



# Piling Works Risk Assessment

Former Abellio Bus Garage  
North Hyde Gardens,  
Hayes,  
UB3 4QQ

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

Issue Date: 18 October 2022  
Revision No:  
Revision Date:



a Colliers Company.



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**Date:**

18 October 2022

**Reference:**

21.1423/CB/LC

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For and on behalf of  
Paragon Building Consultancy Limited

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## PILING WORKS RISK ASSESSMENT

CLIENT NAME: Ark Data Centres Limited

PROPERTY ADDRESS: Former Abellio Bus Garage  
North Hyde Gardens,  
Hayes,  
UB3 4QQ

INSPECTION DATE: N/A



### 1.0 INSTRUCTIONS AND SCOPE OF WORKS

#### 1.1 Scope of Work

1.1.1 Paragon, a Colliers Company (Paragon) has been instructed by Concert on behalf of Ark Data Centres Limited to complete a Piling Works Risk Assessment (PWRA) for a site referred to as the Former Abellio Bus Garage, 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 (aquitar) 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.

1.1.2 This assessment has been completed in connection with the redevelopment of the wider site into a data centre. For the avoidance of doubt, this report relates to Energy Centre 2 which is situated in the Former Abello Plot only, and the wider development already has a PWRA.



1.1.3	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’.
1.1.4	Due regard to the following is made in preparation of the PWRA: <ul style="list-style-type: none"> <li>• Water Resources Act 1991;</li> <li>• Groundwater Regulations 1998 (amended January 2009);</li> <li>• National Planning Policy Framework (NPPF); and</li> <li>• EU Water Framework Directive (WFD).</li> </ul>
1.1.5	The requirements of the Remediation Strategy completed for the wider development have also been considered.

## 2.0 INTRODUCTION

<b>2.1</b>	<b>Site Location and Description</b>
2.1.1	The site is located at the Former Abellio Bus Garage, North Hyde Gardens, Hayes, UB3 4QQ.
2.1.2	The Former Abellio plot is situated in the southern part of the wider development and extends to roughly 0.47Ha.
2.1.3	The Former Abellio plot is surrounded by North Hyde Gardens to the north with the former British Airways (BA) plot beyond. In addition, the former Vodafone plot is situated to the east, the Grand Union Canal is situated to the south and the North Hyde Gardens bridge is situated to the west. The BA and Vodafone buildings have been demolished and are undergoing redevelopment as part of the wider scheme.
2.1.4	There is a Thames Water sewer which runs along the eastern boundary of the Abellio plot at a depth of ca. 12m below ground level (mbgl).
<b>2.2</b>	<b>Proposed Development</b>
2.2.1	The plot is to be redeveloped into an Energy Centre, which is known as EC2 for the wider development.
2.2.2	A site plan showing the proposed development is shown in Appendix 1.
<b>2.3</b>	<b>Planning Conditions</b>
2.3.1	The planning application for the wider development is application ref. 75111/APP/2020/1955. It should be noted that the original application had a pre-commencement condition for a Piling Method Statement (condition 32). This has been completed for the BA and Vodafone plots.

2.3.2	<p>Condition 32 states:</p> <p><i>“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”.</i></p>
2.3.3	<p>The Local Authority has provided a partial discharge notice under application 75111/APP/2021/1506, which states “the details required to discharge Condition 32 in relation to the Abellio Site are outstanding”.</p>
2.3.4	<p>As such, this report aims to meet the requirements of Condition 32 for the Abellio Plot/EC2.</p>
<b>2.4</b>	<b>Previous Reports</b>
2.4.1	<p>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:</p> <ul style="list-style-type: none"> <li>• Paragon (2019) Phase 1 Preliminary Risk Assessment, ref 19.0633/CB/NW dated 29 August 2019 – Rev D, Revised November 2021 (for planning purposes).</li> <li>• Paragon (2020) Phase 2 Ground Investigation Report, ref 20.0023, dated 6 March 2020 – Rev D, Revised November 2021 (for planning purposes).</li> <li>• Paragon (2020) Detailed Quantitative Risk Assessment (DQRA), ref 20.0023/CK/KJH dated 10 July 2020 – Rev C, Revised November 2021 (for planning purposes).</li> <li>• Paragon (2020) Remediation Strategy, ref 20.0023/CK/DCN dated 17 March 2020 – Rev E, Revised November 2021 (for planning purposes).</li> <li>• Paragon (2020) Phase 1 Environmental Audit, ref 20.0054/CB/DCN, dated 27 February 2020.</li> <li>• Paragon (2021) Phase 2 Ground Investigation Report (for Abellio Bus Garage), ref 21.1177/CB/NW, dated 5 November 2021 – Rev A.</li> <li>• Paragon (2021) Abellio Bus Garage, Unexploded Ordnance Survey Letter Report, ref 21.2244/CB/KJH, dated 17 February 2022.</li> </ul>

### 3.0 BACKGROUND INFORMATION

<b>3.1</b>	<b>Summary of Previous Reports</b>
3.1.1	<p>The following information is summarised from the earlier reports listed above. The full documents should be read in conjunction with this report.</p>

<b>3.2</b>	<b>General Description and Current Site Use</b>
3.2.1	The site is centred approximately at National Grid Reference: 510435, 179211, and extends to 0.47Ha. The approximate elevation of the site is 31m Above Ordnance Datum (mAOD).
3.2.2	At the time of the investigation, the Abellio plot comprised a warehouse used as a bus garage with associated two-storey office area operated by Abellio. The warehouse had an internal car wash and repair garage. There was a small Petrol Filling Station at the site entrance and this was fed by an above ground diesel storage tank (AST). The pipework was observed to run above ground. In addition, an Ad-Blue tank and pump was situated at the entrance to the site. These have since been disconnected and removed from the site.
3.2.3	The site has multiple parking areas for the site staff and buses in the central and eastern part of the site. The hardstanding at the site comprises of concrete and tarmac. There was some residual staining on the ground surface which has been assumed to be from leaks from parked buses.
3.2.4	There is a small service yard to the rear of the building in the western part of the site. Two small waste oil tanks (both ASTs) were observed to be present within this area. During drilling, a spill had occurred in this area and spill kits were placed on the ground surface to contain the oil.
3.2.5	The Grand Union Canal is a manmade canal, situated 5m to the south of the plot.
<b>3.3</b>	<b>Historical Land Use</b>
3.3.1	The site formed open land from as early as 1868 until around 1935, where the site was part of a creosoting works, which extended offsite into the land to the north and east. By 1963, the site was shown as a pond, with embankments which were considered to be likely to be due to infilling activities. By 1982, the site was shown as being levelled but undeveloped. The current layout was shown by 2010.
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.
<b>3.4</b>	<b>Geology</b>
3.4.1	From a review of BGS mapping (269 and 270), the geology of the subject site is reported to comprise mostly of the Lynch Hill Gravel underlain by the London Clay Formation. The Langley Silt superficial deposits reportedly cover the south-western part of the site (yard at the rear of the building). The mapping also shows Artificial Ground and Alluvium within 75m of the site.
3.4.2	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.
3.4.3	The ground conditions found during the investigation are presented in Table 1.

3.4.4

**Table 1. Summary of Ground Conditions found during the 2021 Investigation**

Depth From (min/max) (m)	Depth To (min/max) (m)	Soil Type	Description	Notes
0.0	0.05 / 0.20	Tarmacadam / Topsoil	Tarmacadam hardstanding / topsoil	
0.05 / 0.20	3.50 / >5m	Made Ground	Variable Made Ground comprising very loose to medium dense brown and black sandy gravel. Gravel is concrete, brick, flint, glass, clinker, tile and mixed lithologies.	Concrete obstructions were encountered in WS01, WS01a-b and WS03 from depths between 0.20mbgl and 0.45mbgl.
3.50 / 4.50	4.80 / 5.00	Clay	Soft grey and black gravelly peaty clay. Gravel is mixed lithologies.  Alluvium	Encountered in BH01 and WS05.
4.80	>5	Gravel	Medium dense, orange and brown sandy gravel. Gravel is flint.  Lynch Hill Gravel Member	Only encountered in WS05.
5.00	7.50	Clay	Soft to firm brown, blue and grey clay.  Weathered London Clay	Only encountered in BH01.
7.50	>35	Clay	Firm to stiff brown, blue and grey clay with selenite crystals.  Weathered London Clay	Only encountered in BH01.

**3.5 Hydrogeology**

3.5.1 The Lynch Hill Gravel is classified as a Principal Aquifer of high permeability, while the Langley Silt Member is classified as a Secondary (A) Aquifer, and the London Clay Formation is classified as Unproductive Stratum.

3.5.2 The site is not located within Groundwater Source Protection Zone (SPZ).

3.5.3 There is one groundwater abstraction within a 1km radius which is approximately 530m southeast of the site and is used for evaporative cooling.

**3.6 Hydrology**

3.6.1 Grand Union Canal is located directly south of the site, and the River Crane is located approximately 75m to the east of the site. No surface water abstractions have been identified within 1km of the site.

3.6.2	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.
<b>3.7</b>	<b>Unexploded Ordnance (UXO)</b>
3.7.1	Online information indicated that there were several bomb strikes recorded around the site located adjacent to the north 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.
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. No bomb strikes were recorded 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 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 and a magnetometer probe survey if piling is to be implemented.
3.7.4	Brimstone were present during the investigation and identified an anomaly in one location. As such, it was recommended that this area was excavated to inspect the anomaly in case it was UXO. Paragon has previously prepared a report which states that it was a metal chain and no UXO was identified.
<b>3.8</b>	<b>Phase 2 Ground Investigation Summary</b>
3.8.1	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.
3.8.2	A Geoenvironmental Risk Assessment was carried out on the chemical laboratory test data and a revised Conceptual Site Model was presented. Chemical test data found that the concentrations of contaminants testing within the Made Ground and natural soil were below the Generic Assessment Criteria (GAC) for a commercial land use. However, asbestos was encountered in two locations and was quantified at <0.001%.
3.8.3	The results of the groundwater analysis found marginal exceedances of the Environmental Quality Standards for PAH and Heavy Metals. Nevertheless, the exceedances were marginal and no gross contamination was encountered. Therefore, the risk to Controlled Waters was considered to be low.
3.8.4	Three rounds of gas monitoring were completed as part of this investigation and the results identified that the elevated levels of carbon dioxide and methane. Based on a preliminary assessment using BS 8485:2015+A1:2019 ' <i>Code of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildings</i> ', the site falls within Characteristic Situation (CS) 2, whereby gas protection measures are required.



