

2. ANTIGUA WEIR RENEWAL

General Manager responsible:	General Manager City Environment, DDI 941-8656
Officer responsible:	Greenspace Manager
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PURPOSE OF REPORT

1. The purpose of the report is to request the Council to decide its preferred option for the upgrading and stabilisation of the Antigua Weir, in the Avon River at Antigua Street.

EXECUTIVE SUMMARY

2. Boating activities have been carried out on the Avon River in the vicinity of the hospital since 1882 when the Antigua Boat Shed was built and commenced boat hire. The present weir, built in the 1950s creates a pond which supports two boat hire businesses, the Antigua Boat Shed and "Punting On The Park".
3. The present rock weir has become unstable and requires frequent rearrangement and replacement of rocks to maintain a desirable minimum water level. Some form of upgrading or stabilisation is needed to maintain the pond water level and support boating. The objectives are to provide reliable water levels for boating and punting activities without detracting from in-stream values.
4. The Council has the option of strengthening the existing rock formation or rebuilding it in a different form. The preferred option is to replace the present weir with a gravel rapid composed of greywacke river stones. This option is preferred because of its natural appearance and a slight improvement to in-stream values. Alternative options are to strengthen the existing weir or to build a concrete weir.

FINANCIAL AND LEGAL CONSIDERATIONS

5. The preferred option at \$50,000 (estimated) is more expensive than the next alternative, of \$30,000 (estimated) but is budgeted for. The least favoured option is estimated to cost \$400,000. Funding for options 1 or 3 will be provided from the Waterways and Wetlands Restoration: Avon River budget. If option 2 was chosen it would be necessary to seek further funding from the Council as the greater expenditure has not been signalled in the LTCCP.
6. The preferred option would be subject to a resource consent from Environment Canterbury which it is believed would be granted.

STAFF RECOMMENDATION

It is recommended that the present weir be replaced with a gravel rapid composed of greywacke river stones as the preferred option.

BOARD RECOMMENDATION

That the present weir be upgraded and strengthened.

BACKGROUND ON THE ANTIGUA WEIR

7. Boating activities have been carried out on the Avon River in the vicinity of the hospital since 1882 when the Antigua Boat Shed was built and commenced boat hire. Boating was originally carried out on a pond above the Mill Island weir at Hereford Street (where a replica mill wheel has been rebuilt). After removal of the mill weir another timber weir was built between Montreal and Antigua Streets to enable boating to continue. This weir, and a subsequent one, were probably rather insubstantial and were destroyed by floods and eventually replaced by the present rock weir in the 1950s. The present weir creates a pond which, because the Avon River has a rather flat slope through the Botanical Gardens, extends upstream to the tennis courts. The Antigua Boat Shed and Punting On The Park operate boating businesses that use the pond.
8. The present rock weir has become a little unstable, probably as a result of settlement over many years. It requires frequent rearrangement and replacement of rocks to maintain a desirable minimum water level and some form of upgrading or stabilisation is needed. Rocks frequently tumble down the weir and cause the water level upstream to drop. When this occurs boating can become difficult in shallow places upstream, and boats cannot be paddled past a shingle bar, at the Riccarton Main Drain outlet. This limits an average round trip for a hire canoe to less than the minimum one hour hire period and is disappointing for Antigua Boat Shed clients.

THE OBJECTIVES

9. The objectives are to provide reliable water levels for boating and punting activities, form a stable weir and to improve, or at least not detract from instream values.

OPTIONS

10. The Council has the option of strengthening the existing rock formation or rebuilding it in a different form. There are a number of options, each with advantages and disadvantages. Three options are presented. All would be in about the same location as the present weir. The options are:
 - Option 1 - The present weir strengthened, by adding more basalt rocks.
 - Option 2 - A concrete weir, slightly curved and concave, downstream.
 - Option 3 - A gravel rapid composed of greywacke river stones.

The options are represented in photo montages (**see Attachment**).

