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AUDIT OF RIVER MANAGEMENT ASSET MAINTENANCE STANDARDS

- Audit of:** Flood Protection (Operations) Section of Landcare Division, Wellington Regional Council
- Audit by:** Widana Gamage, Michael Hewison and Murray MacKenzie of the Operations Department of Wairarapa Division, Wellington Regional Council
- Locations:** Porirua Stream, Korokoro Stream and Hutt River
- Guides:** Steve Murphy, Jeff Evans and Mike Jensen of the Flood Protection Group, Landcare Division, Wellington Regional Council
- Date:** 20 June 2000

1. Introduction

Annual peer reviews are undertaken of river asset maintenance programmes in the Wellington and Wairarapa areas. To carry out this review, inspections of randomly selected sites from the Flood Protection Group Asset Listing were carried out. Maintenance responsibility for these assets lies with Flood Protection (Operations), either as river scheme managers, or as parties to Watercourse Agreements with urban local authorities.

A total of 9 sites were inspected, 2 on the Porirua Stream, 1 on the Korokoro Stream and 6 on the Hutt River.

2. Porirua Central Business District

Flood protection and channel enhancement works consisting of a stopbank, floodwall, grade control structure and channel berm of reinforced grass had been completed in 1995. These works are inspected quarterly and jointly with city council staff once a year and observations recorded in a maintenance report. A documented inspection is also carried out after significant flood events. The annual maintenance budget for the entire 10km length of the Porirua Stream is \$55,500.

The section of the stream channel inspected was free of flood and other debris. The floodgate inspected in this reach was in good order. However the channel bed levels in this reach needs to be monitored since from visual inspection there appeared to be a gravel build up which could affect the proper functioning of the flood gates.

Our guides mentioned that a bed level survey had been completed recently and appropriate action would be pursued depending on the results of the analysis.

The floodwall, grade control structure and the stopbank appeared to be in good condition. There were no shrubs or trees close to the floodwall and the grass cover on the stopbank and berms was in excellent condition having been mowed recently.

3. Stebbings Detention Dam

This flood detention dam was completed in 1995, and was in excellent overall order at the time of inspection. The grass cover on the batter slopes and spillway was in very good condition.

The culvert inlet screen was in good condition and free of debris, and the inlet and outlet headwalls and associated rock protection were also in good order.

The structure is subject to detailed annual inspection. The culvert inlet screen is cleaned monthly and after flood events, and checked for debris on receipt of a heavy rainfall warning.

Our guides mentioned that the spillway had never operated since construction. It will be important to observe the structure particularly the spillway area after major flood events given the steep slope of the spillway since extensive erosion can be expected in an extended spillway operation.

4. Korokoro Debris Arrestor

This structure in the Korokoro Stream downstream of the Belmont Regional Park is maintained under the terms of a Watercourse Agreement with the Hutt City Council.

This is a driven rail iron and steel tube structure designed to capture flood debris and prevent it moving downstream and blocking the culverts in the industrial buildings area and bridge waterways.

The debris arrestor is checked for debris on receipt of a heavy rainfall warning and after flood events. It is also regularly inspected every quarter. At the time of our inspection the structure was free of debris.

Our guides advised that a report had been obtained from a structural engineer as to the stability of the structure. Additional strengthening works as recommended and painting of the structure was being carried out at the time of the inspection. It was observed that some components of the structure had been temporarily removed to facilitate construction works. Hence it was important to complete the construction works expeditiously to avoid a possible danger to the structure in case of a flood.

Reviewers endorse the works being carried out to strengthen the structure and also concur with Wellington staff views that cost sensitivity needs to be checked to confirm that repair is preferred to renewal. If the debris arrestor is redesigned, consideration could be given to building it as a “nuts and bolts” filter to trap large items only as smaller items can pass right through the system. This may reduce the structural requirements.

