

Part 8 Application for Nenagh Historical and Cultural Quarter

Structural Condition Report on Barbican Walls and Proposed New Entrance to Nenagh Castle

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1 Introduction

This report forms part of the Part 8 planning application for the Nenagh Historical and Cultural Quarter. PUNCH Consulting Engineers undertook an initial Structural condition inspection of the Barbican Walls located within the grounds of Nenagh Castle in the centre of Nenagh Town in August 2023. The purpose of this inspection was to inform the feasibility of forming a new access to the castle through the existing openings in the Barbican walls from the O’Rahilly Street Car Park from a Health and Safety perspective. The purpose of this inspection was also to help inform the design for a proposed entrance utilising a link bridge across the historical moats and through the original stone arches into the castle grounds.

The scope of the topics covered in this report include the follows:

- a. Description of inspection undertaken
- b. Description of structure.
- c. Inspection findings
- d. Conclusions and Recommendations

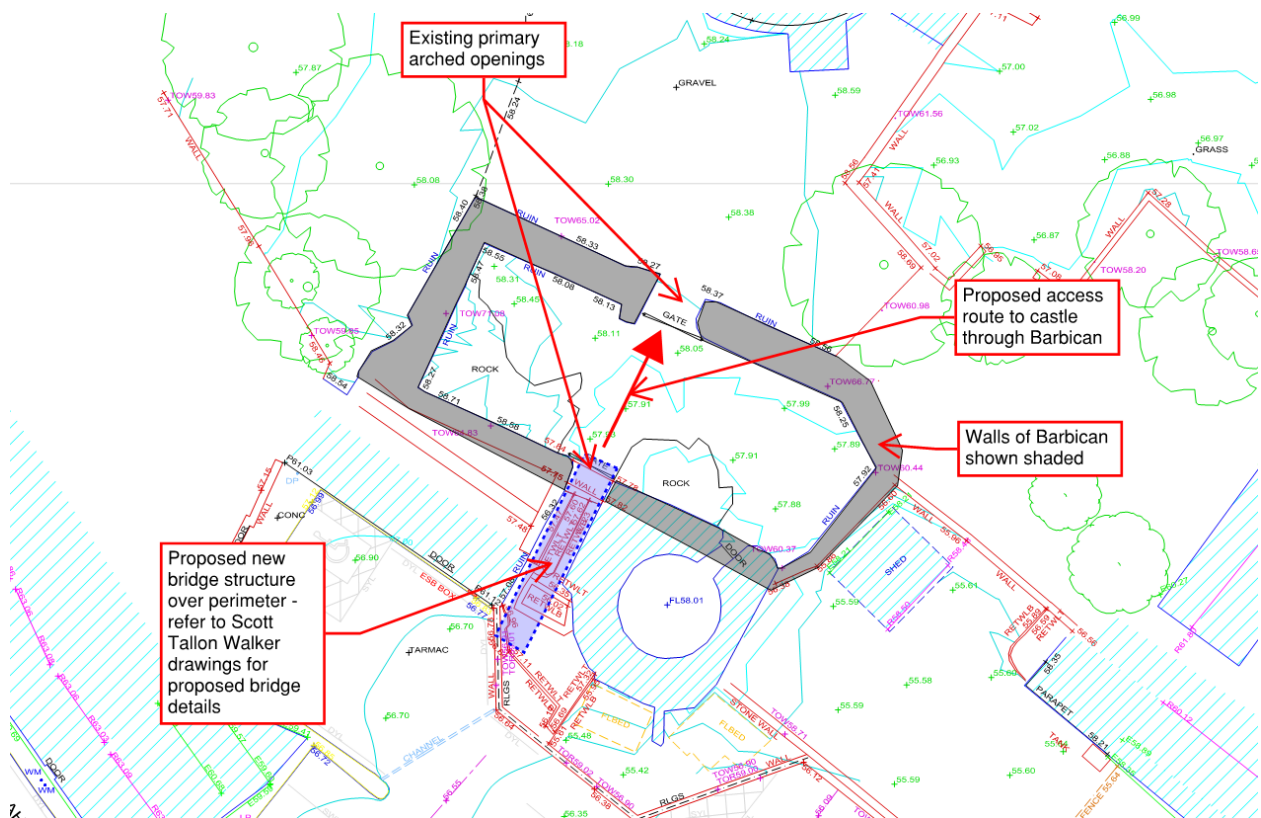


Figure 1 - Survey Plan of Barbican Structure identifying location of proposed pedestrian bridge and access through Barbican

2 Description of Inspection

The structural condition survey was carried out by Mr. David O'Donovan of PUNCH Consulting Engineers on 2nd August 2023.

Representatives from Tipperary County Council and the OPW were also present during the course of this inspection and recommendations contained within this report were agreed in principle during this site meeting.

The weather conditions consisted of occasional heavy showers on the day of the inspection.

The inspection was visual only and no opening up works were undertaken.

A series of record photographs were taken during the inspection and a selection of these site photographs are included in Appendix A of this report.

3 Description of Building

The structure in question is a large random rubble masonry ruin which historically formed the barbican of Nenagh castle which originally would have been the official entry point to the castle.

The walls are substantial in nature, varying in height between 6m to 8m approximately and varying in thickness between 1.2m to 2.0m approximately. There are significant arched openings on the southwestern and northeastern sides of the barbican which relate to the original door openings. The proposal is to reutilise these arched openings to reinstate an entrance with the view of replicating the original entry point.

The construction of these walls is from random rubble and these walls remain in a state of partial collapse with only the masonry elements present, so the walls are fully exposed to the elements from all aspects. The original wall to the Southeastern gable end of the Barbican is no longer standing. The internal area within the Barbican is currently secured from public entry and is in use by the Office of Public Works (OPW) for storage of salvage stone and general building material for use around the site.

4 Inspection Findings and Recommendations

The primary inspection findings and recommendations from a Structural perspective based on the visual survey undertaken from ground level are as follows:

- i. The remains of the masonry walls are exposed to the elements from all sides and have been so for a substantial period of time. As a result, the joints between stones have become weathered and also substantial vegetation growth has taken root.
- ii. Structurally we would deem the arched entrance to the inner castle side of the Barbican to be vulnerable as the remaining arch is quite shallow from a structural perspective and there is a substantial pier of random wall sitting directly over this area. This upper storey of masonry also incorporates openings which further weakens the arch over this primary opening.

