Powell Tolner & Associates Ltd

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Project:	Grimshaw Lane, Manchester
PTA Project No:	9762
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consultancy engineering business environment

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For and on behalf of Powell Tolner & Associates Limited				

Revision	Date	Description	Prepared	Reviewed
P01	27.10.2020	Draft Issue.	LB	AH
P02	03.11.2020	Issued for Planning.	LB	AH
P03	12.02.2021	Site Layout Updated.	LB	AH

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1 INTRODUCTION

Powell Tolner & Associates Ltd have been commissioned by Canmoor Development Ltd to provide a Flood Risk Assessment & Drainage Strategy in support of a planning application for the proposed Industrial development at Grimshaw Lane, Manchester.

The purpose of the report is to provide details of the site Flood Risk and provide a drainage strategy to cope with surface water runoff generated by the proposed development and mitigate any potential downstream impact.

2 DEVELOPMENT DESCRIPTION

2.1 Location

The site is located at Grimshaw Lane, Manchester; OS Grid 387050 , 399990 (SJ 87050 99990) as shown in Figure 1 below. The site has a plan area of 10.3ha as shown on Appendix B – Architect Site Plan.

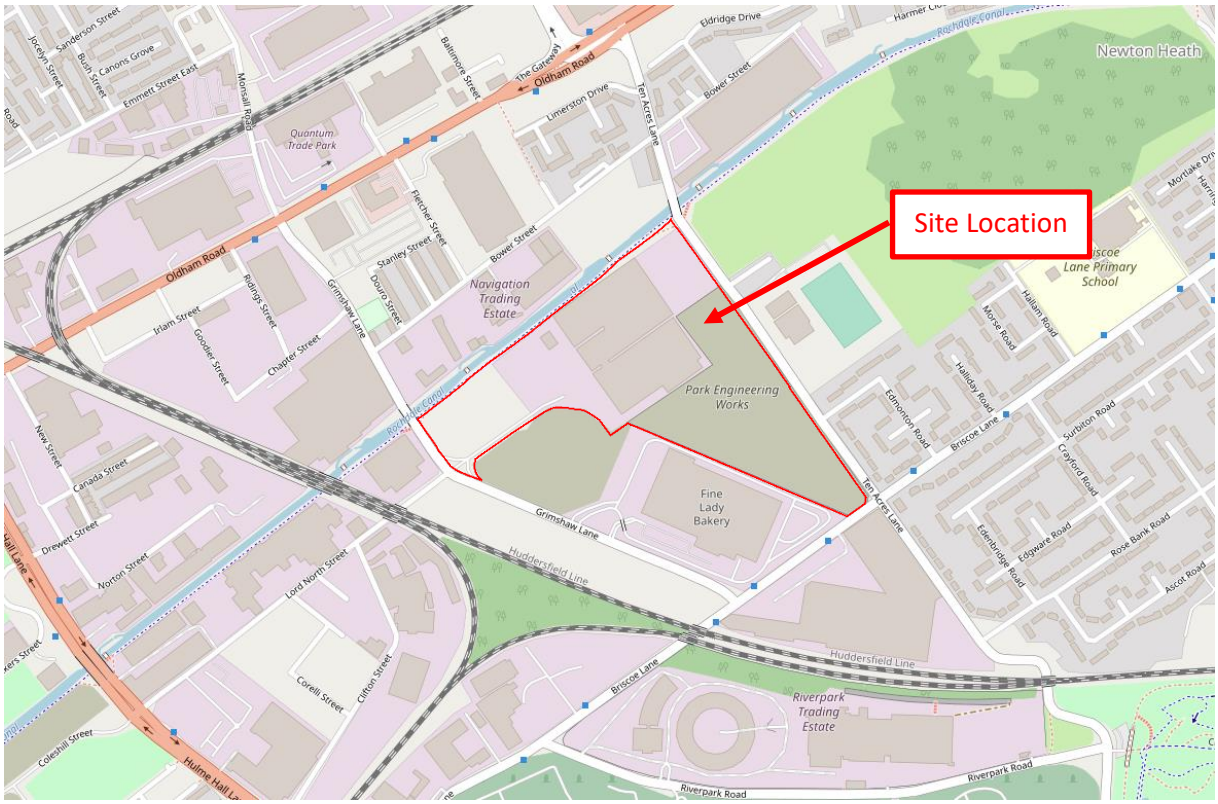


Fig 1: Site Location – Extract from OpenStreetMap

2.2 Existing Site

A pre-development topographical survey was carried out by Greenhatch Group dated 26.01.2021 rev 1 (Appendix A) shows the site to be occupied by concrete and asphalt hardstandings, industrial buildings and green areas, making this a brownfield site.

Roof	23064 m^2
Hardstanding	17490 m^2
Landscaped	62497 m^2
Total	103051 m^2

Table 1: Existing Areas

2.3 Proposals

The proposed development comprises of 7 warehouse buildings (12 Units) with adjacent yard and car park areas as shown on the proposed architect layout – Appendix B.

Roof	40800 m^2
Hardstanding	38571 m^2
Landscaped	20647 m^2
Access Road & Initial Ramps	1983 m^2
Total	103051 m^2

Table 2: Proposed Areas

2.4 Flood Vulnerability Classification

The Environment Agency (EA) Flood risk map below shows the entire site is located within Flood Zone 1, with a low probability of flooding from rivers and seas. This is less than 1 in 1000 (<0.1%) annual probability of flooding.

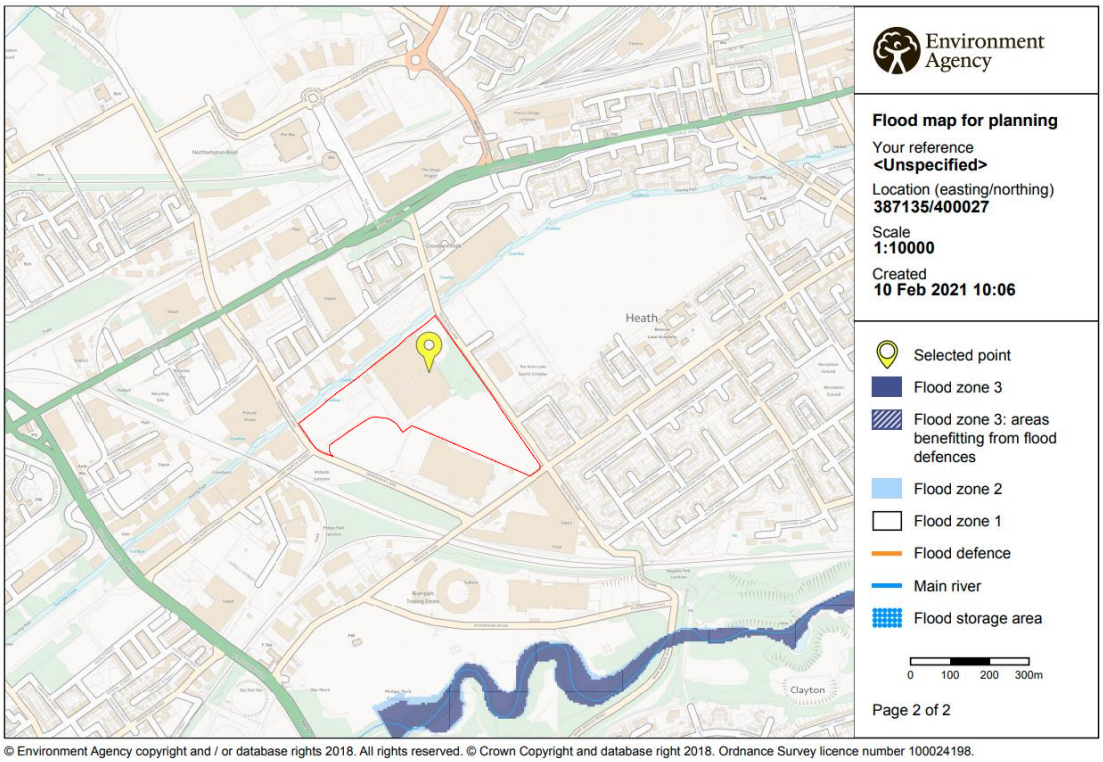


Fig 2: EA Flood Map – Flood Zone Map

2.5 Flood Zone Compatibility

In accordance with the National Planning Policy Framework (NPPF) there are no restrictions upon the type of development within Flood Zone 1. As such the proposed industrial use is compatible within Flood Zone 1. Also, as the site is in Flood Zone 1 the need for an exception test is not required.

2.6 Existing Surface Water Runoff

The site impermeable areas are mostly gravity drained via the existing ø375mm combined sewer lateral running along the site access road into the Public Sewer within Grimshaw Lane.

Due to the existing combined sewer size serving the site it is expected that during extreme rainfall events the sewer capacity is reached and part of the surface water runoff will be conveyed by overland flows along the access road into Grimshaw Lane.

3 FLOOD RISK

In accordance with the NPPF and its Technical Guidance document the risk of flooding from varying sources need to be considered.

3.1 Rivers

The River Medlock and the Moston Brook are the nearest water courses to the site and are located about 750m to the South and 1Km North respectively.
Adjacent to the site is the Rochdale Canal, refer to Section 3.3 for further details.
The EA flood map, as seen in Figure 3, shows the site to have a very low risk of flooding caused by the increase in rivers water levels.

Fig 3: EA Flood Map – Flooding from rivers and sea

3.2 Tidal

The site is not within the tidal influence.

3.3 Canal

The Rochdale Canal runs along the site's northern boundary and the risk of flooding was identified on the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment (SFRA) to be connected to an eventual breach in the canal shown on the maps below.

