Condition Report:
Rutherford's Farm (I44/426)

By Carl Murray and Stuart Griffiths (March 2019)

Report for Hereweka/Harbour Cone Management Trust

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Introduction

This report will assess the condition of Rutherford's Farm (site no. I44/426) which is an historical site complex located near Hereweka/Harbour Cone on the Otago Peninsula in the South Island of New Zealand, near Portobello (see Figure 1). The site can be accessed from Highcliff Road (Figure 2) by walking east from the carpark and passing Nyhon's cow byre (I44/429) and Robert Dick's House (I44/431). There are three historic tracks associated with Rutherford's Farm, recorded as archaeological sites I44/425, I44/427 and I44/423 (see Site Access Map: Figure 2).

A site plan created by Webb (2009) has been modified for easy reference to the features within this report (see Site Plan: Figure 3). To clarify the reporting of the features, they will be discussed under the subheadings: Masonry Structures and Dry Walling. It should also be noted that an extensive survey of the agricultural dry-stone walls around the Otago Peninsula, including those associated with Rutherford's Farm was conducted by Higham (1986). For ease of discussion, the references given to the walls by Higham (1986) will not be used, the walls will instead be referred to in the site plan designed specifically for this report.

A section on the geology and quarrying will be briefly discussed to clarify the range of rock types which were mined or quarried in the area, and to acknowledge outcrops likely associated with the stone structures within Rutherford's Farm.

This report will focus on examining the condition of stone structural remains within the site complex and record any observable damage. The processes which are responsible for the deterioration will be discussed to better understand the causes of damage and to ultimately aid in the development of a conservation plan. These processes include weathering, vegetation, and trampling damage caused by stock as well as people. Observations regarding the deterioration of historical features will be recorded by photograph and scale drawings where applicable and will serve as a periodic marker for future monitoring of the site complex. This comparable method will be useful in understanding the rate of deterioration over time and aid in developing a conservation plan for the site complex as well as the development of procedures that can halt or reduce the impacts of deterioration.

Consultation and advice was given by monumental stonemason Stuart Griffiths on specific conditions of the stone work within the Rutherford's Farm site complex, with possible solutions to rectify any problems regarding stabilization and deterioration of the structures. The role of the archaeologist, Carl Murray, was to convey in text and graphics the very complex state of deterioration of the masonry in the structures and to help interpret what the original state and function of each feature probably was.

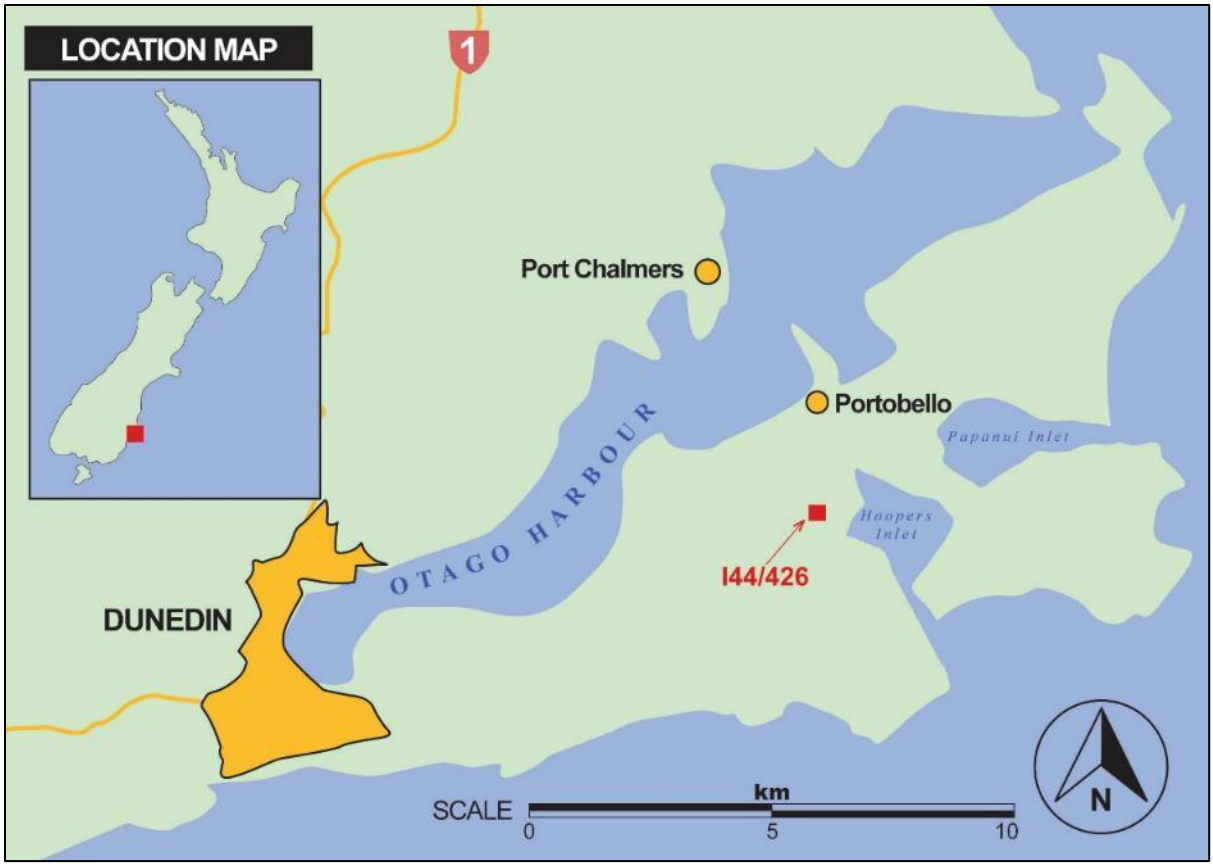

Figure 1. Location map for Rutherford's Farm (Site no. I44/426).

