

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.

Heritage guide for Delivery Teams

Story: Heritage Bridges

Theme: Construction

A guideline created for SCIRT Delivery Teams which outlines the requirements for working around heritage items.

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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Heritage Guide for Delivery Teams

SCIRT is repairing infrastructure all over Christchurch City, and some of this infrastructure has heritage importance. SCIRT teams may work to repair listed heritage items, or may be working on non-listed heritage infrastructure or infrastructure with no heritage significance that requires vehicles, plant or lay down areas in proximity to heritage items.

The purpose of this guideline is to assist Delivery Teams to understand the requirements for working around heritage items, and where to get assistance if needed.

Why is it important

The heritage items are Council Assets, just like a road, a pipe or a tree. They have value to the whole community and therefore should be protected.

It is a client expectation that SCIRT work is performed in a manner that preserves and protects heritage fabric. Where there is modification to a heritage item, this should be discussed with the Heritage Asset Owner's Representative, ideally during the design stage.

Different types of heritage items

There are two types of heritage items; those that are listed in the City Plan and/or registered by the New Zealand Historic Places Trust (NZHPT) and those that are not. It is easy for SCIRT staff to identify heritage objects that are listed in the City Plan or registered by the New Zealand Historic Places Trust during the design process, and discuss the repair or protection strategy with CCC Heritage Team. It can however be difficult to identify unlisted heritage items before construction starts.

The most common listed heritage items that SCIRT teams will encounter are heritage bridges. These are mostly located within the Central City.

Unlisted heritage items commonly encountered are plaques, hand cut kerb stones, early lamp standards, tram tracks, surveyors marks, building tiles and air vents. This is not a comprehensive list so if unsure, please ask the CCC Heritage Team.

Legal Framework

CCC holds a resource consent to repair listed heritage infrastructure, and to work in proximity to listed heritage items when repairing infrastructure (RMA92022494). Any pre-1900 items, and areas within the high Archaeological risk areas, are also subject to the SCIRT Archaeological Authorities.

Repairing Heritage Infrastructure

Note that the following sections relate to SCIRT repairs to listed heritage items (mostly bridges). The below sections are not relevant to Lyttelton retaining walls, archaeological finds, or unlisted heritage items.

What happens in design?

SCIRT and CCC have agreed on a process to manage heritage items. This is referred to as process SCT-007 and is attached for information. To summarise, the process requires that SCIRT designers consult with CCC staff on the proposed repair strategy for a listed heritage item. CCC Heritage Team staff also consult with the New Zealand Historic Places Trust during this process. By the time the project goes through the detailed design gate, the CCC Heritage Asset Owner should have signed off on the repair strategy. Unfortunately this process was only finalised in early 2013, so there is some catch up work to be done on the projects that had already been designed.

Questions on this process can be answered by the SCIRT Lead Designer or the Environmental and Planning Coordinator.

What happens in ECI?

The Delivery Team ECI contact needs to ensure:

- A Temporary Protection Plan (TPP) is written once the construction methodology is known.
- The TPP is signed off by CCC Heritage Asset Owner Representative and Heritage Team before work starts.
- Costs associated with heritage monitoring and advice are factored into the TOC if the SCIRT Heritage Consultant is required during construction (case by case basis).

What needs to happen on site?

Delivery Teams need to ensure:

- A TPP is in place before work starts.
- That any conditions of a Resource Consent for the work is clearly understood by all working on the site.
- Any temporary protection is installed and maintained, and any other requirements in the TPP are carried out (storage, repair, recording methodologies).
- A photographer is contracted to record the heritage structure before during and after work (if required).
- CCC Heritage Team are notified of the start work date and invited to a pre-start site meeting.
- A schedule of heritage monitoring visits is agreed with the CCC Heritage Team. This may be a frequency or the identification of hold points.
- The Site Engineer has the phone number of the CCC Heritage Team and communicates anything unusual or unexpected to them.
- An annotated photographic record of the work is provided to CCC Heritage Team after work is completed. William Fulton can do this work.

Working near heritage

You may not be repairing a heritage bridge, but what if your work site is near a heritage item? The first step is to consider whether or not a Temporary Protection Plan is required. If unsure, the Delivery Team Environmental Advisor or the CCC Heritage Team will be able to assist.

William Fulton is a consultant Heritage Architect who can draft a Temporary Protection Plan. Most commonly, this involves eliminating, isolating or minimising potential damage to Council heritage assets.

