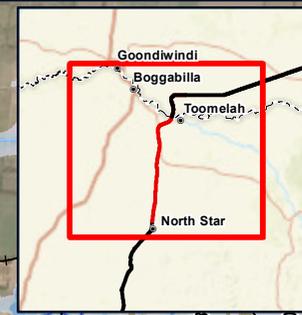
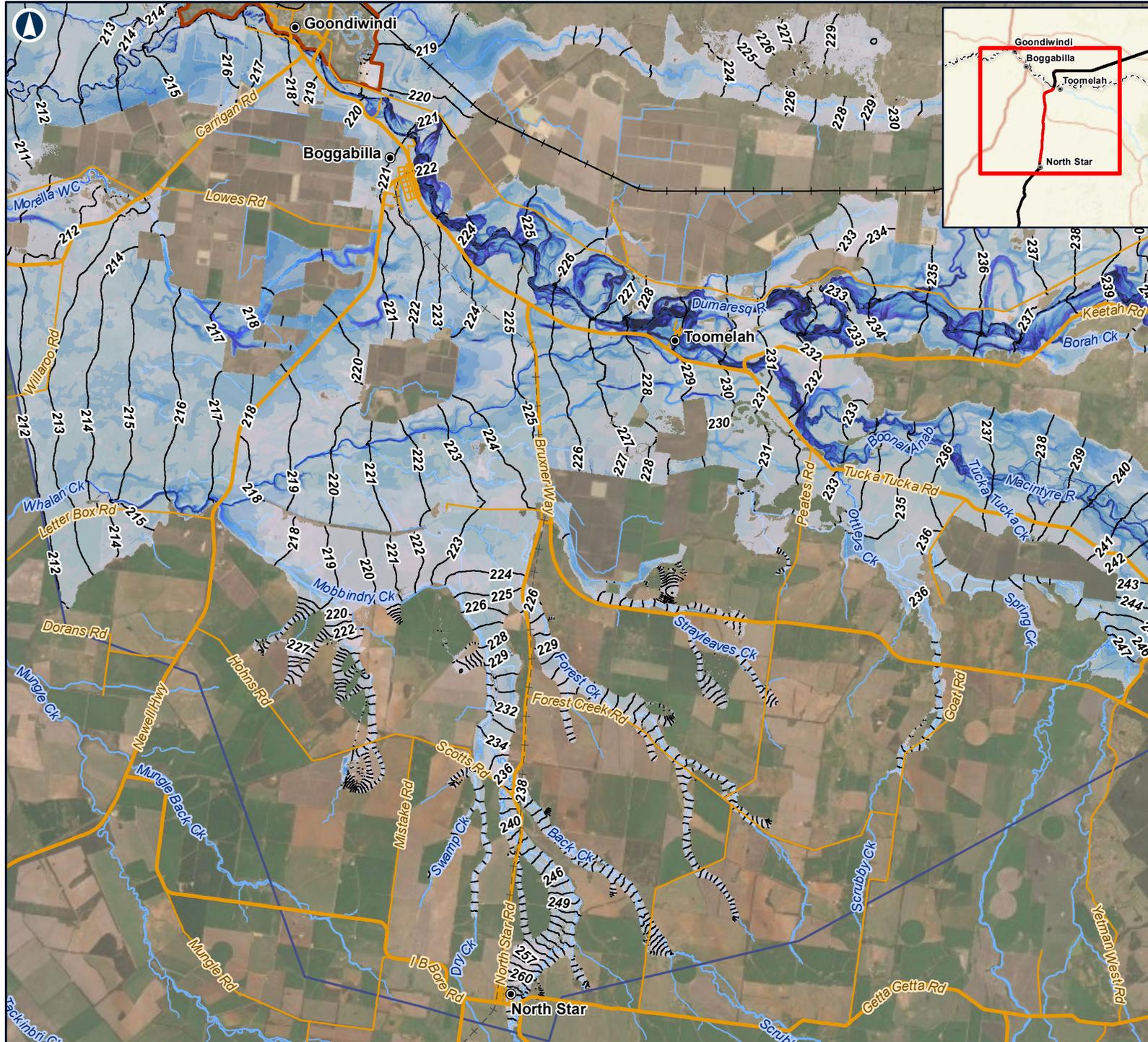


# Appendix E

## Figures – BRVFMP levees and validated 1976 flows



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**NORTH STAR TO NSW/QLD BORDER**

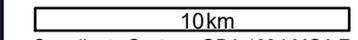
Figure E1: Existing Case BRVMP levees and validated 1976 flows Peak water levels

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- 1m contour (mAHD)
- ▭ Sub-model extent

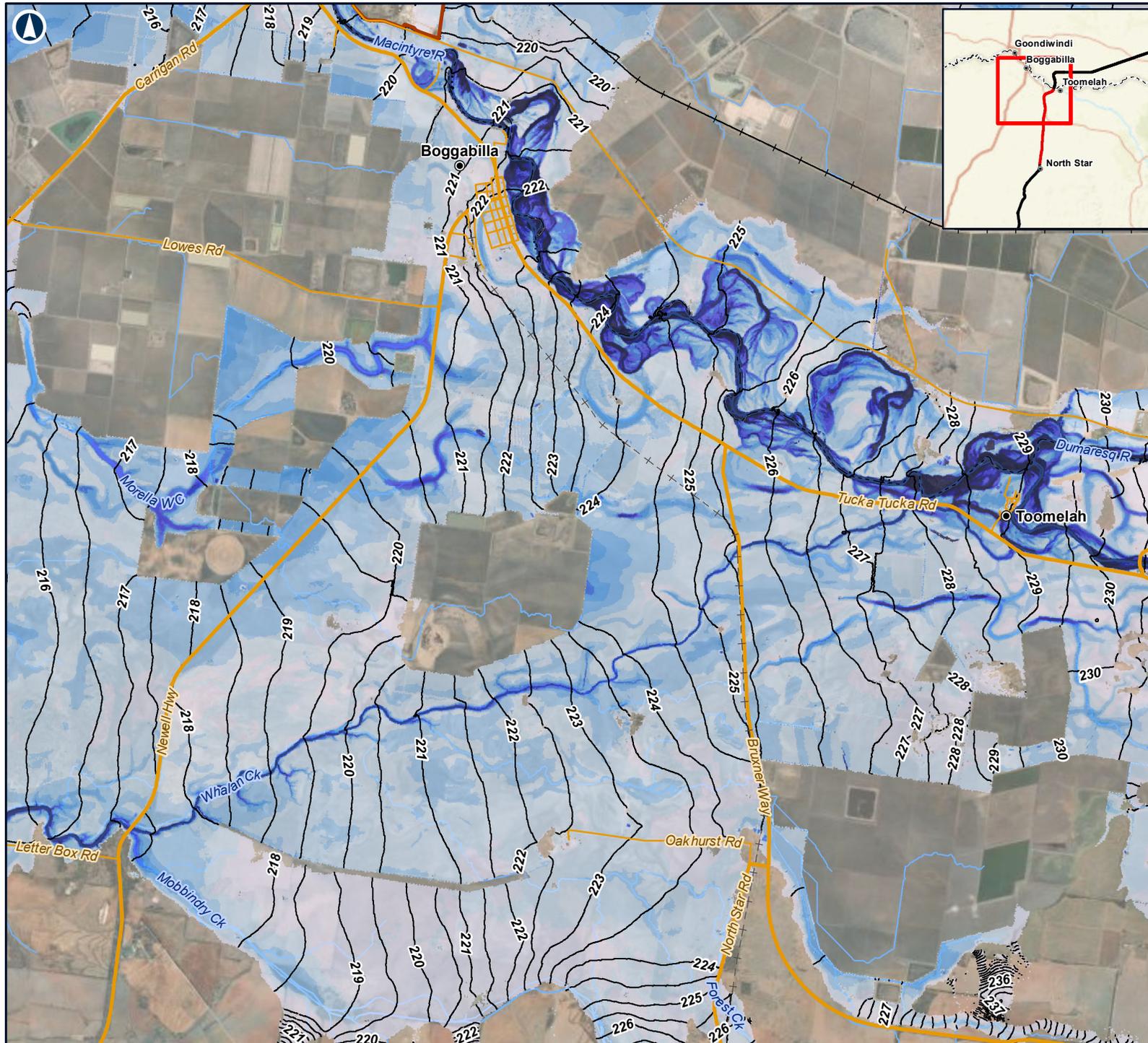
**Depth (m)**

- 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



Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**

Figure E1-A: Existing Case BRVMP levees and validated 1976 flows Peak water levels

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- 0.5m contour (mAHD)
- ▭ Sub-model extent

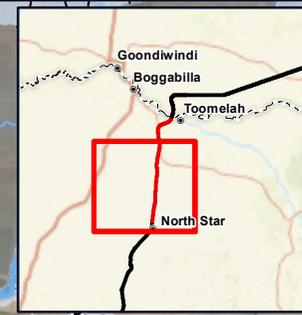
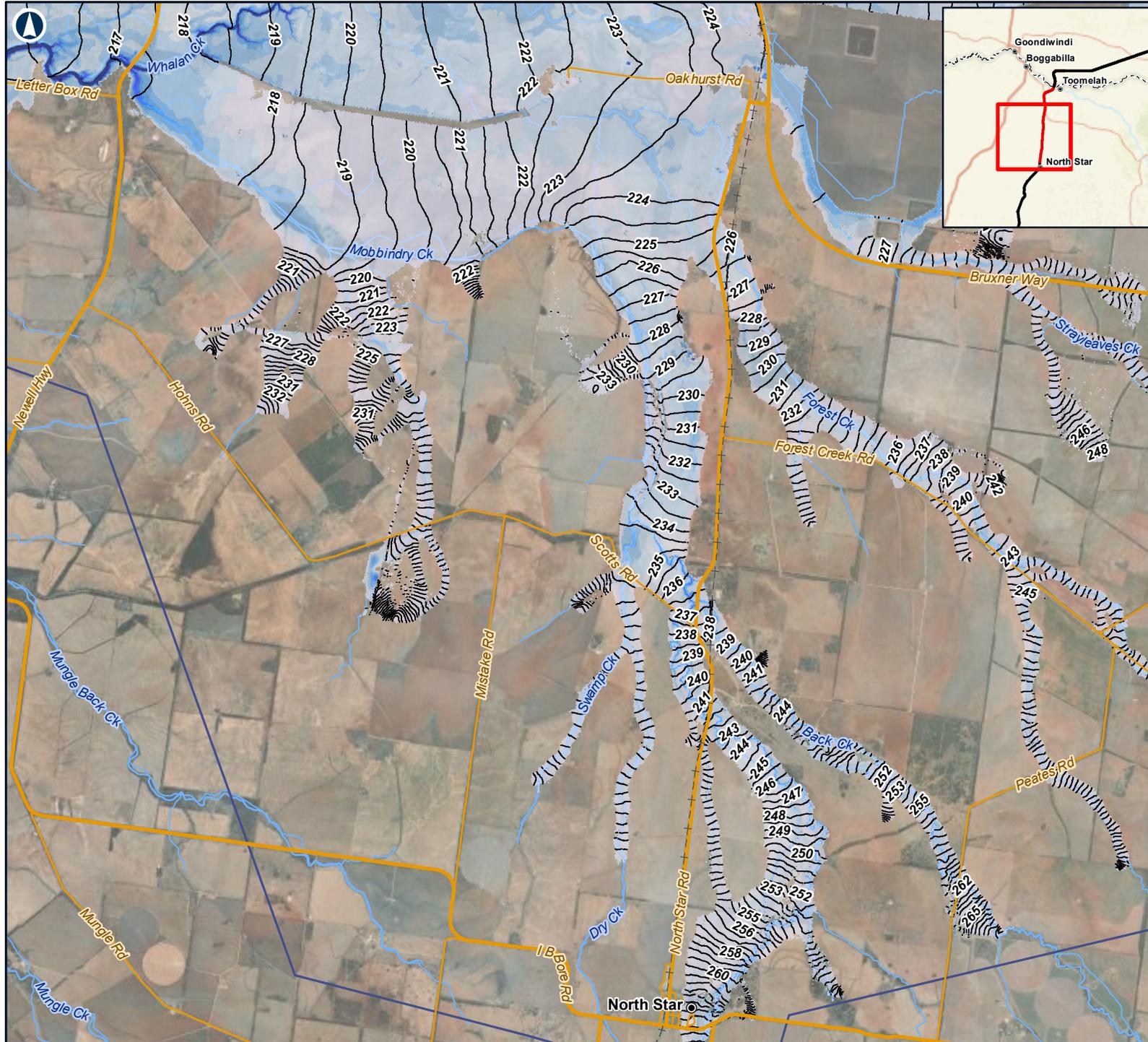
**Depth (m)**

- 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

6km  
 Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E1-B: Existing Case  
 BRVMP levees and validated 1976 flows  
 Peak water levels

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- 0.5m contour (mAHd)
- ▭ Sub-model extent

**Depth (m)**

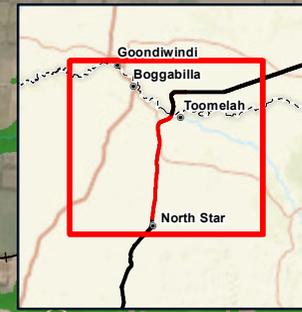
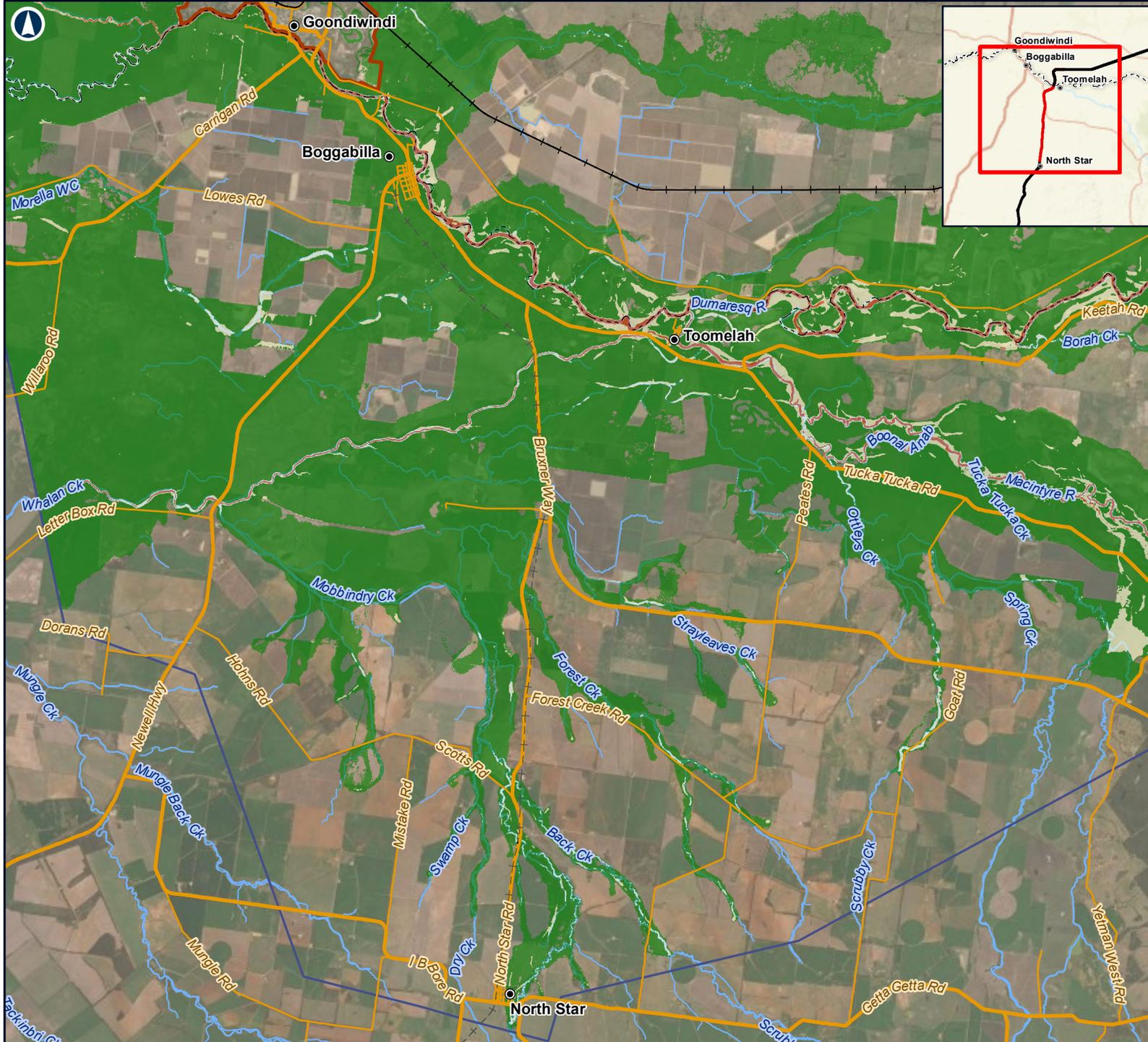
- 0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- 2.0 - 2.5
- 2.5 - 3.0
- 3.0 - 3.5
- 3.5 - 4.0
- 4.0 - 4.5
- 4.5 - 5.0
- > 5.0

