ARP ASSOCIATES
CHARTERED CONSULTING ENGINEERS

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MILLER HOMES (YORKSHIRE) LTD.

DRAINAGE MAINTENANCE AND MANAGEMENT PLAN
FOR
DEVELOPMENT AT WOODHEAD ROAD, BROCKHOLES

Introduction

It is essential that drainage systems, including any Sustainable Drainage Systems (SuDS) and proprietary components, are subject to periodic inspection and maintenance over their lifetime, so that they continue to function to the intended design standard.

This document sets out the responsibilities for management and maintenance of the proposed drainage systems at the above site, and outlines a recommended maintenance regime to be implemented by the responsible party.

This report has been initially prepared for the use and reliance of the Client only. The report shall not be relied upon or transferred to any other parties without the written agreement of ARP Associates. For the avoidance of any doubt, where ARP Associates enters into a letter of reliance for the benefit of a third party, that third party will be permitted to rely on the report. No responsibility will be accepted where this report is used, either in its entirety or in part, by any other party without ARP Associates consent.

Revision Status and Requirements for Future Review

Following receipt of comments from the Lead Local Flood Authority, this revised draft has been prepared for agreement with the Lead Local Flood Authority and Local Planning Authority. The document should be finalised upon completion of construction, including all listed drainage drawing references which should be revised to 'as-built' status.

This plan should be reviewed periodically to confirm it is meeting the objective of ensuring effective drainage is maintained. The maintenance plan should be revised as necessary to keep systems working effectively.

Overview of Drainage Systems

The development is served by three separate drainage systems: A domestic foul drainage system; a surface water drainage system; and a land drainage system.

Domestic foul wastewater from the majority of the site is conveyed by gravity to a foul pumping station in the north of the site. Foul wastewater is pumped through the site via a rising main, discharging into a small gravity foul drainage system serving the south of the site. This system discharges by gravity to a foul public sewer in Smithy Place Lane.

Surface water runoff (from building roofs, roads, and other hardstanding areas) is collected by a system of rainwater pipes and road gullies, into a piped drainage system which flows by gravity to a below-ground attenuation tank in the north of the site. Surface water is discharged to the River Holme to the east of the site via an outfall headwall, at a maximum rate of 25 l/s, controlled by a vortex flow control device. The system is designed to manage rainfall events up to the '1 in 100 year' event, including an allowance for the projected impacts of climate change.

A land drainage system has also been provided to intercept potential groundwater flows which are expected to emanate from the embankments adjacent to the site access road in the west, and from a point source in land adjacent to the south of the site. The flows are conveyed by gravity to the River Holme to the east of the site, discharging via a second outfall headwall.

Drainage Drawings and Documentation

The following drawings illustrate the drainage systems for this development, and should be kept with the maintenance plan and referred to when considering maintenance requirements:

- 425.58.03.01 Section 104 Layout Sheet 1 of 2
- 425.58.03.02 Section 104 Layout Sheet 2 of 2
- 425.58.05.01 Private Drainage Layout Sheet 1 of 6
- 425.58.05.02 Private Drainage Layout Sheet 2 of 6
- 425.58.05.03 Private Drainage Layout Sheet 3 of 6
- 425.58.05.04 Private Drainage Layout Sheet 4 of 6
- 425.58.05.05 Private Drainage Layout Sheet 5 of 6
- 425.58.05.06 Private Drainage Layout Sheet 6 of 6
- 425.58.05.07 Private Drainage Layout Septic Tank Connections
- 425.58.05.08 Private Drainage Layout Additional Four Plots
- 425.58.07.01 Typical Drainage Details Sheet 1 of 2
- 425.58.07.02 Typical Drainage Details Sheet 2 of 2
- 425.58.07.03 S104 Headwall Detail
- 425.58.07.04 Proposed Land Drainage Headwall Detail
- 425.58.12.01 Flow Control Manhole & Details for S53
- 425.58.09.01 Impermeable Area Plan Sheet 1 of 2
- 425.58.09.02 Impermeable Area Plan Sheet 2 of 2
- 425.58.09.03 Gully catchment Plan Sheet 1
- 425.58.09.04 Gully catchment Plan Sheet 2

