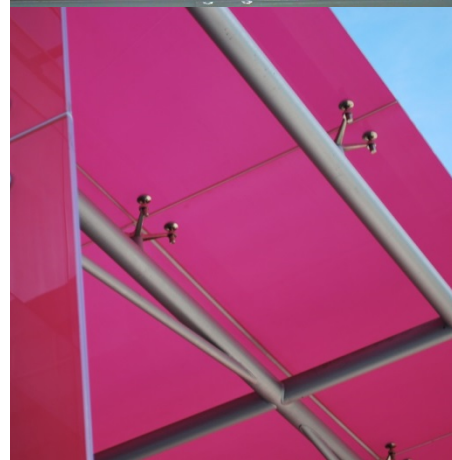
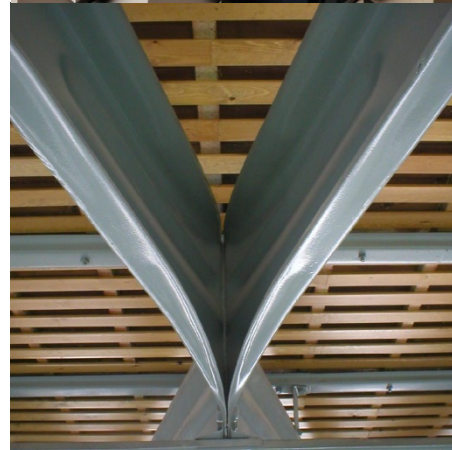
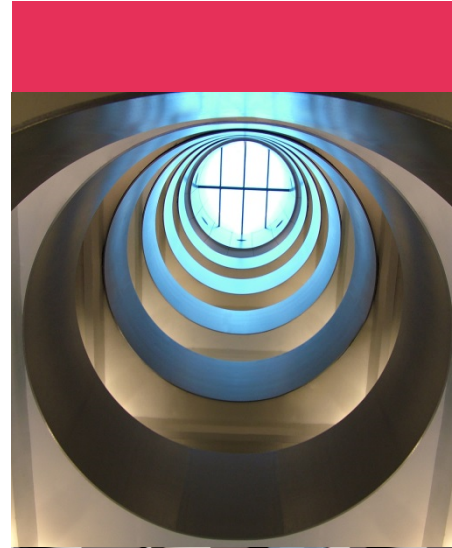


North Manchester General Hospital Decant Village Drainage Strategy

Curtins Ref: NMGH-CUR-00-XX-RP-C-001
Revision: V02
Issue Date: 14 August 2020

Client Name: Manchester University NHS Foundation Trust (MFT)



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Control Sheet

This report has been prepared for the sole benefit, use, and information for the client. The liability of Curtins with respect to the information contained in the report will not extend to any third party.

Author	Signature	Date
Robin Turner Principal Civil Engineer		14 August 2020

Reviewed	Signature	Date
Andrew Macfarlane Director		14 August 2020

Authorised	Signature	Date
Andrew Macfarlane Director		14 August 2020

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- Appendix B – Site Survey
- Appendix C – Drainage Strategy
- Appendix D – Drainage Calculations

1.0 Introduction

1.1 Background

- 1.1.1 Curtins has been appointed by Manchester University NHS Foundation Trust (MFT) (the 'Trust') to provide drainage and flooding advice in relation to a temporary office block at North Manchester General Hospital (NMGH).
- 1.1.2 This application seeks full planning permission for the erection of temporary modular office accommodation to facilitate wider regeneration works at the NMGH site. The temporary accommodation will be delivered in two phases. The first phase of development comprises a 2-storey building, and the second phase involves the addition of a further 2 storeys to accommodate a total of 292 office-based staff.

