

**Drainage Statement for Plots 1 & 3 Wrexham Business
Park**

**Prepared on Behalf of
Kingmoor Park Properties Ltd.**

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C602/SBS/jt/R0470
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1.0 Introduction

Shepherd Gilmour Infrastructure Ltd. has been instructed by Kingmoor Park Properties Ltd. to prepare a Drainage Statement in support of the proposed Planning Application for Wrexham Business Park Plots 1 & 3.

The Drainage Statement will describe the outline proposals for the disposal of foul and surface water from the site.

All plans and scheme drawings referred to are in Appendix A.

1.1 The Site

The site is accessed off Bryn Lane, Wrexham as shown on the location plan C602/304 and Plots 1 & 3 is outlined on the Plot Area Schedule C602/305.

Plot 1 lies immediately to the west of the existing industrial building with Bryn Lane forming its western boundary. The area has been filled and graded to a level approximately 2.5m above the adjacent natural ground level. Ponds and trees are present on the plot boundaries.

Plot 3 is currently a predominantly greenfield area bounded to the north and east by agricultural land and to the south and west by existing industrial development.

A central wooded area - see C602/301 - contains a stream and shallow ditch and splits the plot into two approximately equal areas. Ditches along field boundaries and on the eastern plot boundary are also present. Plot 3 contains a number of large ponds, some of which provide habitat for great crested newts.

In the south west corner an area has been filled, levelled and tarmaced for use as an informal car park. At the southern end of Plot 3 there are other filled mounds and a track runs from a point on Bryn Lane on the north west boundary to a point midway along the southern boundary.

1.2 The Proposed Development

The development proposals are shown on drawing C602/300. The proposals for Plot 1 comprise 5 buildings totalling 82,000sq.ft. Plot 3 comprises two units totalling 900,000 sq.ft. A 400,000 sq.ft unit is planned for the northern part of the site and a 500,000 sq.ft unit in two phases is planned for the southern part.

The land outside the unit boundaries totalling approximately 21 ha. is allocated for landscaping, surface water storage and mitigation.

2.0 Surface Water Assessment

The site is located within Flood Zone A as shown on the Development Advice Maps (see Flood Map C602/306) i.e. the site lies outside the extent of the extreme flood. Generally this means that the chance of flooding each year from rivers or the sea is 0.1% (1 in 1000) or less.

Although the vulnerability classification is low, consultation with the E.A. has confirmed that the E.A. require a surface water drainage statement for the plot which demonstrates that the proposals would not increase flooding downstream of the site. Discharges would therefore need to be constrained at or below the existing greenfield run off rates.

2.1 Existing Surface Water Features and Topography

The existing surface water features are shown on drawing C602/301. The main feature is the overgrown stream which flows north adjacent to Bryn Lane and turns to run east through the central wooded area. The stream crosses the Plot 3 boundary and continues in an easterly direction crossing the B5130. The stream is approximately 1.8m to 2.0m deep and is culverted at track crossing points. Fields drain via shallow ditches typically between 400 and 900mm deep.

Plots 1 & 3 contains a number of ponds. Ponds referenced A, B, J, P and M support small or medium GCN populations. The pond water levels shown are those recorded at the time of the topographical survey on 13.2.2008.

The topographical survey confirms that Plot 1 has been filled to a level of approximately 32.0m AOD. The southern part of Plot 3 falls from south west to north east from approximately 31.5m AOD to 23.0m AOD at an average gradient of 2%. The northern part falls from the north west to south east from approximately 31.0m AOD to 22.5m AOD at an average gradient of 1.5%.

2.2 Plot 3 - The Proposed Surface Water Network

An outline surface water network is shown on drawing C602/302 and plot areas and impermeable areas are shown on C602/300.

The whole of Plot 3 is underlain by clays at shallow depth and therefore infiltration drainage will not be appropriate for this site.

The outline layout shows roof water and pavement water drained via separate systems. Flows will be collected via pipes, french drains and/or swales. Flows from the external pavements will be passed through Class 1 separators. Roof water will not pass through the separators. Flows will be combined and directed to flow control chambers where flows will be restricted to the appropriate greenfield runoff rate for the developed areas.

Flows from the control chambers will be directed via new ditches to the existing watercourses. The attenuated flows will be backfed into storage ponds designed to accommodate attenuated flow volumes generated by the critical 1 in 100 year event plus climate change.