What if heritage is damaged?

If damage occurs to a Council heritage asset:

1. Stop working in proximity to the heritage asset.
2. Take any immediate steps to prevent further damage.
3. Call the CCC Heritage Team and your Environmental Advisor for advice.

The Delivery Team may be required to remediate any damage, depending on the situation and the advice of the CCC Heritage Team. It is important that you do not attempt to repair before receiving advice as this could result in further irreversible damage.

Key contacts

Note that the Christchurch City Council Heritage Team, Asset Owner Representative and the SCIRT Environmental and Planning Coordinator are free resources to Delivery Teams and subcontractors. William Fulton's time will be charged to the Delivery Team during the construction phase, and to the IST during the design phase.

Person	Contact Details	Role
CCC Heritage Asset Owner Representative		Sign off of TPP prior to construction Reviews and comments on the design
CCC Heritage Team Advisor		Provides expert heritage advice on design and construction Monitor the construction impacts on heritage fabric.
SCIRT Heritage Consultant		Write TPP on behalf of SCIRT Provide heritage advice to designers and to Delivery Teams
SCIRT Environmental and Planning Coordinator		Co-ordinate process Escalation in case of disagreement

Resources Attached

- A. Current List of Heritage Projects
- B. Heritage Toolbox for Site Crews
- C. Example Temporary Protection Plan
- D. Heritage Consent Responsibility Table
- E. SCT-007 Heritage Process Map

List of SCIRT Heritage Repair Projects

Structure & Location	SCIRT Project Number	Delivery Team	Year of Construction	Stage of Work
Antigua Street Footbridge	10464 Orange Team	Downer	1901 (previous bridge erected in 1868)	Construction to start in July 2013
Armagh Street Bridge – Hagley Park	10966 Blue Team	MacDow	1885	Detailed Design due Aug 2013
Armagh Street Bridge - City	10468 Orange Team	Downer	1883	Construction to start in June 2013 Possible re-design
Colombo Street Bridge	10467 Orange Team	Downer	1902	Under construction
Gloucester Street Bridge	11026 Orange Team	Fletcher	1886	Concept Design due Aug 2013
Victoria Street (Hamish Hay) Bridge	11026 Orange Team	Fletcher	1863	Concept Design due Aug 2013
Worcester Street Bridge	11026 Orange Team	Fletcher	1885	Construction to start in Aug 2013
Helmores Lane Wooden bridge	10970 Blue Team	MacDow	1866	Detailed Design was originally due Aug 2013. Timeframe revised to July 2014. Detailed design will probably not commence until 2014. This timeframe is subject to further change.
Bridge of Remembrance	10465, 10482 Orange Team	Downer	1924	Under construction
Hereford Street Bridge	10890 Orange Team	Fletcher	?	Detailed Design due November 2013

WORKING IN A HERITAGE ENVIRONMENT

First check to see if the building/place or object are listed registered as heritage items.

Some heritage is not registered or listed but is of archaeological or cultural value - tell-tale signs to look for:

- The general age of the built environment in the area;
- The age of the trees and general landscape of the area;
- Historic plaques in the ground or on items;
- War memorials, statues, monuments, cemeteries, etc.
- Watch for hand cut kerb stones, early lamp standards, tram tracks, surveyors marks, building tiles and air vents.



What effect will your work have on the historic environment?

Issues can range from the large such as the effects of vibration on built heritage to the seemingly small such as view shafts or fixing things (or not) to heritage items even if it is temporary.

Remember: It is an offence to do work that may affect an archaeological site without a written authority from the NZHPT.

- If you discover something unexpected – stop work and follow the accidental discovery protocol



If in doubt please ask

In the first instance contact the heritage team at Christchurch City Council:



Example Temporary Protection Plan

ACTIVITY	POTENTIAL RISK	MITIGATING MEASURES
<p>Deconstruction, documentation, recording and storage</p>	<p>Loss or damage to heritage fabric.</p> <p>Evidence of removed material's location in the building is forgotten or lost.</p>	<ul style="list-style-type: none"> · A photographic survey is to be maintained by the Conservation Architect, prior to work commencing and during dismantling, retrieval and storage. · Monitoring and subsequent photographic record of all works and discoveries shall be maintained by those above who shall be notified as soon as any discoveries become apparent. On instruction record and photograph and report at scheduled site meetings. · Record these significant elements using sketches, measured survey drawings and/or photographs. The record is to be maintained by the Conservation Architect. · The Conservation Architect should be on site throughout critical operations. The Conservation Architect is to sequentially photograph and record the dismantling work as it proceeds. · A record log of materials is to be maintained by the contractor during removal work. The log is to record the location of the material against a reference grid, and is to also reference the stored location of the material. The log is to be maintained in an electronic spreadsheet format agreed with the CCC.