6km

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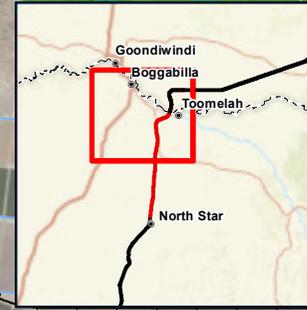
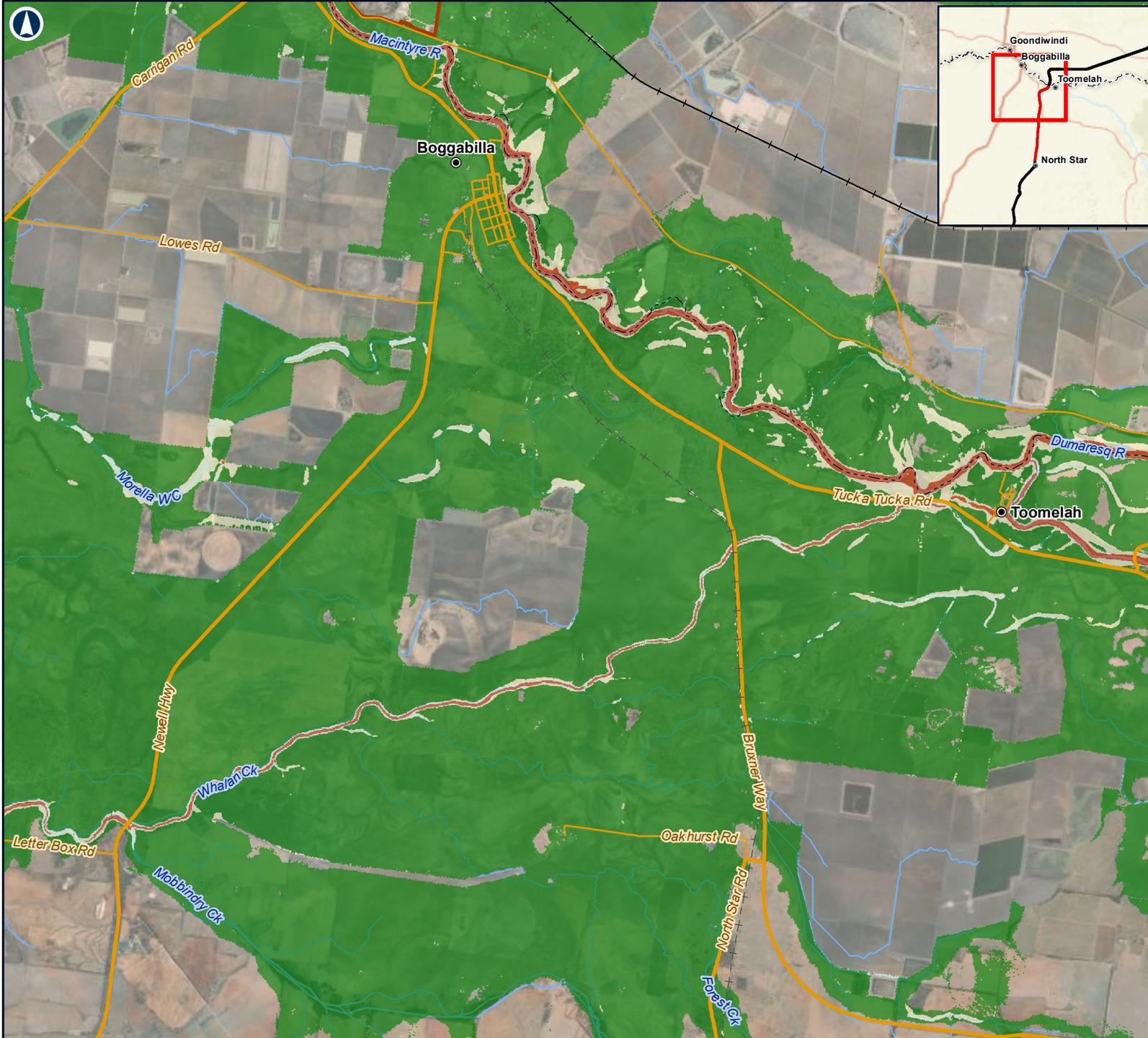
**NORTH STAR TO NSW/QLD BORDER**  
 Figure E2: Existing Case  
 BRVMP levees and validated 1976 flows  
 Velocities

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent
- Peak velocity ( m/s )**
- 0 to 0.5
- 0.5 to 1.0
- > 1.0

10km  
 Coordinate System: GDA 1994 MGA Zone 56  
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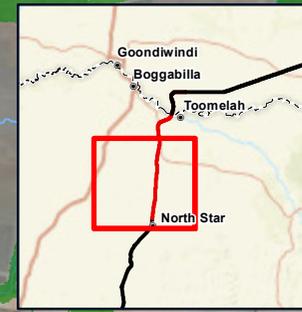
**NORTH STAR TO NSW/QLD BORDER**  
 Figure E2-A: Existing Case  
 BRVFP levees and validated 1976 flows  
 Velocities

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent
- Peak velocity ( m/s )**
- 0 to 0.5
- 0.5 to 1.0
- > 1.0

6km  
 Coordinate System: GDA 1994 MGA Zone 56  
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E2-B: Existing Case  
 BRVFP levees and validated 1976 flows  
 Velocities

**LEGEND**

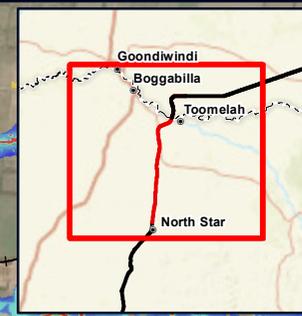
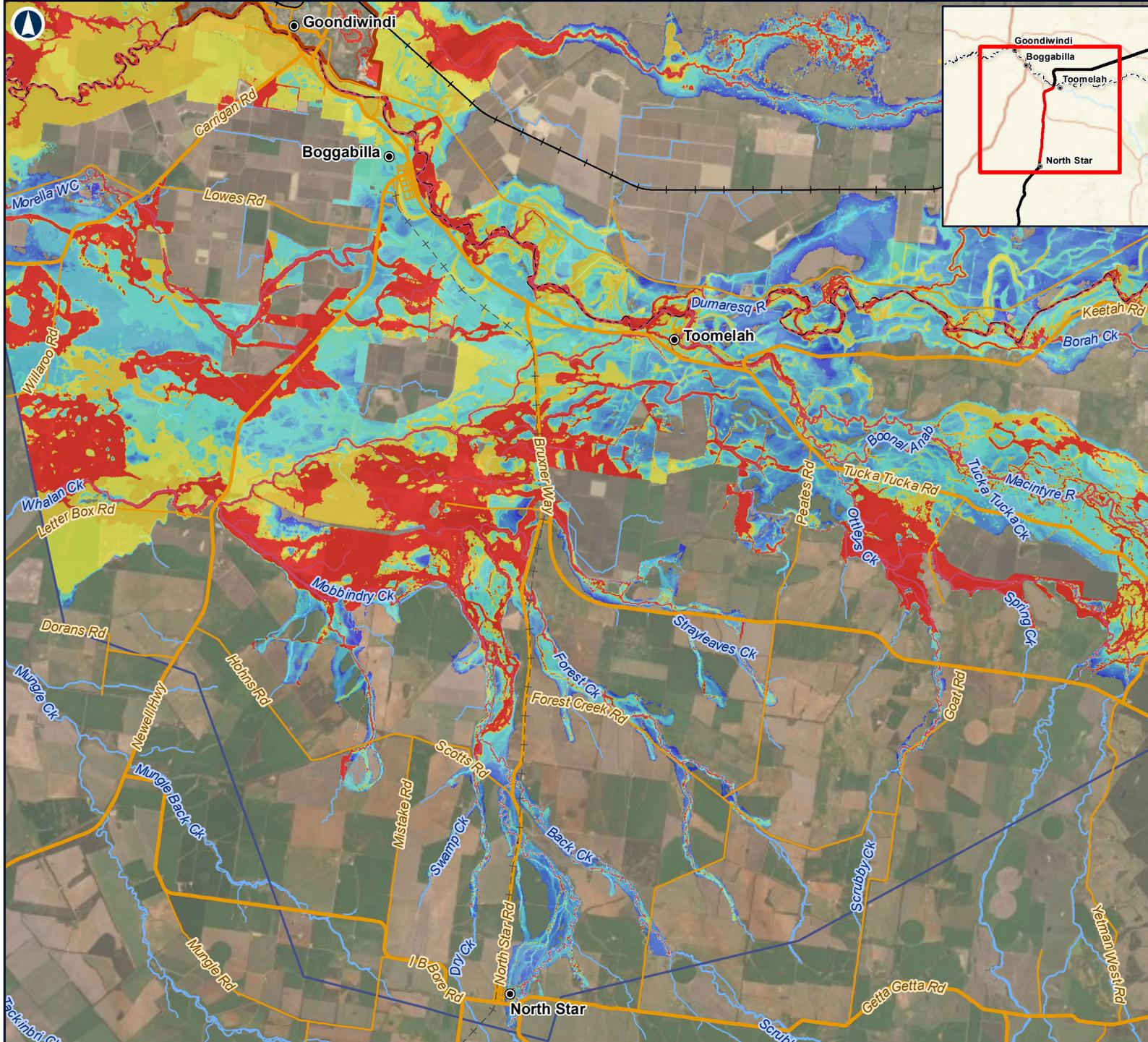
- Localities
  - +— Existing rail (operational)
  - - - Existing rail (non-operational)
  - - - NSW/QLD border
  - Watercourses
  - ▭ Sub-model extent
- Peak velocity ( m/s )**
- 0 to 0.5
  - 0.5 to 1.0
  - > 1.0

6km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E3: Existing Case  
 BRVFP levees and validated 1976 flows  
 Duration of Inundation

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Duration of inundation (hours)**

- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 60
- 60 to 70
- 70 to 80
- 80 to 90
- 90 to 100
- > 100

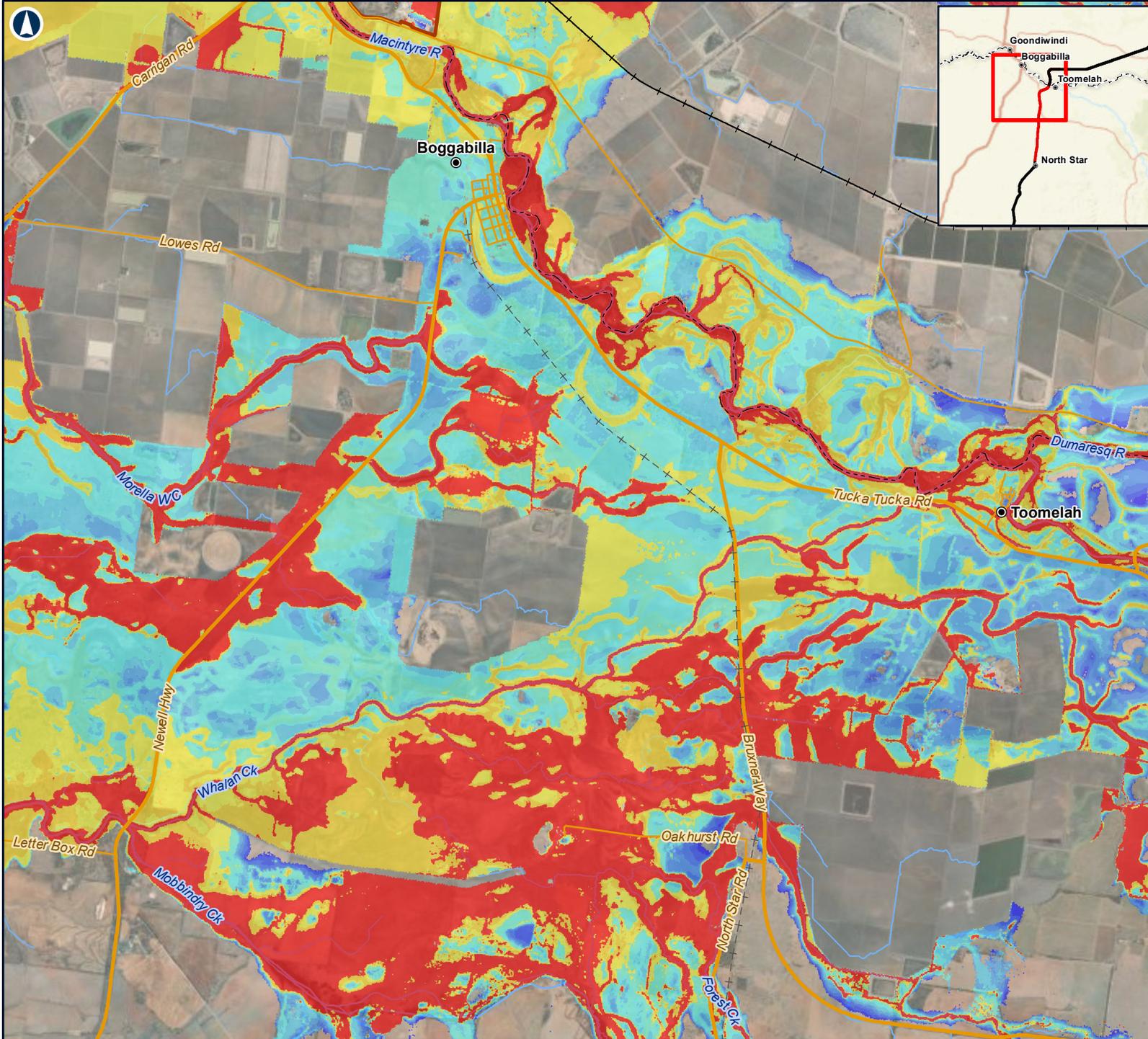
10km

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**NORTH STAR TO NSW/QLD BORDER**

Figure E3-A: Existing Case  
 BRVFP levees and validated 1976 flows  
 Duration of Inundation

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Duration of inundation (hours)**

- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 60
- 60 to 70
- 70 to 80
- 80 to 90
- 90 to 100
- > 100

