APPENDIX A –Provided Data

Central Coast Council

Ordinary Council Meeting

Held in the Council Chamber
2 Hely Street, Wyong

27 June 2023

MINUTES

Present

Rik Hart

In Attendance

David Farmer	Chief Executive Officer
Boris Bolgoff	Director Infrastructure Services
Dr Alice Howe	Director Environment and Planning
Jamie Loader	Director Water and Sewer
Marissa Racomelara	Director Corporate Services
Melanie Smith	Director Community and Recreation Services

3.8 Adoption of Woy Woy Floodplain Risk Management Study and Plan

Time Commenced: 7:27pm

Moved: Rik Hart

***124/23* Resolved**

1 ***That Council adopt the Woy Woy Peninsula Floodplain Risk Management Study and Plan contained in Attachments 1, 2, 3 and 4.***

2 ***That all those who made submissions during public exhibition be notified of Council's decision.***

A Provided Data

Table A 1 Previous study reports provided by Council

Category	Title	Author	Year
Catchment	The Origin and Development of the Umina - Woy Woy Beach Ridge System, Broken Bay, NSW, Article in The Australian Geographer, XI, pp.1-12. [GCC DN 1574905]	Hails, J., R. (1969)	1969
Community Consultation	Community Consultation Woy Woy Borefield	Gosford City Coucil	2006
Development Control Plan	RE: Gosford DCP Chapter 6.7 Water Cycle Management – Stage 1 Report	Storm Consulting	2015
Drainage	Woy Woy, Umina, Ettalong Peninsula, Drainage Strategy Study, for Gosford City Council, June, [GCC DN 1012556 & 1012564]	Webb McKeown & Associates	1992
Drainage	Ross-Rowan Catchment, Woy Woy Channel to Ocean Beach Road, Trunk Drainage Management Study and Management Plan, for Gosford City Council, Sydney, February, [GCC DN 1012933]	Webb McKeown & Associates	1993
Drainage	Woy Woy Peninsula Catchments 'B' and 'C' Drainage Study, for Gosford City Council, Sydney, February, [GCC DN 1013286]	Webb McKeown & Associates	1996
Drainage	Woy Woy Peninsula - Catchments 'P' and 'O' Drainage Investigation - Draft Report (Issue 1), for Gosford City Council, Sydney, February, [GCC DN 1013287]	Patterson Britton & Partners	1997
Drainage	Drainage Investigation Veron Road / Dulkara Road Catchment Umina / South Woy Woy, for Gosford City Council, Sydney, July. [GCC DN 1013225]	Kinhill Engineers	1999
Drainage	Woy Woy Peninsula Catchments 'D' and 'E' Drainage Study, for Gosford City Council, Sydney, July. [GCC DN 1013288]	Ivan Tye and Associates	2000
Drainage	Drainage Investigation Veron Road / Dulkara Road Catchment Umina / South Woy Woy, for Gosford City Council, Sydney, July. [GCC DN 1013225]	Kinhill Engineers	1999
Drainage	Assessment of Alternative Stormwater Drainage Systems for the Woy Woy Peninsula, for Gosford City Council, Insearch, Sydney, September. [GCC DN 1574904]	O'Loughlin, G.	1997
Flooding *Brisbane water*	Brisbane Water: Waterway Foreshore Study, Department of Public Works NSW, March, [GCC DN 1020708]	Posford Pavry Sinclair & Knight	1975
Flooding	Report Stormwater Investigations to Catchment: Blackwall Mountain, Springwood Street, Waitangi Street, Warrigal	Giammarco Engineering	1989

	Street, Wyalong Street, Memorial Avenue, Umina, for Gosford Council:, April, [GCC DN 1021789]		
Flooding *Brisbane water*	Brisbane Water Flood Study: Compendium of Data, PWD Report No.89043, June, [GCC DN 1012682]	Public Works	1991
Estuary *Brisbane Water*	Brisbane Water Estuary Processes Study, Report for Gosford City Council, [in progress]	Cardno Lawson Treloar	2007a
Flooding *Brisbane water*	Brisbane Water Foreshore Flood Study, Report for Gosford City Council, [In progress]	Cardno Lawson Treloar	2007b
Flooding *Brisbane water*	Brisbane Water Foreshore Flood Study	Cardno Lawson Treloar	2013
Flooding *Brisbane water*	Brisbane Water Foreshore Floodplain Risk Management Plan	Cardno Lawson Treloar	2015
Flooding *Brisbane water*	Brisbane Water Foreshore Floodplain Risk Management Study	Cardno Lawson Treloar	2015
Flooding	Central Coast February 1992 Flood Event, Public Works, Report MHL 615, April, [GCC DN 1011945]	Manly Hydraulics Laboratory	1992
Flooding *Kahibah*	Kahibah Creek Flood Study	Willing & Partners Consulting Engineers	1991
Flooding *Kahibah*	Kahibah Creek Floodplain Management Study	Willing & Partners Consulting Engineers	1991
Flooding *Kahibah*	Kahibah Creek Floodplain Management Plan	Willing & Partners Consulting Engineers	1996
Flooding *Woy Woy*	Woy Woy Peninsular Flood Study	DHI	2010
Groundwater Dependent Ecosystems	Proposal for the Monitoring of Impacts associated with Groundwater Extraction from the Woy Woy Peninsula on locally occurring Groundwater Dependent Ecosystems and the Endangered Ecological Community, Umina Coastal Sands Woodland.	Conacher Travers	2005
Geotechnical	Desktop Review and Geotechnical Investigation, Proposed Bores, Various Locations, Umina Beach and Woy Woy, Report for Gosford City Council, October. [GCC DN 3115445]	Douglas & Partners	2005
Groundwater	Development of Further Options for the Gosford Wyong Joint Water Supply Scheme Working Paper 4- Final Report Use of Groundwater	NSW Department of Commerce	2003
Groundwater	Woy Woy Peninsula Sand Aquifer System Numerical Modelling of Groundwater Abstractions, Mackie	Mackie	2005

	Environmental Research, Report for Gosford City Council, June. [Not in DataWorks]		
Groundwater	Woy Woy Peninsula Sand Aquifer System Numerical Modelling of KBR Options, Mackie Environmental Research, Report for Gosford City Council, May. [GCC DN 2234593]	Mackie	2006
GW abstraction	Ecological Assessment of Proposed Groundwater Extraction from Woy Woy Peninsula, Draft, Kariong, July. [GCC DN 3102004]	Conacher Travers	2005
Hydrogeology	Woy Woy Stormwater Infiltration Study Drilling Cored Boreholes	Larry Cook	2000
Hydrogeology	Stratigraphic Analysis of Woy Woy Peninsula – Preliminary Interpretation, Report for Gosford - Wyong Councils, January [GCC DN 1585302]	Hydroilex	2005a
Hydrogeology	Test Drilling and Aquifer Testing, 22 reports for Gosford-Wyong Joint Water Authority, 1 November. [GCC DN 1892492 and others]	Hydroilex	2005b
Hydrogeology/Water Supply	Hydrogeological Assessment, Groundwater Supplies, Woy Woy Peninsula, for Gosford - Wyong Joint Water Supply Scheme, Hydroilex Groundwater Specialists, October.	Cook, L.	2004
Stormwater Infiltration	Potential for Stormwater Infiltration on the Woy Woy Peninsula, Insearch, Sydney, March. [GCC DN 1013390]	O'Loughlin G., Hazelton P., Cook L.	1998
Stormwater Infiltration	Hydrogeological Assessment - Stormwater Infiltration Study Woy Woy Peninsula, Volumes 1 & 2, Larry Cook & Associates Pty Ltd, Gosford, December. [GCC DN 1021287 & 1021332]	Cook, L.	1998
Stormwater Infiltration	Stormwater Management - Infiltration Project for Woy Woy Peninsula, University of Technology, Sydney, January.	Mackett, A., Vidler, M.	1999
Stormwater Infiltration	Woy Woy Stormwater Infiltration Devices - Design Drawings, for Gosford City Council, Sydney, January.	Kinhill Brown & Root	1999
Stormwater Infiltration	Pollution Removal by Stormwater Infiltration in the Woy Woy Peninsula, Stormwater Trust Stage 1 Report HG92.12.2 for Gosford City Council, Sydney, May. [GCC DN 1021333]	UTS	1999a
Stormwater Infiltration	Stormwater Infiltration for the Woy Woy Peninsula, Report for Gosford City Council, Sydney, November. [GCC DN 1021335]	UTS	1999b
Stormwater Infiltration	Report on Stormwater Infiltration Study Woy Woy Peninsula January 1999 to June 2000, for Gosford City Council, Larry Cook & Associates Pty Ltd, Report No. HG00.6.1, Gosford, June. [GCC DN 1021336]	Cook. L.	2000
Stormwater Infiltration	Woy Woy Peninsula Stormwater Infiltration Project - Investigation into Stormwater Quality, University of Technology, Sydney, November.	Brooks, N., Hogan, M.	2000

Stormwater Infiltration	Stormwater Infiltration Experiments on a Sandy Area in Eastern Australia, Lyon, France, June. [GCC DN 1574906]	Matuzic, J., Blasi, A., O'Loughlin, G., Beecham, S., Myl, S.	2001
Stormwater Infiltration	Woy Woy Stormwater Infiltration Project - Vadose Zone and Wetland Investigation, University of Technology, Sydney, November. [GCC DN 1335716]	Parmer, H.	2001
Stormwater Infiltration	Report on Stormwater Infiltration Study Woy Woy Peninsula June 2000 to October 2001, for Gosford City Council, Larry Cook & Associates Pty Ltd, Gosford, January.	Cook, L.	2002
Stormwater/Groundwater	Stormwater and Groundwater Analysis from the Woy Woy Peninsula, University of Technology, Sydney, November. [GCC DN 1335716]	Brisbin, S., Stevens, J.	2001
Groundwater Salinity	Installation of Monitoring Bores for Potential Saltwater Encroachment at Woy Woy	Hydroilex	2005
Groundwater Salinity	Request for Dataflow "Odyssey" EC Data Loggers	Hydroilex	2007
Groundwater Salinity	Proposed Salinity Sentinel Bores, Woy Woy Peninsula	Hydroilex	2007
Lagoon	Everglades Lagoon System Precinct, Plan of Management, Report for Gosford City Council, Kellogg Brown & Root Pty Ltd, Sydney, 21 June. [GCC DN 1605942]	Kellogg Brown & Root Pty Ltd	2005
Landuse	Land Use Investigation, Woy Woy Peninsula, Report for Gosford-Wyong Joint Water Authority, November. [GCC DN 2368247]	Andrews Neil	2005
Review/GW	Gosford/Wyong Groundwater Development - Report "Stratigraphic Analysis of Woy Woy Peninsula - Preliminary Interpretation"	Peter Dundon & Associates Pty Limited	2005
Water Sensitive Urban Design	Water Sensitive Urban Design on the Woy Woy Peninsula, Report to Council (SF.016/04), 28 September. (GCC DN 1352655).	GCC	2004
Flood Study	Davistown Catchment Flood Study	Cardno Lawson Treloar	2010

Table A 2 GIS layers provided by Council

GIS layers	Descriptions
WW-BellsVegetation2013-20180523	Vegetation within Gosford Local Government Area classified. (Bell, 2004) According to "Ecological assessment of proposed groundwater extraction from Woy Woy Peninsula" (Travers, 2005), vegetation communities identified as GDEs on Woy Woy Peninsula are Paperbark Swamp Forest and Umina Coastal Sandplain Woodland. These corresponds to Unit 37e and 33b.
WW-Cadastre-20180523	Cadastres
WW-COSS2010-20180523	The Coastal Open Space System (COSS) A network of native vegetation reserves managed by the Gosford City Council
WW-CouncilLandRegister-20180523	Council registered land
WW-CouncilReserves-20180523	Council reserves
WW-Creeks-20180523	Creeks
WW-DgeBoxCulverts-20180523 WW-DgeCatchments-20180523 WW-DgeChannels-20180523 WW-DgeGrossPollutantTraps-20180523 WW-DgeHeadwalls-20180523 WW-DgePipes-20180523 WW-DgePits-20180523 WW-DgeSubCatchments-20180523	Drainage features
WW-NatParks-20180523	National Parks
WW-RainfallRecorders-20180523	Rainfall gauges Ettalong School Pearl Beach Woy Woy
WW-RoadCentrelines-20180523	Centrelines of roads
WW-FloodGates-20180523	Flood Gates
WW-SewerConnectionPoint-20180523 WW-SewerControlValves-20180523 WW-SewerEncasement-20180523 WW-SewerFitting-20180523	Sewer network/structures

WW-SewerGravityMain-20180523 WW-SewerJunctions-20180523 WW-SewerMaintenanceHoles-20180523 WW-SewerMeter-20180523 WW-SewerNetworkStructures-20180523 WW-SewerPit-20180523 WW-SewerPressureMain-20180523 WW-SewerValves-20180523 WW-SewerVentPipes-20180523	
WW-WaterService-20180523 WW-WaterValve-20180523 WW-WaterMain-20180523 WW-WaterMeter-20180523 WW-WaterFitting-20180523 WW-WaterHydrant-20180523	Water Supply network/structures
WW-WaterNetworkStructure-20180523	Reservoirs and treatment plant
WW-WaterPumps-20180523	Pumps
WW-WaterLevelRecorders-20180523	Decommissioned and proposed water level recorders
WW-WaterBores-20180523	Monitoring and Production bores

APPENDIX B –Community Engagement Materials

Woy Woy Peninsula
Floodplain Risk Management Study and Plan

In 2010 Central Coast Council completed a Flood Study for the Woy Woy Peninsula. The study identified flood risks to people, property, infrastructure and assets. The study provided Council with a better understanding of the importance of the interaction of coastal inundation, groundwater conditions and the increasing effects of development on flood behaviour due the changing hydraulics of the existing terrain surface.

Council, with the assistance of state and federal government, is now undertaking a Floodplain Risk Management Study and Plan (FRMSP) for Woy Woy Peninsula including Kahibah Creek catchment to look at ways to manage flood risk.

More than 10,000 properties within the study area could be affected by flooding in extreme ocean and rainfall events.

Council is asking the community what flood risks they area concerned about and how they would like Council to address the risks.

At Council we know some parts of the Local Government Area (LGA) are more prone to flooding than others and we're committed to finding solutions to reduce the social and economic damages of flooding.

A Flood Study was completed for Woy Woy Peninsula in 2010 and the Brisbane Water Floodplain Risk Management Study and Plan was completed in 2015.

The Woy Woy Peninsula is prone to nuisance flooding, especially from long-duration rainfall events. Flooding occurs in the road reserves and in private property, where it remains until it infiltrates or evaporates. Generally, this flooding may remain for a couple of days. However, during very wet periods the groundwater table can rise such that flooding remains for several weeks.

Flooding is also caused by creek flooding during large rainfall events, as well as inundation from ocean storms.

This Floodplain Risk Management Study and Plan will be looking at options to manage flooding and its consequences. This may include drainage upgrades, foreshore barriers, raising roads, property filling, drainage easements, planning and development controls, community awareness programs or evacuation procedures.

Council will be identifying potential options with the input from the community and will then assess the options and identify what actions Council, SES and the community can undertake to improve flood risk.

Do you have any local knowledge of flooding around Woy Woy Peninsula?

Council would like to hear from you by email, phone or by filling in a brief online questionnaire (yourvoiceourcoast.com/floodplain) or by return mail (postage paid envelope included). Your responses will help us understand the local flooding problems in more detail. Local knowledge and personal experiences of flooding are an invaluable source of data. You can also share you knowledge and thoughts with the project team at the community drop in session listed below.

Community drop in session will be held:

Thursday 18 February 4pm-7pm, Country Women's Association (CWA) Hall (30/32 The Boulevarde, Woy Woy)

You are invited to come along to find out more about the study and to share with the project team your experiences and concerns about flooding in the local area.

Online: yourvoiceourcoast.com/floodplain

Email: FloodManagement@centralcoast.nsw.gov.au

Mail: PO Box 21, Gosford NSW 2250

For more information phone:

Robert Baker 02 4304 7087

Smita Nepal 02 4304 7695

Submissions should be provided by Friday 12th March 2021

Central Coast Council

Woy Woy Peninsula
Floodplain Risk Management Study and Plan

Community Questionnaire Form

Contact Details:

Name _____

Address (including Lot / DP, if known) _____

Email _____ Phone Number _____

How long have you lived, worked in Woy Woy Peninsula?

_____ years

How often do you visit Woy Woy Peninsula and each time how long is your stay?

_____ weeks _____ months _____ years

How aware are you of flooding in and around Woy Woy Peninsula? (please select one)

Aware ___ Somewhat aware ___ Not aware ___

Do you have any specific concerns about flooding related to Woy Woy Peninsula?

(e.g. locations of frequent or severe flooding, or specific impacts of flooding on roads, properties, assets or access)

_____

_____

_____

Do you have any suggestions on how this flooding could be managed better?

_____

_____

_____

_____

_____

When Council manages flooding, what is important to you? Please rank in order of importance - from 1 (most important) to 9 (least important).

How important is flood management concerning:	Rank from 1 (most important) to 9 (least important)
community access and recreational use	
Disadvantage in individual members of the community	
safety of the community during flooding	
community awareness and understanding of the local flood risk	
impacts of flood management on local plants and animals and their habitat	
impact on water quality issues	
cost to Council and the community	
reduction in flood damages to the community	
negative flood impacts on other locations	

Woy Woy Peninsula
Floodplain Risk Management Study and Plan

How do you anticipate you would respond in a major flood in this area?

☐ Evacuate early to an official evacuation centre

☐ Evacuate elsewhere—please describe: _____

☐ Remain at my house (is your house elevated or do you have a second storey?)_____

☐ Other—please describe: _____

☐ Don't know / unsure

☐ I would be interested in information to assist me in responding to a flood

If you were to evacuate, what would be the reasons for you to evacuate? (Select all that apply)

☐ Discomfort / inconvenience / cost of being isolated by floodwater

☐ Need for uniterrupted access to medical facilities. Please specify:_____

☐ Safety of our household

☐ Other—please describe: _____

If you were to remain at your house, what would be the reasons for your to stay? (Select all that apply)

☐ Discomfort / inconvenience / cost of evacuating

☐ Need to care for animals

☐ I know my house can not be flooded and we can cope with isolation

☐ Concern for security of my property if I evacuate

☐ Other—please describe: _____

☐ Not applicable (I intend to evacuate from my house)

What information do you look for during a flood event (please circle all that apply):

Road Closures / Evacuation Notices / Flood Characteristics (magnitude, duration, areas impacted, etc.)

Other—please describe: _____

Where do you currently get updates and information (please circle all that apply) :

Websites / Radio / TV / Social Media / Smartphone App

Other—please describe: _____

Can Council or our consultant contact you for further information relating to your responses to this survey? Yes / No (please circle) **Would you prefer to be contacted by:** Phone / Email (please circle and provide phone number or email address)_____

Do you give Council permission to use your supplied photos and information for the purposes of publicity or inclusion in the project documents? Yes / No (please circle)

Please feel free to attach additional pages.

Please provide your responses via email, mail, phone or online through Council's website

Online: www.yourvoiceourcoast.com/floodplain

Email: FloodManagement@centralcoast.nsw.gov.au
Mail: PO Box 21, Gosford NSW 2250

For more information phone:
Robert Baker 02 4304 7087
Smita Nepal 02 4304 7695

Submissions should be provided by Friday 12th March 2021

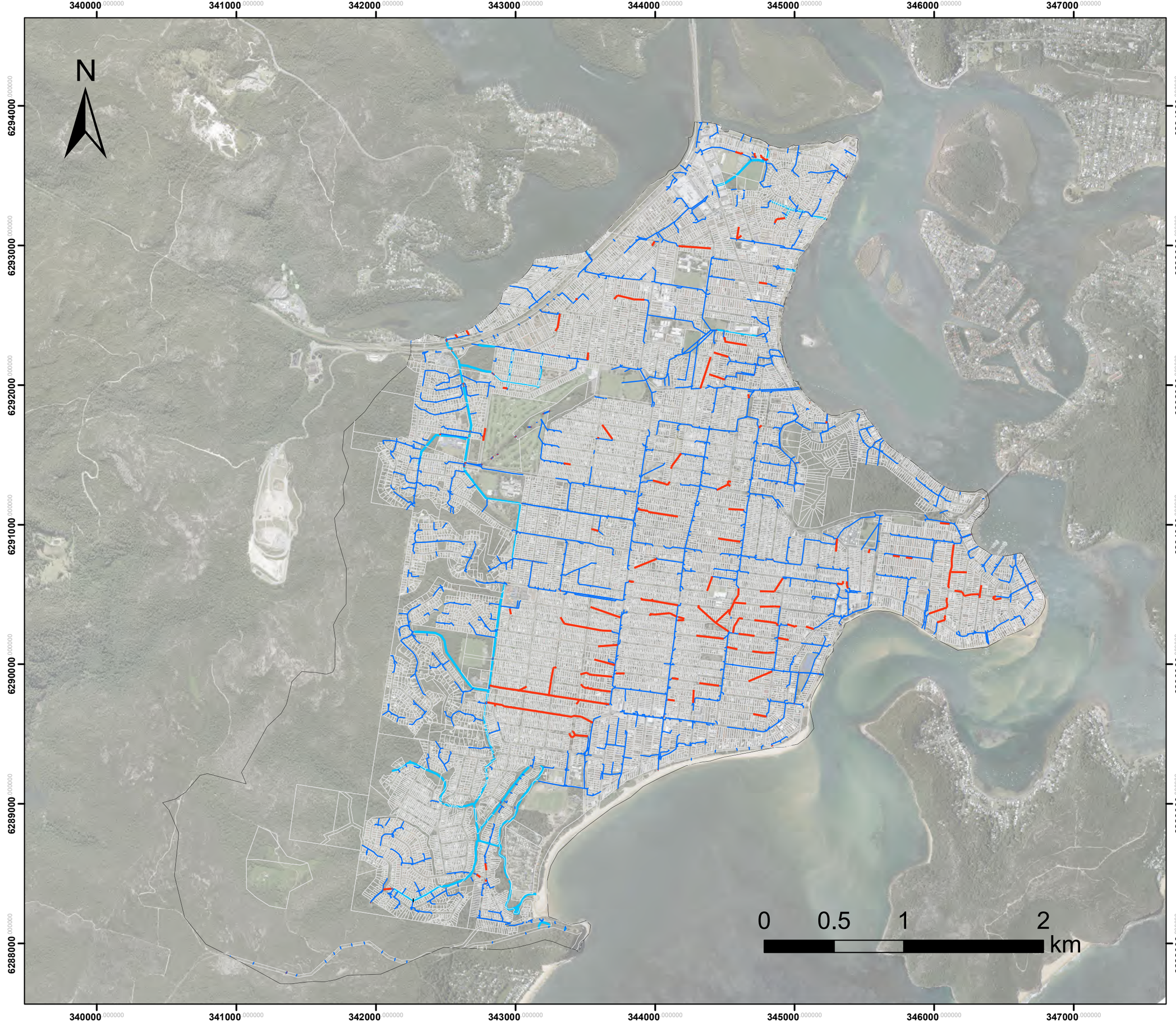


FIGURE C.1

Drainage Evaluation Diameter Information

Legend

Drainage Pipes

- Drainage pipes
- Drainage pipes missing diameter information
- Model Extent
- Drainage Channels

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	07/07/2022
Project No	43803055

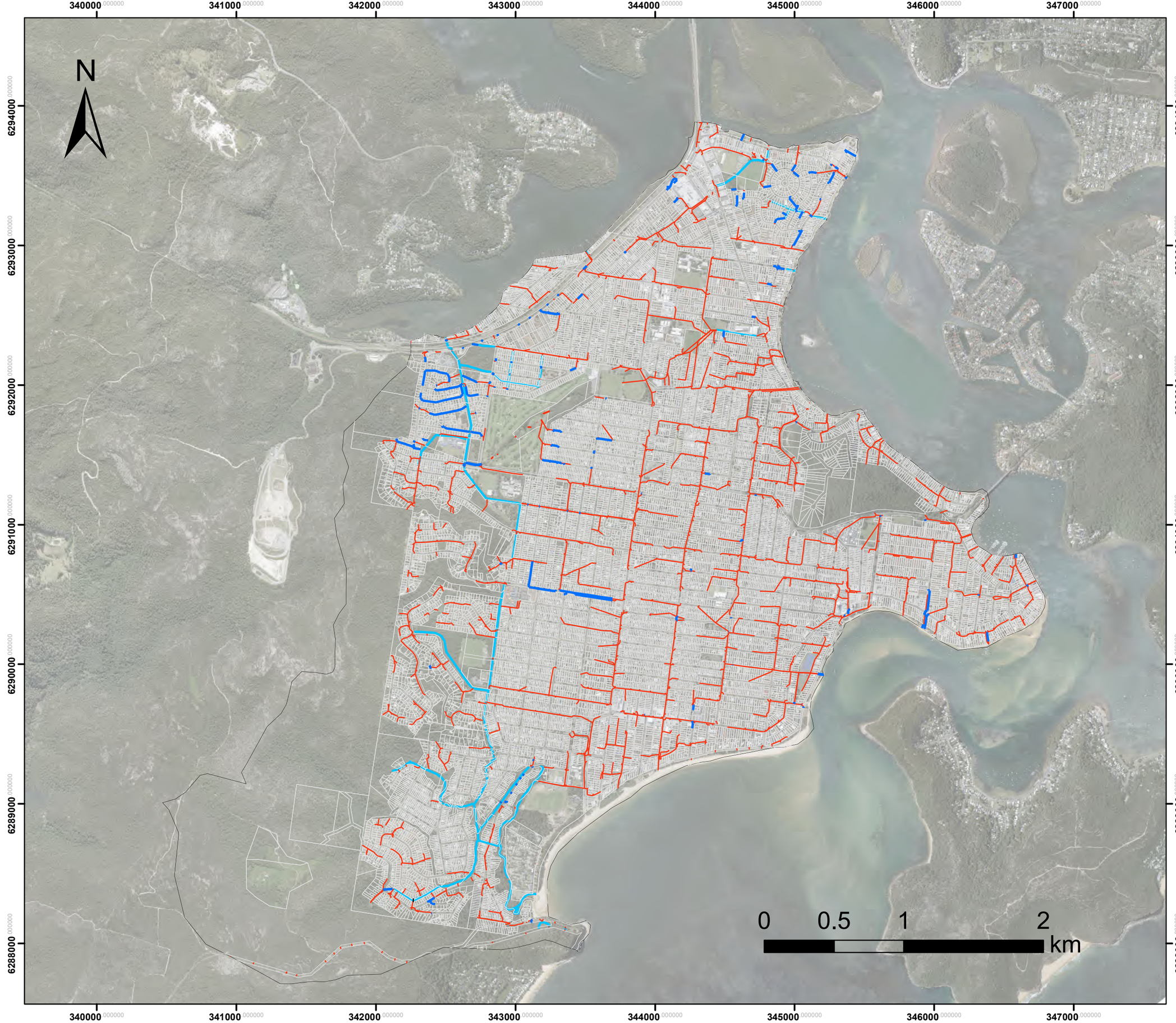


FIGURE C.2

Drainage Evaluation
Invert Level Information

Legend

Drainage Pipes

- Drainage Pipes
- Pipes - Invert Levels are available
- Model Extent
- Drainage Channels

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	07/07/2022
Project No	43803055

APPENDIX D –NAM model

D NAM model for the Kahibah Creek catchment

A NAM model for the Kahibah Creek catchment was developed to determine the critical durations and temporal patterns in the area.

A NAM model is a deterministic, lumped and conceptual rainfall-runoff model embedded in MIKE HYDRO River (DHI, 2021). It simulates overland flow, interflow, and baseflow components as a function of the moisture contents in four storages and the simulated flow can be directly added to the MIKE HYDRO River network for hydraulic routing.

For each of the network branches, a number of catchment areas were delineated and developed in the NAM model based on the DEM. For each of these, the same rainfall and reference evaporation data as the calibrated MIKE SHE model were applied.

For all simulations a 0.1m^3/s baseflow was assumed for Kahibah Creek while sea levels were set based on gauged data from the 1988 event at Ettalong 212423 station.

An automated optimisation procedure was employed to calibrate 13 key NAM model parameters. This calibration routine is based on a multi-objective optimisation strategy known as the SCE algorithm. Using this procedure in combination with the NAM models allows for the simultaneous optimisation of the 13 parameters to meet up to four distinct calibration objectives. The parameters included in the autocalibration process were:

- Maximum water content in surface storage (U_{max})
- Maximum water content in root zone storage (L_{max})
- Overland flow runoff coefficient (CQOF)
- Time constant for interflow (CKIF)
- Time constant 1 for routing overland flow (CK1)
- Time constant 2 for routing overland flow (CK2)
- Root zone threshold value for overland flow (TOF)
- Root zone threshold value for interflow (TIF)
- Root zone threshold value for groundwater recharge (TG)
- Time constant for routing baseflow (CKBF)
- Lower baseflow
- Recharge to lower reservoir (Cqlow)
- Time constant for routing lower baseflow (Cklow)

The autocalibration process optimised the above parameters to provide modelled runoff and flow from a number of creeks across the catchment. These data series were then compared against MIKE SHE 2D results from the 1988 event. Parameters were selected with the aim to minimise the RMSE and balance the overall water balance between these two series. MIKE SHE 2D results were used as the target data series as no historical flow monitoring data was available across the catchment.

Water level and creek flow optimisation was conducted across several locations throughout the area of interest. These locations are shown in **Figure D 1**. Simulated NAM results were also compared to MIKE SHE 2D outputs across a number of locations in **Figure D 2** through **Figure D 9.**

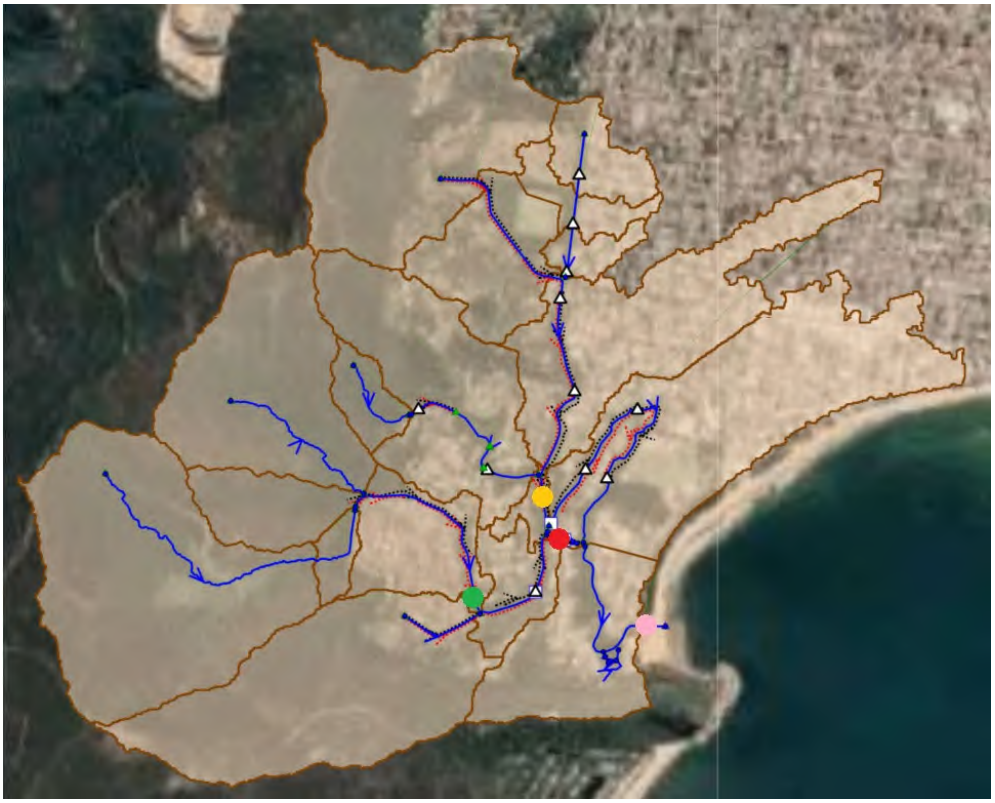


Figure D 1 Calibration site locations. Ettalong Creek-Outlet cross-section 3628.61 (rose), Ettalong Creek cross-section 800 (green), McLaurin Channel cross-section 45 (red) and Kahibah Channel Ceek cross-section 1640 (yellow)

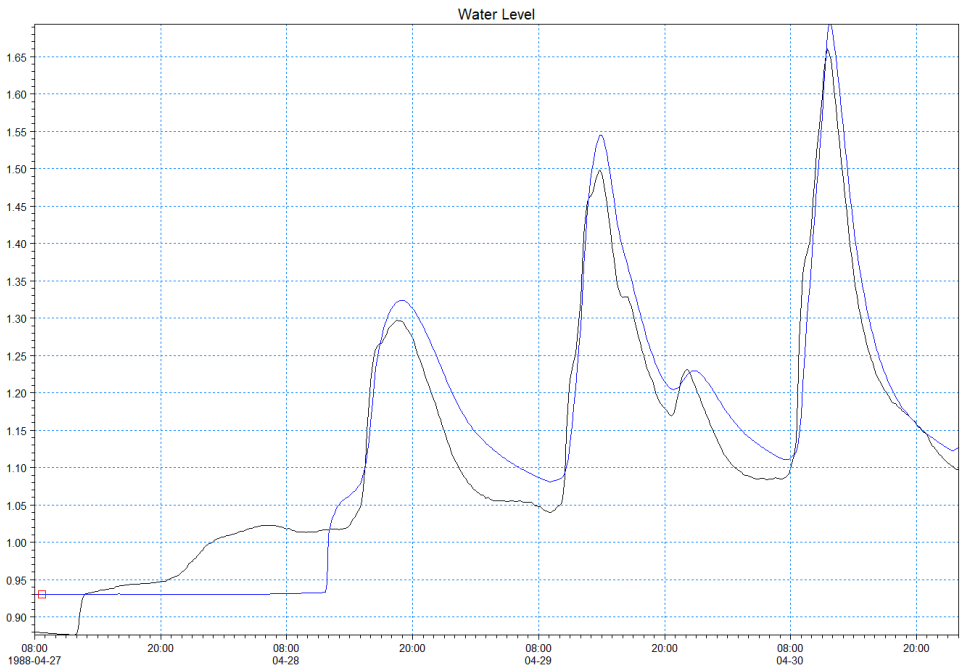


Figure D 2 NAM simulated water levels (blue) compared against the MIKE SHE calibration target (black) at Ettalong Creek Outlet cross-section 3628.61.

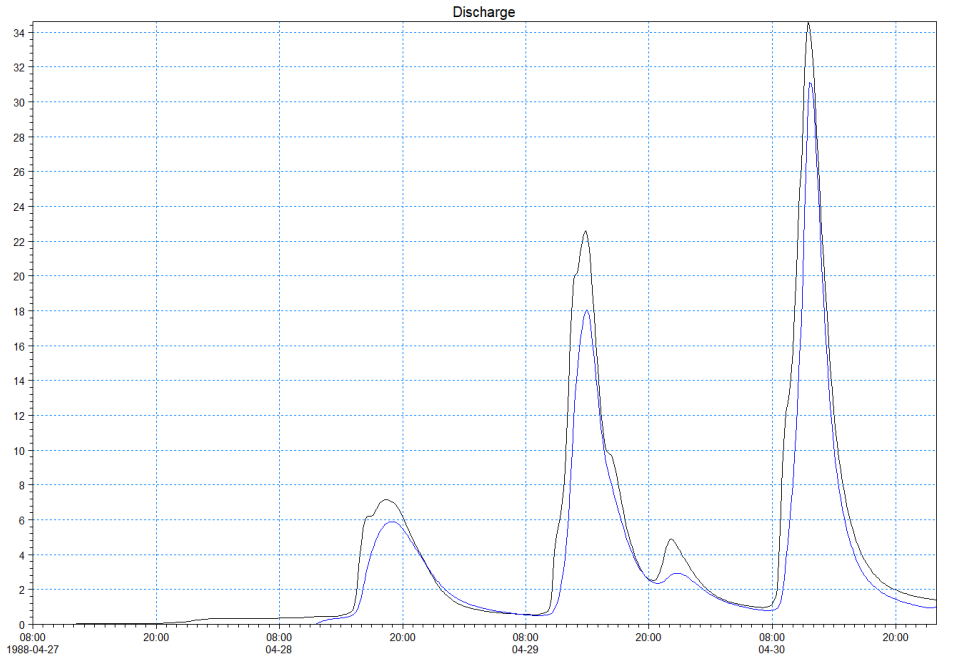


Figure D 3 NAM simulated discharges (blue) compared against the MIKE SHE calibration target (black) at Ettalong Creek Outlet cross-section 3628.61.

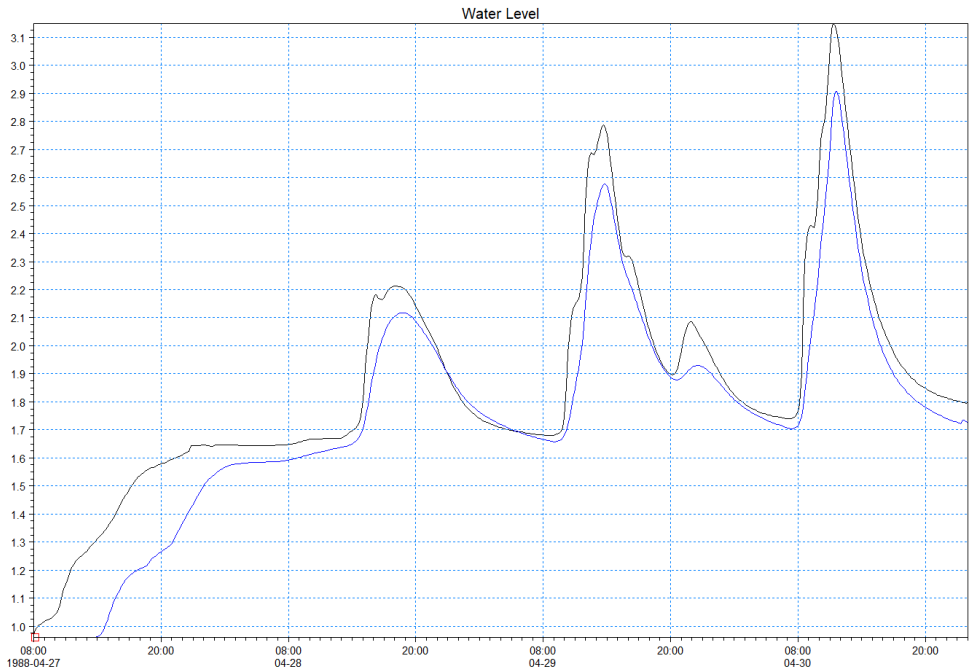


Figure D 4 NAM simulated water levels (blue) compared against the MIKE SHE calibration target (black) at McLaurin Channel cross-section 45.

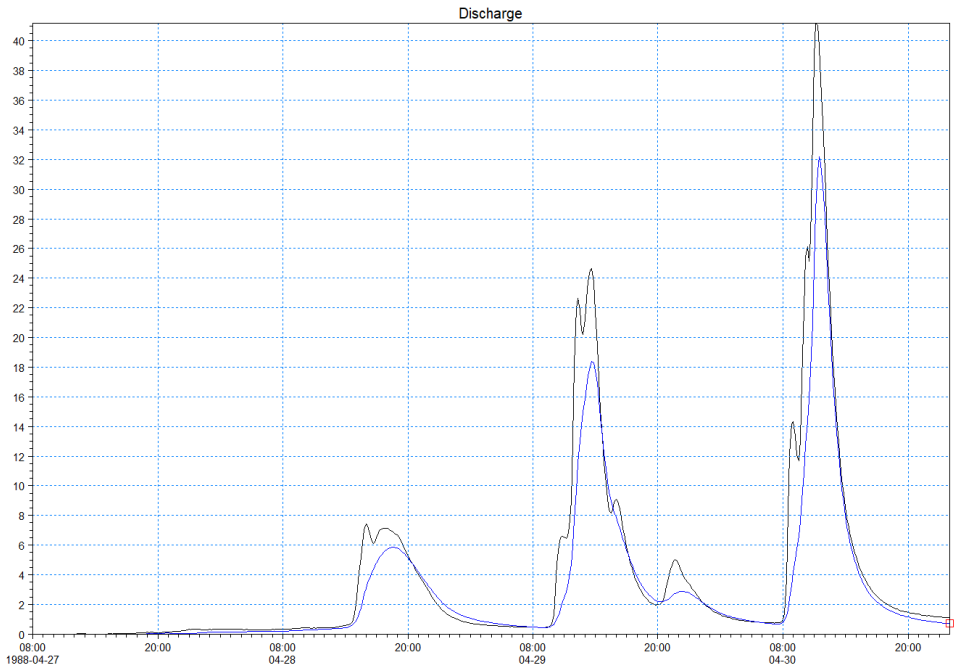


Figure D 5 NAM simulated discharges (blue) compared against the MIKE SHE calibration target (black) at McLaurin Channel cross-section 45.

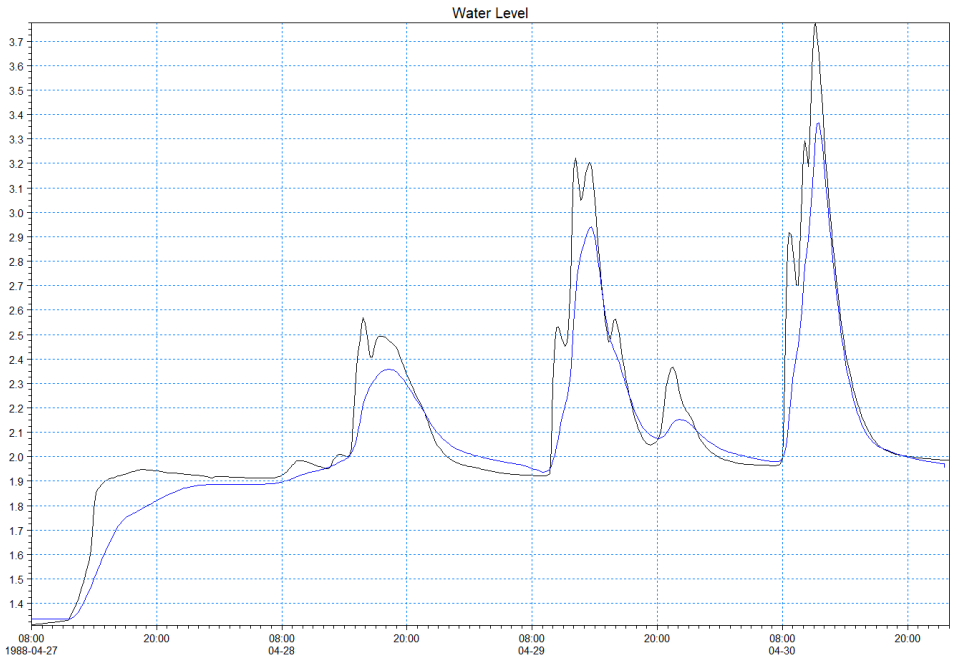


Figure D 6 NAM simulated water levels (blue) compared against the MIKE SHE calibration target (black) at Ettalong Creek cross-section 800.

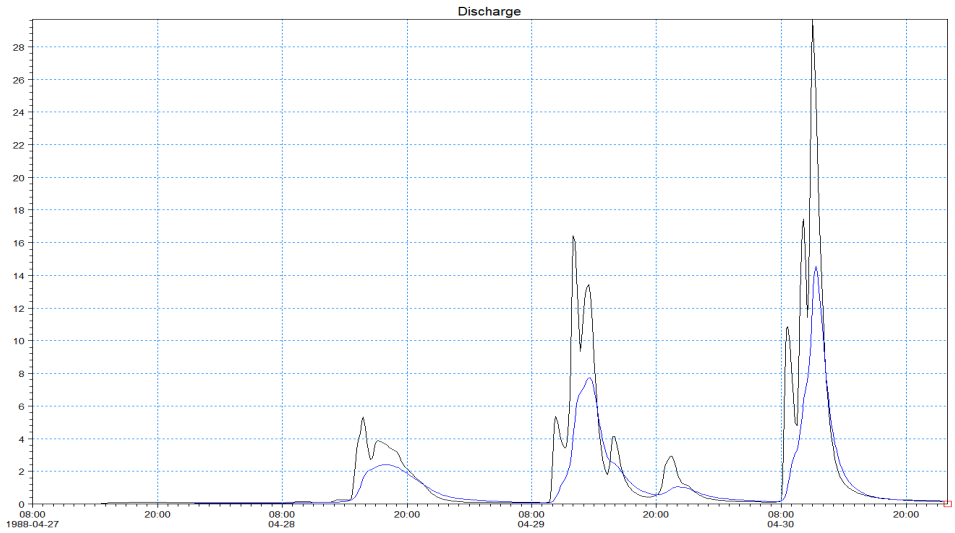


Figure D 7 NAM simulated discharges (blue) compared against the MIKE SHE calibration target (black) at Ettalong Creek cross-section 800.

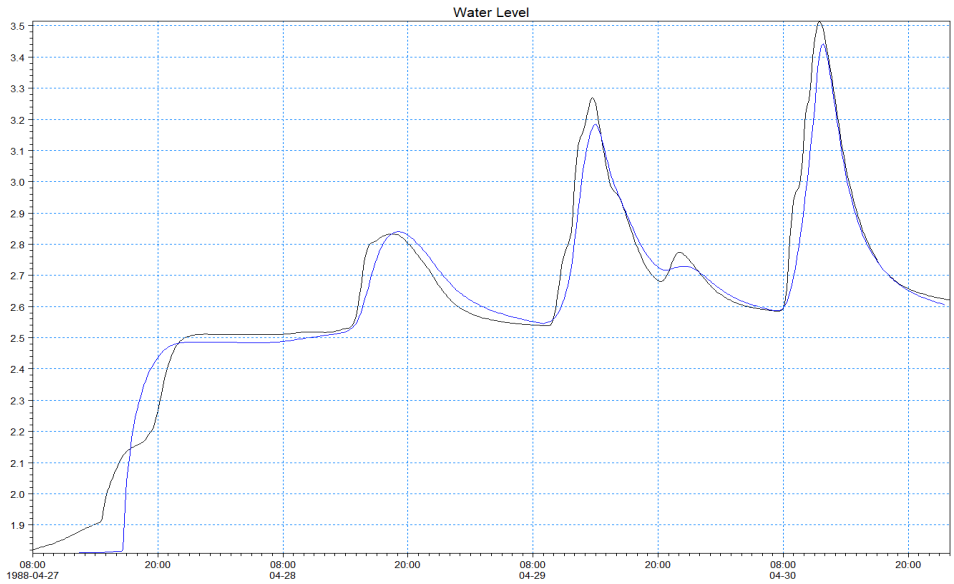


Figure D 8 NAM simulated water levels (blue) compared against the MIKE SHE calibration target (black) at Kahibah Channel Creek cross-section 1640.

