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Proposals to Reduce Risk of Slips, Trips and Falls

at

Dunnottar Castle

for

Dunecht Estates

September 2024

E180125

Adams Napier Partnership is the trading name of Adams Napier Partnership Ltd., a limited company. Registered in Scotland No. SC548072.
Registered Office: 1 Rowan Court, Cavalry Park, Peebles EH45 9BU.

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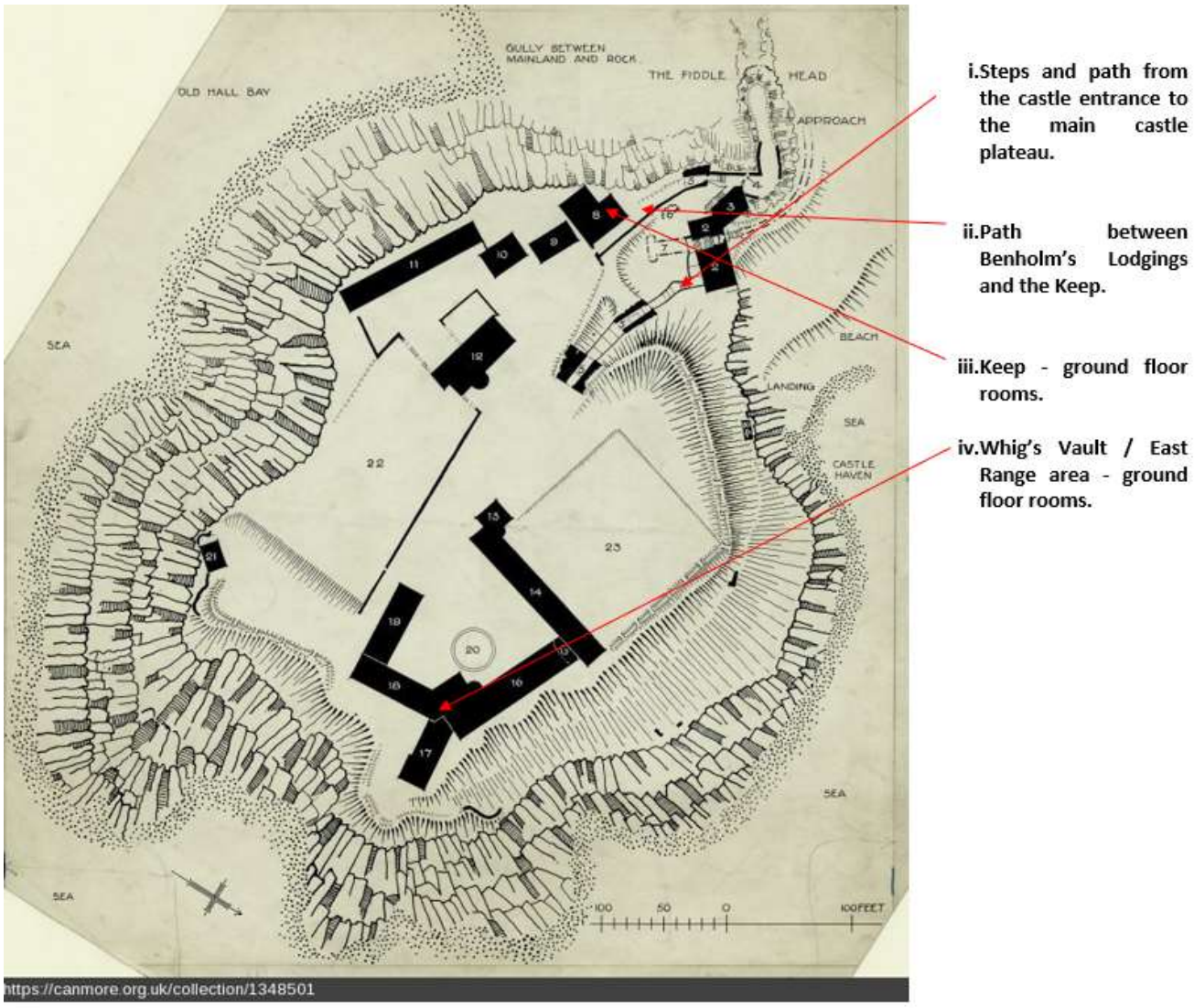
1.0 INTRODUCTION AND BACKGROUND

1.1 Following submission of updated Condition Survey and Conservation Management Plan reports in March 2023, Adams Napier Partnership was instructed by Kenneth Macpherson, on behalf of Dunecht Estates, to provide proposals to reduce the risk of slips, trips and falls in several high use areas of Dunnottar Castle.

1.2 The report was commissioned in response to the worsening condition of steps, paths and floors and health & safety concerns arising from increasing instances of slips, trips and falls. Consequently, the aim of this report is to accompany an application for Scheduled Monument Consent for interventions that will reduce risk whilst also ensuring minimal impact on the property's character and significance. This report should be read in conjunction with the updated Condition Survey and Conservation Management Plan report of March 2023.

1.3 Areas covered in this report:

i. Steps and path from the castle entrance to the main castle plateau.
ii. Path between Benholm's Lodgings and the Keep.
iii. Keep - ground floor rooms.
iv. Whig's Vault / East Range area - ground floor rooms.



Property Address

1.4 Dunnottar Castle
Stonehaven
AB39 2TL

Client's Name & Address

1.5 Dunecht Estate
Estates Office
Dunecht
Westhill
Aberdeenshire
Contact: Kenneth Macpherson

1.6 A survey of the areas identified as being of greatest risk was conducted by William Napier and Robert Adams, Directors, Adams Napier Partnership on Thursday 11 April 2024. This was preceded by a desk-based review of previous survey information and reporting, including a recording exercise that was carried out in August 2019 by Murray Archaeological Services Ltd on the steps which lead from the ticket Kiosk, through the pend tunnels to the main castle plateau.

1.7 Dunnottar Castle is a designated Scheduled Monument located upon a rocky headland approximately 2 miles south of Stonehaven on the northeast coast. The structures within the site are predominantly roofless ruins apart from Benholm's Lodgings, Drawing Room (north range), Silver House (west range), former Gent's Toilet and the Ladies/Gent's Toilets. The structures include buildings, tunnels, courtyards, paths and walls, the earliest thought to date from the 13th century and the most recent comprising 20th century visitor facilities.[1]