- 425.58.10.03 Groundwater Strategy Sheet 1 of 2
- 425.58.10.08 Groundwater Strategy Sheet 2 of 2
- 425.58.10.04 Flood Routing Layout - Full Site
- 425.58.10.05 Flow Control Manhole & Details for S53
- 425.58.10.06 Land Drainage Manhole Schedules
- 425.58.10.07 Land Drainage Details

- 425.58.11.01 Foul Manhole Schedule Sheet 1 of 2
- 425.58.11.02 Foul Manhole Schedule Sheet 2 of 2
- 425.58.11.03 Surface Water Manhole Schedule Sheet 1 of 2
- 425.58.11.04 Surface Water Manhole Schedule Sheet 2 of 2
- 425.58.11.05 Surface Water Demarcation Schedule
- 425.58.11.06 Foul Water Demarcation Schedule

- 425.58.02.01 Section 38 Layout Phase 1
- 425.58.02.02 Section 38 Layout Phase 2
- 425.58.02.03 Section 38 Phase 3 Layout

Any documentation relating to proprietary drainage components should be kept with the maintenance plan and referred to when considering maintenance requirements.

Any persons undertaking maintenance should ensure they refer to the most recent revision of the listed drawings and documentation for the drainage systems, including 'as-built' drawings when available.

Maintenance and Management Responsibility

Adoptable Drainage - A Significant proportion of the surface water and foul drainage systems on this development have been designed to adoptable standards and therefore, once the adoption process is complete, will become the responsibility of Yorkshire Water as the local sewerage undertaker. Those systems to be adopted are shown in the following ARP drawings:

- 425.58.03.01 Section 104 Layout Sheet 1 of 2
- 425.58.03.02 Section 104 Layout Sheet 2 of 2
- 425.58.07.03 S104 Headwall Detail
- 425.58.12.01 Flow Control Manhole & Details for S53
- 425.58.11.01 Foul Manhole Schedule Sheet 1 of 2
- 425.58.11.02 Foul Manhole Schedule Sheet 2 of 2
- 425.58.11.03 Surface Water Manhole Schedule Sheet 1 of 2
- 425.58.11.04 Surface Water Manhole Schedule Sheet 2 of 2
- 425.58.11.05 Surface Water Demarcation Schedule
- 425.58.11.06 Foul Water Demarcation Schedule

At the time of writing, the formal Section 104 Sewer Adoption agreement with Yorkshire Water has not been completed. Formal Adoption of sewers by Yorkshire Water will be sought as soon as 51% of the properties are occupied.

Highway Drainage - The main access roads into the development are designed to adoptable standards and therefore, once the adoption process is complete, the highway gullies serving these roads will become the responsibility of the local Highway Authority. The roads and gullies to be adopted are shown in the following ARP drawing:

- 425.58.02.01 Section 38 Layout Phase 1
- 425.58.02.02 Section 38 Layout Phase 2
- 425.58.02.03 Section 38 Phase 3 Layout
- 425.58.09.03 Gully catchment Plan Sheet 1
- 425.58.09.04 Gully catchment Plan Sheet 2

At the time of writing, the formal Section 38 Highway Adoption agreement with the Highway Authority has not been completed. Formal Adoption of roads by the Highway Authority will be sought following adoption of the sewers by Yorkshire Water and completion of other relevant works.

Single Property Private Drainage - The inspection and maintenance of any drainage infrastructure serving a single property, and located within the curtilage of that property, will remain the responsibility of the relevant property owner.

Shared Private Drainage – Where appropriate, responsibility for the ongoing inspection and maintenance of non-adoptable shared drainage systems on this development will be assigned by Miller Homes to an appropriate individual property owner, or an appropriate group of property owners, through specific clauses in individual property deeds.

Other Private Drainage - Responsibility for the ongoing inspection and maintenance of the remainder of the drainage systems on this development will be assigned by Miller Homes to the appointed Management Company - Residential Management Group Ltd (RMG). Formal handover to RMG shall take place upon completion of construction and the handover of the final plot.