"Canal Breach Zone B. Less likely breach locations, such as at wide, low or very low embankments, were identified by a walkover survey of the canal. At such locations it is more likely that this source of risk could be scoped out within any site specific FRA" – Extract from the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA

It is expected that the shown extent of flooding will be reduced as the site's proposed levels are generally raised above the existing. As the canal is under the Canal and River Trust management it is subjected to routine inspections and maintenance, as such the risk of flooding from the breach of this asset is considered low. Any eventual flooding, if at all, will behave as overland flows being redirected downstream along the site access away from the proposed buildings.

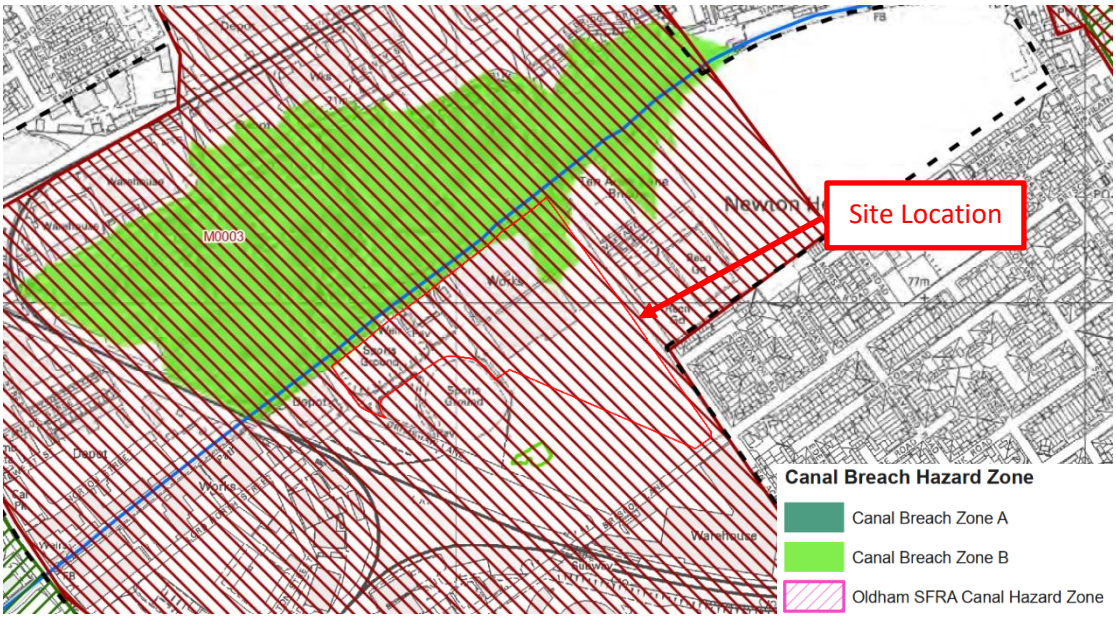


Fig 4: Extract from the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA - Canal Hazard Zones – Drawing MM_3.2B – Appendix C.

3.4 Groundwater

Although the groundwater level within the site was recorded in the Geo-environmental Site Assessment (Appendix K) to be between 0.12 and 4.0m bgl, the risk of flooding due to the rise in groundwater level is deemed low due to the low permeability of the clay strata encountered across the site.

Any eventual flooding will behave as overland flows being redirected downstream along the site access away from the proposed buildings.

Furthermore, the below extract (Figure 5) of the Level 2 SFRA has not identified the site to be at risk of flooding from Groundwater.

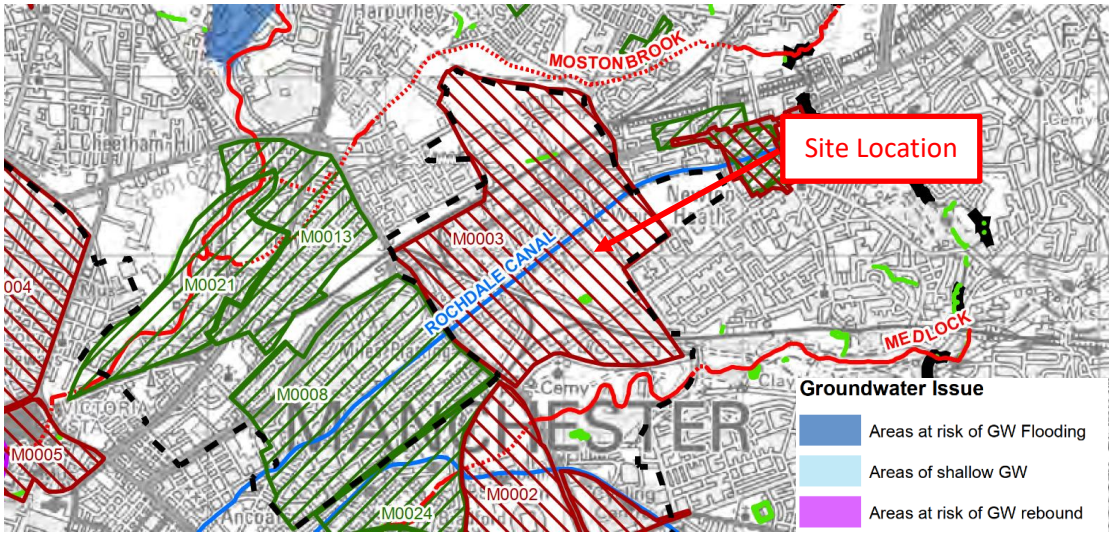


Fig 5: Extract of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid SFRA Groundwater Flooding – Drawing GW_2.1 – Appendix D

3.5 Overland Flows

Based on the topographical survey the site levels generally fall from North East to South West following the adjacent Rochdale Canal.

Locally there are areas where the existing levels are slightly lower and the risk of flooding is associated with these low level areas as shown on EA map (Figure 6).

The proposed buildings are generally set above all of these potential flooding areas and the surrounding areas will be kept lower than the proposed buildings' ground level (FFL) to allow for an exceedance flow path in the case of drainage system malfunction or extreme rainfall events around the buildings (Appendix E).

Fig 6: EA Flood Map – Flooding from Surface Water

3.6 Sewers

The presence of a combined public sewer network in the site vicinity as shown on the United Utilities Sewer records (Figure 7 extract from Appendix F) does impose a risk of flooding due to the potential overflow of these sewers based on the expected increase in rainfall rate. However, risk of flooding from sewers is deemed to be low and any potential flooding would behave as overland flows avoiding the proposed buildings.

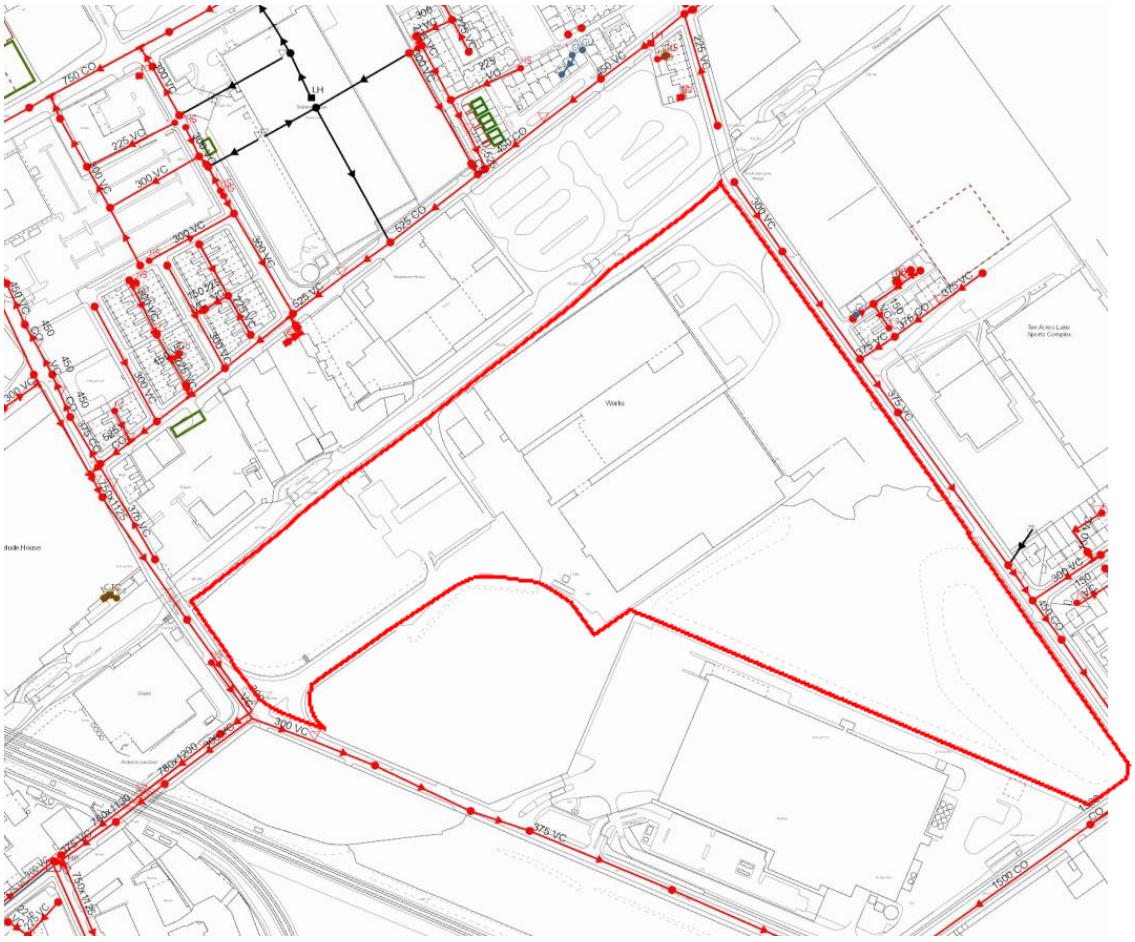


Fig 7: Extract from United Utilities Sewer Records

3.7 Other Sources (Reservoirs)

The risk of flooding from other sources is very low as shown on the EA map below (figure 8).