Options that have been considered and rejected are:
(**see Attachment**)

- A timber weir - considered a poor option because timber would have a relatively short life.
- A short, steep rapid built from large greywacke river boulders. Boulders are expensive and the result would not be sufficiently different from either the present weir or a flatter rapid.

PREFERRED OPTION

11. The preferred option is replacement of the rock weir with a riffle (rapid). Riffles or rapids will be familiar to most people as the broken water sections that are the energy dissipating features in Canterbury gravel rivers. A riffle is proposed because it is the most natural-looking means of retaining a pool at the Antigua Boat Shed and dealing with the drop in water level downstream. It would be formed by creating a sloping riverbed below the present weir with greywacke river stones.
12. This option is preferred because of its natural appearance and a slight improvement to in-stream values. Some 32 of 45 respondents to publicity information preferred this option.

ASSESSMENT OF OPTIONS

Option 3 - The Preferred Option - Riffle/Rapid

The natural and common means by which a gravel river creates pools and drops is by a series of rapids. This feature could be formed at the Antigua Boat Shed by filling below the present weir with greywacke river stones of sufficient size. The riffle would span the full width of the river, as shown in the photo-montage, somewhat shallower at the edges, and probably 30 to 40 metres long. The length would be a compromise between stability and appearance: a longer riffle, as proposed, would be more stable and less turbulent.

Riffles tend to be favoured river habitats because water speed and turbulence keep the gravels cleaner and the water oxygenated. A riffle would be a small addition to habitat values in this part of the river by providing niches for invertebrates and small fish. Slower water velocities near the banks would permit the passage of small fish.

Because the Avon River runs through very flat terrain it is not steep enough to develop riffles normally, although a gentle form of riffle can be seen at Mill Island. Thus a riffle as proposed is not a natural Avon River feature.

This option creates a minor conflict between the objectives of natural appearance and retention of punt access for the business Punting On The Park. Some means of allowing punts to traverse the weir has been requested, to replace the present chute against the river's north bank. This is likely to require the installation of wooden rails at river bed level near the northern river bank to allow punts to slide up and down.

Dissipating the energy of river flows can be done safely with large (300mm maximum), imported stones from the upper Waimakariri, Hurunui or Rakaia Rivers. Stones would be sourced from the Waimakariri River if possible because that river is the source of gravels in Christchurch rivers. Adequate precautions can be taken to guard against the accidental importation of didymo algae. Such precautions can be expected to form part of the conditions of a resource consent.

	Benefits (current and future)	Costs (current and future)
Social	Provides for continuation of long-standing recreational use of this part of the Avon River.	Nil
Cultural	Is inferred (on the basis of previous submissions to Council) to be the option preferred by Maori. No cultural significance to Europeans.	Loss of the heritage value of the existing weir dating from the 1950s.
Environmental	A minor addition to in-stream habitat values because a slightly cleaner and more oxygenated environment would be created locally.	Nil
Economic	All options have similar economic benefits as all permit the continuance of boating operations.	Estimated cost \$50,000.

Extent to which community outcomes are achieved:

Primary alignment with community outcome A City for Recreation, Fun and Creativity. Also contributes to A City of People Who Value and Protect the Natural Environment.

Impact on Council's capacity and responsibilities:

Neutral: the Council is responsible to either maintain, replace or remove the existing asset.

Effects on Maori:

The Tuahuriri Runanga has not made a response to the consultation information, probably because the activity is minor. Based on other consultation the Runanga is judged either to prefer this option or to rate it equally with the status quo.

Consistency with existing Council policies:

No inconsistency.

Views and preferences of persons affected or likely to have an interest:

Some 32 of 45 respondents to a consultation survey preferred this option.

Other relevant matters:

Option 1 - Maintain The Status Quo (If Not Preferred Option) - Retain the Present Weir

The present basalt rock weir has some heritage value, being about 50 years old, although it is not old enough to be protected under the Historic Places Act. It has been described by a well known local designer as (paraphrased) "...a simple and naïve structure, representing the response of earlier city dwellers to constraints in funding and materials." In that view it is worthy of preservation.

