

Royal Berkshire Hospital, ICS ER Project

RBH-DD-XX-XX-RP-D-0002-S4-01

Outline Drainage Strategy

First Issue

Version 1.0

[17/06/24]

Document prepared on behalf of Royal Berkshire NHS Foundation Trust

DOCUMENT CONTROL

Document:	Outline Drainage Strategy
Project:	Royal Berkshire Hospital, ICS ER Project
Client:	Royal Berkshire NHS Foundation Trust
Project Number:	RBH-DD-XX-XX-RP-D-0002-S4-01

Revision:	P01	Prepared by:	JY
Date:	17.06.2024	Checked by:	MY
Status:	First Issue	Approved By:	MY
Description of Revision:	For Planning		

Revision:		Prepared by:	
Date:		Checked by:	
Status:		Approved By:	
Description of Revision:	For Planning – Revised as per updated proposed site plan		

Revision:		Prepared by:	
Date:		Checked by:	
Status:		Approved By:	
Description of Revision:			

Revision:		Prepared by:	
Date:		Checked by:	
Status:		Approved By:	
Description of Revision:			

TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 Purpose of this Report	1
1.2 Scope of the Report	1
1.3 Limitations of this Report	1
2.0 SITE DESCRIPTION	2
2.1 Existing Site	2
2.2 Site Topography	2
2.3 Existing Site surface water Drainage	3
2.4 Existing Surface water discharge rate	3
3.0 PROPOSED SURFACE WATER DRAINAGE STRATEGY	3
3.1 Proposed drainage discharge HIERARCHY	3
3.2 Proposed Surface water discharge rate	4
3.3 suSTAINABLE URBAN DRAINAGE SYSTEMS	4
3.4 Proposed drainage layout	5
4.0 PROPOSED FOUL SEWER DRAINAGE	5
APPENDIX A – PROPOSED SITE LAYOUT	6
APPENDIX B – SITE TOPOGRAPHY	7
APPENDIX C – UTILITY SURVEY	8
APPENDIX D – EXISTING SITE SURFACE WATER DRAINAGE HYDRAULIC MODEL	9
APPENDIX E – BOREHOLE TESTING RESULTS	10
APPENDIX F - THAMES WATER PLANNING CONSULTATION CORRESPONDENCE	11
APPENDIX G – OUTLINE DRAINAGE LAYOUT	12
APPENDIX H – MICRODRAINAGE SOURCE CONTROL STORAGE ESTIMATION	13

LIST OF TABLES

Table 2-1: Existing Site Surface Water Discharge Rate	3
Table 3-1: Proposed Development Surface Water Discharge Rate Accepted by Thames Water	4

LIST OF FIGURES

Figure 2-1: Site Location	2
---------------------------	---

1.0 INTRODUCTION

1.1 PURPOSE OF THIS REPORT

MDA Wirral Ltd have been appointed by Royal Berkshire NHS Foundation Trust (the 'Client') to prepare an outline drainage strategy (FRA) for the proposed development of demolition of existing temporary two storey Medical Block and construction of new two storey Inpatient and Outpatient Urology Building.

The proposed site plan is included in Appendix A.

1.2 SCOPE OF THE REPORT

The outline drainage strategy will consider all the relevant published code and guidance, including Reading Borough Local Plan (adopted November 2019), Reading Borough Council (RBC) Local Flood Risk Management Strategy, Ciria SuDS manual C753, Department for Environment, Food and Rural Affairs Sustainable Drainage Systems : Non-statutory technical standards for sustainable drainage systems, and Drainage and waste disposal: Approved Document H.

1.3 LIMITATIONS OF THIS REPORT

This report has been prepared by MDA Wirral Ltd on behalf of Royal Berkshire NHS Foundation Trust in connection with the scope of the report as described in Section 11 above and taking into account the particular instructions and requirements set out in the fee proposal and the Client's acceptance. It is not intended for and should not be relied on by any third party and no responsibility is undertaken to any third party.

MDA Wirral Ltd accepts no duty or responsibility (including in negligence) to any party other than Royal Berkshire NHS Foundation and disclaims all liability of any nature whatsoever to any such party in respect of this report.

This report cannot be reproduced without the written consent of MDA Wirral Ltd.

2.0 SITE DESCRIPTION

2.1 EXISTING SITE

The site is located on the existing Royal Berkshire Hospital site, north of the Addington Road, Reading. The nearest postcode is RG1 5HD and grid reference is E: 472586, N:172555.

The existing building to be demolished covers a total area of approximately 0.076 hectares and is classed as a brownfield site. The site location is shown in Figure 2-1.

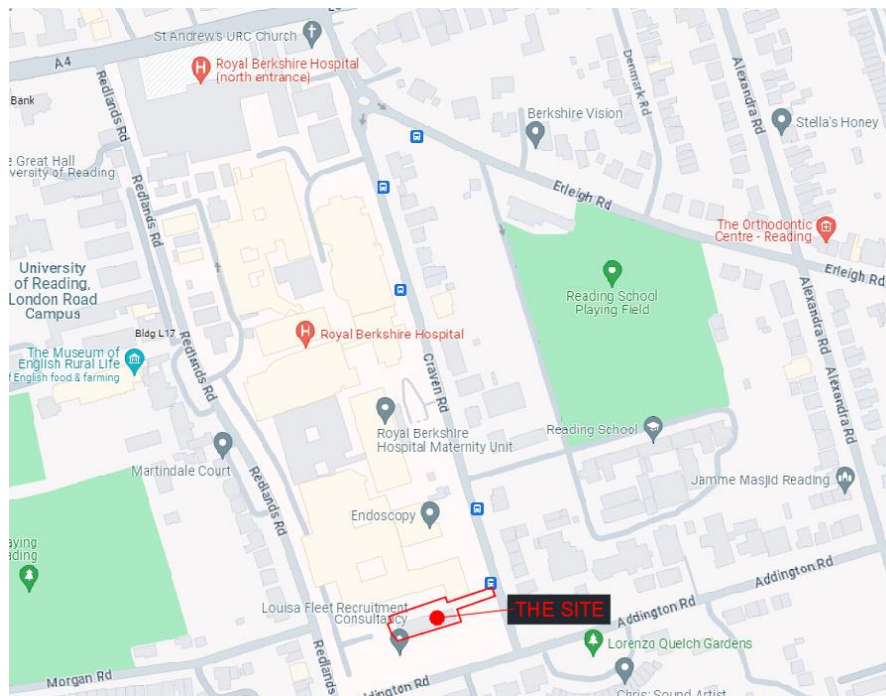


Figure 2-1: Site Location

The site is surrounded by an existing car park on the west, south, and east sides, with a landscaped area to the north. Access to the site is available through the car park entrances from Addington Road to the south and Craven Road to the northeast.

2.2 SITE TOPOGRAPHY

A topographic survey was conducted by Rigour Survey on 15 November 2019.

This survey indicates that the site generally falls from south to north, with levels ranging from 51.58 m AOD to approximation 51.00 m AOD. Notably, the car park and footpath situated to the south of the site slopes towards the site, with its highest elevation recorded at 53.08 m AOD. An existing drainage channel has been installed to prevent surface water from entering the building.

The topographic survey is included as Appendix B.

2.3 EXISTING SITE SURFACE WATER DRAINAGE

In accordance with utility survey drawing received from Rigour Survey (Appendix C), the roof area of the current modular building drains into a 150mm private surface water drainage system. This system directs the water westward to a manhole situated in the car park. The ultimate discharge point for this surface water is unknown and requires a further drainage survey to determine. However, it is likely that this system will discharge into the Thames Water public surface water system, which is located along Craven Road to the west of the development.

2.4 EXISTING SURFACE WATER DISCHARGE RATE

Microdrainage hydraulic modelling has been carried out to assess the existing surface water discharge rate, with results summarised in below table and Appendix D.

Table 2-1: Existing Site Surface Water Discharge Rate

Storm Event	Discharge rate (l/s)
1 in 1 year	24.2
1 in 30 year	51.0
1 in 100 year	51.2

3.0 PROPOSED SURFACE WATER DRAINAGE STRATEGY

3.1 PROPOSED DRAINAGE DISCHARGE HIERARCHY

Surface water discharge hierarchy has been considered in accordance with Ciria C753 guidelines, as outlined below:

- Used as a resource, where appropriate.
- Infiltration to the maximum extent that is practical.
- Discharge to surface waters.
- Discharge to surface water sewer.
- Discharge to combined sewer (last resort).

3.1.1 Used as a resource (rainwater harvesting)

Rainwater harvesting may be suitable, subject to confirmation of usage demand.

3.1.2 Disposing surface water via infiltration

Ground investigation (Appendix E) revealed that the site primarily consists of clay strata. Consequently, it has been determined that discharging surface water via infiltration is not viable.

3.1.3 Discharge to watercourse

The nearest watercourse River Kennet is located approximately 850m north of the site. Discharging to this watercourse would necessitate crossing multiple parcels of third-party land. The discharge method is therefore discounted.

