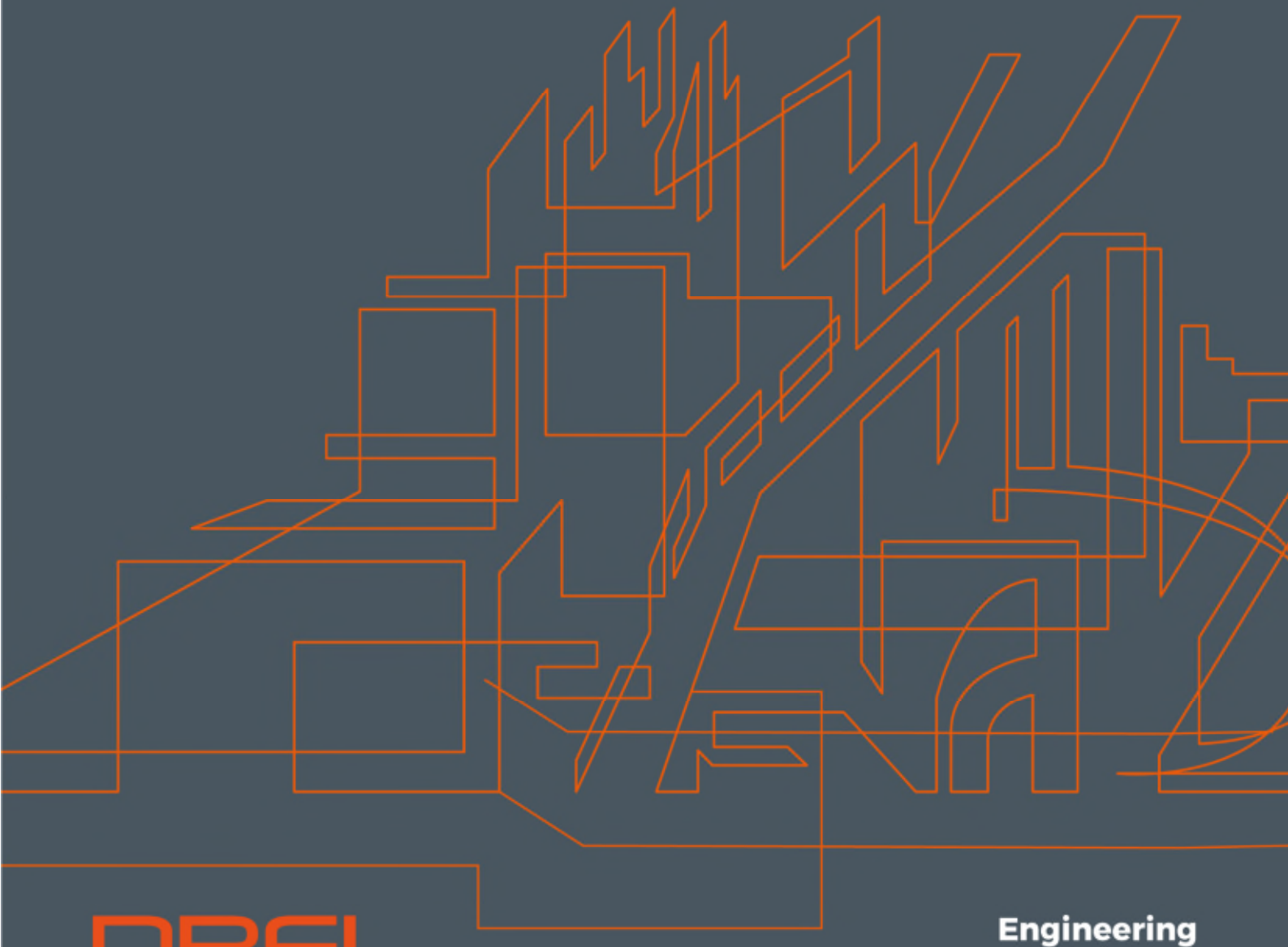
# New Public Realm and Plaza East and North of Waldemar Terrace

## Preliminary Design Report

260051-X-00-X-XXX-RP-DBFL-CE-0002

**November 2026**



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| Project Title: | **New Public Realm and Plaza East and North of Waldemar Terrace** | | |
| Document Title: | **Preliminary Design Report** | | |
| File Ref: | **260051-X-00-X-XXX-RP-DBFL-CE-0002** | | |
| Status: | **P3 - Planning** | Rev: | **2** |
| | **S - Issued** | | |

| Status | Rev. | Date | Description | Prepared | Reviewed | Approved |
|---|---|---|---|---|---|---|
| P3 | 0 | 31/07/26 | First Issue | ROK/EC | RK | RK |
| P3 | 1 | 18/09/26 | Second Issue | ROK/EC | AD | RK |
| P3 | 2 | 11/11/26 | Part 8 Issue | ROK/EC | AD | RK |

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# 1 Introduction

## 1.1 Background

DBFL Consulting Engineers (DBFL) has been commissioned by Dún Laoghaire-Rathdown County Council (DLRCC) to provide consulting engineering services for the design and development of the Public Realm & Plaza – East/North of Waldemar Terrace, Main Street, Dundrum, Dublin 14. The proposed development comprises:

- Reallocation of c. 1,057 m² of road as public realm;
- New public realm of c. 3,001 m², including a new civic plaza with high-quality paving, resurfacing, street furniture and public lighting on independent columns; new accessible raised podium; new incidental play areas; new mobility hub for cycle parking; retention of the existing bike shelter and associated cycle parking; and upgrade of the existing pedestrian crossing;
- New landscaping, including tree planting and sustainable urban drainage systems (SuDS); removal of 7 existing trees on site; removal and relocation of 5 existing trees on site; and retention of 1 existing tree on site; and
- Drainage, utility and all ancillary works.

The proposed scheme seeks to transform an under-utilised urban area to create a communal space that prioritises safety, accessibility and the environment.

The purpose of this report is to provide detailed information about the proposed New Public Realm and Plaza East and North of Waldemar Terrace. It offers a comprehensive overview of the project, including its aims and objectives, relevant policy context, existing conditions and the proposed preliminary design.

## 1.2 Overview

The overall purpose of the project is to create a high-quality, inclusive and multifunctional civic space within Dundrum village that strengthens community life and enhances the daily experience of residents, visitors and commuters alike.

The proposal aligns with Government Policy at both national and local level in its commitment to ensure that communities and neighbourhoods are safe, accessible and sustainable. The proposed

site will be an important feature in creating healthy communities and important placemaking facilities for locals to socialise.

## 1.3 Project Aims & Objectives

The principal aims and objectives of the scheme, in accordance with the overarching purpose and scope, are to:

- Create a high quality, inclusive and multifunctional civic space that supports a wide range of community, cultural and social activities.
- Transform an under-utilised urban area into a vibrant and distinctive place with a strong sense of identity, while recognising and conserving the area's cultural heritage, including the Usher Monument and other local historic features.
- Enhance connectivity and permeability, particularly between Main Street North and South, and improve access to the Dundrum LUAS stop, and adjacent schemes in the area.
- Prioritise active travel and sustainable movement, encouraging walking, cycling and reduced car dependency.
- Provide a safe, accessible and universally designed environment for all users.
- Enhance urban greening, biodiversity and climate resilience, supporting wider environmental and climate action objectives.

## 1.4 Location and Land Use

The proposed scheme area is located at the Taney Cross Junction between the R112 and the R117, beneath the William Dargan Bridge. The scheme is located close to the Green LUAS line that runs directly above the site location and stops at the Dundrum LUAS stop on the William Dargan Bridge. The proposed scheme is also surrounded by the Taney Cross junction and adjacent private lands.




*Figure 1-1 Proposed New Public Realm and Plaza East and North of Waldemar Terrace Site*

The scheme incorporates land zoned under objective MTC by Dun Laoghaire-Rathdown County Development Plan (2022-2028). The following zoning objective applies;

**Zoning Objective 'MTC';** *'To protect, provide for and/or improve major town centre facilities'.*

Within the area it should also be noted that there are protected buildings and structures (as denoted in orange on the Land Zoning Map). These include the Usher Monument (RPS No. 934) and the Railway Station (RPS No. 905).

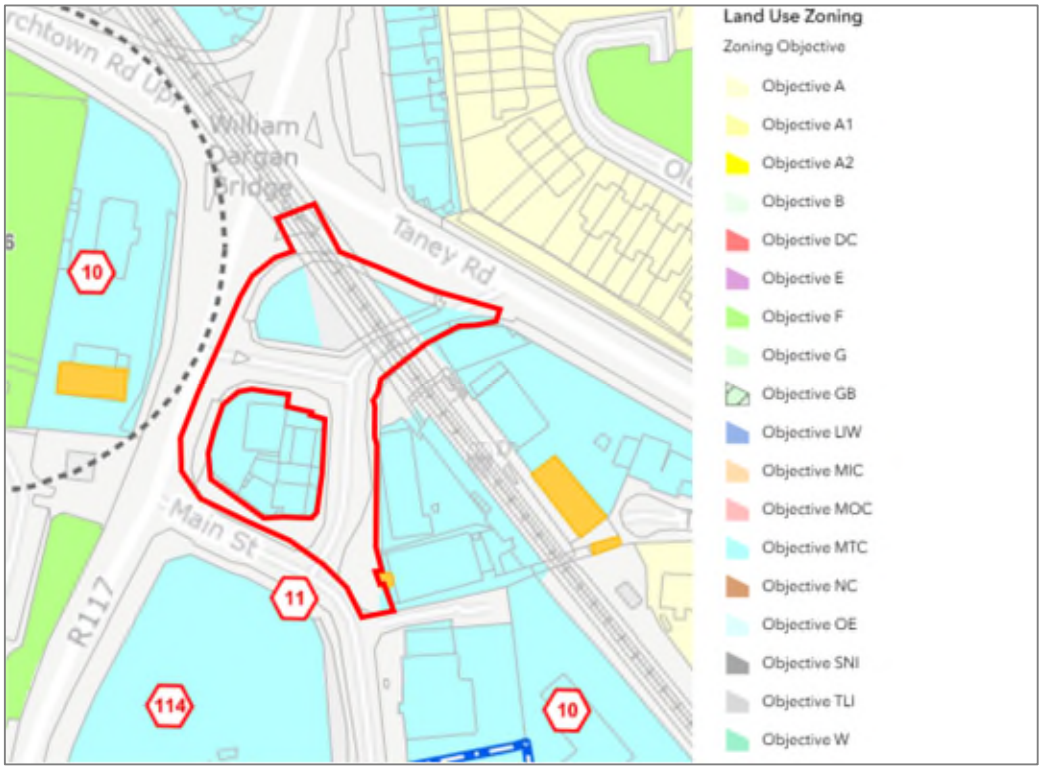



*Figure 1-2: Proposed Scheme in Context of DLR County Development Plan Land Zoning Objectives (Source: DLRCC)*

Key placemaking features currently exist within the area of the proposed scheme and must be considered to conserve the cultural heritage of the area such as the Usher Monument and Waldemar Terrace.

The proposed site is located in an area with several existing and planned transport and public realm schemes. **Figure 1-3** below illustrates the Public Realm & Plaza – East/North of Waldemar Terrace scheme in the context of key adjacent projects, including Dundrum Living Streets and the Dundrum Bus Layover and Bus Gate. Other schemes in the surrounding area, including the Taney Cross Junction Redesign and DLR Connector are also relevant to the development.




*Figure 1-3 Public Realm & Plaza – East/North of Waldemar Terrace in the Context of Dundrum Living Streets and Bus Gate Schemes*

# 2 Design Guidance

## National & Regional Design Context

### 2.1 Introduction

It is important that a review of current international and national design guidelines is undertaken and used to inform the development of the New Public Realm and Plaza East and North of Waldemar Terrace. As **Table 2-1** shows, there is a strong national design basis for this scheme.

If implemented, the scheme would directly and indirectly achieve a range of objectives including the creation of inclusive & safe spaces, public realm enhancement & placemaking, culture & heritage conservation, protection and enhancement of the built and natural environments as well as supporting active lifestyles.

| Level | Guideline |
|---|---|
| International | • Universal Design Guidelines |
| National | • Design Manual for Urban Roads and Streets 2019<br>• Urban Design Manual – A best practice guide 2009<br>• Building for Everyone: A Universal Design Approach |

*Table 2-1: Relevant Design Guidelines for New Public Realm and Plaza East and North of Waldemar Terrace*

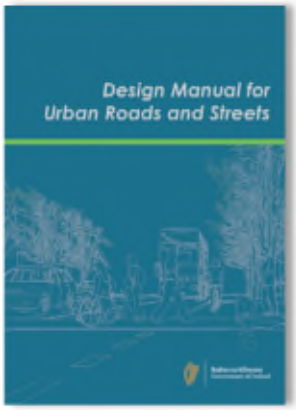
### 2.2 Universal Design Guidelines

The Universal Design Guidelines, first originally developed in 1997 in the North Carolina State University, consists of 7 principles. The principles are to be applied to current designs, to guide future designs and educate consumers and designers about products and environments that are more usable. The 7 principles are Equitable in Use, Flexibility in Use, Simple and Intuitive Use, Perceptible Information, Tolerance for Error, Low Physical Effort, Size and Space for Approach and Use. The guidelines for each principle that relate to the New Public Realm and Plaza East and North of Waldemar Terrace are listed in **Table 2-2** below.

| Principle | Guidelines |
|---|---|
| 1. Equitable Use | **1a:** Provide the same means of use for all users: identical wherever possible; equivalent when not.<br>**1b:** Avoid segregating or stigmatizing any users.<br>**1c:** Provisions for privacy, security, and safety should be equally available to all users.<br>**1d:** Make the design appealing to all users. |
| 2. Flexibility in Use | **2a:** Provide choice in methods of use.<br>**2d:** Provide adaptability to the user's pace. |
| 4. Perceptible Information | **4a:** Use different modes (pictorial, verbal, tactile) for redundant presentation of essential information.<br>**4b:** Provide adequate contrast between essential information and its surrounding.<br>**4c:** Maximize "legibility" of essential information.<br>**4e:** Provide compatibility with a variety of techniques or devices used by people with sensory limitations. |
| 7. Size and Space for Approach and Use | **7d:** Provide adequate space for the use of assistive devices or personal assistance. |

*Table 2-2 New Public Realm and Plaza East and North of Waldemar Terrace Alignment with Universal Design Guidelines*

## 2.3 Design Manual for Urban Roads and Streets 2019




The Design Manual for Urban Roads and Streets (DMURS) 2019 provides design guidance relating to urban roads and streets. It presents principles, approaches and standards that are necessary to achieve balanced, best practice design outcomes with regard to street networks and individual streets.

The Manual acknowledges the need for placemaking to protect heritage and tourism and the need for quality public realm with cycling and walking opportunities that create places for interactions as well as neighbourliness and community growth. The four key design principles of DMURS include:

**Design Principle 1:** *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.*

**Design Principle 2:** *The promotion of multi-functional, place-based streets that balance the needs of all users within a self-regulating environment.*

**Design Principle 3:** *The quality of the street is measured by the quality of the pedestrian environment.*

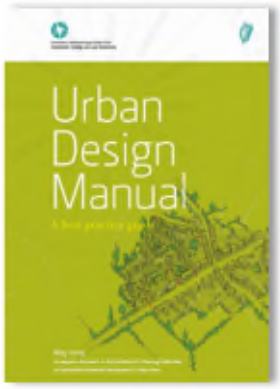
**Design Principle 4:** *Greater communication and co-operation between design professionals through the promotion of a plan-led, multidisciplinary approach to design.*

In creating higher levels of permeability for street users, retrofitting is mentioned as a way to create more sustainable neighbourhoods. Design principles that assist with retrofitting that align with the New Public Realm and Plaza East and North of Waldemar Terrace include:

- *Focus on the provision of pedestrian/cyclist only links.*
- *Rather than seeking to retrofit a fully permeable network (i.e. maximising all connections), focus on key desire lines where the maximum gain can be achieved through the minimum amount of intervention.*
- *Identify potential reductions in private vehicle use or increases in cycling and walking*.
- *Ensure links are short, overlooked, have clear sight lines and are well lit to mitigate anti-social behaviour. Longer links should be limited to those which go through areas of open space.*
- *Implement a package of landscape improvement that will directly add to the attractiveness of an area.*

DMURS also recognises multiple tools to create welcoming streets such as wayfinding to encourage pedestrians and cyclists to use the area as they are more likely to move through an area that has been properly signposted. Furthermore, street trees are also discussed as tactics to create a more enclosed space as well as curb traffic/noise pollution. Good public lighting is to be of consideration, especially where there are cyclist and pedestrians. This will have a large impact on the perception of hazards and security in the area. Poor public lighting is said to discourage users from entering the space.

## 2.4 Urban Design Manual – A best practice guide 2009




The Urban Design Manual (2009) is a companion reference to be used alongside the Guidelines for Planning Authorities on Sustainable Residential Development in Urban Areas. This Manual aims to guide planners toward the creation of compact, user-friendly and sustainable neighbourhoods. The Manual sets out twelve criteria with indicators that are to be considered for residential developments with the public realm being included at number 8 below.




*Figure 2-1: 12 Criteria for residential development (Source: Urban Design Manual 2009)*

The public realm is described as areas where the public can feel safe, secure and enjoy public space. Positive indicators of public realm that relate to the New Public Realm and Plaza East and North of Waldemar Terrace are considered as follows;

- *The public realm is considered as a usable integrated element in the design of the development.*
- *Children's play areas are sited where they will be overlooked, safe and contribute to the amenities of the neighbourhood.*
- *There is a clear definition between public, semi-private, and private space.*

The public realm becomes a safe space when it is overlooked by others, whether from house windows, to on lookers using the space and drivers passing by on nearby roads. This high level of public surveillance encourages more use of the space.

The public realm should be distinctively public by the ease of access to the area by the community.

## 2.5 Building for Everyone: A Universal Design Approach – External Environments




The Building for Everyone: A Universal Design Approach – external environments and approach is the first booklet of 10 that promotes best practice for the design of the built and external environments ensuring that those spaces can be used and accessed by all people regardless of age, size, disability or ability.

The booklet is written by the National Disability Authority that have a statutory role in promoting the achievement of excellence in universal design across many categories including the design of the built environment and external environments.

The New Public Realm and Plaza East and North of Waldemar Terrace is a proposed pedestrian environment with no cars therefore there are more limited considerations that must be adhered to than if cars were also included in the design. The following design guidelines must be adhered to in relation to the public realm.

1. **Access Routes**

   Access routes relate to paths, pavements and other routes that pedestrians may take through public space. There must be enough space for people to move in both directions with ease as well as wheelchairs users. *'A clear width of 2000mm is recommended to enable people to walk alongside each other and for two wheelchair users or parents with strollers to pass comfortably'.*

2. **Surface Materials**

   Different surface materials can be used to clearly delineate between pedestrian and vehicular zones. It is mentioned that surfaces around access points should be hard and firm with good grip. Unstable surfaces should be avoided such as cobblestones and loose gravel.

3. **Street Furniture**

   The Guide advises that street furniture should aim to be coordinated to prevent street cluttering and precisely '*placed at or beyond the boundary of an access route, subject to the widths'* recommended above.

   **Lighting and signage –** It is recommended that lighting columns and signs are mounted on buildings and walls to reduce their impact on the footpath and where this is not

possible, they should be placed no further than 275mm from the outer face or the post or column or property line.

**Placement of street furniture –** The Guide emphasises the importance of street furniture being visible by avoiding grey posts that could blend into the background and by adding lights to bollards. '*Where eye-level signs, such as maps, are supported on two vertical posts, a tapping rail located between the posts at 250 to 400mm above ground level will help prevent an unsuspecting pedestrian colliding with the sign. The sign should not extend more than 150mm beyond the posts and the rail and posts should contrast visually with the background surfaces'.*

**Bins – '***Litter bins should have an overall height of approximately 1300mm and a bin opening at 1000mm above ground level'.*

**Seating –** It is mentioned that seating should be provided at regular intervals. Seats should accommodate wheelchair users as well as parents with strollers, this can be enabled by providing a 900m square of paving beside the seats.

4. **Pedestrian Crossing**

Pedestrian crossing points as mentioned in the Guide should be visible and safe for all users including those with visual difficulties. Crossing points should include a dropped kerb or raised crossing for ease of use. '*The pavement should be ramped perpendicular to the road with a recommended gradient of 1 in 20, where practicable, but not exceeding 1 in 12'.*

At road crossings it is essential to use the correct tactile paving and that it is consistent across all crossings.

| Type of Crossing | Recommended Arrangement |
|---|---|
| Controlled crossing where dropped kerb is positioned in the direct line of travel | Red blister paving to a depth of 1200mm and to the full width of the dropped kerb |
| All other controlled crossings | Red blister paving depth of 800mm and surface of 1200mm wide, extending from the dopped kerb to the rear of the pavement. |

*Table 2-3 Tactile Pavement Guidelines (Source: Building for Everyone: A universal Design Approach)*

## 2.6 Building for Everyone: A Universal Design Approach – Planning and Policy




The Building for Everyone: A Universal Design Approach – planning and policy is the ninth booklet of 10 written by the National Disability Authority. This booklet aims to promote the philosophy of universal design and to encourage developers, designers, builders, and building managers to think creatively when constructing solutions to meet the needs of all citizens.

The main objective of universal design is to create for users with a range of needs which covers everyone regardless of age, gender, size or physical, sensory, mental health or intellectual abilities or disabilities. Universal design is important in planning to create sustainable solutions for all abilities with greater efficiency.

The booklet notes that planning within the public realm demonstrates universal design by:

- *Incorporating clear and consistent paving.*
- *Incorporating wide pathway.*
- *Ensuring minimal street clutter.*
- *Using blister surfacing for pedestrian crossing points.*
- *Using corduroy hazard warning surfacing.*

# 3 Existing Conditions

## 3.1 Existing Pedestrian and Cyclist Facilities

The proposed New Public Realm and Plaza East and North of Waldemar Terrace is located in Dundrum, Co. Dublin, north of Main Street at the intersection of the R112 and the R117. A controlled pedestrian crossing over the left turn slip lane at the junction provides access into the existing public realm space along with dropped kerbs and tactile paving.

Pedestrian footpaths outline the perimeter of the site as well as the perimeter of Waldemar Terrace and the current green area beneath the William Dargan Bridge. The footpath to the north of the proposed scheme runs adjacent to the cycle lane on the R112.

The footpath to the east of the public realm, that connects the R112 and Main Street, provides access to the Dundrum Luas stop elevator, bus shelters for the bus lay-by as well as access to Usher House. The footpaths are c. 1.8m - 2m wide however, there are a number of bollards throughout the area that hinder pedestrians' full use of the footpaths as seen in **Figure 3-1**. The quality of the footpaths varies in some areas with uneven surfaces and vegetation noted (see **Figure 3-2**. Informal crossings are present within the proposed scheme with dropped kerbs but no tactile paving.



*Figure 3-1 Bollards on the footpath in the site*



*Figure 3-2 Vegetation on a footpath in the site*

There is a designated cycle path surrounding the perimeter of the site on the R112 as well as the R117. The cycle lane is off road at the same level as the footpath with no physical segregation between the pedestrian and cyclists as shown in **Figure 3-3.** Sections of this cycle lane, however, are not to standard widths, markings are faded and certain areas impede on pedestrian space, for example at the Taney Cross Junction. Cycle access is provided within the site through an entrance from the R112 that is shared with the bus lane (see **Figure 3-4**). Cyclists can share the bus lane to cycle through the public realm entering at the north entrance and exiting at the south onto Main Street, joining the designated cycle lane yet again on Main Street.



