Proposed Care Home, The Birds PH, 108 Halmer Gate, Spalding, PE11 2EL

Surface Water Drainage Strategy

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Ward Associates (Consulting Engineers) Ltd

Cyclops House, Link Business Park, York YO10 3JB
Tel +44(0)1904 544401
enquiries@wa-eng.co.uk

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Revision History

Rev	Date	Purpose/Status	Comments

1. INTRODUCTION

1.1. WARD Associates Consulting Engineers Limited have been commissioned by Life Property Construction for Glenholme to prepare a Surface Water Drainage strategy report for a proposed 61 Bed Care Home in Spalding.

1.2. This report will describe and outline proposals for the disposal of surface water from the site. It will also include preliminary surface water storage calculations that may be required.

1.3. This report will also provide preliminary layout for disposal of foul water from the development.

2. EXISTING SITE

2.1. The site is located at the Birds Public House, 108 Halmer Gate, Spalding, PE11 2DS. The site area is 0.41 hectares. The site is now a closed down public house which has been for sale for some considerable time. The site is in a residential area of Spalding accessed directly off Halmer Gate.



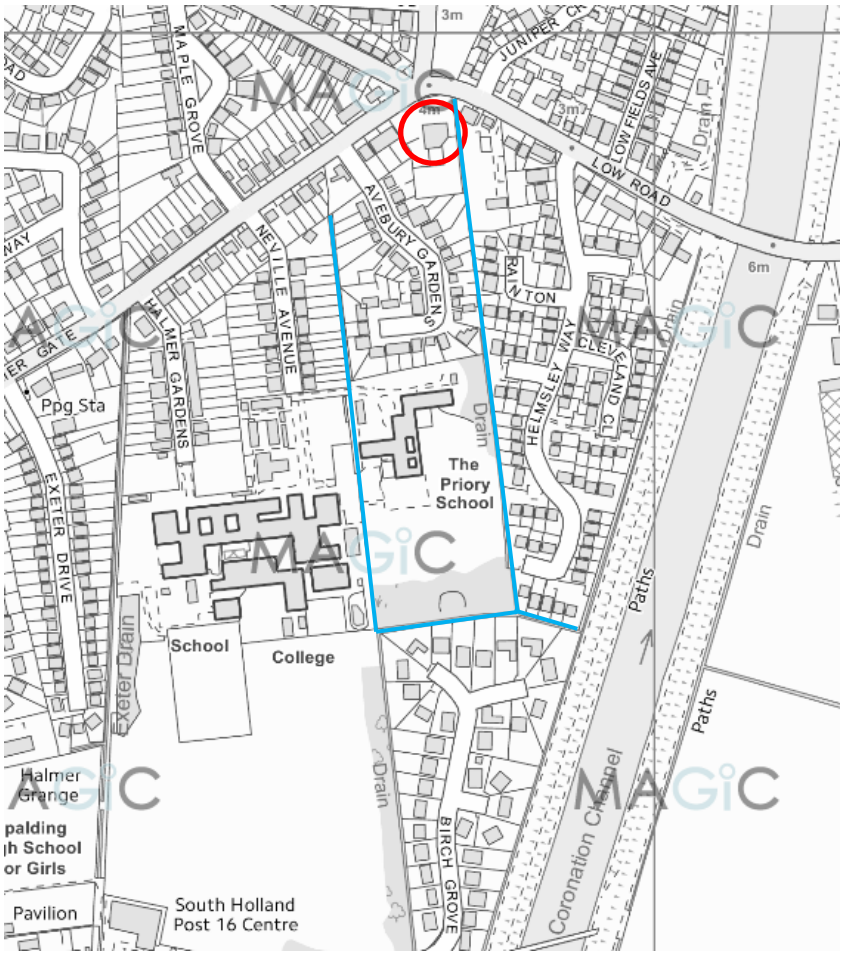
Figure 1 – Site Location Plan

2.2. A copy of the existing site plan is shown in Appendix A.

2.3. The existing public house is located in the middle of the site with extensive tarmac car parking around the site. The Existing site is drainage via gravity with the surface and foul combining on site and connecting into the Anglian Water foul sewer crossing the South of the site. A copy of the CCTV drainage survey for the

site is shown in appendix C. A copy of the existing Anglian water sewer network is shown in Appendix E.

2.4. There is an existing drain along the Eastern boundary of the site which runs North to South and connects into the Coronation Channel.



3. SURFACE WATER DRAINAGE STRATEGY

3.1. SUDS mimic the natural drainage system and provide a method of surface water drainage which can decrease the quantity of water discharged, and hence reduce the risk of flooding. In addition to reducing flood risk, these features can improve water quality and provide biodiversity and amenity benefits.

3.2. The SUDS management train incorporates a hierarchy of techniques and considers all three SUDS criteria of flood reduction, pollution reduction, and landscape and wildlife benefit. In decreasing order of preference, the preferred means of disposal of surface water runoff is:

- Discharge to ground / infiltration
- Discharge to a surface water body.
- Discharge to a surface water sewer.
- Discharge to a combined sewer.

3.3. The philosophy of SUDS is to replicate as closely as possible the natural drainage from a site predevelopment and to treat runoff to remove pollutants, resulting in a reduced impact on the receiving watercourses. The benefits of this approach are as follows:

- Reducing runoff rates, thus reducing the flood risk downstream.
- Reducing pollutant concentrations, thus protecting the quality of the receiving water body.
- Groundwater recharge.
- Contributing to the enhanced amenity and aesthetic value of development areas.
- Providing habitats for wildlife in developed areas, and opportunity for biodiversity enhancement.

3.4. The proposed development is for a 61 bedroom Care Home development with associated hardstanding areas, access road and car park. Refer to Appendix G for proposed site plan and surface water drainage layout. The building is raised above existing ground levels to comply with the requirements in the flood risk assessment given the sites location with Flood Zone 3.

3.5. Refer to Appendix F for proposed site plan indicating impermeable areas.

3.6. Infiltration testing was undertaken by Subsurface in December 2018 to determine the suitability for soakaways/infiltration systems on site. The Subsurface results concluded soakaways would not be feasible on site. Refer to Appendix B for the results.

3.7. To follow the hierarchy for the disposal of surface water it is proposed to connect into the drain along the East site boundary. This drain flows into the Coronation Channel further South of the site.

3.8. It is proposed to use rainwater harvesting for external use. Given the nature of the proposed end user in the Care home it is not considered suitable to utilise rainwater harvesting for internal use such as WC flushing.

3.9. The proposed development comprises impermeable areas as indicated on the plan in Appendix F including:

New Care Home Building	1640 m^2
Access Road and Car Parking	900 m^2
Hardstanding	303 m^2
Total Impermeable Area	**2843 m^2**

3.10. It is proposed to limit the discharge from site to the Greenfield runoff rate. From Appendix D it can be seen that the greenfield runoff rate from the site is 0.5l/s for 1:1 year event. It is proposed to use a discharge rate of 1l/s to minimise risk of blockages.

3.11. This approach would limit the discharge from site into the existing watercourse to minimise risks associated with flooding. This strategy would follow the hierarchy for disposal of surface water.

3.12. The attenuation storage will be designed to accommodate a 1:100 year event over a range of storm durations with a 40% allowance for climate change. It is proposed to utilise permeable surfaces to the car park and access road. This will be designed to provide the attenuation storage minimum 300mm subbase with 30% void ratio. Further attenuation will be provided via attenuation crates below the car park. A copy of the proposed drainage layout with required attenuation is shown in Appendix G. A copy of the supporting attenuation calculations is shown in Appendix H.

3.13. The discharge from site will be restricted with a vortex flow control device positioned on a manhole adjacent the attenuation tank. Refer to Drainage layout in appendix G.

3.14. To mitigate risks associated with contamination a silt interceptor will be installed prior to discharge into the attenuation unit. Details of the interceptor are shown on the proposed drainage layout in appendix G.

3.15. To deal with the residual risk of blockage to all onsite drainage features, the developer and management company will ensure maintenance of their respective drainage system in line with the manufacturers' recommendations by the production of a Maintenance Management Plan. This will ensure that over the

lifetime of the proposed development the drainage system will be properly maintained to ensure proper functionality. A schedule of proposed maintenance is shown below and on the proposed drainage layout in Appendix G.

