



**The Former Grove Public House,
1515 Ashton Old Road,
Manchester M11 1GR**

Proposed Residential Development

Drainage Strategy

For: KMM Homes

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1.0 INTRODUCTION

- 1.1 Integra Consulting has been commissioned by KMM Homes to undertake a Drainage Strategy for the land at the former Grove Public House, 1515 Ashton Old Road, Manchester M11 1GR. This document has been prepared to accompany the full planning application for the demolition of the existing building and construction of a terrace of three residential dwellings (use class C3) with access, landscaping and associated infrastructure (refer to Appendix 5).
- 1.2 The objective of the Drainage Strategy is to identify the proposed surface and foul water drainage strategies for the development site. Potential flooding issues are also considered as part of this report together with any consequent implications on the proposed site development.
- 1.3 The Drainage Strategy has been undertaken in accordance with the pro-forma guidance contained in:
- Department for Communities and Local Government document 'National Planning Practice Guidance: Flood Risk and Coastal Change'
 - Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 1 SFRA prepared by JBA Consulting and dated March 2010 and Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011
 - DEFRA / Environment Agency publication SC030219 'Rainfall Runoff Management for Developments' dated October 2013.
- 1.4 To date, consultations have been undertaken with the Environment Agency (EA).

2.0 STANDARDS AND LIMITATIONS

This report has been prepared solely for use by KMM Homes.

It shall not be relied upon or transferred to any other party without the prior written authorisation of Integra Consulting.

The findings and opinions in the report are based on information derived from a variety of different sources. Integra Consulting do not accept any liability for the accuracy or otherwise of any information provided by third parties.

It should be noted that some of the aspects considered in this study may be subject to change with time. Therefore, if the development is delayed or postponed, consideration may need to be given to reviewing such issues to confirm that no changes have taken place, either at the site or within relevant legislation.

Further consultations with statutory bodies are likely as the scheme progresses. It should be noted that even where responses have been received from Regulators, these could be subject to change at a later date.

3.0 CURRENT SITUATION

3.1 Site Location and Description

The circa 0.05 hectare site is located approximately 1.2km east of the centre of Openshaw at National Grid reference 389916, 397361 as shown on the site location plan in Appendix 1.

The site is generally level (refer to site topographical survey in Appendix 2) and is bounded by residential properties to the east, a heavily vegetated area to the north, Ashton Old Road to the south and Club Street to the west.

Ashton Canal lies circa 450m north of the site whilst the Gorton Upper Reservoir system lies circa 600m to the south east of the site.

3.2 Flooding

Current Environment Agency flood data indicates the proposed development site to lie wholly in Flood Zone 1 (refer to Appendix 3 for details).

EA / DEFRA flood mapping indicates no risk of surface water flooding at the site although there is less than 300mm water depth in Club Street in a low risk scenario between 1 in 100 and 1 in 1000 annual probability.

EA / DEFRA flood mapping does not indicate any areas of the proposed site at elevated risk of reservoir flooding.

3.3 Existing Sewers

The United Utilities sewer plan in Appendix 4 indicate the following adopted sewer infrastructure at and adjacent to the site:

- 225mm diameter combined sewer extending from north to south beneath Club Street
- 375mm diameter (becoming 450mm diameter) combined sewer extending from west to east beneath Ashton Old Road

4.0 PROPOSED DEVELOPMENT

4.1 Development Proposals

It is proposed to submit a full planning application for the demolition of the existing building and construction of a terrace of three residential dwellings (use class C3) with access, landscaping and associated infrastructure (refer to Appendix 5).

