Project Management Plan
CFA Piling

Contract Number: **13_0335**

Issue Date: **02/05/2014**

Site Address:
Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD

Principal Contractor (P/C): **Higgins Construction**

P/C Main Contact: **Mark Collier, 07791 669315**

R & A Contract Supervisor: **Jack Forman, 07776995677**

Site Foreman: **TBC**

Rig Type: **TBC**

SECTIONS	
1	Contract Specific Details – including: 1.1 - Document Control 1.2 - Appointment of Personnel - HS&E-FRM-C01-06 (Issue 06 rev 00)
2	Method Statement – HS&E-FRM-H03-02 (Issue 06 rev 00)
3	Contract Lifting Plan – HS&E-FRM-L02-02 (Issue 06 rev 00)
4	Works Procedures for CFA Piling, Steel Fixing and Sampling & Testing concrete
5	Blowing Out CFA Piling Rig – HS&E-RA-H03-10 (26-01-11 Rev 01)
6	Guidance on Pile Testing for Higgins Construction
7	Inspection and Test Plan
8	Roles and Responsibilities
9	Briefing Record – HS&E-FRM-T03-01 (Issue 06 rev 00)

Subcontractor Schedule		
1	Steel fixing	S & J Contractors
2	Integrity Testing	NDT Services
3	Load Testing	NDT Services
4	Pile Setting Out	TBC

5	Guide Walls	TBC

Document Control

Date	R&A Revision	Revised By	Changes	Effects
01/06/11	1.0	ND	- Added CFA blowing out (section 5) - Minor updates to several paragraphs - Added Document Control (section 10)	Issued to site from next use
08/07/11	1.1	ND	- Revisions to paragraphs (sections 2 and 4-2)	Issued to site from next use
03/08/11	1.11b	ND	- Updated sections on Cube Testing and Site Health & Safety	Issued to site from next use
06/02/12	1.20	PC	- Updated to new H&S version numbers - Added version numbering - Minor updates	Issued to site
13/06/12	1.21	PC	- Changed paragraph about overnight load testing to section 6 “Guidance on Pile Testing” - Updated Record of H&S Briefing page, added more sign in rows and date for each	Issue from now on
10/04/14	1.3	ND	- Various minor changes - Updated non-crane lift plan	Issue from now on

Site Address	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**
Contract No.	**13_0335**
Business Unit	**Rock & Alluvium**
Date	**02/05/2014**

The following operations management team has been appointed for the project identified above:

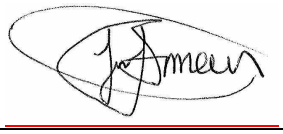
Head of Operations

Nick Dewey	Signature of acknowledgement	

Operations Manager Responsible for HS&E

Mark Gibson (Southern)	Signature of acknowledgement	

Site Supervisor

Warren Pepler **Jack Forman** **Peter Mallett**	Signature of acknowledgement	

General Foreman

Site Foreman	Signature of acknowledgement	

Please refer to Section 2.12 and Section 8 for further details on roles and responsibilities

Your role is to operate and maintain appropriate systems and standards to ensure that the workplace and any operations under your control are carried out and delivered safely and without adverse impact to the environment or neighbours. You should supervise the work of contractors engaged in your operations and take appropriate action where they are working at unacceptable standards

To assist you in this role, you need to ensure that you have read and understood the Company's Health, Safety and Environmental Policies and are familiar with the requirements outlined in the Company's Health, Safety and Environmental Standards. You should have an up to date copy of these documents available for your use. If you do not have copies, or the copies you have are out of date, please contact your Line Manager who will arrange for the documents to be issued to you.

You must notify your line manager immediately in the case of absence due to ill health and also advise your line manager of any periods of planned absence so that he can ensure that a suitably experienced and competent person is designated to undertake this role in your absence.

Nick Dewey
Head of Operations

Rock & Alluvium

Site Address: Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD	Contract No: 13_0335
Subject: CFA Piling R&A Ref: MS/ PMP 21	Date: 02/05/2014

Scope of the Job	CFA Piling
Site Address	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**
Date(s) to be carried out	Refer To Technical Package
The risks of the work are:	As detailed in the Risk Assessment (HS&E-FRM-H03-03)
Personnel No. **Competency level / qualification**	The personnel allocated to this contract are identified on the Labour Allocation Sheet, issued Weekly; it is anticipated that 4 – 7 No personnel will be on site per rig. Qualification of the crew is produced on day of start (or earlier) by the Foreman using Site Personnel Training matrix.
Plant and equipment required	Soilmec hydraulic Piling rig Trailer mounted concrete pump Concrete agitator Compressor. Bunded Vented Fuel bowser Storage container (normally 10ft/3m) Foreman's van Set Tower Lights (Winter only) Access Platform An attendant 360° tracked excavator (minimum 14 tonnes) is to be provided by Higgins Construction . The piling foreman is to check the machine operator's plant operator's CPCS card is in date and covers the plant to be operated. He is also to ensure that the operator is included in the Rock & Alluvium inductions and all site safety tool box talks. As attendant excavator will be required to work in close proximity to Rock & Alluvium personnel the foreman is under instructions to raise with Higgins Construction any doubts as to the driver's abilities or communication skills, notwithstanding any formal qualifications the driver may have.
Materials	Ready-mixed concrete Reinforcement Oils, fuels, greases Prime-a-pump line lubricant
Safe means of access and egress	Higgins Construction is to provide safe means of access and egress to the site and all work areas, including pedestrian and vehicle segregation within the site. If other trades are working near the piling area, Higgins Construction is to provide fencing to segregate the piling area from other operations, the R&A Foreman can stop piling works if it is deemed that follow on trades are working too close and effecting the safety of himself and others. If no other trades are working on site segregation may not be required

This Project Management Plan is to be read in conjunction with the Site Specific Risk Assessment and Galliford Try Health, Safety and Environmental Standards.