		<ul style="list-style-type: none"> · The Conservation Architect and the CCC are to maintain a tracking log recording the movements of materials. Materials are to be stored on site in a secured yard by the Contractor and where required in a secured shipping container. Valuable and fragile fabric may be stored in the CCC storage facility. · If possible dismantle elements in sections that are as large as possible retaining the existing original fabric in an intact as possible manner. · Enable material to be removed and stored in the same sequence as it was dismantled to be able to salvage material. · Take material to a suitable storage area, where fabric can be identified. · Allow for sufficient space in the storage area allow sufficient space for suitable vehicular access.
Communication	<p>Heritage fabric either known or discovered may be</p> <p>at risk if intentions and subsequent actions are not discussed and decided upon by the contractor, client and heritage consultants.</p> <p>Instructions issued on site must come from one source.</p>	<ul style="list-style-type: none"> · Initiate a 'Heritage Site' briefing to all contractors and staff, consultants and work related visitors. · Hold a pre-construction site meeting prior to work commencing on each area of the arch and bridge, and then regular construction meetings (at agreed intervals) on site where heritage related issues are discussed and recorded. · Establish communication procedures for issues arising between site meetings. · Any work as a result of fresh discoveries should be done following the instructions of the Conservation Architect, Structural Engineer and Conservation specialists. All work is to be approved by the CCC Heritage Planners.

<p>Security</p>	<p>Out of hours construction sites are potential targets</p> <p>to damage and subsequent loss of heritage fabric.</p>	<ul style="list-style-type: none"> · The main contractor is to prepare a Site Management Plan including site access, positioning of site buildings, security and sediment control. This is to be submitted to the CCC. · Ensure the whole site is secure during the deconstruction and stabilisation contract period. · The security and safety of scaffolding, hoists, plant and equipment and the security fenced contractor's work and storage area is the contractor's responsibility. · Report on security at site meetings and take appropriate action as situations require. · Install security around all stored material to prevent theft. · If there is the potential for theft, remove especially significant elements to a more secure area. · Final security of the site each day is the contractor's responsibility. The Contractor will secure the bridge at the end of each working day. · The security and safety of scaffolding, hoists, plant and equipment and the security fenced contractor's work and storage area is the contractor's responsibility. · The Site Management Plan is to be approved by CCC. · Maintain existing cordons around the bridge. · Report on security at site meetings and take appropriate action as situations require.
<p>Weather protection</p>	<p>Damage to heritage fabric is possible when</p> <p>elements are exposed to the weather during the repairs. In this instance as the main structure is to be removed and refurbished off site, weather protection is a minor consideration.</p>	<ul style="list-style-type: none"> · Weather protection of any open sections of the fabric may be required depending on the time the effected fabric is left exposed. Weather protection is to be discussed with the Conservation Architect.

<p>Cranage, Sheet Piling Rig and heavy vehicles</p>	<p>The use of cranes or hoists will be required to remove the bridge arch structure and as part of the construction for piles/foundations to the abutments.</p> <p>Vehicle access and cranes need to be located within the Avon River environs that includes planting and mature trees.</p> <p>Sheet piling may have an impact on the neighbouring Antigua Boatshed (Heritage listed item)</p>	<ul style="list-style-type: none"> · Cranes are to be located in discussion with conservation staff. · Take care to maneuver the crane, hoist and vehicles around fences, hard landscaping, trees and planting. · Keep clear of tree trunks and provide protection around the trees where they are close. · Provide barriers around the drip-line circumference of the trees to keep vehicle movement away from tree roots. · Locate crane supporting legs and blocking clear of heritage fabric. · Monitor any impact ground vibration has on the adjacent Antigua Boatsheds.
<p>Construction of new abutments.</p>	<p>Removal of existing concrete abutments may have impact on neighbouring Heritage listed Antigua Boatsheds.</p> <p>Excavation of existing abutments may uncover previous bridge structure.</p>	<ul style="list-style-type: none"> · Assess the impact on the Antigua Boatshed complex when removing and reconstructing the new north abutment. · Involve NZHPT as the Archeaological Authority in any excavation work and discovery protocols.