3.1.4 Discharge to surface water

As mentioned above, surface water runoffs from the existing site is being served by an existing private surface water drainage system. The intention is to discharge surface water runoff from the proposed development into this existing system.

3.1.5 Discharge to combined sewer

Not applicable. Higher discharge hierarchy is met.

3.2 PROPOSED SURFACE WATER DISCHARGE RATE

The maximum allowable discharge rate is assessed in accordance with Sustainable drainage systems: non-statutory technical standards (Defra) standard S3:

For developments which were previously developed, the peak runoff rate from the development to any drain, sewer or surface water body for the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event, but should never exceed the rate of discharge from the development prior to redevelopment for that event.

In addition, a planning consultation was carried out with Thames Water with the below proposed discharge rate for consideration:

Table 3-1: Proposed Development Surface Water Discharge Rate Accepted by Thames Water

Storm Event	Discharge rate (l/s)
1 in 1 year	8.0
1 in 30 year	13.7
1 in 100 year + 40% cc	26.1

The received correspondence (Appendix F) confirmed that Thames Water has no objection to the above proposed discharge rate.

3.3 SUSTAINABLE URBAN DRAINAGE SYSTEMS

Sustainable drainage developed in line with the ideals of sustainable development is collectively referred to as Sustainable Drainage Systems (SuDS). At a particular site, these systems are designed to manage both the environmental risks resulting from the urban runoff and to contribute, wherever possible, to environmental

enhancement. Therefore, SuDS objectives are to minimise the impacts from the development on the quantity and quality of the runoff and maximise amenity and biodiversity opportunities (CIRIA C753, 2015).

SuDS help to mimic the natural flow of water ensuring that both the quantity and quality of the surface water is dealt with before feeding it into the drainage network. SuDS features usually come with added maintenance, however the benefits they reap are considered to outweigh this. The selection of the most appropriate SuDS features should consider constraints, requirements and maintenance of the site. It should be remembered that Local Planning Authorities expect SuDS to be investigated on construction projects. The implementation of SuDS features can assist in achieving the drainage requirements set out in the National Planning Policy Framework.

Landscape-based SuDS approach has been considered. However, the only available landscape area is located to the north of the proposed building, situated on a lower-level slope. This area is deemed unsuitable for SuDS primarily because a gravity drainage system cannot be facilitated. Nevertheless, SuDS elements such as raised planters could be implemented to enhance water quality, local amenity, and biodiversity.

3.4 PROPOSED DRAINAGE LAYOUT

The proposed development is expected to be primarily served by an underground drainage system, which will include pipes, manholes, and an underground storage tank. Additionally, it is intended to direct rainwater from downpipes to linear drainage systems proposed around the building perimeter. This design will keep the system shallow and enable a gravity-based drainage solution.

3.4.1 An outline drainage layout is included in Appendix G. MicroDrainage Source Control quick storage volume estimation has been conducted to assess storage volume for the development, with the result included in Appendix H.

4.0 PROPOSED FOUL SEWER DRAINAGE

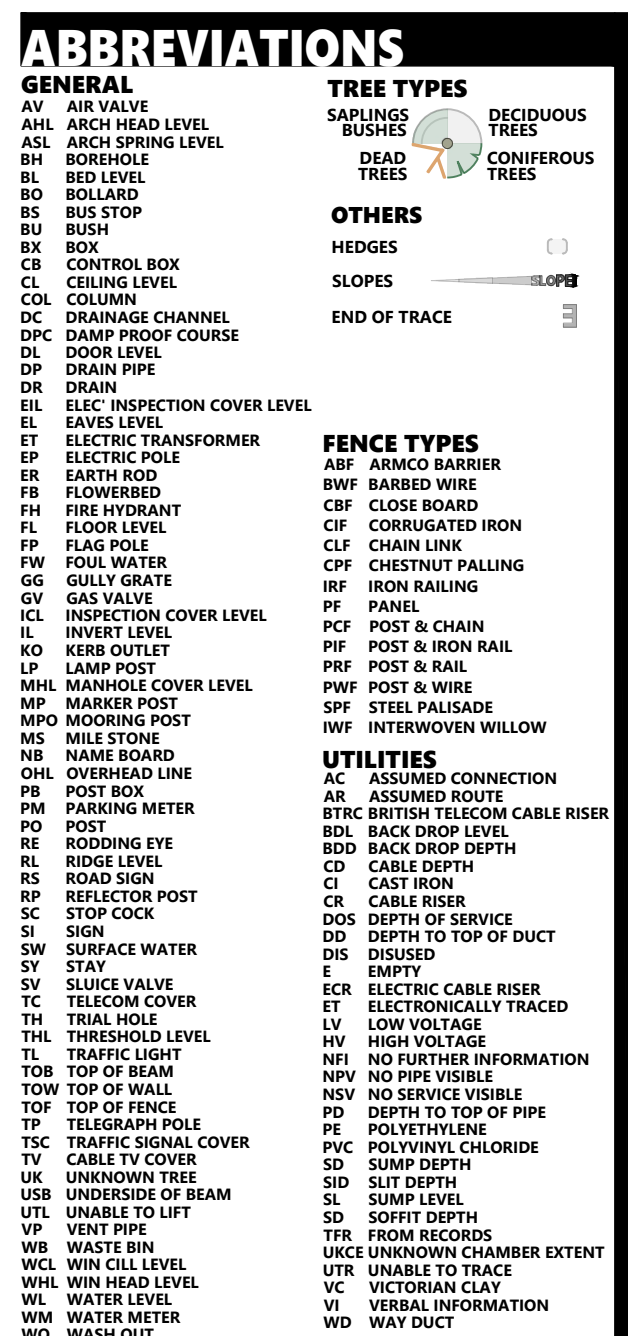
The received utility survey (Appendix C) confirmed that a Thames Water public foul sewer system is located along the Craven Road, which is considered to be the suitable outfall for the development.

In accordance with the planning consultation correspondence received (Appendix F), Thames Water confirmed no object to the foul drainage strategy.

