Water NZ Conference 2019

Dredging to Restore Resilience

Stantec

Agenda

1. Background & History
2. The Challenge
3. The Process
4. Collaboration
5. Summary

Safety Moment

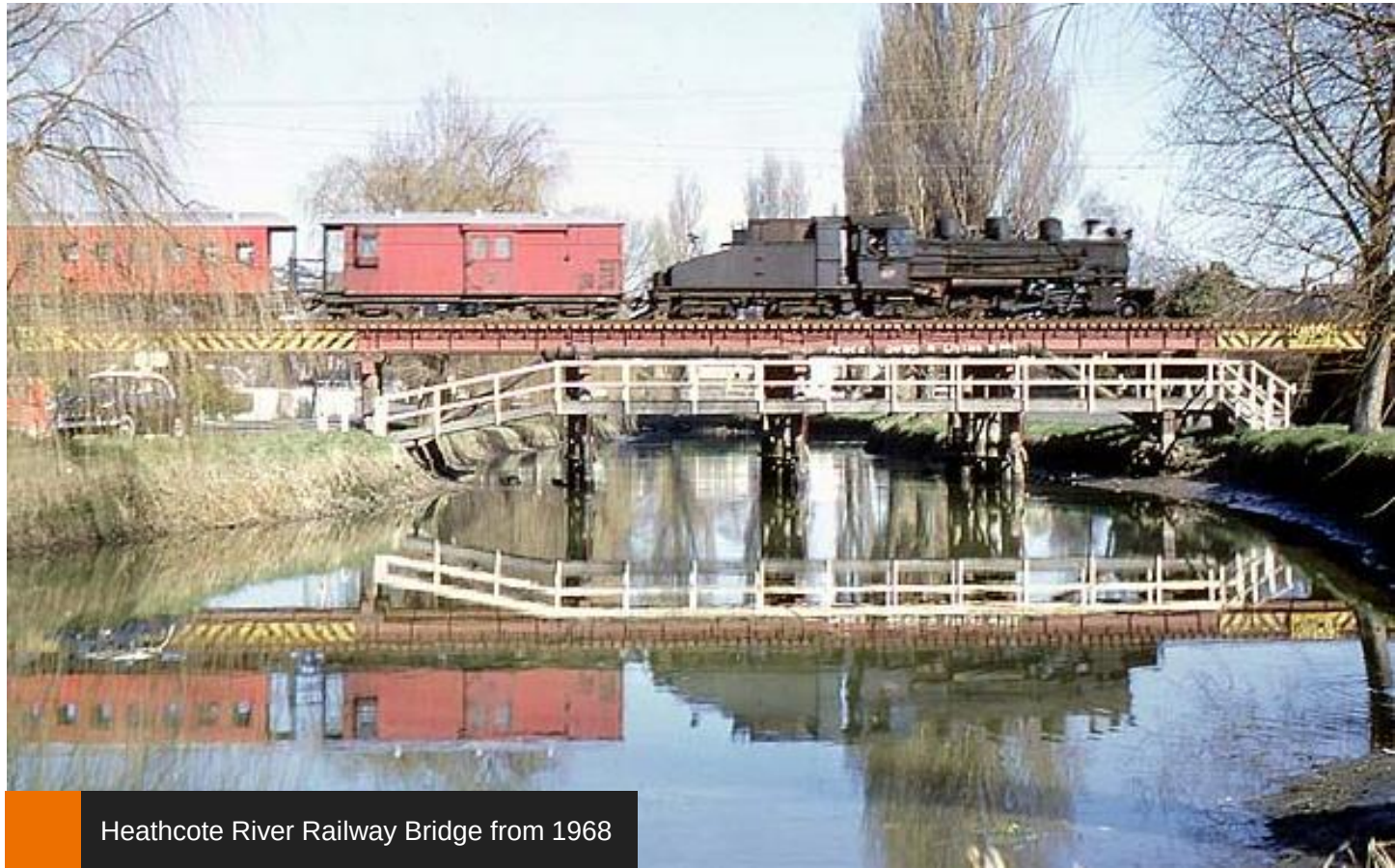
Water Safety was of high importance on this project.