<p>3.8.5</p>	<p>The report concluded that the concentrations of contaminants within soil and groundwater are considered to be suitable for the proposed end use of the development, and no further remediation is required. Nevertheless, recommendations were made for the following:</p> <ul style="list-style-type: none"> <li>• Capping layers in soft landscaped areas;</li> <li>• Gas (methane and carbon dioxide) and vapour resistant membranes within future enclosed structures;</li> <li>• Asbestos control measures and materials management;</li> <li>• Personal Protective Equipment; and</li> <li>• Remediation and Verification reporting.</li> </ul>
<p>3.8.6</p>	<p>Geotechnical design parameters for the strata encountered were provided within the report. The parameters were 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, strength testing including SPTs, and undrained unconsolidated triaxial testing. A design groundwater level was 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.</p>
<p>3.8.7</p>	<p>In summary, given the thickness and variability of the Made Ground and existing obstructions, shallow foundations were not recommended. As such, piled foundations were recommended. It was also recommended that floor slabs should be suspended.</p>
<p>3.8.8</p>	<p>The recorded groundwater strikes and monitoring results appear to show that groundwater flows towards the Grand Union canal and River Crane/Yeading Brook. A design groundwater level of 29.50mOD is recommended.</p>
<p><b>3.9</b></p>	<p><b>Detailed Quantitative Risk Assessment (DQRA) Summary</b></p>
<p>3.9.1</p>	<p>A Detailed Quantitative Risk Assessment was completed for the wider development due to the nature of the contamination identified in the former BA plot. The report identified that the wider development site does not pose any significant risks to Controlled Waters (the River Crane). Furthermore, as no significant risks to Controlled Waters was identified from the investigation on the Abellio plot, no further works are required.</p>

3.10	<b>Remediation Strategy Summary</b>
3.10.1	<p>Based on the findings of the original investigation for the BA and Vodafone plots, 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> <ul style="list-style-type: none"> <li>• Site Clearance and Preparation;</li> <li>• Maintain a watching brief/discovery strategy throughout the works;</li> <li>• Management of asbestos in soil i.e. method statements, personal protective equipment, dust suppression etc.;</li> <li>• Provision of a waste management procedure / reuse strategy;</li> <li>• Provision of a capping system in areas of soft landscaping;</li> <li>• Installation of gas protection measures (CS2);</li> <li>• Long term monitoring of groundwater is to be undertaken to ensure that no adverse impacts to the river are caused during development;</li> <li>• Piling Works Risk Assessment;</li> <li>• Decommissioning of boreholes;</li> <li>• Installation of barrier pipework for new water pipes;</li> <li>• Concrete foundation design (Made Ground and Lynch Hill Gravel: DS-2 and AC-2 and London Clay: DS-2 and AC-1s); and</li> <li>• Provision of a Verification Report.</li> </ul>
3.10.2	<p>As no significant contamination was encountered during the investigation on the Abellio plot, no formal remediation strategy was required for that plot. Instead the recommendations within the report were to be followed which include:</p> <ul style="list-style-type: none"> <li>• Capping layers in soft landscaped areas;</li> <li>• Gas (methane and carbon dioxide) and vapour resistant membranes within future enclosed structures;</li> <li>• Asbestos control measures and materials management;</li> <li>• Personal Protective Equipment; and</li> <li>• Remediation and Verification reporting.</li> </ul>
3.10.3	<p>Documentation stating the above has been completed is to be provided by the developer to Paragon so that a verification report can be submitted.</p>

<b>3.11</b>	<b>Additional Hazards</b>
3.11.1	<p>Based on the foregoing, the following hazards associated with piling at the site have been identified:</p> <ol style="list-style-type: none"> <li>1. Made Ground;</li> <li>2. UXO;</li> <li>3. Buried obstructions (e.g. relic foundations / structures);</li> <li>4. Chemical attack on buried concrete;</li> <li>5. Thames Water Sewer; and</li> <li>6. The Grand Union Canal.</li> </ol>
3.11.2	<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

<b>4.1</b>	<b>Foundation Methodology</b>
4.1.1	<p>The Abellio plot is to be redeveloped into an energy centre (known as EC2). The building will be supported on 149 no. Continual Helical Piles (CHD) at 400/700mm diameter. The piling is to be completed by Roger Bullivant, and their method statement is presented in Appendix 2. In addition, the pile layout plans for the plot are shown in Appendix 1.</p>
4.1.2	<p>Piling constraints were identified during the Phase 2 investigation. These included the potential for UXO, obstructions within the Made Ground, and the presence of the Thames Water sewer.</p>
4.1.3	<p>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. In addition, a sewer impact assessment was completed for the wider development.</p>
4.1.4	<p>The construction sequence in the Abellio plot includes:</p> <ol style="list-style-type: none"> <li>1. Installation of the piling mat;</li> <li>2. Installation of CHD piles;</li> <li>3. Removal of the piling mat and excavation to formation level;</li> <li>4. Construction of the pile caps/raft foundation; and</li> <li>5. Loads from the structure applied to the piles and transfer to the ground.</li> </ol>
4.1.5	<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>

<p>4.1.6</p>	<p>The Method Statement provided by Roger Bullivant highlights the following environmental controls to be in place throughout the works:</p> <ol style="list-style-type: none"> <li>1. Noise:             <ol style="list-style-type: none"> <li>a. All piling works will be done in normal working hours (08.00 – 18.00), any works done outside these hours will be authorised by the principle contractor.</li> <li>b. P.P.E will be issued and worn by all working in the vicinity of the machine in line with the warning signs posted on the machine.</li> </ol> </li> <li>2. Vibration:             <ol style="list-style-type: none"> <li>a. Vibration can be monitored if requested, if vibration is causing or suspected of causing damage to the railway or infrastructure, work will stop until a seismograph is on site to measure the levels of vibration from the piling operation.</li> </ol> </li> <li>3. Refuelling and storage of fuel             <ol style="list-style-type: none"> <li>a. All fuel will be stored in double bunded bowsers with the bund capable of storing 125% of the bowser capacity, the bund is enclosed so rainwater will not be able to collect.</li> <li>b. All fuel stored on site will be stored at least 10m from any drain and 50m from any open hole.</li> <li>c. All refuelling of plant will be done using a pump, with spill kits at the point of refuelling, no pouring from buckets or containers will be permitted.</li> </ol> </li> <li>4. Spoil and muck away             <ol style="list-style-type: none"> <li>a. This method of piling has been selected because it does not generate spoil, the ground been identified as contaminated so the risk of contaminated spoil being moved on and off site has been negated.</li> </ol> </li> <li>5. Contaminated Spoil             <ol style="list-style-type: none"> <li>a. Although the piling method does not generate spoil, all personnel will wear P.P.E at all times, no consumption of food will be done on site and the need for washing of hands must be emphasised.</li> </ol> </li> </ol>
<p><b>4.2</b></p>	<p><b>Piling Mat</b></p>
<p>4.2.1</p>	<p>A pile mat is anticipated to be used as part of the piling methodology. It is suggested that the piling mat is to be formed of 6F2 graded material.</p>
<p>4.2.2</p>	<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>

## 5.0 PILING RISK ASSESSMENT

5.1	<p><b>Introduction</b></p>
5.1.1	<p>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 receptors. Other pollution pathways are considered by the PWRA, however, the impact to water resources is the main concern.</p>
5.2	<p><b>Hazard identification: Potential Adverse Environmental Impacts</b></p>
5.2.1	<p>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.</p>
5.2.2	<p>Based on the above, a Conceptual Site Model (CSM) has been prepared for the Abellio plot.</p>
5.3	<p><b>Conceptual Site Model</b></p>
	<p><u>Sources</u></p>
5.3.1	<p>Few sources of contamination were identified during the ground investigation. In summary, the results of the soil analysis found the concentrations of contaminants within the soils were below the criteria for a commercial land use. As such, no specific remediation was required. Whilst asbestos was noted within the Made Ground, it was quantified at &lt;0.001% (i.e. the limit of detection) and is therefore not considered to be a significant risk. Ground gas was also identified albeit at low levels. Furthermore, the results of the groundwater analysis found marginal exceedances of the Environmental Quality Standards for PAH and Heavy Metals. Despite this, the exceedances were marginal and no gross contamination was encountered. Therefore, the risk to Controlled Waters was considered to be low.</p>
5.3.2	<p>Based on the foregoing no significant contamination has been identified at the site.</p>
	<p><u>Pathways</u></p>
5.3.3	<p>The piling scheme for the Abellio plot is to found the CHD piles to a maximum 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.</p>
5.3.4	<p>Whilst there is the potential for groundwater migration to occur within the Lynch Hill Gravel, no significant contamination has been identified.</p>
	<p><u>Receptors</u></p>
5.3.5	<p>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.</p>



5.3.6

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

5.3.7

**Table 2. Plausible Pollutant Linkages with the BA Plot**

Source	Pathway	Receptor	Risk Rating	Comment
Leachable contaminants from soil	Vertical migration of leachable contaminants from the soil, mobilised by the action of piling.	Principal Aquifer – Lynch Hill Gravel	L	No gross contamination has been identified.  In addition, the thickness of the aquifer is limited due to historical gravel extraction at the site and it is 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.
	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	No gross contamination has been identified.  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	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	No gross contamination has been identified.  In addition, the thickness of the aquifer is limited due to historical gravel extraction at the site and it is 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.
	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	No gross contamination has been identified.  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	Whilst unlikely to present a significant risk, care is 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 Hazard Assessment

5.4.1 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 3, in relation to the proposed use of CHD and helical piles.

### 5.4.2 **Table 3: 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 not been identified at the site to date. In addition, 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.
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	Significant volumes of arisings are not anticipated. Furthermore, gross contaminated soils have not been identified. However, low levels of asbestos were identified. 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.
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 CHD.	L	Pile techniques are to include CHD piles which is an auguring technique. As such, the likelihood of contaminants being driven into an aquifer is limited.

5.4.3 **Table 3: Hazard Assessment (continued)**

Pollution Scenario	Applicability to site	Risk	Hazard Assessment
6. Contamination of groundwater and, subsequently, surface waters by wet concrete, cement paste or grout.	Injection of wet concrete is to take place.	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 potable groundwater abstractions have been identified within 1km of the site.

5.5 **Other Hazards**

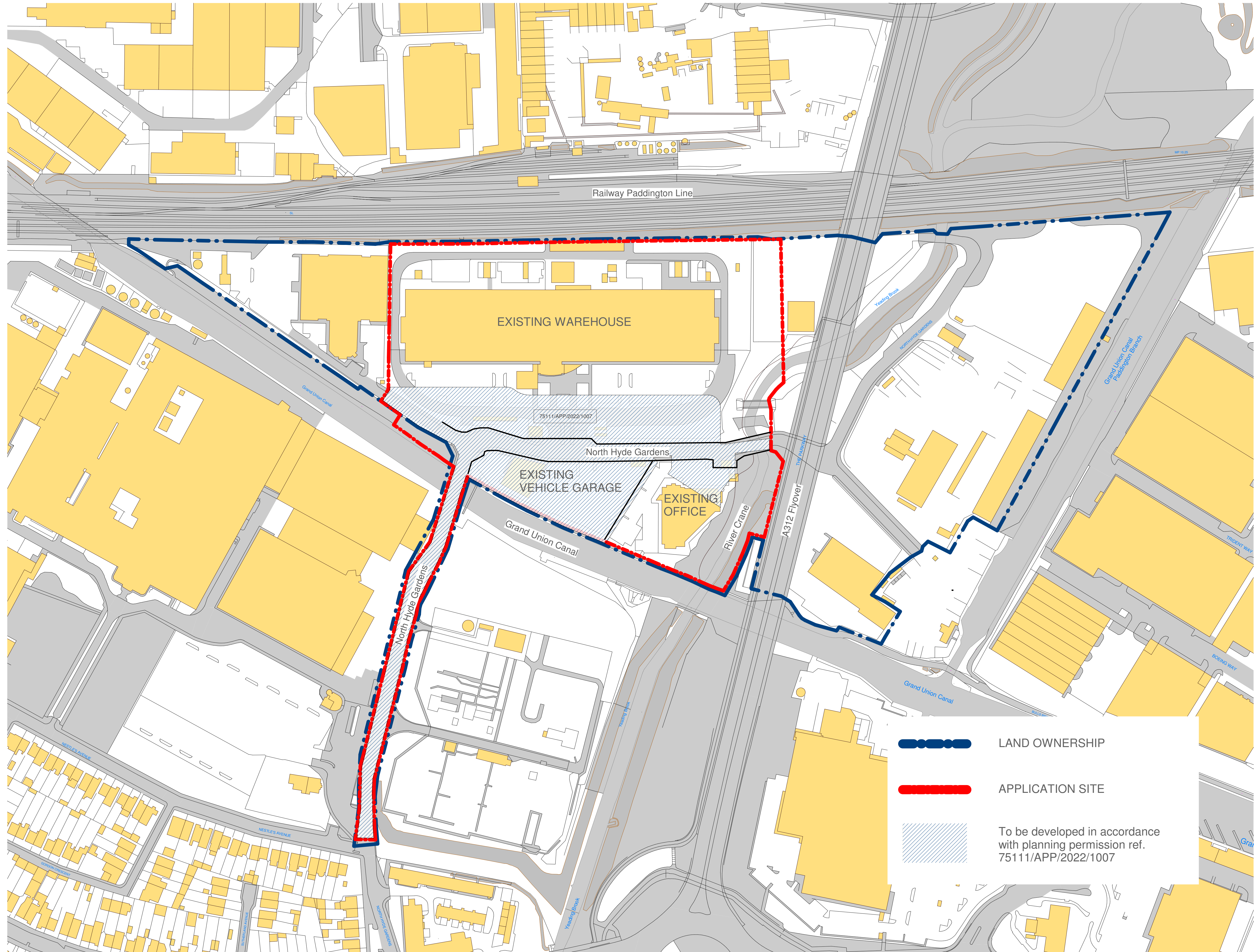
- 5.5.1 In relation to UXO, prior to piling, a UXO magnetometer survey is recommended to be undertaken.
- 5.5.2 In relation to buried obstructions, enabling works are to be undertaken to remove these obstructions.
- 5.5.3 In relation to the Thames Water Sewer, as outlined above, a stability assessment has previously been completed.

