HAYES HIGGINS PARTNERSHIP
CHARTERED ENGINEERS • PROJECT MANAGERS

Civil Engineering Services Report

For

Development at Stillorgan Library

St. Laurence's Park, Stillorgan, Co. Dublin

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Revision	Status	Author	Reviewed By	Approved By	Issue Dates
P	Planning (Part 8)	MCE	KH	RL	13.11.18
P1	Planning	MCE	KH	RL	01.02.19
P1	Planning	LM	RL	RL	06.07.20

1. Introduction

Hayes Higgins Partnership has been commissioned to prepare a Civil Engineering Services Report for the proposed development at Stillorgan Library, St. Laurence's Park, Stillorgan, Co. Dublin.

This report was compiled after reviewing the available information on drainage and water supply, reviewing the OPW flood maps and other available information from public bodies. It contains information on the design of the surface water and foul drainage systems to be constructed for the proposed development.

The design of both the surface water and foul drainage systems has been carried out in accordance with the following:

- The Greater Dublin Regional Code of Practice for Drainage Works
- Technical Guidance Document H of the Building Regulations
- The Greater Dublin Strategic Drainage Study (GDSDS)
- DOE Recommendations for Site Development Works for Housing Areas
- BS 8301:1985, Code of practice for Building Drainage
- BS EN 752 External building drainage
- OPW The Planning System and Flood Risk Management
- Irish Water Code of Practice and Standard Details (Water & Wastewater)

The existing surface water sewers are to be diverted as shown on 2HP drawing 17D102-01. The proposed surface water drainage system is a combination of permeable paving, porous asphalt and a gravity feed drainage system discharging to a modular attenuation system on site. The surface water system is designed to take the runoff generated by a 1 in 100 year storm event (+20%). The attenuation tank will be connected to the diverted line as shown, with a hydrobrake to limit discharge to 3.2 l/s.

The existing foul sewers are to be diverted as shown on 2HP drawing 17D102-01. The foul drainage system for the proposed development is a gravity feed system within the site falling to the diverted line as shown.

2. Proposed Site

The site in question is located at St. Laurence's Park, Stillorgan, Co. Dublin. The existing site consists of unoccupied duplex houses and the existing Stillorgan Public Library. The existing surface and foul drainage lines will be diverted to suit, as shown on the proposed plans. The proposed site measures approximately 6,465 m^2.

The site is bound by the Stillorgan Leisureplex to the West, lower Kilmacud Road to the South, Stillorgan Road (N11) to the East, and St. Laurence's Park to the North. The topography of the site shows a decrease in level of the surrounding roads falling from North to South. However, due to its previous development, the site itself remains fairly level and at a higher elevation than the roads. At the East and South road boundaries, the elevation falls rapidly. Proposed on the site are two apartment blocks, one ranging in height between four and nine storeys and the other comprised of four storeys, and a two-storey public library. A copy of the site survey drawing is included in Appendix C. The apartments and library will be accessed from the existing road directly via the proposed carpark along the Eastern boundary. Residents will have allocated parking spaces located on the ground floor of the main block of apartments.

3. Surface Water Drainage

Local Authorities require that all developments must include a sustainable urban drainage system, SuDS.

Extensive green roofing will be implemented to the flat roofs throughout to mitigate runoff. A combination of permeable paving, porous asphalt, and a gravity feed system discharging to a modular attenuation system connected to the diverted line, via a hydrobrake limiting discharge to 3.2 L/s, are to be used to dispose of the surface water from the developed site. Based on this this flow rate and the site hard standing the required volume for the attenuation tank is 130.2m^2. The allowable flow rate has been calculated based on SAAR and SOIL data specific.

The roadway and carpark area will be formed with porous asphalt and the footpaths will be constructed using permeable paving allowing infiltration of the surface water directly to the ground. Given no infiltration is assumed, the subbase of the permeable paving and porous asphalt is designed to store the run-off generated by storm events.

The gravity feed surface water system will serve the roofs on site. The total impermeable surface area is 2280 m^2, including the roofs of the two apartment blocks and the library. Refer to Sketch SK-17 which shows the relevant proposed site areas contributing to the interception and treatment volume storage and the attenuation calculations included. Surface water sewers will fall by gravity to an attenuation system located in the green area to the West of the larger apartment block. The required storage volume is 136.6 m^3 to retain the on-site runoff. To alleviate any possible risk of flood the storage is designed for a 1 in 100 year storm (+20%). A 20% increase in runoff due to global warming is included as per "Greater Dublin Regional Code of Practice for Drainage Works" and the "GDSDS". Refer to Stormtech calculation sheet showing calculation for proposed tank size and drawing 17D102-05 showing the full details of the proposed attenuation system.

The attenuation system will discharge into the diverted line on site. The existing surface water sewer on Lower Kilmacud Road is a 300mm diameter pipe that falls downslope and we do not anticipate any capacity problems. Drawings include dimensions to demonstrate that all infiltration SuDS proposals, including the attenuation tank, have a 5m separation distance from building foundations. A penstock will be provided in the hydrobrake chamber.

The surface water drains have been designed in accordance with BS EN 752, Code of Practice for Drainage Outside Buildings. Details of the proposed surface water drainage system are shown in Hayes Higgins Partnership drawing within Appendix A (including plans, longitudinal sections, and details) and calculations within Appendix D.

