Basement Construction Plan

March 2016

Introduction

A S106 Agreement dated 10th June 2015 requests that a Basement Construction Plan (BCP) is to be submitted by the Owner and approved by the Council in consultation with English Heritage setting out detailed information relating to the construction of basement forming part of the development and providing for a programme of detailed mitigation measures to be undertaken and put in place by the Owner such plan to be designed with the objective of containing the impact of the basement construction on the structural stability of the Property and the neighbouring properties to include the following:

(i) incorporation of the recommendations contained within the Basement Impact Assessment submitted with the Planning Application;

(ii) inclusion of a detailed monitoring regime throughout the Construction Phase;

(iii) a method statement detailing the proposed method of ensuring the safety and stability throughout the Construction Phase of the neighbouring buildings including temporary works sequence drawings and assumptions;

(iv) detailed design drawings prepared by a suitably qualified and experienced chartered geotechnical engineer and chartered structural engineer both with experience of sub-ground level construction commensurate with the Development whose identities shall be approved in writing in advance by the Council for all elements of the groundworks and basement authorised by the Planning Permission together with specifications and supporting calculations;

(v) an update of the risk assessment submitted with the Planning Application based on the detailed design drawings referred to in (iv) above;

(vi) phasing plan demonstrating that the lower ground floor and basement forming part of the Development shall be completed within twelve months of the start of bulk excavations from the Property; and

(vii) provision of a contingency plan setting out measures that will be undertaken to ensure the safety and preservation of the adjoining properties in the event of any delay in the completion of the basement forming part of the Development

The following document provides these criteria to fulfil this obligation.

(i) incorporation of the recommendations contained within the Basement Impact Assessment submitted with the Planning Application;

Refer to Section 7 'Stage 5 – Review and Decision Making' Basement Impact Assessment PF-12692-RP-002 (see appendix 1):

The proposed basement and its construction have been carefully considered to take account of its surroundings and to defining the design performance required of them in use.

During construction the basement is planned to be formed of a new sheet piled wall which will be toed into the London Clay to form a cofferdam around the new basement. This will isolate the soil within the new basement to enable excavation from the surrounding soil and cut the shallow layer of Hackney Gravels off from the surrounding gravels which containing the perched water table. Once the soils within the sheet piled cofferdam have been cut off from the surrounding perched water it may be excavated in a dry environment with ground water initially removed through pumping.

Upon completion of bulk dig pumps will continue to remove any ground water penetrating the cofferdam. Before the retaining wall is sealed by welding of the sheet piles to one another. A new raft foundation will be constructed at its base with design and construction taking account ground movements and of the new building loads.

Piles have been designed to manage both ground bourn vibration and ground movement from construction activities to the strict predicted ground movement criteria set by Pell Frischmann. Temp Works have also been designed in accordance with EC2, EC3 and EC7 and CIRIA C580 in conjunction with piling in order to satisfy structural stability criteria, strict ground movement criteria set by Pell Frischmann and program and time criteria set by Erith. The sequence of works ensures all of the above criteria in every stage of excavation.

(ii) inclusion of a detailed monitoring regime throughout the Construction Phase;

Monitoring as specified by Pell Frischmann in the document Movement monitoring specification (Appendix 1).

Also attached are monitoring point locations around the site to monitor existing properties and assets.

(iii) a method statement detailing the proposed method of ensuring the safety and stability throughout the Construction Phase of the neighbouring buildings including temporary works sequence drawings and assumptions;

At all times the works will be executed to the following sequence of Excavation and Installation of Temporary Works and will be closely supervised by the Temporary works and Geotechnical engineers.

Sequence of Works

1. Install the Raking props to the existing site perimeter retaining wall. Saw cutting the trench for the Sheet Piles
2. As each prop is reached it will be temporarily removed whilst the sawing is carried out in this location and the props will be replaced once the sawing has passed.
3. Once the sawing has taken place and the props reinstated the sheet piling will take place around the perimeter of the site, again, as each prop position is reached by the piling rig the prop will be temporarily removed to allow the sheet pile to be installed.
4. Once the sheet pile has been installed the raking prop will be re-instated against the sheet piles and the space between the sheet piles will be filled so that the load from the surrounding roads will be transferred back to the prop and Ground floor slab. (See Figure 1)

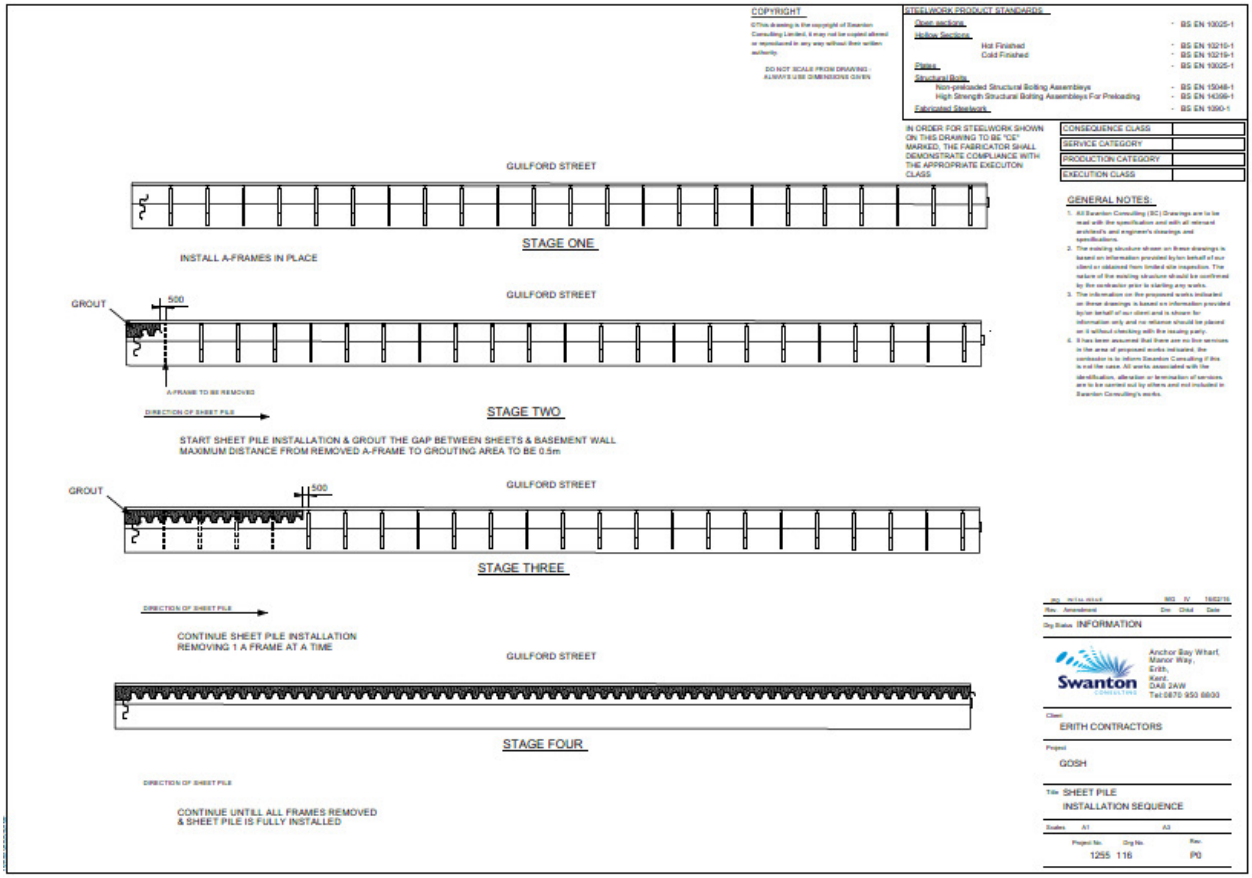


Figure 1

5. The sheet piles will be cut down and the Capping Beam constructed. The flying shores will be installed across the site between the capping beams. The raking props around the perimeter of the site to the existing retaining wall can be removed.
   (see Figure 2)