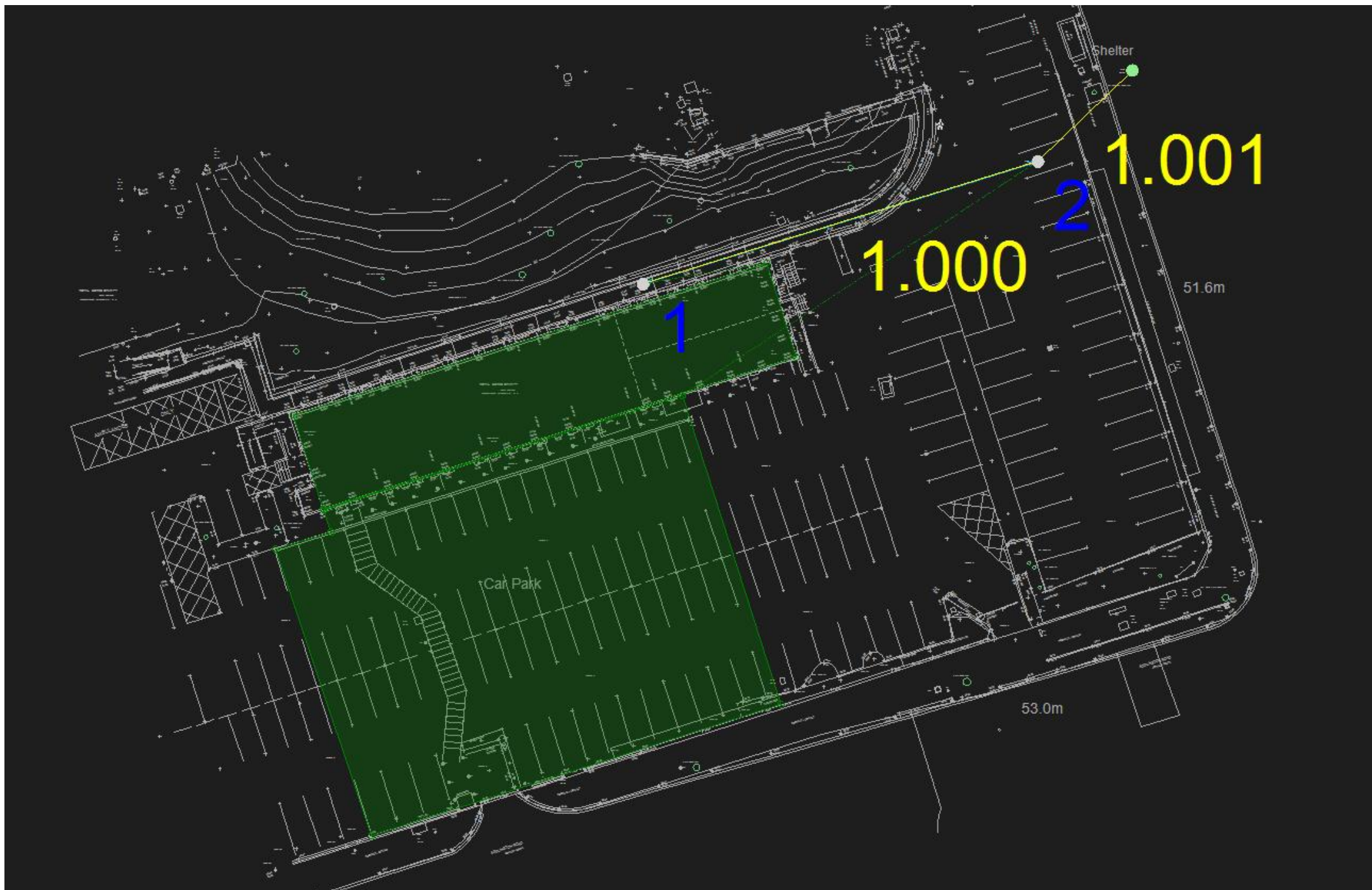
APPENDIX A – PROPOSED SITE LAYOUT

APPENDIX B – SITE TOPOGRAPHY

APPENDIX C – UTILITY SURVEY



APPENDIX D – EXISTING SITE SURFACE WATER DRAINAGE HYDRAULIC MODEL



The Drainage Designers Limited		Page 1
90 Coronation Street Sunderland SR1 2HE	Royal Berkshire Hospital Existing Surface Water Model	
Date 15/06/2024 12:59 File Royal Berkshire Hospita...	Designed by JY Checked by MY	
Innovyze	Network 2020.1	

Existing Network Details for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type
1.000	38.189	0.120	318.2	0.042	5.00	0.0	0.600	o	150	Pipe/Conduit
1.001	12.117	0.457	26.5	0.119	0.00	0.0	0.600	o	150	Pipe/Conduit

Network Results Table

PN	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Vel (m/s)	Cap (l/s)
1.000	49.980	0.042	0.0	0.56	9.9
1.001	49.860	0.160	0.0	1.96	34.7

The Drainage Designers Limited		Page 2
90 Coronation Street Sunderland SR1 2HE	Royal Berkshire Hospital Existing Surface Water Model	
Date 15/06/2024 12:59 File Royal Berkshire Hospita...	Designed by JY Checked by MY	
Innovyze	Network 2020.1	

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.042	0.042	0.042
1.001	User	-	100	0.119	0.119	0.119
				Total	Total	Total
				0.160	0.160	0.160

The Drainage Designers Limited		Page 3
90 Coronation Street Sunderland SR1 2HE	Royal Berkshire Hospital Existing Surface Water Model	
Date 15/06/2024 12:59 File Royal Berkshire Hospita...	Designed by JY Checked by MY	
Innovyze	Network 2020.1	

Network Classifications for Storm

PN	USMH Name	Pipe Dia (mm)	Min Cover Depth (m)	Max Cover Depth (m)	Pipe Type	MH Dia (mm)	MH Width (mm)	MH Ring Depth (m)	MH Type
1.000	1	150	0.730	0.970	Unclassified	1200	0	0.970	Unclassified
1.001	2	150	0.730	0.907	Unclassified	1200	0	0.730	Unclassified

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
------------------------	-----------------	-----------------	-----------------	------------------------	-------------	-----------

1.001		50.460	49.403	0.000	0	0
-------	--	--------	--------	-------	---	---

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	0.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
Return Period (years)	5
FEH Rainfall Version	1999
Site Location	GB 473000 173100 SU 73000 73100
C (1km)	-0.028
D1 (1km)	0.260
D2 (1km)	0.260
D3 (1km)	0.334
E (1km)	0.306
F (1km)	2.624
Summer Storms	Yes
Winter Storms	No
Cv (Summer)	0.750
Cv (Winter)	0.840
Storm Duration (mins)	30

The Drainage Designers Limited

90 Coronation Street
Sunderland
SR1 2HE

Date 15/06/2024 12:59
File Royal Berkshire Hospita...

Innovyze

Royal Berkshire Hospital
Existing Surface Water Model

Designed by JY
Checked by MY

Network 2020.1

Page 4



1 year Return Period Summary of Critical Results by Maximum Level (Rank 1)
for Storm

Simulation Criteria

Areal Reduction Factor 1.000Additional Flow - % of Total Flow 0.000

Hot Start (mins) 0MADD Factor * 10m³/ha Storage 0.000

Hot Start Level (mm) 0Inlet Coefficient 0.800

Manhole Headloss Coeff (Global) 0.500Flow per Person per Day (l/per/day) 0.000

Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0Number of Storage Structures 0

Number of Online Controls 0Number of Time/Area Diagrams 0

Number of Offline Controls 0Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall ModelFEH

FEH Rainfall Version1999

Site Location GB 473000 173100 SU 73000 73100

C (1km)-0.028

D1 (1km)0.260

D2 (1km)0.260

D3 (1km)0.334

E (1km)0.306

F (1km)2.624

Cv (Summer)0.750

Cv (Winter)0.840

Margin for Flood Risk Warning (mm) 300.0DVD Status OFF

Analysis TimestepFineInertia Status OFF

DTS StatusON

Profile(s)Summer and Winter

Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440

Return Period(s) (years)1, 30, 100

Climate Change (%)0, 0, 0

US/MH

PN

Return

PN

Climate

Name

First (X)

Storm

First (Y)

Period

First (Z)

Change

Overflow

Surcharge

Overflow

Flood

Act.

Status

Level

Exceeded

Water

(m)

1.0001 15 Winter1+0% 30/15 Summer 30/15 Summer50.079

1.0012 15 Winter1+0% 30/15 Summer 30/15 Summer49.960

Surcharged Flooded

Half Drain

Pipe

US/MH

Depth

Volume

Flow / Overflow

Time

Flow

Level

PN

Name

(m)

(m³)

Cap.

(l/s)

(mins)

(l/s)

Status

Exceeded

1.0001-0.0510.0000.747.0OK6

1.0012-0.0500.0000.7724.2OK9

©1982-2020 Innovyze

The Drainage Designers Limited		Page 6
90 Coronation Street Sunderland SR1 2HE	Royal Berkshire Hospital Existing Surface Water Model	
Date 15/06/2024 12:59 File Royal Berkshire Hospita...	Designed by JY Checked by MY	
Innovyze	Network 2020.1	

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	0.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	1999
Site Location	GB 473000 173100 SU 73000 73100
C (1km)	-0.028
D1 (1km)	0.260
D2 (1km)	0.260
D3 (1km)	0.334
E (1km)	0.306
F (1km)	2.624
Cv (Summer)	0.750
Cv (Winter)	0.840

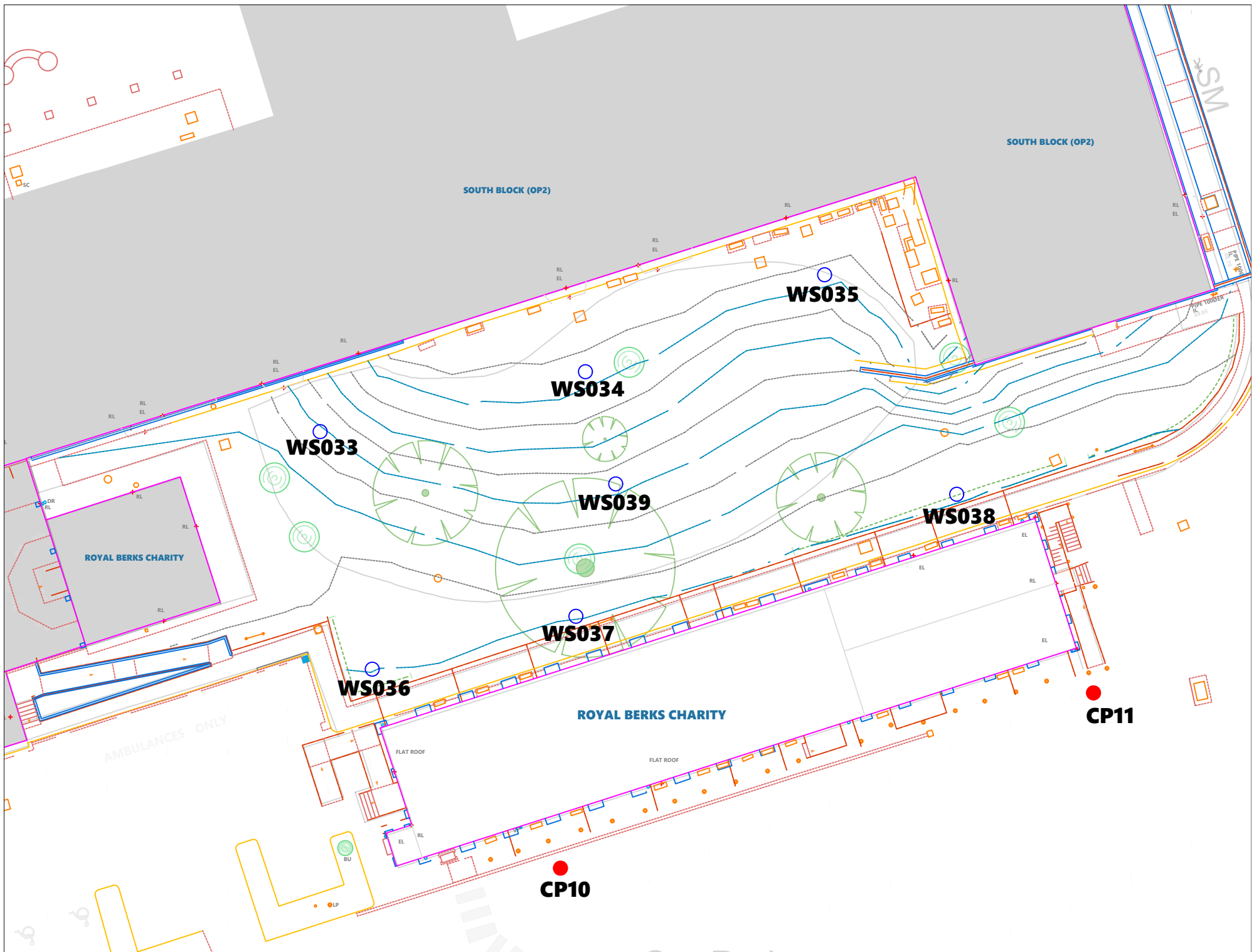
```
Margin for Flood Risk Warning (mm) 300.0      DVD Status OFF
      Analysis Timestep    Fine Inertia Status OFF
      DTS Status          ON
```

