



STRUCTURAL DEMOLITION REPORT  
FOR  
SCARBOROUGH HARBOUR WEST PIER REDEVELOPMENT  
WEST PIER  
SCARBOROUGH  
YO11 1PD

Commissioned by  
WILLIAM BIRCH & SONS LTD.

Report 21037-H-RP-001  
01<sup>st</sup> DECEMBER 2022

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## 1 INTRODUCTION

- 1.1 Mason Clark Associates (MCA) have been commissioned by William Birch & Sons (WBS) to complete a demolition structural assessment for the demolition of Building 4, 7 and the Kiosks.
- 1.2 This assessment, which has been drawn up with input from the Economic Development Regeneration and Tourism Services (EDRTS), North Yorkshire Council (NYC) will be used in order to identify a safe means of demolition of the subject buildings on the Scarborough Harbour West Pier.
- 1.3 The site contains three buildings that are all to be demolished down to ground level. This includes Building 4, Building 7, and the existing Kiosks. See Appendix A for the demolition plan.
- 1.4 We are advised that each building is listed, as they fall within the curtilage of a listed site, the West Pier.
- 1.5 The extent of the demolition works is to extend to any basement areas, pile caps and ground beams. Piles are to be left in-situ with the contractor instructed to provide a record of the position of residual piles, if any.
- 1.6 EDRTS to confirm the scope of loose furniture and material removal, to form part of the demolition contractors works.
- 1.7 Infilling of any redundant openings between Building 3 and 4 must comprise of brickwork which is toothed into and matches the wall type and appearance of Building 3.

1.8 EDRTS is to assess the risk associated with isolations of fire and security alarms prior to demolition works. M and E isolation works to be undertaken by EDRTS, as an enabling package of works if required.

## 2 BACKGROUND

2.1 The West Pier Redevelopment requires the demolition of selected existing buildings on the West Pier. We understand that the buildings on the site are to be demolished to make way for redevelopment of the site in this location.

2.2 Survey drawings for the buildings are not available.

2.3 The site has been developed over many years and as a result the buildings are different structural forms and different ages.

2.4 This statement has been prepared in line with the requirements of BS 6187:2011 – Code of Practice for Full and Partial Demolition which sets out responsibilities for demolition projects. The Code of Practice states that the following issues should be assessed when selecting an approach to demolition (partial list with a view to the structural aspects).

2.4.1 The information given in relevant guidance documents.

2.4.2 Health, safety and environmental requirements.

2.4.3 The type, age, condition, use and business activity (if appropriate) of the facility and local conditions and constraints.

2.4.4 The need to avoid disruption to business continuity, the community, and nearby structures.

2.4.5 Legislative requirements.

2.5 It further gives a list of key planning considerations which should be addressed, as appropriate, when planning demolition projects which include.

2.5.1 Gaining an effective site knowledge.

2.5.2 Complying with legal requirements.

2.5.3 Programme management.

2.5.4 Protecting the public.

2.5.5 Structural stability.

2.5.6 Environmental management.

2.5.7 Occupational safety of the workforce.

2.5.8 Occupational health of the workforce.

2.5.9 Predicted weather conditions.

2.5.10 Materials and plant logistics

2.6 In order to enable the demolition contractor to properly address these considerations, it is necessary for them to understand the structural hazards they face during the demolition works. In addition to this, it is also necessary for them to understand how to maintain structural stability of the building during demolition.

- 2.7 To aid this, the Code of Practice provides “Flowchart for maintaining structural stability” which is reproduced overleaf as figure 1.
- 2.8 The purpose of this statement, therefore, is to provide the demolition contractor with all available information with respect to.
- 2.8.1 Structural hazards in accordance with Section 9 of the standard.
- 2.8.2 Avoidance of unplanned structural collapse, pursuant to Section 15 of the standard.

Figure 4 Flowchart for maintaining structural stability

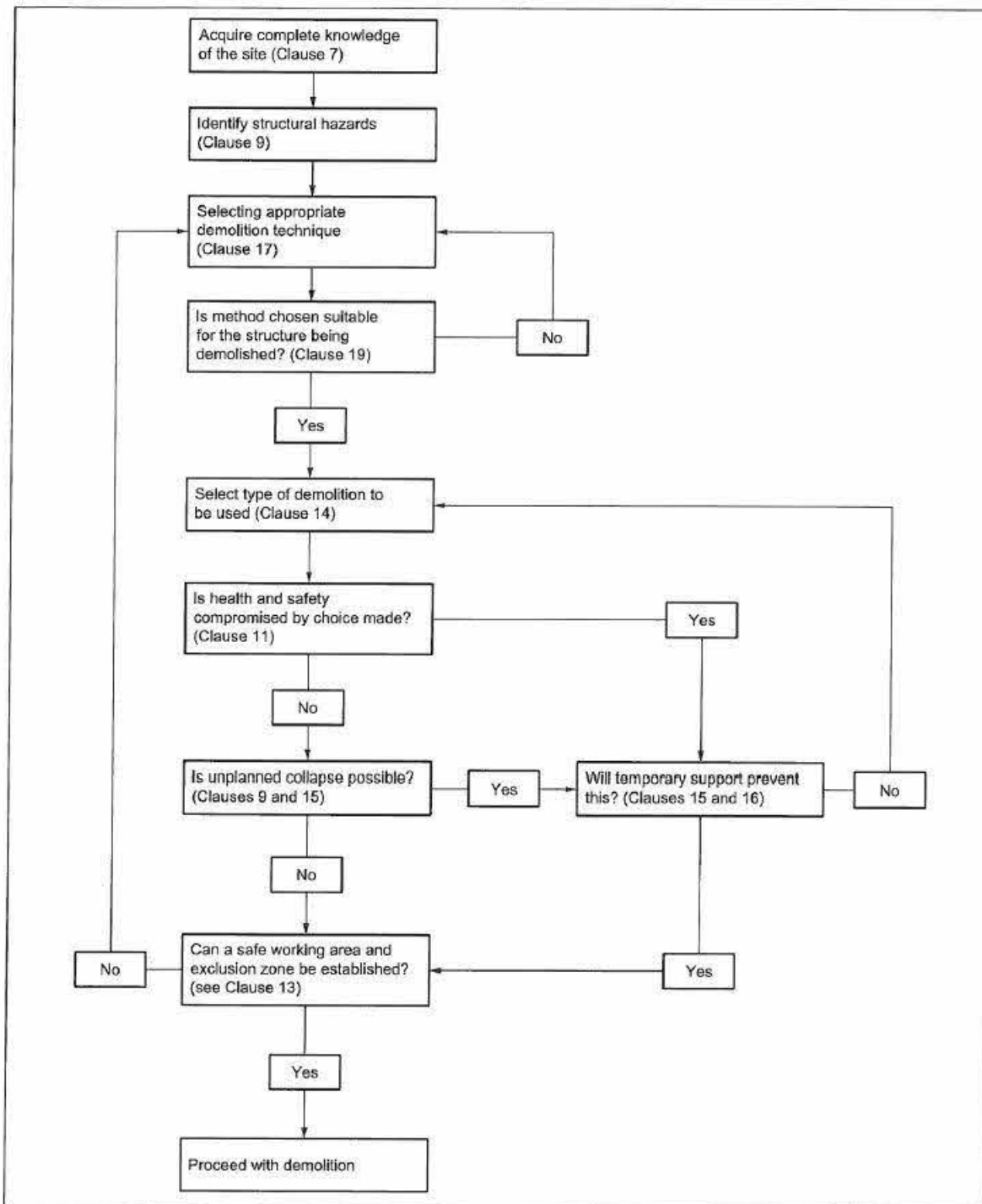


Figure 1 Demolition Planning Flowchart

### 3. SITE VISIT AND OBSERVATIONS OF STRUCTURAL HAZARDS

#### 3.1. General

- 3.1.1. Site visits were carried out in September 2021 and November 2022, by Dominic Mackevych of Mason Clark Associates.
- 3.1.2. Some of the buildings to be demolished were 3D scanned by MCA. The areas which were not scanned include: All external elevations, internal levels and roof void of Building 7; external elevations and internal ground space of Kiosks; various spaces in Building 4 which was not accessible on the day.
- 3.1.3. They do not contain records of service locations adjacent or within the footprint of the works to be carried out.
- 3.1.4. The inspection covered the following buildings, all other buildings being exempt from the structural assessment: Building 4, Building 7, and Kiosks.
- 3.1.5. In line with clause 9 of the Code of Practice, this section identifies the structural form and highlights any features of the structure which pose significant structural hazards. A brief overview of the condition of the structure is also given.
- 3.1.6. Both Building 4 and 7 are adjacent to the pier's edge, approximately 5m. There is a risk that debris from the demolition of the building will deposit pollutants into the North Sea.
- 3.1.7. Building 4 north-east elevation is in close proximity to ground anchors supporting the sheet piled harbour wall.
- 3.1.8. Service have been identified running parallel with the south-east elevation of Building 4.
- 3.1.9. All buildings are in close proximately to public and commercial routes, and highways.

#### 3.2. Building 4

- 3.2.1. The demolition plan of the site is shown in Appendix A.
- 3.2.2. Following our site inspection and thereafter, examination of archive information, we can confirm as follows.
- 3.2.3. Building 4 is a fish processing facility, consisting of two storeys. It is not known whether there are any basement levels. The building is partially vacant.



- 3.2.4. The building was originally constructed circa late 20th century, replacing the earlier fish shed buildings.
- 3.2.5. The structure has three distinct different forms of construction. This is shown on the demolition plan as 4a, 4b, and 4c.
- 3.2.6. 4a is part a single storey steel column and truss framed building, and part a concrete beam and column frame (seen in the external wall) to support the truss and a series of roller shutter entrances to the building.
- 3.2.7. It has external brick walls and hygienic wall panels internally. The upper level is constructed from timber to form the floor and internal walls.
- 3.2.8. The roof construction is formed from steel corrugated sheeting spanning between steel purlins
- 3.2.9. On the north-east elevation, a brick clad / steel clad leaf has been placed in front of the original wall.
- 3.2.10. Access to building 4a is either via south-west elevation roller shutter doors, north-east elevation single door or roller shutters, or through passage ways between Building 4b, 4c or Building 3.
- 3.2.11. The vertical stability consists of metal roof sheets spanning onto purlins which span onto nodal points of steel trusses which span onto either steel columns, concrete columns or brick piers, themselves bearing onto foundations of unknown construction.
- 3.2.12. The lateral stability is provided by column truss moment resisting connections forming a frame, and an assumed tie connection between the frame and Building 4a and 4b.
- 3.2.13. It is noted that Building 4a abuts Building 3 at its north-west gable elevation. The foundations are not known. Further investigation is required to determine if the removal of Building 4 foundations will affect the structural integrity of Building 3's.
- 3.2.14. For information regarding the condition of Building 4a, refer to the condition report in Appendix C.
- 3.2.15. It was noted that truss bottom chords have been cut in areas, creating an unstable truss arrangement. See figure 2 below. This will need to be addressed by the contractor before demolition, to prevent any unplanned collapse of the structure.



*Figure 2 Building 4a Roof Truss*

3.2.16. Building 4b is a two-storey extension, with the lower floor used for fish processing, and the upper floor as a workshop.

3.2.17. The external walls are solid 215mm thick brickwork. The north-east elevation masonry is assumed to be constructed on top of the external wall of Building 4a. This needs further investigation to confirm.

