

MW Consult Ltd

Consulting Civil & Structural Engineers

Project: **Structural Appraisal of 5 Heol Y Felin,
Seven Sisters, Neath, SA10 9BG**

Project Ref: 20/143 **Revision:** –

Client: **Mr John Cole**

Prepared by:	Date:
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1.0 Introduction

- 1.1 MW Consult Ltd has been instructed by Mr John Cole (hereafter referred to as the Client), to undertake a structural inspection of a property at 5 Heol Y Felin, Seven Sisters, Neath; and subsequently prepare a written structural appraisal.
- 1.2 The premises comprises a two-storey dwelling fronting onto Heol Y Felin, with a large adjoining single-storey 'workshop' located to its rear. We understand that the building has had several uses historically, with the workshop area most recently being used as a social club. Whilst the workshop part of the building hasn't been used for some years, the two-storey dwelling is currently used for storage purposes.
- 1.3 We understand that the Client is in the process of submitting a planning application for a 'change in use' for the front part of the former workshop, and that the planning authority has asked for a structural engineer's appraisal to be submitted to support the application.
- 1.4 The extent of the proposed conversion to the workshop is to be limited to approximately 4m back from the workshop's front external wall. This area is shown as a corridor, store, toilets and bar on the existing floor plans. We understand that the planning authority requires the structural appraisal to be made purely in relation to the part of the workshop being converted and therefore this is the extent of our commission.
- 1.5 Our appraisal is based on a visual inspection of the building and contains our considered opinion in relation to its current structural condition at the time of our inspection. We will also outline our recommendations, in broad terms, for any necessary remedial works.
- 1.6 We have not undertaken any excavations to examine ground conditions or foundations and have not investigated any parts of the structures which were covered, unexposed or inaccessible at the time of our visit, other than those specifically referred to in the report. We are therefore unable to report that any such parts of the structures are free from defect. Furthermore, we did not inspect any drains, services or finishes; or remove any vegetation, although we may make reference to such elements within the report.
- 1.7 Although a number of recommendations are made, this report should not be considered as a detailed schedule of defects to allow any recommended remedial works to be priced.
- 1.8 A visual inspection of the property was undertaken at 10.00am on the 23rd July 2020, at which time it was cloudy with light rainfall. During our inspection we liaised at the property with the property owner, Mr John Cole.
- 1.9 The premises are located along the Eastern side of the residential street of Heol Y Felin.
- 1.10 The following report sections should be read in conjunction with the appendices.
- 1.11 This report has been prepared for the Client, the planning authority, mortgage providers, and the construction team. It is not intended for, and should not be relied upon, by any third party. No responsibility is accepted to any third party who may choose to rely on it.

2.0 Description of the Property

- 2.1 Number 5 Heol Y Felin Portfield is a two-storey detached property with an adjoining single-storey 'workshop' area to its rear. The right-hand part of the two storey section, as viewed from the road, is believed to have been a former extension. The Clients proposals involve removing this previous extension.
- 2.2 We would envisage that the original building is in the region of 100 years old.
- 2.3 The original two-storey part of the property has a duo-pitched roof which spans from front-to-rear. The rear part of the two-storey section has a flat roof, as does the previous side extension. The workshop has a duo-pitched roof which spans from side-to-side.
- 2.4 The brickwork external walls appear to be solid rather than cavity construction.
- 2.5 The external faces to some of the walls of the two-storey part of the building have a render finish; the walls to the workshop part of the building are the original facing brick.
- 2.6 The site on which the building is located has an inherent fall from front-to-rear. The ground on which the two-storey part of the building is situated is relatively flat. However, alongside the workshop, the external ground profile slopes upwards with a steep bank located approximately 5m back from the workshops front wall. The ground to both sides of the workshop is severely overgrown preventing access to its rear. Due to the sloping site, the main floor level of the workshop is located at first floor level relative to the two-storey part of the building.
- 2.7 While the majority of the workshop is single-storey, due to the original external ground profile, there is a storage area located at ground floor level beneath the front part of the workshop. The Clients proposals involve widening the north facing ground floor doorway to provide a parking/turning area under the part of the building which will be used as habitable space. Beneath the remainder of the workshop is a small sub-floor void.
- 2.8 Where the stairwell walls project out from the southern side of the workshop, the staircase provides an internal means of access between the two levels. The Clients proposals include removing the staircase and stairwell walls to provide greater separation between the workshop wall and the recently-constructed adjacent dwelling.