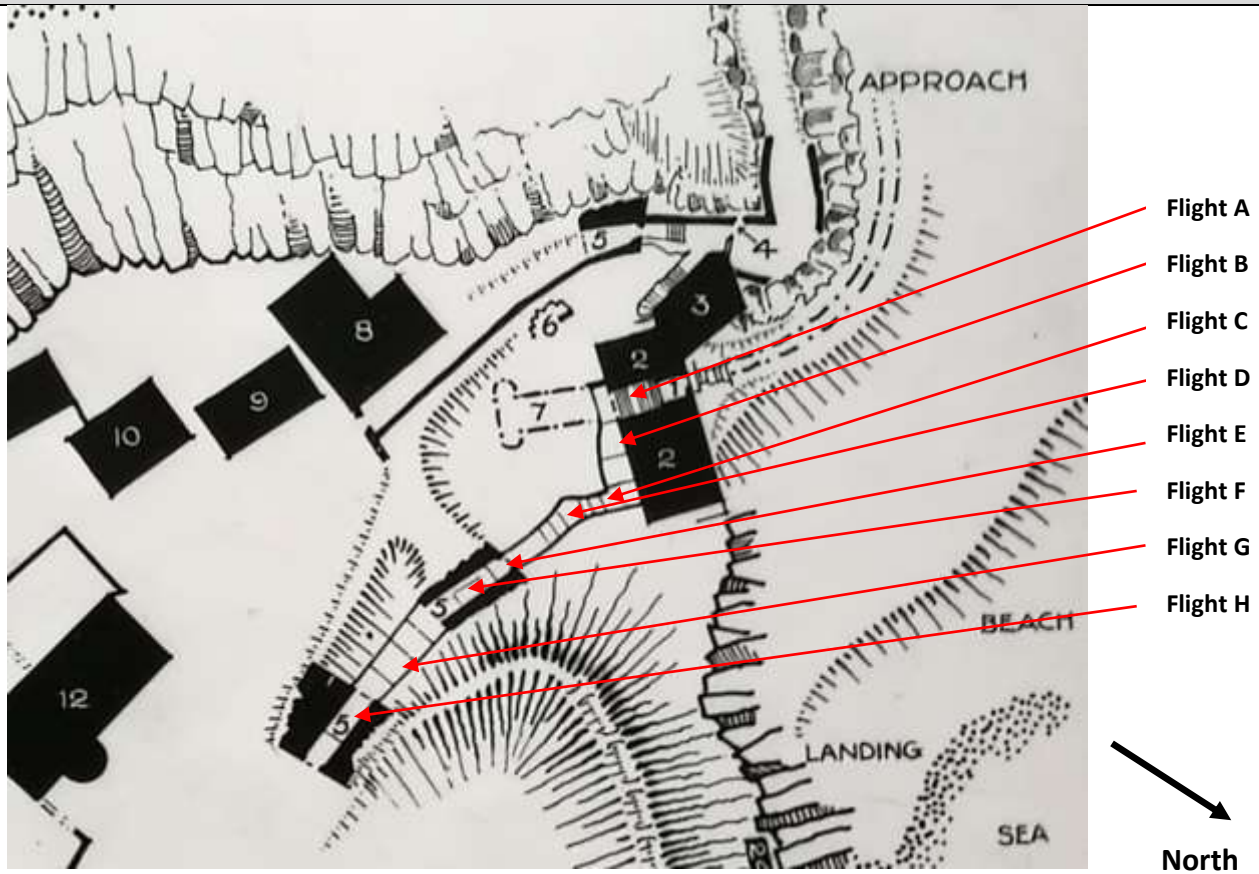
1.8 Visitors access around the property via a series of steps, ramped steps and paths that lead them to the various ruined structures that are predominantly located on the main castle plateau. Of greatest concern are the cobbled steps between the castle entrance and the main castle plateau where there has been a reported increase in slips, trips and falls. Proposals to reduce health and safety risks by replacing the cobbles with cement screeds up to 100mm thick was granted scheduled monument consent in November 2019.[2] However, the Conservation Plan revised in 2023, considered this approach detrimental to significance as it would remove cobbles laid in the 1920s by local unemployed workers using washed stones and pebbles gathered from the beach. Furthermore, replacing in cement was considered visually intrusive.

2.0 PROPOSALS

Proposals to reduce the risk of slips, trips and falls are contained within the table below. Each proposal is accompanied by a heritage risk assessment and mitigations intended to minimise impact on the property's significance. These should be read in conjunction with appended conservation management plan, drawings, sketches and preamble that accompany the Scheduled Monument Consent application.

[1] http://portal.historicenvironment.scot/designation/SM986
[2] https://portal.historicenvironment.scot/decision/900021217

i. Steps and path from the castle entrance to the main castle plateau.



General Description

Steps and step risers constructed of predominantly roughly dressed stonework, with localised use of flat undressed stones – all generally with cement mortar joints.

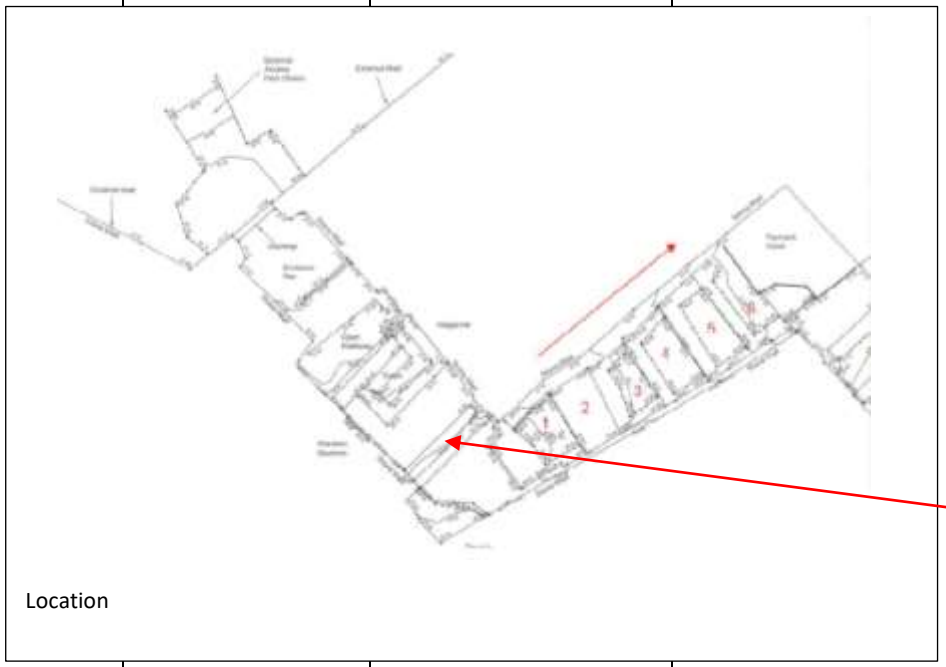
Side drainage channels formed from mix of flat undressed and rounded stones – all generally with cement mortar joints.

Ramped tread sections between steps constructed of rounded washed pebbles, some with decorative patterns.

Steps immediately inside entrance (Ref: A) appear little changed since recorded in late 19th century. Thereafter cobbled areas (refs: B to H) reported to date to 1920s when laid by local labour.

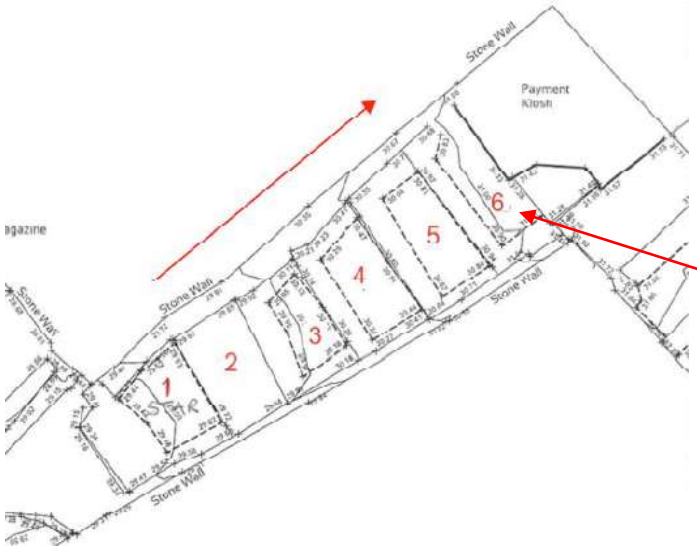
A Scheduled Monument Consent Application (300040384) was approved on 4 November 2019 to allow the removal of the cobbled treads with replacement with a cement based screed. However, following the production of a conservation management plan (updated 2023), this approach was considered detrimental to the significance of the site. Consequently, new proposals have been developed that will allow retention of the cobbles by carrying out localised repair and maintenance work as shown below.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Stone steps **Flight A**	Localised failing joints, damaged steps and paving with some settlement that is increasing risk of slips, trips and falls.	Repoint failing joints, with deeper voids packed with pinning stones, and rebed misaligned stonework in areas where there are tripping hazards. Replace one whole step that is eroded with insufficient tread/going c.800x225x130mm. Part indent adjacent stone c.250x225x130mm where delaminating and is a tripping hazard. Both shown opposite.	Minimal providing stonework is re-bedded in same locations using appropriately designed mortar and matching stone.	 General View Upper most 3 steps **Replace** **Part indent** Close up of step repairs required.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. New stonework in suitably matching stonework using salvaged stone from elsewhere on the Dunecht Estate. The new step will be cut and dressed to match the step immediately left which appears to be a recent replacement.