1. TASK

Rock & Alluvium Ltd as a Specialist Piling Sub Contractor are to construct piles using CFA techniques at the above site. R & A will be working under the instruction of our Client - Higgins Construction . A copy of the F10, confirming the appointment of Higgins Construction is to be available on site

2. SITE HEALTH and SAFETY

Before any piling operations commence, the piling foreman is to:-

a) Review the site specific risk assessment, noting any special requirements and ensure that all piling operatives have received the necessary training to carry out their work.

b) Brief the piling operatives on the site health and safety requirements and check that they have all of the necessary PPE.

c) Check that Higgins Construction is displaying all of the relevant HSE statutory notices.

d) Carry out daily checks of all piling equipment and complete both the “Record of Inspections LOLER” and “Record of Inspections PUWER” books / GT Forms on a weekly basis.

e) Ensure the weekly workplace inspection and safety harness inspection forms are up to date.

f) Check that the piling rig has been thoroughly inspected and certificated within the last 12 months and that the lifting equipment and fall arrest device have been thoroughly inspected and certificated within the last 6 months.

g) Higgins Construction will carry out the Piling Team Site Induction on arrival

h) Ensure the following documents are in place:

- Platform Certificate
- Permit to Work
- Approved Method Statement
- Permit to Dig (Provided by Higgins Construction)

The Contract Supervisor is to ensure that all of above are completed to their satisfaction before piling operations commence.

3. WORKFORCE

The piling team is to be suitably trained. Copies of all plant operator, CPCS/CSCS cards and training certificates will be kept with the piling foreman and shown to the site manager on our arrival to site.

The Piling Team will consist of:

Piling Foreman/Rig driver
Concrete Pump Operator
Banksman (2No)

Additional operatives include:

Steel fixers (up to 3No)
Setting Out Engineer

4. PLANT and EQUIPMENT

Our standard plant assembly supplied for piling operations comprises:

Soilmec hydraulic Piling rig
Trailer mounted concrete pump
Concrete agitator
Compressor.
Bunded Vented Fuel bowser
Storage container (normally 10ft/3m)

Foreman's van
Set Tower Lights (Winter only)

An attendant 360° tracked excavator (minimum 14 to nnes) is to be provided by Higgins Construction . The piling foreman is to check the machine operator's plant operator's CPCS card is in date and covers the plant to be operated. He is also to ensure that the operator is included in **the** Rock & Alluvium inductions and all site safety tool box talks.

As attendant excavator will be required to work in close proximity to Rock & Alluvium personnel the foreman is under instructions to raise with Higgins Construction any doubts as to the driver's abilities or communication skills, notwithstanding any formal qualifications the driver may have.

5. PUBLIC and ADJACENT PREMISES

The site boundary is to be kept secure by Higgins Construction and is to prevent unauthorised access onto the site. In the event of unauthorised people entering the piling area, the piling foreman is to cease all piling operations and ask the people to leave. Piling is not to restart until the piling area is clear. Rock & Alluvium's Foreman is to ensure that this procedure is strictly enforced.

Rock & Alluvium fully comply with the HSE endorsed FPS guidance on "Cleaning and Guarding of Augers on Piling Operations", however in extreme circumstances where auger guards cannot be utilised, R&A work in accordance with section 4.3 of the above mentioned document, i.e. the use of a physical barrier at a 2m radius from the centre of the pile, this physical barrier is to be supplied by Higgins Construction .

6. OTHER CONTRACTORS

All other personnel on site are to be notified of piling works by Higgins Construction and told not to enter into the piling area unless specifically involved. In the event of unauthorised contractors entering the piling area, piling is to cease and the contractors asked to leave. Piling is not to restart until the piling area is clear. R & A Foreman is to ensure that this procedure is strictly enforced. It may be prudent for Higgins Construction to include a specific section within the site induction regarding Piling and the associated hazards; particularly with regard to hearing protection.

7. PILING PLATFORM

Higgins Construction is to design, construct and maintain, a safe and adequate Piling Platform in accordance with BRE 470 'Working platforms for tracked plant'; this is to be confirmed by Higgins Construction issuing a signed FPS "Working Platform Certificate".

Piling Operations are not to commence until Rock & Alluvium have received a signed copy of the Working Platform Certificate and Permit to Work from Higgins Construction **.**

The Piling Platform is to be constructed to safely support the bearing pressures of the Rock & Alluvium piling rig allocated to the project in both its travelling (BRE Load case 1) and working (BRE Load case 2) modes. The rig to be used on site is given on page 1, for which the associated bearing pressures can be supplied by our Contracts Department.

8. SETTING OUT

The Pile positions are to be set out during the Piling by a full time Setting Out Engineer, provided by TBC. The Principal Contractor is to provide either the main grid lines or a minimum of three base control stations and their co-ordinates. These three base stations must be within the site boundary.

The setting out engineer is not to work in areas where piling operations are ongoing. The setting out engineer must also be included in the Rock & Alluvium site safety induction if he is present on site.

9. SERVICES

Higgins Construction is to notify Rock & Alluvium of all known services and to accurately mark these if they fall within 1.0m of any pile position. All redundant services are to be physically disconnected and capped off by Higgins Construction at the site boundary.

Higgins Construction and Rock & Alluvium are to visually check all piling areas and confirm any changes or additions to the "Permit to Work".

10. SITE ACCESS

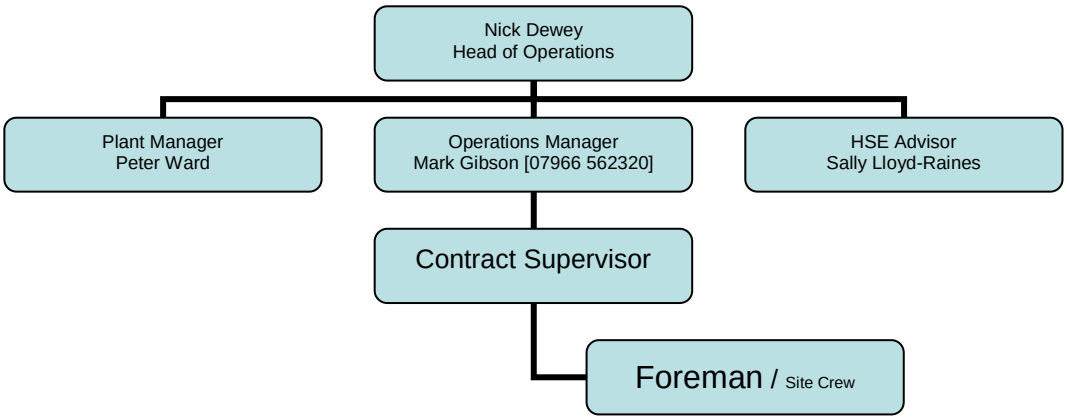
Clear unobstructed access from the road to the Rock & Alluvium work area is to be provided and maintained at all times by Higgins Construction . Separate pedestrian access is required as indicated by current regulations

11. SITE RAMPS

All access ramps constructed by Higgins Construction are to be a minimum of 5m wide and be at a maximum gradient of 1 in 10, unless specifically agreed in writing by Rock & Alluvium. Should the gradient be steeper than 1 in 10, it may be necessary to de-rig the piling rig and lay the mast down to travel safely up or down the ramp, causing unnecessary delay to the piling works

The piling foreman is to check the access ramps and ensure that they are adequate for the purpose. In the event that the ramps are deemed inadequate then the travelling operations are to be suspended and Higgins Construction notified.

12. SUPERVISION and ORGANISATION



The name of the Contract Supervisor / Foreman is given on the front of this Project Management Plan.
Quality audits are undertaken by Operations with review by Quality Manager.
Design issues are reported via Operations/Supervisor/Foreman to the Design Manager, **Neil Stone**.

13. SAFETY MONITORING

The company Safety Advisor will be carrying site visits and is available to deal with any matters Higgins Construction may wish to raise.

14. FIRST AID

The Piling Foreman is to ensure that at least one person in his gang has been on a First Aid *Appointed Person* course within the last 3 Years and that an adequately stocked First Aid kit is available. Any further first aid requirements are to be provided by Higgins Construction .

15. WELFARE FACILITIES

These are to be provided by Higgins Construction and are to be in line with the CDM Regulations (2007); it is anticipated that R&A will have 4-7No personnel on site per rig.
The requirements include:

- Washing facilities, including hot and cold running water, soap and drying facilities.
- Toilet facilities regularly cleaned and serviced.

- Drinking Water and drinking vessels.
- Suitable clothes changing and overnight drying facilities, including lockers for security.
- Messing area. (Food preparation and heating and means for boiling water).

The CDM Regulations make the specific point that full welfare facilities are to be available prior to bringing subcontractors to site. No exemptions are available for small sites. If the supplied Welfare is deemed unacceptable the R&A Foreman can cease piling operations until suitable Welfare has been provided.

16. SITE ESTABLISHMENT/SEQUENCE OF WORK

Rock & Alluvium Ltd are to notify Higgins Construction at least seven days before our intended arrival date to allow adequate time for the local residents to be notified.

a) Men and equipment to arrive on agreed date.
b) Sequence of work to be agreed with Higgins Construction .
c) Piling team sets up piling rig, concrete pump and agitator.
d) Concrete delivered by approved supplier, normally 7 or 8 trucks daily (can be 12+).
e) Reinforcement cages are made by steel fixers or delivered prefabricated.

17. BANKSMAN

All piling rig, crane, excavator and delivery vehicle movements on site are to be controlled by trained, competent and certificated banksman / slinger / signallers.

Lifting Operations will be carried out in accordance with the Lifting Plan given in Section 3.

The Piling Foreman is to ensure that all Lifting equipment is inspected and entered into the “Record of Inspections” LOLER Weekly, and that each item of Lifting Equipment and accessory receives a Thorough Inspection, Test and Certification every 6 months by a competent person. A copy of all the certification for the lifting equipment is kept on site by the piling foreman.

18. PILING

The piling operation will be carried out in accordance with Method Statement 1; CFA Piling, given in Section 4.

19. PILE LOGS

a) The foreman will hand the completed pile logs to Higgins Construction daily for him to sign as a record of progress. The Client will retain the yellow copy, returning the other three signed copies.

b) The white and blue signed copies are forwarded to the R & A office and the pink copy retained on site.

20. PILE REINFORCING CAGES

These may be either delivered prefabricated or fixed on site by steel fixing subcontractor; whom come under the direct supervision of the Rock & Alluvium Foreman

Site fixing of cages will be carried out in accordance with Method Statement 2; Steel fixing, found in Section 4 of this Project Management Plan.

De-bonding
To avoid the hazards of HAVS resulting from the manual breakdown of pile heads with percussive tools, we draw Higgins Construction ‘s attention to the practice of providing de-bonding foam as per ICE tolerances (unless otherwise agreed), to enable the concrete above the cut-off level to be removed with ease. Where this is specified, the foam will be fitted as part of the cage assembly.

21. OBSTRUCTIONS

If an obstruction is encountered during the boring operation, piling will be suspended and Higgins Construction notified and an Instruction sought from the following options:
NOTE: Generally normal CFA Piling will not drill through obstructions

- **Move to another pile position while the obstruction is cleared**
  We will move to another pile position and record the abortive time spent on the obstructed pile.

- **Attempt to bore through the obstruction**

In these circumstances, we do not accept responsibility for the pile position remaining within tolerance. We will also record the time spent on boring through the obstruction and we will seek additional payment for this time and any abnormal damage to the auger flights.

If Rock & Alluvium can drill through the obstruction, then pile construction will proceeded with as before.

If Rock & Alluvium are unable to drill through the obstruction within a reasonable time, Higgins Construction will be notified and asked for a further Instruction. The abortive time spent on pile to be recorded.

Any abandoned pile positions will be backfilled with suitable material. Higgins Construction is responsible for backfilling any areas where obstructions have been removed. It is vital the backfilled area is properly compacted and the piling platform fully reinstated, including any geo-textile interface. A number of recent piling rig over-toppling incidents have been due to inadequately backfilled excavations.

22. CONCRETE

The concrete characteristics will be as specified in the approved pile and concrete mix designs.

23. CUBE TESTING

Concrete sampling and testing will be carried out in accordance with the 2007 ICE Specification for Piling and Embedded Retaining Walls (SPERW) and Method Statement 3; Sampling & Testing Concrete, given in Section 4.

24. DEMARCATION

Any demarcation problems relating to our working area will be referred to Higgins Construction .

25. RISK ASSESSMENT

A Risk Assessment relating to our work has been carried out and will be passed to Higgins Construction for review, in particular to ensure that the interface between Rock & Alluvium and other contractors are managed satisfactorily.

The Piling Platform is to be designed, installed and maintained by Higgins Construction . All excavations are to be backfilled with suitable granular material and compacted so as not to leave any soft spots.

Higgins Construction is to advise of any specific hazards identified/known to them so that any measures necessary to ensure the works can be carried out in a safe environment can be agreed and implemented.

Rock & Alluvium operatives are provided with the following personal protective equipment:

- Head Protection (Helmets)
- Hearing Protection
- Protective Overalls
- Gloves (typically to EN388: 3121)
- Safety Glasses (EN166: 1F; Mandatory, unless heavy rain then at Site Managers discretion. EN166: 1B for blowing out operations / abrasive wheel usage).

- Safety Foot Wear (Boots)
- Wet Weather Clothing
- The Piling Rig and Container contain fire extinguishers in case of fire

In addition a Full Body Harness is provided for use with a Fall Arrest Device should climbing of the piling rig mast be needed. Eye protection is also provided for appropriate tasks.

Higgins Construction is to provide and advise of any special protective measures that may be required (for example due to any site contamination) and deal with the overall protection of site, the workforce and the general public.

This Lifting Plan has been drawn up to meet the requirements of the Federation of Piling Specialists (FPS) Code of Industry Best Practice guide to LOLER, the LOLER Regulation's(1998) ACoP and BS7121, "Safe us of Cranes.

A FPS Platform Certificate will be requested for the site

Please note that one third of Dangerous Occurrences reported by FPS members to the HSE are related to inadequate working platforms leading to a piling rig or crane overturning, each one of which is a potential fatality. The HSE has worked closely with the FPS on this initiative and supports the principle of reducing accidents by the certification of properly designed constructed and maintained working platforms.

Work Supervisor	Site Foreman	**Prepared by**	**Derek Shale 02087427/1** (Appointed Person – Lifting Operations)
Brief Description of the Work	Loading and unloading Plant and Equipment delivered to and loaded away from the site. Lifts by lorry Hiab (specified below) and excavator. Lifting of equipment and materials during piling operations by excavator. Lifting equipment and materials using the Piling Rig auxiliary Winch. See notes regarding restrictions on this equipment.		

Schedule of 'Routine' Lifts

Description of load	***Approx. Weight (Kg)***	***Load Characteristic***	**Method of Lifting**	**Centre of gravity**	**Lifting points/or method of slinging**
Reinforcement Cages	H16, 1.6kg/m H20, 2.5kg/m H25, 4.0kg/m H32, 6.5kg/m H40, 10.0kg/m (Add 10% for helicals).	Cylindrical	Horizontal lift: two chain lift; Vertical lift: Secure lifting points to be provided.	Central	2 leg chains / Nylon slings Vertical lift, secure at tied intersection of helical and main bar
Reinforcement	As above	Bundled steel bars Or Helical	Horizontal lift: two chain lift. Sling or chain hook to attach to bag handles	Central	2 leg chains Chain to pass through, helicals, bundling wires not to be used. Helicals may be bagged.
Drilling Auger	1.7t max depending on diameter	Up to 6.0m long Spiral	two chain choke lift (horizontal).	Central	2 leg chain.
Concrete pump	4.2 tonnes	Engine/hopper	Lifting point on top	Central	Chain
Agitator [Hiab lift]	6 – 9 tonne	Cylinder on frame	4No. lifting points	Central	4 leg chain
Diesel bowser	1.5 tonnes	Cube	4No. lifting points	Central to tank	4 leg chain
Generator, compressor, power-pack etc	3.5 tonnes	Steel box	Lifting Points (on top)	Central	Nylon slings or single chain
Welfare cabins and containers. [Hiab lift only]	7 tonnes	3m x 6m cabin or container	Lifting points Ensure container loads are evenly distributed and secure	Central	4 leg chains

Equipment to be used for the Lift	**1) Excavator**
Make, Model, Attachments, Test Certificates, etc	Excavator supplied by Higgins Construction . It is their responsibility for Checking all Documentation before releasing it to work to Rock and Alluvium

Equipment to be used for the Lift	**2) Hi-ab (Lorry Loader – Max boom length 12.5m)**
Make, Model, Attachments, Test Certificates, etc	Hi-abs supplied by Haulage Contractor (normally Hallet Silberman) who is responsible for Checking all equipment and documentation before releasing it to work to Rock and Alluvium
	See Above, depending on Rig Capacity

Equipment to be used for the Lift	**3) Piling Rig Auxiliary Hoist**
Note: The ancillary winch on the Piling Rig is designed to assist in "normal piling operations", including assembling and de-rigging the auger string and lifting rebar cages into the bore. The manufacturer's operational capacity of the winch is as follows: CM50 = 2.7t; CM70 = 4.1t; R312 = 3.2t. It is not designed for general craneage duties. (*Ancillary rope capacities for CM50/R312 = 25.6t and CM70 = 30.8t)*; ***R&A limit operational capacities to a maximum of 1 (one) tonne.***	
Date of Last inspection:	See LOLER Book / GT Form.
Date of Last Examination	Covered by Rig Annual Examination; Certification is retained by the Rig Operator or available from the Plant Yard. [01708 862121]
Max Safe Working Load (tonnes)	The manufacturer's operational capacity of the winch is as follows: CM50 = 2.7t; CM70 = 4.1t; R312 = 3.2t. ***R&A limit operational capacities to a maximum of 1 (one) tonne.***

Hazards Identified / Known on Site
Refer to General Risk Assessment (HS&E-FRM-H03-03)
Note: **Unloading of Lorries /where crash mats are required for unloading lorry's Higgins Construction to supply.** Attach chains to load from ground where possible. Access to lorry bed by footed or fixed ladder All R&A Piling equipment to be delivered on lorries fitted with handrails and rebar to be pre-slung in 1tonne (Max) bundles.

Operator Competence
Excavator Driver: The competence of the driver supplied by Higgins Construction or his subcontractor will be checked by Higgins Construction prior to releasing the operative to attend Rock and Alluvium
Hi-ab Operator. The Haulage Contractor (normally Hallett Silberman) is responsible to ensure the driver supplied is competent to operate the hi-ab on his machine.
Rig Driver. The Rig Driver will be a holder of a CPCS or CSCS (Piling Operations) card. The card will be available from the driver
Slinger Signaller: All the site crew involved in slinging and signalling operation will be holders of a CSCS Slinger/Signaller Card, which will be presented on request.

Site Address: Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD			
Subject: CFA Piling	**Doc Ref: MS 01**	**Date: 02/05/2014**	**Contract No: 13_0335**

Scope of the Job	CFA Piling
Site Address	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**
Date(s) to be carried out	As Agreed
The risks of the work are:	Refer to Full Risk Assessment and COSHH Assessments HS&E-FRM-H03-03 and HS&E-FRM-H02-02
Personnel No. **Competency level / qualification**	Rig Driver/Foreman Pump Operator Piling Operatives (1or 2) CPCS / CSCS
Plant, equipment and material required	CFA Piling Rig Concrete Pump Concrete Agitator Air Compressor Ancillary plant as required Access Platform
Safe means of access and egress	Provided by Higgins Construction

	***Key:** R = Review, I = Inspect, H = Hold*	**Inspection**	**Responsible**
1	**Shift Commencement**		
1.1	The pump operator lubricates the concrete pump and pumping line		Pumpman
1.2	The foreman checks drawing and design and starts data input into the pile monitoring computer	R	Foreman
2	**Set Up and Boring**		
2.1	The auger set up over pile pin position by the rig operator, guided by the banksman who needs to check from the front and side of the rig. Reference pins are set up in two directions at right angles using the spacing bar.		Banksman
2.2	The concrete discharge flap at the auger tip is closed by one of the following means: • The flap at the tip of the auger is closed and secured using a short length of rope or similar material. The banksman then stands clear and signals the rig driver to lower the tip of the auger to ground level, then signals the rig driver that he can proceed with drilling. or • The flap is held in the closed position by the banksman using a rod longer than 1m in length. The banksman must remain within clear view of the rig driver. The banksman signals the rig driver to lower the auger until the flap is held closed by the ground. He then withdraws the rod and stands clear and then signals the rig driver that he can proceed with drilling. *Note: Side exit flights require disposable bungs.*		Banksman
2.3	When the foreman is satisfied all is in order, he will commence auguring to the required depth. During boring, the gates are kept in the closed position until the auger advances into the natural ground or a minimum of 3m depth. Before the gates are open, the offset markers are used to check the pile position		Rig Driver / Banksman

2.4	One banksman is to be on duty in front of the rig at all time that it is working to ensure that all is in order and other personnel are kept clear.		
2.5	If obstructions are encountered, piling will be suspended and the procedure for obstructions followed (see Section 21 of main M/S).		Foreman
3	**Concreting**		
3.1	At the target depth, the auger is rotated to allow spoil to rise and the auger is lifted a maximum of 150mm to allow concrete to exit (depending on ground conditions and auger type)	I	Rig Driver
3.2	The concrete pump is operated to supply concrete through the delivery hoses and down the auger central stem to form the pile as the auger is withdrawn. Once over-pressure is noted by the rig operator, the auger is lifted, slowly at first.		Pumpman
3.3	The concrete pressure, flow rate and overbreak percentage is monitored throughout the pile construction operation by the rig instrumentation.		Rig Driver
3.4	During withdrawal of the flight the operator operates the mechanical auger cleaner. The piling team are to ensure that the working area is kept clear of unauthorised personnel. On certain *exceptional* occasions the piling gang will be required to manually clear the auger flight of all spoil to prevent this going above head height. This will be under the direct control of the piling foreman and / or banksman who ensure that the auger is not rotated when it is being lifted		Banksman
3.5	As the auger reaches the surface pumping will cease		Rig Driver / Pumpman
3.6	In the event of a tip blockage (that is a blockage experienced at the commencement of the concreting phase) the rig operator will back screw the auger out of the pile in a controlled manner, thus ensuring that as much spoil is replaced as possible into the bore. Higgins Construction will be informed in the event that this occurs.	H	Foreman / Rig Driver / Banksman
3.7	The rig operator will be directed by the banksman onto the next pile position		Banksman
4	**Reinforcement Insertion**		
4.1	The attendant excavator will clear the spoil and concrete slurry from the pile position to a stockpile for disposal		Banksman
4.2	The pile head will be located by the piling crew and a small amount of concrete dug out to define the pile position. The reinforcement cage is then either manually lifted into position, or lowered by the excavator or the rig service line into the wet concrete and pushed down by stepping on the helical binder. Should the reinforcement cage not enter the concrete by this means, the excavator will be used to press it into the wet concrete. The banksman will check the reinforcement cage on completion to ensure it is central in the pile. All reinforcement cages will be fitted with spacers (standard 150mm) to ensure correct concrete cover (standard 75mm).	I	Banksman
4.3	Any reinforcing bars that project above the piling platform are to have yellow plastic protective caps fitted by the Rock & Alluvium operatives to protect against stab, puncture and trip hazards. **Note:** Cages to be installed flush with ground level unless instructed by Higgins Construction after notifying them of the risks i.e. cage/pile damage, trip hazard and restricts movement.		Banksman
4.4	The piling rig then sets up onto a new position with the aid of the banksman and the process is repeated.		Banksman
5	**Sequencing**		
5.1	Works to be sequenced so that it minimises the need for site traffic to cross the concrete hose. A crossover point must be available by either burying the	I	Foreman

	hose or by use of half sleepers on each side of the hose at the dedicated crossing point, thus minimising damage to concrete delivery hoses.		

Site Address: Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD		
Subject: Steel-fixing reinforcement cages	**Doc Ref: MS 02**	**Contract No. 13_0335**

Scope of the Job	Steel fixing
Site Address	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**
Date(s) to be carried out	Refer to Technical Package
The risks of the work are:	Refer to Full Risk Assessment and COSHH Assessments HS&E-FRM-H03-03 and HS&E-FRM-H02-02
Personnel No. Competency level / qualification	Steel fixers (1-3 as appropriate)
Plant, equipment and material required	Steel fixing stands Tying wire
Safe means of access and egress	Provided by Higgins Construction

	***Key:** R = Review, I = Inspect, H = Hold*	**Inspection**	**Responsible**
1	**Purchasing**		
1.1	All reinforcement to be supplied by a CARES approved supplier, on the approved suppliers list.		Buyer
2	**Fixing Area**		
2.1	Higgins Construction shall set aside a suitable area for the assembly of reinforcement cages, together with an adjacent area for storage of reinforcement bars, helical and completed cages. This area needs to be physically segregated from traffic by fencing or similar, to avoid danger to steel fixers or damage to cages.		
3	**Cage Fixing**		
3.1	The Leading Steel fixer is to be given details of the Cages required		Foreman
3.2	The bars and helical will be assembled into cages using purpose made stands onto which bars are loaded to give stability. As each cage is completed it is removed from the assembly stands either by hand in the case of lightweight cages or by crane/excavator for heavier cages.		Steel fixer
3.3	After fabrication, the cages are to be stored on timbers or clean hardcore to avoid contamination by soil	H	Steel fixer
3.4	Heavyweight cages need to have strengthened lifting points to enable them to be moved and lifted safely. This will normally consist of three turns of helical securely wired or welded to each main bar. **Note:** *Heavy weight cages will generally be prefabricated and delivered to site.*		Steel fixer
3.5	Attendant excavator to be utilised to move cages from steel storage area to piling rig; reinforcement will be installed in accordance with Method Statement 1: Part 4.		Banks men / Steel fixer

Site Address: Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD		
Subject: Sampling and Testing Concrete	**Date: MS 03**	**Contract No. 13_0335**

Scope of the Job	Sampling and testing concrete
Site Address	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**
Date(s) to be carried out	Refer to Technical Package
The risks of the work are:	Refer to Full Risk Assessment and COSHH Assessments HS&E-FRM-H03-03 and HS&E-FRM-H02-02
Personnel No. **Competency level / qualification**	Carried out by Concrete pump operator
Plant, equipment and material required	Sampling scoop Concrete cube moulds Tamping bar Trowel Curing tank Mould oil Power supply
Safe means of access and egress	Provided by Higgins Construction

	***Key:** R = Review, I = Inspect, H = Hold*	**Inspection**	**Responsible**
1	**Checking the Load**		
1.1	The Foreman will be informed of the Concrete mix in the Technical pack handed over at site start-up.		Supervisor
1.2	This information will be briefed to the Pump Operator.		Foreman
1.3	When a mixer truck arrives on site, the pump operator will check the delivery ticket prior to discharge to ensure the mix is as specified.	R (Delivery Ticket)	Pump Operator
1.4	Random trucks may have the slump checked.		Foreman
2	**Sampling**		
2.1	Concrete from the beginning and end of the load should not be used; only the middle half is to be sampled. Take scoops at regular intervals into a clean bucket.		Cube maker
3	**Cube Making**		
3.1	Check the cube moulds for damage or out of square. Ensure they are oiled to prevent adhesion.	I	Cube maker
3.2	Fill the 100mm mould in two equal layers, tamping each 25 times, starting in a corner and working your way into the centre **Note:** *A 150mm mould needs 35 tamps for each of two layers*		Cube maker
3.3	Remove surplus concrete with float and smooth off.		Cube maker
3.4	Seal the top of the mould with plastic or a wet cloth to prevent drying out.		Cube maker
3.5	Ensure the cubes are protected from frost damage overnight in the winter as this will destroy the strength. Frost damaged cubes should be discarded.	I	Cube maker
4	**Storage of Cubes**		
4.1	Strip the mould carefully, tapping gently to break the bond. Take care with blended concrete as it may still be weak the following day.		Cube maker

4.2	Mark the cube with the Contract no, Pile no and date cast, recording this also on the dispatch note. **Generally:** *1No to be tested at 7days, 2No at 28days and 1No to be kept as 'spare' (to be tested at 56days if 28day results are low).*		Cube maker
4.3	Place the cubes in the tank where they must be kept wet and warm, Between 18°C & 22°C as Standards dictate.		Cube maker
4.4	Higgins Construction will need to supply 24hr electric power at all times, especially during cold months, for our concrete cubes to cure correctly. **NOTE**: Rock & Alluvium will not guarantee cube results if there is no 24hr power supply and curing conditions are unsuitable.		Higgins Construction
5	**Dispatch**		
5.1	Cubes shall be dispatched for testing regularly and not allowed to accumulate on site. If no cubes have been collected within 1 week, Foreman can contact ESG on 01895 235235, quoting contract number and site address; generally 2No collections per week are allocated per contract.	R (Dispatch Note)	Foreman

Method Statement for blowing out CFA Piling Rig	HS&E-RA-H03-10
	Rev 01
Reviewed by Mark Gibson (Operations Manager)	26-01-11

Resource Schedule			
Plant	**Equipment**	**Manpower**	**Materials**
Compressor	Blow out cannon Sponge Ball Blow out Shield Tarpaulin	1) Banksman & Foreman / Banksman	Water

All Operatives involved in the blowing out procedure must be wearing suitable PPE including eye protection

1.0	**Where to blow out** 1.1 The piling rig should be positioned in a suitable location facing away from the site boundary; walkways; site entrance; cabins; site huts; other plant. The rig supervisor is to risk assess this location to ensure it is suitable and poses no risks. Where possible a suitable designated blow-out area is to be agreed on site. 1.2 If the only option is to blow out facing the site hoarding then the rig is to be positioned as far away as possible and the foreman is to ensure that the site boundary access is suitably protected (i.e. not heras fencing) 1.3 The rig foreman or supervisor is to contact the site manager to ensure that site access and site boundaries are suitably protected and to ensure a safe work area is provided.
2.0	**Preparation before blowing out** 2.1 Upon completion of the last pile of the day shift, any excess concrete held in the agitator / concrete lorry will be pumped through to the piling rig. 2.2 The pump operator will then back pump the final hopper full of concrete to relieve pressure in the concrete hose. 2.3 A wet sponge blow out ball will be placed into the concrete hose at the pump which has just been disconnected. 2.4 A blow out cannon is then connected to the hose and then in turn connected to the compressor. 2.5 The blow out shield is to be placed around the auger base snugly and fixed to the ground with steel pins. The auger above the shield is wrapped with tarpaulin to prevent splashes from grout materials when the sponge ball exits the auger end.

	Blowing Out Shield: 
3.0	**When blowing out** 3.1 The foreman / banksman is to be located at the piling rig. The pump operator is to be located at the compressor next to the blow out cannon. 3.2 A clear line of sight is required and must be maintained for communication between the pump operator and the site personnel attending the rig. 3.3 The compressor is to be started and the air is gradually released to the blow out cannon. The blow out cannon valve is then released to move the concrete along the concrete hose 3.4 The air pressure is to be controlled by the pump operator to allow the sponge ball to exit the auger tip in a controlled way. 3.5 The concrete hose is to be monitored by the banksman / foreman and when the concrete has passed through the last host in the line, the foreman / banksman will signal the pump operator to turn off the air supply to the blow out cannon. 3.6 When the piling rig drop hose lifts and moves, the foreman is to signal the pump operator at the compressor and blow out cannon to release the remaining air in the concrete hose through the blow out cannon release valve, maintaining enough pressure to allow the sponge ball to pass through the auger and exit the tip. Any splashing / debris will be contained by the blow out shield. 3.7 The concrete hoses and augers will now be empty of concrete. 3.8 The foreman / banksman will communicate to the pump operator that the blowing out procedure is complaint.
4.0	**After completion of blowing out** 4.1 The blow out cannon is to be disconnected from the concrete hose. 4.2 Two or three buckets of water are to be poured into the open end of the concrete hose followed by a wet sponge ball. 4.3 Repeat Step **3.0** once. 4.4 Disconnect the blow out cannon from the concrete hose 4.5 Unpin and remove the blow out shield from the front of the auger, remove the tarpaulin and retrieve the sponge blow out balls. 4.6 Wash down all equipment.

Pile Load Testing and Integrity Testing

Guidance for Higgins Construction

1 Pile Load Testing

Introduction

The piling work on this site may include one or more pile load tests. These tests can be one of two types:

- **Preliminary Tests**: This is a test carried out in advance of the main piling work. The pile is usually tested until it fails and the results are used to refine the design of the subsequent working piles. If a test can be left for a long period of time (4-5 weeks) better results will be obtained.

- **Working Pile Test**: This is a test on a working pile and the test load is usually limited to 50% over the design load to avoid overstressing the pile or ground. This test is to check that the piles are capable of bearing the loads imposed on them. It is not intended as a check on workmanship, but on design.

The piles and anchorages for the test will be installed by Rock and Alluvium Ltd. The loading test will be carried out by a specialist subcontractor from our Approved List. After installation, the piles are left for a minimum period of 14 days or longer to enable the concrete to gain sufficient strength (minimum period subject to 7 day cube results).

Pile Protection between Installation and Testing

Between installation and testing, the test pile and anchors must be protected from damage and interference, specifically:

- The anchor piles are reinforced with “Dywidag bars” which protrude from the piles to allow connection to the test beams. The bars are formed from high grade steel which can be damaged by heat or bending. The test area must therefore be **barriered off** from plant movement and no hot work allowed in the vicinity. In the unfortunate event of a bar being bent, it must never be straightened, but we should be informed so we can re-end the bar.
- No excavations must take place around the anchors as these have been designed assuming ground level remains undisturbed. Excavations or loosening of the ground can cause the anchors to pull out, stopping the test. A repeat test will severely disrupt your program

Pile Test

The test contractor will need road access from the public road to the test location for his lorry which contains his test beams and data-logging cabin. The lorry needs to be able to park adjacent to the test pile to enable the data cables run from the data cabin to the test assembly without interference. The lorry will also need to be able to park a safe distance from the pile test assembly under load.

The area around the test must be made suitable for the technician to safely work, i.e. levelled, hard-cored and without trip hazards or excavations.

During the test, the area about 2m from the beam will need to have a barrier around it. This zone becomes a no-go area for all personnel, except those directly involved with the testing procedure.

During the test, no work that could cause vibration should be carried out adjacent to the test as the settlement of the pile under load is measured by accurate electronic instrumentation that is easily disrupted.

Higgins Construction can usually mitigate the disruptive effects of complying with the above requirements by careful selection of the pile(s) to be tested.

Overnight Unmanned - Static Pile Load Testing

The Engineer's Specification for the load testing requires the load to be maintained with measurements taken continuously from the commencement through to the completion of the test; over a period of approximately 19 hours for a working test pile and a period of approximately 27 hours for a Preliminary or Expendable test pile. This will invariably mean that automatic monitoring will continue overnight. This type of testing is monitored remotely at our Sub-Contractors office. Should any problems arise during out of hours an alarm will notify the office and the test will be terminated.

All relevant Method Statements and Risk Assessments shall be issued to Higgins Construction prior to mobilisation of the testing Sub-Contractor.

2 Integrity Testing

It is normal practice to carry out a test on the integrity of the piles after they have been trimmed to cut-off level. To enable this test to be carried out, Higgins Construction needs to note:

- The pile need to be trimmed down to cut-off level.
- A safe access needs to be provided for the test technician to gain access to the head of each pile.
- The pile cap/ground beam excavations must be clear of any standing water.
- The pile cap or ground beam reinforcement must not be in place.
- Although a thin layer of blinding can be in place around the pile, it must neither cover the pile nor be greater than 75mm thick.

Three working days notice is required to book the testing technician.

R&A contact for Sonic Integrity Testing: Fiona Cheesman (01372 389333)

Appendix 6
Inspection and Test Plan
CFA Piling

Key: W – Work available to be witnessed; **R** – Review Documents; **I** – Implement Test or Inspection; **A** – Approval Granted

No	Construction Stage	Spec / Standard Ref	Inspection or Test	Acceptance criteria	Frequency	Person Responsible	Type of Record (if any)	R&A Inspection	Remarks
A	**Preliminary**								
A1	Subcontractor approval	BS 4449 BS EN206 / BS8500	Check approved subcontractors and suppliers list	On list	Prior to commencement	Buyer	Correspondence	R	
A2	Steelfixing s/c start up	*None*	Check operatives competency	CPCS/CSCS Card	Prior to commencement	Foreman	Inspect	R	
A3	Approval of material suppliers	*PR-SUB-700*	Check approved subcontractors and suppliers list	On list	Prior to commencement	Buyer	Correspondence and Certificates	R	Steel to be from CARES Approved Supplier; Concrete to be from QSRMC Approved Depot
A4	Approval of testing laboratory	ICE B19.8	UKAS Accredited	On list	Prior to commencement	Buyer	Correspondence and Certificates	R	Test Lab to be UKAS Registered
A5	Concrete mix	Contract Spec / ICE B19.3	Inspect test results	Clients Engineer to not disapprove	Prior to commencement of main works	Buyer	Cube test result		Mix Design to be Approved Prior to Commencing the Works
B	**Site Start up**								
B1	Check for services and utilities	*None*	Check Service Drawings and Scan Area	Permit to Work to be received from P/C	Prior to commencement	Principal Contractor / Client	Permit to work / dig	R	PC/Client to issue Permit to Work
B2	Platform	FPS Guidance Notes	Check Platform has been Constructed Correctly for Relevant Plant	Firm and Level and Designed to withstand bearing pressures of rig - provided	Daily informal Inspection	R & A Foreman	Working Platform Certificate	R	Piling Platform to be Designed and Installed correctly and Working Platform Certificate must be signed prior to commencing work
B3	Setting out	ICE B1.8.1	Engineering check	Within +/-10mm, tagged with pile no.	Each pile	Engineer / Surveyor	As-built survey / Surveying book	A	Calibration Certificate for Instrument to be obtained
C	**Site Construction**								

