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First Street Developments Ltd

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PLOT 10A FIRST STREET MANCHESTER PILING RISK ASSESSMENT

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1. INTRODUCTION

1.0 Brief

Ramboll UK Limited (Ramboll) has been instructed by First Street Developments Ltd (the 'Client') to undertake a piling risk assessment (PRA) for the proposed development of Plot 10a, First Street, Manchester.

Plot 10a is part of a larger parcel of land formerly referred to as 'Plots 6 and 7', which was then renamed as 'Plots 9 and 10'. The site is shown on Figure 1 and Figure 2 below

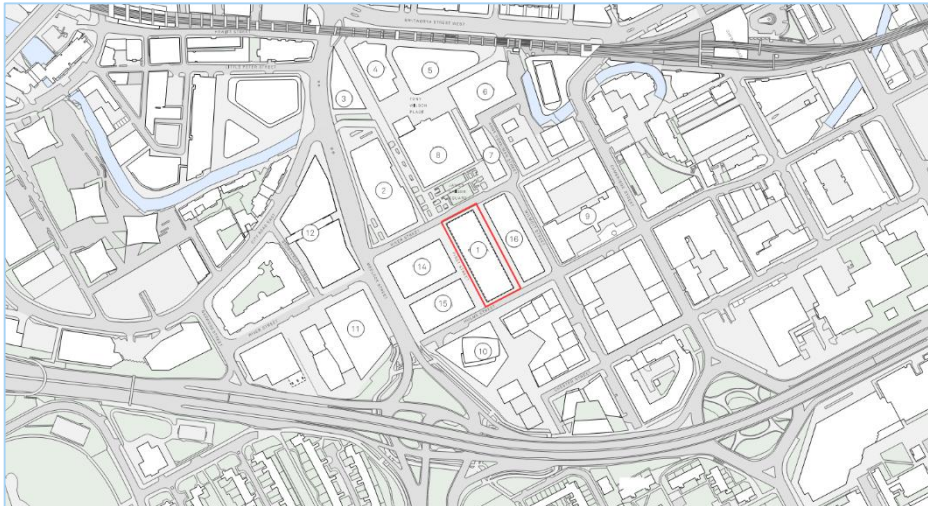


Figure 1 - Site location plan

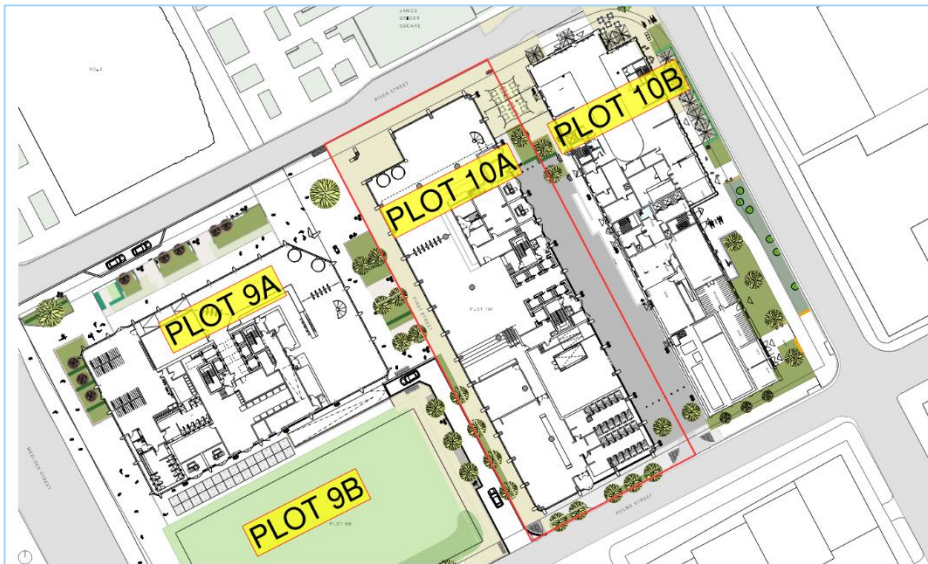


Figure 2 - Plot 10a in the context of the wider plots 9&10 investigation areas

The assessment has been prepared with a view to supporting discharge of Planning Condition 14: *'Piling or any other foundation designs using penetrative methods shall not be permitted other than with the express written consent of the Local Planning Authority, which may be given for those parts of the site where it has been demonstrated that there is no resultant unacceptable risk to groundwater. The development shall be carried out in accordance with the approved details.'*

1.1 Objectives and Scope

The objective and scope of this piling risk assessment is to outline the risks to groundwater posed by the piling method proposed for the site. The information outlined in this document is to be considered in the context of the structural, civil and geotechnical schemes and designs.

The scope and methodology includes the following steps:

- Review of the site environmental setting including geology and hydrogeology and any ground contamination identified during previous phases of investigation;
- Review of proposed foundations and piling design;
- Risk assessment to assess additional risks to the groundwater which may be introduced as a result of the proposed piling solution; and
- Recommendations for any mitigation measures which may be required.

1.2 Proposed Development

The proposed development of Plot 10a comprises of the following:

- Erection of a ground plus 12 storey building comprising of approx. 20,500 sq. m (NIA) of office floor space (Use Class E (g));
- A basement housing mechanical plant equipment;
- Winter gardens and terraces; and
- Landscaping and public realm works.

The development will comprise a building covering the majority of the site with hard landscaping across the remainder of the site. A proposed development plan is provided in Appendix A.

1.3 Roles and Responsibilities

This document discusses the potential risks to the water environment that may arise from proposed piling activities at the site and should be considered by the Piling Contractor (the 'Contractor') in determining the final proposed piling scheme method and designs.

As the final method of constructing the development is to be determined by the contractor, the information contained within this document is provided on an outline basis only. The contractor will be responsible for the final specification of the piling methods and protocols.