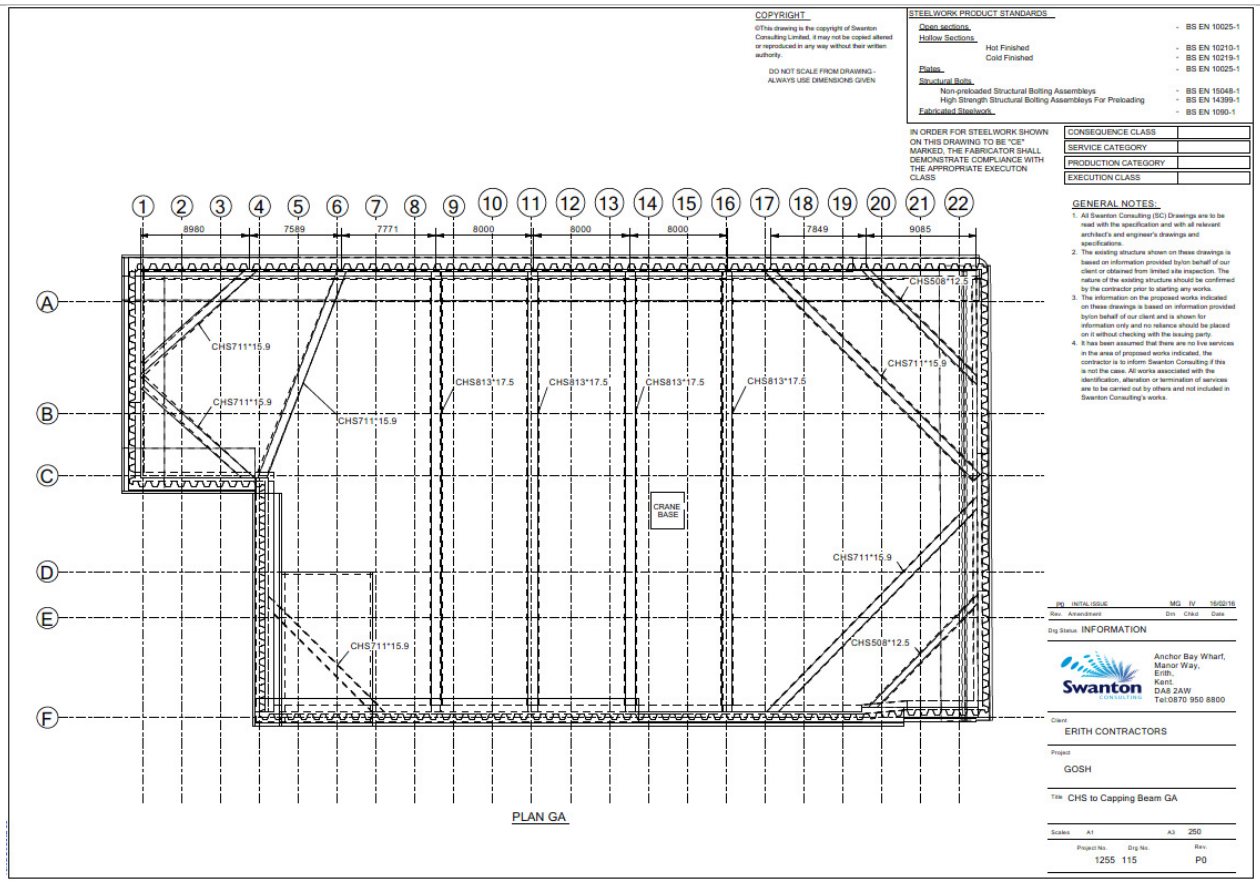


Figure 2

6. The bulk excavation will be carried out to the intermediate level and the Intermediate level of the propping will be installed across the site between the sheet piles. The excavation will be carried out to the formation level of the basement slab when the main reconstruction works can commence. (see Figure 3)

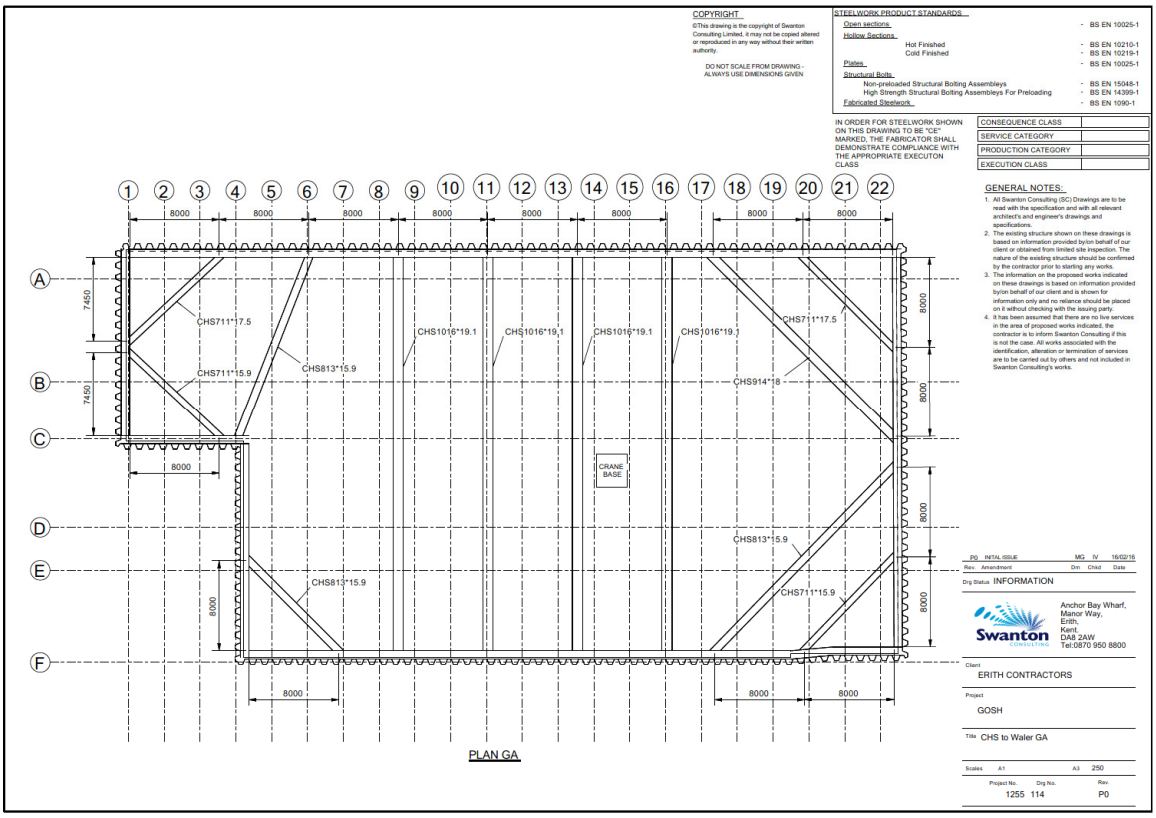
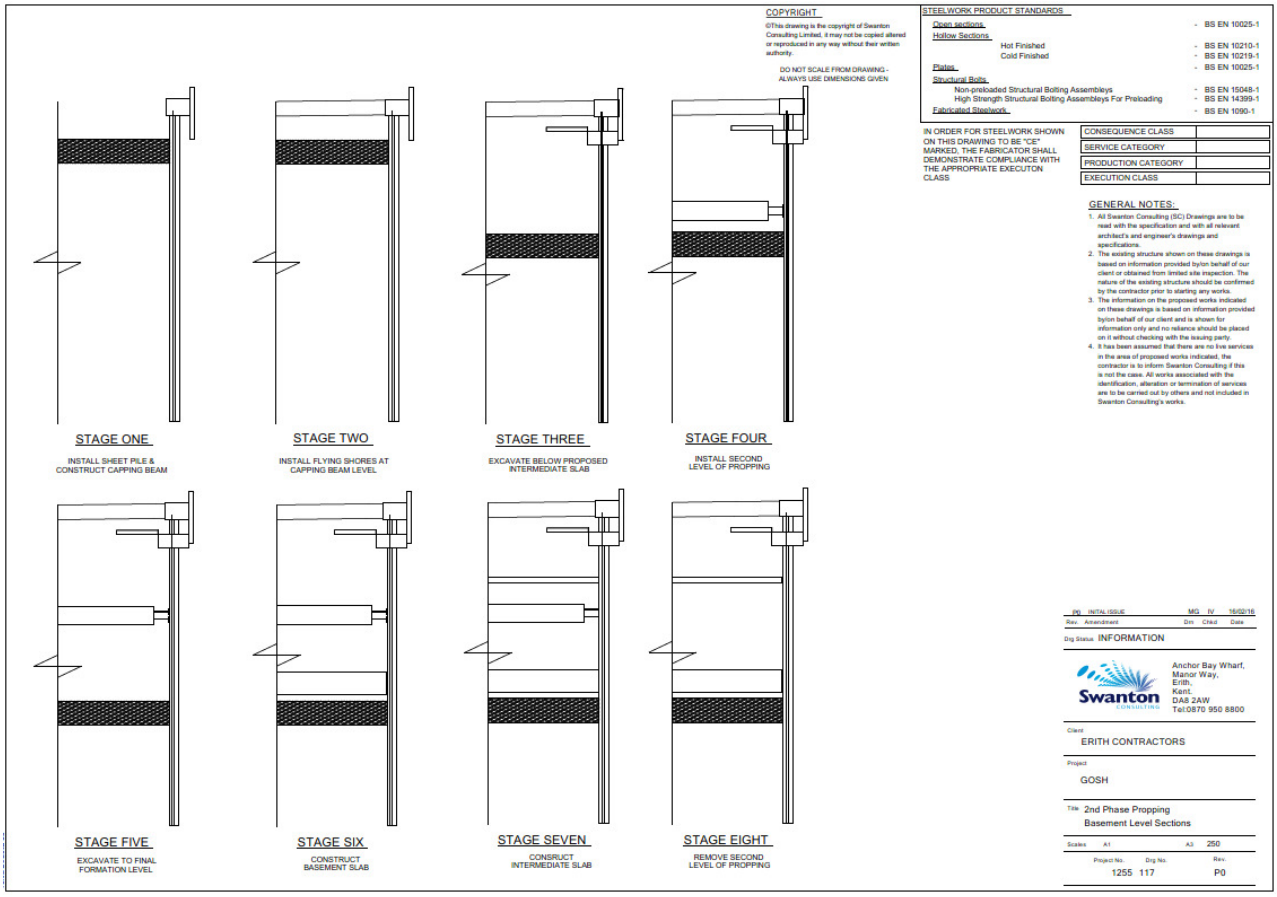


