Waterman Moylan
Engineering Consultants

Engineering Assessment Report

Dunshaughlin West / Phase 2 SHD, County Meath.

September 2020

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Client Name:	Castlethorn Construction ULC
Document Reference:	12-081Ar.008 Engineering Assessment Report
Project Number:	12-081A

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with
Waterman Group's IMS (BS EN ISO 9001: 2015, BS EN ISO 14001: 2015)

Issue	Date	Prepared by	Checked by	Approved by
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Draft 2	Sep '20	S. Venter	J. Ulicna / P. Ingle /I. Swartz	
Final	Sep '20	P. Ingle	I. Swartz	

Comments

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We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above.

This report is confidential to the Client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at its own risk.

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1 Introduction

Waterman Moylan have been appointed by Castlethorn Construction ULC to provide Engineering services for the proposed residential development at Dunshaughlin, Co. Meath.

This Engineering Assessment report has been prepared as part of a SHD planning documentation to An Bord Pleanála for the proposed development, which comprises 415 No. residential units with 1 No. childcare facility and all associated infrastructure necessary to service them.

The proposed residential development forms Phase 2 of the overall development within the townlands of Readsland, Roestown and Knocks. Phase 1 has been approved under Reg Ref.DA/120987, ABP Ref. PL17.241988 and is currently under construction nearing completion.

This report describes receiving environment and the criteria used to design the wastewater and surface water drainage, water supply and road access required to serve the development.

1.1 Site Location and Description

The site is located within the townlands of Readsland, Roestown and Knocks, Dunshaughlin, Co. Meath and is split into two portions. The first portion is located north of Drumree Road and will be referred to throughout this report as **North Site**. The second portion is located to the south of Phase 1 development and will be referred to throughout this report as **South Site**. Phase 1 is a residential development that has been approved under Reg Ref.DA/120987, ABP Ref. PL17.241988 and is currently under construction nearing completion.

North Site

The northern site is bounded by agricultural lands to the north and west, with Drumree Road running along its southern border and the R125 running along its eastern border. The north site also surrounds an existing residential property in the south eastern corner.

South Site

The south site is bounded by the R125 to the west and by Phase1 to the north. Agricultural lands are adjacent to its southern and eastern borders as shown in Figure 1-1 below.

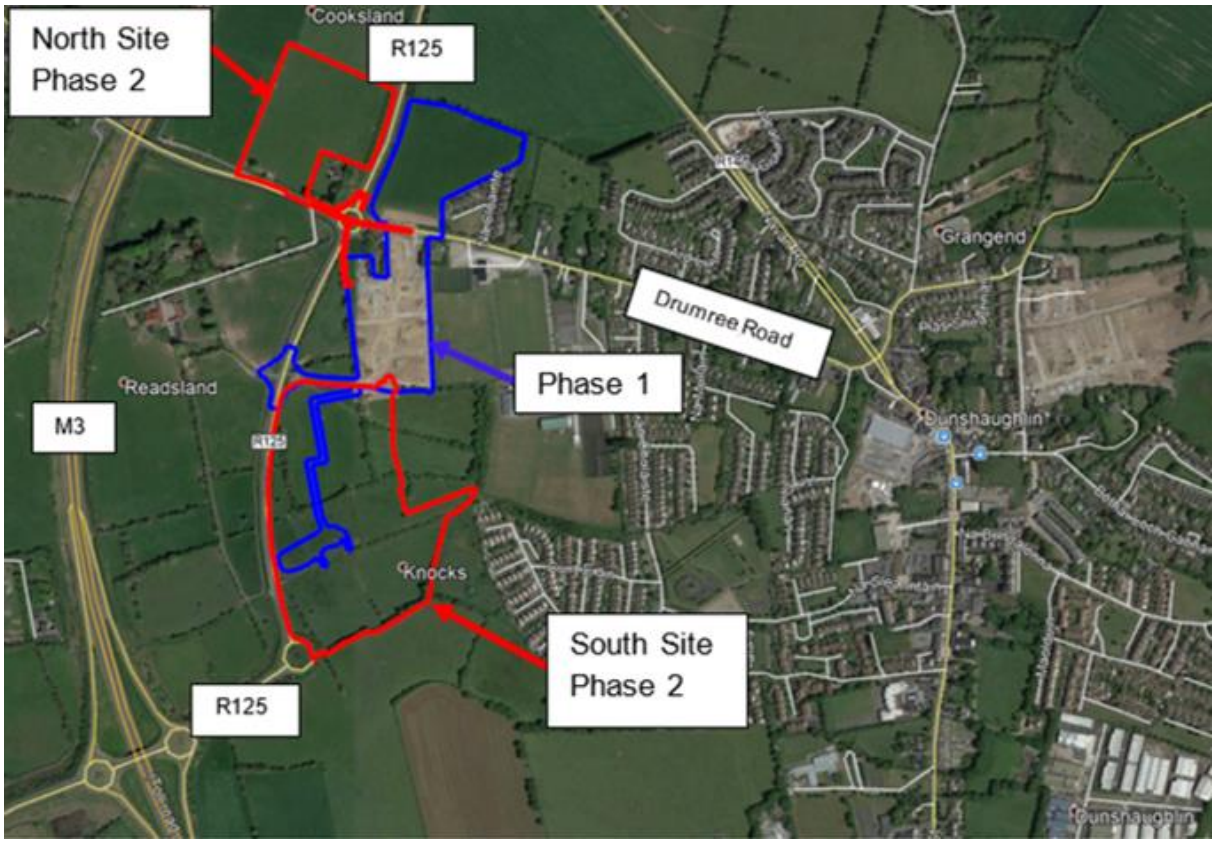


Figure 1-1: Site Location

As per the Meath County Development Plan 2013-2019 for Dunshaughlin, the subject lands are zoned 'A2-New Residential', as shown in Figure 1-2 below.

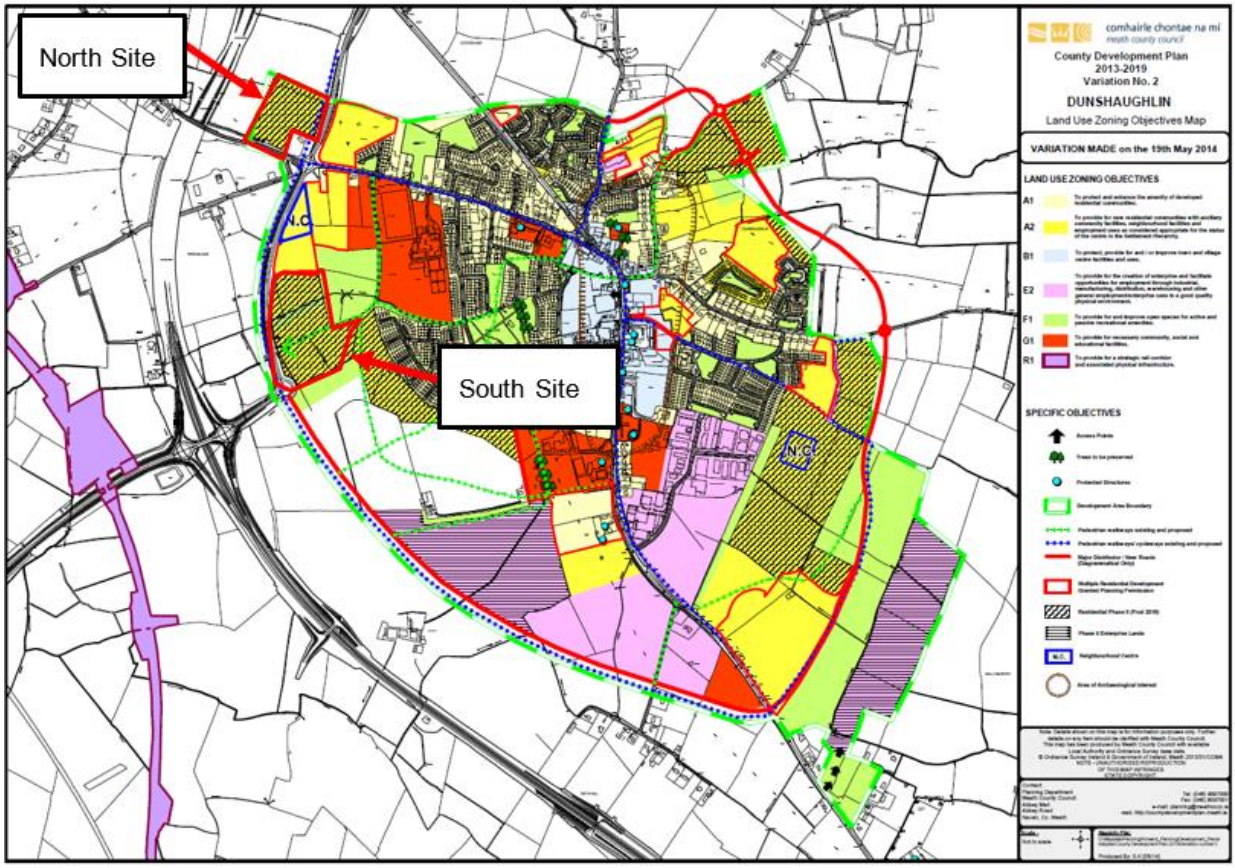


Figure 1-2: County Meath Development Plan 2013-2019

1.2 Site Topography

The overall site area is approximately 14.84 Ha. Both sites are currently greenfield lands. Figure 3 illustrates the existing contours of the north and south sites.

North Site

The north site area is approximately 4.32 Ha and generally falls c. 1/67 from north to south. With a high point of 107.84m OD Malin and a low point of 104.44m OD Malin.

South Site

The south site area is approximately 10.52 Ha and is split into two catchments by the Skane River. Approximately 297m of Skane River traverses the site dividing it into two catchments. Catchment A lies to the north and catchment B lies to the south of the Skane River, as shown in Figure 1-3 below. Catchment A falls c. 1/80 from north to south towards the river and has a high point of 98.76m OD Malin. Catchment B falls c. 1/42 from the south to the north towards the Skane River and has a high point of 96.63m OD Malin. The entire south site has a low point of 91.46m OD Malin at the R125 culvert where the River Skane exits the subject site.

The existing contours of the Phase 2 development can be seen in Figure 1-3 below : -

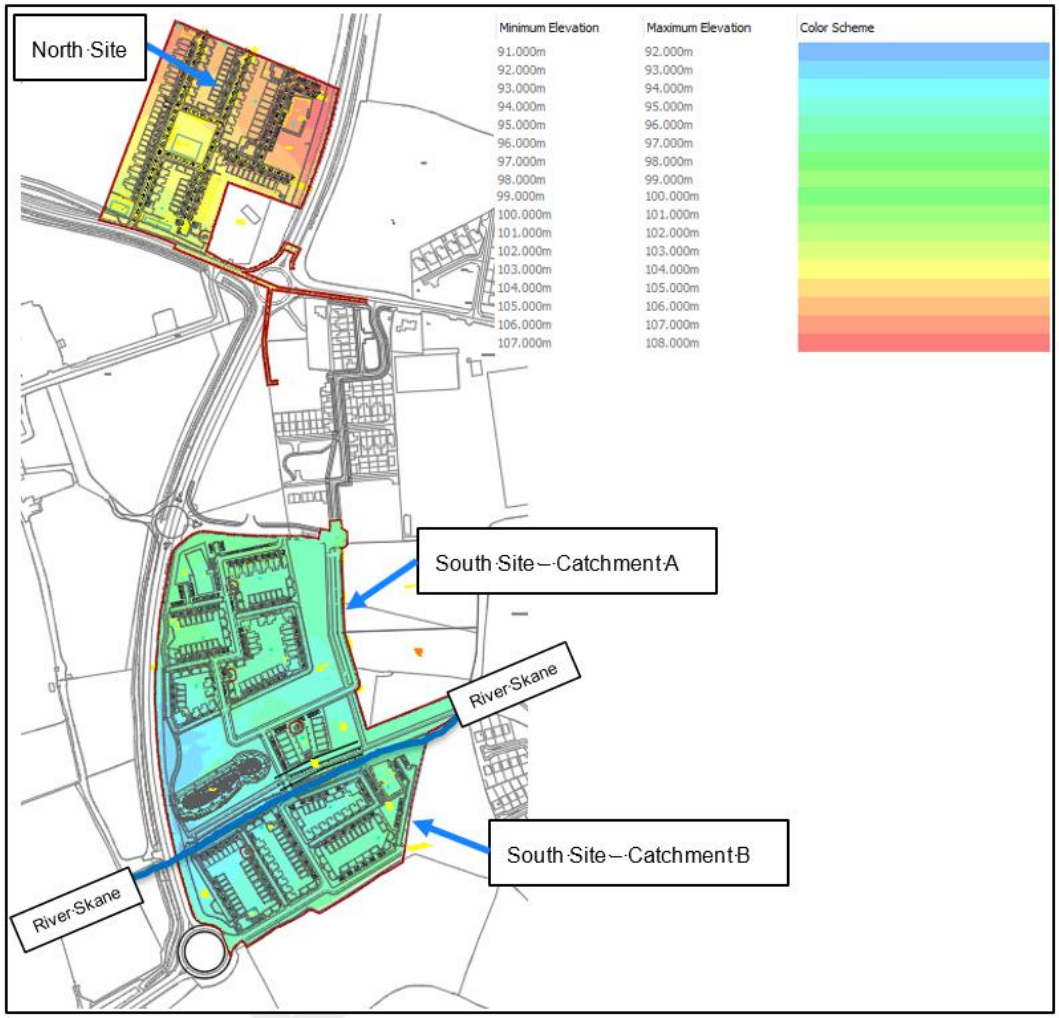


Figure 1-3: Subject Site Existing Contours

1.3 Proposed Development

It is proposed to construct total of 415 no. residential units comprising of 254 dwelling houses, 55 duplex apartments and 106 apartments, and a supporting crèche facility for 80 children and 16 staff. The developer will construct all associated infrastructure to service the development including a network of foul water and surface water drains, watermain and new access roads and footpaths.

2 Foul Water Drainage

2.1 Existing Foul Drainage

Phase 1 of the Dunshaughlin development (Reg. Ref. DA/120987, ABP Ref. PL17.241988), that is currently under construction and nearing completion, discharges via a network of 150mm and 225mm diameter foul sewers to an existing 525mm diameter trunk sewer. The existing 525mm diameter trunk sewer runs alongside the Skane River's north bank in a south-westerly direction and ultimately discharges to the Wastewater Treatment Works at Castletown, Tara. For the development addressed in this report it is proposed to drain the foul water by gravity to this existing 525mm foul sewer.

2.2 Proposed Foul Drainage

North Site

It is proposed to discharge the foul water from the northern site into the Phase 1 foul sewer system at an existing 225mm diameter connection constructed during Phase 1, as illustrated in Figure 2-1.

As described above, the Phase 1 foul sewer system discharges into the existing 525mm trunk sewer and has been designed and constructed to accommodate the additional flows from the subject development.