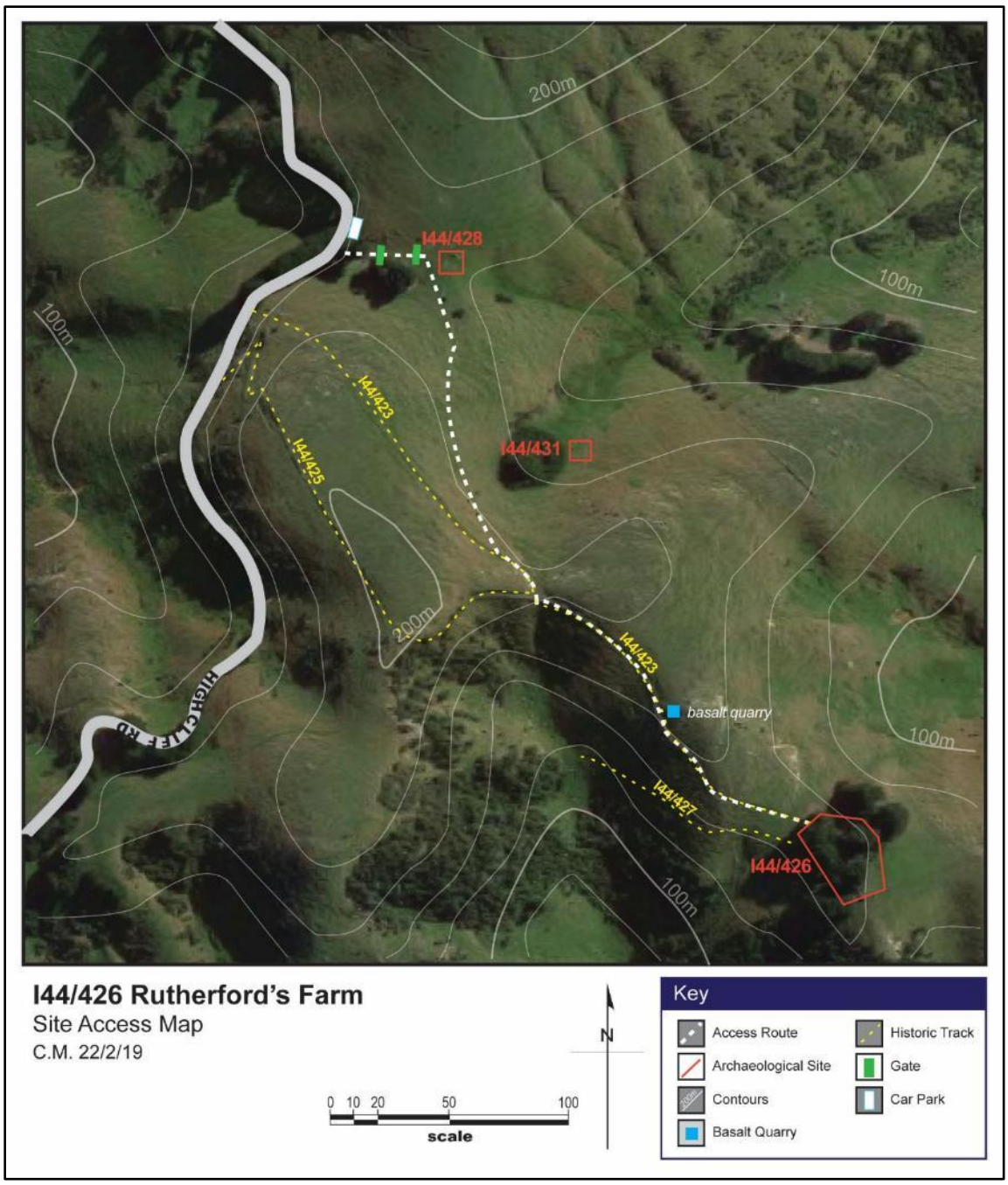

Figure 2. Site access map

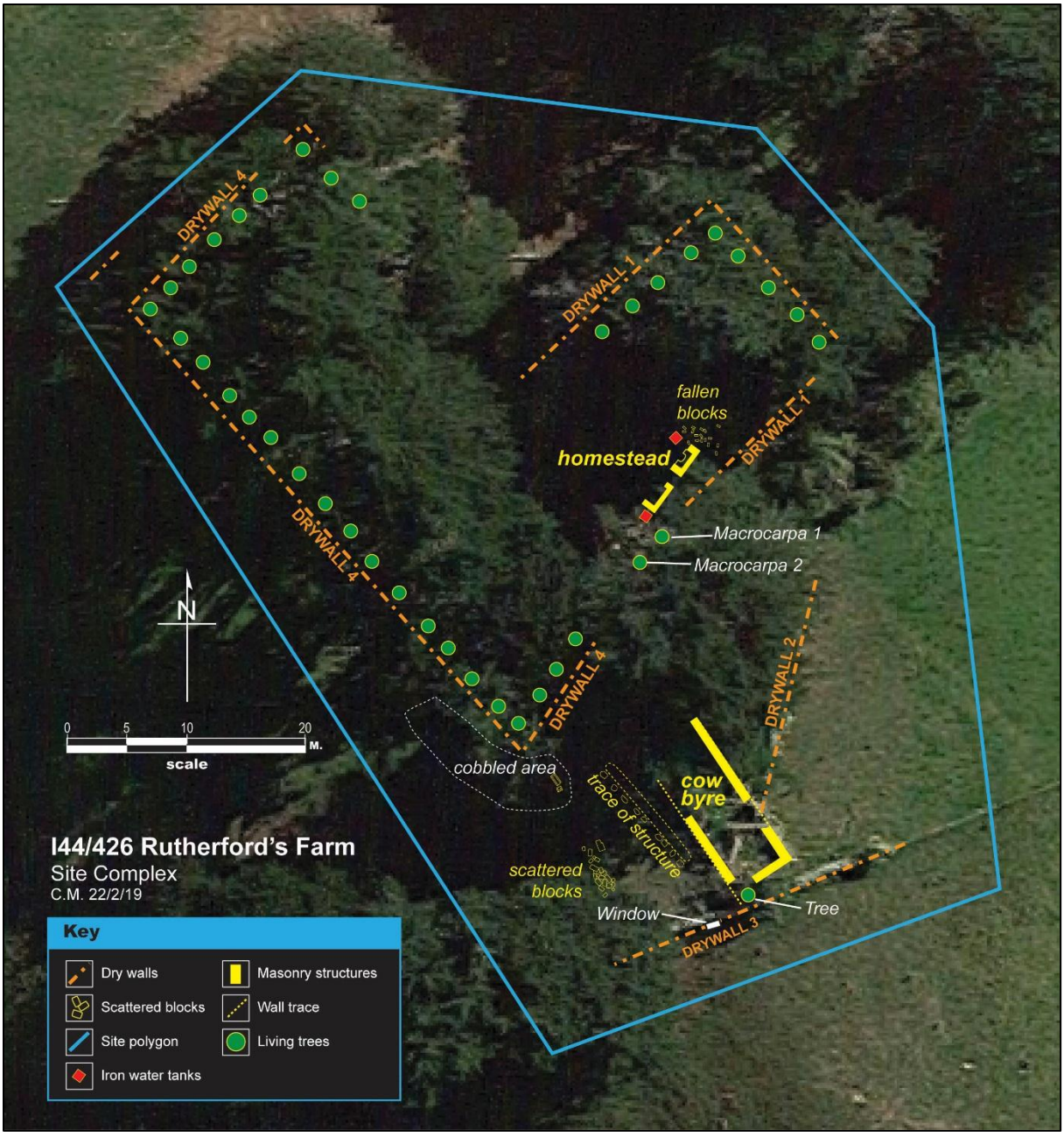

Figure 3. Site plan for I44/426. *Modified from Webb (2009)*

Geology and Quarrying

The geology in the vicinity is associated with the Dunedin volcanics, with Port Chalmers breccia outcropping in several areas around Hooper's inlet along with a variety of Phonolitic based extrusive rocks with varying clast sizes (Price et al, 2003: 2053-2055). The outcropping material along the northern bank of the road (I44/423: see Figure 2) leading into Rutherford's Farm is a volcanic (trachytic) tuff emplaced during the Initial Eruptive Phase of the Dunedin volcanics (Price et al, 2003: 2055). This material is the predominant rock which has been used in the construction of stone structures around the Rutherford's site complex and has been quarried extensively along the northern bank of I44/423 with tool marks still apparent on the rock surface. The rock consists of angular clasts usually less than <2cm and is supported by a matrix of volcanic ash (Price et al, 2003: 2055). A quarry area northeast of the Rutherford's site complex (see Figure 2: basalt quarry) exhibits a contact between the volcanic tuff and basalt (see Figure 4, left). The basalt outcrop exhibits quarrying from tool marks (Figure 4, right); however, no basalt has yet been observed in the structures at Rutherford's Farm.

The quarrying activity could also be attributed to the documented history of James Rutherford's discovery of scheelite on his property (Otago Daily Times, 1886: 2). The scheelite operations likely took place in the valley below the farm with a track (I44/427; see Figure 2) leading down to the area. The upper outcrops in this valley are volcanic (igneous extrusive) and will make contact with the underlying sequence of limestone further below, creating the metamorphic conditions needed to form scheelite. There is also historical evidence of shafts being sunk for gold in the lower southeastern areas of Harbour Cone following the discovery of gold in 1874 (Boult, 1905:425-426) which could also account for some of the physical remnants of quarrying or mining activity around Rutherford's Farm.

Figure 4. Quarry area on the road (I44/324) to Rutherford's which exhibits a contact between basalt and volcanic tuff (left); straight cut edges and hammering marks on the basalt (right).

Rutherford's Farm Site Complex I44/426

Rutherford's Farm is recorded as an archaeological site with New Zealand's site recording scheme through the New Zealand Archaeological Association (NZAA) as site number I44/426. The features which make up the site complex are associated with early dairy farming operations on the Otago Peninsula which began in the 1860's following the sub-division of Block II, Hereweka/Harbour Cone into 10 to 20-acre farm holdings (Middleton, 2008: 36). The Rutherford's site complex consists of a homestead which is central to the site; a large cow byre at the southern end of the site; and four drywalls. All of these structures were made from local stone with varying degrees of stone dressing which is exhibited by finely worked chisel marks. These stone blocks were also noted to be used in Dry Wall 3 as well as being scattered/fallen around the site complex.

The site complex will be discussed below under the subheadings: Masonry Structures which includes the Homestead and Cow Byre; and Dry walling which discusses all stone walls constructed without the use of mortar. Photographs along with illustrations for some elevations of masonry structures will be used to convey information relative to the condition of the stone work and any remnant mortar (where ever used). Vegetation, which is currently causing most of the damage, can refer to grasses, lichen, fallen branches and leaves, and trees. Living trees which are damaging structural remains will be discussed within the section relating to that part of the structure with photographs and illustrations where needed.

