



Engineering Assessment Report

Cherry Orchard Point – Phase 2 of Proposed Development at Sites 4 and 5, Park West Avenue, Dublin 10

January 2025

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Comments

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- A. Uisce Éireann Confirmation of Feasibility Letter (Masterplan Development)
- B. Uisce Éireann Confirmation of Feasibility Letter (Phase 2 Development)
- C. Greenfield Runoff Rate Calculation (Catchment 1)
- D. RoadPlan Stage 1 Road Safety Audit for Phase 2 Subject Development

1. Introduction

This engineering assessment report has been prepared by Waterman Moylan as part of the planning documentation for the proposed Phase 2 development of the Cherry Orchard Point masterplan development at Sites 4 and 5, Park West Avenue, Dublin 10.

This report assesses wastewater and surface water drainage, water supply infrastructure, and details the criteria used to design the proposed wastewater and surface water drainage, and for water supply.

The design of the above noted infrastructure has been undertaken in accordance with, and cognisant of, the following documents:

- Dublin City Council Development Plan (2022-2028).
- Park West & Cherry Orchard LAP (2019).
- Ground investigation details as per the Site Investigation Report.
- Site Specific Topographic Survey.
- Archer Heritage & Planning: Archaeological Testing Report.
- Uisce Éireann existing foul infrastructure maps.
- Uisce Éireann existing watermain infrastructure maps.
- Uisce Éireann Confirmation of Feasibility Letter.
- Uisce Éireann Statement of Design Acceptance.
- Uisce Éireann Code of Practice for Wastewater (July 202 Rev 2).
- Uisce Éireann Code of Practice for Water Infrastructure (July 2020 Rev 2).
- Uisce Éireann Wastewater Standard Details.
- Uisce Éireann Water Standard Details.
- Uisce Éireann QA Field Inspection Requirements Manual.
- Building Regulations Technical Guidance Document Part H.
- Dublin City Council's SuDS Design and Evaluation Guide.
- Dublin City Council's Green and Blue Roof Guide.
- Dublin City Council's SuDS Property Level Guide (2021).
- The SuDS Manual.
- Greater Dublin Strategic Drainage Study.
- DEHLG/OPW Guidelines on the Planning Process and Flood Risk Management.
- Greater Dublin Regional Code of Practice for Drainage Works.

2. Masterplan Lands

2.1 Cherry Orchard Point Site Location and Description

The subject masterplan development is comprised of 2 no. sites. Site 4 & Site 5 are bisected by Park West Avenue and lie to the west and east of this roadway respectively, as per the blue boundary lines indicated on Figure 2-1: Site Location Map (Source: Google Earth). The proposed Phase 2 Subject Site is located within Site 4 of the masterplan development.

Site 4 is bound to the west by the M50, to the south by the Dublin-Kildare rail line and the Park West & Cherry Orchard station, and to the east and north by Park West Avenue. Site 5 is bound to the west by Park West Avenue, the northwest by Cedar Brook Way, the northeast and east by Barnville Park, and to the south by the Dublin-Kildare rail line and the residential unit of 62 Barnville Park.

Site 4 is currently accessed via a secured gate from Park West Avenue. Site 5 is accessed via a similar arrangement from Cedar Brook Way.

The masterplan development is a 4-Phase development with Phase 1, 2, and 4 located on Site 4, and Phase 3 located on Site 5. The subject site for this assessment, Phase 2 of the multi-phase masterplan development is indicated by the red boundary line, also shown on Figure 2-1: Site Location Map (Source: Google Earth).

The overall masterplan development area as per the blue line boundaries is c. 13.02ha, with Site 4 being c. 11.41 ha and Site 5 being c. 1.61ha. The area of the subject application indicated by the redline boundary, including for works in the public domain, is 3.185ha (31,850m²).

For Site 4, the topographic survey of the area indicates that the low point of the site has a level of 55.70m OD. This is located on the eastern site boundary approximately 140m north of the junction of Park West Avenue and Cedar Brook Way. The remainder of the site generally slopes to this location owing to the embankments and subsequent site grading from the Dublin-Kildare Rail line to the south, M50 to the west, and approach road to the overpass on the M50 to the north. A local high point of the site has a level of 62.65m OD located at the northeast of Site 4.

Site 5 has a central high point with a level of 58.05m OD, and slopes outwards to all boundaries. The boundaries of Site 5 typically have levels between 54.80m and 56.00m, with the higher of these levels being located to the south of the site, adjacent to the retaining wall of the Park West Avenue Bridge over the rail lines.

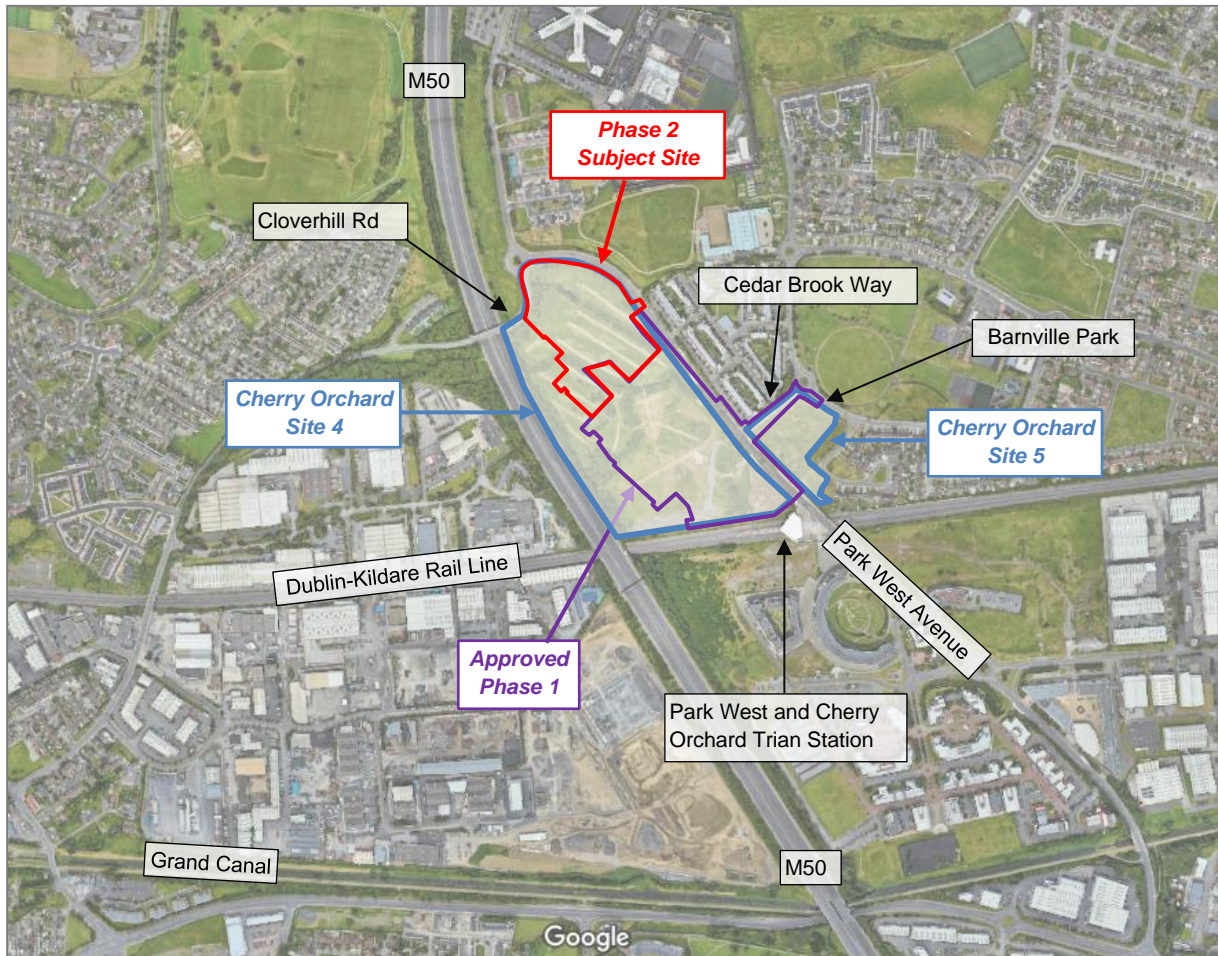


Figure 2-1: Site Location Map (Source: Google Earth)

Ordnance survey and topographic survey mapping indicates that Site 4 contains static ditches with no outfall. These ditches previously had hydrological connectivity and flow, which has been cut-off by the construction of the M50 to the east and the Cedar Brook housing development to the west. These ditches normally remain dry except in heavy rainfall events where water that is not percolated via the site's naturally grassed landscaping, would collect locally in these static ditches for infiltration to the groundwater table. Site 5 does not have any form of surface drainage network and conveys rainfall directly to the soils via its grassed landscape. There is potential during heavy rainfall events, that the ground may become saturated and unable to further infiltrate rainfall, which would then run from the surface, over the boundary and to the adjacent road networks to outfall to the storm drainage networks serving these roads. The sites are located in the catchment of the Blackditch stream, a tributary of the Camac River which has an ultimate outfall to the River Liffey at Heuston Station.

The project archaeologist, Archer Heritage Planning Ltd., have identified the ploughed out remains of a Fulacht Fia located centrally on site 4, adjacent to the convergence of 2 no. static ditches on their southern side. The archaeologist has recommended that the remains of the Fulacht Fia be preserved by record prior to further works being undertaken on site. Further detail is provided in the Archaeology Chapter of the Environmental Report - Addendum to Permitted Phase 1 Parent EIAR submitted as part of this planning application.

2.2 Topographical Details

The 2022 and 2024 Site Investigation Reports undertaken by Ground Investigations Ireland (GII), included as an appendix to the Preliminary Construction Environmental Management Plan submitted under a separate cover, has determined that Site 4 is combination of Greenfield and Brownfield, with evidence of fill material in the area of the site previously used as a construction compound. Site 5 is predominantly a brownfield site, with fill material found for the same reason.

For Site 4, the topographic survey of the area indicates that the low point of the site has a level of 55.70m OD. This is located on the eastern site boundary approximately 140m north of the junction of Park West Avenue and Cedar Brook Way. The remainder of the site generally slopes to this location owing to the embankments and subsequent site grading from the Dublin-Kildare Rail line to the south, M50 to the west, and approach road to the overpass on the M50 to the north. A local high point of the site has a level of 62.65m OD located at the northeast of Site 4.

Site 5 has a central high point with a level of 58.05m OD, and slopes outwards to all boundaries. The boundaries of Site 5 typically have levels between 54.80m and 56.00m, with the higher of these levels being located to the south of the site, adjacent to the retaining wall of the Park West Avenue Bridge over the rail lines.

Refer to Figure 2-2: Existing Site Topography of Masterplan Lands for an extract of the topographical survey of the development showing spot elevations throughout Sites 4 and 5.

It is noted that the existing low points of Site 4 are generally located along Park West Avenue on the east and southeast of the site, a secondary isolated low area within the Site 4 boundary is located centrally within the northern portion of the Phase 1 site (55.54m OD).

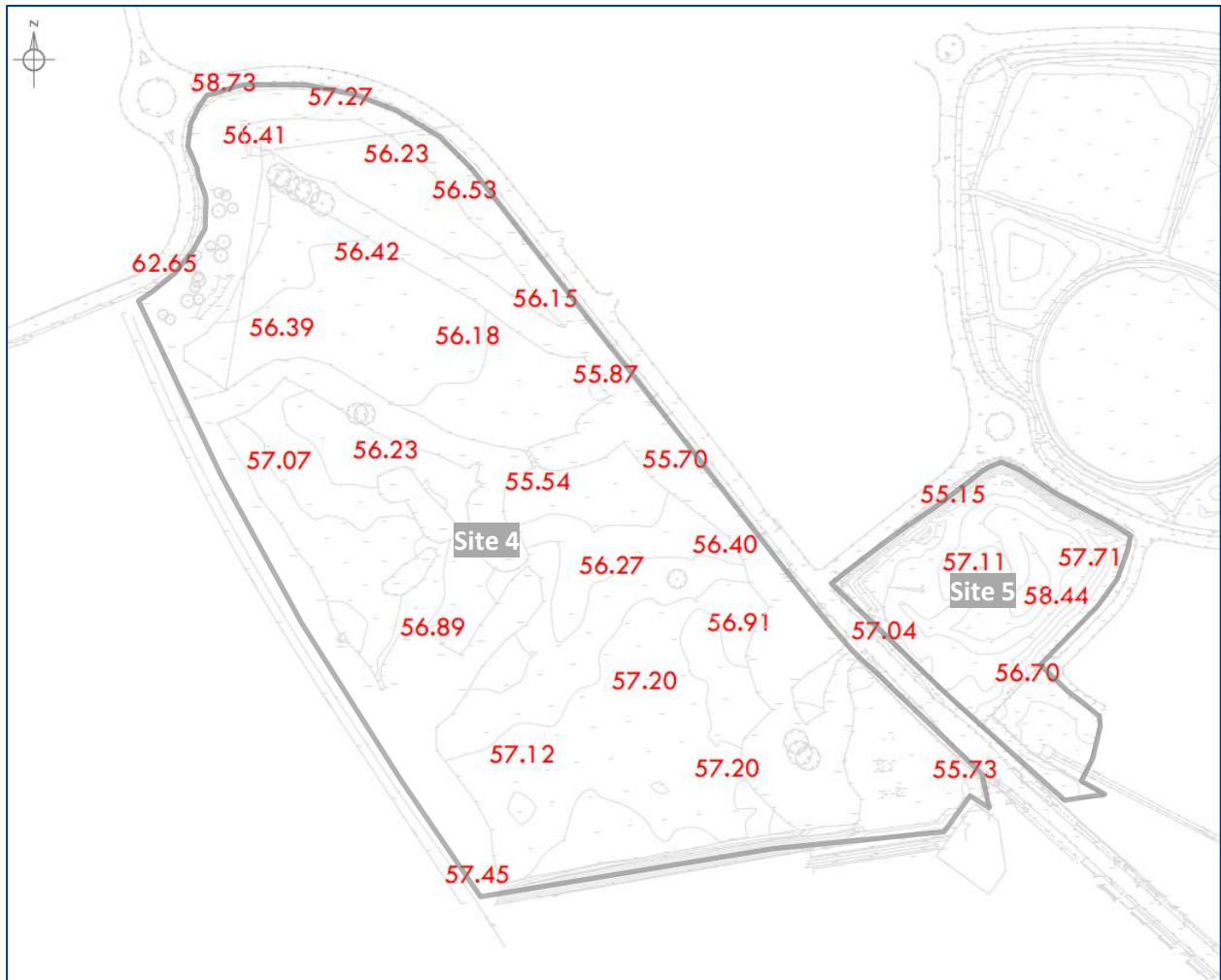


Figure 2-2: Existing Site Topography of Masterplan Lands

2.3 Site Investigation Details and Infiltration Rates

Site investigations for the masterplan lands (including the Phase 2 Subject Site) were undertaken in 2022 by Ground Investigations Ireland (GII), the technical Ground Investigation report was completed in November 2022, and the Waste Analysis Classification report was completed in October 2022. An updated site investigation report was undertaken by GII in July 2024 for the masterplan lands (including the Phase 2 Subject Site) with an updated Waste Analysis Classification Report completed in August 2024. The current 2024 reports will be referenced here within and are submitted as part of this application as an appendix to the Preliminary Construction Environmental Management Plan.

The scope of the works undertaken in the 2024 Site Investigation Report included the following:

- 118 no. Trial Pits undertaken to a maximum depth of 3.6m BGL
- 5 no. Soakaways undertaken to determine a soil infiltration value to BRE digest 365
- 6 no. Slit trenches undertaken to determine existing services.

- 5 no. Window Sample Boreholes undertaken to recover soil samples
- 33 no. Cable Percussion boreholes undertaken to a maximum depth of 4.0m BGL
- 14 no. Rotary Core Boreholes undertaken to a maximum depth of 10.1m BGL
- Geotechnical & Environmental Laboratory testing
- Report with recommendations

Trial Pits

The trial pits were excavated using a 8T, 13T tracked or JCB 3CX excavator at the locations shown in the exploratory hole location plan in Appendix 1 of the Site Investigation Report. Notes were made of any services, inclusions, pit stability, groundwater encountered, and the characteristics of the strata encountered and are presented on the trial pit logs which are provided in Appendix 2 of the Site Investigation Report.

Soakaway Testing

The soakaway testing was carried out in selected trial pits at the locations shown in the exploratory hole location plan in Appendix 1 of the Site Investigation Report. These pits were carefully excavated and filled with water to assess the infiltration characteristics of the proposed site. The pits were allowed to drain and the drop in water level was recorded over time as required by BRE Digest 365. The pits were logged prior to completing the soakaway test and were backfilled with arisings upon completion. The soakaway test results are provided in Appendix 4 of the Site Investigation Report.

Slit Trenches

The slit trenches were excavated using 3T tracked excavator at the locations shown in the exploratory hole location plan in Appendix 1 of the Site Investigation Report. The slit trenches were sampled, logged and photographed by a Geotechnical Engineer/Engineering Geologist prior to backfilling with arisings. Notes were made of any services, inclusions, pit stability, groundwater encountered, and the characteristics of the strata encountered and are presented on the slit trench records which are provided in Appendix 3 of the Site Investigation Report.

Window Sampling

The window sampling was carried out at the locations shown in the location plan in Appendix 1 of the Site Investigation Report using a Tecopsa SPT Tec 10 percussion drilling rig. The window sampling consists of a 1m long steel tube with a cutting edge and an internal plastic liner which is mechanically driven into the ground utilising a 50kg weight falling a height of 500mm. Geotechnical or environmental soil samples can be recovered from each of the liners following logging. The window sample records are provided in Appendix 5 of the Site Investigation Report.

Cable Percussion Boreholes

The Cable Percussion Boreholes were drilled using a Dando 2000 drilling rig with regular in-situ testing and sampling undertaken to facilitate the production of geotechnical logs and laboratory testing. The standard method of boring in soil for site investigation is known as the Cable Percussion method. Standard Penetration Tests were carried out in the boreholes. The results of these tests, together with the depths at which the tests were taken are shown on the accompanying borehole records of the Site Investigation Report. The cable percussion borehole logs are provided in Appendix 6 of the Site Investigation Report.

The rotary coring was carried out by a track mounted T44 Beretta rig at the locations shown on the location plan in Appendix 1 of the Site Investigation Report. The rotary boreholes were completed from the ground surface or alternatively, where noted on the individual borehole log, from the base of the cable percussion borehole where a temporary liner was installed to facilitate follow-on rotary coring. The rotary borehole logs are provided in Appendix 7 of the Site Investigation Report.

Soakaway Design

“At the locations of SA A, SA B, SA C, SA D, and SA E the water level dropped too slowly to allow calculation of ‘f’ the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.”

It is noted that the above referenced soakaway test locations refer to all 5 no. tests undertaken within the Masterplan Lands, 2 no. of which are located within the Phase 2 subject site, SA A and SA B.

Furthermore, the GII Site Investigation Report undertaken in 2022 contained similar findings regarding the infiltration rates of the Cherry Orchard Point Masterplan Lands, stating the following:

“Infiltration rates of $f = 7.303 \times 10^{-6}$ m/s, 6.95×10^{-6} m/s and 7.262×10^{-6} m/s respectively were calculated for the soakaway locations ST06, ST10, and ST11. At the locations of ST01, ST02, ST03, ST04, ST05, ST07, ST08, & ST09, the water level dropped too slowly to allow calculation of “f”, the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction.”

2.4 Proposed Masterplan Development

The masterplan development is a 4-Phase development to be built on Site 4 and Site 5. Each Phase is subject to its own planning permission application. Refer to Figure 2-4: Masterplan Development Phasing Layout for an illustration of the masterplan development layout.

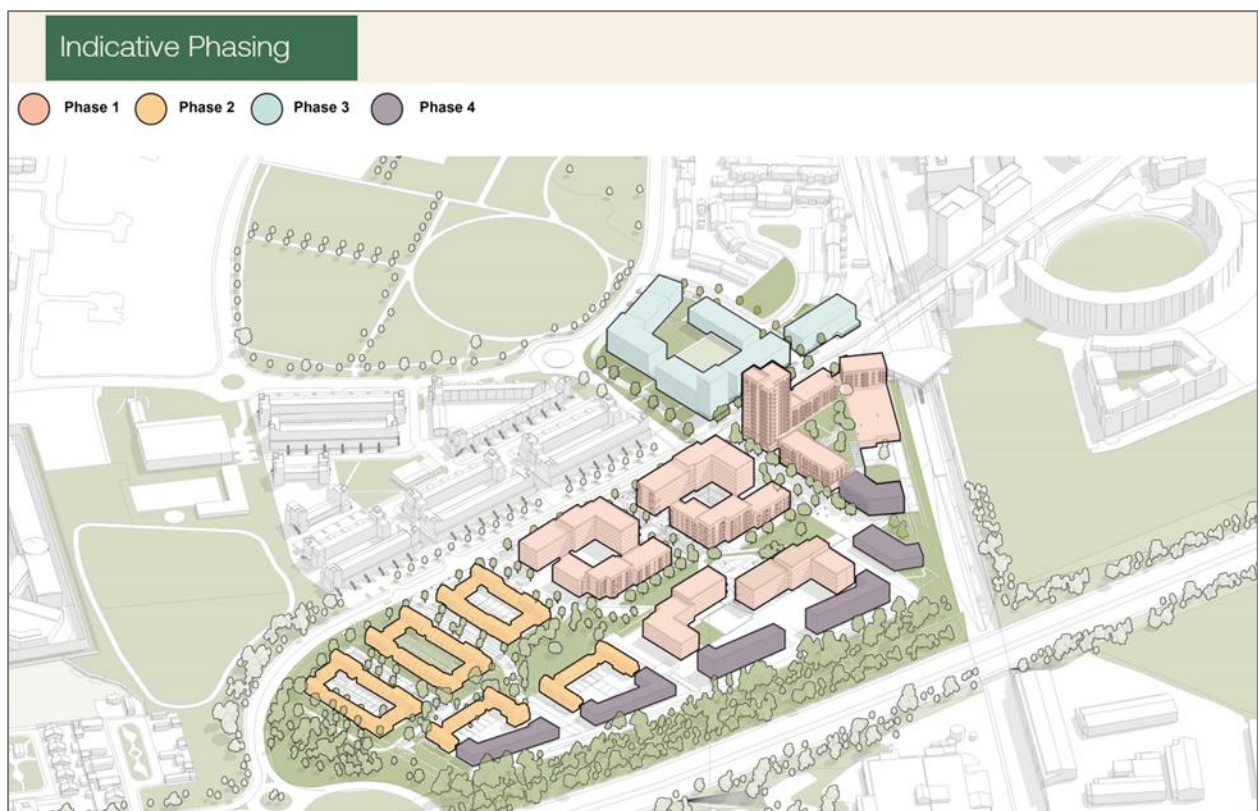


Figure 2-4: Masterplan Development Phasing Layout

A description of each of the 4-Phases is included below:

Approved Phase 1

Is a medium and high-density area located on Site 4 which will provide a total of 708 no. residential units ranging in size from studio to 3-bed apartments, a 2,523m² supermarket, a combined area of 373m² for retail over 7 units, a 672m² creche and 1,222m² of community spaces over 13 buildings. It is noted that

the trunk foul and surface water drainage, including attenuation storage, to serve phases 2, 3, & 4 are part-provided under the planning application submission for Phase 1.

Phase 1 of Cherry Orchard Point was approved in July 2024 under ABP Ref. ABP-318607-23.

Phase 2 (Subject Site)

The subject development, Cherry Orchard Point - Phase 2, is a low-density housing area located to the north of Site 4 and is proposed to contain 137 no. residential units comprising a mix of apartment/duplex units and houses.

The subject development, Cherry Orchard Point – Phase 2 will be referred to as the “Phase 2” development or subject site within this report.

Phase 3

Is located on Site 5, and comprises 254 residential units, 1,200m² of retail space, with community facilities to be confirmed.

Phase 4

Is located on Site 4 and will consist of the construction of commercial office space over 6 blocks with a total area of c. 16,310m².

3. Proposed Development

3.1 Subject Development Description and Location

The proposed Phase 2 development located on lands at Cherry Orchard, Dublin 10 (known as Development Site 4 in the Park West Cherry Orchard Local Area Plan 2019) is on a site of c. 3.185 hectares.

The Phase 2 Subject Site is bound by Cloverhill Road to the north, Cedar Brook Avenue and Park West Avenue to the east, the consented Phase 1 development (Bord. Ref: ABP-318607-23) to the south, and the M50 motorway to the west. The development will consist of the construction of a residential scheme containing 137no. residential dwellings (comprising 31no. 2-bedroom units, and 106no. 3-bedroom units) through a mixture of houses, duplex units and own-door apartments. The proposed development will include a new access road connecting to the entrance point at Park West Avenue as permitted under the Phase 1 scheme, new internal streets, landscaped public and communal open space, a new pedestrian connection to Cloverhill Road and all associated site and development works. The proposed development represents Phase 2 of the overall planned development for Development Sites 4 and 5 of the LAP lands. Phase 1 of the overall planned development was granted permission in July 2024 (Bord. Ref: ABP-318607-23). The proposed development (GFA of c. 13,280sqm) involves the construction of 137no. dwellings in a mix of houses, duplexes and own-door apartments ranging in height from 2 to 3 storeys comprising 31no. two-bed units (9no. two-bed three-person and 22no. two-bed four-person) and 106no. three-bed units (13,015 sqm total residential floor area), and all ancillary accommodation including bike and bin stores and ESB substation (265sqm total GFA). The proposed development also includes the provision of 2,133sqm landscaped public open space, in addition to 2,050sq.m of public open space as consented under the Phase 1 permission (Bord. Ref: ABP-318607-23).