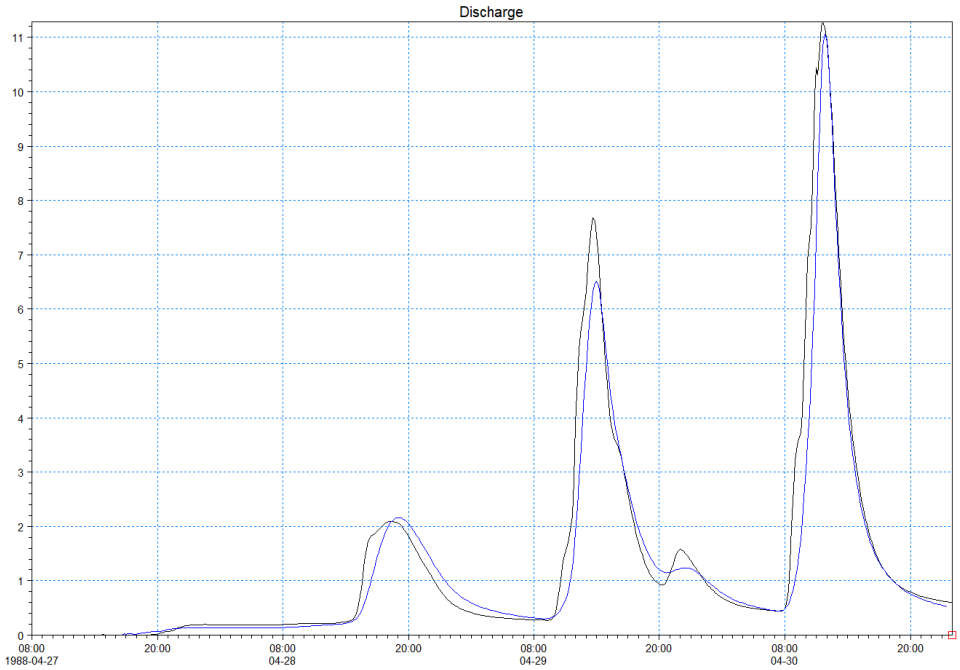


Figure D 9 NAM simulated discharges (blue) compared against the MIKE SHE calibration target (black) at Kahibah Channel Creek cross-section 1640.

