

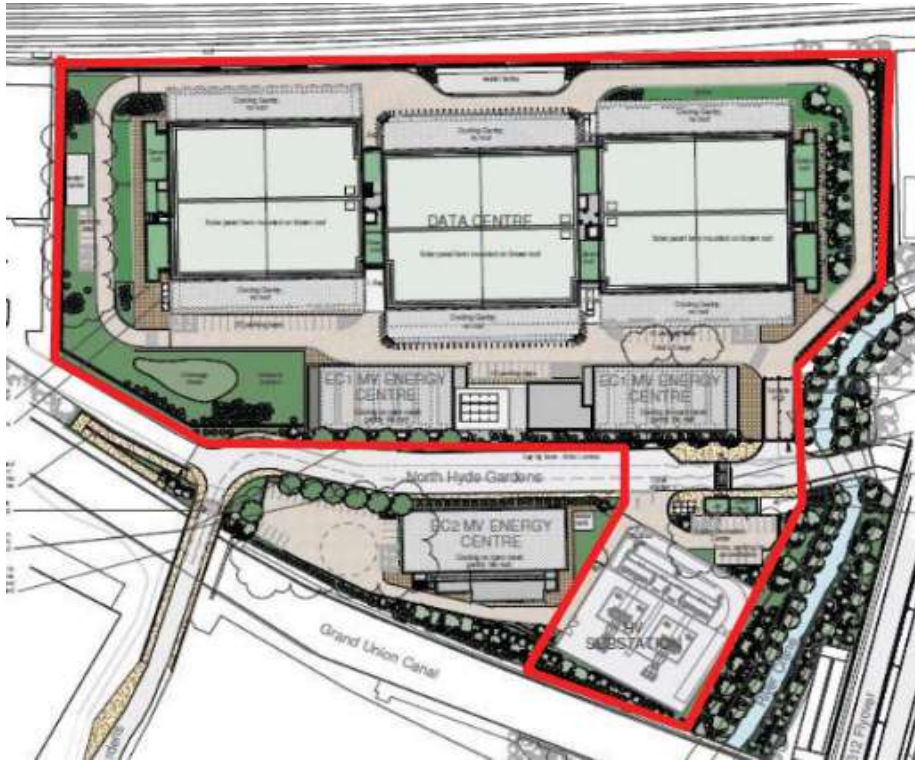
Piling Works Risk Assessment

Former British Airways and Vodafone Plots,
North Hyde Gardens,
Hayes,
UB3 4QQ

A REPORT PREPARED FOR AND ON BEHALF OF:
Ark Data Centres Limited

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PILING WORKS RISK ASSESSMENT

CLIENT NAME: Ark Data Centres Limited

PROPERTY ADDRESS: Former British Airways and Vodafone Plots,
North Hyde Gardens,
Hayes,
UB3 4QQ

INSPECTION DATE: N/A



1.0 INSTRUCTION AND SCOPE OF WORKS

- 1.1** Paragon Building Consultancy Limited (Paragon) was instructed by Concert on behalf of Ark Data Centres Limited on 12 February 2021 to complete a Piling Works Risk Assessment (PWRA) for a site referred to as Former British Airways and Vodafone Plots, North Hyde Gardens, Hayes, UB3 4QQ. The purpose of the PWRA is to consider six pollution scenarios identified for piling operations by the Environment Agency. These are in relation to the site specific ground conditions encountered and the final piling solution to be adopted. The pollution scenarios are as follows:
1. Creation of preferential pathways through a low permeability layer (aquitard) to allow potential contamination to an underlying aquifer;
 2. Creation of preferential pathways through a low permeability surface layer to allow either upward migration of landfill gas, soil gas or contaminant vapours to the surface or infiltration of surface water thereby causing leachates in contaminated soils;
 3. Direct contact of site workers and others with contaminated soil arisings which have been brought to the surface;
 4. Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of pile materials (where the secondary effects are to increase the potential for contaminant migration);
 5. The driving of solid contaminants down into an aquifer during pile driving; and
 6. Contamination of groundwater and, subsequently, surface waters by concrete, cement paste or grout.
- 1.2** This assessment has been completed in connection with redevelopment of the site with a data centre with MV energy centre on the former British Airways (BA) plot and a substation on the former Vodafone plot.

1.3	This report has been prepared to meet the requirements of the Environment Agency. Reference has been made to the Environment Agency’s guidance ‘Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention (2001)’, EA’s Guide Piling into Contaminated Sites (2002) and ‘Piling in Layered Ground: risks to groundwater and archaeology – Science Report SC020074/SR’.
1.4	Due regard to the following is made in preparation of the PWRA: <ul style="list-style-type: none"> • Water Resources Act 1991; • Groundwater Regulations 1998 (amended January 2009); • National Planning Policy Framework (NPPF); and • EU Water Framework Directive (WFD).
1.5	The requirements of the Remediation Strategy have also been considered.

2.0 INTRODUCTION

2.1	Site Location and Description
2.1.1	The site is located at Bulls Bridge Industrial Estate, North Hyde Gardens, Hayes, UB3 4QQ.
2.1.2	The wider industrial estate comprises five main parcels of land that are referred to throughout this report as: Vodafone, British Airways (BA), Abellio, Addison Lee and Conway (Maintenance Yard). Neither the FM Conway nor Addison Lee plots are subject to this application. The access road: North Hyde Gardens is also within the wider site’s demise. This Piling Works Risk Assessment only refers to the Vodafone and BA plots.
2.2	Proposed Development
2.2.1	The development proposals for the application (BA and Vodafone plots only) include site clearance and preparation, including the demolition of remaining buildings, and the redevelopment of the site to provide: a new data centre, MV Energy Centre (including stand-by generation plant and gas storage), a HV Sub-Station, a visitor reception centre, plant, the creation of a new footpath and cycleway link to the canal towpath, works to the highway, car parking, cycle parking, associated infrastructure, enclosures and necessary physical security systems, hard and soft landscaping (including works to the River Crane) and ancillary uses, as well as associated external works.
2.2.2	A preliminary drawing of the data centre has been provided by the client for guidance, however we understand this may be subject to change. The proposed layout is shown in Appendix 1.
2.3	Planning Condition
2.3.1	This document has been prepared to support the planning application ref. 75111/APP/2020/1955 and discharge of pre-commencement condition 32 for Piling Method Statements.

2.3.2 Condition 32 states:

“No piling shall take place until a Piling Method Statement (detailing the depth and type of piling to be undertaken and the methodology by which such piling will be carried out, including measures to prevent and minimise the potential for damage to subsurface sewerage infrastructure, and the programme for the works) has been submitted to and approved in writing by the local planning authority in consultation with Thames Water, the Environment Agency, Network Rail and the National Grid. Any piling must be undertaken in accordance with the terms of the approved piling method statement”.

2.4 Previous Reports

2.4.1 The following reports have been used to provide supporting information for this document; all of the reports are referenced for the site address Bulls Bridge, North Hyde Gardens, Hayes, UB3 4QQ:

- Paragon (2019) Phase 1 Preliminary Risk Assessment, ref 19.0633/CB/NW dated 29 August 2019 – Rev C, Revised December 2020 (for planning purposes).
- Paragon (2020) Phase 2 Ground Investigation Report, ref 20.0023, dated 6 March 2020 – Rev C, Revised December 2020.
- Paragon (2020) Detailed Quantitative Risk Assessment (DQRA), ref 20.0023/CK/KJH dated 10 July 2020 – Rev B, Revised December 2020.
- Paragon (2020) Remediation Strategy, ref 20.0023/CK/DCN dated 17 March 2020 – Rev C, Revised December 2020.

3.0 BACKGROUND INFORMATION

3.1 Summary of Previous Reports

3.1.1 The following information is summarised from the earlier reports listed above. The full documents should be read in conjunction with this report.

3.2 General Description and Current Site Use

3.2.1 The site is centred around National Grid Reference 510423, 179309 and is approximately 6.8Ha. The approximate elevation of the site is 31m Above Ordnance Datum (mAOD). The Phase 2 investigation by Paragon included drilling boreholes within the Vodafone and BA plots. A summary of each parcel of land is described below.

Table 1. Occupant Descriptions

Occupant	Brief description of site activities
Vodafone	At the time of the Phase 2 investigation the plot comprised a detached office block arranged over three floors with a reception atrium at ground floor and a roof terrace at 3rd floor level. The plot had a car park with bin store and diesel powered backup generator. The building on the Vodafone plot was demolished in 2020 and the generator has been removed.
British Airways	The former BA building was demolished in 2019 and the plot currently forms an area of open land.

3.2.2	The River Crane (also known as the Yeading Brook) runs adjacent to the east of the BA and Vodafone plots. The river is situated within the wider site boundary, along the southeast boundary and north through the northeast part of the site (Conway's plot). The Grand Union Canal is a manmade canal, situated 5m to the south of the Vodafone plot.
3.3	Historical Land Use
3.3.1	The earliest available map from 1865 shows the site as mostly vacant with a river running north to south along the eastern part of the site. This map also shows a railway and creosoting works in the northeast corner. Excavations and ground workings were noted from 1910. By 1932, the creosoting works had extended onto the site and a building was shown in the centre. The creosoting works were no longer shown by 1973 and a power station with chimney was shown in the western part of the site by 1983. By 2002, the power station was no longer shown and the British Airways building were shown. The Vodafone building was shown by 2010. A review of planning applications indicate that no environmentally significant conditions were attached to the application to redevelop the site in 1998.
3.3.2	The surrounding area has supported various industrial (potentially contaminative) land uses, including factories, brick fields, mills, railway, electricity substation, creosoting works, and rubber works.
3.3.3	Historical landfilling has been identified on site and east of the River Crane/Yeading Brook since 1936 and records indicate the landfill accepted commercial waste. In addition, the British Geological Survey (BGS) artificial ground mapping covers the entire site.
3.4	Geology
3.4.1	From a review of BGS mapping (map sheet numbers: 255, 256, 269, and 270), the geology of the subject site is reported to be formed of the Lynch Hill Gravel underlain by the London Clay Formation. The mapping also shows Artificial Ground, Langley Silt and Alluvium within 50m of the site. The Alluvium runs in the location of the river with deposits shown to be absent either side of the river. This is likely to be due to the slope on either bank. The Langley Silt may encroach onto the southern part of the site.
3.4.2	The BGS borehole records show a deep third-party borehole was drilled approximately 100m east of the site (Ref:TQ17NW114). The ground conditions are summarised as: Made Ground to 0.91m below ground level (bgl), over Loam and Gravel to 6.10mbgl, over London Clay to 62.79mbgl, over Reading Beds to 82.65mbgl, over Chalk to the base of the borehole at 152.40mbgl.
3.4.3	The surrounding area is known for being historically mined to extract the gravel. As such, there are many landfills and reservoirs in this area. It is therefore possible that the gravel deposits were largely extracted which allowed the landfilling to occur.
3.4.4	The ground conditions recorded during the Phase 2 Investigation are presented in Table 2 below. This investigation comprised eight boreholes drilled by sonic drilling methods to depths of between 10 and 35m below ground level (bgl).

Table 2. Ground Conditions

Depth From (min/max) (m)	Depth To (min/max) (m)	Soil Type	Description
0.0	0.1 / 0.05	Concrete / Tarmacadam	Concrete / Tarmacadam hardstanding
0.05 / 0.1	1.5 / 5.8	Made Ground	Variable Made Ground comprising soft to firm, dark brown, gravelly clay. Gravel is brick, suspected slag, clinker, timber fragment, concrete and mixed lithologies.
1.5 / 5.8	5.7 / 10.2	Gravel	Yellowish orange brown sandy GRAVEL. Gravel is sub-rounded to well-rounded fine to coarse mixed lithologies. Lynch Hill Gravel
5.7 / 10.2	Unproven	Clay	Firm to stiff silty CLAY. London Clay

3.4.5 The geology across the site comprised Made Ground beneath hardstanding that was a black, sandy gravel with brick, flint and clinker. The Made Ground was underlain by Alluvium, Langley Silt and Lynch Hill Gravels. The investigation did not encounter the London Clay, which is likely to be found at depths greater than 6m bgl. An area of peaty clay was identified in TP3 between 1.70m and 2.75m bgl, this may be part of an alluvial deposit or deposited within the landfill.

3.4.6 By reviewing the logs from various phases of investigation, the Made Ground has been found to vary significantly across the site. The desk study has indicated that the site was historically a landfill with industrial and commercial wastes being placed up to circa 1936. It is considered likely that the landfilling occurred as a result of gravel abstraction which was common place in the surrounding area. The deepest areas of Made Ground were identified within the west and southern parts of the site. In addition, buried obstructions were identified.

3.4.7 The Made Ground was predominantly underlain by Lynch Hill Gravel which was generally a granular material described as a grey, black, orange brown, sandy gravel. Sand was found to be coarse and gravel was angular to sub-rounded flint. However, in some areas cohesive deposits were encountered directly beneath the Made Ground. These were found in areas where shallow Made Ground was present and could have represented materials that were not economically viable to abstract. These cohesive deposits have also been interpreted as Lynch Hill Gravel and were generally described as a brown clayey gravel. Example exploratory holes of where the cohesive Lynch Hill Gravel was encountered include TP4, TP5 and WS02. Typically the granular lenses of the Lynch Hill Gravel were only around 1.8m thick on average.

3.4.8 Records indicate that the area in general has a moderate risk of subsidence hazards as a result of shrinking/swelling of underlying clay.

3.5	Hydrogeology
3.5.1	The Lynch Hill Gravel is classified as a Principal Aquifer of high permeability and the London Clay Formation is classified as an Unproductive Stratum. The previous investigation identified groundwater levels between 1.80mbgl and 4.90mbgl within the Made Ground and Lynch Hill Gravel and identified the direction of flow was generally towards the Yeading Brook/River Crane.
3.5.2	The only potentially significant pathway identified is groundwater flow in the shallow aquifer (Lynch Hill Gravel Member). However, the granular lenses of the Lynch Hill Gravel were only around 1.8m thick on average.
3.5.3	The London Clay was encountered at approximately 5.7m bgl at its shallowest and its base was not encountered (maximum drilled depth of 35m). The thickness of the London Clay is anticipated to be >50m based on third party boreholes obtained from BGS records.
3.5.4	The site is not situated within a Groundwater Source Protection Zone (SPZ).
3.5.5	There is one licensed groundwater abstraction within 1km of the subject site. This is located approximately 530m southeast of the site for evaporative cooling by Virtus Hayes Limited. No potable groundwater abstractions have been identified within 1km.
3.6	Hydrology
3.6.1	The River Crane/Yeading Brook runs southwards through the eastern part of the site. The Grand Union Canal is located 10m south of the site and runs eastwards. No surface water abstractions have been identified within 1km of the site.
3.6.2	The River Crane is considered to be the primary controlled waters receptor for the Bulls Bridge site. Based on site investigation data for the site, it is considered that the groundwater flowing beneath the site will discharge into the River Crane and not pass beyond it. This is on the basis that shallow groundwater levels monitored in boreholes in the vicinity of the River Crane are at a similar level to the river and are constrained from downward flow by the London Clay.
3.6.3	There are three discharge consents within 250m of the site. These relate to records approximately 10m north for miscellaneous discharge to land, 85m south and 95m south of the site from trade discharges to the River Crane/Yeading Brook.
3.7	Unexploded Ordnance (UXO)
3.7.1	Online information indicates that there were several bomb strikes recorded around the site during World War II. As such, a specialist assessment was undertaken by Brimstone Site Investigation Limited and comprised a Stage 2 Detailed UXO Risk Assessment (Dated: 3 July 2019, Ref DRA-19-1105) to identify constraints on the proposal. This has been reported separately and a summary is provided below.

3.7.2 The report reviewed the original London bomb plot maps covering the entire German bombing campaign. The data confirmed the wider study area was bombed on at least eight separate occasions, resulting in 29 large 'iron' bombs and one parachute mine within 500m of the site. One 'iron' bomb strike is located within the site boundary. In addition, no records were made for the first month of the 1940 Blitz and areas of soft landscaping would disguise entry points and be unobserved. As such, there is the potential for more unidentified bombs to be present.

3.7.3 The risk assessment within the report suggests that the construction of the power station may have required deep foundations, and as such UXO could have been encountered and removed. However, in other undeveloped areas of the site, buried German dropped bombs would likely remain in-situ.

3.7.4 The report concluded there was a low to moderate risk from UXO and recommended mitigation measures. The risk mitigation measures included UXO safety awareness briefings, onsite supervision during excavations in the southern part of the site and a magnetometer probe survey if piling is to be implemented.

3.8 Site Specific Soil and Groundwater Contamination

3.8.1 Geochemical testing was completed on samples collected from the Made Ground and natural strata during the investigations. A contaminant of concern layout plan included in Appendix 2 and a summary is presented below.

British Airways

3.8.2 Within the BA plot, the contaminants of concern included:

Table 3. Contaminants of Concern within the BA Plot

Contaminant Type	Contaminant	Location
Soil Contamination	Asbestos	WS3, TP6, WS6A, BH02, and TP201
Soil Vapour	Naphthalene	BH08
Contaminants within Leachate	Metals (Chromium (total), copper, lead, mercury) Polyaromatic hydrocarbons (PAH) (recorded as total PAH, naphthalene, and anthracene) Petroleum hydrocarbons (tested as total petroleum hydrocarbons).	TP208, BH08, BH07, and TP204
Groundwater Contamination	Metals (Copper, nickel) Total Phenols Polyaromatic hydrocarbons (PAH) (recorded as total PAH, anthracene and fluoranthene) Petroleum hydrocarbons (tested as total petroleum hydrocarbons).	WS5, BH08, BH07, and BH02
Groundwater (VOC)	VOC including: Benzene, toluene, ethylbenzene, p & m-Xylene, O-Xylene, isopropylbenzene, 1,3,5-Trimethylbenzene and 1,2,4-Trimethylbenzene.	BH08 and BH02

- 3.8.3 Vodafone
Within the Vodafone plot, the contaminants of concern included:

Table 4. Contaminants of Concern within the Vodafone Plot

Contaminant Type	Contaminant	Location
Soil Contamination	Asbestos	WS8
Groundwater Contamination	Metals (Nickel) Polyaromatic hydrocarbons (PAH) (recorded as total PAH)	WS7
Gas	Methane and carbon dioxide	WS7

3.9 Phase 2 Ground Investigation Summary

- 3.9.1 The soil and groundwater samples recovered from the boreholes were submitted for laboratory testing for a range of contaminants in line with the historical uses of the site and findings of the previous investigations.
- 3.9.2 The results identified asbestos fibres were present within the shallow Made Ground across the site. The extensive hardstanding mitigates risks to site users in the current site layout, however when construction commences and hardstanding is broken out there will be a potential release of fibres to air. As such, careful management of the soils will be required throughout the construction phase to mitigate risks to construction workers and off-site receptors.
- 3.9.3 The concentrations of Polycyclic Aromatic Hydrocarbons (PAH) and Total Petroleum Hydrocarbons (TPH) within the groundwater exceeded the Environmental Quality Standards (EQS), which were used to assess the risks to the River Crane (considered the most sensitive Controlled Water assessment). As such, additional investigation and remediation is likely to be required as part of the development.
- 3.9.4 The results from the gas monitoring and vapour analysis have identified slightly elevated concentrations of carbon dioxide and methane, and elevated concentrations of the naphthalene in one location. As such, there is a potential gas and vapour risk.
- 3.9.5 Geotechnical design parameters for the strata encountered have been provided. The parameters have been derived based on in-situ and ex-situ tests and published empirical relations. Geotechnical testing has included standard classification testing including plasticity index, moisture content, particle size distribution and strength testing including SPTs, undrained unconsolidated triaxial testing and hand shear vane testing. A design groundwater level has also been derived based on groundwater strikes encountered and monitoring results from the current site investigation. DS and ACEC classifications are also provided for the Made Ground and Lynch Hill Gravel Member.
- 3.9.6 The recorded groundwater strikes and monitoring results appear to show that groundwater flows towards the Grand Union canal and River Crane. A design groundwater level of 29mOD is recommended.

<p>3.9.7</p>	<p>Based on the above, recommendations were made for the following:</p> <ul style="list-style-type: none"> • Complete a Detailed Quantitative Risk Assessment (DQRA) to understand the risks to the River Crane and provide parameters for remediation purposes; • Consideration of in situ or engineered remediation techniques should the DQRA establish intolerable risks to the surface water courses; • Capping layers in soft landscaped areas; • Gas (methane and carbon dioxide) and vapour resistant membranes within future structures; • Asbestos control measures and materials management; • Personal Protective Equipment; • New pipework; • Piling Works Risk Assessment; • Remediation and Verification reporting; and • Discussion with piling contractors to design a piled foundation solution.
<p>3.10</p>	<p>DQRA Summary</p>
<p>3.10.1</p>	<p>As part of the recommendations from the Phase 2 investigation, a DQRA was undertaken. The findings of the DQRA are summarised below.</p>
<p>3.10.2</p>	<p>Monitoring of surface water in the River Crane has indicated that it is generally free of contamination, with the exception of Ammonia. This was found to be present upstream and downstream of the site, with the concentrations dropping slightly from upstream to downstream. This may indicate that the site is not having a tangible effect on the river.</p>
<p>3.10.3</p>	<p>Groundwater monitoring at the site has indicated that degradation of contamination is taking place, with several lines of evidence supporting this.</p>
<p>3.10.4</p>	<p>Detailed Quantitative Risk Assessment (DQRA) undertaken using the Remedial Targets Methodology has shown that the site does not pose any significant risks to controlled waters (River Crane).</p>
<p>3.10.5</p>	<p>Following the site investigations and DQRA undertaken to date it is considered unlikely that the contamination identified in site soils or groundwater would warrant remediation. Also, due to the presence of high levels of Ammonia already in the River Crane, it is unlikely that any remediation carried out on the Bulls Bridge site would result in a measurable benefit to the River Crane.</p>

3.11	Remediation Strategy Summary
3.11.1	<p>Based on the findings of the Phase 2 and DQRA, a Remediation Strategy was completed. As no significant and grossly contaminated soils or groundwater were limited, the remediation strategy is relatively minor and follows best practice. The report highlighted the need for the following:</p> <ol style="list-style-type: none"> 1. Site Clearance and Preparation; 2. Maintain a watching brief/discovery strategy throughout the works; 3. Management of asbestos in soil i.e. method statements, personal protective equipment, dust suppression etc.; 4. Provision of a waste management procedure / reuse strategy; 5. Provision of a capping system in areas of soft landscaping; 6. Installation of gas protection measures (CS2); 7. Long term monitoring of groundwater is to be undertaken to ensure that no adverse impacts to the river are caused during development; 8. Piling Works Risk Assessment; 9. Decommissioning of boreholes; 10. Installation of barrier pipework for new water pipes; 11. Concrete foundation design (Made Ground and Lynch Hill Gravel: DS-2 and AC-2 and London Clay: DS-2 and AC-1s); and 12. Provision of a Verification Report.
3.12	Additional Hazards
3.12.1	<p>Based on the foregoing, the following hazards associated with piling at the site have been identified:</p> <ol style="list-style-type: none"> 1. Minor contamination within the soils; 2. Minor contamination within the groundwater; 3. UXO; 4. Buried obstructions (e.g. relic foundations / structures); 5. Chemical attack on buried concrete; 6. Thames Water Sewer; 7. The River Crane; 8. The Grand Union Canal; and 9. Nearby railway line.
3.12.2	<p>Specific risk assessments such as services identification, access/egress, health and safety and working restrictions has been assessed by the piling contractor within their own method statements.</p>

4.0 PILING DESIGN

4.1 Development Design

4.1.1 The BA plot will comprise the data centre buildings in the centre, water tanks in the northern and western parts of the plot and the energy centre in the southern part of the plot. All buildings are to utilise CFA piling with pile caps or rafts. Further information is provided in section 4.2.

4.1.2 The Vodafone plot will comprise the substation and control room. The control room is to be constructed on stilts and sit above ground.

4.1.3 The development and preferred piling options are different in each development plot. The parties involved are set out in Table 5.

Table 5. Piling Contractors

Development Plot	Developer	Piling contractor
British Airways	Sweet Projects	Central Piling
Vodafone	JSM	ScrewFast Foundations

4.2 Foundation methodology – British Airways Plot

4.2.1 Within the British Airways plot, the preferred piling option is Continuous Flight Auger (CFA) piling. The method statement provided by Central Piling is provided in Appendix 3, and the key points are outlined below. The pile layout plan for the BA plot is shown in Appendix 1.

4.2.2 Piling constraints were identified during the Phase 2 investigation. These included UXO, obstructions within the ground, the presence of the Thames Water sewer, the proximity to the railway and the adjacent River Crane. It is understood that enabling works are to be completed prior to piling to remove the obstructions. In addition, a UXO survey is to be completed using cone penetration testing and a magnetometer. Due to the presence of the Thames Water sewer in the eastern part of the site, a separate sewer impact assessment has been undertaken. Furthermore, a ground movement and slope stability analysis report has been completed to assess the risk to network rail land. This report has been prepared to address the concerns from the Environment Agency.

4.2.3 The permanent piled foundations are formed of 350mm, 450mm and 600mm diameter continuous flight auger (CFA) piles under raft foundations (Water Tank 1 and 2) and pile caps with ground floor slab (data centre buildings 1,2 and 3). The piling works will necessitate the installation of a piling platform with a thickness of about 600mm, drilling and concreting the CFA piles, while the construction of the raft foundation and pile caps will require excavations of up to 2mbgl. The maximum pile depth is 30mbgl.

4.2.4 The proposed development requires the installation of piled foundation in proximity of the railway embankment. The closest piles to the railway (Water Tank 1) are to be installed approximately 12m away from the nearest rail track and 4m from the embankment edge. Excavation works of up to 2mbgl for the construction of the pile caps and ground floor slab will also be required.

4.2.5	<p>The construction sequence in the BA plot includes:</p> <ol style="list-style-type: none"> 1. Installation of the piling mat; 2. Installation of CFA piles; 3. Removal of the piling mat and excavation to formation level; 4. Construction of the pile caps/raft foundation; and 5. Loads from the structure applied to the piles and transfer to the ground.
4.2.6	<p>The piles are to terminate at a maximum depth of 30mbgl and will therefore pass through the Made Ground and Lynch Hill Gravel, and will terminate within the London Clay Formation.</p>
4.2.7	<p>The Method Statement provided by Central Piling highlights the environmental controls to be in place throughout the works. Due to the presence of the water course (river/canal), the following controls are to be put in place:</p> <ol style="list-style-type: none"> 1. At no point will the Piling Rig be positioned in such a way that it can surcharge the canal wall. An exclusion zone is to be marked on site. 2. A fence will be emplaced at the canal/river edge to ensure that no personnel or equipment can fall in. Debris netting will be emplaced at a height of 3m along the watercourse edge. 3. Extra vigilance will be taken by the Rig Driver when removing spoil from the auger string with the auger cleaner to ensure that none is flicked over the debris netting. 4. A bund formed from sandbags and polythene is to be established to stop waste water from entering the watercourse at any stage. The method statement indicates the removal of this waste water will be undertaken in a safe and controlled manner to reduce risk of breaching the bund. 5. Spill kits will be kept on the piling rig and near the diesel bowser. Blankets will be used to catch any spillages when refuelling. Refuelling is to take place over areas of hardstanding/spill tray and away from the watercourse. 6. Drip trays will be placed under all static plant, and any spillages will be collected in spill blankets and returned in blue contaminated bags to the contractor's yard for disposal. 7. All contaminated liquids are to be placed into waste oil drums and returned to the contractor's yard for disposal.
4.2.8	<p>Additional controls are set out in the method statement in relation to the Thames Water sewer and the railway. These involve the use of exclusion zones and movement/banksman operations.</p>
4.3	Foundation Methodology – Vodafone Plot
4.3.1	<p>Within the Vodafone plot, a helical foundation solution is to be utilised. The method statement provided by ScrewFast Foundations with example schematics is provided in Appendix 4, and the key points are outlined below. The pile layout plan for the Vodafone plot is shown in Appendix 1.</p>

4.3.2	<p>Constraints identified within the Vodafone plot include the Thames Water Sewer, the presence of a temporary Vodafone mast, the adjacent river and the adjacent canal. It is understood that JSM have consulted with Thames Water and Vodafone. JSM have also consulted with National Grid in relation to establishing the HV Energy Centre. This report has been prepared to address the concerns from the Environment Agency.</p>
4.3.3	<p>The piles are to be installed using a tracked excavator with attachment fitted for screwing in the foundation. The piles are formed of an auger section, a central pile and the pile cap. The installation requires the working area to be excavated to a depth of 300mm below formation level.</p>
4.3.4	<p>The construction sequence in the Vodafone plot includes:</p> <ol style="list-style-type: none"> 1. Establish a working area; 2. Set out pile locations; 3. Installation of helical piles; 4. Construction of the pile caps; and 5. Loads from the structure applied to the piles and transfer to the ground.
4.3.5	<p>The piles are to terminate at a maximum depth of 10-15mbgl and will therefore pass through the Made Ground and Lynch Hill Gravel, and will terminate within the London Clay Formation.</p>
4.3.6	<p>The Method Statement provided by ScrewFast Foundations highlights the environmental controls to be in place throughout the works:</p> <ol style="list-style-type: none"> 1. Avoid stock piling of material for long periods as this becomes a desirable habitat for reptiles. 2. A spill kit will be available at all times. 3. All plant used on site will be supplied with drip trays. Drip trays will be used under “static” plant at all times. 4. Only metallic petrol/diesel containers will be used on site and will be stored safely in the works vehicle when not in use. 5. Refuelling (if required) will not be carried out near storm drains or watercourses. 6. All COSHH items shall be stored and disposed of in the correct manner. (Refer to the relevant COSHH sheet/s)
4.4	Piling Mat
4.4.1	<p>The piling mat within the BA plot is to be constructed of 6F2 produced as part of the demolition works. The piling mat within the BA plot is to be formed of a 600mm thickness of 6F2 graded material.</p>
4.4.2	<p>A pile mat is not required within the Vodafone plot.</p>
4.4.3	<p>In the event that the importation of materials is required, these should be scrutinised via provenance and on site testing to ensure that contaminative materials are not being brought to site. Detailed records of volumes and duty of care records should be maintained by the Main Contractor.</p>

4.5	Conceptual Model - Piling
4.5.1	A Conceptual Site Model (CSM) indicating the geology, hydrogeology and details of piling is provided in Appendix 5. This shows a cross section identifying details of the proposed piles, vertical variations in ground conditions, potential pathway linkages and the Controlled Waters receptors.
4.5.2	The key receptor is considered to be the River Crane.

5.0 PILING RISK ASSESSMENT

5.1	Introduction
5.1.1	The intention of the PWRA is to ensure that the proposed piling method will not create new, preferential pathways for the migration of contamination, previously identified at the site, to Controlled Water resources. Other pollution pathways are considered by the PWRA, however, the impact to water resources is the main concern.
5.2	Hazard identification: Potential Adverse Environmental Impacts
5.2.1	The above referenced EA guidance on piling into contaminated sites sets out that the Source–Pathway–Receptor (S-P-R) linkages associated with piling and ground improvement works must be considered in a site-specific context. The guidance indicates that the EA’s response to proposals for piling on contaminated sites will be based on the overall level of risk that piling presents, the techniques, mitigation measures and the quality assurance and control (QA/QC) methods proposed.
5.2.2	Based on the above, a Conceptual Site Model (CSM) has been prepared for the BA and Vodafone plots.
5.3	British Airways CSM
	<u>Sources</u>
5.3.1	Sources of contamination identified in the previous phases of investigation are outlined in Table 3 and in summary included asbestos in soil, soil vapour, soil leachate, and contaminants in groundwater.
5.3.2	Whilst asbestos and soil vapour has been identified as contaminants of concern within the BA plot, they are not considered to have a significant impact on the Controlled Water Receptors. They have therefore been excluded from the assessment. The assessment has therefore focused on elevated concentrations of leachable contaminants within the soil and groundwater contamination.
	<u>Pathways</u>
5.3.3	The piling scheme for the BA plot is to found the CFA piles to a depth of 30m within the London Clay. The piles will pierce through the Made Ground and Lynch Hill Gravels, but will not extend through the base of the London Clay.

5.3.4

Receptors

Receptors include the Lynch Hill Gravel (Principal Aquifer) and the River Crane. The Grand Union Canal is not considered to be a receptor as it is a man made, concrete lined canal.

Plausible Pollutant Linkages

5.3.5

Based on the above, the plausible pollutant linkages have been presented in Table 6 below.

Table 6. Plausible Pollutant Linkages with the BA Plot

Source	Pathway	Receptor	Risk Rating	Comment
Leachable contaminants from soil (Metals including total chromium, copper, lead, mercury, PAH and TPH)	Vertical migration of leachable contaminants from the soil, mobilised by the action of piling.	Principal Aquifer – Lynch Hill Gravel	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature and therefore not considered to be a significant groundwater resource in this area. Furthermore, the site is not situated in a groundwater source protection zone, and no groundwater abstractions have been identified within 1km of the site.
Leachable contaminants from soil (Metals including total chromium, copper, lead, mercury, PAH and TPH)	Vertical migration of leachable contaminants from the soil, mobilised by the action of piling and lateral migration through the Lynch Hill Gravel.	River Crane	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature
Groundwater Contamination (Metals including copper and nickel, total phenols, PAH, TPH and VOCs.	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling into the Principal Aquifer (Lynch Hill Gravel).	Principal Aquifer – Lynch Hill Gravel	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature and therefore not considered to be a significant groundwater resource in this area. Furthermore, the site is not situated in a groundwater source protection zone, and no groundwater abstractions have been identified within 1km of the site.
Groundwater Contamination (Metals including copper and nickel, total phenols, PAH, TPH and VOCs.	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling and lateral migration through the Lynch Hill Gravel and into the River Crane.	River Crane	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature.

Piling Materials (soluble constituents of concrete)	Lateral migration of soluble piling materials.	Principal Aquifer and River Crane	L	Care to be taken during piling activities.
Potential unidentified contaminants	Vertical and lateral migration of previously unidentified contaminants to the Principal Aquifer and River Crane.	Principal Aquifer and River Crane	L	Based on the investigations completed to date, potential areas of additional contamination are considered to be low.

5.4 Vodafone CSM

Sources

5.4.1 Contaminants of concern identified in the previous phases of investigation are outlined in Table 4 and in summary included asbestos in soil, contaminants in groundwater and ground gas.

