

**APPENDIX D**

PUBLIC SEWER RECORDS



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Map Date: 15/08/2023  
Date updated: 15/08/21  
Scale: 1:500  
Sheet: 1

<p><b>Line Styles</b></p> <ul style="list-style-type: none"> <li>Blue dashed line: Sewer</li> <li>Red dashed line: Stormwater</li> <li>Green dashed line: Water</li> <li>Black dashed line: Gas</li> <li>Yellow dashed line: Electricity</li> <li>Orange dashed line: Telecommunications</li> <li>Grey dashed line: Other</li> </ul>	<p><b>Point Symbols</b></p> <ul style="list-style-type: none"> <li>Red circle: Manhole</li> <li>Blue circle: Valve</li> <li>Black circle: Junction</li> <li>Yellow circle: Inlet</li> <li>Orange circle: Outlet</li> <li>Green circle: Other</li> </ul>	<p><b>Area Symbols</b></p> <ul style="list-style-type: none"> <li>Red outline: Sewage Treatment Works</li> <li>Blue outline: Public Pumping Station</li> <li>Black outline: Discharge Point</li> <li>Yellow outline: Other</li> </ul>	<p><b>Legend</b></p> <ul style="list-style-type: none"> <li>Red circle: Sewage Treatment Works</li> <li>Blue circle: Public Pumping Station</li> <li>Black circle: Discharge Point</li> <li>Yellow circle: Other</li> </ul>
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Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
1801	454180	227879	F	111.77	10.03	1.74
2001	454207	227879	F	110.76	10.88	1.78
2902	454222	227823	F	111.23	10.71	2.02

Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
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Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
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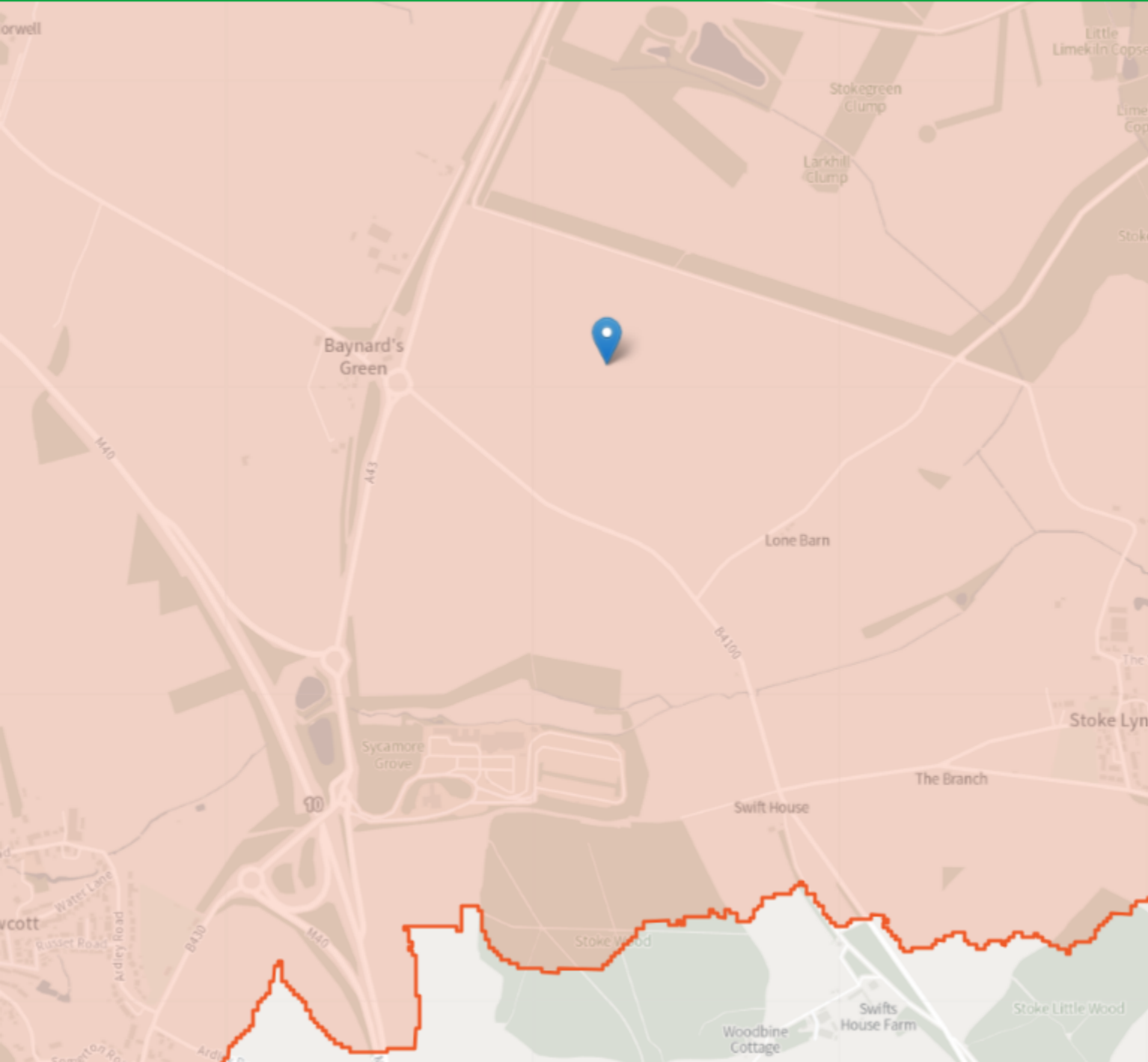
Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
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Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
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Marked Reference	Bankg	Northg	Liquid Type	Cover Level	Invert Level	Depth to Invert
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## APPENDIX E

