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Project No	5797	01	01	07	001	Sht. No.	1 of 9
Client	Bowman Riley Architects Ltd						
Project Title	The George Hotel						
Subject	Option Selection Report						

Option Selection Report

for

Bowman Riley Architects Ltd

at

The George Hotel

Issue	Description	Prepared
00	Initial Issue.	P. Shah
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1 Introduction

The George hotel is in the Kirklees Council of Huddersfield. This report has been written to accompany the planning application and Listed Building consent. The project aspires to restore the derelict and dilapidated building Grade II listed hotel and bring it back to life and up to modern standards. The project forms part of a larger scheme to regenerate St George's Square. This report highlights the various constraints and functional performance parameters considered in the development of a temporary works scheme to aid the Listed Building Consent Application. Various options which were considered and discounted are highlighted in the further sections of this report.

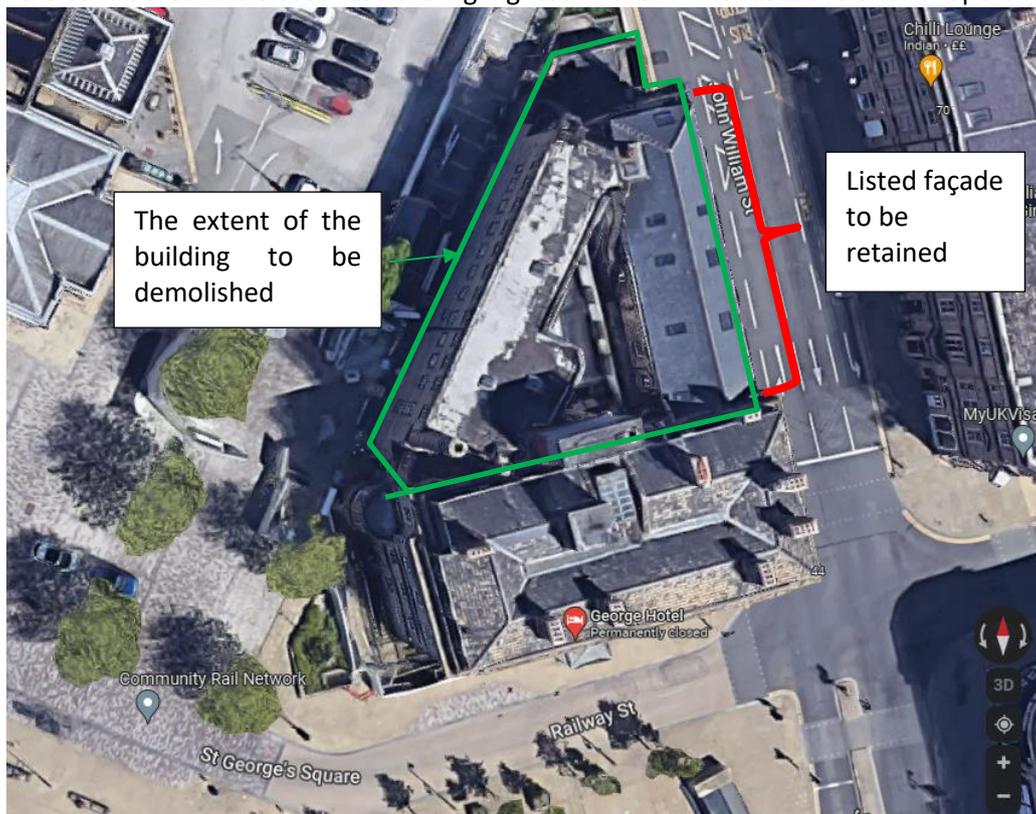


Figure 1: Location Plan- The George Hotel

The listed building façade is adjacent to John William Street on the east. The western compound wall borders the Network Rail car park and the proposed site which will be propped to allow the basement level to be lowered.

The report should be read in conjunction with drawings 5797-01-01-02-001 to 005. The drawings are produced to convey intent only.

