Stream Remediation Project

What's the Problem with Sediment?

- The soils of the Port Hills are prone to severe erosion, especially when they are exposed to disturbance.
- The soils are composed of very fine particles called loess.
- Loess has a high percentage of sodium - the chemical composition of loess means it stays suspended in water and doesn't settle out.

Where the Sediment Goes

- Christchurch Adventure Park is in the Cashmere Valley which is a tributary of Cashmere Stream.
- The Cashmere Stream catchment comprises 2,800 ha with nearly 50km of drains and tributaries.
- Cashmere Stream is a major contributor of sediment into the Ōpāwaho/Heathcote River - in rain events sediment enters Cashmere Stream and moves down into the Ōpāwaho/Heathcote River and on into Ihutai/Avon-Heathcote Estuary.
- Suspended sediment is the biggest water quality issue for Cashmere Stream.
- Erosion in the Cashmere Stream hill catchments has increased in recent years because of:
  - Increased frequency and intensity of rain causing slips, slumps and stream-bank collapse
  - Change in vegetation cover or vegetation removal, including forestry harvest.
  - Track and road construction
  - Subdivisions and housing development
- Erosion has been exacerbated by the 2010-11 earthquakes and the 2017 fires.

What Sediment does in the Streams and River

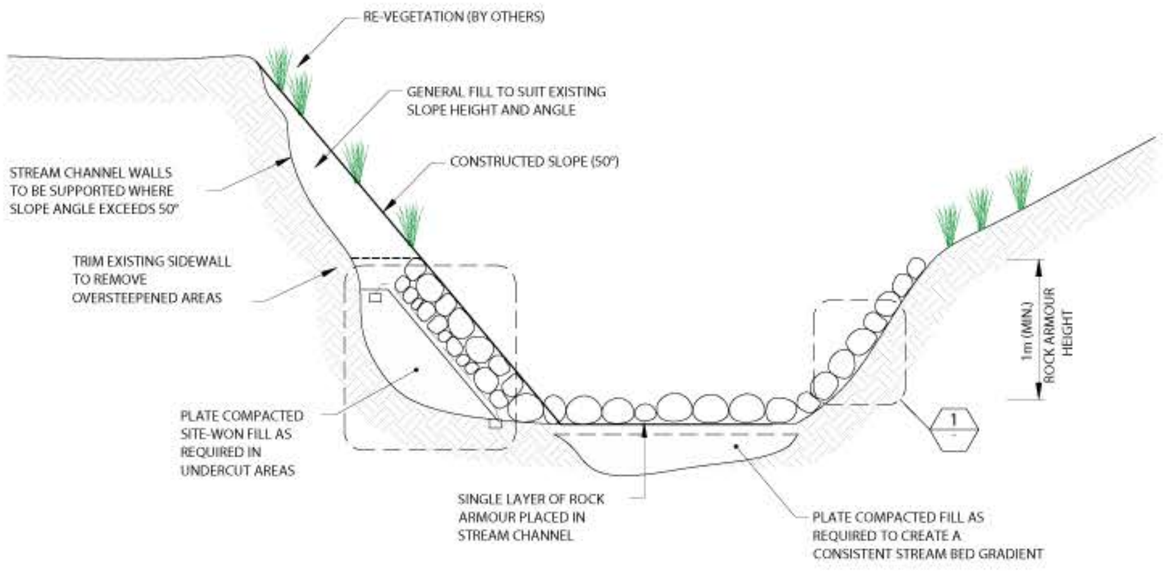
- Sediment in a stream is natural, but too much can cause problems.
- Excess sediment affects the ecological health of the rivers.
  - Suspended sediment can alter the water chemistry, cause temperature decreases and turbidity increases.
  - Sediment blocks light - and photosynthesis in aquatic plants is reduced It can harm fish gills and filter-feeding invertebrates.
  - Deposition of sediment may change the character of the river bed and smother habitat.
  - It destroys the habitat where the smallest stream organisms live and causes declines in fish populations.

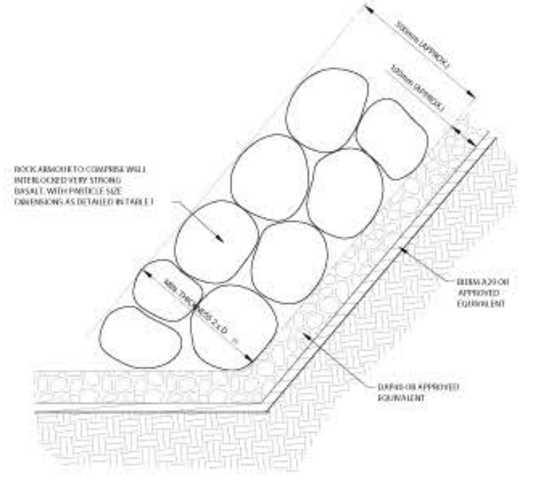
Christchurch City Council · ENGEO · Ōpāwaho Heathcote River Network · Lucas Associates · HGM CONSTRUCTION · CHRISTCHURCH ADVENTURE PARK