No	Construction Stage	Spec / Standard Ref	Inspection or Test	Acceptance criteria	Frequency	Person Responsible	Type of Record (if any)	R&A Inspection	Remarks
C1	Positioning rig	ICE B1.8	Check verticality and position of rig mast	Mast Vertical in both Axes, Verticality 1:75, position +/- 75mm.	Each pile	Front Man		I	Position and verticality to be corrected until within tolerance
C2	Sequence of work	ICE B1.13.3	Ensuring not boring near a recently cast pile	No damage to adjacent piles	Each structure / part of structure	Foreman		I	Nearby piles to be monitored during pile construction.
C3	Pile Positioning	ICE B1.8	Check Auger Position *with use of reference pegs*	Within 25mm	Each Pile	Banksman		R	Position to be corrected until within tolerance.
C4	Depth at toe	ICE B4.4.1, B4.4.4 & B4.5.1	Pile depth to be checked at completion of boring *with rig instrumentation*	Toe level to be at or below target depth	Each pile	Rig Driver	Pile Log / Electronic Rig Printout	I	Checked against pile schedule
C5	Concrete delivery	ICE B19.5	Check delivery ticket before acceptance.	Correct mix	Each delivery	Pump man	Delivery Ticket	R	If nonconforming reject
C6	Workability	ICE B4.4.5.1	Visual inspection *(Flow/slump tests can be carried out upon request by supplier)*	BS 8500-1 table B.1 (180mm +/- 30mm)	Each delivery	Pump Man *(Contract Supervisor to arrange testing)*		I	If nonconforming reject
C7	Delivery or Assembly of pile cages	ICE B19.9	Visual inspection	Steel not excessively rusted. Cage sturdily constructed	Each batch	RA Foreman	Delivery Ticket	I	Cages checked against Technical Package / Cage Drawings
C8	Cage type	*None*	Dimensional check, length, bar diameter, no bars	Compliance with Technical Package /Cage Drawings	Each cage	Banksman		I	Check pile schedule
C9	Spacers / cage formers	ICE B19.9.4	Visual inspection	min 4 no every 4m	Each cage	Front man		I	If possible use 1No spacer per vertical bar and additional spacers at the top
C10	Cage installation	ICE B4.4.7, B9.4.4 & B10.4.4	Check cage has been installed at the correct level (PPL) and is centralised.	+150/-50mm	Each pile	R & A Foreman	Pile Log	I	Check pile schedules, cages placed to Ground level (PPL critical)
D	**Concrete Sampling and Testing**								
D1	Strength	ICE B19.2, B19.8.3 (BS EN12390 Part 2)	Concrete to be sampled and four cubes made	BS EN12390 (Part 2)	As Per SPERW (2007)	Cube maker		W	
D2		ICE B19.2, B19.8.3 (BS EN12390 Part 2)	Cubes stripped from moulds, labelled and stored in heated (20^{o}C +/- 2^{o}C) cube tank	BS EN12390 (Part 2)	Daily	Cube maker	Dispatch paperwork		Cubes to be collected promptly and not allowed to accumulate

No	Construction Stage	Spec / Standard Ref	Inspection or Test	Acceptance criteria	Frequency	Person Responsible	Type of Record (if any)	R&A Inspection	Remarks
E	**Instrumentation**								
E1	Depth Indicator	ICE B4.4.9	Manual check with tape, and/or check against mast increments	At full auger length +/- 100mm	Start of each contract	Foreman		I	
E2	Concrete Flow	ICE B4.4.9	Pass a known volume through the system	+/- 5%	Once during contract	Foreman		I	
E3	Instrumentation - failure	ICE B4.4.9	In case of Instrument failure, pile to be completed if concreting has commenced, otherwise aborted and auger backscrewed out of ground. Supervisor to be contacted and instructions sought		Every instrument breakdown	R & A Foreman		I/S	Pile construction not to commence if electronic instrumentation is not working
F	**Post Construction**								
F1	All piles cast	Drawings and Pile Schedule	Check all piles have been constructed	Drawing/Schedule	End of piling	Foreman	Note in diary and on pile logs		
F2	Post Construction Survey	Pile Layout drawing	Resurvey of pile positions	Within Tolerance (normally 75mm)	Once piles have been exposed	Principal Contractor	As built Schedule		Copy to be sent to Client for O&M Manual
F3	After piles trimmed	*None*	Integrity Testing *(as per NDT procedure)*	No defects	Each pile	Contracts Coordinator	Integrity Test Report		Copy to be sent to Client for O&M Manual
G	**Test Pile and Anchor Construction**								
G1	Anchor Construction	Anchor Layout Drawing	Piles to be constructed to correct depth. Correct, cage, tension bars and Dwyidag bars to be installed	As per layout drawing and technical pack	Each Pile	Foreman			Anchor and test piles to be left a minimum of 14 days before loading. This may be superseded by the strength requirement
H	**Screw Jointed Bars**								
H1	Use of screw jointed anchor bars	R&A Procedure MS-011	Bar joint to be inspected for tightness *using Torque Wrench*	Torque Wrench	Each bar joint	Banksman		I	

Roles and Responsibilities

Names of Role holders given in Labour Allocation List

Supervisor

Site Induction
Site Document Control (Pile Drawing and Schedule)
Ensure rebar is delivered for fixers.
Design Verification on first pile
Ensure Welfare facilities comply with Regulations (summary on page 5)
Ensure 24hr power is available for welfare and cube tank.

Foreman

Ensure Platform Certificate and Permit to Work is in Place.
Liaison with Higgins Construction .
Planning Work Sequence.
Ordering Concrete Deliveries.
Office Returns.

- Pile Logs
- Weekly diary
- Timesheet
- LOLER and PUWER Reports
- CVI's

Liaising with Plant Manager regarding Repairs and Maintenance.
Signing CPCS Logbooks.
Daily Liaison with Supervisor.
Manage Workforce.

Pumpman

Routine Maintenance of Pump, Agitator, Compressor and Lighting set.
Check Concrete tickets before acceptance.
Concrete Sampling and Cube Making.

Banksman

Ensure concrete hoses are kept from trafficked areas.
Ensure cages are properly stored.
Ensure correct cage is inserted.
Ensure spacers and mushrooms are fitted.

Business Unit:	Rock and Alluvium	Contract Number:	**13_0335**
Contract Name:	**Bourne Estate, Portpool Lane, Holborn, London, EC1N 7SD**		
Briefing Type:	Risk Assessment / *Method Statement / *Toolbox Talk *(*Delete as Required)*		
Other *(Please State)*:			
Briefing Title(s) / Reference(s):			
Briefing Delivered By:			

Name	Date & Start Time	Piling Crew	Sub-Con.	Other *(Please Specify eg Company Name)*	Signature

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Name	Date & Start Time	Piling Crew	Sub-Con.	Other *(Please Specify eg Company Name)*	Signature