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Bouygues (U.K.) Limited
Becket House
1 Lambeth Palace Road
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SE1 7EU
Monday 8th September 2025

UNEXPLODED ORDNANCE RISK MITIGATION PLAN

West Park and Birks Grange, University of Exeter

Brimstone Site Investigation (Brimstone) manages and mitigates unexploded ordnance (UXO) risks using industry leading processes and technologies to ensure the safety of all construction, development, geological, and defence projects. Brimstone implements services depending on the UXO risk, the ground conditions, and the proposed ground intrusions, reducing the risk to a satisfactory and tolerable level in accordance with the ALARP 'as low as reasonably practicable' risk mitigation principle.

Following the conclusion of a Brimstone presented stage 2 detailed UXO risk assessment, reference: DRA-21-1255 and issue date 16th July 2021, an elevated risk of encountering UXO has been identified. The elevated risk has been deemed as 'moderate' across the entirety of the assessed parcel of land. This risk rating is seen as intolerable in accordance with industry guidance (CIRIA C681) meaning proactive on-site risk mitigation services must be employed to reduce the risk to a tolerable level to appease the ALARP principle.

The time lapsed between the presentation of the detailed risk assessment (DRA-21-1255) and this issuing of this report is roughly four-years and two-months. The contents of DRA-21-1255 and the associated conclusions remain valid and accurate. Principally, this is because the desk top study assessment approach uses 1940s dated research variables and parameters to conclude the UXO risk. The main variable that may have reduced the risk from July 2021 to present day is groundworks and associated ground disturbance, however Brimstone has been made aware that much of the site has remained largely unchanged.

Site Specific UXO Risk

When assessing UXO risk, Brimstone considers all potential risk sources from German, British, and Allied activities, before providing a risk level for each ordnance category. The intolerable risk for West Park and Birks Grange is German airdropped weapons and specifically high explosives bombs. All other types of ordnance have been assessed as carrying a tolerable risk (low or low-moderate).

Table 1: UXO risk table.

Risk Table				
UXO TYPE (ASSOCIATED HAZARD)	LIKELIHOOD OF UXO CONTAMINATION	LIKELIHOOD OF UXO REMAINING	LIKELIHOOD OF ENCOUNTER	OVERALL RISK RATING
WWII German 'Iron' Bombs	Moderate	Moderate-High	Moderate	Moderate
WWII British Heavy Anti-Aircraft Shells	Low-Moderate	Low-Moderate	Moderate	Low-Moderate
WWII British Land Service Ammunition	Low	Low	Low	Low
WWII German 2kg Incendiary / HE Bombs	Low-Moderate	Low-Moderate	High	Low-Moderate
WWII German 1kg Incendiary Bombs	Low-Moderate	Low-Moderate	High	Low-Moderate
WWII British Light Anti-Aircraft Shells	Low	n/a		Low

The area assessed and concluded as carrying a moderate risk covers the entirety of West Park and Birks Grange and within the assessment boundary.

Figure 1: detailed risk assessment boundary.

General Recommendations for Site-Based Services

In conformance with industry guidelines Brimstone undertakes recognised and approved site-based services to continue the UXO risk mitigation process. These services are recommended based on three key indicators, UXO risk, ground conditions, and proposed ground intrusions.

Table 2: recommended risk mitigation measures.

Risk Mitigation Measure	Recommendation
UXO Safety Awareness Briefing	Prior to all intrusive works commencing.
EOD Engineer - On Site Supervision (Watching Brief)	During all open excavations within undisturbed World War Two (WWII) ground.
Intrusive Magnetometer Probe Survey	At all pile positions that will be installed into undisturbed WWII ground.

A brief explanation of each deliverable is as follows:

Safety awareness briefing

Delivered by a fully qualified and experienced explosives engineer, this session will be around 60-minutes in duration and include a presentation and follow up question and answer for all attendees. The toolbox talk will briefly outline the features and characteristics of the type of ordnance posing a risk to the specific site before running through means of identification and response should any suspicious items be identified. As a bare minimum, it is recommended that a briefing is delivered to all site management for the principal contractor and all site operatives for the groundworks contractor, though all site attendees will find the briefing informative. Following the session, all attendees will name and sign the attendance sheet, and the presentation will be issued to the primary point of contact for the project. Within this document, a generic toolbox talk presentation has been includes that Brimstone regularly delivers to site operatives, noting that the location, site conditions, works activities will be specific for the operatives and the operations they are undertaking.

Watching brief supervision

Whilst excavating in undisturbed wartime ground an advanced explosives engineer will be deployed to site to supervise all groundworks. Initially, the engineer will deliver a safety brief followed by the overseeing of excavations within ground that carries a risk of UXO. Given the supervisory nature of this undertaking there will be no extension to proposed groundworks programme(s) because of the presence of a UXO engineer. It is recommended that an explosives engineer is present for all new intrusions but not follow on activities, such as backfilling or muck-away. The total time on site will largely depend on the duration of the groundworks in risky soils but the UXO engineer will work proactively with the client to ensure that all deployments are necessary and fully justifiable. Brimstone is primary concerned with all excavations that are undertaken with machine power, rather than hand digging. This may include, but is not limited to, trenching, reduced level digging, cut-and-fill, grading and profiling, topsoil stripping, and digging prior to the installation of foundations, basements and other works associated with new developments. The watching brief will be deployed when the contractor breaks ground in the elevated risk areas around the project during November and December 2025

Intrusive magnetometer probe survey

Deploying a cone penetrometer testing (CPT) rig equipped with a magnetometer sensor, each pile location, pile cap, or pile/secant wall will be methodically probed prior to piling activities. The radius of each survey is two-metres from the probe tip omni-directionally, meaning it is often possible to capture multiple piles with a single survey. The duration on site ultimately depends on the number of probes required to survey all proposed pile locations to maximum bomb penetration depth of maximum depth of the piles, whichever is shallower. All Brimstone rigs are fully tracked, so the machine can also operate when the site is at formation level. If a piling mat is due to be installed prior to deployment, Brimstone can penetrate up to 500mm of compacted crushed stone with 95% assurance or 750mm with 60% assurance that the probe will break

through. Our probe will also be able to push through any geotextile layers, leaving a small hole at ground level with no arisings created.

Brimstone completes an average of twenty UXO intrusive probes per day. Brimstone will deploy in phases and over multiple visits and probing will be sequenced depending on the construction programme. For any given batch of surveys, Brimstone will probe in advance of piling commencing, but after the site has been levelled with a maximum gradient of ten percent. The client will also be in receipt of all post-survey reports prior to the commencement of piling.

Site Specific Considerations

A significant variable to consider when planning site-based UXO risk mitigation is alterations to the site between the cessation of wartime activities and present day. During and immediately after World War II (WWII) the site was recorded as being a predominately natural and open ground space, sloping upwards from west to east, away from the rail infrastructure.

Figure 1: high-resolution aerial imagery in 1947.

Since the wartime era, the site has witnessed significant volumes of ground manipulation, in the form of cut-and-fill earthworks and construction to develop the existing campus buildings that are currently used as student accommodation and associated built features. Considering the changes in levels and the developmental works, Brimstone can confirm that the shallow buried risk of unexploded ordnance has been significantly mitigated in areas of made ground or reworked natural ground. There remains a UXO risk in areas of undeveloped ground at surface level and also the natural ground beneath post-WWII imported or reworked natural ground to a theoretical maximum bomb penetration depth of 12m.

Figure 2: a broad outline of areas on site that have remained completely undeveloped.

Site Specific UXO Risk Mitigation Services

Since much of the top layers of ground have been installed or manipulated since WWII, Brimstone recommends that the most prudent way to mitigate the UXO risk is as follows:

- Safety awareness briefing for all site personnel.
- Intrusive magnetometer probe survey prior to all piling activities.
- Watching brief supervision during excavations in all undisturbed wartime ground.

Brimstone has overlaid a series of survey circles on to the general arrangement drawings for all piles, including the pile wall and kingposts, and recommends being in attendance for all deeper (350mm plus) excavations in the areas highlighted in Figure 2.

If these recommended measures are completed the UXO risk will change and will reduce in accordance with ALARP.

Table 3: UXO risk following site-based mitigation

UXO TYPE (ASSOCIATED HAZARD)	LIKELIHOOD OF UXO ENCOUNTER DURING EXCAVATIONS	LIKELIHOOD OF UXO ENCOUNTER DURING PILING
WWII German 'Iron' Bombs	Moderate	Low
WWII British Heavy Anti-Aircraft Shells	Low-Moderate	Low
WWII British Land Service Ammunition	Low	Low

WWII German 2kg Incendiary / HE Bombs	Low-Moderate	Low
WWII German 1kg Incendiary Bombs	Low-Moderate	Low
WWII British Light Anti-Aircraft Shells	Low	Low

To reiterate, CIRIA C681 states that any risk that is low-moderate or lower is deemed to be tolerable with no further site deployment required. Once all UXO risk mitigation works are completed, Brimstone will issue a report that outlines the work undertaken and certification of clearance. Specifically regarding the West Park and Birks Grange scheme, as many as six visits are planned for intrusive survey element of UXO risk mitigation. Considering the long development programme, Brimstone will ensure that interim reports are issued for each visit or block, whichever is larger, and in advance of piling activities commencing. All watching brief deployments will be underpinned by annotated daily work records that will be signed by the client.

UXO Response

When undertaking recommended site services, an item of UXO may be encountered. The services proposed in this risk management plan will ensure that any exposed items of UXO are done so in the safest and the most controlled manner possible. Brimstone has disposed of over 200,000 live, inert, and scrap items since the company was incorporated in 2016. Brimstone has developed a simple, concise, and robust emergency response plan for when an item of ordnance is discovered on a UK construction site. Brimstone positions itself as a UXO risk mitigation company who has employed suitably qualified and experienced individuals into managerial and site-based roles, all of whom are located at strategic points around the UK to ensure that the services delivered on site are suitable to all and any UXO response irrespective of location.

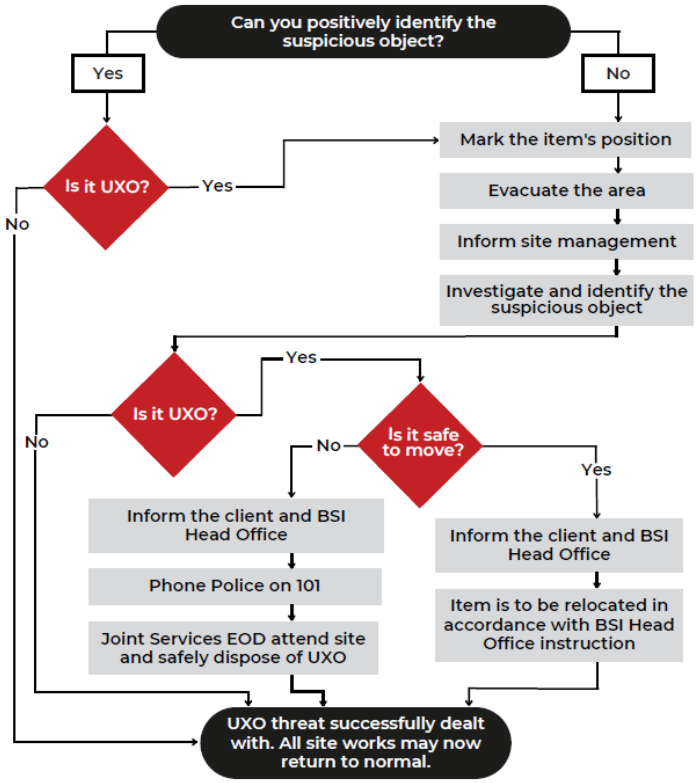

Figure 3: UXO discovery flow diagram.

Joint Services Explosive Ordnance Disposal (EOD) Team

Typically, once an item of UXO has been discovered that is live and therefore unsafe to move by Brimstone, then joint services EOD teams will be contacted via the police and will be subsequently deployed to site. Upon arrival to site, joint services EOD will complete an in-situ dynamic risk assessment to determine the most suitable method to dispose of the item. Variables that will be considered include, but are not limited to:

- The size of the item,
- The net explosive quantity contained within the ordnance,
- The volatility of the item,
- The location of the item, relative to public infrastructure,
- The wider area to determine if there is a suitable demolition area.

Once the outcome of the dynamic risk assessment has been concluded then a suitable removal or demolition plan will be initiated, with one of the following scenarios being assigned:

- Complete removal from site.
- Demolition in the location where the item was discovered.
- Demolition of the item in a nearby location.

Brimstone will work closely with joint services EOD and key stakeholders for the scheme, university, and local area to ensure that all progressive next steps are communicated concisely.

Considering the proposed development works, the greatest risk posed to the public and private infrastructure is a demolition of the item in the location that it is discovered. This method of disposal is a last resort and will only be engaged if absolutely necessary, and likely because the item is too big and/or volatile to move safely.

Disposal of Ordnance

In accordance with company and industry standard operating procedures, Brimstone will always contact the police if a live item of ordnance is unearthed. There may be instances where joint services EOD is unable to attend site, however Brimstone has the experience and qualifications to undertake explosive demolitions of ordnance.

- Cowden case study: www.brimstoneuxo.com/case-study/cowden
- Burntwood case study: www.brimstoneuxo.com/case-study/burntwood
- Wooler case study: www.brimstoneuxo.com/case-study/wooler

Brimstone has developed a robust live demolition plan, underpinned by an ISO9001 accredited risk assessment and method statement document. A key determinant of a successful demolition is the correct protective works and safety distances, and this is governed by the document 'Joint Services Publication 364' (JSP364). As a commercial UXO risk mitigation company, Brimstone will always go over and above JSP364 in the development of the demolition plan.

Figure 4: a demolition area built during a previous project.

Brimstone will only take over the disposal of an item if instructed to do so by joint services EOD, and it is only joint services EOD who make this decision. However, throughout the process Brimstone will work with joint services EOD to ensure that the correct protective works and safety cordons are put in place to ensure that any damage is kept to a minimum and that members of the public are always kept safe.

Conclusion

Following the delivery of three site-based mitigation services the UXO risk to the proposed development will be reduced to a tolerable level, meaning no further proactive on-site mitigation parameters will need to be procured for the developmental works at West Park and Birks Grange. Any alterations to the construction and groundworks programme must be communicated to Brimstone to determine whether these changes will alter the risk profile for the entirety of the site or specific parcels within the wider site boundary. If an item of UXO is discovered, then it will be done so in a controlled manner, with an appropriate and progressive action plans delivered by Brimstone or joint services EOD, with the support of one another.

Annex List

- CPT rig specification sheet (the machine used during the intrusive probe survey).
- Pile layout general arrangement drawings with UXO surveys overlaid.
- EOD certificates for Aaron Florence (company founder and managing director), Ian 'Jock' Forde (operations manager), and Dale Magnus (southwest based site engineer).
- Brimstone RAMS for explosive demolitions.
- Generic toolbox talk presentation.

HoneyBbadger_

BRIMSTONE

CPT CRAWLER 100 kN

HoneyBadger is a bespoke CPT rig equipped with state of the art triaxial magnetometry equipment. Capable of pushing up to 10 tonnes of force, covering 150m of intrusive surveying per day. Single-point (4m diameter) clearance and matrix clearance from surface to bomb penetration depth.

The name is a homage to Captain Phil Nolan, dubbed the 'Honey Badger'. Captain Nolan is a former Royal Engineer Search Advisor who looked for Improvised Explosive Devices in Afghanistan, he is now climbing the seven highest peaks in seven different continents.

