

Lessons learned from one of New Zealand's most challenging civil engineering projects: rebuilding the earthquake damaged pipes, roads, bridges and retaining walls in the city of Christchurch 2011 - 2016.

Environmental Initiative: CO2 diffuser to neutralise high pH

Story: Bridge of Remembrance and Triumphal Arch

Theme: Construction

A document describing the planned approach for neutralising the high pH of any potential bentonite or grout discharge into the Avon river.

This document has been provided as an example of a tool that might be useful for other organisations undertaking complex disaster recovery or infrastructure rebuild programmes.

For more information about this document, visit www.scirtlearninglegacy.org.nz



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DATE: 19/09/2014

ENVIRONMENTAL INITIATIVE



CO₂ Diffuser to Neutralise High pH



Testing of the CO₂ diffuser

What is the initiative?

A CO₂ diffuser, consisting of a perforated hose and a canister of CO₂, was put in place at the Bridge of Remembrance site as a control to address the risk of bentonite or grout fracking (i.e. finding its way into the river through cracks in the river bed) into the river during piling works. The run-off of bentonite and grout is highly alkaline and would increase the river's pH to harmful levels if discharged to water.

How was it identified?

The risk of bentonite or grout fracking into the river during piling and grouting works was identified. Due to the unpredictability of such an event, it was difficult to ensure that a discharge from fracking could be contained. The crew was therefore looking for a solution to treat any concrete discharge appearing in the river. The CO₂ diffuser was identified as a practical solution because it is mobile and quick to deploy to any location in the river, as well as being easy to use. All crew members have been briefed and are able to use the system if needed. CO₂ turns into carbonic acid when in contact with water and in turn neutralizes the high pH that any concrete run-off would cause.

Benefits and future plans

Benefits of this initiative:

- Any run-off getting through the primary controls can be neutralised therefore eliminating harm on the river. The system targets the impacts so goes beyond traditional containment controls.
- The CO₂ diffuser is easy to use, completely mobile, and can be applied anywhere on the river, providing rapid response where standard controls would not work.
- The initiative is easy to replicate for all projects near waterways.
- It provides further reassurance that our environmental impacts are controlled and minimised as far as practically possible for an initial cost of \$248, including \$12.5 for monthly gas bottle hire.

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Discuss at next available pre-start meeting / post on notice boards (valid for 3 months)