Figure 3

7. At all times the Temporary works will be signed off prior to the next phase of the works taking place and issued with a Permit to Load. All temporary works will be inspected weekly by the Temporary Works Coordinator and recorded in the Temporary Works file retained on site. During the rebuild the lower base slab will be constructed including the verts between this slab and the intermediate slab and the Intermediate slab constructed, at this stage the intermediate level of the props can be removed. **Again all in a sequence that will be agreed with the Temporary Works Structural Engineer.** Structural works will continue up to the Ground Floor Slab, and the upper Temporary works will be removed.



Sequence of works summery

(iv) detailed design drawings prepared by a suitably qualified and experienced chartered geotechnical engineer and chartered structural engineer both with experience of sub-ground level construction commensurate with the Development whose identities shall be approved in writing in advance by the Council for all elements of the groundworks and basement authorised by the Planning Permission together with specifications and supporting calculations;

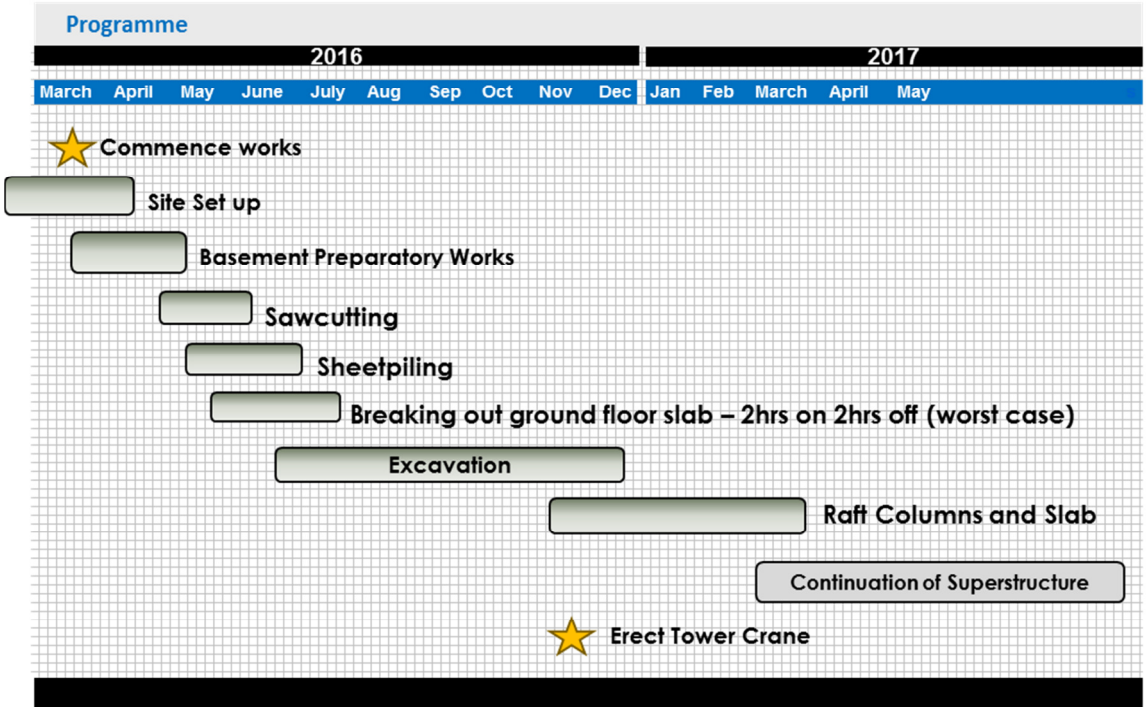
See Appendix 2 for detail drawing arrangements for the temporary works.

(v) an update of the risk assessment submitted with the Planning Application based on the detailed design drawings referred to in (iv) above;

Please see Appendix 3 for the Risk Assessment based on the design drawings provided in this document.

(vi) phasing plan demonstrating that the lower ground floor and basement forming part of the Development shall be completed within twelve months of the start of bulk excavations from the Property; and

Site set up will be at the end of March 2016, with the removal of the Existing Ground Floor slab taking place in early July 2016 once the Sheet Piles and the upper levels of Temporary Works have been installed. The Excavation will take place from the End of July and be completed by in early October. Reconstruction works will then commence and be completed by March 2017.



(vii) provision of a contingency plan setting out measures that will be undertaken to ensure the safety and preservation of the adjoining properties in the event of any delay in the completion of the basement forming part of the Development

As explained in section (iii) at all times the main works including the excavation works will be carried out in conjunction with a sequence agreed with the Structural Engineers and the Geotechnical Engineers. Should the there be any delay in the construction of the Basement all works will be managed to ensure that the preservation of the adjoining properties is not compromised. 'Stage 3' work will not be authorized unless Stage 4 has been arranged and fabricated.

A Temporary Works coordinator will be on site the whole time and no works will be carried out until a Permit to Load is issued for each stage of the Temporary Works Installation. The Temporary Works will be inspected weekly by the Temporary works coordinator and recorded and filed on site.

APPENDIX 1

Basement Impact Assessment PF-12692-RP-002

Approval of our proposed decision will then be reached via a Party Wall Award and in preparation we have already undertaken a ground movement study to ensure that vertical and horizontal ground movements affecting 3 Guilford Street are within the criteria set out in Boscardin, Cording and Burland's Classification which is commonly used in Party Wall Agreement.

7. STAGE 5 – REVIEW AND DECISION MAKING

The proposed basement and its construction has been carefully considered to take account of its surroundings and to defining the design performance required of them in use.

During construction the basement is planned to be formed of a new sheet piled wall which will be toed into the London Clay to form a cofferdam around the new basement. This will isolate the soil within the new basement to enable excavation from the surrounding soil and cut the shallow layer of Hackney Gravels off from the surrounding gravels which containing the perched water table. Once the soils within the sheet piled cofferdam have been cut off from the surrounding perched water it may be excavated in a dry environment with ground water initially removed through pumping.

Upon completion of bulk dig pumps will continue to remove any ground water penetrating the cofferdam. Before the retaining wall is sealed by welding of the sheet piles to one another. A new raft foundation will be constructed at its base with design and construction taking account ground movements and of the new building loads.

7.1 SUBTERRANEAN (GROUNDWATER) FLOW

The new basement is to be constructed over an aquifer but is only to be constructed with in the Hackney Gravels (a non-productive secondary aquifer) and not within the primary aquifer. The incursion into this perched water table is relatively small in volume and the temporary and permanent works will be designed so as to limit the flow rate of water through isolating the excavation from the perched water.

No water courses will be impacted as the nearby River Fleet has been shown to have been diverted into the local sewer system.

7.2 SLOPE STABILITY

The proposals will lead to some removal and pruning of trees which have been assessed by Simon Jones Associates and found to comply with national planning guidance. The tree works are also being discussed with Camden's Tree and Landscape Officer for agreement of the works.

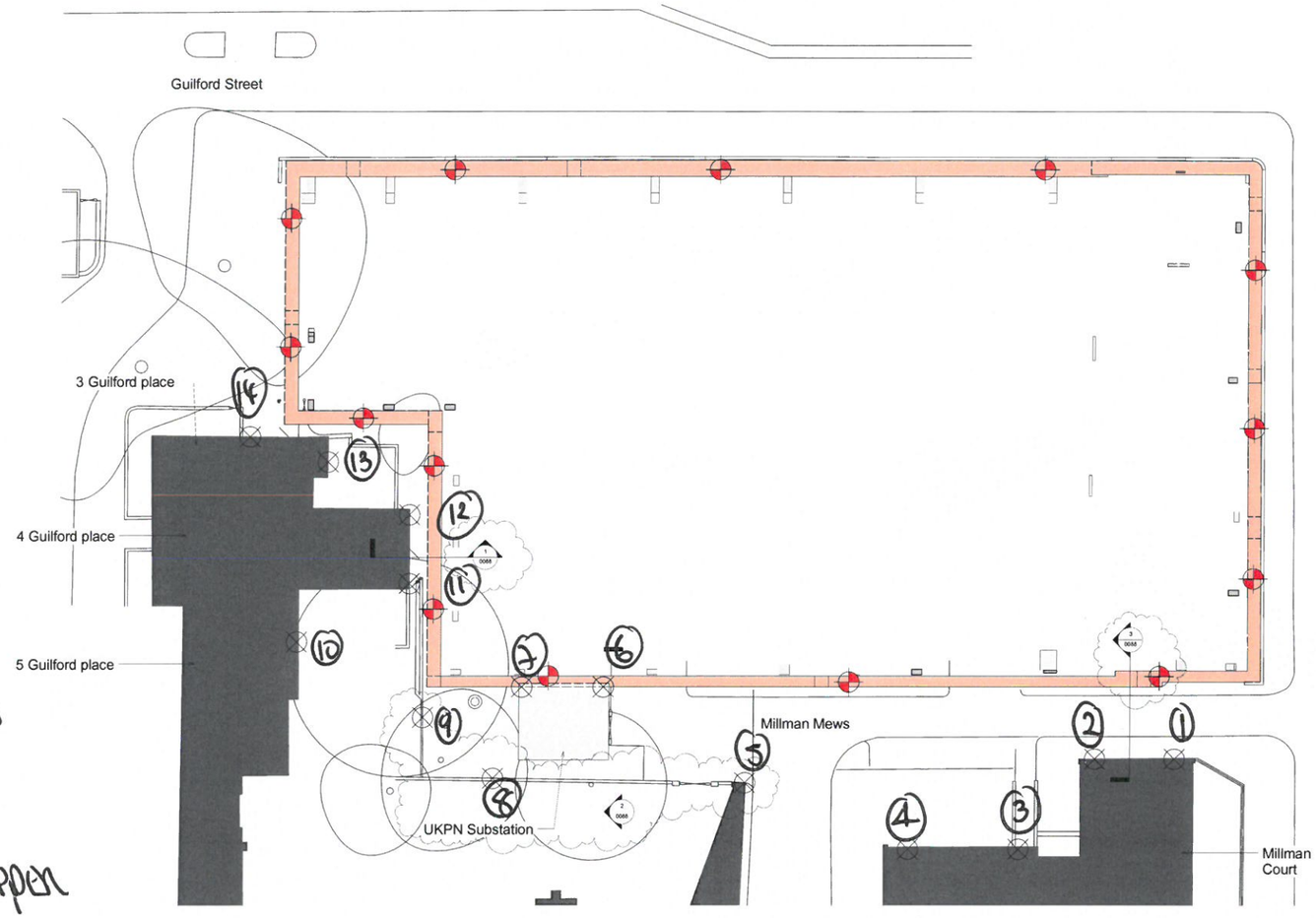
The basement will be formed in a planned and controlled manner to install retaining walls, excavate soil and install new foundations and basement waterproofing to best practice. The foundations will be designed to deal with ground swell and heave so as to control movements of the proposed building and the formation of the basement will be undertaken with a full understanding of surrounding features such as:

- Perched ground water
- Highways
- Surrounding buildings

A temporary cofferdam will be formed from sheet piles to cut off ground water and to enable safe construction. It will then be progressively propped during bulk excavation to control ground movement of highways and neighbouring buildings before being welded into a continuous steel wall to prevent water ingress into the permanent basement. The base of the excavation will then be waterproofed with tanking below the raft foundation and a secondary waterproofing system will be provided via a drained cavity to reinforce the first barrier. To prevent floatation of the building in the long term a permanent state sub raft ground water drainage system is to be detailed below the raft. This will remove any significant water build up at this level cause by seepage around or through the sheet piles below raft level which could otherwise cause a large head of water to build up in the long term.

Throughout this process the predicted ground movements which will have been agreed with the relevant parties prior to the works will be correlated by site surveys of ground movement and party walls to reach actual movements and to correlate the with predictions. In so doing the proposed building works may be shown to avoid excessive impacts on water courses and neighbours.

CROSS SECTION ANALYSIS BUILDINGS



4 Monitoring Positions Location Plan
1 : 150

NOTES:

1. This drawing is to be read in conjunction with all relevant Engineers & Architects drawings and specifications.
2. All dimensions are in millimetres & levels in meters above O.D.
3. Do not scale from this drawing or the computer digital data only written dimensions are to be used.
4. Location of monitoring points are given approximately and are to be agreed in position once the temporary works proposal is available.

KEY:

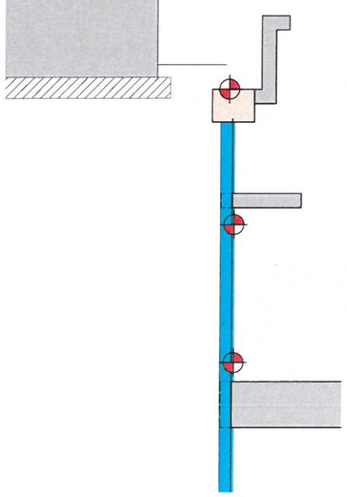
Movement monitoring position to high, medium and low level of new/proposed retaining wall.

Movement monitoring position to high and low level of adjacent buildings.

1 A+B
2 C+D
3 E+F
4 G+H
5 I+J
6 K+L
7 M+N
8 O+P
9 Q+R
10 S+T
11 U+V
12 W+X
13 ~~W+X~~ Y+Z
14 Z1+Z2

UPPER

LOWER.



1 Section 1-1
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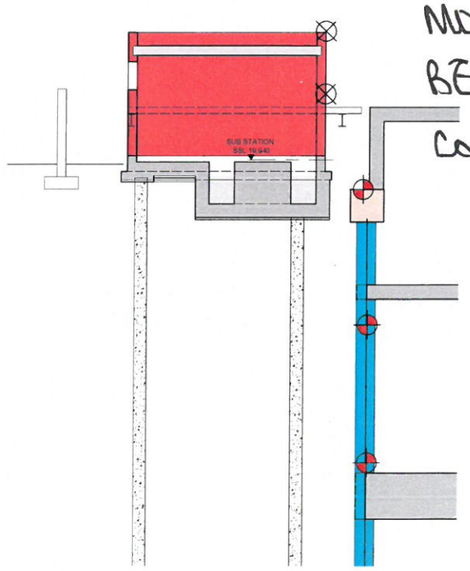
CANYON BEAM MONITORING WILL BE INSTALLED WHEN CONSTRUCTED.



2 Section 2-2
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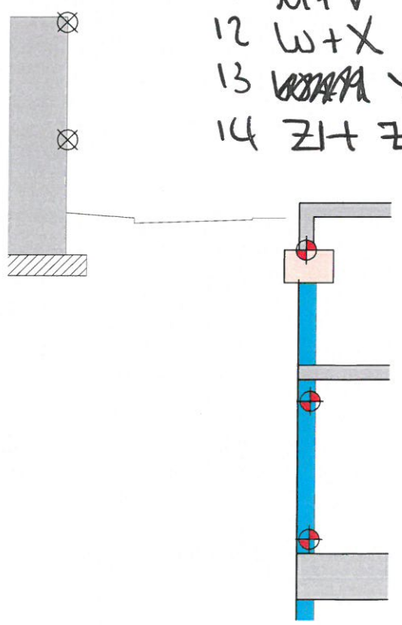

3 Section 3-3
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Rev	Description	Ch'd by	Date
A	MOVEMENT MONITORING POSITIONS ADDED TO DRAWING	MN	16.11.15
	STAGE F ISSUE	TOMN	14.10.15

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Architect/Client/Contractor

STANTON WILLIAMS

Project

CENTRE FOR RESEARCH INTO RARE DISEASE IN CHILDREN

Drawing Title

MONITORING POSITIONS

	Name	Date	Scale: As indicated @ A0
Drawn	ARC	22/09/15	File No:
Design	ANAD	22/09/15	
Check'ed	MN	22/09/15	Drawing Status: STAGE F
Approved	EJ	22/09/15	