Masonry Structures

The two masonry structures within the Rutherford's Farm site complex are the homestead and cow byre which will be discussed below under their own sub-headings. Both structures have been built in a random stone course manner using local volcanic tuff which is available as field stone (observable by sub-rounded edges). Some of the larger custom blocks used for wall ends or roof support, are interpreted to have been quarried from local outcrops and modified for a particular function.

The inner wall mortar used in the homestead masonry is a mixture of lime and clay with volcanic tuff fragments also been used in the wall filling. A lime mortar is used for the external pointing and is drawn out flush with the stone. A volcanic tuff aggregate was noted to be mixed with the lime mortar which may explain its resistance to weathering. The mixing of volcanic tuff with lime mortar causes a chemical reaction (between alumino-silicates and calcium oxide) which increases its adhesion, durability and bonding strength (Al-Zou and Kamel, 2014: 279-280). This may suggest the tuff was used in the production of mortar with knowledge of its increased strengthening and bonding attributes.

The cow byre structure used a clay mortar which is remnant on the internal part of the walls and was likely pointed flush with a lime mortar. Illustrations and photographs of the structure are used to convey the condition of the stone work in the cow byre. Interpretations of gates and access points to the structure will also be briefly discussed.

Any repointing or restorative work done to the masonry structures should acknowledge where the original mortar has been used. Finely dressed tuff which was exhibited in the homestead structure (and elsewhere on the site) should also be noted if restorative work is undertaken, as the tool marks hold information regarding the technique and tool type used by the stone mason.

The Homestead

Two stone masonry sections of the homestead remain, with a one metre gap in between them that was likely an entrance way. The foundations of the structure were obscured by vegetation, so the exact dimensions for the entire homestead were not able to be obtained, however, the footprint of the structure is approximately 7 m long by 4.25 m wide. The two extant stone masonry sections of the house offer an idea of how the house may have been constructed, with large stone blocks observed to be chiseled with precise angles to support a roof truss. Some of the stone noted in the homestead to have fine chiseling was observed to have fallen north of the structure (see Figure 3: fallen blocks). This finely dressed stone was also noted to be scattered in the area

south of the site and also used in the construction (or restoration) of Dry wall 3 (see Figure 3). The absence of a lot of the homestead also suggests the possibility the structure was not made entirely of stone.

The homestead has been built in a random stone course manner (Salmond, 1994 :89), using the local volcanic tuff, which is discussed in the geology and quarrying section above. The stone edges and faces have been hewn to bring them into line, but the quoins were noted to have been worked into more robust forms. Course lime mortar mixed with volcanic tuff aggregate has been used for the external pointing and drawn flush to the stone surface (Figure 5; left).The wall core is a mixture of volcanic tuff rubble, lime and clay, and has been largely washed away where exposed to erosion (Figure 5; right). A lime wash render was likely used as a protective finish as small fragments were observed on the surface of the external mortar (Figure 6).

These walls and presumably the walls that are obscured by vegetation, will need a capping treatment to aid in securing them as well as protecting the interior of the wall from water entering.

Figure 5. Course lime and tuff aggregate mortar used for the external pointing (left); inner wall core mixture of tuff rubble, clay and lime (right).