2.3 Plot 3 - Storage Pond Design

The ponds shown have been designed to accommodate the required storage volumes and to provide GCN habitat. The ponds will feature a residual water depth not greater than 300mm and there will be no through flow. Side slopes at 1 in 5 are shown. Water depths will fluctuate between 300mm and 1200mm under current calculations and the ponds are designed to provide a minimum 300mm freeboard under maximum storage conditions.

2.4 Plot 3 - Calculations of Storage Volumes

The peak greenfield flood flows have been calculated using the Micro Drainage Source Control software ICP SUDS Method. This method is based on the approach outlined in the Institute of Hydrology 1994 IH Report 124 - Flood Estimation for Smaller Catchments. The method is applied to a 50 ha site and the results multiplied by a scale factor equal to the site area divided by 50.

The Micro Drainage results listing the I.H 124 Mean Annual Flood greenfield flow rates for the full range of return periods for a 50 ha site at this location are included in Appendix B.

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development proposals and the land available. However, when the final drainage network is being developed the following issues must be addressed.

- i) GCN's are present on site and measures must be specified to prevent or discourage GCNs from entering the drainage system. Special attention should be paid to the types of grating to be used on linear channels and gullies and the siting of those units. Trapped units should not be used. Shallow swales are preferred to the piped systems.
- ii) Where new flows are discharged into existing watercourses care must be taken to ensure that discharge velocities are kept low to minimise any adverse impact on the existing stream environment. The provision of protective stone pitching to the existing stream profile should be kept to a minimum.
- iii) The flow control arrangement must be kept as simple as possible requiring the minimum level of routine maintenance. The final flow control arrangement and pond profile must ensure that the permissible discharge rates for the shorter return period storms are not exceeded. The use of the Micro Drainage - Complex Control Builder is recommended.
- iv) Plots 1 & 3 contain ponds, mounds and protected trees. The detailed drainage network and associated discharge arrangements and storage ponds should avoid these existing features wherever possible.

3.0 Foul Water Assessment

Welsh Water has a foul/combined sewer network in the vicinity of the site. The Welsh Water network is shown on plan C602/307.

3.1 Consultation With Welsh Water

At the request of Kingmoor Park Properties Ltd. Welsh Water carried out a hydraulic analysis of their network to assess the impact of foul flows from the proposed development. Welsh Water concluded that the flows "cause deterioration in the level of service, locally within the sewerage network". Welsh Water has recommended an upsizing of an element of their network to ensure that the existing level of service is maintained. Discussions are ongoing with Welsh Water in respect of the extent and location of the upsizing works and of alternative solutions.

3.2 Foul Water Flow Rates

It is estimated that the proposed development will accommodate up to 600 employees and that there will be no trade discharges. The foul drainage is estimated at up to 30,000 litres/day with an average dry weather flow of 0.83 litres/sec over a 10 hour day. Peak flows from a development of this type would normally be estimated at 3 x Average Dry Weather Flow (ADWF) i.e. 2.5 litres/sec. However, as flows from both units will need to be pumped a peak flow rate of 5 litres/sec has been adopted.

3.3 The Proposed Foul Water Network

An outline foul water drainage network is shown on drawing C602/303. It is anticipated that foul flows will discharge into Welsh Water manhole reference SJ38509102. On-line storage is included immediately upstream of the outfall manhole to eliminate the adverse impact of the additional flows on the existing downstream network.

Flows from Unit 3.1, 3.2 and Plot 1 will be combined at proposed Manhole B. From Manhole B flows will pass into a "storage" length comprising 600 x 900mm ovoid pipes terminating at Manhole A. A short section of 225mm dia pipework would connect the flow to the outfall manhole reference SJ38509102.

Pumping stations serving the Plot 3 units are positioned within car parking areas for ease of maintenance. The routing of the rising mains is indicative only. The final layout must reflect the constraints imposed by protected trees, the stream, ponds, statutory undertakers plant and highway requirements.

Flows from Plot 1 will discharge into Manhole B by gravity. An existing private sewer crosses Plot 1 and this will need to be diverted and discharged into Manhole B.

4.0 Conclusions

Plots 1 & 3 lie outside the extent of the 1 in 1000 extreme flood. The site is underlain by clay at shallow depth and is unsuitable for infiltration drainage.

