

325 Deansgate, Manchester

Below Ground Drainage Strategy

Issue P01

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1 Summary

1.1 Guidance documents

This report has been prepared using the following documents:

- Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment.
- The Environment Agency
- British Standard 12056: Gravity drainage systems inside buildings, 2000

1.2 Introduction

The aim of this report is to demonstrate that the proposed development at 325 Deansgate will not increase the flood risk to this local site or any properties downstream.

The drainage strategy presented here and the supporting calculations are largely comparable to those submitted as part the planning application by then project engineer, Civic Engineering. For record the previous submission has been included in the appendices for reference if necessary.

2 Surface water drainage strategy

2.1 Permeable and impermeable surfaces

The areas covered by buildings and hard and soft landscaping have been measured from the Architect’s plan drawings for the existing and proposed conditions. This is summarised in the table below.

	Existing (m²)	Proposed (m²)
Total area of site	675	675
Roofs	675	675
Hard landscaping	675	675
Soft landscaping	0	0
Permeable areas	0	0
Impermeable areas	675	675

Table 1: Permeable and impermeable surfaces

The impermeable areas between the existing and the proposed development is unchanged.

The site is currently occupied by a commercial showroom, warehouses and which can be seen to be 100% impermeable.

2.2 Existing surface water scheme

A CCTV drainage survey was conducted onsite identifying manholes, downpipes, inspection chambers and this is included within the Appendix documents in the Stage 2 Civic Report.

Sewer records have been obtained and extracted from the Stage 2 Report from Civic which shows no public sewers within the proposed development site.`

2.3 SuDs

Greater Manchester Council requires new developments to follow the guidance outlined in their Drainage and Planning Policy Statement. This document is based on the National Planning Policy Framework which favours sustainable urban drainage techniques (SuDs) as a means of surface water disposal.

In order to reduce the risk of surface water and sewer flooding, all development proposals in this borough are required to follow the London Plan drainage hierarchy:

- Store rainwater for later use
- Use infiltration techniques, such as porous surfaces in non-clay areas
- Attenuate rainwater in ponds or open water features for gradual release
- Attenuate rainwater by storing in tanks or sealed water features for gradual release
- Discharge rainwater direct to a watercourse
- Discharge rainwater to a surface water sewer/drain
- Discharge rainwater to the combined sewer

The proposed development should not produce surface water discharge which will cause a flood risk or possible surcharge flooding within the site or further downstream. The proposed surface water system will be detailed to ensure this requirement is met.

2.4 Proposed surface water drainage strategy

The proposed development consists of demolishing the existing buildings and building a new twenty three-storey building.

The impermeable area of the proposed development is approximately the same of the existing

The potential climate change allowance for 2070 ranges between the 30% for the central allowance and 40% for the upper end allowance, considering the Irwell catchment area (North West river basin district).

Therefore, the design will consider an allowance of 40% climate change on peak rainfall intensity.

There is a requirement to provide an attenuation tank to accommodate flows up to the 1 in 100-year event with a climate change of 40%.

The industry-standard Modified Rational Method has been used in the calculation of runoff rates from existing impermeable areas which are to be provided with a new drainage system to serve the impermeable catchment area:

$$Q_p = 2.78 \text{ } C_v \text{ } CR \text{ } i \text{ } A$$

Where:

C_v = volumetric runoff coefficient
 CR = 1.3 (Routing Coefficient)
 I = rainfall Intensity for 15 min storm (mm/h) = 27.3 mm/h (Return period of 1 year without climate allowance from TEDDS)
 A = Area (ha)
2.78 = Coefficient which accounts for the differences in units for the inputs and the outputs of the equation

Rainfall intensity data has been obtained from TEDDS design software by Tekla, peak rainfall intensities have been generated for a range of storm return periods for a 15-minute duration winter storm.

The existing runoff rate is, $Q_p = 5.12 \text{ l/s}$

The pipe outlet being half of the existing runoff = 2.56 l/s

Based on the above, the proposed storage tank will require a minimum storage of 25.08 m3.

The rainwater from the roof will be collected from rainwater pipes at ground level and slot drains will collect the run-off from the hard landscaping, the surface water will then be directed to the new attenuation tank which releases the surface water into the existing public sewer.

2.5 Surface water runs

The current proposal consists in collecting the surface water into a new attenuation tank before discharging it at a reduced rate into the existing public sewer.

Three surface water manholes have been proposed with 2 No. main runs running between these and connecting onto the proposed attenuation tank

Each of the main run have been designed considering the sum of all flow rates from the SVP/SS connecting onto the considered run.

	Start	Finish	Length		Design flow rate	Fall - Depth/meter	Min pipe diameter
Run 1	SWMH01	SWMH02	19	m	53	1:100	225
Run 2	SWMH02	SWMH03	16	m	82.9	1:100	300

Table 2: SW pipes design summary

Refer to Appendix C for Structural Calculations.

3 Foul water drainage strategy

3.1 Foul water appliances

The current proposal consists in collecting the foul drainage from each soil vent pipe/soil stack and discharging via a single main run along the perimeter of the building as shown in the drainage GA drawing. This will be connected to the existing 900x525m combined public sewer in Trafford Street, at an unrestricted rate.

Three foul water manholes have been proposed with 3 No. main runs running between these and connecting onto the existing public combined sewer.

Each of the main run have been designed considering the sum of all flow rates from the SVP/SS connecting onto the considered run.

	Start	Finish	Length		Design flow rate	Fall - Depth/meter	Min pipe diameter
Run 1	FWMH01	FWMH02	19	m	34.6	1:80	225
Run 2	FWMH02	FWMH03	17.5	m	79.2	1:80	300

Table 3: FW pipes design summary

Refer to Appendix C for Structural Calculations.

4 Conclusions

- 325 Deansgate lies in Flood Zone 1 which is characterised by low probability of a flood occurring.
- The existing runoff rates have been calculated at 5.12 l/s, based on a 100% site drainage area of 675 m2.
- The Surface Water Discharge for the development will be limited to the 1 in 1 year event rate of 2.56 l/s and will consider an allowance of 40% climate change. Flows will be conveyed across site in a traditional pipe system to reinforced concrete tank incorporated into the raft foundation design. A Hydro brake flow attenuation device will be provided at the tank exist to limit flows going in the public sewer on Trafford Street. Refer to S/9000 Drainage GA.
- The required attenuation volume is 25 m3.
- The foul water drainage from each development will be collected via a piped system and discharge via a single connection to the existing combined public sewer in Trafford Street at an unrestricted rate.

5 Appendix

- Appendix A – Existing sewer records
- Appendix B – Proposed drainage scheme
- Appendix C – Calculations

Appendix A – Existing Sewer Records

Appendix B – Proposed drainage scheme

Appendix C –Calculations