



Project Title:  
**Barry Pump House, Barry**

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**13.2967**

Client:  
**DS Properties**

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**0**

Status:  
**Preliminary**

## **STRUCTURAL SURVEY AND REPORT**

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## **1.0 INTRODUCTION**

The Austin Partnership was commissioned by DS Properties to undertake a structural inspection and report of South Range Building Barry Pump House, Barry, following the partial removal of the existing granite and brick machine bases.

The purpose of the report is to advise on the structural condition of the remaining machine base and comment on the impact the reinstatement of the other machine bases would have on the proposed development.

An inspection of the building was undertaken on the 26<sup>th</sup> January 2015, by Mr Gavin Fairclough BSc.(Hons), a Director of Austin Partnership Ltd.

The weather on the day of the survey was sunny and dry.

The extent of the survey comprised of an internal visual inspection the South Range building.

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

## 2.0 OBSERVATIONS

At the time of our visit, machine base two, three and four had been removed down to slab level (*figure 1*). The removal of machine base one (Photograph 3) had commenced. The granite blocks which sat on the brickwork plinth of machine base two were still within the South Range building and some can be seen in the right hand corner of photograph 1.



Photograph 1

There appeared to be recent masonry repairs (Photograph 1) to the internal spine wall supporting the pair of existing steel columns which in turn support the steel roof trusses. Both sections of the internal spine wall were in poor structural condition, but appeared to be satisfactorily supporting the existing roof structure.



Photograph 2



Machine base one (Photographs 1 & 2) comprises of predominately a solid mass of English bonded brickwork (Photograph 3), supporting approximately 0.5m thick individual sections of granite block. The machine base is approximately 2.6m high from the existing finished floor level and has a plan area of approximately 10.4m x 3.6m



*Photograph 3*



*Photograph 4*



Photograph 5

There was a passageway through machine base one, with the granite blocks above supported by Cast Iron 'I' sections on the perimeter (Photographs 4, 5 & 6) and curved iron plates, internally (Photograph 7). All of the structural sections have suffered significant amount corrosion, probably due to atmospheric conditions. Whilst the sections on the perimeter did not have any obvious signs of section loss they were extremely friable. Given the weight of the granite blocks above there is a potential risk of these sections failing at any time, which could result in death or serious injury to persons in the vicinity.



Photograph 6





Photograph 7



Photograph 8



Photograph 9

The corner of machine base one (Photograph 9) had a full-height vertical crack on the one corner. It is not known whether this was a recent crack or historic. There are number of other similar vertical horizontal and vertical cracks in the masonry, which may result in the brickwork locally spalling. It should be recognised that if spalling does occur, due to the solid mass of the machine base, it should not have an adverse effect on the structure.



### 3.0 DEVELOPMENT PROPOSALS

The machine bases have been removed to enable four new 203x203 UC structural steel columns to be installed to support the new upper floors (Figure 1).

The columns have been positioned such that they support the primary steel beams that support the structural walls and floors above. These primary structural lines are between grids 2-3 (A-J) and 4-5 (A-J) (Figures 2 & 3).

It should be noted the new 203x203 UC structural columns (Figure 1) will be supported off new 1.6x1.6m reinforced concrete pad foundations at basement level i.e. below the level of the existing machine.

Our intention is also to utilise the existing steel columns on grid line E (2-3) & (4-5). We have calculated the axial load through these columns from the new structure above will be in the order of 450kN (ULS). Having reviewed the condition the internal masonry spine wall on grid line E, we recommend the steel columns are extended down to floor level and new foundations are constructed beneath. A further section of this wall will need to be removed on grid line E (1-2/3) to enable the new fire escape staircase to be constructed (Figure 2)

The new suspended ground floor will be constructed using timber joists.

The level of the top of the existing granite blocks to machine base one is approximately 0.3m above the proposed new finished floor. The granite blocks at their current level will have an adverse effect on the floor to ceiling heights of the upper floors.

## 4.0 CONCLUSIONS / RECOMMENDATIONS

The granite blocks on machine base one local to the passageway, grids 1-3 (C-D) should be either immediately lifted off the supporting structure, or temporarily propped to prevent death or serious injury. If temporary propping is to be installed, it is likely the granite blocks will still need to be removed to enable the corroded sections to be cut out new supporting members to be fitted.

