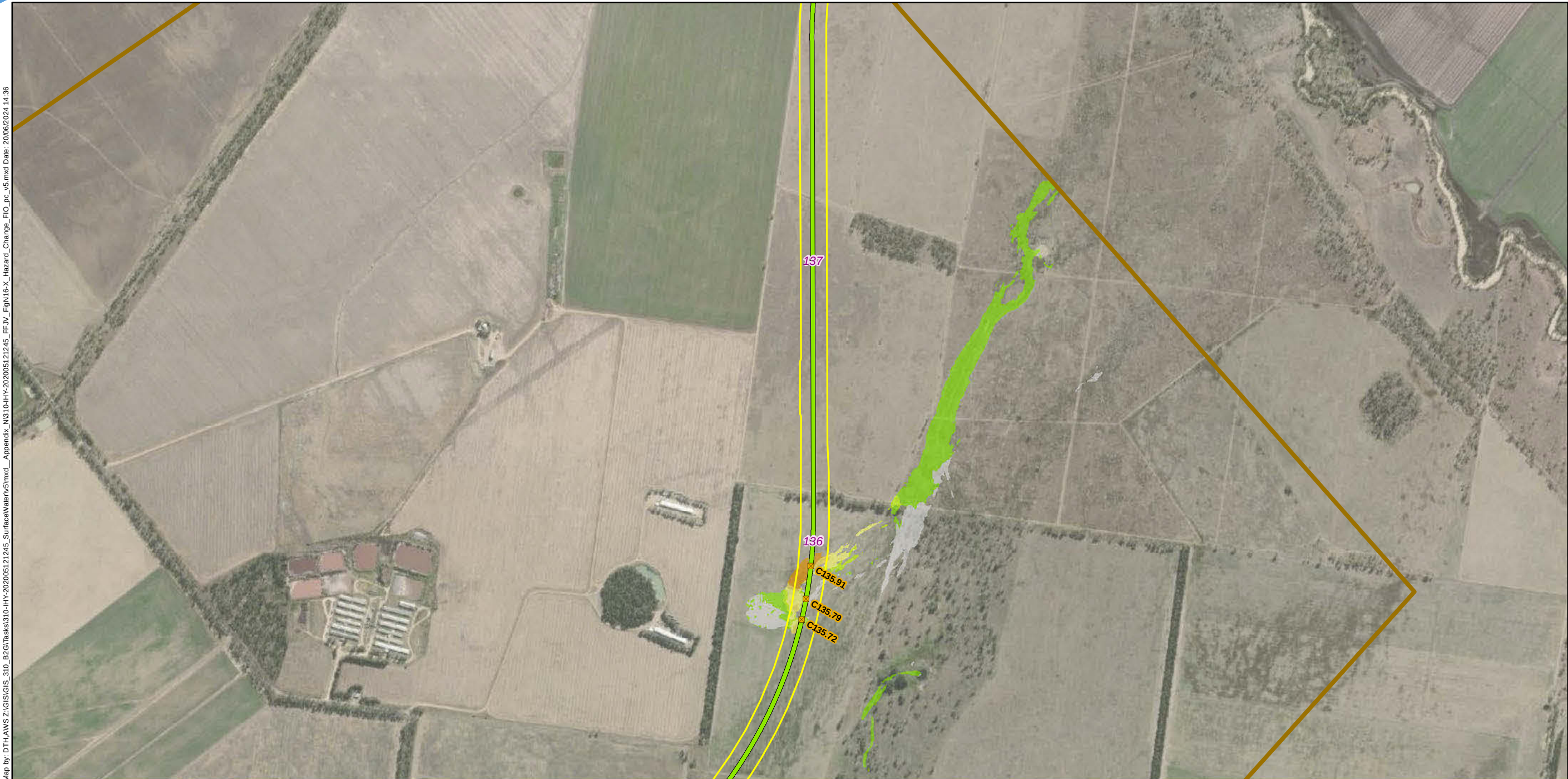
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 34 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



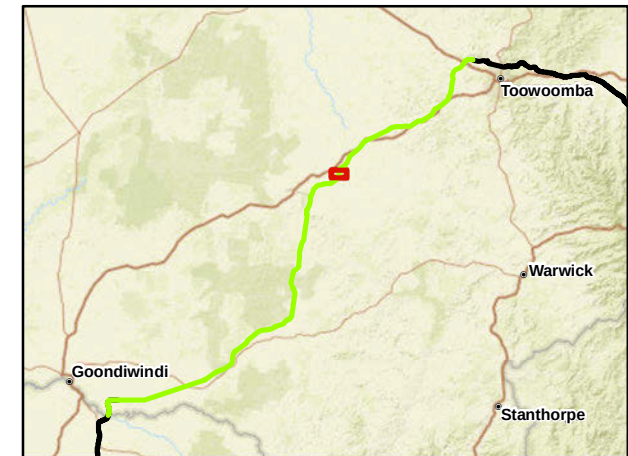
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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

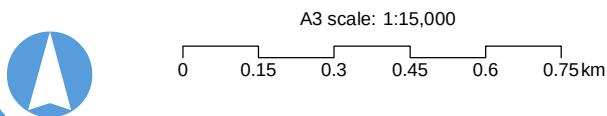
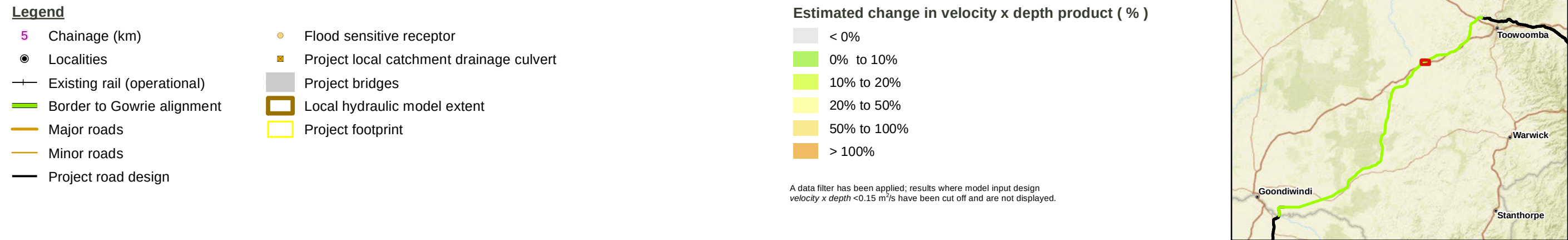


Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 35 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 37 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



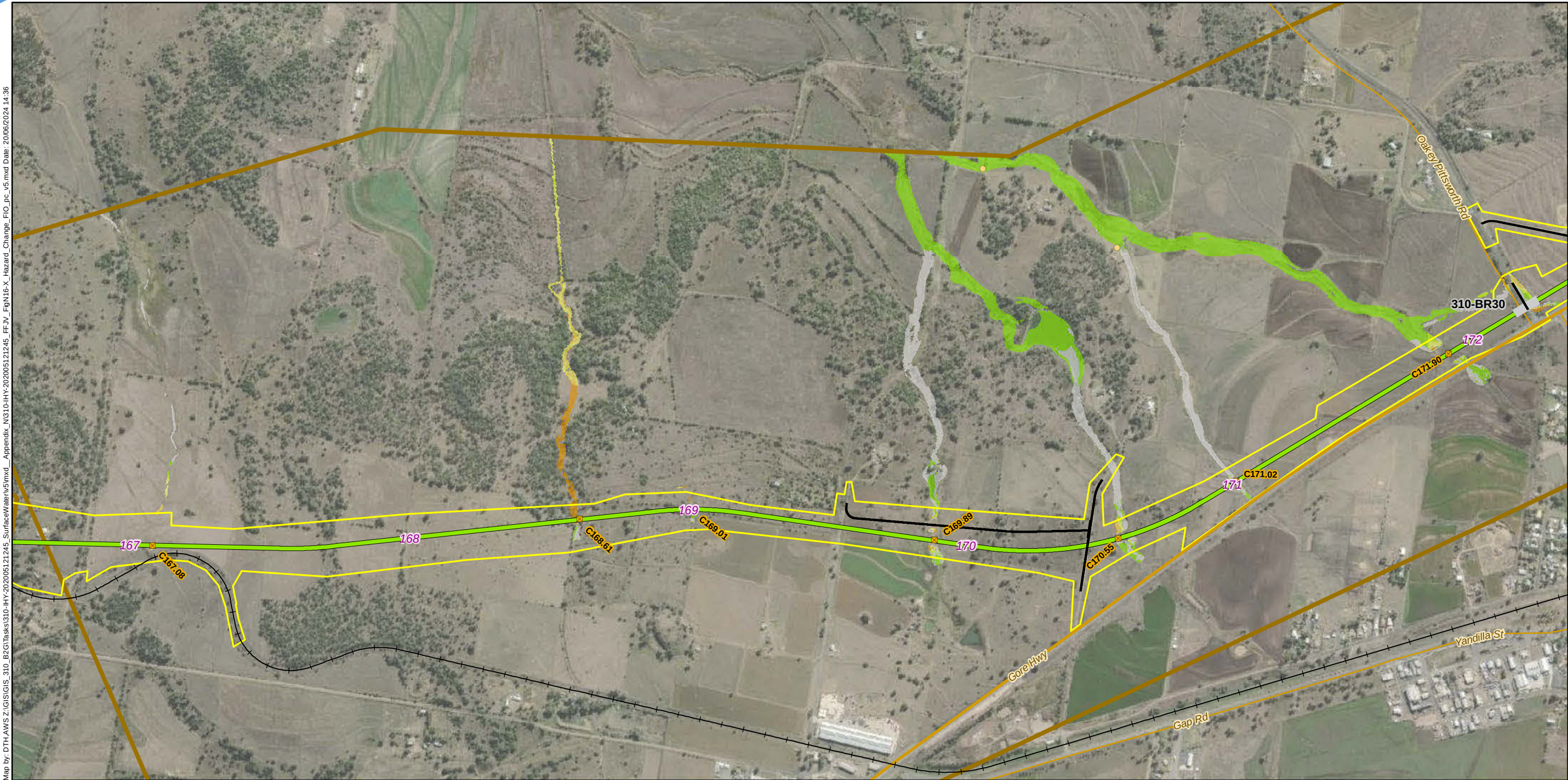
- Estimated change in velocity x depth product (%)

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Figure N16 - page 38 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



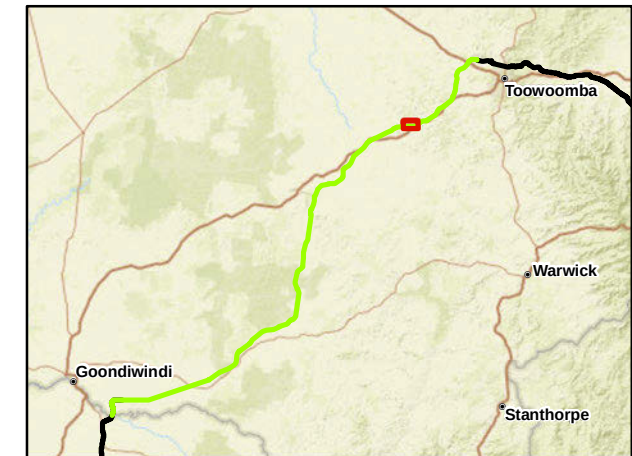
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 39 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



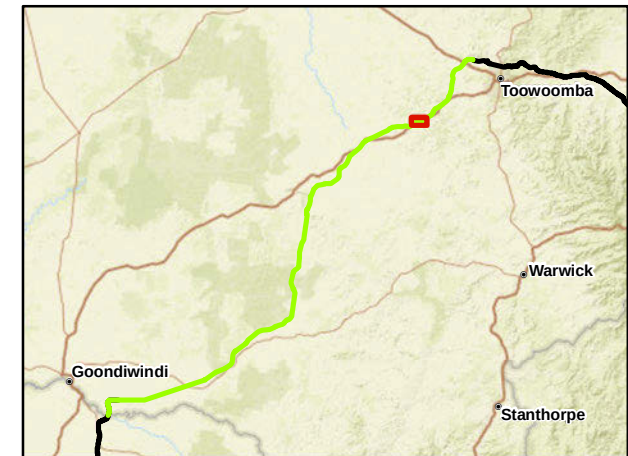
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



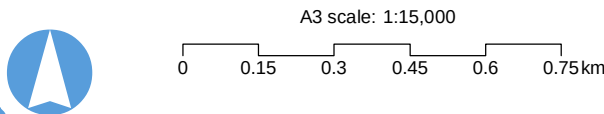
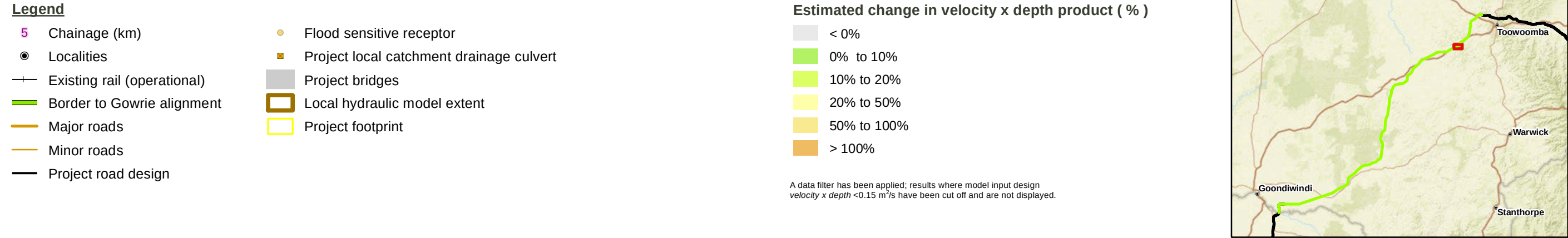
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 40 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard ($v \times d$) (<0.15m²/s cutoff applied)





- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.



Figure N16 - page 42 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH.AWS Z:\GIS\GIS_310_B2\GIS\GIS_310-B2\Tasks\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:36



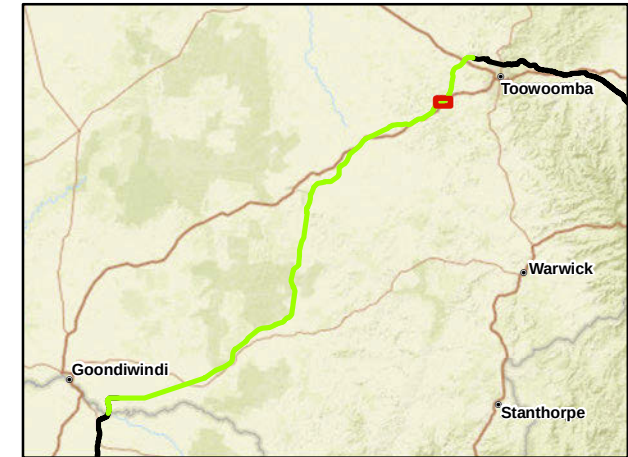
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 43 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



- Estimated change in velocity x depth product (%)**

- A data filter has been applied; results where model input design velocity $\times$ depth $< 0.15 \text{ m}^2/\text{s}$ have been cut off and are not displayed.

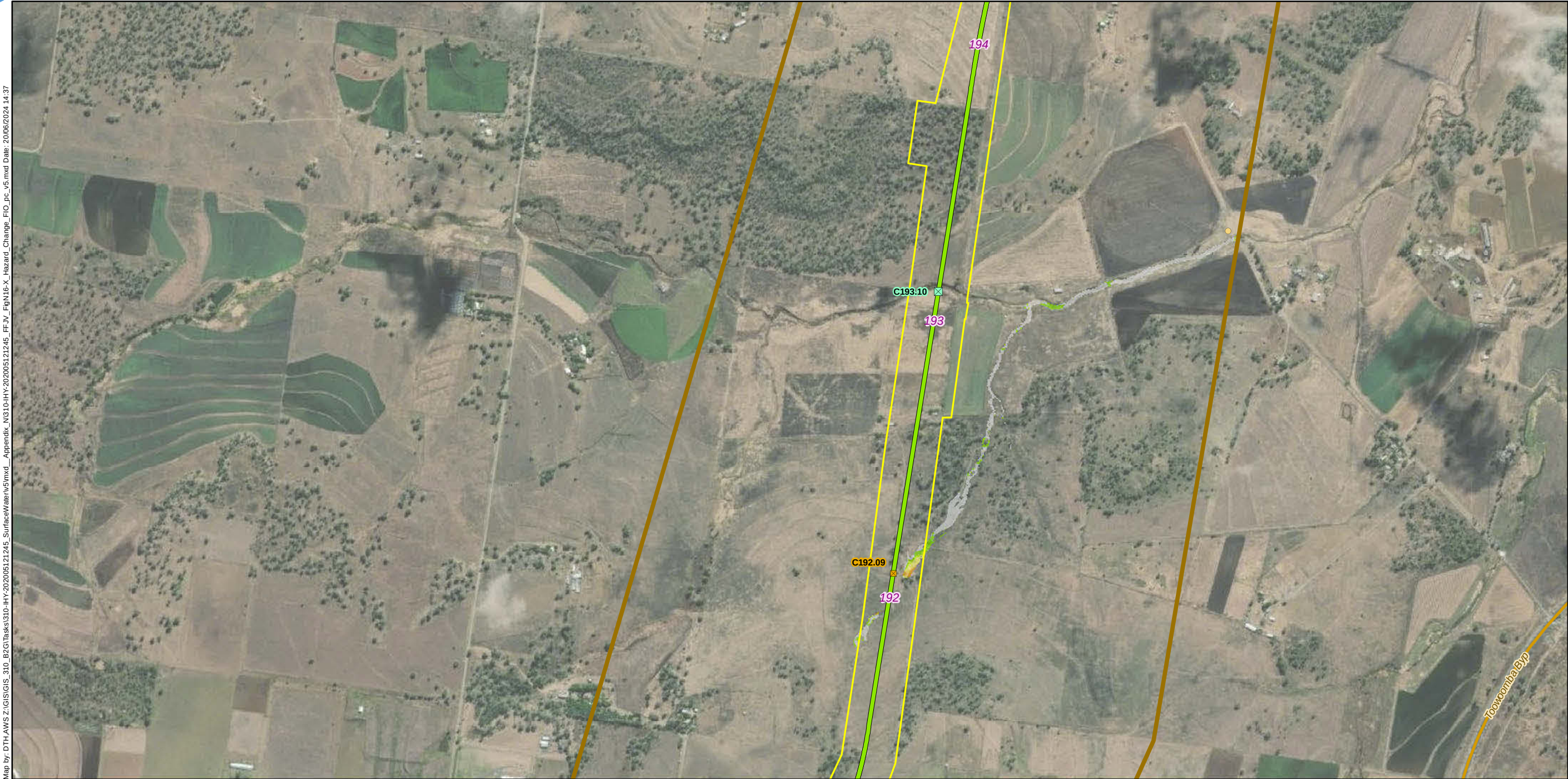


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N16 - page 44 of 48:
d) ($<0.15\text{m}^2/\text{s}$ cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:37



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

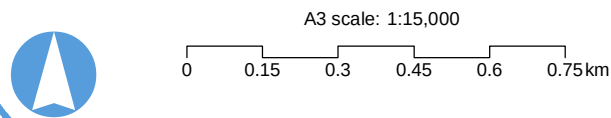
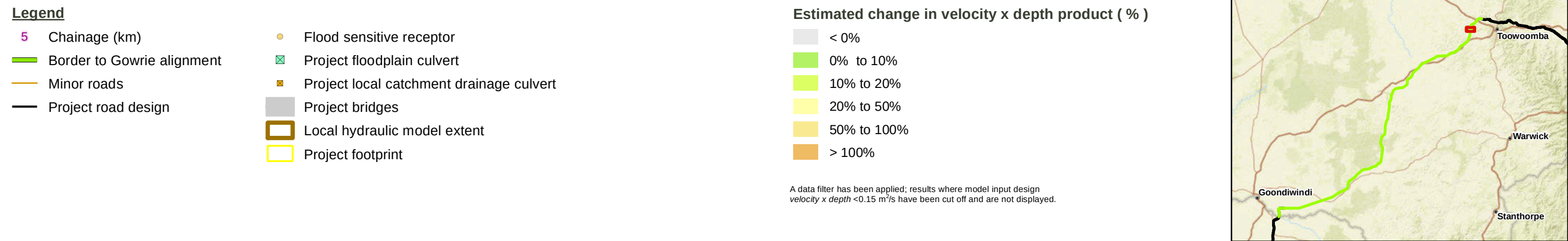
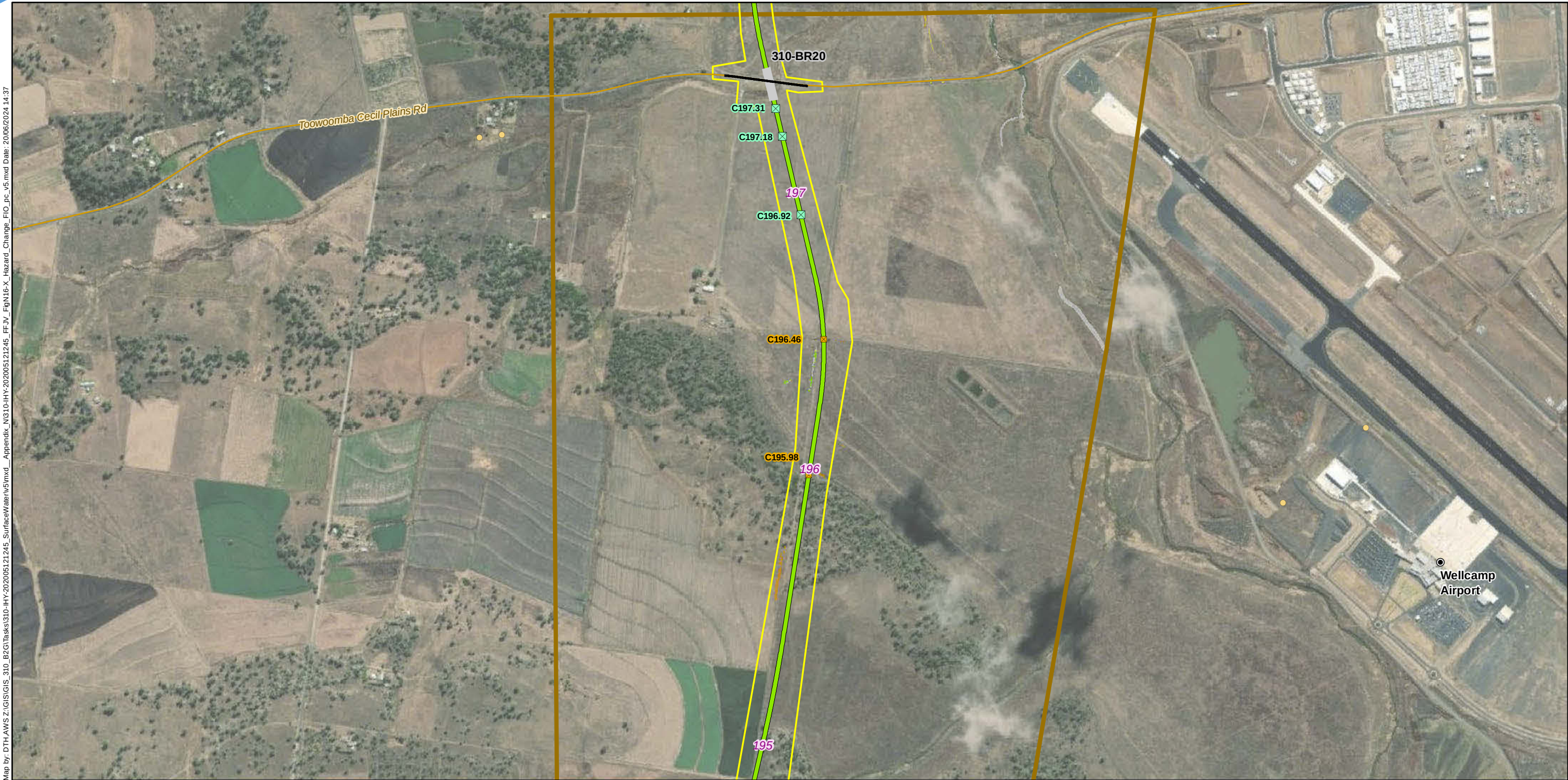


Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 45 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWaterV5.mxd Appendix_IV310-HY-202005121245_FFJV_FigN16-X_Hazard_Change_FIO_pc_v5.mxd Date: 20/06/2024 14:37



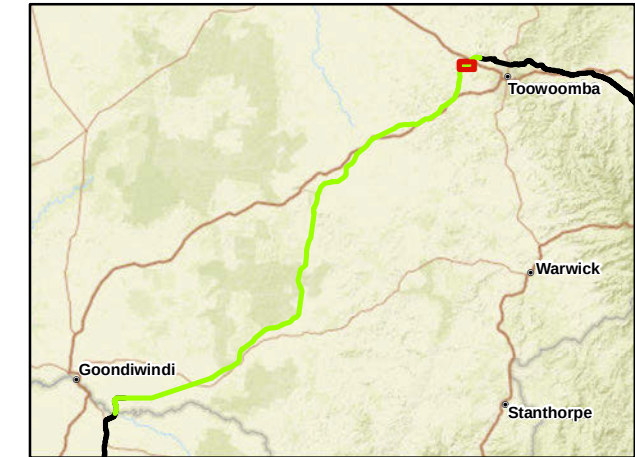
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in velocity x depth product (%)

- < 0%
- 0% to 10%
- 10% to 20%
- 20% to 50%
- 50% to 100%
- > 100%

A data filter has been applied; results where model input design velocity x depth < 0.15 m²/s have been cut off and are not displayed.



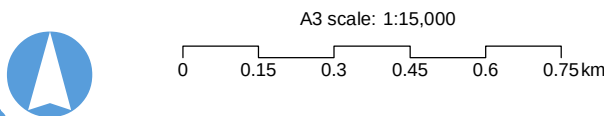
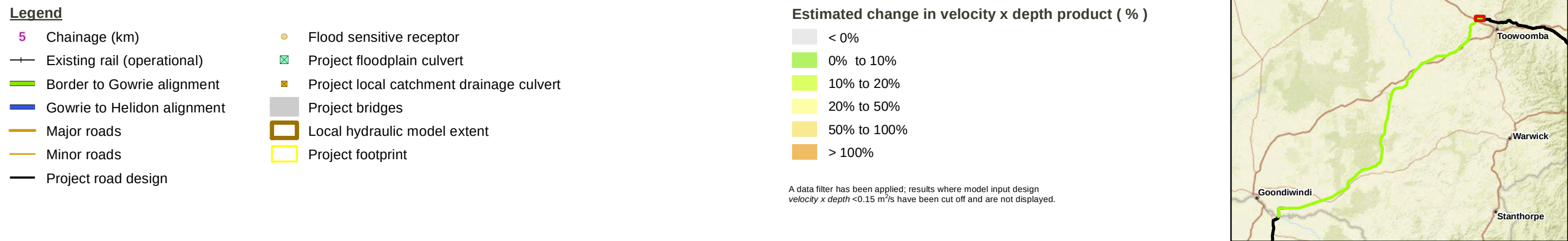
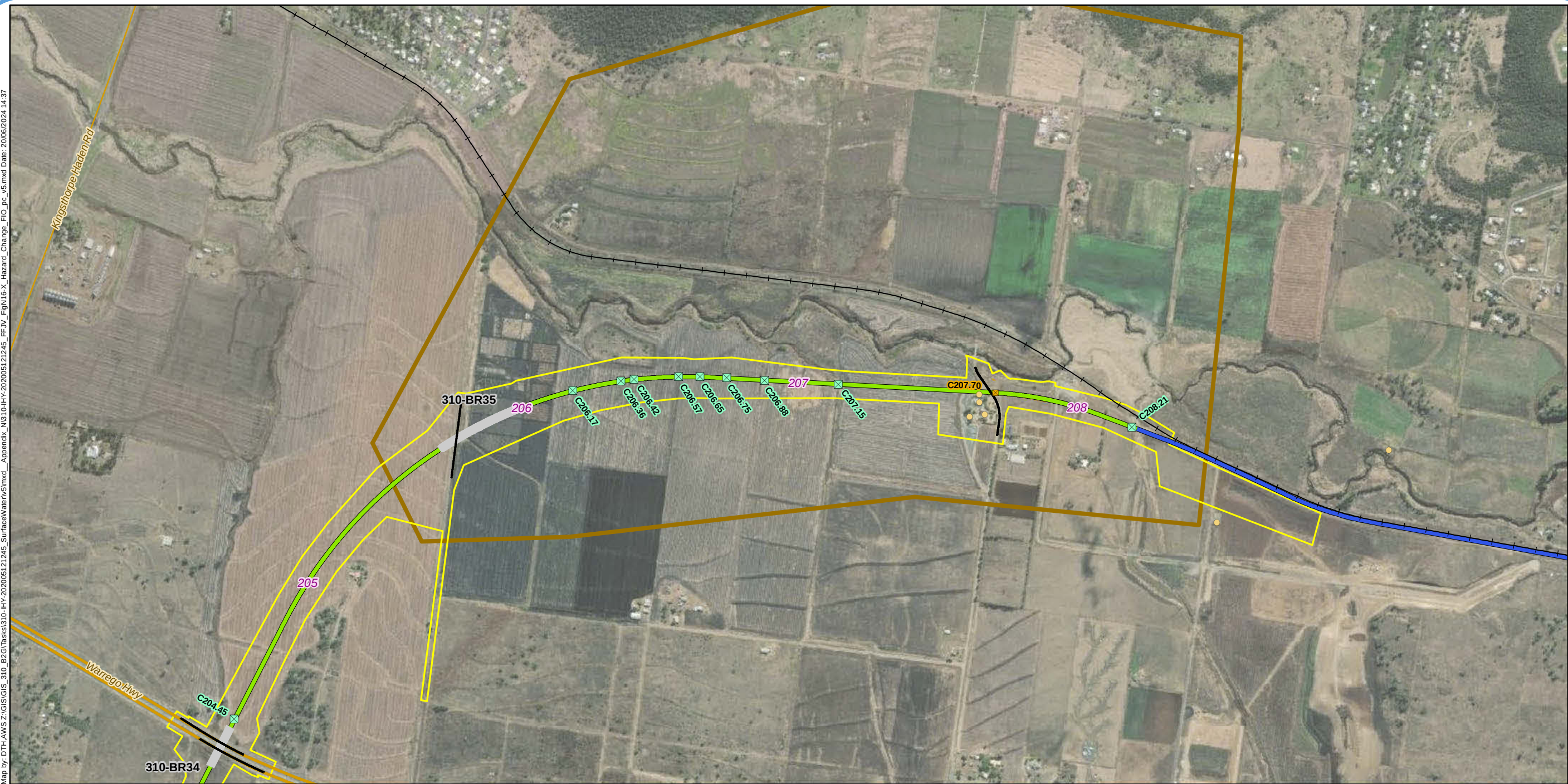
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



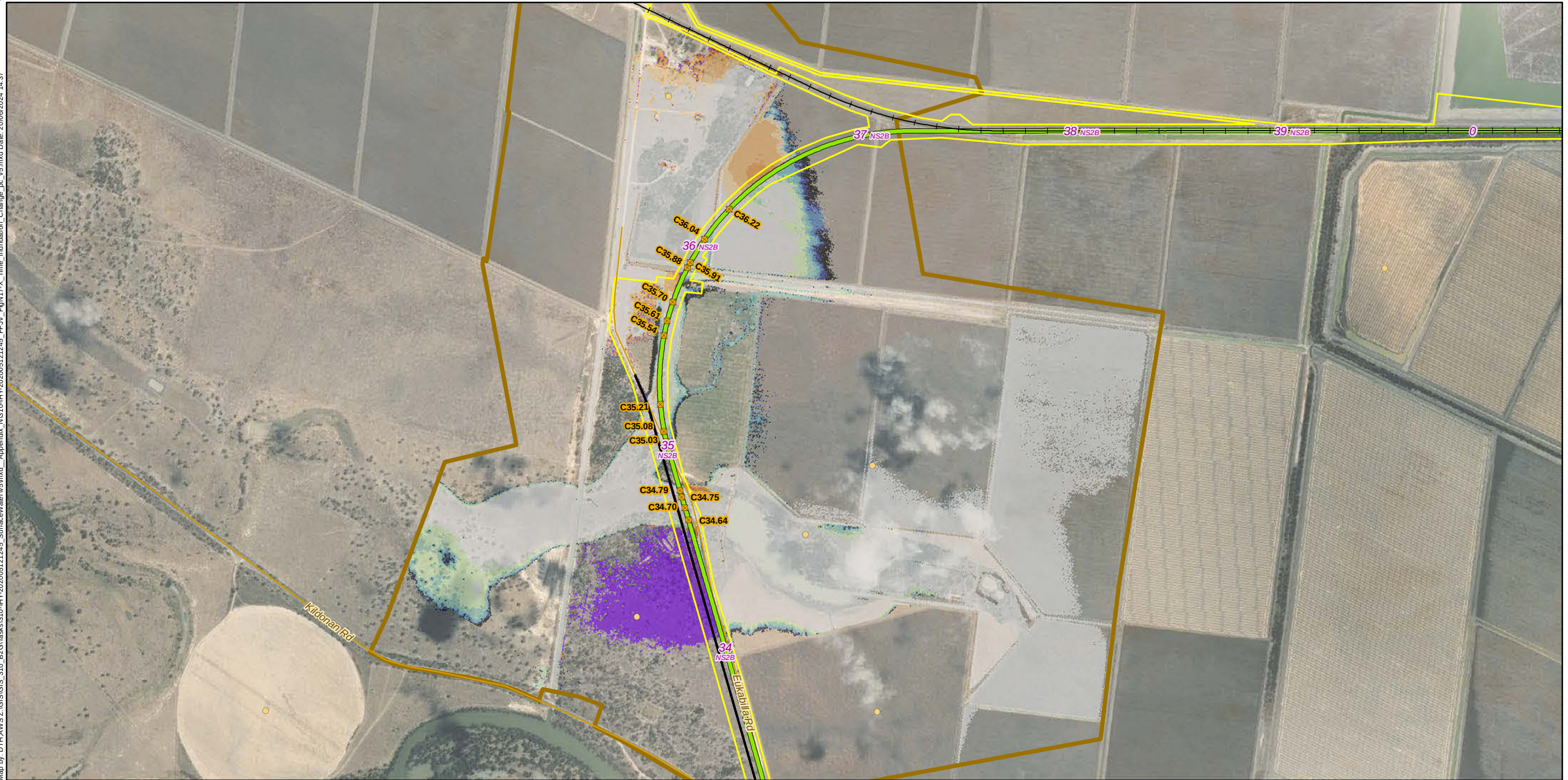
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N16 - page 47 of 48:
1% AEP Event - Local Catchments - Percentage Change in Hazard (v x d) (<0.15m²/s cutoff applied)



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:37



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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

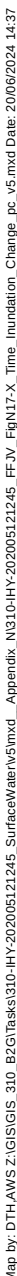


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 1 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

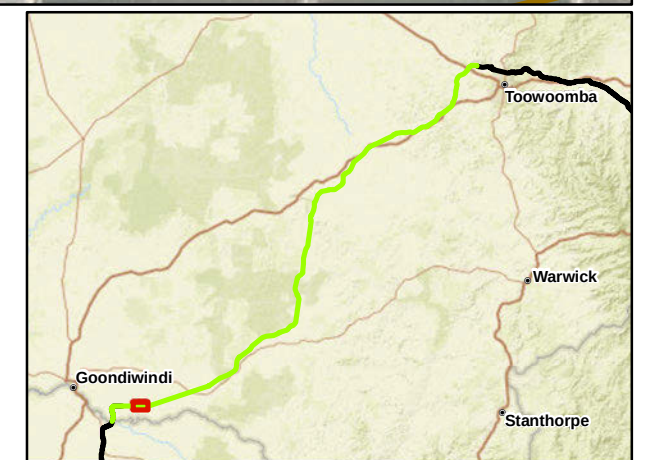


Legend

- ### Legend

Estimated change in time of inundation (%)

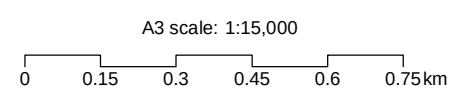
- Estimated change in time of inundation (%)**



A3 scale: 1:15,000



0 0.15 0.3 0.45 0.6 0.75km



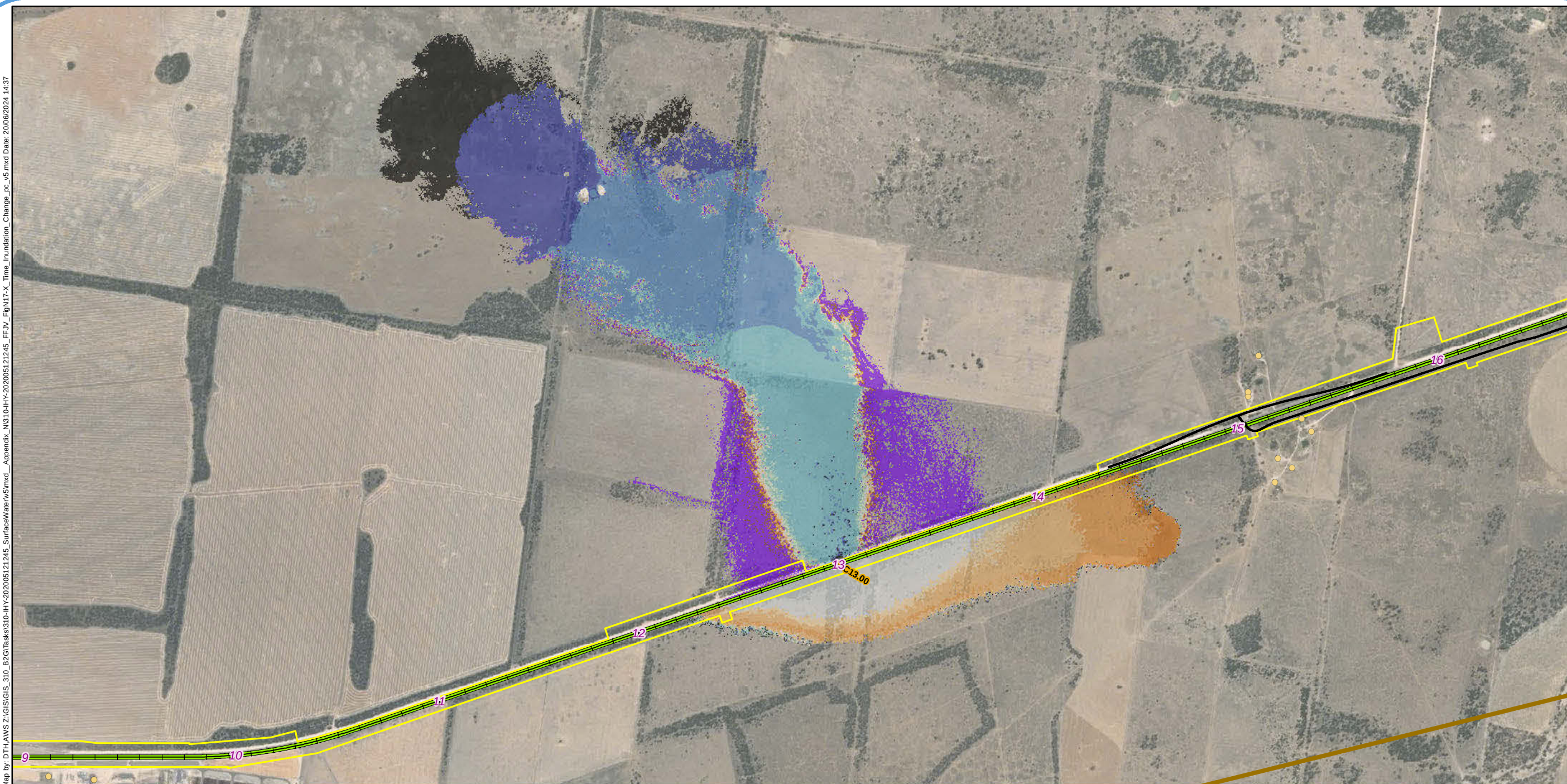
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 2 of 48:

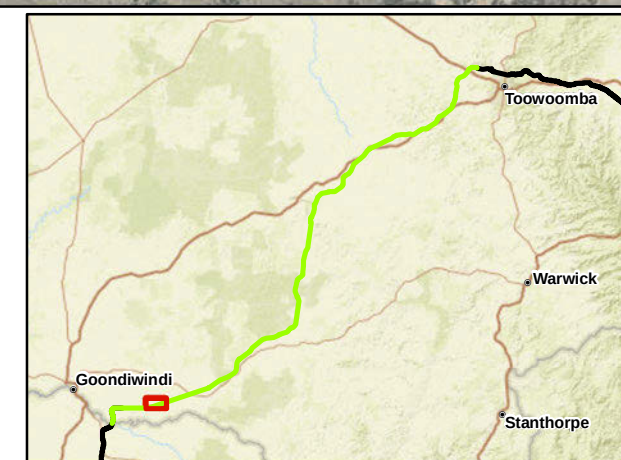
1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area



A3 scale: 1:20,000

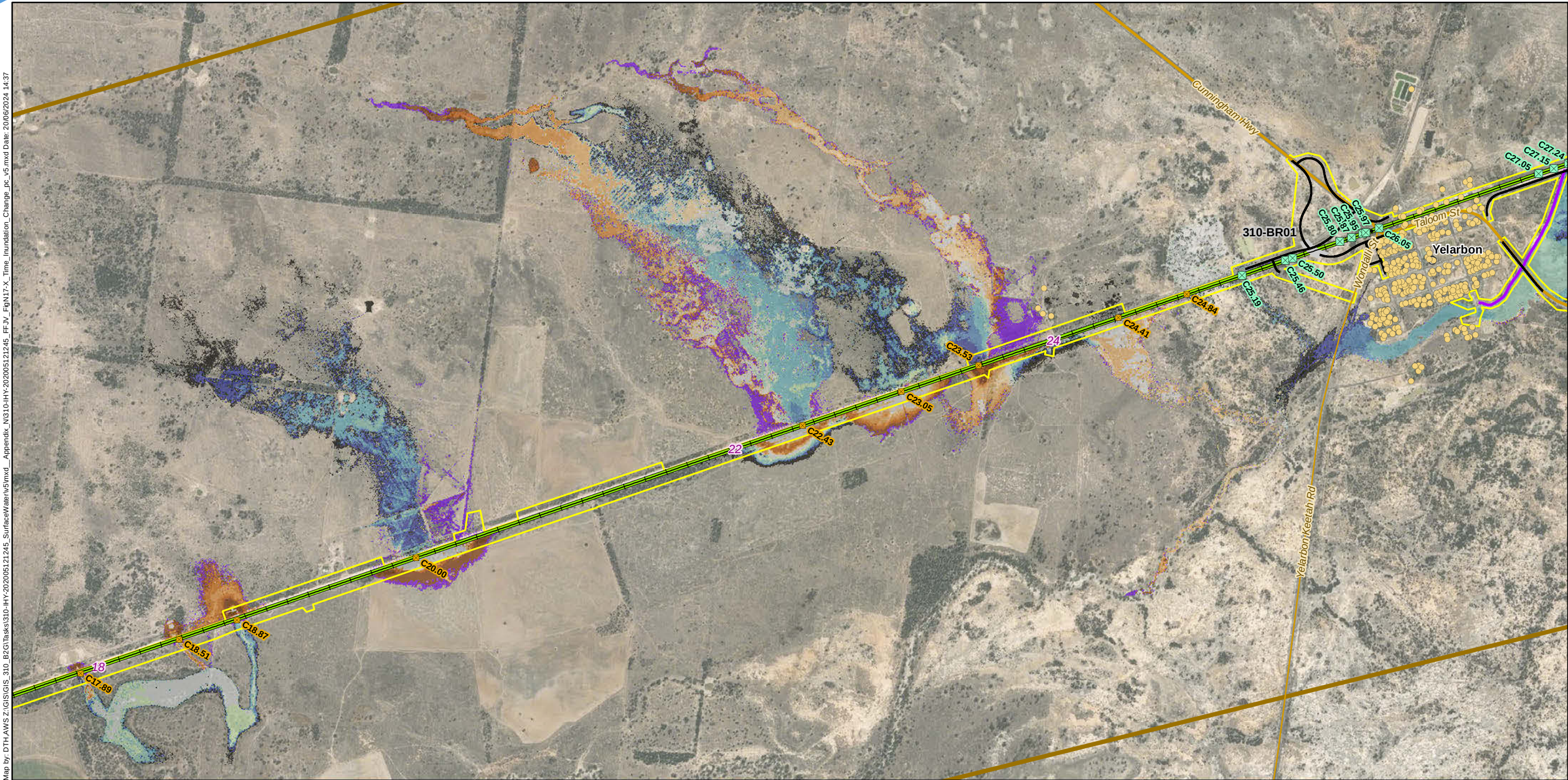


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N17 - page 3 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



Legend

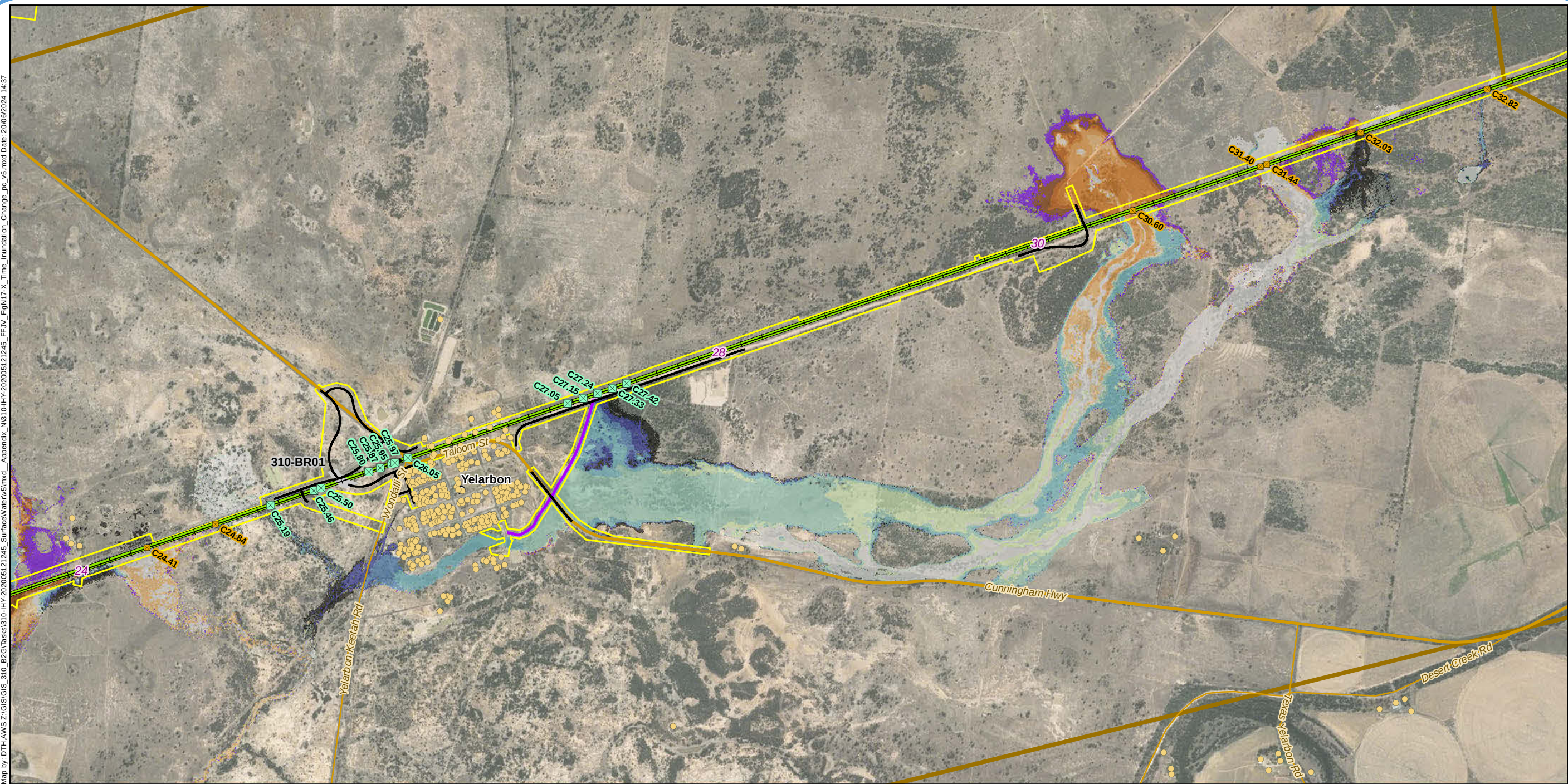
- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



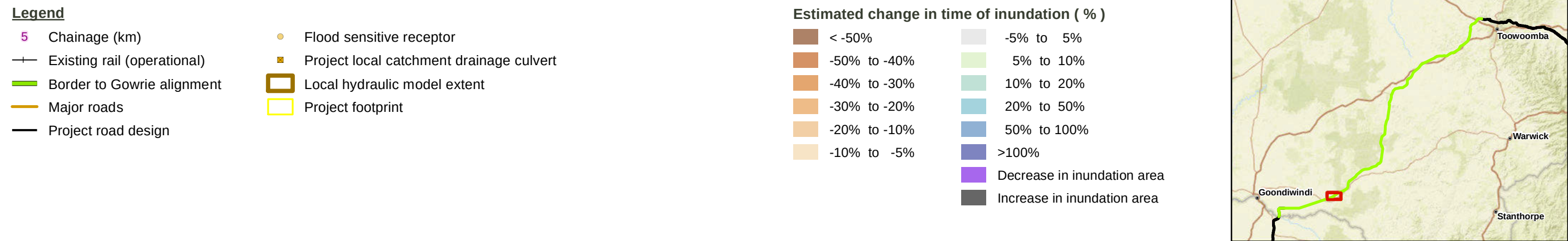
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 5 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

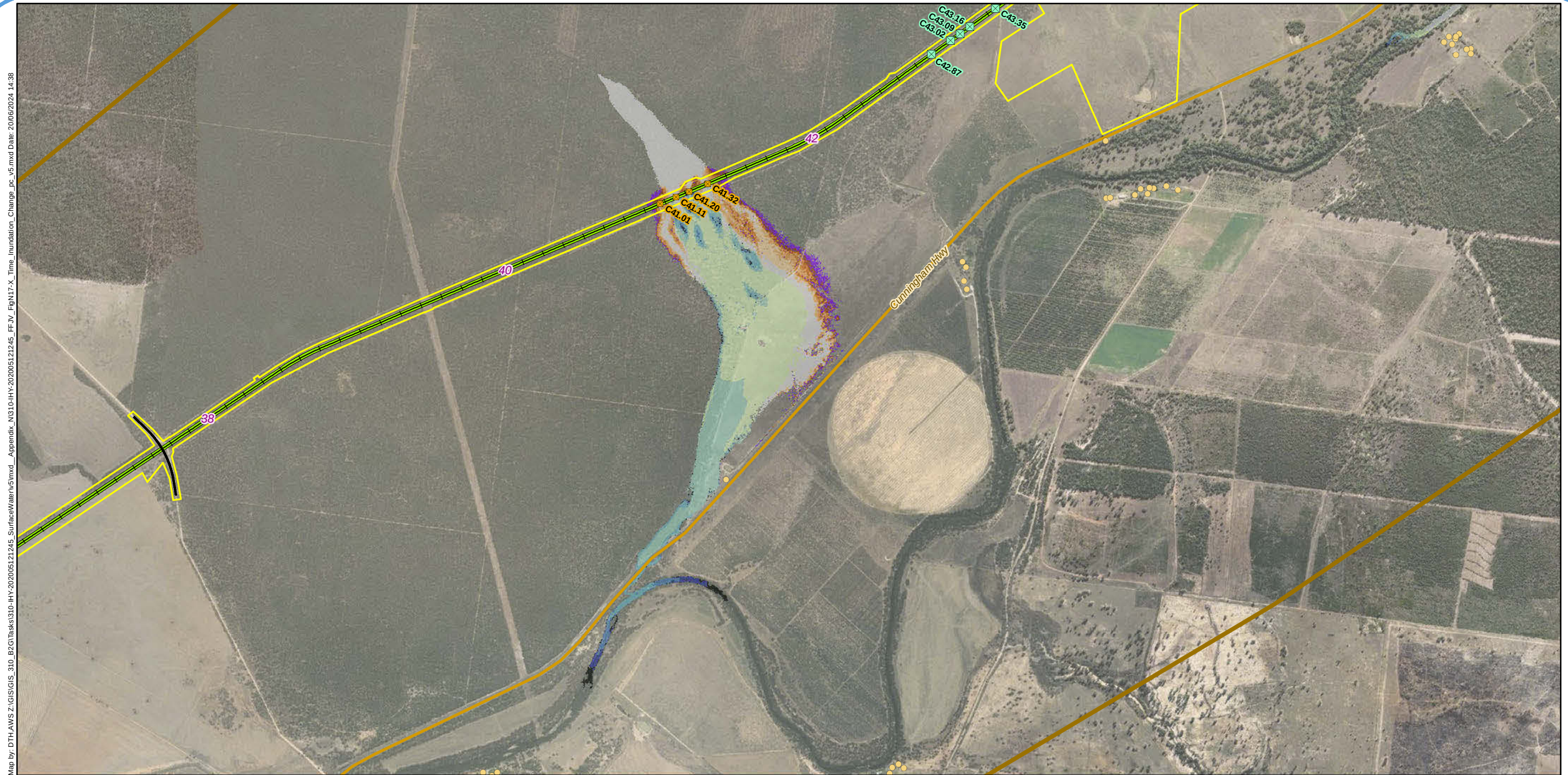


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 6 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

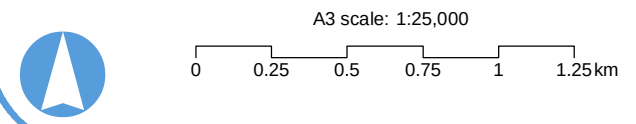
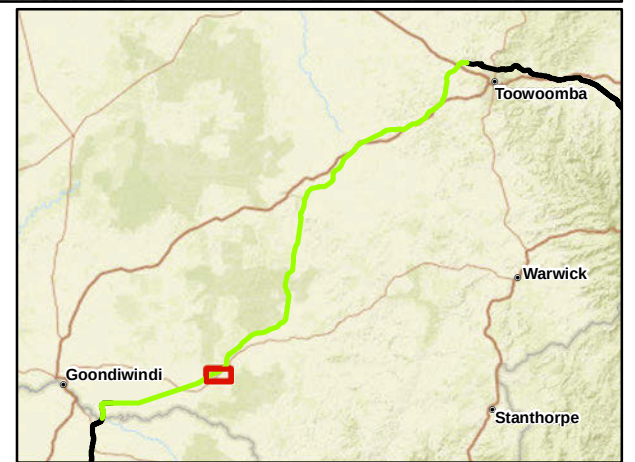