5.4.2 Whilst asbestos and ground gas have been identified as contaminants of concern within the Vodafone plot, they are not considered to have a significant impact on the Controlled Water Receptors. These have therefore been excluded from the assessment. The assessment has therefore focused on elevated concentrations of nickel and PAH within the groundwater of WS7.

Pathways

5.4.3 The piling scheme for the Vodafone plot is to found the helical piles to a depth of 10-20m within the London Clay. The piles will pierce through the Made Ground and Lynch Hill Gravels, but will not extend through the base of the London Clay.

Receptors

5.4.4 Receptors include the Lynch Hill Gravel (Principal Aquifer) and the River Crane. The Grand Union Canal is not considered to be a receptor as it is a man made, concrete lined canal.

Plausible Pollutant Linkages

5.4.5 Based on the above, the plausible pollutant linkages have been presented in Table 7 below.

Table 7. Plausible Pollutant Linkages with the Vodafone Plot

Source	Pathway	Receptor	Risk Rating	Comment
Groundwater Contamination (Metals including nickel and PAH including Total PAH)	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling into the Principal Aquifer (Lynch Hill Gravel).	Principal Aquifer – Lynch Hill Gravel	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature and therefore not considered to be a significant groundwater resource in this area. Furthermore, the site is not situated in a groundwater source protection zone, and no groundwater abstractions have been identified within 1km of the site.
Groundwater Contamination (Metals including nickel and PAH including Total PAH)	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling and lateral migration through the Lynch Hill Gravel and into the River Crane.	River Crane	L	The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature.
Potential unidentified contaminants	Vertical and lateral migration of previously unidentified contaminants to the Principal Aquifer and River Crane.	Principal Aquifer and River Crane	L	Based on the investigations completed to date, potential areas of additional contamination are considered to be low.

5.5**Hazard Assessment**

5.5.1

This is assessed against the six pollution scenarios, which the EA has identified that are of particular concern. The hazard assessment is included below, in Table 8, in relation to the proposed use of CFA and helical piles.

5.5.2

Table 8: Hazard Assessment

Pollution Scenario	Applicability to site	Risk	Hazard Assessment
1. Creation of preferential pathways through an aquitard to allow potential contamination of an aquifer.	Potential for contaminants within the Made Ground to impact the underlying aquifer.	L	Contaminated Made Ground has been identified at the site. However, the piles will terminate in the London Clay Formation, and will not reach the Chalk aquifers below. Whilst the Made Ground is underlain by the Lynch Hill Gravel, the gravel is not considered to be a significant groundwater resource in this area due to its limited thickness and predominantly cohesive nature. Furthermore, the piling technique will auger contaminated soils to the surface as arisings. The concrete cast during auguring will also seal the potential migration pathway for contaminants.
2. Creation of preferential pathways through a low permeability surface layer, allowing migration of landfill gas, soil gas or contaminant vapours to the surface.	Potential for gas and vapour to reach the surface.	L	The concentrations of gas and vapour within the Made Ground are low and there are no low permeability surface layers that are currently trapping the gases beneath the surface. As such, piling will not change the current conditions onsite.
3. Direct contact of site workers and others with contaminated soil arisings that have been brought to the surface.	Potential for contaminated soil arisings to impact site users	L	Contaminants have been identified onsite. Asbestos was identified within the Made Ground of both BA and Vodafone plots. As such, piling contractors will be required to enforce an appropriate Risk Assessment and Method Statement to protect site workers and others. This is to include the use of personal protective equipment and safe storage and disposal of arisings.
4. Direct contact of the piles or engineered structures with contaminated soil or leachate causing degradation of materials.	Potential for contaminated soil to impact piles and cause degradation.	L	Concentrations of contaminants are considered to be low and therefore unlikely to cause degradation of materials. Furthermore, the design of the concrete in relation to sulphates is to be in line with recommendations within the Phase 2 ground investigation report.
5. The pushing of solid contaminants down into an aquifer during pile driving.	Pile techniques are to include CFA and helical piles. These are both auguring techniques. As such the likelihood of contaminants being driven into an aquifer is limited.	L	Pile techniques are to include CFA and helical piles. These are both auguring techniques. As such the likelihood of contaminants being driven into an aquifer is limited.

	<p>6. Contamination of groundwater and, subsequently, surface waters by wet concrete, cement paste or grout.</p>	<p>Injection of wet concrete is to take place on the BA plot as part of the CFA process.</p>	<p>L</p>	<p>The thickness of the aquifer is limited due to historical gravel extraction at the site. In addition the Lynch Hill Gravel was identified to be predominantly cohesive in nature and therefore not considered to be a significant groundwater resource in this area. Furthermore, the site is not situated in a groundwater source protection zone, and no potable groundwater abstractions have been identified within 1km of the site.</p>
<p>5.6</p>	<p>Other Hazards</p> <p>5.6.1 In relation to UXO, prior to piling, a UXO magnetometer survey is being undertaken.</p> <p>5.6.2 In relation to buried obstructions, enabling works are to be undertaken to remove these obstructions.</p> <p>5.6.3 In relation to the Thames Water Sewer, as outlined above, a stability assessment has been completed and foundations have been designed over the sewer.</p> <p>5.6.4 In relation to the railway, it is understood that Network Rail have been consulted and a separate ground stability assessment has been completed.</p>			

6.0 CONCLUSIONS

<p>6.1</p>	<p>Conclusions</p> <p>6.1.1 The use of shallow foundations is not an option for the site due to the nature of the underlying ground conditions with a significant thickness of Made Ground and the structural loadings imposed by the building.</p> <p>6.1.2 The hazard assessment in Table 8 has identified that a low environmental risk exists from the potential for piling to create a preferential pathway for any contaminants to migrate downwards to the underlying sensitive aquifers, and a low risk for gases to migrate upwards.</p> <p>6.1.3 Furthermore, the hazard assessment has identified a low risk of pile degradation due to the soil environment provided, and appropriate concrete mix used for the site. Whilst the technique will bring potentially contaminated materials to the surface, site workers will be protected by employing the use of PPE, as stated above. Pile arisings will be subject to testing (as appropriate) and management for off-site disposal in line with the waste producer’s management plans. Duty of Care records will be maintained for all arisings destined for off-site disposal.</p> <p>6.1.4 Quality Assurance and Quality Control methods will also be completed by the piling contractor whilst on site to enable workmanship to be closely monitored.</p>			
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APPENDIX 1: FIGURES



Paragon Building Consultancy
 65 Southwark Street
 London
 SE1 0HR
 020 7125 0112
 www.paragonbc.co.uk

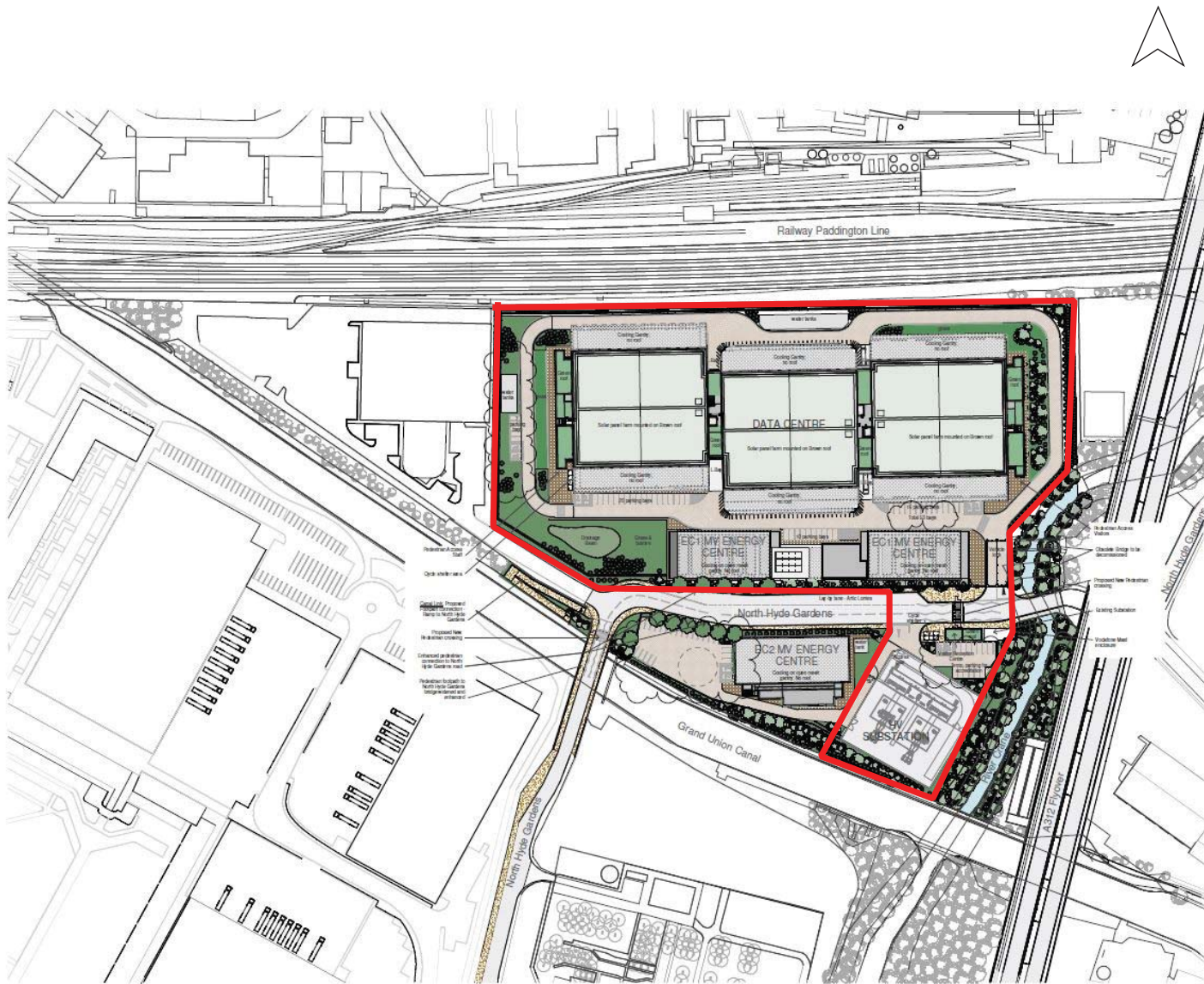
Notes:

Basemap: Google 2019. Insert Map: Google 2019.

-  Site Location
-  Development Area

Rev	Description	Date

Project Bulls Bridge, Hayes	Scale 1:3000
	Drawn by CB
	Approved By CK
Title Site Location Plan	Drawing Number 1
	Date 17/12/2020



building & project consultants
paragon
 Paragon Building Consultancy
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 SE1 0HR
 020 7125 0112
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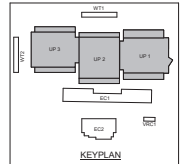
Notes:
 Drawing based on Nicholas Webb Architects plc, Project Union A90 - External Works Site Plan. Ref: ZZ-DR-A-90-005. P02. Dated 27/03/20.

 Development Plot

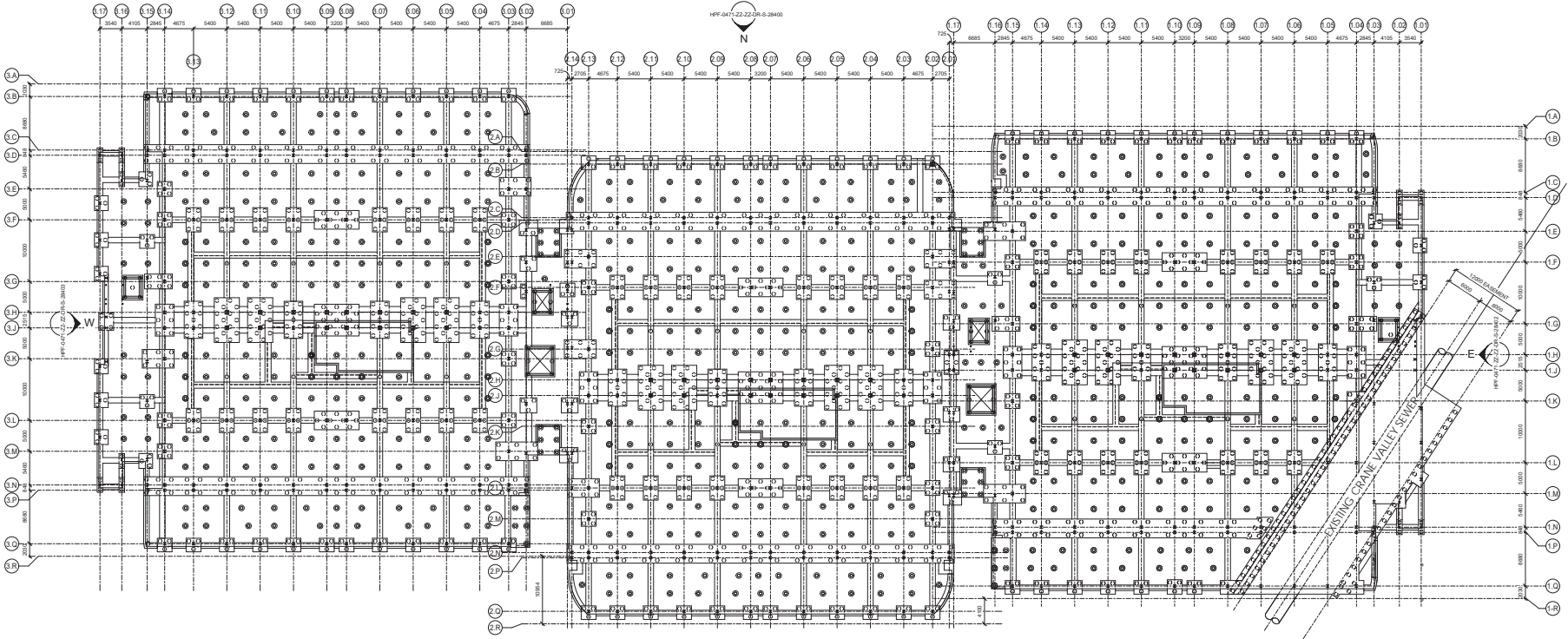
Rev	Description	Date

Project Bulls Bridge, Hayes	Scale Not to scale
	Drawn by CB
	Approved by CK
Title Proposed Development Plan	Drawing Number 2
	Date 17/12/2020

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- NOTES:
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 2. DO NOT SCALE OFF THIS DRAWING. ALWAYS WORK TO NOTED DIMENSIONS.
 3. ALL DIMENSIONS MUST BE VERIFIED ON SITE BEFORE COMPLETING SHOP DRAWINGS OR SETTING OUT THE WORKS.
 4. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SCOPE OF WORKS AS PREPARED BY HOK Hurley Palmer Flatt.
 5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND STRUCTURAL ENGINEER'S DRAWINGS AND ASSOCIATED HOK Hurley Palmer Flatt DOCUMENTS.
 6. FINAL LOCATION OF FOUNDATIONS SUBJECT TO SEWER SURVEY.
 7. FINAL INVERT OF SEWER SUBJECT TO SEWER SURVEY.



1 LF1 FOUNDATION PILECAP GA - BUILDINGS 1-2-3
1 : 250

REV	REVISION	DATE
1	ISSUE 1	11/21/20
2	STAGE 3	S4

HPR Hurley Palmer Flatt

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E info@hurleypalmerflatt.com
W www.hurleypalmerflatt.com

Client: ARK
Address: NWA
Project: UNION PARK

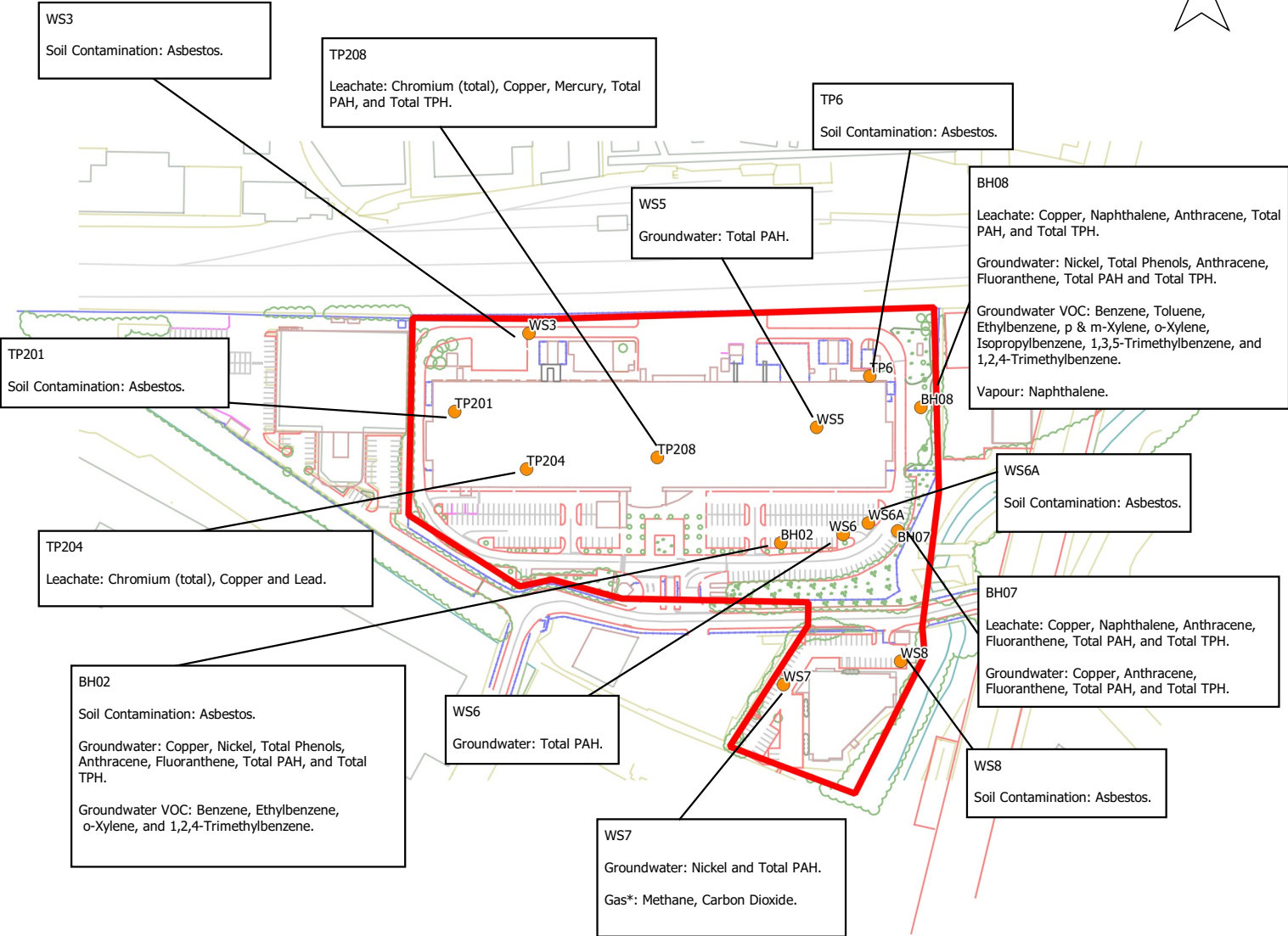
Site: UNION PARK DATA CENTRE
ALL BLOCKS
LEVEL F1 - FOUNDATION PILE CAPS
GENERAL ARRANGEMENT

HPF-DR-Project: PLR15489
Description: HPF-0471-DR-ZZ-MS-S-0001
Drawing No: DR R6-UB 295520
Scale: 1 : 250
Drawing: HPF-0471-ZZ-F1-DR-S-18100
Page: P01

APPENDIX 2: CONTAMINANTS OF CONCERN



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Notes:

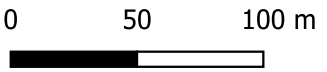
Drawing based on the results from the Ground Engineering Ltd Utility Survey. Ref: 35406. Dated: 19/07/2019.

Boreholes where no elevated contamination was identified have not been presented.

* The gas risk to the site is based on a Gas Screening Value (GSV) calculated based on the worst case which was identified in WS7.

Key

- Site boundary
- Intrusive locations with elevated contamination





Rev	Description	Date

Project Bulls Bridge, Hayes	Scale 1:3000
	Drawn by CB
	Approved By CK
Title Contaminants of Concern Plan	Drawing Number 3
	Date 17/12/2020

APPENDIX 3: PILING CONTRACTOR METHOD STATEMENT – CENTRAL PILING (BA PLOT)

RAMS for Soilmec SF50:

Continuous Flight Auger Piling	
Contract No:	42442A1
Contractor:	Sweet Project Holdings
Site Address:	Project Alliance, Bulls Bridge, Hayes, UB3 4QQ
Site Manager:	TBC
Mobile No:	TBC
Working Hours:	08:00 – 18:00
No of Piles:	2773
Pile Diameter:	350/450/600Ø
Restrictions:	Network Rail asset at North boundary of site and Grand Union canal to South.
Contract Start Date:	TBC
Scope of Work:	2773no bearing piles to a max depth of 29.1m

Rev:	Date:	Prepared by:	Approved by:	Reason for Issue:
A	21/10/2020	Ian Todd Operations Supervisor	Sam Nicole Contracts Manager	Initial Draft for Network Rail, Thames Water and the Canal River Trust.
Signature:				
B				
Signature:				

Contents:

1. Responsible Persons.
2. Site Controls.
3. Health & Safety.
4. Site Operatives / Training.
5. Supplied Plant & Equipment.
6. Central Piling Requirements.
7. Mobilizing on Site.
8. Equipment & Plant Set Up.
9. Fabricating Steel Reinforcement:
10. Priming & Pumping Concrete
11. Piling Procedures.
12. Cleaning Concrete System.
13. Securing Site Plant & Equipment.
14. Plant & Equipment De-Rigging.
15. De-Mobilizing from Site.
16. Environmental Procedures.
17. Quality Procedures.
18. Site Specific Information.
- Appendix A: Piling Rig Configuration
19. Risk Assessments
20. RAMS Confirmation Sheet.

This document has been produced in line with the Central Piling Health & Safety, Environmental and Quality policies.

Central Piling has been assessed and achieved ISO9001, ISO14001 & OHSAS18001 and is a member of the FPS [Federation of Piling Specialists].

Extra Corona Virus precautionary measures

In section 19 Site Specific Information and RA 16 Extra Corona Virus Measures we have put some extra measures in place to safeguard our operatives on site from the Coronavirus Covid-19 these procedures will supersede any other procedures listed in the RAMS.

By following these measures, we will hopefully stop the spread of this pandemic and enable our work force, their family and friends and any vulnerable person who they may come in contact with to stay safe and healthy.

We ask all our clients to ensure they follow the CLC paper on Site Operating Procedures – Protecting Your Workforce and ensure there are ample wash facilities with soap and clean water.

1. Responsible Persons:

Role:	Name:	Tele:	Email:
Managing Director	Steve Hadley	01787 474000	stevehadley@centralpiling.com
Responsibilities:	Director of Health & Safety. To implement, co-ordinate and control the administration of Health and Safety matters within the company.		
Contracts Director	Roger Cox	01787 474000	rogercox@centralpiling.com
Responsibilities:	To manage all contracts whilst staying abreast of developments in HSE legislation and good working practices. Ensuring that any new developments are communicated both quickly and effectively to all company staff.		
HSQE & Operations Manager	Colin Newman	01787 474000 07976 219209	colinnewman@centralpiling.com
Responsibilities:	To ensure all Central Piling employees work safely in line with the companies Health & Safety policy and procedures. To monitor and investigate breaches in health, safety, quality & environmental procedures. To ensure the correct training and Health & Safety information is given to all crews.		
Contracts Manager	Sam Nicole	01787 474000 07890 539359	samnicole@centralpiling.com
Responsibilities:	To organise and attend initial site visit and pre-start meeting(s) and liaise with the client prior to the contract starting. To ensure all rig and plant movements are in accordance with the client's needs and site-specific requirements. To ensure that RAMS are produced and approved and relevant to all activities on the specific contract. Monitoring production and progress of all contracts throughout the construction phase.		
Administrator	Paige Fullgrabe	01787 474000 07966 401595	paigefullgrabe@centralpiling.com
Responsibilities:	To collate and ensure all contract documentation is in place before the contract starts. Liaise with setting out engineers and ensure all drawings are up to date.		
Operations Supervisor	Ian Todd	07976 212218	iantodd@centralpiling.com
Responsibilities:	To liaise with the client ensuring that the site is prepared for the establishment of the piling rig and equipment prior to starting. To ensure that all documentation on site is completed and correct, including the Quality Check Sheet and Working Platform Certificate. Regularly audit the site team based on Health, Safety, Quality and Environmental performance. Monitoring personnel compliance with RAMS and implementing strategies to improve on site performance.		

2. Site Control

- 2.1. The Site Supervisor is the person in control of the works at site level. Should any problems arise beyond his authority, the Operations Supervisor or Contracts Manager should be contacted.
- 2.2. All Health & Safety problems or concerns arising on site the HSQE & Operations Manager or Contracts Director should be informed immediately.

3. Health & Safety

- 3.1. Central Piling employees will operate in a safe and diligent manner, in accordance with their Health & Safety policy & procedures. They will always adhere to the site RAMS.
- 3.2. Personal Protective Equipment will be worn whilst on site. The company's minimum requirement is: Hard Hat, Safety Boots, Safety Glasses, Rubber Gloves and Hi-Viz clothing. Additional Personal Protective Equipment will be worn for site specific work as required by the risk assessments i.e. overalls, dust mask and ear defenders.
- 3.3. Health & Safety is monitored daily by the HSQE & Operations Manager and any incidents, accidents or safety concerns are investigated promptly. All employees are encouraged to report any accidents, or incidents to the Site Manager and Operations Supervisor who will inform the HSQE & Operations Manager. Safety concerns are raised on the site tablet and email to the office, the HSQE & Operations Manager will allocate the safety concern and ensure a non-conformance [action log] is raised and completed within the allotted time scale.
- 3.4. A five-point safe check or site inspection will be completed at least once depending on the size of the contract; the report will be made available to the client and any issues will be passed on to the relevant supervisor or manager to act.
- 3.5. Central Piling has monthly HSQE & Management Committee meeting, which discuss any relevant issues arising and all non-conformances raised. Any issues requiring immediate attention will be discussed in the weekly contracts meeting.
- 3.6. All piling operatives and subcontractors working for / under Central Piling will sign and complete the required site documentation in the table below for the contract and undertake the Sweet Project Holdings site induction before commencing work on site.
- 3.7. The Site Supervisor will deliver a FPS Tool Box Talk briefing to all Central Piling site operatives and sub-contractors at weekly intervals throughout the contract. A copy will be made available for the client if requested in the Weekly Inspection Register.
- 3.8. If the Safe System of Work changes for any reason the work must STOP and the HSQE & Operations Manager or the Contracts Manager must be informed. The RAMS must be altered to highlight the new procedures and communicated to the site crew before work can continue.

Site Documentation;	When Completed;	Completed by;
RAMS	Before they start work on site.	Subcontract labour [Steel fixers, setting out engineers] Excavator & Dumper Operators [attendance], Piling operatives.
Digger Driver Briefing	When in attendance.	Excavator Operators
Lift Plan	Before they start work on site.	Piling Operatives, Excavator Operators, Lorry Loaders
Working Platform Certificate	Start of contract, weekly & after alterations to the piling mat	Site Manager
Permit to Excavate /Dig	Weekly / Daily depending on client	Site Manager, Site Supervisor & Excavator Operator.
Daily Pre-Inspection checks. [Rig, Pump, Drum, Compressor & MEWP]	Daily	Competent Person
LOLER Inspection	Weekly	Competent Person
Tool Box Talk / Site Briefing	Weekly	Operations / Site Supervisor

4. Site Operatives Training

4.1. Site operative's matrix below shows the minimum training requirement for a CFA piling rig contract:

Site Operatives:	CITB Certificate:			CPCS Tickets					
	SMSTS	SSSTS	CSCS Tested	Piling Rig A48	Trailer Mounted Concrete Pump A44	Slinger/ Signaller A40a	IPAF Card	First Aid at Work	Asbestos Awareness
Contracts Supervisor:	X		X				X	X	
Site Supervisor/ Rig Driver:		X	X	X			X	X	X
Pump Operator:			X		X		X		X
Banksman:			X			X	X		X
Setting-Out Engineer:			X						
Steel fixer: [Sub-Contractor]			X						

4.2. No site operatives will operate any plant or equipment for which they have not been trained or authorised to do so by Central Piling senior management team.

5. Supplied Plant & Equipment

5.1. Central Piling will supply the following plant and equipment for the contract.

Plant Required:	Machine details:	Pre-inspection	LOLER	PUWER
Piling Rig	Soilmec SF50 SN:	√	√	√
Holding Drum	Serial No:	√		√
Trailer Mounted Concrete Pump	Putzmeister PM1005 Serial No:	√		√
Compressor	Serial No:	√		√
MEWP	Serial No:	√	√	

5.2. Pre-Inspections:

All plant will be pre-inspected daily by a competent person and details sent to the office. Any immediate problems are telephoned directly to the Plant Manager or hire company.

5.3. Lifting Operations and Lifting Equipment Regulations 1998:

The MEWP and all lifting equipment are tested every six months and a thorough examination certificate issued. Pre-inspection is completed before each use and record weekly in the inspection register. Plant used for lifting is inspected yearly by a qualified insurance inspector and a Thorough Examination certificate issued. All certificates are held by the site supervisor.

5.4. Provision and Use of Work Equipment Regulations 1998:

All plant will come under the PUWER regs. No certifications are required, but the service history is available when requested.

5.5. The MEWP will be a standard machine without the safety crush bar in the basket, there is a negligible risk that the operator could be crushed.

- 5.6. A 2000 litre bunded diesel bowser [Wire lifting ropes attached] will be used to store diesel on site, 200ltr bunded drums will be used to move diesel around site. A spill kit [RA11 Environmental Issues] will be positioned next to the re-fuelling area.
- 5.7. Equipment required for CFA Piling consists of: Set of augers, concrete hoses, blow out drum & skip, barriers, cones, Traffic ramp & a 8' x 10' small container [COSHH store].
- 5.8. **Concrete Hoses:** A CFA rig has two sets of concrete hoses, the hanging hose and the elevated hoses which are double bagged, these are changed yearly. The placement and delivery hoses are changed, and pressure tested every 30 days on a calibrated machine. A certificate is available on request from Central Piling.

6. Central Piling Requirements

- 6.1. Sweet Project Holdings will provide the following:
- 6.2. To provide all site health & safety requirements and welfare facilities in accordance with CDM 2015 Regulations and the CLC paper on Site operating procedures – protecting your workforce.[Corona virus COVID-19]
- 6.3. A 360° Tracked Excavator [Minimum 20 Tonne] & Qualified CPCS operator [with pick & carry duties] in 100% attendance.
- 6.4. Install, test and maintain the working platform when required and provide a completed Working Platform Certificate.
- 6.5. To ensure all pile positions are scanned for services and are clear from overhead and underground obstructions and highlight any service which is in or near the piling platform.
- 6.6. Provide a clean compacted route to the piling platform for access and egress of the piling rig and delivery vehicles. To be designed as the working platform for the piling rig.
- 6.7. Provide a mains water supply [protected from freezing].
- 6.8. If working close to adjacent boundaries, ensure adequate protection is erected and maintained to stop damage or injury occurring outside the site boundary.
- 6.9. To provide coordinates for 3 stations for the setting out engineer.
- 6.10. To set out all pile positions with a steel pin and numbered mushroom safety cap.

7. Mobilising on Site

- 7.1. The low loader will arrive at the entrance of the site and be instructed by the site supervisor where to unload. The unit will be disconnected from the trailer and parked away from the entrance, protection boards will be laid on the road and when ready the banksman will signal to the rig operator to commence unloading the rig. [RA03 Working on Public Highway]. The rig will be banked off the low loader and on to site, to rig up. The Piling rig will be banked while on site by a banksman.
- 7.2. Hi-ab lorries will arrive through out the contract to deliver the piling equipment. They will be banked by the banksman into a position to unload. Lorry restraints will be placed around the lorry bed before the operator climbs on to the lorry. [RA05 Mechanical Handling Operations] A banksman will assist with the unloading of the lorries and place the equipment in a designated area making sure it is safe and secure. When unloaded the Hi-ab lorries will be banked off site.
- 7.3. A lorry will arrive to deliver the steel reinforcement which will be in bundles less than 1 tonne; this will be banked on to the site by the banksman. The Piling Operatives will assist in unloading the steel [RA05 Mechanical Handling Operation. RA04 Working with Operating Plant] aided by the 360° Excavator and place it on bearers in the designated area. When unloaded, the lorry will be banked off site by the banksman.
- 7.4. A Hire Company lorry will arrive with the MEWP [Mobile Elevated Work Platform]; it will be banked into a position to unload. When unloaded it will be driven to an area off the plot which is safe, secure and ready for use. When empty the lorry will be banked off site.

8. Equipment Set Up & Plant Set Up

- 8.1. Before the piling rig can commence rigging up the **Working Platform Certificate [see 6.4]** must be signed by the designated person for the client, to confirm the piling mat has been installed as stated in the pile mat design.
- 8.2. **Emergency Rescue Procedure:** Before using the MEWP, the pre-inspection sheet and rescue plan need completing in the site inspection file [tablet], an operative will be appointed as the competent person in the rescue plan in the event of an emergency. [RA10 Use of MEWP on Site]
- 8.3. The MEWP operator will put his safety harness on and attach the lanyard to the rear, he will complete the pre-inspection sheet [RA10 Use of MEWP on Site] on the MEWP before climbing into the basket and attach the lanyard to the designated anchor point in the basket. He will start the machine, then he will move the MEWP into a position where the ground is stable where he can remove the chain from the raised equipment.

- 8.4. When ready the piling rig will be rigged up by the rig operator and banksman. [RA14 Working at Height, RA02 Working with Wire Rope] The turn buckle will be removed from the travel frame.
- 8.5. The prop will be placed on the rear of the mast section, once its taken the weight of the mast the securing clip and pin will be removed and the red mast bar will be removed and stored. The prop is then removed from the rear section.
- 8.6. The upper mast is then swung round by pushing it into place, the prop then holds the upper section and a bolt and pin are placed and tightened at the joint to hold the lower and upper mast sections. The prop is then removed and the electric connectors joined. The two ratchets are then removed from around the mast and the ropes are taken out of the travel hooks.
- 8.7. The 180° bend is then raised to horizontal and the turn bucket attached.
- 8.8. The rig operator will sit in the cab and instructed by the banksman will raise the mast till the top section of mast fits into the lower foot section, the banksman will stop the operator and place two pins with securing bolts into the joint holes. [RA14 Working At Height]
- 8.9. Once the bolts are fitted the banksman will open the hydraulic arm on the drill head and signal to the operator to start raising the drill head, he will watch the ropes as they go through the sheaf wheels then take the weight of the drill head and bring the cathead into position. The operator will then raise the drill head to approx 2.0m lower the mast back enough for the travel cradle to be removed.
- 8.10. Once removed the operator will lower the mast to approx 22° degrees and the tracks will be walked out into working width and travel bars inserted. The slew pin will also be removed. The operator will then raise the mast to level.
- 8.11. The extension and reaction bar lifting points will be checked before lifting commences.
- 8.12. **If the extension bar is required:** The chain on the ancillary line will be lowered under instruction from the banksman and attached to the lifting eye on the extension bar. The banksman will instruct the rig driver to raise the extension bar, so it hangs above the drill head. He will then instruct the rig driver to lower the extension while he guides it through the drill head and rests it on the ground. The MEWP operator will then raise the basket of the MEWP into a position to remove the chain, he will remove the chain and pull the electric cable from the reel and lower it down to the banksman to connect the plugs together.
- 8.13. The banksman will then instruct the rig driver to lower the ancillary line and attach the hook on to the reaction bar, when ready he will instruct the rig driver to raise the bar over the spectacle on the extension bar. The MEWP operator will help guide the reaction bar through the spectacle while the rig driver lowers it; when it has been lowered to the drill head the banksman will guide it into eye sockets on the drill head and down into the final socket where a pin is inserted and secured using an R clip. The MEWP operator will then remove the chain from the reaction bar and slew the basket away from the rig ready for the augers.
- 8.14. The required size gate guides will be connected into the gates by placing a chain and shackle on the arm of the excavator then completing one gate guide at a time, lift them into place and connect the two bolts through the gates and into the rear of the gate guide.
- 8.15. **Both bolts must be used on the gate guides. The bolts will be checked throughout the contract.**
- 8.16. **Safety Procedure: When connecting augers to an auger string the rig operator will always connect the couplings by forward spinning the auger to line up the pin holes at NO TIME WILL THE HEAD BE BACK SPUN. [RA05 Mechanical Handling Operations] While connecting the couplings the MEWP operator will keep his hands well away until signalled by the rig driver that the couplings are together.**
- 8.17. **Safety Procedure: When using 300mm diameter augers a 600mm extension bar must be fitted to the auger string so the lead auger can't be lifted into the gate guides.**
- 8.18. A 7.0m exclusion zone will be erected around the front of the piling rig before putting the auger string in place.
- 8.19. The first of three flights of 6m auger will be connected below the head this is done by a chain sling being placed three flights down the auger and then placed in the swivel hook on the ancillary line, the ancillary line is lifted slowly lifting the flight of auger into place, the auger is shut in the gates guided by the banksman. The rig driver will then lower the head guided by the banksman into the coupling on the auger (which will be cling film and greased), when connected the MEWP operator will slew into the rig and knock two auger pins in the coupling He will then remove the sling chain from around the auger and slew the MEWP away from the rig and wait for the next auger. This procedure is completed until all the flights are connected.
- 8.20. When all augers have been connected, the MEWP will be driven to an area which is secure, and the operator will remove the lanyard from the anchor point. He will climb down from the basket and go to the ground controls and lift the boom into a raised position and stop the engine and remove the key.
- 8.21. The holding drum will be put in a position so the concrete pump will be placed in front [RA012 Mechanical Handling Operations] and has good access for the concrete lorries. Metal and rubber hoses will then be attached together [RA06 Manual Handling Operations] using hose clamps and secured using clevis pins until the required length is achieved. The hoses will then be connected to the piling rig via the T-Piece. Large whip checks will be placed on all couplings between metal and rubber concrete hoses which are above ground level.

- 8.22. Safety Procedure: A moveable cross over ramp with barriers is provided for protection to the placement concrete hoses on site, if any plant or vehicles need access across the hose the ramp can be placed by lifting it with the excavator, hard core can be place either side of the ramp if required. AT NO TIME IS TRAFFIC TO BE DRIVEN OVER THE PLACEMENT HOSES WITHOUT PROTECTION. Continual traffic movement over unprotected hoses will cause damage to the concrete hose which will result in a severe accident or incident occurring.**
- 8.23.** A wash out bund will be placed under the hopper of the concrete pump and lined with polythene. Concrete lorries will be instructed to wash out into bund. This will be tidied daily.
- 8.24.** At the beginning or end of each day the holding drum water reservoir will be filled with water and a grout will be made up in the half barrel to line the hoses [RA01 COSHH Hazards COSHH Prime-A-Pump]. Mould oil will be sprayed [COSHH 010 Mould Oil, RA013 Use of Mould Oil] onto the concrete pump and holding drum to help stop the concrete sticking.
- 8.25.** All plant and equipment will be checked daily for fluid levels and topped up when necessary [COSHH 006 Gas Oil, COSHH 007 Oils and Greases, RA01 COSHH Hazards]. A spill kit will be position near the topping up procedure. Any defects will be recorded in the daily pre-inspection book.
- 8.26.** The swivel situated on the drill head will be greased daily, if the MEWP is needed to access the drill head **8.3** needs to be followed before using the MEWP.
- 8.27.** When the holding drum requires moving it will be lifted off its bearers using lifting chains. Then, dragging chains will be placed on the excavator and the other end attached to the holding drum. It will then be dragged into the new position (the dragging chains will then be removed) and raised using the lifting chains and the bearers placed under the runners of the holding drum. The concrete pump will be moved by the excavator and placed in front of the holding drum. **AT NO POINT WILL THE DRAGGING CHAINS BE USED FOR LIFTING.**

9. Fabricating Steel Reinforcement

- 9.1** The cages will be made on site by Sub-Contractor steel fixers.
- 9.2** The banksman will place a shackle and 2 leg 10mm chain sling on to the arm of the excavator and instruct the machine operator to lower the chains over a bundle of steel, the chains will be wrapped around the steel [See Lift Plan] [or the single use nylon sling will be used to lift the bundle of steel] the banksman will instruct the machine operator to place a bundle of steel reinforcement on to the cage stands. [A safety line will need to be used if moving long steel]. Once the single use slings have been removed from the steel they must be destroyed by cutting in half and putting in the general waste skip.
- 9.3** The steel fixer will remove the [RA06 Manual Handling Operations] required number of bars from the bundle and feed a helical around them, they will then tie the bars to the helical using tie wire in line with the specification and schedule.
- 9.4** The site supervisor will inform the steel fixer where to place the lifting point on the cages, the steel fixer will ensure that the designated lifting point is tied correctly and then highlighted for the banksman using marker spray.
- 9.5** When completed they will remove the cage from the stands and place it on the floor.
- 9.6** If making heavy cages, [See Lift Plan] chains will be fitted to the excavator and attached to the cage and the cage will be moved off the stands by the machine operator instructed by the banksman and placed in the designated area.
- 9.7** When moving cages around site 2x flat sling will be threaded through the cages and attached to the 2 leg 10mm chain sling. A guide rope will be attached to one end and the banksman will instruct the excavator operator to move to the designated area. The fabricated cages will then be lowered on to bearers and the flat slings removed.
- 9.8** Repeat **9.2** to **9.5** till right number of cages are completed.

10. Priming and Pumping Concrete

- 10.1.** Concrete will arrive at intervals throughout the day and be banked on to the pump by the pump operator. The pump operator will check the concrete ticket [Check mix and slump is correct] and slump test one load per day [If concrete mix is poor slump more often might be required] before putting it in to the concrete pump. Any problem with the concrete mix contact concrete batcher and refuse load, then inform contract team.
- 10.2.** The pump operator will make sure that the lorry driver is wearing the correct PPE [Safety Glasses, Hard Hat, Hi-Viz clothing, Safety Boots and water-resistant gloves], before he starts discharging.
- 10.3.** The pump operator will pour most of the grout into the T-Piece going to the rig then he will attach the blanking end with a clamp and secure with a clevis pin, he will then place 2 buckets of grout into the hopper on the concrete pump. [RA01 COSHH Hazards, COSHH Prime-a-Pump] Whip checks will be placed from all metal to rubber hoses.

- 10.4. The lorry driver will start discharging the concrete [RA01 COSHH Hazards, COSHH 004 Concrete] into the hopper of the pump when instructed to do so by the pump operator, the pump operator will check the change over valve is open to the holding drum, then he will start the holding drum and place in reverse and then start the concrete pump, he will then instruct the lorry driver to keep the hopper full at all times and then commence pumping 10 strokes into the holding drum, he will then stop and back pump 8 strokes and then change the change over valve to the rig and start pumping to the rig.
- 10.5. Once the banksman see's concrete exit the bottom of the auger he will signal to pump operator to stop, he will then back pump 8 strokes and change the valve over to the drum and continue pumping until the lorry is empty.
- 10.6. Repeat 10.4. to 10.5. on each load of concrete delivery through out the day.
- 10.7. When the concrete lorry is empty the pump operator will stop pumping and instruct the lorry driver to wash out in the bund. When washed out the concrete lorry will be banked off site.
- 10.8. When ready to pump concrete to the piling rig, the pump operator will access the crow's nest on the holding drum [RA 14 Piling Rig – Working at Height], he will ensure the changeover valve is ready to pump to the rig and turn the holding drum ready to discharge into the pump operator.
- 10.9. When the banksman gives the pump operator the signal to start pumping, he will put the pump in forward pump and start discharging the holding drum to keep the hopper full on the concrete pump and keeping a close eye on the banksman for any signal to stop.
- 10.10. Once the banksman has signalled the pile is complete the pump operator will back pump 8 times and change the valve over. He will then pump half dozen pumps back into the drum keeping the system moving. He will back pump 8 times again and change the valve back over to go to the piling rig.
- 10.11. If working in hot weather the concrete system will be moved **every 15 mins**, by pumping concrete through the rig system and holding drum system.

11. Piling Operations

- 11.1. Sweet Project Holdings will issue a permit to dig. [Make sure services drawing is also attached]
- 11.2. The piling rig is always banked around site by the banksman.
- 11.3. All mobile phones are banned while operating any plant or equipment.
- 11.4. When piling close to the site boundary make sure that the client has provided protection to vehicles and the public by erecting protective barriers. If none has been provided speak with the site manager about the risks involved before work commences.
- 11.5. If the site supervisor or banksman thinks the piling mat is unsuitable for purpose they must **stop** work and inform the site manager to rectify. If an obstruction is removed from the piling mat, once the piling mat has been reinstated correctly as the piling mat design, the site supervisor will require the site manager to complete the working platform certificate.
- 11.6. The rig operator will be position over a pile position, when in position the operator will level the rig and wait for instruction.
- 11.7. The banksman will place a setting out ring over the pin position and then remove the pin.
- 11.8. He will then position the auger over the setting out ring and signal to the rig driver when it is in position. He will then instruct the operator to raise the head and remove the ring.
- 11.9. The rig operator will then lower the foot to stabilise the rig.
- 11.10. [First pile of the day only when grouting the system]. The rig operator will then make sure the area in front of the rig is clear and signal to the pump operator to commence pumping when concrete appears out of the bottom of the auger the banksman will signal to the pump operator to stop pumping.
- 11.11. The banksman will instruct the rig driver to lower the drill head, he will check the teeth of the auger before starting each pile, if they need replacing he will signal the rig operator that they need replacing.
- 11.12. The banksman and pump operator will prepare a cage by placing de-bonding and a set number of spacers on to the helical and then moving the cage into position for lifting. [RA06 Manual Handling Operation]
- 11.13. An exclusion zone will be created using pedestrian barriers being positioned approximately 3.0m from the auger on two sides at the front of the rig with 'no entry' signage and the excavator will be positioned to become the barrier for the third side. No site personnel are allowed in the exclusion zone while the auger is rotating. The rig operator will not commence drilling until the exclusion zone is in place.



- 11.14. **Safety Procedure:** The gate bar must be removed from the clasp once the gates have been opened or closed it must not be left in the clasp at any time. The correct length bar must always be used. [RA04 Working with Operating Plant]
- 11.15. The rig driver will check the pile number on his piling schedule then input it into the DMS computer system then he will commence drilling down to the design depth.
- 11.16. **Safety Procedure:** When opening or closing the gates the auger will not be rotating. [RA04 Working with Operating Plant] The gates will be opened if the depth of the pile exceeds 15.0m the gate will be opened once the drill head has reached the top of the star wheel cleaner. The banksman will wait for the operator to stop rotating the auger and signal that he may enter the exclusion zone. He will open the gates then remain on the front of the rig while the gates remain open. He will monitor the concrete hoses and hydraulic hoses as the drill head lowers and raises making sure they do not get snagged and stop all unauthorised personnel entering the area. If the rig driver cannot see the banksman the rig operator will STOP drilling until the banksman is in position.
- 11.17. When the pile is drill to the design depth the rig operator will then signal to the pump operator via the banksman to commence pumping.
- 11.18. **Nobody is allowed in the exclusion zone while the auger is rotating. If anybody enters the area the rig operator will stop work until they leave the exclusion zone area.**
- 11.19. **Safety Procedure:** If during the pumping operations a tip blockage should occur in the concrete system, the pump operator will back pump the concrete pump and try pushing the system again. If the blockage does not clear he will then cease pumping and back pump at least 8 times. [RA13 Unblocking CFA Concrete System] The augers will be back rotated out of the bore until the tip can be accessed and the blockage cleared. The pile will be over drilled by approx. 500mm beyond designed depth. If the concreting procedure is stopped for any reason, the rig operator will re-drill back into the concrete a minimum off 200mm then start re-forming the pile.
- 11.20. As the auger is extracted concrete is pumped down the centre of the auger. The augers will be cleaned during extraction by the flail cleaner and the star wheel once the gates have been closed.
- 11.21. **Safety Procedure:** No spoil is to be left on the auger above the auger cleaners. If the banksman or pump operator observe spoil remaining on the auger after going through the auger cleaners, they must stop concreting and inform the rig operator. The operator will drill the augers back into the brushes until the spoil is removed. If the spoil is still present on the auger, the auger will be drilled back into the pile to loosen the material, [RA04 Working with Operating Plant] if spoil is still present the excavator operator will be instructed to break the spoil with his bucket under instruction from the banksman. At no time should an operative use his hands to remove spoil.
- 11.22. When clear the rig driver will signal to the pump operator via the banksman to commence pumping.
- 11.23. The gates will be shut once the drill head has cleared the star wheel cleaner. The operator will signal to the pump operator to stop pumping. He will then stop rotating the auger and instructed the banksman that the exclusion area at the front of the rig is safe to enter. The banksman will close the gates and leave the exclusion zone, he will then signal the operator that it's ok to continue, the operator will signal to the pump operator to commence pumping, the operator will drill the auger 200mm into the concrete then continue lifting the auger out of the pile.
- 11.24. When at top of pile, the rig operator will leave the auger 500mm in the pile until concrete is showing at the base of the pile. He will signal to the pump operator via the banksman to stop pumping.
- 11.25. The rig operator will raise the foot off the ground, slew left and right and jib back the mast 10°. He will then be instructed to reverse away from the pile position.
- 11.26. The banksman will then instruct the excavator driver to remove the spoil from on top of the pile. The arisings will be moved away from the piling operation via 360° excavator and dumper to be stored for removal off site.
- 11.27. The pump operator will clean out the top of the pile [RA01 COSHH Hazards, COSHH Concrete] using a graft, while the banksman attaches a shackle and chain [see Lift Plan] to the arm of the excavator. The banksman will place the chain on the designated lifting point, then instruct the excavator operator to lift the cage and place it over the pile. The banksman will then instruct the operator to lower the cage into the pile assisted by the pump operator until the cage is at ground level. If required, the chain will be removed, and the operator will be asked to tap the cage down to ground level. The cage will then be centralised. Protection will then be place over the constructed pile.
- 11.28. Repeat 11.6 to 11.27 until job is complete
- 11.29. The auger pins will be changed every two weeks and the coupling split, cleaned and re-greased.
- 11.30. The swivel on the swan neck will be greased near the end of every shift. Either by mobilising the MEWP 8.3 or by completing the procedure at ground level. [RA01 COSHH Hazards]
- 11.31. **Straight/Open Bore:** Where the ground is found to be dry and stable, the auger will be drilled down to 500mm short of the required depth, it will then be extracted by forward rotating the auger and using the auger cleaners to clean the auger flights. When the auger is out of the pile the rig driver will raise the foot and back off the pile position, the banksman will instruct the machine operator to clear the spoil. Once clear the banksman will signal to

the rig driver to move forward to the pile position, he will set the auger over the pile and instruct the rig driver that its ok to commence drilling, the rig driver will lower the stabilizing foot on to the working platform and commence drilling. Once the required depth has been achieved the rig driver will stop rotating the auger and extract the auger from the pile. If the pile needs the extension the flight catcher will be used to hold the auger flight while the extension is closed. Once out of the pile a cover will be placed over the void to stop spoil falling in, the spoil will be moved away from the top using a shovel and the pile will be measured using a tape.

11.32. The cage will be inserted in the pile as **11.27**. No piles will be left open without protection.

12. Cleaning the Concrete System

- 12.1. Any remaining concrete will be pumped through the system.
- 12.2. The compressor will be started and a compressor hoses attached, whip checks will be placed on both connectors.
- 12.3. The piling rig will be position as reasonably practicable as far from the hoarding or other plant / personnel on site. The blow out drum will be positioned in front of the rig and the operator will drive into the drum and lower the auger insuring the outlet hole is facing away from the foot.
- 12.4. **When releasing any concrete clamp whether under pressure or not the goggle face mast must be worn by the operative.**
- 12.5. The pump operator will back pump the concrete pump a minimum of 8 strokes to reduce the pressure in the concrete system, he will then make sure the changeover valve is in the drum pumping position, he will then remove the clevis pin and open the concrete clamp on the delivery hose and rest the concrete hose on a hose stand.
- 12.6. The pump operator will then place a 5" hard ball in the delivery hose and attach the ball blower to the delivery hose using a rubber and one bolt concrete clamp and tighten. He will then attach a compressor hose to the rear of the ball blower using a whip check between connectors.
- 12.7. The pump operator will then open the outlet valve on the compressor and wait for the 5" hard ball to exit into the holding drum, he will then close the outlet valve and remove the ball blower.
- 12.8. Water will then be placed into the delivery hoses once full a 5" soft ball will be inserted into the hoses and the ball blower attached using a rubber and one bolt concrete clamp and tighten. Once ready he will open the outlet valve on the compressor and wait for the soft ball to exit into the holding drum.
- 12.9. **Safety Procedure:** The site supervisor/ rig operator will assess whether to blow out in 2 or 3 stages depending on amount of concrete hoses, extension bar fitted and concrete consistency.
Two Stage:
- 12.10. The banksman or rig driver will assist the pump operator in placing a 5" hard ball into the delivery hose and then attach the ball blower using a rubber and one bolt concrete clamp and tighten. The changeover valve will then be changed to the placement hoses going to the rig.
- 12.11. The piling rig will be banked into a position to blow out and a blow-out drum will be placed under the auger and the auger lowered inside. A board will be placed in front of the opening of the blow out drum and the machine operator will be instructed to place his bucket on the board.
- 12.12. The rig driver will then position himself in a safe area to stop anyone approaching the rig and signal to the banksman to open the outlet valve on the compressor. **[RA12 Cleaning CFA Concrete System]**
- 12.13. When the 5" hard ball has exited the bottom of the auger into the blow out drum and the rig operator has located the ball, the rig driver signals to the banksman to shut the outlet valve on the compressor.
Three Stage:
- 12.14. The banksman or rig driver will assist the pump operator in placing a 5" hard ball into the delivery hose and then attach the ball blower using a rubber and one bolt concrete clamp and tighten. The changeover valve will then be changed to the placement hoses going to the rig.
- 12.15. The banksman will sling the concrete hoses on the back of the rig and attach the other end to the chain and shackle on the excavator arm. He will then remove the clevis pin from the clamp and at arm's length open the clamp. Once the concrete hose has been released he will instruct the excavator operator to move the hose to the blow out skip, once on place the excavator will hold the hose while the banksman attaches the concrete hose to the blow out skip using a rubber and one bolt concrete clamp and tighten.
- 12.16. The rig operator will then position himself in a safe area to stop anyone approaching the rig and signal to the banksman to open the outlet valve on the compressor. **[RA12 Cleaning CFA Concrete System]**
- 12.17. When the 5" hard ball has exited the placement hoses into the blow out butt the rig operator has located the ball, the rig operator signals to the banksman to shut the outlet valve on the compressor.
- 12.18. The clevis pin and clamp will be removed from the concrete hose attached to the blow out drum and the excavator operator will be instructed to place the placement hose back to the piling rig it will then be attached using a rubber and one bolt concrete clamp and tighten. The sling will then be removed from the chain on the excavator arm and from around the concrete hoses and stored in the container.

- 12.19. The banksman or rig operator will remove the clamp holding the ball blower and insert a 5" hard ball then reattach the ball blower using a rubber and one bolt concrete clamp and tighten.
- 12.20. The piling rig will be banked into a position to blow out and a blow-out drum will be placed under the auger and the auger lowered inside. A board will be placed in front of the opening of the blow out drum and the machine operator will be instructed to place his bucket on the board.
- 12.21. The rig operator will then position himself in a safe area to stop anyone approaching the rig and signal to the banksman to open the outlet valve on the compressor. [RA12 Cleaning CFA Concrete System]
- 12.22. When the 5" hard ball has exited the bottom of the auger into the blow out drum and the rig operator has located the ball, the rig driver signals to the banksman to shut the outlet valve on the compressor.
- Water Wash Out:**
- 12.23. The ball blower is removed from the delivery hose and water is poured into the delivery hose, when full a 5" blow out ball will be placed into the concrete hose, the ball blower will then be attached by rubber and one bolt concrete clamp and tighten to the delivery hose.
- 12.24. The rig operator will again position himself in a safe area and stop people approaching the rig and signal to the banksman to open the outlet valve on the compressor, when the soft ball has exited the bottom of the auger and been visually located the rig operator will signal to the banksman to close the outlet valve.
- 12.25. The rig operator will instruct the excavator driver to remove his bucket and the board will be removed and stored off the plot. The blow out balls will be retrieved and cleaned and placed in the water butt.
- 12.26. The rig operator will raise the auger and be reversed by the banksman away from the area. The blow out drum and skip will be cleaned daily and removed and placed at the side of the plot and the excavator will clean up the blown-out concrete.
- 12.27. The ball blower will be removed from the compressor hose the valves opened and wash thoroughly in the water butt, the compressor hoses will be coiled up and stored securely.
- Blowing Out System Blockage**
- 12.28. If a blockage in the concrete system occurs while blowing out, the compressor will be turned off and the outlet valves opened to release the trapped compressed air, the outlet valve on the ball blower will then also be opened controlling the release of any trapped air. [RA13 Unblocking the concrete system] Once all air has been released a decision will be made as to where the blockage has occurred. An operative will place a full head visor over his face before removing the clevis pin from the clamp and at arm's length open the clamp arm; all other site operatives will be a minimum of 5 meters away from the blockage area. If air is escaping when the arm is open the clamp will be left until no pressure is heard, again at arm's length the operative will commence opening the clamp. When the clamp is off the blockage will then be cleared. The pipe will then be reconnected with the clamp and secured with a clevis pin before blowing out can commence. If the placement hose or hanging hose are blocked they will be attached to the blow out skip to stop any whipping when the blockage releases.
- 12.29. The pump operator will put the holding drum in reverse and wash out all the concrete into the hopper of the concrete pump, when clean the pump operator will place the pump in reverse and wash all the concrete off the concrete pump and metal hoses. The pump operator will tidy up any excess concrete under the concrete pump.

13. Securing Site Plant & Equipment

- 13.1. The piling rig will be banked in to a designated area to park, he will level the rig, lower the auger on to the ground and then lowered the foot on to the piling mat. The rig operator will turn off the rig and remove the keys and tablet; he will then lock all the doors on the rig making sure everything is safe then turn off the mobiliser lever.
- 13.2. The pump operator when finished will be assisted by the banksman and place all the metal work on the concrete pump, they will then place all the remote controls, tools, chains and equipment in the container and close and lock the door.
- 13.3. The 150cfm compressor will be chained and padlocked to the rear of the holding drum.
- 13.4. All site security fencing will be erected if removed by Central Piling before leaving site.

14. Plant & Equipment De-Rigging

- 14.1. The rig operator will be banked into a position to de-rig in the middle of a plot and erect a 7.0m exclusion zone in front of the rig. The MEWP [RA10 Use of MEWP on Site] operator will complete the pre-inspection checks on the MEWP put on a safety harness, he will start the MEWP on the ground and lower the boom, when lowered he will climb in the basket and attached the lanyard to the anchor point. The MEWP operator will drive the MEWP into a position on stable ground, so that he can slew the MEWP into the auger string to remove the auger pins and attach the sling chain.

- 14.2. Safety Procedure: When disconnecting the auger string at NO TIME WILL THE HEAD BE BACK SPUN. While disconnecting the couplings the MEWP operator will keep his hands well away from the couplings once he has removed the auger pins.**
- 14.3.** The rig operator will lower the auger on to the ground and the banksman will open the gates, the MEWP operator will swing the MEWP into a position to remove the auger pins in the coupling, once removed he will signal to the rig operator via banksman to raise the second line, when in the correct position the MEWP operator will attach a sling chain to the auger and on to the swivel hook, he will then swing the MEWP away from the rig. Under instruction from the banksman the rig operator will raise the drill head, once the augers had come apart he will lift the second line and then lower the auger into a position to be collected.
- 14.4.** Once the auger is on the ground the banksman will remove the sling chain and signal to the operator to raise the ancillary line. The operator will then lower the drill head until the auger is on the ground. This procedure is repeated until all the augers have been removed.
- 14.5.** Once the augers have been removed the banksman will instruct the rig operator to lower the drill head on to the bottom stops. The MEWP operator will slew in and signal to the rig operator via the banksman to raise the ancillary line, when in position he will attached the swivel hook to the lifting eye on the reaction bar and slew away from the rig.
- 14.6.** The securing clip and pin will be removed by the banksman at the base of the bar, he will then signal to the rig operator to lift the ancillary line, when the reaction bar is clear of the spectacle on the extension bar, he will signal to the rig operator to lower the bar on to the ground into a position for loading. He will then remove the swivel hook.
- 14.7.** The MEWP operator will slew into the extension bar and signal to the rig operator via the banksman to raise the ancillary line, when in a position to connect the hook to the lifting hook on the extension bar and then slew away.
- 14.8.** The banksman will signal to the rig operator to raise the ancillary line and when the extension bar is clear of the drill head the operator will jib forwards, then left, once clear he will lower the reaction bar and jib back. He lower the extension bar so the coupling is up against the track and then lower the bar to the ground, in a position for loading.
- 14.9.** The bankmans will remove the hook from the lifting eye and instruct the operator to lift the ancillary line and once in position will instruct him to lower the second line through the centre of the drill head.
- 14.10.** The rig operator and banksman will start de-rigging the piling rig, under instruction from the banksman the rig operator will lower the mast to approximately 22°. The travel bars will be removed and stored on the rig, the tracks will be walked in and when in closed position, the track pins will be inserted.
- 14.11.** The bankmans will instructed the operator to straighten the body of the rig and once in the correct position he will insert the slew pin and secure.
- 14.12.** The operator will then level the mast and the banksman will remove the pin on the hydraulic arm and push into transport position then replace the pin in the arm.
- 14.13.** The travel frame is then connected behind the lower mast section and pins clips inserted. The operator will then jib back until the weight of the top section of mast is taken on the two springs on the travel frame. The two masts pins will then removed and stored on the rig.
- 14.14.** The operator will feed out the main line rope off the drum until 3 rings are left on the drum, the banksman will pull the ropes out in equal length through the sheaf wheels. Once ready the operator will lower the mast down on to the cradle. Then push the override button to finish off the mast lowering. The banksman will ensure no ropes or hoses get snagged. [RA14 Working at Height, RA02 Working with Wire Rope]
- 14.15.** The banksman will make sure all ropes are positioned on the top and bottom of the mast and the MEWP operator will place two ratchets straps either side of the top mast joint and tighten.
- 14.16.** A mast prop will then be place at the rear of the mast and the rig operator will reverse on to the prop to take the weight of the rear mast pins. The MEWP operator will remove the mast bolt and pin and disconnected the electric, the banksman will the instruct the rig operator to track forward and remove the prop.
- 14.17.** The turnbuckle on the 180° concrete pipe will be removed and the pipe will be pushed down ready for the rear section of mast to be pushed round until the mast bar can be positioned and the operator again reverses back taking the weight on the rear section and the red travel bar is then inserted through the two mast sections and a auger pin is inserted secured with a clevis pin, the mast prop will then be removed and stored on the rig.
- 14.18.** The turnbuckle is then connected and tightened on the travel frame.
- 14.19.** The MEWP operator when finished will drive the MEWP into a position ready for collection; he will then release his lanyard from the anchor point and climb out of the basket and remove the key.
- 14.20.** All the holding drum and concrete pump equipment will be taken apart by the pump operator will either be placed around the pump ready for loading or in the container.

15. De-Mobilizing from Site

- 15.1.** The low loader will arrive at the entrance of the site and be instructed by the site supervisor where to disconnect the trailer. The unit will be disconnected from the trailer and parked away from the entrance, protection boards will be

laid on the road and when ready the banksman will signal to the rig driver to commence loading the rig. [RA03 Working on Public Highway]. The rig will be banked onto the low loader.

- 15.2. Hi-ab lorries will arrive on site to collect the concrete pump, holding drum, small container, ramp, compressor, augers and other equipment. It will be banked by the banksman into a position to load. Lorry restraints will be placed around the lorry bed before the banksman climbs on to the lorry. The pump operator will assist [RA05 Mechanical Handling Operations] with the loading. When loaded the Hi-ab lorry will then be banked off site by the banksman.
- 15.3. A hire company will arrive on site and collect the MEWP; The MEWP will be parked into a position for loading before the crew leaves site.
- 15.4. Before leaving site, the site supervisor will check around site to ensure the test pile is highlighted and has bunting attached. He will ensure everything has been collected and the site has been left in good order, he will then speak to the site manager before he leaves site. If items are left on site, he will take photos of the items and check with the transport manager when it is being collected and inform the site team.

16. Environmental Procedures

- 16.1. Central Piling has achieved **ISO14001 Environmental Management Standard** and have developed a Environmental policy. We are committed to achieving good environmental practices and operating in a sustainable manner.
- 16.2. We will endeavour to minimise concrete wastage, prevent pollution and continually improve our environmental activities whilst operating on site.
- 16.3. We will work closely with Sweet Project Holdings to ensure any environmental issues are managed quickly and efficiently.
- 16.4. Spill kits will be kept on the piling rig and near the diesel bower. Blankets will be used to catch any spillages when refuelling.
- 16.5. Drip trays will be placed under all static plant, and any spillages will be collected in spill blankets and returned in blue contaminated bags to our yard for disposal.
- 16.6. All contaminated liquids will be placed into waste oil drums and returned to the yard for disposal.
- 16.7. COSHH material containers will be kept in the COSHH store, in the site container or in drip trays while not in use.
- 16.8. Any drains or water courses which are situated close to the piling works will need to be managed by the client to ensure there is no contamination, we will endeavour to prevent any contamination resulting from the piling operations. [RA11 Environmental Issues]
- 16.9. Tree branches/bushes need to be trimmed approximately 1.0m back from any pile positions; we will not drill through foliage to construct a pile as this could result in damage to the tree/bush and piling rig.
- 16.10. Any environmental issues [safety concerns, spillages, leaking/burst hydraulic hoses] will be recorded as a non-conformance and be discussed in the monthly HSQE management committee meeting.

17. Quality Procedures

- 17.1. Central Piling have achieved **ISO 9001 Quality Management Standard**, which demonstrates the necessary skills required to quality manage our activities, products and services. It is also a measure of reliability, consistency and commitment to supply quality to our existing and potential customers.
- 17.2. A pile design and working platform design will be sent to the client prior to the piling rig arriving to site.
- 17.3. A member of the contract team will visit site and complete a site visit and produce the RAMS for the contract.
- 17.4. On commencement of the contract the operations supervisor will be on site to sign up a Quality Check sheet before drilling commences. He will make sure all drawings, pile loadings, mat levels, debonding levels, cubes and test pile information is correct and complete a handover to the Site Supervisor.
- 17.5. The site supervisor will be given a contract information file, with all required information for the contract. All safety information and pile schedule are uploaded to the site tablet. These are recorded on the daily record sheet in the cab and on the on-board computer. After each shift the daily record sheet is sent to the office for booking in.
- 17.6. The information is collated with the information on the DMS system [onboard rig] and checked with the CP logistics system before being booked in, these checks make sure drilled information is correct [depth, reinforcement and wastage] on all piles.
- 17.7. If Central Piling are contracted to provide a setting out engineer, the engineer will set out all pile positions required daily, check the piling mat level and instruct the operator if details have changed and once constructed will complete an as-built survey. They will speak to the operator immediately if the pile is 100mm out of position, he will also compile and send in file to the office weekly with all the as-built surveys.
- 17.8. Cubes are taken (if requested by the client) by a UKAS accredited company. These cubes are tested at 7 and 28 days to confirm the strength of concrete, if required a 56-day cube can be taken. Results are released after testing.

- 17.9. Integrity testing takes place if requested by the client at a minimum of 7 to 10 days after the piles were installed. The client needs to ring the Central Piling office giving a minimum of 3 days' notice and inform when they will be ready ensuring no reinforcement beams are in place; a specialized company arrives on site and tests the integrity of the pile. Results are released after testing.
- 17.10. Any problems with the quality of our works will be logged as a non-conformance report [Action Log] and this will be discussed in our weekly and monthly meetings.
- 17.11. Members of the contract team will monitor the production and quality daily

18. Site Specific Information

- 18.1 Prior to breaking ground, the client is to confirm that up to date service drawings have been checked against the proposed pile positions and ensure that no underground services exist close to the proposed pile locations [RA15 Site Specific Information].