1. Background & History

Background
& History

Dredging

- Regular flooding
- Dredging 1920’s to 1989
- Dredging stopped due to:
  - funding
  - bank stability
  - environment and ecology



Heathcote River Railway Bridge from 1968

Background
& History

EQs & Sediment

The 2011 Earthquakes caused:

- Bank Collapse
- Lateral Spread
- Bed Heave
- Sediment

Resulting in:

- Less Flow
- Less Habitat
- More Sedimentation
- More Flooding

Heathcote River: Stantec, 2018

2. The Challenge

The Challenge

How to:

- Reduce FWL by 0.3 m
- Under a tight timeframe
- Reduce flooding of “at risk” houses
  - 10 out of 14 (10yr ARI)
  - 46 out of 118 (50yr ARI)

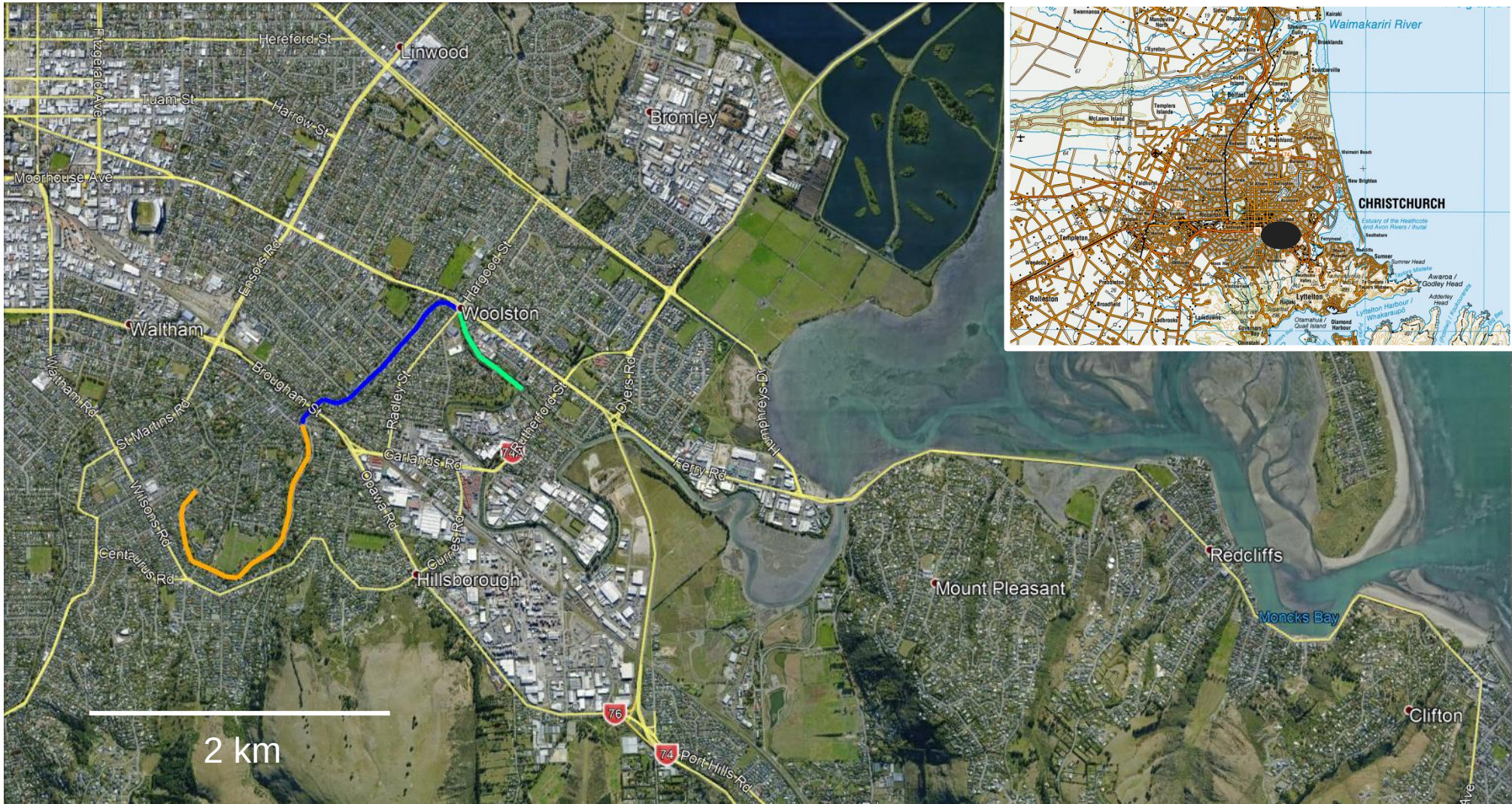
While:

- Keeping the banks stable
- Improving ecology
- Avoiding inānga spawning season

The Challenge

Project Extent

- Stage 1
- Stage 2
- Stage 3

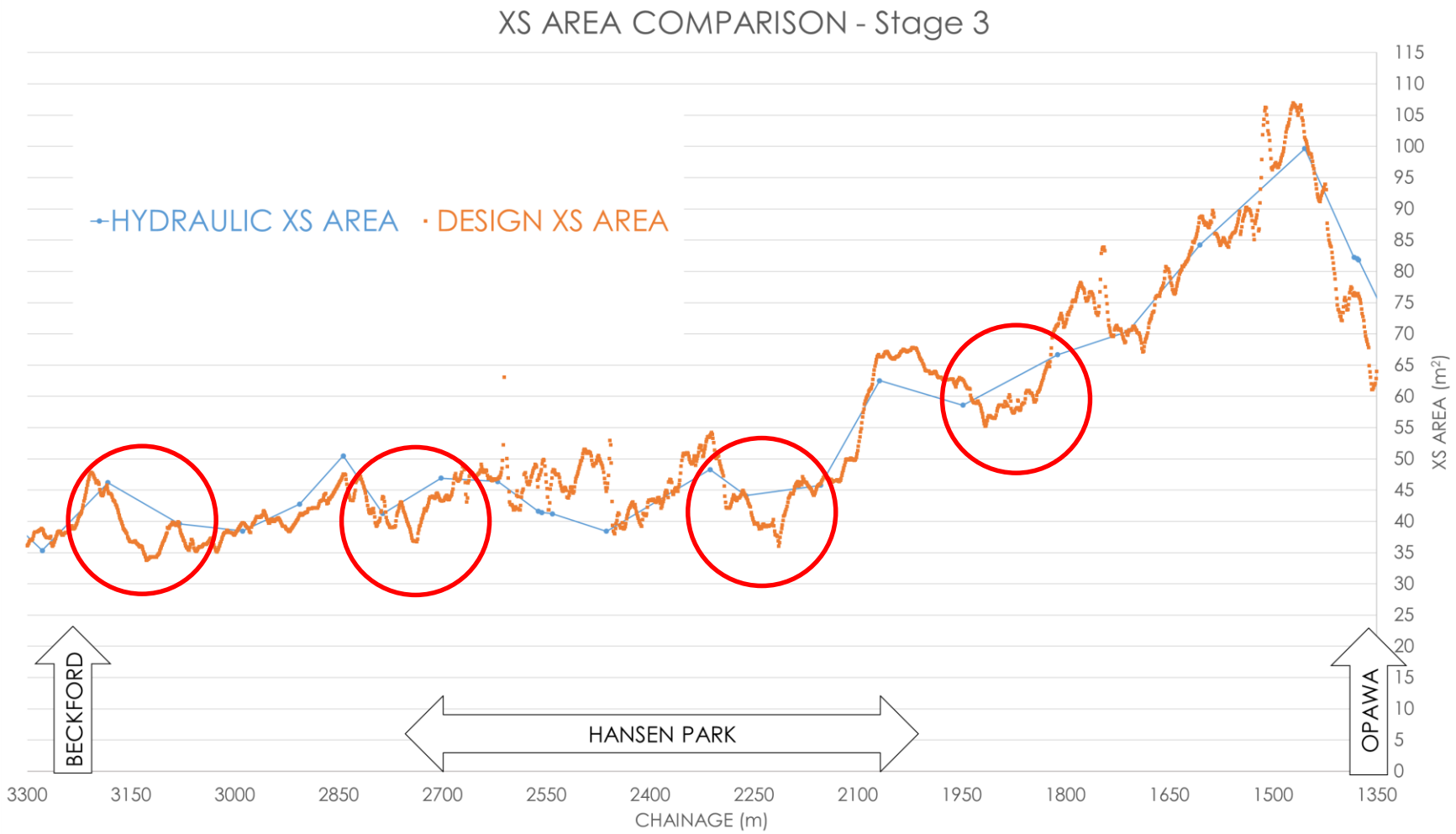


2. The Process

The Process

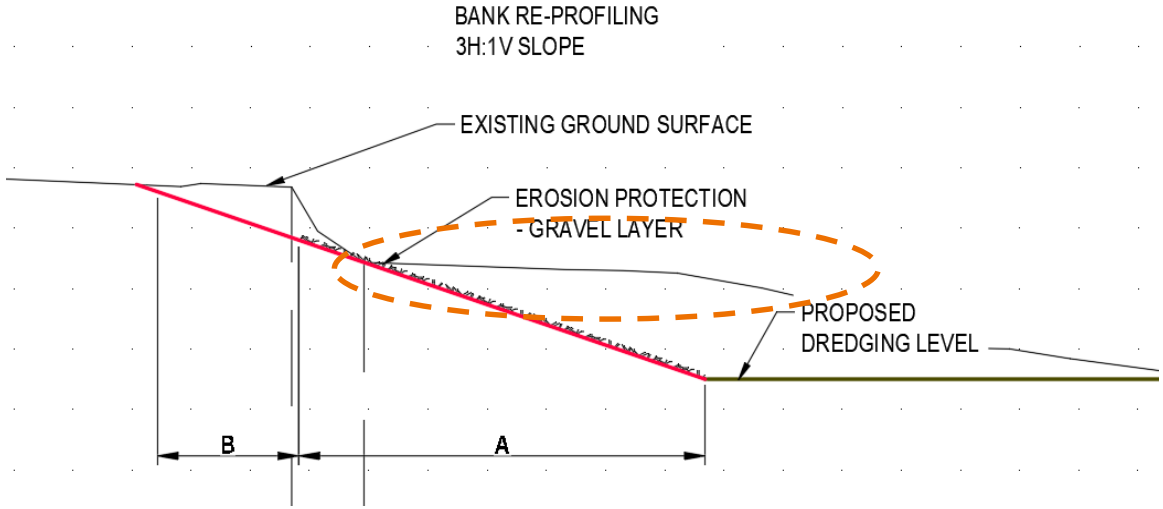
Stage 3

- Backwater calc
- X-section analysis
- Targeted Areas



The Process

Dredging Profiles



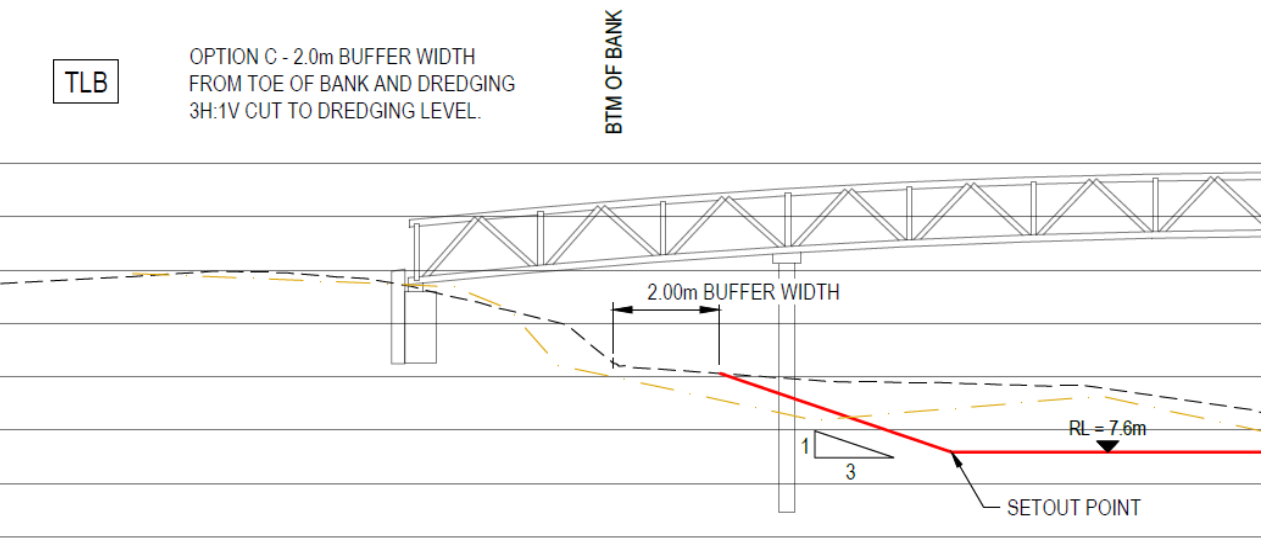
1. Dredging & Bank-cut

Before: Stantec, 2018

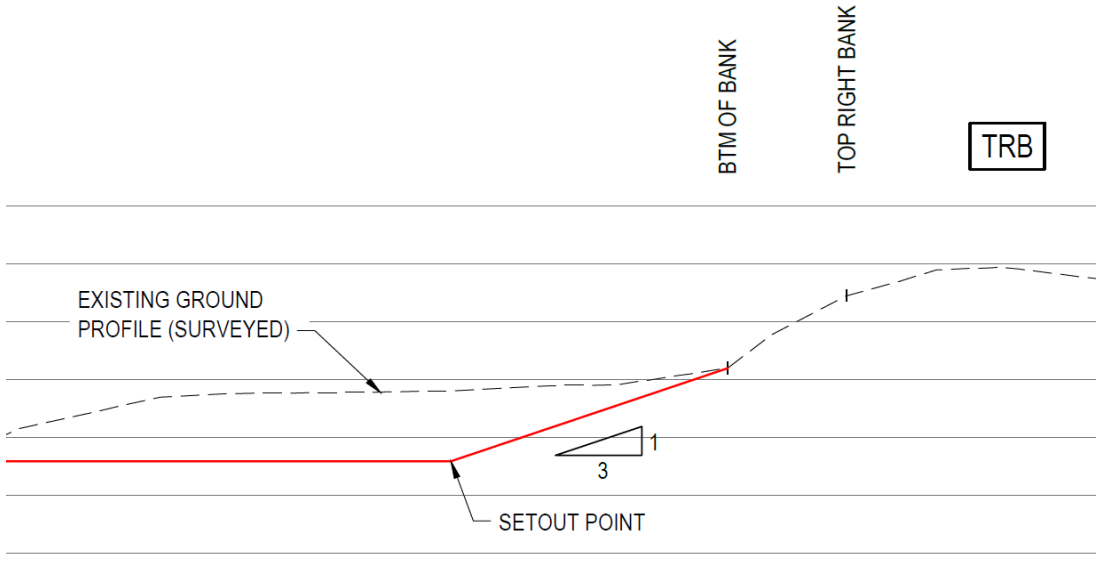
After: Christchurch City Council, 2019

The Process

Dredging Profiles



2. Dredging Only + ‘Buffer Zone’



3. Dredging Only

