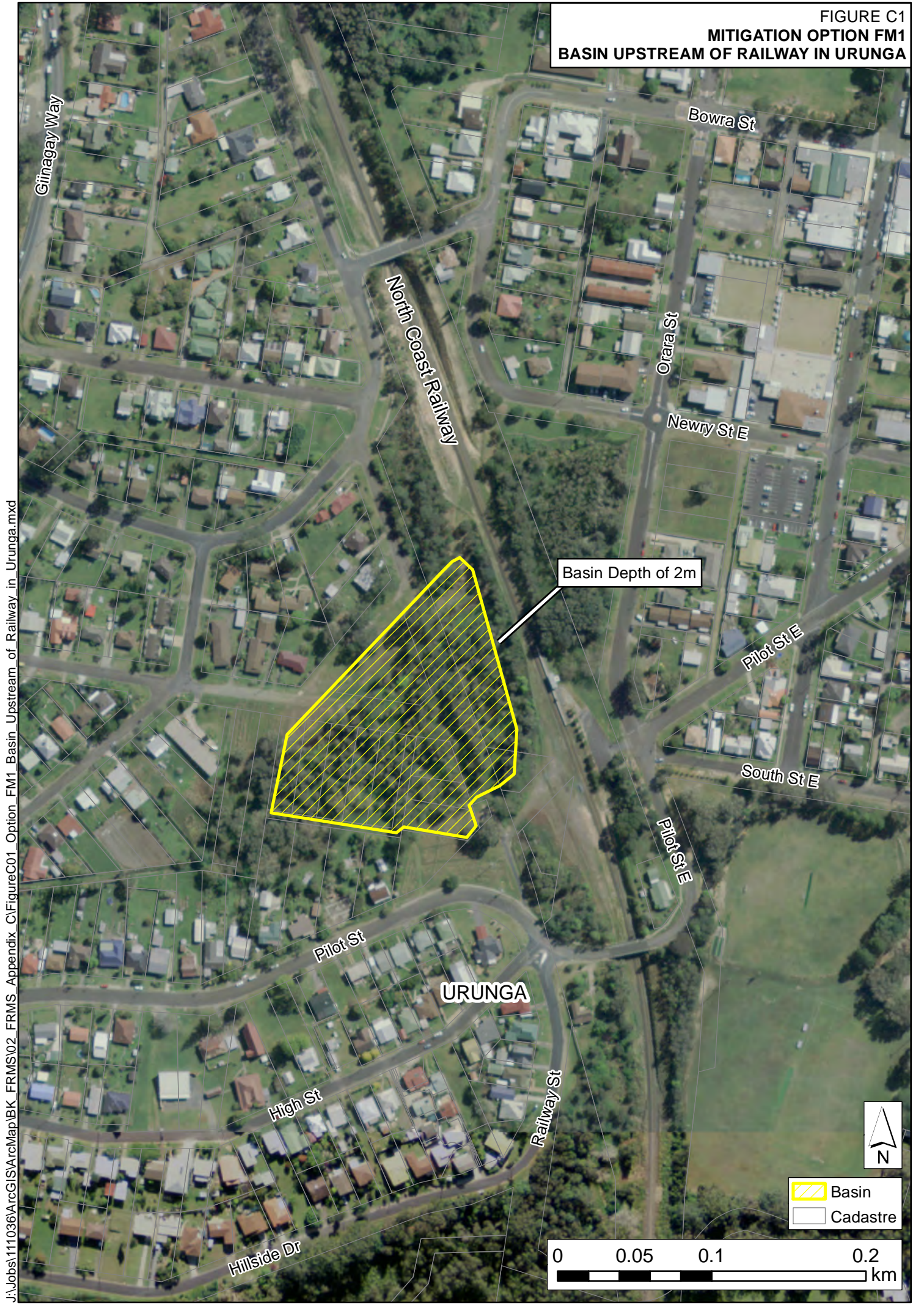


FIGURE C1
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA



J:\Jobs\111036\ArcGIS\Map\BK_FRMS02_FRMS_Appendix_C\FigureC01_Option_FM1_Basin_Upgrade_of_Railway_in_Urunge.mxd

Basin Depth of 2m


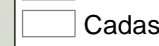




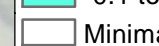
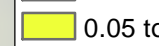




URUNGA

Basin
Cadastre

0 0.05 0.1 0.2 km

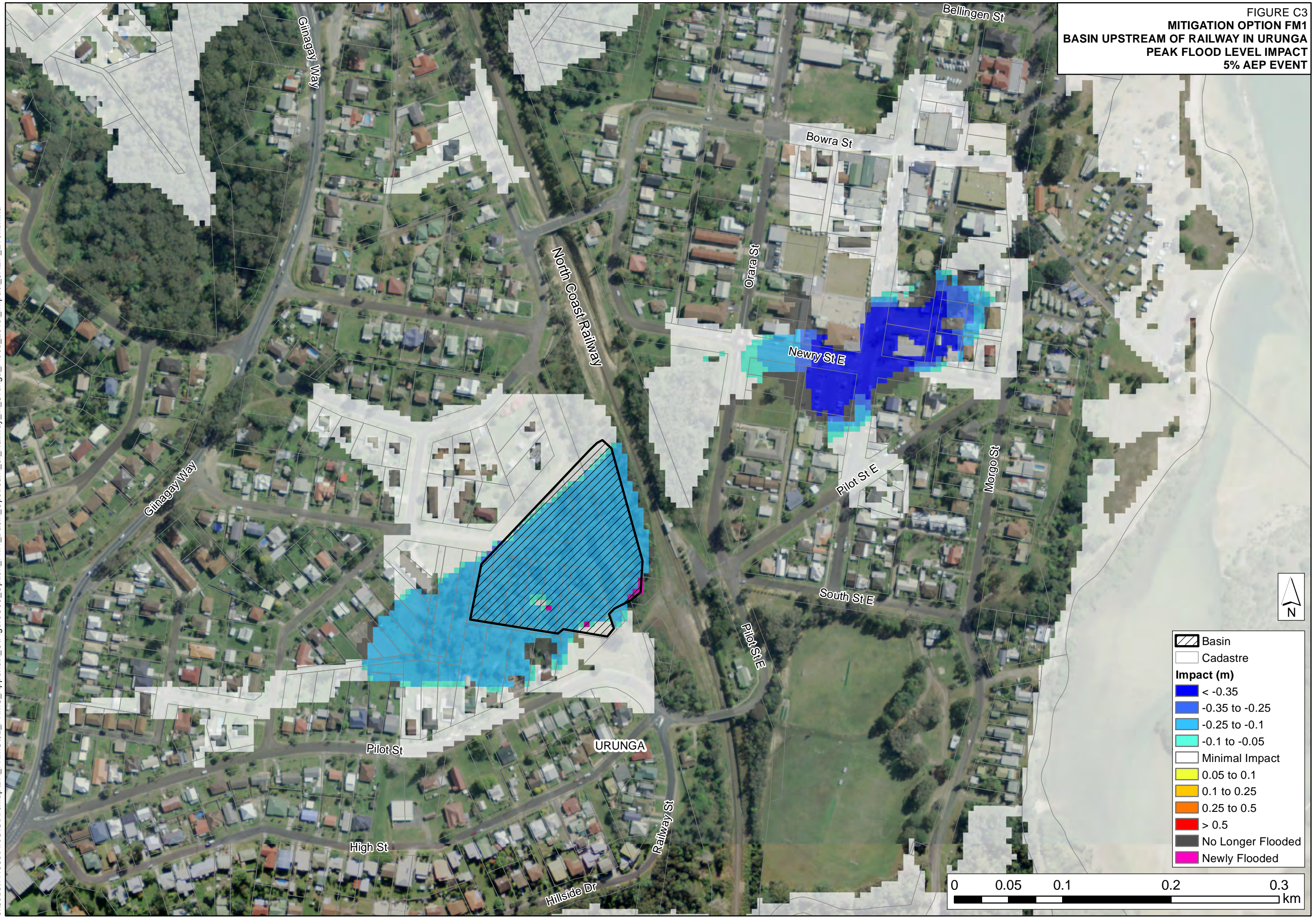
FIGURE C2
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA
PEAK FLOOD LEVEL IMPACT
5Y ARI EVENT



-  Basin
-  Cadastre
- Impact (m)**
-  <math>< -0.35</math>
-  -0.35 to -0.25
-  -0.25 to -0.1
-  -0.1 to -0.05
-  Minimal Impact
-  0.05 to 0.1
-  0.1 to 0.25
-  > 0.5
-  No Longer Flooded
-  Newly Flooded

0 0.05 0.1 0.2 0.3 km

FIGURE C3
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA
PEAK FLOOD LEVEL IMPACT
5% AEP EVENT



| | |
|-------------------|-------------------|
| | Basin |
| | Cadastre |
| Impact (m) | |
| | < -0.35 |
| | -0.35 to -0.25 |
| | -0.25 to -0.1 |
| | -0.1 to -0.05 |
| | Minimal Impact |
| | 0.05 to 0.1 |
| | 0.1 to 0.25 |
| | 0.25 to 0.5 |
| | > 0.5 |
| | No Longer Flooded |
| | Newly Flooded |

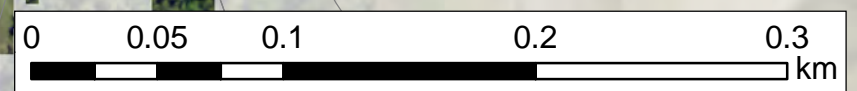


FIGURE C4
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA
PEAK FLOOD LEVEL IMPACT
1% AEP EVENT


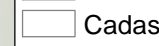




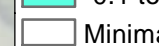
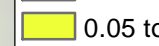