4.2 Surface Water Drainage

The issue of surface water drainage to the proposed development has been considered with reference to the hierarchy of surface water disposal as noted in the Building Regulations H3:

- i) Sustainable Urban Drainage Systems (SUDS)
- ii) Discharge of surface water off site direct to watercourse
- iii) Discharge to adopted sewer

SUDS are made up of one or more structures built to manage surface water runoff. They are used in conjunction with good management of the site to prevent flooding and pollution. There are four general methods of control:

- Filter strips and swales
- Filter drains and permeable surfaces
- Infiltration devices
- Basins and Ponds

A Phase 1 environmental desk study has been undertaken by Peak Environmental Solutions (refer to Appendix 7 for Phase 1 desk study details). The desk study identifies a borehole 85m to the west of the site comprising a thin layer of made ground underlain superficial deposits of boulder clay (till). A study of the geological mapping indicates the boulder clay deposits to be underlain at depth by Permian Collyhurst Sandstone Formation solid deposits.

Although no specific infiltration testing in line with BRE 365 has been undertaken, it is evident from the above noted borehole data / desk study data that the underlying soils at shallow depth beneath the site will have a relatively low permeability and are therefore likely to preclude the use of post-development soakaway surface water drainage techniques at the site.

On the basis that the nearest watercourses to the site lie circa 450m north and over 600m south east of the site through multiple third party land ownerships, it is therefore proposed to discharge suitably attenuated site surface water to the existing 225mm diameter adopted combined sewer that extends from north to south beneath Club Street, potentially using the existing site connection (refer to Appendix 6 for existing drainage survey data covering the adopted combined drainage system in Club Street).

The site lies in a Critical Drainage Area and hence post-development flows would need to be limited to 50% of the existing brownfield runoff rate from the site. It is also noted that, in line with the requirements of the North West SuDS Pro-Forma and section 24.5 of The SuDS Manual, it is proposed to limit post-development surface water runoff to greenfield runoff rates based on a high runoff soil type (FSR Soil Type 5) with a minimum rate of 2 litres per second to apply as a pragmatic measure to avoid future system blockages (refer to Appendix 8 for details).

On this basis, the estimated preliminary on site storage volume to cater for a 1 in 30 year event is circa 2m³ whilst on site storage to cater for a 1 in 100 year plus 40% climate change event is approximately 5m³ (refer to Appendix 8 for details). Please note that these estimated figures are subject to finalisation of soil type following detailed ground investigation.

The post-development surface water drainage strategy will naturally need to be agreed in principle with both the LLFA and United Utilities. Discharge of post-development surface water into the adjacent adopted combined sewer system will also naturally require a formal S106 application to be made to United Utilities.

Ultimately the final design of the drainage system will be subject to the finalised site arrangement, further targeted site investigation and subsequent development of a detailed drainage scheme.

The post-development surface water drainage system will be designed to ensure that:

- There is no surcharge in the 1 in 1 year event:
- Surface water flows remain on site up to a 1 in 100 year + 40% climate change storm event.
- Sufficient surface water storage will be available to ensure there is no risk to property

4.3 National Planning Policy Framework and Technical Guidance

The residential site development proposals are classed as 'more vulnerable' in Table 2 of the Flood Risk and Coastal Change guidance.

'More vulnerable' developments in Flood Zone 1 are classed as appropriate according to Table 3 of the Flood Risk and Coastal Change guidance.

Proposed post development levels will be engineered in order to protect the development and not provide any increased flood risk elsewhere.

Types of flooding that could affect the site are:

River - the site wholly lies in Flood Zone 1

Sea – there is no risk of flooding from the sea

Groundwater – there are no springs or weep areas on the site

Sewers – there have been no local reports of sewer surcharge

4.4 Strategic Flood Risk Assessment & EA Mapping Review

From our review of the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011, the site lies in the Conurbation Core Critical Drainage Area.

There are no groundwater protection zones in the vicinity of the site and there is negligible residual fluvial risk. The site is not noted to lie within a flood warning area.

4.5 Safe Access and Egress

Safe access / egress from the site in extreme conditions will be via the entrance on Club Street.