### EA CLIMATE CHANGE ALLOWANCE FOR PEAK RAINFALL INTENSITY



## Upper and Bedford Ouse Management Catchment peak rainfall allowances



### 3.3% annual exceedance rainfall event

Epoch	Central allowance	Upper end allowance
2050s	20%	35%
2070s	25%	35%

### 1% annual exceedance rainfall event

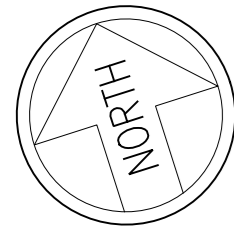
Epoch	Central allowance	Upper end allowance
2050s	20%	40%
2070s	25%	40%

\*Use '2050s' for development with a lifetime up 2060 and use the 2070s epoch for development with a lifetime between 2061 and 2125.

This map contains information generated by Met Office Hadley Centre (2019): UKCP Local Projections on a 5km grid over the UK for 1980-2080. Centre for Environmental Data Analysis, 2022

## APPENDIX F

### DRAINAGE STRATEGY DRAWINGS



**CATCHMENT 1 PROPOSED LINKED ATTENUATION / SOAKAWAY BASINS**

**BASIN 1:**  
TOP OF WATER = 114.650m  
BOTTOM OF BASIN = 113.075m  
TOTAL VOLUME = 240m<sup>3</sup>

**BASIN 2:**  
TOP OF WATER = 114.650m  
BOTTOM OF BASIN = 111.200m  
TOTAL VOLUME = 1,115m<sup>3</sup>

**BASIN 3:**  
TOP OF WATER = 114.650m  
BOTTOM OF BASIN = 111.200m  
TOTAL VOLUME = 16,120m<sup>3</sup>

**BASIN 4:**  
TOP OF WATER = 114.650m  
BOTTOM OF BASIN = 112.850m  
TOTAL VOLUME = 420m<sup>3</sup>

TOTAL ATTENUATION WITHIN BASINS = 17,895m<sup>3</sup>  
INFILTRATION RATE = 8.22x10<sup>-6</sup>m/s

**CATCHMENT 1 OVERFLOW DISCHARGE LOCATION**

SURFACE WATER TO INFILTRATE TO GROUND. DURING MORE EXTREME STORM EVENTS SURFACE WATER WILL RISE AND OVERFLOW INTO EXISTING DITCH PRIOR TO DISCHARGING INTO EXISTING 450DIA SEWER.

FLOW LIMIT = 142.6 l/sec

450Ø SEWER HERE CROSSES BELOW EXISTING HIGHWAY. INVERT LEVEL OF EXISTING SEWER = 113.150m  
OUTFALL TO ACT AS OVERFLOW TO SOAKAWAY SYSTEM. DOWNSTREAM ROUTE TO BE CONFIRMED.

