# **CONSULTING Structural Engineers** Consulting Civil Engineers

**Kings Cross Community Hub** 

Feasibility Report – Structure.

Ref: 200256/H Hawker Approved By: NN Date: 14 Sep 2020 Status: Preliminary Version: 1



## • London 1-5 Offord Street London N1 1DH Telephone 020 7700 6666

## Norwich 6 Upper King Street Norwich NR3 1HA Telephone 01603 628 074

## Cambridge

16 Signet Court Swann Road Cambridge CB5 8LA Telephone 01223 656 058

design@conisbee.co.uk www.conisbee.co.uk





#### Directors

Tim Attwood BSc CEng MIStructE Tom Beaven BEng (Hons) CEng MIStructE Allan Dunsmore BEng (Hons) CEng FIStructE MICE Richard Dobson MEng CEng MIStructE Paul Hartfree IEng MICE MCIHT FGS Ben Heath BEng CEng MIStructE

### Associates

David Richards BEng (Hons) ACGI CEng MIStructE Gary Johns Tom Lefever BEng (Hons) CEng C.WEM MICE MCIWEM Nigel Nicholls IEng AMIStructE Denis Kealy BEng (Hons) CEng MIEI MIStructE Kevin Clark BSc (Hons) PhD DIC CEng MICE Head of Heritage Engineering Conservation Accredited Engineer (CARE) Paul Cosford CEng MICE MCIHT Christina Kennedy MEng (Hons) CEng MIStructE Joel Waugh MICE Adam Crump BSc (Hons)

### Consultants

Alan Conisbee BA BAI CEng MIStructE Conservation Accredited Engineer (CARE) Chris Boydell BSc CEng MIStructE MICE Bob Stagg BSc (Hons) CEng FIStructE MICE Terry Girdler BSc (Hons) Eng MSc CEng FICE MIStructE Conservation Accredited Engineer (CARE)

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#### INTRODUCTION 1.0

- 1.1.1 Conisbee have been asked by the London Borough of Camden to provide advice on the feasibility of changes to the present Community Building below Fleetfield block of flats and 49 Argyle Street; and on the proposed arrangement of a new single storey extension that largely comprises of a large open plan hall with 'serrated' roof.
- 1.1.2 Conisbee has received drawings of the existing buildings and proposed Hub building from the Architects, Architects network.
- 1.1.3 Conisbee visited to site on Monday 17<sup>th</sup> August 2020.
- 1.1.4 What follows is a brief description of the existing site, discussions on the various elements of the proposal, investigations required and a scheme drawing to cover the critical elements.

#### 2.0 **EXISTING BUILDINGS**



- 2.1.1 Prior to WWII, Argyle Street was known as Manchester Street and Birkenhead Street was formerly Liverpool Street. The terraced houses built about Liverpool Street were heavily bombed during Word War II, and the Birkenhead Estate built during the 1960s. It is presumed that 49 Argyle Street was constructed later, during the 1970s as a fill in. The present single storey community rooms and toilets appears to be a further in-fill extension to 49 Argyle's Street lower ground floor, then taking over some of Fleetfields ground floor space.
- 2.1.2 *Fleetfield.* This is a typical six storey post-war block, constructed with reinforced concrete and masonry elements, most likely an reinforced concrete frame. Floor plans of the first to sixth floors obtained from a planning search highlight a regular floor plan arrangement with what maybe a load-bearing internal wall line. The whole ground floor plan will need to be obtained as well as some investigations to check if this is the case.
- 2.1.3 49 Argyle Street. This is a concrete framed building with masonry walls. The single storey surround is masonry with timber roofs.
- 2.2 Railway
- 2.2.1 Whilst the site is close to Kings Cross, there do not appear to be any subterranean railway lines below it. It will be necessary to confirm this with a search.

#### 2.3 Geology.

- 2.3.1 The site was heavily bombed during WWII. British Geological Survey nearby geological borehole records (though note they are all at least a block away) generally indicate up to 2-3m of made ground over lying stiff London Clay to depth. However the Birkenhead Estate does seem to have been built somewhat lower than the surrounding streets, so it is possible the estate was built directly over London clay with the made ground having been removed. Boreholes, or window samples and trial pits will be required to establish depths of made ground and the London Clay.
- 2.3.2 It is understood one or more mature trees will be removed for the new single storey extension building, several others will remain and will need to be considered in the foundation design. The Site Investigation will also need to provide data on the local desiccation of the soils and to what depth, to establish appropriate depths for concrete strip or pad foundations.

