

# The Launceston flood policies: Levees and beyond

*Atkins and Vince of the University of Tasmania examine the development of Launceston's flood levee and flood mitigation policies.*

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## Abstract

Launceston, Tasmania's second largest municipality, has been recognised as a flood-prone area since the first major inundation was recorded in 1828. Following a one in forty year flood event in 1969, the areas susceptible to flooding were protected by a levee system which has been maintained and funded by the Launceston City Council (LCC) and the Tasmanian Government. In May 2007, the latest funding from all tiers of government was committed to levee maintenance. This article examines the development of Launceston's flood levee and flood mitigation policies. It argues that while levee maintenance is an important part of flood management, the additional social, emergency management and planning and development policies that are currently being implemented will strengthen the policy makers' responses in the event of a flood.

Launceston has been known to be susceptible to flooding since the first major flood was recorded in September 1828. This flood risk is primarily due to the location and topography of Launceston's lower suburbs, Inveresk and Invermay. These suburbs are located at the confluence of the North Esk, South Esk and Tamar Rivers which are fed by a catchment system that covers 14 per cent of Tasmania (GHD 2006: 1; Launceston City Council 2009). In addition, Inveresk and Invermay were built on reclaimed swamp, which is part of a natural floodplain on the Tamar River Estuary. As this area developed from a work site for wharf workers to a settlement in the early 1900s, flood inundation was mitigated by the construction of small tidal levees. In 1960, a decision was made to build ten kilometres of earthen levees around the flood prone suburbs. However, many of these levees failed during construction as they were too heavy for the swamp land. These construction failures were augmented during the 1960s and 1970s by use of

rigid piled concrete levees and temporary mud box levees, the latter which were to provide height without excessive weight in order to avoid sinking. However, the performance of these repairs is uncertain; the rigid concrete levees have since developed cavities underneath, allowing a degree of underflow; the temporary mud boxes have failed; and the remaining earthen levees have sunk and need to be lifted so as to prevent overflow. Recent engineering reports have concluded that the levee system is in dire need of repair as it would not protect the two suburbs in the event of a one in fifty year flood event.

The minor flooding which frequently occurs in the Esk Rivers does not pose a significant danger for the community. However, history illustrates that Launceston has encountered several major floods which have caused substantial infrastructural damage and loss of life. Among these, the flood event which occurred from 4-6 April, 1929 was the most significant experienced during the century in North-East Tasmania (State Emergency Service 1990: 21). The LCC flood classification system identifies the 1929 flood as a one in one hundred year flood event – that is, there is a one per cent chance that a flood of or greater than the magnitude of the 1929 event will occur in a given year. In comparison, the levees protecting Inveresk and Invermay at the time of the 1929 flood were merely capable of withstanding a one in twenty year flood event. The impact of the 1929 flood was intensified by the growth of Invermay, which had evolved from a swampland with one road in the late 1800s to a thriving community. The 1929 flooding caused 22 deaths, left approximately 4,500 people homeless, and 1000 homes rendered in need of repair or rebuilding (Terry and Servant 2002: 30). The flood event created immense long term ramifications for Launceston. Industries outside the inundation area were crippled due to a week of absenteeism following the flood. Flood damage, including huge losses of stock, the destruction of railways, bridges, roads and the Duck Reach Power Station, had a huge impact upon Launceston's economy. Two months afterward, ten per cent of the homes that had been inundated were still awaiting health certificates to be approved for usage

once more. It was some weeks after the flooding until the industrial and commercial workings of Launceston regained momentum and before the remaining refugees were permanently housed. Given these events, in conjunction with the subsequent development throughout Invermay since 1929, current policies have focused on reducing the consequences of such a dire flood event.

The summary of policies and decisions on local, state and federal levels that are briefly examined in this paper demonstrate the extensive policy making in this issue area. This paper is based on the research that was prepared for the Launceston Flood Research Initiative in which both authors were involved (Willis, Vogt, Natalier and Vince 2008). This Initiative had two elements. The first drew upon the perceptions of risk among flood-affected Launceston residents and preliminary findings were summarised in a recent article by Vogt, Willis and Vince (2008). This article comprises the second part of the Launceston Flood Research Initiative, focusing on the flood mitigation policies implemented as a response to this issue.