- iii. The walls generally have vegetation growth throughout which will need to be treated and carefully removed. Embedded roots can be a significant contributor to displacement of stones leading to structural instability.
- iv. The remaining masonry elements would generally benefit from cleaning, racking out of loose joints in targeted areas to consolidate these areas and remove risks associated with loose stones. All re-pointing and consolidation works will need to be undertaken with appropriate lime-based mortar to consolidate the wall structure.
- v. The tops of all the walls need to be cleaned, loose stones bedded and the top of the walls at the existing levels flanchued to weather these in their current condition and to promote water to run off the tops of the walls rather than penetrating into the structure resulting in accelerated deterioration.
- vi. Once scaffolding is erected a comprehensive up-close inspection is recommended to enable a more focused inspection to take place and help identify those areas which are most vulnerable. We would see merit on works initially targeting both arches over main openings as we observed open joints to the stone soldier courses and keystones of these arches. Works are also required to target the junction of the voussoir and abutment at either side as these junctions were noted to be quite weathered.
- vii. In order to limit the scale of interventions required to mitigate Health and Safety risks, it is recommended that the access route through the Barbican is limited to the width of the primary openings and that a ballasted railing is provided internally within the Barbican to corral visitors to this central route
- viii. There is a level difference between the O’Rahilly Street carpark and the current ground level within the Barbican walls, so a ramped bridge is required to span over the existing moat and bridged the required level difference. The principle of locating a foundation structure on the O’Reilly Street carpark end of the bridge along with one with the barbican walls was discussed on site with the archaeologist for Tipperary County Council and no opposition was expressed to the principles of what was being discussed. In the absence of a site investigation report some preliminary foundation options will be designed based on assumptions informed by past project in Nenagh town area to help inform next steps from both an Archaeology and engineering perspective.

5 Conclusions

Overall, the proposed new access through the Barbican is deemed feasible from a structural perspective, taking account of Health and Safety risks on the proviso that the recommendations contained within this report are implemented.

It was clear from the onsite meeting with the stakeholders from Tipperary County Council and the Office of Public Works that utilising an entrance route through the Barbican wall and bringing this area of Nenagh Castle back into service and assessable to the public is a priority for this project.

The walls do require structural interventions to consolidate this structure, to re-bed loose elements of random rubble masonry which might otherwise pose a potential health and safety risk to persons passing through or congregating within these walls. It is proposed that the access route through the Barbican is limited to the width of the primary openings and that a ballasted railing is provided internally within the Barbican to corral visitors to this central route. This recommendation will limit the extent of consolidation works required to the Barbican Structure and will focus those interventions at a minimum to the arches over the existing openings and the walls either side of these openings.

Notwithstanding this, substantial works will still need to be undertaken including removal of vegetation, raking out of joints and repointing to generally consolidate the walls. Flaunching to the tops of the walls to create a weathered interface to prevent water penetrating the structure of the walls leading to accelerated deterioration is recommended. We deem that the condition of the original arches requires substantial attention to consolidate these particularly given their shallow nature and the substantial pier load on the arch to the northwestern side in particular.

It is recommended that the proposed bridge over the moat will be founded on shallow foundations at either end and will be designed as a clear spanning trussed structure over the moat structure and associated walls. This bridge structure will be kept as light as possible to limit the size and extent of foundations required. The proposed foundation within the barbican walls will be circa 300mm thick and will be founded no deeper than 500mm below existing ground level thereby minimising excavation depths. The finalised design will be agreed with OPW archaeologist at detailed design stage and all on site works will need to be undertaken under archaeological supervision.

6 Disclaimer

- 1. This report is based on a visual inspection only.*
- 2. No form of opening up works and/or uncovering or exposing of any surfaces was undertaken and therefore, we are unable to report that such parts are free from defect.*
- 3. No testing of drains was carried out.*
- 4. No measurements were carried out.*
- 5. This report and its contents has been prepared and is intended solely for use by the client and should not be used or relied upon wholly or partly by any third party without the prior written consent and approval of the report writer.*
- 6. The report is solely based on the condition of the property at the time of the inspection and therefore, no liability is accepted for any deterioration or otherwise, of the property thereafter.*
- 7. The condition of other non-structural items are outside the scope of this report and any reference made to them is by way of observation and good practice.*
- 8. This report does not address asbestos or those other materials deemed to be hazardous and/or prohibited and their presence or otherwise cannot be confirmed.*

