

**HAWKE'S BAY REGIONAL COUNCIL**  
**ASSET MANAGEMENT AND BIOSECURITY COMMITTEE**  
**Thursday 17 February 2005**

**SUBJECT: SAWFLY**

**INTRODUCTION:**

A number of agenda papers have been prepared and presented to Council over the past 4 years relating to the establishment and on-going effect of the willow sawfly (*Nematus oligospilus*) on Willow tree species within areas of the major flood control schemes in Hawke's Bay. Past papers have largely kept Councillors advised as to the development of the problem in various areas in Hawke's Bay and provided regular updates on a number of possible mitigation initiatives being undertaken, either by ourselves or in conjunction with a range of other agencies.

The effects of willow sawfly on the Heretaunga Plains Scheme – Rivers live willow edge protection has now reached a threshold where a more deliberate, widespread, on the ground response is required to minimise the risk of a major failure within the managed sections of the flood control scheme. This report documents a staged proposal to either strengthen existing works and in some instances replace entire sections of flood protection assets.

**COMMENT:**

**A) History**

Willow sawfly which feeds almost exclusively on willow trees has caused severe depredation and loss of river buffer zone willow trees on the Heretaunga Plains. This sawfly entered New Zealand in 1997, and has progressively spread south from its Auckland entry point. The Heretaunga Plains were first affected in 1999-2000 and since then severe defoliation of willow trees has occurred during the summer months. Willow sawfly spreads as a mass infestation, and the willows are periodically defoliated, with up to three or more defoliations over a summer season. Experience and laboratory trial studies have shown that up to 90% of the root mass of a willow is lost due to these successive defoliations, leading ultimately to the death of the tree. Last summer was unusually wet, and there was less damage than in the previous two summers. However, there has been a progressive weakening and die off of the buffer zone willow trees.

The severity of the willow loss experienced over the 2003/04 year has necessitated a large write down in the asset value of the river management buffer zones on the Heretaunga Plains. This revaluation was carried out in August 2004 and was reviewed and endorsed by Gary Williams of G & E Williams Consultants Ltd. The live willow edge protection was valued at \$5,600,000, and as a result of sawfly damage has now been assessed as having a value of \$2,250,000. The extent of willow sawfly damage is shown on the attached map.

Gary Williams and Council staff inspected the willow buffer zones on the Lower Tukituki, Ngaruroro and Tutaekuri Rivers on 13 October 2004, with the findings forming the basis of this paper. Gary Williams has in the past been the engineer of many of the scheme planting works and had also maintained a connection with the scheme works over the past 20 years through asset management, scheme performance and valuation exercises as well as an involvement in a wide range of other river management issues around the country. He was therefore used to independently validate the level of concern about the current scheme asset condition and has provided assistance with proposals contained in this paper.

## B) VEGETATION PROTECTION ZONES

The vegetation protection zones can be grouped into 3 specific zones as follows:

### 1. Edge Protection Zone

This is defined as the first 20 to 40 metres of edge protection immediately adjacent to the river edge. This zone needs to be of sufficient strength to withstand direct attack from the river, accommodate high river velocities and discourage any lateral erosion of the river from occurring.

### 2. Buffer Zone

This is defined as the zone between the immediate edge protection zone and the stopbank or adjoining private property, in areas where there are no stopbanks. This zone is intended to act as a filter for flood flows by controlling velocities to an acceptable level and discouraging any preferential berm flows from developing. These trees also provide an important source of back up material for flood damage reinstatement work and for emergency edge protection repairs.

### 3. Near Stopbank Zone

This is the area immediately adjacent to the toe of the stopbank and consists of 2 or 3 rows of shrub willow species. The intent of this work is to control water velocities to an acceptable level along the river side of the stopbank face to minimise the risk of erosion to the bank surface.

Vegetation protection is the principal protection measure along the rivers of the Heretaunga Plains (and elsewhere) and is just about exclusively made up of different species and varieties of willows. The erosion forces of the river at the riverbank edge and on the berms are mostly controlled by the willow vegetation, which requires an on going commitment for management. The channel edge is prepared by layering down tall willows, re-planting with willow poles and slotting-in large felled willows into the riverbank thus forming a buffer zones. These buffer zones can be strengthened by pile and cable permeable groynes and retards at severe pressure points. To protect major assets like bridges, rock protection works are often used

The affect of willow sawfly on the vegetation protection zones has been assessed in terms of light, heavy and severe damage. The estimated loss (of asset effectiveness) has been taken as a 25% loss for light damage, 70% for heavy and 90% for severe. The continual defoliation of the willow trees gives rise to root die back, and it is the progressive root loss that has the most serious impact on the erosion protection ability of the willows. The weakened trees easily break up and more trees are required for bank slotting works as the trees weaken. There is also a loss in the source trees for repair works. Damage estimates, therefore, reflect the amount of root loss and the general weakening and loss of buffer zone and edge protection zone trees.

The assessment of damage on a reach by reach basis has resulted in an estimated loss in effectiveness of the buffer zone over the Heretaunga Plains scheme (three main rivers) of over 50%. This is an overall loss in effectiveness, but there are long lengths of severe damage, which exposes the scheme assets to widespread damage and a breaching of the flood defences. The buffer zone function is to protect the stopbank flood defence system. The earth embankment stopbanks are easily eroded away if strong flood flows impinge upon them for a sufficient length of time, or if lateral erosion of their foundations occurs due to loss of the adjacent berm. Any breach of a stopbank will have serious consequences, flooding all the land downstream of the breach. Continuous dense and effective buffer zones are thus required to strengthen the active edge of the channel, protect the berm area and slow the velocities on the berm to maintain the integrity of the stopbanks.

Depreciation of the scheme vegetation protection zones from around \$5.6 million to \$2.25 million indicates a very serious loss of effectiveness. The willow protection zones are the primary defence measure, and all the other flood protection assets are at risk because of the loss in effectiveness of the protective vegetation. The stopbanks (and the culvert structures in them) have become very seriously exposed to risk of failure because of the rapid sawfly damage to the willows. This sawfly damage has, in just a few years, seriously undermined the integrity of the whole flood protection scheme, and destroyed many years of effort in establishing, strengthening and maintaining the vegetation protection zones. The result is an increased risk of a stopbank breach placing large areas of the Heretaunga Plains at risk of flooding.

### **C) SAWFLY INFESTATION**

Once introduced into New Zealand, willow sawfly spread very rapidly, with massive population explosions on the widely available willow vegetation. This rapid and massive infestation is typical of a new species introduction where there is a plentiful food source. Although willow sawfly appears to have some willow species and variety preferences, all the willows present along the Heretaunga Plains rivers have suffered from repeated severe defoliations.

The longer term impacts of this newly introduced species on willows in New Zealand is not something that can be easily predicted. The initial response was to monitor its spread and its effect on willows, and see whether some environmental balance would arise between the sawfly, its food sources and possible predators, as has been the experience in some other regions, such as Bay of Plenty and Waikato. Thus far, the effects of willow sawfly have been quite variable around the country. The ability of the sawfly to propagate itself and give rise to mass infestations is clearly dependent on climatic and environmental factors, as would be expected. It would appear, though, that the Heretaunga Plains are an ideal habitat for willow sawfly, with its affects petering out inland and further south.

The most likely scenario on the Heretaunga Plains is then one of continuing mass infestations until all, or virtually all of the willows on the plains have been killed off. Complete destruction of willows has certainly occurred over large areas, and in many more areas the willows are so weak that their death is now just a matter of time. The loss of its food source would then, obviously, result in a rapid decline in sawfly numbers, but only a few need to survive to re-infest any willows that are then re-planted to re-establish the river buffer zones.

Therefore, while the severity of defoliations will vary from season to season, a progressive and rapid collapse of the willow vegetation of the buffer zones must now be expected. This is an alarming prognosis, and one that has become apparent only very recently. The severity of willow sawfly on the Heretaunga Plains is quite remarkable, and is, so far at least, believed to be the worst in the country.

### **D) INITIATIVES TO DATE**

Since the discovery of willow sawfly and the realisation of the potential significant and severe effects of sawfly on Council's assets, staff have progressed a number of initiatives.

1. A research programme on willow sawfly has been expanded and coordinated at a national level. Financial contributions have been secured from the majority of regional councils and unitary authorities to enable the science provider HortResearch to progress a research programme on willow sawfly at an accelerated rate. The aims of the research programme are to:
  - Understand willow sawfly lifecycle, habits, influences and constraints.

- Assess the susceptibility of willows to sawfly damage and to quantify the effects. This included an assessment of numerous willow species to determine palatability and effects on sawfly growth and fecundity.
- Investigate alternative tree species, including alternative willow species, to try and identify one that is resistant to willow sawfly, and other species that may provide similar attributes to willows.
- Investigate whether chemical or biological control of willow sawfly will provide effective control.

Ongoing funding for this programme was not supported in the recent public good science funding rounds, and the programme is therefore in danger of collapsing by 30 June 2005 unless further funding can be found. The collapse of this programme may result in the loss of 40 years of corporate knowledge and intellectual property associated with the willow and poplar breeding programme and research into willow sawfly resistant species.

## 2. Trialing a range of control methods on-site.

Insecticide has been injected into trees with some positive effects. This process is being further assessed to determine its viability for specific high risk areas and areas of new planting.

Willows have been sprayed with a range of insecticides, in a joint project with New Zealand Biosecure who successfully eradicated the Southern Saltmarsh mosquito from Hawke's Bay several years ago.

Extensive planting of Japanese willow, which appears to have a natural resistance to sawfly, has been undertaken. This is a shrub willow variety. Its gravel holding ability has yet to be fully assessed, and it appears to be rather brittle which may mean that it is susceptible to damage during a flood event. Further assessment of these attributes will be made over the next few years and advice on the ability to interbreed willow sawfly resistant attributes together with less brittle varieties will need to be progressed.

3. Damage assessments each year since willow sawfly first arrived in Hawke's Bay have been maintained. These show a band of severe sawfly damage around the mid to upper boundary of the Heretaunga Plains. This band appears to be consistent with the temperature and altitude sensitivity of where sawfly will establish and develop eruptive phases. Further work is being done in this area.
4. Alternative species including alder, acacia and poplar have been planted to provide flood resistance on the river berms both from the root structure and in maintaining water velocities to design levels on berm land.

## **E) MANAGEMENT RESPONSE**

The initial response to the sawfly introduction and spread was to monitor its effect, replant as necessary, carry out experimental plantings of different varieties etc and undertake research work on willow sawfly and various control options. The risks were clearly recognised, with the potential for severe damage to willows. However experience of other regions in New Zealand followed a pattern of initial establishment, evidence of defoliations over 1 or 2 seasons with a subsequent lessening of the problem below eruptive levels due largely to climatic conditions. It is evident that the more extreme dry, droughty conditions of the North Island east coast is most suited to producing conditions for more of the eruptive phases, as is clearly evident in sections of Hawke's Bay and Gisborne. The exponential nature of the spread and impact of willow sawfly in an ideal

habitat does, though, give rise to a far more serious problem, and we are now very much on the back foot in dealing with the effects of willow sawfly on the Heretaunga Plains.

The management response now has to become a major effort. Although re-planting efforts clearly cannot match the destruction of willow sawfly in terms of compensating re-growth, the aim should be as rapid a re-establishment as possible of robust and dense vegetation protection zones. This requires a commitment to extensive planting and an open-minded use of a range of species. Species experimentation should continue, with the aim of finding a mix of species that will provide the most effective vegetation for a buffer zone management approach to erosion protection, given the on going presence of willow sawfly. The impact of willow sawfly is a very clear lesson about the ecological dangers of relying on a narrow range of willow species. So far, the only willow that has not been defoliated by willow sawfly in the field is the Japanese willow. Extensive planting of this species has been done over the last three years along the rivers. A range of other non-willow species has also been planted, including alders, casuarina and acacias.

The ease of propagation of willows makes them an ideal species for the front line of vegetation protection (the edge protection zone) – while also making them a weed problem in the river channel. The search for sawfly resistant willow species is continuing with the joint initiative with HortResearch, and these species will be used to re-plant the river side edge of the vegetation zones, as and when these are available. Other species will though be planted throughout the buffer zones, especially deep rooting river margin species, such as alders and poplars.

Care is required in selecting species, especially regarding seed spread along river channels. Alders do naturally spread along waterways, some species more readily than others. Some acacia species also spread very easily along waterways, with fast growth rates. The related albizia species, which seed prolifically, are becoming a real weed infestation problem along river banks in other areas.

A major re-planting programme is recommended, with the initial emphasis on re-establishing a continuous margin of vegetation along the stopbanked lengths of the scheme. Re-establishing some degree of continuous protective vegetation is of paramount importance. A minimum width of vegetation zone should be built up, using chevron planting, as already undertaken, to cover the worst affected areas as quickly as possible. Over time a full width buffer zone can be re-established, with more species diversity, including native species. The importance of dispersing berm flows and preventing strong flows alongside the stopbanks also needs to be considered when prioritising re-planting and in the lay out of the planting.

## **F) PROPOSED WORKS PROGRAMME**

### **Edge Protection Zone**

To date large tree willows have provided the necessary standard of protection in this area. Due to the weakened nature of the trees, from repeated sawfly defoliations, particularly with the loss of root holding ability this area is now considered a high risk and large tracts of edge protection would be unable to withstand a moderate to major flood event.

No alternative replacement to the tree willow, which has the properties of rapid establishment, drought tolerance, Flood tolerance, excellent root holding ability, ability to be lopped or layered and reused and has a reasonable life span, has been identified. It is now proposed to install additional structural works in the high risk and most affected areas of the edge protection zones within the Heretaunga Plains scheme. The proposal is to establish 15 metre long permeable groynes at 50 metre intervals along the active channel edge, consisting of railway iron and wire rope, within the existing weakened works. Spacings will be increased or decreased as necessary in specific locations, dependant on the river alignment or level of exposure in certain areas. It is also

proposed to plant 8 rows of trees including Matsudana willow, alder, poplar and flax/cabbage tree varieties of trees adjacent to the new groynes. The intent of this work is to provide additional protection to the existing works while also establishing new replacement trees to ultimately take over or further support the remaining trees in the immediate edge protection zone. Areas considered to be of extreme risk may also be further strengthened by the use of rock armouring between the groynes.

### Buffer Zones

Tree species in this area are generally willows of either tree or in some instances shrub varieties. However other alternative species have also been successfully used. Other varieties include poplars, alders, eucalypts, pines and some native species. It is proposed to provide a range of options for the buffer zones, dependent on their significance in relation to areas protected, size and width of the respective zones and whether they are within the stopbank protected reaches or not. The broad intent of the works is to separate the berm areas into smaller cell type areas by planting chevron zones at approximately 150 metre spacing down the river system. Plant varieties intended for this work include shrub willows, poplars, alders and natives.

### Near Stopbank Zones

While shrub varieties of willows have been the primary source of material for this zone there are other alternative options such as native shrubs e.g., pittosporums etc; that could provide a similar level of protection. The resistant Japanese shrub willow variety is also ideally suited to this area, as would be Egyptian or viminalis clones. Not all areas adjacent to the stopbanks have been planted as part of the original scheme planting works as they were considered to be sufficiently distant from the active river channel and in some instances have sufficient protection provided by the edge and buffer zones. It is considered in most circumstances that the above rationale is still relevant for most sections of rivers, however additional planting is being proposed for sections of the Tutaekuri River where upgrade works are still to be undertaken. It is also proposed to interplant some sections of existing shrub willow planting in the near stopbank zone where the weakened trees are of concern or particularly close to the active channel.

## G) PLANTING PHILOSOPHY

A number of alternative species have been planted and trailed in various section of the Heretaunga Plains scheme over the past 20 years. The following lists species trailed;

Species	River	Primary use
Alders	Ngaruroro	Velocity control – spur banks
Acacias	Ngaruroro	Velocity control – spur banks
Casuarinas	Ngaruroro	Buffer zones, velocity control
Cabbage tree	Tutaekuri	Buffer zones, velocity control
Kanuka	Tutaekuri	Buffer zones, velocity control
Flaxes	All rivers	Public access areas. aesthetics
Poplars	Lower Tukituki, Ngaruroro	Buffer zones, chevrons
Pines	Ngaruroro, Tutaekuri	Buffer zones, timber production
Eucalypts	Tutaekuri	Buffer zones, Coppicing firewood

Using knowledge and experience gained from the above trial works and comparisons against a recent inspection of similar works in the Manawatu area, as well as a range of accepted good river management practices, the planting regime being proposed is as follows;

**Edge Protection Zone**

Row 1 – Willow (Matsudana hybrid)

Row 2,3 & 4 – Alder (Cordata or glutinosa)

Row 5 & 6 – Poplar (Kawa, Argyle or Veronese)

Row 7 & 8– Shrub (Phormium, Cordyline, Kanuka, Pittosporum)

**Buffer Zone**

Row 1 & 2 – Shrub willow (Japanese) or Phormium, Cordyline, Kanuka, Pittosporum

Row 3 & 4 – Poplar (Kawa, Argyle or Veronese)

Row 5 & 6 - Alder (Cordata or glutinosa)

**Near Stopbank Zone**

Shrub willow (Japanese, Viminalis, Egyptian), Kanuka, Pittosporum

**Specific properties of trees selected**

## 1. Tree Willow - Matsudana

Tried and tested variety that provides rapid establishment, good root holding ability, able to be reused and will withstand significant flood pressure once well established. This variety is not sawfly resistant but there is the expectation that these trees could be specifically managed by chemical control methods. These trees are proposed as the first line of defence in the absence of any other suitable species being identified to date.

## 2. Alder - Alnus - Cordata

Medium growth rate with good wind and drought tolerance. Develops a strong tap root and good nitrogen fixer. Trees can inhibit ground cover if planted too closely but develops good root structure in this area.

## 3. Alder - Alnus - Glutinosa

Fast growing species suited to river environment. Wind and drought tolerant. Develops a strong tap root and good nitrogen fixer. Trees can inhibit ground cover if planted too closely but develops good root structure in this area.

## 4. Poplar - Veronese

Is wind and drought tolerant with good form and growth rates. Is less possum palatable than other clones. Good root establishment and holding ability.

## 5. Poplar - Kawa

Similar properties to Veronese and Argyle but prefers more moist conditions. Is possum resistant. Has established well on river berm land in Lower Tukituki River.

## 6. Poplar - Argyle

Is relatively drought and wind tolerant, establishing a rough bark. Provides similar qualities to the Veronese clone.

## 7. Shrub Willow – Kinuyanagai (Japanese)

Is sawfly resistant with very good shrub characteristics. Branches can be brittle, however shows good drought tolerance and is growing in relatively poor river conditions.

## 8. Shrubs – Natives

An extensive range of native options are available for planting in the buffer zones. Specific trials have been undertaken with phormium, cordyline, kanuka, and some pittosporums. Totara has also been planted successfully in the Manawatu area.

Planting options will not be restricted to the above list of tree and shrub species, with a wide range of other alternatives available, particularly in the buffer zones, however from experience the above species will satisfy most of the important river control requirements of rapid establishment, drought tolerance, suitability for reuse and other important properties.

A wide range of other criteria is also being considered as part of the species selection. Issues such as biodiversity, food value for birds and other wildlife, wind and site condition tolerance, shade and riparian values, the opportunity to lessen risk of exposure to having too few varieties and a concept of lessening willow numbers such that sawfly control might become a more realistic alternative, are other factors being considered.

An assessment of tree numbers has been undertaken and is summarised as follows:

<b>EDGE ZONE</b>	
Tree Willow - Matsudana	38,340
Alders	76,680
Poplars	38,340
Shrubs Willows	36,210
Shrubs Native	36,210
<b>BUFFER ZONES</b>	
Alders	17,325
Poplars	13,860
Shrubs Willows	11,435
Shrubs Native	11,435
<b>TOTALS</b>	
Willows - Matsudana	38,340
Alders	94,005
Poplars	52,200
Shrub Willows	47,645
Shrub natives	47,645
<b>Total plant numbers</b>	<b>279,835</b>

An assessment has been made as to plant availability for the proposed programme

## H) WORK PROGRAMME AND PRIORITIES

The rivers have been separated into three priority zones as a means of determining a manageable work programme whilst also managing an acceptable risk. These areas are defined as;

### Severe Risk

These are defined as areas where the protection works are now completely dead or will die in a short period of time. There is almost complete exposure of the stopbank or adjoining private property and significant lateral erosion is expected from a small to moderate flood. The works will be almost entirely new with little of the existing protection saved or used. Works will be carried out in these areas first with the establishment of both the frontline structural works and

planting of the 30 metre edge protection zone. Work will then be completed on the buffer zone chevron plantings at the rear of these works.

### **High Risk**

These are defined as areas where there are substantial areas of dead or dying trees or in some cases the risk of failure are more consequential, such as areas near stopbanks. Trees in these areas have suffered extensive defoliations over a number of years and there is significant doubt that these trees will ever recover. The loss of root holding ability is also severely affected and these areas are unlikely to contain a moderate to major flood event. These are prioritised to follow after the severe risk zones and will follow a similar pattern of establishment as mentioned above.

### **Moderate Risk**

These are areas where tree have been affected a number of times by sawfly defoliations over recent years but the trees are still relatively healthy with good leaf coverage. There are however significant concerns about the root structure of the tree and sufficient doubt as to the trees ability to perform in a moderate to major flood event. The proposal is to add additional structural works within the existing works to compensate for the concern about these trees. It is also proposed to interplant alternative species within the existing trees to ultimately provide a more diverse range of tree species and lessen the risk of a single threat to one specific variety. This work is largely programmed for years 4 and 5.

The work programme (appendix 1) has been prioritised into 5 years, such that the highest risk works will be completed over the first three year period with the high to moderate work being completed in years 4 and 5. It is intended to take full advantage of seasonal opportunities by carrying out as much of the structural works outside the Spring and Summer period thereby ensuring the longest possible period for planting. Further advice has been provided on keeping rooted varieties of plants chilled which allows a longer planting period. This has been successful in Manawatu.

It is important to note that the programme has been established on the basis of current knowledge and experience of the sawfly problem. The areas defined appear to have relatively specific demarcation points which may relate to altitude, climate or local conditions. These positions have been stable over the last 3 or 4 years so have been used in determining the extent of the proposed works. Conditions may change, for better or worse, over the coming years that may make it necessary to review the extent to which the works may have to be carried out.

It is also important to remember the risks that are being taken over the 3 to 5 years following initial planting and the time needed for plants to establish and gain sufficient strength to withstand a flood event. This risk cannot be overstated. There is the expectation that the structural works will provide as much protection as possible during the establishment phase. 3 to 5 years with little more than small flood events will also assist the plantings to get established and effective.

## **I) COSTS AND FUNDING**

Sawfly was recognised as a potential significant threat to the assets of the Heretaunga Plains during the development of the 2004/14 LTCCP. At that time \$960,000 of additional expenditure was included at the rate of \$120,000 per year for the seven years from 2007/2008 to 2013/2014. It was envisaged that this would provide for extensive planting of alternative tree species resistant to sawfly. In addition contributions of \$20,000 per year to an on going sawfly mitigation research programme were provided.

The programme of work now proposed is significantly larger and more urgent than was provided for under the 2004/14 LTCCP. The programme of works as proposed in this briefing paper will have a significant impact on the Heretaunga Plains Flood Control Scheme – Rivers rating account and because 30% of the costs are met from general funding these will also be impacted. Because of the severe damage that is now recognised to have occurred as a result of sawfly damage to the live willow edge protection, and the significantly increased risk of damage to river protection works, including a potential stopbank breach, staff recommend that remedial work commence as soon as possible. Staff propose that this work be commenced in the 2005/2006 financial year, and that the work be undertaken through a programme of strengthening works and planting of willow sawfly resistant species over a five year period.

Under the present financial policy of Council, the work will be funded seventy percent through the Heretaunga Plains Scheme – Rivers targeted rates and the remaining thirty percent from general funding. However, because of the significantly increased risk posed by the sawfly damaged live willow edge protection to the Hawke's Bay and national economies, and regional and national infrastructure, staff believe that Council should, on behalf of the Regional and Scheme ratepayers, approach Central Government to determine whether they will meet a portion of the cost of the proposed works. Over the past twelve months, and supported by a greater awareness of the risks and costs of extensive flooding, Council staff and the previous and current Council Chairman, have lobbied Central Government with regard to the withdrawal of Foundation for Research, Science and Technology funding for ongoing sawfly research. Staff believe that there is now an awareness at Central Government Ministerial level of the issue and believe that further lobbying is justified because of the significance of the funding required to mitigate the effects of sawfly in Hawke's Bay, and the significant risk to the national and local economy and infrastructure that now exists.

While staff seek Committee support for lobbying Central Government for funding to meet a portion of the cost of the proposed remedial works, this paper sets out funding options assuming that the work is entirely funded from works rates and general funding in accordance with existing Council policy.

### **Targeted Rates**

Budgets for the 2004/14 LTCCP were prepared on the basis of an extensive capital works programme for improvement to the Scheme assets in accordance with the Scheme Asset Management Plan, all of which was to be funded directly through targeted rates and scheme reserves with no borrowing. The Scheme rating account had a relatively healthy balance of \$399,693 as at 30 June 2004. This balance is predicted to increase to approx \$490,000 by 30 June 2005 if scheme costs run to budget in the 2004/05 year. However actual costs of capital works in the 2004/05 year are now predicted to be less than estimated resulting in some savings and a predicted Scheme rating account balance as at 30 June 2005 of approximately \$700,000.

There is a range of options which have been considered by staff to provide the Scheme funding for the required works. These are discussed below and summarised in the attached spreadsheet.

### **Option 1: Rates increase in line with inflation and loan funding used to match shortfall**

#### *Change from LTCCP 2004/14*

- Targeted rates increase by three percent annually to match inflation.
- Loan funding is used to meet shortfall

#### *Discussion*

Staff have evaluated this option using loan funding on the basis of a table loan with equal annual payments being made each year over a ten year period. Additional loans maybe required in each of the 2011/12 and 2012/13 years to meet the costs of the proposed Clive River widening project, which forms part of the Te Karamu recommendations.

Preliminary estimates by staff indicate that the following loans will be required:

Year	Loan amount
2005/06	\$500,000
2006/07	\$1,000,000
2007/08	\$1,500,000
2011/12	\$500,000
2012/13	\$1,000,000

A 10 year repayment period is considered appropriate given:

- The ability of the Scheme to service loans with longer terms is more manageable than for short term loans. Ideally therefore loans should be of a long duration, and:
- The ideal situation is to have intergenerational equity which means that the beneficiaries of the assets (i.e. the present and future owners of land protected by the Scheme) should meet a share of the costs through repayment of long term loans, however:
- The risk of a major flood event causing extensive damage to the new works and resulting in significant reinstatement costs means that the Scheme should aim to repay outstanding loans over the shortest possible time because of the ongoing risk of assets being destroyed or severely damaged by a major event before they are fully established.

This approach will meet the immediate needs of the Scheme with regard to sawfly mitigation and the capital works programme, however because of the loan burden it will mean that the Scheme is not in a position to react to further demands which may arise in the future, such as improvements to the flood capacity, without a significant rate increase or further borrowings, because of the significant debt burden. This is illustrated in the attached spreadsheet by the large Scheme deficit that arises after year 2013/14.

## **Option 2: All work funded by rates**

### *Change from LTCCP 2004/14*

- Targeted rates increase by fifty percent in the 2005/16 year.
- Future reductions in targeted rates may be possible. The model on the attached spreadsheet shows a 25% reduction in works rates in each of the 2008/09, 2009/10, 2013/14, and 2014/15 years.
- Targeted rates continue to increase in line with in each year where no reduction or increase occurs.

### *Discussion*

The cost of the programmed works can be met through increased targeted rating. The model presented on the attached spreadsheet shows rates would need to increase by 50% in the 2005/06

year. Clearly this would have a significant financial impact on Scheme ratepayers. Therefore staff do not prefer this option.

**Option 3: Rates increase in line with inflation, some loan funding, and other capital works deferred.**

*Change from LTCCP 2004/14*

- Targeted rates increase by three percent annually to match inflation.
- Loan funding is used to meet some costs of sawfly mitigation (\$1,000,000 in 2006/07 and \$500,000 in 2007/08; Total \$1,500,000).
- Other capital works are deferred.

*Discussion*

Loan funding will be required to meet the costs of the sawfly mitigation works if it is to be done over the proposed 5 year period. Other capital improvement works could be deferred to a time that allows it to be funded directly through the existing level of rates and without additional borrowing. This approach would result in some capital improvement works being deferred as set out in the table below:

<b>Project</b>	<b>Commencement date 2004/14 LTCCP</b>	<b>Proposed commencement date</b>
Ngaruroro River stopbanks	Year 1 & 2 of a 4 year programme completed in 2004/05	Year 3 deferred to 2010/11
Clive River stopbanks	Programmed to commence 2004/05 now revised to 2005/06	Work considered urgent and therefore commencement date remains 2005/06
Tutaekuri River stopbanks	Year 1 & 2 of a 4 year programme completed in 2004/05	Year 3 deferred to 2011/12
Tutaekuri/Waimate River stopbanks	2010/11	2014/15
Clive River widening	2009/10	2009/10
Super design flood structures	2010/11	2014/15

Staff believe that there may be some benefit in reviewing the priority of some capital works, other than the sawfly mitigation works, to minimise the need for borrowing, however they believe that the length of deferment proposed under this model would be unwise. Staff will again review the capital works programme for the Heretaunga Plains Scheme Rivers as part of the review of the Asset Management Plan and preparation of the draft 2006/16 LTCCP. This review may result in some changes to the programme proposed in this option.

The minimal level of borrowing does however leave the Scheme in a strong position in 10 years to react to further demands which may arise in the future.

**Option 4: Rates increase 10% in 2005/06 and then in line with inflation, some loan funding, and some capital works deferment.**

*Change from LTCCP 2004/14*

- Targeted rates increase by 10% in 2005/06 and then by three percent annually to match inflation.
- Loan funding is used to meet some costs of sawfly mitigation (\$750,000 in each of the 2006/07 and 2007/08 years; Total \$1,500,000).
- Other capital works are deferred.

*Discussion*

Loan funding will be required to meet the costs of the sawfly mitigation works if it is to be done over the proposed 5 year period. Other capital improvement works could be deferred to a time that allows it to be funded directly through the rates funding without additional borrowing. If rates are increased by 10% in the 2005/06 year then other capital works need not be deferred to the extent shown in Option 3. This approach would result in capital improvement works being deferred as set out in the table below:

<b>Project</b>	<b>Commencement date 2004/14 LTCCP</b>	<b>Proposed commencement date</b>
Ngaruroro River stopbanks	Year 1 & 2 of a 4 year programme completed in 2004/05	Year 3 deferred to 2008/09
Clive River stopbanks	Programmed to commence 2004/05 now revised to 2005/06	Work considered urgent and therefore commencement date remains 2005/06
Tutaekuri River stopbanks	Year 1 & 2 of a 4 year programme completed in 2004/05	Year 3 deferred to 2009/10
Tutaekuri/Waimate River stopbanks	2010/11	2012/13
Clive River widening	2009/10	2008/09
Super design flood structures	2010/11	2013/14

As with option 3, staff believe that there may be some benefit in reviewing the priority of some capital works other than the sawfly mitigation works to minimise the need for borrowing, however believe that the length of deferment proposed under this model would be more acceptable than under option 3. Staff will again review the capital works programme for the Heretaunga Plains Scheme Rivers as part of the review of the Asset Management Plan and preparation of the draft 2006/16 LTCCP. This review may result in some changes to the programme proposed in this option.

As with option 3 the minimal level of borrowing does however leave the Scheme in a strong position in 10 years to react to further demands which may arise in the future.

Staff prefer option 4 because:

1. The immediate requirement to mitigate the effects of sawfly will be addressed as a matter of urgency.
2. Other capital works, although deferred will be undertaken within a reasonable time frame. In addition the stopbanks along the right bank of the Clive River will be strengthened in the immediate future.

3. Borrowing is limited to \$1,500,000, which will not place a significant capital and interest repayment burden on the Scheme.
4. The Scheme remains in a position to be able to react to future issues that may arise.

## J) GENERAL FUNDING:

The revenue and financing policy as adopted in the LTCCP 2004-14 states that the funding required for the Heretaunga Plains Scheme – Rivers, is 30% public funding and 70% private funding (targeted rates). Therefore, the proposal included in this paper for capital expenditure on sawfly mitigation measures requires that 30% of the total capital works be funded from general funding sources.

The table below sets out the general funding requirement for the Heretaunga Plains Flood Control Scheme under each of the funding options analysed in this paper and compares the requirement under each option with the LTCCP 2004-14.

<b><u>General Funding Requirements</u></b>					
	<b>2005/06</b>	<b>2006/07</b>	<b>2007/08</b>	<b>2008/09</b>	<b>2009/10</b>
	<b>\$000</b>	<b>\$000</b>	<b>\$000</b>	<b>\$000</b>	<b>\$000</b>
<b>LTCCP (2004-14)</b>	498	481	488	517	519
<b>Option 1 Variation</b>	978 +480	1021 +540	988 +500	597 +80	538 +19
<b>Option 2 Variation</b>	979 +481	1020 +539	983 +495	581 +64	515 -4
<b>Option 3 Variation</b>	911 +413	876 +395	821 +333	493 -24	480 -39
<b>Option 4 Variation</b>	911 +413	875 +394	820 +332	589 +72	580 +61

It can be seen from the table that Option 1 and Option 2 does require greater funding from general funding sources than do Option 3 and 4. The reason for this is the more aggressive deferral in Options 3 and 4 of capital items that have previously been approved in the LTCCP. The comments below deal specifically with Option 4, in relation to the Heretaunga Plains Flood Control Scheme, as the recommendation of this paper.

There are three methods of securing additional general funding for this project:

- Operating cash balances
- Regional income
- General funding rates

### ***Operating Cash Balances***

Council considered at their meeting on 29 September 2004 a paper titled " General Funding Cash Surplus from 2003-04". That paper set out that the improved operating result for the year ending 30 June 2004 meant that additional funding of \$930,000 over the LTCCP figures, was available to

Council. At that meeting, Council approved approximately \$380,000 of additional expenditure, on LiDAR data, coastal investigations, stock truck effluent sites etc.

Consequently, at 31 January 2005, Council's cash operating balances are \$550,000 higher than the levels projected in the LTCCP 2004-14.

### **Regional Income**

The number of sales of leasehold properties to lessors, has far exceeded the estimated sales levels as concluded in the LTCCP. The estimated sales level for the 2004-05 year was for 80 properties to be sold for approximately \$3.6M. Current projections now show that it is expected that 200 properties will be sold at a sales value of approximately \$9.9M for the 2004-05 year.

Due to the significant increase in sales, the sale of land account average balance during the 2004-05 year estimated in the LTCCP to be \$10.5M has now been revised to an average of \$14.5M for that same time period. Further, interest rates estimated in the LTCCP at 5.75% for the 2004-05 year are now closer to 6% on average for that year.

This gives rise to the following calculation:

### **Sale of Land Account Interest**

Reforecast (\$14.5M at 6% interest)	\$870,000
LTCCP	<u>\$600,000</u>
Net Increase :	\$270,000
Estimated Decrease in Leasehold Rentals due to the additional 120 leasehold property sales	<u>\$70,000</u>
Net Improvement	\$200,000

Council will be reviewing the 2004-05 budgets during their reforecasting discussions in April 2005. Until that exercise is completed and presented to Council, Council cannot be confident that the improvement in operating interest of \$200,000 will be available for funding further initiatives. However, it would be fair to say that it is most probable that the additional interest will be available for re-allocation to fund other projects.

### **General Funding Rates**

The table below sets out the proposed level of general funding rates for 2005/06 as included in the LTCCP, and compares this to the current rates being paid for the 2004-05 year. It should be noted that the proposed level provided for an 11.04% increase in general funding rates.

#### **General Funding Rates**

	UAGC		Land Value			Total	
	\$000 Excl. GST	Per Property (Incl. GST)	\$000 Excl. GST	Per \$100,000 Land Value (Incl. GST)		\$000 Excl. GST	% Increase from 2004/05
				1/9/03 Values	1/9/04 Values		
Current Levels 2004/05	1,716	32.02	909	11.91	N/A	2,625	
LTCCP 2005/06	1,904	35.52	1,020	12.64	8.78	2,924	11.4%
<b>Option (a)</b> Rate Increase to cover 50% and remaining 50% from Reserves	1,904	35.52	1,220	15.11	10.51	3,124	19%
<b>Option (b)</b> Rate Increase to cover 100%	1,904	35.52	1,420	17.60	12.23	3,324	26%

The table also provides general funding options for the sawfly mitigation initiative, based on Option 4 previously outlined in this paper. If general funding rates were to fund 50% of the sawfly mitigation initiative during 2005-06 General Rates would need to increase 19% (i.e. a further 8.4% over the LTCCP planned levels), and if general funding rates were to fund 100% of the sawfly mitigation initiative then the rates would need to increase by 26% in 2005-06 (15.4% more than that planned in the LTCCP).

### **Summary**

Staff propose that general funding rates be retained for 2005/06 at the level previously consulted on for the LTCCP 2004-14. It is noted that this would still mean that general funding rates would increase from \$2,625,000 to \$2,924,000, an increase of 11.4%.

It is further recommended by staff that due to the increased funding available in the cash operating reserves, as compared to the projections in the LTCCP, that for the 2005-06 and 2006/07 year the general funding requirement for the sawfly mitigation initiative be funded from cash operating reserves.

It is important for Council to note that the requirement for general funding under Option 4 outlined above in this paper, requires funding from general funding sources for the 2007/08 and subsequent years as under:

2007-08 + \$332,000

2008-09 + \$73,000

2009-10 + \$61,000

These funding issues will then need to be resolved during the Council deliberations for the LTCCP 2006-16.

Staff recommend that it is best to consult on revised levels of general funding rates during an LTCCP special consultative process.

However, because the additional capital spend of \$6.1M on the sawfly mitigation over a 5 year time frame, does result in a significant increase in the cost of an activity as included in the LTCCP, such expenditure will trigger an amendment to the LTCCP. A summary of proposals and impact of this initiative on the LTCCP financials will need to be set out clearly in the Annual Plan 2005-06. Consequently, the land drainage and river control group of activity financials and Council wide Statement of Performance etc will need to include updated financials for all the years of the LTCCP. The sources of funding to provide the general funding requirement for the years subsequent to 2005/06 for the sawfly mitigation initiatives will have to be included in these forecasts. It is therefore recommended by staff that the financials reflect an increase in general funding rates of \$200,000 effective for the year 2007-08 and for operating reserves to fund the remaining general funding requirement of \$132,000 in the 2007-08 year.

### **DECISION MAKING PROCESS:**

Council is required to make every decision in accordance with Part 6 Sub-Part 1, of the Local Government Act 2002 (the Act).

Staff have assessed the requirements contained within the section of the Act in relation to this item and have included the following.

1. Section 88 of the Act covering the changing mode of delivery for example, where a local Council that has in the past delivered an activity transfers the delivery of that activity to a Council-controlled organisation or to another private organisation or person etc., does not apply.
2. Section 97 of the Act which covers a significant change in the intended level of service provision of a significant activity or where a decision will significantly affect the cost of delivery of an activity as identified in the Long Term Council Community Plan, does apply. Because Section 97 requires that such decisions are only to be taken if provided for in a Long Term Council Community Plan. Consequently, the effect of a decision as recommended in this paper would trigger an amendment to the LTCCP 2004-14.
3. Section 84 of the Act where a special consultative procedure is used in relation to an amendment to a Long Term Council Community Plan applies. The effect of the recommendations in this paper would be to require a statement of proposal to be included in the Annual Plan 2005-06, which would set out the background to the proposal, and the effects which such a proposal will have on the LTCCP 2004-14.
4. The decision does fall within the definition of the Council's Policy on Significance, specifically to a criteria "*the impact or consequences of the decision or proposal on the effected persons (being a large proportion of the local community) will be substantial*" and, furthermore, the criteria "*the financial implications of the decision on the Council's overall resources are substantial*".
5. The persons affected by this decision in this paper will be the ratepayers of the Heretaunga Plains and Rivers Scheme and in the future all ratepayers within the Hawke's Bay region as contributors to general funding rates.
6. Section 80 of the Act covering decisions that are significantly inconsistent with any existing policy or plans does not apply.

## **RECOMMENDATION:**

The Committee recommend that Council:

1. Agree that the decisions to be made are significant under the criteria contained in the Council's adopted Policy on Significance and that such a decision would trigger an amendment to the LTCCP 2004-14 as set out in Section 97(1)(a) of the Act (change to the level of service) and Section 97(1)(d) of the Act (where there is a significant increase in the cost to the local authority in relation to any activity identified in the Long Term Council Community Plan), and that a special consultative process under Section 94 of the Act will need to be carried out prior to a final decision on whether or not Council should proceed with the proposed sawfly mitigation work.
2. Agree to signal to the community through a special consultative process their desire to:
  - a. Proceed with the proposed sawfly mitigation works over a five year programme with a total estimated cost of approximately \$6,100,000.
  - b. Increase the Heretaunga Plains Scheme – Rivers targeted rates by 10% in the 2005/06 year and then in line with inflation estimated to be 3% in each subsequent year.
  - c. Change the level of service provided by the Heretaunga Plains Flood Control Scheme assets from that indicated in the LTCCP 2004/14 through the deferment of some other capital works.

- d. Fund the shortfall in the Heretaunga Plains Scheme –Rivers rating account as a result of the sawfly mitigation works through loan funding, with all loans having a ten year repayment period.
  - e. Fund the general funding requirements from cash operating reserves for 2005/06 and 2006/07; and an increase in general funding rates of \$200,000 in 2007/08. The remaining \$132,000 required in 2007/08 to also be met from operating reserves.
3. Request staff to prepare a statement of proposal for the works necessary for the mitigation of the effects of sawfly on the Heretaunga Plains Scheme river edge protection, for use in a special consultative process in accordance with the requirements of section 84 of the Local Government Act 2002, using the funding model presented in Option 4 above for scheme funding, and for the general funding requirements in accordance with recommendation 2(e) above; for Council's further consideration as part of Council's 2005/06 draft annual plan deliberations on 9 and 10 March 2005.
  4. Continue to lobby Central Government for a contribution to assist in funding the sawfly mitigation initiative.

**Graeme Hansen**  
**BUSINESS UNIT MANAGER**

**Mike Adye**  
**GROUP MANAGER ASSET MANAGEMENT**

**Gary Clode**  
**ENGINEERING MANAGER**

**Andrew Caseley**  
**CHIEF EXECUTIVE**

## **EXTRACT FROM MINUTES**

### **SAWFLY**

Mr Hansen advised that a number of agenda papers have been prepared and presented to Council over the past 4 years relating to the establishment and on-going effect of the willow sawfly (*Nematus oligospilus*) on Willow tree species within areas of the major flood control schemes in Hawke's Bay.

Mr Hansen gave the Committee a presentation showing the effects of willow sawfly on the Heretaunga Plains Scheme – Rivers live willow edge protection which has now reached a threshold where a more deliberate, widespread, on the ground response is required to minimise the risk of a major failure within the managed sections of the flood control scheme.

In reply to a question about what could be achieved if funding was no object , Mr Hansen replied there could be an issue with the supply of the number of trees required because the trees are sourced overseas but structural mechanisms could be put in place first. He advised that if

necessary Works Group could deliver its planned programme in one year, but they would have to gear up for that.

Mr Hansen advised that the proposed programme addresses the high risk problem areas first and it would also be intended to follow that protocol regardless.

Councillors questioned what risk there was to the Council assets if there was a major flood in Hawke's Bay. Mr Adye advised that there is an increased risk of lateral erosion during any flood event. This means that a major single event or series of smaller events could result in sufficient lateral erosion resulting in stopbank failure.

***The meeting adjourned at 10.15am and reconvened at 10.30am***

Councillor Dick questioned whether Council's insurance policy covers this type of situation. Mr Caseley agreed to look into this and report back to Council. Council's disaster relief funds will also be looked at to see if they are applicable for this also.

Mr Caseley advised that Dr Michael Cullen is visiting the Regional Council on Friday, 18 February where this matter will be discussed and the possibility of Central Government assistance will be broached. Hawke's Bay constituency MPs will also be approached.

Councillor Scott requested staff to investigate the use of a targeted rate as one of the funding options for consideration by Council, and the impact to the ratepayer and the community will be included as part of this.

In summary Councillor Rose advised that the Committee agree that any work that can be should be accelerated, especially in the high risk areas and Council will have a further look at how any funding options will impact rate payers and the community. Mr Caseley will report back on the meeting with Dr Cullen. Council will embark on a media effort to the community to provide background on this issue.

**RESOLUTION**

That Council:

1. Agree that the decisions to be made are significant under the criteria contained in the Council's adopted Policy on Significance and that such a decision would trigger an amendment to the LTCCP 2004-14 as set out in Section 97(1)(a) of the Act (change to the level of service) and Section 97(1)(d) of the Act (where there is a significant increase in the cost to the local authority in relation to any activity identified in the Long Term Council Community Plan), and that a special consultative process under Section 94 of the Act will need to be carried out prior to a final decision on whether or not Council should proceed with the proposed sawfly mitigation work.
2. That staff, in view of the significantly increased risk created by the impact of sawfly damage to the edge protection of the Heretaunga Plain Flood Control Scheme, be instructed to:
  - i) Reconsider the programme of works to accelerate the planned remedial works and;
  - ii) Further consider remedial works that will more quickly reduce the level of flooding risk faced by the community for a major flood event on the Heretaunga Plains;
  - iii) Further consider funding options for the required works including the use of special targeted rates;

- iv) Investigate an insurance claim for the damage incurred;
- v) Seek government funding to help limit the cost of the remedial works programme;
- vi) Plan a public information campaign on the issue.

**von Dadelszen / McIntyre**

**CARRIED**