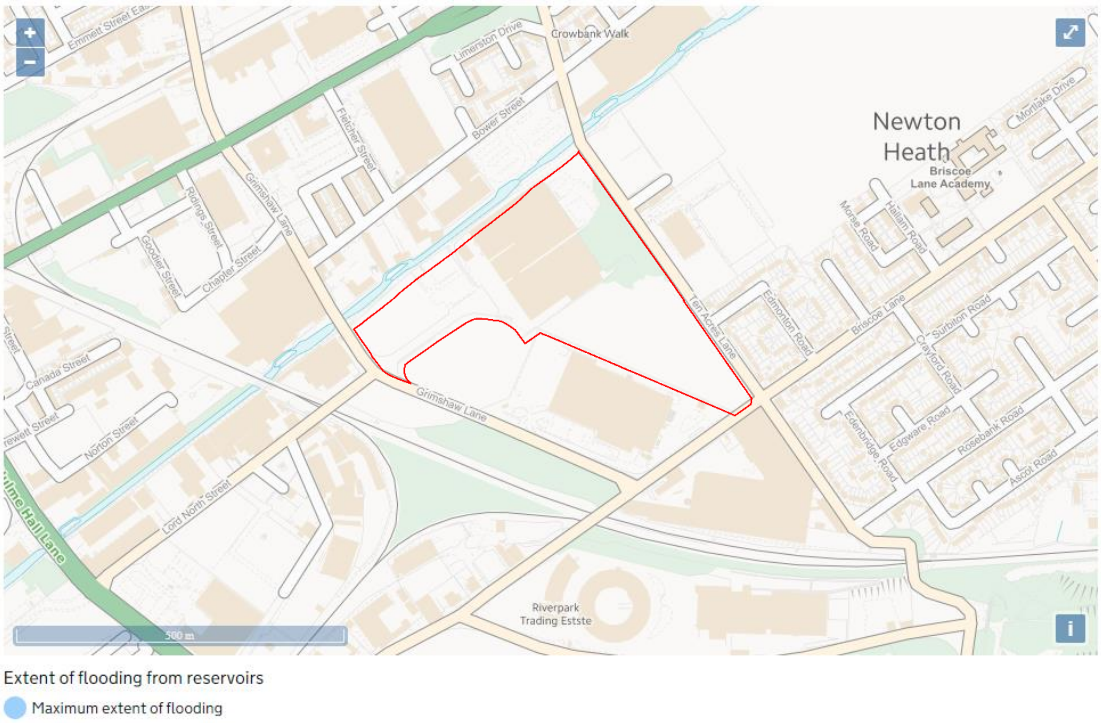


Fig 8: EA Flood Map – Flooding from Reservoirs

3.8 Climate Change

The projected effects of climate change are expected to lead to increased rainfall, river flows, raised sea level and tidal fluctuations. The only ones which can be pertinent to this development are the ones from increased rainfall, its effect on drainage systems, river and canal flows.

The EA, as the government's expert on flood risk, has updated these climate change allowances. Following the above, 20% increase the peak rainfall intensity (Upper end category) should be used considering the proposed development lifetime (25 -50 years) and the flood risk due to surface water runoff.

Furthermore, the 1 in 100 year storm event with a 40% increase in climate change rainfall events shall be safely contained on site, thus preventing any increase in flood risk to adjacent & downstream properties.

As a result of climate change there would be a slight increase in risk of flooding by overland flows and sewers; however, the risk would remain low.

3.9 Residual Risk

There are no other residual risks to the development.

4 FLOOD RISK MANAGEMENT

4.1 Floor Levels

To mitigate the flood risk due to surface water, the proposed development levels should be designed to provide flood flow routes away from the development in the event of surface water drainage malfunction or during extreme rainfall events falling outside of the design requirements. Refer to Appendices E and J with the Surface Water Exceedance Flow Route & Proposed Levels Layout.

4.2 Sustainable Drainage Techniques

The use of various sustainable drainage techniques have been investigated with respect to their potential to be used within the development to control storm water as close to the source as possible and reduce the potential increased flood risk from the development. They are reviewed in order of Most to Least Sustainable based upon the SuDS Hierarchy table from the EA.

	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit
Most Sustainable	Living roofs	✔	✔	✔
↑	Basins and ponds - Constructed wetlands - Balancing ponds - Detention basins - Retention ponds	✔	✔	✔
↕	Filter strips and swales	✔	✔	✔
↕	Infiltration devices - soakaways - infiltration trenches and basins	✔	✔	✔
↓	Permeable surfaces and filter drains - gravelled areas - solid paving blocks - porous paviors	✔	✔	
Least Sustainable	Tanked systems - over-sized pipes/tanks - storms cells	✔		

Table 3: The SuDS Hierarchy

4.2.1 Living Roofs

Living / Green roofs are not recommended for this development due to severe implications of adopting these systems on an industrial warehouse:

- Structural: Even an extensive green roof system with a 100mmm thick growing media will impose considerable loading to a typical lightweight roof system used on these units. Thus, increasing substantially the overall structural requirements.
- Slope: Green roofs are typically installed on flat roofs. The proposed lightweight roof system has a significant slope, and as such complex proprietary systems would have to be implemented.
- Maintenance: Any regular or irregular maintenance to the proposed units' high roofs is likely to require the mobilization of elevation platforms and trained personnel.
- Damage & leaks: Although these systems are waterproof, extreme weather factors or human error can result in a leak in the roof. In these restricted conditions, finding and repairing such failure in a complex roof system would be a challenging process.

Although a green roof should always be considered, on this development, the complexity and disadvantages of implementing a green roof are far greater than the potential benefits.

4.2.2 Basins and Ponds

The proposed development layout consists of a high hard surface content restricting the use of large source control systems at the ground level. The only large proposed soft landscaped area to the South East of the site is part of an acoustic mound and as such basins and ponds are not considered possible.

4.2.3 Filter Strips and Swales

The proposed development layout consists of a high hard surface content restricting the use of large source control systems at the ground level and as such swales are not considered possible.

4.2.4 Infiltration Devices

The Phase II Geo-environmental Site Assessment by TRC ref 385367.0000.0000 dated September 2020 confirms that infiltration will not be viable due to the poor permeability of the soil encountered (Appendix K – Extract of the TRC Phase II Geo-environmental Site Assessment). As such, infiltration systems are not considered possible.

4.2.5 Permeable Paving

Considering that infiltration is not viable due to the presence of Clay and contamination within the site, a possible permeable paving system will be restricted in its functions as it will need to be tanked & drained into the proposed surface water system.

4.2.6 Tanked Systems

Considering the proposed site layout, a below ground storage system to attenuate peak discharge flows will likely provide the most cost-effective solution without substantial implications to the proposed site layout.

4.3 Surface Water Discharge Hierarchy Assessment

4.3.1 Discharge Through Infiltration

As mentioned in section 4.2 infiltration systems have been considered not viable due to the encountered clay soils with low permeability.

4.3.2 Discharge into Surface Water Body

The only surface water body adjacent to the site is the over 200 year old Rochdale Canal, the structure and condition of which are unknown. Any outfall discharging into the canal would be below the canal water level (Approx. canal water level 69.39mAOD) creating a permanently submerged outfall and thus reducing the ease of regular inspection and maintenance. Discharging into the canal is therefore not considered practical.

4.3.3 Discharge to Surface Water Sewers

There are no surface water sewers at the site vicinity.

4.3.4 Discharge to Combined Sewer

As a last resort the proposed development will discharge into a combined public sewer by reusing an existing ø375mm combined outfall along the access road.

4.4 Proposed Drainage

Site surface water runoff will drain by gravity through drainage channels, gullies, manholes and pipe work into the existing combined lateral running along the site access.

The proposed external yard areas runoff will be treated by petrol interceptors to remove oil and sediments.

The proposed discharge rate will be restricted to 50% of the existing impermeable runoff rate of a 1 year return rainfall event from 287 l/s (Appendix G – Predevelopment Runoff Rates) together with greenfield rate from existing soft landscaped areas of 36 l/s to a total of 179 l/s (143 l/s + 36 l/s). The runoff flows will be restricted through flow controls as shown on the Proposed Drainage Layout - Appendix I. This surface water discharge restriction does not include the existing site bellmouth access from Grimshaw Lane and initial access ramps which is proposed to remain as is i.e. draining freely into the combined sewer.

Attenuated will be provided in the form of below ground cellular tanks and we have estimated the attenuation volume required to be between 3060 and 4640m^3 (Appendix H).

Due to this imposed restriction, the peak runoff from storm events with longer return events will have considerably higher reductions compared to the existing condition as shown on the table 4 below.

Surface Water Runoff Rates \ Rainfall Periods		1 in 1 year		1 in 100 years		1 in 100 + 40% Climate Change	
		Imp. Areas	Green Areas	Imp. Areas	Green Areas	Imp. Areas	Green Areas
Existing	Without bellmouth & ramped access road	287 l/s	36 l/s	904 l/s	87 l/s	1266 l/s	121 l/s
		323 l/s		991 l/s		1387 l/s	
	With bellmouth & ramped access road	302 l/s	36 l/s	951 l/s	87 l/s	1331 l/s	121 l/s
		338 l/s		1038 l/s		1452 l/s	
Proposed	Without bellmouth & ramped access road	143 l/s 50% reduction	36 l/s	143 l/s 84% reduction	87 l/s	143 l/s 89% reduction	121 /s
		179 l/s		228 l/s		264 l/s	
	With bellmouth & ramped access road	158 l/s 48% reduction	36 l/s	190 l/s 80% reduction	87 l/s	208 l/s 84% reduction	121 l/s
		194 l/s 42% reduction		277 l/s 73 % reduction		329 l/s 77% reduction	

Table 4: Existing / Proposed Surface Water Discharge Rate

The foul water will also discharge by gravity through the existing combined lateral and we estimate the expected peak foul water discharge rates to be small and comparable to the peak foul rate from the existing site.

