ARUP

Ruirside Developments Limited

Parkgate Street Blocks B1 & C

Drainage and Watermain Planning Report

Reference: PGATE-ARUP-ZZ-XX-RP-CD-0002

Issue 2 | 05 December 2024

Job number 265381-00

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Document Verification

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		Name	Kieran Dowdall	Gregg Sim	John Flaherty
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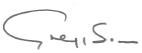
		Signature			

Issue Document Verification with Document ✓

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1. Introduction

This report has been prepared to accompany drainage and watermain drawings as prepared by Arup and architectural drawings prepared by Reddy Architecture and Urbanism for the planning application of a mixed-use residential and commercial development at the former Hickey's site, 42A Parkgate Street, Dublin 8.

The existing development site area is 0.82 hectares which is approximately 95% existing roof and hardstanding areas and contains a number of low-rise buildings which will be demolished. Refer to the architect's layouts for the proposed redevelopment.

The site is located adjacent to the River Liffey fronting onto Parkgate Street to the north, Heuston Station to the south and Wolfe Tone Quay to the southeast. See Figure 1 below for site location.

Figure 1 Map data © 2021 Google

1.1 Proposed Development

Planning permission was granted in 2020 (ABP Ref. 306569-20) at the site for 321 no. Build-to-Rent (BTR) residential units, ancillary residents' amenity facilities, commercial office space, retail space and café/restaurant accommodated in 5no. blocks ranging from 8 to 13 storeys over ancillary basement area, and all associated and ancillary conservation, landscaping and site development works (with amendments to car parking, basement and undercroft approved by the Board under s.146B (ABP 311507-21 refers), this permission is due to wither in 2025. In the eastern apex of the site, permission was also ultimately granted for a 30-storey Block A tower in 2021 under ABP Ref. 310567-21 which comprises 198 residential units resulting in an overall number of 519 units accommodated on site. A further application for the change of use for Block B2 from commercial office space to 40 number residential units was granted permission in 2023 under DCC Reg. Ref. LRD6042/23.

The planning application, for which this drainage and watermain report forms part of, seeks a new permission for Block B1 and Block C ranging in height from 8 to 13 storeys with basement and under croft, and including: 316no. apartments (178no. 1-bed units and 138no. 2-bed units). These blocks remain largely as per the previously consented development, with amendments made to comply with Dublin City Council Development Pan 2022-2028.

The proposed development, for the purposes of this report, is considered in the context of the application site in its entirety, comprising the proposed development (i.e. revised Blocks B1 & C) and the same associated demolition, conservation, site works, landscape and boundary works, and development previously permitted under 306569-20 (as amended). It is further considered in the context of ABP Ref. 310567-21 as amended by DCC Reg. Ref. LRD6042/23 (Block A and B2). This will collectively be referred to as “the development”.

2. Existing Drainage Systems

The existing drainage systems on the site are mainly separate with the surface water system discharging unrestricted into the River Liffey and the foul system into the existing sewerage network on Parkgate Street. There is an existing 450mm combined sewer on Parkgate Street discharging in an easterly direction into a 750mm combined sewer on Wolfe Tone Quay, which eventually discharges into the Municipal Wastewater Treatment Plant at Ringsend. Approximately 6% of the existing roof area of the site discharges to the existing sewer on Parkgate Street. Refer to Arup drawing PGATE-ARUP-ZZ-00-DR-CD-0001 in Appendix A and Appendix C for a copy of the existing drainage and sewerage systems in the vicinity.

3. Proposed Drainage

Drainage from the development will be drained on a completely separate system, with separate foul and surface water drains connecting to the receiving systems on Parkgate Street and the River Liffey, respectively.

Sustainable drainage systems will be incorporated into the design with surface water run-off from the development discharging through a minimum of a two-stage treatment train process prior to discharge by gravity to the River Liffey.

Foul drainage from the development will discharge by gravity to the existing 450mm foul sewer on Parkgate Street.

The drainage systems shall be designed in accordance with Part H of the Building Regulations, EN 752: Drain and Sewer Systems outside Buildings, The Greater Dublin Regional Code of Practice for Drainage Works, Uisce Éireann’s Code of Practice for Water and Wastewater and to DCC Drainage Division and Uisce Éireann requirements.

3.1 Proposed Foul Drainage

Foul drainage from the development shall be drained by a separate system to that of the surface water drainage system. Foul drainage from the new development shall drain by gravity and discharge to the existing 450mm sewer on the Parkgate Street. See Arup drainage drawings PGATE-ARUP-ZZ-00-DR-CD-0002 and PGATE-ARUP-ZZ-00-DR-CD-0003 in Appendix A, consented under An Board Pleanála ref. 306569-20.

Foul drainage from basement level within Blocks B1 and Block C (which is part of the consented scheme) shall drain by gravity to a central pumping chamber and be pumped via a rising main to an external foul manhole prior to discharge by gravity to the existing 450mm foul sewer on Parkgate Street. Incidental run-off from the basement car park will discharge through a Class 2 full retention petrol interceptor before discharge via a pump chamber and rising main to the external foul gravity drainage system. Foul outfall manholes will be constructed to Uisce Éireann’s Code of Practice.

The foul drainage system will be designed to take discharges from residential apartments, small office, retail, café/restaurants, and gym. Drainage from kitchen/canteen facilities will discharge through a grease separator designed in accordance with IS EN 1825 Part 1 and Part 2 and / or to Uisce Éireann requirements.

The existing structures which included warehousing had 10 number of employees equivalent to a total hydraulic loading of 0.75 m^3 per day of foul effluent equating to an average flow of 0.009 litres/second (over a 24-hour period) and a peak flow of 0.04 litres/second based on 4.5 x Dry Weather Flows (DWF). An average daily BOD_5 loading of 0.2 kg/day based on 20 grams of BOD_5/head/day for office usage.

The development will have an estimated total hydraulic loading of 235m^3 per day of foul effluent generated on completion of the development. This equates to an average flow of 2.80 litres/second (over a 24-hour period) and a peak flow of 8.47 litres/second. The final average daily BOD_5 loading from the new development would be 94.6 kg/day. Refer to Table 1 for a breakdown of foul loading calculations.

Three new foul connections will be required to the existing sewerage system on Parkgate Street in agreement with Uisce Éireann.

Based upon details submitted as part of the original COF application, reference CDS23006543, Uisce Éireann confirmed that subject to a specific condition, a connection to the foul sewer network can be facilitated. Uisce Éireann Confirmation of Feasibility Statement outlined the condition to construct a new surface water sewer on Parkgate Street to reduce the equivalent surface water peak flows from their network, to accommodate the proposed development. A connection application has been submitted to Uisce Éireann in May 2024, reference CDS2300654301, and awaiting connection agreement to be put in place for the development.

Arup has carried out an equivalent surface water area catchment design and has agreed with Dublin City Council Drainage Division and Uisce Éireann for the construction of a new surface water sewer on Parkgate Street to remove surface water run-off from Uisce Éireann network. Refer to Arup drawing PGATE-ARUP-ZZ-00-DR-CD-0004 for a copy of the proposed sewer improvement works on Parkgate Street.

DCC drainage construction standards in accordance with the Greater Dublin Regional Code of Practice for Drainage Works shall be applied to all surface water infrastructure proposed in the public way. A pre-construction CCTV survey on the public surface water sewers affected by the development will be undertaken. See Arup drainage drawings PGATE-ARUP-ZZ-00-DR-CD-0002 and PGATE-ARUP-ZZ-00-DR-CD-0004 in Appendix A, consented under An Board Pleanála ref. 306569-20.

Refer to Appendix E for a copy of the Confirmation of Feasibility and Design Acceptance Statements from Uisce Éireann and correspondence confirming the agreed number of 563 units.

Please note that the proposed foul drainage listed above also incorporates the wider site development and associated planning applications as discussed in Section 1.1 above.

Table 1 Development foul loading

Use type	Nett floor area (m^2)	Number of units	Occupancy level	Number of persons	Design flows (litres per person per day)	Peaking Factor	Daily foul loading (litres)
Commercial / Retail	134	-	1 staff / 20m^2	7	50	6.0	350
Amenity / Gym	150	-	1 staff / 55m^2	3	45	6.0	135
Visitors to gym	-	-	-	400	10	6.0	4,000
Residential	-	559	2.7 persons / unit	1,509	150	3.0	226,350
Cafes	263		1staff/13m^2	140	12	6.0	1,680
Visitors to Cafes	-	-	-	120	15	6.0	2,700
Total							235,215

3.2 Proposed Surface Water Drainage

Surface water run-off from the development shall drain by gravity and discharge to the River Liffey. Sustainable drainage systems will be incorporated into the development and will include greenroofs, raingardens, filter strips, filter drains, rainwater harvesting for irrigation purposes and surface water treatment systems. Surface water run-off will go through a minimum of two-stage treatment prior to discharge by gravity to the River Liffey. The proposed SuDS measures will reduce the quantity and improve the quality of water discharging into the receiving system, see Section 3.3 below.

Run-off from roofs and paved areas will discharge unrestricted to the River Liffey above the 1 in 200-year tidal event plus 20% climate change of 3.82m OD. A non-return valve will be located at the outfall headwall in agreement with DCC Drainage Division.

3.3 Surface Water Management Plan

The proposed Surface Water Management Plan is in line with the key requirements of the Dublin City Council Drainage Division Planning & Development Control Section. The proposed surface water drainage system takes cognisance of the Dublin City Development Plan 2016 – 2022 with respect to Sustainable Drainage Systems (SuDS) Section 9.5.4. The proposed SuDS measures provide a minimum of two stage treatment train approach including interception and primary and secondary treatment of surface water run-off. This treatment approach is in line with The CIRIA SuDS Manual C753 and is outlined below.

3.3.1 Greenroof

The proposed greenroofs on Block B1 and Block C will be a mix of intensive and extensive greenroof covering 1480m^2 representing 52% of the roof areas and will provide interception of rainfall, filtration through the medium, storage within the voids facilitating evapotranspiration. This is in line with the overall percentages as submitted as per planning application LRD6042/23 and previous consultations with DCC.

The greenroofs will intercept and absorb the first 5 – 10mm of rainfall thereby reducing the volume of run-off into the receiving systems. Rainfall run-off that is not absorbed by the greenroof will filtrate through substrate and geotextile filter fabric. A limited attenuation volume will be provided by the greenroof

drainage layer system below the geotextile filter fabric, which will provide a time delay between the rainfall event and discharge into the system thereby reducing peak flow discharge rates.

According to the leading greenroof supplier / manufacturer Bauder, up to 40% of the average annual rainfall can be absorbed and released back into the atmosphere by transpiration and evaporation.

Amenity areas at roof-top level account for c. 17% of roof space. These areas will drain onto or into adjacent extensive and intensive greenroofs providing a total of 69% roof area with 2-stage treatment. The remaining c. 30% of roof area will discharge into rainwater harvesting tanks for use as irrigation of planting in amenity rooftop areas. This measure will provide a single stage treatment and a second stage treatment through catchpits on the receiving drainage system.

Therefore, rainfall run-off from roof areas will go through a two-stage treatment train including interception and primary treatment in line with SuDS Manual C753 Table 26.7, replicated in Table 1 Section 4.

3.3.2 Raingarden

Raingardens proposed adjacent to Block B1 and Block C will allow surface water run-off from paved areas to pond temporarily before filtering through vegetation and underlaying soil before discharge into the system.

Paved areas at ground level will discharge into the proposed raingardens. The raingardens will serve as a bio-retention system providing interception as the water discharges through plants, shrubs, and landscape medium. The planters will provide temporary retention for the 1 in 1-year event in the shallow depressions. Sand based material circa 750 – 850mm deep will be used to filter the water passing through. Further filtration will be provided by the geotextile filter membrane prior to discharge into the surface water system.

Therefore, rainfall run-off from approximately 11% of paved areas at ground level will go through a three-stage treatment train including interception, primary and secondary treatment in line with SuDS Manual C753 Table 26.7.

3.3.3 Filter Drains

Filter drains proposed in the Private Amenity landscaped area between Blocks B1 and Block C will reduce peak run-off rates prior to discharge into the surface water drainage system. The filter drains are linear excavations filled with suitable granular material with a minimum void porosity of 30% and wrapped in a geotextile filter membrane. Catchpits will also be provided downstream of the infiltration trenches to provide primary treatment. The granular material and geotextile filter material will provide interception and act as a secondary treatment in preventing ingress of fine material from paved areas prior to discharge into surface water drainage system.

Therefore, rainfall run-off from approximately 14% of paved areas discharging into the filter drains / catchpits will go through a three-stage treatment train including interception, primary and secondary treatment in line with SuDS Manual C753 Table 26.7.

3.3.4 Filter Strips

Filter strips proposed in the Private Amenity landscaped area between Blocks B1 and Block C will provide interception from impermeable areas before discharging into the filter drains or surface water drainage system. This additional measure will promote sedimentation and filtration thereby providing primary treatment.

Therefore, rainfall run-off from paved areas discharging into the filter strips will go through treatment train including interception and primary treatment in line with SuDS Manual C753 Table 26.7.

3.3.5 Proprietary Surface Water Treatment System

As a portion of the external pavement including some low-level roof terraces equivalent to 17% of the site area will receive a single stage treatment using catchpits, proprietary surface water treatment system like “First Defence or Downstream Defender” will be incorporated into the drainage system to ensure the run-off will receive a minimum of 2-stage treatment. This additional measure will improve the quality of surface water run-off discharging into the receiving system, in compliance with best drainage practice and SuDS

requirements. The “First Defence or Downstream Defender” will provide removal efficiency rates of 50% for suspended solids and 80% for hydrocarbons. Refer to Appendix F for Hydro-International Guide to Surface Water Treatment System and their compliance with SuDS Manual C753.

Third party testing has confirmed Mitigation Indices for proprietary surface water treatment systems similar to swales and ponds. All surface water run-off from the site will discharge by gravity through these treatment systems prior to discharge to the River Liffey.

3.3.6 Summary of SuDS Measures

The proposed comprehensive Surface Water Management Plan for the development, carried out in consultation with Mitchell & Associates Landscape Architects, is in line with the key requirements of the Dublin City Drainage Division and the Dublin City Development Plan 2022 – 2028 with respect to Sustainable Drainage Systems.

Rainfall run-off from the proposed site development will go through at least a two-stage treatment train prior to discharge into the River Liffey.

Table 2 is a summary of the proposed SuDS measures for the development and the management train in line with The CIRIA SuDS Manual C753. The key SuDS measures for the proposed development include but are not limited to greenroofs, raingardens, filter drains, filter strips and rainwater harvesting for irrigation purposes.

Table 2 SuDS Component and Treatment train (Source CIRCA C753)

SuDS Component	Interception	Close to source / primary treatment	Secondary treatment	Tertiary treatment
Greenroof	Yes	Yes		
Bio-retention Raingarden / raised planters	Yes	Yes	Yes	
Filter drains	Yes		Yes	
Rainwater harvesting	Yes			
Filter strip	Yes	Yes		
Catchpits		Yes		
Proprietary treatment systems		Yes (where design performance can be demonstrated)	Yes (where design performance can be demonstrated)	Yes (where design performance can be demonstrated)

3.4 Flood Risk Assessment

Please see separate report for Flood Risk Assessment.

4. Watermains

The water supply connection to the proposed development will be from the existing 150mm public main adjacent to the site on Parkgate Street with a cross-connection to the 600mm public main running in parallel with the 150mm public main, as directed by Uisce Éireann.

The proposed watermain system will be designed to supply water to the redevelopment with sluice valves and hydrants located in compliance with Part B of the Building Regulations and the local Fire Officers requirements. See Arup drawing PGATE-ARUP-ZZ-00-DR-CD-0002 for layout of the watermain and connection to the public network, consented under An Board Pleanála ref. 306569-20.

A Pre-connection Enquiry Application was submitted to Uisce Éireann on 4 February 2019 to confirm capacity in the network. Based upon details submitted as part of the application, Uisce Éireann confirmed that a water supply connection can be facilitated. Refer to Uisce Éireann Confirmation of Feasibility Statement. A new water connection from the existing mains on Parkgate Street will be required in agreement with Uisce Éireann.

