



CDEM Resilience Fund project application form

78637808

Application for CDEM Resilience Collaborative fund approval

Project title	Chatham Islands tsunami inundation modelling and signage
Date of application	28 February 2012

Details on application

Lead local authority	Chatham Islands Council
CDEM Group	Chatham Islands CDEM Group
Other local authorities or Groups supporting the proposal	Environment Canterbury

Project description

Executive summary [200 words maximum description.]

The purpose of the project is to gain a better understanding of areas of tsunami risk on the Chatham Islands, and in particular the main settlements of Kaingaroa, Owenga, Waitangi, and Te One to Henga, so that risk reduction measures can be implemented.

The main components of the project are:

- Using satellite imagery or LiDAR of all or parts of the Chatham Islands to generate a digital elevation model of low lying areas up to 20 metres elevation.
- Using the digital elevation model to model areas of likely inundation from at least two tsunami scenarios (most likely a 'worst case' tsunami from South America, and a Hikurangi subduction zone tsunami).
- Using the tsunami modelling to assess areas that need to be evacuated in the event of a tsunami warning, and the potential impacts of a tsunami.
- Delineating evacuation zones and developing tsunami information boards and evacuation signs.
- Development of public education material.

The timeframe for the project will be two years. Specific timings are dependent on when satellite imagery or LiDAR data can be acquired, and when modelling is able to be undertaken.

The cost of the project is approximately \$228,000. This is comprises:

- \$90,000 – development of digital elevation model
- \$128,000 – tsunami inundation modelling
- \$10,000 – development of signage and public education material.

Problem/opportunity [200 words maximum description.]

Tsunami evacuation is based on best practice and information on areas considered relatively safe in a tsunami event. No tsunami modelling has been undertaken for the Chatham Islands and it is not known if evacuation routes for the more vulnerable areas are safe given the current uncertainties around potential tsunami impacts in these areas. If there is a short time frame for evacuation (e.g. in the event of a Hikurangi subduction zone tsunami), then

communities may not be able to move completely clear of areas that could be impacted, but we are currently uncertain where would be safe enough for them. This is a particular concern for the northern part of Chatham Island where the community is exposed to any tsunami coming from the north and evacuation routes are exposed on one side to the sea and on the other to the lagoon which is also exposed to the sea.

This project will give emergency managers and the community a clearer picture of how best to manage the tsunami risk.

Alignment with identified goals and objectives *[200 words maximum description.]*

The use of tsunami inundation modelling will identify limitations to evacuating some communities, and will also identify the best areas to evacuate to. The use of this information can then be used directly to meet the objectives of the goals of the National CDEM Strategy as identified:

- Goal one – 1A, 1B, 1D
- Goal two – 2A
- Goal three – 3B, 3C, 3D, 3E
- Goal four – 4A, 4B

Dissemination of benefits to sector *[200 words maximum description.]*


- Opportunity to demonstrate how science can be applied to risk reduction and readiness.
- Will provide an example of how risk reduction and response planning can enhance the resilience of small communities
- It is important that the Chatham Islands has a good understanding of its tsunami risk, especially given its prominence during a South American tsunami event as the place of 'first impact' for New Zealand.
- Alignment with current tsunami signage projects elsewhere in New Zealand.

Project design

Project manager	Rana Solomon (Emergency Management, CI)
Other project members	CEG Chair (Chatham Islands CDEM Group) Helen Grant (Hazard Analyst, Environment Canterbury) Canterbury Regional Emergency Management Office
External providers/contractors	Landcare Research or New Zealand Aerial Mapping (digital terrain model) Natural Hazards Research Platform or another tsunami modelling provide (tsunami modelling) Sign manufacturer (tsunami sign printing)

Deliverables

Milestone	Date for completion	Cost
Development of DEM (dependent on when satellite imagery or LiDAR can be obtained)	December 2012	\$90,000 + local authority time to manage contract
Tsunami inundation modelling	June 2013	\$128,000 + local authority time to manage contract
Delineation of evacuation zones	October 2013	Local authority time
Development and installation of	February 2014	\$5,000 + local authority

signs		time
Development and production of public education material	February 2014	\$5,000 + local authority time
Identified risks		
Risk	Suggested management	
Unsuitable weather conditions delay satellite imagery/LiDAR acquisition, delaying development of digital elevation model	If we opt for satellite imagery it is best to do this from October, for sun angles to be best. We have provided extra time in the timeline so that there is a good chance of good weather for imagery capture.	
Limited resources within New Zealand to undertake tsunami inundation modelling	The likely timeframes for generating the digital elevation model provide enough time to "book in" well in advance the required expertise for modelling. The contract for the modelling will need to be very clear and the consultant will need to stick to time. We will add in contingency time for data integrity issues around the digital elevation model and ensure the elevation model is QA'd before being provided to us (this has been a problem in recent tsunami modelling in Canterbury).	
Digital elevation model is not of high enough resolution to give robust modelled inundation results	We will need to make a decision at the onset of the project about the desired resolution of the elevation model and how well this can be used on the relatively flat coastal areas of Chatham Island. Environment Canterbury will be discussing this with tsunami modellers in mid March 2012.	
Possible vandalism of signs	We will choose the sites for the signs carefully, and will develop a brief asset management plan for the signs.	
Funding request and use		
CDEM resilience fund contribution	\$228,000	
Local authority contribution	Staff time	
Other sources of funding	Environment Canterbury staff time as per CIC/ECan contract	
Expenditure <i>[Please supply details]</i>	<ul style="list-style-type: none"> - \$ 90,000 Development of digital elevation model - \$128,000 Tsunami inundation modelling - \$ 10,000 Signage and public education material 	
Application confirmation		
Approval of Chief Executive		
CDEM Group comment		
Comment	This project has been on the back burner for some years and always recognised as vital; however the distance involved for imagery and inundation modelling has been the stopper because of the cost involved. The information this project will provide will help in the	

	decision making process not just for the Chatham Islands but the rest of NZ.
Approval of Coordinating Executive Group Chair	