Once the final design for the development scheme has been completed, the contractor shall determine whether the proposed piling scheme fits with the assessment described in this document, and if not, shall provide additional assessment for any changes to the piling methods as necessary. The additional assessment shall be reported by the Contractor in a final Piling Risk Assessment document.

The final Piling Method Statement and Risk Assessment will need to be agreed by the contractor with regulators and key stakeholders before any piling works commence at the site. The contractor shall prepare detailed method statements covering environmental matters associated with the piling works.

The Contractor shall ensure that the works detailed in the method statements comply with applicable Environment Agency (EA) and Council requirements and ensure all necessary permissions and approvals have been obtained prior to commencement of works.

1.4 Previous Relevant Reports

Previous ground investigation and contaminated land risk assessment work has mostly been prepared for the combined Plots 9 and 10. There have been several reports already prepared for the site including:

- Ramboll, 2023, Plot 10a Development First Street Manchester, Remedial Strategy (1620007819-RAM-XX-XX-RP-CL-00010 Remedial Strategy);
- Ramboll, 2020, Plot 9 and Plot 10 First Street Manchester, Contaminated Land Interpretive Report, (Ref:1620002943-GCLIR-03);
- Ramboll, March 2017, Contaminated Land Desk Study – Plot 6/7 First Street, Report Ref: 1620002943_CLDS_01;
- Cundall, 2016, Geoenvironmental Assessment Plot 6/7 First Street, Manchester, (Ref:1011906.RPT.GL.005).

Details from these reports are referenced as appropriate throughout.

1.5 Constraints and Limitations

This document has been prepared for the use of First Street Developments Ltd. This report summarises information provided from a number of external sources and cannot offer any guarantees or warranties for the completeness or accuracy of information relied upon. It should be noted that although every effort has been made to ensure the accuracy of the data obtained from the investigation, the possibility exists for variations in ground, ground gas and groundwater conditions between and around the exploratory hole locations.

The proposed risk management strategies and recommendations summarised in this report relate to details of the proposed development at the time of writing the report. Any substantial changes to the proposed design may require a reassessment of the implications of the environmental risks identified.

2. ENVIRONMENTAL SETTING AND GROUND CONDITIONS

2.0 The Site

The site is situated north of Hulme Street, Manchester, and is bounded by Plot 10b to the immediate east, Plot 9 to the immediate west, and River Street to the north.

The site is located within the First Street Strategic Development Framework (SDF) 2018 area. It is part of a wider vision to create a mixed-use neighbourhood in the area, supported by a mixture of leisure, office, and residential blocks.

The site is currently mostly hardstanding, reflecting its recent use as a temporary car parking area ahead of the plot's permanent redevelopment. There is limited vegetation on site.

2.1 Geology and hydrogeology

The ground profile has been described in detail in previous reports, a summary is presented in Table 2.1.

Table 2.1 Summary of Ground Conditions.

Stratum	From (m AOD)	To (m AOD)	Thickness (m)	General Description
Hard Surfacing	GL or 30.9	30.9 to 30.5	0.1 to 0.4	Comprising concrete slab, locally reinforced or black asphalt.
Made Ground (Granular)	GL	32.8 to 27.8	0.5 to 3.7	Typically grey, sandy, angular to sub rounded, fine to coarse gravel of brick, concrete and charcoal with further inclusions of clinker, ash, clay. Some slag gravel, crushed red brick and sandstone / limestone gravel horizons identified locally.
Made Ground (Cohesive)	GL or 30.8	32.5 to 28.4	0.5 to 2.3	Dark grey, sandy, gravelly silt or very soft to firm, dark brown, slightly sandy, gravelly clay. Gravel of fine to coarse brick, concrete and charcoal and some peat and organic materials identified.
Alluvium	31.6 to 28.4	30.7 to 26.4	1.3 to 3.0	Soft grey or brown, slightly gravelly, sandy clay. Locally mottled orange. Some inclusions of gravel. Some peat with abundant roots.
Glaciofluvial Deposits	30.7 to 26.4	29.8 to 23.9	0.8 to 4.3	Very dense, or dense, dark orange / brown, light reddish grey, brown or yellowish brown, slightly gravelly, fine to coarse sand.
Glacial Till	29.8 to 25.4	28.8 to 25.3	1.0 to 2.8	Stiff, dark brown mottled dark grey and orange / brown, slightly sandy, slightly gravelly clay.
Weathered Bedrock (Chester Pebble Beds)	25.6 to 23.8	25.2 to 21.5	0.4 to 3.0	Generally recovered as very dense, rarely slightly clayey, fine and medium sand. Locally tending to extremely weak fine to medium sandstone.
Intact Bedrock (Chester Pebble Beds)	25.2 to 21.5	8.9 to 5.9	Base not Proven	Extremely weak to weak, reddish brown fine to medium (occasionally coarse) sandstone with occasional 0.01 m to 0.50 m laterally discontinuous layers of extremely weak mudstone. Rare fine to coarse sub-angular to rounded mudstone clasts.

Further details are provided in the previous reports.

The superficial deposits on site are classified as a Secondary A Aquifer, and the underlying Chester Pebble Beds as a Principal Aquifer. There are no groundwater abstractions nearby the site.

The ground investigations have identified shallow perched groundwater and a deeper body of groundwater present within the sandstone, which has been shown to be persistent over time with typical fluctuation within a range of one metre (25-26 m AOD).

2.2 Ground Contamination Identified

Previous reports describe geo-environmental ground investigation, sampling and risk assessment. The potentially significant pollutant linkages identified for Plot 10a which were required to be carried through to the remedial strategy are listed in Table 2.1 below.