The temporary accommodation is proposed to be removed after 5 years once NMGH campus regeneration works have been concluded. The application also includes the provision of and improvements to a footpath route north of the site to Central Drive."
- 1.1.3 The proposed site plan and red line boundary is included in **Appendix A**.
- 1.1.4 There is not a risk of flooding from watercourses and the sea as identified on the Environment Agency (EA) indicative flood outline mapping. The site is located within flood zone 1 and less than 1Ha in area therefore a detailed flood risk assessment is not required.
- 1.1.5 This Drainage Statement (DS) has been prepared in order to support the development, providing guidance with regards to the surface water drainage strategy elements of the development.

1.2 Structure of the Report

- 1.2.1 Following this introduction, **Section 2** of the report provides an overview of the existing site drainage.
- 1.2.2 The development proposals are summarised in **Section 3**, including planned site investigations and alternations to the existing surface water drainage system through the modular building development.
- 1.2.3 The drainage strategy outlined within this report is to an RIBA Stage 2 level of design and will be further coordinated following input from the appointed modular contractor and the results of site investigations.
- 1.2.4 This Drainage Statement has been prepared in accordance with
 - BS EN 752:2008 (Drain and sewer systems outside buildings),
 - Sewers for Adoption
 - Building Regulations - Document H (Drainage and waste disposal)
 - Technical Guidance to the National Planning Policy Framework

2.0 Existing site

2.1 Site Location

2.1.1 North Manchester General Hospital (NMGH) is located within the bounds of Manchester City Council, approximately 4km to the north of Manchester City Centre. The Decant Village site is located within the southern area of the wider NMGH site, refer to appendix A.

2.1.2 The Phase 1 Preliminary Risk Assessment for ground conditions references published geological mapping showing superficial deposits comprise of Glacial Till across most of the site, and Glaciofluvial Sheet Deposits in the northwest of the site.

Superficial deposits are underlain by Chester Formation, beneath most of the site, and the Manchester Marls Formation outcropping in the centre of the site. A fault is recorded in the centre of the site, orientated northwest southeast. The site is situated in a coal mining reporting area; however, it is not within the Development. Considering this, and the distance to the nearest mine entry and coal outcrops, the risk to the site from shallow mining works is considered as low.

Made Ground is not indicated to be present, however considering historic activity on site it is anticipated.

2.1.3 The site is located adjacent to the Estates and Transport facility known as Plot G6 as part of the wider NMGH site, and is used as a car park for staff, contractors, and estate vehicles



Figure 2.1 – Site view from Google Earth

- 2.1.4 The vehicular access points to the site are located off Ellis Drive via a gated entry point directly to the north of the site, with an additional access further to the west of Ellis Drive and the Estates Central Store. Pedestrians and cyclists can also access the site in a similar manner to the vehicular access.

2.2 Site drainage

- 2.2.1 The existing yard to Plot G6 comprises of impermeable hardstanding providing vehicle parking and buried fuel and petrol interceptor tanks to the southern boundary.

The impermeable surface is generally falling to the north towards Ellis Drive with positive surface drainage features including yard gullies and linear slot drains as identified on the site survey drawing included in Appendix B and drainage strategy drawing NMGH-CUR-ZZ-ZZ-DR-C-07002-P01 included in Appendix C.

- 2.2.2 An existing petrol interceptor is understood to be located adjacent to the existing building and is proposed to be protected and maintained through the development.

- 2.2.3 Plot G6 is part of a largely un-restricted (attenuated) catchment area which discharges to the United Utilities public sewer via a private combined surface and foul water system offsite on the southern boundary on Crescent Drive.

The onsite combined sewer is understood to be private (not adopted) and is indicated on record drawings as being 600mm diameter with depth at MH5 being approximately 7.7m.

- 2.2.4 The United Utilities network which the private 600mm diameter sewer connects into is understood to be smaller pipe diameter pipes at 375mm diameter hence given the difference in size and un-restricted flows there is a medium to high risk that the risk connection is over capacity hence requiring a reduction in discharge from the Decant Village plot G6.