3.0 Observations - Externally

- 3.1 The external faces of the perimeter walls to the front and sides of the workshop appear to be plumb without any evidence of leaning, bulging or any other significant defects.
- 3.2 While the brickwork is generally in reasonable condition for a building of this age, some of the bricks have spalled slightly and there are generally a few minor sporadic cracks. The brickwork is generally stained and grubby in places.
- 3.3 To the south-facing wall of the stairwell which is due to be removed, there is a vertical crack in the brickwork towards the bottom of the wall. This crack ranges from hairline up to approximately 2mm in width and appears to be thermal rather than subsidence-related.
- 3.4 A few of the mortar joints are slightly weak, but this can be remedied by local repointing.
- 3.5 Vents are located below first floor level to allow ventilation of the ground floor rooms.
- 3.6 The window and door openings have concrete lintels. While the majority of these appear to be in reasonable condition, some of them have cracks, particularly to their undersides. The lintel above the right-hand first floor window to the north elevation has a severe horizontal crack in its underside although the surrounding masonry appears defect-free.
- 3.7 The link structure between the ground floor of the two-storey part of the building and the workshop contains a concrete staircase. The staircase forms a bridge over what is essentially an alleyway between the two-storey part of the building and the workshop. As such, the sides and underside of the staircase are visible from the outside. Whilst the majority of the concrete appears defect-free there are a few patches where the concrete has spalled, exposing steel reinforcing bars which are corroding. The corrosion is currently only regarded as being mild, rather than propagating deep into the reinforcement.
- 3.8 The main roof ridge line appears to be level without any signs of sagging and the corrugated sheet roof finishes to the south-facing roof slope also look to be in reasonable condition. We were unable to view the roof finishes to the north-facing roof slope.
- 3.9 Rainwater gutters are present serving the roofs and these have corresponding downpipes. To the north elevation the downpipes terminate approximately half way down the walls rather than continuing down to ground level; it is unclear whether gulley pots are present. The rainwater pipe serving the roof of the link between the two-storey building and the workshop is discharging water onto the face of the wall which has stained the brickwork.
- 3.10 Whilst we did not specifically check, we did not observe any evidence of leaking drains.

4.0 Observations - Internally

- 4.1 It is evident that the workshop property has not been used for some time. To convert the front part of this area for habitable use a comprehensive refurbishment will be required.
- 4.2 The first floor level workshop is a large open-plan space, where the only internal walls are located towards the front of the room where the proposed conversion is due to take place. The internal walls are all non-load-bearing partitions and as these do not support the roof structure they can be removed to suit the proposed architectural layout.
- 4.3 Similarly when viewed from the outside, the inside faces of the external walls were found to be plumb without displaying any evidence of leaning or bulging. However, the wall finishes are present which prevents the inspection of the masonry itself, although based on the condition of the walls externally we would not envisage any major defects.
- 4.4 The roof structure comprises a series of steel lattice trusses which span from side-to-side between the north and south external walls. These trusses are formed from steel angle sections which have welded gusset plates which are bolted together at the node points. Steel angle section purlins span between the trusses to support the corrugated roof sheets.
- 4.5 The trusses are generally in reasonable condition, but have experienced surface corrosion, particularly to the rafter elements adjoining to the roof cladding, and at the roof apex. The purlins are generally more corroded than the trusses. It was difficult to inspect the purlins to the roof above where the conversion is proposed due to the ceiling. However, the purlins here appear to be in similar condition to those elsewhere in the workshop.
- 4.6 The sizes of the purlins and the truss elements appear reasonable for their spans and loads and are currently considered to be adequate in supporting the roof construction.
- 4.7 Where the trusses are supported off the walls, there are thickenings in the walls which are readily apparent from the outside of the building. It could be that steel posts are present at these locations with the walls built around them; or alternatively the brickwork has just been built in solid piers to provide extra strength at the truss support points.
- 4.8 The ground floor appears reasonably solid and level underfoot without any signs of excessive sagging or vibration etc although we did not take any specific measurements. Viewed from the underside, the majority of the workshop floor above the sub-floor void is seen to comprise timber joists supported off brickwork sleeper walls. To the front end of the workshop above the storage area, which is below where the conversion will take place, the floor is supported off a series of steel beams. The beams which are painted and have only minor surface rusting are supported off internal masonry walls.
- 4.9 The masonry walls at ground floor level are plumb and in reasonable condition without any notable defects. The separating walls between the two storage areas and the smaller storage area and the sub-floor space have plaster finishes and show no signs of defects.
- 4.10 The ground floor area has a solid concrete ground-bearing slab which is free from any notable defects. There is a channel running down the centre of the floor to the main room