## The levee issue and policy decisions

In the wake of Launceston's 1929 flood, the LCC and the Tasmanian government considered a range of flood mitigation measures. In December 1960, the Tasmanian government approved the construction of levees to replace existing earthen barriers to protect Inveresk and Invermay from future flood events. However, a number of failures apparent in the design, construction and the settlement of the foundations of the levees during the 1960s and 1970s led members of the LCC to see the levee system as fundamentally flawed (Launceston Flood Protection Board 1975; Parliament of Tasmania 2006). Temporary fixtures erected in the 1970s remain yet to be replaced. A report from engineering consultancy firm GHD in 2006 stated that the LCC Flood Protection Scheme, including the levees surrounding Invermay, posed a significant risk of failure in the event of a one in fifty year flood (GHD 2006: iv). It is estimated that if the levees were to fail, 40 per cent of Invermay could be inundated with as much as one metre of water during high tide each day. In addition, the consequences of a flood event occurring today would be considerably worse than in 1929 due to further infrastructural, business and housing development. If a one in one hundred year flood were to occur today, it would have a devastating effect on Inveresk and Invermay, potentially causing damage to 78 commercial, 649 residential and 194 industrial properties (Williams 2007: 4). Further, it is likely that some of Launceston's most prominent infrastructure, including Aurora



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*Despite the flood risk, Invermay and Inveresk are considered by many to be areas offering suitable lifestyle choices.*

Stadium, the Queen Victoria Museum and Art Gallery, and the University of Tasmania's Inveresk Campus would incur flood related damage (Vogt, Willis and Vince 2008: 49). The need for evacuation and the closure of major roads would render a significant part of the city inaccessible with service interruptions preventing home occupation and commercial activity. The degeneration of the levee system over time, in conjunction with further development in flood-prone areas has left Launceston highly susceptible to flood events. Although this issue has been addressed in the past, it has only been since 1999 that a comprehensive policy solution has been initiated.

The need to act upon Launceston's flood risk sparked debate between the LCC, Tasmanian government and Tasmanian representatives in the Federal government as to who should fund the reconstruction of the levees. Although the Tasmanian government was financially responsible for levee maintenance, the cost of addressing these fundamental deficiencies was far greater than could be dealt with in the annual budget (Tasmanian Department of Premier and Cabinet 2007). This predicament led to the Tasmanian government and LCC signing a Partnership Agreement and forming a Flood Steering Committee in 1999 to reassess the cost of levee maintenance. The Committee was also responsible for developing long term land use planning strategies for the suburbs and investigating sustainable dredging of the Tamar River (Tasmanian Department of Premier and Cabinet 2007).

Despite these good intentions, very little action occurred until 2003 when the Steering Committee released an expression of interest for a consultancy study to attain an educated judgment as to what actions should be undertaken. The chosen consultant was GHD, an engineering consultancy firm which was commissioned to undertake a social, economic, infrastructure and flooding risk assessment of Launceston's low-lying suburbs (GHD 2006: 1). The GHD report confirmed the poor condition of

Launceston's levee system, stating that there was a 40 per cent chance of a flood causing more than \$110 million damage in the next 50 years (GHD 2006: iv). Consequently, GHD recommended a number of strategies which did not rely completely on levee focussed outcomes as had the previous State government's solution. The recommendations included parts of the current levee system being either rebuilt or repaired, the revision of land use planning and development control policies in flood prone areas, and a major review of LCC flood response and management plans (GHD 2006: v).

In order to identify a flood mitigation strategy from the options suggested by GHD and an appropriate funding model, the Flood Steering Committee hired consultant Frontier Economics (Frontier Economics 2006: iv). The consultant supported GHD's findings to redevelop levees, planning controls and flood warning and evacuation procedures. Frontier suggested that the \$30 million initial cost of the recommendations should be borne equally between the LCC, State and Federal government (Frontier Economics 2006: vi). Given that the project was entirely reliant on the acquisition of the Federal government's portion of the funding, it played a pivotal role in bringing the flood issue to the fore (Tasmanian Government 2007a). Similarly, the State government's contribution to the funding was conditional on the LCC and Federal Government committing similar costs. The Agreed Measures also stated that LCC and the State government were to prepare a submission to the Federal government seeking a commitment to their \$10 million share of the funding (Tasmanian Government 2007a). Despite a minor readjustment in which the overall figure had to be expanded to \$39 million to compensate for an increase in property values and the need to relocate Lindsay Street properties to build a levee wall, all three tiers of government had agreed to provide \$13 million each in early 2007 (Williams 2007b; Aird 2007; Australia Parliament 2007).