3.0 Proposed drainage strategy

3.1 Surface water drainage

- 3.1.1 The proposed modular building does not increase the site impermeable areas but will replace existing hardstanding's impermeable catchment area with the roof catchment created by the modular building.
- 3.1.2 The proposed modular building footprint overlaps existing drainage gullies which will be reset to suit the proposed hardstanding arrangement.
- 3.1.3 The proposals are to construct a new surface water drainage system to collect the roof catchment area from the modular buildings and convey to the 600mm private combined sewer.
- 3.1.4 The site discharge rate from the new drainage system has been limited to 5l/s with a cellular attenuation tank with volume of 20m³ being positioned adjacent to the surface water outfall as indicated on the Drainage Strategy drawing NMGH-CUR-ZZ-ZZ-DR-C-07002-P01.
- 3.1.5 The product specification for the cellular tank is subject to agreement with the Principal Contractor at RIBA Stage 4. At this stage the attenuation tank has been designed for climate change allowance of 15years. The supporting drainage calculations have been included in Appendix D.
- 3.1.6 Drainage Strategy has been developed from record drawings and GPR surveys of the site. The CCTV survey on the existing drainage system is to be undertaken at RIBA Stage 3.
- 3.1.7 The new drainage has been designed and detailed to maintain the existing building drainage system as the existing building is to remain live throughout the development.

3.2 Foul water drainage

- 3.2.1 New foul drainage runs serving the modular office are to be kept separate from the surface water drainage and connect into the existing onsite network as indicated on the Drainage Strategy drawing NMGH-CUR-ZZ-ZZ-DR-C-07002-P01.

The foul water connection points are subject to completion of the CCTV survey to existing establish levels and connectivity.

Appendix A – Proposed Layout

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DO NOT SCALE FROM THIS DRAWING

The contractor shall check and verify all dimensions on site and report any discrepancies in writing to Sheppard Robson before proceeding work

FOR ELECTRONIC DATA USE

Electronic Data / drawings are issued as "read only" and should not be interrogated for measurement. All dimensions and levels should read, only from those values stated in text on the drawing.



Key:

— Site Boundary

— NMCH Ownership Boundary

— GMMH Boundary

REV.	DATE	AMENDMENT
P01	22/07/20	FIRST ISSUE
P02	04/08/20	Blue ownership boundary added