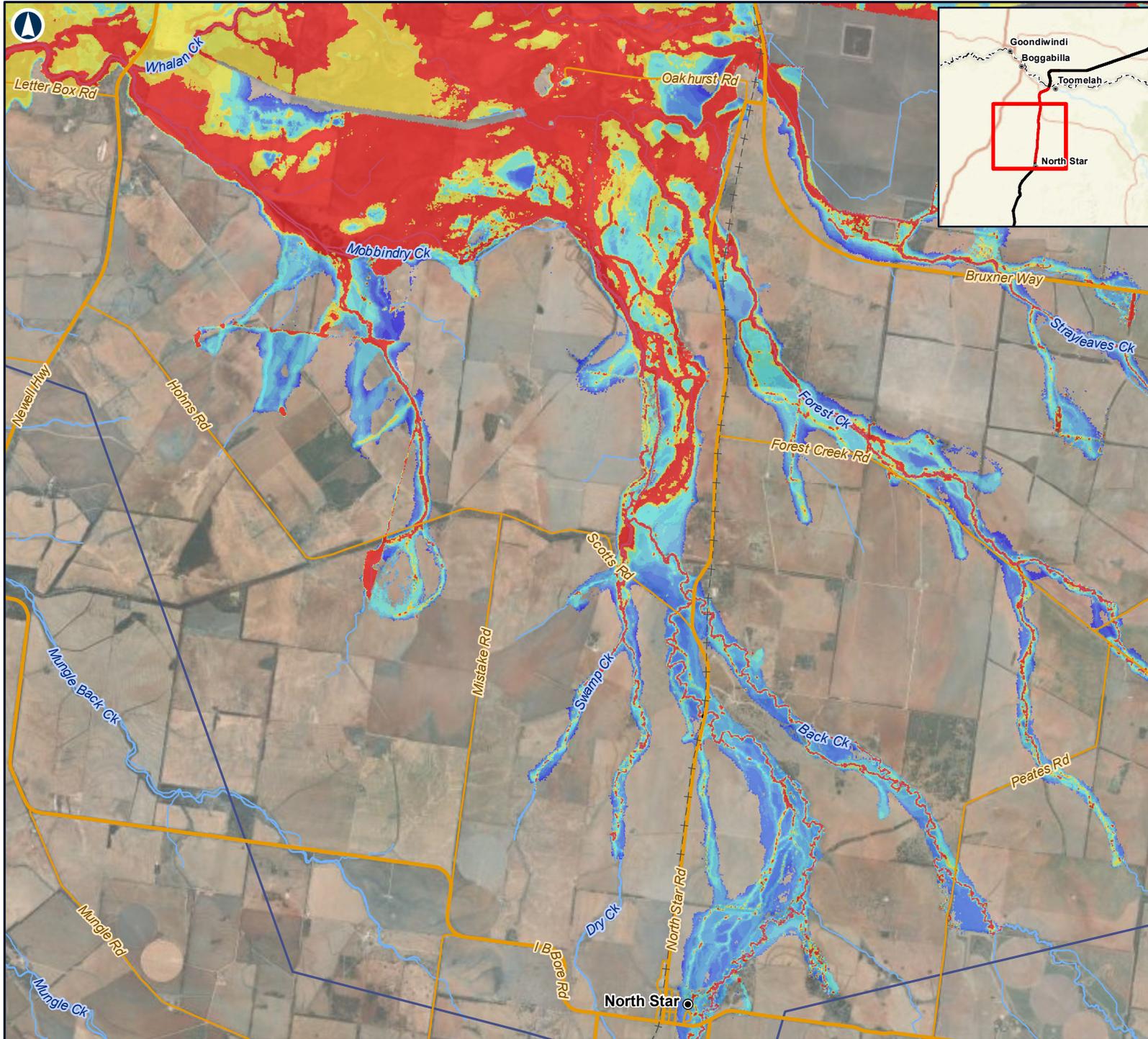
6km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**

Figure E3-B: Existing Case  
 BRVFP levees and validated 1976 flows  
 Duration of Inundation

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

**Duration of inundation (hours)**

- 0 to 10
- 10 to 20
- 20 to 30
- 30 to 40
- 40 to 50
- 50 to 60
- 60 to 70
- 70 to 80
- 80 to 90
- 90 to 100
- > 100

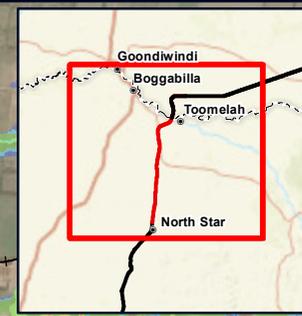
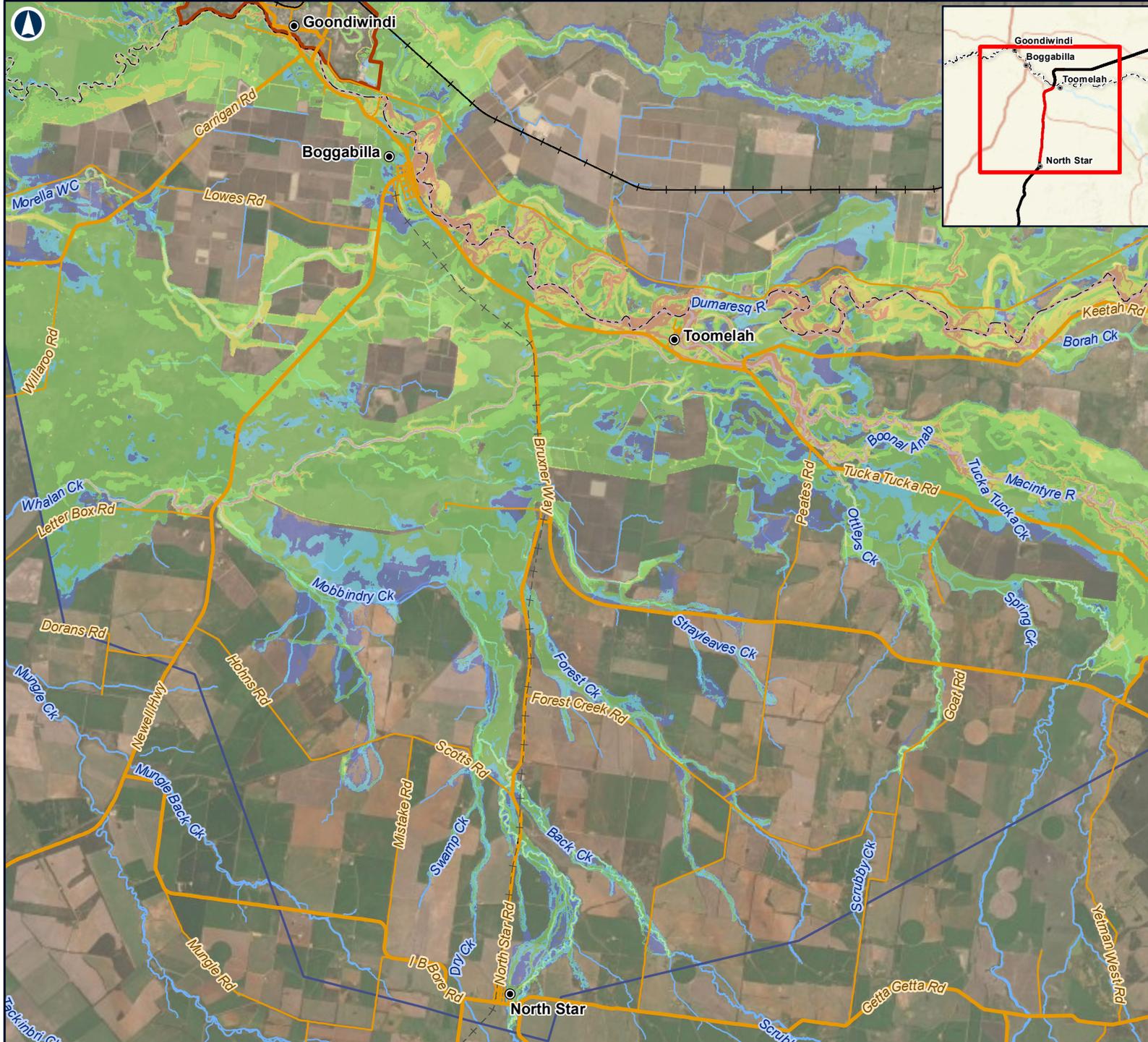
6km

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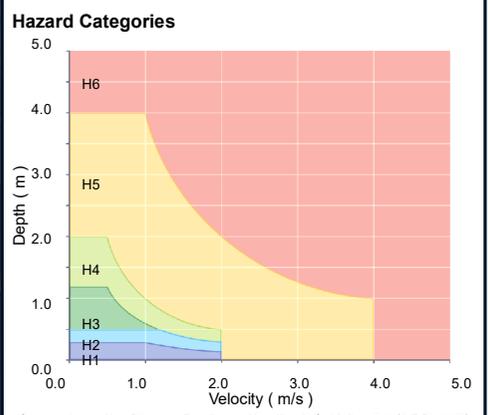
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E4: Existing Case BRVMP levees and validated 1976 flows Hazard Categories

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent



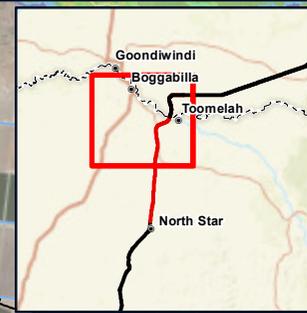
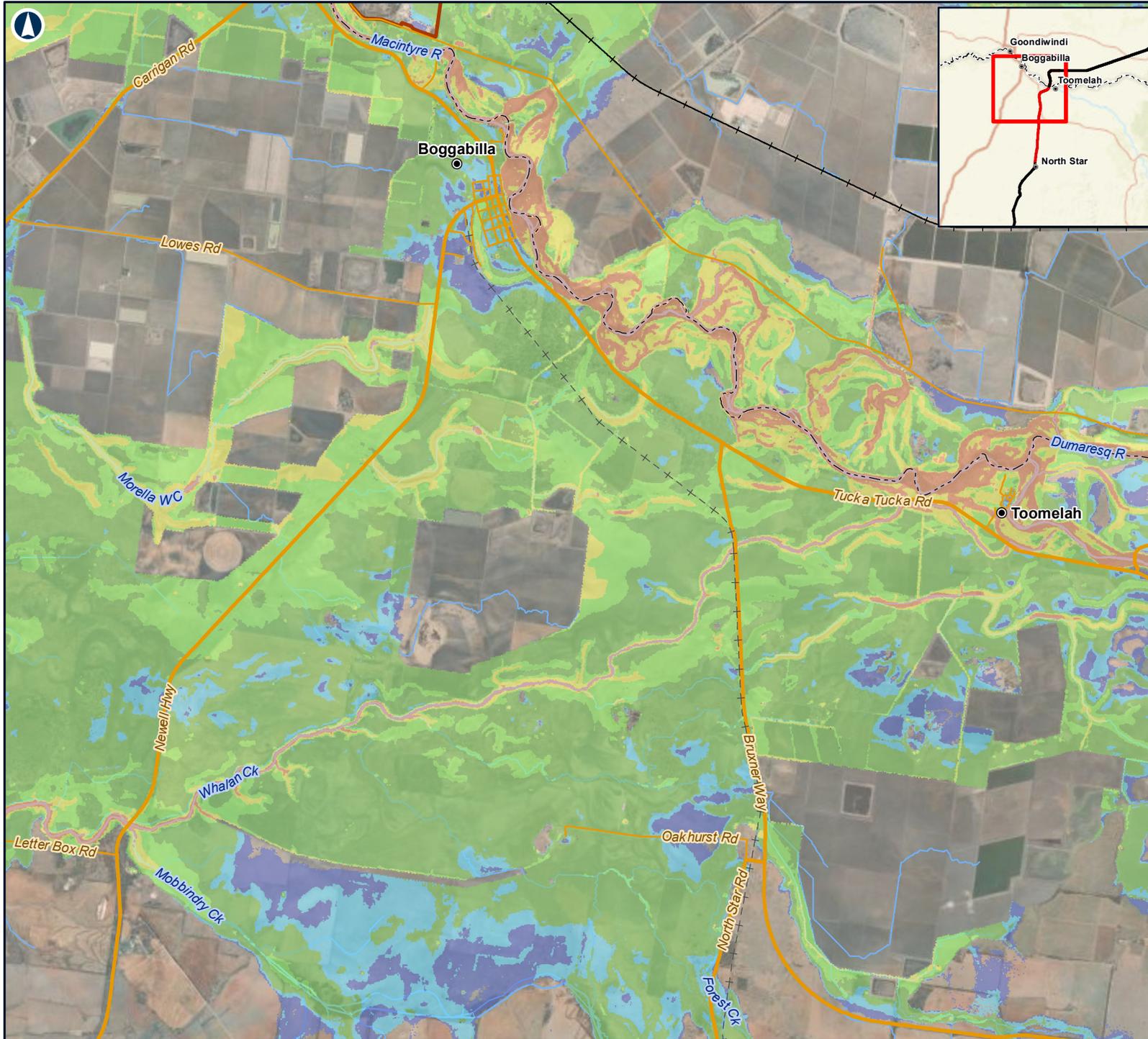
10km

Coordinate System: GDA 1994 MGA Zone 56

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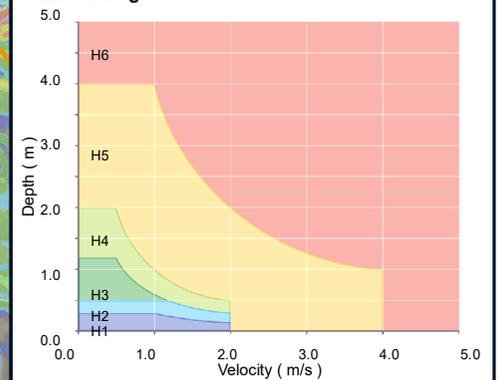
**NORTH STAR TO NSW/QLD BORDER**

Figure E4-A: Existing Case BRVFP levees and validated 1976 flows Hazard Categories

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

**Hazard Categories**



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

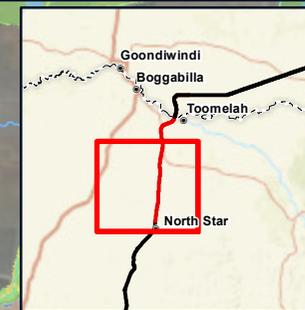
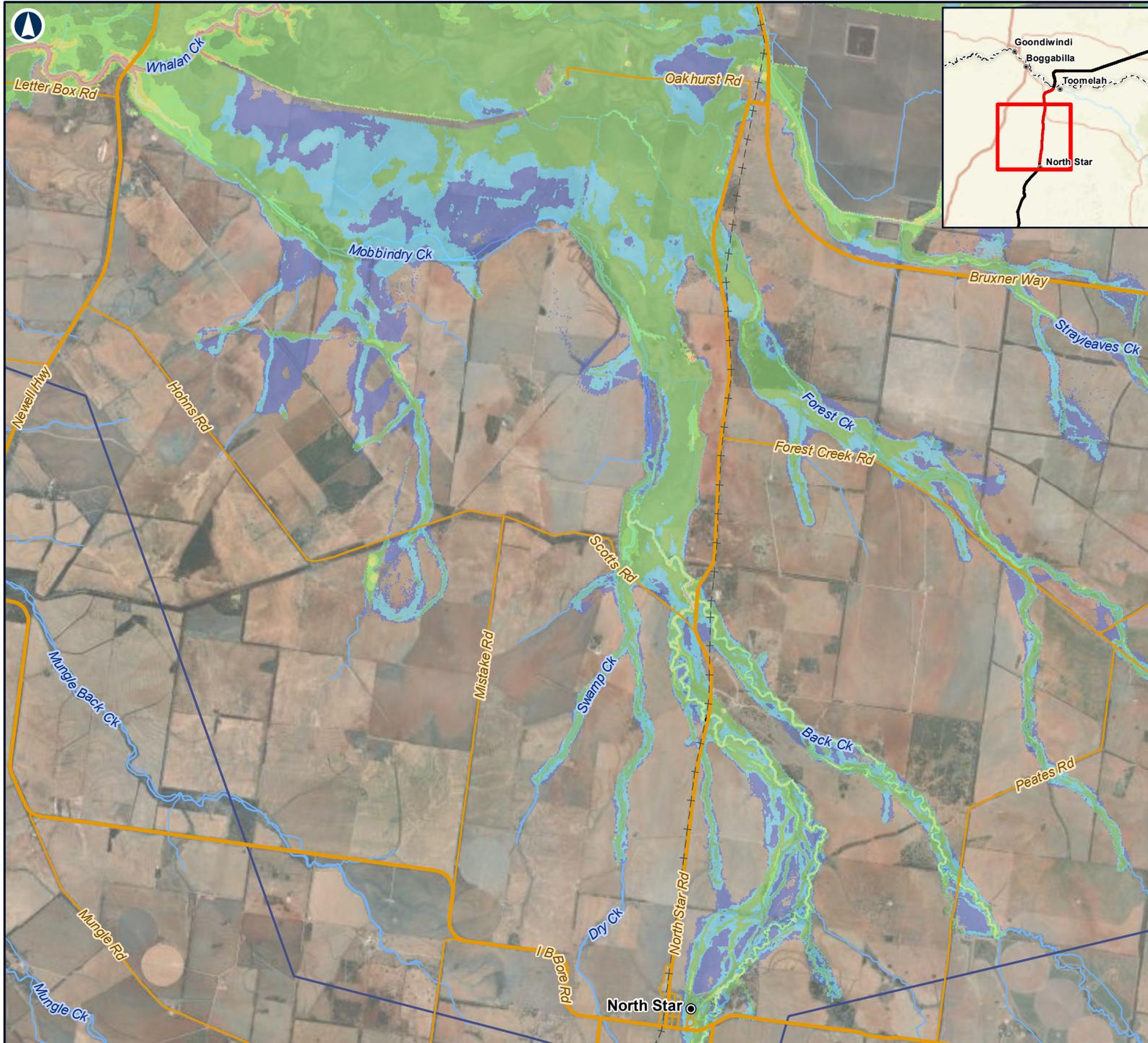
6km