Location

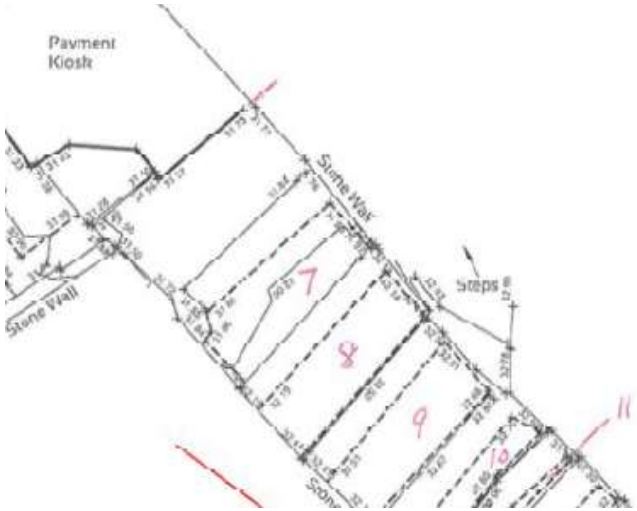
Spoil heap of local stone collected from the estate. This will be cut down, dressed and used to repair and form step risers.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Cobbled and Stone Steps **Flight B (cobbled steps 1 to 6)** References follow those used in the archaeologic recording report of 2018/19 – see appended	Fair, locally poor where there are localised failing joints and loose stones and cobbles. A small section of cobbles is missing to the uppermost tread (ref. step 6) immediately below the kiosk. Condition here has deteriorated since recorded in 2018.	Repoint any open/failing joints and rebed loose stones and cobbles in their current locations. Retain as existing with minimal like for like repairs as required in future to make good failing joints and loose stones. Replace missing cobbles at upper most tread to match surrounding using loose cobbles lifted previously and stored on site.	Minimal providing stonework is re-bedded in same locations using appropriately designed mortar and matching stone.	 General View Replace missing cobbles (c.0.3m2) at uppermost tread of cobbled steps 66 to match surrounding using loose cobbles lifted previously and stored on site.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site.

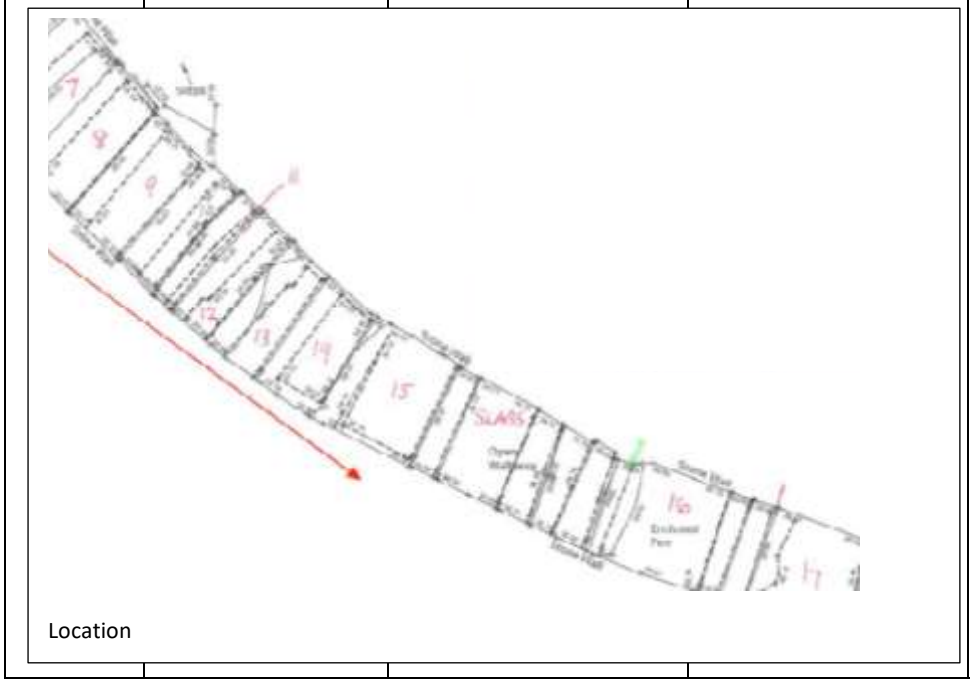


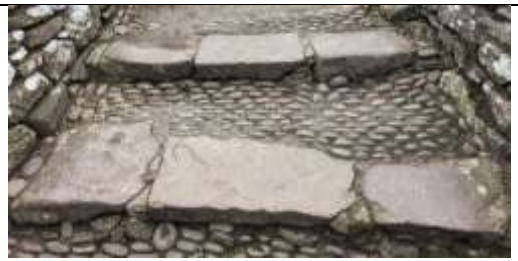
Location

Flight C (steps 7 to 8)	Poor. Missing cobbles to the two uppermost treads (refs. 7 & 8) with those that remain loose, uneven and poorly repaired. Condition here has deteriorated since recorded in 2018. Failing joints and uneven step risers.	Lift all existing cobbles and set aside for relaying along with cobbles previously lifted and stored on site. Repoint failing joints, including use of pinning stones to pack out voids, and rebed uneven step risers in their current locations.	Minimal providing stonework is re-bedded in same locations and cobbles are laid to match surrounding surviving work.	 Steps at Kiosk – repoint failing joints. Cobbled Step 7 - lift and relay cobbled tread 100%– approx. area 1.51m2. Repoint failing joints and rebed uneven stone step risers. Cobbled Step 8 - lift and relay cobbled tread 100%– approx. area 0.77m2. Repoint failing joints and rebed uneven stone step risers.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site.

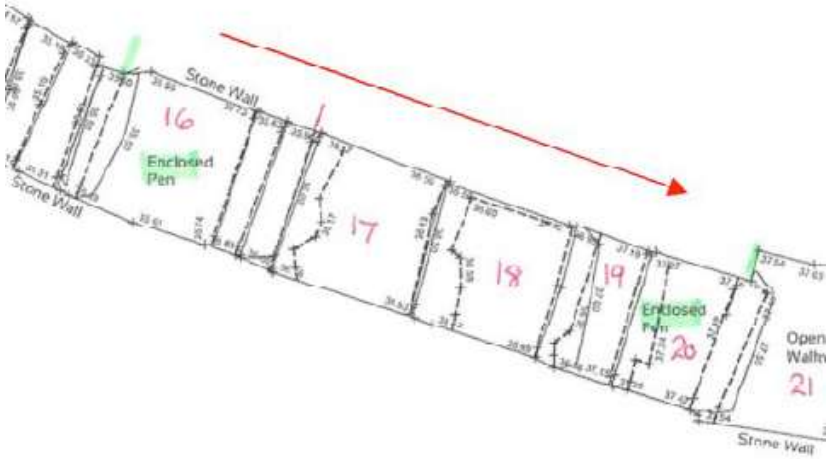


Location

Flight D (cobbled steps 9 to 15 and stone steps and paving between cobbled steps 15 & 16)	Poor. Missing cobbles to treads of 9, 10, 11 & 14 with those that remain loose, uneven and poorly repaired. Condition here has deteriorated since recorded in 2018. Uneven treads to 12 & 13. Tread 15 has a steep gradient with frequent reports of slips. Failing joints and uneven step risers.	Lift all existing cobbles to treads 9, 10, 11, 12, 13 & 14 and set aside for relaying along with cobbles previously lifted and stored on site. Repoint failing joints, including use of pinning stones to pack out voids, and rebed uneven step risers in their current locations. Reduce slip risk by introducing new a new step in centre of tread 15 and adjusting cobble gradients either side accordingly – See appended drawing DC_PATHS_04A_FLIGHT D Step 15	Minimal providing stonework and pinnings are re-bedded in same locations and cobbles are laid to match surrounding surviving work. New step risers should match surrounding work.	 Location Cobbled Step 9 - 100% (c.1.19m2) Cobbled Step 10 - 100% (c.0.75m2) Cobbled Step 11 - 100% (c.0.97m2) Cobbled Step 12 - 100% (c.0.9m2)	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site. Stonework for new step riser to be of suitably matching stonework using salvaged stone from elsewhere on the Dunecht Estate. The new step will be cut and dressed to match surrounding work.

