

Key Findings of Stage 1 of the WFMP review

Hydrology

- Review completed by NIWA in January 2009.
- Flow records were reviewed and are sufficient to provide reasonable estimates of flood quantities.
- Current Flood estimates for the 100 year return period flood event are the same as those adopted in the WFMP.
- Increases in flood peak flows of order 10% and 20% as a consequence of global warming are recommended in 50 and 100 years respectively.

Hydraulics

- Reviewed by Phil Wallace in March-May 2009.
- 16 design scenarios were modelled representing combinations of short or long mouth, 100 year flow/20 year sea level or 100 year sea level/20 year flow and current climate, 2040's mid range climate, 2090's mid range climate or 2090's upper range climate.
- Results show that river channel flood levels increase by up to 500mm above El Rancho and up to 900mm below El Rancho, when compared to the 1992 results. The progressive nature of the development of the hydraulic models has however meant that the information used for the design of works is close to current estimates.
- The predicted peak flood levels have increases because.
 - Revised estimates of storm surge
 - Updated cross sections allowing for aggregation
 - 2005 flood (80 year return period) providing better model calibration
 - Southerly mouth position
- Results show that all new stopbanks constructed meet the current 1 in 100 year design standard except in the Otaihanga area.
- The revised design level estimates for the Otaihanga Domain floodwall is 4.51m. The current level is 4.15m. The most recent house raising is to current estimates but does not make any allowance for future climate change.

- The effects of predicted climate change are as follows:
 - Upstream of Otaihanga - increased flood levels of about 100mm in 2040's and 500mm in 2090.
 - Otaihanga - mouth - increased flood levels of about 200mm in 2040's, 500mm in 2090.
- Existing stopbanks are likely to require topping up in places to cope with climate change predictions. A long section survey of existing stopbanks would provide a clearer indication of the required top-ups.
- Consideration needs to be given to whether new stopbanks are to be constructed to levels that account for climate change or whether they are constructed in such a way that they can be topped up should that be necessary.
- The implications of increased river levels both now and in the future on properties at Waikanae Beach and Otaihanga requires further investigation
- Consideration needs to be given to revising the flood maps and levels to reflect climate change predictions
- The model would be improved by using updated Lidar survey and two dimensional modelling tools (MIKE FLOOD). This upgraded floodplain model could be integrated with KCDC models of the Waimeha/Ngarara and Mazengarb catchments for local stormwater.

Processes monitored

- The monitoring activities as described in Section 3.3.5 of the WFMP have by in large been carried out. Some improvements have been made and there is room for further improvements to be made.
- Advances in technology have resulted in improved aerial photography of the river. Since 2001 high level aerial digital colour photographs have been produced at 2 yearly intervals or after a 20 year flood or greater. These are integrated with GIS to provide multiple layers of information such as assets and contours.
- Bed level surveys have been undertaken of the river every 5 years and after the 2005 flood. The bed levels from these surveys were analysed and recommendations for annual extraction volumes were reported to Council and actioned.
- The location of the mouth and the level of sand build-up at the foredune are checked visually several times each year.
- Annual reports recording work done, with dates, location, type, etc have been completed as a consent requirement. Costs are not included in these reports but are recorded elsewhere. Work

done and records of the assets performance have not been linked to the aerial photography and this work remains outstanding.

Flood damage reports have been produced following all major floods.

Asset management records are updated annually and a report on the condition of assets is produced annually.

- A SAP asset management system is presently being implemented which will eventually be capable of linking and analysing all the information gathered.
- In the most recent Flood Protection Annual Asset Management report to Council (Report No. 08.725) it was reported that the Waikanae River flood protection assets are in good condition. Waikanae River assets are currently valued at \$6.7M. The only asset that requires major improvements is the Jim Cooke Park stopbank, which is due for a capital upgrade in 2013/14.
- Significant implications for the flood hazard on the Waikanae Floodplain as a result of monitoring are reported to Council through 6 weekly manager's reports, annual asset management, operations and FMP progress reports and other reports as required.
- The effectiveness of flood mitigation works has been monitored regularly by routine site inspections and recorded in quarterly/annual operations reports, flood damaged reports and asset management registers.
- Reviews of current knowledge on climate change have been undertaken every 5 years following reviews undertaken by the Intergovernmental Panel on Climate Change (IPCC). The lack of certainty and GW policy has meant that climate change figures have not been used for flood mitigation methods and flood level advise for proposed developments