Table 2.1: Potentially Significant Pollutant Linkages Identified for Plot 10a

Pollutant Linkage	Additional Actions Required
Asbestos in Made Ground across the site.	Risk management measures required to address potential risks to human health (construction workers and off-site receptors) during construction.
Hydrocarbons and Semi Volatile Organic Carbon (SVOCs) in soils above water supply pipe threshold for PE pipe.	Barrier pipe recommended.
Potential additional impacts e.g. beneath site cabins and where site investigation access was restricted, or unexpected / unidentified contamination which may be encountered during works.	Risk management measures required in remedial strategy.

The impacts identified on site were not considered to pose a significant risk to the groundwater. However, minor impacts of hydrocarbons and SVOCs are noted and there is a potential for unexpected, localised impacts in areas between investigation locations.

The underlying sandstone aquifer is a Principal Aquifer, although with no local abstraction use at present.

Piling may introduce preferential pathways for contaminant migration to the groundwater aquifer and as such a review of the piling method and development proposals has been undertaken.

3. PILING METHOD

3.1 Outline foundation strategy

The foundation system for Plot 10a comprises Continuous Flight Auger (CFA) piled foundations of 750mm diameter piles. The piles are to be bored into the rock stratum and act through a combination of friction and end bearing. A contiguous piled wall will form the basement level of the building and provide ground retention in the temporary (unpropped) and permanent (propped) cases. A traditional reinforced concrete (RC) retaining wall is provided on the basement walls to gridline 4 and off gridline K. The proposed foundation layout is shown in Figure 3 below.

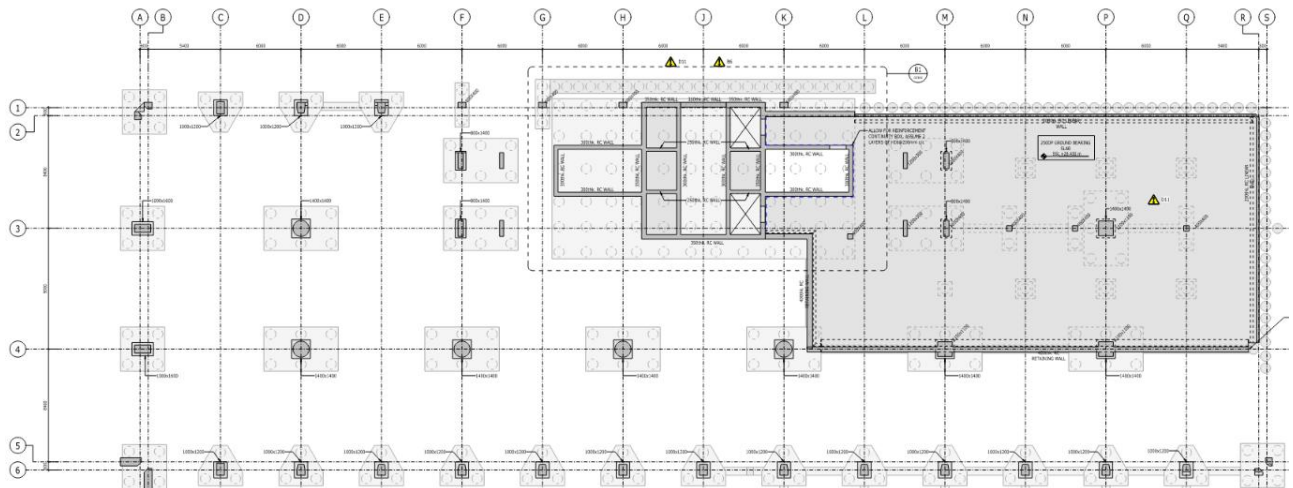


Figure 3: Foundation and substructure strategy

A temporary contiguous piled wall has been included for adjacent to the core pile cap (gridline 1/G-L) as part of the contractor proposals for earth retraction to excavate the core pile cap. Pile forces for this temporary contiguous piled wall shall be scheduled by the temporary works engineer.

The external ground levels vary by around 2.3m from FFL=30.930mAOD at the building entrance to around FFL=33.250mAOD at studios and cycles stores. The main basement SSL is 28.450mAOD. These levels result in a maximum basement depth of 4.8m

3.2 CFA Piles

The preferred piling option is CFA piles. This non-displacement piling method involves the drilling of a full-length auger with a hollow stem (temporarily plugged) into the ground using a constant penetration rate. Once the design toe level is reached, concrete is pumped through the hollow stem of the auger while the auger is extracted at a controlled rate, keeping the end of the auger embedded into the concrete as it is pumped out, maintaining a positive pressure throughout the process. Once the full length of the pile is concreted a reinforcement cage is pushed into the fluid concrete to provide additional strength.

The piling layout, foundation layout and basement level layout are provided in drawings in Appendix A. Piles are to be 750 mm in diameter and will extend to a depth of ~5-6m into sandstone bedrock, to be confirmed by the pile designer.

The introduction of such piles through the made ground and superficial deposits has the potential to bring contaminated soil arisings to the surface.

The progression of CFA piles relies on the retention of soil on the auger flights to support the surrounding soil and prevent collapse or migration outwards of soil. The potential for creation of a temporary pathway around the pile is limited with this method, and should one occur it would likely be short lived (in the region of minutes) and subsequent concreting of the pile and close-up of soil due to soil stresses would close the pathway.

4. PILING RISK ASSESSMENT

4.0 Methodology

The assessment of risks associated with piling presented within this report is based upon the requirements of and guidance within the following EA documents:

- i. Piling into Contaminated Sites¹;
- ii. Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention NC/99/73²; and
- iii. Piling in Layered Ground: Risks to Groundwater and Archaeology³.

The risk assessment is framed around the potential pollution of groundwater scenarios detailed within NC/99/73:

- Creation of preferential pathways through a low permeability layer (an aquitard) to allow potential contamination of an aquifer and/or surface water feature;
- The driving of solid contaminants down into an aquifer during pile driving; and
- Contamination of groundwater, and subsequently, surface waters by wet concrete, cement paste or grout.