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |

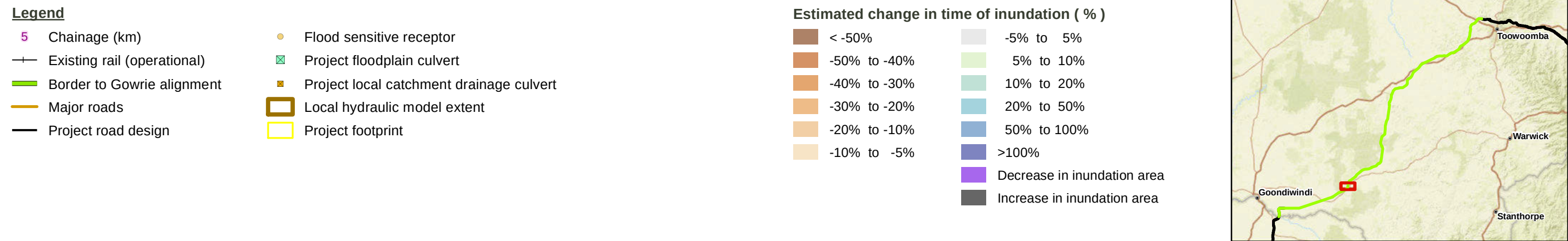


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 7 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



- Estimated change in time of inundation (%)**

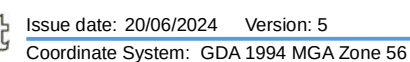
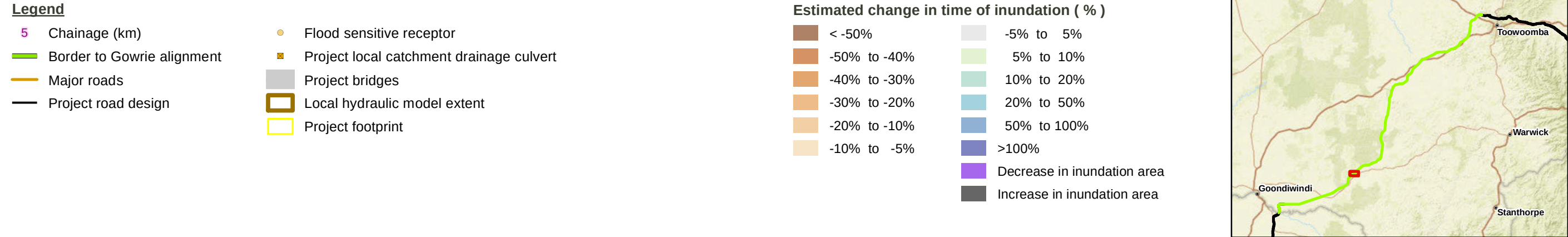
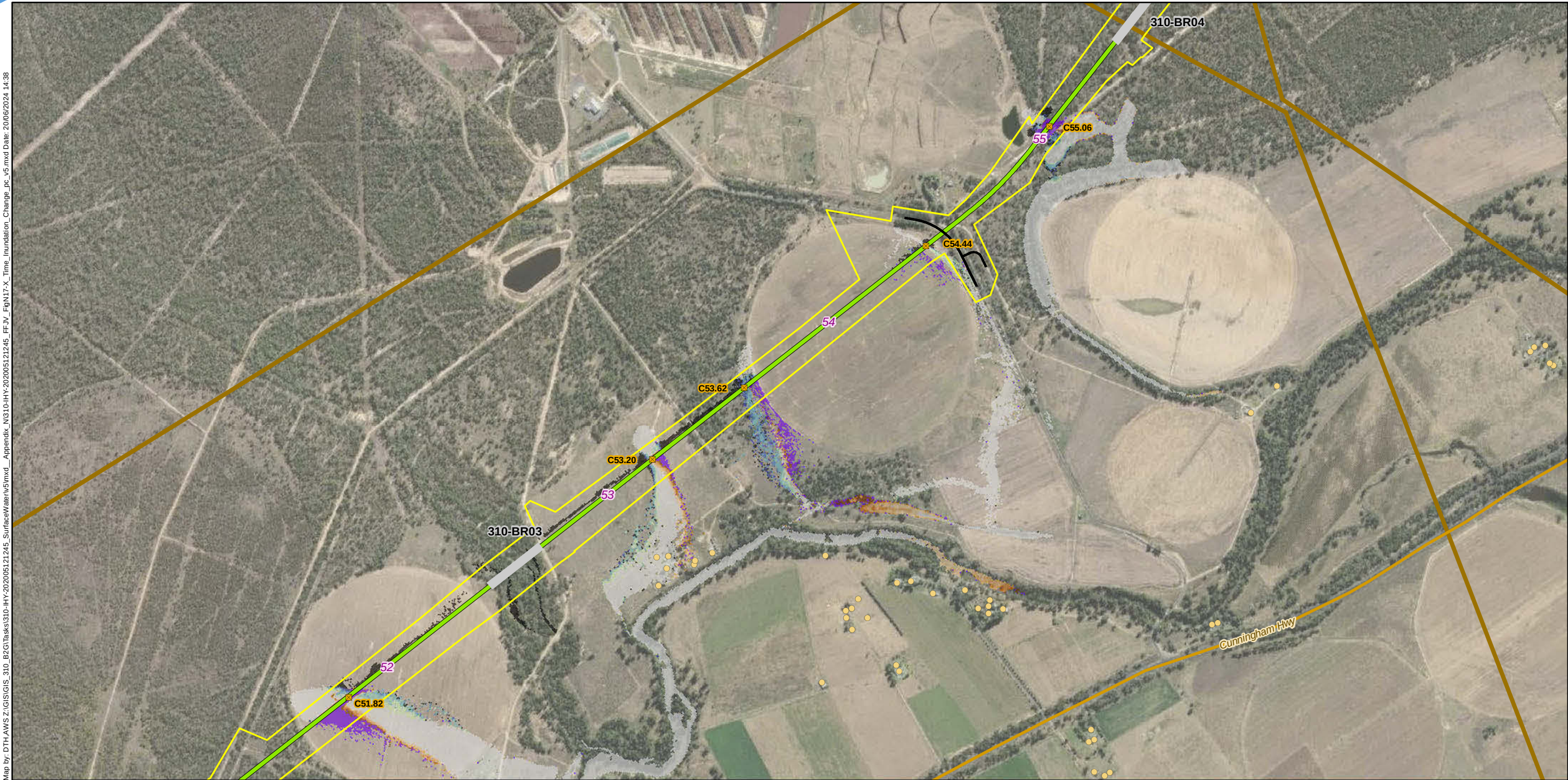


Figure N17 - page 9 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 10 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: D:\HAWKS\GIS\310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:38



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



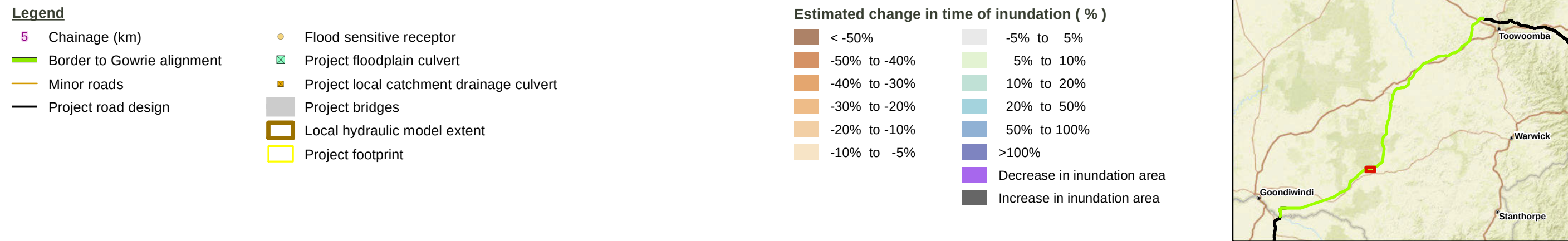
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

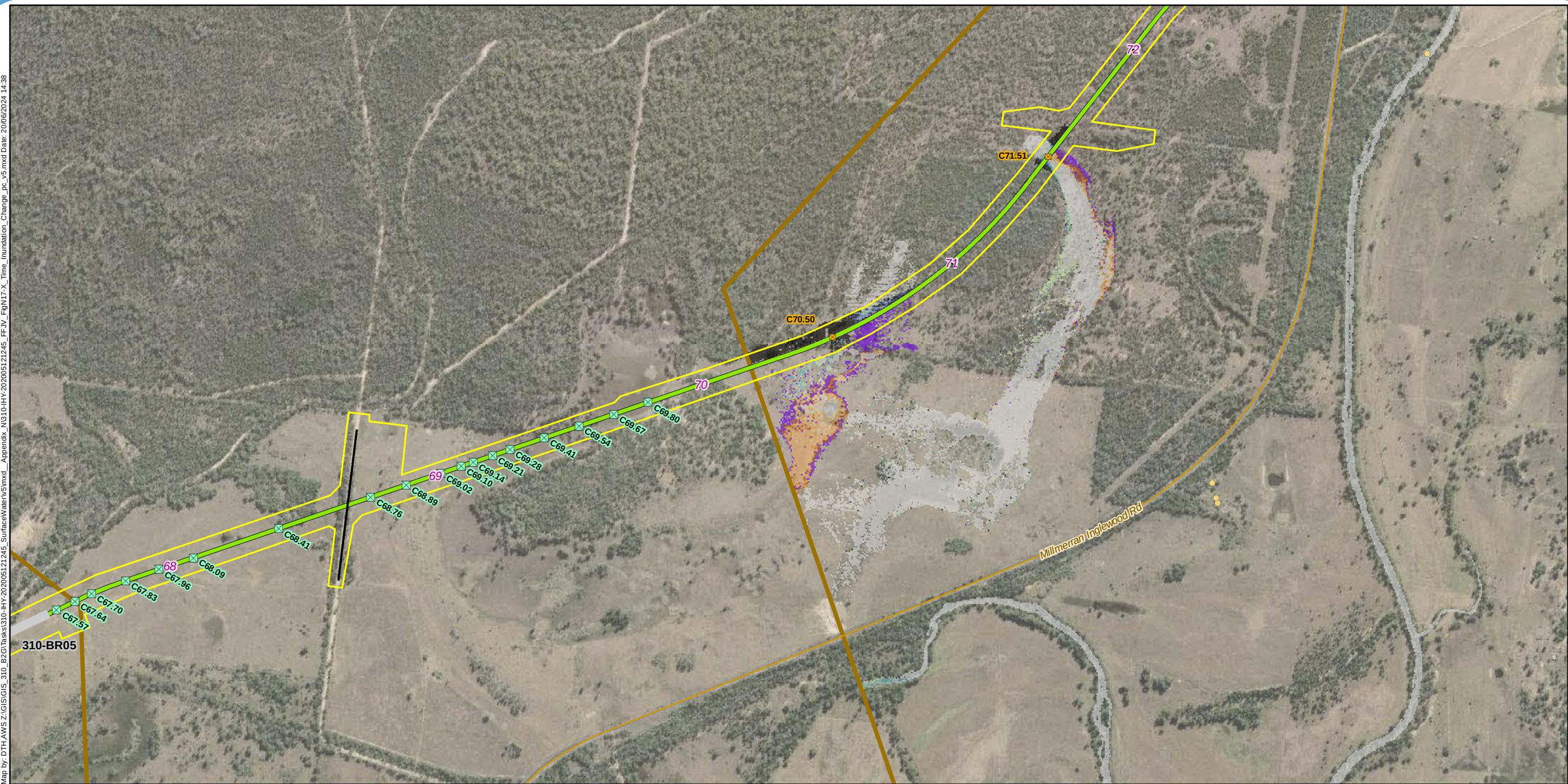
Border to Gowrie

Figure N17 - page 11 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 13 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:38



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

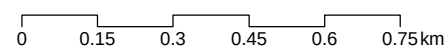
0 0.15 0.3 0.45 0.6 0.75 km



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The terrain is depicted with green and brown shading, and a network of roads is shown in red and black lines.

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N17 - page 15 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

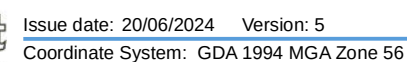


Figure N17 - page 16 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

A3 scale: 1:15,000



Border to Gowrie

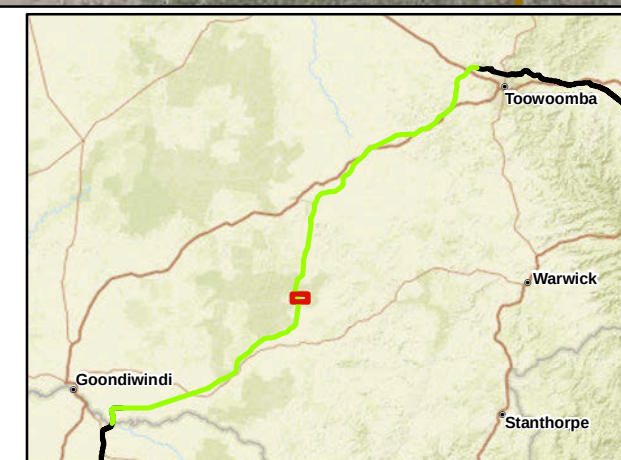
Figure N17 - page 17 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

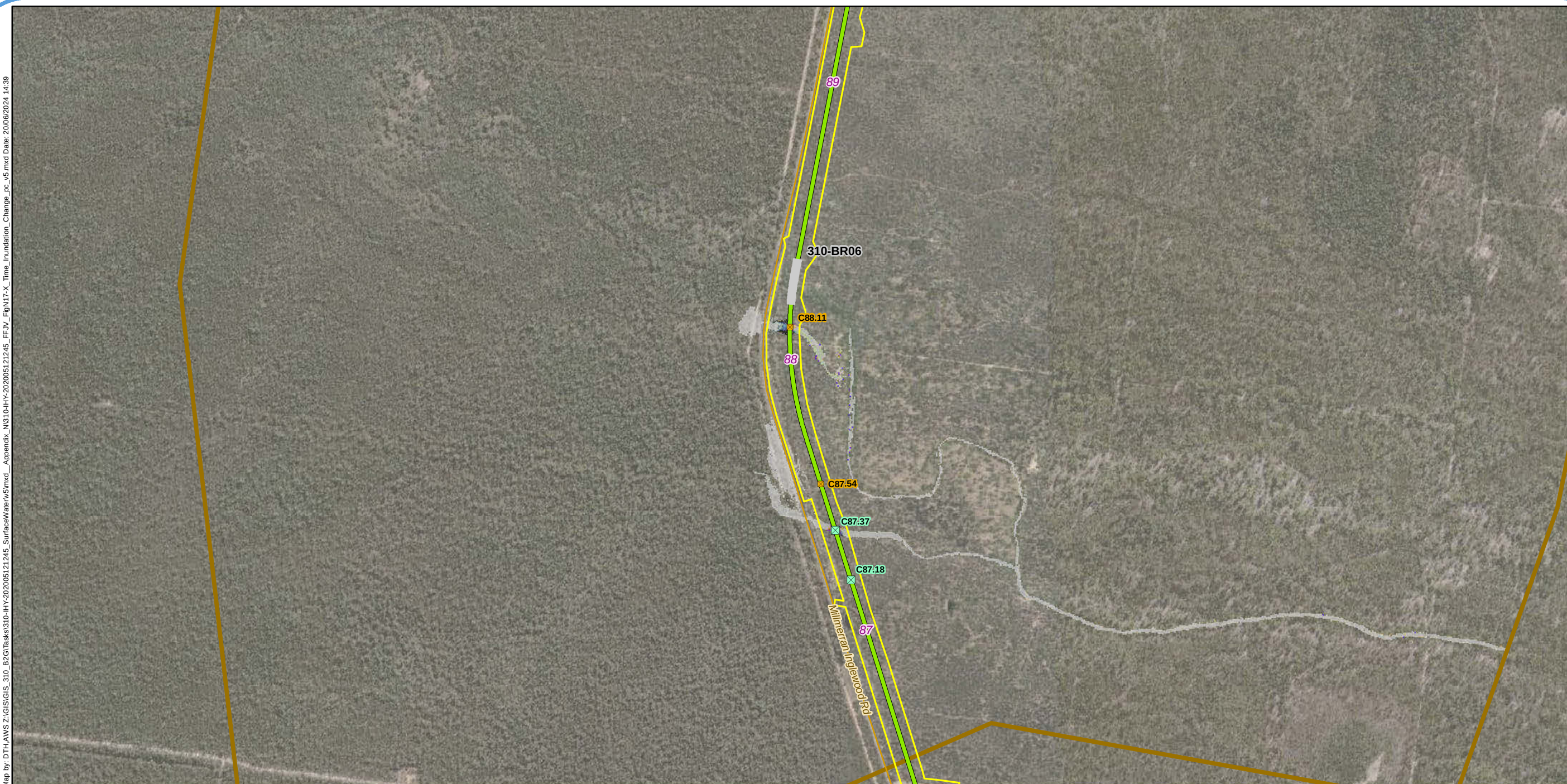
	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

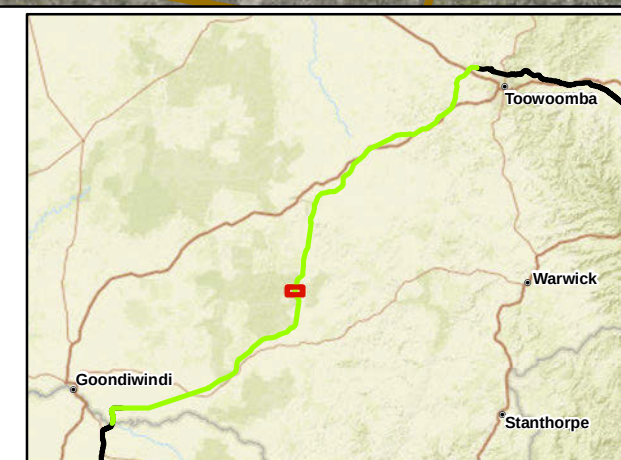
Border to Gowrie

Figure N17 - page 18 of 48:



5	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Minor roads		Project local catchment drainage culvert
	Project road design		Project bridges
			Local hydraulic model extent
			Project footprint

	< -50%		-5% to 5%
	-50% to -40%		5% to 10%
	-40% to -30%		10% to 20%
	-30% to -20%		20% to 50%
	-20% to -10%		50% to 100%
	-10% to -5%		>100%
			Decrease in inundation area
			Increase in inundation area

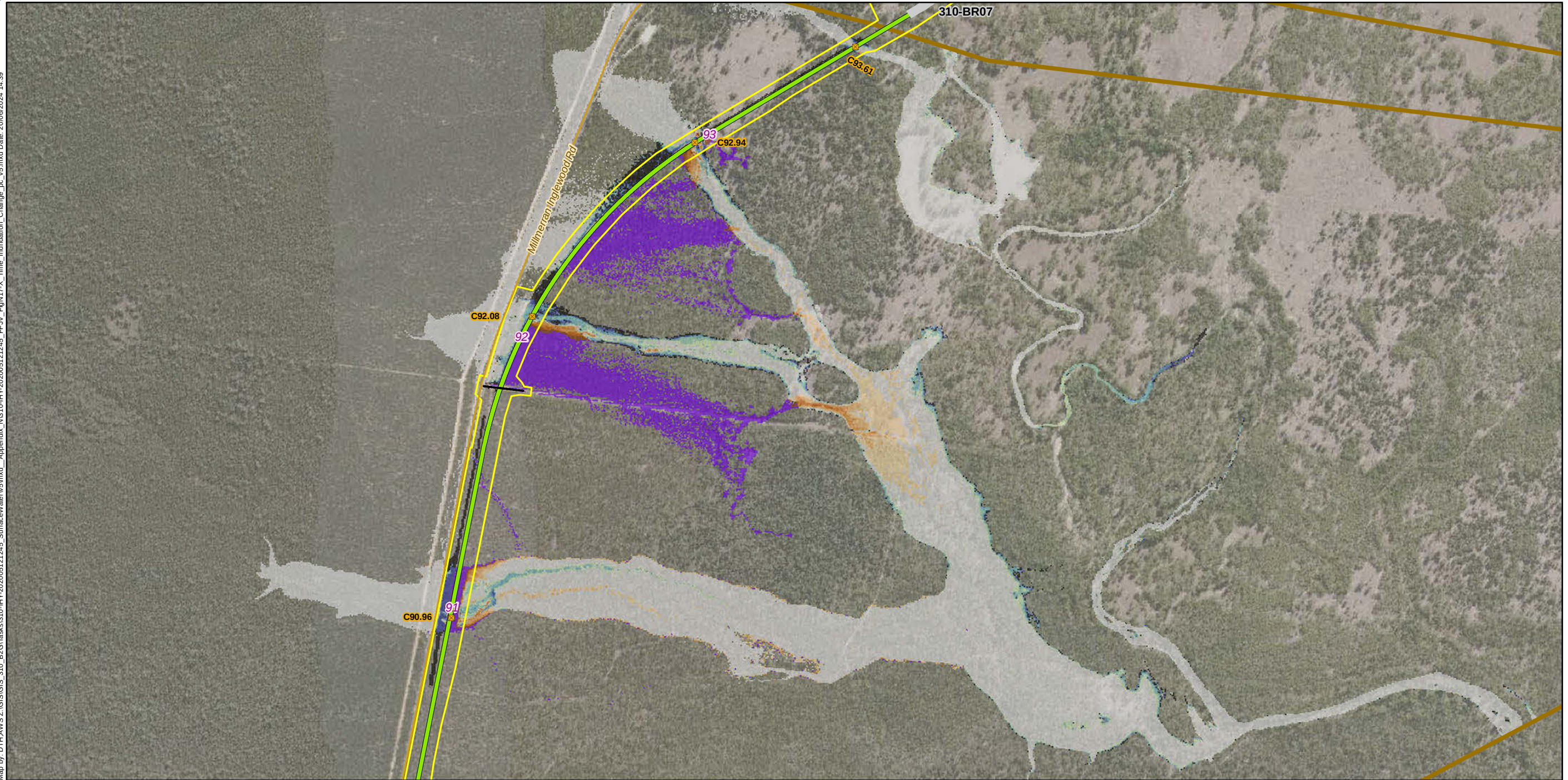


1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Border to Gowrie

Figure N17 - page 19 of 48:

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:39



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



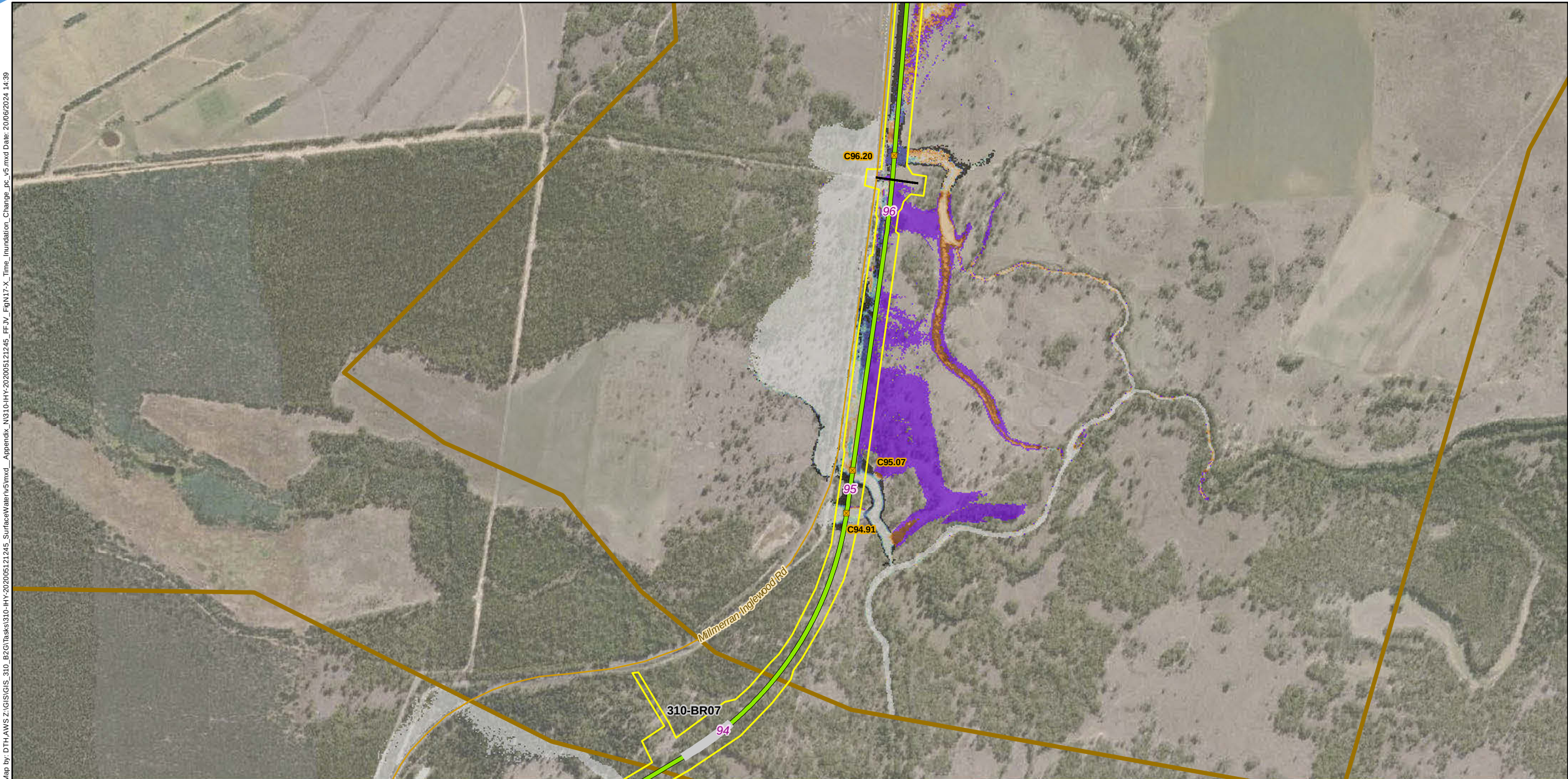
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 20 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: D:\HAWKS\Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:39

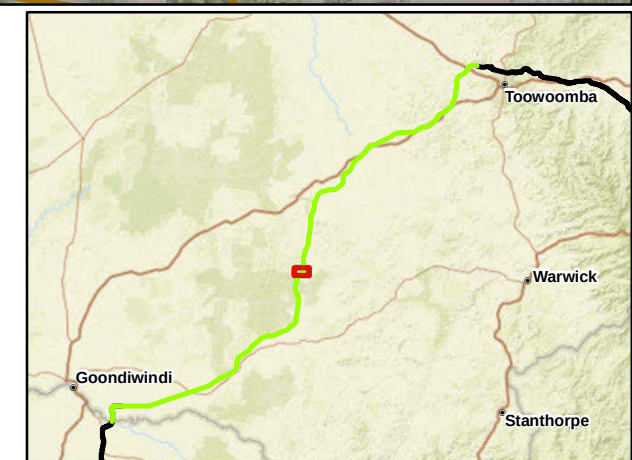


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



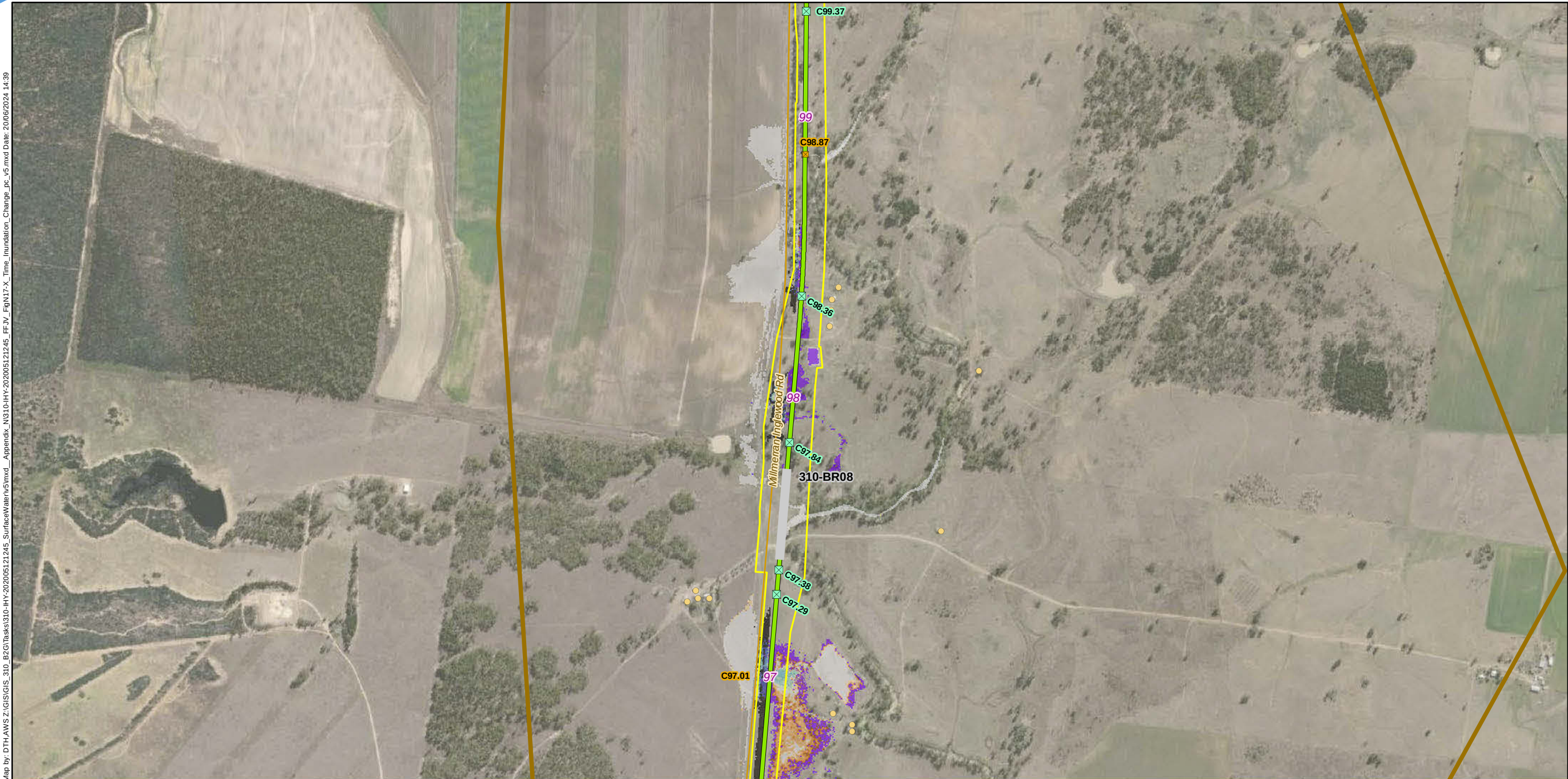
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 21 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:39



Legend

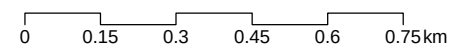
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:39



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



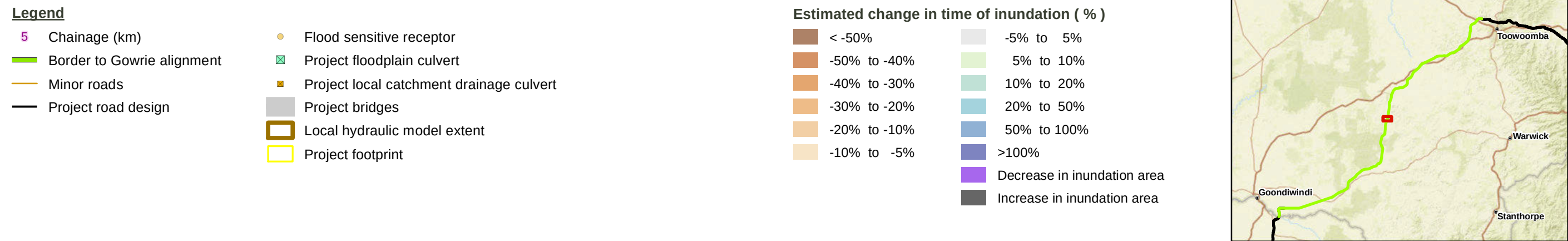
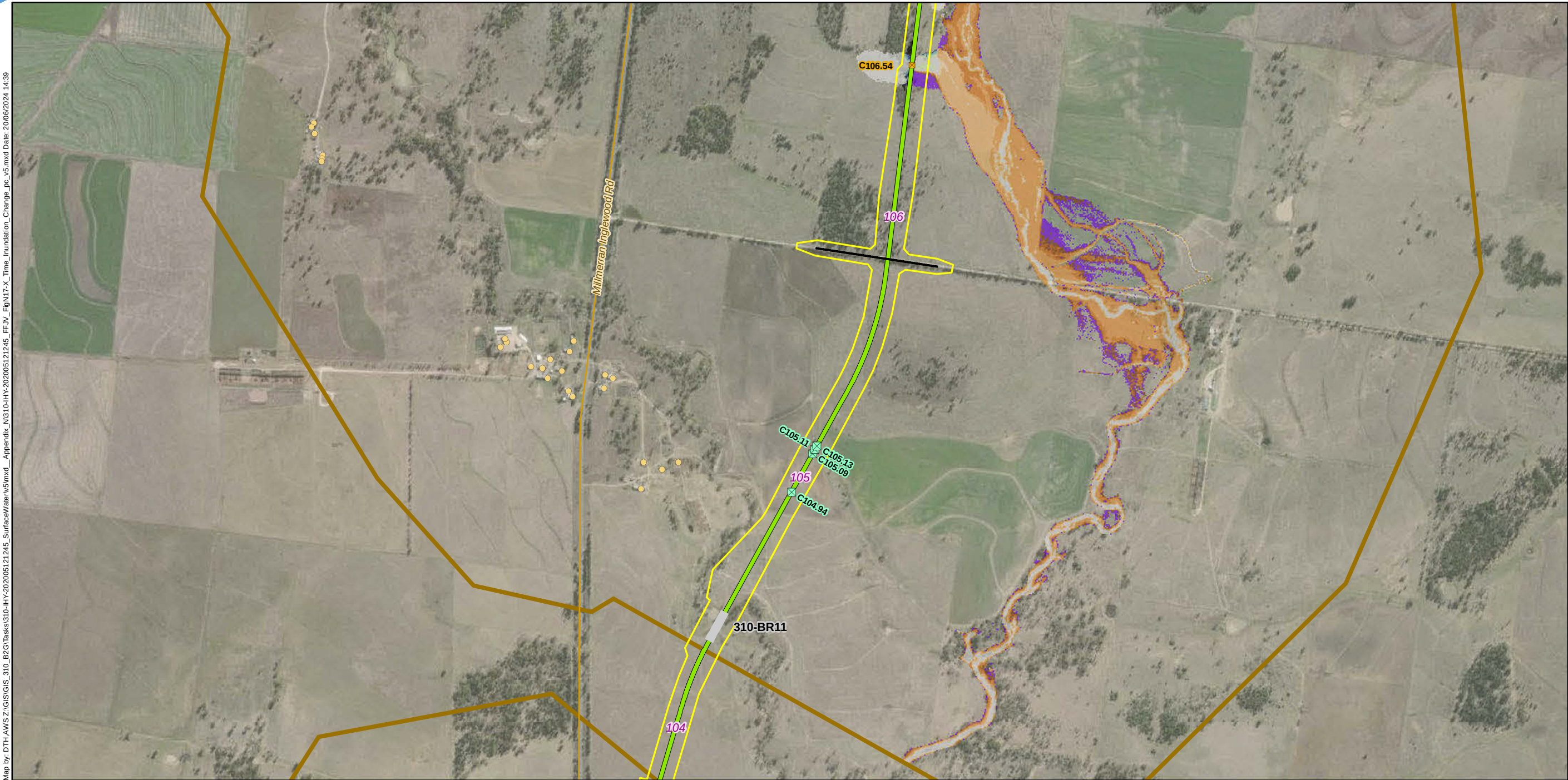
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 23 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

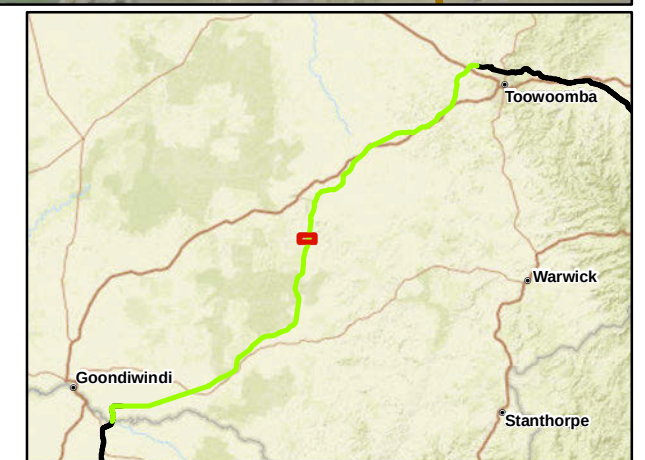
Border to Gowrie

Figure N17 - page 24 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**



A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15)$, $[0.3, 0.45)$, and $[0.6, 0.75]$, and 0 for intervals $[0.15, 0.3)$ and $[0.45, 0.6)$.

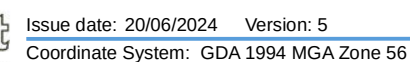


Figure N17 - page 25 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:39

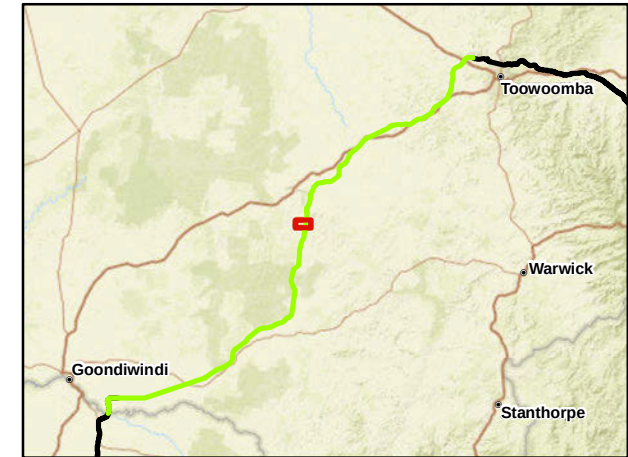


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 26 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-IHY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40

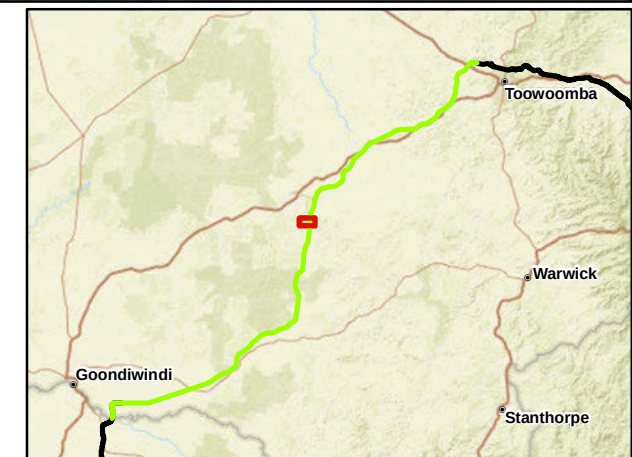


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 27 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

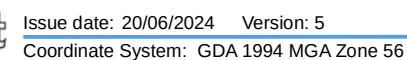
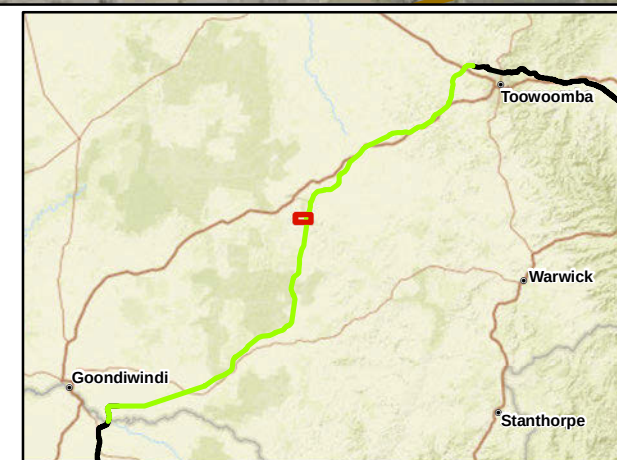


Figure N17 - page 28 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: D:\HAWKS\GIS\310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appldix_IV310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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

Map by: D:\HAWKS\Z:\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N\310-HY-202005121245_FF_V_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40

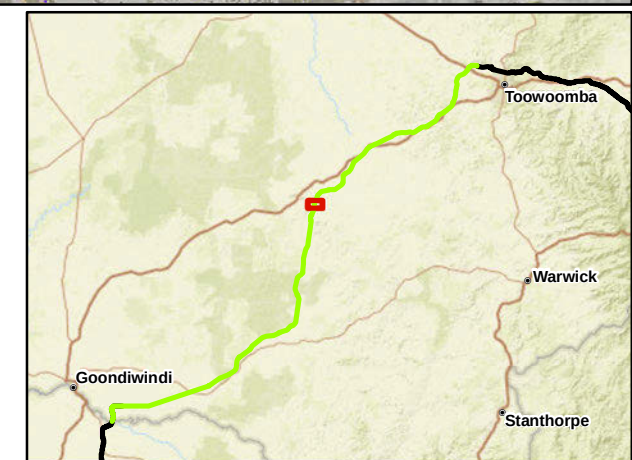


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



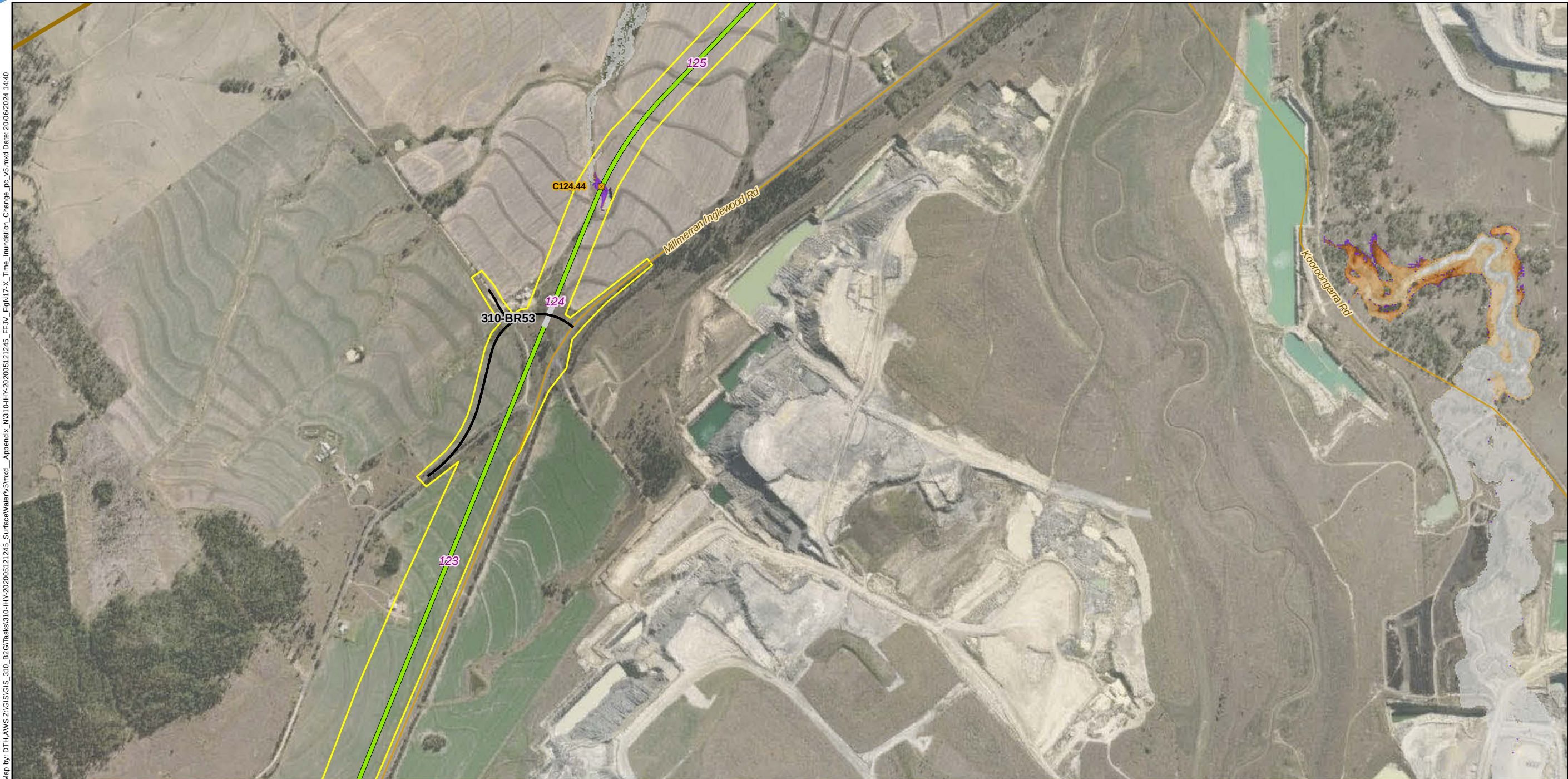
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 30 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 31 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

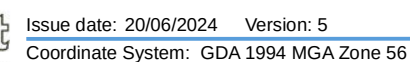


Figure N17 - page 32 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

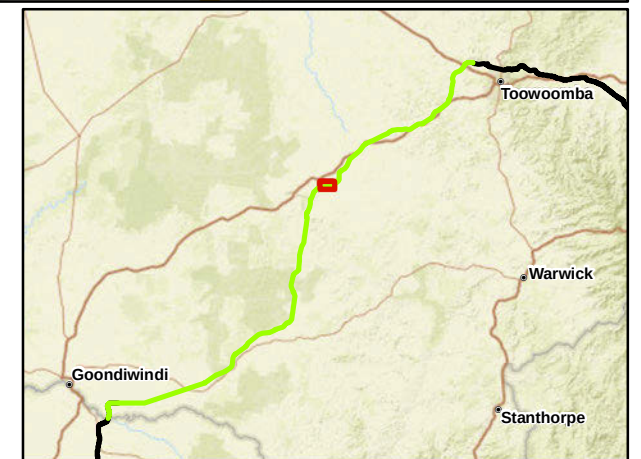


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 33 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-IHY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 34 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Future Freight
Integrating Community, Environment and Engineering

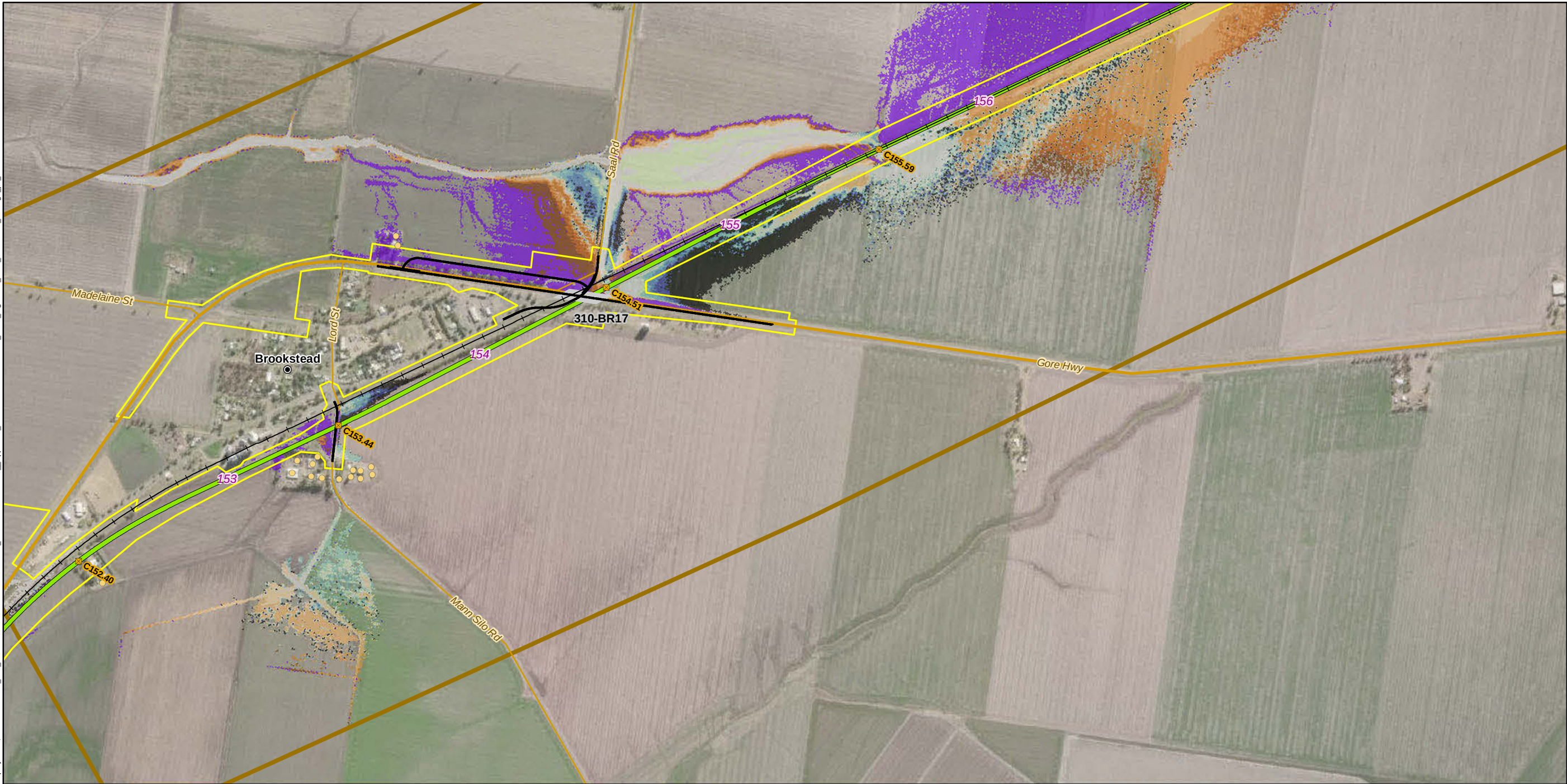
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 35 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



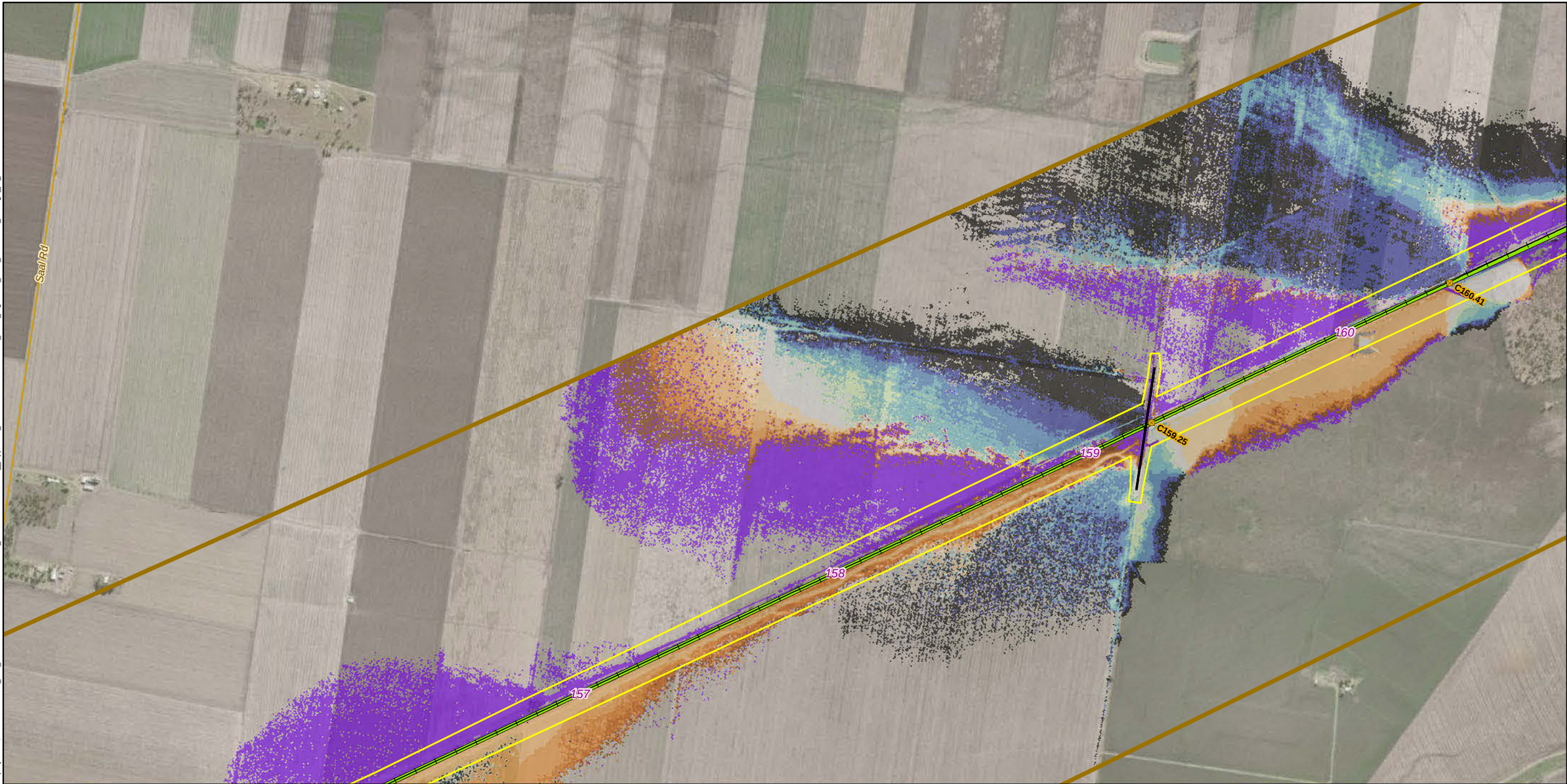
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 36 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 37 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:40