If machine base one were to remain in its current location, we anticipate approximately 5m<sup>2</sup> of approximate 37m<sup>2</sup> plan area would need to be removed to enable the new foundations and steel columns to be constructed. Given the solid dense mass of English bonded brickwork, it is envisaged this figure may increase dependent upon the cutting equipment available to remove the bonded brickwork.

We have considered the potential of locating the new columns local to machine base one on top of the granite, but given their location on the edge of the slab and the potential of spalling brickwork, we do not consider this a viable solution in view of the anticipated column loads.

Unfortunately, due to the locations of the supporting walls on the upper floors, it would be difficult to relocate our structural columns without putting significant loads onto the perimeter brickwork. This should be avoided as the condition of the perimeter walls is unknown, particularly beyond the face brickwork and existing masonry piers / corbels.

As discussed, the columns on grid line E (2-3) and E (4-5) will need to be extended to support the new structure above, and a section of the wall on line E (1-2/3) will need to be removed to enable the fire escape stairs to be constructed. Without substantial alterations to approved upper floor plans, our structural solution is restricted to the one currently indicated.

As we understand, DS properties have consulted with their Architect EWA, and they are proposing to reconstruct the machine bases one and two in the external Piazza area (Figure 4 - illustrating a typical relocation proposal). As can be seen from the Architect's illustration, the intention would be for both of the machine bases, the anvil and one of the existing cranes in the North Range building all to be sited in the Piazza area to preserve the historic history of the pump house.

In view of all of the above structural restrictions the machine bases impose upon the design, we are concerned about the structural viability of the project should the Vale of Glamorgan council impose upon DS Properties that the machine bases should be reinstated.