Land Drainage System - Responsibility for the ongoing inspection and maintenance of the separate land drainage system (which has been provided to intercept potential groundwater flows from the embankments adjacent to the site access road in the west and from a point source in land adjacent to the south of the site) will be assigned by Miller Homes to the appointed Management Company - RMG. Formal handover to RMG shall take place upon completion of construction and the handover of the final plot. The land drainage system is shown in the following ARP drawings:

- 425.58.10.03 Groundwater Strategy Sheet 1 of 2
- 425.58.10.08 Groundwater Strategy Sheet 2 of 2
- 425.58.07.04 Proposed Land Drainage Headwall Detail
- 425.58.10.06 Land Drainage Manhole Schedules
- 425.58.10.07 Land Drainage Details

Maintenance and Management Responsibility Prior to Formal Handover/Adoption - Prior to the designated parties taking formal responsibility for the drainage systems as above, Miller Homes shall be responsible for maintaining the drainage systems. Miller Homes will make use of its operatives on site and appropriate subcontractors to undertake the required maintenance whilst construction is ongoing. If any of the above formal agreements to maintain any aspect of the drainage is still outstanding once the developer has

completed construction and leaves site, Miller Homes shall remain responsible for those elements of the drainage systems until such time as formal agreement takes place.

Failure of Adoption - In the unlikely event that the adoption of the sewers by Yorkshire Water does not proceed, and/or adoption of the highways by the Highway Authority does not proceed, Miller Homes will appoint the Management Company - RMG - to maintain the affected drainage systems in perpetuity. However, this is considered unlikely to be necessary.

Health and Safety

All operation, inspection and maintenance should be undertaken by suitably qualified and competent professionals, using safe systems of work.

In particular, it should be recognised that some maintenance tasks may necessitate entry into confirmed spaces – these tasks should only be undertaken by suitably trained operatives, using an appropriate safe systems of work.

Attention is drawn to the requirements of the Construction Design and Management Regulations 2015, and in particular, the duties and obligations of the Client.

Drainage Easements

Legal drainage easements will apply to some of the Yorkshire Water public sewers on this development site, once adopted. The applicable easements are shown in the following ARP drawings:

- 425.58.03.01 Section 104 Layout Sheet 1 of 2
- 425.58.03.02 Section 104 Layout Sheet 2 of 2

The easements must be kept clear of obstructions, such as new buildings/extensions in perpetuity. Advice should be sought from Yorkshire Water in advance if any works are proposed within these easements in the future.

Watercourse

The site is adjacent to a watercourse – the River Holme – which is classified as a 'Main River' by the Environment Agency. Responsibility for maintaining the watercourse rests with the owners of the watercourse; Under the principle of riparian ownership, the owner of any reach of the watercourse is normally the party who own the land through which the watercourse flows. Further guidance on watercourse ownership responsibilities is available from https://www.gov.uk/guidance/owning-a-watercourse.

Visual inspection of the watercourse should be undertaken at regular intervals to check for any obstruction to flow or erosion. It is recommended that inspections take place not more than six months apart, but also after heavy storms or sustained periods of inclement weather. If advance warning is given, inspection should also take place prior to expected heavy storms or sustained periods of inclement weather.

Rubbish and debris which could cause an obstruction should be removed as necessary. General maintenance of the watercourse corridor should take place as required to maintain the flow, but you should check whether any work proposed requires prior consent. Works must not result in detriment to water quality, flood risk or ecology.

The Environment Agency may undertake some management activities on the watercourse and may require access via the site to do so. The Environment Agency also has permissive powers to maintain and improve Main Rivers. Permissive powers include the power to force landowners to carry out maintenance if the watercourse is causing flooding etc elsewhere; or the power to undertake such maintenance and re-charge the landowner.

As the watercourse is classified as an 'Main River', a Flood Risk Activity Permit may be required from the Environment Agency for any works (temporary or permanent) which affect the watercourse, including any works within 8m of the top of the bank. Advice should be sought from the Environment Agency in advance if any works are proposed. Further guidance is available from https://www.gov.uk/guidance/flood-risk-activities-environmental-permits

Drainage Maintenance and Management Regime

As set out above, Yorkshire Water shall be responsible for determining and implementing an appropriate maintenance regime for the adoptable drainage elements once the sewer adoption has been completed, and the Highways Authority shall be responsible for determining and implementing an appropriate maintenance regime for the adopted highway gullies once the highway adoption has been completed.

