GeoAssist Limited
Civil, Environmental & Geotechnical

Client:
Renaker Build Ltd.
1st Floor, NQ Building
47 Bengal Street
Ancoats
Manchester
M4 6BB

Architect/Consultant

Remediation Strategy & Deployment Plan

Great Jackson Street Plot F2, Manchester

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October 2023 Site Ref: 6131/VJS-RSDP v1.00

Client:
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47 Bengal Street
Ancoats
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Remediation Strategy and Deployment Plan

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Appendices

A1. Site plan & exploratory hole locations

A2. Proposed plan

A3. Plan indicating location of samples exceeding assessment criteria

A4. Approximate basement excavation extent

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Remediation Strategy and Deployment Plan

1. Introduction

This report contains the details of the Remediation Strategy and Deployment Plan to be undertaken at the development site at Great Jackson Street Plot F2, Manchester.

The work was commissioned following the acceptance of the quotation and an instruction to proceed issued by the Client, Renaker Build Limited in September 2023.

The purpose of this report is to provide adequate detail to ensure that where possible identified risks are mitigated or managed to an appropriate level for the intended land use following the conclusions of:

- A Geo-environmental Interpretive Report by others referenced 03558AA and Dated 13/01/2022.

The approximate grid reference for the centre of the site Plot F2 is 383445, 397243. The area of the Site is outlined with a solid red line on the Site plan in Appendix A1. The positions of exploratory holes are also indicated on the plan.

2. Description of the Site

2.1 Present

The site is located on a plot of land between Pond Street and Great Jackson Street, Manchester immediately to the south of The Deansgate Square Development. The site forms an irregular shape, and the topography of the site is relatively level. The site is presently subject to enabling works to allow bulk earthworks/excavation to commence subject to planning condition discharge.

2.2 Proposed

It is understood that the development for Plot F2 incorporates:

- The development of a new 51 storey hi rise structure with a two-tiered basement carpark and public realm podium structure.
- It is understood that the basement and podium levels will tie in with a similar proposed development to west (Plot F1).

The proposed development plan for the Site forms appendix A2 to this report.

3. Review Of Previous Reports

The following site investigation reports and advice notes are known to have been produced for this site and have been referenced where considered appropriate. A brief description of the information contained within is also provided.

Author	Date	Ref	Title / description
Coffey	Jan 2022	03558AA_R_002B_CT - GIR.docx	Geotechnical and Geo-environmental Interpretative Report
GeoAssist Ltd	Jan 2022	6069/CGJ- FGI-v1.1 FINAL	Factual Report incorporating geotechnical testing and analytical testing
GeoAssist Ltd	05/09/2023	Technical Note 050923	Further information as requested by MCC Environmental Health internal memorandum section dated 14 August 2023 planning reference 776371 – A way forward
GeoAssist Ltd	Sept 2023	6131VJS ACM-F	Ground Investigation – Targeted Asbestos/ACMSoil Sampling
GeoAssist Ltd	06/10/2023	Technical Note 051023	Results of additional Exploratory Holes and analytical testing across plots F1 and F2 – CSM remains unchanged

4. Conceptual Model

The conceptual model as originally presented within the Coffey geo-environmental report Referenced 03558AA_R_002B_CT - GIR.docx and dated Jan 2022 is presented in table 1.0 below:

Table 1.0 Conceptual site model

SOURCE	RECEPTOR	PATHWAY	RISK RATING
Asbestos containing materials present within the ground.	On-site construction workers	inhalation of fibres blown from any open ground where soils are exposed during construction	LOW TO MODERATE*
	End users and site visitors	inhalation of fibres blown from any open ground where soils are exposed post construction including maintenance work	VERY LOW
	Off-site personnel adjacent the site	inhalation of fibres blown from any open ground where soils are exposed during construction, maintenance works and building use	VERY LOW

SOURCE	RECEPTOR	PATHWAY	RISK RATING
Potential inorganic and/or organic contamination present within the made ground and natural soil at the site (excluding the imported fill materials)	On-site construction workers	direct contact, ingestion or inhalation of solids / liquids / gases / vapours or dust in any open ground where soils are exposed during construction	LOW
	End-users and site visitors	direct contact, ingestion or inhalation of dust blown from any open ground where soils are exposed in proposed landscaped areas	VERY LOW
	Off-site workers adjacent the site	ingestion or inhalation of dust blown from any open ground where soils are exposed during construction and maintenance works	LOW
	Foundation concrete	direct contact	LOW

Notes
*Residual risk reduces to LOW following appropriate management controls as discussed in Section 10.2 below.

5. Remediation Strategy

5.1 Objectives

The Coffey geo-environmental report Referenced 03558AA_R_002B_CT - GIR.docx and dated Jan 2022 identified some minor risks to human health (principally site workers) associated with Asbestos fibers/ACM and PAH compounds within the existing made ground at the site. The location and type of contaminant are noted on the plan which forms appendix A3 to this report. The plan in appendix A3 also includes the locations of the more recent additional ACM testing as documented in Geoassist report referenced 6131VJS ACM-F and the additional exploratory holes as proposed in Technical Note 050923 and Reported in Technical Note 051023.

Risks were identified using the C4SLs "minimum or tolerable" risk generic assessment criteria. Where samples were found to exceed the assessment criteria and a potential pollutant linkage identified, a decision to manage the risk through appropriate remedial measures has been taken.