The total public open space provided for Phase 2 totals 4,183 sqm (12.34% of the net site/development area (3,390ha) of Phase 2 lands). Communal open space for the duplex and apartment units is provided across three dedicated communal amenity areas (602sq.m in total area) with private open space to serve the proposed units to be delivered through a mixture of rear gardens and terraces.

The proposed development will also involve the provision of 141no. car parking spaces at curtilage and street level throughout the development, of which 7no. are accessible spaces and 71no. EV charging points (representing 50% of the total parking spaces). A total of 306no. bicycle parking spaces, of which 18no. are visitor spaces accommodated through a mixture of bike stores and external cycle parking stands. A total of 7no. motorbike parking spaces are also provided. Vehicular, pedestrian and cycle access routes to serve the proposed development are provided via the consented Phase 1 entrance to the east of the site along Park West Avenue with further connections provided to the north and to the south to the permitted Phase 1 scheme. Provision is also made for the installation of a signalised access junction with associated traffic lights and below ground infrastructure and the relocation of bus stop and shelter along Park West Avenue. The need to provide a signalised junction requires minor alterations to the entrance to the development including adjustment to the paving as previously permitted under the Phase 1 scheme (no further amendments to that permission are proposed under this application.) The proposed development also includes the provision of off-street cycle lanes along Park West Avenue that will provide direct connectivity to the Rail Station to the southeast and Cherry Orchard Park to the east.

The development will also provide for all associated ancillary site development works including site clearance, boundary treatment, associated public lighting, internal roads and pathways, bin and bike stores, ESB substation, hard and soft landscaping, play equipment, and all associated works and infrastructure to facilitate the development including connection to foul and surface water drainage and water supply.

Refer to Figure 3-1: Subject Site Location within Masterplan development for the location of the subject development.

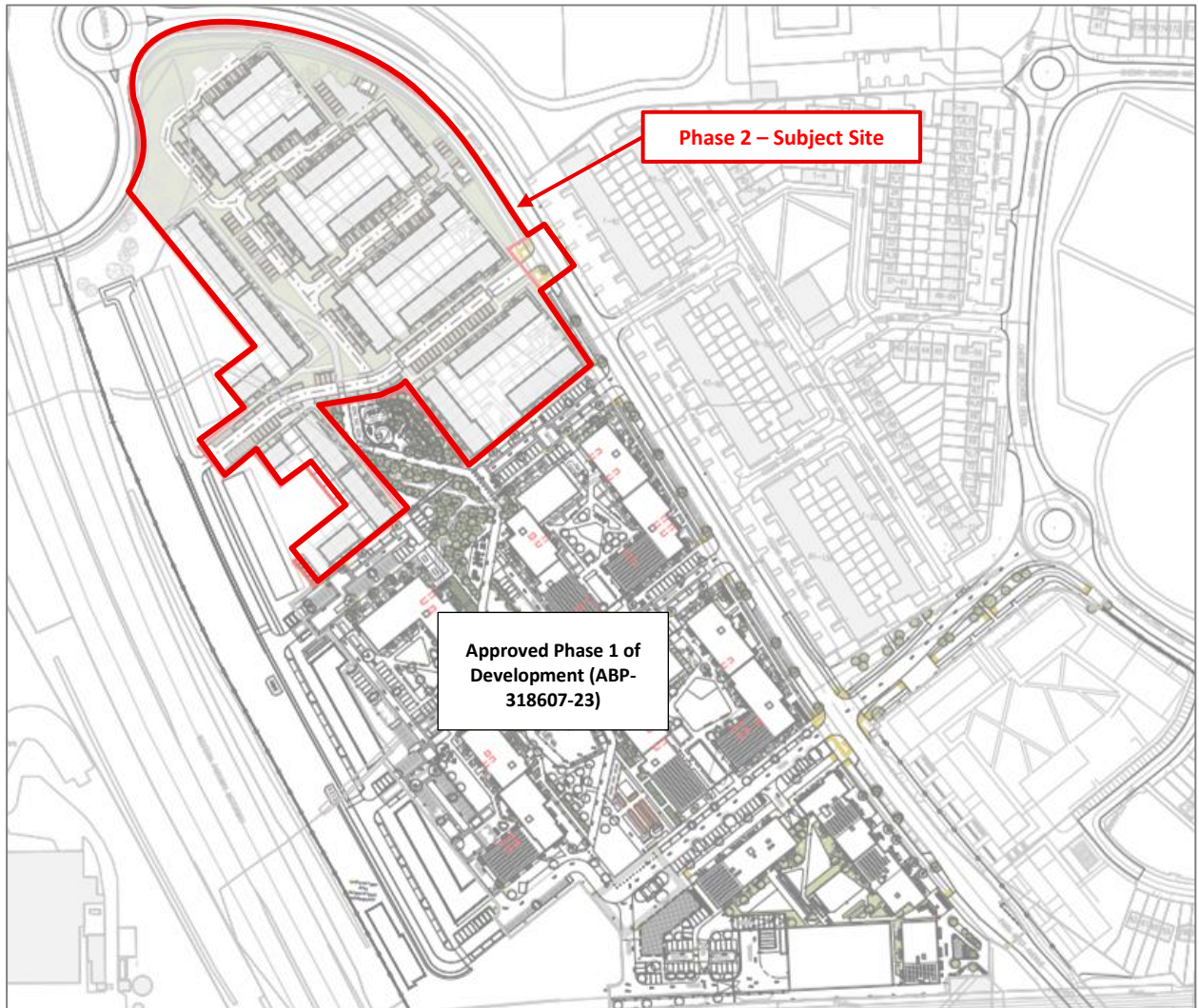


Figure 3-1: Subject Site Location within Masterplan development

A breakdown of the schedule of accommodation for the subject application is provided below.

Table 3-1: Phase 2 Schedule of Accommodation

Unit Type		Area sqm	No. of Units	Total Floor Area
2 Bed/ 4 Person House	HT A	81	13	1053
3 Bed/ 5 Person House - 2 storey	HT B	96	56	5376
3 Bed/ 5 Person House - 2 storey (end terrace)	HT B1	96	19	1824
3 Bed/ 5 Person House - 2 storey	HT C	106	13	1378
2 Bed/ 4P Own-Door Apt - mid terrace	Duplex A	73	6	438
2 Bed/ 3P Own-Door Apt (UD) - mid terrace	Duplex A (UD)	73	4	292
2 Bed/ 4P Own-Door Apt - end terrace/ corner	Duplex A1	73	3	219
2 Bed/ 3P Own-Door Apt (UD) - end terrace/ corner	Duplex A1 (UD)	73	5	365
3 Bed/5P Own-Door Duplex - end terrace/ corner	Duplex A2	115	8	920
3 Bed/5P Own-Door Duplex - mid terrace	Duplex A3	115	10	1150
Total			137	13015

The development includes all associated site works, undergrounding of overhead lines, boundary treatments, drainage, and service connections.

4. Foul Water Network

4.1 Existing Foul Water Network

The Masterplan Development sites are greenfield in nature in terms of foul water infrastructure, with no connection to the foul water network. Uisce Éireann network maps for the locality have been obtained and are extracted to Figure 4-1: Extract of Uisce Éireann Foul Water Network Map, below.

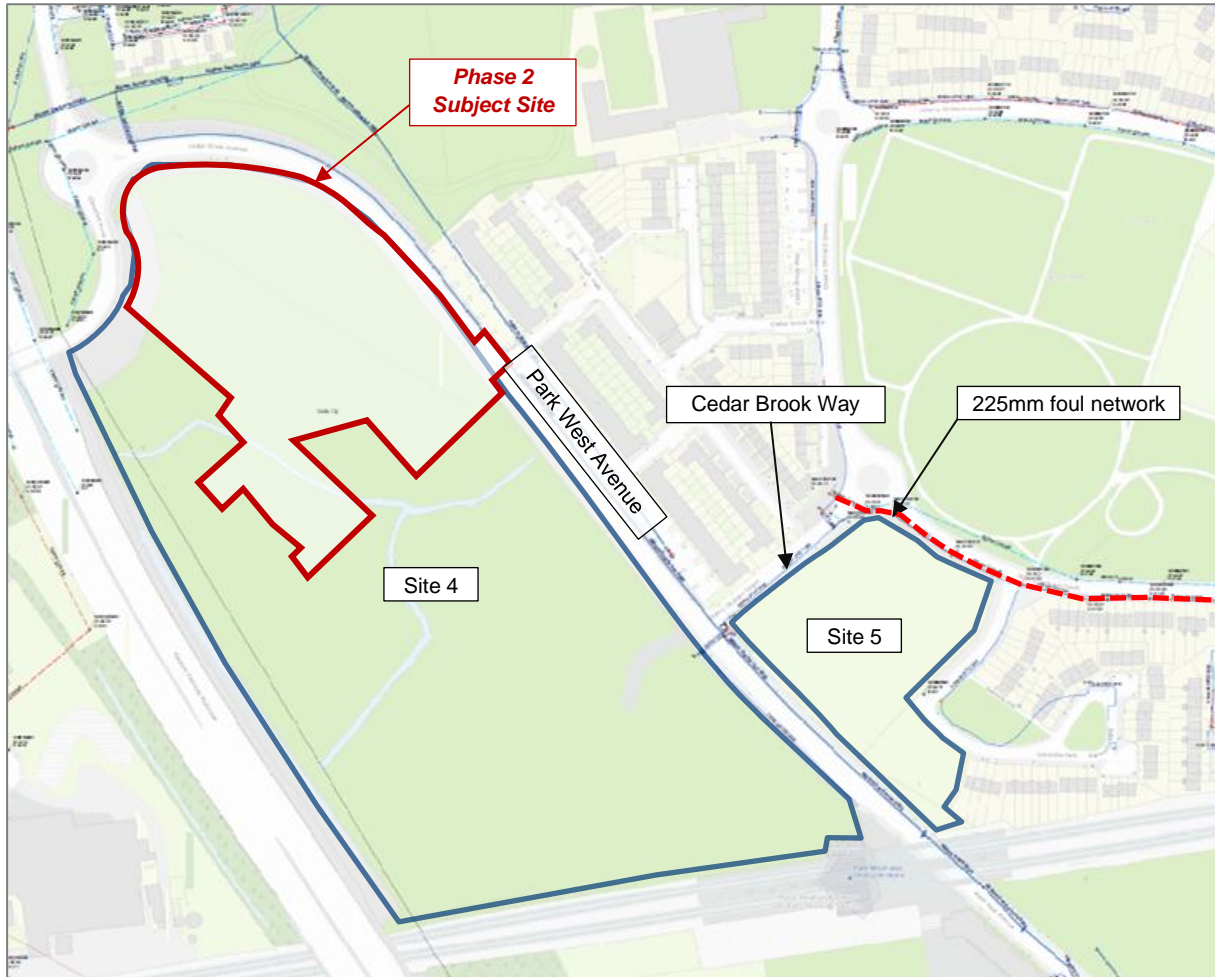


Figure 4-1: Extract of Uisce Éireann Foul Water Network Map

The nearest existing foul network to the Phase 2 Subject Site is a 225mm diameter foul network adjacent Site 5 located in Cedar Brook Way. Cedar Brook Way is named as Cherry Orchard Green on Uisce Éireann maps. This network flows east then north, joining the 375mm diameter foul network in Cherry Orchard Avenue. The foul water section of the Park West-Cherry Orchard Local Area Plan (Chapter 4.10.3), as per consultations with Uisce Éireann and Dublin City Council, advises that the sites are within the catchment of the 9B trunk sewer which has an ultimate outfall to Ringsend Wastewater Treatment Plant (WWTP) at the Dublin Port.

A 225mm diameter pipe typically has a capacity for up to 330 no. units, as per the Uisce Éireann Code of Practice for Wastewater Infrastructure (July 2020 Revision 2), while a 300mm diameter pipe can typically serve up to 830 no. units.

Figure 4-2: Extract of Foul Water Network Map from LAP is extracted from the Park West-Cherry Orchard LAP and shows the foul drainage network in the extended vicinity of the sites.



Figure 4-2: Extract of Foul Water Network Map from LAP

4.2 Uisce Éireann Consultation

4.2.1 Masterplan Development

Confirmation of Feasibility Letter for Masterplan development (October 2022)

A Pre-Connection Enquiry (PCE) was submitted with a Confirmation of Feasibility (COF) letter received from Uisce Éireann on 21 October 2022. The COF, with CDS ref. no. CDS22004824, stated that the Masterplan development foul water connections were feasible subject to upgrades. The COF included provision for a multi/mixed use development of 1,293 units in total.

Uisce Éireann, as part of their Confirmation of Feasibility Letter, have instructed that both Sites 4 & 5 must connect to the foul water infrastructure on Cherry Orchard Green (Cedar Brook Way). In order to meet this connection strategy for both sites, Uisce Éireann have confirmed that it is acceptable for Site 4 to be served by a 300mm Ø trunk sewer laid at a gradient of 1/300.

The COF further advised that Uisce Éireann has a project underway which will provide the necessary upgrades and capacity to service the entirety of the Masterplan development. As part of these upgrades the existing 225mm Ø on Barnville Park is to be upsized to a 1050mm Ø tank sewer, in order to act as a storage tank during peak flow periods. The COF stated that it was expected that the upgrade project would be completed by Q1 2026.

4.2.2 Subject Development

Confirmation of Feasibility Letter for Subject Development (March 2024)

An updated PCE related to the subject development, Phase 2, was sent to Uisce Éireann in February 2024. The enquiry included an over-provision for 160 no. units to act as a factor of safety in the case the unit numbers were to increase during the design phase. A COF letter for this enquiry was received from Uisce Éireann on 26 March 2024, with a corresponding CDS ref. no. CDS24001410.

The updated COF stated that the foul water demand for the Phase 2 subject development would be feasible subject to upgrades (the same upgrades mentioned in the masterplan COF with ref. no CDS22004824 discussed above). However, the upgrade project date of completion was updated from Q1 of 2026 to Q3 of 2028. The estimated time of completion for the Uisce Éireann upgrade works has increased by 2,5 years. This timeline for delivery of upgrades should not impact connection for the proposed development to the Uisce Éireann network.

Refer to Appendix A for a copy of the Masterplan Development Uisce Éireann COF Letter which includes details of the aforementioned upgrades required and to Appendix B for a copy of the Phase 2 Uisce Éireann COF Letter.

4.3 Proposed Foul Water Network

4.3.1 Masterplan Development

It is proposed for the masterplan development, that Site 4 be drained via a series of 150mm and 225mm Ø sewers which will connect to the aforementioned 300mm Ø trunk sewer. This trunk sewer will exit Site 4, running south-easterly to the junction of Park West Avenue and Cedar Brook Way. It will proceed along Cedar Brook Way to connect to the existing foul network. The south of Site 4 (high-density) will similarly be served by a network of 225mm and 300mm Ø pipes. This network will exit Site 4 at the proposed southern access road and proceed north to connect to the 300mmØ trunk sewer. Site 5 will be the subject of a separate future detailed planning application, but for the purpose of the masterplan lands is currently envisaged to be drained via a network of 150mm and 225mm Ø pipes and will connect to the existing foul network at the connection point as specified by Uisce Éireann. All networks are proposed to drain by gravity and there is no requirement for pumping of the proposed foul networks.

The proposed internal foul drainage network has been designed and sized in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure and Standard Details with one deviation that the 300mmØ trunk sewer to be laid at a gradient of 1/300, which as previously noted has been approved by Uisce Éireann.

A Statement of Design Acceptance for the Masterplan development foul water network design was received from Uisce Éireann in October of 2023.

4.3.2 Subject Development

As previously noted under the existing foul water section, Uisce Éireann have advised it has a project underway which will provide the necessary upgrades and capacity and is scheduled for completion in Q3 2028. The upgrades include the upsizing of the existing 225mm Ø on Barnville Park to a 1050mm Ø pipe. The Phase 1A development of the Masterplan development has been permitted by Uisce Éireann to proceed in advance of these upgrades works and will connect into the existing foul water network. Further discussions are underway between the Client and Uisce Éireann to discuss and agree alternative measures to accommodate future phases (including the subject site) via the use of a balancing tank to be constructed on Site 5, in advance of the proposed Uisce Éireann upgrades.

It is proposed that the Phase 2 subject site be drained via. gravity by 150mm Ø and 225mm Ø foul water pipes before connecting into the Approved Phase 1 development's foul water network at a foul water spur located at the subject developments access location. The outfall foul water pipe proposed for the subject development is proposed to be a 225mm diameter sewer. The foul water network design for the Phase 2 subject site can be seen in Waterman Moylan Drawing No. COP-WMC-PH2-00-DR-P-0200 – Proposed Drainage General Layout Arrangement.

The Phase 2 subject site is proposed to connect into the Approved Phase 1 development at 1 no. location as indicated in Figure 4-3: Subject Development's Proposed Foul Water Connection Point.

The proposed foul water network layout arrangement for the Phase 2 subject site is shown on Waterman Moylan Drawing No. COP-WMC-PH2-00-DR-P-0200 – Proposed Drainage General Arrangement.

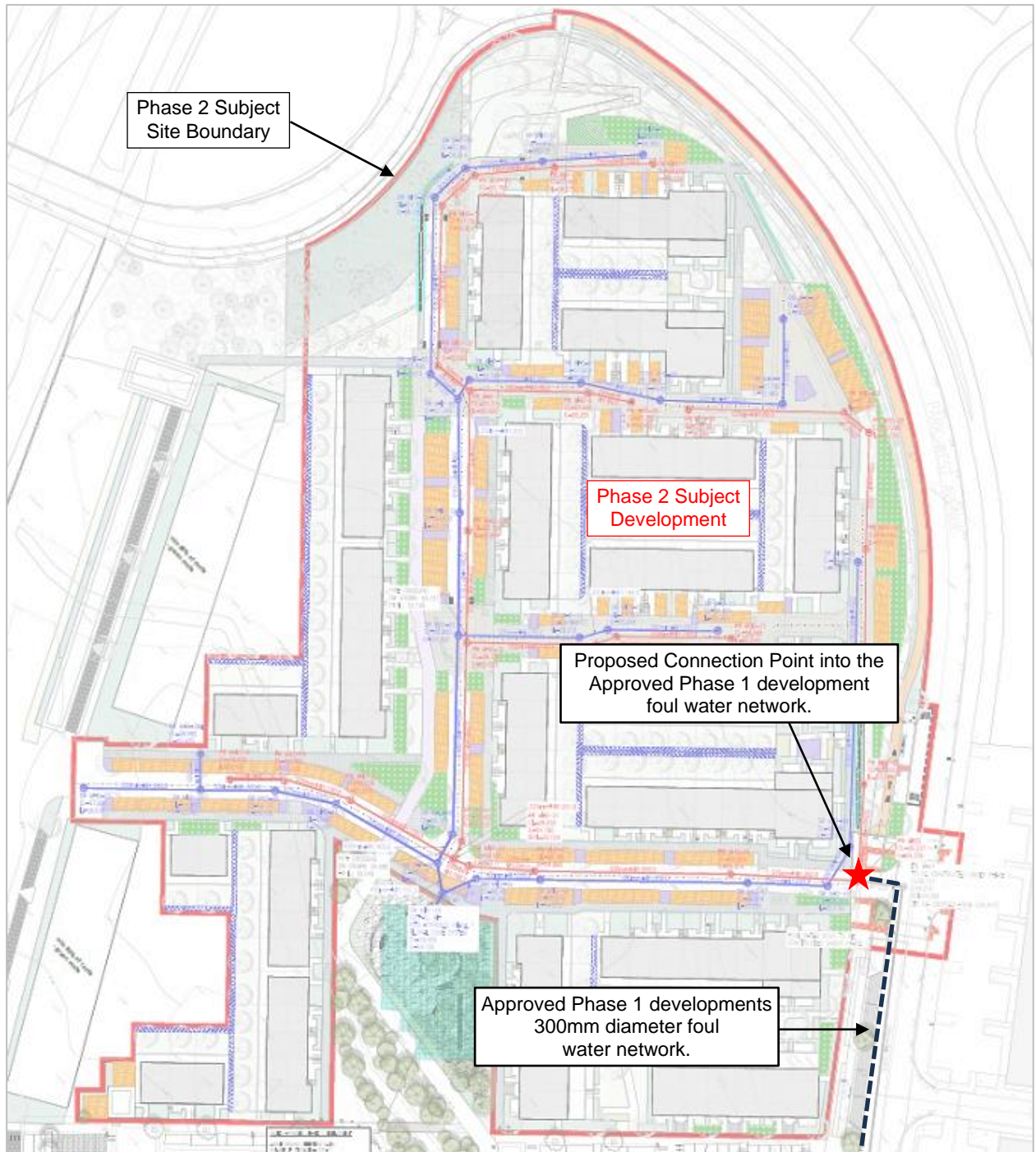


Figure 4-3: Subject Development's Proposed Foul Water Connection Point

4.4 Proposed Foul Water Drainage – Generated Flows

4.4.1 Subject Development

The Phase 2 subject site is proposed to be a residential development with a total of 137 no. residential units. Domestic wastewater loads for all phases has been calculated based on 2.7 persons per unit with a per capita wastewater flow of 150 litres per head per day, as per Appendix C of the Uisce Éireann Code of Practice for Wastewater Infrastructure.

The residential flows have also incorporated a 10%-unit allowance, in line with Section 3.6 of the Uisce Éireann Code of Practice for Wastewater Infrastructure.

Based on the Uisce Éireann Code of Practice for Wastewater Infrastructure, the subject development's foul water flows generated are outlined in Table 4-1: Calculation of Phase 2's Foul Water Flow Demand, below.

Table 4-1: Calculation of Phase 2's Foul Water Flow Demand

	Description	Total Population	Load per Capita	Daily Load	Total DWF	Peak Flow
		No. People	ℓ/day	ℓ/day	ℓ/s	ℓ/s
Phase 2	137 units	370	150	55,485	0,706	2,119

The total dry weather flow from the Phase 2 subject site has been calculated as 0,706 ℓ/s, with a peak flow of 2,119 ℓ/s.

It is noted that the total dry weather flow for the masterplan development on Sites 4 and 5 (including the subject site) is 7.39 ℓ/s, with a peak demand of 22.19 ℓ/s.

The subject development's foul water flow generation is thus 10% of the masterplan developments overall foul water flow generation.

4.5 Foul Water Drainage – General

The proposed internal foul drainage network has been designed and sized in accordance with the Uisce Éireann Code of Practice for Wastewater Infrastructure and Standard Details. No private drainage will be located within public areas.

Drains will be laid to comply with the requirements of the latest Building Regulations, and in accordance with the recommendations contained in the Technical Guidance Document H of the Building Regulations (2010).

5. Surface Water Network

5.1 Dublin City Council Consultation

Meetings were held with the Surface Water Department of Dublin City Council in 2022 & 2023 in order to agree the principles of the surface water and SuDS strategy of the masterplan lands. These meetings outlined the preliminary surface water strategy, SuDS strategy, and connection points. The overall preliminary proposal was deemed acceptable and suitable for further detailed design progression. It was agreed that the outflow rate be set at a maximum of 2 l/s/ha as per Dublin City Council requirements. This is in accordance with Dublin City Council's "SuDS Design and Evaluation Guide", which instructs in their Flow Control Discharge Limits Table (page 43), that the 1-in-100-year maximum outflow rate shall be limited to 2 l/s/ha.

Discussions were held with the Surface Water Department of Dublin City Council on the preliminary design strategy of the Proposed Cherry Orchard Point - Phase 2 development on 4 November 2024. DCC confirmed that the surface drainage strategy presented, which includes the connection of the Proposed Cherry Orchard Point - Phase 2 site to the Approved Phase 1 developments surface water network that ultimately discharges into the existing network in Cedar Brook Way, was acceptable. They further confirmed that the internal drainage strategy was acceptable in principle and expressed a desire for maximum SuDS features within the subject site. It was also noted that the outflow rate is limited to 2 l/s/ha as per Dublin City Council policy, which is lower than the current greenfield runoff rate for the site, thus when the Proposed Cherry Orchard Point - Phase 2 development becomes developed, the runoff rate for the site will actually be reduced from its current rate.

5.2 Site Conditions and Existing Surface Water Network

The 2022 Site Investigation Report by GII, that undertook infiltration rate testing within Site 4, including the Phase 2 Subject Site, advises for ground conditions that:

"Infiltration rates of $f = 7.303 \times 10^{-6}$ m/s, 6.95×10^{-6} m/s and 7.262×10^{-6} m/s respectively were calculated for the soakaway locations ST06, ST10, and ST11. At the locations of ST01, ST02, ST03, ST04, ST05, ST07, ST08, & ST09, the water level dropped too slowly to allow calculation of 'f', the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction."

This is generally in line with the reports finding of predominantly clay-based subsoils.

Of the 14 no. Trial Pits undertaken with a maximum depth of 3.2m, Trial Pit (TP) 04 showed signs of slow seepage from groundwater at 2.6m BGL (Below Ground level).

Of the 11 no. Soakaway Tests undertaken, Soakaway Test (ST) 06 encountered groundwater at 1.8m BGL, which rose to a level of 1.6m BGL within 5 minutes.

Similarly, the 2024 Site Investigation Report by GII, that undertook infiltration testing within Site 4, including the Phase 2 Subject Site, advises for ground conditions that:

"At the locations of SA A, SA B, SA C, SA D, and SA E the water level dropped too slowly to allow calculation of 'f' the soil infiltration rate. These locations are therefore not recommended as suitable for soakaway design and construction."