KEYPLAN

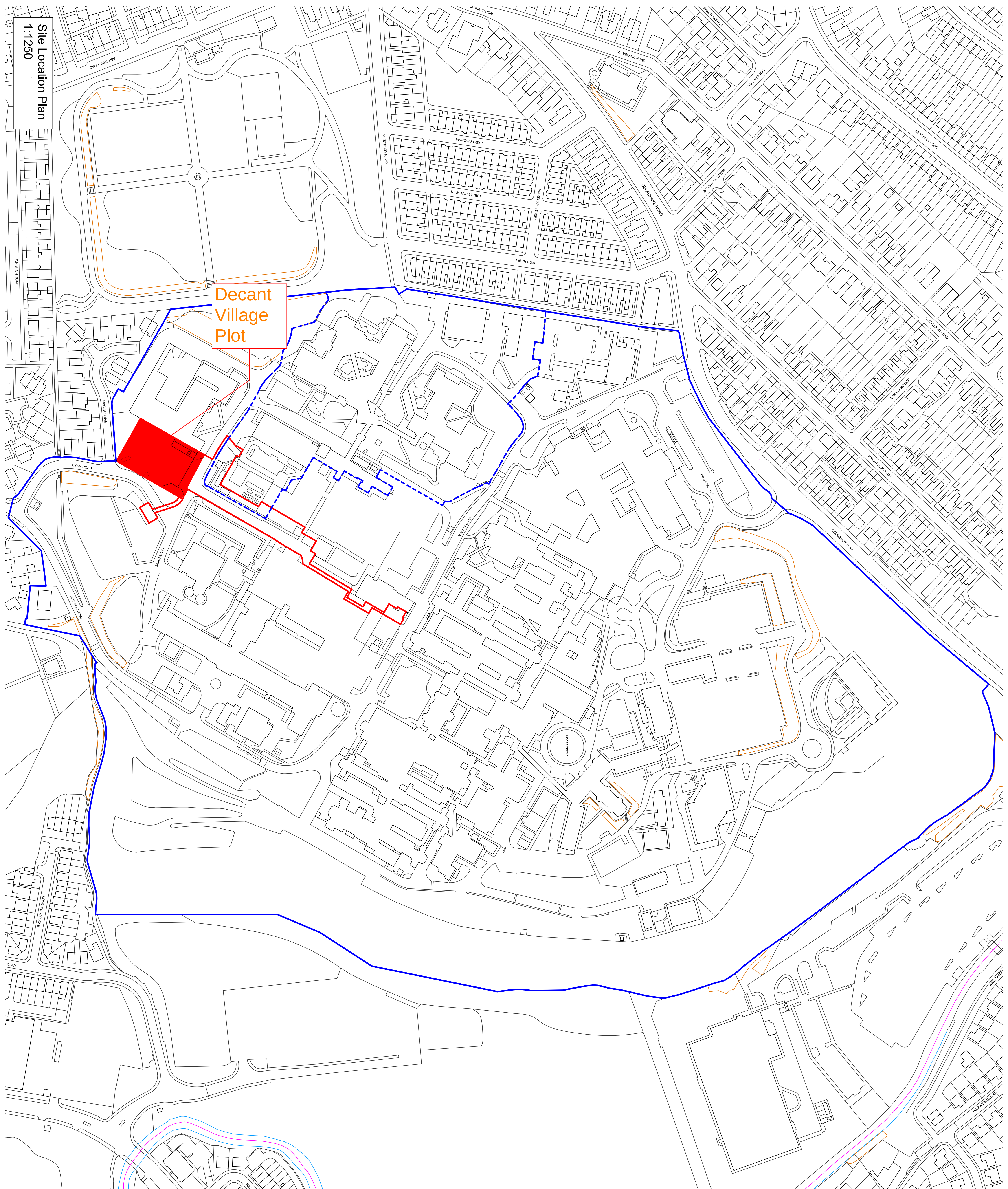
CLIENT
Manchester University Foundation Trust

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PROJECT
6512 North Manchester General Hospital Masterplan
SCALE@A1 DATE ORIGINATOR CHECKED AUTHORISED
1:1250 22/07/20 SS DB AS

Site Location Plan

Stage 2	PURPOSE FOR ISSUE	SR.NO.
S2	For information	6512
DRAWING NO.	6512 - SRA - E1 - XX - DR - A - 00000	REV.
		P02