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2 Constraints

Site Constraints

- Conserving the listed façade and avoiding physical anchor connections into the façade
- Not undermine Block A stability and physical anchors into the building
- Maintain minimum 12m wide traffic lanes along John William Street
- Maintain normal functioning of the car park
- The 3m wide pavement along John William Street is to be kept open to the pedestrians
- Buried services in the pavement
- Limited bearing capacity on the pavement
- Pedestrian access requirements on the pavement.
- The impact of oncoming traffic

Project Constraints

- Retaining the façade as a free-standing wall and limiting the deflection ($H/500$) of the wall to avoid potential damage to the façade
- Temporary works scheme should be such that it minimises hindrance during the construction.
- Maintain the stability of the retained structures/basement throughout the course of the works
- Economical and practical design proposals

3 Materials

3.1 Façade Retention and Basement Propping

The incumbent scheme would be designed in structural steel, concrete and/or proprietary elements for the following reasons:

- Flexibility in creating bespoke connections and framing structure
- Prefabricated elements would lead to quicker installation
- Higher material strength leads to an economical design
- Recycled structural steel elements would lead to a more sustainable option
- Proprietary materials can be hired leading to sustainable design
- Utilising the new proposed concrete slab thereby reduces time and material requirements.

The following materials have been discounted:

Scaffolding Components

A stiff frame would be required to achieve the deflection limits set out by the project. The scheme would be impractical due to the volume of scaffolding materials required for a stiff frame. The scaffolding would also require more frequent inspections which might have increased the costs of the project.

Timber

The frame in timber was discounted due to the following reasons:

- Increased time due to complex carpentry and therefore increased project cost.
- Impractical design due to material requirements to meet project specifications and constraints
- Risk of instability and collapse due to fire

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4 Option Selection – Façade Retention