				 Cobbled Step 13 - 100% (c. 0.92m2) Cobbled Step 14 - 100% (c.1.19m2) Cobbled Step 15 (c.2.21m2) with new step to be introduced in centre and gradients adjusted to reduce slip risk. Steps and paving between cobbled steps 15 & 16 – repoint failing joints and rebed loose/uneven stones in there current locations.	

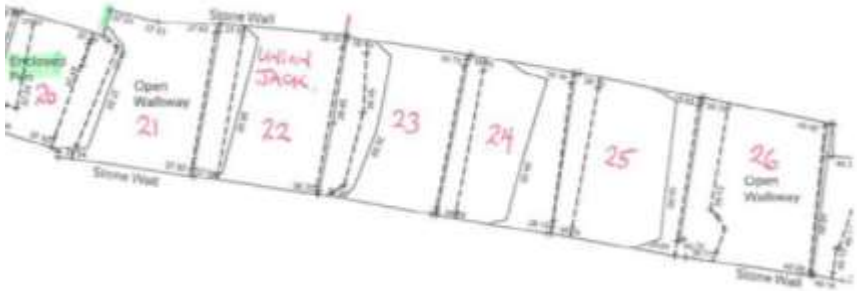
Flights E & F (cobbled steps 16 to 20, and stone steps between cobbled steps 16 & 17)	Fair. Localised failing joints and loose/uneven cobbled treads and stone steps.	Minimal repairs as required to reduce slips and trips risk. In most cases this will only require localised repointing and resetting of loose/uneven cobbles and stone steps, except to 18 where the uppermost c.40% of cobbles are uneven and require rebedding.	Minimal providing stonework and pinnings are re-bedded in same locations and cobbles are laid to match surrounding surviving work.	 Cobbled Step 16 – patterned cobbles – minimal works. Steps bewteen cobbled steps 16 and 17 – minimal work – repointing. Cobbled Step 17 – patterned cobbles – minimal works.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site.



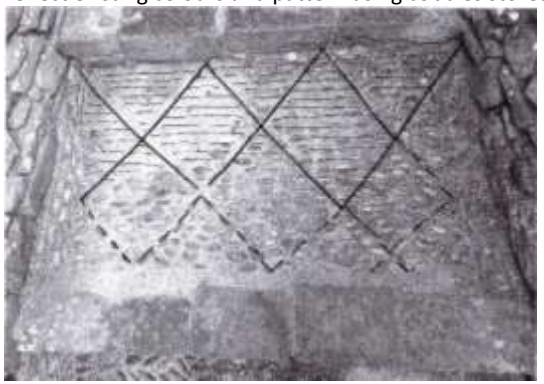
Location

				 Cobbled Step 18 – uppermost c.40% uneven to be re-bedded. Cobbled Step 19 – minimal works. Cobbled Step 20 – minimal works.	

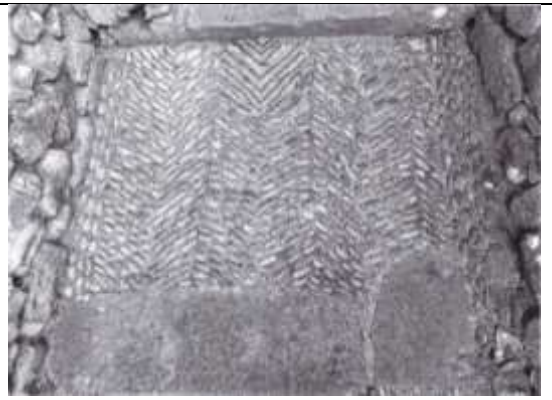
Flight G (cobbled steps 21 to 26)	Poor. Missing cobbles and/or locally poor quality previous repairs to patterned cobbled treads 23, 24, 25 & 26). Condition here has deteriorated since recorded in 2018. Locally failing joints to step risers.	Minimal repairs as required to reduce slips and trips risk. This will require localised repointing and resetting of missing/loose/uneven cobbles to 23, 24, 25 & 26 and repointing failing joints to stone steps risers.	Minimal providing stonework and pinnings are re-bedded in same locations and cobbles are laid to match surrounding surviving work.	 Cobbled Step 21– patterned cobbles – minimal works. Cobbled Step 22 – patterned cobbles – minimal works. Cobbled Step 23– patterned cobbles – approx 30% rebedding to reflect existing colours and pattern using cobbles stored on site.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site. Affected cobbles to patterned treads to be rebedded reflect existing colours and pattern using cobbles stored on site. Previous record photographs to be used, including from archaeological recording report of 2018/19.



Location

				 Cobbled Step 23– patterned area to be rebedded. Cobbled Step 24– patterned cobbles – approx 45% rebedding to reflect existing colours and pattern using cobbles stored on site.  Cobbled Step 24– patterned area to be rebedded.	

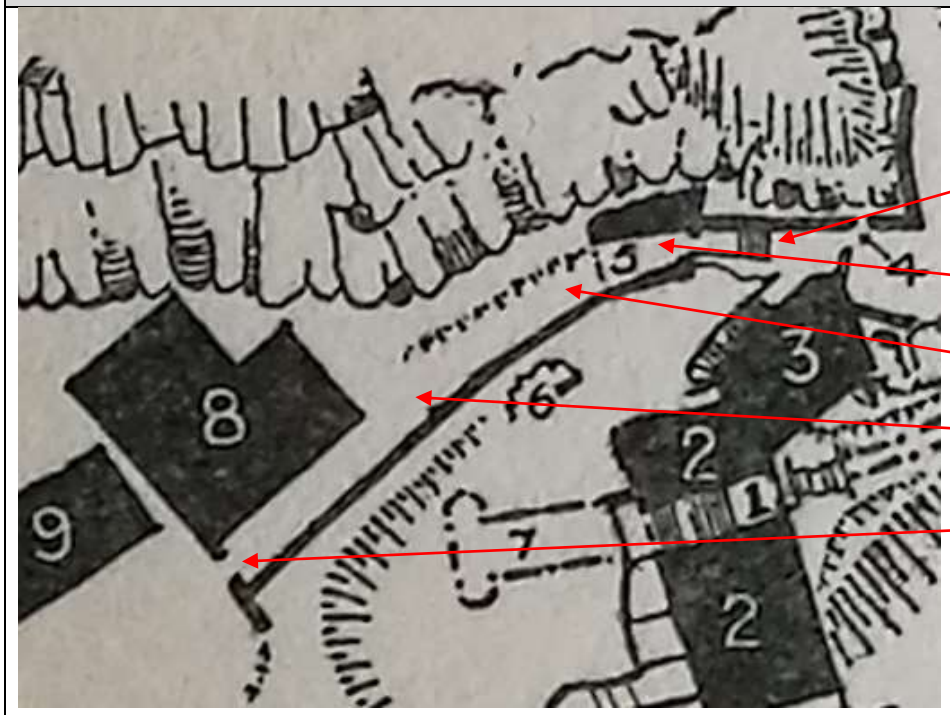
				 Cobbled Step 25– patterned cobbles – approx 45% rebedding to reflect existing colours and pattern using cobbles stored on site. Cobbled Step 25– patterned area to be rebedded. Cobbled Step 26– patterned cobbles – approx 10% rebedding to reflect existing colours and pattern using cobbles stored on site.	