Figure 6. Remnants of a fine coat of lime wash over the external pointing

Southern Elevation

The southern elevation of the homestead (Figure 7) is approximately 4.25 metres wide by 1.57 metres high. The two masonry sections are still largely intact, however, vegetation is obscuring the base of the structure. The blackened areas in Figure 7 are crevices where mortar and wall core has been washed out. The south-eastern corner of the entrance way is sitting loosely on top of the lower course and has been pushed out (eastward) approximately 15 cm. This area is outlined with a red dashed line in Figure 7 and is also exhibited in Figure 8. Stone blocks at the south-western end of the southern wall are noted to be chiseled and laid at an angle of approximately 58°, most likely to support a roof truss (see Figure 7).

A dead tree is laying over the north-eastern section of the homestead and is likely bearing weight upon this part of the structure (see Figure 7 and Figure 9). The south-eastern section of masonry offers a good example of the mortar's weather resistance with most of the wall still intact (Figure 9).

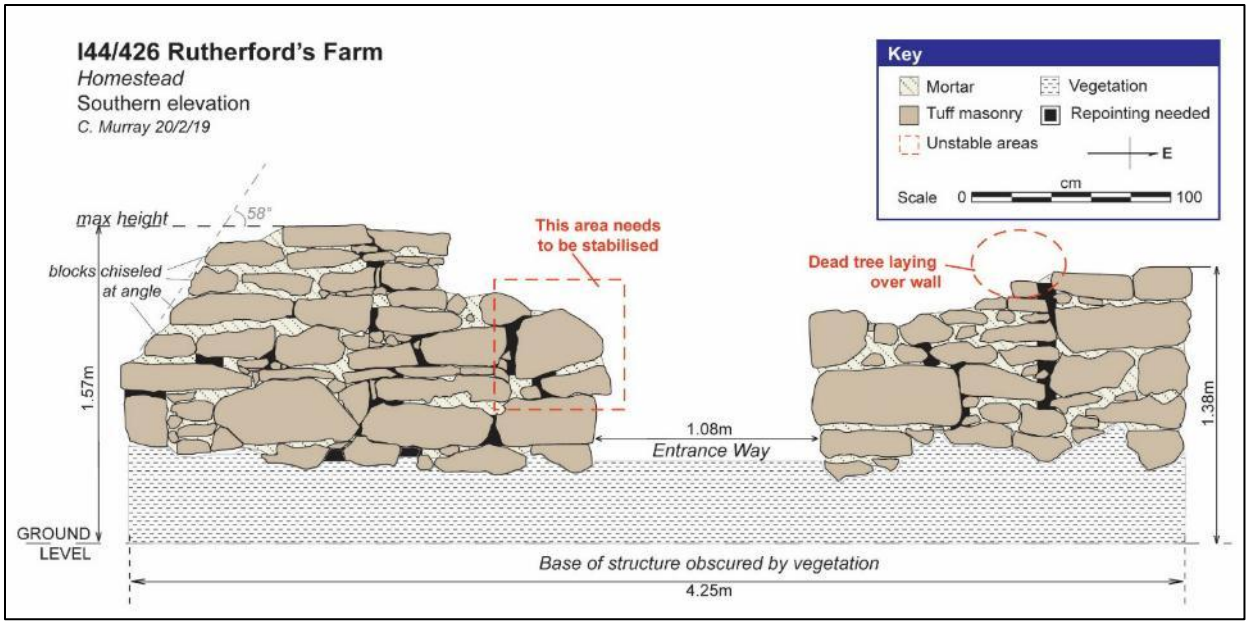

Figure 7. Southern elevation of Rutherford's homestead.

Figure 8. South-western corner of the entranceway to the homestead which needs to be stabilized: looking north-down (left); looking west at the inner section of wall (right).

Figure 9. The south-eastern section of the southern wall (looking north) with the dead tree laying over it; note the lime mortar here has resisted weathering.

Western Elevation

The southern corner section of masonry is all that remains of the western wall. The top of the inner southern wall can be observed from this position to be very unstable. The yellow dashed circle in Figure 10 (left) highlights the area of the inner southern wall which will need to be stabilized. Large stone blocks (protruding northward) which likely supported a roof truss are being held in place by the weight of surrounding blocks. The mortar and a lot of the wall core in this area has been washed out (see Figure 10; right), making the top of the wall vulnerable to collapse.

The remaining section of the western wall is approximately 1.2m high, 1.5m long and 60cm wide. This small remaining section of wall is in good condition, with most of the mortar still intact and holding the stone blocks in place. Figure 11 shows this section of wall with tool marks (trowel point?) observable in a lime mortar which is mixed with a finer aggregate than the mortar observed elsewhere on the structure. This part of the wall has likely been repointed at a later stage, but still during the occupancy of the homestead.

Some of the larger blocks in this section of wall are weathered, likely a result of increased water and wind exposure without the protection of a roof. Very fine chisel marks can be observed on some of these blocks (see Figure 11), emphasizing the skill

of the stone mason as well as informing us the exceptionally sharp tool set. These tool marks offer evidence of tool types and methods used to dress the stone and should be acknowledged if restorative work is undertaken on sections of wall where these are exhibited.

Figure 10. The area within the yellow dashed circle needs to be stabilized, looking east (left); A close-up of the lime/clay mortar used in the wall core, looking south (right).