*Figure 3-3 Cycle Lane at Taney Cross*




*Figure 3-4 Current Cyclist access from the R112*

There are currently two bike parking areas in the existing site. There is one bike shelter with nine bike stands on the footpath south of Waldemar Terrace, as seen as location 1 in **Figure 3-5** below, and two more bike stands that stand alone on the opposite side of the road, displayed as location 2 below.










*Figure 3-5 Location of current bike parking facilities in the proposed site*

## 3.2 Existing Public Transport Facilities

**Figure 3-6** below shows the location of the two bus stops that are located in the existing site, no. 6041 and no. 2825. Access through the space is restricted to buses and cycles only, i.e. general traffic is not permitted to enter from the R112 or R117.

Buses can enter and exit from the R117 to the west of the site as well as Main Street to the south and can enter only from the R112 to the north of the site.




*Figure 3-6 Location of bus stops within the existing site*

Bus numbers 74, 14, and 44D operated by Dublin Bus as well as the 750 which is operated by Dublin Coach service the stops. Each of these routes as well as frequency are shown in **Table 3-1** below.

| Bus No. | Operate By | Route | Frequency |
|---|---|---|---|
| **74** | Dublin Bus | Dundrum Luas Station to Eden Quay | Every 30 minutes |
| **14** | Dublin Bus | Dundrum Luas Station to Beaumont (Ardlea Rd.) | Every 10-12 minutes on peak |
| **44D** | Dublin Bus | Dundrum Luas Station to O'Connell Street | 06:35 and 07:25 to O'Connell Street<br>17:28 to Dundrum Monday-Friday |
| **750** | Dublin Coach | Dundrum Luas Station to Dublin Airport | Once every hour Monday-Friday |

*Table 3-1 Existing bus facilities in the existing site*

The Green Line Luas runs above the existing site and stops at the Dundrum Luas stop on the William Dargan Bridge. Access to the Luas stop is provided by an elevator located within the site as well as a staircase that lies outside the remits of the scheme, as illustrated in **Figure 3-7** below.




*Figure 3-7 Access to the Luas Stop*

## 3.3 Existing Road Network

The site is located at the junction between the R112 and the R117 as depicted in **Figure 3-8**. The R112 is a regional single carriageway road with two lanes of traffic that provides access from Chapelizod to Mount Merrion. The R117 is another regional road and provides access from Charlemont Street to Wicklow, joining the N11 at Bray. Dundrum Main Street is also located to the south of the site which is a one-way street running south to north towards the site before becoming a two-way street again at the Bank of Ireland which is depicted by a broken yellow line in **Figure 3-8**. As previously mentioned, there is no vehicular access to the site from any of these road networks besides the buses.

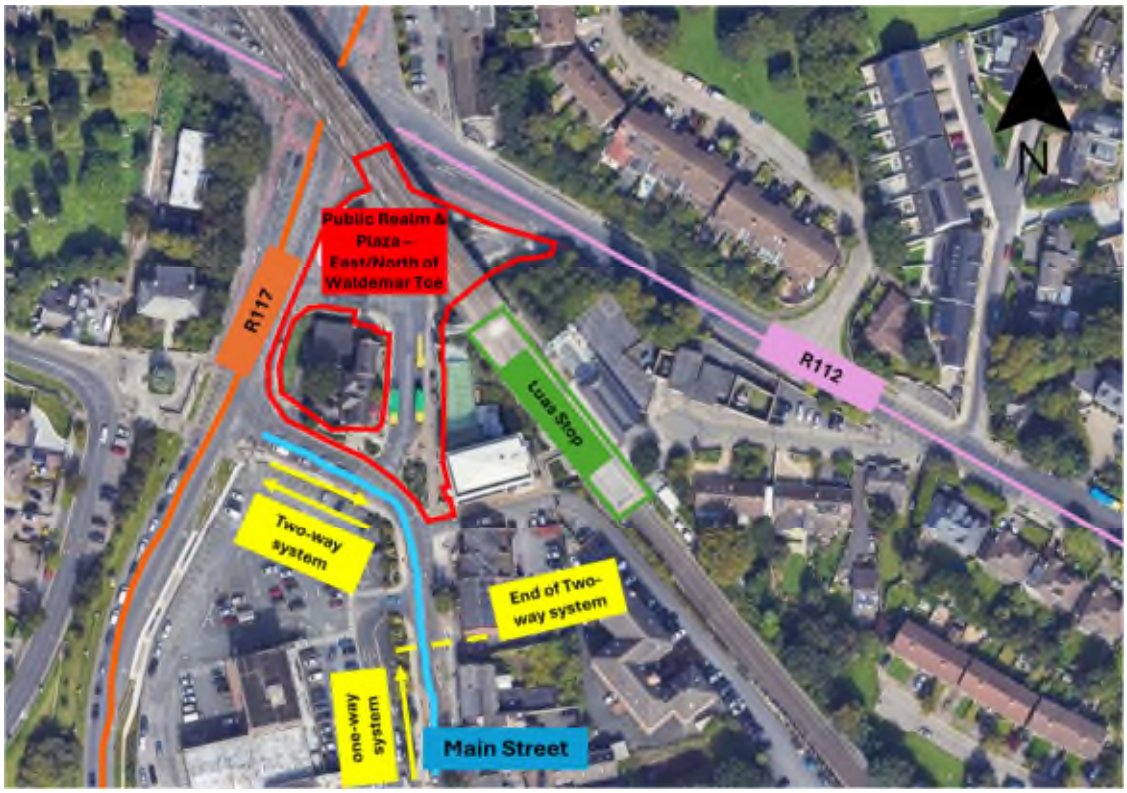



*Figure 3-8 Existing road network surrounding the existing site*

## 3.4 Summary of Site Audit Report

A Site Audit Report was prepared prior to the commencement of the design process to identify existing issues, constraints and notable features that may affect the usability, accessibility and overall experience of the area for vulnerable road users, including pedestrians, cyclists and people with visual or mobility impairments.

The site audit identified that the existing area does not currently provide an attractive or welcoming environment for pedestrians or other users of the public realm, with a number of issues relating to accessibility, pedestrian comfort, connectivity and the quality of the existing space. The area that was audited can be seen in **Figure 3-9** below with reference points to areas where issues were found.




*Figure 3-9 Site audit location and locations of identified issues*

An initial site audit found that the pedestrian facilities, although present throughout the area are not up to standard. Many of the footpaths are cluttered with street furniture (broken bollards, public lighting poles, unused miscellaneous poles), are uneven and have overgrown vegetation, all of which can cause potential hazards for pedestrians and reduces the space for pedestrians to move comfortably through the area. Formal pedestrian crossings in the area also suffer from street clutter with guardrails to the north of the site and often have the incorrect tactile paving in place as shown in **Figure 3-10**.



*Figure 3-10 Vegetation, substandard and confusing tactile paving at formal pedestrian crossing*

Similarly, despite cycling facilities being in place, they remain below the standard that is acceptable. Cycle lanes are insufficient in width, uneven, encroach on pedestrian footpaths are placed in a confusing manner (i.e. two cycle lanes side by side) and markings are illegible in places. An example of this is seen in **Figure 3-11**.



*Figure 3-11 Confusing cycle lane layout and faded road markings*

In summary, the current condition of the area does not prioritise nor welcome the movement of people. The area is dominated by the bus lay-by and combined with a lack of seating areas and the poor pedestrian and cycling facilities, this has created a hostile environment which discourages people from gathering and limits the space's ability to serve a meaningful community or public realm function.

The site audit was subsequently updated to reflect the proposed preliminary design for the scheme. The updated audit, incorporating the design measures proposed in response to the issues identified is provided in the pack that accompany this report.

# 4 Preliminary Design

## 4.1 The Proposed Scheme

Dún Laoghaire-Rathdown County Council are proposing to construct a new public realm and plaza east and north of Waldemar Terrace, Main Street, Dundrum, Dublin 14. The proposed development comprises:

- Reallocation of c. 1,057 m² of road as public realm;
- New public realm of c. 3,001 m², including a new civic plaza with high-quality paving, resurfacing, street furniture and public lighting on independent columns; new accessible raised podium; new incidental play areas; new mobility hub for cycle parking; retention of the existing bike shelter and associated cycle parking; and upgrade of the existing pedestrian crossing;
- New landscaping, including tree planting and sustainable urban drainage systems (SuDS); removal of 7 existing trees on site; removal and relocation of 5 existing trees on site; and retention of 1 existing tree on site; and
- Drainage, utility and all ancillary works.

The preliminary design serves as the foundation for the planning consent for the scheme. At this stage, it presents detailed information on key aspects of the design, including lighting, environmental mitigation measures, sustainable urban drainage systems (SuDS), drainage requirements, and proposals for the public realm and landscaping. The extent of the scheme is shown in **Figure 4-1** below.

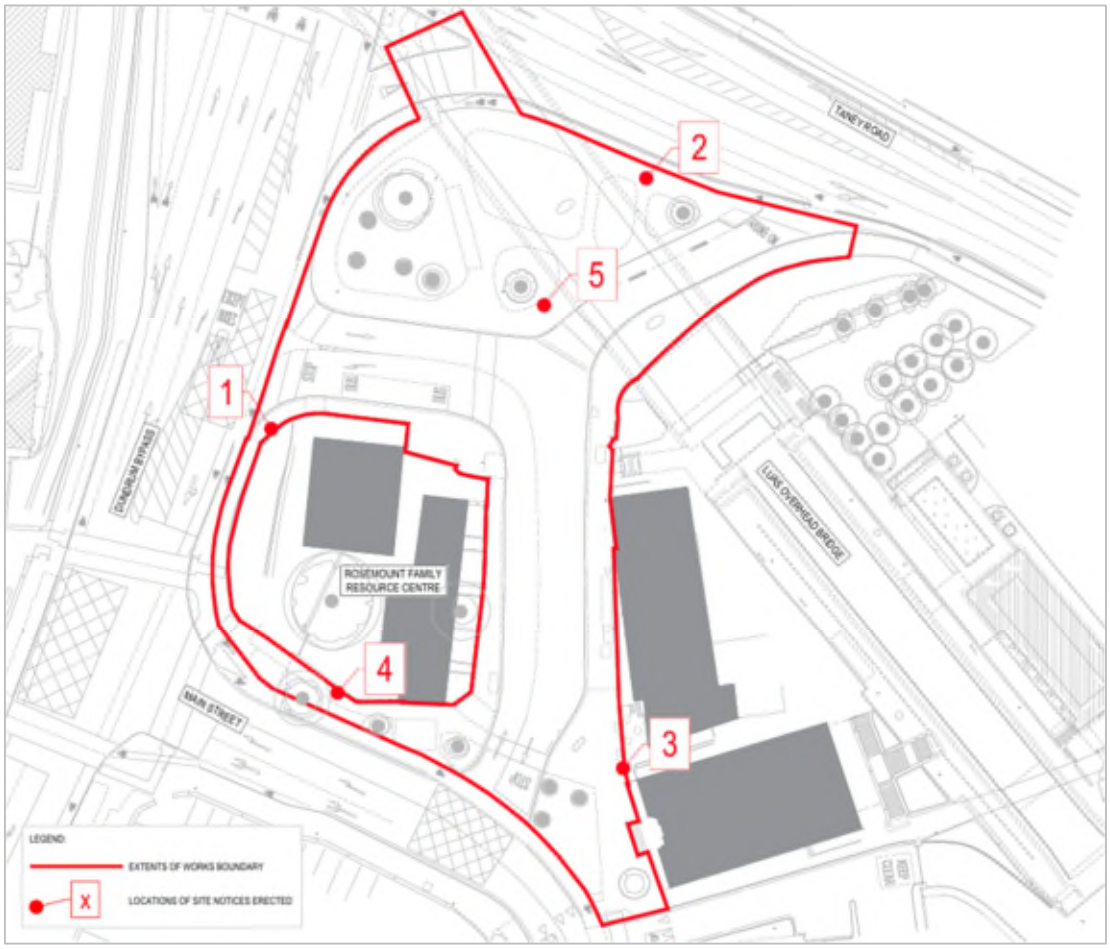



*Figure 4-1: New Public Realm and Plaza East and North of Waldemar Terrace - Site Extents (Snip of DBFL Drawing No. X-0000-Z00-DTM-DR-DBFL-CE-1001).*

The proposed Public Realm & Plaza – East/North of Waldemar Terrace will transform the existing area beneath the William Dargan Bridge into a high-quality, pedestrian-priority civic space, improving connectivity, accessibility and the overall quality of the public realm, while maintaining controlled access for essential operational requirements.

The proposed development includes the conversion of approximately 1,057 m² of existing road space into public realm, forming part of the overall 3,001 m² scheme area, as illustrated in **Figure 4-2**. The figure also identifies the associated tree works, comprising the removal of 7 existing trees, relocation of 5 trees and retention of 1 existing tree.

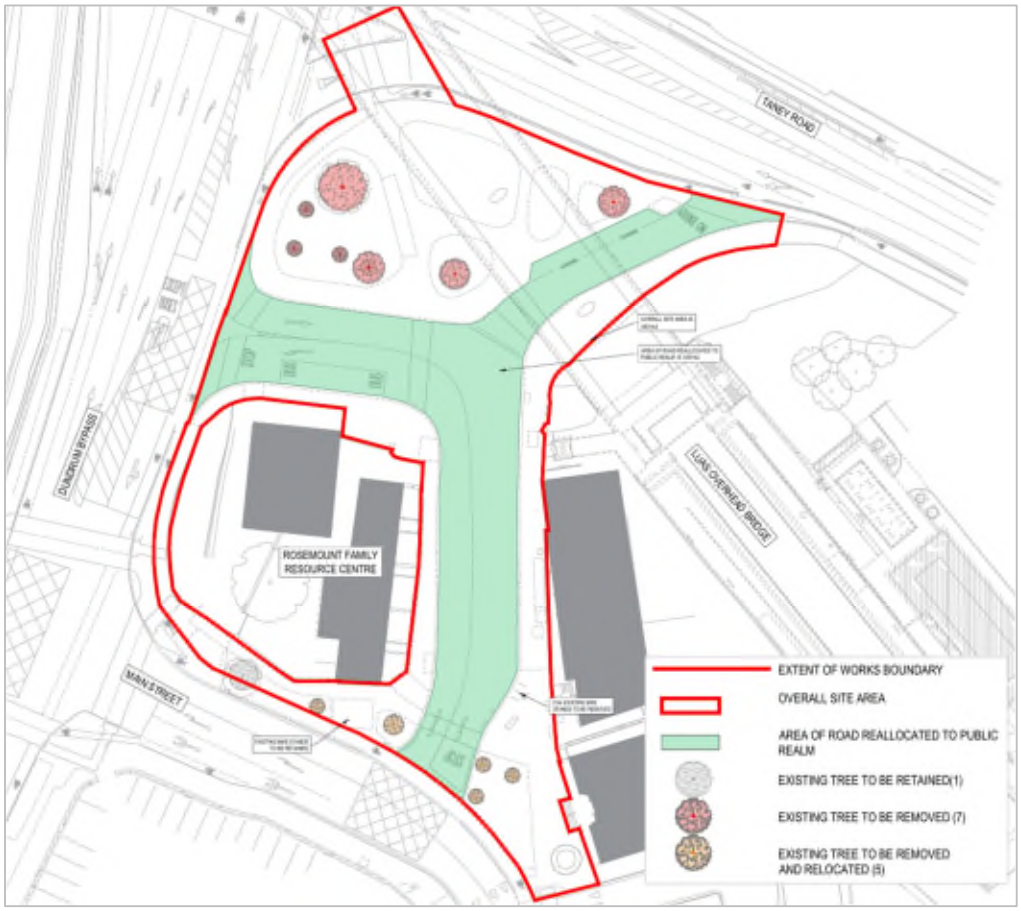



*Figure 4-2: New Public Realm and Plaza East and North of Waldemar Terrace – Existing Site Layout (Snip of DBFL Drawing No. X-0000-Z00-DTM-DR-DBFL-CE-1002).*

The proposed layout is centred around the existing Usher Monument and a new focal feature within the central plaza area. These elements are connected by a flexible transition space designed to accommodate a variety of uses, including community events, markets and informal gatherings. The plaza provides improved connections between the surrounding streets, including Main Street, Taney Road, Dundrum Bypass and Waldemar Terrace.

The design provides a series of clear and accessible pedestrian routes into and through the space, with the primary northern and southern entrances forming the main connections to the plaza and additional east and west connections improving permeability. A secondary pedestrian route through the landscaped area to the north-west provides an alternative route and enhances the experience of the planted areas.

The scheme includes a range of public realm improvements, including new paving treatments, seating areas, planting, public lighting upgrades, cycle parking facilities and a mobility hub beneath the William Dargan Bridge. The existing sheltered cycle parking facility south of Waldemar Terrace

will be relocat, with additional cycle parking provided within the proposed mobility hub to support active travel.

The proposed landscaping strategy incorporates new planting areas and SuDS features, contributing to biodiversity, sustainable water management and the creation of a more comfortable and attractive public space.

The proposed arrangement is illustrated in **Figure 4-3**.




*Figure 4-3: New Public Realm and Plaza East and North of Waldemar Terrace - General Arrangement (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201)*

## 4.2 Pedestrian and Cycle Movement in the space

The proposed pedestrian network has been developed to respond to existing and anticipated pedestrian desire lines, ensuring that the public realm provides direct, legible and accessible connections between the key destinations surrounding the site. These include Main Street and Dundrum Village to the south, the Luas Green Line and associated lifts and stairs, existing and proposed bus stops, the signalised pedestrian crossings, Taney Road, Dundrum Bypass and Waldemar Terrace. The arrangement of the primary and secondary pedestrian routes has been

designed to accommodate these movements while creating a high-quality public space that encourages people to pass through, stop and spend time within the plaza. The principal pedestrian movement flows are illustrated in **Figure 4-4.**




*Figure* 4-4 *Illustration of key pedestrian desire lines through the public realm (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201)*

### *Seating & Place Making*

The proposed scheme has been developed to prioritise social interaction and community engagement. Therefore, it was important to include seating areas and places for people to gather within the public realm to utilise the space as opposed to simply passing through it. Seating is proposed throughout the scheme in multiple areas allowing different types of interactions between people.

The scheme incorporates a variety of seating arrangements throughout the public realm, including benches integrated into the raised planters, seating facing the central plaza and elevated stage, and sculptural seating elements beneath the bridge. These provide opportunities for resting,

social interaction and informal activities, with inclusive seating arrangements incorporating space for wheelchair users. Additional seating is provided along the landscaped pedestrian routes and within more sheltered areas, creating a range of settings for different users. The proposed seating arrangements are illustrated in **DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201**.

### *Cycling Facilities and Mobility Hub*

The proposed scheme includes dedicated cycle parking facilities located adjacent to the existing cycle network, providing convenient access for cyclists while minimising potential conflicts between cyclists and pedestrians within the public realm area.

A mobility hub is proposed beneath the William Dargan Bridge, providing cycle parking facilities, cargo bike parking and supporting infrastructure. The location of the mobility hub allows cyclists to access the facilities directly from the surrounding cycle network without requiring movement through the central pedestrian plaza, thereby reducing potential interactions between cyclists and pedestrian activity within the civic space.

The proposed mobility hub will provide nine standard bicycle parking spaces, two cargo bike parking spaces and a bicycle repair station. Illustrative examples of the proposed standard Sheffield cycle stands, cargo bicycle stands and bicycle repair station are provided in **Figure 4-5** and **Figure 4-6**.



*Sheffield strands in George's Street Lower in Dún Laoghaire (Source: Google Maps)*



*Stands for cargo bikes. St Stephens Green (Source: Cycle Design Manual)*

*Figure 4-5 Example images of Sheffield and Cargo Bike Stands*



*Figure 4-6 Bike Repair Station and Sheffiled stands in Sixmilebridge in County Clare (Source: Clare County Council)*

The existing sheltered cycle parking facility located to the south of Waldemar Terrace will be retained as part of the proposed scheme. This facility provides 9 cycle stands, providing for 18 cycling spaces, and remains directly connected to the existing cycle route, providing an additional convenient location for cyclists accessing the public realm from the southern approach.

Additional cycle parking is also proposed at the western path of the scheme, adjacent to the existing cycle route along Dundrum Bypass. Two bicycle parking stands, providing for 4 cycle parking spaces, will be provided at this location, allowing cyclists approaching from the west to conveniently access the public realm while remaining close to the cycle network.

The proposed cycle facilities are illustrated in **DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201**.

## 4.3 Vehicular Access to Central Area

The proposed New Public Realm and Plaza East and North of Waldemar Terrace has been designed as a pedestrian-priority space, with no general vehicular traffic permitted within the central public realm area. However, access requirements have been considered throughout the design process to ensure that the space can accommodate essential operational vehicles, including emergency vehicles, maintenance vehicles, Luas infrastructure servicing vehicles and vehicles associated with events or occasional activities within the plaza.

Access into the central public realm will be restricted to authorised vehicles only. Three lockable Socket Mounted Bollards are proposed at the Main Street entrance to prevent unauthorised vehicular access while allowing access for emergency, maintenance, servicing and event-related vehicles when required. The bollards are proposed with a clear spacing of 1.45 m to restrict unauthorised vehicle access while maintaining accessibility where required. The location of the proposed bollards is shown in **Figure 4-7**.




*Figure 4-7 Proposed Moveable Bollards Location (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201)*

Swept path assessments have been undertaken to demonstrate that the proposed access arrangements can accommodate the required design vehicles. The assessments have been carried out using a Fire Appliance and a Food Truck, representing the principal operational vehicles expected to access the site. The design vehicle specifications are provided in **Figure 4-8.**

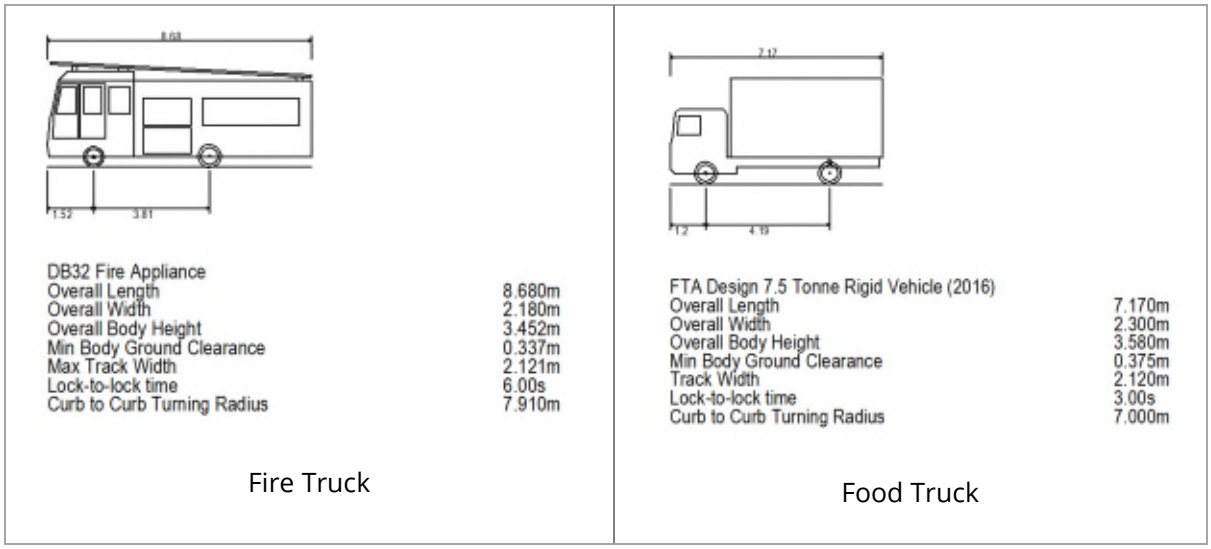



*Figure 4-8 Design Vehicles Specifications*

**Figure 4-9** and **Figure 4-10** illustrate the swept path assessments for the northbound and southbound approaches from Main Street, respectively. In each figure, the swept path shown on the left represents the Fire Appliance, while the swept path on the right represents the Food Truck.

Both approaches are capable of accommodating the design vehicles; however, the northbound approach provides the more straightforward manoeuvre and is therefore identified as the preferred access route for authorised vehicles. The southbound approach also remains feasible and provides flexibility for emergency vehicle access where required.



*Figure 4-9 Swept Path Northbound (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1231)*



*Figure 4-10 Swept Path Southbound (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1232)*

In addition to accommodating operational vehicles, the proposed layout has been designed to facilitate bridge maintenance activities. A minimum clearance of 3 m has been maintained between the podium and the William Dargan Bridge, providing sufficient space for an elevating work platform to access the underside of the bridge for inspection and maintenance purposes. The available clearance is illustrated in **Figure 4-11**.

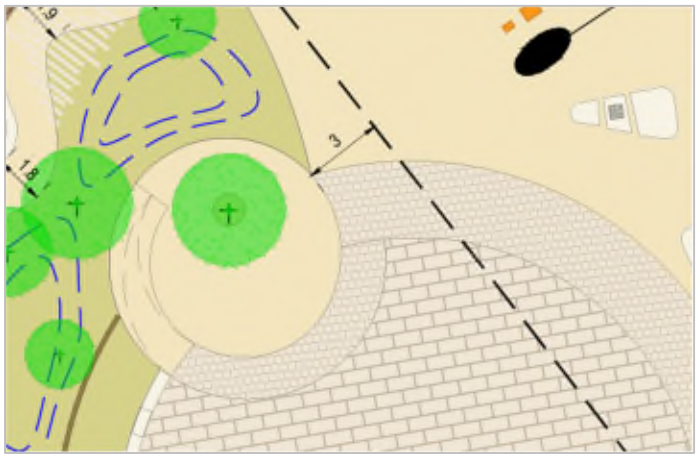



*Figure 4-11 Distance between the podium and the bridge (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1201)*

## 4.4 Access to Adjacent Properties

The proposed New Public Realm and Plaza East and North of Waldemar Terrace has been designed to maintain vehicular access to all adjoining properties throughout the operation of the scheme. The two dwellings located within the scheme extents have been considered as part of the design process to ensure that the proposed public realm layout does not adversely affect access to these properties. The locations of the dwellings requiring vehicular access are shown in **Figure 4-12**, with the proposed access arrangements described below.

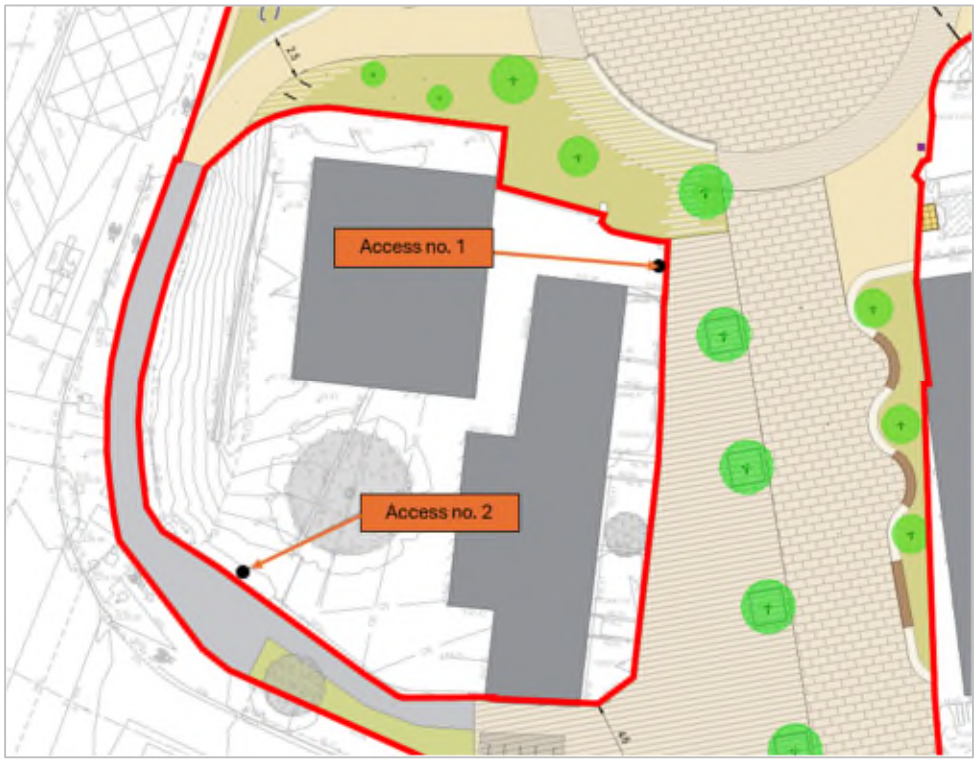



*Figure 4-12 Dwellings Requiring Vehicular Access Within the Scheme Extents (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1241)*

Vehicular access to **Property Access No. 1**, in Waldemar Terrace, will continue to be available via the authorised vehicle route through the public realm, entering from Main Street through the proposed moveable bollards. **Figure 4-13** illustrates the existing access arrangement and **Figure 4-14** demonstrates, through swept path analysis, that a standard van can safely access the property.



*Figure 4-13 Property Access No. 1 – Existing Access Arrangement*




*Figure 4-14 Swept Path Assessment – Van Access to Property Access No. 1 (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1241)*

Vehicular access to **Property Access No. 2**, in Main Street, will also be maintained as part of the proposed scheme. The existing access arrangement will remain unchanged, with no modifications proposed to the property entrance. Swept path analysis has been undertaken to demonstrate that a standard van can safely enter and exit the property from the two directions of Main Street.

**Figure 4-15** illustrates the existing access arrangement and **Figure 4-16** the corresponding swept path assessments.



*Figure 4-15 Property Access No. 2 – Existing Access Arrangement*



*Northbound Direction*

*Southbound Direction*

*Figure 4-16 Swept Path Assessment – Van Access to Property Access No. 2. (Snip of DBFL Drawing No. X-0100-Z00-DTM-DR-DBFL-CE-1241)*

## 4.5 Public Lighting

A new public lighting scheme is proposed throughout the Public Realm & Plaza – East/North of Waldemar Terrace to provide a safe, attractive and accessible environment for pedestrians, while complementing the character of the proposed public realm. The lighting design has been coordinated with the proposed landscaping, seating areas, pedestrian routes and surrounding infrastructure.

The proposed scheme incorporates LED luminaires to provide appropriate illumination throughout the public realm, together with GOBO projectors to cast defined graphical patterns onto the plaza surface. These projections will add visual interest and enhance the character of the space after dark, with a sharp cut-off to minimise unwanted light spill. The lighting columns located beneath and adjacent to the William Dargan Bridge have been designed with reduced mounting heights to avoid conflict with the bridge structure while achieving the required lighting levels.

Existing lighting infrastructure will be rationalised where required, with redundant lighting columns removed and new lighting provided to achieve consistent illumination across the scheme.

## 4.6 Landscape and Public Realm

A Landscape Plan has been prepared as part of the proposed New Public Realm and Plaza East and North of Waldemar Terrace. The landscape proposals form an integral part of the overall design, creating a high-quality civic space that is attractive, accessible and capable of supporting a range of everyday and community activities.

The landscape strategy is centred around the creation of a flexible public realm, with the raised podium acting as the principal focal point of the space and the enhanced setting of the Usher Monument reinforcing its importance within the local area. These key features are connected by an open civic space capable of accommodating markets, community events, informal recreation and day-to-day pedestrian movement.

A variety of seating opportunities have been incorporated throughout the scheme to encourage people to stop, meet and spend time within the public realm. These include sculptural seating beneath the William Dargan Bridge, seating integrated within raised planters, pocket seating areas adjacent to Waldemar Terrace and seating associated with the central civic space. The distribution of seating provides a range of spaces for both social interaction and quieter informal use.

The landscape proposals also introduce new trees, planting areas and rain gardens to soften the urban environment, enhance biodiversity and contribute to sustainable surface water management through the integration of Sustainable Drainage Systems (SuDS). The planting strategy has been developed to improve the visual quality of the public realm while providing seasonal interest, shade and increased resilience to climate change.

The proposed public realm has been designed to be fully accessible, with clear pedestrian routes, inclusive seating opportunities and carefully integrated landscape features that support movement throughout the site for users of all ages and abilities.

## 4.7 Horizontal & Vertical Alignment

The proposed New Public Realm and Plaza East and North of Waldemar Terrace involves the reconfiguration of the existing carriageway and footway arrangement to create a pedestrian-priority public space. The existing bus route through the centre of the site will be removed, with the area raised to align with the surrounding footpath levels and create a continuous public realm environment.

The vertical alignment has been developed to provide an accessible and comfortable pedestrian environment, with appropriate gradients and crossfalls incorporated to facilitate pedestrian movement and surface water drainage. The proposed arrangement minimises unnecessary changes in level throughout the space, reducing potential trip hazards and ensuring the area remains accessible for pedestrians of all ages and abilities.

Localised level changes are introduced to accommodate key public realm features, including the raised podium, seating elements and landscaped areas. These features have been carefully integrated into the overall layout to define different activity areas, enhance the character of the space and provide focal points, while maintaining clear and accessible pedestrian routes throughout the public realm.

The horizontal alignment of the proposed scheme has been developed to respond to existing pedestrian desire lines and improve connectivity between the surrounding streets, including Main Street, Taney Road, Dundrum Bypass and Waldemar Terrace. The layout provides a series of clear and legible pedestrian routes into and through the space, with the primary north-south connection forming the main pedestrian movement route between Main Street and Taney Cross.

The width and arrangement of the pedestrian routes have been designed to balance pedestrian comfort, accessibility and the operational requirements of the space. The main access routes provide sufficient width to accommodate pedestrian movement, emergency access, maintenance activities and occasional servicing requirements, while secondary routes through the landscaped areas provide additional permeability and opportunities for informal movement through the space.

The proposed horizontal and vertical arrangement has also been developed to integrate with surrounding and future schemes, including the Living Streets proposals and the future Taney Cross Junction Upgrade. This ensures that pedestrian connections, crossing arrangements and the overall public realm strategy are considered as part of the wider transformation of the area.

# 5 Surface Water Drainage Strategy

## 5.1 Existing Drainage

The existing is site comprises a predominantly hardstanding urban area, consisting primarily of asphalt road surfacing and concrete footpaths.

The existing surface water network is shown in Figure 5-1 Existing Surface Water Network, upon review of both DLRCC records and review of the utilities survey undertaken by Apex Surveys.

There are isolated informal green areas within the site area, but in its current state, holds minimal ecological value, and limited ability to reduce peak storm flows. The site is generally drained through a combination of typical road gulleys. There is a large Ø750mm surface water outfall transversing through the site, with multiple smaller connections, the outfall discharges into the River Slang, to the west of the development.

Upstream of the River Slang, is the culverted realignment of the stream, which enabled the construction of the Dundrum Bypass Road (R117) The culvert system is known for flow constraint issues, further discussed within this Report.

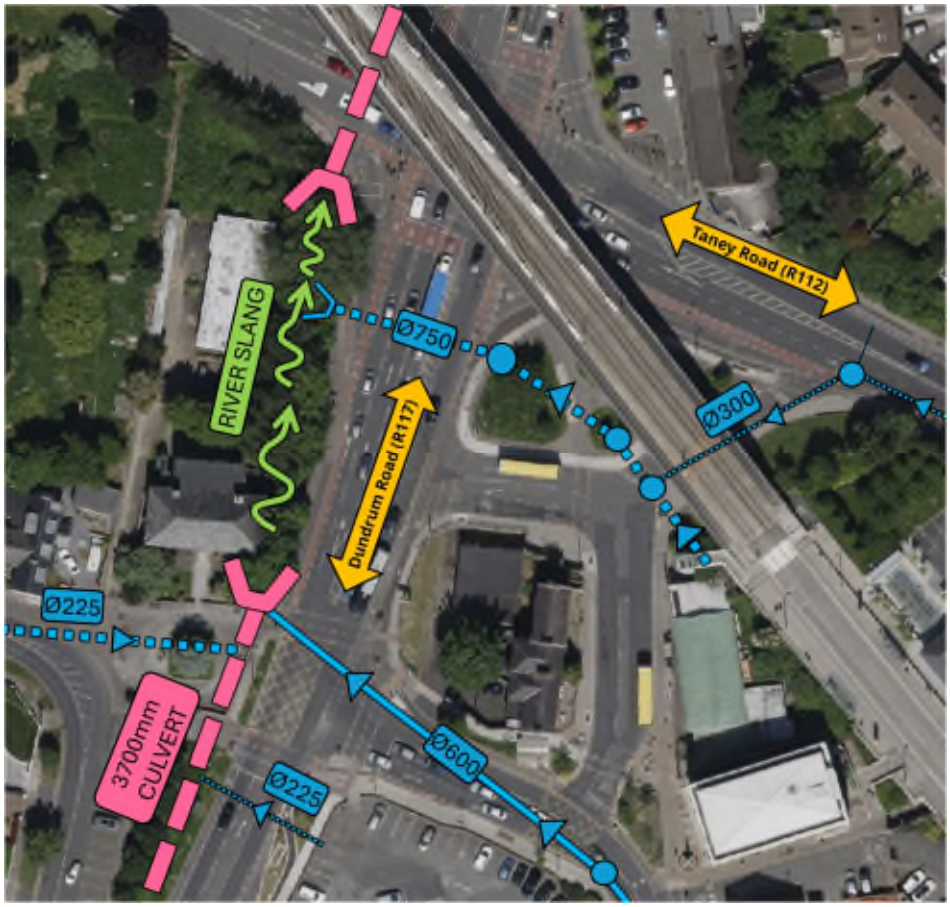



*Figure 5-1 Existing Surface Water Network*

The Strategic Flood Risk Assessment from DLRCC included within the County Development Plan has noted within the heavily culverted nature of the Dundrum Slang River and the limited capacity of the culverts located upstream of the Junction of Dundrum Bypass and Main Street Junction with Centre generate excessive overland flood flow volumes that pond at low lying areas noted in **Figure 5-2**. The extent of ponding is impacted by overland flood levels that would ultimately need to overtop the road kerb and railing plinth adjacent to the library, draining downstream back into the River Slang Channel.

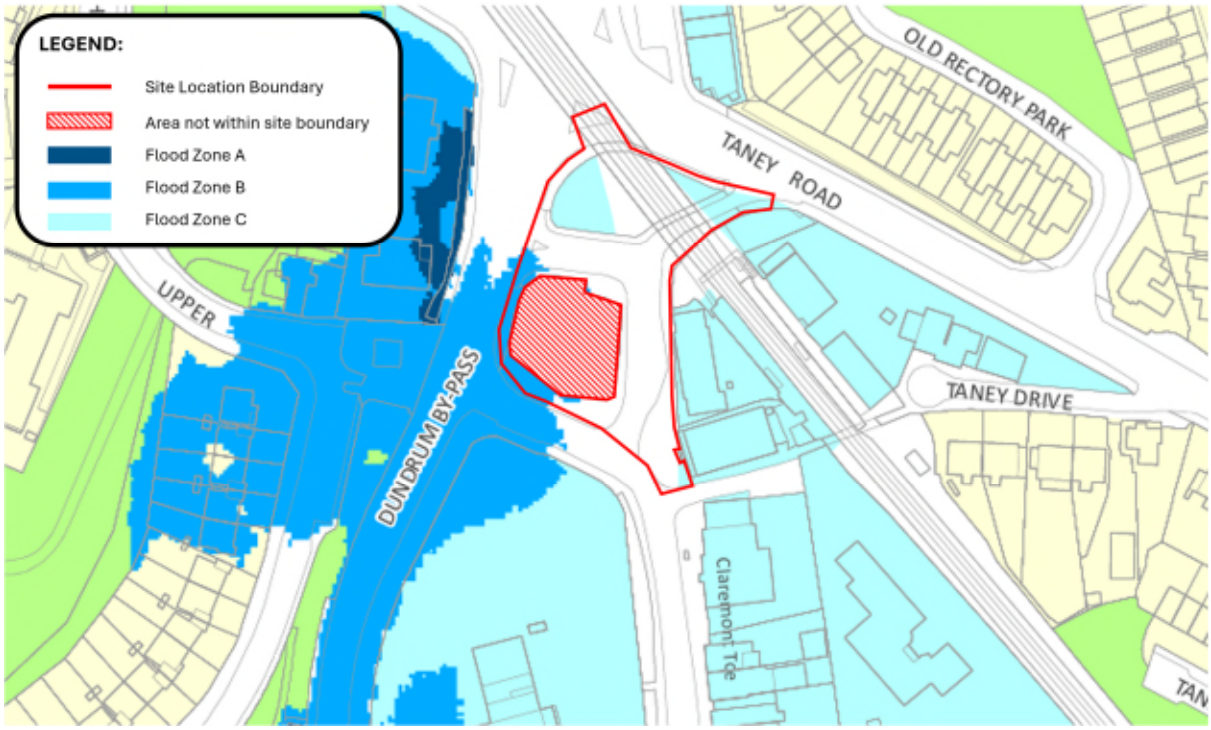



*Figure 5-2 Adjacent Flooding Issues*

## 5.2 Sustainable Surface Water Management

Please refer to Proposed Drainage Layout, *260051-X-0500-Z00-DTM-DR-DBFL-CE-1301* for drainage proposals. The public scheme's strategy at it's core is intended as an exemplarily example of a Sustainable Drainage Retrofit Design.

All detailed design of the overall surface water management strategy for the scheme shall comply with the Greater Dublin Regional Code of Practice for Drainage Works and the requirements of Appendix 7: Sustainable Drainage System Measures of the DLRCC County Development Plan 2022-2028 that includes policies and guidelines recommended within the Greater Dublin Strategic Drainage Study (GDSDS).

The drainage strategy, at a minimum, intends to mirror the natural drained environment by considering and recognising natural flow paths, with the proposed infrastructure emulating and optimising the management of surface water through detailed site layout design and drainage infrastructure. This included surfaced impermeable paved areas within the central paved plaza to positively draining into proposed nature-based SuDS solutions, while remaining areas will infiltrate into permeable surfacing or green SuDs structures such as rain gardens, swales and biofiltration areas. Hard landscape furniture such as benching areas adjacent to green SuDS areas have underlying drainage slots constructed at their respective bases to promote pass-through flow of surface water collected at the surface to the green SuDS areas. This will be fully developed during detailed design.

During larger, more intense storm events, surface water will be directed to overflow chambers within the green SuDS areas and discharged directly into the surface water network. Surface water infiltrating through permeable surfacing will be collected by a combination of filter drains, as minimal infiltration into the underlying soils is expected.

The development proposed is an exemplary example of nature based SuDS solutions provided by DLRCC within the public realm, proposed Nature Based SuDS include a combination of:

- Dry and Wet Swales
- Tree Pits
- Filter Drains
- Rain Gardens
- Biofiltration areas
- Permeable Paving

The proposed scheme is illustrated in **Figure 5-3** below.

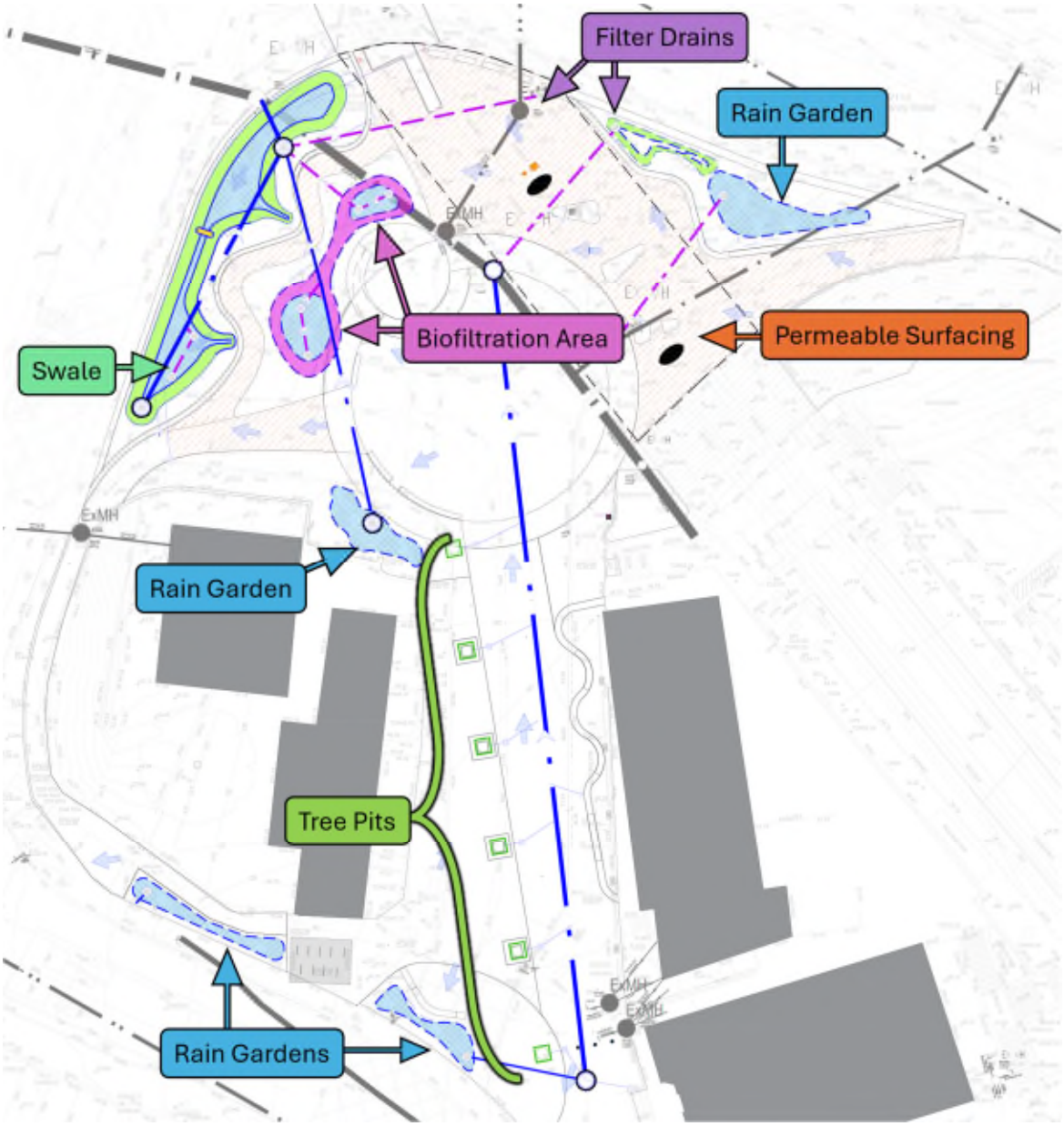



*Figure 5-3 Proposed Drainage Strategy*

In line with the requirements of Appendix 7 of the DLRCC Development Plan, the site shall be designed to accommodate climate change by increasing rainfall intensities by 20%. However, the site is a public realm scheme, proposed with the retrofitting of nature designed SuDS solutions at it's core, this approach is highlighted and defended within the Development Plan, therefore applied urban creep factors are considered inappropriate.