4.1 Option 1

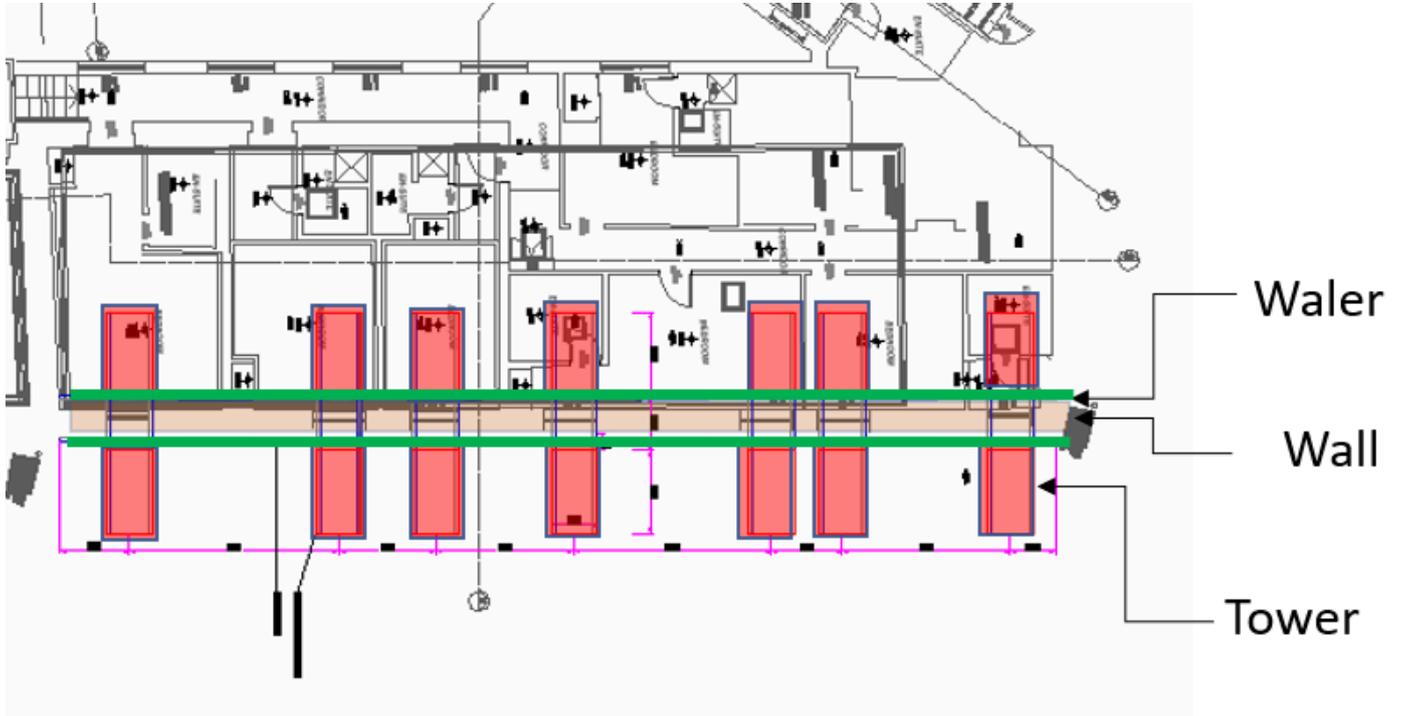


Figure 2: Plan View for Façade Retention - Option 1

A 5m-wide frame is composed of two towers; one tower will be installed behind the retained façade and the other in front of it. Each tower is approximately 2m wide. The tower columns would be installed through small openings in the floors which would negate the need for additional temporary works. The towers will be braced together through the windows in the façade allowing them to act together. Horizontal walers would be connected to the towers on both sides of the façade at various levels. The required kentledge would be approximately 5 to 8 Tonnes/metre on the external sides of the towers.

The internal towers would be used to support the basement propping. They would require a foundation which would be tied into the permanent works design. The external towers would require kentledge.

This option was discounted by the Lead Engineer, Ramboll, due to the challenges of adopting an internal scheme and sequencing demolition, propping and new build construction around it.

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4.2 Option 2



Figure 3: Plan View for Facade Retention - Option 2

Early assessments revealed that the pedestrian requirements and the pavement's limited capacity would lead to a challenging and impractical scheme. It was proposed to move all the support towers for the façade retention inside of the building. The foundation requirements would be approximately +/- 12 tonnes/metre. It was envisaged that these loads would be managed by the new basement floor slab. This scheme was discounted by Ramboll due to the potential obstructions created by the internal support towers during the planned works. The new basement slab might require local higher reinforcements and/or depth of the floor slab.