				 Cobbled Step 26– patterned area to be rebedded.	

Flight H (cobbled steps 27 & 28)	Fair. Localised failing joints to cobbled treads and stone steps. Localised loose and missing cobbles. Damaged 'threshold' step at upper end of cobbled step 28 which is a tripping hazard in an area which is prone to flooding in proximity of the timber path due to historic footfall causing depression.	Minimal repairs as required to reduce slips and trips risk. In most cases this will only require very localised repointing and resetting of loose/uneven cobbles and repointing stone step risers. Proposal is to lift and store the damaged 'threshold' stone and cut back the timber path to allow laying a larger area of paving c. 1.1x0.6m bedded on semi-dry mortar bed. This will reduce risk of slips and falls. Stone paving stored on the site will be stored, which together with the mortar bed will not require excavations greater than 100mm.	Minimal providing stonework and pinnings are re-bedded in same locations and cobbles are laid to match surrounding surviving work. Excavations within topsoil only to a depth no greater than 100mm. A consultant archaeologist can be on standby if required.	 Cobbled Step 27 – minimal works. Cobbled Step 27 – minimal works generally. Cobbled Step 27 – lift and store damaged 'threshold', and cut back timber path to allow laying larger area of paving c. 1.1x0.6m.	Record locations before commencement and again at completion. Records to be kept on site. Loose stonework to be rebedded in their original/current locations. Use appropriately specified mortar designed to withstand level of exposure and wear. Replacement cobbles to be used from stock of cobbles previously lifted and stored on site. Paving stored at the site will be used and will match new stone paving laid elsewhere. Excavations within topsoil only to a depth no greater than 100mm. A consultant archaeologist can be on standby if required.

Location

ii. Path between Benholm's Lodgings and the Keep.



Stone Steps and Paving at Benholm's Lodging

Gravel Path, including below covered Pend

Timber Steps

Gravel Path to northeast corner of Keep

Arched opening with paving and cobbles in proximity

North

General Description

Natural stone paving and steps in proximity of Benholm's Lodgings leading to a gravel path that takes visitors beneath a covered vaulted pend to timber steps and another gravel path that leads to an arched opening at the northeast corner of the Keep where there remains some natural stone paving and cobbles.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Natural stone paved area and steps at Benholm's Lodgings	Localised failing joints and settlement with ledges that is a tripping risk.	Repoint failing joints and rebed misaligned stonework to provide even walking surface.	Minimal.		Take record photographs before and after. Use appropriately specified lime based mortar. Rebed stonework in existing locations.

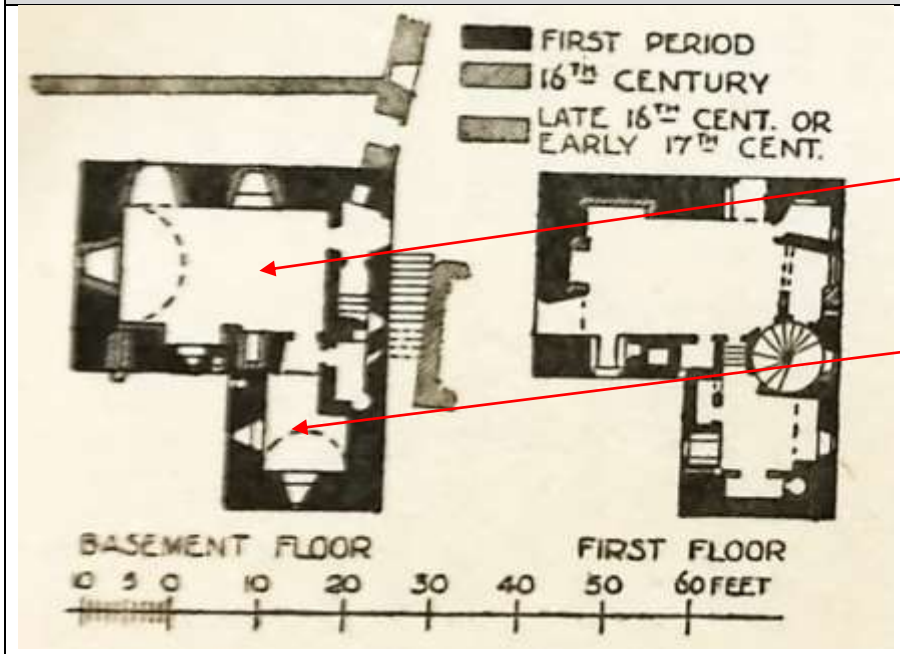
Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Pea gravel path on type 1 aggregate subbase starting at stone steps at Benholm's Lodgings to timber steps at east side of covered pend.	Poor condition due to aggregate continually being washed out during increasingly frequent instances of heavy rainfall. This results in a high riser at the foot of the timber steps, uneven walking surface, and exposes larger stones which are a tripping risk. Furthermore, there is a slipping risk from washed out aggregate gathering on the stone steps and paving at Benholm's Lodgings.	Regrade type 1 subbase and lay natural stone path to from top of steps at Benholm's Lodgings eastwards to east side of pend. Maximum scraping back to allow new paving and bed no greater than 100mm. Proposed paved area between steps and pend c.4.2x1.6m. Proposed paved area through pend 5.0x0.8m. New paving to be laid on semi-dry mortar bed. See appended drawing DC_PATHS_01A_STEPS AND PATH from PEND to KEEP. Stone paving to be of reclaimed slate store on site or riven Caithness paving.	Some. However, comparative photograph show that there has been much change in this area, including a greater use of stone paving previously - see p. 33 of the Conservation Management Plan. Introducing natural stone paving will provide an even walking surface to reduce risk. The depth of existing aggregate subbase and gravel will be able to accommodate the depth of new paving and bedding without disturbing older layers and fabric beneath.	 	Take record photographs before and after. Use appropriately specified lime based bedding and jointing mortar. New paving and provisional step will be in suitably matching stonework using salvaged stone stored on site and/or from elsewhere on the Dunecht Estate. Works confined to areas previously disturbed, made up and backfilled. If required, a consultant archaeologist could be on stand by to record any older fabric or remains exposed during regrading of the subbase.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Timber Steps to east of covered pend. Treads between timber risers backfilled with compacted type 1 subbase and finished with pea gravel.	Inconsistent rises between 120 and 320mm. Uneven walking surfaces from gravel being washed out.	Option A Adjust existing timber step riser heights to c.190mm each. Pack stone pinnings beneath to stabilise. Regrade treads with type 1 subbase and finish with compacted crushed stone aggregate blinding.	Minimal if timber risers retained. Works confined to areas previously disturbed, made up and backfilled.		Take record photographs before and after.

