

 T J Booth Associates. Consulting Engineers 20A Eastgate St, Rochdale OL16 1DH	Project				Job Ref.	
	83 Fielding Street, Rochdale				calc-tjba-vrajitoru-83 fielding st-DSR-020524	
	Section				Sheet no./rev.	
	DRAINAGE STRATEGY				1 / 0	
	Calc. by	Date	Chk'd by	Date	App'd by	Date
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History.

Revision	Date	Reason
0	May 2024	Original.

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Introduction.

Reference:

Planning application for the "Erection of four, one-bedroom, self-contained apartments together with the creation of 4 new parking spaces and bin storage area". The proposed development is located on a site which already has an existing block of apartments and a car park.

Purpose of Report:

The primary purpose of this report is to identify specific drainage proposals for parts of the proposed site in accordance with the national drainage hierarchy for surface water disposal & exceedance characteristics, also considering the proposed end adopters and their requirements.

Regarding site assessment, this report will appraise the existing site and local drainage infrastructure, assess the suitability of the proposed development, giving recommendations for drainage design & management, specifically for approval of the LLFA/EA/sewerage undertakers, as applicable.

General principles:

Drainage from new developments is to be designed to follow the national drainage hierarchy for surface water discharge to the following networks in order of preference:

- *infiltration*
- *watercourse*
- *public sewer*

Flow rates (existing & proposed) are to be estimated for approval using the following methodology:

- *Development should aim to deliver greenfield runoff on greenfield sites up to a 100yr rainfall event, considering climate change.*
- *Development should aim for a minimum reduction in surface water runoff rates of 50% for Brownfield sites on a 1yr rainfall event.*
- *Development should be designed so that there is no flooding to the development in a 30yr event and so that there is no property flooding in a 100yr event considering climate change.*

Plans.

Location Plan.

The Application Site (red line plan in Appendix) is located on the corner of Fielding Street and Clough Road, Middleton, Rochdale.

The Site is within an urban area.

No open watercourses exist within the local area.

Site Plan.

The Site comprises a nominally rectangular plot of land approximately 850sqm in area. It has an existing Site building which already has occupied residential apartments to the southwest side of the Site footprint, and a car park to the northeast side. There is a small strip of vegetated soft landscaping to the northwest boundary.

It is proposed to build an additional block of 4No. apartments within the existing car park, which will be situated to the northwest boundary. Refer to Proposed Plan in Appendix.

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Existing Site areas are as follows:

- *Existing apartment building footprint (impermeable)* 260 sqm
- *Soft landscaping (permeable)* 130 sqm
- *Macadam car park (impermeable)* 460 sqm
- *Total* 850 sqm

Proposed Site areas are as follows:

- *Existing apartment building footprint (impermeable)* 260 sqm
- *Proposed apartment building footprint (impermeable)* 75 sqm
- *Soft landscaping (permeable)* 130 sqm
- *Proposed macadam car park (impermeable)* 385 sqm
- *Total* 850 sqm

Desk Surveys & Investigations.

Existing and proposed topography.

No topographic survey has yet been undertaken but land elevation falls towards the road at the front northeast boundary. There are topographic surveys around the Site, and some data for manholes is given.

Geology & Site Investigations.

BGS maps indicate the Site to be underlain by undifferentiated Pennine Lower Coal Measures – generally mudstone with thin interbedded sandstone layers.

The maps show Hummocky Glacial Deposits (clay).

HR Wallingford maps suggest the Site comprises heavy clay subsoil, soil class 4.

Local Records.

There is a new development encircling the southwest Application Site boundary. Investigations comprising borehole/trial holes have been undertaken and have shown to be Hummocky glacial clay & sandy clay, unsuitable for infiltration. The closest boreholes were undertaken within 5-10m of the Application Site.

Adjacent/local development have all discounted infiltration due to local geology.

Drainage Surveys.

No drainage survey of the Site has yet been undertaken.

Statutory Undertakers Plans.

The United Utilities sewer plans show a manhole (No.3804) within the Site and with a 225 combined sewer running towards the southeast Site boundary. The combined sewer flows out to a manhole in Fielding Street which is approximately 1.7m deep, indicating the onsite depth is less than this.