We expect the peak flow demand for the proposed development to be in the region of 17.51 litres/second.

The installation of low flow fittings and a rainwater harvesting system for the development will reduce the demand on the existing water supply network.

Refer to Appendix E for a copy of the Confirmation of Feasibility and Design Acceptance Statements from Uisce Éireann and correspondence confirming the agreed number of 563 units .

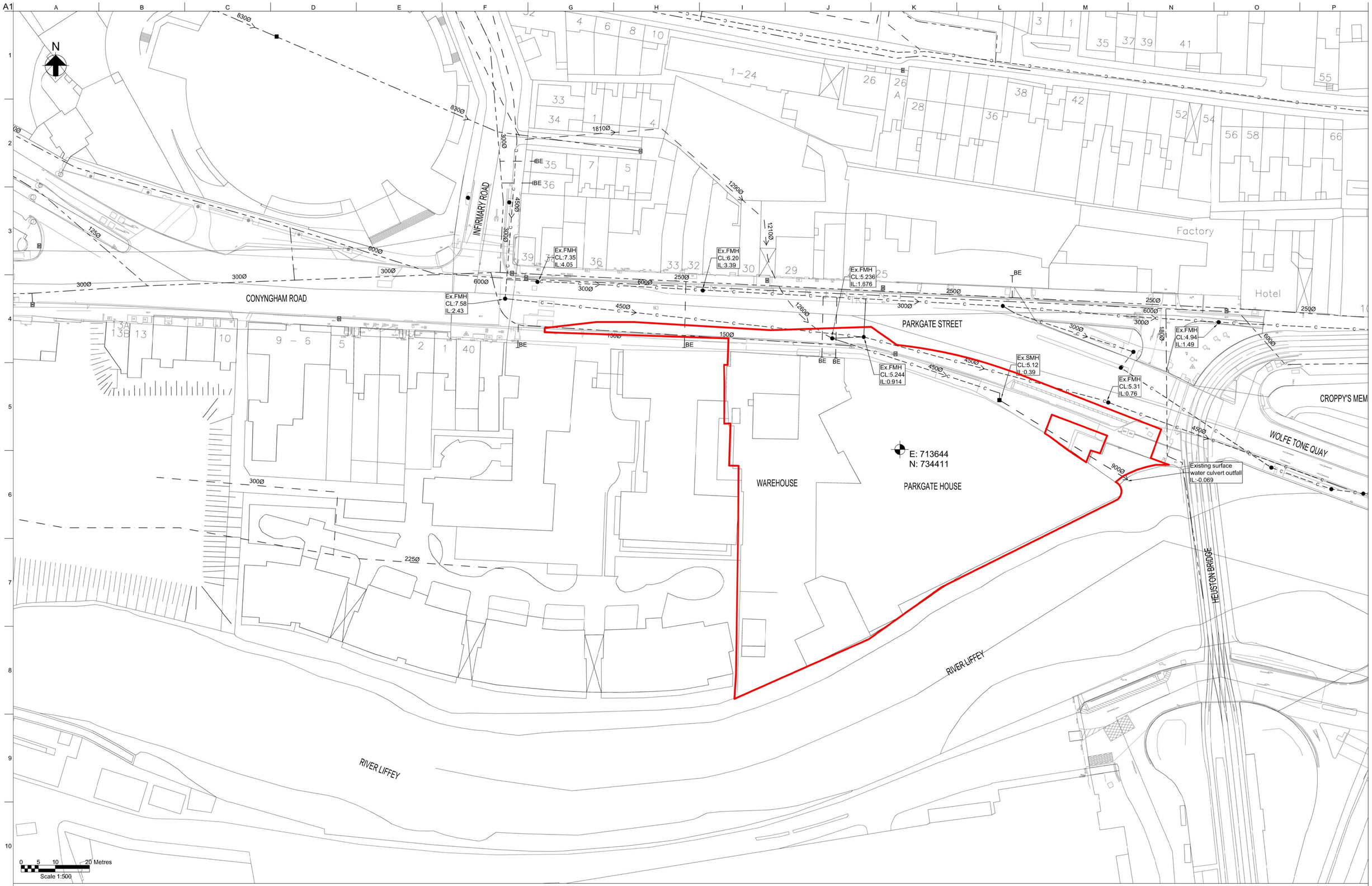
Appendix A

Arup Drawings

Appendix A

Arup Drawings

A1



Legend

- Existing Watermain — Hydrant
- Existing Surface Sewer — Ex. SMH
- Existing Combined Sewer — Ex. FMH
- Site Boundary Line

Rev	Date	By	Chkd	Appd
PL3	08/06/21	SB	KD	GS
Issued for Planning (Status A2)				

Rev	Date	By	Chkd	Appd
C01	10/02/21	SB	GS	GS
Issued for Stage 1 Tender (Status A3)				
PL2	11/12/20	SB	KD	KD
Pre-app Submission				
PL1	17/12/19	MC	AB	KD
Planning Issue				

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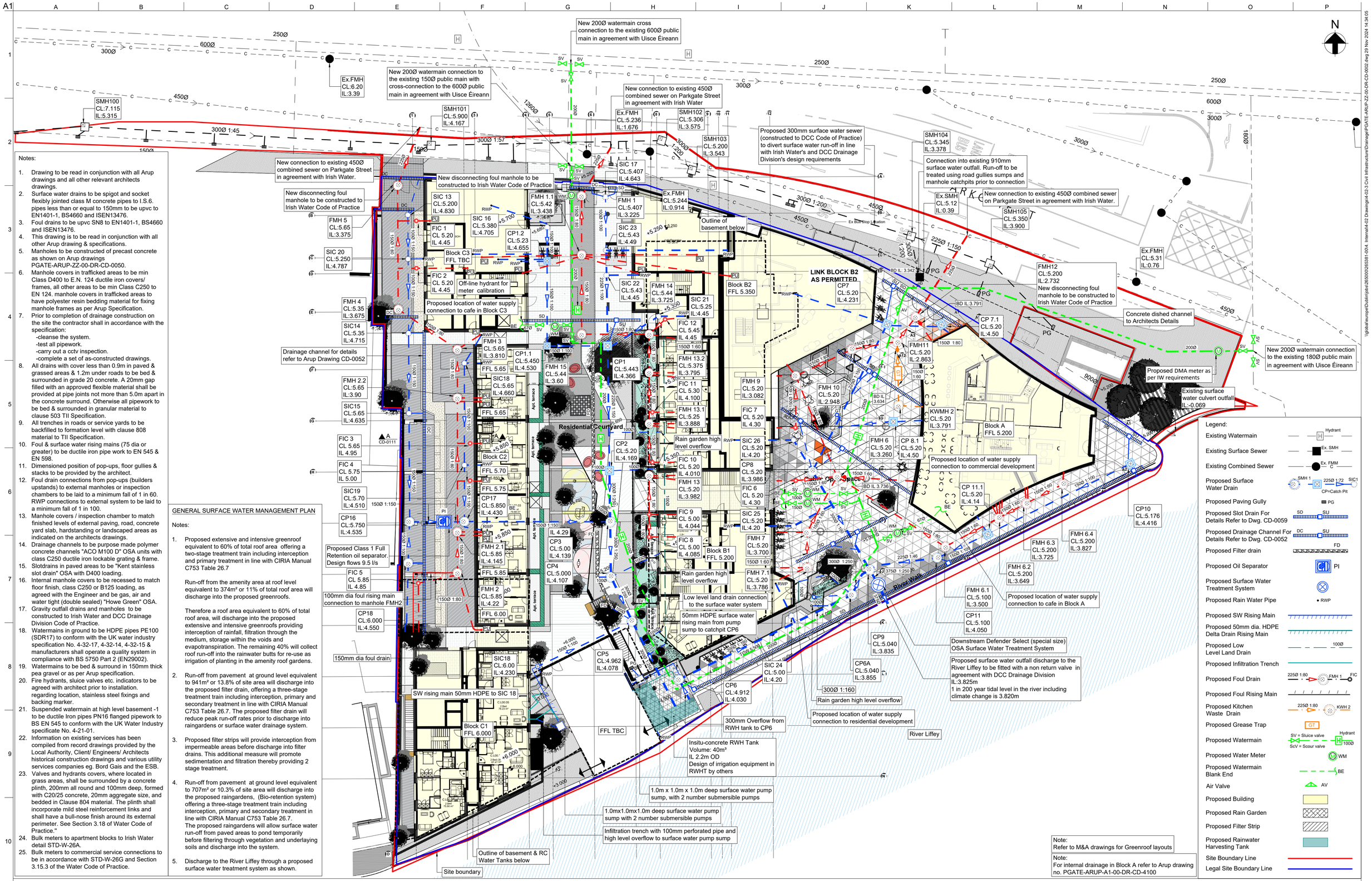
Client
Ruirside Developments Limited

Project Title
Parkgate Street Redevelopment

Drawing Title
Existing Drainage and Watermain Site Plan Layout

Scale at A1 1:500
Role Civil
Suitability A2 - Approved for Planning
Arup Job No 265381-00
Rev PL3
Name PGATE-ARUP-ZZ-00-DR-CD-0001

Do not scale



Notes:

1. Drawing to be read in conjunction with all Arup drawings and all other relevant architects drawings.
2. Surface water drains to be spigot and socket flexibly jointed class M concrete pipes to I.S.6. pipes less than or equal to 150mm to be upvc to EN1401-1, BS4660 and ISEN13476.
3. Foul drains to be upvc SN8 to EN1401-1, BS4660 and ISEN13476.
4. This drawing is to be read in conjunction with all other Arup drawing & specifications.
5. Manholes to be constructed of precast concrete as shown on Arup drawings PGATE-ARUP-ZZ-00-DR-CD-0050.
6. Manhole covers in trafficked areas to be min Class D400 to E.N. 124 ductile iron covers/ frames, all other areas to be min Class C250 to EN 124. manhole covers in trafficked areas to have polyester resin bedding material for fixing manhole frames as per Arup Specification.
7. Prior to completion of drainage construction on the site the contractor shall in accordance with the specification:
   -cleanse the system.
   -test all pipework.
   -carry out a cctv inspection.
   -complete a set of as-constructed drawings.
8. All drains with cover less than 0.9m in paved & grassed areas & 1.2m under roads to be bed & surrounded in grade 20 concrete. A 20mm gap filled with an approved flexible material shall be provided at pipe joints not more than 5.0m apart in the concrete surround. Otherwise all pipework to be bed & surrounded in granular material to clause 503 TII Specification.
9. All trenches in roads or service yards to be backfilled to formation level with clause 808 material to TII Specification.
10. Foul & surface water rising mains (75 dia or greater) to be ductile iron pipe work to EN 545 & EN 598.
11. Dimensioned position of pop-ups, floor gullies & stacks to be provided by the architect.
12. Foul drain connections from pop-ups (builders upstands) to external manholes or inspection chambers to be laid to a minimum fall of 1 in 60. RWP connections to external system to be laid to a minimum fall of 1 in 100.
13. Manhole covers / inspection chamber to match finished levels of external paving, road, concrete yard slab, hardstanding or landscaped areas as indicated on the architects drawings.
14. Drainage channels to be purpose made polymer concrete channels "ACO M100 D" OSA units with class C250 ductile iron lockable grating & frame.
15. Slotdrains in paved areas to be "Kent stainless slot drain" OSA with D400 loading.
16. Internal manhole covers to be recessed to match floor finish, class C250 or B125 loading, as agreed with the Engineer and be gas, air and water tight (double sealed) "Howe Green" OSA.
17. Gravity outfall drains and manholes to be constructed to Irish Water and DCC Drainage Division Code of Practice.
18. Watermains in ground to be HDPE pipes PE100 (SDR17) to conform with the UK water industry specification No. 4-32-17, 4-32-14, 4-32-15 & manufacturers shall operate a quality system in compliance with BS 5750 Part 2 (EN29002).
19. Watermains to be bed & surround in 150mm thick pea gravel or as per Arup specification.
20. Fire hydrants, sluice valves etc. indicators to be agreed with architect prior to installation. regarding location, stainless steel fixings and backing marker.
21. Suspended watermain at high level basement -1 to be ductile Iron pipes PN16 flanged pipework to BS EN 545 to conform with the UK Water Industry specificate No. 4-21-01.
22. Information on existing services has been compiled from record drawings provided by the Local Authority, Client/ Engineers/ Architects historical construction drawings and various utility services companies eg. Bord Gais and the ESB.
23. Valves and hydrants covers, where located in grass areas, shall be surrounded by a concrete plinth, 200mm all round and 100mm deep, formed with C20/25 concrete, 20mm aggregate size, and bedded in Clause 804 material. The plinth shall incorporate mild steel reinforcement links and shall have a bull-nose finish around its external perimeter. See Section 3.18 of Water Code of Practice."
24. Bulk meters to apartment blocks to Irish Water detail STD-W-26A.
25. Bulk meters to commercial service connections to be in accordance with STD-W-26G and Section 3.15.3 of the Water Code of Practice.

GENERAL SURFACE WATER MANAGEMENT PLAN

Notes:

1. Proposed extensive and intensive greenroof equivalent to 60% of total roof area offering a two-stage treatment train including interception and primary treatment in line with CIRIA Manual C753 Table 26.7

   Run-off from the amenity area at roof level equivalent to 374m² or 11% of total roof area will discharge into the proposed greenroofs.

   Therefore a roof area equivalent to 60% of total roof area, will discharge into the proposed extensive and intensive greenroofs providing interception of rainfall, filtration through the medium, storage within the voids and evapotranspiration. The remaining 40% will collect roof run-off into the rainwater butts for re-use as irrigation of planting in the amenity roof gardens.

2. Run-off from pavement at ground level equivalent to 941m² or 13.8% of site area will discharge into the proposed filter drain, offering a three-stage treatment train including interception, primary and secondary treatment in line with CIRIA Manual C753 Table 26.7. The proposed filter drain will reduce peak run-off rates prior to discharge into raingardens or surface water drainage system.

3. Proposed filter strips will provide interception from impermeable areas before discharge into filter drains. This additional measure will promote sedimentation and filtration thereby providing 2 stage treatment.

4. Run-off from pavement at ground level equivalent to 707m² or 10.3% of site area will discharge into the proposed raingardens, (Bio-retention system) offering a three-stage treatment train including interception, primary and secondary treatment in line with CIRIA Manual C753 Table 26.7.
   The proposed raingardens will allow surface water run-off from paved areas to pond temporarily before filtering through vegetation and underlaying soils and discharge into the system.