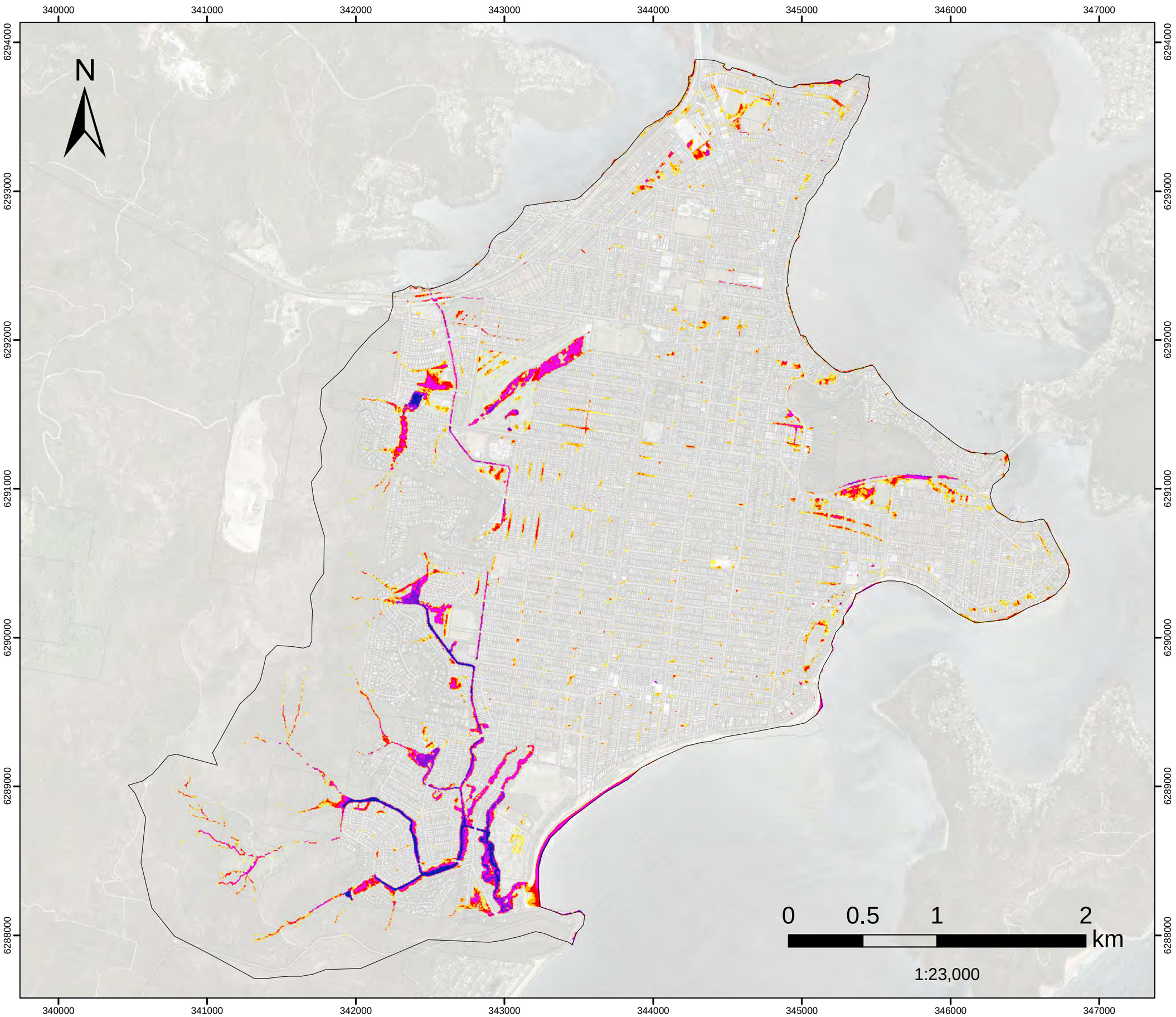


FIGURE E.1

0.5%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

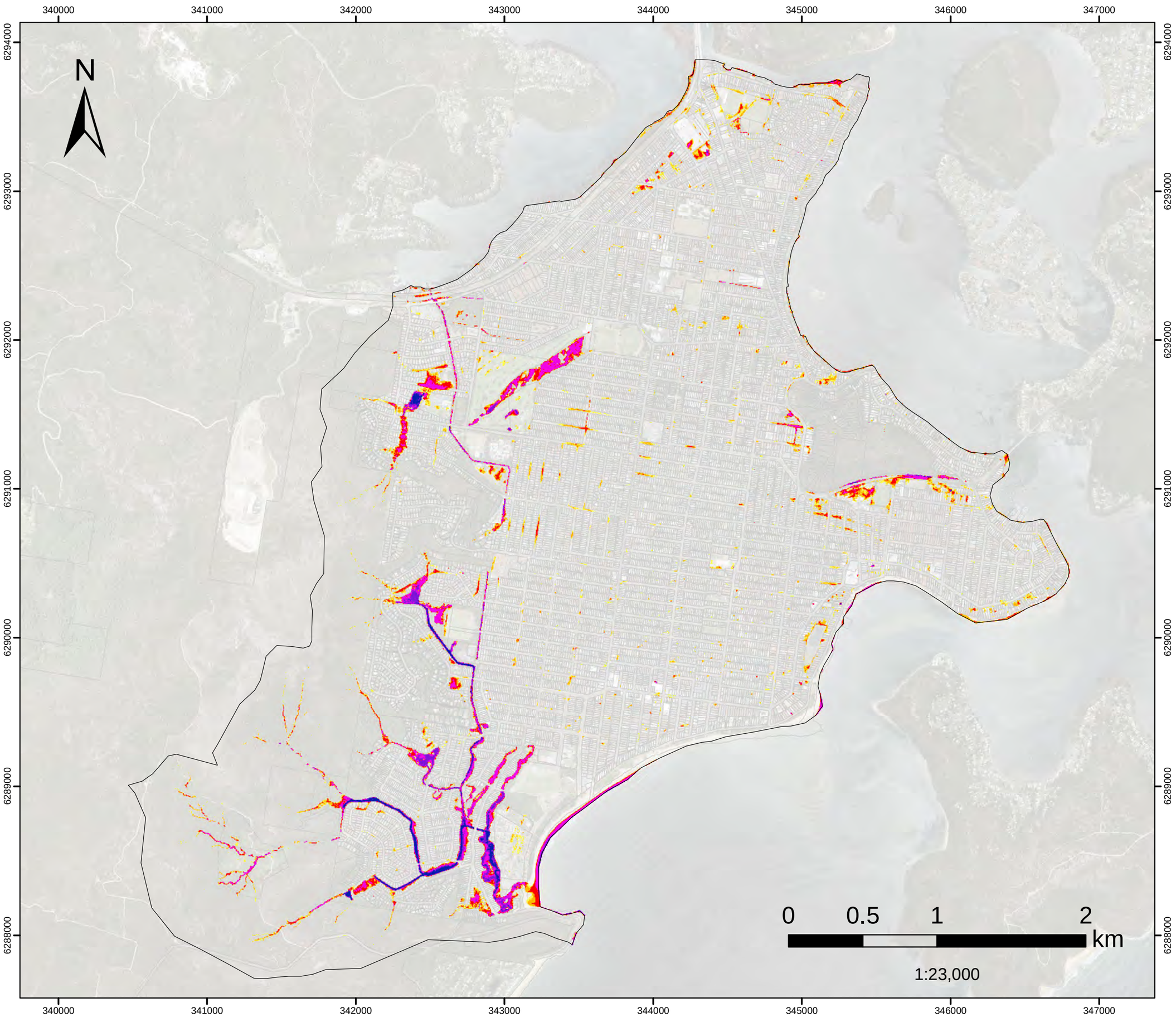


FIGURE E.2

1%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

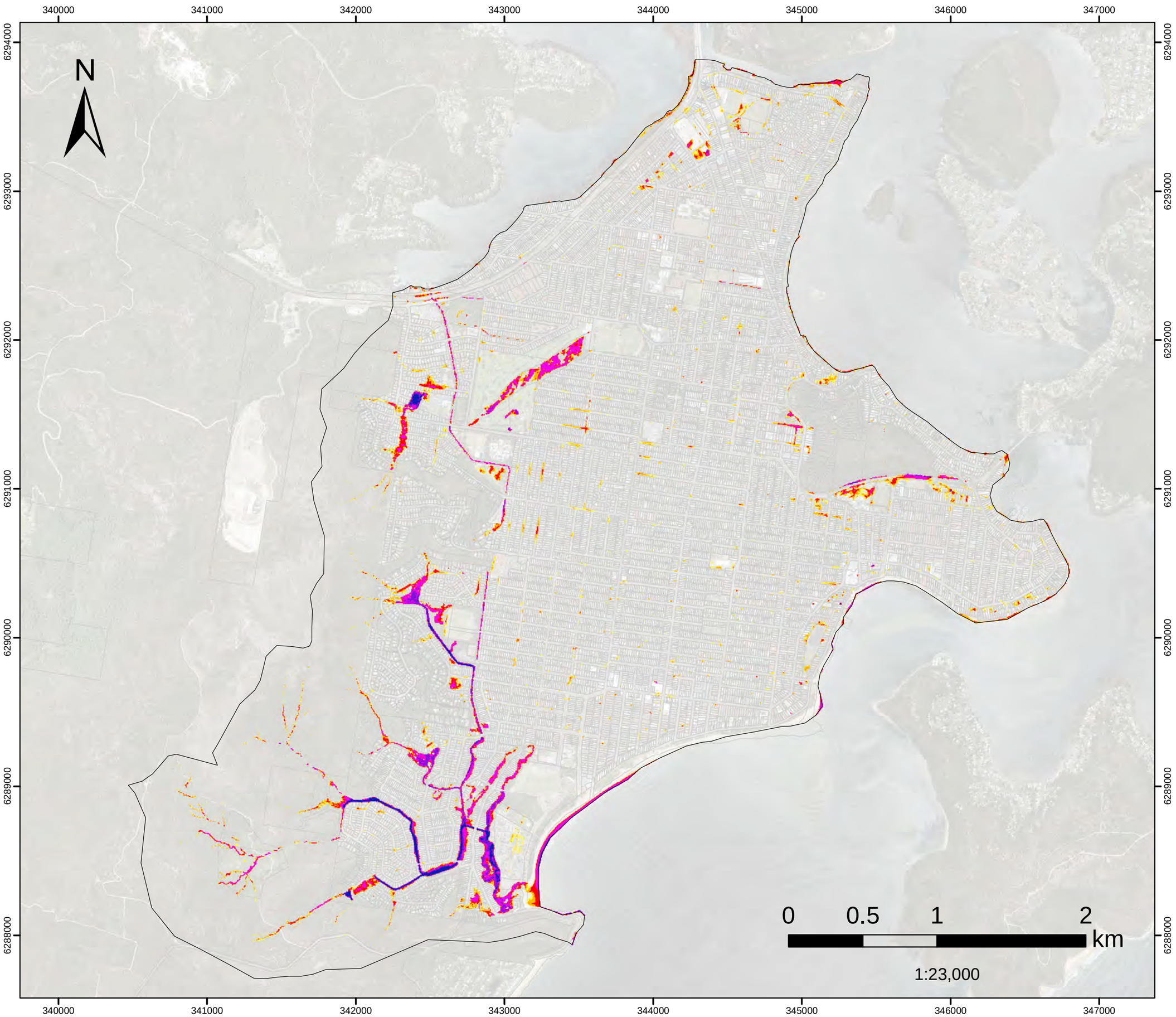


FIGURE E.3

2%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

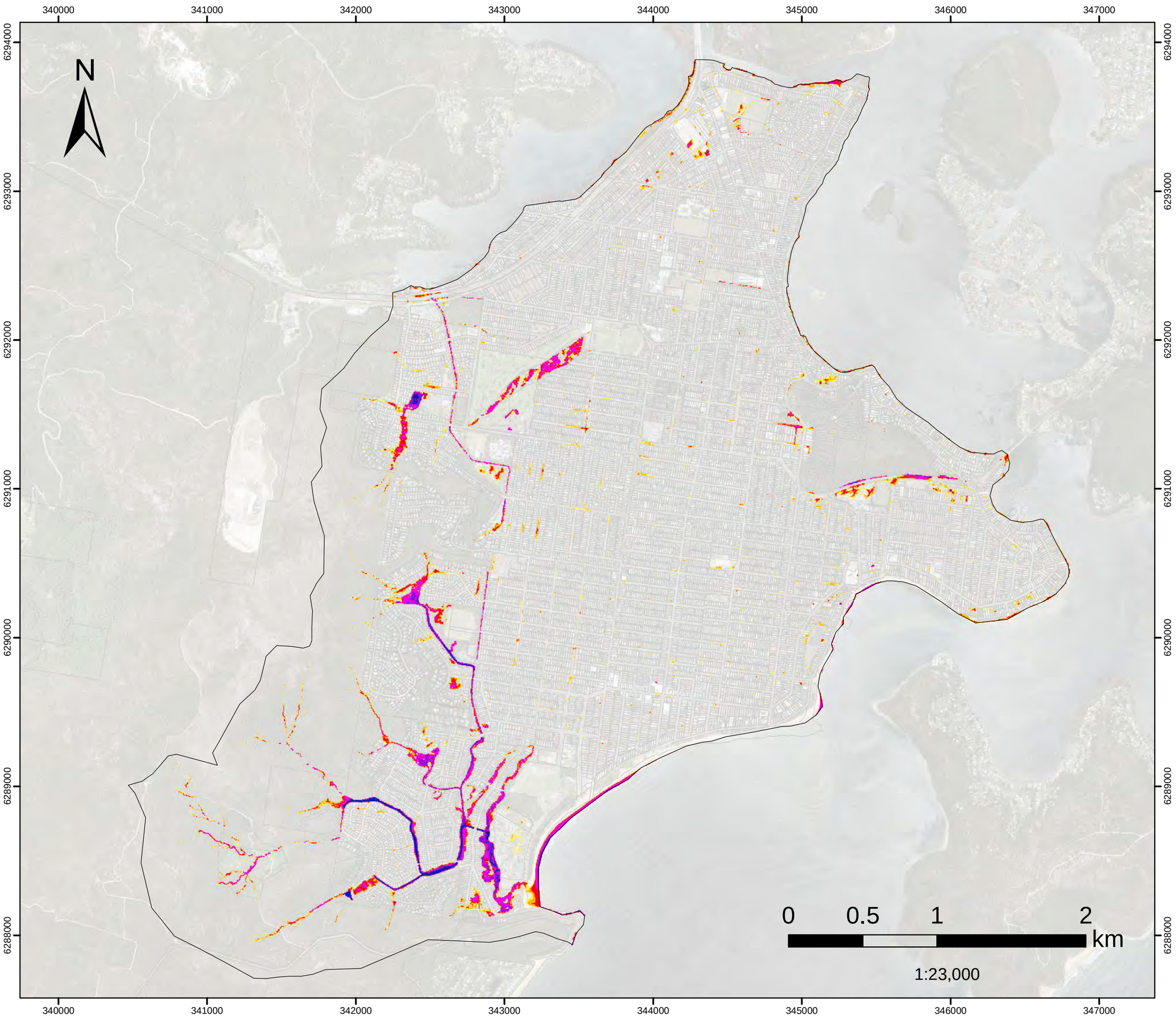


FIGURE E.4

5%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

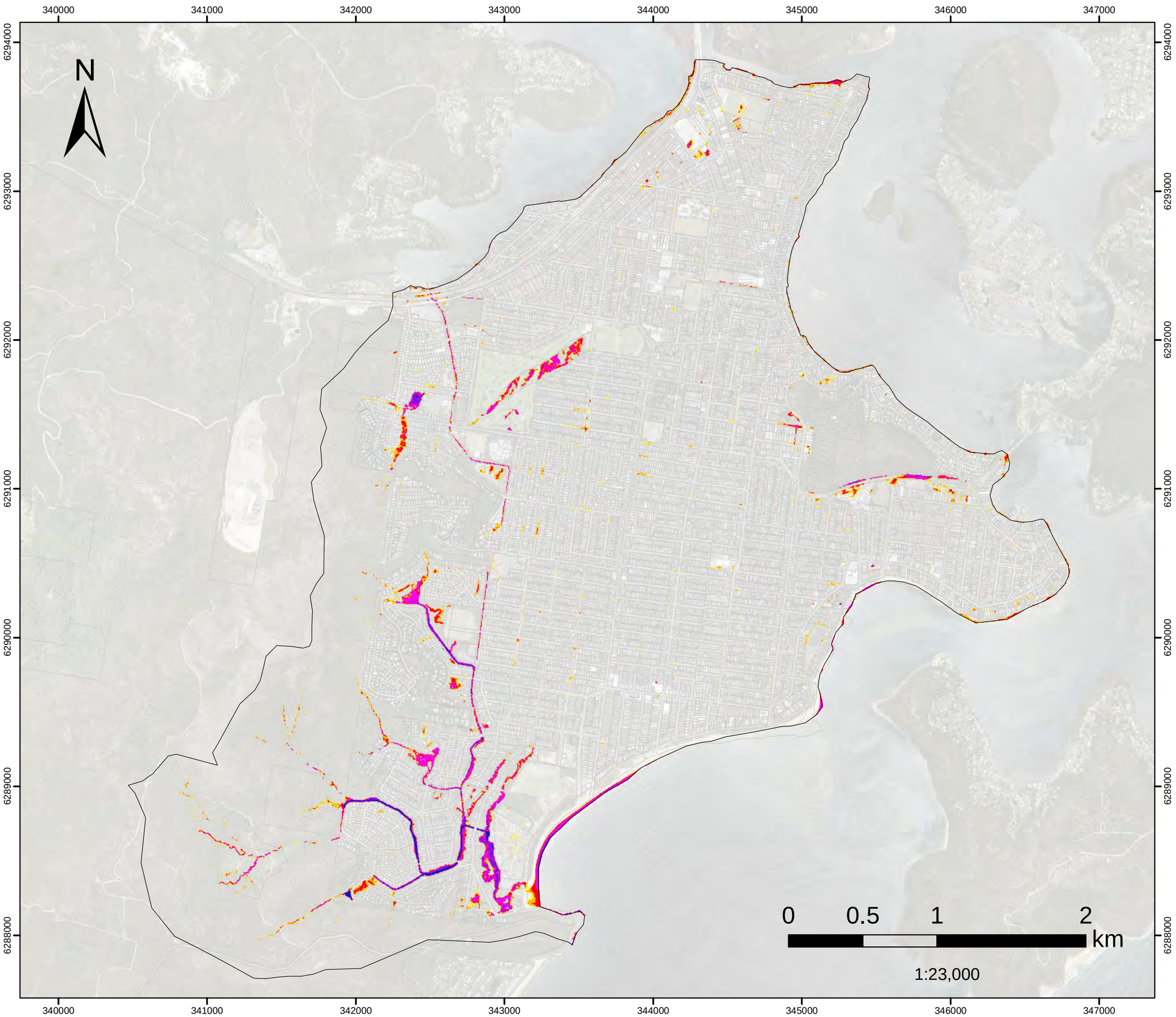


FIGURE E.5

10%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

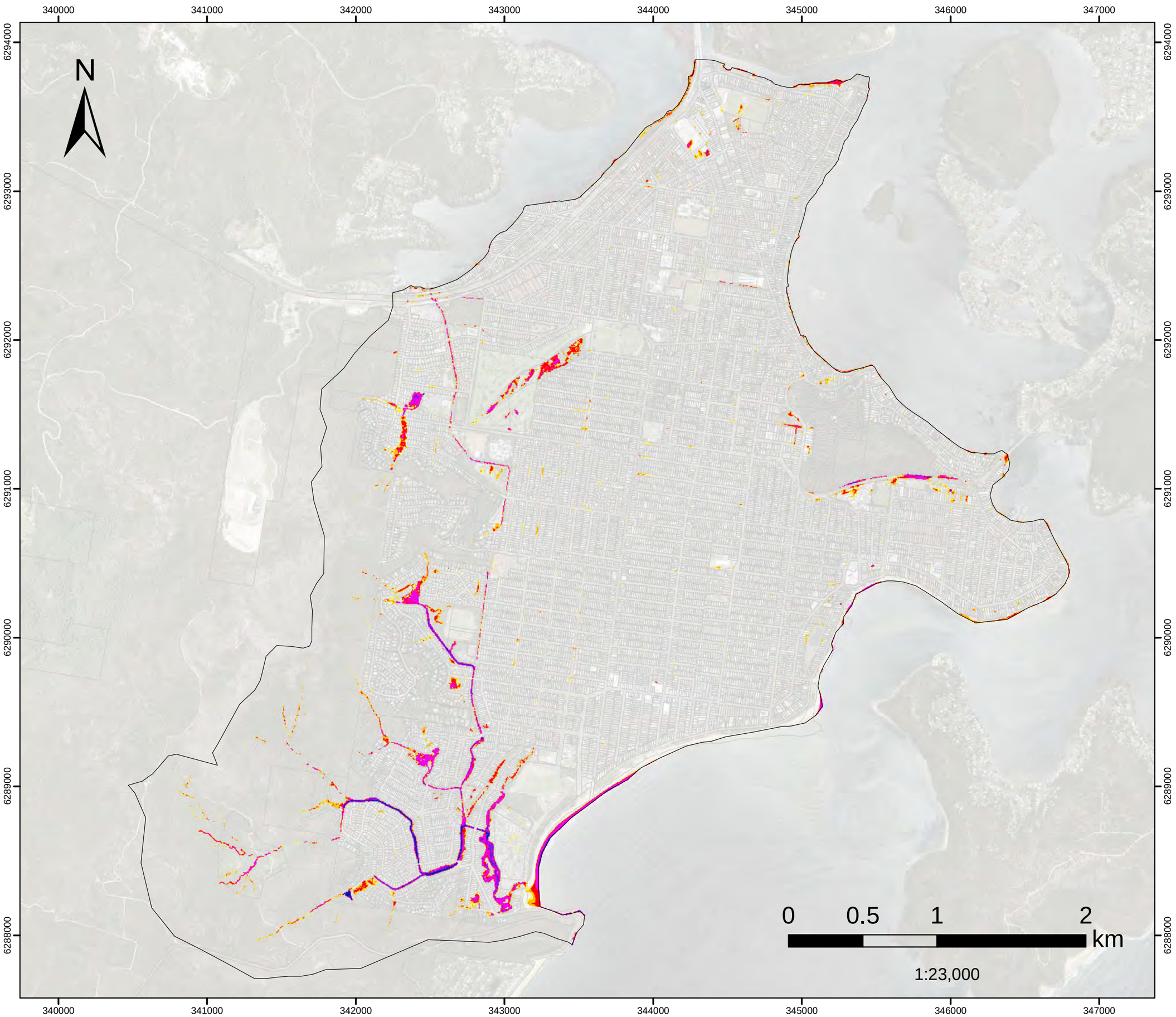


FIGURE E.6

20%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

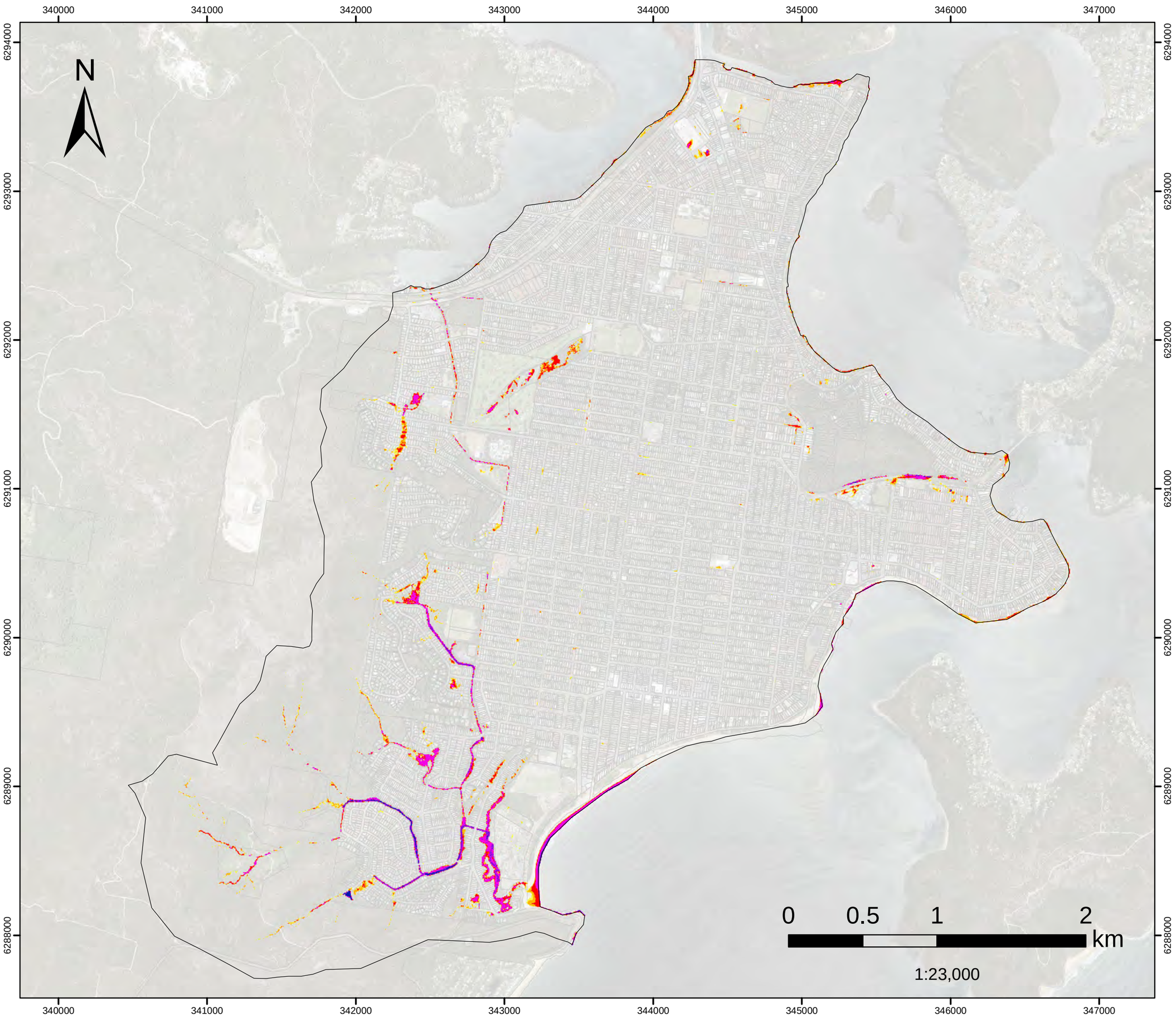


FIGURE E.7

50%AEP Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

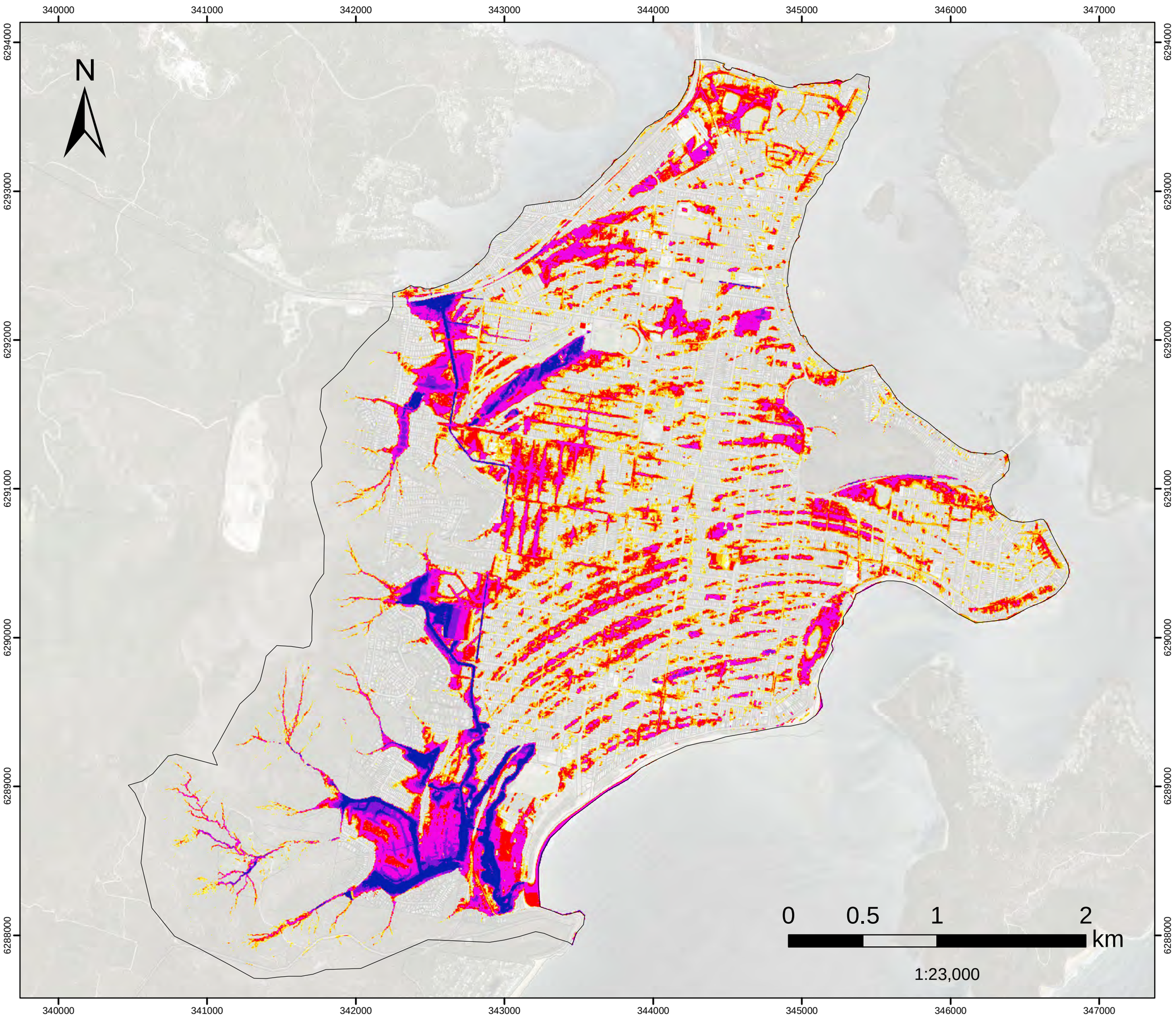


FIGURE E.8

PMF
Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

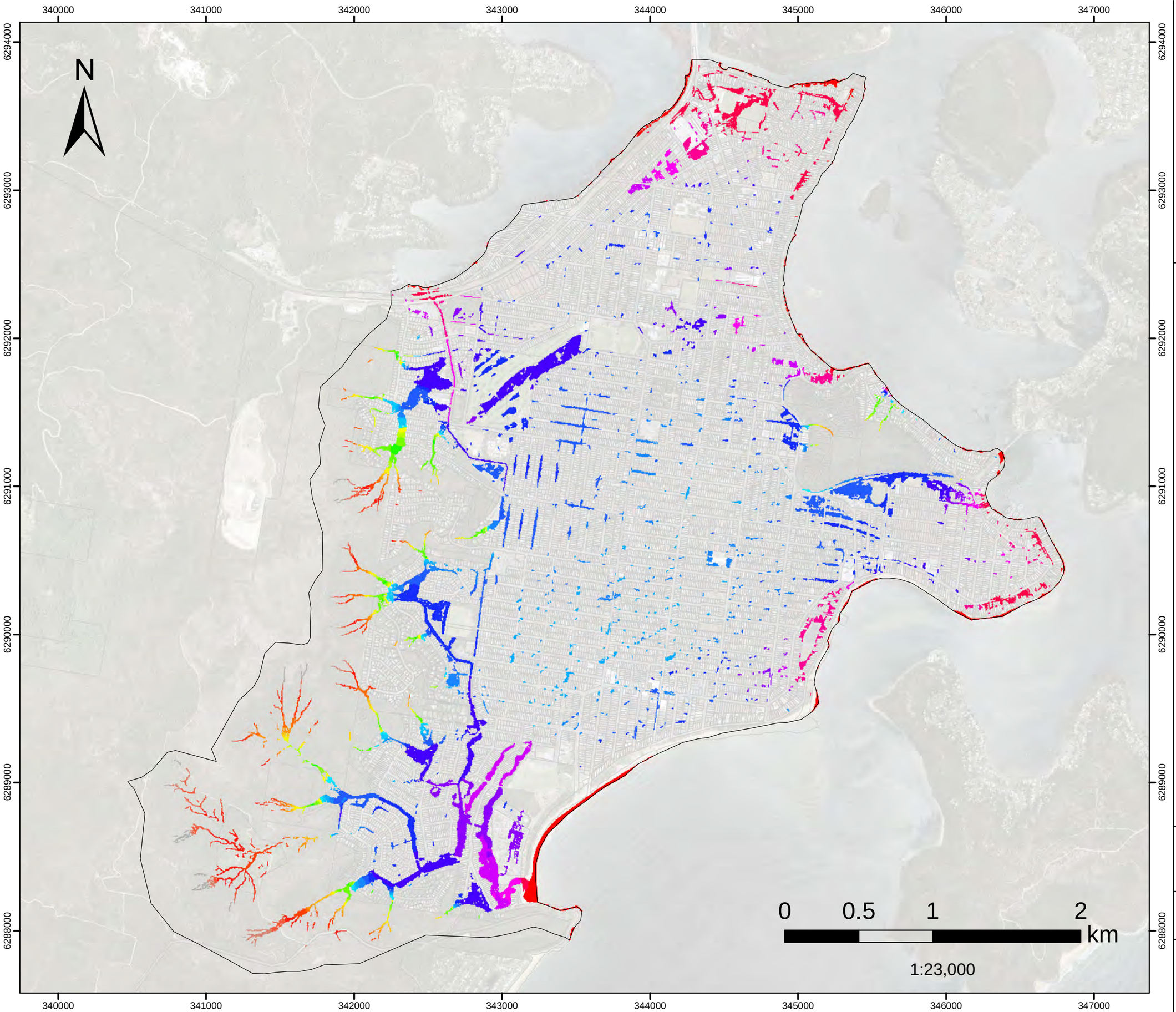


FIGURE E.9

0.5%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

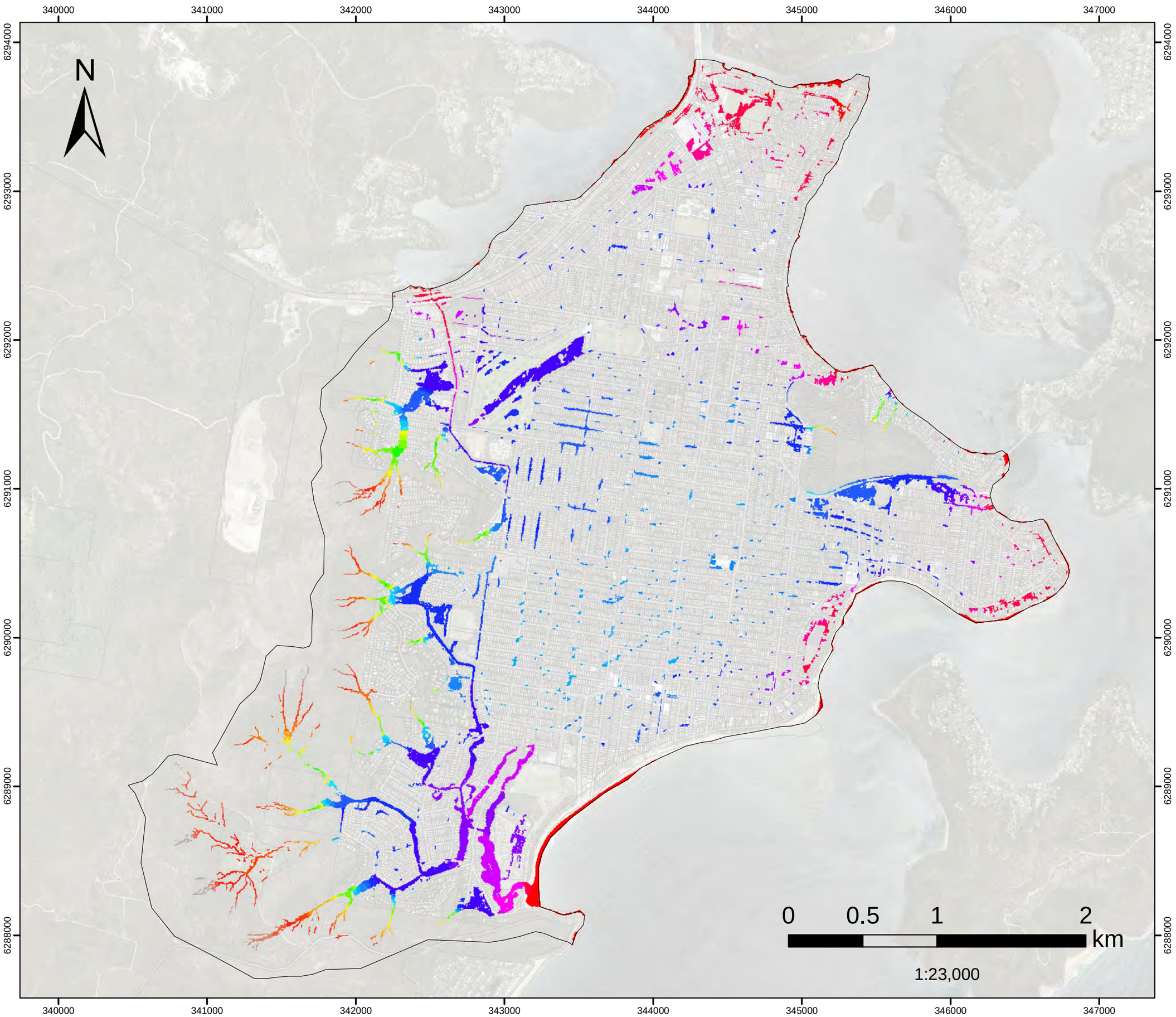


FIGURE E.10

1%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

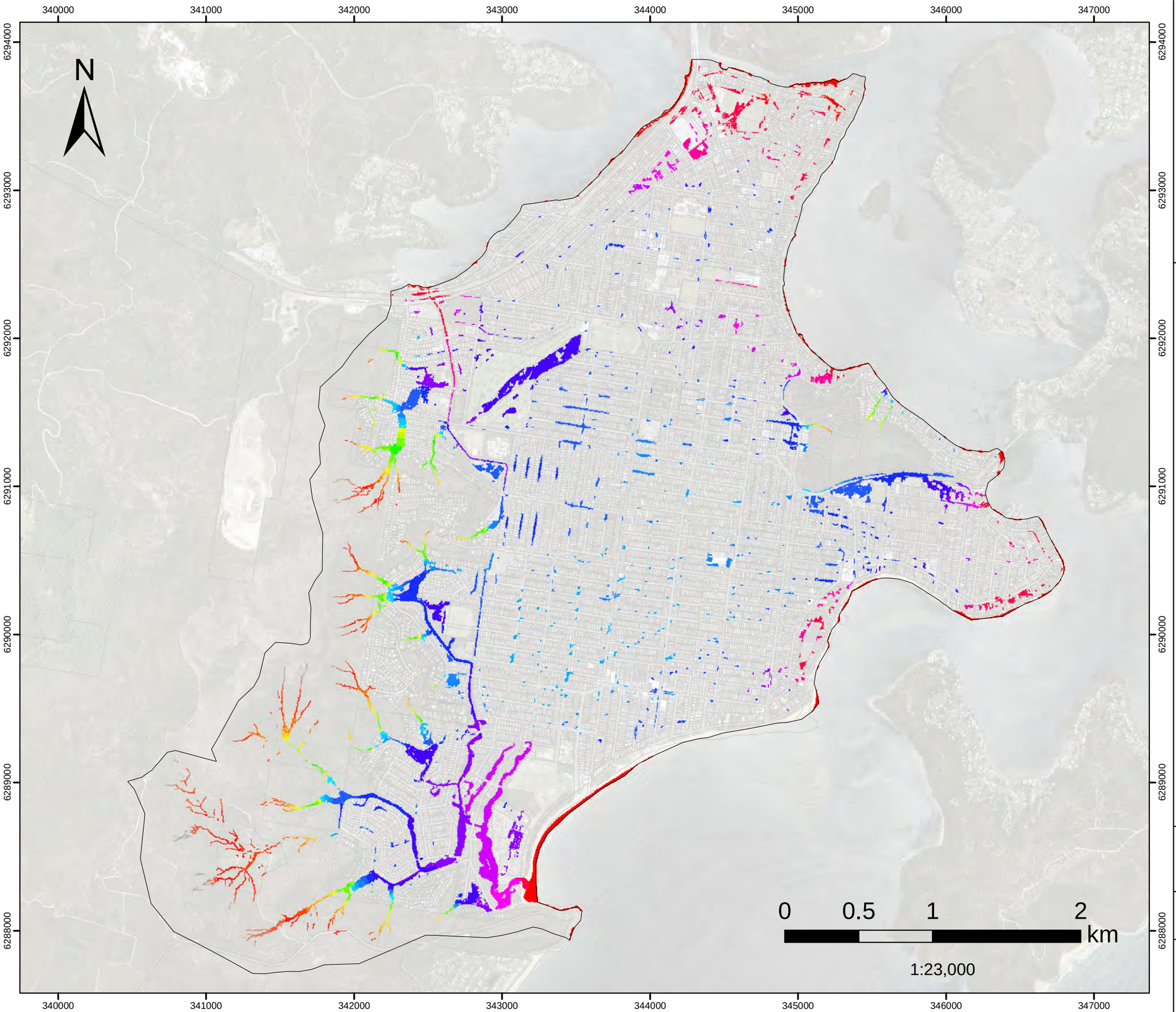


FIGURE E.11

2%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

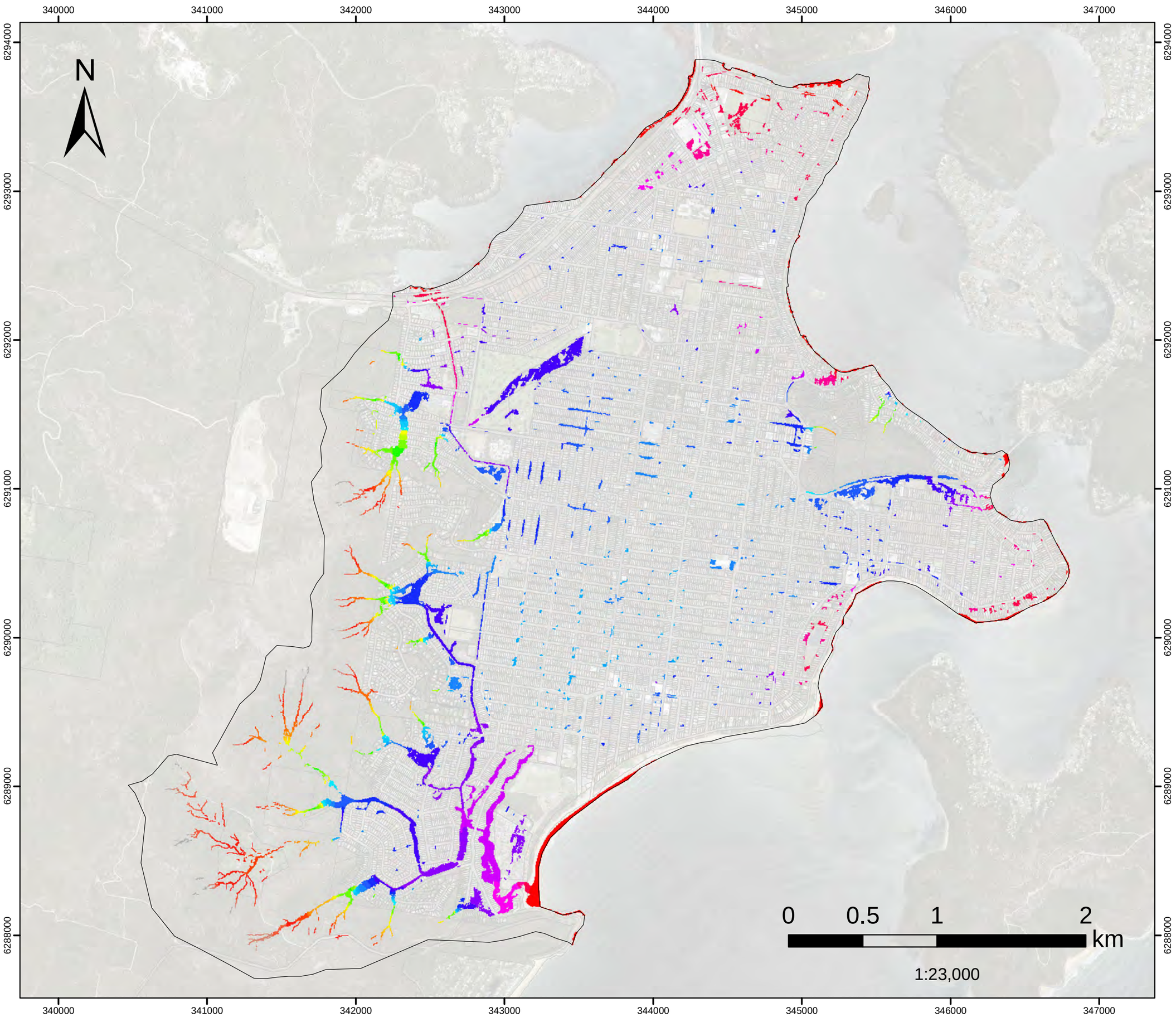


FIGURE E.12

5%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

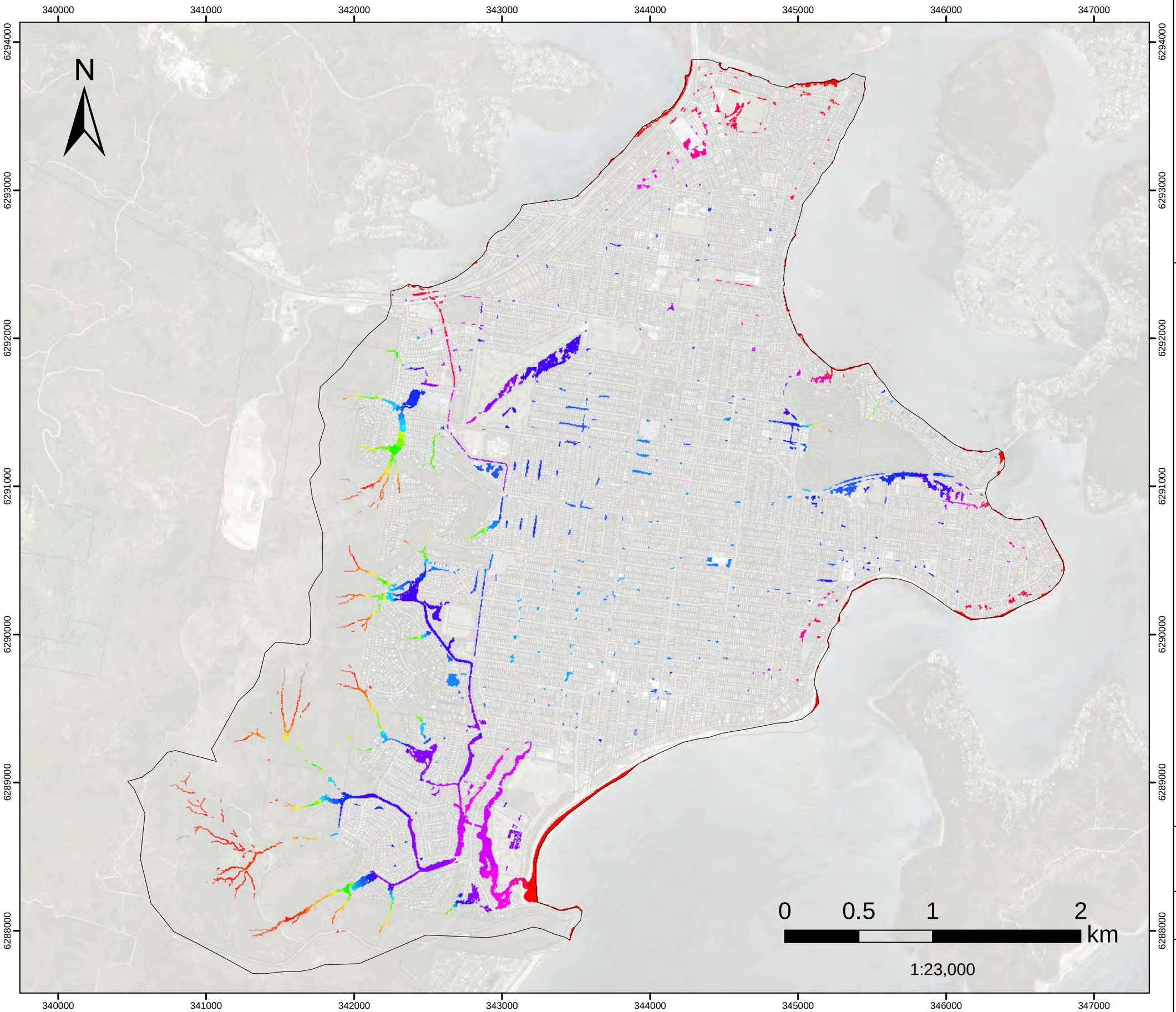


FIGURE E.13

10%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

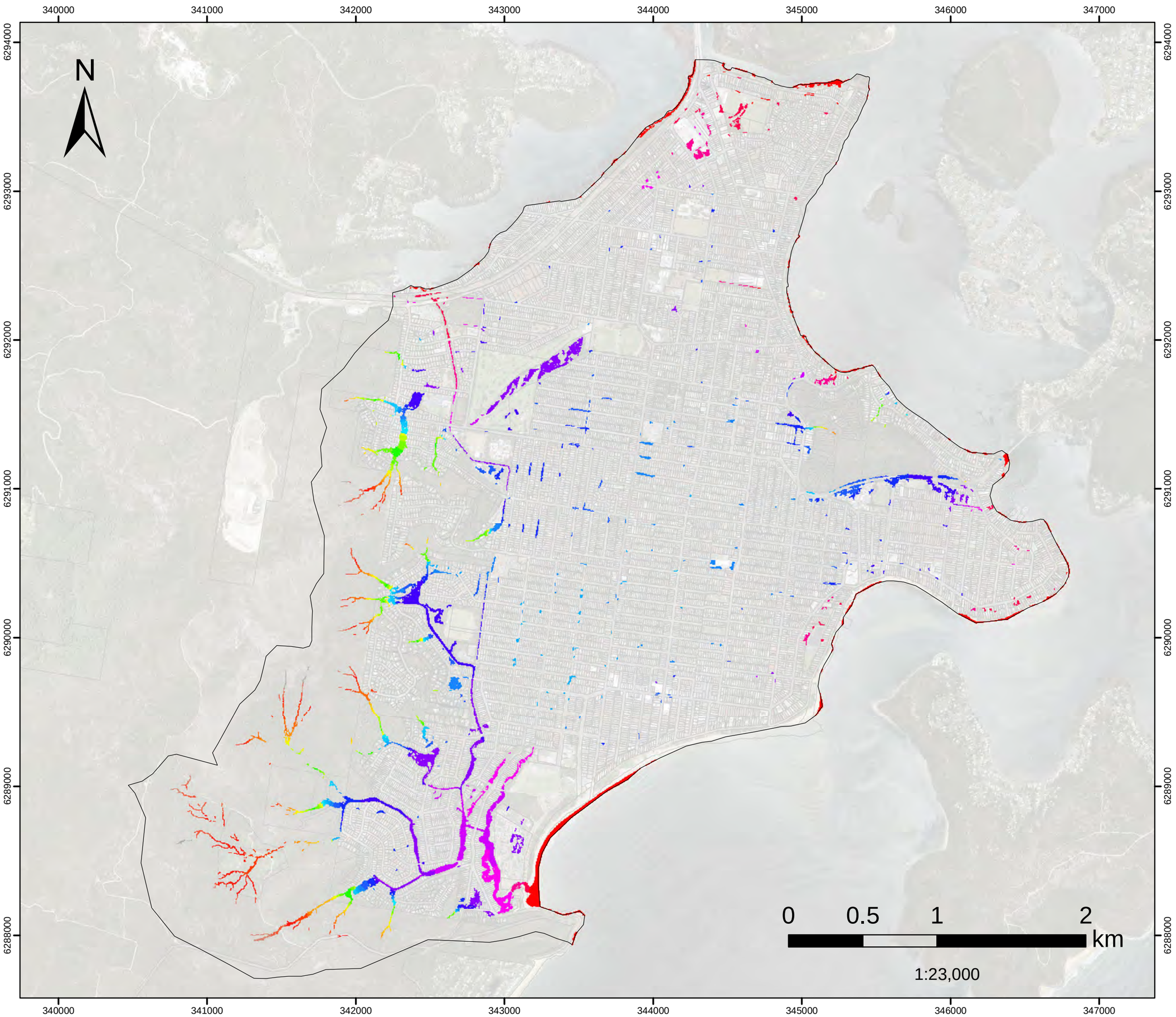


FIGURE E.14

20%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

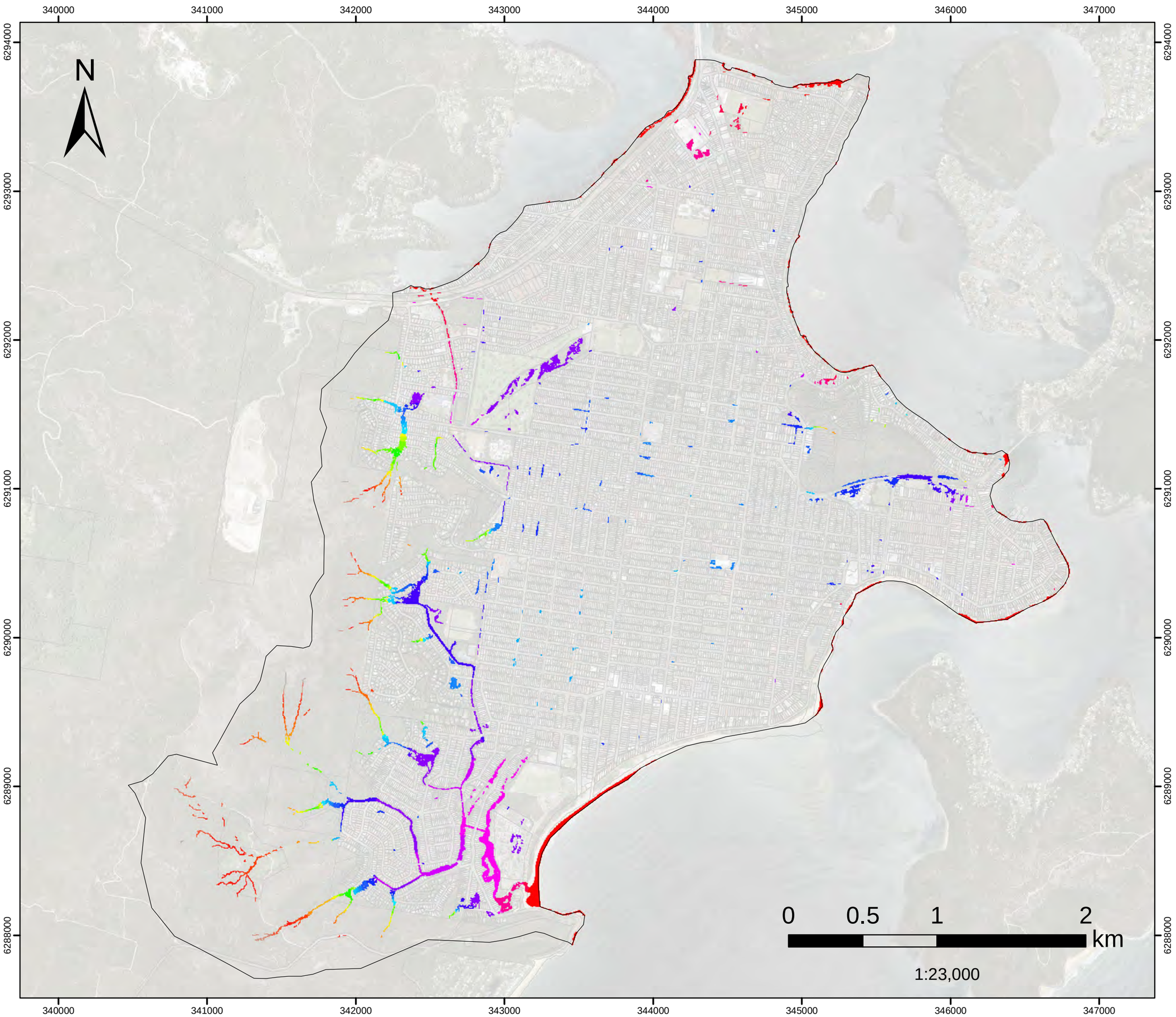


FIGURE E.15

50%AEP Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

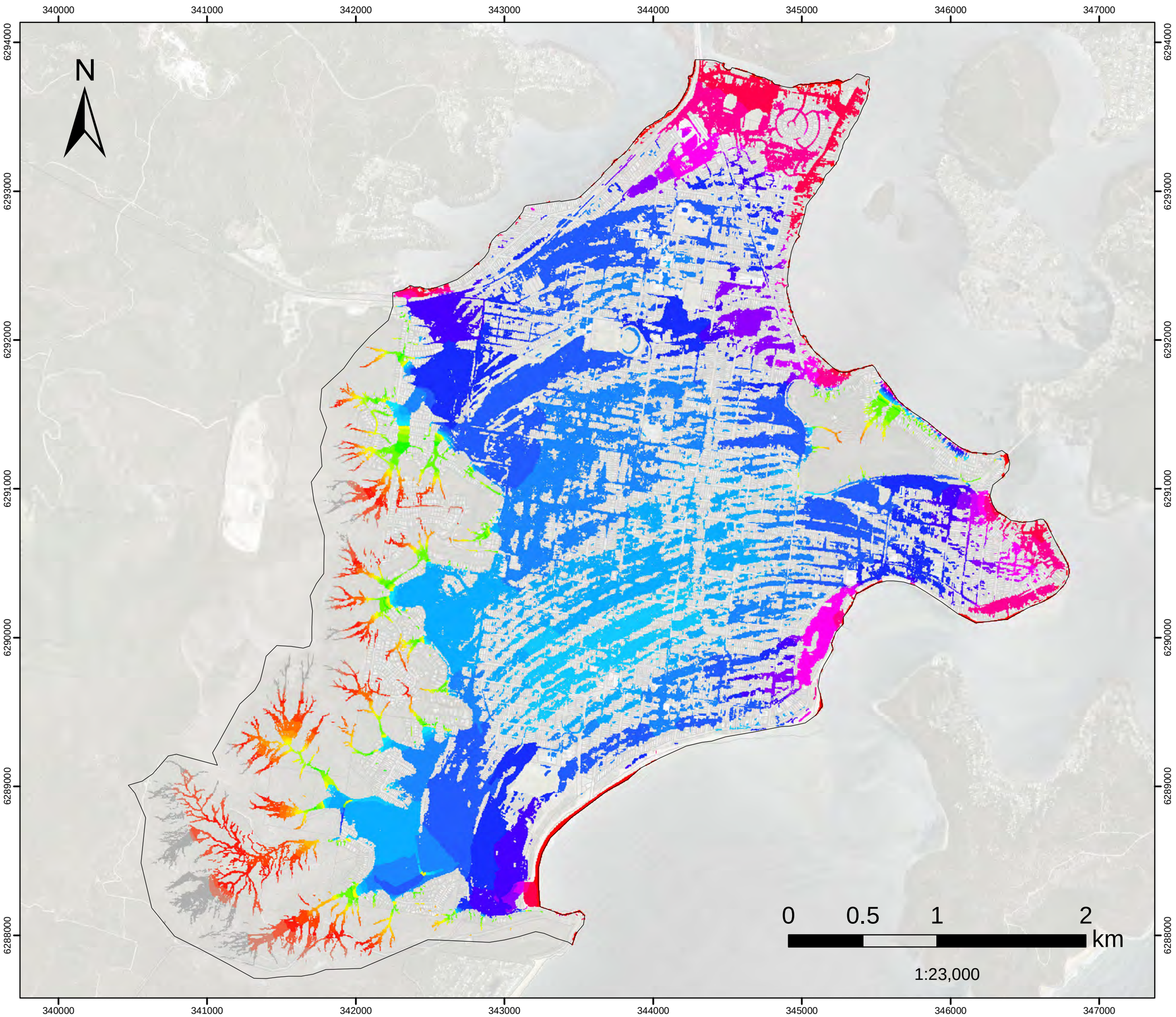


FIGURE E.16

PMF
Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

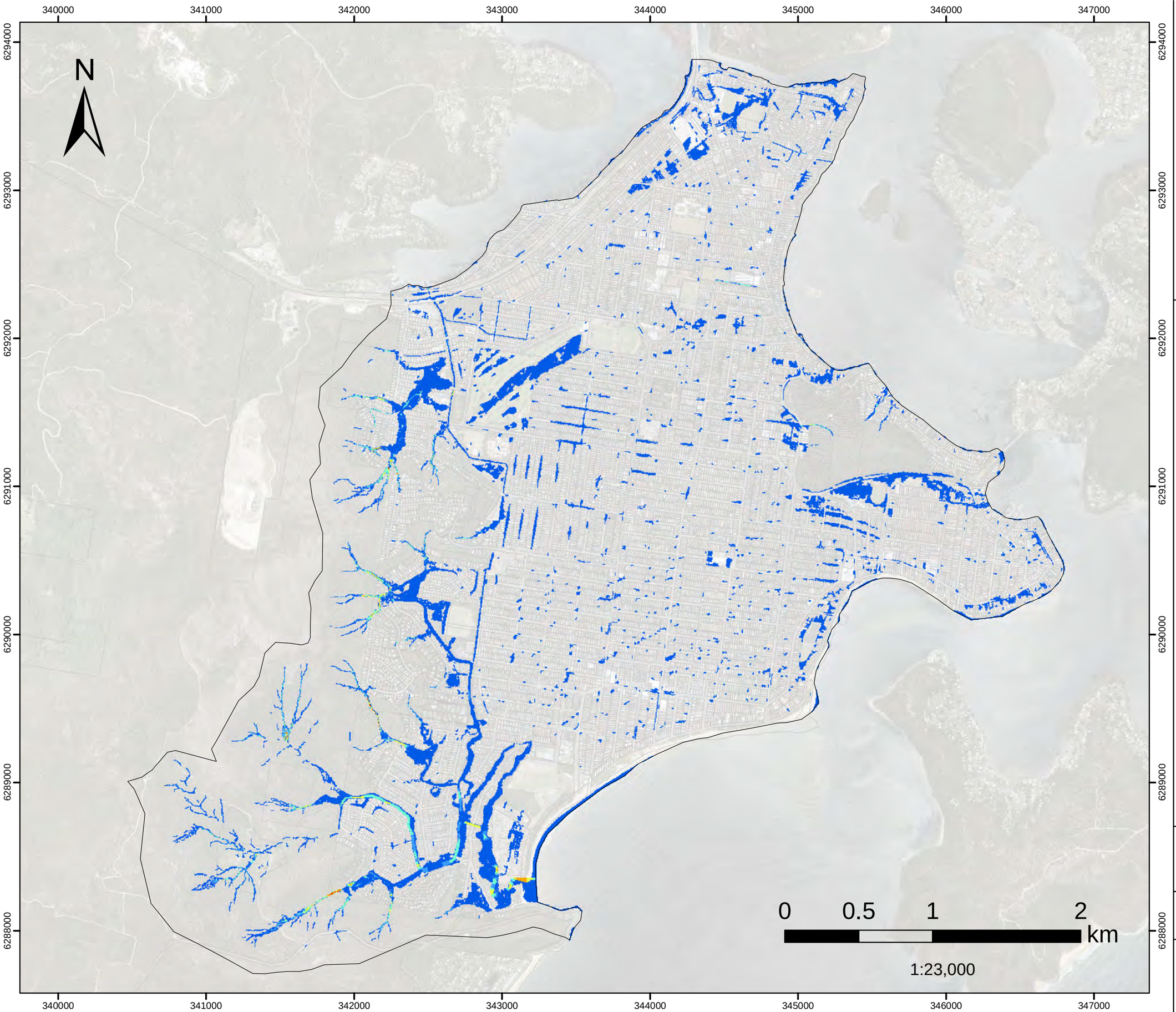


FIGURE E.17

0.5%AEP Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

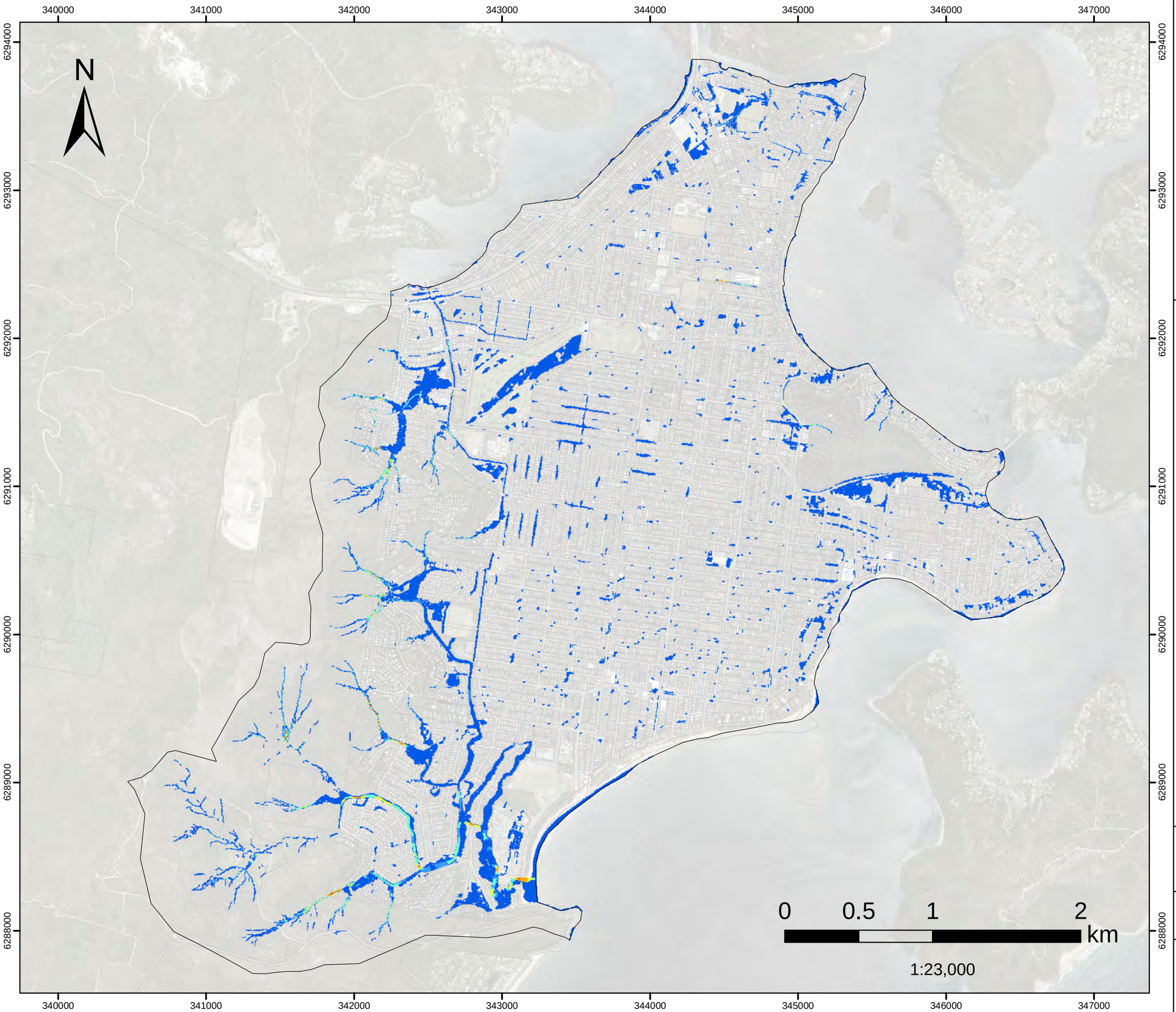


FIGURE E.18

1%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

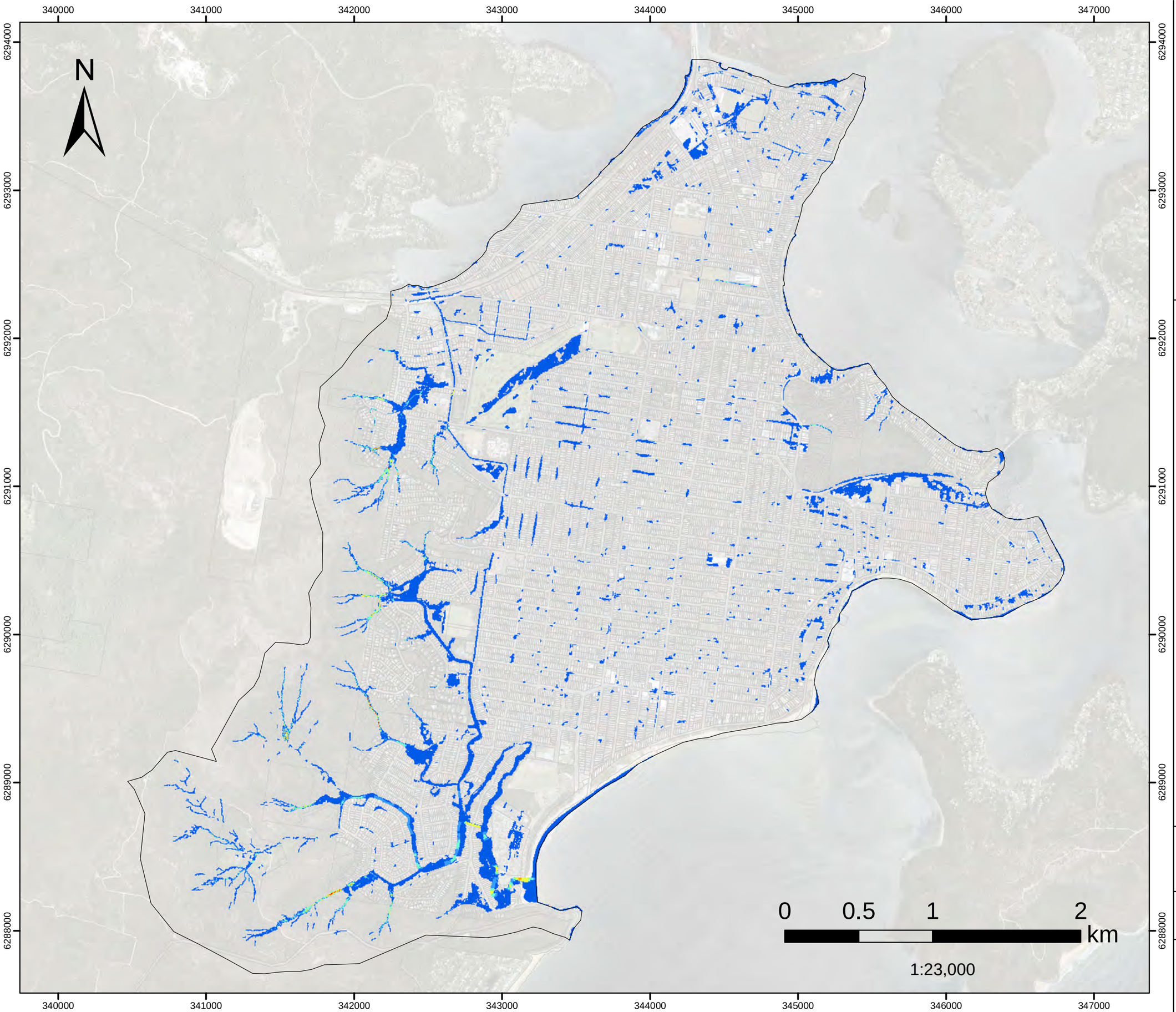


FIGURE E.19

2%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

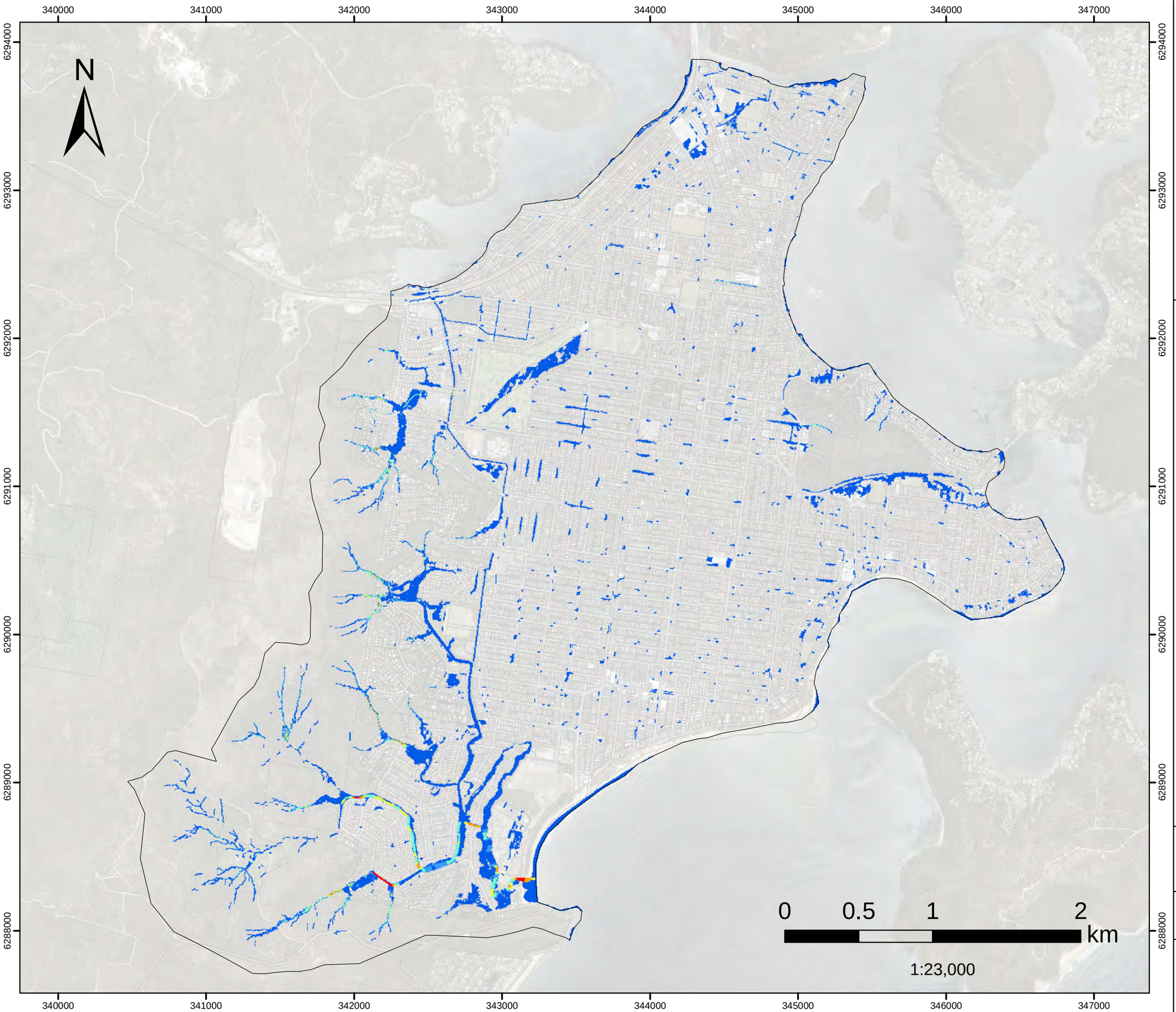


FIGURE E.20

5%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

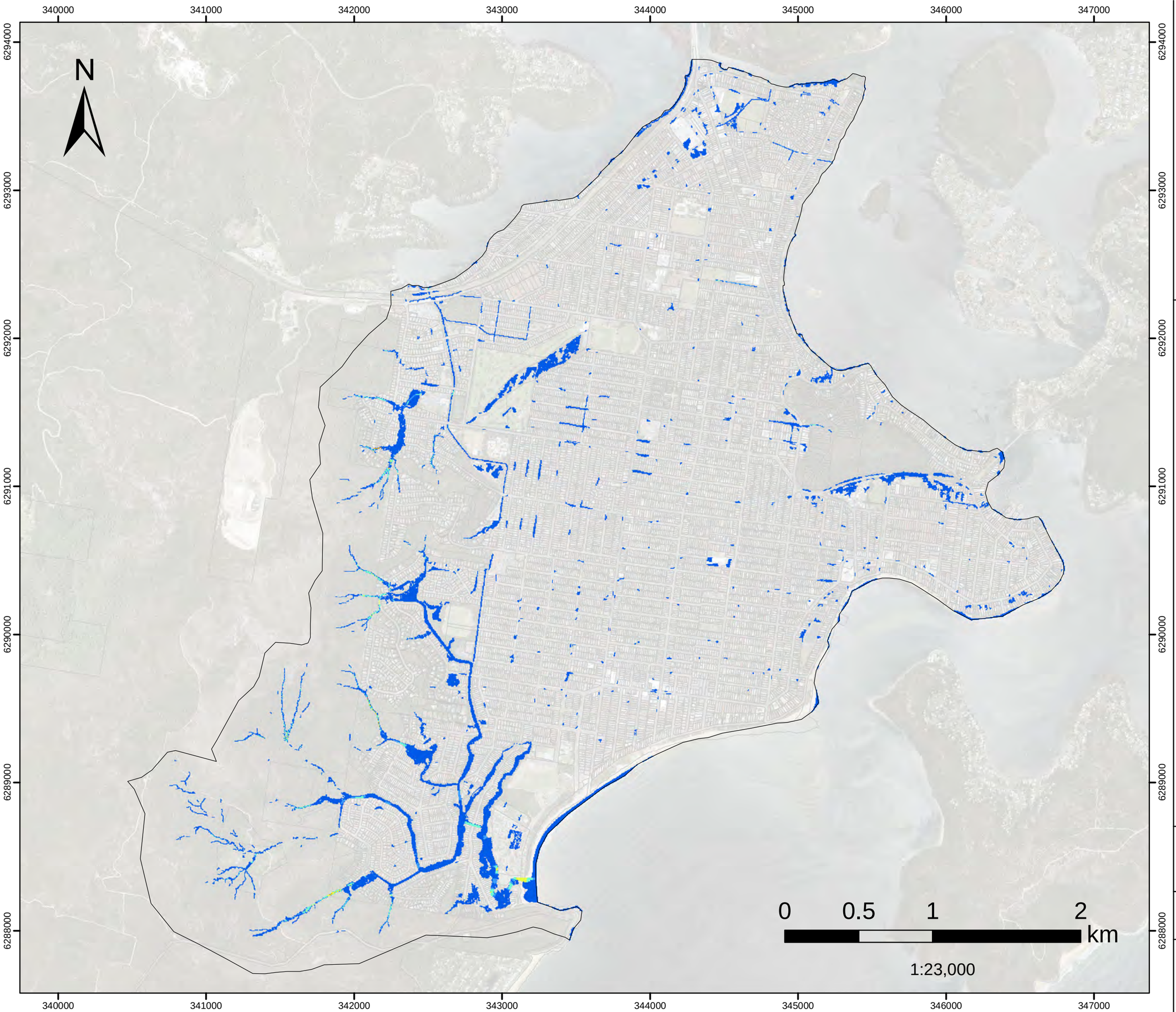


FIGURE E.21

10%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

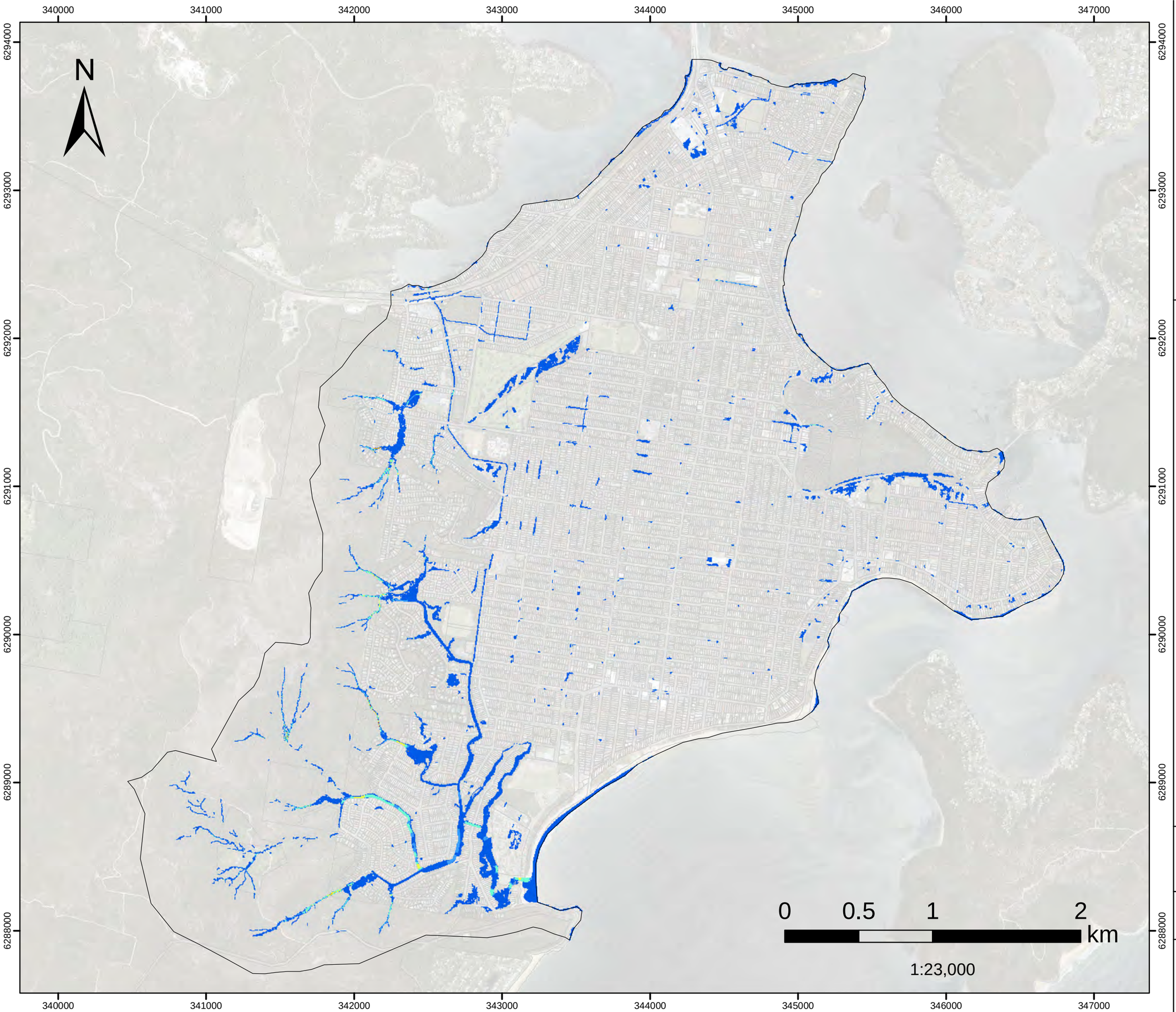


FIGURE E.22

20%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

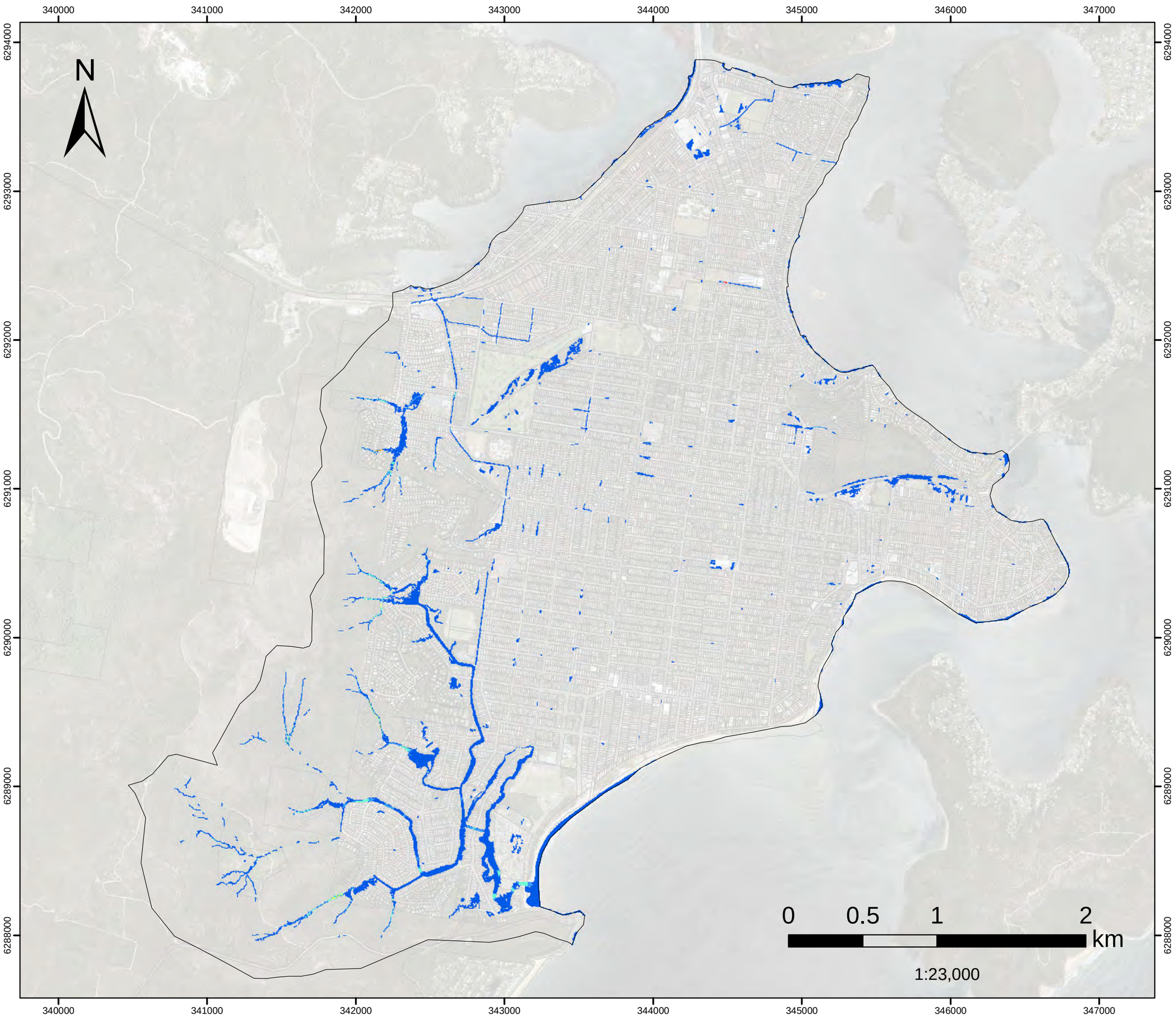


FIGURE E.23

50%AEP
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

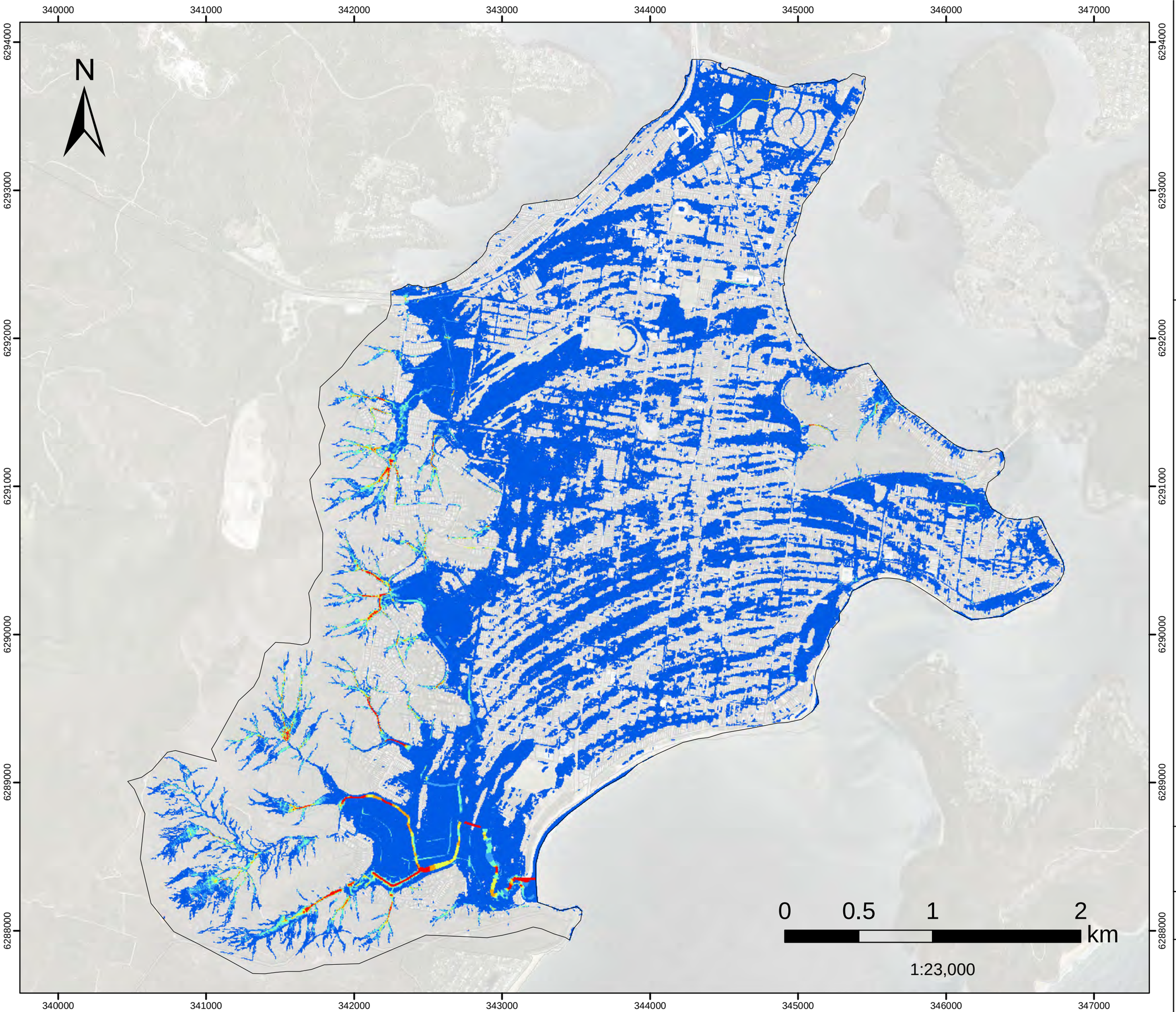


FIGURE E.24

PMF
Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Oct 2020
Project No	43803055