3.2.18. The floor and roof construction is timber. It was noted that the timber roof of Building 4b spans on to one steel angle purlin of Building 4a. This is a significant risk, as likely not a structural designed detail.



*Figure 3 Building 4b Timber Roof Deck Spanning onto Purlins of Building 4a*

3.2.19. The internal walls are a mixture of brick, timber, and hygienic panels.

- 3.2.20. There is a 1-ton capacity lifting beam located above an external opening on the second floor. The condition of this lifting beam is heavily corroded, and likely not in commission. It is recommended this is not utilised for demolition methods.
- 3.2.21. The steel frame of the south-west external balcony which serves the Cafe 'Lookout on the Pier' is fixed via steel bolts to Building 4b. Stepped diagonal cracking was identified adjacent to this fixing, suggesting this arrangement is overstressing the masonry bonds between the brickwork.
- 3.2.22. It is noted that Building 4b abuts Building 3 at its north-west gable elevation. The foundations are not known. Further investigation is required to determine if the removal of Building 4b foundations will affect the structural integrity of Building 3's.
- 3.2.23. Building 4c is a steel column and beam structure formed out of square hollow sections (SHS). The building is cladded with timber plywood on its south-west elevation and partially cladded with a single layer of metal sheeting on it's south-east elevation.
- 3.2.24. The roof is covered with a single layer of metal sheeting supported off SHS beams. The SHS beams on the north-east and north-west may be fixed to Building 4a and 4b respectively. This requires further investigation.
- 3.2.25. It was noted that this structure has surface corrosion to TEK screw connections between the cladding and frame, leading to loss of cladding fixity back to the structure.
- 3.2.26. The frame itself is generally surface corroded on each member which was visible.
- 3.2.27. The foundations of Building 4c are unknown and require further investigation to provide comment on form, significant risks, or their conditions.
- 3.2.28. The steel framed gate adjacent to the south-east end of the south-west elevation is to be demolished as well.

### 3.3. Building 7

- 3.3.1. The building could not be inspected internally, and information provided in this section is based on a visual survey conducted on foot around the external elevations of the building. Following our site inspection and thereafter, examination of archive information, we can confirm as follows.
- 3.3.2. Building 7 is constructed in circa 1950. Its roof is likely timber construction with concrete plain tiles. It is not known whether there any basement levels.
- 3.3.3. The structure is a two-storey building, with a loft space used as an additional floor. The building is partially occupied, and was once used as bait sheds.
- 3.3.4. The external walls are brick and at least two courses thick. Their thickness and internal construction are unknown.
- 3.3.5. The construction of the floors at ground level to loft level are concrete slabs likely spanning between internal walls.
- 3.3.6. The internal cross walls are constructed from brick.
- 3.3.7. The upper external wall brickwork was noted as being of a different type than it's lower counterpart, and likely this would have either been rebuilt or an extension to the original building.
- 3.3.8. No lintel provisions were observed generally in the external window and door openings.
- 3.3.9. A steel lifting beam was identified in the south-west elevation gable near roof apex level. It is face fixed back to the wall above a steel lintel.
- 3.3.10. A reinforced concrete balcony extends out of the south-east elevation which has concrete down stands. It is unknown how this is fixed back to the original structure, although an extension of the internal first floor suspended concrete slab is likely.
- 3.3.11. The handrail of the balcony is galvanised steel construction and is to be demolished along with the building.

- 3.3.12. Access to the building at ground floor level is via multiple doors providing access to segregated unit spaces.
- 3.3.13. Access to the building first floor level is via two single flight of steel stairs cases, situated externally on the south-east elevation. These are to be demolished along with the building.
- 3.3.14. Access to the loft space from the outside is via a galvanised steel CAT ladder and platform situated on the north-west elevation of the building.
- 3.3.15. For the condition of the building, see condition report in Appendix C.
- 3.3.16. The foundations of Building 7 are unknown and require further investigation to provide comment on form, significant risks, or their conditions.
- 3.3.17. The vertical stability of the structure relies on the timber roof spanning to transverse walls or trusses spanning onto the external longitudinal walls. This needs verifying through non-intrusive / intrusive investigation.
- 3.4. Kiosks
- 3.4.1. The kiosks have only been inspected externally by foot. Following our site inspection and thereafter, examination of archive information, we can confirm as follows.
- 3.4.2. The kiosks are shop units selling seafood and are single storey. The building was constructed circa mid-late 20th century.
- 3.4.3. The external wall is brickwork with air bricks present approximately 0.5m above ground level and 0.15m below top of door level.
- 3.4.4. The roof is mono-pitched and likely constructed from timber with a felt covered pitch which slopes downwards in a north-west to south-east direction.

- 3.4.5. The north-west elevation contains multiple shop fronts, subdivided by transverse internal walls of unknown construction. Another longitudinal wall spans the length of the building separating the sales areas from the back rooms.
- 3.4.6. The shop frontages over-hang the north-west elevation. With a duo pitch soffit spanning south-west to north-east.
- 3.4.7. External exposed steel columns supporting the eaves of the duo pitch soffit have been identified along the north-west elevation.
- 3.4.8. Access to the kiosks are through double doors located behind each unit on the south-east elevation.
- 3.4.9. There is a meter box annex located to the south-west elevation, constructed from 215mm thick brick walls, a felt cover timber roof, and concrete ground slab.
- 3.4.10. There is a consistent edge of ground concrete slab along the perimeter of the building. This requires further investigation to confirm.
- 3.4.11. The vertical stability requires further investigation to provide comment. Likely support is from steel frame or masonry walls bearing onto a concrete raft foundation.
- 3.4.12. The horizontal stability is likely provided by racking action of the brick walls in a transverse and longitudinal direction.

#### 4. AVOIDANCE of UNPLANNED STRUCTURAL COLLAPSE

##### 4.1. General

- 4.1.1. The potential for structural collapse should be avoided by planning suitable methods and sequences of demolition prior to works starting on site, and these should be written into the method statements. As works progress on site, the anticipated demolition methods should be reviewed for suitability and changes made where required. Where changes are required, these

should be fully thought through and properly documented with all relevant permissions put in place.

- 4.1.2. Unplanned collapse, which includes the collapse of an entire structure or, more likely, parts of a structure or building, generally occur.
  - 4.1.3. Prematurely (i.e., unintentional at that time) because of inadequate residual structural stability, e.g., when pre-weakened; and/or
  - 4.1.4. Unintentionally (i.e., not intended for demolition) because of inadequate stability resulting in part of the structure or building to collapsing or falling.
  - 4.1.5. Methods of managing the avoidance of unplanned collapses should be based on a sound knowledge of the structure and the way it acts to transmit the loads to the ground.
  - 4.1.6. To predict the possibility of premature and unintentional collapse and understand why such an event might occur, an assessment of the structure should be undertaken and the effects on the structure of the proposed methods and sequences of work determined before work commences.
- 4.2. Building 4a Demolition Considerations
- 4.2.1. The following are points which need to be included in the detailed demolition method statements in order to avoid unplanned structural collapse.
  - 4.2.2. Scaffolding with reinforced plastic sheeting will be required to be set up around the demolition area to prevent pollutants entering the North Sea and debris injuring the general public. The contractor review if the scaffolding is either to be independent of the building it surrounds or, have ties to it for stability which is revised in between appropriate phases of the demolition process.
  - 4.2.3. The building is subdivided into three different sub-groups (4a,4b, and 4c). To ensure overall stability of Building 4 during the demolition phase, each sub group should be assessed to

determine in what sequence they should be demolished, taking into account the information contained within this report.

- 4.2.4. We recommend that the basis of the proposed method of demolition for the structure should consider a top-down approach which is the reverse of the construction sequence and hence is inherently a safe approach. This is particularly important to avoid unplanned collapse of adjoining Buildings 4b, which is partially supported off 4a. Another reason this approach is sensible is that the walls of Building 4a support the roof construction, and removing the walls first, would cause unintentional collapse of the roof. The contractor should consider if the complete bay length is an appropriate length to collapse for the roof or if it needs to be sectional, so that the temporary free standing wall state of the ground floor walls are not in a destabilised state
- 4.2.5. It should be feasible to adopt a longitudinal sectional demolition procedure, working from the south-east to north-west. To each bay, pairs of residual roof purlins can be left in place as the roof covering is stripped, to maintain short term longitudinal stability between frames. How the building is braced must be identified, to ensure demolition of bays does not compromise short term lateral stability of the structure.
- 4.2.6. The trusses may require a 'clamp and cut' technique to be adopted to allow their removal, and the columns could be cut off at ground level.
- 4.2.7. The internal timber walls, if found not to be providing lateral stability, could be demolished during the soft-strip phase.
- 4.2.8. The external masonry walls could be pushed into the building, onto the concrete ground slab using long reach plant.
- 4.2.9. The proximity of plant near service ducts and manholes/chambers to be planned.



- 4.2.10. Road plates or other transfer structures may be necessary. Integrity of chambers, particularly brick chambers to be verified if plant is reliant for support on these elements, else removal of cover lids and infilling with compact material should be considered.
- 4.2.11. Suitable Exclusion Zones should be established around all adjacent buildings and roads.
- 4.2.12. These should address the height of Building 4a and its proximity to adjacent features and harbour edge.
- 4.2.13. If long-reach plant is to be employed, then the concentrated loads on the ground should be observed. Ground conditions are likely to be as shown in Appendix D.
- 4.2.14. The external concrete framing which supports the roof and external masonry infill panels, may be manually pre-weakened, via disc cutters forming joints, to sectionally remove the building in bays. However, Remote demolition techniques using long-reach plant with interchangeable breaker, shears and grab for example, would be preferable.
- 4.2.15. Details of the bracing strategy are unclear from the photos viewed, we note the masonry walls to the single-storey area, and it may be that this structure is acting as a shear wall in an transverse / longitudinal direction. We could see no evidence in the details viewed of any longitudinal steel bracing hidden in the external walls.
- 4.2.16. The foundations are to be removed via peckering the concrete slab and removing the debris. Further investigation is required to advise on removing any shallow foundation and foundation incorporated with Building 3's.
- 4.2.17. Note embedded ground anchors are present along the north-east elevation.
- 4.2.18. Note underground services identified along the south-west elevation.
- 4.3. Building 4b Demolition Considerations
- 4.3.1. The following are points which need to be included in the detailed demolition method statements in order to avoid unplanned structural collapse.

- 4.3.2. Scaffolding with reinforced plastic sheeting will be required to be set up around the demolition area to prevent pollutants entering the North Sea and debris injuring the general public. The contractor review if the scaffolding is either to be independent of the building it surrounds or, have ties to it for stability which is revised in between appropriate phases of the demolition process.
- 4.3.3. The building is subdivided into three different sub-groups (4a,4b, and 4c). To ensure overall stability of Building 4 during the demolition phase, each sub group should be assessed to determine in what sequence they should be demolished, taking into account the information contained within this report.
- 4.3.4. We recommend that the basis of the proposed method of demolition for the structure should consider a top-down approach which is the reverse of the construction sequence and hence is inherently a safe approach.
- 4.3.5. The building is stable laterally via diaphragm action from the roof and floor timber construction tied to the external masonry walls, and surrounding buildings. The masonry walls then act in racking to transfer these forces to the foundations, or the existing buildings act to buttress the surrounding construction.
- 4.3.6. The soft-strip phase should evaluate how to remove the section of the balcony which is supported off of Building 4b, to a point when it is in equilibrium from it's connection to Building 3 only or if temporary support is introduced to achieve equilibrium. This extent needs to be agreed with a MCA structural engineer and relevant stakeholders before the soft-strip phase begins. The balcony should be removed before demolishing the main building.
- 4.3.7. A number of internal timber walls or hygienic panels could be demolished during the soft-strip phase, but it must be determined that they do not provide stability to the building.
- 4.3.8. The contractor should investigate if adequate lateral restraint straps utilised between the first-floor construction and the external masonry wall exist. If not then they should consider if they need to introduce temporary fixings/propping to stabilise the walls before demolition.