		Option B Alternatively, replace timber steps with salvaged stone from elsewhere on the estate and new treads in riven Caithness paving c.65mm thick. See appended drawings: DC_PATHS_01A_STEPS AND PATH from PEND to KEEP and DC_PATHS_02A_STEPS from PEND to KEEP Proposed interventions confined to areas previously made up with type 1 and timber sleepers therefore no risk to underlying fabric. Introducing natural stone paving will provide an even walking surface to reduce risk. The depth of existing aggregate subbase and gravel will be able to accommodate the depth of new paving and bedding without disturbing older layers and fabric beneath.	Some. However, the timber steps and backfilled treads are clearly later work. The proposed work is designed to sit within areas previously disrupted and/or made up to form the timber steps. Therefore, unlikely to disturb early fabric. Step E Step D Step C Step B Step A New paving proposed in pend.		Take record photographs before and after. Works confined to areas previously disturbed, made up and backfilled. If required, a consultant archaeologist could be on stand by to record any older fabric or remains exposed during regrading of the subbase.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Gravel path from timber steps east of covered pend to arched opening at the northeast corner of the Keep where there where there remains some natural stone paving and cobbles.	Washout of gravel has exposed buried stones and has created ledges and ponding around paving at the arched opening.	Regrade and lay new gravel to provide even walking surface. Introduce new paving to increase width of arched opening to reduce trip risk and rest cobble stones where ponding occurs. Repoint open joints. Scraping back to accommodate new paving and semi-dry mortar bed between 75 and 100mm.		 	Take record photographs before and after. Relay cobbles in same location, but re-level to avoid ponding. Use appropriately specified lime based bedding and jointing mortar. New paving in suitably matching stonework using salvaged stone from elsewhere on the Dunecht Estate.

iii. **Keep - ground floor rooms**



Main Room

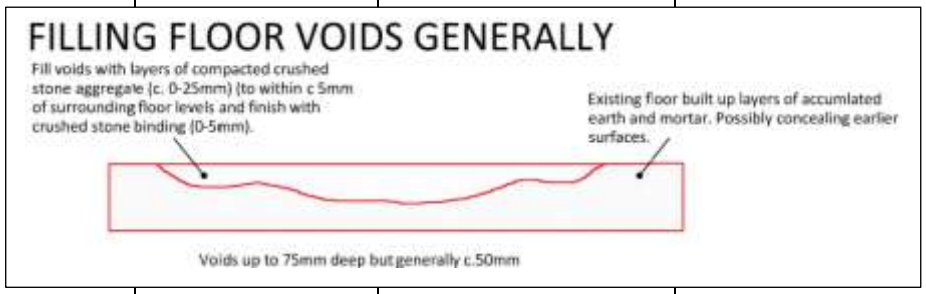
Side Room

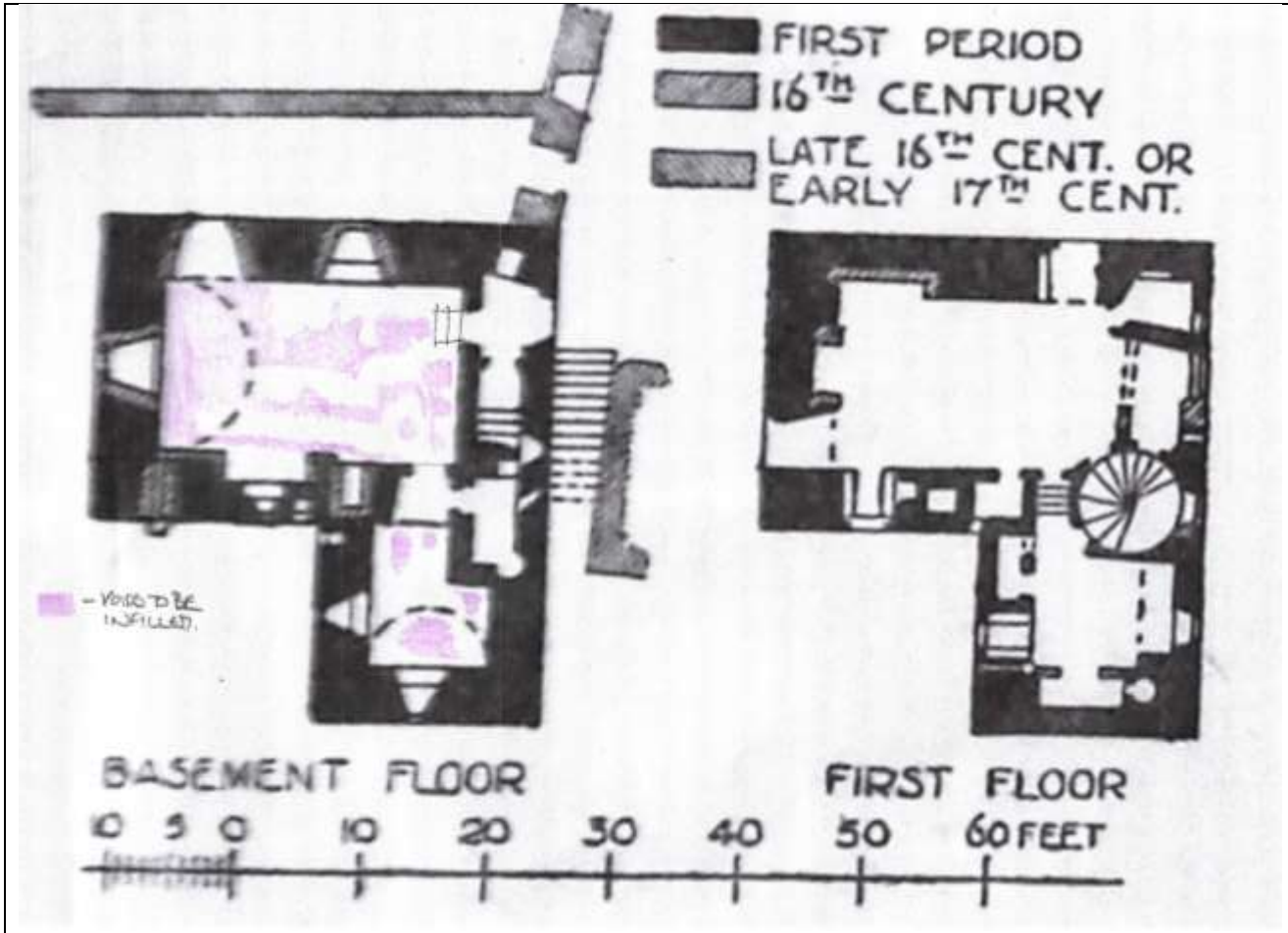
North

General Description

Earthen type floors. Judging by exposed and protruding cobbles and stones in some areas, questionable whether or not these floors are original, added later or have formed since the keep was ruined.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Main and Side Room	Voids and holes forming in floor finish resulting in uneven and broken edges and surfaces resulting in tripping hazards. Issues exacerbated by continual foot fall and exposure to driving rain which enters through unprotected openings. Extent of filling required is around 25% of the floor area. Depth of filling up to 75mm, but generally up to 50mm.	Minimal – backfill voids and uneven areas with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.	Some, but retains as much of the existing finish as possible with new material introduced clearly identifiable.		Infilling voids only – no excavations. Take record photographs before and after.