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years)	1, 30, 100
Climate Change (%)	0, 0, 0

PN	US/MH		Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water
	Name									Level (m)
1.000	1	15	Winter	100	+0%	30/15 Summer	30/15 Summer			51.105
1.001	2	15	Winter	100	+0%	30/15 Summer	30/15 Summer			50.758

PN	US/MH Name	Surcharged	Flooded			Half Drain	Pipe		
		Depth	Volume	Flow /	Overflow	Time	Flow	Level	
		(m)	(m³)	Cap.	(l/s)	(mins)	(l/s)	Status	Exceeded
1.000	1	0.975	4.645	1.71			16.3	FLOOD	6
1.001	2	0.748	18.069	1.63			51.2	FLOOD	9

APPENDIX E – BOREHOLE TESTING RESULTS



 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP010
Machine : Dando D150 Method : Cable Percussion		Casing Diameter 200mm cased to 10.00m 150mm cased to 18.00m		Ground Level (mOD) 51.65		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472579.13 E 172544.21 N		Dates 26/10/2023-31/10/2023		Project Contractor TFGI		Sheet 1/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Service Clearance Pit		
1.50-1.95	SPT N=7	1.50	DRY	1,1/2,1,2,2	50.65	1.00	Soft becoming firm brown sandy CLAY with occasional angular fine to medium flint gravel. TAPLOW GRAVEL MEMBER		
2.50-2.95	SPT N=16	1.50	DRY	1,2/3,4,5,4		(4.00)			
3.50-3.95	SPT N=12	3.00	DRY	1,3/3,4,3,2					
4.50-4.95	SPT N=7	3.00	DRY	1,1/1,1,2,3			becoming soft		
5.50-5.95	SPT N=11	4.50	DRY	1,2/2,3,3,3	46.65	5.00	Loose becoming medium dense brown slightly gravelly clayey SAND. Gravel is angular fine to medium flint. TAPLOW GRAVEL MEMBER		
						(2.20)			
7.00-7.45	SPT N=6	7.00	DRY	1,0/1,0,1,4	44.45	7.20	200mm band of soft brown gravelly slightly sandy CLAY - gravel is angular to sub-angular fine to coarse flint		
							Loose becoming very dense brown SAND. Sand is predominantly medium to coarse. TAPLOW GRAVEL MEMBER		
8.50-8.95	SPT N=8	8.50	DRY	2,2/1,2,3,2					
10.00-10.45	SPT N=50	10.00	9.35	26/10/2023:8.82m 27/10/2023:8.90m 2,6/8,12,18,12					
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m. Borehole cased to 18.00m. Water added from 9.00 - 9.50m and 10.00 - 13.00m to assist boring. Groundwater was encountered at 14.00m. Standpipe installed upon completion - see separate sheet for details. DD15 - SPT Hammer Energy Ratio: 66%								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.CP010	



Site

Royal Berkshire Hospital, London Road, Reading,
Berkshire. RG1 5AN.Borehole
Number

CP010

Machine : Dando D150

Method : Cable Percussion

Casing Diameter

200mm cased to 10.00m
150mm cased to 18.00m

Ground Level (mOD)

51.65

Client

Royal Berkshire NHS Foundation Trust

Job
Number

TFGI/1418/23

Location

472579.13 E 172544.21 N

Dates

26/10/2023-
31/10/2023

Project Contractor

TFGI

Sheet

2/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
11.50-11.95	SPT N=50	11.50	WA	2,4/8,10,16,16		(5.80)			
13.00-13.45	SPT N=34	13.00	WA	3,3/5,7,10,12	38.65	13.00	Very stiff grey CLAY locally slightly sandy with occasional orange oxidation marks. LAMBETH GROUP		
				Water strike(1) at 14.00m, rose to 13.86m in 20 mins.		(1.50)	becoming thinly interbedded dark grey, green and brown sandy CLAY with rare sub-angular medium flint		▼1 ▽1
16.00-16.45	SPT N=11	14.50	DRY	2,2/4,3,2,2 Water strike(2) at 16.10m, rose to 15.64m in 20 mins.	37.15	14.50	Recovered as: Structureless CHALK comprising uncompact cream with occasional orange staining. Locally small pockets of very soft brown silty clay noted. SEAFORD AND NEWHAVEN CHALK FORMATION		▼2 ▽2
17.50-17.95	SPT N=22	17.50	16.52	27/10/2023:16.10m 30/10/2023:15.48m 4,6/6,6,4,6					

Remarks

Scale
(approx)

1:50

Logged
By

CW

Figure No.

TFGI/1418/23.CP010

TFGI TERRA FIRMA Ground Investigation Ltd						Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP010	
Machine : Dando D150 Method : Cable Percussion		Casing Diameter 200mm cased to 10.00m 150mm cased to 18.00m		Ground Level (mOD) 51.65		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472579.13 E 172544.21 N		Dates 26/10/2023-31/10/2023		Project Contractor TFGI		Sheet 3/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
20.50-20.95	SPT N=27	18.00	16.45	4,4/3,6,9,9			CHALK becoming orangish cream silty GRAVEL and rare COBBLES - clasts are weak to moderately weak low to high density angular to sub-angular with light orange laminae - requent medium to coarse gravel sized fragments of angular flint noted		
22.00-22.45	SPT N=43	18.00	16.00	9,6/8,8,13,14		(15.95)			
25.00-25.45	SPT N=28	18.00	15.95	3,4/6,6,7,9					
26.50-26.95	SPT N=56	18.00	15.85	4,5/8,10,22,16					
28.00-28.45	SPT N=49	18.00	15.65	30/10/2023:15.65m 31/10/2023:15.45m 19,6/9,10,14,16 31/10/2023:15.90m					
Remarks								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.CP010	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP010
Machine : Dando D150 Method : Cable Percussion		Casing Diameter 200mm cased to 10.00m 150mm cased to 18.00m		Ground Level (mOD) 51.65		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472579.13 E 172544.21 N		Dates 26/10/2023-31/10/2023		Project Contractor TFGI		Sheet 4/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.00-30.45	SPT N=32	18.00	15.90	6,7/8,7,8,9	21.20	30.45	Complete at 30.45m		
Remarks Scale (approx) 1:50 Logged By CW Figure No. TFGI/1418/23.CP010									