Seismic Stability

Check movement
(pre and post-dredging)

No liquefaction

- Pre-dredge - tens of mm
- Post-dredging similar

Significant Liquefaction

- Pre-dredging - hundreds of mm
- Post-dredging plus 20%
- Similar levels of damage

Bank instability: EOS Ecology, 2011

Bank Instability: Waterways Centre of F/W Management, 2016

Ecology

Significant planting post construction

- River’s edge
- Top of bank
- Trees/canopy

Before: Stantec, 2018

After: Stantec, 2018

4. Collaboration

Collaboration

Client & the Consultants

- Worked with CCC to assess options and processes
- Worked with DHI to streamlined the design
- Worked with Landscape Architects to achieve a consistent finished
- Worked with Arborists to preserve values species

Halswell Quarry Planting:
Christchurch City Council, 2017

5. Summary

Summary

Construction

Summary

Construction

Dredging: CCC, 2018

Dredging: CCC, 2018

Summary

Construction

Dredging: CCC, 2018

Dredging: CCC, 2018

Summary

What did we achieve?

- Reduced flood water levels
- More efficient design process
- Optimised hydraulics
- Minimised bank instability
- Enhanced landscape and habitat
- Happy Client !!

Water NZ Conference 2019

Dredging to Restore Resilience

Stantec