THE STATS

Year of Manufacturer	2022
Pushing Force	100 kN
Pulling Force	130 kN
Testing Speed	0 - 25 mm / sec
Length	4212 mm
Width	2000 mm
Height (Bellows Up)	3660 mm
Height (Bellows Down)	2780 mm

Turning Circle	4.5 m
Mass	11000 kg
Ground Pressure on Tracks	0.55 kg / cm^2
Ground Pressure on Levelling Jacks	1.83 kg / cm^2
Ground Pressure While Pulling	4.00 kg / cm^2
Engine	JCB EcoMax 6 - cylinder directly injected turbo charged diesel engine
Sensor	Tri-axial Fluxgate Magnetometer
Survey Diameter	4m

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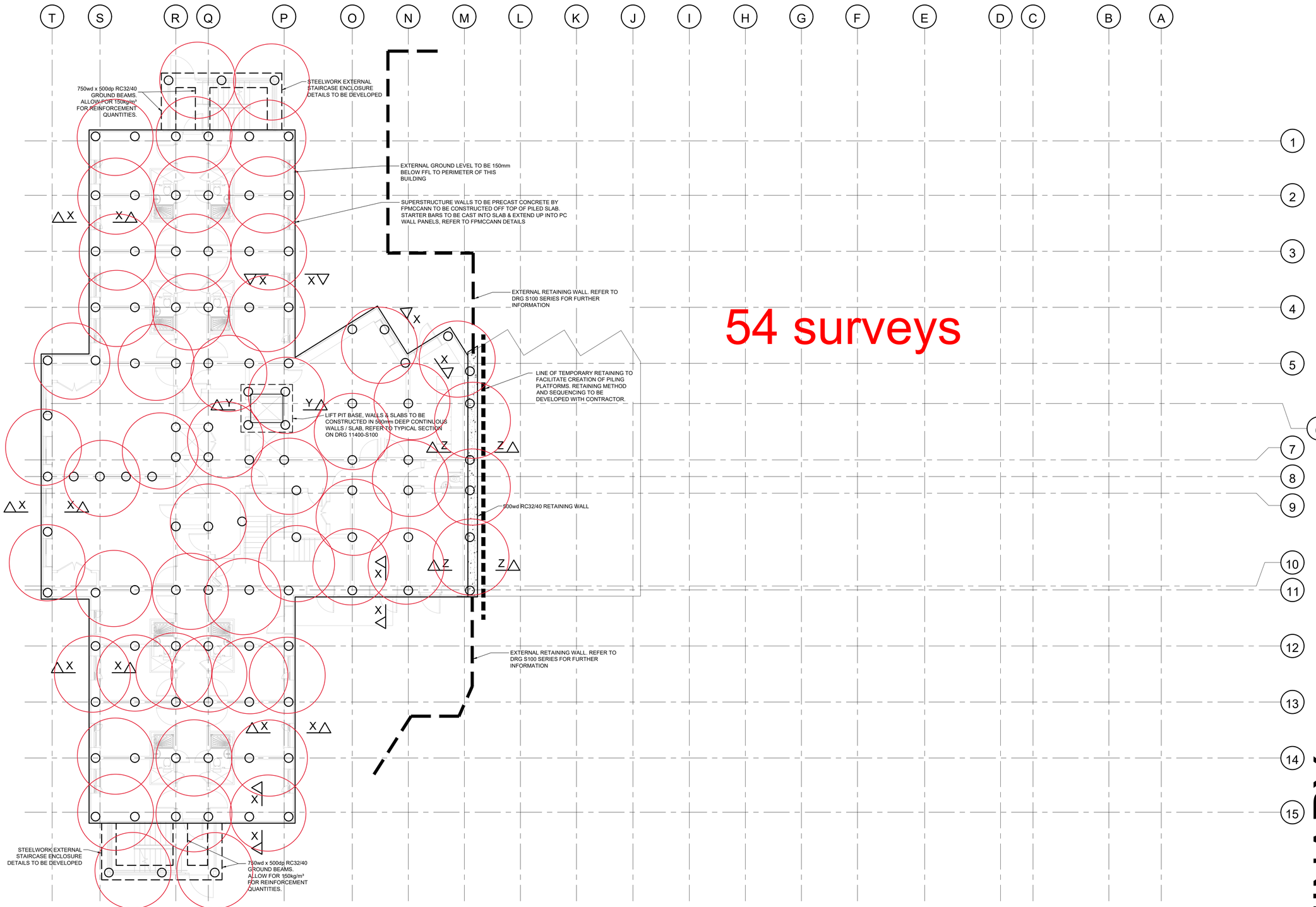


54 surveys

BLOCK GH: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 110
PRELIMINARY TOTAL FOR WHOLE BLOCK = 252

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT

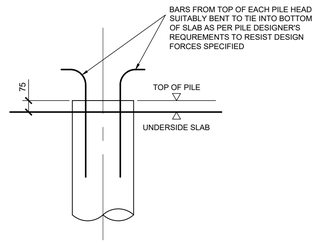
ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED:

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX. 150MPa) & TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES). PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS & SHALLOW DEPTH TO BEARING.

2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.



TYPICAL PILE HEAD DETAIL
SCALE 1:20

REV.	DATE	NOTE	BY	CHK
P01	03.02.23	ISSUED FOR PRICING	SH	BC

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PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers COLES
1st FLOOR, ASHLEIGH COURT
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Fax: 01752 222115
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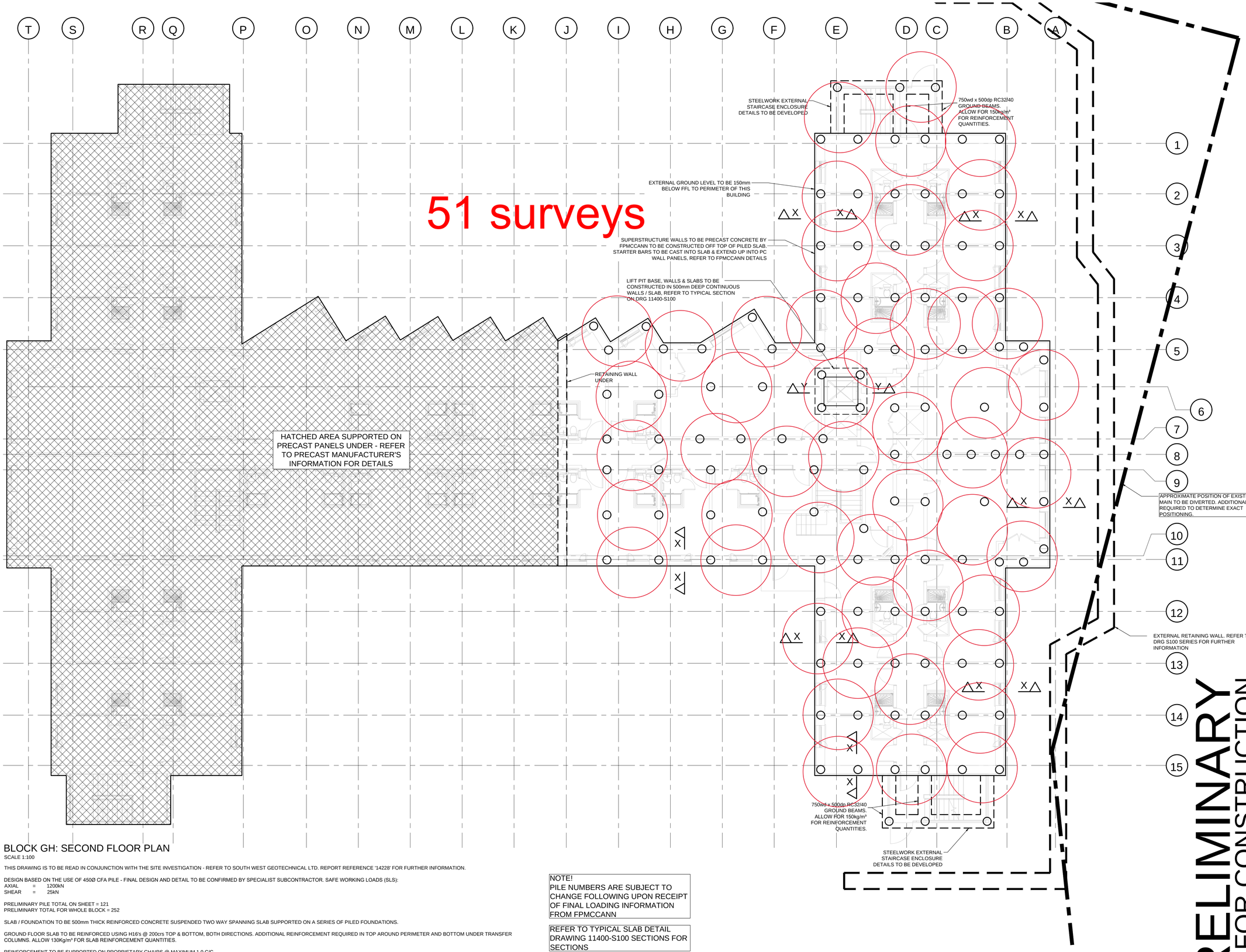
PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK GH
GROUND FLOOR PLAN

SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

DRAWING NUMBER: 11400-S72
REVISION: P01

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-GH-GF-DR-S-00072



BLOCK GH: SECOND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 121
PRELIMINARY TOTAL FOR WHOLE BLOCK = 252

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

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REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

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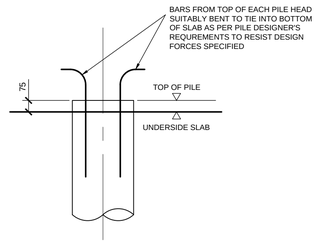

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P01	03.02.23	ISSUED FOR PRICING	SH	BC

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PRELIMINARY
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Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK GH
SECOND FLOOR PLAN

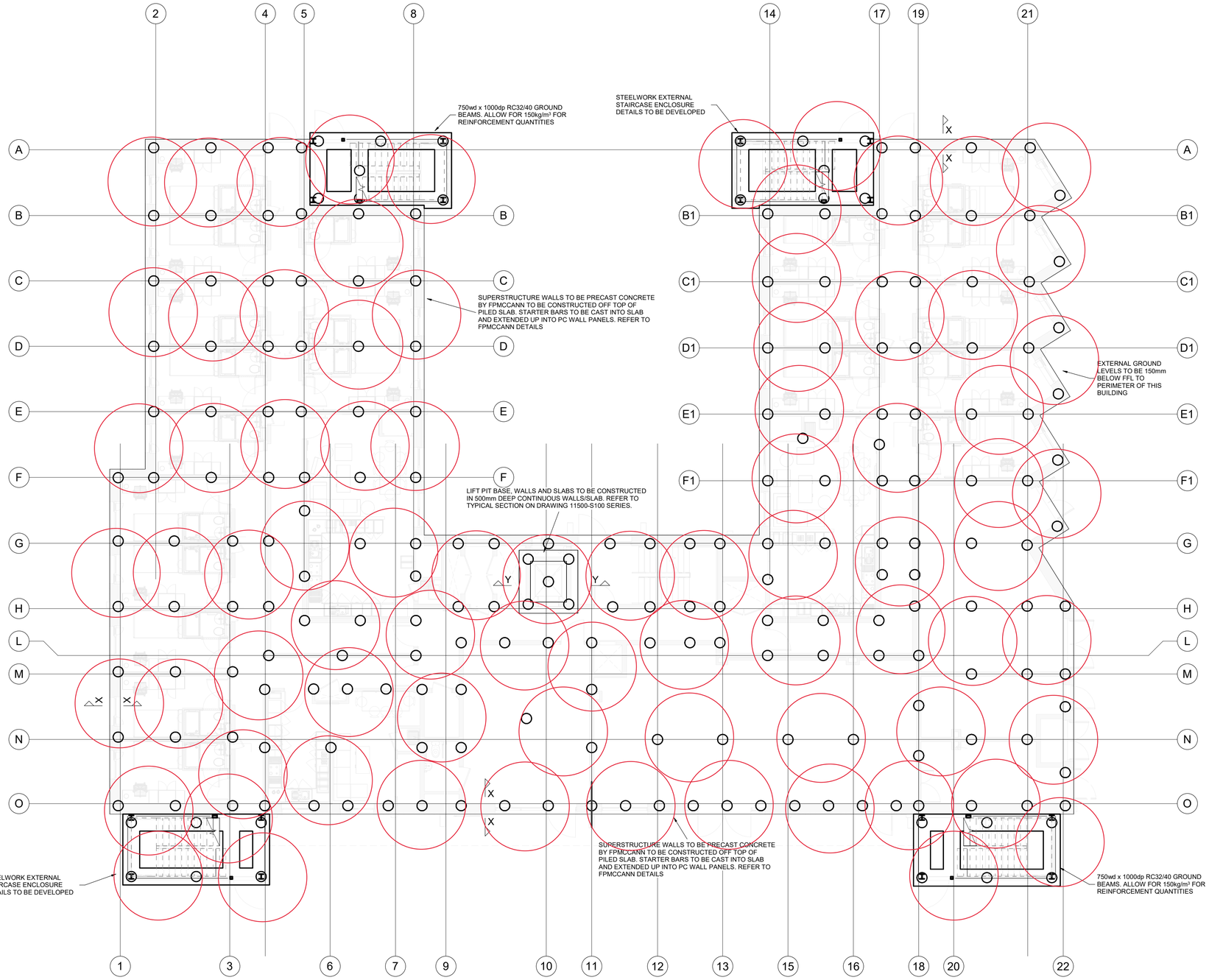
SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

DRAWING NUMBER
11400-S74

REVISION
P02

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-GH-02-DR-S-00074

DRAWING STATUS
S5 - ISSUED FOR REVIEW AND ACCEPTANCE (CLIENT)



BLOCK CB GROUND FLOOR PLAN

1 : 100

NOTES:
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AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL FOR BLOCK = 224

SLAB / FOUNDATION TO BE 500thk REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

SLAB TO BE REINFORCED USING H16S @ 200crs TOP AND BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0m C/C. IF PREFERRED, CHAIRS CAN BE PROVIDED USING BENT REINFORCEMENT. PLEASE NOTE, QUANTITIES FOR THE SLAB DO NOT INCLUDE FOR CHAIR REINFORCEMENT.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN AND DETAIL.

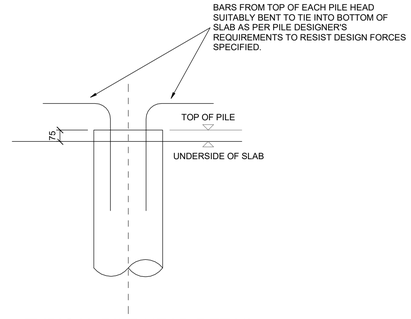
INSULATION BELOW SLAB TO PASSIVHAUS DESIGNER'S DETAILS.

SOLID COMPRESSIBLE VOLUMNE CHAGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF INSULATION. PROVIDE CORDEK CELLCORE HX S 16/24 160mmthk OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS. IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED. REFER TO SITE SPECIFICATIONS FOR BEARING STRATA RELATIVE TO FFL.

THIS DRAWING WAS PREVIOUSLY ISSUED AS No. EXE-A&C-EX-CB-GF-S-00001 TO A SEPARATE CONTRACTOR. IT HAS NOW BEEN RENUMBERED TO THE ORIGINAL NUMBER TO REALIGN TO A SINGLE CONTRACTOR PACKAGE

CHANGES SINCE PREVIOUS TENDER ISSUE

- GROUND FLOOR CHANGED TO PILED SLAB
- TRANSFER STRUCTURE OVER REMOVED
- LAYOUT UPDATED TO SUIT LATEST ARCHITECTURAL INFORMATION



TYPICAL PILE HEAD DETAIL

1 : 20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT.

ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED: ⚠

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. THE GROUND INVESTIGATION REPORT NOTES THE ROCK IS LOCALLY VERY STRONG (MAXIMUM ESTIMATED UCS OF 150 +MPa). PILING CONTRACTOR TO SELECT APPROPRIATE PILING METHOD TO ENSURE THE RIG IS SUITABLE TO PENETRATE THROUGH THE ROCK.

2. THE GROUND INVESTIGATION REPORT NOTES THE EXISTING RESIDUAL SOILS / MUDSTONES ARE PRONE TO DETERIORATION IF EXPOSED TO THE ELEMENTS. ALL FORMATIONS ARE TO BE PROTECTED AS SOON AS POSSIBLE AFTER EXCAVATION.

3. THE GROUND INVESTIGATION REPORT NOTES FURTHER TESTING AND MONITORING OF GROUND WATER SHOULD BE CARRIED OUT DUE TO THE TIMING OF THE ORGINAL TESTING.