5.0 Conclusions & Recommendations

- 5.1 The front part of the workshop is considered to be free from any significant defects and as such we consider that it is suitable for retention as part of the proposed conversion. Relatively minor remedial works are required and are summarise these as follows:
- 5.2 The faces of the external walls should be cleaned of dirt, staining etc. Any loose mortar joints will need to be identified and locally re-pointed as and where necessary.
- 5.3 The crack located to the southern side of the stairwell wall would require remedial works if this wall was due to be retained. However, as the wall is due to be removed under the Clients proposals, no remedial works are required here. The replacement wall is proposed to be set back on the line of the workshops main side wall and will need to be a cavity wall, constructed off suitable concrete strip foundations.
- 5.4 The lintels which have cracked will need to be replaced with suitable new lintels. We would envisage that the new lintels would be precast concrete in order to match the appearance of the existing lintels. Whilst not all of the lintels appear to be defective at present, they are of considerable age and as such are considered to be liable to issues arising in the short term. As such, we would recommend that all of these lintels to the part of the building which is to be converted be replaced as part of the refurbishment.
- 5.5 While adequate at present, the concrete staircase has spalled in places. The staircase will need to be remedied otherwise its condition will continue to worsen over time. Any loose concrete around the exposed bars will need to be carefully removed to expose the full extent of the corrosion to the bars. The corroded bars shall then be hand cleaned as far as reasonably practical, ideally to reach a standard of cleanliness of SA2. The bars shall be primed immediately after cleaning with a viscous zinc-rich fluid (e.g. Sika MonoTop-610). The concrete around the bars will then need reinstating. Scabble the surface to avoid any smooth surfaces and clean off any dust, dirt etc. A high-build cementitious repair mortar (e.g. Sika MonoTop-615) will then be required to protect the bars. We would recommend that these repairs be undertaken by a specialist subcontractor such as 'Sealability' or 'Restruct'. On completion of the repairs we would also recommend providing a corrosion inhibitor such as Sika FerroGard-903+ to improve the durability of the concrete in the long-term. Alternatively, a cheaper alternative could be to clad the staircase in weather-proof cladding or at a minimum apply a coat bituminous paint.
- 5.6 The missing sections of the rainwater downpipes shall be replaced with new and taken down to the ground level to prevent rainwater from running down the face of the walls.
- 5.7 The contractor shall investigate for the presence of existing gulley pots and ideally connect the new downpipes into these. If no gulleys are found then the contractor shall allow for constructing a below ground drainage system or channels to take the roof-water runoff away from the base of the walls as this could lead to softening of the subsoils and settlement issues over a period of time. The drainage system shall discharge the water to soakaways at least 5m from the buildings or alternative suitable points of discharge.
- 5.8 The steel roof structure is considered to have adequately supported the roof to date. We understand that there was historically a suspended ceiling present and on that basis a new suspended ceiling can be erected without the risk of overloading the steel roof structure.

- 5.9 However, the roof structure is corroded and this will require remedial works. The degree of corrosion to the trusses is considered to be surface corrosion rather than propagating deeper into the metal. The extent of the proposed refurbishment works only encompasses a single roof truss and one span of purlins between the masonry wall and the first truss.
- 5.10 The steel sections forming the trusses will need to be thoroughly cleaned of all surface corrosion to restore the steelwork to a SA2 standard of cleanliness. The steelwork, including all plates and bolts shall then be well-painted using a suitable zinc-rich paint.
- 5.11 The purlins are typically much more corroded than the trusses and we recommend that the contractor erects a mobile scaffold to inspect the purlins in detail. As with the truss elements, the purlins will also need to be thoroughly cleaned back to SA2 standard, and then provided with a coat of suitable zinc-rich paint. Alternatively, it may prove easier to carefully remove the existing purlins and replace them with new on a like-for-like basis. If the purlins are to be replaced then the roof sheets will need to be temporarily propped.
- 5.12 The Contractor will need to ensure that the ends of the lattice truss supported off the side walls and the purlins supported off the external front walls are not unduly corroded where they are embedded in the masonry walls. Should the ends of the purlins be found to be severely corroded then the contractor will need to allow for replacing these with new.
- 5.13 New non-load bearing stud partitions will need to be provided to the area being converted to suit the required room layouts. We recommend that timber or metal stud partitions be used, and noggins or double joists be provided in the floor beneath these. The heads of the new partitions will need to be laterally restrained to the underside of the roof, possibly providing trimmers between the masonry walls and the truss ceiling chord.
- 5.14 The external walls are considered to likely be solid rather than cavity walls so a suitable means of preventing moisture ingress will need to be considered by the client or architect
- 5.15 The contractor shall allow for removing the floor boards to the front area of the workshop floor to check that the joists are not decaying especially the ends of the joists where they are pocketed into the masonry walls. Allow for replacing any defective joists with new.
- 5.16 We suggest that the ceiling finishes above the ground floor storage areas are carefully removed or otherwise potentially over-clad with new insulation and waterproofing to prevent heat loss and moisture ingress between the stores and the habitable space above.
- 5.17 New precast concrete lintels or possibly galvanised steel beams will be required in order to create the enlarged door opening in the external northern wall at ground floor level.