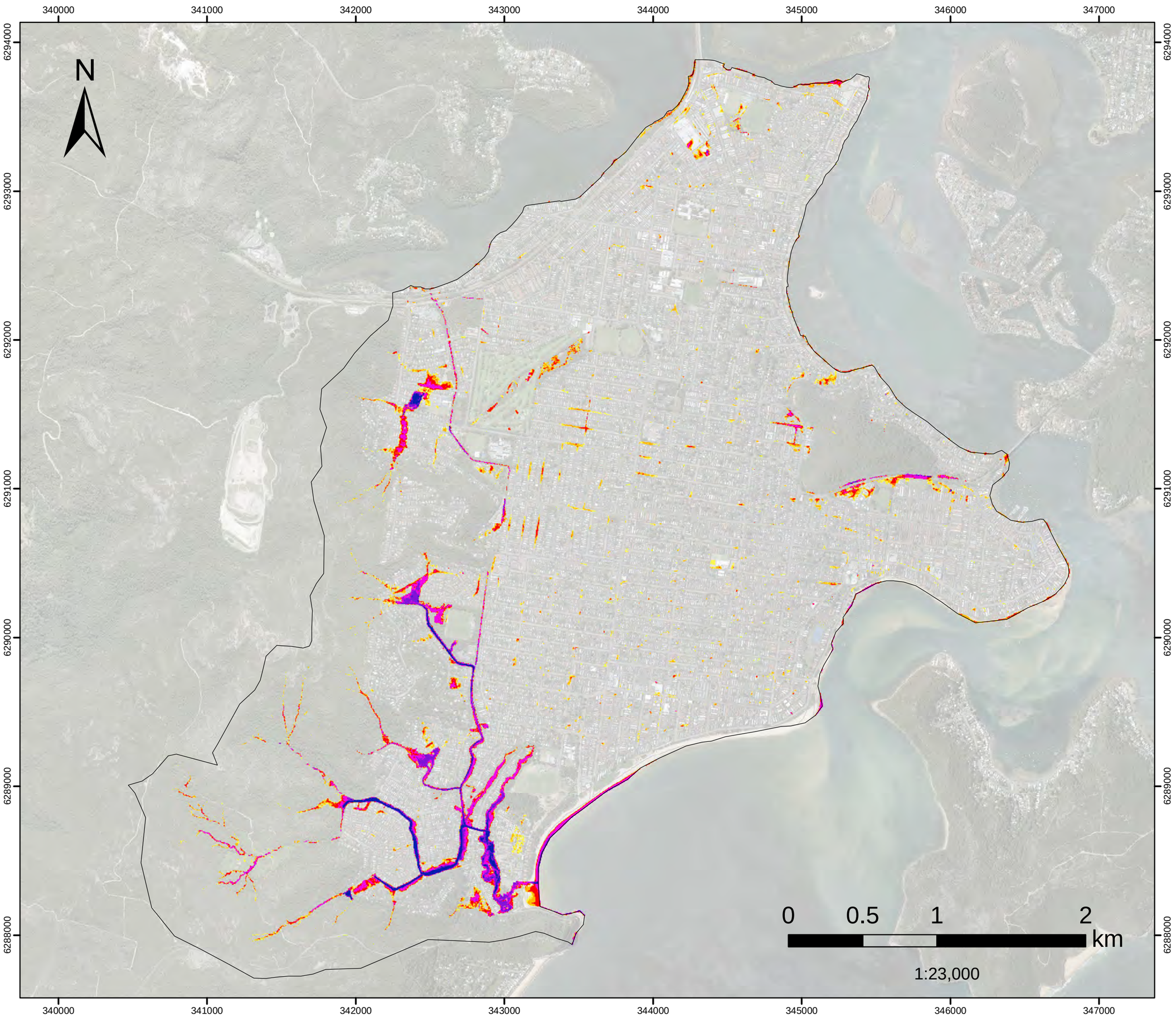


FIGURE E.25
0.5%AEP (Critical Duration) Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

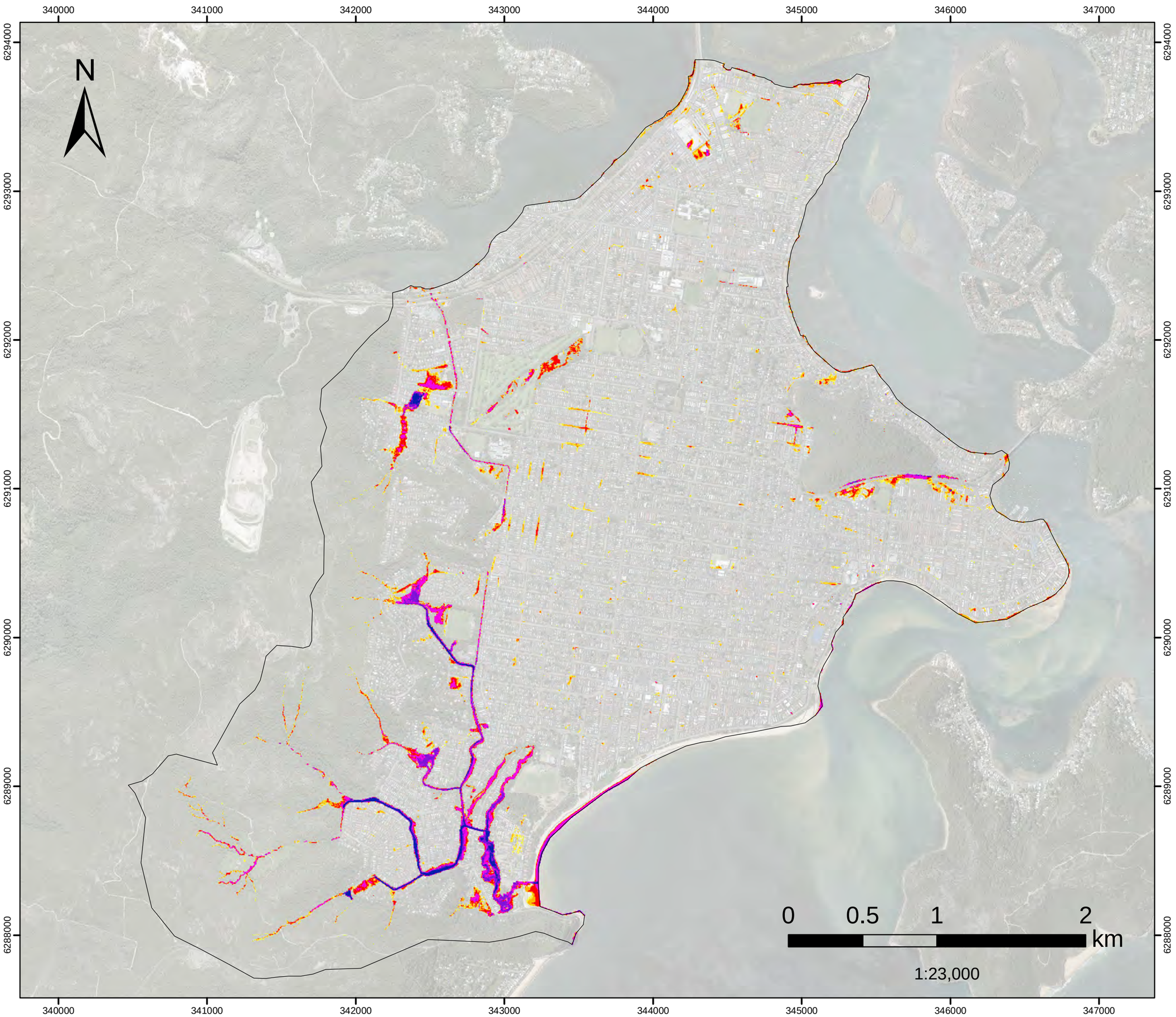


FIGURE E.26
1%AEP
(Critical Duration)
Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

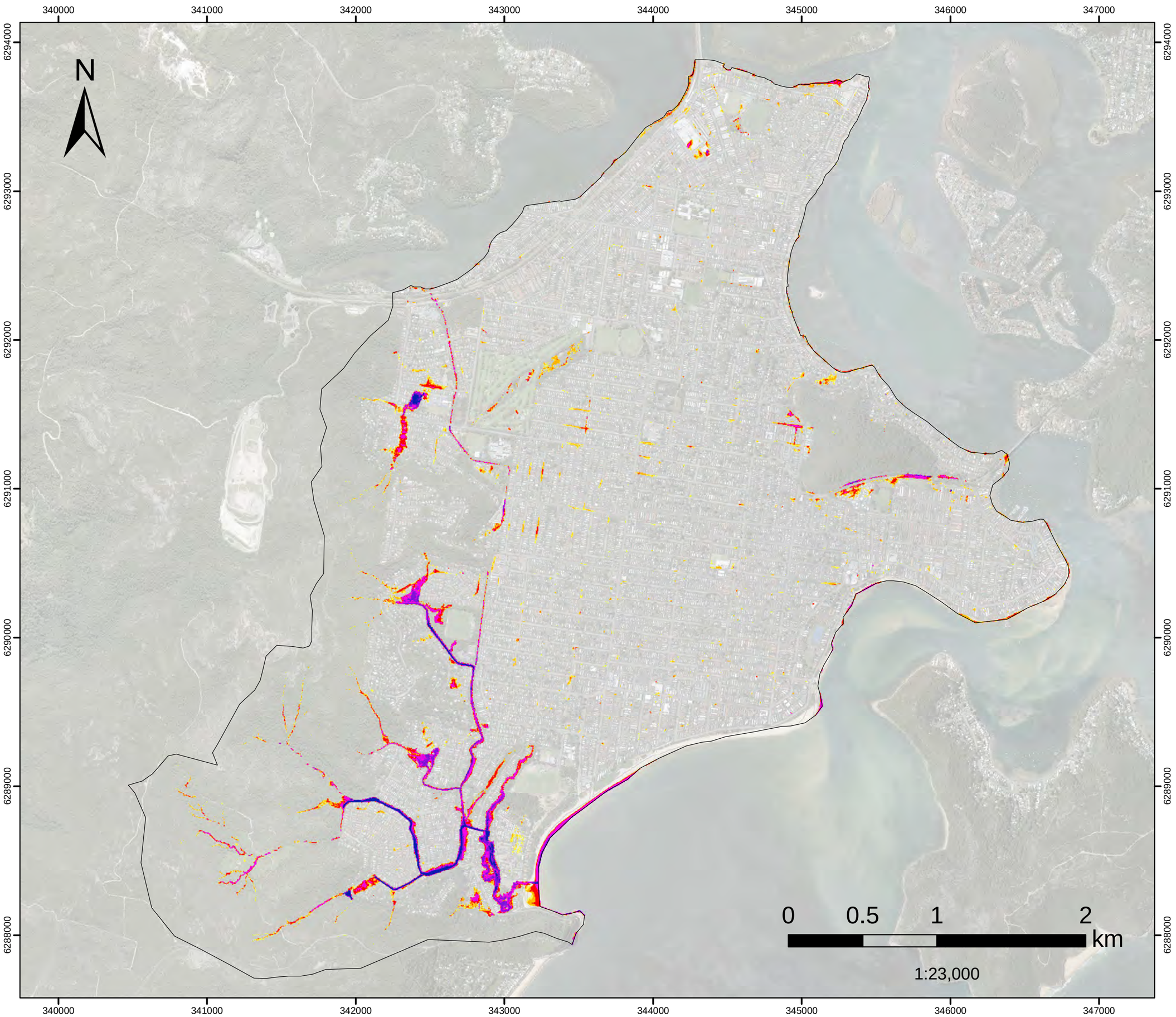


FIGURE E.27
2%AEP
(Critical Duration)
Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

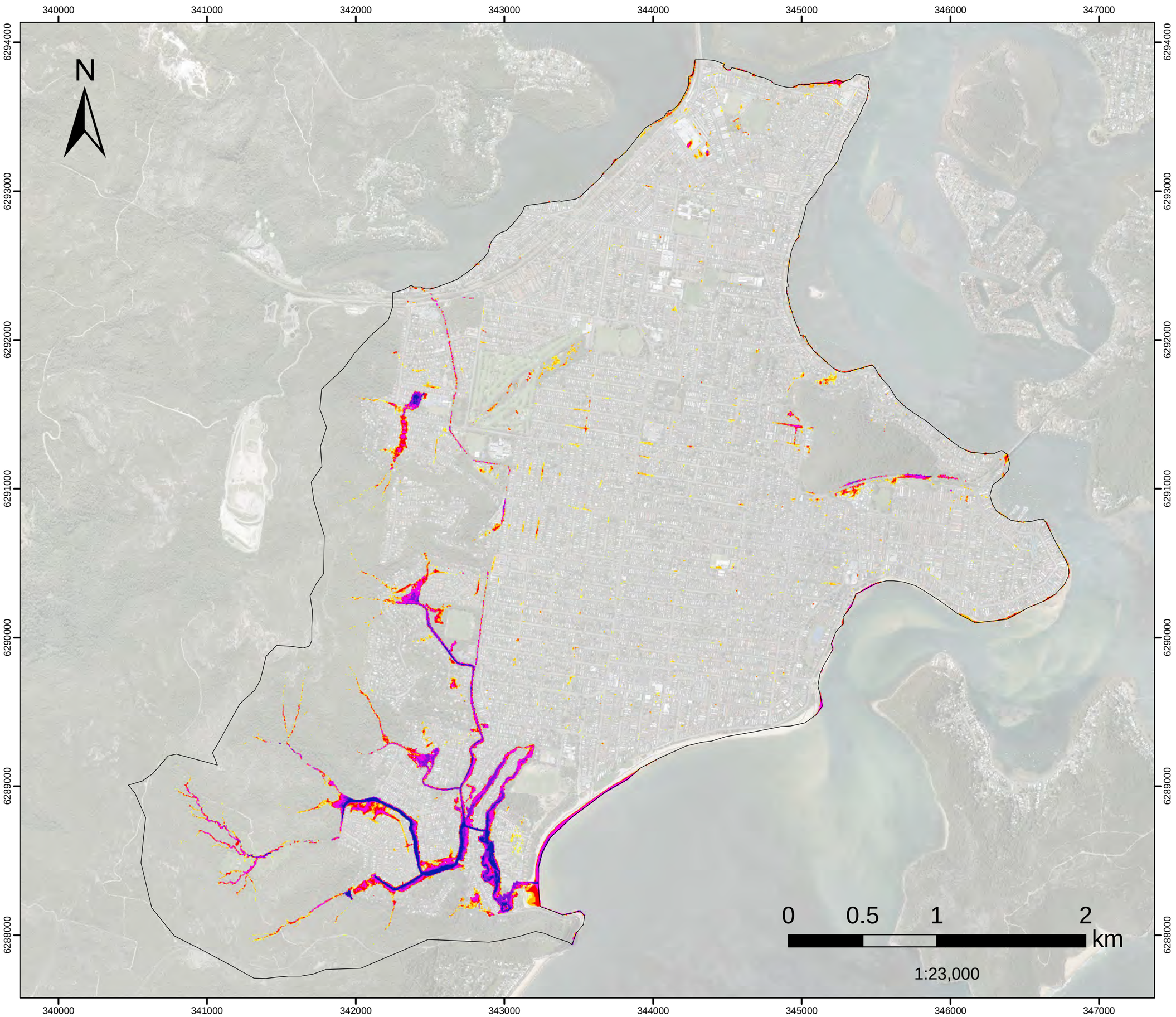


FIGURE E.28
5%AEP (Critical Duration) Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

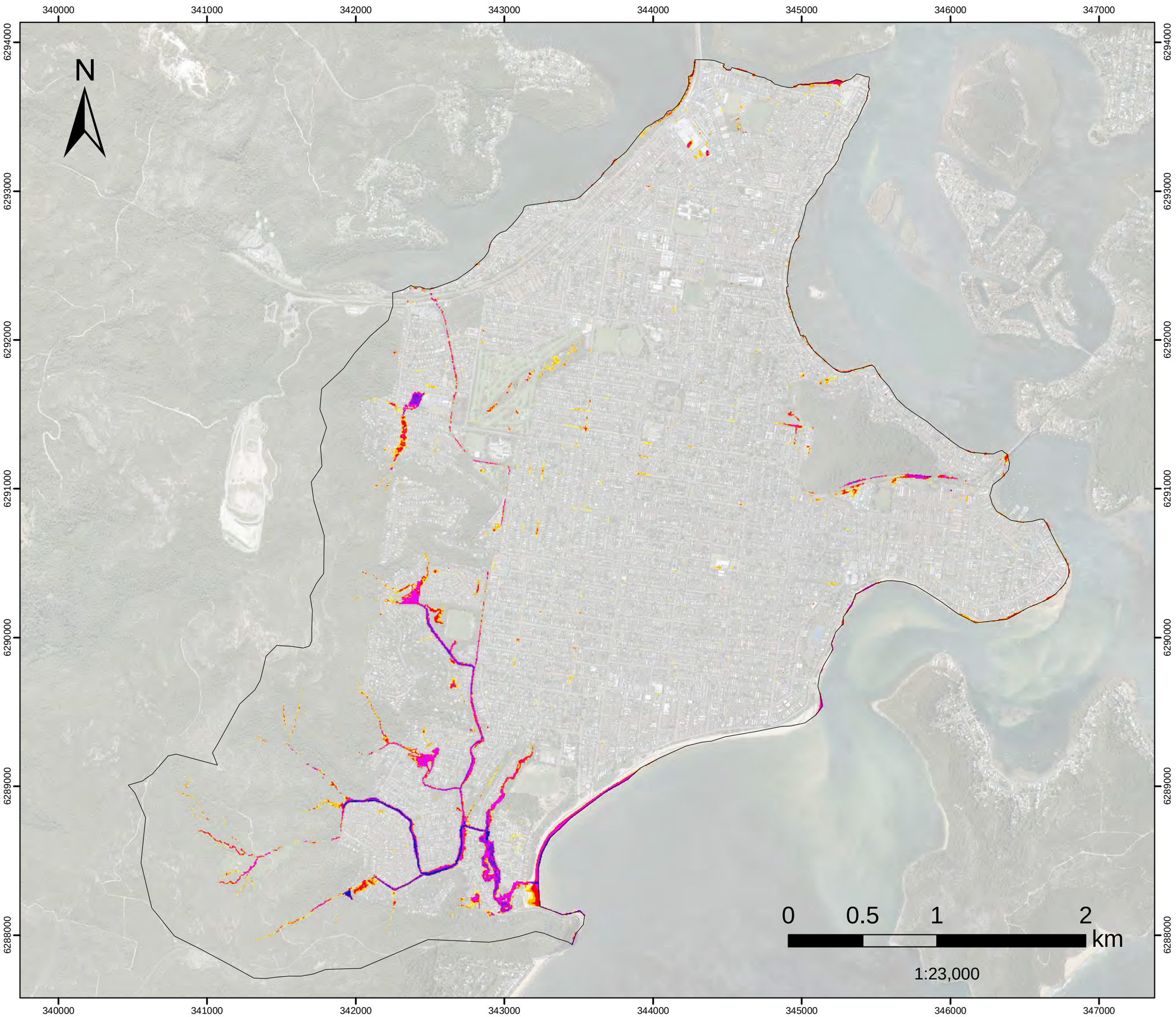


FIGURE E.29
10%AEP (Critical Duration) Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 3hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

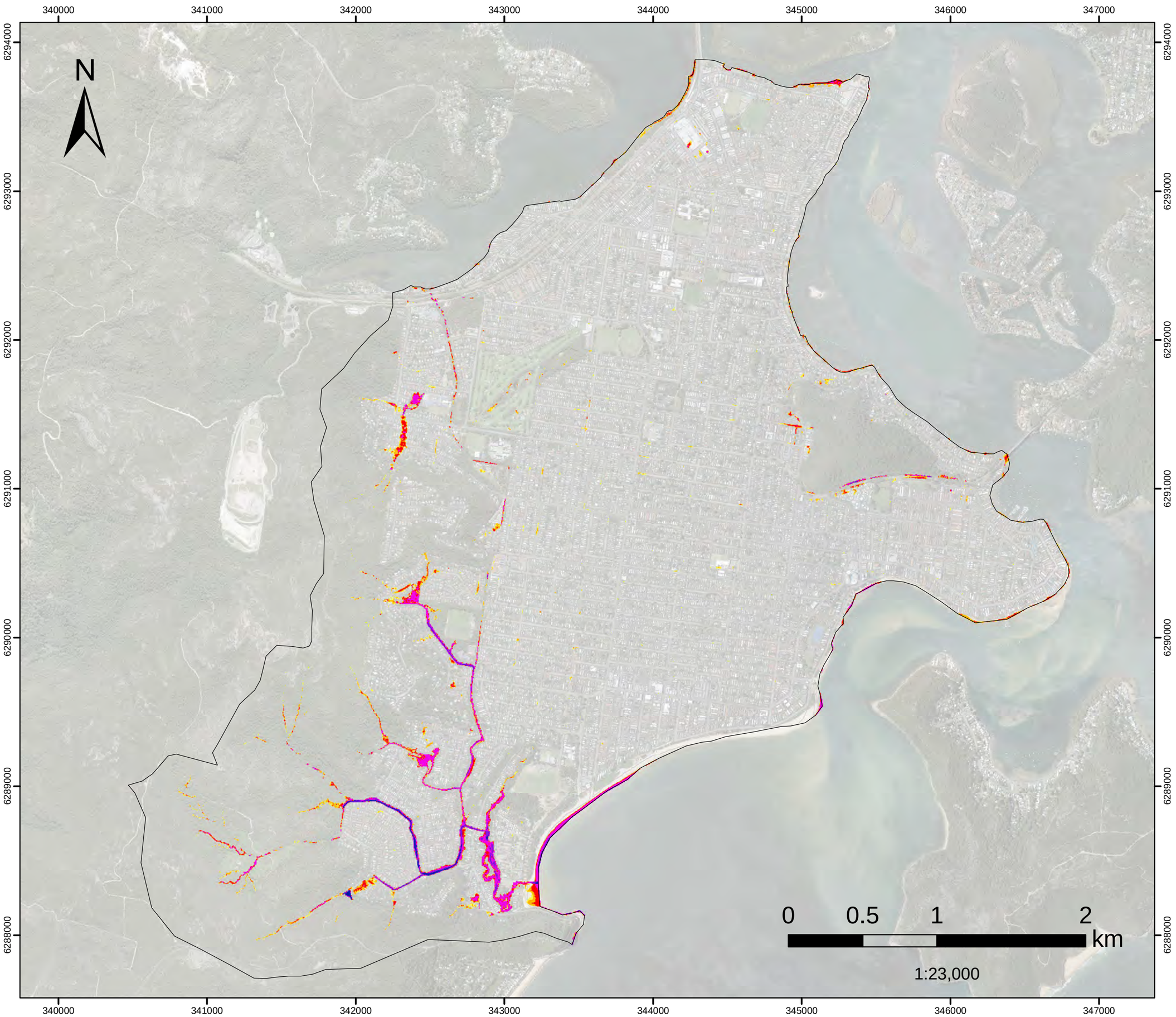


FIGURE E.30
20%AEP
(Critical Duration)
Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 1hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

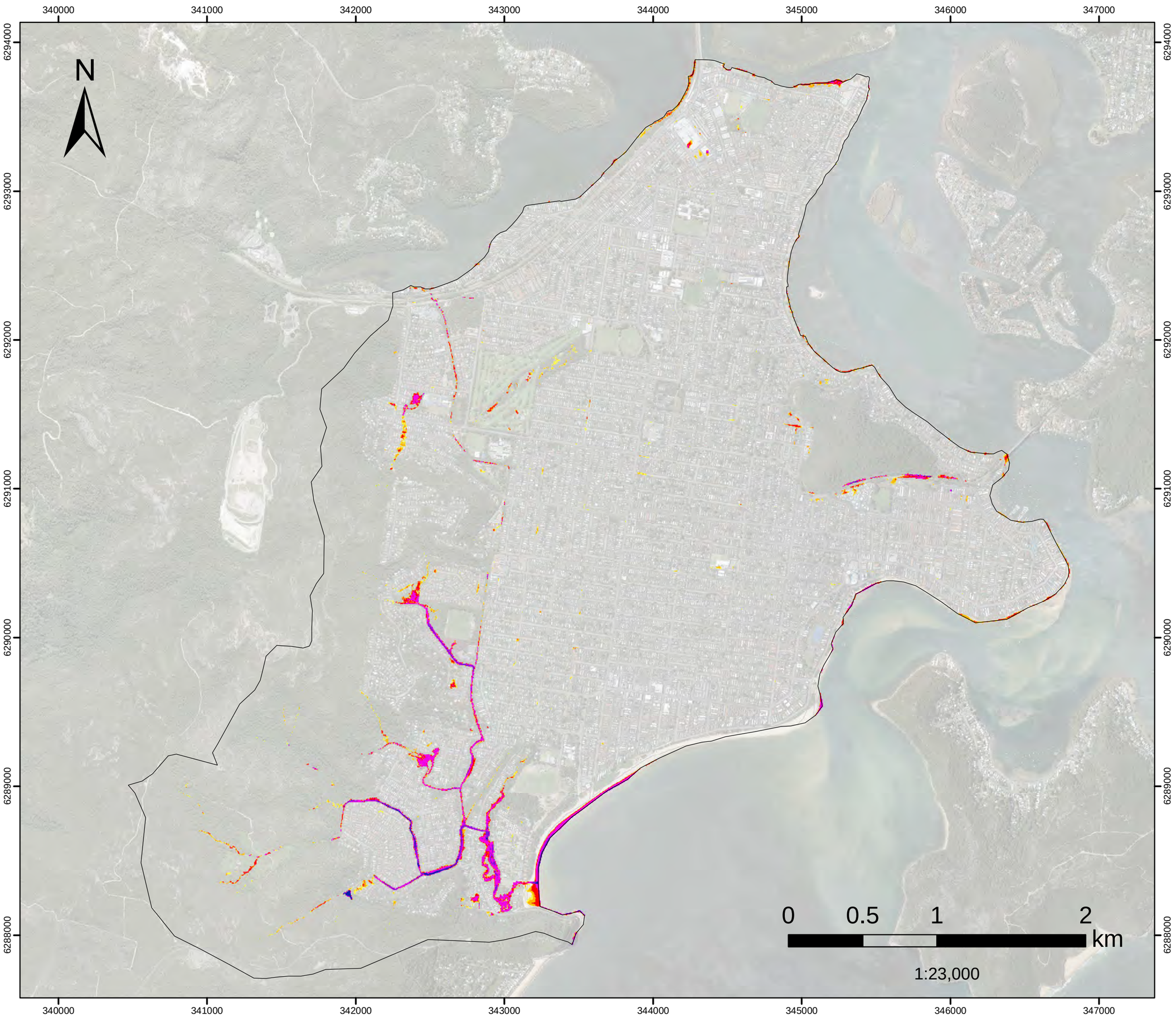


FIGURE E.31
50%AEP (Critical Duration) Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

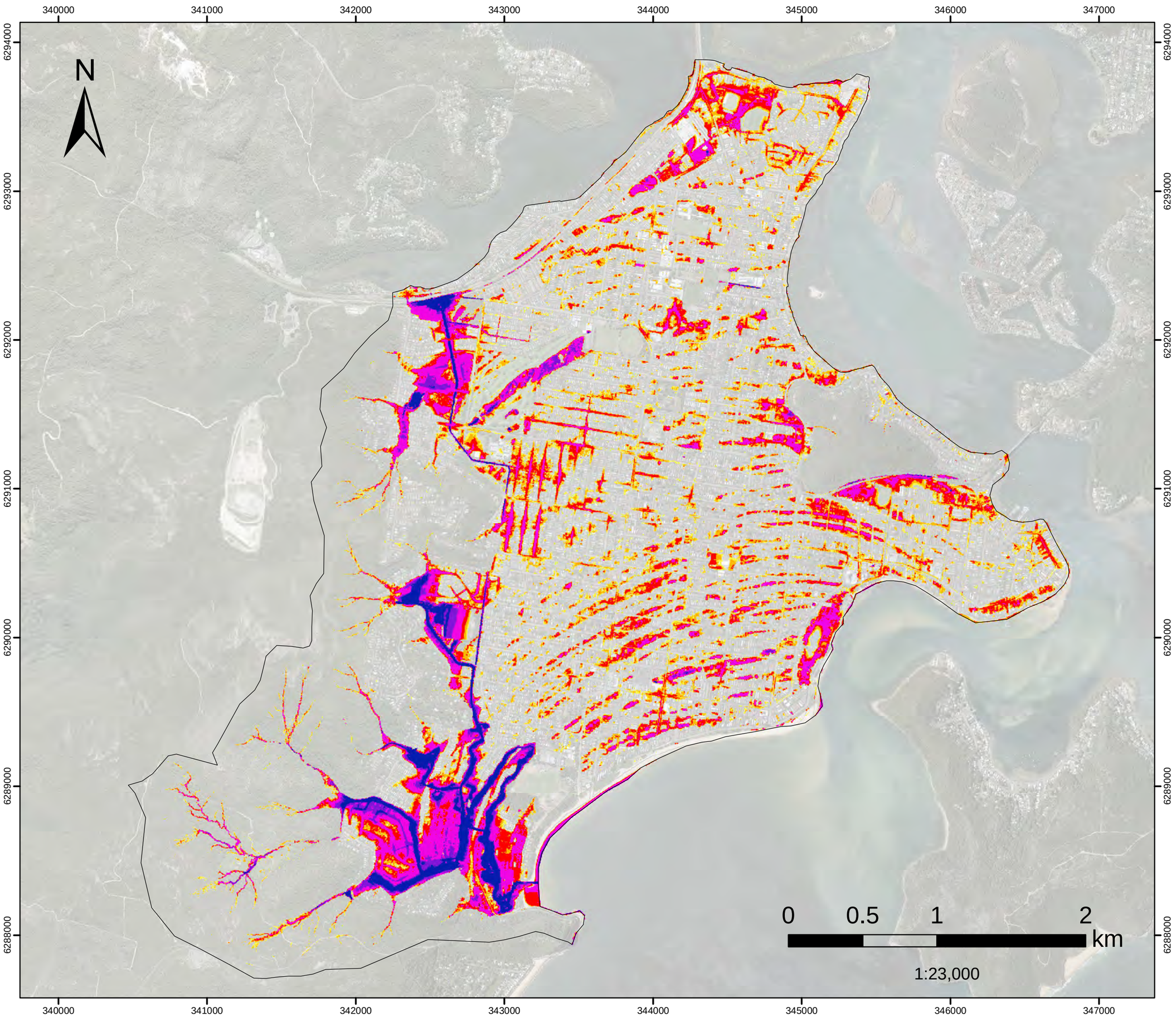


FIGURE E.32
PMF
(Critical Duration)
Flood Depth

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

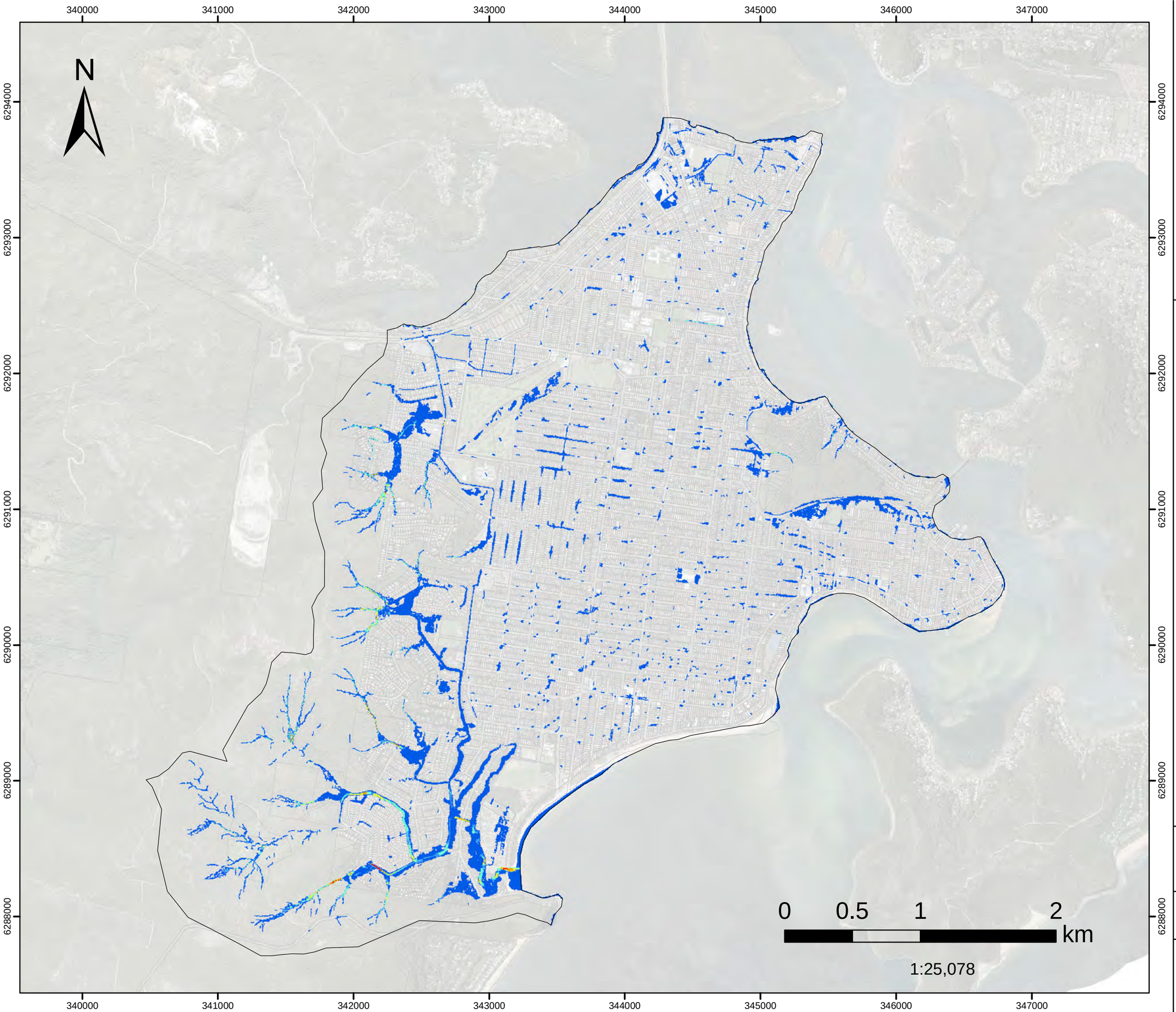


FIGURE E.33

0.5%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

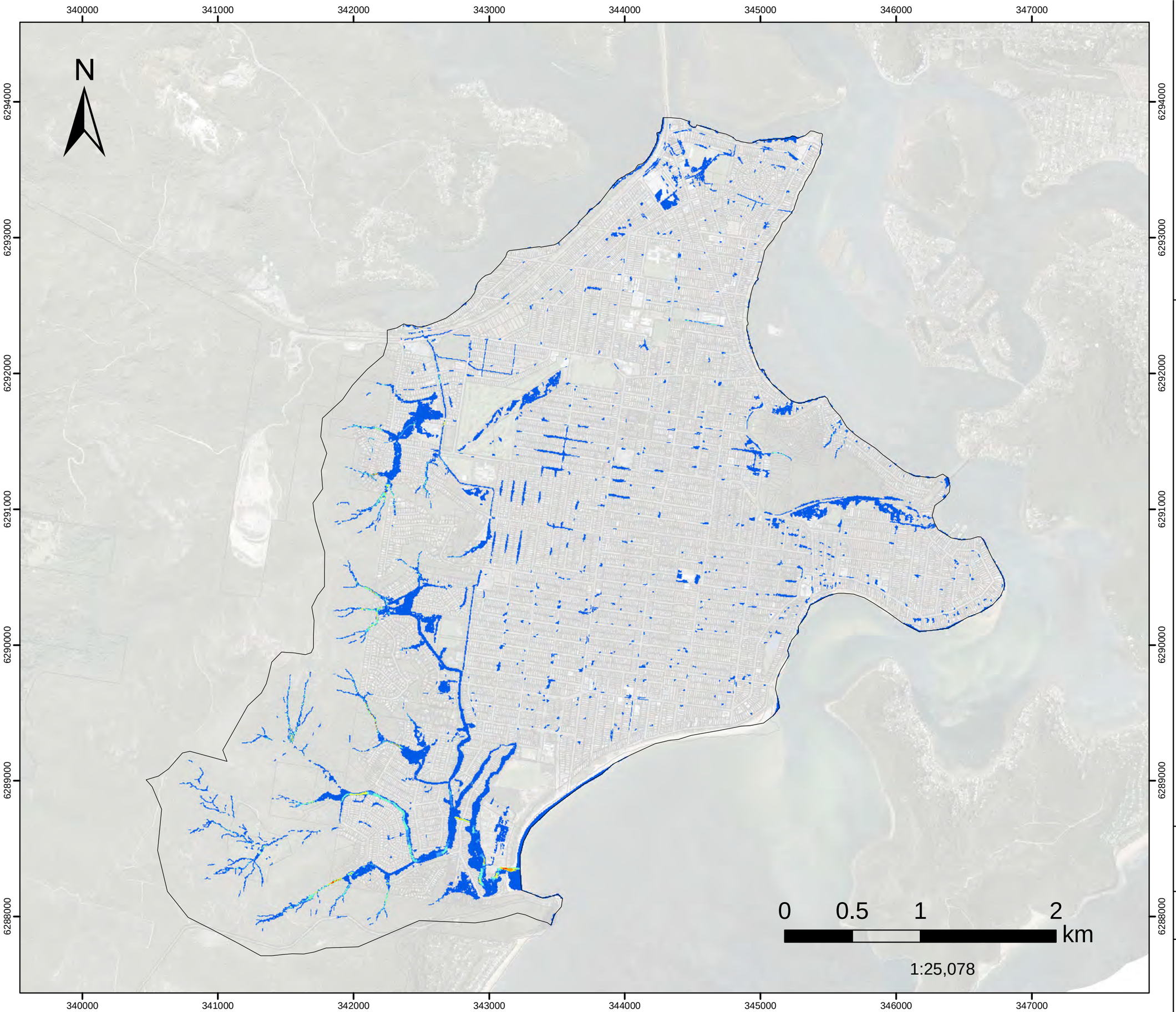


FIGURE E.34

1%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

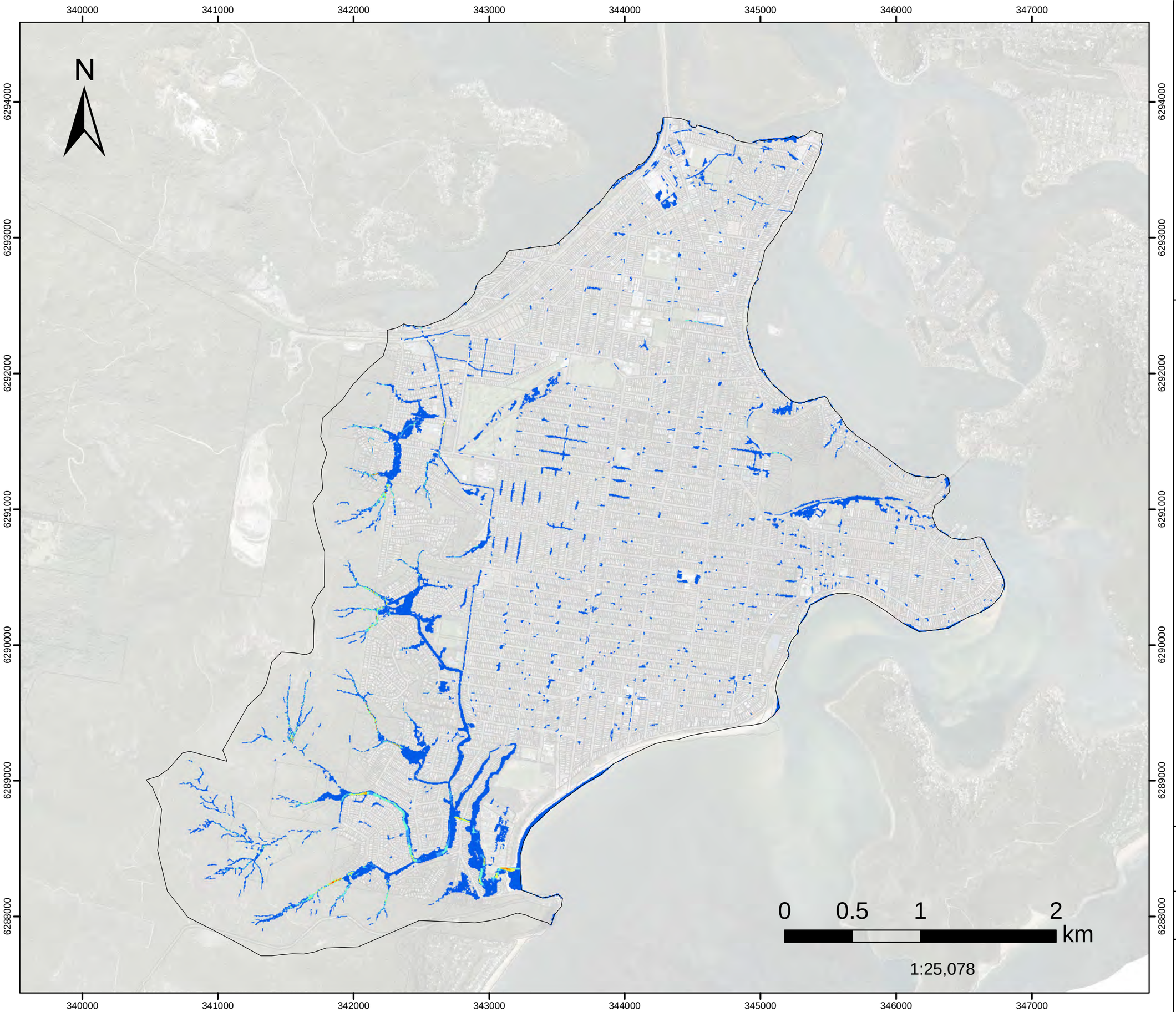


FIGURE E.35

2%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

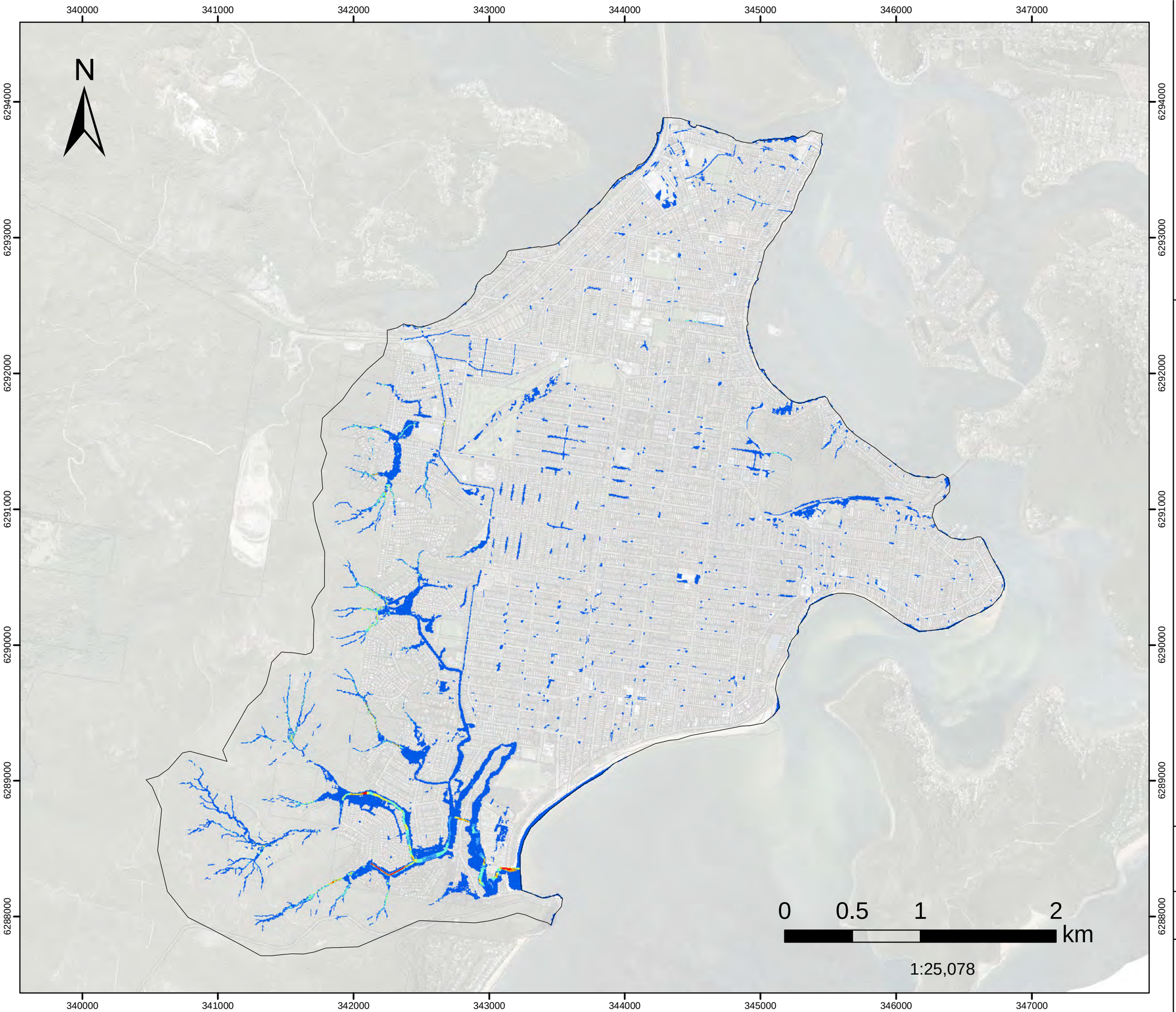


FIGURE E.36

5%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

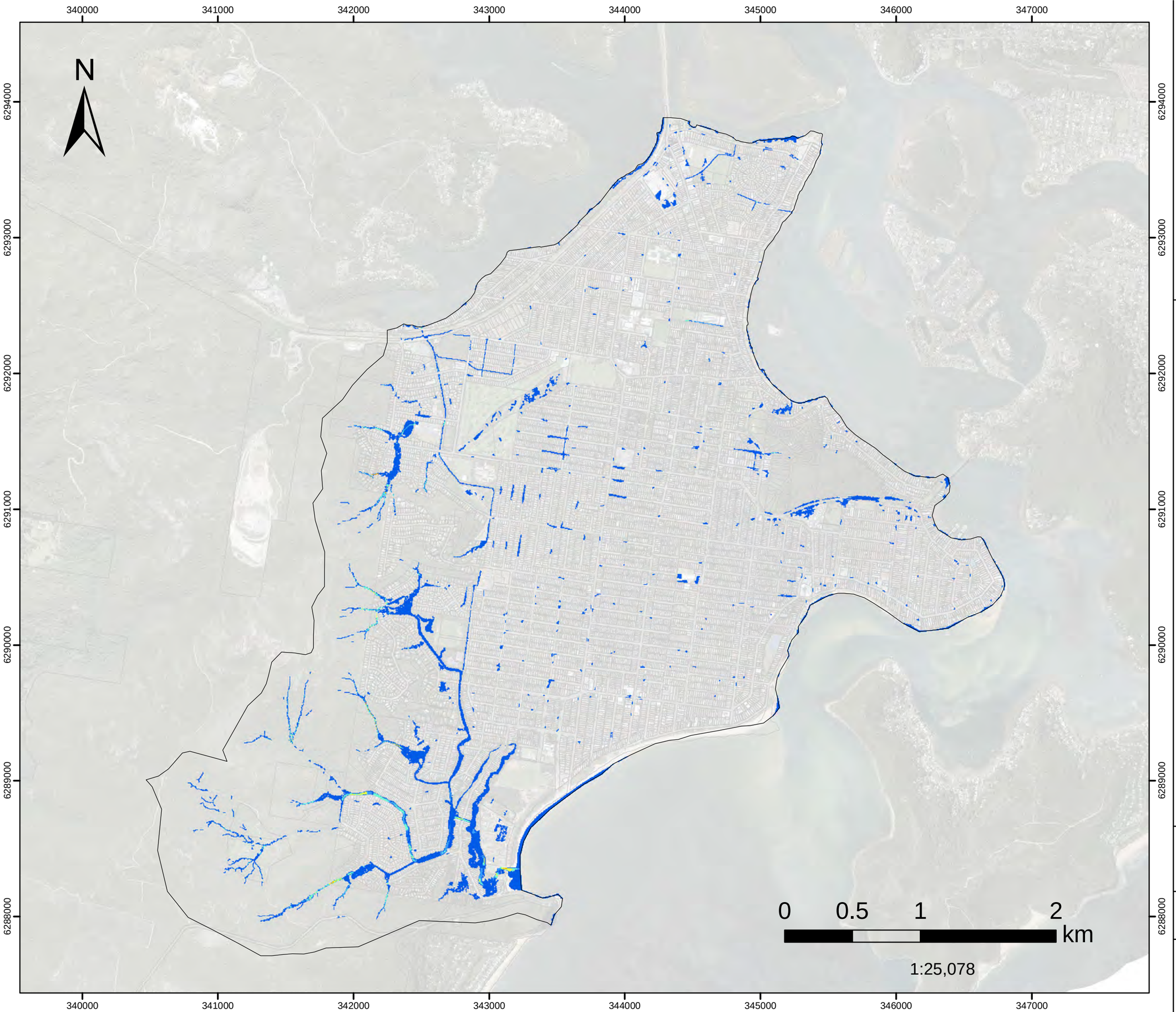


FIGURE E.37

10%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 3hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