During an exceedance storm event, i.e. greater than the 1% AEP event, the development's layout is designed to direct over-land flows away from buildings. Adjacent flooding during an exceedance

storm event caused by the surcharging of the River Slang Culvert System may interact within the proposed swale within the south-western corner of the development as indicated in **Figure 5-2**, strategic overflow brio manholes have therefore been placed providing local temporary relief back into the surface water network.

In Summary, the proposed scheme, with the typical quantum of impermeable surfaces appropriate to the type of development would typically result in an increased runoff volume compared to an equivalent greenfield site. However, the effective drained area of the proposed development in comparison to its existing state, as described, has been significantly reduced and therefore any pluvial flood risk has been well-mitigated within the site when compliant to guidance documents. This also includes proposals incorporates substantial open spaces and well-designed Sustainable Drainage Systems (SuDS) further reducing pluvial risk and greatly improving water quality parameters of collected surface water.

## 5.3 Construction Stage Mitigation Measures: Hydrology

A 'Construction and Environmental Management Plan' (260051-X-00-X-XXX-RP-DBFL-CE-004) prepared by DBFL and submitted with the application will be further developed and maintained by the contractor during the construction phase of this development to align with the appointed Contractor's construction methodology.

Construction activities associated with the proposed scheme will be managed to minimise the potential for adverse effects on surface water quality and the existing drainage network. Appropriate measures will be implemented during construction to manage surface water runoff, sediment and potential pollutants, including the protection of existing drainage infrastructure and receiving waters, appropriate management of fuels and construction materials, and controls relating to concrete works, dewatering and construction runoff.

Detailed construction management and pollution prevention measures will be developed and implemented as part of the construction stage documentation, having regard to the final design and the nature and sequencing of the works.

## 5.4 Flood Risk Assessment

The Site-Specific Flood Risk Assessment of the proposed development, 260051-X-00-X-XXX-RP-DBFL-CE-003, as part of the planning package was undertaken with the requirements of the "Planning System and Flood Risk management Guidelines for Planning Authorities", November 2009.

The proposed public realm scheme would be classified as a 'water compatible development' according to Table 3.1 of the Guidelines, in which the Sequential Approach mechanism enables this type of development to be located within any Flood Zone including Flood Zone A, where the probability of flooding from rivers and the sea is highest, exceeding a 1% or 1 in 100 year for river flooding and 0.5% or 1 in 200 for coastal flooding.

The process of following flood risk assessment stages determined that the site is within Flood Zone Categories, B & C as defined by *The Guidelines*.

In addition, the existing site area is a predominantly impermeable surface with no existing reduction in discharge. The proposed development provides well-designed Sustainable Drainage Systems (SuDS), Consequently, significantly reducing the effective drained area of the proposed site area compared to its current state, and mitigating pluvial flood risk within the site and downstream receptors.

A possible source of flood risk from the surcharging or blockage of the development's drainage systems has been identified. This risk is mitigated by suitable design of the drainage network, regular maintenance and inspection of the network and establishment of exceedance overland flow routes.

It is therefore concluded that:

- The development proposed is appropriate for the Site's flood zone category
- The Planning System and Flood Risk Management Guidelines Sequential Approach is met and the 'Avoid' principal achieved
- A Justification Test is not required

# 6 Consultation and Engagement with DLRCC and TII

## 6.1 DLRCC Internal Circulations

Various internal departments within Dún Laoghaire-Rathdown County Council (DLRCC) were consulted in relation to the development of the New Public Realm and Plaza East and North of Waldemar Terrace.

As part of the internal consultation process, DLRCC departments were consulted at two key stages of the design development. The first internal circulation was undertaken at the initial concept design stage, allowing departments to provide early feedback and identify key considerations to inform the progression of the scheme. A second internal circulation was undertaken once the design had been developed further, providing an opportunity for departments to review the more detailed preliminary design proposals and provide additional technical comments.

## 6.2 Engagement with TII

Transport Infrastructure Ireland (TII) was consulted during the development of the scheme. A Draft Part 8 Pack was issued to TII for review, with particular regard to the proximity of the proposed works to the Luas infrastructure and Dundrum Luas Stop.

TII provided observations highlighting the need to ensure the continued safe and efficient operation of Luas during and after construction, including maintaining access to Luas infrastructure, protecting the operation of the stop and lift, and obtaining the necessary permits and agreements in advance of construction.

In response, the Preliminary Construction and Environmental Management Plan (pCEMP) was updated to include specific reference to Luas and the associated protection and access requirements.

Further engagement with TII and the Luas operator will be undertaken during the detailed design stage to review the proposed arrangements, address any outstanding requirements and agree any necessary permits or agreements in advance of construction.

# 7 Environmental Assessment & Planning Report

## 7.1 Introduction

This section summarises the environmental assessments undertaken in support of the proposed New Public Realm and Plaza East and North of Waldemar Terrace.

## 7.2 EIA Screening

The Environmental Impact Assessment (EIA) Screening Report has been prepared by JBA Consulting on behalf of Dún Laoghaire-Rathdown County Council (the applicant) in relation to the New Public Realm and Plaza East and North of Waldemar Terrace. The aim of the EIA screening report is to assess the potential environmental impacts of the proposed scheme. The EIA screening assesses the proposed scheme with reference to the relevant EIA legislation including the EIA Directive, Planning and Development Regulations, the Roads Act and Regulations. The methodology has particular regard to the '3-step' assessment process set out on the Office of the Planning Regulator (OPR) Environmental Impact Assessment Screening Practice Note PN02 (June 2021). Regard is also had to the European and National guidance documents.

The consideration of potential impacts covers all significant direct, indirect and secondary impacts as relevant having regard to the criteria for determining whether development listed in Part 2 of Schedule 5 should be subject to an environmental impact assessment under Schedule 7 of the Planning and Development Regulations, 2001 to 2018.

Having regard to the proposed development which is considered not of a nature specified in either Part 1 or Part 2 of Schedule or considered as a development type subject to mandatory EIAR under the Planning and Development Act 2000 the criteria in Schedule 7, the information provided in accordance with Schedule 7A of the Planning and Development Regulations 2001-2018, as amended and as follows;

- The scale, nature and location of the proposed impacts
- The potential impacts and proposed mitigation measures
- The results of the any other relevant assessment of the effects on the environment

The conclusions of the EIA indicate that the characteristics of the proposed development, the location of the proposed development and the potential impact of the proposed developed are not considered to significantly impact the environment. It was found that any impacts that this development will cause will be temporary, only during the construction phase and easily mitigated.

Once operational, the proposed development will be low in environmental impact. The proposed development will create better green infrastructure, supporting the community in the local area. Local businesses, services and residents will benefit from the positive impacts on visual and landscape characteristics that the proposed development will provide.

Overall, it was concluded that the proposed development will not have significant or cumulative effects on Designated Sites within a 5km radius. Therefore, an Environmental Impact Assessment Report is not required.

## 7.3 AA Screening

The Screening for Appropriate Assessment report has been prepared by JBA Consulting on behalf of Dún Laoghaire-Rathdown County Council (DLRCC, the applicant), regarding the New Public Realm and Plaza East and North of Waldemar Terrace.

Screening for AA is required under Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (the Habitats Directive). The AA Screening Report was prepared in accordance with the European Commission's Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites: Methodological Guidance on the provisions of Article 6(3) and 6(4) of the Habitats Directive 92/43/EEC (EC, 2018) as well as the Department of the Environment's Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (DoEHLG, 2010).

It was concluded that the proposed development, either individually or in combination with other plans or projects, and without relying on any mitigation measures, is not likely to have significant effect on any European Sites, in view of each sites' conservation objectives, and thus that a Stage Two Appropriate Assessment is not required.

## 7.4 EcIA Screening

The Ecological Impact Assessment (EcIA) report has been prepared by JBA Consulting on behalf of Dún Laoghaire-Rathdown County Council (DLRCC, the applicant), regarding the New Public Realm and Plaza East and North of Waldemar Terrace. The EcIA investigated the potential impacts the development could have on key ecological features, including Annex I habitats and Annex II species under the EU Habitats Directive. Locally important habitat and species were also considered.

A number of appropriate mitigating and enhancement measures are identified in the EcIA to counteract any minor effects on biodiversity as a result of the proposed development.

# 8 Conclusion

This report supports the Part 8 planning application for the proposed New Public Realm and Plaza East and North of Waldemar Terrace. The proposed development will transform the existing area beneath and surrounding the William Dargan Bridge into a high-quality, pedestrian-priority civic space that enhances connectivity, accessibility and the overall public realm within Dundrum Village.

The proposed scheme has been developed through an iterative design process, informed by ongoing engagement with Dún Laoghaire-Rathdown County Council. Throughout the preliminary design stage, the layout has been refined to improve pedestrian movement, strengthen connections with the surrounding streets and public transport network, provide high-quality public spaces and seating areas, enhance the setting of the Usher Monument, and accommodate the operational requirements of emergency, maintenance and servicing vehicles.

The scheme has been designed to integrate with both existing infrastructure and future projects within the area, including the Living Streets proposals and the future Taney Cross Junction Upgrade, ensuring that it forms part of a coordinated long-term vision for Dundrum Village.

The proposed public realm incorporates new landscaping, planting, Sustainable Drainage Systems (SuDS), public lighting, cycle parking facilities and a mobility hub, creating a flexible civic space capable of supporting everyday activity as well as markets, community events and informal recreation.

A comprehensive review of the environmental and technical considerations associated with the scheme has been undertaken as part of the preliminary design process. The findings of the supporting environmental assessments demonstrate that the proposed development can be delivered without significant adverse effects, subject to the implementation of the recommended mitigation measures where applicable.

Overall, the proposed New Public Realm and Plaza East and North of Waldemar Terrace represents a significant enhancement to the public realm within Dundrum Village, providing a safe, accessible and attractive space that supports sustainable travel, encourages social interaction and contributes to the long-term regeneration of the area.

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NSAI Certified

HEALTH & SAFETY
ISO 45001:2018
NSAI Certified

QUALITY
I.S. EN ISO 9001:2015
NSAI Certified

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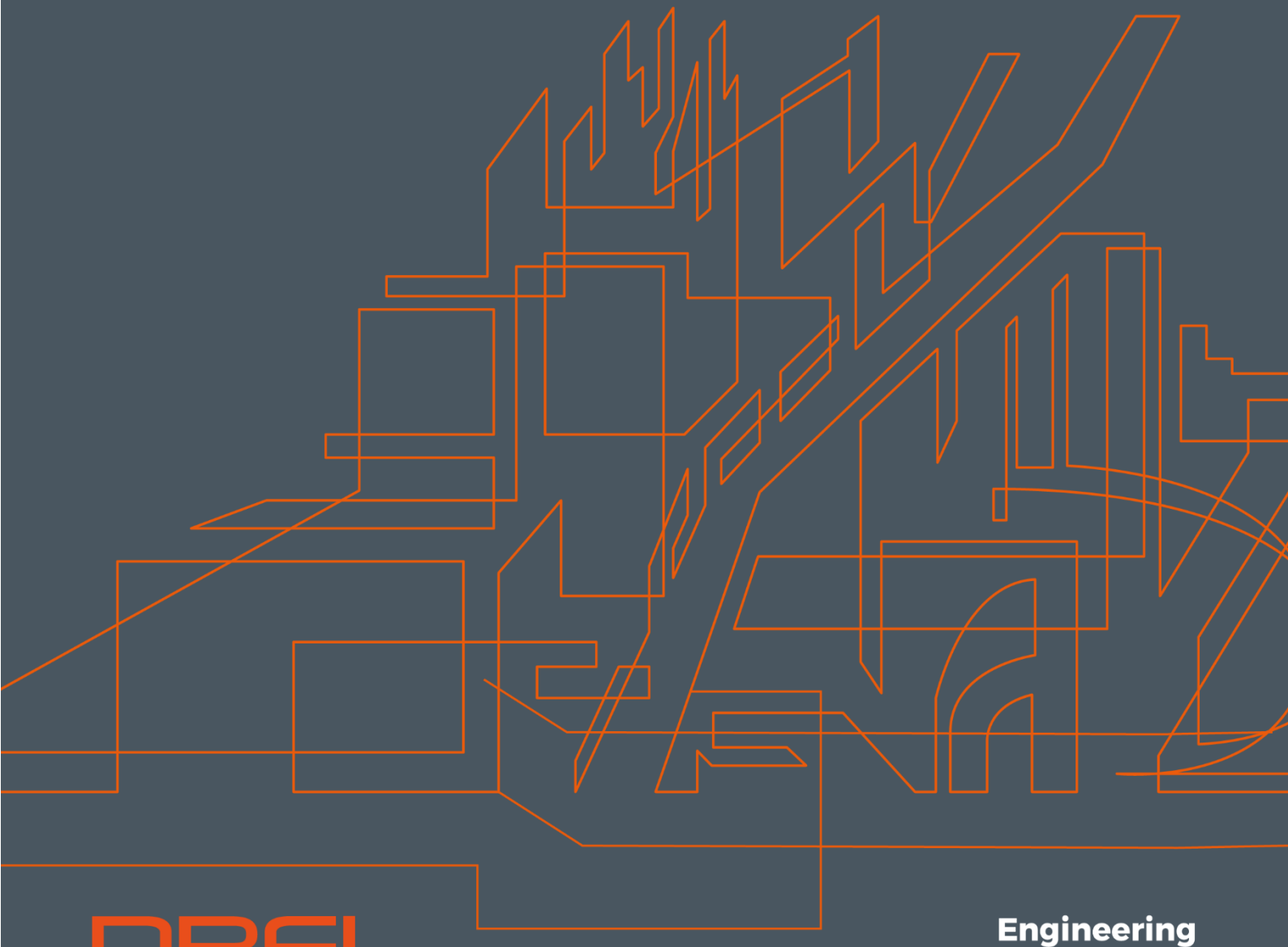
# New Public Realm and Plaza East and North of Waldemar Terrace

## Site-Specific Flood Risk Assessment

260051-X-00-X-XXX-RP-DBFL-CE-003

**November 2026**



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|---|---|---|---|
| Project Title: | **New Public Realm and Plaza East and North of Waldemar Terrace** | | |
| Document Title: | **Site-Specific Flood Risk Assessment** | | |
| File Ref: | **260051-X-00-X-XXX-RP-DBFL-CE-003** | | |
| Status: | **P3 - Planning** | Rev: | **2** |
| | **S - Issued** | | |

| Status | Rev. | Date | Description | Prepared | Reviewed | Approved |
|---|---|---|---|---|---|---|
| P1 | 0 | 31/07/26 | Preliminary Review | Gráinne Grogan | Grant Humphrey | Grant Humphrey |
| P1 | 1 | 15/09/26 | Round 2 Comments | Gráinne Grogan | Grant Humphrey | Grant Humphrey |
| P3 | 2 | 13/11/26 | Part 8 Issue | Gráinne Grogan | Grant Humphrey | Grant Humphrey |

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# 1 Introduction

## 1.1 Background

DBFL Consulting Engineers (DBFL) have been commissioned by Dún Laoghaire-Rathdown County Council (DLRCC) to prepare a Site-Specific Flood Risk Assessment (SSFRA) for the proposed works to be carried out at Taney Cross, Dundrum Co. Dublin. Dundrum, known as "New Public Realm and Plaza East and North of Waldemar Terrace".

The overall purpose of the scheme is to transform an under-utilised urban area by providing safe and attractive facilities for pedestrians and cyclists through the delivery of junction upgrades, improving existing infrastructure, and enhancing facilities that support sustainable modes of transport in Dundrum while prioritising safety, accessibility and the environment.

## 1.2 Location

The subject site, circa 0.3ha, is located at the intersection of the R122 and R117 in Dundrum, Co. Dublin beneath the William Dargan Bridge. The scheme is located close to the Green LUAS line that runs directly above the site location and stops at the Dundrum LUAS stop on the William Dargan Bridge.

The proposed site is located near multiple adjacent schemes including the Taney Cross Junction Redesign, Dundrum Living Streets, Dundrum Bus layover & Bus Gate and DLR Connector. Coordination with adjacent schemes will be necessary throughout the public realm scheme.

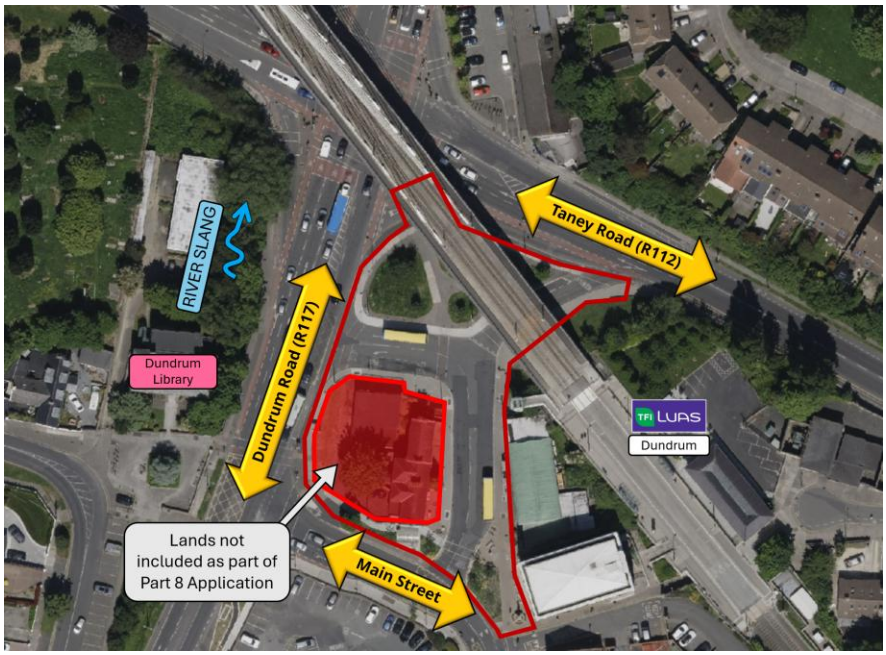



*Figure 1-1: Proposed Scheme Site (Source: DLAP 23)*

## 1.3 Objectives

This report aims to inform the Planning Authority of the flood risk associated with the proposed development of the subject site. The report will assess the site and the development proposal in accordance with the requirements of 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities' and requirements imposed within the by Dun Laoghaire-Rathdown County Development Plan (2022-2028).

The report will provide the following:

- Confirmation of the site's flood zone category.
- Information to support an informed decision on the planning application in the context of flood risk.
- Appropriate flood risk mitigation and management measures for residual flood risk.

## 1.4 Flood Risk Assessment Scope

This SSFRA related only to the application site and utilises the information obtained from various sources, together with an assessment of flood risk for the existing land and proposed development. The report follows the requirements of 'The Planning System and Flood Risk Management – Guidelines for Planning Authorities', referred to as 'The Guidelines' for the remainder of this report.

## 1.5 Approach

- Chapter 1: This chapter considers 'The Guidelines' as they relate to the proposed application.
- Chapter 2: Flood risk assessment
- Chapter 3: Initial (non-quantitative) flood risk assessment
- Chapter 4: Detailed (quantitative) flood risk assessment
- Chapter 5: Justification Test
- Chapter 6: Summary and conclusion of Site-Specific Flood Risk Assessment (SSFRA)

## 1.6 Existing Site

The existing site is a public realm facility with serves two bus stops, no. 6041 and no. 2825, serving Bus numbers 74, 14, and 44D operated by Dublin Bus as well as the 750 which is operated by Dublin Coach service.

Access through the space is restricted to buses and cycles only, i.e. general traffic is not permitted to enter from the R112 or R117.

Buses can enter and exit from the R117 to the west of the site as well as Main Street to the south and can enter only from the R112 to the north of the site.

A controlled pedestrian crossing over the left turn slip lane at the junction provides access into the existing public realm space along with dropped kerbs and tactile paving.

Pedestrian footpaths outline the perimeter of the site as well as the perimeter of Waldemar Terrace and the current green area beneath the William Dargan Bridge. The footpath to the north of the proposed scheme runs adjacent to the cycle lane on the R112

The footpath to the east of the public realm, that connects the R112 and Main Street, provides access to the Dundrum Luas stop elevator, bus shelters for the bus lay-by as well as access to Usher House.

There are currently two bike parking areas in the existing site.




*Figure 1-2 : Google Street View of New Public Realm and Plaza East and North of Waldemar Terrace viewed from Taney Road (R112)*

## 1.7 Topography

The overall topography of the site falls to a local low point located at the south-west of the site along Dundrum Road.

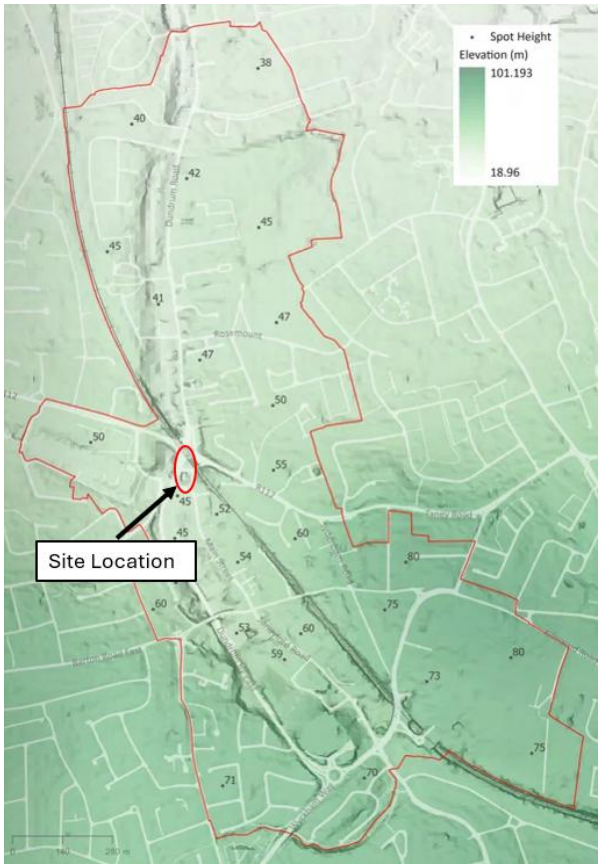



*Figure 1-3: Topography of Dundrum LAP lands from Dundrum Local Area Plan 2023*

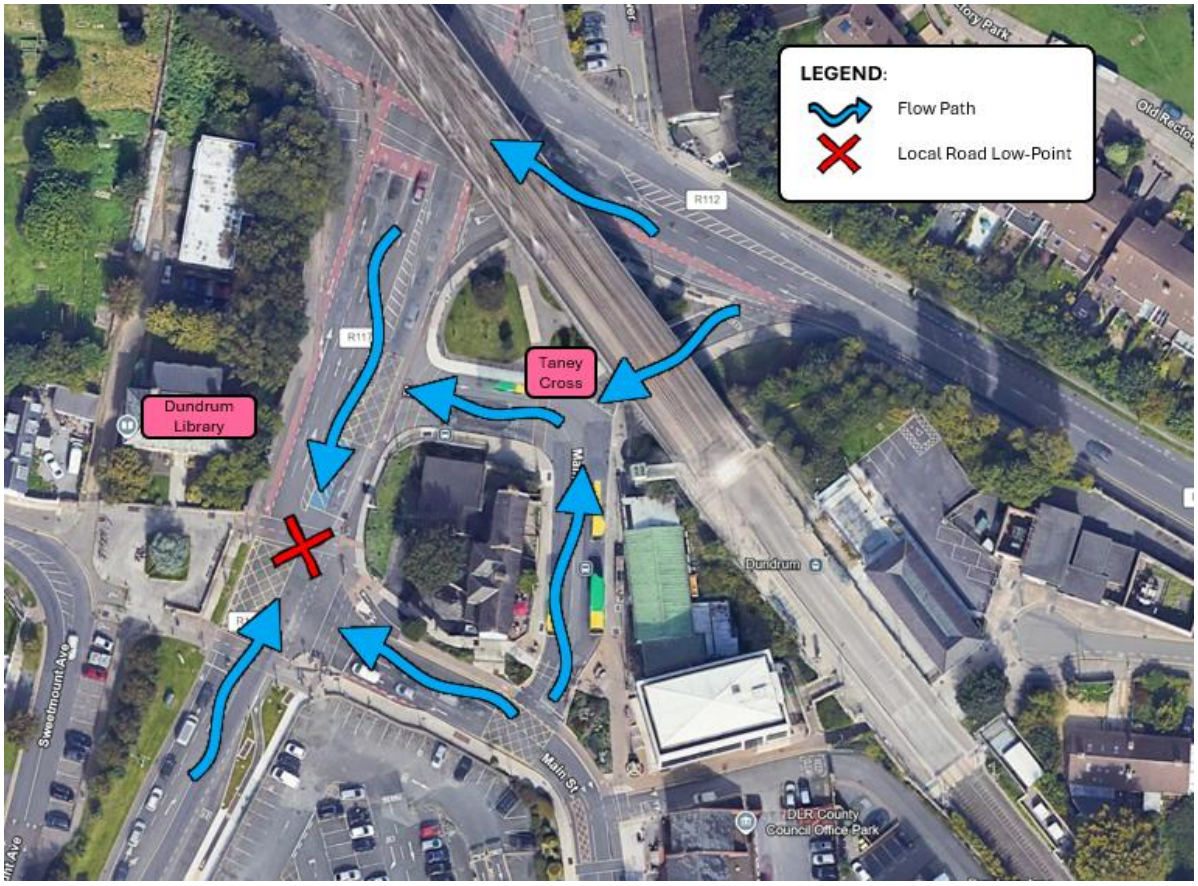



*Figure 1-4: Existing Flow Paths*

## 1.8 Existing Surface Water Network

The existing is site is currently a localised undeveloped urban area of predominantly hardstanding area consisting of asphalt road surfacing and concrete footpaths.

The existing surface water network is shown in Figure 1-5, upon review of both DLRCC records and review of the utilities survey undertaken by Apex Surveys.

There are isolated informal green areas within the site area, but in it's current state, holds minimal ecological value, and limited ability to reduce peak storm flows. The site is generally drained through a combination of typical road gulleys. There is a large Ø750mm surface water outfall transversing through the site, with multiple smaller connections, the outfall discharges into the River Slang, to the west of the development.

Upstream of the River Slang, is the culverted realignment of the stream, which enabled the construction of the Dundrum Bypass Road (R117) The culvert system is known for flow constraint issues, further discussed within this Report.

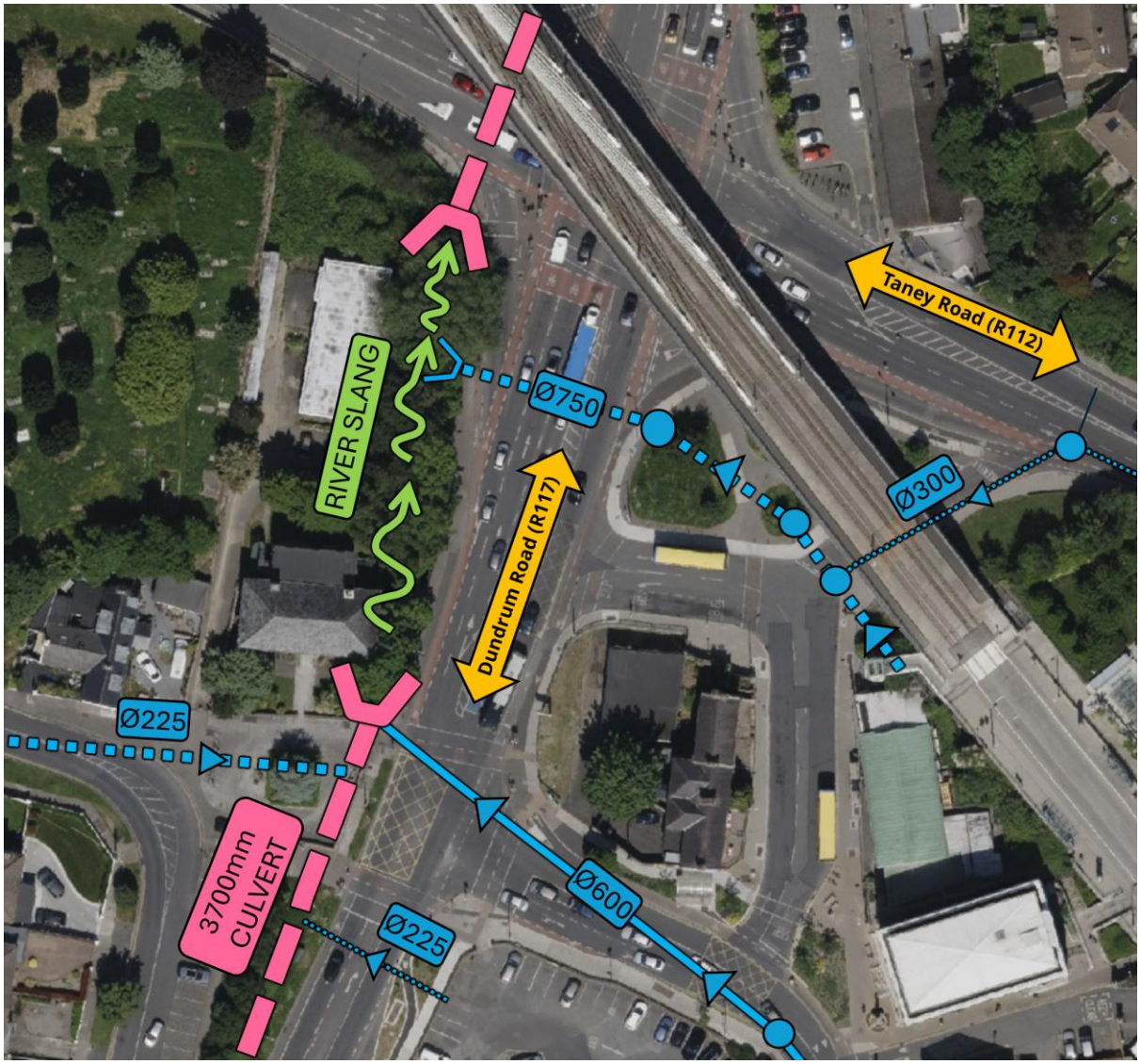



*Figure 1-5: Existing Surface Water Network*

## 1.9 Proposed Development

The New Public Realm and Plaza East and North of Waldemar Terrace scheme has been identified by DLRCC as an area with potential to function as a new civic space. The principle aims and objectives of the proposed development, in accordance with the overarching purpose and scope, are to:

- Create a high quality, inclusive and multifunctional civic space that supports a wide range of community, cultural and social activities.
- Transform an under-utilised urban area into a vibrant and distinctive place with a strong sense of identity, while recognising and conserving the area's cultural heritage, including the Usher Monument and other local historical features.

- Enhance connectivity and permeability, particularly between Main Street North and South, and improve access to the Dundrum LUAS stop, and adjacent schemes in the area.
- Prioritise active travel and sustainable movement, encouraging walking, cycling and reduced car dependency.
- Provide a safe, accessible and universally designed environment for all users.
- Enhance urban greening, biodiversity and climate resilience, supporting wider environmental and climate action objectives.

General arrangement of the proposed scheme is illustrated below.




*Figure 1-6: Proposed scheme - General Arrangement*

# 2 Flood Risk Assessment Guidelines and Strategy

## 2.1 Planning System & Flood Risk Management Guidelines

### 2.1.1 General

The Guidelines and their associated Technical Appendices outline the requirements for a Site-Specific Flood Risk Assessment.

The proposed public realm scheme would generally be classified as classified as a 'water-compatible development' according to Table 3.1 of the Guidelines shown below in Figure 2-1. Table 3.2 of the Guidelines shown in Figure 2-2. Below indicates that the Sequential Approach mechanism requires this type of development to be located within Flood Zones B or C, where the probability of flooding from rivers and the sea is moderate (between 0.1% or 1 in 1000 and 1% or 1 in 100 for river flooding and between 0.1% or 1 in 1000 year and 0.5% or 1 in 200 for coastal flooding).

| Vulnerability class | Land uses and types of development which include*: |
|---|---|
| **Highly vulnerable development (including essential infrastructure)** | Garda, ambulance and fire stations and command centres required to be operational during flooding;<br>Hospitals;<br>Emergency access and egress points;<br>Schools;<br>Dwelling houses, student halls of residence and hostels;<br>Residential institutions such as residential care homes, children's homes and social services homes;<br>Caravans and mobile home parks;<br>Dwelling houses designed, constructed or adapted for the elderly or, other people with impaired mobility; and<br>Essential infrastructure, such as primary transport and utilities distribution, including electricity generating power stations and sub-stations, water and sewage treatment, and potential significant sources of pollution (SEVESO sites, IPPC sites, etc.) in the event of flooding. |
| **Less vulnerable development** | Buildings used for: retail, leisure, warehousing, commercial, industrial and non-residential institutions;<br>Land and buildings used for holiday or short-let caravans and camping, subject to specific warning and evacuation plans;<br>Land and buildings used for agriculture and forestry;<br>Waste treatment (except landfill and hazardous waste);<br>Mineral working and processing; and<br>Local transport infrastructure. |
| **Water-compatible development** | Flood control infrastructure;<br>Docks, marinas and wharves;<br>Navigation facilities;<br>Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location;<br>Water-based recreation and tourism (excluding sleeping accommodation);<br>Lifeguard and coastguard stations;<br>Amenity open space, outdoor sports and recreation and essential facilities such as changing rooms; and<br>Essential ancillary sleeping or residential accommodation for staff required by uses in this category (subject to a specific warning and evacuation plan). |
| *Uses not listed here should be considered on their own merits | |

*Figure 2-1: Vulnerability Class for a new public realm at Taney Cross, Dundrum*

| | Flood Zone A | Flood Zone B | Flood Zone C |
|---|---|---|---|
| Highly vulnerable development (including essential infrastructure) | Justification Test | Justification Test | Appropriate |
| Less vulnerable development | Justification Test | Appropriate | Appropriate |
| Water-compatible development | Appropriate | Appropriate | Appropriate |

*Figure 2-2: Criteria for the Requirement for a Justification Test*

### 2.1.2 Flood Risk Assessment Stages

This Site-Specific Flood Risk Assessment will initially use existing available flood risk information to determine the flood zone category of the subject site and to confirm the application of Sequential Approach in accordance with the Guidelines. Refer to Figure 2-3 for details.

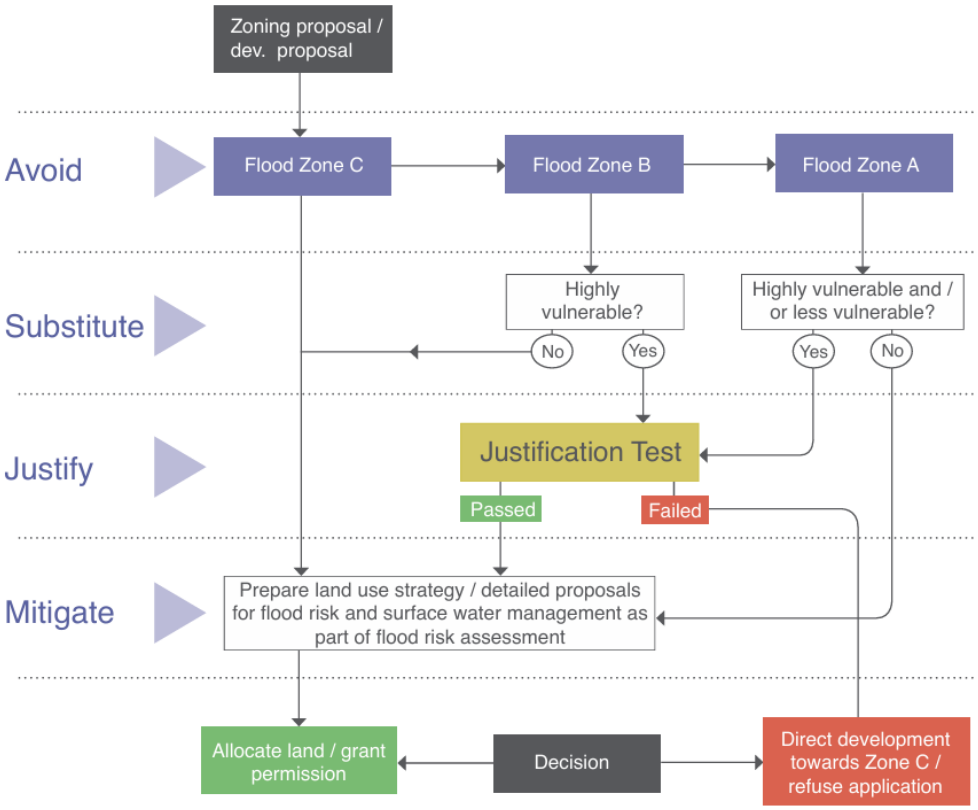



*Figure 2-3: Sequential Approach mechanism in the Planning Process*

Flood risk is normally assessed by a flood risk identification stage followed by an initial flood risk assessment. A more detailed flood risk assessment stage then follows which includes an assessment of surface water management, flood risk and mitigation measures to be applied. The following report sections outline the flood risk assessment stages for the proposed development which follow the requirements of the Guidelines' Technical Appendices.

### 2.1.3 Dún Laoghaire-Rathdown Development Plan

The scheme incorporates land zoned under objective MTC by Dun Laoghaire-Rathdown County Development Plan (2022-2028), as part of the development plan, The Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (DLR SFRA) has indicated strategic approaches specific to the zoning objective, MTC, in which only less-vulnerable developments would require justification tests if located within Zone A. However, the DLR SFRA has indicated that proposed developments categorised as "water-compatible developments" would still need to provide an appropriately detailed flood risk assessment is required consider mitigation measures such as development layout and finished floor levels, access, egress and emergency plans. In Addition, Climate change and other residual risks should also be considered within the SSFRA.

The SFRA has suggested the incorporation of Nature-based measures implemented on a site-specific basis as part of a landscaping or green infrastructure plan to control flooding by providing focus on the use of porous surfaces in developments (Sustainable Urban Drainage Systems or SUDS) and planting of native vegetation communities/assemblages that are tolerant of both wet and dry conditions.

The DLRCC Dundrum Local Area Plan also states that any development within the site area shall demonstrate that development of the site does not contribute to worsening of flood risk outside the site through the preparation of a Site-Specific Flood Risk Assessment (SSFRA).

# 3 Stage 1: Flood Risk Identification

## 3.1 General

The initial flood risk identification stage uses existing information to identify and confirm whether there may be flooding or surface water management issues for the site that may warrant further investigation.

## 3.2 Available Flood Risk Information

The available flood risk information and data sources for the subject site and surrounding area that were consulted are listed below in Table 3-1

*Table 3-1: Information Sources Consulted*

| | Information Source | Coverage | Quality | Confidence | Identified Flood Risks | Flood Risk |
|---|---|---|---|---|---|---|
| Primary Data Sources & Modelled Data | OPW CFRAM Fluvial Maps | Regional | High | High | Flood maps indicate that the majority of the development works and site extents are outside the 0.1% AEP flood extents. The southeast corner of the site is shown as being within the 0.1% and 1% AEP flood extents. | ✓ |
| | OPW CFRAM Tidal Maps | Regional | High | High | Flood map indicates the site to be outside the 0.1% AEP event coastal flood zone. | ✘ |
| | Irish Costal Protection Strategy Study (ICPSS) | Nationwide | High | High | Flood maps indicates that the development site is beyond 0.1% AEP event. | ✘ |

| | | | | | | |
|---|---|---|---|---|---|---|
| | DLRCC Development Plan Strategic Flood Risk Assessment (SFRA) | Local | High | High | Flood risk at the natural low spot near the existing Dundrum Library | ✓ |
| | DLRCC Dundrum ICM 2020 Study | Local | High | High | 0.1% Flood Depths modelled within Site | ✓ |
| **Secondary Data Sources** | OPW Historic | Nationwide | Varies | Varies | No records of flooding on site | ✗ |
| | Historic OSI Maps | Nationwide | Moderate | Low | No records of flooding on site | ✗ |
| | EPA Streams | Nationwide | Moderate | Moderate | River Slang flows near site | ✓ |
| | Drainage Records | County | Moderate | Moderate | Trunk 750mm diameter Uisce Éireann surface water pipe running through the site. | ✗ |
| | Geological Survey Ireland Maps | Nationwide | Moderate | Low | Made Ground | ✗ |

## 3.3 Identified Flood Risks/ Flood Sources

### 3.3.1 OPW Predicative, Historic & Benefiting Lands Maps & Flood Hazard Information

A review of the OPW website indicates that the site has not experienced any flooding in the past. The flood history report identifies 14 flood events within a 2.5km radius of the site since 2000; however, none of these flood events were identified as having caused flooding within the subject development lands. Based on the flood report, the nearest recorded flood events, are shown in Figure 3-1.

The most significant recent flood event occurred in October 2011 (Flood ID-11720), when a blockage in a culvert upstream on the River Slang caused water levels to rise and overtop the channel resulting in substantial overland flow, and flooding within Dundrum Town Centre. The ground floor of Dundrum shopping centre, the Red Car park and some ground floor apartments were flooded. Floodwaters flowed down Sandyford Road to Taney Cross and flooded Taney Crossroads. Dundrum Library located near the subject site did not experience flooding during this event; however, ponding was recorded adjacent to the building due to the presence of a local low spot. Past Flood Record Report is provided in Appendix A.

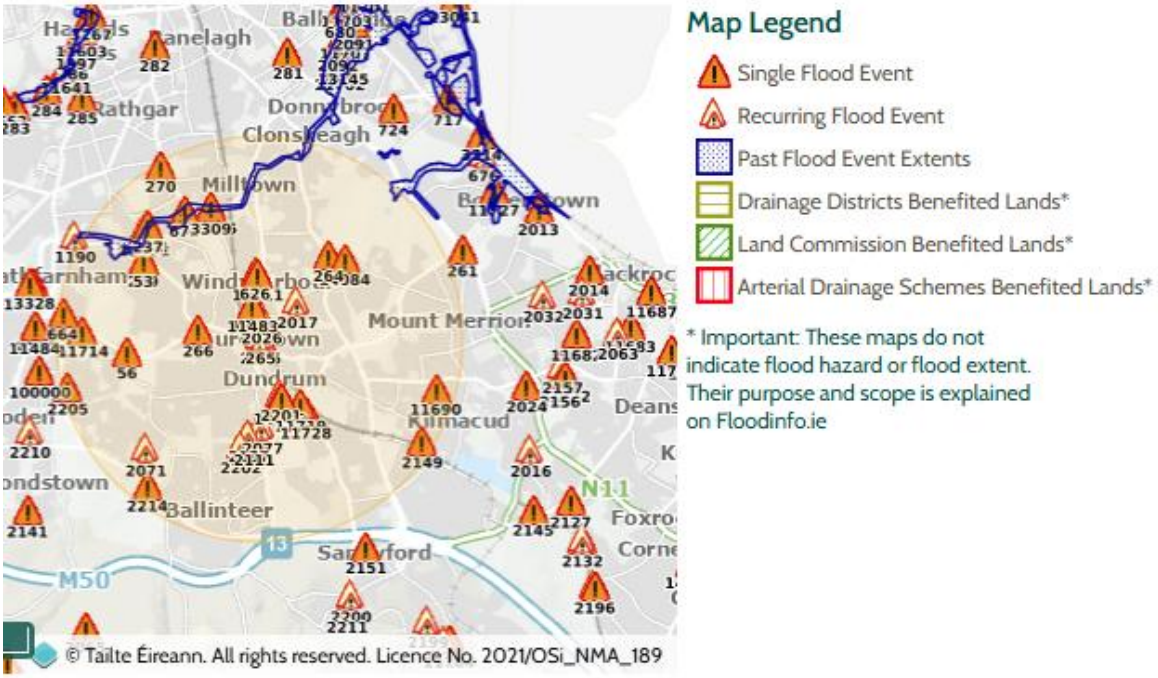



*Figure 3-1: Past Flood Events Within 2.5km of the subject site*

### 3.3.2 Fluvial Flooding Risk

As part of the EU Floods Directive, the OPW is undertaking a Catchment Flood Risk Assessment and Management (CFRAM) Study. An initial part of this Study was a national Preliminary Flood Risk Assessment (PFRA) to identify areas at risk of significant flooding. The PFRA report and maps identify areas deemed to be at risk of flooding (referred to as Areas for Further Assessment, or 'AFAs'), as they require more detailed assessment on the extent and degree of flood risk by the later CFRAM Studies. Unfortunately, the information for this specific site area is under review following an error in the representation of watercourse around Dundrum Town Centre. The updated mapping is provided within the Dun Laoghaire-Rathdown County Council's Strategic Flood Risk Assessment

### 3.3.3 Tidal Flooding Risk

The OPW completed the Irish Coastal Protection Strategy Study (ICPSS) in 2013, which provides strategic current scenario and future scenario (up to 2100) coastal flood hazard maps and strategic coastal erosion maps for the national coastline. The OPW undertook a National Coastal Flood Hazard Mapping (NCFHM) project in 2021, which aim was to produce updated national scale coastal flood extent and depth maps for various AEP events. The subject site is outside the extents of the mapped coastal/tidal flood zones identified in these studies, and, therefore, will not be considered further in terms of flood risk. The subject site is approximately 4km from the coast.

### 3.3.4 Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (2016-2022)

JBA Consulting was appointed by DLRCC in 2016 to prepare a Stage 3 Flood Risk Assessment (FRA) for the lower Dundrum MTC lands (Mixed Town Centre) in support of overall Strategic Flood Risk Assessment provided within Appendix 13 of the DLRCC Development Plan 2016-2022. In addition, JBA consulting has produced a Stage 3 Flood Risk Assessment on the proposed Dundrum MTC lands that considers flood risks specific to 3 land zone objective areas which are adjacent to the Main Street Scheme, namely,

- **Site 1:** Phase Two lands at Dundrum Shopping Centre
- **Site 2:** Dundrum Library Site
- **Site 3:** Site opposite the Library (referred as the 'Gym' site)

Refer to Figure 3-2 for the full flood map that indicates that a portion on the south-westerly area of the subject site is between the 0.1% and 1% AEP flood events (Flood Zone B) with noted limited areas located within the1% AEP flood events, i.e. Flood Zone A.