5 OFFSITE IMPACT

The proposed redevelopment of this site results in an increase in impermeable site area and an equivalent increase in surface water runoff volume.

To reduce the offsite impact, the surface water drainage network will be designed to cater for all storm events up to and including the critical 1 in 100 year return period rainfall event with allowances of climate change (40%) without flooding and the allowable peak discharge rate will be reduced to a maximum of 50% of the existing impermeable areas runoff and kept at greenfield rates to the existing soft landscaped areas, to 179 l/s.

6 MAINTENANCE STRATEGY

The surface water strategy consists of gullies, drainage channels, oil separators, cellular attenuation tanks & flow control devices together with connecting pipe network, manholes & inspection chambers. Refer to drawing 9762-8100 for the proposed drainage layout (Appendix I).

Any man-entry into the system and silt removal should be by trained personnel with adequate personal protective equipment. Approved safety procedures must be followed in accordance with Health and Safety Act

This drainage system maintenance will be responsibility of the project developer or by an appointed maintenance company and as such an appropriated maintenance regime should be implemented.

6.1 Manholes, Inspection Chambers, Pipe Work, Drainage Channels & Gullies

The surface water drainage system should be inspected and maintained periodically, primarily to check for silt sedimentation within the system or ingress of any detritus or debris which would decrease system performance. Table 5 sets out the recommended maintenance actions and frequency.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove manhole and chamber covers to sewers and flow control on network– inspect to ensure water is flowing freely and that the water flow route is unobstructed. Remove debris and silt as required.	Half Yearly Undertake one of these inspections after leaf fall in autumn
Occasional Maintenance	None required	
Remedial Actions	Re-line or replace pipework if unable to clear blockages by jetting.	As required
Monitoring	Inspect chambers for build-up of silt and debris	Half yearly

Table 5 – Operation & maintenance requirements for pipe network, manholes & inspection chambers, drainage channels & gullies.

6.2 Cellular Tanks

The geocellular tanks which have been proposed, are modular storage systems made with plastic units. The units can be assembled to achieve the required volume and usually on multiple layers.

Generally, the units have 95% of voids content and are used to create an efficient below ground structure to store surface water.
Table 6 sets out the recommended maintenance actions and frequency.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Inspect and identify any areas that are not operating correctly. If required, take remedial action.	Monthly for 3 months, then annually.
	Remove debris form the catchment surface (where it may cause risks to performance).	Monthly.
	Remove sediments from pre-treatment structures and/or internal forebays.	Annually, or as required.
Remedial Actions	Repair/rehabilitate inlets, outlets, overflows and vents.	As required.
Monitoring	Inspect/check all inlets, outlets, vents and overflows to ensure that they are in good condition and operating as designed.	Annually
	Survey inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required.

Table 6 – Operation & maintenance requirements for attenuation storage tanks - Based on CIRIA SuDS Manual 2015

6.3 Proprietary Surface Water Treatment Systems (Class 1 Bypass Oil Separators)

These are manufactured products to provide a treatment to the surface water by removing specific pollutants.

Table 7 sets out the recommended maintenance actions and frequency. Manufacture guidance/recommendations should always be used when available.

Maintenance schedule	Required action	Typical frequency
Regular Maintenance	Remove litter and debris and inspect for sediment, oil and grease accumulation.	Monthly for 3 months, then annually.
	Change the filter media.	As recommended by manufacturer.
	Remove sediment, oil grease and floatables.	As necessary – indicated by system inspections or immediately following significant spill.
Remedial Actions	Replace malfunctioning parts or structures.	As required.
Monitoring	Inspect for evidence of poor operation.	Biannually
	Inspect filter media and establish appropriate replacement frequencies.	Biannually
	Inspect sediment accumulation rates and establish removal frequencies.	Monthly during first half year of operation, then every six months.

Table 7 – Operation & maintenance requirements for proprietary surface water treatment systems - Based on CIRIA SuDS Manual 2015

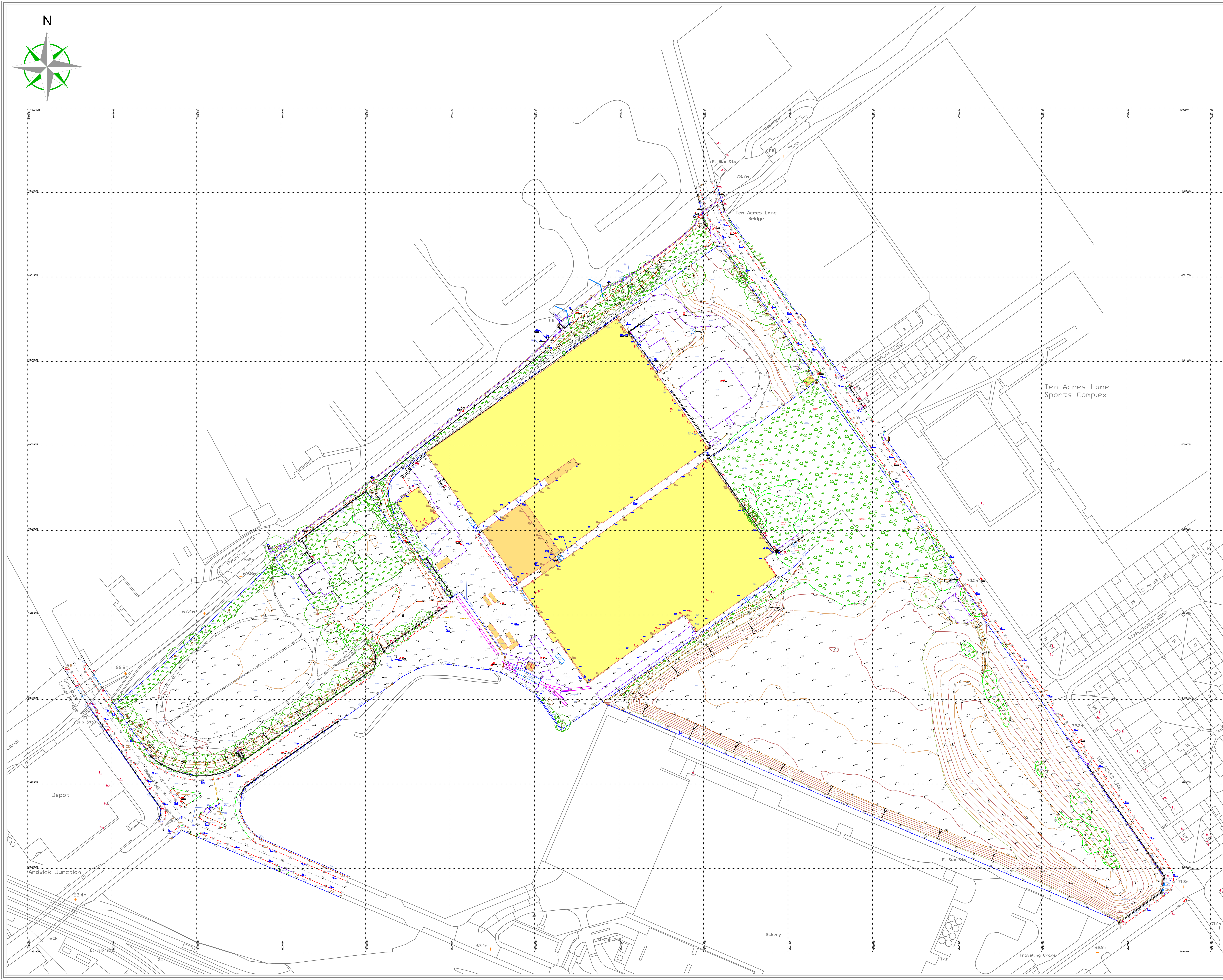
7 CONCLUSION

The FRA has considered the potential flood risk to the proposed development and its potential impact on flood risk:

- The development is located in Flood Zone 1.
- The development has a very low/low risk of flooding.
- The development drainage system and levels are to be designed to accommodate the 100-year rainfall event with a 40% allowance for climate change.
- The proposed development runoff rate is to be restricted to a maximum of 50% of the existing impermeable areas 1 in 1 year rate and greenfield rates for the existing soft landscaped areas.
- The proposed development's drainage regime aims to reduce the onsite and offsite flood risk.

Therefore, the development has an overall low flood risk both on and offsite.

APPENDIX A – Topographic and Utilities Survey



Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	387138.6163	400128.9474	72.8300
GH2	387160.4383	400088.5668	73.1986
GH5	387029.8581	399956.7004	70.2384
GH6	387053.9243	399924.6820	70.1247
GH500	387006.3397	399991.9209	70.4356
J1	387266.5277	400038.9727	74.3781
J2	387217.5429	400092.3464	75.1416
J3	387168.9549	400176.0594	76.3971
J5	387147.2154	400185.5257	73.0050
J6	387074.6479	400128.7842	72.9172
J7	387007.9545	400070.7349	70.0906
J8	386955.2201	400029.6396	70.1400
J9	386973.4147	399994.2723	70.8024
J10	387024.6251	399920.3313	69.7922
J11	386970.6730	399924.4147	68.7584
J12	386903.1282	399869.1779	67.4342
S10	386840.9066	399839.9795	66.8344

OS Note:

Some services may have been omitted due to parked vehicles. The Ordnance Survey tile is to be used as a guide only.