A surface water drainage scheme for the development which restricts discharge flow rates to current greenfield rates can be accommodated within the plot boundaries.

For Plot 1 storage of attenuated flows in underground cellular units is recommended. For Plot 3 storage of attenuated flows in ponds is recommended with ponds designed to provide habitat for GCNs which are present on site.

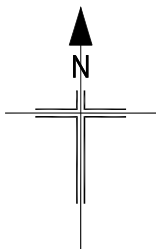
It is recommended that the final drainage scheme should incorporate swales, ditches, french drains and storage ponds together with additional detailed measures to minimise the impact on the existing landscape and ecological environment.

Welsh Water's foul/combined sewer network extends into Wrexham Business Park. Their network will require upsizing in part and off-site and on-site options are available. The design and implementation of these options is the subject of on-going discussions with Welsh Water.

It is recommended that the foul and surface water strategy outlined in this statement should be accepted as the basis of the detailed drainage design for Wrexham Business Park – Plots 1 & 3.

This statement is provided for an Outline Decision. A detailed Statement will be required by condition for the reserved matters and will be supplied at the time when scheme specifics are known.

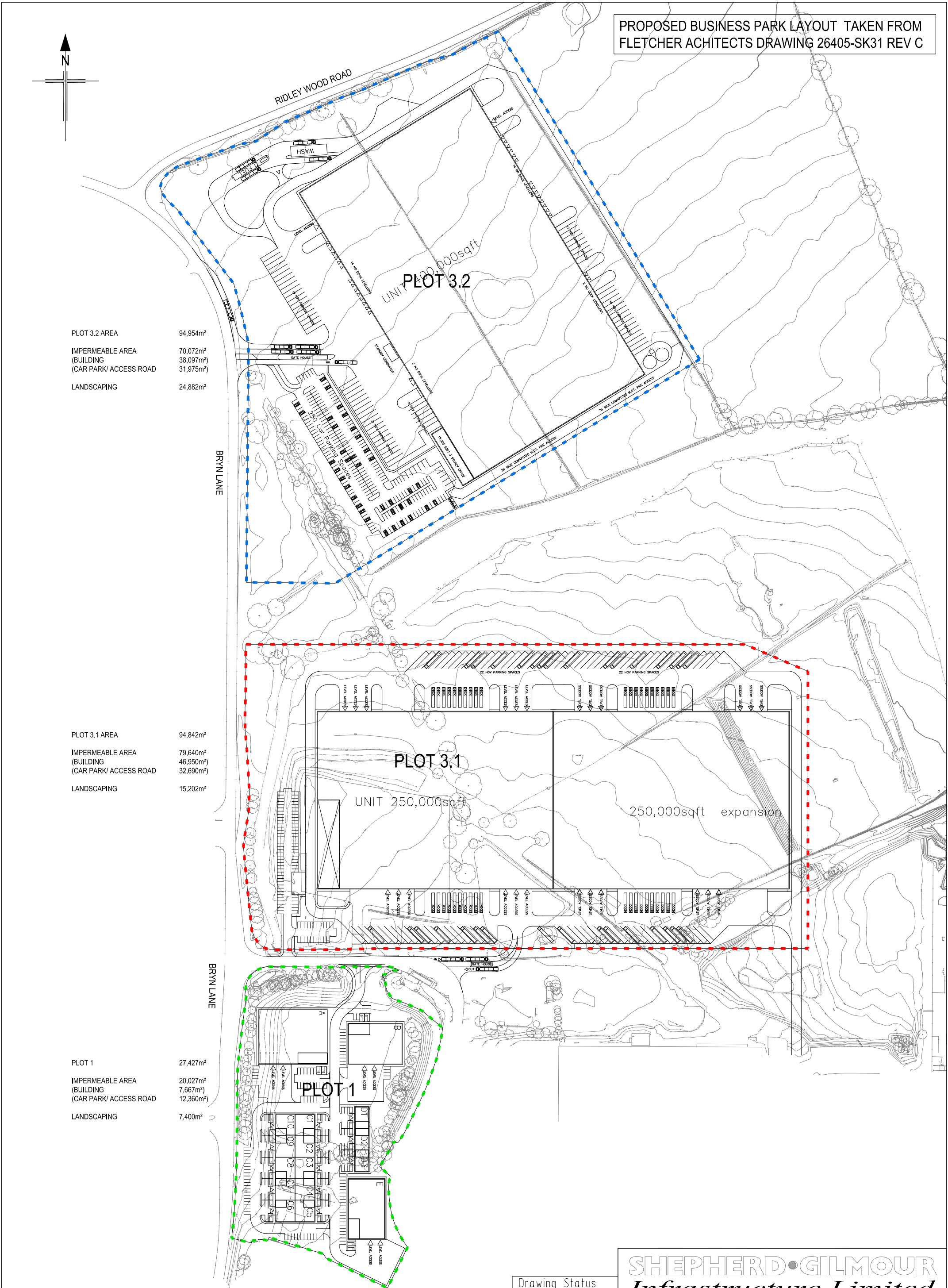
APPENDIX A

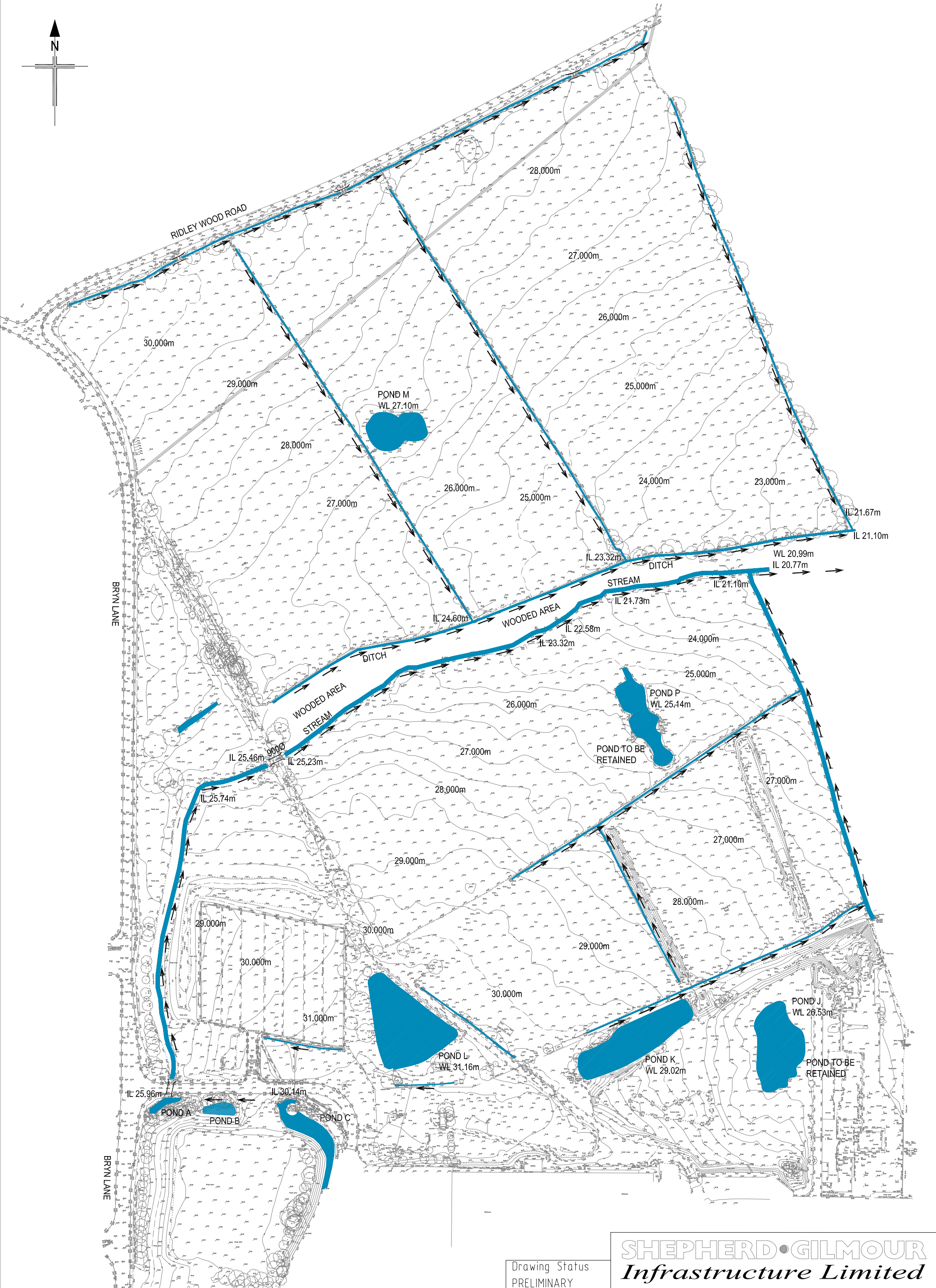


PLOT 3.2 AREA 94,954m²
IMPERMEABLE AREA 70,072m²
(BUILDING 38,097m²)
(CAR PARK/ ACCESS ROAD 31,975m²)
LANDSCAPING 24,882m²

PLOT 3.1 AREA 94,842m²
IMPERMEABLE AREA 79,640m²
(BUILDING 46,950m²)
(CAR PARK/ ACCESS ROAD 32,690m²)
LANDSCAPING 15,202m²

PLOT 1 27,427m²
IMPERMEABLE AREA 20,027m²
(BUILDING 7,667m²)
(CAR PARK/ ACCESS ROAD 12,360m²)
LANDSCAPING 7,400m²





Contract WREXHAM BUSINESS PARK		Drawing Status PRELIMINARY		Rev A		Scale 1/2500 (A3)		Checked	
Title PLOT 1 & 3 - EXISTING LAND DRAINAGE FEATURES		Drawing No C602/301		Date 13.08.08		Drawn DR		Approved	
		APPENDIX A							

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Infrastructure Limited

Rev

A

Date

13.08.08

Scale

1/2500 (A3)

Drawn

DR

Checked

Approved

NQA

ISO9001

REGISTERED COMPANY

REGISTERED

COMPANY

OF GREAT BRITAIN



JOB TITLE		CLIENT	
WREXHAM BUSINESS PARK		KINGMOOR PARK PROPERTIES LTD	
DRAWING TITLE			
PLOT 1 & 3 - OUTLINE FOUL WATER DRAINAGE PROPOSALS			
SCALE	DRAWN BY	DATE	REVISION
1/1000 (A1)	DR	12.08.08	A
DRAWING No		C602/303	