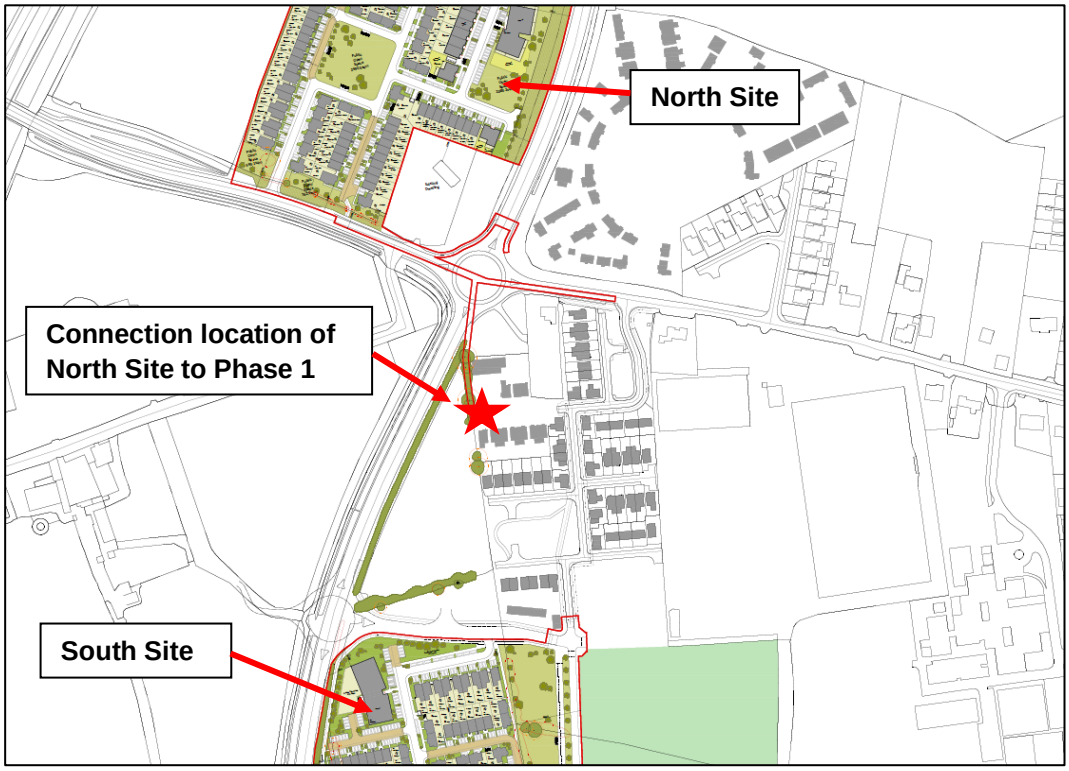


Figure 2-1: Phase 2 North Site Foul Connection Location at Phase 1

South Site

For the southern site north of the Skane River it is also proposed to discharge the foul water into the existing Phase 1 foul sewer system at multiple new connections along spine road that runs through the South Site. The southern half of the site will drain via gravity to the 525mm trunk sewer that runs along the river and will discharge into an existing connection manhole constructed under Phase 1.

Irish Water Design Acceptance

The Design layout drawings and long sections have been issued to Irish Water for review and Design Acceptance has been received from Irish Water on the 4th September 2020. (See Appendix A). Once Planning Permission has been received for the Development a Connection Application will be submitted to Irish Water to obtain a Connection Agreement.

2.3 Proposed Foul Water Drainage Calculations

The proposed development will consist of 415 residential units and a creche. Based on Irish Waters Code of Practice for Wastewater Infrastructure, the peak foul flow from the proposed development will be as follows:

Table 2-1: Proposed Foul Water Flow Calculations

Description	No. of Units	Flow l/h/day	Population per Unit	Infiltration Factor	Total Discharge (l/d)
Residential Units	415	150	2.7	1.1	184,883
Crèche	1 80 children 16 staff	90	96	1.1	9,504
				Totals	***194,387 l/d***

Table 2-2: Proposed Peak Foul Flow Calculations

Proposed Peak Foul Flow Calculations	
Total Daily Discharge *(from Table 2-1.)*	194,387 l/d
Dry Weather Flow (DWF)	2.25 l/s
Peak Foul Flow (=3 x DWF)	***6.75 l/s***

The total peak flow from the development to the approved foul water network is 6.75 l/s.

A Pre-Connection Enquiry form was submitted to Irish Water and a Confirmation of Feasibility (COF) response has been received in February 2020. In summary Irish Water have confirmed that the existing wastewater infrastructure can accommodate the proposed development. The letter states that it is subject to the following network upgrade:

- Approximately 600m of 225mm foul sewer subject to contribution of relevant portion of costs for the upgrade required.

We have engaged with Irish Water and received a Design Acceptance for the proposed Development.

Please refer to Appendix A for the Irish Water response reflecting the COF and Design Acceptance.

The foul water drainage network has been modelled using Flow Hydraulic modelling software. These results are included in Appendix B of this report.

Waterman Moylan Drawing No's 12-081A-P210A to P213A illustrate the proposed layout for the foul water drainage for the subject site.

2.4 Foul Water Drainage General

All public foul sewers to vest with Irish Water will be constructed strictly in accordance with Irish Water Code of Practice and Connection Agreement. No private drainage will be located within public areas.

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

Strict separation of storm and surface water from the foul sewer system will be maintained as part of the detail design strategy and construction control on site.

3 Surface Water Drainage

3.1 Existing Surface Water Drainage

The subject site is within the catchment of Skane River. At present the surface water runoff from the subject site either filters into the ground water table through the soil or drains directly overland to the existing ditches and drains and eventually discharges to Skane River.

North Site

There is an existing 450mm diameter surface water sewer on the north side of Drumree Road that drains eastward towards the roundabout junction with the R125, then head south down the R125 road and ultimately discharges into the Skane River. Based on the fall of the site, the current surface water drains toward the Drumree Road and percolates into the existing filter drainage along the Road and enters the 450mm diameter surface water pipe. There are no ditches around the field or any isolated depressions that retain any surface water.

South Site

Under the approved Phase 1 development (Reg. Ref. DA/120987, ABP Ref. PL17.241988), surface water sewers and an attenuation pond have been constructed with spare capacity for the future development of adjacent lands. The existing drainage network ultimately outfalls to Skane River at a reduced rate of 14 l/s during the 1 in 100 year storm event plus an additional 20% allowance for climate change factors, based on the Phase 1 Permission.

3.2 Proposed Surface Water Drainage

It is proposed that the development will discharge surface water runoff at a rate equivalent of the greenfield runoff into the Skane River.

North Site

The proposed north site surface water will be attenuated on site and will discharge through hydrobrakes into the existing manhole EX 45 on 450mm Surface Water pipe in Drumree Road.

The site topography and proposed architectural design and the existing invert levels of surface water drain in Drumree Road will not allow for the site to be drained and attenuated as a single network. It is proposed that the North Site be subdivided into three surface water drainage catchment areas, N1, N2 and N3 to achieve on site attenuation. Please refer to Figure 3-1 below for details.

South Site

The proposed south site surface water drainage north of the Skane River will drain into the existing drainage network constructed under the approved Phase 1 development. The existing drainage and attenuation pond has capacity to cater for this catchment, further referred to as S1, along with a proposed Detention Basin to the north of the existing pond to cater for the peak rainfall event. The detention basin will be mostly dry grassed area since the invert level is higher than that of the existing attenuation pond.

To accommodate runoff from the proposed development south of the Skane River, it is proposed to divide the subject site into two catchments, S2 & S3 and to construct an attenuation tank for each catchment where excess flows will be attenuated, before discharged at greenfield runoff rate into Skane River at a single point. Please refer to Figure 3-1 below for details.

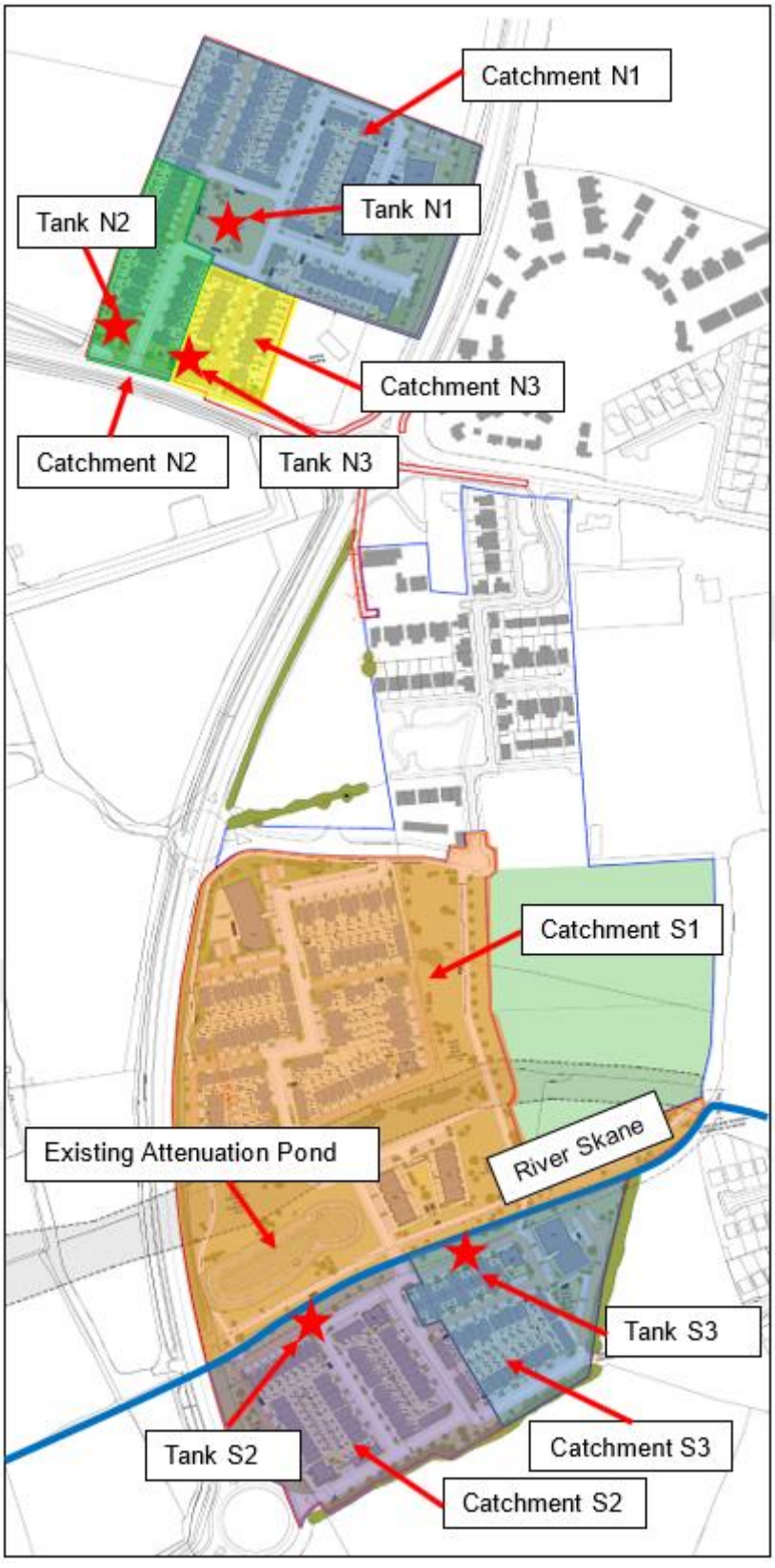


Figure 3-1: Catchment Area Layout and Attenuation Tank Locations

3.3 Surface Water Drainage Calculations

The following site characteristics are contained in the Greenfield Run-off Calculations contained within Appendix C, and are reiterated in the following sections:

3.3.1 Outflow Limits

It is proposed that the development will discharge surface water runoff at a rate equivalent of the existing greenfield runoff rates into the River Skane. The total greenfield runoff rates for the site has been calculated using the Institute of Hydrology report No 124 “Flood Estimation for Small Catchments” for sites less than 50Ha, where:

Qbar = 0.00108(Area) 0.89 x (SAAR) 1.17 x (SOIL) 2.17

Greenfield Run-Off = Qbar x ("n-year" factor)

Allowable Discharge = Greenfield Run-Off x Area

Where:

- Area = Site area in km2 (Or 50 hectares if site is less than 50 Hectares)
- SAAR = Standard Annual Average Rainfall, taken from Met Eireann 1981-2010 Annual Average Rainfall Grid
- SOIL = Runoff constant (Varies between 0.1 and 0.53)

Estimated Greenfield runoff rates are as follows:-

North Site	9.78l/s
South Site North of Skane River	16.41l/s
South Site South of Skane River	8.66l/s

3.3.2 Proposed Development Catchment Characteristics

The surface water catchment details have been summarised in Table 3-1 below:-

Table 3-1: Surface Water Catchment Details

	Proposed Development
North Site Area (Catchment) – Ha*	4.1
Impermeable Area - Ha	2.44
% Hardstanding	59.5
South Site North of Skane River - Ha	6.88
Area (Catchment) - Ha	
Impermeable Area - Ha	3.76
% Hardstanding	54.7
South Site South of Skane River - Ha	3.63
Area (Catchment) - Ha	
Impermeable Area - Ha	2.17
% Hardstanding	62.5
SAAR - mm	881
SOIL Index	0.3
Climate Change	20%

3.4 Storm Water Drainage and Attenuation Calculations

The total impermeable areas of the Northern Site catchment and Southern Site catchment including roads, car-parking and roofs, are approximately 2.44Ha and 6.03Ha, with the peak outflow being limited to 9.78 l/s for the North Site, 16.41 l/s for the upper half of the South Site and 8.66 l/s for the lower half of the South Site for the 1 in 100-year event plus 20% for climate change. The proposed surface water drainage network can be seen on Waterman Moylan drawings 12-081A-P210 to P213.

Both the North and South Sites are each subdivided into three catchment areas. The layout of the catchment areas and the location of the proposed attenuation areas are shown in Figure 3-1.

Catchment N1, forms the Upper half of the North Site with the lower half of the North Site divided between Catchment N2, that encompasses the western portion of the North Sites lower half, and Catchment N3, that encompasses the eastern portion of the North Site lower half. The surface water runoff from Catchments N1 and N2 will be attenuated before being discharged at a controlled rate into Catchment N3. The combined flow rate of the three catchment areas will be restricted to the calculated greenfield runoff of the entire North Site with the excess flow from catchment N3 being attenuated by an offline tank. Finally, the surface water runoff for catchment N1, N2 and N3 will be discharged into the existing surface water sewer system with in Drumree Road that then drains south along the R125 and ultimately discharges into the River Skane.

Catchment S1 contains the upper half of South Site located to the north of the River Skane and discharges into the existing surface water system constructed during Phase 1 that flows into the existing attenuation pond that ultimately discharges into the River Skane. The lower half of South Site located to the south of the River Skane has been subdivided into two sub-catchments, namely S2 and S3.

The S2 catchment attenuates water from the western part of the lower South Site before discharging at a controlled rate directly into the river. The S3 catchment attenuates water from the eastern part of the lower South Site before being discharged into catchment S2 and ultimately into the River Skane.

Refer to Appendix B for the stormwater storage calculations.

Catchment N1

The overall catchment area for catchment N1 is 2.73ha, with approximately 1.60ha of impermeable area. The max outflow from this catchment is 6.4l/s. Storage design calculations indicate that for a return period of 100 years, 1440-minutes winter storm event is critical and requires a storage of 805 m^3, including 20% storage to facilitate climate change. It is proposed to provide an underground attenuation tank with a storage volume of 1176 m^3.

Catchment N2

The overall catchment area for catchment N2 is 0.77ha, with approximately 0.44ha of impermeable area. The max outflow calculated for this catchment is 1.84l/s and has been raised to 2l/s. Storage design calculations indicate that for a return period of 100 years, 1440-minutes winter storm event is critical and requires a storage of 213 m^3, including 20% storage to facilitate climate change. It is proposed to provide an underground attenuation tank with a storage volume of 315 m^3.

Catchment N3

The overall catchment area for catchment N3 is 0.6ha, with approximately 0.40ha of impermeable area. The max outflow from this catchment is 9.78l/s. Storage design calculations indicate that for a return period of 100 years, 1440-minutes winter storm event is critical and requires a storage of 166 m^3, including 20% storage to facilitate climate change. It is proposed to provide an underground attenuation tank with a storage volume of 252 m^3.

Catchment S1

The overall catchment area for catchment S1 is 6.88ha, with approximately 3.76ha of impermeable area. The attenuation pond constructed during Phase 1 of the development has been designed to attenuate the upper half of the South Site in addition to the detention basin located to the north of the existing pond.

Catchment S2

The overall catchment area for catchment S2 is 2.47ha, with approximately 1.42ha of impermeable area. The max outflow from this catchment is 8.7l/s. Storage design calculations indicate that for a return period of 100 years, 1440-minutes winter storm event is critical and requires a storage of 659 m^3, including 20% storage to facilitate climate change. It is proposed to provide an underground attenuation tank with a storage volume of 840 m^3.

Catchment S3

The overall catchment area for catchment S3 is 1.16ha, with approximately 0.76ha of impermeable area. The max outflow from this catchment is 2.8l/s. Storage design calculations indicate that for a return period of 100 years, 1440-minutes winter storm event is critical and requires a storage of 373 m^3, including 20% storage to facilitate climate change. It is proposed to provide an underground attenuation tank with a storage volume of 441 m^3.

3.5 SUDS Assessment

As per Meath County Council guidelines surface water should be managed in accordance with the Greater Dublin Strategic Drainage Study (GDSDS) Regional Drainage Policies Volume 6, for New Developments and CIRIA documents. These documents specify that surface water run-off should be managed as close to its source as possible.

Sustainable Urban Drainage Systems (SUDS) have been developed and are in use to alleviate the detrimental effects of traditional urban storm water drainage practice that typically consisted of piping run-off of rainfall from developments to the nearest receiving watercourse. Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as SUDS. They are typically made up of one or more structures, built to manage surface water run-off. The use of SUDS to control run-off also provides the additional benefit of reducing pollutants in the surface water by settling out suspended solids, and in some cases providing biological treatment.

A stormwater management or treatment train approach ensures that run-off quantity and quality is improved. The following objectives of the treatment train provide an integrated and balanced approach to help mitigate the changes in stormwater run-off flows that occur as land is urbanised and to help mitigate the impacts of stormwater quality on receiving systems:

1) **Source control:** conveyance and infiltration of run-off; and
2) **Site Control:** reduction in volume and rate of surface run-off, with some additional treatment provided.

The applicant has considered the use of all appropriate SUDS measures as part of the site SUDS strategy, details are outlined in Table 3-2 below.

Table 3-2: SUDS Measures

SUDS Stage	SUDS Measure	Measure Outline	Use on site
Source Control	Permeable Pavements	Permeable pavements are alternative paving surfaces to standard finishes that allow stormwater run-off to filter through voids in the pavement surface into an underlying stone reservoir, where it is temporarily stored and/or infiltrated.	Permeable paving will be utilised for the on curtilage carparking area to provide treatment and storage to rainwater falling on these areas.
	Swales	Swales are shallow, landscaped depressions designed to store and/or convey run-off and remove pollutants. They may be used as conveyance structures to pass the run-off to the next stage of the treatment train and can be designed to promote infiltration where soil and groundwater conditions allow.	Swales will be used for access road surface water treatment, where possible, to treat water at source before conveying it to a downstream attenuation tank.

SUDS Stage	SUDS Measure	Measure Outline	Use on site
Site Control	Hydrobrake	Attenuation tanks are used to create a below ground void space for the temporary storage of surface water before controled release to the minor watercourse. Hydrobrakes are used to restrict the outfall from the attenuation tank to the equivalent of the existing agricultural run-off. This ensures the development will not give rise to any impact downstream of the site.	It is proposed to use attenuation tanks to store surface water on site before discharging to the minor watercourse that runs across the site. Hydrobrakes will be used before discharging into the River Skane.
	Downstream Defender	Defenders are proposed to remove hydrocarbons and suspended solids before discharging to the existing water course.	It is proposed to locate Defenders down stream of the hydrobrakes

In accordance with the SUDS Manual CIRIA C753 the pollution prevention guidelines have been followed to ensure appropriate levels of treatment are provide before attenuated run-off from the site is discharged into the watercourse. Runoff from all the hardstanding areas passes through adequate levels of treatment to remove the Total Suspended Solids, Metals and Hydrocarbons present before discharge to the River Skane.

In conclusion the water quality from this catchment should be high.

3.6 SUDS Maintenance

For the SUDS strategy to work as designed it is important that the entire drainage system is well maintained. It will be the responsibility of the site management team to ensure the drainage system is maintained. Maintenance and cleaning of gullies, hydrobrakes, defenders, manholes (including catch pits) and attenuation tanks will ensure adequate performance. The recommended program is outlined in the tables below: -

Table 3-3 Swale Maintenance Schedule

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

Table 3-4: Permeable Paving Maintenance Schedule

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

Table 3-5: Attenuation Tank Maintenance Schedule

SUDS Element	Maintenance		
Attenuation Tanks	Maintenance Issues	Failure of components, blockage from debris	
	Maintenance Period	Maintenance Task	Frequency
	Regular	Inspect and identify any elements that are not operating correctly. If required, take remedial action.	Monthly for three months, then annually
		Remove sediment/debris from catchment surface that may lead to blockage of structures.	Monthly or as required
		Remove sediment/debris from catch pits/ gullies and control structures.	Annually, after severe storms or as required
	Remedial Work	Repair inlets, outlets, vents, overflows and control structures.	As required
	Monitoring	Inspect all inlets, outlets, vents, overflows and control structures to ensure they are in good condition and operating as designed.	Annually or after severe storms
		Survey inside of tank for sediment build-up and remove if necessary	Every five years or as required

Table 3-6: Downstream Defender Maintenance Schedule

SUDS Element	Maintenance		
Downstream Defender	Maintenance Issues	Failure of components, blockage from debris	
	Maintenance Period	Maintenance Task	Frequency
	Regular	Inspect when assessing road gullies. If required, take remedial action.	Bi-annually
		Remove sediment/hydrocarbon accumulation.	Bi-annually or as required
	Remedial Work	None expected as no working parts in the vortex separator.	N/A
	Monitoring	Inspect Defender from cover MH to ensure they are in good condition and operating as designed.	Annually or after severe storms

Table 3-7: Hydrobrake Maintenance Schedule

SUDS Element	Maintenance		
Hydrobrake	Maintenance Issues	Failure of components, blockage from debris	
	Maintenance Period	Maintenance Task	Frequency
	Regular	Inspect when assessing road gullies. If required, take remedial action.	Bi-annually or after storm event
		Remove debris and sediment accumulation.	Bi-annually or as required
	Remedial Work	Remove debris and sediment accumulation.	As required
	Monitoring	Inspect Hydrobrake from access cover to ensure they are in good condition and operating as designed.	Annually or after severe storms

3.7 Network Design

As described above the proposed surface water drainage system for this development has been designed as a SUDS system and uses permeable paving and attenuation tanks together with flow control devices and downstream defenders/petrol interceptors to treat run-off and remove pollutants to improve quality, restrict outflow and control quantity of run-off.

Strict separation of surface water and wastewater will be implemented within the development. Surface water local drains will be a minimum 225mm dia. and generally will consist of PVC (to IS123) or concrete socket and spigot pipes (to IS 6). These drains will be laid to comply with the requirement of the Building Regulations 2010, and in accordance with the recommendations contained in the Technical Guidance Documents, Section H and will be laid strictly in accordance with the requirements of Meath County Council.

3.8 OPW - Section 50 Process

Waterman Moylan has engaged with the office of Public Works (OPW) in relation to the Section 50 application process for the proposed two pedestrian/cycle bridges and road crossing over the River Skane to link the South Site. Following review of the OPW Section 50 Guidelines and Examples, discussions have taken place with Jamie Keogh of OPW, the responsible official is overseeing the Boyne Catchment. The River Skane is a tributary of the River Boyne. Mr Keogh indicated that whilst the existing culvert under the R125 may appear oversized, he would recommend that we use the same cross sectional area for our proposed culverts. This approach has been taken in preparing the Draft Section 50 Application forms submitted to Mr Keogh for review and approval in principle before the formal application is submitted. (See draft Section 50 application forms in Appendix E)

4 Water Supply

4.1 Existing Water Supply

North Site

There is an existing 200mm watermain within Drumree Road east of the roundabout on the R125 and Drumree Road. An existing 250mm Raw water mains runs from west to east along the Drumree Road which is noted as a primary supply for Dunshaughlin. An existing 100mm Watermain that runs east west along Drumree Road

South Site

There are existing 150mm and 200mm diameter spurs provided under permitted Phase 1 development for the proposed Phase 2 development connection.

4.2 Proposed Water Supply

North Site

The north site will be serviced by a connection to the existing 200mm diameter (225mm OD) watermain within Drumree Road. A portion of the existing watermain is indicated as 100mm and will need to be upgraded from the north site, along Drumree Road to the existing 200mm pipe near the Phase 1 connection.

South Site

The South site will be serviced by a connection to the existing watermain spurs constructed under the permitted Phase 1 development. These two spurs are 150mm and 200mm.

In addition to the above, proposed 160mm diameter (OD) mains will link into the proposed 225mm diameter mains in both the North and South sites with 110mm diameter (OD) pipes servicing the bulk of the development in accordance with Irish Water signed off design arrangement

General

A Pre-Connection Enquiry form was submitted to Irish Water and a Confirmation of Feasibility (COF) response was received in February 2020. In summary, Irish Water have confirmed that the existing water infrastructure can accommodate the proposed development. The letter states that it is subject to the following network upgrade:

- Approximately 650m of 200mm ID watermain.

We have engaged with Irish Water regarding the upgrades and they indicated that this is for a possible watermain along the R125 – Their records have not yet been updated to reflect the 200mm ID watermain through Phase 1 that replicates what they had intended. Designs have since been issued to Irish Water and a Design Acceptance for the proposed Development was received on the 4th September 2020.

Please refer to Appendix A for the Irish Water response reflecting the COF and Design Acceptance.

4.3 Water Supply Calculations

The total water requirement from the public supply, for the development, is estimated at 177.3m^3/day. The breakdown of the required flow is in Table 4-1 below:

Table 4-1: Total Water Demand

Description	No. of Units	Flow l/h/day	Population per Unit	Total Discharge (l/d)
Residential Units	215	150	2.7	172,530
Creche	1	50	96	4,800
Total				***177,330***
Average Daily Domestic Demand (l/s)				***2.05l/s***
Average Day/Peak Week Demand x 1.25				***2.56l/s***
Peak Demand x 5				***12.8l/s***

The total peak water demand of the proposed development was estimated at 12.8 l/s.

Please refer to the Waterman Moylan drawing 12-081A-P310 to P313 for the proposed watermain network details.

4.4 Water Supply - General

All watermains will be laid strictly in accordance with Irish Water requirements for vesting transfer and in accordance with the Connection Agreement.

Valves, hydrants, scour and sluice valves and bulk water meters will be provided in accordance with the Irish Water Code of Practice.

5 Roads and Transportation

5.1 Existing Road Layout

The Phase 2 site is located circa 400m southwest of Dunshaughlin town centre and is adjacent to regional route R125, L2088 and Drumree Road serving an area which has commercial, educational, and retail functions and a large hinterland catchment area. See Figure 5-1 below which shows the location of the North Site and South Site relative to the Phase 1 Site (Reg.Ref.DA/120987, ABP Ref.PL 17.241988)

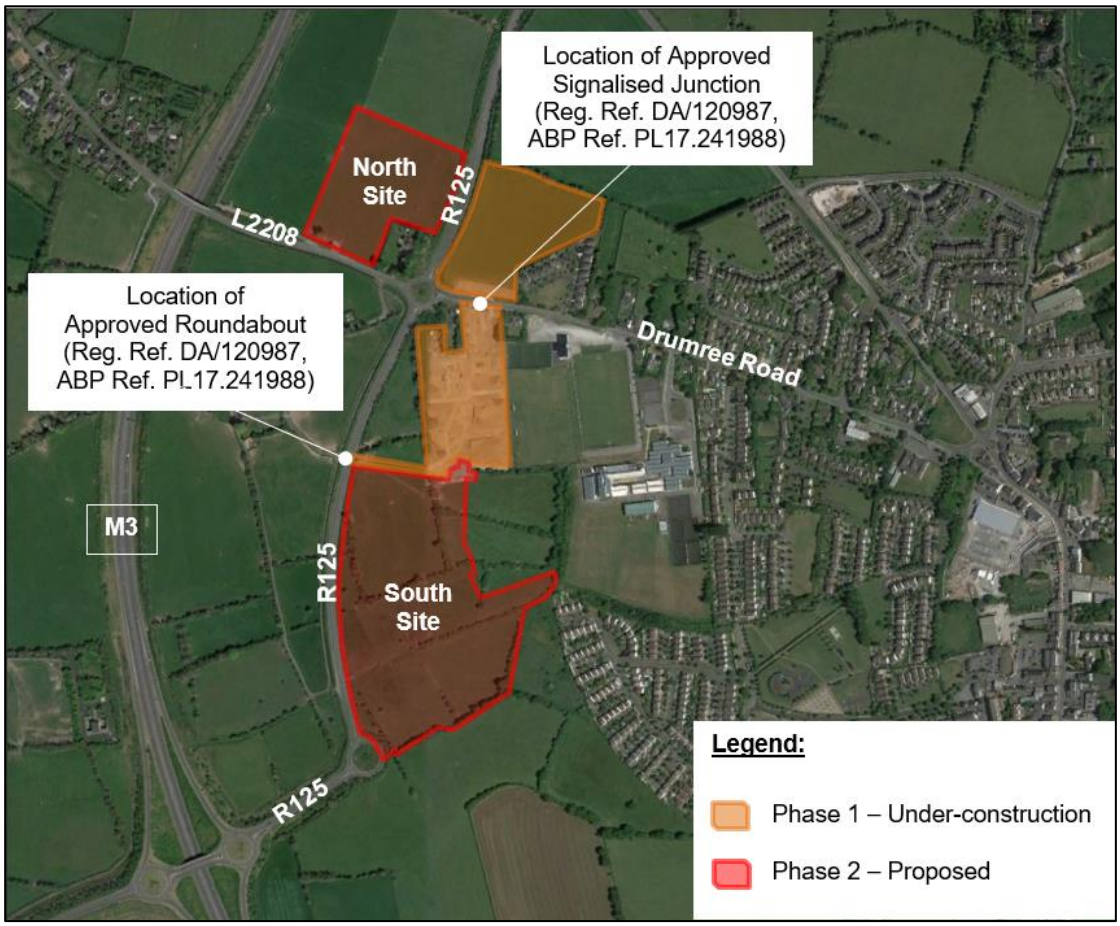


Figure 5-1: Location of Proposed (Phase 2) and Under-Construction (Phase 1) Developments

R125

The R125 is a single carriageway road with hard shoulders and an assigned speed limit of 80 km/h. This portion of the R125 runs in a general north-south direction and connects the R147 to the national route M3.

Drumree Road/L0288

Drumree Road is a single carriageway road with an assigned speed limit of 50 km/h east of the existing R125 roundabout and 80km/h west of the roundabout. It runs in a general southeast-northwest direction and connects the town of Dunshaughlin to the R125. From this junction Drumree Road turns into the L0288 which connects Dunshuaghlin to Leshamston, Clavinstown and Dunsany to the West.

A traffic and transport assessment has been conducted and submitted under a separate cover as part of this application.

5.2 Site Description of Proximity and Accessibility

Based on the Department of Housing, Planning and Local Government, Guidelines for Planning Authorities, Sustainable Urban Housing: '*Design Standards for New Apartments, 2018* criteria below, classification the subject site is considered to be in the **'*Peripheral and/or Less Accessible Urban Locations*'** category based on the following facts: -

1. The site is in a moderate size town of Dunshaughlin, Co. Meath.
2. Bus stops are located in Dunshaughlin town centre on Main Street which is c. 12 minutes walking distance from the subject site.
3. Bus Eireann bus service 109, 109A and 109B serves Dunshaughlin Town. Frequency of the buses Dublin direction are one service every 10-20 minutes during peak hour.
4. Dunboyne M3 Parkway park and ride railway station is located 12.4km away and can be reach by car in 13min. Frequency of the trains between M3 Parkway – Dublin Pearse are 30 minutes during peak hour.

