APPENDIX D

APPENDIX D

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Further Information
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DISCLAIMER

APPENDIX D: MODELLING QUALITY REPORT

BMT WBM

Technical Note

From:	Anne Kolega	To:	Moreton Bay Regional Council
Date:	25 October 2012	CC:	
Subject:	Modelling Quality Report; Burpengary Creek		

1 Background

As part of Moreton Bay Regional Council's (MBRC) Regional Floodplain Database (RFD) project, a detailed TUFLOW model of the Burpengary Creek catchment has been developed. This technical note has been prepared to demonstrate that the model performance is suitable for the intended use and that the sensibility of the results has been checked.

2 Model Development Process

The following procedure has been implemented in the development of the model:

1 Most of the model structures were surveyed as part of this study, thus the reliability of the structure data is high (some culverts were based on drawings). This approach ensured that sufficient data was captured for the level of accuracy required from the model;

2 The model was calibrated against three events to assess model performance against historic events; during calibration Council surveyed the locations of the gauge sensors;

3 A final model was developed and used to simulate all the design and sensitivity events;

4 Council reviewed the Stage 1 model and provided additional data for new developments and culverts for inclusion in the updated model; and

5 Further checking was undertaken to ensure that the model was suitable for simulating the full range of flood events.

Throughout model development, model stability, warnings messages and mass errors were monitored to ensure that the model performance was acceptable. Careful attention was provided to ensuring that flow through the 1D structure elements in the model was stable, as well as flow across the floodplain in the 2D domain.

3 Additional Amendments

Additional amendments were necessary for simulating the extreme events. The extent of the active 2D domain was further extended to ensure that the PMF flows were fully captured.

4 Model Performance

The following model performance checks have been undertaken:

- Stability of flow through key structures (e.g. Figure 1) was checked during model development. The arrangement of SX connections, structures and embankments has been edited to ensure that stable peak flows have been achieved where necessary;
- Stability of overland flow hydrographs were checked at several locations in the floodplain; (e.g. Figure 1);

- TUFLOW warning messages have been minimised. A few negative depth warning messages remain in parts of the catchment. But these are localised and limited to short time periods in the overall simulation; and
- Mass balance errors have been minimised. Mass balance errors are within 0.2% for all design and sensitivity analysis events; except for the PMF event with a mass balance error of up to 0.7%.

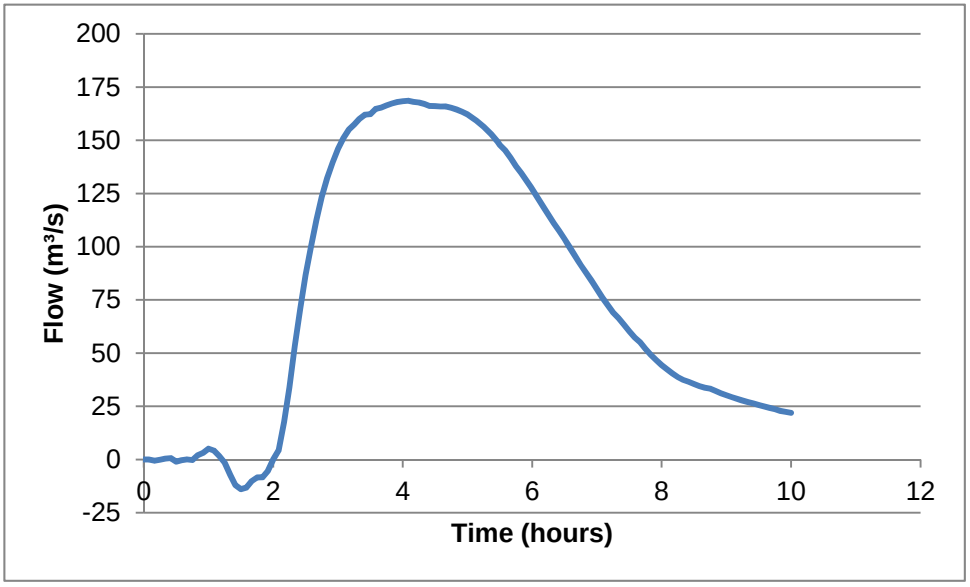


Figure 1: Flow through Bridge (ID: BUR_01_16524) at O'Brien Road, Burpengary (100 year ARI; 3 hour storm duration)