4. SERVICE PENETRATIONS AND VOIDS TO BE AGREED.

5. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

80 surveys

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11500-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVILS DRAWINGS FOR POSITION

⚠ NOTE! ADDITIONAL GROUND INVESTIGATION MAY BE REQUIRED TO CONFIRM:
a. ROCK BEARING LEVELS
b. CONTAMINATION
c. GROUND WATER MONITORING

REV	DATE	NOTE	BY	CHK
P04	01.05.24	DRAWING REALIGNED TO SINGLE CONTRACTOR PACKAGE	DJC	RS
P03	17.04.24	UPDATED TENDER ISSUE	DJC	RS
P02	28.04.23	TENDER ISSUE	DC	BC
P01	01.03.23	ISSUED FOR PRICING	SH	BC

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers COLES
1st FLOOR, ASHLEIGH COURT
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PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
BIRKS GRANGE VILLAGE, UNIVERSITY OF EXETER

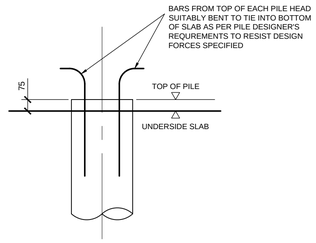
DRAWING TITLE
BLOCK CB GROUND FLOOR PLAN

SCALE	DATE	DRAWN BY	CHECKED BY
As indicated	MAR-23	SH	BC

DRAWING NUMBER: 11400 S63
REVISION NO: P04

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-CB-GF-DR-S-00063

DRAWING STATUS
S3 -SUITABLE FOR REVIEW AND COMMENT



TYPICAL PILE HEAD DETAIL

SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

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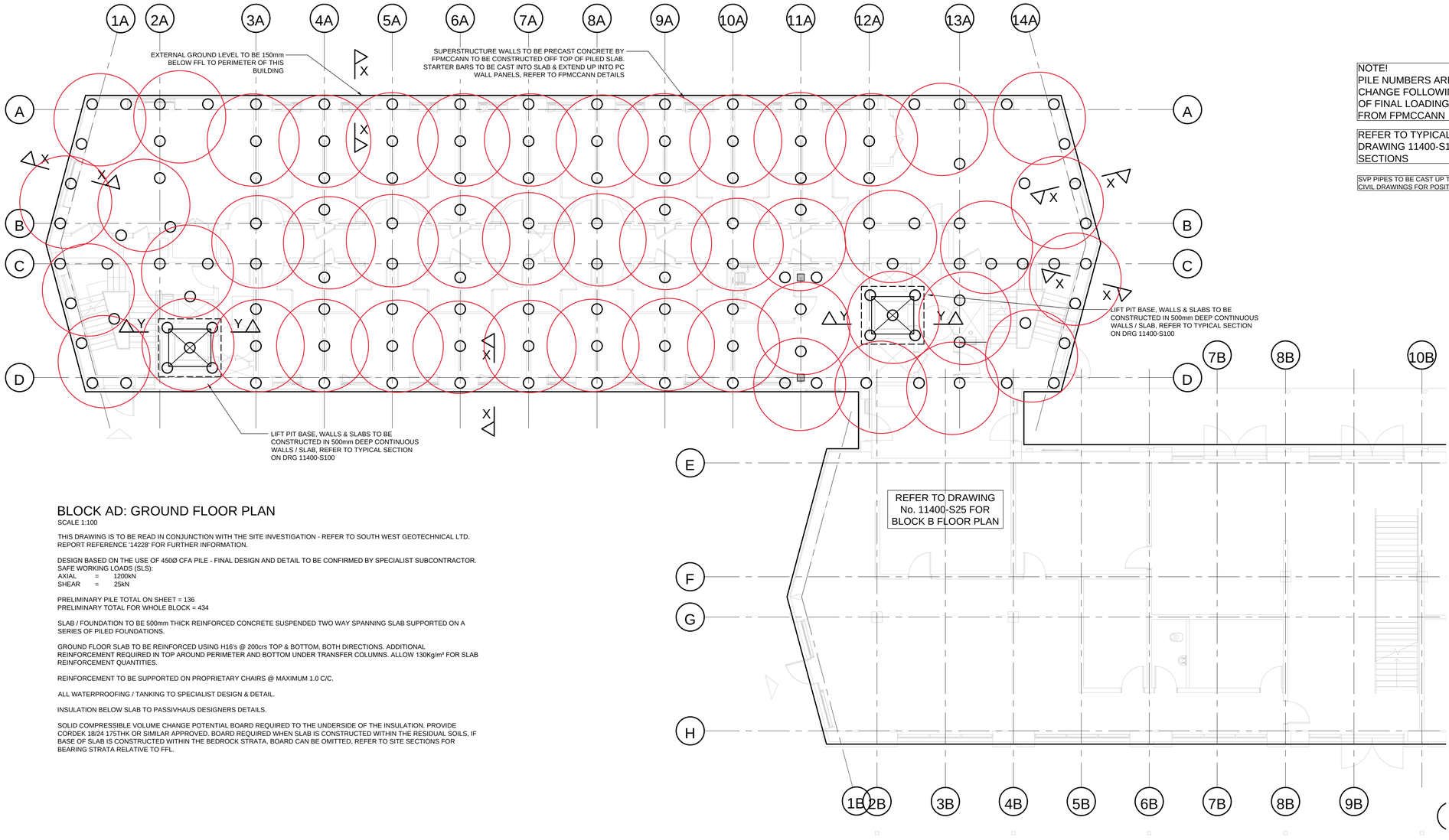
FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX. 150MPa) & TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES). PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS & SHALLOW DEPTH TO BEARING.

2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

48 surveys



NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

BLOCK AD: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR.
SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 136
PRELIMINARY TOTAL FOR WHOLE BLOCK = 434

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

REV.	DATE	NOTE	BY	CHK
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

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ASHLEIGH WAY
LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK AD
GROUND FLOOR PLAN
(1 OF 3)

SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

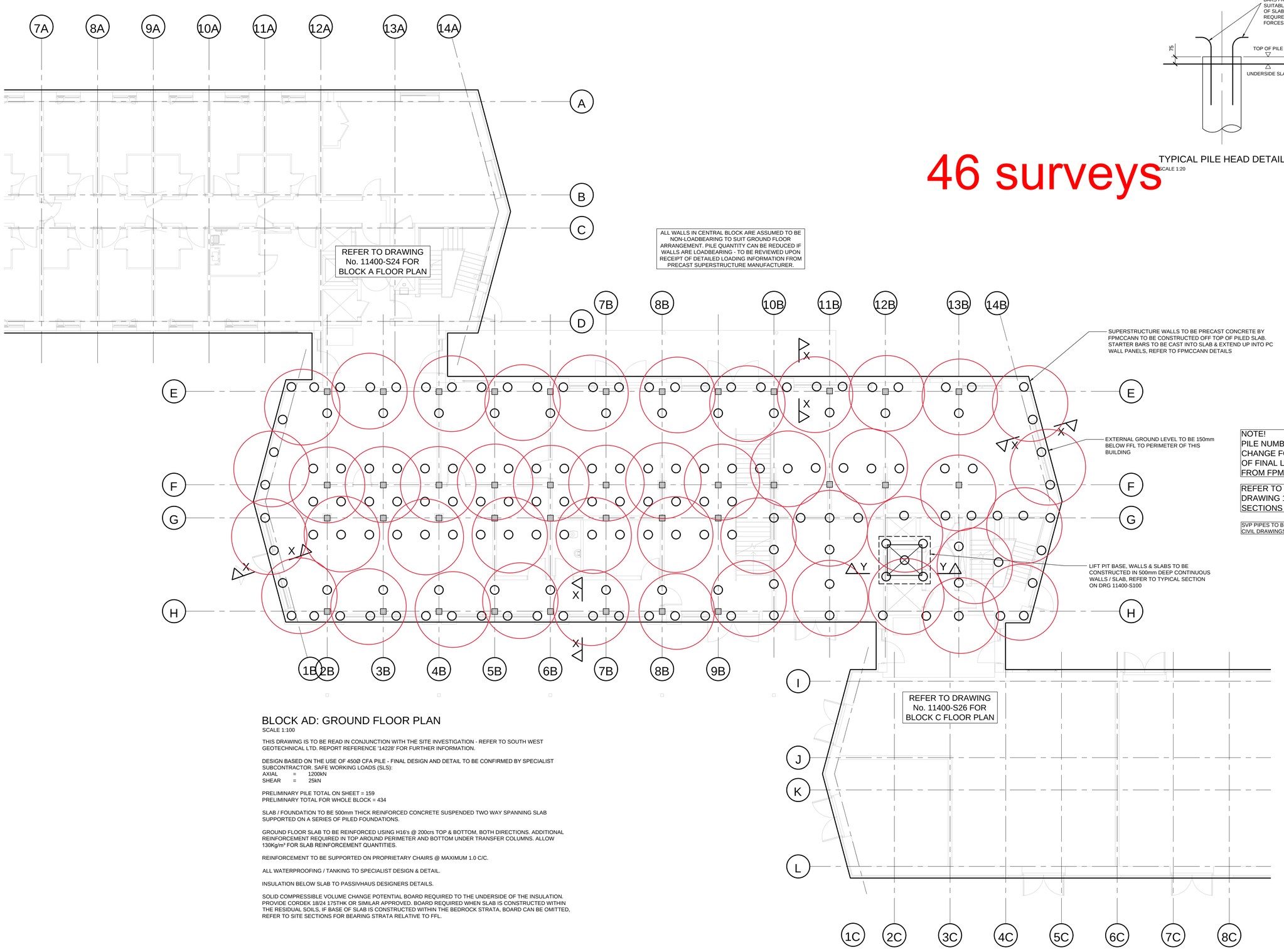
DRAWING NUMBER
11400-S24

REVISION
P02

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-AD-GF-DR-S-00024

DRAWING STATUS
S5 - ISSUED FOR REVIEW AND ACCEPTANCE (CLIENT)

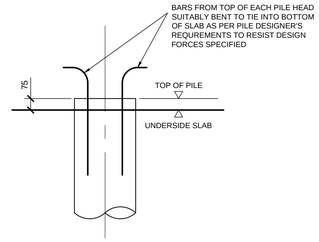
PRELIMINARY
NOT FOR CONSTRUCTION



SUPERSTRUCTURE WALLS TO BE PRECAST CONCRETE BY FPMCCANN TO BE CONSTRUCTED OFF TOP OF PILED SLAB. STARTER BARS TO BE CAST INTO SLAB & EXTEND UP INTO PC WALL PANELS, REFER TO FPMCCANN DETAILS

EXTERNAL GROUND LEVEL TO BE 150mm BELOW FFL TO PERIMETER OF THIS BUILDING

LIFT PIT BASE, WALLS & SLABS TO BE CONSTRUCTED IN 500mm DEEP CONTINUOUS WALLS / SLAB, REFER TO TYPICAL SECTION ON DRG 11400-S100



TYPICAL PILE HEAD DETAIL
SCALE 1:20

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

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FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

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2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

BLOCK AD: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 159
PRELIMINARY TOTAL FOR WHOLE BLOCK = 434

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m² FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS. IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

REV.	DATE	NOTE	BY	CHK
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers
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1st FLOOR, ASHLEIGH COURT
ASHLEIGH WAY
LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK AD
GROUND FLOOR PLAN
(2 OF 3)

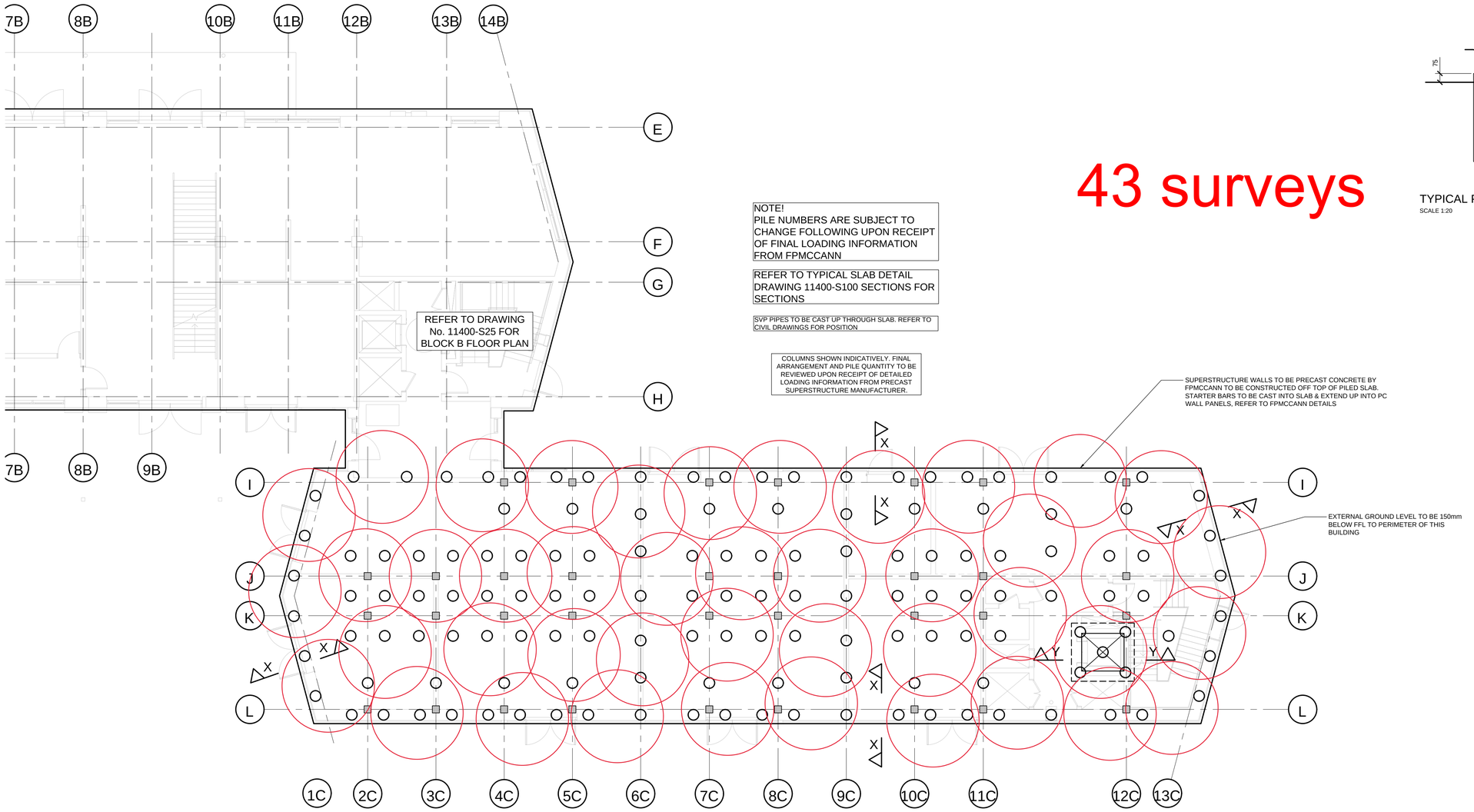
SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

DRAWING NUMBER
11400-S25

REVISION
P02

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-AD-GF-DR-S-00025

DRAWING STATUS
S5 - ISSUED FOR REVIEW
AND ACCEPTANCE (CLIENT)



NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

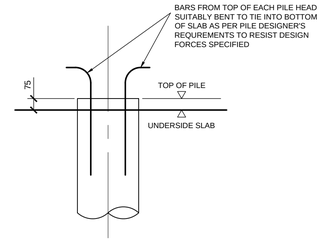
SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

COLUMNS SHOWN INDICATIVELY. FINAL ARRANGEMENT AND PILE QUANTITY TO BE REVIEWED UPON RECEIPT OF DETAILED LOADING INFORMATION FROM PRECAST SUPERSTRUCTURE MANUFACTURER.

SUPERSTRUCTURE WALLS TO BE PRECAST CONCRETE BY FPMCCANN TO BE CONSTRUCTED OFF TOP OF PILED SLAB. STARTER BARS TO BE CAST INTO SLAB & EXTEND UP INTO PC WALL PANELS, REFER TO FPMCCANN DETAILS

EXTERNAL GROUND LEVEL TO BE 150mm BELOW FFL TO PERIMETER OF THIS BUILDING

43 surveys



TYPICAL PILE HEAD DETAIL
SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

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2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

BLOCK AD: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 139
PRELIMINARY TOTAL FOR WHOLE BLOCK = 434

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

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REV.	DATE	NOTE	BY	CHK
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers
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1st FLOOR, ASHLEIGH COURT
ASHLEIGH WAY
LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK AD
GROUND FLOOR PLAN
(3 OF 3)

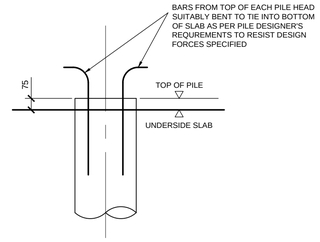
SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

DRAWING NUMBER: 11400-S26
REVISION: P02

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-AD-GF-DR-S-00026

DRAWING STATUS
S5 - ISSUED FOR REVIEW
AND ACCEPTANCE (CLIENT)

66 surveys



TYPICAL PILE HEAD DETAIL

SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT

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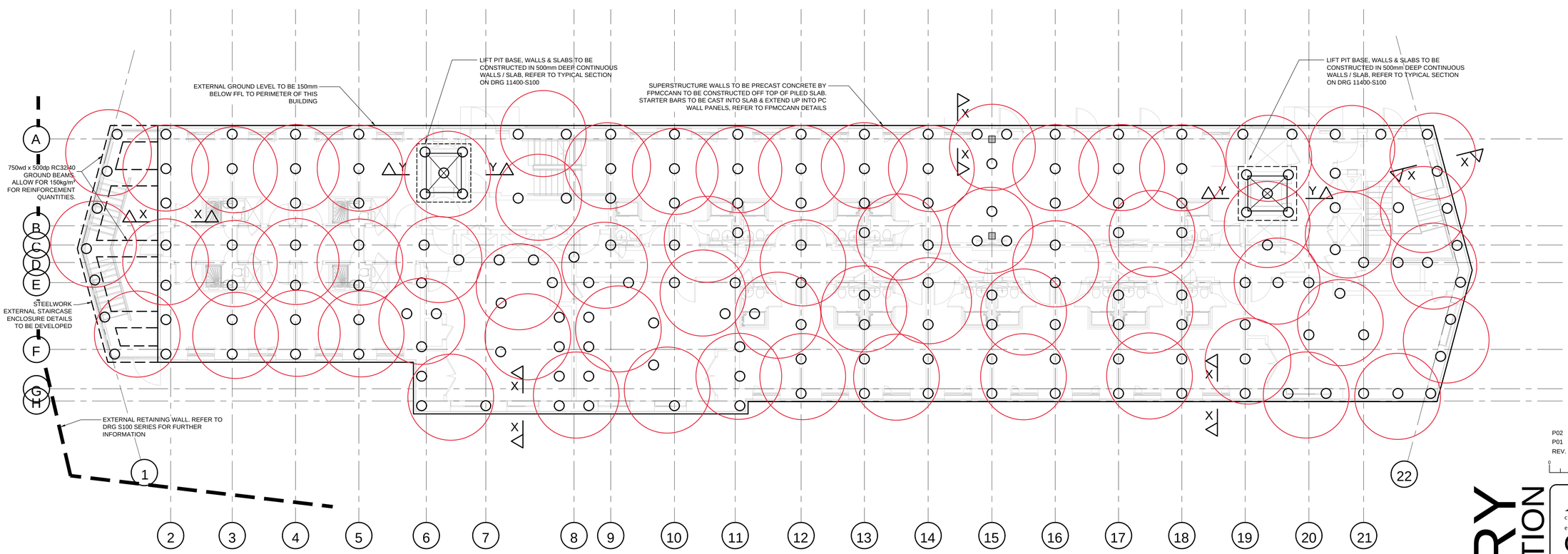