Drawing No: PF-S-A12692-GA-B1-0088 Revision: A

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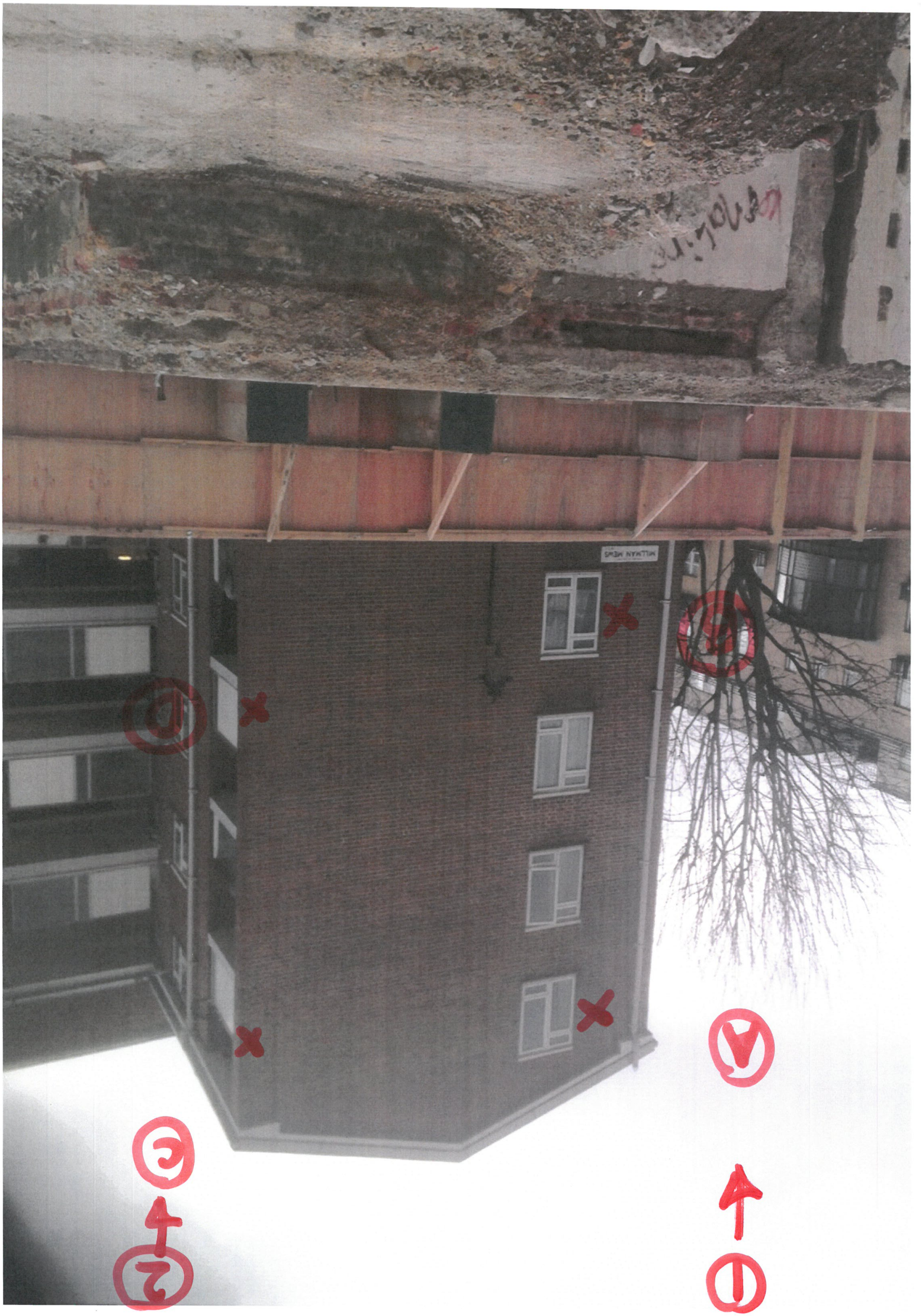
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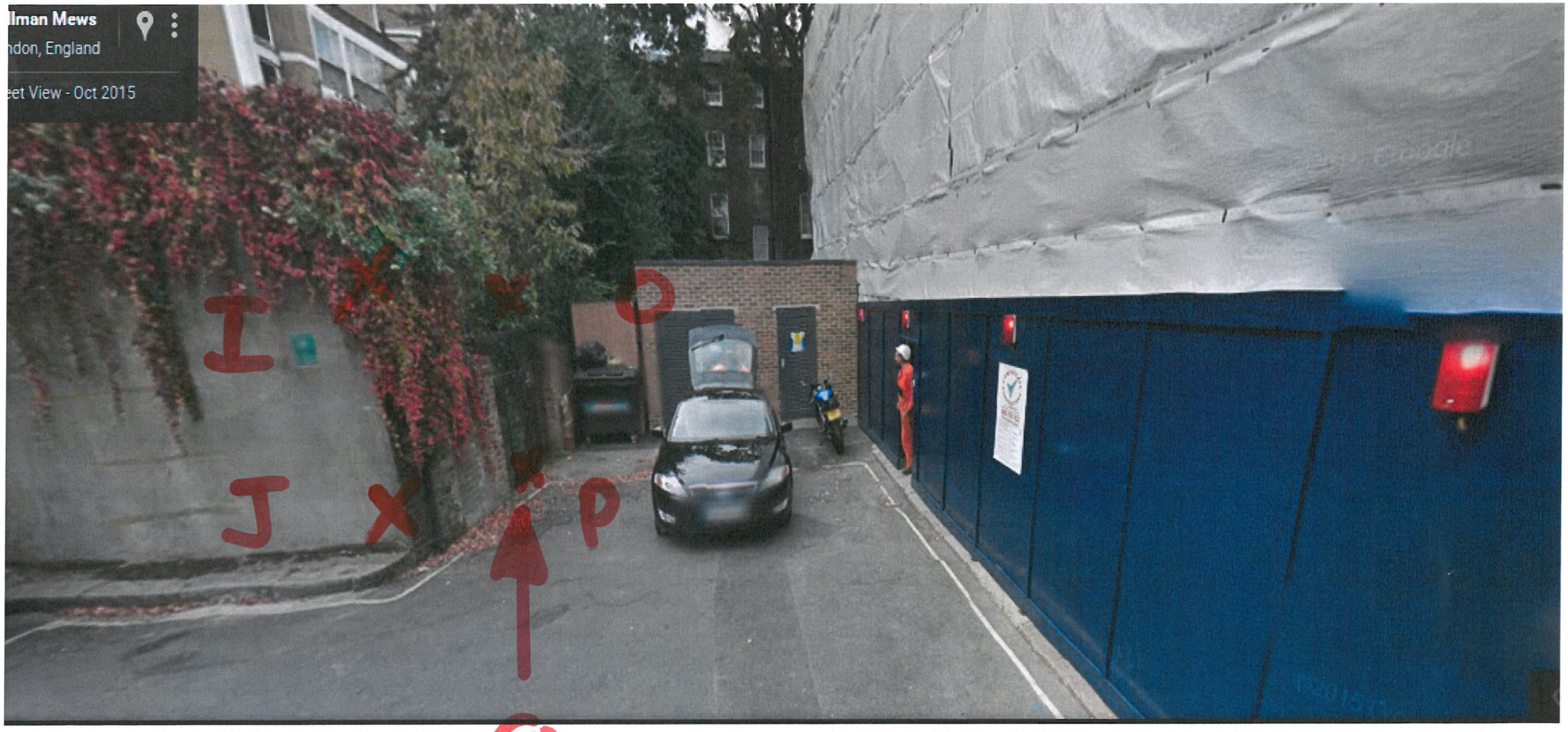
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3 GUILFORD PLACE
72 x
12 x
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APPENDIX 2

General Arrangement Plans for Temporary Works

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Cold Finished	-	BS EN 10219-1
Plates	-	BS EN 10025-1
Structural Bolts		
Non-preloaded Structural Bolting Assembleys	-	BS EN 15048-1
High Strength Structural Bolting Assembleys For Preloading	-	BS EN 14399-1
Fabricated Steelwork	-	BS EN 1090-1