5. Discharge to the River Liffey through a proposed surface water treatment system as shown.

Note:
Refer to M&A drawings for Greenroof layouts

Note:
For internal drainage in Block A refer to Arup drawing no. PGATE-ARUP-A1-00-DR-CD-4100

Legend:

- Existing Watermain — Hydrant
- Existing Surface Sewer — Ex. SMH
- Existing Combined Sewer — Ex. FMM C
- Proposed Surface Water Drain — SMH 1, 225Ø 1:72, SIC1, CP=Catch Pit
- Proposed Paving Gully — PG
- Proposed Slot Drain For Details Refer to Dwg. CD-0059 — SD, SU
- Proposed Drainage Channel For Details Refer to Dwg. CD-0052 — DC, SU
- Proposed Filter drain — FD
- Proposed Oil Separator — PI
- Proposed Surface Water Treatment System
- Proposed Rain Water Pipe — RWP
- Proposed SW Rising Main
- Proposed 50mm dia. HDPE Delta Drain Rising Main
- Proposed Low Level Land Drain — 100Ø
- Proposed Infiltration Trench
- Proposed Foul Drain — 225Ø 1:80, FMH 1, FIC
- Proposed Foul Rising Main
- Proposed Kitchen Waste Drain — 225Ø 1:80, KWH 2
- Proposed Grease Trap — GT
- Proposed Watermain — SV = Sluice valve, ScV = Scour valve, Hydrant, 100Ø
- Proposed Water Meter — WM
- Proposed Watermain Blank End — BE
- Air Valve — AV
- Proposed Building
- Proposed Rain Garden
- Proposed Filter Strip
- Proposed Rainwater Harvesting Tank
- Site Boundary Line
- Legal Site Boundary Line

0 5 10 Metres
Scale 1:250

Rev	Date	By	Chkd	Appd
C13	29/11/24	DF	AN	GS
	Issued for Planning (Status S2)			
C12	25/04/24	WC	KD	GS
	Issued to Uisce Éireann for Connection Application			
C11	24/10/23	WC	KD	GS
	Issued for planning Block B2 Amendment Revised as Clouded			
C10	28/08/22	WC	KD	GS
	Issued to Uisce Éireann for new PCE application			
C09	15/08/23	WC	KD	GS
	Issued for planning Block B2 Amendment Revised as Clouded			
C08	15/02/23	WC	KD	GS
	Legal Site Boundary Line added & Issued to Irish Water for Information			

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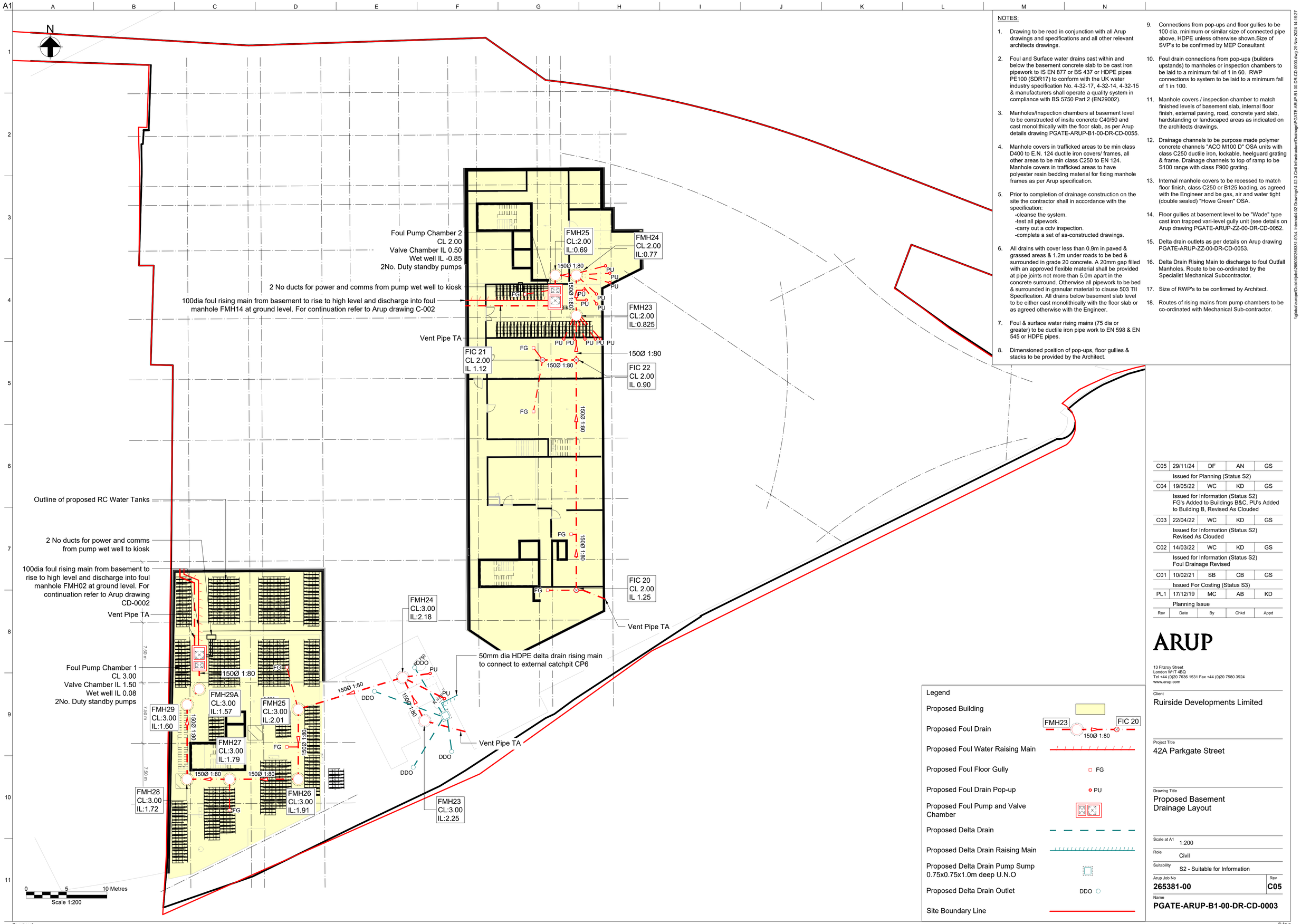
Client: Ruirside Developments Limited

Project Title: 42A Parkgate Street

Drawing Title: Permitted Drainage & Watermain Layout

Scale at A1: 1:250
Role: Civil
Suitability: S2 - Suitable for Information
Arup Job No: 265381-00
Rev: C13
Name: PGATE-ARUP-ZZ-00-DR-CD-0002



NOTES:

1. Drawing to be read in conjunction with all Arup drawings and specifications and all other relevant architects drawings.
2. Foul and Surface water drains cast within and below the basement concrete slab to be cast iron pipework to IS EN 877 or BS 437 or HDPE pipes PE100 (SDR17) to conform with the UK water industry specification No. 4-32-17, 4-32-14, 4-32-15 & manufacturers shall operate a quality system in compliance with BS 5750 Part 2 (EN29002).
3. Manholes/Inspection chambers at basement level to be constructed of insitu concrete C40/50 and cast monolithically with the floor slab, as per Arup details drawing PGATE-ARUP-B1-00-DR-CD-0055.
4. Manhole covers in trafficked areas to be min class D400 to E.N. 124 ductile iron covers/ frames, all other areas to be min class C250 to EN 124. Manhole covers in trafficked areas to have polyester resin bedding material for fixing manhole frames as per Arup specification.
5. Prior to completion of drainage construction on the site the contractor shall in accordance with the specification:
   -cleanse the system.
   -test all pipework.
   -carry out a cctv inspection.
   -complete a set of as-constructed drawings.
6. All drains with cover less than 0.9m in paved & grassed areas & 1.2m under roads to be bed & surrounded in grade 20 concrete. A 20mm gap filled with an approved flexible material shall be provided at pipe joints not more than 5.0m apart in the concrete surround. Otherwise all pipework to be bed & surrounded in granular material to clause 503 TII Specification. All drains below basement slab level to be either cast monolithically with the floor slab or as agreed otherwise with the Engineer.
7. Foul & surface water rising mains (75 dia or greater) to be ductile iron pipe work to EN 598 & EN 545 or HDPE pipes.
8. Dimensioned position of pop-ups, floor gullies & stacks to be provided by the Architect.
9. Connections from pop-ups and floor gullies to be 100 dia. minimum or similar size of connected pipe above, HDPE unless otherwise shown.Size of SVP's to be confirmed by MEP Consultant
10. Foul drain connections from pop-ups (builders upstands) to manholes or inspection chambers to be laid to a minimum fall of 1 in 60. RWP connections to system to be laid to a minimum fall of 1 in 100.
11. Manhole covers / inspection chamber to match finished levels of basement slab, internal floor finish, external paving, road, concrete yard slab, hardstanding or landscaped areas as indicated on the architects drawings.
12. Drainage channels to be purpose made polymer concrete channels "ACO M100 D" OSA units with class C250 ductile iron, lockable, heelguard grating & frame. Drainage channels to top of ramp to be S100 range with class F900 grating.
13. Internal manhole covers to be recessed to match floor finish, class C250 or B125 loading, as agreed with the Engineer and be gas, air and water tight (double sealed) "Howe Green" OSA.
14. Floor gullies at basement level to be "Wade" type cast iron trapped vari-level gully unit (see details on Arup drawing PGATE-ARUP-ZZ-00-DR-CD-0052.
15. Delta drain outlets as per details on Arup drawing PGATE-ARUP-ZZ-00-DR-CD-0053.
16. Delta Drain Rising Main to discharge to foul Outfall Manholes. Route to be co-ordinated by the Specialist Mechanical Subcontractor.
17. Size of RWP's to be confirmed by Architect.
18. Routes of rising mains from pump chambers to be co-ordinated with Mechanical Sub-contractor.

Legend

- Proposed Building
- Proposed Foul Drain (FMH23 — 150Ø 1:80 — FIC 20)
- Proposed Foul Water Raising Main
- Proposed Foul Floor Gully (FG)
- Proposed Foul Drain Pop-up (PU)
- Proposed Foul Pump and Valve Chamber
- Proposed Delta Drain
- Proposed Delta Drain Raising Main
- Proposed Delta Drain Pump Sump 0.75x0.75x1.0m deep U.N.O
- Proposed Delta Drain Outlet (DDO)
- Site Boundary Line

Rev	Date	By	Chkd	Appd
C05	29/11/24	DF	AN	GS
	Issued for Planning (Status S2)			
C04	19/05/22	WC	KD	GS
	Issued for Information (Status S2) FG's Added to Buildings B&C, PU's Added to Building B, Revised As Clouded			
C03	22/04/22	WC	KD	GS
	Issued for Information (Status S2) Revised As Clouded			
C02	14/03/22	WC	KD	GS
	Issued for Information (Status S2) Foul Drainage Revised			
C01	10/02/21	SB	CB	GS
	Issued For Costing (Status S3)			
PL1	17/12/19	MC	AB	KD
	Planning Issue			

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Client
Ruirside Developments Limited

Project Title
42A Parkgate Street

Drawing Title
Proposed Basement Drainage Layout

Scale at A1 1:200
Role Civil
Suitability S2 - Suitable for Information
Arup Job No 265381-00
Rev C05
Name PGATE-ARUP-B1-00-DR-CD-0003

Appendix B

Storm Water Attenuation Calculations

Technical Note

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Project title	Parkgate Street Redevelopment	Job number	265381-00
cc	Kieran Dowdall Alan Fitzsimons Sean Barrett	File reference	P01
Prepared by	Alpha Barry	Date	06 December 2019
Subject	Proposed Surface Water Drainage Design		

1 Microdrainage Simulation Summary

The Parkgate Street Redevelopment proposed surface water drainage system is designed for a 2 year storm return period. The system is simulated and indicates no surface flooding at any part of the site for storms up to and including the 1:100 year return period plus 20% for climate change. Refer to Arup drawing C-0002 Proposed Drainage Layout for the surface water drainage layout.

2 Introduction

Microdrainage design software is based on the Wallingford procedure. It has the ability to model and analyse fully integrated drainage systems. The rainfall and runoff variables required are explained under the following headings.

3 Design Criteria and Loading

The Parkgate Street Redevelopment proposed surface water drainage system is designed in accordance with Part H of the Building Regulations, BS EN 752 Drain and Sewer System, the Greater Dublin Regional Code of Practice for Drainage Works.

The Flood Studies Report (FSR) rainfall methodology is used in the programme. Rainfall is calculated using Region, Return Period, M5-60, and Ratio R as explained further below.

The programme uses the M5-60 (60 minutes storm duration of 5 year return period) and ratio R (M5-60/M5-2 day) to calculate the intensity/duration/ frequency characteristics for any location in Ireland.

A rainfall depth of 16.300mm on 60 minutes storm duration of 5 year return period and a ratio of 0.278 was applied as design criteria on Microdrainage. Refer to this report for a copy of the Met Eireann Rainfall Statistics for the location.

4 Storm Network Details

The storm network is designed on Microdrainage using a 2 year return period. The pipe network and gradient are assigned using the Modified Rational Method where:

Q (l/s) = Cv*Cr*(2.78*I(mm/hr)*A (ha))

Cv= 0.75 and Cr= 1.3 (as recommended by the Wallingford Procedure)

Run-off from roofs will discharge via a suspended pipework into a surface water system at ground level. The roads and paving at grade level are drained by gravity via a system of road gullies, drainage channels and filter drains. The proposed surface water system at ground level is a series of drains and catchpits. The system discharges unrestricted into the River Liffey following a two-stage treatment train in line with SuDS Manual C753 Table 26.7. Therefore, there are no online control devices such as Hydrobrakes or orifices. The surface water system has no offline controls such as overflow pipes.

There are no attenuation systems in place as the proposed surface water system discharges unrestricted to the River Liffey above the 1 in 200-year tidal event plus 20% climate change of 3.82m OD. The proposed surface water system is simulated for the critical 1 in 100 year return including climate change. Refer to this Report for a copy of the simulation of the surface water system.

A non-return valve will be located at the outfall headwall in agreement with DCC Drainage Division.

5 Network Simulation

The level of service includes no surface flooding for return periods up to 1:100 year plus 20% for climate change. Detailed summary of critical results of the 2 year+20%, 30 year+20% and 100 year + 20% is included in this report.

DOCUMENT CHECKING (not mandatory for File Note)

	Prepared by	Checked by	Approved by
Name	Alpha Barry	Kieran Dowdall	Kieran Dowdall
Signature			

Microdrainage Simulation

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - Scotland and Ireland

Return Period (years)	2	PIMP (%)	100
M5-60 (mm)	16.300	Add Flow / Climate Change (%)	0
Ratio R	0.278	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	500	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	300	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits

Design criteria and loading

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.278
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SCP1	360 Winter	2	+20%	30/15 Summer				4.366
S2.000	SAJ13	15 Winter	2	+20%					4.833
S2.001	SIC14	15 Winter	2	+20%					4.616
S2.002	SIC15	15 Winter	2	+20%					4.522
S3.000	SIC17	15 Summer	2	+20%					4.579
S2.003	SCP16	15 Winter	2	+20%	30/15 Summer				4.418
S2.004	SCP17	15 Winter	2	+20%	30/15 Summer				4.339
S1.001	SCP3	15 Winter	2	+20%	30/15 Summer				4.158
S1.002	SCP4	15 Winter	2	+20%	30/15 Summer				4.143
S1.003	SCP5	15 Winter	2	+20%	30/15 Summer				4.120
S1.004	SCP6	15 Winter	2	+20%	30/15 Summer				4.083
S4.000	SCP7	15 Winter	2	+20%	30/15 Summer				4.365
S4.001	SCP8	15 Winter	2	+20%	30/15 Summer				4.156
S5.000	SCP10	15 Winter	2	+20%	100/15 Summer				4.496
S5.001	SCP11	15 Winter	2	+20%	100/15 Summer				4.154
S1.005	SCP9	15 Winter	2	+20%	2/15 Winter				4.022

2 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCP1	-0.225	0.000	0.00		0.0	OK	
S2.000	SAJ13	-0.053	0.000	0.45		2.7	OK*	
S2.001	SIC14	-0.096	0.000	0.27		4.3	OK*	
S2.002	SIC15	-0.096	0.000	0.28		4.4	OK*	
S3.000	SIC17	-0.121	0.000	0.08		1.9	OK*	
S2.003	SCP16	-0.073	0.000	0.52		7.5	OK	
S2.004	SCP17	-0.076	0.000	0.48		7.3	OK	
S1.001	SCP3	-0.088	0.000	0.48		24.9	OK	
S1.002	SCP4	-0.070	0.000	0.91		46.6	OK	
S1.003	SCP5	-0.064	0.000	0.81		45.6	OK	
S1.004	SCP6	-0.053	0.000	0.71		44.9	OK	
S4.000	SCP7	-0.091	0.000	0.66		25.7	OK	
S4.001	SCP8	-0.130	0.000	0.60		36.2	OK	
S5.000	SCP10	-0.070	0.000	0.55		9.4	OK	
S5.001	SCP11	-0.148	0.000	0.25		9.3	OK	
S1.005	SCP9	0.002	0.000	1.17		95.0	SURCHARGED	