OS Buildings — *Surveyed Buildings*

This survey has been orientated to the Ordnance Survey (O.S) National Grid OSGB36(15) via Global Navigational Satellite Systems (GNSS) and the O.S. Active Network (OS Net).

A true OSGB36 coordinate has been established near to the site centre via a transformation using the OSTN15GB & OSGM15GB transformation models. The survey has been correlated to this point and a further one or more OSGB36 (15) points established to create a true O.S. bearing for angle orientation.

No scale factor has been applied to the survey therefore the coordinates shown are arbitrary & not true O.S. Coordinates which have a scale factor applied.

Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings, Wall, Kerb line, Line marking, Drop kerb, Centre line
Overhead Cable, Concrete edge, Tarmac edge, Grass verge, Canopy/Overhang, Verge
1 — Station and Name
100.000 — Station Level
Tree / Bush / Sapling
Area of Undergrowth
Woodland
R: Ridge Level
E: Eaves Level
F: Flat Roof Level
TWL: Top of Wall Level
Gate

Fence types:
I\W Interwoven
I\R Iron Railings
W\M Wire Mesh
P\R Post & Rail
P\W Post & Wire
C\L Chain Link
W\P Wooden Panels
C\P Concrete Panels
S\P Steel Palisade

IC	Inspection chamber	Bo	Bollard
PInv	Pipe invert	IB	Illuminated bollard
Gy	Gully	Bin	Rubbish bin
Bg	Back gully	Vp	Vent pipe
Dp	Down pipe	Grl	Ground light
Pipe	Pipe above ground	Lbox	Letter box
MH	Manhole	Ldr	Ladder
WL	Water level	Sty	Stile
Fl	Flood light	IFL	Internal floor level
Lp	Lamp post	THL	Threshold level
Tp	Telegraph post	Sp	Sign post
Ep	Electricity post	TH	Trialhole
Tl	Traffic light	BH	Borehole
Bus	Bus stop	ELC	Electric
Sv	Stop valve	BT	British Telecom
St	Stop tap	C'box	Control box
Er	Earth rod	TT	Tactile
Wm	Water meter	BP	Brick paved
Gas	Gas valve	CPS	Concrete paving slabs
Av	Air valve	CVR	Cover
ICU	Undentified inspection	IC	Inspection chamber
Wo	Wash out	R/wall	Retaining wall
Re	Rodding eye	UTL	Unable to lift
BB	Belisha beacon	TCL	Tree canopy level
CTV	Cable tv	G:	Girth
Mkr	Marker post	MG	Multi girth
Gmkr	Gas marker post	Stmp	Tree Stump
So	Soffit	CL:	Cover level
		IL:	Invert level

Rev	Date	Description	Drawn	Q. Ref
1	26.01.21	Topo Survey Extension	JC	GH8075

greenhatch group

□ Topographical Surveys □ Site Engineering □ Utility / CCTV Surveys
□ Measured Building Surveys □ 3D Laser Scanning □ Revit & BIM Models

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NW1 5LL
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CLIENT
Hale Architecture

PROJECT
Grimshaw Lane
Manchester
M40 2BA

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 1000	07.08.20
DRAWN	**QUALITY REF**
JC	GH8075

Level datum	See notes
Grid orientation	See notes
Job number	37505

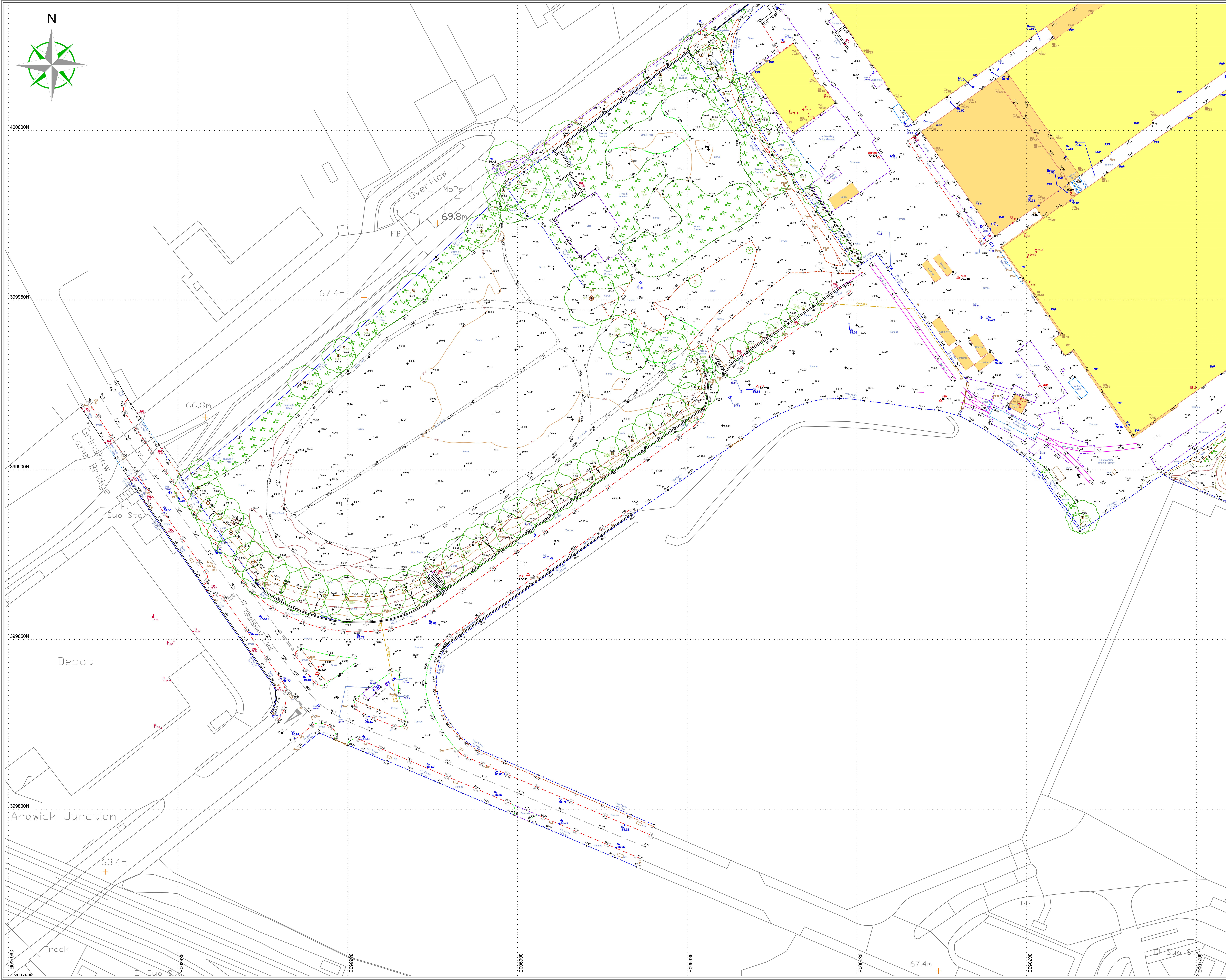
Drawing No.	Rev.
37505_T	1

Comments
This plan should only be used for its original purpose. Greenhatch Group accepts no responsibility for this plan if supplied to any party other than the original client.

All dimensions should be checked on site prior to design and construction.

Drainage information (where applicable) has been visually inspected from the surface and therefore should be treated as approximate only.

Notes:



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J2	387217.5429	400092.3464	75.1416
J3	387168.9549	400176.0594	76.3971
J5	387147.2154	400185.5257	73.0050
J6	387074.6479	400128.7842	72.9172
J7	387007.9545	400070.7349	70.0906
J8	386955.2201	400029.6396	70.1400
J9	386973.4147	399994.2723	70.8024
J10	387024.6251	399920.3313	69.7922
J11	386970.6730	399924.4147	68.7584
J12	386903.1282	399869.1779	67.4342
S10	386840.9066	399839.9795	66.8344

OS Note:

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Please refer to Survey Station Table to enable establishment of the on-site grid and datum.

Legend:

Buildings
Overhead Cable
Wall
Concrete edge
Kerb line
Tarmac edge
Line marking
Grass verge
Drop kerb
Canopy/Overhang
Centre line
Verge
1 100.000 — Station and Name / Station Level
Tree / Bush / Sapling
Area of Undergrowth
Woodland
R: Ridge Level
E: Eaves Level
F: Flat Roof Level
TWL: Top of Wall Level
Gate

Fence types:
I\W Interwoven
I\R Iron Railings
W\M Wire Mesh
P\R Post & Rail
P\W Post & Wire
C\L Chain Link
W\P Wooden Panels
C\P Concrete Panels
S\P Steel Palisade

IC	Inspection chamber	Bo	Bollard
PInv	Pipe invert	IB	Illuminated bollard
Gy	Gully	Bin	Rubbish bin
Bg	Back gully	Vp	Vent pipe
Dp	Down pipe	Grl	Ground light
Pipe	Pipe above ground	Lbox	Letter box
MH	Manhole	Ldr	Ladder
WL	Water level	Sty	Stile
Fl	Flood light	IFL	Internal floor level
Lp	Lamp post	THL	Threshold level
Tp	Telegraph post	Sp	Sign post
Ep	Electricity post	TH	Trialhole
Tl	Traffic light	BH	Borehole
Bus	Bus stop	ELC	Electric
Sv	Stop valve	BT	British Telecom
St	Stop tap	C'box	Control box
Er	Earth rod	TT	Tactile
Wm	Water meter	BP	Brick paved
Gas	Gas valve	CPS	Concrete paving slabs
Av	Air valve	CVR	Cover
ICU	Undentified inspection	IC	Inspection chamber
Wo	Wash out	R/wall	Retaining wall
Re	Rodding eye	UTL	Unable to lift
BB	Belisha beacon	TCL	Tree canopy level
CTV	Cable tv	G:	Girth
Mkr	Marker post	MG	Multi girth
Gmkr	Gas marker post	Stmp	Tree Stump
So	Soffit	CL:	Cover level
		IL:	Invert level