Appendix A Images

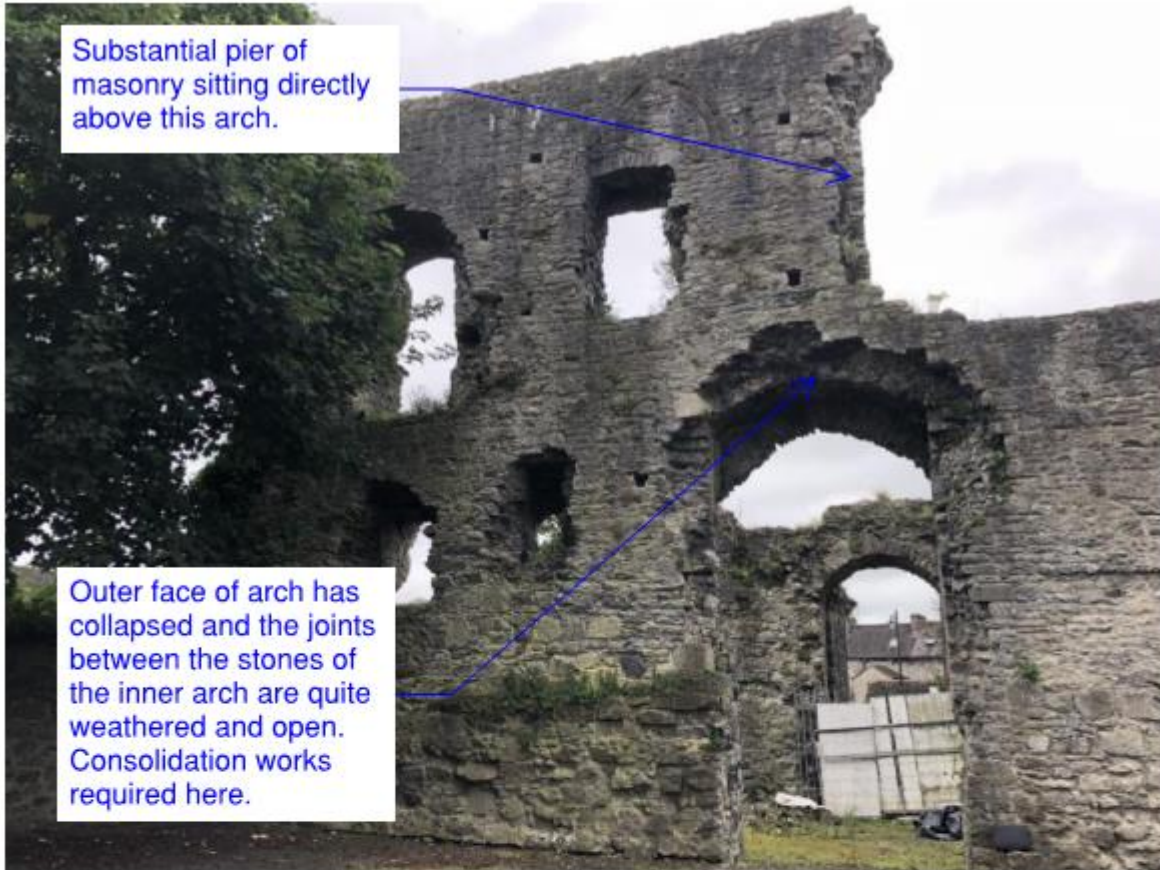
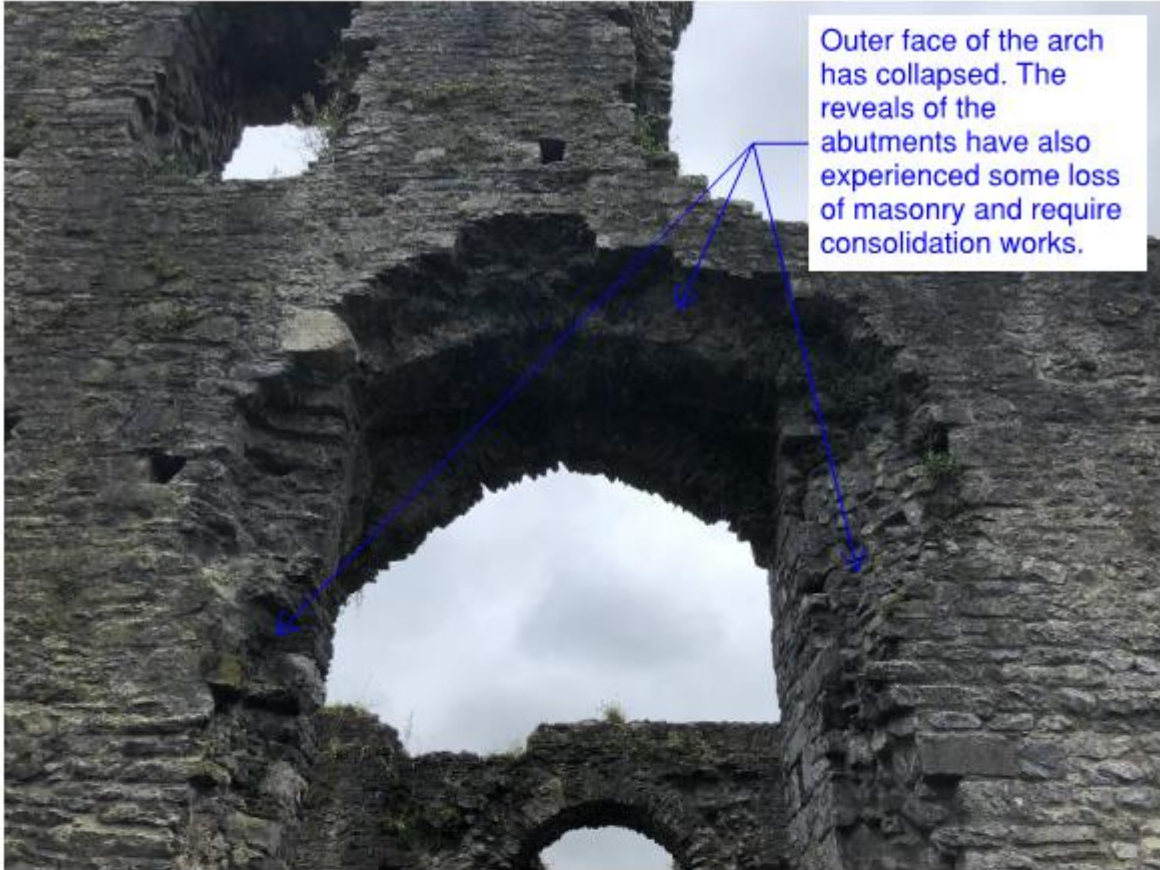