FIGURE C5
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA
PEAK FLOOD LEVEL IMPACT
0.2% AEP EVENT



FIGURE C6
MITIGATION OPTION FM1
BASIN UPSTREAM OF RAILWAY IN URUNGA
PEAK FLOOD LEVEL IMPACT
PMF EVENT



-  Basin
-  Cadastre
- Impact (m)**
-  < -0.35
-  -0.35 to -0.25
-  -0.25 to -0.1
-  -0.1 to -0.05
-  Minimal Impact
-  0.05 to 0.1
-  0.1 to 0.25
-  > 0.5
-  No Longer Flooded
-  Newly Flooded

0 0.05 0.1 0.2 0.3 km



FIGURE C7
MITIGATION OPTION FM2
RIPARIAN ZONE IN BELLINGEN

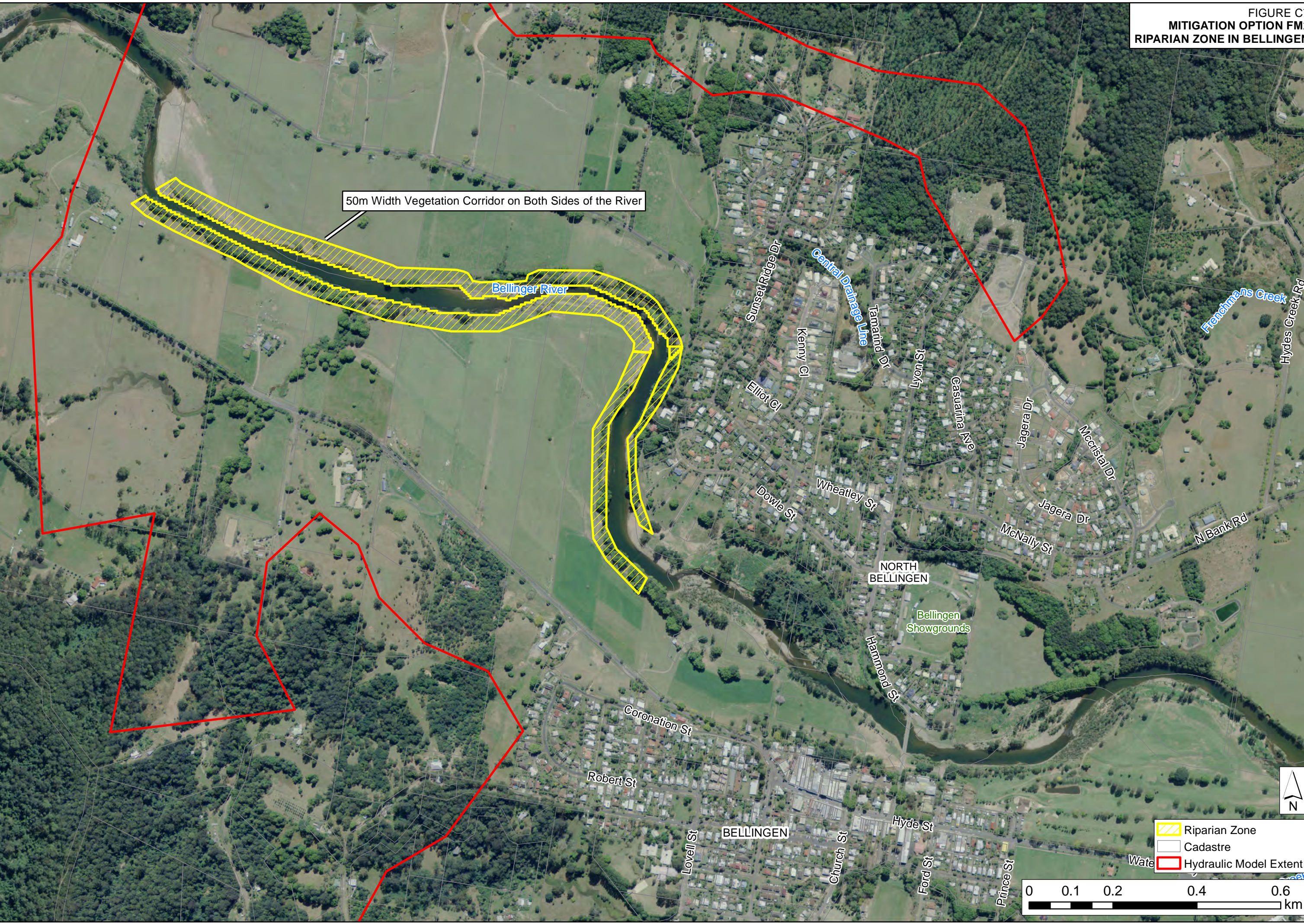
50m Width Vegetation Corridor on Both Sides of the River

Bellinger River

Central Drainage Line

Fenchmens Creek

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- Riparian Zone
- Cadastre
- Hydraulic Model Extent

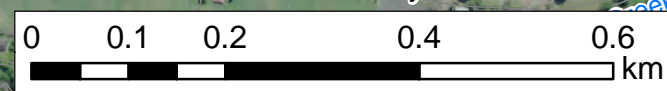
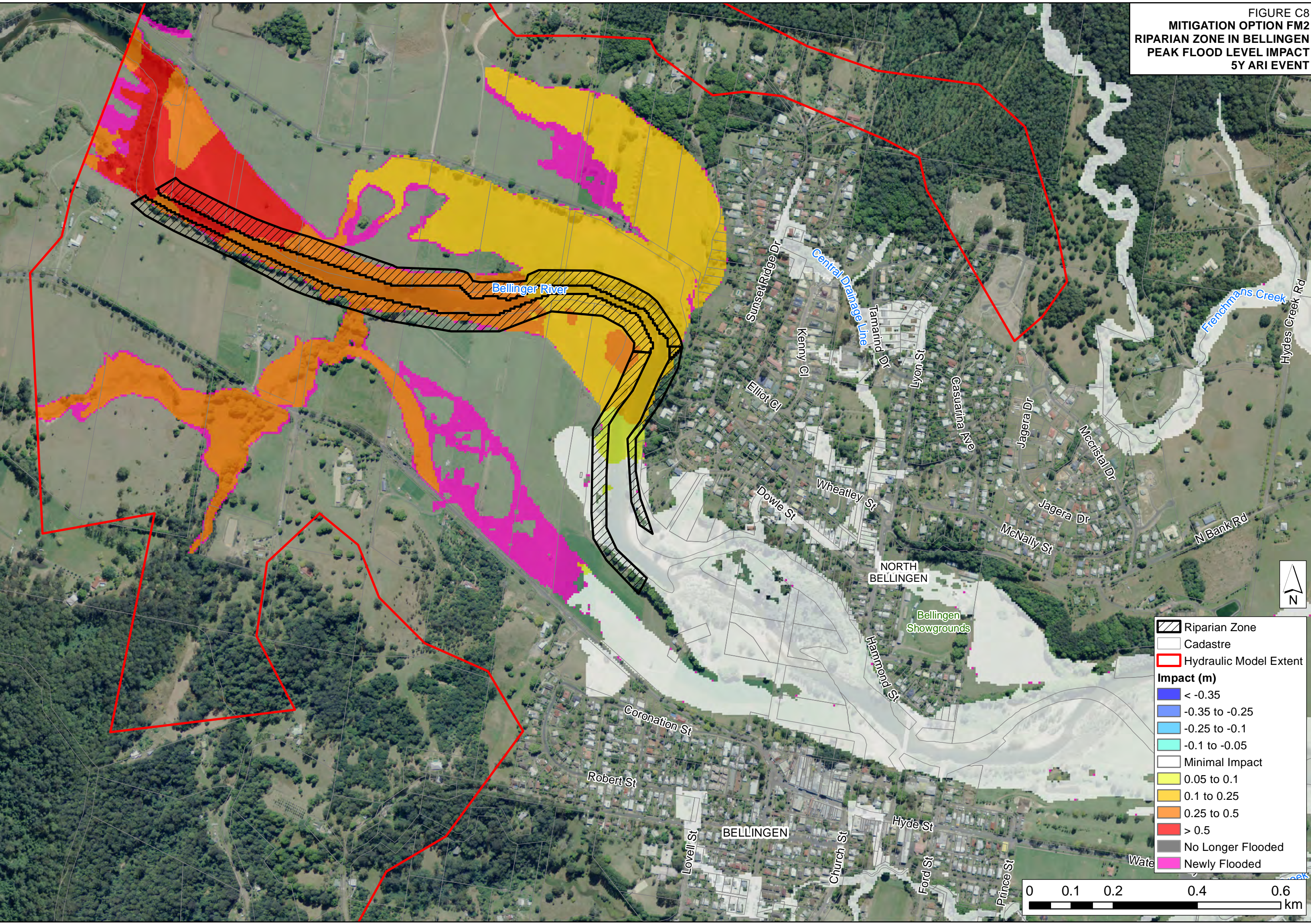


FIGURE C8
 MITIGATION OPTION FM2
 RIPARIAN ZONE IN BELLINGEN
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

J:\Jobs\111036\ArcGIS\Map\BK_FRMS\Appendix_C\FigureC08_Option_FM2_Riparian_Zone_in_Bellingeen_Flood_Level_Impact_20AEP_Event.mxd



- Riparian Zone
- Cadastre
- Hydraulic Model Extent
- Impact (m)**
- < -0.35
- 0.35 to -0.25
- 0.25 to -0.1
- 0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