4. Foul Water Drainage

The foul drainage system has been designed in accordance with Irish Water Code of Practice and Standard Details for Wastewater, BS 8301:1985, Code of Practice for Building Drainage and the current Building Regulations.

The foul drainage system for the development is a gravity feed system falling to the diverted line on site via a 225mm pipe. The existing foul drainage will be diverted in the manner proposed in the Hayes Higgins drawings. The development will not result in a significant increase in foul discharge (peak flow of 2.79 l/s) from the site on the public sewer and we do not anticipate any capacity problems.

The main foul sewers in the proposed development are to consist of 225mm diameter uPVC pipes with fall 1/150 chosen throughout to minimise the risk of blockages and to aid maintenance. Based on the 225mm diameter pipes with a 1:150 fall, the design flow is calculated as 37.2 l/s. A roughness coefficient (ks) of 1.5mm is applied to the design of all pipes.

The drawings included with the planning application show the proposed foul drainage layout. Details of the proposed foul sewer are shown in Hayes Higgins Partnership drawing within Appendix A (including plans, longitudinal sections, and details) and calculations within Appendix E.

5. Water Supply System

There is an existing 3 in. diameter Cast Iron public watermain located along the existing St. Laurence's Park road between the existing public library and existing houses. This line will be removed to the site boundary and a 100mm diameter HDPE watermain used to serve this site.

In accordance with requirements air valves and scour valves will be provided around the site as necessary. Hydrants will be provided as directed by the Fire Safety Certificate and Technical Guidance Document B of the Building Regulations 2006. Water saving devices including aerated taps and low water usage appliances will be used in the proposed development in accordance with best practice. The water supply system has been designed and will be installed in accordance with Irish Water Code of Practice and Standard Details for Water.

The proposed watermain layout and details are shown on Hayes Higgins Partnership drawing within Appendix B.

6. Flood Risk Assessment

Initially a desktop flood risk assessment was undertaken to identify possible sources of flooding and the risk posed to the development, and separately the risk posed to surrounding areas because of the development. A number of sources of information were reviewed including the OPW's websites, www.floodmaps.ie and www.floodinfo.ie, and Appendix 13 of Dún Laoghaire-Rathdown County Development Plan 2016-2022.

External Sources

1. Coastal – the site is situated far enough away from the sea and at a higher elevation than the surrounding roads to the south and east not to be subjected to coastal flooding.
2. Fluvial – the OPW website and Appendix 13 of the County Development Plan identify the road junction at the southeast corner of the site within the low probability zone (0.1% AEP) of fluvial flooding. The road level at this junction lies at approximately 46.8m OD. The lowest finished floor level for the proposed development lies at 49.0m OD and as such deemed not to be subjected to fluvial flooding.
3. Pluvial – the public surface water sewer runs from North to South along Stillorgan Road, the Eastern boundary of the site, and east to west along the lower Kilmacud Road, the southern boundary of the site. Blockage of these sewers would result in flooding on the roadways – resulting floodwater would flow towards the road junction at the southeast corner of the site. The road level at this junction lies at approximately 46.8m OD. The lowest finished floor level for the proposed development lies at 49.0m OD. As such the proposed development is deemed not to be subjected to pluvial flooding from external sources.
4. Groundwater Flooding – Groundwater level was encountered at 1.4 m below ground at the northern end of the site, and at 3.8 m below ground at the southern end. The groundwater level slopes towards the Southeast corner of the site. A rise in groundwater would firstly result in flooding to road junction, which is at a lower level than the proposed ground floor level.

The OPW flood mapping website, www.floodmaps.ie has been reviewed, and from the information contained in this report it is evident that the site has not been subjected to flooding during previously reported flooding events. As such it is reasonable to assume there is no risk to the proposed development resulting from flooding off-site.

Internal sources

On site surface water is dealt with via natural attenuation of the landscape, through permeable paving and porous asphalt, appropriate finished floor levels, extensive green roofs to the roof areas throughout and a modular attenuation system designed to store runoff from a 1 in 100 year storm (+20%) with hydrobrake limiting discharge to 3.2 l/s. As such the proposed development is deemed not to be subjected to pluvial flooding from internal sources.

Due to all of these factors the risk of flooding is deemed to be minimal. Subsequent to the desktop review a site specific flood risk assessment was undertaken by IE Consulting. The assessment confirmed as found in the desktop review that the flood risk to the development is low. Refer to IE Consulting Site Specific Flood Risk Assessment report contained in Appendix H.

7. Services Design Summary

The proposed Surface water drainage system has been set up so as to ensure that adequate self-cleansing velocities are obtained, in accordance with the Building Regulations, and comply in full with the Greater Dublin Regional Code of Practice for Drainage Works. Similarly, the proposed Foul drainage system has been set up so as to ensure that adequate self-cleansing velocities are obtained for partial flows under design loading, in accordance with the Building Regulations and Irish Water Code of Practice and Standard Details for Water & Wastewater.

Appendix A – Proposed Drainage Layout

Appendix B – Proposed Watermain Layout

Appendix C – Site Survey

Appendix D – Surface Water Calculations

Appendix E – Foul Water Calculations

Appendix F – Flood Map Report

Appendix G – Site Investigation Report

Appendix H – Site Specific Flood Risk Assessment