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EAGLAIS NA H-AOIDHE CHURCH

REPORT ON STORM DAMAGE AND THREATS FROM THE SEA

STATUS FOR APRIL 2015

SYNOPSIS

Eaglais Na H-Aoidhe (The Ui Church) is a Scheduled Ancient Monument. It was the principal church of medieval Lewis and Harris, thought to have been built in the late 14th century, on the site of an earlier chapel, by a dynasty of the McLeods of Lewis as their new religious centre on the island. It is dedicated to St Columba, the founder of the famous 6th century Abbey at Iona.

The church is now a partly roofed rectangular ruin with a graveyard to the south, east and west of it. Little remains of its land to the north because of the extensive sea erosion. The ruin is in good condition having been recently stabilised and consolidated through the work directed by us on behalf of the The Ui Church Trust. The Trust, created with a mission to preserve this important historic site and manned by local volunteers, has been very successful in justifying the need to preserve it and promoting interest in its history and significance. It has also attracted funding from numerous bodies, chiefly Historic Scotland, and getting significant support from the Council and the entire Western Isles community. Approximately £400k has been spent on its ongoing rescue plan so far, including a limited amount of more recent civil engineering work to reduce but not eliminate, the ongoing threats from the sea.

The longstanding threats from storms had always been an issue to resolve in parallel with the structural conservation work, however the devastation left over the last winter has significantly hastened the need for remedial and preventative measures. This has started with the support of Scottish Government in putting £80k into the sheet piled engineering as a first stage of such work. The immediate threats to the church and the graveyard have been reduced but will not be eliminated in terms of protecting a major heritage site until the owners of the surviving land to the north of the piling carry out repairs and commit to stabilisation of the revetment. Much of it has to be rebuilt, such is the severity of the damage.

Also, the recent erosion exposed and damaged, previously unseen sites of archaeological importance, most likely predating the existing church. Although, these sites received some temporary and limited protection, the threat to them is still real.

This Report spells out the consequences of doing nothing and advises of the range of likely costs in dealing with the necessary works. This will be in a range of £250k + VAT and will have to involve professional fee and archaeology.

The work is urgent and we most strongly recommend that it be carried out as soon as possible under our direction and supervision, given our background knowledge, initial preparations and designs to date. Although consents under the Ancient Monuments Act will be needed for all the measures we do not foresee problems in this regard given the historic and archaeological assets to be protected.

I. INTRODUCTION AND SUMMARY

This Report arises from a request for an overview of the ongoing encroachment of the sea into the lands at Eaglais Na H-Aoidhe which overlook the bay. These lands support the church, graveyard, path and recorded/unrecorded archaeology. Although the severity of the recent storms has resulted in major acts of destruction, it has followed a history of overtoppings, impacts and penetrations by the sea through a deteriorating porous defensive revetment which has been nearing the end of its functional structural life for some time.

At any lesser and less vulnerable site, the holes and type of damage could probably be accommodated by filling them with a few truck loads of stones, but this is not such a location. The implications of the deterioration and scale of destruction on this stretch of coastline have to be considered differently from common places, given the cherished heritage which is now being threatened. Although the loss of part of the pathway between the graveyard and the sea could be written off as low-priority for such things, the growth in awareness of the significances and importance of the ancient historic church on an international scale, and its surrounding archaeology, means that "doing nothing" is a totally unsound and unsafe concept. Neglect of previous and recent warnings could result in an immeasurable loss despite the backstop of the steel piling recently installed. Apart from this, the impact on the Community which has taken on all the challenges of the church on behalf of the Western Isles would be devastating.

Apart from this, its designation as a Scheduled Ancient Monument means that those who are responsible for "doing nothing" could be implicated in an act of criminal negligence under the relevant Act of Law.

These non-engineering statements are not conclusions from this report. It is another set of facts which underpins the urgent need for coordinated action between all the affected parties to plan and expedite robust and long lasting remedial work.

This report should be read in conjunction with our previous detailed reports on the damage and AOC reports from archaeological monitoring.

II. PROGRESS WITH ENGINEERING INTERVENTIONS

In March 2015, we oversaw the very efficient and well thought out installation method for our sheet pile design along the north side of the path. A highly specialised piling machine was brought in from Ireland to minimise vibration risk to the building and the graveyard given their developing fragility relative to the sea forces notwithstanding the consolidation and stabilisation work already completed on its masonry.