Site Location Plan
1:1250



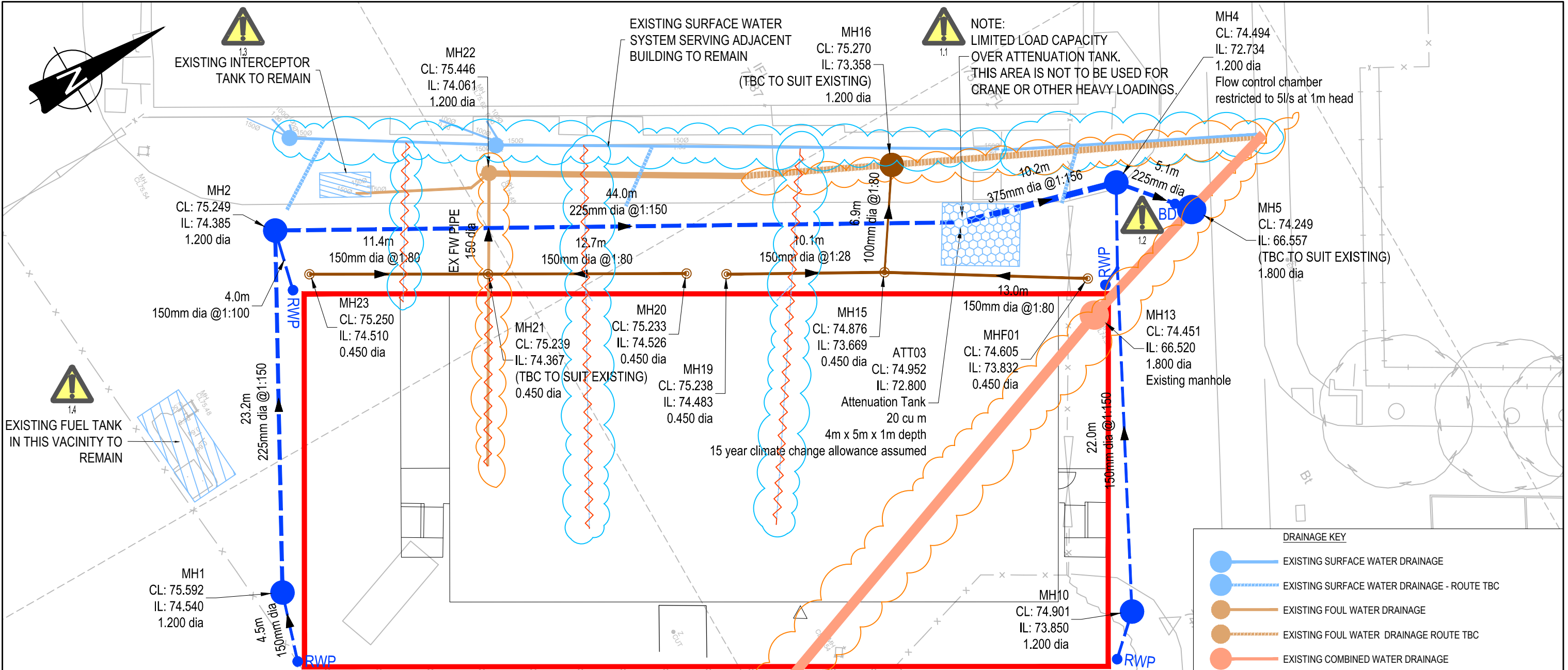
Appendix B –Site survey

This utility survey has been undertaken using:
 A: Radiodetection R34000 + R34000 TII
 B: Mole Geoscience Ground Penetrating Radar

Power carrying features shown on this drawing are shown as an individual service line. This does not necessarily represent the number of cables actually present and it is possible that there could be multi numbers of cables including HV, LV and communications transmission cables following the same trace line. These could be at different depths, the trace signal from the deeper cables being masked by signal emitted from the shallower service above. Cable runs could also be present running parallel to the single line shown.

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Appendix C – Drainage strategy



- NOTES**

 - THIS DRAWINGS IS FOR PLANNING AND STRATEGY PURPOSES ONLY
 - LEVELS SHOWN ON THIS DRAWING MAY CHANGE, TO SUIT EXISTING LEVELS TO BE DETERMINED VIA CCTV SURVEY AND ADDITIONAL TOPOGRAPHICAL SURVEY.
 - CONNECTIVITY OF EXISTING DRAINAGE TO BE PROVED BY CCTV SURVEY AS SHOWN ON THE DRAWING.
 - THE DESIGN ASSUMES THAT THE EXISTING DOWNSTREAM DRAINAGE IS IN GOOD CONDITION AND IS SUITABLE FOR USE.
 - THE REQUIRED ATTENUATION IS CALCULATED ON THE BASIS OF NO OFF SITE FLOODING FOR A 1 IN 100 YEAR EVENT PLUS 15% CLIMATE CHANGE ALLOWANCE.
 - THE EXISTING PARKING IS ASSUMED TO DRAIN VIA GULLIES AND CONNECT TO THE EXISTING SURFACE WATER PIPE TO THE WEST OF THE SITE. THE EXISTING GULLIES TO THE WESTERN EDGE OF THE SITE SHALL BE RETAINED TO DRAIN THE REMAINING HARDSTANDING AREA.
- GENERAL NOTES:**