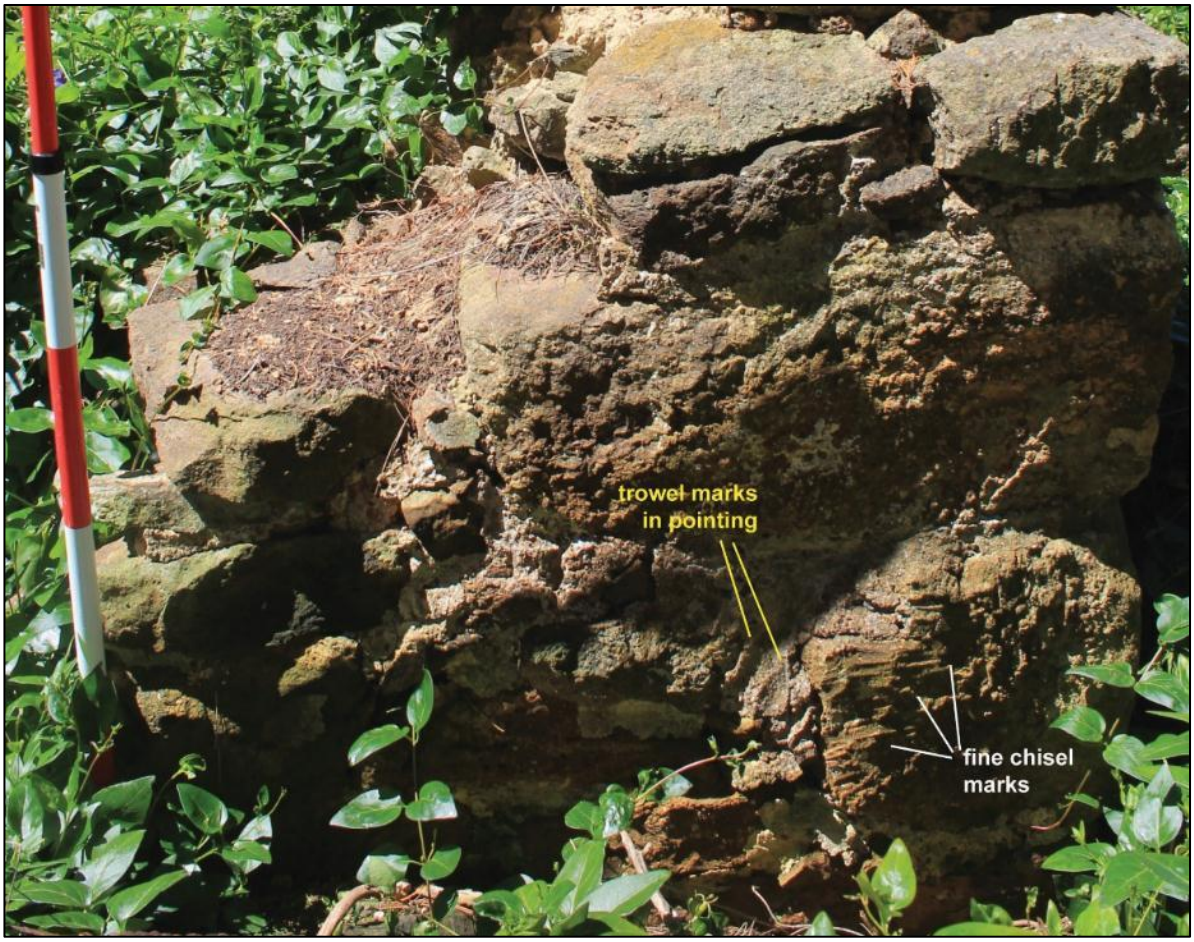

Figure 11. Outer western wall, looking east: trowel marks observed in lime mortar (yellow); fine chisel marks exhibited in the volcanic tuff (white).

Northern Elevation

The northern wall of the structure has been removed, with the materials likely being used in the drywalls around the site. The inner southern wall can be seen from this position, revealing the large blocks protruding from the top of the western section of the southern wall. Figure 12 is a photograph taken looking south toward the homestead structure and exhibits the interior of the structure which is obscured by vegetation. In the top right of the image, two yellow dashed lines highlight the angle cut into the blocks which likely functioned as support for a roof truss. A close-up of these blocks looking south at the inner wall is shown in Figure 13 (left). A viscous black pitch/tar was observed on the inner southern wall (western section; see Figure 13; right) which could be associated with asphalt damp-proofing between the courses. No aggregate was observed to be mixed with this binding agent and it has likely been applied as a restorative measure rather than being part of the original fabric.

Figure 12. Looking south toward the homestead. The yellow dashed lines in the top right of the image follow the angle (58°) cut into the stone which likely supported a truss.

Figure 13. The inner southern wall with large cut blocks protruding northward (left); black pitch/tar used to repoint a section of the inner southern wall (right).

Eastern Elevation

The eastern elevation of the homestead consists of a small section of wall which measures approximately 1.4m high, 1m long and 60cm thick. The northern part of the wall is missing, the materials likely having been removed and used elsewhere on the site. It is also possible that the missing section of wall was made from wood and has deteriorated. Vegetation is obscuring the area where the wall continued so no foundations for the wall were observed. A dead tree is lying across part of the eastern wall and hanging over the edge of the southern wall and can be viewed in the top right corner of Figure 14 (left).

The small section of masonry which remains offers an example of the original lime mortar used in the structure, with the stone in this section still very strongly set (Figure 14; right). The stone in this section of the structure is in relatively good condition, with erosion being only minimal.

Figure 14. Outer eastern wall, looking west (left); close-up of the masonry in the outer western wall. Note the volcanic tuff used as aggregate in the lime mortar (right).

The Cow Byre

The cow byre is a stone masonry structure built in a random course manner similar to the house, although the mortar used was likely of a lesser quality. The eastern wall end, which is still largely intact, exhibits the mortar being drawn out flush with the stone (Figure 15, left), indicating how the entire structure was originally pointed. The inner wall mortar was clay based and also mixed with tuff rubble for the wall core (Figure 15, right). The structure is approximately 13.5 m long by 4 m wide.

Large sections of the northern and southern walls are intact with the southern wall being the back end of the structure, and the main entryway being at the northern end. The

south-western end of Drywall 2 adjoins the eastern wall of the cow byre (see Figure 3). A tree is growing up through the south-west corner of the cow byre and is also damaging Drywall 3. An area directly east of the cow byre was recorded by Webb (2009) as being the footprint of a structure and is shown in the site plan (Figure 3). This area was obscured by vegetation and a fallen tree during the recent field surveys but should be acknowledged to ensure no damage is done to the area if physical conservation work is conducted.

Figure 15. Northern wall end of the cow byre exhibiting remnants lime mortar drawn flush with the stone (left); clay mortar and tuff rubble used in the inner wall.

Eastern wall

The eastern wall of the cow byre is approximately 13.5 metres long, 1.6 metres high at its highest point, and 60cm wide. The stone used is mainly sub-rounded field stone with evidence of coarse dressing to shape some of the larger blocks. All of the external pointing has been washed out. These areas are exhibited in the illustration of the inner eastern wall (Figure 16) as blackened areas between the masonry. The enlarged southern section of wall (see Figure 16B: enlarged) is the area which has been most affected by weathering, with most of the mortar and wall core being washed out. About half way along the inner eastern wall, large stone blocks belonging to another wall end are strewn about the base of the wall (see Figure 16A: enlarged). Vegetation is obscuring the footings of the wall, and grasses are covering large areas of the southern part of the wall. The northern section of the outer eastern wall was inaccessible due to tree growth. This area will be updated after vegetation is removed. The southern section of the outer eastern wall (see Figure 17) has no observable mortar or wall core present and will need to be stabilized.