The objective of the proposed remediation strategy is to ensure that the risks associated with the identified contaminants are mitigated to a negligible level or managed to an acceptable level post development.

The ground gas risk assessment identified low levels of carbon dioxide in the made ground deposits on site and subsequent analysis using the BS5485:2016+A1:2019 methodology concludes that gas protection measures are not necessary.

5.2 Details of Proposed Works

The site specific remediation methodology selected for this site is based on the most effective, practicable and durable solution available not entailing excessive cost and also takes account of the proposed construction program for the site. Significant removal of near surface soils over the entire area of the Site and replacement at a reduced level with standard construction materials such as 1st generation aggregate sub-base and waterproof concrete slabs and walls, or hardstanding. In these areas the act of construction alone will suffice to;

- Remove contaminant sources by excavation and
- Pathways by capping

and hence preclude any further possibility of the source from impacting end user receptors. Removal of all made ground and excavation into bedrock will eliminate minor carbon dioxide production and a significant thickness of Grade 2 waterproof concrete walls and basement slabs along with the code compliant basement carpark ventilation will prevent carbon dioxide intrusion and build up.

It is estimated that 21,300m3 of made ground, natural drift deposits and bedrock will be removed from site as part of the works. Waste transfer notes should be retained in accordance with the law and will be required to demonstrate compliance with the remediation plan. For the most part the removed soils will be replaced by structures to form the basement level car parks. Imported materials and any site won materials will be tested to demonstrate conformance with the specification and the results included within the remediation validation and completion report. A plan indicating the area of the bulk excavation is provided in appendix A4.

Construction/Remediation will be achieved using standard 360 backhoe excavation plant. Deposits will be excavated, stockpiled and loaded into 8 wheel tippers with dust covers and taken off site to a suitable materials handling facility. Foundation arisings in the affected areas will be treated in the same manner as the earthworks for remediation and will not be reused on site. The disposal operation will be conducted under a subcontract with a registered waste carrier. The enabling works will be undertaken by the developer.

General site preparation works are presently underway and bulk excavation/earthworks are anticipated to begin in late October or early November 2023.

5.3 Details of Type and Form of Contamination to be Remediated

The elevated levels of contamination identified were found to be present in the shallow made ground strata. The type and nature of the contamination can thus be summarized as such;

Table 5.0 Summary of Type and form of contamination to be remediated.

Determinand	Nature of Contaminant	GAC (mg/kg) Comm.	Max Value (mg/kg)	Sample Location(s) exceeding Criteria	Impacted Strata	Action
Asbestos Cement type material	0.958%			BH4 - 0.5	Made Ground	Remove as part of site prep works including Pile Mat Placement to 0.95m depth
Benzo[a]pyrene		5.7		WS4 – 0.40, 0.60 and 1.4 WS5 – 0.30	Made Ground	Remove as part of site prep works including Pile Mat Placement to 0.95m depth Exceedance at 1.40m will be removed at bulk earthworks stage. Following piling
Benzo[b]fluoranthene		7.2		WS4 – 0.40, 0.60 and 1.4 WS5 – 0.30	Made Ground	Remove as part of site prep works including Pile Mat Placement to 0.95m depth
Dibenzo[ah]anthracene		0.57		WS4 – 0.40, 0.60 and 1.4 WS5 – 0.30, 0.80	Made Ground	Remove as part of site prep works including Pile Mat Placement to 0.95m depth

Full details of the ground conditions on the site are provided in the exploratory hole logs The Coffey geo-environmental report Referenced 03558AA_R_002B_CT - GIR.docx and dated Jan 2022

6. Site Management Procedures

6.1 Details of Consents & Licenses

All contractors engaged by client in relation to remediation will have appropriate licenses in place where required.

At present the following contracts have been let:

WASTE PRODUCER			WASTE CARRIER		DISPOSAL SITE		
Contractor	Waste Stream (Generated)	(Permitted) EWC Code (s)	Name	Registration No.	Disposer Name	Licence No.	Disposal Facility (Transfer / Recycling / Landfill / Exempt Site)
Principal Contractor	General Waste Skip (Mixed Construction Waste)	15 01 06/17 01 07/ 17 02 01/17 02 02/ 17 02 03/17 04 07/ 17 05 04/17 06 04/ 17 08 02/17 09 04/	W Leeson & Sons	CBDU100836	W Leeson & Sons	EAWML 50114	Transfer
PC	Municipal Waste	20 03 01	Kennys	CBDU76122			
PC	Mixed Metals	17 04 07	EMR	CBDU188448	EMR	EAWML 50065	Transfer
PC	Wood	17 02 01	W Leeson & Sons	CBDU100836	W Leeson & Sons	EAWML 50114	Transfer
	Plasterboard	17 08 02	W Leeson & Sons	CBDU100836	W Leeson & Sons	EAWML 50114	Transfer
Various	Packaging	15 01 06	W Leeson & Sons	CBDU100836	W Leeson & Sons	EAWML 50114	Transfer
PC	Soil / Earth	20 03 03	UBU	CBDU101690	UBU	EAWML5 0112	Transfer
PC	Muck Away	17 05 04	PP Oconnor (To Be Confirmed)	CBDU101751			

6.2 Site Waste Management Plan

A range of measures will be adhered to during the construction process to mitigate against commonly encountered risks on construction sites. These mitigation measures centre on the standard requirements for construction contractors with regard to the protection of site operatives, the general public and wider environment when developing sites.