Image 1

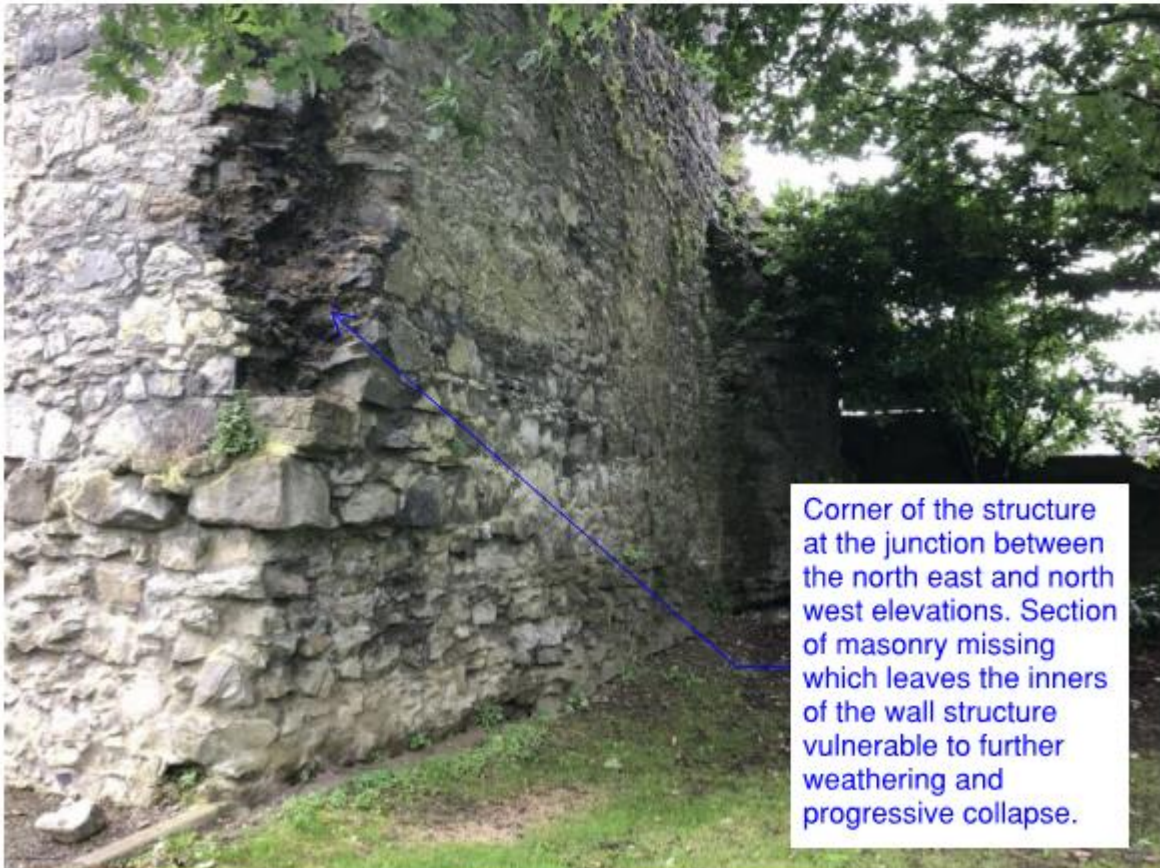


Image 2



Outer face of the arch has collapsed. The reveals of the abutments have also experienced some loss of masonry and require consolidation works.

Image 3



Corner of the structure at the junction between the north east and north west elevations. Section of masonry missing which leaves the inners of the wall structure vulnerable to further weathering and progressive collapse.