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



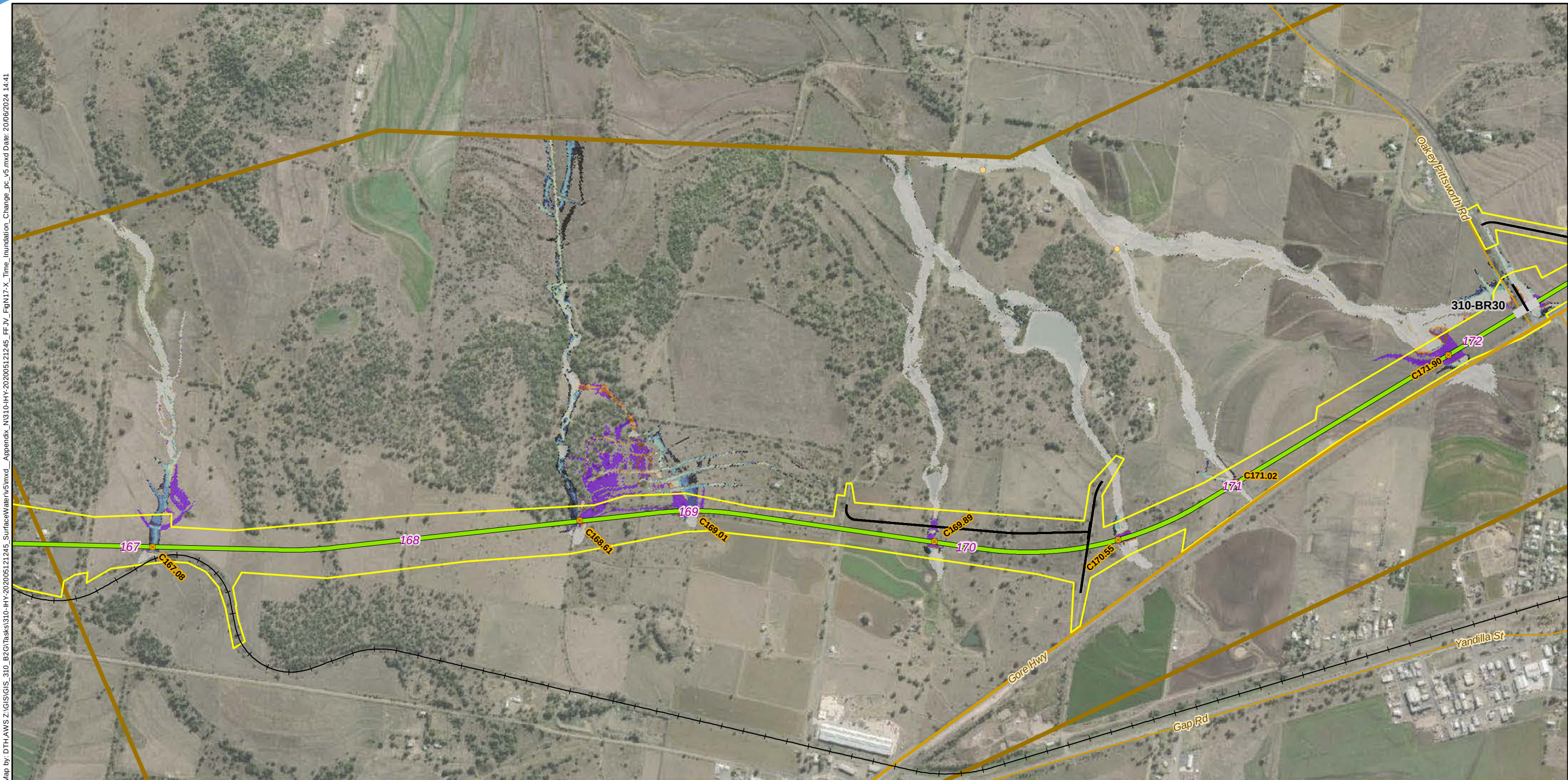
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 38 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41

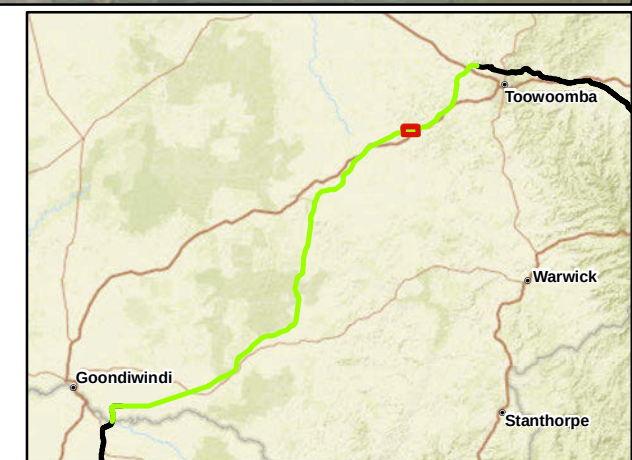


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

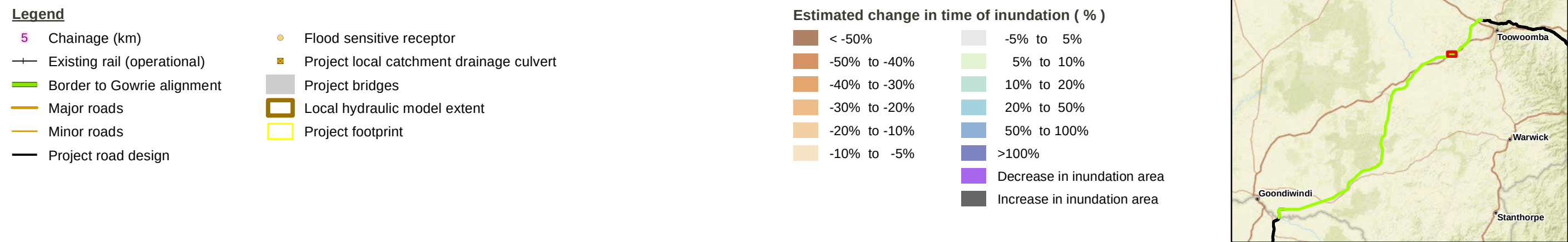
- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41



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

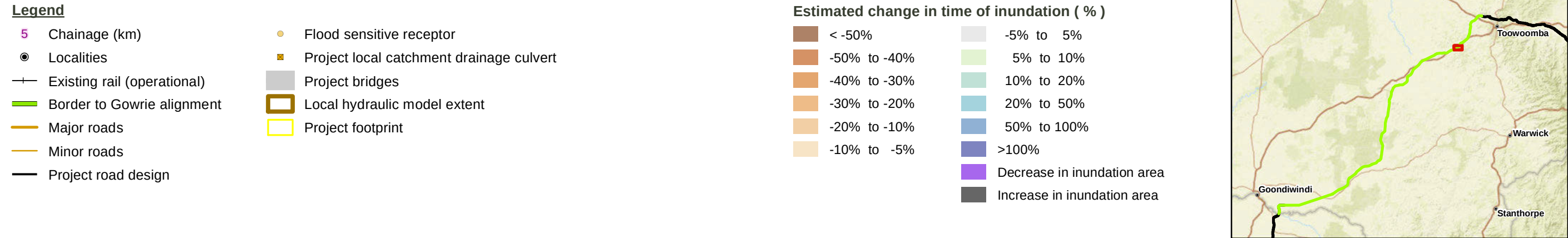


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 40 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 41 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure N17 - page 42 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41

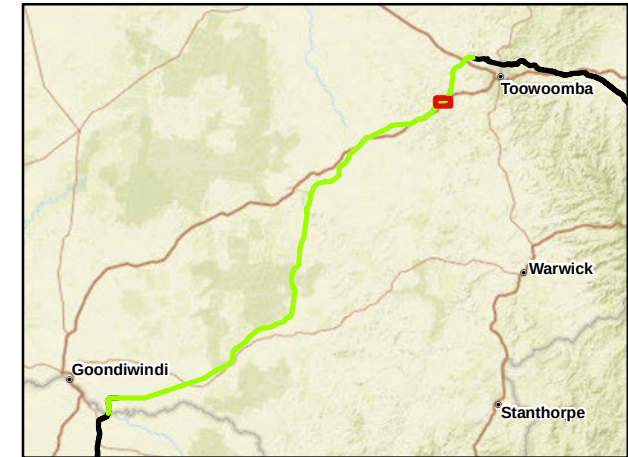


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 43 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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



Future Freight
Integrating Community, Environment and Engineering

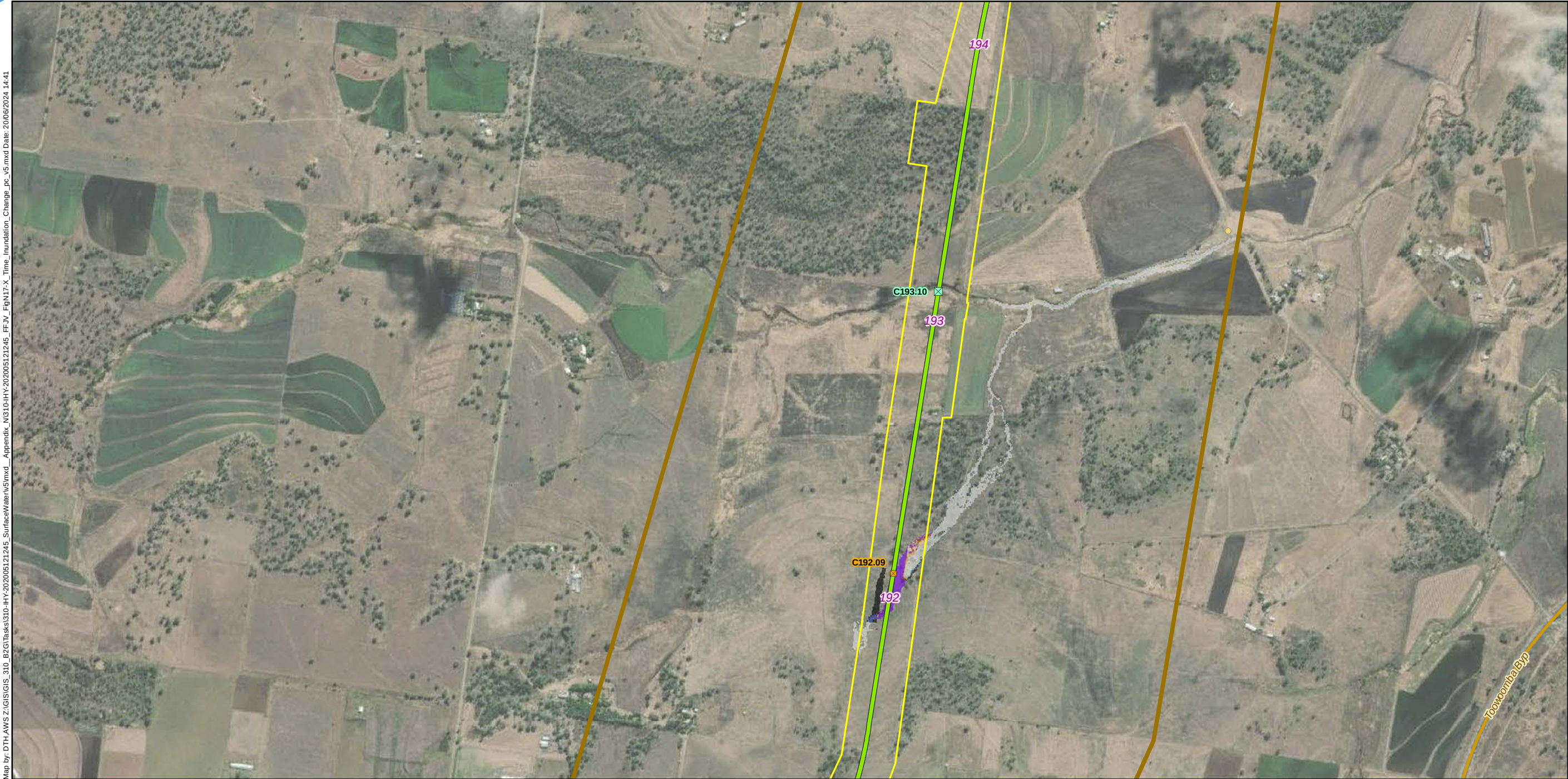
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 44 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



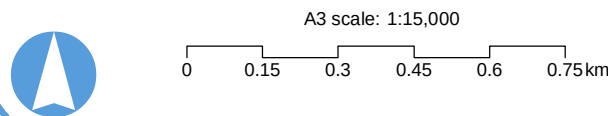
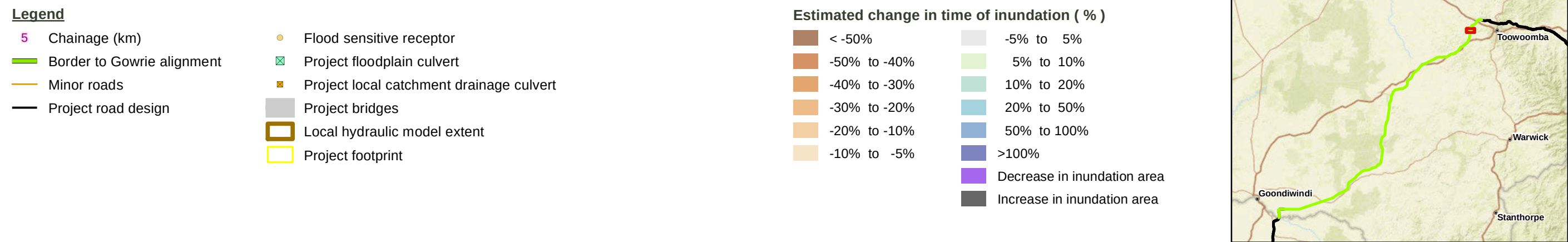
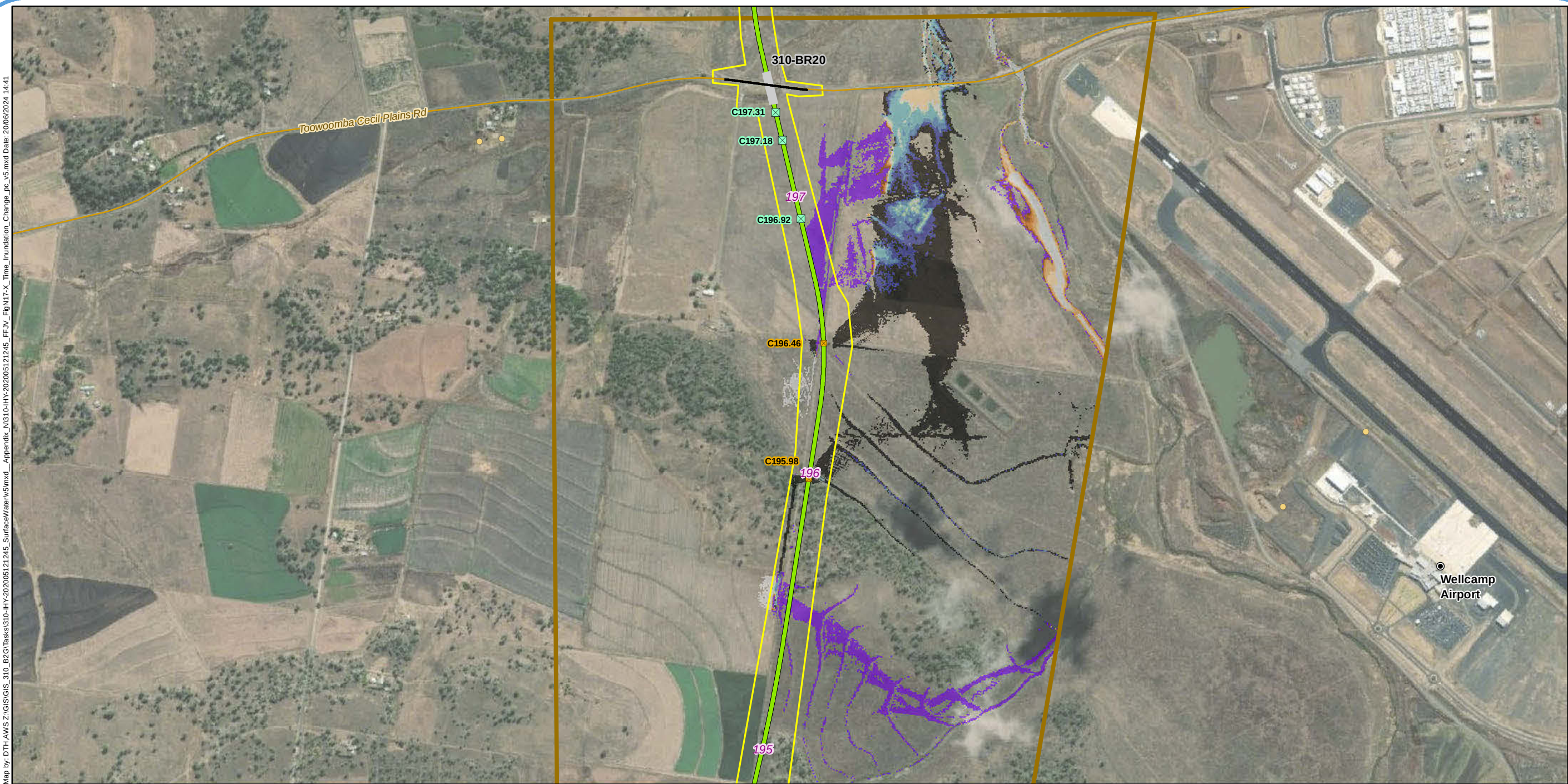
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

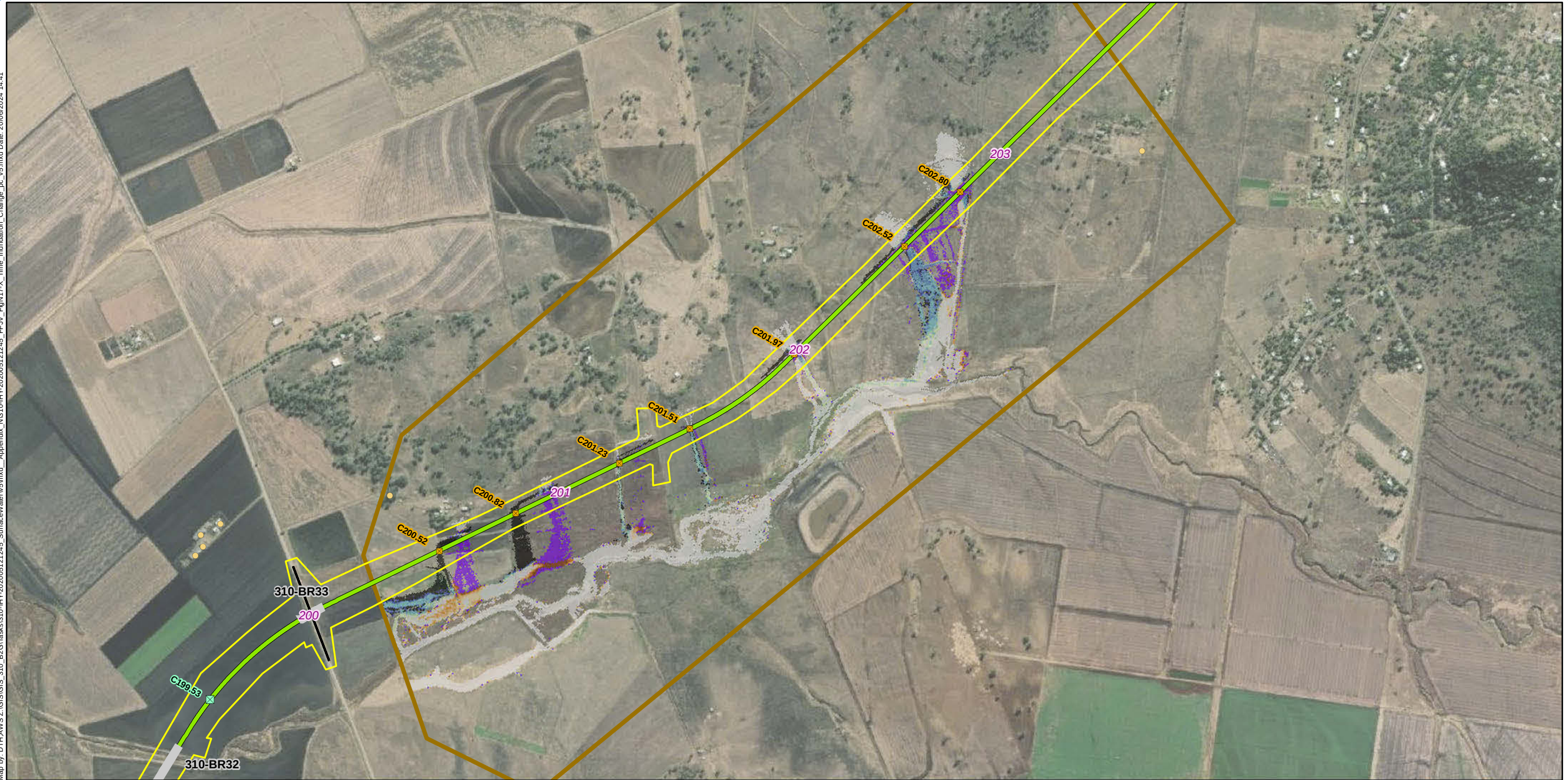
Border to Gowrie

Figure N17 - page 45 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWaterV5.mxd Appendix_IV310-HY-202005121245_FFJV_FigN17-X_Time_Inundation_Change_pc_v5.mxd Date: 20/06/2024 14:41



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-----------------------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |
| | Decrease in inundation area |
| | Increase in inundation area |



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

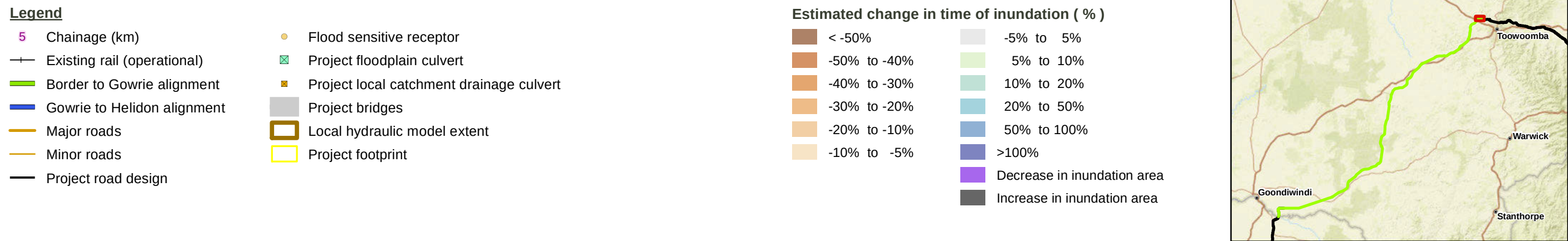
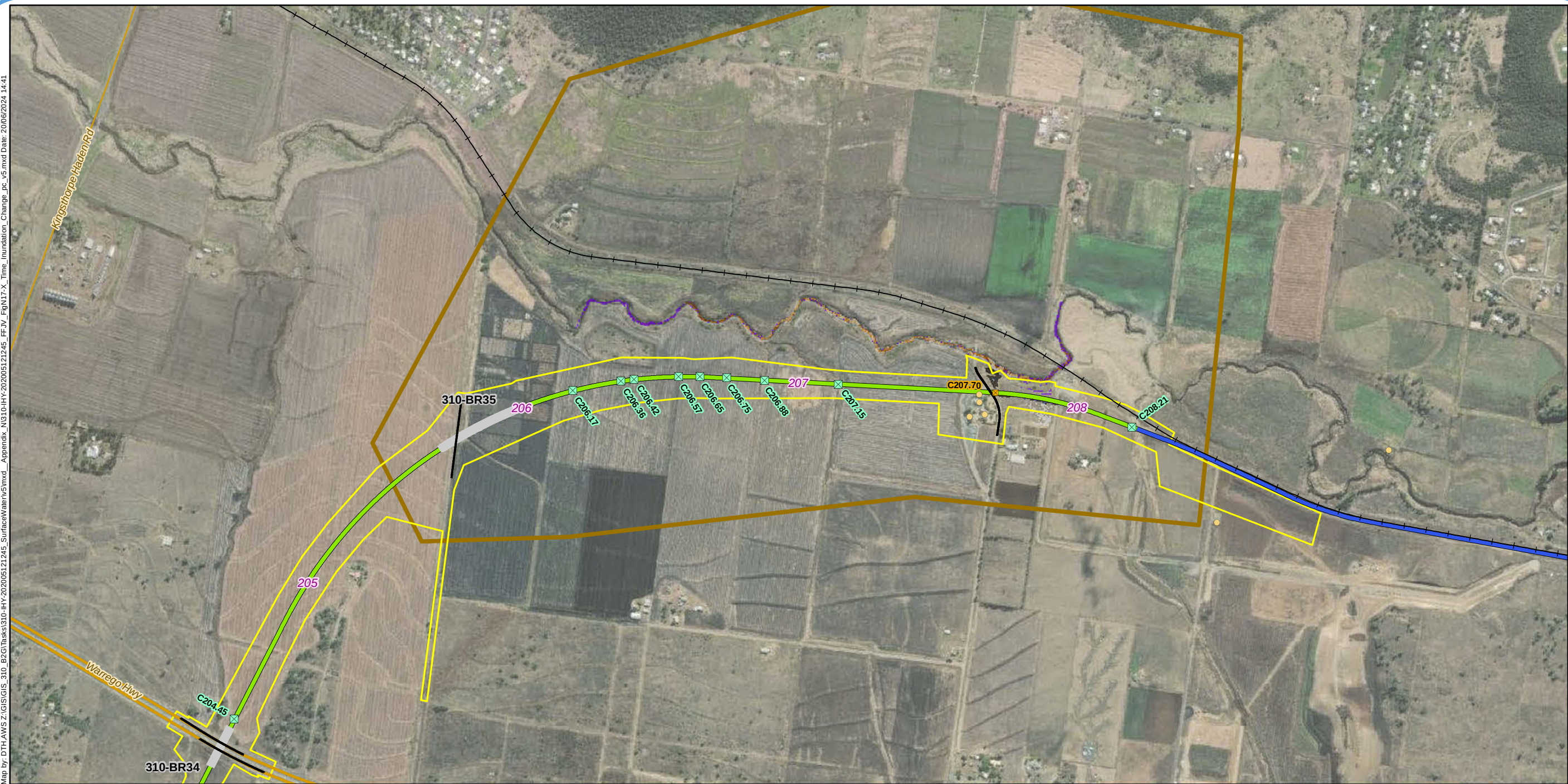


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 47 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N17 - page 48 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.





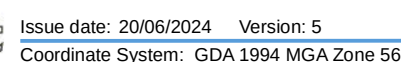
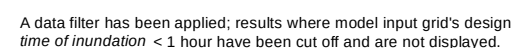
- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.

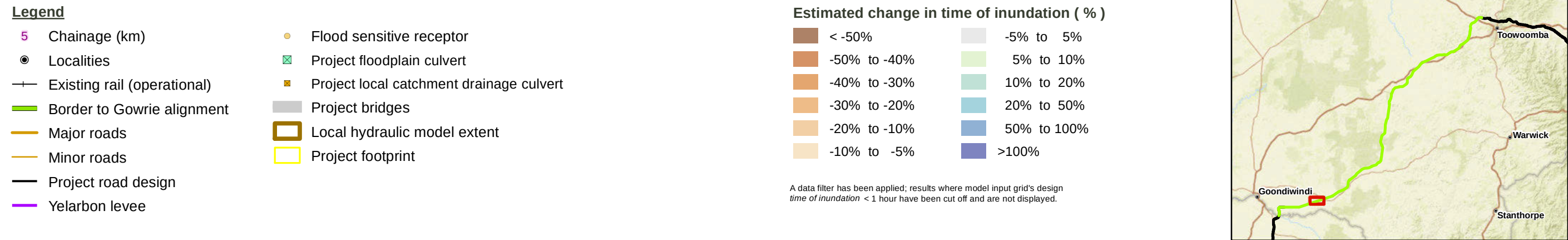




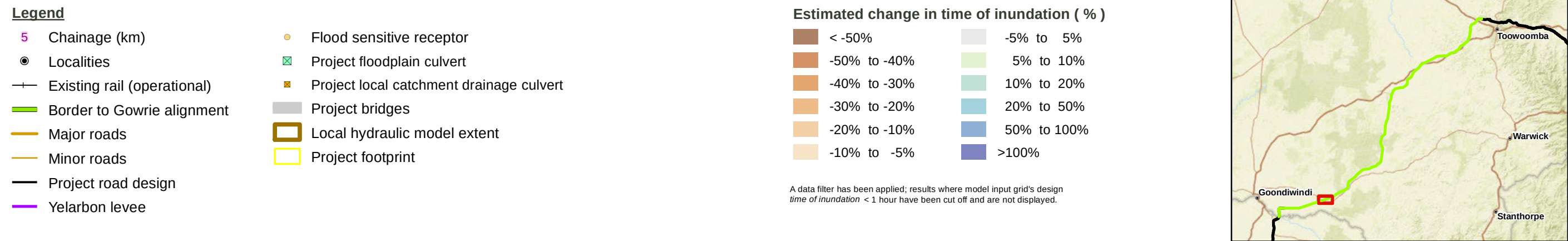
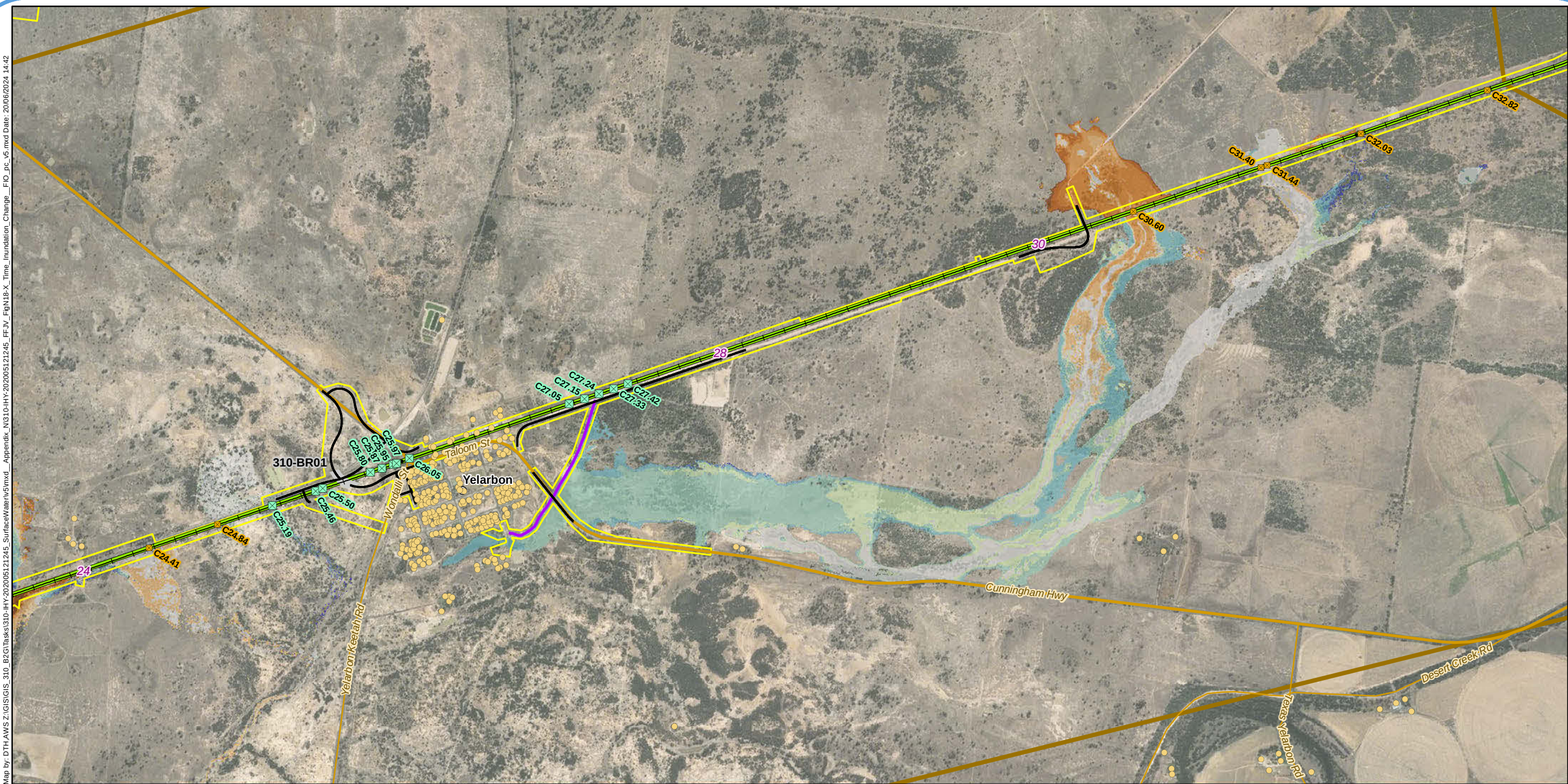
- Estimated change in time of inundation (%)**



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 5 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

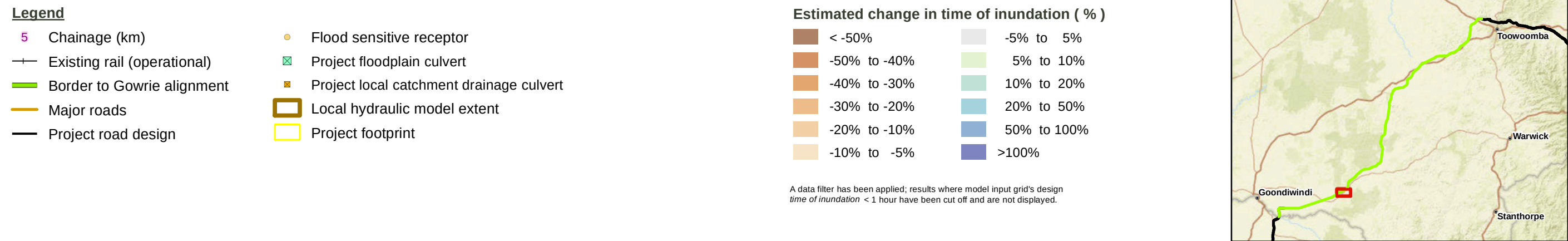


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 6 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km

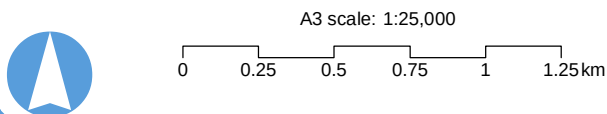
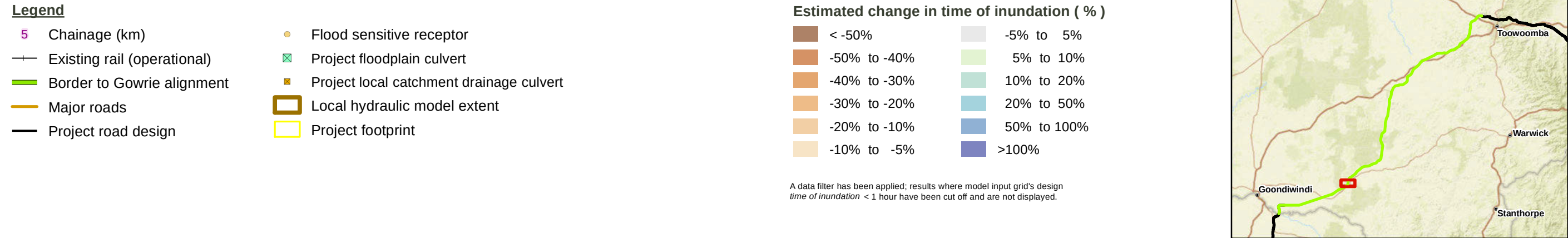


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 7 of 48:

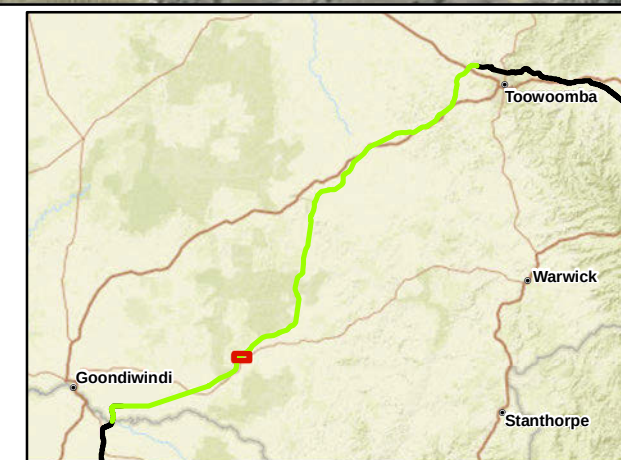
1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



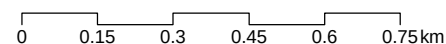


- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



A3 scale: 1:15,000



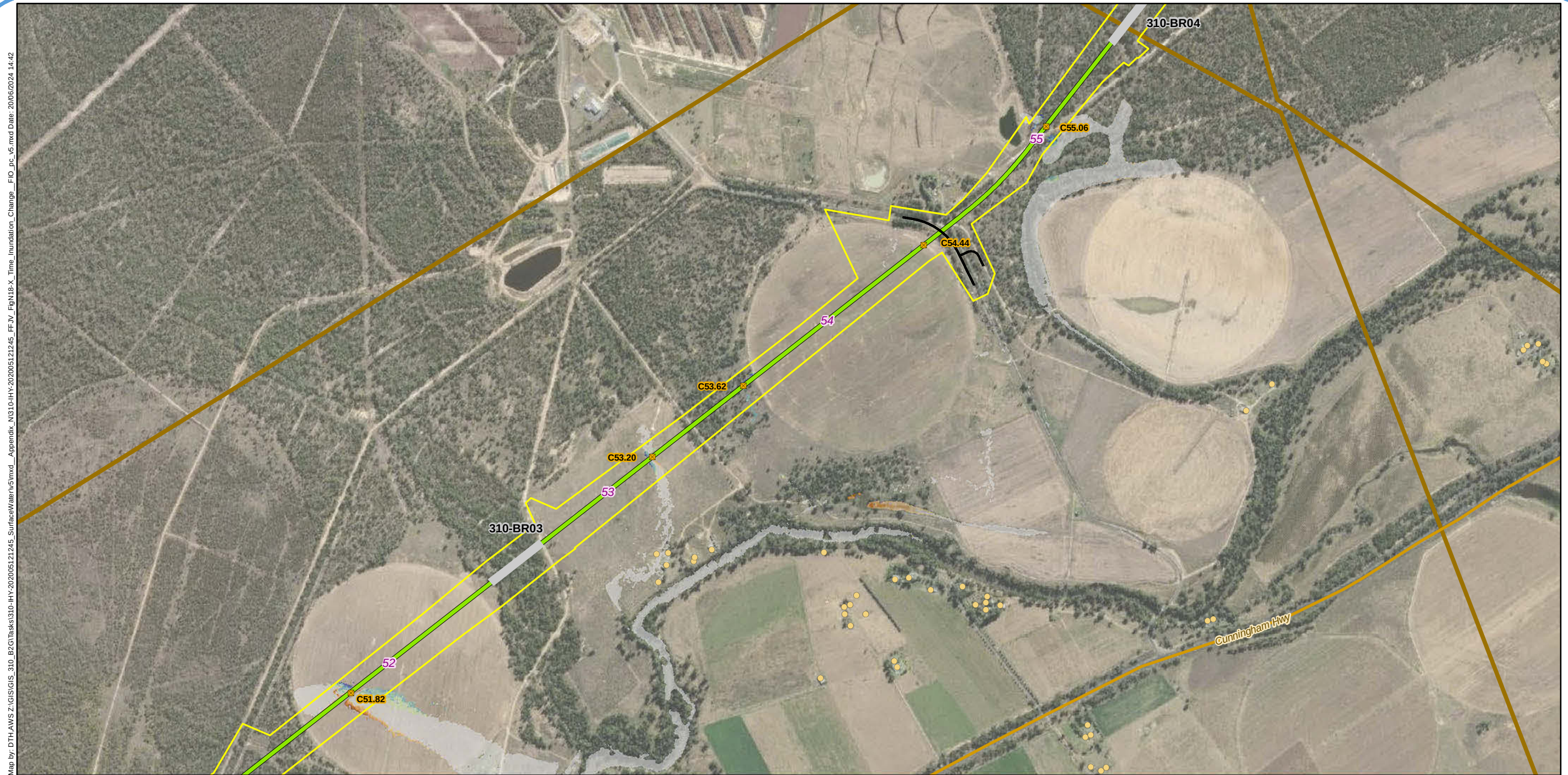
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 9 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



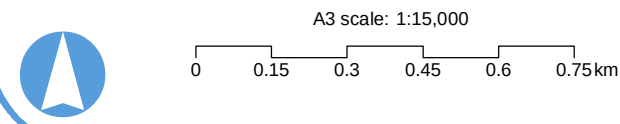
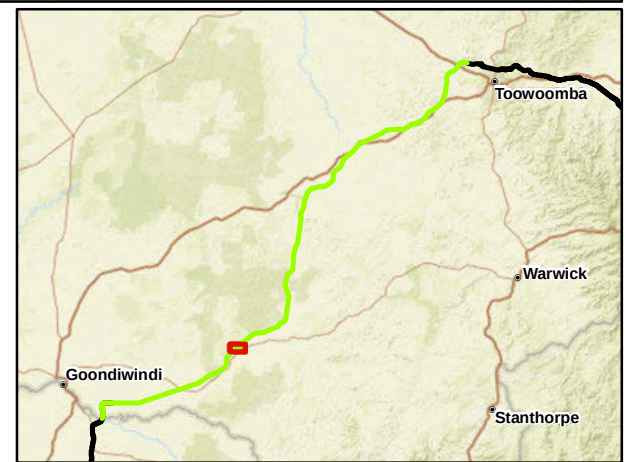
Legend

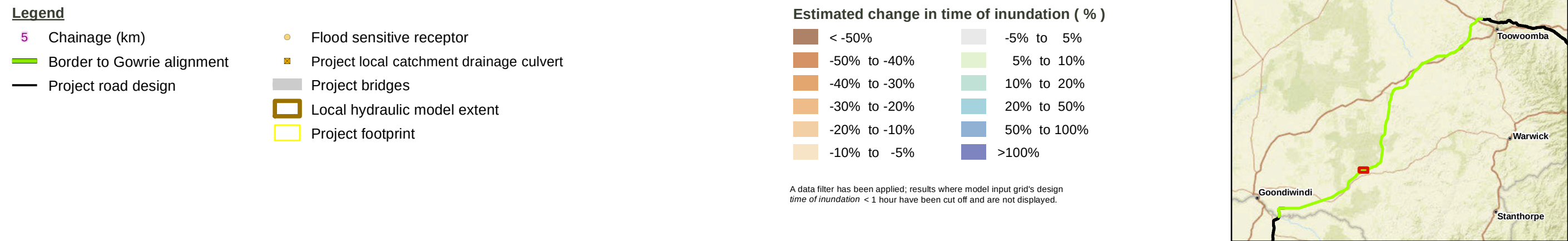
- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.





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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 11 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.

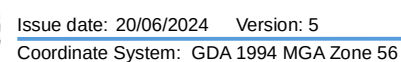
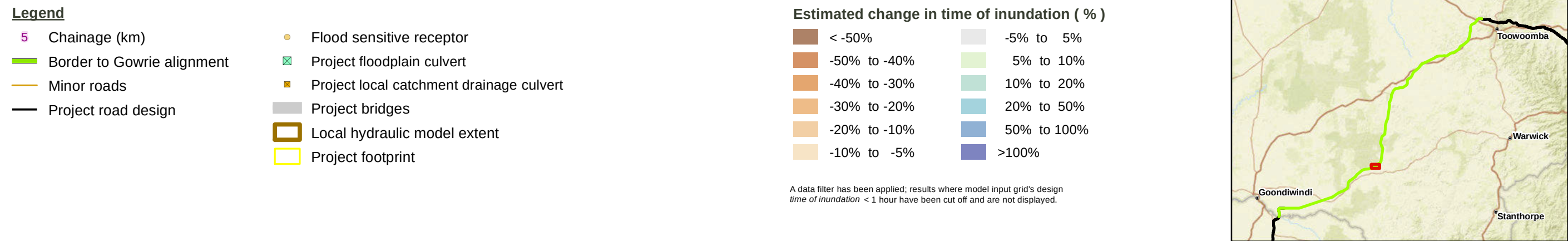


Figure N18 - page 12 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:43



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

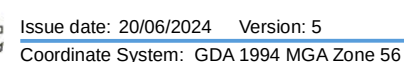
Figure N18 - page 14 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.

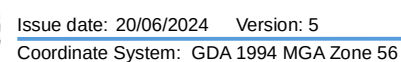


Figure N18 - page 16 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



5 Chainage (km)

Border to Gowrie alignment

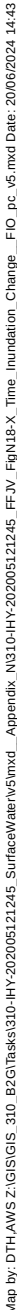
Minor roads

Project road design

- A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.

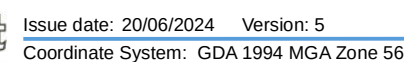


Figure N18 - page 19 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 20 of 48:
1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

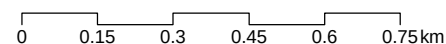


- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 21 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:43



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 22 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWaterV5.mxd_Appendix_IV310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:43



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



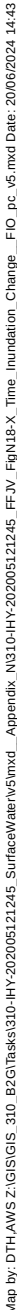
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 23 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

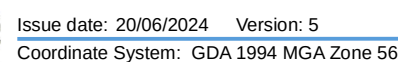


1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Border to Gowrie

Figure N18 - page 25 of 48:

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:43



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 26 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



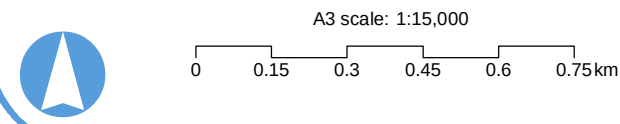
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.





- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.





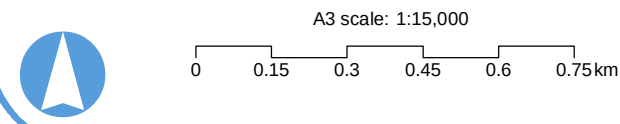
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:44



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



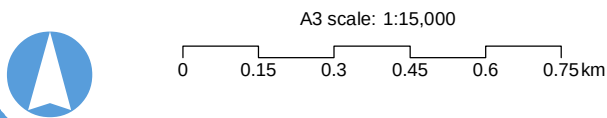
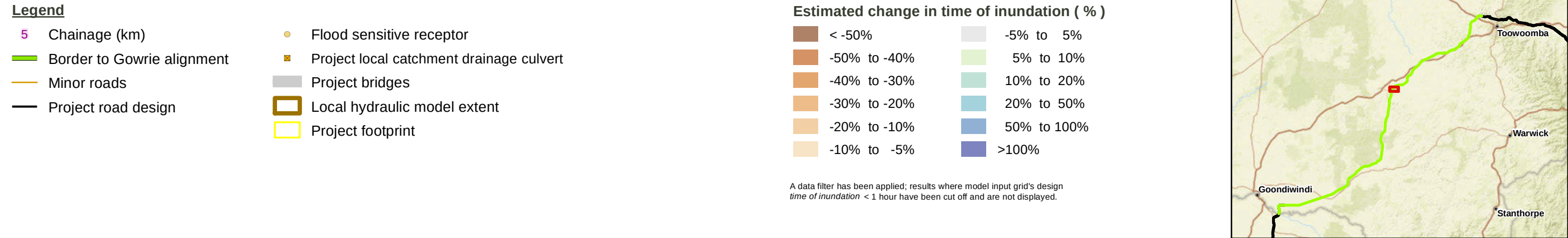
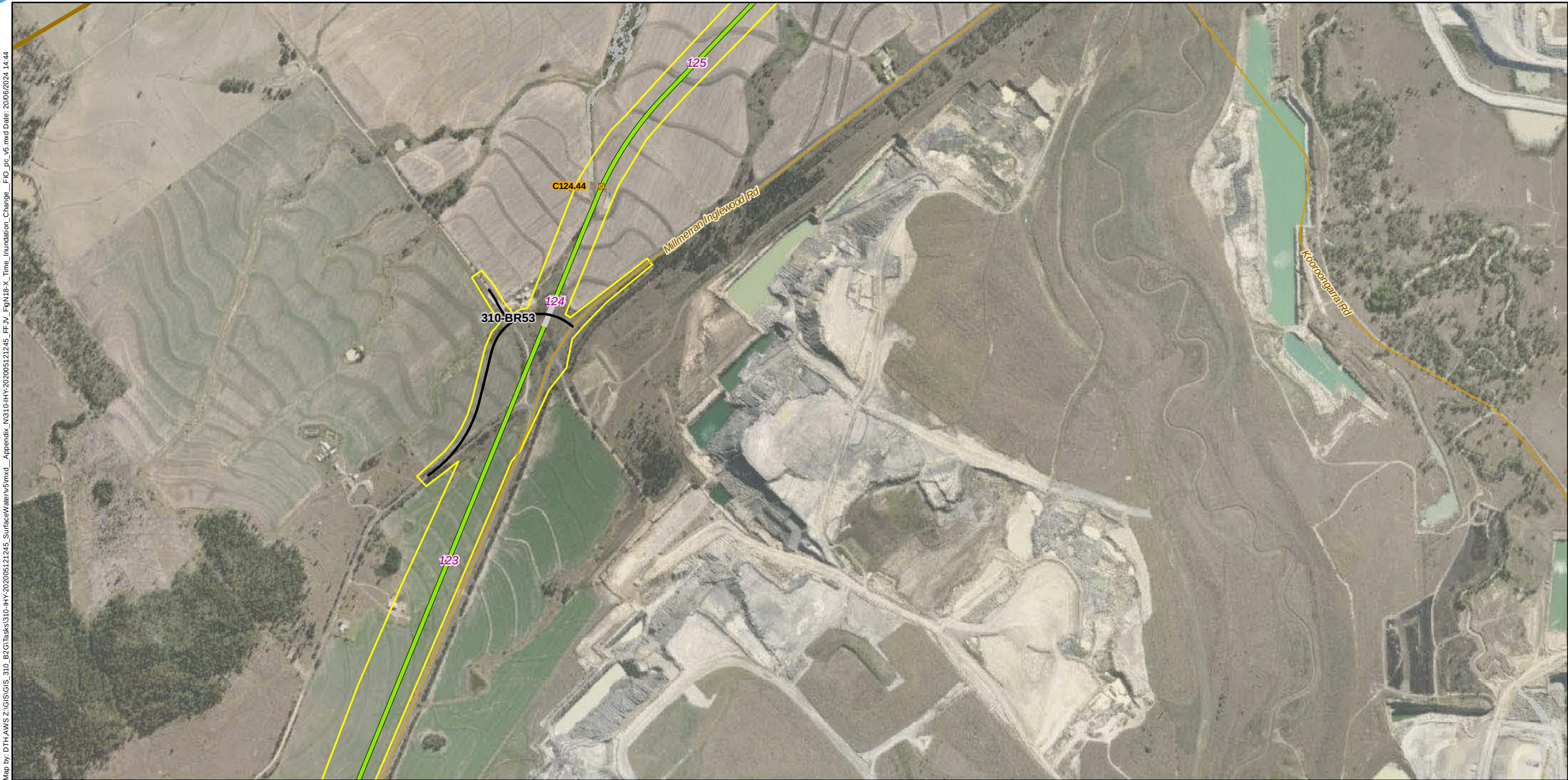
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 30 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)





- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.

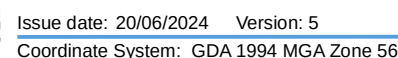
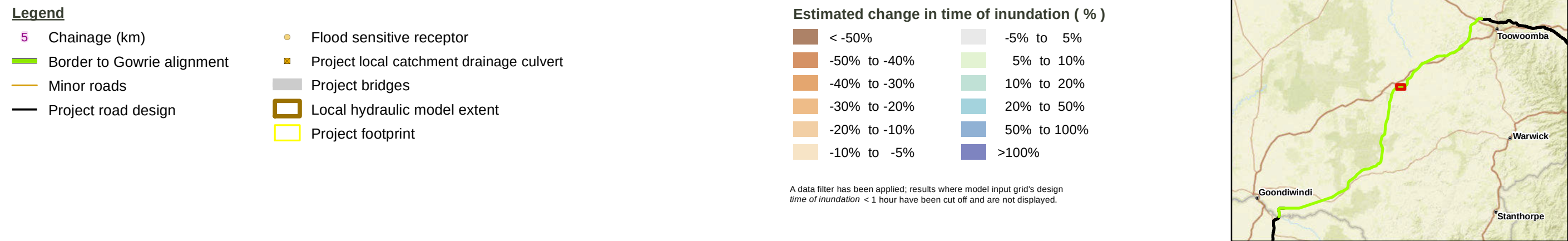


Figure N18 - page 32 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 33 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:44



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

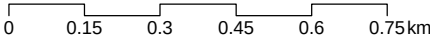
Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



A3 scale: 1:15,000



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 34 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_N18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:44



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 35 of 48:
1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



- Estimated change in time of inundation (%)**

A data filter has been applied; results where model input grid's design *time of inundation* < 1 hour have been cut off and are not displayed.