The position of the sewer is beneath the proposed building, and will need to either be built over or diverted. Approval will be needed from United Utilities if diversion is proposed, however, a build over approval can be signed off by RMBC Building Control without the need to involve United Utilities under the United Utilities Build Over Protocol, of which RMBC is a member.

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Ratio 60 min to 2 day rainfall of 5 yr return period	$r = 0.300$
5-year return period rainfall of 60 minutes duration	$M5_{60min} = 20.0 \text{ mm}$
Increase of rainfall intensity due to global warming	$p_{climate} = 0 \%$
Factor Z1 (Wallingford procedure)	$Z1 = 0.77$
Rainfall for 30min storm with 5 year return period	$M5_{30min_i} = Z1 \cdot M5_{60min} = 15.4 \text{ mm}$
Factor Z2 (Wallingford procedure)	$Z2 = 0.62$
Rainfall for 30min storm with 1 year return period	$M1_{30min} = Z2 \cdot M5_{30min_i} = 9.6 \text{ mm}$
Design rainfall intensity	$I_{max} = M1_{30min} / D = 19.1 \text{ mm/hr}$

DESIGN RAINFALL 30YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other
Storm duration	$D = 30 \text{ min}$
Return period	Period = 30 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	$r = 0.300$
5-year return period rainfall of 60 minutes duration	$M5_{60min} = 20.0 \text{ mm}$
Increase of rainfall intensity due to global warming	$p_{climate} = 0 \%$
Factor Z1 (Wallingford procedure)	$Z1 = 0.77$
Rainfall for 30min storm with 5 year return period	$M5_{30min_i} = Z1 \cdot M5_{60min} = 15.4 \text{ mm}$
Factor Z2 (Wallingford procedure)	$Z2 = 1.53$
Rainfall for 30min storm with 30 year return period	$M30_{30min} = Z2 \cdot M5_{30min_i} = 23.5 \text{ mm}$
Design rainfall intensity	$I_{max} = M30_{30min} / D = 47.1 \text{ mm/hr}$

DESIGN RAINFALL 100YR (THE WALLINGFORD PROCEDURE)

Design rainfall in accordance with the Wallingford Procedure

Tedds calculation version 2.0.02

Design rainfall intensity

Location of catchment area	Other
Storm duration	$D = 30 \text{ min}$
Return period	Period = 100 yr
Ratio 60 min to 2 day rainfall of 5 yr return period	$r = 0.300$
5-year return period rainfall of 60 minutes duration	$M5_{60min} = 20.0 \text{ mm}$
Increase of rainfall intensity due to global warming	$p_{climate} = 0 \%$
Factor Z1 (Wallingford procedure)	$Z1 = 0.77$
Rainfall for 30min storm with 5 year return period	$M5_{30min_i} = Z1 \cdot M5_{60min} = 15.4 \text{ mm}$
Factor Z2 (Wallingford procedure)	$Z2 = 1.99$
Rainfall for 30min storm with 100 year return period	$M100_{30min} = Z2 \cdot M5_{30min_i} = 30.7 \text{ mm}$
Design rainfall intensity	$I_{max} = M100_{30min} / D = 61.4 \text{ mm/hr}$

Proposed Surface Water System.

Following the guidance of hierarchy for disposal of surface water (SUDS):

- **INFILTRATION:** BGS maps indicate the subsoils comprise clays locally which will not be suitable for infiltration. Adjacent developments in the local area have also dismissed infiltration as a disposal method for surface water, and have instead had to revert to attenuation & flow control. Infiltration is not considered suitable for the Site and the next option will need to be considered.

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- **WATERCOURSE:** There is a culverted watercourse to the east, however, this is within 3rd party land, and across a highway. It is not considered feasible for the development to connect via this method, and it is discounted as a form of surface water disposal.
- **SW SEWER:** There is a 225dia surface water sewer in the Clough Road highway which should be suitable for connection. There is also a new SW connection from the adjacent development (to the southwest boundary), which will route down Fielding Street and connect to the SW sewer in the highway. This would be an easier and cheaper point of connection rather than excavating in Clough Road and should be utilised if it is installed at the time of connection. Refer to Indicative Drainage Proposal in the Appendix.