According to the **Department of Housing, Planning and Local Government, Guidelines for Planning Authorities, Sustainable Urban Housing: '*Design Standards for New Apartments, 2018***, *'identification of the types of location in cities and towns that may be suitable for apartment development, will be subject to local determination by the planning authority, having regard to the following broad description of proximity and accessibility considerations:*

1) Central and/or Accessible Urban Locations

Such locations are generally suitable for small- to large-scale (will vary subject to location) and higher density development (will also vary), that may wholly comprise apartments, including:

- *Sites within walking distance (i.e. up to 15 minutes or 1,000-1,500m), of principal city centres, or significant employment locations, that may include hospitals and third-level institutions;*
- *Sites within reasonable walking distance (i.e. up to 10 minutes or 800-1,000m) to/from high capacity urban public trans*
- *port stops (such as DART or Luas); and*
- *Sites within easy walking distance (i.e. up to 5 minutes or 400-500m) to/from high frequency (i.e. min 10 minute peak hour frequency) urban bus services.*

The range of locations outlined above is not exhaustive and will require local assessment that further considers these and other relevant planning factors.

2) Intermediate Urban Locations

Such locations are generally suitable for smaller-scale (will vary subject to location), higher density development that may wholly comprise apartments, or alternatively, medium-high density residential development of any scale that includes apartments to some extent (will also vary, but broadly >45 dwellings per hectare net) including:

- *Sites within or close to i.e. within reasonable walking distance (i.e. up to 10 minutes or 800-1,000m), of principal town or suburban centres or employment locations, that may include hospitals and third level institutions;*
- *Sites within walking distance (i.e. between 10-15 minutes or 1,000-1,500m) of high capacity urban public transport stops (such as DART, commuter rail or Luas) or within reasonable walking distance (i.e. between 5-10 minutes or up to 1,000m) of high frequency (i.e. min 10 minute peak hour frequency) urban bus services or where such services can be provided;*

- *Sites within easy walking distance (i.e. up to 5 minutes or 400-500m) of reasonably frequent (min 15 minute peak hour frequency) urban bus services. The range of locations is not exhaustive and will require local assessment that further considers these and other relevant planning factors.*

3) Peripheral and/or Less Accessible Urban Locations

Such locations are generally suitable for limited, very small-scale (will vary subject to location), higher density development that may wholly comprise apartments, or residential development of any scale that will include a minority of apartments at low-medium densities (will also vary, but broadly <45 dwellings per hectare net), including:

- *Sites in suburban development areas that do not meet proximity or accessibility criteria;*
- *Sites in small towns or villages.' Site Access*

5.3 Proposed Road Layout & Access

See Figure 5-2 below which shows the general road layout and access points into both the North and South Sites. For future detail please see drawings 12-081A – P110 -P113. The proposed development on the North Site will connect directly on to L2088 via existing agricultural lands access point which will be upgraded to a T-junction. The proposed development on the South Site will be accessed via the Phase 1 spine road to the north and a new roundabout on R125 to the north west, (approved under Phase 1 Reg. Ref. DA/120987), and via the existing southern roundabout on the R125 Dunshaughlin Link Road.

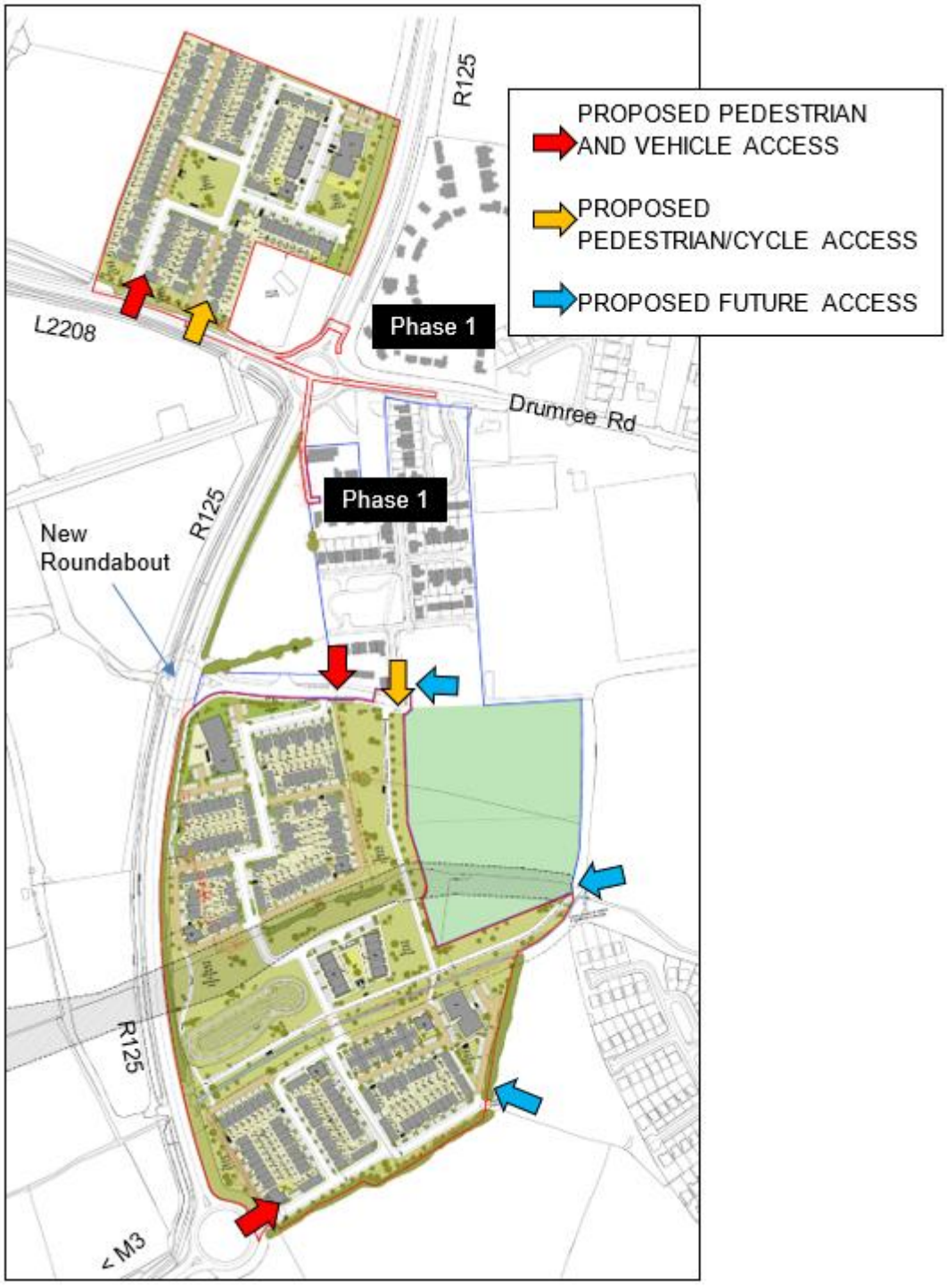


Figure 5-2: Proposed Layout & Access Routes

A Stage 1 Road Safety Audit has been undertaken for the proposed development, see Appendix D for details.

Stage 2, the detailed design, will be undertaken once permission has been granted. During this process, discussion with Meath County Council will be held to ensure compliance with the Council's requirements as one aspect of the RSA flagged was a barrier on the R125.

5.3.1 DMURS & Traffic Calming

The stated objective of DMURS is to achieve better street design in urban areas and have a constructive approach to traffic calming. This will encourage more people to choose to walk, cycle or use public transport by making the experience safer and more pleasant. It will lower traffic speeds, reduce unnecessary car use and create a built environment that promotes healthy lifestyles and responds more sympathetically to the distinctive nature of individual communities and places. The implementation of DMURS is intended to enhance how we travel to and from business; enhance how we interact with each other and have a positive impact on our enjoyment of the places to and through which we travel.

Four characteristics represent the basic measures that should be established in order to create people friendly streets that facilitate more sustainable neighbourhoods. These characteristics are as follows:-

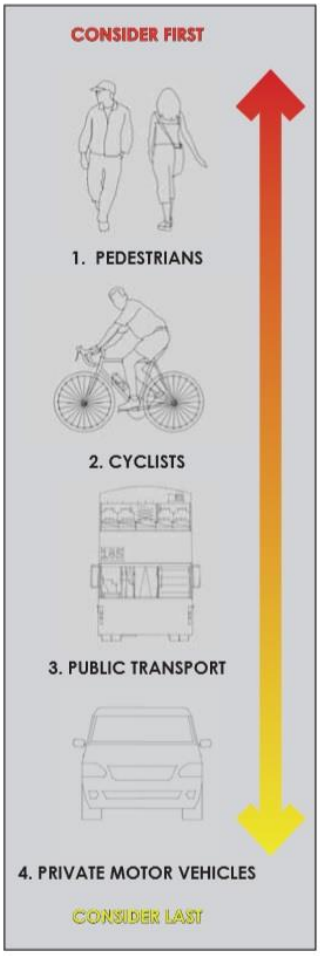
1) Connectivity;
2) Enclosure;
3) Active Edge;
4) Pedestrian Activity/Facilities.

Each of these characteristics are set out in DMURS Statement of Consistency Report.

The DMURS guidelines have been used at all radii at junctions to assist with traffic calming. DMURS sets out four core design principles which designers must have regard in the design of roads and streets. These four core principles are set out below together with a commentary setting out how these design principles have been incorporated into the design of the proposed residential development.

Connectivity

"The creation of vibrant and active places requires pedestrian activity. This in turn requires walkable street networks that can be easily navigated and are well connected."



In order of importance, DMURS prioritises pedestrians, cyclists, public transport then private cars.

This is illustrated in the adjacent image extracted from DMURS guidelines.

- The proposed development has been designed with pedestrians and cyclists taking precedence over other modes of transport where possible. Pedestrian and cyclist connectivity is provided throughout the proposed development and along the Drumree Road interface and the R125 with links to the existing established residential developments and Dunshauglin Main Street.

- The proposed development provides pedestrian and cyclist links to Phase 1, Drumree Road, the R125 and to the future Greenlink to Dunshaughlin Park and Main Street. The connection locations and type are illustrated in Figure 2 below.

- Several existing public transport services are available within proximity of the subject site. The Bus Eirean service routes 109, 109A and 109B are all located within a c.12 minute walk to the subject site via Drumree Road and an approx. c .9 minute walk from the bus service via the planned Skane river Greenway.

- The proposed development has been carefully designed to promote strong levels of connectivity in favour of pedestrians and cyclists with vehicular movement taking a secondary role in line with the objectives of DMURS. Connectivity throughout the scheme is heavily weighted towards the pedestrian. There are two cycle/pedestrian bridges crossing the River Skane promoting pedestrian and cycle movement within the development.

  It is considered that the proposed development is fully compliant with the connectivity objectives of DMURS

Enclosure

"A sense of enclosure spatially defines streets and creates a more intimate and supervised environment. A sense of enclosure is achieved by orientating buildings towards the street and placing them along its edge. The use of street trees can also enhance the feeling of enclosure."

The proposed development has been designed so that the residential units are overlooking streets and public open spaces which provide passive surveillance. Landscaping and tree planting are provided along the roads/streets which assist in providing a sense of enclosure.

As seen in Figure 5-3 and Figure 5-4 below, which are excerpts from the architects CGI drawings, the houses within the proposed Phase 2 development overlook the streets and public open space with the tree line promoting the feeling of enclosure along the public open space.

Figure 5-3: Architects CGI showing a sense of Enclosure within a home zone area.

Figure 5-4: Architects CGI showing a sense of Enclosure within a street view of the development.

5.3.1.1 Design Principle 1 (Connected Networks)

"To support the creation of integrated street networks which promote higher levels of permeability and legibility for all users and in particular more sustainable forms of transport."

As described previously the proposed development has been carefully designed to ensure the focus on connectivity is centred around pedestrians and cyclists. The provision of high levels of connectivity for pedestrians and cyclists are intended to promote walking and cycling by making them a more attractive option to the private car.

The proposed development is well connected to the surrounding streets and includes proposed pedestrian/cycle link along the River Skane to Dunshaughlin Main Street. As part of the development it is proposed to provide strong pedestrian and cycle connections alongside the permitted distributor road connecting the existing Phase 1 and proposed Phase 2 to Drumree Road and the R125.

These pedestrian and cycle link proposals serve as promotion of sustainable modes of transport and interconnectivity between the sites and surrounding environs.

5.3.1.2 Design Principle 2 (Multi-Functional Streets)

"The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment."

The road, street and housing layout has been designed to include new connections within the proposed development to the existing adjoining lands, and as a hierarchical street pattern enhancing the streets use for both pedestrians and vehicles alike.

Open space proposals have been designed to complement and enhance this hierarchy. Cycle paths and walkways are incorporated into the road network with numerous cross site directions which will encourage this multi-functional use within the development.

The hierarchical internal road network creates a calm and composed environment by virtue of the number, layout and composition of dwellings. The design will contribute a positive urban response to the local context, place making and identity of the area and in the process promote the multi-functional, place-based streets.

5.3.1.3 Design Principle 3 (Pedestrian Focus)

"The quality of the street is measured by the quality of the pedestrian environment."

The design of the scheme has placed a particular focus on pedestrian/cycle movement. In this regard, connectivity throughout the scheme is heavily weighted towards the pedestrian and away from the private car. This is promoted by providing footpaths of 2.2m (1.8m required by DMURS) along all roads, and shared bicycle and pedestrian paths throughout the site, connecting public open spaces and home zones across the site as well as integrating the River Skane into the pedestrian focus within the subject site.

Home zones are promoted to generate intimate housing clusters, to inform the clear hierarchy of public realm. The streetscape has been designed to provide a sense of enclosure with good passive surveillance to enhance pedestrians sense of safety and wellbeing.

The internal streets within the development are characterised by a compact and highly efficient layout, arranged to facilitate pedestrian permeability throughout the scheme and nearby areas.

Well-designed neighbourhoods and landscapes contribute to an overall sense of well-being by providing places for people to meet up for a walk, for collaboration or just to chat.

5.3.1.4 Design Principal 4 (Multi-disciplinary Approach)

"Greater communication and co-operation between design professionals through promotion plan led multidisciplinary approach to design."

The design of the proposed scheme has been developed through the design team working closely together. The proposed development design is led by O'Mahony Pike Architects working together with Waterman Moylan Consulting Engineers and Doyle + O'troithigh Landscape Architecture ltd.

The developer and promoter of the scheme, Castlethorn Construction is a well-established design driven residential developer and have a proven track record in delivering high quality residential developments. The Multi-disciplinary team are committed to delivering a high-quality development which complies with the recommendations of DMURS.

5.3.2 Provision for Pedestrians and Cyclists

The proposed pedestrian and cycle links for the Phase 2 development can be seen in Figure 5-5 below, which is an extract of the Water Moylan Drawing 12-081A-P160.

The Waterman Moylan Drawing 12-081A-P160 reflects the existing pedestrian/cyclists arrangements that have been provided along Drumree Road to the town Centre as well as proposed arrangements. Discussions have taken place with MCC to facilitate the link around the River Skane, which will link east wards to the town centre in the future in accordance with Dunshaughlin Development Plan.

Multiple pedestrian accesses are proposed for the North and South Site, including accesses to future developments. Refer to Figure 5-5 (extract of Drawing 12-081A-P160), Figure 5-6 and Figure 5-7 below for details.

