



**HAYES HIGGINS PARTNERSHIP  
CHARTERED ENGINEERS • PROJECT MANAGERS**

## **Civil Engineering Services Report**

For

**ORCHARD GATE SHD**

Units 64 & 65, Cherry Orchard Industrial Estate

2nd Floor, The Glass House, 11 Coke Lane, Smithfield, Dublin 7.

Tel: +353 (0)1 661 2321 Email: [admin@hayeshiggins.ie](mailto:admin@hayeshiggins.ie)

Web: [www.hhp.ie](http://www.hhp.ie)



# Contents

1. Introduction
2. Proposed Site
3. Surface Water Drainage System
4. Foul Drainage System
5. Water Supply System
6. Flood Risk Assessment
7. Planning Authority's Opinion on Proposed Development
8. Services Design Summary

Appendix A – Proposed Drainage & Watermain Layout

Appendix B – Site Survey

Appendix C – Surface Water Calculations (Attenuation, Greenfield run-off, MET Eireann rainfall)

Appendix D – Foul Water Calculations

Appendix E – Flood Map Report

Appendix F – Irish Water Confirmation of Feasibility & Statement of Design Acceptance

Appendix G – SuDs Matrix Document

Appendix H – Site Investigation

Appendix I – Response to Report of the Planning Authority (SDCC Drainage Comments)



## DOCUMENT CONTROL SHEET

|              |                                    |   |    |     |      |   |   |   |            |
|--------------|------------------------------------|---|----|-----|------|---|---|---|------------|
|              | <b>Client</b>                      | AAI Palmerstown Ltd.  |    |     |      |   |   |   |            |
|              | <b>Project Title</b>               | Orchard Gate SHD<br>Units 64 & 65, Cherry Orchard Industrial Estate |    |     |      |   |   |   |            |
|              | <b>Project Ref.</b>                | 20D018  |    |     |      |   |   |   |            |
|              | <b>Document Title</b>              | Planning Report   |    |     |      |   |   |   |            |
|              | <b>Document No.</b>                | 20D018-PR 01  |    |     |      |   |   |   |            |
|              | <b>This Document<br/>Comprises</b> | DCS   | PD | TOC | Text | - | - | - | Appendices |
|              |                                    | 1   | -  | 1   | 3    |   |   |   | 9          |
| <b>Check</b> |                                    |   |    |     |      |   |   |   |            |

| Revision | Status   | Author | Reviewed By | Approved By | Issue Dates |
|----------|----------|--------|-------------|-------------|-------------|
| P        | Planning | LM     | DH          | DH          | 20.04.21    |
| P1       | Planning | LM     | DH          | DH          | 13.12.21    |
|          |          |        |             |             |             |
|          |          |        |             |             |             |



## 1. Introduction

Hayes Higgins Partnership has been commissioned to prepare a Civil Engineering Services Report for the proposed development Orchard Gate SHD at Units 64 & 65, Cherry Orchard Industrial Estate.

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 proposed surface water drainage system is a combination of SuDs mechanisms including permeable surfaces, tree pit / bio retention landscaped areas, green roofing and gravity feed drainage system discharging to a stone storage 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 site drainage will be connected to the existing surface water system (on the Cherry Orchard Industrial Estate road south of the site on site), with a hydrobrake to limit discharge to 2 l/s.

The foul drainage system for the proposed development is a gravity feed system within the site falling to the existing foul drainage system on the Cherry Orchard Industrial Estate road south of the site on site.

## 2. Proposed Site

The site in question is located at the former warehouse facility at units 64 & 65, Cherry Orchard Industrial Estate. The site presents a gateway location at the Western junction of Kennelsfort Road Upper and the Eastern industrial estate. The existing buildings on the site will be demolished and the existing surface & foul drainage and watermain lines on the site will be grubbed up and removed. The proposed site measures approximately 0.763ha.

The site is bound by the Kennelsfort Road Upper to the West, Cherry Orchard Industrial Estate Road to the South. There are retail units to the northern boundary of the site and warehouse units to the east. The topography of the site shows a decrease in level of the surrounding roads falling from South to North along Kennelsfort Road Upper. However, due to its previous development, the site itself remains fairly level and the interfaces between the site and the surrounds are relatively level. At the East boundary, the elevation rises from the site to the road and at the South road boundaries the site is similar level to the road.