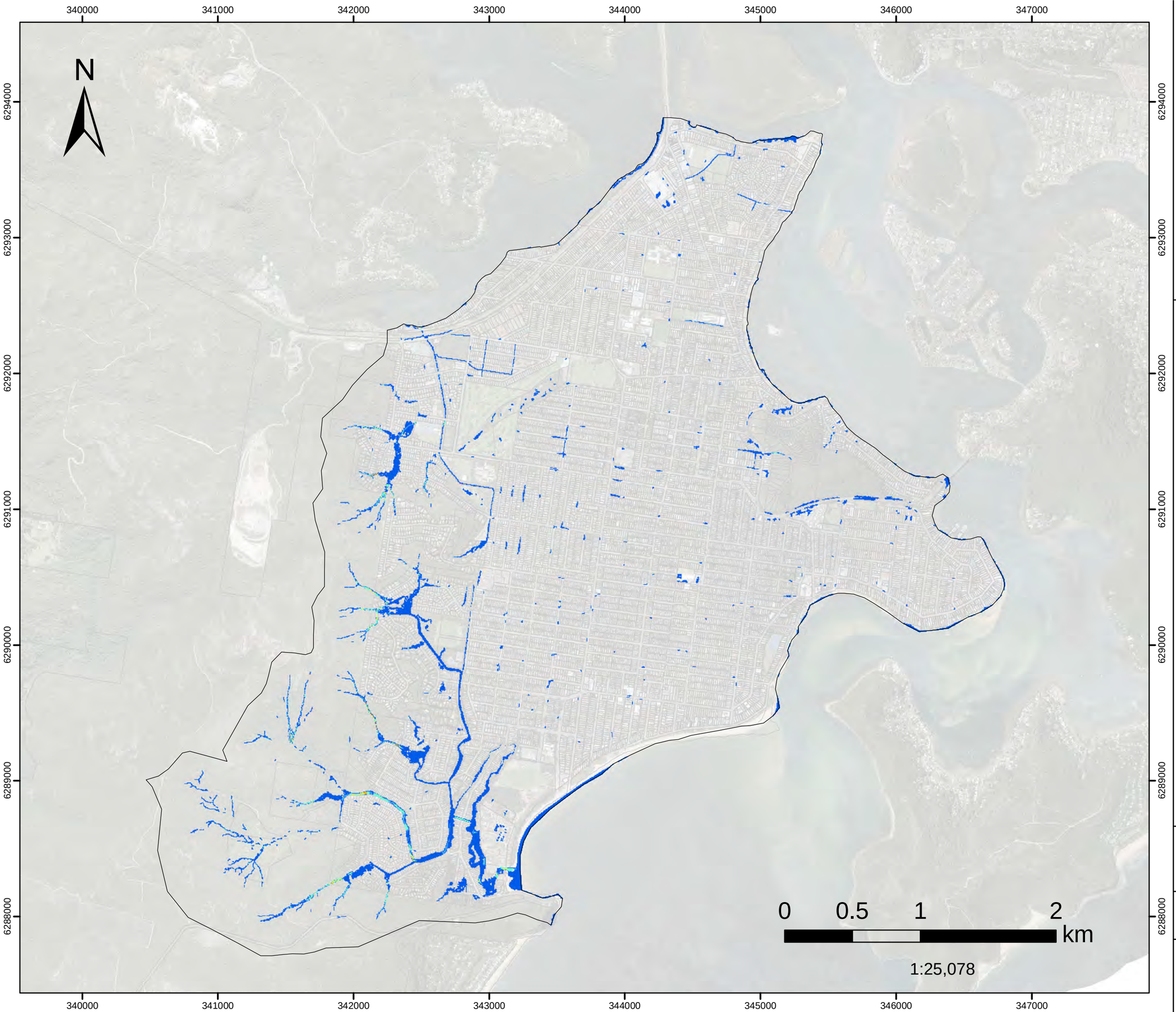


FIGURE E.38

20%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 1hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

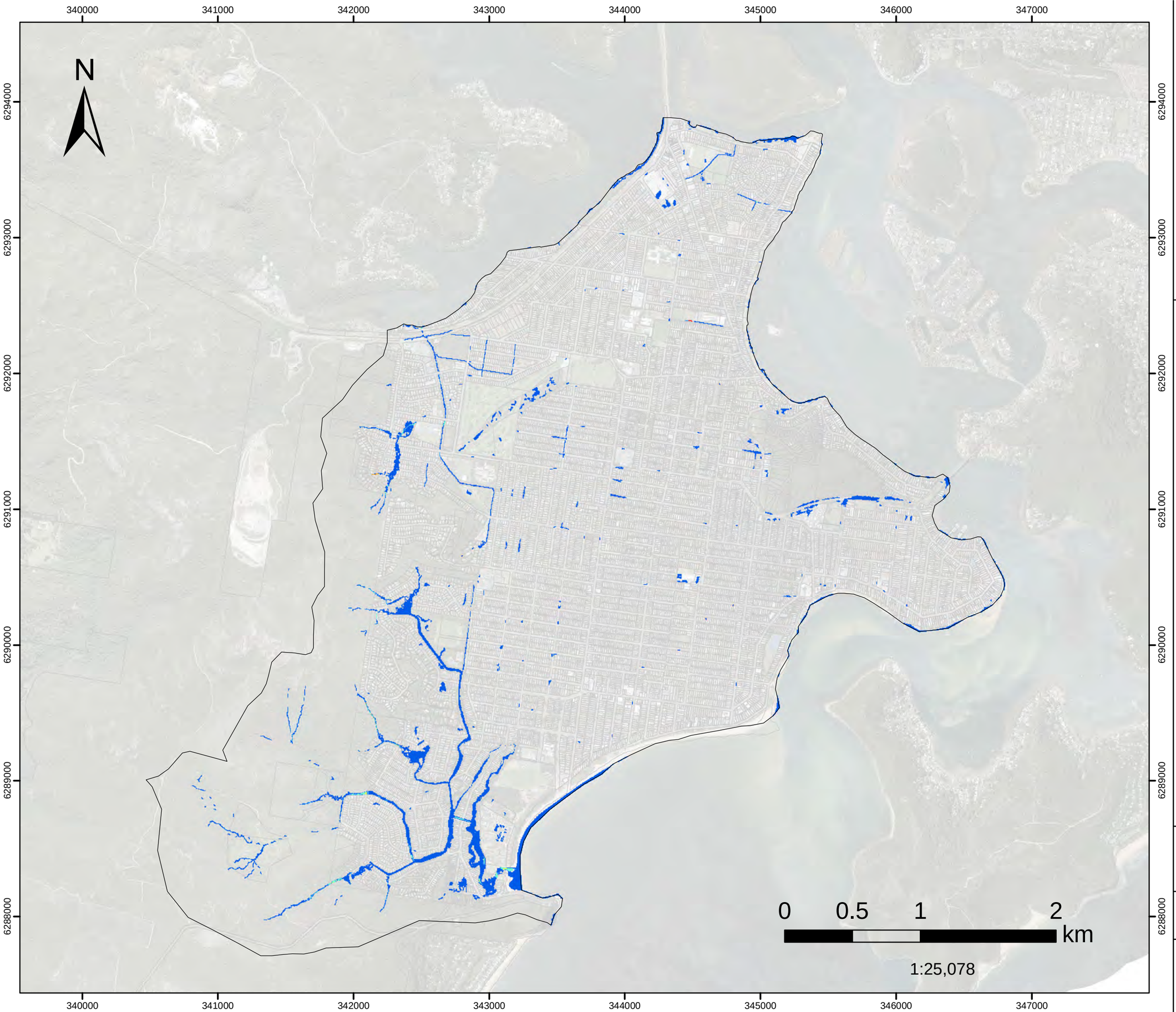


FIGURE E.39

50%AEP (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

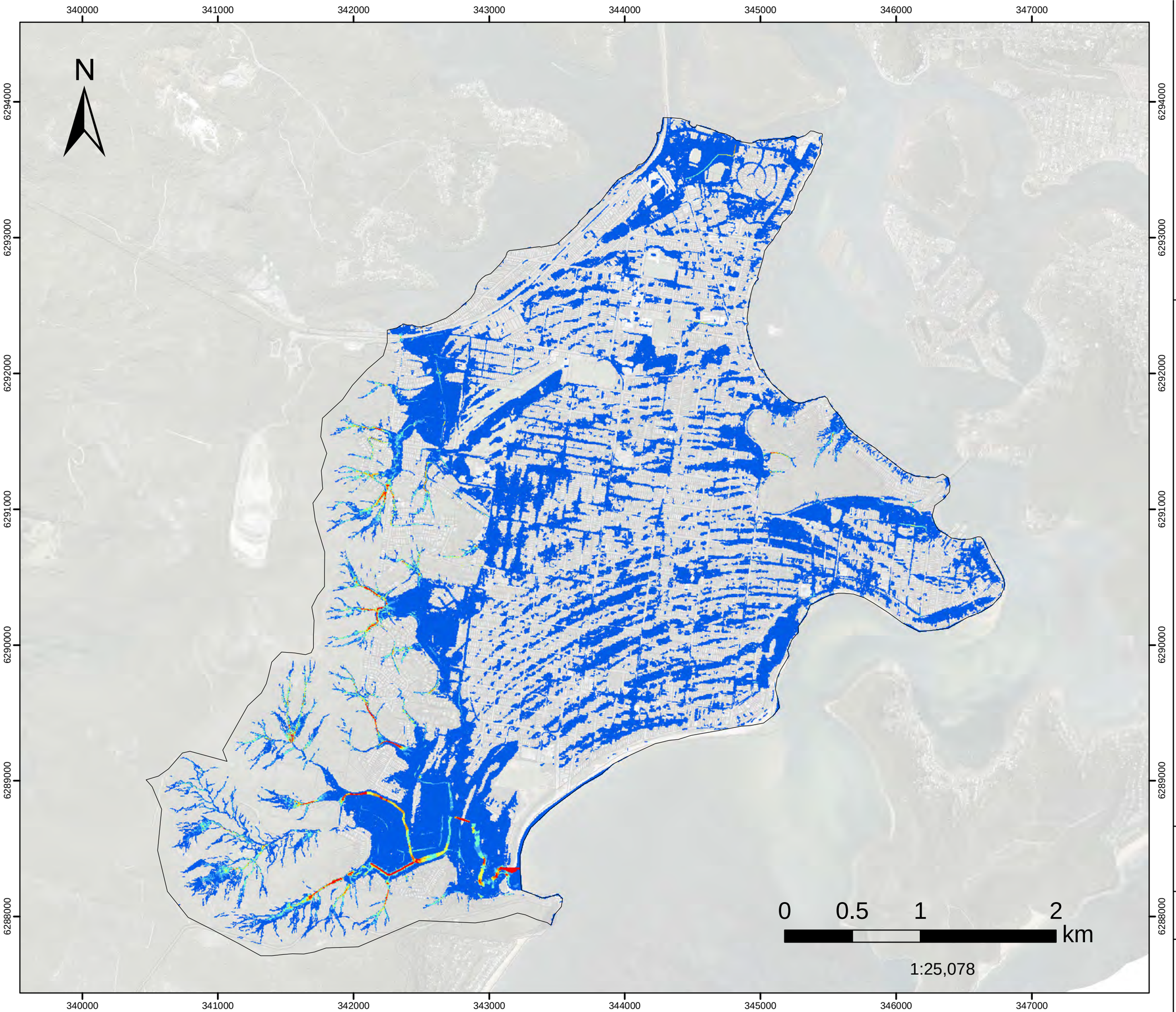


FIGURE E.40

PMF (Critical Duration) Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Assessed for the critical duration 2hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

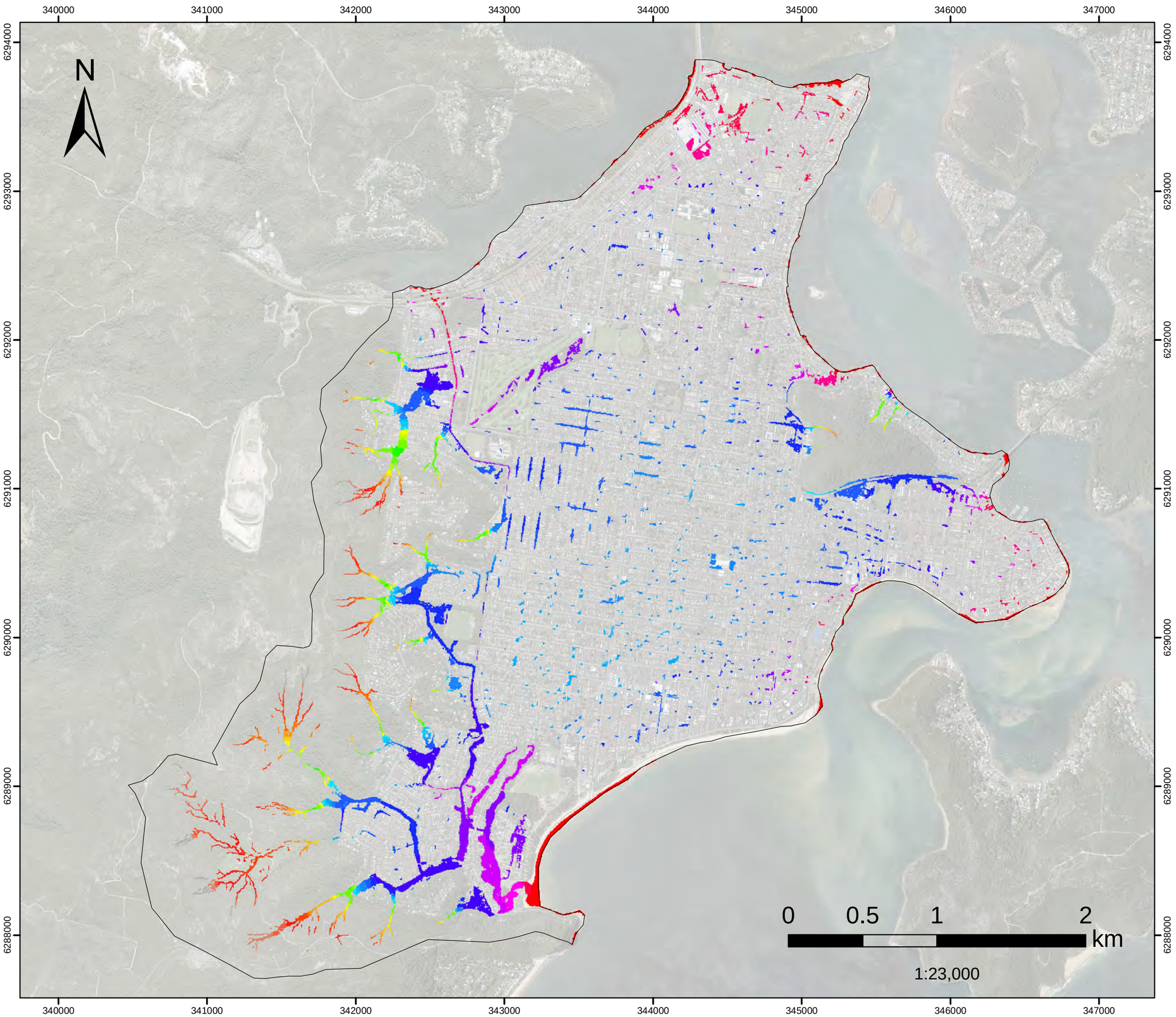


FIGURE E.41
0.5%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 2hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

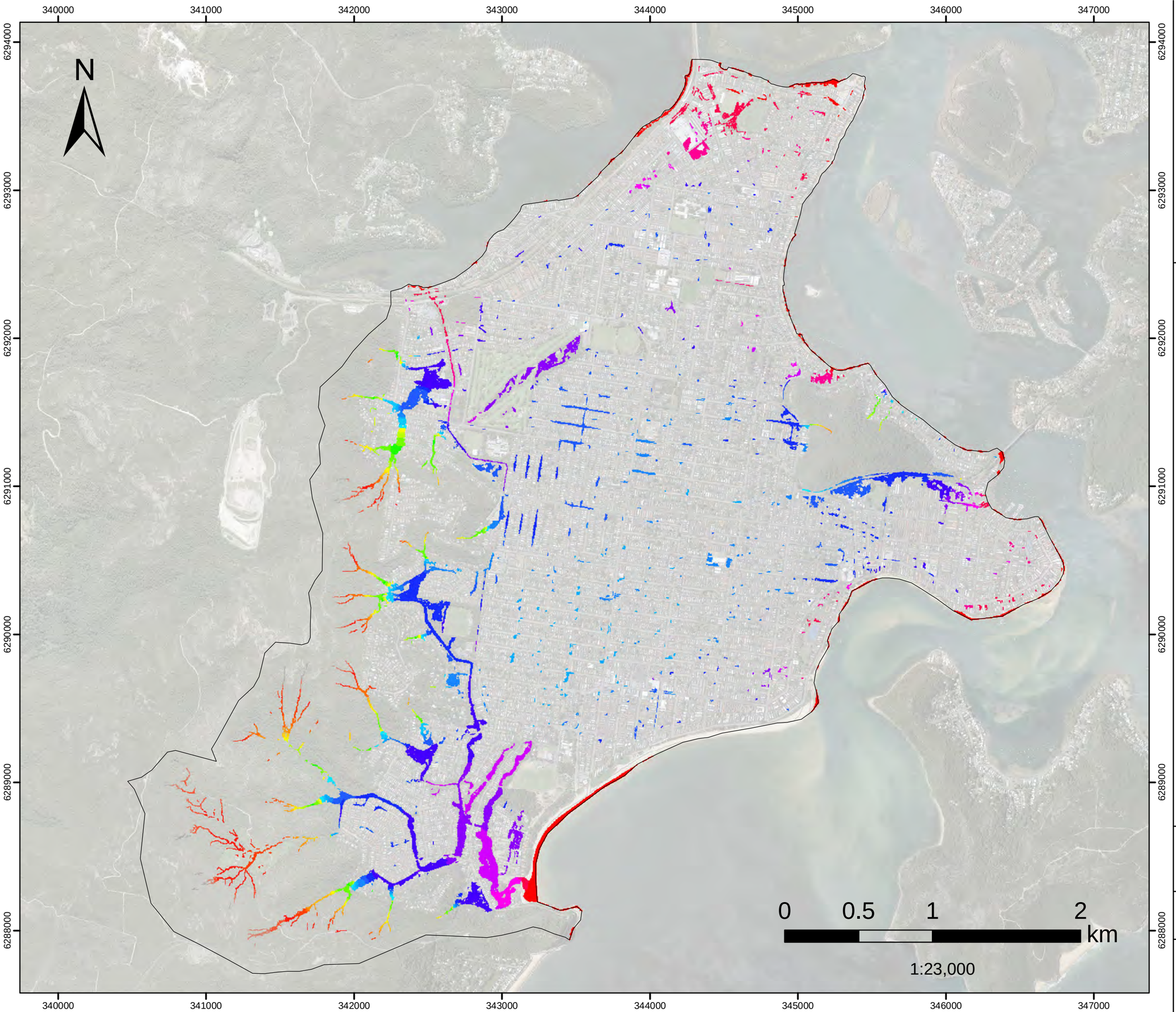


FIGURE E.42
1%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

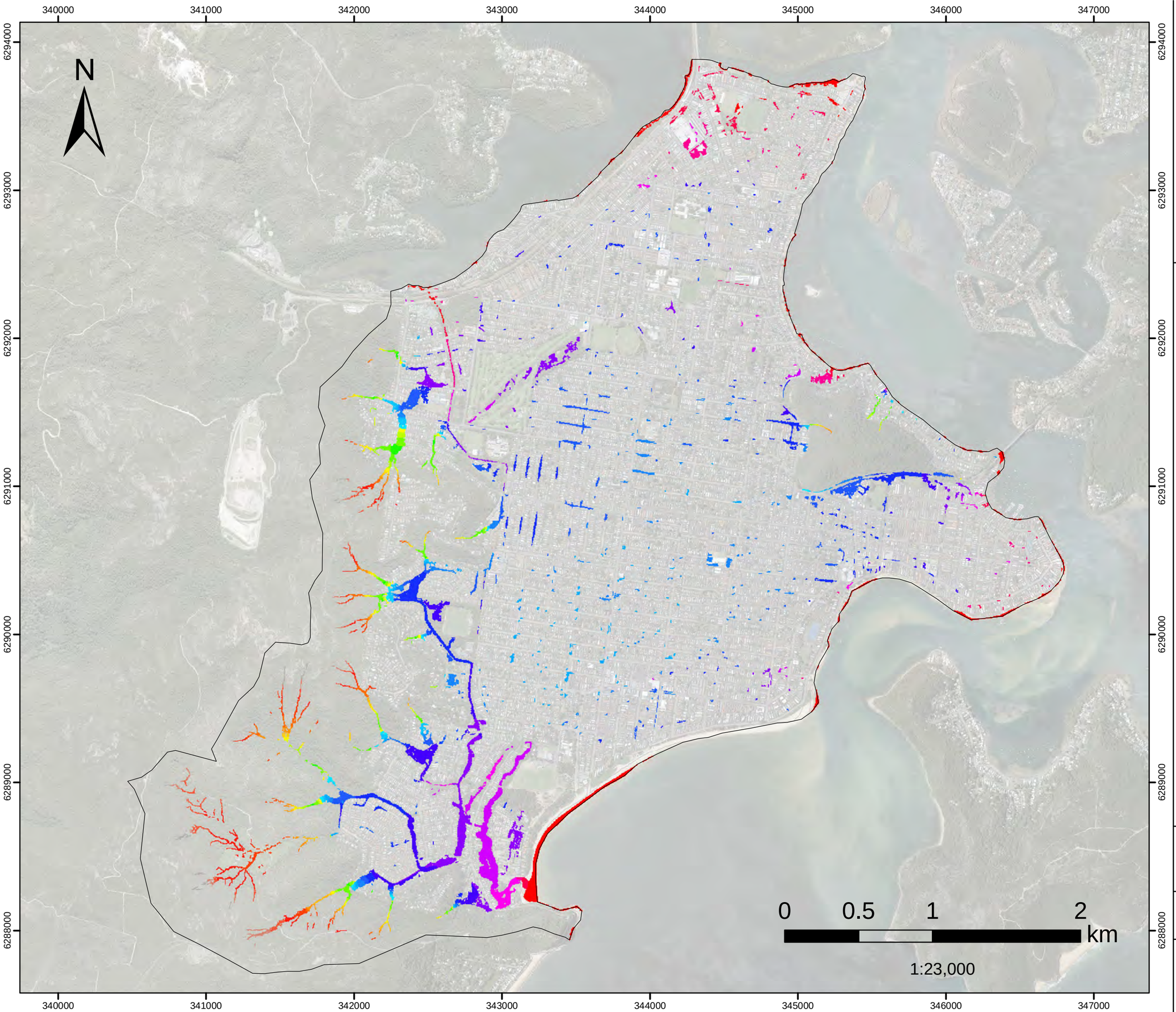


FIGURE E.43
2%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 2hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

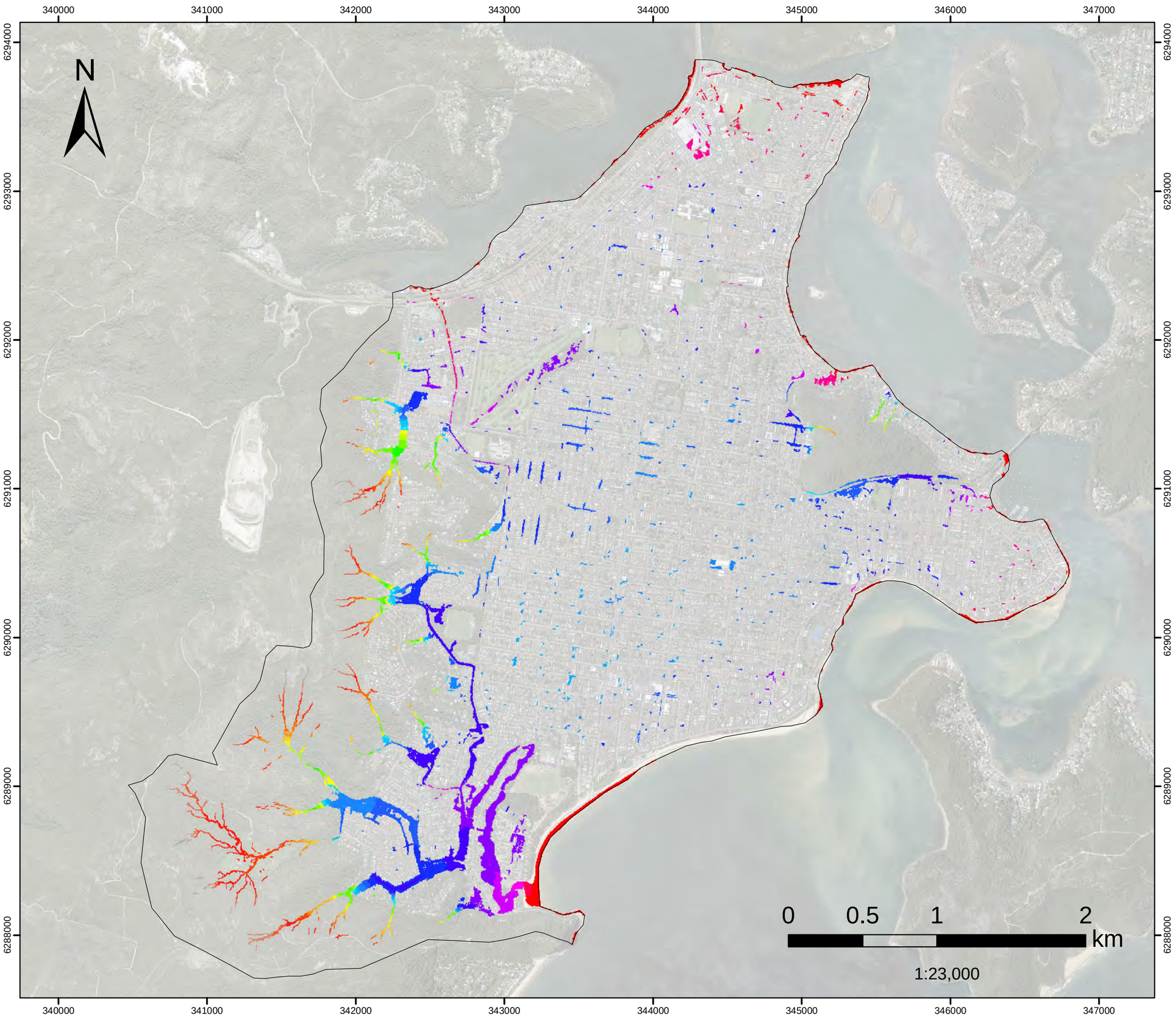


FIGURE E.44
5%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 2hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

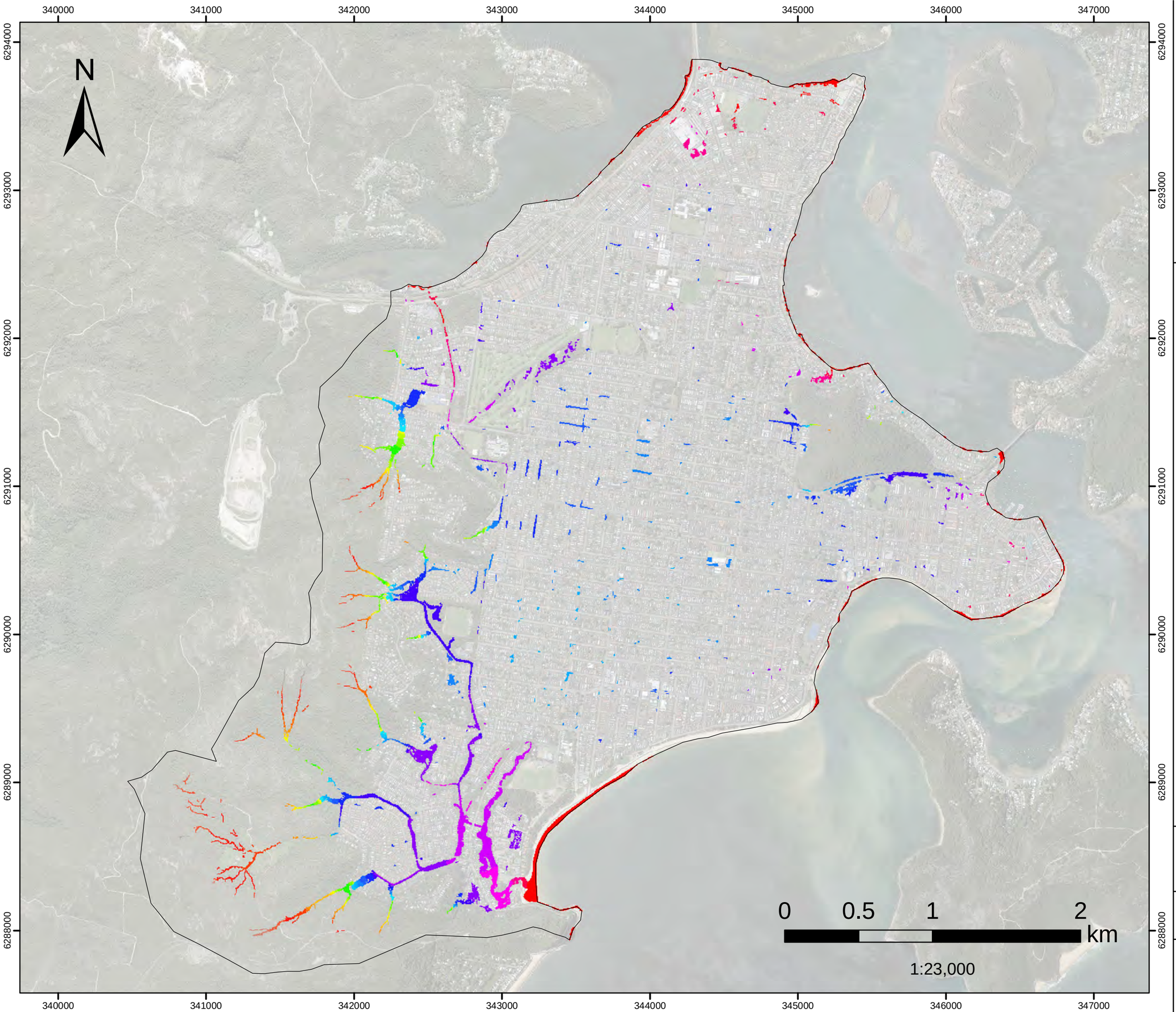


FIGURE E.45
10%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 3hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

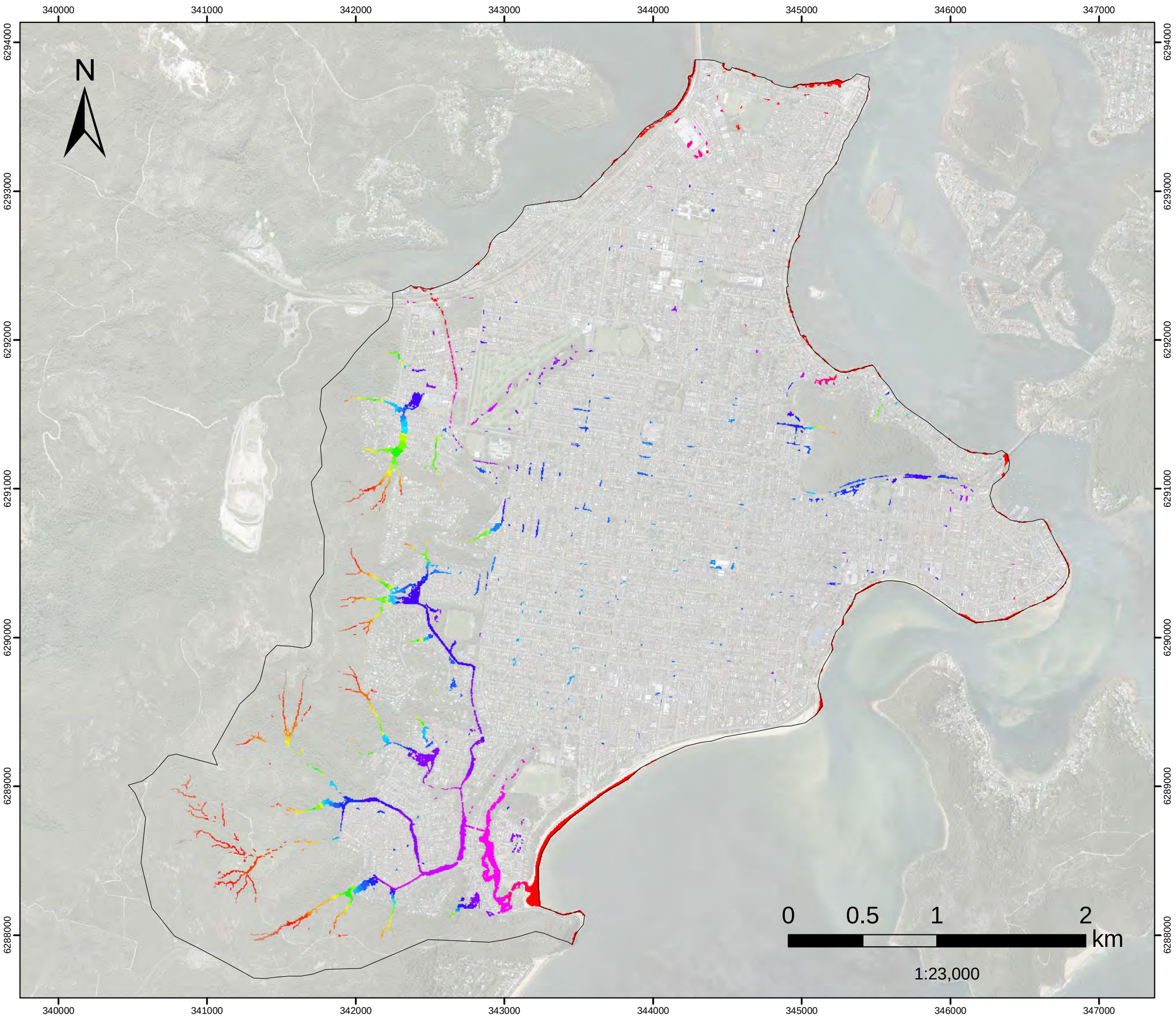


FIGURE E.46
20%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 1hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

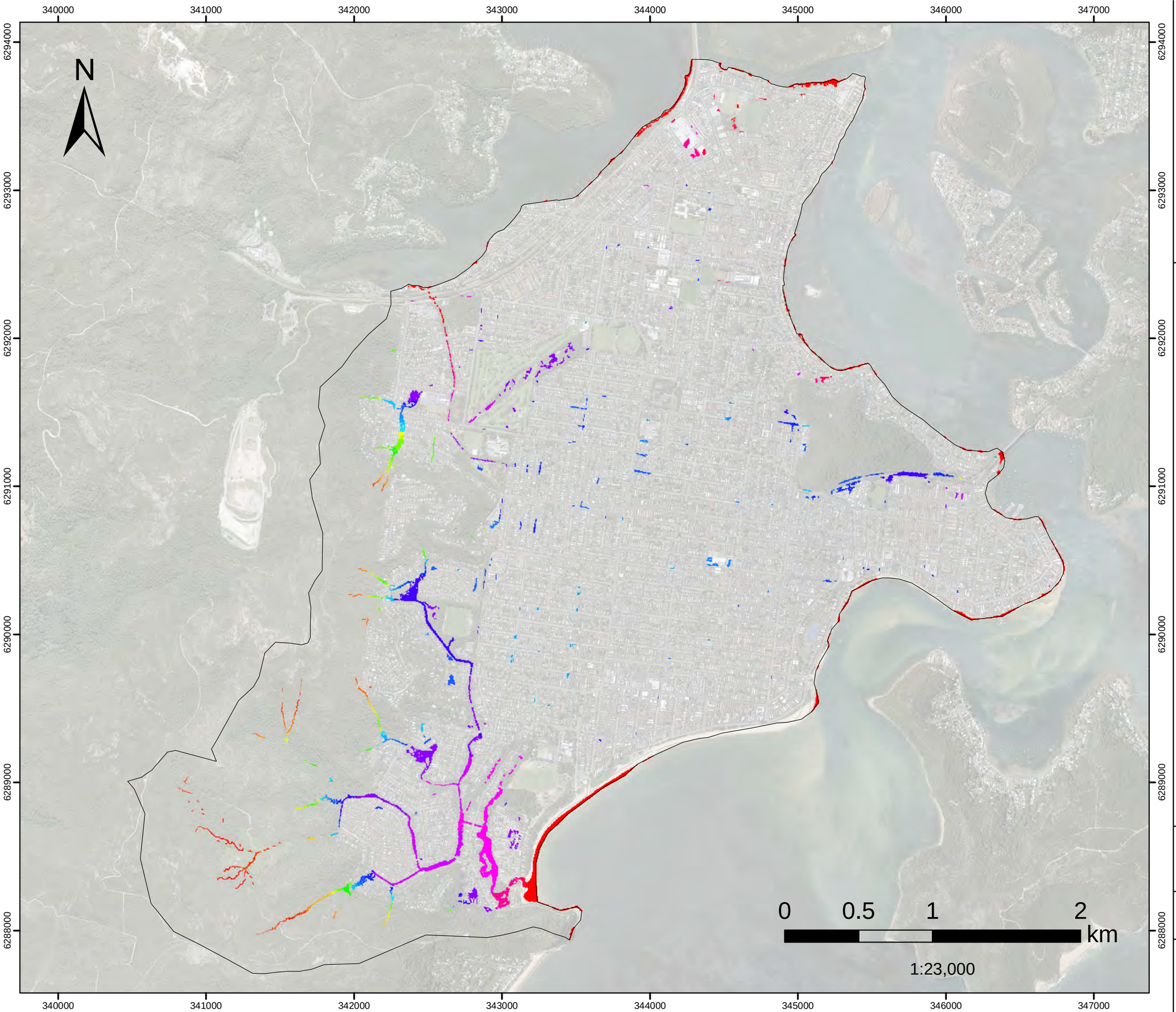


FIGURE E.47
50%AEP

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

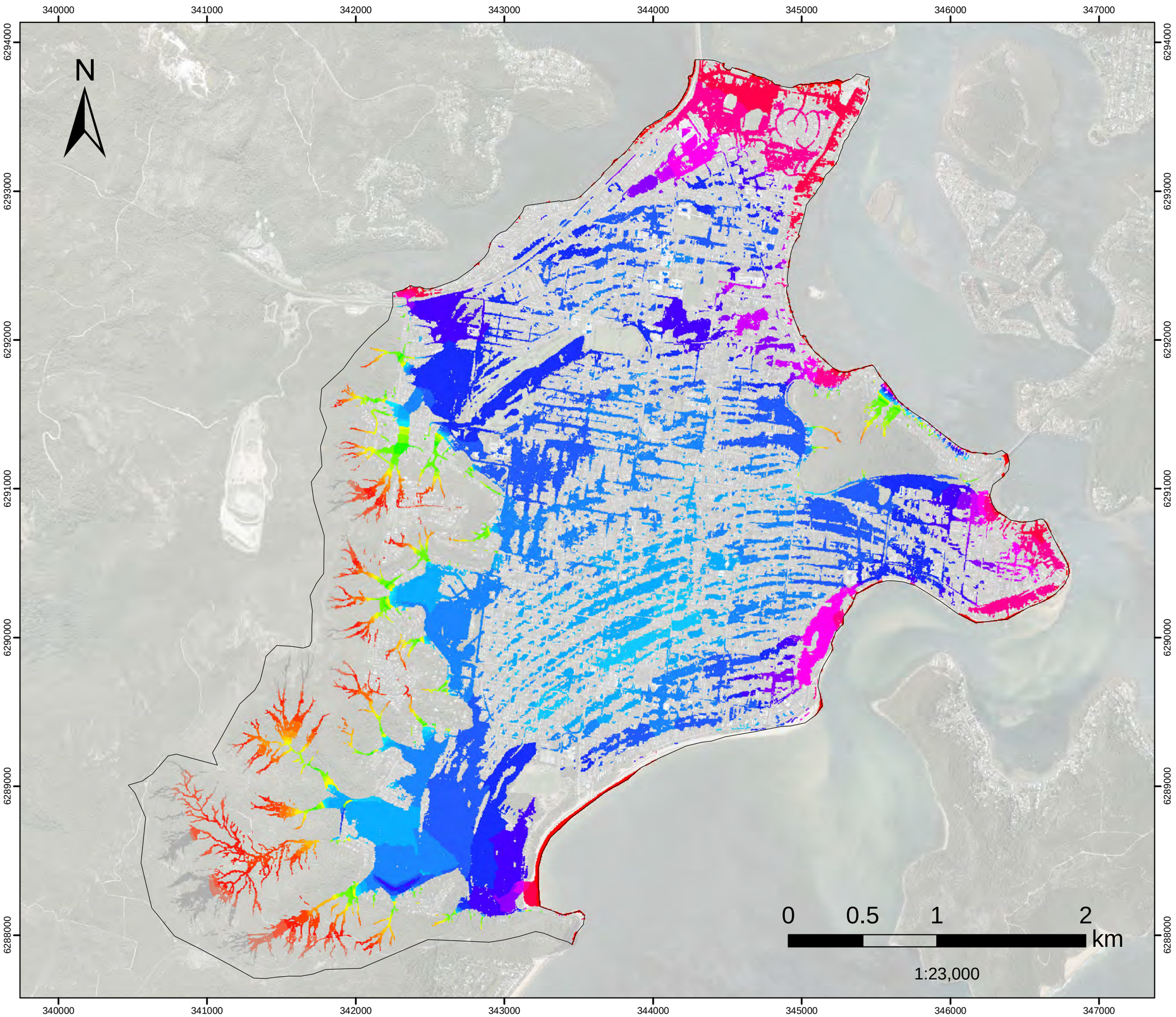


FIGURE E.48
PMF

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.
Assessed for the critical duration 2hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

