Disaster Waste Management Plan
Final Project Report
2021

Contact:

Valerie Bianchi

Waste Prevention Advisor

Waikato Regional Council

waikatoregion.govt.nz

Table of Contents

1 Project Overview

1.1 Background

Prior to the initiation of the Disaster Waste Management Plan project, emergency response planning in New Zealand did not include any specific procedures or tools for management of waste generated in a disaster[1]. Without a planning tool for pre and post disaster waste event planning environmental, public health and land stability issues have historically been ignored. Increased urbanisation and dependence on complex infrastructure networks increase a community's vulnerability to a disaster. This also is likely to increases the amount of waste produced during a disaster. These large waste volumes can overwhelm existing solid waste management facilities and personnel as well as the response and the long-term recovery of a disaster-affected area.

Based on this strong need to develop effective disaster waste management planning and response the Disaster Waste Management Plan (DWMP) project was developed. Through an application to the National Emergency Management Agency's (NEMA) Resilience Fund, the final operational phase of the DWMP project was initiated in 2019. The DWMP project has been a collaborative project between Environment Canterbury, Waikato Regional Council and Bay of Plenty Regional Council, with Auckland Council coming on board as a project partner in 2020. Project partners have joined to implement a DWMP template for New Zealand aimed at providing waste calculations and pre-planning for the management of bulk waste streams following a disaster event.

During previous phases of the project, the DWMP tool and workbook were created to provide response agencies with clear instructions and solutions for the management, collection, transportation, storage, sorting and disposal of multiple waste streams (including contaminated, toxic and hazardous wastes) after a major regional disaster event. The tool includes a GIS based application where users can define areas or use modelled scenario inputs (e.g. flood prone areas) to identify the number of buildings affected, how affected they will be, and estimate how much waste of different streams will be generated. The tool can be updated as information is received during the recovery period, allowing informed and timely decision making in an event response.

The tool and workbook have been tested during a pilot with Environment Canterbury and Ashburton District Council in the previous phase of the project. At the time of testing, the tool and workbook were not considered to be ready for final distribution. The final phase of the DWMP project focused on operationalising the tool and workbook.

1.2 Project objectives

The aim of the final phase of the DWMP project was to make the existing MS Word-based workbook and tool accessible, user friendly and operational through an online platform. This online tool would be available to government agencies, emergency response and other relevant agencies to minimise the effects of disaster waste. This would enable planned and rapid estimation of volumes of waste generated by a disaster. This would also allow decision making for disposal options to safely manage bulk waste after a disaster event to aid social and environmental recovery.

The expected outcomes of the project were to:

- Support disaster scenario planning and emergency response by providing user-defined actions required to manage and dispose of disaster generated waste

---

[1] See Business Case for Implementation of a Disaster Waste Management Plan Template for New Zealand (2017)

- Transform the existing tools, processes and workflows from MS Word and Excel into an online solution
- Produce a structured and accessible document with custom Disaster Waste Management Plans for specific events as an output
- Provide templates that cover a range of disaster scenarios with flexibility to apply regional and local knowledge

2 Project Plan

2.1   Components and methodology

The project was designed with three stages, tool development, testing and implementation. The final tool was intended to be developed for local authorities (including territorial authorities (TAs) and emergency management groups, who could run the tool on their systems with local data. The tool development phase was envisaged to focus on setting up the online tool for planning and emergency use. Tool testing focused on testing the performance of the tool, identifying any gaps and amending the tool as necessary to ensure it is robust, fit for purpose and meets the expected requirements.

Tool implementation focused on training and education for end users on the DWMP tool. It was suggested that regional pilot days were planned to engage TAs, Regional Council representatives and CDEM groups in usage and application. The project was further broken down into four milestones:

Milestones	Components
Milestone 1: Implementation Planning	- Establish an implementation plan - Finalise requirements for architecture and hosting - Identify platform host
Milestone 2: Operational tool developed for testing	- Review former DWMP scenario template and associated instruction workbook - Review the existing DWMP calculator tool - Create wireframes to demonstrate the intended DWM scenario planning processes for all current stakeholders, with the intent that additional stakeholders could be onboarded in the future - Create a data model to support the DWM scenario planning tool
Milestone 3: Implementation complete (Incl. Demonstration, User acceptance testing)	- Identify and onboard superusers from each partner council - Run three superuser demonstrations to test the operational tool - Run one user acceptance test and two drop-in sessions with superusers and additional local government representatives to identify issues and provide training
Milestone 4: Final tool delivery	- All documentation and training material is available - Final tool is ready for use

Figure 1: Milestones

2.2   Roles & Responsibilities

The final phase of the DWMP project has been a shared responsibility between Waikato Regional Council, Bay of Plenty Regional Council, Environment Canterbury and Auckland Council. Waikato Regional Council, Auckland Council and NEMA were financial contributors to this phase of the project and the project was managed by Waikato Regional Council. After the government procurement process Beca was awarded the contract to carry out the final DWMP development.