Two distinct sources of potential contamination have been identified by the ground investigation that could have an impact on human receptors. Impacts are likely to be restricted to direct contact only with a negligible risk to the wider environment and off site receptors as a consequence of the limited volume of the identified source material.

The development proposal for the Site includes bulk excavation with a materials management plan and standard measures, which are typically applied on construction sites, will be employed during excavation works to prevent and minimise the release of potentially contaminated materials into the environment from their original source location.

Such measures will include the following:

- The use of personal protective equipment and respiratory protective equipment for construction workers where necessary.
- Dust suppression measures where necessary, in order to prevent the generation of dust on, and migration of dust off, site. This is likely to take the form of damping down using road sweeping plant or hoses.
- Bunded containment of fuel for construction plant if on site and appropriately controlled refuelling areas with drip mats / trays where applicable
- The provision of emergency spill kits for fuel and oils
- The provision of environmental awareness training for site workers including the findings of the Phase II ground investigation and supplementary investigations (This can be in the form of toolbox talks).

6.3 Watching Brief

Careful observations will be made during excavation works to confirm the current assessment of site conditions. Any evidence of additional contamination will be brought to the attention of the LPA as soon as is practicably possible.

6.4 Variations/Deviations from the Deployment Plan

Any variation from the remediation strategy shall be reported in writing to the LPA as soon as is practicably possible, by an appropriately qualified person detailing what, if any, actions have been taken along with a justification for the decisions taken. Where actions have not yet been taken a method to deal with the variation will be provided. Where appropriate, photographic and or written evidence supporting such decisions should be provided within the verification report.

7. Validation & Verification of Remedial Measures

7.1 Objectives

To provide evidence to demonstrate that the remediation has been implemented as per the methods of the remediation strategy and or deployment plan and thereby the remediation has been successful, and the risks managed to the desired level or mitigated in the whole.

7.2 Sampling Strategy & Lines of Evidence

In this instance, Waste Transfer Notes for all soils waste leaving site will be included within the verification report and will be retained in accordance with the law.

Elsewhere the use of site notes and photographs from the site engineer and watching brief site visits during the earthworks and foundation installation will be utilised where appropriate.

Tabulated PID results from formation level inspections should be incorporated where appropriate.

7.3 Post Development Analysis and Targets

Landscaped public realm areas of the site will include limited above ground planters and tree pits, where this is the case site won soils will not be used. All Imported soils materials intended for use on site will be tested at a rate of not less than 1 sample per $50m^3$, a minimum of 3 samples will be tested to ensure they meet assessment criteria provided in Table 7.0. For the most part the soil criteria is based on EA Soil Guideline Values (SGVs), The Category 4 Screening Levels (C4SL) and Suitable For Use (S4U) assessment criteria published by Land Quality Management. These are considered to be appropriately protective of human health for the residential land use. Where LQM criteria are not available other equally health protective criteria derived using the UK methodology have been utilised from sources as indicated within Table 7.0.