Simulation results for 2 year return period

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.278
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SCP1	15 Winter	30	+20%	30/15 Summer				4.642
S2.000	SAJ13	15 Winter	30	+20%					4.855
S2.001	SIC14	15 Winter	30	+20%					4.712
S2.002	SIC15	15 Winter	30	+20%					4.618
S3.000	SIC17	15 Winter	30	+20%					4.700
S2.003	SCP16	15 Winter	30	+20%	30/15 Summer				4.707
S2.004	SCP17	15 Winter	30	+20%	30/15 Summer				4.672
S1.001	SCP3	15 Winter	30	+20%	30/15 Summer				4.646
S1.002	SCP4	15 Winter	30	+20%	30/15 Summer				4.576
S1.003	SCP5	15 Winter	30	+20%	30/15 Summer				4.476
S1.004	SCP6	15 Winter	30	+20%	30/15 Summer				4.377
S4.000	SCP7	15 Winter	30	+20%	30/15 Summer				4.530
S4.001	SCP8	15 Winter	30	+20%	30/15 Summer				4.298
S5.000	SCP10	15 Winter	30	+20%	100/15 Summer				4.546
S5.001	SCP11	15 Winter	30	+20%	100/15 Summer				4.225
S1.005	SCP9	15 Winter	30	+20%	2/15 Winter				4.200

30 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCP1	0.051	0.000	0.04		1.4	SURCHARGED	
S2.000	SAJ13	-0.031	0.000	0.81		4.9	OK*	
S2.001	SIC14	0.000	0.000	0.54		8.5	SURCHARGED*	
S2.002	SIC15	0.000	0.000	0.46		7.3	SURCHARGED*	
S3.000	SIC17	0.000	0.000	0.15		3.3	SURCHARGED*	
S2.003	SCP16	0.217	0.000	0.84		12.0	SURCHARGED	
S2.004	SCP17	0.257	0.000	0.87		13.3	SURCHARGED	
S1.001	SCP3	0.400	0.000	0.69		36.2	SURCHARGED	
S1.002	SCP4	0.362	0.000	1.55		78.9	SURCHARGED	
S1.003	SCP5	0.291	0.000	1.38		78.4	SURCHARGED	
S1.004	SCP6	0.241	0.000	1.23		78.1	SURCHARGED	
S4.000	SCP7	0.074	0.000	1.14		44.8	SURCHARGED	
S4.001	SCP8	0.011	0.000	1.12		67.2	SURCHARGED	
S5.000	SCP10	-0.020	0.000	0.99		16.8	OK	
S5.001	SCP11	-0.077	0.000	0.44		16.1	OK	
S1.005	SCP9	0.179	0.000	2.16		175.1	SURCHARGED	

Simulation results for 30 year return period

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	0	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model		FSR	Ratio R 0.278
Region	Scotland and Ireland	Cv (Summer)	0.750
M5-60 (mm)	16.300	Cv (Winter)	0.840

Margin for Flood Risk Warning (mm)	0.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2, 30, 100
Climate Change (%)	20, 20, 20

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	SCP1	15 Winter	100	+20%	30/15 Summer				4.928
S2.000	SAJ13	15 Winter	100	+20%					4.886
S2.001	SIC14	30 Winter	100	+20%					4.712
S2.002	SIC15	30 Winter	100	+20%					4.618
S3.000	SIC17	30 Winter	100	+20%					4.700
S2.003	SCP16	15 Winter	100	+20%	30/15 Summer				4.993
S2.004	SCP17	15 Winter	100	+20%	30/15 Summer				4.954
S1.001	SCP3	15 Winter	100	+20%	30/15 Summer				4.934
S1.002	SCP4	15 Winter	100	+20%	30/15 Summer				4.867
S1.003	SCP5	15 Winter	100	+20%	30/15 Summer				4.716
S1.004	SCP6	15 Winter	100	+20%	30/15 Summer				4.568
S4.000	SCP7	15 Winter	100	+20%	30/15 Summer				4.754
S4.001	SCP8	15 Winter	100	+20%	30/15 Summer				4.435
S5.000	SCP10	15 Winter	100	+20%	100/15 Summer				4.696
S5.001	SCP11	15 Winter	100	+20%	100/15 Summer				4.359
S1.005	SCP9	15 Winter	100	+20%	2/15 Winter				4.304

100 year Return Period Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	SCP1	0.337	0.000	0.06		2.5	SURCHARGED	
S2.000	SAJ13	0.000	0.000	0.94		5.7	SURCHARGED*	
S2.001	SIC14	0.000	0.000	0.52		8.2	SURCHARGED*	
S2.002	SIC15	0.000	0.000	0.53		8.4	SURCHARGED*	
S3.000	SIC17	0.000	0.000	0.13		3.0	SURCHARGED*	
S2.003	SCP16	0.503	0.000	1.04		14.9	SURCHARGED	
S2.004	SCP17	0.538	0.000	1.09		16.6	SURCHARGED	
S1.001	SCP3	0.688	0.000	0.84		44.3	SURCHARGED	
S1.002	SCP4	0.654	0.000	1.90		96.5	SURCHARGED	
S1.003	SCP5	0.532	0.000	1.69		95.5	SURCHARGED	
S1.004	SCP6	0.432	0.000	1.51		95.5	SURCHARGED	
S4.000	SCP7	0.298	0.000	1.39		54.2	SURCHARGED	
S4.001	SCP8	0.148	0.000	1.35		81.5	SURCHARGED	
S5.000	SCP10	0.130	0.000	1.16		19.7	SURCHARGED	
S5.001	SCP11	0.057	0.000	0.55		20.2	SURCHARGED	
S1.005	SCP9	0.284	0.000	2.64		214.6	SURCHARGED	

Simulation results for 100 year return period

Rainfall Statistics

Met Eireann
Return Period Rainfall Depths for sliding Durations
Irish Grid: Easting: 313712, Northing: 234384,

	Interval		Years											
DURATION	6months,	1year,	2,	3,	4,	5,	10,	20,	30,	50,	75,	100,	150,	200,	250,	500,
5 mins	2.4,	3.5,	4.1,	5.0,	5.6,	6.1,	7.7,	9.5,	10.7,	12.4,	14.0,	15.2,	17.1,	18.6,	19.8,	N/A ,
10 mins	3.4,	4.9,	5.7,	7.0,	7.8,	8.5,	10.7,	13.2,	14.9,	17.3,	19.5,	21.2,	23.8,	25.9,	27.6,	N/A ,
15 mins	4.0,	5.7,	6.7,	8.2,	9.2,	10.0,	12.6,	15.6,	17.6,	20.4,	22.9,	24.9,	28.0,	30.4,	32.4,	N/A ,
30 mins	5.3,	7.5,	8.7,	10.5,	11.8,	12.7,	15.9,	19.6,	22.0,	25.4,	28.5,	30.8,	34.5,	37.4,	39.7,	N/A ,
1 hours	7.0,	9.8,	11.3,	13.6,	15.1,	16.3,	20.2,	24.6,	27.5,	31.6,	35.3,	38.1,	42.5,	45.8,	48.6,	N/A ,
2 hours	9.2,	12.7,	14.6,	17.5,	19.4,	20.8,	25.6,	31.0,	34.5,	39.4,	43.8,	47.1,	52.3,	56.3,	59.6,	N/A ,
3 hours	10.8,	14.9,	17.0,	20.2,	22.4,	24.0,	29.4,	35.4,	39.3,	44.8,	49.6,	53.3,	59.0,	63.4,	67.1,	N/A ,
4 hours	12.1,	16.6,	19.0,	22.5,	24.8,	26.6,	32.5,	38.9,	43.2,	49.1,	54.3,	58.2,	64.4,	69.1,	72.9,	N/A ,
6 hours	14.3,	19.4,	22.1,	26.1,	28.7,	30.7,	37.3,	44.5,	49.2,	55.8,	61.5,	65.9,	72.7,	77.9,	82.1,	N/A ,
9 hours	16.8,	22.7,	25.7,	30.2,	33.2,	35.5,	42.8,	50.9,	56.2,	63.4,	69.8,	74.7,	82.1,	87.8,	92.5,	N/A ,
12 hours	18.9,	25.3,	28.7,	33.6,	36.8,	39.3,	47.3,	56.0,	61.7,	69.5,	76.3,	81.5,	89.5,	95.6,	100.6,	N/A ,
18 hours	22.2,	29.6,	33.4,	38.9,	42.6,	45.4,	54.3,	64.0,	70.3,	79.0,	86.5,	92.3,	101.0,	107.7,	113.2,	N/A ,
24 hours	25.0,	33.0,	37.2,	43.2,	47.2,	50.2,	59.9,	70.4,	77.2,	86.5,	94.6,	100.8,	110.2,	117.3,	123.1,	143.2,
2 days	30.7,	39.8,	44.4,	51.0,	55.4,	58.7,	69.1,	80.4,	87.6,	97.3,	105.8,	112.2,	121.8,	129.1,	135.1,	155.5,
3 days	35.2,	45.2,	50.2,	57.4,	62.0,	65.6,	76.7,	88.6,	96.1,	106.3,	115.1,	121.8,	131.8,	139.3,	145.5,	166.4,
4 days	39.3,	49.9,	55.3,	62.9,	67.8,	71.6,	83.2,	95.7,	103.6,	114.2,	123.3,	130.2,	140.5,	148.3,	154.7,	176.1,
6 days	46.3,	58.1,	64.1,	72.4,	77.9,	81.9,	94.6,	108.1,	116.5,	127.9,	137.6,	144.9,	155.8,	164.0,	170.7,	193.2,
8 days	52.4,	65.4,	71.8,	80.8,	86.6,	91.0,	104.6,	118.9,	127.8,	139.8,	150.0,	157.7,	169.1,	177.7,	184.7,	208.1,
10 days	58.1,	72.0,	78.8,	88.4,	94.6,	99.2,	113.6,	128.6,	138.0,	150.6,	161.3,	169.3,	181.2,	190.1,	197.3,	221.5,
12 days	63.3,	78.1,	85.3,	95.5,	102.0,	106.8,	121.9,	137.6,	147.4,	160.5,	171.6,	179.9,	192.2,	201.5,	209.0,	233.9,
16 days	73.1,	89.3,	97.3,	108.4,	115.4,	120.7,	137.0,	154.0,	164.5,	178.5,	190.4,	199.3,	212.4,	222.2,	230.1,	256.5,
20 days	82.0,	99.7,	108.2,	120.2,	127.8,	133.5,	150.9,	168.9,	180.0,	194.9,	207.4,	216.8,	230.6,	240.9,	249.2,	276.8,
25 days	92.5,	111.7,	120.9,	133.9,	142.0,	148.1,	166.8,	186.1,	197.9,	213.7,	227.0,	236.9,	251.5,	262.3,	271.1,	300.1,

NOTES:
N/A Data not available
These values are derived from a Depth Duration Frequency (DDF) Model
For details refer to:
'Fitzgerald D. L. (2007), Estimates of Point Rainfall Frequencies, Technical Note No. 61, Met Eireann, Dublin',
Available for download at www.met.ie/climate/dataproducts/Estimation-of-Point-Rainfall-Frequencies_TN61.pdf

$M_5 60$ = 16.3mm
M_5 2days = 58.7mm
Ratio = 0.278

Appendix C

Uisce Éireann Drainage & Watermain Records

UISCE ÉIREANN : IRISH WATER

N

Legend

- Unknown Meter ; Other Meter
- Sluice Valve Open
- Sluice Valve Closed
- Sluice Valve Closed

Water Hydrants

Hydrant Function

- Fire Hydrant
- Telemetry Kiosk
- Cap
- Other Fittings

Water Distribution Mains

Owned By

- Irish Water
- Private
- Irish Water

Sewer Manholes

Manhole Type

- Standard

Sewer Discharge Points

Discharge Type

- Other; Unknown

Sewer Inlets

Inlet Type

- Catchpit
- Gravity - Combined
- Gravity - Foul
- Gravity - Overflow

Storm Manholes

Manhole Type

- Standard

Storm Discharge Points

Discharge Type

- Outfall
- Surface Gravity Mains

a3 - Scale **1:1,000**

Date: 21/05/2019

Meters

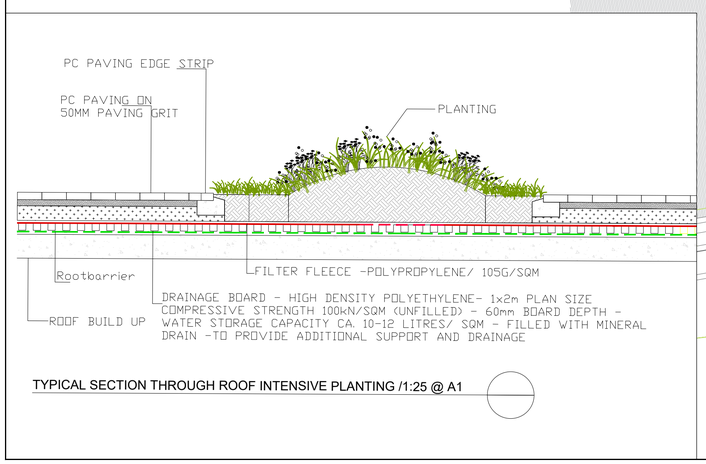
0 12.5 25

Appendix D

Greenroof Layout

INDICATIVE 3D ROOF GARDEN SKETCH

INSPIRATIONAL IMAGE



TYPICAL SECTION THROUGH ROOF INTENSIVE PLANTING /1:25 @ A1

LEGEND

- SMALL TREES
- INTENSIVE PLANTING
- SEDUM PLANTING
- NATURAL FLAG PC PAVING
- SEATING ELEMENT
- DECKING
- PERGOLA
- SWIFT BOXES

NORTH

>1:200 @ A1<

REV	DESCRIPTION	ISSUED BY	DATE

MITCHELL + ASSOCIATES
LANDSCAPE ARCHITECTURE URBAN DESIGN
Unit 5, Woodpark, The Rise, Glasnevin, Dublin 9, Ireland t: + 353 1 454 5066 e:info@mitchellassoc.net

PROJECT
Parkgate Street

CLIENT
Ruirside Developments Limited

JOB NO.
LPAR010

DRAWING
Proposed Roof Garden Plan

DRAWING NO.
201

DRAWN BY	CHECKED	DATE
Tijana Cavara Petrovic	FMcG	03.12.2024
STATUS: Planning	**SCALE** >1:200 @ A1<	**REVISION** 0

NOTES:
All dimensions are in millimeters unless otherwise stated and shall be checked and confirmed by the contractor on site. Any discrepancies shall be immediately reported to the landscape architects. Work to figured dimensions only - Do not scale from drawing. Do Not Scale. Use Figured Dimensions Only. Not for Construction Purposes unless Specifically Marked.

Appendix E

Uisce Éireann Correspondence

CONFIRMATION OF FEASIBILITY

Kieran Dowdall

ARUP
50 Ringsend Road
Dublin 4

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

27 September 2023

Our Ref: CDS23006543 Pre-Connection Enquiry
Former Hickey & Co. Ltd., Parkgate Street, Dublin

Dear Applicant/Agent,

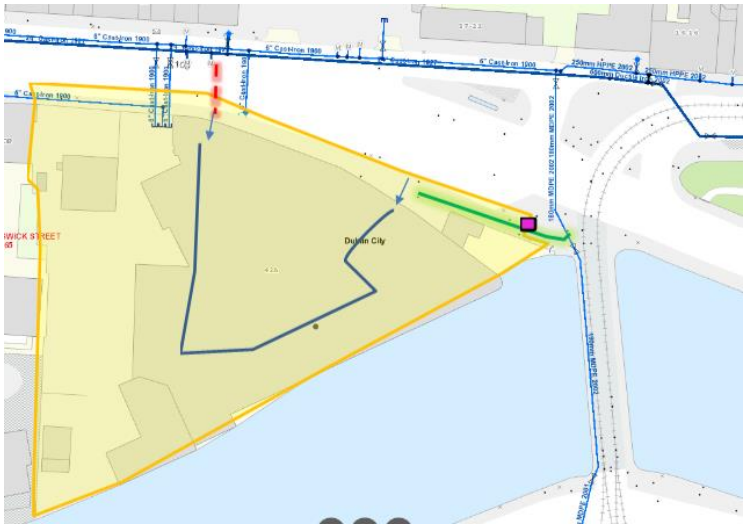
We have completed the review of the Pre-Connection Enquiry.