Image 4

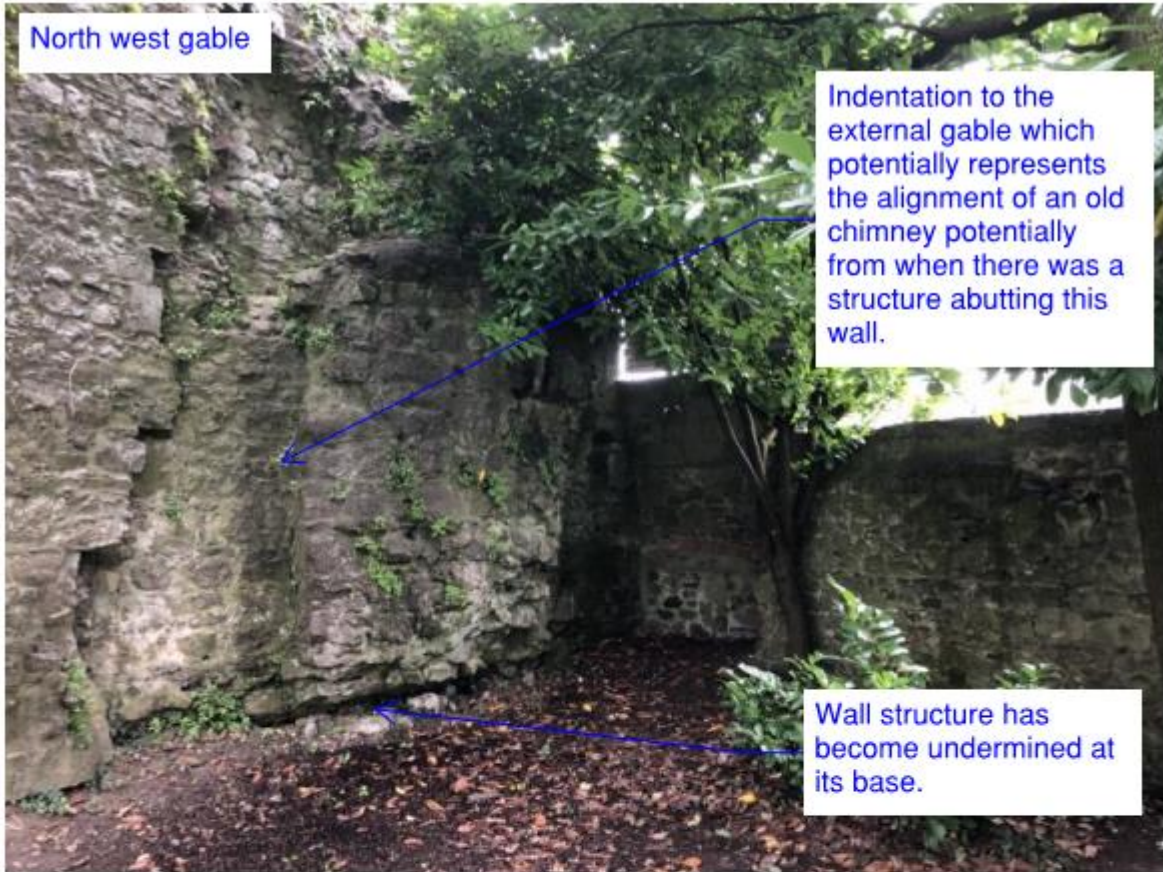


Image 5

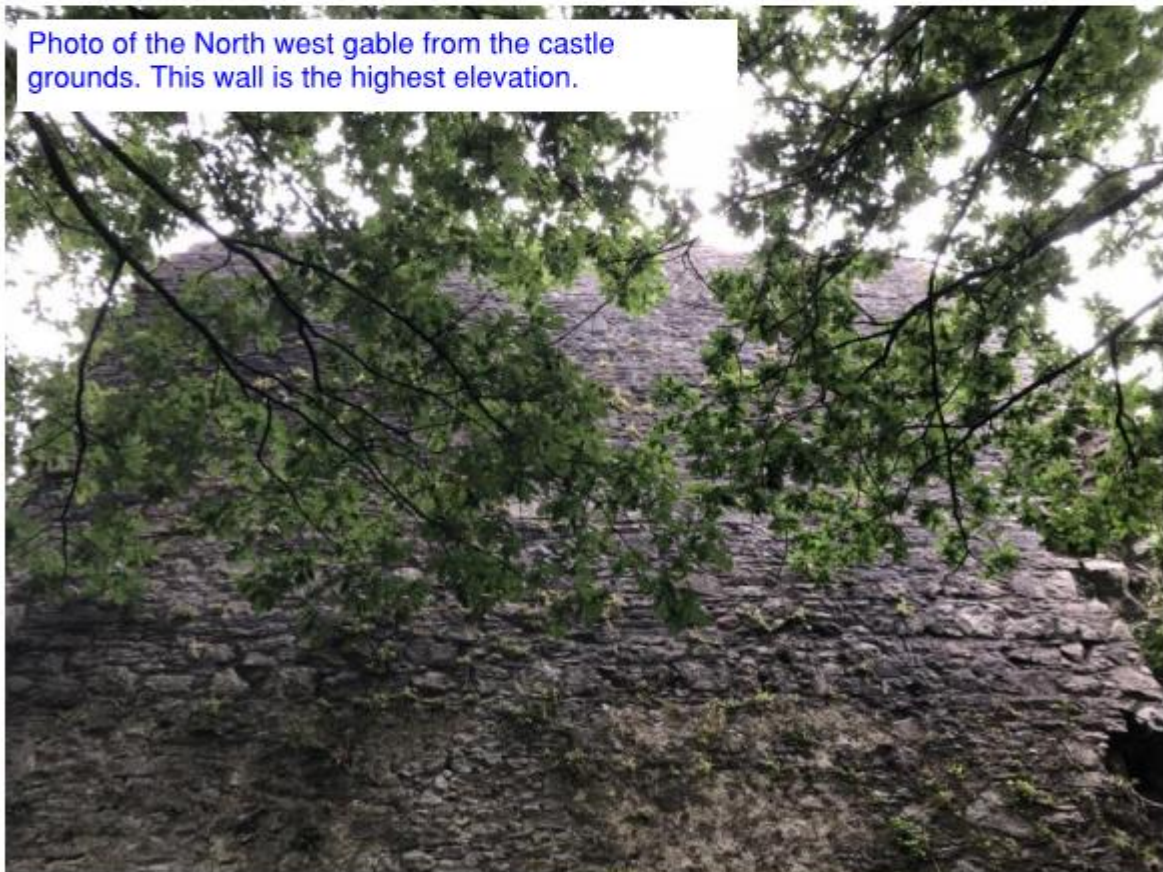


Image 6

Photo of the North East gable from the castle grounds.



Image 7

Record photo with the Barbican walls looking in a south easterly direction. Original wall to this side of the barbican is no longer present.