**GREENFIELD RUN OFF**

QBAR = 4.5l/s/ha

Rural Runoff Calculator

ICP SUDS

ICP SUDS Input (FSR Method)

Return Period (Years): 100

Area (ha): 1.000

SAAR (mm): 659

Soil: 0.470

Growth Curve: (None)

Partly Urbanised Catchment (QBAR)

Urban: 0.000

Region: Region 5

Calculate

Results

QBAR rural (l/s): 4.5

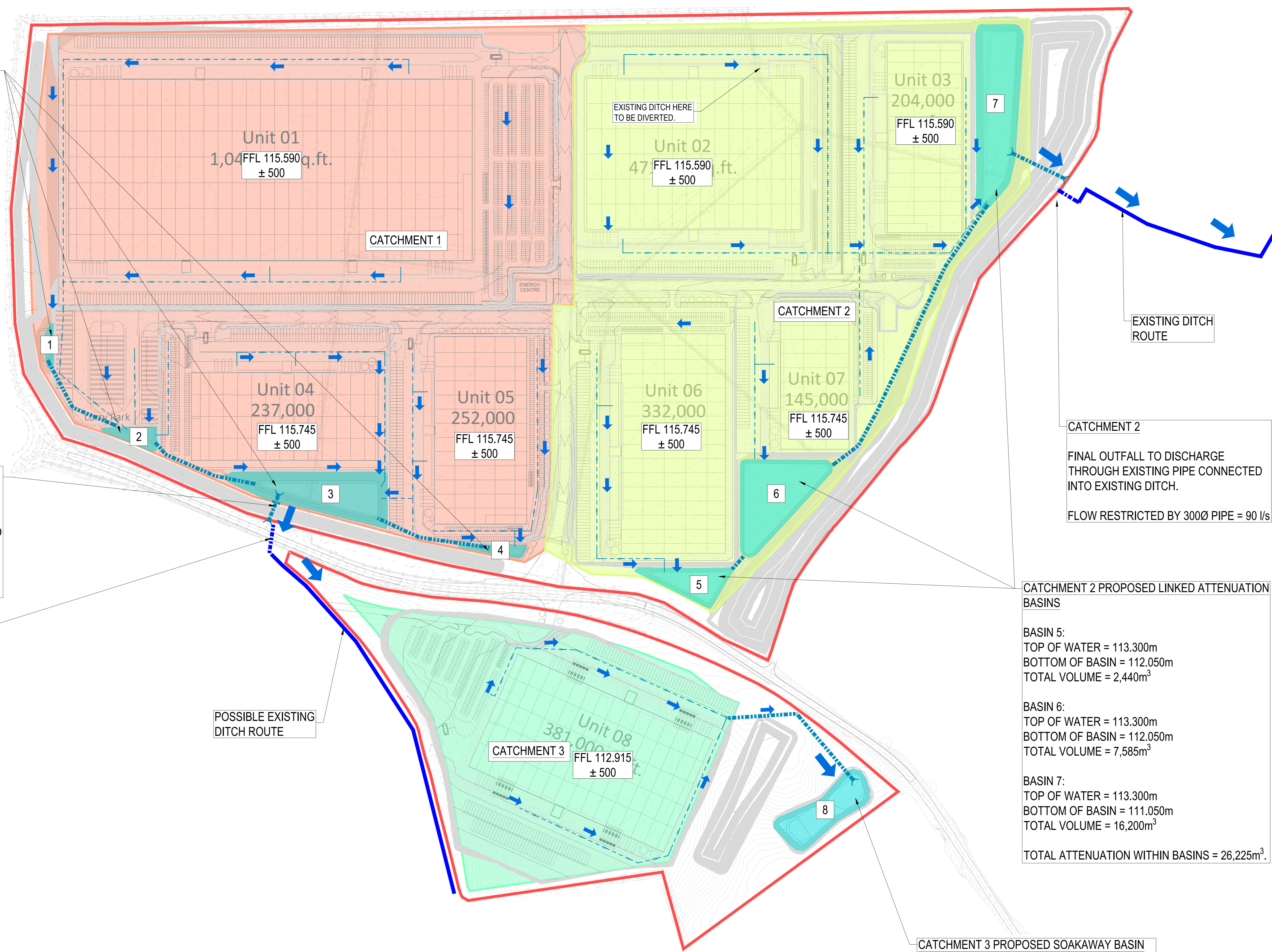
QBAR urban (l/s): 4.5

Region	QBAR (l/s)	Q (100yrs) (l/s)	Q (1 yrs) (l/s)	Q (30 yrs) (l/s)	Q (100 yrs) (l/s)
Region 1	4.5	11.2	3.8	8.5	11.2
Region 2	4.5	11.8	3.9	8.5	11.8
Region 3	4.5	9.4	3.9	7.9	9.4
Region 4	4.5	11.6	3.7	8.8	11.6
Region 5	4.5	16.0	3.9	10.8	16.0
Region 6/Region 7	4.5	14.4	3.8	10.2	14.4
Region 8	4.5	10.9	3.5	8.6	10.9
Region 9	4.5	9.8	4.0	7.9	9.8
Region 10	4.5	9.4	3.9	7.6	9.4

Enter Return Period between 1 and 1000

**LEGEND**

- SITE BOUNDARY
- CATCHMENT 1
- CATCHMENT 2
- CATCHMENT 3
- EXISTING SURFACE WATER PIPE
- EXISTING DITCH
- PROPOSED ABOVE GROUND STORAGE
- PROPOSED SURFACE WATER PIPE



**DRAINAGE STRATEGY**

IT IS PROPOSED TO SPLIT THE TOTAL SITE INTO 3NO. DRAINAGE CATCHMENTS THAT WILL HAVE SEPERATE OUTFALLS AS BELOW.

**DRAINAGE STRATEGY - CATCHMENT 1**

TOTAL IMPERMEABLE AREA = 316860m<sup>2</sup> | 31.686ha  
QBAR GREENFIELD RUN OFF RATE = 4.5l/s/ha  
