

## **Appendix 1**

### **Implementation Examples**

Following are some examples of conservation issues at Linwood Cemetery. They include typical examples of common grave types, with recommended conservation interventions.

These examples complement guidance provided in Implementation Strategies and Recommendations in the main body of the conservation plan, as well as the Tabulated Guide to the Conservation of Monuments in Appendix 3.

More detailed condition notes and specific recommendations selected notable graves follow in Appendix 2.

The key for guiding timeframes for priority is as follows:

**Immediate** - as soon as possible

**Urgent** - required to prevent further deterioration (within three to six months)

**Necessary** - required to ensure good standard of maintenance (generally within one to three years, but could be a staged process covering up to five years or longer, given the scale of work at Linwood Cemetery)

**Desirable** - whenever possible, or to enhance heritage values.

## Photograph 1 Broken Headstones



**Example** –headstone broken off base or broken itself

**Issue** – the stone surface lying against the earth can accelerate deterioration of the stone and the broken pieces could become separated and disassociated from the grave

**Recommendation** – Seek advice to have the broken pieces glued back together. If possible and practical, the headstone can also be pinned and returned to an upright position

**Priority** - Necessary

**Who to Undertake** – Stonemason or experienced Contractor

### **Additional Comments (for rejoining monuments):**

- Rejoining should only be carried out by suitably qualified professionals.
- Broken headstone pieces may be rejoined using bronze or other non-ferrous dowels and appropriate adhesives such as acrylic or epoxy resins.
- Do not use Portland cement or Plaster of Paris.
- Do not use iron as it is potentially corrosive.
- Wash from lime mortar causes problems especially with sandstone or polished black granite.

## Photograph 2 Unstable Memorial



**Example** – (centre of picture) unstable leaning monument (and broken and uneven concrete grave)

**Issue** – monument likely to topple and break (or encourage vandals to push over), possibly damaging other graves or people in the process

**Recommendation** – Seek professional advice for stabilising

**Priority** – Urgent to Necessary

**Who to Undertake** – Depending on the structure: Buildings Conservator, Engineer, Stonemason or experienced Contractor

**Additional comments:** A slight lean in a headstone is not in itself an issue and can add to the character of the historic cemetery. The issue is when it may collapse. There are a number of headstones/memorials at Linwood Cemetery that are on a slight lean now and currently no intervention is required. They should be monitored however, and stabilised if the leans threaten their stability.

### Photograph 3 Multiple Breaks



#### **Example** – Multiple breaks

**Issue** – In many cases this is due to vandalism, and there is the risk that the broken pieces are removed and become disassociated from the grave.

**Recommendation** – glue pieces together and reinstate if possible. If not possible to reinstate, seek advice on resetting in a new concrete slab/desk. If original location is not known, secure in a designated area for ‘stray’ parts of monuments (reversible in case original location becomes known).

**Priority** – Urgent/Necessary

**Who to Undertake** – Conservator/Stonemason/Experienced Contractor or possibly others as long as best practice is followed

**Additional Comments:** Fragments of headstone could be set in concrete or some other way to present the fragments being removed. However, it is critical to ensure that if the fragments are set in concrete, they definitely belong to that burial/grave site. It is not acceptable to leave loose parts on the graves of others for anything other than the very short term. The joined fragments should be documented and cross-referenced to the Linwood Cemetery Working Group database where possible.

## Photograph 4 Concrete Slab Collapse



**Example** – concrete slab/vault distortion or collapse, due to compaction of grave fill and/or vandalism

**Issue** – potentially unstable (and can make the headstones/monuments unstable), and it can appear unsightly

**Recommendation** – One option is to cover the cracked concrete area with sand (which is particularly appropriate at Linwood Cemetery) or gravel. This is an affordable, minimum labour option which has been endorsed by the Historic Cemeteries Conservation Trust of New Zealand. It has the advantage of retaining the original concrete below the sand/gravel. In some cases, under professional guidance, it may be best to record then remove the broken stone, correct ground level and reset concrete

**Priority** – Immediate/Urgent where the stability of other elements of the grave (and safety of people) is being compromised. Generally the priority ranges from Necessary to Desirable.

**Who to Undertake** – Stonemason/Conservator/experienced Contractor for correcting ground level and replacing concrete, but for infilling with gravel/sand, Council staff or volunteers may undertake.

## Photographs 5 Railings



**Example** – bent wrought iron railing with some parts missing, rusting, broken, paint missing

**Issue** – looks untidy, iron corroding, parts could become disassociated with the grave

**Recommendation** – For rusting iron, thoroughly hand clean to get loose rust off, then apply fisholene or if going to paint afterwards, apply anti-rusting guard and then paint with oil based paint. For broken, bent iron, parts of the concrete plinth of the rails could be reconstructed and rejoined. Where parts of the railing have been removed, they could be reinstated where original location is known.