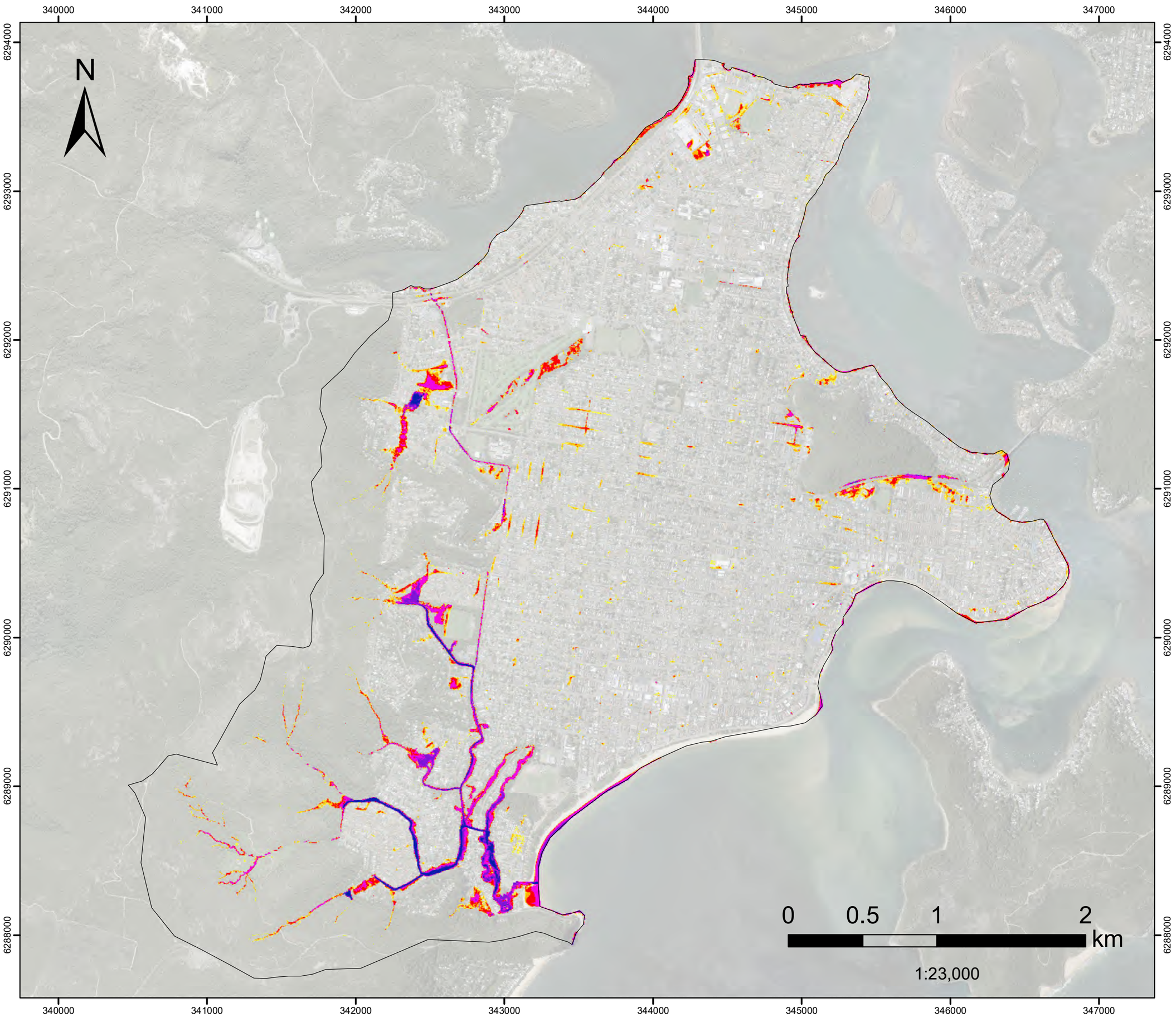


FIGURE F.1
1%AEP CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

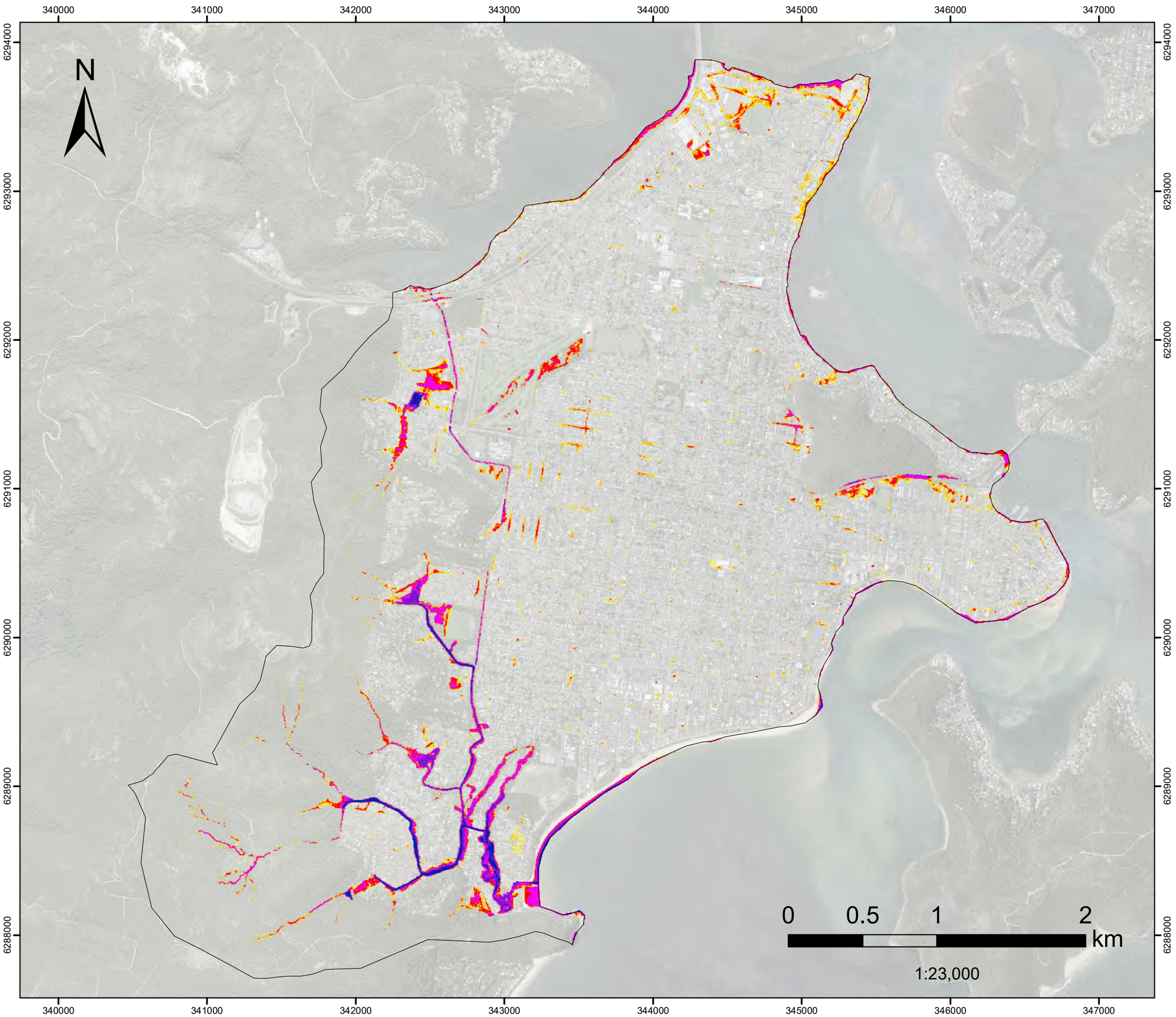


FIGURE F.2
1%AEP CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

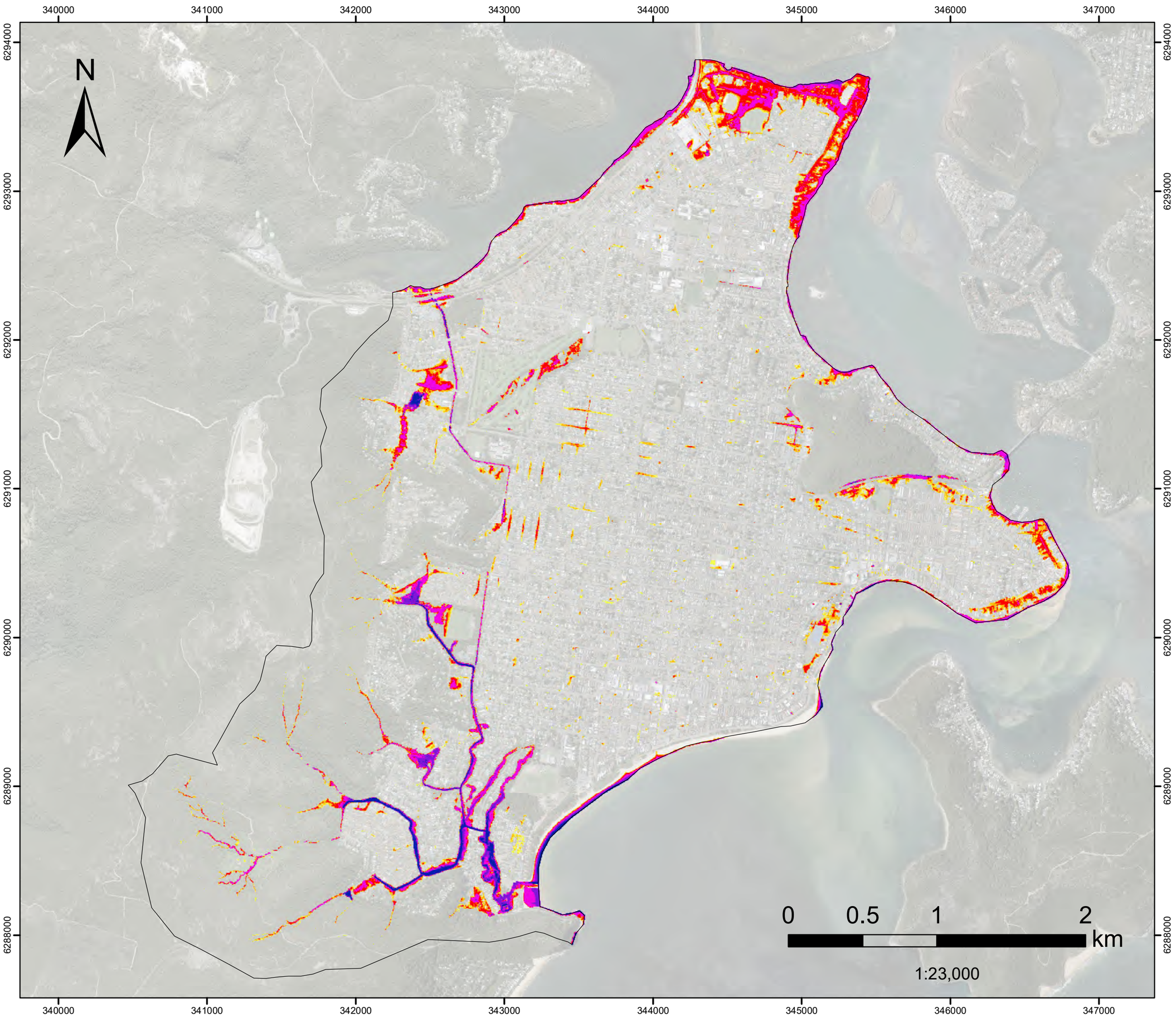


FIGURE F.3
1%AEP CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

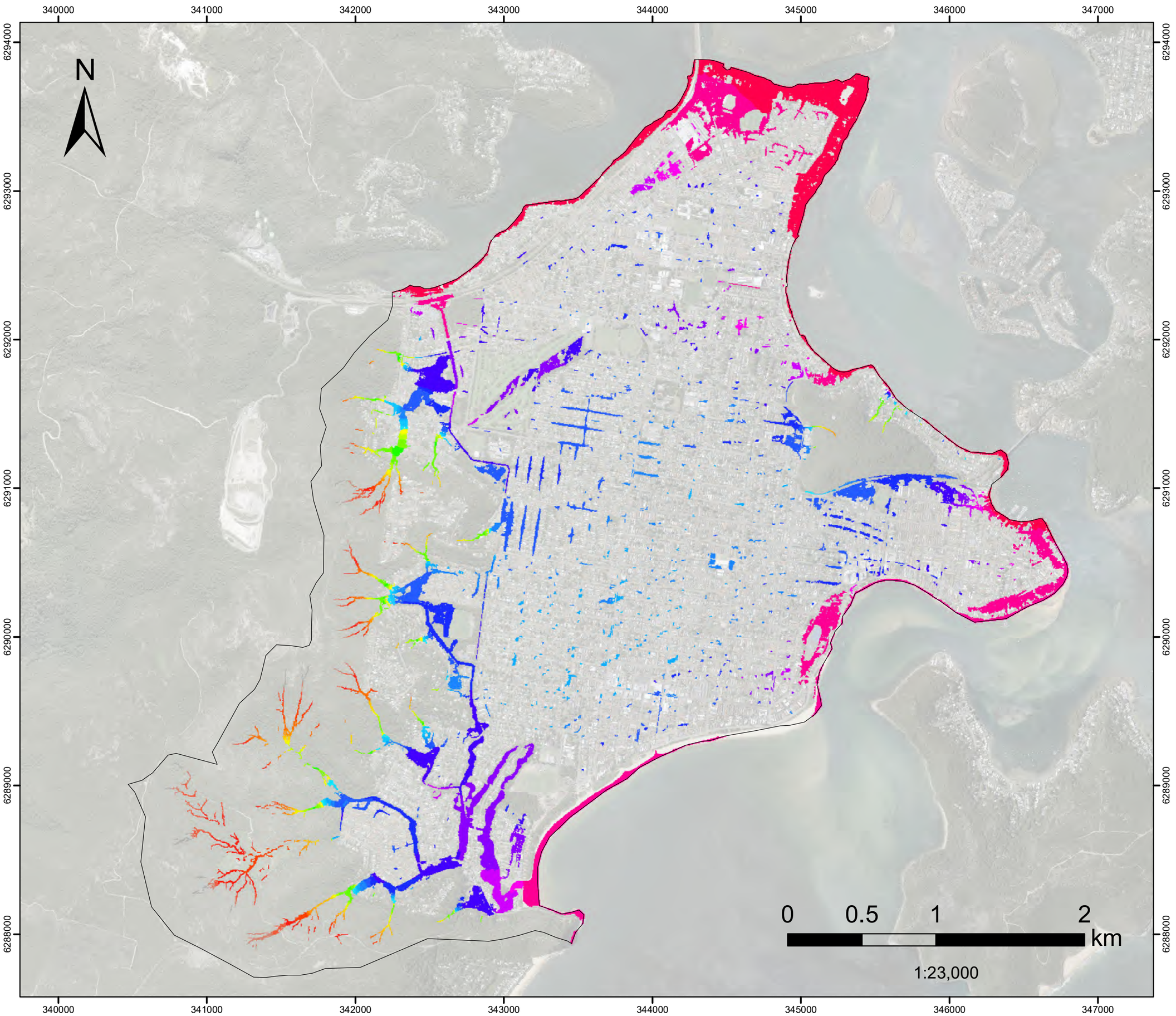


FIGURE F.18
1%AEP CC3 iniSZ

(Sea level rise 0.74m, Interim Climate Change Factor 19.7%, Updated antecedent conditions)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	15 March 2023
Project No	43803055

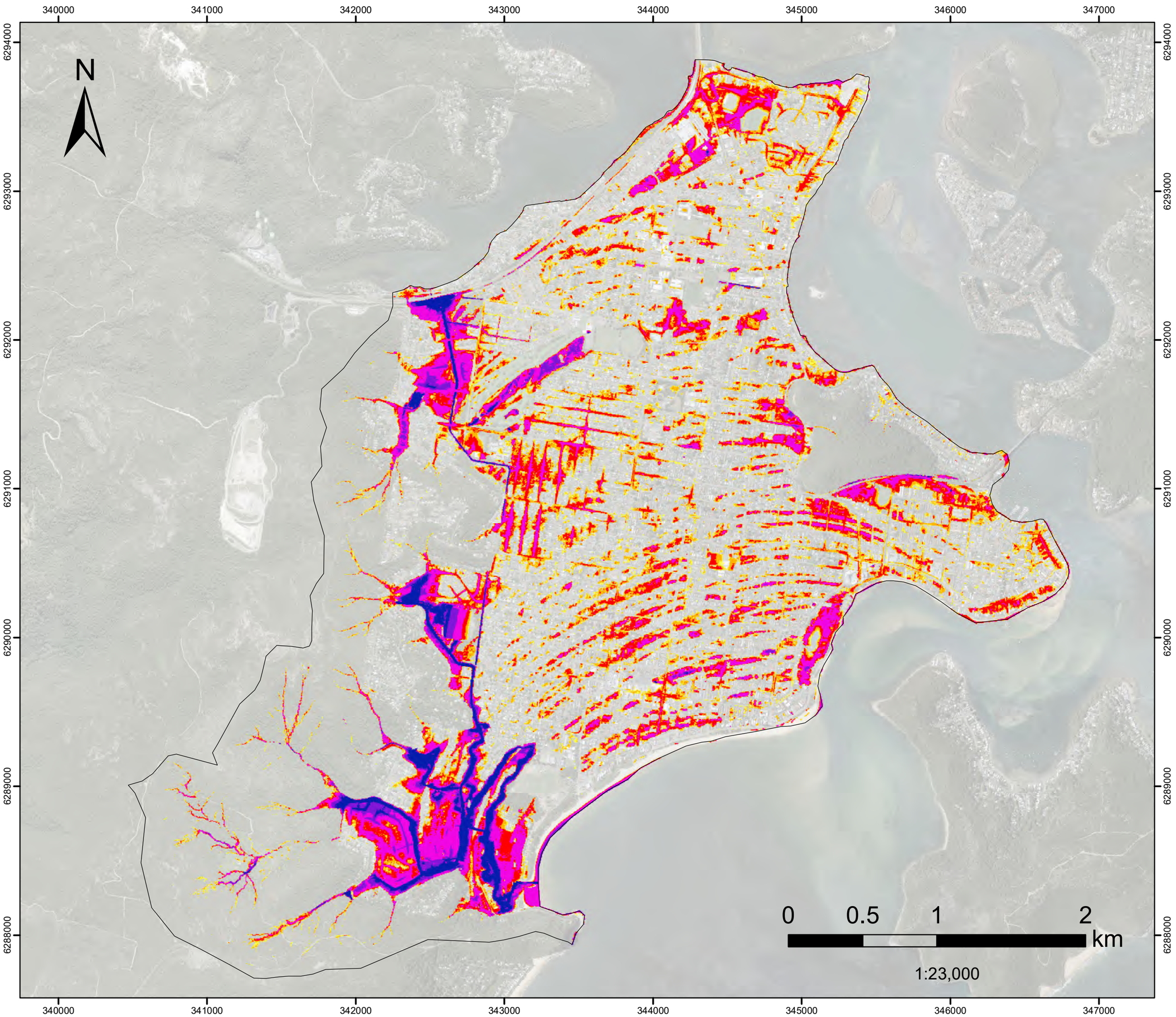


FIGURE F.5
PMF CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

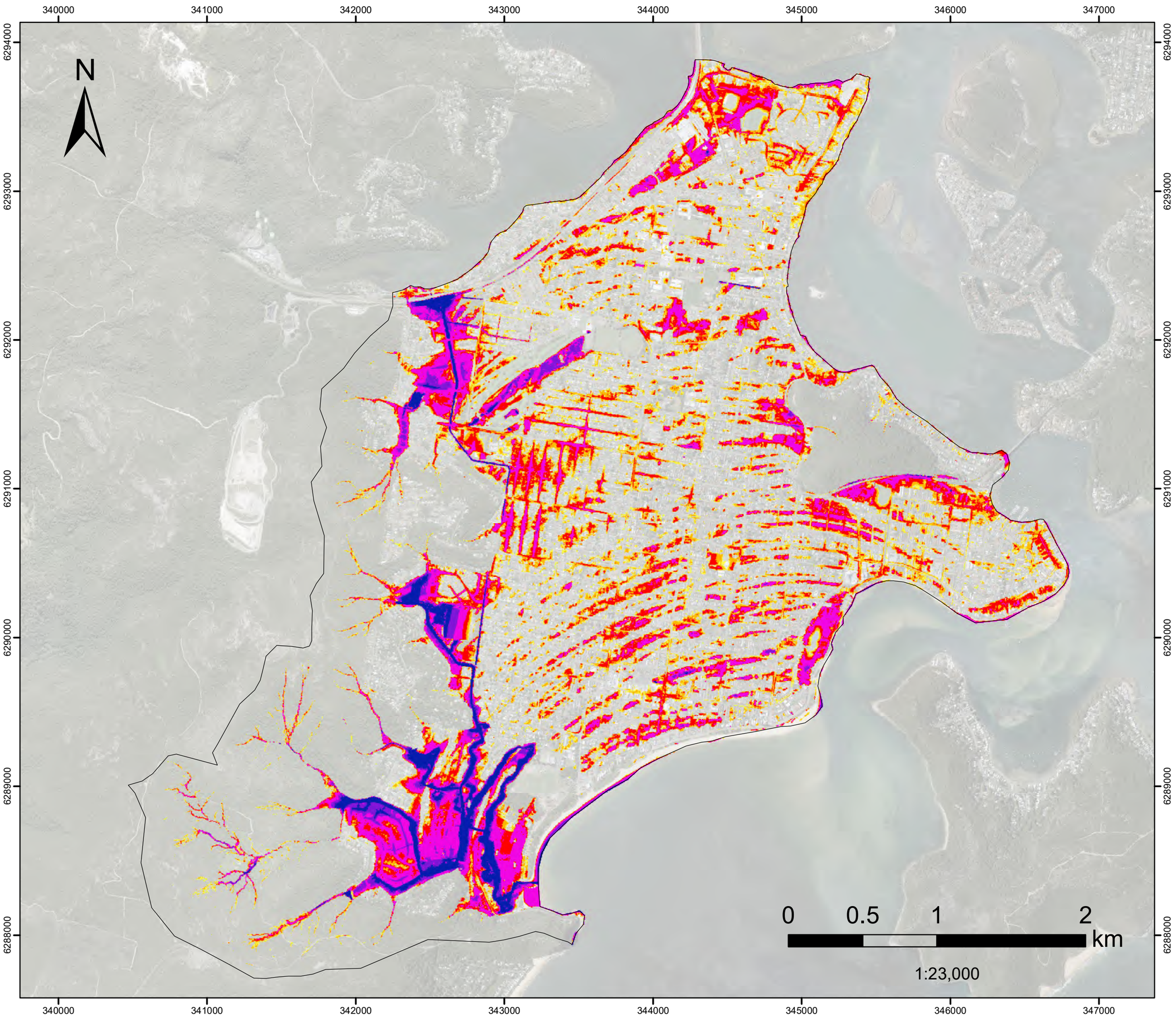


FIGURE F.6
PMF CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

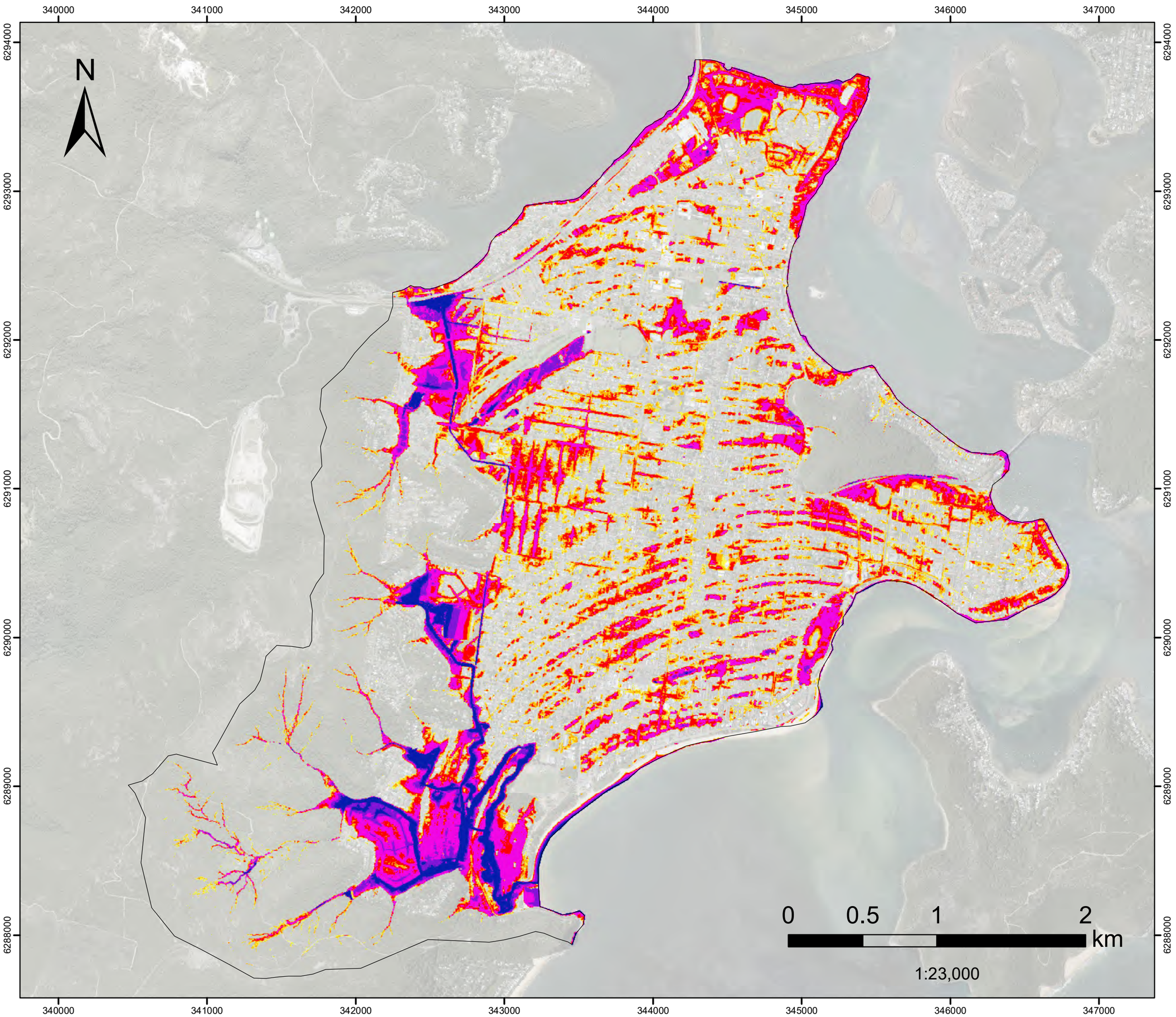


FIGURE F.7
PMF CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

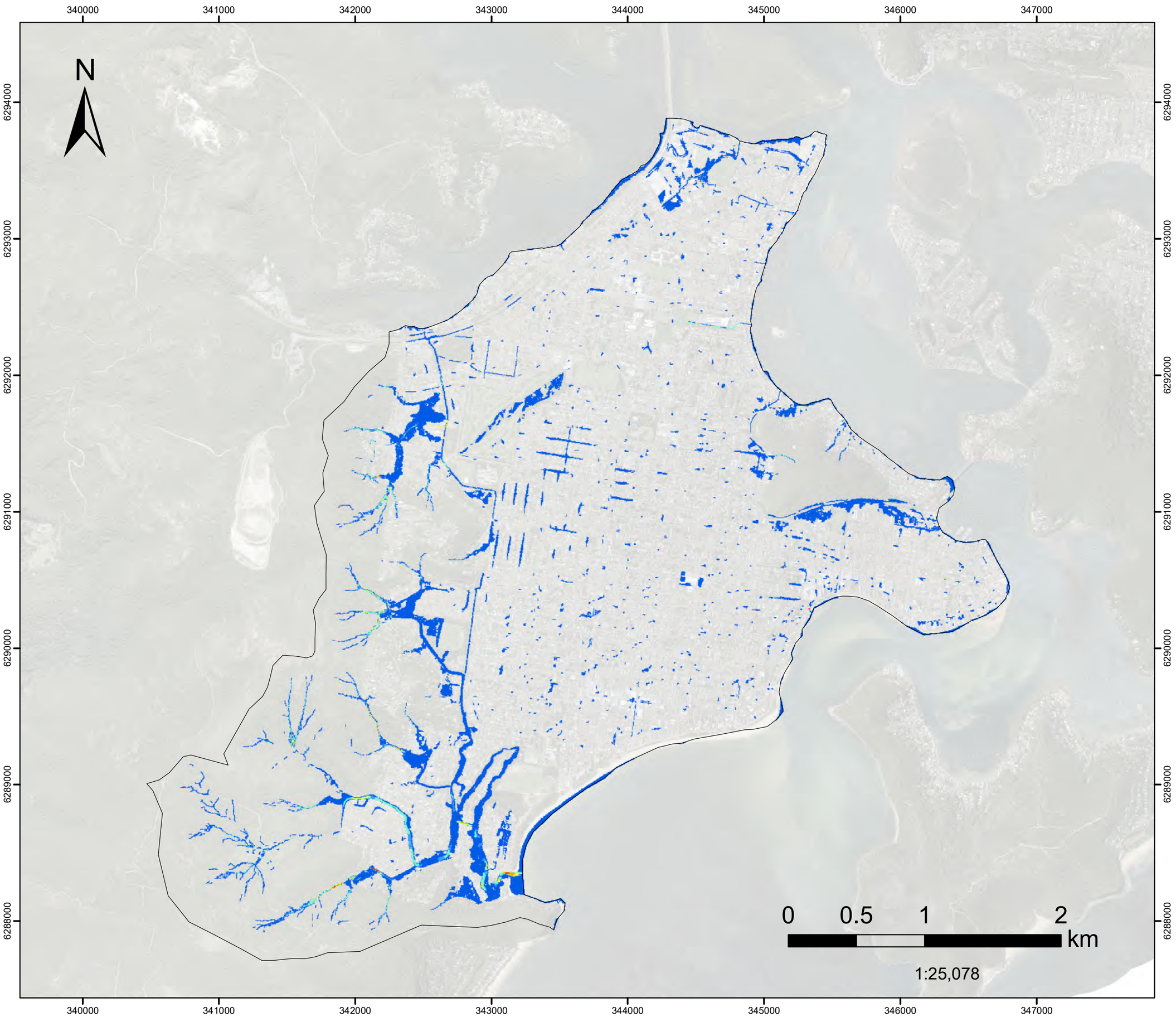


FIGURE F.8
1%AEP CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

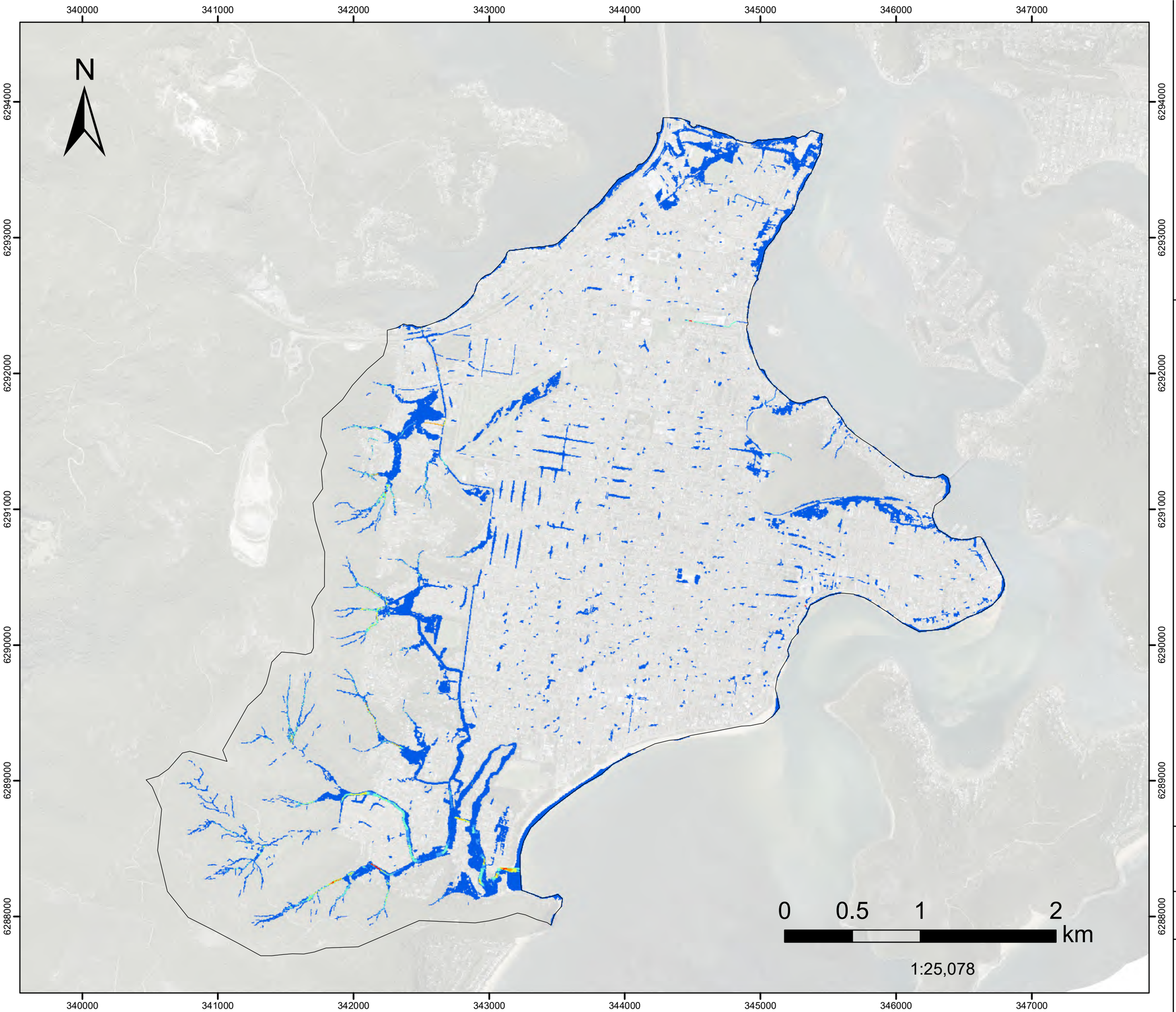


FIGURE F.9
1%AEP CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

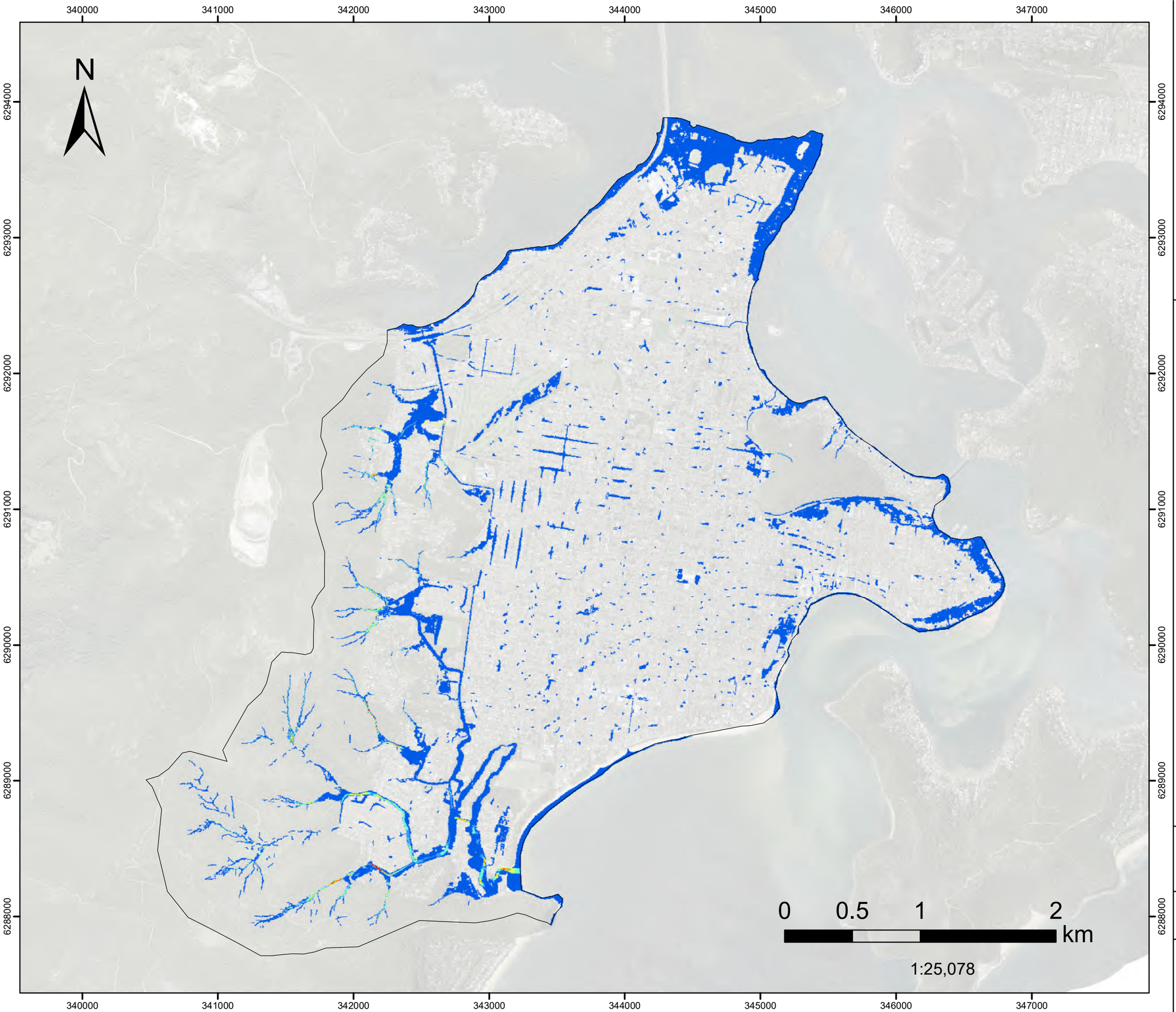


FIGURE F.10
1%AEP CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

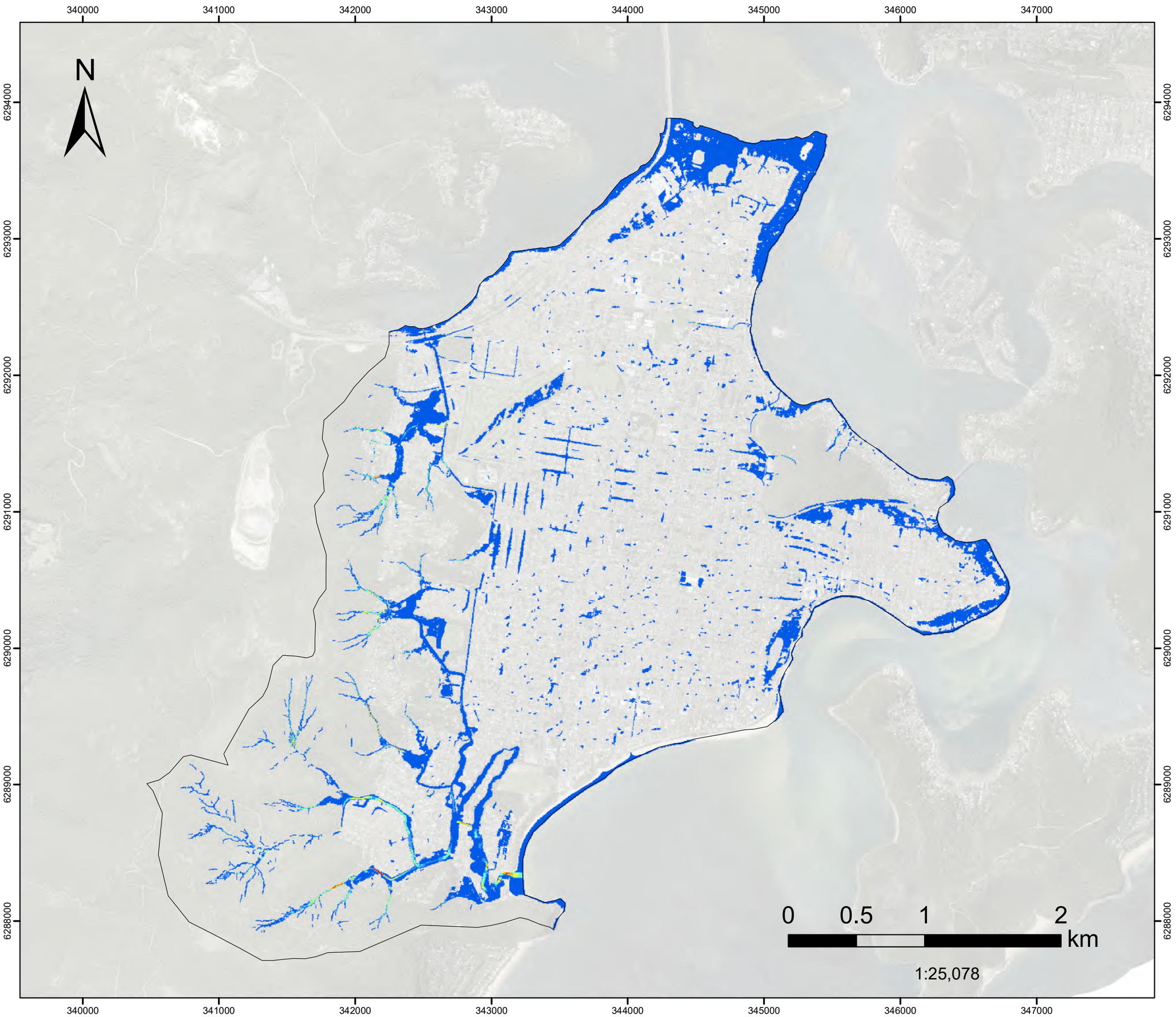
Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

FIGURE F.11
1%AEP CC3 iniSZ

(Sea level rise 0.74m, Interim Climate Change Factor 19.7%, Updated antecedent conditions)



Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	15 March 2023
Project No	43803055

