



# STOCKYARD AND BENNISON CREEK FLOOD MAPPING

South Gippsland Shire  
Council

**CATEGORY: D.1.d**  
**Hydraulic Modelling**

## PROJECT SCOPE

Following major flooding events within the township of Foster, South Gippsland Shire Council (SGSC) and the West Gippsland CMA (WGCMA) received State funding to undertake a flood and drainage study for the town including Stockyard Creek and Bennison Creek catchments.

The objective of the study was to improve land use planning and emergency response via the development of computer based flood models and the generation of detailed flood extent, depth, height and velocity information for a range of flood events. Engeny was engaged by SGSC to undertake flood mapping of the Stockyard Creek and Bennison Creek catchments.

Flood modelling was undertaken in accordance with 2016 Australian Rainfall and Runoff guidelines and using a combination of RORB hydrological modelling and 1D/2D TUFLOW hydraulic modelling. A 1D HEC-RAS model was used to verify the performance of the TUFLOW flood model at major waterway structures. All hydraulic and hydrological models were developed by Engeny and both the hydrological and hydraulic modelling methodologies were reviewed and approved by the Department of Environment Land Water and Planning's (DELWP) independent panel of technical experts.

Two (2) community engagement meetings were used to establish the nature of historical flooding (which was used to validate the flood modelling) and to bring the community on the journey in order to develop effective and supported flood mitigation solutions. In addition to the design event based flood modelling, Engeny also completed a consequence assessment and risk of failure assessment for two large dams located in the catchment above Foster.

The outputs from the project included A3 colour flood maps for a range of design events up to the Probable Maximum Flood, a level of service rating for the Foster drainage system, an Annual Average Damages assessment, recommendations for structural (concept designs developed and presented) and non-structural flood risk reduction measures and information to inform an update to the Emergency Flood Management Plan for the township of Foster.

#### **START DATE**

May 2017

#### **COMPLETION DATE**

June 2019

#### **CLIENT CONTACT**

Geoffrey Davis – Assets Planning  
Engineer

03 5662 925

#### **RELEVANCE TO CATEGORY**

- Flood modelling utilising RORB, TUFLOW and HEC-RAS (all created by Engeny).
- Verification of models to historical flood data supplied by residents at community meetings.
- Stockyard Creek and Bennison Creek (waterways) and Foster drainage system modelling and assessment.
- Identification of existing system constraints.
- Drainage system performance reporting including identifying the level of service currently provided and areas of shortfall.
- Assessment of structural flood mitigation options.
- Concept design of flood mitigation works.
- Cost estimates and qualitative assessments of benefits.

#### **PROJECT INNOVATION**

The low to medium density residential areas in the township of Foster contain properties that are directly connected to the pipe drainage system and those with downpipes connected to the back of kerb. The relatively small size of the township enabled Engeny to adopt an innovative approach to flood modelling using 'virtual pits' to represent back of kerb connections for those properties not directly connected to the pipe drainage system. This approach meant that pit inlet capacity could be modelled more accurately within residential areas which was considered to be particularly important given the nature of flooding reported by residents.



#### **PROJECT OUTCOME**

This project has provided South Gippsland Shire Council with a clear understanding of the flooding risks associated with Bennison and Stockyard Creeks and the drainage system within the township of Foster. The project has provided Council with a range of clear structural and non-structural flood mitigation options to address flood risk and information to assist future flood management planning with Emergency Services.