**Priority** – Necessary to Desirable

**Who to Undertake** – Historic iron specialist

**Additional Comments:** Only paint where there is an indication of the original paint colour (often it was black). For the most part, rust on wrought and cast iron is not causing major problems at Linwood Cemetery. The area where the iron joins the concrete plinth or the earth is where most corrosion is occurring and this is the main reason to apply fisholene or paint. Common causes of failure are lack of maintenance of protective coating causing rusting, rusting of fixings, impact damage, vegetation growth, moss and lichen growth, inadequate cleaning of debris, galvanic corrosion, pollution, abrasion, fatigue, salts which act as electrolytes accelerating corrosion, inappropriate repairs and design.

Note: Cast and wrought iron should be riveted, not welded.

## Photographs 6

### Delamination of Stone



**Example** – Delamination of stone

**Issue** – Parts of original stone is falling away and historic inscriptions are disappearing

**Recommendation** – Have assessed on a case by case basis. A possible solution is to clean off all moss/lichen/dirt, record the information inscribed, then apply a poultice over the entire stone to rid it of salts, then micro grout it solidify the loose bits.

**Priority** – Desirable, dependent on further information. For the most part addressing delamination is difficult.

**Who to Undertake** – Stone Conservator/Building Conservator

**Additional Comments:** Delamination is where a hard outer crust forms on the stone and causes it to come away and fall off. In many cases, there is very little that can be done to address it. While a poultice may be a solution to get rid of the salts causing the hard outer crust, it would need to be done every 5-10 years since salts will continue to enter the stone through the ground. Micro grouting is a technique developed by the International Centre for the Study of the Preservation and Restoration of Cultural Property (ICCROM) for reattaching or consolidating heritage fabric such as fresco and stonework. Micro grouting involves drilling tiny holes in the stonework, flushing the holes with alcohol to clean them and then very gently injecting lime fly ash grout.

**Photograph 7**  
**Lead Lettering**



**Example** - Lead lettering falling off

**Issue** – Heritage fabric is broken or lost and inscriptions become hard or impossible to read

**Recommendation** – Record as much of the inscription as possible and photograph with the sun slanting across the face of the stone. While lettering can be re-leaded, it generally involves extensive work.

**Priority** – Recording Necessary; Re-leading Desirable where appropriate

**Who to Undertake** –. Systematic recording can be carried out by Council staff or volunteers. Re-leading only to be carried out by experienced professionals

**Photograph 8**  
**Graffiti**



**Example** – Graffiti sprayed on and scratched

**Issue** – Potential damage from paint, and failed attempts to remove; permanent damage from scratching.

**Recommendation** – Poultice to remove paints, do not use acidic cleaners on limestone. Do not use mechanical grinders, sand or waterblasting to remove graffiti. Take appropriate safety precautions.

**Priority** – Necessary/Desirable

**Who to Undertake** – Stone Conservator or experienced Contractor

**Photograph 9**  
**Inappropriate and Failed Repairs**



**Example** – Failed glue, discoloured staining

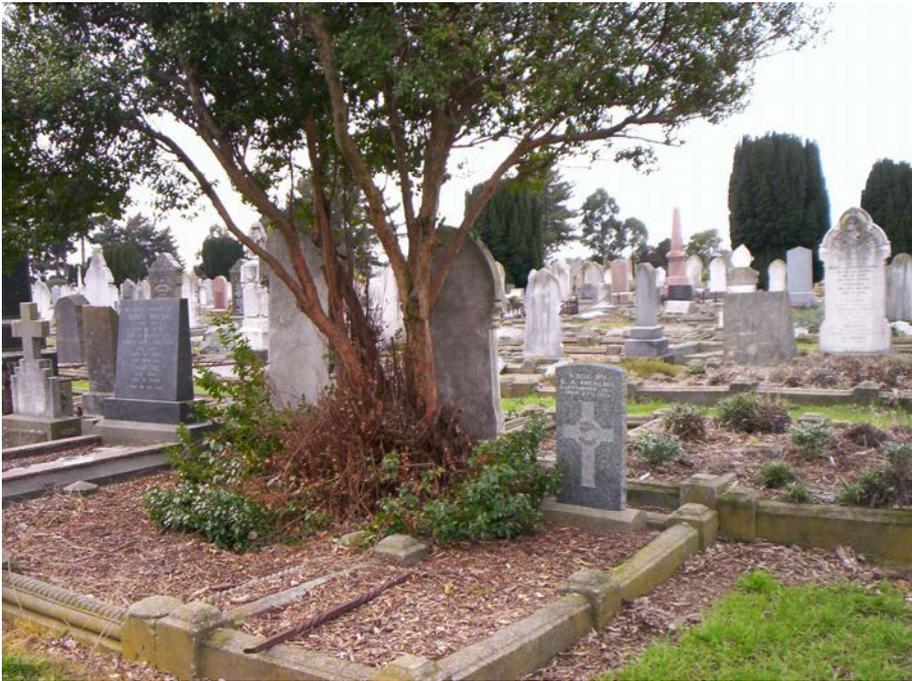
**Issue** – Potential damage and/or staining from inappropriate methods and fixing agents, further damage if attempts to repeat failed method.