It is noted that the above referenced soakaway test locations refer to all 5 no. tests undertaken within the Masterplan Lands, 2 no. of which are located within the Phase 2 subject site, SA A and SA B.

Refer to Figure 2-3 for the location of the soakaway locations mentioned above within the Phase 2 Subject Site.

5.3 Surface Water Catchments

5.3.1 Masterplan Development

For storm water management purposes, the Masterplan Lands (Site 4 and Site 5) have been divided into 4-no. separate catchments, as shown in Figure 5-1: Indicative Layout of Surface Water Catchments. As noted, Catchment 1 is further divided into 2-no. sub-catchments, Catchment 1A and 1B. The Site 4 surface water network has been designed according to the surface water catchments identified above, the Phases of Site 4 (Approved Phase 1, proposed Phase 2, and future proposed Phase 4) may fall within more than 1-no. surface water catchment.

Based on the details presented by the 2022 and 2024 Site Investigation Reports, the sites have properties equivalent of a Type 5 soil, which has a runoff rate of 8.66 l/s/ha. However, in line with DCC requirements the attenuation calculations undertaken, have limited the outflow rate to a maximum of 2.0 l/s/ha, by using a soil type 2 for progression of the calculations. This is in accordance with Dublin City Council's "SuDS Design and Evaluation Guide", which instructs in their Flow Control Discharge Limits Table (page 43), that the 1-in-100-year maximum outflow rate shall be limited to 2 l/s/ha.

The calculated greenfield runoff rate for each surface water catchment is shown in the below table.

Table 5-1: Greenfield Runoff Rates for Surface Water Catchments

Catchment	Location / Phases Included	Area (Ha)	Greenfield Runoff Rate
Catchment 1A	North – Phase 2 Subject Site, Phase 4, small portion of Approved Phase 1	4.58 ha	8.60 l/s
Catchment 1B	Central East – Approved Phase 1, small portion of Phase 2 Subject Site	1.36 ha	3.20 l/s
Catchment 2	West – Phase 4 and Approved Phase 1	3.79 ha	7.55 l/s
Catchment 3	South – Approved Phase 1	1.67 ha	3.33 l/s
Catchment 4	Southwest – Phase 3 / Site 5	1.61 ha	3.21 l/s

Storm water from each catchment will be attenuated and discharge at a controlled rate, limited to a maximum of 2 l/s/ha (as per Dublin City Council requirements), to ultimately outfall to the existing surface water networks at Cedar Brook Way and Barnville Walk.

5.3.2 Subject Development

The Phase 2 subject site lies within Catchments 1A and 1B. The majority of Phase 2 (95% of site area) falls within Catchment 1A with the remainder (5% of site area) falling within Catchment 1B. Catchment 1A is shown by orange shading and Catchment 1B is shown by blue shading in Figure 5-1.

It is proposed to construct a stormwater drainage network that will service and attenuate the Site 4 development internally before discharging at the allowable greenfield rates to the local surface water network. This surface water network will facilitate connections from the Approved Phase 1 development to the Phase 2 subject development and future Phase 4 development. It is proposed that Site 4 will connect to the existing 1,050mm Ø network in Cedar Brook Way.

The Greenfield Runoff Rate of a development refers to the pre-development rainfall runoff rate. According to the Greater Dublin Regional Code of Practice, a range of formulae exist for predicting greenfield runoff. The simplest and the one considered most appropriate for applying to this criterion was developed by the Institute of Hydrology in their report 124 “Flood estimation for small catchments”, 1994. An online tool available from the UK SUDS website uses this criterion to calculate the required Greenfield Runoff Rate.

Refer to Appendix C for a copy of the Greenfield Runoff Rates retrieved from the UK SUDS website confirming the above outfall rate for Catchment 1, for which, the Phase 2 subject site development is located within.

Refer to Figure 5-1: Indicative Layout of Surface Water Catchments for which shows the location and extent of the 4-no. surface water catchments and the Phase 2 subject development boundary within the Masterplan Lands.

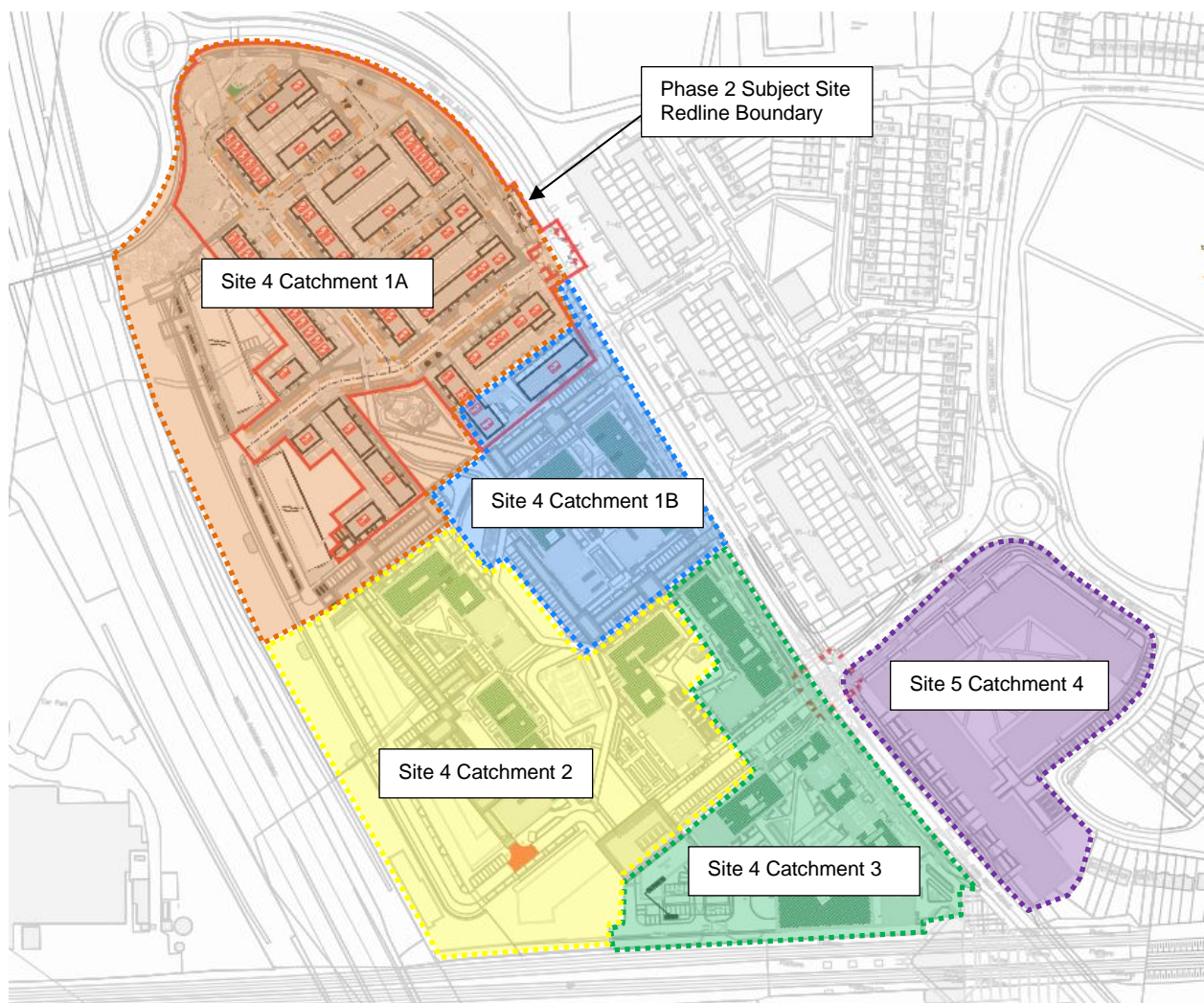


Figure 5-1: Indicative Layout of Surface Water Catchments on Site 4 and Site 5

5.4 Proposed Surface Water Network Design

The Phase 2 subject site will be served by a surface water network with pipes ranging in size from 150mm to 450mm and will outfall to the permitted below ground pluvial tank system to be constructed under the Approved Phase 1 development (referred to as Tank 1). The permitted below ground pluvial tank system is positioned below an above ground detention basin (which is proposed as part of the Planning Compliance submission for the Approved Phase 1 development). The location of the permitted pluvial tank and proposed detention basin is directly south of the Phase 2 boundary, within the Approved Phase 1 development.

Calculations for pipe sizes and gradients are based on surface water runoff from hardstanding areas such as the dwelling roofs, the parking areas, and footpaths, using the Rational Method for surface water design (Bilham's Formula).

Strict separation of surface water and wastewater will be implemented within the development. Drains will be laid in such a manner as to minimise the risk of inadvertent connection of waste pipes to the surface water system.

All SUDS and surface water drainage networks proposed in the public domain will be constructed to the standards required for Taking in Charge of the local authority, DCC. As is standard, the proposed Surface Water network, including SUDS devices will be constructed in accordance with the requirements of the Greater Dublin Regional Code of Practice (V6.0) such as in respect to separation distance between utilities etc.

For storm water management purposes, Site 4 of the Masterplan Lands has been divided into 3-no. separate catchments; Catchment 1, 2, and 3 (with Catchment 1 further divided in Catchments 1A and 1B). The details of these catchments are discussed in the preceding chapter.

As noted, the Phase 2 subject development surface water network connection is proposed at the permitted pluvial tank system located at the south of the subject site, to be built under the Approved Phase 1 development. A 450mm Ø outfall pipe is proposed to connect into the pluvial cube system at an invert level of 54.10m. The outlet invert level of the pluvial tank is designed as 54.00m with a proposed hydro-brake installed downstream of the tank set to the allowable greenfield runoff rate for Catchment 1A.

Figure 5-2: Subject Development's Proposed Surface Water Connection Point shows the Phase 2 subject development's proposed connection point into the Approved Phase 1 development's surface water network. The Approved Phase 1 surface water network on Site 4 will connect into the existing 1,050mm Ø network in Cedar Brook Way as shown in the below sketch, and as per the masterplan lands drainage strategy. The surface water connection point has been designed as a crown-to-crown connection.

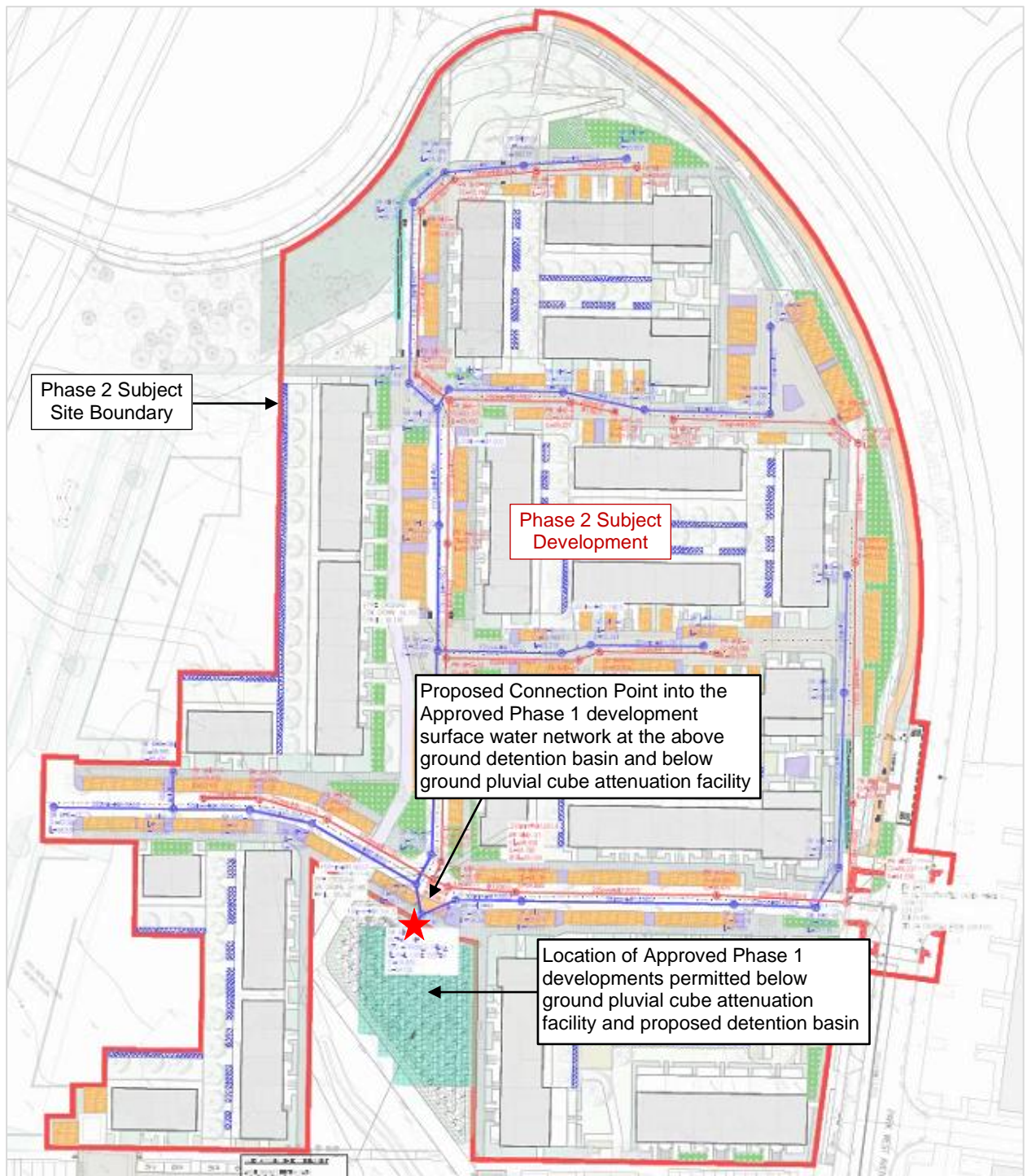


Figure 5-2: Subject Development's Proposed Surface Water Connection Point

5.5 Proposed Surface Water Attenuation Storage

5.5.1 Introduction

Focus will be placed on Site 4 within this chapter, for which contains the Phase 2 Subject Site. The infrastructure to be built under the Approved Phase 1 (ABP-318607-23) development; the permitted attenuation pluvial cube system located in the park area of the Approved Phase 1 development, will provide the required attenuation storage volumes for the proposed Phase 2 Subject Site. Similarly, the Approved Phase 1 development will provide the required attenuation storage volumes for the future Phase 4 development of the Masterplan Lands.

Due to the topography of the existing lands, Site 4 generally slopes toward the eastern boundary, along Park West Avenue. Localised low areas are also located centrally within the Approved Phase 1 development and to the southeast of Site 4.

The maximisation of above ground attenuation storage in the form of detention basins, wetland areas, or similar above ground storage systems is possible on sites that offer open green spaces at the low elevation points of the site. Following this rationale, if the Site 4 layout (containing Phases 1, 2, and 4) were to be designed with above ground attenuation storage potential as the primary design criteria, the green open space area of Site 4 would be proposed along the western edge of Park West Avenue. As part of the masterplan drainage strategy for the Cherry Orchard Point development, the attenuation storage provision for Site 4 has been accommodated within the Approved Phase 1 development.

The agreed upon Masterplan layout based on the Cherry Orchard Local Area Plan and consultation between the Design Team, the LDA, and Dublin City Council, includes open green space areas located in the following locations:

- The permitted park and open green space area on northern edge of the Approved Phase 1 development.
- The permitted communal garden and MUGA pitch area centrally located within the Approved Phase 1 development.
- The permitted open green space located at the northwest of the proposed Phase 2 development.

Of the above permitted open green space areas, only the permitted park located on the northern edge of the Approved Phase 1 development (also located along the southern edge of the proposed Phase 2 Subject Site) is located at a localised low point. The remaining 2-no. open green space areas are not located at low areas of Site 4 (within the Approved Phase 1 development). Due to the topography of the permitted park area, an above ground detention basin is possible at this location.

5.5.2 Above Ground vs. Below Ground Storage

As discussed, it must be noted that the permitted open green space areas within Site 4 are located to the north and centrally of the Approved Phase 1 development, and to north of the proposed Phased 2 development. A sizeable above ground detention basin is proposed within the northern open green space area of the Approved Phase 1 development (as part of the Planning Compliance submission for the Approved Phase 1 development), additionally, the MUGA pitch in the centrally located green space area in the Approved Phase 1 development is to be used as an above ground attenuation area during extreme rainfall events. Where possible, above ground storage has been proposed as far as practically possible within Site 4. The open green space area within Phase 2 is located to the north, at the high point of the site and thus cannot be utilised for attenuation storage purposes.

A summary of the below storage for Site 4 as per the Approved Phase 1 development (planning submission design) is included in the below table. The majority of the Phase 2 Subject Site (95% of site area) lies within Catchment 1A of Site 4.

Table 5-2: Approved Phase 1 Below Ground Attenuation Storage Volumes

Catchment	Description	Name/Reference	Storage Volume Provided
1A	Below ground pluvial cube system below permitted park area	Tank 1	1437 m ³
1B	Below ground stone storage areas south of Tank 1	Stone Storage Areas (1), (2), & (3)	48.40 m ³ + 126 m ³ + 85 m ³ =211 m ³
2	Below ground pluvial cube system south of MUGA Pitch	Tank 3	410 m ³
3	Below basement parking concrete attenuation tank (in Blocks 1,2 & 3)	Tank 4	1122 m ³
Total			3228.40 m³

The total permitted below ground attenuation storage under the Approved Phase 1 development is 3228.40m³.

As part of Planning Compliance for the Approved Phase 1 development, and in response to feedback received from the Drainage Department of DCC on 4 November 2024, the below ground storage provided throughout the Approved Phase 1 development has been proposed to be reduced where possible. Planning Compliance is to be submitted in conjunction with the proposed Phase 2 development, as such, the proposed reduction in below ground storage is deemed necessary for inclusion within this application. The approval of the below proposal is subject to agreement/approval from DCC by the Planning Compliance process. The proposed reduction in below ground attenuation storage within the Approved Phase 1 development is shown in the below table.

Table 5-3: Planning Compliance Submission - Reduced Below Ground Attenuation Storage Volumes

Catchment	Description	Name/Reference	Updated Proposed Storage Volume Provided
1A	Below ground pluvial cube system below permitted park area	Tank 1	1102 m ³
1B	Below ground pluvial cube system below permitted park area	Tank 2	200 m ³
2	Below ground pluvial cube system south of MUGA Pitch	Tank 3	66.50 m ³
3	Below basement parking concrete attenuation tank (in Blocks 1,2 &3)	Tank 4	721 m ³
Total			2089.50 m³

The total proposed below ground attenuation storage to be submitted as part of Planning Compliance for the Approved Phase 1 development is 2089.50m³.

Similarly, the above ground attenuation storage volumes permitted under the Approved Phase 1 development have been increased as part of Planning Compliance in response to feedback received from the Drainage Department of DCC on 4 November 2024.

The permitted above ground attenuation storage volume as per the Approved Phase 1 development is a total of 459 m³. The updated design proposal to be submitted as part Planning Compliance is 508 m³ achieved through the use of the following SuDS features:

- An above ground detention basin (above Tank 1) in Catchment 1A – 375 m³;
- An existing historic ditch in Catchment 1B – 79 m³;
- A MUGA Pitch (also used as a detention basin) in Catchment 2 – 220 m³.

The increase in above ground attenuation storage offers an additional 49 m³ of storage.

Additionally, all green roofs permitted under the Approved Phase 1 development have been redesigned as blue green roof systems to hold higher volumes of rainfall runoff at roof level. Although no green nor green blue roofs are proposed on the residential unit's roofs in the Phase 2 development, mention of this SuDS feature within the Approved Phase 1 development is necessary as this contributes to the attenuation storage volume offered on Site 4 (for which includes the Phase 2 subject site). The total attenuation storage volume offered by the proposed blue green roof systems to be submitted as part of Planning Compliance for the Approved Phase 1 development is included per Catchment, below:

Table 5-4: Green vs. Green Blue Roof Attenuation Volumes

Catchment	Total Area of Green / Green Blue Roofs	Provided Storage Volume in Green Roofs (submitted as part of Planning)	Provided Storage Volume in Green Blue Roofs (to be submitted as part of Planning Compliance)	Increase in Storage Volume Provided
1A	-	-	-	-
1B	1841 m ²	147 m ³	250 m ³	103 m ³
2	2850 m ²	228 m ³	388 m ³	160 m ³
3	3628 m ²	290 m ³	493 m ³	203 m ³
Totals	8319 m ²	665 m ³	1131 m ³	466 m³

The total roof level attenuation for the Approved Phase 1 development as proposed as part of Planning Compliance is 1131 m³.

5.5.3 Required Attenuation Volumes

A breakdown of the required and provided attenuation storage volumes for each surface water catchment within Site 4 is included in the table below. Required attenuation storage for each catchment is calculated using the industry standard software, FLOW (Causeway). The majority of the Phase 2 Subject Site (95% of site area) lies within Catchment 1A, with the remainder (5% of site area) located within Catchment 1B.

Table 5-5: Required and Provided Attenuation Storage per Catchment

Catchment	Area (Ha)	Attenuation Storage Volume		
		Required (m ³)	Provided (m ³)	Above Requirement
Catchment 1A	4.58 ha	1,733	2,589	49 %
Catchment 1B	1.36 ha	530	641	21 %
Catchment 2	3.79 ha	1,305	1,480	13 %
Catchment 3	1.67 ha	994	1,352	36 %
Total		4,562	6,062	33 %

As can be seen from the above table, each sub-catchment within Site 4 has been designed to provide above the attenuation storage requirement. A total of 4562 m³ of surface water storage is required for the overall Site 4, a total of 6,175 m³ has been provided through the use of various nature-based sustainable urban drainage systems, 33% above the requirement. The provided attenuation storage for Site 4 is thus considered acceptable as it meets the required volume of storage.

5.5.4 Allowable Outflow Rates – Chain System

As noted, Site 4 has been divided into 3-no. catchments (a total of 4-no. sub-catchments), namely, Catchment 1A, 1B, 2, and 3, with Site 5 its own catchment. However, 3-no. of the sub-catchments for Site 4, catchments 1A, 1B and 2, will run in a chain-like system to outfall to the public surface water network. The result of the chain system includes Catchment 1 flowing through Catchment 2 before discharging to the public surface water network in Cedar Brook Way. Subsequently, the hydrobrake limit for Catchment 2 will be the sum of the permitted outflow rate for Catchments 1 (1A & 1B) & 2.

The required attenuation storage volume for each sub-catchment within Site 4 and the corresponding allowable discharge rate accounting for the chain system is shown in the table below.

Table 5-6: Attenuation Storage Volume and Discharge Rate in Chain System

Catchment	Area	Allowable Discharge Rate (Per Catchment)	Allowable Discharge Rate (accounting for Chain System)	Required Attenuation Volume
	Ha	l/s	l/s	m ³
Catchment 1 A: Site 4 North	4.58 ha	8.60 l/s	8.60 l/s	1733
Catchment 1 B: Site 4 North	1.36 ha	3.20 l/s	11.80 l/s	530
Catchment 2: Site 4 Central	3.79 ha	7.55 l/s	19.35 l/s	1305
Catchment 3: Site 4 South	1.67 ha	3.33 l/s	3.33 l/s	994
Total	11,40	22.68	-	4562

5.6 Proposed SUDS Design

5.6.1 Sustainable Urban Drainage Systems (SUDS)

The Council's SUDS Design & Evaluation Guide advises that: *"Sustainable Drainage or SUDS is a way of managing rainfall that minimises the negative impacts on the quantity and quality of runoff while maximising the benefits of amenity and biodiversity for people and the environments."* These Sustainable Drainage System (SuDS) are considered a collection of water management practices that aim to align modern drainage systems with natural water processes.

Sustainable Drainage System (SuDS) are a collection of water management practices that aim to align modern drainage systems with natural water processes.

SuDS facilities are designed to prevent pollution of streams and rivers and to slow down runoff from sites, therefore helping to prevent downstream flooding and improve water quality. This closely mimics natural catchment behaviour where rainfall either infiltrates through the soil or runs off slowly over the ground surface to the nearest watercourse. This is known as the "treatment train" approach. SUDS devices should be placed at source, site, and regional levels. SUDS can also provide amenity benefits to local communities and benefits for biodiversity simultaneously.

Dublin City Council's Development Plan (2022-2028) has identified SUDS as the preferred method of managing rainfall from new developments. The proposed SUDS for the subject application have been incorporated and designed in accordance with Dublin City Council's SUDS Design and Evaluation Guide.

In the following sections of the assessment report, it will be outlined in detail how SUDS devices have been utilised and incorporated as an integral part of the overall plan for the proposed development, and how their inclusion will mitigate the risk of localised and downstream flooding, while also promoting residential amenity and biodiversity.

The proposed SUDS measures have been assessed for suitability, designed, and incorporated in accordance with CIRIA Report C753 The SUDS Manual, Dublin City Council's SuDS Property Level Guide (2021), and Dublin City Council's SUDS Design and Evaluation Guide, and Green & Blue Roof Guide, in order to develop a nature-based approach to surface water management for the proposed development.

5.6.2 Subject Development's Proposed SUDS

The following SUDS features are proposed for the Phase 2 Subject Site:

- Permeable paving below all parking spaces;
- Public rain gardens throughout the development;
- Bio-retention tree-pits throughout the development;
- 1m wide private rain gardens in all rear gardens;
- Varying width roadside swales throughout the development.