Contract WREXHAM BUSINESS PARK

Drawing No
C602/304 - APP A

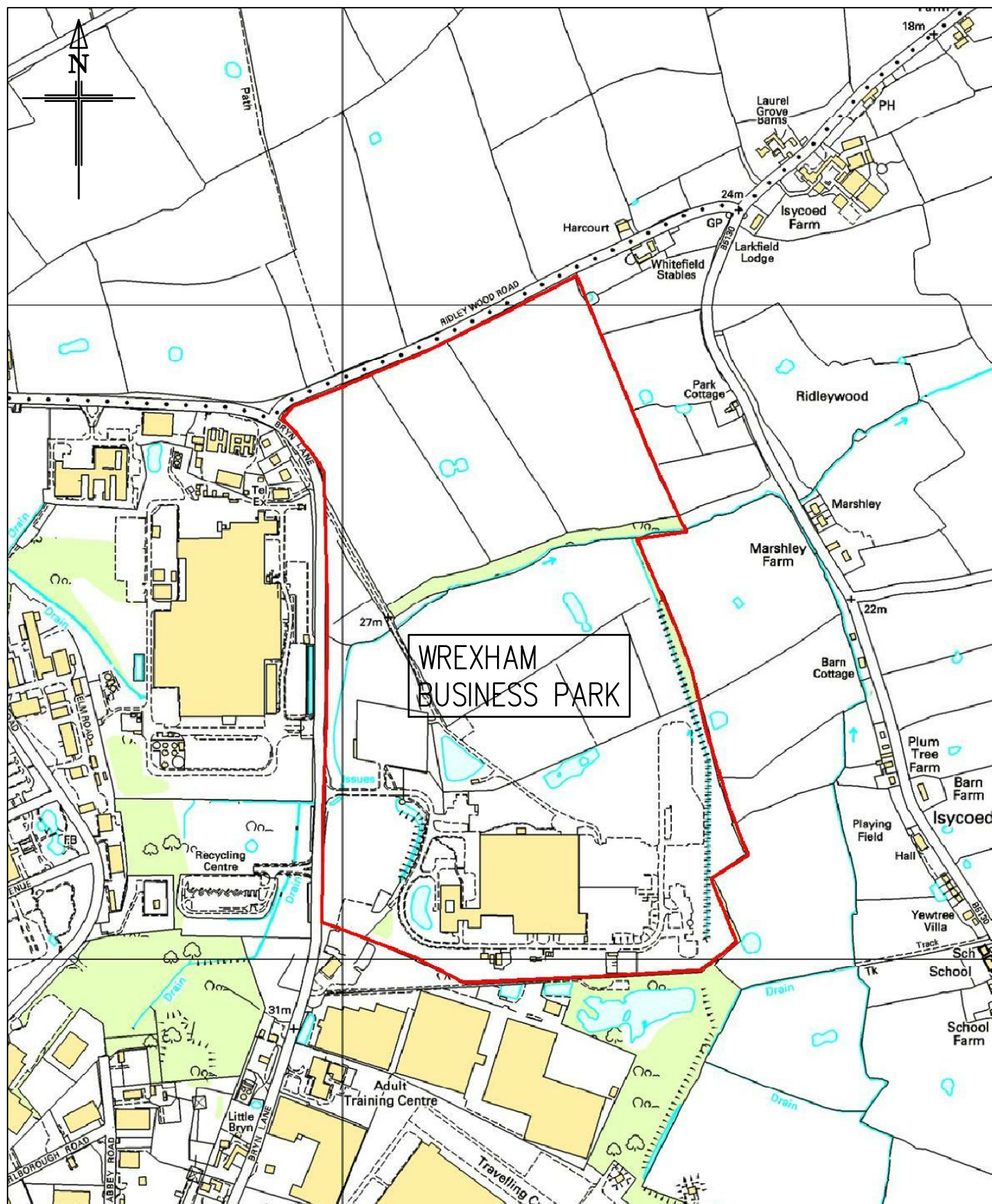
Rev -

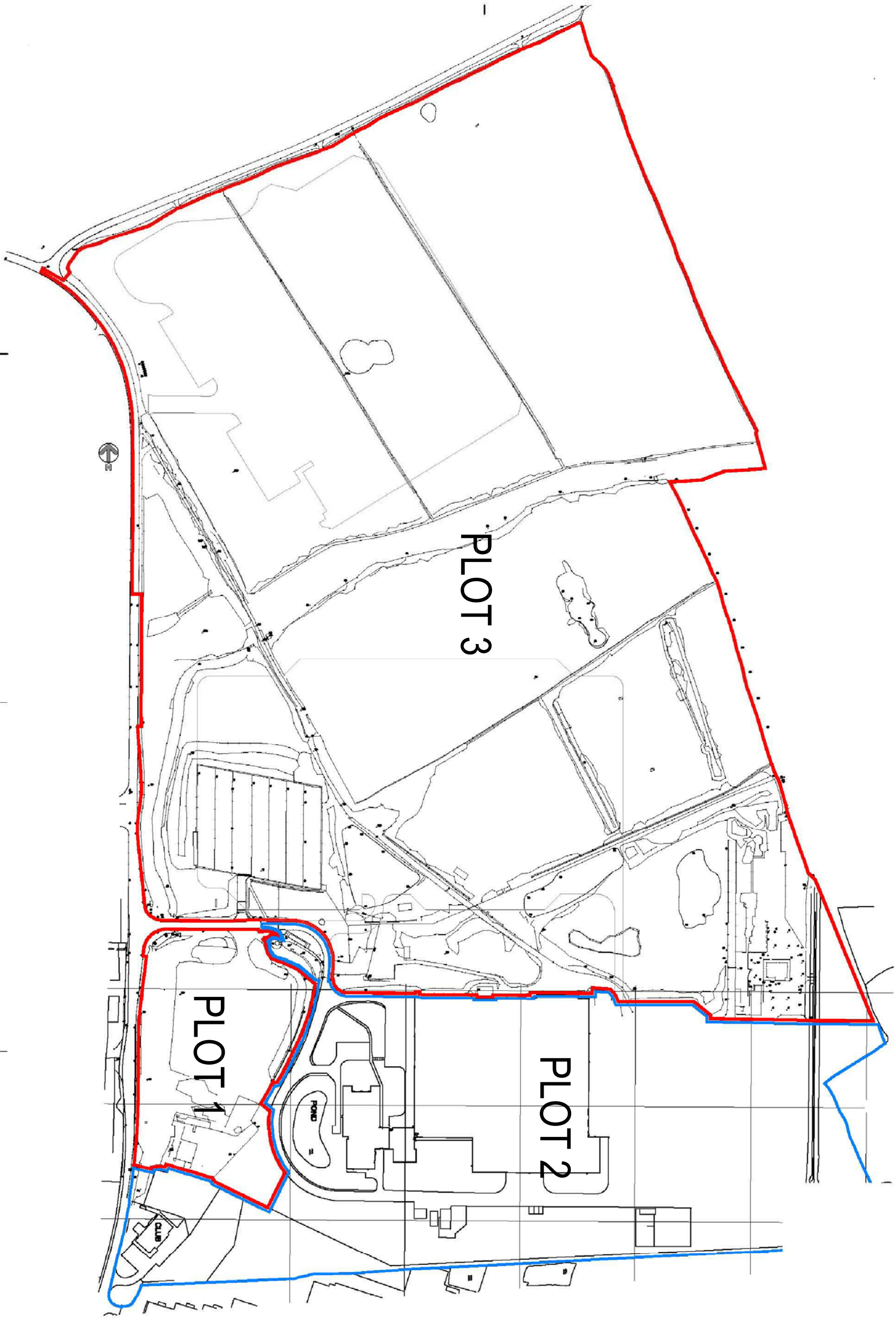
Checked

Title SITE LOCATION PLAN

Date
20.08.08Scale
N.T.SDrawn
DR

Approved





Contract	WREXHAM BUSINESS PARK			
Title	PLOT AREA SCHEDULE			
Drawing No		Rev	Scale	Checked
C602/305		A	N.T.S	
APPENDIX A		Date	Drawn	Approved
		20.08.08	DR	

Contract WREXHAM BUSINESS PARK

Drawing No
C602/306 - APP ARev
-

Checked

Title FLOOD PLAIN MAP

Date
20.08.08Scale
N.T.SDrawn
DR

Approved



Site Location Boundary

Dark blue shows the area that could be affected by flooding, either from rivers or the sea, if there were no flood defences. This area could be flooded:

- from the sea by a flood that has a 0.5% (1 in 200) or greater chance of happening each year.
- or from a river by a flood that has a 1% (1 in 100) or greater chance of happening each year.

Light blue shows the additional extent of an extreme flood from rivers or the sea. These outlying areas are likely to be affected by a major flood, with up to a 0.1% (1 in 1000) chance of occurring each year.