BLOCK EF: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL = 187

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

REV.	DATE	NOTE	BY	CHK
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

AIREY COLES consulting engineers
1st FLOOR, ASHLEIGH COURT
ASHLEIGH WAY
LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK EF
GROUND FLOOR PLAN

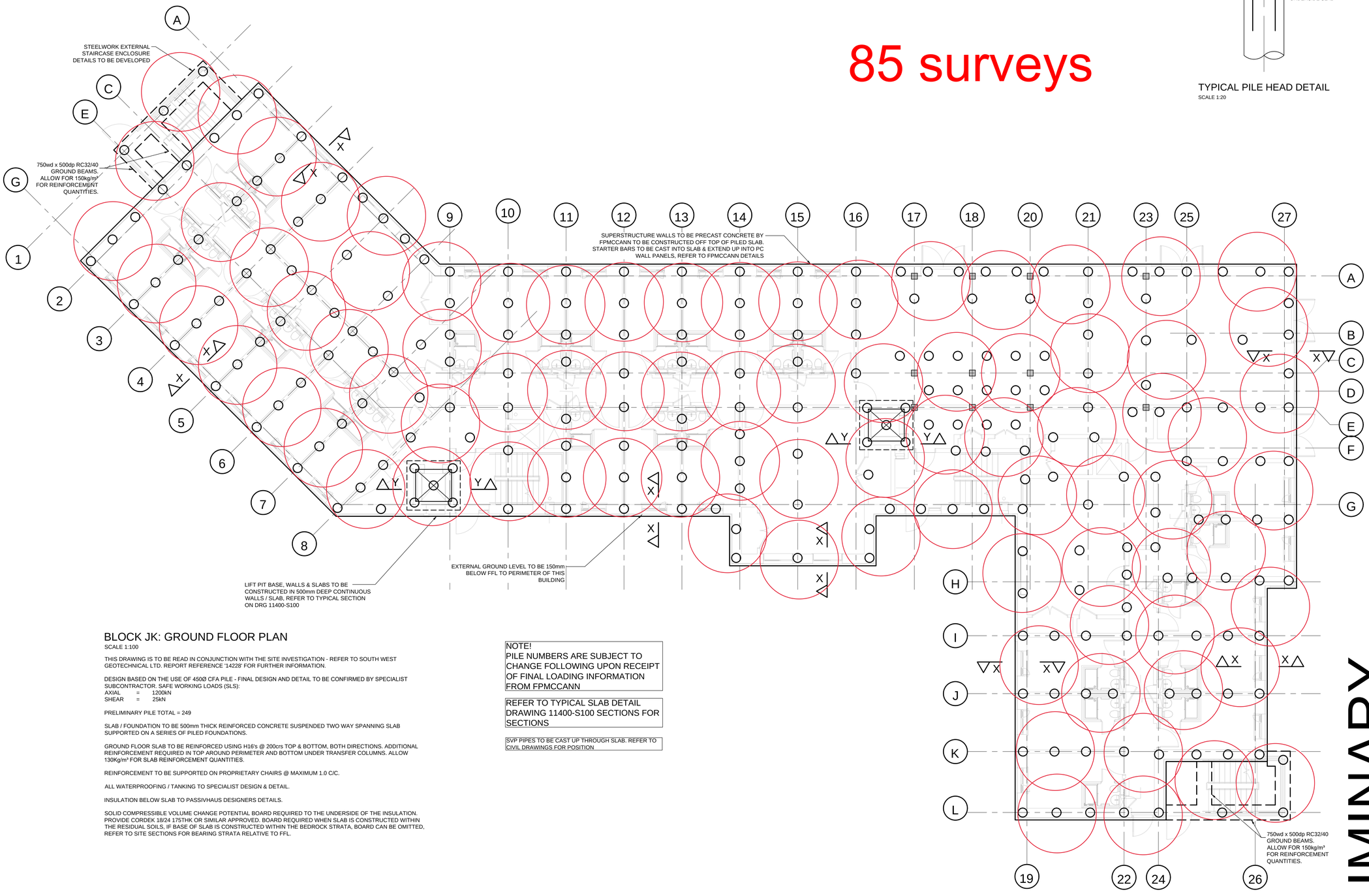
SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

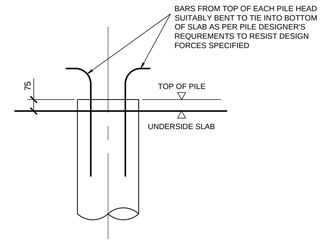
DRAWING NUMBER: 11400-S42
REVISION: P02

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-EF-GF-DR-S-00042

DRAWING STATUS
S5 - ISSUED FOR REVIEW AND ACCEPTANCE (CLIENT)

PRELIMINARY
NOT FOR CONSTRUCTION





TYPICAL PILE HEAD DETAIL
SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

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ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED:

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX. 150MPa) & TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES). PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS & SHALLOW DEPTH TO BEARING.

2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

BLOCK JK: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOR FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN AND DETAIL TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL = 249

SLAB / FOUNDATION TO BE 500mm THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

GROUND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP & BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130Kg/m³ FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MAXIMUM 1.0 C/C.

ALL WATERPROOFING / TANKING TO SPECIALIST DESIGN & DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNERS DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF THE INSULATION. PROVIDE CORDEK 18/24 175THK OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SECTIONS FOR BEARING STRATA RELATIVE TO FFL.

NOTE!
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL DRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION

REV.	DATE	NOTE	BY	CHK
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers
COLES
1st FLOOR, ASHLEIGH COURT
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LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK JK
GROUND FLOOR PLAN

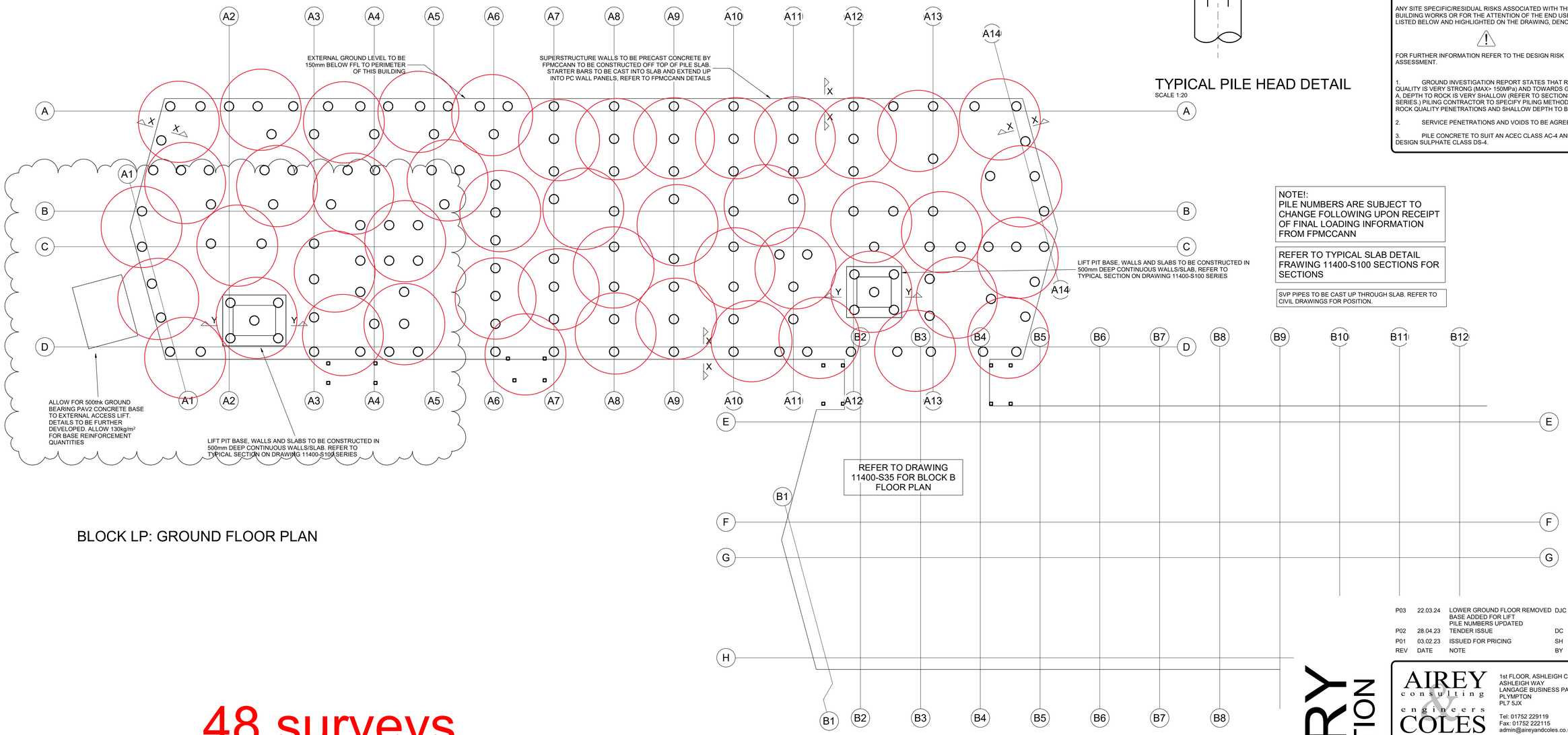
SCALE	DATE	DRAWN BY	CHECKED
1:100	FEB-23	SH	BC

DRAWING NUMBER
11400-S52

REVISION
P02

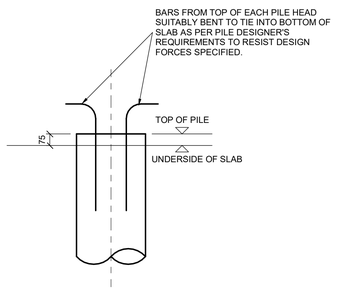
PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-JK-GF-DR-S-00052

DRAWING STATUS
S5 - ISSUED FOR REVIEW
AND ACCEPTANCE (CLIENT)



BLOCK LP: GROUND FLOOR PLAN

48 surveys



TYPICAL PILE HEAD DETAIL

SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT.

ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED:

⚠

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX> 150MPa) AND TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES.) PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS AND SHALLOW DEPTH TO BEATING.
2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED.
3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

NOTE!:
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL FRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION.

NOTES:
THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOF FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 146
PRELIMINATY TOTAL FOR WHOLE BLOCK = 376

SLAB/FOUNDATION TO BE 500thk THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

SECOND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP AND BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130kg/m² FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MIXIMUM 1.0 c/c.

ALL WATERPROOFING/TANKING TO SPECIALIST DESIGN AND DETAIL.

INSULATION BELOW SLAB TO PASSIVHAUS DESIGNER'S DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF INSULATION PROVIDE CORDECK 18/24. 175thk OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SPECIFICATIONS FOR BEARING STRATA RELATIVE TO FFL.

PRELIMINARY
NOT FOR CONSTRUCTION

REV	DATE	NOTE	BY	CHK
P03	22.03.24	LOWER GROUND FLOOR REMOVED BASE ADDED FOR LIFT PILE NUMBERS UPDATED	DJC	RS
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

AIREY consulting & engineers COLES
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admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

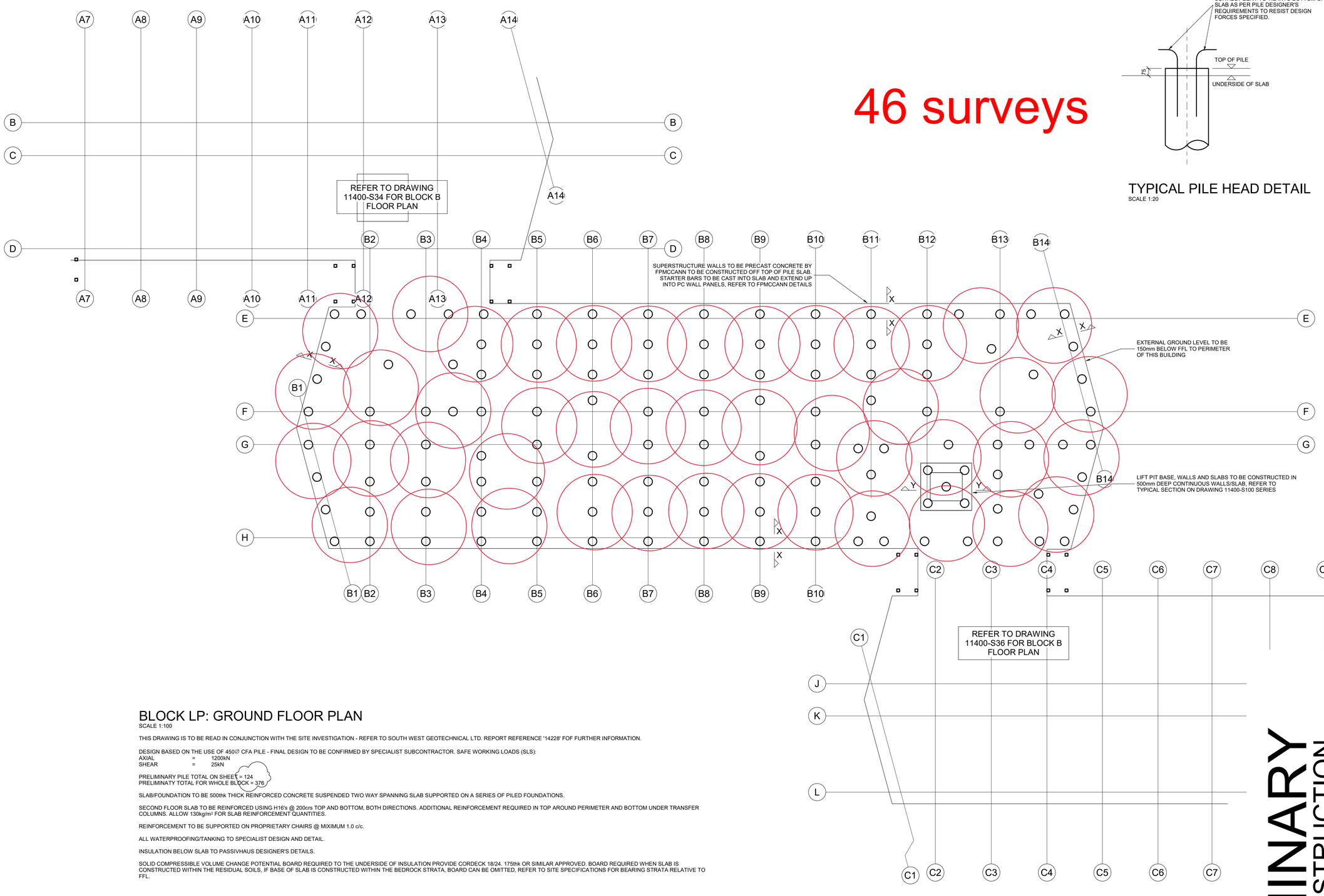
DRAWING TITLE
BLOCK LP GROUND FLOOR PLAN
(1 OF 3)

SCALE	DATE	DRAWN BY	CHECKED BY
As indicated	FEB-23	SH	BC

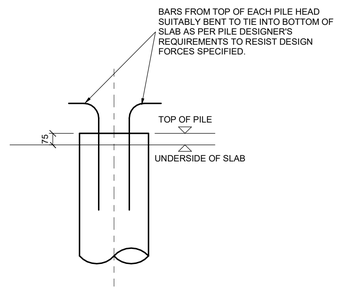
DRAWING NUMBER	REVISION NO.
11400- S34	P03

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-LP-GF-DR-S-00034

DRAWING STATUS
S5 - ISSUED FOR REVIEW
AND ACCEPTANCE (CLIENT)



46 surveys



TYPICAL PILE HEAD DETAIL

SCALE 1:20

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT.

ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED:

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX> 150MPa) AND TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES.) PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS AND SHALLOW DEPTH TO BEATING.

2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED.

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

NOTE!:
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL FRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION.

BLOCK LP: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOF FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450∅ CFA PILE - FINAL DESIGN TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 124
PRELIMINATY TOTAL FOR WHOLE BLOCK = 376

SLAB/FOUNDATION TO BE 500thk THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

SECOND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP AND BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130kg/m² FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MIXIMUM 1.0 c/c.