Spalding - Maintenance Schedule					
Item	Visual Inspection	Cleanse / De-sludge	CCTV Survey	Responsibility	Comments
Surface Water Drainage System (pipework, chambers etc.)	1 years	10 years	10 years	Building Owner	Cleansing to be carried as necessary
Gullies / Channels / Rainwater Stacks	Monthly	1 years	N/A	Building Owner	Cleansing to be carried as necessary
Petrol interceptor: Camber and Alarm	Monthly	1 years	N/A	Building Owner	Maintenance in accordance with manufacturer's instructions
Attenuation Unit	1 years		5 years	Building Owner	Cleansing to be carried as necessary in line with manufacturers recommendations
Vortex Flow Control	Monthly	1 years	N/A	Building Owner	Cleansing to be carried as necessary
Permeable Tarmac Paving	1 years	Swept' clean of debris every 2 years	N/A	Building Owner	Jetwash or suction road sweep permeable tarmac as performance levels reduce
Permeable Block Paving	1 years	Swept' clean of debris every 2 years	N/A	Building Owner	Lift blocks and removed sand bedding and replace and re-bed paving- refer to individual manufacturers recommendations.

3.16. It is recommended that the attenuation tank, interceptor, discharge point and vortex flow control device is constructed early in the construction project to provide a drainage point for any surface water arising during construction.

4. FOUL DRAINAGE STRATEGY

4.1. There is an existing Anglian Water foul sewer crossing the rear of the site. As part of the proposed works this sewer will be diverted around the proposed building and provide connection points for the proposed drainage. There is sufficient fall on the existing drain to allow diversion with a gradient of 1:64.

4.2. It is proposed to connect the care home foul drainage via gravity connection into the Anglian sewer network. A copy of the proposed foul drainage layout is shown in Appendix G.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1. Given the nature of the ground conditions and the failed infiltration test results it is proposed to restrict the surface water discharge from site via an attenuated solution discharging into the existing watercourse along the East boundary.

5.2. The attenuation system should be designed to accommodate 1 in 100 year rainfall event with a 40% allowance for climate change. The attenuation storage is provided by storage within the subbase of the permeable access road and car parking areas and storage crates installed within the car parking area.

5.3. A controlled outflow rate of 1l/s is proposed which is above the 0.5l/s greenfield rate but is considered suitable to prevent the risk of blockages.

5.4. A preliminary surface water drainage layout is shown in Appendix G. This design will ensure will ensure no flooding occurs in a 1 in 100 peak rainfall event. These calculations include a 40% allowance for climate change. Refer to calculations in Appendix H.

5.5. Surface water should pass through a silt interceptor prior to entering the attenuation unit to ensure management of contamination prior to discharge into the ditch.

5.6. It is proposed to use rainwater harvesting for external use. Given the nature of the proposed end user in the Care home it is not considered suitable to utilise rainwater harvesting for internal use such as WC flushing.

5.7. The proposed surface drainage solution should be approved by the local authority prior to commencing any drainage works on site.

5.8. Attenuation tank, vortex flow control and interceptors are to be installed and maintained in line with manufacturer's recommendations. A copy of the proposed maintenance schedule is shown in section 3 and on the proposed surface water drainage layout in Appendix F and further details in Appendix H

APPENDIX I

SURFACE WATER MAINTENANCE MANAGEMENT PLAN

MAINTENANCE MANAGEMENT PLAN

All proposed sewers for the development will be maintained by a management company set up by HC One.

Cellular Storage Crates

The ongoing maintenance activities for below ground cellular storage crates are detailed below.

Maintenance Activity	Remedial Action	Inspection Frequency
Cleaning catchpits prior to cellular storage crates	Check, clean and empty catchpits as required.	Typically annually or as required
CCTV inspection of crates	Should any blockage occur within the surface water drainage system, the cellular storage crates may require inspection.	As required, should a blockage occur

Conventional Surface Water Drainage Features

The maintenance of all drainage features serving the development will be maintained by HC One. Ongoing maintenance activities for this infrastructure are detailed below.

Maintenance Activity	Action	Frequency
Check gully pots, linear drainage channels and catchpits	Check, clean and empty gully pots and catchpits as required to remove debris and sediment	Typically bi-annually or as required
Check manholes and inspection chambers	Inspect manholes and inspection chambers for any signs of blockages. Clean, jet and empty as required	Typically annually or as required
CCTV survey and jetting of drains	Check the integrity of drains, jet and clean as required. Remove collected debris as required	Typically annually or as required
Hydrobrake chambers	Check and remove any silt build up or blockages in accordance with the Manufacturers recommendations	Typically biannually or as required

Records

A service log will be maintained which will include details of all scheduled maintenance required. Logs will be incorporated that record when checks were carried out and whether

any actions are deemed necessary. If actions are required, a breakdown of the maintenance measures undertaken or in progress will be logged along with the date when the action was or is to be scheduled.

Records will be maintained by the management company for a minimum period of 5 years.