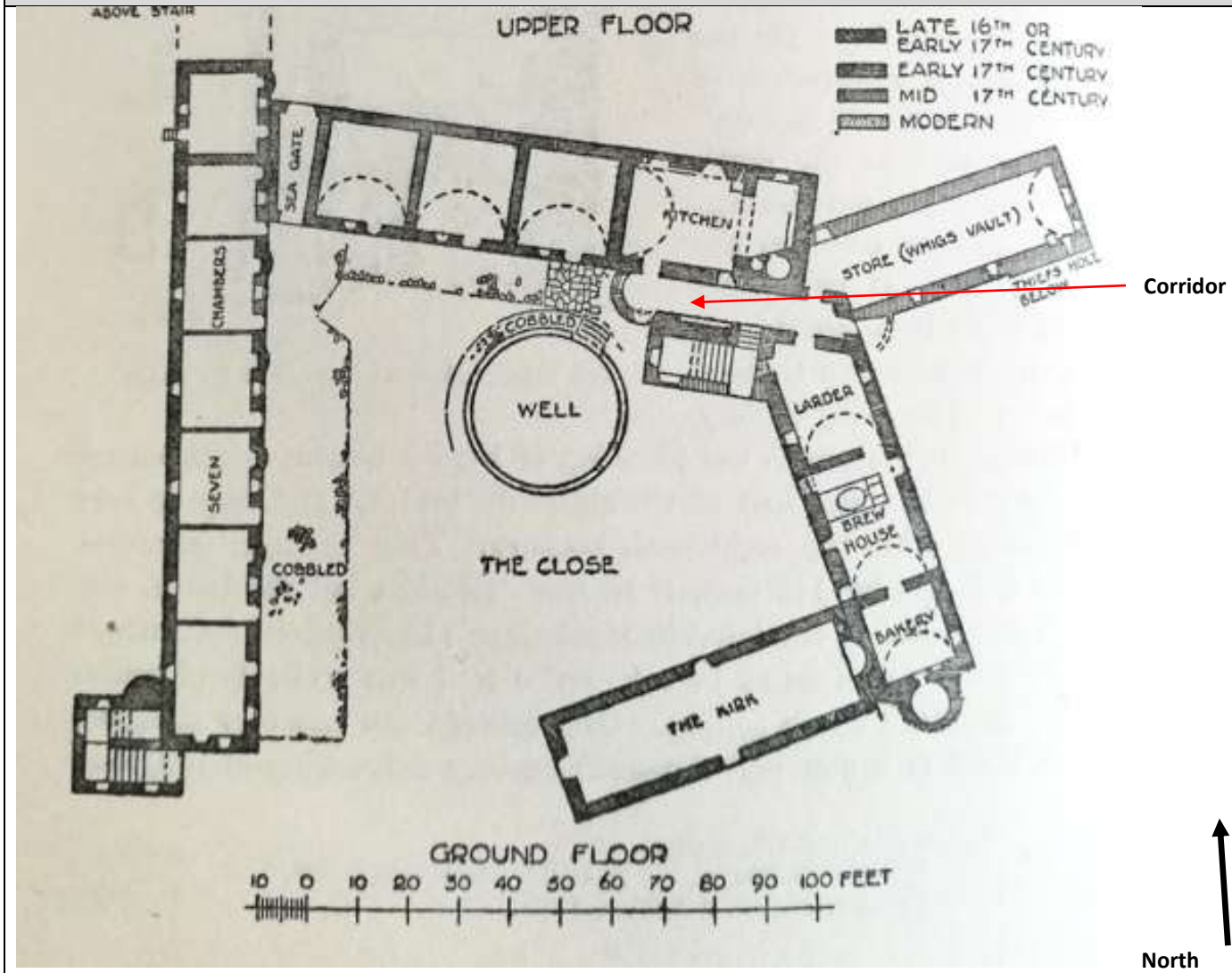




Marked up floor plan showing extent of void filling to ground floor to reduce risk of slips, trips and falls

It is proposed that voids in the floors are backfilled with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.

iv. **Whig's Vault / East Range area - ground floor rooms – Corridor, Kitchen, Whig's Vault, Larder & Brew House**



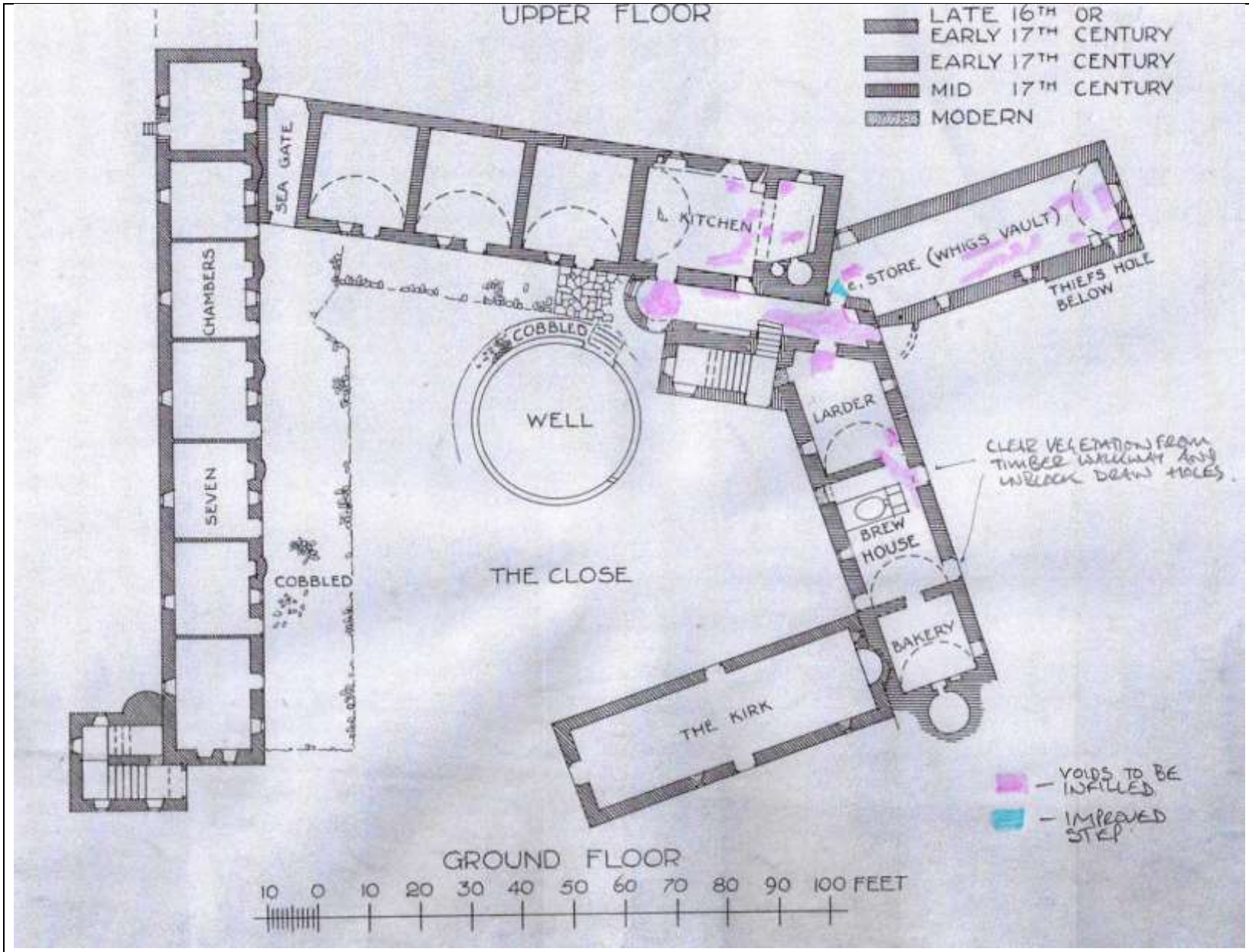
Corridor

North

General Description

Earthen type floor, with layers of lime type mortar (or fallen plaster?) visible at broken edges in corridor. Judging by exposed and protruding cobbles and stones in some areas, questionable whether or not these floors are original, added later or have formed since this areas was ruined.

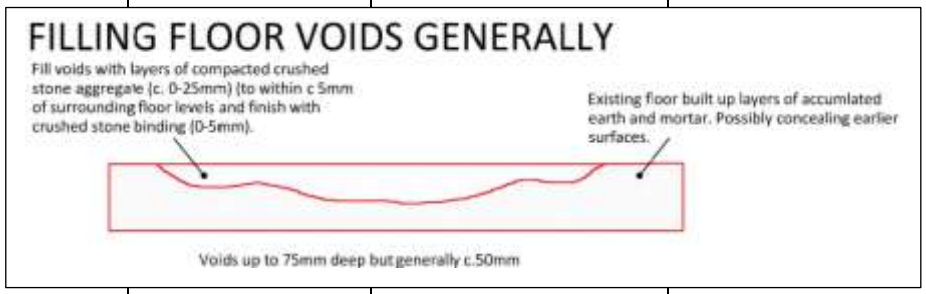
Voids throughout the corridor, kitchen, Whig's Vault, Larder and Brew House are a tripping hazard.