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INSULATION BELOW SLAB TO PASSIVHAUS DESIGNER'S DETAILS.

SOLID COMPRESSIBLE VOLUME CHANGE POTENTIAL BOARD REQUIRED TO THE UNDERSIDE OF INSULATION PROVIDE CORDECK 18/24. 175thk OR SIMILAR APPROVED. BOARD REQUIRED WHEN SLAB IS CONSTRUCTED WITHIN THE RESIDUAL SOILS, IF BASE OF SLAB IS CONSTRUCTED WITHIN THE BEDROCK STRATA, BOARD CAN BE OMITTED, REFER TO SITE SPECIFICATIONS FOR BEARING STRATA RELATIVE TO FFL.

REV	DATE	NOTE	BY	CHK
P03	22.03.24	PILE NUMBERS UPDATED	DJC	RS
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers COLES
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LANGAGE BUSINESS PARK
PLYMPTON
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admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK LP GROUND FLOOR PLAN (2 OF 3)

SCALE	DATE	DRAWN BY	CHECKED BY
As indicated	FEB-23	SH	BC

DRAWING NUMBER: 11400- S35
REVISION NO: P03

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-LP-GF-DR-S-00035

DRAWING STATUS
S5 - ISSUED FOR REVIEW AND ACCEPTANCE (CLIENT)

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT.

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⚠

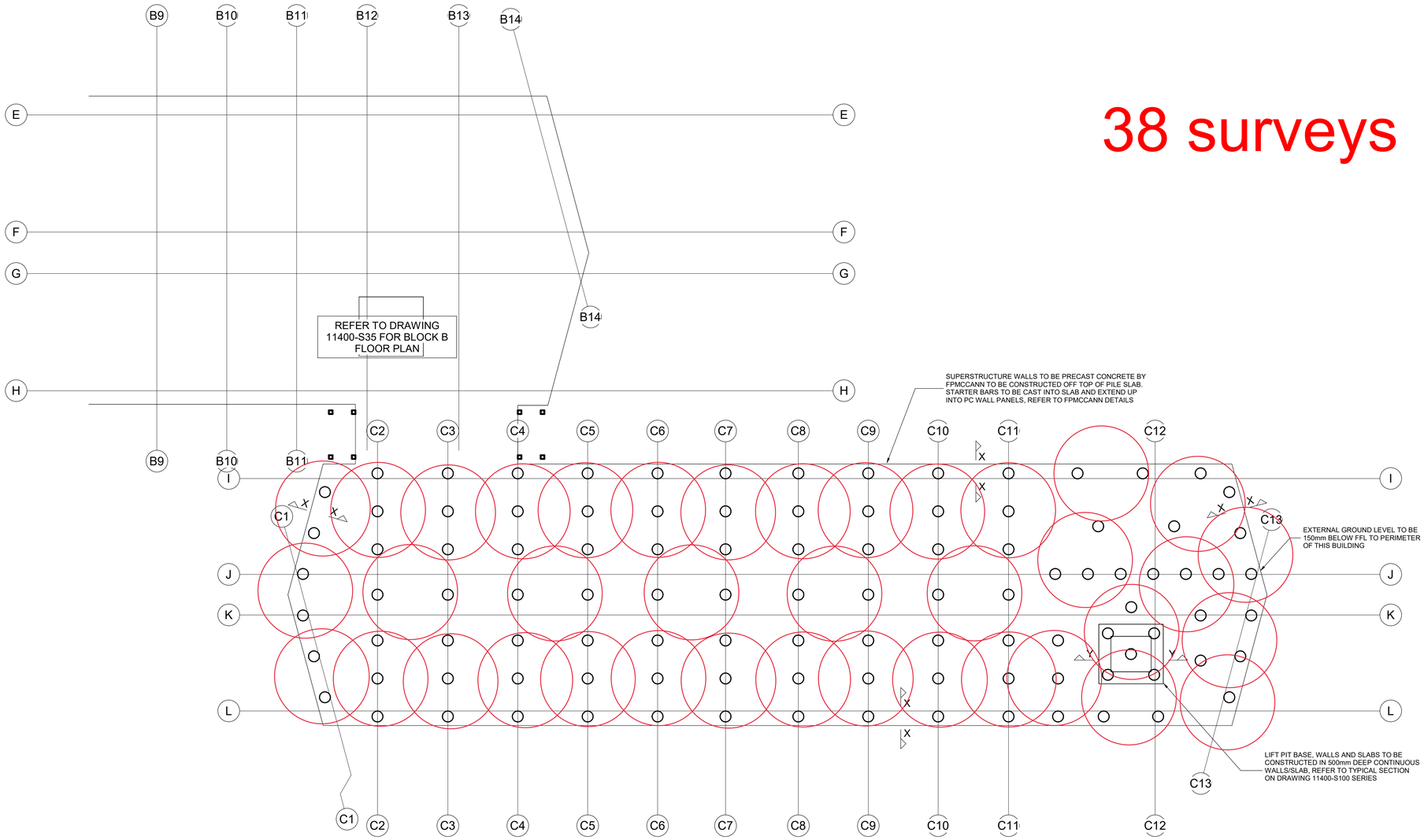
FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. GROUND INVESTIGATION REPORT STATES THAT ROCK QUALITY IS VERY STRONG (MAX> 150MPa) AND TOWARDS GRIDLINE A, DEPTH TO ROCK IS VERY SHALLOW (REFER TO SECTIONS S1000 SERIES.) PILING CONTRACTOR TO SPECIFY PILING METHOD TO SUIT ROCK QUALITY PENETRATIONS AND SHALLOW DEPTH TO BEATING.

2. SERVICE PENETRATIONS AND VOIDS TO BE AGREED.

3. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

38 surveys



NOTE!:
PILE NUMBERS ARE SUBJECT TO CHANGE FOLLOWING UPON RECEIPT OF FINAL LOADING INFORMATION FROM FPMCCANN

REFER TO TYPICAL SLAB DETAIL FRAWING 11400-S100 SECTIONS FOR SECTIONS

SVP PIPES TO BE CAST UP THROUGH SLAB. REFER TO CIVIL DRAWINGS FOR POSITION.

BLOCK LP: GROUND FLOOR PLAN

SCALE 1:100

THIS DRAWING IS TO BE READ IN CONJUNCTION WITH THE SITE INVESTIGATION - REFER TO SOUTH WEST GEOTECHNICAL LTD. REPORT REFERENCE '14228' FOF FURTHER INFORMATION.

DESIGN BASED ON THE USE OF 450Ø CFA PILE - FINAL DESIGN TO BE CONFIRMED BY SPECIALIST SUBCONTRACTOR. SAFE WORKING LOADS (SLS):
AXIAL = 1200kN
SHEAR = 25kN

PRELIMINARY PILE TOTAL ON SHEET = 106
PRELIMINATY TOTAL FOR WHOLE BLOCK = 376

SLAB/FOUNDATION TO BE 500thk THICK REINFORCED CONCRETE SUSPENDED TWO WAY SPANNING SLAB SUPPORTED ON A SERIES OF PILED FOUNDATIONS.

SECOND FLOOR SLAB TO BE REINFORCED USING H16's @ 200crs TOP AND BOTTOM, BOTH DIRECTIONS. ADDITIONAL REINFORCEMENT REQUIRED IN TOP AROUND PERIMETER AND BOTTOM UNDER TRANSFER COLUMNS. ALLOW 130kg/m² FOR SLAB REINFORCEMENT QUANTITIES.

REINFORCEMENT TO BE SUPPORTED ON PROPRIETARY CHAIRS @ MIXIMUM 1.0 c/c.

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INSULATION BELOW SLAB TO PASSIVHAUS DESIGNER'S DETAILS.

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REV	DATE	NOTE	BY	CHK
P03	22.03.24	PILE NUMBERS UPDATED	DJC	BC
P02	28.04.23	TENDER ISSUE	DC	BC
P01	03.02.23	ISSUED FOR PRICING	SH	BC

PRELIMINARY
NOT FOR CONSTRUCTION

AIREY consulting engineers COLES
1st FLOOR, ASHLEIGH COURT
ASHLEIGH WAY
LANGAGE BUSINESS PARK
PLYMPTON
PL7 5JX
Tel: 01752 229119
Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
BLOCK LP GROUND FLOOR PLAN
(3 OF 3)

SCALE	DATE	DRAWN BY	CHECKED BY
1 : 100	FEB-23	SH	BC

DRAWING NUMBER: 11400-S36
REVISION NO.: P03
ISO 9001:2015 REGISTERED

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-LP-GF-DR-S-00036

DRAWING STATUS
S5 - ISSUED FOR REVIEW
AND ACCEPTANCE (CLIENT)

NOTES

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER AIREY AND COLES DRAWINGS, DETAILS AND PERFORMANCE SPECIFICATIONS AS WELL AS ALL ARCHITECT'S DRAWINGS, DETAILS AND PERFORMANCE SPECIFICATIONS.

ANY REFERENCE TO SPECIFIC MANUFACTURERS IN THE DRAWINGS ARE PURELY INDICATIVE AND SUBJECT TO FINAL CONFIRMATION BY THE MAIN CONTRACTOR.

CONSTRUCTION DESIGN AND MANAGEMENT REGULATIONS (CDM) 2015

IT IS PRESUMED THAT THE APPOINTED PRINCIPAL CONTRACTOR WILL BE FULLY CONVERSANT WITH ORDINARY RISKS ASSOCIATED WITH CONSTRUCTION ITEMS OF A NORMAL NATURE, WILL HAVE THE APPROPRIATED LEVEL OF SKILL KNOWLEDGE AND EXPERIENCE SPECIFIC TO THE PROJECT, AND THAT ALL WORKS WILL BE CARRIED OUT IN ACCORDANCE WITH THE APPROVED METHOD STATED AND RISK ASSESSMENT

ANY SITE SPECIFIC/RESIDUAL RISKS ASSOCIATED WITH THE BUILDING WORKS OR FOR THE ATTENTION OF THE END USED ARE LISTED BELOW AND HIGHLIGHTED ON THE DRAWING, DENOTED: !

FOR FURTHER INFORMATION REFER TO THE DESIGN RISK ASSESSMENT.

1. THE GROUND INVESTIGATION REPORT NOTES THE ROCK IS LOCALLY VERY STRONG (MAXIMUM ESTIMATED UCS OF 150+MPa). PILING CONTRACTOR TO SELECT APPROPRIATE PILING METHOD TO ENSURE THE RIG IS SUITABLE TO PENETRATE THROUGH THE ROCK.
2. THE GROUND INVESTIGATION REPORT NOTES THE EXISTING RESIDUAL SOILS/MUDSTONES ARE PRONE TO DETERIORATION IF EXPOSED TO THE ELEMENTS. ALL FORMATIONS ARE TO BE PROTECTED AS SOON AS POSSIBLE AFTER EXCAVATION.
3. THE GROUND INVESTIGATION REPORT NOTES FURTHER TESTING AND MONITORING OF GROUNDWATER SHOULD BE CARRIED OUT DUE TO THE TIMING OF THE ORIGINAL TESTING.
4. PILE CONCRETE TO SUIT AN ACEC CLASS AC-4 AND A DESIGN SULPHATE CLASS DS-4.

REFER TO 11400-S1 DRAWING SERIES FOR BLOCK PLANS

REFER TO 11400-S1000 DRAWING SERIES FOR SITE SECTIONS

REFER TO 11400-S1100 DRAWING SERIES FOR RETAINING WALL ELEVATIONS

REFER TO 11400-S1200 DRAWING SERIES FOR EXTERNAL SLAB AND STAIR DETAILS

ANCHORED BANK TO BE DESIGNED TO ALLOW FOR TEMPORARY EXCAVATION CIRCA 2m DEEP TO BE CARRIED OUT BETWEEN WALL & BUILDING FOR DRAINAGE INSTALLATION

APPROXIMATE POSITION OF EXISTING GAS MAIN. ADDITIONAL SURVEY REQUIRED TO DETERMINE EXACT POSITIONING.

KP2 TO BE CONSTRUCTED LATER IN CONSTRUCTION PROGRAMME TO SUIT ACCESS ROAD TURNING HEAD

NOTE! INVERT LEVEL OF TANK EXCEEDS MAXIMUM RETAINED HEIGHT FOR ADJACENT CONTIGUOUS PILED WALL. WORKS TO BE SEQUENCED TO ENSURE RETAINED HEIGHT IS NOT EXCEEDED AT ANY POINT.

RC5 TO BE CONSTRUCTED LATER IN CONSTRUCTION PROGRAMME TO SUIT ACCESS ROAD TURNING HEAD

EXTENTS OF ROOT PROTECTION AREA TO BE REVIEWED WITH ARBORICULTURALIST

BLOCK GH
FFL=66.000

BLOCK JK
FFL=69.000

BLOCK EF
FFL=61.000

BLOCK AD
FFL=61.000

BLOCK LP
FFL=69.000

BLOCK CB
FFL=26.400

'P06'
FFL=60.000
FFL=63.000

AB1
AB2

WS01 WS02 WS03 WS04 WS05 WS06 WS07 WS08 WS09 WS10 WS11 WS12 WS13 WS14 WS15 WS16 WS17 WS18 WS19 WS20 WS21 WS22 WS23

BH01 BH02 BH03 BH04 BH05 BH06 BH07 BH08 BH09 BH10 BH11

TP01 TP02 TP03 TP04

GB1 GB2 GB4 GB5 GB6 GB7 GB8 GB9

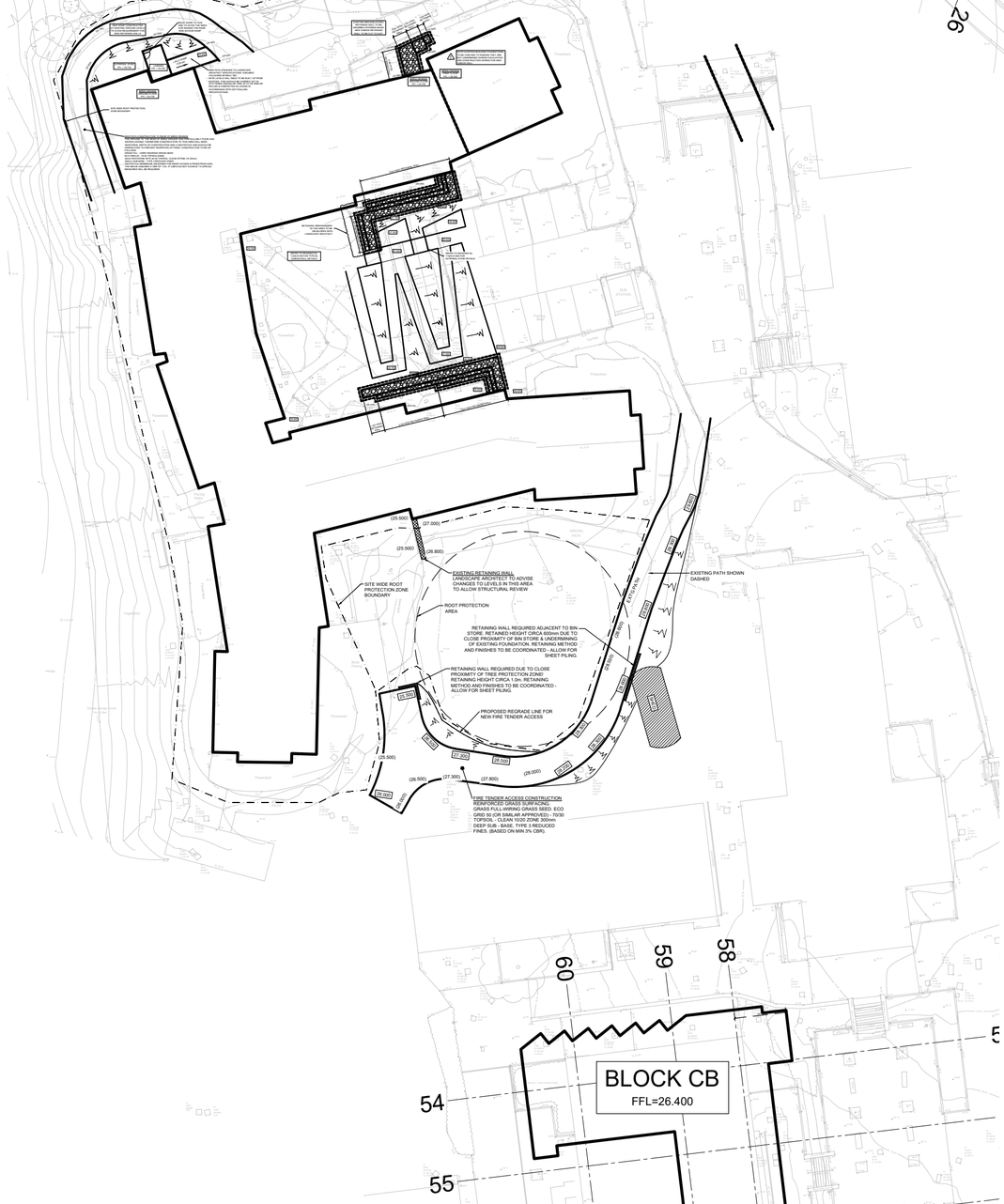
CP1 CP2 CP3 CP4 CP5 CP6

KP1 KP2 KP3 KP4 KP5 KP6

RC1 RC2 RC3 RC4 RC5

SP1 SP2

238 surveys



CHANGES SINCE PREVIOUS TENDER ISSUE

- RETAINING WALL TYPES AND REFERENCES UPDATED

KEY

- 750Ø CONTIGUOUS PILED WALL (MAX. RETAINED HEIGHT = 5m)
- 630Ø CONTIGUOUS PILED WALL (MAX. RETAINED HEIGHT = 3m)
- KING POST RETAINING WALL (MAX. RETAINED HEIGHT = 3m)
- RC CANTILEVER RETAINING WALL (MAX. RETAINED HEIGHT VARIES)
- TEMPORARY RETAINING STRUCTURE - REFER TO S1 SERIES FOR FURTHER INFORMATION.
- GABION BASKET RETAINING WALL
- ROOT PROTECTION AREA - REFER TO ARBORICULTURALIST REPORT FOR FURTHER INFORMATION
- ANCHORED BANK
- WS01 WINDOW SAMPLE LOCATION
- BH01 BOREHOLE LOCATION
- TP01 TRIAL PIT LOCATION
- PROPOSED ATTENUATION TANK - REFER TO AIREY AND COLES CIVILS INFORMATION FOR DETAILS
- PILED CRANE BASE BY OTHERS (SHOWN INDICATIVELY)