Potential pollution linkages are identified using the source-pathway-receptor framework. The potential significance of each linkage is made by consideration of the likely magnitude and mobility of the source, the sensitivity of the receptor and nature of the migration/exposure pathways between them.

The risks of concern from CFA piling are assessed in terms of the likelihood of the risk being realised, and the severity of the consequence if the risk was realised, using the criteria in Table 4.1.

Table 4.1: Severity and Likelihood Criteria for Piling Risk Assessment

Severity	Example/ Criteria
High (H)	Significant pollutant linkage which would cause deterioration of water quality or significant risks to human health in the long term. Could cause irreparable structural damage.
Medium (M)	Pollutant linkage which could result in deterioration of water quality or risks to human health in the long term or cause a short term pollutant linkage restricted to the duration of piling. Could cause repairable structural damage.
Low (L)	Any pollutant linkage caused would not significantly affect water quality or risks to health.
Likelihood	Example/ Criteria
High (H)	Would cause a pathway to be created
Medium (M)	May cause a pathway to be created, but if it was realised, would not be likely to represent a significant risk.
Low (L)	Would be unlikely to cause a pollutant linkage, but if it was realised, would not be likely to represent a significant risk.

¹ Environment Agency (2002) Piling into Contaminated Sites

² Environment Agency (2001) Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination Guidance on Pollution Prevention NC/99/73

³ Environment Agency (2014) Piling in Layered Ground: Risks to Groundwater and Archaeology SC020074

The severity and likelihood classifications are then used to provide an overall risk, as detailed in Table 4.2.

Table 4.2: Piling Risk Assessment Method

Likelihood	Severity		
	High	Medium	Low
High	Very High	High	Medium
Medium	High	Medium	Low
Low	Medium	Low	Very Low

4.1 Risk Assessment

An overall assessment of the piling risk is provided in Table 4.3 below. Risks are considered to be significant where the risk assessment is rated as medium, high or very high. In such circumstances the mitigation measures described must be employed.

Table 4.3: Piling Risk Assessment

Site-specific Potential Pollution Scenario	Piling /Ground Improvement Activity	Source (S) Pathway (P) Receptor (R)	Severity	Likelihood	Risk Classification	Comments
Creation of preferential pathways through low permeability deposits to allow potential contamination of an aquifer.	CFA piles	S Minor impacts of hydrocarbons and SVOC in shallow made ground soils. Low mobility within the environment	Low	Low	Very low	Limited contamination present at site. Limited potential for rainfall infiltration and leachate generation. CFA piling technique is such that there is a low likelihood of pathway creation.
		P Leaching and migration. Limited leachate generation potential due to building covering the majority of the site post-development which will limit rainfall infiltration.				
		R Sandstone aquifer				
The driving of solid contaminants down into an aquifer during piling	CFA piles	S Minor impacts of hydrocarbons and SVOC in shallow made ground soils.	Low	Low	Very low	Limited contamination present at site. CFA piling technique is such that there is a low likelihood of pathway creation. Volume of displaced material would be low.
		P Limited potential for material to be dragged down by CFA piling technique. Potential for leaching from any limited volume of impacted made ground material dragged down by pile.				
		R Sandstone aquifer				
Contamination of groundwater, by wet concrete, cement paste or grout	CFA piles	S Wet concrete	Low	Low	Very low	Potential source is of limited duration, low risk of significant impact to groundwater.
		P Leaching directly into groundwater				
		R Sandstone aquifer				

5. CONCLUSIONS AND RECOMMENDATIONS

The piling risk assessment has concluded that there will be no resultant unacceptable risk to groundwater from the piling methods proposed. The use of CFA piling is considered to be the most appropriate technique to minimise the potential for the creation of pollutant linkages through piling given the nature of the ground and groundwater conditions at the site.

The contractor shall produce the piling/foundation works method statement and risk assessment, which shall be agreed by the EA and local authority prior to the commencement of any piling works on site. The piling works method statement shall specify how the works will be carried out, measures to minimise cross-contamination, measures to handle arisings (including disposal), and measures to prevent the creation of voids or preferential flow pathways and downward migration of potential contaminants into the aquifer.

The contractor shall ensure that appropriate quality assurance/quality control (QA/QC) methods are incorporated to demonstrate that high levels of workmanship have been used and that drilling fluid/grout/concrete or similar is not lost into the aquifer, shall set out a plan for verification that the measures identified have been complied with, and shall carry out appropriate monitoring and maintenance of verification records. The Ramboll 2023 Remedial Strategy also includes details on handling of arising.

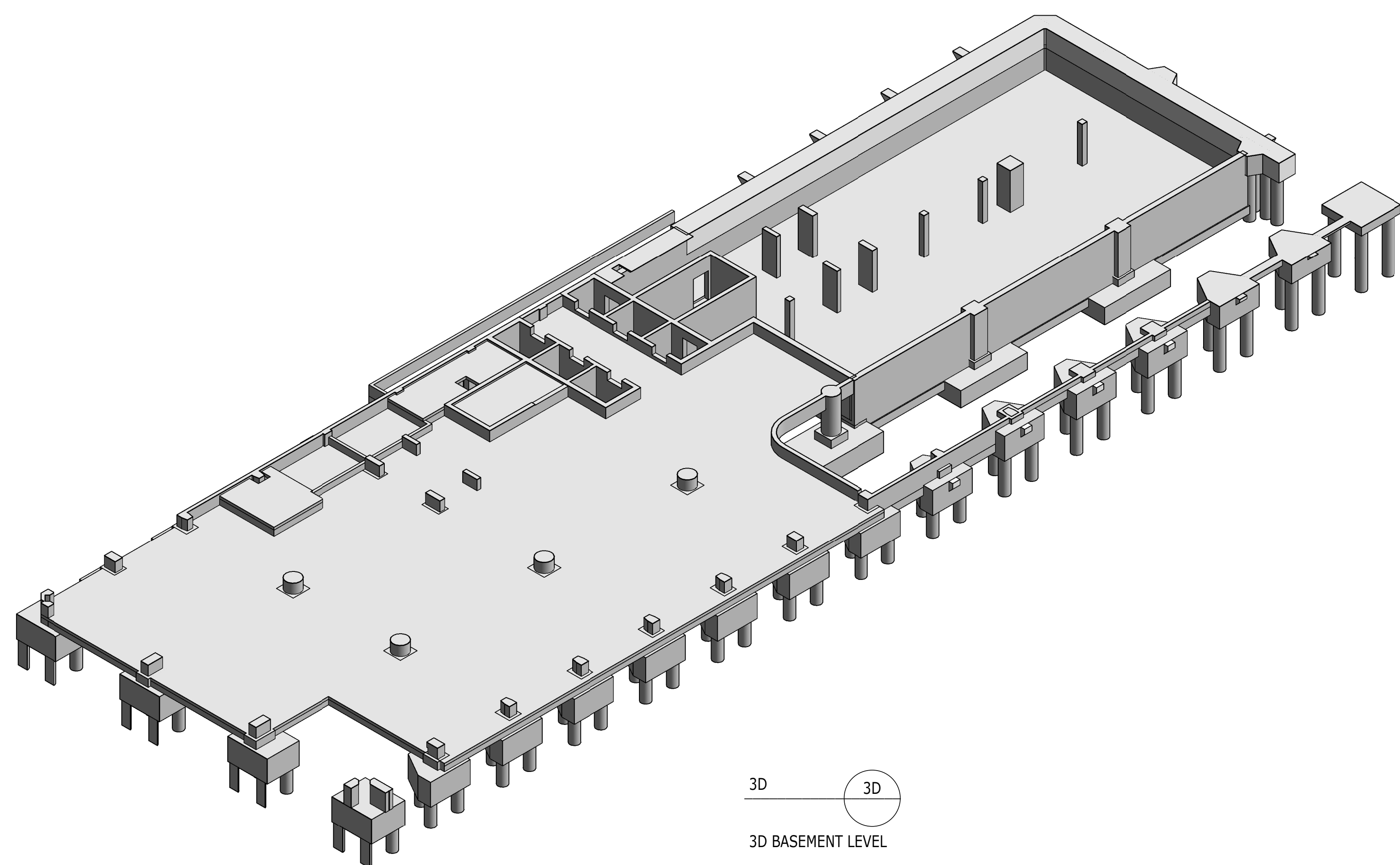
On completion of the works, the contractor shall validate that the works were carried out in accordance with the approved piling method.

Regulators may require prior agreement for the use of chemical drilling fluids, if the contractor intends to use any drilling fluids other than clean water; this must be agreed in advance by the contractor with the EA and the local Council.

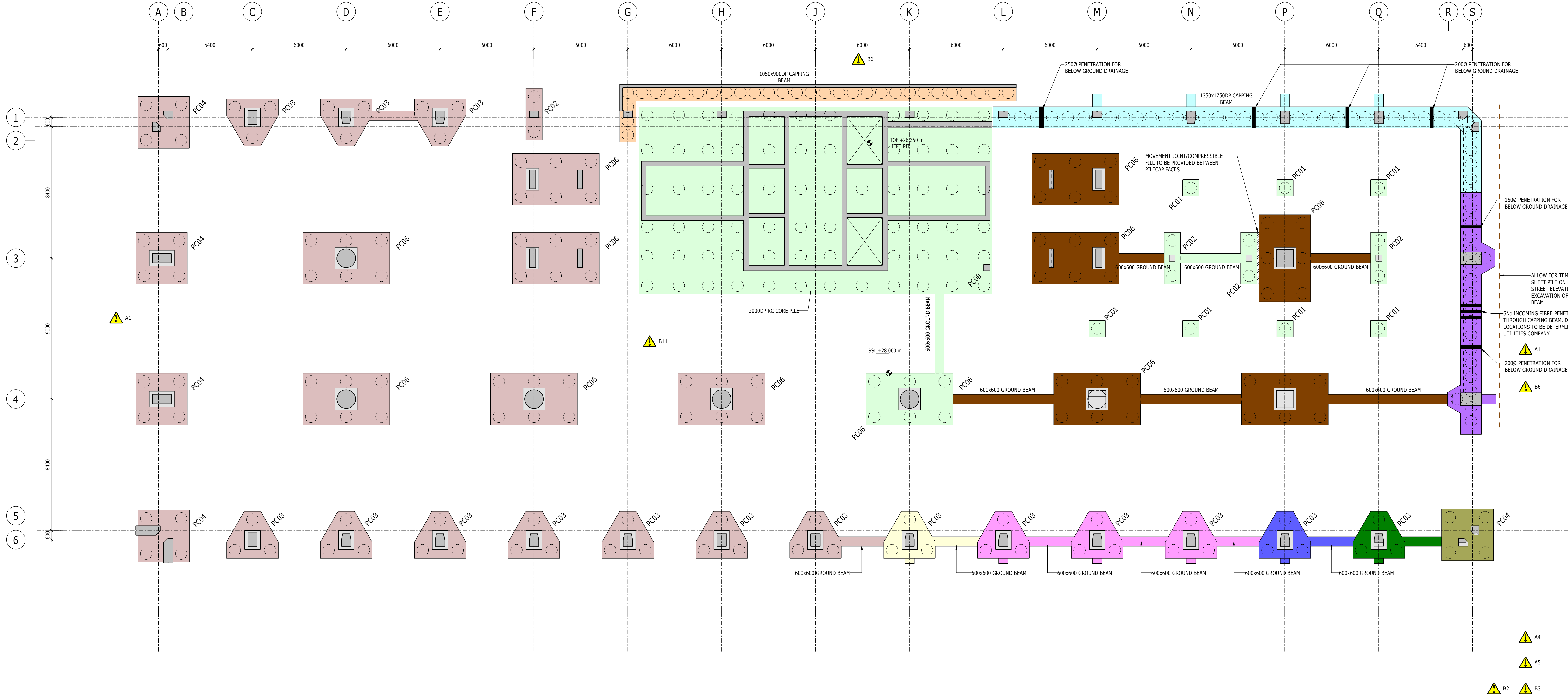
No excavation or construction work shall commence until all the aforementioned approvals have been obtained, including all necessary permissions.

No further mitigation measures or recommendations are required.

APPENDIX A
Drawings

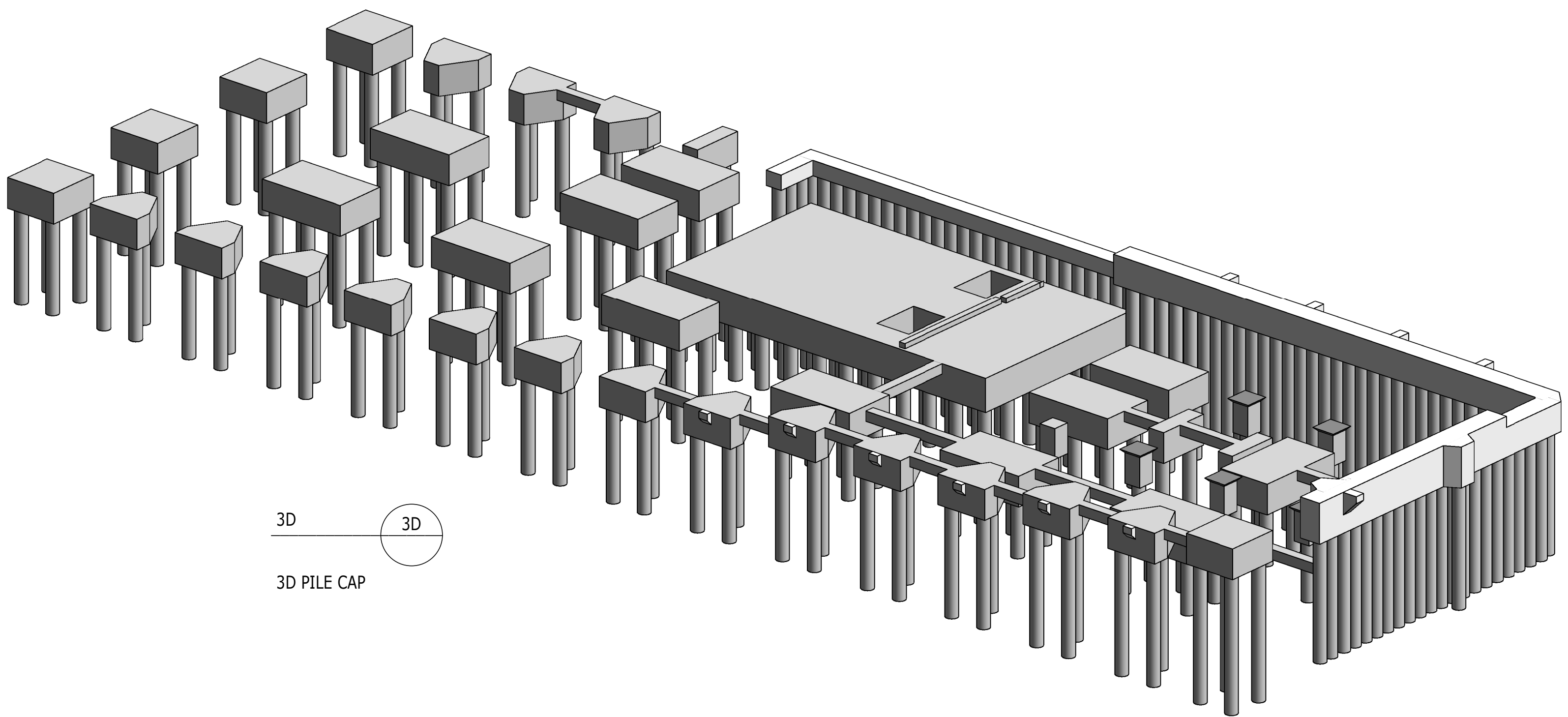


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Drawing No: FSP10A-RAM-XX-B1-DR-SX-00990			Rev: P03



LEGEND - TOP OF FOUNDATION	
	TOF +27.700m
	TOF +28.000m
	TOF +30.065m
	TOF +30.180m
	TOF +31.350m
	TOF +31.100m
	TOF +32.000m
	TOF +32.650m
	TOF +30.325m
	TOF +31.650m
	TOF +31.920m
	TOF +32.650m

RC FOUNDATIONS SCHEDULE					
MEMBER REF	SIZE/DESCRIPTION	MEMBER SIZE		DEPTH	VOLUME (m³)
		LENGTH	WIDTH		
PC01	7500 RC 1-PILE CAP	1050	1050	1800	1.98 m³
PC02	7500 RC 2-PILE CAP	3300	1050	1800	6.24 m³
PC03	7500 RC 3-PILE CAP	3300	2999	1800	13.87 m³
PC04	7500 RC 4-PILE CAP	3300	3300	1800	19.60 m³
PC06	7500 RC 6-PILE CAP	5550	3300	1800	32.97 m³
PC08	2000DP RC CORE PILE				516.87 m³