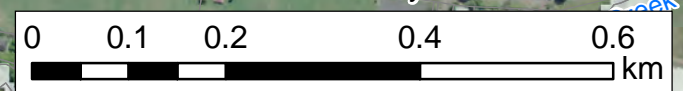
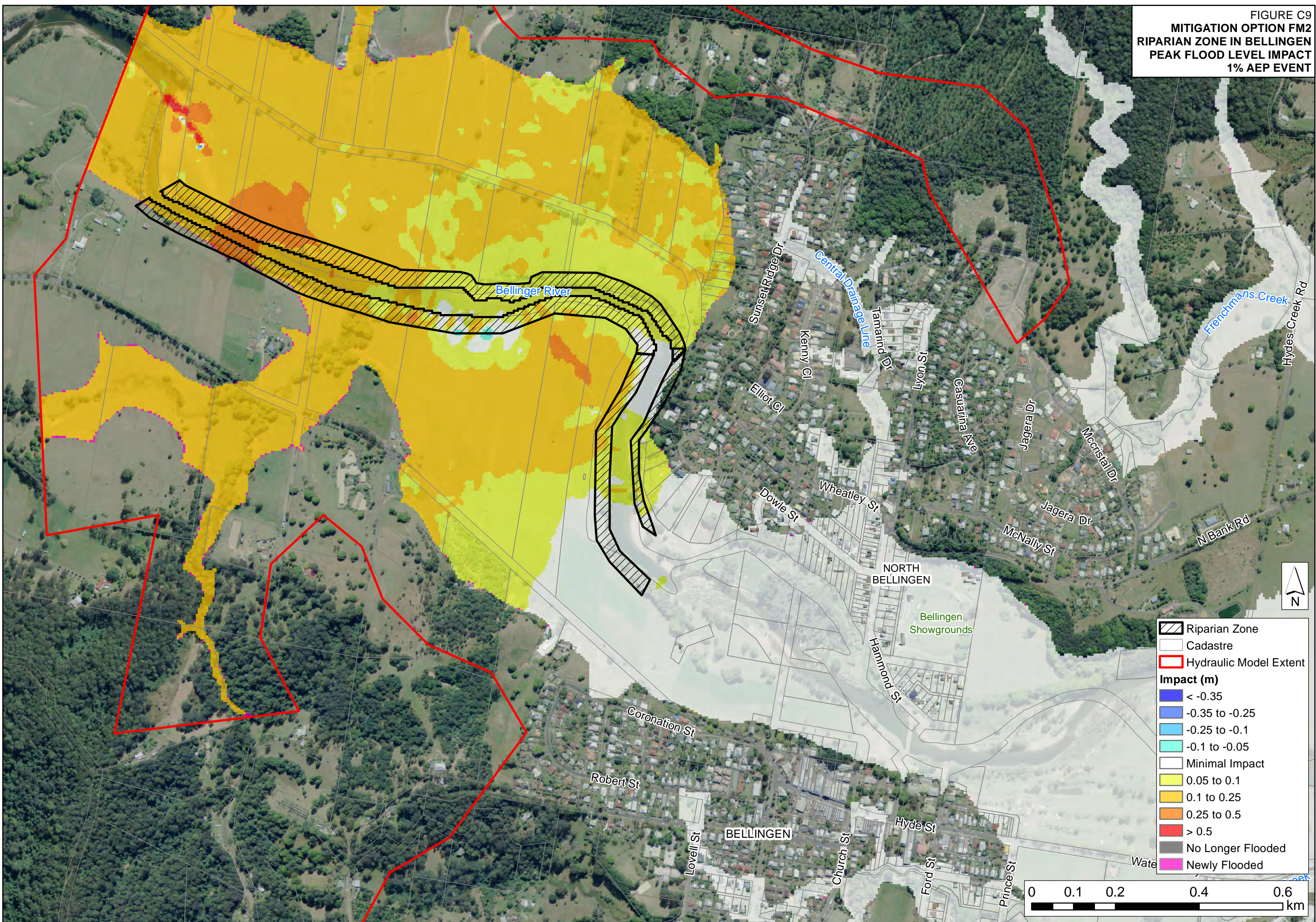


FIGURE C9
 MITIGATION OPTION FM2
 RIPARIAN ZONE IN BELLINGEN
 PEAK FLOOD LEVEL IMPACT
 1% AEP EVENT

J:\Jobs\111036\ArcGIS\Map\BK_FRMS_Appendix_C\FigureC09_Option_FM2_Riparian_Zone_in_Bellingem_Flood_Level_Impact_1AEP_Event.mxd



- Riparian Zone
- Cadastre
- Hydraulic Model Extent
- Impact (m)**
- < -0.35
- 0.35 to -0.25
- 0.25 to -0.1
- 0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

0 0.1 0.2 0.4 0.6 km

FIGURE C10
MITIGATION OPTION FM3
STORMWATER PIPE IN MORGO STREET, URUNGA



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FIGURE C11
 MITIGATION OPTION FM3
 STORMWATER PIPE IN MORGO STREET, URUNGA
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

J:\Jobs\11036\ArcGIS\Map\BK_FRMS_Appendix_C\FigureC11_Option_FM3_Stormwater_Pipe_in_Morgo_Street_Urunga_Flood_Level_Impact_5y_Event.mxd



- Option FM3 Pit
- Option FM3 Pipe
- Cadastre
- Impact (m)**
- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

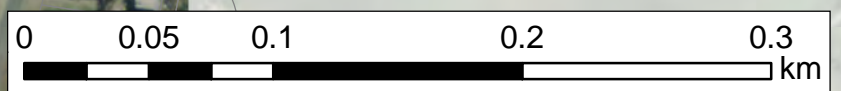


FIGURE C12
 MITIGATION OPTION FM3
 STORMWATER PIPE IN MORGO STREET, URUNGA
 PEAK FLOOD LEVEL IMPACT
 5% AEP EVENT

J:\Jobs\11036\ArcGIS\Map\BK_FRMS\Appendix_C\FigureC12_Option_FM3_Stormwater_Pipe_in_Morgo_Street_Urunga_Flood_Level_Impact_5AEP_Event.mxd



- Option FM3 Pit
- Option FM3 Pipe
- Cadastre
- Impact (m)**
- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

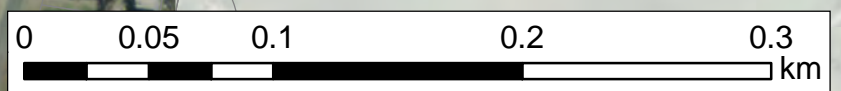


FIGURE C13
 MITIGATION OPTION FM3
 STORMWATER PIPE IN MORGO STREET, URUNGA
 PEAK FLOOD LEVEL IMPACT
 1% AEP EVENT

J:\Jobs\11036\ArcGIS\Map\BK_FRMS\Appendix_C\FigureC13_Option_FM3_Stormwater_Pipe_in_Morgo_Street_Urunga_Flood_Level_Impact_1AEP_Event.mxd



- Option FM3 Pit
- Option FM3 Pipe
- Cadastre
- Impact (m)**
- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

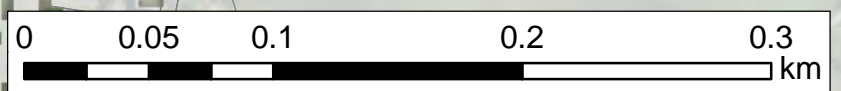
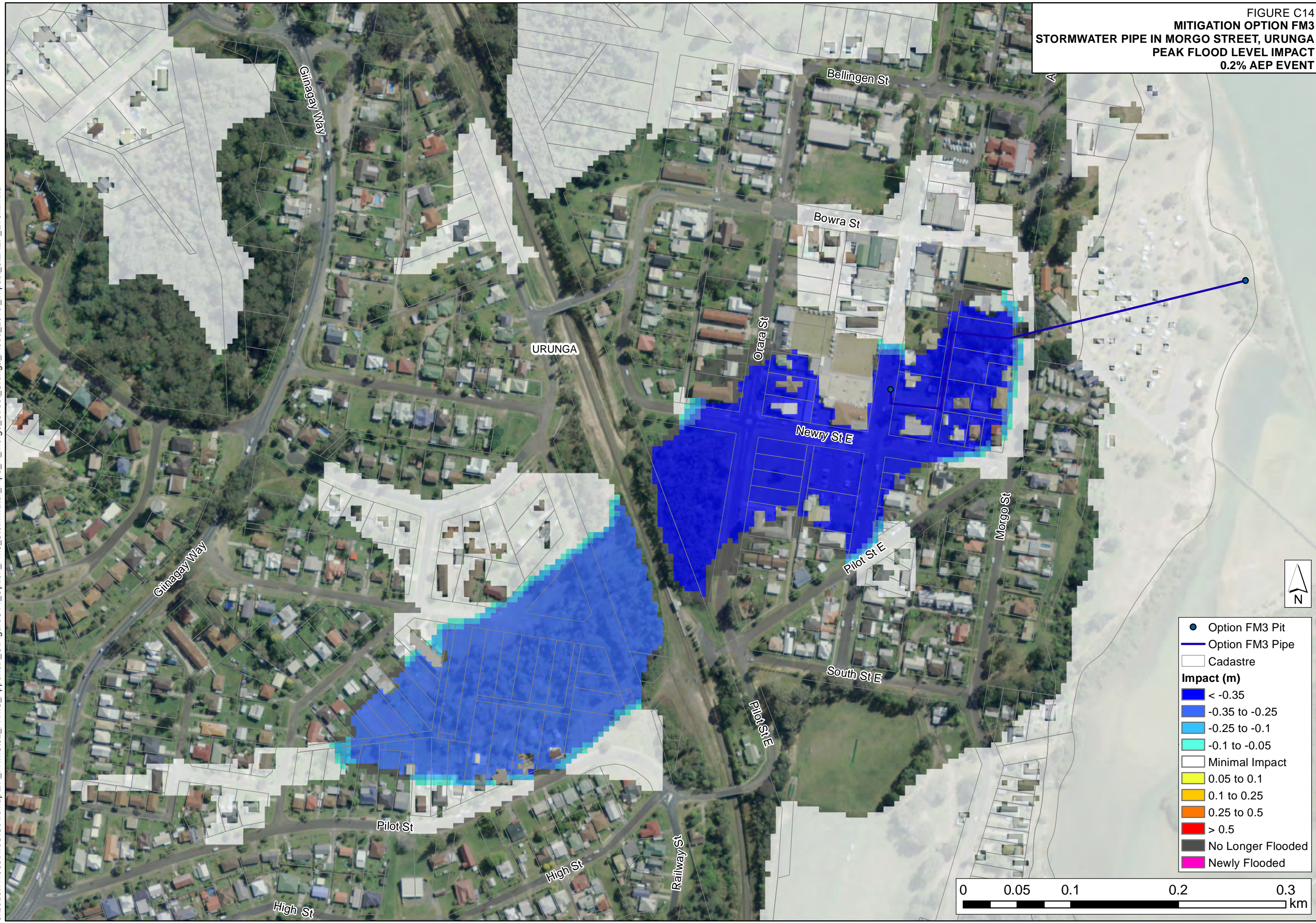