- 4.3.9. If adequate lateral restraint to the walls is provide at floor level, it would be possible to collapse the timber roof onto the first-floor construction sectionally not exceeding 5m longitudinally. An inspection and resistance check of the timber joists / floor boarding construction is necessary to confirm this.
- 4.3.10. As the roof and floors are demolished, all materials landing on the floors below shall be constantly removed and not allowed to build up.
- 4.3.11. Debris should be regularly removed from the building footprint.
- 4.3.12. The proximity of plant near service ducts and manholes/chambers to be planned.
- 4.3.13. Road plates or other transfer structures may be necessary. Integrity of chambers, particularly brick chambers to be verified if plant is reliant for support on these elements, else removal of cover lids and infilling with compact material should be considered.
- 4.3.14. Suitable Exclusion Zones should be established around all adjacent buildings and roads.
- 4.3.15. These should address the height of Building 4b and its proximity to adjacent features and harbour edge.
- 4.3.16. Remote demolition technique using long reach plant with interchangeable breaker, shears and grab for example, would be preferable.
- 4.3.17. If long-reach plant is to be employed, then the concentrated loads on the ground should be observed. Ground conditions are likely to be as shown in Appendix D.
- 4.3.18. Manual demolition should be avoided wherever possible. If it must be employed, close attention to the method for deconstruction of walls will be needed. A crack inspection of the walls and report to MCA for further advice should be undertaken. Brickwork should be removed row by row. Avoid manual deliberate weakening of walls.

- 4.3.19. The external masonry wall now effectively 'free-standing' above first floor level will require longitudinal sectional removal immediately after each 5m section of roof is removed. An appropriately designed protection mat will need to be reviewed to support dynamic loads generated as the sections of the wall are pulled in an outwardly direction from the building to protect the external landscape. This could be done using a long-reach plant with appropriate attachments such as a grab, shears, or bucket, in a manner which will not cause debris to fall inward and damage the first-floor construction.
- 4.3.20. The contractor should assess and record any cracks or movement joints, which can act as unsupported edges and has the potential unintentional collapse the wall during or before the demolition phase. They should then consider how to manage these defect during the demolition phase.
- 4.3.21. The second portion of the roof, located between the internal north-east elevation masonry wall and along the apex of Building 4a truss, should remain in place to provide short term lateral stability, and be demolished in the appropriate sequence during the demolition of Building 4a.
- 4.3.22. The demolition of the first-floor construction and ground floor external wall of 4b should then follow, which mimics the sectional longitudinal approach recommended for the roof and first floor external masonry wall.
- 4.3.23. The foundations are to be removed via peckering the concrete slab and removing the debris. Further investigation is required to advise on removing any shallow foundation and foundation incorporated with Building 3's or 4a's.
- 4.3.24. Note embedded ground anchors are present along the north-east elevation.
- 4.3.25. Note underground services identified along the south-west elevation.
- 4.4. Building 4c Demolition Considerations
- 4.4.1. The following are points which need to be included in the detailed demolition method statements in order to avoid unplanned structural collapse.

- 4.4.2. Scaffolding with reinforced plastic sheeting will be required to be set up around the demolition area to prevent pollutants entering the North Sea and debris injuring the general public. The contractor review if the scaffolding is either to be independent of the building it surrounds or, have ties to it for stability which is revised in between appropriate phases of the demolition process.
- 4.4.3. The building is subdivided into three different sub-groups (4a,4b, and 4c). To ensure overall stability of Building 4 during the demolition phase, each sub-group should be assessed to determine in what sequence they should be demolished, taking into account the information contained within this report.
- 4.4.4. We recommend that the basis of the proposed method of demolition for the structure should consider a top-down approach which is the reverse of the construction sequence and hence is inherently a safe approach.
- 4.4.5. It should be feasible to remove the roof and wall cladding first. The connections between the SHS steel frame, must be inspected, and their ability to act as moment resisting frames or ties to existing buildings assessed, to allow the external skin to be removed.
- 4.4.6. A longitudinal sectional 'clamp and cut' procedure is recommended for the removal of the SHS steel frame. This will be done by clamping the column head, and preferably cold cutting the top beams. This will allow the plant to then bend the column over towards the protection mat. The column can then be cold cut at it's base.
- 4.4.7. The proximity of plant near service ducts and manholes/chambers to be planned.
- 4.4.8. Road plates or other transfer structures may be necessary. Integrity of chambers, particularly brick chambers to be verified if plant is reliant for support on these elements, else removal of cover lids and infilling with compact material should be considered.
- 4.4.9. Suitable Exclusion Zones should be established around all adjacent buildings and roads.

- 4.4.10. These should address the height of Building 4c and its proximity to adjacent features and harbour edge.
- 4.4.11. Remote demolition technique using high reach plant with interchangeable breaker, shears and grab for example, would be preferable.
- 4.4.12. If long-reach plant is to be employed, then the concentrated loads on the ground should be observed. Ground conditions are likely to be as shown in Appendix D.
- 4.4.13. Debris should be regularly removed from the building footprint.
- 4.4.14. Details of the bracing strategy are unclear from the photos viewed. It is likely the frame is supported via its connections to Building 4b and 4c respectively.
- 4.4.15. The foundations are to be removed, however further investigation is required to advise on removing any shallow foundation and foundation incorporated with 4b or 4a.
- 4.4.16. Note embedded ground anchors are present along the north-east elevation.
- 4.4.17. Note underground services identified along the south-west elevation.
- 4.5. Building 7 Demolition Considerations
- 4.5.1. The following are points which need to be included in the detailed demolition method statements in order to avoid unplanned structural collapse.
- 4.5.2. Scaffolding with reinforced plastic sheeting will be required to be set up around the demolition area to prevent pollutants entering the North Sea and debris injuring the general public. The contractor review if the scaffolding is either to be independent of the building it surrounds or, have ties to it for stability which is revised in between appropriate phases of the demolition process.
- 4.5.3. We recommend that the basis of the proposed method of demolition for the structure should consider a top-down approach which is the reverse of the construction sequence and hence is inherently a safe approach.

- 4.5.4. The top-down approach should be sectional. I.e. One bay removed at a time, to ensure stability of the structure is maintained.
- 4.5.5. Before demolition of the main building, a ‘clamp and cut’ approach may be considered if the removal of the CAT ladder and platform on the north-west elevation is deemed appropriate. The removal of the steelwork portion of the first-floor steel balcony should be considered at this phase as well.
- 4.5.6. Consideration should be given to whether the steel balcony or CAT ladder and platform can be utilised as access/egress routes during the demolition phase.
- 4.5.7. The assumed timber roof, assumed to span from south-east gable to the first transverse wall, could be collapsed onto the concrete slab which acts as the soffit to the first floor. Any ridge, or purlins could be left in place to provide short-term lateral stability of the gable wall.
- 4.5.8. It would be considered normal to assume that a tower crane could lift a 1t mini excavator plant to upper floor levels to assist with the demolition process. However, the Structural integrity of the thin floor slab construction must be investigated first, if this is to be contemplated.
- 4.5.9. The proximity of plant near service ducts and manholes/chambers to be planned.
- 4.5.10. Road plates or other transfer structures may be necessary. Integrity of chambers, particularly brick chambers to be verified if plant is reliant for support on these elements, else removal of cover lids and infilling with compact material should be considered.
- 4.5.11. Suitable Exclusion Zones should be established around all adjacent buildings and roads.
- 4.5.12. These should address the height of Building 7 and its proximity to adjacent features and harbour edge.
- 4.5.13. Buttrressing cross walls to be raked back during demolition to assist in maintaining short term stability.

- 4.5.14. Remote demolition technique using long-reach plant with interchangeable breaker, shears and grab for example, would be preferable.
- 4.5.15. Manual demolition should be avoided wherever possible. If it must be employed, close attention to the method for deconstruction of walls will be needed. Brickwork should be removed row by row. Avoid manual deliberate weakening of walls.
- 4.5.16. The supporting walls to be removed immediately following supported roof / slab removal to prevent residual freestanding walls being subject to external wind forces. If a strip-by-strip approach is adopted, then long lengths of freestanding wall can be avoided.
- 4.5.17. Demolition of each level should consider a top-down unit-by-unit inward progression from the south-east gable to the north-west gable, to reduce the risk of outward falls/premature collapse.
- 4.5.18. Brickwork walls should be demolished using remote long-reach plant or by hand design from elevated platforms and carefully pushing the walls in stages. This avoids accumulation of arisings on the slender floor slabs which could lead to premature collapse and there after disproportionate collapse of the structure from pancake failure. If long-reach plant is to be employed, then the concentrated loads on the ground should be observed. Ground conditions are likely to be as shown in Appendix D.
- 4.5.19. As stated earlier, the floor slabs appear to be of a thin concrete construction and therefore the potential for overloading with demolition arisings should be observed.
- 4.5.20. The demolition of upper floor slabs to consider controlled fall of debris and examine loading of floor slabs below, it is possible that due to the aspect ratio of the rooms being longitudinal rather than square, that the slabs have been designed as spanning in one direction only.
- 4.5.21. The reinforcement pattern should be confirmed by Ferro-scanning or similar, to verify the capacity of the floors. Once the capacity of the slab can be accurately determined, then the method of demolition can be determined with more confidence. If one way spanning capacity



is available, then removal of floors using a strip-by-strip method can be considered. This would allow better control of demolition and volume of arisings onto the slab below.

4.5.22. Due to the sensitivity of the upper floors construction, the use of mini rigs as access or forming a crash deck system should be carefully planned and decision of any spreader systems on supporting floors.

4.5.23. Temporary propping to adjacent slabs may be required to control the removal.

4.5.24. As the roof and floors are demolished, all materials landing on the floors below shall be constantly removed and not allowed to build up.

4.5.25. Debris should be regularly removed from the building footprint.

4.5.26. Guard railing will be required at all levels.

4.5.27. It may be preferable to consider using a tower crane to lift skips to and from the building.

4.5.28. Use of wrecking balls to be avoided.

4.5.29. The foundations are to be removed, however further investigation is required to advise on removing any shallow foundation and foundation incorporated with Building 3's, 4b or 4a.

#### 4.6. Kiosks Demolition Considerations

4.6.1. The following are points which need to be included in the detailed demolition method statements in order to avoid unplanned structural collapse.

4.6.2. Scaffolding with reinforced plastic sheeting will be required to be set up around the demolition area to prevent debris injuring the general public. The contractor should review whether the scaffolding is either to be independent of the building it surrounds or, the connections to tied to the building and revised in between appropriate phases of the demolition process.

