D & B Property

Proposed Residential Development
Grange Moor
Briestfield Road
Near Huddersfield

Drainage Assessment

Prepared by EWE Associates Ltd
Draft Rev0 January 2022

EWE Associates Ltd
7 Waveney Close
Burton Upon Stather
Scunthorpe
North Lincolnshire
DN15 9DT
t: 01724 721099
M: 07875 972270
e: lea.favill@eweassociates.com

CLIENT DETAILS

D & B Property
9 Gough Drive
Tipton
West Midlands
DY4 7AL

CONTRACT

This report describes work commissioned by D & B Property on 10th May 2021. D & B Property representative for the contract was Mr Neil Bowen. Lea Favill of EWE Associates Ltd carried out the work.

Date: 11th January 2022

Prepared by: …… …… Lea Favill
Director

REVISION HISTORY

Draft Report Rev0 issued 11th January 2022
- 1No copy issued to Mr Neil Bowen

CONTENTS

APPENDICES:

1. INTRODUCTION

Terms of Reference

This report was commissioned by D & B Property to consider the surface water and foul water drainage system for the proposed residential development at Grange Moor off Briestfield Road near Huddersfield.

The proposal involves the construction of 18 residential units within two blocks. The development will also include an access road and parking areas. The drainage issues are being considered as part of the current planning application.

Approach to the Assessment

For the purposes of this study, the following have been considered: -

- Site level information and proposed finished levels of the buildings and external works.
- Onsite constriction.
- Options available to developer.
- NPPF guidelines with regards to the control of runoff.
- PPG3 pollution prevention guidelines.
- Future adoption and management of drainage system.
- Infiltration characteristics of subsoils.
- Discharge rates into existing combined sewer.
- Flood risk to adjacent land users.

Design Constraints

For the purposes of this study, the following constraints have been applied: -

- The design is based on the proposed layout provided by the client's representative. At this stage no modifications to the layout are proposed.
- The proposal is for 18 private dwellings which will be sold to individual owners as such any drainage features or attenuation structures will be maintained by the individual owner/maintenance company.
- SUDs features are to be recommended where practically possible.
- There is a 225mm diameter public combined sewer within Briestfield Road which runs past the site entrance. The depth is unknown but assumed to be at least 1.4m deep.
- Trial holes have been excavated within the site which revealed solid clay. Initial testing resulted in no significant movement of water. As such, infiltration drainage not considered practical for development.

- There are no watercourses or culverted watercourse which are accessible to the site.
- It is assumed that the minimum design standard is 1 in 100 years plus climate change (40%) as the site is less vulnerable.
- No on site above ground flooding will be acceptable up to and including 1 in 100 years plus climate change (40%) storm.

2. DESIGN OF PROPOSED SURFACE WATER DRAIANGE SYSTEM

Existing Drainage

The existing site is a semi permeable parking area to the rear of a public house/restaurant. The existing development site has a total area of 0.203 hectares. There are no roofed or paved areas within the site with formalised drainage.

Table 2-1: Qbar runoff from existing site 0.203 hectares

Return Period	Flow in litres per second (l/s)
Qbar	0.5
1 in 1 year	0.5
1 in 30 year	1.0
1 in 100 year	1.1

The ICPSUDs Calculation has been used to calculate the existing runoff from the paved site. The calculation sheet is provided at Appendix A of this report. The 1 year rate of 0.5l/s has been calculated. As this is impractically low a discharge rate of 2l/s into the existing combined sewer is proposed for the development.

Any discharge from the site into the combined sewer may require the consent of the water authority.

Proposed Drainage Strategy

A peak discharge rate from the site of 2 l/s has been estimated. An assessment of the required balance volume has been made using the estimated post development impermeable area of 0.144 hectares. Using WinDes Source Control software developed by Microdrainage the required attenuation has been calculated for the 1 in 100 year plus climate change (40%) event.

Reference should be made to Appendix C where the calculation sheets are provided. The attenuation size has been tabulated overleaf in Table 2-2. It is estimated that during the 1 in 100 year plus climate change (40%) event that 95.8m³ of storage will be required. The storage volume is the maximum volume required during a 960 minute duration as such this is greater than the modelled volume of the tank. This will be provided within two crate tanks located within the access road/car parking spaces within the site.