6.0 **CONCLUSIONS**6.1 **Conclusions**

- 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 energy centre.
- 6.1.2 The hazard assessment in Table 2 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.
- 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.
- 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.

## APPENDIX 1: FIGURES

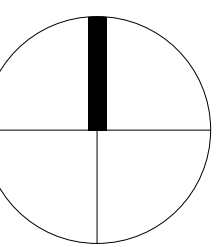




**LAND OWNERSHIP**

**APPLICATION SITE**

To be developed in accordance with planning permission ref. 75111/APP/2022/1007



DO NOT SCALE This Drawing  
Dimensions to be checked on Site.

Notes:

Issue	Date	Description	Checked
P02	01/09/2022	Extant of Application revised	AVC
P01	09/06/2020	Issued for Planning	AVC

**PLANNING**

Client:

**ARK**  
DATA CENTRES

**NWA**  
Nicholas Webb Architects plc  
The Old Dairy  
Horseleydown Farm  
Redbourn  
Hertfordshire AL3 7GA  
01482 77550  
info@nwarchitects.co.uk  
www.nwarchitects.co.uk

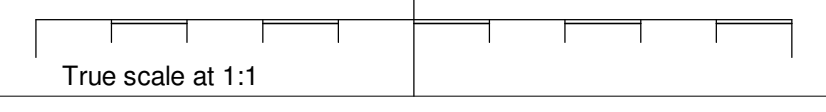
Project:  
**Union Park at Bulls Bridge**

Drawing Name:  
**A01 - SITE LOCATION  
Site Location Plan**

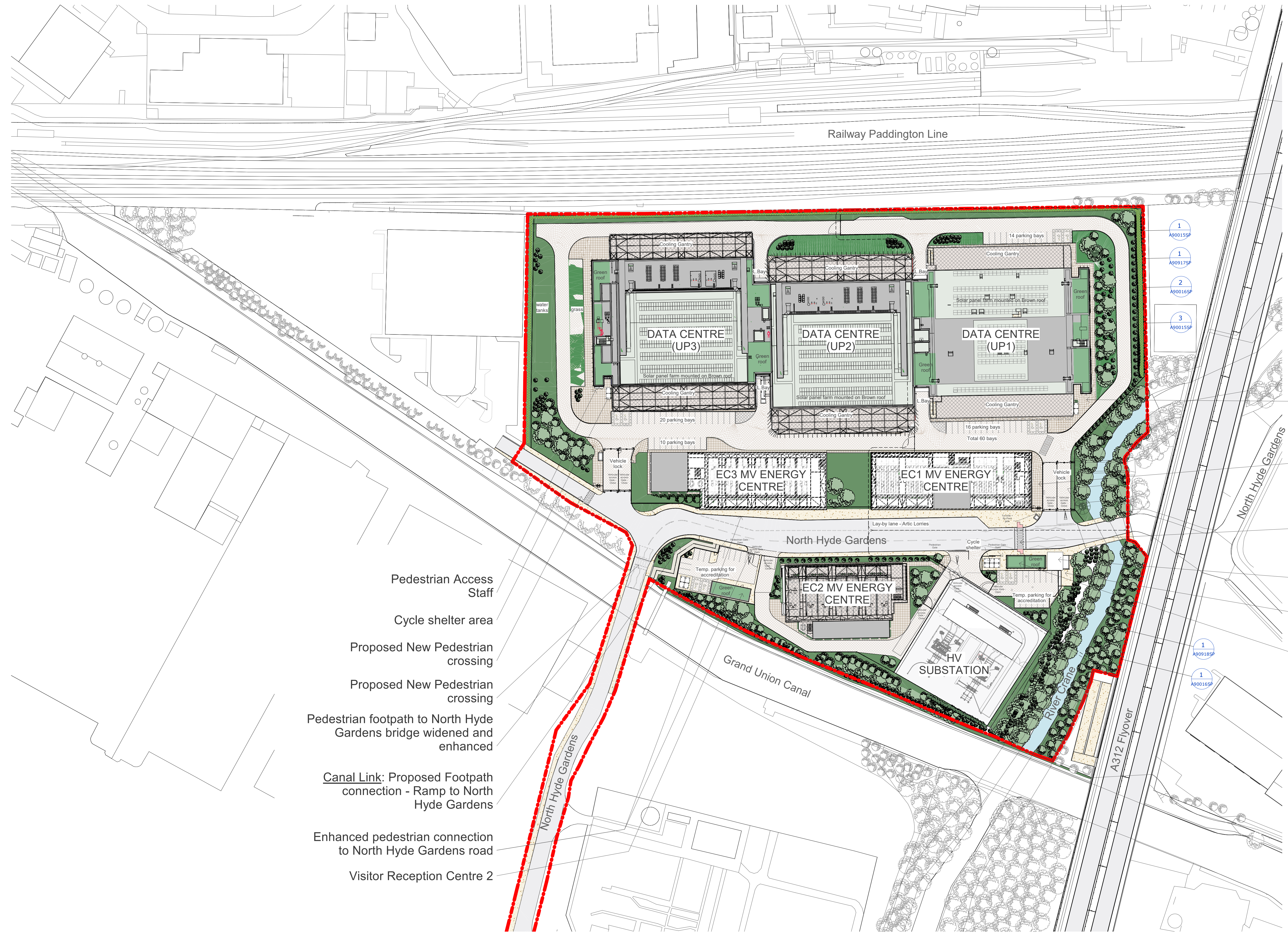
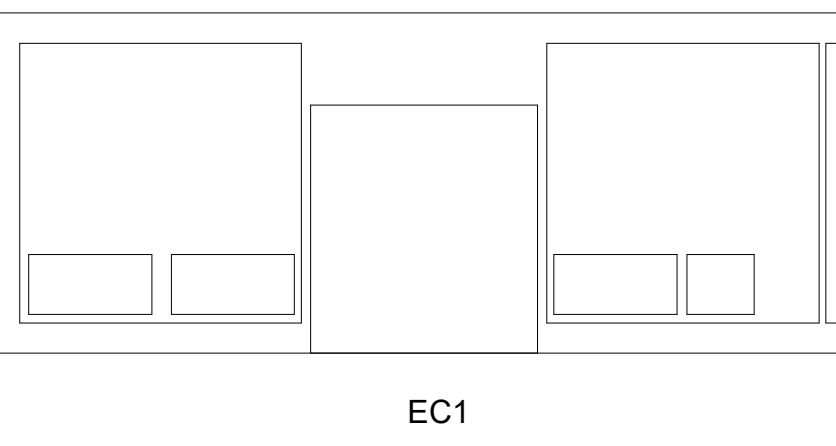
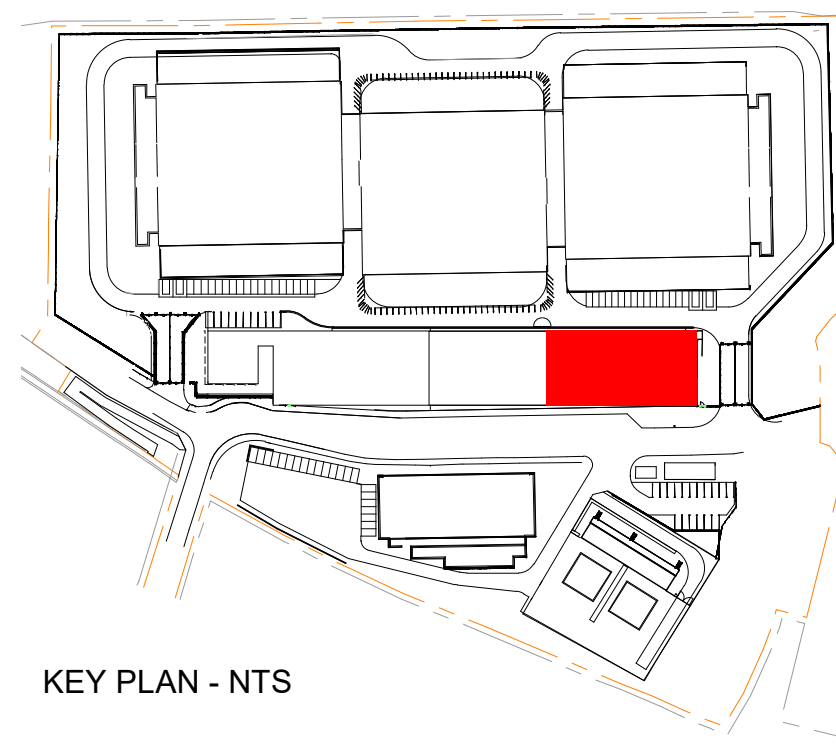
Drawn Date: 27/03/20	Drawn By: AVC
Scale: As Indicated @ A1	Approved By: NW
Drawing No: NWA-0471-SN-ZZ-DR-A-01-000	Rev: P02

**Site Location Plan**

1 : 1250







- Pedestrian Access Staff
- Cycle shelter area
- Proposed New Pedestrian crossing
- Proposed New Pedestrian crossing
- Pedestrian footpath to North Hyde Gardens bridge widened and enhanced
- Canal Link: Proposed Footpath connection - Ramp to North Hyde Gardens
- Enhanced pedestrian connection to North Hyde Gardens road
- Visitor Reception Centre 2

- Pedestrian Access Visitors
- Security Kiosk/ Sentry point
- Proposed New Pedestrian crossing
- Existing Substation
- Vodafone Mast enclosure
- Visitor Reception Centre 1

1 Site Plan 1 : 750

DO NOT Scale This Drawing Dimensions to be checked on Site.

Notes: For Structural design and calculations refer to Specialist Engineer's drawings and documentation. For Mechanical and Electrical design and calculations refer to Specialist Engineer's drawings and documentation.