5.0 FIGURES

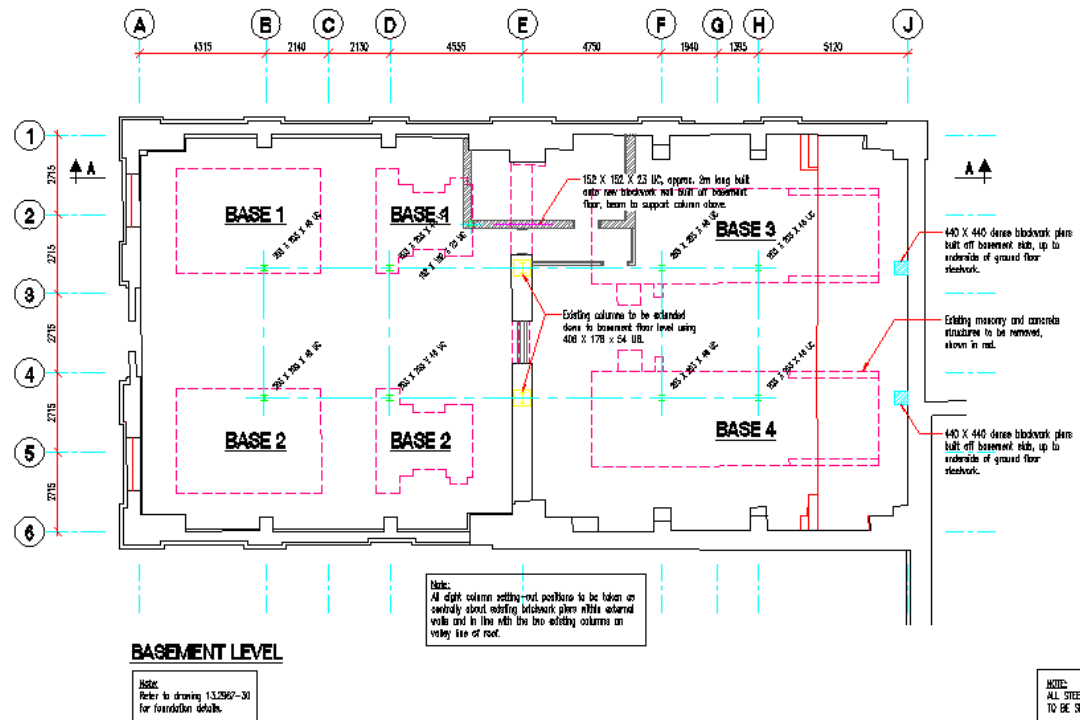


Figure 1



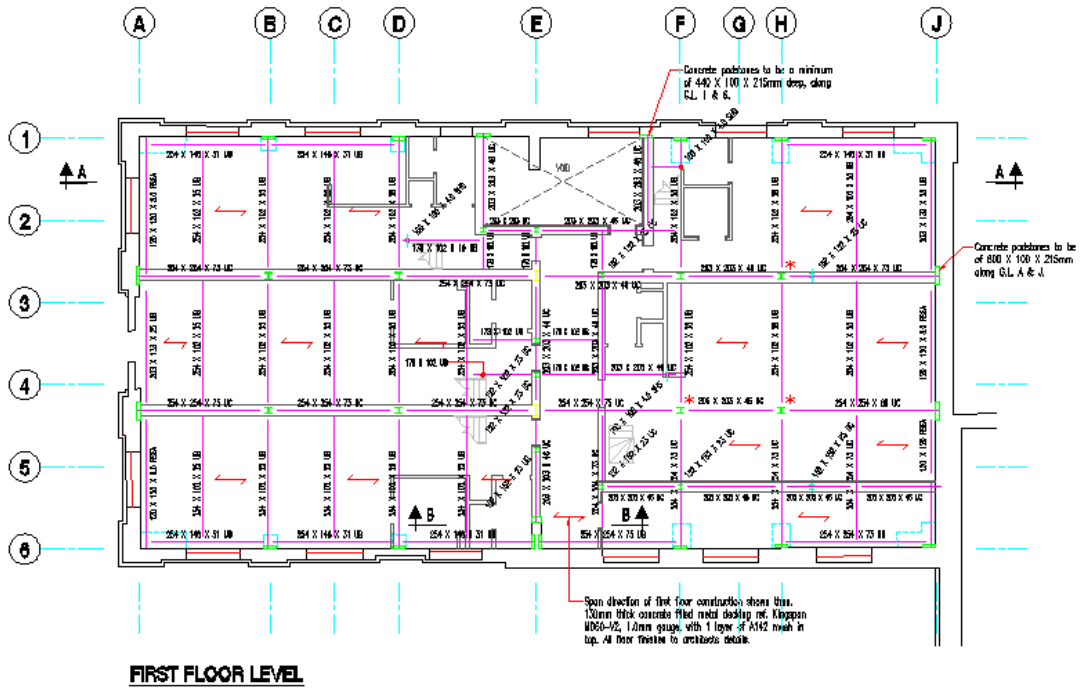