3D
3D PILE CAP

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A1,A4,A5, B3,B6,B11

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- ALL LEVELS ARE IN METRES ABOVE ORDINANCE DATUM U.N.O.
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND SPECIFICATIONS.
- FOR GENERAL NOTES, REFER TO RAMBOLL DRAWING No. 1620007819-RAM-XX-XX-DR-S-00010.
- ASSUMED PILE CAPACITIES: (5m ROCK SOCKET)
DA1C1 (SET B) : +5810kN / -1420kN
DA1C2 (SET C) : +3780kN / -2850kN
- ASSUMED PILE CAPACITIES: (6m ROCK SOCKET)
DA1C1 (SET B) : +6760kN / -1760kN
DA1C2 (SET C) : +4420kN / -3525kN
- ALL PILES TO BE 750mm IN DIAMETER, SPACED AT 3D U.N.O.
- CONTRACTOR TO ALLOW FOR DE-WATERING DURING CONSTRUCTION AS PERCHED GROUNDWATER IS LIKELY TO BE FOUND DURING BASEMENT WORKS.
- TOWER CRANE FOUNDATIONS ARE NOT SHOWN IN THIS DRAWING. THESE ARE TO BE DESIGNED BY THE PRINCIPAL CONTRACTOR AND MUST BE COORDINATED WITH THE PERMANENT WORKS FOUNDATIONS AND BELOW GROUND DRAINAGE.
- THE PRECAST CONCRETE FACADE IS INTENDED TO BE BASE SUPPORTED, PER FLOOR, AND FIXED TO THE FRAME AT COLUMN POSITIONS. ALLOW FOR CAST-IN CHANNELS, OR DEVELOPMENT OF AN RC CORBEL DETAIL TO PERMIT COLUMNS. REQUIREMENTS ARE PENDING DEVELOPMENT OF FACADE DETAILS BY ARCHITECT / SPECIALIST.
- THE 9M LONG PANELS TO GRID A&S MUST BE SUPPORTED TO COLUMN POSITIONS. ALLOW FOR TEMPORARY PROPPING IF LOADED TO THE SLAB EDGE IN THE CONSTRUCTION CASE
- THE DESIGN OF THE CORE WALLS, CORE PILECAP AND PILE LOADS HAVE BEEN COMPLETED BY RAMBOLL REPRESENTING THE PERMANENT BUILDING CONDITION. THE TEMPORARY WORKS DESIGNER MUST MAKE SUITABLE ALLOWANCE FOR DESIGN AND REVIEW OF THE CORE WALLS, CORE PILECAP AND PILE LOADS FOR THE TEMPORARY (CONSTRUCTION) CASE
- BUILDING SERVICES PENETRATIONS IN THIS DRAWING HAVE BEEN PROVIDED AND POSITIONED AS PER CUNDALL DRAWING FSP10A-CDI-XX-81-SK-P-00991. SETTING-OUT, QUANTITY AND LEVELS OF PENETRATIONS TO BE CONFIRMED BY BUILDING SERVICES SUBCONTRACTOR.

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPLESSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

P03	STAGE 4 ISSUE	23/06	JP	NSM
P02	STAGE 3 ISSUE	04/04	JP	NSM
P01	STAGE 2 ISSUE	23/09	DM	NSM
Rev	Description	Date	By	App

D2 - FOR TENDER

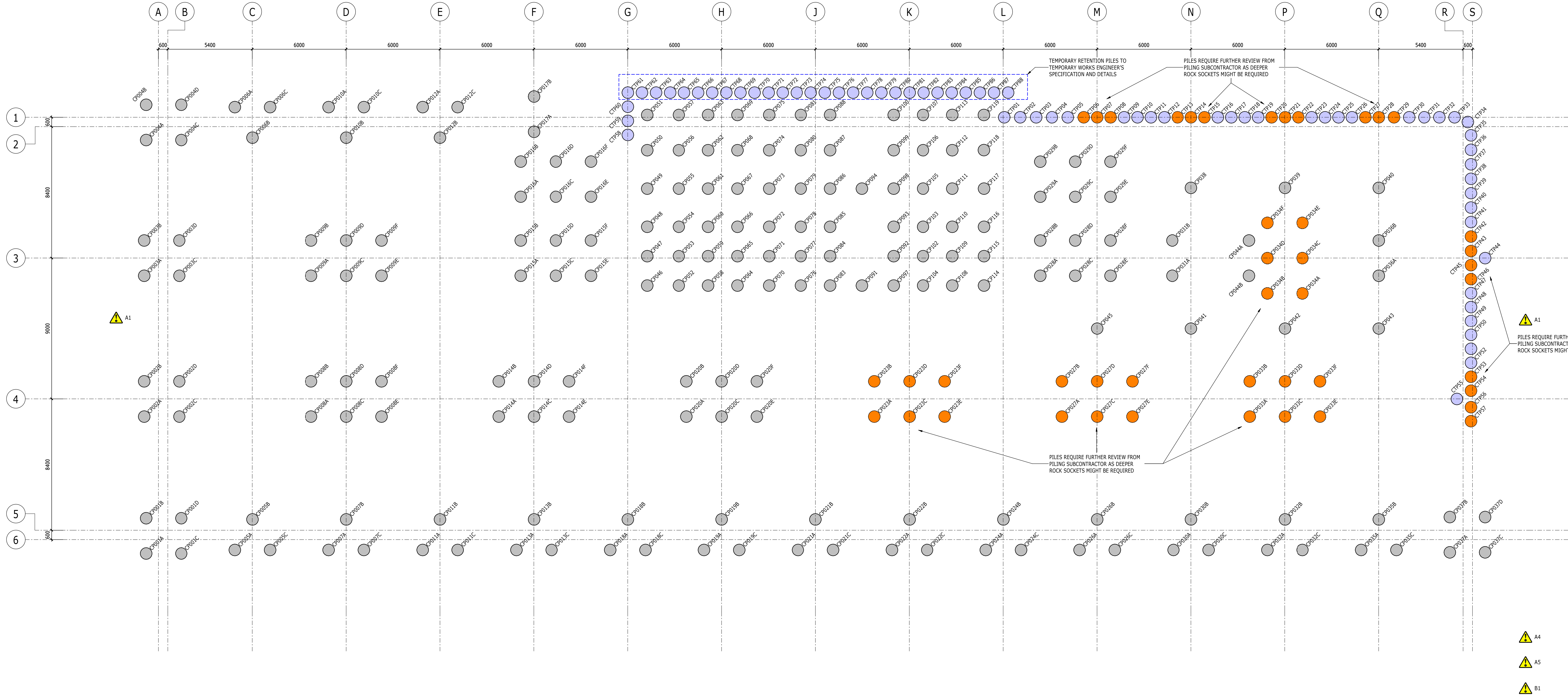
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GENERAL ARRANGEMENT
FOUNDATION LAYOUT