Uisce Éireann has reviewed the pre-connection enquiry in relation to a Water & Wastewater connection for a Multi/Mixed Use Development of 563 unit(s) at Former Hickey & Co. Ltd, Parkgate Street, 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

- A new 200mm ID connection main (green line in figure below) is to be connected to the existing 180mm MDPE with installation of a DMA meter with associated telemetry system on the line.
- A secondary connection (new 200mm ID main) is to be connected to the existing 24'' spur of the 24'' CI main on Parkgate Street. Double control valves to be installed on this connection main and both set to closed during normal operations.
- Both new mains should be connected internally.

- 

- **Wastewater Connection** - Feasible without infrastructure upgrade by Irish Water

- Surface water flow from Parkgate Street should be removed from the combined network as proposed. At connection application stage you should provide evidence of the successful delivery of the Project in agreement with Dublin City Council.

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.

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/

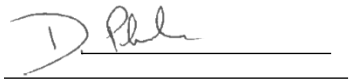
Where can you find more information?

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

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

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

Yours sincerely,



Dermot Phelan
Connections Delivery Manager

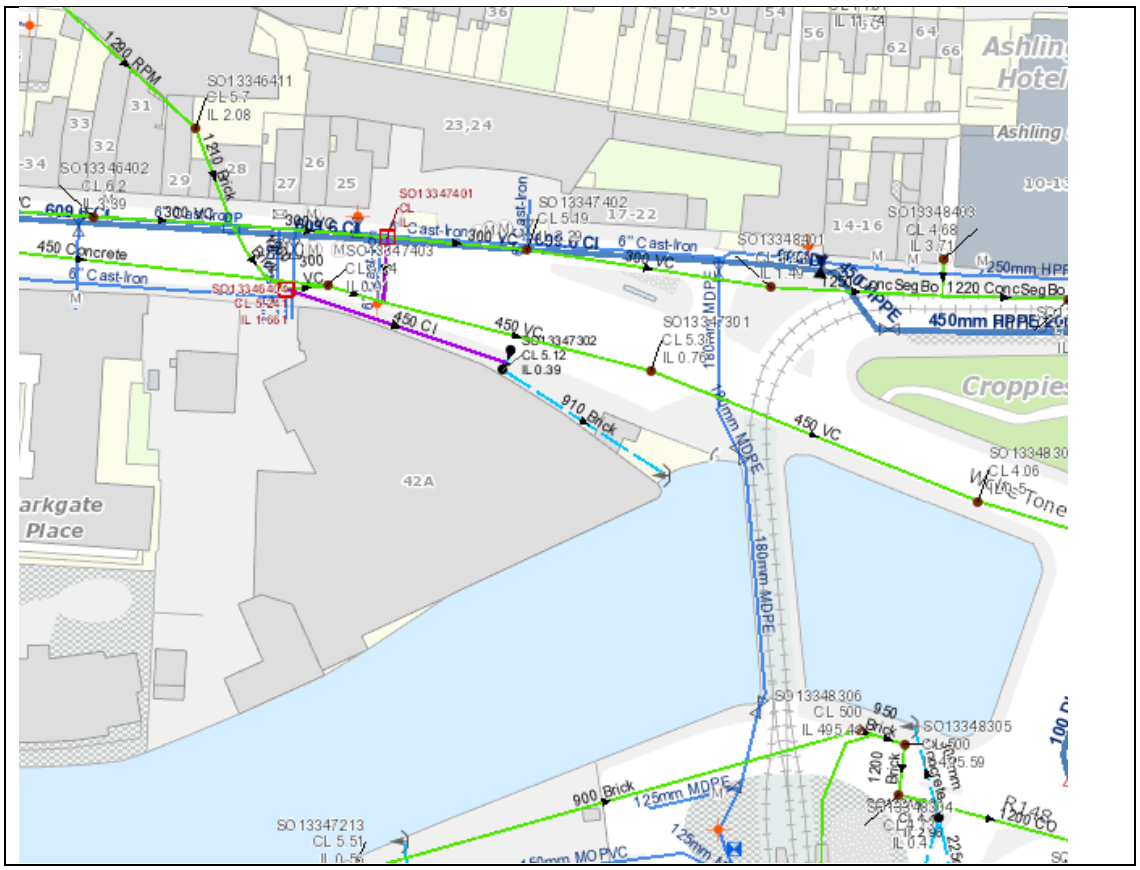
Section A - What is important to know?

What is important to know?	Why is this important?
Do you need a contract to connect?	• 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 and be granted and sign a connection agreement with Uisce Éireann.
When should I submit a Connection Application?	• A connection application should only be submitted after planning permission has been granted.
Where can I find information on connection charges?	• Uisce Éireann connection charges can be found at: https://www.water.ie/connections/information/charges/
Who will carry out the connection work?	• All works to Uisce Éireann's network(s), including works in the public space, must be carried out by Uisce Éireann*. *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
Fire flow Requirements	• 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	• 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 Uisce Éireann's network(s)?	• Requests for maps showing Uisce Éireann's network(s) can be submitted to: datarequests@water.ie

What are the design requirements for the connection(s)?	• The design and construction of the Water & Wastewater pipes and related infrastructure to be installed in this Development shall comply with ***the Uisce Éireann Connections and Developer Services Standard Details and Codes of Practice,*** available at www.water.ie/connections
Trade Effluent Licensing	• 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/ **trade effluent is defined in the Local Government (Water Pollution) Act, 1977 (as amended)

Section B – Details of Uisce Éireann's Network(s)

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



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

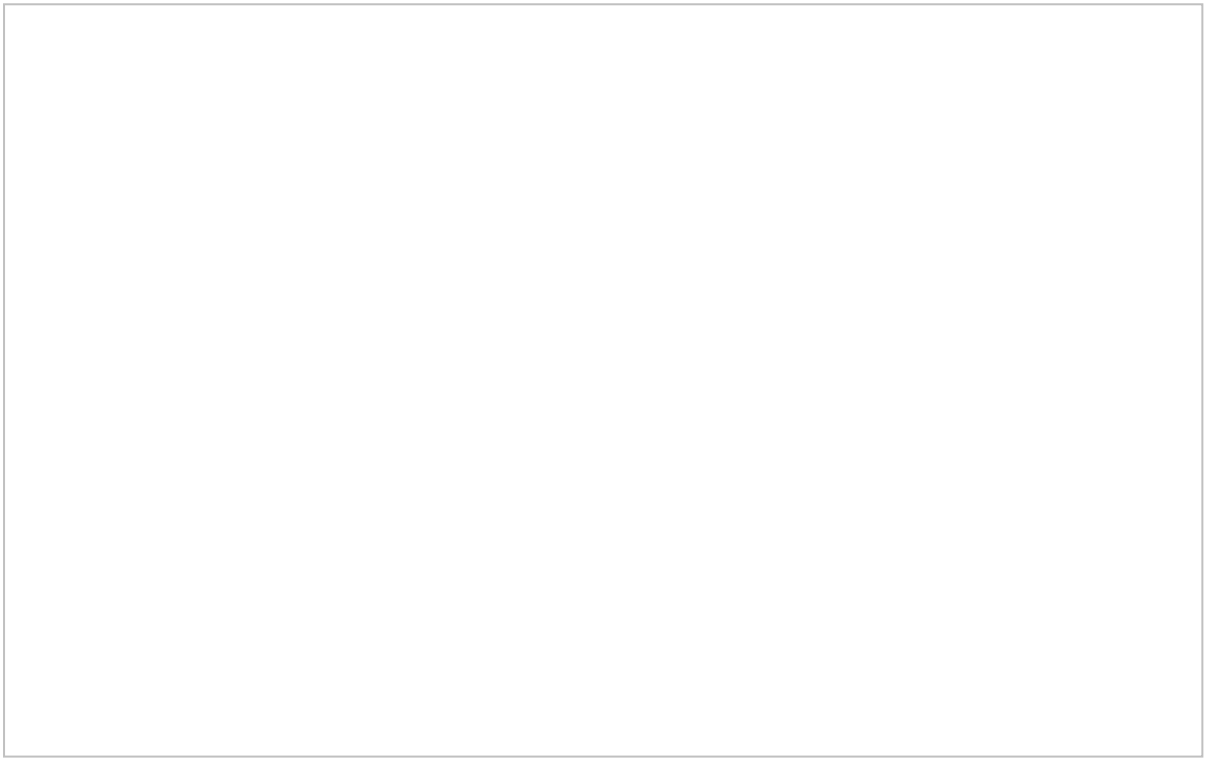
Note: The information provided on the included maps as to the position of Uisce Éireann's underground network(s) is provided as a general guide only. The information is based on the best available information provided by each Local Authority in Ireland to Uisce Éireann.

Whilst every care has been taken in respect of the information on Uisce Éireann's network(s), Uisce Éireann 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 Uisce Éireann's underground network(s). The onus is on the parties carrying out excavations or any other works to ensure the exact location of Uisce Éireann'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.

Outlook

CDS2300654301 Uisce Éireann Connection Application EMAIL:0624218

From newconnections <newconnections@water.ie>
Date Wed 24/05/22 8:55 AM
To Kieran Dowdall <Kieran.Dowdall@arup.com>



Subject Line: Uisce Éireann Connection Application Ref Number: CDS2300654301

Dear Customer,

Thank you for submitting your Water & Wastewater Application Form for Former Hickey & Co LTD, Parkgate Street, Dublin 8. Your Uisce Éireann reference number for your application is CDS2300654301, which you can keep for your records.

Next steps in your application:

Assessment of Application: Your application is currently being assessed to confirm it is technically feasible; we will be in touch once this assessment has been completed. A significant level of analysis is required before we can provide a response. Two considerations are:

- A review of the available capacity in Uisce Éireann infrastructure versus your requirements.
- The location for connection versus the distance to/from our network.

Where your requirements are of a significant nature for example, multiple properties or commercial/industrial developments, this work may take a period of time to complete.

Getting an offer: If your application is technically feasible, we will issue you with an offer to connect, detailing costs and works required.
From receipt of your Connection Application, it takes on average 16 weeks to issue a Connection Offer.

Accepting the offer: You can enter into a connection agreement by accepting the terms and conditions as set out in your offer, and by making the required payment.

If your development is a Housing Development (two or more housing units), in advance of commencing works on site and where water services infrastructure is vested in the ownership of Uisce Éireann through the Connection Agreement, the developer is required to initiate a kick-off meeting to agree a suite of site inspections for on site Quality Assurance (QA).

Construction Phase: If required, an Uisce Éireann agent will contact you in relation to the connection assets required to facilitate your connection to the network.

Physical Connection: An Uisce Éireann agent will deliver the full connection works in the public domain. We will contact you to arrange a suitable time to complete the works required to connect your development to the Uisce Éireann network. **From securing the Road Opening Licence, to completing connection takes on average 12 weeks.**

Connection to the network: Once connected, a meter will be installed and you can fully avail of our services as per the connection agreement.

If you have any further queries please contact us on **1800 278 278** or **+353 1 707 2828;** alternatively, you can visit www.water.ie/connections for more information.

Please do not amend this subject line as it will help us deal with your response.

Yours sincerely,

Customer Service Advisor

Callsave 1800 278 278 | +353 1 707 2828
www.water.ie/connections

Application form

Multi/mixed use development water and/or wastewater connection

This form should be completed by a person or organisation who wishes to apply to Uisce Éireann for a water and/or wastewater connection to be used for both domestic and for any trade, industry or business, or any purpose other than domestic for more than one unit. If completing this form by hand, please use BLOCK CAPITALS and black ink. Please note that this is a digital PDF form and can be filled in electronically

Please refer to the **Guide to completing the application form** on page 16 of this document when completing the form.

*** Denotes mandatory/ required field. Please note, if mandatory fields are not completed the application will be returned.**

Section A | Applicant details

1 PCE Reference Number (if applicable): CDS2300654 3

2 *Applicant details:

Registered company name (if applicable):

Delaston Limited

Trading name (if applicable):

Company registration number (if applicable): 627397

Parent company registered company name (if applicable):

Parent company registration number (if applicable):

If you are not a registered company/business, please provide the applicant's name:

*Contact name: Eoin Wilcox

*Postal address: Usher House Main Street

Dundrum Dublin 14

*Eircode: D14N7Y8

Please provide either a landline or a mobile number

Landline: 01-2164080

*Mobile: 086-8262828

*Email: ewilcox@chartered.ie

3 Agent details (if applicable):

The fields marked with * in this section are mandatory if using an agent

*Contact name: Kieran Dowdall

Company name (if applicable): Arup

*Postal address: 50 Ringsend Road

Dublin 4

*Eircode: D04T6XO

Please provide either a landline or a mobile number

Landline: 01-2334455

*Mobile

*Email: kieran.dowdall@arup.com

4 Developer details:

The fields in this section are mandatory if a developer is involved.

*Contact name: Eoin Wilcox

Company name (if applicable): Delaston

Company registration number (if applicable):

*Postal address: Usher House Main Street

Dundrum Dublin 14

*Eircode: D14N7Y8

Please provide either a landline or a mobile number

Landline: 01-2164080

*Mobile 0868262828

*Email: ewilcox@chartered.ie

5 *Please indicate whether the applicant, agent or developer who should be contacted in relation to this application:

Applicant Agent ✔ Developer

Section B | Site details

6 ***Site address 1 (include Site name/Building name/Building number):**

Former Hickey & Co Ltd

***Address 2** Parkgate Street

***Address 3** Dublin 8

***City/Town**

***County** **Eircode**

7 ***Irish Grid co-ordinates (proposed connection point):**

Eastings (X) 313717 Northings (Y) 234384

Note: Values for Eastings must be between 015,900 and 340,000. Northings, between 029,000 and 362,000
Eg. co-ordinates of GPO, O'Connell St., Dublin: E(X) 315,878 N(Y) 234,619

8 ***Local Authority:**

Local Authority that granted planning permission (if applicable):

Dublin City Council

9 ***Planning reference** (current reference and any previous planning reference that may be applicable):

ABP-306569-20 ABP-310567-21

Additional Planning reference: LRD6042/23-S3A-P2217
Note: The development must have full planning permission before this form is submitted, or enter "EXEMPT" for exempted developments.

10 ***Has full planning permission been granted?** Yes ✔ No

If 'Yes', please provide the date it was granted

ABP-306569-20 : 19/05/2020
ABP-310567-21 : 04/10/2021
LRD6042/23-S3A-P2217 : 26/01/2024

11 ***Type of premises:** New Existing ✔

If 'Existing', please specify existing use of premises: HQ & Storage

11.1 Date that previous development was last occupied (if applicable): / / 2019

11.2 If 'Existing', please provide WPRN, if known:

12 ***Are there potential contaminated land issues?** Yes ✔ No

If 'Yes', please include a detailed site-specific report on the approach being taken to deal with contaminated land and the measures being taken to mitigate the impact on infrastructure.

Refer to notes, page 20.

13 ***Is this development affiliated with a government body/agency?** Yes No ✔

If 'Yes', please specify the body/agency:

Eg. IDA, HSE, LDA, etc.

Section C | Development details

14 ***Please outline the domestic and/or industry/business use proposed:**

Domestic:

Property type	Number of units	Property type	Number of units
House		Apartments	559
Duplex		Number of Apartment Blocks	6

Industry/business:

Property type	Number of units	Property type	Number of units
Agricultural		Brewery / Distillery	
Restaurant / Café / Pub	2	Car Wash / Valeting	
Creche		Data Centre	
Fire Hydrant		Fire Station	
Food Processing		Hotel Accommodation	
Industrial / Manufacturing		Laundry / Laundrette	
Office		Primary Care Centre	
Residential / Nursing Care Home		Retail	1
School		Sports Facility	
Student Accommodation		Warehouse	

Other (please specify type)	Gym	No. of Units	1

Note: This application form is for more than one business/industrial unit or a combination of domestic and business/industrial units.