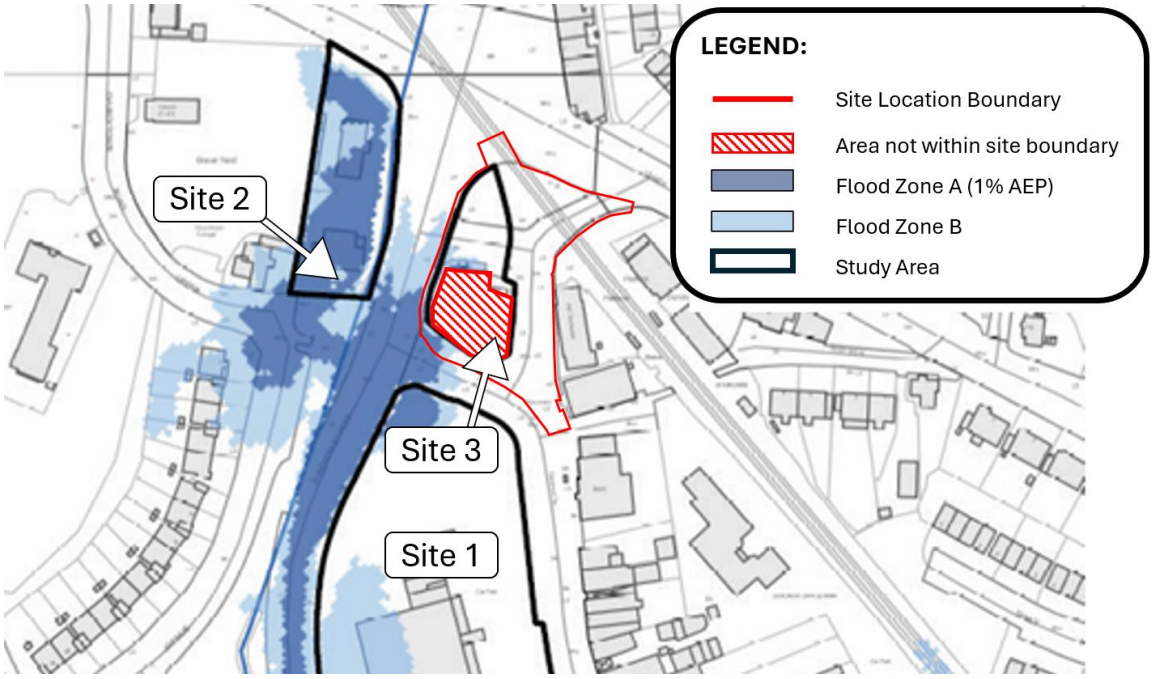



*Figure 3-2: River Slang Flood Risk Map (DLRCC SSFRA 2016-2022)*

### 3.3.5 Integrated Catchment Model (ICM) of the River Slang catchment

In 2020 DLRCC also commissioned Nicholas O'Dwyer and Black & Veatch to develop and verify an Integrated Catchment Model (ICM) of the River Slang catchment. The model incorporates both the surface water network and the open watercourse within the catchment. Fluvial and pluvial flood maps have been prepared for Dundrum along with modelled water levels of the 10% AEP, 1% AEP and 0.1% AEP flood events at a number of nodes upstream and downstream of the site area. The node locations are indicated in Figure 3-3.

One of these nodes, SL15, is located adjacent to, but outside, the subject site. The predicted water levels at this location are 42.86m OD, 43.79m OD and 45.21m OD for the 10%, 1% and 0.1% AEP flooding events respectively as seen in Table 3-2. The existing ground level at the SL15 node location is approximately 45.04m OD, indicating that the modelled 0.1% AEP water level exceeds this level. There is a cycle lane within the south-western portion of the site with a minimum existing ground level of approximately 44.95m OD, which is below the modelled 0.1% AEP water level at SL15.

The modelled levels are supported by the River Slang ICM fluvial flood mapping (Figure 3-3), which indicates that only a small area of the south-western portion of the site is potentially affected during the 0.1% AEP flood event. The remainder of the site lie outside the at-risk area. As a result, the site is considered to be at a low risk of fluvial flooding, with any potential flooding events confined to a limited area along the south-western part of the site.

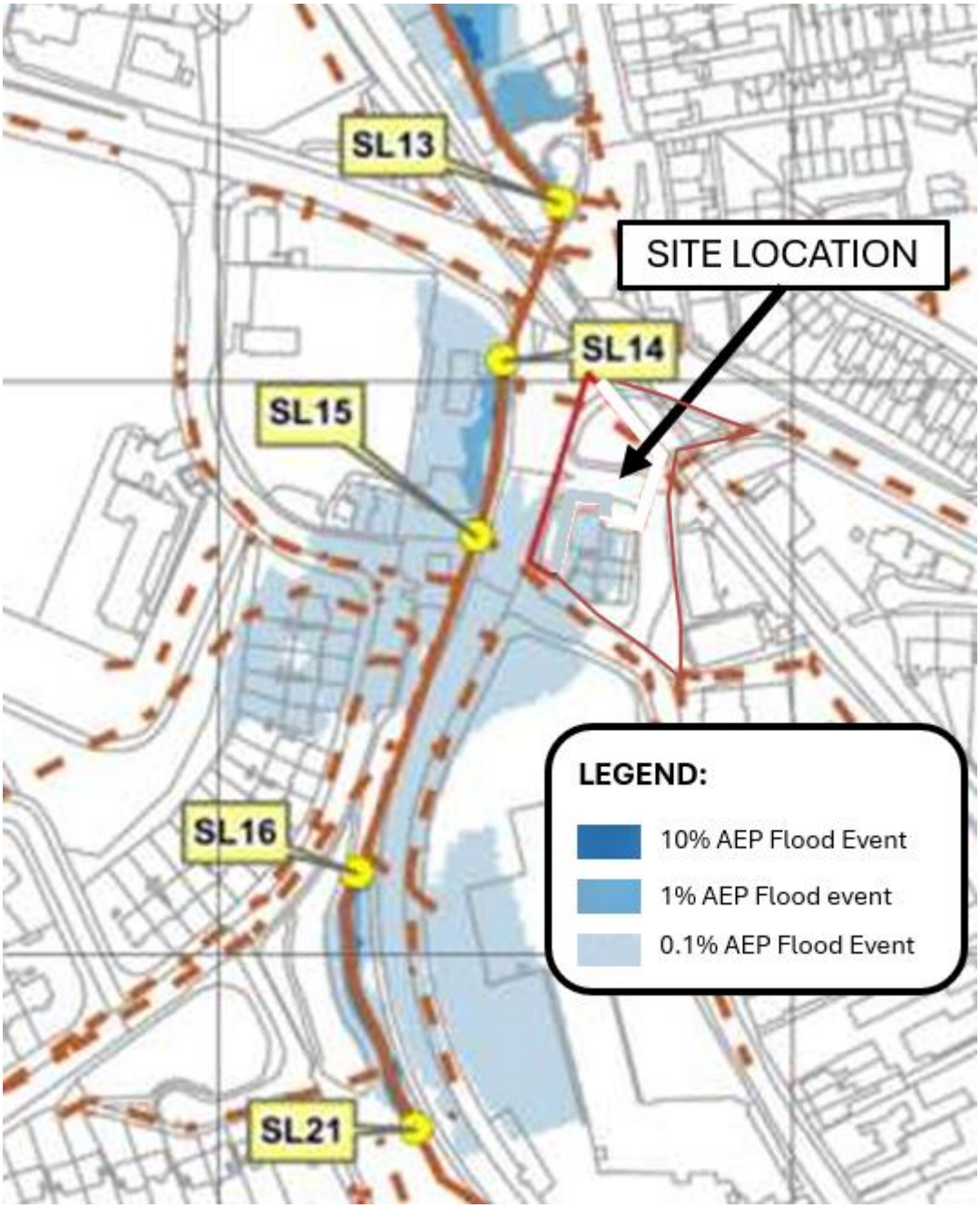



*Figure 3-3: River Slang (Dundrum) Integrated Catchment Model Fluvial Flood Map showing location of node SL15, from DLRCC FRA Report 2022*

*Table 3-2: Water Levels extracted from River Slang (Dundrum) Integrated Catchment Model (Fluvial), from DLRCC FRA Report 2022*

| Node Label | Water Level (OD) 10% AEP | Water Level (OD) 1% AEP | Water Level (OD) 0.1% AEP |
|---|---|---|---|
| SL21 | 44.58 | 44.94 | 45.68 |
| SL16 | 42.97 | 44.10 | 45.60 |
| SL15 | 42.86 | 43.79 | 45.21 |
| SL14 | 42.52 | 43.43 | 44.97 |
| SL13 | 42.30 | 42.94 | 43.53 |

#### 3.3.5.1 Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (2022 - 2028)

Following the Stage 3 FRA of the Dundrum MTC lands, completed in support of the 2016–2022 Development Plan's Strategic Flood Risk Assessment, flood zone mapping was updated as part of the 2020 Dundrum Slang ICM Study, which generated fluvial, pluvial, and combined flood extents and provided a more detailed integrated catchment modelling assessment. The 2020 Study was used to provide the majority of the baseline data for the DLRCC Strategic Flood Risk Assessment, as part of the current DLRCC Development Plan 2022-2028. An extract of the current DLR SFRA Flood Map is provided in Figure 3-4, full map is provided in Appendix A, in which the flooding extents have been greatly reduced within the scheme, removing Flood Zone A extents entirely, and significantly reducing the extent of Flood Zone B. The majority of the scheme is now located within Flood Zone C.

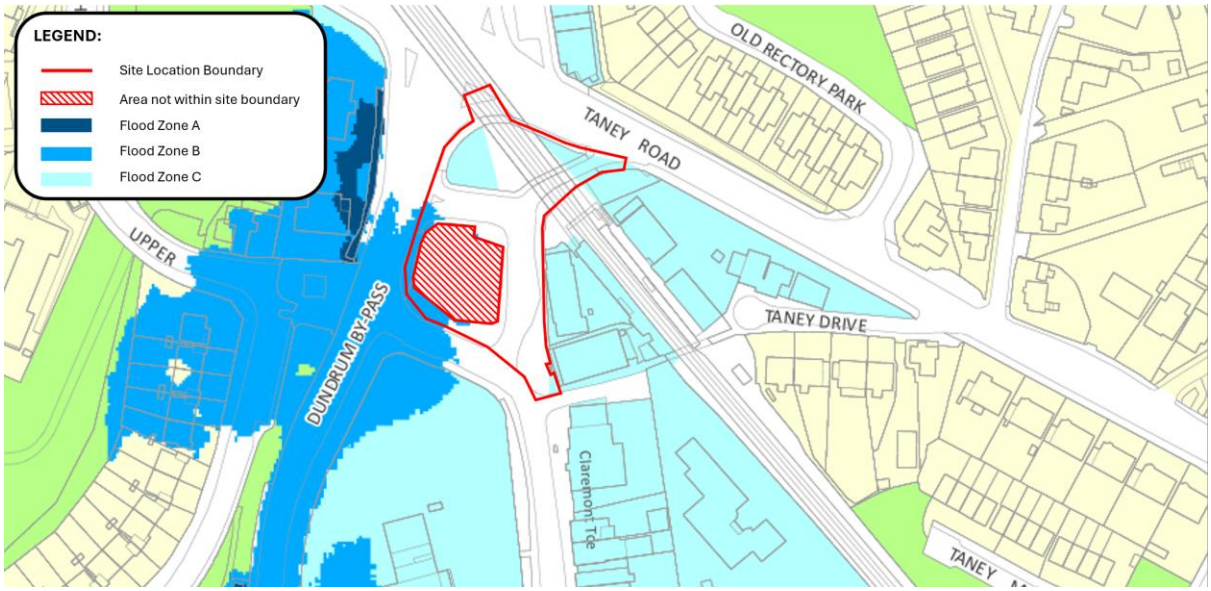



*Figure 3-4: Dundrum Slang Flood Map: DLRCC Development Plan 2022-2028: Appendix 15: SFRA*

### 3.3.6 Pluvial Flooding Risk

Pluvial flooding results from rainfall-generated runoff flowing over the ground surface before it can enter a drainage system. Due to the highly urbanised nature of the River Slang catchment, pluvial and fluvial flooding mechanisms are closely linked

The Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (DLR SFRA) has indicated that the modelled water levels continue to be sensitive to model parameters and any ingress to Flood Zone B could increase flood risk to neighbouring properties.

The River Slang Integrated Catchment Model (ICM) indicates that only a limited area within the south-western portion of the site may be affected by pluvial flooding during extreme rainfall events, and the remainder of the site is at a low risk.

### 3.3.7 Dún Laoghaire-Rathdown Strategic Flood Risk Assessment

The Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (DLR SFRA) as

The extents of Flood Zone B indicate that areas may be particularly vulnerable to channel blockage, and sensitive to reductions in channel capacity and changes to overland flood flow paths.

The SFRA has suggested the incorporation of Nature-based measures implemented on a site-specific basis as part of a landscaping or green infrastructure plan to control flooding by providing focus on the use of porous surfaces in developments (Sustainable Urban Drainage Systems or SUDS) and planting of native vegetation communities/assemblages that are tolerant of both wet and dry conditions.

### 3.3.8 Other Sources

Additional information sources were consulted to identify any further potential flood risk to the subject site. These sources are listed in Table 3-3 below.

*Table 3-3: Other Sources Consulted*

| Source | Findings |
|---|---|
| Topographical surveys of the area | Local low points to the west along Dundrum Bypass (R117) |
| Flood defences information | Flood defence works have been completed along the Dodder beginning downstream where the river meets the sea. |

| | |
|---|---|
| | Works has been completed upstream from Ballsbridge as far as the Smurfit weirs to the standard of protection of an estimated 1% AEP (1 in 100 year) fluvial event. |
| Soil data from EPA and GSI | Subsoils identified as Made Ground. |
| Groundwater information from GSI | The Ground Survey Ireland (GSI) website is currently offline and should be available again by the end of August. However, some information was found from the Dundrum Community Centre Co. Dublin FRA.<br><br>No karst features have been identified near the proposed site or surrounding area. The underlying aquifer is classified as a poor aquifer, and no instances of groundwater flooding have been identified at the site. |
| Site Investigation Report | |
| Walkover survey | No evidence of flooding within the site. |
| Local information & DLRCOCO consultation | A detailed modelling assessment highlighted the vulnerability of the library and gym sites. As a result, development in these locations would be premature until a flood relief scheme is completed. It is important that the flow path and the capacity for storage on site is respected in any development proposal.<br><br>The gym site opposite the library failed the justification test. Meaning development would be premature until a catchment wide flood relief scheme is completed and |

| | |
|---|---|
| | development potential should be reassessed at that stage. |
| Historical maps | No evidence of flooding within the site. |
| Aerial maps | No evidence of flooding within the site. |

## 3.4 Source-Pathway-Receptor

A Source-Pathway-Receptor model has been developed to identify the potential sources of floodwater, receptors that may be affected (including the people, property, and infrastructure associated with the proposed development), and the pathways through which floodwater may spread during 0.1% AEP (1000-year) and 1% AEP (100-year) storms events. The analysis, summarised in Table 3-4 below, assesses the likelihood and magnitude of each flooding source, the performance and response of the associated pathways, and the resulting consequences for receptors in the context of the proposed development. The identified sources, pathways and receptors are assessed further in the following sections.

*Table 3-4: Source-Pathway-Receptor Analysis*

| Source | Pathway | Receptor | Likelihood | Consequence | Risk |
|---|---|---|---|---|---|
| **Tidal** | Tidal flooding from coast (approximately 4km away), with the site at minimum 43m AOD | Subject development | Remote | Low | Very Low |
| **Fluvial** | Flooding from surcharged Dundrum Slang River located very close to the subject site. | Subject development | Possible | Medium | Moderate |

| | | | | | |
|---|---|---|---|---|---|
| **Surface Water Drainage (Pluvial)** | Flooding from development's surcharging drainage systems | Subject development | Possible | Medium | Low |
| **Groundwater flooding** | Rising groundwater levels are considered unlikely due to the absence of recorded groundwater flooding and the presence of poor aquifer. | | | | |
| **Human or Mechanical Error (Pluvial)** | Inadequate conveyance capacity of existing structures in river causing flooding. | Areas of development draining to the surface water network | Possible | Medium | Low |

The Source-Pathway-Receptor model identified a potential risk of fluvial flooding from the Dundrum Slang River, and pluvial flooding associated with the proposed site drainage in the future.

In particular, surface water run-off from the site has the potential to pose a localised flood risk if the downstream drainage network and ditches are not designed and constructed in accordance with the regulations, including the Greater Dublin Strategic Drainage Study (GDSDS), and does not adequately account for flood exceedance events, defined as storm events greater than the 1% AEP, where the capacity of the drainage network may be exceeded.

## 3.5 Summary

In Summary, from the source-pathway-receptor model, the flood risks are as follows:

- The proposed development is considered to be at **negligible risk** from tidal flooding.

- There is a **moderate risk** of fluvial flooding as the subject site is in both Flood Zone B and C, with the majority of the site located in Flood Zone C.
- There is a **low risk** of pluvial flooding and infrastructure flooding with a potential for surcharge to occur during exceedance events and or in the event of blockage within the proposed drainage network, where a storm exceeds the drainage network's design capacity.

# 4 Stage 2: Flood Risk Assessment

## 4.1 Initial Fluvial Flood Risk Assessment (Construction Stage)

Flood Risk may be elevated during the construction stages of the development where the topsoil and made ground has been temporarily stripped and the rate of run-off increased. However, the construction phase is intended to be transient and short-term in nature, with moderate changes to the aspects of natural flow paths within the subject site, however these will be managed accordingly to mitigate potential risks.

## 4.2 Initial Pluvial Flood Risk Assessment (Operation Stage)

The Source-Pathway-Receptor model has identified that there could be potential for pluvial flood risk within the subject lands associated with future drainage networks serving the proposed development. These networks have potential to cause localised flooding unless they are designed in accordance with relevant standards (e.g. the GDSDS) and if they do not adequately account for flood exceedance events, such as storm periods greater than the 1% AEP.

The Source-Pathway-Receptor model also identified that effective operation and maintenance of the drainage system is essential to minimise the risk pluvial flooding arising from human or mechanical error, such as blockages.

As result, flood risk assessment shall consider pluvial flood risk in relation to the following;

- Proposed Surface Water Management measures.
- Flood Exceedance.
- Impact of proposals on flood risk to adjacent areas.
- Effects of climate change.
- Sustainable Urban Structure.
- Residual risks.
- Effectiveness of any flood mitigation measures.

### 4.2.1 Sustainable Surface Water Management

Please refer to Proposed Drainage Layout, 260051-X-0500-Z00-DTM-DR-DBFL-CE-1301 for drainage proposals. The scheme's strategy at it's core is intended as an exemplarily example of a Sustainable Drainage Retrofit Design.

All detailed design of the overall surface water management strategy for the scheme shall comply with the Greater Dublin Regional Code of Practice for Drainage Works and the requirements of

Appendix 7: Sustainable Drainage System Measures of the DLRCC County Development Plan 2022-2028 that includes policies and guidelines recommended within the Greater Dublin Strategic Drainage Study (GDSDS).

In accordance with the GDSDS it is proposed to use Sustainable Urban Drainage systems (SUDS) for managing stormwater for the proposed development. The aim of the SUDS strategy for the site will be to; attenuate storm-water runoff where possible, reduce storm-water runoff, reduce pollution impact, replicate the natural characteristics of rainfall runoff for the site, recharge the groundwater profile.

The drainage strategy, at a minimum, intends to mirror the natural drained environment by considering and recognising natural flow paths, with the proposed infrastructure emulating and optimising the management of surface water through detailed site layout design and drainage infrastructure. This included surfaced impermeable paved areas within the central paved plaza to positively draining into proposed nature-based SuDS solutions, while remaining areas will infiltrate into permeable surfacing.

Surface water infiltrating through permeable surfacing will be collected through a combination of filter drains, as minimal infiltration is expected in the underlying soils.

The development proposed is an exemplary example of nature based SuDS solutions provided by DLRCC within the public realm, therefore

Proposed Nature Based SuDS include a combination of :

- Dry and Wet Swales
- Tree Pits
- Filter Drains
- Rain Gardens
- Biofiltration areas
- Permeable Paving

In summary, the proposed scheme, with the typical quantum of impermeable surfaces appropriate to the type of development would typically result in an increased runoff volume compared to an equivalent greenfield site. However, the effective drained area of the proposed development in comparison to its existing state , as described, has been significantly reduced and therefore any pluvial flood risk has been well-mitigated within the site when compliant to relevant

guidance documents. This also includes proposals incorporates substantial open spaces and well-designed Sustainable Drainage Systems (SuDS) further reducing pluvial risk and greatly improving water quality parameters of collected surface water including the reducing pollution impact and recharging the groundwater profile.

The proposed drainage strategy serving the scheme is illustrated in Figure 4-1.

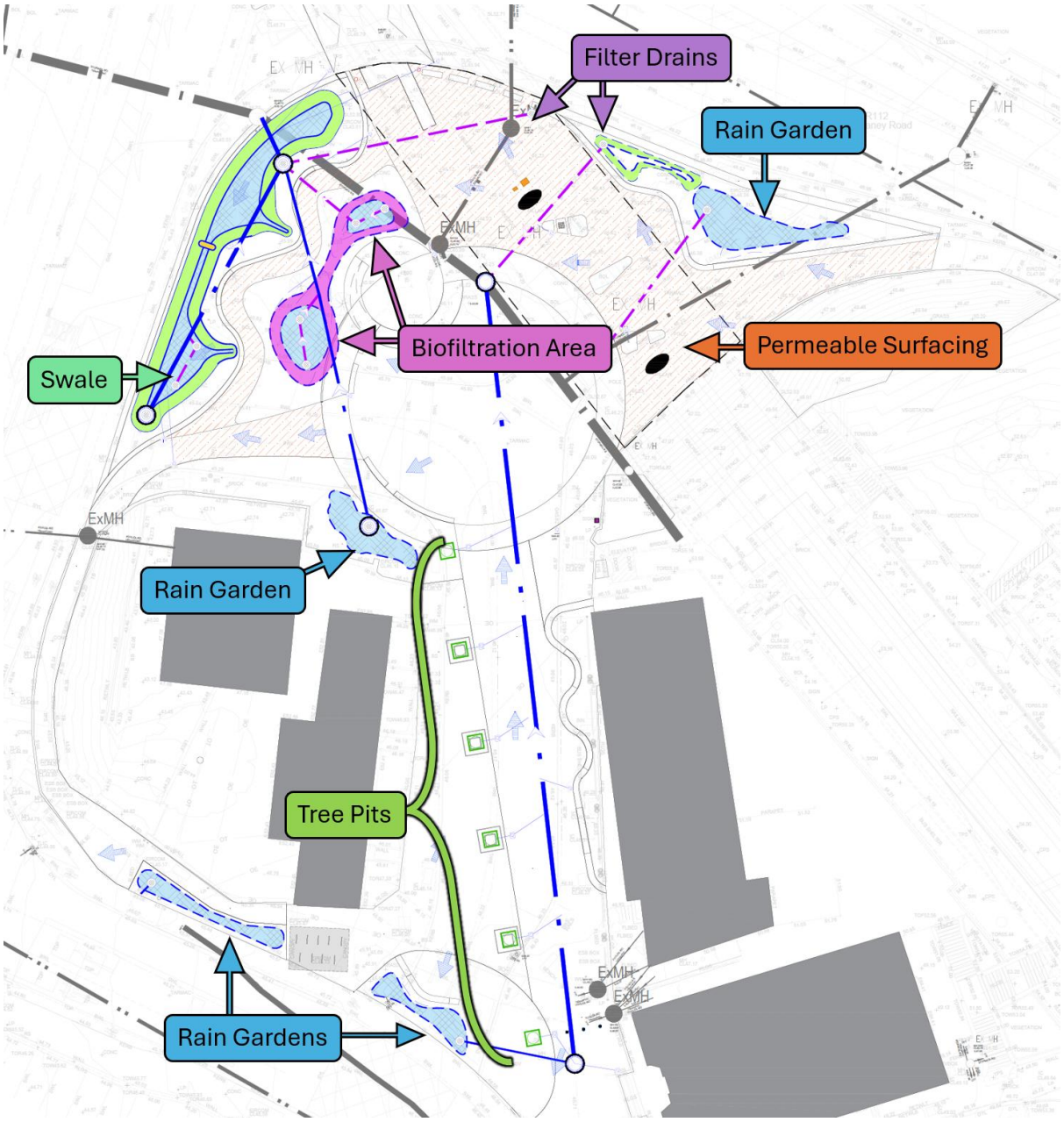



*Figure 4-1 : Proposed Drainage Strategy*

### 4.2.2 Flood Exceedance

During an exceedance storm event, i.e. greater than the 1% AEP event, the development's layout is designed to direct over-land flows away from buildings. Adjacent flooding during an exceedance

storm event caused by the surcharging of the River Slang Culvert System may interact within the proposed swale within the south-western corner of the development as indicated in Figure 3-4, strategic overflow brio manholes have therefore been placed providing local temporary relief back into the surface water network.