No	Date	Description	By
001	2022/02/02	Issued for Stage Approval	VB
002	2022/02/02	Issued for Stage 1	AGC
003	2022/02/02	Issued for Stage 2	AGC

STAGE 4

**SWEET PROJECTS**  
ON BEHALF OF **ARK**

**NWA**  
NORTH WEST ARCHITECTS  
Architects  
Registered with the Architects Registration Board  
100, Cannon Street, London EC4A 3DF  
020 7490 7700  
www.nwaarchitects.co.uk

Union Park at Bulls Bridge

Drawing Name: A90 - External Works SW Site Plan Aerial View



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EC BUILDING 2 STEEL COLUMN SCHEDULE	
REFERENCE	SIZE
C1	UC305x305x118
C2	UC356x368x129
C3	SHS200x200x10

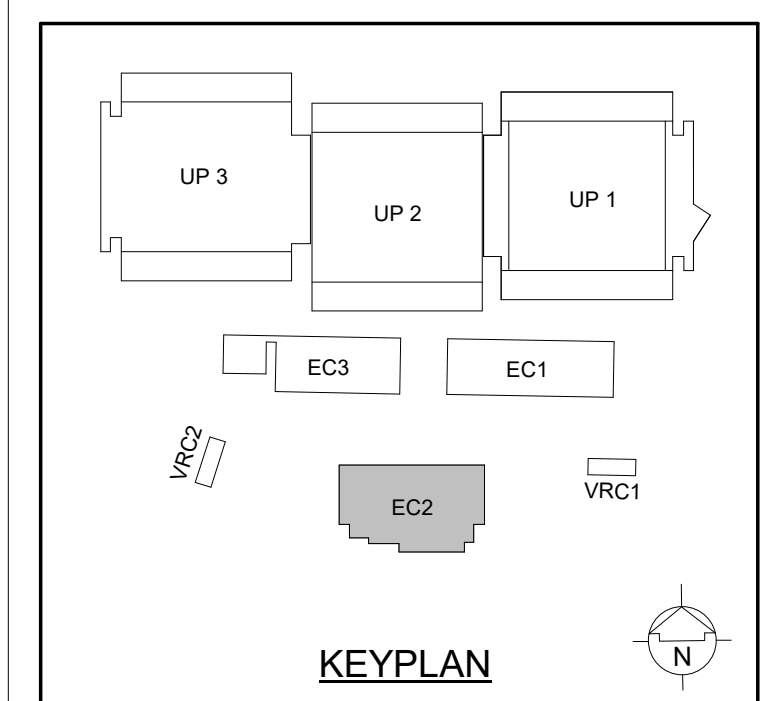
EC BUILDING 2 - CAPPING BEAM SCHEDULE	
REFERENCE	SIZE
CB1	1050x1100DP CAPPING BEAM
CB2	1050x1500DP CAPPING BEAM
CB3	1300x1100DP CAPPING BEAM

EC BUILDING 2 - RC WALL SCHEDULE		
REFERENCE	SIZE	REMARKS
W01	250mm RC WALL	WATERPROOF CONCRETE

EC BUILDING 2 STEEL BEAM SCHEDULE	
REFERENCE	SIZE
SB1	UB406x178x60
SB2	UB305x165x40
SB3	UB332x108x2
SB4	UB610x229x101
SB5	UB762x267x134

EC BUILDING 2 - GROUND BEAM SCHEDULE	
REFERENCE	SIZE
GB1	1000x1000mm RC BEAM
GB2	800x800mm RC BEAM

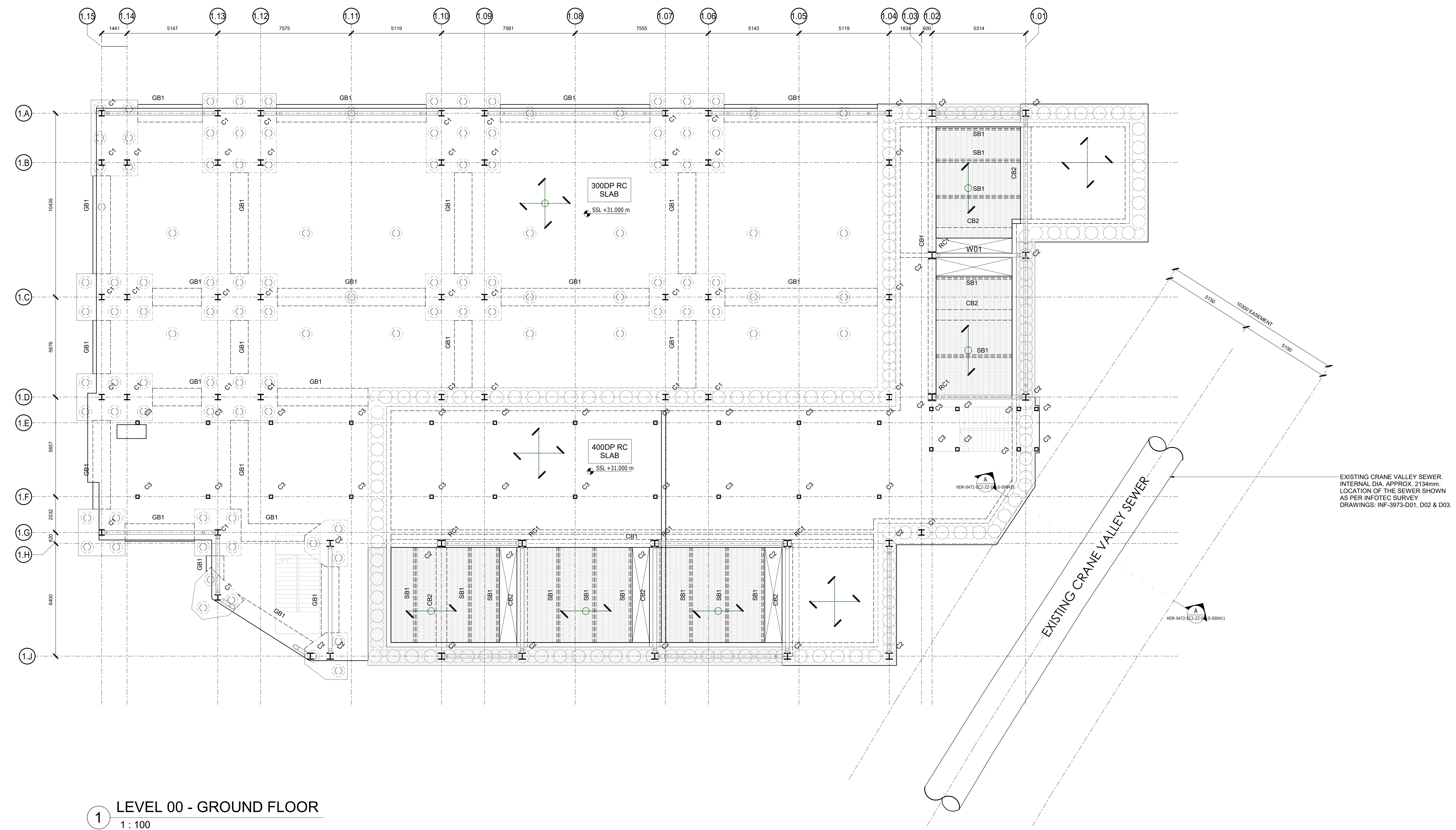
EC BUILDING 2 - PILECAP SCHEDULE	
REFERENCE	SIZE
PC01	2650x2430x1500DP
PC02	4500x4200x1500DP
PC03	4300x2650x1500DP
PC04	2650x2650x1500DP



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SLAB SCHEDULE	
	DENOTES 50mm THK OPEN STEEL GRATING PANELS. ALLOW FOR LK208P PANELS BY LIONWELD KENNEDY - 50x5 MAIN BARS, GALVANISED, MAXIMUM SPAN 2.5m.
	DENOTES 300mm THK SUSPENDED RC SLAB
	DENOTES 400mm THK SUSPENDED WATERPROOF RC SLAB

ALL GROUND FLOOR SLABS TO BE CAST ON VAPOUR RESISTANT GAS MEMBRANE ON 50mm LEAN MIX CONCRETE LAYER ON MIN. 300mm WELL COMPACTED HARDWARE SUB-BASE.



1 LEVEL 00 - GROUND FLOOR  
1 : 100

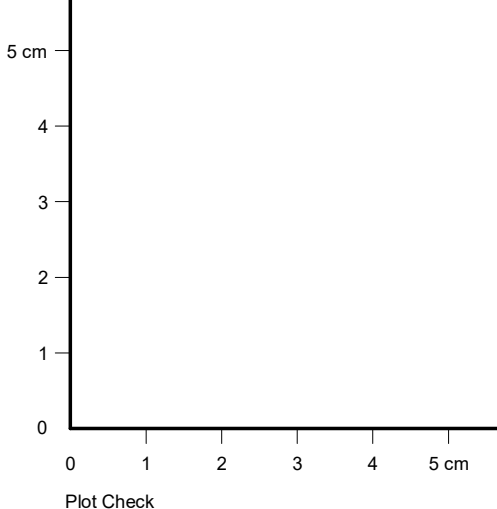
Rev	Description	Date
PO1	PRELIMINARY	23.09.22

Drawing Status: Preliminary  
Subsidiary: S3

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Architect: NWA  
Project: UNION PARK  
Title: EC BUILDING 2  
LEVEL 00 - GROUND FLOOR  
GENERAL ARRANGEMENT

HDR Project Number: 10274713	
Model Name: HDR-0472-EC2-ZZ-M3-S-000001	
Drawn: EC	Chk/Asst: AS/DC
Date: 23/09/22	Scale @ A0: 1:100
Drawing Number: HDR-0472-EC2-00-DR-S-200201	
Revision: P01	





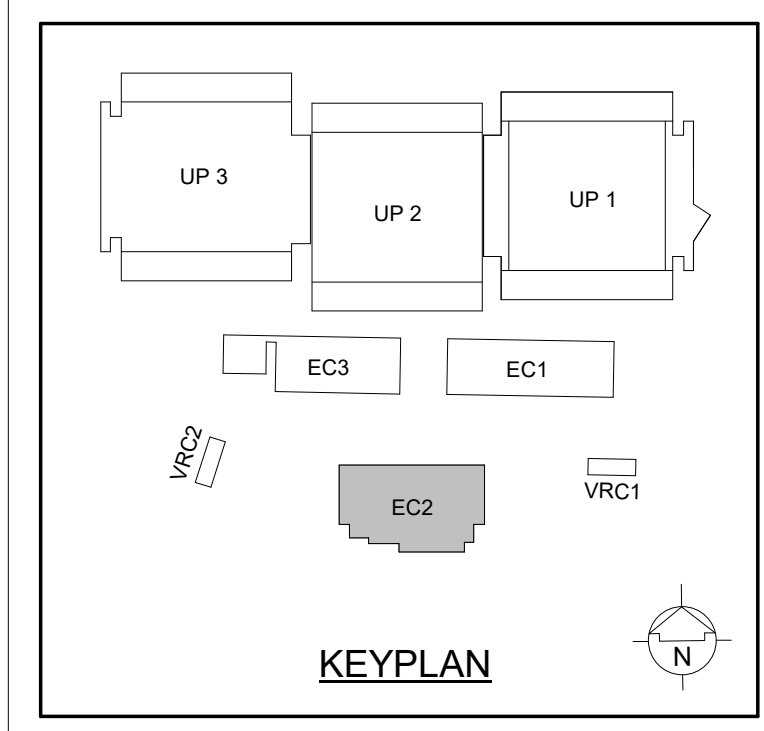
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EC BUILDING 2 - RC COLUMN SCHEDULE	
REFERENCE	SIZE
RC1	450 x 450mm