Coordinate System: GDA 1994 MGA Zone 56

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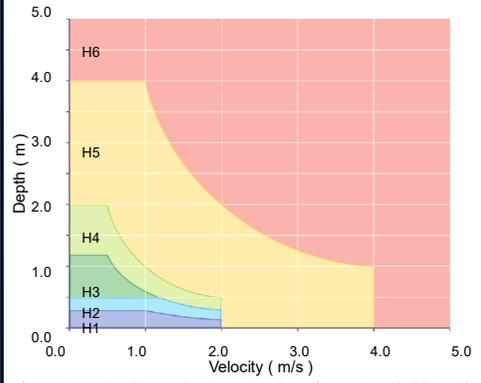
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E4-B: Existing Case  
 BRVFP levees and validated 1976 flows  
 Hazard Categories

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

**Hazard Categories**

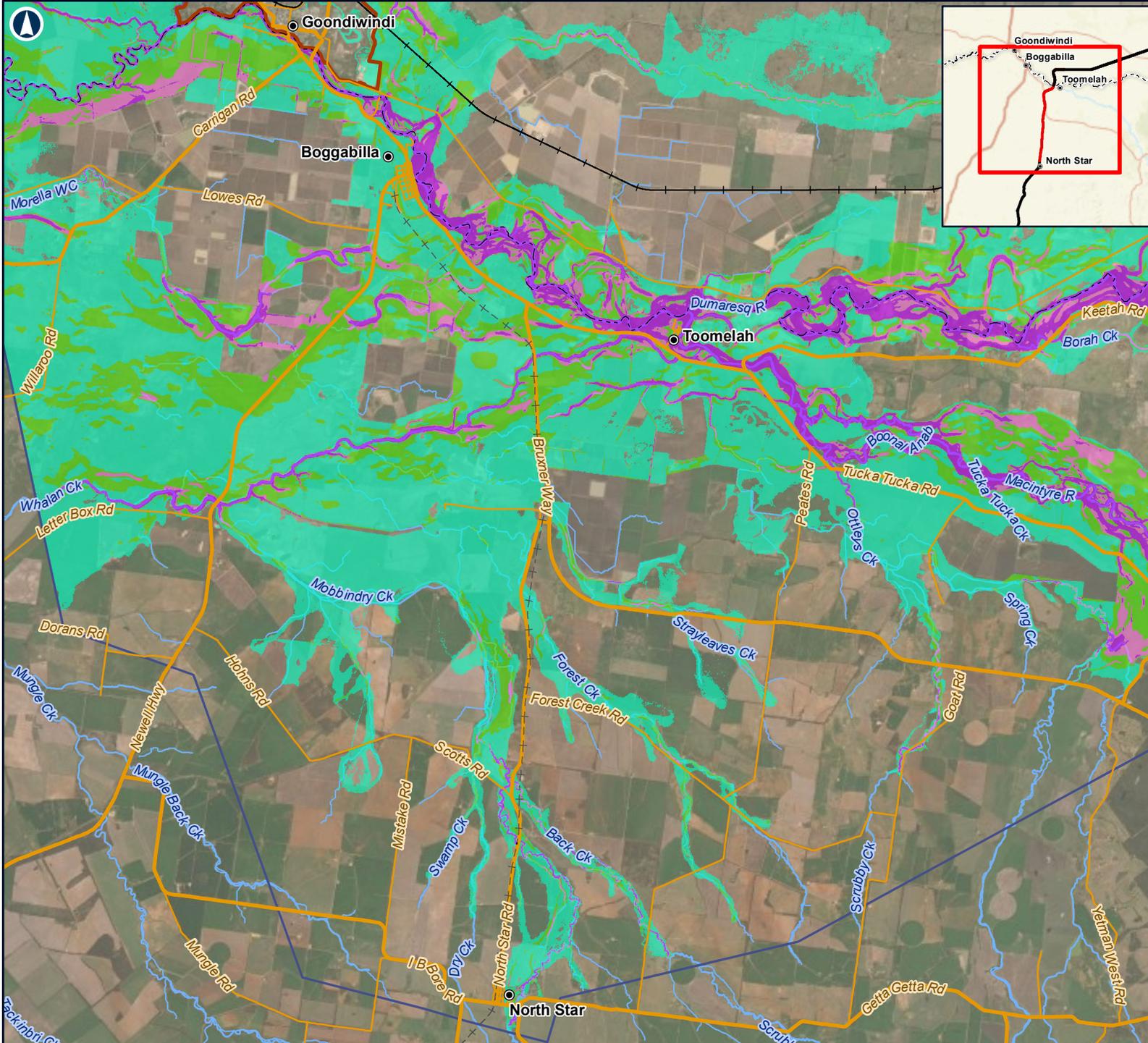


Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

6km  
 Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E5: Existing Case  
 BRVFP levees and validated 1976 flows  
 Velocity x Depth product

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Velocity x Depth product (m<sup>2</sup>/s)**

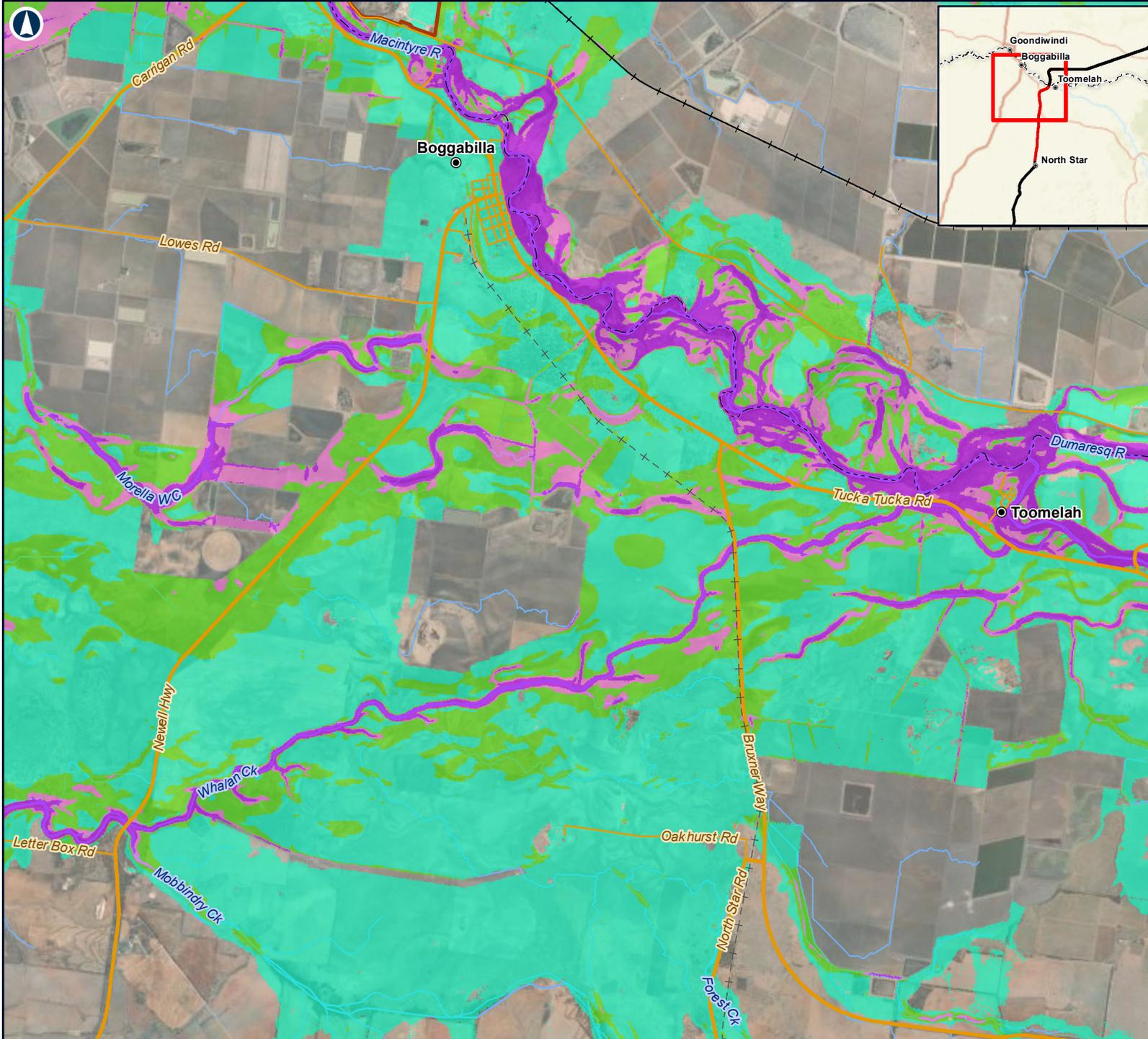
- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

10km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**

Figure E5-A: Existing Case  
 BRVFM levees and validated 1976 flows  
 Velocity x Depth product

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Velocity x Depth product (m<sup>2</sup>/s)**

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

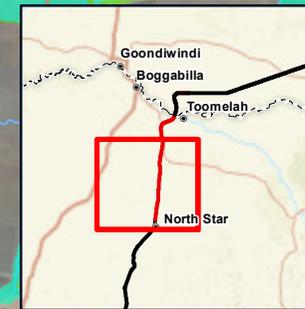
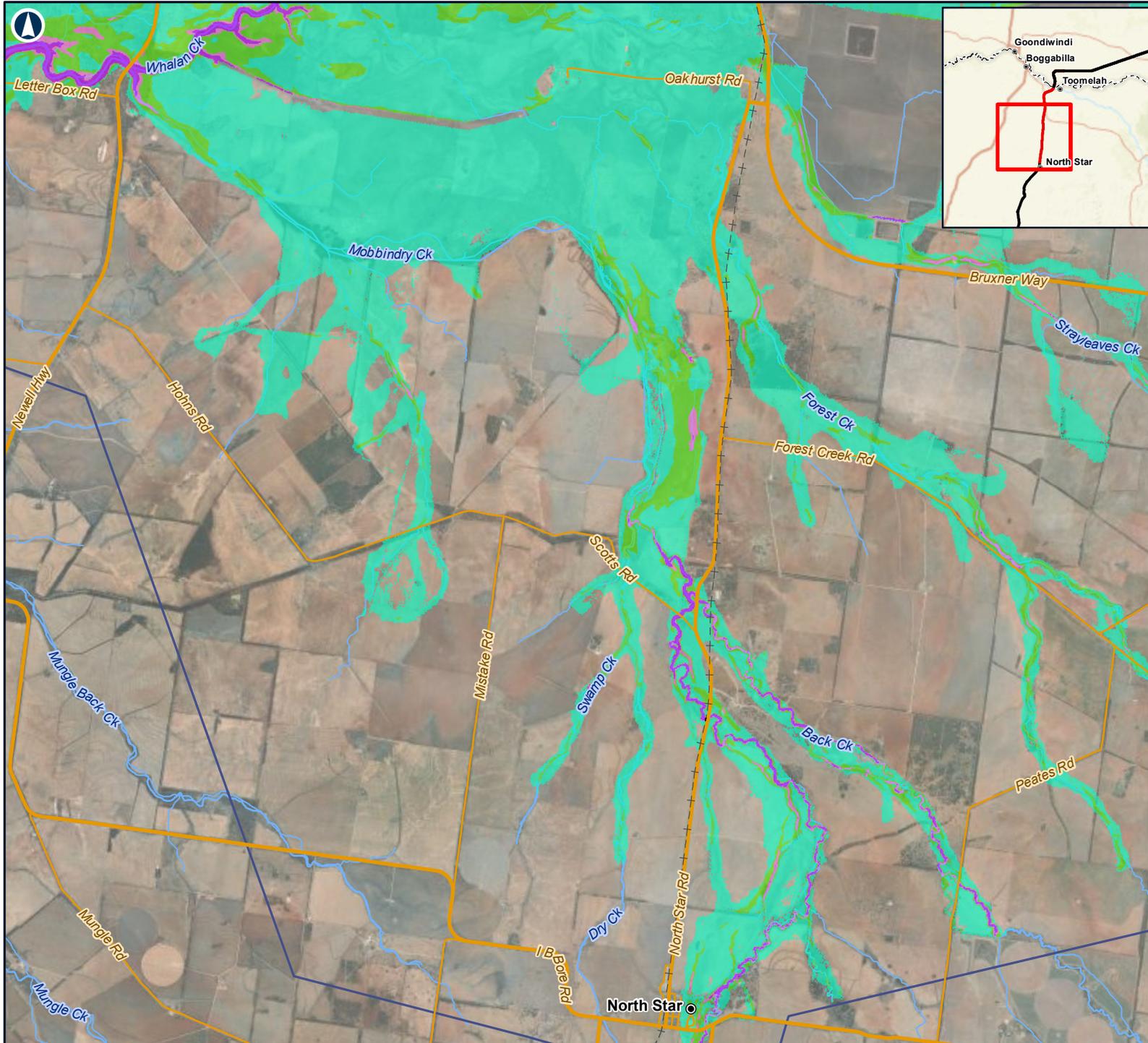
6km

Coordinate System: GDA 1994 MGA Zone 56

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 Author: FFJV GIS

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E5-B: Existing Case  
 BRVFP levees and validated 1976 flows  
 Velocity x Depth product

**LEGEND**

- Localities
- +— Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

**Velocity x Depth product (m<sup>2</sup>/s)**

- 0 to 0.3
- 0.3 to 0.6
- 0.6 to 1
- 1 to 40

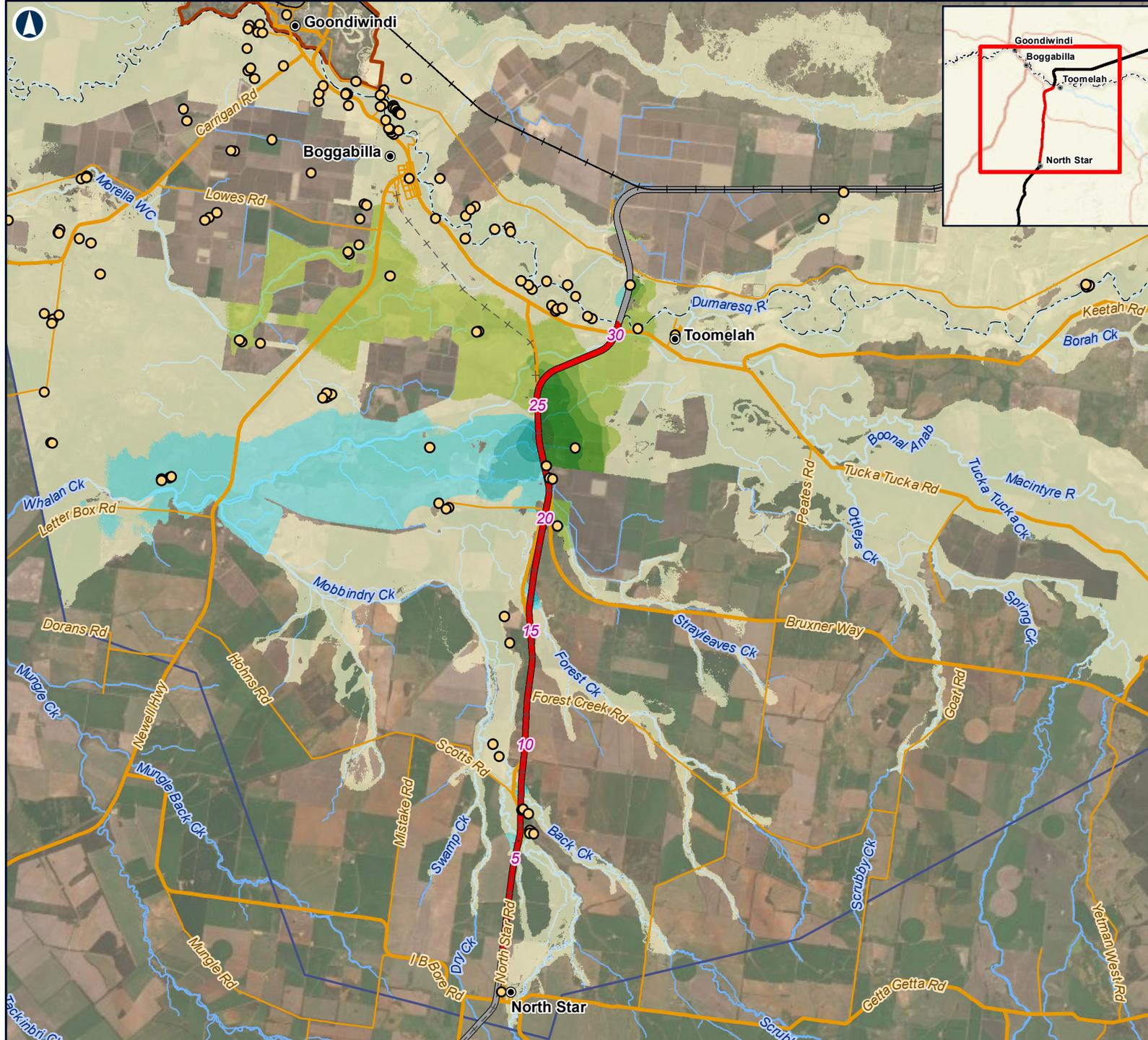
6km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E6: Developed Case BRVFP levees and validated 1976 flows  
 Change in peak water levels