4.6 Foul Water Drainage

We would propose to discharge post-development foul drainage from the proposed residential development site to the existing 225mm diameter adopted combined sewer that extends from north to south beneath Club Street potentially using the existing site connection.

The foul drainage network will naturally comply with Building Regulations 2010 – Approved Document H1 and the calculations for post-development foul water discharge will be based on Sewers for Adoption 8th Edition.

5.0 SuDS DESIGN STATEMENT

5.1 SuDS Requirements

SuDS measures are required on the proposed development to comply with the National Planning Policy Framework (NPPF), DEFRA Non-Statutory Technical Standards for Sustainable Drainage Systems and the SuDS guidance in the Manchester City, Salford City and Trafford Councils Level 2 Hybrid Strategic Flood Risk Assessment - Level 2 SFRA prepared by JBA Consulting and dated March 2011

The key conceptual SUDS design criteria for the development are covered in Non-Statutory Technical Standards for Sustainable Drainage under sections S1 to S9 based on the brownfield nature of the development site.

Peak Flow Control

S3 of the DEFRA Technical Standards stipulates that for brownfield developments, the peak runoff from the development for the 1 in 1 year and 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate for the same rainfall event but should never exceed the rate of discharge from the development prior to re-development for that event.

Volume Control

Requirement S5 stipulates that the runoff volume in the 1 in 100 year, 6 hour rainfall event must be constrained to a value as close as is reasonably practicable to the greenfield runoff volume for the same event but should never exceed the runoff volume from the development site prior to development.

Flood Risk within the Development

S7 stipulates that the drainage system shall be designed such that no flooding shall occur on any part of the site during a 1 in 30 year storm event whilst the S8 requirement stipulates that, during a 1 in 100 year enhanced rainfall event, no flooding of any building shall occur.

S9 stipulates that site levels shall be designed such that flows which are as a result of rainfall events exceeding the 1 in 100 year enhanced rainfall event, are managed in exceedance routes that minimise the risks to people and property.

Water Quality

Water quality measures are generally considered with reference to CIRIA Report 'C753 – The SUDS Manual', specifically Chapters 4 and 26. In this instance, the hierarchy of surface water discharge has demonstrated that it is not feasible to discharge surface water flows to ground or to watercourse and hence the local existing adopted combined sewer system is the only viable discharge option. Accordingly, no further water quality treatment is considered appropriate.

5.2 Proposed SUDS Methodology & Drainage Design Principles

As detailed in section 4.2, discharge of surface water direct to the ground in the form of infiltration measures is deemed infeasible due to the low level permeability of the underlying natural strata. Accordingly, controlled discharge to the adjacent existing adopted combined sewerage network beneath Club Street is the proposed method of post-development surface water discharge.

Peak Flow Control

Post-development surface water flows from the proposed development site shall be limited to greenfield runoff rates with a minimum rate of 2 litres per second to apply as a pragmatic measure to avoid future system blockages.

Volume Control

The proposed post-development discharge flow rate of 2 litres per second will apply for all flood events from the 1 in 1 year to the 1 in 100 year (enhanced) event.

Flood Risk within the Development

To cater for excess surface water runoff, the proposed method of attenuation on the site is to utilise oversized pipe storage within the residential development that will, in turn, discharge attenuated site surface water into the existing adopted combined sewerage system beneath Club Street via a hydrobrake system.

It is proposed to accommodate the 1 in 100 year (enhanced) event storage volume within the underground pipe storage. Accordingly, this will ensure that criteria S7 and S8 are met.

The site is to discharge post-development surface water into underground pipe storage within the 'red line' site boundary which in turn will discharge through a flow control chamber to limit the discharge to a runoff rate of 2 litres per second. Downstream of the storage / flow control chamber, the attenuated surface water flow will discharge to the adjacent adopted combined water sewerage system beneath Club Street.