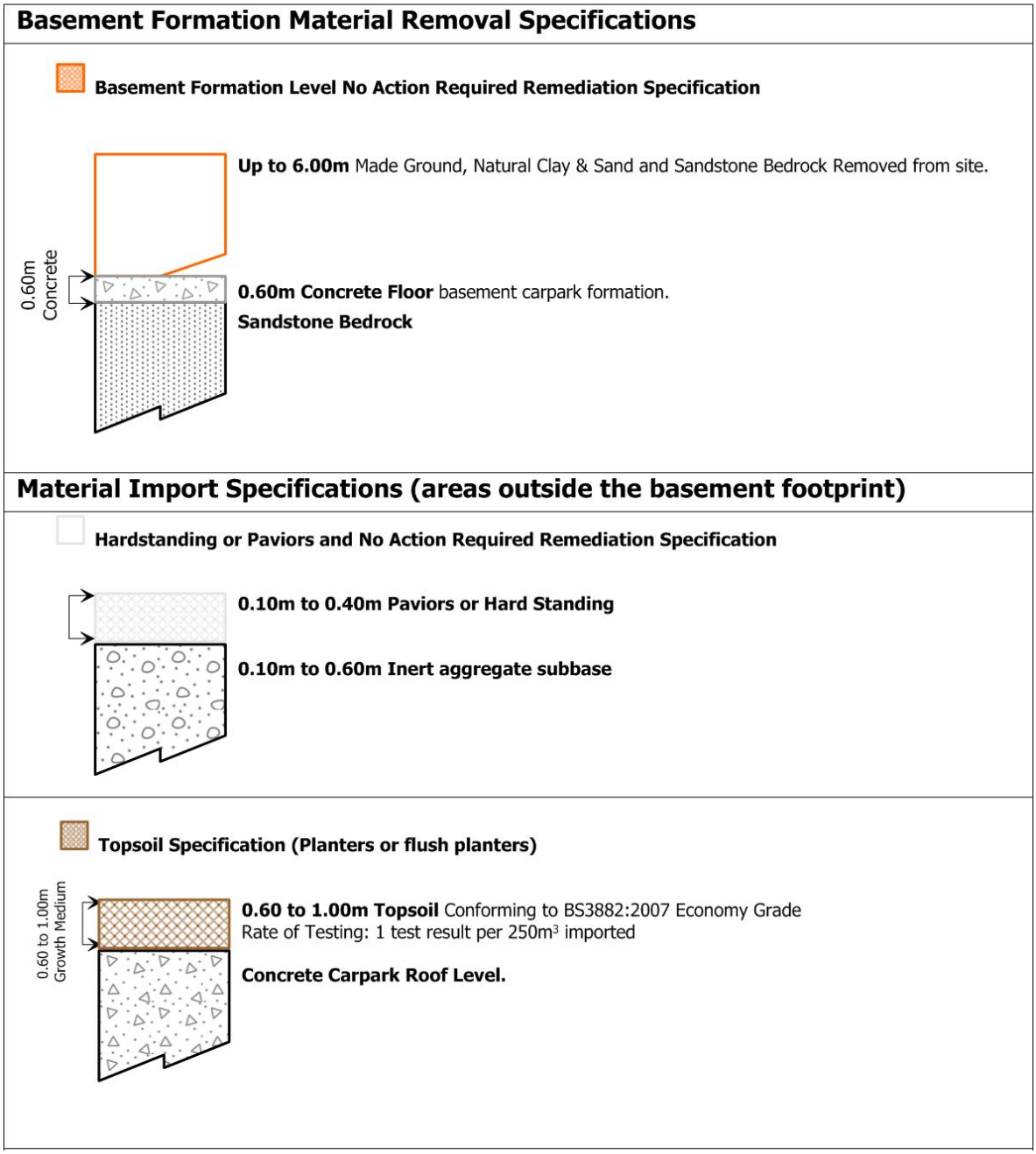


Figure 7.0 Material Import Specifications

Delivery notes for imported soil materials will be retained and incorporated into the verification and validation report. Photographic evidence of the insitu soils will also be provided clearly showing the depth of placement.

Table 7.0 Soils Import Criteria

SAL Reference Customer Sample Ref: Determinand	RES C4SL / S4UL SOM 6% GAC LQM II
Arsenic	37
Boron (water-soluble)	290
Cadmium	22
Chromium*	910
Chromium VI	21
Copper	2400
Cyanide(Total)	-
Cyanide(free)**	34
Lead	200
Mercury	1.2
Nickel	130
pH	-
Phenols(Mono)	1100
Selenium	250
SO4(Total)	-
Sulphide	-
Sulphur(Free)	-
Thiocyanate	-
Zinc	3700
Acenaphthene	1100
Acenaphthylene	920
Anthracene	11000
Benzo(a)Anthracene	-
Benzo(a)Pyrene SM	5
Benzo(b/k)Fluoranthene	-
Benzo(ghi)Perylene	-
Chrysene	-
Dibenzo(ah)Anthracene	-
Fluoranthene	890
Fluorene	860
Indeno(123-cd)Pyrene	-
Naphthalene	13
Phenanthrene	440
Pyrene	2000
PAH(total)	500
Asbestos id	ND

All Units mg/kg unless otherwise stated — Indicates Exceedance of Applicable Level

*Criteria Assumes Chromium III

**Criteria is derrived considering acute effects on 1-2yo Female Receptor ingesting a single dose of 3g of soil

**Criteria is derrived considering Total TPH (C10 to C35) is formed entirley of a 50:50 Aliphatic and Aromatic Split C8-C10 range

Basis of Assessment Criteria:	EA 2005 WAC (Human Health Value)	C4SL
	LQM S4UL	Atrisk 06

7.4 Verification Report

Upon substantial completion of the project a verification report containing the lines of evidence and test results discussed in Section 7.2 and 7.3 herein, shall be submitted to the LPA along with a completion statement confirming that the development has been subjected to the remediation strategy detailed herein and has met the stated objectives. It is the duty of the developer to maintain adequate lines of evidence that work has been completed in accordance with this remediation strategy and failure to provide the necessary evidential information such as waste transfer notes, photographs, delivery notes for imported soils will lead to planning delays and cost increases in the final completion stages of the development for which the developer will be responsible.