REFERENCE PLAN
NOT TO SCALE

REV.	DATE	NOTE	BY	CHK
P11	29.11.24	RETAINING WALLS UPDATED	DJC	RS
P10	02.05.24	UPDATED TO INCLUDE BLOCKS CB & RF	DJC	RS
P09	17.04.24	UPDATED TENDER ISSUE	DJC	RS
P08	28.03.24	BLOCKS QR & ST REMOVED RETAINING WALL TO BLOCK LP EXTENDED	DJC	RS
P07	27.04.23	TENDER ISSUE	SH	BC
P06	24.03.23	CRANE BASE POSITIONS UPDATED CP5 AND SP2 PROFILES AMENDED	SH	BC
P05	17.03.23	UPDATED TO SUIT DESIGN DEVELOPMENT WALL REFERENCES UPDATED CP1 PROFILE AMENDED	DC	BC
P04	07.03.23	RC WALL REFERENCES ADDED	SH	BC
P03	03.03.23	GABION REFERENCES ADDED	SH	BC
P02	01.03.23	UPDATED TO SUIT DESIGN DEVELOPMENT	SH	BC
P01	06.02.23	ISSUED FOR PRICING	SH	BC

0 10 20 30 40 50 60 70 80 90 100

PRELIMINARY ISSUE
NOT FOR CONSTRUCTION

AIREY & COLES consulting engineers
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ASHLEIGH WAY
LANGAGE BUSINESS PARK
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Fax: 01752 222115
admin@aireyandcoles.co.uk

PROJECT
WEST PARK,
UNIVERSITY OF EXETER

DRAWING TITLE
SITE PLAN SHOWING EXTERNAL RETAINING WALLS

SCALE	DATE	DRAWN BY	CHECKED
1:500	FEB-23	SH	BC

DRAWING NUMBER: 11400-S1000
REVISION: P11

PROJECT-ORIGINATOR-ZONE-LVL-TYPE-ROLE-DRG NO
EXE-A&C-EX-XX-DR-S-01000

DRAWING STATUS
S3 -SUITABLE FOR REVIEW AND COMMENT

UNITED KINGDOM OF GREAT BRITAIN
AND NORTHERN IRELAND

Defence College of
Logistics and
Personnel Administration

Certificate of Qualification

This is to certify that

25124285 2LT A R FLORENCE

successfully completed

0801 OFFICERS & SNCO ADVANCED EOD

at the

CONVENTIONAL MUNITIONS DISPOSAL WING
DEFENCE EOD MUNITIONS AND SEARCH SCHOOL SOUTH

25 JAN – 26 MAR 10

Lt Col A S K Fox MBE RE
CO DEMSS South
For Commandant

UNITED KINGDOM OF GREAT BRITAIN

AND NORTHERN IRELAND

DEFENCE EXPLOSIVE ORDNANCE
DISPOSAL SCHOOL

This is to certify that

SGT I. Forde

Successfully completed

Officers & SNCOs Advanced EOD

from 30 June to 22 July 2005

T.A. Curd
Commander Royal Navy

Commanding Officer

UNITED KINGDOM OF GREAT BRITAIN
AND NORTHERN IRELAND

DEFENCE EOD MUNITIONS AND SEARCH TRAINING REGIMENT

CERTIFICATE OF QUALIFICATION

This is to certify that

D244525D LH D Magnus

Has successfully completed the

0064 Defence EOD Operator CMD Course

24 Apr 17 - 07 Jul 17

Ministry of Defence

Maj IG Mackintosh RE
Officer Commanding CMD Squadron
DEMS Training Regiment

BRIMSTONE

RISK ASSESSMENT AND METHOD STATEMENT (RAMS)

EXPLOSIVE DEMOLITIONS

RISK ASSESSMENT AND METHOD STATEMENT (RAMS)

EXPLOSIVE DEMOLITIONS

Client:	EXAMPLE
Project Ref:	EXAMPLE
RAMS Ref:	EXAMPLE
Written By:	Bronwyn Price
Reviewed By:	Jock Forde
Authorised By:	Aaron Florence
Version:	3
Status:	Final
Date:	EXAMPLE

QUALITY POLICY

Brimstone Site Investigation Ltd, known as Brimstone, is committed to the delivery of unexploded ordnance (UXO) risk mitigation services, including safe removal and disposal of explosive ordnance, in the UK and overseas. Since our incorporation in 2016 it has been our goal to provide unsurpassed and unbiased UXO risk mitigation services. Brimstone is a client-centric organisation, with the aim to provide the client the services they need, to the agreed requirement, in accordance to national and international standards or standard operating procedures.

We are committed to providing a safe, cost-effective, and quality service, underpinned by our core values:

- **Integrity:** We are unwavering in our commitment to providing pristine, unbiased counsel and superior services. Our ethical compass guides every interaction, ensuring we maintain the highest standards of conduct in all our endeavours.
- **Professionalism:** We embody professionalism at every level, conducting our business with unparalleled excellence. Our commitment to quality guarantees top-tier service and a seamless experience for every client.
- **Knowledge:** We are devoted to perpetual growth, consistently expanding our expertise to stay at the forefront of industry innovation and strategy. Our thirst for knowledge ensures we are equipped to lead and succeed in an evolving marketplace.
- **Innovation:** We champion innovation, continuously advancing our services and processes. Our pursuit of inventive strategies and pioneering solutions ensures we not only meet but exceed the evolving needs of our clients and the industry.

We are committed to the applicable requirements of the ISO 9001:2015 standards. We set and review quality monitoring objectives using the plan, do, check, act cycle to measure the performance of our quality management system. Brimstone wholly endorses the ethos of 'continual improvement efforts' and allocates resources to meet this requirement.

This policy applies to the whole of the Brimstone services and involves all personnel including the managing director. All personnel are responsible for helping manage quality, seeking improvement through constant review, and by encouraging supplier and subcontractor involvement. We are committed to achieving customer satisfaction using quality procedures, which will be operated to meet or exceed the applicable requirements of ISO 9001.

Aaron Florence
Founder and Managing Director
Brimstone Site Investigation Ltd.

RAMS BRIEFING LOG

I, the undersigned have been provided with and understand the contents of this Risk Assessment and Method Statement and agree to abide by the rules and methodology stated within.

Name	Company	Date	Signature

Briefing Provided By:			
Name:		**Job Role:**	
Date:		**Signature:**	

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1 INTRODUCTION

1.1 Company Details

Brimstone Site Investigation Ltd is a UK-based UXO risk mitigation company working on projects in the UK and overseas. We assess, survey, investigate and dispose of unexploded ordnance. We are a company member of the Institute of Explosive Engineers, certified to ISO 9001 quality management standards, are CHAS Premium and Constructionline Gold members. We follow the industry standard CIRIA C681 and C785 guidelines. Our registered address is Innovation Centre Medway, Maidstone Road, Chatham, Kent, ME5 9FD, (0)2071172492.

1.2 Scope

The scope of the project is to minimise the threat of encountering UXO. We provide services to reduce the risk to people and property to ALARP – as low as reasonably practicable standard. We achieve this by reducing the risk to a point where any further reduction in risk is grossly disproportionate in terms of cost, effort and time.

This project is to conduct **Explosive Demolitions** to mitigate the risk posed from UXO discovery.

1.3 Project Location

The project address is given as:
[Full Site Address]

1.4 Client Contact Details

Name:	
Company:	
Contact Number:	

1.5 Staff and Training

Personnel may be changed during the project, the client will be informed of any personnel changes ahead of time and an appropriate project handover will be completed. Personnel changes will conform to the client's and Brimstones site induction processes.

Off-site:

Name	Job Role	Contact	Email
Aaron Florence	Managing Director	020 7117 2492	Aaron.florence@brimstoneuxo.com
Jock Forde	Operations Manager	07885 373 907	Jock.forde@brimstoneuxo.com
Bronwyn Price	Business Coordinator	07725 743 484	Bronwyn.price@brimstoneuxo.com
Mollie Ferguson	Operations Executive	07513 821 461	Mollie.ferguson@brimstoneuxo.com

On-Site:

Name	Job Role	Contact	Competence

All Brimstone UXO Engineers go through a rigorous vetting process to ensure that they are suitably qualified and experienced personnel (SQEP) for UK-based Explosive Ordnance Disposal activities. All SQEP UXO Engineers employed by, or subcontracted to, Brimstone hold formal qualifications gained through an internationally recognised EOD school. Typically, these qualifications are gained at Defence Explosive Ordnance Disposal, Munitions and Search Training Regiment (formerly Defence Explosive Ordnance Disposal School) during military service. Other qualifications include that of the International Mine Action Standards (IMAS).

1.6 CSCS Cards

CSCS cards are intended for construction related occupations only.

"Following discussions with the appropriate standard setting body, and key industry representatives, it has been agreed that your occupation is non-construction related and should be removed from the CSCS scheme entirely.

CSCS will not be issuing cards for non-construction related occupations, this means some workers will be arriving on site without a card.

It is not CSCS's intention to prevent non-construction workers or visitors from entering site because they do not have a CSCS card. It is the responsibility of the site managers to induct non-construction related workers and escort them where appropriate in order that they can carry out their work safely on site."

– Email from CSCS to BSI, 16 June 2022

The client is to familiarise and induct Brimstone UXO Engineers to the specific health and safety requirements for the site, as per direction given by CSCS.

However, many of our sub-contractors do have CSCS cards, which generally are green labourer's cards or a SSSTS card and will be in possession of them during the project. Whilst these cards do not provide evidence of competency to complete their tasks on site (as is the aim of such cards schemes) they do supply evidence that the individual has received basic health and safety awareness training. Sites which mandate CSCS card must let Brimstone know at the earliest opportunity so we can staff the job accordingly.

2 GENERAL PROVISIONS

2.1 Responsibilities

The client is:

- To provide safe and clear access and egress
- To provide information on buried services
- To provide permits to work (as required)
- To provide site inductions
- To provide welfare facilities, and
- To provide any reasonable additional information, assistance or advice which may be requested by our on-site UXO Engineer.

Brimstone will:

- Brief relevant personnel
- Work in accordance with these RAMS
- Keep a copy of the RAMS whilst carrying out the work

- Stop work if a safety issue is highlighted
- Report any incidents, accidents or near misses
- Identify any site activity which impacts our system of work, and
- Comply to the site rule and safety requirements of the client.

2.2 Welfare

Unless otherwise agreed, the client will provide welfare for the use of Brimstone personnel whilst on site. These include as a minimum:

- A place of rest, to eat and make hot drinks
- A sink or basin to wash hands
- A source of safe drinking water, and
- Toilet facilities.

2.3 First Aid

First aid requirements are expected to be met by the client. Brimstone personnel are often trained in First Aid at Work, although not always. If the client has specific first aid requirements, then they must let Brimstone know at the earliest opportunity so we can staff the job accordingly.

Brimstone staff are to attend site inductions, these inductions must contain information on:

- The nearest A&E facility
- Who the appointed persons/first aiders are on site
- Where appointed persons/first aiders are and how to contact them, and
- The location of first aid kits.

2.4 Fit for Work

Brimstone staff are often medically screened according to the Fit for Work standard. If the client has any specific requirements regarding medical screening, then they must let Brimstone know at the earliest opportunity so the job can be staffed accordingly.

No member of staff will be deployed to site with a medical condition that means they cannot complete their job safely. This could include:

- Prescription drugs that cause drowsiness
- Musculoskeletal disorders
- Stress, anxiety or depression, and
- Breathing or lung problems.

2.5 Access and Egress

The client has a responsibility to provide safe access and egress to the work area. Brimstone staff are expected to comply with site rules concerning access and egress to the work area. Walkways must be provided where necessary to protect pedestrians from:

- Falls from height
- Contact with moving plant or vehicles, and

- Falling objects.

Brimstone staff are expected to attend site inductions and make themselves aware of the prescribed routes, including emergency routes. If any concerns are raised regarding routes, then site management and Brimstone head office should be informed at the earliest opportunity.

2.6 Permits to Work

Permits to work are a special permission to carry out activities which are considered to be high risk. The client is responsible for providing permits to work where work falls into a high-risk category. Brimstone has determined that the following areas of high-risk activities can apply to our works:

- Hot works
- Excavations
- Lone working, and
- Working at height.

The clients must also be able to provide evidence of buried services, through drawings of GPR surveys where excavations by plant or machinery are carried out.

Brimstone does not typically issue permits to work as we are rarely the principal or main contractor on the site. Brimstone staff are to be briefed on the scope of the permit, must retain a copy of the permit, and must always follow the stipulations of the permit.

2.7 Personal Protective Equipment

Brimstone staff are to wear the minimum of safety boots and a high-visibility jacket and to be in possession of all other undermentioned items. Additional PPE requirements stipulated by the client must be observed. Any further PPE must be worn for the specific hazards of the job. All Brimstone staff have been trained in the correct use of PPE.

PPE	Grade	When	Additional information
High-Visibility Jackets	BS EN ISO 20471	At all times	Branded
Safety Helmet	BS EN397	As required	Branded - All times within 10m of plant
Safety Boots	BS EN ISO 20345	At all times	Metal-free construction (composite)
Work Gloves	BS EN 388	As required	
Eye Protection	BS EN 166.1.F	As required	
Hearing Protection	EN 352-2	As required	

2.8 Equipment Shutdown

Any machinery and/or equipment used by Brimstone must be shut down at the end of the day and secured according to the specifics of that item, plant or machinery. Any site-specific requirements mandated by the client are to be observed.

3 GENERAL HEALTH AND SAFETY PRECUATIONS

3.1 Manual Handling

Manual handling should be avoided where machinery or plant can complete the task. An assessment of the risk of injury from manual handling must be completed ahead of beginning the task, the risks associated must be reduced to ALARP.

Brimstone staff exposed to manual handling tasks are trained in manual handling and are familiar with methods of movements to reduce risk whilst carrying out these tasks.

3.2 Lone Working

Whilst Brimstone avoids lone working where possible, we accept that on occasion tasks will or must be carried out by lone individuals. When lone working is carried out, we assess:

- Stress and mental wellbeing
- Medical suitability, and
- The workplace.

We train individuals in lone working procedures and expect them to comply to those procedures. Any lone workers must have a means of contact if an incident arises.

3.3 Mental Well-being

Brimstone staff stay in regular communication with the ground staff and monitor the wellbeing of all workers.

To manage a healthy mental wellbeing, we recommend:

- Spending time doing activities that you enjoy
- Eating healthy, balanced diet, drinking enough water
- Avoiding smoking, alcohol, and drugs
- Regular exercise
- Getting a suitable amount of sleep, and
- Taking breaks where necessary in order to reduce mental fatigue.

3.4 Asbestos

Brimstone recognises that asbestos in its various forms is present on many project sites across the country and that coming into contact with asbestos is a likely occurrence at some point during our staff's careers. Asbestos assessments are to be carried out by the client/landowner where there is a legal requirement to do so.

Asbestos must be treated with the utmost caution. No Brimstone member of staff is to handle asbestos materials under any circumstances. We provide training on asbestos awareness, which is renewed annually to help make staff recognise asbestos and be aware of its health risks.

3.5 Excavations

Excavations may be carried out by Brimstone staff or by contractors working on behalf of Brimstone to investigate any deeper anomalies encountered. Any external suppliers of services or products will be vetted for competency and shall ensure that all cards are in date and machinery is serviceable prior to use in addition to the supplying company's own safe system of works being accepted.

During any excavation phase of works, we will ensure that:

- Collapse is prevented by shoring, stepping or battering
- Plant and materials are kept from the edge
- No person enters an excavation without a permit and training to do so
- Underground services are avoided as per client drawings or surveys
- Neighbouring structures are not undermined
- Any personnel must stand back from the edge of the excavation at a distance equal to its depth, and
- All ground shall be left in an acceptable state once work is complete.