FIGURE C14
 MITIGATION OPTION FM3
 STORMWATER PIPE IN MORGO STREET, URUNGA
 PEAK FLOOD LEVEL IMPACT
 0.2% AEP EVENT

J:\Jobs\11036\ArcGIS\Map\BK_FRMS\Appendix_C\FigureC14_Option_FM3_Stormwater_Pipe_in_Morgo_Street_Urunga_Flood_Level_Impact_0.2AEP_Event.mxd



- Option FM3 Pit
 - Option FM3 Pipe
 - Cadastre
- Impact (m)**
- < -0.35
 - -0.35 to -0.25
 - -0.25 to -0.1
 - -0.1 to -0.05
 - Minimal Impact
 - 0.05 to 0.1
 - 0.1 to 0.25
 - 0.25 to 0.5
 - > 0.5
 - No Longer Flooded
 - Newly Flooded

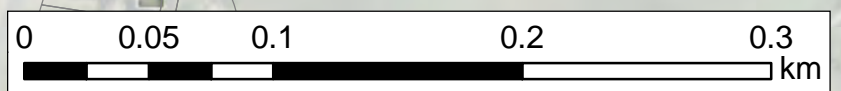


FIGURE C15
 MITIGATION OPTION FM3
 STORMWATER PIPE IN MORGO STREET, URUNGA
 PEAK FLOOD LEVEL IMPACT
 PMF EVENT

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- Option FM3 Pit
- Option FM3 Pipe
- Cadastre
- Impact (m)**
- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

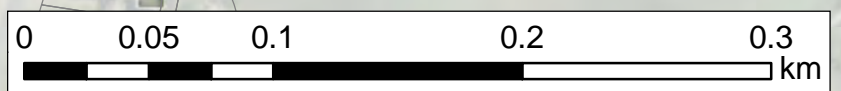


FIGURE C16
MITIGATION OPTION FM4
OPEN DRAIN IN MORGO STREET, URUNGA



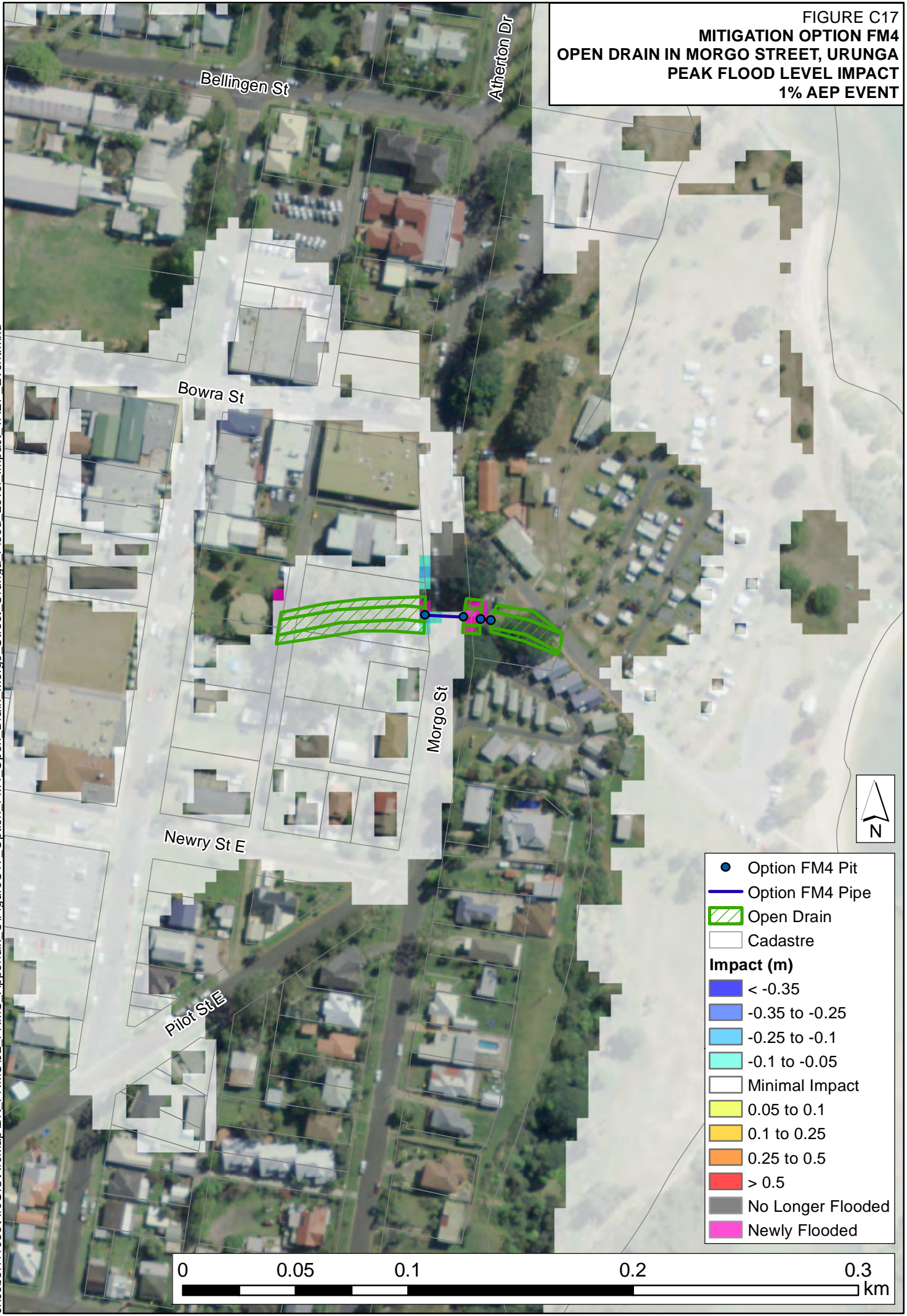
3 of 2.4m x 1.2m

- Option FM4 Pit
- Option FM4 Pipe
- ▨ Open Drain
- Cadastre



FIGURE C17
MITIGATION OPTION FM4
OPEN DRAIN IN MORGO STREET, URUNGA
PEAK FLOOD LEVEL IMPACT
1% AEP EVENT

J:\Jobs\111036\ArcGIS\Map\BK_FRMS_Appendix_C\FigureC17_Option_FM4_Open_Drain_Morgo_Street_Urunga_Flood_Level_Impact_1AEP_Event.mxd



- Option FM4 Pit
 - Option FM4 Pipe
 - ▨ Open Drain
 - Cadastre
- Impact (m)**
- <math>< -0.35</math>
 - -0.35 to -0.25
 - -0.25 to -0.1
 - -0.1 to -0.05
 - Minimal Impact
 - 0.05 to 0.1
 - 0.1 to 0.25
 - 0.25 to 0.5
 - > 0.5
 - No Longer Flooded
 - Newly Flooded