Matthew Benson MSc GMICE
Geotechnical/Environmental Engineer

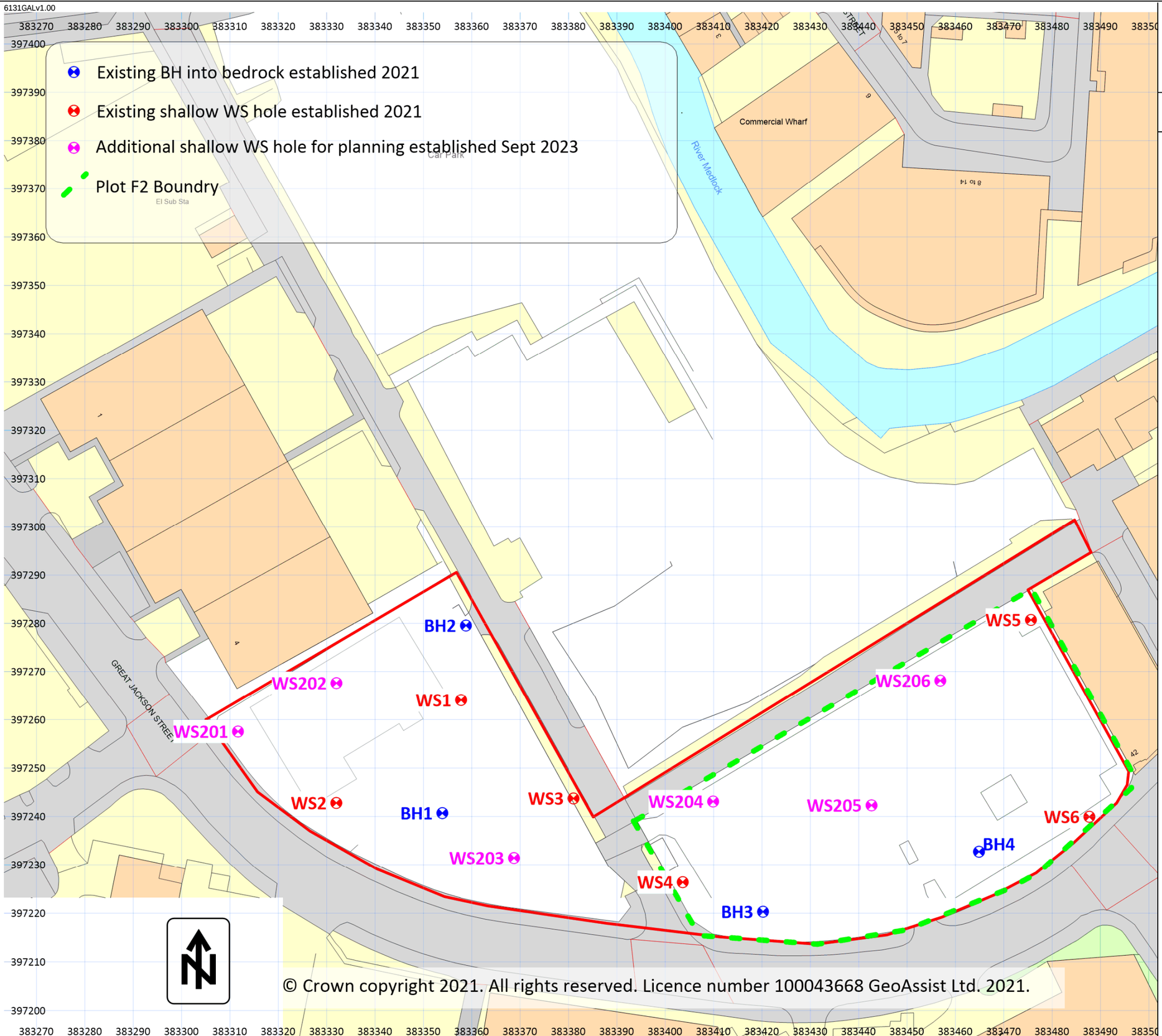
Mark Richardson MSc CEng MICE
Technical Director

Field investigations have been restricted to a level of detail required to achieve the stated objectives of the work. Ground conditions are, and can be, variable and have only been tested at isolated locations across the Site. Therefore the potential exists for ground conditions to be encountered which are different to those considered in this report. Chemical analysis was conducted for a number of parameters based on an expert understanding of the historical and operational data available at the time and it should not be inferred or otherwise, that other chemical species are not present.

This report excludes consideration of potential hazards arising from any activities at the Site other than normal use and occupancy for the intended land uses. Hazards associated with any other activities have not been assessed and must be subject to a specific risk assessment by the parties responsible for those activities

This report has been prepared by GeoAssist Limited with all reasonable professional skill, care and diligence within the terms of the contract with Renaker Build Limited. The report is confidential to Renaker Build Limited, their/the named persons advisors and bankers, and GeoAssist Limited accepts no responsibility of whatever nature to third parties to whom this report may be divulged. GeoAssist Limited owns the copyright in this report. All rights are reserved, and unauthorised use is prohibited. Renaker Build Limited may use the report for their/her/his own purposes.