Image 8



Image 9

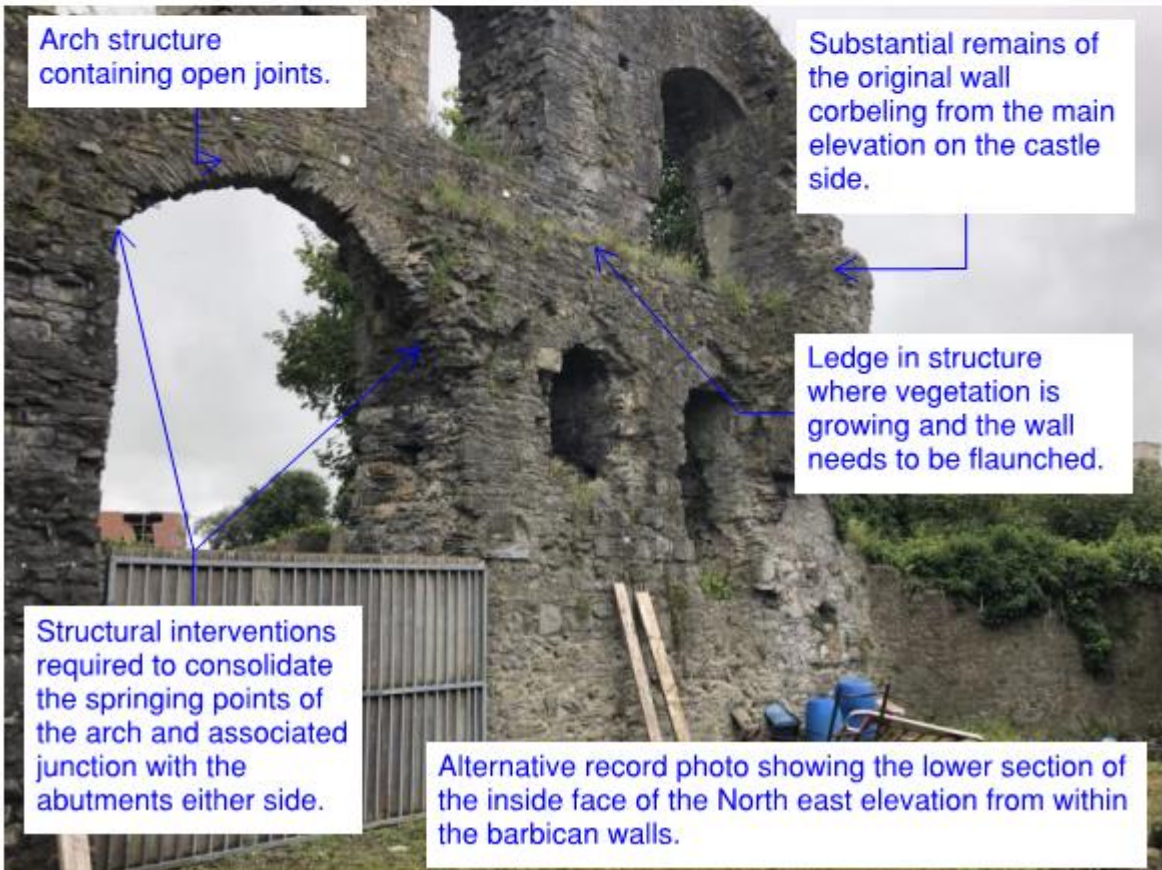


Image 10

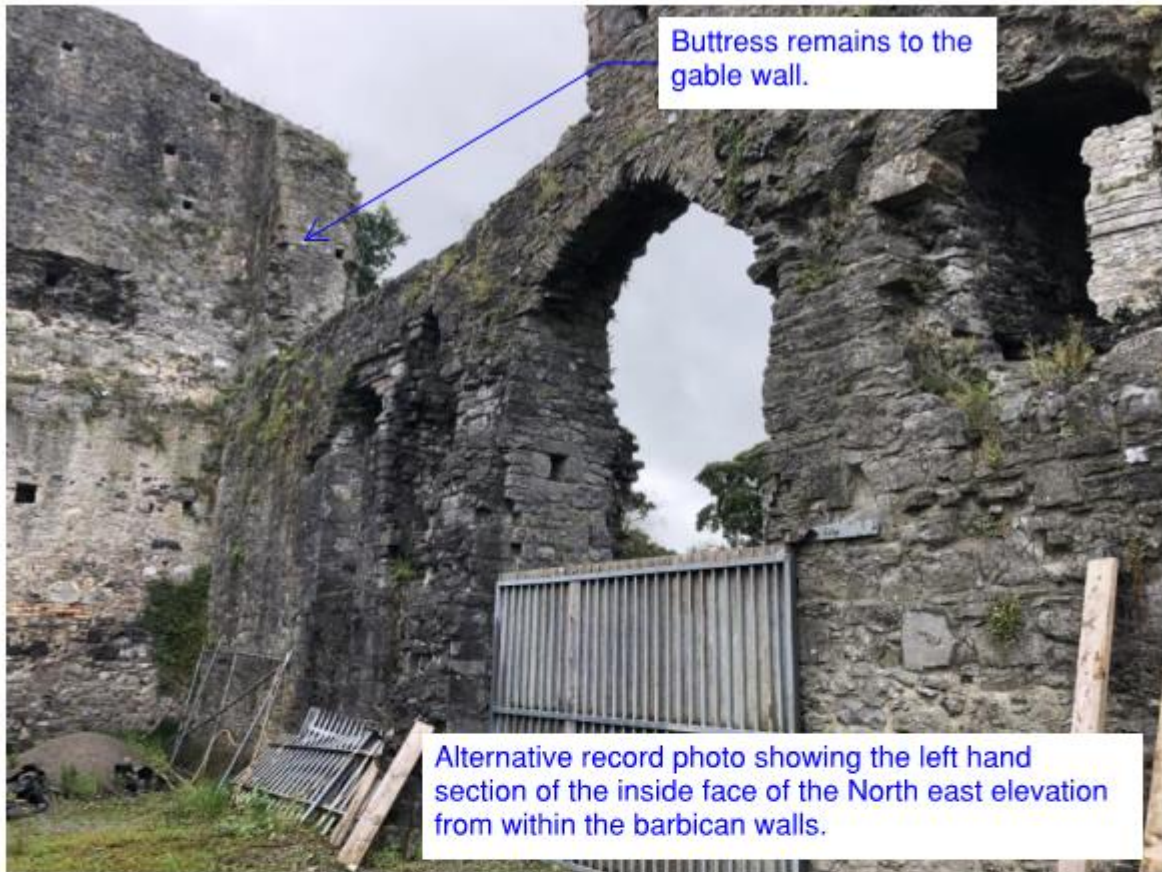


Image 11

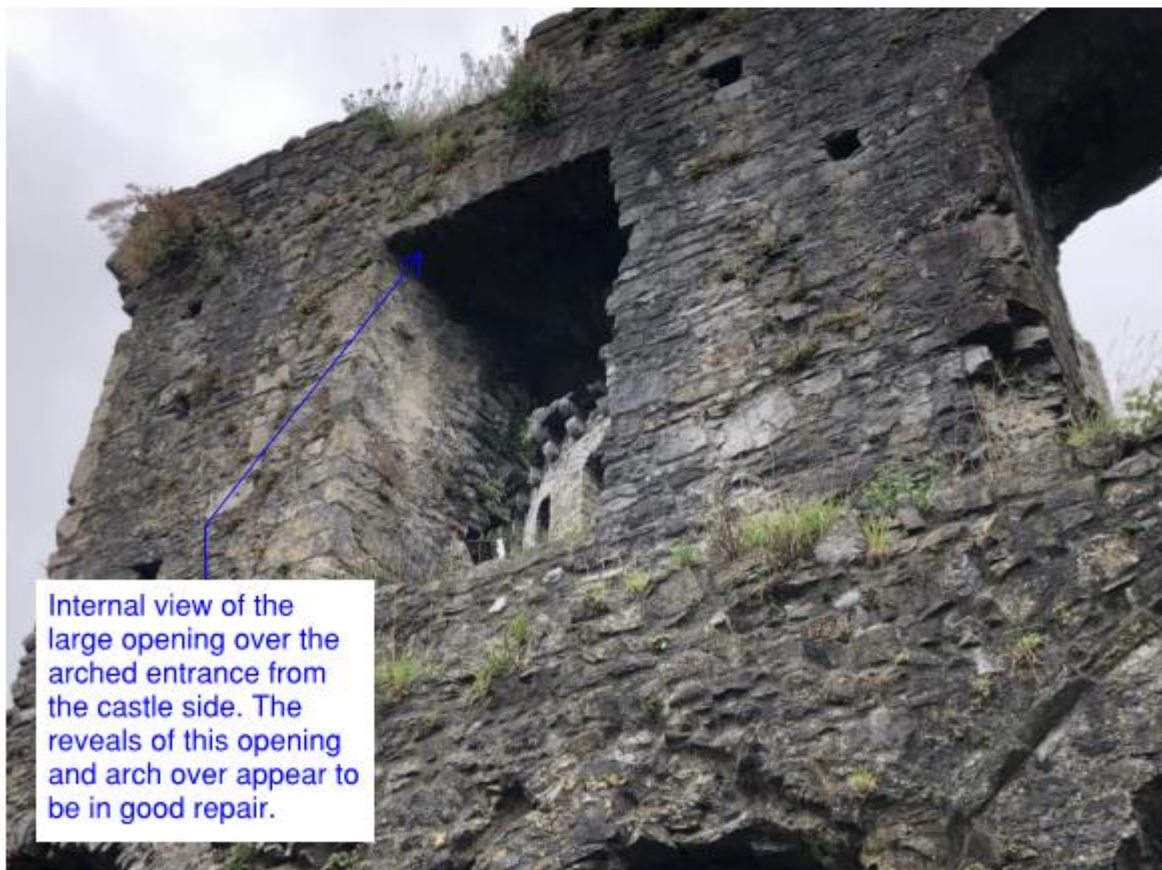


Image 12

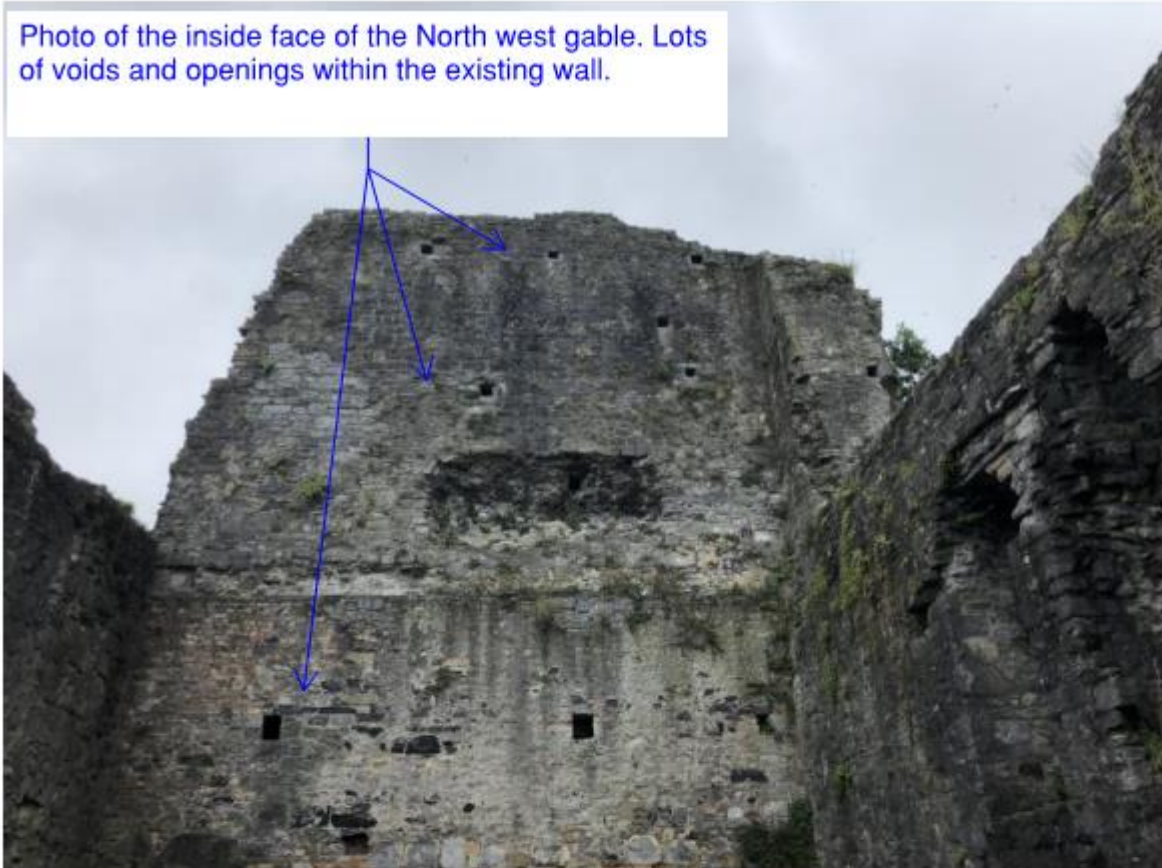


Image 13