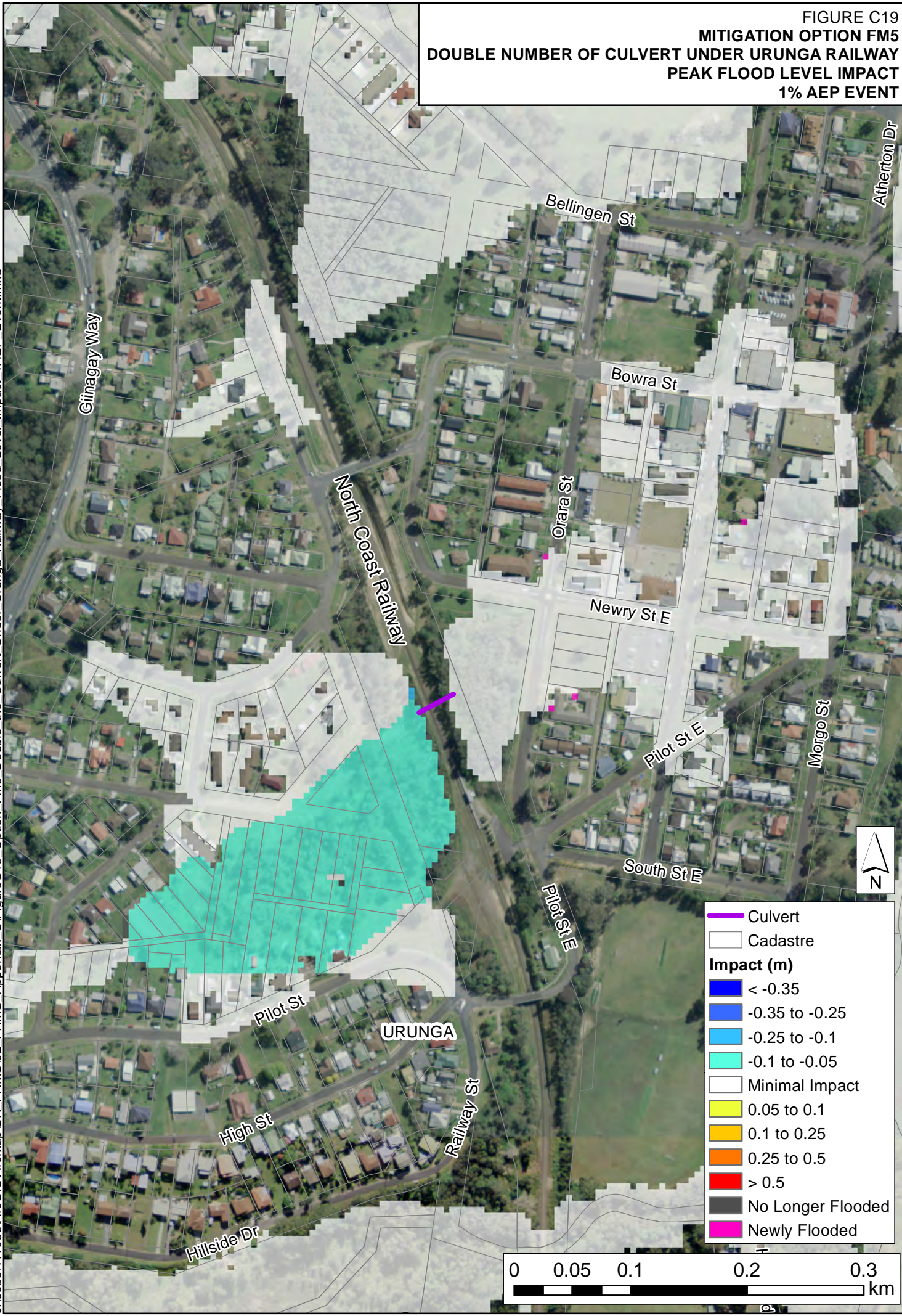
0 0.05 0.1 0.2 0.3 km

FIGURE C18
MITIGATION OPTION FM18
DOUBLE NUMBER OF CULVERT UNDER URUNGA RAILWAY



FIGURE C19
 MITIGATION OPTION FM5
 DOUBLE NUMBER OF CULVERT UNDER URUNGA RAILWAY
 PEAK FLOOD LEVEL IMPACT
 1% AEP EVENT

J:\Jobs\111036\ArcGIS\Map\BK FRMS02 FRMS Appendix C\FigureC19 Option FM5 Double the Culvert Under Urunga Railway Flood Level Impact 1AEP Event.mxd



| | |
|-------------------|-------------------|
| | Culvert |
| | Cadastre |
| Impact (m) | |
| | < -0.35 |
| | -0.35 to -0.25 |
| | -0.25 to -0.1 |
| | -0.1 to -0.05 |
| | Minimal Impact |
| | 0.05 to 0.1 |
| | 0.1 to 0.25 |
| | 0.25 to 0.5 |
| | > 0.5 |
| | No Longer Flooded |
| | Newly Flooded |

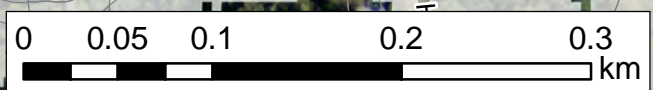


FIGURE C20
MITIGATION OPTION PM1
RAISE LAVENDERS BRIDGE TO 2Y ARI LEVEL



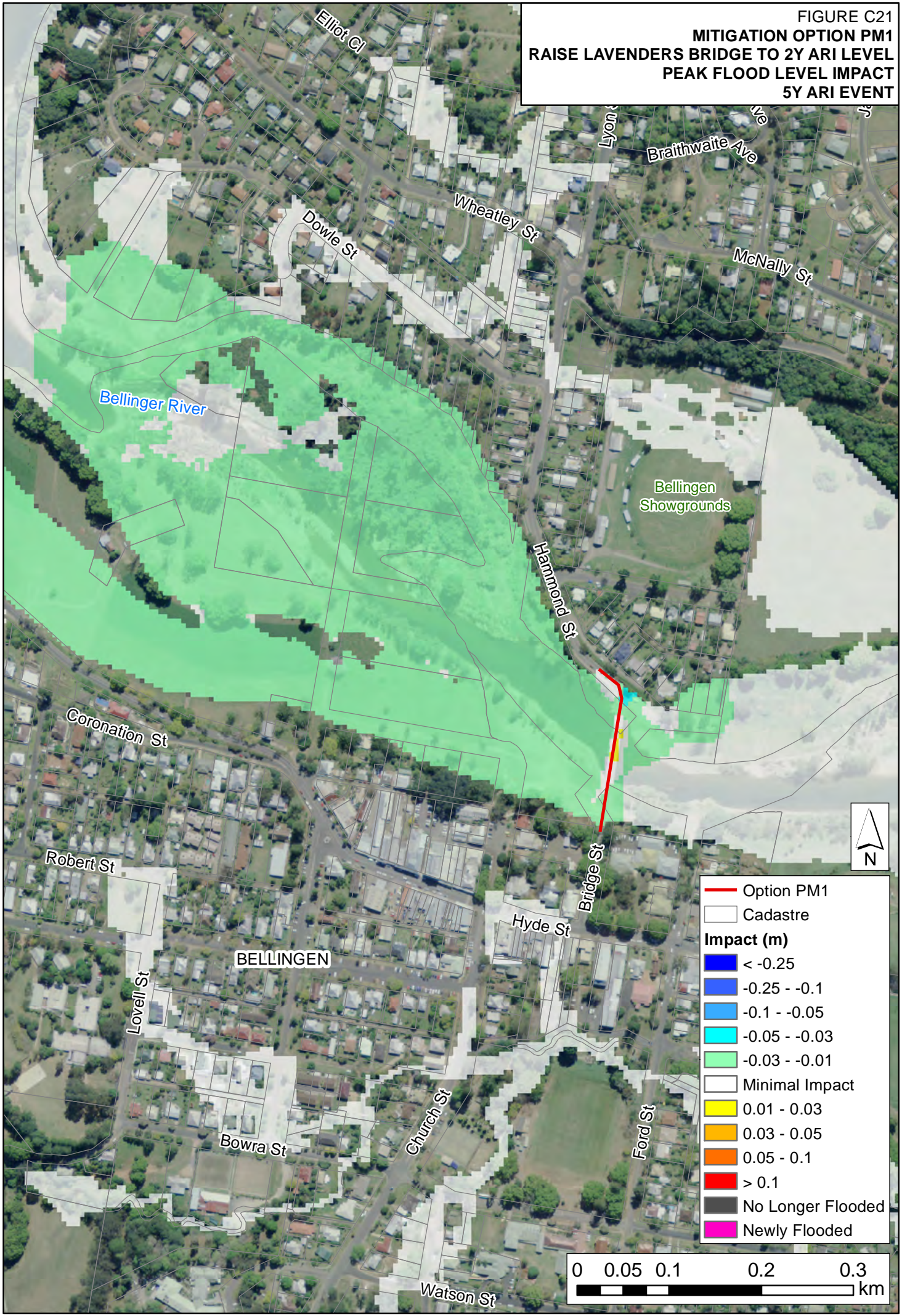
Raise Lavenders Bridge to 2Y ARI Level = 6.6 mAHD

Option PM1
Cadastre

0 0.05 0.1 0.2 0.3 km

FIGURE C21
 MITIGATION OPTION PM1
 RAISE LAVENDERS BRIDGE TO 2Y ARI LEVEL
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

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| | |
|-------------------|-------------------|
| | Option PM1 |
| | Cadastre |
| Impact (m) | |
| | < -0.25 |
| | -0.25 - -0.1 |
| | -0.1 - -0.05 |
| | -0.05 - -0.03 |
| | -0.03 - -0.01 |
| | Minimal Impact |
| | 0.01 - 0.03 |
| | 0.03 - 0.05 |
| | 0.05 - 0.1 |
| | > 0.1 |
| | No Longer Flooded |
| | Newly Flooded |

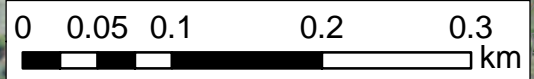
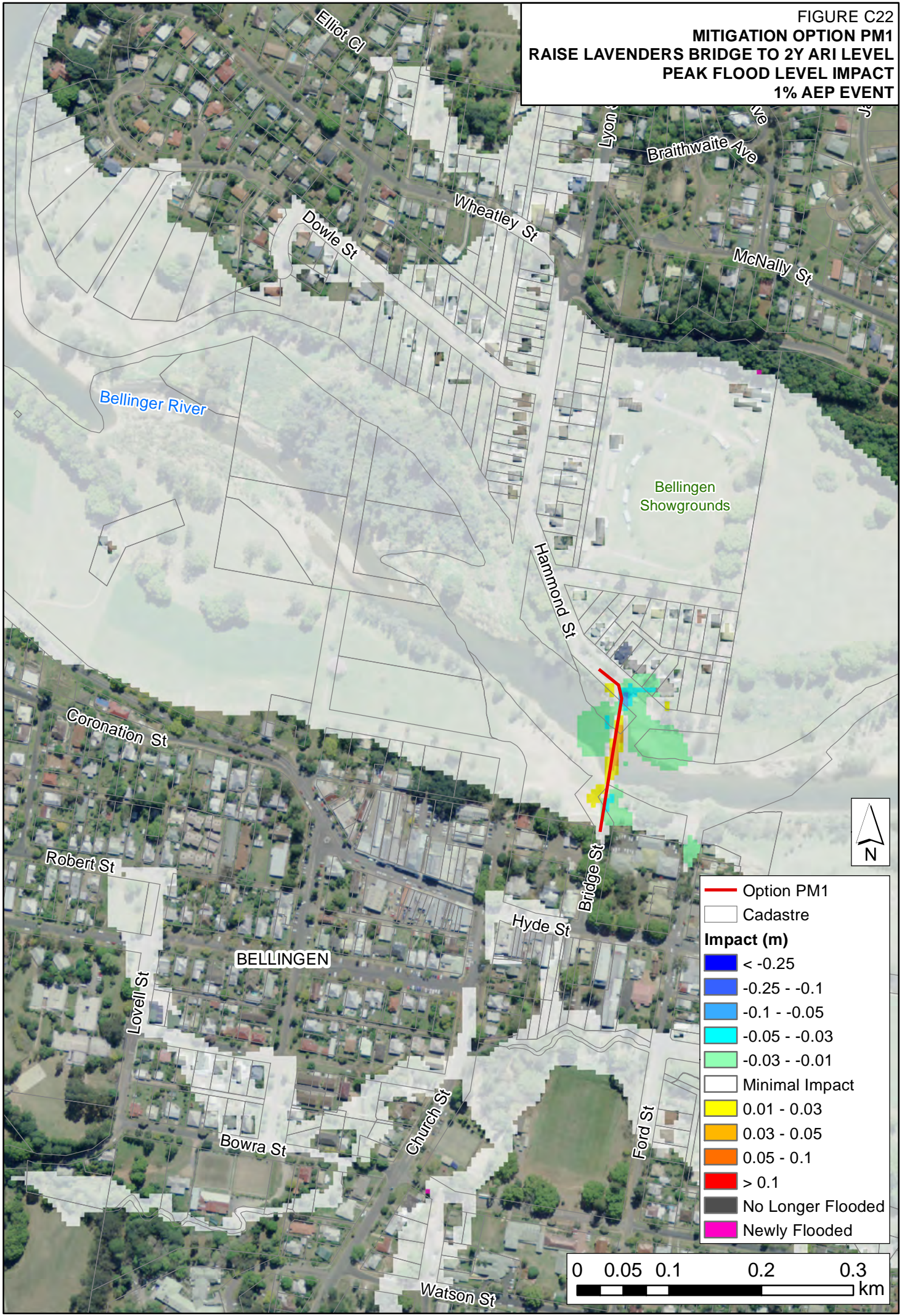