The drainage strategy drawing provided at Appendix B shows the drainage strategy for the site which includes a crate tanks connecting to the existing combined sewer. The location of the tanks can be modified to suit on site constraints.

Table 2-2: WinDes 1 in 100 year+CC Storage Volume

Return Period	Required Attenuation	Total volume during 960min storm (m^3)
1 in 100 year + CC	2No. Crate tanks 12m by 5m by 0.8m deep	95.8

It is normal practice to ensure that the 1 in 30 year event is maintained below the ground in the form of storage and the difference between the 1 in 100 year and the 1 in 30 year is permitted to flood the surface as long as there is no flooding to buildings and the flood volume is contained within the site boundary. Alternatively, if the development is sensitive, the client can choose to store the full 1 in 100 year plus climate change balance volume below ground.

Adoption & Maintenance

It is considered that the piped drainage systems and attenuation structure will be maintained by private land owners and management company.

3. DESIGN OF PROPOSED FOUL WATER DRAINAGE SYSTEM

There is a public combined sewer located within Briestfield Road adjacent to the site entrance. The sewer can be seen on the Yorkshire Water sewer plan of the area provided at Appendix D. The existing sewers are illustrated on the drainage plan at Appendix B.

It is also proposed that the new development connects into the existing combined sewer. During detailed design stage the combined sewer depth should be confirmed, and it can the be established whether foul pumping is required. As the development is unadopted there is ample room within the site to provide a private package pumping station if required.

Appendix A: - Existing Runoff Calculation

EWE Associates Ltd		Page 1
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 25/11/2021 18:45 File	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