Due to the small size of the proposed development (75sqm), attenuation will not be required. Refer to Modified Rational Method estimation below using rainfall & climate change data for maximum estimated flow rates:

MODIFIED RATIONAL METHOD					
Client:	Vrajitoru				
Site:	83 Fielding St, Middleton.				
PEAK RUNOFF RATE ESTIMATION					
in accordance with CIRIA C753, pgs 519-520, EQ. 24.5					
modified rational method		$Q = 2.78 C i A$	return period (Tr)	rainfall mintensity (mm/hr)	runoff rate (l/s)
site area:	75	sqm	1yr	19.10	0.40
	0.0075	Ha	30yr	47.10	0.98
volumetric runoff coefficient Cv:	1		100yr	61.40	1.28
dimensionless routing coefficient Cr:	1		30yr+40%	65.94	1.37
runoff coefficient C (Cv x Cr):	1		100yr+45%	89.03	1.86
rainfall intensity assumptions:					
1yr rainfall	19.1	mm/hr	synthetic TEDDS calculation		
30yr rainfall	47.1	mm/hr	synthetic TEDDS calculation		
100yr rainfall	61.4	mm/hr	synthetic TEDDS calculation		
development type	residential	enter commercial or residential			
30yr rainfall climate change allowance	40	%	0.4	ratio	
100yr rainfall climate change allowance	45	%	0.45	ratio	

- **COMBINED SEWER:** Only required for foul drainage.

Proposed Foul Water System.

There foul sewer should be connected to the UU combined sewer within the Site.

Additional Recommendations.

An Indicative Drainage Plan (excerpt) is included in the Appendix. For full plan, refer to separate drawing ref: dwg-tjba-vrajitoru-83 fielding st-indicative drainage plan-rev0.

A drainage survey of the existing on-site combined sewer should be undertaken to find its exact location. The developer can then decide whether to build over in accordance with/and to Building Control approvals; or to divert which will require a UU application & approval. Neither of these options requires supervision under Planning, and shouldn't halt the Planning approval process.

This report should be issued to the LPA/B.Control for approval prior to construction.

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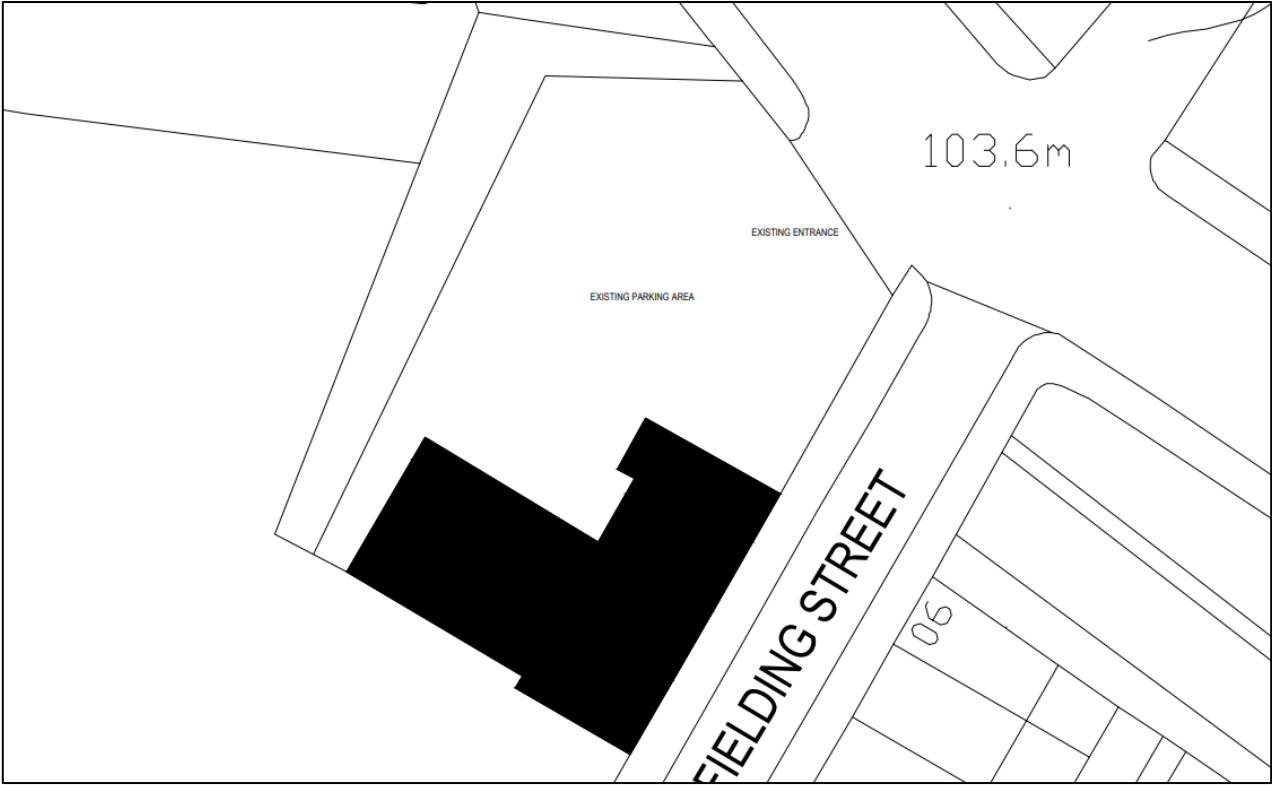
Appendix.

