



EUROBODALLA SHIRE COUNCIL

WAGONGA INLET, KIANGA AND DALMENY FLOOD STUDY

FINAL REPORT



FEBRUARY 2016







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JULY 2016

Project Wagonga Inlet, Kianga and Dalmeny Flood Study		Project Number 112034	
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Date 11 July 2016		Verified by 	
Revision	Description	Distribution	Date
5	Final Flood Study	ESC, OEH	February 2016
4	Draft Flood Study	ESC, OEH	March 2015
3	Calibration and Validation Report	ESC, OEH	August 2014
2	Preliminary Working Draft Report	ESC, OEH	March 2014
1	Draft Flood Study – Public Exhibition	ESC, OEH	September 2013

**WAGONGA INLET, KIANGA AND DALMENY
FLOOD STUDY**

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LIST OF ABBREVIATIONS

1D	One (1) Dimensional
2D	Two (2) Dimensional
ALS	Airborne Laser Scanning
DEM	Digital Elevation Model
ICOLL	Intermittently Closed and Open Lake or Lagoon
IFD	Intensity-Frequency-Duration
LiDAR	Airborne Light Detection and Ranging Survey
NPWS	National Parks and Wildlife Services
TIN	Triangular Irregular Network
UTC	Coordinated Universal Time

FOREWORD

The NSW Government's Flood Prone Land Policy provides a framework to ensure the sustainable use of floodplain environments. The Policy is specifically structured to provide solutions to existing flooding problems in rural and urban areas. In addition, the Policy provides a means of ensuring that any new development is compatible with the flood hazard and does not create additional flooding problems in other areas.

Under the Policy, the management of flood liable land remains the responsibility of local government. The NSW Government provides technical and financial assistance to Councils in the discharge of their floodplain management responsibilities.

The Policy provides for technical and financial support by the Government through four sequential stages:

1. ***Flood Study***
 - Determine the nature and extent of the flood problem.
2. ***Floodplain Risk Management***
 - Evaluates management options for the floodplain in respect of both existing and proposed development.
3. ***Floodplain Risk Management Plan***
 - Involves formal adoption by Council of a plan of management for the floodplain.
4. ***Implementation of the Plan***
 - Construction of flood mitigation works to protect existing development, use of Local Environmental Plans to ensure new development is compatible with the flood hazard.

This document forms the first stage of the floodplain risk management process, i.e. the Flood Study. The Flood Study is based upon data relevant at the date of commencement (2012). At the commencement of subsequent stages of the floodplain risk management process, the data is updated to include changes that have occurred within the catchments over the interim period.

EXECUTIVE SUMMARY

BACKGROUND

The Flood Study includes four catchments; the Wagonga Inlet, Kianga Lake, “Duck Pond” and Mummuga Lake Catchments. Wagonga Inlet is a trained entrance estuary with the township of Narooma located within the catchment. The Kianga Lake, “Duck Pond” and Mummuga Lake Catchments are Intermittently Closed and Open Lakes and Lagoons (ICOLL’s). The township of Kianga is within Kianga Lake Catchment and the township of Dalmeny is within the Mummuga Lake and “Duck Pond” Catchments.

OBJECTIVES

The purpose of this Flood Study is to define the flood behaviour under existing catchment conditions (at the commencement of the study), through the development of a suite of hydrologic and hydraulic models that can also be used as the basis for a future Floodplain Risk Management Study and Plan for the study area, and to assist Eurobodalla Shire Council (ESC) when undertaking flood-related planning decisions for existing and future developments.

The primary objectives of the study are:

- to determine the flood behaviour including design flood levels and velocities over a range of flooding events, from storm runoff in the catchment and from tidal influences;
- to determine provisional residential flood planning areas and flood planning levels;
- to undertake provisional flood emergency response planning classification of communities;
- to provide a model that can establish the effects of flood behaviour of future development; and
- to assess the sensitivity of flood behaviour to potential climate change effects such as increases in rainfall intensities and sea level rise.

FLOODING HISTORY

There have been a number of flood events known to have occurred within the catchments. Data suggests that the 2010 event was the largest rainfall event to have occurred in recent times, with a 100 year ARI estimate at Narooma. An event in 1999 had an estimate of between a 20 year and a 50 year ARI event at Narooma. The 2007 event had an estimate of between a 10 year and a 20 year ARI event at Narooma. And the 2014 event had an estimate less than or equal to a 1 year ARI event.

Photographs of flooding were available for the 2010 and 2014 events and survey data of flood levels were available for the 1999 and 2010 events. Water levels recorded within Barlows Bay were available for all the events investigated.

HYDROLOGIC AND HYDRAULIC MODELLING PROCESS

The hydrologic modelling was undertaken using WBNM and the hydraulic model was established using TUFLOW.

The design rainfall events that were modelled were the 20%, 10%, 5%, 1% and 0.5% AEP design events and the Probable Maximum Precipitation (PMP). The temporal patterns for the design events were sourced from Australian Rainfall and Runoff (AR&R) (Pilgrim, 1987) and the Intensity-Frequency-Duration (IFD) data was obtained from the Bureau of Meteorology's (BoM). The PMP estimates were derived according to the BoM guidelines, the *Generalised Short Duration Method* (BoM, 2003).

OUTCOMES

The flood study report details the results and findings of the investigations. The key elements include:

- a summary of available flood related data;
- establishment and validation of the hydrologic and hydraulic models;
- sensitivity analysis of the model results to variation of input parameters;
- the estimation of design flood behaviour for existing catchment conditions;
- preliminary hydraulic categories and provisional hazard mapping;
- preliminary residential flood planning areas and flood planning levels;
- flood emergency response classification of communities; and
- potential implications of climate change projections.