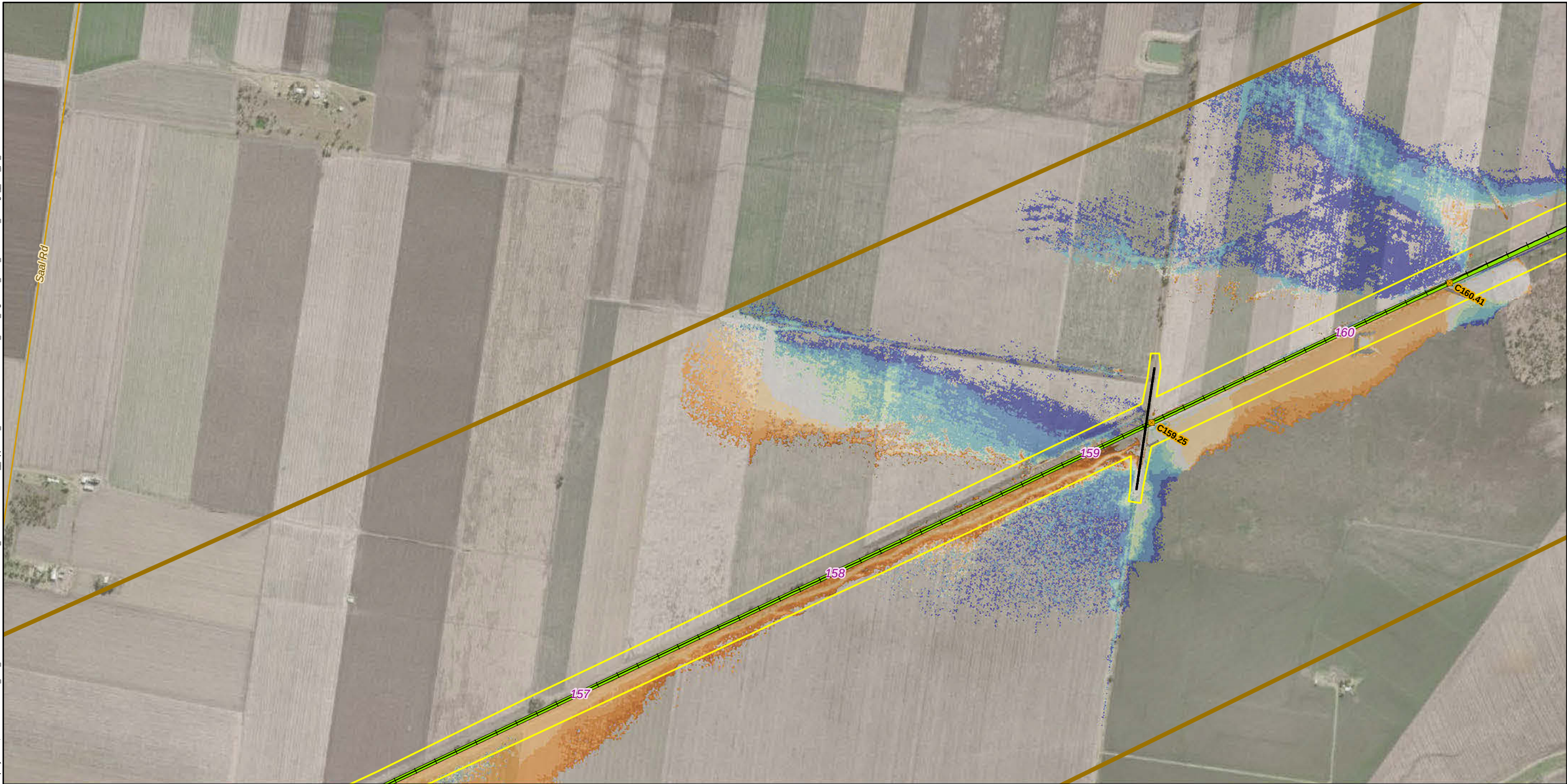
Future Freight
Integrating Community, Environment and Engineering

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Border to Gowrie

Figure N18 - page 36 of 48:

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:44



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 37 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



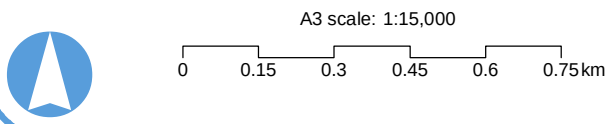
Legend

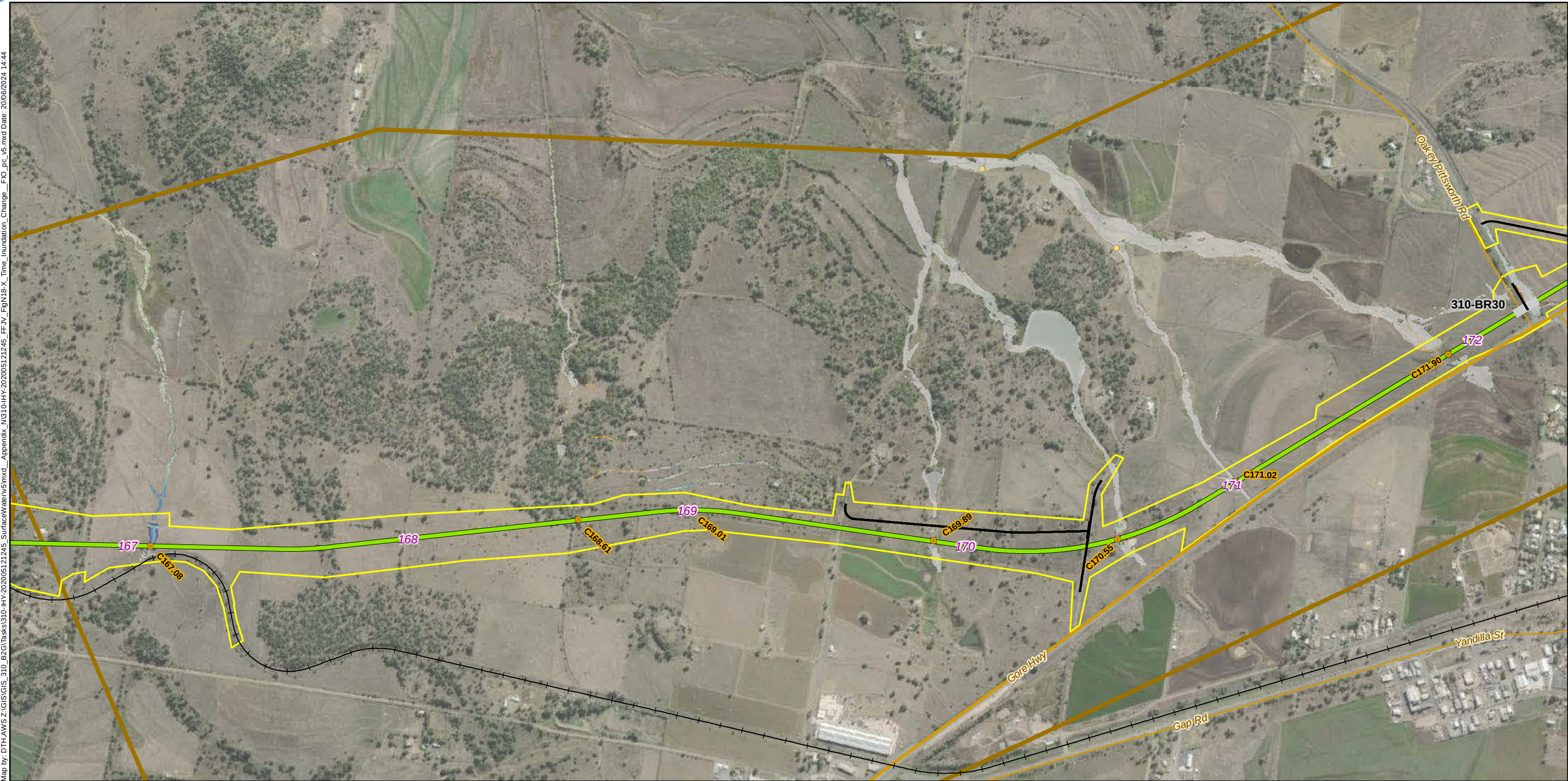
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

- | | |
|--------------|-------------|
| < -50% | -5% to 5% |
| -50% to -40% | 5% to 10% |
| -40% to -30% | 10% to 20% |
| -30% to -20% | 20% to 50% |
| -20% to -10% | 50% to 100% |
| -10% to -5% | >100% |

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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

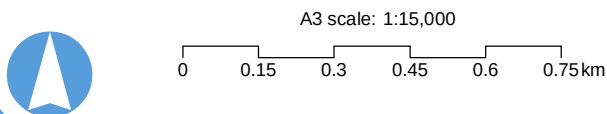
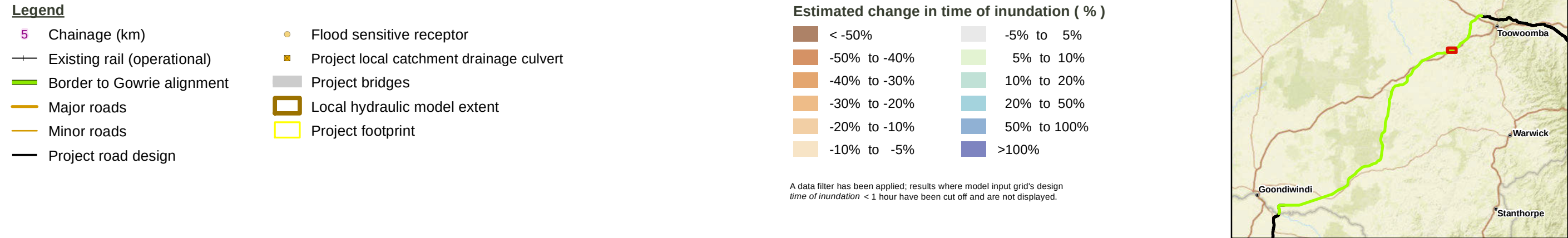


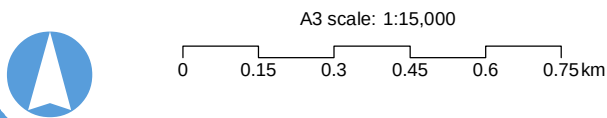
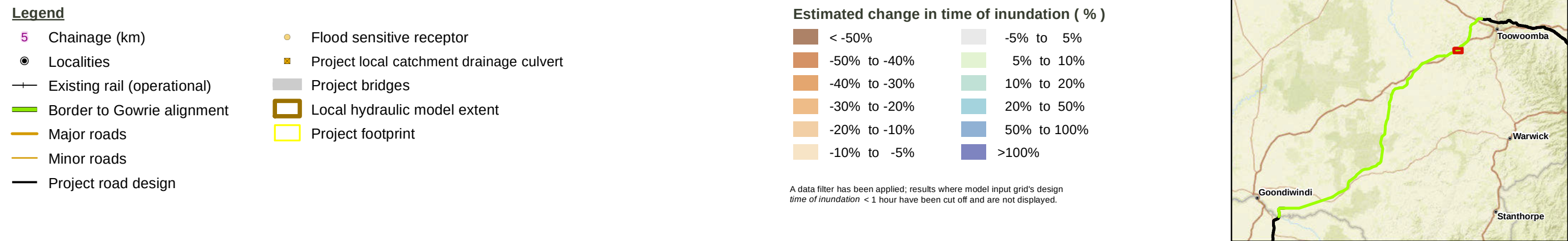
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 39 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)





Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV310-HY-202005121245_FFJV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 42 of 48:
1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_IV\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



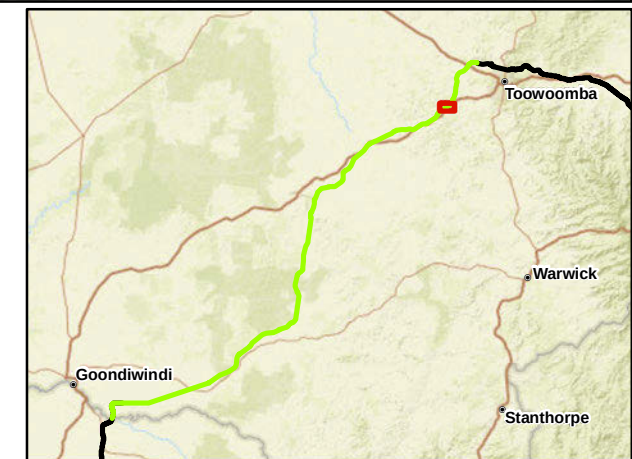
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 43 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



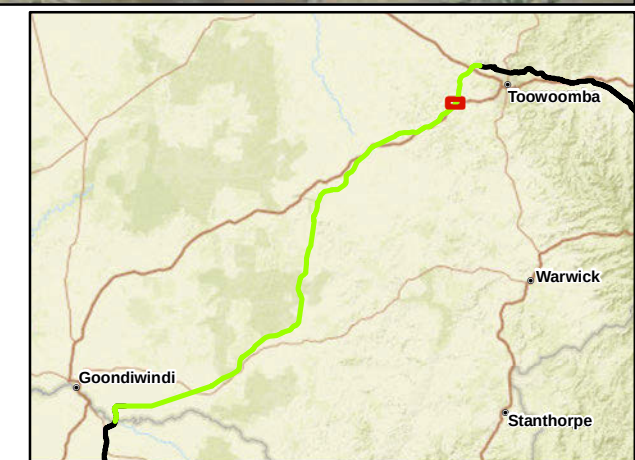
Legend

- | | |
|----------------------------|--------------------------------|
| 5 Chainage (km) | ● Flood sensitive receptor |
| Border to Gowrie alignment | ▣ Project floodplain culvert |
| Major roads | ▣ Project bridges |
| Minor roads | ▣ Local hydraulic model extent |
| Project road design | ▣ Project footprint |

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 44 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5mxd_Appldix_IV310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



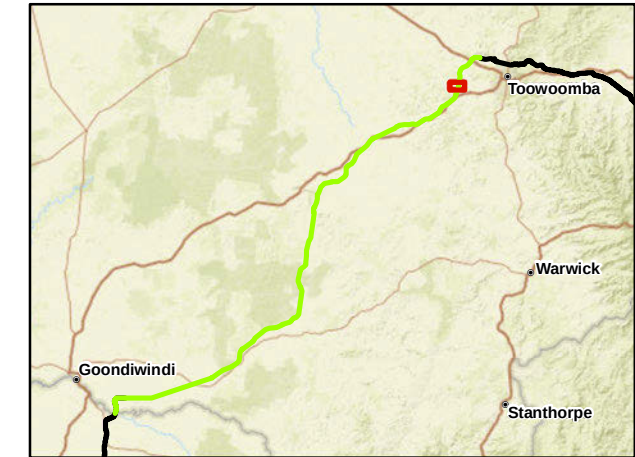
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



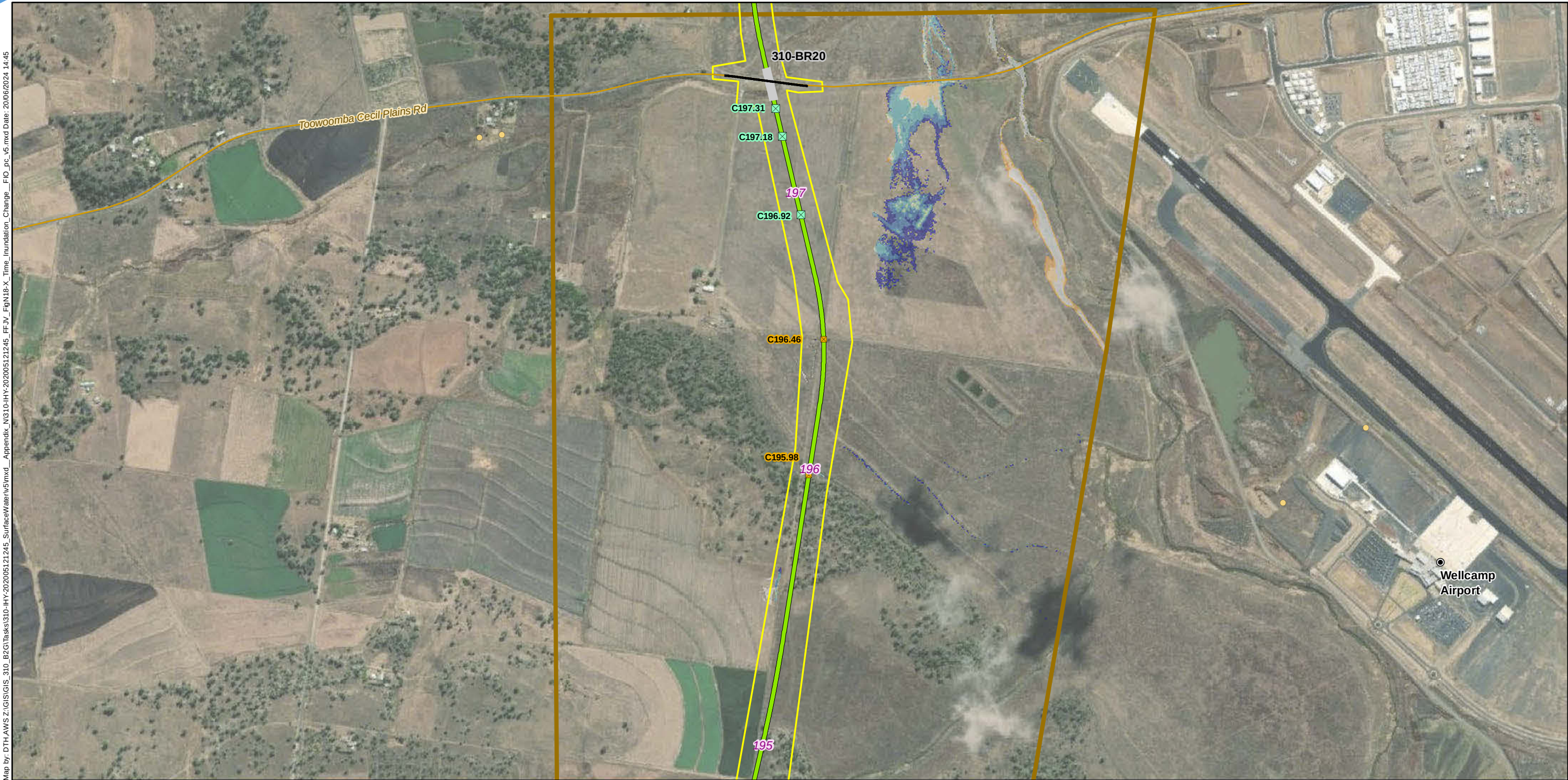
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 45 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310-HY-202005121245_SurfaceWater\5vmsd_Appendix_N\310-HY-202005121245_FF\JV_FigN18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



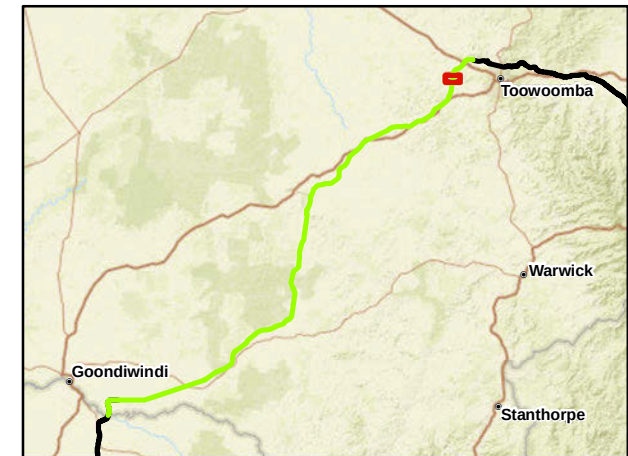
Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 46 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWaterV5.mxd Appendix_N18\18-X_Time_Inundation_Change_FIO_pc_v6.mxd Date: 20/06/2024 14:45



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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



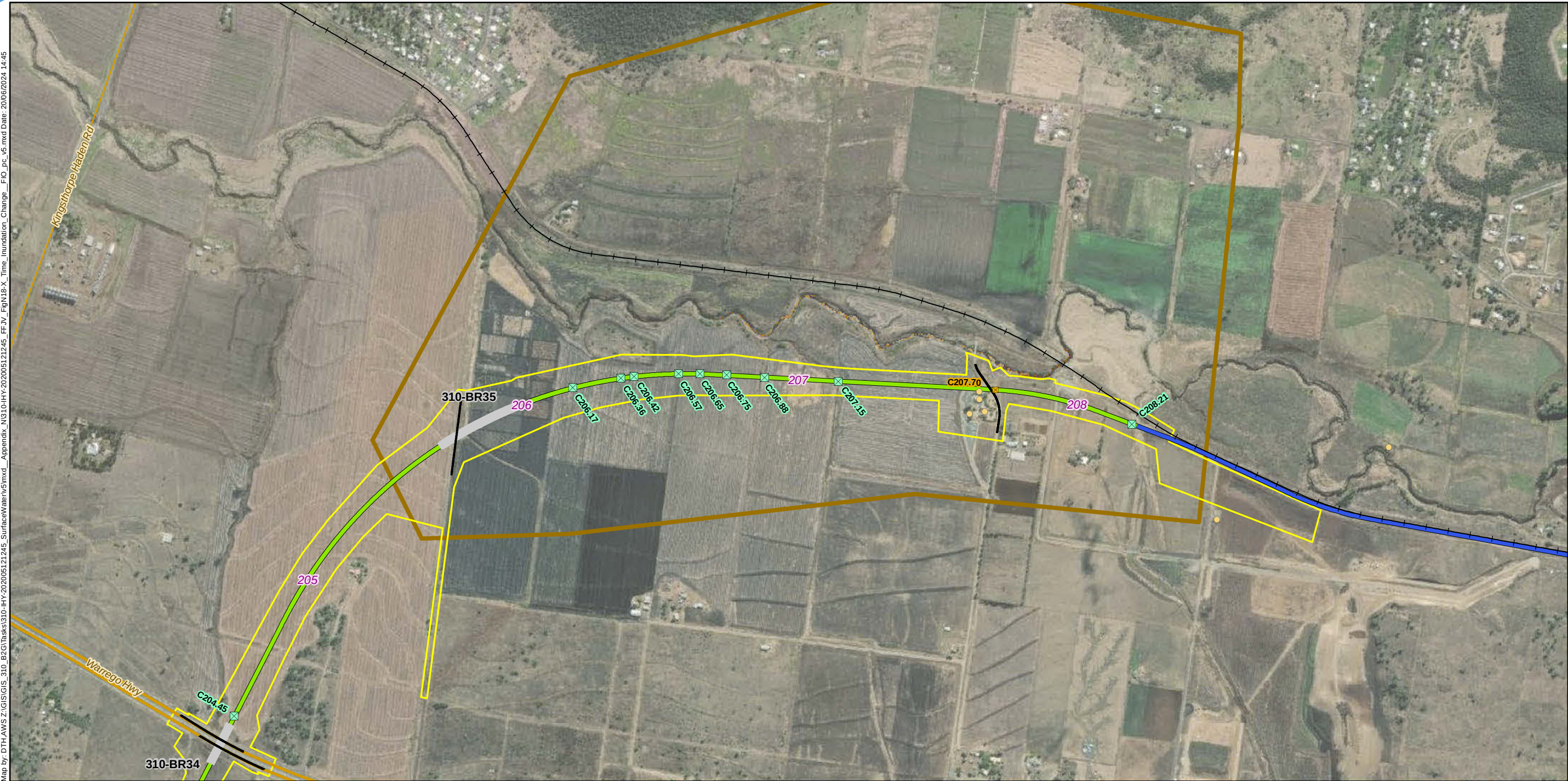
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 47 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated change in time of inundation (%)

< -50%	-5% to 5%
-50% to -40%	5% to 10%
-40% to -30%	10% to 20%
-30% to -20%	20% to 50%
-20% to -10%	50% to 100%
-10% to -5%	>100%

A data filter has been applied; results where model input grid's design time of inundation < 1 hour have been cut off and are not displayed.



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: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure N18 - page 48 of 48:

1% AEP Event - Local Catchments - Percentage Change in Time of Inundation (<1 hour cutoff applied)

APPENDIX T2

Hydrology and Flooding Technical Report—Volume 2

Appendix O Local drainage 20% AEP flood maps

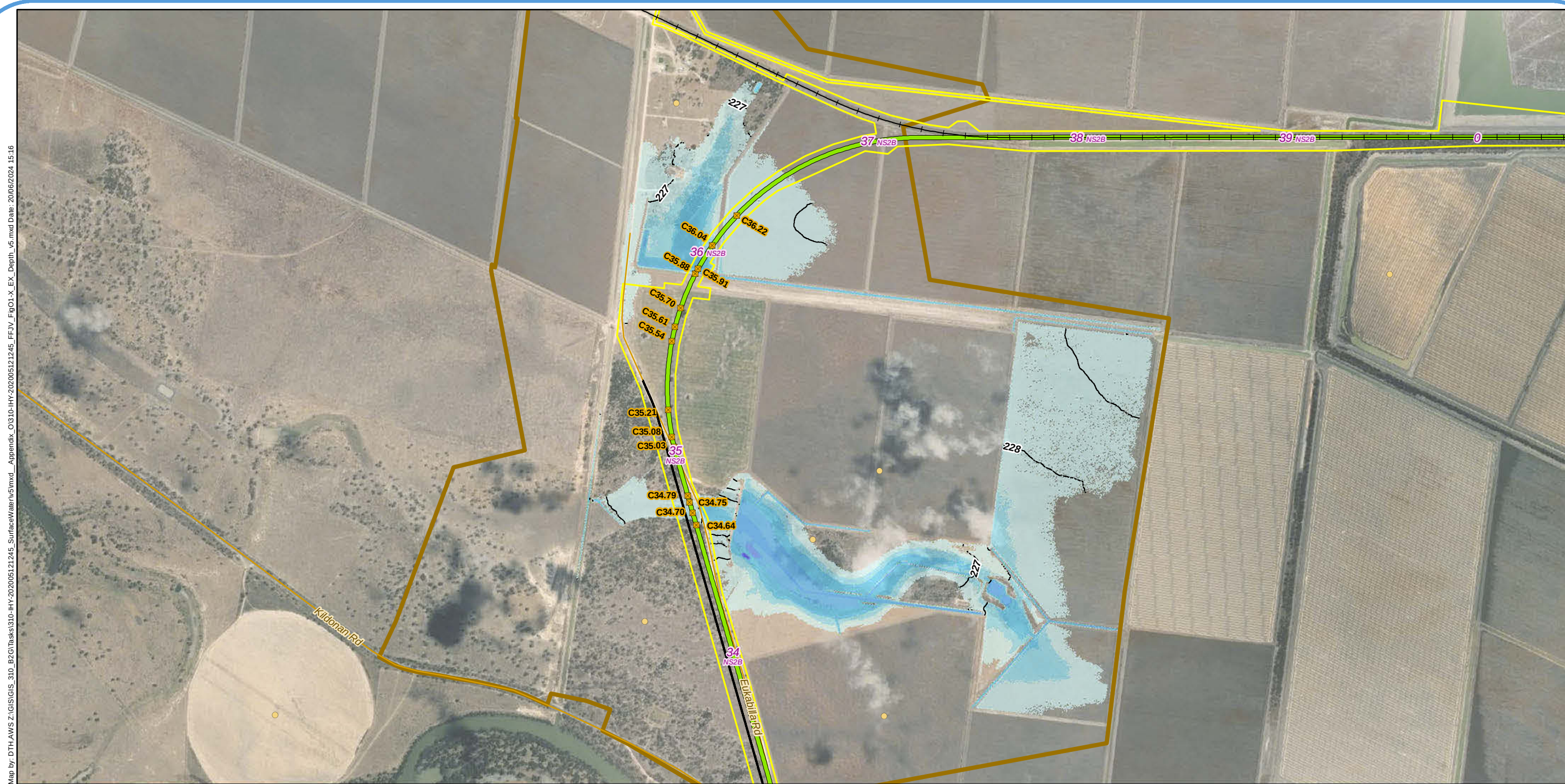
BORDER TO GOWRIE REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT

Appendix O

Local Drainage 20% AEP Flood Maps

Figure O1-1 to 48	20% AEP Event - Peak Water Levels - Existing Case
Figure O2-1 to 48	20% AEP Event - Peak Velocity - Existing Case
Figure O3-1 to 48	20% AEP Event - Peak Hazard - Existing Case
Figure O4-1 to 48	20% AEP Event - Peak Time of Inundation - Existing Case
Figure O5-1 to 48	20% AEP Event - Peak Water Levels - Developed Case
Figure O6-1 to 48	20% AEP Event - Peak Velocity - Developed Case
Figure O7-1 to 48	20% AEP Event - Peak Hazard - Developed Case
Figure O8-1 to 48	20% AEP Event - Peak Time of Inundation - Developed Case
Figure O9-1 to 48	20% AEP Event - Afflux
Figure O10-1 to 48	20% AEP Event - Change in Velocity
Figure O11-1 to 48	20% AEP Event - Change in Hazard
Figure O12-1 to 48	20% AEP Event - Change in Time of Inundation
Figure O13-1 to 48	20% AEP Event - Change in Velocity (<0.5m/s cutoff)
Figure O14-1 to 48	20% AEP Event - Percentage Change in Velocity (<0.5m/s and >1.0m/s cutoff)
Figure O15-1 to 48	20% AEP Event - Percentage Change in Velocity (<1.0m/s cutoff)
Figure O16-1 to 48	20% AEP Event - Percentage Change in Hazard ($v \times d$) (<0.15m ² /s cutoff applied)
Figure O17-1 to 48	20% AEP Event - Percentage Change in Time of Inundation
Figure O18-1 to 48	20% AEP Event - Percentage Change in Time of Inundation (<1 hour cutoff applied)

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:16

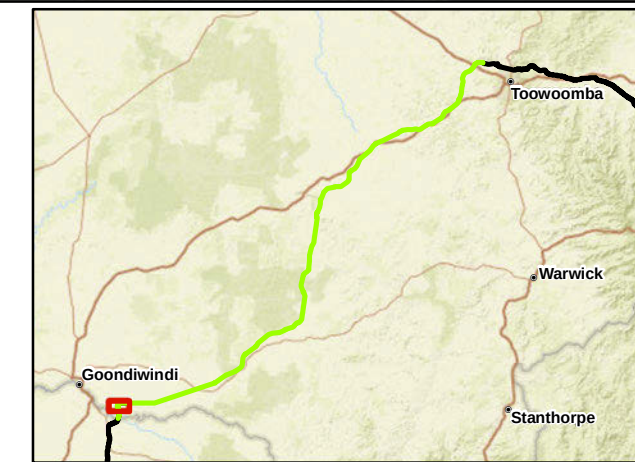


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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
0.5m peak water surface contour (mAHD)	





- Estimated peak depth (m)**

A3 scale: 1:15,000



Border to Gowrie

Figure O1 - page 2 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:17



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|--|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
| 0.5m peak water surface contour (mAHD) | |



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



Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 3 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Legend

- 5 Chainage (km)
- Localities
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Yelarbon levee
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHd)

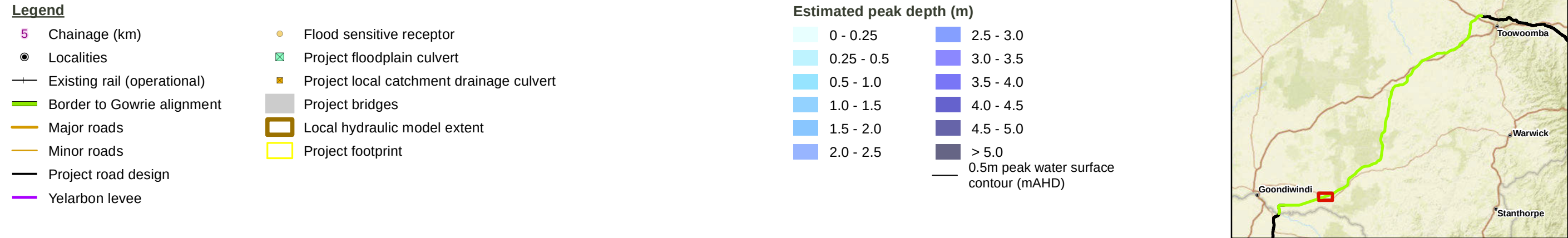
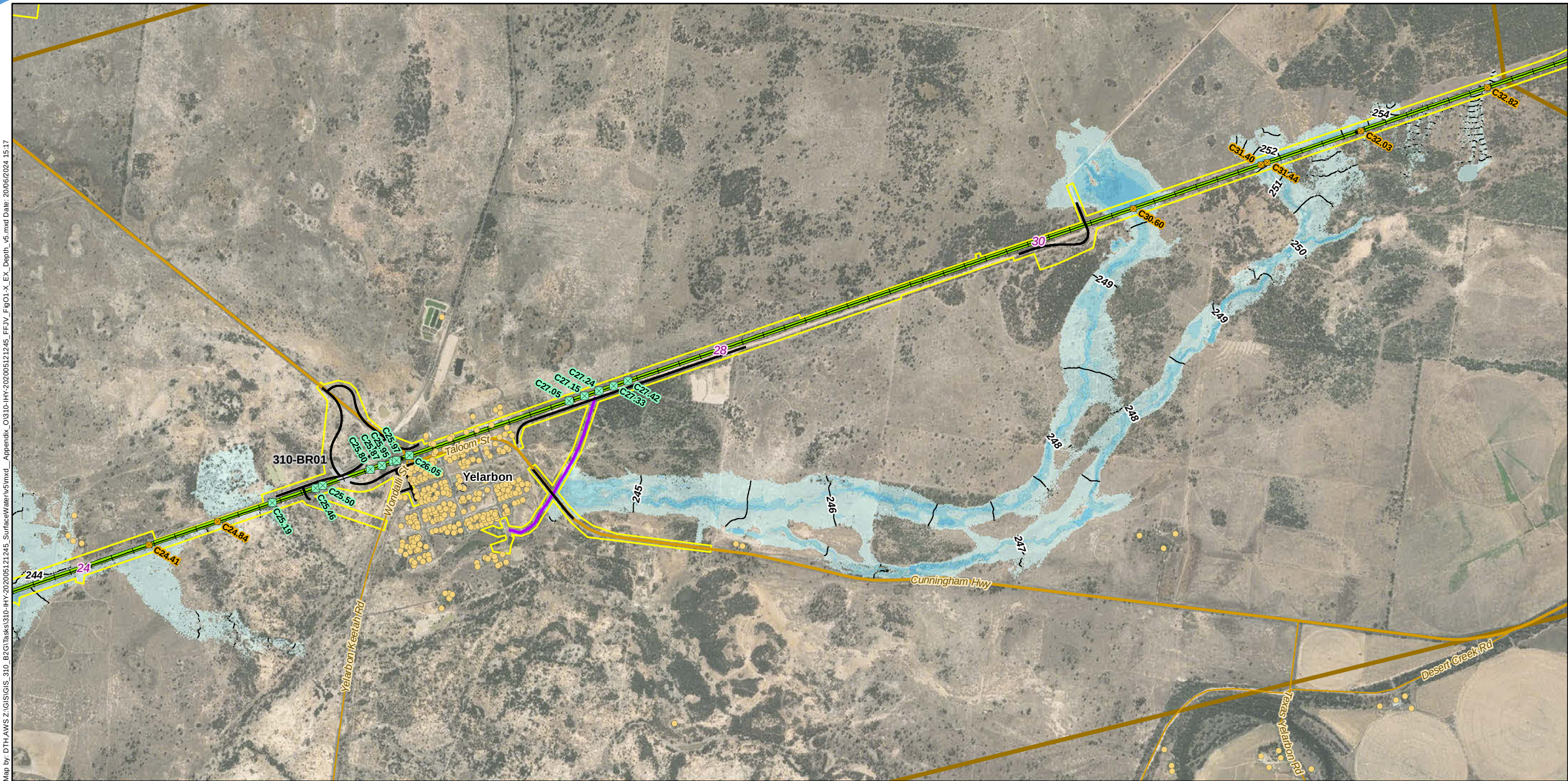


Border to Gowrie

Figure O1 - page 4 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case





A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



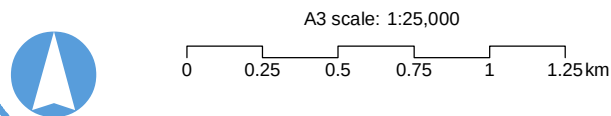
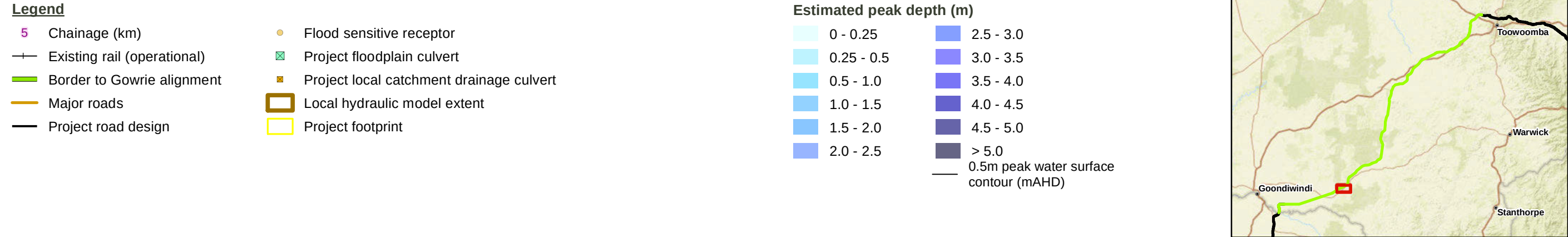
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)

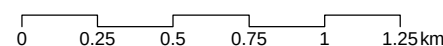






- Estimated peak depth (m)**

A3 scale: 1:25,000



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 8 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A map of south-eastern Australia showing the locations of Goondiwindi, Toowoomba, Warwick, and Stanthorpe. A red rectangle highlights the study area, which is located between Goondiwindi and Toowoomba.

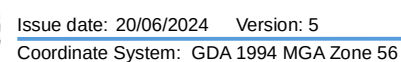
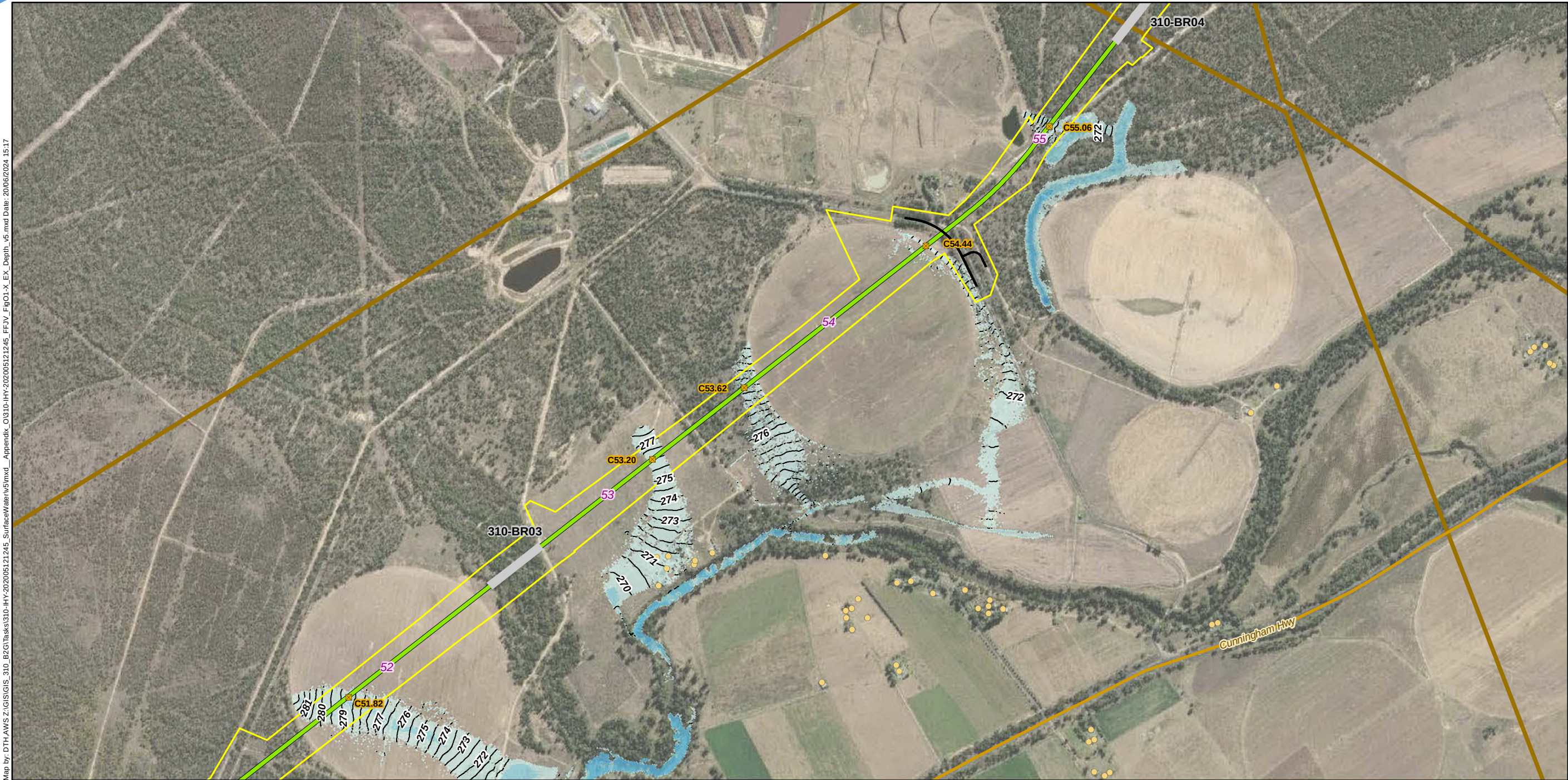


Figure O1 - page 9 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

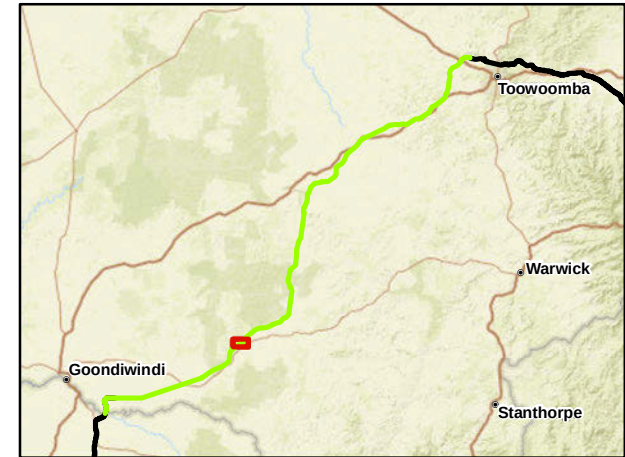


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)



Border to Gowrie

Figure O1 - page 10 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A map of south-eastern Australia showing the study area. A red rectangle indicates the study site, located on the border between New South Wales and Victoria, near the town of Goondiwindi. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

Figure O1 - page 11 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

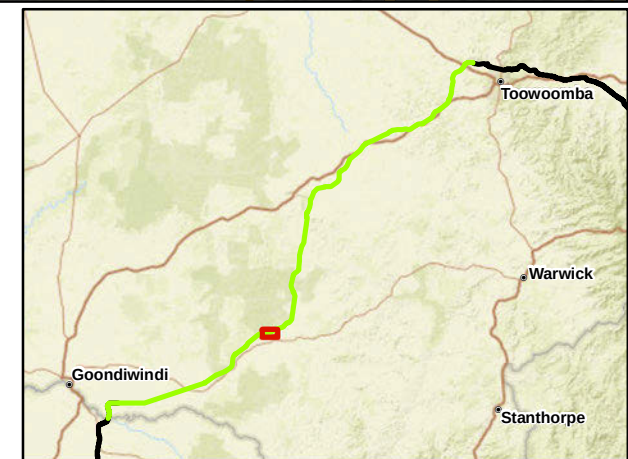


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

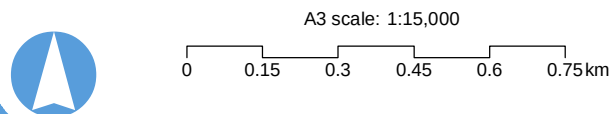
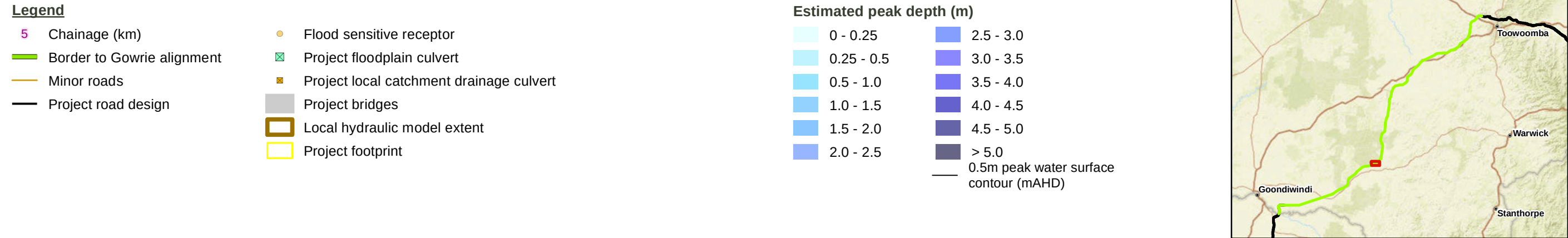
Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km





- Estimated peak depth (m)**

A3 scale: 1:15,000

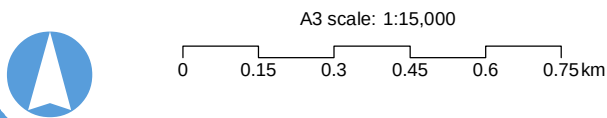
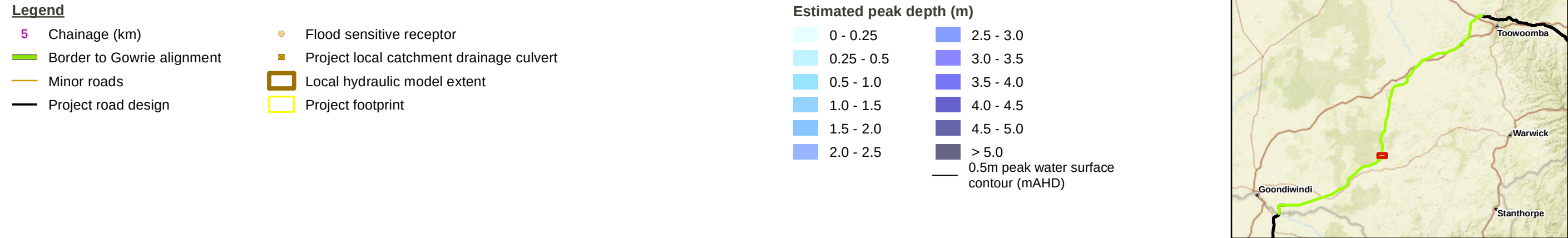
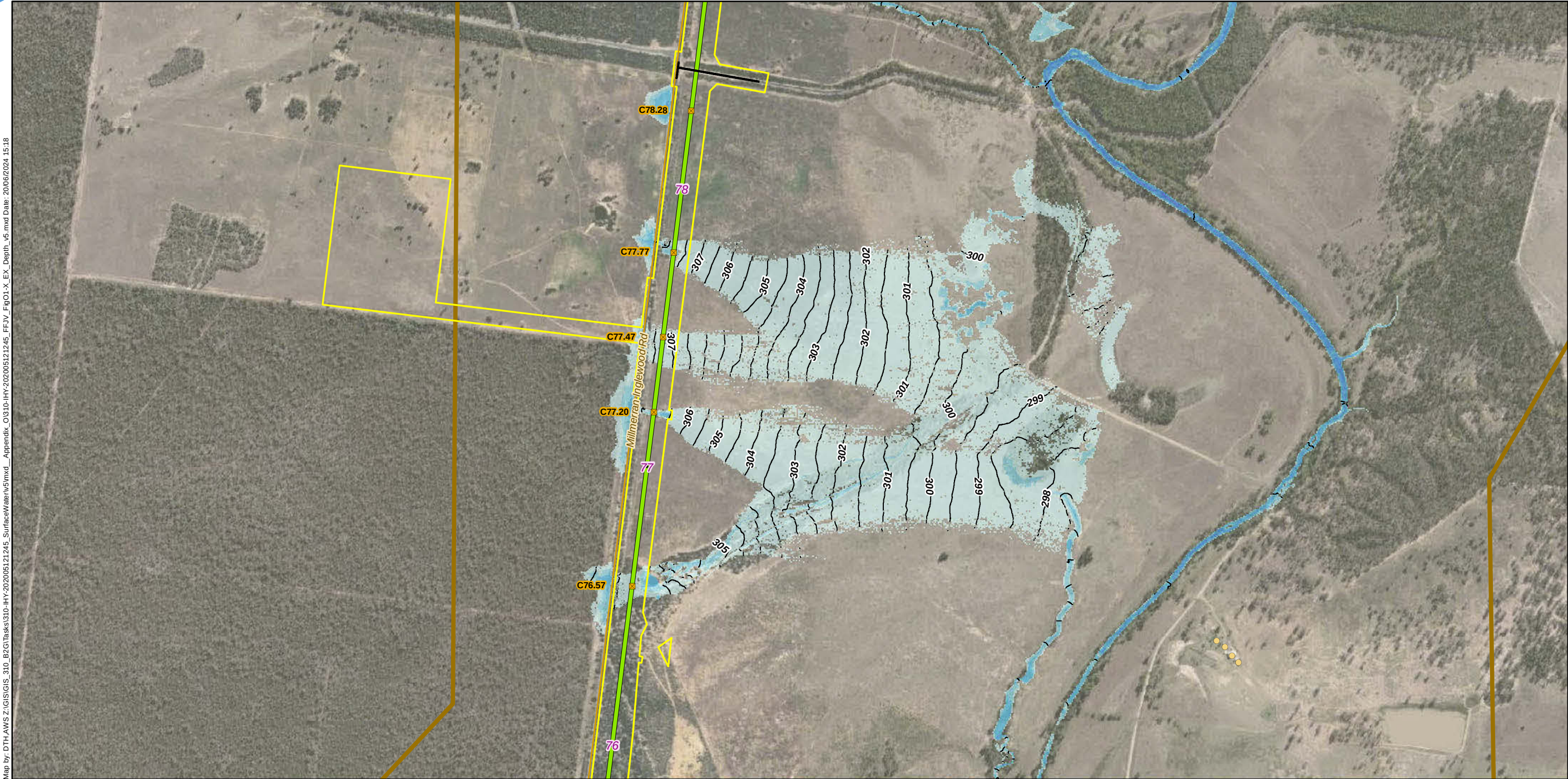


Issue date: 20/06/2024 Version: 5

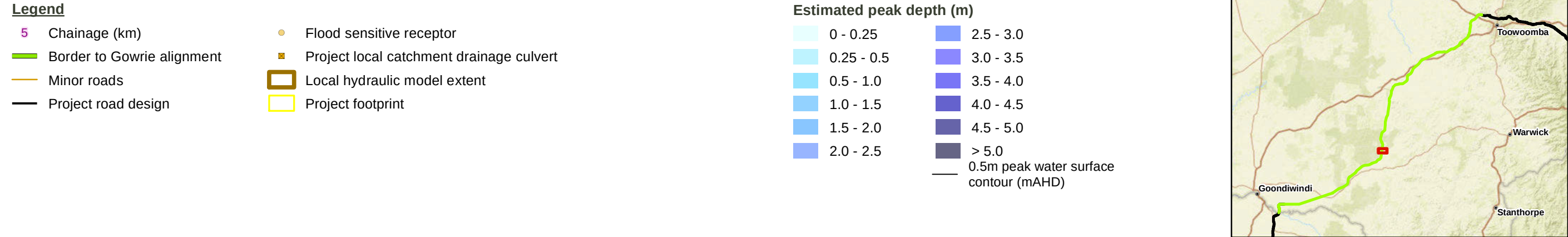
Coordinate System: GDA 1994 MGA Zone 56

Figure O1 - page 14 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:18



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



- Estimated peak depth (m)**

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O1 - page 17 of 48:

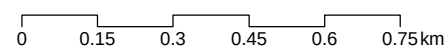
20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A map of the Toowoomba region in Queensland, Australia. A green line indicates the proposed road route, starting near Goondiwindi, passing through a red square marker, and ending near Toowoomba. Other towns shown include Warwick and Stanthorpe. The map also displays major roads and geographical features like rivers and hills.