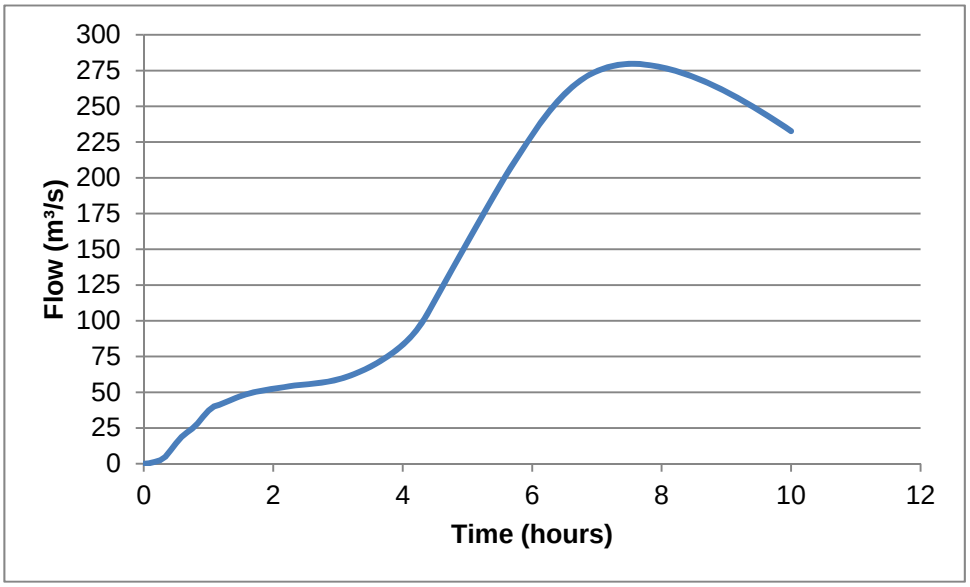


Figure 2: Overland Flow Hydrograph at the Downstream End near the mouth of Burpengary Creek (100 year ARI; 3 hour storm duration)

5 Conclusion

The Burpengary Creek model has been developed with due consideration given to ensuring the quality of the model. The model has been reviewed internally and externally by MBRC. Amendments have been made in light of these reviews, and the overall model performance is suitable for the intended use of the model.

APPENDIX E

APPENDIX E: FLOOD MAPS – 100 YEAR ARI

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Moorina Rd
Franz Rd
Oakey Flat Rd
Rowley Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Pioneer Dve
Callaghan Rd
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
O Brien Rd
Halston Rd
Uhlmann Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd

0.82 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
100 Year ARI Peak Flood Level (m AHD)

LEGEND

- Burpengary Creek Catchment Boundary
- Contour Line [Labelled with 100 Year ARI Peak Flood Level (m AHD)]
- Cadastral Boundaries

Title:

Peak Flood Level Map - 100 Year ARI

Figure: E-1

Rev: A

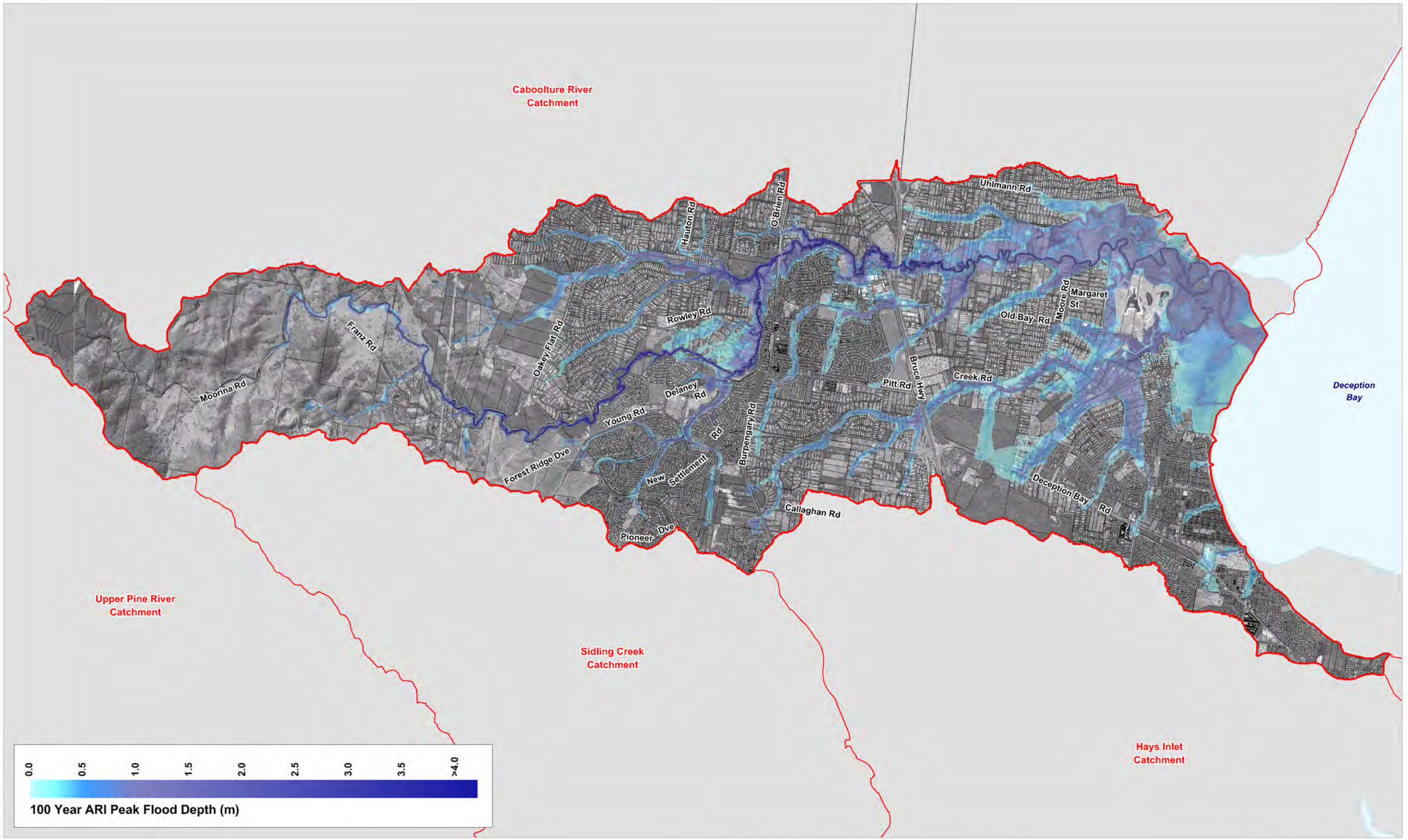
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_013_121030_Peak Flood Level.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Title:

Peak Flood Depth Map - 100 Year ARI

Figure: E-2

Rev: A

N

0km 1.5 3

Approx. Scale

BMT WBM

www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_014_121030_Peak Flood Depth.wor

Caboolture River Catchment

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Franz Rd
Oakey Flat Rd
Moorina Rd
Young Rd
Delaney Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd
Callaghan Rd
Pioneer Dve

Deception Bay

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

0.0 0.5 1.0 1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5 >6.0

100 Year ARI Peak Flood Velocity (m/s)

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Title:

Peak Flood Velocity Map - 100 Year ARI

Figure: **E-3**

Rev: **B**

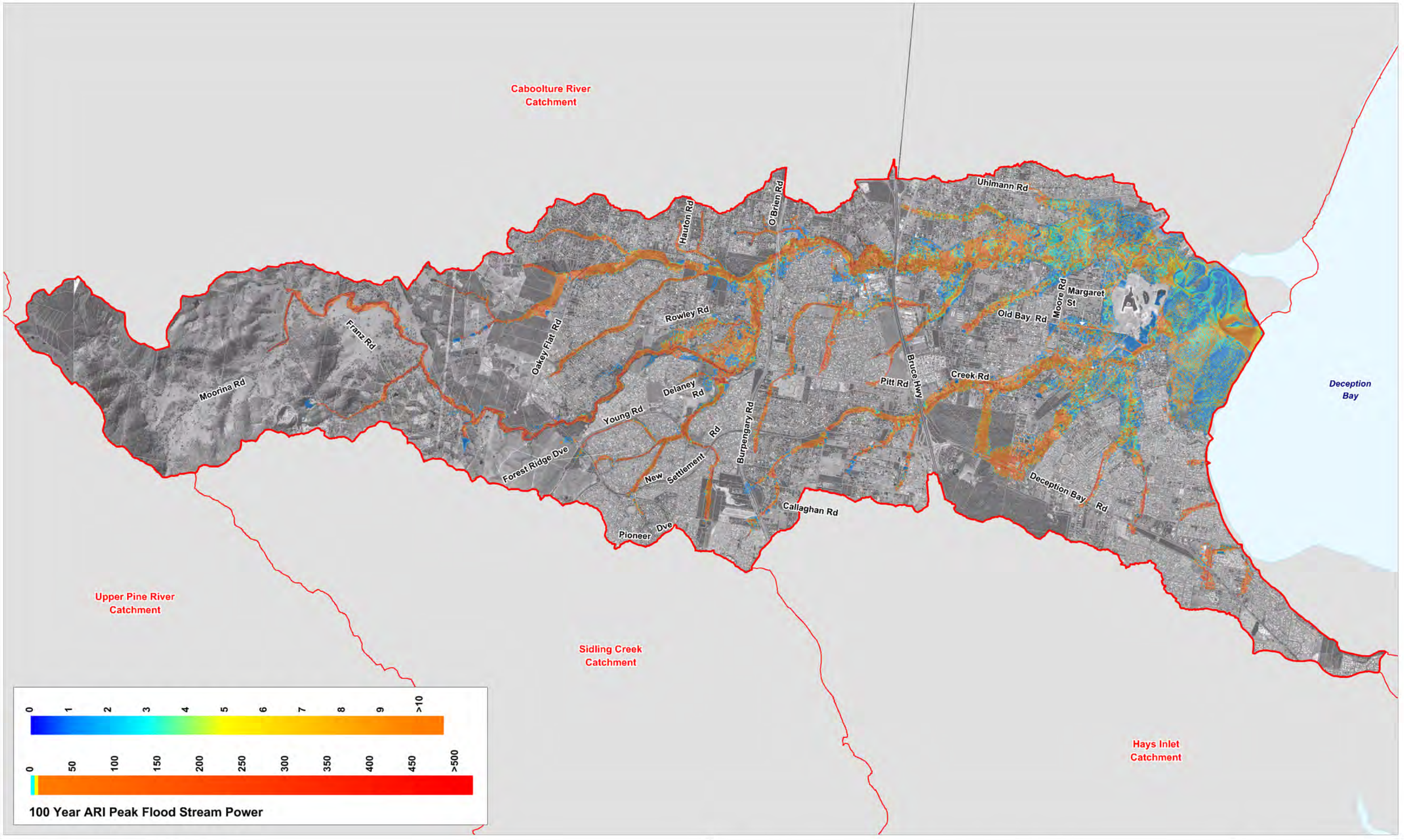
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_015_121030_Peak Flood Velocity.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Note:
Stream power is a function of velocity and bed shear stress.

