PROPOSED PHASE 2 RESIDENTIAL DEVELOPMENT AT FORMER BAGULEYS GARDEN CENTRE, MIDGELAND ROAD, BLACKPOOL.

DRAINAGE STRATEGY REPORT

HAMILTON TECHNICAL SERVICES
1 CHILTERN AVE, EUXTON, CHORLEY, LANCS, PR7 6NU

ISSUE 1
1/6/2022
C-0995

Document Control Sheet

Proposed Phase 2 Residential Development on land at former Baguley's Garden centre, Midgeland road, Blackpool. FY4 5HE.

Drainage Strategy Report

Job	Date	Issue	Copy
C0995	06TH Jan 2022	1	

Originator……..G Hamilton… …….

Checker……G Hamilton…… ..……..

Approver……G Hamilton…… …..……..

Contents

1.0 Introduction

2.0 Description of existing site

3.0 Proposals for Development

4.0 Maintenance

5.0 Conclusions

Figures and Plans

1. Introduction

1.1. Hamilton Technical Services have been commissioned by Mr Dennis Mackay of Denmac Holdings Ltd., to prepare a drainage report and design for Phase 2 of a residential development on land off Midgeland Road, Blackpool. The site is on land formerly known as Baguley's Garden centre.

1.2. The site comprises an area of land on the east side of Midgeland Road and to the west side of Stockydale Road. The site is presently set to rough ground, brambles and grass with some old concrete footings and with hedges to the southern and eastern boundaries.

1.3. The national grid reference for the site is 333434E, 432811N. A location plan is attached as **Figure 1** of this report.

2. Description of the existing site.

2.1. The site is bounded to the east by Stockydale Road beyond which lies residential land. To the north the site is bounded by further residential land part of which is a section of Phase 1 of the development. To the west the site is bounded by the remainder of Phase 1 of the development and older residential properties leading to Midgeland road. The southern boundary is to more residential properties and a southerly section of Stockydale Road.

2.2. Consultation of the extensive site investigations carried out as part of the Phase 1 planning application indicate the site to be underlain by clay soils and to be naturally wet with impeded drainage.

2.3. A further site investigation has been undertaken by means of a trial excavation and site walkover. The recent appraisal confirms the above findings that exclude infiltration as a means of surface water disposal. As part of the Phase 1 development, agreement was reached with United Utilities for the surface water run-off from the site to be discharged into the public surface water sewer in Midgeland Road.

2.4. As part of the construction of Phase 1 of the development separate systems for foul and surface water drainage were installed. The surface water system included a large attenuation tank to which the run-off from Phase 2 was to be discharged when development commenced on Phase 2. A plan showing the drainage installed at Phase 1 is attached as **Figure 2** of this report.

2.5. The foul drainage system installed for Phase 1 was designed to accept only the run-off from Phase 1, with the run-off from Phase 2 to be discharged into the public combined sewer in Stockydale Road on the eastern site boundary. Surface water from Phase 2 will be discharged to the attenuation system already installed and incorporating a reduced discharge through an orifice fitted in the manhole immediately downstream of the attenuation tank.

3. Proposals for Development

3.1. The development of the site will consist of the regrading of the site in many areas. The extension of the Phase 1 road system network. The construction of the new drainage works and the construction of five detached bungalows with garages drives and parking. The communal areas of the site will be landscaped. A plan showing the proposed site layout is attached as **Figure 3** of this report.

3.2. The surface water run-off from the developed site will drain into the existing attenuation tank from where it will outfall into the existing Phase 1 drainage system at a controlled rate. Foul water run-off will be discharged into the existing public sewer located just outside the site boundary in Stockydale Road.

3.3. The outlet chamber from the attenuation system contains a flow restriction orifice of 50mm diameter to minimise the discharge rates from the new phase of development to the minimum practical flow rates. A plan showing the proposed drainage layout for Phase 2 is attached as **Figure 4** of this report.

3.4. A series of flow simulation calculations has been completed using Micro Drainage software and these calculations show the maximum flow rates from Phase 2 will be limited as follows. The maximum flow rate during a 1 in 1 Yr storm will be 1.30 l/s; during a 1 in 2 Yr storm it will be 1.50 l/s; during a 1 in 30 Yr storm it will be 2.80 l/s and during a 1 in 100 Yr storm it will be 3.50 l/s.

3.5. These calculations include an allowance for climate change of 40% rainfall increase and an allowance for urban creep. A plan showing the catchment areas used in the calculations is attached as **Figure 5** of this report and a selection of the calculations is contained in **Appendix 1** of this report.

4. Maintenance

4.1. The maintenance and any necessary repairs to the roads, landscaping and drainage systems will be carried out by the site management company that looks after the Phase 1 development. The new dwellings will be signed up to this management company

4.2. The drainage systems will be inspected at six month intervals and any necessary cleaning or repair works will be carried out immediately.