Site history 2.1

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#### 3.0 PROPOSALS

#### Alterations to existing buildings. 3.1

- 3.1.1 49 Argyle Street. The alterations to the main 49 Argyle Street building at ground level mainly comprise of removal of non-load bearing partitions, and a new lintel to the plant room. The circular columns should be retained as these provide support to the building above. The existing single storey roof structure maybe modified as required to accommodate new roof lights, although it is likely to be more straightforward and timelier to create a new roof, given the relatively small area. Existing lintels will need to be checked that they have not suffered deterioration as embedded reinforcement of older structures can be subject to corrosion. Some allowance for repair is to be included.
- 3.1.2 Fleetfield. It will be necessary to establish the load bearing walls within Fleetfield prior to finalising the new office and toilet arrangement. This is especially the case to the wall within the present toilet, which may be a rear elevation line. It is likely that overall the arrangement will be satisfactory, though may require some retention of piers and some lintel or beams elements.

#### New Entrance, café and planting area. 3.2

- 3.2.1 Terraced planting area. Each step is 1.2m or less. To avoid structure taking up too much ground space which may reduce local permeability a system such as cantilevered king posts (i.e. galvanized UC sections) with railway sleeper or pre-cast concrete planks is suggested. A gabion wall system could also be chosen, or a typical masonry structure, though the former would take up more space, and the later more liable to movement from nearby or self-seeded trees.
- 3.2.2 Entrance and café. The entrance and café boundary wall will require reinforced concrete retaining walls, although reinforced hollo-block wall maybe an option. The café roof structure is cantilevered to avoid loading the Fleetfield balconies, and careful detailing will be required to ensure the new green roof drains away from Fleetfield. The columns and beams supporting the roof could be timber (for instance glulam beams) or steelwork - both of which could be exposed. Timber would still require steelwork connections. They could also be pre-case concrete to match the 'parent' building; however, this option would release more carbon and possibly be less timely.

#### New office and multi-purpose room extension. 3.3

3.3.1 Framing. Owing to the large spanned roof, a steelwork frame is proposed for the main structure, which can then sit within the timber clad walls.

3.3.2 Roof. The roof is a serrated, almost industrial style roof, with roof lights to one plane and a green roof to the other. The structure could either be formed with large span steel beams (457UB or 305UC depth) or a steel Vierendeel trusses, as indicated on the scheme drawings, which would be lighter if entail a greater amount of fabrication. If the truss could be formed with all three sides then this could be lighter still. It is anticipated there will be a cross beam at the location of a proposed partition screen, which would enable the screen to be hanging, greatly easing the opening / closing of it. This arrangement will need to be discussed and agreed at the next design stage as subsequent alterations will impact on the design of the roof and foundations.

#### Drawings. 3.4

3.4.1 Refer to the appended drawings for scheme and notation.

#### INVESTIGATIONS 4.0

- Geology. 4.1
- 4.1.1 A site investigation will be required to check local ground conditions and to establish bearing strength. As some depth of made ground is expected, and with known trees, it is proposed to undertake bore holes to the front and rear areas to approx. 5m depth.
- 4.1.2 Boundary conditions. Trial pits will also be included in the site investigation to establish the existing sections and formation of the foundations local to the proposed extensions.
- 4.1.3 Piling. In the event of piling being the most suitable option, then the contractor will need to allow for a further deeper borehole to establish parameters for specialist piling design if necessary.

#### Fleetfield. 4.2

4.2.1 As per item 3.1.1. it will be necessary to establish the load-bearing wall lines or/and location of reinforced concrete columns. Access to the other similar area on the ground floor may assist, or at least a layout arrangement, as it is possible the ground and first floors are different with the first-floor floor deck being a transfer structure. Some local opening-up will also highlight whether internal walls are load bearing.

#### Drawings 4.3

- 4.3.1 Please find Site Investigation drawing 200256-SK-S-000 attached.
- 4.3.2 Please find Opening-up / investigation drawings 200256-SK-S-001 attached.

## 5.0 EMBODIED CARBON

- 5.1.1 The engineering of the new structures to the most efficient design whilst bearing in mind the impact of the various materials and their weight will have the least 'increase' in carbon footprint. Extensive use of materials such as timber for cladding will also increase any embodied carbon within the building, although for the spans and height of space within the new rear extension, it will not be possible to form the primary structure from timber.
- 5.1.2 The foundations and retaining structures will need to be concrete in this relatively compact site with nearby influences of trees and possible deep made ground, however again, the design will aim to be as efficient as possible and the specification will allow for replacement of cement wherever and to what extent is possible. Options such as screw piles could be explored which will reduce arising from site, and maybe reused or recycled in the future.