14.1 Please provide the maximum expected occupancy for the business/industry units selected: 28

Note: This should be the number of people, according to the proposed development you selected (e.g. Number of office workers, number of nursing home residents, maximum pub occupancy, maximum hotel occupancy, number of retail workers).

14.2 Please provide additional details if your proposed business use are in the Food Processing, Industrial unit/ Manufacturing, Sports Facility or Other Categories.

N / A

15 ***Approximate start date of proposed development:** 18 / 11 / 2024

16 ***Is the development multi-phased?** Yes No ✔

16.1 If 'Yes', application must include a master-plan identifying the development phases and the current phase number. Please include details on the number of each type of house which are part of this application.

16.2 If 'Yes', please provide details of variations in water demand volumes and wastewater discharge loads due to phasing requirements.

16.3 Which phase of the development is this application associated with?

16.4 Number of units associated with overall development: 559

16.5 Number of units associated with this application: 559

17 ***Will the developer install the local infrastructure?** Yes ✔ No

Yes, for proposed surface water sewer on Parkgate Street. Water and wastewater connection by Uisce Eireann

18 ***Please indicate the type of connection required by ticking the appropriate box below:**

Both Water and Wastewater ✔ Please complete both Sections D and E

Water only Please go to Section D

Wastewater only Please go to Section E

Reason for only applying for one service (if applicable):

Section D | Water connection and demand details

19 ***Is there an existing connection to public water mains at the site?** Yes ✔ No

19.1 If yes, is this application for an additional connection to one already installed? Yes No ✔

19.2 If yes, is this application to increase the size of an existing water connection? Yes No ✔

19.3 Please indicate pre-development water demand (if applicable):

Pre-development peak hour water demand	N/A	**l/s**
Pre-development average hour water demand	N/A	**l/s**

Pre-development refers to brownfield sites only. Please include calculations on the attached sheet provided.

20 ***Approximate date water connection is required:** ☐☐ / 0 5 / 2 0 2 5

21 ***What diameter of water connection is required to service this development?** 2 0 0 mm

Please note that the connection size provided may be used to determine the connection charge.

22 ***Is more than one connection required to the public infrastructure to service this development?** Yes ✔ No

If 'Yes', how many? 0 2

23 ***Please indicate the domestic water demand for the proposed development:**

Post-development peak hour water demand	19.35	**l/s**
Post-development average hour water demand	2.62	**l/s**

Please include calculations on the attached sheet provided.

24 ***Please indicate the business water demand (shops, offices, schools, hotels, restaurants, etc.):**

Post-development peak hour water demand	0.52	**l/s**
Post-development average hour water demand	0.083	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details. Please provide the breakdown of water demand for each individual unit.

25 ***Please indicate the industrial water demand (industry-specific water requirements):**

Post-development peak hour water demand	N/A	**l/s**
Post-development average hour water demand	N/A	**l/s**

Please include calculations on the attached sheet provided. Where there will be a daily/weekly/seasonal variation in the water demand profile, please provide all such details. Please provide the breakdown of water demand for each individual unit.

26 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?**

5 . 2 0 m

27 **What is the highest finished floor level on-site above Malin Head Ordnance Datum?** 9 8 . 0 0 m

28 ***Is on-site water storage being provided?** Yes ✔ No

Please include calculations (details and capacity) of all water storage provided on-site on attached sheet provided.

29 ***Are there fire flow requirements?** Yes ✔ No

Additional fire flow requirements over and above those identified in Q23-25	25	**l/s**

Please include calculations on the attached sheet provided, and include confirmation of requirements from the Fire Authority.

30 ***Do you propose to supplement your potable water supply from other sources?** Yes No ✔

If 'Yes', please indicate how you propose to supplement your potable water supply from other sources (see **Guide to completing the application form** on page 18 of this document for further details):

Section E | Wastewater connection and discharge details

31 ***Is there an existing connection to public sewer at the site?** Yes ✔ No

31.1 If yes, is this application for an additional connection to one already installed? Yes No ✔

31.2 If yes, is this application to increase the size of an existing connection? Yes No ✔

31.3 Please indicate pre-development wastewater discharge (if applicable):

Pre-development peak discharge	N/A	**l/s**
Pre-development average discharge	N/A	**l/s**

Pre-development refers to brownfield sites only. Please include calculations on the attached sheet provided.

32 ***Approximate date wastewater connection is required:** / 1 1 / 2 0 2 5

33 ***What diameter of wastewater connection is required to service this development?** 2 2 5 mm

Please note that the connection size provided may be used to determine the connection charge.

34 ***Is more than one connection required to the public infrastructure to service this development?** Yes ✔ No

If 'Yes', how many? 0 3

35 Please indicate the domestic wastewater hydraulic load for the proposed development:

Post-development peak discharge	7.86	**l/s**
Post-development average discharge	2.62	**l/s**

Please include calculations on the attached sheet provided. Please provide the breakdown of the peak and average discharge for each individual unit.

36 *Please indicate the business wastewater hydraulic load (shops, offices, schools, hotels, restaurants, etc.):

Post-development peak discharge	0.49	**l/s**
Post-development average discharge	0.083	**l/s**

Please include calculations on the attached sheet provided. Please provide the breakdown of the peak and average discharge for each individual unit.

37 *Please indicate the industrial wastewater hydraulic load (industry-specific discharge requirements):

Post-development peak discharge	N/A	**l/s**
Post-development average discharge	N/A	**l/s**

Please include calculations on the attached sheet provided. Please provide the breakdown of the peak and average discharge for each individual unit.

38 Wastewater organic load:

Characteristic	**Max concentration (mg/l)**	**Average concentration (mg/l)**	**Maximum daily load (kg/day)**
Biochemical oxygen demand (BOD)	300		
Chemical oxygen demand (COD)	550		
Suspended solids (SS)	300		
Total nitrogen (N)	60		
Total phosphorus (P)	15		
Other			

Temperature range	< 40 degrees
pH range	6-10

39 *Is a Trade Effluent Discharge to Sewer Licence required? Yes ✔ No

If 'Yes', please complete the wastewater characteristic form included in this document (see Table 1 below) in order to allow us to ascertain the nature of the effluent to be discharged to the Uisce Éireann network.
A Trade Effluent Discharge to Sewer Licence can be applied for at **www.water.ie/tradeeffluent**

2 No. food and beverage outlets

40 ***Storm water run-off will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer. In the case of such brownfield sites, please indicate if the development intends discharging surface water to the combined wastewater collection system:**

Yes | No ✔

If 'Yes', please give reason for discharge and comment on adequacy of SUDS/attenuation measures proposed.

Please submit detailed calculations on discharge volumes, peak flows and attenuation volumes with this application.

41 ***Do you propose to pump the wastewater?** Yes ✔ No

If 'Yes', please include justification for your pumped solution with this application.

Foul pumping from basement level

42 **What is the existing ground level at the property boundary at connection point (if known) above Malin Head Ordnance Datum?** 5.20 m

43 **What is the lowest finished floor level on-site above Malin Head Ordnance Datum?** 2.00 m

44 **What is the proposed invert level of the pipe exiting the property to the public road?** 2.732 m

Section F | Supporting documentation

Please provide clear and legible versions of the following mandatory documents (all mandatory):

> Site location map: A site location map to a scale of 1:1000, which clearly identifies the land or structure to which the application relates. The map shall include the following details: ✔

a) The scale shall be clearly indicated on the map.

b) The boundaries shall be delineated in red.

c) The site co-ordinates shall be marked on the site location map.

> Site layout map(s) to a scale of 1:500 showing layout of proposed development, water network and wastewater network layouts, additional water/wastewater infrastructure if proposed, connection points to Uisce Éireann infrastructure. ✔

> All design submissions as outlined in the Uisce Éireann Code of Practice for Water Infrastructure **www.water.ie/watercodeofpractice** and the Uisce Éireann Code of Practice for Wastewater Infrastructure **www.water.ie/wastewatercodeofpractice**, including the layout of all other services to be provided within the site (for example: gas, electricity, telecommunications).

> All design calculations as outlined in the Uisce Éireann Codes of Practice for Water Infrastructure and the Uisce Éireann Codes of Practice for Wastewater Infrastructure. ✔

> Conceptual design of the connecting asset to the proposed development to the existing Uisce Éireann infrastructure including service conflicts, gradients, pipe sizes and invert levels. ✔

> Any other information that would help Uisce Éireann assess this application.

> Master Plan of entire proposed development with phase of development associated with this application is identified.

> Schedule of house/unit numbers, associated addresses applied for as part of this application and additional associated information. This must be provided in the template spreadsheet which is available from Uisce Éireann.

Section G | Declaration

I/We hereby make this application to Uisce Éireann for a water and/or wastewater connection as detailed on this form.

I/We understand that any alterations made to this application must be declared to Uisce Éireann.

The details that I/we have given with this application are accurate.

I/We have enclosed all the necessary supporting documentation.

Any personal data you provide will be stored and processed by Uisce Éireann and may be transferred to third parties for the purposes of the water and/or wastewater connection process. I hereby give consent to Uisce Éireann to store and process my personal data and to transfer my personal data to third parties, if required, for the purposes of the connection process.

If you wish to revoke consent at any time or wish to see Uisce Éireann's full Data Protection Notice, please see **https://www.water.ie/privacy-notice/**

Signature:  Date: 20 / 05 / 2024

Your full name (in BLOCK CAPITALS):

K	i	e	r	a	n		D	O	W	D	A	L	L																	

Uisce Éireann will carry out a formal assessment based on the information provided on this form.
Any future connection offer made by Uisce Éireann will be based on the information that has been provided here.

Please submit the completed form to **newconnections@water.ie** or alternatively, post to:

Uisce Éireann
PO Box 860
South City Delivery Office
Cork City

Please note that if you are sending us your application form and any associated documentation by email, the maximum file size that we can receive in any one email is 35MB.

Please note, if mandatory fields are not completed the application will be returned.

Uisce Éireann is subject to the provisions of the Freedom of Information Act 2014 ("FOIA") and the codes of practice issued under FOIA as may be amended, updated or replaced from time to time. The FOIA enables members of the public to obtain access to records held by public bodies subject to certain exemptions such as where the requested records may not be released, for example to protect another individual's privacy rights or to protect commercially sensitive information. Please clearly label any document or part thereof which contains commercially sensitive information. Uisce Éireann accepts no responsibility for any loss or damage arising as a result of its processing of freedom of information requests.

Calculations

Water demand

Domestic

226,350 litres/day / (24x60x60) = 2.62 l/s average flow.
2.62 x 1.25 = 3.87 l/s (Average day peak week)
3.87 x 5 = 19.35 l/s Peak Flow

Business

7,185 litres/day / (24x60x60) = 0.083 l/s average flow.
0.083 x 1.25 = 0.104 l/s (Average day peak week)
0.104 x 5 = 0.52 l/s Peak Flow

Total domestic and business water demand = 233,535 litres/day

On-site storage

Please see cold water calculations attached.

Fire flow requirements

Tower wet riser will require a 45m3 tank with a feed of 1,500 litres/min from the main.

Domestic Hydraulic Loading

559 units at 2.7 persons per unit = 1509 persons @ 150 l/p/day = 226,350 litres/day. Average discharge = 2.62 l/s x 3 (peaking factor), Peak discharge = 7.86 litres/second.

Business Hydraulic Loading

Commercial Retail 134m2 at 1 staff/20m2 = 7 persons @ 50 litres/person/day = 350 litres/day.
Amenity Gym 150m2 at 1 staff/55m2 = 3 persons @ 45 litres/person/day = 135 litres/day
Gym members 400@ 10 litres/person/day = 4,000 litres/day
Cafes 236m2 at 1 staff/13m2 = 18 persons @ 50 litres/person/day = 900 litres/day and 120 sittings @ 15 litres/person/day = 1,800 litres/day. Total Cafe usage = 2,700 litres/day

Total Business hydraulic loading = 7,185 litres/day. Average discharge = 0.083 l/s x 6 (peaking factor), Peak discharge = 0.49 litres/second.

Table 1: Wastewater characteristic form
(Only to be filled out if a Trade Effluent Discharge to Sewer Licence is required)

Wastewater characteristic:	Prior to treatment	As discharged
Temperature (oC)		< 40
pH		6-10
Colour (degrees Hazen)		
BOD (mg/l)		300
COD (mg/l)		550
Suspended solids (mg/l)		300
Settleable solids (mg/l)		
Dissolved solids (mg/l)		
Ammonia (as N) (mg/l)		
Nitrates (as N) (mg/l)		
Phosphorus (as P) (mg/l)		
Sulphates (as SO4) (mg/l)		400
Chlorides (as C1) (mg/l)		
Phenols (as C6H5OH) (mg/l)		
Detergents (as lauryl sulphate)		100
Fats, oils and grease (mg/l)		100
Metals (specify each) (mg/l)		
Organohalogen compounds (specify each)		
Organophosphorus compounds (specify each)		
Organotin compounds (specify each)		
Mineral oils or hydrocarbons of petroleum origin (mg/l)		
Other relevant characteristics		

Guide to completing the application form

This form should be completed by customers requiring a business water and/or wastewater connection to Uisce Éireann infrastructure when applying for a connection that will serve at least 2 units: 2 or more business/industrial units or a mixture of domestic and business/industrial units.

The Uisce Éireann Codes of Practice are available at **www.water.ie** for reference.

Section A | Applicant details

Question 1: Please state the Pre-Connection Enquiry (PCE) reference number provided during the Pre-Connection Enquiry Phase if applicable.

Question 2: This question requires the applicant or company applying for a connection to identify themselves, their postal address, and to provide their contact details.

Question 3: If the applicant has employed a consulting engineer or an agent to manage the application on their behalf, the agent's address and contact details should be recorded here. This section is mandatory if you have selected "Agent" as the preferred contact option in Question 5.

Question 4: Please provide the name, postal address, and contact details of the developer for the proposed new development. This section is mandatory if you have selected "Developer" as the preferred contact option in Question 5.

Question 5: Please indicate whether it is the applicant, the agent or the developer who should receive future correspondence in relation to the application.

Section B | Site details

Question 6: This is the address of the site requiring the water/wastewater service connection and for which this application is being made.

Question 7: Please provide the Irish Grid co-ordinates of the proposed site. Irish grid positions on maps are expressed in two dimensions as Eastings (E or X) and Northings (N or Y) relative to an origin. You will find these coordinates on your Ordnance Survey map which is required to be submitted with the application.

Question 8: Please identify the Local Authority that is dealing with your planning application, for example Cork City Council.

Question 9: Please provide the planning reference number granting your proposed development.

Question 10: Please indicate if full planning permission has been granted. If "yes" enter the date it was granted.

Question 11: Please indicate if there is an existing premises, and where there is, please specify the current use of the premises, for example business or industrial type. If greenfield, please advise 'agricultural'. This will help us to determine the current water demand and wastewater discharge.

Question 11.1: Please specify the date that the development site was last occupied. Your answer will help us to determine the previous water usage of the development. If the site was previously greenfield, then this question does not need to be completed.

Question 11.2: Water Point Reference Number (WPRN)' is a unique number assigned to every single water services connection in the country. The WPRN is prominently displayed on correspondence received from Uisce Éireann, and can be found on water bills, previous connection offers, or previous enquiries in relation to the site. Existing customers and brownfield sites should have a WPRN. New customers are not required to answer this question.

Question 12: Please provide details in relation to contaminated land on your site (if any); this will determine what pipe material will be appropriate in the vicinity of the contaminated ground.

Question 13: Please indicate if this development is affiliated with a government body/agency, and if so, specify.

Section C| Development details

Question 14: Please detail the number of each property type in the Domestic table provided. For single residential units, use the Single Domestic application form.

Please detail the number of units for each industry/business type in the Industry/business table provided. For single business units use the Single Business Application Form. For housing developments, use the Housing Development application form.