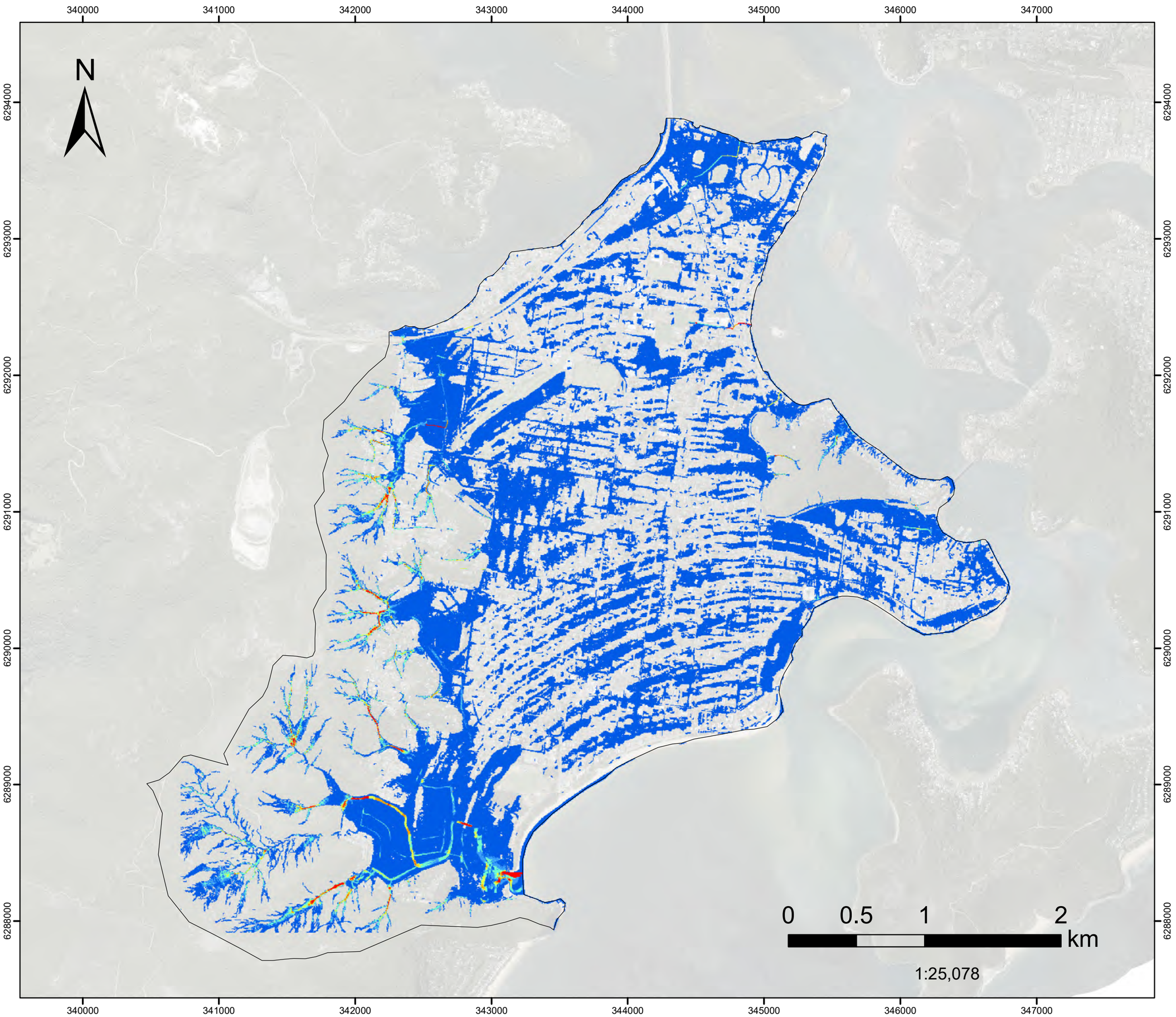


FIGURE F.12
PMF CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

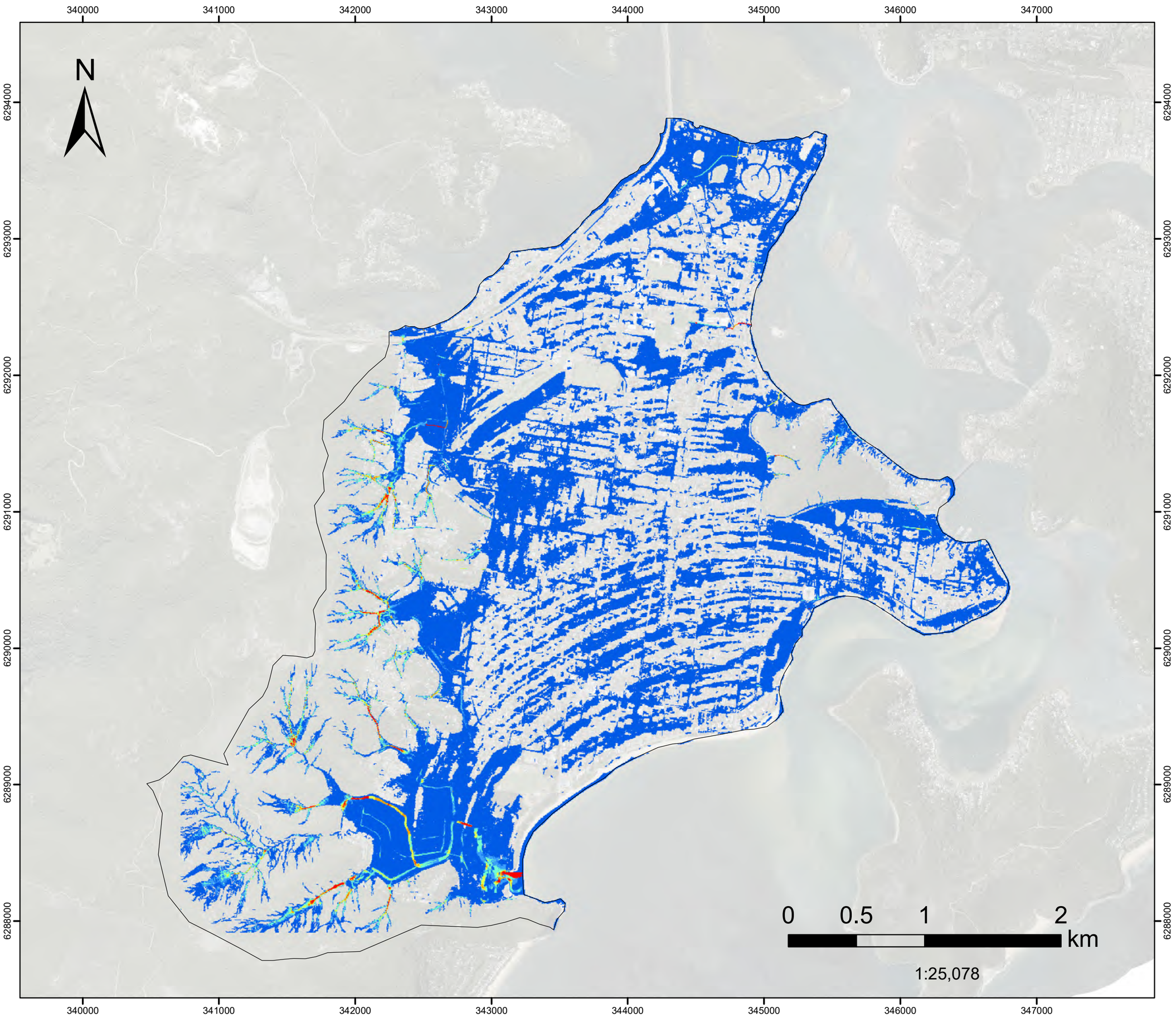


FIGURE F.13
PMF CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

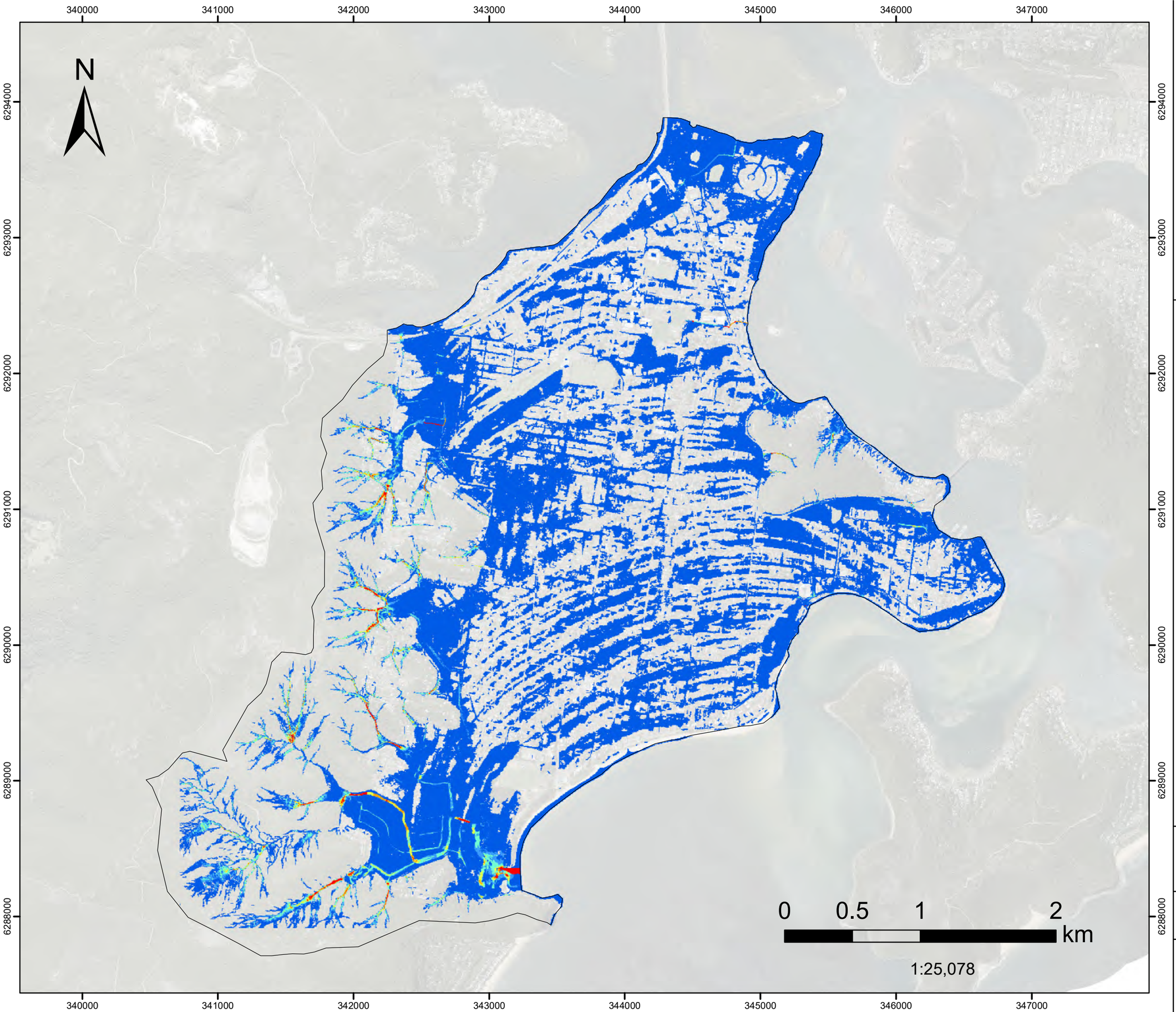


FIGURE F.14
PMF CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Peak Velocity

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Velocity (m/s)

- Below 0.75
- 0.76 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- Above 2.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

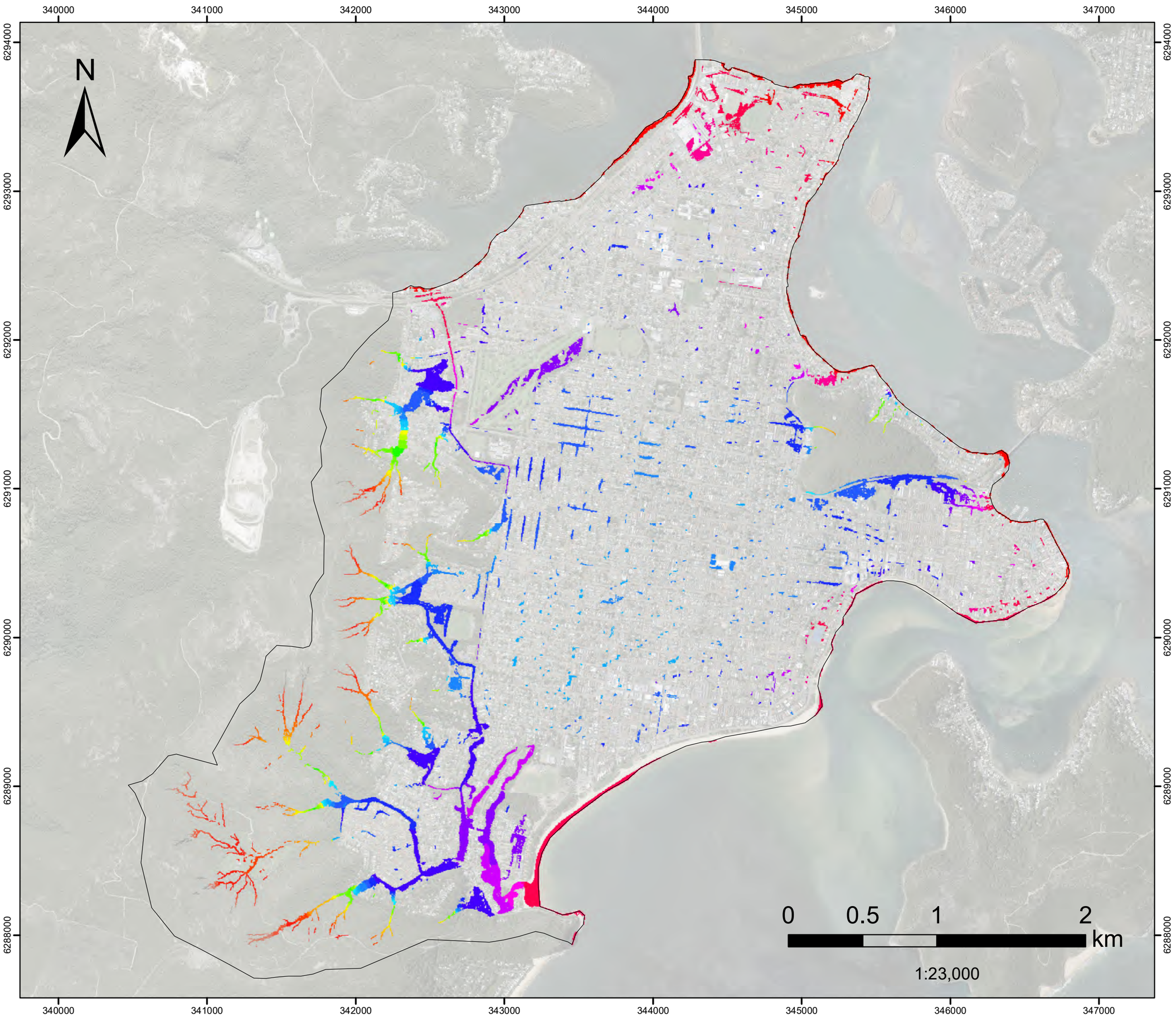


FIGURE F.15
1%AEP CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

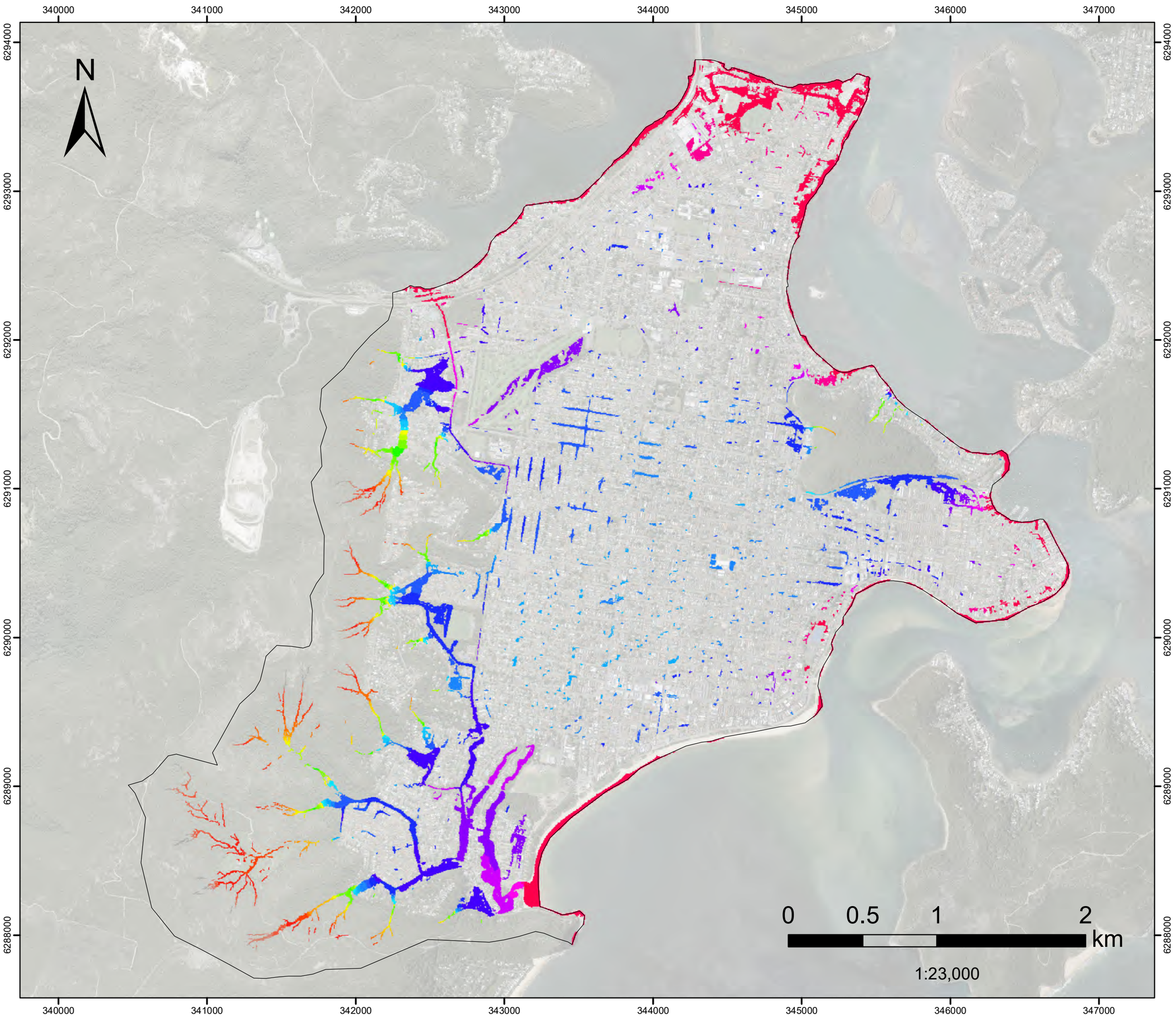


FIGURE F.16
1%AEP CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

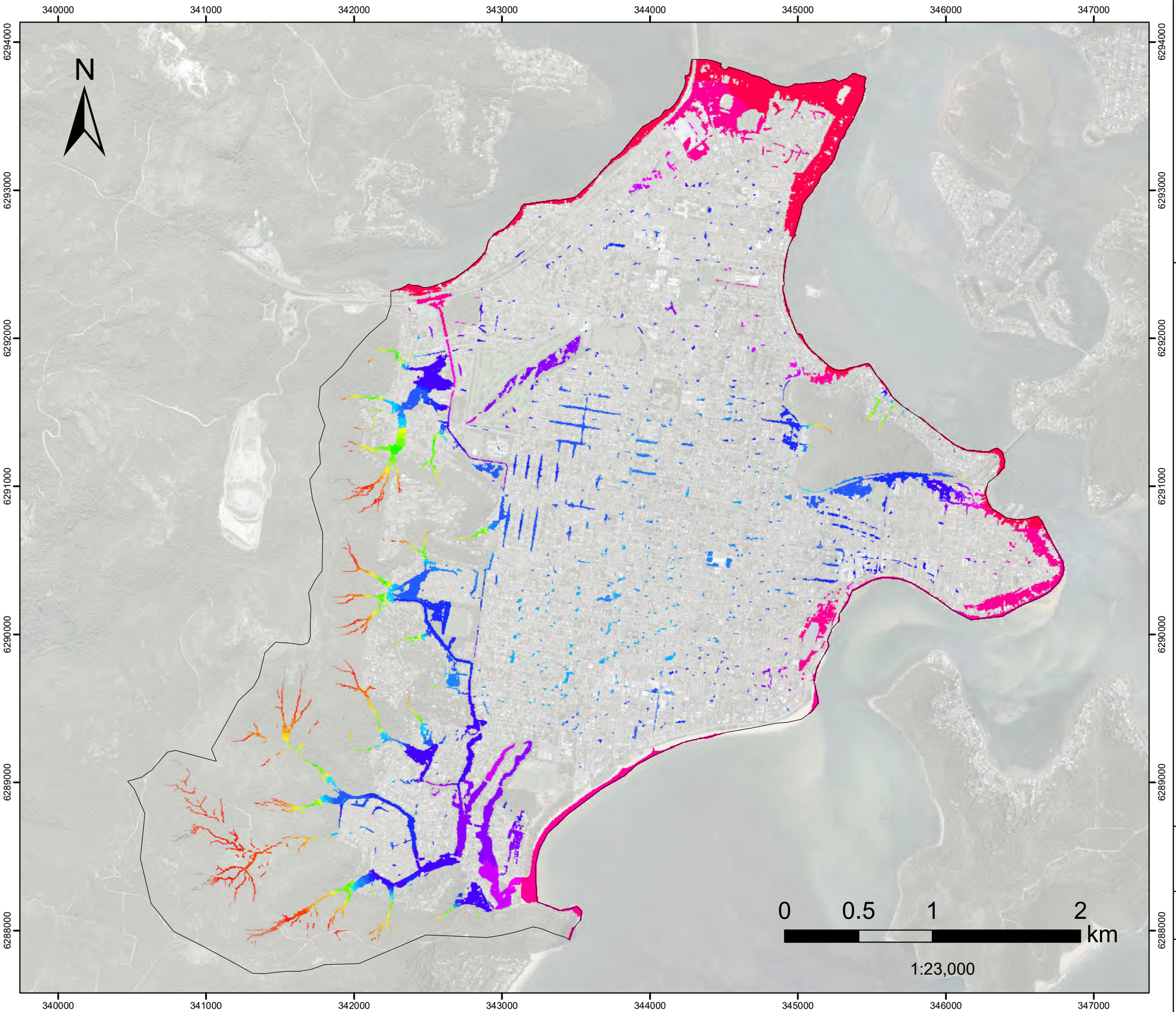


FIGURE F.17
1%AEP CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

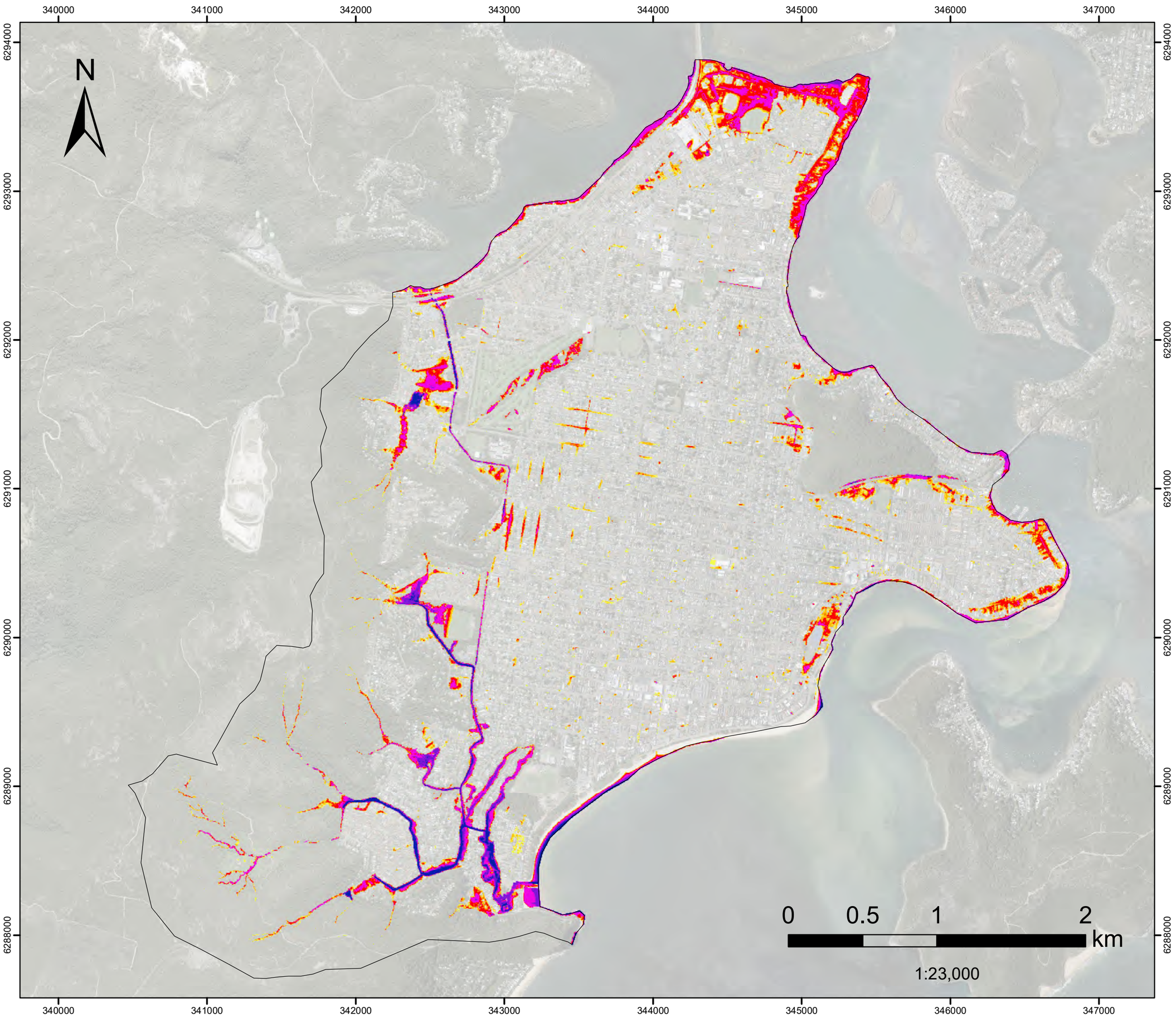


FIGURE F.4
1%AEP CC3 iniSZ

(Sea level rise 0.74m, Interim Climate Change Factor 19.7%, Updated antecedent conditions)

Flood Depth

Filtered with"
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 6hrs

Model Domain

Flood Depth (m)

- < 0.15
- 0.16- 0.2
- 0.21 - 0.3
- 0.31 - 0.5
- 0.51 - 1
- 1.1 - 1.5
- >1.5

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	15 March 2023
Project No	43803055

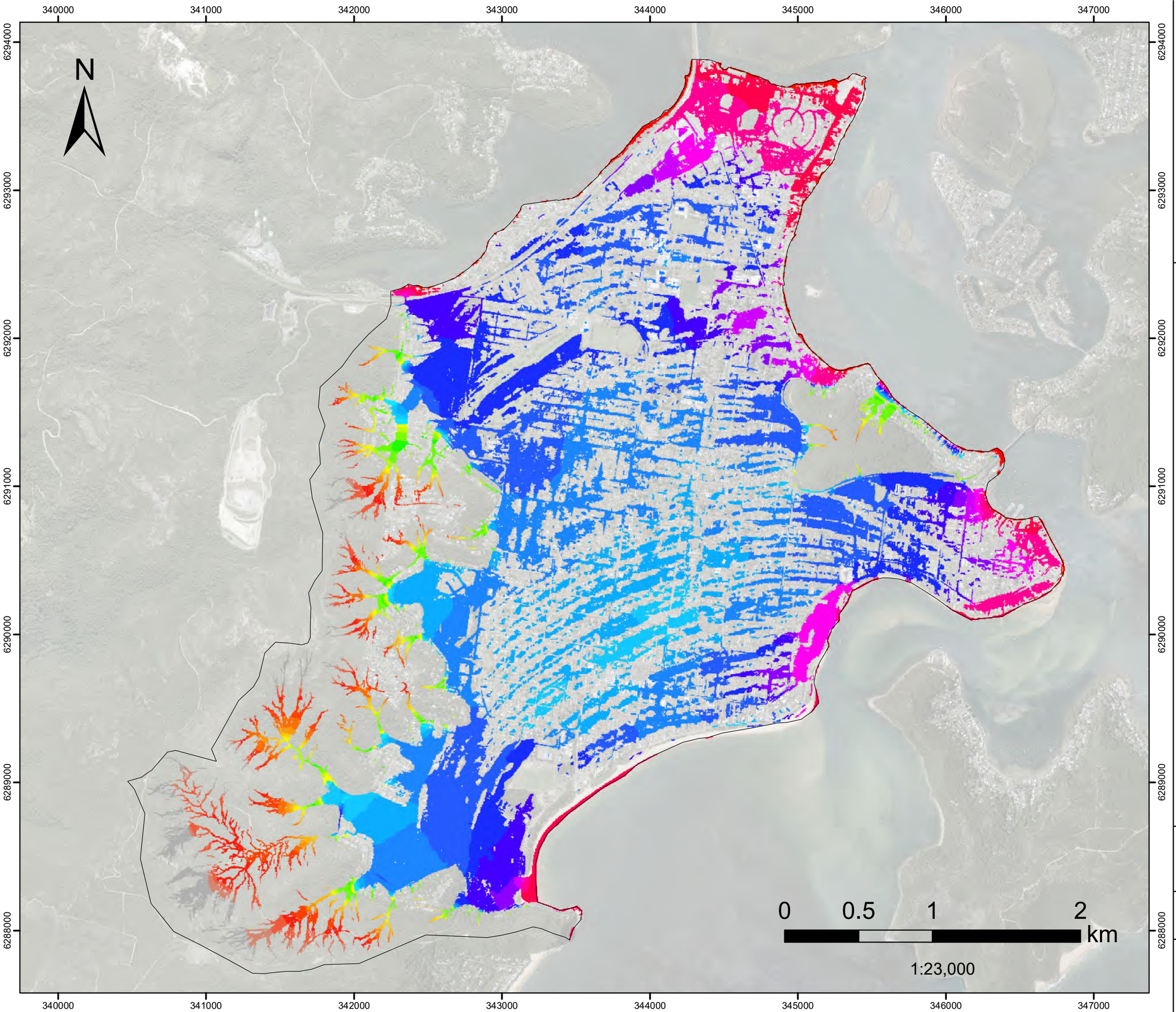


FIGURE F.19
PMF CC1

(Sea level rise 0.20m,
Interim Climate Change Factor 9.0%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

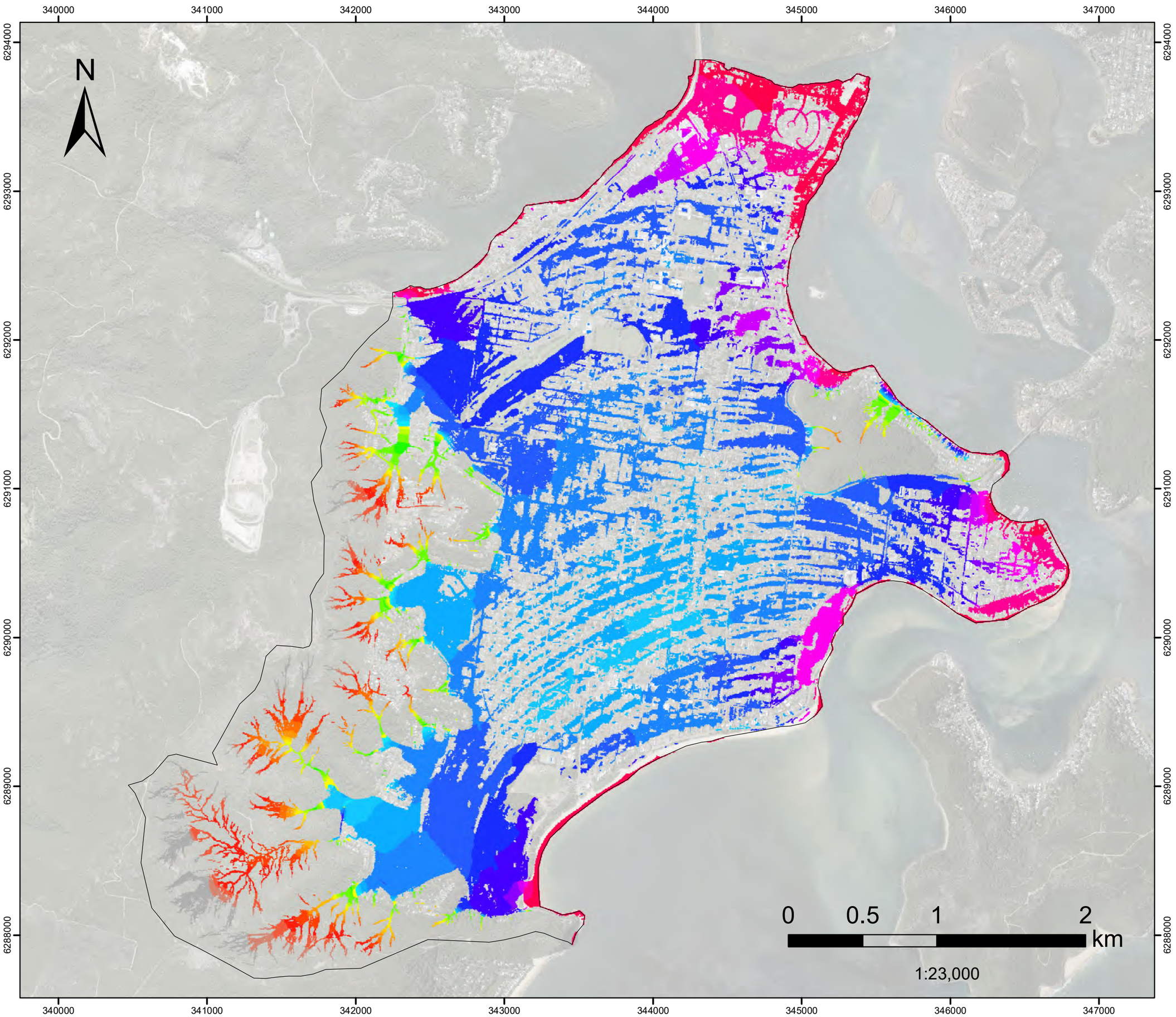


FIGURE F.20
PMF CC2

(Sea level rise 0.39m,
Interim Climate Change Factor 14.2%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

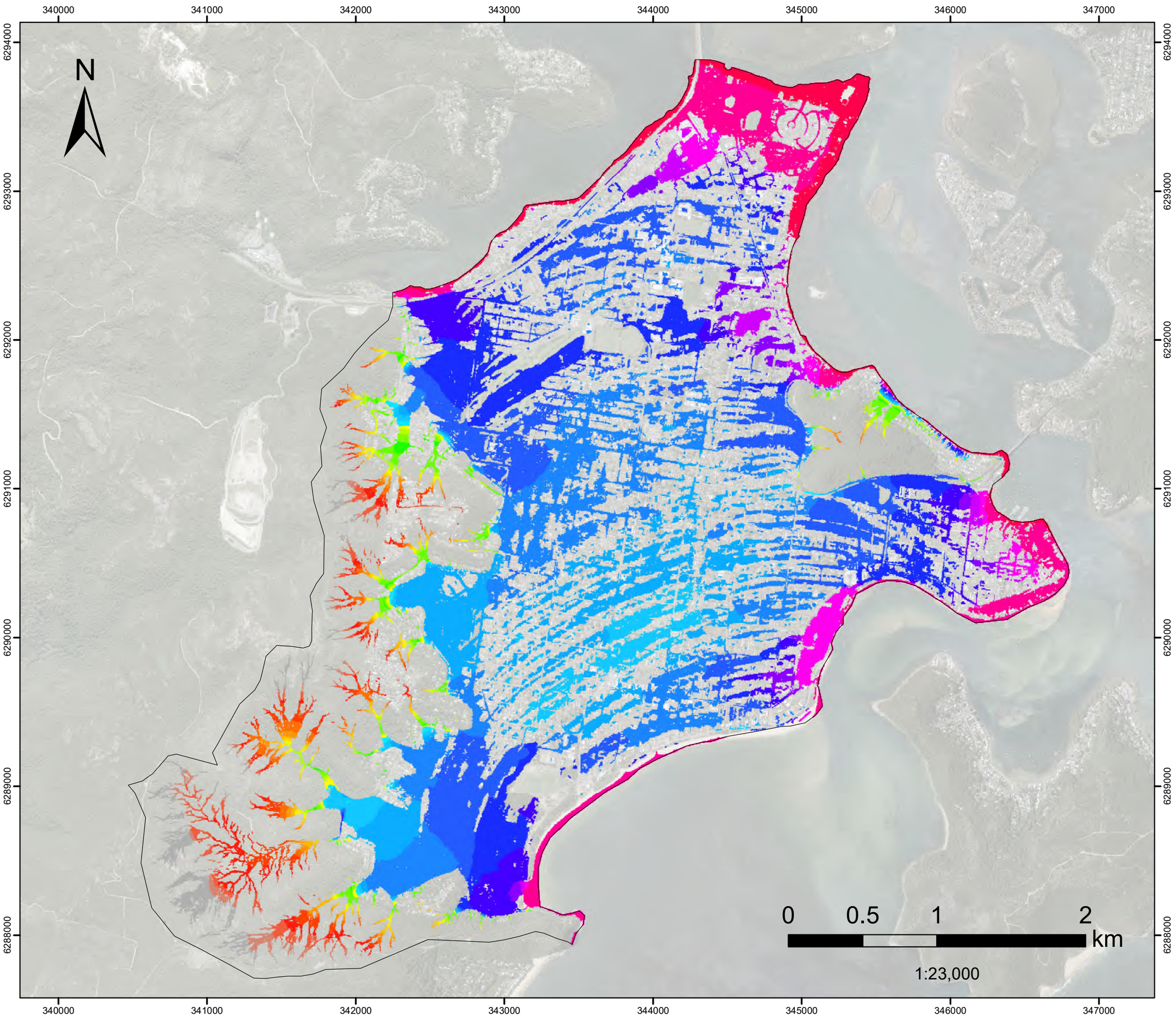


FIGURE F.21
PMF CC3

(Sea level rise 0.74m,
Interim Climate Change Factor 19.7%)

Flood Level

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)
No puddles less than 100m2.

Assessed for the critical duration 2hr

Model Domain

Flood Level (mAHD)

- 0.7 - 1
- 1.1 - 1.5
- 1.6 - 2
- 2.1 - 2.5
- 2.6 - 3
- 3.1 - 3.5
- 3.6 - 4
- 4.1 - 4.5
- 4.6 - 5
- 5.1 - 5.5
- 5.6 - 6
- 6.1 - 6.5
- 6.6 - 7
- 7.1 - 7.5
- 7.6 - 8
- 8.1 - 9
- 9.1 - 10
- 10.1 - 20
- 20.1 - 30
- 30.1 - 40
- 40.1 - 50
- 50.1 - 60
- 60.1 - 70
- 70.1 - 80
- 80.1 - 90
- 90.1 - 100
- 100.1 - 110
- 110.1 - 120
- 120.1 - 130
- 130.1 - 140

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 March 2023
Project No	43803055

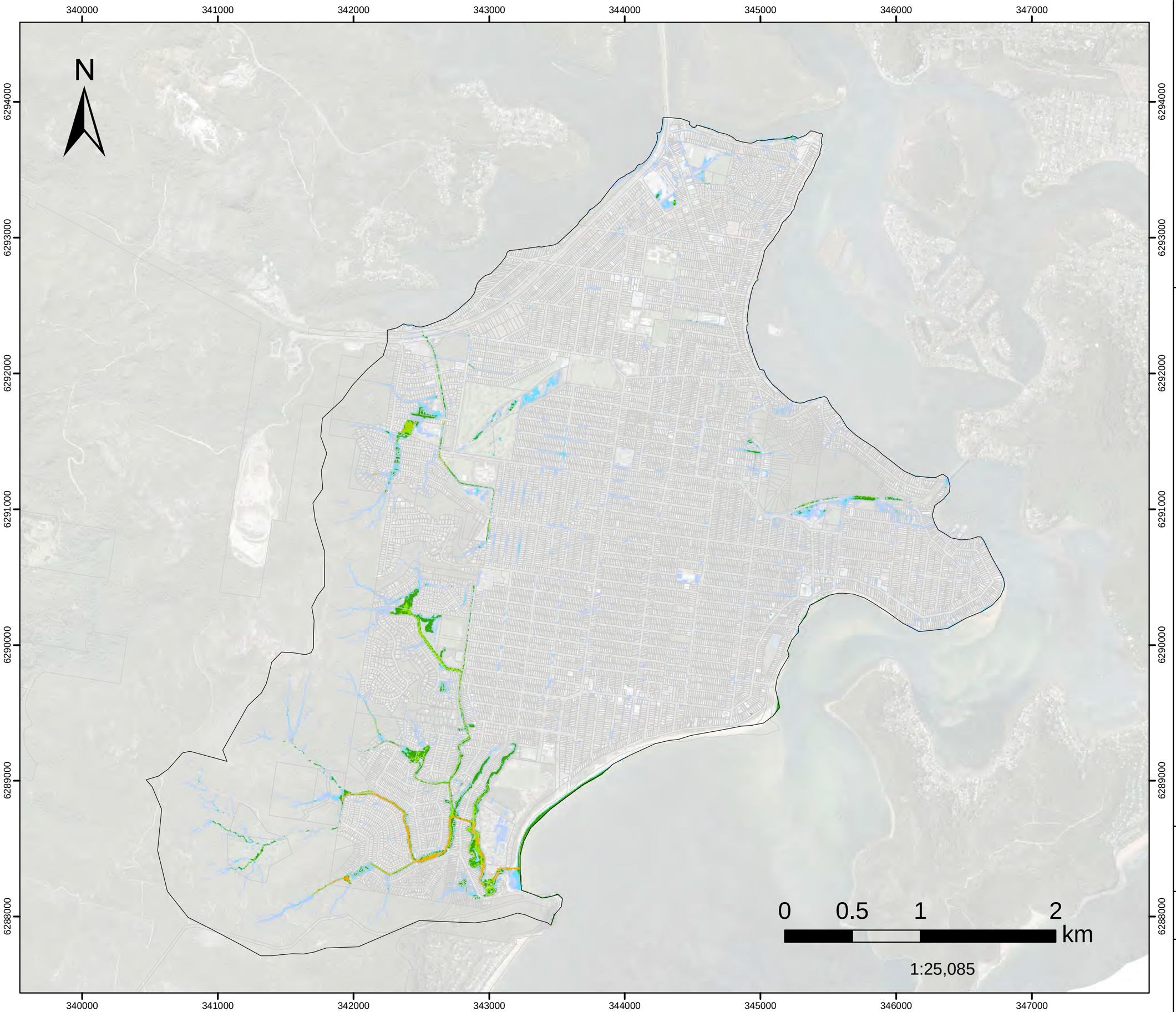


FIGURE G.1

1%AEP
Hazard Classification

Assessed for the critical duration 6hrs

- Model Domain
- H1
- H2
- H3
- H4
- H5
- H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

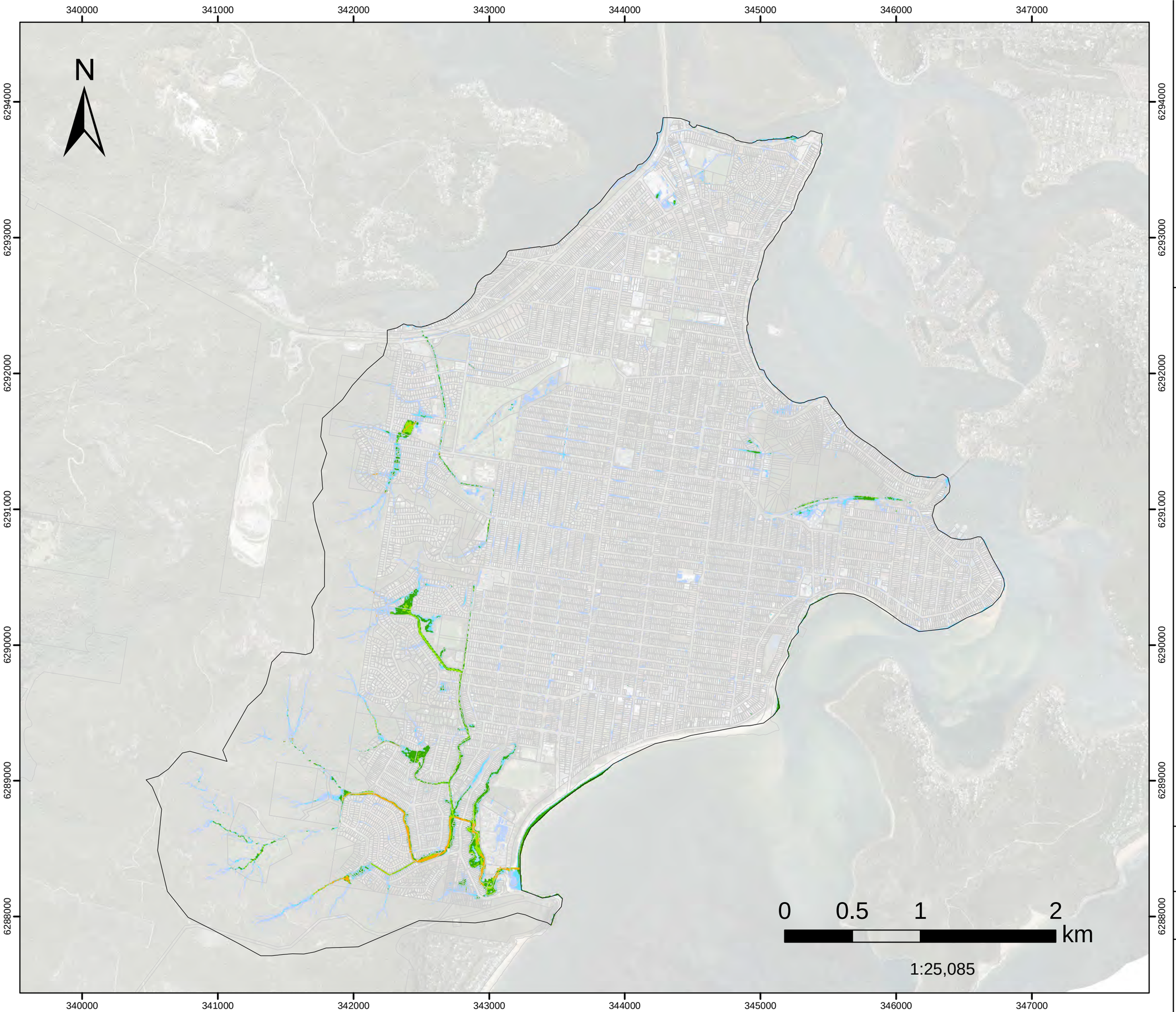


FIGURE G.2

2%AEP
Hazard Classification

Assessed for the critical duration 2hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