Proposed on the site are four apartment blocks, ranging in height between five and nine storeys. The proposal is for 144 apartments and associated facilities with a mix of one bedroom apartments and two bedroom apartments. A copy of the site survey drawing is included in Appendix B.



### 3. Surface Water Drainage

Local Authorities require that all developments must include a sustainable urban drainage system, SUDS. A combination of SuDs mechanisms will be utilised on this site. This includes; permeable surfacing with stone storage, bio retention landscaped areas and tree pits, stone storage systems fed by slot drains on the podium slab and green roofing. Based on the combined approach an attenuation tank is not required. All possible SuDs mechanisms have been explored, refer to the justification matrix for SuDs in Appendix G. Given the nature of the site with the building layout, podium slab and limited open space at ground level it is not feasible to utilize swales, ponds etc. The site investigation indicates that infiltration is not available. On this basis the subbase of the porous asphalt is designed to store the run-off generated by storm events. Green roofs have been provided on the apartment blocks for the most part.

To alleviate any possible risk of flood the on-site surface water 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". Site specific MET Eireann Rainfall data has been used in the surface water drainage and attenuation design. The surface water will be dealt with and stored on site and a connection to the existing surface water drainage system will be used to dispose of the surface water from the developed site. To provide the required attenuation volume the stone sub bases have been designed as storage. A connection to the public surface water system (750mm dia. Surface water pipe) on the Cherry Orchard Industrial Estate road south of the site via a hydrobrake limiting discharge to 2 L/s. Site specific Greenfield runoff rate has been used in the calculations, refer to calculations in Appendix C indicating Qbar run off rate and SAAR and SOIL values for the site. Based on this this flow rate and the site hard standing the required volume for each area has been calculated, see summary table below and detailed calculations in Appendix C.

Below see table outlining a breakdown of all proposed surface types, surface areas and corresponding surface run off coefficients for the site and table for buildup depths of stone based on requirements. The surface water strategy for each hard standing area is outlined below.

- The stone storage on the podium will be used to deal with the surface water in this area. A stone paving with falls to slot drains and a stone sub base build up will be provided.
- The external perimeter path will be dealt with via falls on the hard standing area to the tree pits and bioretention rain landscaped areas at street level
- The entrance road surfacing will take the form of porous asphalt and will provide storage for the run-off from the road, car park area and the roof area (450mm depth)
- The surface run-off from the car park will be connected to the stone buildup in the porous asphalt entrance road via a petrol interceptor (Kingspan NSBP003). The proposed car park drainage layout for the development and the location of petrol interceptor is indicated on the drainage layout. The car park drainage will consist of a standard concrete finish car park slab laid to falls to surface water gullies and below slab 150mm diameter pipes.

## Surface type / Attenuation

| Area                            | m <sup>2</sup> | Impermeability factor  | Run-off area (m <sup>2</sup> ) | Attenuation needed for 1/100 + 20% | Depth of stone (based on 37% voids)    |
|---------------------------------|----------------|--|--------------------------------|------------------------------------|--|
| Roof general - impermeable area | 709            | 1.0  | 709                            | All roofs 67m <sup>3</sup>         | 243mm                                  |
| Green roof                      | 2409           | 0.5  | 1205                           |                                    |  |
| Permeable paving podium         | 873            | 0 - take stone as storage no infiltration                      | 873                            | 36m <sup>3</sup>                   | 111mm                                  |
| Porous asphalt entrance road    | 744            | 1.0 - take stone as storage no infiltration                    | 744                            | 30m <sup>3</sup>                   | 109mm                                  |
| Site perimeter hardstanding     | 1185           | 1.0 - layers of free draining soil and gravel                  | 1185                           | 61m <sup>3</sup>                   | 139mm (assuming typical stone buildup) |
| Car park - impermeable          | 2005           | Take as 0.33 carpark is covered with only one vehicle entrance | 668                            | 27m <sup>3</sup>                   | 98mm                                   |