Title:
Peak Flood Stream Power Map - 100 Year ARI

Figure: **E-4**

Rev: **B**

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_016_121030_Peak Flood SP.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
Hauton Rd
O'Brien Rd
Rowley Rd
Franz Rd
Oakey Flat Rd
Moorina Rd
Young Rd
Delaney Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Pioneer Dve
Callaghan Rd
Pitt Rd
Bruce Hwy
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

New South Wales Floodplain Development Manual Flood Hazard Category
100 Year ARI Event

Low Hazard
High Hazard

Title:

Peak Flood Hazard Map - 100 Year ARI

Figure: **E-5**

Rev: **B**

N

0km 1.5 3

Approx. Scale

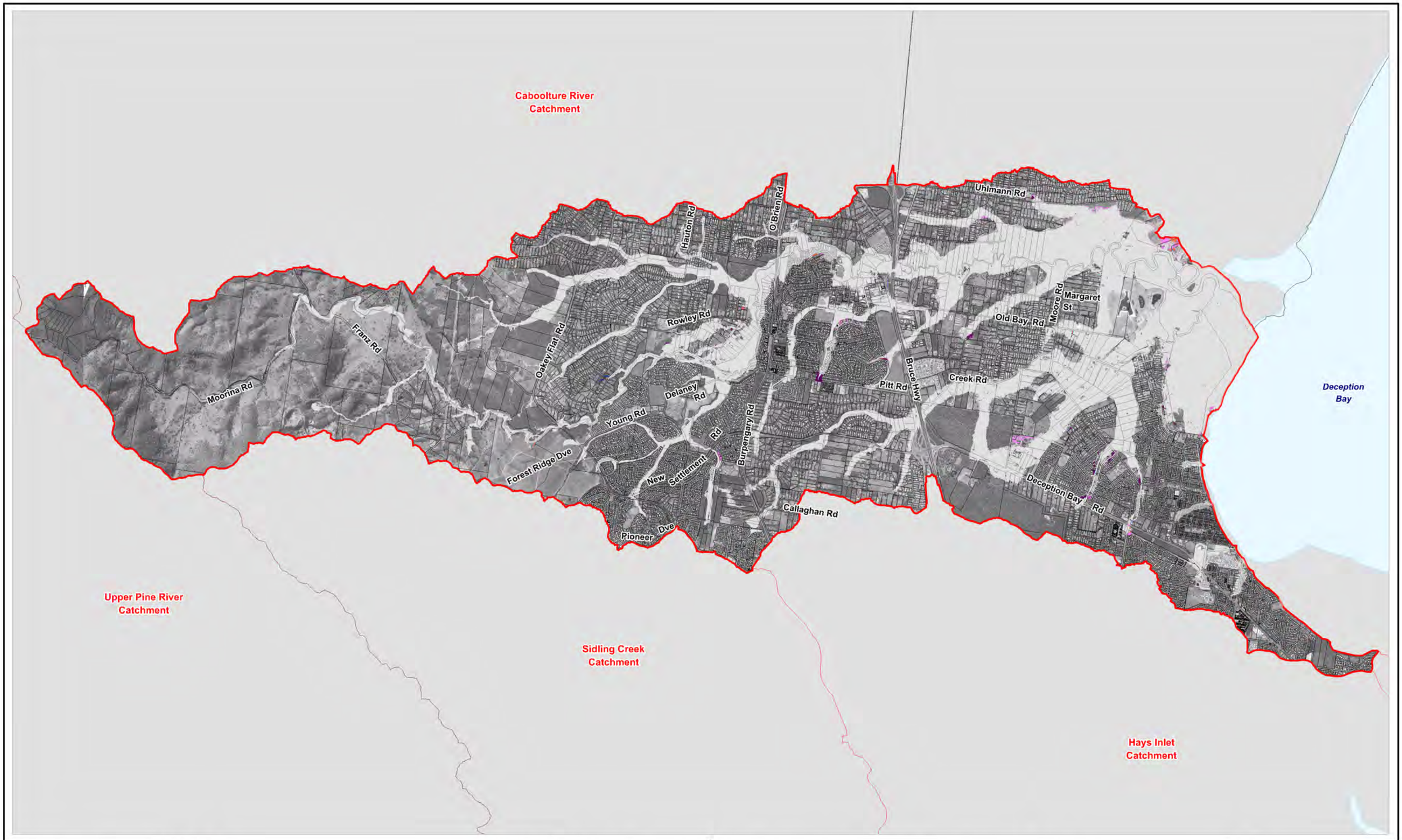
BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_017_121030_Peak Flood Z1.wor