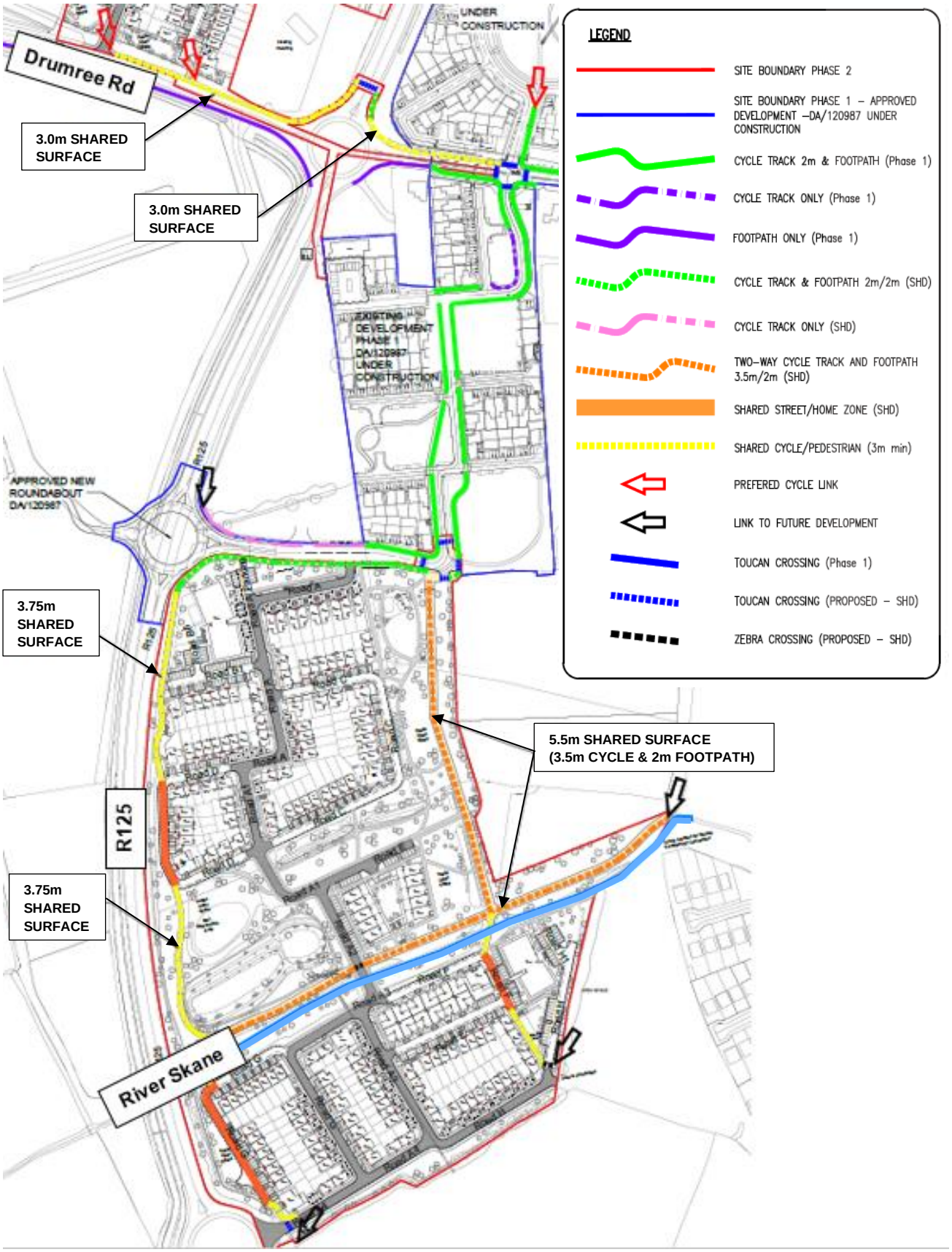


Figure 5-5: Phase 2 Proposed Pedestrian & Cycle Links

North Site

Proposed access to the subject site is through an established priority junction on L2088 that borders the North Site to the south. As part of the application it is proposed to construct a shared surface for pedestrians & cyclists along the northern edge of the L2088 from the site access to the R125. Additionally, a pedestrian cross walk is proposed across the R125 to connect the site to the town footpath network. Discussions have taken place with Meath County Council and general agreement has been reached on the layout reflected below following a series of design reviews and application of the DMuRS Guidelines and the National Cycle Manual and applicable traffic calming measures.

On the 1st September 2020 we received the following confirmation from MCC Transportation "*The proposal appears to address the principal of the items previously raised. MCC Transport has no objections to the construction of the shared surface now but you should ensure that any amendments/changes to same complies with the planning permission for the site*."

Figure 5-6 on the following page shows the proposed shared surface link from the North Site to the R125/Phase 1 Drumree Road.

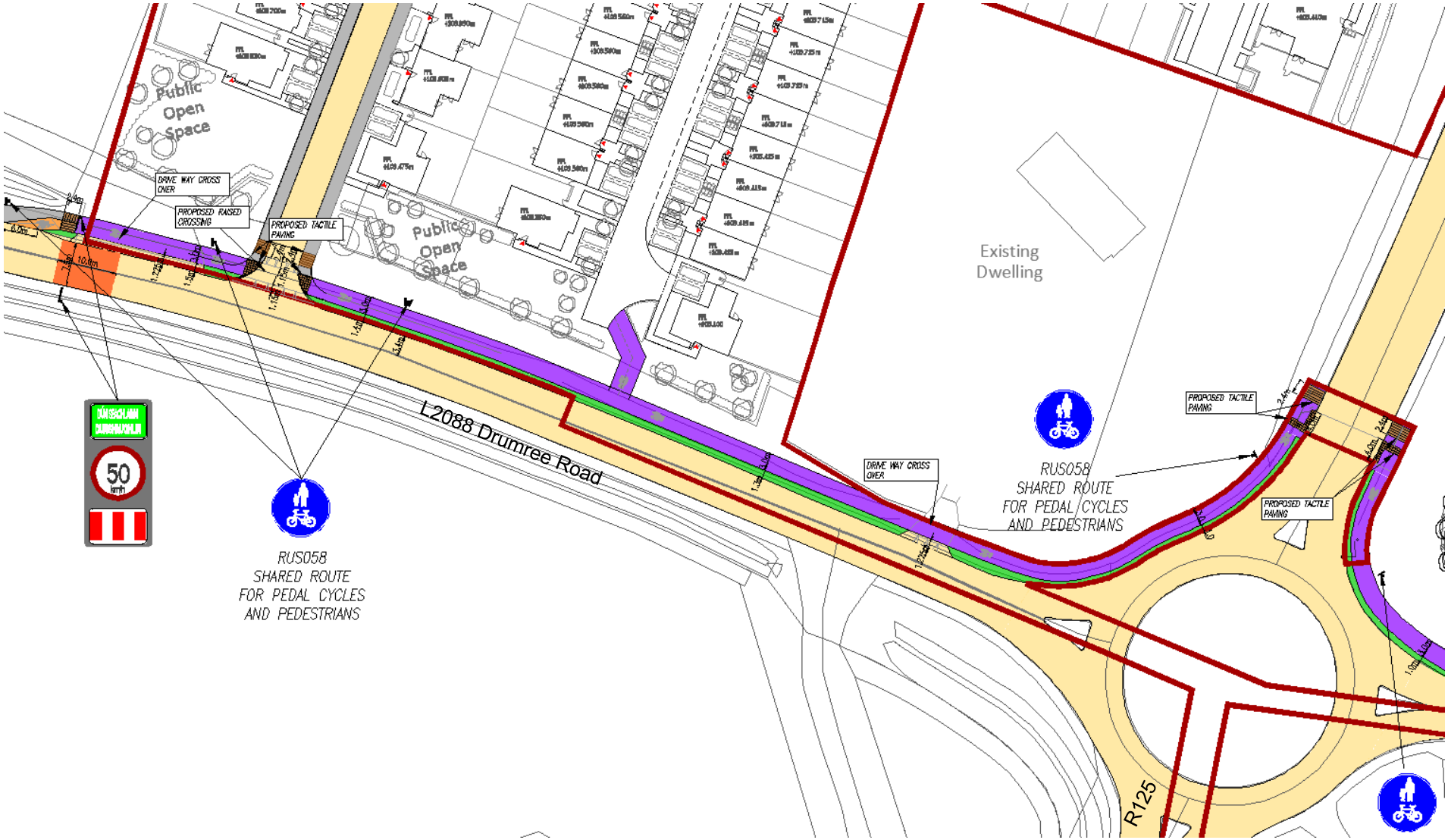


Figure 5-6: Proposed Shared Surface link from North Site (Phase 2) to R125/Phase 1 Drumree Rd

South Site

The South Site will be by served by two accesses, one to the north of the site and another to the south. (See Figure below). As part of the Phase 1 application a roundabout is permitted where the Phase 1 access road joins the R125. An access junction for the upper half of the Phase 2 South Site is proposed along the permitted southern access road for Phase 1. Direct access to the lower half of the south access will be granted from an additional leg being constructed to the existing roundabout on the R125. The two halves of the site will be connected by a bridge that crosses the River Skane, making both sections accessible from either proposed access junction.

Figure 5-7 on the following page shows the proposed access off the Phase 1 permitted road.

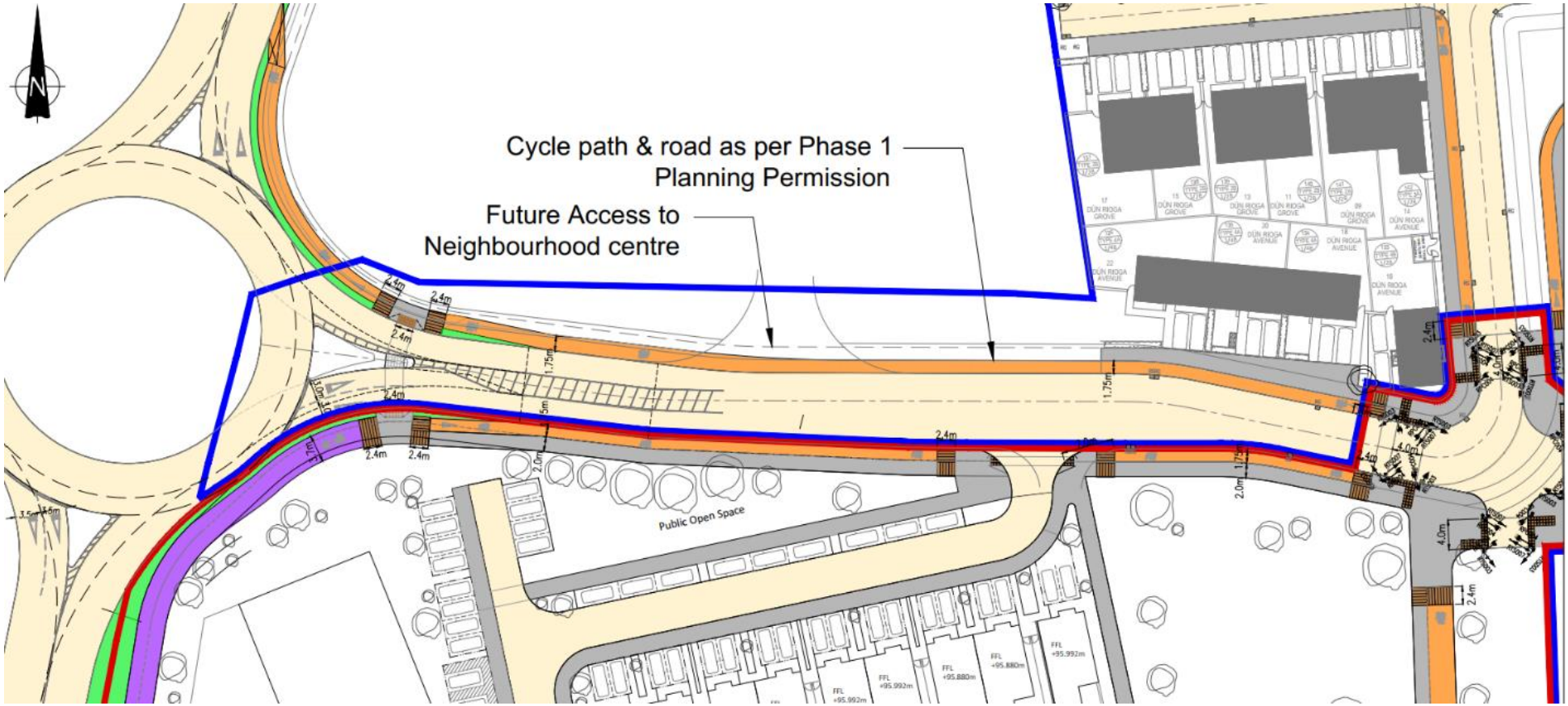


Figure 5-7: Proposed Access off Phase 1 Permitted Road

5.3.3 Public Transport

An assessment of the existing public transport service provision in the area has been carried out. This includes detailed analysis of the modes of transport available, ease of access and frequency of service currently available.

Bus

The proposed development site is currently served by Bus Eireann service routes 109, 109A and 109B which serve public bus stops located in Dunshaughlin Town Centre, approximately 1km east of the subject site. These routes connect Dunshaghlin to Dublin Airport, Dublin City Centre and Dublin Busaras Terminal. In the opposite direction, these routes connect Dunshaughlin to Navan, Kells and Trim.

A summary of the peak hour frequencies of these Bus Eireann Routes can be seen in Table 5-1 below:-

Table 5-1: Bus Eireann Service Routes.

Route No.	**Bus** Eireann **Service Route**	**Peak Hours Frequency**
109	Dublin – Dunshaughlin – Navan - Kells	30 minutes
109A	Dublin Airport / City Centre – Ashbourne – Ratoath – Dunshaughlin – Navan – Kells	Hourly
109B	Dublin – Dunshaughlin – Kilmessan – Trim	Every Two Hours

Access from the proposed development sites to the subject bus stops in Dunshaughlin Town Centre is via Drumree Road. A second link is under discussion to extend the cycle/pedestrian route along the River Skane to link to College Park, Dunshaughlin town Park and Main Street to the east, subject to final details being agreed with MCC and the adjoining landowner (LMETB). The location of the subject bus stops in relation to the proposed development sites is illustrated in Figure 5-8 below.