5.3 Management and Maintenance of SuDS Drainage System

The management and maintenance of the above noted SuDS measures to serve the proposed development will be undertaken by a maintenance management company to be appointed for the project. The appointment of the maintenance and management company is to be confirmed at the completion of the build phase. All parts of the drainage network are to be accessible and are to be constructed from materials that are suitable and robust for the lifetime of the development.

The maintenance activities required for the drainage network are as follows:

5.3.1 Flow Control

The maintenance for the flow control is as follows:

Operation	Frequency
Inspect and identify any areas that are not operating correctly, if required take remedial actions	Monthly for three months then at six monthly intervals
Debris removal from catchment surface (where it may cause risk to performance)	Monthly
Check control chamber for blockage or silt, algae or other matter by jetting	As required, but at least four times a year
Remove sediment from upstream drainage network and sediment from within manhole by jetting	As required, but at least twice a year
Repair / check all inlets and control mechanics	As required
Inspect / check all inlets and control mechanics to ensure that they are operating as designed	Twice a year as a minimum and after severe storm events

5.3.2 Flow Control Chamber Design Criteria

In addition to the above maintenance methods, the flow control chamber will be designed so it works effectively throughout the lifespan of the development and will have precautionary features to ensure maintenance work can be carried out promptly and efficiently to ensure no control failure which may otherwise subsequently lead to flooding.

Details of the flow control chamber are as follows:

- High Water Level Alarm: Alarm installed and directed to site maintenance team
- Spares: Control spares to be kept on site for efficient maintenance

5.3.3 Flood Routes

A visual monthly inspection of flood routes should be made in order to check that routes are not blocked by new fences, walls, soil or other rubbish with removal undertaken as necessary.

5.3.4 Spillage – Emergency Action

Most spillages on development sites are of compounds that do not pose a serious risk to the environment as they enter the drainage system in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommend by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.

In the event of a serious spillage, either by volume or of unknown or toxic compounds, then the spillage should be isolated using soil, turf or fabric and outlet pipes from chambers downstream of the spillage blocked with bungs. Bungs for blocking pipes may be made by wrapping soil or turf in a plastic sheet or close woven fabric. The Environment Agency should be contacted immediately.

5.3.5 Linked and Further Maintenance

The maintenance of the drainage network and SuDS features is to be linked with the landscape maintenance plan for the proposed development.

5.3.6 Maintenance Activities

A log of all maintenance activities is to be kept and made available to the Local Planning Authority (LPA) and / or the Lead Local Flood Authority (LLFA) on request.

6. CONCLUSIONS

6.1 Flooding

Following review of the Environment Agency flood maps and data, it has been confirmed that the site lies wholly in Flood Zone 1.

There are to be no off site surface water flood routes generated by the development during an enhanced 1 in 100 year storm. All surface water run-off will remain on site in the 1 in 100 year + 40% climate change event.

6.2 Site Surface Water Drainage

The site is to discharge post-development surface water into underground oversized pipe storage within the 'red line' site boundary which in turn will discharge through a flow control chamber to limit surface water discharge to a runoff rate of 2 litres per second. Downstream of the storage / flow control chamber, the attenuated surface water flow will discharge to the adjacent adopted combined water sewerage system beneath Club Street.

6.3 Site Foul Water Drainage

We would propose that post-development foul drainage discharges from the proposed residential development to the existing adjacent adopted combined sewerage system beneath Club Street within the western section of the site.

6.4 Flood Risk Management Measures

There will be a site management Health and Safety document prepared in respect of the site.

6.5 Off Site Impacts

All roofed and paved areas are to be drained into the site surface water drainage system. The design of the site surface water system will ensure that no off site flood flows are generated by the proposed development in the 1% plus climate change event.

6.6 Residual Risk

With careful design of the drainage elements as described above, there will be no residual flood related risks remaining after the development has been completed.

The proposed building envelopes will naturally fully lie in Flood Zone 1.

A post-development safe emergency access can be maintained at all times during a flood event with emergency access from Club Street.

APPENDIX