The weir permits the passage of trout and eel but hinders smaller fish and probably excludes some native fish because of the speed and steepness of water flow. If the weir was rebuilt it could be modified to improve small fish access, possibly by constructing a wooden fish ladder against the northern bank.

The heritage value of the existing weir has been considered by the Council's heritage planners and the Historic Places Trust. The Heritage Team comments that:

"... the overriding heritage significance lies in the social history of boating in the area - the fact that a weir was placed so as to enhance this facility, and the association with the boatsheds and the pedestrian footbridge, which all played a significant role in the early recreational activities of Christchurch residents - rather than in the fabric or specific design of the present weir."

Therefore when considering whether the existing weir should be restored, or a new one in concrete or greywacke river stones be built, the heritage aspects do not provide an obvious choice. With all three weir options, the intangible heritage of the history of recreation in this area of the river will be maintained, particularly due to the presence of the boatsheds, which, in continued use for boating since their construction in 1882, provide an intact, tangible reminder of this history rather than the present weir structure.

The Historic Places Trust expressed a preference for the status quo but commented that the weir is neither an historic nor an archaeological site and that other factors might over-rule.

Loss of the existing weir is seen to be balanced by environmental factors including the replacement of basalt rock by greywacke river gravel.

	Benefits (current and future)	Costs (current and future)
Social	Provides for continuation of long-standing recreational use of this part of the Avon River.	Nil
Cultural	Retains the heritage value of the existing weir which dates from the 1950s.	Is inferred (on the basis of previous submissions to Council) to be a slightly inferior option from the perspective of Maori values.
Environmental	No change.	Nil
Economic	All options have similar economic benefits as all permit the continuance of boating operations.	Estimated cost \$30,000.
<p>Extent to which community outcomes are achieved: Primary alignment with community outcome A City for Recreation, Fun and Creativity.</p> <p>Impact on Council's capacity and responsibilities: Neutral: the Council is responsible to either maintain, replace or remove the existing asset.</p> <p>Effects on Maori: Any effects are insignificant because this is a status quo option.</p> <p>Consistency with existing Council policies: No inconsistency.</p> <p>Views and preferences of persons affected or likely to have an interest: Nine of 45 respondents to a consultation survey (including the Antigua Boatshed and Punting on the Avon) preferred this option.</p> <p>Other relevant matters:</p>		

Option 2 - Concrete Weir

A concrete weir as shown in the photomontage is envisaged to have a 30-40cm wide concrete cap that would drop a uniform curtain of water into the pool below. It would be a neater, more formal structure than the present weir and in appearance and construction would be more in keeping with the built environment of Oxford and Cambridge Terraces.

Because it would form a definite barrier to fish and boats it would be necessary to construct fish and boat access. A fish pass would be built against the north river bank and could be co-located with a ramp for boat access.

Construction of foundations and prevention of leakage would make a concrete weir an expensive option and funding for expenditure of this scale has not been allocated.

	Benefits (current and future)	Costs (current and future)
Social	Provides for continuation of long-standing recreational use of this part of the Avon River.	Nil.
Cultural	A formal, designed, permanent and neater structure in keeping with the build-up nature of Oxford and Cambridge Terraces	Loss of the heritage value of the existing weir which dates from the 1950s.
Environmental	Little change, provided that an effective fish pass is installed.	No environmental costs identified.
Economic	All options have similar economic benefits as all permit the continuance of boating operations.	Estimated cost \$400,000.

Extent to which community outcomes are achieved:

Primary alignment with community outcome A City for Recreation, Fun and Creativity.

Impact on Council's capacity and responsibilities:

Neutral: the Council is responsible to either maintain, replace or remove the existing asset.

Effects on Maori:

In the absence of a response from Maori but based on previous consultation it is assumed that placement of a concrete weir in the river would be the least desirable option.

Consistency with existing Council policies:

No inconsistency.

Views and preferences of persons affected or likely to have an interest:

Four of 45 respondents to a consultation survey preferred this option.

Other relevant matters: