



Memorandum

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Attention: Mel Wykes
 Company: Beca Mel.Wykes@beca.com
 Date: 1 April 2020
 From: Steve Dunn
 Message Ref: Waitangi Stream design change
 Project No: W16117B Omaroro Reservoir

Dear Mel

I understand you are seeking confirmation of the change in design for planting in the Waitangi Stream Tributary that is proposed as mitigation for stream works.

The current design for this section of the site, as set out in the LEMP, has some planting which follows the Waitangi Stream Tributary. In the schedule, it is labelled '*Enrichment planting of current seral vegetation with potential canopy species*'. This is required by consent. This 'enrichment planting' consists of tall growing native canopy trees widely spaced along the stream, that over time grow above the smaller growing trees and give a wider range of species in the general area. The four species used are tawa, kahikatea, pukatea and nikau.

However, the ecological assessment identified that this proposed planting did not anticipate the earthworks necessary for this application and the proposed planting was insufficient to fully revegetate the lower section of stream. It recommended instead, to use dense planting of fast-growing riparian tree species that would rapidly provide a closed canopy over the stream. The purpose of this canopy is to shade out existing weeds, and thereby enhance stream habitat. This planting would extend from the end of the stormwater pipe, upstream for approximately 30m, which is to the point where there is a complete native canopy.

It is now proposed that on each side of the Waitangi Stream:

- **Carex** - a single row of plants at 0.5m centres, be planted immediately beside the stream. This equates to a total of 120 plants. These grasses will overhang the waterway, as requested by WCC.
- **Seral trees with bulking plants** – a double row of plants at 1.0 metre centres. This equates to 120 plants. These small trees and large shrubs will be planted behind the Carex, to form a vegetation mass that will overtop and shade out the weeds; creating a similar environment that is found further up the stream. Close planting densities will ensure a dense canopy cover in a relatively short period. Where there is vegetation already growing in the proposed planting area, plants will be reallocated to adjoining open areas on the west bank of Waitangi Stream.
- **Enrichment trees** – a single row of tall growing canopy species spaced at approximately 5.0 metre centres will be planted amongst the Seral trees. This equates to a total of 12 trees. These slow, tall growing trees will ultimately grow through the smaller trees and shrubs to form a large canopy at upper levels and give a wider range of species for the area in the long term.

At the time of planting, the location of new plants may be adjusted to work around vegetation that is already present, or unsuitable ground conditions in the planting zone.

Plant species proposed include:

Native Revegetation - Waitangi Stream above Stormwater Extension				
Key seral trees (mahoe, wineberry, five finger, tree fuchsia)				
Key bulking plants (karamu, kanono)				
Year 1 Establish (double row each side of waterway behind Carex)				
<i>Aristotelia serrata</i>	Wineberry	1.5 L	1m	10%
<i>Carpodetus serratus</i>	Putaputaweta	1.5 L	1m	10%
<i>Coprosma grandifolia</i>	Kanono	1.5 L	1m	10%
<i>Coprosma robusta</i>	Karamu	1.0 L	1m	20%
<i>Fuchsia excorticata</i>	Kotukutuku	1.5 L	1m	10%
<i>Melicytus ramiflorus</i>	Mahoe	1.5 L	1m	20%
<i>Pittosporum eugenioides</i>	Lemonwood	1.5 L	1m	10%
<i>Pseudopanax arboreus</i>	Five Finger	1.5 L	1m	10%
Year 3 or 4 Enrichment (1 row each side of waterway amongst seral plants)				
<i>Beilschmiedia tawa</i>	Tawa	5.0 L	5m	35%
<i>Dacrycarpus dacrydioides</i>	Kahikatea	5.0 L	5m	15%
<i>Laurelia novae-zelandiae</i>	Pukatea	5.0 L	5m	15%
<i>Rhopalostylis sapida</i>	Nikau	5.0 L	5m	35%
Year 1 Stream Side (1 row each side of waterway)				
<i>Carex secta</i>	Purei	tbc	0.5 m	50%
<i>Carex virgata</i>	Swamp sedge	tbc	0.5 m	50%

The plans and schedule will be updated when this design change has been agreed.



Steve Dunn

Registered NZILA Landscape Architect