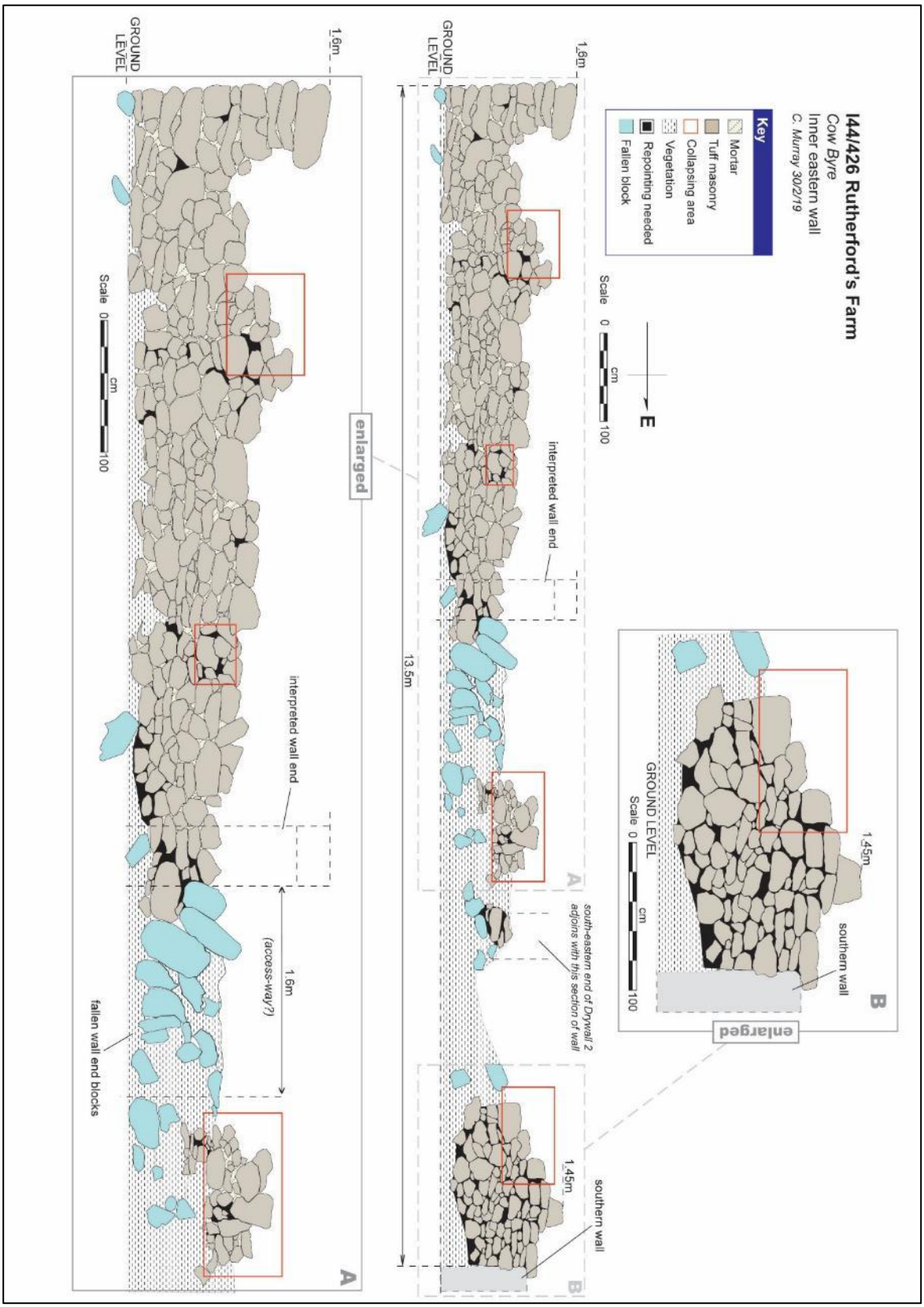

Figure 16. Cow Byre: section drawing of inner eastern wall.

Figure 17. The southern section of the cow byre's outer eastern wall, looking west.

Southern Wall

The southern wall is the back of the cow byre and adjoins with the eastern and western walls (see Figure 18). This section of wall measures approximately 3.3m long, 1.1m maximum height and 60cm wide. The base and the central sections of the inner southern wall were obscured by vegetation. A tree is growing through the western corner of the wall and has damaged the masonry in this area by dislodging the stone blocks which are scattered around the base of the wall (Figure 20). The external mortar has eroded away from the inner southern wall and is shown as the blackened areas between the stone work in Figure 18.

Only three courses of stone are observable in the cow byre's outer southern wall (Figure 19) with most of the mortar washed out. The ground surface is higher at the base of the outer wall compared to inside the byre by approximately 40cm. Vegetation and the tree growing in the south-western corner of the structure made recording of that area difficult. The vegetation will need to be removed where it is covering the wall to observe its condition. The tree growing through the south-western corner is causing damage to both the cow byre and Dry wall 3.

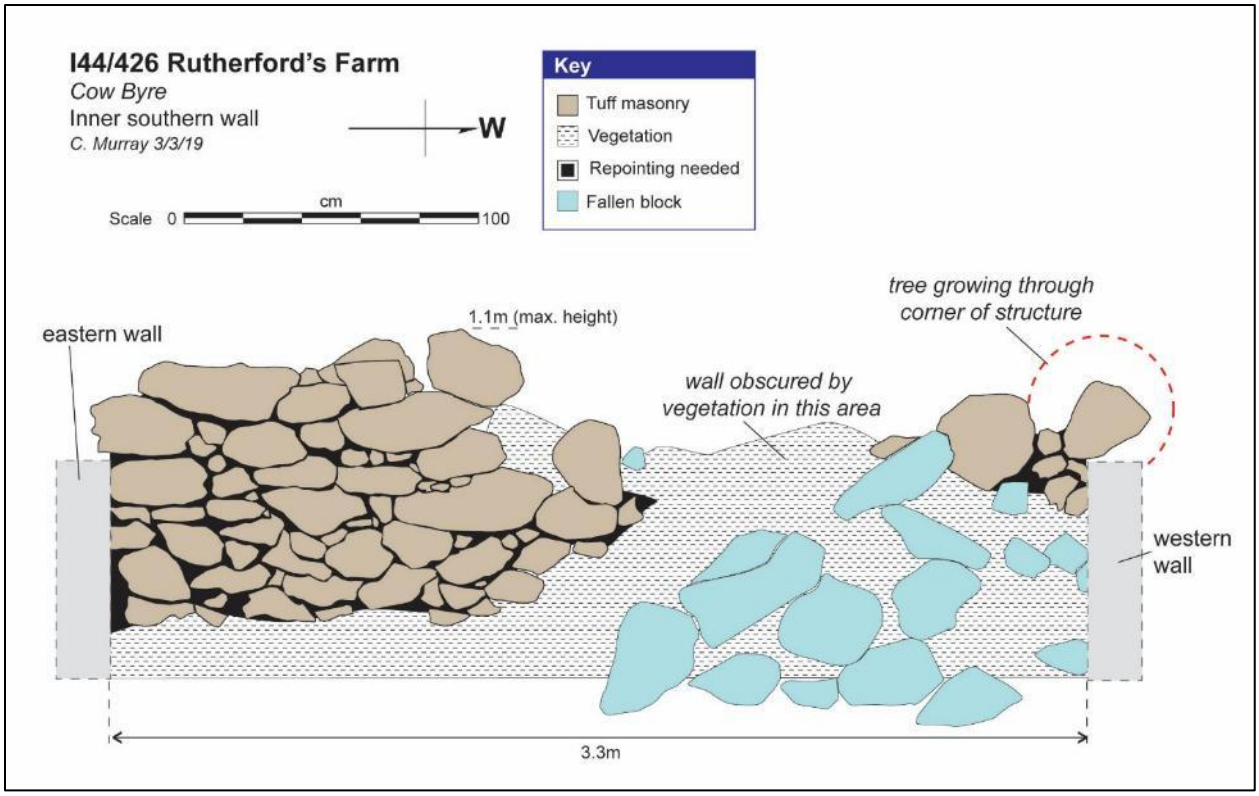

Figure 18. Cow byre: section drawing of inner southern wall.