4.3. The funding for the management company will be through an annual maintenance fee paid by each dwelling belonging to the scheme.

5. Conclusions

5.1. The development of the site can be completed in a safe and sustainable manner that will reduce the risk of flooding within and outside the site.

5.2. The surface water drainage serving the developed site has been designed to accommodate the predicted changes in rainfall due to climate change and urban creep for the 100 yr lifetime of the development.

Figures;

Figure 1 – Site Location Plan
Figure 2 - Existing Site Drainage Plan
Figure 3 – Proposed Site Layout Plan
Figure 4 – Proposed Site Drainage Plan
Figure 5 – Surface Water Catchment Areas Plan

Appendix 1 – Surface Water Storm Simulation Calcs.

Rev.	Amendment	Date	By / Chk
B	- Red and blue line amended.	20/09/21	JB / AC
A	- Red and blue line amended.	20/09/21	JB / AC
\	- Initial issue.	26/02/19	JB / AC

Joseph Boniface Architects
Architects Registration Board
RIBA
Chartered Practice

Joseph Boniface Architects Ltd
01253 280 485
bonifacearchitects.co.uk
office@bonifacearchitects.co.uk
62 Caunce Street, Blackpool, FY1 3LA.

Project
New Residential Scheme,
Land off Midgeland Road,
Blackpool

Client
Mr. D. McKay

Drawing Title
Site Location Plan

Status
PLANNING

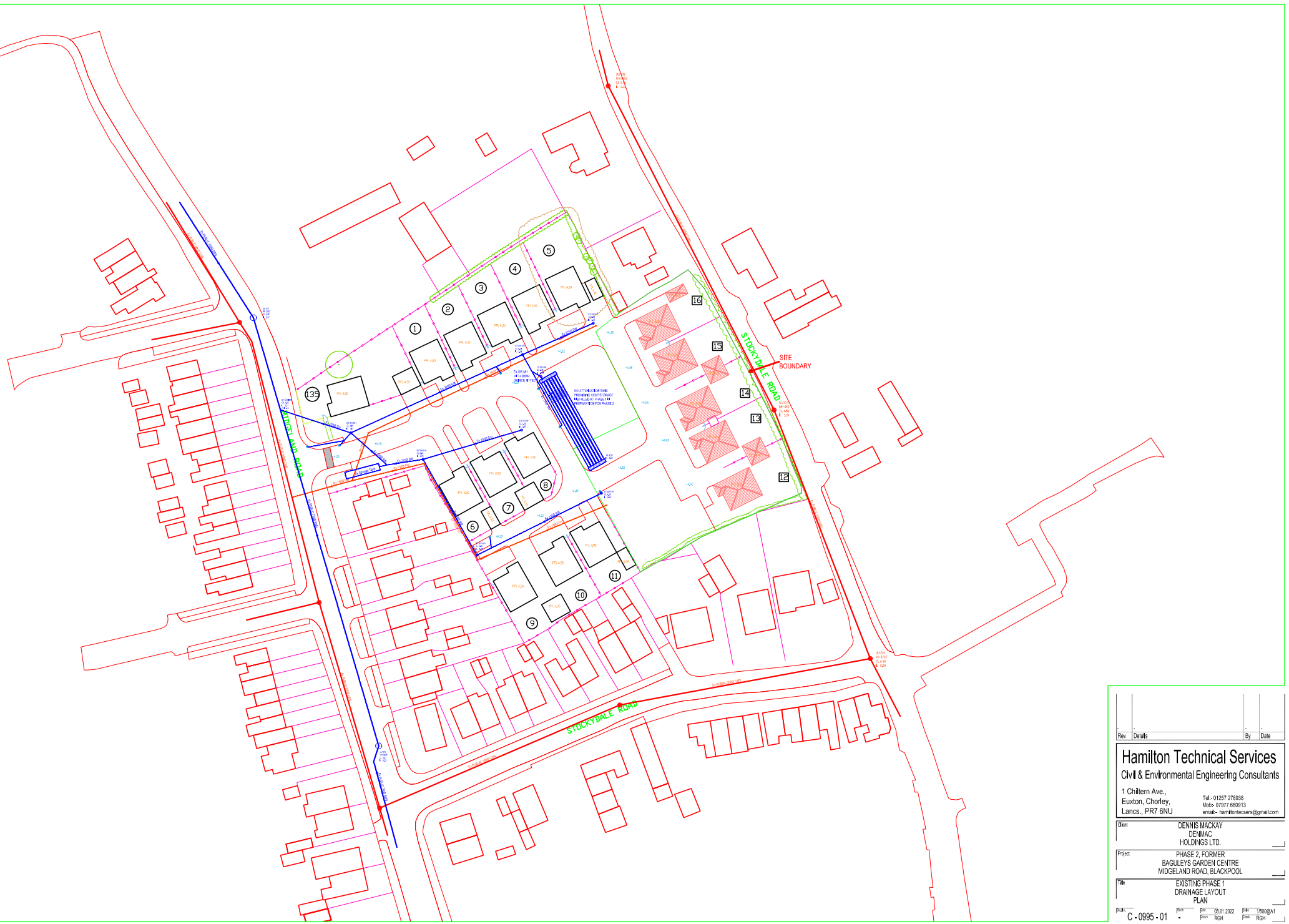
Scale
1:1250 @ A3

Drawn By
JB

Date
20/02/2019

Drawing Number
JBA363-PL-001

Revision
B



Rev	Details	By	Date
-	-	-	-

Hamilton Technical Services
Civil & Environmental Engineering Consultants

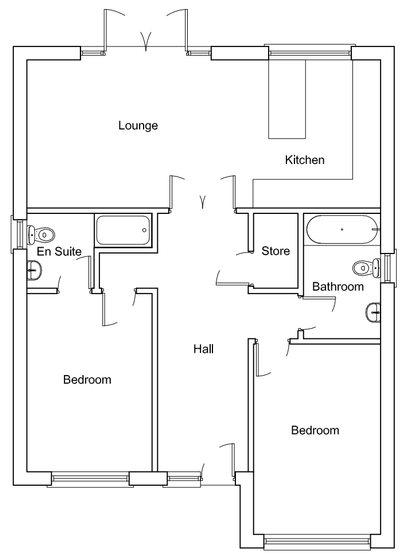
1 Chiltern Ave.,
Euxton, Chorley,
Lancs., PR7 6NU
Tel:- 01257 278938
Mob:- 07977 680913
email:- hamiltontecsers@gmail.com

Client: DENNIS MACKAY
DENMAC
HOLDINGS LTD.

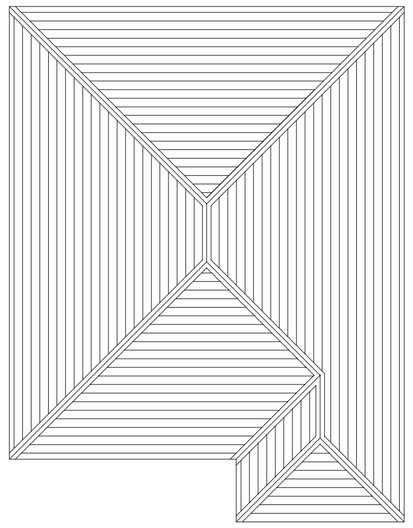
Project: PHASE 2, FORMER
BAGULEYS GARDEN CENTRE
MIDGELAND ROAD, BLACKPOOL

Title: EXISTING PHASE 1
DRAINAGE LAYOUT
PLAN

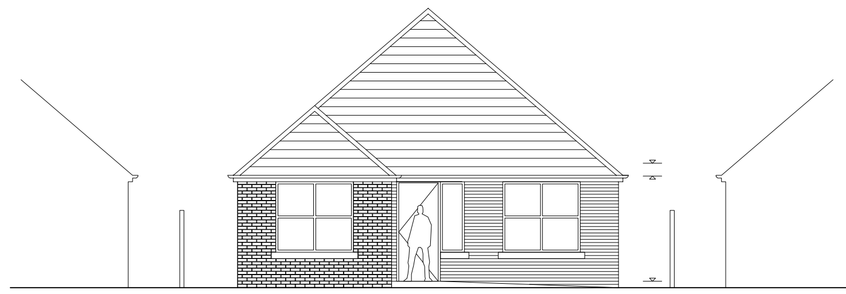
Proj. No. C - 0995 - 01
Rev -
Date 05.01.2022
Drawn RGH
Scale 1:500@A1
Check RGH