If your proposed business use is not on the list, provide details of the proposed use in 'Other (please specify type)' and enter the number of units.

Question 14.1: Please indicate the maximum expected occupancy for the business/industry units selected. Note: This should be the number of people, according to the proposed development you selected (e.g. Number of office workers, number of nursing home residents, maximum pub occupancy, maximum hotel occupancy, number of retail workers).

Question 14.2: If you have selected any of the "Food Processing", "Industrial unit / Manufacturing", "Sports Facility" or" Other" categories in the checklist, please provide here the specific details of your proposed business use. For example, the nature of the Food Processing business, the type of Sports Facilities or the specifics of your business if you have selected "Other".

Question 15: Please indicate the approximate commencement date of works on the development.

Question 16: Please indicate if a phased building approach is to be adopted when developing the site.

Question 16.1: If yes, please provide details of the phase master-plan.

Question 16.2: If yes, please provide details of the proposed variation in water demand/wastewater discharge as a result of the phasing of the development.

Question 16.3: Please specify which phase of the development this application is associated with.

Question 16.4: Please specify the number of dwelling units associated with the overall development.

Question 16.5: Please specify the number of dwelling units associated with this application.

Question 17: Please indicate if the developer will install local infrastructure as defined under the Uisce Éireann Codes of Practice for Water Infrastructure and/or the Uisce Éireann Codes of Practice for Wastewater Infrastructure.

'Local infrastructure' means water supply and wastewater collection pipework and accessories infrastructure that is located within the boundary of the new development and which will be constructed to facilitate water supply or wastewater collection from the individual units within the development, excluding service connections.

Question 18: Please indicate the type of connection required by ticking the appropriate box and proceed to complete the appropriate section or sections.

Section D | Water connection and demand details

Question 19: Please indicate if a water connection already exists for this site.

Question 19.1: Please indicate if this application is for an additional connection to one already installed on the site.

Question 19.2: Please indicate if you are proposing to upgrade the water connection to facilitate an increase in water demand. Uisce Éireann will determine what impact this will have on our infrastructure.

Question 19.3: If the site was previously in use, please provide details of the pre-development peak hour and average hour water demand.

Question 20: Please indicate the approximate date that the proposed connection to the water infrastructure will be required.

Question 21: Please indicate what diameter of water connection is required to service this development. Please note that the connection size provided may be used to determine the connection charge.

Question 22: Please indicate if more than one connection is required to service this development.

Question 23: Please calculate the domestic water demand and include your calculations on the calculation sheet provided. Average domestic daily demand in a development can be established based on daily per-capita consumption, house occupancy, number of properties, etc. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). For design purposes, please refer to the Uisce Éireann Codes of Practice for Water Infrastructure.

Question 24: If this connection application is for a business premises, please provide calculations for the water demand and include your calculations on the calculation sheet provided. Business premises include shops, offices, hotels, schools, etc. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak demand for sizing the pipe network will be as per the business production requirements. For design purposes, please refer to the Uisce Éireann Codes of Practice for Water Infrastructure.

Question 25: If this connection application is for an industrial premises, please calculate the water demand and include your calculations on the calculation sheet provided. Demand rates (peak and average) are site specific. Average demand is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak demand for sizing the pipe network will be as per the specific business production requirements. For design purposes, please refer to the Uisce Éireann Codes of Practice for Water Infrastructure.

Question 26: Please specify the ground level at the location where connection to the public water mains will be made. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 27: Please specify the highest finished floor level on-site. This is required in order to determine if there is sufficient pressure in the existing water infrastructure to serve your proposed development. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 28: If storage is required, water storage capacity of 24-hour water demand must usually be provided at the proposed site. In some cases, 24-hour storage capacity may not be required, for example 24-hour storage for a domestic house would be provided in an attic storage tank. Please calculate the 24-hour water storage and include your calculations on the attached sheet provided. Please also confirm that on-site storage is being provided by ticking the appropriate box.

Question 29: The water supply system shall be designed and constructed to reliably convey the water flows that are required of the development including fire flow requirements by the Fire Authority. The Fire Authority will provide the requirement for fire flow rates that the water supply system will have to carry. Please note that while flows in excess of your required demand may be achieved in the Uisce Éireann network and could be utilised in the event of a fire, Uisce Éireann cannot guarantee a flow rate to meet your fire flow requirement. To guarantee a flow to meet the Fire Authority requirements you should provide adequate fire storage capacity within your development. Please include your calculations on the attached sheet provided, and further provide confirmation of the Fire Authority requirements.

Question 30: Please identify proposed additional water supply sources, that is, do you intend to connect to the public water mains or the public mains and supplement from other sources. If supplementing public water supply with a supply from another source, please provide details as to how the Uisce Éireann potable water supply is to be protected from cross contamination at the premises.

Section E| Wastewater connection and load details

Question 31: Please indicate if a wastewater connection to a public sewer already exists for this site.

Question 31.1: Please indicate if this application is for an additional wastewater connection to one already installed.

Question 31.2: Please indicate if you are proposing to upgrade the wastewater connection to facilitate an increased discharge. Uisce Éireann will determine what impact this will have on our infrastructure.

Question 31.3: If the site was previously in use, please provide details of the pre-development peak and average wastewater discharge.

Question 32: Please indicate the approximate date that the proposed connection to the wastewater infrastructure will be required.

Question 33: Please indicate what diameter of wastewater connection is required to service this development.

Question 34: Please indicate if more than one connection is required to service this development. Please note that the connection size provided may be used to determine the connection charge.

Question 35: Please calculate the wastewater loading and include your calculations on the calculation sheet provided. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). Sewers carrying domestic wastewater from housing developments should be designed to carry a minimum wastewater volume of six times dry weather flows (6DWF). Dry weather flows (DWF) should be taken as 600 litres per dwelling (three persons per house and a per capita wastewater flow of 200 litres per head per day). For design purposes, please refer to the Uisce Éireann Codes of Practice for Wastewater Infrastructure.

Question 36: If this connection application is for a business premises, please provide calculations for the wastewater and include your calculations on the calculation sheet provided. Business premises include shops, offices, hotels, schools, etc. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak discharge for sizing the pipe network will be as per the business production requirements. Please refer to the Uisce Éireann Codes of Practice for Wastewater Infrastructure.

Question 37: If this connection application is for an industrial premises, please calculate the wastewater and include your calculations on the calculation sheet provided. Discharge rates (peak and average) are site specific. Average discharge is the total daily volume divided by a 24-hour time period and expressed in litres per second (l/s). The peak discharge for sizing the pipe network will be as per the specific business production requirements. Please refer to the Uisce Éireann Codes of Practice for Wastewater Infrastructure.

Question 38: Please specify the maximum and average concentrations and the maximum daily load of each of the wastewater characteristics listed in the wastewater organic load table, and also specify if any other significant concentrations are expected in the effluent. Please complete the table and provide additional supporting documentation if relevant. Note that the concentration shall be in mg/l and the load shall be in kg/day. Note that for business premises (shops, offices, schools, hotels, etc.) for which only domestic effluent will be discharged (excluding discharge from canteens/restaurants which would require a Trade Effluent Discharge to Sewer Licence), there is no need to complete this question.

Question 39: Where a Trade Effluent Discharge to Sewer Licence is required, it will need to be applied for separately - visit **www.water.ie/tradeeffluent** Note however that a full suite of quality analysis of the proposed discharge should be provided as part of this application by filling out Table 1 above. If you do not need a Trade Effluent Discharge to Sewer Licence, please do not fill out this form.

Question 40: In exceptional circumstances, such as brownfield sites, where the only practical outlet for storm/surface water is to a combined sewer, Uisce Éireann will consider permitting a restricted attenuated flow to the combined sewer. Storm/surface water will only be accepted from brownfield sites that already have a storm/surface water connection to a combined sewer and the applicant must demonstrate how the storm/surface water flow from the proposed site is minimised using a sustainable urban drainage system (SUDS). This type of connection will only be considered on a case by case basis. Please advise if the proposed development intends discharging surface water to the combined wastewater collection system. If so, please submit detailed calculations in relation to attenuation volumes, peak discharges and total discharge volumes.

Question 41: If the development needs to pump its wastewater discharge to gain access to the Uisce Éireann infrastructure, please specify the pump flow rate, timings of discharge, and provide justification for the pumped solution on the calculation sheet provided.

Question 42: Please specify the ground level at the location where connection to the public sewer will be made. This is required in order to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 43: Please specify the lowest floor level of the proposed development. This is required in order to determine if the development can be connected to the public sewer via gravity discharge. Levels should be quoted in metres relative to Malin Head Ordnance Datum.

Question 44: Please specify the proposed invert level of the pipe exiting the property to the public road.

Section F| Supporting documentation

Please provide additional information as listed.

Section G| Declaration

Please review the declaration, sign, and return the completed application form to Uisce Éireann by email or by post using the contact details provided in Section G.

Q12 - Dealing with contaminated Land.

This report outlines the results of the recent GI carried out by JPC in Parkgate Street. The approach adopted was to use the information from the 2022 GI along with the 2019 GI data to look at the likely quantities.

We have taken the findings from the initial report for Parkgate Street, based on the sampling and testing carried out in 2019 and looked at the volume of material requiring excavation and removal off site, based on the excavation levels. We have not accounted for any reuse of materials on site. These figures are based on the assumption that no material was suitable for reuse and all excavated material will require disposal off site. In reality, the material described as suitable for disposal to a Soil Recovery Facility will most likely be suitable for reuse on site. In addition other materials may be suitable for re-use as long as they contain less than 2% anthropogenic waste. This will only be able to be accurately determined once the bulk dig commences and processes are put in place which would allow assessment of this.

Based on the current basement footprint, it can be shown that there is approximately 10,000m3 (10,263m3) requiring excavation. Levels should be checked and confirmed against the updated design drawings. The excavation levels adopted for each area are based on excavation down to the base of the pile cap and as such, this value may be an overestimate of the true volume to be excavated. The volume to be excavated was broken down based on the proportions previously reported. Note that these proportions are based on an investigation across the entire site and across all depths. Areas which may not require excavation have been included in this assessment. The breakdown is presented below:

• Inert Licenced Landfill – 10%
• Non-Hazardous Licenced Landfill – 45%
• Non-Hazardous licenced landfill with asbestos – 10%
• Hazardous licenced landfill – 15%
• Hazardous licenced landfill with asbestos – 15%
• Specialist Disposal or ex-situ treatment – 5%

Upon assessing the dig footprint and incorporating the additional information available (i.e. 2022 GI) we can now report that the breakdown of the actual material requiring disposal is as follows:

• Soil Recovery Facility – 5% (new category)
• Inert Licenced Landfill – 25% (+15%)
• Non-Hazardous Licenced Landfill – 45% (Same)
• Non-Hazardous licenced landfill with asbestos – 10% (Same)
• Hazardous licenced landfill – 10% (-5%)
• Hazardous licenced landfill with asbestos – 5% (-10%)
• Specialist disposal or ex-situ treatment – 0% (-5%)

Note that these figures are estimates only and are prepared for the use of the design team only. This information is presented to assist the design team in assessing the proposals of the contractor and to ensure that those proposals are in line with our own expectations.

Notes

Notes

Appendix F

Hydro International Guide to Surface Water Treatment Systems

TABLE 26.7 **Indicative suitability of SuDS components within the Management Train**

SuDS component	Interception[1]	Close to source/ primary treatment	Secondary treatment	Tertiary treatment
Rainwater harvesting	Y			
Filter strip	Y	Y		
Swale	Y	Y	Y	
Filter drain	Y		Y	
Permeable pavement	Y	Y		
Bioretention	Y	Y	Y	
Green roof	Y	Y		
Detention basin	Y	Y	Y	
Pond	[3]	Y[2]	Y	Y
Wetland	[3]	Y[2]	Y	Y
Infiltration system (soakaways/ trenches/ blankets/basins)	Y	Y	Y	Y
Attenuation storage tanks	Y[4]			
Catchpits and gullies		Y		
Proprietary treatment systems		Y[5]	Y[5]	Y[5]

Notes

1 Interception components are also normally also a treatment component (excluding rainwater harvesting which only removes runoff from the system)

2 for roof runoff only

3 Interception design may be possible in certain scenarios, but would require detailed justification

4 If unlined and design performance can be demonstrated (noting the need to protect groundwater)

5 where design performance can be demonstrated

A Guide to The SuDS Manual (C753) Simple Index Approach

Author: Mark Goodger, Regional Technical Manager
Hydro International

The SuDS Manual (C753) Simple Index Approach

Introduction

In Table 26.1 of The SuDS Manual (C753) four risk based approaches for water quality management are specified:

1. Simple Index Approach
2. Risk Screening (generally used to determine if Simple Index Approach is appropriate)
3. Detailed Risk Assessment
4. Process-Based Treatment Modelling

With the intention that the simpler approaches are applied in lower risk scenarios, with more sophisticated assessments only used when appropriate to the risk.

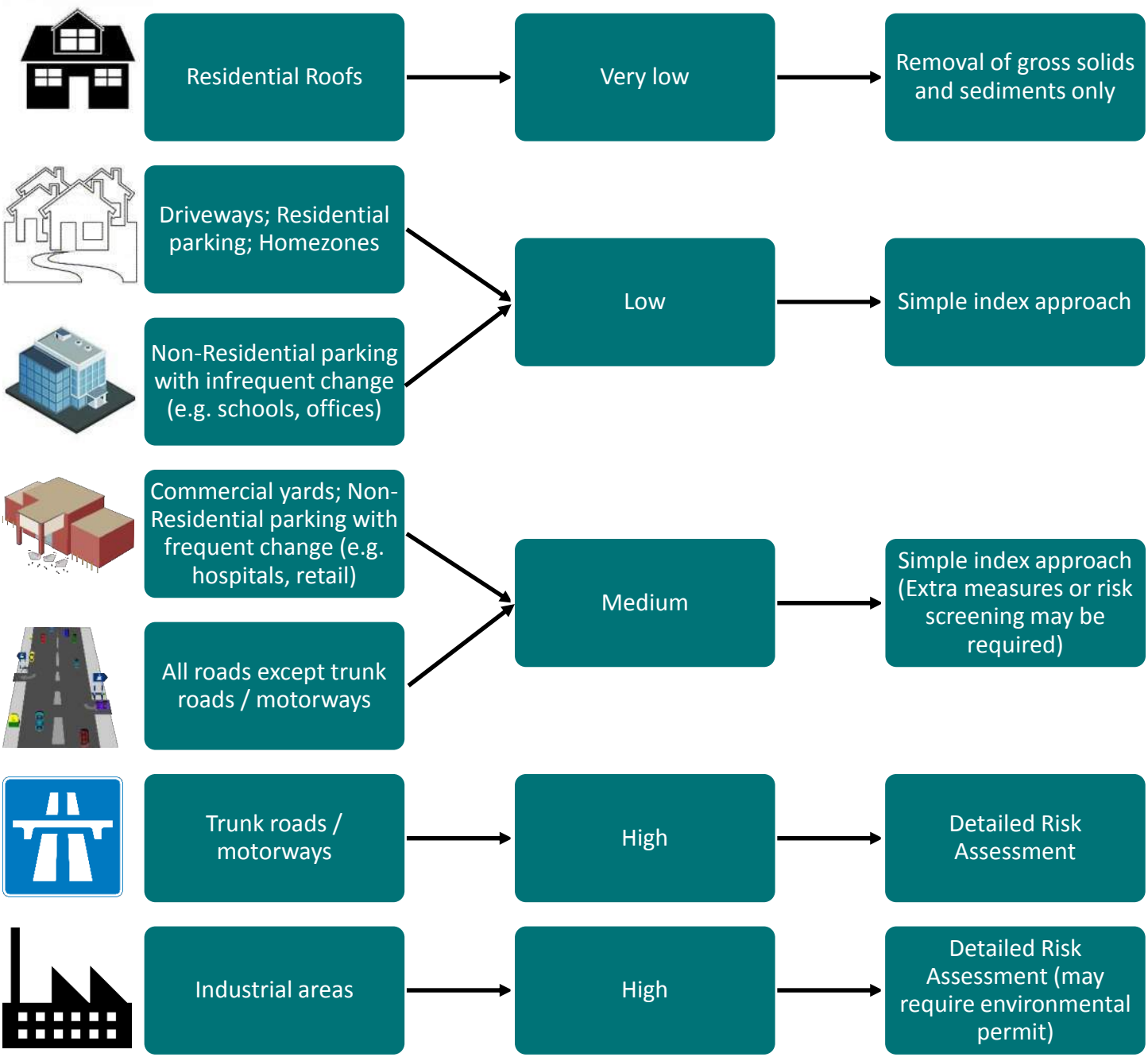


Figure 1: Applying the Risk Based Water Quality Management Approaches (Source: After Table 4.3 of the SuDS Manual)

Applying the Simple Index Approach (SIA)

The Simple Index Approach (SIA) recommended in Section 26.7.1 of The SuDS Manual (C753) was developed from that set out by Middlesex University (as outlined in Annex 5 of Chapter 26 of The SuDS Manual) and follows a three step approach:

Step 1 – Allocate suitable pollution hazard indices for the proposed land use categories

Step 2 – Select SuDS with a total pollution mitigation index that equals or exceeds the pollution hazard index

Step 3 – Where the discharge is to protected[1] surface waters or groundwater, consider the need for a more precautionary approach.