We trust that our report is to your understanding and is fit for your purposes. However, should you have any queries and/or wish to discuss matters further please do not hesitate to contact us.

Yours sincerely,



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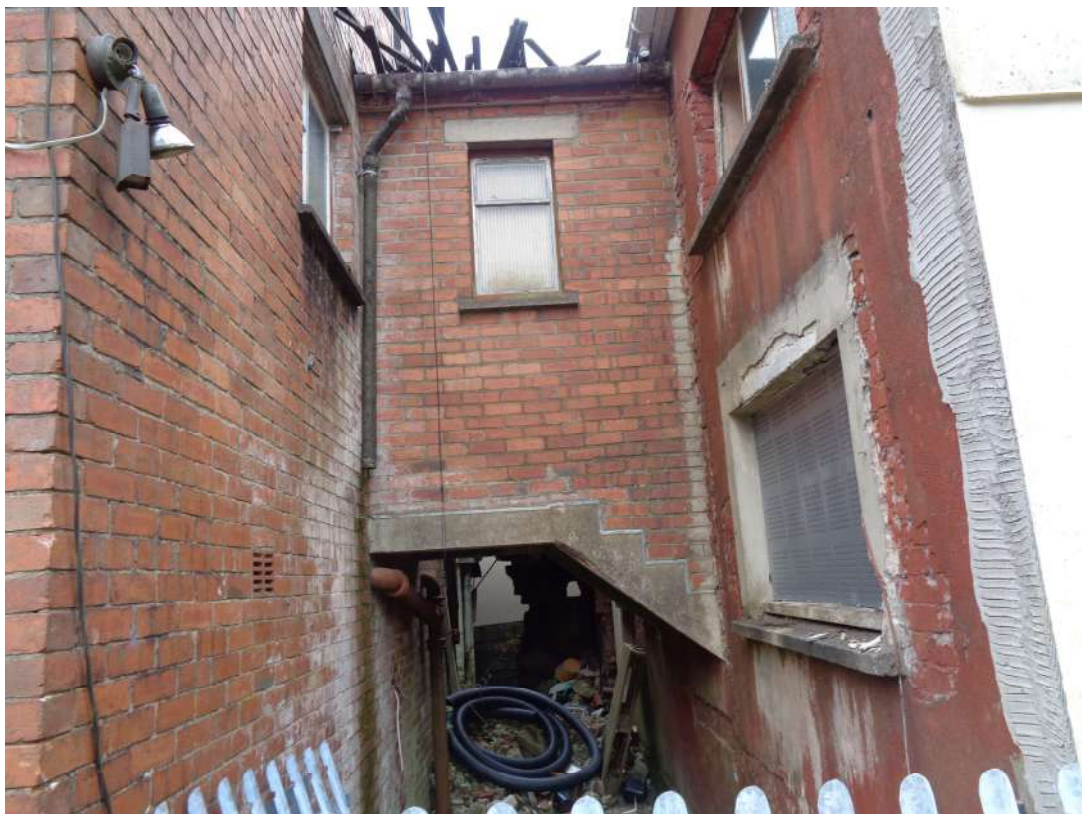
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Appendix A – Photographs



Photograph 1 – North wall of workshop.



Photograph 2 – North wall of the link structure.



Photograph 3 – South wall of the workshop.



Photograph 4 – Front wall of the workshop.



Photograph 5 – Internal view of workshop first floor level (facing front of workshop).



Photograph 6 – Roof truss on the line of the extent of the proposed conversion.



Photograph 7 – Sub-floor void beneath the majority of the workshop.



Photograph 8 – Main storage space beneath the area which is to be converted.