**LEGEND**

- Flood sensitive receptor
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

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

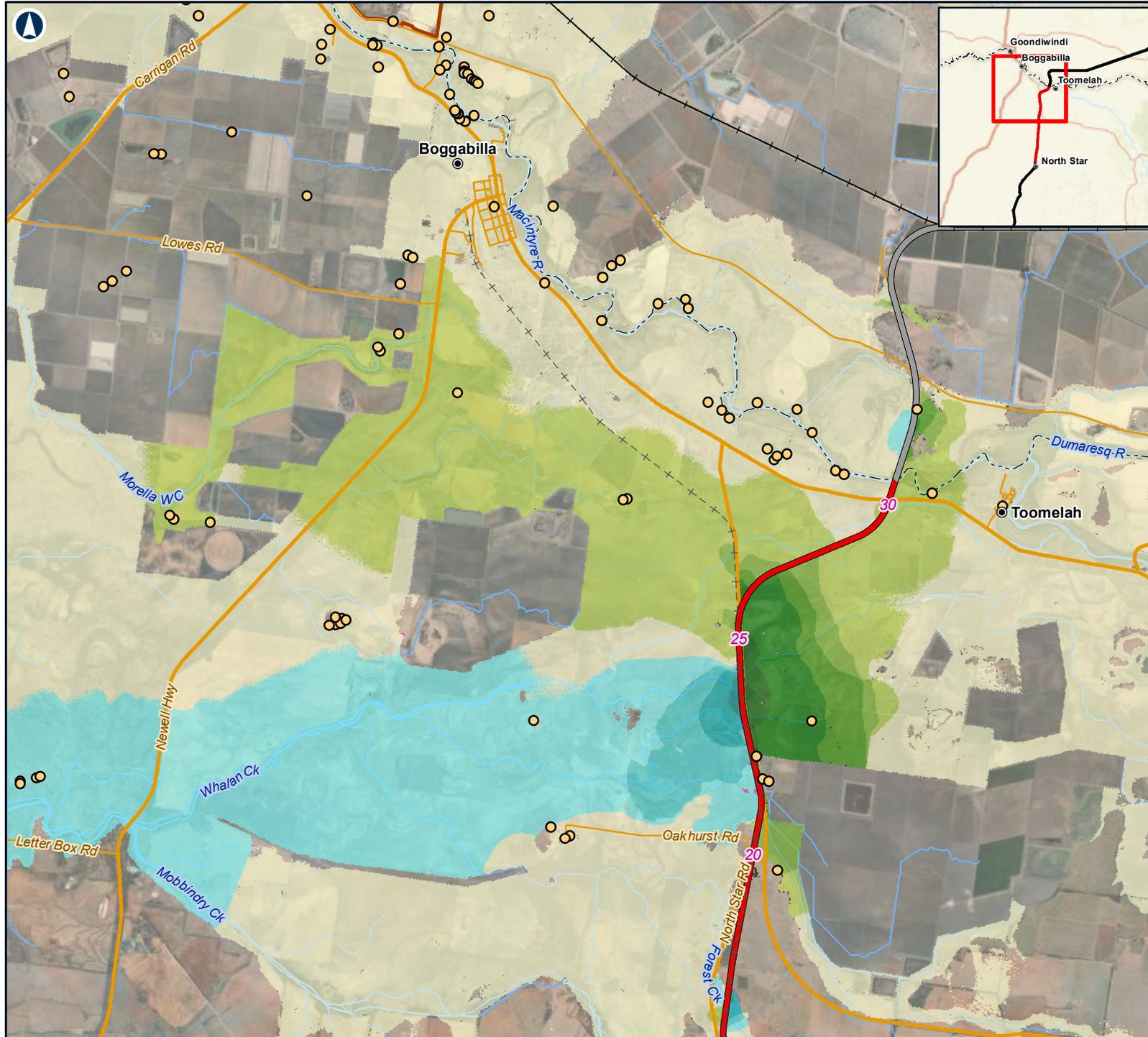
- <math>< -0.5</math>
- 0.5 to -0.2
- 0.2 to -0.1
- 0.1 to -0.05
- 0.05 to -0.01
- 0.01 to 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- > 0.5
- Was Wet Now Dry
- Was Dry Now Wet

10km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E6-A: Developed Case BRVFP levees and validated 1976 flows  
 Change in peak water levels

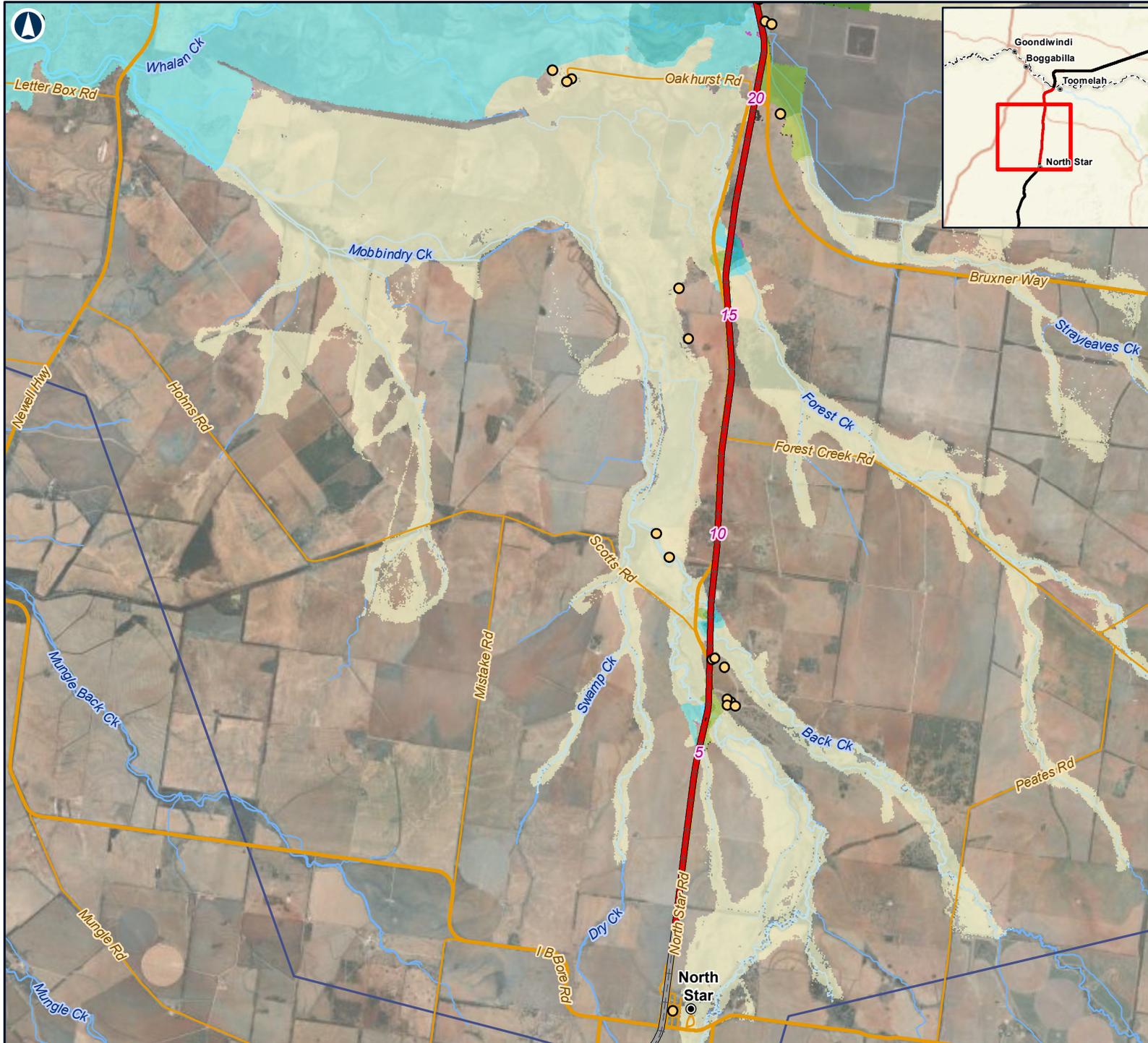
**LEGEND**

- Flood sensitive receptor
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

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

- < -0.5
- 0.5 to -0.2
- 0.2 to -0.1
- 0.1 to -0.05
- 0.05 to -0.01
- 0.01 to 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- > 0.5
- Was Wet Now Dry
- Was Dry Now Wet

6km  
 Coordinate System: GDA 1994 MGA Zone 56  
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E6-B: Developed Case BRVFP levees and validated 1976 flows  
 Change in peak water levels

**LEGEND**

- Flood sensitive receptor
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

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

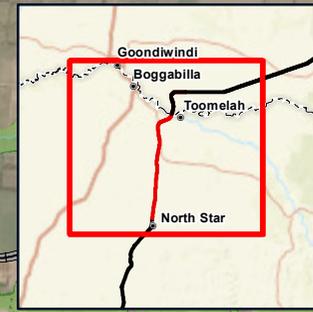
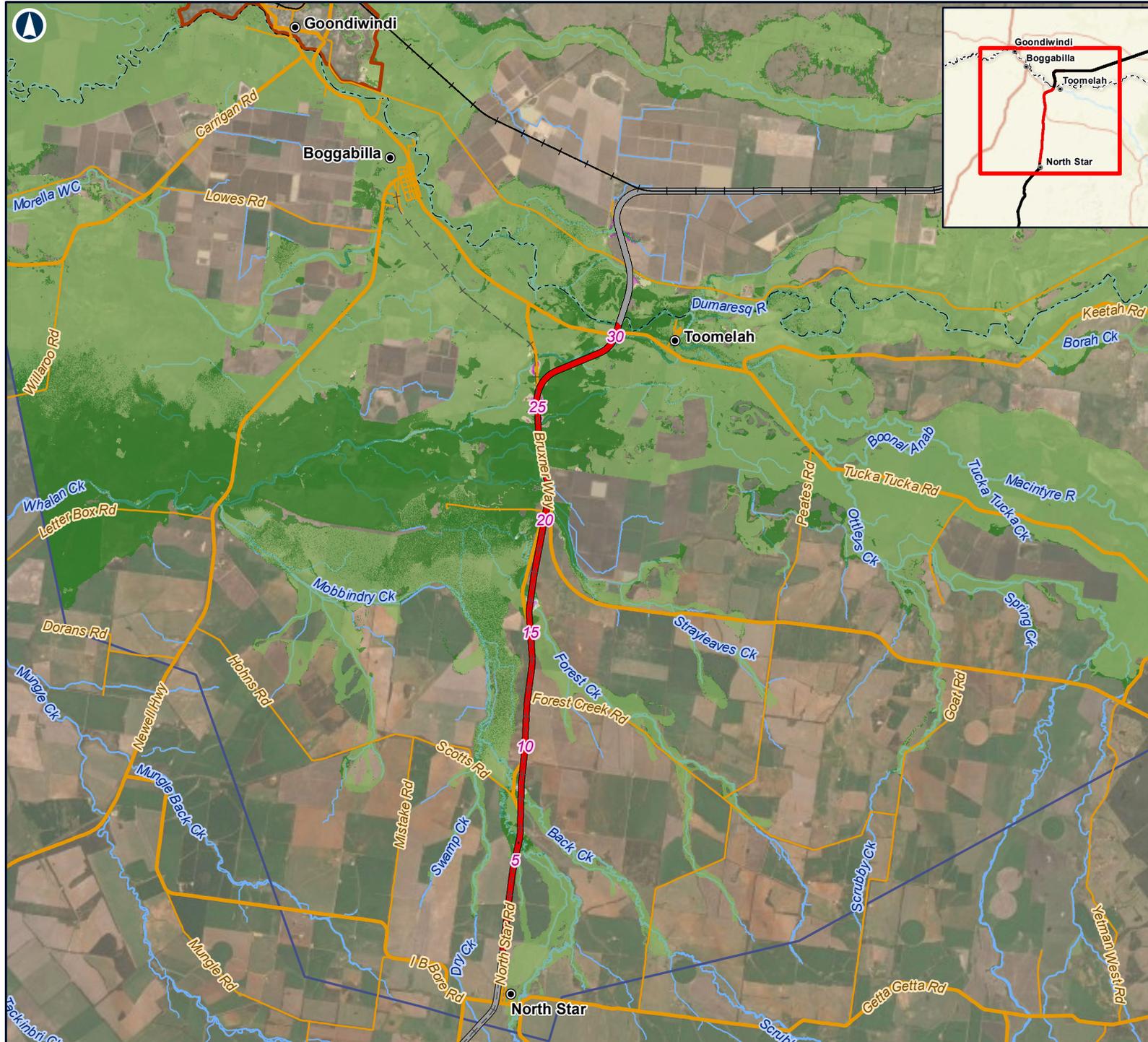
- < -0.5
- 0.5 to -0.2
- 0.2 to -0.1
- 0.1 to -0.05
- 0.05 to -0.01
- 0.01 to 0.01
- 0.01 to 0.05
- 0.05 to 0.1
- 0.1 to 0.2
- 0.2 to 0.5
- > 0.5
- Was Wet Now Dry
- Was Dry Now Wet

6km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E7: Developed Case BRVFP levees and validated 1976 flows  
 Percentage change in velocities