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 18 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



5 Chainage (km)

Border to Gowrie alignment

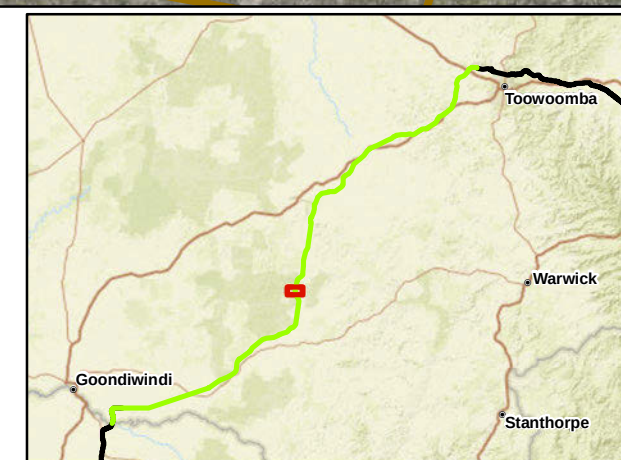
Minor roads

Project road design

-  Flood sensitive receptor
-  Project floodplain culvert
-  Project local catchment drainage culvert
-  Project bridges
-  Local hydraulic model extent
-  Project footprint

Legend for Figure 10:

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- > 5.0
- 0.5m peak water surface contour (mAHd)



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O1 - page 19 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\GIS_310_IHY\202005121245_SurfaceWater\5mxd_Appldix_D\310-IHY\202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:18



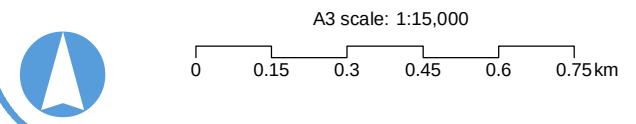


Legend

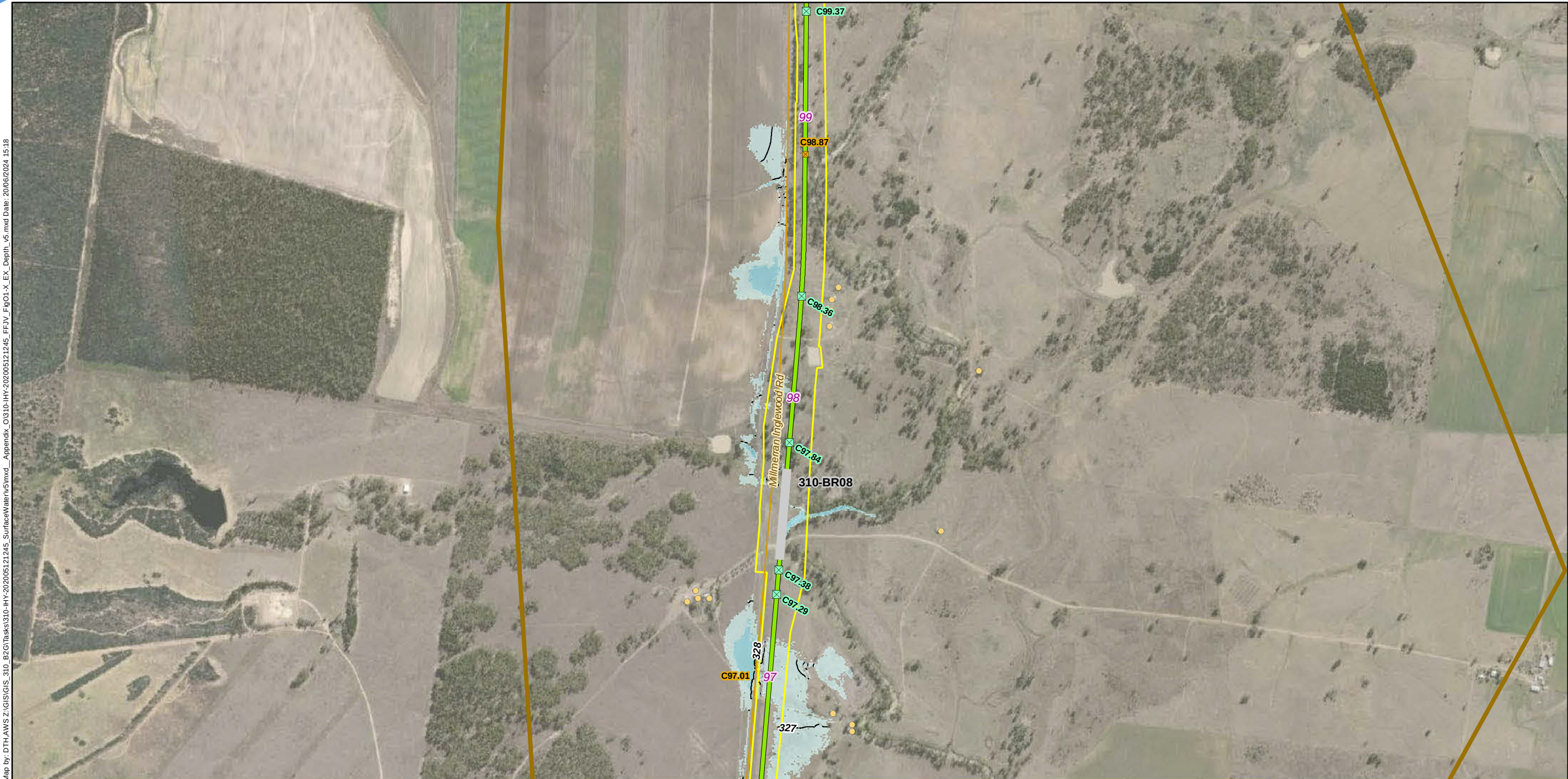
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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
0.5m peak water surface contour (mAHD)	



Map by: D:\HAWKS\Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:18

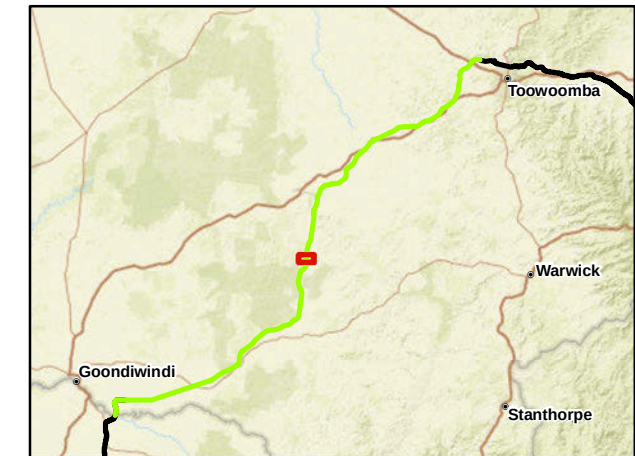


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAH)



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

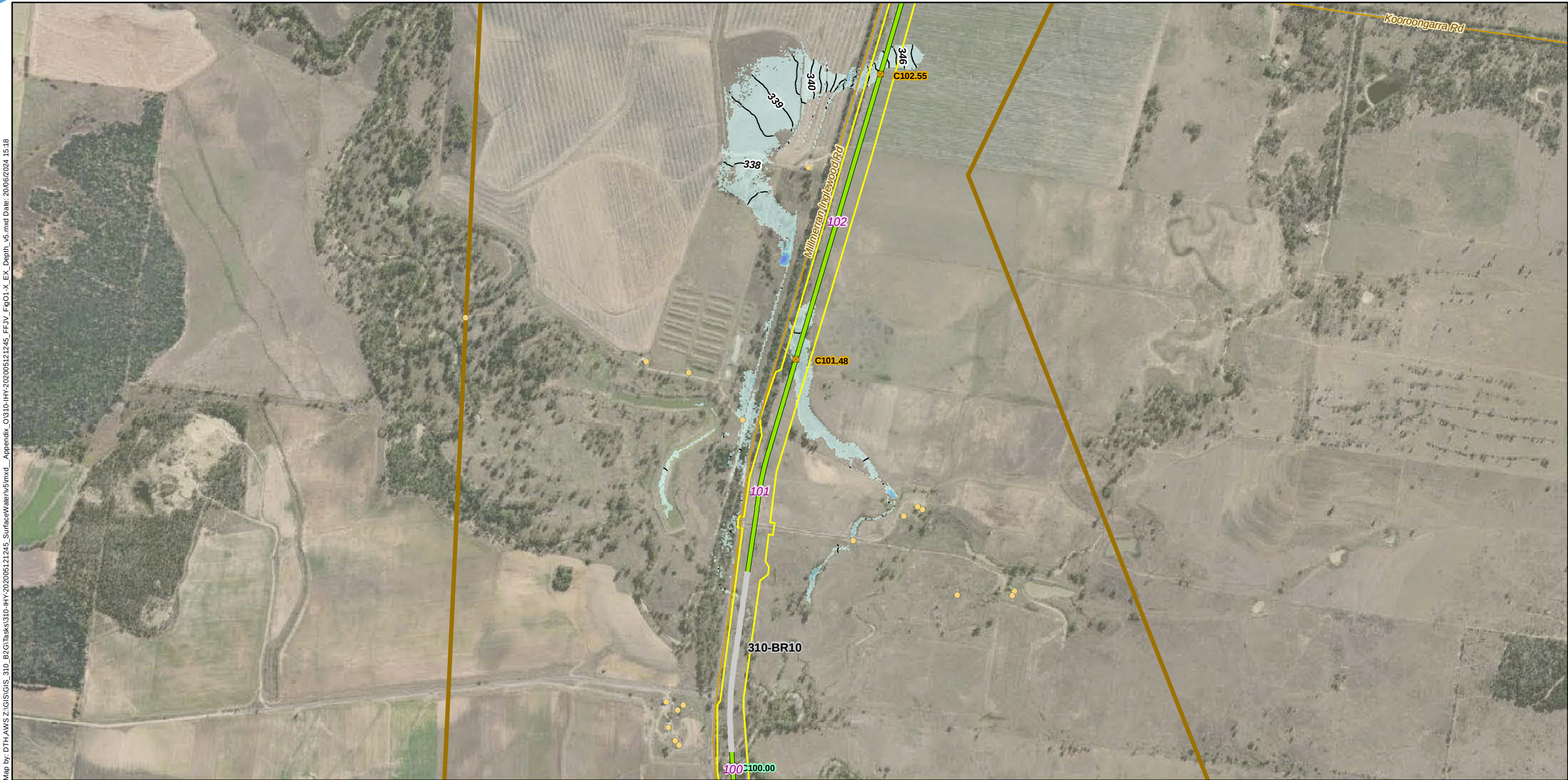


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 22 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

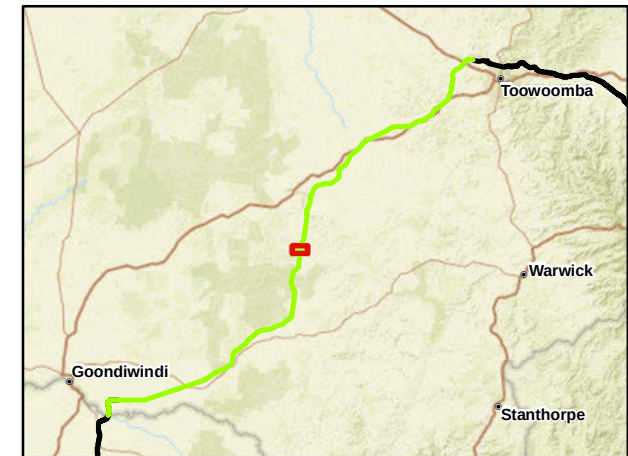


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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
0.5m peak water surface contour (mAHD)	



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



- Estimated peak depth (m)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.

A3 scale: 1:15,000



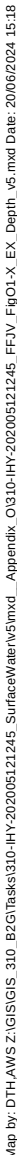
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 24 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Legend

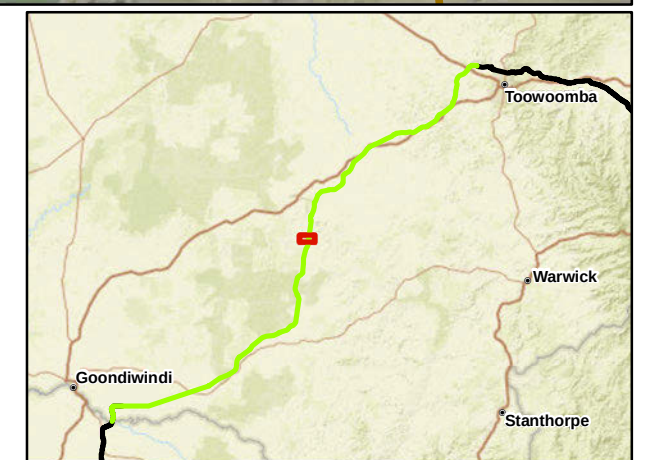
- Legend**
- | | | | |
|---|----------------------------|--|--|
| 5 | Chainage (km) | | Flood sensitive receptor |
| | Border to Gowrie alignment | | Project local catchment drainage culvert |
| | Minor roads | | Local hydraulic model extent |
| | Project road design | | Project footprint |

Estimated peak depth (m)

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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

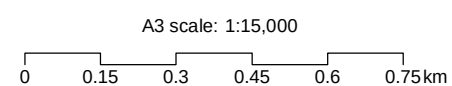
— 0.5m peak water surface contour (mAHD)



A3 scale: 1:15,000



0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 25 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Chainage (km)	Flood sensitive receptor
Border to Gowrie alignment	Project local catchment drainage culvert
Minor roads	Local hydraulic model extent
Project road design	Project footprint

Legend for Figure 10:

- 0 - 0.25
- 0.25 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- > 5.0
- 0.5m peak water surface contour (mAHd)

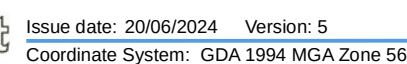
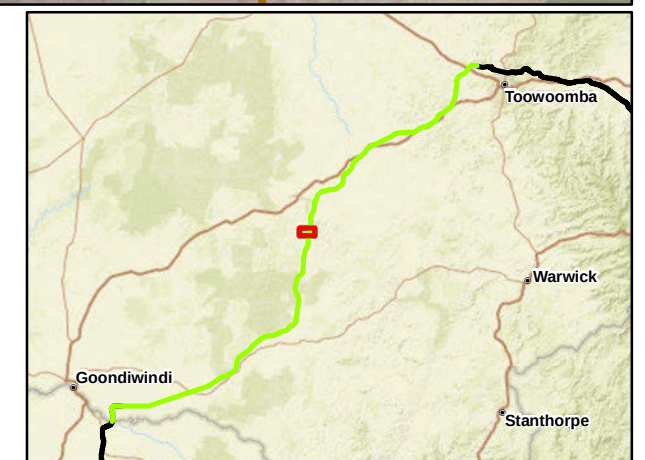


Figure O1 - page 26 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

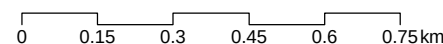
Figure O1 - page 27 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A3 scale: 1:15,000

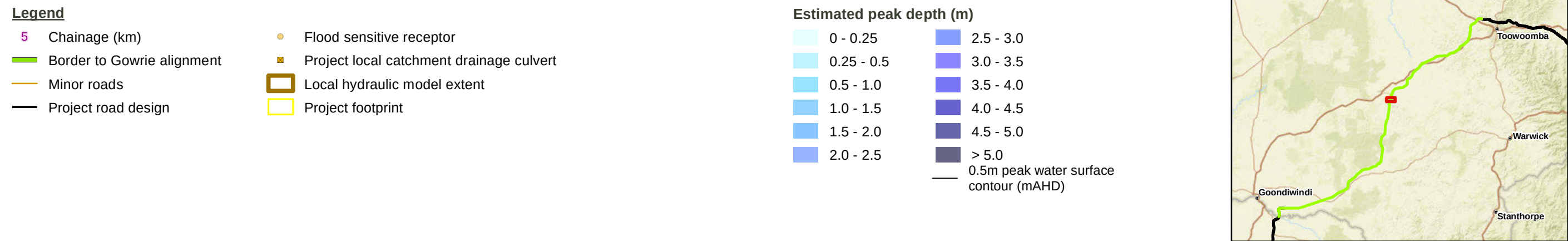
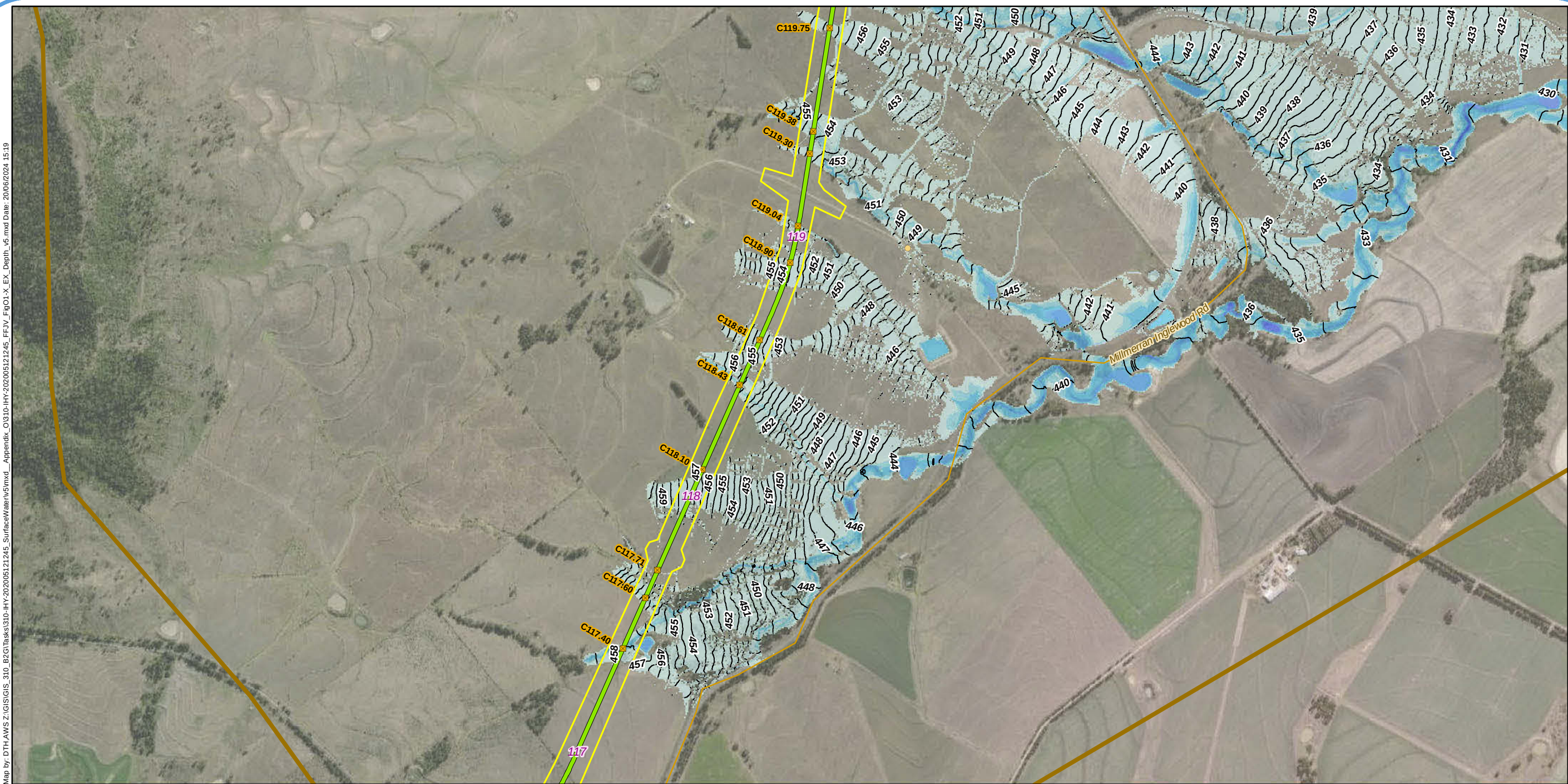


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 28 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



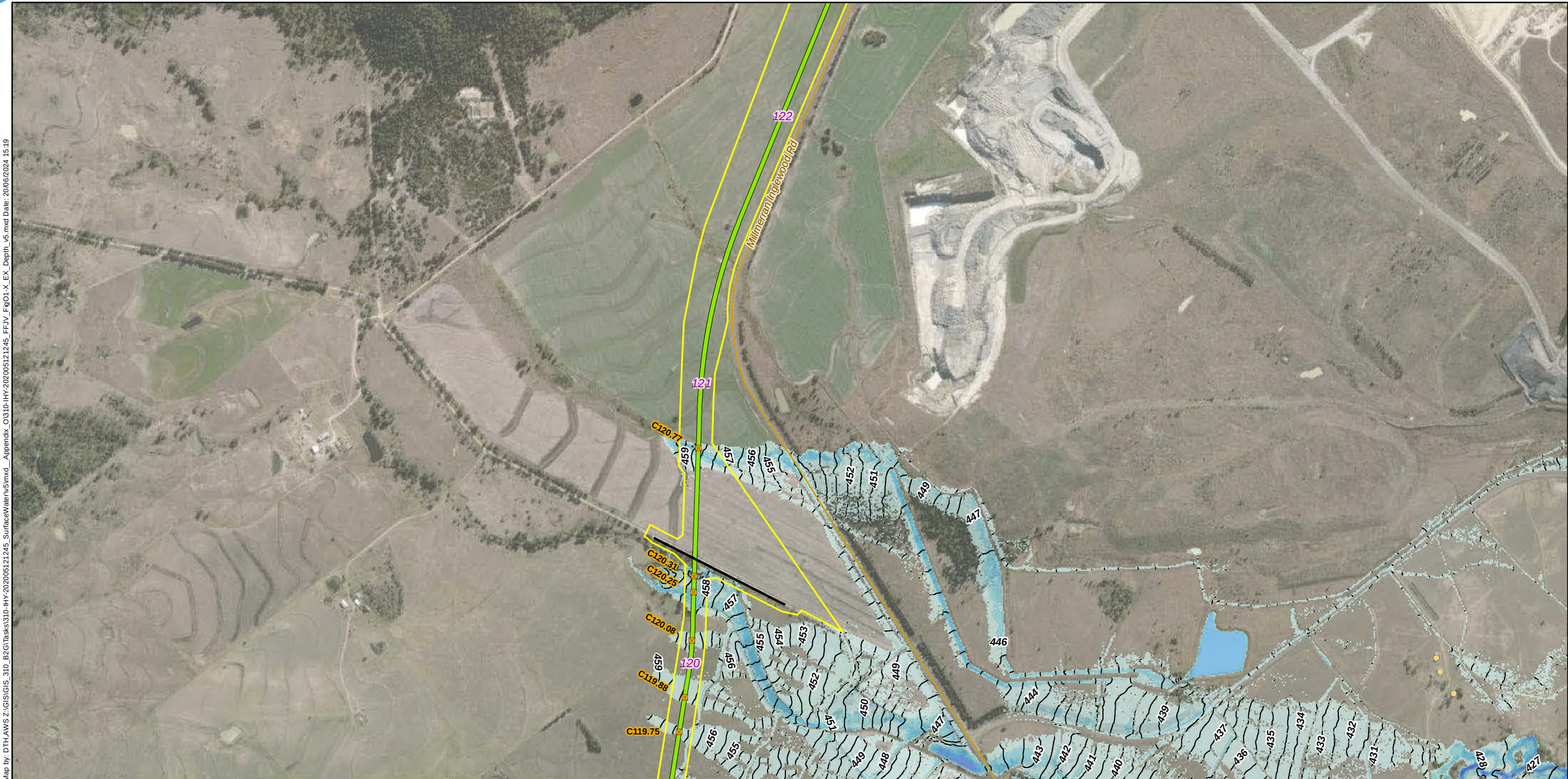
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 29 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:19

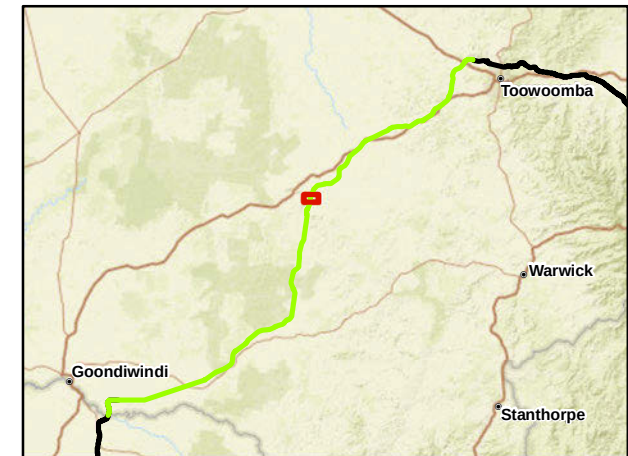


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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
0.5m peak water surface contour (mAHD)	



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

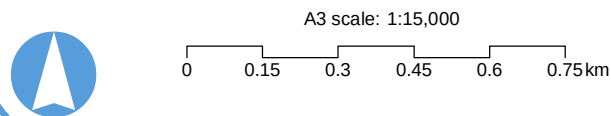
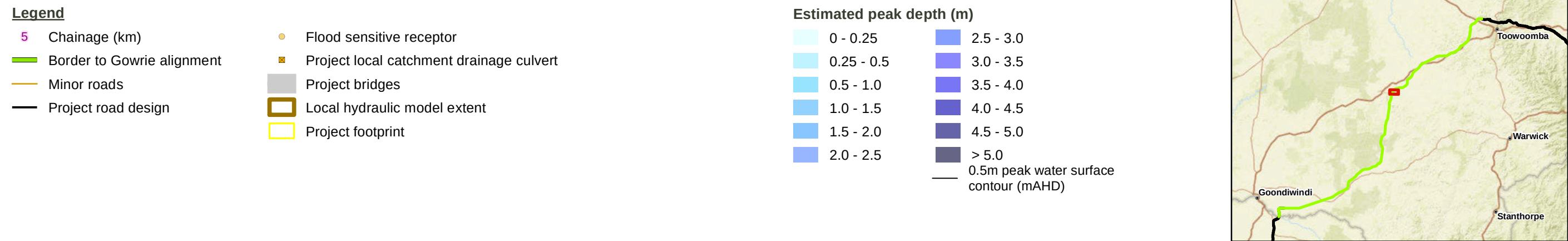
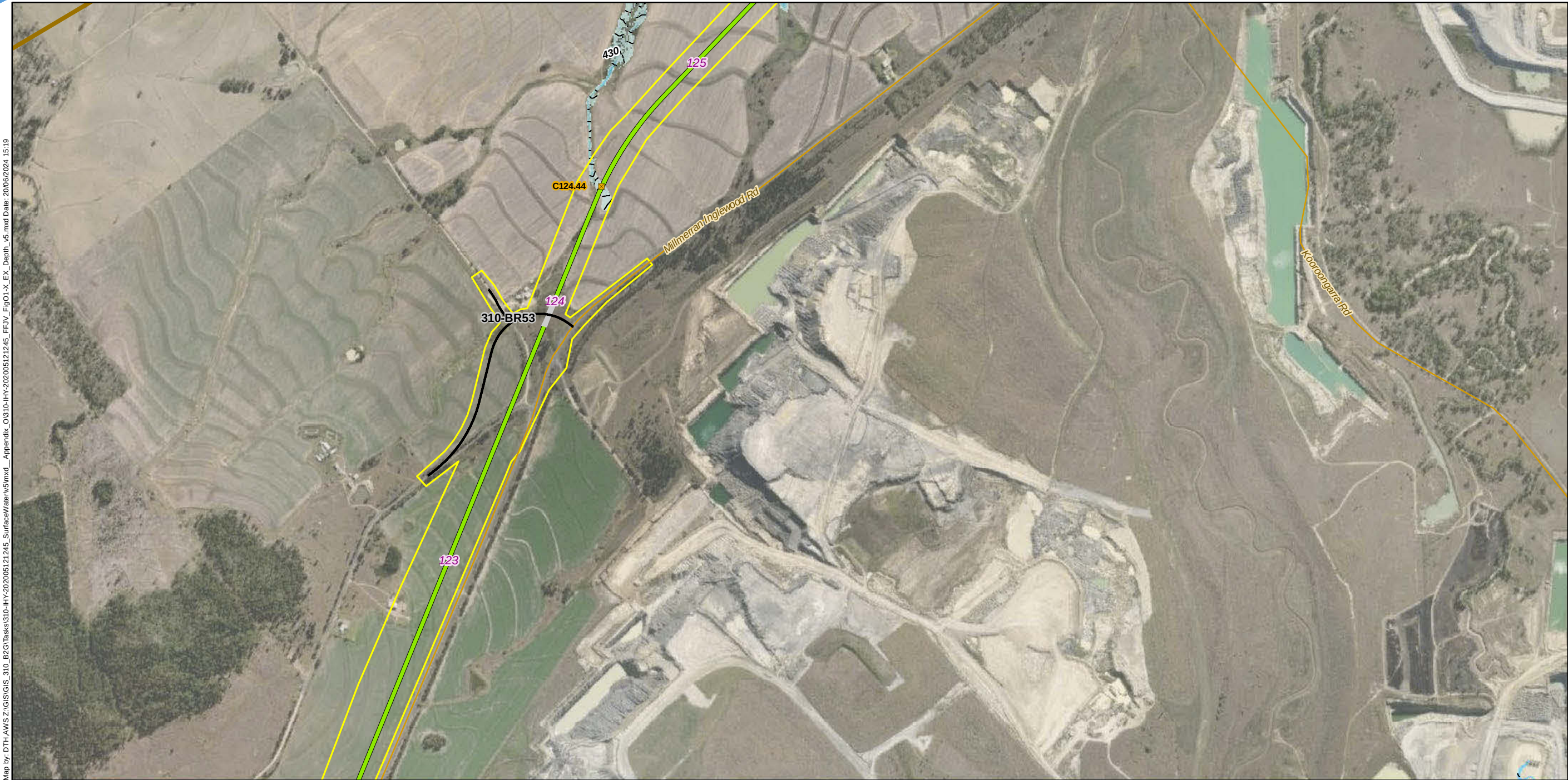


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

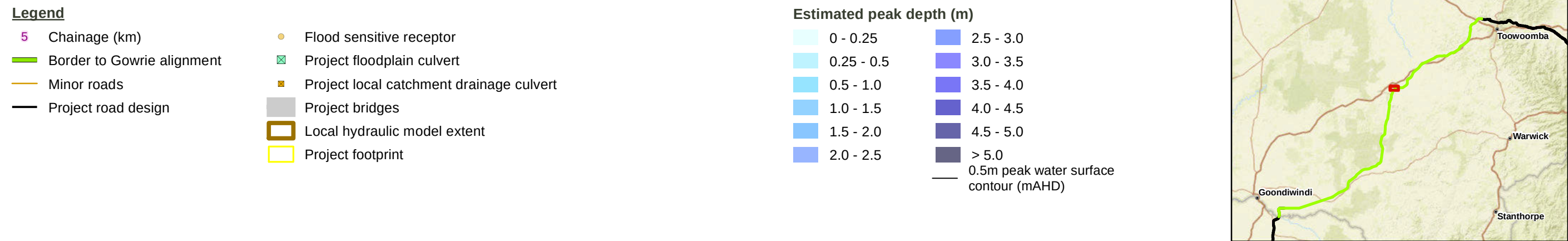
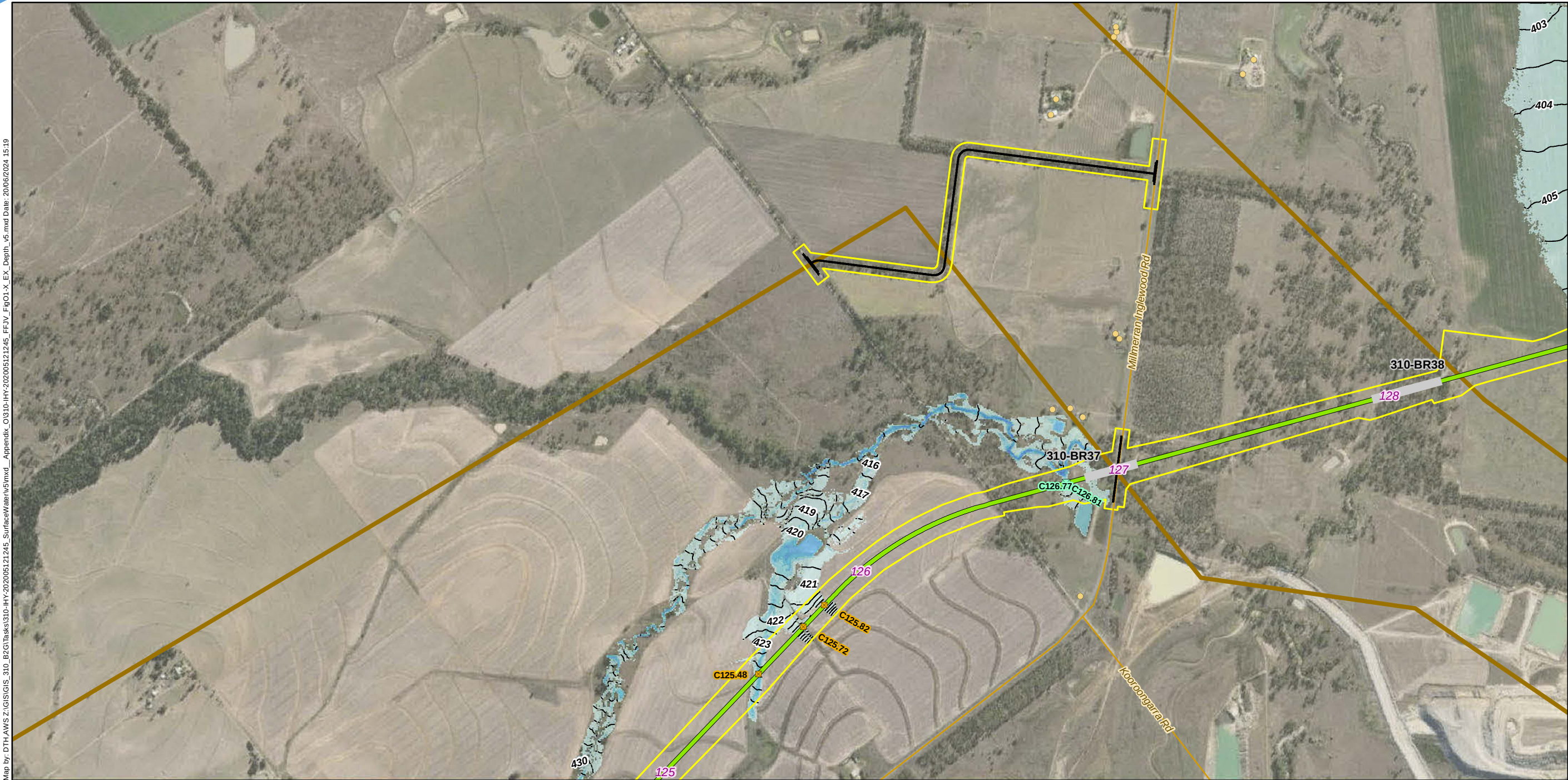
Border to Gowrie

Figure O1 - page 30 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:19



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



- Estimated peak depth (m)**

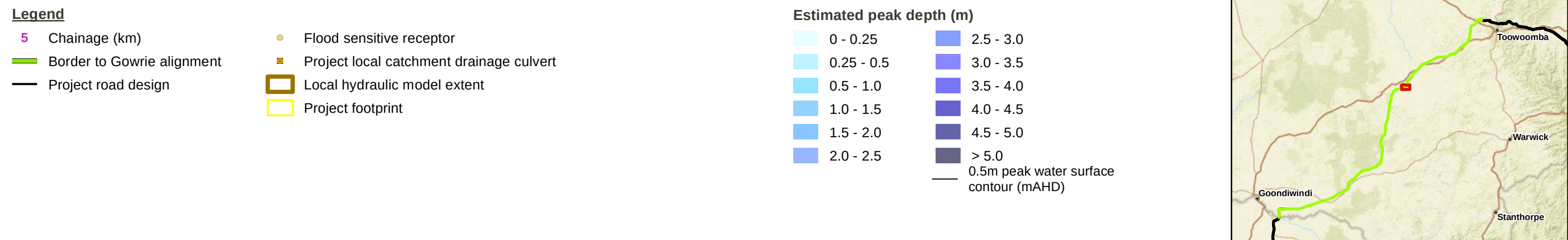
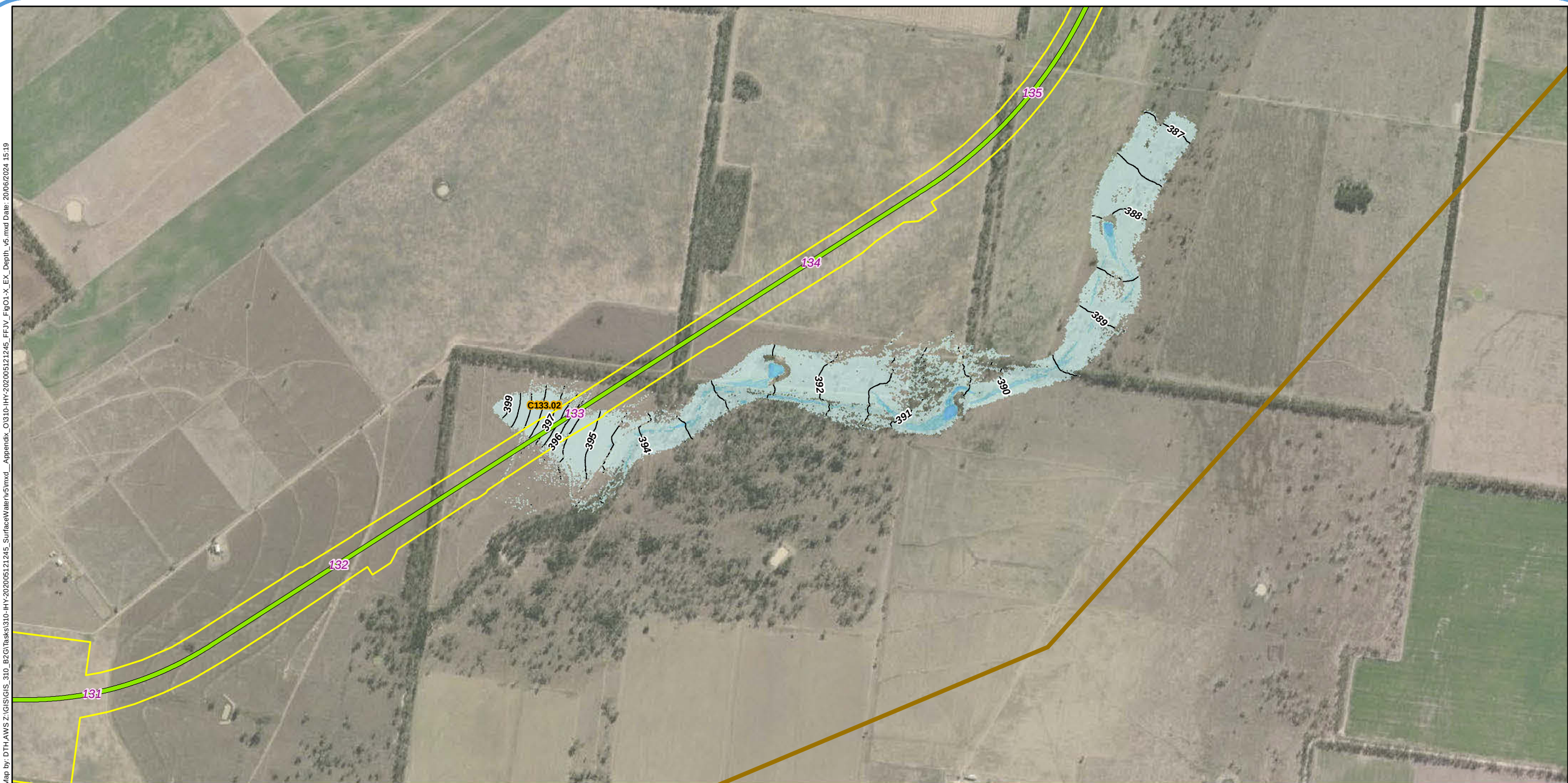


Border to Gowrie

Figure O1 - page 33 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:19



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

Map by: D:\HAWKS\GIS\310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:19

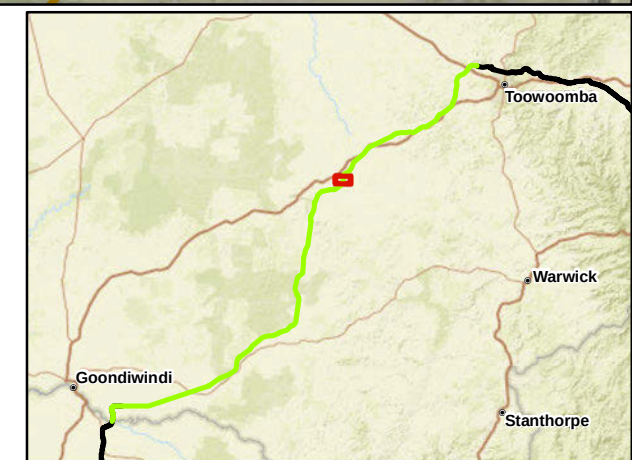


Legend

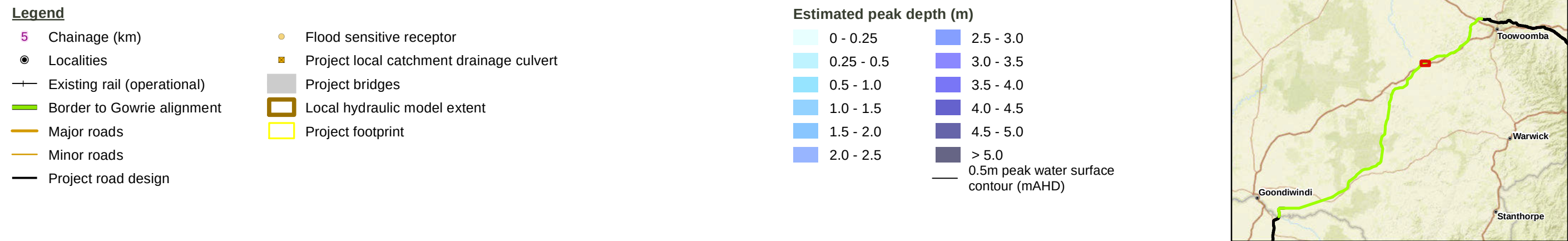
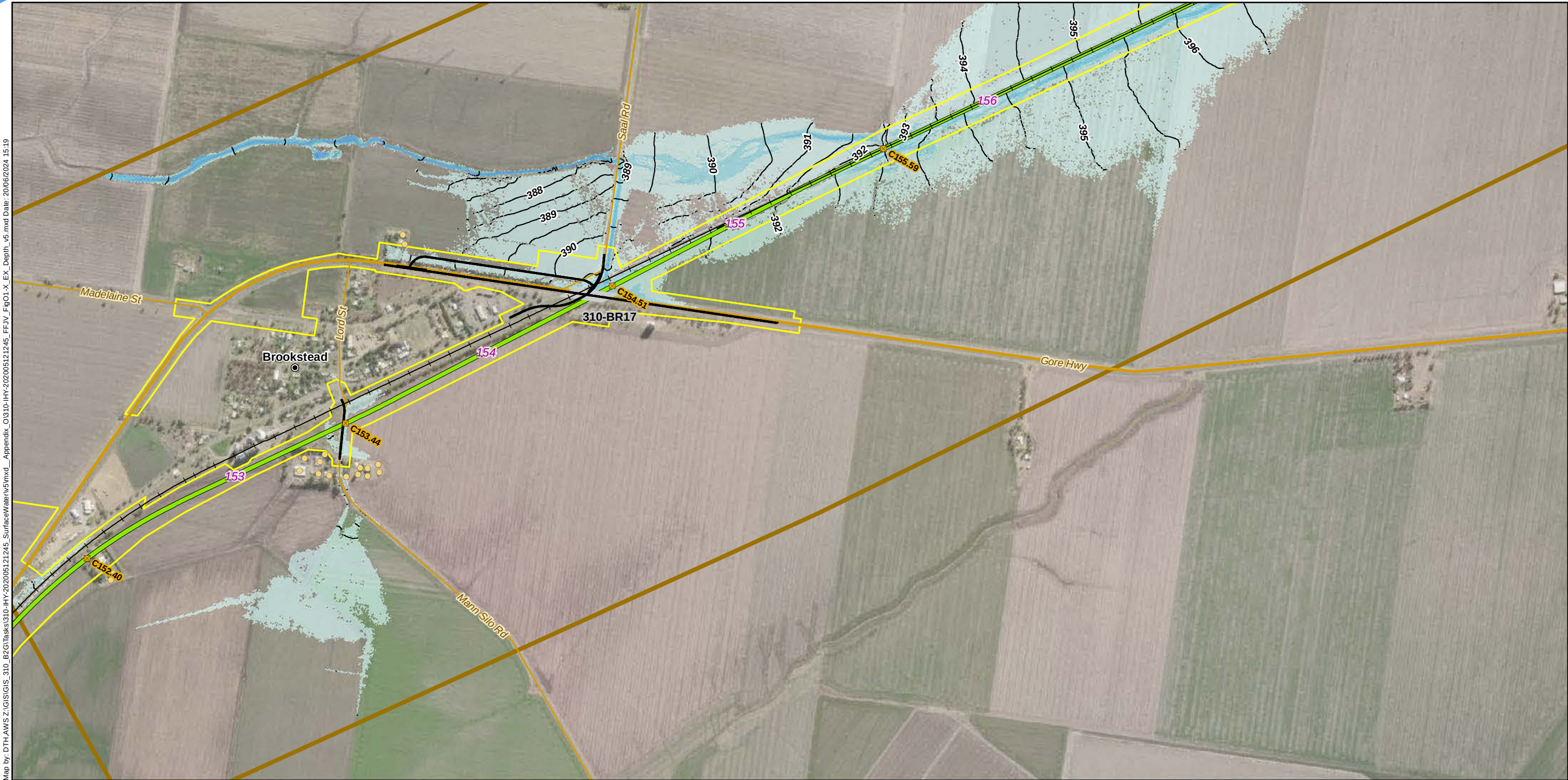
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

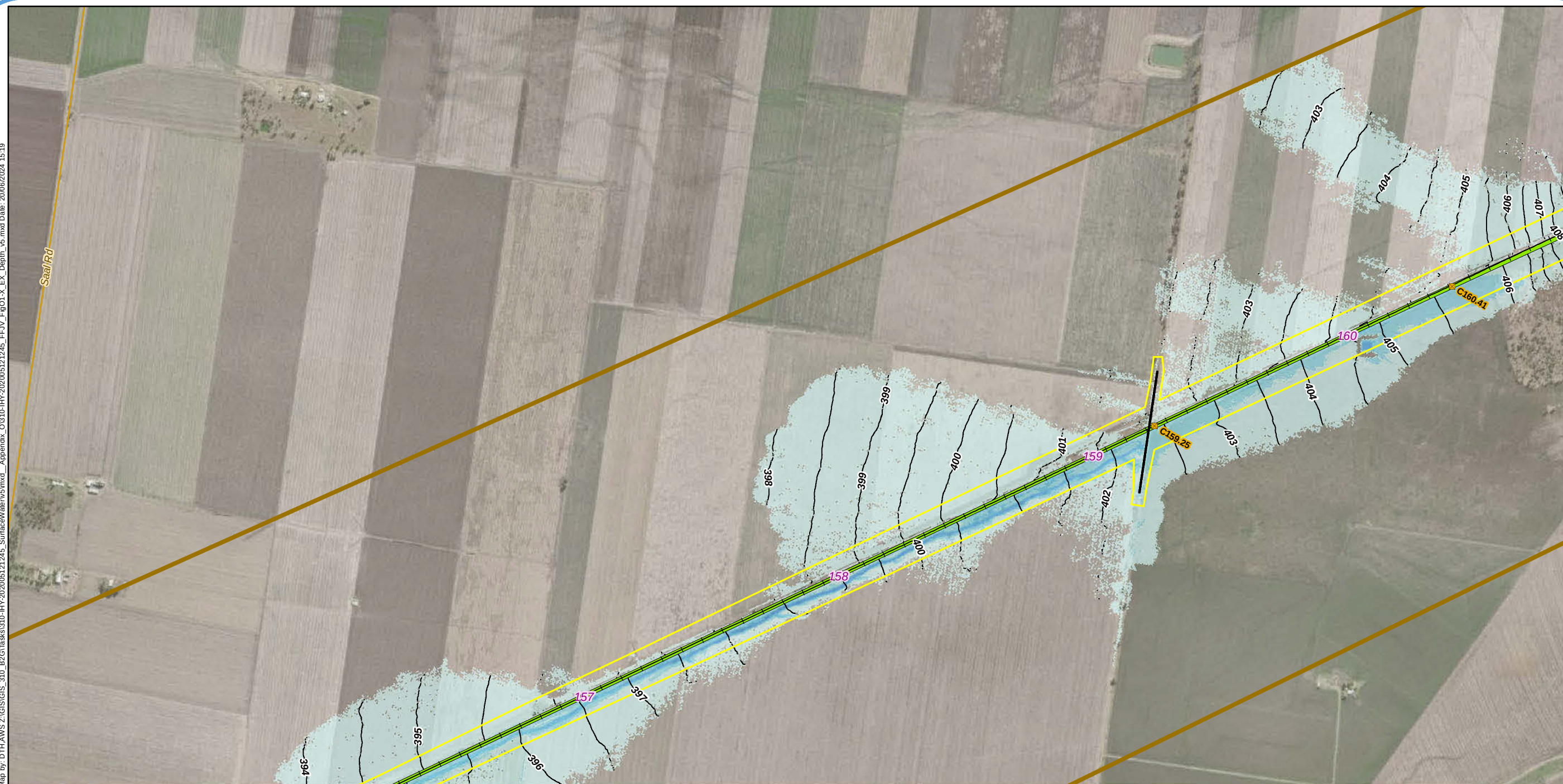
0 - 0.25	2.5 - 3.0
0.25 - 0.5	3.0 - 3.5
0.5 - 1.0	3.5 - 4.0
1.0 - 1.5	4.0 - 4.5
1.5 - 2.0	4.5 - 5.0
2.0 - 2.5	> 5.0
0.5m peak water surface contour (mAHD)	



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



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

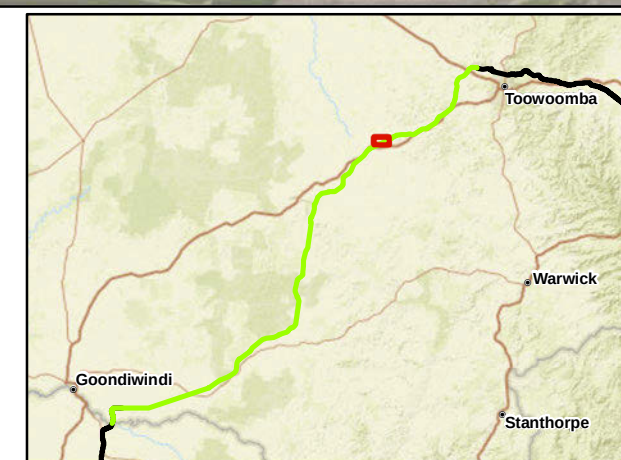


- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design

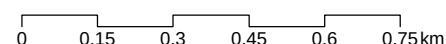
- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

0 - 0.25	2.5 - 3.0
0.25 - 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

— 0.5m peak water surface contour (mAHd)



A3 scale: 1:15,000



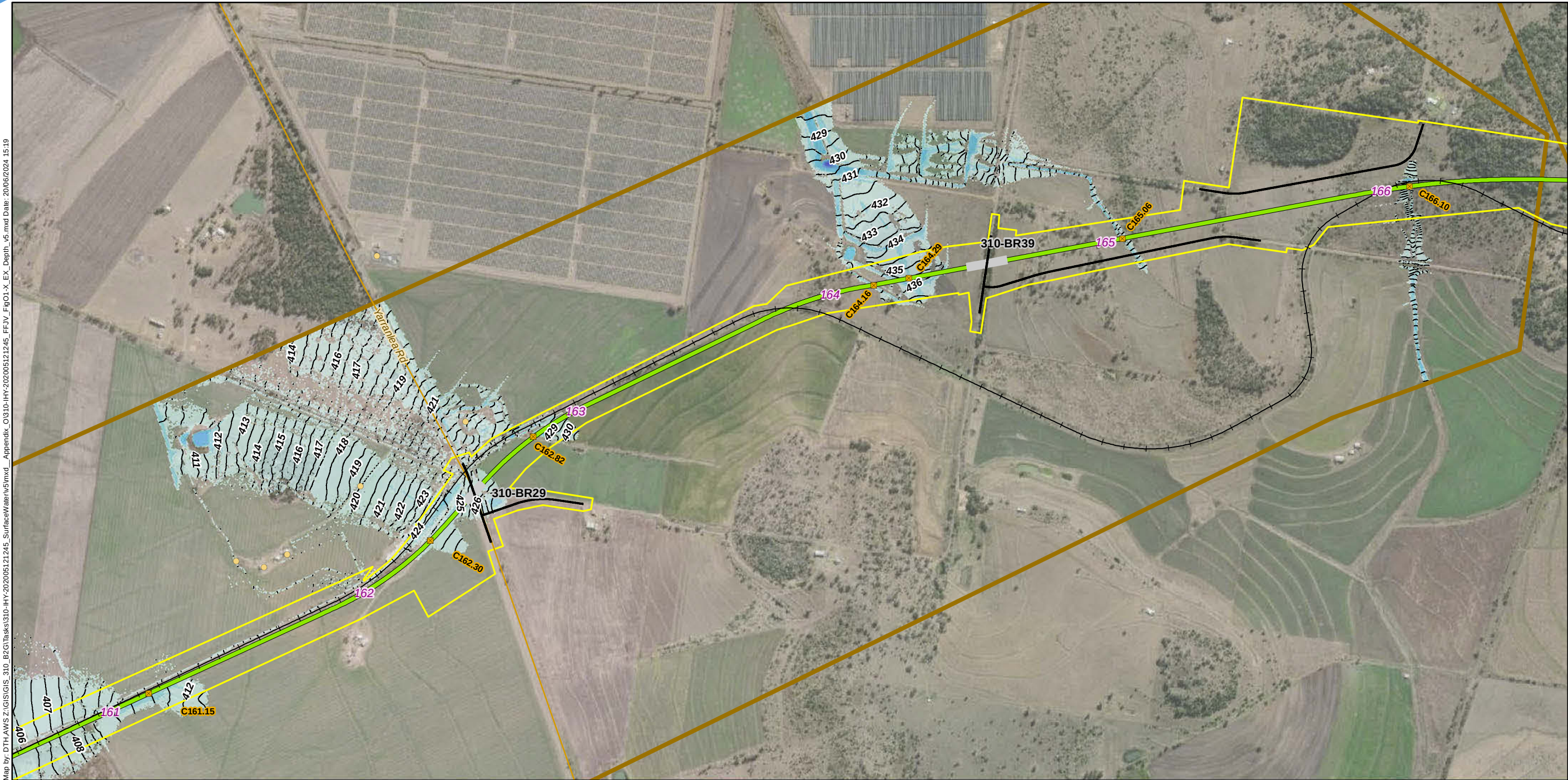
Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O1 - page 37 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:19



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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

0.5m peak water surface contour (mAHD)



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

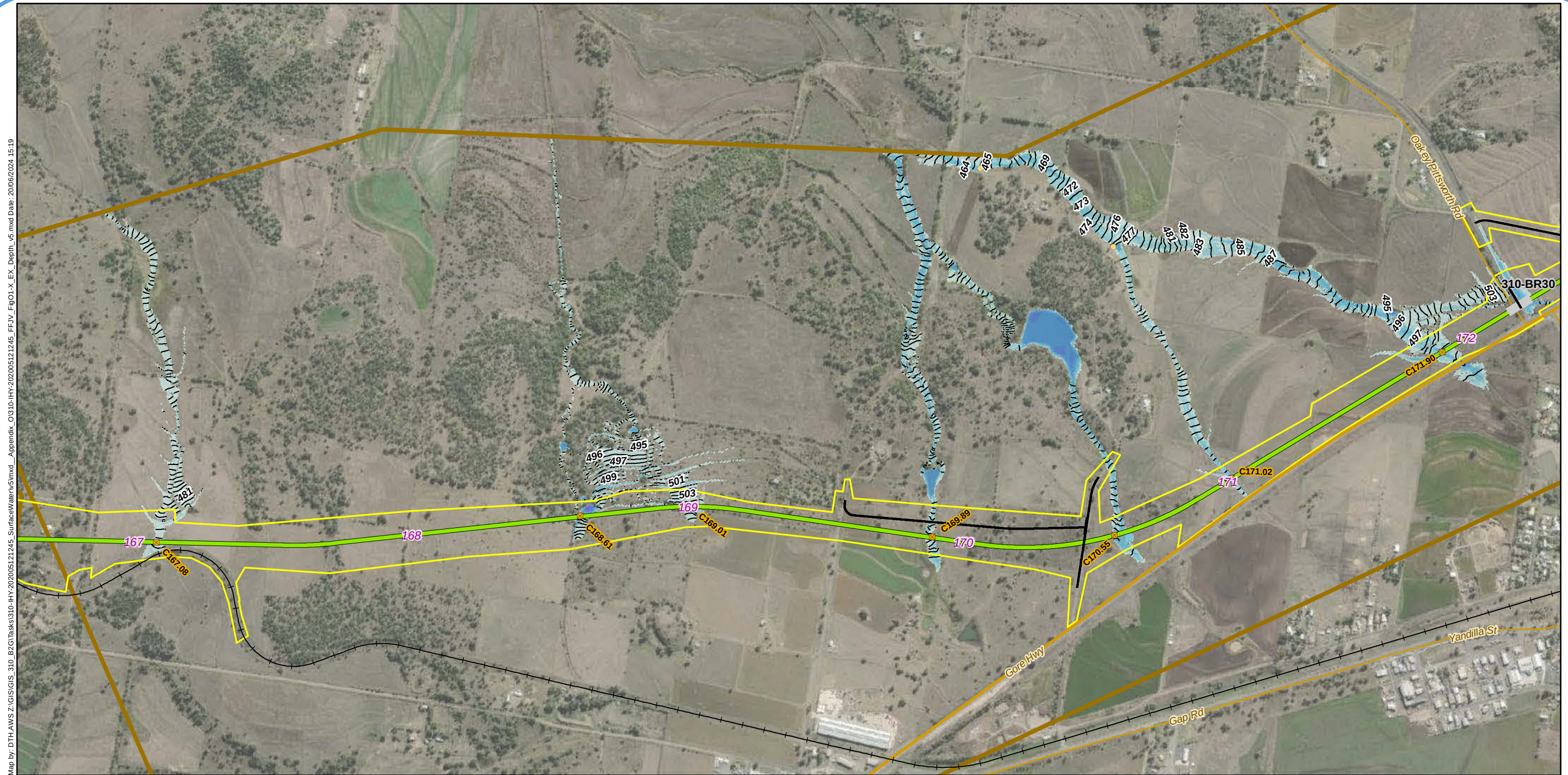


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 38 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



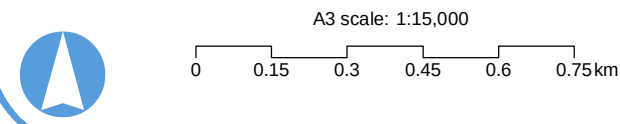
Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

0 - 0.25	2.5 - 3.0
0.25 - 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

0.5m peak water surface contour (mAHD)





Legend

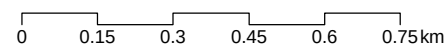
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

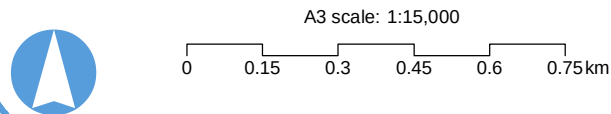
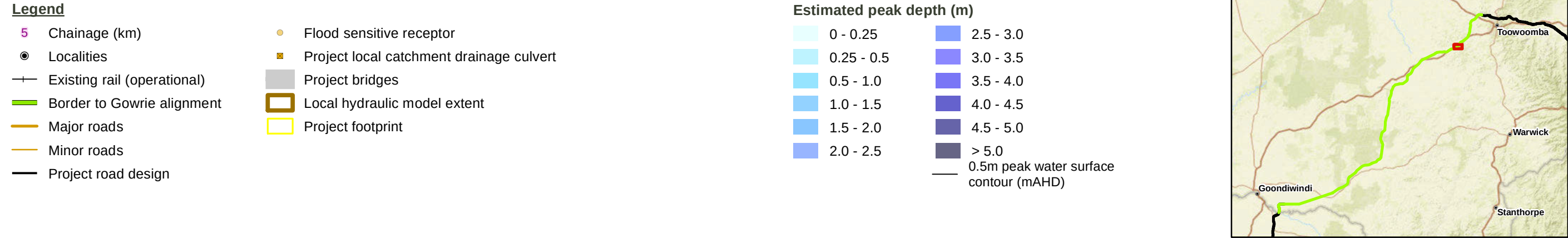
Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)



A3 scale: 1:15,000







- Estimated peak depth (m)**

A map of the Toowoomba region in Queensland, Australia. The map shows a proposed rail route highlighted in green. The route starts near Goondiwindi, passes through a red square, and ends near Toowoomba. Other locations marked include Warwick and Stanthorpe. The map also shows major roads and rivers.