Role	Responsibilities
Project Working Group (Council representatives)	• Contribute senior knowledge of project • Contribute to the Project Plan, RFP, RFP Evaluation • Fulfil internal council processes • Advise on major issues • Identify super users
Project Manager (Waikato Regional Council)	• Overall management of the project • Liaise between project partners • Budget management • Risk and issue reporting and management • Oversight of the project workstreams • Day-to-day coordination of the project workstreams • Provide project recommendations as required e.g. media releases, risk mitigation, and other reporting
Development Lead (DL) (Beca)	• Day-to-day management of the tool development workstream • Progress reporting to project manager
Testing Lead (TL) (Beca)	• Day-to-day management of the tool testing workstream • Progress reporting to project manager
Implementation Lead (IL) (Beca)	• Day-to-day management of the tool implementation workstream • Progress reporting to project manager

Figure 2: Project responsibility structure

3 Project Implementation

3.1 Implementation Summary

Funding was originally awarded by NEMA through the Resilience Fund in 2019. The first Request for Proposal (RFP) process revealed that the available funding was not adequate to achieve the project objectives. The Project Team decided to seek additional funding and then engage in another RFT process. While this delayed the start of the project, additional funding was successfully sourced from Waikato Regional Council and Auckland Council. An extension of the Resilience Fund contribution was granted, but further delays resulted from the Covid-19 lockdown in March 2020. Following on from these delays, the second RFP process was initiated in November 2020. Beca was awarded the contract and commenced work in February 2021. Despite delays, the project was implemented to a high quality, with engaged stakeholders from across the country.

3.2 Project Activities

3.2.1 Hosting

As part of implementation planning, a suitable host needed to be identified at the start of the project. Beca's scope was limited to the implementation of the solution only and did not include ongoing hosting, licencing, maintenance and support. It was identified that a public organisation might be able to provide this function. The Waikato Local Authority Shared Services (WLASS) were identified as the Tool host. This is a temporary arrangement for the purpose of demonstrating how a shared tool could be utilised across councils. The next step of the project is to identify a more permanent host for this nationally significant project.

3.2.2 Tool development and Application

A set of wireframes was developed in the initial phase of the project, based on the MS Word workbook and previous tool. The wireframe set was then used, to further refine the design with the wider project team before being implemented as the online platform. The online platform was then trialled with the project team during sprint end demos and training sessions to finalise some of the more detailed requirements to be implemented.

The Tools functionality was defined based on a number of requirements;
1. That it needed to be able to be implemented and maintained by an undefined hosting organisation.
2. Access to the solution will need to have a level of security and not be publicly available. Users from a number of agencies will need access.
3. Design is to consider ongoing licensing costs.

The solution is:
- The DWMP Tool is built on the Microsoft Power Apps Platform as a Canvas App.
- A Dataverse database .
    o Plans are saved as PDF in Dataverse
- Hosting of spatial contextual data in ArcGIS Online and location of scenarios and interim facilities
    o This is reliant on GIS Administrators from each council adding and maintaining the data.
- The map in PowerApps is a Bing map that interacts with data in ArcGIS Online
- The reporting capability for the tool is driven by FME Cloud.

For the use of the application users must have a Power App per user or app plan this is to allow the "Premium connector" to the Dataverse environment.

During the application build the integration of ArcGIS Online with PowerApps was challenging, while there were options to interact with an Esri map and edit data from the PowerApp, the usability wasn't as intuitive as we would have liked. In keeping with the supportable requirement, developing a custom solution for the integration of the map was not a desired approach. The solution implemented leverages Bing Maps which natively integrates with PowerApps and pushes geometry edits through to ArcGIS Online.

Figure 3: Initial wireframes were used

Figure 4 The online application was trialled with Super Users and a wider user group

3.2.3 Superusers and User acceptance training

A superuser approach was taken to embed use of the tool in councils prior to project sign off. The objective was to have two to three super users per organisation (Waikato RC, ECan, Auckland Council, BOPRC) who could contribute one to two hours per week during the project to participate in the design and solution testing. These superusers would then be able to train other users and share knowledge across the superuser group.

Three superuser demonstrations were held to test the operational tool, followed by one user acceptance test and two drop-in sessions with super users and additional local government representatives to identify issues and provide training.