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

**Change in velocities ( % )**

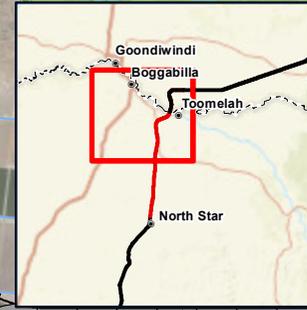
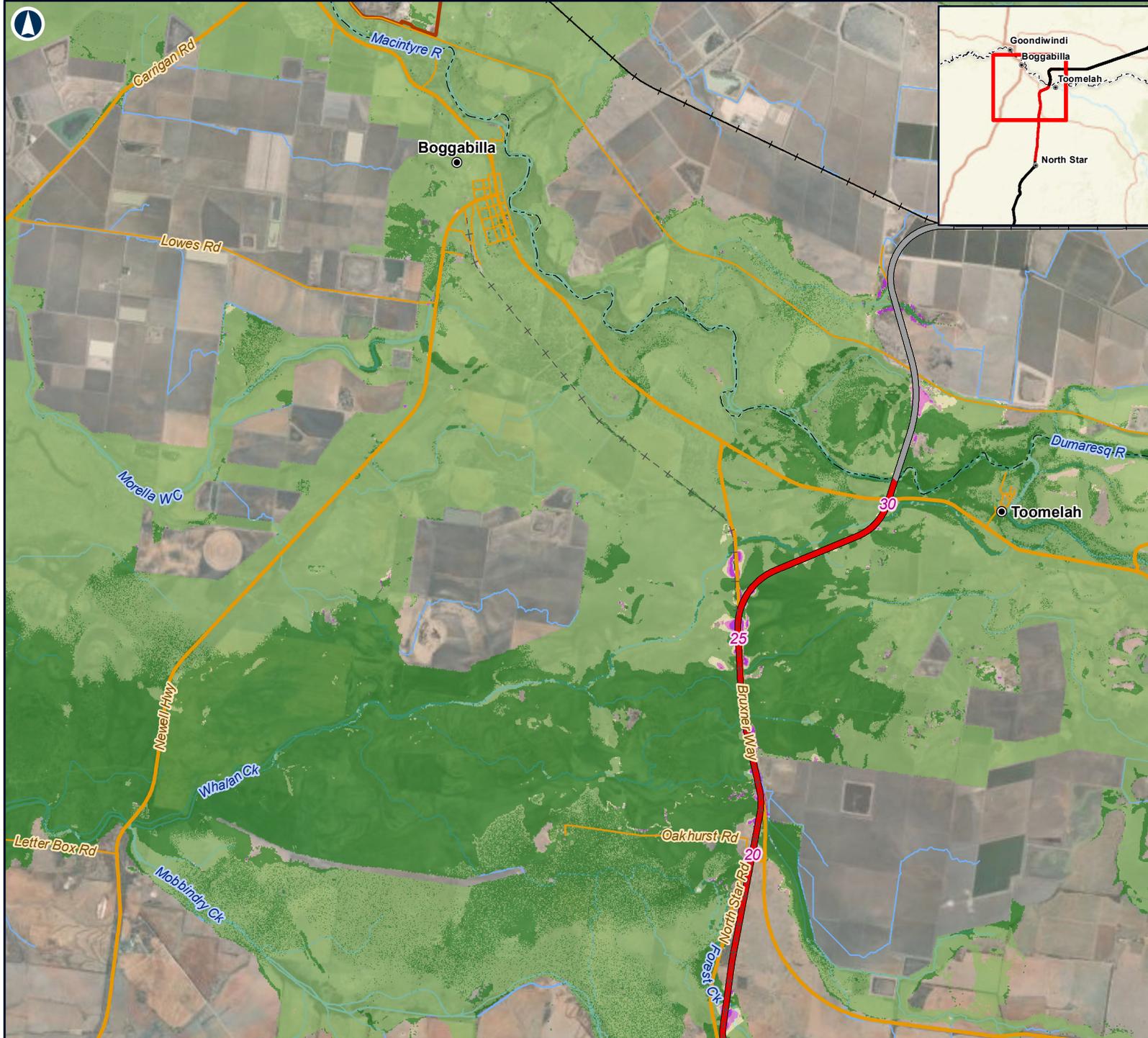
- < 0
- 0 to 10
- 10 to 20
- 20 to 30
- > 30

10km

Coordinate System: GDA 1994 MGA Zone 56

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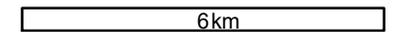
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**NORTH STAR TO NSW/QLD BORDER**

Figure E7-A: Developed Case BRVFP levees and validated 1976 flows  
 Percentage change in velocities

**LEGEND**

- Localities
  - 5 Chainage (km)
  - North Star to NSW/QLD border alignment
  - Adjoining alignments
  - Existing rail (operational)
  - - - Existing rail (non-operational)
  - - - NSW/QLD border
  - Watercourses
  - Goondiwindi levee
  - Sub-model extent
- Change in velocities ( % )**
- < 0
  - 0 to 10
  - 10 to 20
  - 20 to 30
  - > 30

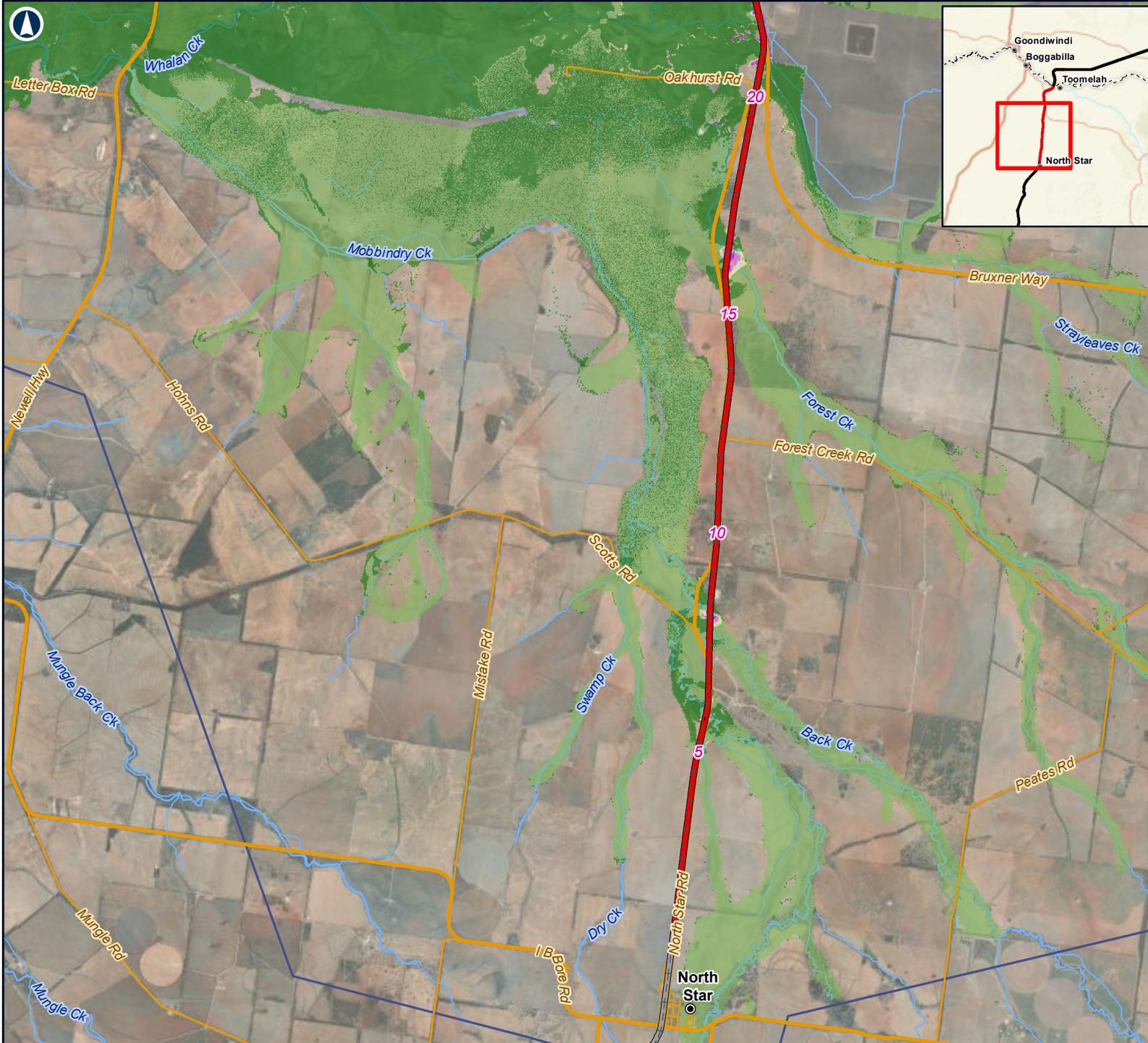


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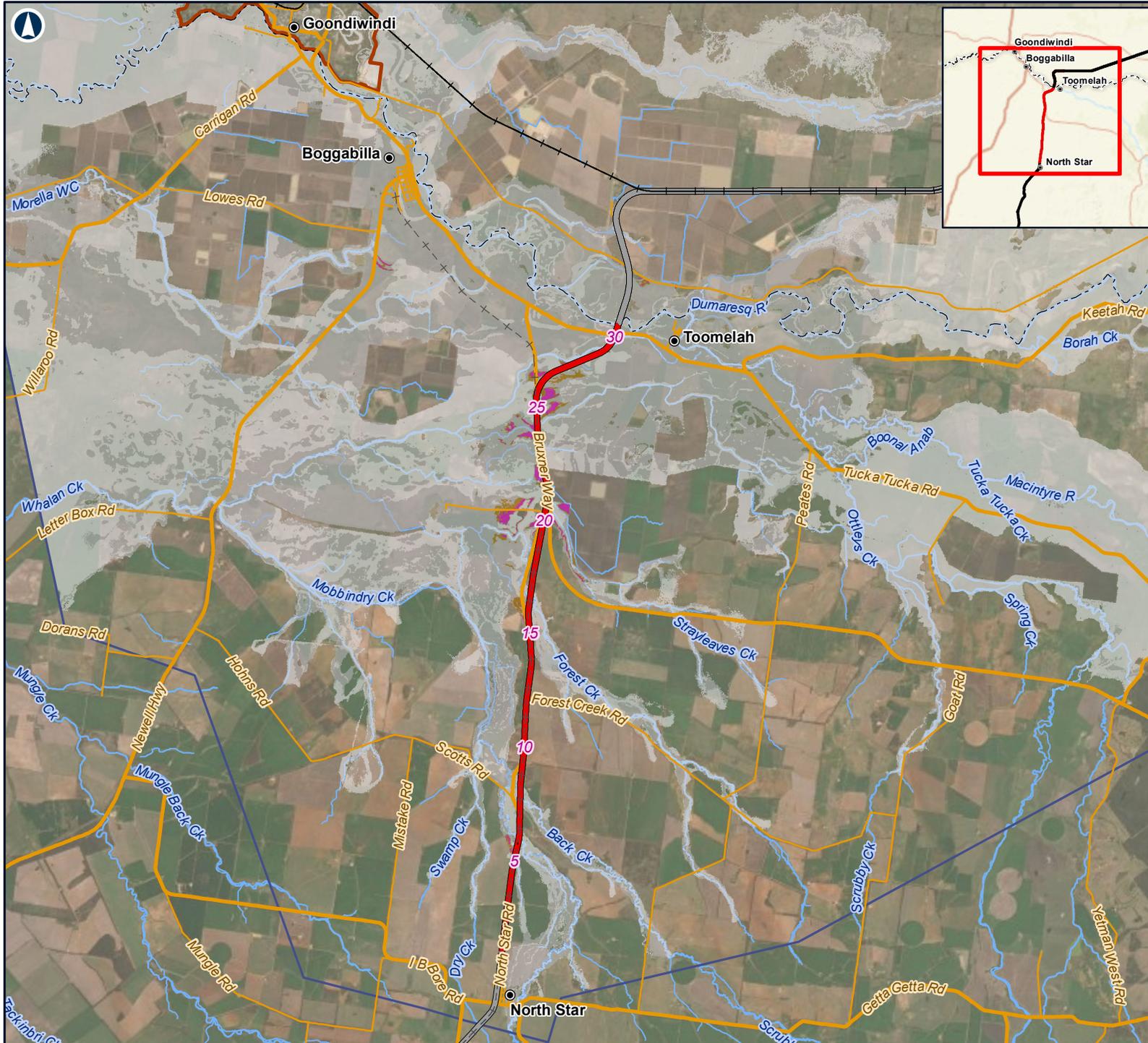
**NORTH STAR TO NSW/QLD BORDER**  
 Figure E7-B: Developed Case BRVFP levees and validated 1976 flows  
 Percentage change in velocities

**LEGEND**

- Localities
  - 5 Chainage (km)
  - North Star to NSW/QLD border alignment
  - Adjoining alignments
  - Existing rail (operational)
  - - - Existing rail (non-operational)
  - - - NSW/QLD border
  - Watercourses
  - ▭ Sub-model extent
- Change in velocities ( % )**
- █ < 0
  - █ 0 to 10
  - █ 10 to 20
  - █ 20 to 30
  - █ > 30

6km  
 Coordinate System: GDA 1994 MGA Zone 56  
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E8: Developed Case BRVMP levees and validated 1976 flows  
 Percentage change in duration of inundation

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Change in duration of inundation ( % )**

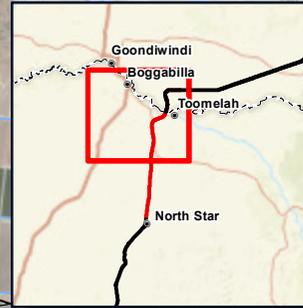
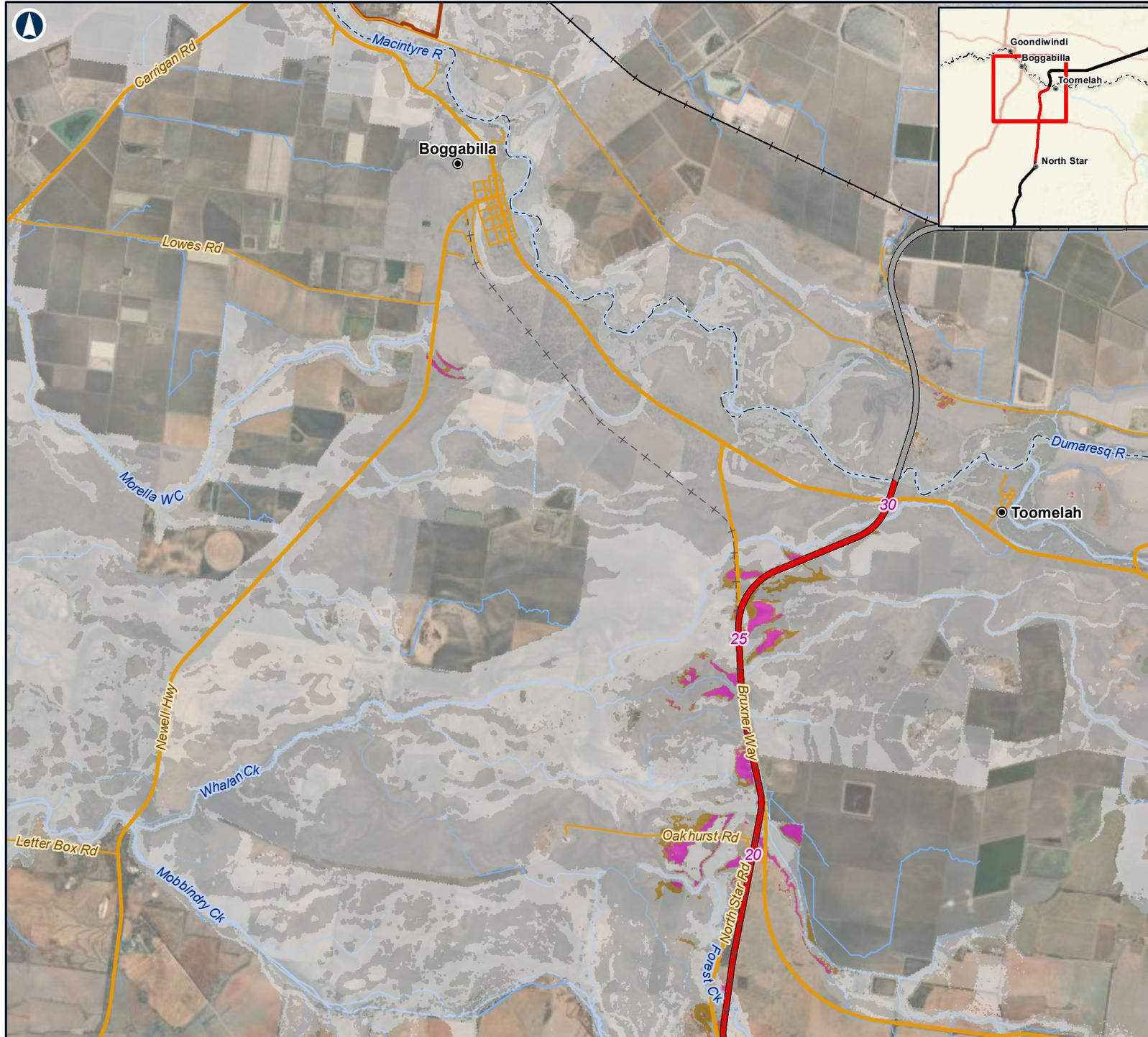
- ▭ < 0
- ▭ 0 to 10
- ▭ 10 to 20
- ▭ > 20

10km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E8-A: Developed Case BRVFP levees and validated 1976 flows  
 Percentage change in duration of inundation