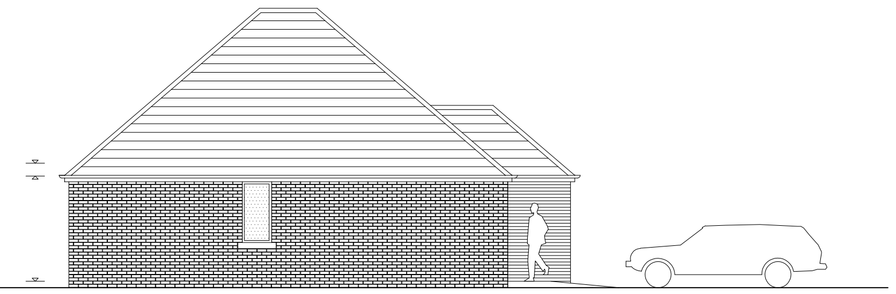
GROUND FLOOR PLAN



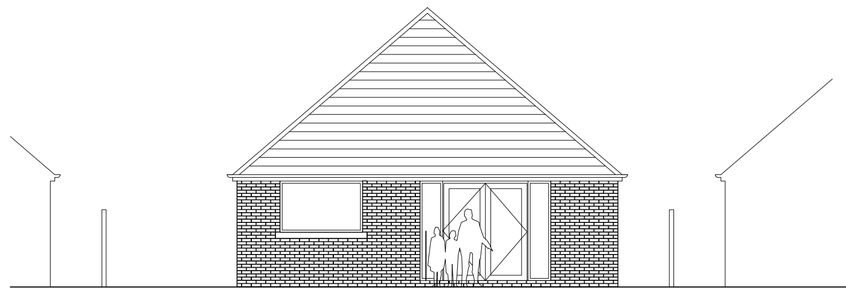
ROOF PLAN



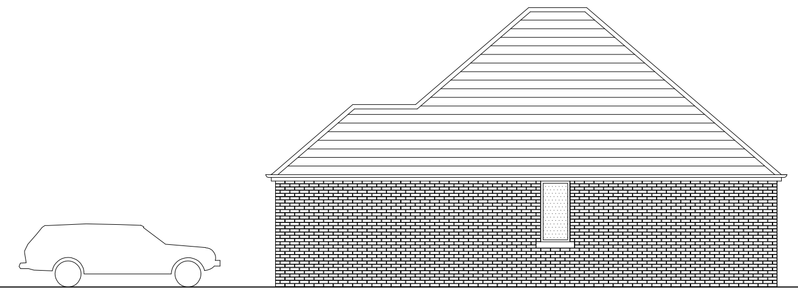
FRONT ELEVATION



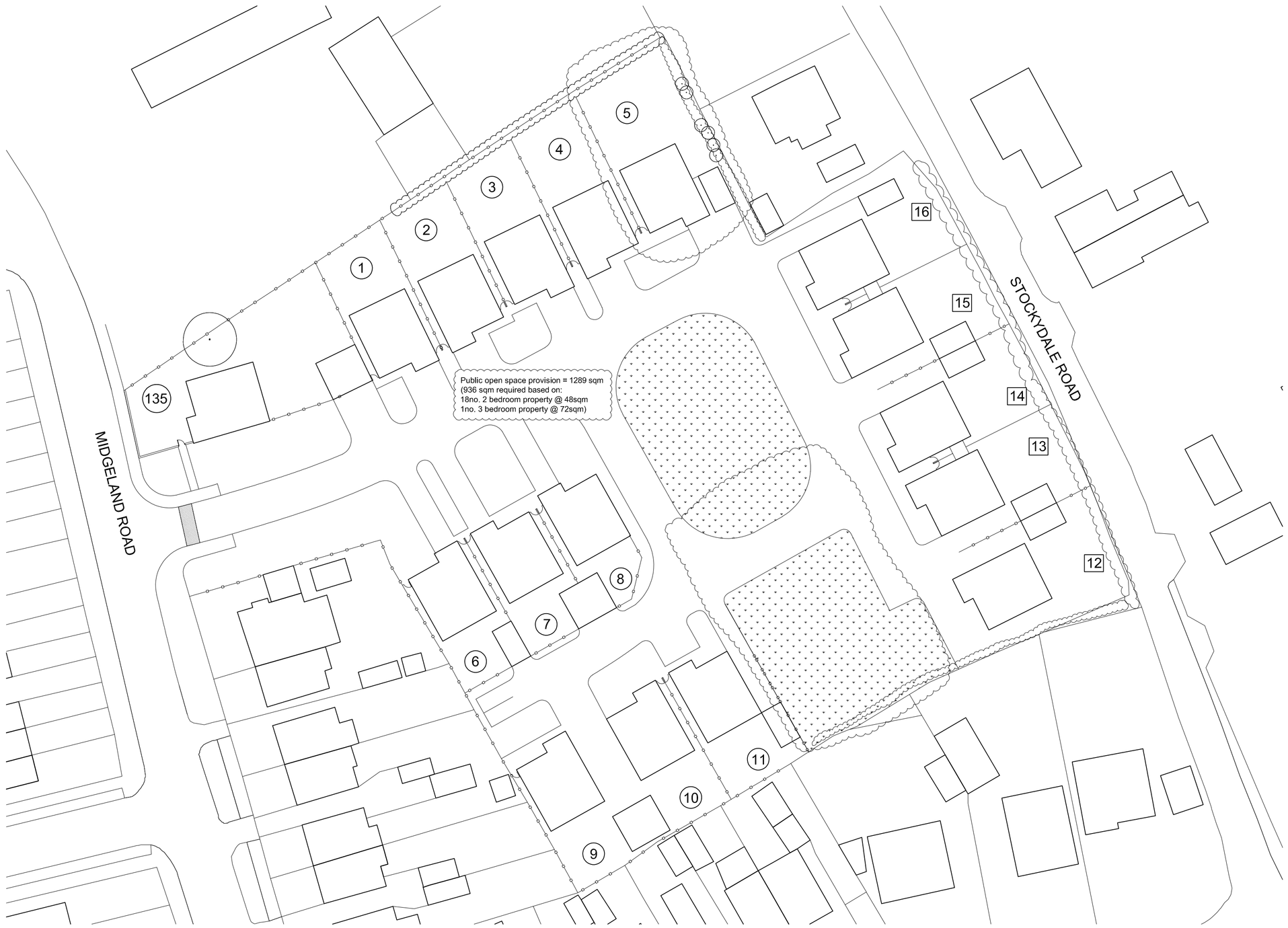
SIDE ELEVATION



REAR ELEVATION



SIDE ELEVATION



Rev.	Amendment	Date	By / Chk
D	- Unit removed. - POS amended. - Landscaping amended.	11/11/21	JB / AC
C	- Hedgerow position adjacent Stockydale Road amended.	08/11/21	JB / AC
B	- Internal partition removed. - Site plan amended.	04/11/21	JB / AC
A	- Garage positions amended.	26/10/21	JB / AC
\	- Initial issue.	14/09/21	JB / AC

Joseph Boniface Architects

Joseph Boniface Architects Ltd
01253 280 485
bonifacearchitects.co.uk
office@bonifacearchitects.co.uk
62 Caunce Street, Blackpool, FY1 3LA.