## 6.0 CONCLUSION

6.1.1 The proposed scheme is structurally feasible and with careful design and co-ordination between the design team maybe a practical and elegant structure with the least impact on the environment.

Signed by author:

Helen Hawker BEng MSc CEng IStructE Principal Engineer For Conisbee

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Proposed in grey / green with yellow existing arrangement overlaid in yellow.

Comments for discussion / feasibility stage









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kwork	

Drawing Status PRELIMINARY Date Sept 2020 Scale

1:125@A3

Drawn ΗH Engineer ΗH

Project No 200256

Drawing No SK-S-100

Revision

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1-5 Offord St ondon N1 1DH Tel 020 7700 6666 Fax 020 7700 6686 design@conisbee.co.uk www.conisbee.co.uk

Drawn Check

Project

Rev Date Description

**Consulting Structural Engin** 

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KINGS CROSS COMMUNITY HUB, 49 ARGYLE STREET.

Title

EXISTING AND PROPOSED GROUND FLOOR OVERLAY WITH NOTES





Date Description

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## Project

KINGS CROSS COMMUNITY HUB, 49 ARGYLE STREET.

Title

PROPOSED GROUND FLOOR FEASIBILTY STRUCTURAL SCHEME

Drawing Status PRELIMINARY Date Drawn Sept 2020

Scale 1:125@A3 ΗH Engineer ΗH

Project No 200256

Drawing No SK-S-101

Revision

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This drawing must be read in conjunction with the specification and all other relevant drawings. Do not scale from this drawing.

## KEY

- timber or steel columns below
- steel columns below
- steel beams / trusses
- timber or steel beams
  - span of timber roof : sheathed in ply or with steel bracing shown dashed

Rev Date Description

Drawn Check

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1-5 Offord St ondon N1 1DH Tel 020 7700 6666 Fax 020 7700 6686 design@conisbee.co.uk www.conisbee.co.uk

## Project

KINGS CROSS COMMUNITY HUB, 49 ARGYLE STREET.

## Title

PROPOSED ROOF SRTUCTURE FEASIBILTY STRUCTURAL SCHEME

Drawing Status				
PRELIMINARY				

Date Sept 2020

Scale 1:125@A3

Engineer ΗH

Drawn

ΗH

Project No 200256

Drawing No SK-S-102

Revision

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## <u>KEY</u>



TP01 - 06 : trial pits to establish formation of adjacent extensions up to 1.2m depth.



WH01-03 Window sample holes to 5m depth. These maybe hand augured if possible although it must be noted made ground to 2-3m depth is expected.

WH04 Window sample to 10m depth to prove to stiff clay.

Notes.

Window samples and trial pits to record dessication.

Window samples to establish soil characteristics and design parameters for ground bearings slabs, mass concrete foundations and initial design parameters for mini-pile design (WH04).

It must be noted that for piled design, a specialist sub-contractor will need to prove their design on site to depths as required.

A brief will be provided, the Site Investigation is to:

BS 5930:1999, Code of Practice for Site Investigations

BS 1377:1990 Methods of Test for Soils for Civil Engineering Purposes

Rev Date De	scription	Drawn Check				
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Project KINGS CROSS COMMUNITY HUB, 49 ARGYLE STREET.						
Title SITE INVESTIGATION TRIAL PIT AND WINDOW HOLE LOCATION PLAN						
Drawing Status	(	Project No <b>200256</b>				
Date Sept 2020	Drawn HH	Drawing No				
Scale 1:125@A3	Engineer HH	Revision -				



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Proposed in yellow below

Rev Date Description

Drawn Check

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1-5 Offord St London N1 1DH Tel 020 7700 6666 Fax 020 7700 6686 design@conisbee.co.uk www.conisbee.co.uk

## Project

KINGS CROSS COMMUNITY HUB, 49 ARGYLE STREET.

Title

SITE INVESTIGATIONS : WITHIN PROPERITES

Drawing Status						
PRELIMINARY						
Date	Drawn					
Sept 2020	HH					
Scale	Enginee					
1:125@A3	HH					

Project No 200256

Drawing No SK-S-001

Revision

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