Working in Close Proximity to Network Rail Asset

- 18.2 It is acknowledged that the site is bounded by a Network Rail asset, this is shown on Appendix D.
- 18.3 All the piling mats will be designed by a Central Piling engineer with information from the Soilmec SF65 loading criteria datasheet. [See Soilmec SF65 spec Sheet]. Timber baulks will be provided at the perimeter of the piling mats to stop the rig tracking off the edges.
- 18.4 Any pile positions further than approx 33m (see fall diagram for Soilmec SF65 in Appendix D) from the boundary of the live railway track will be piled as stated in Section 12 Piling Operations. The 33m zone is based on the rig being 30m tall plus a 3m allowance.
- 18.5 When working within the 33m restricted zone the following extra measures will be followed by Central Piling at all times. A Soilmec SF65 will be used as a specialist piling rig in this area.
- 18.6 The piling mat will be visually inspected by Rig Driver/ Site Supervisor and the banksman before the rig enters the restricted area. Any problems will be rectified to the rig driver's satisfaction before the rig moves.
- 18.7 The rig driver will jib the mast back 10 degree and wait for instruction from the banksman.
- 18.8 The banksman will bank the rig into a position so that when it enters the restricted area the rig will always be perpendicular to the live railway tracks, the rig will not sprag when it is in the restricted area (See Appendix C).
- 18.9 The Banksman will bank the rig over the pile position and advise the driver to level the mast, when level the banksman will bank the rig by signalling to the rig driver to track or slew the rig so the auger is over the pile position.
- 18.10 When set up on the pile position procedures in section 12 Piling Operations will be followed.
- 18.11 Before moving off the pile position the rig driver will raise the foot and jib the mast back 10 degrees then wait for instruction from the banksman.
- 18.12 The banksman will visually check the piling mat before banking the piling rig straight back on to the next pile.
- 18.13 Procedures 18.6 to 18.12 will be followed until the piling rig comes out of the restricted area.
- 18.14 When out of the restricted area the banksman can bank the rig by spragging the rig into a position that it can enter the restricted area and be banked in a straight line to the next line of pile.
- 18.15 The piling rig when moving in the restricted area will have the mast jibbed back 10 degrees at all times.
- 18.16 The NR emergency procedures must always be available within the site office and are shown in Appendix B. The Network Rail Emergency Number is 03457 114141.
- 18.17 Sweet Project Holdings will provide a physical and visual barrier on site to mark the extent of the Network Rail boundary. At no point will any plant be permitted to oversail this zone including the attendant excavator.
- 18.18 All piles will be installed with a reinforcement cage. The typical length for these is 8-10m and they will be installed with the Excavator.
- 18.19 When installing pile cages the Excavator will be positioned at the front of the piling rig in a similar position to its location when clearing spoil. It will not be permitted to slew or oversail the Network Rail boundary [RA15 Site Specific].
- 18.20 Appendix D shows the location of the plant to be used on site and indicates the working area for the MEWP whilst in use. The location of the excavator whilst installing steel reinforcement is also indicated.

Working Close to Thames Water Asset

- 18.21 It is acknowledged that the site is crossed on the South Eastern corner by the Crane Valley sewer, a Thames Water asset.
- 18.22 The pile layout drawings from Hurley Palmer Flatt (HPF-0471-EC1-F2-DR-S-181 50/60/112/115) show the location of the piles and the Thames Water assets. A 12m exclusion zone is marked on the drawings, pile positions must be

outside of this exclusion zone and no plant shall be permitted to operate within the area. A typical example of these drawings is shown in Appendix E for clarity.

- 18.23** Where the sewer runs through the site, Sweet Project Holdings will need to place a physical barrier on the piling mat at the edge of the exclusion zone to ensure that the rig does not encroach within the area.
- 18.24** The owner of the specific asset will be consulted by Sweet Project Holdings to determine the necessary exclusion zone and conditions to be followed whilst working in the area.
- 18.25** All proposed pile positions must be undertaken with consideration for the requirements set by the Thames Water Guidance for working near their assets.
- 18.26** The piling rig will not be positioned over the asset at any point during the operation. CFA piling causes negligible vibration and soil displacement, therefore creating negligible PPV impact on the asset. Frictional capacity will not be considered in the top 3m of the pile, further reducing impact on surrounding strata and any services it may contain.

Working in Close proximity to a Canal or River

- 18.27** It is acknowledged that the site is bounded to the South/South West by the Grand Union Canal and all site activities must be undertaken with mitigation measures to ensure that the watercourse is protected (the location of the Canal is shown in Appendix D). Any works within 9m of the canal must be compliant with the following.
- 18.28** At no point will the Piling Rig be positioned in such a way that it can surcharge the canal wall. Sweet Project Holdings will advise on the extent of the exclusion zone and mark on site.
- 18.29** A fence will have to be emplaced at the canal edge to ensure that no personnel or equipment can fall into the canal. Debris netting will have to be emplaced by Sweet Project Holdings at a height of 3m along the canal edge.
- 18.30** Extra vigilance will be taken by the Rig Driver when removing spoil from the auger string with the auger cleaner to ensure that none is flicked over the debris netting.
- 18.31** Sweet Project Holdings will need to emplace a bund formed from sandbags and polythene to stop waste water from entering the canal at any stage. Removal of this waste water will have to be undertaken by Sweet Project Holdings in a safe and controlled manner to reduce risk of breaching the bund.

Central Piling cannot be held responsible for any damage or incident relating to the Thames Water Sewer, Network Rail asset or Grand Union Canal.

CORONAVIRUS EXTRA SITE PRECAUTIONARY MEASURES

- 18.1** **Travelling to site** – Site employees where possible will travel to site in separate vehicles, arrangements will be made for parking on site [if possible]. Travelling to site by public transport should be avoided.
- 18.2** If multiple members of staff need to share the same vehicle they should ensure that they only share with the same individuals, the number of people in the vehicle must be kept to a minimum.
- 18.3** Try to ensure that good ventilation is maintained by keeping windows open, even if only slightly. Always make sure that the fans are not set to re-circulate air in the vehicle.
- 18.4** If using a vehicle it should be cleaned on a regular basis using gloves and standard cleaning products, always ensure that a packet of antibacterial wipes and a bin bag are available. Any items used for cleaning must be disposed of immediately after use.
- 18.5** If travelling to site via public transport cannot be avoided, all persons must ensure that they wear a face covering, avoid touching their faces and wash their hands with soap and water for 20 seconds before and after travel. Always ensure that you have antibacterial gel available.

Site Working

- 18.6** All entry systems that require skin contact will be removed, If required to sign in/out of site this will be done by one crew member and will be situated close to a sink or toilet block so hands can be washed and sanitised immediately afterwards.
- 18.7** When entering or leaving site ensure you keep a minimum distance of two metres from other operatives.
- 18.8** Operatives must wash hands regularly with soap and fresh water. Hands needed to be dried using disposable hand towels which should be immediately placed in a bin after use.
- 18.9** If you do need to use the canteen facilities make sure you keep 2 metres away, ensure that the area is sanitised before and after use.
- 18.10** The toilet or drying room facilities should only be used one at a time, ensure you wash your hands once finished.
- 18.11** When working on site make sure you keep a minimum distance of 2.0m from other site operatives, use the excavator where possible to lift equipment. If required to working at 1.0m distance, full face covering shield must be worn. Do not work closer than 1.0m apart.

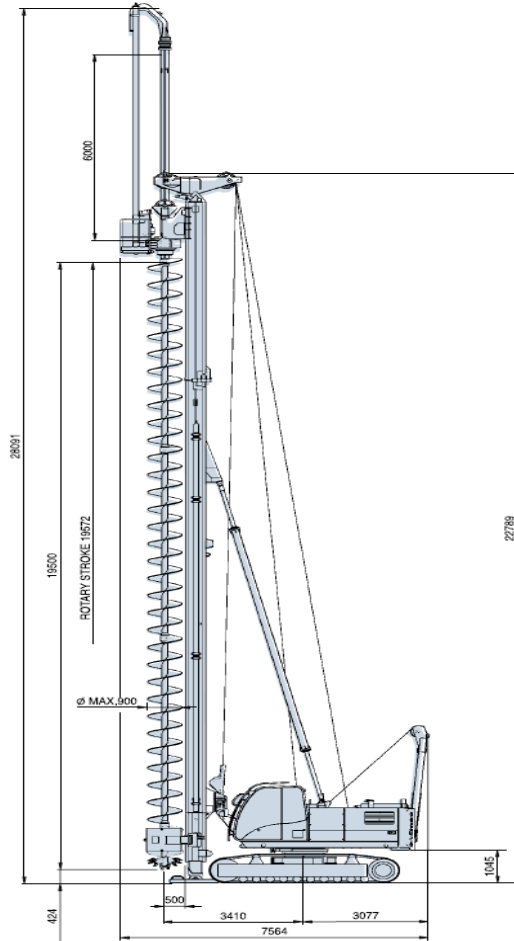
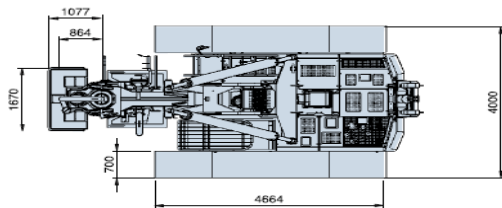
- 18.12** If any situation arises where the excavator cannot be used and two operatives are required to work within the 1 metre with a full-face covering shield, work must cease, and a manager informed immediately.
- 18.13** Do not share PPE, telephones or the tablet, one person to complete the tasks on the tablet. [Pre-inspections and weekly checks]
- 18.14** Working platform certificate will be accepted by an email from the principle contractor stating the mat has been installed as stated in the design.
- 18.15** If any of the operatives have any symptoms of the coronavirus [See www.nhs.uk/conditions/coronavirus-corvid-19/ or phone 112 for advise] they must stay at home and self-isolate for 7 days. If someone in their house has symptoms, they must self-isolate for 14 days.
- 18.16** Delivery tickets will not be signed, inform the Procurement Manager who will confirm with the delivery company.
- 18.17** There should only be one Operative driving the rig, there should not be changes in roles throughout the works. If the driver needs to be changed the cab should be wiped down with disinfectant wipes.

Appendix A:

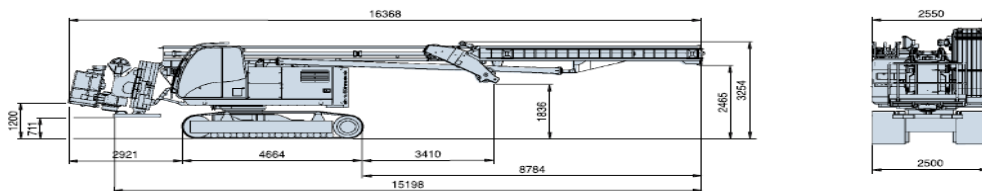
SF-50

HYDRAULIC CFA ROTARY RIG

Working Condition



Transport Condition



Appendix B:

HS032 V1.2 April 2020

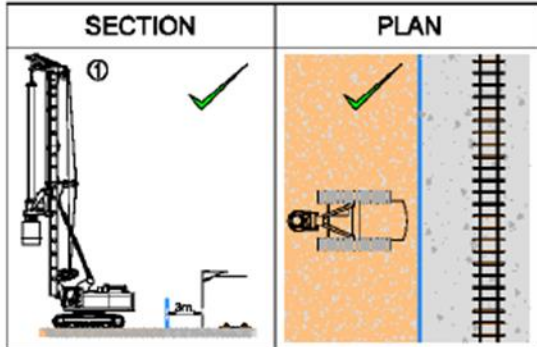
Site Emergency Procedures

After every emergency and when the site is safe contact senior management and inform them of the incident.
Take photos and record times of events for reference when completing a report.

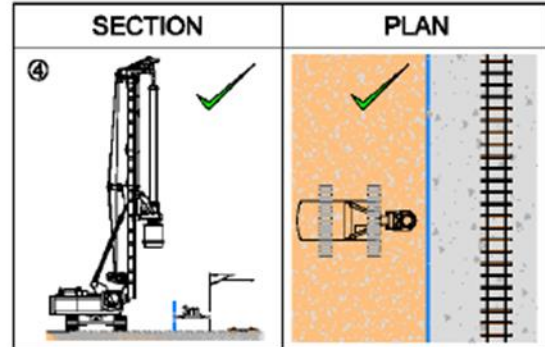
Emergency	Response
Severe Injury	Seek First Aider. Call Ambulance by dialling 999. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Fire	Raise the Alarm. Go to muster point. Inform the Site Manager [PRINCIPAL CONTRACTOR]. Call Fire Brigade by dialling 999.
Uncovering Asbestos or other dangerous substance.	STOP WORK. Inform the Site Manager [PRINCIPAL CONTRACTOR]. Wait for Instructions.
Suspect unexploded ordnance	STOP WORK. Clear the immediate area. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Underground or overhead Electric cable strike	STOP WORK. Driver to stay in cab. Other Operatives DO NOT TOUCH RIG. Inform the Site Manager [PRINCIPAL CONTRACTOR] immediately.
Gas main Strike	STOP WORK. Switch off ALL plant. Prohibit smoking. Inform the Site Manager [PRINCIPAL CONTRACTOR] immediately.
Data cable or BT cable strike	Stop work. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Sewer strike	Stop work. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Water main strike.	STOP WORK. Use bunding to keep water from vulnerable areas and guide flow towards drainage or waterway. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Uncovering suspected archaeological or human remains	STOP WORK. Inform the Site Manager [PRINCIPAL CONTRACTOR].
Gross pollution Incident	STOP WORK. Inform the Site Manager [PRINCIPAL CONTRACTOR]. Contact Environmental Agency on 03708508506 to advise if working near a watercourse.
Failure of piling platform threatening rig stability	Attempt to stabilize the rig immediately by: <ul style="list-style-type: none"> • Use available excavators to hold down the tracks. • Lean the mast back 20° maximum. • Put foot down on to working platform • Drill the augers into the ground. • Track away from subsiding area. Inform the Site Manager [PRINCIPAL CONTRACTOR] of working platform failure.
NR Details	Railway ELR and mileage: HHH 2m40-42ch Up Holborn Slow NR Control: 0207 9793730 NR Asset Protection: Mike Bradford (07798614477)

Appendix C:

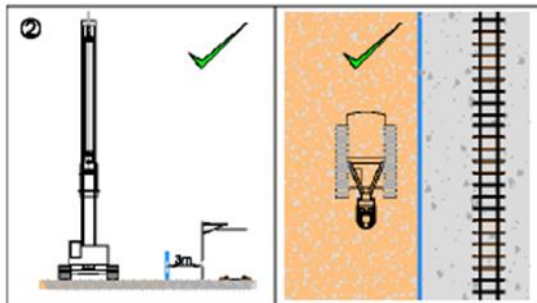
ORIENTATION OF PILING RIG ADJACENT TO THE RAILWAY INFRASTRUCTURE DURING NORMAL RAILWAY OPERATIONS.



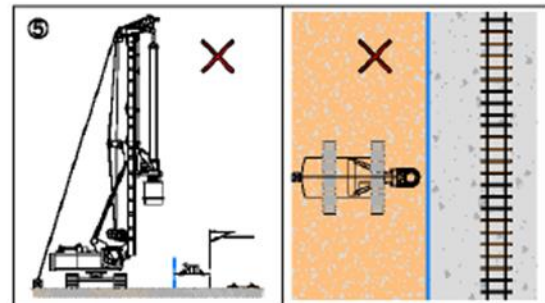
RIG MAY SIT AT THIS ORIENTATION



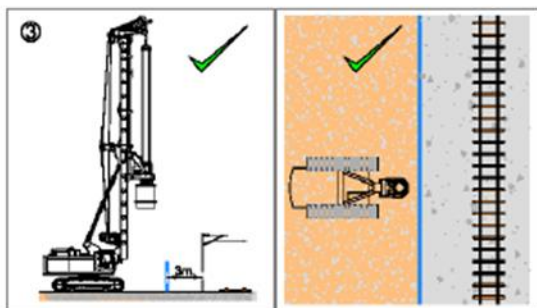
RIG MAY SIT AT THIS ORIENTATION (SUBJECT TO MANUFACTURERS SPECIFICATION)



RIG MAY SIT AT THIS ORIENTATION



INDEPENDENT TIE BACKS OR ANY OTHER ARTIFICIAL STABILITY AIDS MUST NOT BE UTILISED

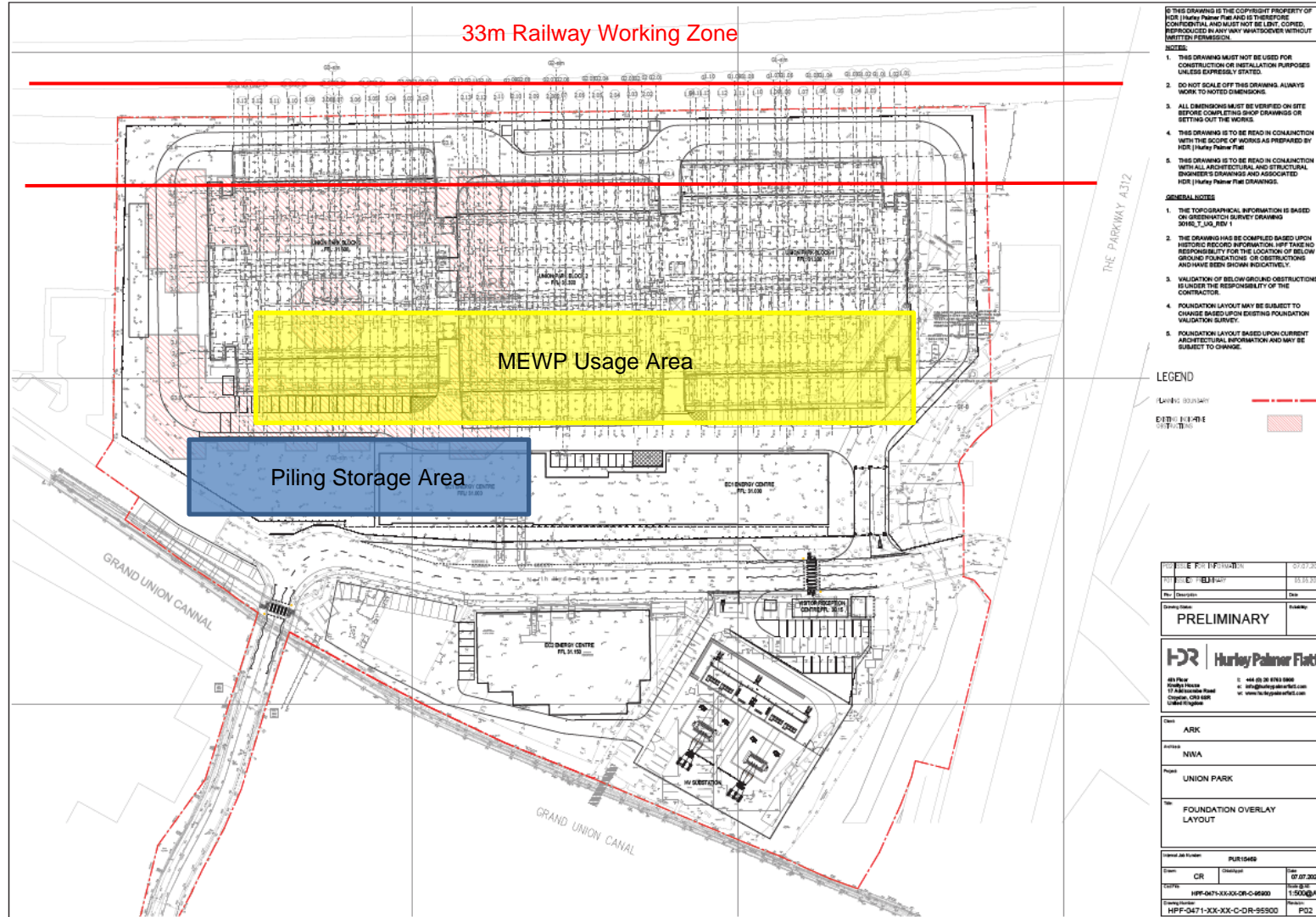


RIG MAY SIT AT THIS ORIENTATION

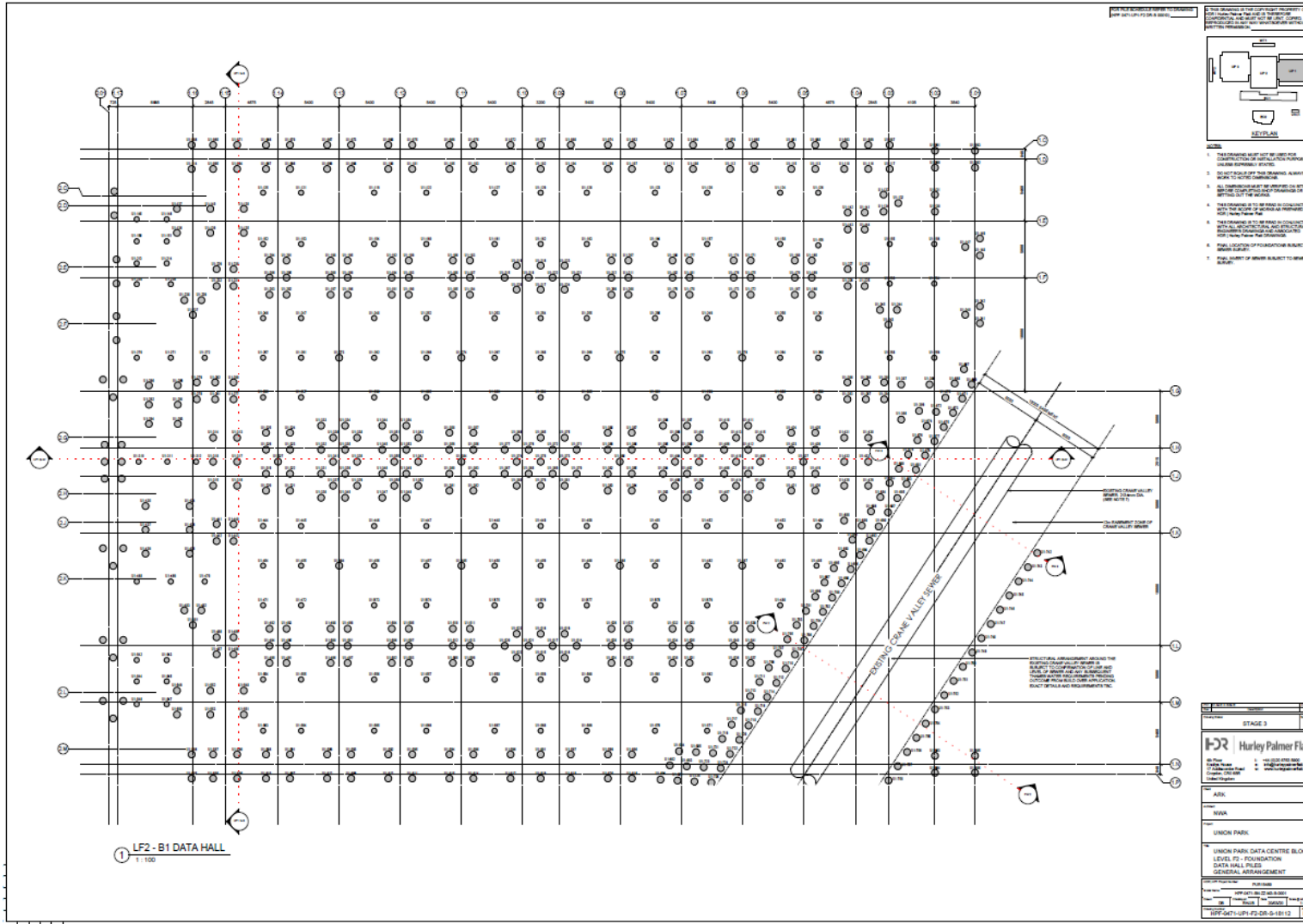
NOTE :-

- 1.) IN ALL CASES APPROPRIATE MITIGATION MEASURES SHOULD BE IMPLEMENTED - PARTICULARLY WITH REGARD TO THE PILING PLATFORM CONSTRUCTION.
- 2.) PLATFORM TO BE CONSTRUCTED IN ACCORDANCE WITH THE SPECIFICATION.
- 3.) NO ARTIFICIAL AIDS ALLOWED TO INCREASE STABILITY - REFER TO DIAGRAM 5.

Appendix D:



Appendix E:



19. RISK ASSESSMENTS

Contents

RA Number	Activity
RA01	COSHH Hazards
RA02	Working with Wire Ropes
RA03	Working on Public Highways
RA04	Working with Operating Plant
RA05	Mechanical Handling Operations
RA06	Manual Handling Operations
RA07	Working with Pressurised Water
RA08	Working with an Arc Welder
RA09	Use of Lorry Loaders
RA10	Use of MEWP on Site
RA11	Environmental Issues
RA12	Cleaning CFA Concrete System
RA13	Unblocking CFA Concrete System
RA14	Piling Rig – Working At Height
RA15	Site Specific Risk Information
RA16	Extra Coronavirus Measures

<u>Assessment Rating</u>	
<u>Severity - Value</u>	<u>Probability - Value</u>
Negligible Injury - 1	Very Unlikely - 1
Minor Injury - 2	Unlikely - 2
Moderate injury - 3	Possible - 3
Major injury - 4	Likely - 4
Severe / Fatalitv - 5	Verv Likelv - 5

Probability

Severity

	Marginal	Minor	Moderate	Major	Severe
Very Likely	5	10	15	20	25
Likely	4	8	12	16	20
Possible	3	6	9	12	15
Unlikely	2	4	6	8	10
Very Unlikely	1	2	3	4	5

Hazard	Hazard Effect	Factors of Harm		Degree of Risk	Control Measures	Residual Degree of Risk:	Control measures implemented/ monitored by	Control frequency check rate
		S	P					
RA01 COSHH Hazards								
Antifreeze:	Minor Irritant to skin Intense smarting to eyes Affects central nervous system if swallowed	4	4	16	Addition PPE requirements: water resistant gloves to be worn when handling. Do not siphon and ensure that hands are wash before eating. Wash any spills of skin immediately. Store in the COSHH box. See COSHH 001 Data Sheet for information.	LOW	All Operatives	When Required.
Concrete (Wet):	Severe irritation to skin from concrete burns.	3	5	15	Addition PPE requirements: water resistant gloves & Hi-Viz overalls. Wash contact area on skin immediately if in contact with concrete. See COSHH 004 Data Sheet for information.	LOW	All Operatives	When Required.
Gas Oil:	Minor irritation to skin on contact. Gastric irritation if swallowed.	3	5	15	Addition PPE requirements: water resistant gloves and Hi-Viz overalls to be worn when refuelling. Do not siphon and ensure that hands are washed before eating. Store in the COSHH box. See COSHH 006 Data sheet for information.	LOW	All Operatives	When Refuelling.
Oil & Greases:	Moderate irritation to skin, mist may cause irritation to nose & throat if inhaled.	3	3	9	Addition PPE requirements: water resistant gloves to be worn when refuelling. Clear up any spillages immediately and dispose of in hazardous waste bag. Wash hands before eating. Store in the COSHH box. See COSHH 007 Data Sheet for more information.	LOW	All Operatives	When Required.
Prime-A-Pump:	Slight Irritation to eyes & skin. Slip trip & fall on spilt liquid.	3	3	9	Addition PPE requirements: water resistant gloves when working with. Clear up spillages by diluting spilt liquid away. Wash hands before eating. Store in the COSHH box. See COSHH 008 Data Sheet for more information.	LOW	All Operatives	When mixing and pouring.
Mould Oil:	Avoid contact with skin irritant	3	3	9	Addition PPE requirements: water resistant gloves & Hi-Viz Overalls when refuelling. Do not use near hot exhaust or naked flames, make sure fire extinguisher and spill kit are present when refuelling. Do not siphon and ensure that hands are washed before eating. Store in the COSHH box. See COSHH 010 Data Sheet for more information.	LOW	All Operatives	When Applying.
Delvo:	Avoid contact with skin irritant	3	3	9	Addition PPE requirements: water resistant gloves. Throw whole sachet into holding drum and mix. Store in a sealed container in the COSHH box. Wash hands before eating. See COSHH 012 Data Sheet for more information.	LOW	All Operatives	When Required.
RA02 WORKING WITH WIRE ROPES								
Broken Wires / Rope:	Laceration and amputation injuries to the hands, arms and legs. Personal injury from contact with moving ropes.	4	4	16	Always wear chrome leather gauntlets when handling wire ropes. Keep hands, arms and legs protected. Don't allow rope to slip through hands when feeding onto sheaf wheel. Always be aware and alert when working close to moving ropes, keep fingers, arms and legs protected. Secure any loose clothing and keep contact with rig operator when feeding the rope.	LOW	Banksman	When Required.

Sweet Project Holdings Ltd

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Project Alliance, Bulls Bridge, Hayes, UB3 4QQ



Uncoiling Wire Rope:	Personal injury and injury to others nearby from being struck due to release of inherent springiness of rope.	3	3	9	Be aware of coil's springiness, keep the coil vertical whilst coiling or uncoiling, do not allow the coil to unwind when it is flat on the ground, when fastening or unfastening ties take care and restrain whilst coiling/uncoiling and ensure that all other personnel have been directed to stand clear.	LOW	All Operatives	When Required.
RA03 WORKING ON PUBLIC HIGHWAYS								
Danger to General Public:	Personal injury from being struck by moving plant and vehicles.	4	3	12	When moving vehicles on to the public highway ensure that a banksman is used for all movements. The banksman needs to stop all people in the surrounding area before instructing the plant/vehicle to move.	LOW	Banksman	When Required.
Danger of Traffic Accident:	Personal injury from being struck by moving traffic. Injuries to road users caused by collisions with other traffic or our plant.	5	4	20	Give clear signals to stop traffic when safe to do so, ensure that all traffic has stopped before walking onto the highway. Make sure to be alert and maintain the stop signal whilst standing on the highway, when safe and clear to do so signal clearly for the traffic to proceed but only do this once you have exited the highway and it is clear of plant and equipment.	MEDIUM	Banksman	When Required.
Unloading equipment with Hi-ab:	Injury and damage caused by being struck by lifted equipment.	5	4	20	Only certificated lifting equipment is to be used, erect exclusion barriers to stop any personnel from entering the lifting area whilst and when the lift is taking place and ensure that all loads are secure before lifting. Stop the lift if anyone enters the exclusion zone.	LOW	Banksman	When Unloading.
Unloading the piling rig:	Injury to public from being struck by moving piling rig. Damage to vehicles and surrounding buildings from collision with moving plant.	5	4	20	Place protection boards on the road, path and kerbs if required before unloading the piling rig. All general public and traffic need to be stopped by the banksman. One banksman always needs to bank the piling rig. Once the rig has been unloaded all protection boards and any debris must be cleared.	LOW	Banksman	When Required.
RA04 WORKING WITH OPERATING PLANT								
Being struck by the excavator:	Severe or possibly fatal injuries from impact or entrapment from rotating the excavator base machine or digging bucket.	4	5	20	Ensure that the operator is trained and competent. Ensure he signs the digger briefing sheet. Make eye contact before you enter his swing area. When the excavator is working be sure to stand clear and never approach whilst it is working, wait for the driver to acknowledge your presence and then approach when it is safe to do so.	LOW	Banksman	When Required.
Rig Instability	Severe or possibly fatal personal injury and injury to others from overturning rig.	5	3	15	Before works commence ensure that a valid working platform certificate has been signed by the client. Always assess the suitability of the ground before moving into any area, when assessing you need to check that the ground is firm level and unobstructed. If you find that the ground is unstable then report this to the client and do not move until the ground is stable. All other personnel need to be alert and directed to stand clear. When tracking up and down slopes the rig should drive down a	LOW	Banksman	When Piling.

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					slope and reverse up a slope, the slope should be no more than a 20:1. [See Manufactures Operation Manual].			
Trapped by slewing base of plant.	Severe, possibly fatal injury due to entrapment from slewing base.	4	4	16	Ensure that the operator is aware of you, make eye contact and acknowledgement before entering the slew area. Stop any unauthorised entry into the area.	LOW	Banksman	When Piling.
Injury from falling spoil CFA Piling	Sever or possibly fatal injuries from spoil falling on personnel.	5	5	25	Ensure that the spoil is completely removed from the auger flights using the mechanical auger cleaners provided. The banksman needs to keep close observation of the auger flights while completing the concreting stage. He must stop all operators if spoil is not removed. The rig driver must then re-drill the augers into the cleaners until clean. All personnel must remain outside of the exclusion zone. Ensure the brushes are in good order, replace if worn.	LOW	Banksman	When Piling.
Danger of trapped fingers	Lacerations or crushing injuries and possible amputation of fingers.	3	5	15	Use visual means to check pin hole alignment, DO NOT put fingers into the pin holes. Use the palm of your hands when moving the augers in to place when coupling together.	LOW	Banksman	When Required.
Working on the front of the Piling Rig	Severe, possibly fatal injury due to impact from falling spoil or entrapment in the rotating augers.	4	4	16	Barriers must be erected around the front of the rig at approx. 3.0m from the auger, if the excavator is in place this will act as a barrier on one side. No personnel are allowed inside the exclusion zone while the augers are rotating. If anyone enters the exclusion zone while the auger is rotating the rig operator will stop until the exclusion zone is clear.	LOW	Rig Operator/ Banksman	When Piling.
Opening the auger gates.	Severe, possible fatal injury from entanglement in rotating auger.	4	4	16	No personnel are allowed in the exclusion zone while the auger is rotating. When opening or closing the gates the rig operator will stop rotating the auger and signal to the banksman to enter the exclusion zone, once the banksman has exited the exclusion zone the operator will commence drilling. If anyone enters the exclusion zone while the auger is rotating the operator will stop until the exclusion zone is clear. The gates will not be opened until the drill head needs to pass the auger cleaner at approx. 15.0m depending on length of auger string. Once open a banksman must stay near the exclusion zone to stop any unauthorised entry. Once the gates have been opened or closed the gate bar will be removed from the gate clasp.	LOW	Rig Operator/ Banksman	When Piling.
Greasing the Concrete Swivel	Personal injury, possibly fatal from crushing from falling swan neck.	4	4	16	Follow the operations manual on greasing the concrete swivel, complete the task daily on the first pile of the day and the last pile. If the swivel fails to take any grease, grout is seen around the check hole, oil residue is seen around the base of the swivel and there has been several tip or stem blockages when pumping and if the reaction bar starts to twist when you are rotating the office must be advised immediately.	LOW	Rig Operator/ Banksman	When Piling.

RA05 MECHANICAL HANDLING OPERATIONS								
Overloading excavator	Severe, possibly fatal injuries caused by impact or entrapment from overturning excavator or from sudden uncontrolled movement of load.	5	3	15	Understand that 360° excavators are not cranes. Do not exceed the maximum permitted 1t SWL. Any load above 1t the Excavator Operator must except the lift. [See Lift Plan] The banksman will bank the excavator when lifting the load. Before completing the lift check that the Operator has the relevant competence card and that the card is in date.	LOW	All Operatives	When required.
Being hit by suspended load	Severe, possibly fatal personal injuries from impact or entanglement when movement or unexpected lowering of suspended load.	5	3	15	Follow the Lift Plan . Do not stand under the suspended load, keep your distance and ensure to make other site personnel aware of the suspended load. The banksman will always bank the excavator. If long lengths of steel reinforcement are being suspended, safety lines will be needed to control the load.	LOW	All Operatives.	When required.
Excavator bucket free falling to the ground	Severe, possibly fatal injuries from being struck by falling excavator bucket.	5	4	20	Ensure that the excavator operator is competent and completes the digger driver briefing sheet. Before any lift takes place get the operator to complete a shake, rattle and roll with his bucket, then connect the chain to the shackle. When the lift has been completed make sure to remove the chain.	LOW	Banksman/ Pump Operator	When required.
Lifting reinforcement and augers with excavator	Severe injuries from being struck by swinging load or trapping fingers.	4	4	16	Follow the Lift Plan . Use only the correct lifting equipment, make sure that it has been tested within 6 months and that it is tagged with SWL. Do not exceed an angle greater than 45°. Before attaching the chain make sure that the excavator has stopped before attaching the chain/sling. Ensure that the chain is attached before starting the lift and always ensure that hands are away from the chain when the load is lifted. Attach a tag line to one end of the item being lifted. Do not stand under a raise item that is being lifted. Do not exceed 1000kg.	LOW	All Operatives	When required.
Connecting and Dis-connecting the auger string.	Severe injury to all personnel from falling augers.	4	4	16	Ensure that when possible the extension bar is unlocked and hanging through the rotary table when connecting or disconnecting the auger string. Always forward rotate the augers when connecting or disconnecting. Never back spin when the extension is in locked position.	LOW	Rig Operator/ Banksman	When required.
Moving holding drum with excavator	Injury from dragging the holding drum over uneven site. Severe injury from trapping fingers.	3	3	9	Make sure the dragging chains are used and that a competent person banks the excavator whilst the dragging is taking place. Before attaching chains to the anchor points make sure that the excavator has stopped and then correctly attach on the front or rear of the holding drum. Make sure the operator keeps his digger arm low while dragging not to damage the frame work of the holding drum.	LOW	All Operatives.	When required.

RA06 MANUAL HANDLING OPERATIONS								
Lifting cages and concrete hoses.	Temporary or permanent disability due to back strain from adopting the incorrect posture during manual lifting, pulling or pushing.	3	4	12	Assess the load that needs to be lifted by taking into consideration the ground and weather conditions, the route to take and if you should pull or push the load. Adopt the correct posture; straight back, one foot slightly in front of the other and bent knees. Always use mechanical means when possible, ask for help if too heavy.	LOW	All Operatives.	When required.
Trapping Fingers	Crushing injuries to the fingers which can possibly lead to amputations.	3	4	12	Lower the loads slowly and ensure that hands are positioned to avoid entrapment. Use palm of hand when moving suspended load.	LOW	All Operatives.	When required.
Hand Abrasions	Minor hand injuries from contact with abrasive substances or sharp, rough or abrasive machine parts or tools.	3	3	9	Gloves must be worn when handling material, rubber gloves to be used when working with concrete or COSHH liquid, gauntlets should be worn when working with ropes, augers and sharp/rough items.	LOW	All Operatives.	When required.
RA07 WORKING WITH A PRESSURISED WATER								
High pressure water jet.	Personal injury and injury to others from the impact of a pressurised water jet.	3	3	9	Warn others who are working in the vicinity before using the jet washer and put barriers in place when necessary. Wear addition PPE [waterproof clothing & rubber safety boots].	LOW	Pump Operator	When required
Back spray.	Eye and skin injuries to self and others from over/back spray and impact from dislodged objects.	3	3	9	Choose a working area which is isolated from others, if this is not possible then warn the others who are in the vicinity before operating the washer. Wear addition PPE [waterproof clothing & rubber safety boots] and where necessary put barriers in place to protect others from over/back spray.	LOW	Pump Operator	When required
Slipping on wet surfaces	Personal injuries and injuries to others from slip trips and falls due to wet surfaces.	3	4	12	Anticipate the direction of flow of any waste water before operating the washer and choose an isolated area where possible. Make provisions for directing flow to a suitable area and warn others who will be affected. Work area must be tidy.	LOW	Pump Operator	When required
RA08 WORKING WITH ARC WELDER								
Temporary Eye Damage	Eye damage to self & others from intense glare & ultra violet radiation. Radiation burns to exposed skin of self & others from ultra violet radiation.	4	3	12	Do not look directly at welding arc, especially at close quarters. Use welder's headset or facemask for eye and face protection. Warn others to look away before striking arc. Be aware that reflected arc can be equally as hazardous. Erect barriers or use opaque screens to shield passers-by and others from sight of arc. Have a fire extinguisher in close proximity	LOW	Plant Fitter	When Required.
RA09 USE OF LORRY LOADER (Hi-ab) ON SITE								
Collapse due to poor ground conditions. [Set-Up]	Major injury to operator and/or other personnel from overturning vehicle.	3	4	12	Before starting work complete the lorry loader site risk assessment sheet with the site manager ensuring all potential underground/overhead hazards have been identified. Make sure the pads are placed under every stabilizer and ensure that any excavation is approx. 2:1 away.	LOW	Lorry Operator/ Banksman	When Required.

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Collapse due to poor ground conditions. [During lifting].	Major injury to operator and/or other personnel from over turning vehicle.	5	4	20	Ensure the ground is suitable, firm and level to carry stabiliser loads and vehicle weight together. Get confirmation from Site Manager before completing any lifts. Ensure there is adequate space to safely rig and operate lorry/crane.	LOW	Lorry Operator/ Banksman.	When Required.
Slinging and lifting loads.	Major injury to slinger/signaller and other personnel from load movement.	5	4	20	Work to Lift Plan when lifting equipment. All lifting equipment will be visually checked before any lift and have a current certificate and correct identification. Banksman to complete test lift on all items before lifting fully. Always double wrap chains / slings when lifting a cylindrical material. Lorry Operator to lift smoothly without any abrupt movement.	LOW	Lorry Operator/ Banksman.	When Required.
Unauthorised entry during lift.	Major injury to other personnel from lifted load.	4	4	12	Barrier off an exclusion zone to restrict access. Cease lifting operations if unauthorised personnel enters exclusion zone.	LOW	Lorry Operator/ Banksman.	When Required.
Overhead obstructions during lifting procedure.	Danger to banksman and Lorry Operator of electrocution from contact with power lines.	5	4	20	Ensure that the lorry operator checks for any overhead obstructions before setting up. If they are unable to set up anywhere else, use shortened chains and get banksman to watch load as it moves under overhead obstructions. If a damp wet day do not complete lifts in case of arcing.	LOW	Lorry Operator/ Banksman.	When Required.
Load becoming unstable whilst slewing into position.	Contact or crushing injury to operator and/or other personnel.	4	4	16	Make sure the operator slews smoothly with no abrupt movements. Use guide ropes where appropriate, two persons and two guide ropes might be necessary. Enlist help where needed. Keep the load close to the ground when possible.	LOW	Lorry Operator/ Banksman.	When Required.
Failure of lifting points during lifting.	Contact or crushing injury to operator and/or other personnel from falling load.	5	3	15	Ensure all lifting points are inspected before attaching chains. Report concerns when necessary. If in doubt do not lift. Remain clear of the lift area and instruct all other nearby personnel.	LOW	Lorry Operator/ Banksman.	When Required.
Falling from lorry bed.	Severe, possibility fatal injury from falling from height.	5	4	20	Two Lorry restraining straps need placing around the bed of the lorry. One at 470mm from bed and the second at 950mm. Use a Ladder to access bed.	LOW	Lorry Operator/ Banksman.	When Required.
Lone working during lifting operation.	Possibility of long delay before discovery of injured operator.	5	5	25	The operator must not work alone. Unless the following guidelines are followed: A designated person must be appointed to keep in communication with the operator. Whilst carrying out the operation they must keep their mobile phone on them at all times and when the operation is complete notify the designated person.	Medium	Lorry Operator	When Required.
Vehicle reversing into or from loading or unloading position.	Possibility of contact and crushing injuries to other personnel due to restricted rearward visibility access routes and physical barriers.	5	4	20	No reversing without a banksman. Use the provided wide angle mirrors and ensure that the reversing lights and audible warning systems are operational as additional safeguards.	LOW	Lorry Operator/ Banksman.	When Required.

RA10 USE OF MEWP ON SITE								
Working in basket on MEWP when at height.	Severe or possibly fatal impact or entrapment injuries from falling from basket.	5	5	25	Ensure that only competent personnel operator the MEWP. When working at height a safety harness and lanyard must be worn and attached to anchor point in basket. You must not leave the raised man basket at any time or unclip the lanyard. Follow rescue plan in case of emergency.	LOW	MEWP Operator	When Required.
Travelling around site.	Severe or possibly fatal impact or entrapment injuries from overturning MEWPs.	4	4	16	Ensure that only IPAF qualified personnel drive machinery. Read and understand the MEWP's operator's safety guide and perform pre-inspection before commencing, Report any defects. Before moving ensure that the route is clear from obstacles and any excavations. Do not raise boom too high if the route is uneven and do not speed over uneven surfaces. Make sure to check for any overhead hazards. Additional PPE [Safety Harness and Lanyard] must be worn.	LOW	MEWP Operator	When Required.
Position of MEWP for use on site.	Severe or possibly fatal impact or entrapment injuries from overturning MEWP and crushing on overhead hazards when raising the boom.	4	4	16	Ensure that only qualified personnel drive the MEWP. Read and understand the MEWP operator's safety guide. Check that the working area is level and that there are no excavations. Position MEWP close enough to the rig to work. Erect barriers and create an exclusion zone around base of MEWP when working at height.	LOW	MEWP Operator	When Required.
Emergency procedures when MEWP has engine or hydraulic failure.	Machine failure while boom is at height.	4	4	16	Before works commence ensure the rescue plan is signed by a competent person this is found on the Foreman's Tablet. The rescue plan highlights how an operative is rescued when working at height. If the piling rig is required for the rescue HSQE Manager will give authorisation, as the operative climbs down the auger. Follow rescue procedures in case of emergency.	LOW	MEWP Operator	When Required.
RA11 ENVIRONMENTAL ISSUES								
Major spillage of oil or diesel into a drain or watercourse.	Severe or possibly fatal impact on the surrounding environment.	4	4	16	If a spillage occurs, then stop work and try to stop it by using the spill kit provided before it enters any drain/watercourse. Inform the client, office and ring the environmental incident hotline [if required] on 0800 807060 , this is a 24-hour service.	Medium	All Operatives	When Required.
Major spillage of grout or concrete into a diesel or watercourse.	Severe or possibly fatal impact on the surrounding environment.	4	4	16	Stop work and stop the grout or concrete from entering the drains or watercourse using the spoil or crushed concrete which is available on site to create a bund. Inform the client, office and ring the environmental incident hotline on 0800 807060 , if required, this is a 24-hour service.	Medium	All Operatives	When Required.
Washing out from concrete pump and holding drum.	Severe or possibly fatal impact on the surrounding environment.	4	4	16	Place the wash out bund under the hopper of the concrete pump and line with polythene, Clean out daily by emptying waste on to piling mat. Any spillages of concrete or grout will be cleaned up immediately.	LOW	All Operatives	When Required.

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Storing COSHH containers on site.	Severe or possibly fatal impact on the surrounding environment.	4	3	12	Ensure that all COSHH containers are kept in a COSHH store on site and once used they are returned. Always keep spill kits next to the COSHH store. Diesel is to be kept in 110% bunded containers. When refuelling or topping up oils be sure to use a spill kit absorbent mat in case of spillages.	LOW	All Operatives	When Required.
RA12 CLEANING CFA CONCRETE SYSTEM								
Concrete Splash	Can cause irritant contact dermatitis and cement burns to skin. Personal injuries from flying debris. Damage to nearby buildings & vehicles.	4	5	20	Place the blow out drum under the auger, place 1 sheet of ply [8"x 4"] vertically behind the drum up against the mast. Ensure that a competent person keeps all other personnel at least 10m away from the front of the piling rig. Ensure that any splashes are washed away immediately using cold water. If buildings or vehicles get splashed wash with clean water and don't scrub.	LOW	All Operatives	When Required
Cleaning the holding drum	Can cause irritant dermatitis and cement burns to skin. Falling from height and entanglement can cause personal injuries that could possibly be fatal.	4	5	20	When working at height place the chain/bar over the exit point on crow's nest. Ensure all guards are fitted correctly. Keep hands clear of rotating parts and if concrete encounters skin, wash off immediately with clean water. Additional PPE must be worn. [Hi-Viz Waterproof clothing & rubber safety footwear].	LOW	Pump Operator	When Required
Concrete Clamp Failure	Clamps failing, Severe, possible fatal impact to unsupported concrete hose.	4	5	20	Place whip checks on every coupling which is at height on the piling rig and the pump/holding drum set up. Replace faulty whip checks. Ensure all concrete clamps are in good condition and have a clevis pin inserted.	LOW	All Operatives	When Required
Cleaning the concrete pump	Entanglement injuries in moving parts, slip, trips and falls. Personal injuries and possibly fatal incidents.	5	4	20	Ensure that the work space is kept tidy. Do not put hands near any moving parts. Make sure that all guards are fitted to the concrete pump and if any concrete encounters skin it is to be washed off with clean water immediately. Additional PPE must be worn. [Hi-Viz Waterproof clothing & rubber safety footwear].	LOW	Pump Operator	When Required
Blowing out concrete system	Severe, possible fatal from contact with flying debris & concrete hose	4	5	20	Site Supervisor/ Rig Driver to decide whether to blow out in 2 or 3 stages depending on amount of placement hose, auger extension and concrete consistency. Must only use no smaller than 5" hard ball or 6" soft ball when blowing out. Blow out skip to be use if blowing out in 3 stages to hold placement hose from whipping. Blow out drum to be placed at the base of the auger. All personnel to be kept out of the vicinity when blowing out [min 10m]. All clamps to be opened at arm's length. The one bolts concrete clamp to be used as the ball blower clamp.	LOW	All Operatives	When Required
Explosive release of compressed air	Penetration of skin by compressed air. Personal injury and possibly fatal from flying hoses or debris.	5	5	25	Ensure to turn off air valve on compressor and open valve on ball blower, then make sure all trapped air is released before disconnecting any concrete hose clamps. The cleaning ball needs to be blown through the concrete system and located before opening any the hose clamps at arm's length. Additional PPE required [full face shield].	LOW	All Operatives	When Required
RA13 UNBLOCKING CFA CONCRETE SYSTEM								

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<p>Explosive release of concrete from jammed auger cap.</p>	<p>Personal injuries from impact of wet concrete jet. Irritant contact dermatitis and cement burns to skin. Personal injuries from flying debris.</p>	<p>3</p>	<p>4</p>	<p>12</p>	<p>Understand that there is always concrete under pressure in a blocked auger. Anticipate the direction of movement of concrete when cap or obstruction is removed and stand in the safest place. Erect boards and direct side opening auger towards boards. Ensure that all personnel and machinery are clear of the area. Use a long bar or shovel to remove cap or obstruction at arm's length, Do NOT remove by hand. If concrete encounters the skin, then wash off immediately with clean, cold water.</p>	<p>LOW</p>	<p>Banksman</p>	<p>When Required</p>
<p>Blockage in concrete system [Concreting].</p>	<p>Personal injuries from impact of wet concrete jet. Irritant contact dermatitis and cement burns to skin. Eye irritation. Personal injuries (possibly fatal) from flying hoses, clamps, pipework and debris.</p>	<p>4</p>	<p>5</p>	<p>20</p>	<p>When blockage in concrete system occurs do not attempt to continue pumping [2 attempts max]. Back pump 8 times to try and remove pressure from the concrete system. Locate blockage by watching concrete hoses pulsate. Place an exclusion zone around the blocked area at approximately 5.0m to ensure all personnel and machinery stay clear of the area. Connect placement hose or hanging hose to blow out skip. Use long bar or shovel to release joint clamps at arm's length. If pressure is found when clamp is released leave the clamp until pressure (hissing) stops. Always stay vigilant around a block concrete system. Additional PPE [Full face mask]. Inform management when blocked do not use compressed air attempt to push blockage in opposite direction with concrete pump.</p>	<p>Medium</p>	<p>All Operatives</p>	<p>When Required</p>
<p>Blockage in concrete. [Blowing -out]</p>	<p>Personal injuries from impact of wet concrete jet. Irritant contact dermatitis and cement burns to skin. Eye irritation. Personal injuries (possibly fatal) from flying hoses, clamps, pipework and debris.</p>	<p>5</p>	<p>5</p>	<p>25</p>	<p>Understand that there is always concrete under pressure in a blocked pipe. Ensure that the compressor is switched off and all air release valves are opened, erect boards around the joint to act as a shield. Additional PPE [Full face mask] to be worn. Make sure whip checks are fitted and left in place until hoses clamp is opened and pressure released. Anticipate the direction of movement of the concrete and pipework when joint is released under pressure and ensure to be standing in the safest place. Place an exclusion zone around the blocked area at approximately 5.0m ensure all personnel and machinery stay clear of the area. Attach the placement hose or hanging hose on to the blow out skip always secure the clamp with a clevis pin. Use a long bar or shovel to release joint clamps at arm's length. If pressure is found when clamp is released leave the clamp until pressure (hissing) stops. Always stay vigilant around a blocked concrete system. Never release the 2.8m side rubber concrete hose when blocked.</p>	<p>Medium</p>	<p>All Operatives</p>	<p>When Required</p>

Unblocking a blocked concrete hose at height.	Personal injuries from impact of wet concrete jet. Irritant contact dermatitis and cement burns to skin. Eye irritation. Personal injuries (possibly fatal) from flying hoses, clamps, pipework and debris.	5	5	25	When blockage in concrete system occurs do not attempt to continue pumping [2 attempts max]. Back pump 8 times to try and remove pressure from the concrete system. Locate blockage by watching concrete hoses pulsate. Place an exclusion zone around the blocked area at approximately 7.0m ensure all personnel and machinery stay clear of the area. Additional PPE [Full face mask] required. MEWP Operator will position the MEWP basket at height close to the clamp on the hanging hose. He will attach a nylon sling around the concrete hose and attach to the second line, the rig operator will take the slack up and the MEWP Operator will remove the coupling at arm's length. If pressure is found when clamp is released leave the clamp until pressure (hissing) stops. Always stay vigilant around a blocked concrete system. Once released the Rig Operator will lower the hose to ground level for the blockage to be removed.	Medium	Banksman	When Required
Release of augers under pressure	Personal injuries from impact of wet concrete jet. Irritant contact dermatitis and cement burns to skin. Personal injuries from flying debris.	4	4	16	Be aware of the probability of concrete under pressure in an auger string and stay vigilant. When the pins have been removed ensure that the MEWP Operator clearly signals to the rig driver and moves the MEWP to a safe distance. Erect barriers to form an exclusion zone around the front of the rig keeping all personnel out of the area. Rig Operator must wait for the signal and ensure that all personnel are standing clear before separating the auger joint.	LOW	All Operatives	When Required
RA14 WORKING AT HEIGHT								
Rigging and de-rigging auger string	Severe, possibly fatal injuries banksman from falling from height.	5	5	20	Use MEWP. Before putting on inspected safety harness and extendable lanyard, make sure there is a valid certificate. Complete Pre-Inspection checks on MEWP before using. Once in the basket attach lanyard to anchor point. Never get out of a raised basket or un-attach the lanyard while at height. Place a 7.0m exclusion zone around the front of the piling rig.	LOW	MEWP Operator	When Required.
Access to rear maintenance area	Personal injury, possibly severe from impact with ground, materials, buildings and machinery.	4	4	16	Inspect safety harness and lanyard and make sure there is a valid certificate. Once you have climbed the permanent ladder on side of the rig attach the lanyard to the second line. Stand only on flat anti slip surfaces which are provided and do not go near the edges.	LOW	Rig Operator	When Required.
Standing on track	Personal injury, possibly severe, from impact with ground and machinery.	4	4	16	Ensure that only supervisor, trainer or maintenance personnel stand on the rig while it is drilling. Do not stand on track whilst it is moving, dismount and stand away from rig. When dismounting go backwards stepping down to ground level.	LOW	All Operatives	When Required
Greasing Cathead	Personal injury, possibly severe, from impact with ground, materials, buildings and machinery.	4	4	16	Use MEWP if on site, if not use industrial steps and make sure that the steps are footed while being used.	LOW	Rig Operator	When Required.

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Attaching and removing pins and bolt on hinged section of the mast	Personal injury, possibly severe, from impact with ground, materials, buildings and machinery.	4	4	16	Use MEWP if on site, if not use industrial steps and make sure that the steps are footed while being used.	LOW	Rig Operator/ Banksman	When Required
Attaching and removing pins from drill head section	Personal injury, possibly severe, from impact with ground, materials, buildings and machinery.	3	3	9	Lift drill head above pins on foot section. Use MEWP if on site, if not use industrial steps and make sure that the steps are footed while being used to remove pins.	LOW	Rig Operator/ Banksman	When Required
Greasing the Concrete Swivel	Personal injury, possibly fatal from crushing from falling swan neck.	4	4	16	Complete pre start checks on the MEWP and wear the certified full body harness and lanyard. Make sure exclusion zone is erected around the MEWP when you are working at height and ensure the grease drum is left in the basket when pumping grease, else use a hand grease gun.	LOW	MEWP Operator	Twice Daily
RA15 SITE SPECIFIC RISK INFORMATION								
Underground services	Personal injury, possible fatal impact from striking underground services, particularly electric and gas. Potential major disruption to on-site and off-site personnel from damage to utilities.	4	5	20	Prior to piling the Client should check up to date service drawings against the proposed pile positions. Where services exist within close proximity to proposed pile positions, the relevant asset holder should be contacted to confirm the safe distance for piling based upon the type of service present. Services should be clearly marked at ground level to ensure protection of the asset.	LOW	Client	Prior to piling
RA16 EXTRA CORONA VIRUS MEASURES								
Travelling to site	Site Operatives; Catching coronavirus and putting vulnerable people at risk.	5	5	25	Where possible go to work in separate vehicles, ensure you wash regularly with soap and water before travelling home and avoid using public transport.	LOW	Site Operatives	Travelling
Working on site	Site Operatives; Catching coronavirus and putting vulnerable people at risk.	5	5	25	Do not work closely with other operatives, make sure you keep a minimum distance of 2 metres. Wash your hands frequently with soap and water and dry with paper disposable towels. Reduce working hours so breaks do not need to be taken, if they do use the minimum 2 metre rule or use their vehicle for a break. Only use the toilet or drying room units one at a time. Read Health and safety information and send an email to accept, only one person uses the tablet and completes inspections and weekly checks. Don't share PPE, mobile phones or the tablet.	LOW	Site Operatives	When on site
Cannot complete task without excavator help.	Site Operatives; Catching coronavirus and putting vulnerable people at risk.	5	5	25	If any task or procedure cannot be completed with one operative and an excavator, the work must cease, and the supervisor must ring a manager for guidance. DO NOT have two operatives working within the 2 metre safe zone.	LOW	Site Operatives	When working.
Felling unwell with symptoms	Site Operatives; Catching coronavirus and putting vulnerable people at risk.	5	5	25	Operatives to stay at home, check the NHS website or call 112. If possibility infected self-isolate for a minimum of 7 days, if person in the same house has symptoms self-isolate for a minimum of 14 days. DO NOT COME TO WORK AND PUT OTHERS AT RISK.	LOW	Site Operatives	When felling unwell.

21. RAMS CONFIRMATION SHEET

All site operatives [including Sub-Contractors] working for or with the piling team will sign the confirmation sheet below to confirm they will conform to the written RAMS:

Name:	Date:	Occupation:	Signature:
X			

APPENDIX 4: PILING CONTRACTOR METHOD STATEMENT – SCREWFAST FOUNDATIONS (VODAFONE PLOT)

SFF Ref:	7039	Site:	Ark Project Union
Principal Contractor	JSM Group	Revision:	000
Produced By:	M Lawrence	Date:	27/10/2020
Checked By:	J Wright	Date:	27/10/2020
Doc Name:	SFF 6977 – Ark Project Union – RAMS		

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Method Statement

1 Introduction

1.1 Overview of Works

Installation of 128 No. Helical Piles and top hats.

1.2 Availability of Method Statement

This Method Statement will be kept in the project office and a copy will be available at all times onsite via the SFF Site Pack when work is being undertaken.

2 Scope of Works

2.1 Scope of Works

- Deliveries and Unloading,
- Installation of ScrewFast piles

The above works will take place at locations specified by the PC. Exact pile positions will be set out by the main contractor.

2.2 Limits of Working Area

The works area is situated within a non-working/not live substation. The site is secured from the public by perimeter fencing and security gates. Exclusion Zones to be implemented at works area to prevent impact/collisions with people and plant.

2.3 Location and Programme

The work location is referred to as **Ark Project Union Substation**

Site address is North Hyde Gardens, Hayes, UB3 4QQ

Works comprise of 80 No. Helical Piles installed to varying depths. Refer to ScrewFast helical pile design and drawings for details.

- Works are set to commence on- **Nov 2020 - TBA**
- The intended duration of works is 18 shifts (day works) excluding weekends. This will depend on ground conditions and any unforeseen site delays.
- Shift times are as follows – 08:00hours till 17:00hours (including lunch break etc) longer working hours are possible upon agreement if necessary.

3 Hazards

3.1 Generic Hazards Associated with Task

- Plant movements
- Plant access and egress
- Manual handling
- Sharp edges
- Noise levels
- Lifting operations
- Hot Works
- Night Working

3.2 Site Specific Hazards

- Buried services
- Weather conditions
- Slips, trips and falls.
- Site traffic / plant movements
- Lifting Operations
- Access and egress into the working area
- Restricted space

For COVID-19 Specific requirements please refer to section 11.

4 Interface Arrangements

4.1 Public Interface

SFF don't expect any Public interface as the site is secured from the public by perimeter fencing and security gates. Should any Public interface occur the SFF site supervisor will notify the client as soon as practically possible.

5 Environment

5.1 Waste

The ScrewFast piling systems themselves do not produce waste, therefore we only expect minimal general waste to be generated on site as a result of ScrewFast's Activities. The following procedure will be adhered to with regard to onsite waste:

- General Waste (litter) will be bagged and removed from site at the end of the shift.
- Spoil arising from any digging or grading of land will be spread locally or removed from site – removal from site will be the responsibility of the Principal Contractor.

5.2 Plant and Fuel

All plant used will be modern and well maintained resulting in minimum emissions and less likelihood of leaks.

Refuelling

- Refuelling of plant will take place using funnels to avoid spillages.
- Refuel well away from work areas where possible to avoid risk of spilling where hot works may take place
- Ensure the refuelling point is suitable and well ventilated
- Ensure the machine is shut off
- Allow time for machinery to cool down if possible

- Ensure the correct fuel is being used
- Make sure all ignition sources are removed while refuelling, and ensure that no smoking will occur nearby while refuelling
- Check the safety data sheet and labelling of fuel / oil containers and ensure required instructions are followed or are able to be followed.
- Confirm that all fittings, hoses terminals and tanks are in good condition and free of leaks
- Avoid spilling or splashing fuel (use of funnels and fuel containers with flexi pourers)
- If decanting:
 - use a suitable pump
 - Only pour into a container on the ground or on a solid surface
 - Wear eye protection
 - Wear suitable gloves
- No refuelling of the machine will take place within 10m of any known water course
- Plant will have a spill kit provided.
- No barrels will be used onsite. Only Bunded Fuel Bowsers will be used for carrying fuel.
- Plant nappies to be used on site at **ALL TIMES** while refuelling is taking place.
- Drip trays must be used at all times on generators etc
- SFF to provide a double skinned fuel bowser

5.3 Contaminated Land

ScrewFast Foundations have not been notified of any potential contaminants within the working area. If during the course of the works any suspected Asbestos containing materials are discovered the works will stop and the client representative will be notified. The client will be responsible for safe removal of any ACM's prior to works recommencing.

5.4 Noise

Noise will be kept to a minimum. Sound levels will be monitored onsite and noted on the daily risk assessment / daily site report. If noise levels go above 85dB then the required PPE (Ear Defenders) must be worn as highlighted in the Risk assessment. Ear defenders must be worn as mandatory when operating hand held power tools.

6 Plant and Equipment

6.1 Operated Plant and Attachment

- 21 tonne rubber tracked excavator
- 250kN Torque head
- 6m Rock auger
- 10m Telehandler

ALL Plant Operators will have the appropriate current plant proficiency certificates (CPCS only) and will have undergone induction training by ScrewFast with regards to on-site procedures and hand signals prior to commencement of work on site. Operative will also be required to complete a full JSM induction before attending site followed by and complete project induction.

- Excavator type if known: **21 tonne rubber tracked machine (see Appendix D)**

Please Note- The SFF site supervisor will complete a plant check sheet when the machine first gets delivered to site and then on a daily basis until the job is complete. A copy of plant inspection sheets must be provided to PC weekly for filing

6.2 Small Plant

- Generators
- Battery Powered Tools
- Approved CAT & Genny Scanner (eCAT4+ min)
- 110V Tools
- Cut off saw
- 9 & 4 ½ Inch Grinders
- Impact Wrench

6.4 Base Components

- Steel Helical piles
- Steel top hats
- Bolts

6.3 Tools and Equipment

- Steel Erectors Podger/Ratchet
- Lump Hammer
- Sledgehammer
- Pinch Bars
- Insulated Shovels
- Spirit Levels
- Measuring Equipment
- Laser Levels
- Certificated Lifting Chains/Slings/Camlock

6.5 Safety Equipment

- PPE will be worn as listed in 7.5.
- Fire Safety Equipment for hot works – Fire extinguishers, screens, fire blankets.

7 Personnel

7.1 Key Personnel Involved

Name	Organisation	Job Role	Contact No
Thomas Worton	JSM Group	Project Manager	01992 788 019
Iaian Turkentine	ScrewFast Foundations	Operations Director	07515 922287
Marion Lawrence	ScrewFast Foundations	Safety, Health & Environment Manager	07515 050849

7.2 Site Personnel (Crew) – subject to change

Name	Organisation	Job Role	Contact No
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Will Harris	ScrewFast Foundations	Site Supervisor/ Lift Supervisor	07469 753105
Matt Woods	ScrewFast Foundations	Senior Pile Technician / Slinger-Signaller	07880 385973
Robert Day	ScrewFast Foundations	Pile Technician / Telehandler Operative	07721 128815
Joss Wainwright	Screwfast Foundations	Senior Driller / Pile Technician	07876 896613

All site personnel will attend a site induction. All site personnel will be CSCS or CPCS card holders.

The crew shall comprise the minimum of Plant Operator and 1 Installers. The Installer will act as a Banksman. All Installers will have been trained under the ScrewFast Foundation scheme.

All members of the crew will be familiar with Standard Hand Signals.

- Banksman on site will be nominated by the **ScrewFast site supervisor**
- CPCS Slinger Banksman will assist all lifts and plant movements.

7.3 Communication

A list of personnel involved with the project along with contact numbers is included in 7.1 and 7.2. The ScrewFast Lead Project Manager will ensure appropriate communication and co-operation with all parties involved in the works.

ScrewFast Employees will be able to communicate with the Construction Manager and Projects Office from site at all times with the use of Mobile Phones (Mobiles must only be used in safe zones)

7.4 Welfare

Welfare facilities to be provided by Principal Contractor

Site staff will also make use of compound facilities. Welfare van and compound facilities will be kept clean and tidy at all times. Daily Inspection will be carried out by SFF Site Supervisor and if found to be in an unsuitable condition this will be reported to site management team to rectify.

7.5 PPE

As a minimum all Site Personnel will wear the following PPE

- Category 2 Flame retardant overalls to be worn at all times while working within all live compounds
- High Visibility Clothing/Vests/Jerkins
- Hard hat
- Safety boots (Rigger boots are not permitted)
- Safety gloves appropriate to task and including anti -vibration gloves where applicable
- Impact Glasses/Goggles
- Ear defenders where required

- FP3 masks as required

PPE to be worn correctly at all times, Long sleeves must be kept long and not rolled up

Other PPE will be worn as dictated by Risk Assessment.

7.6 Site Inductions/RAMS briefing

It is the responsibility of the Principal Contractor to carry out all the necessary Risk Assessments, Public Services Checks and Setting Out before the arrival of ScrewFast Foundations on site. All site specific information including the Risk Assessment is briefed to our staff as an induction prior to the commencement of piling works.

All members of the Screwfast site team will be required to attend a JSM SHEQ induction prior to commencing works

Under Section 2 (1) of the Health & Safety at Work Act 1974 a ScrewFast Foundations representative will carry out their own Risk Assessment upon arrival to site or at a pre work site visit and the results should be recorded in writing. Risk Assessments and Method Statements (RAMS) will be briefed to all site operatives by the SFF supervisor prior to works commencing. All RAMS briefing shall be recorded on **Appendix A**. Daily Risk Assessments will be completed onsite prior to each shift commencing.

Any proposed changes to the RAMS during the works should be notified to the ScrewFast Construction Manager or Health and Safety Manager for sign off before being re-issued and then re-briefed to all Site Operatives

7.7 Safety of Personnel & Agreed SSOW (Safe System Of Work)

- All personnel will attend site induction held by the Principal Contractor before any work is to commence onsite.
- These RAMS will be briefed to all personnel prior to works starting by the SFF site supervisor. A copy of the briefing register will be issued to the pC
- All personnel will obey work permits and no work will start without the required permit.
- Standard PPE detailed in 7.5.
- Personnel to be competent for task. (CSCS/CPCS Card holders)
- All tasks undertaken are covered by the Risk Assessment, which details preventative measures.
- All pile and equipment weights will be supplied by SFF to the client prior to ScrewFast's arrival on site
- COSHH data and assessments to be produced for any substances relevant to the work (see Appendix F)
- SFF site supervisor will issue ALL 6/12monthly certs for Plant and equipment (including lifting equipment) to the PC/Client at the site induction prior to any work commencing on site.
- All piles and equipment will be mechanically lifted wherever possible.
- The excavator will not be used to transport stillage's on/around site. Stillages to be transported using appropriate Telehandler/Forklift. Loads to be secured with Ratchet straps before being lifted.
- If deemed necessary, our site supervisor may request the need of a type 1 substance to be scattered within the working area to provide adequate grip to eliminate Slip/Trips and Falls
- Machine to have a rear-view camera fitted and the required mirrors so a good level of visibility is maintained at all times.
- SFF site supervisor to have a valid SMSTS or SSSTS certificate.