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 42 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- Estimated peak depth (m)**

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O1 - page 43 of 48:

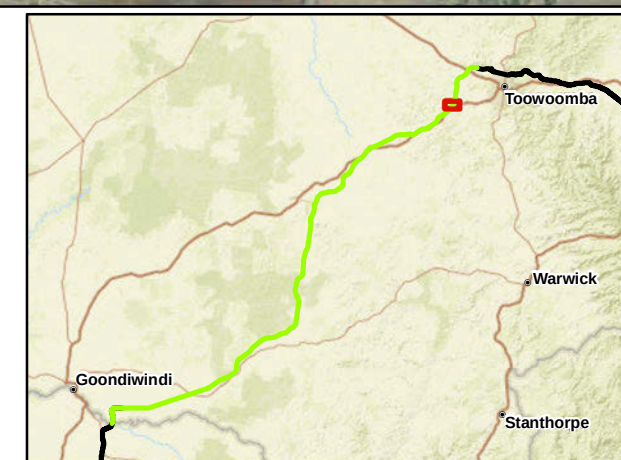
20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- ☒ Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

0 - 0.25	2.5 - 3.0
0.25 - 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

— 0.5m peak water surface contour (mAHd)



20% AEP Event - Local Catchments - Peak Water Levels - Existing Case

Border to Gowrie

Figure O1 - page 44 of 48:



- Estimated peak depth (m)**

A3 scale: 1:15,000

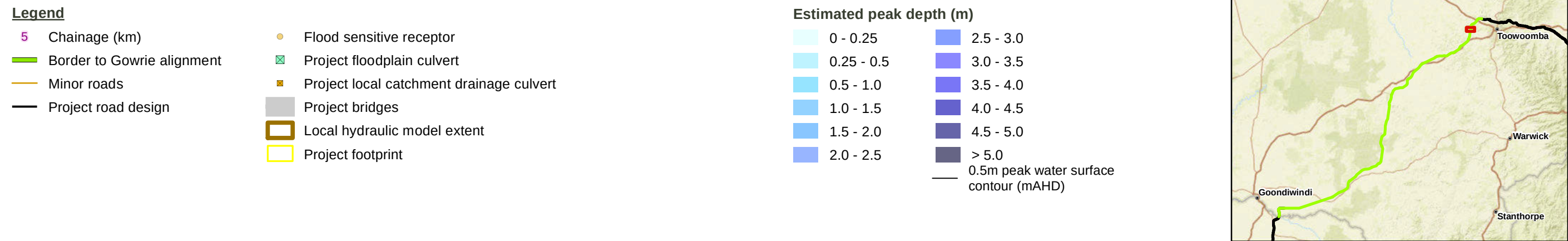
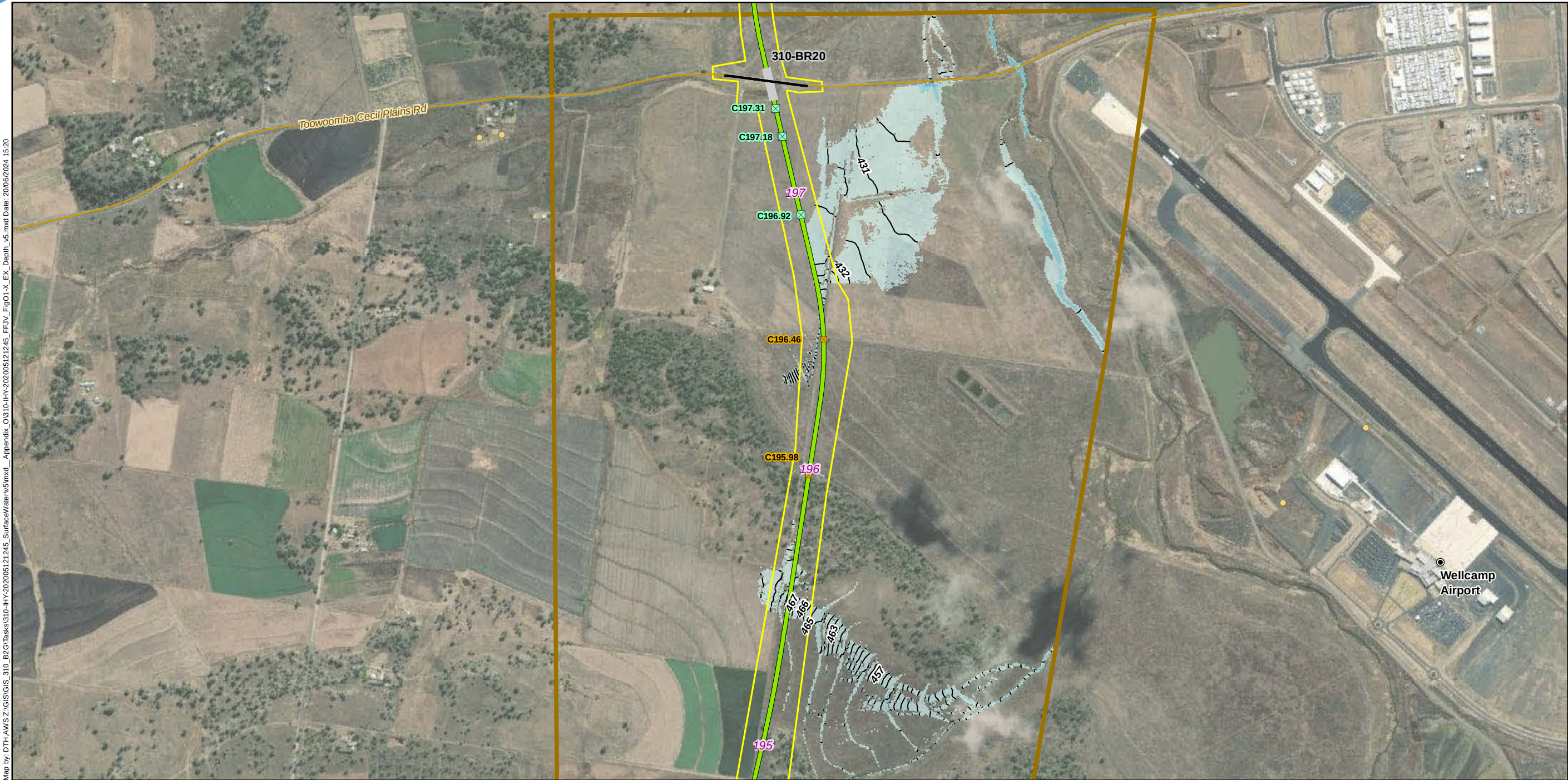


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O1 - page 45 of 48:

20% AEP Event - Local Catchments - Peak Water Levels - Existing Case



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig01-X_EX_Depth_v5.mxd Date: 20/06/2024 15:20



Legend

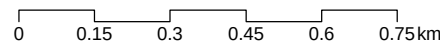
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

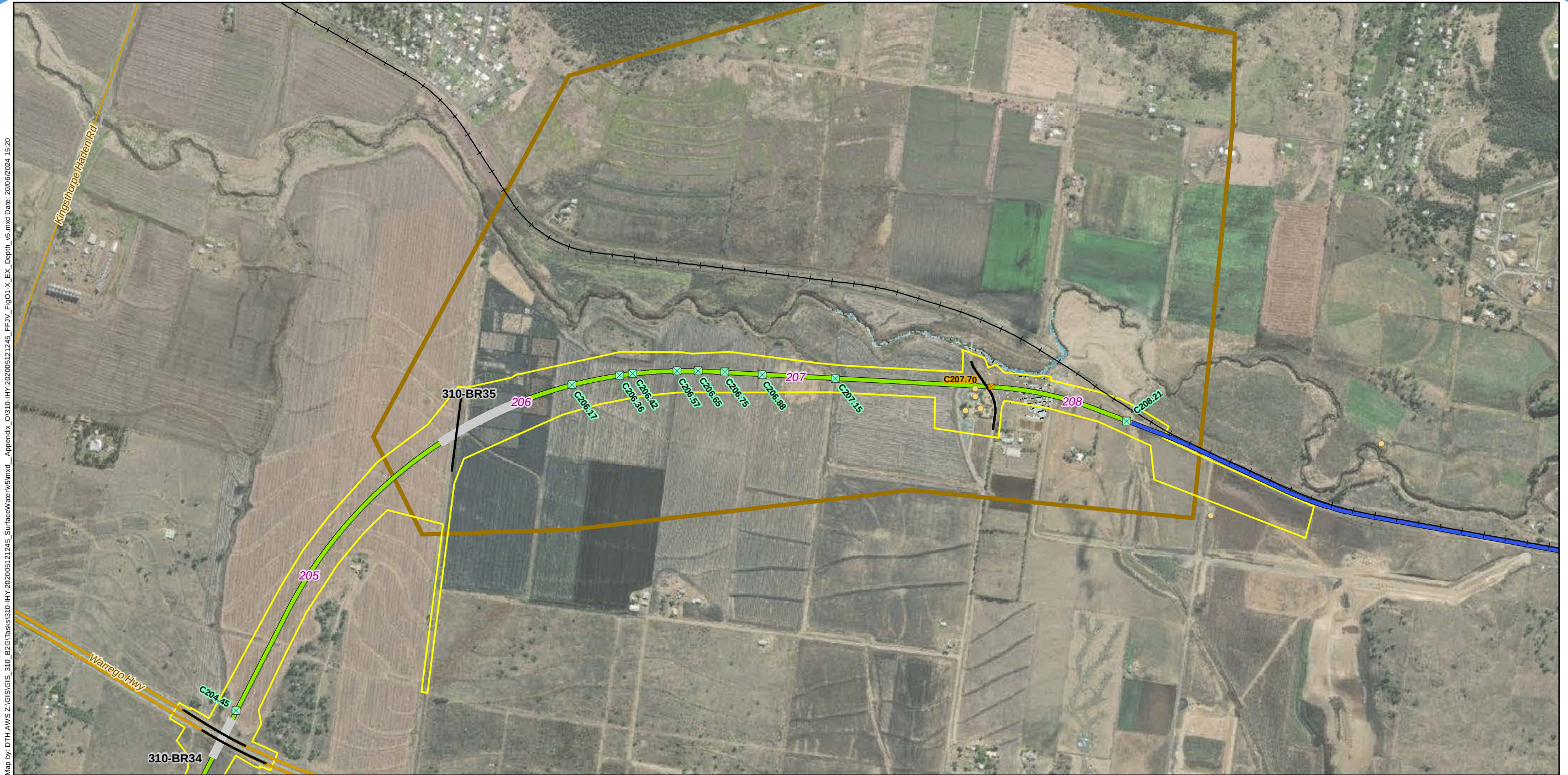
Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)



A3 scale: 1:15,000





Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Gowrie to Helidon alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated peak depth (m)

- | | |
|------------|-----------|
| 0 - 0.25 | 2.5 - 3.0 |
| 0.25 - 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 |
- 0.5m peak water surface contour (mAHD)



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:56



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	

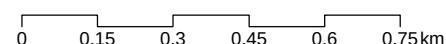


A3 scale: 1:20,000
0 0.2 0.4 0.6 0.8 1km



- Estimated Peak velocity (m/s)**

A3 scale: 1:15.000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O2 - page 2 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:57



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)	
0.0 - 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	



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



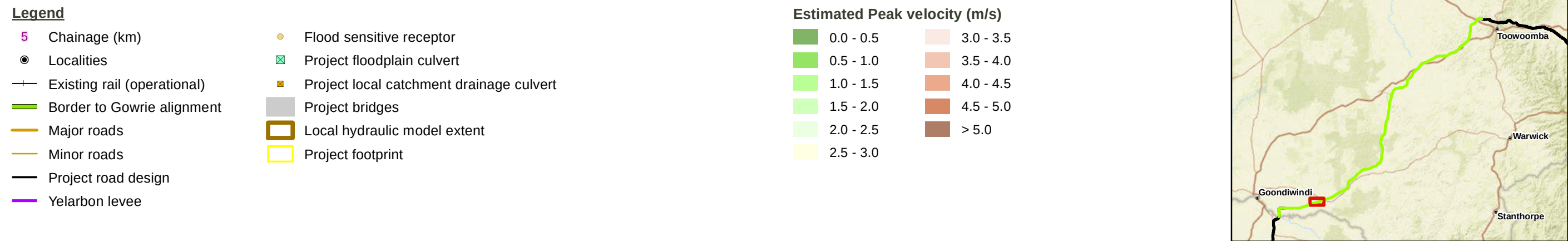
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

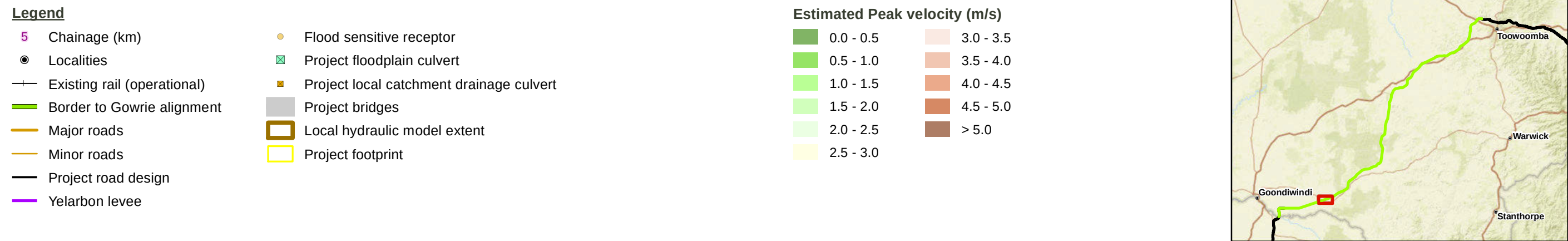
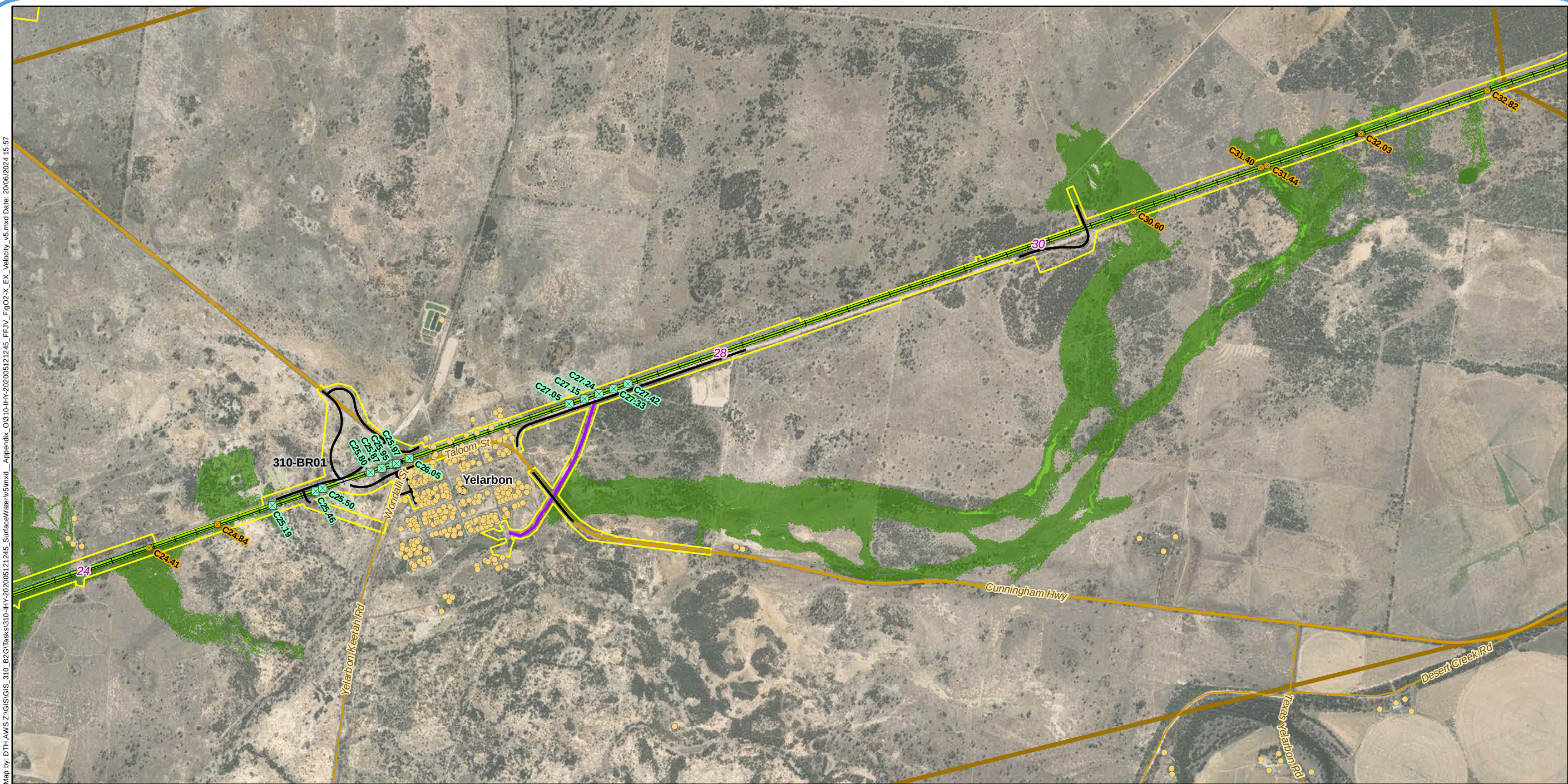
Figure O2 - page 3 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



A3 scale: 1:25,000

0 0.25 0.5 0.75 1 1.25 km



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km

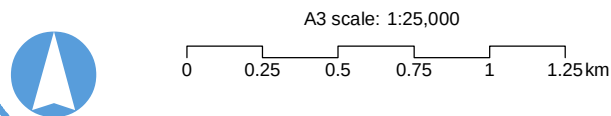
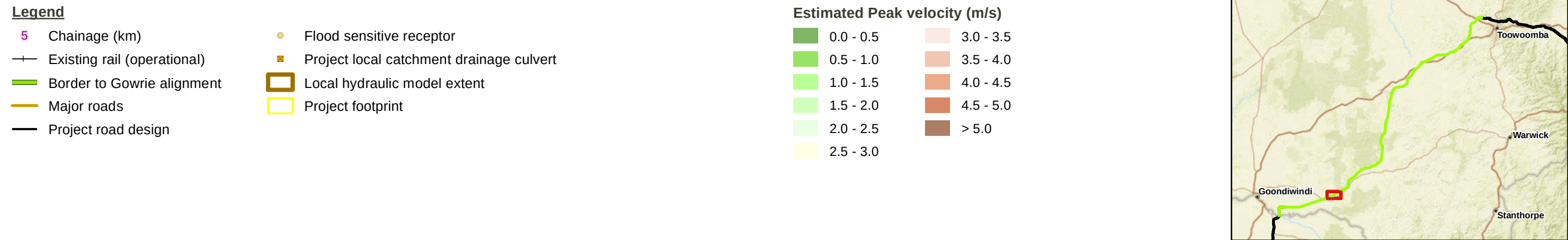


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 5 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case





Legend

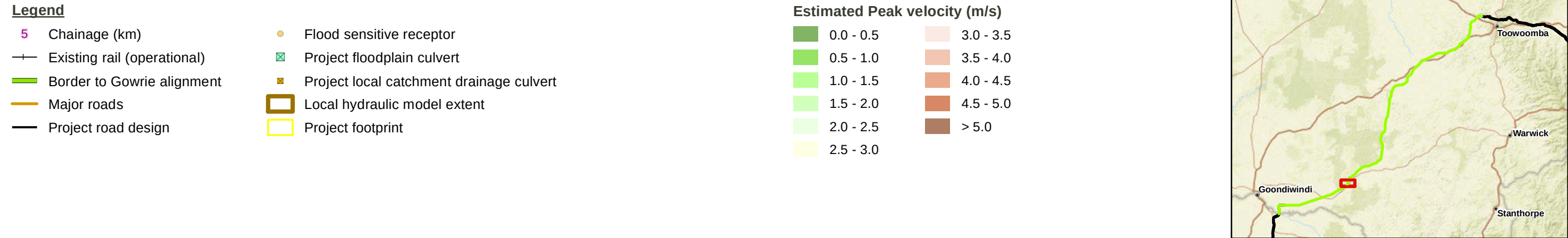
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 8 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**



A step function graph on a horizontal axis labeled from 0 to 0.75 km. The function is 1 for intervals $[0, 0.15)$, $[0.3, 0.45)$, and $[0.6, 0.75]$, and 0 for intervals $[0.15, 0.3)$ and $[0.45, 0.6)$.

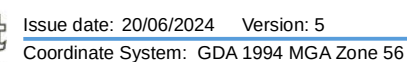
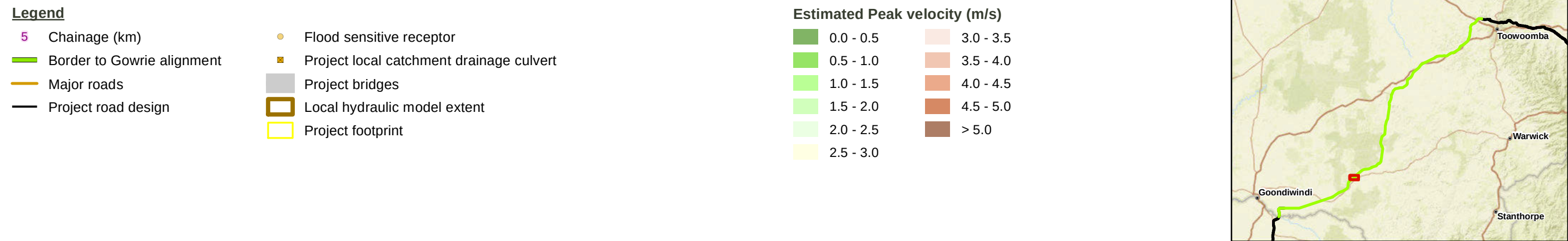
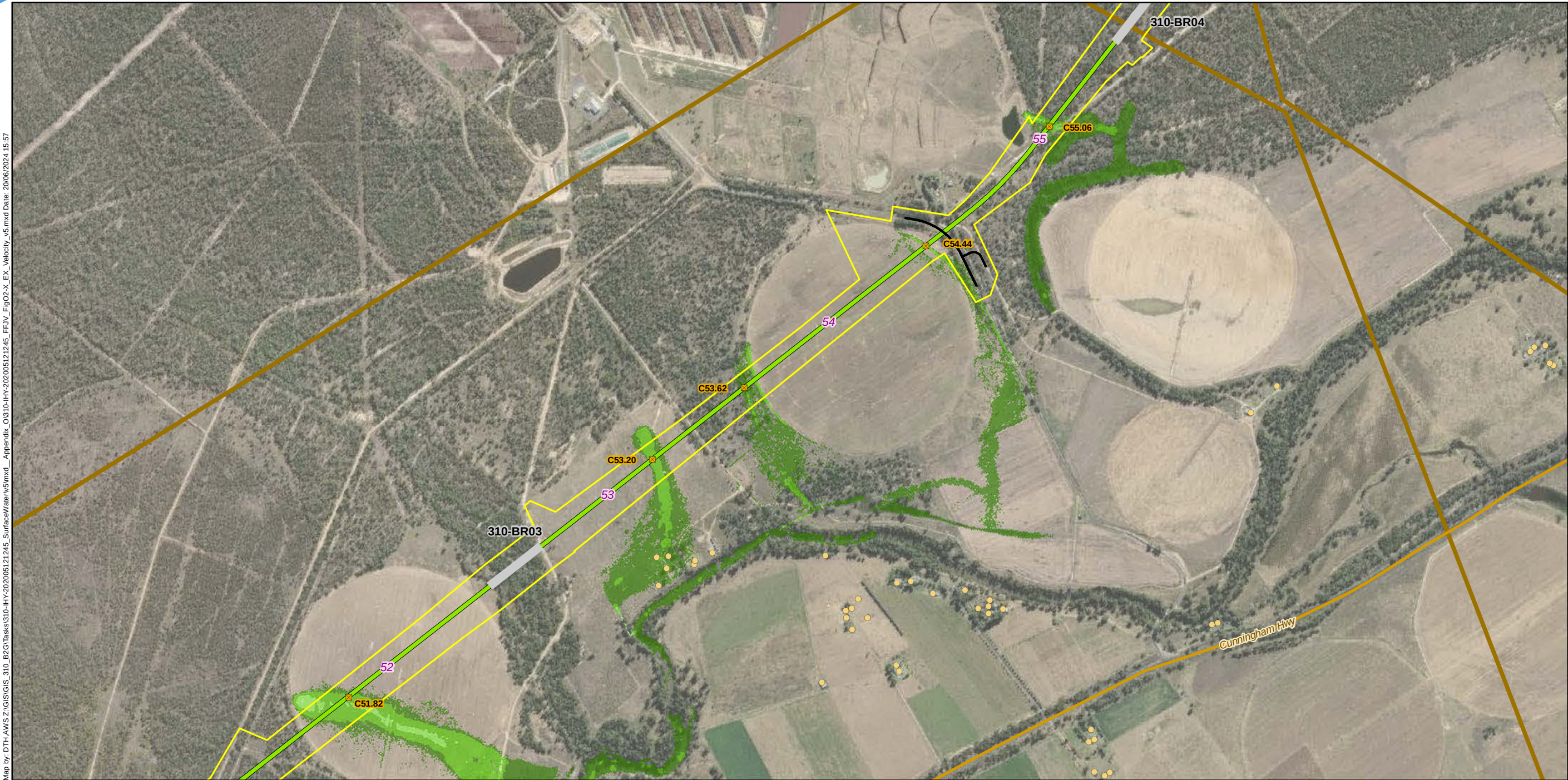


Figure O2 - page 9 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 10 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case

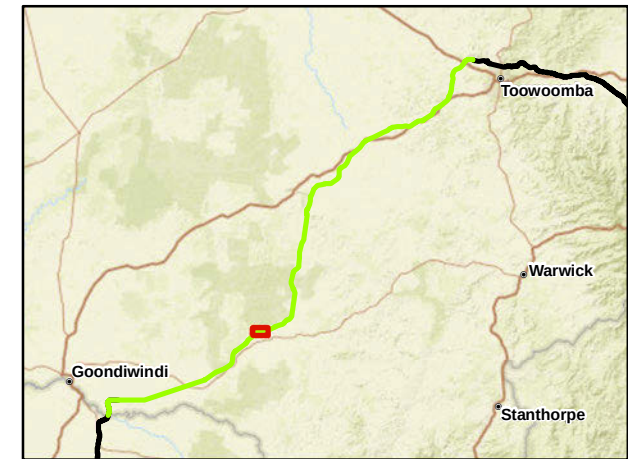


Legend

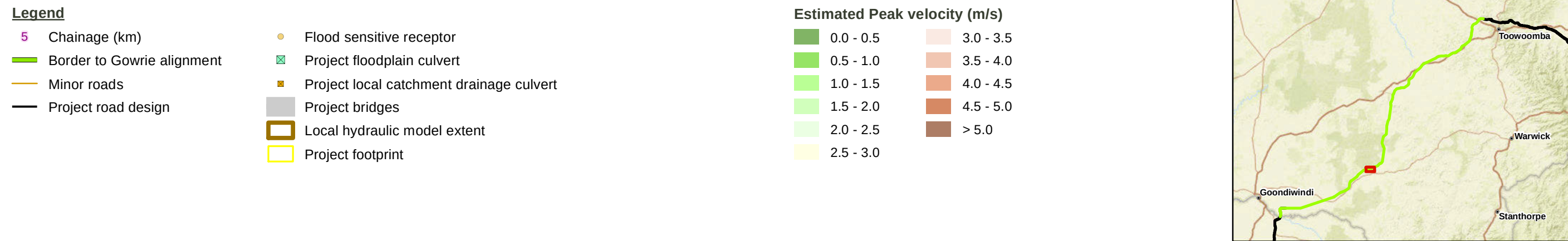
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	

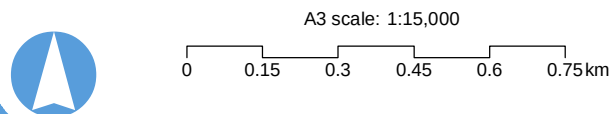
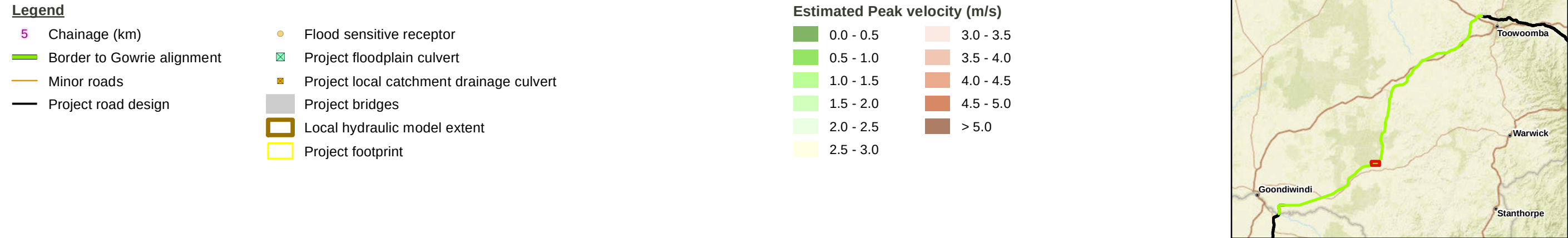


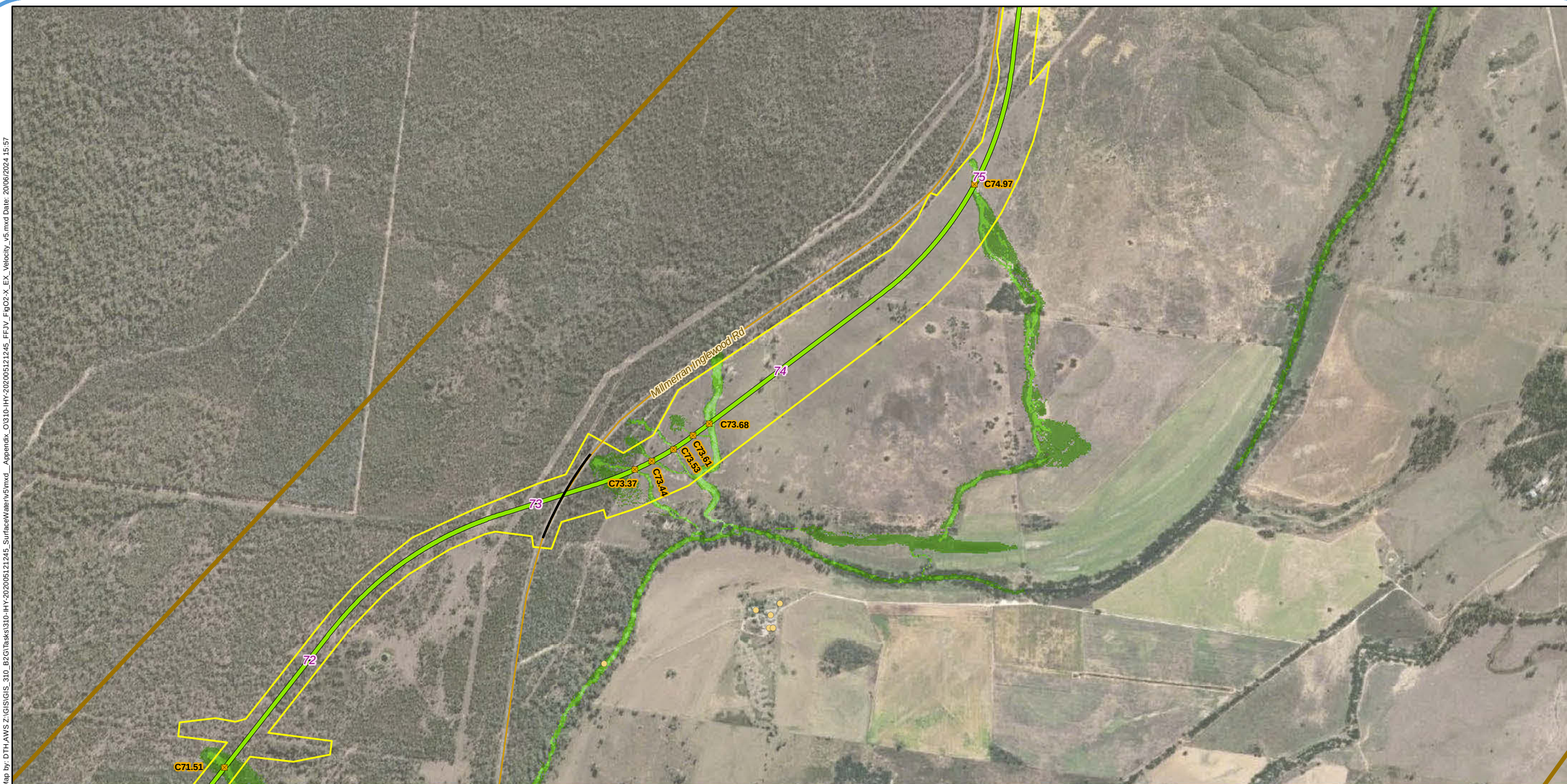
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km





- Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

0.0 - 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	

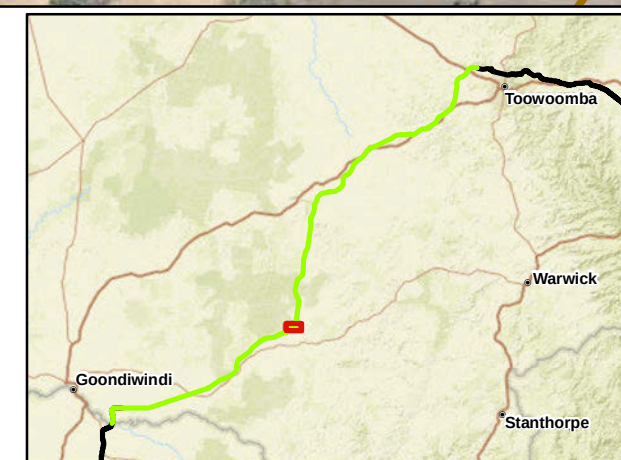


Figure O2 - page 14 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The terrain is depicted with green and brown shading, and a network of roads is shown in red and black lines.

A3 scale: 1:15,000



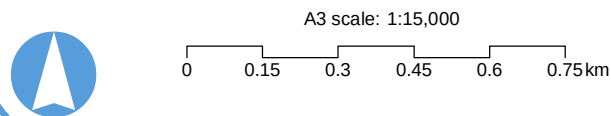
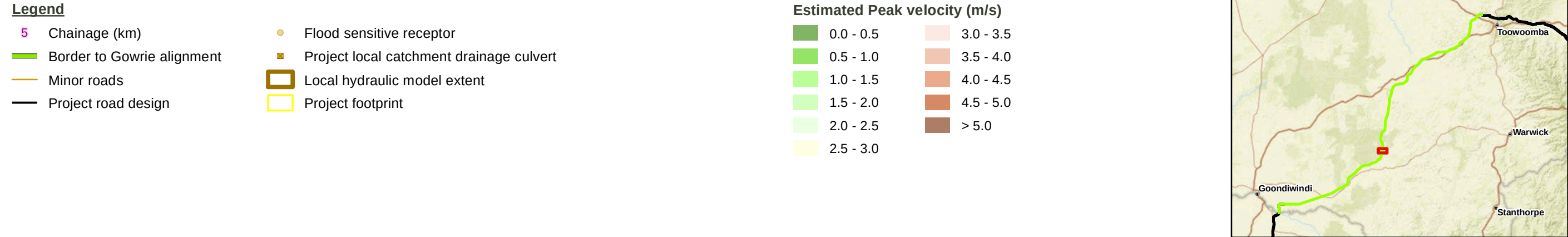
Issue date: 20/06/2024 Version: 5

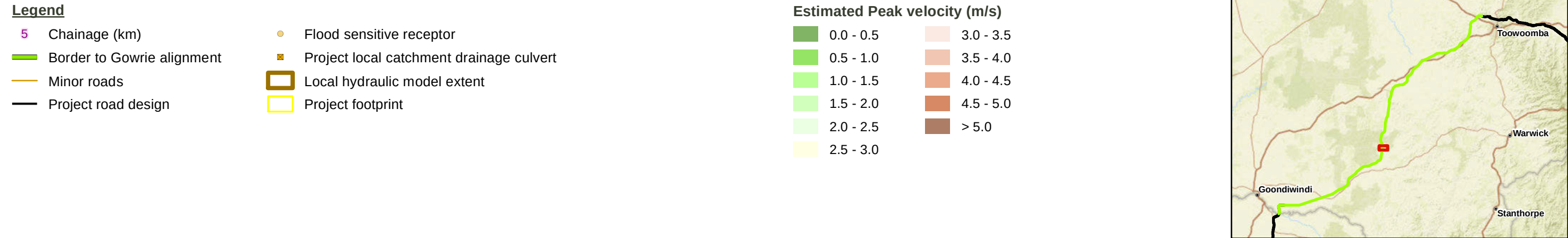
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 15 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case





A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



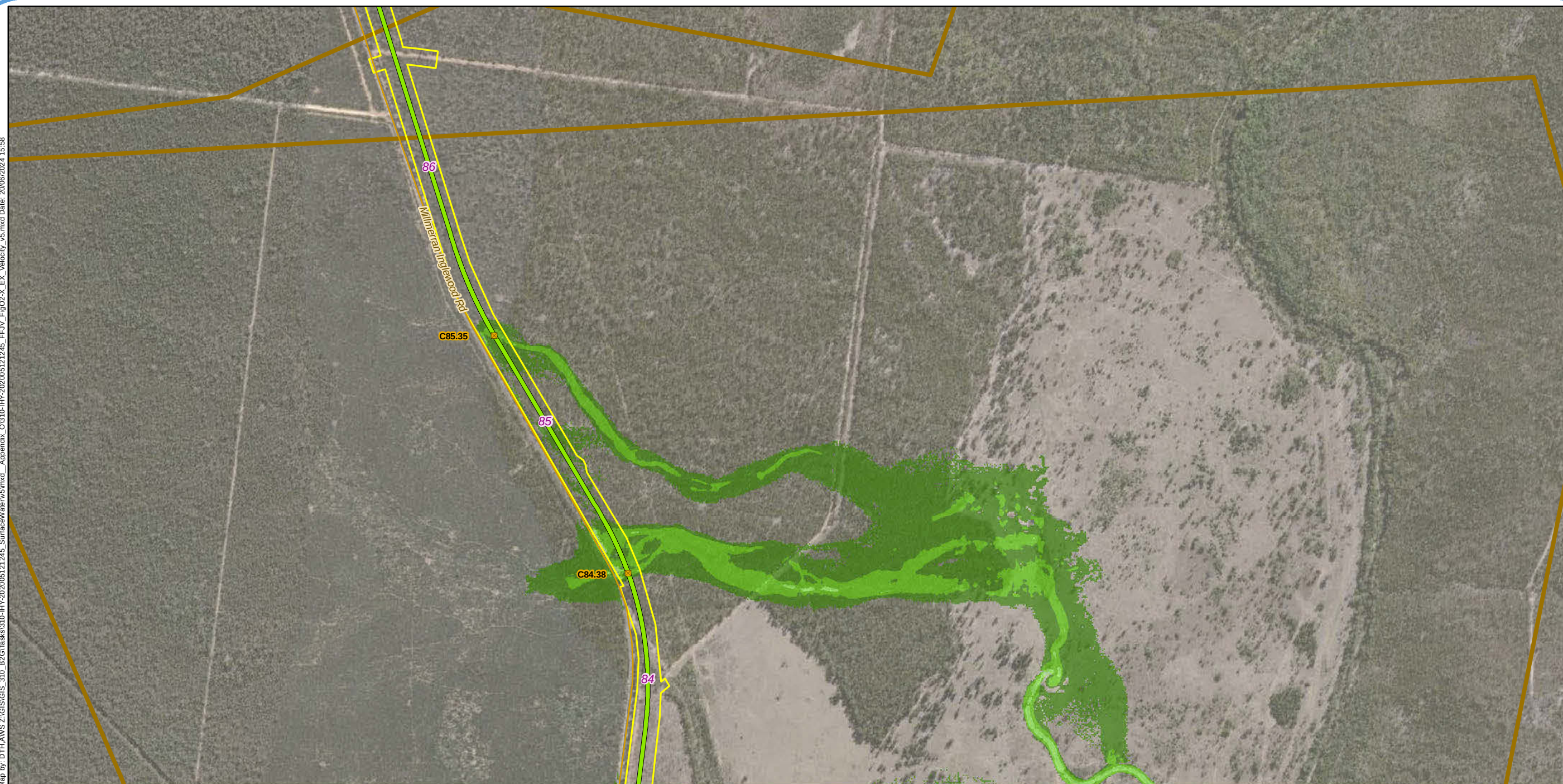
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 17 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



5 Chainage (km)

Border to Gowrie alignment

Minor roads

Project road design

- Flood sensitive receptor
- Project local catchment drainage culvert
- ▭ Local hydraulic model extent
- ▭ Project footprint

0.0 - 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	

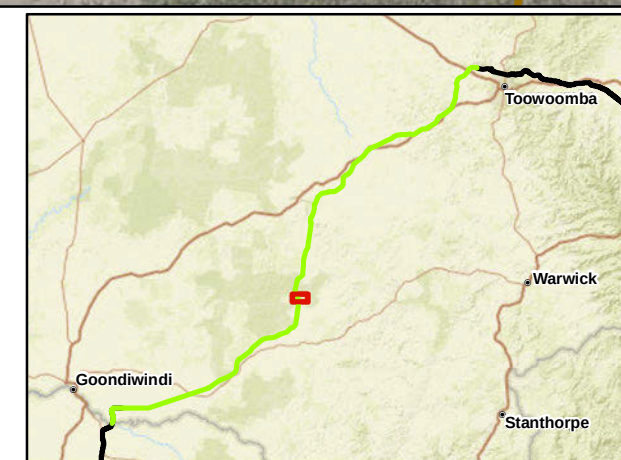
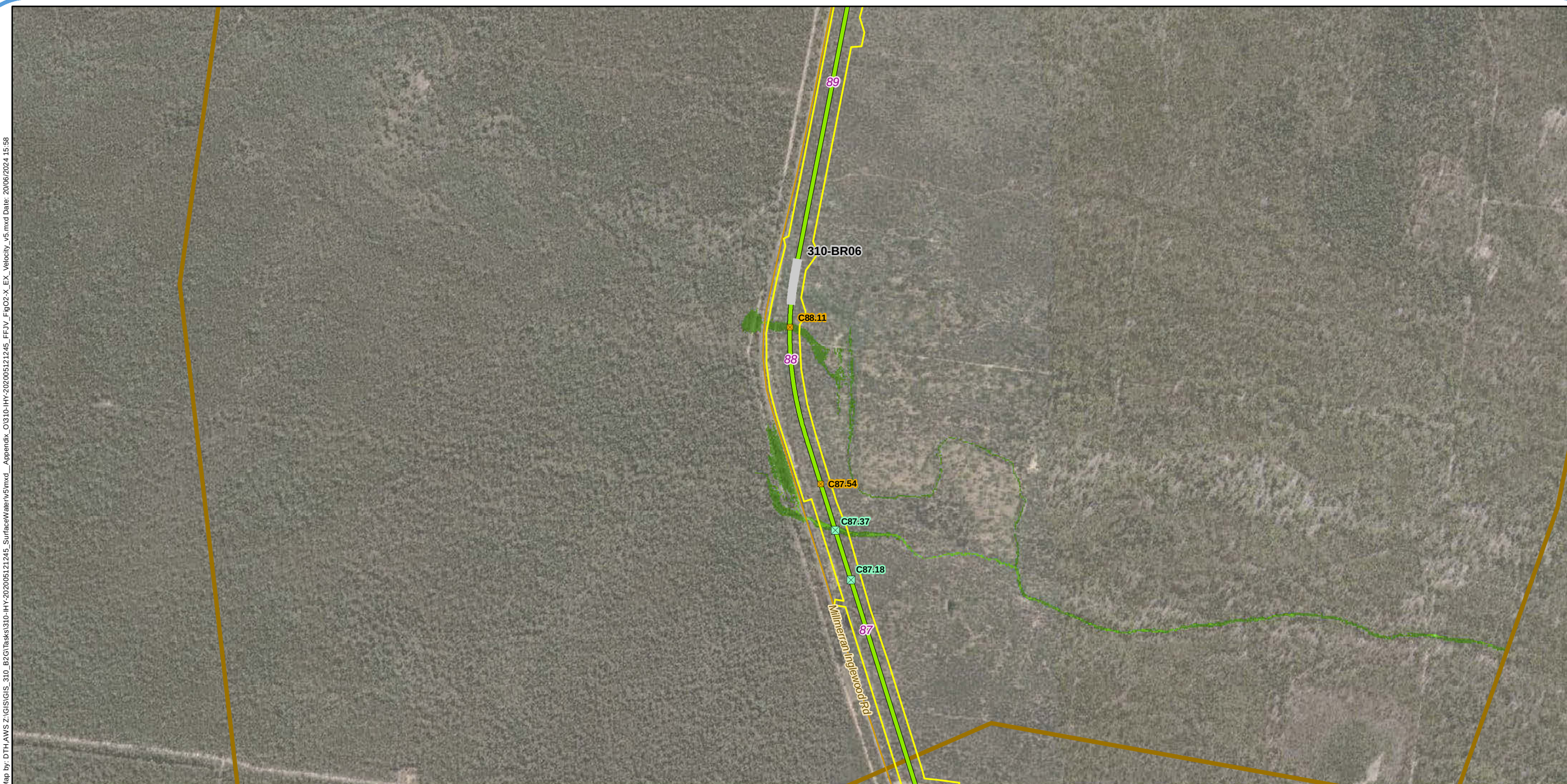


Figure O2 - page 18 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



5	Chainage (km)		Flood sensitive receptor
	Border to Gowrie alignment		Project floodplain culvert
	Minor roads		Project local catchment drainage culvert
	Project road design		Project bridges
			Local hydraulic model extent
			Project footprint

0.0 - 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	



20% AEP Event - Local Catchments - Peak Velocity - Existing Case

Border to Gowrie

Figure O2 - page 19 of 48:

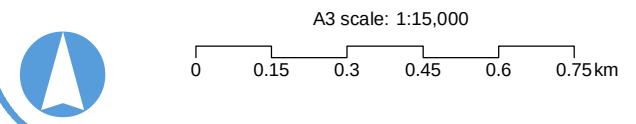
Map by: D:\HAWK\GIS\310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Applix_D\310-HY-202005121245_FF\J_V_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:58



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)			
0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0
2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0
4.0 - 4.5	4.5 - 5.0	> 5.0	





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

- Estimated Peak velocity (m/s)**
- | | |
|-----------|-----------|
| 0.0 - 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 | |



Figure O2 - page 21 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case

A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWaterV5.mxd Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:58



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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

Map by: D:\HAWKS\GIS\310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:58

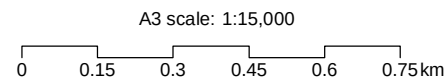


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



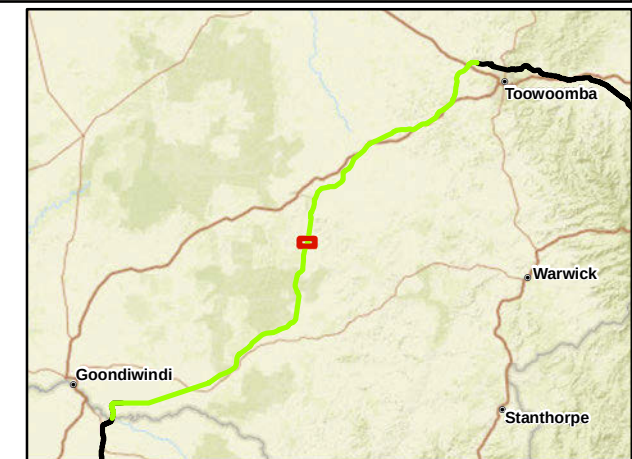


Legend

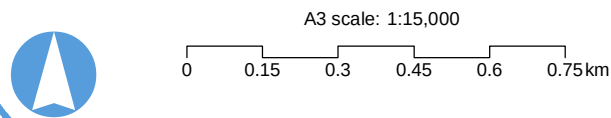
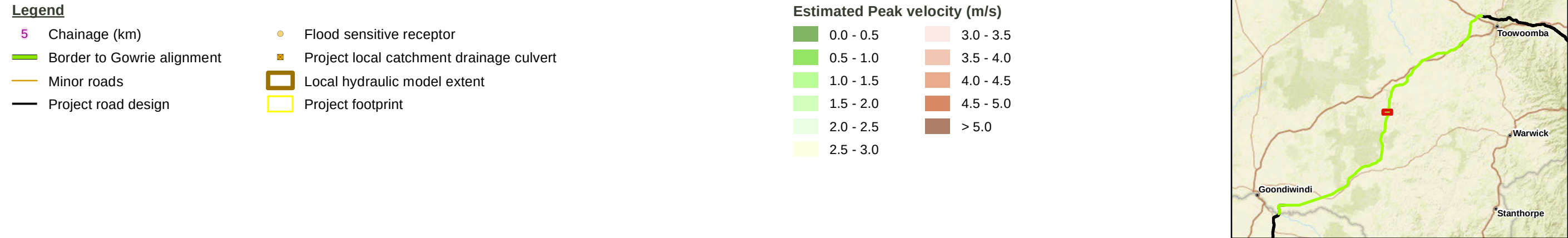
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

- | | |
|-----------|-----------|
| 0.0 - 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 | |



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



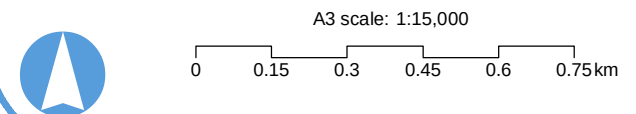
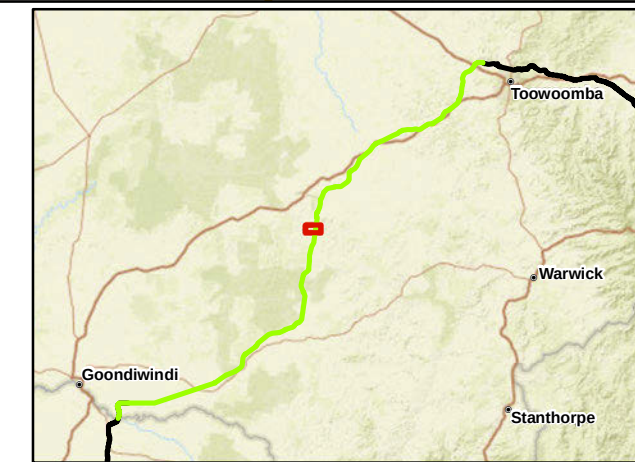
Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\Tasks\310-HY-2020\5121245_SurfaceWater\5mxd_Appendix_D\310-HY-2020\5121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:58



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)	
0.0 - 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	





- Estimated Peak velocity (m/s)**

A map of south-eastern Australia showing the study area. A red square indicates the study site, located on a road between Goondiwindi and Toowoomba. The map also shows the locations of Toowoomba, Warwick, and Stanthorpe. The study area is highlighted in green.