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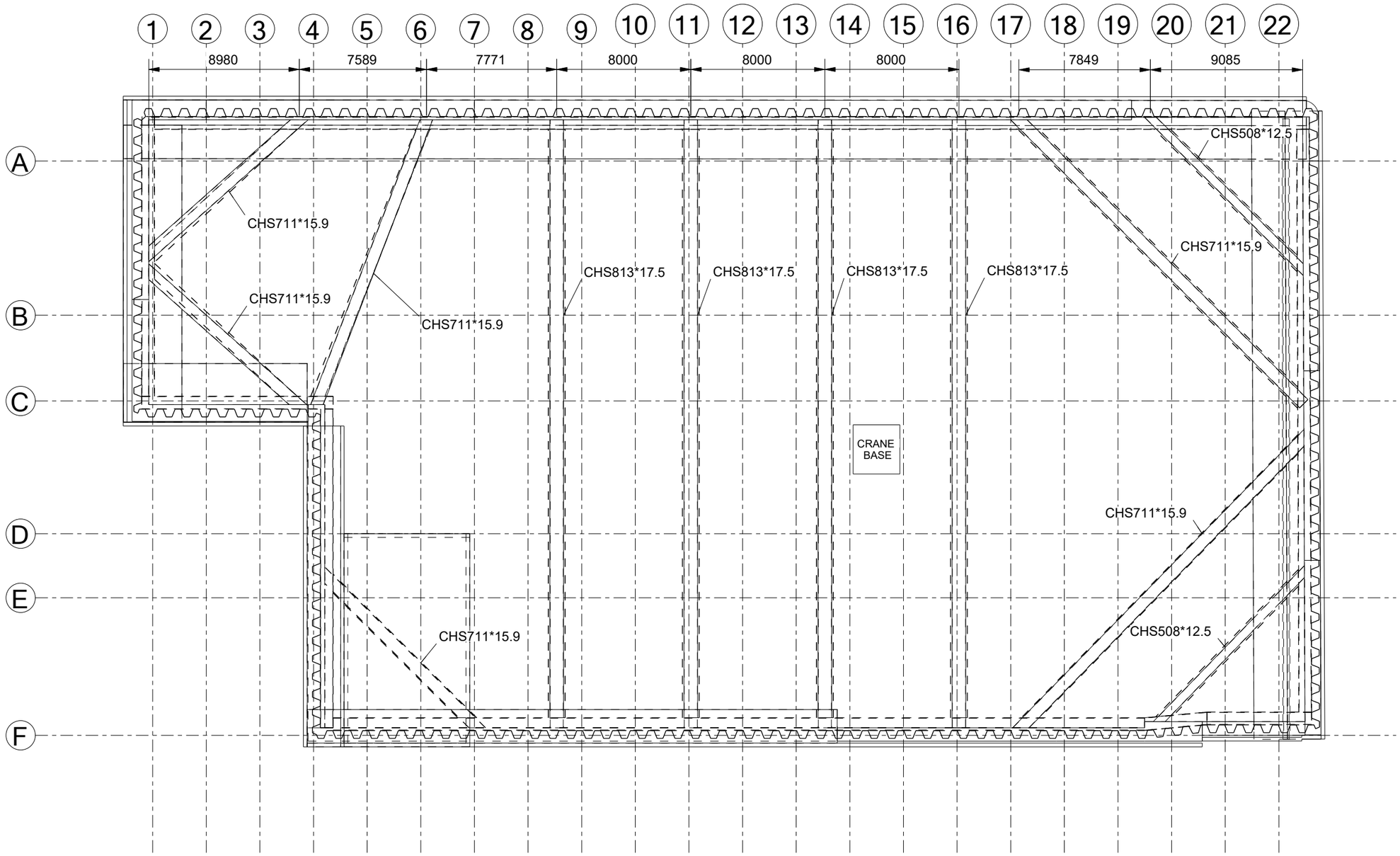

PLAN GA

GENERAL NOTES:

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Rev.	Amendment	Drn	Chkd	Date
P0	INITAL ISSUE	MG	IV	16/02/16

Drg Status INFORMATION

Swanton CONSULTING

Anchor Bay Wharf,
Manor Way,
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DA8 2AW
Tel:0870 950 8800

Client
ERITH CONTRACTORS

Project
GOSH

Title CHS to Capping Beam GA

Scales A1 A3 250

Project No.	Drg No.	Rev.
1255	115	P0

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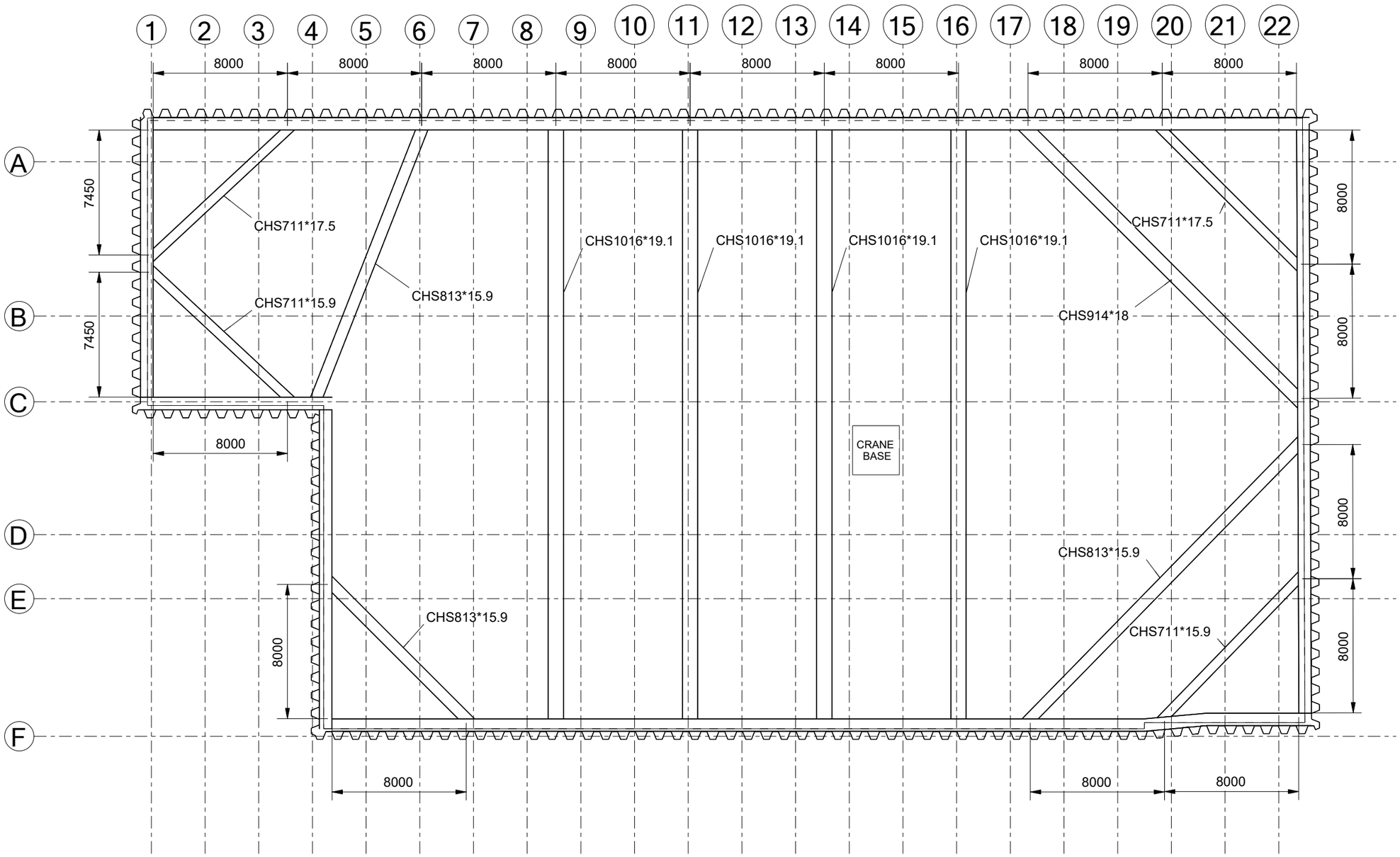

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High Strength Structural Bolting Assembleys For Preloading	-	BS EN 14399-1
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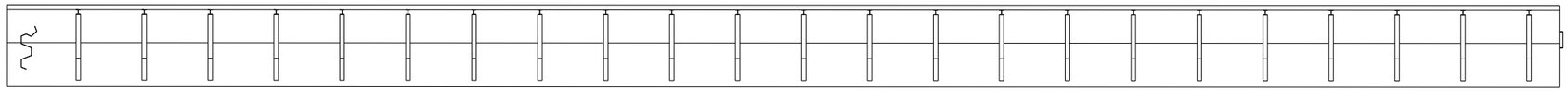
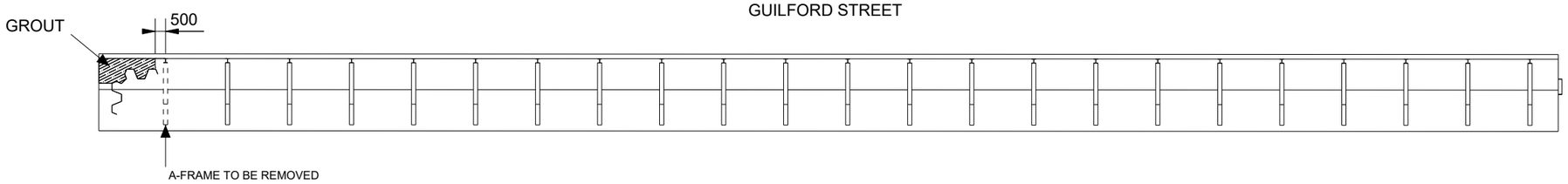
GUILFORD STREET



STAGE ONE

INSTALL A-FRAMES IN PLACE

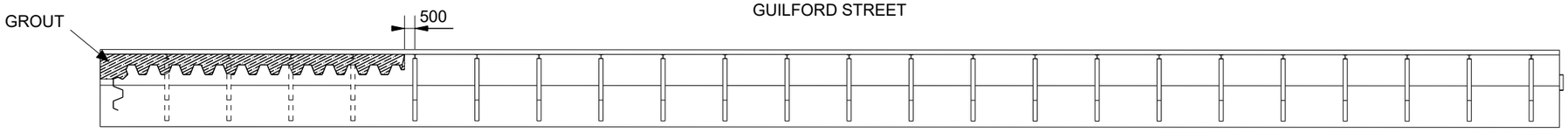
GUILFORD STREET



STAGE TWO

START SHEET PILE INSTALLATION & GROUT THE GAP BETWEEN SHEETS & BASEMENT WALL
MAXIMUM DISTANCE FROM REMOVED A-FRAME TO GROUTING AREA TO BE 0.5m