Boring Method Cable Percussion Borehole Dando 2000	Casing Diameter 200mm to 6.00m 150mm to 14.00m	Ground Level (mOD) 44.60	Client Royal Berkshire NHS Foundation Trust	Job Number TFGI/1418/23
	Location 472405.436 E 172815.383 N	Dates 31/05/2023- 05/06/2023	Project Contractor TFGI	Sheet 1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.50-1.00	B1				44.40 44.25	(0.20) (0.20) (0.15) (0.38)	MADE GROUND: Type 1 Backfill MADE GROUND: Hardcore Sub-Base comprising brick, broken concrete and flint.		
1.00-1.45 1.00-1.45	SPT(C) N=8 B2		DRY	1,1/2,2,2,2		(1.15)	MADE GROUND: Reworked brown slightly clayey slightly gravelly SAND. Gravel is fine to coarse sub-angular to sub-rounded flint, rare brick and rare ash.		
1.50-2.00	B3				43.10	1.50	Medium dense becoming dense dark to light brown to grey slightly gravelly very clayey SAND interbedded with bands of firm becoming stiff dark brown CLAY. Gravel is fine to coarse sub-angular to sub-rounded flint.		
2.00-2.45	B4			31/05/2023:DRY			TAPLOW GRAVEL MEMBER		
2.00-2.45 2.50-3.00	SPT(C) N=14 B5	2.00	DRY	01/06/2023:DRY 2,4/4,5,2,3					
3.00-3.45 3.00-3.45	SPT(C) N=27 B6	2.80	DRY	1,2/3,6,8,10		(2.80)	becoming slightly clayey gravelly SAND		
3.50-4.00	B7								
4.00-4.45 4.00-4.45	SPT(C) N=34 B8	4.00	2.50	4,6/8,8,8,10	40.30	4.30	Dense dark brown slightly clayey sandy GRAVEL. Gravel is fine to coarse sub-angular to sub-rounded flint and occasional sandstone. Rare flint cobbles noted up to 100mm diameter.		
4.50-5.00	B9						TAPLOW GRAVEL MEMBER		
5.00-5.45 5.50-5.80	SPT(C) N=42 B10	5.00	DRY	01/06/2023:DRY 02/06/2023:DRY 4,6/8,8,10,16		(1.50)			
5.90-6.00 6.00-6.45 6.00-6.45	D11 SPT N=10 D12	6.00	DRY	1,1/1,2,3,4	38.80	5.80 (0.80)	Soft to firm mottled dark brown to grey slightly sandy slightly gravelly CLAY. Gravel is fine to coarse sub-angular to well-rounded flint.		
					38.00	6.60	Recovered as: Clean white slightly gravelly CHALK. Gravel is fine to coarse angular to sub-rounded flint and chalk lithorelics.		
7.00-7.45 7.00-7.45	SPT N=10 B13	6.10	DRY	1,1/2,3,2,3			SEAFORD AND NEWHAVEN CHALK FORMATION		
8.50-8.95 8.50-8.95	SPT N=3 B14	8.50	8.70	2,2/1,0,1,1 Water strike(1) at 8.70m.					
10.00-10.45	SPT N=24	10.00	1.00	1,2/4,4,6,10					

Remarks Hand dug inspection pit from GL - 1.20m. Borehole cased to 14.00m Water was added from 3.50m - 5.80m and 6.60m - 14.50m to assist boring. Groundwater was encountered at 8.70m. Difficult to advance borehole beyond 11.00m - chiselling and bailing techniques employed to advance borehole. Standpipe installed upon completion - see separate sheet for details. SPT006 - Hammer Energy Ratio: 76.87%	Scale (approx) 1:50	Logged By CW
	Figure No. TFGI/1418/23.CP001	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP001
Boring Method Cable Percussion Borehole Dando 2000		Casing Diameter 200mm to 6.00m 150mm to 14.00m		Ground Level (mOD) 44.60		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472405.436 E 172815.383 N		Dates 31/05/2023- 05/06/2023		Project Contractor TFGI		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45	B15					(8.17)	becoming slightly cobbly gravelly CHALK majority of chalk matrix not recovered		
11.50-11.79 11.50-11.95	SPT(C) 50/140 B16	11.00	5.50	10,8/15,35 02/06/2023:8.00m 05/06/2023:8.55m			becoming very gravelly CHALK - gravel is fine to coarse sub-angular to sub-rounded chalk lithorelics and flint large quantity of flint noted (possible flint boulder)		
13.00-13.37 13.00-13.45	SPT(C) 50/220 B17	13.00	11.10	4,10/15,16,19					
14.50-14.77	SPT(C) 100/120	14.00	9.48	11,14/45,55	29.83	14.77	Complete at 14.77m		
Remarks								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.CP001	



Site

Royal Berkshire Hospital, London Road, Reading,
Berkshire. RG1 5AN.Borehole
Number
CP011

Boring Method Dando 150 Cable Percussion	Casing Diameter 200mm to 10.50m 150mm to 23.50m		Ground Level (mOD) 51.36	Client Royal Berkshire NHS Foundation Trust	Job Number TFGI/1418/23
	Location 472611.039 E 172554.605 N		Dates 16/10/2023- 20/10/2023	Project Contractor TFGI	Sheet 1/4

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.20-1.65 1.20	SPT N=0 D1	1.20	DRY	1,0/0,0,0,0	50.16	(1.20)	Service Clearance Pit		
2.00-2.45 2.00	SPT N=10 D2	2.00	DRY	1,3/3,2,2,3		1.20	Very loose becoming loose dark brown clayey SAND with rare angular fine flint gravel. TAPLOW GRAVEL MEMBER		
2.50-3.00	B3					(2.30)			
3.00-3.45 3.50	SPT N=4 B4	3.00	DRY	16/10/2023:DRY 17/10/2023:DRY 2,2/1,1,1,1	47.86	3.50	Soft to firm becoming firm brown gravelly sandy CLAY. Gravel is sub-angular to rounded fine to medium flint gravel. TAPLOW GRAVEL MEMBER		
4.00-4.45 4.00	SPT N=8 D5	4.00	DRY	1,1/2,1,2,3					
5.00	D6								
6.00-6.50	B7								
6.50-6.95	SPT N=8	6.00	DRY	1,1/1,2,3,2					
7.00-7.50	B8					(7.50)			
8.00	D9								
8.50-9.00	B10						becoming loose brown gravelly clayey SAND		
9.50-9.95	SPT N=8	9.00	DRY	1,2/2,2,2,2					

Remarks

Vacuum excavated service clearance pit by others from GL - 1.20m.
Borehole cased to 23.50m.
Water added from 10.50 - 12.00m to assist boring. Groundwater was encountered at 16.00m.
Standpipe installed upon completion - see separate sheet for details.
DD15 - SPT Hammer Energy Ratio: 66%

Scale
(approx)

1:50

Logged
By

CW

Figure No.

TFGI/1418/23.CP011

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP011
Boring Method Dando 150 Cable Percussion		Casing Diameter 200mm to 10.50m 150mm to 23.50m		Ground Level (mOD) 51.36		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472611.039 E 172554.605 N		Dates 16/10/2023- 20/10/2023		Project Contractor TFGI		Sheet 2/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.35	B11						becoming firm grey and orangish brown CLAY with frequent black oxidation spots		
10.50-10.95 10.50	SPT N=12 D12	10.50	DRY	1,2/2,3,4,3					
11.00-11.50	B13				40.36	11.00	Light brown SAND and GRAVEL. Gravel is angular to sub-rounded fine to coarse flint. TAPLOW GRAVEL MEMBER		
						(1.00)			
12.00-12.45 12.00-12.50	SPT(C) N=15 B14	12.00	10.50	1,2/3,3,4,5	39.36	12.00	Firm to stiff red mottled grey slightly sandy CLAY. LAMBETH GROUP		
				17/10/2023:10.82m 18/10/2023:11.31m		(1.50)			
13.00-13.50	B15								
13.50-13.95 13.50	SPT N=12 D16	13.50	DAMP	1,2/2,3,3,4	37.86	13.50	Light brown SAND. Sand is predominantly medium to coarse. LAMBETH GROUP		
14.50	D17					(2.50)			
15.00-15.45 15.00	SPT N=21 D18	15.00	DRY	2,3/5,5,5,6					▼1
16.00-16.50	B19			Water strike(1) at 16.00m, rose to 15.37m in 20 mins, not sealed. 3,4/4,5,6,7	35.36	16.00	Very stiff thinly laminated grey and orange CLAY. LAMBETH GROUP		▽1
16.00-16.45 16.50	SPT N=22 D20	16.50	DRY			(1.50)			
17.00-17.50	B21								
17.50-18.00	B22				33.86	17.50	Recovered as: Structureless CHALK comprising cream slightly sandy silty GRAVEL. Gravel is angular fine composed of chalk and occasional angular fine to coarse flint. SEAFORD AND NEWHAVEN CHALK FORMATION becoming silty - gravels absent		
18.00-18.45 18.00	SPT N=14 D23	18.00	17.90	2,3/4,3,3,4					
19.50-19.95 19.50	SPT N=21 D24	19.30	16.35	3,5/6,4,5,6					
Remarks								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.CP011	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP011
Boring Method Dando 150 Cable Percussion		Casing Diameter 200mm to 10.50m 150mm to 23.50m		Ground Level (mOD) 51.36		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472611.039 E 172554.605 N		Dates 16/10/2023- 20/10/2023		Project Contractor TFGI		Sheet 3/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
21.00-21.45 21.00	SPT N=38 D25	20.50	17.10	6,3/3,5,8,22			becoming cream mottled orange slightly gravelly slightly sandy SILT - gravel is angular to sub-angular fine to coarse chalk lithorelics - chalk gravel is very weak low density cream and orange with occasional black specks		
22.50	D26			18/10/2023:17.35m					
22.50-22.95	SPT N=31	20.50	15.46	19/10/2023:15.46m 12,7/7,8,7,9					
24.00-24.45 24.00	SPT N=46 D27	20.50	15.61	8,10/9,9,11,17		(12.85)			
24.50-25.50	B28								
25.50-25.95 25.50	SPT N=31 D29	23.50	16.18	5,7/7,9,8,7					
27.00-27.45 27.00 27.00-28.50	SPT N=27 D30 B31	23.50	16.35	5,5/5,6,7,9			rare flint cobbles observed locally		
							gravels becoming absent		
28.50-28.95 28.50	SPT N=43 D32	23.50	15.82	6,7/7,8,14,14					
29.00-30.00	B33			19/10/2023:16.21m			becoming slightly gravelly		
Remarks								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.CP011	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number CP011
Boring Method Dando 150 Cable Percussion		Casing Diameter 200mm to 10.50m 150mm to 23.50m		Ground Level (mOD) 51.36		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472611.039 E 172554.605 N		Dates 16/10/2023- 20/10/2023		Project Contractor TFGI		Sheet 4/4	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
30.00-30.35 30.00	SPT 25*/50 N=33 D34	23.50	16.21	20,5/,12,9,12	21.01	30.35	Complete at 30.35m		
Remarks Scale (approx) 1:50 Logged By CW Figure No. TFGI/1418/23.CP011									