Additionally, as per the DCC's SuDS Property Level Guide (2021), the following SuDS features are proposed to be incorporated into the drainage design to enhance the provision of SuDS in private areas:

- Water butts on rear garden downpipes, where feasible;
- Rain garden provision at the duplex privacy screening planting, where feasible;
- Green sedum roof or alternative suds measures such as rain garden / filter drain at downpipe location on selected bin/bike stores.

Details of the rain gardens within duplex privacy screening planting areas and typical water butt arrangement details can be found on the landscape architects drawings submitted as part of this planning application.

It is proposed that surface water runoff from the residential building roofs is collected in the rear garden within private rain gardens and within the permeable paving proposed at all car parking spaces to the front of the buildings. Where possible, the rear garden private rain gardens will connect into surface water networks routed below the permeable paving of the proposed car park spaces to add an additional layer of treatment before connecting into the mainline surface water networks within the internal roads network.

Surface water runoff from the proposed internal roads and footpath network will be conveyed into roadside swales, bio-retention tree pits and public rain gardens positioned throughout the development. Dropped kerb details adjacent to roadside swales will ensure surface water runoff from the roads infiltrates these proposed SUDS features.

The indicative layout of the proposed SUDS for the Phase 2 development can be seen in Figure 5-3: Indicative Layout of the Proposed SUDS Features in Phase 2 .

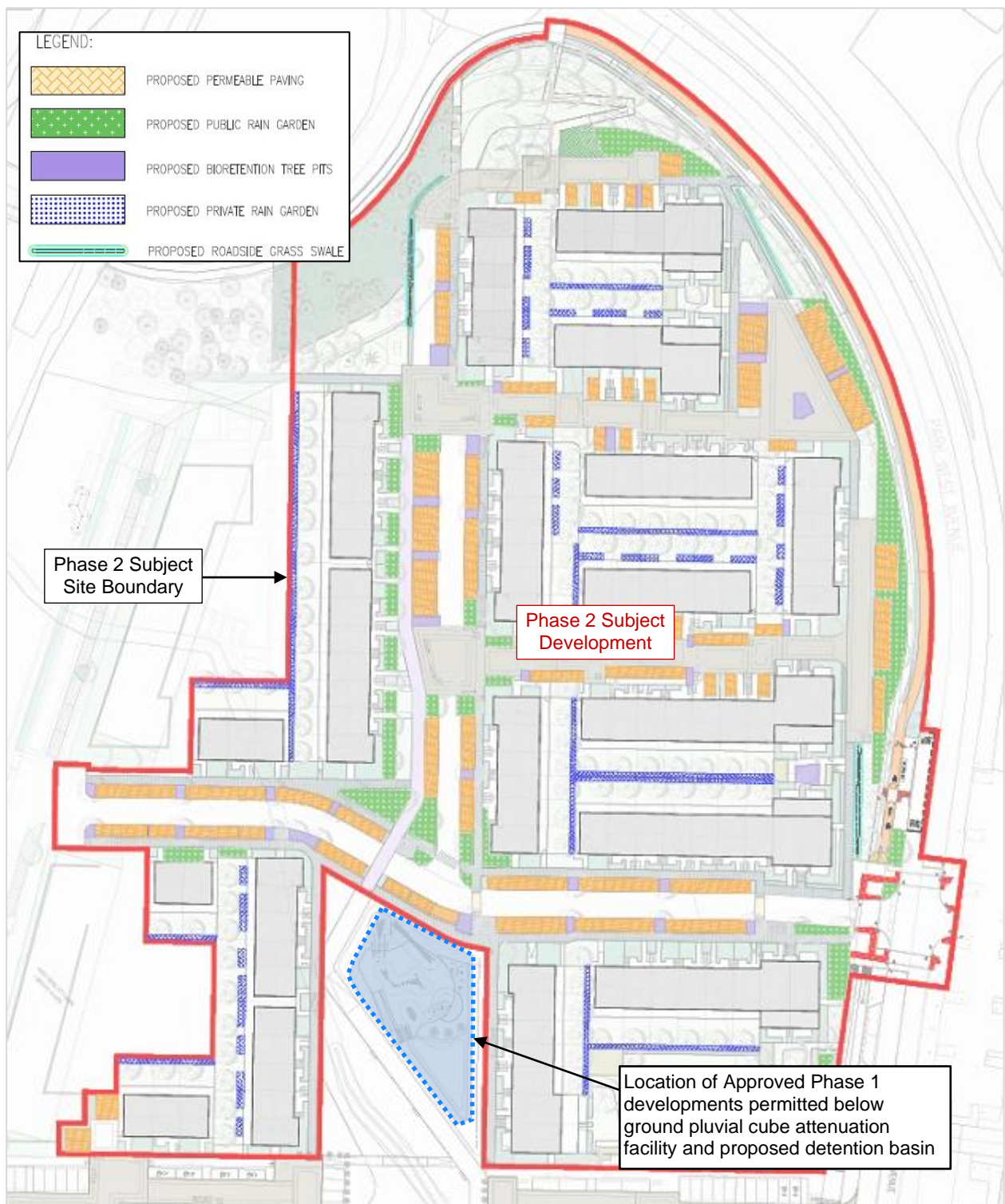


Figure 5-3: Indicative Layout of the Proposed SUDS Features in Phase 2

The total storage volume offered by the various SUDS features proposed within the Phase 2 development is included in the below table.

Table 5-7: Storage Volume of Proposed SUDS in Phase 2

SUDS Feature	Area (m ²)	Depth	Void Ratio	Storage Volume Provided (m ³)
Permeable Paving	1870	0.35	0.4	262 m ³
Bio-retention Tree Pits	380	1.00	0.4	152 m ³
Swales	106	1.00	0.4	64 m ³
Private Rain Gardens	631	0.50	0.4	126 m ³
Public Rain Gardens	1172	0.65	0.4	305 m ³
Total				909 m³

It is proposed to incorporate a Storm Water Management Plan through the use of various SUDS techniques to treat and minimise surface water runoff from the site. The methodology involved in developing a Storm Water Management Plan for the subject site is based on recommendations set out in the Greater Dublin Strategic Drainage Study (GDSDS), Dublin City Council's SUDS Design and Evaluation Guide, and in the CIRIA Report C753 The SUDS Manual. Based on three key elements – Water Quantity, Water Quality and Amenity – the targets of the CIRIA Report C SUDS train concept have been implemented in the design, providing SUDS devices for each of the following:

- Source Control
- Site Control
- Regional Control

5.6.3 Source Control

Phase 2 - Permeable Paving:

It is proposed to introduce permeable paving at all private driveways and parking areas throughout the development. Downpipes from the front of the houses, duplexes, and apartments will drain to filter drains beneath the permeable paving to facilitate maximum infiltration of surface water from driveways and roof areas.

The goal of permeable paving is to control stormwater at the source to reduce runoff. In addition to reducing surface runoff, permeable paving has the dual benefit of improving water quality by trapping suspended solids and filtering pollutants in the substrata layers.

Refer to Figure 5-4: Illustration of Permeable Paving Buildup for an extract of a permeable paving detail taken from the SUDS Design & Evaluation Guide.

A total area of 1870m² below parking spaces is proposed to be used for permeable paving throughout the Phase 2 site.

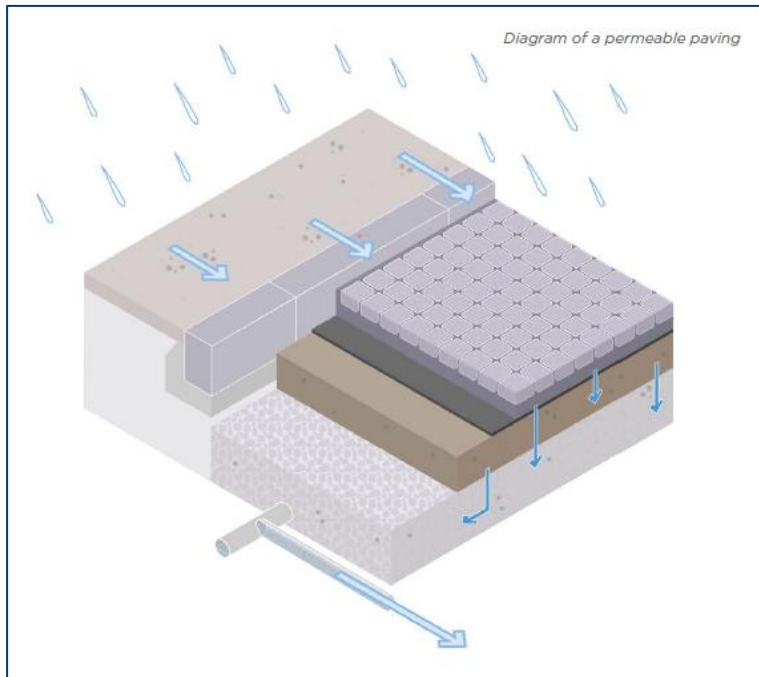


Figure 5-4: Illustration of Permeable Paving Buildup

5.6.4 Site Control

Phase 2 - Roadside Bio-retention Tree Pits:

It is proposed to provide roadside trees throughout the development. Trees can help control storm water runoff because their leaves, stems, and roots slow rain from reaching the ground and capture and store rainfall to be released later. Trees help to attenuate flows, trap silts and pollutants, promote infiltration, and prevent erosion. Incorporating tree planting offers multiple benefits, including attractive planting features, improved air quality and increased biodiversity whilst helping to ensure adaptation to climate change.

Refer to Figure 5-5: Illustration of SUDS Tree Pit for an extract of a tree pit detail taken from the SUDS Design & Evaluation Guide.

A total area of 380m² is proposed to be used for roadside bio-retention tree pits throughout the Phase 2 site.

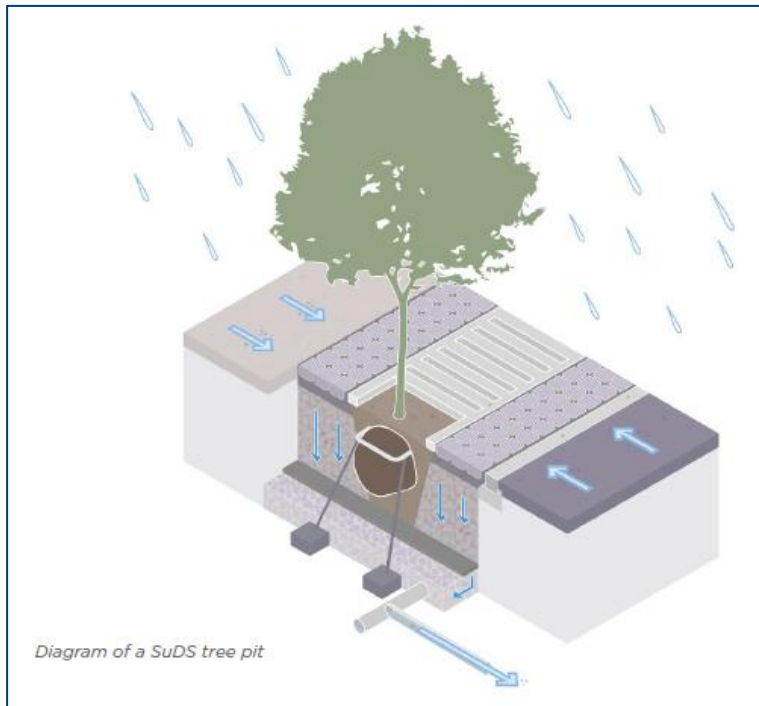


Figure 5-5: Illustration of SuDS Tree Pit

Phase 2 - Swales:

Swales are grassed channels proposed to run parallel and adjacent to selected roads throughout the site. Rainfall from the road surface will be directed to gaps in the road kerbing and will flow to the swales. The swales will be linked back to the drainage network to prevent flooding in extreme weather events, where the volume of rainfall exceeds the percolation capacity of the swales. An image extracted from the SuDS Design & Evaluation Guide showing a swale with potential for storing rainfall runoff, constructed in Pelletstown, is shown in Figure 5-6: Illustration of Swale, below.



Figure 5-6: Illustration of Swale

Grassed swales enhance surface water runoff quality as they slow down water flow, allowing suspended particles to filter and settle out of suspension.

106 linear metres of swales are proposed as part of the Phase 2 site development.

Phase 2 - Bio-retention Raingarden Systems:

Bio-retention planted areas will be provided within the private domain in rear gardens for all dwellings, with public rain gardens proposed adjacent to the internal roads network. Planted boxes rain gardens in strategic placed locations will also intercept down pipes from the apartment blocks.

Refer to Figure 5-7: Illustration of Rain Garden for an extract of a rain garden detail taken from the SUDS Design & Evaluation Guide.

It is proposed that a total area of 631m² within rear gardens will be used for proposed rain gardens. The private rain gardens will be 1m in width and 650mm in depth. Furthermore, it is proposed that a total area of 1172m² within green spaces areas adjacent to the internal roads network will be used for public rain gardens. The public rain gardens vary in width and length and have a depth of 800mm.

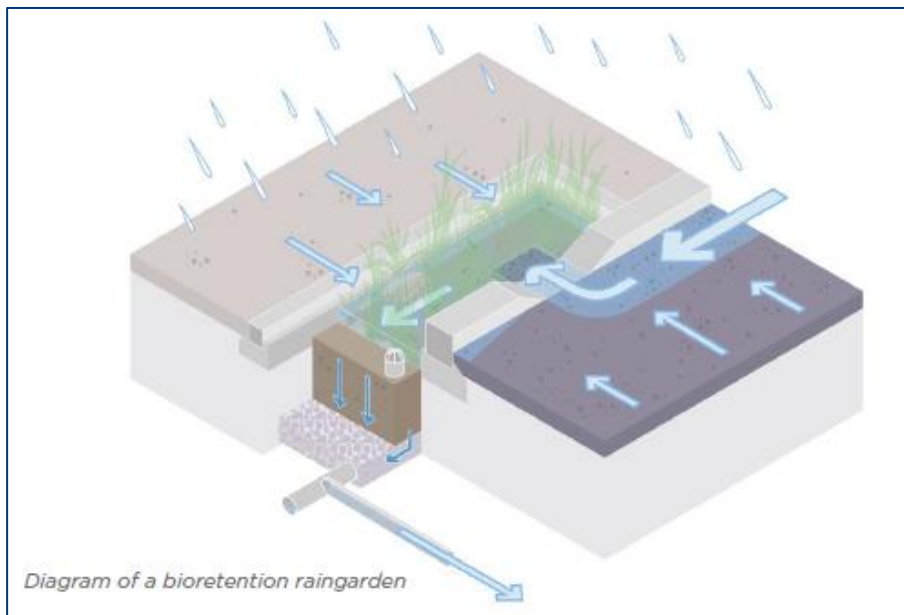


Figure 5-7: Illustration of Rain Garden

5.6.5 Regional Control

Regional Control for the Phase 2 subject developments surface water runoff is facilitated under the Approved Phase 1 development via an above ground detention basin.

Detention Basin and Pluvial Cube Attenuation Facility (Approved under Phase 1 development)

As part of the Planning Compliance submission for the Approved Phase 1 development, an above ground detention basin is to be utilised for attenuation of surface water within the permitted park area of the Approved Phase 1 development. This basin can be utilised during regular weather conditions for other purposes and will only fill with water during heavier rainfall events. Detention basins are engineered depressions in the ground and are typically seeded with grass and may also be suitable for planting. Detention basins may be further utilised as recreational/play areas, an option which has been utilised in the proposals for this Phase 1 project. A prime example of this incorporated to the project is the above ground detention basin located within the park area, on the border of the Approved Phase 1 development and the

proposed Phase 2 development, which performs the role of a “multi-functional SUDS component” which will act as a playground and open green space area during dry weather and an attenuation area during heavier rainfall events, as per the figure included on Page 15 of the Council’s SUDS Design & Evaluation guide (and for which is included below).

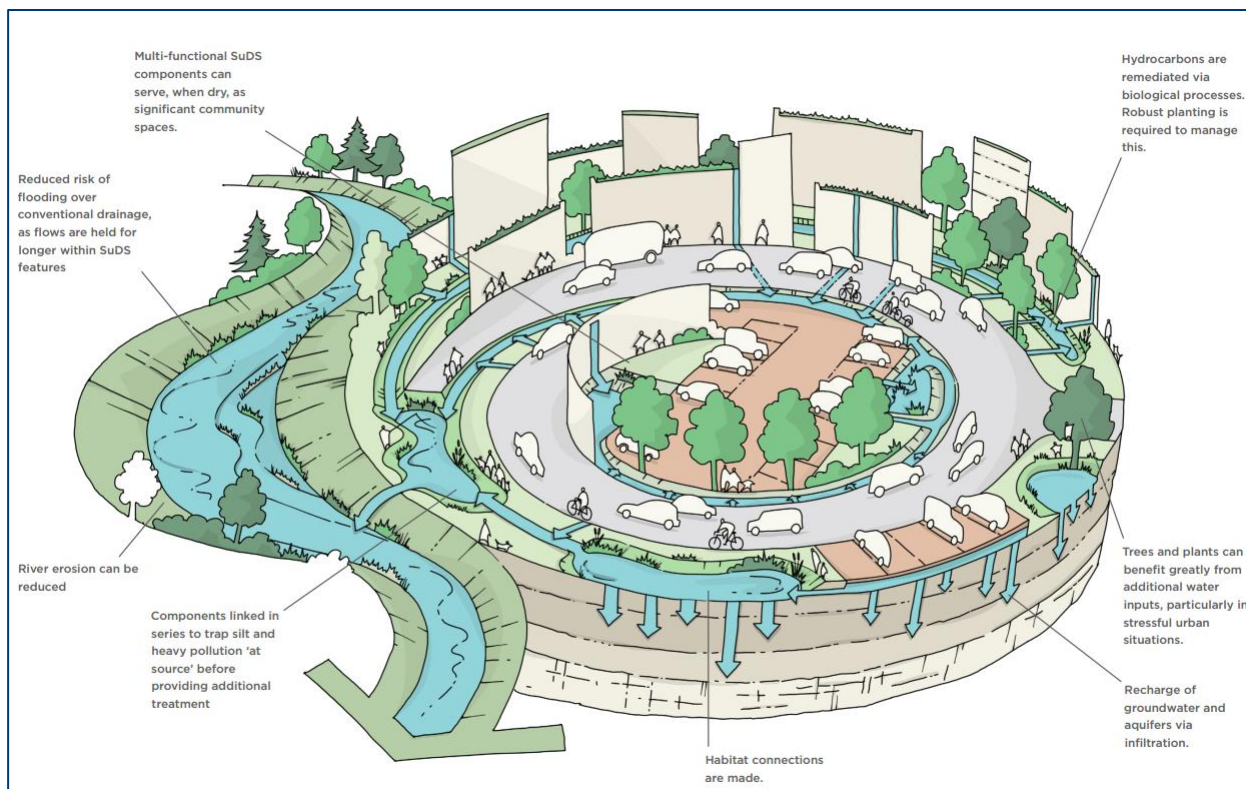


Figure 5-8: Multi-Functional SUDS Components Extract

This detention basin is designed to cater solely for surface water runoff from Catchment 1A. The majority of the Phase 2 subject development (95% of total area) lies within Catchment 1A, with the remainder of the development falling within Catchment 1B. The detention basin is designed above a below ground pluvial cube system. The surface water catchments are discussed in detail under Section 7.3 of this report.

Refer to Figure 5-3: Indicative Layout of the Proposed SUDS Features in Phase 2 for the location of the detention basin.

The detention basin can be seen in an extract of Waterman Moylan Drawing No. COP-WMC-PH1-00-DR-P-0205 - Attenuation Storage Tank 1 Details (submitted as part of Planning Compliance for the Approved Phase 1 development) included in Figure 5-9 and for which shows a cross-section view through the below ground pluvial tank system and the above ground detention basin proposed directly south of the Phase 2 development within the Approved Phase 1 development.

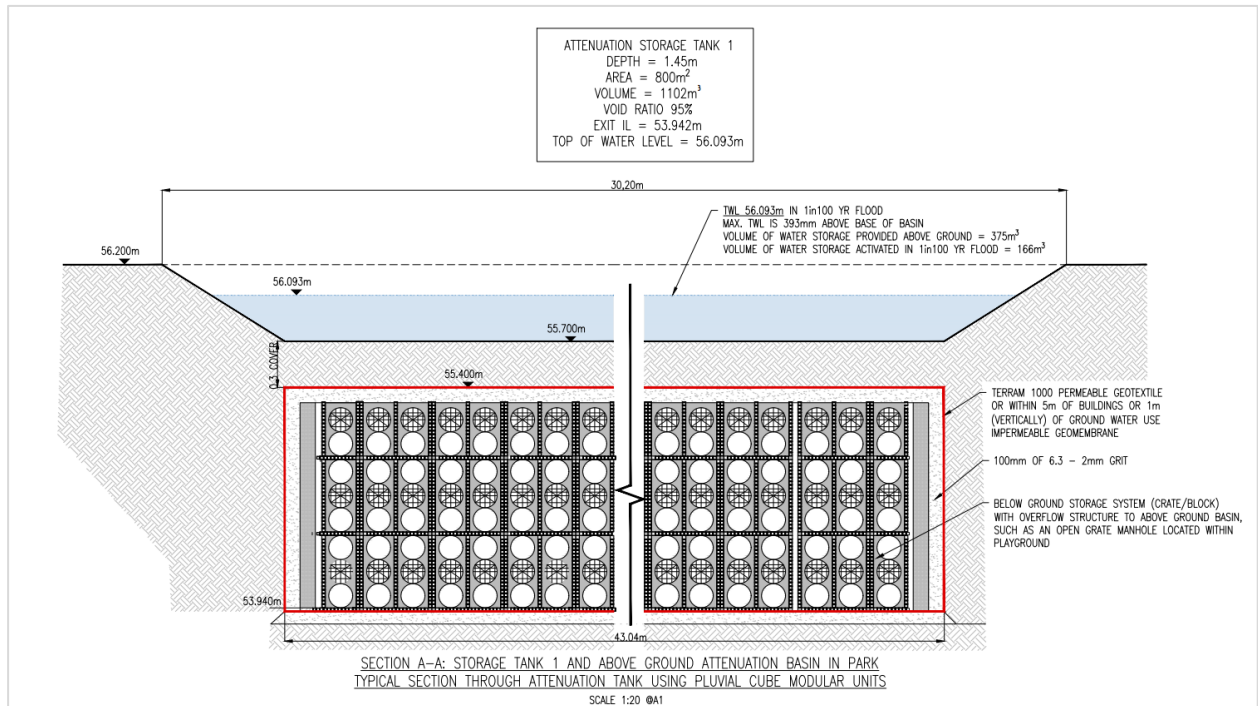


Figure 5-9: Extract of Waterman Moylan Drawing: Attenuation Storage Tank 1 Details

The top of water level (T.W.L) in the critical 1-in-100-year storm event within the detention basin, 56.093m, has been designed 500 mm below the lowest adjacent finished floor level (FFL). The lowest adjacent FFL within the relevant catchment (Catchment 1A) is set at 56.700m OD Malin (located in the Phase 2 development) and is 607 mm above the critical storm event T.W.L level.

The detention basin offers a total above ground storage volume of 375 m³. The volume of water activated during the critical 1-in-100-year storm event is 166 m³.

The above ground detention basin is not activated during the critical 1-in-5-year and 1-in-30-year storm events and is only activated during the critical 1-in-100-year storm event. A summary of these volumes and water levels are shown in the table below.

Table 5-8: Detention Basin Volume and Water Levels during Storm Events

Detention Basin (Volume 375 m ³)	1-in-5-year storm event	1-in-30-year storm event	1-in-100-year storm event
Storage Volume Activated	0 m ³	0 m ³	166 m ³
Top of Water Level in Basin	0 m	0 m	56.093 m
Depth of Water in Basin	0 mm	0 mm	393 mm
Volume of Basin Activated	0 %	0 %	44 %

As per the Planning Compliance submission to be submitted for the Approved Phase 1 development, the already permitted below ground pluvial cube tank, located below the above ground detention basin, is proposed to be reduced in volume from 1437 m³ to 1102 m³. The below ground pluvial cube tank is activated during the critical 1-in-5-year, 1-in-30-year storm, and 1-in-100-year storm events. A summary of these volumes and water levels are shown in the table below.

Table 5-9: Pluvial Cube Attenuation Facility Volume and Water Levels during Storm Events

Pluvial Cube Attenuation Tank	1-in-5-year storm event	1-in-30-year storm event	1-in-100-year storm event
Storage Volume Activated	769 m ³	1062 m ³	1102 m ³
Top of Water Level in Tank	55.01 m	55.40 m	55.40 m
Depth of Water in Tank	0 mm	0 mm	393 mm
Volume of Basin Activated	0 %	0 %	44 %

Flow Control:

A flow control device (Hydrobrake or similar approved) is proposed at each sub-catchment attenuation feature, which will limit exiting flows to a maximum rate of 2l/s/ha as permitted by DCC. A hydro-brake downstream of the detention basin will limit the surface water outflow for Catchment 1A to 8.60 l/s.

Petrol interceptor:

Class 1 petrol interceptors will be provided before the surface water outfalls to the local surface water network in Cedar Brook Way.

5.6.6 SuDS Maintenance Regime

Surface SuDS features can typically be maintained as part of the regular maintenance of the landscape, incorporating litter picking, grass cutting, and inspections. Figure 5-10: Regular Maintenance Requirements for SuDS, is an extract taken from Section 12.3 of the SuDS Design & Evaluation Guide and generally describes the regular maintenance aspect for the SuDS.