THEREFORE TOTAL DISCHARGE RATE = 142.6l/s  
INFILTRATION RATE = 8.22x10<sup>-6</sup>m/s

CATCHMENT 1 WILL DRAIN USING A HYBRID STRATEGY OF INFILTRATION TO GROUND AND DISCHARGING AT GREENFIELD RUNOFF RATE INTO AN EXISTING WATERCOURSE DURING MORE EXTREME STORMS ONLY.

SURFACE WATER IS PROPOSED TO BE STORED IN A MIXTURE OF ABOVE GROUND ATTENUATION BASINS AND BELOW GROUND CELLULAR STORAGE TANKS PRIOR TO BEING DISCHARGED INTO AN EXISTING DITCH LOCATED TO THE SOUTH OF CATCHMENT 1. DUE TO THE FOUND PERMEABILITY OF THE EXISTING STRATA THE ATTENUATION BASINS WILL ALSO ACT AS A SOAKAWAY.

IT IS PROPOSED TO INFILTRATE TO GROUND DURING THE MAJORITY OF DESIGN STORMS. DURING MORE EXTREME DESIGN STORMS THE WATER LEVEL WILL RISE TO A LEVEL OF 113.150m AND THEN OVERFLOW INTO THE PROPOSED OUTFALL AND DISCHARGE AT A CONTROLLED DISCHARGE RATE EQUIVALENT TO THE QBAR GREENFIELD RUNOFF RATE.

APPROXIMATE REQUIRED STORAGE DURING 1 IN 100 YEAR STORM + 40% ALLOWANCE FOR CLIMATE CHANGE = APPROXIMATELY 22,700m<sup>3</sup>.

AVAILABLE ABOVE GROUND STORAGE = 17,895m<sup>3</sup>  
REMAINING STORAGE TO BE LOCATED WITHIN A MIXTURE OF BELOW GROUND ATTENUATION AND CONTROLLED ABOVE GROUND LOCALISED PONDING ENSURING PONDING DOES NOT LEAVE THE SITE BOUNDARY.