P01	NEW DRAWING	31/07/20	RT	AM
Rev:	Description:	Date:	By:	Chkd:

"RESIDUAL HAZARD REGISTER (RELATES TO CIVIL/STRUCTURAL MATTERS ONLY)
HAZARDS THAT SHOULD BE OBVIOUS TO A COMPETENT CONTRACTOR HAVE NOT BEEN INDICATED ON THIS DRAWING. SHOULD ANY ADDITIONAL HAZARDS BE IDENTIFIED, THE CONTRACTOR SHOULD NOTIFY ALL RELEVANT PROJECT TEAM MEMBERS."

HAZARD REGISTER			
REF:	ITEM (FEATURE, ELEMENT, OR ACTIVITY)	POTENTIAL HAZARD IDENTIFIED	ACTION
1.1	LIFTING AND DELIVERIES	LIMITED STRENGTH TO ATTENUATION TANK	NO HEAVY LOADS OR CRANES TO BE OVER THIS AREA
1.2	EXCAVATION	BURIED SERVICES	SERVICES TO BE LOCATED PRIOR TO EXCAVATION
1.3	EXCAVATION	BURIED INTERCEPTOR	INTERCEPTOR TO BE LOCATED PRIOR TO EXCAVATION TO PREVENT DAMAGE
1.4	EXCAVATION AND LOADING	BURIED FUEL TANK	AREA TO BE AVOIDED TO PREVENT RISK OF DAMAGE AND/OR COLLAPSE

DRAINAGE KEY

- EXISTING SURFACE WATER DRAINAGE
- EXISTING SURFACE WATER DRAINAGE - ROUTE TBC
- EXISTING FOUL WATER DRAINAGE
- EXISTING FOUL WATER DRAINAGE ROUTE TBC
- EXISTING COMBINED WATER DRAINAGE
- PROPOSED SURFACE WATER DRAINAGE
- PROPOSED RAINWATER PIPE POSITION (APPROXIMATE)
- PROPOSED SURFACE WATER ATTENUATION
- PROPOSED FOUL WATER DRAINAGE
- PROPOSED COMBINED WATER DRAINAGE
- EXISTING SURFACE WATER PIPES TO BE CCTV SURVEYED
- EXISTING FOUL OR CW WATER PIPES TO BE CCTV SURVEYED
- EXISTING PIPE TO BE GRUBBED UP AND REMOVED.
- CONNECTIONS TO EXITING LIVE DRAINAGE TO BE CAPPED OFF TO PREVENT DAMAGE OR BLOCKAGE TO EXISTING PIPES.

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Project: **NMGH PLOT 6**

Drg Title: **DRAINAGE STRATEGY**

Project No: Originator: Volume: Level: Type: Role: Category / Number: Rev:

NMGH - CUR - ZZ - ZZ - DR - C - 07002 - P01

Status: **PRELIMINARY**

Drawn By: RT	Checked By: AM
Designed By: RT	Date: 30/07/20
Scale: 1:250	

\\ifs03\projects\075805-NMGH_Acute_Hospital\Q4-Production\4A-Models-Drawings\CIModel

Appendix D – Drainage calculations

Links (Input)