EC BUILDING 2 - RC WALL SCHEDULE		
REFERENCE	SIZE	REMARKS
W01	250mm RC WALL	WATERPROOF CONCRETE

EC BUILDING 2 - GROUND BEAM SCHEDULE	
REFERENCE	SIZE
GB1	1000x1000mm RC BEAM
GB2	800x800mm RC BEAM

EC BUILDING 2 - PILECAP SCHEDULE	
REFERENCE	SIZE
PC01	2650x2430x1500DP
PC02	4500x4200x1500DP
PC03	4350x2650x1500DP
PC04	2650x2650x1500DP

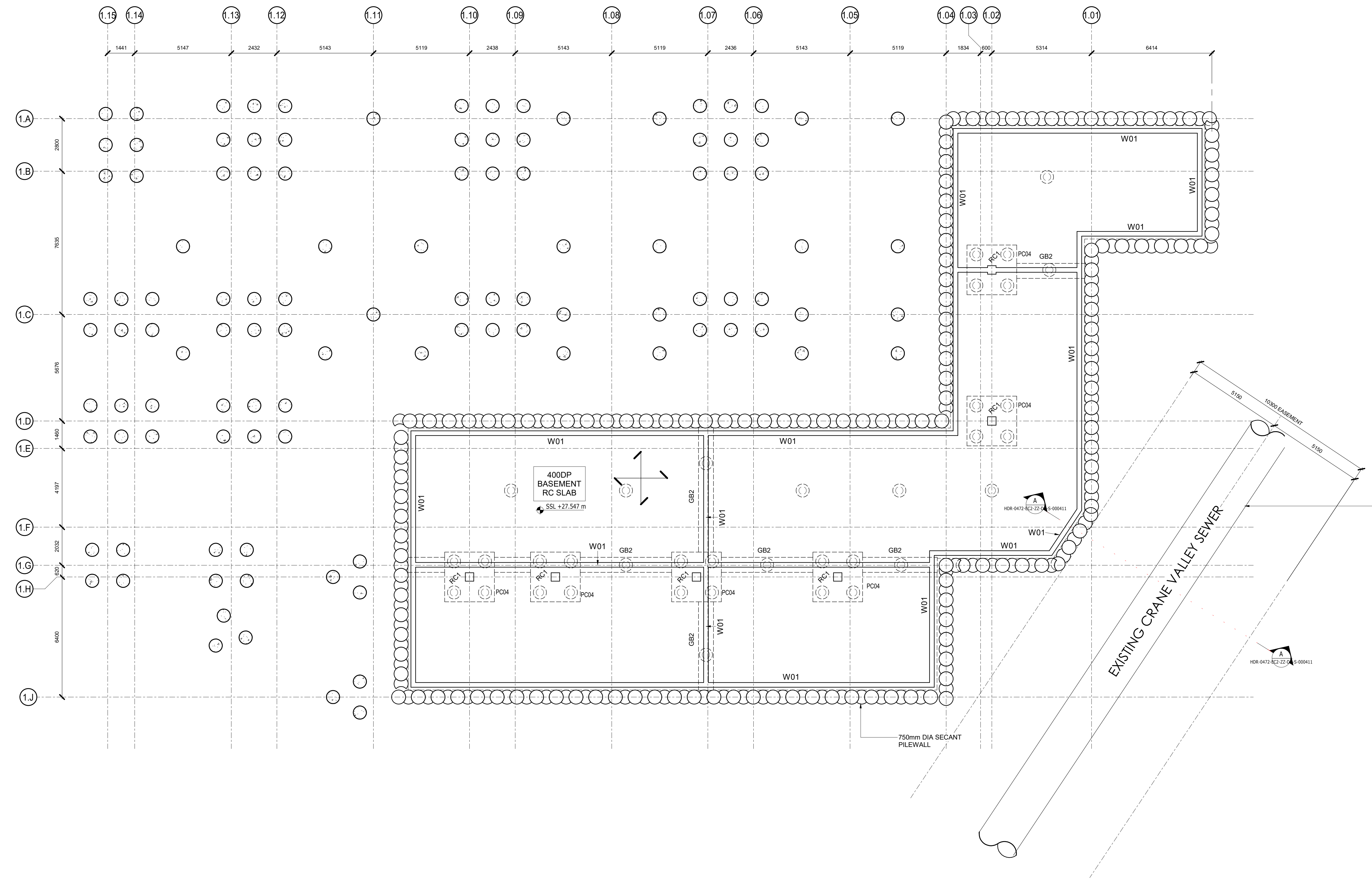


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**SLAB SCHEDULE**

↻ DENOTES 400mm THK SUSPENDED WATERPROOF RC SLAB

ALL GROUND FLOOR SLABS TO BE CAST ON VAPOUR RESISTANT GAS MEMBRANE ON 50mm LEAN MIX CONCRETE LAYER ON MIN. 300mm WELL COMPACTED HARDCORE SUB-BASE



EXISTING CRANE VALLEY SEWER  
INTERNAL DIA. APPROX. 2154mm  
LOCATION OF THE SEWER SHOWN AS PER INFOTEC SURVEY DRAWINGS: INF-3975-D01, D02 & D03.

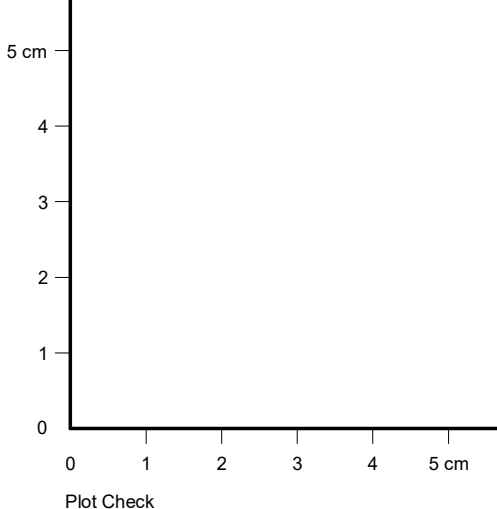
**1 CABLE CHAMBER**  
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PD1 PRELIMINARY	23.09.22
Rev	Description Date
Drawing Status:	Subsidiary:
PRELIMINARY	S3

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Architect: **NWA**  
Project: **UNION PARK**  
Title: **EC BUILDING 2  
CABLE CHAMBER  
GENERAL ARRANGEMENT**

HDR Project Number: 10274713			
Model Name: HDR-0472-EC2-ZZ-M3-S-000001			
Drawn: EC	Chk/Asst: AS/JB	Date: 23/09/22	Scale @ A0: 1:100
Drawing Number: HDR-0472-EC2-B1-DR-S-160211			Revision: P01





FOR PILE SCHEDULE REFER TO DRAWING HDR-0472-EC2-F2-DR-S-170701

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RC1	450 x 450mm

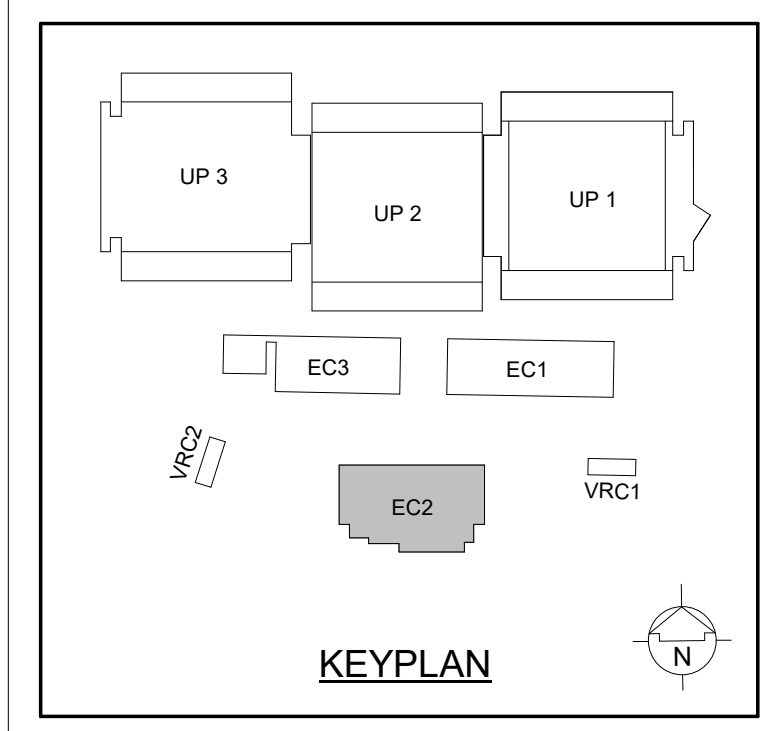
EC BUILDING 2 STEEL COLUMN SCHEDULE	
REFERENCE	SIZE
C1	UC305x305x118
C2	UC356x368x129
C3	SHS200x200x10

EC BUILDING 2 - CAPPING BEAM SCHEDULE	
REFERENCE	SIZE
CB1	1050x1100DP CAPPING BEAM
CB2	1050x1500DP CAPPING BEAM
CB3	1300x1100DP CAPPING BEAM

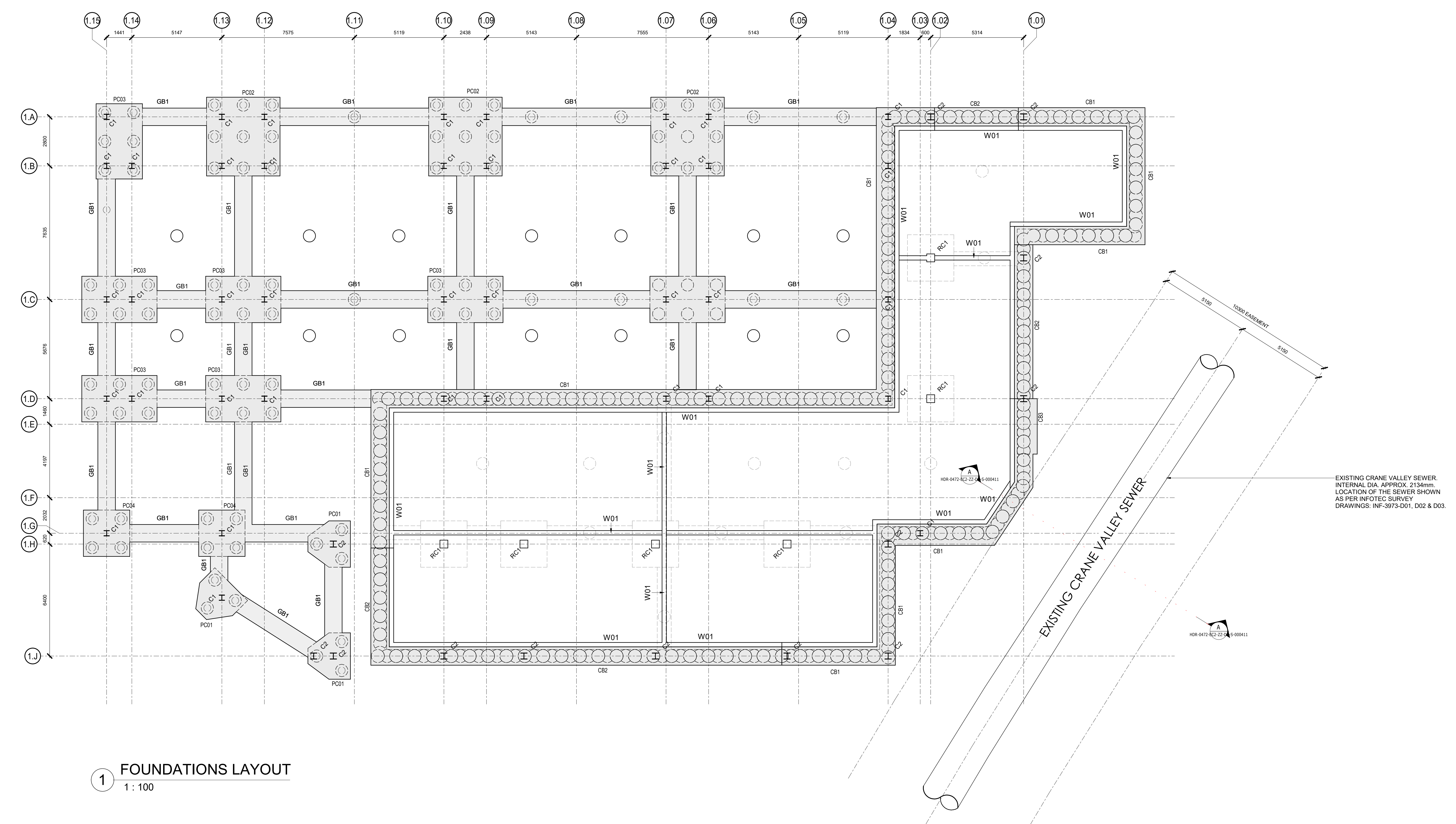
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REFERENCE	SIZE	REMARKS
W01	2500k. RC WALL	WATERPROOF CONCRETE