FIGURE C22
 MITIGATION OPTION PM1
 RAISE LAVENDERS BRIDGE TO 2Y ARI LEVEL
 PEAK FLOOD LEVEL IMPACT
 1% AEP EVENT

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— Option PM1
 □ Cadastre

Impact (m)

- < -0.25
- -0.25 - -0.1
- -0.1 - -0.05
- -0.05 - -0.03
- -0.03 - -0.01
- Minimal Impact
- 0.01 - 0.03
- 0.03 - 0.05
- 0.05 - 0.1
- > 0.1
- No Longer Flooded
- Newly Flooded

0 0.05 0.1 0.2 0.3 km

FIGURE C23
MITIGATION OPTION PM2
RAISE LAVENDERS BRIDGE TO 5Y ARI LEVEL



Raise Lavenders Bridge to 5Y ARI Level = 7.76 mAHD

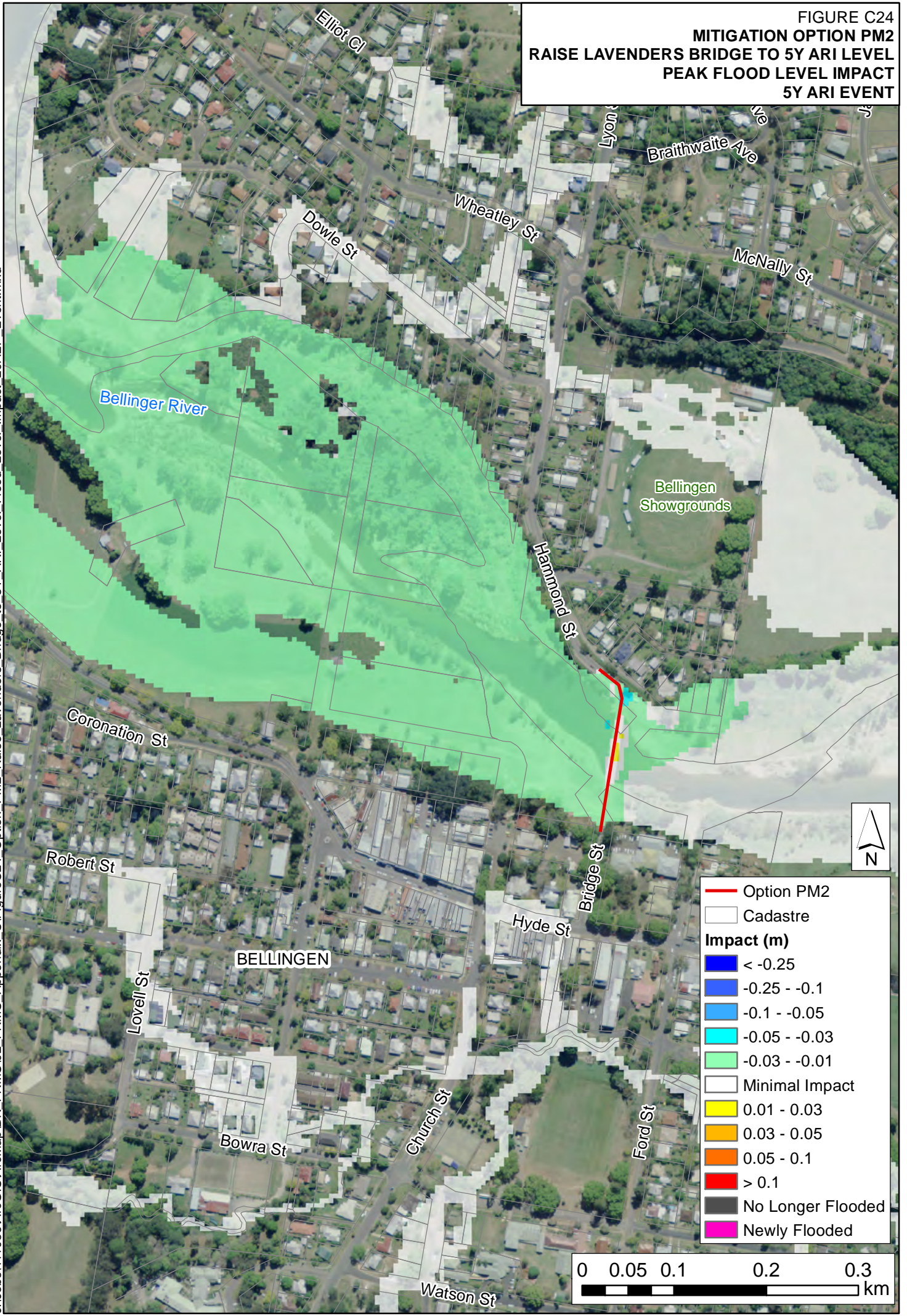
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Option PM2
Cadastre

0 0.05 0.1 0.2 0.3 km

FIGURE C24
 MITIGATION OPTION PM2
 RAISE LAVENDERS BRIDGE TO 5Y ARI LEVEL
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

J:\Jobs\111036\ArcGIS\Map\BK FRMS02 FRMS Appendix C\FigureC24 Option PM2 Raise Lavenders Bridge to 5Y ARI Level Flood Level Impact 20AEP_Event.mxd

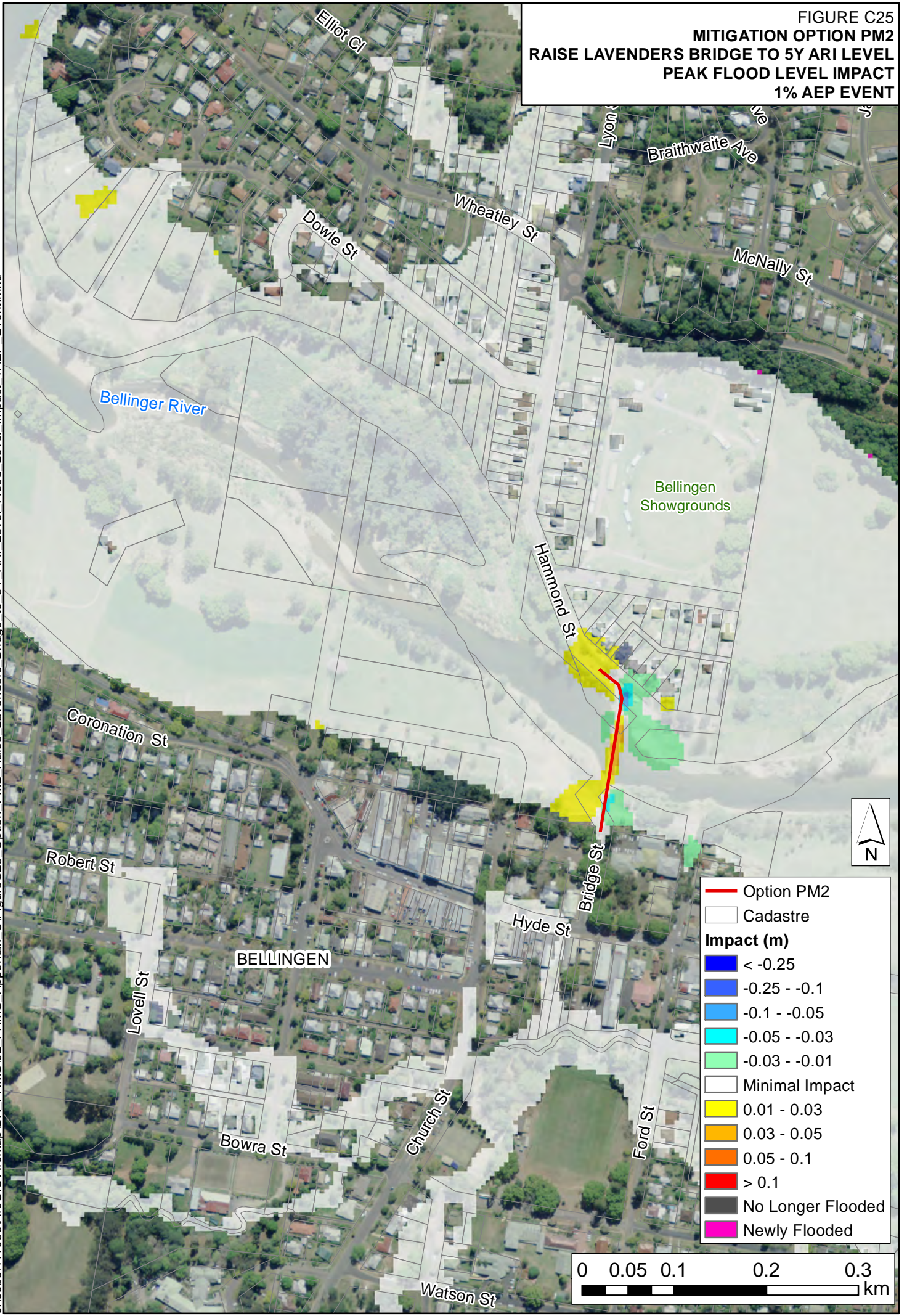


| | |
|-------------------|-------------------|
| | Option PM2 |
| | Cadastre |
| Impact (m) | |
| | < -0.25 |
| | -0.25 - -0.1 |
| | -0.1 - -0.05 |
| | -0.05 - -0.03 |
| | -0.03 - -0.01 |
| | Minimal Impact |
| | 0.01 - 0.03 |
| | 0.03 - 0.05 |
| | 0.05 - 0.1 |
| | > 0.1 |
| | No Longer Flooded |
| | Newly Flooded |