Note:

1 Designated as those protected for the supply of drinking water (see SuDS Manual Table 4.3).

Step 1: Define pollution hazard indices

Pollution hazad indices are presented in Table 26.2 of The SuDS Manual and reproduced here for simplicity. The indices range from 0 (no pollution of this type) to 1 (high pollution hazard for this contaminant type).

Table 1: Pollution hazard indices for different land use classes (Source: Reproduced from The SuDS Manual Table 26.2)

Land Use	Pollution Hazard Level	Total Suspended Solids (TSS)	Metals	Liquid Hydrocarbons (free floating oils)
Residential Roofs	Very low	0.2	0.2	0.05
Other Roofs (typically commercial / industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
Individual property driveways, residential car parks, low traffic roads (e.g. cul de sacs, homezones and general access roads) **and non-residential car parks with infrequent change** (e.g. schools, offices) – i.e. <300 traffic movements / day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential parking with frequent change (e.g. hospitals, retail)**; all roads except low traffic roads and trunk roads / motorways**[1]	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites)**; sites where chemicals and fuels** (other than domestic fuel oil) **are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways**[1]	High	0.8[2]	0.8[2]	0.9[2]

Notes:

1. Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009)
2. These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (see also The SuDS Manual Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help to determine the most appropriate treatment approach to the development of a design solution. **Also consider spill protection – contact Hydro International to find out more about our specialist treatment and containment options for high pollultion hazard sites.**

Where a site land use falls outside of these categories, the indices should be adapted (and agreed with the drainage approving / adopting body) or else a more detailed risk assessment should be carried out.
Equivalent indices should be developed for other contaminants of interest of any given site. **For assistance with development of indices or detailed site analysis, contact Hydro International.**

Step 2: Determine SuDS Pollution Mitigation Indices

To deliver adequate treatment, the selected SuDS components should have a total pollution mitigation index (for each contaminant type) that equals or exceeds the pollution hazard index (for that contaminant type):

Total SuDS Mitigation Index (for each contaminant) ≥ Pollution hazard index (for each contaminant)

If the mitigation index of an individual component is insufficient, two components (or more) in series will be required, with a factor of 0.5 used to account for the reduced performance of secondary or tertiary components, in line with the following equation:

$$\text{Total SuDS Mitigation Index} = \text{Mitigation Index}_1 + 0.5\,(\text{Mitigation Index}_2)$$

Where *Mitigation Index$_n$ = Mitigation Index for Component n.*

If the only runoff destination is to surface water (i.e. there is no infiltration from the SuDS to groundwater), the surface water mitigation indices should be used.

Where the principal destination of the runoff is to groundwater, then the groundwater indices should be used. This will be the case, even for infiltration systems that are designed to discharge to surface waters once the infiltration capacity is exceeded – In this scenario, the overflow will often not need to be treated prior to discharge to surface waters as the risk will be low (highly contaminated flows will have been treated prior to infiltration) and dilution will be high.

In England and Wales, if the principal runoff destination is intended to be to surface water, but some infiltration (even in small amounts) may occur through unlined components, then the groundwater indices should be used for the proportion of runoff that discharges to groundwater and the surface water indices used for the proportion of runoff that discharges to surface waters. In Scotland & Northern Ireland, groundwater risk management is not a requirement for this scenario.

Table 2: SuDS mitigation indices for discharges to surface waters (Source: Extended and reproduced from The SuDS Manual Table 26.3)

Type of SuDS Component	Mitigation Indices[1]		
	TSS	Metals	Liquid Hydrocarbons
Filter Strip	0.4	0.4	0.5
Filter Drain	0.4[2]	0.4	0.4
Swale	0.5	0.6	0.6
Bioretention System	0.8	0.8	0.8
Permeable Pavement	0.7	0.6	0.7
Detention Basin	0.5	0.5	0.6
Pond[3]	0.7[2]	0.7	0.5
Wetland[3]	0.8[2]	0.8	0.8
First Defense® Vortex Separator	0.5[a]	0.33[c]	0.4[d]
Downstream Defender® Advanced Vortex Separator	0.5[a]	0.4[c]	0.8[a]
Up-Flo™ Filter	0.8[a]	0.69[c, e]	0.4[d]
Hydro-BioCell™ Bioretention System	0.8[b]	0.8[b]	0.8[d]

Notes:

1) SuDS components only deliver these indices if they are designed and constructed in accordance with the relevant technical chapters of the SuDS Manual. Designers and installers of SuDS components should be able to demonstrate competence in their respective areas.
2) Filter drains, ponds and wetlands are not recommended for removal of coarse sediments as their use for this purpose will have significant maintenance implications. Sediment (TSS) should be removed upstream where possible.
3) Where a wetland is not specifically designed to provide significantly enhanced treatment performance, it should be considered as having the same mitigation indices as a pond.

a) Derived from 3rd party testing and / or verification programmes. Test reports available on request.
b) Derived from testing and / or monitoring. Test reports available on request.
c) Derived from partitioning of sediment bound and dissolved contaminants and associated testing. Evidence available on request.
d) Based on typical values for components of this type.
e) Dependant on filter media used.

Table 3: SuDS mitigation indices for discharges to groundwater (Source: Extended and reproduced from The SuDS Manual Table 26.4)

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates[1]	Mitigation Indices		
	TSS	Metals	Liquid Hydrocarbons
A layer of dense vegetation underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.6[4]	0.5	0.6
A soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.4[4]	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment) underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.4[4]	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment and including a geotextile at the base separating the foundation from the subgrade) underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.7[4]	0.6	0.7
Bioretention underlain by soil with good contaminant attenuation potential[2] of at least 300mm in depth[3]	0.8[4]	0.8	0.8
Flow through Proprietary Treatment System prior to infiltration SuDS	**TSS**	**Metals**	**Liquid Hydrocarbons**
First Defense® Vortex Separator	0.5[a]	0.33[c]	0.4[d]
Downstream Defender® Advanced Vortex Separator	0.5[a]	0.4[c]	0.8[a]
Up-Flo™ Filter	0.8[a]	0.69[c,e]	0.4[d]
Hydro-BioCell™ Bioretention System	0.8[b]	0.8[b]	0.8[d]

Notes:

SuDS components only deliver these indices if they are designed and constructed in accordance with the relevant technical chapters of the SuDS Manual. Designers and installers of SuDS components should be able to demonstrate competence in their respective areas.

1) All designs must include a minimum of 1m unsaturated depth of aquifer material between the infiltration surface and the maximum likely groundwater level (as required by infiltration design – see The SuDS Manual Chapter 25).
2) For example as recommended in Sniffer (2008a and 2008b), Scott Wilson (2010) or other appropriate guidance.
3) Alternative depths may be considered where it can be demonstrated that the combination of the proposed depth and soil characteristics will provide equivalent protection to the underlying groundwater – see note 1.
4) If significant amounts of sediment are allowed to enter an infiltration system, there will be a high risk of rapid clogging and subsequent system failure. It is recommended to remove sediment prior to the infiltration system as far as reasonably practical.

a) Derived from 3rd party testing and / or verification programmes. Test reports available on request.
b) Derived from testing and / or monitoring. Test reports available on request.
c) Derived from partitioning of sediment bound and dissolved contaminants and associated testing. Evidence available on request.
d) Based on typical values for components of this type.
e) Dependant on filter media used.

IMPORTANT NOTES:

- Where the indices are not considered representative by the designer, a more detailed risk assessment can be undertaken.
- Components should always be designed for treatment, as described in the relevant technical guidance set out in the individual component chapters of The SuDS Manual. **If they are incorrectly designed, constructed or inadequately maintained, their treatment performance could be significanty adversely affected.**
- Where the infiltration component itself does not provide sufficient pollution mitigation, the design should include upstream SuDS components that are lined to prevent infiltration from occurring until sufficient treatment has taken place.

Step 3: Consider the need for a precautionary approach where discharges are to protected waters

Reference should be made to local standards, planning requirements and guidance, particularly with reference to discharges to protected waters where more detailed risk assessments or enhanced treatment may be required.

Case Studies:

Small is Beautiful

A First Defense® provided a much-needed small footprint solution to meeting regulatory requirements on a confined site for a new commercial office development in Perkins Township, Ohio.
TSS was the main pollutant of concern and although the Simple Index Approach was not in use in Ohio at the time of installation, retrospectively considering this approach would give:

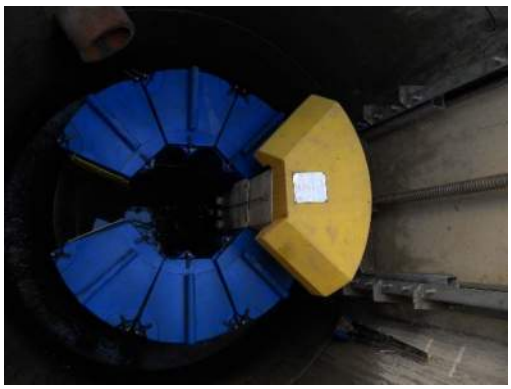
TSS Hazard Index (Office Development) = 0.5
First Defense® TSS Mitigation Index = 0.5

Mitigation Index ≥ Hazard Index

Pollution Protection in Whisky Country

Poor drainage, flooding and freezing weather led to a landslip and extreme surface degradation along a section of the narrow A95 near Elgin. Although it pre-dated the new SuDS Manual risk based approach, treatment was vital as the surface water runoff destination was to an area world-renowned for the production of single malt whiskey and an important salmon fishery.
A Downstream Defender® advanced hydrodynamic vortex separator minimises the risk of sediment and hydrocarbon pollution reaching the sensitive watercourse.

Downstream Defender® Mitigation Indices:
TSS = 0.5
Heavy Metals = 0.4
Liquid Hydrocarbons = 0.8



Fine Filtration enables Mixed-Use Development

Environment Agency planning conditions for a new commercial access road to retail and light commercial units as part of a mixed-use development in Faversham, Kent, required treatment prior to infiltration.
A bypass separator provides important spill protection for liquid hydrocarbons, prior to an Up-Flo™ Filter that ensures fine filtration of sediments and associated contaminants, such as Polycyclic Aromatic Hydrocarbons (PAHs). Although the installation pre-dates the Simple Index Approach, retrospective consideration of the approach gives:

Contaminant	TSS	Metals	PAHs
Hazard Indices (Commercial Access)	**0.7**	**0.6**	**0.7**
Up-Flo™ Filter Mitigation Indices	**0.8**	**0.69**	**0.72**

Stringent Quality Control, Naturally

Hydro BioCell™ have brought attractive landscaping and stringent surface water quality control to a sensitive location in Barry, South Wales.
3 units were retrofitted to the Business Support Centre car park as part of a wide urban regeneration scheme, effectively removing pollutants prior to discharge into the adjacent, rejuvenated harbourside.

Contaminant	TSS	Metals	Hydro-carbons
Hazard Indices (Commercial / Retail Parking)	**0.7**	**0.6**	**0.7**
Hydro BioCell™ Mitigation Indices	**0.8**	**0.8**	**0.8**

Simple Index Approach (SIA) Tool

A SIA spreadsheet tool has been developed by HR Wallingford on behalf of the Scottish Environment Protection Agency (SEPA) to support the implementation of the Simple Index Approach. The tool is freely available to download at www.susdrain.org/resources/SuDS_Manual.html.
The spreadsheet tool works through the Simple Index Approach Design Steps:

Step 1: Define pollution hazard indices

				Pollution Hazard Indices		
	Runoff Area Land Use Description		*Hazard Level*	Suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable): →	Residential parking		Low	0.5	0.4	0.4
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:						
	Landuse Pollution Hazard Index		**Low**	**0.5**	**0.4**	**0.4**

Step 2: Determine SuDS Pollution Mitigation Indices

			Pollution Mitigation Indices		
	SuDS Component Description		Suspended Solids	Metals	Hydrocarbons
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list: →	Proprietary treatment system	Enter User Defined Indices in row below			
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list: →	None				
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list: →	None				
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:	Hydro BioCell	SuDS Component 1	0.8	0.8	0.8

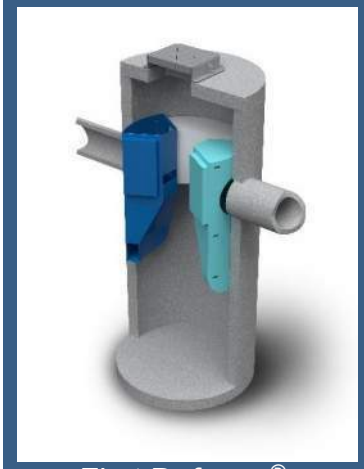
Calculation of Total SuDS Mitigation Indices and Results

	Combined Pollution Mitigation Indices		
	Suspended Solids	Metals	Hydrocarbons
Total Pollution Mitigation Indices for the Runoff Area	**0.8**	**0.8**	**0.8**

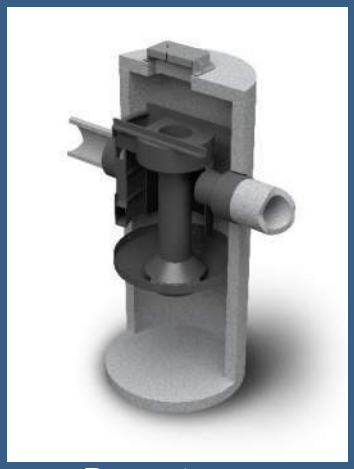
	Sufficiency of Pollution Mitigation Indices		
	Suspended Solids	Metals	Hydrocarbons
	Sufficient	Sufficient	Sufficient

The Hydro StormTrain® Series of Surface Water Treatment Devices

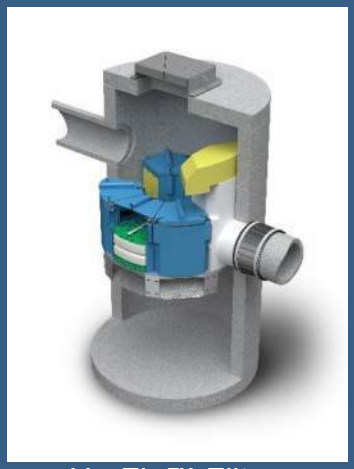
Each Hydro StormTrain® device delivers proven, measurable and repeatable surface water treatment performance. Each can be used independently to meet the specific treatment needs of a site; or can combined with one another or in conjunction with other SuDS components to form a mangament train; or can be used to protect and enhance SuDS features less suited to providing the first stage of treatment or more prone to failure due to sedimentation or shock loads associated with spills.



First Defense®
Vortex Separator



Downstream Defender®
Advanced Hydrodyanmic Vortex Separator



Up-Flo™ Filter
Fluidised Bed Up Flow Filtration System

Hydro BioCell™
Bioretention System

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