Prior to adoption, or where drainage remains unadopted, as a minimum, it is recommended that inspection and maintenance follow the regime set out below. However, the timescales indicated below should be reviewed based on inspections and should be increased in frequency if required.

Notwithstanding any recommendations set out in this document, all proprietary components should be operated/inspected/maintained in accordance with the manufacturer's requirements/specifications.

Further advice on inspection and maintenance of SuDS components is set out in CIRIA publication C753 The SuDS Manual (2015).

Asset/Item:	Guttering/Rainwater Downpipes	
Location/Access:	Located on all properties.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	These should be cleaned at regular intervals. In inclement weather, this frequency is likely to increase.	Bi-annually or as required
Remedial actions	Repair leaks or damage.	As required

Asset/Item:	Gullies/Linear Drainage	
Location/Access:	Located site-wide as shown on External Works drawings 425/58/08.11 to 425/58/08.18.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Gullies and Linear Drainage should be cleaned at regular intervals. Jet-washing and suction-borne methods are recommended, with the contents disposed of at a licenced waste facility.	Bi-annually
	Covers and frames should be inspected at regular intervals, particularly to check line and level, and to ensure integrity, security of hinges and to check line/level is within safe and workable tolerance.	Bi-annually
Remedial actions	Repair covers if damaged.	As required
Monitoring	Inspect Gullies and Linear Drainage to ensure they are in good condition and operating as required.	Annually and after large storms

Asset/Item:	Carrier Drains	
Location/Access:	Located site-wide as shown on S104 Layout drawings 425/58/03.01 and 425/58/03.02, Private Drainage Layout drawings 425/58/05.01 to 425/58/05.08, and Groundwater Strategy drawings 425/58/10.03 and 425/58/10.08.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Carrier Drains should be cleaned at regular intervals. Jet-washing and suction-borne methods are recommended, with the contents disposed of at a licenced waste facility.	Bi-annually
Remedial actions	Repair (In the event of damage or vandalism).	As required
Monitoring	Inspect flow in Carrier Drains (via manholes) to ensure they are in good condition and operating as required	Annually and after large storms
	Conduct CCTV inspection to confirm pipe condition and confirm and requirements for remediation.	Every 3-5 years

Asset/Item:	Manholes/Inspection Chambers	
Location/Access:	Located site-wide as shown on S104 Layout drawings 425/58/03.01 and 425/58/03.02, Private Drainage Layout drawings 425/58/05.01 to 425/58/05.08, and Groundwater Strategy drawings 425/58/10.03 and 425/58/10.08.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Visual inspection of manholes and inspection chambers, to check for any siltation or obstruction to flow, should be undertaken at regular intervals, recommended not more than six months apart.	Bi-annually
	Covers and frames should be inspected at regular intervals, particularly to check line and level, and to ensure integrity, security of hinges and to check line/level is within safe and workable tolerance.	Bi-annually
Remedial actions	Repair covers if damaged.	As required
Monitoring	Inspect Manholes and Inspection Chambers to ensure they are in good condition and operating as required	Annually and after large storms

Asset/Item:	S104 Outfall Headwall	
Location/Access:	Located at coordinates 414853, 411300 on bank adjacent to River Holme, as shown on S104 Layout drawing 425/58/03.02	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Visual inspection of the surface water outfall and flap valve, to check for any obstruction to flow or debris, should be undertaken at regular intervals, recommended not more than six months apart.	Bi-annually
	The ground around the outfall should be checked for signs of movement and any erosion.	Bi-annually
	The outfall should be inspected in advance of storm conditions if feasible, and should be re-inspected after heavy storms or sustained periods of inclement weather.	As required
Remedial actions	Flap valve should be replaced if it becomes damaged or seized.	As required
	Should the outfall become damaged, or the surrounding ground is subject to movement or erosion, the structure should be inspected by an Engineer and remedial works prescribed as necessary.	As required