APPENDIX F

APPENDIX F

APPENDIX F: MODEL SENSITIVITY ANALYSIS MAPS



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

100 Year EDS Minus 100 Year 1 Hour, 3 Hour and 6 Hour Storm

Figure: F-1

Rev: A

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_018_121030_Flood_Level_Comp_S1.wor

Caboolture River Catchment

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Pioneer Dve
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Callaghan Rd
Deception Bay Rd

Deception Bay

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Roughness Scenario (S2) Minus 100 Year EDS

Figure: **F-2**

Rev: **A**

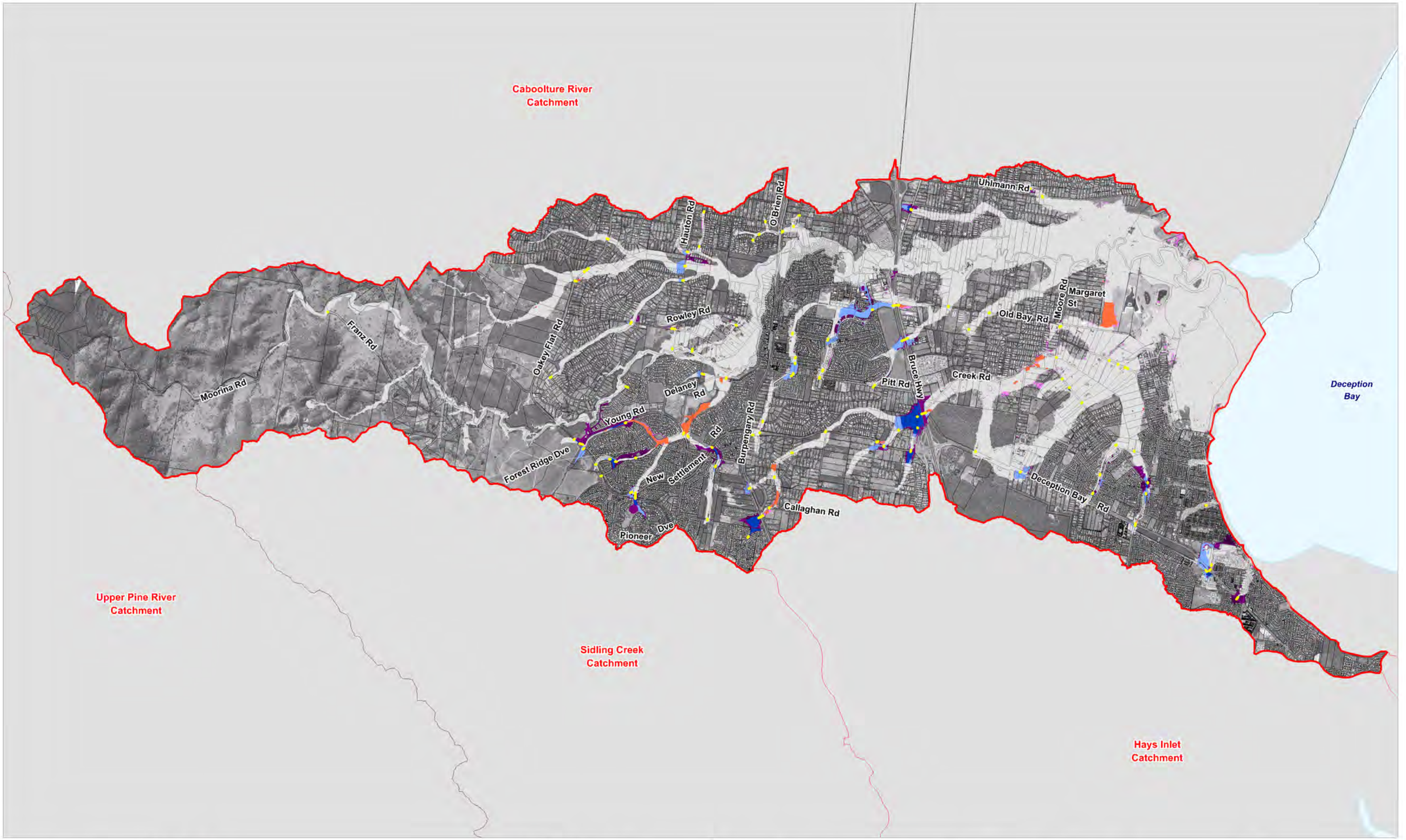
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_019_121030_Flood_Level_Comp_S2.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Culvert Blockage Scenario (S3) Minus 100 Year EDS