Figure 19. The small remaining section of the outer southern wall of the cow byre, looking north-west.

Figure 20. The large tree growing through the south-west corner of the cow byre and Drywall 3, looking south (left); a close-up of the tree, looking south (right).

Western Wall

The western wall of the cow byre is approximately 12.9m long, 1.67m high at its highest point, and 60cm wide. An illustration of the inner western wall is offered in Figure 21 and shows the extent of vegetation over this part of the structure. The tree growing in the southern section of wall is discussed above (see Figure 20) and causing the most damage. Two dead trees have fallen over the structure (outlined in red: Figure 21) and will need to be removed. The observable stone work is in relatively good condition, however, the external mortar has been washed out. The blackened areas between the masonry (Figure 21) indicate where mortar has been washed out, also showing blocks which have fallen at the base of the wall (in blue). The central part of the wall offers a good example of the original height of the structure (approximately 1.67m), however, a vine covering the wall is obscuring the stone work.

The northern section of the outer western wall was inaccessible due to vegetation and a fallen trees. Figure 22 shows the vegetation coverage of the inner and outer sections of the western wall also exhibiting the large area of this wall which is still intact. Figure 23 shows the thick vegetation obscuring the southern section of the outer western wall.

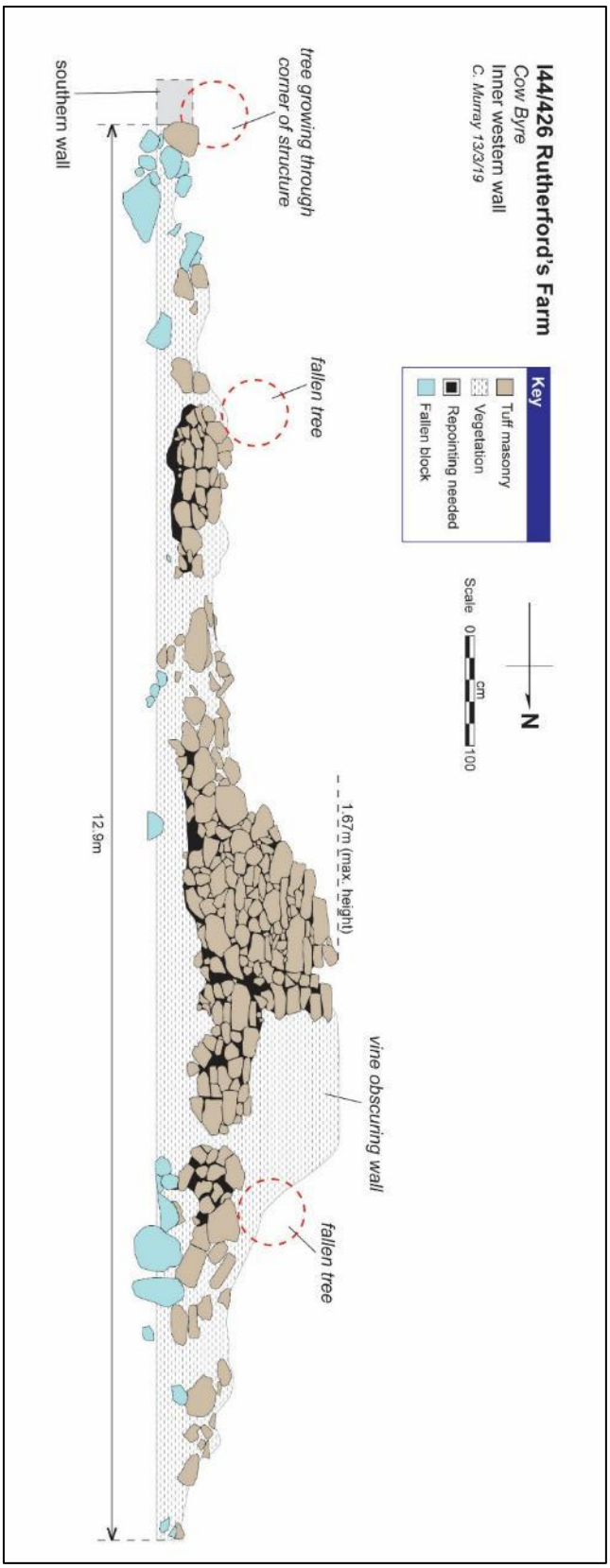

Figure 21. Inner western wall of the cow byre.

Figure 22. Northern section of cow byre's western wall with vegetation making some areas inaccessible: inner wall, looking north-west (left); outer wall, looking north-east (right).

Figure 23. Southern section of the cow byre's outer western wall exhibiting the thick vegetation obscuring this area of the structure, looking south-east.

Drywalling

Four drywalls were recorded in the Rutherford's Farm site complex and have been labelled as 'Drywalls 1 to 4' in orange on the site plan (Figure 3). An immediate observation upon entering the site is the damage that has been done to the drywalls from fallen macrocarpa branches. Sheep have been spotted within the site boundary on several site visits, but there is little evidence of sheep damaging any of the stone structures. The drywalls are discussed below with photographs and dimensions. The construction of the walls will be briefly discussed where the condition allows for most of the structure to be observed. The condition of the walls will be discussed and suggestions for rectification or mitigation of the cause of conditions will be offered where possible.

Drywall 1

The north-western section of Drywall 1 is approximately 22m long and is oriented north-east to south-west. This part of the wall adjoins to the north-eastern section of Drywall 1 (see Figure 3). This section of wall has a height range of 10cm to 1.2m. A lot of this structure is still intact, with fallen blocks strewn about in the immediate vicinity of the wall (see Figure 24: left). Fallen branches are shown in Figure 24 (right) to be damaging part of the wall. The macrocarpas planted within the wall boundary have pushed a large section of this wall over (see Figure 25).

The north-eastern section of Drywall 1 is approximately 15m long and is oriented north-west to south-east. This part of the wall adjoins to the north-eastern and south-eastern sections of Drywall 1. This section of wall has a height range of 20cm to 80cm. Figure 26 displays the remaining parts of the section of wall outlined in the yellow dashed line. Fallen blocks from the wall can be seen in the foreground. There was possibly a gate in the gap between the two remaining sections of this wall.