Asset/Item:	Land Drainage Outfall Headwall	
Location/Access:	Located at coordinates 414855, 411299 on bank adjacent to River Holme as shown on Groundwater Strategy drawing 425/58/10.08.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Visual inspection of the surface water outfall and flap valve, to check for any obstruction to flow or debris, should be undertaken at regular intervals, recommended not more than six months apart.	Bi-annually
	The ground around the outfall should be checked for signs of movement and any erosion.	Bi-annually
	The outfall should be inspected in advance of storm conditions if feasible, and should be re-inspected after heavy storms or sustained periods of inclement weather.	As required
Remedial actions	Flap valve should be replaced if it becomes damaged or seized.	As required
	Should the outfall become damaged, or the surrounding ground is subject to movement or erosion, the structure should be inspected by an Engineer and remedial works prescribed as necessary.	As required

Asset/Item:	Silt Traps	
Location/Access:	Located site-wide as shown on Private Drainage Layout drawings 425/58/05.01 to 425/58/05.08, and Groundwater Strategy drawings 425/58/10.03 and 425/58/10.08.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Silt traps should be cleaned at regular intervals. Jet-washing and suction-borne methods are recommended, with the contents disposed of at a licenced waste facility.	Bi-annually
	Catch pits should be inspected in advance of storm conditions if feasible and should be re-inspected after heavy storms or sustained periods of inclement weather.	As required
	Covers and frames should be inspected at regular intervals, particularly to check line and level, and to ensure integrity, security of hinges and to check line/level is within safe and workable tolerance.	Bi-annually
Remedial actions	Repair covers if damaged.	As required

Asset/Item:	Filter Drains	
Location/Access:	Located at coordinates 414653, 411106 and 414676, 411130, above and below entrance road, as shown on Groundwater Strategy drawing 425/58/10.03.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Maintenance	Pipes should be cleaned at regular intervals, recommended not more than twelve months apart. Jet-washing and suction-borne methods are recommended, with the contents disposed of at a licenced waste facility.	Annually
Remedial actions	Replacement of filter medium and/or geotextile may be required in the longer-term if this becomes silt-ladened.	As required

Asset/Item:	Vortex Flow Control	
Location/Access:	Located in manhole S53 at coordinates 414809, 411300, as shown on S104 Layout drawing 425/58/03.02. Access track with demountable bollards provided from estate road in north of site.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Inspection and Maintenance	The flow control unit should be regularly inspected and maintained as necessary, in accordance with Manufacturer's requirements.	Annually
	The flow control unit should be inspected in advance of storm conditions if feasible and should be re-inspected after heavy storms or sustained periods of inclement weather.	Annually or as required
Occasional Inspection and Maintenance	The sump of the unit should be emptied periodically, using a suction unit and the contents disposed of at a licenced waste facility.	Every 2 years or as required
Remedial Inspection and Maintenance	Repair or replace parts if required. Neoprene seals to be replaced any time the unit is removed from its mountings.	As required
End-of Life Replacement	Replace unit if parts become inoperable or severely degraded over time. Specification of flow control must be such that the same flow characteristics are provided.	60 years

Asset/Item:	Attenuation Tank	
Location/Access:	Located at coordinates 414787, 411300, as shown on S104 Layout drawing 425/58/03.02. Access track with demountable bollards provided from estate road in north of site.	
Maintenance Schedule	**Required Action**	**Typical Frequency**
Regular Inspection and Maintenance	Check and identify any areas that are not working correctly. Take remedial action if required.	Monthly for 3 months then annually
	Clear debris from the catchment surface in any areas it may cause a risk to performance.	Monthly
	Remove sediment from pre-treatment structures and/or internal forebays.	Annually, or as required
	Check all inlets, outlets, vents and overflows are in good condition and working as designed.	Annually
Occasional Inspection and Maintenance	Inspect inside of tank for sediment build-up and remove if necessary.	Every 5 years or as required
Remedial Inspection and Maintenance	Repair/restore inlets, outlets, vents and overflows.	As required but likely to be more than 10 years
End-of Life Replacement	Replace cellular tank	60 years