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	MH7	MH1	4.520	0.600	74.660	74.615	0.045	100.4	150	2.08	50.0
1.001	MH1	MH2	23.200	0.600	74.540	74.385	0.155	149.7	225	2.44	50.0
2.000	MH8	MH2	3.990	0.600	74.500	74.460	0.040	99.8	150	2.07	50.0
1.002	MH2	ATT03	43.983	0.600	74.385	74.092	0.293	150.1	225	3.13	50.0
1.003	ATT03	MH4	10.216	0.600	72.800	72.734	0.066	154.8	375	3.24	50.0
3.000	MH9	MH10	3.189	0.600	73.882	73.850	0.032	99.7	150	2.05	50.0
3.001	MH10	MH12	22.027	0.600	73.850	73.703	0.147	149.8	150	2.50	50.0
4.000	MH11	MH12	1.329	0.600	73.716	73.703	0.013	102.2	150	2.02	50.0
3.002	MH12	MH4	5.479	0.600	73.703	73.186	0.517	10.6	150	2.53	50.0
1.004	MH4	MH5	5.132	0.600	72.734	72.691	0.043	120.0	225	3.32	50.0
1.005	MH5	MH13	9.206	0.600	66.557	66.520	0.037	248.8	600	3.41	50.0

Simulation Settings

Rainfall Methodology	FSR	Skip Steady State	x
FSR Region	England and Wales	Drain Down Time (mins)	240
M5-60 (mm)	17.000	Additional Storage (m³/ha)	20.0
Ratio-R	0.400	Check Discharge Rate(s)	x
Summer CV	0.750	Check Discharge Volume	x
Analysis Speed	Normal		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 | 7200

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
30	0	0	0
100	15	0	0

Node ATT03 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	72.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	1.00	Time to half empty (mins)	51

Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)	Depth (m)	Area (m²)	Inf Area (m²)
0.000	20.0	0.0	1.000	20.0	0.0	1.001	0.0	0.0

Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH7	9	74.714	0.054	4.9	0.0421	0.0000	OK
15 minute summer	MH1	9	74.591	0.051	4.9	0.0579	0.0000	OK
15 minute summer	MH8	9	74.554	0.054	4.9	0.0532	0.0000	OK
15 minute summer	MH2	10	74.453	0.068	9.8	0.0765	0.0000	OK
30 minute summer	ATT03	22	72.938	0.138	9.1	2.9226	0.0000	OK
15 minute summer	MH9	9	73.938	0.056	4.9	0.0359	0.0000	OK
15 minute summer	MH10	9	73.911	0.061	4.9	0.0695	0.0000	OK
15 minute summer	MH11	9	73.770	0.054	4.9	0.0579	0.0000	OK
15 minute summer	MH12	9	73.746	0.043	9.8	0.0068	0.0000	OK
30 minute summer	MH4	22	72.938	0.204	7.3	0.2306	0.0000	OK
30 minute summer	MH5	22	66.599	0.042	4.3	0.1059	0.0000	OK
30 minute summer	MH13	22	66.559	0.039	4.3	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	MH7	1.000	MH1	4.9	0.864	0.277	0.0256	
15 minute summer	MH1	1.001	MH2	4.9	0.594	0.115	0.1945	
15 minute summer	MH8	2.000	MH2	4.9	0.866	0.276	0.0226	
15 minute summer	MH2	1.002	ATT03	8.6	0.854	0.204	0.4441	
30 minute summer	ATT03	1.003	MH4	4.3	0.224	0.027	0.5009	
15 minute summer	MH9	3.000	MH10	4.9	0.798	0.275	0.0203	
15 minute summer	MH10	3.001	MH12	4.9	0.895	0.337	0.1205	
15 minute summer	MH11	4.000	MH12	4.9	1.025	0.279	0.0065	
15 minute summer	MH12	3.002	MH4	9.7	2.354	0.177	0.0227	
30 minute summer	MH4	Hydro-Brake®	MH5	4.3				
30 minute summer	MH5	1.005	MH13	4.3	0.536	0.010	0.0741	7.9