FIGURE C25
MITIGATION OPTION PM2
RAISE LAVENDERS BRIDGE TO 5Y ARI LEVEL
PEAK FLOOD LEVEL IMPACT
1% AEP EVENT

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| | |
|-------------------|-------------------|
| | Option PM2 |
| | Cadastre |
| Impact (m) | |
| | < -0.25 |
| | -0.25 - -0.1 |
| | -0.1 - -0.05 |
| | -0.05 - -0.03 |
| | -0.03 - -0.01 |
| | Minimal Impact |
| | 0.01 - 0.03 |
| | 0.03 - 0.05 |
| | 0.05 - 0.1 |
| | > 0.1 |
| | No Longer Flooded |
| | Newly Flooded |



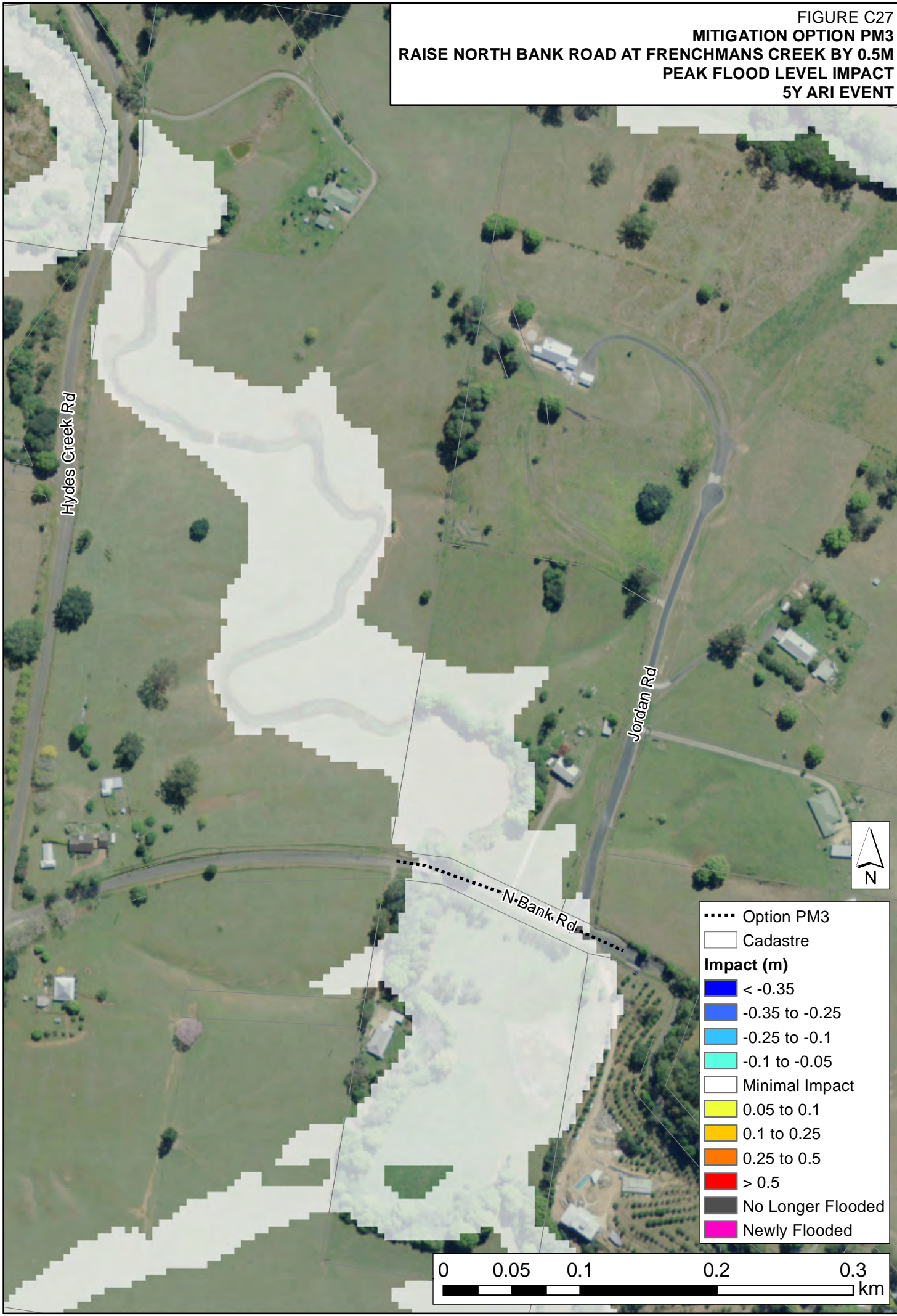
FIGURE C26
MITIGATION OPTION PM3
RAISE NORTH BANK ROAD AT FRENCHMANS CREEK BY 0.5M

J:\Jobs\111036\ArcGIS\Map\BK_FRMS_Appendix_C\FigureC26_Option_PM3_Raise_North_Bank_Road_at_Frenchmans_Creek_by_0.5m.mxd



FIGURE C27
 MITIGATION OPTION PM3
 RAISE NORTH BANK ROAD AT FRENCHMANS CREEK BY 0.5M
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

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- Option PM3
- Cadastre
- Impact (m)**
- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

0 0.05 0.1 0.2 0.3 km



FIGURE C28
MITIGATION OPTION FM4
RAISE NORTH BANK ROAD AT FRENCHMANS CREEK TO 5Y ARI LEVEL

J:\Jobs\111036\ArcGIS\Map\BK_FRMS102_FRMS_Appendix_C\FigureC28_Option_PM4_Raise_North_Bank_Road_at_Frenchmans_Creek_to_5Y_ARI_Level.mxd



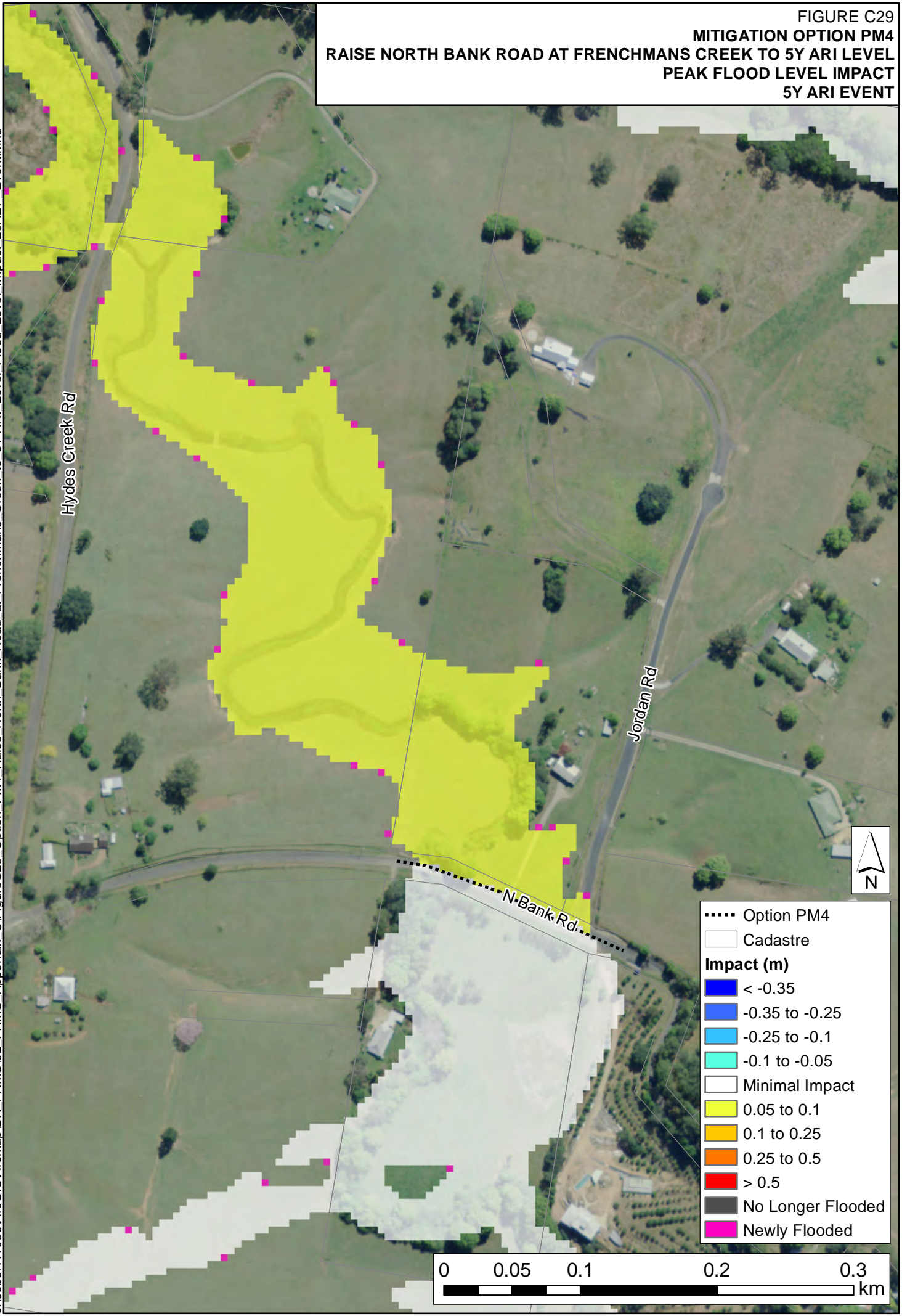
Road Raised to 5Y ARI Level

- Option FM4
- Cadastrate



FIGURE C29
 MITIGATION OPTION PM4
 RAISE NORTH BANK ROAD AT FRENCHMANS CREEK TO 5Y ARI LEVEL
 PEAK FLOOD LEVEL IMPACT
 5Y ARI EVENT