- 4.6.3. We recommend that the basis of the proposed method of demolition for the structure should consider a top-down approach which is the reverse of the construction sequence and hence is inherently a safe approach.
- 4.6.4. The top-down approach should be sectional. I.e. One bay removed at a time, to ensure stability of the structure is maintained.
- 4.6.5. The proximity of plant near service ducts and manholes/chambers to be planned.
- 4.6.6. Road plates or other transfer structures may be necessary. Integrity of chambers, particularly brick chambers to be verified if plant is reliant for support on these elements, else removal of cover lids and infilling with compact material should be considered.
- 4.6.7. Suitable Exclusion Zones should be established around all adjacent buildings and roads.
- 4.6.8. These should address the height of the kiosks and its proximity to adjacent features and harbour edge.
- 4.6.9. The demolition sequence of the assumed overhang timber roof between each eave and the demolition of the main span of the roof needs to be considered to prevent overturning of the overhang portion.
- 4.6.10. The building could be demolished using a remote demolition technique such as a long reach plant with interchangeable breaker, shears and grab for example. This is the preferred method of construction.
- 4.6.11. The assumed timber roof, from one gable end to the first transverse wall, could be collapsed onto the ground floor concrete slab. Any structural framing could be left in place to provide short-term lateral stability of the gable and longitudinal walls.
- 4.6.12. Buttressing cross walls to be raked back during demolition to assist in maintaining short term stability.

- 4.6.13. Manual demolition should be avoided wherever possible. If it must be employed, close attention to the method for deconstruction of walls will be needed. Brickwork should be removed row by row. Avoid manual deliberate weakening of walls.
- 4.6.14. The supporting walls to be removed immediately following supported roof removal to prevent residual freestanding walls being subject to external wind forces. If a strip-by-strip approach is adopted, then long lengths of freestanding wall can be avoided.
- 4.6.15. Brickwork walls should be demolished using remote long-reach plant or by hand from elevated platforms and carefully pushing the walls in stages. If long-reach plant is to be employed, then the concentrated loads on the ground should be observed. Ground conditions are likely to be as shown in Appendix D.
- 4.6.16. Before moving on to subsequent bays, the support steel column and framing it supports could be 'clamped and cut', preventing long lengths of steel frame acting as unstable free standing cantilevers.
- 4.6.17. Debris should be regularly removed from the building footprint.
- 4.6.18. The foundations are to be removed, however further investigation is required to advise on removing any shallow foundation.
5. ASBESTOS
- 5.1. An asbestos strip-out should be undertaken within the buildings ahead of the main demolition works and confirmation should be obtained that this has been completed prior to the works commencing.

## 6. SUMMARY

- 6.1. The basic principle of the demolition of Building 4a, 4b, 7 and the Kiosks is a top-down method.
- 6.2. The basic principle of the demolition of Building 4c steelwork is a cut-and-clamp method.
- 6.3. This is considered to be a safe approach.
- 6.4. The proximity of the pier edge and other buildings to the demolition locations, commercial and public use of the West Pier should be considered.
- 6.5. The masonry cross wall format of Building 7 and the method of provision of lateral and vertical stability is to be carefully accounted for in any proposed demolition sequence.
- 6.6. Buildings 4a, 4b, 4c and Building 3 balcony rely on their connectivity to one and other for stability and requires consideration to the method of provision of lateral and vertical stability during the planning of the demolition sequence.
- 6.7. Note the unknown construction of the roof of Buildings 4b, 7 and the Kiosks, and unknown floor / foundation construction of Buildings 4,7 and the kiosks.
- 6.8. Note Building 7 or the kiosks have not been inspected internally.
- 6.9. The demolition methodology to observe the external wall construction and the location of movement joints in the brickwork.
- 6.10. Instability identified in Building 4 Trusses having bottom chords which have been cut.
- 6.11. Note poor detailing of supporting roof construction and first floor wall off of Building 4a.
- 6.12. Note underground service have been identified along the south-west elevation of Building 4.
- 6.13. Note underground pier wall anchors present along north-east elevation of building 4.
- 6.14. The interaction of the exposed external steel columns and their support to the Kiosks overhang roof is unknown.
- 6.15. Long-reach plant with suitable attachments and cold cutting techniques are the preferred method of demolition.
- 6.16. Ground conditions need to be considered if long-reach plant is used.
- 6.17. The internal north-east elevation wall and roof of Building 4b supported which is supported on the roof construction of Building 4a is to be demolished in the appropriate sequence of the demolition of building 4a.

6.18. The demolition sequence of the Kiosks overhang roof needs to be considered to prevent overturning the roof construction.

*Signed on behalf of Mason Clark Associates Ltd:*



**Dominic Mackevych** B.Eng (Hons) I.Eng M.I.C.E  
**Senior Structural Engineer**

## 7 LIMITATIONS

- 7.1 Our inspection and report are concerned with the structural aspects of the structure such as foundations, walls and floors. We have not concerned ourselves with the condition of items such as doors, windows, and other fittings; or items such as timber infestation / decay, dampness, and testing of services to the property, unless specified in the report.
- 7.2 Sampling and testing of materials is beyond the scope of this report.
- 7.3 We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.
- 7.4 This report is applicable to the condition and state of the building at the time of inspection. The building may be subject to deterioration in the future and the opinions expressed in this report may need to be revised accordingly.
- 7.5 This report is limited to the property under consideration. It does not consider the effects that adjoining properties may have, unless with prior agreement, a detailed inspection of all adjoining properties can be made.
- 7.6 The above recommendations do not constitute a full list of works to be carried out and refer to the main areas of work associated with structural aspects of the building, based on a visual inspection only and under the limitations of our inspection.
- 7.7 All building and construction works are covered by the requirements of the CDM regulations. Owners/Clients have legal responsibilities to engage persons and companies with appropriate level of skills knowledge and experience to ensure that the requirements of the CDM regulations are met. The works required will be covered by the CDM regulations 2015 and you should understand your obligations and act accordingly.
- 7.8 Unless specifically mentioned no comment is made in the report as to the presence of new or old mine workings or tunneling, heavy metals, chemical, biological, electromagnetic or radioactive contamination or pollution, or radon methane or other gases, underground services or structures, springs and water courses, sink holes or the like, noise or vibratory pollution, mould, asbestos and asbestos products.

- 7.9 The report has been prepared for the client alone and no third party should rely on it. For the avoidance of doubt, the Contracts (Rights of Third Parties) Act 1999 shall not apply to this contract.
- 7.10 The inspection and report will not include any liability in respect of Advice/Design in fire safety to the structure and/or any liability whatsoever in respect of any losses (whether direct or indirect) arising from combustibility of cladding in delivery of our Services. We shall not be liable for that part of any claim which relates to loss of profits, loss of use, loss of production, loss of contract, liquidated damages or for any cost of decamping or rehousing.

APPENDIX A  
Demolition Plan



APPENDIX B

Photographs

APPENDIX C  
Condition Surveys

APPENDIX D  
Archive Boreholes



**Hull (Registered Office)**

Church House  
44 Newland Park  
Hull HU5 2DW

**Leeds**

Unit E  
Millshaw Business Living  
Global Avenue

**York**

Partnership House  
Monks Cross Drive  
Monks Cross

**CIVIL ENGINEERING**

Bridge design, maintenance and construction  
Wharfs, jetties and marine structures  
Highway design and maintenance  
Retaining wall and slope stability solutions  
Land remediation advice  
Road and sewer design to adoptable standards  
Section 38 and 104 Agreements  
Sewer requisitions and diversions  
Section 98 and 185 Agreements  
Flood Risk Assessments  
Coastal erosion flood breach analysis  
Flood risk management / prevention schemes  
Underground drainage design  
Stormwater attenuation  
SUDS  
Ponds, lakes and balancing ponds

**PROJECT MANAGEMENT**

**QUANTITY SURVEYING & CONTRACT ADVICE**  
**CDM SERVICES**

**BUILDING SURVEYING SERVICES**

Design, Remedial Repair / Improvement Schemes  
Contract Administration  
Building Surveys  
Professional Opinion Reports  
Condition Surveys & Schedules of Condition  
Measured Surveys  
Dilapidation Claims  
Party Wall etc. Act Representation  
Disabled Adaptations

**EXPERT WITNESS SERVICES**

Civil & Structural engineering disputes  
Project Disputes  
Health and Safety Regulations

**STRUCTURAL ENGINEERING**

Residential and commercial building structures  
Education and healthcare facilities  
Heavy industrial development  
Feasibility studies for development sites  
Building Regulations and Planning Applications  
Access and maintenance gantries  
Modular building design  
Blast design  
Subsidence management and resolution  
Temporary works design and specification  
Site and soils investigation  
Sulphate attack specialists  
Confined spaces assessments

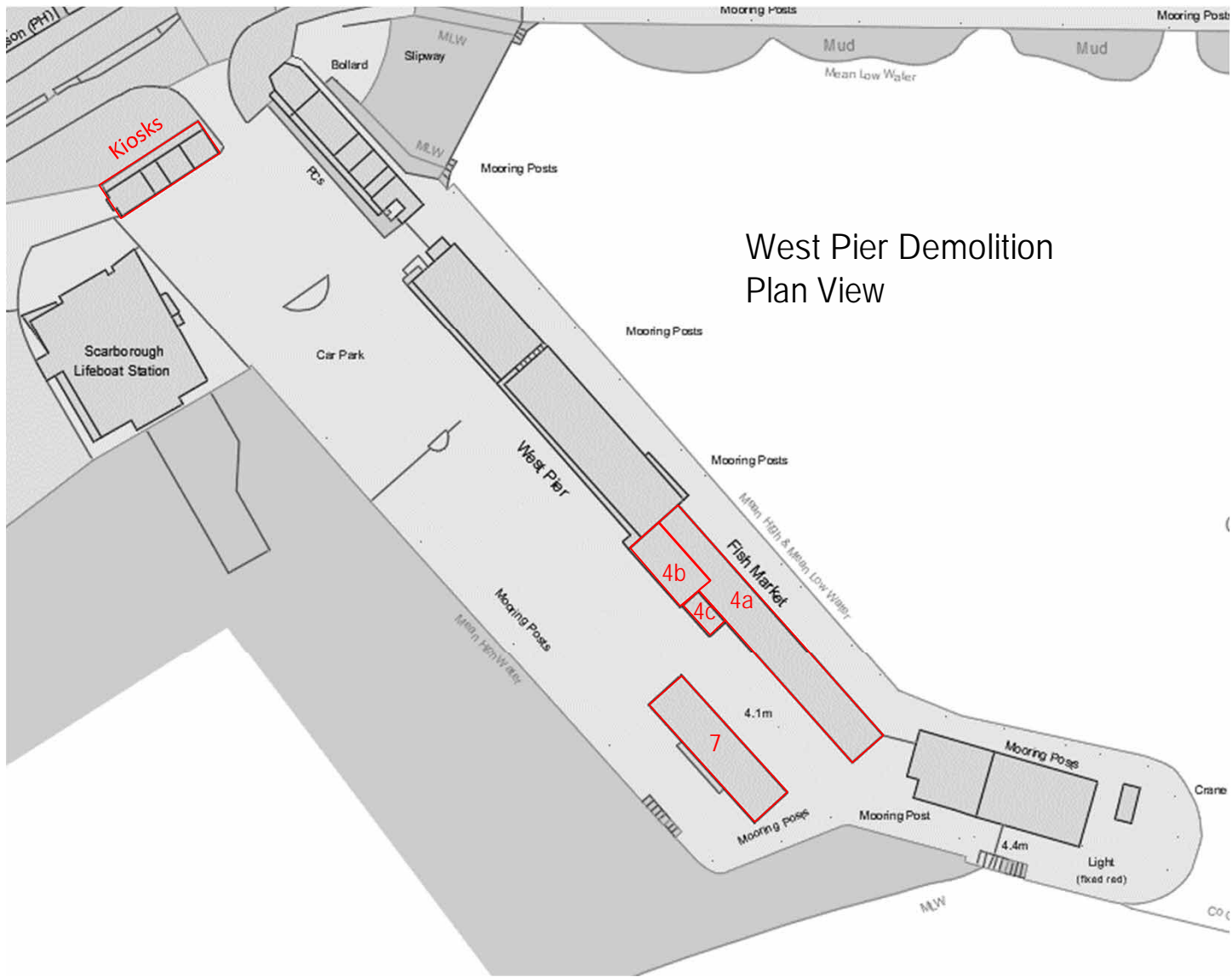
**CONSERVATION ENGINEERING**

Engineer Accredited in Building Conservation  
CARE Registered Engineer  
Heritage and conservation engineering  
Listed Building refurbishment  
Historic Parks and Gardens  
Scheduled Ancient Monuments  
Monitoring and investigations  
Liaison with Local Conservation Officers  
Buildings at Risk and Managed Ruins