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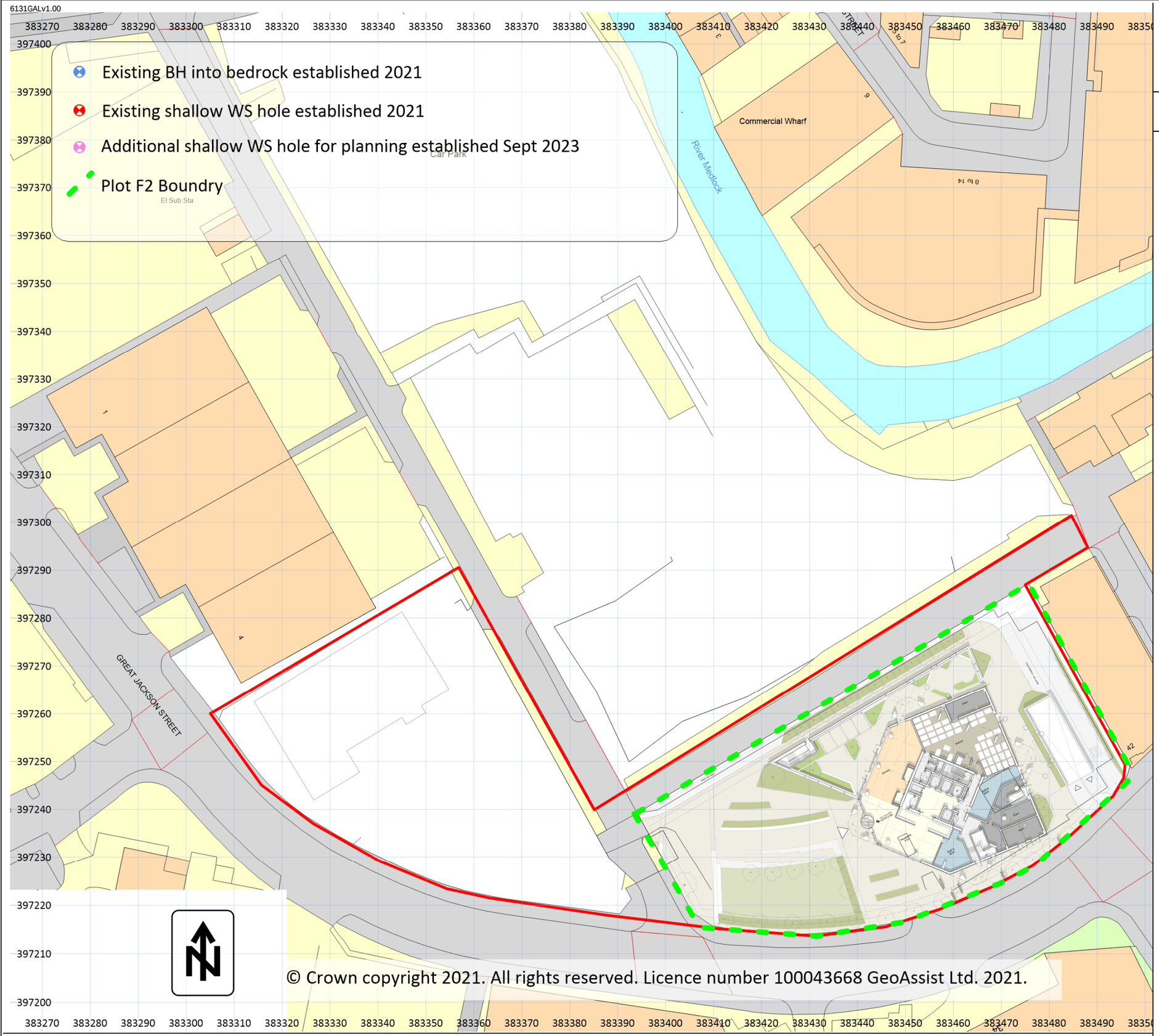
A1 Site Plan With Exploratory Hole Positions

Site Name	Great Jackson Street Plot F2
Location	Manchester
GeoAssist Ref	6131VJS
Client	Renaker Build Limited
	Renaker Build Ltd. 1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	
NGR (centre of site)	
Production Date	5th Oct 2023
Survey Method	
Surveyor	Others
Status	v1.00
Base Survey	OSGB36

Note:

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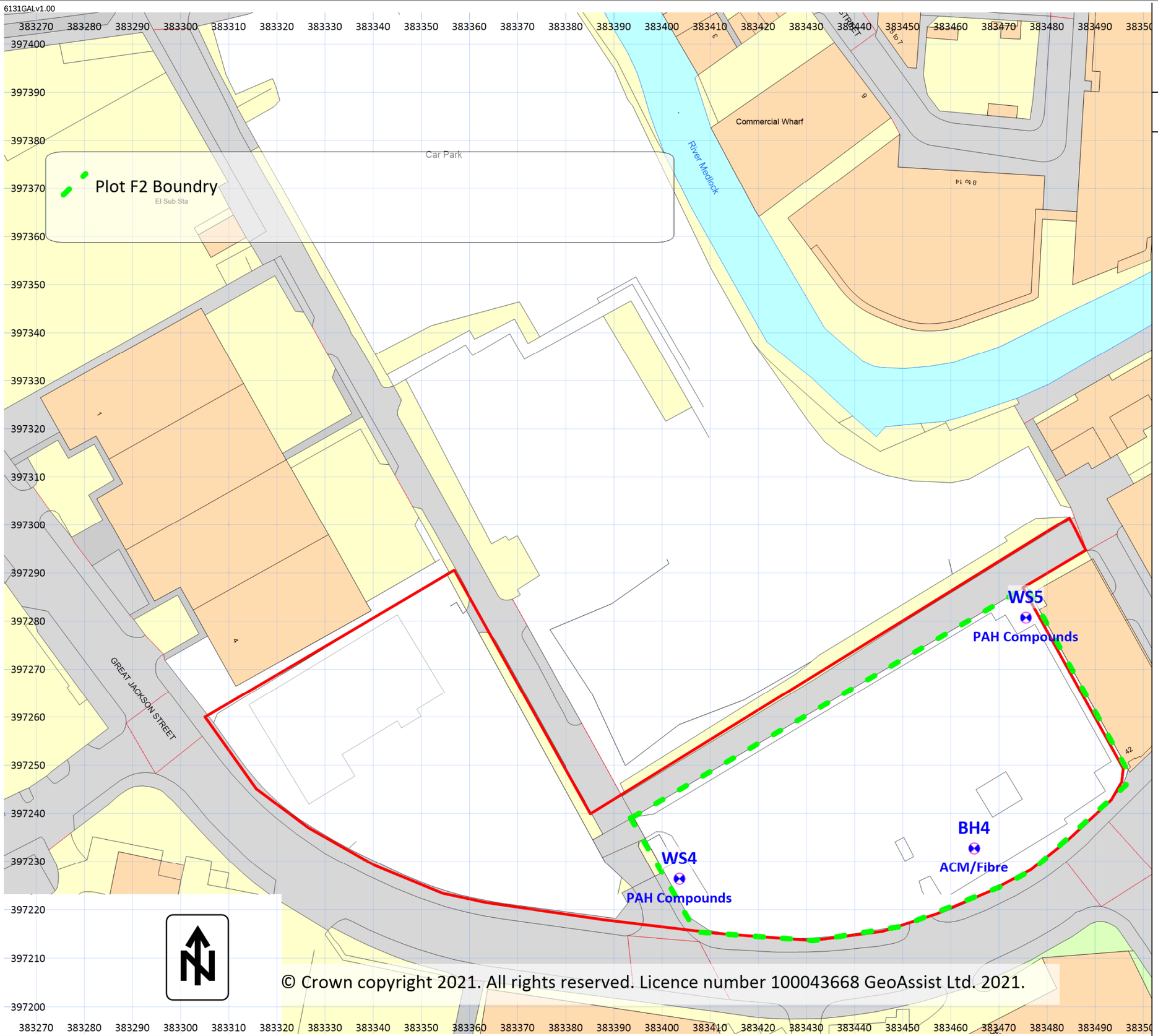
A2 Proposed Site Plan