**Recommendation** – Poultice to remove stains, do not use acidic cleaners on limestone; do not use mechanical grinders, sand or waterblasting to remove glues or stains; take appropriate safety precautions.

**Priority** – Necessary/Desirable

**Who to Undertake** – Stone Conservator for complex repairs. Council staff/volunteers following best practice for basic repair.

**Photograph 10**  
**Tree Roots**



**Example** – tree growth adjacent to graves

**Issue** – roots are damaging graves and shade encouraging moss growth

**Recommendation** – Seek advice from arboriculturalist. Where the tree does not have historic value, carefully remove at just above the ground level, taking care to protect graves. This may involve removing limbs and then poisoning the stump and roots. Stabilisation or repair of the grave can then be carried out.

**Priority** – Urgent to Necessary, on a case by case basis

**Who to Undertake** – Council staff under the guidance of arboriculturalist.

**Additional Comments:** Trees that have high heritage value for the cemetery need to be treated differently. Some yew trees are likely to be well over 100 years old and are themselves part of the grave/memorial. Under the guidance of an arboriculturalist, identified limbs of trees could be removed or pruned to lessen the impact on the graves. In some cases, it may be necessary to remove historic trees, but this should only be done weighing up all the considerations. It may be possible to take cuttings of some trees to replant where their lineage is important.

Note also that pine needles on the periphery of the cemetery drop pine needles. These needles should be removed regularly to prevent coverage of the graves and avoid microbiological growth, salt ingress and moisture retention.

**Photograph 11**  
**Historic Grave Plantings**



**Example** – historic trees within grave sites

**Issue** – the trees themselves are part of the memorial and have heritage value, but as they grow, the trees over time are damaging other historic features such as railings, headstones, vaults.

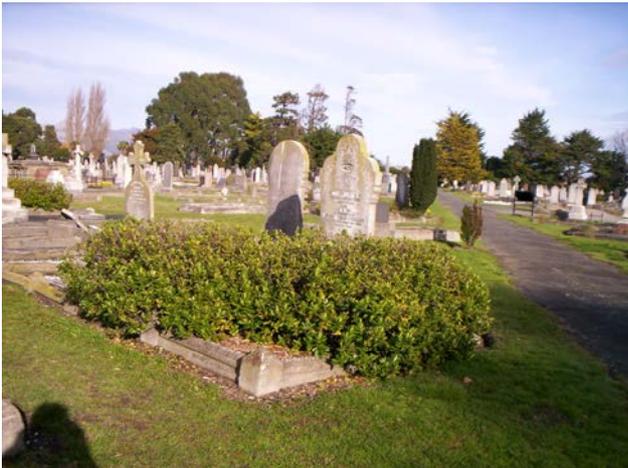
**Recommendation** – seek the advice of an arboriculturalist. One solution may be to take out the inner limbs of the trees but retain the height and form of the tree.