**3D LASER SCANNING AND DATA CAPTURE**

Latest Generation 3D Laser Scanning  
Measured Building Surveys  
Topographical Surveys  
Monitoring Surveys  
3D modelling (Revit, CAD, Inventor, Solidworks)  
M & E Modelling  
Volumetric / Level analysis  
Scan to BIM  
Scan data cloud hosting  
Hi-Def HDR photographic surveys

APPENDIX A  
Demolition Plan



West Pier Demolition  
Plan View

APPENDIX B

Photographs





Photo 1 – South-west elevation of Building 4a



Photo 2 - North-east elevation of Building 4a



*Photo 3 - North-east elevation of Building 4a adjacent to Building 3*



*Photo 4 - Converted loft space of Building 4a*



*Photo 5 - Steel staircase to loft of Building 4a*





*Photo 6 - Hygienic Wall Panels at ground floor Building 4a*



*Photo 7 - South-west elevation of Building 4b*



*Photo 8 - Lifting Beam taken from inside Building 4b*



Photo 8 – Upper floor of Building 4b



Photo 9 - Café balcony fixed to Building 4b





*Photo 10 - Hygienic panelling at ground floor of Building 4b*



*Photo 11 - South-west elevation of Building 4c*



*Photo 12 - Aerial perspective of Building 4c Roof*



*Photo 13 - South-east elevation of Building 7*





*Photo 14 - Internal view of one unit at first floor level Building 7*



*Photo 15 - Reinforced concrete basement present along south-east elevation of Building 7*



Photo 16 - North-west elevation of Kiosks



Photo 17 - North-west elevation showing overhang soffit and steel columns of Kiosks

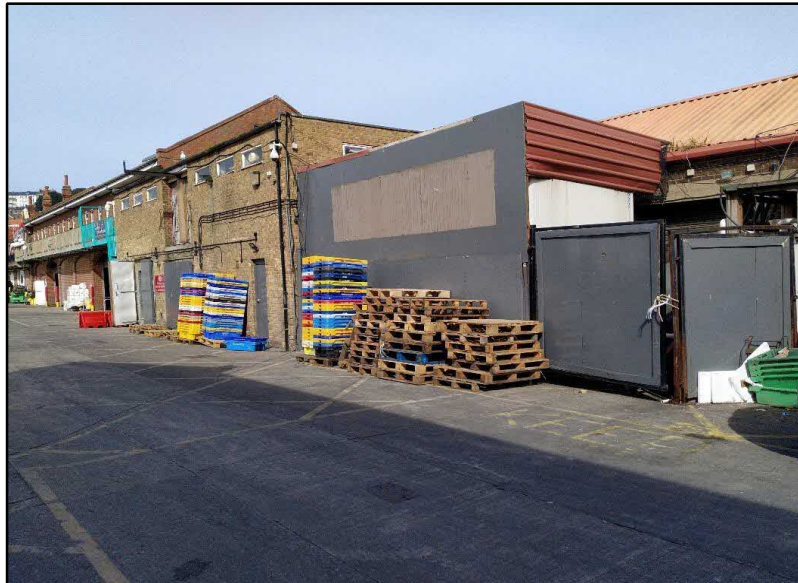


Photo 17 South-east elevation of Kiosks



APPENDIX C  
Condition Surveys

Condition Survey  
of  
Building No.4  
West Pier  
South Bay  
Scarborough  
YO11 1PD



### Summary of construction type

Please refer to the aerial view above annotated as Building 4a, Building 4b and Building 4c. Construction notes are based on external inspection only due to limitation on access imposed by tenant and comments on roof structure and internal partitions/floors are based on 3D scan images.

Walls to Building 4A are cast in situ concrete framed with brick envelope or brick infill panels between columns, although part of the east elevation are finished with insulated metal panels. Roof is covered with profiled metal sheets on steel trusses. The ground floor is concrete. Where seen from 3D scan images the internal partitions on ground floor are a mixture of PU cold room panels metal sheathed and timber partitions to GF. Steel internal staircases leading to timber partitions/floors first floor.

Walls to Building 4b (two storey office section) are cavity walls with possible inner leaf of brickwork and outer leaf of brickwork. The roof is a flat roof covered with felt although part of the roof has been altered to span onto the steel trusses of Building 4a in an unusual way and seemingly without structural calculations. Likely Timber first floor, ground floor concrete slab.

Walls and roof to Building 4c are rudimentary timber I think its steel framed and plywood clad and also seemingly built without any structural design considerations.

### Summary of salient defects

Exposed concrete frame members of Building 4a have spalling concrete and exposed reinforcement, necessitating specialist concrete repairs. The south east corner of Building 4a has suffered settlement or subsidence of foundations, resulting in cracking in brickwork. The south gable of Building 4a has also moved away (bulged) slightly due to the wall being a replacement for an earlier wall and presence of straight joints between old and newer brickwork.

Flat roof of Building 4b has perished felt in need of replacement. Walls of Building 4b have various cracks caused by corrosion of handrail fixings and other fixings set in the brickwork, and areas of impact damage. Windows are in poor condition and in need of replacement. We suspect there are no lintels over the windows, requiring investigation and probable installation of lintels when replacing windows. Cavity walls in this age of building often have wall ties that corrode and cause the brickwork to crack and move and we recommend investigation of condition of the wall ties because remedial work to replace them is very expensive.

Building 4c is poorly constructed and in a dilapidated condition and we recommend it be taken down and the adjoining parts of 4a and 4b made good after that.

Limitations

Please see separate tab/page for the survey limitations.

In addition it should be noted that roof spaces and other voids have not been inspected as there were no asbestos survey reports available to confirm areas were safe to enter.

Costs are based on all recommended work being done in a single project and not spread over time into smaller parcels. The estimated costs may not, in all circumstances, reflect the lowest tender prices available.

Our report provides comment on works required imminently to preserve the building but we have not provided a programmed maintenance plan covering works potentially required in future years.

We have not included within the costs any allowances for tenant's fitting-out works, fixtures, fittings, furnishings carpets, floor coverings and the like.

Issue Log for Report 19866-H-RP-004

Rev	Date	Description	Author	Checked
0	15/10/2021	First issue	DS	MEA
Issuing office: Hull (refer to back page for details)				

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
1.00	Roofs										
1.01	Roofs	Building 4a	C. Fair	Fair condition but gutters blocked and leaking.	1 to 5	Clean out and repair gutters. MEWP or other access equipment needed.	Yes	1	Item	£ 2,000.00	£ 2,000.00
1.02	Roofs	Steel Trusses	D. Poor /Life Expired	Section of bottom chord of steel truss removed possibly to avoid trip hazard. Structural element now unstable. Impact with truss due to use	S22,	Investigate each truss to determine extent and adequacy of any current restraint in place to support trusses to determine action needed. Cost for investigation only at present because scope of remedial works is not known.	No	1	Item	£ 1,500.00	£ 1,500.00
1.03	Roofs	Steelwork Purlins, Support beams/columns	D. Poor /Life Expired	Surface corrosion present on purlins and internal steel framing	S23,	Wirebrush off rust and apply projective coating	Yes	1	Item	£ 2,500.00	£ 2,500.00
1.04	Roofs	Building 4b	D. Poor /Life Expired	Flat roof with perished felt.	8, 9	Strip and re-cover roof and install thermal insulation to roof. Scaffolding required.	Yes	120	m	£ 325.00	£ 39,000.00
1.05	Roofs	Building 4b	D. Poor /Life Expired	Flat roof with unorthodox structural changes and roof timbers bearing on steel trusses.	7, 8, 38	Provisional sum for structural improvements pending better investigation work	No	1	Item	£ 10,000.00	£ 10,000.00
1.06	Roofs	Building 4b	D. Poor /Life Expired	Gutters old and failing, causing dampness in walls.	9, 14	Replace gutters and fall pipes	Yes	1	Item	£ 500.00	£ 500.00
1.07	Roofs	Building 4c	D. Poor /Life Expired	Poorly built timber/steel structure (walls and roof)	6, 7, 21, 22	Take down and clear away all of 4c (roof and walls) and make good to adjoining surfaces. Provisional sum pending investigation of construction and ease of demolition.	Yes	1	Item	£ 15,000.00	£ 15,000.00
2.00	Walls										
2.01	Walls	Building 4a	C. Fair	Spalling concrete and exposed reinforcement	34 to 37	Carry out specialist concrete repairs. Provisional sum pending full inspection.	Yes	1	Item	£ 5,000.00	£ 5,000.00
2.02	Walls	Building 4a	D. Poor /Life Expired	Cracking caused by suspected foundation settlement or subsidence at south east corner. Crack appears to have previously been repointed and has opened up further.	31 to 33	Investigate and carry out remedial works. Cost included at present is for crack repairs and trial pit investigations assuming no requirement for foundation remedial works such as underpinning. Trial pit investigation required to determine precise cause of settlement.	Yes	1	Item	£ 1,500.00	£ 1,500.00
2.03	Walls	Building 4a	D. Poor /Life Expired	Cracking between south gable and south east corner brickwork due to vertical Crack appears to have previously been repointed and has opened up further.	31 to 33	Install remedial ties to reinstate bond across vertical joint	Yes	1	Item	£ 750.00	£ 750.00
2.04	Walls	Building 4a	C. Fair	Various areas of eroded mortar pointing to brickwork at low level. Many areas hidden by crab pots and no cost allowance for those areas.	36	Rake out and repoint. Provisional sum pending exposing all walls.	Yes	1	Item	£ 2,000.00	£ 2,000.00
2.05	Walls	Building 4b	C. Fair	In this age of building with coastal exposure conditions there is a possibility of wall tie corrosion.		Investigate possible wall tie corrosion. Cost for investigation only. Any remedial works would be in addition at potentially over £10k.	No	1	Item	£ 1,000.00	£ 1,000.00
2.06	Walls	Building 4b	C. Fair	Cracking present where balcony fixed to west elevation of building 4b. Possibly due to lever arm of handrail connection and floor cantilever beam connection.	S3,	Provide new column and foundation to balcony. Rakeout and repoint masonry	No	1	Item	£ 4,000.00	£ 4,000.00
2.07	Walls	Building 4b	D. Poor /Life Expired	Lintels seem to be absent above windows	12, 13, 14	Allow for installing lintels when replacing windows. Temporarily prop masonry above windows to allow for installation.	No	7	No.	£ 1,000.00	£ 7,000.00
2.08	Walls	Building 4b	C. Fair	Various areas of eroded mortar pointing to brickwork and areas of impact damage. Areas of cracking caused by corrosion of built in fixings.	14, 16, 18, 19	Cut out corroding fixings and replace in stainless steel. Repair areas of impact damage. Repaint cracks and eroded joints.	Yes	1	Item	£ 1,250.00	£ 1,250.00
3.00	External Windows & Doors										
3.01	Doors	Building 4a	C. Fair	Of varying types in serviceable condition. Some are fairly recently installed	29, 30, 34	No works needed at present					£ -
3.02	Windows	Building 4a	B. Good	Recently replaced with no works required at present	29, 30, 34						£ -
3.03	Windows	Building 4b	D. Poor /Life Expired	Office windows rotted	12, 13, 14	Replace. Temporarily prop masonry above windows to allow for installation.	Yes	7	No.	£ 600.00	£ 4,200.00