The line of piling now pragmatically defines a boundary of the accessible part of the land area Scheduled under the Ancient Monuments Act. It also defines the actions needed to complete the stabilisation of the site as a whole.

To the north of this line is an ongoing erosion which has to be addressed by the owners/custodian of that land.

To its south is the church and graveyard depending on the piling for its support until the revetment and its foundations can be made sound.

The purpose of "our" continuous curtain of steel piling is to prevent the ground under the building from sliding away as the sea gets closer to it and begins to weaken it through geotechnical and geological processes. It is not a final wave barrier although it could perform this function as a last resort; it is designed to be a containment vessel to manage the foundations below the church long before the sea finally breaches the revetment. The piling stops water passing through from the sea and stops the softened ground oozing north under the building.

This Report is about how critical it is not to let the sea through and the implications of "Doing Nothing" at the church and everywhere else along the vulnerable stretch of beach from the hard cliffs to the east of the church along to the ramped access to the beach. Solutions are offered in outline at this stage and need to be developed in detail. Some probable costs are also proposed.

In parallel with us monitoring the piling installation, we have been surveying the damage caused by the storms over the past winter and identified the various features and factors which have accelerated the decay to the point of devastation. This is an engineering exercise which has exposed the underlying extent of damage to the revetment in addition to the very visible big holes which have been scoured out of the ground after parts of it collapsed. These have been widely reported in the media and debated in Edinburgh (Historic Scotland) relative to the relatively large amount of Government Funding given to the piling intervention.



1. SPECIALIST PILE DRIVING MACHINE



2. SHEET PILES

The sea itself however has also revealed what has long been suspected from discoveries which had been made years ago during the main sea wall construction. There are important archaeological remains along the accessible land-sea boundary as well as historic burials in the area which was once a centuries old graveyard. This is being separately discussed between Archaeologists and Historic Scotland, but we are making reference to it here because the engineering of the interim storm damage reinstatement has to include measures to safeguard these discoveries and in order to facilitate expert recording and assessment in safer conditions. We have initiated this using some steel piles driven into one of the voids.

Regarding the archaeology next to the church the run up to the piling project included an exploratory trench excavated by hand by AOC Archaeologists. This was required under the conditions of the current Scheduled Monument Consent for the piling. Its excavations revealed two burial plots right on the edge of the slipping grassy slope. The remains have been made protected against damage and secured by slightly altering the line of the piles, but there are wider implications for the graveyard area as currently defined by the concrete wall. The exposure of the burials north of the church (remaining parts of the historic graveyard) therefore represents an issue for the Trust, the Council and the landowner.

III. ENGINEERING ASSESSMENT OF STORM DAMAGE

▪ AT THE CHURCH

The church is located at the east of the bay and seems to have suffered less direct sea action compared to the more central part albeit photographs show waves flying over the roof of the west chapel. Possibly the rock outcrop defining the east end of the bay diverts the main wave impact and the hardened shell of the main sea wall at the contemporary graveyard to the west of the historic side had concentrated more force on the crust on that side, also focused the circulation around the foot of the ramp.

It is impossible for us to assess this now but what we do know is that the whole length of the mortared stone revetment along the front of the church has been fatally broken by the battering from the storms. It had been failing progressively for many years through wear/tear and lack of maintenance, but the increased storm height and frequency have taken the sea right inside it and are pulling it down.



3. VIEW ON UNDERMINED CONCRETE TOE OF THE REVETMENT ALONG THE CHURCH AND LANDSLIP



4. ANOTHER VIEW ON THE UNDERMINED TOE AND VOIDED AND BULGING ARMOUR STONE REVETMENT

It is undermined, sunken, bossed, avalanching, hollowed out, cracked and holed, allowing water and erosive forces to get behind it. This is certain to have begun a process of further change and weakening of the physical condition of the longstanding sandy soft peaty subsoil layers which hold up the church. This drove the need for the urgent steel piling measures. The worn back wedge of ground left holding up the corner of the church simply cannot be further exposed to destabilising changes in robustness and composition.

The revetment was not very strong by engineering standards to start with. It is basically tapered stones set fairly neatly in cement mortar but relying for stability mainly on their own weight, intact joints and being knitted into the gravel and sand underneath. When storm water and air get underneath and behind however they either lift up or lose support through erosion; either way they "buckle" and crack.