Please Note- All machine movement will require the need of a **Banksman**. Any slinging will be carried out by a CPCS Slinger/Signaller.

8 Methodology

8.1 Prior to Work

The Main Contractor will be in possession of all required paperwork. ScrewFast to check all materials and plant are available for task and all are to specification. Certified ScrewFast installer will ensure pile sections for each location correspond with installation sheet. Any relevant thorough examination certs to be produced before work is to commence.

8.2 Briefing Arrangements

- These RAMS will be briefed to all individuals involved with the works prior to any work commencing on site.
- All personnel requiring to access site must be briefed prior to doing so.
- All briefed personnel will acknowledge brief by signing Method Statement Briefing Record Sheet included in **Appendix A**.
- Daily Safety Briefs will be carried out through the duration of the job relating to site specific issues that may occur.
- All work permits will be briefed to site personnel prior to work commencing.
- **SFF site supervisor must attend the daily DAB briefing at the start of each day**

8.3 Access, Site Set-up and deliveries

- All vehicles will access the worksite via a dedicated access point. The SFF site supervisor will be responsible to ensure that our vehicles are following any site traffic plans at all time.
- Piling materials/equipment will be unloaded from the delivery lorries and stored in the lay down/store area as agreed by the PC at the Pre-start meeting. The SFF site supervisor will oversee this operation and make sure the works are being carried out according to the SSOW briefed at the start of the works.
- SFF Telehandler will be used to transport piles from the laydown area to the worksite as required.
- All marking out of the pile positions will need to be completed prior to SFF arrive. It was agreed at the pre-start meeting that the ground level would be reduced to 300mm below top of pile. Any concrete obstructions below ground that conflict with pile positions would need to be removed by the PC prior to SFF arriving onsite.
- A hot works permit will be issued by the PC prior to any hot works commencing on site.
- Any hot works will require a Fire watchman to be present while the activity is being carried out and for at least 1hr after the activity is finished.

8.4 Buried Services

The Principal Contractor is responsible to inform and identify using spray paint or warning tape of any underground services within the vicinity of the works. This must be done before any work on site commences. Buried services local to the works will be plotted on the ground. These locations will then be confirmed using an eCAT4+ scanner and Genny where appropriate in accordance with the following section with data made available for download upon request. Service records to be made available for ScrewFast Site Operatives.

Prior to the installation of piles or any excavations the appropriate areas are to be scanned using a eCAT4+ Scanner and Genny (scanned in all modes) to identify any uncharted buried cables. Two types of scan are to be undertaken as follows:- firstly with the cable locating tool set to detect electromagnetic radiation from cables carrying live electrical currents and secondly set to detect radio signals from other detectable sources.

Please Note - A Permit to Dig will be issued by Client to SFF. When all parties are satisfied that the area is safe for piling / digging to begin only then can the work commence.

8.5 Set Out Pile Location

Pile locations will be set out by Principal Contractor reed bar with mushroom caps, to identify pile centres. All pile setting out must be completed prior to SFF arrival onsite.

Please Note- All setting out is the responsibility of Principal contractor unless agreements have been made prior to ScrewFast arriving **onsite**.

8.6 Earthworks

All ground works are the responsibility of others, including any excavations, vegetation clearance, tree removal, obstruction removal, exposing/diverting known services and any site levelling. This **must** be completed before SFF are to commence works on site.

***SFF require the ground level to be 300mm below finished pile height on all pile locations. ***

PC responsibility also includes any damage to the ground or making good of the ground after the installation has taken place. If SFF feel that the ground disturbance is going to be high, then this will be raised at the Prestart meeting prior to the installation taking place.

8.7 Permit to Dig and Commence Installation

As part of internal procedures, ScrewFast operatives will ask the PC to sign SFF Permit to Commence Installation. By signing this permit the PC is confirming that all the relevant checks/precautions have been complied too and they are happy for ScrewFast to commence piling (**Appendix B**). CAT Scanner must be at works area at all times and used at regular intervals.

ScrewFast Foundations permits must be signed by all parties involved prior to any works commencing onsite.

8.8 Installation of ScrewFast piles

Installation Safe Practice for working within an Exclusion Zone

- Site supervisor to set up and exclusion zone around the dipper arm/boom of the excavator by using chapter 8 fencing. Where Site conditions do not allow for the use of fencing then Line Spray will be used on the ground to identify the Exclusion Zone. The Exclusion zone should be a Min of 1metre circumference around Torque head.
- Entry to the Exclusion Zone should be restricted to trained SFF personnel. This should be controlled by the ScrewFast site supervisor.
- Entry into the Exclusion zone is restricted to the following actions/conditions:
 - Insertion and removal of Bolts to Disconnect and Connect Pile sections, Top Hats and Drive Adaptors, and manual positioning of Pile Sections during installation. In these circumstances the Machine will be in Operation however, the Torque Head will be attached to an installed section and will not be unable to swing unless lifted by the machine. The instruction to lift and fully disconnect the sections must only be given by the Banksman when all operatives have left the exclusion zone.

- All other entry to the exclusion Zone will be under the supervision of the banksman and will only be permitted when the Deadman switch on the machine has been engaged.
- All Operatives and Visitors to ScrewFast sites/works area must be briefed on the Exclusion Zone rules by the ScrewFast Site supervisor.

**** Lifting methods to be assessed by the site supervisor/lift supervisor to determine most suitable lifting method for the task.****

Lifting of Pile sections using a loading stillage (if required).

- The Lifting Frame will be placed in the correct position either by the telehandler or the machine (if using the machine, the appropriate lifting methods will be identified by the slinger signaller). The frame should be placed on firm level ground to ensure stability.
- An exclusion zone of min 1m circumference (Site supervisor to determine exact size of exclusion zone according to the working space available at each pile location) to be implemented around lifting frame.
- The pile sections will be slung and lifted vertically (using the excavator) for positioning into the lifting frame using the appropriate lifting method identified by the slinger signaller. The nominated banksman overseen by the site supervisor will ensure that the area around the lifting frame is clear. The instruction to proceed with the lift will then be given to the machine operator.
- The pile section will be lifted into position inside the lifting frame. Once the pile is safely positioned inside the frame the Senior pile technician will give the instruction for the machine operator to engage the dead man switch so the site operatives can enter the exclusion zone to tighten the bolts situated on the frame (the machine will still be supporting the weight of the pile section at this time until it is fully secured in the lifting frame. When all bolts on the lifting frame have been tightened and the pile is secured the Senior pile technician will then release the lifting accessories from the now stable pile section.
- The slinger-signaller/senior pile tech will then give the machine operator the signal to start lifting the drive adaptor over the pile section which is in the lifting stillage and line up the bolts so the adaptor can be secured to the pile section.
- Once the drive adaptor is secured the bolts securing the pile in the frame can be loosened so the pile section can be lifted out of the loading stillage under the control of the slinger-signaller/ banksman
- This method should be followed for all pile sections prior to installation and attachment of the 'Top Hat 'adaptor.

For installation follow screwpiling method outlined below

Screwpiling Process

- All instructions to the machine operator will be given by nominated certified installer.
- Torque head will be attached to excavator boom.
- Torque head will be tested to ensure hydraulics are connected in correct way.
- 'Top Hat' Adapter will be fixed to the torque head.
- A visual Inspection of pile to be carried out before manual handling takes place. Any jagged edges caused by residual galvanising to be cleaned off using 4 ½" grinder to be made safe to handle.
- The pile sections will be slung and lifted vertically using the appropriate lifting method identified by the slinger signaller. The pile technicians (min 2), will hold the pile section steady in an upright position, for connection to the pile adaptor.
- The point or lead section of the pile will then be bolted to the adaptor.
- Machine will lift the point section into the correct location as guided by installer and pushed about 300mm into the ground.
- When in correct location, the installer will instruct machine operator to start the installation process.
- Line and angle adjustments to the pile will be carried out continuously throughout the installation to achieve the design.
- The pile section will be driven into the ground until just the connection point protrudes (approx 300mm).
- Pile section will be unbolted from the pile adapter.

- Certified ScrewFast Installer will select next pile section to be added.
- Selected section will be bolted to the pile adaptor and lifted by the machine to the part-installed pile.
- Pile sections will be bolted together
- Installation process will continue.
- Line and angle adjustments will be made to achieve design.
- This process will be repeated until the pile is installed as per the installation sheet.
- The pile will now be driven down to the correct level as per design using the timber peg as a datum to work from.
- When the pile is at 1 metre from finished level the machine operator will reduce the revs of the machine to approx half, to allow accurate torque readings to be taken.
- Torque readings will be taken at 1m, 0.5m and 0.0m.
- All readings will be recorded on the installation sheet and returned to pile designer for checking.
- Upon completion of pile installation Top hats will be placed on and fastened with the appropriate bolts.

Notes on installation problems:

If design torque is not reached further pile sections can be added under the instruction of the Certified Installer and confirmation required by design manager and checker.

Ground conditions encountered may mean that the rock auger is required to bore a pilot hole.

Rock Auger Process

- The part installed pile would be removed from its position in the ground/location.
- The auger is attached to the torque head and then guided into the ground following the same guidance/method for Screwpiling
- The Rock Auger Adapter will be fixed to the foot of the Torque Head.
- The Drive Section of the Rock Auger is then lifted by the machine with a strap and held in position.
- The Drive section of the Rock Auger will then be bolted to the Top Hat adapter.
- Machine will lift the Drive Section of the Rock Auger into the correct location as guided by installer and pushed into the ground Approx 300mm
- When in correct location, the installer will instruct machine operator to start the Rock Auger process.
- Line and angle adjustments to the Auger position will be carried out continuously throughout the installation to achieve the correct piling position.
- The Rock Auger will be screwed into the ground until the connection point protrudes (approx 300mm) above existing ground level.
- Drive section will be unbolted from the Top Hat adapter.
- The Mid Section of the rock auger will then be bolted together with suitable torque applied to the nuts.
- The Rock Augering process will continue.
- Line and angle adjustments to the Auger position will be carried out continuously throughout the installation to achieve the correct piling position.
- This process will be repeated until the connection point for the mid section protrudes (approx 300mm) above existing ground level.
- The Mid Section will be unbolted from the Top Hat adaptor.
- The final section of the Rock Auger will then be bolted together with suitable torque applied to the nuts.
- The Rock Augering process will continue.
- Line and angle adjustments to the Auger position will be carried out continuously throughout the installation to achieve the correct piling position.
- When all Three Sections of the Rock Auger have been driven down to the desired levels the process to uninstall the pile begins by unwinding each section until connection points are exposed and bolts can be removed. Once all Rock Auger sections have been removed the Screw piling process begins again.

Hot Works (if required for remedial works/modification of pile sections)

It is very occasionally required to carry out Hot Cutting/Grinding to modify pile sections. In the event that Cutting of pile sections is required the following safe system of work must be followed at all times

- PC's Hot works permit must be issued prior to any hot works taking place
- Only trained and competent personnel to operate the equipment.
- Move the workpiece to safe location for carrying out hot works
- Remove nearby combustible materials (such as flammable liquids, wood paper, packaging or plastics)
- Protect nearby combustible materials that cannot be moved. Use suitable guards or covers such as metal sheeting, or fire retardant blankets.
- Prevent flame, heat sparks or hot spatter from landing on hoses
- Keep fire extinguishers nearby (**must have 2x extinguishers available onsite at all times**)
- Visually inspect equipment before use for signs of wear or damage.
- Turn the gas supply off at the cylinder when the job is finished or before the cylinders are moved or transported.
- Keep hoses away from sharp edges and abrasive surfaces or where vehicles can run over them.
- Correct wearing of flame retardant PPE, and visor.
- Appoint a fire watchman for 30mins after hot work finishes.

Hot Works Process.

- A Stihl Saw will be used to cut the section to the agreed finished pile height
- The cut section will need to have the galv cleaned ready for top caps / discs to be welded to top of pile.
- If a pile cannot progress to within 500mm or less of correct height it is to be wound out and the B1m section cut down by the correct amount?
- Use Stihl saw to cut piles to correct height. The pile will then need a new set of drive holes put into the section that has been cut.
- Holes for driving section down will be cut into the tube with oxy propane gas torch by a competent person
- The pile sections will be slung and lifted vertically using a 2m round sling which will be connected to the torque head eyelet using a shackle. The strap will be connected to the pile using its pre drilled connection holes with another shackle.
- The pile technicians (2) will hold the pile steady in a safe upright position. After standing upright, one of the 2 technicians will remove the shackle from the pile whilst the other technician remains stabilising the pile.
- After the shackle is removed from the pile the technician will then restabilise the pile with the first technician while the top hat is moved into position to then be attached to the pile.

8.9 Fitting of Top hats

- Once the piles have been installed to the correct level the top hat can be lifted onto the installed pile. If required a bolt can then be inserted into the existing drive hole or holes and secured to the pile using a nut which is tighten down using either a impact wrench or adjustable spanner.

8.10 Housekeeping

- At the end of each shift site will be tidied.
- All excess materials will be loaded to vehicles.
- All waste will be bagged and loaded to vehicles to be recycled or disposed of in waste skip in the compound (**supplied by the Principal Contractor**).
- All excavations/unfinished bases will be fenced off

- ScrewFast Supervisor will ensure that site is tidy and safe prior to leaving site.
- On completion of the project ScrewFast Supervisor will ensure that all equipment and waste is removed from site.

8.11 Installation Records

Installation sheets and logs will be completed daily as piling progresses.

8.12 Change to planned Methodology or Tasks

- If subsequent to acceptance approval of this Method Statement, any change to the planned methodology or task needs to be implemented then this must be discussed and agreed with the Client and SFF Head of Construction.
- Where changes are required at short notice, i.e. during the excavation of the works, the proposed change must be approved by the SFF Site Supervisor, SFF Head of Construction and the PC Site Manager. Once the change is approved the relevant briefing must be given to the team highlighting new risks and the necessary control measures. This will be documented and the client notified at the earliest opportunity.

8.13 Process for dealing with design change

ScrewFast installers are trained to follow strict guidelines (outlined below) should they encounter difficulties or anything that necessitates a change during installation. ScrewFast project management and design team offer a 24hour service and the individuals linked to the particular project and their contact details are available at the bottom of the installation sheets.

1. Call the ScrewFast project manager or design department. Installers must not make any changes to pile depth or configuration without project manager or designer team approval.
2. Relaying all information pertinent to the issue.
3. Design department to consider all options and where appropriate instruct a change or ask the installers to wait for further instructions.
4. Depending on the project specifics an external check by third party/consultant may be required. The ScrewFast PM or designers will seek the appropriate approval prior to instructing the installers what to do.
5. Depending on the severity of the change project management may need to seek commercial approval prior to installers progressing.
6. Installers are to only act/continue works until given clear instruction of what to do from either the project manager or design department.
7. Any change and instruction is to be captured on the installation sheets on the appropriate page provided.
8. This change will be signed off once the works are complete by the person who gave the instruction and or the design department.

It must be noted that between steps 2 and 3 the installers may be asked to try a few different techniques to install the pile (rock auguring, change of pile configuration for example). However, no change will be commissioned until cleared and approved by the ScrewFast design department and if required an external checker.

9 Environmental Controls

- All Vehicles are to be checked for defects prior to commencing work.
- Any Protected Species toolbox talk will be given to the SFF team by the PC before work commences onsite.
- Temporary fencing to delineate the site extents prior to excavation works commencing.
- Avoid stock piling of material for long periods as this becomes a desirable habitat for reptiles.
- A spill kit will be available at all times.
- All plant used on site will be supplied with drip trays. Drip trays will be used under “static” plant at all times.
- Only metallic petrol/diesel containers will be used on site and will be stored safely in the works vehicle when not in use.
- Refuelling (if required) will not be carried out near storm drains or watercourses.
- All COSHH items shall be stored and disposed of in the correct manner. (Refer to the relevant COSHH sheet/s)

- Digging by hand should avoid injury to any animals hibernating in the verge and allow them to move away safely.
- If any protected species are found on site the environmental team should be contacted immediately.
- Root disturbance should be kept to a minimum.
- Any vehicles or machinery not in use are to be switched off

10 Emergency Plans

10.1 First Aid

A first aider will be onsite at all times and a **first aid kit will be in ScrewFast vehicle.**

First Aider will be identified by a helmet sticker (white cross on green background) and will be pointed out to site personnel at briefing stage.

- ALL members of the SFF site team are first aiders

10.2 Emergency Contact numbers

Emergency Services = **999 or 112 from a mobile phone.**

Please Note- Use **112** from a mobile phone. This will put you through to local operators and they can obtain your location

British Telecom	0800 309409
Water	0845 2780845
Environment Agency	0800 807060
National Grid (Gas)	0800 111 999
SSEN	0800 072 7282

10.3 Nearest Hospital (A&E)

Ealing Hospital (2.7miles)
Uxbridge Road
Southall
Middlesex
UB1 3HW

Tel: 0208 967 5000

Operatives will also be informed of emergency plans at site induction by the PC.

10.4 Serious Incidents

Emergency services will be called to site using 999 or 112 from mobile phones, should any serious incidents occur. Iaian Turkentine, ScrewFast is also to be contacted on

Tel: 07515 922287

10.5 Accident / Incident / Near Miss Reporting

All accidents will be recorded in ScrewFast/PC's Accident Book. All incidents/accidents and near misses will be reported to the PC/Client (within 30mins) and will need to be reported in accordance to ScrewFast procedures. **Please note ALL the above must be reported to (details below)**

Name- Thomas Worton

Position- Project Manager

Company- JSM Group Contact No- 01992 788 019

Site specific First Aid and Emergency Procedures will be briefed to all site personnel at induction provided by Principle Contractor / Client.

11 COVID-19 Specific Requirements

Please find below a list of controls to be implemented by ScrewFast. These will be performed in conjunction with any site-specific and government requirements as detailed/briefed in the site induction by JSM Group.

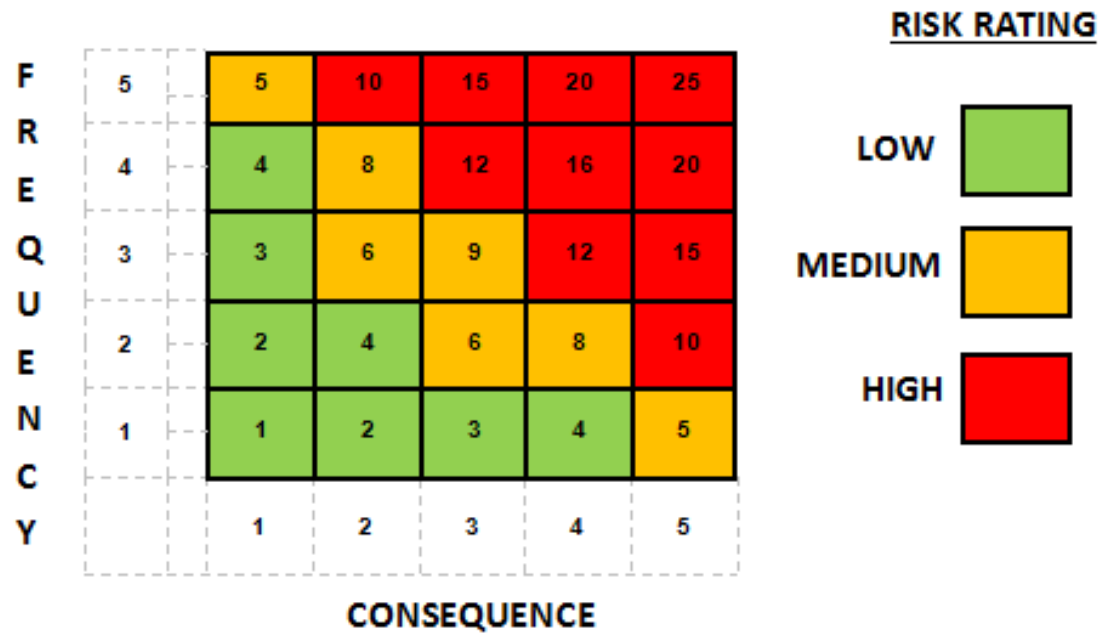
- We continue to regularly reminding our employees about the need to maintain good hygiene, and updating them on the latest Government guidance on self-isolation
- Daily monitoring of the latest Government guidance, and ensuring this is effectively communicated to our employees and our supply chain colleagues working on our sites.
- Stopped the practice of vehicle sharing – all workers to travel alone in vehicles to ensure social distancing 2m rule is adhered to.
- Our site operatives as we will not be asked to stay away in hotels as a result of COVID-19. Please note we may have to reduce our working hours onsite to accommodate travel time. We will attempt to select the team nearest to the project location to maximise time onsite.
- 2m distancing rule to be applied onsite. The nature of ScrewFast's activities make it possible to enforce a 2m distance rule when working onsite. The site supervisor will oversee all works to ensure that this safe distance is maintained during top hat fitting and beam landing.
- 1 tool – 1 operative. Tasks will be planned and allocated to ensure only 1 operative uses each individual tool per day. At the end of each day all tools and equipment will be subject to thorough antibacterial cleaning/wipe down.
- All operatives will be provided with a supply of antibacterial gel and cleaning wipes to maintain hygiene.
- Operative will be advised to bring their own drinking/eating utensils to site to avoid using shared items (cups/forks/spoons)

- Regular safety briefings and toolbox talks to be carried out to remind people of the controls to take to prevent the spread of COVID-19.
- Appropriate PPE to be worn at all times.
- ScrewFast to bring own pens. Alternatively, briefings can be recorded verbally or by video and sent to ScrewFast PM before work starts.
- ScrewFast supervisor to liaise with haulage drivers prior to arrival for best way to unstrap loads, avoiding potential contact with each other.

Refer to appendix G – COVID-19 Risk Assessment for full COVID-19 controls.

HEALTH, SAFETY & ENVIRONMENTAL RISK ASSESSMENTS

SFF Ref:	7039	Site:	Ark Project Union
Client:	JSM Group	Rev No:	000
Produced By:	M Lawrence	Date:	27/10/2020
Checked By:	J Wright	Date:	27/10/2020
Doc Name:	SFF 70379 – Ark Union Project – RAMS		



Health & Safety Risks

		(C) Health and Safety Consequence	(F) Frequency			(RR) Risk Rating = Consequence x Frequency				
This Risk Assessment should be read In conjunction with the referenced Method Statement		1 Insignificant (no effect)	1 Very rare (1 in 10-20 years)			1-5 Insignificant				
		2 Marginal (minor injuries)	2 Rarely (1 in 2-10 years)			6-8 Acceptable WORK SHALL PROCEED				
		3 Serious (major injuries)	3 Likely (1 in 1-2 years)			9-15 Unacceptable				
		4 Critical (fatalities)	4 Frequent (< 1/Year)			16 – 25 Intolerable WORK SHALL NOT START				
		5 Catastrophic	5 Very Frequent (1/Month)							
ACTIVITY/ EVENT FEATURE/ SITUATION	HAZARD/ ISSUE/ INTERACTION (CAUSE)	UNDESIREED EVENT	CONSEQUENCES	BEFORE CONTROL			CONTROL	AFTER CONTROL		
				C	F	RR		C	F	RR
Working within close proximity to others	Exposure to COVID-19	Contracting COVID-19	Fatality, illness	5	3	15	Follow government guidelines on prevention. Refer to Appendix G Agreed COVID-19 requirements. Remain 2m+ from any individual Do not share tools.	5	1	5

							<p>Travel separately.</p> <p>Avoid any close interface with clients by doing paperwork prior or via video logging.</p> <p>Required PPE to be worn at all times.</p> <p>Continually use anti bac/wipes spray when touching surfaces.</p> <p>Wash hands.</p> <p>Avoid hand contact with face and mouth</p> <p>Dispose of tissues/litter appropriately</p>			
The public, third parties and trespassers	General Public	Contact with Construction work / plant	Major injury	4	4	16	<p>Implement fencing to segregate from public access. Immobilise/ use Vandal guards/ remove plant when not in use/ overnight. Do not leave excavations uncovered. Leave all work areas in a safe condition at all times.</p>	4	1	4
Lifting Operations	Unsafe load	Falling load Overturning machine	Fatality, Major Injury, damage to infrastructure	5	4	20	<p>Pile and equipment weights and SWL of the machine to be supplied prior to the works taking place.</p> <p>Lift plans to be implemented and checked by an appointed person where necessary</p> <p>Trained operatives to complete any lifting tasks eg slingers/signallers and lift supervisors etc</p> <p>Certified in-date lifting equipment to be used at all times</p> <p>Stable Ground conditions</p> <p>Exclusion zones to be set up where the lifting operation is taking place</p> <p>Segregation of the working area to allow access to competent and trained operatives only</p>	5	1	5
Setting up/Changing of Torque Head	Hydraulic spill, unsafe load	Oil spill, falling load	Fatality, Major Injury, contaminated land	5	4	20	<p>Trained operatives and slingers to perform works.</p> <p>Certified lifting gear.</p>	5	1	5

							Switch machine off when changing Torque Head. Spill Kits and Plant Nappies on standby. To be completed in a suitable area agreed by the PC rep - Not within 10m of a known water course			
Weather Conditions	Fog/Mist/Heavy rainfall	Inadequate vision	Fatality/Major injury	4	4	16	Hi – vis clothing worn by all work force PC rep to advise if weather changes may affect the task	4	1	4
	Sun	Dehydration	Major Injury	2	5	10	Drink plenty of water Adequate breaks during the working day Application of sunscreen	2	1	2
Working within open Excavations while piling	Unprotected excavations	Trench collapse	Fatalities	4	4	16	Excavation to be adequately supported in compliance with construction design management Regs 2015 (CDM) Any excavations on site are to be clearly identified by the PC with good signage and barriers Excavation and earth work to be inspected regularly and recorded. Inspect prior to each shift and after inclement weather. Safe access and egress into the excavation must be provide by the PC/Client Temporary fencing to be erected around the edge of the excavation to warn others, must be provided by the PC/Client	4	1	4
	Biological Hazard	Personal injury	Fatality/Major injury	4	3	12	Staff are briefed on good hygiene practices. All staff to be trained on Leptospirosis/other diseases. Cover any open cuts with plasters Wear suitable gloves at all times within the working area	4	1	4

							SFF to make sure good hygiene is being maintained by all operatives			
	Moving Machinery	Personal injury	Fatality/Major injury	4	4	16	<p>Only to be operated by trained and competent staff</p> <p>Banksman to supervise all machine movements at all times.</p> <p>Remove keys when not in use</p> <p>Be aware of others entering the work area at all times</p> <p>Use segregation and walkways wherever possible</p>	4	1	4
	Crush injuries	Personal injury	Major injury	3	4	12	<p>Workforce briefed about placing fingers near pile connections.</p> <p>Suitable gloves to be worn at all times</p> <p>Good communication between machine driver and installers at all times</p>	3	1	3
Unloading of Vehicles	Falls from Height	Personal Injury	Major injury	4	4	16	<p>All unloading/loading activities to be carried out within tM</p> <p>Trained operatives only to carry out unloading tasks.</p> <p>All unloading tasks to be overseen by Site Supervisor.</p> <p>ALL Delivery contractors/SFF staff to receive site induction/safety briefing prior to commencement of unloading vehicles.</p> <p>Appropriate PPE to be worn at all times. If accessing the back of a lorry then appropriate harness/lanyard must be used to prevent falls from height.</p> <p>Use of loading area advised by the PC rep at site induction</p> <p>Task Specific Risk Assessment to be carried out by Operator & Site Supervisor prior to use</p>	4	1	3

Services (Surface and Buried)	Buried services	Personal injury	Fatality/Major injury	4	4	16	<p>Clients permit to dig system will be implemented at all times.</p> <p>Known services protected / highlighted. CAT scan of area prior / during works</p>	4	1	4
	Protection of exposed services	Striking Explosion Damage Personal injury	Fatality/Major injury	4	4	16	<p>All exposed services to be suitably identified, colour coded</p> <p>Any services within 500mm of pile centres need to be exposed prior to piling commencing</p> <p>PC rep to advise on any known services within the working area and a full brief given to the SFF site supervisor prior to pile commencing</p>	4	1	4
Use of power tools (general)	Vibration from prolonged use of tools	Over exposure	HAVS	3	4	12	<p>The appropriate exposure limits will be strictly adhered to.</p> <p>Keep hands warm and implement regular rotation of trained operatives to share exposure.</p> <p>Monitor and record findings</p>	3	1	3
	Noise	Hearing loss/damage	Major injury	3	4	12	<p>At or above 85dB suitable ear protection is mandatory. Above 80dBbut below 85dB suitable ear protection is advised.</p> <p>Ear protection will be available onsite at all times.</p> <p>Any changes in noise levels picked up by SFF site supervisor will be reported to the PC rep onsite</p> <p>Good signage in high risk area supplied by PC</p> <p>Monitor/record findings</p>	3	1	3
	Dust / Debris	Inhalation / Flying Debris	Major injury	3	4	12	<p>Appropriate PPE to be worn (Goggles / dust mask) by operator and personnel working in close proximity.</p>	3	1	3

							<p>Examination of tool bits / blades for excessive wear or damage prior to commencement.</p> <p>Damp down any airborne dust</p> <p>Good signage in high risk areas supplied by PC</p>			
	Re-fuelling	Fire Spills	Burns Environment Contamination	3	3	9	<p>No smoking or naked flame when re-fuelling or within 10m.</p> <p>Use correct funnel for re-fuelling</p> <p>Fuel to be stored in bunded bowsers</p> <p>Spill kits & drip trays to be employed</p> <p>Refuelling area to be advised by PC during induction</p>	3	1	3
	Incorrect use, missing guards, Position of operation	Entanglement Poor posture Fire	Major injuries, Lacerations Soft tissue injuries Burns	3	3	9	<p>Only competent personnel are to operate equipment.</p> <p>Do not use if guard is missing or incorrectly positioned.</p> <p>Flame retardant PPE to be used wherever possible</p>	3	1	3
Cutting of Galvanised Steel Sections. Hot Cutting/Gas/Grinder/Stihl saw	Defective equipment Moving Parts Emissions/Fume – Zinc fumes from cutting Galvanised Steel Noise Vibration Fuels and oils Fire	Personal injury Cuts / Abrasions Metal Fume Fever / Inhalation of fumes Burns	Fatality/Major injury	4	3	12	<p>PC's Hot works permit must in place prior to any hot works commencing</p> <p>Pre-use check of equipment to be carried out each day before use and every time a blade/disc is changed. Defects must be reported.</p> <p>Saw must not be operated unless guard is in place</p> <p>Suitably well-maintained plant to be used at all times.</p> <p>RPE mask to be used when cutting galvanised steel sections with appropriate filter to prevent inhalation of fumes.</p> <p>Cutting to be carried out in well ventilated area.</p>	4	1	4

							<p>Only trained & competent personnel are to operate equipment.</p> <p>Keep hands warm and avoid prolonged use of the equipment- alternate jobs</p> <p>When using the equipment ensure clear working space and ensure a good foot hold.</p> <p>Ensure sparks cannot land on flammable material</p> <p>Ear defenders must be worn when operating the saw – this also includes other personnel within the operating area.</p> <p>An exclusion area to be set up to protect people from sparks/dust/fumes/noise</p> <p>Correct wearing of flame-retardant PPE</p> <p>Fire extinguisher to be available at works area</p> <p>Fire watch to be implemented for 30 mins after hot works finish.</p>			
Slips, Trips & Falls	Access and Egress	Slips, Trips & Falls	Minor injury Cuts and bruises	2	5	10	<p>Visual Awareness</p> <p>Adequate Lighting</p> <p>Correct wearing of PPE</p> <p>Good housekeeping to be maintained at ALL times</p> <p>SFF site supervisor will carry out regular Tool Box talks to changing hazards</p>	2	3	6
Manual Handling	Sprain and strains Torn ligaments/ tendons	Lifting heavy/ awkward loads	Major injury Pulled muscles	3	4	12	<p>Mechanical methods of lifting to be implemented for pile sections at all times</p> <p>Briefing in manual handling to be given to all site operatives in accordance with company guidelines</p> <p>Gloves and steel toe cap boots to be worn at all times</p>	3	2	6

	Cuts/bruising	Sharp edges	Major injury	3	4	12	<p>Briefing in manual handling to be given to all site operatives in accordance with company guidelines</p> <p>Visual inspection of all pile sections to be carried out prior to handling. Any sharp edges identified will be removed using 4 ½ inch grinder before handling.</p> <p>Agreed SSOW with PC rep</p> <p>Gloves, long sleeved vests/coat and steel toe cap boots to be worn at all times.</p> <p>Good communication between operatives</p>	3	1	3
	Trapped feet/hands	Dropped objects	Major injury	3	4	12	<p>Briefing in manual handling to be given to all site operatives in accordance with company guidelines</p> <p>Gloves and Steel toe cap toe boots to be worn at all times.</p> <p>Good communication between operatives</p>	3	1	3
Head injury from falling objects obstruction or collision with plant	Injury due to unsafe stacking/positioning/storage of plant/materials or vehicles	Employees and general public	Major Injury	3	3	9	<p>PPE- Safety helmets to be worn at all times</p> <p>Exclusion zones to be set up when others are working at height directly above</p> <p>Agreed SSOW by PC rep</p> <p>Good communication between operatives</p> <p>Good signage</p>	3	1	3
Equipment/Plant access and egress with-in, to and from site	Injury to employee or member of the public	Employees and general public, Fuel spillage/ leak	Major Injury,	4	4	16	<p>Signage</p> <p>Trained and competent plant operators</p> <p>Site briefings</p> <p>Traffic routes marked as necessary</p> <p>Warning indicators fitted to vehicles (eg. flashing light /horn)</p> <p>When accessing or exiting a vehicle the following should be followed:</p>	4	1	4