When Brimstone staff are working in a supporting capacity, all activities will be driven by the client so long as they meet the above safety standards as a minimum.

3.6 Working at Height

Working at height includes working on a roof or ladder, working on a fragile surface or working near excavations, amongst others. The definition of working at height is a place where if there were no precautions in place an individual could fall a distance liable to cause personal injury. Brimstone recognises that this includes working near excavations. Any work near excavations must be assessed for risks with appropriate controls put in place to manage those risks. Please see excavations for further information.

3.7 Fire Procedures

When a fire is observed the main aim is to ensure everyone reach a place of safety. If individuals feel they are able to tackle a small fire, then they may if they can do so safely and are adequately trained. Fire extinguisher locations and muster points should be detailed during the induction.

Sources of ignition and sources of fuel are to be separated and managed according to the risk assessment where a risk is highlighted. Some ignitions risks include:

- Electrical faults
- Hot works
- Smoking, and
- Portable heaters.

Some fuel sources include:

- Combustible materials,
- Flammable gases and liquids, and
- Waste.

The client must ensure that:

- Emergency routes are provided and briefed, and
- Suitable signage in put in place for FFE and muster points.

3.8 Accidents, Incidents and Near Misses

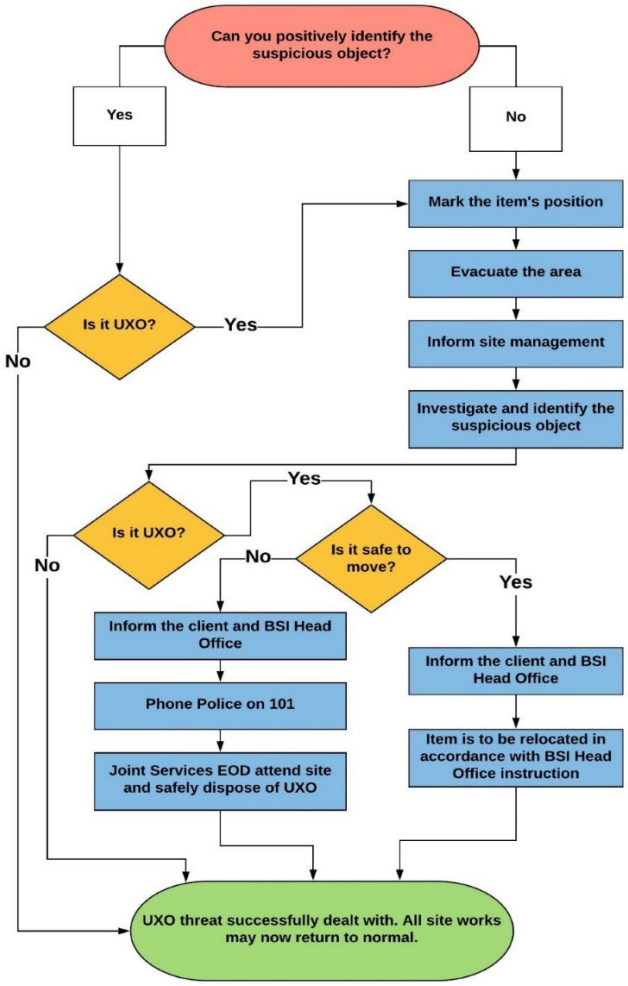
An accident is an event that results in injury or ill health. An incident is classed into near misses and undesired circumstances (an untrained person competing work beyond their capability). Further, a dangerous occurrence is a reportable event under RIDDOR (2013).

Any accidents, incidents or near misses - AINM are to be initially dealt with (e.g. first aid, moving materials, putting up barriers) and then reported both to site management and Brimstone head office. Brimstone staff have a responsibility to stop work and report the event and await further instruction, whilst an investigation is carried out. Brimstone has a zero AINM track record and is committed to maintaining the high standards we have set.

4 UXO SAFETY PRECAUTIONS

No item of UXO is to be touched or moved by any individual except those suitably qualified and trained to do so. Advice is to be sought from an advanced operator ahead of any positive action of an item of UXO. The client is advised to follow Brimstone's lead when directing the response to an item of UXO.

4.1 Reaction to Suspected UXO



4.2 UXO Safety Distances

Total Mass of Ordnance (kg)	Safety Distances (m)			
	Surface UXO		Buried UXO	
	Protected	Unprotected	Protected	Unprotected
2	21	609	10	21
5	31	732	15	31
10	50	841	21	50
15	50	912	25	50
20	56	966	29	56
25	61	1010	32	61
50	82	1160	45	82
125	120	1393	70	120
250	165	1600	97	185
500	214	1838	140	214

4.3 UXO Response

In the event that a UXO discovery occurs on site the following actions will be taken:

- Mark the position of the item.
- Evacuate all non-essential personnel to a safe area, usually a fire muster point.
- Establish a cordon to stop people or vehicles encroaching onto the area.
- Inform the client representative.
- Identify the ordnance and carry out a hazard assessment to determine the nature and extent of the risk
- An assessment of whether the ordnance is safe or unsafe to move will be made.
- If the item is assessed to be safe to move, the Supervisor will determine on the best course of action to relocate the article in a safe and efficient manner to a containment area to be disposed of at a later time.
- When an item is considered unsafe to move, Head Office will be informed and further advice will be sought.
- When a controlled explosion is required to be carried out, all workers will be notified of the intended time, an exclusion zone will be maintained with sentries posted and a NOTAM will be put in place.

5 METHOD OF WORK

Prior to any work commencing, the Brimstone Advanced EOD Operator shall carry out a task briefing with any individuals directly involved with the task to ensure that details of a response to a UXO discovery are fully understood and all members are working to a common standard as stated within these RAMS.

Any concrete, hard standing, tarmac or similar should have been broken out ahead of Brimstone attending the site of demolition activities will be defined by Aaron Florence prior to any works. A strategy of protective

works will be put in place to mitigate the effect of blast and fragmentation, as well as any specific related risks i.e. incendiary UXO, gases and chemicals and shaped charges.

The demolition site should be:

- Free of any ferro-magnetic anomalies. If an anomaly is present, it will be investigated, identified and cleared. This will ensure that all disposal activities take place within a sanitised area of the site.
- Free of buried services. The client must provide all known service drawings which may require mitigation during demolitions.
- In an area which can be readily controlled by Brimstone.
- If possible, away from any flight paths at an affected altitude.
- If possible, greater than 200m away from any telecommunications masts.

All cordons will be contained within the site boundary and all positive EOD action activities will be calculated using the net explosive quantity (NEQ) of the UXO in conjunction with the proposed donor charge.

In addition, quantities of explosives will be limited as far as possible to ensure disruption is kept to a minimum. It is unacceptable that any damage or other liabilities should occur to infrastructure, buildings, property or people as a result of explosive demolitions. Residents within a 500m radius will be issued with letters warning of upcoming planned explosive demolitions.

Safety distances, cordons, tamping, barriers, trenches and shelters, prior to any positive EOD action, will be calculated by Managing Director and Advanced Operator Aaron Florence and are defined as:

SITE DIAGRAM SHOWING BLAST AND FRAGMENTATION RADIUS' RELIVANT TO THE SITE.

Pre-Checks to Positive EOD Action

Prior to any Positive EOD Action, the Advanced EOD Operator will

- Control at all times the fully charged Shrike Exploder.
- Check electrical cables for continuity.
- Define safe distances and direct a cordon managed by sentries.
- Define a safe firing point outside of the safety cordon.
- Identify any radio/mobile telecommunications masts within a 200m radius of the proposed demolition site. Should RADHAZ be deemed excessive a non-electric system may be utilised.
- Monitor the weather forecast for low cloud and poor visibility.

Prior to any positive EOD action, the assisting EOD Operator will

- Ensure that all sentries are posted correctly around the boundaries so that no personnel, members of the public, or wildlife are entering the safety cordon.
- Manage the airhorn, which will be sounded with 3 x 1 second blasts 5 minutes prior to firing.
- To ensure that radios are fully charged, on the correct channel, and properly distributed amongst sentries. Radio check is to be conducted.
- To ensure that all mobile phones are in flight-mode to mitigate against radiofrequencies interfering with electric detonators (RADHAZ) and
- Confirm NOTAM is in place.

Positive EOD Action

- With the NEQ of the UXO disposal calculated, the UXO will be placed within the protective measures in a manner to aid efficiency to minimise use of donor explosives.
- Donor charges will be placed in such a manner to mitigate the specific risks presented by each type of ordnance. For example, shape charge cones will be collapsed first, and rocket motors secondarily.
- Detonating cord will be double thumb knotted and enveloped with the plastic explosives. A cradle, with a minimum 0.1m overlap, will be made to seat the detonator. All detonating cord joints are to be taped. No clips are to be used.
- Twin core electrical wire will be run from the disposal area to the firing point. Electrical wire will once again be tested for continuity.
- The Advanced EOD Operator, and ONLY the Advanced EOD Operator, whilst in possession of and controlling the Shrike Exploder, will approach the demolition site and attach the detonator to the electrical wire. The Advanced EOD Operator will then attach the detonator to the detonator cord cradle. The Advanced EOD Operator will then retreat to the firing point.
- The assisting EOD Operator will do a final communications check with the sentries.
- The Advanced EOD Operator will state a five-minute warning. The assisting EOD Operator is to sound the airhorn with 3 x 1 second blasts.
- The Advanced EOD Operator will then wait 3 minutes and then attach the electrical wires to the Shrike Exploder. With 60 seconds to detonation the Advanced EOD Operator will complete a final test of the circuit and prime the Shrike Exploder. Once the time has elapsed, the Senior UXO Engineer will shout loud and clear “FIRING, FIRING NOW!”. On detonation, personnel are to look upwards for any potential projected debris and wait the allotted 10 minutes soak time.
- The Advanced EOD Operator, and ONLY the Advanced EOD Operator, will approach the seat of the explosion to inspect the success, failure, or partial failure of the demolition. Personnel may approach the demolition area once being given a loud and audible “ALL CLEAR!”.
- Should more than one demolition be required in a given day the sequence above, including the pre-checks, will be repeated. Should a misfire occur, the above steps are to be repeated. The Advanced EOD Operator will direct the task of identifying the cause of the misfire and will put in place appropriate solution.

RISK ASSESSMENT MATRIX

Client:		Project:		Method:	

The following matrix is used to assess the associated risk in relation to tasks within the scope of the project. The tasks covered by this assessment are those detailed in the Method Statement. The assessment below is of the present risk known on the site at the time of writing. Should any additional risks present themselves or be highlighted by the client during a RAMS review then the following assessment can be amended accordingly.

Table 1: Likelihood

Value	Description
1	Improbable
2	Unlikely
3	Possible
4	Likely

Table 2: Consequences

Value	Description
1	Insignificant
2	Minor
3	Moderate
4	Major

Table 3: Comparative Risk Value

X		Likelihood			
		1	**2**	**3**	**4**
Consequence	**1**	1	2	3	4
	2	2	4	6	8
	3	3	6	9	12
	4	4	8	12	16

Table 4: Risk Definitions

High	Immediate requirement to review and investigate the case removing / reducing the risk or improving the controls.
Medium	Broadly acceptable level of risk, controls need evaluating to consider ALARP improvements.
Low	Acceptable level of risk.

RISK ASSESSMENT

#	Activity	Hazard	Implication	Persons Affected	Pre-Control Risk Rating			Control Measures	Post-Control Risk Rating		
					L	C	R		L	C	R
1	Moving plant and machinery	Crush injuries	Fatality or serious trauma injury	All site personnel	3	3	9	a) Identify and maintain exclusion zones for each type of plant b) Wearing of high-vis clothing c) Always get the 'thumbs-up' before passing plant d) Awareness of crush zones between plant and walls, other plant, other materials e) Areas of moving machinery to have suitable lighting f) Ensure the site maintains even ground conditions	1	3	3
		Machine striking personnel	Fatality/major trauma injury	All site personnel	3	4	12	a) Wearing of high-vis clothing b) Identify and maintain exclusion zones for each type of plant c) Always get the 'thumbs-up' before passing plant d) Use established segregated walkways for site personnel and public e) Maintain a minimum of 600mm distance between plant and other solid objects e.g: walls and other plant	1	4	4
		Noise	Permanent damage to hearing	Those working with or near operating plant or machinery	4	3	12	a) Use of ear protection (85 db) when working near plant for extended durations b) Toolbox talks/induction for specific plant safety measures c) Ensure personnel take regular breaks to avoid	2	2	4

								too much exposure to high levels			
		Spillages	Dermatitis, fumes, environmental	Those working with or near operating plant or machinery	**4**	**3**	**12**	a) Always wear rubber-backed gloves when handling fuels and cleaning up spillages b) Keep a spill kit with any plant under Brimstone scope to protect the environment c) Regularly inspect machinery for leaks and repair faulty parts d) Use of drip trays e) Ensure to adhere to refuelling procedures	**1**	**2**	**2**
		Diesel exhaust fumes	Lung cancer	Those working with or near operating plant or machinery	**3**	**4**	**12**	a) Ensure that plant uses AdBlue to reduce harmful exhaust fumes b) Ensure work areas maintain adequate ventilation c) Ensure that plant and machinery is regularly serviced d) Ensure that plant inspections are completed e) Wear a face covering if working within an area without adequate ventilation	**1**	**4**	**4**
2	All works	Trips and slips	Minor-major injuries	All site personnel	**4**	**3**	**12**	a) Always use established site walkways b) Avoid and report any trip/slip hazards c) Maintain good site housekeeping at all times d) Wear appropriate footwear with ankle support e) Maintain even ground surfaces f) Ensure sufficient lighting in all working areas	**2**	**2**	**4**
		Foul weather	Hypothermia	Site personnel working outside	**4**	**4**	**16**	a) Have available and wear foul-weather PPE when required b) Ensure safe and accessible shelter for all site personnel c) Ensure that welfare has facilities for hot food and drinks preparation d) Have spare set of dry clothes on wet days e) Be aware of the nearest A&E department	**1**	**4**	**4**

								hospital f) No lone working g) Tool box talk on inclement weather			
		Manual handling	Musculoskeletal Disorders (MSDs)	All site personnel	3	3	9	a) Use correct manual handling techniques b) Avoid lifting large loads alone (team-lifting) c) Be aware of how much you can safely lift on your own d) Use machinery/plant to lift as primary method e) Load adjustment, amend weight of loads if possible	1	2	2
		Lone Working	Risk of Injury with no immediate treatment/Psychological (Mental Health) Issues	Individuals working on site alone	3	3	9	a) Reduce the amount of time working alone daily b) Ensure site security is of high standards including locks on gates and security cameras c) Keep in regular communication with office staff and update on site d) Train those lone working in lone working procedures annually. e) Ensure there is an emergency plan in place and that the individual knows how to implement this	2	2	4
3	Biological Disease	Leptospirosis	Fever, nausea	Those in contact with water courses or standing water	2	4	8	a) Avoid exposure to contaminated water b) Wear correct PPE when working in or near water c) Ensure welfare has proper handwashing facilities and wash hands before eating, drinking and smoking d) Ensure all personnel are aware of the closest medical care if symptoms appear	1	2	2
		Psittacosis	Flu-like, severe pneumonia	All site personnel	3	4	12	a) Ensure welfare has proper handwashing facilities and wash hands before eating, drinking and smoking b) Wear safety gloves as when appropriate	2	2	4

		Tetanus	Lock-jaw, muscle spasms, fever	UXO Engineers, groundworkers	3	3	9	a) Ensure welfare has proper handwashing facilities and wash hands before eating, drinking and smoking b) Cover all cuts and open skin with correct coverings c) Wear safety gloves as and when appropriate	2	2	4
4	Hazardous substances	Asbestos	Asbestosis, cancer	Those working near demolitions or excavations	4	4	16	a) Attend site inductions – they will contain information regarding any asbestos found on site b) Restrict access to authorised personnel only c) Additional Asbestos Awareness training when required d) Use clear warning signs to indicate the presence of asbestos e) Report any asbestos or suspected asbestos to site management f) Wearing of Tyvek suit and FaceFit mask when required g) Only licenced workers are to remove/work with asbestos h) Prohibit eating, drinking and smoking in contaminated areas.	2	3	6
		Dust	Silicosis	All site personnel	4	4	16	a) Use dust suppression used with equipment which produces dust b) Dusty sites are to be dampened to supress dust c) Wear a minimum of P3 mask when working in or near a dust-producing work area d) Avoid works producing dust unless completely necessary e) Establish designated easting and resting areas away from dusty environments	2	3	6
		Cement	Dermatitis, burns	Those working with or near cement works	4	3	12	a) Avoid working near ongoing cement works b) Wear Tyvek suit and rubber-backed gloves when handling cement, or operating near	2	2	4

								cement works c) Be aware of ongoing site cement works			
5	Repetitive work	Upper Limb Disorders (ULDs), Repetitive Strain Injury	Pain, loss of mobility	All site personnel	**4**	**3**	**12**	a) Any developing pain or mobility issues are to be immediately reported to site management b) Spread out repetitive work through the day c) Take regular breaks from repetitive work d) Share workload where possible	**2**	**3**	**6**
6	Unloading equipment	Crush injuries, Manual Handling Injury	Fatality or serious trauma injury	All site personnel	**4**	**4**	**16**	a) Maintain safe distances, respect barriers b) Be aware of planned unloading operation through site briefings c) Maintain exclusion zones d) Use mechanical means where possible e) Get assistance where needed f) Be aware of safe working load	**1**	**4**	**4**
7	Working at height	Falls from height	Fatality or serious trauma injury	All site personnel working at height or near excavations	**4**	**4**	**16**	a) All works conducted with permits b) Restraints should be worn where part of the Method Statement c) Handrails and toe boards to be fitted correctly and used d) Regular checks to be done to maintain safe working at height e) Keep site and work area free from trip hazards	**1**	**4**	**4**
		Collapsing excavations	Fatality or serious trauma injury	All site personnel working near excavations	**4**	**4**	**16**	a) Excavations should not exceed 1.5mbgl without protective works as defined in a Temporary Works Plan b) Excavations should not be entered without prior planning in place c) No excavations are to be entered by Brimstone site workers at any time where the depth of the excavation exceeds 1m. d) Place warning signs to alert all personnel of the high levels of dust.	**1**	**4**	**4**