The stones were held against sliding down the slope by a strong toe of concrete keyed into the beach. However this is now being undermined as the beach level gets progressively lowered. Erosion of the sandy gravel underneath which the toe sits on is very apparent. If the toe were to rotate further, all the stones will slide into the sea.

Basically the revetment has to be rebuilt or heavily reinforced until this can be done. An engineered method must be found very soon.

The owners must act as previously advised.

■ WEST OF THE CHURCH

The stone revetment has collapsed completely in two areas and is now failing in between them. The loose ground behind it has been carried away leaving some dangerous vertical faces liable to collapse and causing injury. The toe is still there but is damaged.



5. UNDERMINED CONCRETE TOE, ALSO VISIBLE VOIDS IN THE STONEWORK



6. LANDSLIP IN THE EAST PART OF THE REVETMENT.



7. BULGING AND VOIDED STONEWORK



8. SEVERE LOSS OF GROUND WEST OF THE CHURCH CAUSING SERIOUS PUBLIC SAFETY ISSUE; ALSO THIS IS AREA OF OUTSTANDING ARCHAEOLOGICAL IMPORTANCE

The severity of the damage at these two areas serves to illustrate the weaknesses in the revetment. The installed piles should minimise a risk of such a disaster at the church but the erosion must not be allowed to take down more of the revetment anywhere.

With regard to safety, we had put up marker tapes and recommended some temporary shoring but these cannot be treated as a long term solution and safety needs to be enforced by the Council.



9. DAMAGE TO SIDE OF SLEEPWAY

IV. DISCUSSION

The sea through geological time has progressively eroded and reshaped the land creating the current beach and bay profile. Coastal erosion generally is the subject of expert study involving many threads of investigation but from our immediate perspective we are caught up in recent events as the sea continues to erode, destroy, bury and reveal remains from all the periods of history from 8000 BC to the present.

Recent developments created the serious purpose of the large concrete sea wall to the west of the ramp. It also resulted in the sloping mortared stone revetment in front of the church itself and to the west of it. The latter is much less robust than the former.

The loss of the ancient graveyard around the church is of legendary proportions as is well documented in local history books providing real insight into the depth of incursion of the sea into the land.

It is a longstanding battle which was under control for a while but the sea has begun to win again. Even the harder rocky cliff face to the east of the church is splitting away and falling into the sea as a result of sustained storm action. The rest of the natural ground is sand underlain by peat which does not stand a chance against the sea without a hard crust to protect it.



10. OVERALL VIEW OF THE COASTLINE SHOWING ALL THE AREAS OF DAMAGE

In the past few months huge storms have scoured out two very large voids from the banking to the west of where the graveyard burn outfalls to the sea. In parallel with this, the full length of the revetment itself was battered again and is now collapsing with voids beneath and behind it causing cracks in its face and subsidence. Its foundations are directly undermined as the beach itself has dropped a couple of feet since it was built. All this has also been an obvious and direct threat to the church for many years. The 40metre long barrier of 5metre high steel sheet piles have had to be installed to prevent subsidence of the Church's foundations.

Philosophically, as a basis of our design, the piling is only a containment of the foundation strata. To many however it represents the very last line of defence against the sea. Regardless of how one might interpret the purpose of our design, the piles still need the ground in front of them and the protective crust of revetment to be in good condition. The piles will not stand completely on their own for very long should the sea be allowed to carve away the defences right up to the front of them. No one should therefore assume that the sea will be beaten by the piles. The front row of defence is the sea facing revetment.

The piling has been funded mainly by Historic Scotland as part of the church conservation plan as this body and the Church Trust are unable legally to do anything about the outside land and revetment.

To the west of the piled length, if the voids are left unattended, the loss will be the path, the cemetery boundary wall and ultimately the graves themselves after important archaeological deposits have been washed away. The latter is considered by archaeologists to be bronze age and are already damaged. The scoured face is standing unshored, unshielded and falling such that the owner and Council could be liable for cause injury or a fatality.