J:\Jobs\111036\ArcGIS\Map\BK_FRMS102_FRMS_Appendix_C\FigureC29_Option_PM4_Raise_North_Bank_Road_at_Frenchmans_Creek_to_5Y-ARI_Level_Flood_Level_Impact_20AEP_Event.mxd



..... Option PM4

□ Cadastre

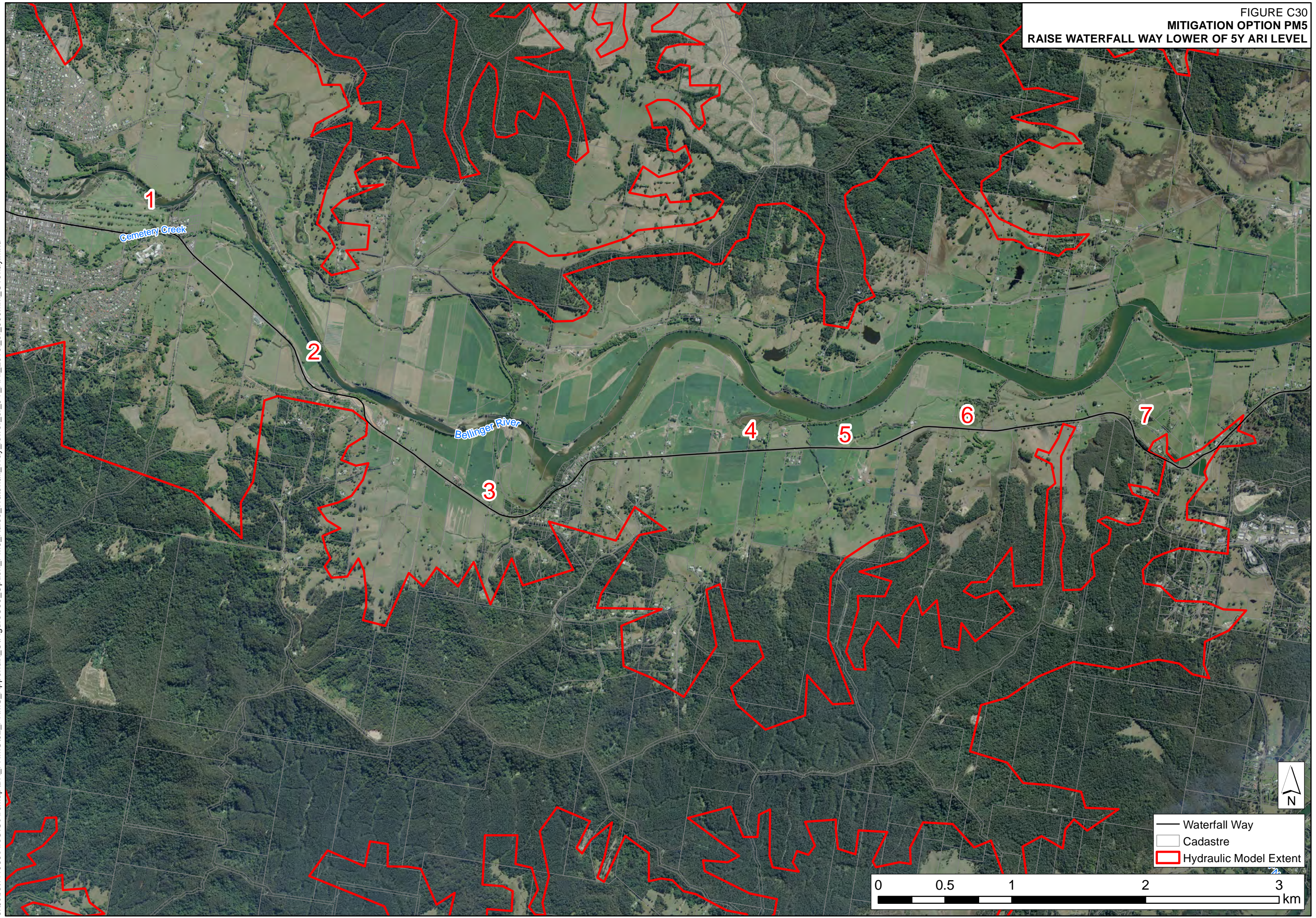
Impact (m)

- < -0.35
- -0.35 to -0.25
- -0.25 to -0.1
- -0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded



FIGURE C30
MITIGATION OPTION PM5
RAISE WATERFALL WAY LOWER OF 5Y ARI LEVEL

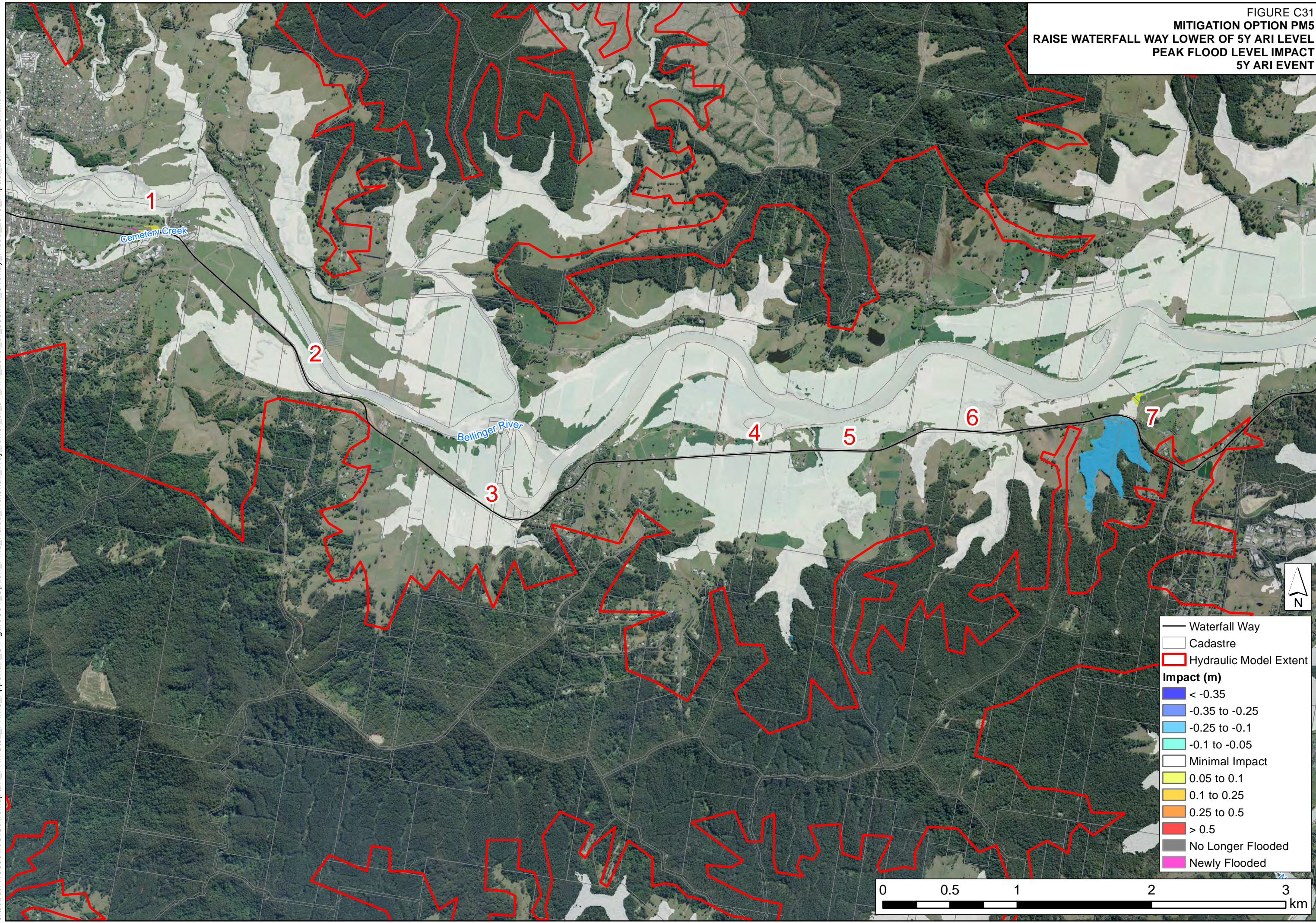
J:\Jobs\11036\ArcGIS\ArcMap\IBK_FRMS_Appendix_C\FigureC30_Option_PM5_Raise_Waterfall_Way_lower_of_5Y_ARI_Level_of_500mm_Overlay.mxd



- Waterfall Way
- Cadastre
- Hydraulic Model Extent



FIGURE C31
MITIGATION OPTION PM5
RAISE WATERFALL WAY LOWER OF 5Y ARI LEVEL
PEAK FLOOD LEVEL IMPACT
5Y ARI EVENT



- Waterfall Way
- Cadastre
- Hydraulic Model Extent
- Impact (m)**
- < -0.35
- 0.35 to -0.25
- 0.25 to -0.1
- 0.1 to -0.05
- Minimal Impact
- 0.05 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- No Longer Flooded
- Newly Flooded