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS033
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 143mm cased to 5.00m		Ground Level (mOD) 50.79		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472566.902 E 172560.188 N		Dates 20/09/2023		Project Contractor TFGI		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45 1.00-2.00	SPT(C) N=13 B1		DRY	2,2/3,3,3,4	49.79	1.00	Service Clearance Pit		
2.00-2.45 2.00-3.00	SPT(C) N=11 B2	2.00	DRY	2,4/3,2,3,3		(3.24)	Medium dense orangish brown SAND and GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER		
3.00-3.45 3.00-4.00	SPT(C) N=13 B3	3.00	DRY	2,3/3,4,3,3			150mm band of orangish brown fine to coarse SAND		
4.00-4.45 4.00-4.18 4.30-4.45	SPT(C) N=34 D4 D5	4.00	DRY	2,6/7,7,8,12	46.55	4.24	240mm band of yellowish brown medium to coarse SAND becoming dense		
4.72-5.00	B6				46.07	4.72	Very stiff light brown and light grey sandy silty CLAY with rare pockets of orangish brown sand. Occasional pockets of reddish brown silt noted. TAPLOW GRAVEL MEMBER		
5.00-5.37	SPT 100/220	5.00	DRY	7,12/22,38,40	45.42	5.37	Orangish brown sandy clayey GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER		
							Complete at 5.37m		
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m Borehole cased to 5.00m. Groundwater was not encountered. SPT Refused at 5.37m - position aborted by Engineer. Borehole backfilled with bentonite granules and pellets upon completion. DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.WS033	



Site

Royal Berkshire Hospital, London Road, Reading,
Berkshire. RG1 5AN.Borehole
Number

WS034

Boring Method

Dando Terrier 2002
Dynamic Sampling

Casing Diameter

143mm cased to 6.00m

Ground Level (mOD)

46.27

Client

Royal Berkshire NHS Foundation Trust

Job
Number

TFGI/1418/23

Location

472583.79 E 172581.201 N

Dates

12/09/2023-
13/09/2023

Project Contractor

TFGI

Sheet

1/1

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45 1.00-1.70	SPT(C) N=20 B1		DRY	3,4/5,6,4,5	45.27	(1.00) 1.00	Service Clearance Pit Medium dense becoming very dense orangish brown SAND and GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER		
1.72-1.85 2.00-2.45 2.20-3.00	D2 SPT(C) N=9 B3	2.00	DRY	2,3/2,3,2,2			...280mm band of light brown slightly gravelly fine to coarse SAND - gravel is sub-rounded to angular flint		
3.00-3.45 3.00-4.00	SPT(C) N=14 B4	3.00	DRY	2,3/4,3,3,4		(4.40)			
4.00-4.45 4.30-5.00	SPT(C) N=10 B5	4.00	DRY	3,3/2,4,2,2					
5.00-5.45 5.00-5.20 5.40-6.00	SPT(C) N=85 D6 B7	5.00	DRY	3,6/13,13,20,39	40.87	5.40	Very dense light brown slightly gravelly fine to coarse SAND. Gravel is sub-rounded to angular fine to coarse flint. TAPLOW GRAVEL MEMBER		
6.00-6.34	SPT 100/190	6.00	DRY	12/09/2023: DRY 13/09/2023: DRY 10,17/30,32,38	39.93	(0.94) 6.34	Complete at 6.34m		

Remarks

Vacuum excavated service clearance pit by others from GL - 1.00m
Borehole cased to 6.00m.
Groundwater was not encountered.
SPT Refused at 6.34m - position aborted by Engineer.
Borehole backfilled with bentonite granules and pellets upon completion.
DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.

Scale
(approx)

1:50

Logged
By

Figure No.

TFGI/1418/23.WS034

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS035
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 143mm cased to 6.00m		Ground Level (mOD) 46.55		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472596.713 E 172584.894 N		Dates 19/09/2023		Project Contractor TFGI		Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
							Service Clearance Pit		
1.00-1.45 1.00-1.20 1.20-2.00	SPT(C) N=22 D1 B2		DRY	2,2/5,5,5,7	45.55 45.30	1.00 (0.25) 1.25	Firm to stiff dark orangish brown slightly gravelly slightly sandy CLAY. Gravel is sub angular to rounded fine to medium flint. TAPLOW GRAVEL MEMBER Medium dense dark orangish brown SAND and GRAVEL. Gravel is angular to rounded fine to coarse flint. TAPLOW GRAVEL MEMBER		
2.00-2.45 2.00-3.00	SPT(C) N=12 B3	2.00	DRY	2,3/2,3,3,4					
3.00-3.45 3.30-4.50	SPT(C) N=9 B4	3.00	DRY	3,3/3,2,2,2		(3.85)			
4.00-4.45	SPT(C) N=9	4.00	DRY	2,3/2,3,2,2					
4.70-5.10 5.00-5.45 5.20-5.80	B5 SPT(C) N=10 B6	5.00	DRY	2,2/2,2,3,3	41.45	5.10 (0.70)	becoming dark orangish brown slightly gravelly SAND - gravel is angular to sub angular fine to medium flint Soft to firm reddish brown very gravelly slightly sandy CLAY. Gravel is angular to rounded fine to coarse flint. TAPLOW GRAVEL MEMBER		
6.00-6.31 6.00-6.30 6.30-6.80	SPT(C) 100/155 D7 D8	6.00	DRY	7,19/35,60,5	40.75 40.55	5.80 (0.20) 6.00	Soft to firm becoming very stiff orange and red and light grey sandy slightly gravelly CLAY. Gravel is rounded fine to coarse of flint. LAMBETH GROUP		
6.80-7.00 7.00-7.32	D9 SPT 100/165	6.00	DRY	7,17/30,45,25	39.55	(1.00) 7.00	Very dense orange clayey SAND. Sand is fine to medium. LAMBETH GROUP becoming light yellow SAND rare rounded to sub-rounded fine to medium flint gravel noted locally		
				19/09/2023:DRY			Complete at 7.32m		
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m Borehole cased to 6.00m. Groundwater was not encountered. SPT Refused at 7.32m - position aborted by Engineer. Borehole backfilled with bentonite granules and pellets upon completion. DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.WS035	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS036
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 143mm cased to 3.00m		Ground Level (mOD) 50.79		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472566.902 E 172560.188 N		Dates 21/09/2023- 22/09/2023		Project Contractor TFGI		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45	SPT(C) N=10					(1.00)	Service Clearance Pit		
1.20-2.00	B1		DRY	2,1/2,2,3,3	49.79 49.66	(0.13)	MADE GROUND: Soft dark brown sandy gravelley CLAY. Gravel is fine to coarse flint. Sand is fine. Frequent rootlets rare red brick fragments noted.		
2.00-2.45	SPT(C) N=18	2.00	DRY	2,2/3,5,4,6			Soft to firm becoming stiff orangish brown sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to sub-rounded fine to coarse flint. Occasional black oxidation spots and rare rootlets observed. TAPLOW GRAVEL MEMBER		
2.00-3.00	B2					(3.12)			
3.00-3.45	SPT N=24	3.00	DRY	3,5/5,5,7,7			rare pockets of light brown silty fine sand noted - rootlets becoming absent		
3.00-4.00	B3								
4.00-4.45	SPT N=23	3.00	DRY	3,5/6,7,5,5	46.54	4.25	Medium dense orangish brown SAND AND GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER		
4.60-4.75	D4					(0.75)			
4.80-5.00	D5								
5.00-5.45	SPT N=16	3.00	DRY	2,2/2,2,4,8	45.79	5.00	Firm brown CLAY with frequent oxidation spots. TAPLOW GRAVEL MEMBER		
5.00-5.64	B6					(0.64)			
6.00-6.45	SPT N=15	3.00	DRY	3,3/3,3,4,5	45.15	5.64	Medium dense orangish brown SAND AND GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER		
6.30-7.00	B7								
7.00-7.45	SPT N=26	3.00	DRY	3,3/6,5,7,8		(3.16)			
7.22-8.80	B8								
8.00-8.45	SPT N=30	3.00	DRY	4,5/9,7,8,6					
8.80-9.00	D9				41.99	8.80	Firm light orangish brown mottled grey locally reddish orange slightly gravelly sandy CLAY with occasional black oxidation spots. Gravel is angular fine of flint. LAMBETH GROUP		
9.00-9.45	SPT N=35	3.00	DRY	5,6/7,9,8,11		(1.57)			
10.00-10.37	SPT 100/220			5,5/15,35,50					
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m Borehole cased to 3.00m. Groundwater was not encountered. Borehole backfilled with bentonite granules and pellets upon completion. DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.								Scale (approx) 1:50	Logged By
								Figure No. TFGI/1418/23.WS036	