GUILFORD STREET

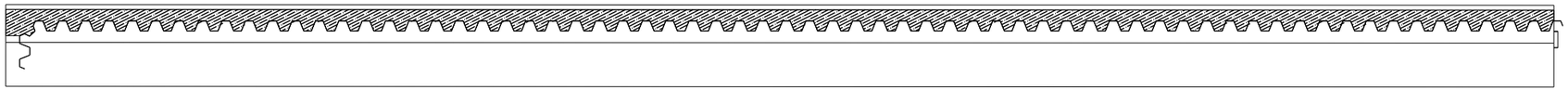


STAGE THREE

DIRECTION OF SHEET PILE

CONTINUE SHEET PILE INSTALLATION
REMOVING 1 A FRAME AT A TIME

GUILFORD STREET



STAGE FOUR

DIRECTION OF SHEET PILE

CONTINUE UNTILL ALL FRAMES REMOVED
& SHEET PILE IS FULLY INSTALLED

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INSTALLATION SEQUENCE

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Plates	-	BS EN 10025-1
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High Strength Structural Bolting Assembleys For Preloading	-	BS EN 14399-1
Fabricated Steelwork	-	BS EN 1090-1

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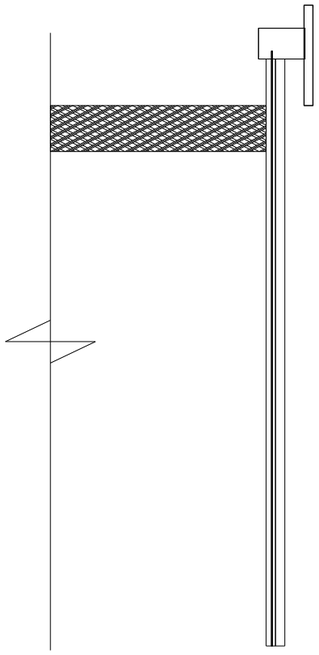
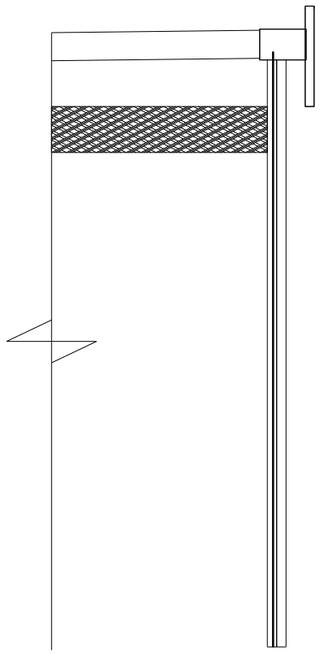


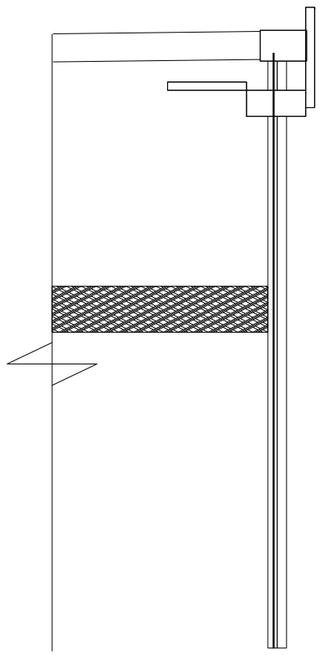
STAGE ONE

INSTALL SHEET PILE & CONSTRUCT CAPPING BEAM



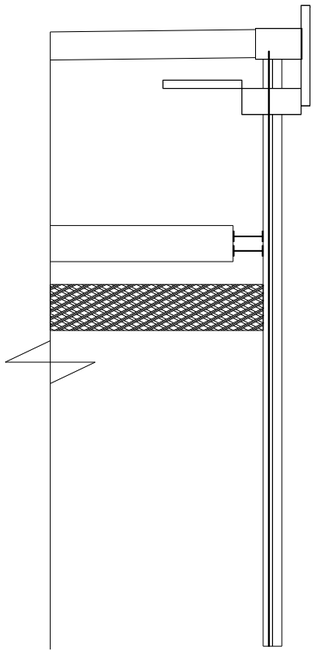
STAGE TWO

INSTALL FLYING SHORES AT CAPPING BEAM LEVEL



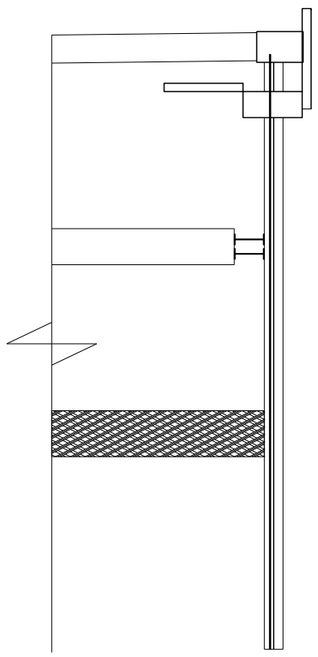
STAGE THREE

EXCAVATE BELOW PROPOSED INTERMEDIATE SLAB



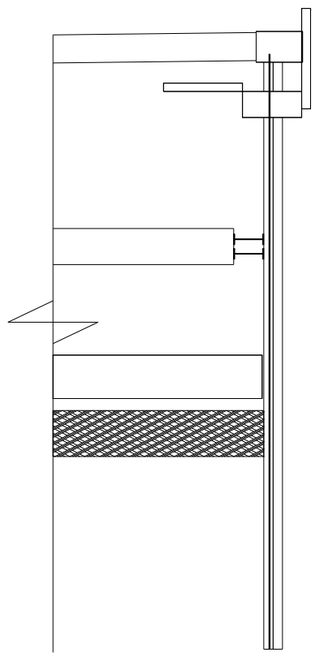
STAGE FOUR

INSTALL SECOND LEVEL OF PROPPING



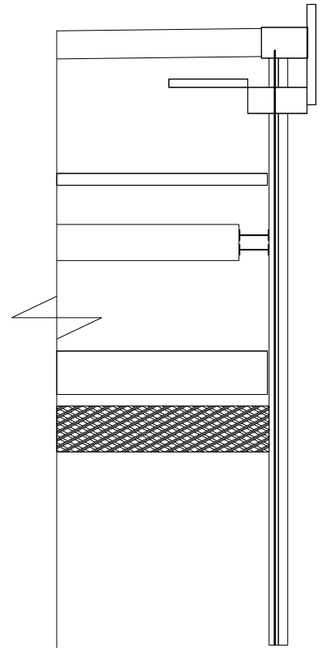
STAGE FIVE

EXCAVATE TO FINAL FORMATION LEVEL



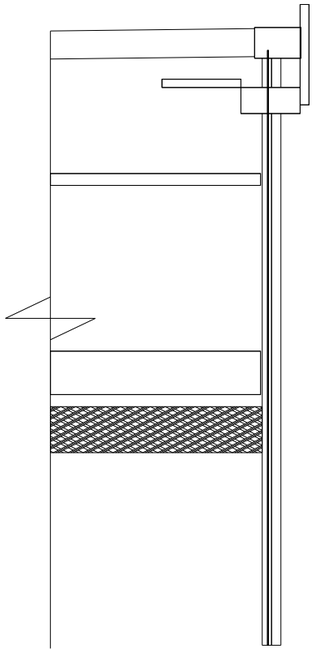
STAGE SIX

CONSTRUCT BASEMENT SLAB



STAGE SEVEN

CONSRUCT INTERMEDIATE SLAB



STAGE EIGHT

REMOVE SECOND LEVEL OF PROPPING

Rev.	Amendment	Drn	Chkd	Date
P0	INITAL ISSUE	MG	IV	16/02/16

Drg Status INFORMATION

Swanton CONSULTING

Anchor Bay Wharf,
Manor Way,
Erith,
Kent.
DA8 2AW
Tel:0870 950 8800

Client
ERITH CONTRACTORS

Project
GOSH

Title
2nd Phase Propping
Basement Level Sections

Scales A1 A3 250

Project No.	Drg No.	Rev.
1255	117	P0

Tekla Structures

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DO NOT SCALE FROM DRAWING - ALWAYS USE DIMENSIONS GIVEN

STEELWORK PRODUCT STANDARDS

Open sections	-	BS EN 10025-1
Hollow Sections		
Hot Finished	-	BS EN 10210-1
Cold Finished	-	BS EN 10219-1
Plates	-	BS EN 10025-1
Structural Bolts		
Non-preloaded Structural Bolting Assembleys	-	BS EN 15048-1
High Strength Structural Bolting Assembleys For Preloading	-	BS EN 14399-1
Fabricated Steelwork	-	BS EN 1090-1