During these sessions and user acceptance testing, changes to workflow and the manner in which data will be captured was identified. These were logged and implemented in following sprints.
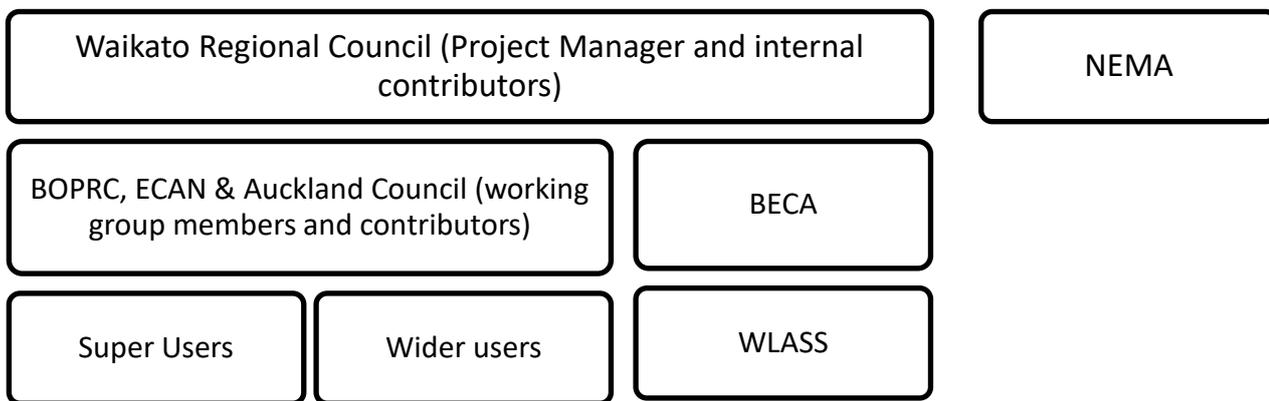
Waikato Regional Council (Project Manager and internal contributors)		NEMA
BOPRC, ECAN & Auckland Council (working group members and contributors)	BECA	
Super Users	Wider users	WLASS

Figure 5: Contributors to the project

3.3 Project Deliverables

Project deliverables include the DWMP platform and documentation.

Users will need PowerApps Per User or Power Apps Per App license to operate, this is provided through WLASS

Users are provided access to the DWM tool through their Organisational Microsoft account, by invitation from the WLASS tenant administrator.

The tool is hosted in Azure, and leverages ArcGIS Online for the map data and FME cloud for the report generation

The tool is accompanied by training and help documentation for users self-support. As-built and administration guides are also provided to assist support of the tool

3.4 Success & Challenges

Overall user acceptance testing showed that the DWMP platform was a useful and user-friendly tool. Emergency management planners from the Waikato Region have reviewed the tool and have fed back that they would attach it to action planning. Based on their experience of the online platform, they responded that there is good functionality across several of the functions identified in the CIMS (Coordinated incident Management System). Feedback also included that Regional On-Scene Commanders responding to marine oil spills will be able to use the functionality of this tool in relation to shoreline clean ups. Other feedback was that the tool was easy enough to show someone to use in under ten minutes.

There are a couple of challenges for the future of the online DWMP platform. For one, usability of the DWMP platform will be conditional on how usage unrolls in times of emergency. Secondly, an area of development could be calculating generic volumes of debris which would aid in emergency management planning and response. Finally, an immediate issue will be ongoing hosting.

3.5   Next Steps

Support and ongoing hosting was not a part of this phase of the project. The next steps for the DWMP project are to investigate and identify who will own the future development/direction of the tool.

The system is currently hosted by WLASS, however they have indicated they won't provide ongoing support for the tool. Ongoing support for the solution needs to be agreed.
Additional ongoing considerations include:
- Hosting costs from WLASS
- Hosting agreement with WLASS, expected uptime and access/support during an event
    o They will likely reduce costs by shutting down servers (FME Cloud) outside main business hours (if agreed) access to the complete tool may be required 24/7 during an event, process to enable 24/7 access should be added to a hosting agreement
- Process for managing BAU support, who the contact is, giving them access to the WLASS environment to support the Tool
- Support personnel should be familiar with PowerApps and Dataverse, ArcGIS Online and, FME Cloud

There is potential for future partnership and development for this nationally significant project. There are conversations occurring with the Regional Shareholders Limited to see if that is a suitable fit.

The other next step for the tool is for it to be used in a real scenario.

Bibliography

Stantec (2017) Business Case for Implementation of a Disaster Waste Management Plan Template for New Zealand

Tonkin and Taylor (2018) Disaster Waste Management Plan template