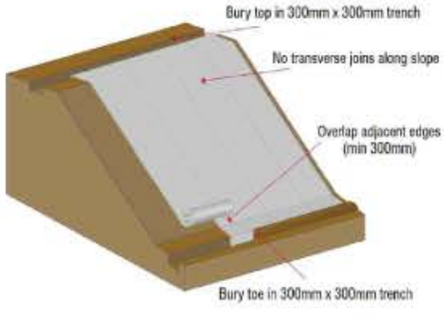
Stream Remediation Project

Stopping Erosion

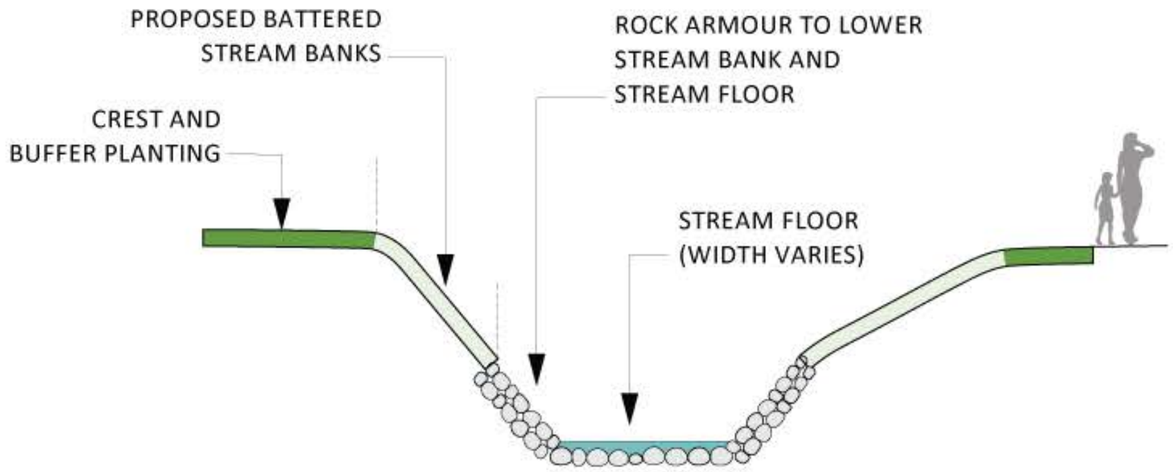
- There is no single measure that will significantly reduce sediment input
- The best long-term way to reduce sediment is to stop erosion happening.
  - Growing native trees is a long-term solution – especially in the hill tributaries.
  - Focus on revegetation of the steeper and most erodible slopes in the catchment.
  - The lower reaches of hill tributaries are transformed into shallow, wide wetlands.
  - All tributaries are fenced and planted.
- In the shorter term rehabilitation of erosion sites makes a difference.
- In CAP, stream-bank erosion is a significant sediment source.
  - In rain events the fine-textured sediment in the stream bank is likely to be eroded and transported directly into stream channels.
  - Armouring the stream banks and planting the riparian edge will reduce this risk of bank erosion.







Proposed Stream Contouring - Cross Section



Proposed Species & Planting Zones

FEATURE PLANTING

Pseudopanax arboreus
Whauwhaupaku / Five Finger

Pseudopanax crassifolius
Horoeka / Lancewood

Cordyline australis
Tikouka / Cabbage Tree

Phormium tenax
Harakeke / Flax

BUFFER PLANTING

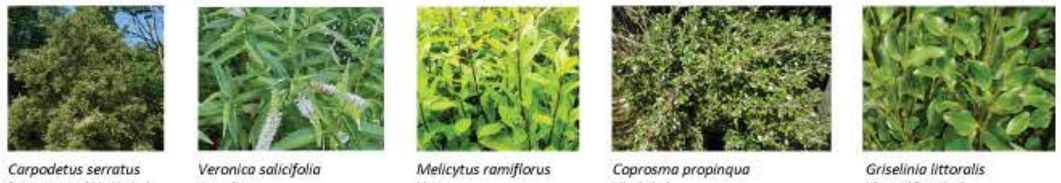
Coprosma rhamnoides
Twiggy Coprosma

Veronica salicifolia
Koromiko

Austroderia richardii
South Island Toetoe

Carex virgata
Pukio

CREST PLANTING



Carpodetus serratus
Putaputaweta / Marble leaf

Veronica salicifolia
Koromiko

Melicytus ramiflorus
Mahoe

Coprosma propinqua
Mingimingi

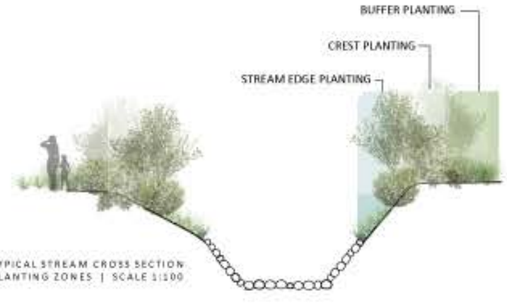
Griselinia littoralis
Käpuka / Broadleaf

STREAM EDGE PLANTING

Carex secta
Purei

Dianella nigra
Turutu

Parablechnum minus
Swamp Kiokio



TYPICAL STREAM CROSS SECTION
PLANTING ZONES | SCALE 1:100

Christchurch City Council · ENGEO · Ōpāwaho Heathcote River Network · Lucas Associates · HGM CONSTRUCTION · CHRISTCHURCH ADVENTURE PARK