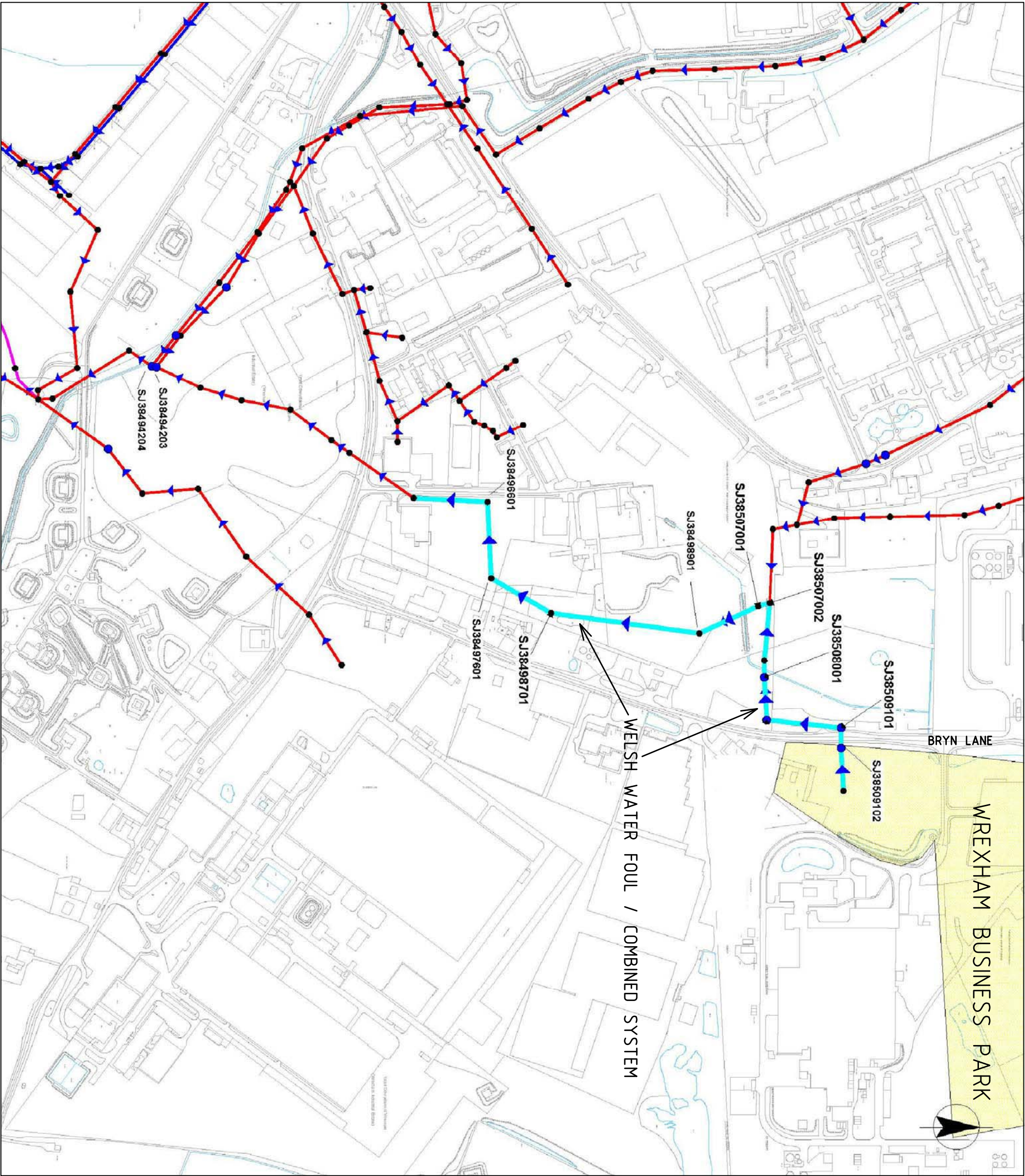
These two colours show the extent of the natural floodplain if there were no flood defences or certain other manmade structures and channel improvements.

The purple line shows all flood defences built in the last five years to protect against river floods with a 1% (1 in 100) chance of happening each year, or floods from the sea with a 0.5% (1 in 200) chance of happening each year, together with some, but not all, older defences and defences which protect against smaller floods. Flood defences that are not yet shown, and the areas that benefit from them, will be gradually added.

Hatched areas benefit from the flood defences shown, in the event of a river flood with a 1% (1 in 100) chance of happening each year, or a flood from the sea with a 0.5% (1 in 200) chance of happening each year. If the defences were not there, these areas would be flooded.

Flood defences do not completely remove the chance of flooding, however, and can be overtopped or fail in extreme weather conditions.





NOTE
BASED ON WELSH WATER'S REPORT
ASSESSMENT OF THE DEVELOPMENT
AT WREXHAM BUSINESS PARK,
WREXHAM - MAY 2008

Contract	WREXHAM BUSINESS PARK		
Title	WELSH WATER FOUL / COMBINED SEWER NETWORK		
Drawing No	C602/307	Rev	-
APPENDIX A		Date	20.08.08
Scale	NTS	Drawn	DR
Checked		Approved	

APPENDIX B

29 Ellesmere Street
Manchester
M15 4LZ

WREXHAM BUSINESS PARK

Date 15 August 2008 12:41
FileDesigned By stevem
Checked By

Micro Drainage

Source Control W.11.2

IH 124 Mean Annual Flood

Input

Return Period (years)	30	Soil	0.450
Area (Ha)	50.000	Urban	0.000
SAAR (mm)	793.000	Region Number	4

Results l/s

QBAR Rural	254.2
QBAR Urban	254.2

Q 30 years	498.0
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Q 1 year	211.0
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Q 2 years	227.8
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Q 5 years	312.6
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Q 10 years	378.7
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Q 20 years	451.8
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Q 25 years	477.3
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Q 30 years	498.0
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Q 50 years	559.7
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Q 100 years	653.2
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Q 200 years	767.6
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Q 250 years	805.7
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Q 1000 years	1057.4
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