Type	Activity	Normal site care (Site) or SuDS-specific maintenance (SuDS)	Suggested frequency
Regular Maintenance			
Litter	Pick up all litter in SUDS Landscape areas along with remainder of the site – remove from site	Site	1 visit monthly
Grass	Mow all grass verges, paths and amenity grass at 35-50mm with 75mm max. Leaving cuttings in situ	Site	As required or 1 visit monthly
Grass	Mow all dry swales, dry SUDS basins and margins to low flow channels and other SUDS features at 100mm with 150mm max. Cut wet swales or basins annually as wildflower areas – 1st and last cuts to be collected	Site	4-8 visits per year or as required
Grass	Wildflower areas strimmed to 100mm in Sept or at end of school holidays – all cuttings removed Or Wildflower areas strimmed to 100mm on 3 year rotation – 30% each year – all cuttings removed	Site	1 visit annually 1 visit annually
Inlets & outlets	Inspect monthly, remove silt from slab aprons and debris. Strim 1m round for access	SuDS	1 visit monthly
Permeable paving	Sweep all paving regularly to keep surface tidy	Site	1 visit annually or as required

Figure 5-10: Regular Maintenance Requirements for SuDS

There will still be a remaining requirement for more intensive maintenance tasks to be undertaken however, the severity of these tasks can be reduced by regular inspections and proactive responses being incorporated as a part of the regular maintenance regime discussed above. A table showing the typical requirements for the occasional maintenance tasks and remedial works is extracted from the SUDS Design & Evaluation Guide to Figure 5-11: Further Maintenance Requirements for SuDS.

Occasional Tasks			
Permeable paving	Sweep and suction brush permeable paving when ponding occurs	SuDS	As required - estimate 10-15 year intervals
Flow controls	Annual inspection of control chambers - remove silt and check free flow	SuDS	1 visit annually
Wetland & pond	Wetland vegetation to be cut at 100mm on 3 - 5 year rotation or 30% each year. All cuttings to be removed to wildlife piles or from site.	Site	As required
Silt	Inspect swales, ponds, wetlands annually for silt accumulation	Site & SuDS	1 visit annually
Silt	Excavate silt, stack and dry within 10m of the SuDS feature, but outside the design profile where water flows. Spread, rake and overseed.	Site & SuDS	As required
Native planting	Remove lower branches where necessary to ensure good ground cover to protect soil profile from erosion.	SuDS	1 visit annually
Remedial Work			
General SuDS	Inspect SuDS system to check for damage or failure when carrying out other tasks.	SuDS	Monthly
	Undertake remedial work as required.		As required

Figure 5-11: Further Maintenance Requirements for SuDS

Further to the above extracts on SuDS maintenance requirements, maintenance schedules for the particular SuDS features proposed within the Phase 2 site – swales, raingardens and bio-retention tree pits, and permeable paving have been sourced from The SuDS Manual (CIRIA C753) and summarised in the tables to follow.

Table 5-10: Phase 2 Swale Maintenance Schedule

	Maintenance Period	Maintenance Task	Frequency
Swales	Regular	Remove the litter and debris	Monthly, or as required
		Cut grass – to retain height within specified design range.	Monthly (during growing season), or as required
		Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
		Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
		Inspect infiltration coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Occasional	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if soil is exposed over 10% or more of the swale treatment area
	Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
		Re-level uneven surfaces and reinstate design levels	As required
		Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
		Remove and dispose of oils or petrol residues using safe standards practices	As required

Table 5-11: Phase 2 Bio-Retention Tree Pit & Rain Gardens Maintenance Schedule

Bio-Retention Tree Pit & Rain Gardens	Maintenance Period	Maintenance Task	Frequency
	Regular	Remove the litter and debris	Monthly, or as required
		Cut grass – to retain height within specified design range.	Monthly (during growing season), or as required
		Manage other vegetation and remove nuisance plants.	Monthly at start, then as required
		Inspect inlets, outlets and overflows for blockages, and clear if required.	Monthly
		Inspect infiltration coverage	Monthly for 6 months, quarterly for 2 years, then half yearly
		Inspect inlets and facility surface for silt accumulation, establish appropriate silt removal frequencies	Half yearly
	Occasional	Reseed areas of poor vegetation growth, alter plant types to better suit conditions, if required	As required or if soil is exposed over 10% or more of the swale treatment area
	Remedial actions	Repair erosion or other damage by re-turfing or re-seeding	As required
		Re-level uneven surfaces and reinstate design levels	As required
		Remove build-up of sediment on upstream gravel trench, flow spreader or at top of filter strip	As required
		Remove and dispose of oils or petrol residues using safe standards practices	As required

Table 5-12: Phase 2 Permeable Paving Maintenance Schedule

Permeable Paving	Maintenance Period	Maintenance Task	Frequency
	Regular	Brushing and vacuuming (standard cosmetic sweep over the whole surface)	Once a year, after autumn leaf fall, or as required, based on site specific observations of clogging or manufacturer's recommendations.
	Occasional	Removal of weeds	As required
	Remedial actions	Remediation work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users	As required
	Monitoring	Inspect silt accumulation rates and establish appropriate brushing frequencies. Monitor inspection chambers.	Annually

5.7 Surface Water – General

Surface water sewers will generally consist of PVC (to IS 123) or concrete socket and spigot pipes (to IS 6) and laid strictly in accordance with Dublin City Council requirements for taking in charge. It is intended that all sewers within the public domain will be handed over to Dublin City Council for taking in charge.

All private outfall manholes will be built in accordance with the Greater Dublin Regional Code of Practice for Drainage Works (V6.0). No private drainage will be located within public areas.

Drains will be laid in accordance with the requirements Technical Guidance Document H of the Building Regulations (2010).

5.8 Flood Risk Assessment

A site-specific Flood Risk Assessment has been carried out for the proposed Phase 2 development and accompanies this submission under a separate cover.

6. Water Supply

6.1 Existing Water Supply

Uisce Éireann records for the surrounding area have been obtained and are extracted to Figure 6-1: Uisce Éireann Watermain Network Map Extract, below.



Figure 6-1: Uisce Éireann Watermain Network Map Extract

The watermain network map advises that a 450mm diameter Ductile Iron (DI) network runs the length of Park West Avenue on the eastern side, between Sites 4 & 5. There is a branch from this watermain crossing to the west side of Park West Avenue, just south of the T-junction with Cedar Brook Way, and is a 300mm diameter DI. It then proceeds south for approx. 130m as a 110mm MOPVC network. To the northwest and northeast of Site 5 there is an existing 200mm diameter uPVC network. Cedar Brook Way is named as Cherry Orchard Green in Uisce Éireann correspondence and maps.

6.2 Uisce Éireann Consultation

6.2.1 Masterplan Development

Confirmation of Feasibility Letter for Masterplan development (October 2022)

A Pre-Connection Enquiry (PCE) was submitted with a Confirmation of Feasibility (COF) letter received from Uisce Éireann on 21 October 2022. The COF, with CDS ref. no. CDS22004824, stated that the masterplan developments water supply and connections were feasible without required upgrades. The COF included provision for a multi/mixed use development of 1,293 units in total. The following was stated within the COF letter:

“Water Connection – Feasible without infrastructure upgrade by Uisce Éireann

Site 4 is to be connected (Via a new 200mm connection main) to the existing 300mm ductile iron spur off of the 450mm DI Trunk Main in Park West Avenue opposite the Cherry Orchard Green junction (Purple line in mapping below). A new DMA will be required here with a minimum 200mm spine main within the development. Metering and telemetry will be required at this new connection.”

Refer to Appendix A for a copy of the masterplan lands Uisce Éireann COF Letter.

6.2.2 Subject Development

Confirmation of Feasibility Letter for Subject Development (March 2024)

An updated PCE related to the subject development, Phase 2, was sent to Uisce Éireann in February 2024. The enquiry included an over-provision for 160 no. units. A COF letter for this enquiry was received from Uisce Éireann on 26 March 2024, with a corresponding CDS ref. no. CDS24001410.

The updated COF stated the subject developments, Phase 2, water supply and connections were feasible without required upgrades. The following was stated within the COF letter:

“Water Connection – Feasible without infrastructure upgrade by Uisce Éireann

- *As per Cherry Orchard Masterplan, the entire Site 4 (Phase 1 and 2) was proposed to create as a separate DMA, the connection being taken from existing 300mm DI spur from 450mm DI main at junction of Park West Avenue and Cherry Orchard Green.*
- *A DMA meter with associated telemetry and a PRV valve are required at the connection point for the Site 4.”*

Refer to Appendix B for a copy of the Phase 2 Subject Site's Uisce Éireann COF Letter.

6.3 Proposed Water Supply

6.3.1 Masterplan Development

Site 4 is proposed to be served by 2-no. 200mm connections to the existing 300mm Ductile Iron watermain as instructed by Uisce Éireann. The proposed 200mm watermain will follow the main vehicular circulation route of Site 4 and will be further supplemented by 150mm and 100mm loops and branches.

Site 5 is proposed to be connected via a 100mm watermain to the existing 200mm uPVC network as instructed by Uisce Éireann. A DMA meter with associated telemetry and a PRV valve will be installed at the connection point into the existing water supply network for Site 4.

A Statement of Design Acceptance for the Masterplan development water supply network design was received from Uisce Éireann in October of 2023.

6.3.2 Subject Development

The Phase 2 subject site is proposed to connect into the Approved Phase 1 development at 3 no. locations as indicated in Figure 6-2: Subject Development's Proposed Water Supply Connection Points. The proposed water supply network within the subject site will comprise of 100mm diameter loops connected to a 150mm and 200mm diameter bulk water supply main to the south of the development. The proposed 150mm and 200mm diameter mains are proposed to connect into the Approved Phase 1 development.

The water supply network design for the Phase 2 subject site can be seen in Waterman Moylan Drawing No. COP-WMC-PH2-00-DR-P-0300 – Proposed Water Supply Layout, extracted to Figure 6-2 below.

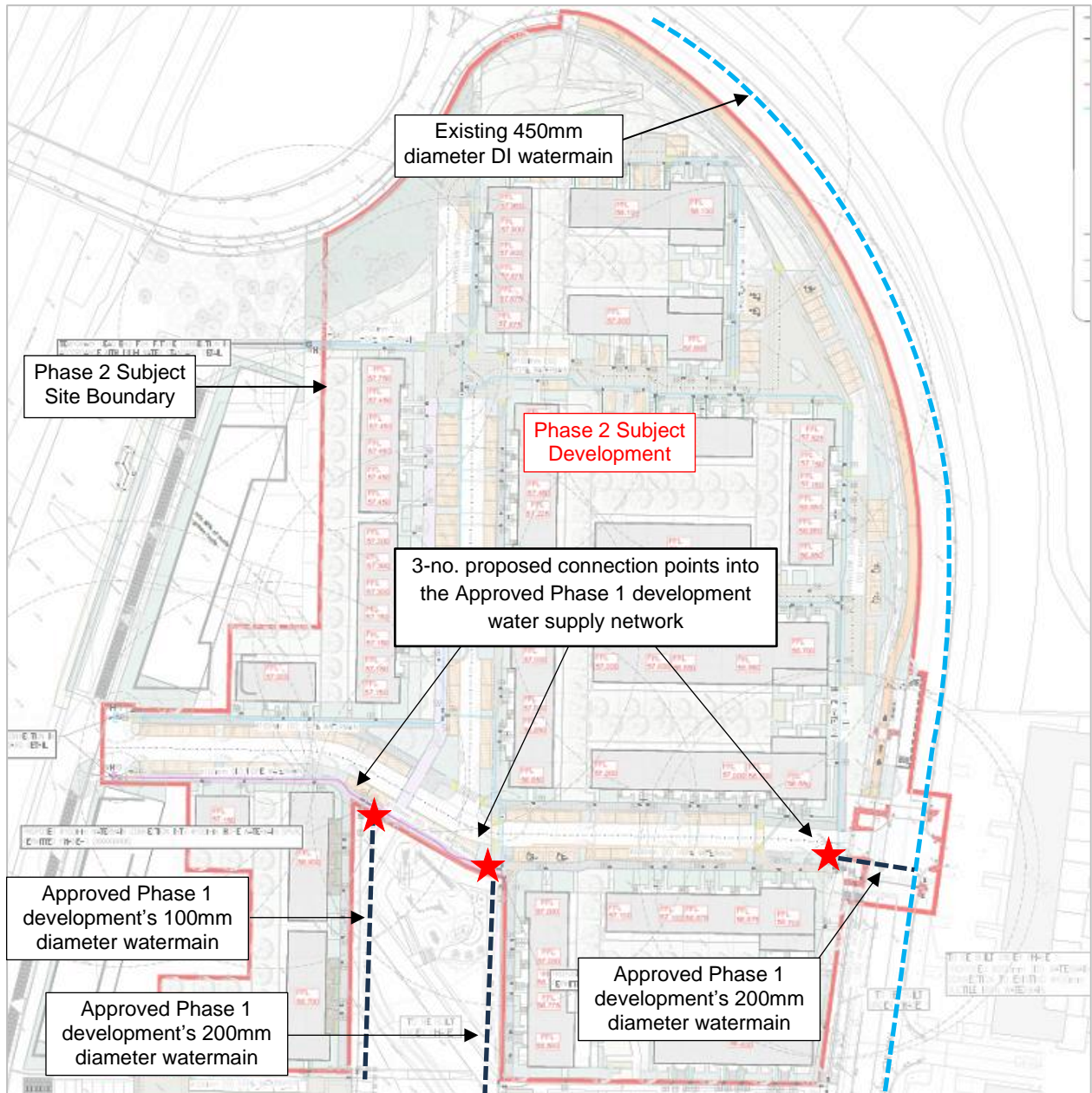


Figure 6-2: Subject Development's Proposed Water Supply Connection Points

6.4 Proposed Water Supply Calculations

6.4.1 Subject Development

The subject development is proposed to be a residential development with a total of 137 no. residential units. The average domestic demand has been established based on an average occupancy ratio of 2.7 persons per dwelling with a daily domestic per capita consumption of 150 litres per head per day, as per Appendix C of the Uisce Éireann Code of Practice for Water Infrastructure.

The average day/peak week demand has been taken as 1.25 times the average daily domestic demand, while the peak demand has been taken as 5 times the average day/peak week demand, as per Section 3.7.2 of the Uisce Éireann Code of Practice for Water Infrastructure.

Based on the Uisce Éireann Code of Practice for Water Infrastructure, the subject development's water supply demands are outlined in Table 6-1: Calculation of Phase 2's Water Demand, below.

Table 6-1: Calculation of Phase 2's Water Demand

	Description	Total Population	Water demand	Average Demand	Average Peak Demand	Peak Demand
		No. People	ℓ/day	ℓ/s	ℓ/s	ℓ/s
Phase 2	137 units	370	55,485	0.642	0.803	4.014

The average demand for water supply from the Phase 2 development is 0.64 ℓ/s, with a peak demand of 4.01 ℓ/s.

It is noted that the average demand for the masterplan development on Sites 4 and 5 (including the subject site) is 7.33 ℓ/s, with a peak demand of 45.84 ℓ/s.

The subject development's water supply demand is thus 9% of the masterplan developments overall water supply demand.

6.5 Water Supply – General

All watermains will be laid strictly in accordance with Uisce Éireann requirements for taking in charge as per the Uisce Éireann Code of Practice for Water Infrastructure (July 2020 Revision 2) and the Uisce Éireann Water Infrastructure Standard Details (July 2020 Revision 4).

Valves, hydrants, scour and sluice valves, and bulk water meters will be provided in accordance with the requirements of Uisce Éireann within the above-mentioned documents.

6.6 Water Conservation

The water demand for the Phase 2 Subject Site residential development can be subdivided as follows:

- Potable / Non-potable Breakdown

Detailed studies have quantified the breakdown between potable and non-potable uses for residential uses. According to the guideline: Promoting Sustainable Household Water Consumption, issued by Irish Water in September 2019, Figure 2.3 of the document (shown in Figure 6-3 below) illustrates the water use

patterns that have been documented for a three-person household in the UK (insufficient data is available from Ireland households).

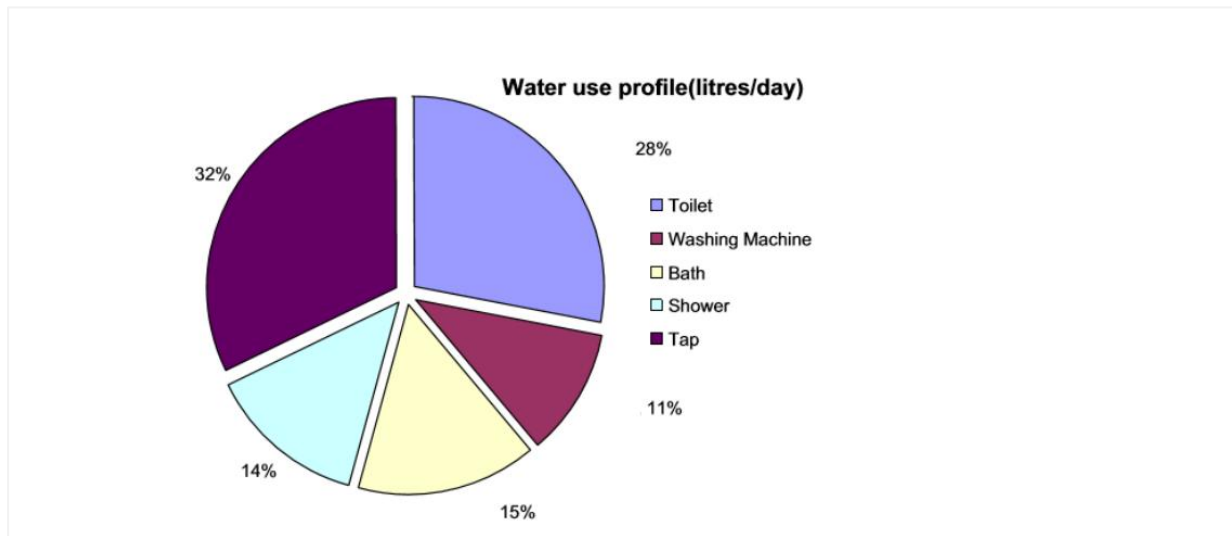


Figure 6-3: Water use patterns for 3-person households

The following water conservation measures will be used, to reduce overall water demand – water saving device installations including:

- Kitchen tap swivel aerator
- Water saving shower heads
- Spray taps
- Low volume flush / dual flush WC's
- Draw off tap controls
- Leak detection measures – through the metering of supply

7. Transport

A detailed Traffic and Transport Assessment (TTA) has been undertaken by Waterman Moylan and is submitted as part of this application under a separate cover. The TTA addresses various transport elements such as the receiving transport environment, the required car and parking quantum, the proposed car and cycle parking quantum, trip generation assessments, and impact on the surrounding environment.

A summary of key elements is included here within.

7.1 Proposed Site Access

Access to the Phase 2 Subject Site is via a proposed signalised junction off Park West Avenue, located at the southeast of the site. The junction design, including tactile paving formed part of the Approved Phase 1 development and is thus permitted, however, as part of the Phase 2 Subject Site, it is proposed to include traffic signal poles for pedestrian and vehicular signalisation at the junction. Sightlines at these junctions will comply with the requirements of DMURS. The fourth junction will form an at-grade signalised crossroads with Barnville Park. The signals at this junction will incorporate cycle and pedestrian phases. Access to Site 5 will be from an at-grade priority junction to be located on Barnville Park.

7.2 Car Parking

7.2.1 Car Parking Standards

Standards for car parking in new developments are set out in Appendix 5: Transport and Mobility – Technical Requirements of the Dublin City Development Plan 2022 – 2028. Parking standards are area-based with Cherry Orchard and the subject site in Zone 2 according to the Development Plans Map J.

For Houses, Apartments and Duplexes, Table 2 specifies a maximum provision of 1 space per unit in Zone 2.

7.2.2 Car Parking Proposed

The proposed car parking ratio for the residential development in Phase 2 is 1 space per unit with 137 spaces for the 137 units proposed. 4-no. accessible spaces are also proposed. Please refer to the Waterman Moylan Traffic and Transport Report submitted as part of this application, under a separate cover, for details pertaining to the parking rationale. A summary of the proposed parking for the Phase 2 Subject Site is included below.

For the houses, a total of 27 spaces are proposed on curtilage with 114 number spaces on-street.

- 27 number on curtilage spaces for the houses.
- 74 number on-street spaces for the houses.
- 34 number on -street spaces for the apartments and duplex.
- 2 number on-street accessible spaces for the houses, apartments and duplex.
- 4 number on-street accessible spaces

The locations of the car parking spaces are shown on the architectural and engineering drawings included with the planning application.

7.2.3 Cycle Parking Standards

Standards for cycle parking are set out in Section 3.0 of Appendix 5 to the Dublin City Development Plan 2022 – 2028. The cycle parking standards for Zone 2 reproduced from Table 1 of Appendix 5 are presented in the table below.

Table 7-1: Cycle Parking Standards

Land Use	Long Term	Short Stay
Residential Dwelling	1 per unit	1 per 5 dwellings
Residential Apartment	1 per bedroom	1 per 2 apartments

The required cycle parking for the Phase 2 development is discussed in detailed in the TTA, the summary of which is included below:

Long Term Cycle Parking Required = 191 spaces

Short Term Cycle Parking Required = 38 spaces

7.2.4 Cycle Parking Provided

A total of 306 cycle parking spaces are proposed to be located as follows:

- 194 long stay spaces for houses with no rear access
- 90 long stay spaces for apartments and duplex.
- 4 cargo spaces for the apartments / duplex.
- 18 short stay spaces for visitors

The locations of these spaces are shown on the architectural and engineering drawings included in the planning application.

Shower / changing facilities for staff will be provided in accordance with Section 3.2 of Appendix 5 of the City Development Plan.

7.3 Public Transport

7.3.1 Existing Bus Services

Bus services in the area of the proposed development are a combination of historic services operated by Dublin Bus and new services provided under the auspices of Bus Connects. Dublin Bus Routes 79 and 79a which formerly served Park West Avenue, and the Park West & Cherry Orchard Station were replaced by Bus Connects Routes G1 and 60 in October 2022. Timetables for Routes G1 and 60 are included in Appendix B of the TTA.

Refer to Figure 7-1: Extract of Bus Connects Map for G-Spine and Route 60 for a map of the bus routes in the vicinity of the subject development.



Figure 7-1: Extract of Bus Connects Map for G-Spine and Route 60

7.3.2 Car Sharing Services

An existing car sharing base operated by GoCar Ireland is located at The Crescent Building in the Park West Business Park. This base is located in the Information Centre car park off Yeats Way at a walk time of 8 minutes (600 metres) from the subject site.

7.3.3 Existing Cycle Facilities

The existing cycle facilities in the area of the subject site comprise cycle tracks on both sides of Park West Road, partly on-road and partly off-road.

7.3.4 Existing Pedestrian Facilities

Existing pedestrian facilities in the area of the subject site comprise footpaths on both sides of Park West Road, Barnville Walk, Barnville Place, Cedar Brook Walk and Cedar Brook Way. There are no footpaths on Cedar Brook Avenue which is primarily a residential parking area.

Pedestrian crossing facilities are provided at the following locations:

- Junction 1: Uncontrolled Crossing (Cloverhill Road / Park West Avenue)

- Junction 4: Signalised Crossing (Park West Avenue / Barnville Walk).

7.3.5 Existing Rail Services

Park West & Cherry Orchard which opened in 2008, is an intermediate station on the Kildare Commuter Line with regular commuter and inter-city services including stopping services from Portlaoise and Newbridge to Heuston Station and from Hazelhatch & Celbridge to Grand Canal Dock. The train station is located along the southern border of the Site 4 masterplan lands.

For details of the rail routes serviced, frequency of routes, and operational hours of the station, please refer to the TTA.

7.4 Road Safety Audit

A Stage 1 Road Safety Audit undertaken by RoadPlan has been commissioned for the Phase 2 subject development and can be found in Appendix D of this report.

APPENDICES

A. Uisce Éireann Confirmation of Feasibility Letter (Masterplan Development)

CONFIRMATION OF FEASIBILITY

Robert Walpole

Waterman Moylan,
Block S, Eastpoint Business Park
Alfie Byrne Road
East Wall,
Dublin 3
D03H3F4

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Irish Water
PO Box 448,
South City
Delivery Office,
Cork City.

www.water.ie

21 October 2022

Our Ref: CDS22004824 Pre-Connection Enquiry
Cherry Orchard Sites 4 and 5, Park West Avenue, Cherry Orchard,
Dublin 10, Co. Dublin

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Irish Water has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 1,293 unit(s) at Cherry Orchard Sites 4 and 5, Park West Avenue, Cherry Orchard, Dublin 10, Co. Dublin, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Irish Water
- Site 4 is to be connected (Via a new 200mm connection main) to the existing 300mm ductile iron spur off of the 450mm DI Trunk Main in Park West Avenue opposite the Cherry Orchard Green junction (Purple line in mapping below). A new DMA will be required here with a minimum 200mm spine main within the development. Metering and telemetry will be required at this new connection.