4.3 Option 2a

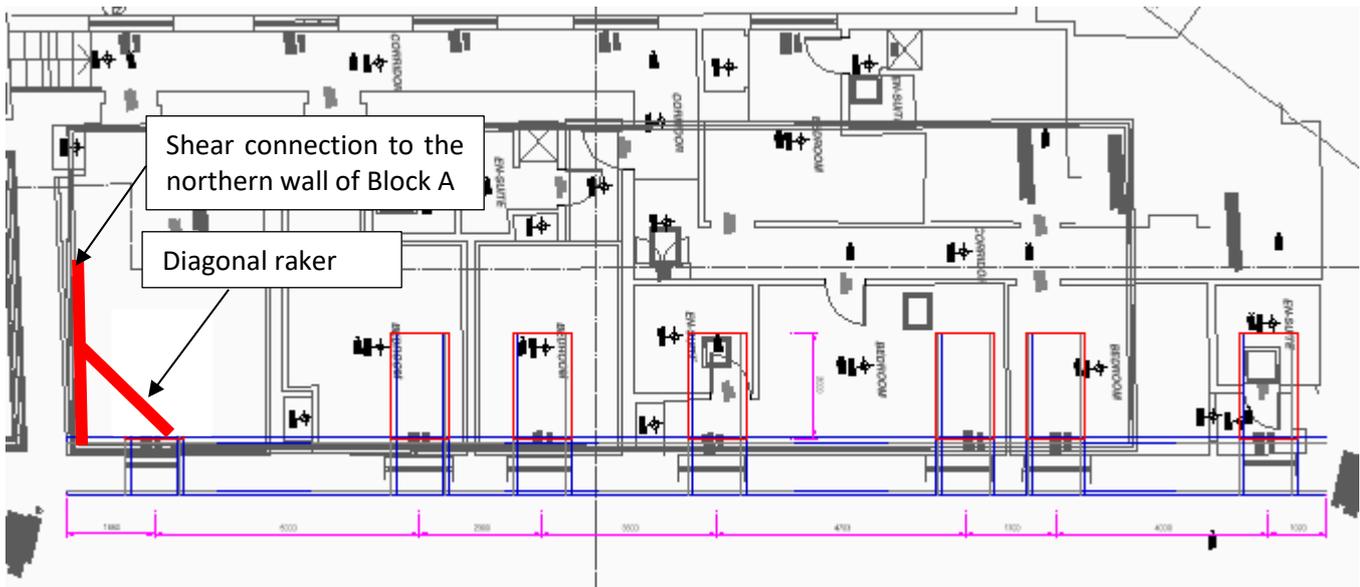


Figure 4: Plan View for Option 2a

It was proposed that the tower adjacent to Block A could have been removed if we were able to install diagonal rakers connecting the walers back to the northern wall of Block A. This option works in conjunction with other primary options. However, it has been discounted due to its potential impact on the heritage fabric of the building.

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4.4 Option 3

The pavement has limited bearing capacity and space for foundations. The project team liaised with the local highway department to pursue potential lane closure allowing a wider frame to be installed on the pavement and minimise the kentledge required to maintain façade stability.

RDG was advised that a minimum of 12m of clearance was to be maintained from the façade retention which each lane a minimum of 3m wide.

The temporary works consist of structural steel frames spaced at every 1m c/c and are 3m wide. The structural steel walers are proposed at the top and bottom of the window on each level to provide maximum stability and support to the heritage fabric. It is envisaged that the support frame will be fully braced with structural steel members and has a platform above the pedestrian tunnel to support kentledge blocks. The current kentledge requirement is approximately 9.6Tonnes/m

The scheme has two walers at each location, one on the outside and one on the inside. These walers effectively 'sandwich' the listed façade in between them thereby, negating the need to install physical anchors to the wall and damage the fabric externally.

The compressible layer in front of the walers will allow architectural details to be protected from damage and distribute the forces uniformly along each waler.

The internal waler requires physical anchors which are proposed to be installed to the back of the retained façade. We don't envisage these anchors to impact the heritage value of the fabric as they are located at the back of the wall and away from public sight.

The design proposes the use of 2no. stainless steel M16 HAS-U resin anchor or similar with a 100mm embedment at 1mc/c per waler.