TFGI TERRA FIRMA Ground Investigation Ltd						Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS036	
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 143mm cased to 3.00m		Ground Level (mOD) 50.79		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472566.902 E 172560.188 N		Dates 21/09/2023- 22/09/2023		Project Contractor TFGI		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
					40.42	10.37	Complete at 10.37m		
Remarks								Scale (approx)	Logged By
								1:50	
								Figure No. TFGI/1418/23.WS036	

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS037
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 113mm cased to		Ground Level (mOD) 50.73		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472590.392 E 172565.374 N		Dates 07/09/2023- 08/09/2023		Project Contractor TFGI		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45 1.00-1.60	SPT(C) N=14 B1		DRY	2,4/3,3,3,5	49.73	1.00	Service Clearance Pit		
1.60-3.00	B2						Firm becoming stiff orangish brown mottled grey sandy slightly gravelly CLAY. Gravel is angular to well-rounded fine to coarse flint. TAPLOW GRAVEL MEMBER		
2.00-2.45	SPT(C) N=15	2.00	DRY	2,3/3,4,3,5		(3.15)			
3.00-3.45 3.00-3.30 3.30-4.00	SPT(C) N=22 D3 B4	3.00	DRY	2,4/5,4,5,8					
4.00-4.45 4.00-4.15 4.15-4.80	SPT(C) N=23 D5 B6	4.00	DRY	2,3/6,5,5,7	46.58	4.15	Dense to medium dense brownish grey gravelly SAND interbedded with soft to firm orangish brown CLAY. Bedding thickness ranges from ~100mm - 450mm. TAPLOW GRAVEL MEMBER		
4.80-4.92 4.92-5.05 5.00-5.45 5.05-5.22 5.22-5.70	D7 D8 SPT(C) N=11 D9 B10	5.00	DRY	0,0/1,1,4,5			becoming slightly sandy silty CLAY - sand is fine becoming gravelly sand - gravel is angular to sub-angular fine to medium flint becoming fissured light orange CLAY - fissures are closely spaced and randomly orientated - black oxidation spots noted on fissure walls		
5.70-8.00	B11						becoming brown SAND and GRAVEL - gravel is angular to sub-rounded fine to coarse flint		
6.00-6.45	SPT(C) N=10	6.00	DRY	2,5/2,3,2,3		(4.35)			
7.00-7.45	SPT(C) N=5	7.00	DRY	2,1/2,1,1,1					
8.00-8.45	SPT(C) N=10	8.00	DRY	4,2/2,3,2,3					
8.50-9.00	B12			07/09/2023:DRY 08/09/2023:DRY	42.23	8.50	Stiff becoming very stiff red and greyish green gravelly slightly sandy CLAY. Gravel is angular to sub-rounded fine to coarse flint. LAMBETH GROUP sands and gravels become absent		
9.00-9.45 9.00-10.00	SPT(C) N=24 B13	9.00	DRY	2,3/4,6,6,8					
9.50	D14					(2.50)			
10.00-10.45	SPT(C) N=29	9.00	DRY	3,5/7,7,7,8					
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m Borehole cased to 9.00m. Groundwater was not encountered. Borehole backfilled with bentonite granules and pellets upon completion. DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.WS037	

TFGI TERRA FIRMA Ground Investigation Ltd						Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS037	
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 113mm cased to		Ground Level (mOD) 50.73		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472590.392 E 172565.374 N		Dates 07/09/2023- 08/09/2023		Project Contractor TFGI		Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.60-11.00	B15						becoming whitish yellow SAND		

 TERRA FIRMA Ground Investigation Ltd							Site Royal Berkshire Hospital, London Road, Reading, Berkshire. RG1 5AN.		Borehole Number WS038
Boring Method Dando Terrier 2002 Dynamic Sampling		Casing Diameter 143mm cased to 4.00m		Ground Level (mOD) 50.70		Client Royal Berkshire NHS Foundation Trust		Job Number TFGI/1418/23	
		Location 472607.606 E 172572.079 N		Dates 25/09/2023- 26/09/2023		Project Contractor TFGI		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
1.00-1.45 1.00-1.60	SPT(C) N=22 B1		DRY	6,6/7,5,5,5	49.70	(1.00) 1.00 (0.60)	Service Clearance Pit MADE GROUND: Stiff dark brown slightly sandy slightly gravelly CLAY. Gravel is fine to coarse flint. Sand is fine. Occasional rootlets rare red brick fragments noted.		
2.00-2.45 2.00-3.00	SPT(C) N=13 B2	2.00	DRY	2,1/2,3,4,4	49.10	1.60	Firm becoming very soft orangish brown slightly sandy gravelly CLAY. Sand is fine to medium. Gravel is angular to sub rounded fine to coarse flint. Occasional black oxidation spots and rare rootlets observed. TAPLOW GRAVEL MEMBER		
3.00-3.45 3.00-4.00	SPT(C) N=13 B3	3.00	DRY	1,2/3,2,3,5					
4.00-4.45 4.00-4.67	SPT(C) N=11 B4	4.00	DRY	2,3/2,3,3,3		(4.64)			
5.00-5.45 5.00-6.00	SPT N=11 B5	4.00	DRY	2,2/2,2,4,3			becoming slightly gravelly sandy CLAY		
6.00-6.45 6.24-7.00	SPT N=4 B6	4.00	DRY	1,1/1,1,1,1	44.46	6.24	Loose orangish brown locally clayey SAND AND GRAVEL. Gravel is angular to rounded fine to coarse flint. Sand is fine to coarse. TAPLOW GRAVEL MEMBER rootlets becoming absent		
7.00-7.45 7.40-8.00	SPT N=8 B7	4.00	DRY	1,2/2,2,2,2					
8.00-9.00 8.00-8.45	B8 SPT N=5	4.00	8.00	Water strike(1) at 8.00m. 2,3/2,1,1,1			becoming brown slightly gravelly SAND		▽1
9.00-9.45 9.00-10.00	SPT N=11 B9	4.00	9.00	2,3/3,3,3,2		(5.76)			
10.00-10.45	SPT N=8	4.00	10.00	25/09/2023:9.00m 26/09/2023:DRY 2,1/1,0,3,4			becoming brown SAND and GRAVEL		
Remarks Vacuum excavated service clearance pit by others from GL - 1.00m Borehole cased to 4.00m. Groundwater was encountered at 8.00m. Borehole backfilled with bentonite granules and pellets upon completion. DT1 - Hammer Energy Ratio: 62% - blow count not corrected for energy ratio.								Scale (approx) 1:50	Logged By CW
								Figure No. TFGI/1418/23.WS038	

APPENDIX F - THAMES WATER PLANNING CONSULTATION CORRESPONDENCE

From: BCTAdmin@thameswater.co.uk
Sent: Tuesday, April 18, 2023 9:31 AM
To: Planning Administration
Subject: 3rd Party Planning Application - 230321

*** *WARNING - this is an External Email ***

STOP, THINK, before you CLICK links or OPEN attachments or REPLY.

Reading Borough Council
Council Offices
Civic Centre
Reading
Berkshire
RG1 7TD

Our DTS Ref: 74653
Your Ref: 230321

18 April 2023

Dear Sir/Madam

Re: New ward, ICU / ERF, South Block, Royal Berkshire Hospital, London Road, READING, Berkshire, RG1 5AN

Waste Comments

Thames Water recognises this catchment is subject to high infiltration flows during certain groundwater conditions. The scale of the proposed development doesn't materially affect the sewer network and as such we have no objection, however care needs to be taken when designing new networks to ensure they don't surcharge and cause flooding. In the longer term Thames Water, along with other partners, are working on a strategy to reduce groundwater entering the sewer networks.

Thames Water recognises this catchment is subject to high infiltration flows during certain groundwater conditions. The developer should liaise with the LLFA to agree an appropriate sustainable surface water strategy following the sequential approach before considering connection to the public sewer network. The scale of the proposed development doesn't materially affect the sewer network and as such we have no objection, however care needs to be taken when designing new networks to ensure they don't surcharge and cause flooding. In the longer term Thames Water, along with other partners, are working on a strategy to reduce groundwater entering the sewer network.

.

Thames Water would advise that with regard to FOUL WATER sewerage network infrastructure capacity, we would not have any objection to the above planning application, based on the information provided.

Thames Water would advise that with regard to SURFACE WATER network infrastructure capacity, we would not have any objection to the above planning application, based on the information provided.