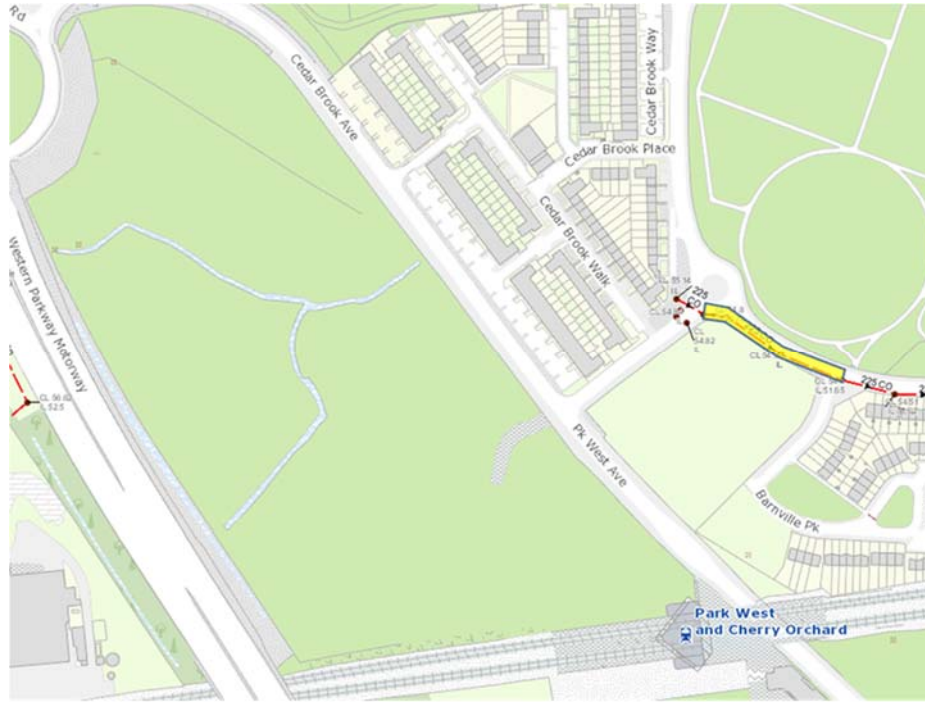


Figure 1 -Wastewater upgrades

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Irish Water.

As the network capacity changes constantly, this review is only valid at the time of its completion. As soon as planning permission has been granted for the Development, a completed connection application should be submitted. The connection application is available at www.water.ie/connections/get-connected/

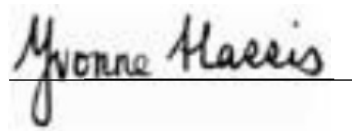
Where can you find more information?

- **Section A** - What is important to know?
- **Section B** - Details of Irish Water's Network(s)

This letter is issued to provide information about the current feasibility of the proposed connection(s) to Irish Water's network(s). This is not a connection offer and capacity in Irish Water's network(s) may only be secured by entering into a connection agreement with Irish Water.

For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,

A handwritten signature in black ink, reading "Yvonne Harris", written over a horizontal line.

Yvonne Harris
Head of Customer Operations

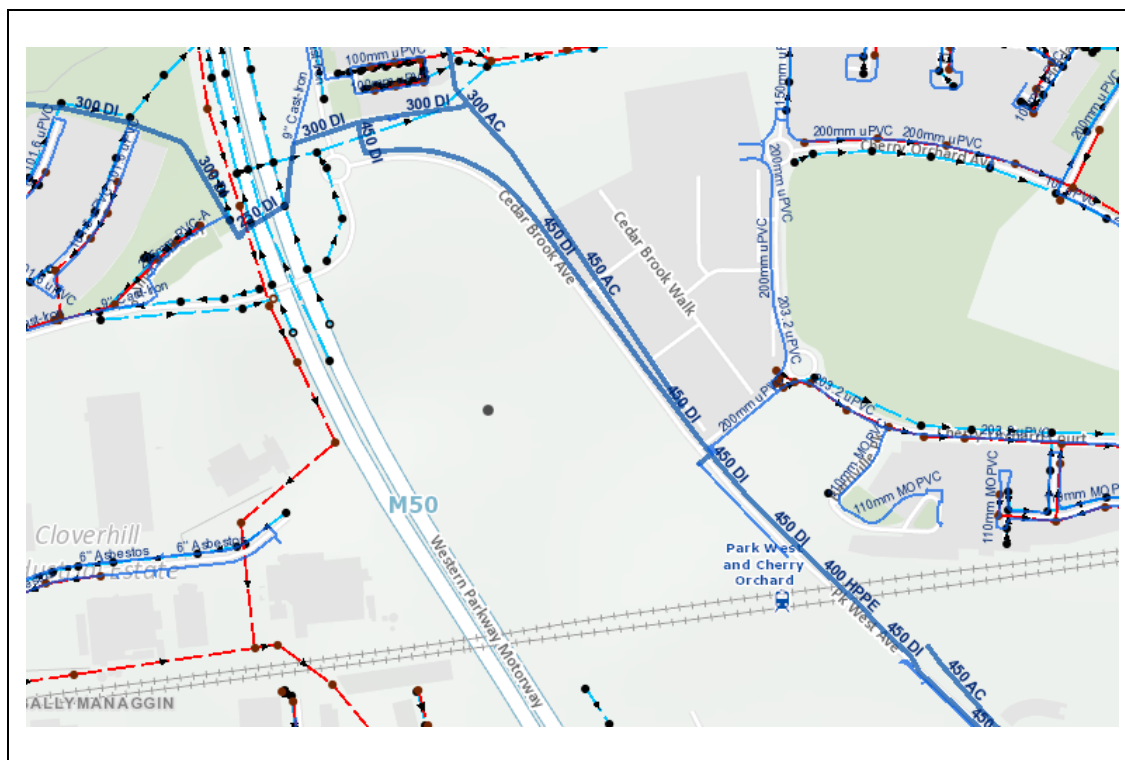
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Irish Water's network(s). • Before the Development can connect to Irish Water's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Irish Water.
When should I submit a Connection Application?	<ul style="list-style-type: none"> • A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	<ul style="list-style-type: none"> • Irish Water connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	<ul style="list-style-type: none"> • All works to Irish Water's network(s), including works in the public space, must be carried out by Irish Water*. <p>*Where a Developer has been granted specific permission and has been issued a connection offer for Self-Lay in the Public Road/Area, they may complete the relevant connection works</p>
Fire flow Requirements	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to fire flow requirements for the Development. Fire flow requirements are a matter for the Developer to determine. • What to do? - Contact the relevant Local Fire Authority
Plan for disposal of storm water	<ul style="list-style-type: none"> • The Confirmation of Feasibility does not extend to the management or disposal of storm water or ground waters. • What to do? - Contact the relevant Local Authority to discuss the management or disposal of proposed storm water or ground water discharges.
Where do I find details of Irish Water's network(s)?	<ul style="list-style-type: none"> • Requests for maps showing Irish Water's network(s) can be submitted to: datarequests@water.ie

<p>What are the design requirements for the connection(s)?</p>	<ul style="list-style-type: none"> The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with <i>the Irish Water Connections and Developer Services Standard Details and Codes of Practice</i>, available at www.water.ie/connections
<p>Trade Effluent Licensing</p>	<ul style="list-style-type: none"> Any person discharging trade effluent** to a sewer, must have a Trade Effluent Licence issued pursuant to section 16 of the Local Government (Water Pollution) Act, 1977 (as amended). More information and an application form for a Trade Effluent License can be found at the following link: https://www.water.ie/business/trade-effluent/about/ <p>**trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)</p>

Section B – Details of Irish Water’s Network(s)

The map included below outlines the current Irish Water infrastructure adjacent the Development: To access Irish Water Maps email datarequests@water.ie



Reproduced from the Ordnance Survey of Ireland by Permission of the Government. License No. 3-3-34

Note: The information provided on the included maps as to the position of Irish Water’s underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Irish Water.

Whilst every care has been taken in respect of the information on Irish Water’s network(s), Irish Water assumes no responsibility for and gives no guarantees, undertakings or warranties concerning the accuracy, completeness or up to date nature of the information provided, nor does it accept any liability whatsoever arising from or out of any errors or omissions. This information should not be solely relied upon in the event of excavations or any other works being carried out in the vicinity of Irish Water’s underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Irish Water’s underground network(s) is identified prior to excavations or any other works being carried out. Service connection pipes are not generally shown but their presence should be anticipated.

B. Uisce Éireann Confirmation of Feasibility Letter (Phase 2 Development)

CONFIRMATION OF FEASIBILITY

Penelope Ingle

Waterman Moylan
Block S
Eastpoint Business Park
Alfie Bryne Road, Dublin 3
Dublin
D03H3F4

26 March 2024

Uisce Éireann
Bosca OP 448
Oifig Sheachadta na
Cathrach Theas
Cathair Chorcaí

Uisce Éireann
PO Box 448
South City
Delivery Office
Cork City

www.water.ie

**Our Ref: CDS24001410 Pre-Connection Enquiry
Phase 2, Cherry Orchard, Dublin 10, Dublin**

Dear Applicant/Agent,

We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Housing Development of 160 unit(s) at Phase 2, Cherry Orchard, Dublin 10, Dublin, (the **Development**).

Based upon the details provided we can advise the following regarding connecting to the networks;

- **Water Connection** - Feasible without infrastructure upgrade by Uisce Éireann
- As per Cherry Orchard Masterplan, the entire Site 4 (Phase 1 and 2) was proposed to create as a separate DMA, the connection being taken from existing 300mm DI spur from 450mm DI main at junction of Park West Avenue and Cherry Orchard Green.
- A DMA meter with associate telemetry and a PRV valve are required at the connection point for the Site 4.



Stiúrthóirí / Directors: Tony Keohane (Cathaoirleach / Chairman), Niall Gleeson (POF / CEO), Christopher Banks, Fred Barry, Gerard Britchfield, Liz Joyce, Patricia King, Eileen Maher, Cathy Mannion, Michael Walsh.

Oifig Chláraithe / Registered Office: Teach Colvill, 24-26 Sráid Thalbóid, Baile Átha Cliath 1, D01 NP86 / Colvill House, 24-26 Talbot Street, Dublin, Ireland D01NP86

Is cuideachta ghníomhaíochta ainmnithe atá faoi theorainn scaireanna é Uisce Éireann / Uisce Éireann is a design activity company, limited by shares. Cláraithe in Éirinn Uimh.: 530363 / Registered in Ireland No.: 530363.

- Minimum 200mm spine main is required within the site 4 to provide adequate supply and fire flow.
- Phase 1 arterial route (spine main) of the Development must be completed and connected to Uisce Éireann network, as per the Master Plan, before connection of the Phase 2.

• **Wastewater Connection** - Feasible Subject to upgrades

- In order to accommodate the proposed connection, upgrade works are required to increase the capacity of Uisce Éireann network downstream of the Development. Uisce Éireann currently has a project underway which will provide the necessary upgrade and capacity. This upgrade project is scheduled to be completed in Q3 2028 (this may be subject to change)
- Approximate connection point location is shown below:



- Network extension works from the connection point up to the Development site will be funded by the Developer. The fee will be calculated at a connection application stage.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Uisce Éireann infrastructure. Before the Development can be connected to our network(s) you must submit a connection application and be granted and sign a connection agreement with Uisce Éireann.

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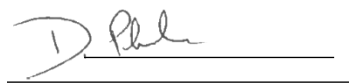
Where can you find more information?

- **Section A** - What is important to know?
- **Section B** - Details of Uisce Éireann's Network(s)

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For any further information, visit www.water.ie/connections, email newconnections@water.ie or contact 1800 278 278.

Yours sincerely,

A handwritten signature in dark ink, appearing to read 'D. Phelan', is written over a horizontal line.

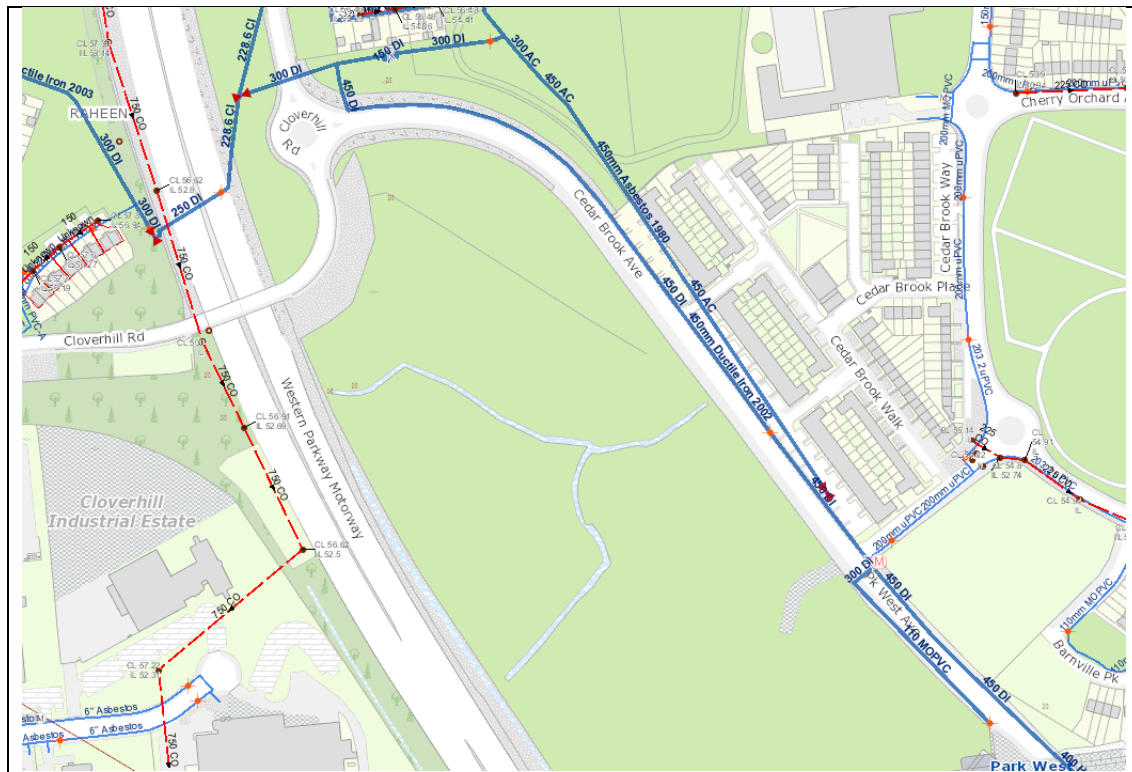
Dermot Phelan
Connections Delivery Manager

Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	<ul style="list-style-type: none"> • Yes, a contract is required to connect. This letter does not constitute a contract or an offer in whole or in part to provide a connection to Uisce Éireann's network(s). • Before the Development can connect to Uisce Éireann's network(s), you must submit a connection application <u>and be granted and sign</u> a connection agreement with Uisce Éireann.
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Where do I find details of Uisce Éireann's network(s)?	<ul style="list-style-type: none"> • Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

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datarequests@water.ie



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C. Greenfield Runoff Rate Calculation (Catchment 1)

CATCHMENT 1

Calculated by:	Penelope Ingle
Site name:	Phase 2 Cherry Orchard
Site location:	Cherry Orchard, Dublin

This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance "Rainfall runoff management for developments", SC030219 (2013), the SuDS Manual C753 (Ciria, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Site Details	
Latitude:	53.33714° N
Longitude:	6.38374° W
Reference:	4016782554
Date:	Jan 16 2024 00:15

Runoff estimation approach

IH124

Site characteristics

Total site area (ha):	5.94
-----------------------	------

Methodology

Q _{BAR} estimation method:	Calculate from SPR and SAAR
SPR estimation method:	Calculate from SOIL type

Notes

(1) Is Q_{BAR} < 2.0 l/s/ha?

When Q_{BAR} is < 2.0 l/s/ha then limiting discharge rates are set at 2.0 l/s/ha.

Soil characteristics

	Default	Edited
SOIL type:	2	2
HOST class:	N/A	N/A
SPR/SPRHOST:	0.3	0.3

(2) Are flow rates < 5.0 l/s?

Where flow rates are less than 5.0 l/s consent for discharge is usually set at 5.0 l/s if blockage from vegetation and other materials is possible. Lower consent flow rates may be set where the blockage risk is addressed by using appropriate drainage elements.

Hydrological characteristics

	Default	Edited
SAAR (mm):	954	755
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

(3) Is SPR/SPRHOST ≤ 0.3?

Where groundwater levels are low enough the use of soakaways to avoid discharge offsite would normally be preferred for disposal of surface water runoff.

Greenfield runoff rates

Default

Edited

Q_{BAR} (l/s):	15.55	11.83
1 in 1 year (l/s):	13.22	10.05
1 in 30 years (l/s):	33.12	25.19
1 in 100 year (l/s):	40.59	30.87
1 in 200 years (l/s):	44.47	33.83

This report was produced using the greenfield runoff tool developed by HR Wallingford and available at www.uksuds.com. The use of this tool is subject to the UK SuDS terms and conditions and licence agreement , which can both be found at www.uksuds.com/terms-and-conditions.htm. The outputs from this tool are estimates of greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, CEH, Hydrosolutions or any other organisation for the use of this data in the design or operational characteristics of any drainage scheme.

D. RoadPlan Stage 1 Road Safety Audit for Phase 2 Subject Development

24222-01-001

**PROPOSED DEVELOPMENT AT
CEDAR BROOK AVENUE,
CHERRY ORCHARD, DUBLIN 10**

Road Safety Audit Stage 1

for

Waterman Moylan

DECEMBER 2024



7, Ormonde Road
Kilkenny.
R95 N4FE

Tel: 056 7795800
info@roadplan.ie
www.roadplan.ie

DOCUMENT CONTROL SHEET

Project Title	Proposed Development at Cherry Orchard, Dublin
Project No.	24222-01
Client	Waterman Moylan
Document Title	Road Safety Audit Stage 1
Document No.	24222-01-001

Status	Author(s)	Reviewed By	Approved By	Issue Date
Draft 1	HC/ GF	GF	GF	13/12/2024
Final	HC/ GF	GF	GF	19/12/2024

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2. STAGE 1 AUDIT	5
3. AUDIT TEAM STATEMENT	19
4. SAFETY AUDIT FEEDBACK FORM	20
APPENDIX A	22

1. INTRODUCTION

- 1.1 This report describes a Stage 1 Road Safety Audit carried out at the proposed development off Cedar Brook Avenue, Cherry Orchard, Dublin 10. The audit was carried out on 12th December 2024 in the offices of Roadplan Consulting, Kilkenny.
- 1.2 The audit team members were as follows:
 - George Frisby, BE CEng MIEI
Auditor Number GF51255
 - Harry Cullen, BE CEng MIEI
Auditor Number HC1333178
- 1.3 Both audit team members visited the site on the 12th November 2024. The audit comprised of an examination of the drawings relating to the scheme supplied by Waterman Moylan and an examination of the site.
- 1.4 The speed limit at the proposed works location is 30 km/h.
- 1.5 This Stage 1 Audit has been carried out in accordance with the relevant sections of TII GE-STY-01024. The team has examined only those issues within the design relating to the road safety implications of the scheme and has therefore not examined or verified the compliance of the design to any other criteria.
- 1.6 All problems described in this report are considered by the audit team to require action in order to improve the safety of the scheme and minimise accident occurrence.
- 1.7 Appendix A contains copies of the audited drawings.

2. STAGE 1 AUDIT

2.1 **Problem:** Traffic Control at Junction **Location :** Site Entrance

The proposed road markings and signage drawing shows a Yield sign at the junction of the proposed development and Cedar Brook Avenue. See Figure 1 below.

Given the scale of the development and the potential traffic generated, a Yield control at this junction may lead to traffic exiting the development without due regard to other traffic, leading to collisions and injuries.

It should be noted that the residential junction on the opposite side of the road has a STOP control at the junction – see Figure 2 below.

It may well be that given the scale of the development and the fact that there is a junction directly opposite the proposed entrance, that a safer solution may well be 'STOP' control at this junction with a pedestrian crossing to allow vulnerable road users to cross the road in safety.

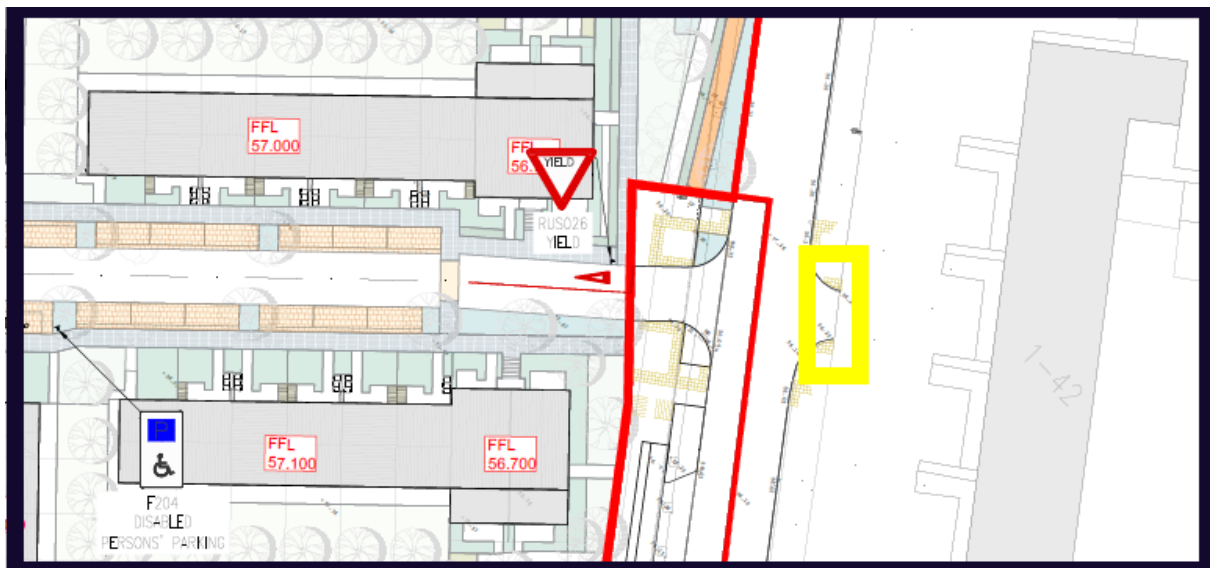


Figure 1: Traffic Control proposed at entrance to the development



Figure 2: 'STOP' Traffic Control at entrance to the development opposite the proposed site.

Recommendation:

Confirm that :

- an analysis has been carried out on peak traffic flows on Cedar Brook Avenue and the proposed development, and
- that the traffic control being proposed at the entrance/exit to the development is suitable to meet safety concerns of motorists, and
- that measures are proposed to ensure vulnerable road users can cross the road in safety at this location.

2.2 Problem: Additional Crossings of the main road

Location : Locations on the Site Boundary

There are a number of additional locations on the site boundary where gaps are being proposed for pedestrians/cyclists to exit onto the main road, but no pedestrian crossing facilities are being proposed at these locations. See Figure 3 below.

This could lead to vulnerable road users crossing the road in an uncontrolled manner, leading to collisions with injuries.



Figure 3: No facilities for pedestrians to cross the road

Figure 4 below shows Cedar Brook Avenue at the proposed site entrance/exit.



Figure 4: Cedar Brook Avenue near the proposed entrance to the site

Recommendation:

Provide facilities for vulnerable road users to cross the road at exit points from the site.

2.3 Problem: Parking for Disabled drivers

Location: In the Development

While there are a number of designated parking areas provided for wheelchair users, current guidelines would suggest that 5% of all parking spaces should be made available for disabled drivers. The number provided falls well short of this.

Recommendation:

Review the allocation of designated parking areas for wheelchair users, to meet with current guidelines. These disabled parking places should be located close to the dwellings.

2.4 Problem: EV Charging stations

Location: In the Development

There does not appear to be any charging points proposed for electric vehicles. Current guidelines would suggest that all developments should provide facilities for charging battery operated cars at a rate of up to 10% of the total car parking spaces.

Recommendation:

Review the allocation of designated charging points for electric vehicles, to meet with current guidelines.

2.5 Problem: Designated cycleways

Location: In the Development

There does not appear to be any designated cycleways called up on the drawings, and no indication of a connection from the site to the existing cycleways on both side of Cedar Brook Avenue.

This can lead to collision between pedestrians and cyclists on the footpaths in the development, leading to injuries, as well as difficulties with cyclists crossing Cedar Brook Avenue with no crossing facilities.

Recommendation:

Provide designated cycleways in the development (if not already provided), with connectivity throughout the development. Allow for connecting up to existing cycleways on Cedar Brook Avenue and provide facilities for cyclists to cross the main road in safety.

2.6 Problem: Parking

Location: In the Development

There is a location in the development where the swept paths indicate that drivers reversing into their designated parking place. This can lead to problems with some drivers entering and others exiting, as well as issues with disabled drivers finding this manoeuvre very difficult. This can lead to collisions with injuries. See Figure 5 below.

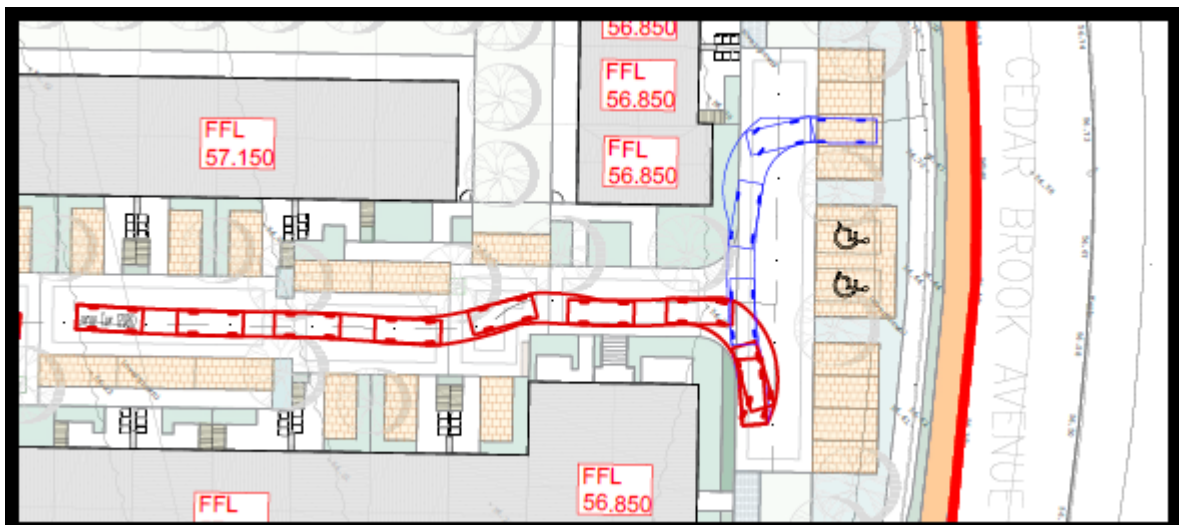


Figure 5: Requirement to reverse into parking places.