Border to Gowrie

Figure O2 - page 27 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

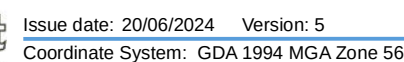


Figure O2 - page 28 of 48:

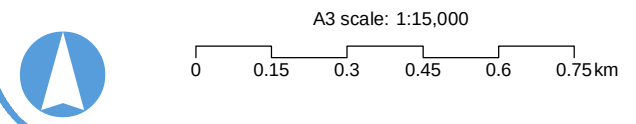
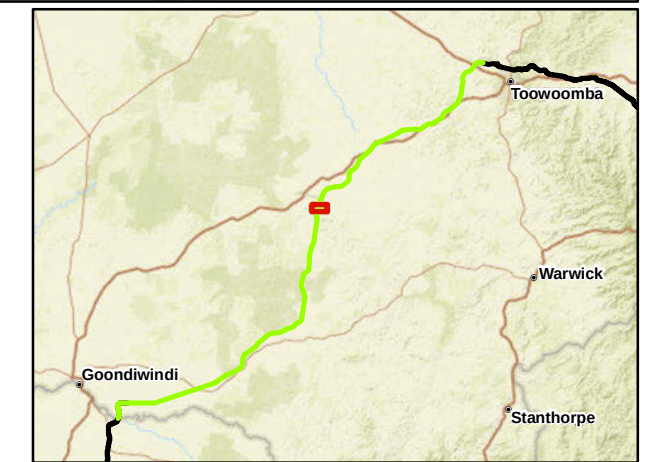
20% AEP Event - Local Catchments - Peak Velocity - Existing Case



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)	
0.0 - 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	



Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-HY-202005121245_SurfaceWaterV5.mxd Appendix_D\310-HY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:59



Legend

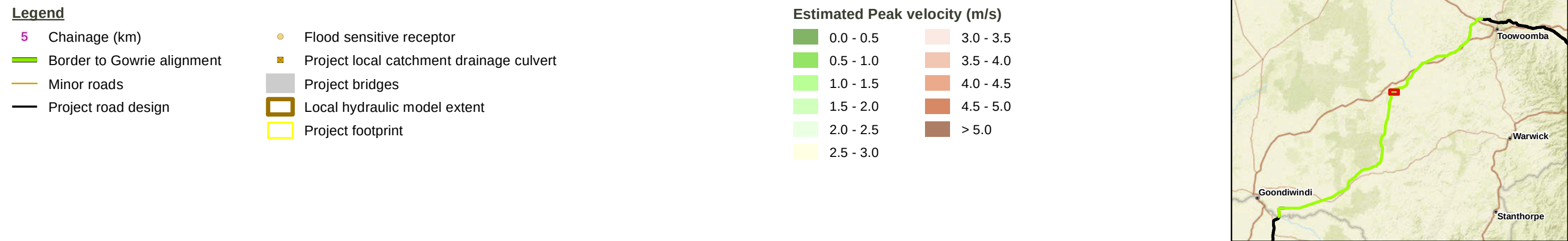
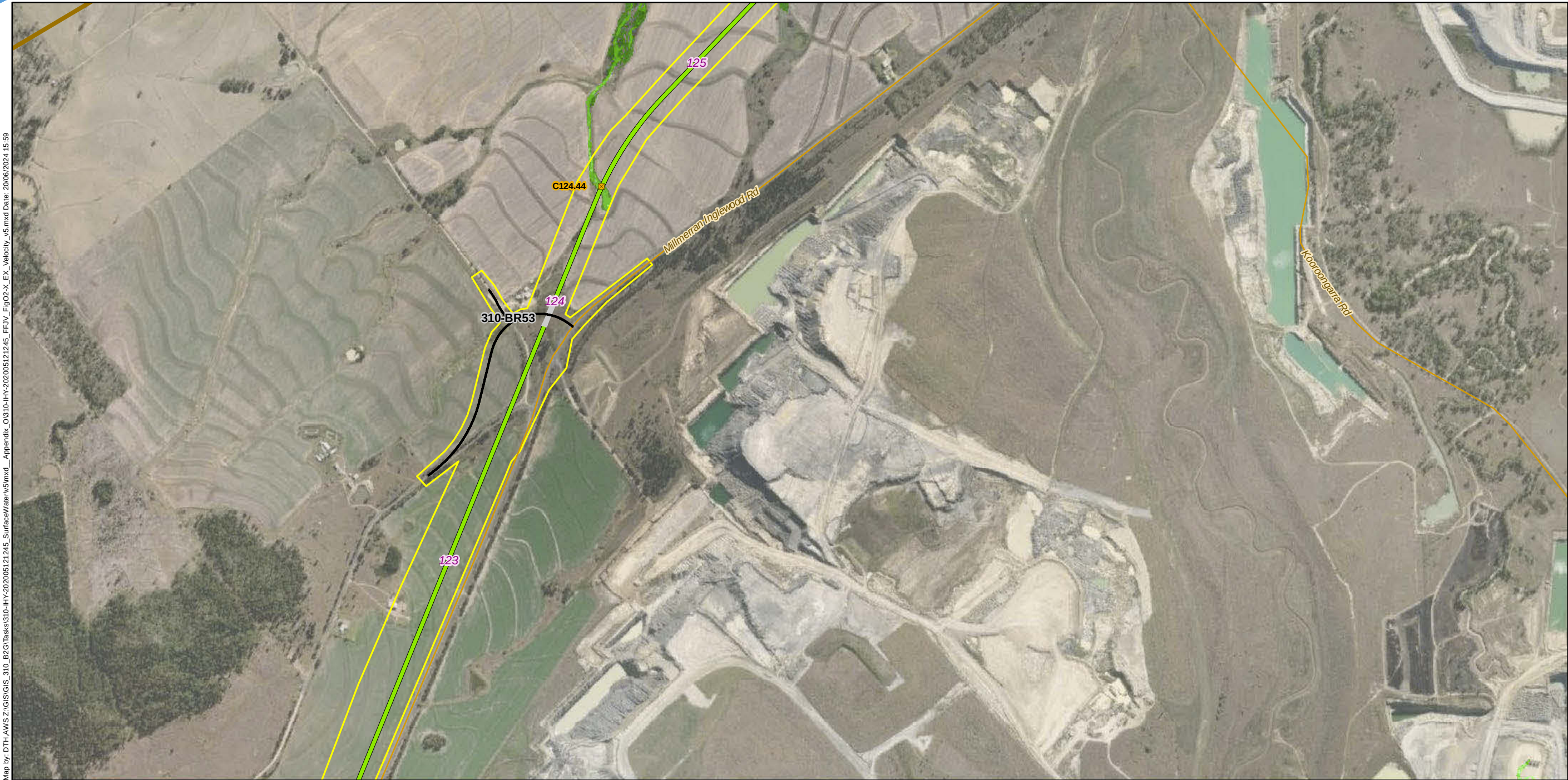
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



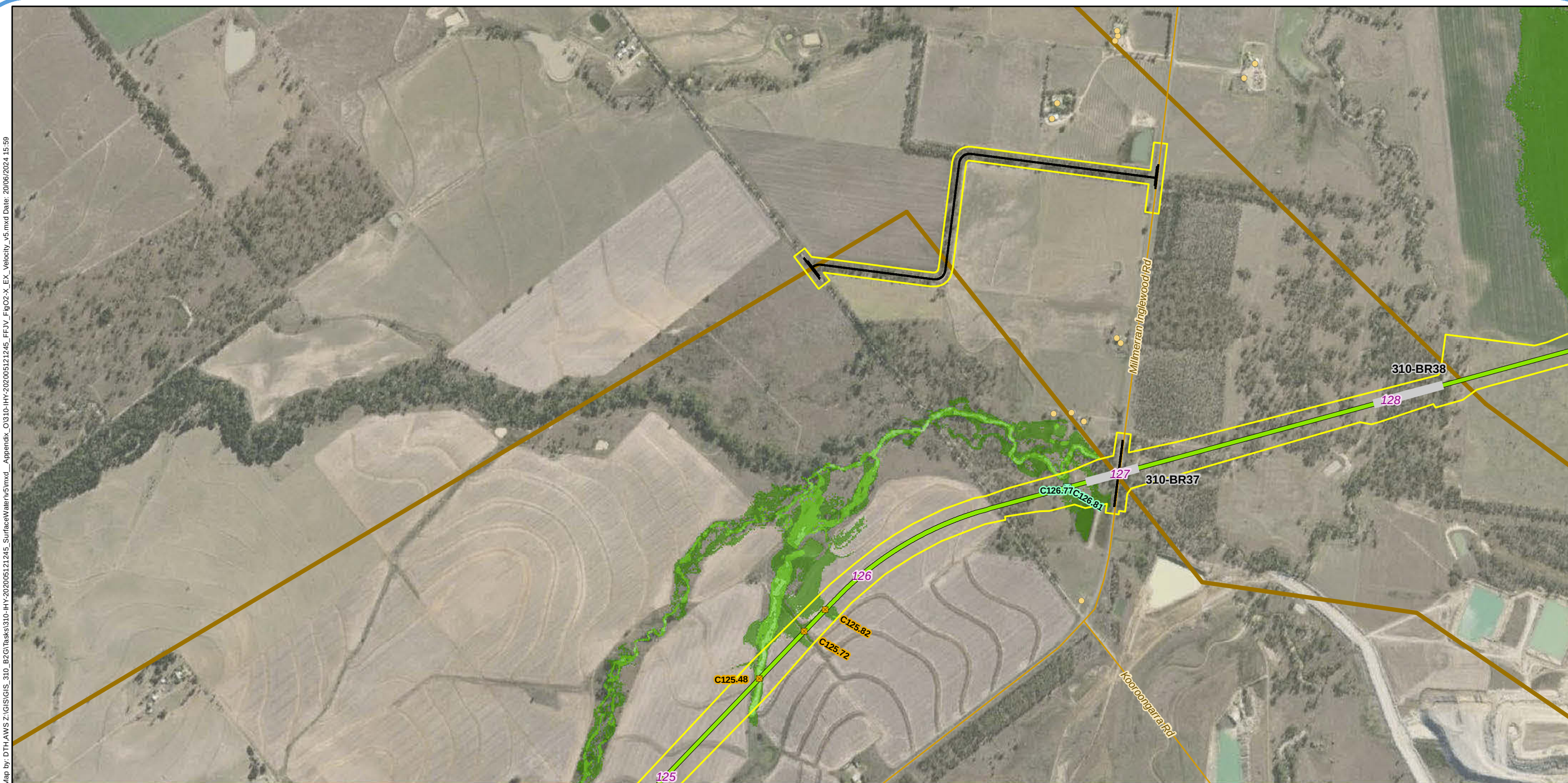
A3 scale: 1:15,000
0 0.15 0.3 0.45 0.6 0.75 km



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:59



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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

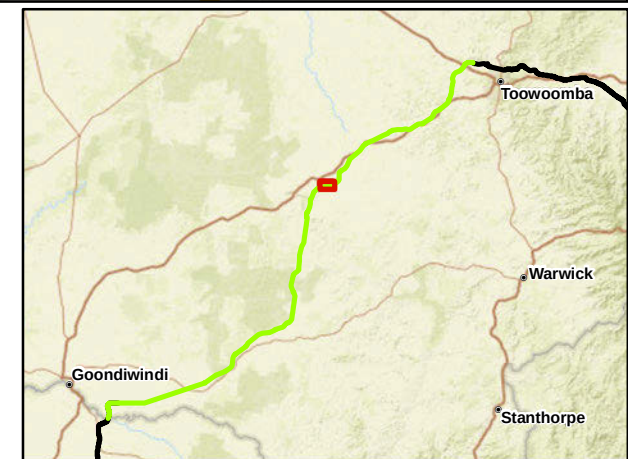


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:59

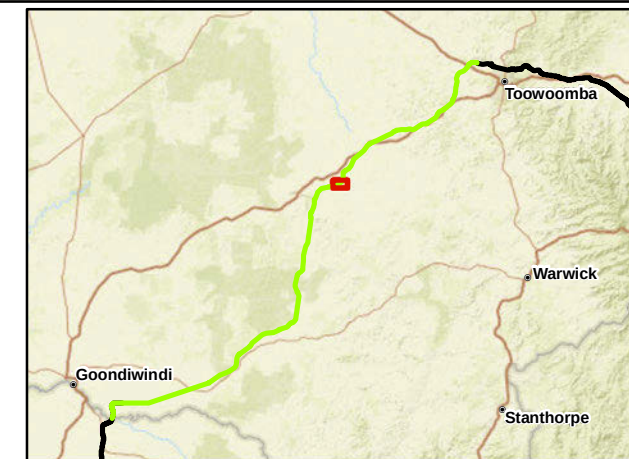


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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

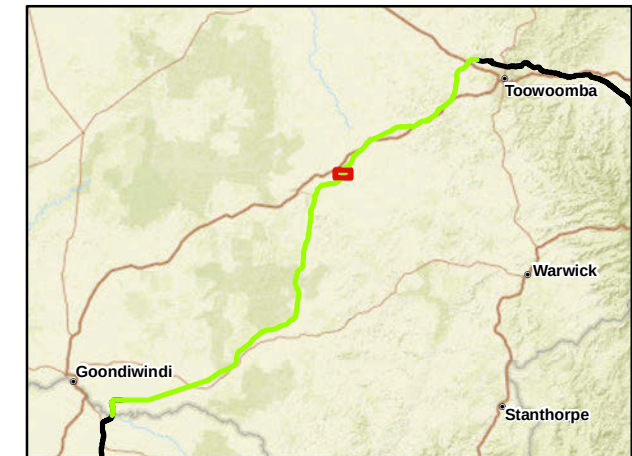
Map by: D:\HAWKS\GIS\310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 15:59



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)	
0.0 - 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	



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

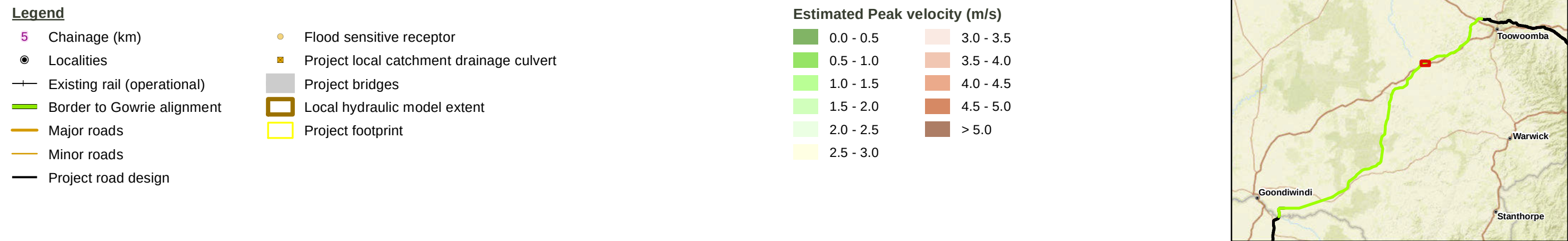


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

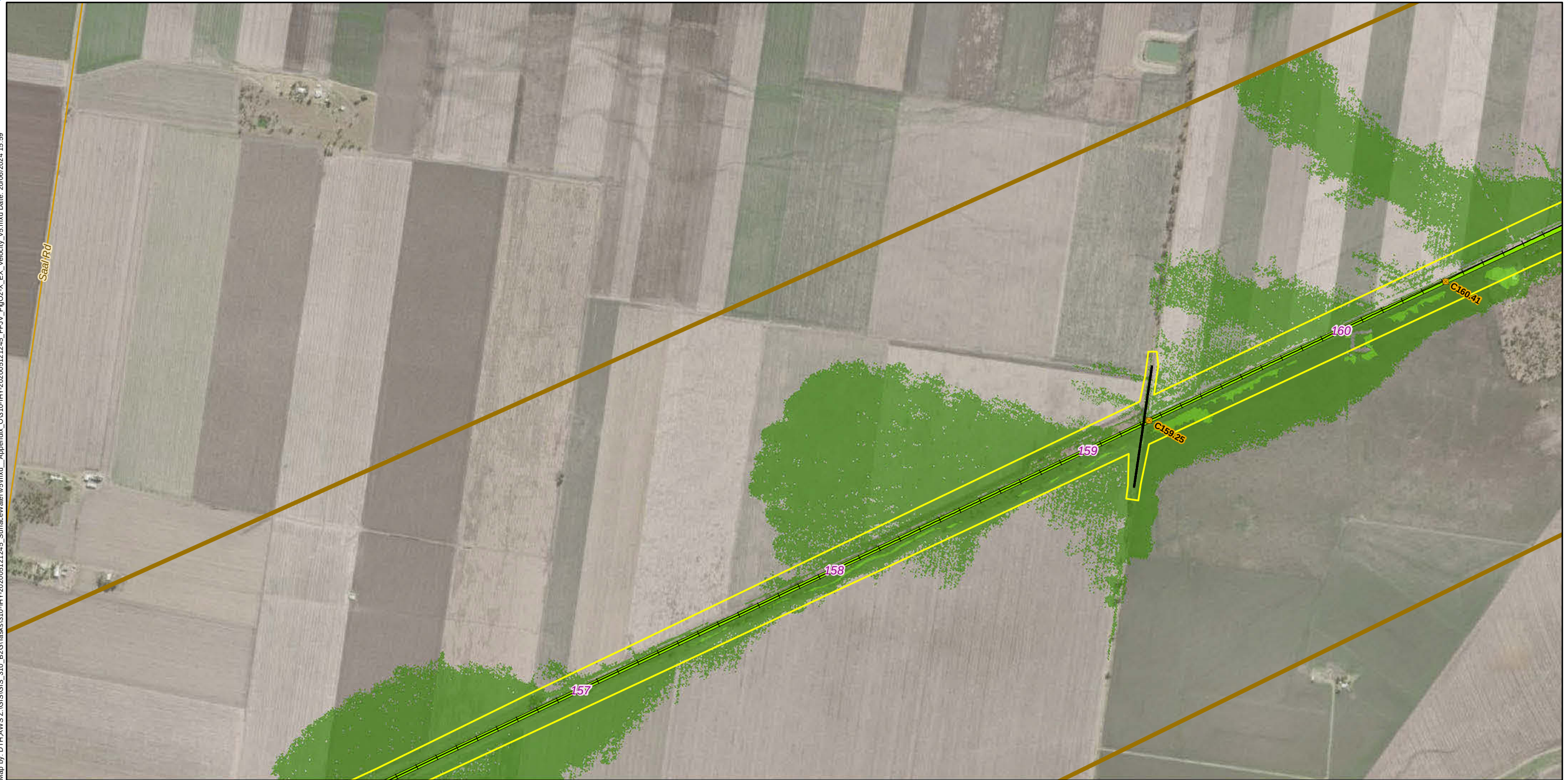
Figure O2 - page 35 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



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

Map by: D:\HAWKS\GIS\310_B2\GIS\310-HY-202005121245_SurfaceWater\5mxd_Appendix_D\310-HY-202005121245_FF\FF_Velocity_v5.mxd Date: 20/06/2024 15:59

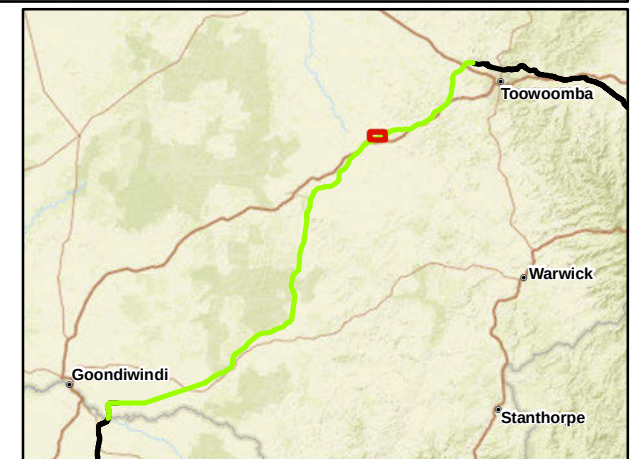


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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

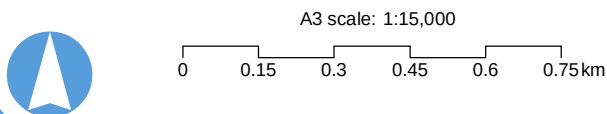


Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	





- Estimated Peak velocity (m/s)**



Border to Gowrie

Figure O2 - page 39 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

Figure O2 - page 40 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

0.0 - 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	

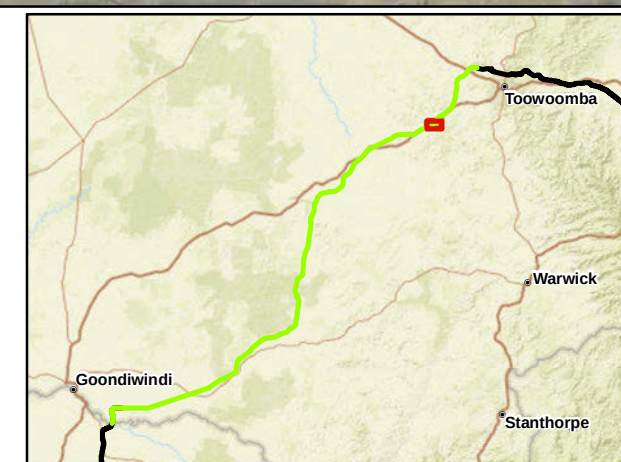
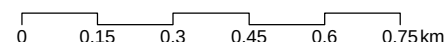


Figure O2 - page 41 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



A3 scale: 1:15.000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56



- Estimated Peak velocity (m/s)**

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 42 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

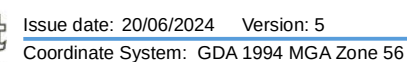


Figure O2 - page 43 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)			
0.0 - 0.5	0.5 - 1.0	1.0 - 1.5	1.5 - 2.0
2.0 - 2.5	2.5 - 3.0	3.0 - 3.5	3.5 - 4.0
4.0 - 4.5	4.5 - 5.0	> 5.0	



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



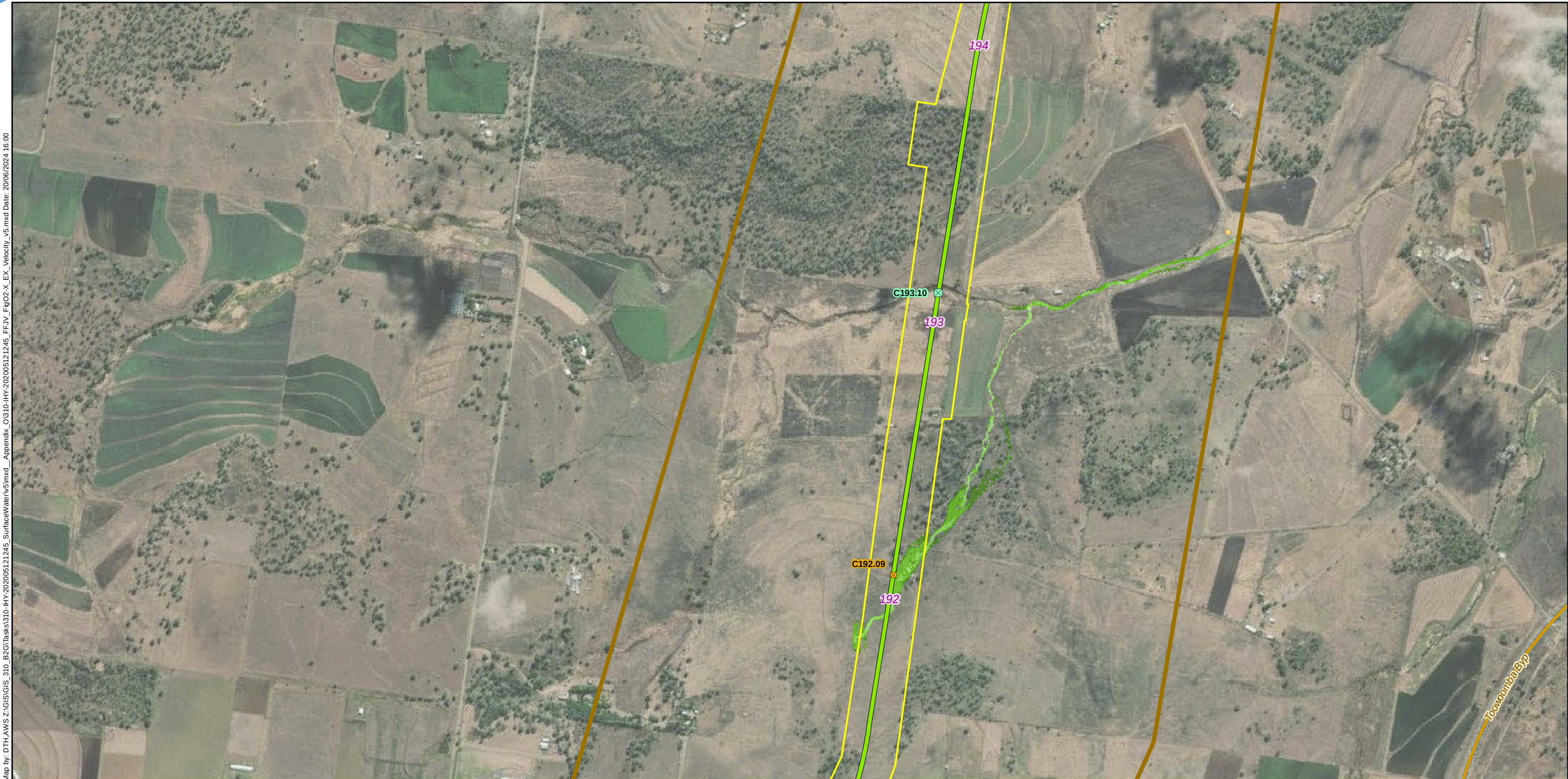
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 44 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case

Map by: DTH\AWS Z\GIS\GIS_310_B2\GIS\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_D\310-IHY-202005121245_FF\JV_Fig02-X_EX_Velocity_v5.mxd Date: 20/06/2024 16:00



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)			
0.0 - 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			



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



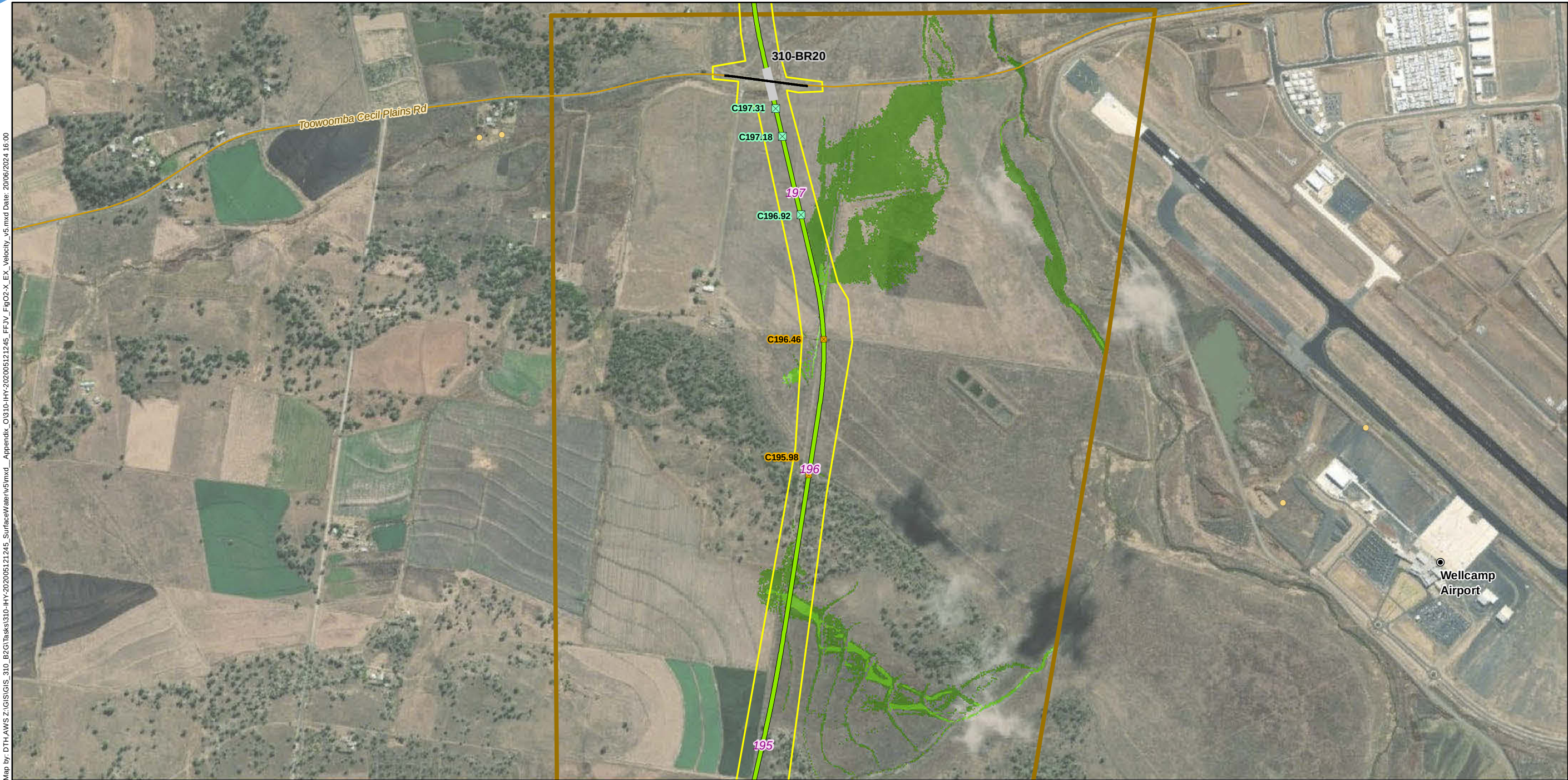
Future Freight
Integrating Community, Environment and Engineering

Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 45 of 48:

20% AEP Event - Local Catchments - Peak Velocity - Existing Case



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Peak velocity (m/s)

0.0 - 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	



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



- Estimated Peak velocity (m/s)**

A map showing the route from Toowoomba to Goondiwindi. The route is highlighted in green, starting from Toowoomba (marked with a red square) and ending at Goondiwindi. The map includes labels for Toowoomba, Warwick, Stanthorpe, and Goondiwindi. The terrain is shown with green and brown shading, and a network of roads is visible.

A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O2 - page 47 of 48:

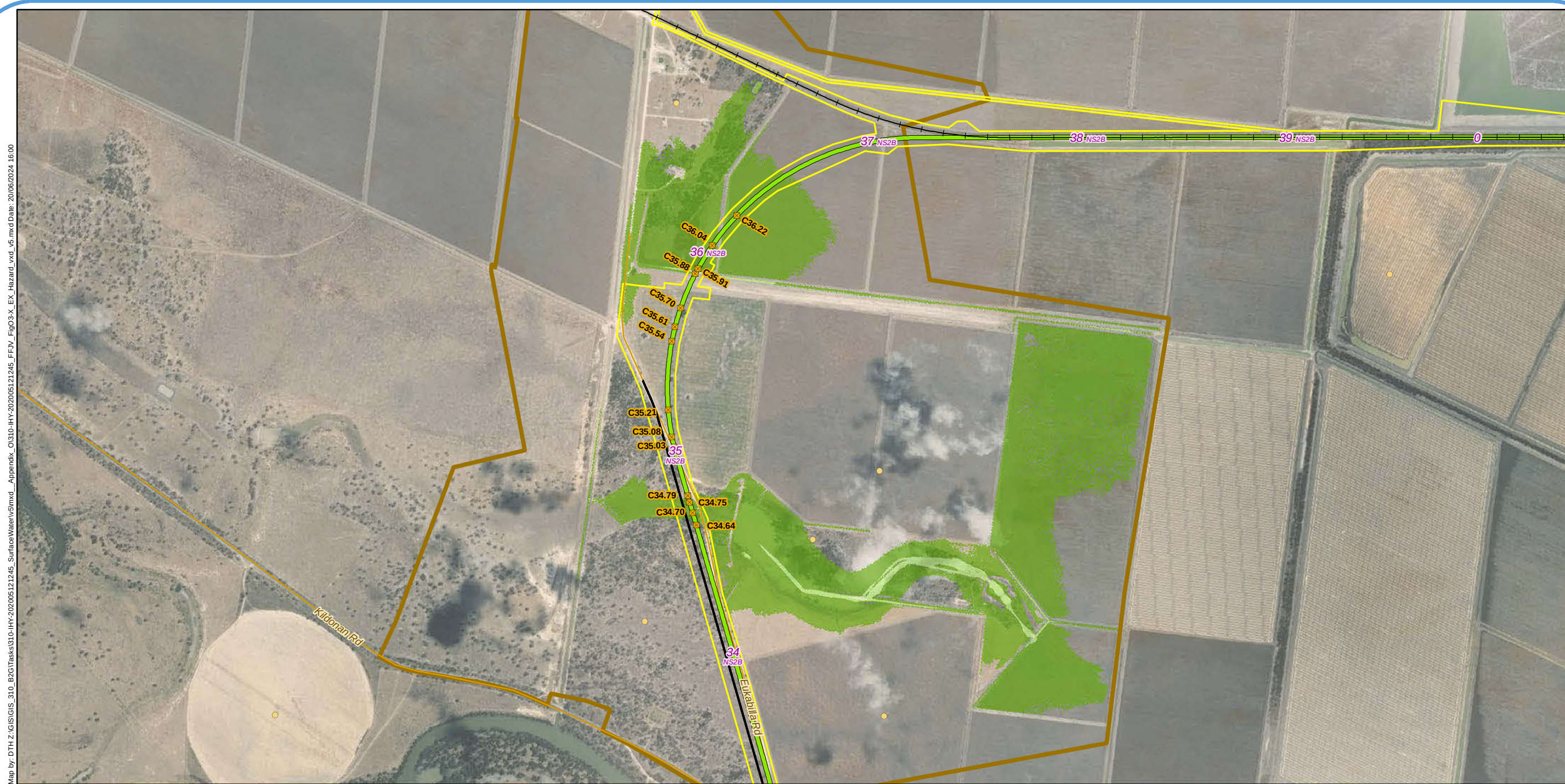
20% AEP Event - Local Catchments - Peak Velocity - Existing Case



- Estimated Peak velocity (m/s)**

A map showing the proposed route from Toowoomba to Goondiwindi. The route is highlighted in green, starting from Toowoomba in the north-east and heading south-west towards Goondiwindi. The map includes labels for Toowoomba, Warwick, Stanthorpe, and Goondiwindi. A red rectangle on the route near Toowoomba indicates the location of the proposed solar farm.

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_Fig03-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:00

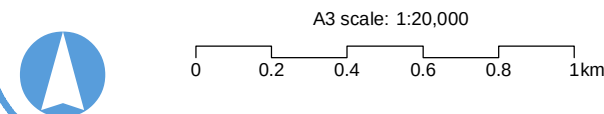


Legend

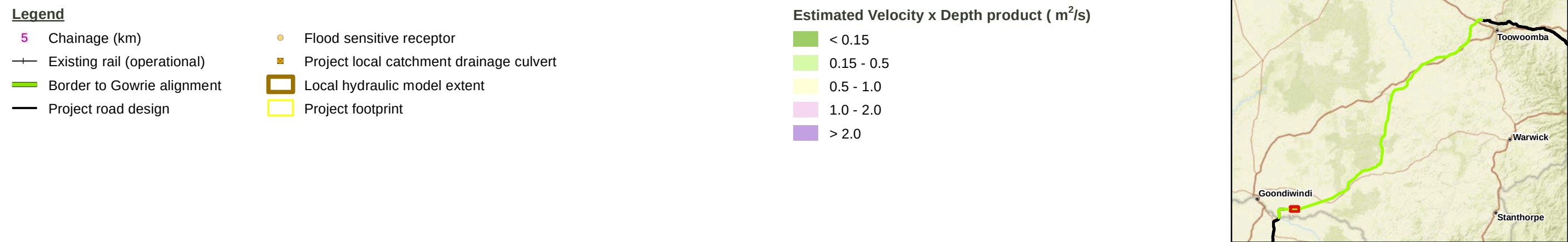
- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:00



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



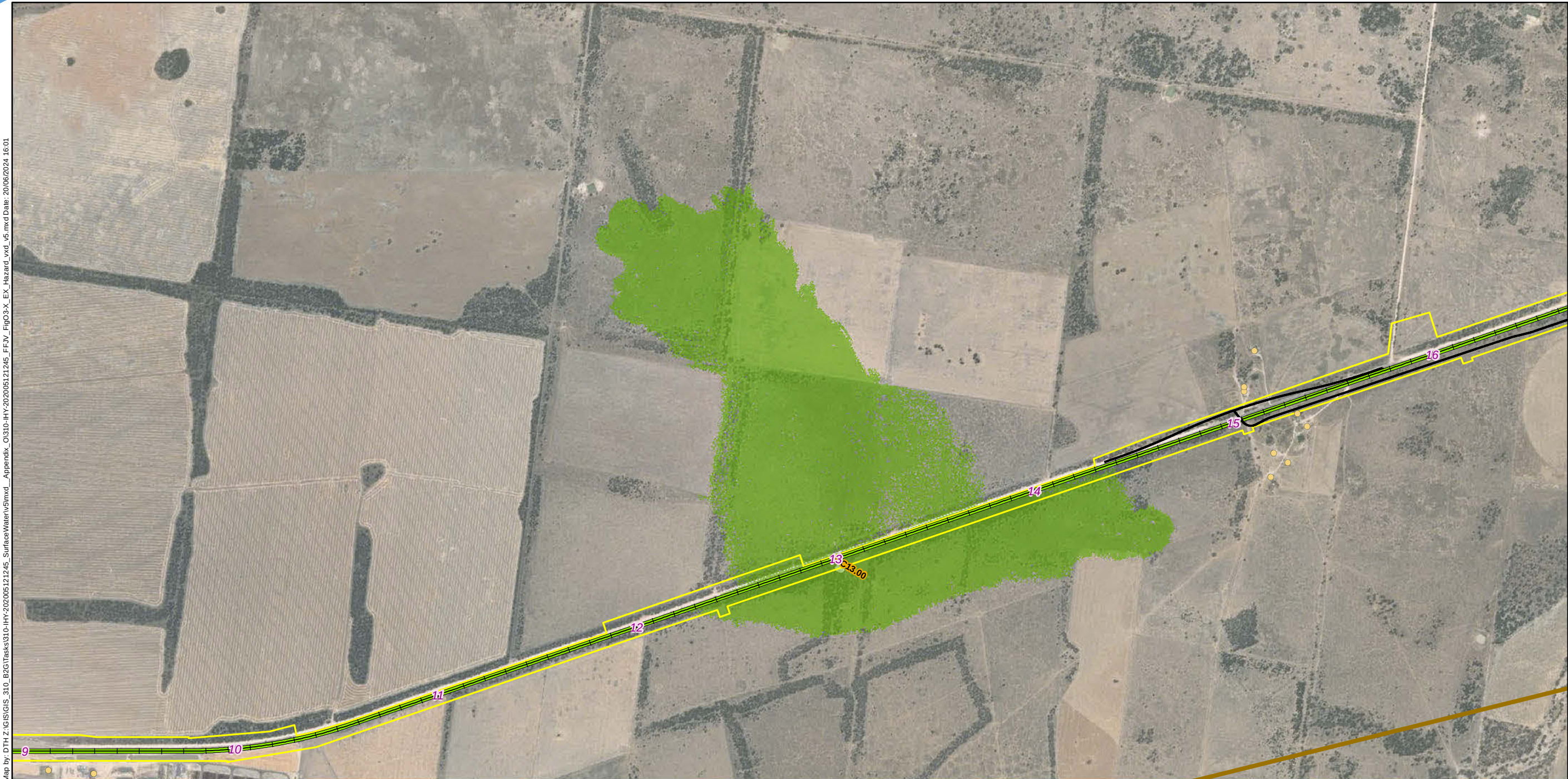
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 2 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01



Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

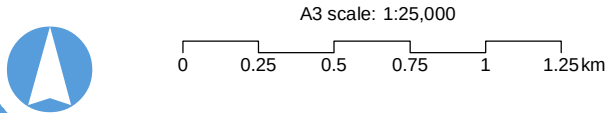
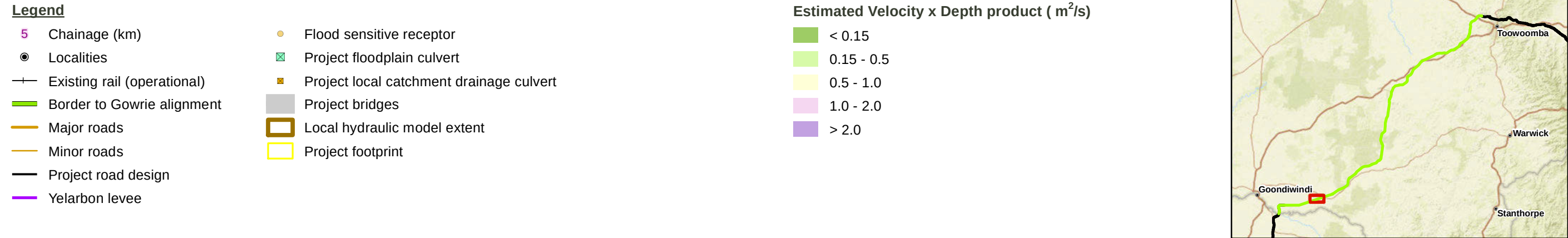


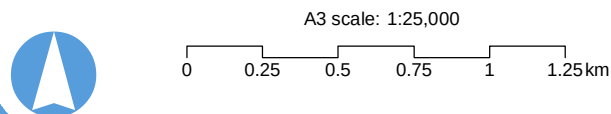
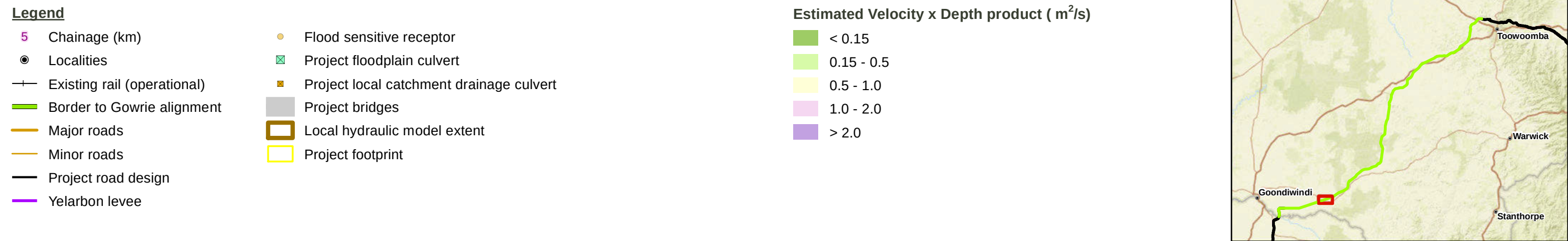
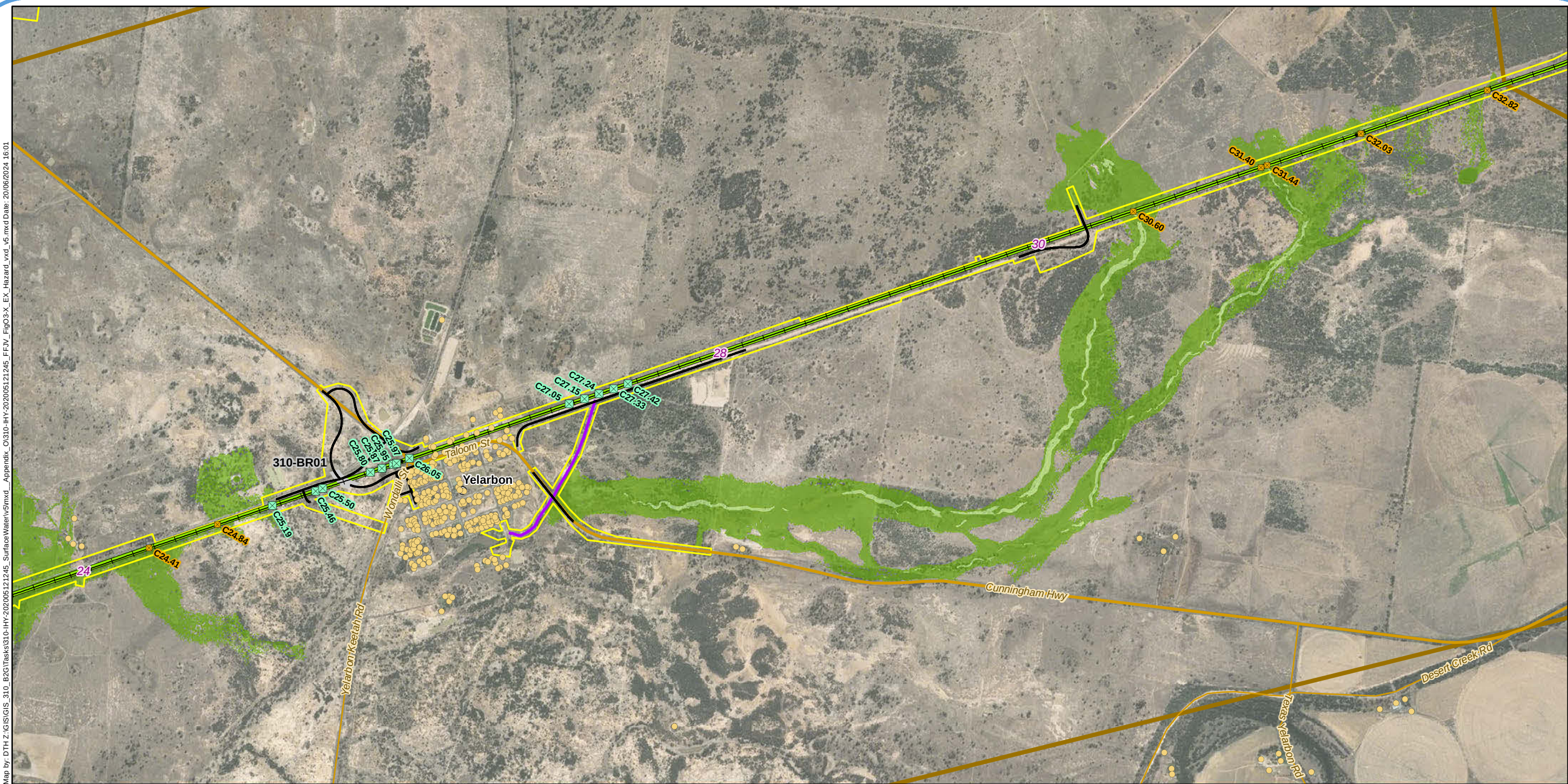
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 3 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case







Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



A3 scale: 1:25,000
0 0.25 0.5 0.75 1 1.25 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 6 of 48:

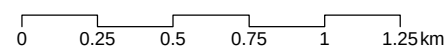
20% AEP Event - Local Catchments - Peak Hazard - Existing Case



- Estimated Velocity x Depth product (m²/s)**



A3 scale: 1:25,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 7 of 48:

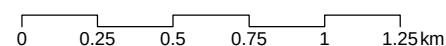
20% AEP Event - Local Catchments - Peak Hazard - Existing Case



- Estimated Velocity x Depth product (m²/s)**



A3 scale: 1:25,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 8 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

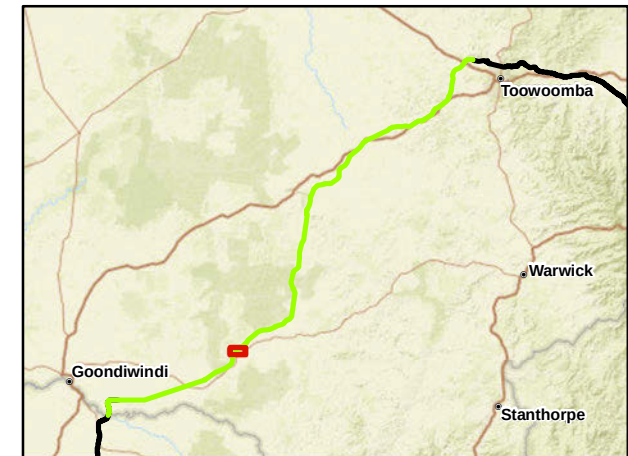


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01

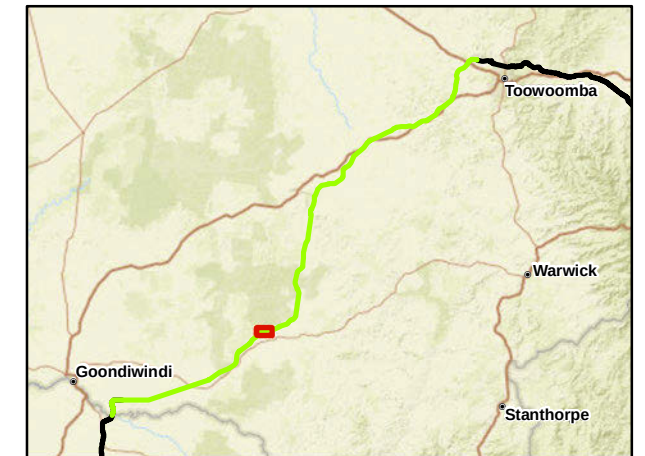


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01

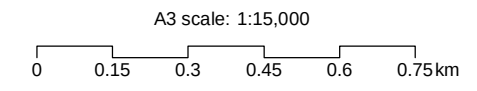
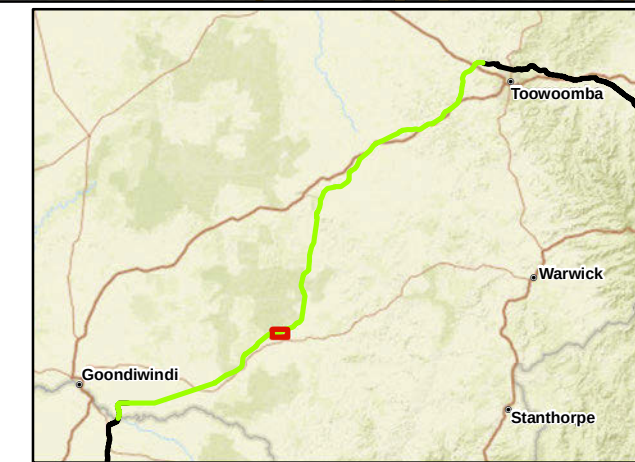


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

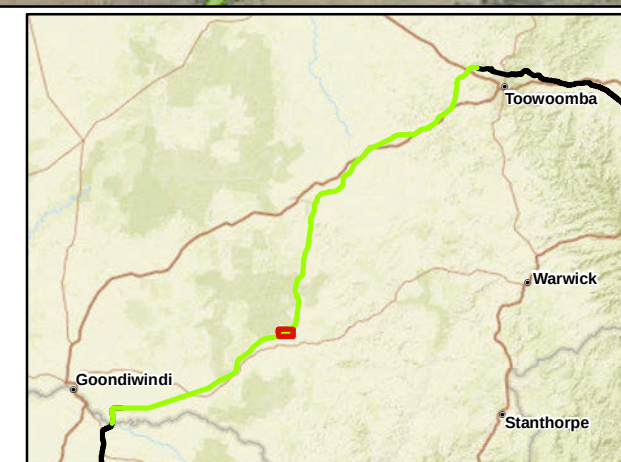
Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

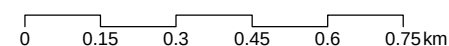




- Estimated Velocity x Depth product (m²/s)**



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 13 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01

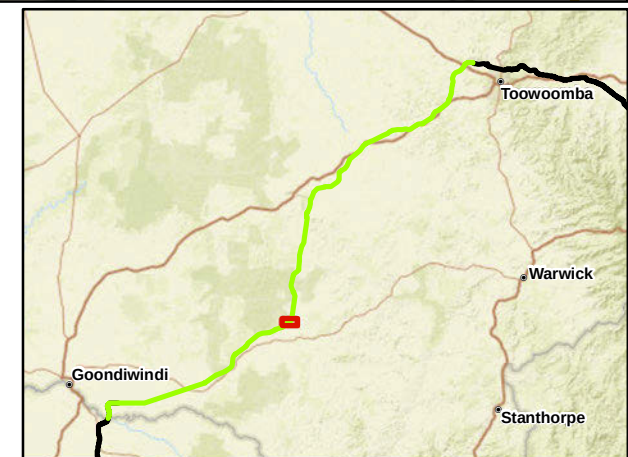


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 14 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:01

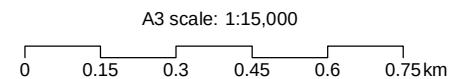
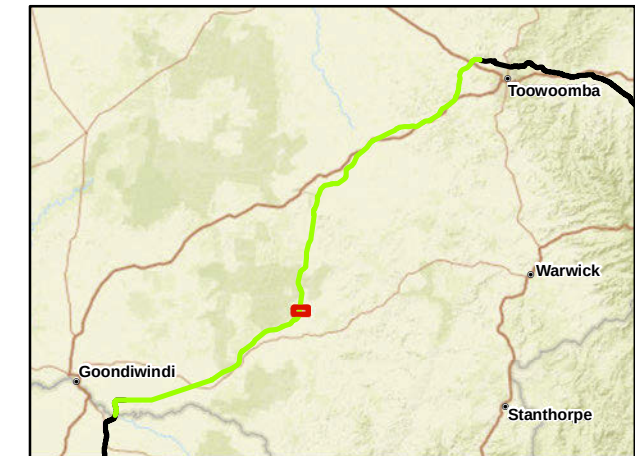


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

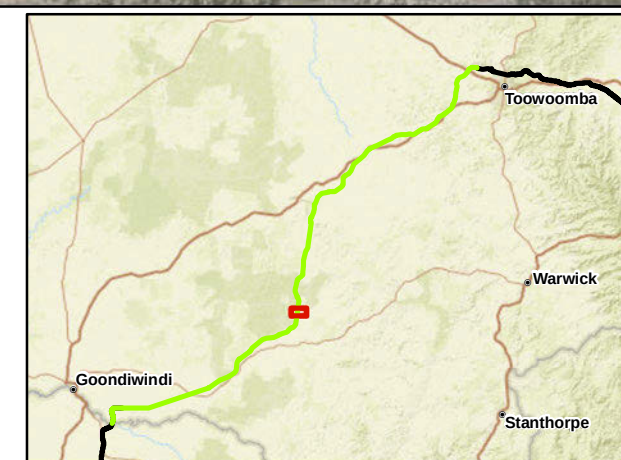
Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0

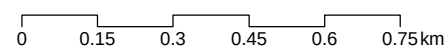




- Estimated Velocity x Depth product (m²/s)**



A3 scale: 1:15,000



Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 16 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02

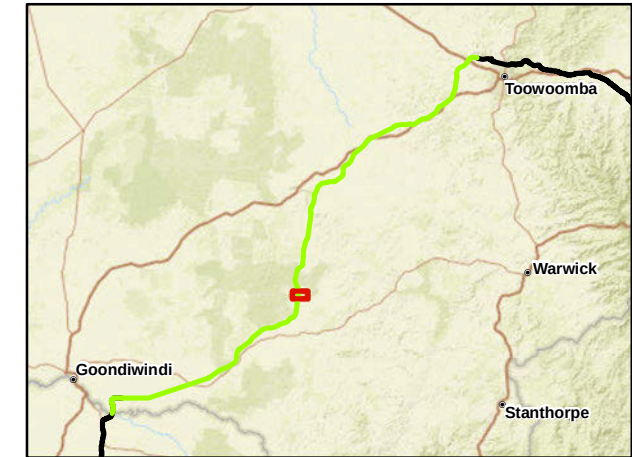


Legend

- | | |
|----------------------------|--|
| 5 Chainage (km) | ● Flood sensitive receptor |
| Border to Gowrie alignment | ■ Project local catchment drainage culvert |
| Minor roads | Local hydraulic model extent |
| Project road design | Project footprint |