Figure: **F-3**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM
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Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_020_121030_Flood_Level_Comp_S3.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd
Callaghan Rd
Pioneer Dve

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Rainfall Scenario (S4) Minus 100 Year EDS

Figure: **F-4**

Rev: **A**

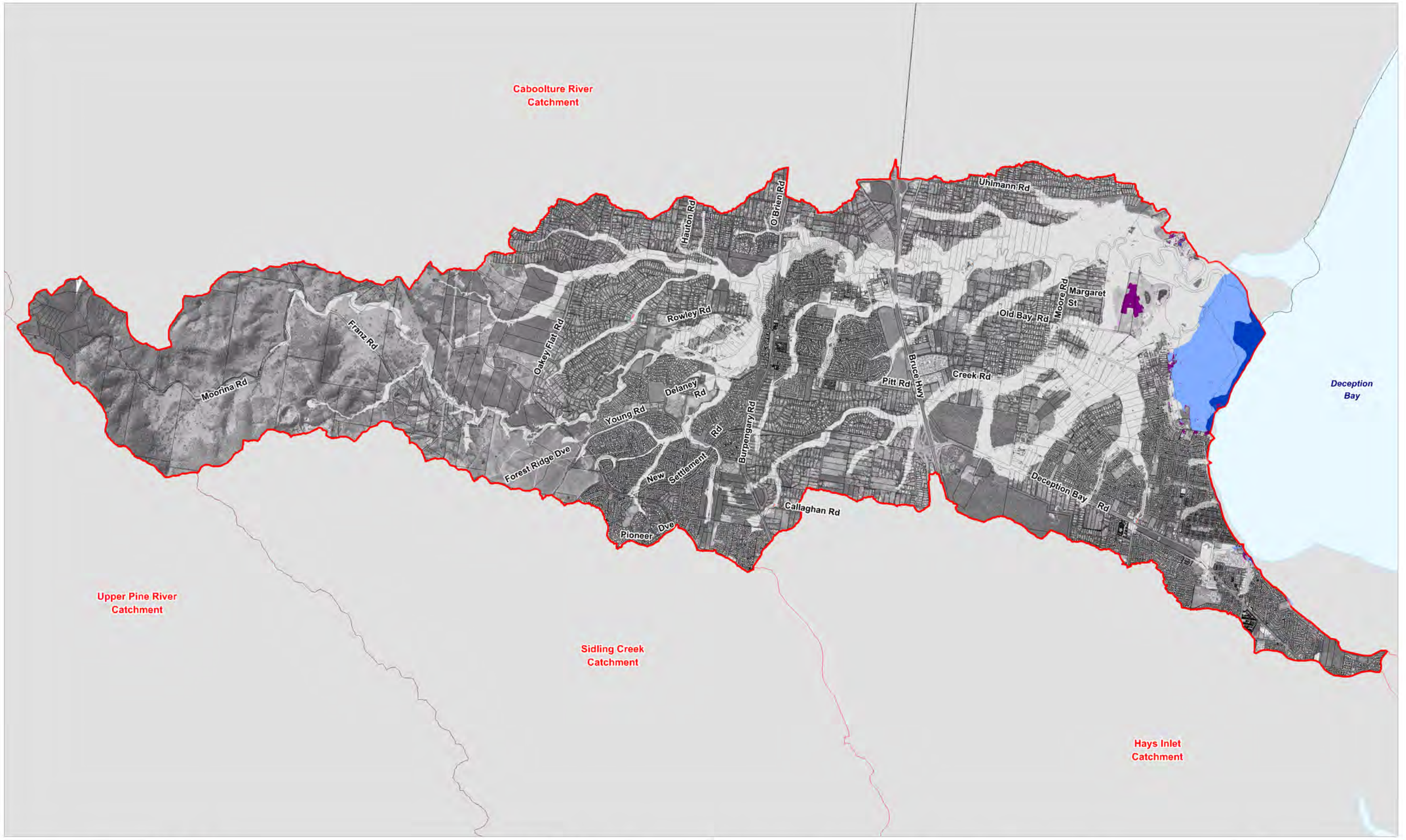
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_021_121030_Flood_Level_Comp_S4.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Downstream Boundary Scenario (S5) Minus 100 Year EDS