Location Plan.

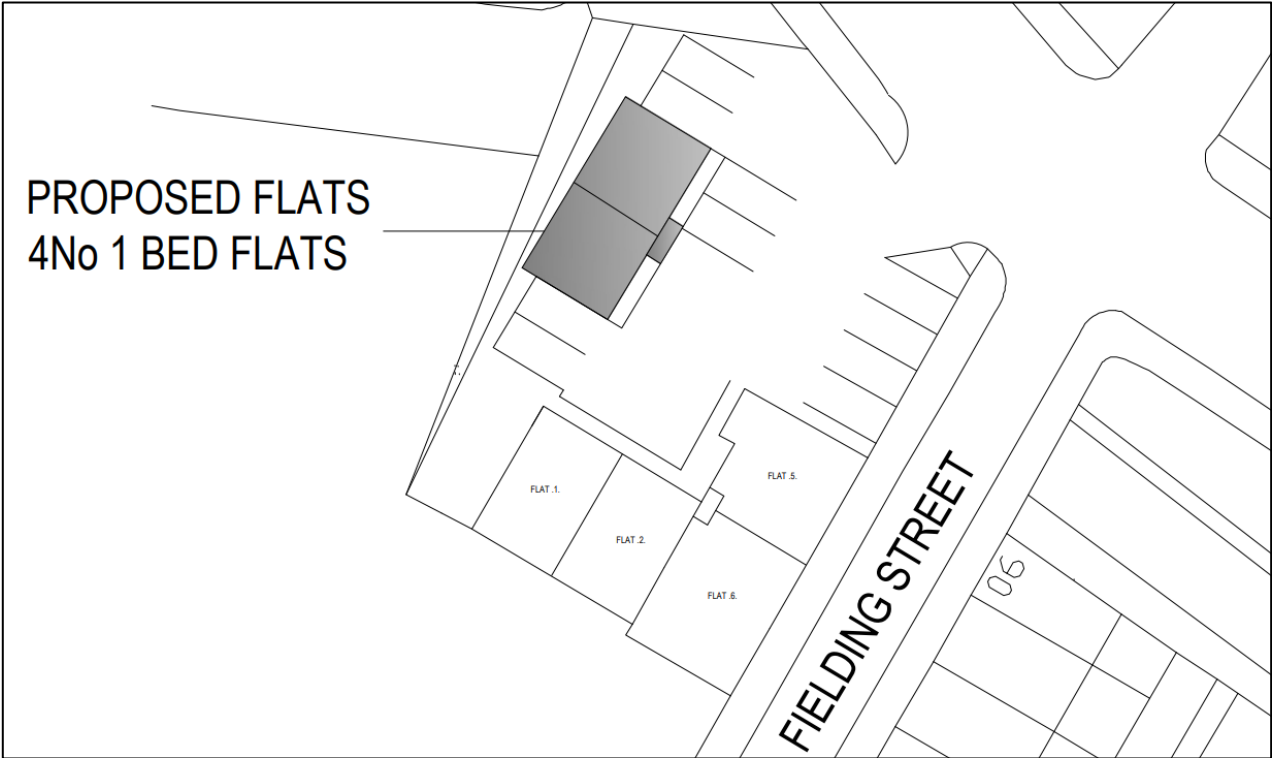


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Existing Site Plans.