Recommendation:

Review the site layout to allow for easier access to parking at this location

2.7 Problem: Fire Tender Sweep Path

Location: In the Development

There are a number of locations where the fire tender vehicle appears to overhang footpaths and grass areas to complete manoeuvres, and even overhang the extents of the site. See Figure 6 below. This can lead to collisions with pedestrians leading to injuries.



Figure 6: Fire Tender overhangs

Recommendation:

Review Fire Tender Sweep path to ensure vulnerable road user safety is not comprised throughout the development.

2.8 **Problem: Refuse Truck Sweep Path**

Location: In the Development

There are a number of locations (circled in yellow on Figure 7 below) where the refuse truck vehicle appears to overhang footpaths, parking areas and grass areas to complete manoeuvres, and even overhang the extents of the site. See Figure 7 below. This can lead to collisions with pedestrians leading to injuries.

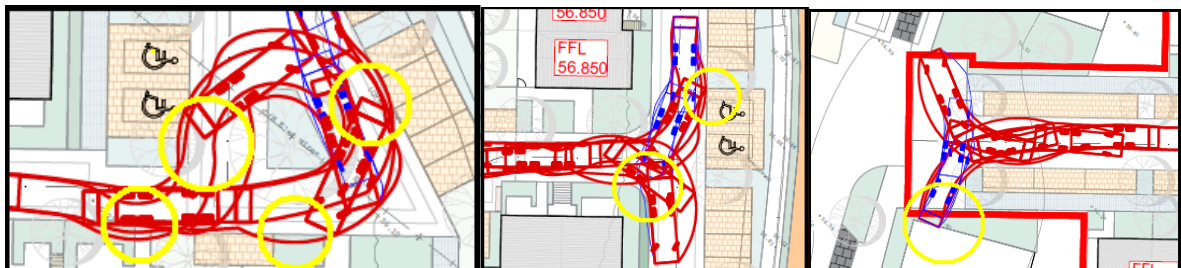


Figure 7: Refuse Truck overhangs

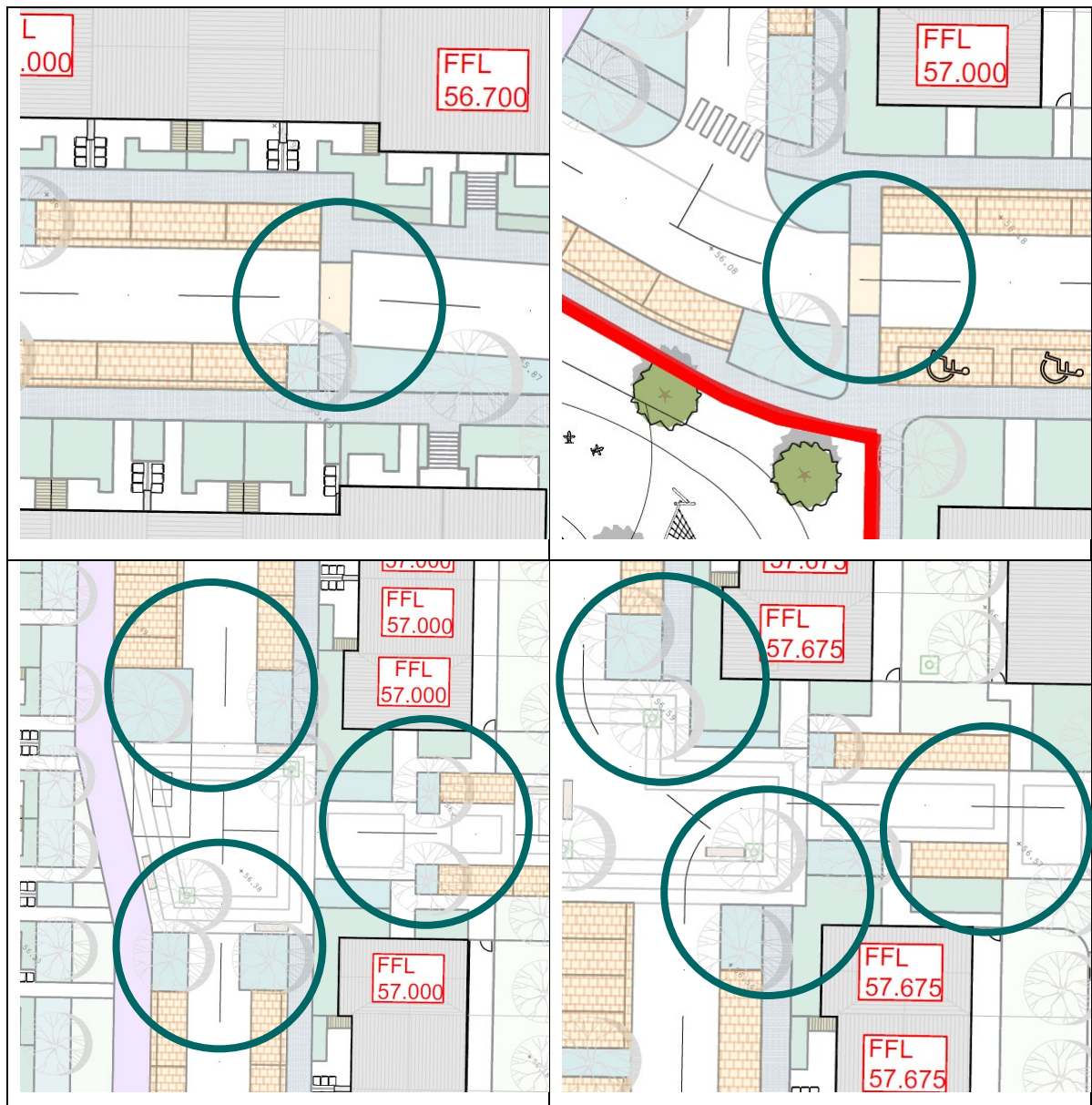
Recommendation:

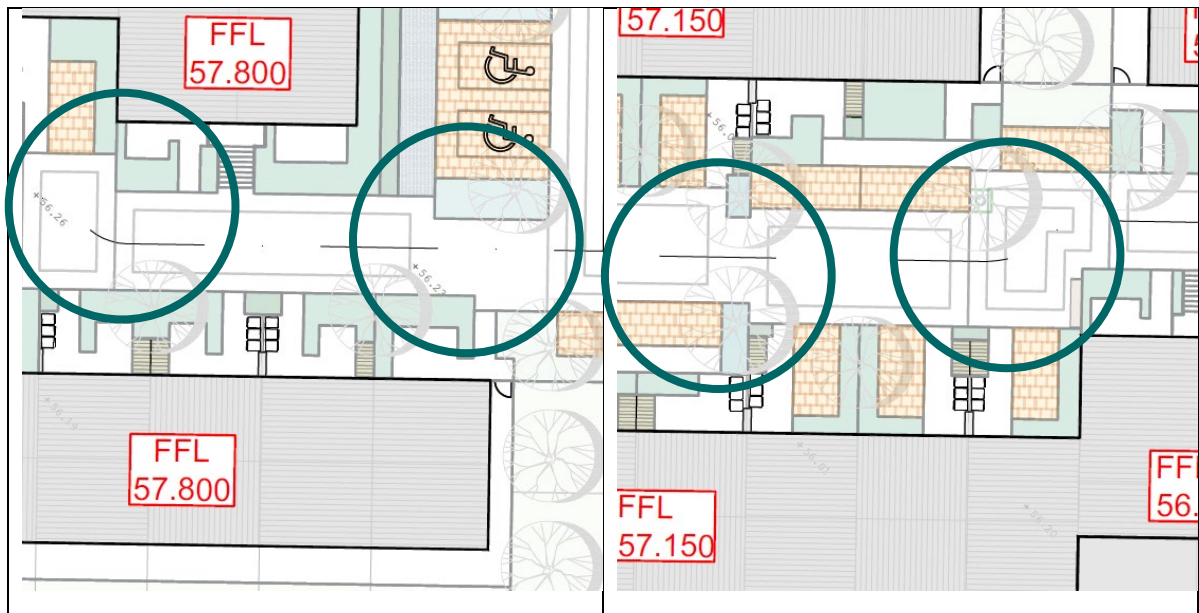
Review Refuse Truck Sweep path to ensure vulnerable road user safety is not comprised throughout the development.

2.9 Problem: Projected Buildouts in Carriageway

Location: In the Development

There are a number of locations where buildouts project into the carriageway resulting in pinch points. This can lead to side swipe collisions. In addition, in the absence of appropriate edge guidance, there is a risk of vehicles colliding with the buildout.



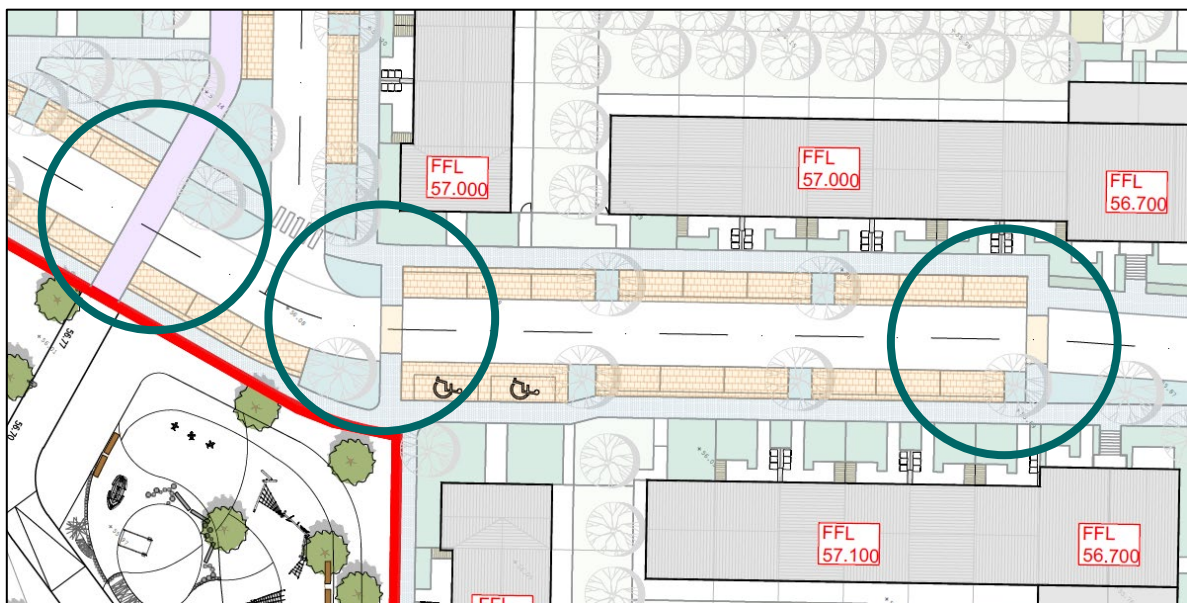
**Recommendation:**

Review the carriageway layout and provide adequate street space to cater the needs of all road users.

2.10 Problem: Priority at Pedestrian Crossings

Location: In the Development

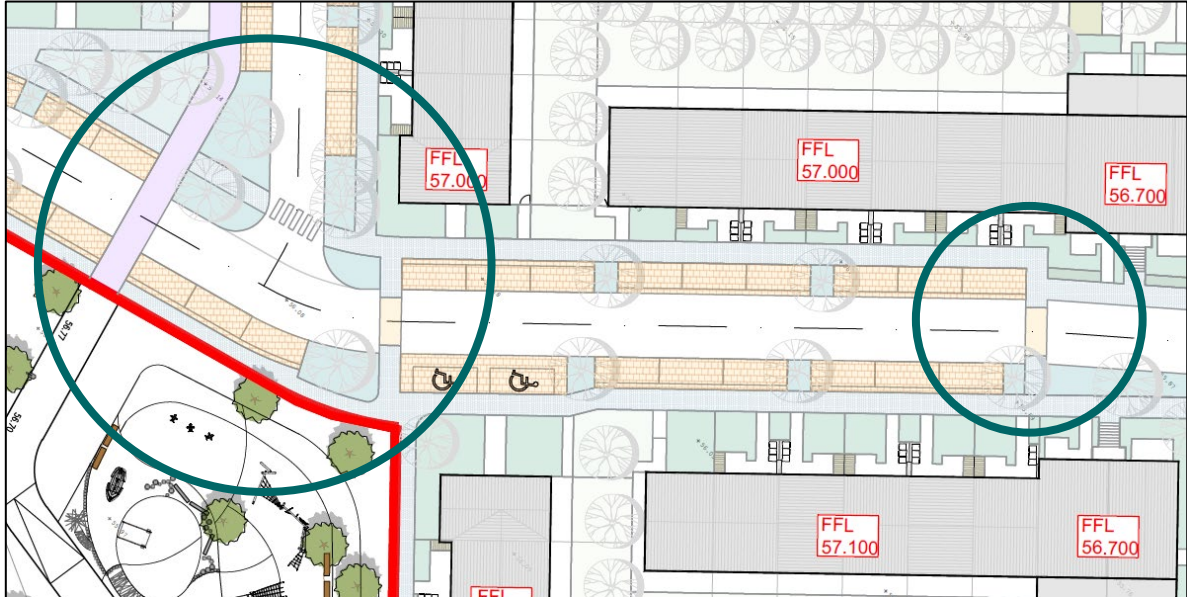
At a number of locations, pedestrian crossings are shown to be provided within the development without adequate crossing features indicating priority. Such a layout may confuse both motorists and pedestrians as to who has priority at the crossing which could contribute to a pedestrian collision at these locations.

**Recommendation:**

Review the proposed pedestrian crossings and provide adequate features to clearly define priority.

2.11 Problem: Inadequate Pedestrian Crossing Features**Location:** In the Development

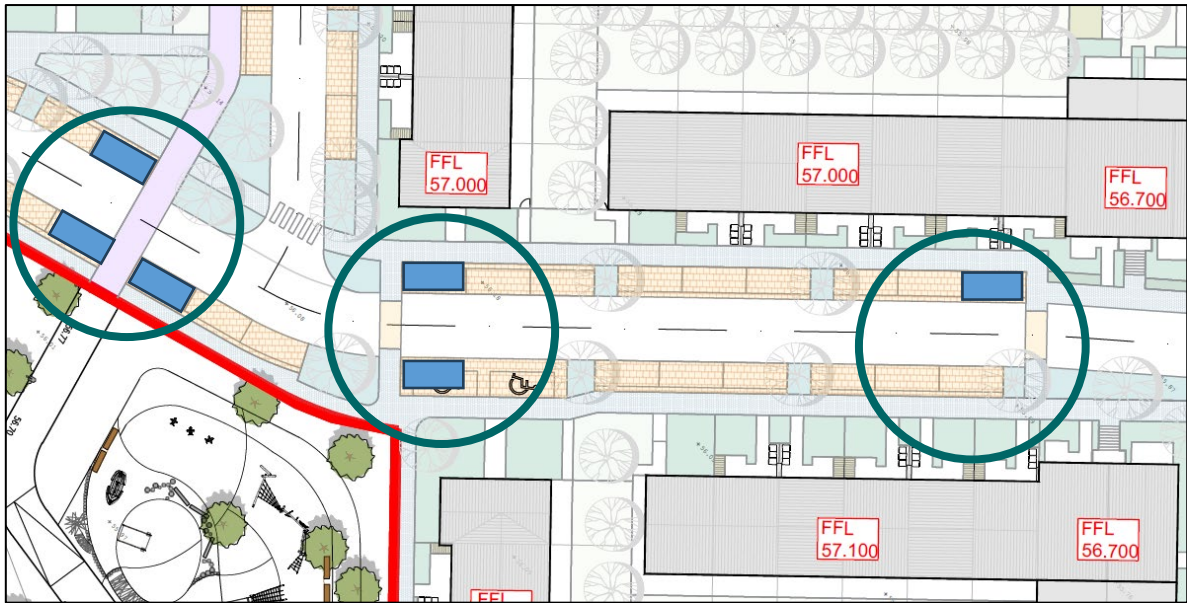
Facilities such as dropped kerbs and tactile paving are not shown to be provided for pedestrians at proposed pedestrian crossings. This may cause difficulty or delay for crossing movements by pedestrians and increase the risk of their being struck by passing motor traffic.

**Recommendation:**

Provide facilities such as dropped kerbs and tactile paving for pedestrians where their presence is anticipated.

2.12 Problem: Intervisibility between Pedestrians and Drivers**Location:** In the Development

Intervisibility between pedestrians crossing pedestrian crossings at the locations shown below and drivers of vehicles approaching the crossings may be restricted by parked cars adjacent to the crossing. A lack of adequate intervisibility may contribute to a collision at these locations.

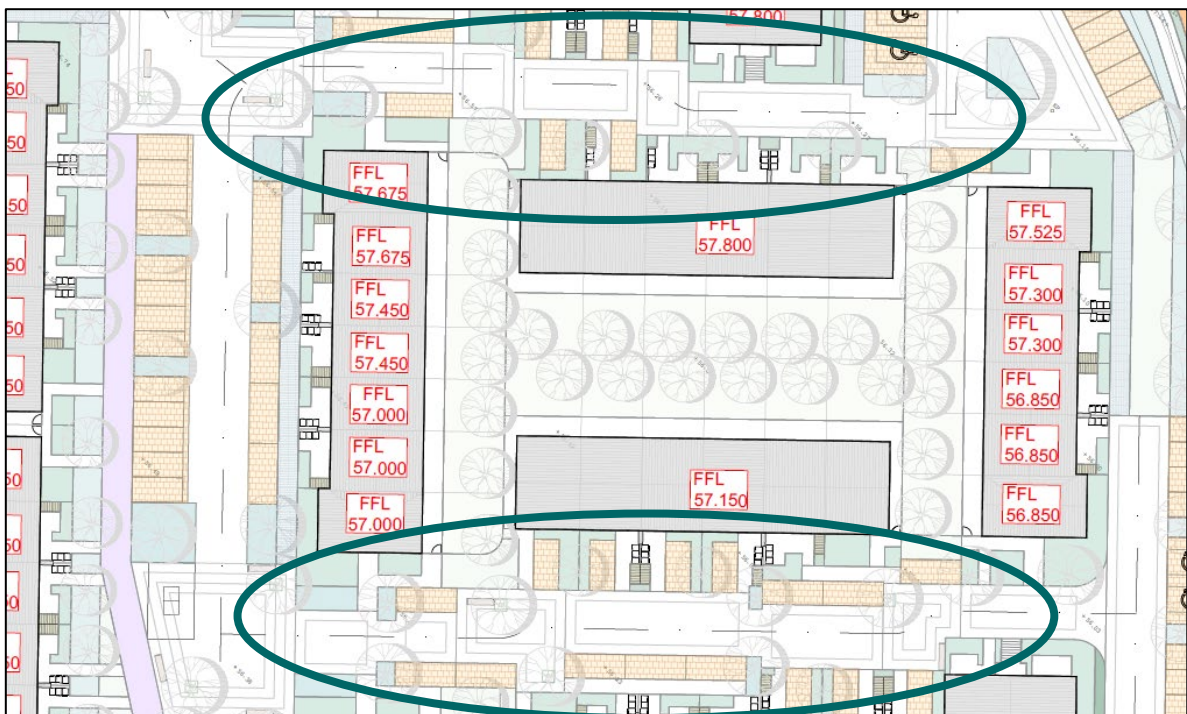
**Recommendation:**

Ensure adequate intervisibility is provided between pedestrians and drivers of vehicles approaching all pedestrian crossing locations.

2.13 Problem: Inconsistent Width and Alignment of East West Access Roads

Location: In the Development

The east west access roads have an inconsistent width, and there are a number of locations where the alignment appears to be confusing to the road users and could increase the risk of collisions at these locations.



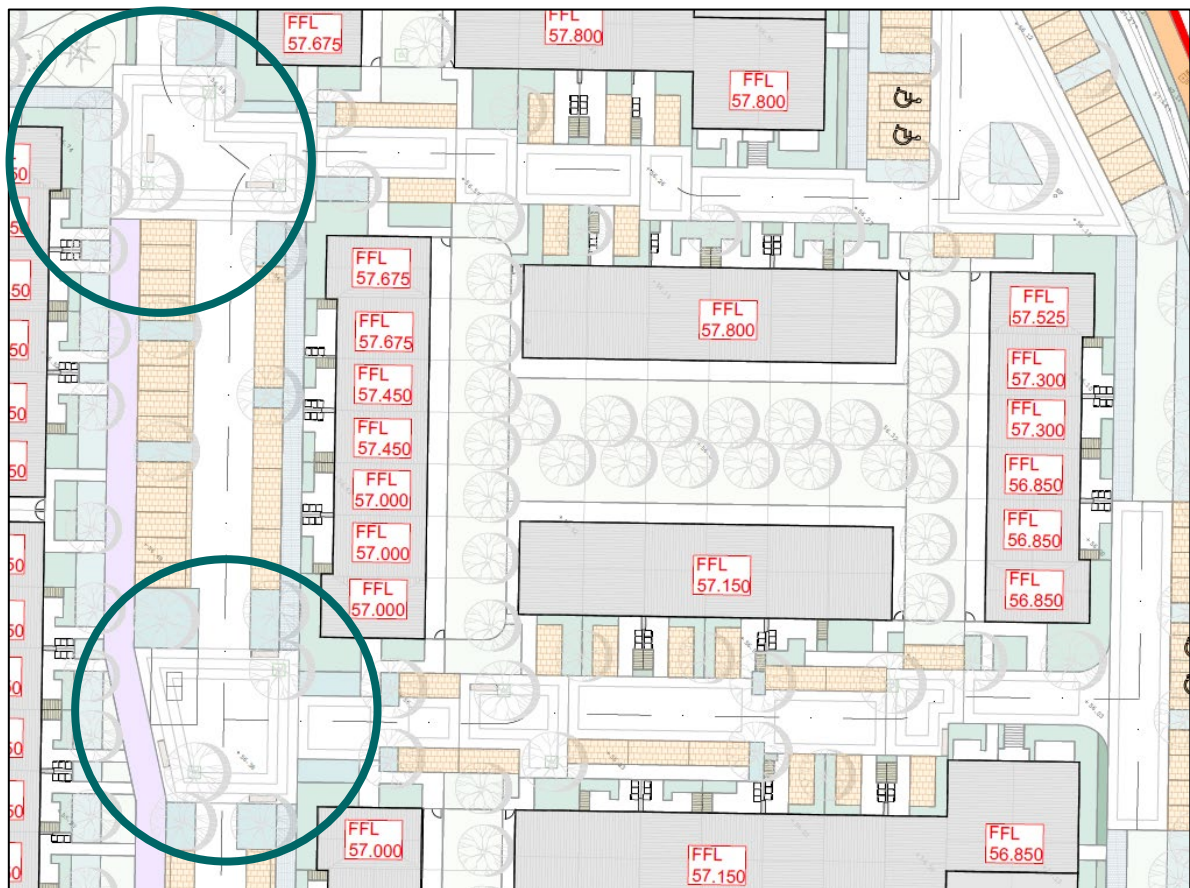
Recommendation:

The east west access roads should have a consistent width and smooth alignment to minimise potential conflict for road users.