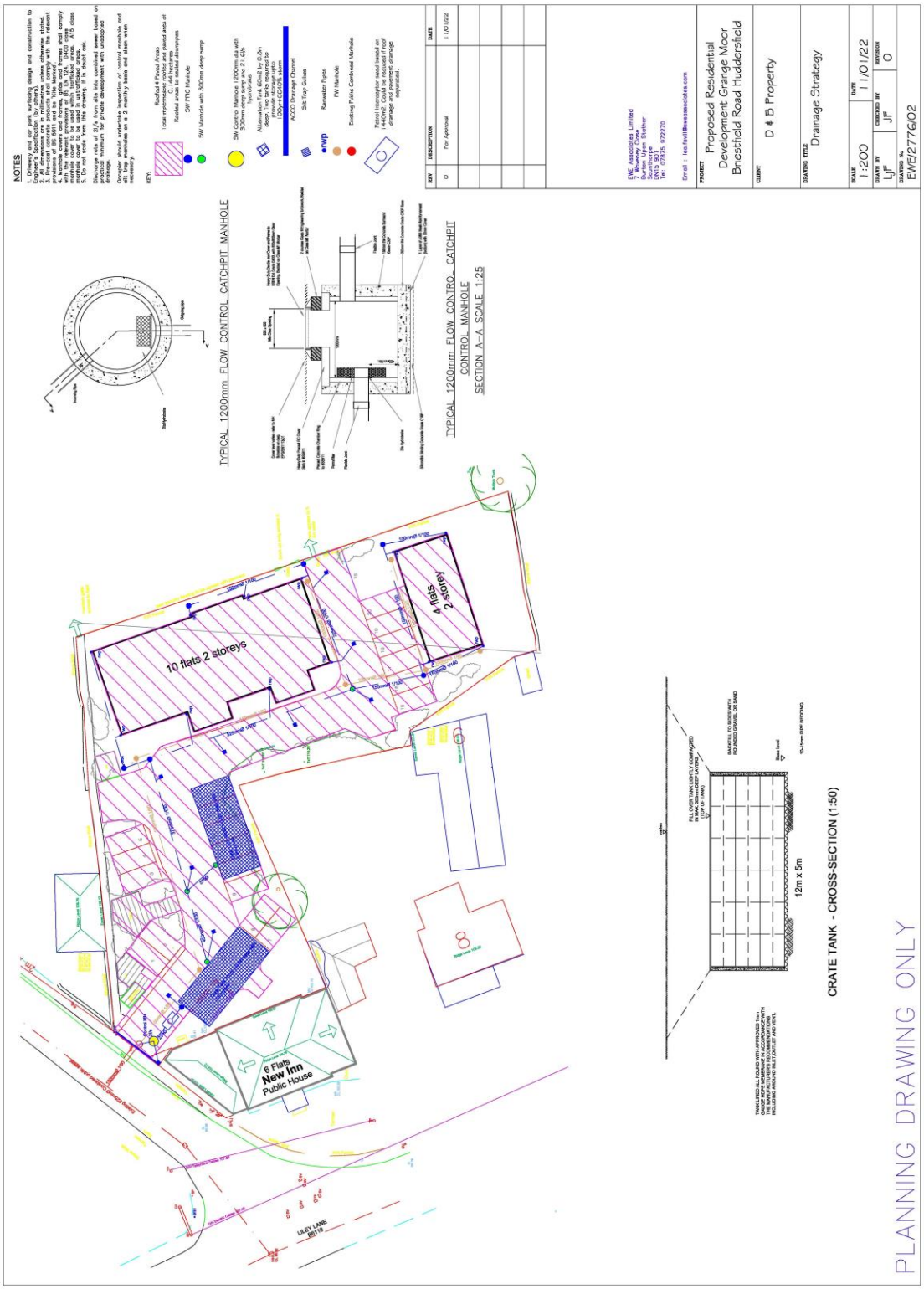
ICP SUDS Mean Annual Flood

Input

Return Period (years)	1	Soil	0.400
Area (ha)	0.144	Urban	0.000
SAAR (mm)	772	Region Number	Region 3

Results	l/s
QBAR Rural	0.5
QBAR Urban	0.5
Q1 year	0.5
Q1 year	0.5
Q30 years	1.0
Q100 years	1.1

Appendix B: - Drainage Drawings



Appendix C: - 1 in 100 year+CC WinDes Calculation Sheets

EWE Associates Ltd		Page 1
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 25/11/2021 18:48 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	98.881	0.381	1.0	45.7	O K
30 min Summer	98.948	0.448	1.1	53.8	O K
60 min Summer	99.022	0.522	1.2	62.7	O K
120 min Summer	99.099	0.599	1.3	71.8	O K
180 min Summer	99.139	0.639	1.3	76.7	O K
240 min Summer	99.164	0.664	1.3	79.7	O K
360 min Summer	99.187	0.687	1.4	82.5	O K
480 min Summer	99.193	0.693	1.4	83.1	O K
600 min Summer	99.194	0.694	1.4	83.3	O K
720 min Summer	99.194	0.694	1.4	83.2	O K
960 min Summer	99.198	0.698	1.4	83.7	O K
1440 min Summer	99.190	0.690	1.4	82.9	O K
2160 min Summer	99.165	0.665	1.3	79.8	O K
2880 min Summer	99.135	0.635	1.3	76.3	O K
4320 min Summer	99.038	0.538	1.2	64.5	O K
5760 min Summer	98.958	0.458	1.1	54.9	O K
7200 min Summer	98.891	0.391	1.0	47.0	O K
8640 min Summer	98.835	0.335	1.0	40.3	O K
10080 min Summer	98.787	0.287	0.9	34.5	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Summer	172.445	22
30 min Summer	102.493	37
60 min Summer	60.917	66
120 min Summer	36.207	124
180 min Summer	26.706	182
240 min Summer	21.520	242
360 min Summer	15.873	360
480 min Summer	12.790	448
600 min Summer	10.818	502
720 min Summer	9.434	564
960 min Summer	7.697	694
1440 min Summer	5.777	970
2160 min Summer	4.336	1388
2880 min Summer	3.537	1792
4320 min Summer	2.531	2596
5760 min Summer	1.996	3392
7200 min Summer	1.660	4176
8640 min Summer	1.428	4928
10080 min Summer	1.257	5656