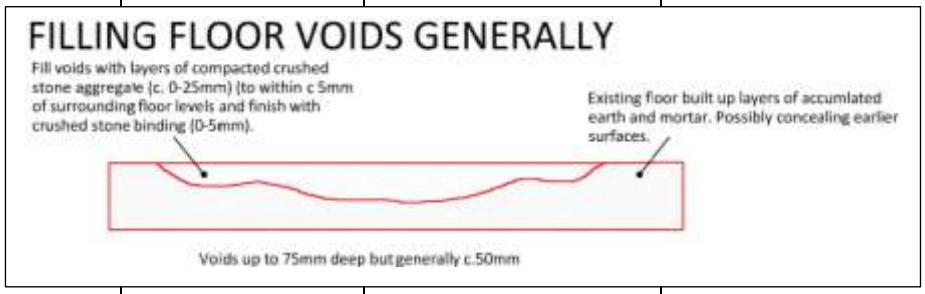


Marked up floor plan showing extent of void filling to ground floor to reduce risk of slips, trips and falls

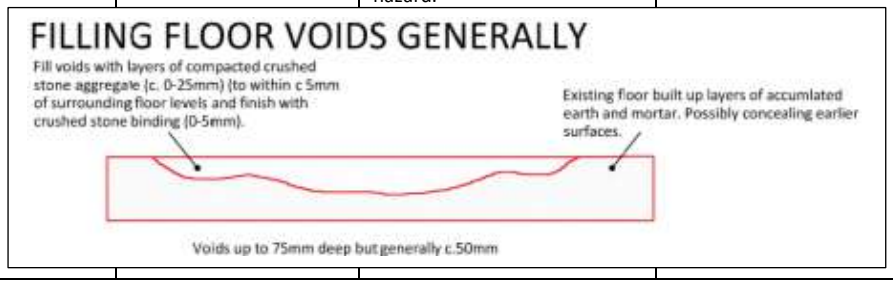
It is proposed that voids in the floors are backfilled with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Corridor	Voids and holes forming in floor finish resulting in uneven and broken edges and surfaces resulting trip hazards. Issues exacerbated by continual foot fall and exposure to driving rain which enters through unprotected openings.	Minimal – backfill holes and uneven areas with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.	Some, but retains as much of the existing finish as possible with new material introduced clearly identifiable.		Infilling voids only – no excavations. Take record photographs before and after. Differing materials will show difference between old and new.

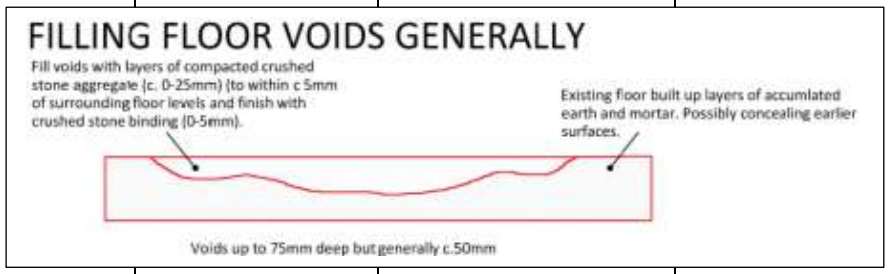


Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Kitchen	Voids and holes forming in floor finish resulting in uneven and broken edges and surfaces resulting trip hazards. Issues exacerbated by continual foot fall and exposure to driving rain which enters through unprotected openings.	Minimal – backfill holes and uneven areas with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.	Some, but retains as much of the existing finish as possible with new material introduced clearly identifiable.	 	Infilling voids only – no excavations. Take record photographs before and after. Differing materials will show difference between old and new.

Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Whig's Vault	Raised section immediately inside opening from adjacent corridor is uneven with a variable step riser down to the main floor area. Main floor area - Voids and holes forming in floor finish resulting in uneven and broken edges and surfaces resulting trip hazards. Issues exacerbated by continual foot fall and exposure to driving rain which enters through unprotected openings.	Raised section – as shown on photo - build up give a consistent rise. Lay natural stone paving to create a level landing immediately inside entrance where there is an uneven raised section. New paving can be laid onto existing fabric with no disruption. Total thickness of new paving including semi-dry mortar bed will be no greater than 100mm. Voids where depth is greater to be packed with stone offcuts. Total new rise = c.250mm. See appended drawing DC_PATHS_03A_WHIGS VAULT STEP and FLOORS	Some, but will protect existing exposed fabric from further damage resulting from foot fall.	 	Infilling voids only – no excavations or disturbance. Take record photographs before and after.. Differing materials will show difference between old and new. Use appropriately specified lime based bedding and jointing mortar. New paving in suitably matching stonework laid over existing fabric with no disruption below – possibly using salvaged stone from elsewhere on the Dunecht Estate.
		Minimal – backfill holes and uneven areas with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.	Some, but retains as much of the existing finish as possible with new material introduced clearly identifiable.		



Ref	Condition	Repair / Intervention Approach	Potential Heritage Impact	General Photographs	Mitigation
Larder and Brew House	Voids and holes forming in floor finish resulting in uneven and broken edges and surfaces resulting trip hazards. Issues exacerbated by continual foot fall and exposure to driving rain which enters through unprotected openings. Ponding at openings made worse by blocked drains and vegetation growing through slated walkway externally.	Clear vegetation from slatted walkway and unblock drains to reduce ponding at external openings – estate action. Minimal – backfill holes and worse affected uneven areas where puddles are forming at entrances with crushed stone aggregate subbase and finish with crushed stone blinding. Shallow-ness of voids restricts use of geotextile separating layer which if fitted would create a tripping hazard.	Some, but retains as much of the existing finish as possible with new material introduced clearly identifiable.	 	Infilling voids only – no excavations or disturbance. Take record photographs before and after.. Differing materials will show difference between old and new.



3.0 CONCLUSION

3.1 The interventions proposed for each area are intended to reduce risks associated with slips, trips and fall in a way that will have minimal impact on the property's significance and character. Taking invasive action, but by doing so in a measured way by continuing the use of matching materials and recording throughout, will reduce both risk and future maintenance.

3.2 The steps from the castle entrance to the main castle plateau present slip/trip hazards due to their steep and inconsistent gradients combined with the cobbles polished surface. This risk is increased further where cobbles are missing and/or loose. The suggested approach of relaying loose/missing cobbles reduces risk while retaining the significance of the work carried out under a labour scheme in the early 20th century. Introducing a new step to reduced gradients will reduce risk whilst retaining the pleasing aesthetic achieved by using cobbles.

3.3 The paths between Benholm's Lodging's and the Keep are predominantly sloping gravel paths which are affected by rainfall and surface water run-off. After heavy rain the gravel is washed to lower levels and the path eroded posing a health and safety risk from both slips and trips. To prevent a recurrence of the issues evident a paved path is proposed along with improving the steps in close proximity. This will formalise the path as well as helping to minimising erosion.

3.4 The earthen floors (which appear formed by latter accumulated material) to the Keep, Whig's Vault and the East Range, are all similarly affected by surface water wash out (and continual footfall). The proposed filling of voids with compacted aggregate will retain and protect existing floor finishes while providing a more even and easier to maintain walkway surface.

Signature	**Representing**	**Date**
	William Napier MRICS **Adams Napier Partnership**	September 2024
	Robert Adams MRICS **Adams Napier Partnership**	September 2024