**DRAINAGE STRATEGY - CATCHMENT 2**

TOTAL IMPERMEABLE AREA = 265218m<sup>2</sup> | 26.5ha  
QBAR GREENFIELD RUN OFF RATE = 4.5l/s/ha  
THEREFORE TOTAL DISCHARGE RATE = 119.3l/s

SURFACE WATER IS PROPOSED TO BE STORED IN A MIXTURE OF ABOVE GROUND ATTENUATION BASINS AND BELOW GROUND CELLULAR STORAGE TANKS PRIOR TO BEING DISCHARGED INTO AN EXISTING DITCH LOCATED TO THE EAST OF CATCHMENT 2. THE EXISTING DITCH DISCHARGES BELOW THE CARRIAGEWAY TO THE EAST VIA A 300DIA SEWER, THEREFORE THE MAXIMUM RRICTED RATE OF 90l/s

DUE TO THE FOUND LOW PERMEABILITY OF THE EXISTING STRATA THE ATTENUATION BASINS WILL NOT ACT AS SOAKAWAYS.

REQUIRED STORAGE DURING 1 IN 100 YEAR STORM + 40% ALLOWANCE FOR CLIMATE CHANGE = APPROXIMATELY 24,100m<sup>3</sup>.

**DRAINAGE STRATEGY - CATCHMENT 3**

TOTAL IMPERMEABLE AREA = 84140m<sup>2</sup> | 8.41ha  
INFILTRATION RATE = 3.13x10<sup>-5</sup> m/s

DUE TO THE FOUND PERMEABILITY OF THE EXISTING STRATA IT IS PROPOSED TO DRAIN CATCHMENT 3 VIA INFILTRATION BASINS. SURFACE WATER IS PROPOSED TO BE DRAINED INTO A SOAKAWAY BASIN.

REQUIRED STORAGE DURING 1 IN 100 YEAR STORM + 40% ALLOWANCE FOR CLIMATE CHANGE = APPROXIMATELY 5,300m<sup>3</sup>

CATCHMENT 2

FINAL OUTFALL TO DISCHARGE THROUGH EXISTING PIPE CONNECTED INTO EXISTING DITCH.

CATCHMENT 2 PROPOSED LINKED ATTENUATION BASINS

**BASIN 5:**  
TOP OF WATER = 113.300m  
BOTTOM OF BASIN = 112.050m  
TOTAL VOLUME = 2,440m<sup>3</sup>

**BASIN 6:**  
TOP OF WATER = 113.300m  
BOTTOM OF BASIN = 112.050m  
TOTAL VOLUME = 7,585m<sup>3</sup>

**BASIN 7:**  
TOP OF WATER = 113.300m  
BOTTOM OF BASIN = 111.050m  
TOTAL VOLUME = 16,200m<sup>3</sup>

TOTAL ATTENUATION WITHIN BASINS = 26,225m<sup>3</sup>

**CATCHMENT 3 PROPOSED SOAKAWAY BASIN**

FINAL OUTFALL TO DISCHARGE DIRECTLY INTO PROPOSED SOAKAWAY.

**BASIN 8:**  
TOP OF WATER = 108.200m  
BOTTOM OF BASIN = 106.500m  
TOTAL VOLUME = 5,700m<sup>3</sup>

INFILTRATION RATE = 3.13x10<sup>-5</sup> m/s

Rev	Date	Description
R4	27.03.24	ATTENUATION AMENDED.
R3	26.02.24	ATTENUATION AMENDED.
R2	21.12.23	CLIMATE CHANGE VALUE INCREASED.
R1	09.11.23	PRELIMINARY ISSUE.