Rev	Date	Description	Drawn	Q. Ref
1	26.01.21	Topo Survey Extension	JC	GH8075

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CLIENT
Hale Architecture

PROJECT
Grimshaw Lane Manchester M40 2BA

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 500	07.08.20
DRAWN	**QUALITY REF**
JC	GH8075

Level datum	See notes
Grid orientation	See notes
Job number	37505
Drawing No.	Rev.
37505_T	1

Comments
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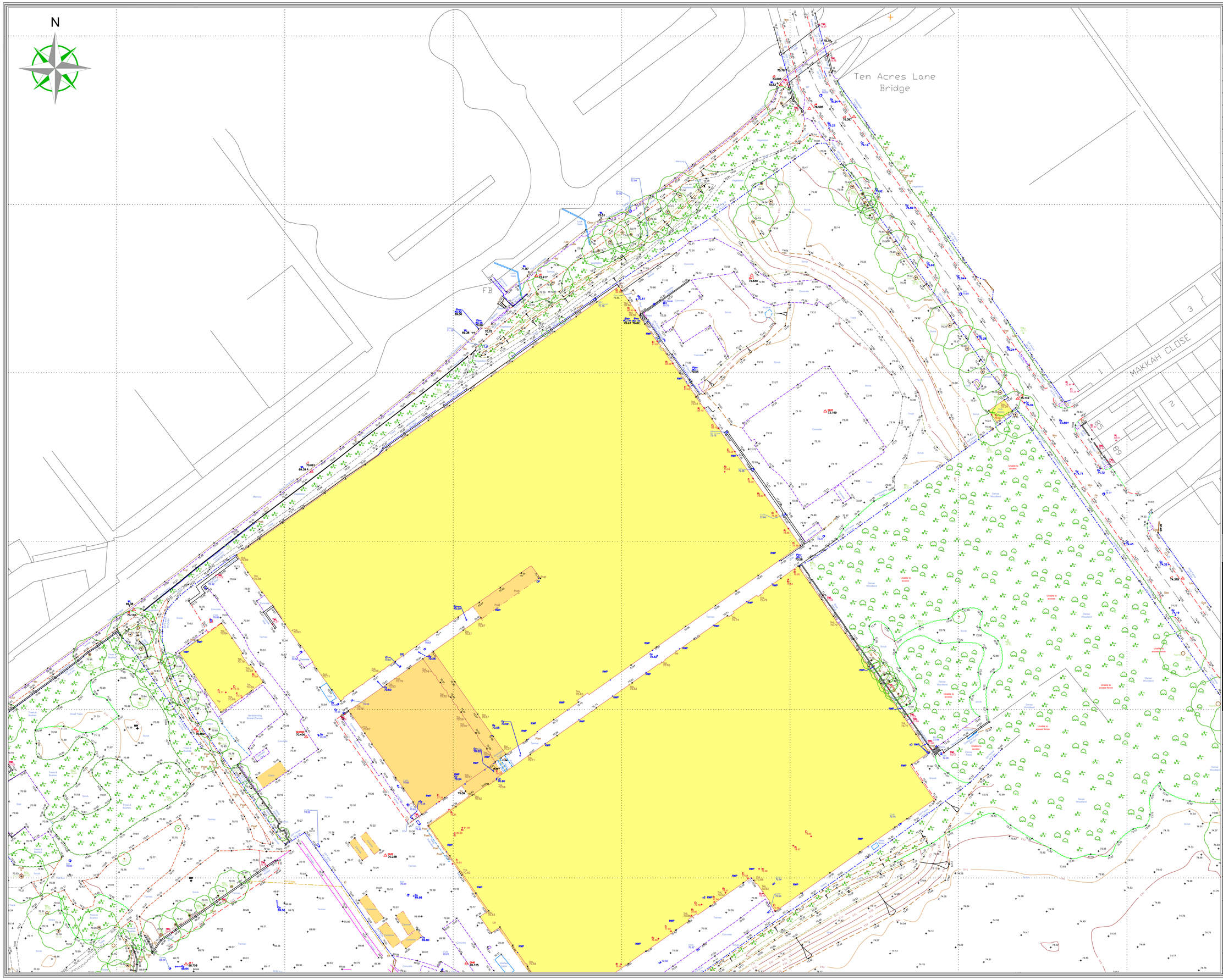

Station Information:

Station	Easting (m)	Northing (m)	Level (m)
GH1	387138.6163	400128.9474	72.8300
GH2	387160.4383	400088.5668	73.1986
GH5	387029.8581	399956.7004	70.2384
GH6	387053.9243	399924.6820	70.1247
GH500	387006.3397	399991.9209	70.4356
J1	387266.5277	400038.9727	74.3781
J2	387217.5429	400092.3464	75.1416
J3	387168.9549	400176.0594	76.3971
J5	387147.2154	400185.5257	73.0050
J6	387074.6479	400128.7842	72.9172
J7	387007.9545	400070.7349	70.0906
J8	386955.2201	400029.6396	70.1400
J9	386973.4147	399994.2723	70.8024
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Legend:

Fence types: FW, Interwoven, Iron Railings, WIRE, Wire Mesh, POS, Post & Rail, POW, Post & Wire, CHL, Chain Link, WOF, Wooden Panels, CNP, Concrete Panels, SWF, Steel Palisade

Rev	Date	Description	Drawn	Q. Ref.
1	26.01.21	Topo Survey Extension	JC	GH8075

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CLIENT
Hale Architecture

PROJECT
Grimshaw Lane Manchester M40 2BA

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 500	07.08.20
DRAWN: JC	QUALITY REF: GH8075

Level datum	See notes
Grid orientation	See notes
Job number	37505

Drawing No.: 37505_T — Rev.: 1

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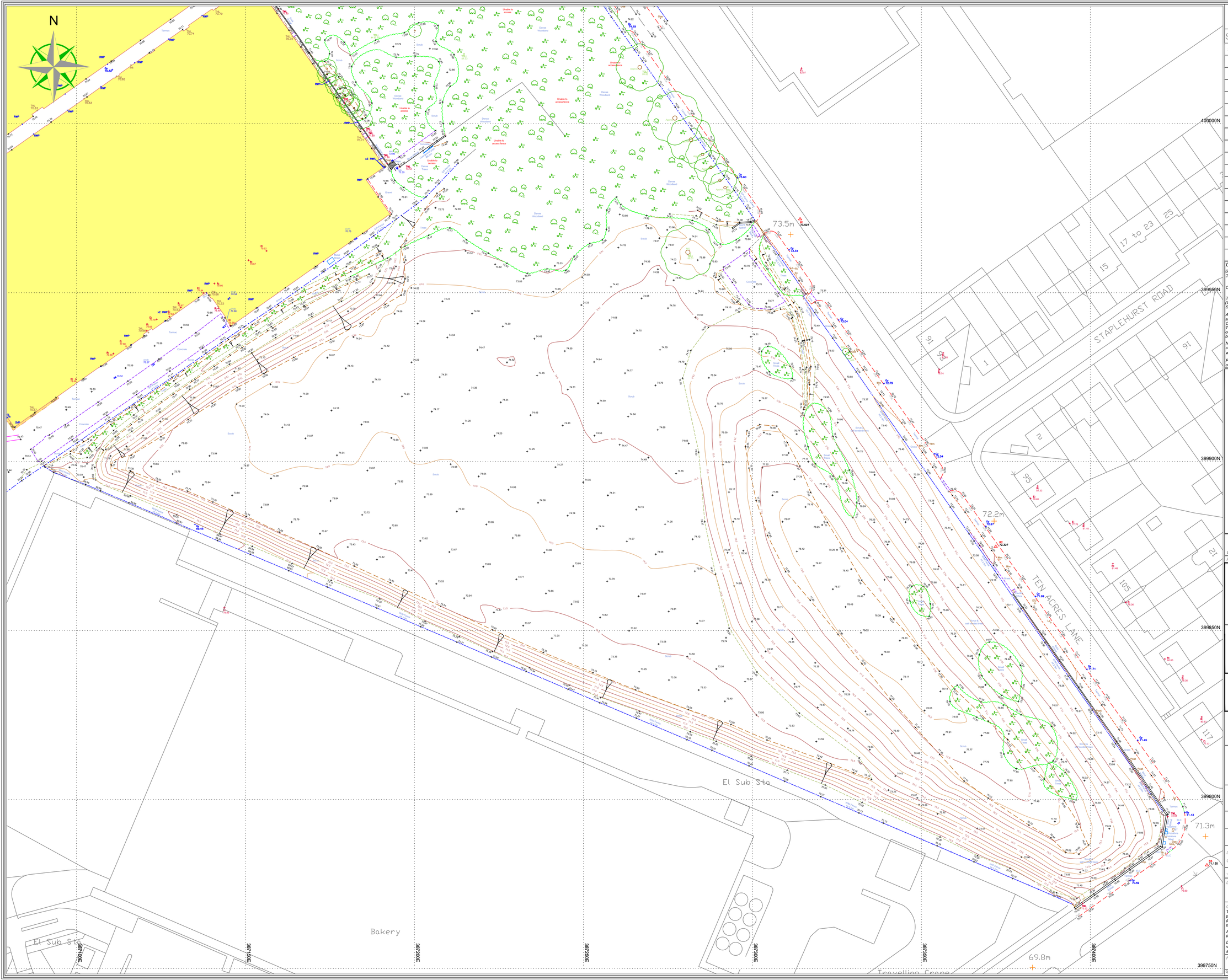