Project
New Residential Scheme,
Land off Midgeland Road,
Blackpool

Client
Mr. D. McKay

Drawing Title
Proposed Type A Plans and Elevations

Status
PLANNING

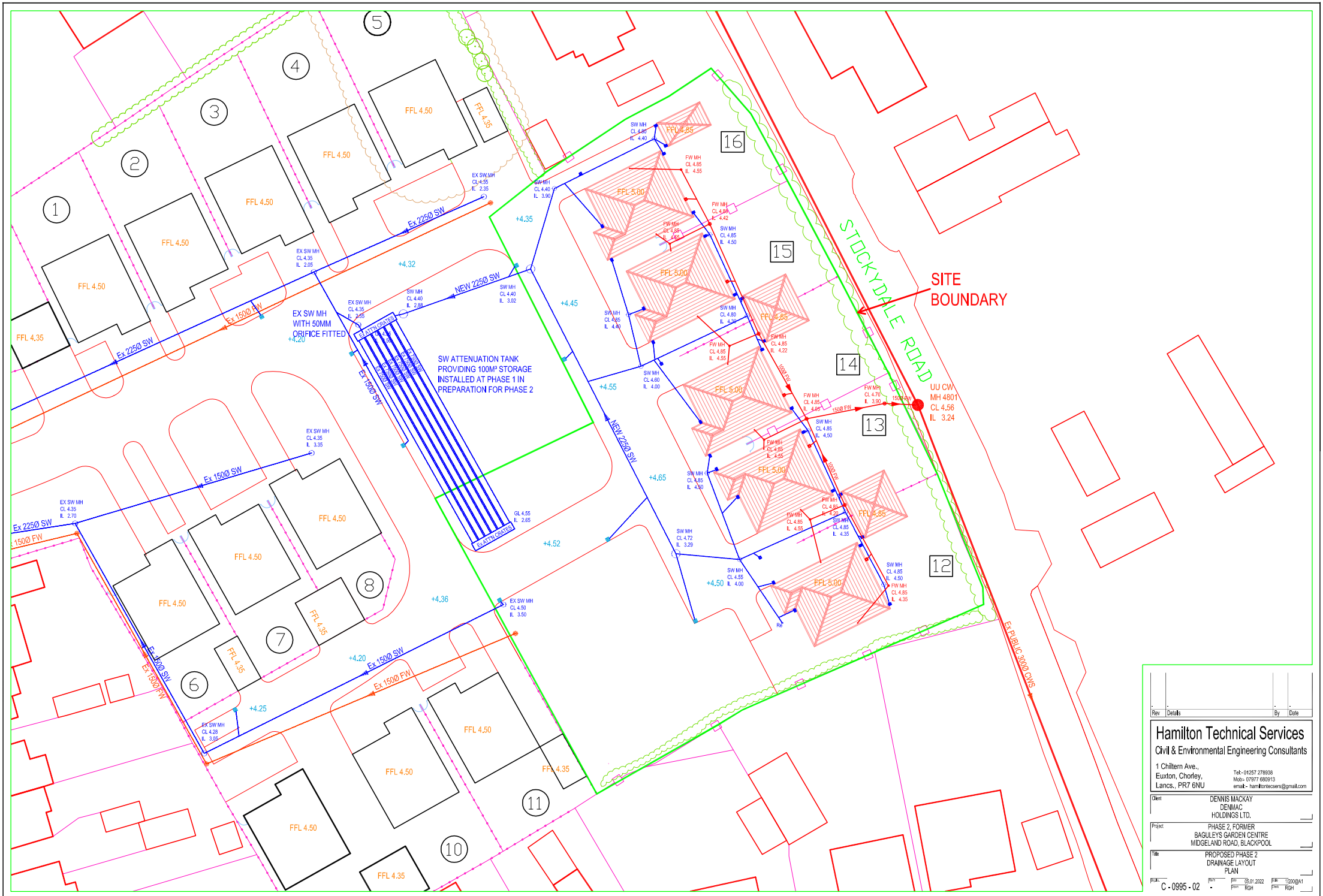
Scale
1:100 @ A1

Drawn By
JB

Date
14/09/2021

Drawing Number
JBA363-PL-018

Revision
D



Rev	Details	By	Date