Dust and debris	<p>The contractors site and construction area is located adjacent to the Avon, public roads, footpaths and public spaces..</p>	<ul style="list-style-type: none"> · Contractor to manage dust to avoid nuisance and discharge beyond the work site. · Debris is to be kept out of stormwater kerb channels. If required, provide a sediment filter trap to prevent sediment entering the stormwater reticulation system`. Check street crossing and kerb channel regularly for accumulated sediment and clean and remove as necessary. · Remove only debris from site. This is to remove the risk of heritage fabric being removed from site that may otherwise be required for restoration or interpretation purposes.
Removal, repair and reinstatement of original metal arches	<p>Damage to original fabric during the lifting and moving operation.</p> <p>Damage to original fabric during the cleaning and refurbishment work.</p> <p>Damage to the refurbished arches in the relocation process</p>	<ul style="list-style-type: none"> · Design and Monitor the lifting points as the bridge arches appear to be under tension. Support the arch as per Construction Methodology. · Provide contractor methodology for the appropriate paint removal system and new paint specification. · Provide necessary protection to Antigua Boatshed during the lift out and reinstatement of the refurbished arch structure

Heritage Consent Responsibility Table

RESOURCE CONSENT RMA92022494

Granted to:	Christchurch City Council, Civic Office
Heritage Consent	Global Heritage Consent
Date effective from:	11 July 2013
Date effective until:	11 July 2023

Responsibility:
Delivery Team
IST
Heritage Consultant

<u>Condition</u>		<u>Responsibility</u>	<u>Frequency</u>
1)	The works shall be undertaken in accordance with 'Process Plan SCT-007: SCIRT/CCC Management of Heritage Objects' (version 1.2 or later) as submitted with the application.	IST Environmental & Planning Coordinator to coordinate. Designers to action.	Ongoing during design
2)	That a photographic record of the affected areas as per the matters outlined in Vol. 3, Section 10, matter 1.3.5, Photographic records (Group 1-4 heritage items) be undertaken prior to commencement of any work and following the completion of the alterations to the listed structure and that this be lodged with the Council's Heritage Team Leader for their records within 3 months of completion of construction. High resolution digital images are acceptable. These should be provided on a disc with an accompanying annotated hard copy of the images as per the heritage team's protocols for recording heritage – further information can be supplied by the heritage team with regard to the annotated hard copy;	Delivery Team Site Engineer to organise photographer. SCIRT Heritage Consultant to create annotated photographic record and submit to CCC.	Ongoing during construction

3)	A Temporary Protection Plan (“TPP”) in accordance with the Councils guidelines (pamphlet no 14) and works methodology is to be developed in agreement with the CCC’s Heritage Asset Owner before any work commences on any heritage item covered by this consent;	Delivery Team Site Engineer to provide construction methodology to SCIRT Heritage Consultant. SCIRT Heritage Consultant to prepare the TPP and submit to CCC.	Once, prior to the start of construction
4)	A monitoring programme is to be developed in agreement with the CCC Heritage Team Leader and NZHPT before any work commences on any heritage item covered by this consent;	SCIRT Heritage Consultant to initiate during discussions with CCC on the TPP. Monitoring frequency or hold points to be discussed between Delivery Team Site Engineer, SCIRT Heritage Consultant and CCC.	Once, prior to the start of construction
5)	That all physical works affected heritage fabric be undertaken in accordance with the agreed TPP for the site. In addition, no listed heritage items shall be relocated or removed from their site without the agreement of the CCC Heritage Asset Owner;	Delivery Team Site Engineer	Ongoing during construction
6)	The removal of any original fabric from heritage items must be undertaken in accordance with an agreed TPP;	Delivery Team Site Engineer	As required
7)	That samples of any elements of original fabric removed and not to be reinstated are identified at the discretion of the CCC Heritage Team Leader and CCC Heritage Asset Owner. These samples are to be recorded and stored and retained for later interpretative purposes e.g. profiled or decorative stone, metal or timber elements. The storage and location of such material is to be determined in consultation with the Council’s Heritage Team Leader (or nominee) and the site project manager;	Delivery Team Site Engineer with advice from SCIRT Heritage Consultant if required	As required
8)	That any original material required to be replaced should be done so in a like-for-like manner, where practicable. For example, where any new stone work is required, this is to be matched as close as practicable with the original stone type, colour, density and, where possible, quarry source.	Delivery Team Site Engineer	As required