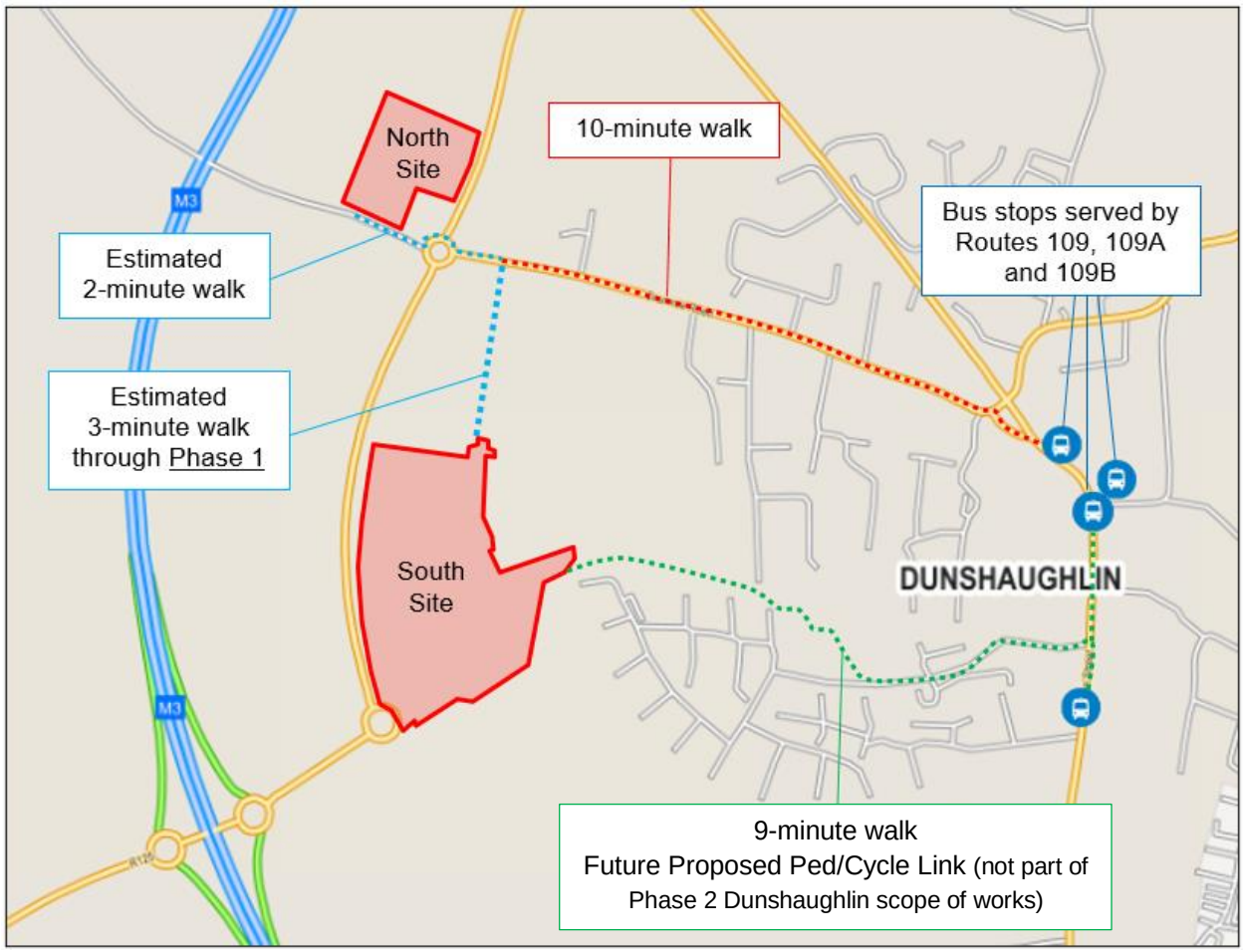


Figure 5-8: Bus Stop Locations

Travel time from the subject bus stops in Dunshaughlin Town Centre to Dublin Airport is approximately 52 minutes and to Busaras Terminal is approximately 55 minutes. In the opposite direction, the travel time from the subject bus stops in Dunshaughlin to Navan is approximately 20 minutes, to Kells it is approximately 40 minutes, and to Trim it is approximately 32 minutes.

The proposed development has been designed to the Design Manual for Roads and Street (DMURS) to maximise pedestrian linkages both within and to the surrounding urban environment. Minor roads have been designed with low traffic speeds to prioritise pedestrians and cyclists, whilst incorporating a number of dedicated pedestrian and cycle routes.

Rail

The proposed development site is located approximately 12.5km north of the closest train station - M3 Parkway, which is the terminus of the Docklands to M3 Parkway Western Commuter service.

The Commuter Rail service through M3 Parkway Station serves all stations from Docklands to M3 Parkway. The service operates at 3 – 4 services per hour on weekdays.

The M3 Parkway Station comprises c. 1,200 free park and ride spaces. These spaces currently provide the opportunity for those living in the surrounding villages and towns to commute by a car-train combined travel and to shift away from car-based travels to Dublin City.

Primary vehicular access to the M3 Parkway Station is via the M3 (10-minute drive) with an alternative parallel route via the R147 (15-minute).

5.4 Car Parking

The proposed development comprises a total of 415 no. residential units comprising of 254 dwelling houses, 55 duplex apartments and 106 apartments, and a supporting crèche facility for 80 children and 16 staff.

In accordance with the Meath County Council Development Plan 2013-2019 the number of required parking spaces per housing type and creche is set out in Table 5-2 below:

Table 5-2: Car Parking Standards

Unit Type	No. Units	Parking	Spaces Required
Residential - Houses	254	2 spaces/unit	508
Residential – 2 Bedroom Duplex Apartments	24	1.25 spaces/unit	30
Residential – 3 Bedroom Duplex Apartments	31	2 spaces/unit	62
Residential – 1&2 Bedroom Apartments	106	1.25 spaces/unit	133
Visitor	161	In all apartment cases, 1 visitor space per 4 apartments	41
Creche	16 employees 80 students	1 per employee & dedicated set down area 1 per 5children	32
		TOTAL	**806**

Based on car parking requirements as represented above, this development would require 806 No. car parking spaces.

However, In March 2018, a revised version of the document "Sustainable Urban Housing: Design Standard for New Apartments" was released. The parking standards set out in this document are considerably lower than those contained in the Meath County Development Plan 2013 – 2019 in respect to apartment developments.

The following extracts from the "Design Standards for New Apartments – March 2018" summarises the guidelines for parking in new apartment developments situated in a Peripheral and/or Less Accessible Urban Location.

"***Peripheral and/or Less Accessible Urban Locations****: As a benchmark guideline for apartments in relatively peripheral or less accessible urban locations, one car parking space per unit, together with an element of visitor parking, such as one space for every 3-4 apartments, should be generally be required."*

The proprosed number of car parking spaces projected to serve the proposed North and South Sites of Phase 2 development are presented below. The development's car parking proposals include the provision of a total 664 No. car parking spaces which will all be provided on surface within the development.

Allocation of the proposed parking spaces for the overall Phase 2 development is outlined below:

- **Residential** (254 Houses): 442 No. car parking spaces, which equates to a ratio of approximately 1.7 car parking spaces per house unit.
- **Residential** (161 Apartments & Duplexes): 161 No. car parking spaces, which equates to a ratio of 1.0 car parking space per apartment/duplex unit, however it is worth noting there are available visitor parking spaces within the vicinity of the apartments & duplexes. Which equates to a ratio of 1.3 when considering the 47 No. residential vistior spaces, mentioned below.
- **Residential (Visitor):** 47 No. car parking spaces.
- **Disable Parking:** 6 No. car parking spaces.
- **Creche:** 8 No. car parking spaces (Staff parking).

The Architects, OMP, have on several occasions presented the car parking rationale used for this proposed development. The meetings held included an S247 Submission & Presentation held on 7 February 2020, and SHD Pre Application Submission held in March 2020 and an SHD Pre Application meeting with An Board Pleanàl (ABP) on 3 June 2020. In the ABP's Inspector's Report it was noted by the Council that "The parking is less than that required under develpment plan standards". This response is seen as positive towards the car parking rationale within the proposed development.

5.5 Cycle Parking

Secure bicycle parking will be provided within the curtilage of each of the individual houses. Cycle parking for the apartments will be provided in secure areas adjacent to the apartments/duplexes.

In accordance with the Sustainable Urban Housing: Design Standards for new Apartments 2018 the number of required bicycle parking spaces are as follows:

Table 5-3: Bicycle Parking Standards

Unit Type	No. Units	Parking	Spaces Required
Residential - Houses	254	1 space/unit	254
Residential – Duplex/Apartments	161	1 spaces/bedroom	369
Visitors -Duplex/Apartment	161	0.5 spaces/unit	81
Houses Short Term Stay	254	0.2 spaces/unit	51
		TOTAL	**755**

As per the "Design Standard for New Apartments – March 2018" it is proposed that throughout the development there will be 568 no. cycle parking spaces provided as per the Architects schedule of bicycle parking, refer to Table 5-4 below. The Meath County Council Development Plan 2013-2019 requires that the number of bicycle parking spaces should be at least one third of the number of vehicle parking spaces required, which equates to 221. The proposed number of cycle parking satisfies this standard.

Table 5-4: Proposed Bicylce Parking

BICYCLE PARKING*		
	No. of spaces	**Ratio spaces/unit**
Allocated Parking - Apartments	188	1 per bedroom
Short Term Parking - Apartments	58	1 per 2 units
Allocated Parking - Duplex		
Rear Garden/Patio Access	78	1 per bedroom
within Bike Stores	63	
Short Term Parking - Duplex	28	1 per 2 units
Houses (Mid-Terrace)		
within Bike Stores	101	1 per unit
Short Term Parking - Houses	52	1 per 5 units
TOTAL	568	

*as per Sustainable Urban Housing: Design Standards for New Apartments 2018

APPENDICES

A. Irish Water Response to Pre-Connection Enquiry & Design Acceptance

James Leonard
Usher House
Main Street
Dundrum, Dublin 14, Co. Dublin D14N7Y8

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

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

www.water.ie

20 February 2020

Dear James Leonard,

Re: Connection Reference No CDS19008551 pre-connection enquiry -
Subject to contract | Contract denied

Connection for Multi/Mixed Use Development of 630 unit(s) at Dunshaughlin, Drumree Road, Co. Meath.

Irish Water has reviewed your pre-connection enquiry in relation to a water connection at Dunshaughlin, Drumree Road, Co. Meath.

Based upon the details that you have provided with your pre-connection enquiry and on the capacity currently available in the network(s), as assessed by Irish Water, we wish to advise you that, subject to a valid connection agreement being put in place, your proposed connection to the Irish Water network(s) can be facilitated.

Strategic Housing Development

Irish Water notes that the scale of this development dictates that it is subject to the Strategic Housing Development planning process. Therefore:

A. In advance of submitting your full application to An Bord Pleanala for assessment, you must have reviewed this development with Irish Water and received a Statement of Design Acceptance in relation to the layout of water and wastewater services.
B. You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed and appropriate connection fee paid at a later date.

Wastewater: To connect this development to Irish Water's wastewater network significant upgrades are required, these include but are not limited to the construction of approx. 600m of 225mm foul sewer.(assuming a gravity connection is feasible) Should you wish to have such upgrade works progressed, Irish Water will require you to provide a contribution of a relevant portion of the costs for the required upgrades, please contact Irish Water to discuss this further.

Water: To connect this development to Irish Water's water network significant upgrades are required, this include but are not limited to the construction of approx. 650m of 200mm ID watermain to connect both sites to the network. Should you wish to have such upgrade works progressed, Irish Water will require you to provide a contribution of a relevant portion of the costs for the required upgrades, please contact Irish Water to discuss this further

All infrastructure should be designed and installed in accordance with the Irish Water Codes of Practice and Standard Details. A design proposal for the water and/or wastewater infrastructure should be submitted to Irish Water for assessment. Prior to submitting your planning application, you are required to submit these detailed design proposals to Irish Water for review.

You are advised that this correspondence does not constitute an offer in whole or in part to provide a connection to any Irish Water infrastructure and is provided subject to a connection agreement being signed at a later date.

A connection agreement can be applied for by completing the connection application form available at **www.water.ie/connections**. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities.

If you have any further questions, please contact Patrick O'Neill from the design team on 01 89 25250 or email patoneil@water.ie. For further information, visit **www.water.ie/connections.**

Yours sincerely,

Maria O'Dwyer

Connections and Developer Services

James Leonard
Usher House
Main Street
Dundrum, Dublin 14, Co. Dublin D14N7Y8

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

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

www.water.ie

4 September 2020

Re: Design Submission for Dunshaughlin, Drumree Road, Co. Meath (the "Development") (the "Design Submission") / Connection Reference No: CDS19008551

Dear James Leonard,

Many thanks for your recent Design Submission.

We have reviewed your proposal for the connection(s) at the Development. Based on the information provided, which included the documents outlined in Appendix A to this letter, Irish Water has no objection to your proposals.

This letter does not constitute an offer, in whole or in part, to provide a connection to any Irish Water infrastructure. Before you can connect to our network you must sign a connection agreement with Irish Water. This can be applied for by completing the connection application form at www.water.ie/connections. Irish Water's current charges for water and wastewater connections are set out in the Water Charges Plan as approved by the Commission for Regulation of Utilities (CRU)(https://www.cru.ie/document_group/irish-waters-water-charges-plan-2018/).

You the Customer (including any designers/contractors or other related parties appointed by you) is entirely responsible for the design and construction of all water and/or wastewater infrastructure within the Development which is necessary to facilitate connection(s) from the boundary of the Development to Irish Water's network(s) (the "**Self-Lay Works**"), as reflected in your Design Submission. Acceptance of the Design Submission by Irish Water does not, in any way, render Irish Water liable for any elements of the design and/or construction of the Self-Lay Works.

If you have any further questions, please contact your Irish Water representative:
Name: Patrick O'Neill
Phone: 01 89 25250
Email: patoneil@water.ie

Yours sincerely,

Maria O'Dwyer
Connections and Developer Services

B. Surface Water Storage Calculations

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
15 min Summer	92.742	0.542	22.5	1083.6	O K
30 min Summer	92.922	0.722	22.5	1444.1	O K
60 min Summer	93.102	0.902	22.5	1803.9	O K
120 min Summer	93.287	1.087	22.5	2174.5	O K
180 min Summer	93.392	1.192	22.5	2388.8	O K
240 min Summer	93.461	1.261	22.6	2534.7	O K
360 min Summer	93.549	1.349	23.2	2722.6	O K
480 min Summer	93.600	1.400	23.6	2833.9	O K
600 min Summer	93.630	1.430	23.8	2900.9	O K
720 min Summer	93.647	1.447	24.0	2939.0	O K
960 min Summer	93.657	1.457	24.0	2962.0	O K
1440 min Summer	93.655	1.455	24.0	2956.2	O K
2160 min Summer	93.628	1.428	23.8	2897.2	O K
2880 min Summer	93.588	1.388	23.5	2807.8	O K
4320 min Summer	93.491	1.291	22.8	2598.9	O K
5760 min Summer	93.390	1.190	22.5	2383.7	O K
7200 min Summer	93.287	1.087	22.5	2173.8	O K
8640 min Summer	93.184	0.984	22.5	1968.8	O K
10080 min Summer	93.084	0.884	22.5	1767.6	O K
15 min Winter	92.808	0.608	22.5	1216.3	O K
30 min Winter	93.011	0.811	22.5	1621.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
15 min Summer	99.186	0.0	1019.0	29
30 min Summer	66.249	0.0	1348.6	43
60 min Summer	41.735	0.0	1823.0	72
120 min Summer	25.643	0.0	2236.7	130
180 min Summer	19.139	0.0	2498.3	190
240 min Summer	15.518	0.0	2693.3	248
360 min Summer	11.521	0.0	2979.1	368
480 min Summer	9.315	0.0	3183.1	486
600 min Summer	7.895	0.0	3332.1	604
720 min Summer	6.895	0.0	3435.8	722
960 min Summer	5.566	0.0	3515.4	916
1440 min Summer	4.115	0.0	3401.4	1144
2160 min Summer	3.041	0.0	4856.3	1540
2880 min Summer	2.453	0.0	5208.5	1960
4320 min Summer	1.809	0.0	5669.6	2776
5760 min Summer	1.457	0.0	6242.6	3624
7200 min Summer	1.231	0.0	6592.1	4400
8640 min Summer	1.073	0.0	6887.0	5192
10080 min Summer	0.955	0.0	7133.5	5960
15 min Winter	99.186	0.0	1140.2	29
30 min Winter	66.249	0.0	1492.9	43

Summary of Results for 100 year Return Period (+20%)

Storm Event	Max Level (m)	Max Depth (m)	Max Control (l/s)	Max Volume (m³)	Status
60 min Winter	93.213	1.013	22.5	2026.1	O K
120 min Winter	93.419	1.219	22.5	2445.7	O K
180 min Winter	93.534	1.334	23.1	2690.8	O K
240 min Winter	93.611	1.411	23.7	2859.8	O K
360 min Winter	93.711	1.511	24.4	3081.6	O K
480 min Winter	93.771	1.571	24.9	3218.0	O K
600 min Winter	93.809	1.609	25.1	3305.2	O K
720 min Winter	93.833	1.633	25.3	3360.5	O K
960 min Winter	93.854	1.654	25.5	3410.7	O K
1440 min Winter	93.843	1.643	25.4	3385.3	O K
2160 min Winter	93.809	1.609	25.1	3304.7	O K
2880 min Winter	93.750	1.550	24.7	3170.9	O K
4320 min Winter	93.607	1.407	23.7	2849.6	O K
5760 min Winter	93.454	1.254	22.6	2518.1	O K
7200 min Winter	93.297	1.097	22.5	2193.6	O K
8640 min Winter	93.135	0.935	22.5	1870.3	O K
10080 min Winter	92.971	0.771	22.5	1541.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Discharge Volume (m³)	Time-Peak (mins)
60 min Winter	41.735	0.0	2041.0	72
120 min Winter	25.643	0.0	2500.5	128
180 min Winter	19.139	0.0	2788.5	186
240 min Winter	15.518	0.0	3000.4	244
360 min Winter	11.521	0.0	3301.0	360
480 min Winter	9.315	0.0	3496.4	476
600 min Winter	7.895	0.0	3610.9	590
720 min Winter	6.895	0.0	3654.4	702
960 min Winter	5.566	0.0	3629.4	922
1440 min Winter	4.115	0.0	3544.6	1294
2160 min Winter	3.041	0.0	5434.3	1644
2880 min Winter	2.453	0.0	5821.8	2108
4320 min Winter	1.809	0.0	6244.0	3028
5760 min Winter	1.457	0.0	6992.0	3880
7200 min Winter	1.231	0.0	7383.8	4760
8640 min Winter	1.073	0.0	7715.9	5544
10080 min Winter	0.955	0.0	7996.5	6352