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
3.04	Loading bay door	Building 4b	D. Poor /Life Expired	Loading bay door rotted	15	Replace Temporarily prop masonry above windows to allow for installation.	Yes	1	No.	£ 1,750.00	£ 1,750.00
3.04	Lifting beam above loading bay door	Building 4b	D. Poor /Life Expired	Heavily corroded and not safe to use	10, 11, 15	Remove	Yes	1	No.	£ 750.00	£ 750.00
4.00	Structural Frame										
4.01	Internal inspection of frame and roof structure excluded	Interior not inspected due to tenant related access restrictions, except those done by 3d scanning.									£ -
5.00	Foundations, Substructure & Basements										
5.01	Excluded	Foundations not seen but signs of settlement identified									£ -
6.00	Floors & Stairs										
6.01	Excluded	Interior not inspected due to tenant related access restrictions									£ -
7.00	Internal Walls, Partitions & Doors										
7.01	Excluded	Interior not inspected due to tenant related access restrictions									£ -
8.00	Ceilings										
8.01	Excluded	Interior not inspected due to tenant related access restrictions									£ -
9.00	Wall Finishes										
9.01	Excluded	Interior not inspected due to tenant related access restrictions									£ -
10.00	Floor Finishes										
10.01	Excluded	Interior not inspected due to tenant related access restrictions									£ -
11.00	Fixtures & Finishes										
11.01	Excluded	Assumed that fixtures/finishes are tenant owned items									£ -
12.00	External Areas, Outbuildings & Boundaries										
12.01	Excluded	Excluded									£ -
13.00	Drainage										
13.01	Drainage	Below ground drainage		See separate Jet-Aire report		Carry out repair works recommended in Jet-Aire report. Specialist cost required from Jet-Aire and not yet provided.					£ -
14.00	Fire Precautions										
14.01	Excluded	Excluded.									£ -
15.00	Accessibility										
15.01	Excluded.	Excluded.									£ -

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
<b>16.00</b>	<b>Thermal Insulation &amp; Energy Efficiency</b>										
16.01	Excluded	Interior not inspected due to tenant related access restrictions									
<b>17.00</b>	<b>Noise &amp; Disturbance</b>										
17.01	Excluded	Excluded.									£ -
<b>18.00</b>	<b>Land Contamination &amp; Environmental Controls</b>										
18.01	Excluded	Excluded.									£ -
<b>19.00</b>	<b>Deleterious &amp; Hazardous Materials</b>										
19.01	Asbestos	Excluded.									£ -
19.02	Lead	Excluded.									£ -
<b>20.00</b>	<b>Statutory Matters</b>										
20.01	Excluded	Excluded.									£ -
<b>21.00</b>	<b>Rights of Way, Easements &amp; Shared Services</b>										
21.01	Excluded	Excluded.									£ -

Approximate estimate

Ex VAT



## LIMITATIONS

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Sampling and testing of materials is beyond the scope of this report.

We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

This report is applicable to the condition and state of the building at the time of inspection. The building may be subject to deterioration in the future and the opinions expressed in this report may need to be revised accordingly.

This report is limited to the property under consideration. It does not consider the effects that adjoining properties may have, unless with prior agreement, a detailed inspection of all adjoining properties can be made.

The above recommendations do not constitute a full list of works to be carried out, but refer to the main areas of work associated with structural aspects of the building, based on a visual inspection only and under the limitations of our inspection.

All building and construction works are covered by the requirements of the CDM regulations. Owners/Clients have legal responsibilities to engage persons and companies with appropriate level of skills knowledge and experience to ensure that the requirements of the CDM regulations are met. The works required will be covered by the CDM regulations 2015 and you should understand your obligations and act accordingly.

Unless specifically mentioned no comment is made in the report as to the presence of new or old mine workings or tunneling, heavy metals, chemical, biological, electromagnetic or radioactive contamination or pollution, or radon methane or other gases, underground services or structures, springs and water courses, sink holes or the like, noise or vibratory pollution, mould, asbestos and asbestos products.

The report has been prepared for the client alone and no third party should rely on it. For the avoidance of doubt, the Contracts (Rights of Third Parties) Act 1999 shall not apply to this contract.

The inspection and report will not include any liability in respect of Advice/Design in fire safety to the structure and/or any liability whatsoever in respect of any losses (whether direct or indirect) arising from combustibility of cladding in delivery of our Services. We shall not be liable for that part of any claim which relates to loss of profits, loss of use, loss of



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production, loss of contract, liquidated damages or for any cost of decamping or rehousing. Possible deleterious materials have been noted during the survey. Any prospective purchaser should acquire specialist advice on the appropriate actions for dealing with these materials. In addition, we would highlight that, for all non-domestic properties and communal areas, any materials containing asbestos must be managed and or removed in accordance with the current Asbestos Regulations. We recommend that specialist report be undertaken to clearly identify these materials and management/removal requirements.

This report is limited to structural matters. The client should obtain their own advice on any specialist surveys that need to be undertaken.

This report relates to the building in its original layout. We have not been involved in the refurbishment works and therefore cannot comment on the effects of any changes to the structure of the building. It is the responsibility of those involved in the refurbishment; to ensure the buildings present stability is not compromised, and its future stability is ensured.

Short of the whole structure involved being dismantled, an appraisal can only ever be based on the areas investigated, in the belief they are representative.

**Hull (Registered Office)**

Church House  
44 Newland Park  
Hull HU5 2DW

**Leeds**

Unit E  
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Global Avenue

**York**

Partnership House  
Monks Cross Drive  
Monks Cross

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Building Surveying  
Health and Safety Regulations

Condition Survey  
of  
Building 7  
West Pier  
South Bay  
Scarborough  
YO11 1PD



Summary of construction type

Built circa 1950 consisting of:

Likely timber roof with concrete plain tiles (roof interior not seen due to absence of asbestos report)

Walls of cavity construction with brick outer leaf. Gable peaks appear to have been rebuilt and the reason is not apparent.

Internal dividing walls of blockwork (only seen through windows).

Concrete suspended slab first floor (only seen through windows).

Concrete slab ground floor (only seen through windows).

Unprotected steel or timber lintels in walls.

Cantilevered concrete balcony along west elevation as access deck to first floor units.

Balcony extension near south west corner is of galvanised steel with open mesh deck.

Steel Platform with CAT ladder into roof void.

External steel lifting beam.

Summary of salient defects

Corrosion in lintels with resultant bowing in piers between opening and lifting and cracking to brickwork above openings.

Extensive spalling of bricks and erosion of mortar.

Subsidence or similar movement affecting south west corner and resulting in cracking in this area.

Spalling of concrete on balcony.

Balcony access steps are steep and effectively ladders and a risk assessment is required to establish if they are safe for continuing use.

Windows and doors in poor condition.

Limitations

Please see separate tab/page for the survey limitations.

In addition it should be noted that roof spaces and other voids have not been inspected as there were no asbestos survey reports available to confirm areas were safe to enter.

Costs are based on all recommended work being done in a single project and not spread over time into smaller parcels. The estimated costs may not, in all circumstances, reflect the lowest tender prices available.

Our report provides comment on works required imminently to preserve the building but we have not provided a programmed maintenance plan covering works potentially required in future years.

We have not included within the costs any allowances for tenant's fitting-out works, fixtures, fittings, furnishings carpets, floor coverings and the like.

Issue Log for Report 19866-H-RP-007

Rev	Date	Description	Author	Checked
0	15/10/2021	First issue	MEA	DS
Issuing office: Hull (refer to back page for details)				

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
1.00	Roofs										
1.01	Main Roof	Pitched roof with concrete plain tiles	C. Fair	In a fair condition with no significant defects identified.	23, 24, 53, 54, 55, 58	No works required at present but marine environment may mean high frequency of repairs as the roof covering gets older.		280	m2	£ -	£ -
1.02	Main Roof	Brick parapet to gables with concrete coping stones and lead flashing.	C. Fair	In a fair condition with no significant defects identified. Note gable brickwork is more recent than the elevations.	21, 53, 55, 57	Check condition of brickwork behind flashings. Provisional sum allowed for brickwork repairs.		1	No.	£ 2,000.00	£ 2,000.00
1.03	Main Roof	Timber fascia boards	D. Poor /Life Expired	Timber boards in a weathered condition with poor flaking paint and areas of rot.	4, 7, 53, 54, 55	Repair and repaint	Yes	56	m	£ 50.00	£ 2,800.00
1.04	Main Roof	uPVC Guttering and rainwater pipes	D. Poor /Life Expired	In a poor condition with evidence of being full of debris and vegetation growth together with leaking joints.	4, 8, 14, 17, 23, 24, 27, 28, 29,	Replace	Yes	56	m	£ 75.00	£ 4,200.00
2.00	Walls										
2.01	Brick elevations	Brick elevations	D. Poor /Life Expired	Brickwork is generally in a poor condition with numerous areas of eroded and spalled brickwork together with evidence of corroded steel lintels and previous patch repairs and partial rebuild adjacent to the south east corner. The brickwork piers between the doors and windows to are bowing due to lintel corrosion expansive forces and brickwork above windows is lifting.	1-24, 27-30, 41-71	Rebuild /substantially repair elevations and replace lintels. Temporary system of support to appropriate parts of structure to stabilise it for removal of walls, design and installation of lintels. Locally cut and replace weathered brickwork.	Yes	316	m2	£ 325.00	£ 102,700.00
2.03	Brick elevations	Brick elevations	D. Poor /Life Expired	Corroding lintels and loose brickwork to 1st floor south elevation	42, 44, 46,	Included above					£ -
2.04	Brick elevations	Brick elevations	D. Poor /Life Expired	Corroding lintels and loose brickwork to ground floor south elevation.	51, 52,	Included above					£ -
2.05	Brick elevations	Brick elevations	C. Fair	Cavity walls in this age of building often have wall tie corrosion. The risk of this is highest in marine environments. It is important to understand if wall ties are corroded because corrosion can lead to brickwork becoming unstable.		Investigate possible wall tie corrosion. Cost is for investigation only pending knowing if corrosion is present. Cost of remedial wall ties could be in excess of £10k	Yes	1	Item	£ 1,000.00	£ 1,000.00
3.00	External Windows & Doors										
3.01	Windows	Timber windows fitted with single glazing.	D. Poor /Life Expired	Severely weathered and rotten timber frames.	1, 5, 7, 8, 9, 10, 11, 14, 18, 20, 23, 29, 30, 32	Replace - 2m2 West Gable, 14m2 North , 2m2 East Gable, South 18m2 Temporary system of support to appropriate parts of structure to stabilise it for removal of walls, design and installation of lintels. Locally cut and replace weathered brickwork.	Yes	36	m2	£ 500.00	£ 18,000.00
3.02	Windows	PVCu windows	C. Fair	uPVC windows to north elevation	6, 15 16	No works required at present	Yes	4	m2		£ -
3.03	Doors	Timber ledged and braced doors	D. Poor /Life Expired	Severely weathered and rotten timber frames.	1	Replace - 10m2 West Gable, 34m2 North - 2m2 East Gable, South 24m2 Temporary system of support to appropriate parts of structure to stabilise it for removal of walls, design and installation of lintels. Locally cut and replace weathered brickwork.	Yes	70	m2	£ 500.00	£ 35,000.00
3.04	Doors	Other doors	C. Fair	Timber doors in satisfactory condition	13	No action	Yes	6	m2		£ -
4.00	Structural Frame										
4.01	None	Not applicable Structural frame to be confirmed but assumed to be traditional loadbearing masonry				Internal investigations required					£ -
5.00	Foundations, Substructure & Basements										
5.01	Excluded	Not seen									£ -