9)	All new material for example new stone or iron work on bridges shall be recorded and date stamped.	Delivery Team Site Engineer	As required
10)	That all works under this consent will be done in accordance with the SCIRT Archaeological Management Plan.	Delivery Team Site Engineer	As required
11)	That all physical works on the heritage structure are to be undertaken by a suitably qualified professional with heritage experience within that field. All work shall be overseen and monitored by a suitably qualified engineer, a heritage architect and craftsman with suitable heritage experience appointed by the Consent Holder in agreement with the CCC Heritage Asset Owner.	Delivery Team to select subcontractor(s). SCIRT Heritage Consultant to liaise with CCC.	Ongoing during construction
12)	Any works affecting other heritage structures not listed in the original consent application documentation will be agreed in consultation with the CCC Heritage Asset Owner, the CCC Heritage Team Leader and the consent holder's conservation architect prior to the commencement of work on that structure;	IST Environmental & Planning Coordinator	As required
13)	The consent holder shall notify the Council's heritage Team Leader at least 5 days prior to works commencing that are likely to affect the heritage item. The notification shall include the expected start date, duration of works and completion date;	Delivery Team Site Engineer	Once, 5 days prior to the start of construction
14)	The consent holder shall notify the CCC Heritage Team Leader once the repair of a listed heritage structure passes through SCIRT Gate 3 into Concept Design. The notification shall include a statement of the heritage value of the listed structure from a suitably qualified heritage specialist;	IST Environmental & Planning Coordinator	Once, as projects enter SCIRT Gate 3
15)	The consent holder shall not commence work or shall cease work if any unforeseen circumstances arise during construction that will result in a previously unanticipated impact on the heritage fabric of the structure. Five days notice, or less at the agreement of all parties, must be given to allow any changes to be discussed and agreed upon between CCC's Heritage Team Leader and the consent holder before further work is undertaken.	Delivery Team Site Engineer with advice from SCIRT Heritage Consultant.	As required

Advice notes:

1	All references to 'CCC Heritage Asset Owner' should be taken to mean the Asset Engineer (Greenspace- Buildings and Heritage). At the time of this consent this role was held by Maria Adamski.	N/A	
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2	The applicant should undertake consultation with the CCC Heritage Asset Owner at the Concept design stage and work should not commence until approval has been granted from the CCC Heritage Asset Owner;	IST Environmental & Planning Coordinator	
3	The consent holder should undertake consultation with Ngāi Tahu with respect to works that effect areas of significance to Maori for example the Otakaro/Avon River and its immediate environs and in the Banks Peninsula area in general noting the silent files and areas such as Takapūneke and Ōnawe Peninsula;	IST Environmental & Planning Coordinator	
4	On particular sites the where the Department of Conservation (DOC) are the asset owners, DOC should be informed of proposals before work is undertaken;	IST Environmental & Planning Coordinator	Note that this is only the provincial Chambers site. Notification to DoC would be appropriate if any works on the Gloucester St Bridge will impact the Provincial Chambers site
5	Where applicable and appropriate, all work should be undertaken with consideration to the conservation principles contained within the ICOMOS New Zealand Charter for the conservation of places of cultural or heritage value and any relevant conservation plans;	SCIRT Heritage Consultant	
6	The appropriate principles outlined in any relevant Conservation Plans for listed items within the parameters of this global consent should be adhered to where possible and practicable;	SCIRT Heritage Consultant	
7	Where sites are pre 1900 the conditions of the SCIRT global archaeological authorities and Archaeological Management Plan under the Historic Places Act to destroy or modify the site will apply.	Delivery Team	
8	In the event of the accidental discovery of cultural/archaeological remains (e.g.: human remains, concentrations of shells, charcoal or charcoal-stained soil, fire-fractured stone, bottles, pieces of glass or ceramics, unidentifiable bones, etc.) during the undertaking of earthworks and/or the installation of services, the NZHPT accidental discovery protocol guidelines will apply. These require that all earthworks must cease immediately; and contact made with the Regional Archaeologist at the Christchurch office of the New Zealand Historic Places Trust, and that work must not recommence until approval in writing has been given by the Regional Archaeologist of the New Zealand Historic Places Trust, as required under the Historic Places Act.	Delivery Team	

Process