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**TRITAX SYMMETRY**  
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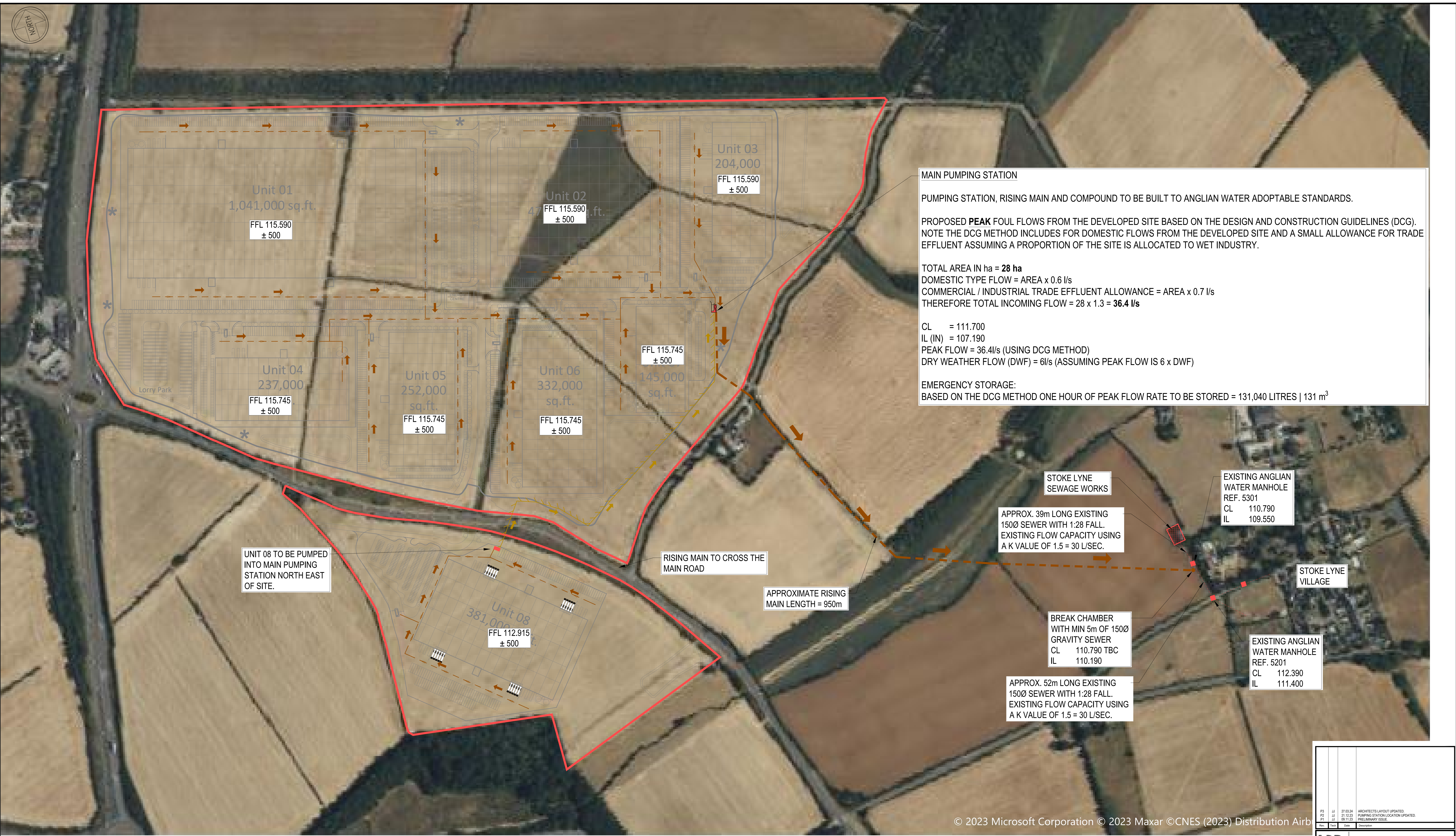
Client: **SYMMETRY PARK, ARDLEY**  
M40 JUNCTION 10

Project Title: **SURFACE WATER DRAINAGE STRATEGY**  
PLANNING

Purpose of Issue:  Information  Preliminary  Approval  Tender  Construction  Record Copy

First Issue Date: **NOV 2023** Drawn By: **JJ** Scale: **1:2000 @ A0** Checked: **NDH**

Drawing Number: **10387340-HDR-XX-XXX-DR-C-303** Rev: **P4**



Unit 01  
1,041,000 sq.ft.  
FFL 115.590  
± 500

Unit 02  
477,000 sq.ft.  
FFL 115.590  
± 500

Unit 03  
204,000  
FFL 115.590  
± 500

Unit 04  
237,000  
FFL 115.745  
± 500

Unit 05  
252,000  
sq.ft.  
FFL 115.745  
± 500

Unit 06  
332,000  
sq.ft.  
FFL 115.745  
± 500

Unit 07  
145,000  
sq.ft.  
FFL 115.745  
± 500

Unit 08  
381,000  
FFL 112.915  
± 500

**MAIN PUMPING STATION**  
PUMPING STATION, RISING MAIN AND COMPOUND TO BE BUILT TO ANGLIAN WATER ADOPTABLE STANDARDS.

PROPOSED **PEAK FOUL FLOWS** FROM THE DEVELOPED SITE BASED ON THE DESIGN AND CONSTRUCTION GUIDELINES (DCG). NOTE THE DCG METHOD INCLUDES FOR DOMESTIC FLOWS FROM THE DEVELOPED SITE AND A SMALL ALLOWANCE FOR TRADE EFFLUENT ASSUMING A PROPORTION OF THE SITE IS ALLOCATED TO WET INDUSTRY.