A high level plan of maintaining flood flow paths is illustrated in Figure 4-2. Notable low points draining larger areas such as the low point indicated in the west of the scheme have proposed manholes with large brio grated manhole covers with increased drainage capacity compared to conventional road gulleys.




*Figure 4-2: Flood Flow Paths*

### 4.2.3 Climate Change and Urban Creep

In line with the requirements of Appendix 7 of the DLRCC Development Plan, the site shall be designed to accommodate climate change by increasing rainfall intensities by 20%.

However, with regards to urban creep, the proposed scheme, at it's core, is intended to be an exemplarity example of DLRCC in the retrofit of nature designed SuDS solutions within disused public realm sites, this approach is highlighted and defended within the County Development Plan, therefore applied urban creep factors are considered inappropriate and have not been applied to this scheme.

### 4.2.4 Access and Egress During Flood Events

Based on relevant fluvial flood levels from the ICM model, it is anticipated that safe access to and egress from the development can be maintained via the north-western portion of the site during the 0.1% AEP flood event. The south-western area of the site is considered to be at the greatest risk of flooding during this extreme event and may become temporarily unusable. In such circumstances, pedestrians and cyclists on the site should be directed away from the affected area and towards the northern portion of the site, where access and egress are expected to remain available under the ICM modelled flood scenarios.

### 4.2.5 Residual Risks

The remaining residual flood risks identified following the detailed assessment are as follows:

- Pluvial flooding from the private drainage system related to a pipe blockage or from flood exceedance.
- Pluvial flooding from the development's drainage system for storms in excess of the 1% AEP design capacity.
- Temporary loss of usage of areas of the subject site within Flood Zone B.

### 4.2.6 Mitigation Measures

Proposed mitigation measures to address residual flood risks are summarized below;

M1. Proposed drainage system to be maintained on a regular basis to reduce the risk of a blockage.

M2. In the event of storms exceeding the 0.1% AEP design capacity of the drainage system, then possible flood routing for overland flows towards the drainage outfalls should not be blocked.

M3. In the event of a fluvial flood event, the overland flow paths should remain clear to ensure the conveyance of flood water through the site.

M4. Maintain the Access and Egress route to the north of the site to ensure emergency access to the development can be facilitated during flood events.

### 4.2.7 Effectiveness of Mitigation Measures

It is considered that the flood risk mitigation measures if implemented are sufficient to provide a suitable level of protection to the proposed development.

A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

The subject site is located in Flood Zones B and C. The south-western area of the site is at a risk of flooding during a 0.1% AEP flooding event according to the ICM model. As a result an alternative access and egress point to the proposed development via the north of the site is available for pedestrians and cyclists during a temporary blockage due to flooding.

A regularly maintained drainage system will ensure that it remains effective and in good working order should a large pluvial storm occur.

Should extreme pluvial flooding occur that is in excess of the development's drainage capacity, then overland flood routes to the drainage outfall could protect the proposed development.

## 4.3 Summary

Following an assessment of the flood risks to the Site Area, the Site is determined to be within Flood Zone Category B & C as defined by The Guidelines. Therefore, the development proposals are considered acceptable.

The sequential approach mechanism detailed within Flood Risk Assessment indicated that the proposed type of development is appropriate for this Flood Zone Category.

Therefore, no further detailed assessment of flood mitigation strategies is considered necessary.

# 5 Stage 3: Detailed Flood Risk Assessment

As prior Stage 2 (Initial Assessment) of the SSFRA indicates that the proposed development is deemed appropriate for the Site's flood zone category, therefore a "Justification Test" in terms of a detailed flood risk assessment is not required as the site is in Flood Zone B & C.

# 6 Conclusion

The Site-Specific Flood Risk Assessment for the proposed development was undertaken in accordance with the requirements of the Planning System and Flood Risk Management Guidelines for Planning Authorities, November 2009.

In addition, the Dún Laoghaire-Rathdown Strategic Flood Risk Assessment (DLR SFRA) Dun Laoghaire-Rathdown County Development Plan (2022-2028) has indicated strategic approaches specific to it's zoning objective (MTC).

A possible source of flood risk from the surcharging or blockage of the development's drainage systems has been identified. This risk is mitigated by suitable design of the drainage network, regular maintenance and inspection of the network and establishment of exceedance overland flow routes.

The existing site area is a predominantly impermeable surface with no existing reduction in discharge. The proposed development, while creating additional impermeable surfaces and increased runoff volume compared to an equivalent greenfield site, incorporates substantial open spaces and well-designed Sustainable Drainage Systems (SuDS). Consequently, the effective drained area of the proposed development is significantly reduced in comparison to its current state, and pluvial flood risk has been well-mitigated.

It is therefore concluded that:

- The development proposed is appropriate for the Site's flood zone category
- The Planning System and Flood Risk Management Guidelines Sequential Approach is met and the 'Avoid' principal achieved
- A Justification Test is not required

# Appendix A : OPW Past Flood Record

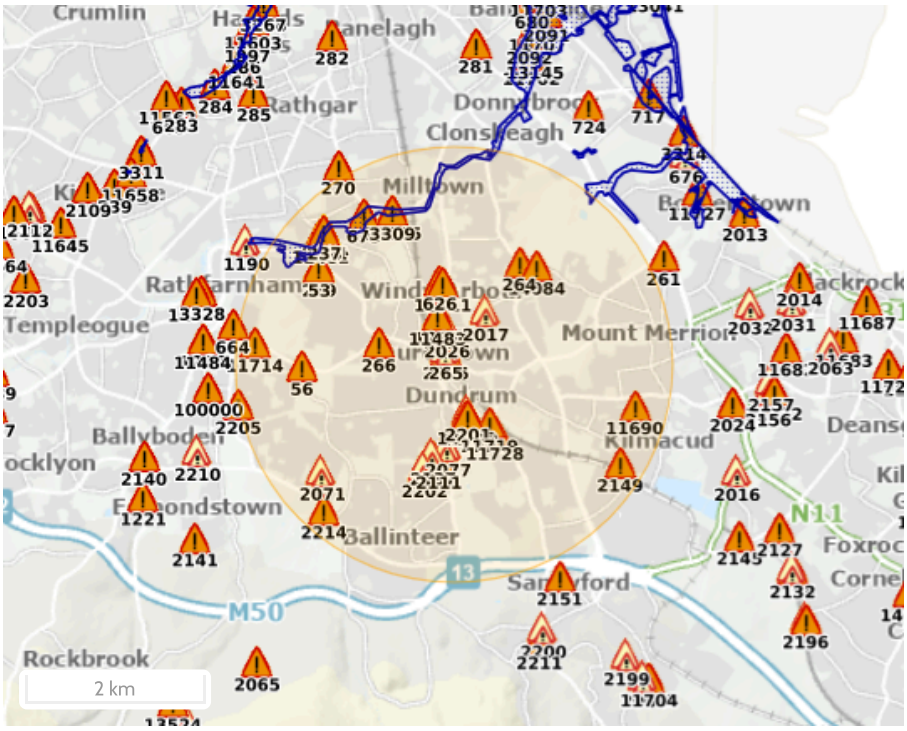
# Past Flood Event Local Area Summary Report

OPW Oifig na nOibreacha Poiblí Office of Public Works

Report Produced: **17/9/2026 19:06**

This Past Flood Event Summary Report summarises past flood events within 2.5 kilometres of the map centre.

This report has been downloaded from www.floodinfo.ie (the "**Website**"). The users should take account of the restrictions and limitations relating to the content and use of the Website that are explained in the Terms and Conditions. It is a condition of use of the Website that you agree to be bound by the disclaimer and other terms and conditions set out on the Website and to the privacy policy on the Website.




## Map Legend

- Single Flood Event
- Recurring Flood Event
- Past Flood Event Extents
- Drainage Districts Benefited Lands*
- Land Commission Benefited Lands*
- Arterial Drainage Schemes Benefited Lands*

* Important: These maps do not indicate flood hazard or flood extent. Their purpose and scope is explained on Floodinfo.ie

## 54 Results

| | Name (Flood_ID) | Start Date | Event Location |
|---|---|---|---|
| 1. | Larchfield Estate Recurring (ID-2017) | n/a | Exact Point |
| | Additional Information: Reports (5) Press Archive (0) | | |
| 2. | Nutley Elm Park Streams June 1963 (ID-118) | 10/06/1963 | Area |
| | Additional Information: Reports (14) Press Archive (20) | | |
| 3. | Dodder August 1986 (ID-1) | 25/08/1986 | Area |
| | Additional Information: Reports (21) Press Archive (18) | | |
| 4. | Ashlawn Ballinteer Road June 1993 (ID-2111) | 10/06/1993 | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 5. | Lakelands Close Stillorgan Jan 1980 (ID-2149) | 21/01/1980 | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 6. | Barton Drive Ballyboden Feb 1994 (ID-2205) | 03/02/1994 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |

| | Name (Flood_ID) | Start Date | Event Location |
|---|---|---|---|
| 7. | Little Dargle Grange Road Nov 1982 (ID-2214)<br>**Additional Information:** Reports (1) Press Archive (0) | 07/11/1982 | Approximate Point |
| 8. | Pine Copse Road Ballinteer Nov 1982 (ID-2137)<br>**Additional Information:** Reports (1) Press Archive (0) | 05/11/1982 | Exact Point |
| 9. | Dodder Classon's Bridge Nov 2000 (ID-3309)<br>**Additional Information:** Reports (1) Press Archive (0) | 05/11/2000 | Approximate Point |
| 10. | Flooding at Willow Bank Apartments, Sandyford Rd, Dublin 14 on 24th Oct 2011 (ID-11728)<br>**Additional Information:** Reports (1) Press Archive (0) | 23/10/2011 | Exact Point |
| 11. | Flooding at Riverdale, Dundrum, Dublin 14 on 24th Oct 2011 (ID-11719)<br>**Additional Information:** Reports (1) Press Archive (0) | 23/10/2011 | Exact Point |
| 12. | Slang River 24th Oct 2011 Frankfort (ID-11483)<br>**Additional Information:** Reports (1) Press Archive (0) | 23/10/2011 | Approximate Point |
| 13. | Little Dargle Sept 1931 (ID-53)<br>**Additional Information:** Reports (4) Press Archive (0) | 02/09/1931 | Approximate Point |
| 14. | Little Dargle Sept 1957 (ID-56)<br>**Additional Information:** Reports (3) Press Archive (0) | 23/09/1957 | Approximate Point |
| 15. | Dodder Sept 1931 (ID-237)<br>**Additional Information:** Reports (9) Press Archive (3) | 02/09/1931 | Approximate Point |
| 16. | Little Dargle Dec 1956 (ID-259)<br>**Additional Information:** Reports (3) Press Archive (0) | 25/12/1956 | Approximate Point |
| 17. | Roebuck June 1963 (ID-264)<br>**Additional Information:** Reports (4) Press Archive (2) | 10/06/1963 | Exact Point |
| 18. | Dundrum June 1963 (ID-265)<br>**Additional Information:** Reports (4) Press Archive (8) | 10/06/1963 | Exact Point |
| 19. | Churchtown June 1963 (ID-266)<br>**Additional Information:** Reports (4) Press Archive (2) | 10/06/1963 | Exact Point |
| 20. | Flooding at Roebuck Road on 21/08/2021 (ID-14084)<br>**Additional Information:** Reports (0) Press Archive (0) | 21/08/2021 | Approximate Point |
| 21. | Rosemount Dundrum Road Recurring (ID-2026)<br>**Additional Information:** Reports (3) Press Archive (0) | n/a | Exact Point |
| 22. | Slang Old Ballinteer Road Recurring (ID-2077)<br>**Additional Information:** Reports (4) Press Archive (0) | n/a | Exact Point |
| 23. | Dundrum River Sept 1957 (ID-626)<br>**Additional Information:** Reports (1) Press Archive (0) | 23/09/1957 | Exact Point |
| 24. | Dodder August 1905 (ID-657) | 24/08/1905 | Approximate Point |

| | Name (Flood_ID) | Start Date | Event Location |
|---|---|---|---|
| | Additional Information: Reports (5) Press Archive (4) | | |
| 25. | Dodder August 1946 (ID-658) | 10/08/1946 | Approximate Point |
| | Additional Information: Reports (7) Press Archive (2) | | |
| 26. | Dodder October 1886 (ID-659) | 16/10/1886 | Approximate Point |
| | Additional Information: Reports (4) Press Archive (2) | | |
| 27. | Dodder August 1912 (ID-660) | 26/08/1912 | Approximate Point |
| | Additional Information: Reports (5) Press Archive (0) | | |
| 28. | Dodder Dartry Cottages Nov 2000 (ID-673) | 05/11/2000 | Approximate Point |
| | Additional Information: Reports (3) Press Archive (0) | | |
| 29. | Dodder Sept 1957 (ID-731) | 23/09/1957 | Approximate Point |
| | Additional Information: Reports (5) Press Archive (0) | | |
| 30. | Dodder November 1968 (ID-1231) | 01/11/1968 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 31. | Old Railway line Dundrum recurring (ID-2025) | n/a | Exact Point |
| | Additional Information: Reports (5) Press Archive (0) | | |
| 32. | Manor Rise Recurring (ID-2071) | n/a | Exact Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 33. | Pine Copse Willow Road Recurring (ID-2075) | n/a | Exact Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 34. | Slang Pyelands Dundrum recurring1 (ID-2201) | n/a | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 35. | Ludford Area Ballinteer Recurring (ID-2202) | n/a | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 36. | Dodder 24th Oct 2011 Waldron's Br (ID-11482) | 23/10/2011 | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 37. | Flooding at Dundrum Town Centre on 21/08/2021 (ID-14085) | 21/08/2021 | Approximate Point |
| | Additional Information: Reports (0) Press Archive (0) | | |
| 38. | Dodder Oct 1880 (ID-1228) | 27/10/1880 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 39. | Dodder October 1891 (ID-1229) | 19/10/1891 | Approximate Point |
| | Additional Information: Reports (3) Press Archive (0) | | |
| 40. | Dodder November 1898 (ID-1230) | 23/11/1898 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 41. | Dodder November 1901 (ID-1232) | 10/11/1901 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 42. | Dodder November 1915 (ID-1233) | 11/11/1915 | Approximate Point |

| | Name (Flood_ID) | Start Date | Event Location |
|---|---|---|---|
| | Additional Information: Reports (3) Press Archive (0) | | |
| 43. | Dodder September 1883 (ID-1234) | 03/09/1883 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 44. | Dodder December 1956 (ID-1235) | 29/12/1956 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 45. | Dodder Orwell Gardens Nov 1965 (ID-3342) | 17/11/1965 | Approximate Point |
| | Additional Information: Reports (10) Press Archive (0) | | |
| 46. | Flooding at Dundrum Shopping Centre and Taney Cross, Co. Dublin on 24th Oct 2011 (ID-11720) | 23/10/2011 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 47. | Flooding at Dale Drive, Stillorgan, Co. Dublin on 24th Oct 2011 (ID-11690) | 23/10/2011 | Exact Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 48. | Flooding at Milltown, Dublin 6 on 24th Oct 2011 (ID-11705) | 23/10/2011 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 49. | Flooding at Nutgrove Avenue, Rathfarnham, Dublin 14on 24th Oct 2011 (ID-11714) | 23/10/2011 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 50. | Little Dargle Feb 1958 (ID-60) | 10/02/1958 | Approximate Point |
| | Additional Information: Reports (2) Press Archive (0) | | |
| 51. | Dodder Lr Dodder Road Orwell Gardens Dec 1958 (ID-77) | 18/12/1958 | Approximate Point |
| | Additional Information: Reports (7) Press Archive (0) | | |
| 52. | Dodder Dec 2003 (ID-349) | 02/12/2003 | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 53. | Slang Frankfort August 1986 (ID-1267) | 24/08/1986 | Approximate Point |
| | Additional Information: Reports (1) Press Archive (0) | | |
| 54. | Flooding at Dundrum, Dublin 14 on 24th Oct 2011 (ID-11711) | 23/10/2011 | Exact Point |
| | Additional Information: Reports (1) Press Archive (0) | | |

# Appendix B : DLRCC SFRA (2022 -2028) Flood Map

Comhairle Contae County Council

Planning and Organisational Innovation Department

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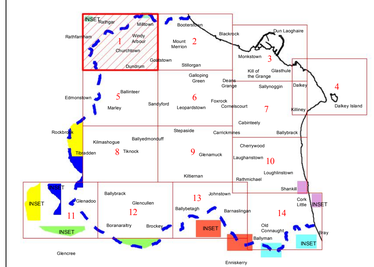
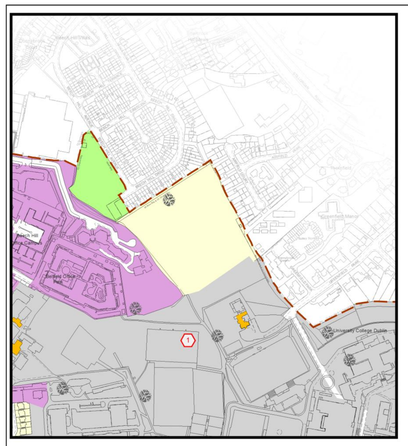
# COMHAIRLE CHONTAE DHÚN LAOGHAIRE-RÁTH AN DÚIN

# DÚN LAOGHAIRE-RATHDOWN COUNTY COUNCIL

## Flood Zone Maps



INDEX



INSET ADJOINING MAP No. 1




- Hotspots
- Hotspots Predicted
- Flood Zone A
- Flood Zone B
- County Boundary

0 0.1 0.2 0.3 0.4 0.5
Kilometres

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Planning and Organisational Innovation

M Henchy
Director

Comhairle Contae County Council

**Flood Zone Maps**

| | | | |
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| Prepared By: | Louise McGauran | Drawn By: | B. Mwenelupembe |
| Date: March 2016 | Scale: 1:5,000 | Map No. MAP1 | |

ENVIRONMENT
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HEALTH
& SAFETY
ISO 45001:2018
NSAI Certified

QUALITY
I.S. EN ISO 9001:2015
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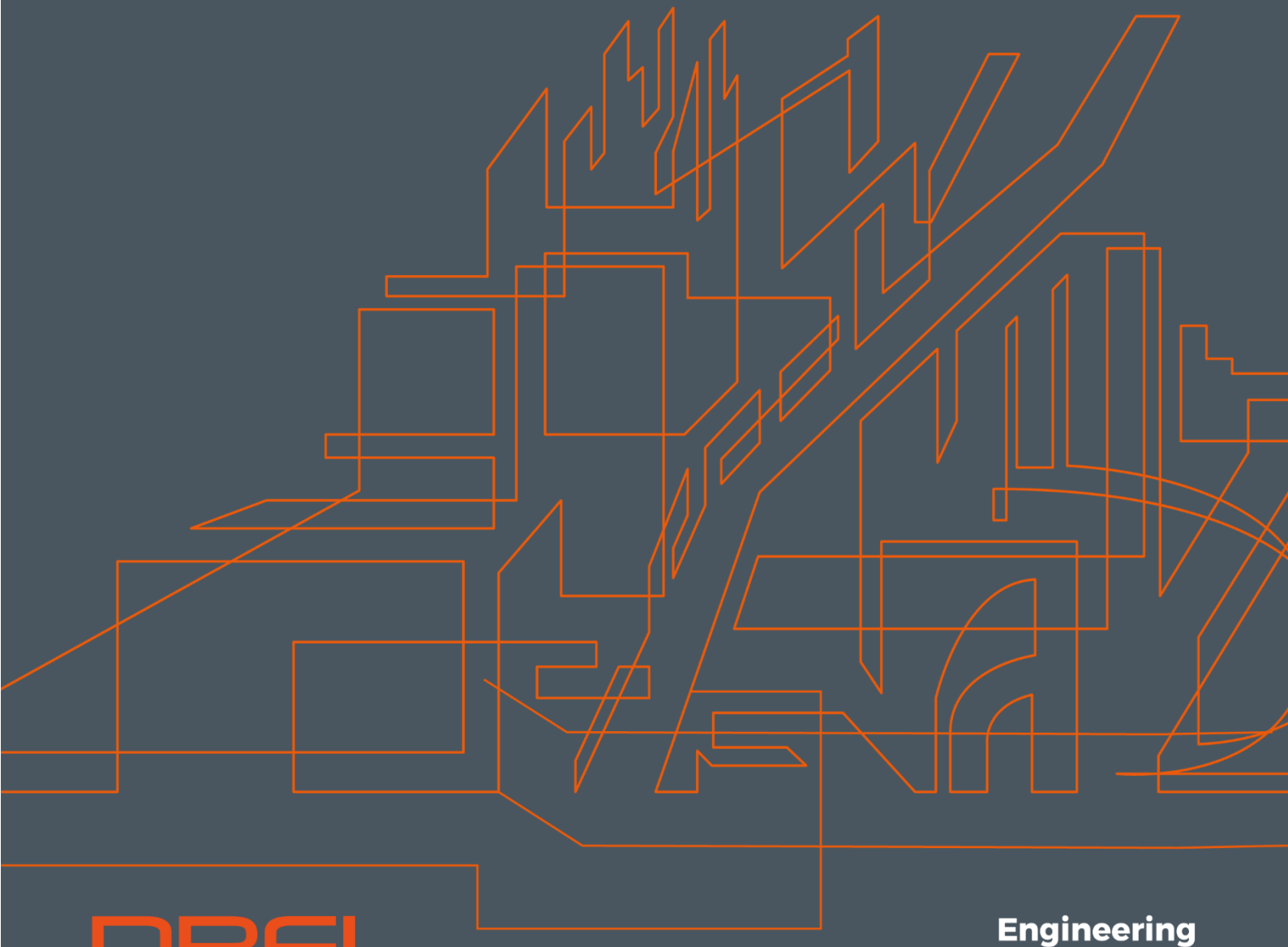
# New Public Realm and Plaza East and North of Waldemar Terrace

## Preliminary Construction & Environmental Management Plan

260051-X-00-X-XXX-RP-DBFL-CE-004

**November 2026**



DBFL CONSULTING ENGINEERS

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| | | | |
|---|---|---|---|
| Project Title: | **New Public Realm and Plaza East and North of Waldemar Terrace** | | |
| Document Title: | **Preliminary Construction & Environmental Management Plan** | | |
| File Ref: | **260051-X-00-X-XXX-RP-DBFL-CE-004** | | |
| Status: | **P3 - Planning** | Rev: | **2** |
| | **S - Issued** | | |

| Status | Rev. | Date | Description | Prepared | Review | Approved |
|---|---|---|---|---|---|---|
| P3 | 0 | 07/08/26 | First Round Comments | Grant Humphrey | | Aimee Dunne |
| P3 | 1 | 16/09/26 | Second Round Comments | Grant Humphrey | | Aimee Dunne |
| P3 | 2 | 12/11/26 | Chapter 4 Update on Luas | Grant Humphrey | | Aimee Dunne |

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# 1. Introduction

## 1.1 Overview

The Preliminary Construction & Environmental Management Plan has been prepared by DBFL Consulting Engineers in support of the planning application for in support of the planning application for the design and development of the public realm scheme. The proposed scheme seeks to transform an under-utilised urban area to create a communal space that prioritises safety, accessibility and the environment.