Water Comments

If you are planning on using mains water for construction purposes, it's important you let Thames Water know before you start using it, to avoid potential fines for improper usage. More information and how to apply can be found online at thameswater.co.uk/buildingwater.

On the basis of information provided, Thames Water would advise that with regard to water network and water treatment infrastructure capacity, we would not have any objection to the above planning application. Thames Water recommends the following informative be attached to this planning permission. Thames Water will aim to provide customers with a minimum pressure of 10m head (approx 1 bar) and a flow rate of 9 litres/minute at the point where it leaves Thames Waters pipes. The developer should take account of this minimum pressure in the design of the proposed development.

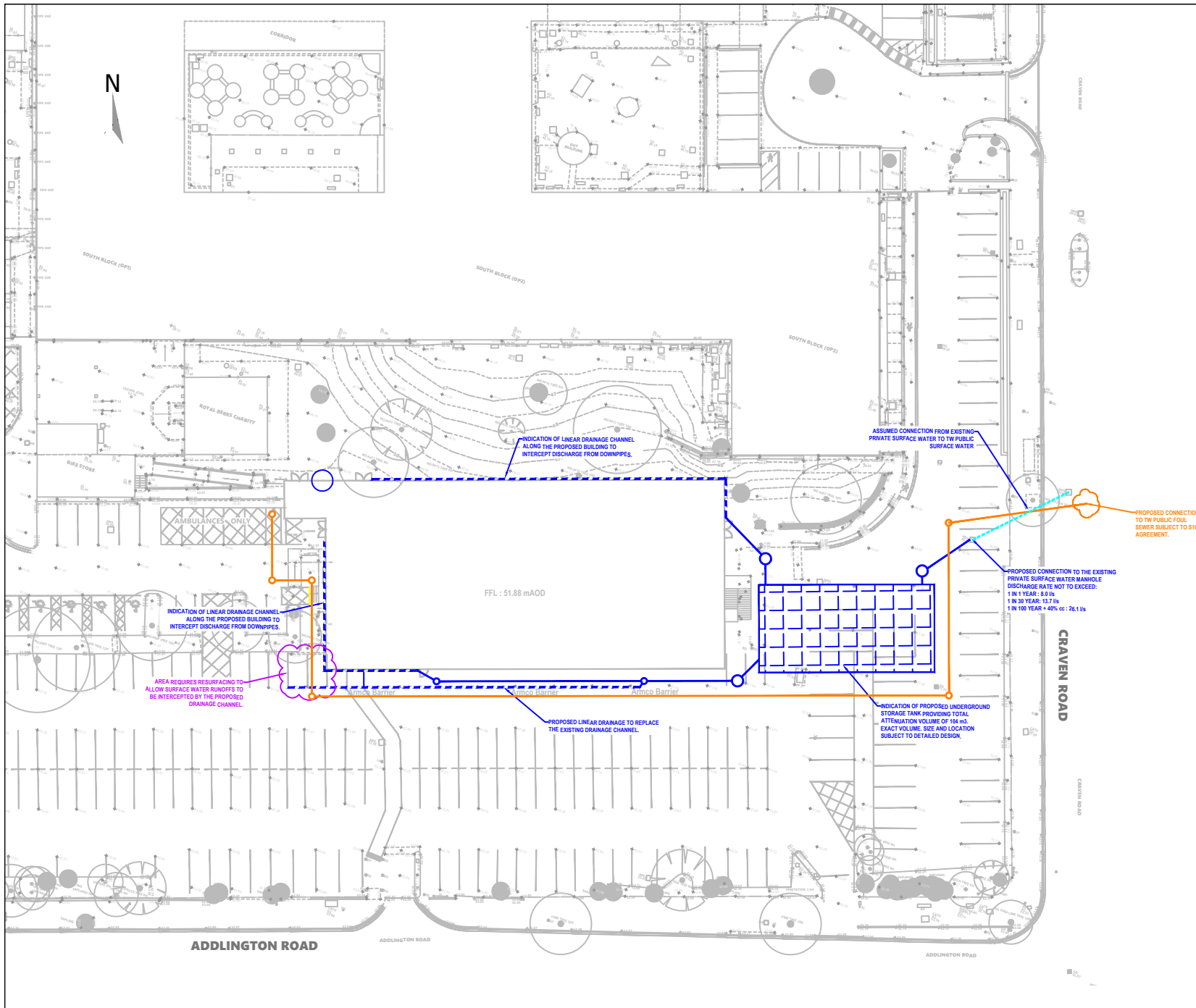
Yours faithfully
Development Planning Department

Development Planning,
Thames Water,
Maple Lodge STW,
Denham Way,
Rickmansworth,
WD3 9SQ
Tel:020 3577 9998
Email: devcon.team@thameswater.co.uk

This is an automated email, please do not reply to the sender. If you wish to reply to this email, send to devcon.team@thameswater.co.uk Visit us online www.thameswater.co.uk , follow us on twitter www.twitter.com/thameswater or find us on www.facebook.com/thameswater. We're happy to help you 24/7.

Thames Water Limited (company number 2366623) and Thames Water Utilities Limited (company number 2366661) are companies registered in England and Wales, both are registered at Clearwater Court, Vastern Road, Reading, Berkshire RG1 8DB. This email is confidential and is intended only for the use of the person it was sent to. Any views or opinions in this email are those of the author and don't necessarily represent those of Thames Water Limited or its subsidiaries. If you aren't the intended recipient of this email, please don't copy, use, forward or disclose its contents to any other person – please destroy and delete the message and any attachments from your system.

APPENDIX G – OUTLINE DRAINAGE LAYOUT



NOTE:

- DO NOT SCALE FROM THIS DRAWING.
- THIS DRAWING SHOULD NOT BE UTILISED FOR CONSTRUCTION.
- DRAINAGE DESIGN SUBJECT TO DESIGN DEVELOPMENT.

LEGEND

- PROPOSED PRIVATE SURFACE WATER DRAINAGE
- PROPOSED PRIVATE SURFACE WATER LINEAR DRAINAGE
- PROPOSED PRIVATE UNDERGROUND ATTENUATION STORAGE TANK
- PROPOSED PRIVATE FOUL SEWER DRAINAGE
- ASSUMED CONNECTION BETWEEN PRIVATE SURFACE WATER DRAINAGE TO TW PUBLIC SURFACE WATER SEWER

P01	17.06.2024	FIRST ISSUE	MY
REV	DATE	DESCRIPTION	BY

FOR INFORMATION



Client Name
ROYAL BERKSHIRE NHS FOUNDATION TRUST

Project Name
ROYAL BERKSHIRE HOSPITAL, ICS ER PROJECT

Drawing Title
OUTLINE DRAINAGE STRATEGY

MDA Job No	RBH-DD	Uniclass	Uniclass Classification
Status	FOR PLANNING	Scale at A1	1 in 200
Drawn by	JY	Checked by	MY
Date	17.06.2024	Revision	P01

Drawing Number
RBH-DD-XX-XX-RP-D-0500-S4-01

APPENDIX H – MICRODRAINAGE SOURCE CONTROL STORAGE ESTIMATION

1 in 1 year storage estimation

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 1

Version 1999

Site GB 473000 173100 SU 73000 73100

C (1km) -0.028 D3 (1km) 0.334

D1 (1km) 0.260 E (1km) 0.306

D2 (1km) 0.260 F (1km) 2.624

Cv (Summer) 0.750

Cv (Winter) 0.840

Impermeable Area (ha) 0.200

Maximum Allowable Discharge (l/s) 8.0

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 0

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 7.5 m³ and 15 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Area between 0.000 and 999.999

1 in 30 year storage estimation

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 30

Version 1999

Site GB 473000 173100 SU 73000 73100

C (1km) -0.028 D3 (1km) 0.334

D1 (1km) 0.260 E (1km) 0.306

D2 (1km) 0.260 F (1km) 2.624

Cv (Summer) 0.750

Cv (Winter) 0.840

Impervious Area (ha) 0.200

Maximum Allowable Discharge (l/s) 13.7

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 0

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 35 m³ and 50 m³.

These values are estimates only and should not be used for design purposes.

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

1 in 100 year + 40 cc% storage estimation

Quick Storage Estimate

Micro Drainage

Variables

FEH Rainfall

Return Period (years) 100

Version 1999

Site GB 473000 173100 SU 73000 73100

C (1km) -0.028 D3 (1km) 0.334

D1 (1km) 0.260 E (1km) 0.306

D2 (1km) 0.260 F (1km) 2.624

Cv (Summer) 0.750

Cv (Winter) 0.840

Impervious Area (ha) 0.200

Maximum Allowable Discharge (l/s) 26.1

Infiltration Coefficient (m/hr) 0.00000

Safety Factor 2.0

Climate Change (%) 40

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0

Quick Storage Estimate

Micro Drainage

Results

Global Variables require approximate storage of between 78 m³ and 104 m³.

These values are estimates only and should not be used for design purposes.

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Analyse OK Cancel Help

Enter Maximum Allowable Discharge between 0.0 and 999999.0