## Stone Build-up

| Area                         | Area m <sup>2</sup> | Attenuation volume m <sup>3</sup> | Volume of stone needed (baes on 37% voids) | Area of stone storage | Depth of stone m |
|------------------------------|---------------------|-----------------------------------|--|-----------------------|------------------|
| Apartment roof A,B,C,D       | 1914                | 67                                | 181  | 744                   | 243              |
| Permeable paving podium      | 873                 | 36                                | 97   | 873                   | 111              |
| Porous asphalt entrance road | 744                 | 30                                | 81   | 744                   | 109              |
| Site perimeter hardstanding  | 1185                | 61                                | 165  | 1185                  | 139              |
| Car park - impermeable       | 668                 | 27                                | 73   | 744                   | 98               |

There is an existing 225mm public surface water sewer traversing the site to the west. 2HP confirm a wayleave will be registered with the Property Registration Authority in favour of South Dublin County Council in relation to the existing sewer where it traverses the site. The extents of the wayleave will be agreed with South Dublin County Council. A minimum clear setback distance of 3m will be provided between all structures and trees and the centreline of the surface water sewer.

There will be a complete separation of the foul and surface water drainage systems within the site, both in respect of installation and use. The surface water drains are designed in accordance with BS EN 752, Code of Practice for Drainage Outside Buildings.

### 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 and Irish Water Code of Practice.

The foul drainage system for the development is a gravity feed system falling to the public foul drainage system (225mm dia. foul water pipe) on the Cherry Orchard Industrial Estate road south of the site on site. The development will not result in a significant increase in foul discharge 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 1/170 chosen throughout to minimise the risk of blockages and to aid maintenance. Based on the 225mm diameter pipes with a 1:170 fall, the design flow is calculated as 34.94 l/s. A roughness coefficient (ks) of 1.5mm is applied to the design of all pipes.



A Confirmation of Feasibility and Statement of Design Acceptance for the development has been received from Irish Water, refer to letter contained in Appendix F. Irish Water have confirmed the development is feasible without upgrade by Irish Water. 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. Calculations are provided within Appendix D.

## 5. Water Supply System

There is an existing 150mm diameter asbestos water main on the Cherry Orchard Industrial Estate road south of the site on site. A looped 100mm diameter HDPE watermain will be installed on site with a new connection to this public water main.

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. Confirmation of Feasibility and Statement of Design Acceptance for the development has been received from Irish Water, refer to letter contained in Appendix F. Irish Water have confirmed the development is feasible without upgrade by Irish Water.

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

## 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](http://www.floodmaps.ie) and [www.floodinfo.ie](http://www.floodinfo.ie).

### External Sources

The site is situated far enough away from the sea not to be subjected to coastal or tidal flooding. The OPW flood mapping website, [www.floodmaps.ie](http://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. The surrounding land slopes away from the site. As such it is reasonable to assume there is no risk to the proposed development resulting from flooding off-site.

### Internal sources

It is intended that all surface water run off generated by the 1in100 year storm will be dealt with via attenuation tank storage and porous surfacing. An allowance has been made for a 20% increase in runoff due to global warming, as per the "Greater Dublin Strategic Drainage Study" recommendations. As such the proposed development is deemed not to be subjected to pluvial flooding from internal sources.

Due to all these factors, there is no material flood risk on the site.



## **7. Planning Authority's Opinion on Proposed Development**

2HP have considered all queries raised by South Dublin County Council in their Opinion on Proposed Development. On receipt of these queries 2HP reviewed the drainage design strategy and updated the design approach in line with queries raised. 2HP issued a response letter to South Dublin County Council addressing the queries raised and detailing the updated design. The above details on the foul and surface water drainage are reflective of the updated design and response issued to South Dublin County Council. The response issued is contained within Appendix I.

## **8. Services Design Summary**

The proposed Surface water drainage system has been set up to ensure that adequate self-cleansing velocities are obtained, in accordance with the Building Regulations, and to comply fully with the Greater Dublin Regional Code of Practice for Drainage Works. Similarly, the proposed Foul drainage system has been set up 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.