C. Greenfield Runoff Calculations

Phase 2 North Site

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Stian Venter
Site name:	12-081A North Site
Site location:	Dunshaughlin

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

Site Details

Latitude:	53.51790° N
Longitude:	6.55633° W
Reference:	2375192185
Date:	Aug 07 2020 12:51

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 4.1

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	859	881
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	9.49	9.78
1 in 1 year (l/s):	8.07	8.31
1 in 30 years (l/s):	20.22	20.83
1 in 100 year (l/s):	24.78	25.52
1 in 200 years (l/s):	27.15	27.97

Phase 2 South Site - Northern Portion

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Stian Venter
Site name:	12-081A South Site_Upper
Site location:	Dunshaughlin

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

Site Details

Latitude:	53.51321° N
Longitude:	6.55622° W
Reference:	1793189845
Date:	Aug 19 2020 10:38

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 6.88

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	859	881
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	15.93	16.41
1 in 1 year (l/s):	13.54	13.95
1 in 30 years (l/s):	33.93	34.95
1 in 100 year (l/s):	41.58	42.83
1 in 200 years (l/s):	45.56	46.93

Phase 2 South Site - Southern Portion

Greenfield runoff rate estimation for sites

www.uksuds.com | Greenfield runoff tool

Calculated by:	Stian Venter
Site name:	12-081A Lower South Site Total
Site location:	Dunshaughlin

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

Site Details

Latitude:	53.51096° N
Longitude:	6.55401° W
Reference:	1748904318
Date:	Aug 18 2020 12:45

Runoff estimation approach

IH124

Site characteristics

Total site area (ha): 3.63

Methodology

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

Soil characteristics

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

Hydrological characteristics

	Default	Edited
SAAR (mm):	862	881
Hydrological region:	12	12
Growth curve factor 1 year:	0.85	0.85
Growth curve factor 30 years:	2.13	2.13
Growth curve factor 100 years:	2.61	2.61
Growth curve factor 200 years:	2.86	2.86

Notes

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

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

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

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

(3) Is SPR/SPRHOST ≤ 0.3?

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

Greenfield runoff rates

	Default	Edited
Q_{BAR} (l/s):	8.44	8.66
1 in 1 year (l/s):	7.17	7.36
1 in 30 years (l/s):	17.98	18.44
1 in 100 year (l/s):	22.03	22.6
1 in 200 years (l/s):	24.14	24.76

D. Road Safety Audit

Title: **Stage 1 Road Safety Audit**

For;

Phase 2 Residential Development (SHD), R125 Dunshaughlin Co. Meath.

Client: **Waterman Moylan**

Date: **September 2020**

Report reference: **0848R01**

VERSION: **FINAL**

Prepared By:

Bruton Consulting Engineers Ltd

Glaspistol
Clogherhead
Drogheda
Co. Louth.

Tel: 041 9881456
Mob: 086 8067075
E: admin@brutonceng.ie
W: www.brutonceng.ie

CONTENTS SHEET

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1.0 Introduction

This report was prepared in response to a request from Ms. Jana Ulicna

The Road Safety Team comprised of;

Team Leader: **Norman Bruton**, BE CEng FIEI, Cert Comp RSA

TII Auditor Approval no. NB 168446

Team Member: **Owen O'Reilly**, B.SC. Eng Dip Struct. Eng NCEA Civil Dip Civil. Eng CEng MIEI

TII Auditor Approval no. OO1291756

The Road Safety Audit comprised of an examination of drawings and other material provided by Waterman Moylan and a site visit by the Audit Team, together, on 28th August 2020. The weather at the time of the site visits was dry and the road surface was wet.

This Stage 1 Road Safety Audit has been carried out in accordance with the requirements of TII, Publication Number GE-STY-01024, dated December 2017.

The scheme has been examined and this report compiled in respect of the consideration of those matters that have an adverse effect on road safety. It has not been examined or verified for compliance with any other standards or criteria.

The problems identified in this report are considered to require action in order to improve the safety of the scheme for road users.

If any of the recommendations within this safety audit report are not accepted, a written response is required, stating reasons for non-acceptance. Comments made within the report under the heading of Observation are intended to be for information only. Written responses to Observations are not required.

The information supplied to the Audit Team is listed in **Appendix A.**

A feedback form for the Designer to complete is contained in **Appendix B.**

A plan drawing showing the problem locations is contained in **Appendix C**.

2.0 Background

It is proposed to construct Phase 2 of a residential development (415 units) including creche in Dunshaughlin Co. Meath. The development is split between two sites. The first (Site 1, 266 units) is off the R125 roundabout adjacent to junction 6 on the M3. The second (Site 2, 149 units) is off the L2208 Drumree Road. Phase 1 of the development was under construction at the time of the site visit. It is split both sides of Drumree Road to the East of the R125. A new roundabout is to be constructed on the R125 as part of the Phase 1 works.

Site 1 will have vehicular access from a new arm of the existing R125 2 arm roundabout. The fourth arm will be part of a future relief/link road which does not form part of this scheme. Site 1 will be linked to Phase 1 through the internal road network adjacent to the new R125 roundabout.

Site 2 will have a vehicular access by means of a priority junction onto the L2208. A separate pedestrian and cyclist access will also be provided.

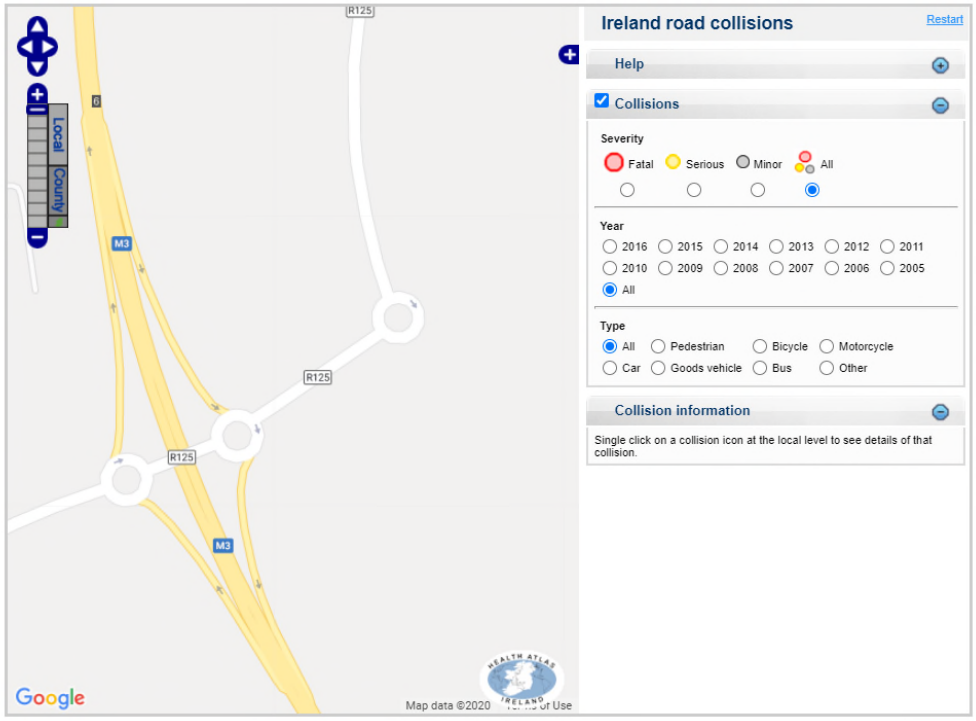
Upgrade works on Drumree Road are also proposed, mainly to benefit vulnerable road users.

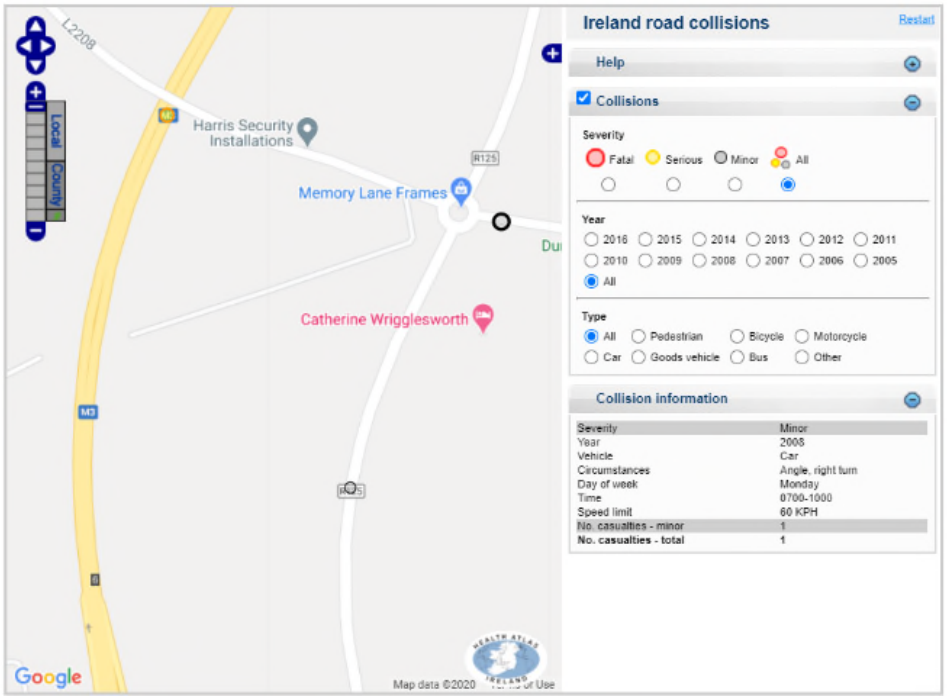
The speed limit on the R125 and the L2208 (west) is 80km/hr.

The location of the site is shown below.

Site Location Map (image courtesy of www.maps.openstreetmap.ie)

The Road Safety Authority's website shows that there was only one minor injury collision recorded in the 12 year period 2005-2016 on the L2208 to the East of the existing R125 roundabout.




Ireland road collisions
Restart
Help
Collisions
Severity
Fatal
Serious
Minor
All
Year
2016 2015 2014 2013 2012 2011
2010 2009 2008 2007 2006 2005
All
Type
All Pedestrian Bicycle Motorcycle
Car Goods vehicle Bus Other
Collision information
Severity Minor
Year 2008
Vehicle Car
Circumstances Angle, right turn
Day of week Monday
Time 0700-1000
Speed limit 60 KPH
No. casualties - minor 1
No. casualties - total 1
Harris Security Installations
Memory Lane Frames
Catherine Wrigglesworth
L2208
R125
M3
Local
County
Google
Map data ©2020

3.0 Main Report

3.1 Problem

LOCATION

Drawing 12-081A P151 A, Sightlines at junctions.

PROBLEM

The visibility envelopes at the internal junctions are in some cases through car parking spaces and through street furniture such as trees. As a result, the visibility will be obscured which could lead to collisions if drivers exit junctions at inappropriate times.

RECOMMENDATION

It is recommended that the visibility envelopes be kept clear of obstacles.

3.2 Problem

LOCATION

R125 existing safety barrier.

PROBLEM

There is an existing safety barrier on the eastern verge of the R125 on approach to the roundabout at headwalls and open drains. It is unclear if a risk assessment has been carried out for the future need of this safety barrier. Without a safety barrier an errant vehicle could collide with a headwall/open drain and lead to injuries for the vehicle occupants.

RECOMMENDATION

It is recommended that a risk assessment be carried out, taking into account the proposed Phase 1 roundabout on the R125 and, if a barrier is required, then the area behind the barrier (working width) should be kept clear of any vegetation other than grass which can be easily maintained.

4.0 Observations

4.1 Observation

Space will be required for a replacement directional sign on the L2208 on approach to the R125 roundabout. The current sign face appears excessively large. Sign supports should not obstruct the proposed shared use track.

5.0 Audit Statement

We certify that we have examined the site on the 28th August 2020. The examination has been carried out with the sole purpose of identifying any aspects of the design which could be added, removed or modified in order to improve the safety of the scheme.

The problems identified have been noted in this report together with associated safety improvement suggestions which we would recommend should be studied for implementation. The audit has been carried out by the persons named below who have not been involved in any design work on this scheme as a member of the Design Team.

Norman Bruton **Signed:** Norman Bruton

(Audit Team Leader) **Dated: 24/9/2020**

Owen O'Reilly **Signed:** Owen O'Reilly

(Audit Team Member) **Dated: 24/9/2020**

Appendix A

List of Material Supplied for this Audit;

- Drawing 12-081A P110 Rev A
- Drawing 12-081A P111 Rev A
- Drawing 12-081A P112 Rev A
- Drawing 12-081A P113 Rev A
- Drawing 12-081A P140 Rev A
- Drawing 12-081A P141Rev A
- Drawing 12-081A P142 Rev A
- Drawing 12-081A P150 Rev A
- Drawing 12-081A P151 Rev A
- Drawing 12-081A P152 Rev A
- Drawing 12-081A SK003E GA
- Drawing 12-081A SK003E Sheet 1 of 3
- Drawing 12-081A SK003E Sheet 2 of 3
- Drawing 12-081A SK003E Sheet 3 of 3
- Drawing LP-01-PP
- Drawing LP-02-PP
- Drawing SES 10220 Sheet 1
- Drawing SES 10220 Sheet 2
- Drawing 1217A-OMP-00-ST-DR-A-1000 Site Plan

Material Provided as Background Information;

- Draft Traffic and Transport Assessment, WM 2020

Appendix B

Feedback Form

BRUTON CONSULTING ENGINEERS

ROAD SAFETY AUDIT FORM – FEEDBACK ON AUDIT REPORT

Scheme: R125 SHD Dunshaughlin, Co. Meath
Stage: Stage 1 Road Safety Audit
Date Audit (Site Visit) Completed: 28/8/2020

Paragraph No. in Quality Audit Report	Problem accepted (yes/no)	Recommended measure accepted (yes/no)	Alternative measures (describe)	Alternative measures accepted by Auditors (Yes/No)
3.1	Yes	Yes		
3.2	Yes	Yes	The R125 is controlled by MCC /A risk assessment will be undertaken at detailed design Stage. These drawings need to be submitted to MCC for final approval which will address any alterations to the existing safety barrier to facilitate the new access point before works are undertaken and will be reassessed as part of the Stage 2 RSA process	Yes