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
6.00	Floors & Stairs										
6.01	Balcony	Concrete balcony to middle of south elevation	D. Poor /Life Expired	Concrete balcony top surface generally satisfactory except for defects identified in photos. Severe corrosion and blown concrete to soffit of balcony slab requiring major overhaul or likely replacement to ensure longevity over repairs	25, 26, 29, 40	Specialist concrete repairs required although this will only be a stop gap and marine environment may cause continuing spalling.	Yes	1	Item	£ 10,000.00	£ 10,000.00
	Steel Platform and CAT Ladder	Steel platform west elevation.	C. Fair	Fixings to corroded. Platform access door has no locking mechanism	2	Remove and replace fixings with galvanised equivalents. Install fixing mechanism to access.  Temporary support to balcony steelwork to allow removal and replacement of bolts.	Yes	1	Item	£ 250.00	£ 250.00
6.02	Floors	Concrete First Floor. Not yet inspected due to tenants being absent.		No access but photographed through windows	36, 37, 38, 39						£ -
6.03	Floors	Concrete Ground Floor. Not yet inspected due to tenants being absent.		No access							£ -
7.00	Internal Walls, Partitions & Doors										
7.01	Internal walls	Brick partition walls. Not yet inspected due to tenants being absent.		No access viewed through window only	37, 38, 39						£ -
8.00	Ceilings										
8.01	Ceilings	Not yet inspected due to tenants being absent.		No access	37, 38, 39						£ -
9.00	Wall Finishes										
9.01	Wall finishes	Not yet inspected due to tenants being absent.		No access	37, 38, 39						£ -
10.00	Floor Finishes										
10.01	Floor finishes	Not yet inspected due to tenants being absent.		No access	37, 38, 39						£ -
11.00	Fixtures & Finishes										
11.01	Excluded										£ -
12.00	External Areas, Outbuildings & Boundaries										
12.01	Excluded										£ -
13.00	Drainage										
13.01	Excluded										£ -
14.00	Fire Precautions										
14.01	Excluded										£ -
15.00	Accessibility										
15.01	Excluded										£ -

Ref.	Element /Location	Sub Element	Grade	Condition	Photo Ref.	Recommended Action	Backlog Maint	Volume	Unit	Rate	Budget Estimate
16.00	Thermal Insulation & Energy Efficiency										
16.01	Roof interior	Not yet inspected due to tenants being absent and no asbestos survey reports available									£ -
16.02	External walls	Excluded									£ -
16.03	Windows	Excluded									£ -
17.00	Noise & Disturbance										
17.01	Excluded										£ -
18.00	Land Contamination & Environmental Controls										
18.01	Excluded										£ -
19.00	Deleterious & Hazardous Materials										
19.01	Excluded										£ -
19.02	Excluded										£ -
20.00	Statutory Matters										
20.01	Excluded										£ -
21.00	Rights of Way, Easements & Shared Services										
21.01	Excluded										£ -

Approximate estimate  
Excluding VAT

£ 175,950.00

## Limitations

Our inspection and report are concerned with the structural aspects of the building such as foundations, walls and floors. We have not concerned ourselves with the condition of items such as doors, windows, and other fittings; or items such as timber infestation / decay, dampness, and testing of services to the property, unless specified in the report.

Sampling and testing of materials is beyond the scope of this report.

We have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and we are therefore unable to report that any such part of the property is free from defect.

This report is applicable to the condition and state of the building at the time of inspection. The building may be subject to deterioration in the future and the opinions expressed in this report may need to be revised accordingly.

This report is limited to the property under consideration. It does not consider the effects that adjoining properties may have, unless with prior agreement, a detailed inspection of all adjoining properties can be made.

The above recommendations do not constitute a full list of works to be carried out, but refer to the main areas of work associated with structural aspects of the building, based on a visual inspection only and under the limitations of our inspection.

All building and construction works are covered by the requirements of the CDM regulations. Owners/Clients have legal responsibilities to engage persons and companies with appropriate level of skills knowledge and experience to ensure that the requirements of the CDM regulations are met. The works required will be covered by the CDM regulations 2015 and you should understand your obligations and act accordingly.

Unless specifically mentioned no comment is made in the report as to the presence of new or old mine workings or tunneling, heavy metals, chemical, biological, electromagnetic or radioactive contamination or pollution, or radon methane or other gases, underground services or structures, springs and water courses, sink holes or the like, noise or vibratory pollution, mould, asbestos and asbestos products.

The report has been prepared for the client alone and no third party should rely on it. For the avoidance of doubt, the Contracts (Rights of Third Parties) Act 1999 shall not apply to this contract.

The inspection and report will not include any liability in respect of Advice/Design in fire safety to the structure and/or any liability whatsoever in respect of any losses (whether direct or indirect) arising from combustibility of cladding in delivery of our Services. We shall not be liable for that part of any claim which relates to loss of profits, loss of use, loss of production, loss of contract, liquidated damages or for any cost of decamping or rehousing. Possible deleterious materials have been noted during the survey. Any prospective purchaser should acquire specialist advice on the appropriate actions for dealing with these materials. In addition, we would highlight that, for all non-domestic properties and communal areas, any



materials containing asbestos must be managed and or removed in accordance with the current Asbestos Regulations. We recommend that specialist report be undertaken to clearly identify these materials and management/removal requirements.

This report is limited to structural matters. The client should obtain their own advice on any specialist surveys that need to be undertaken.

This report relates to the building in its original layout. We have not been involved in the refurbishment works and therefore cannot comment on the effects of any changes to the structure of the building. It is the responsibility of those involved in the refurbishment; to ensure the buildings present stability is not compromised, and its future stability is ensured.