Estimated Velocity x Depth product (m²/s)

- | |
|------------|
| < 0.15 |
| 0.15 - 0.5 |
| 0.5 - 1.0 |
| 1.0 - 2.0 |
| > 2.0 |



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

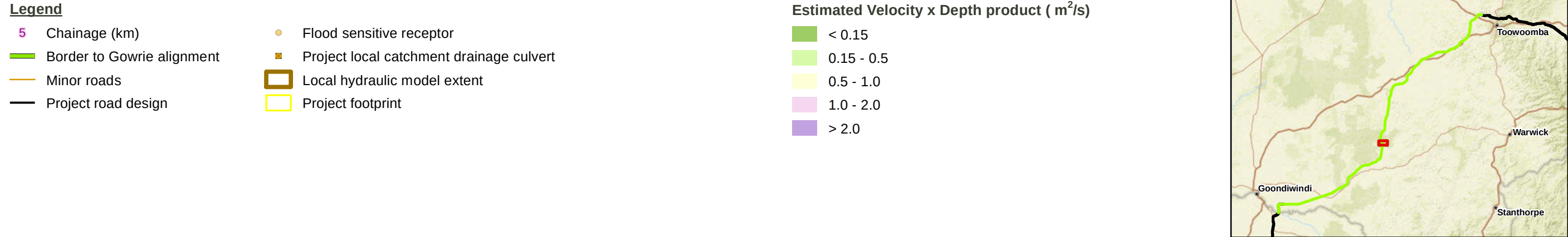


Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 17 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 18 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02

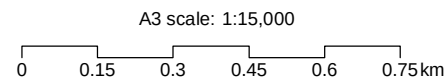


Legend

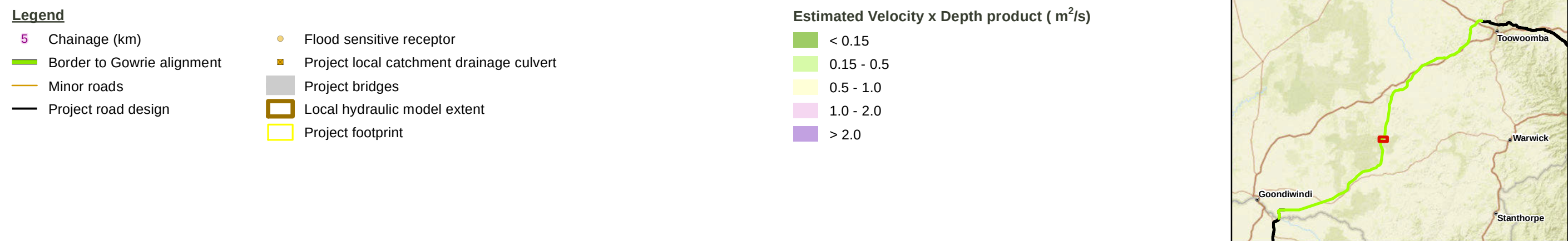
- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 20 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 21 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

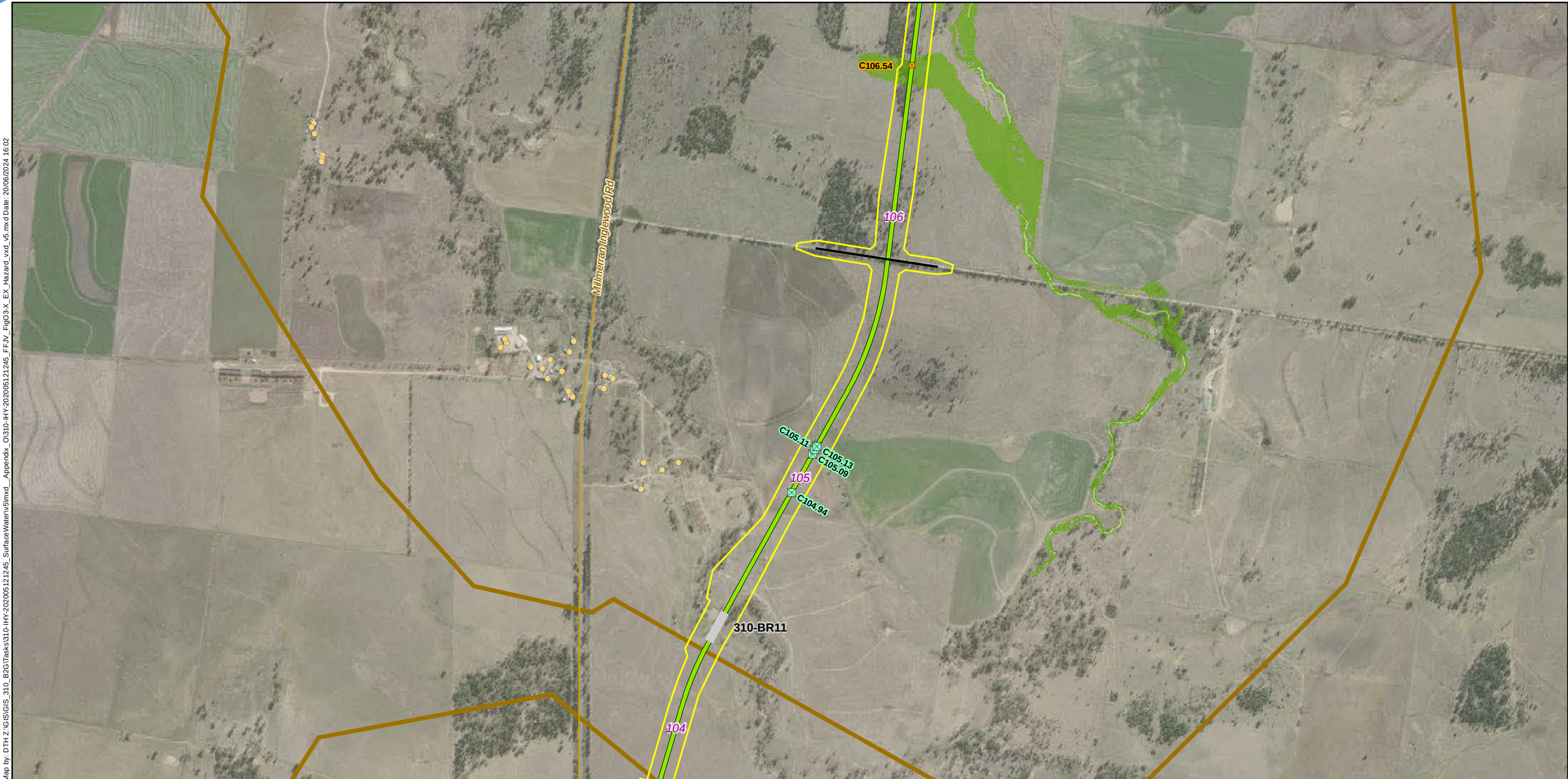
Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02

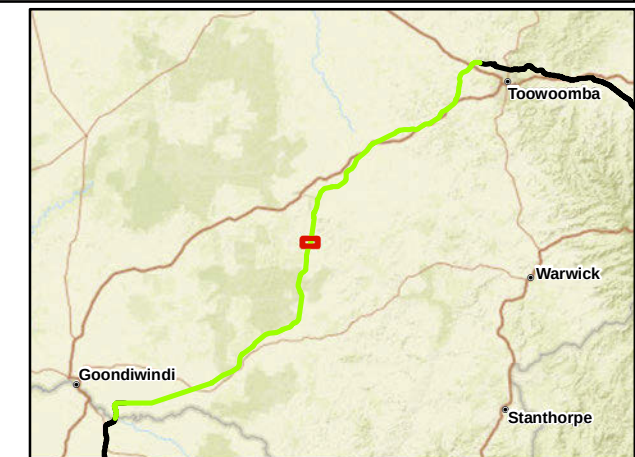


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

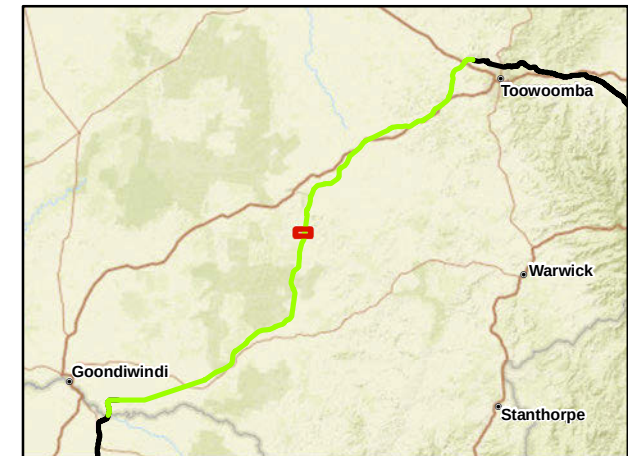


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02

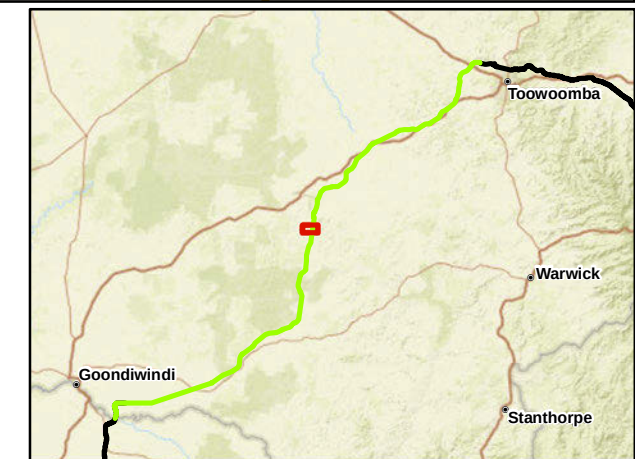


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

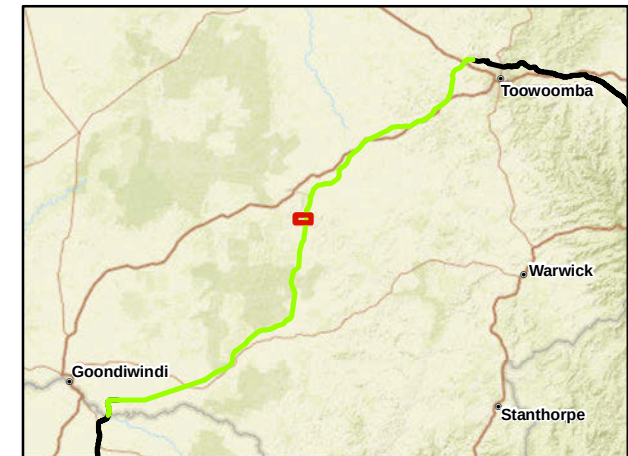


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:02

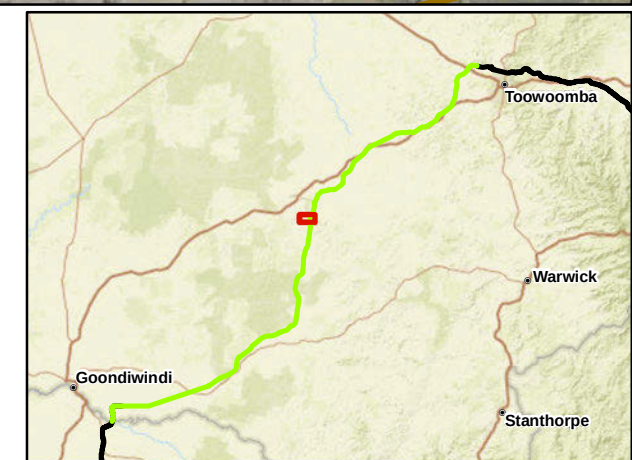


Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 28 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case



Legend

5 Chainage (km)

Border to Gowrie alignment

Minor roads

Project road design

Flood sensitive receptor

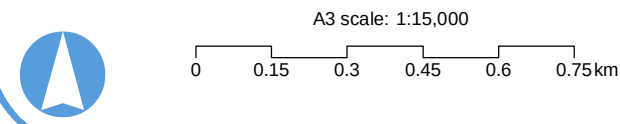
Project local catchment drainage culvert

Local hydraulic model extent

Project footprint

Estimated Velocity x Depth product (m²/s)

< 0.15
0.15 - 0.5
0.5 - 1.0
1.0 - 2.0
> 2.0



Border to Gowrie
Figure O3 - page 29 of 48:
20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:03



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



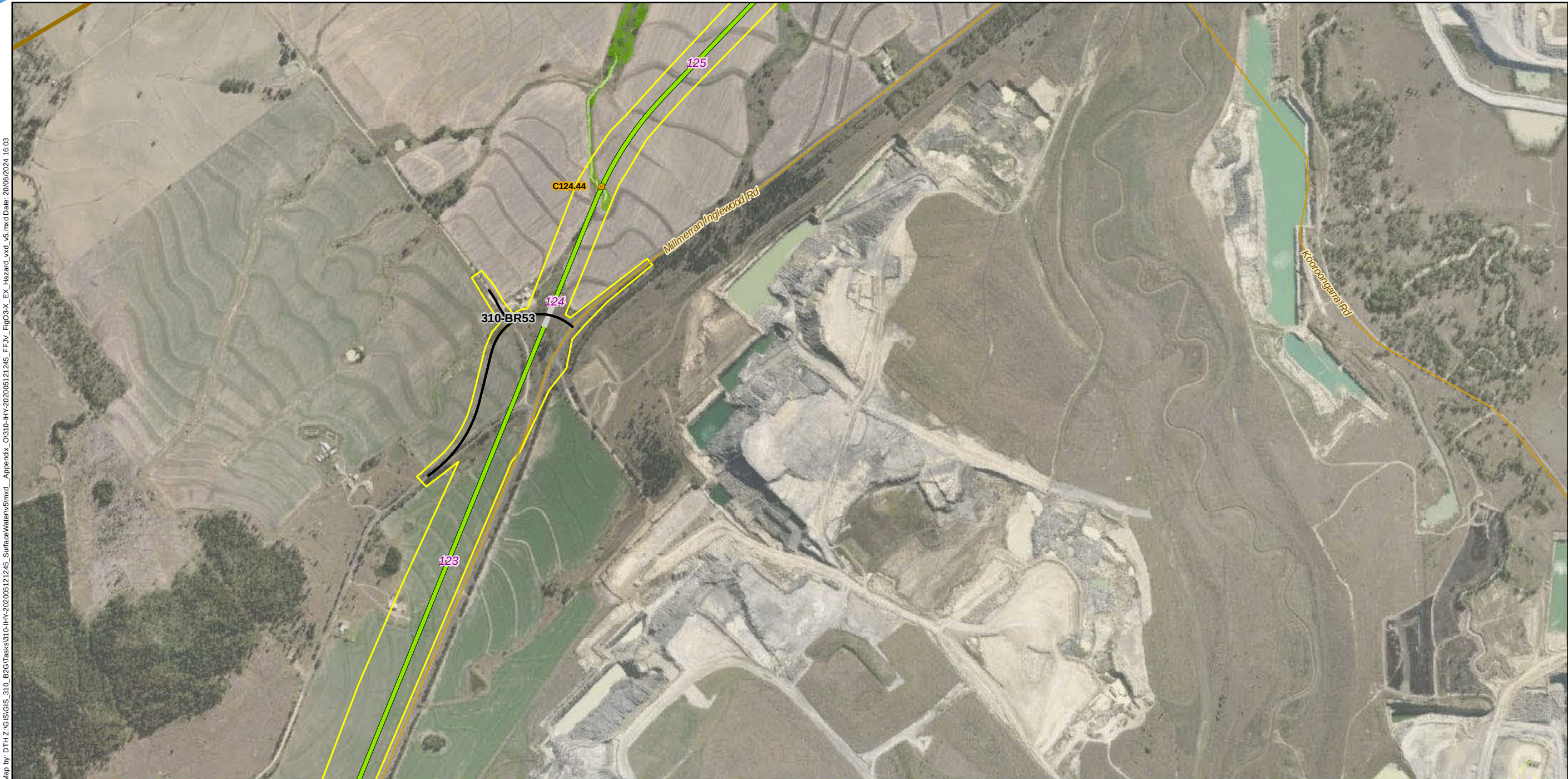
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 30 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_O\310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:03



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



Future Freight
Integrating Community, Environment and Engineering

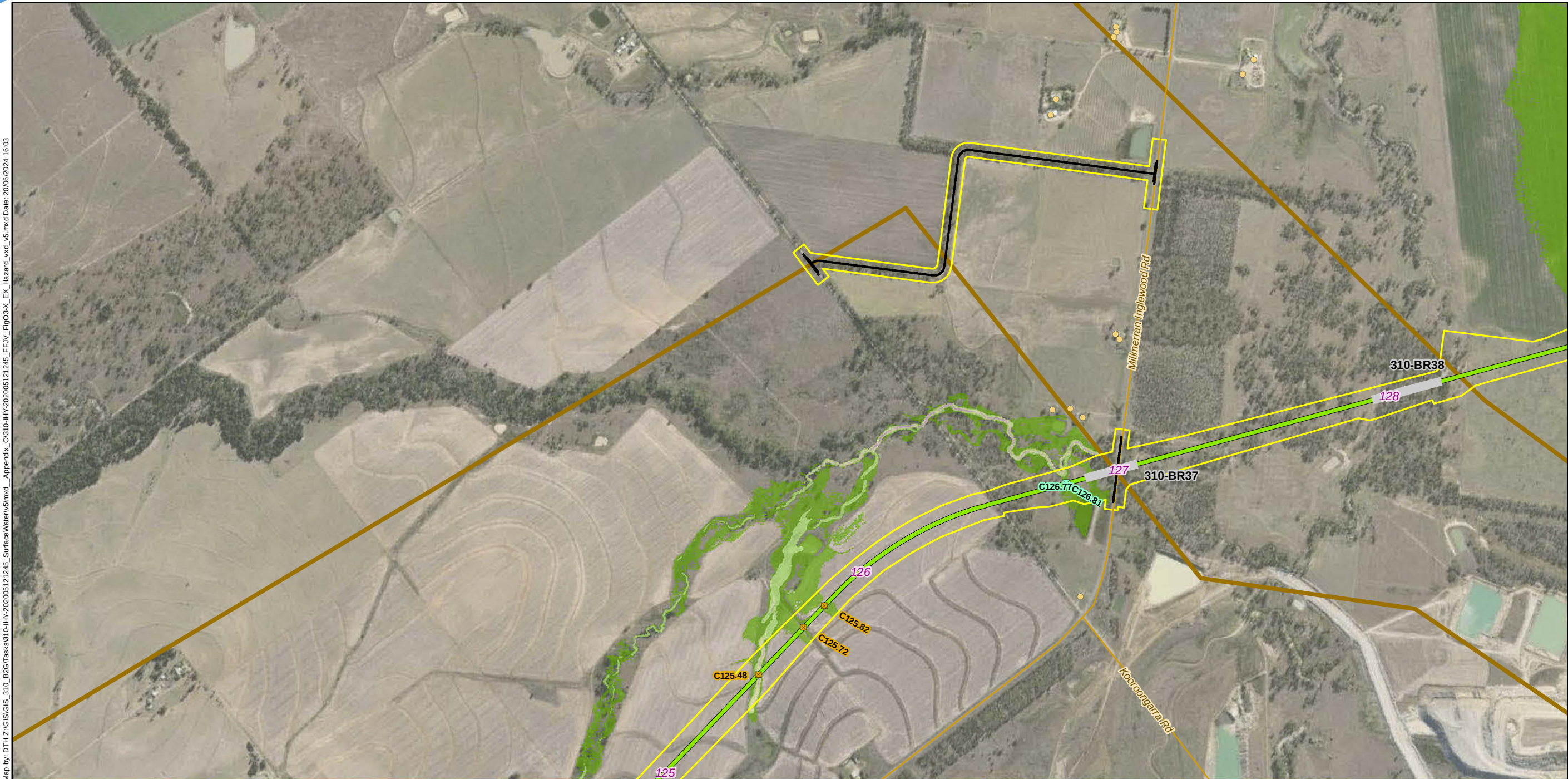
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 31 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case

Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:03



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Minor roads
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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



Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 32 of 48:

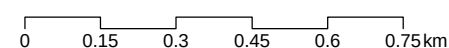
20% AEP Event - Local Catchments - Peak Hazard - Existing Case



- Estimated Velocity x Depth product (m²/s)**

-

A3 scale: 1:15,000

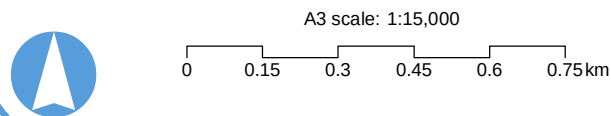
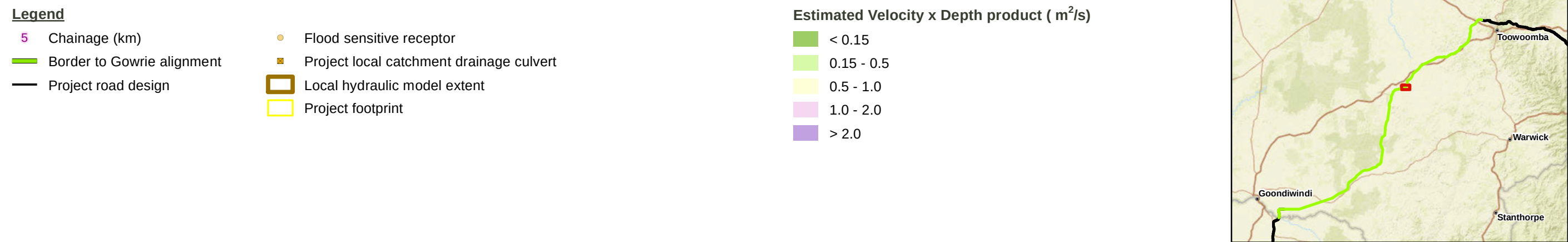


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 33 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case



Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:03

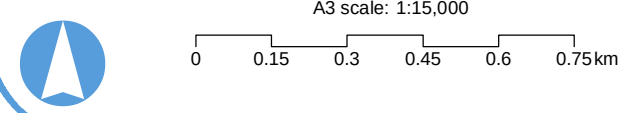
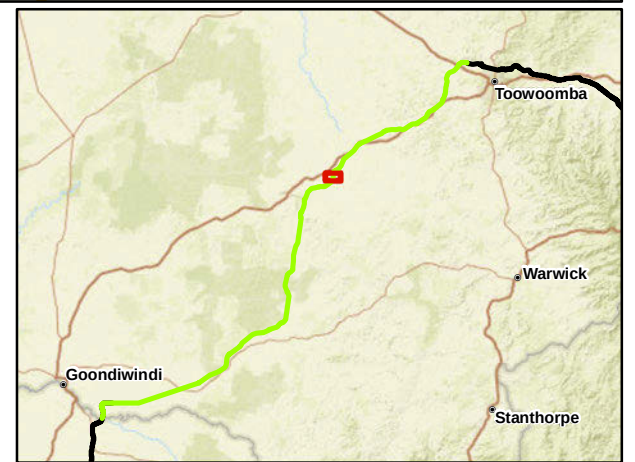


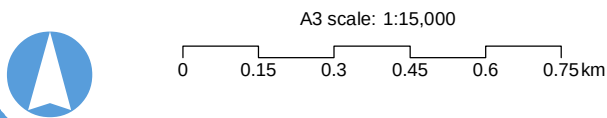
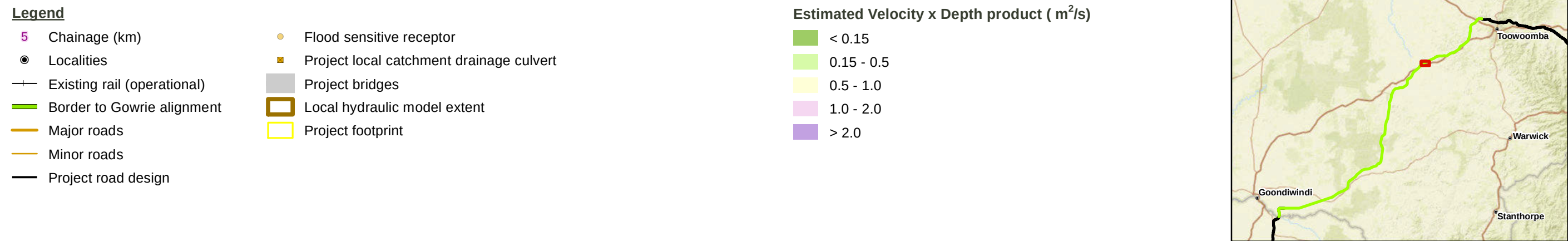
Legend

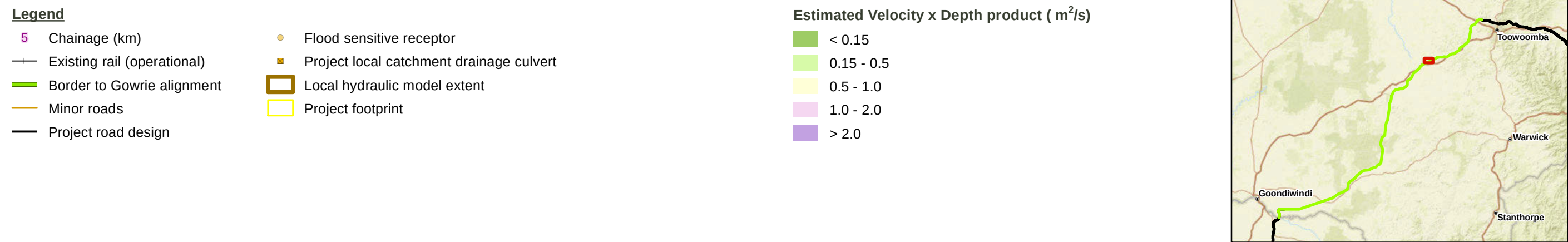
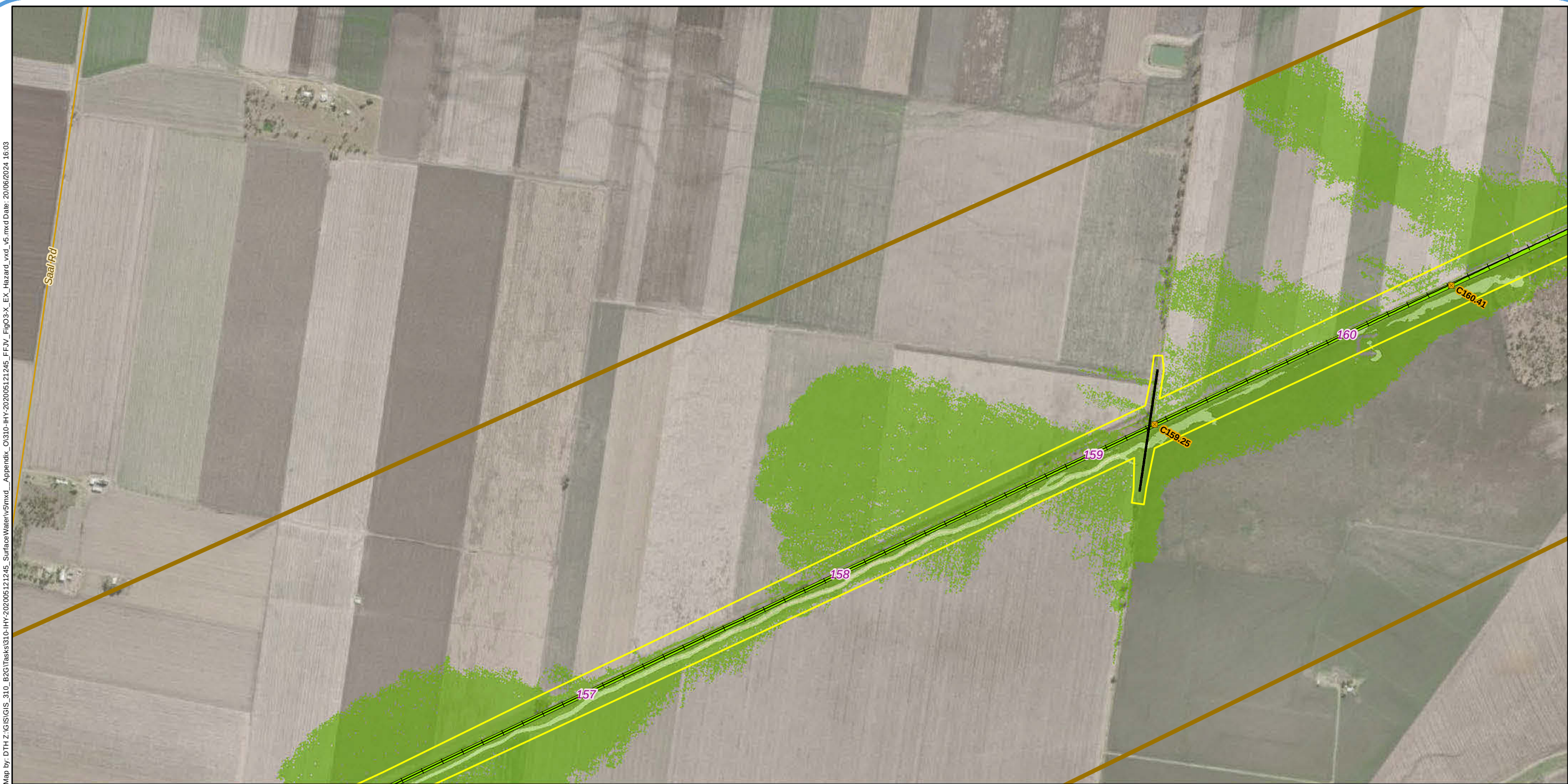
- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0







A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km

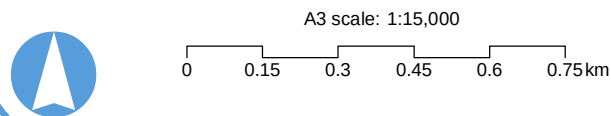
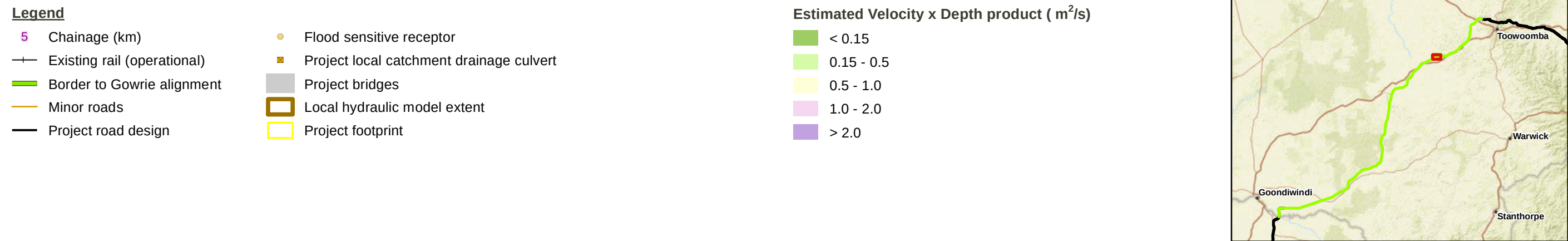
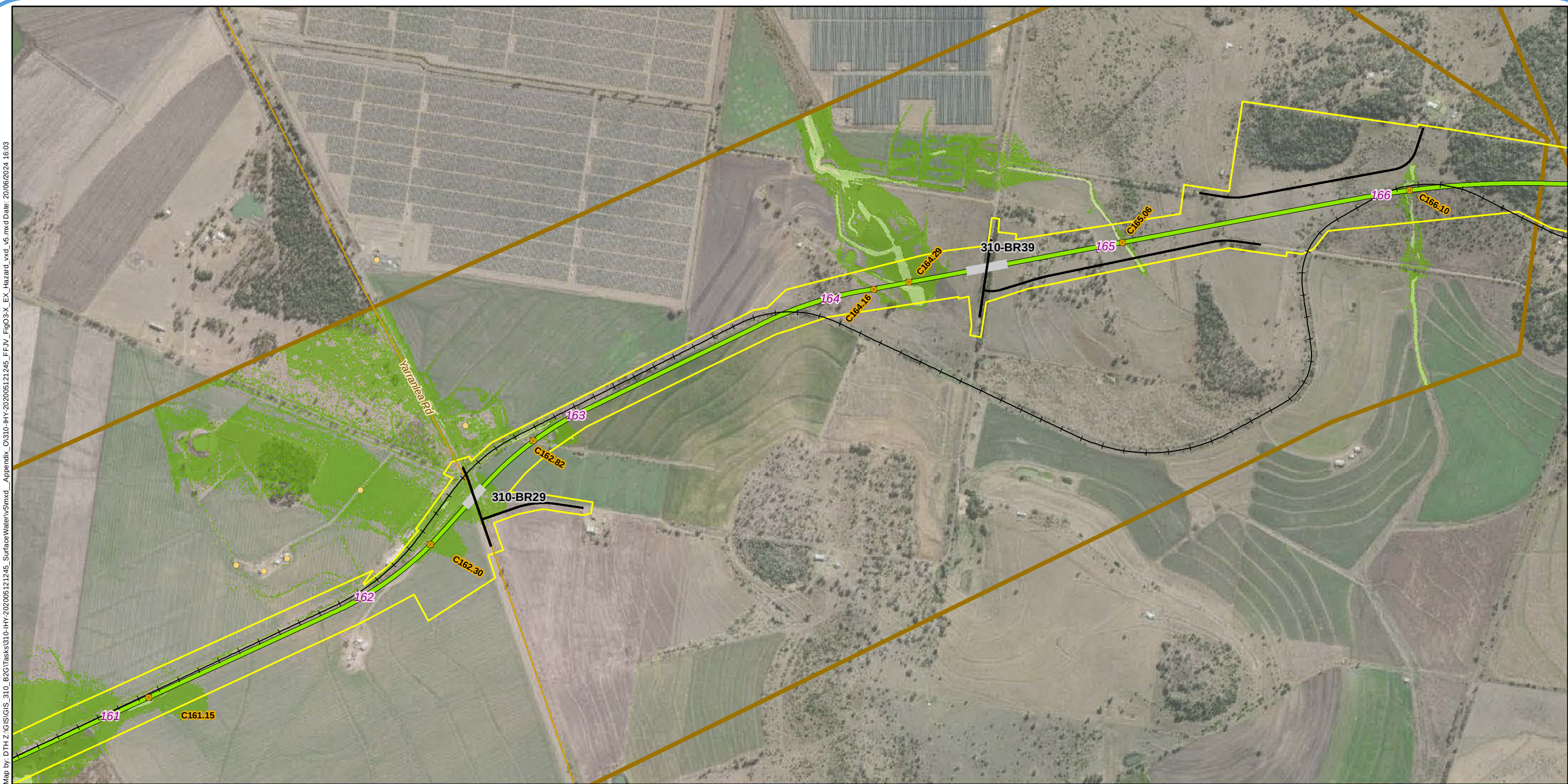


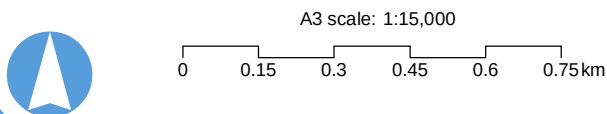
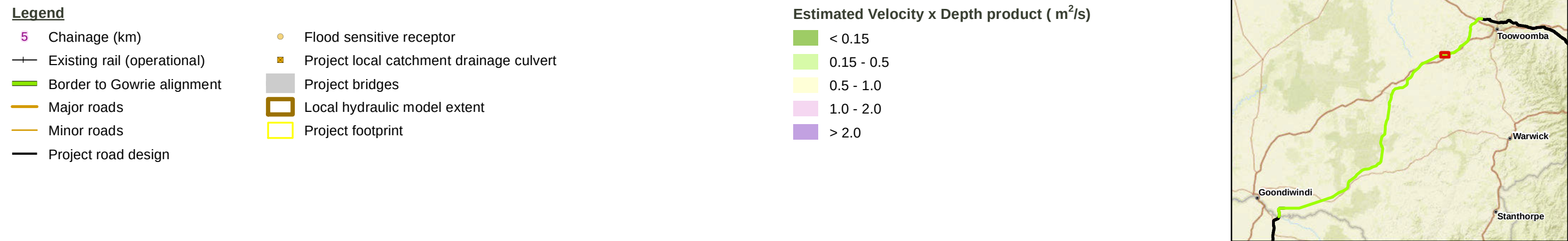
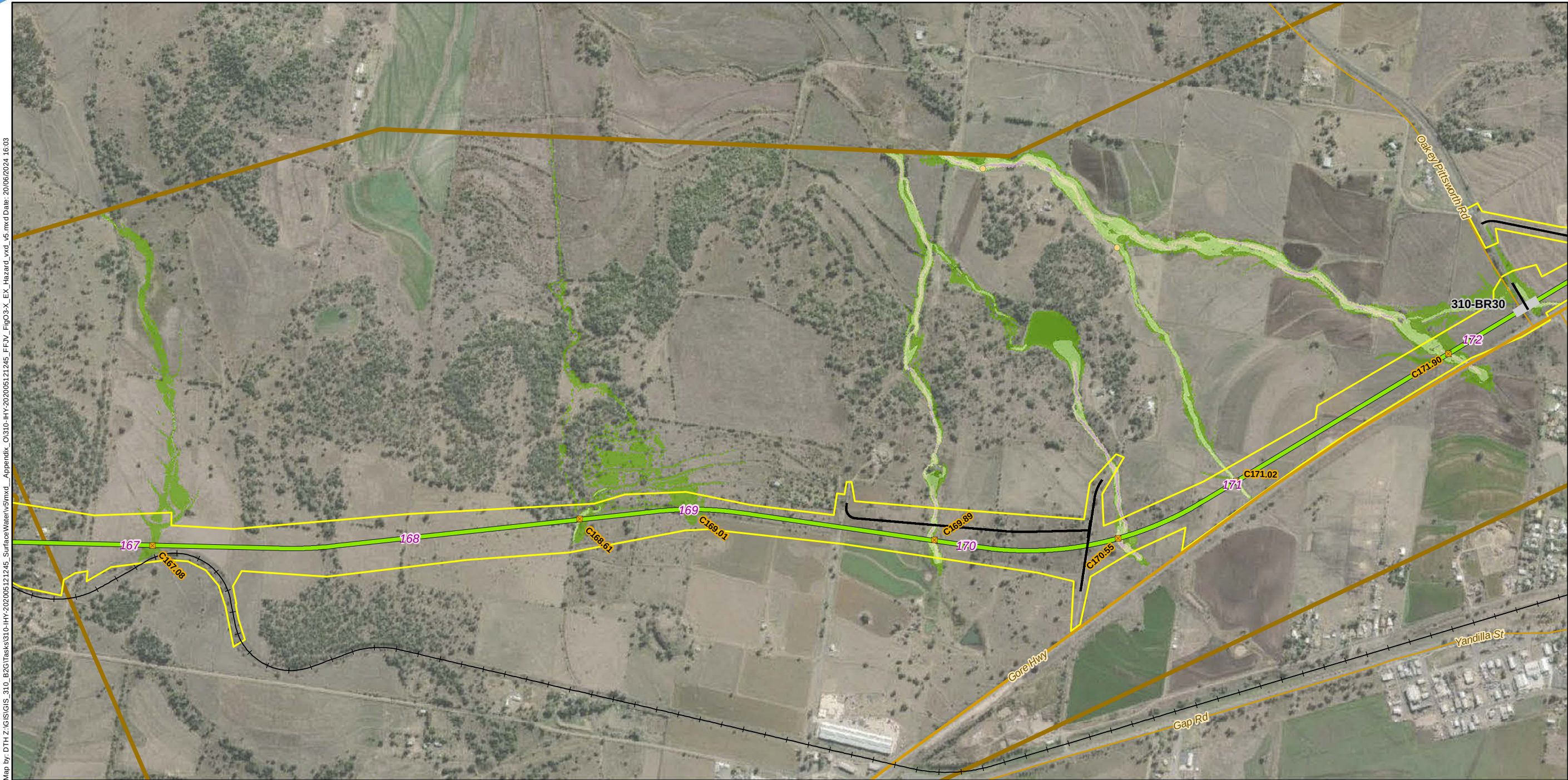
Issue date: 20/06/2024 Version: 5
Coordinate System: GDA 1994 MGA Zone 56

Border to Gowrie

Figure O3 - page 37 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case







Legend

- 5 Chainage (km)
- Existing rail (operational)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

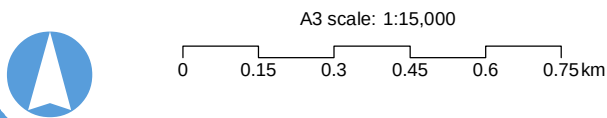
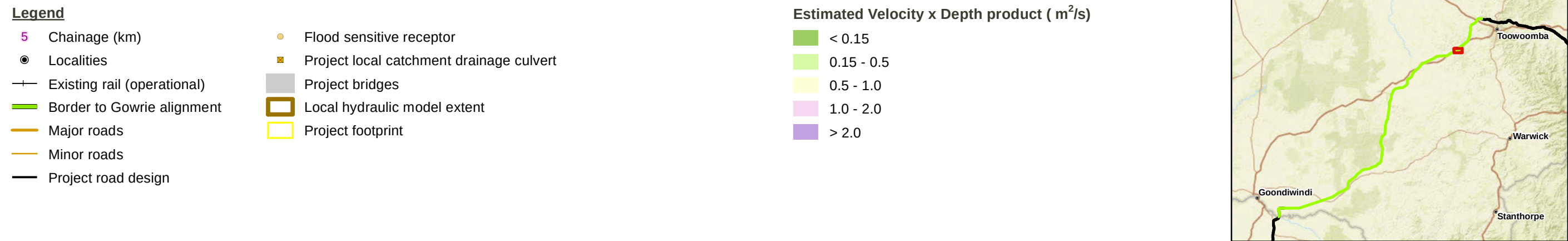
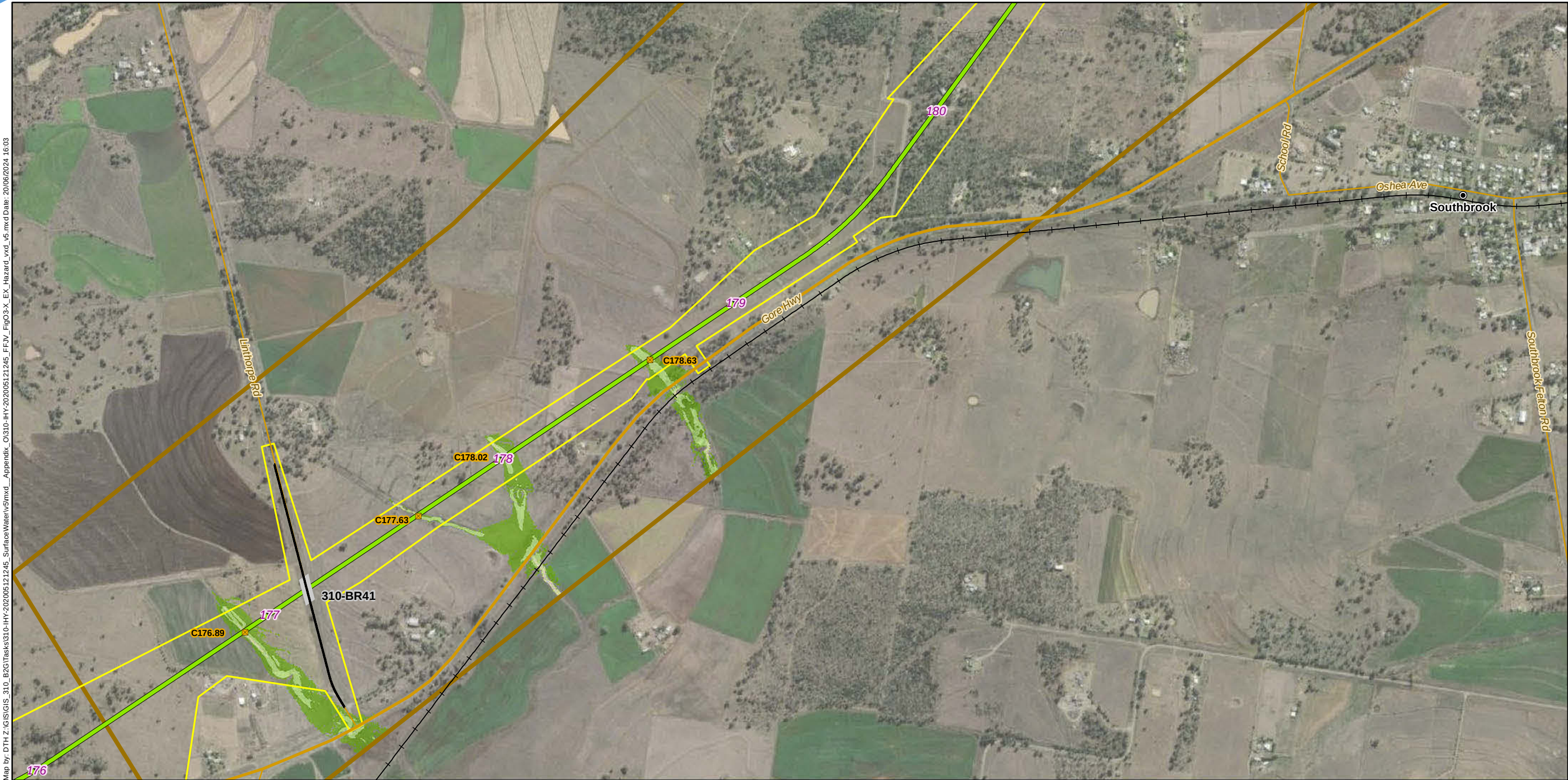
Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



A3 scale: 1:15,000

0 0.15 0.3 0.45 0.6 0.75 km



Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWater\5mxd_Appendix_OI310-IHY-202005121245_FF_V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:03

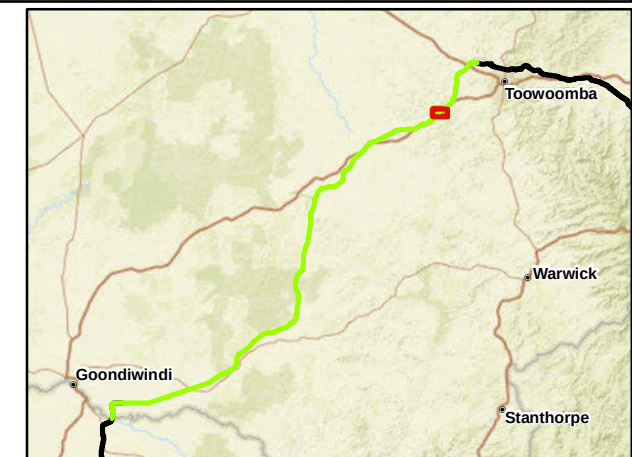


Legend

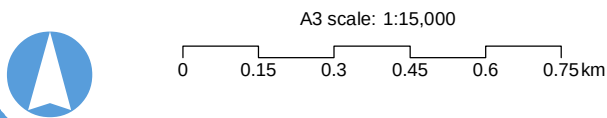
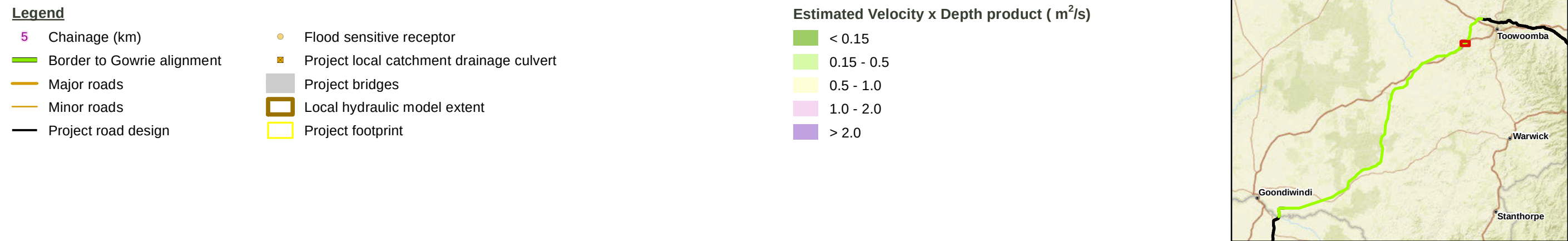
- 5 Chainage (km)
- Border to Gowrie alignment
- Major roads
- Minor roads
- Project road design
- Flood sensitive receptor
- Project local catchment drainage culvert
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m^2/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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





- Estimated Velocity x Depth product (m²/s)**

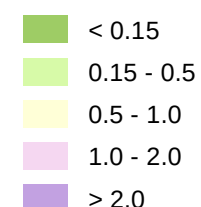
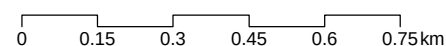


Figure O3 - page 44 of 48:

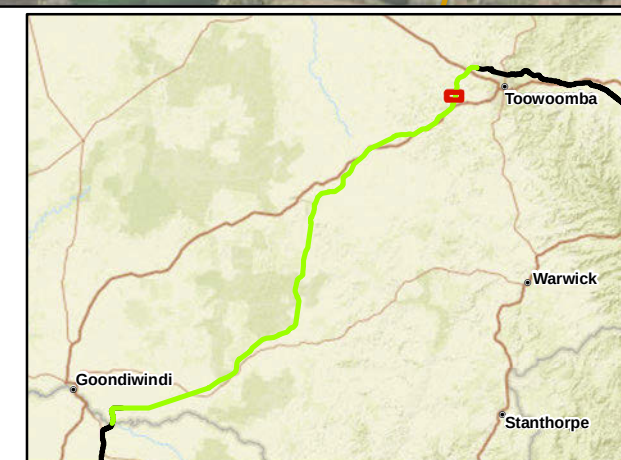
20% AEP Event - Local Catchments - Peak Hazard - Existing Case

A3 scale: 1:15,000

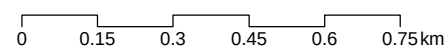




- Estimated Velocity x Depth product (m²/s)**



A3 scale: 1:15,000

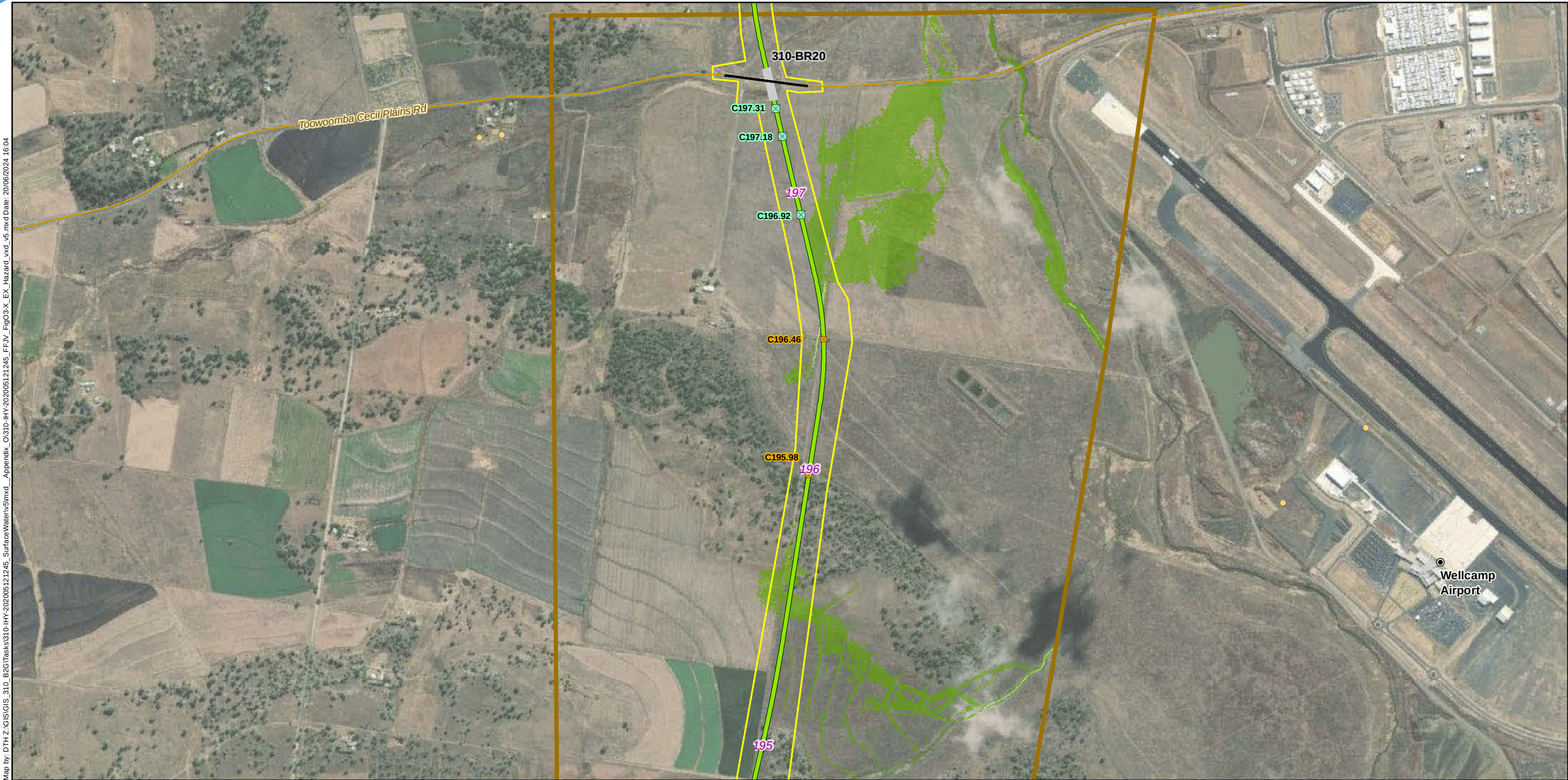


Issue date: 20/06/2024 Version: 5

Coordinate System: GDA 1994 MGA Zone 56

Figure O3 - page 45 of 48:

20% AEP Event - Local Catchments - Peak Hazard - Existing Case



Map by: DTH Z:\GIS\GIS_310_B2G\Tasks\310-IHY-202005121245_SurfaceWaterV5.mxd_Appendix_OI310-IHY-202005121245_FF-V_FigO3-X_EX_Hazard_vxd_v5.mxd Date: 20/06/2024 16:04



Legend

- 5 Chainage (km)
- Border to Gowrie alignment
- Project road design
- Flood sensitive receptor
- Project floodplain culvert
- Project local catchment drainage culvert
- Project bridges
- Local hydraulic model extent
- Project footprint

Estimated Velocity x Depth product (m²/s)

- < 0.15
- 0.15 - 0.5
- 0.5 - 1.0
- 1.0 - 2.0
- > 2.0



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