IN ORDER FOR STEELWORK SHOWN ON THIS DRAWING TO BE "CE" MARKED, THE FABRICATOR SHALL DEMONSTRATE COMPLIANCE WITH THE APPROPRIATE EXECUTON CLASS

CONSEQUENCE CLASS	
SERVICE CATEGORY	
PRODUCTION CATEGORY	
EXECUTION CLASS	

GENERAL NOTES:

1. All Swanton Consulting (SC) Drawings are to be read with the specification and with all relevant architect's and engineer's drawings and specifications.
2. The existing structure shown on these drawings is based on information provided by/on behalf of our client or obtained from limited site inspection. The nature of the existing structure should be confirmed by the contractor prior to starting any works.
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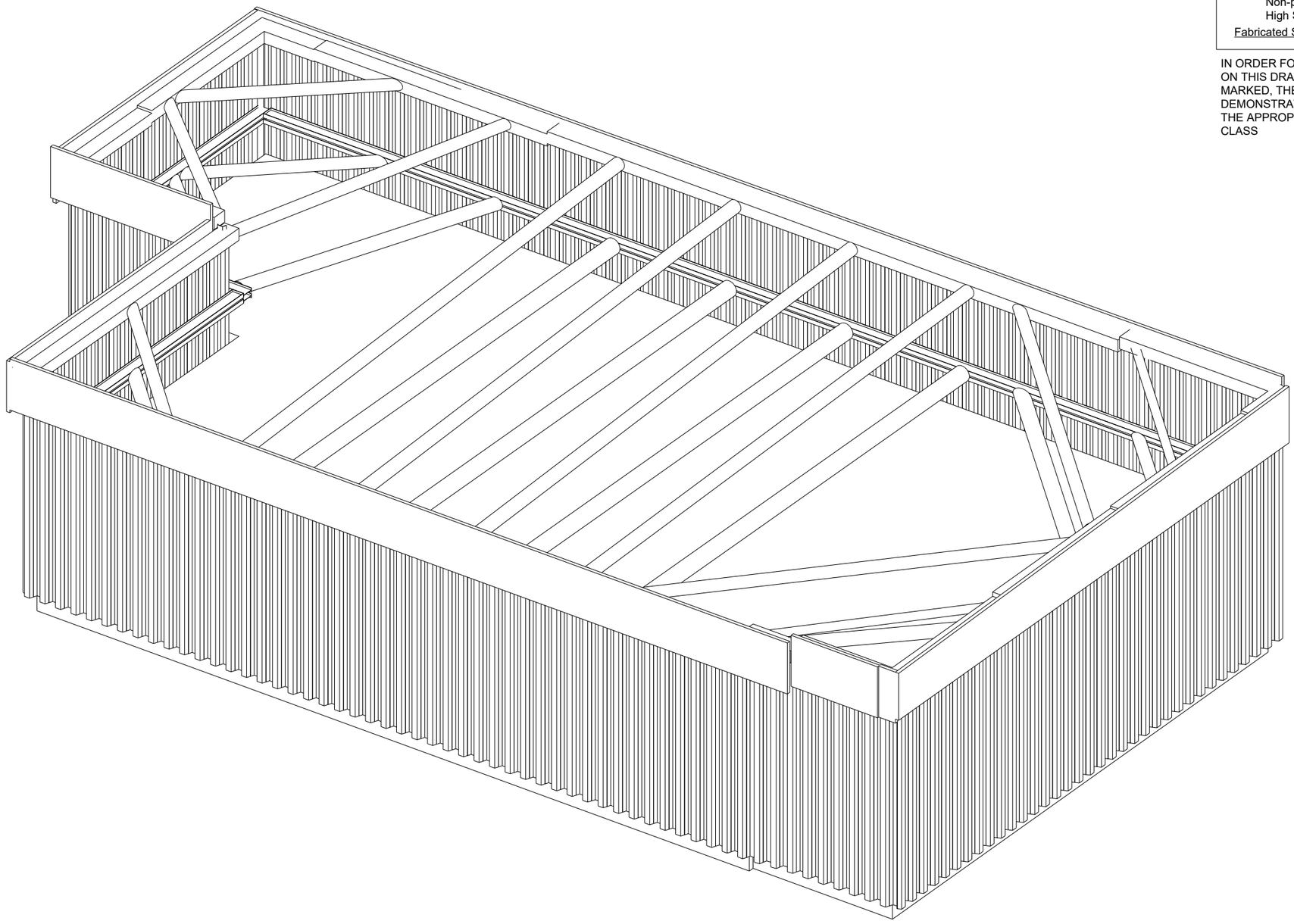

3d

Rev.	Amendment	Drn	Chkd	Date
P0	INITAL ISSUE	MG	IV	16/02/16

Drg Status INFORMATION

Swanton CONSULTING

Anchor Bay Wharf,
Manor Way,
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Tel:0870 950 8800

Client
ERITH CONTRACTORS

Project
GOSH

Title INDICATIVE 2nd PHASE PROP LAYOUT

Scales A1 N.T.S. A3 N.T.S.

Project No.	Drg No.	Rev.
1255	113	P0

Tekla Structures

APPENDIX 3

Risk Register

Great Ormond Street Hospital Redevelopment
Centre for Research into Rare Disease in Children
Risk Register - March 2016

Probability	Impact				
	1	2	3	4	5
	2	4	6	8	10
	3	6	9	12	15
	4	8	12	16	20
	5	10	15	20	25

Risk Category	Risk Description	Risk Mitigation Measures	Date for action	Risk Owner	Probability		Impact	Current Product	Post mitigation product
					Current	Post mitigation			
Construction	Circular Hollow Section (Propping Steelwork) stressing causing failure	All Steelwork to be procured through companies with the CE Mark for Quality. Temporary works will be sourced through BS5975 +A1 Code of Practice and BSI2011 / BS EN 1090:2-2008 and EN ISO 3834-3 2005. All Temporary works will be a designed item and installation will be siged off by a Temporary Works Coordinator and issued with a Permit to Load. The sequencing of Loading and Unloading Temporary will be through a sequence agreed with the Temporary Works Designer.	on-going	ERITH	4	1	4	16	4
Construction	Site Traffic Build Up accessing site a causing traffic delay	Traffic delivering or removing materials from site will be controlled by a designated coordinator, to prevent to build up of vehicles, vehicles will be booked in to a delivery / collection time slot / a Holding area has been allocated off site where vehicles can be called into site at specific times.	on-going	ERITH	3	2	2	6	2
Construction	Existing Retaining Wall failure during sawcutting, sheetpile and excavation works.	Exisiting retaining walls to be supported by Temporary Works which will be a designed item and manufactred as per the CHS sections above, installation and removal will be sequenced as agreed with the Temporary works designer and be signed off by the Temporary Works coordinator and issued with a Permit to load.	on-going	ERITH	3	2	4	12	8
Construction	Excavation Collapse due to installed temporary work not designed to project parameters and not checked regularly	Excavations will be supported by either a propriatory or Design system. All designed items of works will be checked at a minimum of weekly intervals and the inspections retained on site for inpection / recording purposes.	on-going	ERITH	4	2	4	16	8
Construction	Failure of Sheet Piles During Construction due no design of temporary works.	Sheet piles to be supported by Designed Temporary works by way of Flying Shores at 2 levels during the excavation works.	on-going	ERITH	2	1	4	8	4
Construction	Tower Crane Base failure due to unincorperated design.	The Tower Crane base will be incorperated into the Proposed base of the structure and will be designed in conjunction between the Temporary works Engineer and the Structures engineer.	on-going	ERITH	3	1	3	9	3
Construction	Failure of Structural Slabs during Construction due to unsupported or design formwork.	Slabs will be supported and backpropped as the works proceed using a propriatory system and will be designed by the subcontractor. Support will be by way of Ischebeck, Titan, SGB or PERI propping. Permits to load will be issued prior to follow on works taking place. Temporary works will be dseigned to BS5975 / BS2011	on-going	ERITH	3	2	3	9	6
Construction	Falls through Voids / Slab Penetrations due to unprotected edges.	All leading edges will be protected with handrails or scaffold A frames, these will be moved as the works proceed. Fall Arrest system with Harnesses will be used when construction the slab decking prior to the handrails.	on-going	ERITH	4	1	3	12	3
Construction	Welfare Gantry Collapse due to ground collapse, live loads and wind loads.	The Welfare Gantry will be designed for the Dead / Imposed / Self / Live and Imposed wind loadings by a temporary works engineer. The Gantry will be checked at a minimum weekly interval and signed off in the temporary works register.	on-going	ERITH	3	1	3	9	3