EC BUILDING 2 - GROUND BEAM SCHEDULE	
REFERENCE	SIZE
GB1	1000x1000mm RC BEAM
GB2	800x800mm RC BEAM

EC BUILDING 2 - PILECAP SCHEDULE	
REFERENCE	SIZE
PC01	2650x2430x1500DP
PC02	4500x4200x1500DP
PC03	4300x2650x1500DP
PC04	2650x2650x1500DP



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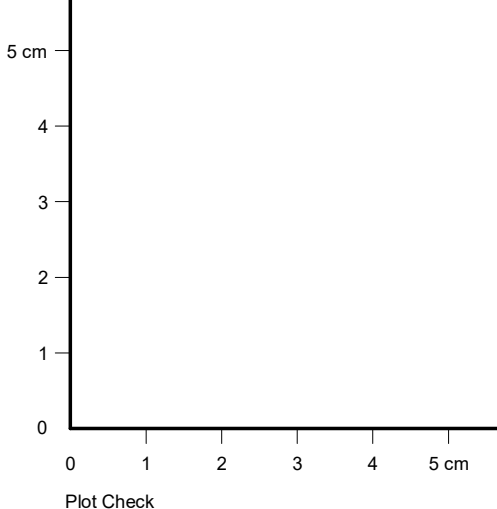
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Rev	Description Date
Drawing Status:	Submittal:
PRELIMINARY	S3

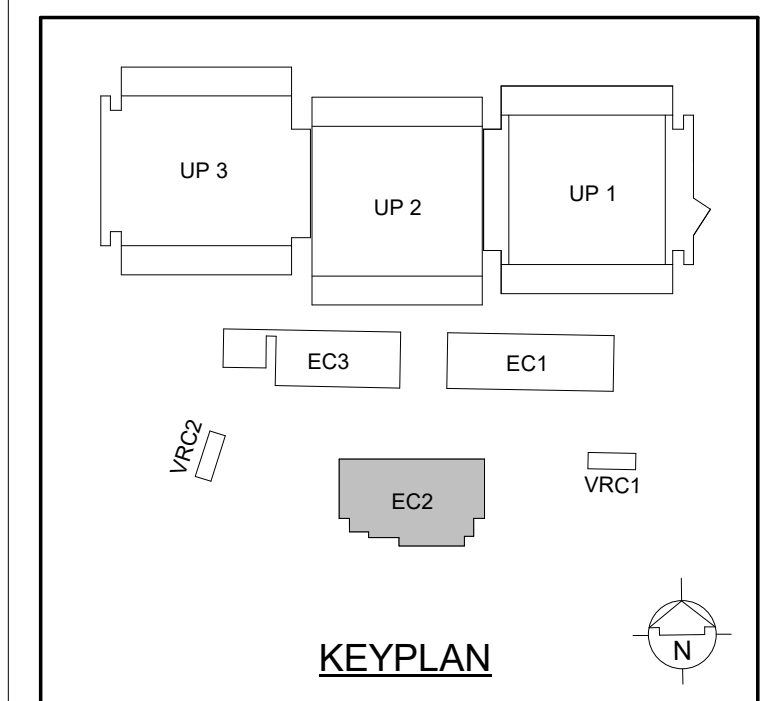
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Architect: **NWA**  
Project: **UNION PARK**  
Title: **EC BUILDING 2  
LEVEL F1  
FOUNDATIONS  
GENERAL ARRANGEMENT**

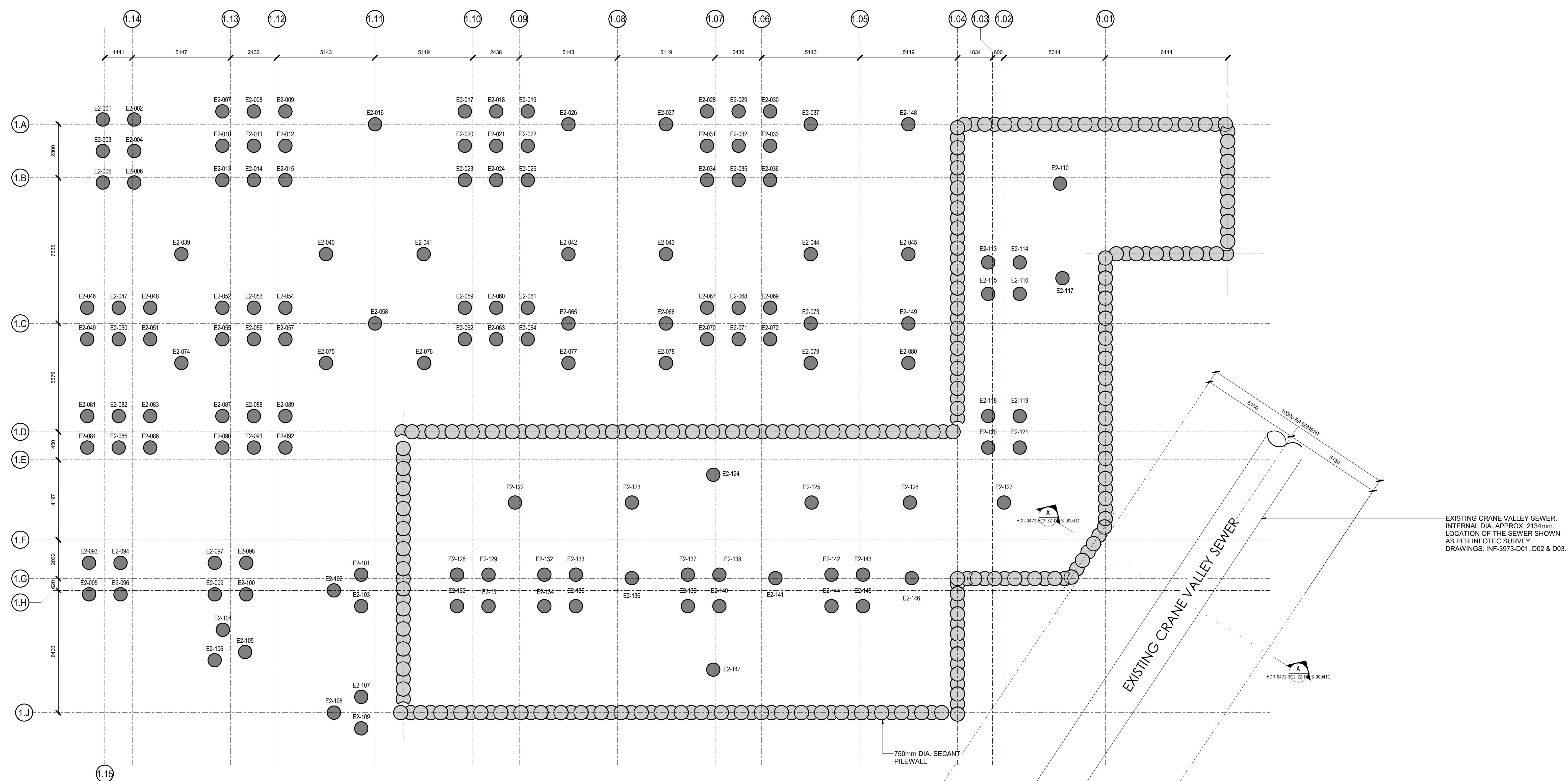
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Date: 31/07/20	Scale @ A0: 1:100
Revision:	
Drawing Number: HDR-0472-EC2-F1-DR-S-170202	
P01	







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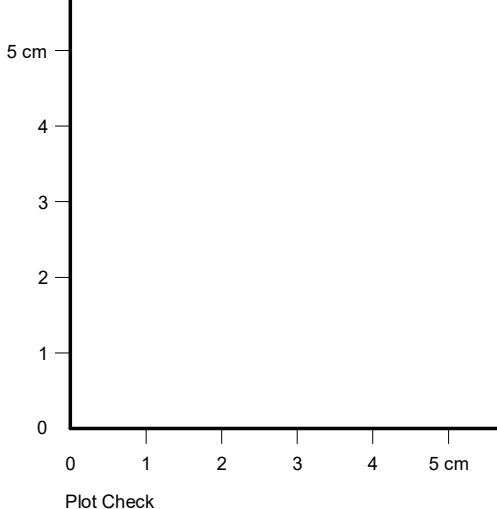
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1: 100

PO1 PRELIMINARY	23.09.22
Rev	Description Date
Drawing Status:	Subsidiary:
PRELIMINARY	S3

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Title: **EC BUILDING 2  
LEVEL F2 - FOUNDATIONS  
PILING LAYOUT  
GENERAL ARRANGEMENT**

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Drawn:	EC	Checked:	AS/JB	Date:	23/09/22	Scale @ A0:	1:100
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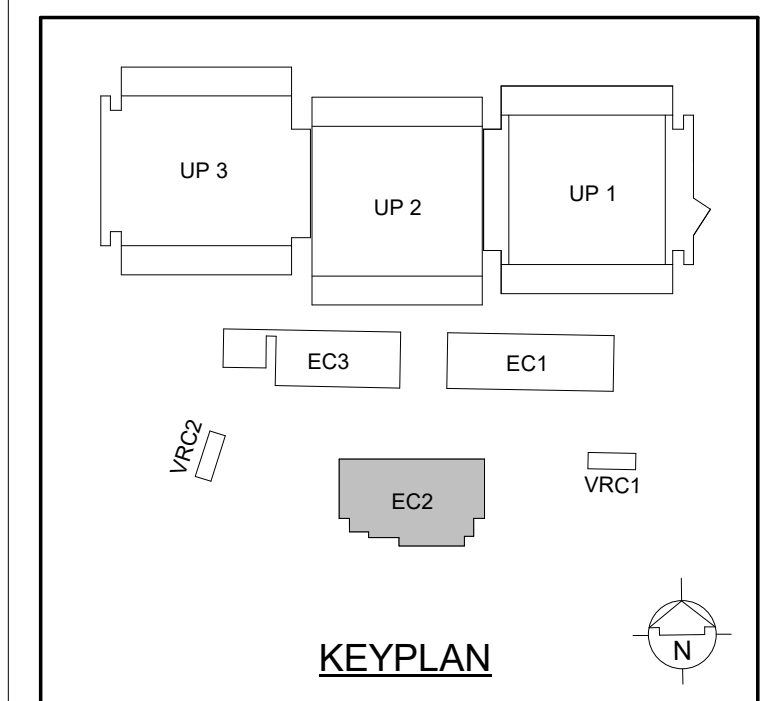