-	-	-	-

Hamilton Technical Services
Civil & Environmental Engineering Consultants

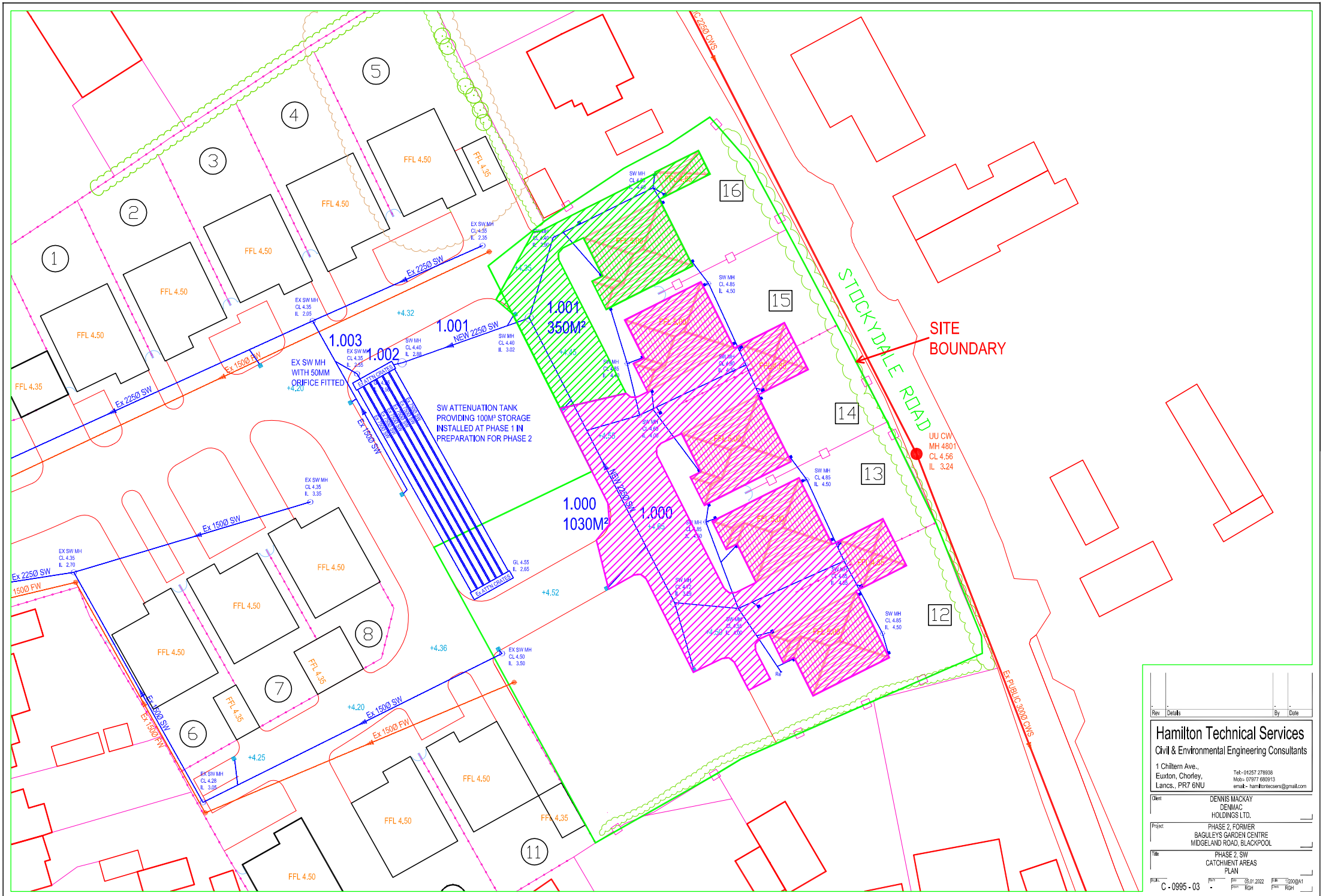
1 Chiltern Ave.,
Euxton, Chorley,
Lancs., PR7 6NU
Tel:- 01257 278938
Mob:- 07977 680913
email:- hamiltontecsers@gmail.com

Client: DENNIS MACKAY DENMAC HOLDINGS LTD.