Site Name	Great Jackson Street Plot F2
Location	Manchester
GeoAssist Ref	6131VJS
Client	Renaker Build Limited
	Renaker Build Ltd. 1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	
NGR (centre of site)	
Production Date	5th Oct 2023
Survey Method	
Surveyor	Others
Status	v1.00
Base Survey	OSGB36

Note:

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A3 Site Plan

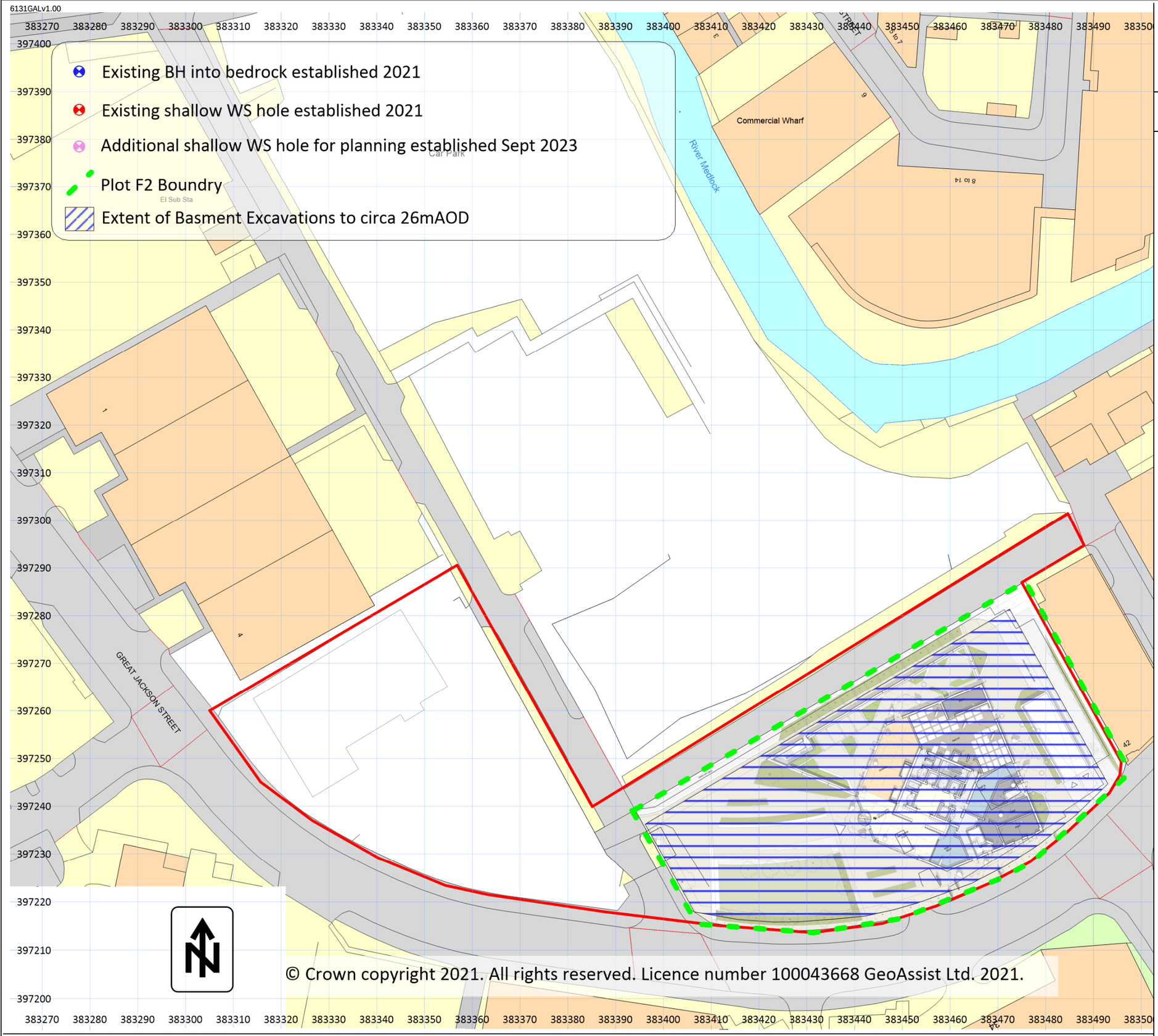
Locations of Samples Exceeding Assessment Criteria