EWE Associates Ltd		Page 2
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 25/11/2021 18:48 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Winter	98.927	0.427	1.1	51.2	O K
30 min Winter	99.003	0.503	1.2	60.3	O K
60 min Winter	99.087	0.587	1.3	70.5	O K
120 min Winter	99.175	0.675	1.4	81.0	O K
180 min Winter	99.224	0.724	1.4	86.8	O K
240 min Winter	99.254	0.754	1.4	90.4	O K
360 min Winter	99.286	0.786	1.5	94.3	O K
480 min Winter	99.297	0.797	1.5	95.7	O K
600 min Winter	99.298	0.798	1.5	95.7	O K
720 min Winter	99.294	0.794	1.5	95.3	O K
960 min Winter	99.298	0.798	1.5	95.8	O K
1440 min Winter	99.283	0.783	1.5	94.0	O K
2160 min Winter	99.238	0.738	1.4	88.5	O K
2880 min Winter	99.187	0.687	1.4	82.5	O K
4320 min Winter	99.049	0.549	1.2	65.9	O K
5760 min Winter	98.942	0.442	1.1	53.1	O K
7200 min Winter	98.856	0.356	1.0	42.7	O K
8640 min Winter	98.783	0.283	0.9	33.9	O K
10080 min Winter	98.708	0.208	0.9	24.9	O K

Storm Event	Rain (mm/hr)	Time-Peak (mins)
15 min Winter	172.445	22
30 min Winter	102.493	36
60 min Winter	60.917	64
120 min Winter	36.207	122
180 min Winter	26.706	180
240 min Winter	21.520	238
360 min Winter	15.873	350
480 min Winter	12.790	460
600 min Winter	10.818	560
720 min Winter	9.434	588
960 min Winter	7.697	736
1440 min Winter	5.777	1050
2160 min Winter	4.336	1496
2880 min Winter	3.537	1932
4320 min Winter	2.531	2768
5760 min Winter	1.996	3576
7200 min Winter	1.660	4392
8640 min Winter	1.428	5184
10080 min Winter	1.257	6056

EWE Associates Ltd		Page 3
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		Micro Drainage
Date 25/11/2021 18:48 File 100yr+CC40% tank ...	Designed By Lea Checked By	
Micro Drainage	Source Control W.12.4	

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
Site Location	421900 416500 SE 21900 16500
C (1km)	-0.026
D1 (1km)	0.369
D2 (1km)	0.412
D3 (1km)	0.294
E (1km)	0.305
F (1km)	2.370
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Time / Area Diagram

Total Area (ha) 0.144

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.100	4-8	0.044

EWE Associates Ltd		Page 4
Windy Ridge Barn Thealby Lane Winterton DN15 9TG		
Date 25/11/2021 18:48	Designed By Lea	
File 100yr+CC40% tank ...	Checked By	
Micro Drainage	Source Control W.12.4	