## Policy responses

After a period of negotiation between the members of the Steering Committee, a range of flood mitigation measures was agreed upon and released in April 2007 (Launceston City Council 2007a). These Agreed Measures were designed to address relevant social issues, planning and development, emergency management coordination and levee reconstruction and maintenance. The LCC and the Tasmanian State government have since formulated a number of policy responses in order to reflect these measures.

## Social issues

A distinct lack of flood risk awareness and emergency response strategies within the Invermay community necessitated the execution of social policies. The Agreed Measures stipulated that the LCC was to establish a public education strategy to increase public awareness of the flood risk in Invermay and Inveresk (Tasmanian Government 2007a). This led to the formation of the Council-enacted Launceston Flood Research Initiative in May 2007 which produced a report in February 2008 analysing community perspectives of flood risk. This report has served as a basis for the LCC's public education strategy (Vogt and Brayford 2007). A pilot flood education strategy commenced in June 2007 where flood emergency plans designed by Invermay Primary School and Meander Primary School students were showcased in an exhibition held at the Queen Victoria Museum and Art Gallery (Midgley 2007; Launceston City Council 2008a). The public education strategy also included the distribution of Flood Preparation Kits to potentially affected households to inform residents of what they should do before, during and after a flood (Scott, 2009a). The analysis of other pertinent social issues, such as the dissemination of flood emergency information to key demographic groups such as elderly people and immigrants, have been addressed in the Launceston Flood Research Initiative's report.

## Building and planning

In order to attend to the Agreed Measures that related to building and planning, a Planning Steering Committee was formed within the LCC in 2006. The aim of the building and planning measures was to prevent further development which would increase the consequences of a flood, with the long-term intention of converting land use to facilitate activities that incur a low level of flood damage (Tasmanian Government 2007a). In order to execute building restrictions in Invermay, the Committee amended the Tasmanian Government's Building Act 2000 in July 2006, which involved the adoption of a floor flood level of 3.4 metres above sea level for the Inveresk and Invermay area (Launceston City Council 2007b). This flood floor level applied to the construction of all new residential buildings and the modification to any habitable floor area in the flood zone. In conjunction with the building restrictions, the Planning Steering Committee undertook a review of the LCC Planning Scheme in order to guide future land use and development and the management of natural environments up until 2020 (Launceston City Council 2007c). The review led to the development of land classifications for flood-labile land and the prohibition of construction

between the levee system and the river (Community Development Initiatives Australia 2007). Further extensive revision to the Planning Scheme included the prohibition of new residential developments, new schools and aged care homes as well as the prohibition of any other development which would magnify the damage caused by a flood.

In August 2008, LCC Aldermen voted to breach the Agreed Measures by easing these planning restrictions in order to permit the construction of housing units, education facilities and a cinema and bowling complex in Invermay (Williams 2008a). This demonstrates a frequently encountered challenge in developing flood mitigation measures for existing flood-prone communities, whereby investment in flood control works (such as levees) elicits a perceived reduction in risk and consequently stimulates floodplain development (Smith 1998: 232-3). Smith describes this as the 'levee paradox', whereby the intensification of development behind levees generates higher potential losses than that experienced before the construction of levees. Due to this inherent over-reliance in the structural control of floodwaters, the levee paradox poses a continual challenge for effective flood mitigation. Fortunately in the case of Launceston, threats from the Federal and State government to withdraw their collective \$26 million funding prevented the LCC from acting upon these planning scheme changes (Williams 2008b). The LCC has since rescinded its decision to ease planning restrictions within the area.

## Emergency management

A revision of all relevant emergency management procedures and documents was also undertaken. This included the LCC Flood Evacuation Plan which outlines flood evacuation procedures and lists the organisations that are to be involved in an evacuation and their responsibilities (Willis et al 2008). The Tasmania Police have developed a section within the Flood Evacuation Plan which specifically addresses flooding in Invermay. The revision also incorporated a review of the Launceston Planning Scheme (1996) to accommodate flood-related building and planning restrictions within Launceston. The LCC has formulated a Flood Warning Plan, a Flood Response Plan and a Flood Levee Patrol Plan, all of which are to be used when it is likely that a flood event will occur. A General Management Plan and a Flood Recovery Plan were also revised in order to provide support during and in the aftermath of a flood event.