V. CONCLUSIONS

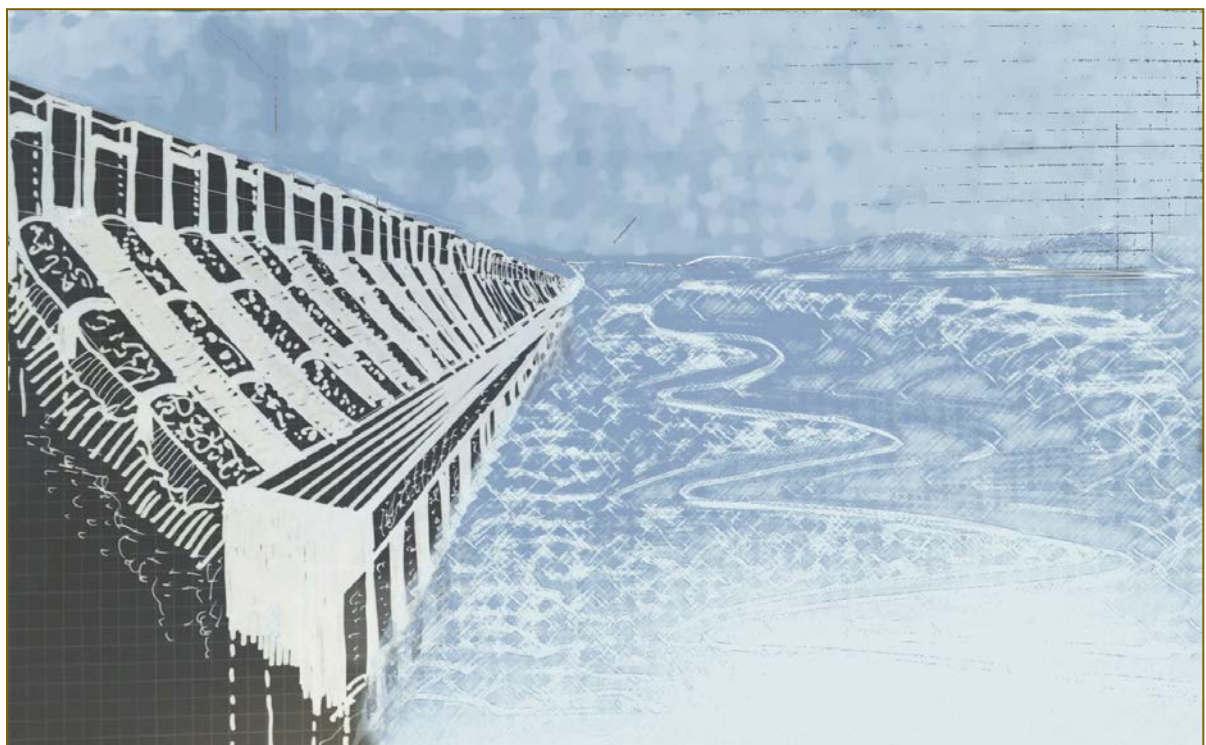
"Doing Nothing" to the revetment along beside the Church means an unacceptably high risk of loss of protective ground from continuing exposure to storms. It also represents high risk of progressive erosion and loss from normal tidal variations. The strength and protection from the revetment has all but gone. A particular combination of wave height and storm angle could see the revetment completely disappear and the Church and path left on the face of a ten foot high wall of steel. Progressive collapse could be the next stage as the supporting strata becomes directly exposed to the storms. It might not all happen at once but one small area would soon expand into this scenario.

"Doing nothing" along the west side of the burn is equally unacceptable. The scoured out holes from the breached revetment threatens the pathway, public amenity, safety, heritage, archaeology and the huge efforts by the community and funders to preserve access to the church.

"Doing nothing" overall also represents negligence of a heritage site, public safety, disrespect for the Law and other's rights. It ultimately threatens the reputation of those who are around the project, those who own the land and are legally responsible. Funders for any part of the future projects could abandon it because of residual risks.

Below there is an artistic impression of what a robust sea defence might look like. It has to be designed expertly in consideration of all the engineering and heritage protection criteria we have discussed above. A detailed technical appraisal has to be commissioned by the relevant owners, or Council, followed by a design to our approval.

This is not a new recommendation to the owners who are responsible but is a formal reminder. The Trust has played a significant role, with HS, in pushing for action, but they can do no more without support from those who are responsible for protecting the land from the sea. This obviously is not just any land; it is extremely important heritage.



VI. PROBABLE COSTS

In our opinion a budget of £250k + VAT might be required to cover the necessary work. This includes professional design fee and allowance for the required archaeological monitoring and recording.

This budget however is subject to detailed engineering appraisal and design.

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AOC REPORTS FROM ARCHAEOLOGICAL ASSESSMENT

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APPENDIX B

ADDISON CONSERVATION + DESIGN PAST REPORTS ON RISKS FROM THE SEA