Figure: **F-5**

Rev: **A**

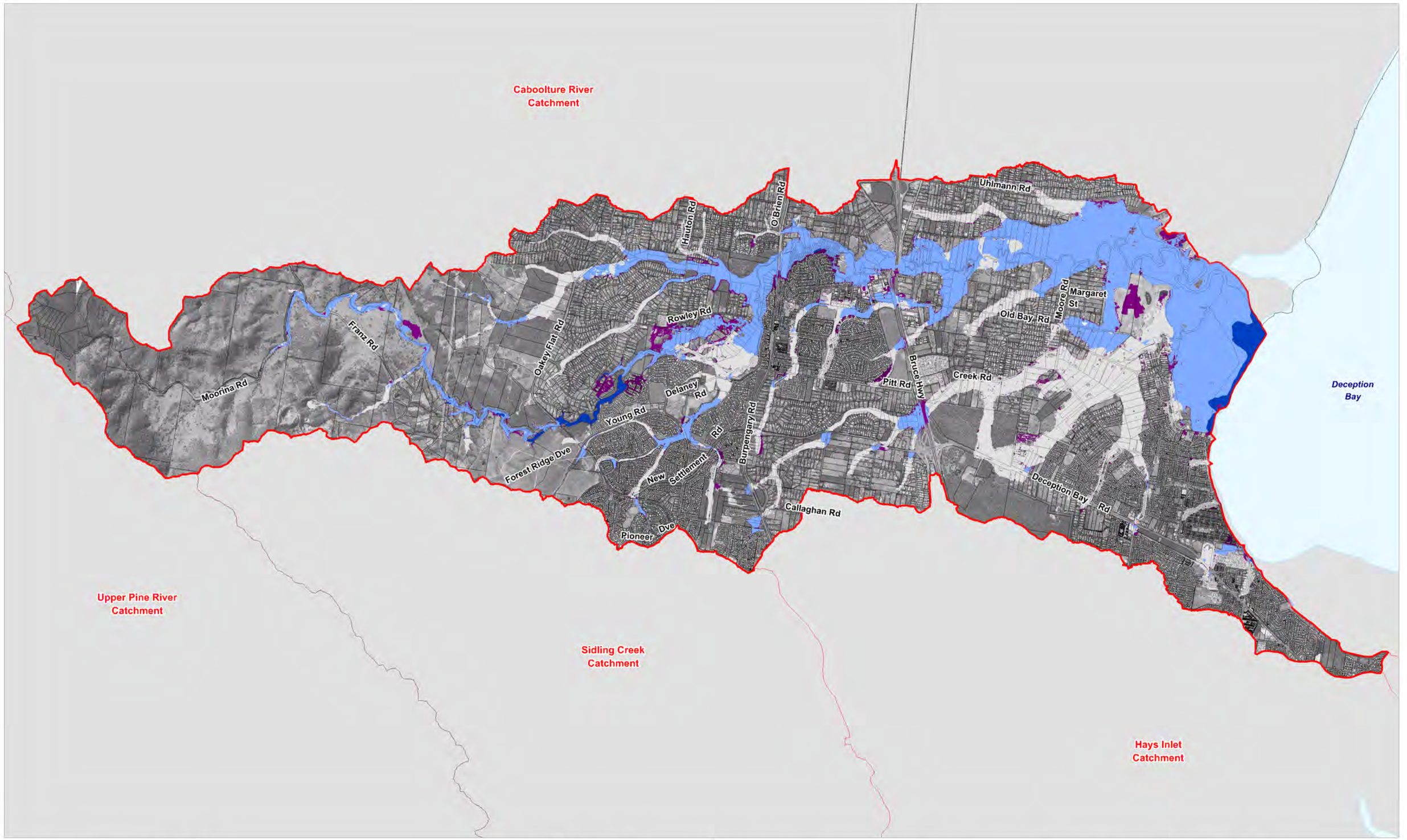
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_022_121030_Flood_Level_Comp_S5.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Downstream Boundary and Rainfall Scenario (S6) Minus 100 Year EDS