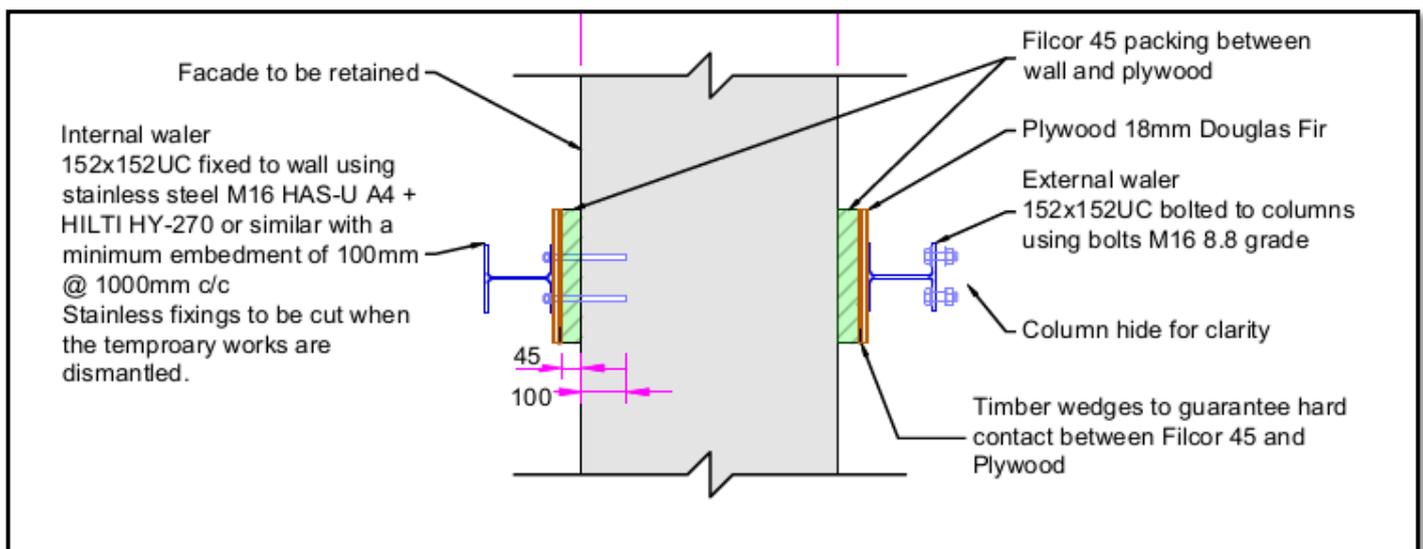


Figure 5: Typical Connection Detail for the Walers into the Fabric

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Due to the proximity of the temporary works to the traffic and the risk of a potential collision. Preliminary assessments indicated that impact loading from the vehicle would be in the region of 250kN perpendicular to the frame and 500kN parallel to the frame as per BS EN 1991-1-7. The magnitude of these loads is significant and would lead to an impractical design. RDG has proposed the use of a vehicular barrier system which would be fully independent of the temporary works and a minimum of 300mm away from the outside line of the frames. This would ensure a certain distance is available for barriers to move and absorb partial impact forces generated by the vehicle collision. The remaining force is to be absorbed by the temporary works system via a disproportionate collapse mechanism. It is recommended that a speed limit be imposed on the traffic expected to pass in front of the temporary works scheme.

The design considers disproportionate collapse and allows for a single external column to collapse in the event of a vehicular impact. The connection of the column to the horizontal members at the first floor will be carefully considered to allow disproportionate collapse without impacting the structure.

The temporary works frame can be optimised further to reduce the frame above the pedestrian access whilst still maintaining the columns below this level at 1m centres. The contractor may choose the use of proprietary equipment for the temporary works frame if it does not adversely impact the anchor requirements in the fabric set out in this document.

5 Basement Propping Scheme

The existing basement supports the pavement on John William Street and the car park. It is proposed that the basement be lowered by approximately 600mm.

The basement propping scheme consists of horizontal structural steel walers, props and concrete thrust block. Local openings in the basement slab will be required to allow thrust block formation. Any detrimental effects to the façade and the compound will be assessed prior to the local opening works. The thrust block will form part of the new basement floor. Refer to drawing 5797-01-01-02-003 for the location of the thrust block in relation to the façade and the compound wall.

The bottom waler will be installed once the thrust block is cast and cured. The waler is a horizontal structural steel member anchored to the façade and the compound wall using stainless steel resin anchors. The impact on the heritage value of the fabric is minimised since the anchors are installed at the back of the listed façade.

Proprietary props like Mabey Mass 50 or similar are used to support the walers at approximately 4m centres. The props are anchored into the trust block.

The top waler and the props will be installed before the façade retention on John William Street is installed.

Once the basement is sufficiently propped, the façade and the compound wall will be underpinned, and the remaining basement structure (floor and the wall) will be installed.

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6 Construction Sequence

The construction sequence for the proposed works is as follows:

1. Local excavation below the current basement level to install a partial permanent slab which is utilised as a thrust block for basement propping
2. East and West elevation propping is to be installed and anchored into the thrust block
3. Install the façade retention
4. Progressively demolish the floors and other internal structure
5. Sequential underpinning the listed façade and the compound wall
6. Install the new basement slab and cantilever RC stub
7. Sequential dismantling of the basement propping as the RC wall progresses and 1st floor restored
8. Dismantle the façade retention progressively as the new floors are installed and have achieved sufficient strength

Refer drawing 5797-01-01-02-005 for the proposed construction sequence.

7 Conclusion

RDG recommends exploring option 3 for façade retention scheme for detailed design. However, option 1 might be suitable if foundation loads need reduction.

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