Project: PHASE 2, FORMER BAGULEYS GARDEN CENTRE MIDGELAND ROAD, BLACKPOOL

Title: PROPOSED PHASE 2 DRAINAGE LAYOUT PLAN

Proj. No. C - 0995 - 02 | Rev. - | Date 05.01.2022 | Scale 1:200@A1 | Drawn RGH | Check RGH



Rev	Details	By	Date
-	-	-	-

Hamilton Technical Services
Civil & Environmental Engineering Consultants

1 Chiltern Ave.,
Euxton, Chorley,
Lancs., PR7 6NU
Tel:- 01257 278938
Mob:- 07977 680913
email:- hamiltontecsers@gmail.com

Client: DENNIS MACKAY
DENMAC
HOLDINGS LTD.

Project: PHASE 2, FORMER
BAGULEYS GARDEN CENTRE
MIDGELAND ROAD, BLACKPOOL

Title: PHASE 2, SW
CATCHMENT AREAS
PLAN

Proj. No. C - 0995 - 03 | Rev. - | Date 05.01.2022 | Drawn RGH | Scale 1:200@A1 | Check RGH

Land at former Baguleys Garden centre, Midgeland Road, Blackpool.

Appendix 1

SW Run-off Simulation Calculations

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.378	-0.137	0.000	0.32	0.0	12.9	OK
1.001	S2	3.117	-0.128	0.000	0.39	0.0	16.3	OK
1.002	S3	2.949	-0.156	0.000	0.20	0.0	16.4	OK
1.003	S4	2.608	-0.092	0.000	0.02	0.0	0.8	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.366	-0.149	0.000	0.24	0.0	9.9	OK
1.001	S2	3.105	-0.140	0.000	0.31	0.0	12.9	OK
1.002	S3	2.940	-0.165	0.000	0.16	0.0	12.9	OK
1.003	S4	2.623	-0.077	0.000	0.03	0.0	1.1	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	1	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 1 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.351	-0.164	0.000	0.17	0.0	6.7	OK
1.001	S2	3.090	-0.155	0.000	0.21	0.0	8.9	OK
1.002	S3	2.930	-0.175	0.000	0.11	0.0	9.0	OK
1.003	S4	2.637	-0.063	0.000	0.04	0.0	1.3	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table 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)
1.000	39.560	0.270	146.5	0.103	4.00	0.0	0.600	o	225
1.001	16.690	0.140	119.2	0.035	0.00	0.0	0.600	o	225
1.002	6.000	0.330	18.2	0.000	0.00	0.0	0.600	o	225
1.003	3.200	0.300	10.7	0.000	0.00	0.0	0.600	o	150

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	0.00	4.61	3.290	0.103	0.0	0.0	0.0	1.08	42.9	0.0
1.001	0.00	4.84	3.020	0.138	0.0	0.0	0.0	1.20	47.6	0.0
1.002	0.00	4.88	2.880	0.138	0.0	0.0	0.0	3.08	122.6	0.0
1.003	0.00	4.89	2.550	0.138	0.0	0.0	0.0	3.10	54.8	0.0

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.391	-0.124	0.000	0.41	0.0	16.7	OK
1.001	S2	3.133	-0.112	0.000	0.50	0.0	21.1	OK
1.002	S3	2.958	-0.147	0.000	0.26	0.0	21.2	OK
1.003	S4	2.625	-0.075	0.000	0.03	0.0	1.2	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.377	-0.138	0.000	0.31	0.0	12.8	OK
1.001	S2	3.118	-0.127	0.000	0.39	0.0	16.7	OK
1.002	S3	2.949	-0.156	0.000	0.21	0.0	16.7	OK
1.003	S4	2.645	-0.055	0.000	0.04	0.0	1.4	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	2	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 2 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.360	-0.155	0.000	0.21	0.0	8.6	OK
1.001	S2	3.099	-0.146	0.000	0.27	0.0	11.4	OK
1.002	S3	2.936	-0.169	0.000	0.14	0.0	11.4	OK
1.003	S4	2.661	-0.039	0.000	0.04	0.0	1.5	OK