The south-eastern section of Drywall 1 is approximately 16m long and is oriented north-east to south-west. This part of the wall adjoins to the north-eastern section of Drywall 1 and has a height range of 15cm to 1.35m. Figure 27 (left) exhibits a fallen tree on the north-eastern end of the wall as well as a small shrub (behind the stadia pole) which is growing out of the wall. A gap in the wall approximately 1.5m wide Figure 27 (right) may have been another access way to the section. A large section of this wall is in excellent condition with tilted coping stones still capping the structure (Figure 28). A vine is covering part of the wall and is likely aiding in protecting it from weathering and livestock damage. However, due to the wall having no mortar adhering the stone, the vine is

likely to grow within the structure dislodging the stonework over time and should therefore be removed.

Figure 24. North-western section of Drywall 1: looking north-east (left); looking north-west (right).

Figure 25. North-western section of Drywall 1 showing the damage caused by macrocarpa growth, looking south-west.

Figure 26. North-east section of Drywall1 (looking south).

Figure 27. South-eastern section of Drywall1, looking south-east (left); a gap in the wall which may have been an access way (right).

Figure 28. South-eastern section of Drywall1, looking east. Note the coping stones are still capping a large section of this wall.

Drywall 2

Drywall 2 (see Figure 29 to 31) is oriented north-east to south-west and is approximately 20 metres long. The south-western end of this wall is adjoined with the eastern wall of the cow byre (see Figure 3 and Figure 31). The large blocks observed at the intersection of the two structures suggest a gate support may have been built into the wall. The maximum height of Drywall 2 was approximately 63cm and the minimum was 10cm where only one course of the wall could be observed. A lot of the damaged areas of the wall exhibit fallen blocks within the vicinity. Damage to this structure has likely been caused by falling branches from the nearby macrocarpas.

Figure 29. North-eastern section of Drywall 2, looking north-west.

Figure 30. Drywall 2: looking south-west. Note the cow byre in the background.

Figure 31. The south-western end of Drywall 2 that adjoins with the eastern wall of the cow byre.

Drywall 3

Drywall 3 is the southern perimeter wall and is an extension of the consumption wall that encloses the complex. A part of this wall is raised higher than the other drystone walls and has a small window opening built into it (see Figure 32). The south-western corner of the cow byre forms a one metre gap between Drywall 3 and was likely used as an access point to the area. The southern wall of the cow byre may have also been used as an inner wall with Drywall 3 to make a lean-to structure which is evident in a rough outline of stone projecting from the wall near the access point. A tree growing in this area is causing damage to Drywall 3 and the cow byre, as well as obscuring details of the features (see Figure 20). Looking north at Drywall 3 reveals two types of methods used to construct different sections of this wall. This change likely reflects different phases of use for the site. Figure 33 is a photograph exhibiting the western and eastern sections of wall (divided by the yellow dashed line). The western section is very tightly packed and well made with the capping stone laid using a flat coping technique (Higham, 1986: 28). The eastern section has been constructed similar to the other drywalls within the complex but is more robust. The capping stones on this section of wall were mostly removed, but those observed were noted to be laid using a tilted coping method (Higham, 1986: 28). The western section of wall is approximately 13 metres long and two metres high at its highest point. This section likely post-dates the rest of the complex as it was observed to be built into the eastern section of wall. The

material used to build this wall has possibly been taken from the house site or the byre due to the quality of the hewn stone used, with some specimens exhibiting the fine chisel marks observed on some of the blocks still extant in the homestead. Figure 34 shows the western section of wall looking north. A tree has fallen on the western end of the wall (see Figure 34: right) and will need to be removed. The eastern section of Drywall 3 is approximately 17 metres long and has a maximum height of 1.2 metres. This section of wall is still largely intact with fallen stones still within the vicinity of the structure. A small tree is growing out of the eastern end of the wall (see Figure 35: right) and will need to be removed.

Figure 32. Inner section of Drywall 3, looking south. The small window built into the wall (right).

Figure 33. Drywall 3: two separate methods of construction are exhibited either side of the yellow dashed line, looking north.

Figure 34. The western section of Drywall 3, looking north; a tree has fallen on the western end of the wall (right).

Figure 35. The eastern section of Drywall 3, looking north (left); a small tree growing out of the eastern end of the wall (right).

Drywall 4

Drywall 4 is a large perimeter wall with the longest part of the wall being the western boundary which measures almost 50 metres. Two smaller sections to the north and south, each measuring approximately 10 metres long. A lot of this wall is still intact with the maximum height being 1.2 metres and thickness being approximately 1.5 metres. The wall has been constructed similar to the other drywalls in the complex, except for the western section of Drywall 3.

This wall has been badly damaged by macrocarpa trees which are dropping large branches onto the feature, causing sections of the wall to collapse (see Figure 36). The macrocarpas, which were planted inside the wall, have overgrown areas of the structure causing it to bulge outward (Figure 37). For this reason, a lot of the stones dislodged from the wall are strewn about the western base of the wall.

Figure 36. Drywall 4: northern section of the wall with macrocarpa tree branches fallen onto the structure causing massive damage.

Figure 37. Drywall 3: macrocarpa growth pushing the wall outward.

Conclusion

This report has offered an overview of the condition of stone structures within the Rutherford's Farm site complex (I44/426) that are in varying degrees of ruin. The geology in the site vicinity is very complex, however, the stone used in the structures was found to be mostly field stone (volcanic tuff) with larger stone blocks possibly having been quarried from nearby. The smaller field stone used in masonry was observed to be more resistant to weathering than the larger blocks that are believed to have been quarried.

The stone ruins on the site were noted to be a mixture of masonry and drywall structures, with the primary focus of this report being on the masonry structures which are held together with mortar. The remaining masonry sections in the homestead have used a bonding mixture of lime and volcanic tuff, which is interpreted to have made the mortar more resistant to weathering. Most of the mortar used in the cow byre was noted to have been washed out, with evidence of an internal clay mortar being used. Some sections of the homestead and cow byre were noted to be unstable and will need to be propped or restored for stabilization.

The vegetation at Rutherford's Farm is the biggest cause of damage to the site, with large macrocarpas growing into each other and dropping large broken branches. The tree growing within the south-east corner of the cow byre will need to be carefully removed. There are several dead trees lying over structures within the site, that will also need to be removed. Grasses, fallen leaves and other ground-based vegetation is obscuring large sections of the stone features making recording of the condition difficult. The large stand of macrocarpas that were planted within the wall boundaries, have now pushed large parts of the wall over. It is suggested that the areas below the macrocarpas should be closed to public access until the trees have been cut back or removed. If any vegetation is removed from a structure, a plan needs to be put into place which will ensure the removal of vegetation will not cause further damage to the structure.

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