**Priority** - Necessary

**Who to Undertake** – Seek advice from arboriculturalist.

## Photographs 12

### Plantings on/beside Graves



**Example** – Recent plantings on graves

**Issue** – If not carefully maintained, will obscure headstones and potentially damage stone and ironwork over time.

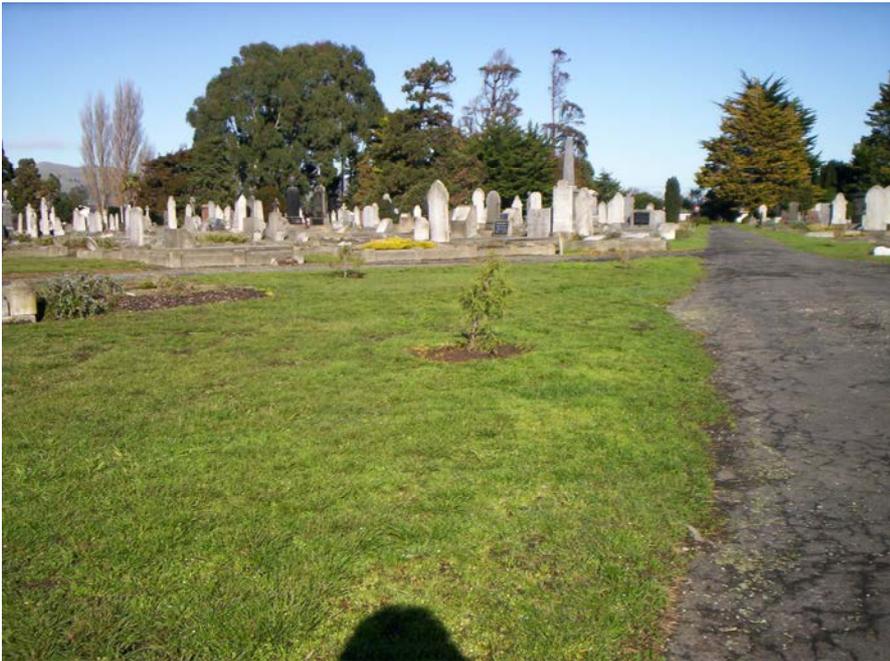
**Recommendation** – Carefully maintain recent plantings. For example, agapanthus, hebes etc should be pruned and thinned regularly.

**Priority** – Necessary

**Who to Undertake** – Council staff/volunteers

**Additional Comments:** Avoid new plantings on or immediately adjacent to graves. New corner planting beside graves is not recommended. For the recent corner plantings, if possible the soil level needs to be lowered to be level with the grass since at present it is causing dampness to the sides of the graves

**Photograph 13**  
**Recent Plantings on Unmarked Burial Sites**



**Example** – Recent tree plantings in areas of known and likely burials

**Issue** – While recent plantings, such as in the photograph above, are not necessarily a fault or issue, careful consideration is required as to whether mature conifers are appropriate on a site of burials.

**Recommendation** – In the opinion of the authors, these conifers should be removed. However, before a final decision is made, the Council should consult with Roman Catholic Church (as area 38 was for Roman Catholic burials) and potentially the wider community to confirm if planting of conifers on this site is the agreed course of action.

**Priority** – Necessary/Desirable

**Who to Undertake** – Council staff

## Photographs 14

### Lichens and Mosses



**Example** – Biological Growth, notably mosses and lichens

**Issue** – Some growths are eating into stone, including obscuring inscriptions

**Recommendation** – Seek advice on a case by case basis as not all growth is causing damage. If removing biological growth, ensure this is done very carefully. In some cases, as with the photograph above, the main parts of the lichen can be scraped off carefully with a scalpel, then loose material gently brushed off the surface of the stone. In some cases it may be appropriate to use a biocide (see additional comments below).

**Priority** – Necessary/Desirable

**Who to Undertake** – Ideally a stone conservator, or an expert with experience in removing mosses/lichens on historic structures

**Additional Comments:** There is considerable discussion about the best way to deal with biological growth. English Heritage advises that most lichens, mosses and some wildflowers can be left on monuments so long as they do not obscure carved details, and do not recommend the use of chemicals. The National Trust of Australia's guide to conserving cemeteries cautions against removing biological growth and recommends expert advice if anything other than gentle brushing off is required. The HCCTNZ similarly cautions, but states that if it is necessary to remove biological growth, then use only preparations based on quarternary ammonium compounds eg benzylkonium chloride. For lichens, algae, fungi and moulds, the HCCTNZ recommends Kemsol "Mosskill". If a biocide is to be used, it is essential that it doesn't have soluble salts or bleach in it. The Council has received additional advice from HCCTNZ that "Wet and Forget" and "Simple Green" products are acceptable and are readily available. "30 Seconds" is not suitable.

Note: Headstones at Linwood Cemetery shows that different types of marble and stone have different types of lichens and mosses.

**Photograph 15**  
**Dirty Headstone**



**Example** – Dirty headstone

**Issue** – Obscures historical inscriptions and can cause damage

**Recommendation** – *In general, do not clean* unless not cleaning will result in information loss (text/pictorial inscriptions) or dirt is hiding faults that need to be assessed/addressed

**Priority** – Potentially desirable, although non-intervention may be most appropriate in most cases

**Who to Undertake** – Stone conservator/stone mason or Council staff/volunteers with appropriate training

**Additional Comments:** Do not clean headstones often, and do not clean unstable stones. Avoid acidic cleaners on marble or limestone. An effective gentle way to wash light soiling is washing with small quantities of water and natural fibre brushes. Never use wire brushes. Don't clean with water at a time when there is a risk of freezing temperatures before the stone dries out. Never sandblast or use high-pressure sprays on monuments.