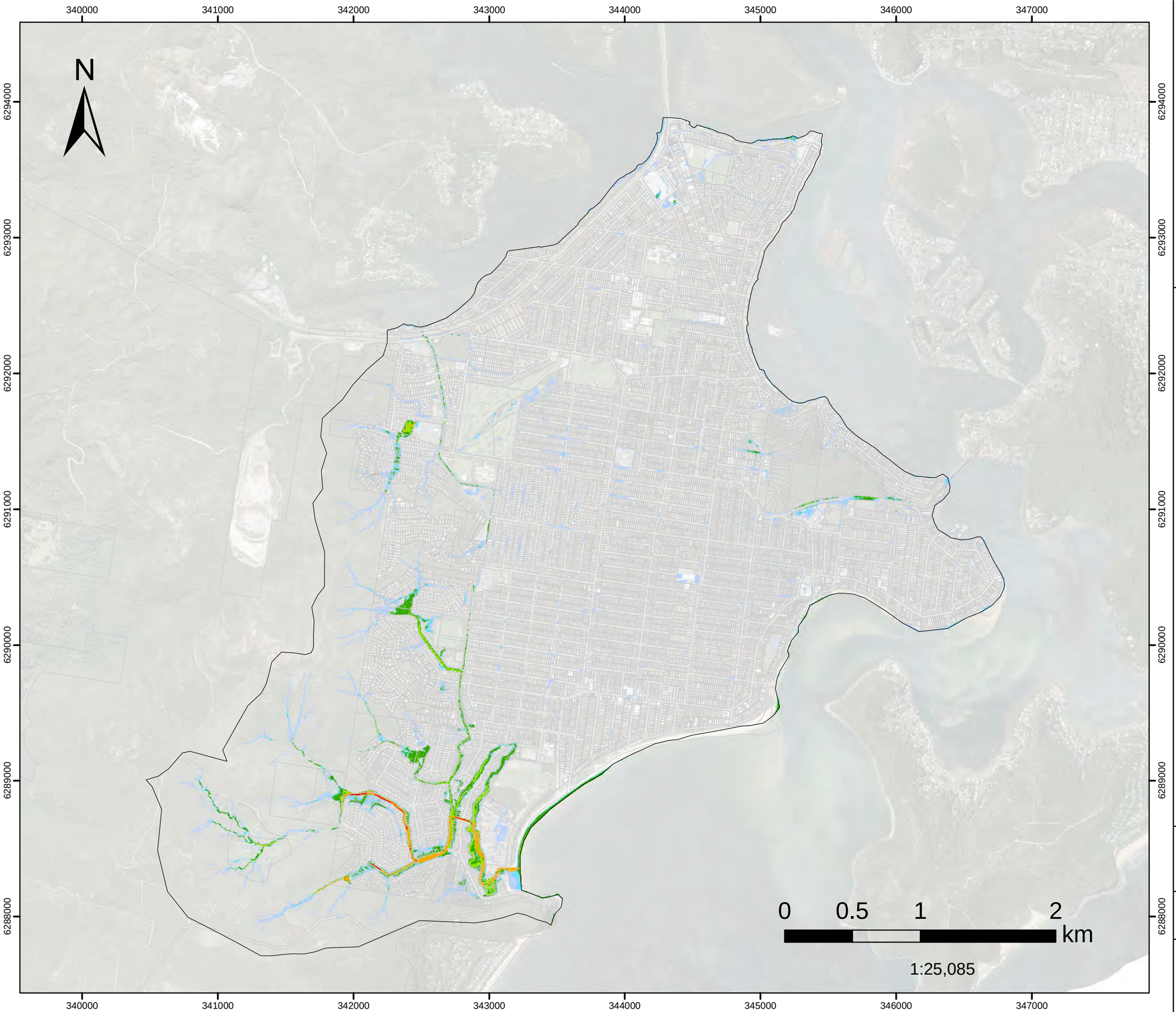


FIGURE G.3

5%AEP
Hazard Classification

Assessed for the critical duration 2hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

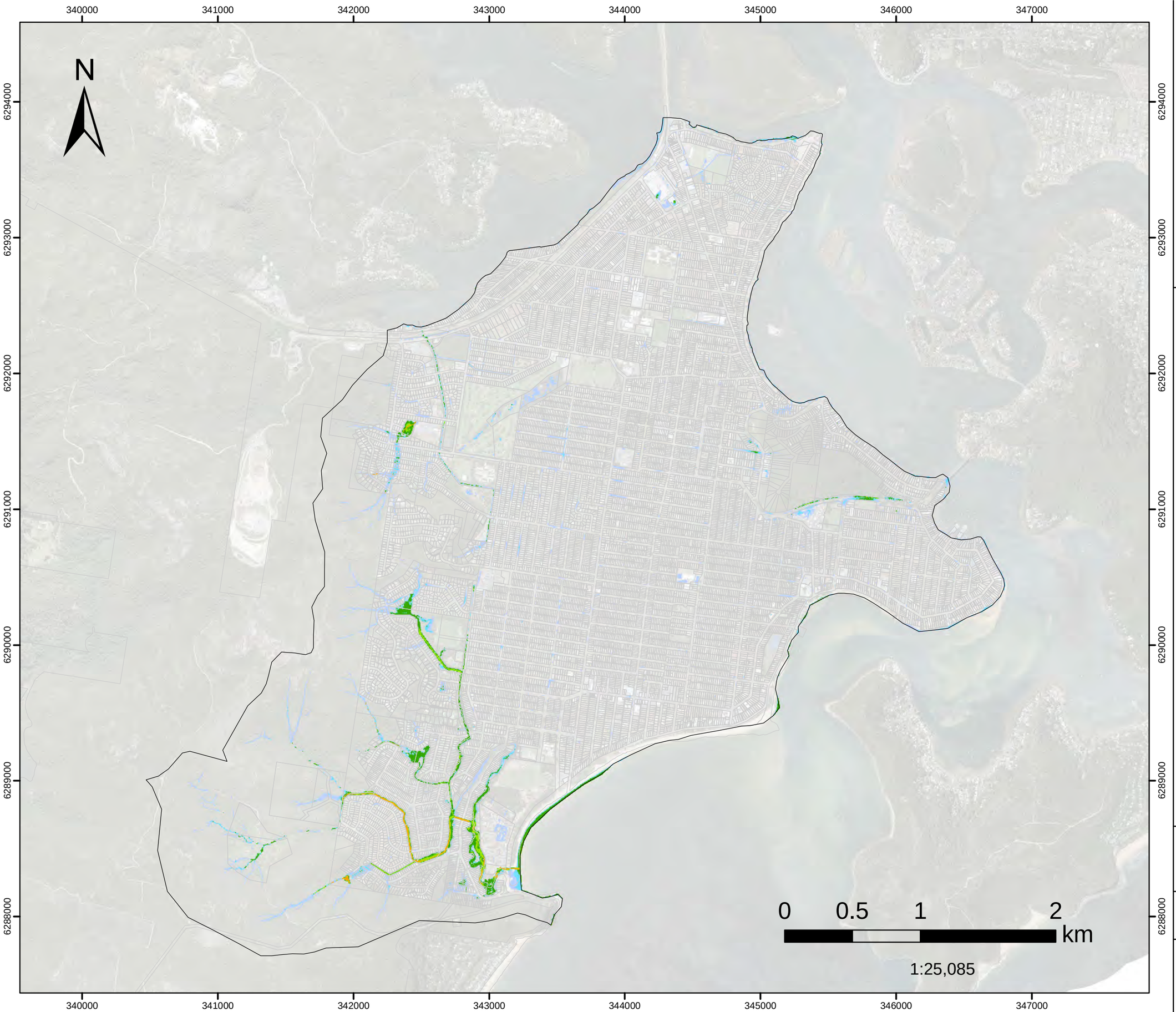


FIGURE G.4

10%AEP
Hazard Classification

Assessed for the critical duration 3hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

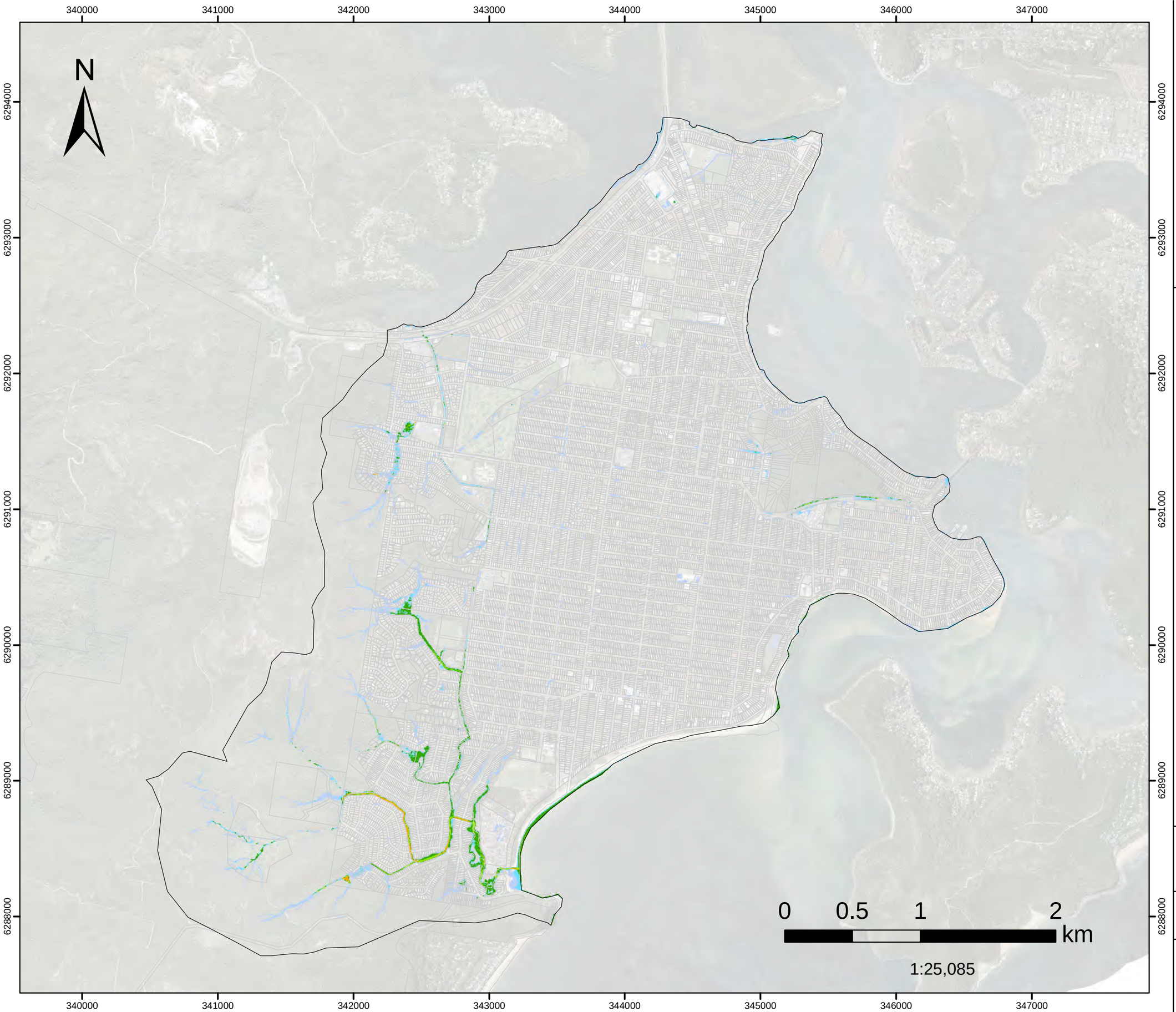


FIGURE G.5

20%AEP
Hazard Classification

Assessed for the critical duration 1hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

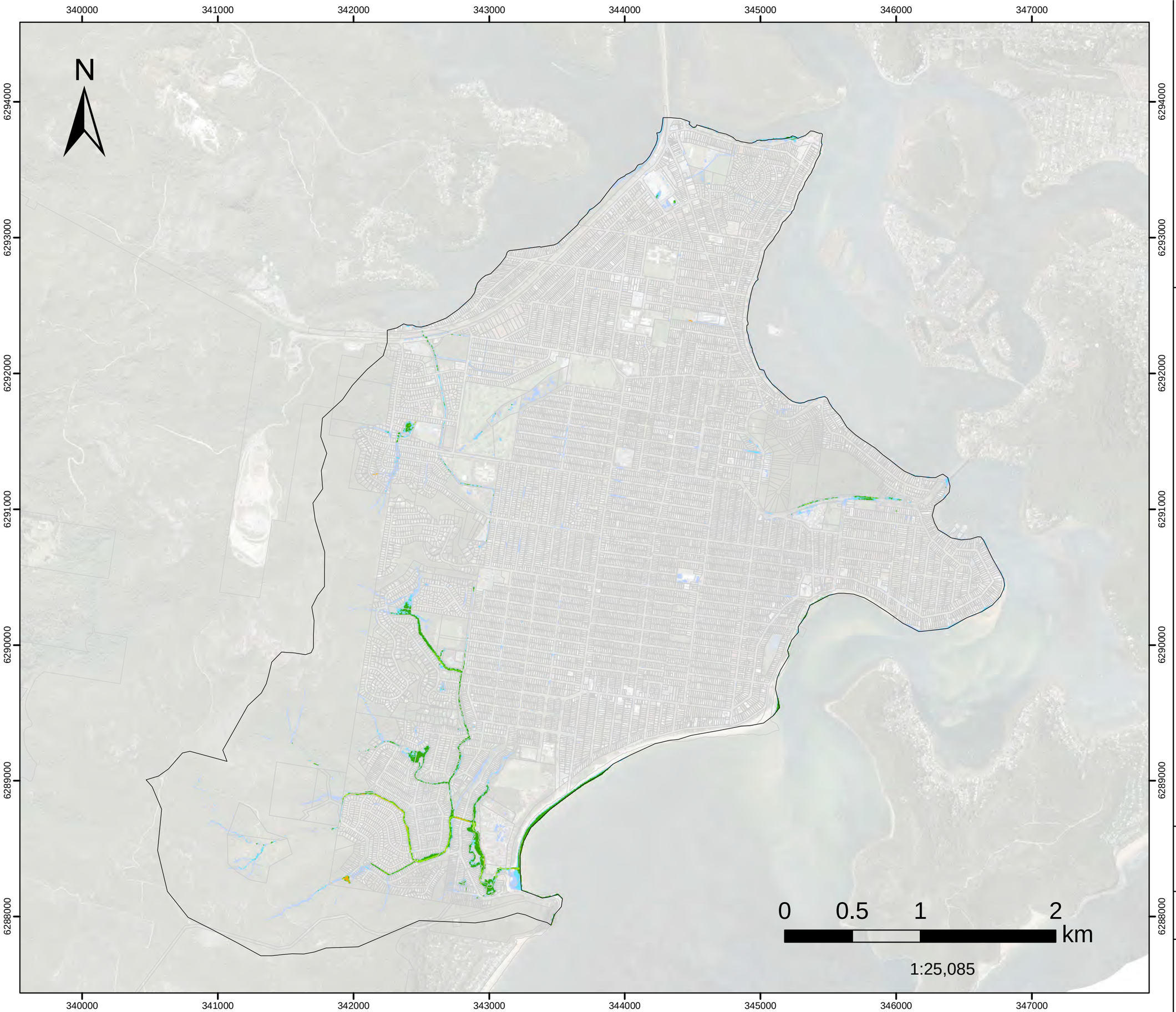


FIGURE G.6

50%AEP
Hazard Classification

Assessed for the critical duration 6hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

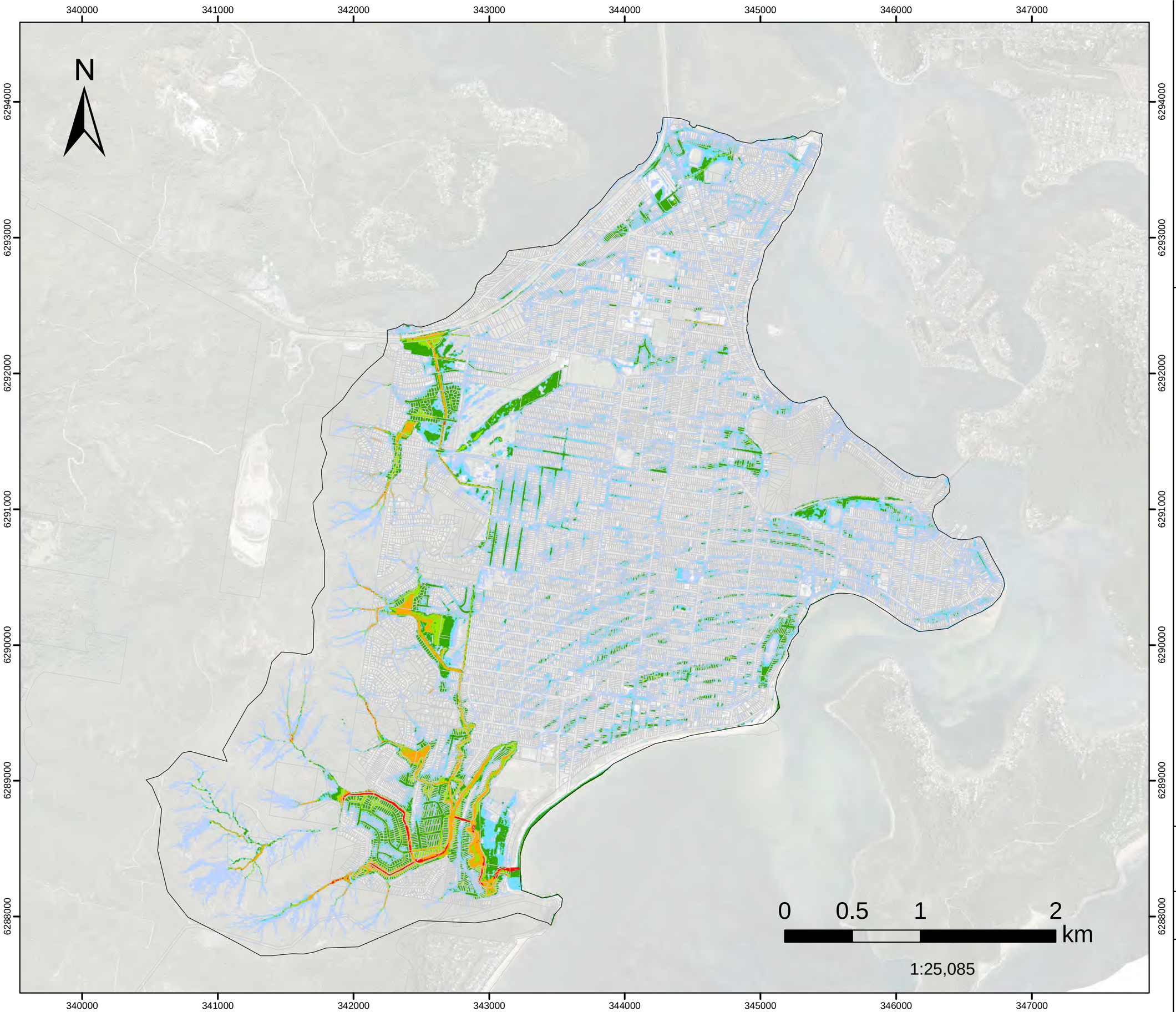


FIGURE G.7

PMF
Hazard Classification

Assessed for the critical duration 2hrs

Model Domain

H1

H2

H3

H4

H5

H6

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	1 Aug 2021
Project No	43803055

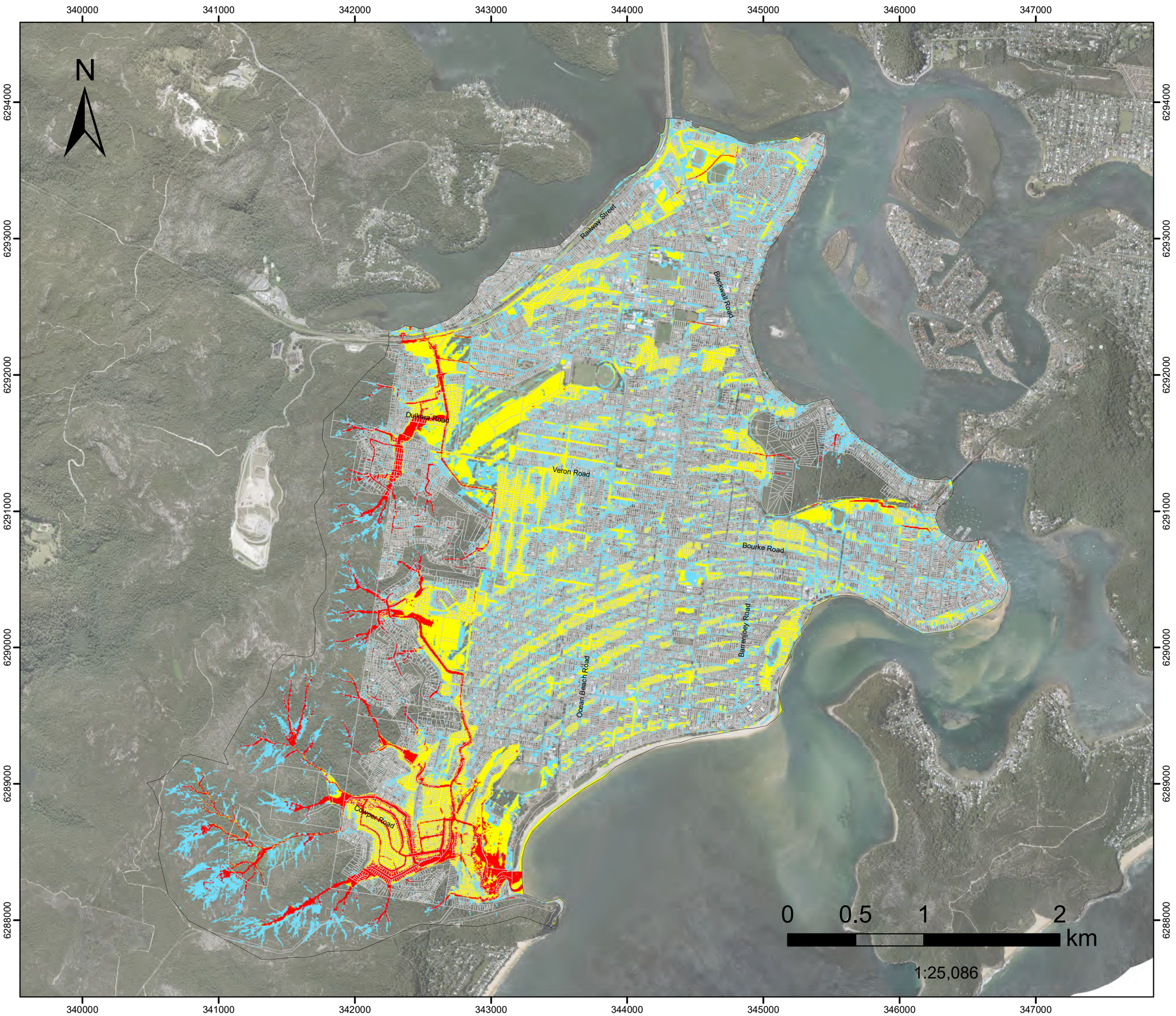


FIGURE H.1

PMF
Flood Function

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Floodway

Flood Storage

Flood Fringe

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

DHI

Version	FINAL
Date	14/07/2022
Project No	43803055

FIGURE H.2

1%AEP
Flood Function

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Floodway

Flood Storage

Flood Fringe

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	14/07/2022
Project No	43803055

FIGURE H.3

5%AEP
Flood Function

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Floodway

Flood Storage

Flood Fringe

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	14/07/2022
Project No	43803055

FIGURE H.4

20%AEP
Flood Function

Filtered with
Depth>0.10m, OR
Velocity>2m/s, OR
(Depth>0.05m AND VxD>0.025m2/s)

No puddles less than 100m2.

Model Domain

Floodway

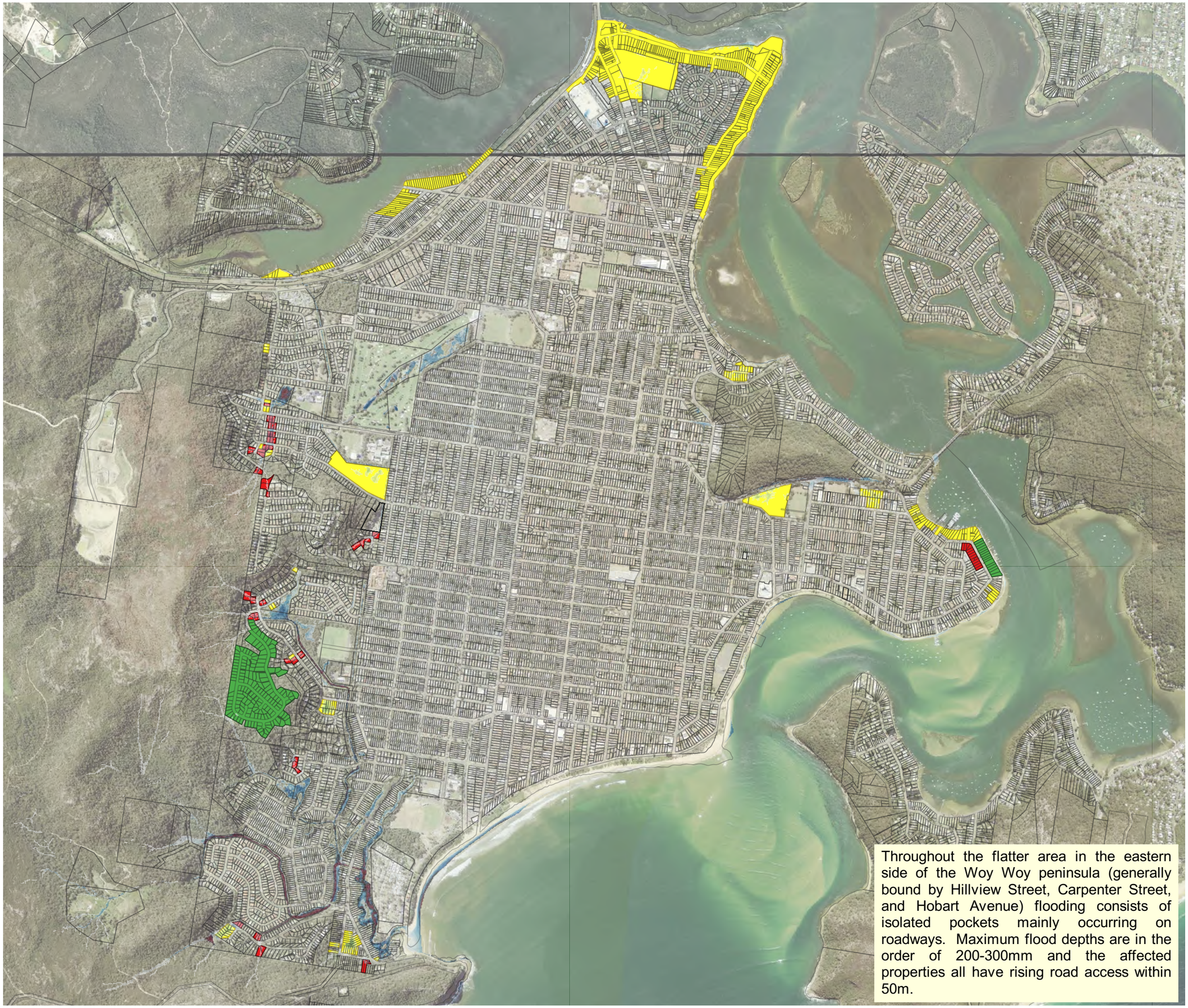
Flood Storage

Flood Fringe

Datum Projection: GDA 1994 MGA Zone 56
Vertical Datum: Australian Height Datum
Grid: Map Grid of Australia

Woy Woy
Flood Risk Management Study

Version	FINAL
Date	14/07/2022
Project No	43803055



Throughout the flatter area in the eastern side of the Woy Woy peninsula (generally bound by Hillview Street, Carpenter Street, and Hobart Avenue) flooding consists of isolated pockets mainly occurring on roadways. Maximum flood depths are in the order of 200-300mm and the affected properties all have rising road access within 50m.

N
W E
S

Figure I 110

Flood Emergency Response Classification

10% AEP

Legend

Cadastre

Emergency Response Category

- Flooded, Isolated, Submerged
- Flooded, Isolated, Elevated
- Flooded, Escape Overland
- Flooded, Escape Rising Road

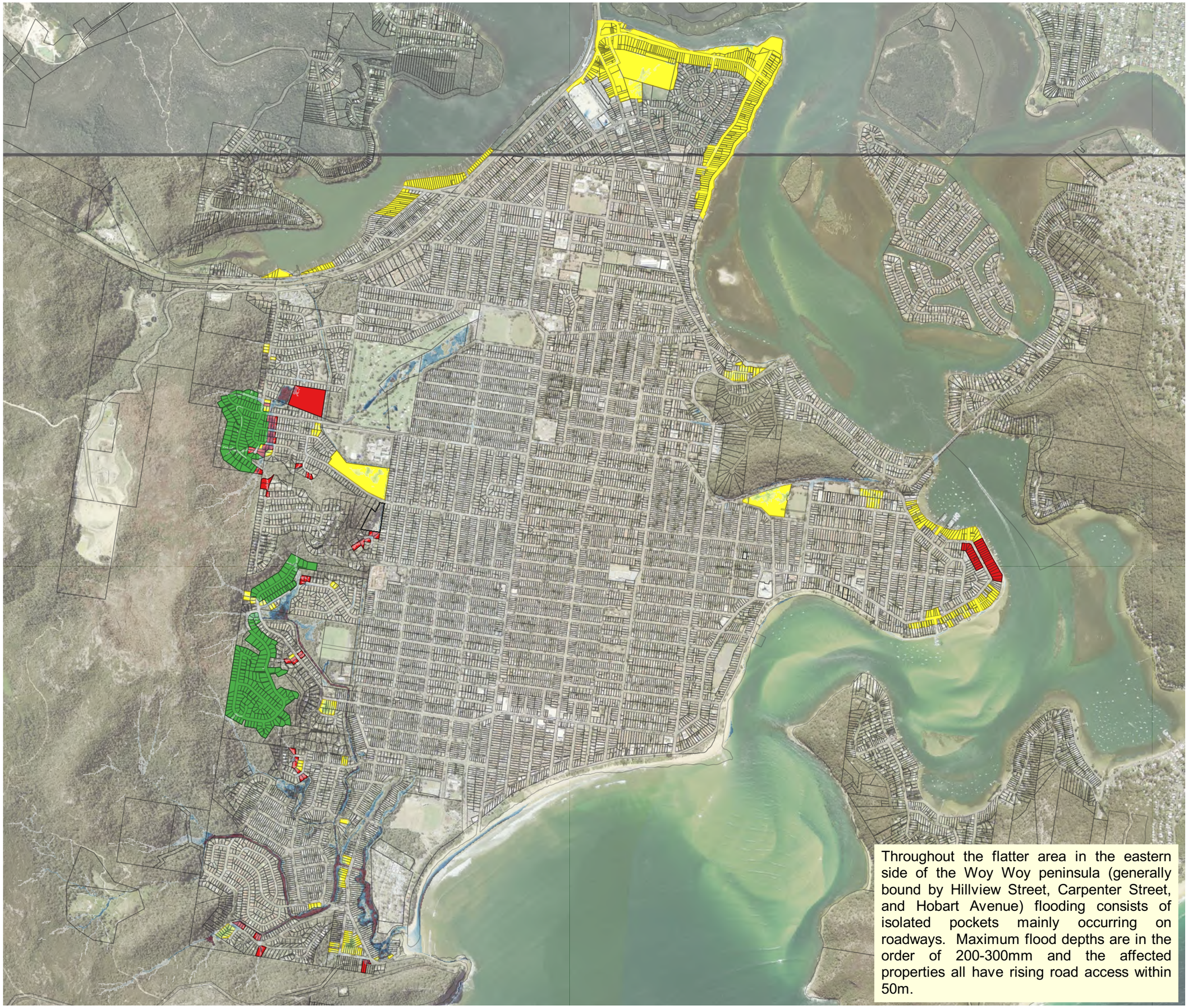
10% AEP Flood Depth (m)

- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.2
- > 1.2

0 0.5 1 km

Scale : 1:20000@A3
Date : 9 November 2020
Revision : A
Created by : JRF
Coordinate System : MGA 56

Rhelm



Throughout the flatter area in the eastern side of the Woy Woy peninsula (generally bound by Hillview Street, Carpenter Street, and Hobart Avenue) flooding consists of isolated pockets mainly occurring on roadways. Maximum flood depths are in the order of 200-300mm and the affected properties all have rising road access within 50m.

N
W E
S

Figure I 111

Flood Emergency Response Classification

5% AEP

Legend

Cadastre

Emergency Response Category

- Flooded, Isolated, Submerged
- Flooded, Isolated, Elevated
- Flooded, Escape Overland
- Flooded, Escape Rising Road

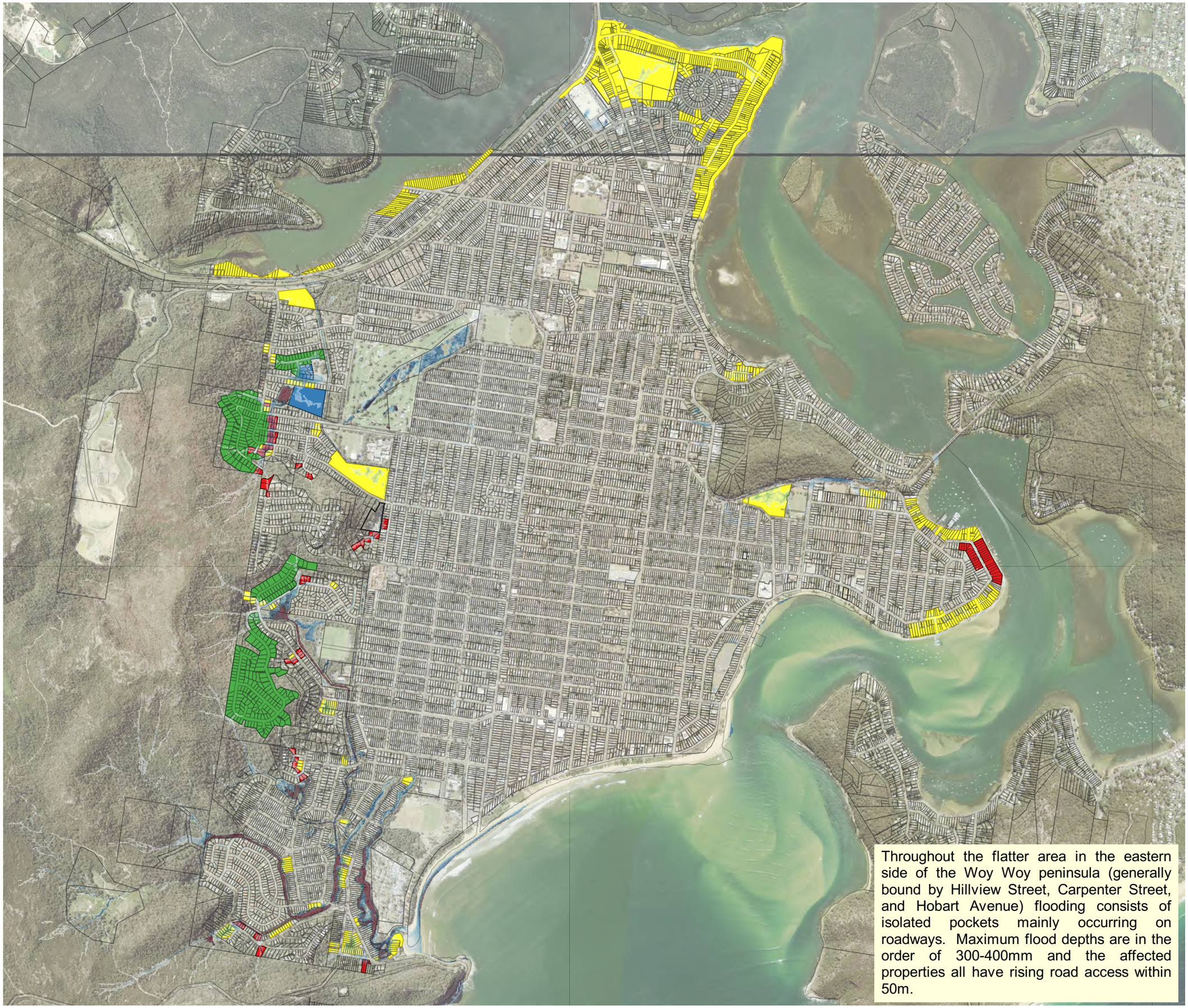
5% AEP Flood Depth (m)

- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.2
- > 1.2

0 0.5 1 km

Scale : 1:20000@A3
Date : 9 November 2020
Revision : A
Created by : JRF
Coordinate System : MGA 56

Rhelm



Throughout the flatter area in the eastern side of the Woy Woy peninsula (generally bound by Hillview Street, Carpenter Street, and Hobart Avenue) flooding consists of isolated pockets mainly occurring on roadways. Maximum flood depths are in the order of 300-400mm and the affected properties all have rising road access within 50m.

N
W E
S

Figure I 112

Flood Emergency Response Classification

1% AEP

Legend

Cadastre

Emergency Response Category

- Flooded, Isolated, Submerged
- Flooded, Isolated, Elevated
- Flooded, Escape Overland
- Flooded, Escape Rising Road

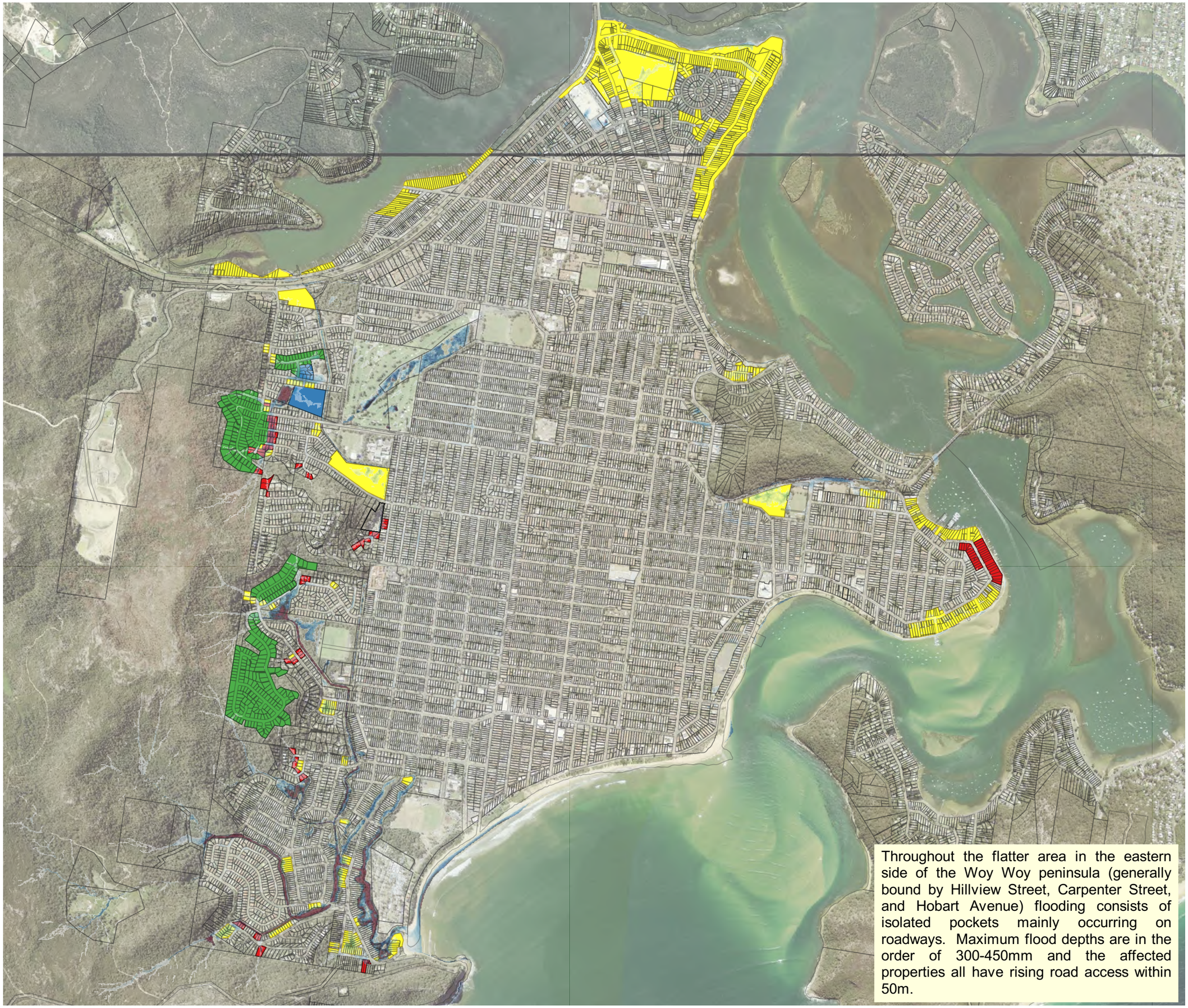
1% AEP Flood Depth (m)

- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.2
- > 1.2

0 0.5 1 km

Scale : 1:20000@A3
Date : 9 November 2020
Revision : A
Created by : JRF
Coordinate System : MGA 56

Rhelm



Throughout the flatter area in the eastern side of the Woy Woy peninsula (generally bound by Hillview Street, Carpenter Street, and Hobart Avenue) flooding consists of isolated pockets mainly occurring on roadways. Maximum flood depths are in the order of 300-450mm and the affected properties all have rising road access within 50m.

N
W E
S

Figure I 113

Flood Emergency Response Classification

0.5% AEP

Legend

Cadastre

Emergency Response Category

- Flooded, Isolated, Submerged
- Flooded, Isolated, Elevated
- Flooded, Escape Overland
- Flooded, Escape Rising Road

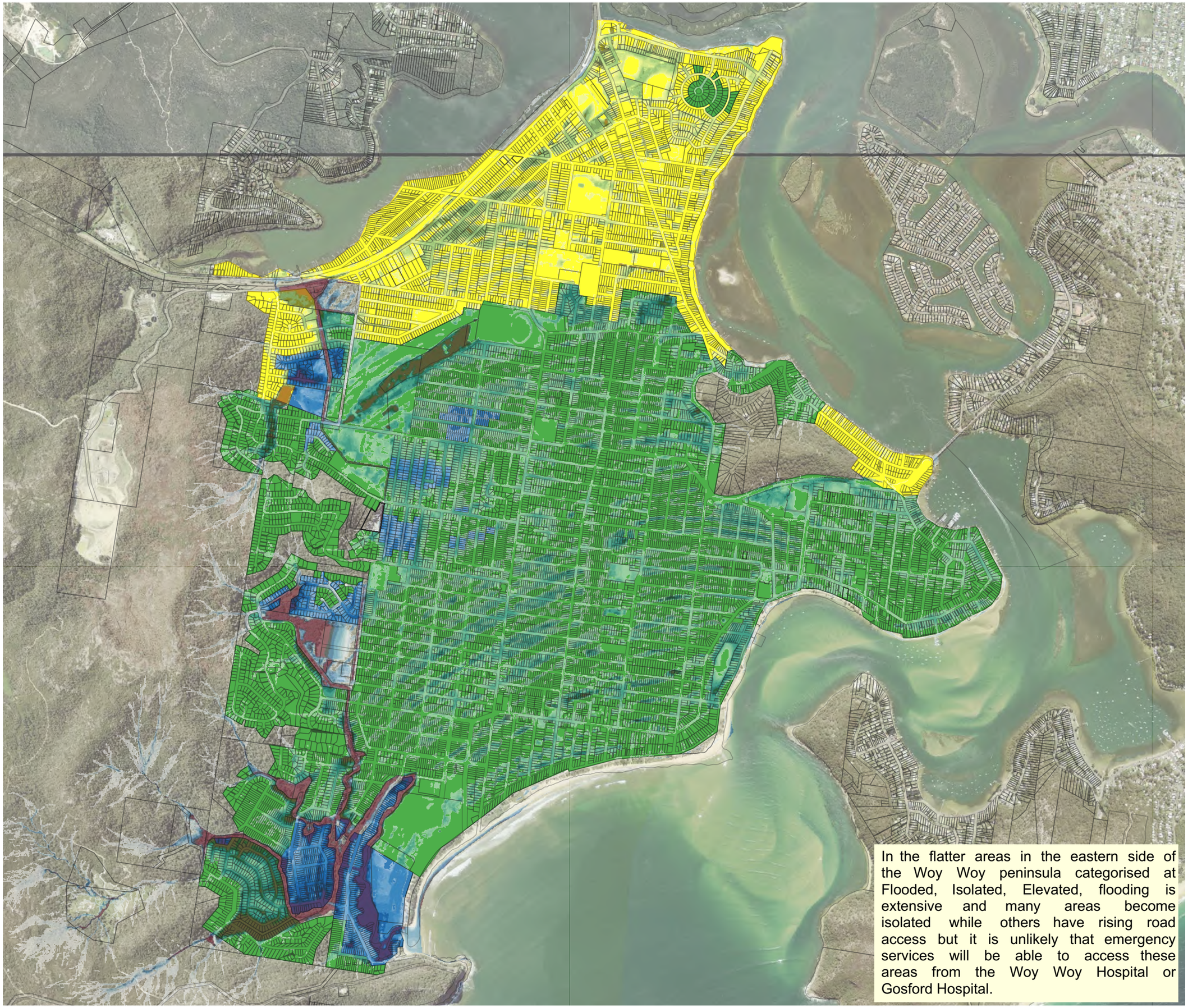
0.5% AEP Flood Depth (m)

- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.2
- > 1.2

0 0.5 1 km

Scale : 1:20000@A3
Date : 9 November 2020
Revision : A
Created by : JRF
Coordinate System : MGA 56

Rhelm



In the flatter areas in the eastern side of the Woy Woy peninsula categorised at Flooded, Isolated, Elevated, flooding is extensive and many areas become isolated while others have rising road access but it is unlikely that emergency services will be able to access these areas from the Woy Woy Hospital or Gosford Hospital.

N
W E
S

Figure I 114

Flood Emergency Response Classification

PMF

Legend

Cadastre

Emergency Response Category

- Flooded, Isolated, Submerged
- Flooded, Isolated, Elevated
- Flooded, Escape Overland
- Flooded, Escape Rising Road

PMF Flood Depth (m)

- 0.1 - 0.2
- 0.2 - 0.3
- 0.3 - 0.4
- 0.4 - 0.5
- 0.5 - 0.75
- 0.75 - 1
- 1 - 1.2
- > 1.2

0 0.5 1 km

Scale : 1:20000@A3
Date : 9 November 2020
Revision : A
Created by : JRF
Coordinate System : MGA 56

Rhelm