TOTAL AREA IN ha = 28 ha  
DOMESTIC TYPE FLOW = AREA x 0.6 l/s  
COMMERCIAL / INDUSTRIAL TRADE EFFLUENT ALLOWANCE = AREA x 0.7 l/s  
THEREFORE TOTAL INCOMING FLOW = 28 x 1.3 = 36.4 l/s

CL = 111.700  
IL (IN) = 107.190  
PEAK FLOW = 36.4l/s (USING DCG METHOD)  
DRY WEATHER FLOW (DWF) = 6l/s (ASSUMING PEAK FLOW IS 6 x DWF)

EMERGENCY STORAGE:  
BASED ON THE DCG METHOD ONE HOUR OF PEAK FLOW RATE TO BE STORED = 131,040 LITRES | 131 m<sup>3</sup>

UNIT 08 TO BE PUMPED INTO MAIN PUMPING STATION NORTH EAST OF SITE.

RISING MAIN TO CROSS THE MAIN ROAD

APPROXIMATE RISING MAIN LENGTH = 950m

STOKE LYNE SEWAGE WORKS

APPROX. 39m LONG EXISTING 1500 SEWER WITH 1:28 FALL. EXISTING FLOW CAPACITY USING A K VALUE OF 1.5 = 30 L/SEC.

EXISTING ANGLIAN WATER MANHOLE REF. 5301  
CL 110.790  
IL 109.550

STOKE LYNE VILLAGE

BREAK CHAMBER WITH MIN 5m OF 1500 GRAVITY SEWER  
CL 110.790 TBC  
IL 110.190

EXISTING ANGLIAN WATER MANHOLE REF. 5201  
CL 112.390  
IL 111.400

APPROX. 52m LONG EXISTING 1500 SEWER WITH 1:28 FALL. EXISTING FLOW CAPACITY USING A K VALUE OF 1.5 = 30 L/SEC.

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- LEGEND**
- SITE BOUNDARY
  - EXISTING FOUL WATER DRAIN WITH MANHOLE
  - EXISTING SEWAGE TREATMENT WORKS AT STOKE LYNE
  - NEW FOUL WATER DRAIN WITH MANHOLE
  - NEW PRIVATE PUMPING STATION LOCATED WITHIN THE SOUTHERN DEVELOPMENT
  - NEW PRIVATE RISING MAIN FROM SOUTHERN SITE TO MAIN PUMPING STATION
  - NEW MAIN PUMPING STATION BUILT TO ADOPTABLE STANDARDS
  - NEW ADOPTABLE STANDARD RISING MAIN FROM MAIN PUMPING STATION TO BREAK CHAMBER

**FOUL WATER DRAINAGE STRATEGY**

DOMESTIC FOUL WATER TO DISCHARGE VIA GRAVITY INTO A PUMPING STATION LOCATED ON THE EASTERN SIDE OF THE SITE BUILT TO ADOPTABLE STANDARDS.

THE COMPOUND WILL BE ACCESSED FROM THE END OF THE MAIN ACCESS ROAD.

THE CURRENT DEPTH OF THE PUMPING STATION IS ASCERTAINED ASSUMING FOUL SEWERS ARE REQUIRED TO THE FULL EXTENT OF EACH UNIT AND DRAINS VIA GRAVITY TO THIS LOCATION.

<p>NOV 2023</p> <p>10387340-HDR-XX-XXX-DR-C-304</p>	<p>NOV 2023</p> <p>1:2000 @ A0</p>	<p>NOV 2023</p> <p>NDH</p>	<p>NOV 2023</p> <p>1:2000 @ A0</p>	<p>NOV 2023</p> <p>NDH</p>
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**TRITAX SYMMETRY**  
 A TRITAX BIG BOX COMPANY  
 SYMMETRY, ARDLEY  
 M40 JUNCTION 10  
 FOUL WATER DRAINAGE STRATEGY  
 PLANNING  
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