Site Name	Great Jackson Street Plot F2
Location	Manchester
GeoAssist Ref	6131VJS
Client	Renaker Build Limited
	Renaker Build Ltd. 1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	
NGR (centre of site)	
Production Date	5th Oct 2023
Survey Method	
Surveyor	Others
Status	v1.00
Base Survey	OSGB36

Note:

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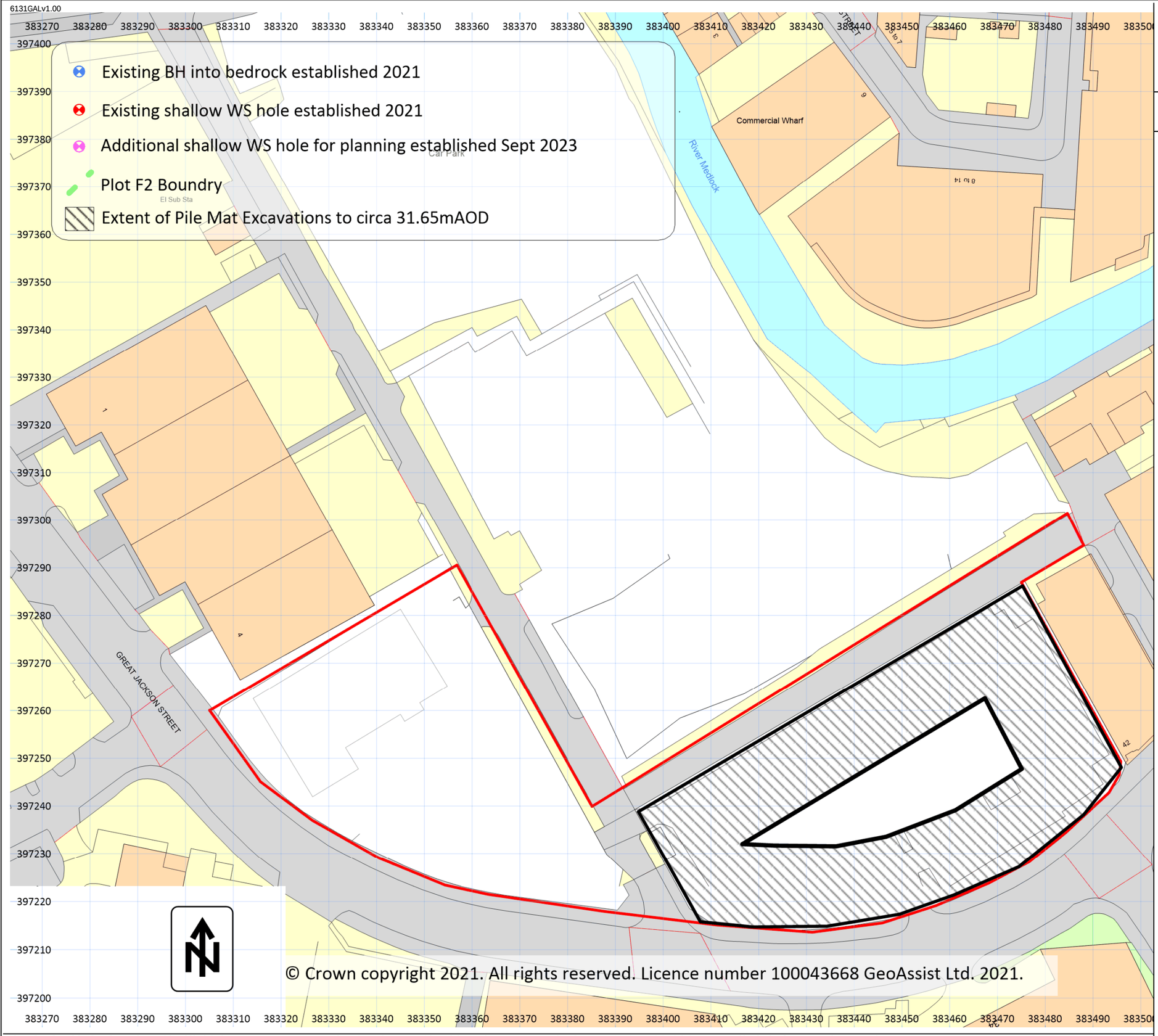
A4-1 Site Plan
Extent of Basement Excavation

Site Name	Great Jackson Street Plot F2
Location	Manchester
GeoAssist Ref	6131VJS
Client	Renaker Build Limited
	Renaker Build Ltd. 1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	
NGR (centre of site)	
Production Date	5th Oct 2023
Survey Method	
Surveyor	Others
Status	v1.00
Base Survey	OSGB36

Note:

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A4-2 Site Plan
Extent of Pile Mat Excavation

Site Name	Great Jackson Street Plot F2
Location	Manchester
GeoAssist Ref	6131VJS
Client	Renaker Build Limited
	Renaker Build Ltd. 1st Floor, NQ Building 47 Bengal Street Ancoats Manchester M4 6BB
Planning Consultant	
NGR (centre of site)	
Production Date	5th Oct 2023
Survey Method	
Surveyor	Others
Status	v1.00
Base Survey	OSGB36

Note:

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