Model Details

Storage is Online Cover Level (m) 100.000

Tank or Pond Structure

Invert Level (m) 98.500

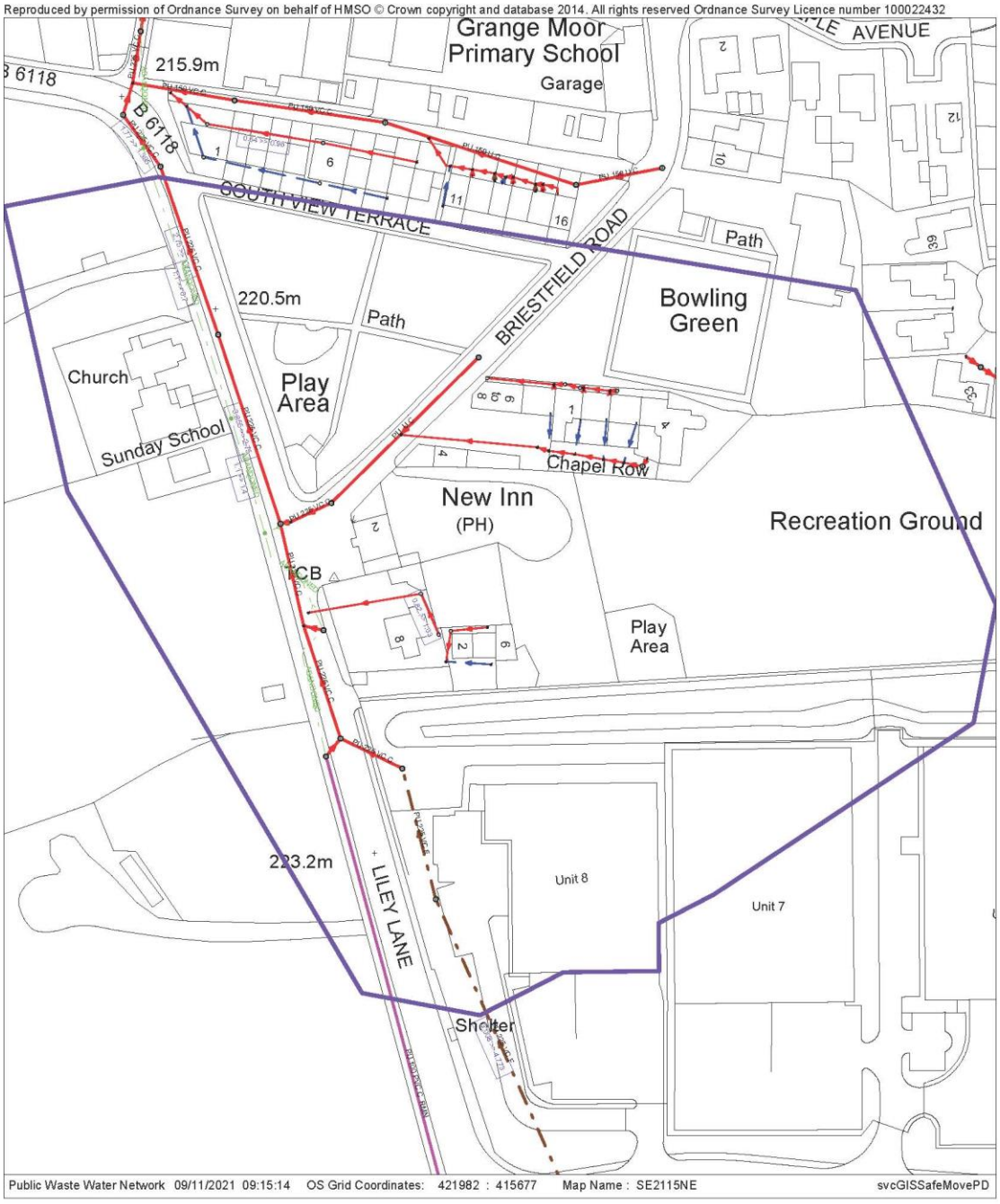
Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	120.0	1.400	0.0	2.800	0.0	4.200	0.0
0.200	120.0	1.600	0.0	3.000	0.0	4.400	0.0
0.400	120.0	1.800	0.0	3.200	0.0	4.600	0.0
0.600	120.0	2.000	0.0	3.400	0.0	4.800	0.0
0.800	120.0	2.200	0.0	3.600	0.0	5.000	0.0
1.000	0.0	2.400	0.0	3.800	0.0		
1.200	0.0	2.600	0.0	4.000	0.0		

Hydro-Brake® Outflow Control

Design Head (m) 1.500 Hydro-Brake® Type Md4 Invert Level (m) 98.500
Design Flow (l/s) 2.0 Diameter (mm) 46

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	0.9	1.200	1.8	3.000	2.9	7.000	4.4
0.200	0.8	1.400	2.0	3.500	3.1	7.500	4.6
0.300	0.9	1.600	2.1	4.000	3.3	8.000	4.7
0.400	1.1	1.800	2.2	4.500	3.5	8.500	4.9
0.500	1.2	2.000	2.4	5.000	3.7	9.000	5.0
0.600	1.3	2.200	2.5	5.500	3.9	9.500	5.1
0.800	1.5	2.400	2.6	6.000	4.1		
1.000	1.7	2.600	2.7	6.500	4.3		

Appendix D: - Sewer Plan



5