							<ul style="list-style-type: none"> • 3 points of contact • Facing inwards • Never jumping off • Checking surroundings prior. 			
Hazardous substances - COSHH	Coming into contact with potentially hazardous substances	Employees	Major injury	4	3	12	COSHH assessments to be adhered too Correct PPE for the task eg gloves and eye protection etc COSHH procedure outlined in induction/ Supervisors briefing Environmental SDS/RA Follow manufactures guidelines at all times	4	1	3
Machinery and plant movements	Contact With People Collisions Crush Structural collapse	Pedestrians, employees and general public Falling load Overturning machine	Major injury, damage to infrastructure	4	4	16	Provision of banksman to oversee All movements Vehicular movements restricted wherever possible Trained operators Good lighting within the working area Segregation of the working area to competent and trained operatives only Use pedestrian walkways wherever possible Good communication between operatives Appropriate signage	4	1	4
	Contamination of watercourse	Environment	Environmental Disaster	4	3	12	Spill kits and drip trays to be employed. Use of plant nappies and drip trays Report to PC	4	1	4
Use and storage of Petrol & Diesel (highly flammable & combustible fluids)	Contact with contaminant Fuel spills Fire	Fire /explosion Spills	Major Injury Fatality	5	4	20	Diesel to be stored in bunded fuel tanks Petrol will be stored in metallic containers which will not exceed 20litres. They must be marked labelled with correct signage. Petrol containers will be stored safely in works vehicle when not in use.	5	1	5

							<p>Refuel well away from works area</p> <p>Ensure refuelling pint is suitable and well ventilated Ensure the machine is shut off</p> <p>Make sure ignition sources are removed while refuelling, and ensure that no smoking will occur nearby while refuelling</p> <p>Check the data safety sheet and labelling of fuel/oil containers and ensure that required instructions are followed or able to be followed</p> <p>Confirm that all fittings, hoses, terminals and tanks are in good condition and free of leaks</p> <p>Avoid spilling or splashing fuel (for example, us funnels and flexi pour containers)</p> <p>If decanting: Use a suitable pump – Only pour into a container on the ground on a solid surface – wear eye protection – wear suitable gloves</p> <p>Spill kits to be made available</p> <p>Relevant Coshh Assessments to be included in site pack.</p>			
Protective Guard for pile rig	Coming into contact with pile rig whilst in motion	Personal injury	Major Injury	4	4	16	<p>All operatives to retreat to a safe working zone when pile being installed. Revolutions of machine are limited to 9rpm, the average allowable without a protective guard is 12rpm.</p> <p>Maintain safe distance for operation</p> <p>Only trained and competent operative should be allowed within 1m of the task being carried out</p>	4	1	4

Who is at risk Key: Animals, Ground, Public, Vegetation, Water, General Environment									
GENERAL ENVIRONMENTAL RISKS									
Activity / Hazard	Risk	Who Is at Risk	Risk Rating			Control Measures	Ranking + Controls		
			How Likely	How Severe	Risk(L x S)		How Likely	How severe	Risk(L x S)
Needles and Sharps	Discovery during works in an area or en-route to site (car parks, access points etc)	Public	3	5	15	If noted, record locations and do what you can to mark area and keep others away. Report to Site Manager ensure these get removed	1	5	5
Access and Egress	Spread of mud from sites onto surrounding land and roads	Public and Vegetation	3	2	6	Seek site help to keep entrance clean, ask them if you can wash wheels etc.	2	2	4
Machine breaks down	Loss spillage of fuel, hydraulic fluids, engine oil or other hydrocarbons to ballast or lineside	Animals, Ground and Vegetation	3	4	12	Maintain vehicle regularly. Compound this by daily inspection of vehicle to check for signs of leakage. Carry spill kits suitable for where you are working. On hard surfaces granules can be put down, on ballast or soil use flexible spill mat/tray	1	4	4

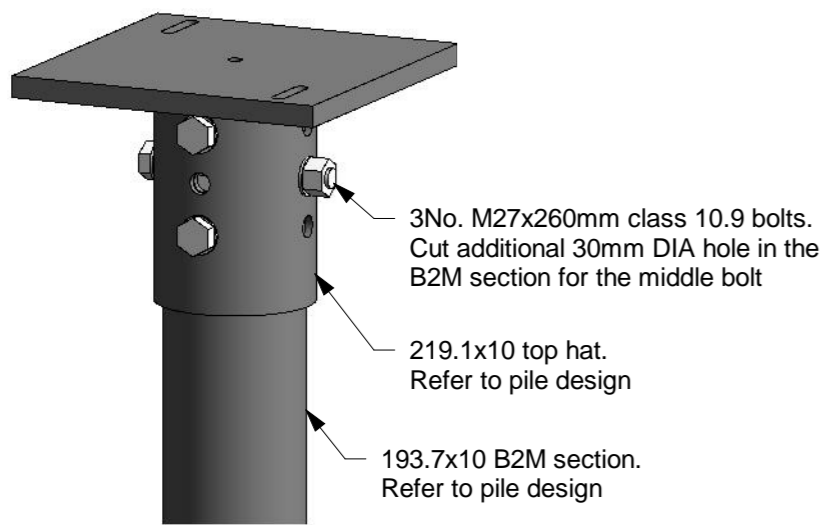
Hydrocarbon transferal	Spill during refuelling, draining of engines, tank discharge	Animals, Ground and Vegetation	3	4	12	Ensure any operations with higher risks have a full set equipment (e.g. enough containers, funnels etc.) Ensure a flexible spill mat or tray (e.g. 'plant nappy' type) is available	2	4	8
Oil/fuel Spill Sensitive Areas	Hydrocarbon spillage (e.g. leak, burst hose, during repairs/refuelling) affects streams, ponds or countryside	Animals, Water	3	4	12	Sensitive areas to be identified before works start (workers instructed not to carry out high risk tasks at the locations) Identify suitable locations (e.g. access points) and get staff to use them.	1	4	4
Spillage of COSHH Substances	Substance spillage affects homes, street works sites, streams, ponds or countryside	Animal, Ground, Water, Vegetation, Water and Public	3	4	12	Seek lowest risk form of substance to use and follow instructions for use. Carry out COSHH and usage risk assessment and do actions from assessment.	2	4	8
Vibration	Machine noise disturbs residents or other public	Public	4	3	12	Ensure machines are properly maintained and that any springing or dampening is working. Client to inform residents possible disturbance. Brief staff to turn machines off when not in use and to take regular breaks	2	3	6
Damage from works or material stacking	Plants or animals squashed, burrows or territorial/feeding routes blocked.	Animals, Vegetation	3	4	12	Ensure lineside not disturbed unnecessarily- for example by taking 'shortcuts'. Ensure materials are left in cess area and removed promptly	1	4	4

Waste and leftovers	Plants or animals squashed, burrows or territorial/feeding routes blocked. Public/worker trip hazard	Animals, Vegetation and Public	3	4	12	Instruct that waste and off-cut materials are returned to the depot. Supervisors to check over site before leaving area	1	4	4
Disturbance of controlled weeds	Lax, uniformed works practices lead to spread of Japanese Knotweed, Himalayan Balsam, Giant Hogweed or others	Vegetation and Public	4	4	16	Brief staff about plants, keeping clear of them and the need to report any contact with them. Supervisors to check over site before leaving area	1	4	4
Disturbance of rare wildlife	Badgers, bats and water voles all known form this route	Animals and Vegetation	4	4	16	Brief staff about rough locations, keeping clear of them and the need to report any contact with them. HSE Advisor to visit area when staff are present to monitor possible contact or signs of presence	1	4	4
Disturbance of rare wildlife	Nesting birds frightened off and abandon young	Animals	4	4	16	Brief staff about risks in bird nesting season (March to August inclusive). Plan works to avoid trees and hedgerows during the nesting period	2	4	8
Discharge of water	Need to remove fluid from pits, chambers or others locations for cabling/pole installation	Water	2	4	8	Check whether locations contain water in advance of works. If so seek clearance by civils. Obtain permission and permits (confined space – discharge of water – power off) before setting up site	1	4	4

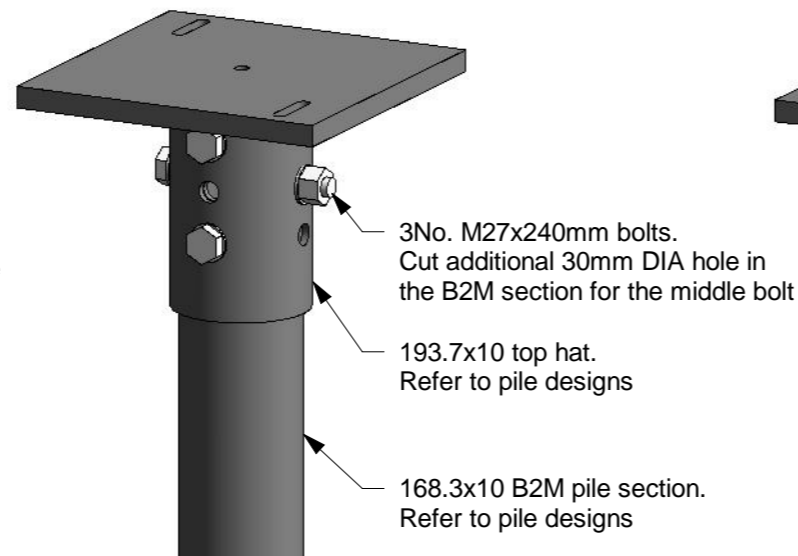
Hazardous substance discovery	Asbestos discovered in course of works	Public	2	5	10	Brief staff on keeping away from/urgent reporting of possible asbestos finds	1	5	5
Use of energy	Most equipment, lights, machines etc. used on site less than domestic/work shop types	General Environment Public	4	3	12	Brief staff on lean operations, switching off when not in use etc. Use green fuel, test plant regularly, ensure new buys are efficient as possible	2	3	6

Person completing assessment: **Marion Lawrence** Date: **27/10/2020** Signed: 

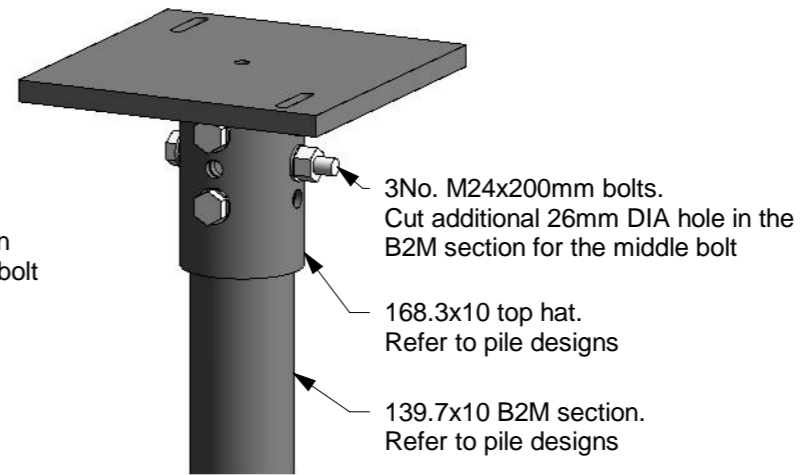
Supervisor on site can carry out further risk assessments if necessary.



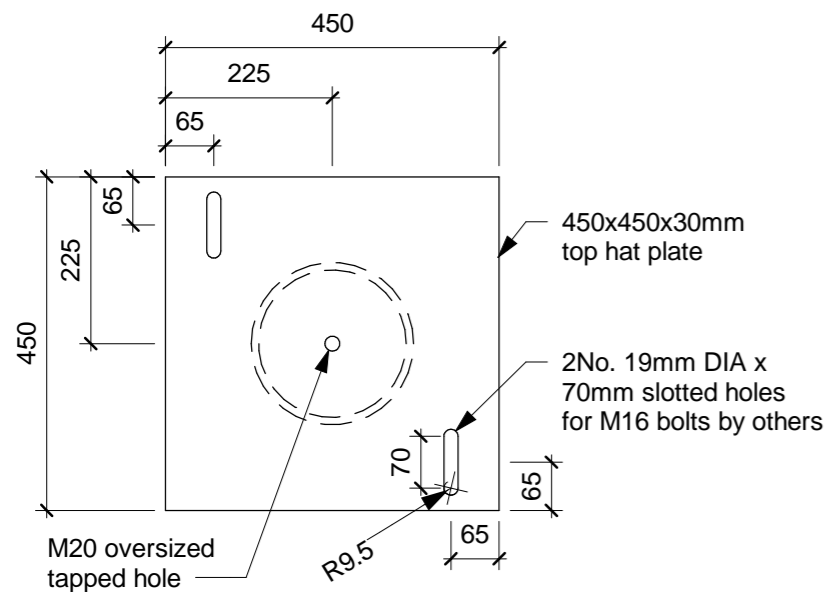
PILE T1 CONNECTION



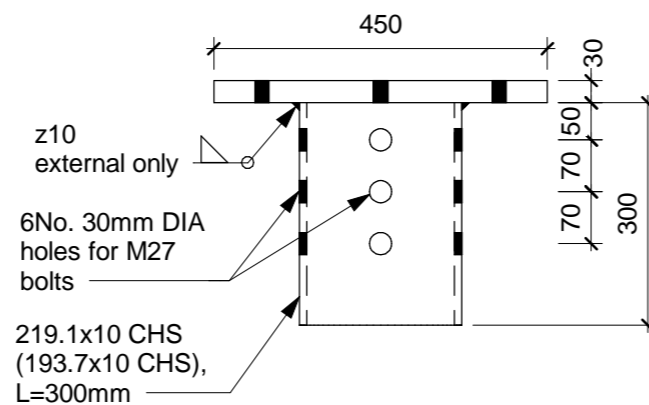
PILE T2 & T3 CONNECTION



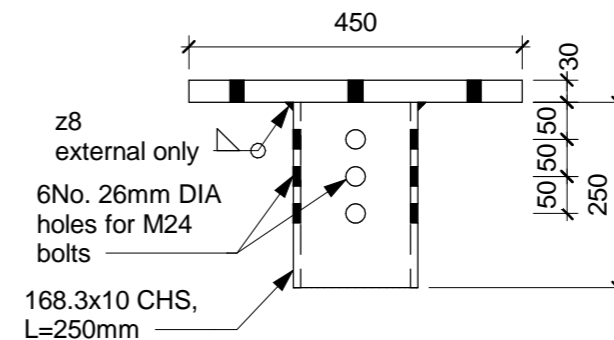
PILE T4 & T5 CONNECTION



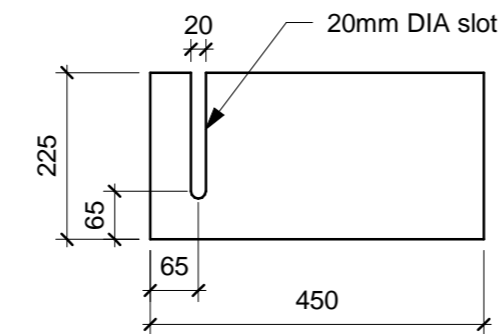
TOP HAT. PLAN VIEW
(all top hat types)



219.1x10 (193.7x10) TOP HAT. SIDE VIEW



168.3x10 TOP HAT. SIDE VIEW



5mm THICK SPACER PLATES FOR LEVELLING BETWEEN TOP HATS AND SUPERSTRUCTURE COLUMNS (STEEL S275)

General Notes:

1. Conforms to BS8888. All geometrical tolerances must not exceed steel execution tolerances specified in BS EN 1090 for the execution class specified in General Note 5.
2. All dimensions are in millimetres unless otherwise stated.
3. All levels are in metres related to site datum unless otherwise specified.
4. This drawing is to be read in conjunction with the relevant specification.
5. Design & fabrication to latest edition of BS EN 1993-1, BS EN 1993-5, BS EN 1990:2002+A1:2005 & BS EN 1090-2 (execution class 2) unless otherwise specified.
6. All constituent products to be CE marked and DoP's provided upon request.
7. All RHS, SHS and CHS to be minimum S355 J2H complying with BS EN 10219, BS EN 10210 unless otherwise stated.
8. All open sections and plates to be S355 J2 complying with BS EN 10025 unless otherwise stated. Plates greater than 55mm thick are to be grade S355 NL unless otherwise stated.
9. All welding to be by qualified personnel certified to BS EN ISO 9606-1 in accordance with client requirements and approved by Screwfast Foundations.
10. All welds to be BS EN 1011-1 and are specified as 'z - leg length' on drawing. Continuous fillet welds to all seams unless otherwise specified.
11. Trim or notch all mating ends of sections and prepare all edges of sections or plates for acceptable fit before welding.
12. Do not grind off welds unless otherwise specified.
13. All butt welds where specified to full penetration and capped over with additional cap weld where specified.
14. All structural bolts to be BS EN 15048 class 8.8. Bolts galvanised above ground and to a depth of 2.0m BGL. Pile bolts below 2.0m BGL to similar class but zinc coated unless otherwise stated.
15. All structural bolts to be torqued as per the installation requirements on the quality checklist. Fit & tighten lock nuts as required after primary nuts have been torqued.
16. All holding down bolts, washers, nuts & lock nuts as specified to be provided by others unless otherwise agreed.
17. Min. 40Mpa grout to be used where specified unless otherwise indicated.
18. Grout to be placed as soon as reasonably possible after placement of grillage.
19. All steelwork unless specifically indicated to be self colour, to be galvanised.
20. All galvanising to be in accordance with BS EN ISO 1461 min. cover 85 microns unless otherwise stated. All galvanising drainage holes to be fitted with plastic plugs during assembly.
21. It is the fabricators responsibility to perform all quality checks in accordance with Screwfast quality procedures and observe all normal good practice.
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25. Where required, the supply and installation of earth bonding equipment is by others. Where foundation earthing or equipotential bond testing is required, this is to be by others.
26. This design is copyright to Screwfast Foundations and some patents may apply.

AS BUILT

Design Residual Risk Assessment - Construction		
Activity	Residual risk	Control
Piling near to existing structures	Causing minor damage to existing structure during piling operation	Undertake investigations to determine position and level of existing structure prior to piling
Piling installation including work on sloping ground	Personal injury	Use mechanical lift. Adequate lighting. Manual handling risk assessment. Create level access on sloping ground. Exclusion zone around work zone area.
Buried/overhead services	Damage to service and workers	Provide with information and drawings. contractor to ensure adequate steps are followed onsite to locate services
Unexpected ground conditions	Not being able to get piles into ground, or longer piles required	Pre-auger, to request redesign, or to request site move.
Piles installed out of position	Not being able to land structure in correct position	Ensure piles are installed within allowable tolerance
Lifting materials	Dropping materials	Certification for all lifting equipment and provide suitable supervision

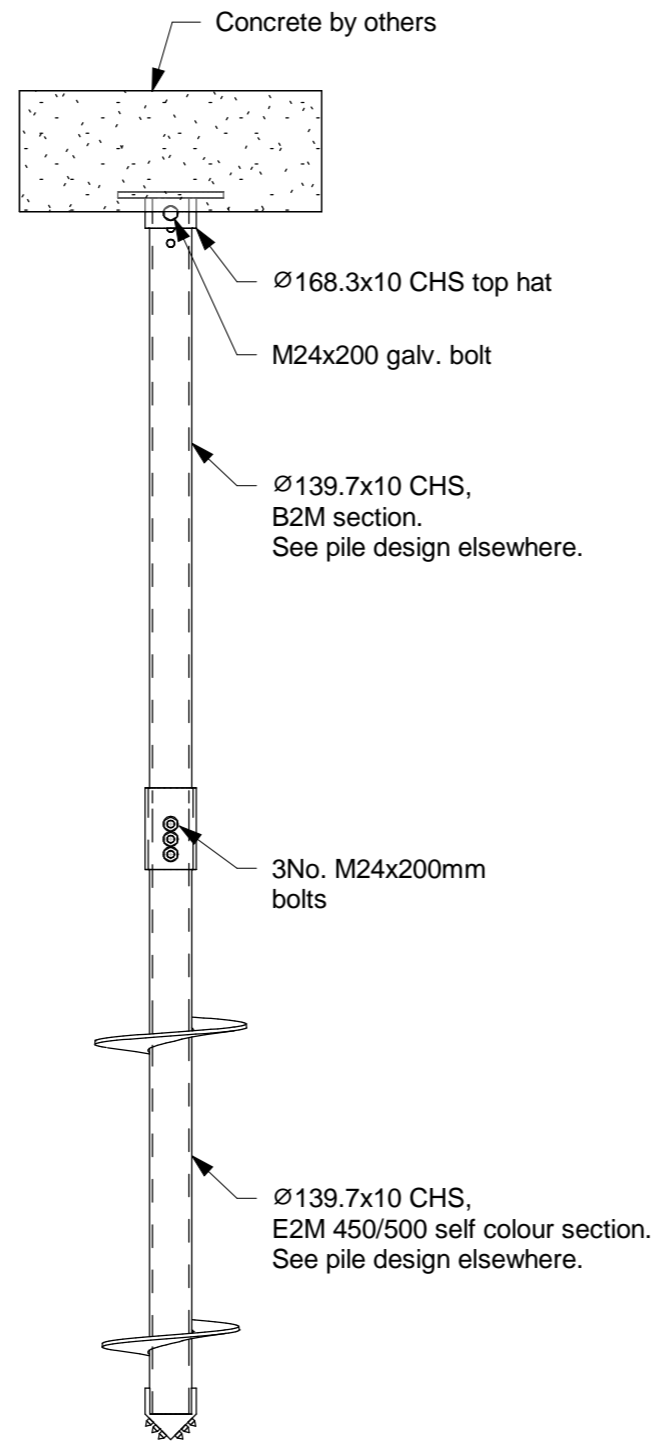
Do not scale
Design life: 60 Years

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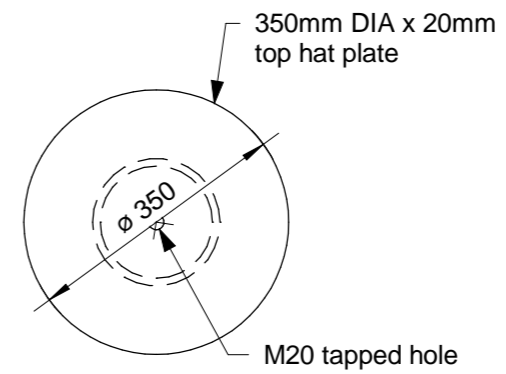
				CLIENT 		CONTRACTOR		PROJECT TITLE DOVERCOURT SUBSTATION			
4 SANDRIDGE PARK, PORTERS WOOD, ST ALBANS, HERTS, AL3 6PH TEL: 01727 735 550 FAX: 01727 828 098 EMAIL: info@screwfast.com				CONSULTANT		CHECKER		DRAWING TITLE HELICAL PILE CONNECTIONS AND TOP HAT FABRICATION DETAILS			
XX	XXXX	XX	XX-XX-XX	XX				DESIGNED	DRAWN	CHECKED	APPROVED
								SM	APA	LC	AP
								06-12-17	07-02-17	07-02-17	08-02-17
								SFF No	DWG No	STATUS	REV No
								6014	03	C	0



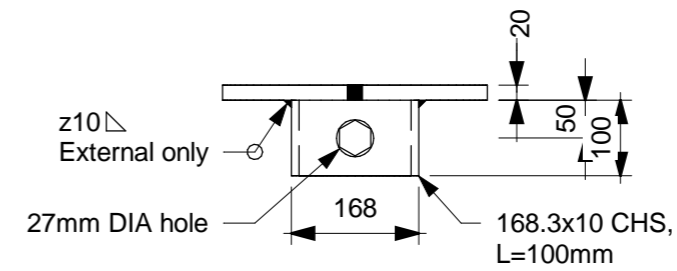
ISOMETRIC VIEW



SIDE VIEW



Top hat. Plan view



Top hat. Side view

General Notes:

1. Conforms to BS8888. All geometrical tolerances must not exceed steel execution tolerances specified in BS EN 1090 for the execution class specified in General Note 5.
2. All dimensions are in millimetres unless otherwise stated.
3. All levels are in metres related to site datum unless otherwise specified.
4. This drawing is to be read in conjunction with the relevant specification.
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7. All RHS, SHS and CHS to be minimum S355 J2H complying with BS EN 10210 unless otherwise stated.
8. All open sections and plates to be S355 J2 complying with BS EN 10025 unless otherwise stated. Plates greater than 55mm thick are to be grade S355 NL unless otherwise stated.
9. All welding to be by qualified artisans certified to BS EN ISO 9606-1 in accordance with client requirements and approved by Screwfast Foundations.
10. All welds to be BS EN 1011-1 and are specified as 'z - leg length' on drawing. Continuous fillet welds or butt welds to all seams unless otherwise specified.
11. Trim or notch all mating ends of sections and prepare all edges of sections or plates for acceptable fit before welding.
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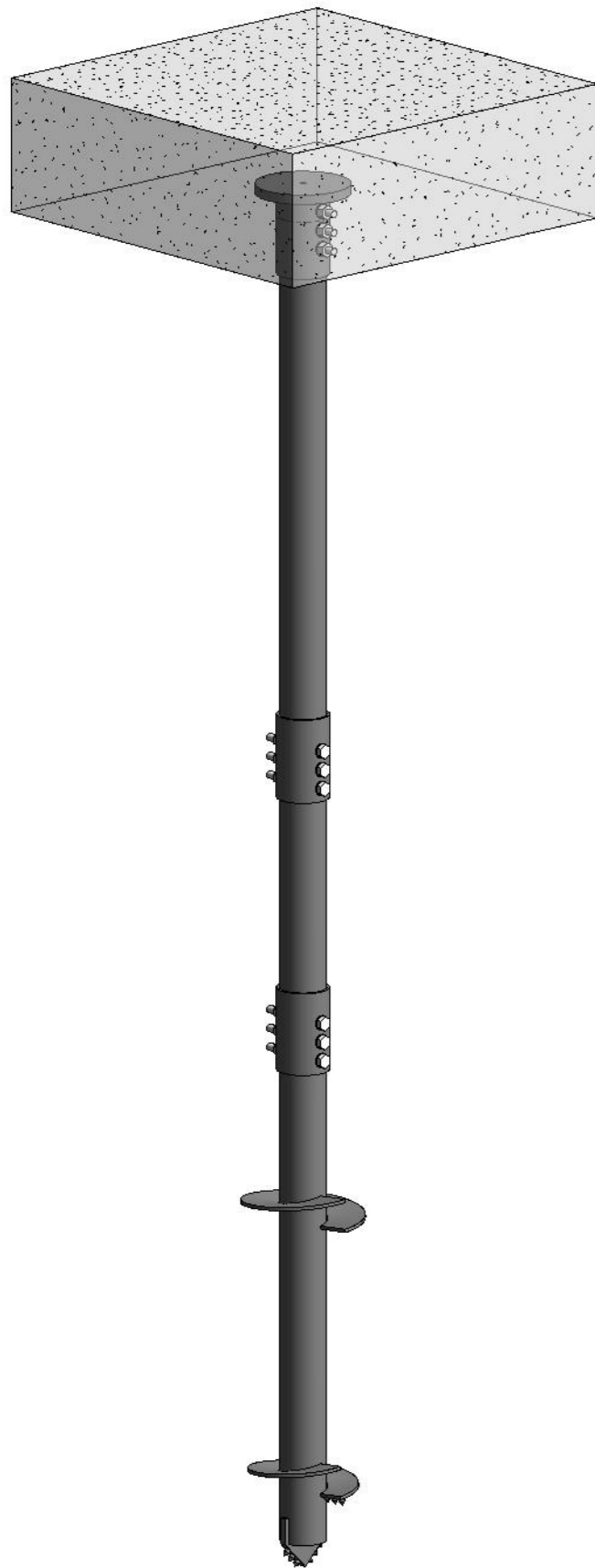
FOR APPROVAL

Design Residual Risk Assessment - Construction		
Activity	Residual risk	Control
Piling near to existing structures	Causing minor damage to existing structure during piling operation	Undertake investigations to determine position and level of existing structure prior to piling
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Piles installed out of position	Not being able to cast concrete in correct position	Ensure piles are installed within allowable tolerance
Lifting materials	Dropping materials	Certification for all lifting equipment and provide suitable supervision

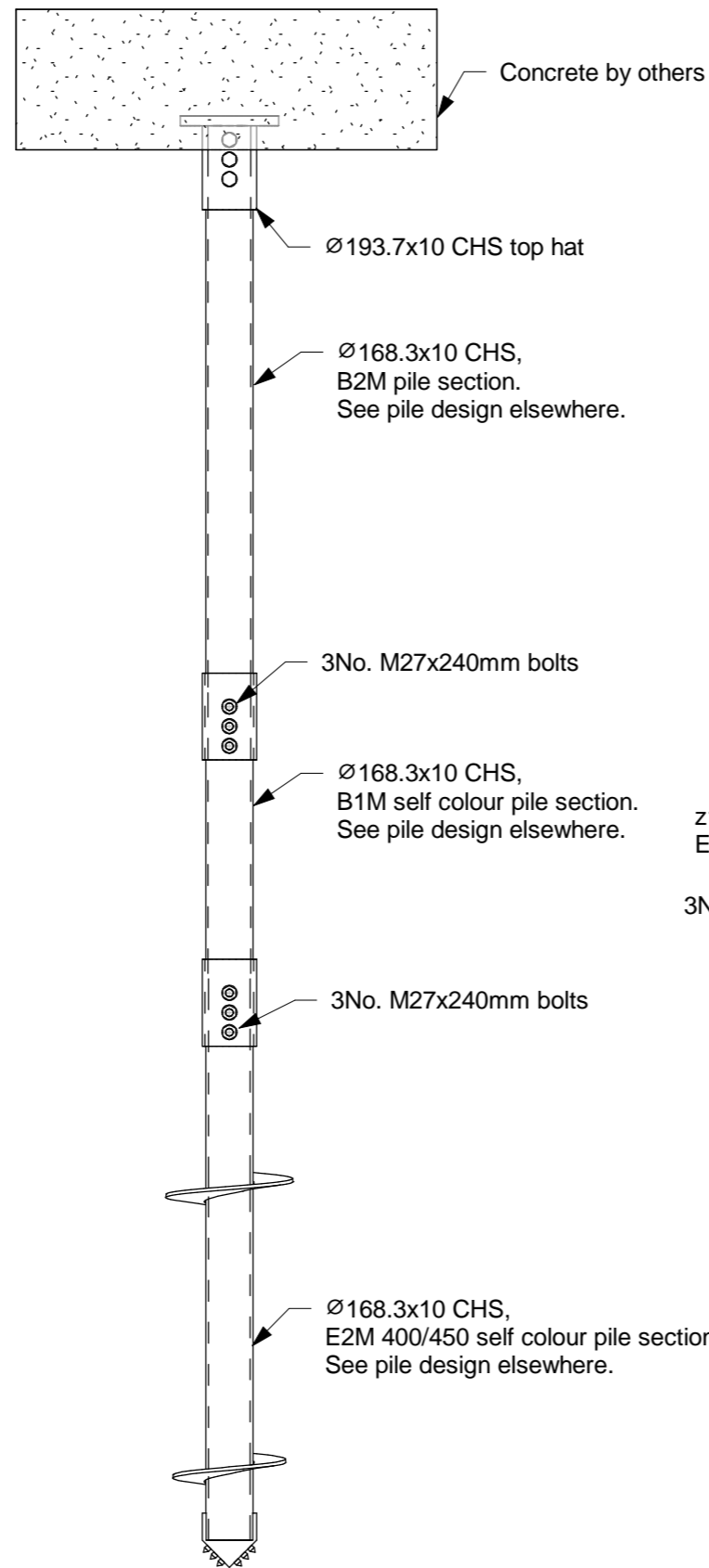
Do not scale
Design life: 120 Yrs

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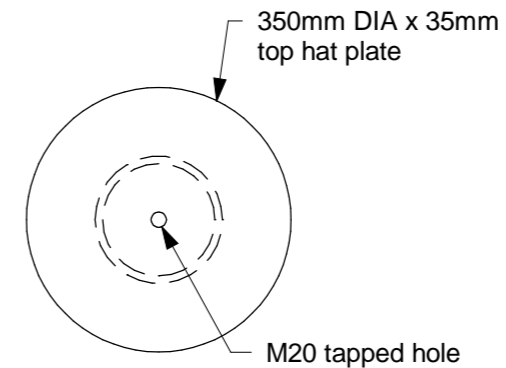
<p>4 SANDRIDGE PARK, PORTERS WOOD, ST. ALBANS, HERTS, AL3 6PH TEL:01727 735 550 FAX:01727 828 098 EMAIL: info@screwfast.com</p> <p>ISO 9001:2008, NO.G89496, UYDB NO. 77558, RAIL LINK NO.18290 SCREWFEST PRODUCTS ARE PROTECTED BY COPYRIGHT & PATENTS FILED AND PENDING UK & FOREIGN PAT'S: Nos: 0104330.6, 0311022.8, 0400863.7, 0407082.7, 0408155.0, 0422062.0, 0426025.3, 0505127.1, 0505558.7, 0507345.7</p>				<p>CLIENT</p>	<p>CONTRACTOR</p>	<p>PROJECT TITLE</p> <p>KING'S POINT READING</p>	<p>DESIGNED</p> <p>SM</p> <p>15-09-17</p>	<p>DRAWN</p> <p>APA</p> <p>27-09-17</p>	<p>CHECKED</p> <p>LC</p> <p>26-09-17</p>	<p>APPROVED</p> <p>AP</p> <p>27-09-17</p>
<p>CONSULTANT</p>	<p>CHECKER</p>	<p>DRAWING TITLE</p> <p>RETAINING WALL TYPE 1 HELICAL PILES</p>	<p>SFF No</p> <p>6082</p>	<p>DWG No</p> <p>01</p>	<p>STATUS</p> <p>A</p>	<p>REV No</p> <p>0</p>				



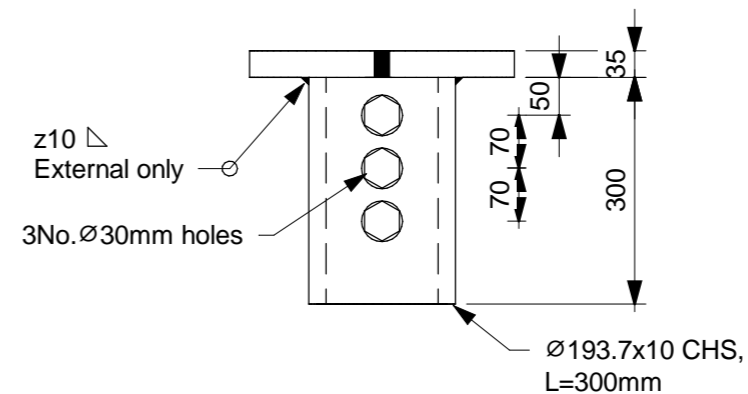
ISOMETRIC VIEW



SIDE VIEW



Top hat. Plan view



Top hat. Side view

General Notes:

1. Conforms to BS8888. All geometrical tolerances must not exceed steel execution tolerances specified in BS EN 1090 for the execution class specified in General Note 5.
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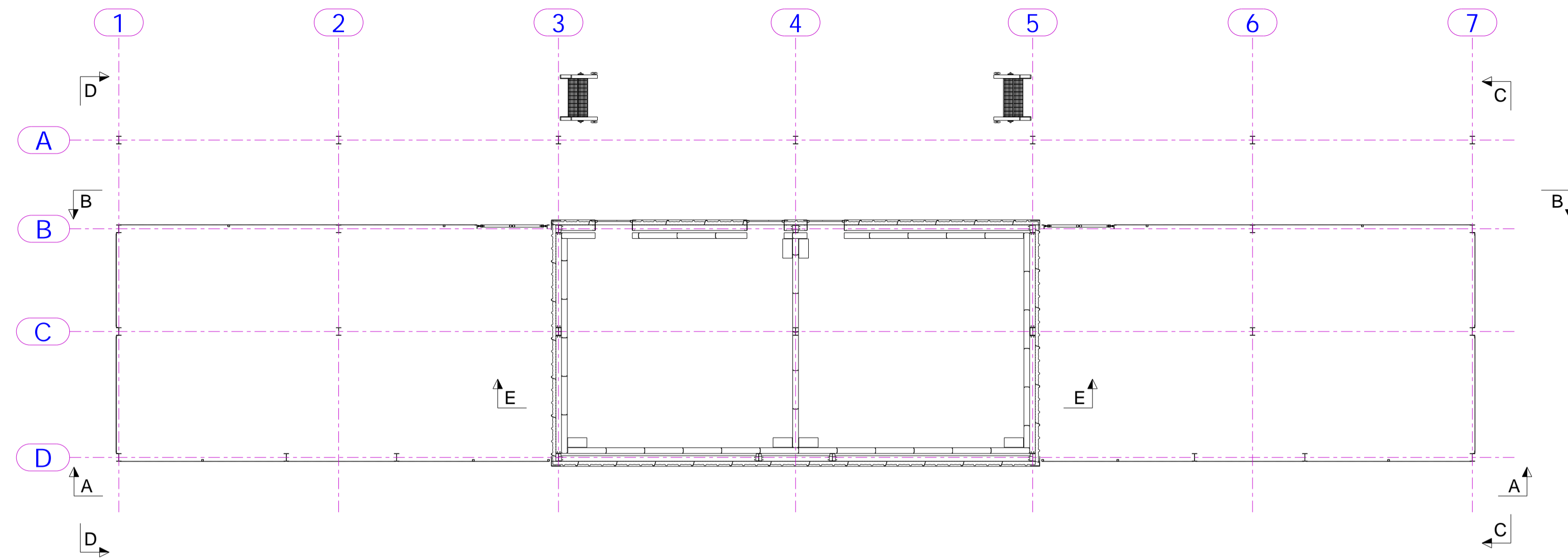
**Do not scale
Design life: 120years**

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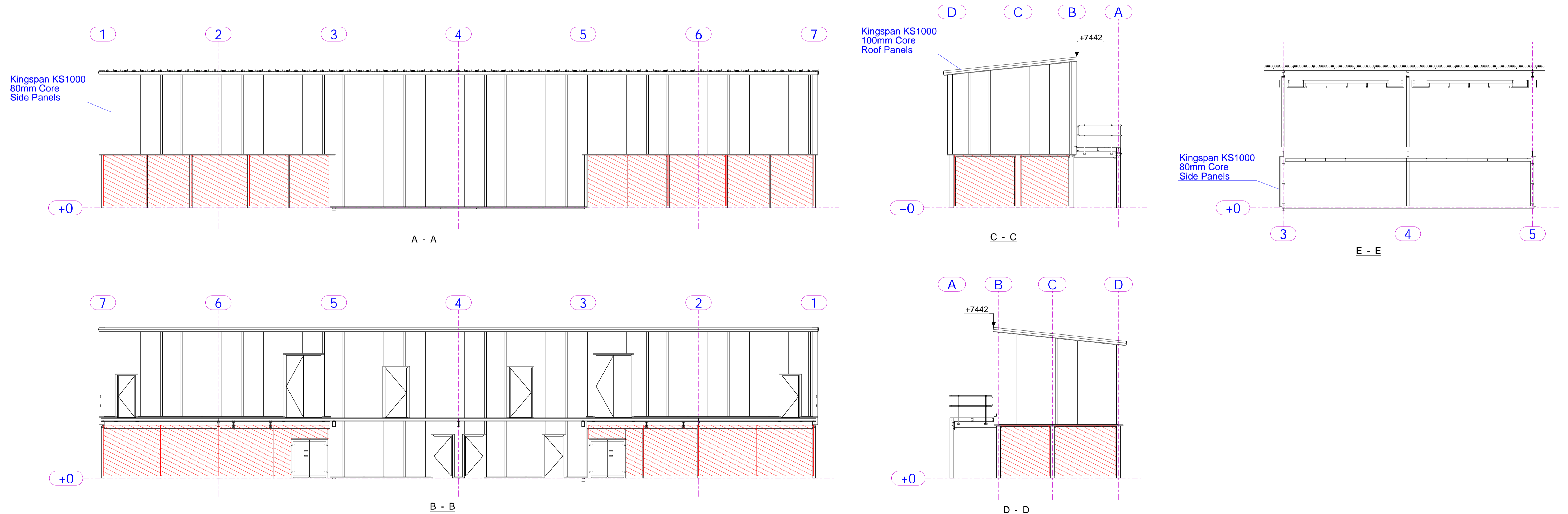


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CLIENT		CONTRACTOR		PROJECT TITLE	KING'S POINT READING			
CONSULTANT		CHECKER		DRAWING TITLE	DESIGNED	DRAWN	CHECKED	APPROVED
					SM	APA	LC	AP
					15-09-17	27-09-17	26-09-17	28-09-17
					SFF No	DWG No	STATUS	REV No
					6082	02	A	0

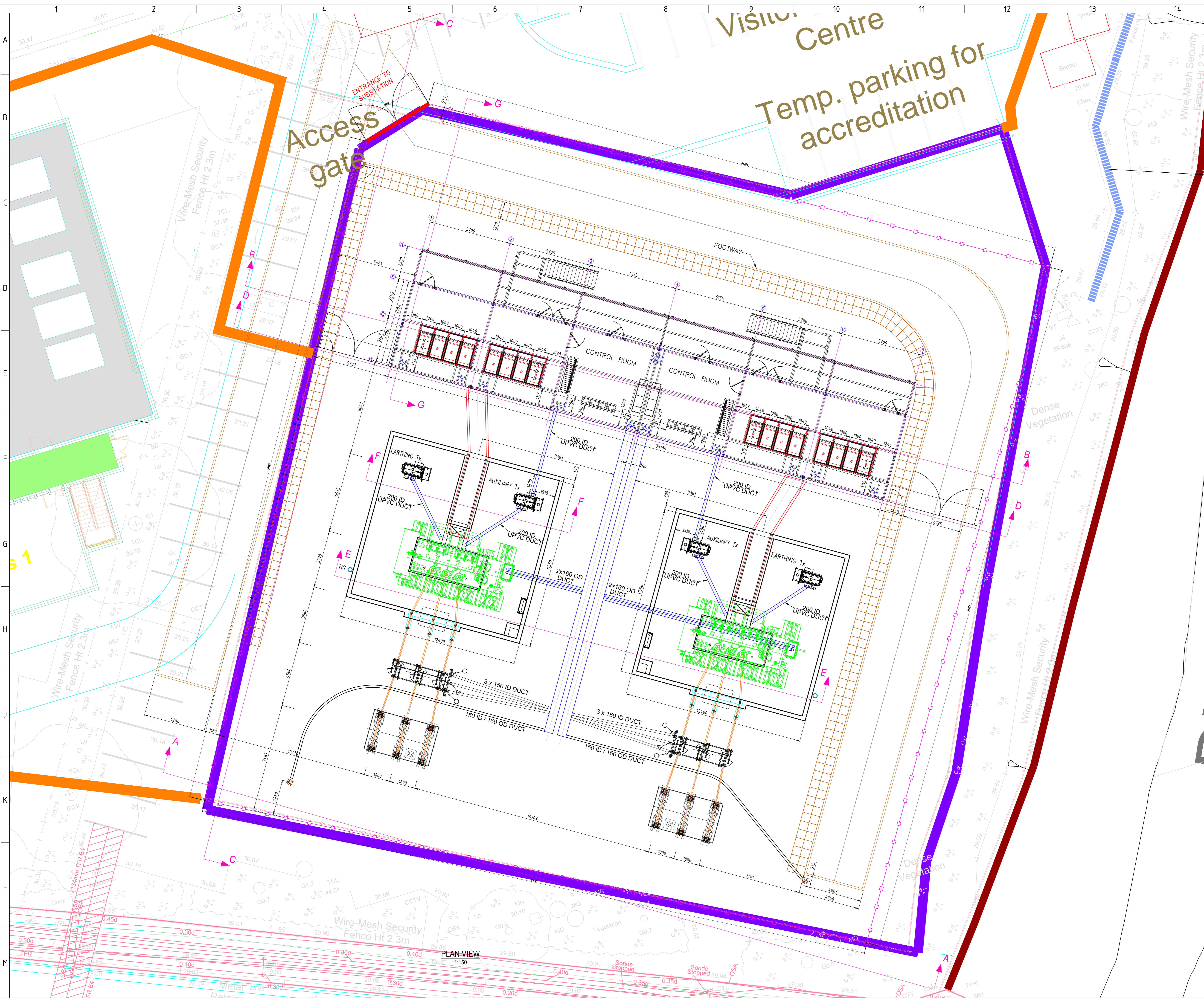


JSM Project Union - Plan View



 Hatched Areas Denote A358 Weld Security Mesh Panels

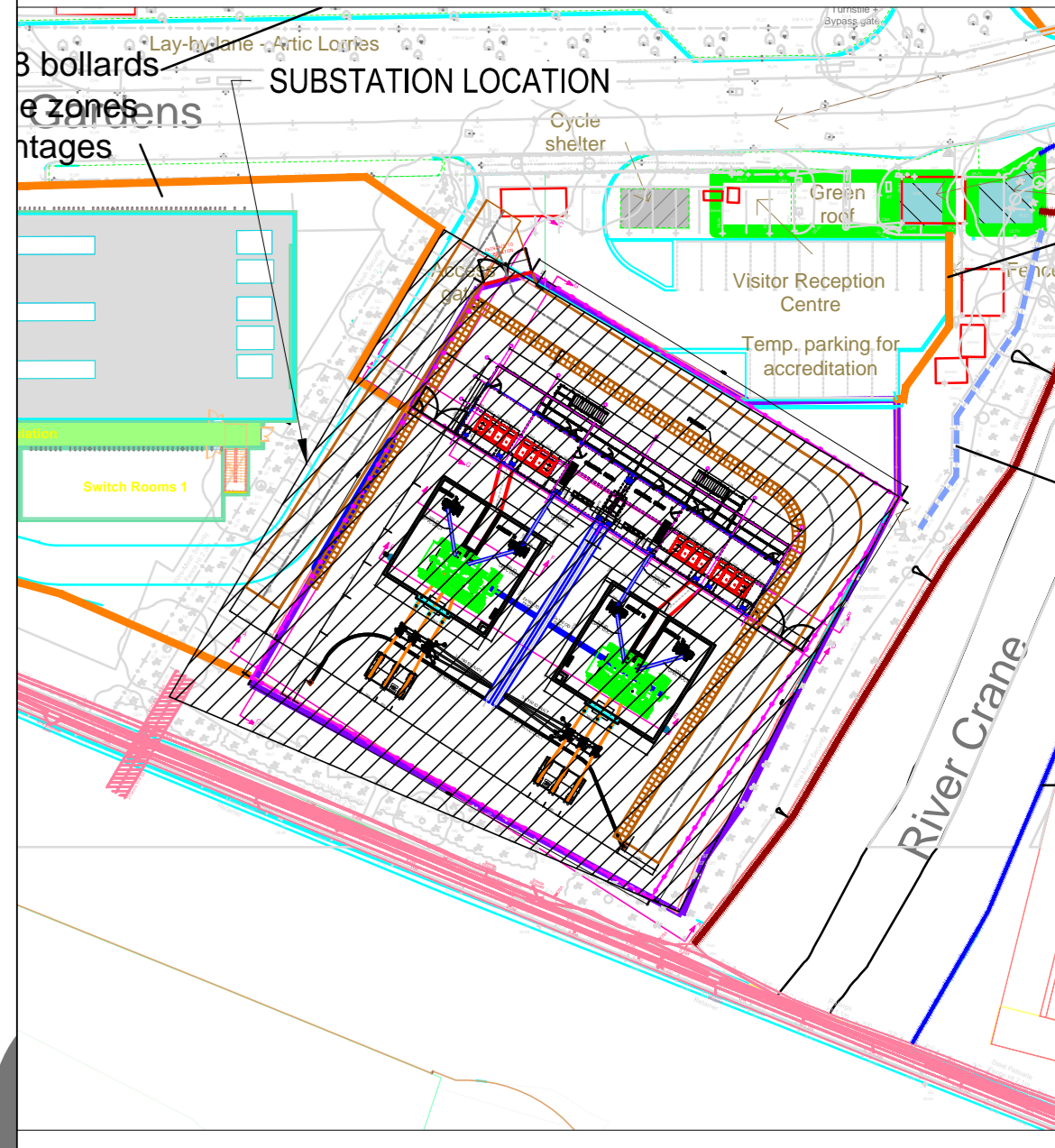
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JSM	Project Union Data Centre	
		<small>Unit No. Thorpe Way Building Construction OAKS ASP 1 01 295 251 265 1 01 295 251 008 e info@hawkins-group.co.uk www.hawkins-group.co.uk</small>
DRAWING TITLE	Project Union - Plan & Elevation Views	
CONTRACT	Project Union Data Centre	
MODELLED BY	MC	ISSUE DATE
CONTRACT NO	JOB149970	SCALE 1:100
DRAWING No	149970_101	REVISION No.



- NOTES:**
- 1) ALL DIMENSIONS ARE IN mm'S UNLESS OTHERWISE SHOWN.
 - 2) FENCE TO BE 2.4m WELDED GALVANISED STEEL ANTI-BURROW PALISADE.
 - 3) FOR EXTERNAL LIGHTING LAYOUT PLEASE REFER DRG P1152-ARK-1003 SHT-1.
 - 4) F.G.L. & F.F.L. TO FLOOD LEVEL ZONE.
 - 5) OUTGOING CABLE ROUTES & PULLING PITS PROVIDED AND SPACE FOR TO BE CONFIRMED.
 - 6) SIZE AND LOCATION OF PITS TO BE CONFIRMED IN CONSULTATION WITH HPF.
 - 7) MAIN GATE LOCATION TO BE COORDINATED WITH HV ENERGY CENTER AND SUBSTATION COMMON ROAD.
 - 8) ALL PLANT ITEMS GA TO BE CONFIRMED.

- LEGENDS:**
- ENTRANCE GATE AS PER CLIENT PROVIDED DRG
 - SUBSTATION BOUNDARY AS PER ARCHITECTURE BASE PROVIDED BY ARK
 - SUBSTATION PALISADE FENCE
 - PLANT/BUILDING
 - AIS PLANT AND BUSBAR (90x6" AL TUBE)
 - 11kV CABLE TRENCH
 - MAIN POWER TRANSFORMER
 - CONTROL CABLE TRENCH
 - ROAD
 - MOTOR DRIVE DISCONNECTOR
 - MOTOR DRIVE EARTH SWITCH

REFERENCE DRAWINGS
 P1152-ARK-DWG-1001 SHT 2 & 4 - UNION PARK 66/11.9/11.9kV SUBSTATION ELEVATIONS



SITE ORIENTATION
1:1000

REV	DATE	DESCRIPTION	DRN	CHK	APP
C	26.12.20	UPDATED AS PER CLIENT COMMENTS	M.S.	S.S.	D.C.
B	31.10.20	FOR APPROVAL	-	-	M.E.
A	01.10.20	FOR APPROVAL	-	-	M.E.
P5	23.08.20	DISCONNECTOR ADDED PASS	-	-	M.E.
P4	21.05.20	FOR PLANNING	-	-	M.E.
P3	17.05.20	FOR PLANNING	-	-	M.E.
P2	21.04.20	FOR PLANNING	-	-	M.E.
P1	28.03.20	FOR DISCUSSION	M.S.	S.S.	D.C.
P1	07.02.20	PRELIMINARY ISSUE	M.S.	S.S.	D.C.

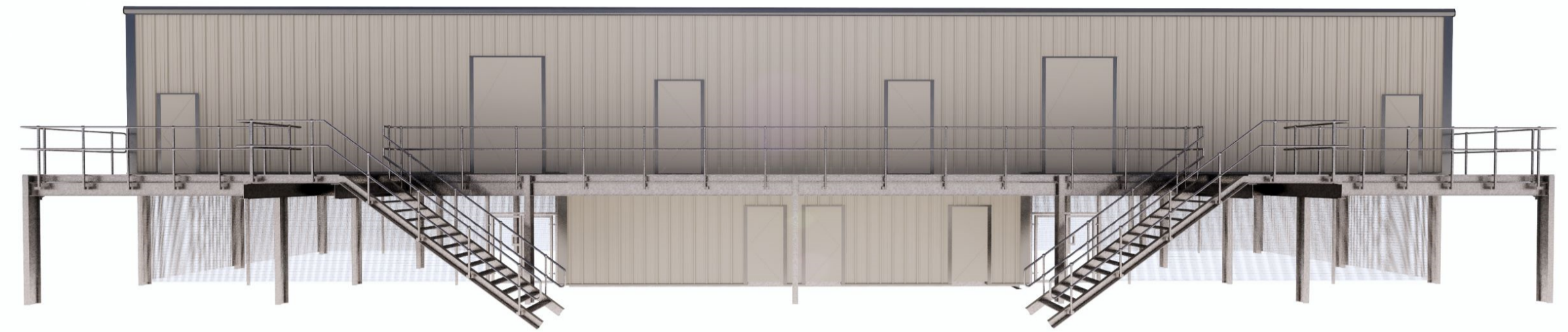
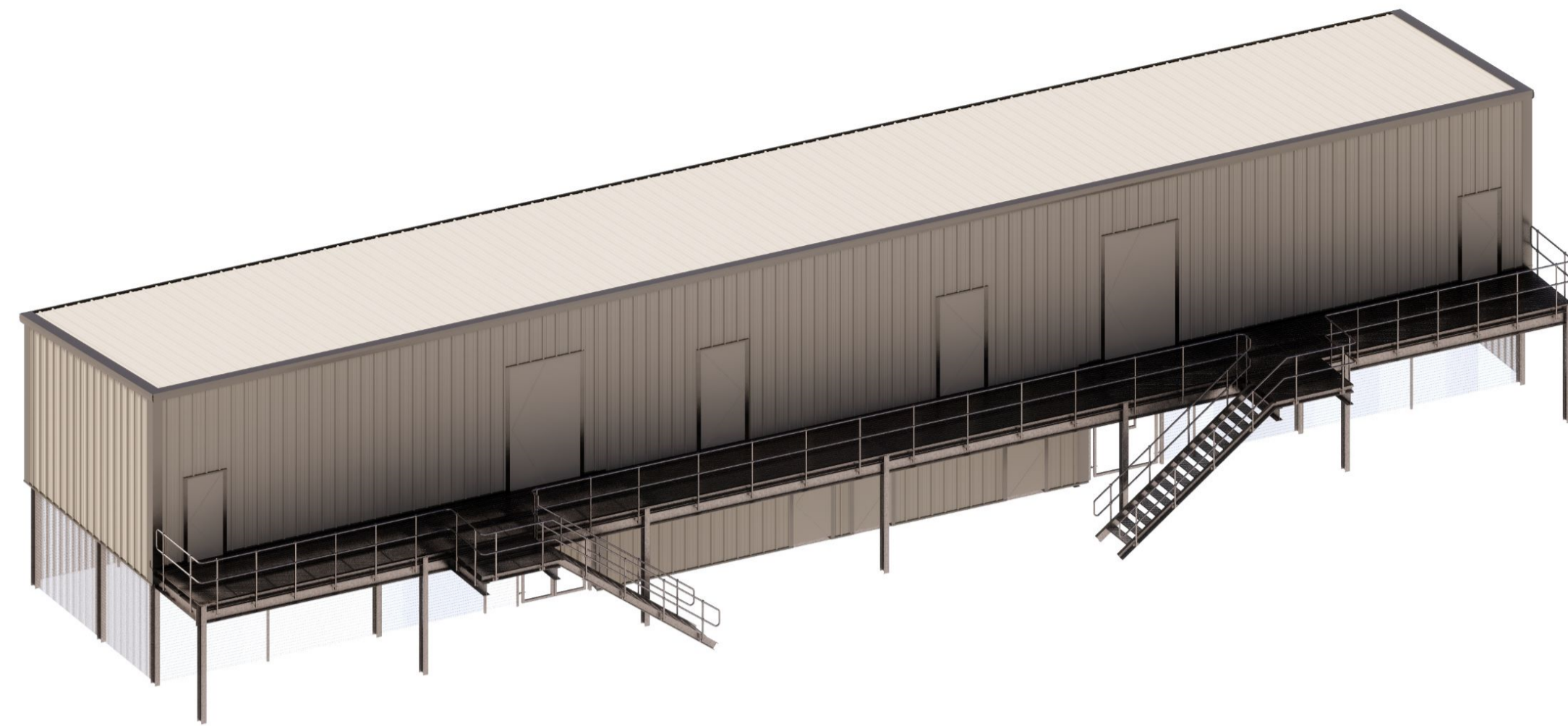
The information on this document is proprietary and shall not be used, copied, reproduced or disclosed in whole or in part without written consent of JSM Construction Ltd.
 All traffic management will be provided in accordance with the Code of Practice for Safety at Street Works and Road Works, the "Red Book" for copy of which will be available on site, issued under Sections 65 and 124 of the New Roads and Street Works Act 1991 and Chapter 8 of the Traffic Signs Manual.



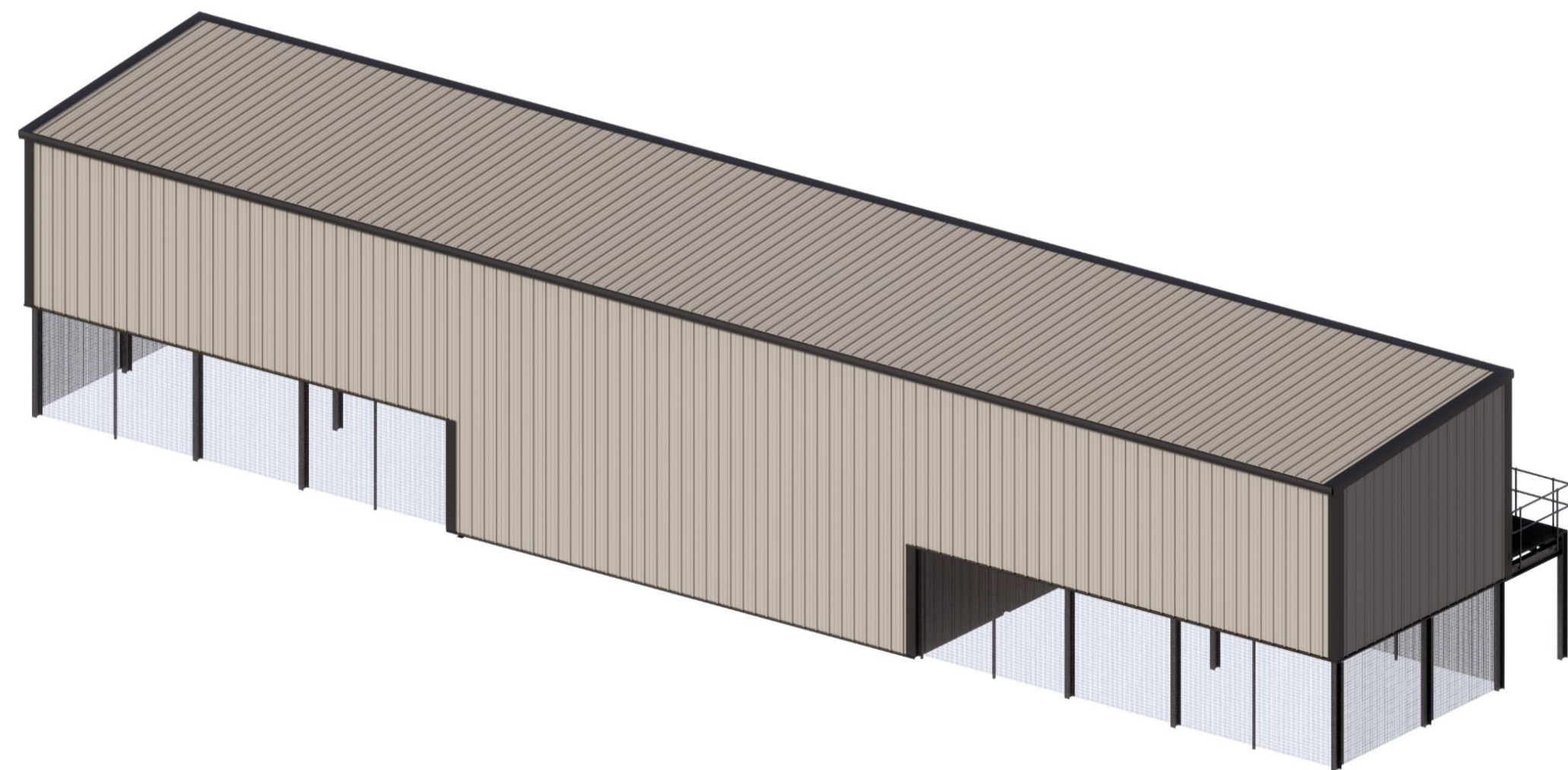
TITLE
 UNION PARK 66/11.9/11.9kV SUBSTATION

PROJECT NAME
 PROJECT UNION SUBSTATION WORKS
CUSTOMER
 ARK DATACENTER
CUSTOMER DRAWING NUMBER
 P1152-ARK-DWG-1001 SHT 1
STATUS
 FOR APPROVAL
SCALE
 1:150
SIZE
 A1
REVISION

PLAN VIEW
1:150



JSM Project Union - Front Elevation View



JSM Project Union - Rear Elevation View

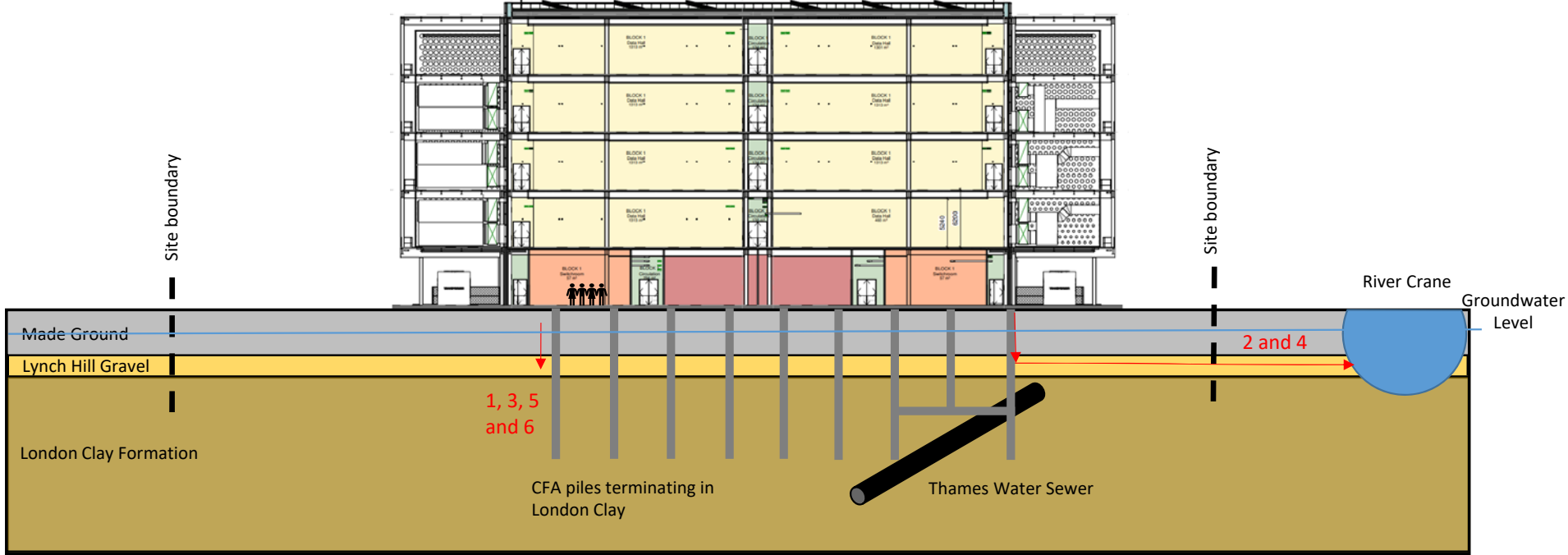
REV MARK	REVISION DESCRIPTION	REVISION DATE
JSM	Project Union Data Centre	
DRAWING TITLE	Project Union - 3D Images	
CONTRACT	Project Union Data Centre	
MODELLED BY	MC	ISSUE DATE
CONTRACT NO	JOB149970	SCALE
DRAWING No	149970_102	REVISION No.



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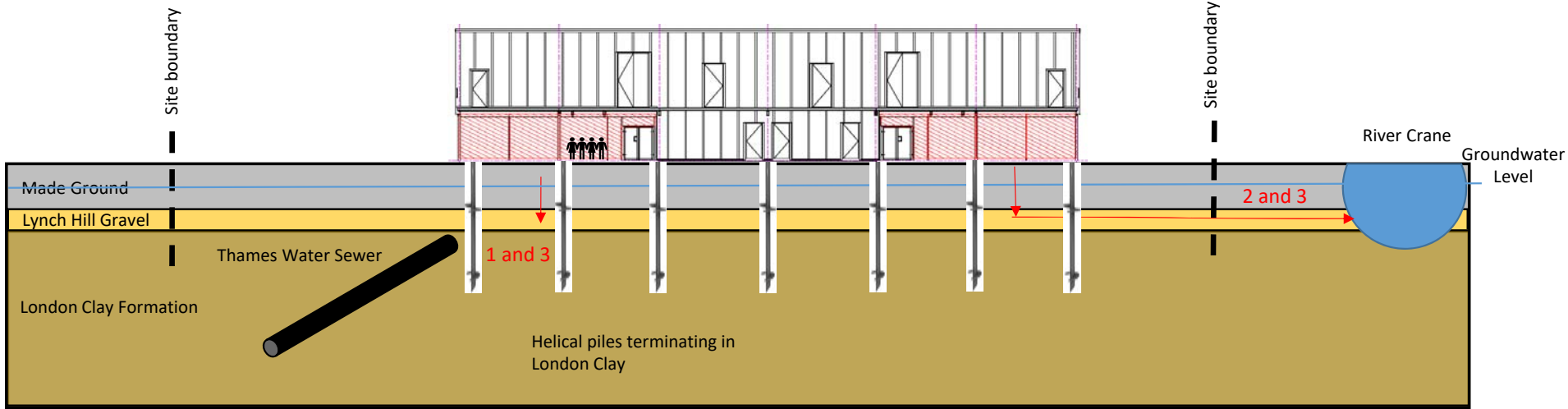
APPENDIX 5: CONCEPTUAL MODEL – PILING

Conceptual Site Model British Airways Plot



Number	Pathway
1	Vertical migration of leachable contaminants from the soil, mobilised by the action of piling.
2	Vertical migration of leachable contaminants from the soil, mobilised by the action of piling and lateral migration through the Lynch Hill Gravel.
3	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling.
4	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling and lateral migration through the Lynch Hill Gravel.
5	Lateral migration of soluble piling materials.
6	Vertical and lateral migration of previously unidentified contaminants to the Principal Aquifer and River Crane.

Conceptual Site Model Vodafone Plot



Number	Pathway
1	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling into the Principal Aquifer (Lynch Hill Gravel).
2	Vertical migration of dissolved phase contamination by groundwater flow along a preferential pathway created by piling and lateral migration through the Lynch Hill Gravel and into the River Crane.
3	Vertical and lateral migration of previously unidentified contaminants to the Principal Aquifer and River Crane.

APPENDIX 6: EXTENT OF SURVEY AND LIMITATIONS

EXTENT OF SURVEY AND LIMITATIONS

Paragon has been able to identify perceived risks based on the information reviewed and made available. Where comment are provided based on third party data and or reports provided to Paragon, we cannot be held responsible for the accuracy of the work of others and we assume that all information supplied to us is accurate and representative of the current site conditions.

Environmental risk assessments will be undertaken with due regard to Contaminated Land Guidance documents (available and relevant at the time of issuing our report) issued by (but not limited to) the Environmental Protection Act Part IIA 1990 (and relevant amendments), Department for Environment, Food and Rural Affairs (DEFRA) and its predecessors, the Environment Agency (and its devolved equivalents), British Standards Institute (BSi), the Royal Institution of Chartered Surveyors (RICS) and the American Society for Testing and Materials (ASTM) Standard E 1527-00. No liability can be accepted for the effects of any future changes to such guidelines and legislation. In the event that guidance / legislation changes it may be necessary for Paragon to update or modify reports.

Unless specifically stated otherwise, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

The risk assessment (where included) is dictated by the finite data on which it is based and is relevant only for the purpose of which the report is commissioned. If additional information or data becomes available which may affect the opinions expressed in our report, we reserve the right to review such information and, if warranted, to modify the risk assessment accordingly. We reserve the right to charge an additional fee for un-anticipated second opinion reviewing of previous reports. A site inspection was not carried out within the scope of this assessment.

Our report will be for the attention and purposes of the Addressee only and consequently we cannot accept any third party liability for the whole or any part thereof. Neither may the whole nor any part of our report, nor any reference thereto, be published in any way nor included in any published document, circulate or statement without our prior written approval of the form and context in which it may appear.

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