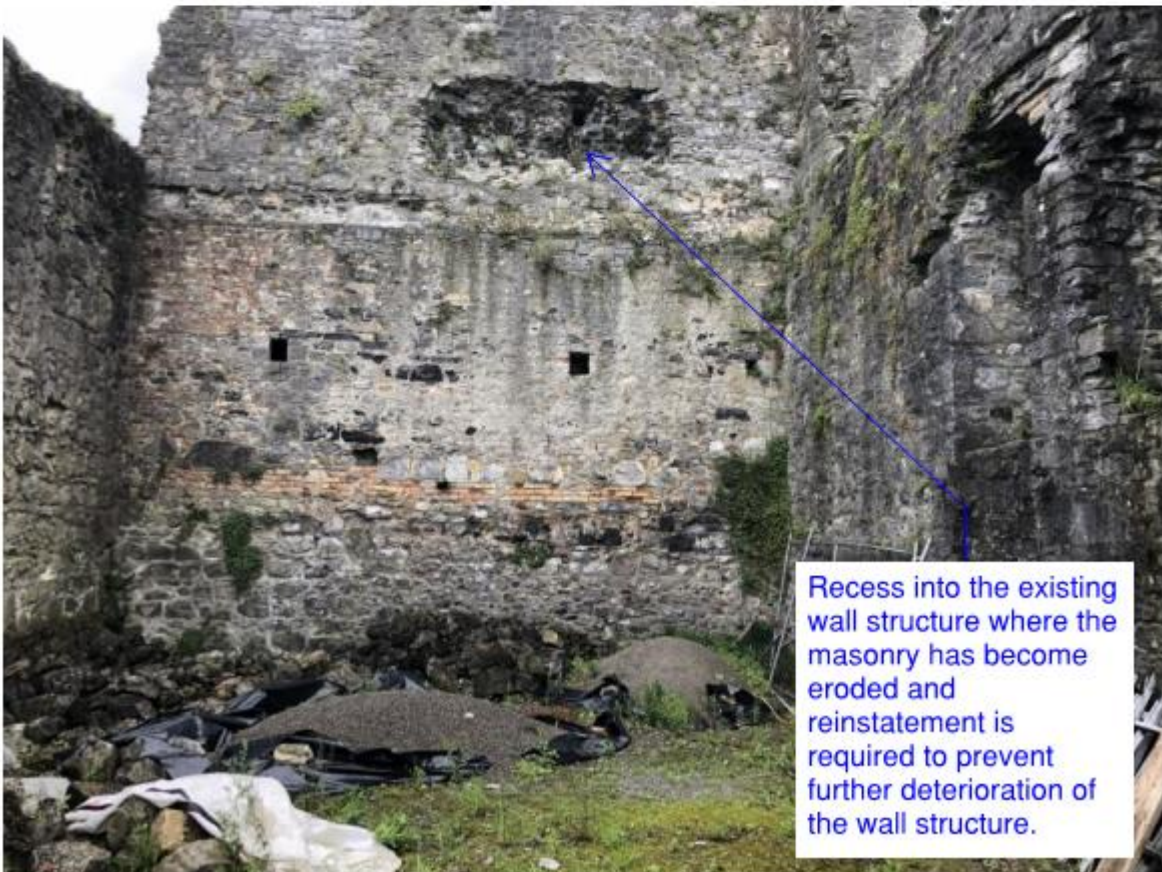


Image 14

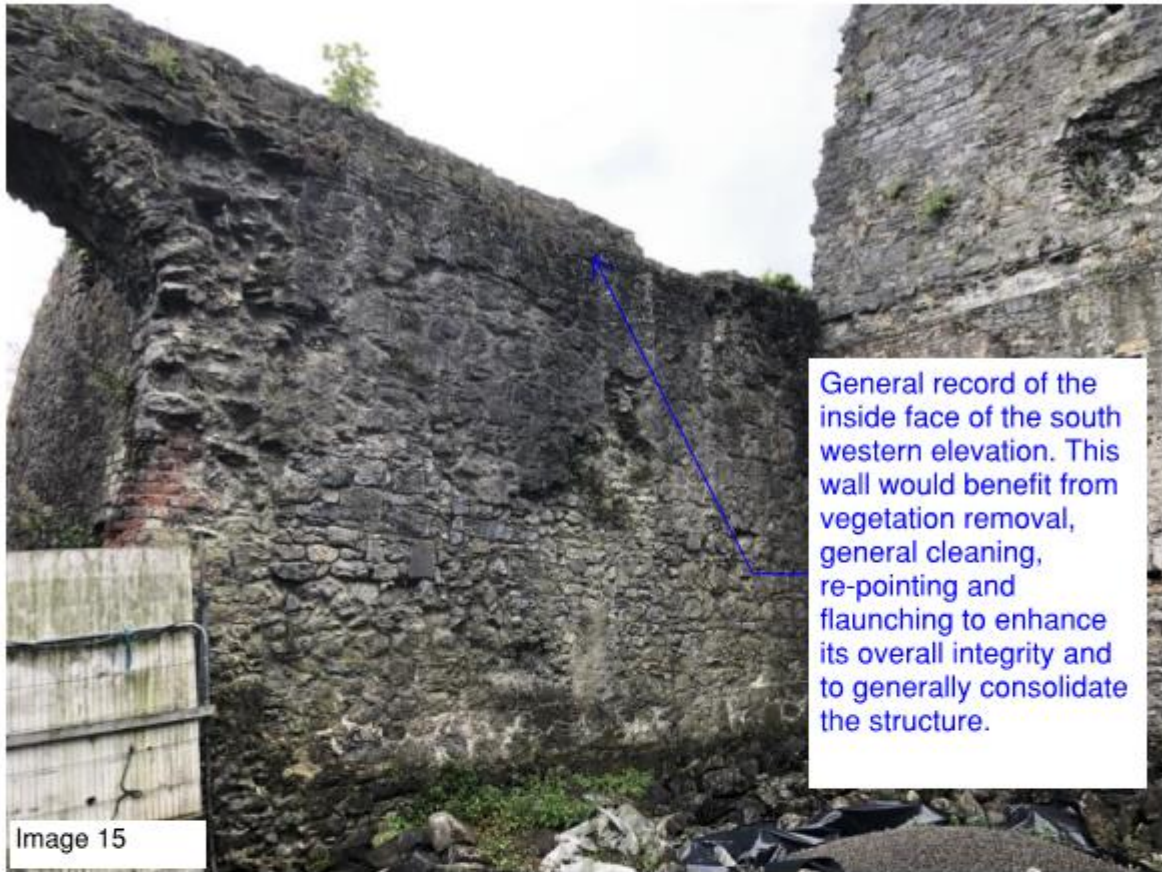




Image 17

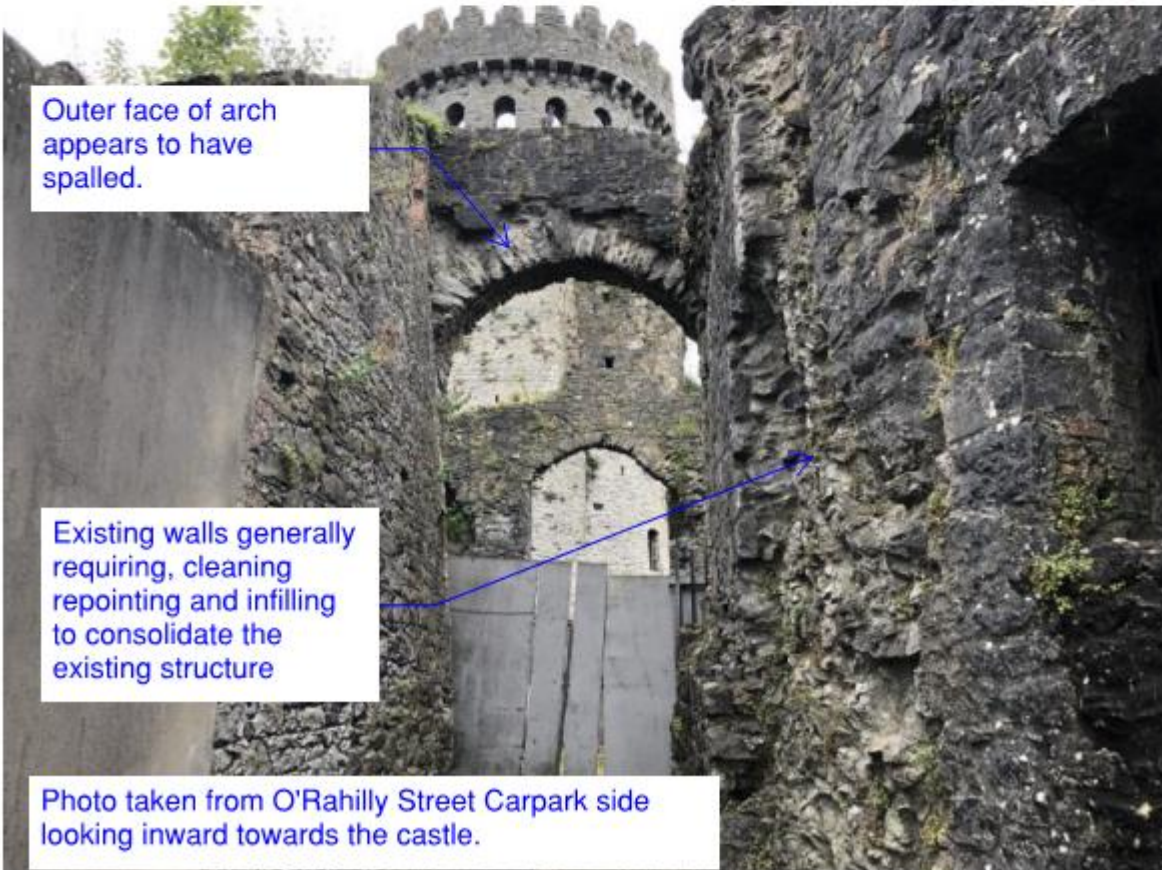


Image 18



Record photo of the existing walls and moat over which the proposed link bridge will be spanning looking inwards toward the castle.

Image 19



Record photo of the existing walls and moat over which the proposed link bridge will be spanning looking outwards towards the carpark.

Image 20