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J5	387147.2154	400185.5257	73.0050
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IC Inspection chamber; Pinv Pipe invert; Gy Gully; Bg Back gully; Dp Down pipe; Pipe Pipe above ground; MH Manhole; WL Water level; FL Flood light; Lp Lamp post; Tp Telegraph post; Ep Electricity post; Tr Traffic light; Bus Bus stop; St Stop tap; Er Earth rod; Wm Water meter; Gas Gas valve; Av Air valve; ICU Unidentified inspection; Rwall Retaining wall; Re Rodding eye; BB Bellsha beacon; CCTV Cable tv; Mkr Marker post; Gmkr Gas marker post; Sp Soffit; Bo Bollard; Ill Illuminated bollard; Bin Rubbish bin; Vp Vent pipe; Gli Ground light; Lbox Letter box; Ldr Ladder; Stp Stile; FFL Internal floor level; THL Threshold level; Sp Sign post; TH Trailhole; BH Borehole; ELC Electric; BT British Telecom; Chov Control box; TT Tactile; BP Brick paved; CPS Concrete paving slabs; CVR Cover; IC Inspection chamber; TCL Tree canopy level; G Girth; MG Multi-girth; Stmp Tree Stump; CL Cover level; TL Tramlines; Gate; Fence types:

Rev	Date	Description	Drawn	Q. Ref
1	26.01.21	Topo Survey Extension	JC	GH8075

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CLIENT
Hale Architecture

PROJECT
Grimshaw Lane Manchester M40 2BA

TITLE
Topographical Survey

SCALE	DATE
A1@ 1: 500	07.08.20
DRAWN	QUALITY REF
JC	GH8075

Level datum	See notes
Grid orientation	See notes
Job number	37505
Drawing No.	Rev.
37505_T	1

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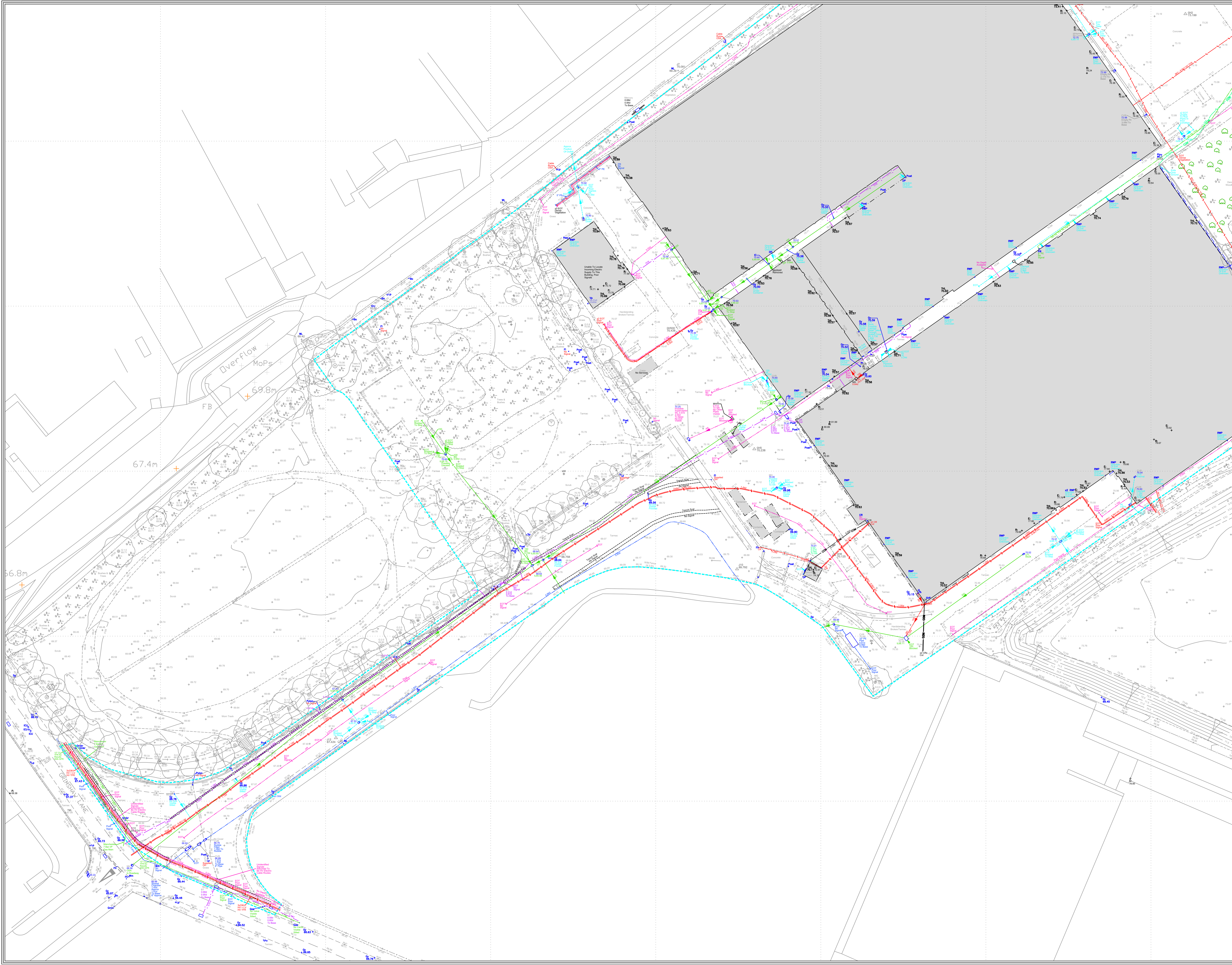

NOTES;
Unable to locate PE Gas supply into site, no results gained with GPR. Plotted on from statutory records.
Unable to locate the full route of the Water supplies into or around the site, poor signals obtained.
Sewer systems in poor condition in areas of the site inhibiting the Survey Team to conclusively confirm connectivity.

UTILITY KEY

ELECTRIC CABLE
ELECTRIC & COMMS CABLE
TRAFFIC SIGNAL CABLE
TELECOMS CABLE
CABLE TELEVISION
COMMUNICATION CABLE
WATER PIPE
GAS PIPE
FOUL DRAINAGE
CONTAMINATED SURFACE DRAINAGE
SURFACE DRAINAGE
COMBINED DRAINAGE
PUMPING MAIN
FUEL PIPE
VENT PIPE
OFFSET FILL PIPE
GAUGE LINE
VAPOUR RECOVERY
SERVICE DUCTS
HEATING PIPES
UNIDENTIFIED SIGNAL
SURVEY BOUNDARY
END OF TRACE

ABBREVIATIONS

AC	ASBESTOS CEMENT	MW	MONITORING WELL
AR	ASSUMED ROUTE	OH	OVERHEAD
BB	BASE BEND	OSA	OFF SURVEY AREA
BD	BACKDROP	PE	POLYETHYLENE
BH	BOREHOLE	PL	PLASTIC
BR	BRICK	PR	PIPE RISER
CI	CAST IRON	PVC	POLYVINYL CHLORIDE
CL	COVER LEVEL	RE	RODDING EYE
CO	CONCRETE	RWP	RAIN WATER PIPE
CR	CABLE RISER	S/A	SOAKAWAY
CP	CATCHPIT	SI	SPUN IRON
DI	DUCTILE IRON	ST	STOP TAP
DP	DOWN PIPE	S.T	STEEL
ED	EMPTY DUCT	SV	SLUICE VALVE
EOSC	END OF TRENCH SCAR	SVP	SOIL VENT PIPE
EOT	END OF TRACE	TE	TRAPPED EXIT
ER	EARTHING ROD	TFR	TAKEN FROM RECORD
EP	ELECTRICITY POLE	TL	TRAFFIC LIGHT
FH	FIRE HYDRANT	TP	TELEGRAPH POLE
Gy	GULLY	UTCCTV	UNABLE TO CCTV
GPR	GROUND PENETRATING RADAR	UTF	UNABLE TO FIND
GRP	GLASS REINFORCED PLASTIC	UTL	UNABLE TO LIFT
GV	GAS VALVE	UTS	UNABLE TO SURVEY
HL	HIGH LEVEL	VC	VITRIFIED CLAY
HOR	HEAD OF RUN	VP	VENT PIPE
IC	INSPECTION CHAMBER	VR	VAPOUR RECOVERY
IL	INVERT LEVEL	WL	WATER LEVEL
LP	LAMP POST	WM	WATER METER
MH	MANHOLE	WO	WASH OUT VALVE
SWS	SURFACE WATER SEWER		
FWS	FOUL WATER SEWER		
CWS	COMBINED WATER SEWER		