## Levee reconstruction

The final section of the Agreed Measures outlined the agreement to rebuild more than 70 per cent of the existing levee system. This also involved the purchase and subsequent relocation of businesses along Lindsay Street in Invermay which was to take place over six years. The Agreed Measures included an annual \$150,000 for levee maintenance and \$250,000 from the State government for the dredging of silt from the Tamar River (Launceston City Council 2007a). The LCC has largely completed the acquisition of the Lindsay Street properties and is set to commence demolition work on Lindsay Street buildings in August 2009. However, in June 2009 the cost of the flood mitigation project was reported to have blown out by \$20 million due to the price of land acquisitions and escalating construction costs. Despite this setback and amidst surrounding uncertainty as to how this funding will be obtained, levee reconstruction project currently remains scheduled to be completed by December 2012 (Scott 2009b).

## Policy responses, levees and beyond

Once the funding from all tiers of government had been secured for levee reconstruction, the LCC began to implement the measures as agreed by the Flood Steering Committee. However, there has been a distinct focus on the reconstruction of the levees as the primary policy response to mitigate Launceston's flood risk. This levee focus has been reflected through the media's reporting, the way in which some members of the government have dealt with the issue and the way in which the issue has been interpreted by the community. The media has attached salience to the levee aspect of the flood issue as the most tangible feature of the Agreed Measures, with local papers broadcasting titles such as 'Flood Levee Inaction Riles', '\$10m Levee Boost', 'Action on Flood Levee Funding Needed Now' and 'Levee Action' (Williams 2007c; Price 2007; Williams 2006; Lowe 2006, Australian Broadcasting Corporation 2007). Recent difficulties surrounding land acquisition to make way for the Lindsay Street levees and a \$20m funding blowout have further intensified the perceived notion held by the media and community that the levees are the most important policy response to flood risk (Williams 2008c; Scott 2009b). Members from all three tiers of government have also focused upon the levee system in order to attract political attention to the issue of flood risk and the need for funding. The LCC summarised the purpose of its quest for flood mitigation funding as a means to "repair the ageing flood levees" (Launceston City Council 2008b), while the belief that the funding should be "best spent on fixing the levee problem"

has been raised by members of Federal and State governments (Tasmanian Legislative Council 2007; Williams 2007d). These perceptions detract from the reality that effective flood mitigation must incorporate a multi-faceted approach.

Fortunately, a multi-faceted approach has indeed been adopted in the Launceston context. Despite an overt focus on levee reconstruction by the media, community and some members of government, all policy measures outlined in the Agreed Measures continue to be implemented. It is important to note that the focus on levees in Launceston should by no means reflect the importance of the other Agreed Measures. It was this perception that led to the momentary push for the easing of planning restrictions, the endangerment of the flood mitigation funding and the potential for intensified flood risk as per Smith's levee paradox. Alternatively, it should be emphasised that all policy measures are as important as one another. An effective levee system is of no use without an emergency evacuation plan. Similarly, there is no point in implementing short term strategies such as public education programs and revisions of emergency management documents without the adoption of long term planning and development restriction policies. Without the complete and unrestrained implementation of all the policies outlined in the Agreed Measures, the flood risk will not be adequately addressed. Further, a complete implementation of policies is necessary for policy makers and emergency management personnel to know what to do in the event of a flood.

## Conclusion

The tri-partisan agreement between the Federal and State governments and the LCC has so far exhibited a potentially effective policy response to Launceston's flood risk. However, it is vital that continuous support is offered from all levels of government where necessary. This is particularly relevant in light of the uncertainty as to who will supply the additional \$20 million necessary to complete the project. A broad range of agreed measures has been adopted, although this has not been reflected given the way in which political leadership and the media have allowed the levee issue to overwhelm the debate. Consequently, it is important to emphasise that a multi-faceted approach is critical in the effective mitigation of flood risk, as opposed to single strategy solutions or the emphasis on one measure at the expense of others. In the Launceston context, a heightened importance should be placed upon the maintenance of an effective community education strategy as highlighted by the Launceston Flood Research Initiative.

Also, a genuine constraint on development in flood-prone areas is essential so as to avoid the intensification of flood risk. Aside from these recommendations, this flood mitigation project can only be seen as a major step forward in natural disaster management for the area, reducing the risk of what could be a catastrophic scenario.

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