5. Block Road Works (Hutt River)

A 250 metre length of the riverbank and berms in this section had been subject to continuing erosion since the November 1994 floods, gradually reducing the berm width between the river and the Hutt motorway. At the time of the inspection flood damage repair works were being carried out. The works consisted of filling and restoring the berm and rock rip-rap lining of bank edge. Placing of rock rip-rap had been completed while restoring of berm was in progress. Filling was being done in layers with a stepped face on the riverside. The stepped face had been sown with a grass seed mixture before being covered in a Geotextile cloth. The grass will grow through the cloth and disguise it. Native plants were to be introduced later on to the exposed area by planting through the cloth.

The backfill material being used in the final layer did not seem to be a suitable material for the intended purpose of establishing a high quality grass sward. From our observations it was also not being suitably compacted. This could lead to slumping during sustained periods of rain or flooding causing loss of integrity and design level. Reviewers suggest that additional specification/performance criteria be included as appropriate for any future works or alternatively that supervision be tightened.

6. Manor Park

During the 1998 October floods serious bank erosion had resulted in the washing out of a 500m long by 40m deep section of the bank and golf course. Repair works consisted of a series of 15 debris fences each 25m in length spaced at 30m intervals covering the whole of erosion bay and berm filling. The riverside end of the alternate fences were armoured with rock heads. The bays between the debris fences were planted with rooted willow stock. A rock groyne of 750 tonnes had been constructed at the upstream end of the debris fences to enhance the protection. On the opposite side, the gravel beach had been cross-bladed and trees removed to achieve the design alignment for this section of the river. All completed works were consolidating well and appeared to have been constructed to a good standard.

A minor concern was the advisability of removing willows on the opposite bank edge given the proximity of the river to the State Highway. However our guides advised that willows had been removed from an inside bend to achieve the desired alignment and the situation will be monitored. The preferred alignment on this bank will be re-planted in the 2001 season.

7. Elbow Park Bank Protection Works

Berm restoration and erosion protection works completed in 1998 had consolidated well. Protection works consisted of bank battering, pole planting, rail iron and netting gabions and rock barb groynes. Rail iron and netting gabion work on the opposite left bank too appeared to be in good order. This method of bank protection relies on a stable bed and that was available at this site as seen by the exposed bedrock.

Two of the rock barb groynes here need minor refurbishing to replace displaced rocks.

8. Totara Park Rail Iron Fence

This site was on the Right Bank about 400 meters downstream of the Elbow Park protection works. A longitudinal driven rail iron fence with chain link netting had been constructed and the eroded area backfilled from behind the fence and planted with willows. There was no bedrock at this site as at Elbow Park and a good part of this structure had failed due to scour of the riverbed. Two concrete block groynes armoured at the toe with heavy rock had been constructed since then and appeared to be working well and had provided stability to the section downstream. There was good silt deposition between the groynes and the willow planting done in between was establishing well.

However the remaining section of the fence was still vulnerable in a flood and may have to be replaced with rock or concrete block groynes as a long-term solution.

9. Bridge Road River Works

Here the reviewers visited a private property where part of the back yard and some landscaping built too close to the river had collapsed apparently due to its foundation being eroded in the October 1998 floods. A total of three private properties and a local council pumping station were affected. Further erosion was expected unless something was done. This section of the river just above the Birchville Gorge, is deeply entrenched with steep banks and has a channel width of about 50 metres.

Repair works carried out here at a cost of \$80,000 consisted of a wall of netted rock gabions anchored to the bedrock below. These gabions provided a basic level of protection to the bank from further erosion. It was up to the property owner to provide any additional protection above this level since it is not strictly a River Scheme responsibility.

Reviewers consider that within the constraints of available space and cost, the solution was fit for the purpose and provided a very flexible opportunity for property owners to decide what other levels of additional protection they wished to install at their cost.

10. Summary

These inspections completed over a one-day period were considered to provide a reasonably representative overview of river asset maintenance standards. Prior to the inspections the reviewers had the opportunity to briefly go through the documents relating to maintenance works in the Hutt River and Porirua Stream.

The reviewers assessment is that the overall standards of asset maintenance applied by the Flood Protection Group are appropriate when related to prevailing practice, available funding, asset value, and the consequences of failure.

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