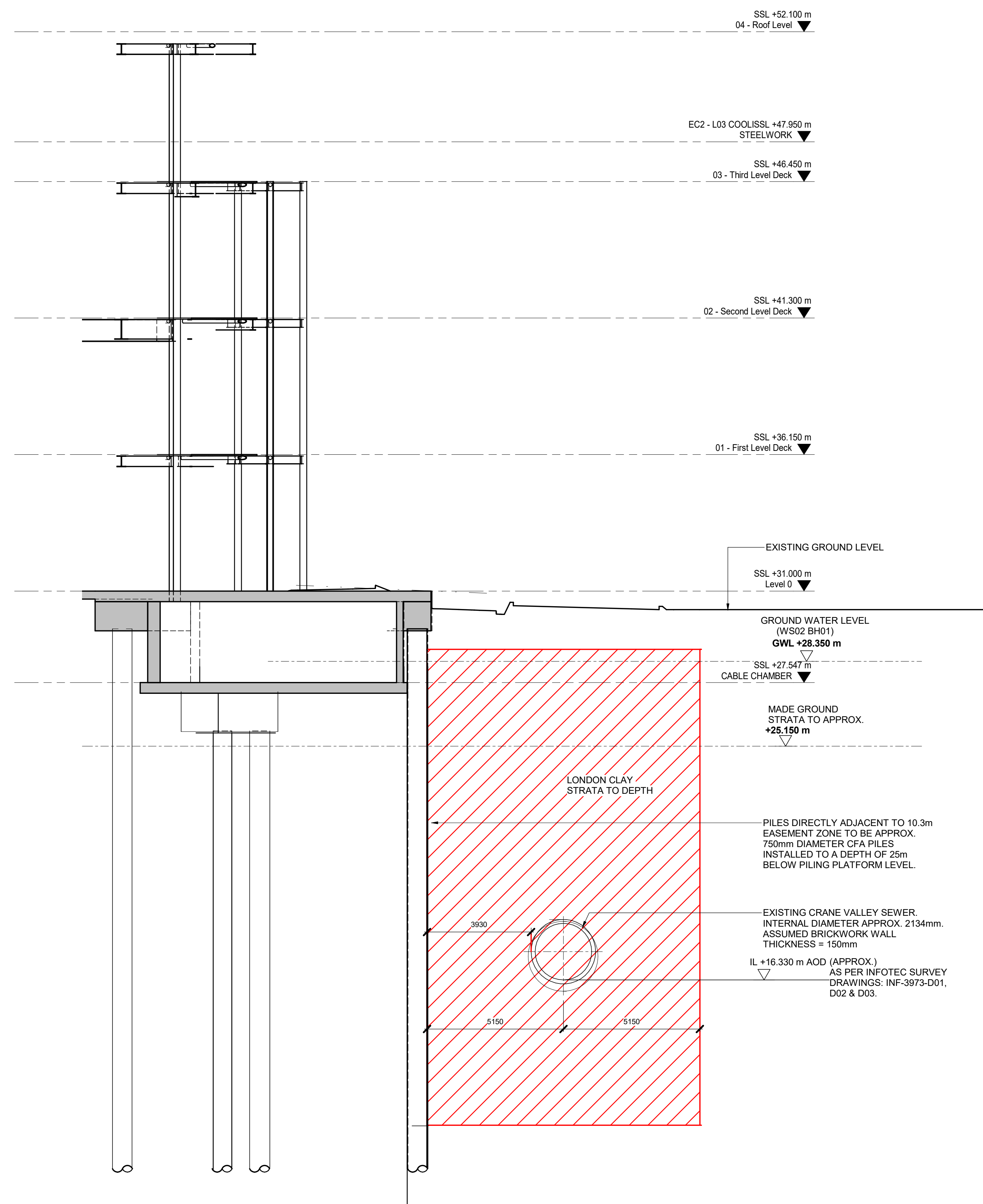
PILE SCHEDULE E2										
PILE REF.	PILE DIA. (mm)	PERMANENT LOAD (kN)	VARIABLE LOAD (kN)	WIND LOAD (kN)	WATER UPLIFT (kN)	LATERAL LOAD (kN)	CUT OFF LEVEL (mm AGD)	EASTINGS (mm)	NORTHINGS (mm)	
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E2-003	400/700	400	800	+200		50	29275	510419726	179226182	
E2-004	400/700	400	800	+200		50	29275	510421375	179226210	
E2-005	400/700	400	800	+200		50	29275	510419754	179224532	
E2-006	400/700	400	800	+200		50	29275	510421404	179224560	
E2-007	400/700	400	800	+200		50	29275	510429597	179228384	
E2-008	400/700	400	800	+200		50	29275	510427606	179228333	
E2-009	400/700	400	800	+200		50	29275	510429256	179228421	
E2-010	400/700	400	800	+200		50	29275	510429588	179226564	
E2-011	400/700	400	800	+200		50	29275	510427638	179226593	
E2-012	400/700	400	800	+200		50	29275	510429287	179228621	
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E2-016	400/700	200	400	0		50	29775	510433967	179227928	
E2-017	400/700	400	800	+200		50	29275	510438655	179228584	
E2-018	400/700	400	800	+200		50	29275	510440305	179228612	
E2-019	400/700	400	800	+200		50	29275	510441954	179228641	
E2-020	400/700	400	800	+200		50	29275	510438686	179228784	
E2-021	400/700	400	800	+200		50	29275	510440336	179228812	
E2-022	400/700	400	800	+200		50	29275	510441985	179228841	
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E2-029	400/700	400	800	+200		50	29275	510453001	179228831	
E2-030	400/700	400	800	+200		50	29275	510454651	179228860	
E2-031	400/700	400	800	+200		50	29275	510451383	179227003	
E2-032	400/700	400	800	+200		50	29275	510453032	179227031	
E2-033	400/700	400	800	+200		50	29275	510454682	179227060	
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E2-036	400/700	400	800	+200		50	29275	510454713	179225261	
E2-037	400/700	200	400	0		50	29775	510456787	179228222	
E2-039	400/700	200	400	0		50	30775	510423938	179220852	
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E2-122	400/700									



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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 HDR.
  5. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND STRUCTURAL ENGINEER'S DRAWINGS AND ASSOCIATED HDR DRAWINGS.



**A** SECTION  
1 : 100

PO1   PRELIMINARY	23.09.22
Rev	Date

Drawing Status:	Subsidiary:
PRELIMINARY	S3

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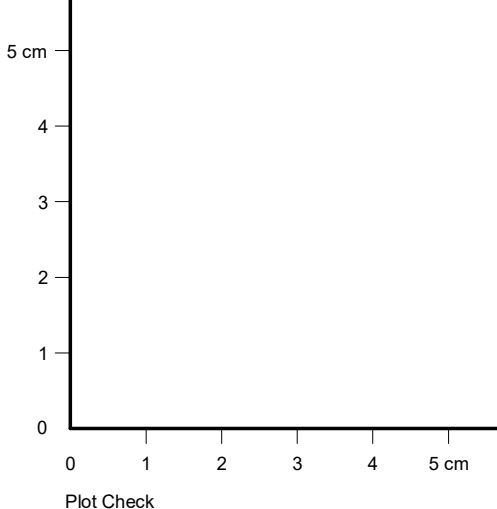
Client: SWEET PROJECTS

Architect: NWA


Project: UNION PARK

Title: EC BUILDING 2  
SECTIONS THROUGH SEWER

HDR Project Number: 10274713	
Model Name: HDR-0472-EC2-ZZ-M3-S-000001	
Drawn: EC	Chk/Asst: AS/JB
Date: 23/09/22	Scale @ A0: 1:100
Revision:	
Drawing Number: HDR-0472-EC2-ZZ-DR-S-000411	P01



## APPENDIX 2: PILING CONTRACTOR METHOD STATEMENT


	<b>METHOD STATEMENT</b>		<b>Page 1 of 6</b>
	<b>** CHD Rotary Piling **</b>		REV 1
	<b>Site Specific Method Statement</b>		Issued: 30/09/2022
<b>Contract Name:</b>	<b>EC2, Bulls Bridge, Hayes</b>	<b>Contract Number:</b>	<b>WP/20/2080</b>



**SITE SPECIFIC METHOD STATEMENT**  
**FOR**  
**PILING WORKS TO BLOCK EC2**  
**Bulls Bridge, Hayes**

**Client – Sweet Projects Holdings Ltd**

Date	Author	Checked by	Revision
<b>30.09.2022</b>	<b>ANDREW PREECE</b>		

	<b>METHOD STATEMENT</b>		<b>Page 2 of 6</b>
	<b>** CHD Rotary Piling **</b>		REV 1
	<b>Site Specific Method Statement</b>		Issued: 30/09/2022
<b>Contract Name:</b>	<b>EC2, Bulls Bridge, Hayes</b>	<b>Contract Number:</b>	<b>WP/20/2080</b>

## **Purpose and Scope**

### **Scope of works**

RB have won the piling works on the Sweet Projects site, EC2, Bulls Bridge, Hayes.

RB will install 149 CHD (400/700mm) (Continual Helical Piles) for the commercial development being constructed on the EC2, Bulls Bridge site, on Bulls Bridge, Hayes.

This method statement should be read in conjunction with Roger Bullivant standard method statements for CHD work.


Please note that this work does not cover any piling to the Visitors reception Centre No 2 located adjacent to the EC2 site as due to site constraints it is unlikely to be piled

GEN-TMS 1301 Sonic Integrity Testing  
 GEN-TMS 1318 Static Load Test  
 GEN-TMS 1321 Clearing concrete, grout pipes and blockages  
 PGI-PMS 1303 CHD Piling  
 PGI-PMS 1306 Rigging and De-rigging the Mast for 7003-6  
 PGI-PMS 1313 Loading and Unloading Rigs  
 PGI-PMS 1316 Unloading Piling Materials  
 PGI-PMS 1317 Preparation of the Pile Head for Static Load Testing (Wet Cast Pile)

## **1.0 Health and Safety Controls**

### **Piling works**

- All piling works will be undertaken in line with company procedures listed above.
- Prior to mobilisation of the piling equipment, the principle contractor will be issued with the details of the machine and any ancillary equipment to be used. Specifically, the maximum bearing pressures will be given so that the piling platform can be designed and built.
- All personnel associated with the piling works and any others on site affected by the piling works will be briefed on the method statements and risk assessments and a briefing sheet signed to show receipt and understanding of the briefing.
- All personnel will undertake the site briefing.
- All personnel will have proof of training and competency at the induction and available for inspection throughout the contract.
- All certification for the machine and any lifting apparatus will be given up for inspection.
- All personnel will be issued and wear appropriate P.P.E in line with company instructions. Task specific P.P.E will be issued and worn as the need arises as identified by the risk assessment.