**LEGEND**

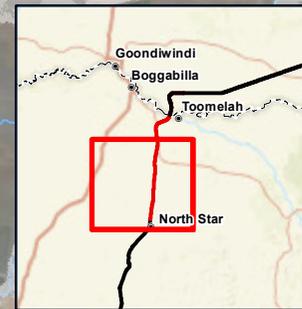
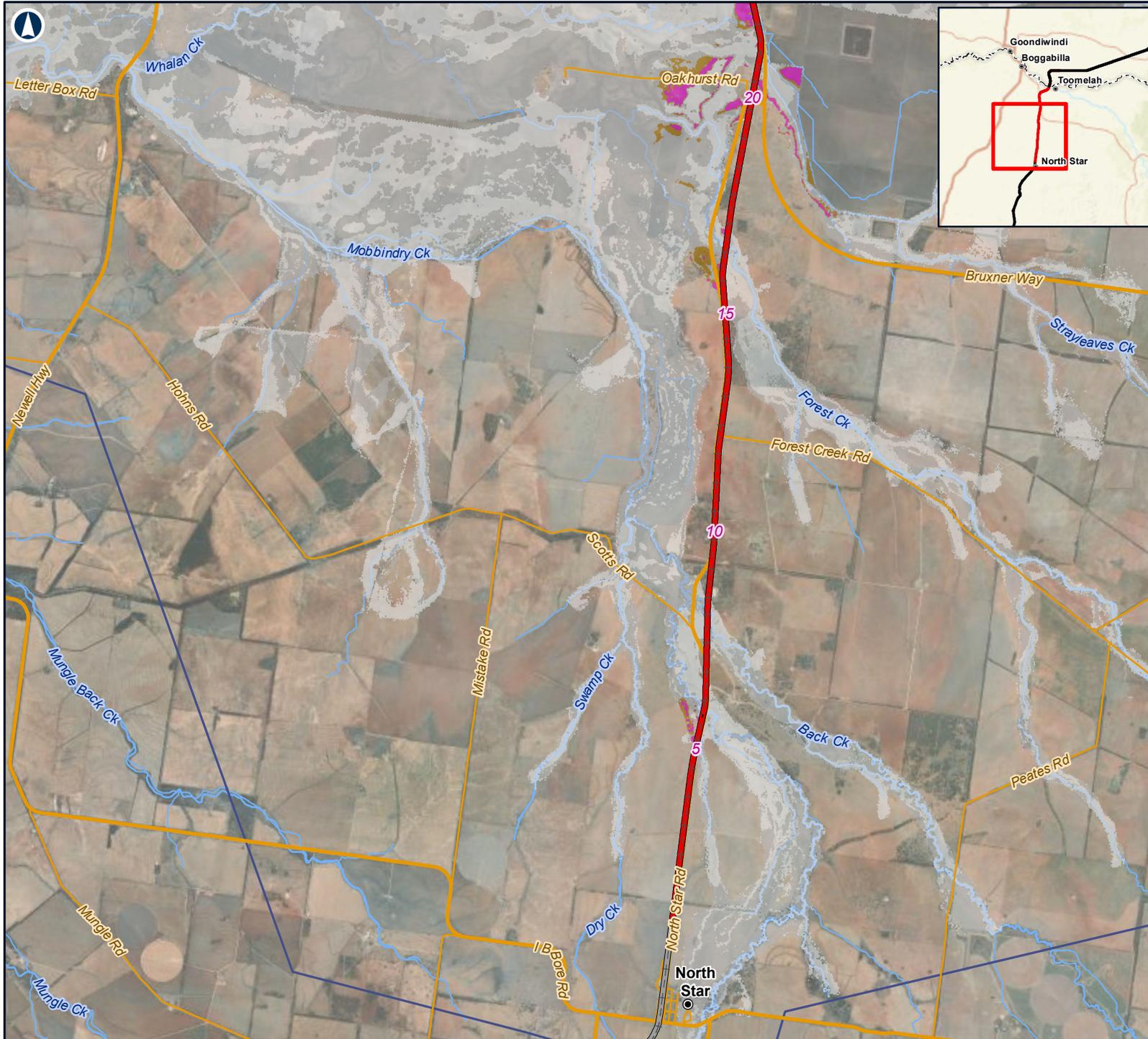
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Change in duration of inundation ( % )**

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

6km  
 Coordinate System: GDA 1994 MGA Zone 56  
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**NORTH STAR TO NSW/QLD BORDER**

Figure E8-B: Developed Case BRVFP levees and validated 1976 flows  
 Percentage change in duration of inundation

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent

**Change in duration of inundation ( % )**

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

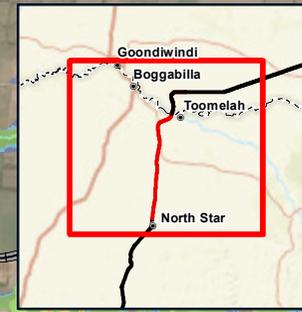
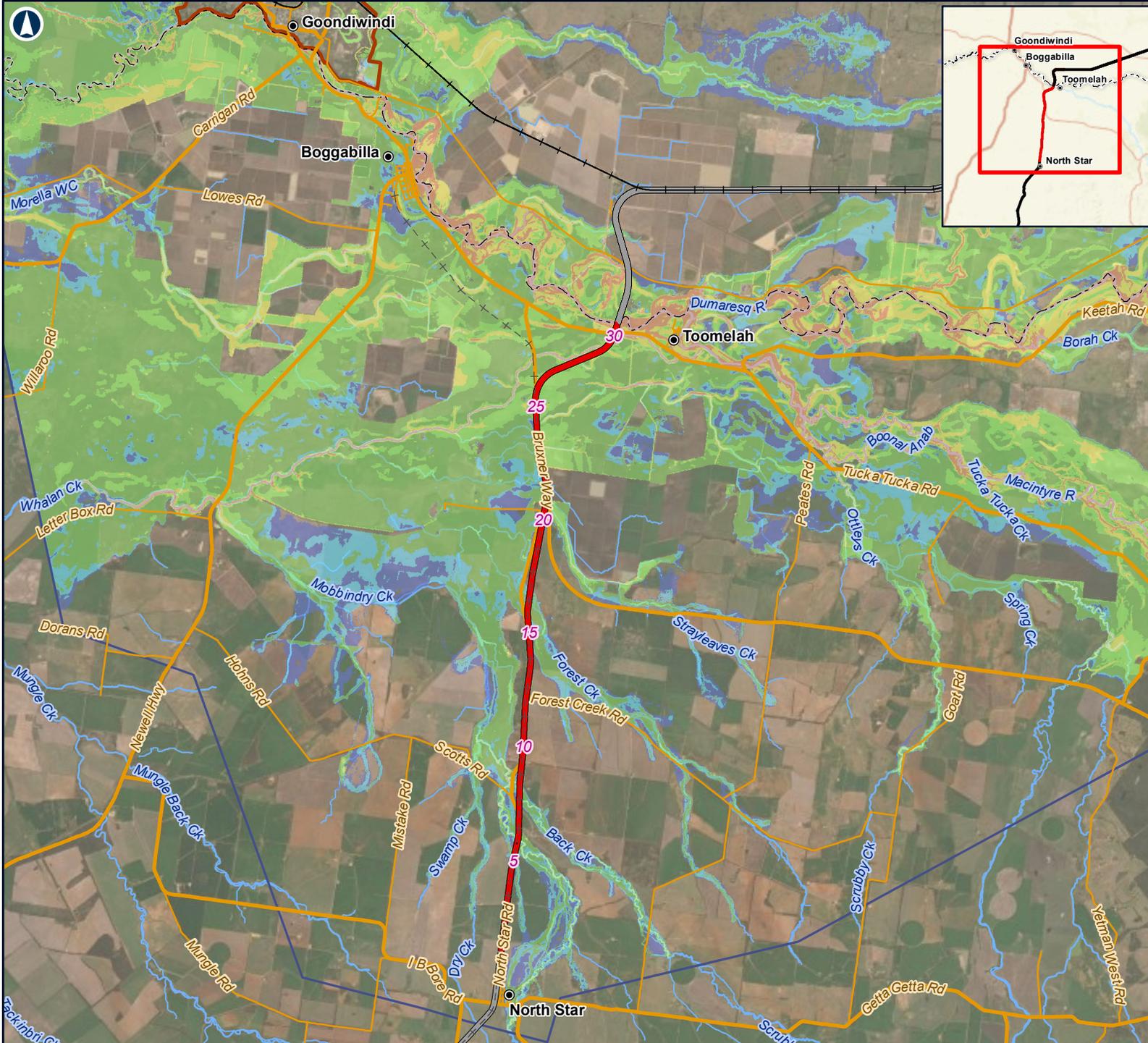
6 km

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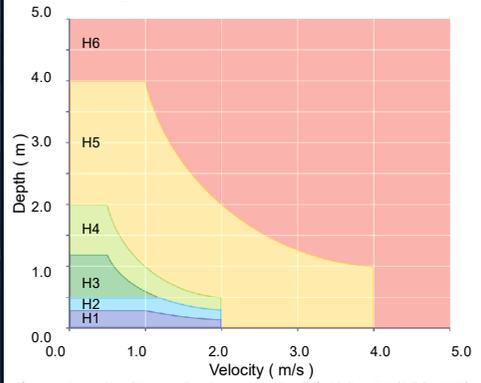
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E9: Developed Case BRVFP levees and validated 1976 flows  
 Hazard categories

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- Existing rail (non-operational)
- NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent

**Hazard Categories**



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

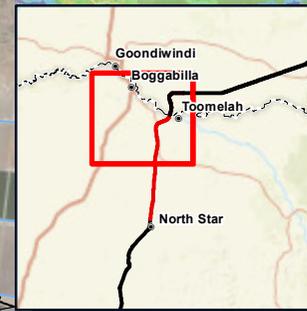
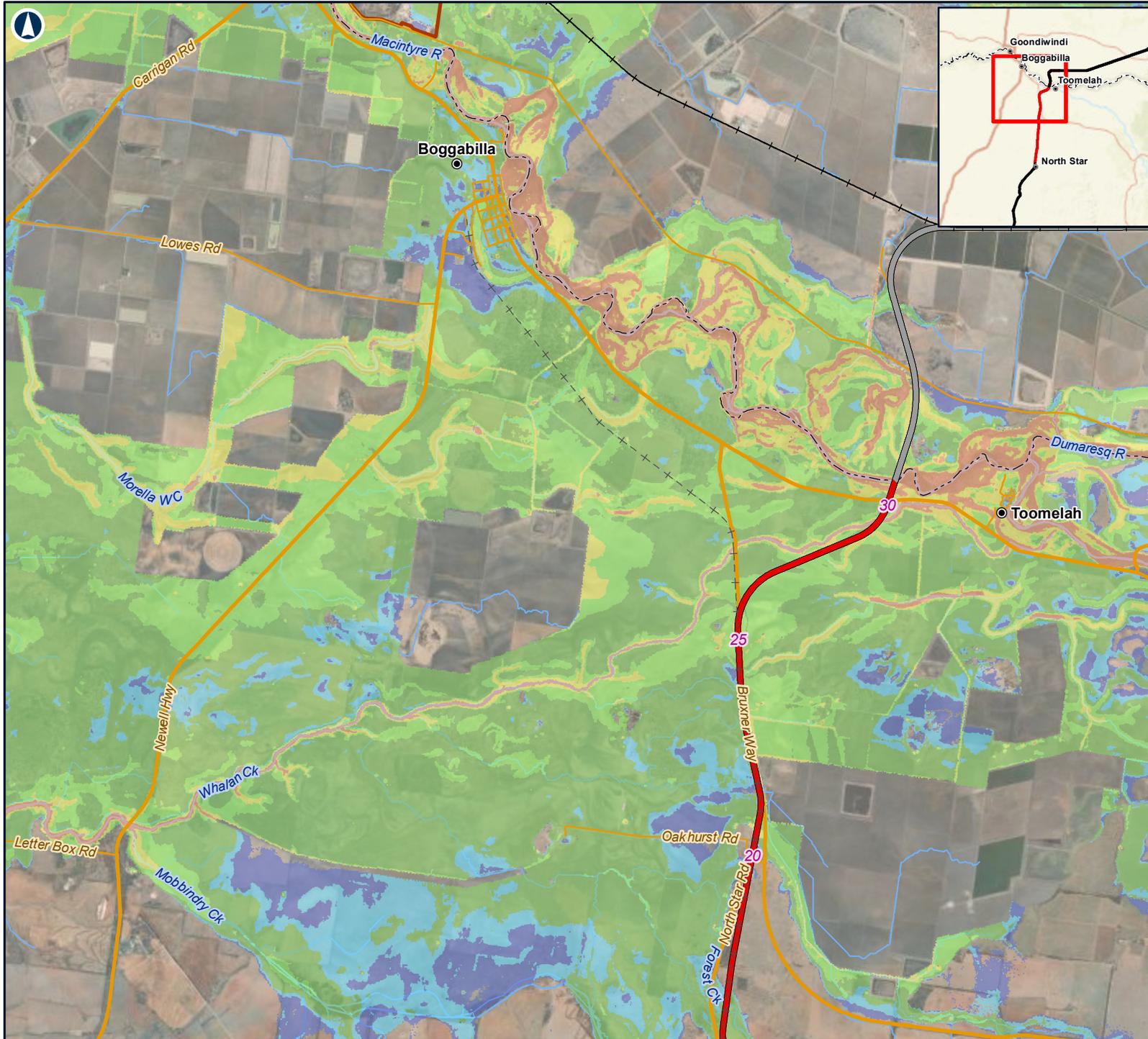
10km

Coordinate System: GDA 1994 MGA Zone 56

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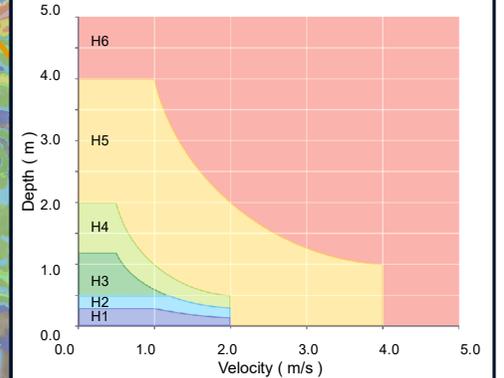
**NORTH STAR TO NSW/QLD BORDER**

Figure E9-A: Developed Case BRVFP levees and validated 1976 flows Hazard categories

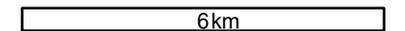
**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Hazard Categories**



Source: Australian Disaster Resilience Handbook Guideline 7-3 (AIDR 2017)