Signed.....
Design Team Leader

Date.....22/9/2020

Signed.....
Audit Team Leader

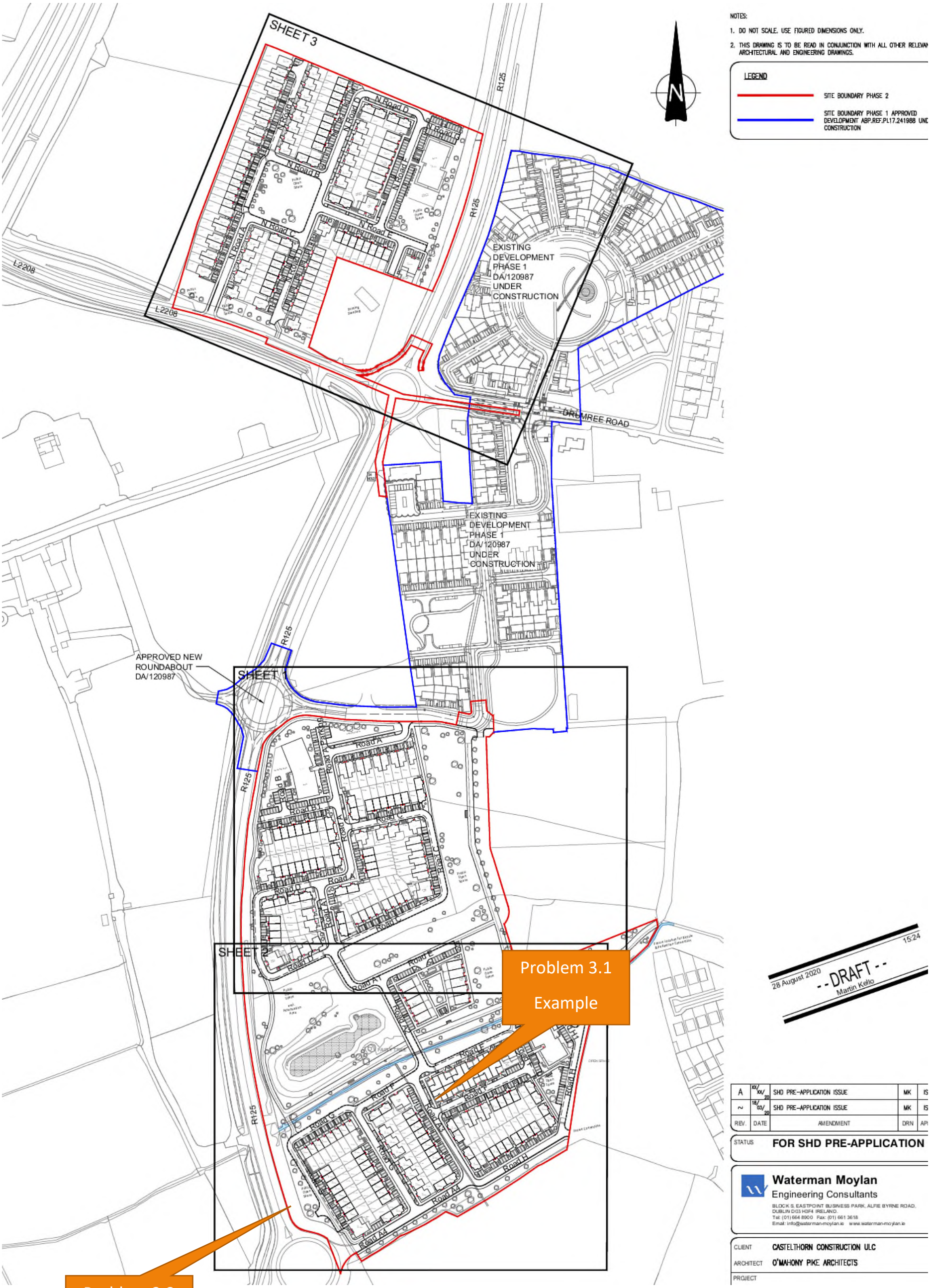
Date.....22/9/2020

Signed.....
Employer/Developer

Date.....24/9/20

Appendix C

Problem Location Plan.



Problem 3.1

Example

Problem 3.2

E. Draft Section 50

Construction, Replacement or Alteration of Bridges and Culverts
Application for Consent under Section 50 of the Arterial Drainage Act, 1945 & EU (Assessment and Management of Flood Risks) Regulations SI 122 of 2010

Project Name	**Dunshaughlin (Location A)**	Structure Ref No.	

Applicant (Correspondence will issue to agent)			
Company or Organisation Name:	**Castlethorn Construction ULC**		
Postal Address:	**Usher House, Main Street, D14N7Y8**		
Contact Person:	**James Leonard**		
Phone:	**012164060**	Fax:	
E-mail:	**jleonard@castlethorn.ie**		

Agent (Correspondence will issue to agent)			
Company or Organisation Name:			
Postal Address:	**Block S, Eastpoint Business park, Alfie Byrne Road D03 H3F4**		
Contact Person:	**Ian Swartz**		
Phone:	**016648900**	Fax:	
E-mail:	**i.swartz@waterman-moylan.ie**		

Location and Parameters of crossing					
Watercourse:	**River Skane**			Catchment:	**Boyne**
Address (Townland – County):	**Dunshaughlin, County Meath**				
Grid Reference	X:	**295880**	Y:	**252206**	
Hydrometric Station(s) utilized (including reference number):	**Station Name: Drumree (Skane)** **Station Number: 07021**				
Area of Contributing Catchment:	**1.8**	Km^2	Road Reference:	**East of R125**	
Design Flood Flow:	**1.043**	m^3/s	Annual Exceedance Probability (AEP):	**1**	%

Statement of Authenticity	
I hereby certify that the information contained in this application form, along with all appended supporting information, has been checked by me and that all statements are true and accurate.	
Name:	
Company/Organisation:	
Signature:	
Date:	****/09/20**

Application Check List	☐
COMPLETED APPLICATION FORM	☒
SUPPORTING HYDROLOGICAL AND HYDRAULIC INFORMATION	☒
PHOTOGRAPHS COVERING SITE OF ALL PROPOSED WORKS	☒
SCALED PLAN OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED CROSS SECTION OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED LONG SECTION OF CHANNEL THROUGH BRIDGE/CULVERT	☒
DETAILS OF RELEVANT EXISTING STRUCTURES	☒
COMPLETED STATEMENT OF AUTHENTICITY	☒
PLAN OF CATCHMENT AREA	☒
COPY OF NOTICE OF GRANT OF PLANNING PERMISSION WITH CONDITIONS [*1]	☒

For OPW use only	*Date of Receipt*							
OPW Drainage Maintenance Region	*East*	☐	*South East*	☐	*South West*	☐	*West*	☐

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.

Correspondence Number	*OPW Register No:*	
	Consent Issued	☐

ADDITIONAL INFORMATION

Hydrological Analysis

Methodology Applied

Method Used	Tick box if used or state other	Flow *2 (m^3/sec)
6 – Variable Catchment characteristics		
3 – Variable Catchment Characteristics		
IH 124	☒	**0.333**
Gauged Flow	☐	
Unit Hydrograph	☐	
Other	☐	
Other	☐	

FSR ☐ FSU ☐ Other ☐

Comments

Factors Applied

Type of Factor	Value Used
Climate Change	**20%**
Irish Growth Curve	**2.61**
Factor for Standard Error	
Drained Channel	
Other	

Tidal ☐

Comments

Hydraulic/Structure Details

Description of Structure*3	2700mm (Width)x900mm (Height) Internal Culvert
Effective Conveyance Area *4	**1.601** m^2
Upstream Invert Level mOD	Downstream Invert Level mOD
Upstream Soffit Level mOD	Downstream Soffit Level mOD
Upstream Design Flood Level mOD	Downstream Design Flood Level mOD

NOTES :

1. In line with OPW policy, section 50 approvals should be sought for bridges and culverts that are necessary for access or deemed acceptable by the planning authority. A copy of the notice of grant of planning permission with all conditions should be enclosed with all applications, that are not exempt development under the Planning and Development Act, 2000, as evidence that these factors have been considered.
2. Flow is the estimated flow from the catchment, without any factors applied.
3. The following details are to be included: the channel bed level, invert and soffit levels of the structure along with the width, length and total conveyance area. Any environmental considerations such as bed depression, baffles, mammal walkways etc. should be described.
4. Effective conveyance area is from channel bed level to design flood level.
5. All levels must be given to Ordnance Datum, Malin Head.

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.

Construction, Replacement or Alteration of Bridges and Culverts
Application for Consent under Section 50 of the Arterial Drainage Act, 1945 & EU (Assessment and Management of Flood Risks) Regulations SI 122 of 2010

Project Name	**Dunshaughlin (Location B)**	Structure Ref No.	

Applicant (Correspondence will issue to agent)			
Company or Organisation Name:	**Castlethorn Construction ULC**		
Postal Address:	**Usher House, Main Street, D14N7Y8**		
Contact Person:	**James Leonard**		
Phone:	**012164060**	Fax:	
E-mail:	**jleonard@castlethorn.ie**		

Agent (Correspondence will issue to agent)			
Company or Organisation Name:			
Postal Address:	**Block S, Eastpoint Business park, Alfie Byrne Road D03 H3F4**		
Contact Person:	**Ian Swartz**		
Phone:	**016648900**	Fax:	
E-mail:	**i.swartz@waterman-moylan.ie**		

Location and Parameters of crossing					
Watercourse:	**River Skane**			Catchment:	**Boyne**
Address (Townland – County):		**Dunshaughlin, County Meath**			
Grid Reference	X:	**295998**	Y:	**252257**	
Hydrometric Station(s) utilized (including reference number):		**Station Name: Drumree (Skane)** **Station Number: 07021**			
Area of Contributing Catchment:		**1.8** Km^2	Road Reference:	**East of R125**	
Design Flood Flow:	**1.043** m^3/s	Annual Exceedance Probability (AEP):		**1** %	

Statement of Authenticity	
I hereby certify that the information contained in this application form, along with all appended supporting information, has been checked by me and that all statements are true and accurate.	
Name:	
Company/Organisation:	
Signature:	
Date:	****/09/20**

Application Check List	☐
COMPLETED APPLICATION FORM	☒
SUPPORTING HYDROLOGICAL AND HYDRAULIC INFORMATION	☒
PHOTOGRAPHS COVERING SITE OF ALL PROPOSED WORKS	☒
SCALED PLAN OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED CROSS SECTION OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED LONG SECTION OF CHANNEL THROUGH BRIDGE/CULVERT	☒
DETAILS OF RELEVANT EXISTING STRUCTURES	☒
COMPLETED STATEMENT OF AUTHENTICITY	☒
PLAN OF CATCHMENT AREA	☒
COPY OF NOTICE OF GRANT OF PLANNING PERMISSION WITH CONDITIONS [*1]	☒

For OPW use only	*Date of Receipt*							
OPW Drainage Maintenance Region	*East*	☐	*South East*	☐	*South West*	☐	*West*	☐

If the application form is not completed correctly, and in its entirety, the application may be deemed invalid and returned for correction.

Correspondence Number	*OPW Register No:*	
	Consent Issued	☐

ADDITIONAL INFORMATION

Hydrological Analysis

Methodology Applied

Method Used	Tick box if used or state other	Flow *2 (m^3/sec)
6 – Variable Catchment characteristics		
3 – Variable Catchment Characteristics		
IH 124	☒	**0.333**
Gauged Flow	☐	
Unit Hydrograph	☐	
Other	☐	
Other	☐	

FSR ☐ FSU ☐ Other ☐

Comments

Factors Applied

Type of Factor	Value Used
Climate Change	**20%**
Irish Growth Curve	**2.61**
Factor for Standard Error	
Drained Channel	
Other	

Tidal ☐

Comments

Hydraulic/Structure Details

Description of Structure*3	16m maximum clear span bridge
Effective Conveyance Area *4	**1.897** m^2
Upstream Invert Level mOD	Downstream Invert Level **93.459** mOD
Upstream Soffit Level **95.001** mOD	Downstream Soffit Level mOD
Upstream Design Flood Level mOD	Downstream Design Flood Level **94.388** mOD

NOTES :

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2. Flow is the estimated flow from the catchment, without any factors applied.
3. The following details are to be included: the channel bed level, invert and soffit levels of the structure along with the width, length and total conveyance area. Any environmental considerations such as bed depression, baffles, mammal walkways etc. should be described.
4. Effective conveyance area is from channel bed level to design flood level.
5. All levels must be given to Ordnance Datum, Malin Head.

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Construction, Replacement or Alteration of Bridges and Culverts
Application for Consent under Section 50 of the Arterial Drainage Act, 1945 & EU (Assessment and Management of Flood Risks) Regulations SI 122 of 2010

Project Name	**Dunshaughlin (Location C)**	Structure Ref No.	

Applicant (Correspondence will issue to agent)			
Company or Organisation Name:	**Castlethorn Construction ULC**		
Postal Address:	**Usher House, Main Street, D14N7Y8**		
Contact Person:	**James Leonard**		
Phone:	**012164060**	Fax:	
E-mail:	**jleonard@castlethorn.ie**		

Agent (Correspondence will issue to agent)			
Company or Organisation Name:			
Postal Address:	**Block S, Eastpoint Business park, Alfie Byrne Road D03 H3F4**		
Contact Person:	**Ian Swartz**		
Phone:	**016648900**	Fax:	
E-mail:	**i.swartz@waterman-moylan.ie**		

Location and Parameters of crossing					
Watercourse:	**River Skane**			Catchment:	**Boyne**
Address (Townland – County):	**Dunshaughlin, County Meath**				
Grid Reference	X:	**295816**	Y:	**252173**	
Hydrometric Station(s) utilized (including reference number):	**Station Name: Drumree (Skane) (Inactive)** **Station Number: 07021**				
Area of Contributing Catchment:	**1.8**	Km^2	Road Reference:	**East of R125**	
Design Flood Flow:	**1.043**	m^3/s	Annual Exceedance Probability (AEP):	**1**	%

Statement of Authenticity	
I hereby certify that the information contained in this application form, along with all appended supporting information, has been checked by me and that all statements are true and accurate.	
Name:	
Company/Organisation:	
Signature:	
Date:	****/09/20**

Application Check List	☐
COMPLETED APPLICATION FORM	☒
SUPPORTING HYDROLOGICAL AND HYDRAULIC INFORMATION	☒
PHOTOGRAPHS COVERING SITE OF ALL PROPOSED WORKS	☒
SCALED PLAN OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED CROSS SECTION OF BRIDGE/CULVERT/APPROACH EARTHWORKS	☒
SCALED LONG SECTION OF CHANNEL THROUGH BRIDGE/CULVERT	☒
DETAILS OF RELEVANT EXISTING STRUCTURES	☒
COMPLETED STATEMENT OF AUTHENTICITY	☒
PLAN OF CATCHMENT AREA	☒
COPY OF NOTICE OF GRANT OF PLANNING PERMISSION WITH CONDITIONS [*1]	☒

For OPW use only	*Date of Receipt*							
OPW Drainage Maintenance Region	*East*	☐	*South East*	☐	*South West*	☐	*West*	☐

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Correspondence Number	*OPW Register No:*	
	Consent Issued	☐

ADDITIONAL INFORMATION

Hydrological Analysis

Methodology Applied		
Method Used	Tick box if used or state other	Flow *2 (m^3/sec)
6 – Variable Catchment characteristics		
3 – Variable Catchment Characteristics		
IH 124	☒	**0.333**
Gauged Flow	☐	
Unit Hydrograph	☐	
Other	☐	
Other	☐	

FSR ☐ FSU ☐ Other ☐

Comments

Factors Applied	
Type of Factor	Value Used
Climate Change	**20%**
Irish Growth Curve	**2.61**
Factor for Standard Error	
Drained Channel	
Other	

Tidal ☐

Comments

Hydraulic/Structure Details

Description of Structure*3	Clear span bridge		
Effective Conveyance Area *4	**0.693** m^2		
Upstream Invert Level	mOD	Downstream Invert Level	**91.777** mOD
Upstream Soffit Level	**94.025** mOD	Downstream Soffit Level	mOD
Upstream Design Flood Level	mOD	Downstream Design Flood Level	**92.157** mOD

NOTES :

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4. Effective conveyance area is from channel bed level to design flood level.
5. All levels must be given to Ordnance Datum, Malin Head.

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UK and Ireland Office Locations