	<b>METHOD STATEMENT</b>		<b>Page 3 of 6</b>
	<b>** CHD Rotary Piling **</b>		REV 1
	<b>Site Specific Method Statement</b>		Issued: 30/09/2022
			<b>XXX- XMS XXXX</b>
<b>Contract Name:</b>	<b>EC2, Bulls Bridge, Hayes</b>	<b>Contract Number:</b>	<b>WP/20/2080</b>


- Prior to the rig arriving on site, a platform certificate will be issued in line with the company work instruction document Working Platform and FPS Certificate (GEN-WID 1044)
- Prior to work starting, the area for piling will be inspected for buried and overhead services. The principle contractor will be asked for service drawings and details of known services, an RB permit to dig (GEN-SFD 1042) will be issued and will run parallel to any permit issued by the principle contractor.
- The boom pump will be placed at the furthest possible place away from the railway, so that if the boom pump was to topple, it would not do so onto the railway.
- All site access and egress arrangements along with traffic routes will be made known by the principle contractor, so that site deliveries of plant and materials can be arranged.
- Specific details of the piling operation can be found in the company standard method statements detailed above.
- Details of the rig orientation from the line standard are detailed.

## **2.0 Pre-work 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.
- **Lifting Operations and Lifting Equipment Regulations 1998:**
- **Provision and Use of Work Equipment Regulations 1998:**
- 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.
- 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.
- All plant will come under the PUWER regs. No certifications are required, but the service history is available when requested.

## **3.0 Fabricating of Steel**

- The cages will be made off site by Sub-Contractor steel fixers and delivered to site.
- 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 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.
- The steel fixer will remove the 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.

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	** CHD Rotary Piling **		REV 1
	<b>Site Specific Method Statement</b>		Issued: 30/09/2022
<b>Contract Name:</b>	<b>EC2, Bulls Bridge, Hayes</b>	<b>Contract Number:</b>	<b>WP/20/2080</b>

- 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.
- When completed they will remove the cage from the stands and place it on the floor.
- If making heavy cages, 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.
- 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.

#### **4.0 Storage of Equipment**

- The piling rig will be banked into 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.
- 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.

#### **5.0 Factors to be considered.**

##### **5.1 Ground conditions**

All platforms will be designed using information supplied by RB. All platforms will be at least 2m larger than the footprint on the planned building so that the piling rig can access from any side of the pile position. Platforms will regularly be inspected and returned to their designed state by the principle contractor.


Areas for storage and plant assembly will also be subject to inspection to prevent any unplanned incidents. No storage or assembly will take place in the area deemed by NWR as on or near the line. All platforms should be designed and constructed with suitable drainage to prevent flooding or the platform surface being obscured by lying water.

5.2 Limitations to movement (lateral, heave or settlement), these being specified at an early stage, together with any noise and/or vibration limits, as these will have an ultimate bearing on the method selected. It is noted that the effects of vibration are particularly important where driven, displacement or vibratory piling techniques are being proposed.

The method being proposed is a displacement rather than replacement method for environmental reasons. The piling solution and ground conditions indicate that there will be no ill effects to the railway infrastructure or the permanent way.

All works will be undertaken in daylight hours and noise will only be normal in respect of the piling operation.



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	** CHD Rotary Piling **		REV 1
	<b>Site Specific Method Statement</b>		Issued: 30/09/2022
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Vibration will be monitored if there is any suspicion that there may be damage to the rail infrastructure.

### 5.3 The effect of ground displacement and/or soil loosening

The piling method has been identified as compatible with the ground conditions shown up by the site investigation and will have a minimal affect on ground conditions in relation to heave or loosening, the contrary is expected, and the ground should tighten as a result of the piling operation.

5.4 The frequency and speed of trains can in certain situations are considered to be a factor. This can also include standing trains adjacent to the works, for example in sidings or platforms.

All works deemed on or near the line by NWR will be done under their control. Suitable time will be given so that a safe system of work can be established, implemented, and briefed. Any work that may impinge or have an impact on the railway will be done under the control of NWR, notice of the works will be given in suitable time so that train drivers can be warned of the piling working near the line at the given location.

The nearest structure to the work location is the underbridge on Bognor Rd Chichester ELR: TBH2 27m 44ch.

## 6.0 Environmental Controls

### Noise

All piling works will be done in normal working hours (08.00 – 18.00), any works done out Side these hours will be authorised by the principle contractor.

P.P.E will be issued and worn by all working in the vicinity of the machine in line with the Warning signs posted on the machine.

### Vibration

Vibration can be monitored if requested, if vibration is causing or suspected of causing damage to the railway or infrastructure, work will stop until a seismograph is on site to measure the levels of vibration from the piling operation.

### Refuelling and storage of fuel


All fuel will be stored in double bunded bowsers with the bund capable of storing 125% of the bower capacity, the bund is enclosed so rainwater will not be able to collect.

All fuel stored on site will be stored at least 10m from any drain and 50m from any open Hole.

All refuelling of plant will be done using a pump, with spill kits at the point of refuelling, no pouring from buckets or containers will be permitted.

### Spoil and muck away

This method of piling has been selected because it does not generate spoil, the ground

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been identified as contaminated so the risk of contaminated spoil being moved on and off site has been negated.

Contaminated Spoil

Although the piling method does not generate spoil, all personnel will wear P.P.E at all times, no consumption of food will be done on site and the need for washing of hands must be emphasised.

**7.0 Method and/or Process**

Specific details of the piling process are detailed in the company method statements for CHD Piling listed

- GEN-TMS 1301 Sonic Integrity Testing
- GEN-TMS 1318 Static Load Test
- GEN-TMS 1321 Clearing concrete, grout pipes and blockages
- PGI-PMS 1303 CHD Piling
- PGI-PMS 1306 Rigging and De-rigging the Mast for 7003-6
- PGI-PMS 1313 Loading and Unloading Rigs
- PGI-PMS 1316 Unloading Piling Materials
- PGI-PMS 1317 Preparation of the Pile Head for Static Load Testing (Wet Cast Pile)

## APPENDIX 3: EXTENT OF SURVEY AND LIMITATIONS

## EXTENT OF SURVEY AND LIMITATIONS

This report is for your sole use, and consequently no responsibility whatsoever is undertaken or accepted to any third party for the whole or any part of its contents. Paragon accept no responsibility or liability for the consequences of this document being used for any purpose or project other than for which it was commissioned or a third party with whom an agreement has not been executed. Should any third party which to use or rely upon the contents of the report, written approval must be sought from Paragon, a charge may be levied against such approval.

The report has been designed to address potential source, pathway and receptor pollutant linkages associated with the proposed development, by means of intrusive investigation. The content and findings of the report are based on data obtained by employing site assessment methods and techniques, considered appropriate to the site as far as can be interpreted from desk-based materials and a visual walkover of the site. Such techniques and methods are subject to limitations and constraints set out in the report. The findings and opinions are relevant at the time of writing, and should not be relied upon at a substantially later date as site conditions can change. For example, seasonal groundwater levels, natural degradation of contaminants etc.

No liability can be accepted for the conditions that have not been revealed by the exploratory hole locations, or those which occur between each location. Whilst every effort will be made to interpolate the conditions between exploratory locations, such information is only indicative and liability cannot be accepted for its accuracy. By their nature, exploratory holes provide a relatively small and localised snapshot of the ground conditions relative to the size of the site.

Specific comment is made regarding the site's status under Part 2A of the Environmental Protection Act (EPA) 1990, which provides a statutory definition of Contaminated Land and as revised under The Contaminated Land (England) (Amendment) Regulations 2012. Unless specifically stated as relating to this definition, references to 'contamination' and 'contaminants' relate in general terms to the presence of potentially hazardous substances in, on or under the site.

The opinions given within this report have been dictated by the finite data on which they are based and are relevant only to the purpose for which the report was commissioned. If additional information or data becomes available which may affect the opinions expressed in this report, Paragon reserves the right to review such information and, if warranted, to modify the opinions accordingly. Paragon reserves the right to charge additional fees for; un-anticipated second opinion reviewing of previous reports.

Paragon has prepared this report with reasonable skill, care and diligence. The recommendations contained in this report represent our professional opinions. These opinions were arrived at in accordance with currently accepted industry practices at this time. The work undertaken to provide the basis of this report comprised a study of available documented information from a variety of sources. We cannot provide guarantees or warranties for the accuracy of third-party data, which is reviewed in good faith and assumed to be representative and accurate.

It should be noted that any risks identified in this report are perceived risks based on the information reviewed. 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. The risk assessment is completed in line with the relevant land use agreed for the site and the time of completing the works. Changes to site conditions or land use may require a reassessment.

## DEFINITIONS

For the avoidance of doubt, Paragon Building Consultancy Limited (Paragon) has prepared the following alphabetical list of definitions and reservations to aid the client in understanding the content of our advice and or written reports(s):

Accuracy	Level of agreement between true value and observed value.
ACM's	Asbestos Containing Materials
Conceptual Site Model	Textual and or schematic hypothesis of the nature and sources of contamination, potential migration pathways (including description of the ground and groundwater) and potential receptors, developed on the base of the information from the preliminary investigation and refined during subsequent phases of investigation and which is an essential part of the risk assessment process.  <b>Note 1:</b> The conceptual exposure model is initially derived from the information obtained by the preliminary investigation. This conceptual model is used to focus subsequent investigations, where these are considered to be necessary, in order to meet the objectives of the investigations and the risk assessment. The results of the field investigation can provide additional data that can be used to further refine the conceptual model.
Contamination	Presence of a substance which is in, on or under land, and which has <u>the potential</u> to cause significant harm or to cause significant pollution of controlled water.  <b>Note 1:</b> There is no assumption in this definition that harm results from the presence of the contamination.  <b>Note 2:</b> Naturally enhanced concentrations of harmful substances can fall within this definition of contamination.  <b>Note 3:</b> Contamination may relate to soils, groundwater or ground gas.
Controlled Water	Inland freshwater (any lake, pond or watercourse above the freshwater limit), water contained in underground strata and any coastal water between the limit of highest tide or the freshwater line to the three-mile limit of territorial waters.  <b>Note 1:</b> See Section 104 of The Water Resources Act 1991.
Enquiries	Any enquiries undertaken by Paragon of local authorities and statutory undertakers are made verbally in respect of environmental issues. Local searches are not undertaken and no responsibility is accepted for any inaccurate information provided. It is further assumed unless otherwise stated that all necessary licences, permits etc. either run with the property or are transferable to a new occupier as appropriate.
Harm	Adverse effect on the health of living organisms, or other interference with ecological systems of which they form part, and, in the case humans, including property.
Hazard	Inherently dangerous quality of a substance, procedure or event.
Pathway	Mechanism or route by which a contaminant comes into contact with, or otherwise affects, a receptor.
Precision	Level of agreement within a series of measurements of a parameter.
Receptor	Persons, living organisms, ecological systems, controlled water, atmosphere, structures and utilities that could be adversely affected by the contaminant(s).

Risk	Probability of the occurrence, magnitude and consequences of an unwanted adverse effect on a receptor.
Risk Assessment	Process of establishing, to the extent possible, the existence, nature and significance of risk.
Sampling	Methods and techniques used to obtain a representative sample of the material under investigation.
Soil	<p>Upper layer of the earth's crust composed of mineral parts, organic substance, water, air and living matter.</p> <p><b>Note 1:</b> In general accordance with BS 10175:2001 the term soil has the meaning ascribed to it through general use in civil engineering and includes topsoil and subsoil; deposits such as clays, silt, sand, gravel, cobbles, boulders and organic deposits such as peat; and material of natural or human origin (e.g. fills and deposited wastes). The term embraces all components of soil, including mineral matter, organic matter, soil gas and moisture, and living organisms.</p>
Source	<p>Location from which contamination is, or was, derived.</p> <p><b>Note 1:</b> This could be the location of the highest soil or groundwater concentration of the contaminant(s).</p>
Uncertainty	Parameter, associated with the result of a measurement that characterises the dispersion of the values that could reasonably be attributed to the measurement.

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