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.621	0.106	0.000	1.02	0.0	41.6	SURCHARGED
1.001	S2	3.324	0.079	0.000	1.27	0.0	53.8	SURCHARGED
1.002	S3	3.015	-0.090	0.000	0.66	0.0	53.8	OK
1.003	S4	2.750	0.050	0.000	0.06	0.0	2.2	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.450	-0.065	0.000	0.84	0.0	34.1	OK
1.001	S2	3.250	0.005	0.000	1.04	0.0	44.1	SURCHARGED
1.002	S3	2.999	-0.106	0.000	0.55	0.0	44.3	OK
1.003	S4	2.809	0.109	0.000	0.07	0.0	2.5	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 30 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.411	-0.104	0.000	0.56	0.0	22.9	OK
1.001	S2	3.163	-0.082	0.000	0.73	0.0	30.7	OK
1.002	S3	2.976	-0.129	0.000	0.38	0.0	30.7	OK
1.003	S4	2.862	0.162	0.000	0.08	0.0	2.8	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	15
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 15 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.919	0.404	0.000	1.28	0.0	52.0	SURCHARGED
1.001	S2	3.463	0.218	0.000	1.61	0.0	67.9	SURCHARGED
1.002	S3	3.040	-0.065	0.000	0.84	0.0	67.7	OK
1.003	S4	2.809	0.109	0.000	0.07	0.0	2.5	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	30
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 30 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.646	0.131	0.000	1.05	0.0	42.6	SURCHARGED
1.001	S2	3.344	0.099	0.000	1.33	0.0	56.4	SURCHARGED
1.002	S3	3.019	-0.086	0.000	0.70	0.0	56.3	OK
1.003	S4	2.890	0.190	0.000	0.09	0.0	2.9	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	60
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 60 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.435	-0.080	0.000	0.74	0.0	30.1	OK
1.001	S2	3.194	-0.051	0.000	0.95	0.0	40.3	OK
1.002	S3	2.992	-0.113	0.000	0.50	0.0	40.2	OK
1.003	S4	2.964	0.264	0.000	0.09	0.0	3.3	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	120
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 120 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.398	-0.117	0.000	0.47	0.0	19.1	OK
1.001	S2	3.146	-0.099	0.000	0.60	0.0	25.5	OK
1.002	S3	3.019	-0.086	0.000	0.32	0.0	25.5	OK
1.003	S4	3.015	0.315	0.000	0.10	0.0	3.5	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	240
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 240 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.372	-0.143	0.000	0.29	0.0	11.6	OK
1.001	S2	3.114	-0.131	0.000	0.37	0.0	15.5	OK
1.002	S3	3.032	-0.073	0.000	0.19	0.0	15.5	OK
1.003	S4	3.029	0.329	0.000	0.10	0.0	3.5	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	400
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 400 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m^3)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.357	-0.158	0.000	0.19	0.0	7.9	OK
1.001	S2	3.096	-0.149	0.000	0.25	0.0	10.6	OK
1.002	S3	3.014	-0.091	0.000	0.13	0.0	10.6	OK
1.003	S4	3.011	0.311	0.000	0.10	0.0	3.4	SURCHARGED

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.113	4-8	0.025

Total Area Contributing (ha) = 0.138

Total Pipe Volume (m³) = 2.532

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)
1.003	SW PIPELINE	4.250	2.250	2.250	225	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.840	Foul Sewage per hectare (l/s)	0.000
Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	40.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Run Time (mins)	1440
Manhole Headloss Coeff (Global)	0.500	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Storage Structures	1
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0		

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Winter
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	18.000	Storm Duration (mins)	600
Ratio R	0.350		

Online Controls for Storm

Orifice Manhole: S4, DS/PN: 1.003, Volume (m³): 2.2

Diameter (m) 0.050 Discharge Coefficient 0.600 Invert Level (m) 2.550

Storage Structures for Storm

Cellular Storage Manhole: S4, DS/PN: 1.003

Invert Level (m) 2.550 Safety Factor 2.0
Infiltration Coefficient Base (m/hr) 0.00000 Porosity 0.95
Infiltration Coefficient Side (m/hr) 0.00000

Depth (m)	Area (m²)	Inf. Area (m²)	Depth (m)	Area (m²)	Inf. Area (m²)
0.000	130.0	0.0	0.800	130.0	0.0
0.400	130.0	0.0	0.801	0.0	0.0

Summary of Results for 600 minute 100 year Winter (Storm)

Margin for Flood Risk Warning (mm) 200.0 DVD Status OFF
Analysis Timestep Fine Inertia Status OFF
DTS Status ON

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status
1.000	S1	3.346	-0.169	0.000	0.14	0.0	5.8	OK
1.001	S2	3.085	-0.160	0.000	0.18	0.0	7.8	OK
1.002	S3	2.979	-0.126	0.000	0.10	0.0	7.8	OK
1.003	S4	2.976	0.276	0.000	0.10	0.0	3.3	SURCHARGED