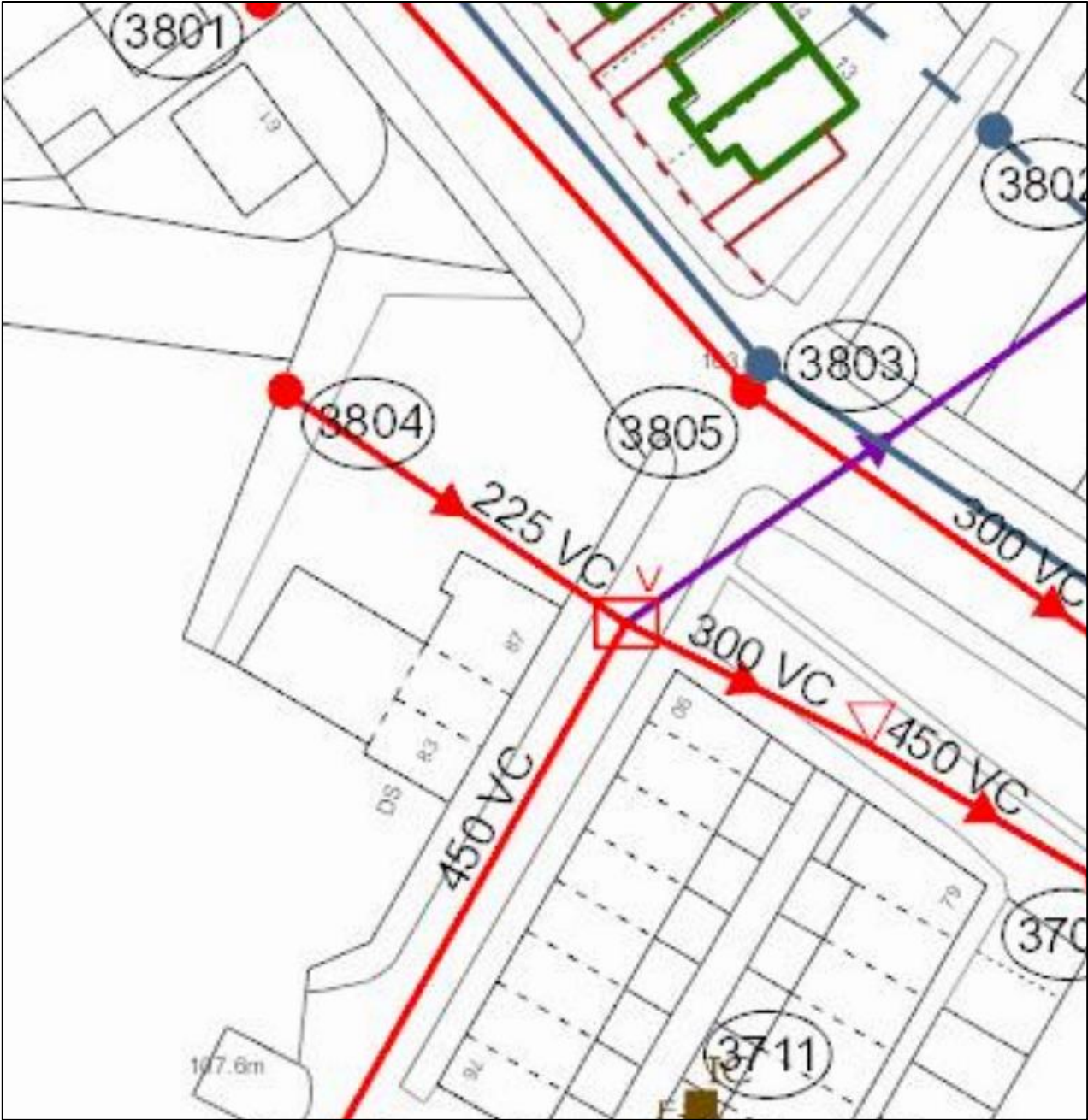


Proposed Site Plans.



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United Utilities Sewer Plans.



Refno	Cover	Func	Invert	Size x	Size y	Shape	Matl	Length
3804		CO	0	225			VC	30.23243
3803	103.62	SW	0	225			VC	145.6091