2.14 Problem: Confusing Junction Layout

Location: In the Development

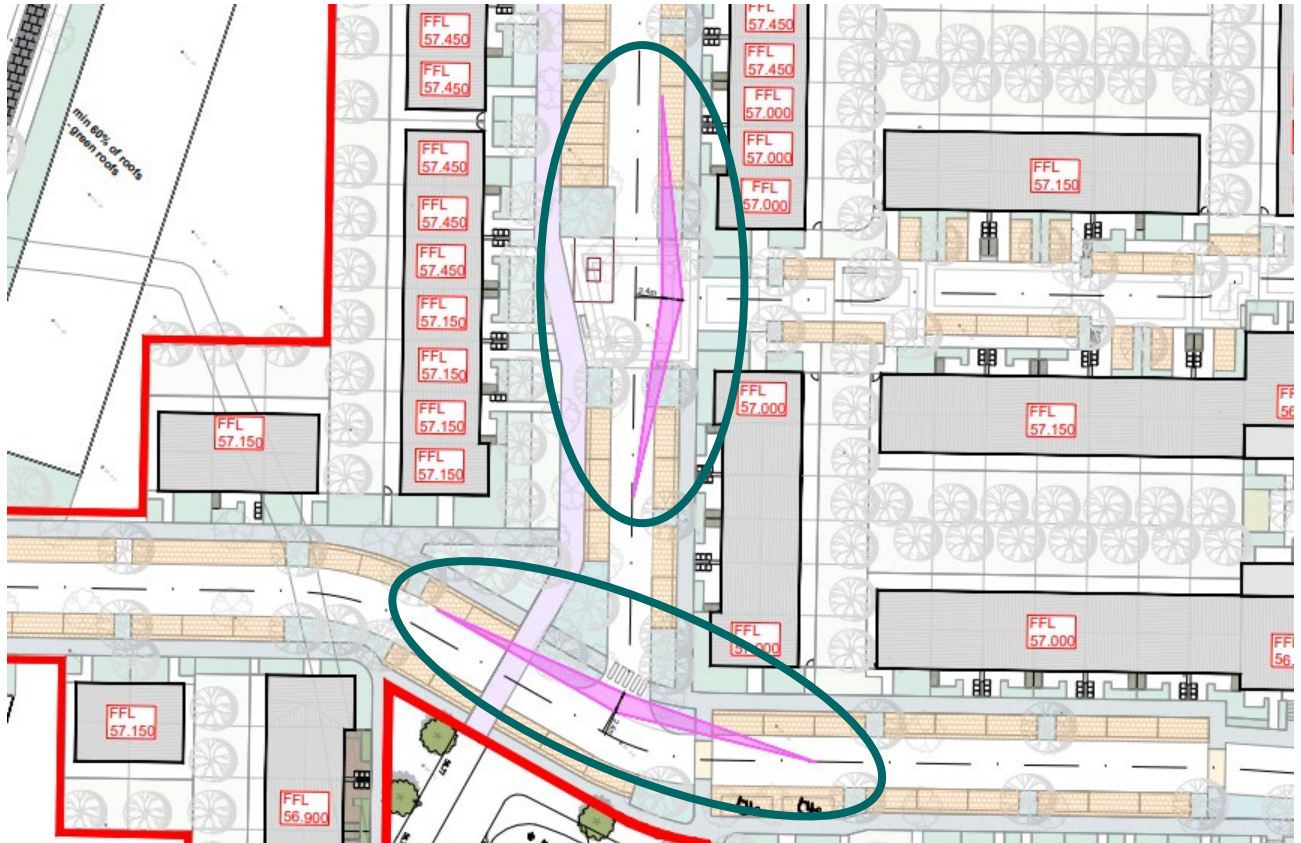
The layout and priority at some junctions appears to be confusing to road users at a number of locations which could contribute to pedestrian collisions and vehicle collisions at these locations.

**Recommendation:**

The proposed junction layouts should be reviewed and modifications implemented to ensure safety of all user groups.

2.15 Problem: Priority and Layout of Junctions**Location:** In the Development

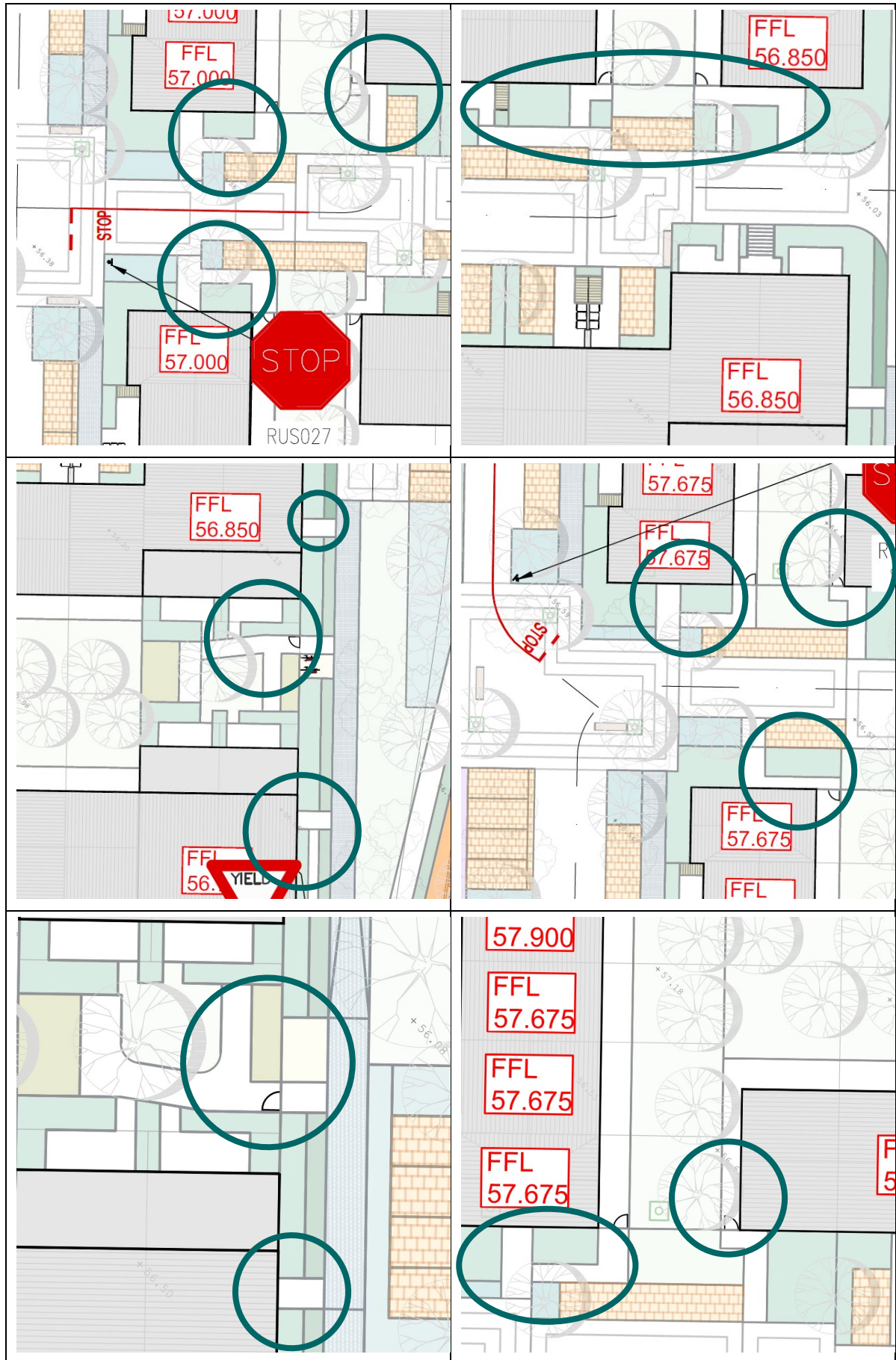
The visibility splays at a number of locations may be partially obstructed by trees located within the roadside verge and parked cars adjacent to the junctions. Lack of adequate visibility may increase the likelihood of a collision at these locations.

**Recommendation:**

Ensure that adequate visibility splays are provided at all junctions within the proposed development.

2.16 Problem: Inadequate Footpath Width**Location:** In the Development

The footpath widths appear to be insufficient to accommodate mobility impaired pedestrians at a number of locations. This may result in pedestrians travelling along the carriageway where they would be at an increased risk of being struck by a passing vehicle, or into adjacent landscaping causing injury.



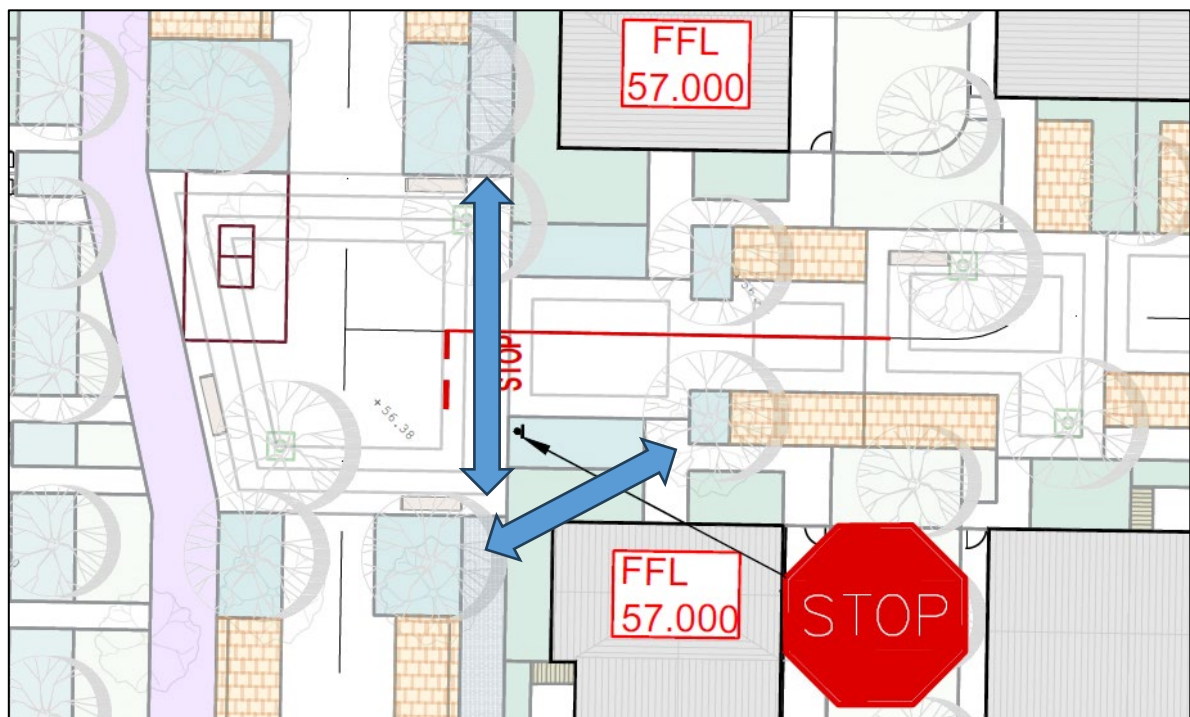
Recommendation:

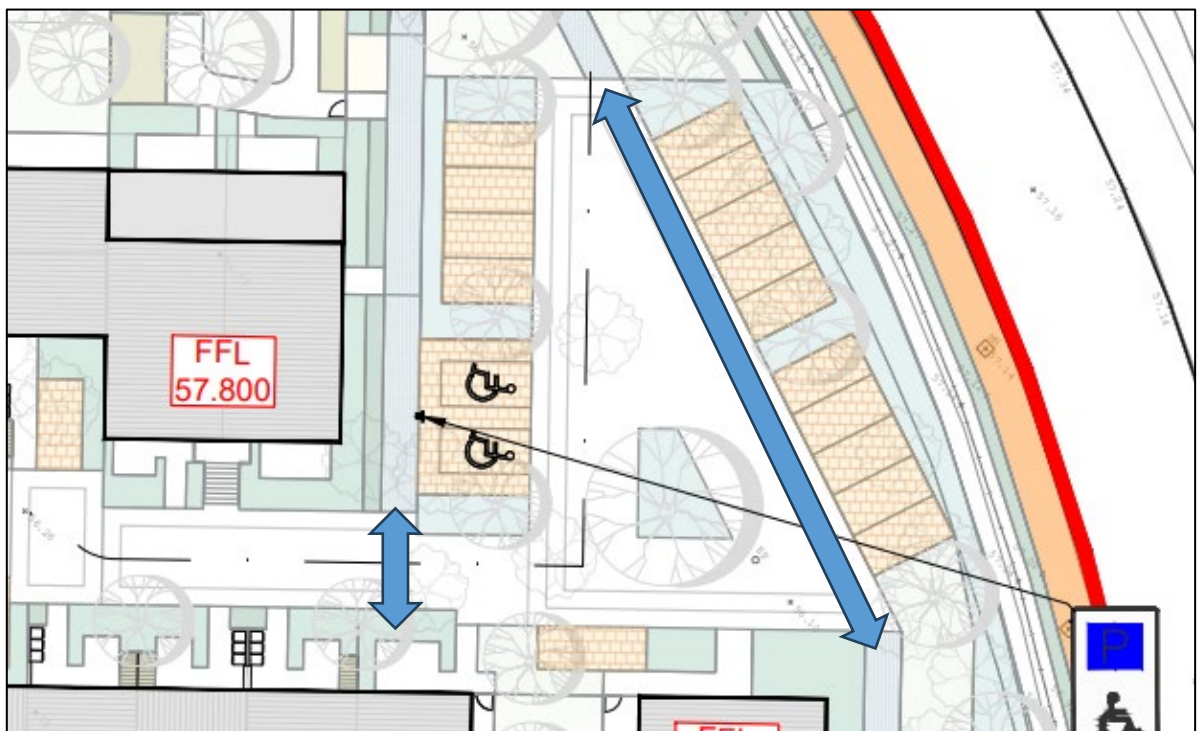
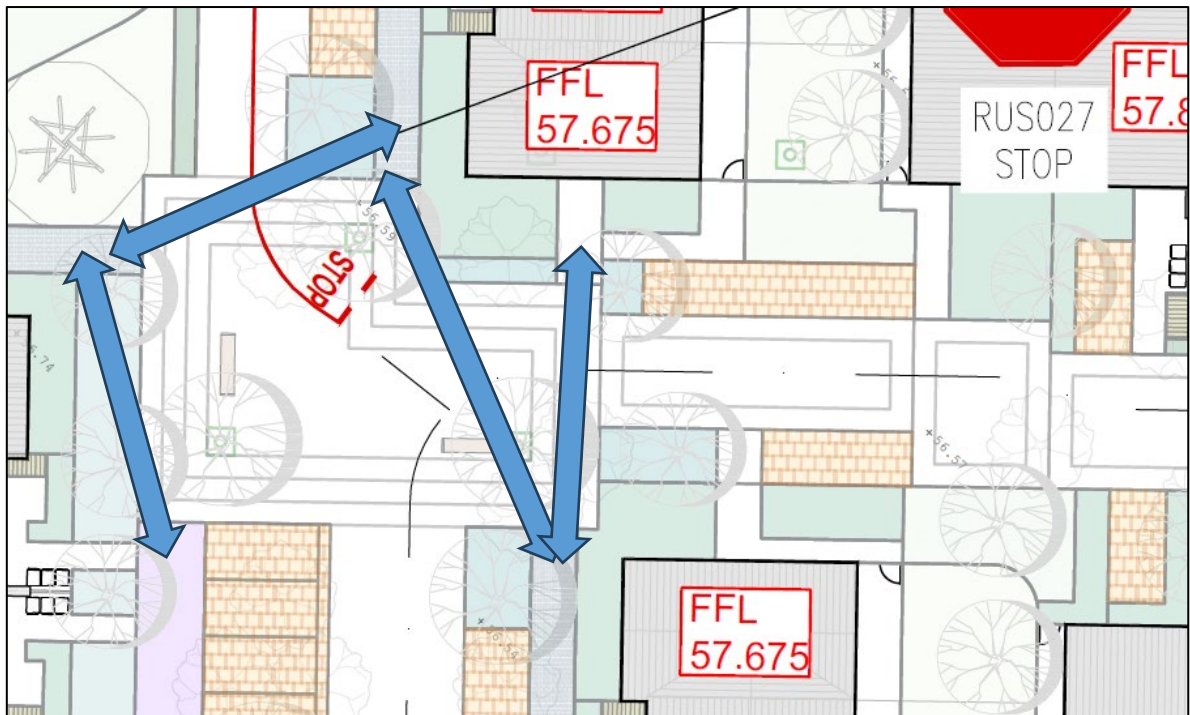
Ensure that adequate footpath widths are provided throughout the proposed development.

2.17 Problem: Priority and Layout of Junctions

Location: In the Development

Connectivity of pedestrian facilities appears incomplete in terms of pedestrian linkage at the locations indicated below. The lack of an adequate connection may lead to pedestrian slips, trips and falls at this location. Furthermore, where adequate guidance features are not provided, visually impaired pedestrians may become disoriented in the shared space and may stray onto the central access road, increasing the risk of collisions.



**Recommendation:**

- Adequate pedestrian links should be provided to the existing pedestrian footpaths to improve connectivity.
- Measures should be provided to provide guidance to visually impaired pedestrians.

3. AUDIT TEAM STATEMENT

- 3.1 We certify that we have examined the drawings listed in Appendix A and have inspected the site. This examination has been carried out with the sole purpose of identifying any features of the scheme that could be removed or modified to improve the safety of the scheme.

Signed.....  George Frisby

Date12th December 2024.....

Signed.....  Harry Cullen

Date12th December 2024.....

4. SAFETY AUDIT FEEDBACK FORM

Scheme: Proposed Development at Cedar Brook Avenue, Cherry Orchard, Dublin

Document Number: 24222-01-001

Audit Stage: Stage 1 RSA

Date Audit Completed: 12th December 2024

Paragraph No. in Safety Audit Report	To Be Completed By Designer			To Be Completed by Audit Team Leader
	Problem accepted (yes/no)	Recommended measure Accepted (yes/no)	Describe alternative measure(s). Give reasons for not accepting recommended measure. Only complete if recommended measure is not accepted.	Alternative measures or reasons accepted by auditors (yes/no)
2.1	YES	YES	Please refer to the updated roads markings and signage drawing no. COP-WMC-PH2-00-DR-P-0110. The yield sign at the proposed site access has been amended to reflect a signalised junction arrangement. The details of the signalised junction do not form part of the Phase 2 subject development, the junction is outside the redline boundary.	-----
2.2	YES	YES	The intention of the gap in the hedge along the boundary of the subject site is to allow cyclists to join the cycle lane from an access point off the subject development. This eliminates the need for cyclists to join the cycle lane at the extreme north or south access points of the cycle lane along Park West Avenue, offering a more convenient linkage position and saving cyclists time.	-----
2.3	YES	YES	The quantum of disabled/accessible car parking spaces is noted. The required 5% of accessible spaces will be included within the development. Please refer to the architects parking allocation drawings, with no. COP-PH2-CCK-S1b-00-DR-A-1034, for details of the 7-no. accessible car parking spaces (5% of total spaces) within the development.	-----

2.4	YES	YES	A total of 71-no. EV parking spaces (50%) of spaces is proposed within the development. Please refer to the architects parking allocation drawing, with no. COP-PH2-CCK-S1b-00-DR-A-1034, for details.	-----
2.5	YES	YES	<p>Cycle connectivity is provided for within the approved Phase 1 development's proposed junction which is located at the Phase 2 subject developments access location. Cycle lane linkage is provided for across the proposed junction, along the western edge of Park West Avenue.</p> <p>Additionally, several access locations to the north of the proposed development have been incorporated to allow pedestrians and cyclists to enter/exit the development. Please refer to Landscape Architects Drawing no. 100 for further details.</p>	-----
2.6	YES	YES	Please refer to the updated large vehicle auto-track analysis for the development depicting a different swept path analysis in this parking location.	-----
2.7	YES	YES	Please refer to the updated Fire Tender auto-track analysis for details. The auto-track analysis on the north of the subject development uses a reinforced grass area to enable its movement – this reinforced grass area has been designed into the scheme for the purposes of the fire tender and refuse vehicle movements. The internal roads network has been designed in accordance with DMURS guidance regarding road widths, layouts, horizontal deflections, etc.	-----
2.8	YES	YES	Please refer to the updated Refuse Vehicle auto-track analysis for details. The vehicle swept path has been retained within the roads edge with minor overhang movements shown in green spaces but does not hinder movement within designated pedestrian footpaths/areas. The internal roads network has been designed in accordance with DMURS guidance	-----

			regarding road widths, layouts, horizontal deflections, etc.	
2.9	YES	YES	<p>The use of buildouts and horizontal deflections within the Woonerfs/homezones (3 no. east-west roads to the north) have been incorporated as a traffic calming measure to ensure a slower speed of vehicles are adhered to within these shared surface streets for the ultimate safety of all road users (pedestrians/cyclists/vehicle users).</p> <p>Buildouts within the proposed main access road (southern road) can incorporate edge guidance if required. The greenspace areas adjacent to the buildouts can be tapered in to meet the buildouts where possible to facilitate a clearer defined roads edge. The parking spaces on either side of the buildouts can also be shifted 1m east/west to facilitate green spaces on all sides of the buildouts to enable the above mentioned tapering.</p>	-----
2.10	YES	YES	<p>Appropriate tactile paving at pedestrian crossings will be included within the proposed developments design to ensure clarity regarding pedestrian right of way and location of crossings. Please refer to the updated Waterman Moylan Drawing no. COP-WMC-PH2-00-DR-P-0101 - Proposed General Arrangement & Levels Layout, for details.</p>	-----
2.11	YES	YES	<p>As noted in 2.10, appropriate tactile paving will be provided at the outlined pedestrian crossings. Additionally, dropped kerbs will also be incorporated, if or where required.</p> <p>Existing pedestrian crossings located along the proposed access road to the south could be shifted 1m east/west to improve intervisibility between pedestrians and vehicles, if required.</p>	-----
2.12	YES	YES	Adequate visibility will be ensured for all pedestrians/vehicle users at proposed	-----

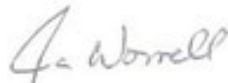
			pedestrian crossings. It is noted that single narrow elements such as flora with narrow stems and high foliage are permitted within visibility splays. The trees proposed within the development will be of this nature.	
2.13	YES	YES	<p>The 3-no. east-west road alignments north of the proposed main access road are proposed to be Woonerf/Homezone streets. As such, no kerbing and various horizontal deflections have been proposed along these roads, in accordance with DMURS, to promote lower vehicular speeds through these share surface streets to ensure the safety of all users (pedestrians/cyclists/vehicle users).</p> <p>The Woonerf streets serve as access to residential areas with a low quantum of units:</p> <ul style="list-style-type: none"> • The northern Woonerf street serves as access to 14-no. houses • The central Woonerf street serves as access to 15-no. houses • The southern Woonerf street serves as access to 22-no. houses. <p>These Woonerf streets are designed between 5-6m in width. Areas where the street is designed as 6m wide is to facilitate reverse movements of vehicles, in line with DMURS guidance.</p> <p>Introduction of pinch points throughout the Woonerf streets and differentiating surface finishes to that of the linking road (north-south alignment) within the development have been incorporated, in line with Woonerf principles.</p>	-----
2.14	YES	YES	Please refer to the updated roads markings and signage drawing no. COP-WMC-PH2-00-DR-P-0110 for details. The east-west Woonerf/homezone at this junction has been modified to incorporate a stop sign on the right arm to ensure road users are aware that	-----

			<p>priority is given to the north-south road users.</p> <p>This junction forms part of a Woonerf/homezone arrangement and is thus a shared surface for all user (pedestrian, cyclist, and vehicular) with reduced vehicular speeds.</p>	
2.15	YES	YES	<p>We note that all intervisibility splays within the development will be designed to ensure visibility between vehicles and pedestrians. The visibility splays at the Woonerf/homezone streets have been updated to reflect 20 km/hr speeds with a corresponding 15m visibility play.</p> <p>It is noted that single narrow elements such as flora with narrow stems and high foliage are permitted within visibility splays. The trees proposed within the development will be of this nature.</p>	-----
2.16	YES	YES	<p>The footpaths shown under this audit item are all on the private side, leading off the proposed Woonerf/homezone streets to private dwellings. These do not constitute public footpath arrangements but are rather defined as private footpath aprons which service the individual residential units; connecting to the rear gardens in many cases. These footpath arrangements do not form part of Part M requirements as they are not within the public street network.</p>	-----
2.17	YES	YES	<p>The proposed footpaths running north-south terminate at/connect into the proposed Woonerf/homezone street arrangements where a shared surface for pedestrians/cyclists and vehicle users is proposed. These Woonerf/homezone areas are considered to be pedestrian priority zones and are demarcated by:</p> <ul style="list-style-type: none"> • A difference in surface finish - block paving with granite surface finish – to communicate to pedestrians that they are entering a Woonerf street arrangement. • Raised table arrangement at intersection between road and 	-----

			<p>Woonerf/homezone to slow vehicular speeds</p> <ul style="list-style-type: none"> • Flush kerbs along the pedestrian routes through the Woonerf <p>Tactile paving indicating the direction of the continued footpath on the far side of the Woonerf/homezones, at the pedestrian footpaths have been incorporated to aid the visually impaired pedestrian. Please refer to the updated Waterman Moylan Drawing no. COP-WMC-PH2-00-DR-P-0101 - Proposed General Arrangement & Levels Layout, for details.</p> <p>Proposed footpaths running east-west within the Woonerf/homezone roads are not intended to connect to the main pedestrian linkages along the north-south alignment as they are private in nature.</p> <p>In general, we have updated these areas with tactile paving to promote better understanding of the direction of the connecting footpath element on the far side of the Woonerf junction for the sole purpose of facilitating the visually impaired. For all other users, the Woonerf junctions' intention is to allow free-flow pedestrian activity across the junction, in any direction.</p>	
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Safety Audit

Signed off



Design Team Leader

Print Name Ian Worrell

Date 19/12/2024

Safety Audit

Signed off



Employer

Print Name Clare Fox

Date 19/12/2024

Safety Audit

Signed off  **Audit Team Leader**

Print Name ...George Frisby.....

Date ...19/12/2024.....

Please complete and return to:

Roadplan Consulting,
7, Ormonde Road
Kilkenny
E-mail: info@roadplan.ie

APPENDIX A

List of Drawings Examined

The following drawings have been provided electronically in PDF format by Waterman Moylan and are appended here.

Drawing Number	Rev	Drawing Title
COP-WMC-PH2-00-DR-	P-0100 -	Proposed Site Layout
COP-WMC-PH2-00-DR-	P-0101 -	Proposed General Arrangement & Levels Layout
COP-WMC-PH2-00-DR-	P-0110 -	Proposed Road Markings and Signage
COP-WMC-PH2-00-DR-	P-0113 -	Proposed Visibility Splays
COP-WMC-PH2-00-DR-	P-0115 -	Swept Path Analysis Refuse Vehicle
COP-WMC-PH2-00-DR-	P-0116 -	Swept Path Analysis Fire Tender
COP-WMC-PH2-00-DR-	P-0117 -	Swept Path Analysis Large Car

UK and Ireland Office Locations