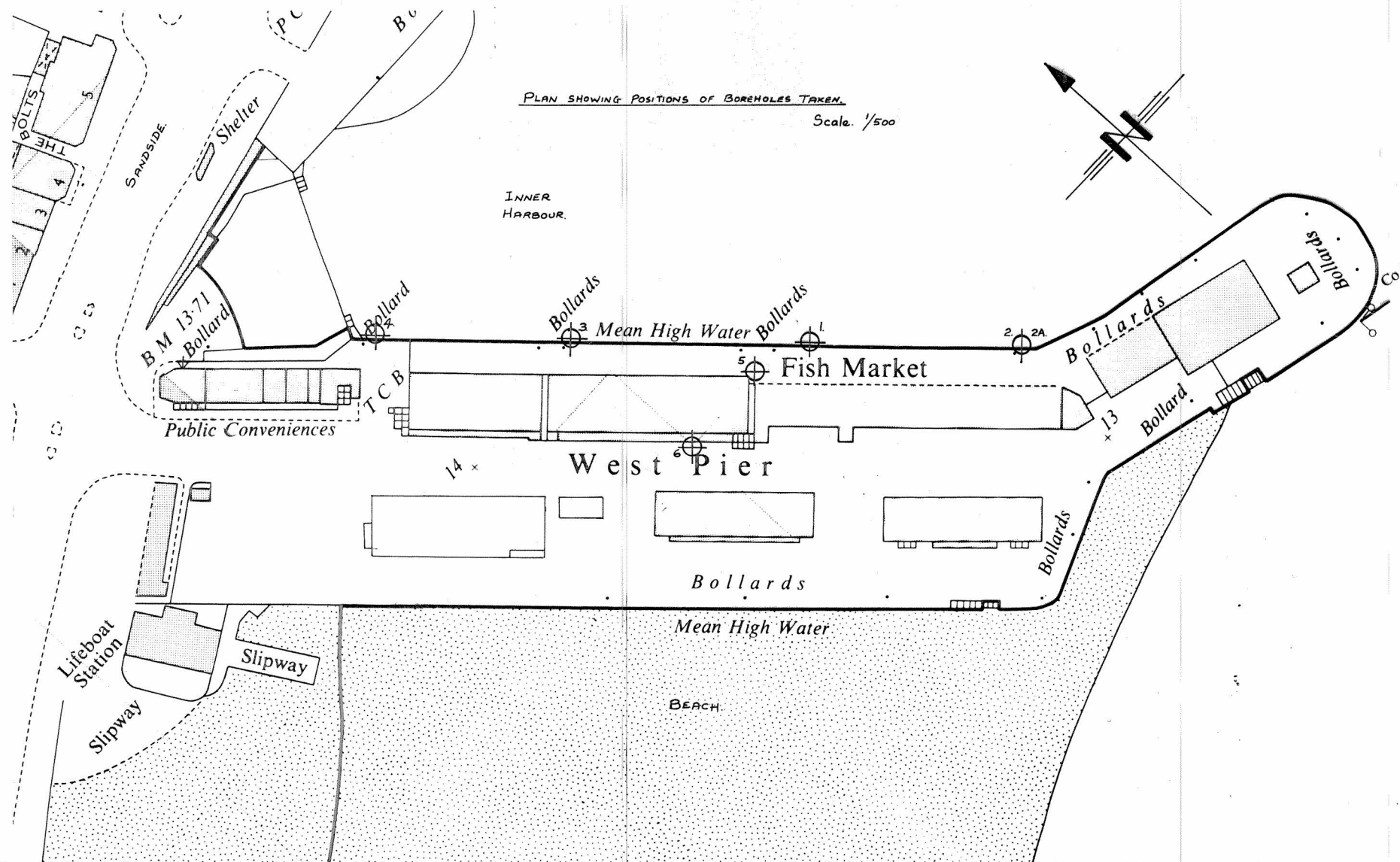
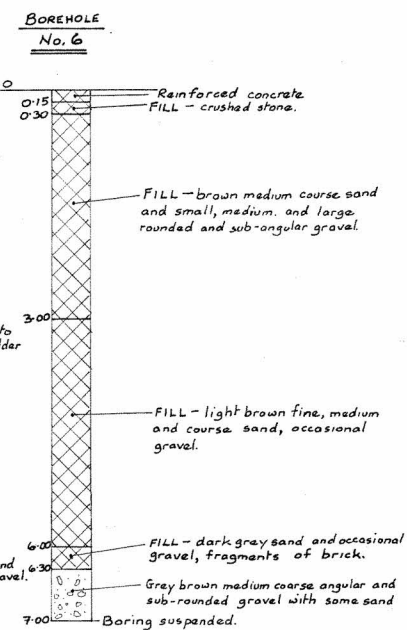
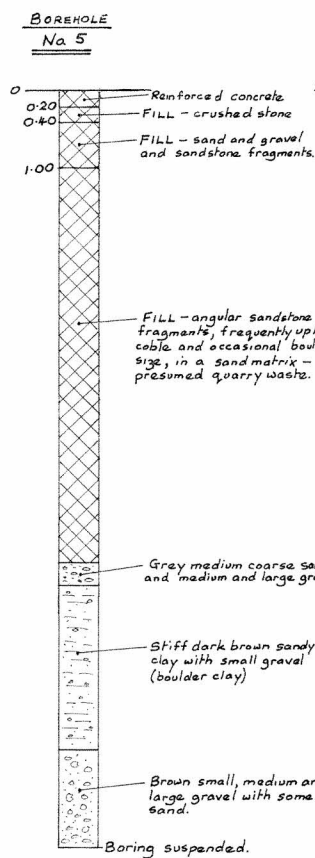
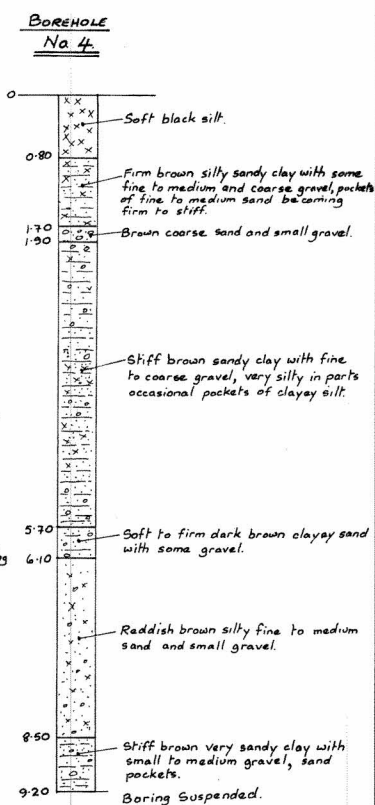
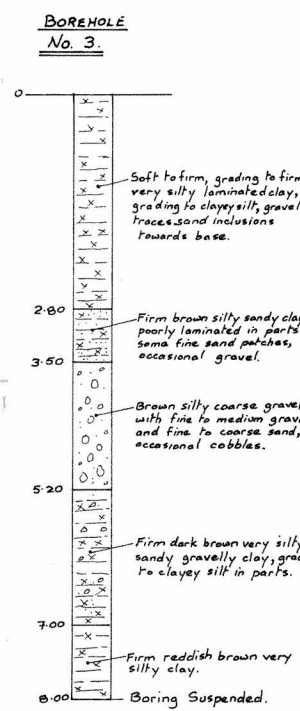
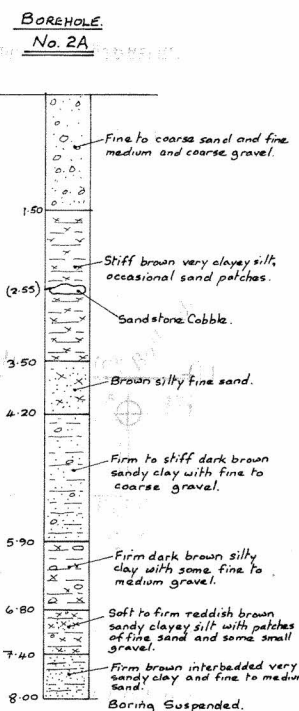
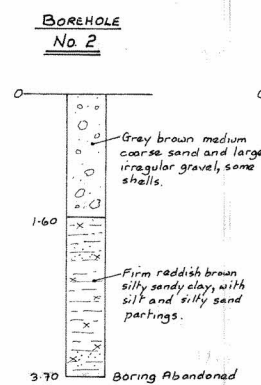
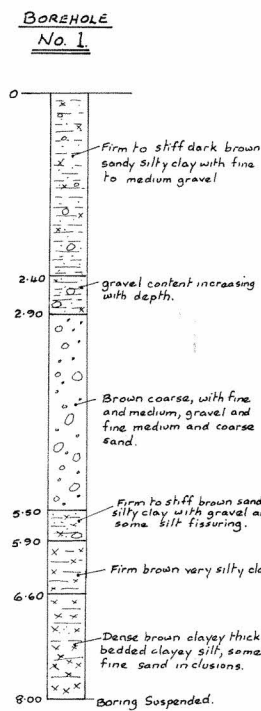
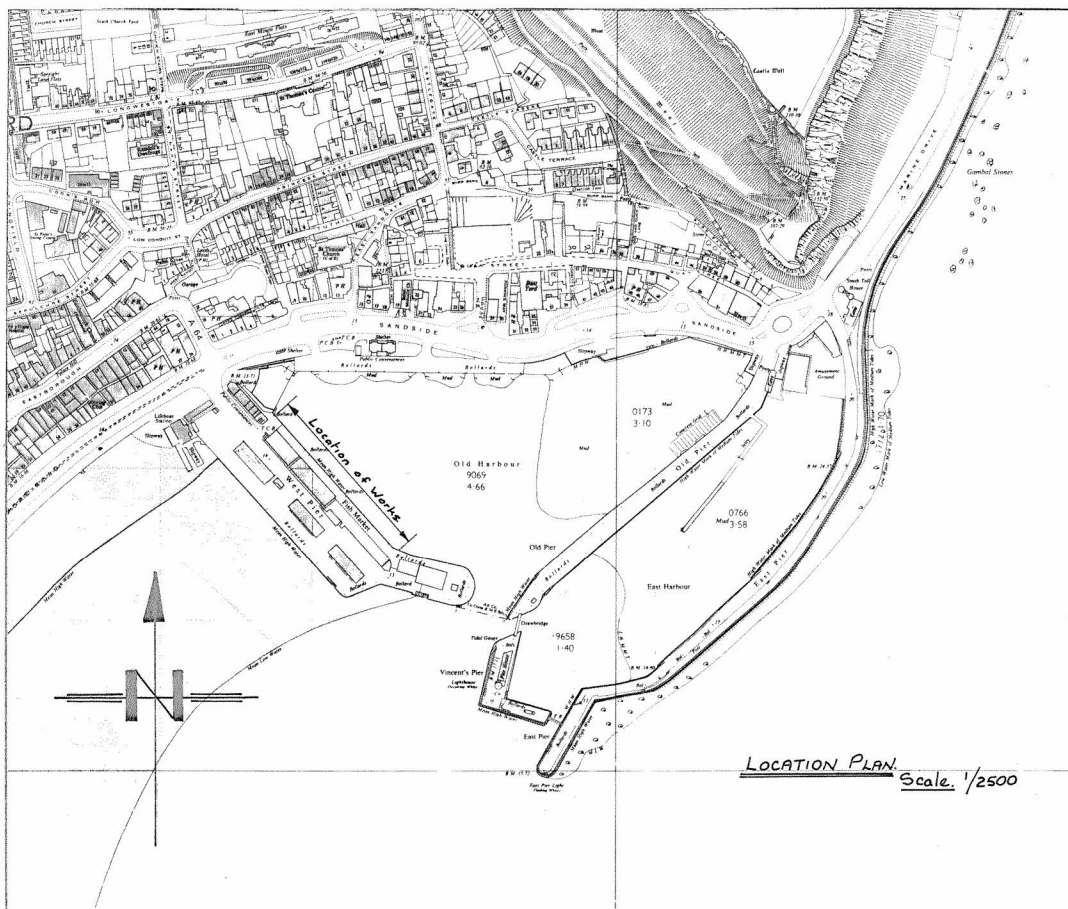
Short of the whole structure involved being dismantled, an appraisal can only ever be based on the areas investigated, in the belief they are representative.



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<p><b>CIVIL ENGINEERING</b>          Bridge design, maintenance and construction          Wharfs, jetties and marine structures          Highway design and maintenance          Retaining wall and slope stability solutions          Land remediation advice          Road and sewer design to adoptable standards          Section 38 and 104 Agreements          Sewer requisitions and diversions          Section 98 and 185 Agreements          Flood Risk Assessments          Coastal erosion flood breach analysis          Flood risk management / prevention schemes          Underground drainage design          Stormwater attenuation          SUDS          Ponds, lakes and balancing ponds</p> <p><b>PROJECT MANAGEMENT</b>  <b>QUANTITY SURVEYING &amp; CONTRACT ADVICE</b>  <b>CDM SERVICES</b></p> <p><b>BUILDING SURVEYING SERVICES</b>          Design, Remedial Repair / Improvement Schemes          Contract Administration          Building Surveys          Professional Opinion Reports          Condition Surveys &amp; Schedules of Condition          Measured Surveys          Dilapidation Claims          Party Wall etc. Act Representation          Disabled Adaptations</p> <p><b>3D Laser Scanning and Data Capture</b></p>	<p><b>STRUCTURAL ENGINEERING</b>          Residential and commercial building structures          Education and healthcare facilities          Heavy industrial development          Feasibility studies for development sites          Building Regulations and Planning Applications</p> <p>Access and maintenance gantries          Modular building design          Blast design</p> <p>Subsidence management and resolution          Temporary works design and specification          Site and soils investigation          Sulphate attack specialists          Confined spaces assessments</p> <p><b>CONSERVATION ENGINEERING</b>          Engineer Accredited in Building Conservation CARE          Registered Engineer          Heritage and conservation engineering          Listed Building refurbishment          Historic Parks and Gardens          Scheduled Ancient Monuments          Monitoring and investigations          Liaison with Local Conservation Officers          Buildings at Risk and Managed Ruins</p> <p><b>EXPERT WITNESS SERVICES</b>          Civil &amp; Structural engineering disputes          Project Disputes          Building Surveying          Health and Safety Regulations</p>
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**APPENDIX D**  
**Archive Boreholes**



**Notes**

- Boreholes No's 1, 2, 2A, 3 and 4 were taken in October 1986.
- Borehole No's 5 and 6 were taken in May 1987.

**Distribution**

dwg no	sent to	date	copies

**Revisions**

affix	description	date	by



Job  
**PROPOSED STEEL SHEET PILING OF WEST PIER, SCARBOROUGH HARBOUR**  
 LOCATION PLAN AND BOREHOLE DETAILS

Scales: 1/2500 + 1/500  
 Drawn by *MB* Checked by *RH*  
 Drawing No.

G 34 27/1

8 / 2 / 1 2

Date Drawn AUGUST 1987	Date Checked	Date Microfilmed
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DEPARTMENT OF TECHNICAL SERVICES  
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 YO11 2HG Telephone (0723) 372351  
 Director of Technical Services  
 N. D. Clements B. Eng. C. Eng. FICE

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Liaison with Local Conservation Officers  
Buildings at Risk and Managed Ruins

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Latest Generation 3D Laser Scanning  
Measured Building Surveys  
Topographical Surveys  
Monitoring Surveys  
3D modelling (Revit, CAD, Inventor, Solidworks)  
M & E Modelling  
Volumetric / Level analysis  
Scan to BIM  
Scan data cloud hosting  
Hi-Def HDR photographic surveys