8	Excavations	Striking/disturbing UXO	Explosion. Single or multiple fatalities, serious injuries	All site personnel	**4**	**4**	**16**	a) Only SQEP UXO Engineers are to supervise excavations b) Detailed UXO risk assessments c) Properly maintained and calibrated equipment d) Work in close adherence to the Method Statement e) Safe access and egress f) Install barriers and guardrails g) Warning signs to be placed in the area h) Training on emergency procedures	**3**	**4**	**12**
9	Ground Penetration	Striking/disturbing UXO	Explosion. Single or multiple fatalities, serious injuries	All site personnel	**4**	**4**	**16**	a) Only SQEP UXO Engineers are to supervise target investigation b) Detailed UXO risk assessments c) Properly maintained and calibrated equipment d) Work in close adherence to the Method Statement e) Correct method for digging targets to be observed at all times f) QA checks to be carried out on Brimstone personnel to ensure continuation of standards set	**2**	**4**	**12**
10	Explosive demolitions	Detonators	Detonation. Major injury	Senior UXO Engineer	**4**	**4**	**16**	a) Radiofrequency hazards assessment b) Correct storage and handling c) Only SQEP UXO Engineers are to handle detonators	**2**	**3**	**6**
		Plastic explosives	Fire/deflagration	Those working with or near plastic explosives	**3**	**3**	**9**	a) Explosives stored aware from any sources of ignition or sources of excessive heat b) No smoking or hot works on site whilst explosives are being used c) Fire extinguishers are to be readily available d) Site fire evacuation plan in place e) Burn kits available	**2**	**3**	**6**

			Chemical tags – carcinogenic	UXO Engineers	**3**	**3**	**9**	a) Explosives should only be handled wearing rubber gloves b) Packaging should be properly disposed of c) Only SQEP UXO Engineers are to handle explosives	**2**	**3**	**6**
		Safety distances	Fatality/major injury	All site personnel, members of the public	**4**	**4**	**16**	a) Calculated in accordance with JSP364 b) Calculated by Advanced EOD Operator only c) Protective works are to be established d) Sentries and a safety cordon will be maintained e) Demolition plan briefing to all personnel f) Notice to airmen (NOTAM) to be issued g) Local authorities to be informed	**1**	**4**	**4**


BRIMSTONE
SITE INVESTIGATION

SCOPE

1. Historical context
2. Basic identification
3. Actions on a UXO find

HISTORICAL CONTEXT

- UK sites can be contaminated with German WW2 airdropped munitions or Allied land service ammunition (LSA), or potentially both.

- The MOD is the second largest landowner in the UK, as land is returned to the local authority, UXO can be left behind. UXO is frequently found on airfields, training areas and former barracks.

- 10% of WW2 German bombs failed to detonate, contaminating the UK's cities and industrial areas with UXO.

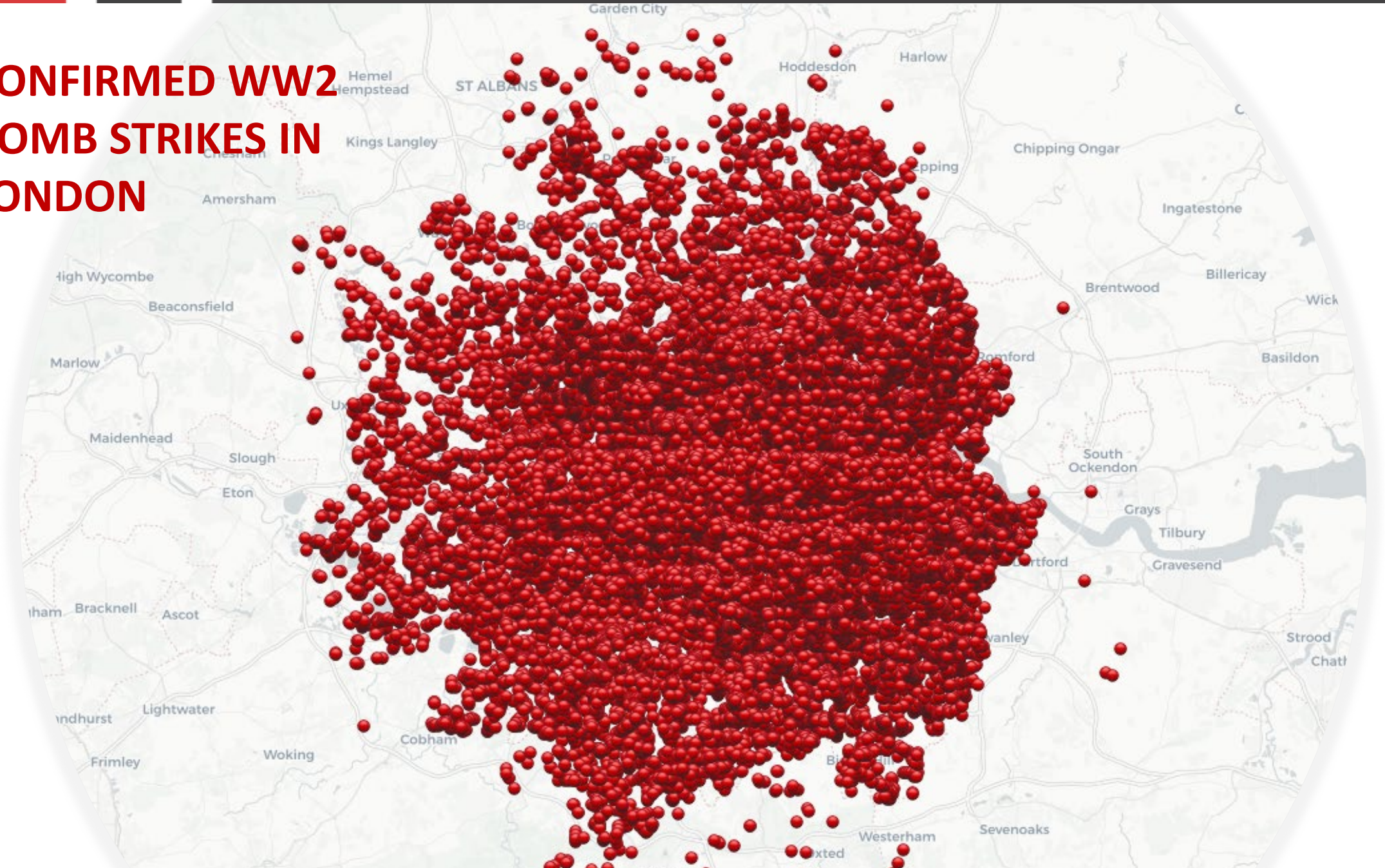
- 32,000 individual attacks across Britain between 1939-1944, dropping over 70,000 tonnes of bombs[1].

1. University of Exeter: humanities.exeter.ac.uk/media/universityofexeter/collegeofhumanities/history/researchcentres/centreforthestudyofwarstateandsociety/bombing/THE_BOMBING_OF_BRITAIN.pdf

HISTORICAL CONTEXT

- **London:** Beginning on ‘Black Saturday’ 7th September 1940 London experienced 57 consecutive nights of air raids.
- **Southampton:** On the 23rd of November, 800 bombs were dropped in a raid that lasted six hours.
- **Coventry:** 14-15th November 1940, the Luftwaffe dropped 503 tonnes of explosives and 30,000 incendiary bombs.
- **Hull:** Suffered 82 air-raids during the war, killing 1,200 civilians.
- **Birmingham:** On the 19-20th of November 1940, 400 tonnes of explosives were dropped.

CONFIRMED WW2 BOMB STRIKES IN LONDON



CASE STUDY: STAFFORDSHIRE, 2018-2019

Brimstone recovered in excess of 3,000 live No. 68 grenades in 2019 on a project in Staffordshire

Other items recovered include landmine and projectile fuzes, and Z-rockets.

Brimstone planned, in conjunction with HSE, the safe explosive demolition of these items on-site across several days.

The grenades were found abandoned on a post-war demilitarisation facility.

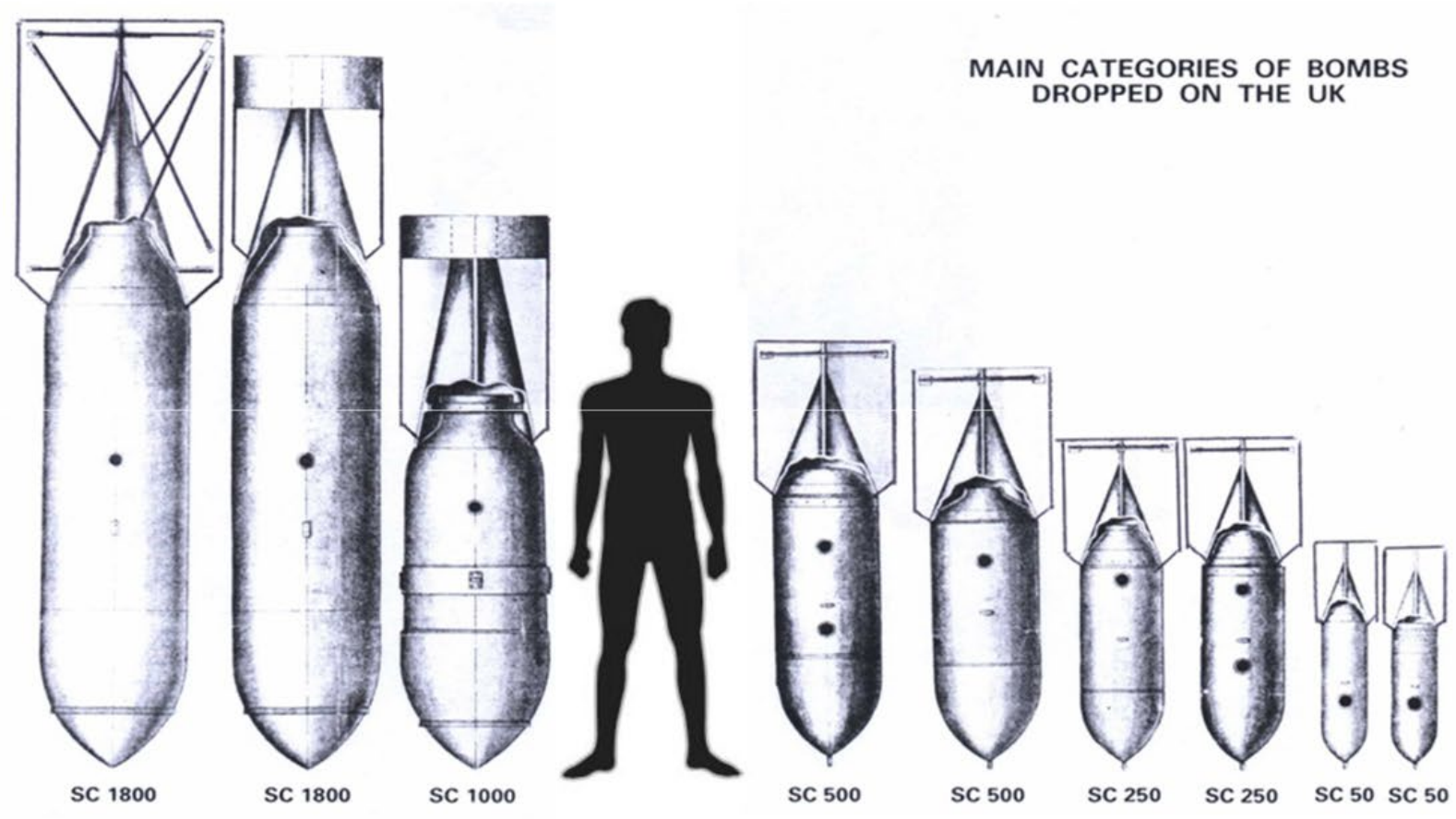
ORDNANCE IDENTIFICATION

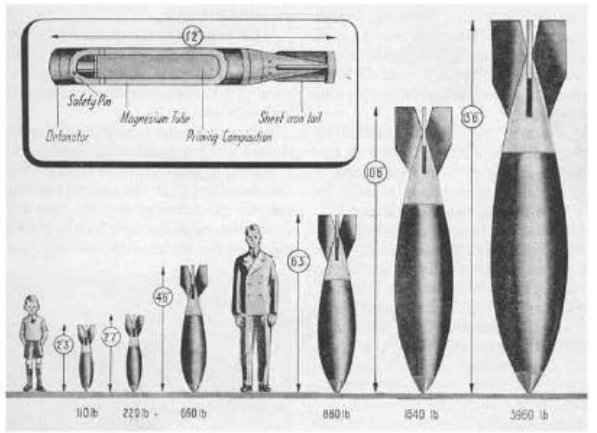
Airdropped

Projectiles

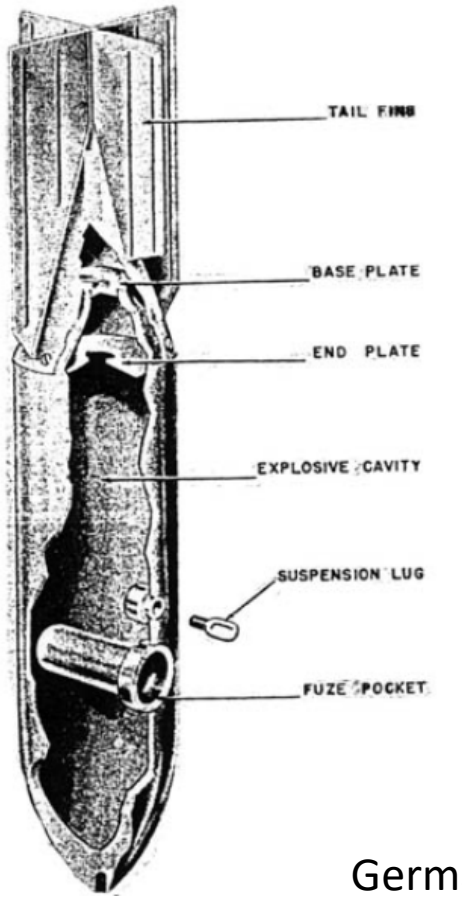
Grenades

AIRDROPPED ORDNANCE





AIRDROPPED ORDNANCE



German WW2
SC50 Bomb

AIRDROPPED ORDNANCE

German WW2 1kg
Incendiary Bombs

German WW2 SD2 HE
Submunition ‘Butterfly Bomb’

German WW2
SD1 HE
Submunition

WW2 ANTI-AIRCRAFT GUNS

Howtizer, 3.7” HAA

Bofors 40mm AA

PROJECTILES

40mm
Bofors
Round

Projector Infantry
Anti-Tank

2” HE
Mortar

4.5” Howitzer Projectile

3” HE Mortar

GRENADES

No. 68 AT Rifle Grenade

No. 82 ‘Gammon Bomb’ Offensive Hand Grenade

No. 36 ‘Mills Bomb’ Defensive Hand Grenade

No. 76 SIP Grenades

No. 69 ‘Dual-Purpose’ Hand Grenade

No. 74 AT ‘Sticky Bomb’ Hand Grenade

ORDNANCE IDENTIFICATION

Found UXO can be:

- Misshapen
- Rusty
- Parts missing
- Covered in clay, mud or concretia

SC 50, without tail section

SC 50, with tail section

Nautilus Diving Cylinder

Gas Cylinder

1kg Incendiary Bombs compared to scaffolding pipe (bottom)

ACTIONS ON DISCOVERING SUSPECTED UXO

1. Stop work immediately,
2. Avoid touching or interfering with the object,
3. Report the discovery to site management and
4. Evacuate the area

When Brimstone Site Investigation is present on-site, report the find immediately, and we will proceed according to our Standard Operating Procedures.

REMEMBER, ORDNANCE IS DESIGNED TO KILL.
AGE DOES NOT MAKE UXO SAFER.