DISCLAIMER

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CLIENT
Hale Architecture

PROJECT
**Grimshaw Lane
Manchester
M40 2BA**

TITLE
Underground Utility Survey

SCALE	DATE
A1@ 1: 500	10-13.08.20
DRAWN	QUALITY REF
TO	14176

Level datum	See note
Grid orientation	See note
Job number	37505

Drawing No.	Rev.
37505 _UG1	1

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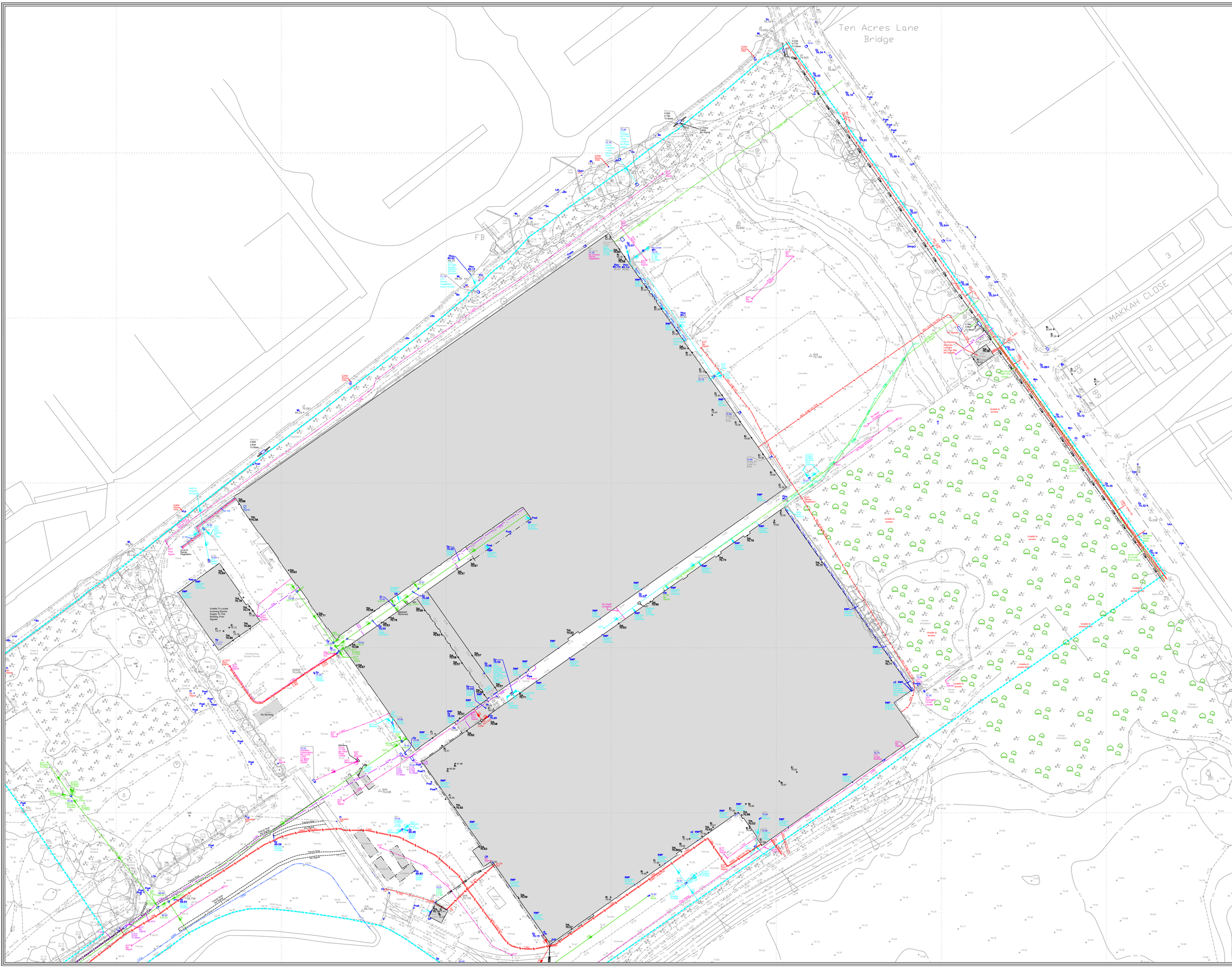

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- TRAFFIC SIGNAL CABLE
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- CABLE TELEVISION
- COMMUNICATION CABLE
- WATER PIPE
- GAS PIPE
- FOUL DRAINAGE
- CONTAMINATED SURFACE DRAINAGE
- SURFACE DRAINAGE
- COMBINED DRAINAGE
- PUMPING MAIN
- FUEL PIPE
- VENT PIPE
- OFFSET FILL PIPE
- GAUGE LINE
- VAPOUR RECOVERY
- SERVICE DUCTS
- HEATING PIPES
- UNIDENTIFIED SIGNAL
- SURVEY BOUNDARY
- END OF TRACE

ABBREVIATIONS

AC	ASBESTOS CEMENT	MW	MONITORING WELL
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CLIENT
Hale Architecture

PROJECT
Grimshaw Lane
Manchester
M40 2BA

TITLE
Underground Utility Survey

SCALE	DATE
A1@ 1: 500	10-13.08.20
DRAWN	QUALITY REF
TO	14176

Level datum	See note
Grid orientation	See note
Job number	37505
Drawing No.	Rev.
37505 _UG2	1

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Notes:

APPENDIX B – Site Layout

DRAFT

N

Existing public footpath ■■ between 'Ten Acres Lane' & 'Canal Tow Path' ■■ byway(No. 66). (within ownership but beyond fence line)

Existing Sub Station to be removed

Mature Willow, RPZ over site boundary

Unit A 5,400ft²

Unit B 5,050ft²

Unit C 5,050ft²

Unit D 5,800ft²

Unit E 7,300ft²

Unit F 11,500ft²

Unit 1 39,500ft²

Unit 2 25,800ft²

Unit 3 34,500ft²

Unit 4 146,000ft²

Unit 5 123,600ft²

Unit 6 51,000ft²

Retaining Wall extent to be confirmed

Site Entrance

Site Access

ROCHDALE CANAL

TEN ACRES LANE

GRIMSHAW LANE

BRISCOE LANE

STAPLEHURST ROAD

MAKKAH CLOSE

Depot

Ardwick Junction

Bakery

Travelling Crane

Overflow

Track

Sub Sta

El Sub Sta

Tks

GG

MP 2.0

KEY

1. Recycling & Refuse
2. Cycle Storage (Sheffield Stands)
3. Motorbike Parking Bay
4. EV Electric Car Charging Points
5. Area for External Plant

S/S Existing Electrical Sub Station

S/S Proposed Electrical Sub Station

Unit Entrance

Proposed Fence Line

Trees & Vegetation Existing & Proposed

- Existing Trees
- Existing Vegetation
- Ground Cover: evergreen and decidous shrub ground cover planting with specimen shrubs.
- Deciduous Hedge: shrub hedge planted in double staggered rows as detailed.
- Specimen Shrub: specimen native shrub planting as detailed.
- Wild flower meadow areas: to be seeded with wildflower seed mix as detailed; refer to notes.
- Native Shrub Planting: native shrub planting mix under planted with wildflower seed mix as detailed.
- Bulb Planting: native bulbs to be scattered within soil as detailed.
- Tree Planting: tree planting with tree canopy spread illustrated at 25 years growth.

Disclaimer:
Subject to survey.
The topographical information shown is based on the topographical survey by Greenhatch Group
Survey project no. *37505_T Rev1 January 2021*

Notes:

KEY

Site Boundary (103,050m²/ 25.46 acres /10.31ha)

AREA SCHEDULE(GIA)

UNIT A (GIA)	**5,400ft²**
Warehouse (Incl. office Undercroft)	4,450ft²
Office (FF Only)	950ft²
Car parking spaces	*5*
UNIT B (GIA)	**5,050ft²**
Warehouse (Incl. office Undercroft)	4,175ft²
Office (FF Only)	875ft²
Car parking spaces	*4*
UNIT C (GIA)	**5,050ft²**
Warehouse (Incl. office Undercroft)	4,175ft²
Office (FF Only)	875ft²
Car parking spaces	*4*
UNIT D (GIA)	**5,800ft²**
Warehouse (Incl. office Undercroft)	4,750ft²
Office (FF Only)	1,050ft²
Car parking spaces	*5*
UNIT E (GIA)	**7,300ft²**
Warehouse (Incl. office Undercroft)	5,950ft²
Office (FF Only)	1,350ft²
Car parking spaces	*8*
UNIT F (GIA)	**11,500ft²**
Warehouse (Incl. office Undercroft)	9,900ft²
Office (FF Only)	1,600ft²
Car parking spaces	*11*
UNIT 1 (GIA)	**39,500ft²**
Warehouse (Incl. office Undercroft)	36,900ft²
Office (FF Only)	2,600ft²
Car parking spaces	*53*
UNIT 2 (GIA)	**25,800ft²**
Warehouse (Incl. office Undercroft)	23,750ft²
Office (FF Only)	2,050ft²
Car parking spaces	*39*
UNIT 3 (GIA)	**34,500ft²**
Warehouse (Incl. office Undercroft)	31,900ft²
Office (FF Only)	2,600ft²
Car parking spaces	*45*
UNIT 4 (GIA)	**146,000ft²**
Warehouse (Incl. office Undercroft)	136,400ft²
Office (FF Only)	4,800ft²
Office (SF Only)	4,800ft²
Car parking spaces	*120*
UNIT 5 (GIA)	**123,600ft²**
Warehouse (Incl. office Undercroft)	116,300ft²
Office (FF Only)	3,650ft²
Office (SF Only)	3,650ft²
Car parking spaces	*100*
UNIT 6 (GIA)	**51,000ft²**
Warehouse (Incl. office Undercroft)	47,400ft²
Office (FF Only)	3,600ft²
Car parking spaces	*75*
TOTAL AREA (GIA)	**460,500ft²**
Car parking spaces	*469*

Rev:	Notes:	Date:	Dwn:	Iss:
C	Update following survey info.	02.02.21	HT	HA
B	Unit Amendments	01.02.21	HT	HA
A	Site Amendments	20.01.21	HT	HA
-	DRAFT ISSUE	14.01.21	HT	HA

Suitability Code:

0 10 20 30 40 50

CANMOOR

hale
ARCHITECTURE
22c Leathermarket Street, London, SE1 3HP

Project:
Grimshaw Lane, Manchester

Drawing Title:
Proposed Site Plan

Project No:	Scale @ A1 @ A3	Revision:
20066	1:1000 / 1:2000	C

Drawing No:
PL-1003

APPENDIX C – SFRA – Canal Hazard Zones