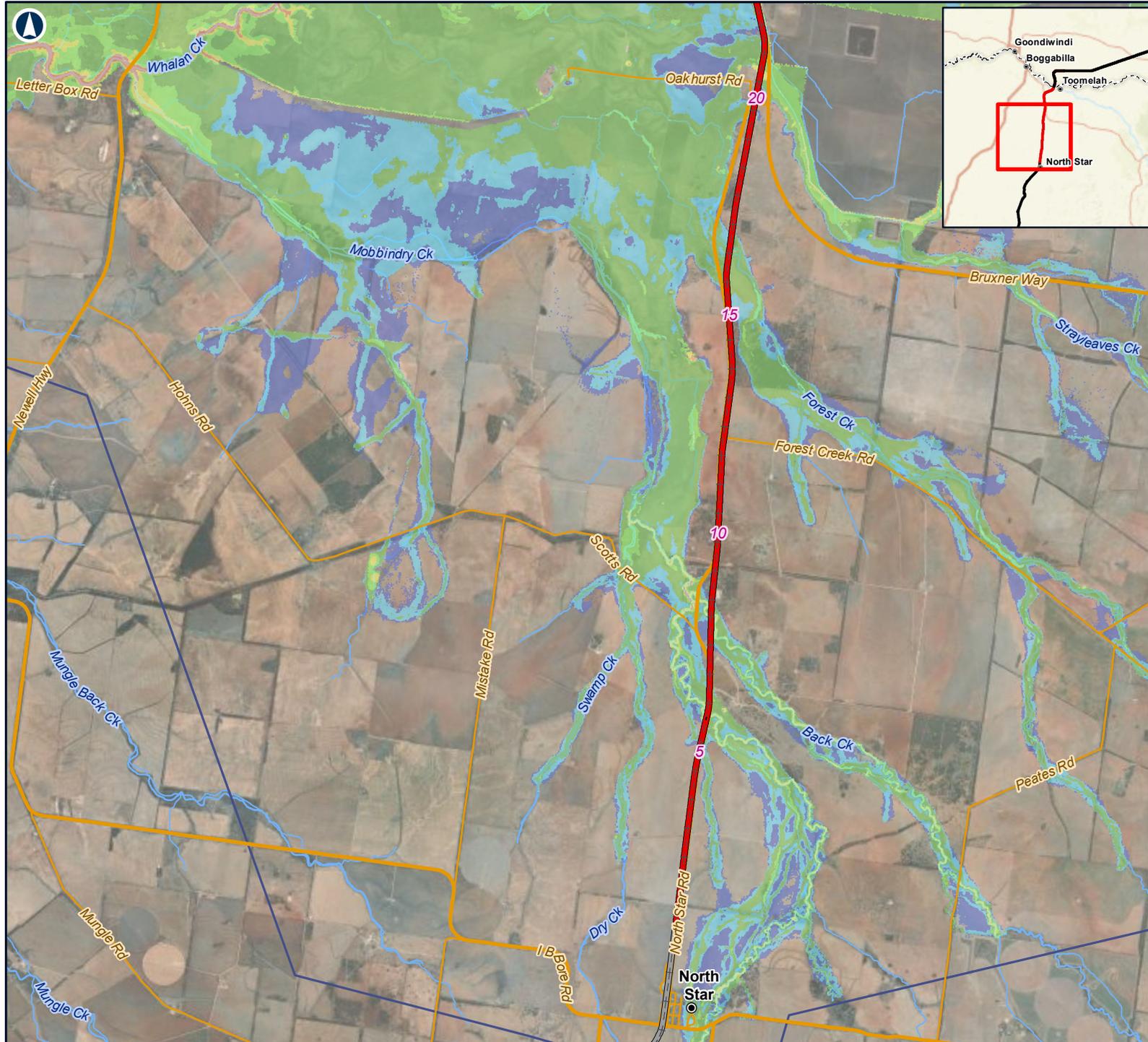


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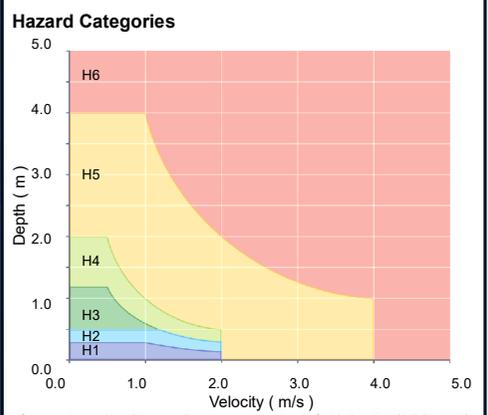
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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E9-B: Developed Case BRVFP levees and validated 1976 flows  
 Hazard categories

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- ▭ Sub-model extent



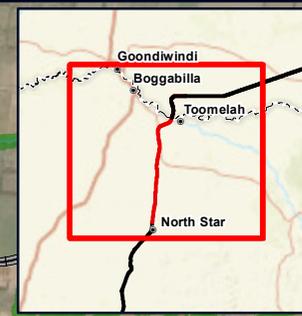
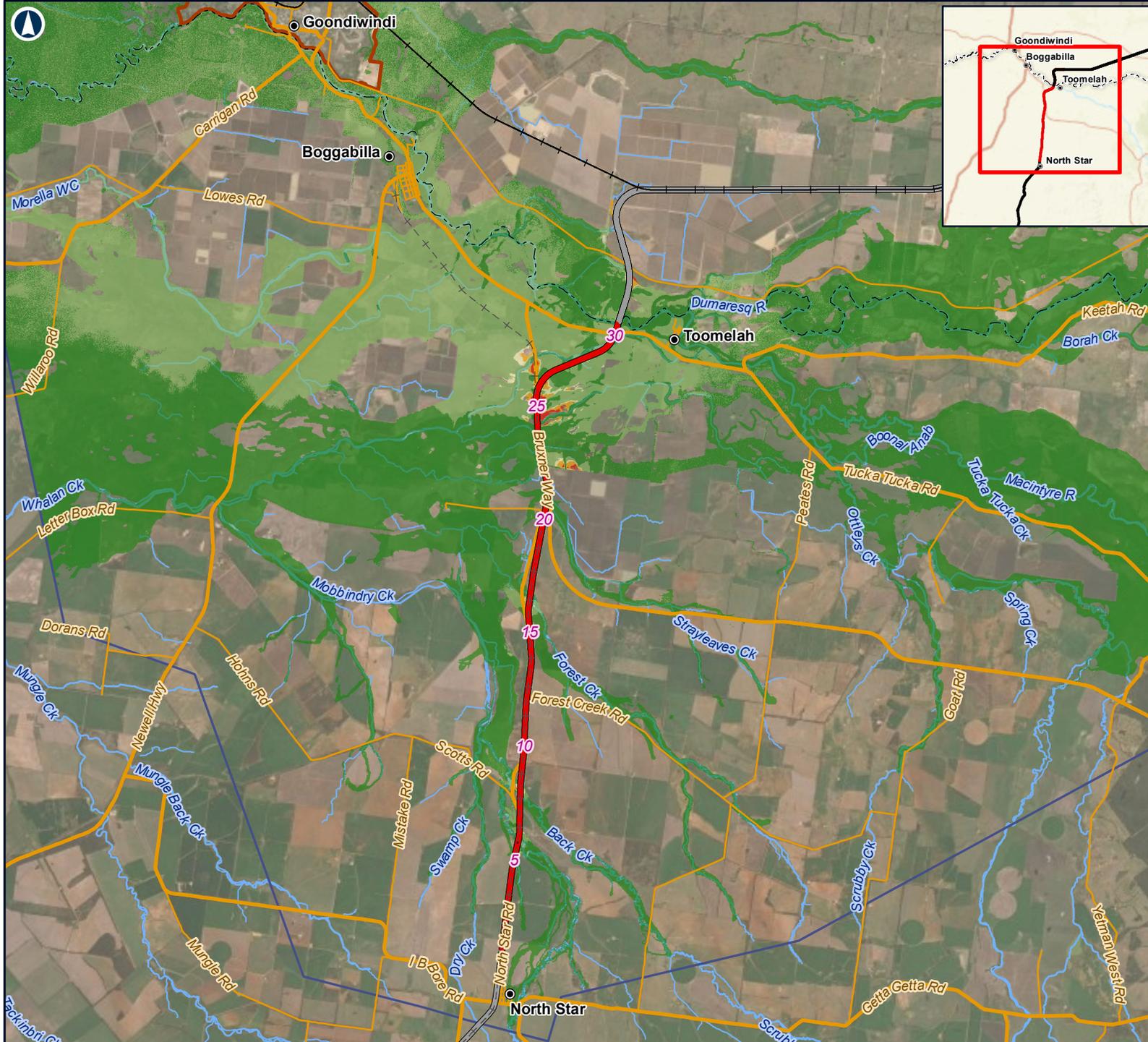
6km

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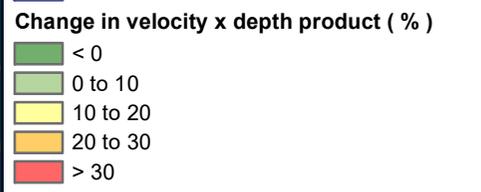


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**NORTH STAR TO NSW/QLD BORDER**  
 Figure E10: Developed Case  
 BRVFP levees and validated 1976 flows  
 Percentage change in velocity x depth product

**LEGEND**

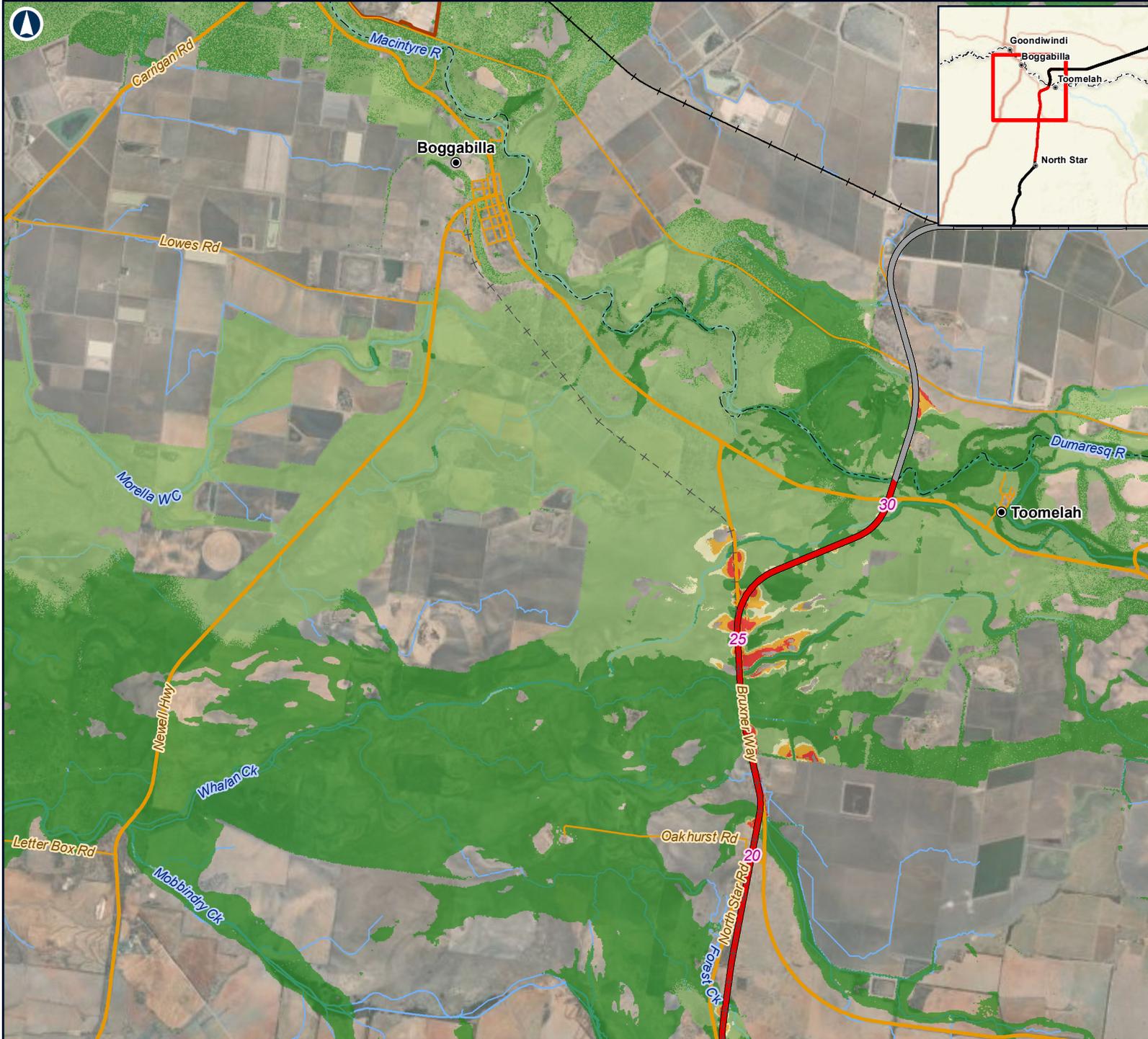
- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- Sub-model extent



10km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**

Figure E10-A: Developed Case BRVfMP levees and validated 1976 flows  
 Percentage change in velocity x depth product

**LEGEND**

- Localities
- 5 Chainage (km)
- North Star to NSW/QLD border alignment
- Adjoining alignments
- Existing rail (operational)
- - - Existing rail (non-operational)
- - - NSW/QLD border
- Watercourses
- Goondiwindi levee
- ▭ Sub-model extent

**Change in velocity x depth product ( % )**

- < 0
- 0 to 10
- 10 to 20
- 20 to 30
- > 30

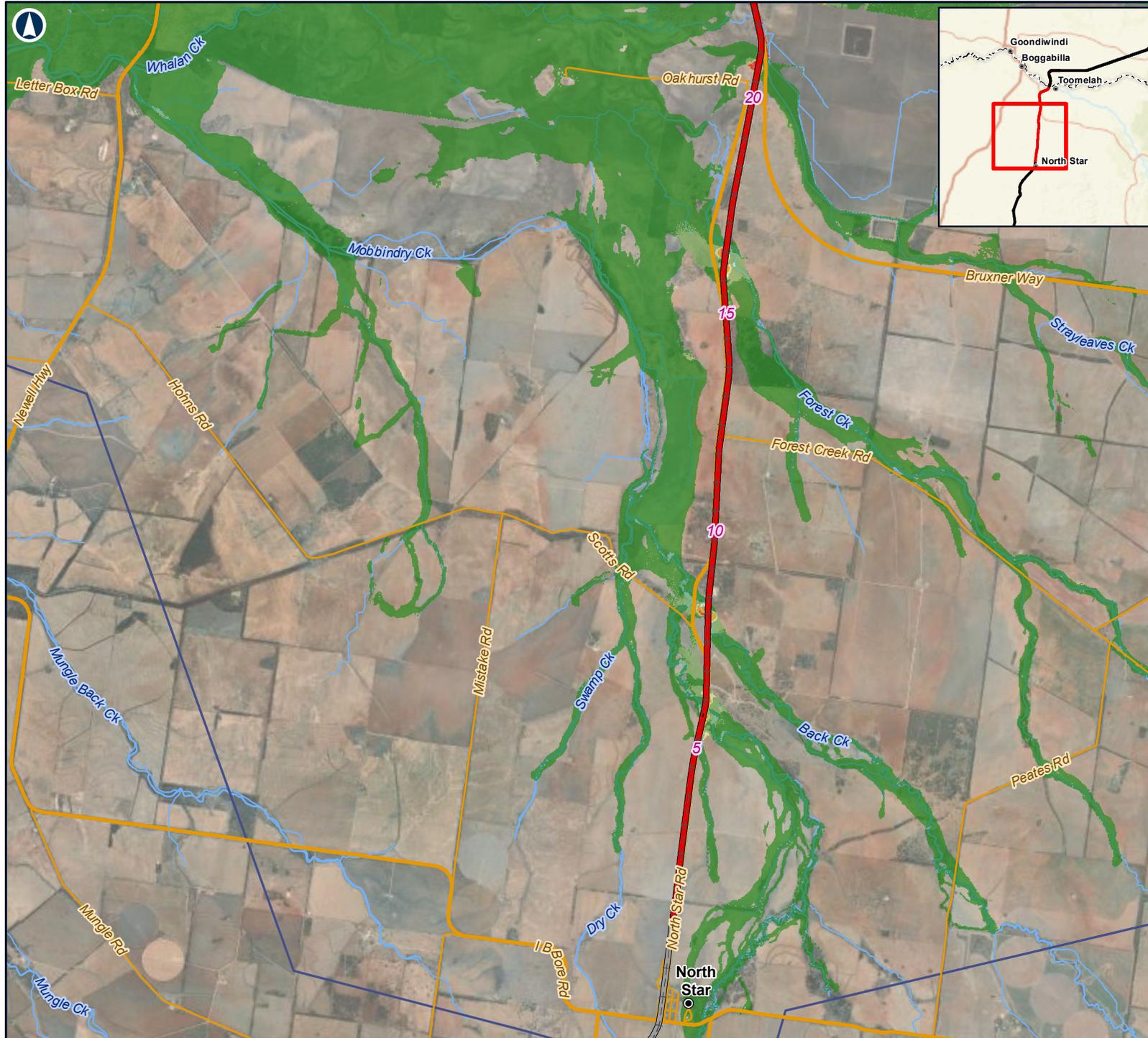
6km

Coordinate System: GDA 1994 MGA Zone 56

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**NORTH STAR TO NSW/QLD BORDER**

Figure E10-B: Developed Case BRVFMP levees and validated 1976 flows  
 Percentage change in velocity x depth product

**LEGEND**

- Localities
  - 5 Chainage (km)
  - North Star to NSW/QLD border alignment
  - Adjoining alignments
  - Existing rail (operational)
  - - - Existing rail (non-operational)
  - - - NSW/QLD border
  - Watercourses
  - ▭ Sub-model extent
- Change in velocity x depth product ( % )**
- Green < 0
  - Light Green 0 to 10
  - Yellow 10 to 20
  - Orange 20 to 30
  - Red > 30

6km  
 Coordinate System: GDA 1994 MGA Zone 56  
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