Figure 2

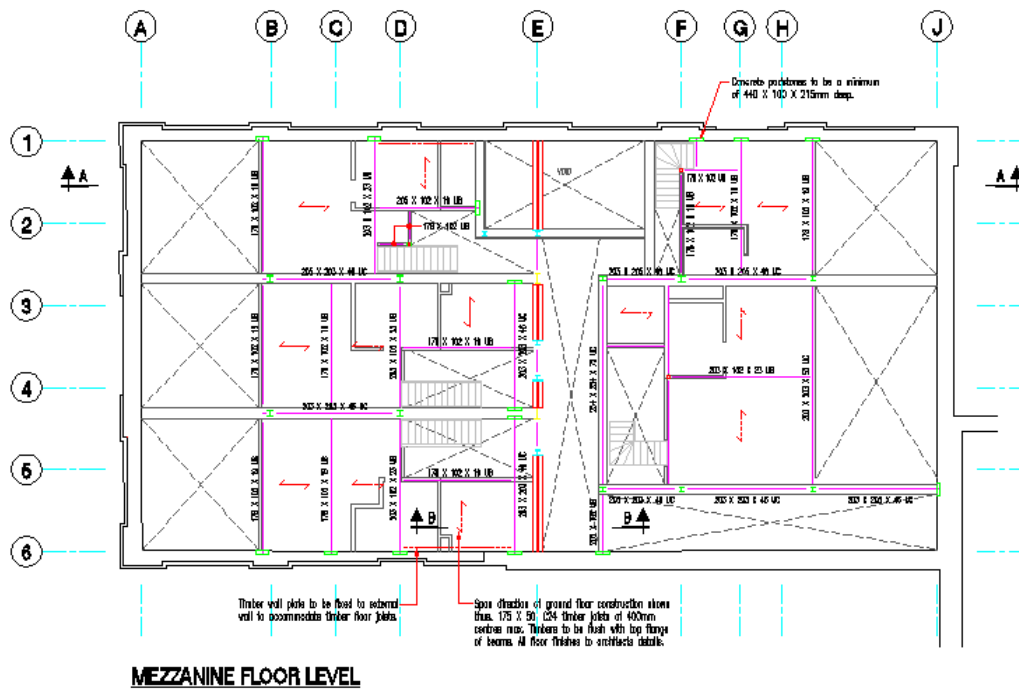
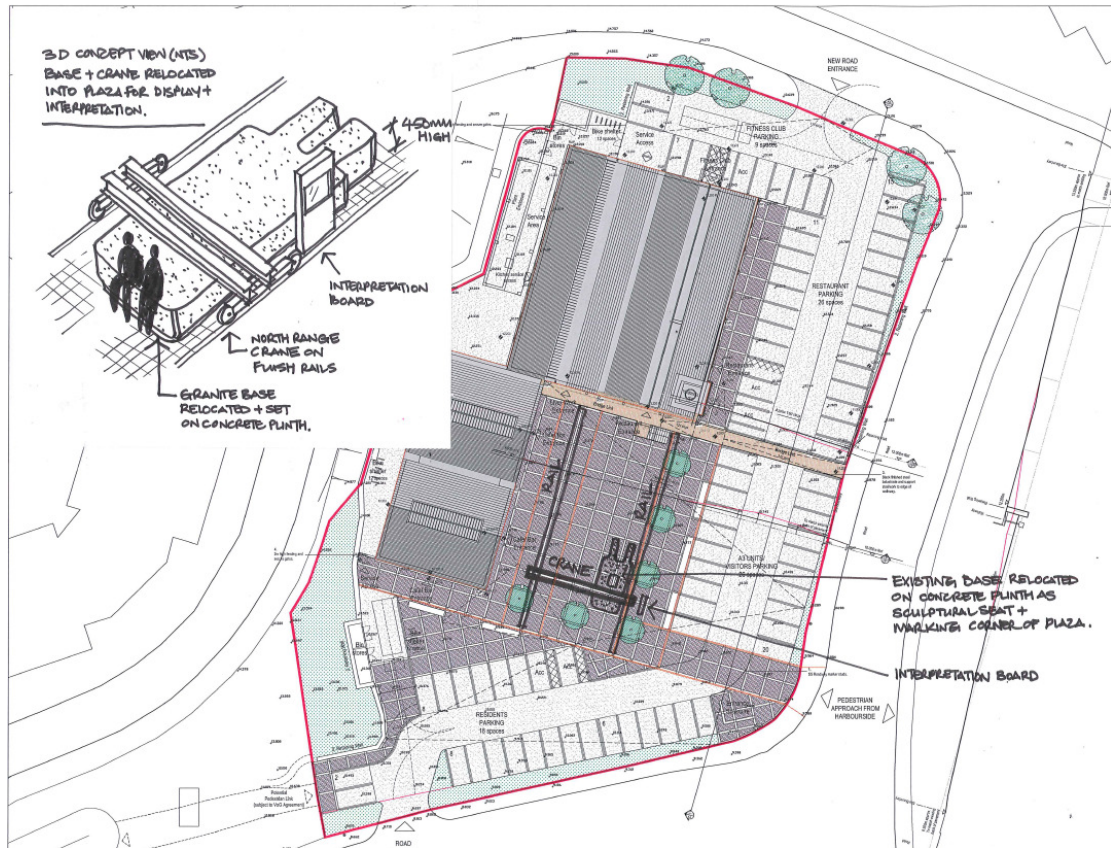


Figure 3



*Figure 4*