Figure: **F-6**

Rev: **A**

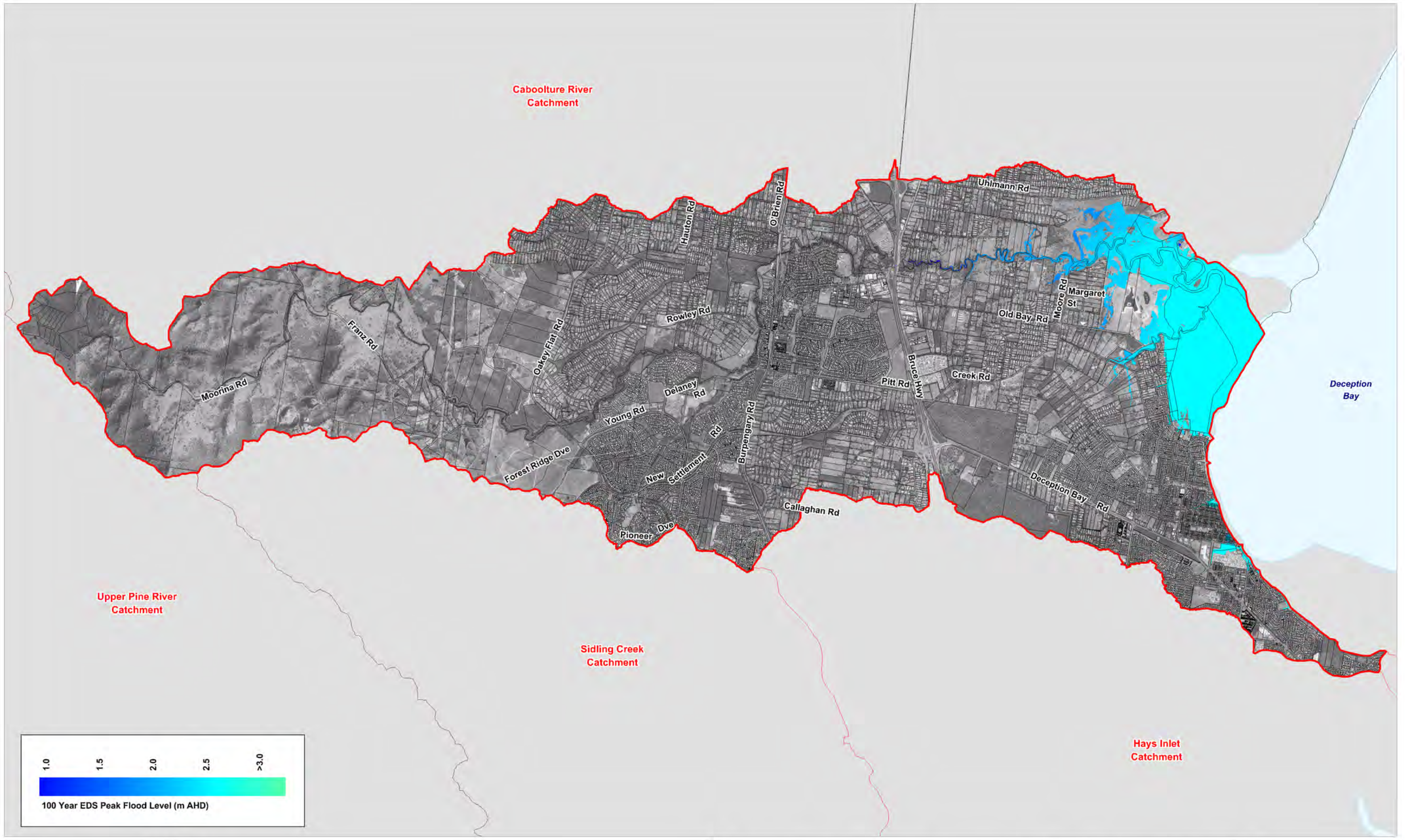
N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_023_121030_Flood_Level_Comp_S6.wor



LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Title:

Dynamic Storm Tide Peak Flood Level - 100 Year EDS (S7)

Figure: **F-7**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM

www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_024_121030_Flood_Level_Comp_S7.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Young Rd
Delaney Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd
Callaghan Rd
Pioneer Dve

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:
Static Storm Tide Scenario (S8) Minus 100 Year EDS

Figure: F-8

Rev: A

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_025_121030_Flood_Level_Comp_S8.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd
Callaghan Rd
Pioneer Dve

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Static Storm Tide, Increased Rainfall and Sea Level Rise Scenario (S9) Minus 100 Year EDS

Figure: **F-9**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_026_121030_Flood_Level_Comp_S9.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Pioneer Dve
Callaghan Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Vegetation Scenario (S10) Minus 100 Year EDS

Figure: **F-10**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_027_121030_Flood_Level_Comp_S10.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Young Rd
Delaney Rd
Forest Ridge Dve
New Settlement Rd
Pioneer Dve
Burpengary Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Callaghan Rd
Deception Bay Rd

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Residential Development Scenario (S11) Minus 100 Year EDS

Figure: **F-11**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM
www.bmtwbm.com.au

Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_028_121030_Flood_Level_Comp_S11.wor

Caboolture River Catchment

Upper Pine River Catchment

Sidling Creek Catchment

Hays Inlet Catchment

Deception Bay

Uhlmann Rd
O'Brien Rd
Hauton Rd
Rowley Rd
Oakey Flat Rd
Franz Rd
Moorina Rd
Delaney Rd
Young Rd
Forest Ridge Dve
New Settlement Rd
Burpengary Rd
Pioneer Dve
Callaghan Rd
Bruce Hwy
Pitt Rd
Creek Rd
Old Bay Rd
Moore Rd
Margaret St
Deception Bay Rd

LEGEND

Burpengary Creek Catchment Boundary

Cadastral Boundaries

Difference in Peak Levels (m)

- < -0.5
- -0.5 to -0.1
- -0.1 to 0.1
- 0.1 to 0.5
- > 0.5
- Was dry now wet
- Was wet now dry

Title:

Increased Residential Development and Vegetation Scenario (S12) Minus 100 Year EDS

Figure: **F-12**

Rev: **A**

N

0km 1.5 3

Approx. Scale

BMT WBM
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Filepath : I:\B17727_I_ak_MBRC_Detailed_Model\DRG\Variation 2012\FLD_029_121030_Flood_Level_Comp_S12.wor