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH7	9	74.750	0.090	12.0	0.0706	0.0000	OK
15 minute summer	MH1	9	74.621	0.081	12.0	0.0918	0.0000	OK
15 minute summer	MH8	9	74.590	0.090	12.0	0.0890	0.0000	OK
15 minute summer	MH2	9	74.501	0.116	24.0	0.1309	0.0000	OK
60 minute summer	ATT03	44	73.312	0.512	17.8	10.8126	0.0000	SURCHARGED
15 minute summer	MH9	9	73.978	0.096	12.0	0.0622	0.0000	OK
15 minute summer	MH10	9	73.954	0.104	12.0	0.1172	0.0000	OK
15 minute summer	MH11	9	73.807	0.091	12.0	0.0972	0.0000	OK
15 minute summer	MH12	9	73.772	0.069	24.0	0.0110	0.0000	OK
60 minute summer	MH4	45	73.311	0.577	12.4	0.6530	0.0000	SURCHARGED
15 minute summer	MH5	24	66.600	0.043	4.7	0.1102	0.0000	OK
15 minute summer	MH13	24	66.561	0.041	4.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	MH7	1.000	MH1	12.0	1.086	0.677	0.0500	
15 minute summer	MH1	1.001	MH2	12.0	0.745	0.283	0.3881	
15 minute summer	MH8	2.000	MH2	12.0	1.089	0.675	0.0440	
15 minute summer	MH2	1.002	ATT03	22.0	1.099	0.519	0.8953	
60 minute summer	ATT03	1.003	MH4	-5.7	0.207	-0.036	1.1268	
15 minute summer	MH9	3.000	MH10	12.0	0.990	0.675	0.0398	
15 minute summer	MH10	3.001	MH12	12.0	1.140	0.829	0.2306	
15 minute summer	MH11	4.000	MH12	12.0	1.281	0.684	0.0127	
15 minute summer	MH12	3.002	MH4	24.0	3.012	0.436	0.0436	
60 minute summer	MH4	Hydro-Brake®	MH5	4.7				
15 minute summer	MH5	1.005	MH13	4.7	0.547	0.011	0.0793	14.8

Results for 100 year +15% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	MH7	9	74.783	0.123	17.8	0.0962	0.0000	OK
15 minute summer	MH1	9	74.641	0.101	17.8	0.1139	0.0000	OK
15 minute summer	MH8	9	74.623	0.123	17.8	0.1215	0.0000	OK
15 minute summer	MH2	9	74.535	0.150	35.6	0.1700	0.0000	OK
60 minute summer	ATT03	55	73.781	0.981	31.1	20.7377	0.0000	SURCHARGED
15 minute summer	MH9	9	74.027	0.145	17.8	0.0938	0.0000	OK
15 minute summer	MH10	9	74.003	0.153	17.0	0.1727	0.0000	SURCHARGED
15 minute summer	MH11	9	73.840	0.124	17.8	0.1330	0.0000	OK
60 minute summer	MH12	50	73.793	0.090	18.9	0.0143	0.0000	OK
60 minute summer	MH4	51	73.780	1.046	18.8	1.1832	0.0000	SURCHARGED
120 minute summer	MH5	60	66.600	0.043	4.7	0.1102	0.0000	OK
15 minute summer	MH13	51	66.561	0.041	4.7	0.0000	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
15 minute summer	MH7	1.000	MH1	17.8	1.152	1.005	0.0698	
15 minute summer	MH1	1.001	MH2	17.8	0.817	0.419	0.5262	
15 minute summer	MH8	2.000	MH2	17.8	1.153	1.001	0.0616	
15 minute summer	MH2	1.002	ATT03	33.0	1.208	0.780	1.2265	
60 minute summer	ATT03	1.003	MH4	-12.5	0.205	-0.078	1.1268	
15 minute summer	MH9	3.000	MH10	17.0	1.080	0.955	0.0559	
15 minute summer	MH10	3.001	MH12	16.3	1.275	1.125	0.3087	
15 minute summer	MH11	4.000	MH12	17.8	1.369	1.014	0.0173	
60 minute summer	MH12	3.002	MH4	18.8	2.822	0.341	0.0784	
60 minute summer	MH4	Hydro-Brake®	MH5	4.7				
120 minute summer	MH5	1.005	MH13	4.7	0.547	0.011	0.0793	44.5

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