Project No:	Scale (B A3):	Date:	Drawn:
1620007819	1 : 100	AUG/22	DM
Drawing No:		Rev:	
FSP10A-RAM-XX-FN-DR-SX-00980		P03	



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- FOR GENERAL NOTES, REFER TO RAMBOLL DRAWING No: FSP10A-RAM-XX-XX-DR-S-00010, S-00011 & S-00012.
- IT HAS BEEN ASSUMED THAT A GUIDE WALL WILL BE USED TO LIMIT POSITIONAL (INSTALLATION) TOLERANCE TO +/- 25mm FOR ALL PILES IN THE CONTIGUOUS PILED WALL.
- TOWER CRANE FOUNDATIONS ARE NOT SHOWN IN THIS DRAWING. THESE ARE TO BE DESIGNED BY THE PRINCIPAL CONTRACTOR AND MUST BE COORDINATED WITH THE PERMANENT WORKS FOUNDATIONS AND BELOW GROUND DRAINAGE.
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DA1C1 (SET B) : +6760kN / -1760kN
DA1C2 (SET C) : +4420kN / -3525kN
- THE FOLLOWING DESIGN SCENARIOS WILL NEED TO BE CONSIDERED FOR THE DESIGN OF THE CONTIGUOUS PILED WALL.
 - A. PERMANENT: FULL BUILDING LOAD, INCLUDING OCCUPANCY. FOR THIS CONDITION THE WALL WILL BE PROPPED AT BASEMENT AND GROUND LEVELS.
 - B. TEMPORARY FOR BASEMENT CONSTRUCTION: THE WALL WILL BE UNPROPPED DOWN TO THE FORMATION LEVEL OF THE BASEMENT SLAB.
 - C. TEMPORARY FOR FRAME ERECTION: THE WALL WILL BE PROPPED AT BASEMENT LEVEL AND GROUND SLAB LEVEL BY THE PERMANENT STRUCTURE PRIOR TO THE FRAME ERECTION ABOVE.
- ALLOW FOR INTEGRITY TESTING FOR ALL PILES.
- LATERAL DEFLECTIONS OF THE CONTIGUOUS PILED WALL TO BE LIMITED TO 30mm IN THE TEMPORARY CASES.
- THE MAIN CONTRACTOR AND PILING CONTRACTOR SHOULD PREPARE A SITE LOGISTICS PLAN FOR REVIEW BY CADENT GAS TO DEMONSTRATE MEANS OF PROTECTING THE GAS MAIN DURING CONSTRUCTION. THE PILING CONTRACTOR SHALL PROVIDE A PILING RISK ASSESSMENT FOR SUBMISSION TO, AND TO THE SATISFACTION OF, THE ENVIRONMENTAL AGENCY TO DEMONSTRATE THAT THE PROPOSED PILE TYPE, INSTALLATION METHODOLOGY, AND SITE PROCEDURES, DO NOT PRESENT A RISK TO THE GROUND AND AQUIFER BELOW.
- ALL PILES TO BE 750mm IN DIAMETER, SPACED AT 3D U.N.O.
- PILE ARRANGEMENTS AND CAPACITIES SHOWN ON THIS DRAWING ARE PRELIMINARY ONLY. FINAL DESIGN BY PILING SUBCONTRACTOR.

KEY	
	CONTIGUOUS BORED PILE
	ALL PILES SPACED AT 1.2xØ1A OF PILE U.N.O.

PILE TOTALS	
PILE TYPE	TOTAL
CFA	223
CONTIG	88

THESE NOTES ARE BASED ON THE USE OF EXPERIENCED AND COMPETENT CONTRACTORS CARRYING OUT THE WORK USING AN APPROVED SAFE METHOD OF WORKING

KEY TO HEALTH AND SAFETY SYMBOLS

- INDICATES A RESIDUAL RISK REQUIRING A COMPLESSORY ACTION
- INDICATES A RESIDUAL RISK FOR INFORMATION
- INDICATES A RESIDUAL RISK REQUIRING A PROHIBITIVE ACTION
- INDICATES A RESIDUAL RISK AS A WARNING

P04	STAGE 4 ISSUE	23/05/2022	JP	NSM
P03	STAGE 3 ISSUE	05/05/2022	JP	NSM
P02	STAGE 3 ISSUE	04/04/2022	JP	NSM
P01	STAGE 2 ISSUE	23/09/2022	DM	NSM
Rev	Description	Date	By	App

D2 - FOR TENDER

FIRST ST PLOT 10a

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GENERAL ARRANGEMENT
PILING LAYOUT

Project No:	Scale (B A1):	Date:	Drawn:
1620007819	1 : 100	AUG22	DM
Drawing No:			Rev:
FSP10A-RAM-XX-PL-DR-SX-00970			P04