The proposed scheme is within the administrative area of Dún Laoghaire-Rathdown County Council (DLRCC), located at the Taney Cross Junction between the R112 and the R117, beneath the William Dargan Bridge. The scheme is located close to the Green LUAS line that runs directly above the site location and stops at the Dundrum LUAS stop on the William Dargan Bridge. The proposed scheme is also surrounded by the Taney Cross junction and adjacent private lands.

The proposed site is located near multiple adjacent schemes including the Taney Cross Junction Redesign, Dundrum Living Streets, Dundrum Bus layover & Bus Gate and DLR Connector. Coordination with adjacent schemes will be necessary throughout the Taney Cross Public Realm development.

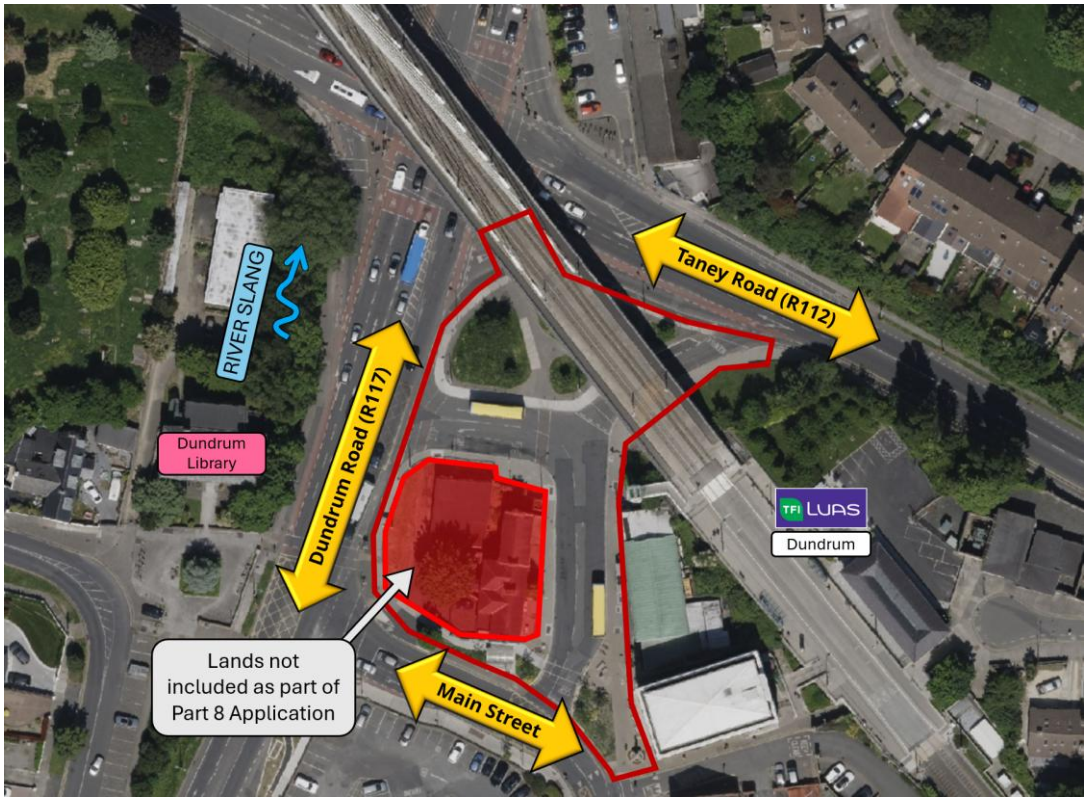


*Figure 1-1: Site Location*

## 1.2 Proposed Development

The proposed public realm cheme will transform the existing area beneath the William Dargan Bridge into a high-quality, pedestrian-priority civic space, improving connectivity, accessibility and the overall quality of the public realm.

The proposed layout is centred around the existing Usher Monument and a new focal feature within the central plaza area. The scheme includes a range of public realm improvements, including new paving treatments, seating areas, planting, public lighting upgrades, cycle parking facilities and a mobility hub beneath the William Dargan Bridge. The existing sheltered cycle parking facility south of Waldemar Terrace will be retained, with additional cycle parking provided within the proposed mobility hub to support active travel.

The proposed landscaping strategy incorporates new planting areas and SuDS features, contributing to biodiversity, sustainable water management and the creation of a more comfortable and attractive public space.

The proposed arrangement of the public realm scheme is illustrated in **Figure 1-2**.




*Figure 1-2: General Arrangement*

## 2. Works Proposal

This Construction & Environmental Management Plan is for the works associated with the construction of the proposed public realm scheme.

The construction management issues addressed within this plan include the following:

- Working Hours
- Traffic Management
- Stripping of Topsoil and Excavation of Subsoil
- Storage of Topsoil & Subsoil
- Erosion and Sediment Control
- Accidental Spills and Leaks
- Biodiversity
- Waste Management
- Noise and Vibration
- Air, Dust & Climatic Factors
- Landscape and Visual Impact
- Archaeology
- Material Assets – Site Services
- Site Compound Facilities and Parking

This Construction & Environmental Management Plan shall be referenced in all tender and contract documentation for the proposed works and is to be read in conjunction with all relevant Engineering and landscape documentation.

## 3. Working Hours

For the duration of the proposed infrastructure works the maximum working hours shall be 07:00 to 19:00 Monday to Friday (excluding bank holidays) and 08:00 to 14:00 Saturdays, subject to the restrictions imposed by the local authority.

No working will be allowed on Sundays and Public Holidays.

Subject to the agreement of the local authority, out of hours working may be required for utility connections, roadworks on existing roads, resurfacing works etc.

# 4. Traffic and Transportation

A Construction Stage Traffic Management Plan (TMP) will be prepared for the works in accordance with the principles outlined below and shall comply at all times with the requirements of:

- Department of Transport Traffic Signs Manual (2019) – Chapter 8 Temporary Traffic Measures and Signs for Roadworks
- Department of Transport Guidance for the Control and Management of Traffic at Road Works (2010)
- Any additional requirements detailed in the Design Manual for Roads and Bridges (DMRB) & Design Manual for Urban Roads & Streets (DMURS)

In general, the impact of the construction period will be temporary in nature and less significant than the operational stage of the proposed development (HGV vehicle movements not expected to exceed 3 vehicles per day during the busiest period of construction works).

All construction traffic will enter the site from the surrounding regional road network (R112 and R117) via designated entry points. Security facilities will be provided at each entry point with adequate off-road queuing facilities to avoid construction traffic queuing onto the existing road network.

Construction traffic will generally consist of the following categories:

- Private vehicles owned and driven by site staff and management
- Construction vehicles e.g. excavation plant, dump trucks and material delivery vehicles, involved in road and infrastructure construction.
- On-site employees will generally arrive before 08:00, thus avoiding morning peak hour traffic. These employees will generally depart after 16:00.

It should be noted that a large proportion of construction workers would arrive in shared transport.

The majority of subsoil excavated from site will be reused on site while unsuitable material will be removed off-site to a licenced facility or reused on a neighbouring site as part of an Article 27 Licence. Topsoil and subsoil will be transported from site on a phased basis in order to minimise impact on the existing road network.

**Works Adjacent to Luas Line**

As part of the works, the proposed scheme will impact the existing access to the lift serving the Dundrum Luas Stop. However, access to both platforms via the existing stairs will remain unaffected.

Prior to the commencement of any works, a detailed Photographic Condition Survey will be carried out of all adjoining properties including those associated with Luas due to the site's adjoining proximity to the Green Luas Line.

As part of the Construction-Stage Traffic Management Plan (TMP), the contractor shall make appropriate provision for pedestrian access to the Luas lift, where practicable, during the various stages of construction. TII and/or the Luas operator will be afforded 24hr access to Luas infrastructure during and post construction.

Prior to the commencement of works, the finalised Construction Management Plan (CMP) and TMP shall be submitted for the written agreement of Dun Laoghaire Rathdown County Council subject to the written agreement of TII. The CMP shall include identification of the Dundrum Luas Stop Lift and associated infrastructure and the TMP shall identify appropriate vehicular and pedestrian access arrangements and working procedures for the Luas lift during construction. These shall include emergency access requirements, and appropriate notification procedures for works affecting lift access.

Appropriate agreements between TII, Luas Operator and the developer shall be undertaken and completed prior to the commencement of development where deemed necessary by TII upon review of the CMP and TMP.

All Works, including e.g. scaffolding and hoarding, carried out in close proximity to Luas infrastructure, the developer or contractor will be required to apply for a works permit from the Luas Operator by virtue of the Light Railway (Regulation of Works) Bye-laws 2004 (S.I. number 101 of 2004) which regulates works occurring close to the Luas infrastructure in accordance with TII's "Code of engineering practice for works on, near, or adjacent the Luas light rail system". The permit application will require prior consultation, facilitated by the Luas operator.

# 5. Road Cleaning

The scheme shall be constructed in a manner to minimise disruption to road users, local residents and businesses. All construction works to be undertaken in a clearly delineated site area which will have specific entry and exit points for construction traffic.

Provision will be made for the cleaning by road sweeper etc. of all access routes to and from the site during the course of the works. Road cleaning shall be undertaken as required during the completion of the works.

All road sweeping vacuum vehicles will be emptied off site at a suitably licensed facility.

# 6. Soils and Geology

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to soil and geology.

The works will include stripping of topsoil within green areas and excavation of subsoil layers within paved areas. These activities have potential to expose the soils and geological environment to pollution.

The contractor shall obtain approval of their proposed erosion and sediment control measures from Dún Laoghaire-Rathdown County Council's Environment Section prior to commencing works on site. The contractor shall also agree the rock breaking methodology with Dún Laoghaire-Rathdown County Council where required.

The following measures are to be implemented in order to mitigate against such risks.

**Stripping of Topsoil**

- Stripping of topsoil shall be carried out in a controlled and carefully managed way and coordinated with the proposed staging for the works.
- At any given time, the extent of topsoil strip (and consequent exposure of subsoil) shall be limited to the immediate vicinity of active work areas.
- Topsoil stockpiles shall be protected for the duration of the works and not located in areas where sediment laden runoff may enter existing surface water drains.
- Topsoil stockpiles shall also be located so as not to necessitate double handling.

**Excavation of Subsoil Layers**

- The duration that subsoil layers are exposed to the effects of weather shall be minimised. Disturbed subsoil layers will be stabilised as soon as practicable (e.g. backfill of service trenches, construction of road capping layers, construction of foundations and completion of landscaping).
- Similar to comments regarding stripped topsoil, stockpiles of excavated subsoil material shall be protected for the duration of the works.

**Weather Conditions**

- Typical seasonal weather variations will also be taken account of when planning stripping of topsoil and excavations with an objective of minimising soil erosion

**Surface Water Runoff**

- Surface water runoff from areas stripped of topsoil and surface water collected in excavations will be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- Discharge from any vehicle wheel wash areas is to be directed to on-site settlement ponds.
- On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
- Pouring of concrete including wash down and washout of concrete from delivery vehicles will be controlled in an appropriate facility to prevent contamination.
- Surface water discharge points during the construction phase are to be agreed with Dún Laoghaire-Rathdown County Council's Environment Section prior to commencing works on site

**Water Pumped from Excavations**

- Rainwater and groundwater pumped from excavations is to be directed to on-site settlement ponds.
- On-site settlement ponds are to include geotextile liners and riprapped inlets and outlets to prevent scour and erosion.
- Surface water discharge points during the construction phase are to be agreed with Dún Laoghaire-Rathdown County Council's Environment Section prior to commencing works on site.

**Accidental Spills and Leaks**

- All oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area.
- Refuelling and servicing of construction machinery shall take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).

- A response procedure shall be put in place to deal with any accidental pollution events and spillage kits shall be available and construction staff will be familiar with the emergency procedures and use of the equipment.

**Other Mitigation Measures**

- All materials exported from site shall be in accordance with the Waste Management Acts.
- Imported materials to be suitably separated to avoid contamination or mixing.
- For imported materials, the use of local quarries or locally available material should be prioritised.
- Any potential for use of surplus material within local sites shall be pursued at construction and detailed design stage (subject to compliance with Waste Management Acts). If any material is to be reused on another site as a by-product (and not as waste), this will be done in accordance with Article 27 of the Waste Directive Regulations.
- An Emergency Response Plan shall be prepared by the contractor which contains measures to ensure that accidental spillages will be appropriately dealt with, which includes a response procedure to deal with any accidental pollution events.

# 7. Water: Hydrogeology

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to soil and geology.

The following measures are to be implemented during the construction phase to mitigate risks to the water and hydrogeological environment.

**Erosion and Sediment Control**

- Measures shall be implemented to capture and treat sediment laden surface water runoff (e.g. sediment retention ponds, surface water inlet protection, fencing and signage around specific exclusion zones and earth bunding adjacent to open drainage ditches) prior to discharge of surface water at a controlled rate.
- Groundwater pumped from excavations shall be directed to on-site settlement ponds.
- Discharge from any vehicle wheel wash areas shall be directed to on-site settlement ponds.
- On-site settlement ponds shall include geotextile liners and riprapped inlets and outlets to prevent scour and erosion
- Surface water discharge points during the construction phase shall be agreed with Dún Laoghaire-Rathdown County Council's Environment Section prior to commencing works on site
- Weather conditions and seasonal weather variations shall be taken account of when planning stripping of topsoil and excavations, with an objective of minimizing soil erosion.
- The duration that rock layers are exposed to the effects of weather shall be minimized by back filling excavations as soon as practicable after construction of the drainage and pumping station.

**Accidental Spills and Leaks**

- In order to mitigate against spillages contaminating underlying soils and geology, all oils, fuels, paints and other chemicals shall be stored in a secure bunded hardstand area.

- Refuelling and servicing of construction machinery shall take place in a designated hardstand area which is also remote from any surface water inlets (when not possible to carry out such activities off site).
- An Emergency Response Plan detailing the procedures to be undertaken in the event of a spillage of chemical, fuel or hazardous wastes will be prepared prior to construction.
- Pouring of concrete including wash down and washout of concrete from delivery vehicles shall be controlled in an appropriate facility to prevent contamination.
- Regular samples shall be taken from soils affected by earthworks which shall be analysed for contamination

# 8. Water: Water Supply, Drainage & Utilities

The following measures are to be implemented during the construction phase in order to mitigate risks to the water supply, drainage and utilities:

- Surface water runoff from areas stripped of topsoil and surface water collected in excavations shall be directed to on-site settlement ponds where measures will be implemented to capture and treat sediment laden runoff prior to discharge of surface water at a controlled rate.
- The construction compound shall include adequate staff welfare facilities including foul drainage and potable water supply. Foul drainage discharge from the construction compound will be tinkered off site to a licensed facility until a temporary connection to the public foul drainage network has been established.
- The construction compound's potable water supply shall be located where it is protected from contamination by any construction activities or materials.
- A competent contractor shall be appointed to undertake the works and protect existing systems from damage during construction.
- Relocation of existing ESB infrastructure shall be fully coordinated with ESB Networks to ensure interruption to the existing power network is minimized (e.g. agreeing power outage to facilitate relocation of cables). Ducting and / or poles along proposed relocated routes will be constructed and ready for rerouting of cables in advance of decommissioning of existing power lines.
- Similarly, connections to the existing gas and telecommunications networks shall be coordinated with the relevant utility provider to reduce outages and carried out by approved contractors

# 9. Biodiversity

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to aspects of Biodiversity.

**Mitigation Measures for Habitats during Construction Stage**

Where practicable, the removal of trees and other features suitable for use by nesting birds shall be undertaken outside the bird nesting season (avoiding the period 1st March to 31st August). Should the construction programme require vegetation clearance between March and August bird nesting surveys shall be undertaken by suitably experienced ecologists. If no active nests are recorded, vegetation clearance shall take place within 24 hours. In the event that active nests are observed, an appropriately sized buffer zone shall be maintained around the nest until such time as all the eggs have hatched and the birds have fledged. Once it is confirmed that the birds have fledged and no further nests have been built or occupied, vegetation clearance may take place. Care must be taken during development to ensure that common lizards, common frogs and smooth newts (which are all protected under the *Wildlife Act* (1976) and subsequent amendments) are not harmed. Open trenches and excavations shall be covered overnight where practicable, and pipes and ducts shall be capped when not in use for the protection of fauna.

**Water quality**

- The following mitigation measures will ensure there are no impacts on water quality in the immediate vicinity of the proposed development from release of hydrocarbons, polluting chemicals, sediment/silt and contaminated waters control during the construction stage of the proposed development and therefore no potential impacts on the depositing/lowland river habitat (River Slang)
- Specific measures to prevent the release of sediment over baseline conditions to the existing surface water drainage network, during the construction work, which will be implemented as the need arises. These measures include, but are not limited to, the use of silt fences, silt curtains, settlement lagoons and filter materials.
- Provision of exclusion zones and barriers (e.g. silt fences) between earthworks, stockpiles and temporary surfaces to prevent sediment washing into the existing drainage systems and hence the downstream receiving water environment.

- Provision of temporary construction surface drainage and sediment control measures to be in place before earthworks commence.
- Weather conditions will be taken into account when planning construction activities to minimise risk of run-off from the site.
- Prevailing weather and environmental conditions will be taken into account prior to the pouring of cementitious materials for the works adjacent to any surface water drainage features, or drainage features connected to same. Pumped concrete will be monitored to ensure no accidental discharge. Mixer washings and excess concrete will not be discharged to existing surface water drainage systems. Concrete washout areas will be located remote any surface water drainage features, where feasible, to avoid accidental discharge to watercourses. Washing out of any concrete trucks on site will be avoided (dry brush shoots will be used instead).
- Any fuels of chemicals (including hydrocarbons or any polluting chemicals) shall be stored in a designated, secure bunded area(s) to prevent any seepage of potential pollutants into the local surface water network. These designated areas will be clearly sign-posted and all personnel on site will be made aware of their locations and associated risks.
- All mobile fuel bowsers shall carry a spill kit and operatives must have spill response training. All fuel containing equipment such as portable generators shall be placed on drip trays. All fuels and chemicals required to be stored on-site will be clearly marked. Care and attention should be taken during refuelling and maintenance operations. Particular attention should be paid to gradient and ground conditions, which could increase risk of discharge to waters.
- A register of all hazardous substances, which will either be used on site or expected to be present (in the form of soil and/or groundwater contamination) shall be established and maintained. This register will be available at all times and shall include as a minimum:
    - Valid Safety Data Sheets;
    - Health & Safety, Environmental controls to be implemented when storing, handling,
    - using and in the event of spillage of materials;
    - Emergency response procedures/precautions for each material; and,

    - The Personal Protective Equipment (PPE) required when using the material.
    - Implementation of response measures to potential pollution incidents.

- Robust and appropriate Spill Response Plan and Environmental Emergency Plan shall be prepared prior to works commencing and they will be communicated, resourced and implemented for the duration of the works. Emergency procedures/precautions and spillage kits will be available and construction staff will be trained and experienced in emergency procedures in the event of accidental fuel spillages.
- All trucks shall have a built-on tarpaulin that will cover excavated material as it is being hauled off-site and wheel wash facilities will be provided at all site egress points.
- Machinery arriving on site should be cleaned and free from invasive species
- Water supplies shall be recycled for use in the wheel wash. All waters shall be drained through appropriate filter material prior to discharge from the construction sites.
- The removal of any made ground material, which may be contaminated, from the construction site and transportation to an appropriate licenced facility shall be carried out in accordance with the Waste Management Act, best practice and guidelines for same.
- A discovery procedure for contaminated material shall be prepared and adopted by the appointed contractor prior to excavation works commencing on site. These documents shall detail how potentially contaminated material will be dealt with during the excavation phase.
- Implementation of measures to minimise waste and ensure correct handling, storage and disposal of waste (most notably wet concrete, pile arisings and asphalt).
- All of the above measures implemented on site will be monitored throughout the duration of construction to ensure that they are working effectively, to implement maintenance measures if required and applicable, and to address any potential issues that may arise.

# 10. Construction Waste Management

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to the management and reduction of waste expected during stages of construction.

Prior to the commencement of development, the contractor shall prepare a Construction and Demolition Resource Waste Management Plan (RWMP) as set out in the EPA "Best Practice Guidelines for the Preparation of Resource and Waste Management Plans for C&D Projects (2021)" including demonstration of proposals to adhere to best practice and protocols. The RWMP shall be submitted to and agreed with Dublin City Council.

The plan shall be implemented in order to improve waste management on site, increase segregation and minimise construction waste costs. Waste arising from the site will be considered in relation to the waste management hierarchy of prevention, reduce, reuse, recycle, energy recovery and disposal.

**Mitigation Measures**

The following measures are to be implemented during the construction phase in order to reduce the amount of waste produced, manage the wastes generated responsibly and handle waste in such a manner as to minimise the effect on the environment:

- Building materials shall be chosen with the aim to 'design out waste';
- Appointing a waste manager to ensure effective management of waste during the excavation and construction works
- On-site segregation of waste materials shall be carried out to increase opportunities for off-site reuse, recycling and recovery, it is anticipated that the following waste types, at a minimum, will be segregated:
    - Concrete rubble (including ceramics, tiles and bricks);
    - Metals;
    - Glass; and
    - Timber.
- Left over materials (e.g. timber off-cuts, broken concrete blocks/bricks) and any suitable construction materials shall be re-used on-site, where possible;

- All waste materials will be stored in skips or other suitable receptacles in designated areas of the site;
- Any hazardous wastes generated (such as chemicals, solvents, glues, fuels, oils) shall also be segregated and will be stored in appropriate receptacles (in suitably bunded areas, where required);
- A waste manager shall be appointed by the main contractor(s) to ensure effective management of waste during the excavation and construction works;
- All construction staff will be provided with training regarding the waste management procedures;
- All waste leaving site will be reused, recycled or recovered where possible to avoid material designated for disposal;
- All waste leaving the site will be transported by suitable permitted contractors and taken to suitably registered, permitted or licenced facilities; and
- All waste leaving the site will be recorded and copies of relevant documentation maintained.

Nearby sites requiring clean fill material shall be contacted to investigate reuse opportunities for clean and inert material, if required. If any of the material is to be reused on another site as by-product (and not as a waste), this shall be done in accordance with Article 27 of the EC (Waste Directive) Regulations (2011). EPA approval shall be obtained prior to moving material as a by product.

These mitigation measures will ensure that the waste arising from the construction phase of the development is dealt with in compliance with the provisions of the Waste Management Act 1996, as amended, associated Regulations and the Litter Pollution Act 1997, the EMR Waste Management Plan (2015-2021). It will also ensure optimum levels of waste reduction, reuse, recycling and recovery are achieved and will encourage sustainable consumption of resources.

# 11. Noise and Vibration

The goal of this chapter is to outline general principles for implementing mitigation measures during the construction phase, focusing on minimizing environmental risks related to noise and vibration.

Noise-related mitigation methods are described below and shall be implemented for the project in accordance with best practice. These methods include:

- The contract documents will clearly specify that the Contractor undertaking the construction of the works will be obliged to take specific noise abatement measures and comply with the recommendations of BS5228-1 2009 +A1 2014. These measures will typically include:
- No plant used on site will be permitted to cause an ongoing public nuisance due to noise.
- The best means practicable, including proper maintenance of plant, will be employed to minimise the noise produced by on site operations.
- All vehicles and mechanical plant will be fitted with effective exhaust silencers and maintained in good working order for the duration of the contract.
- Compressors will be attenuated models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic tools shall be fitted with suitable silencers.
- Machinery that is used intermittently will be shut down or throttled back to a minimum during periods when not in use.
- Any plant, such as generators or pumps, which is required to operate before 07:00hrs or after 19:00hrs will be surrounded by an acoustic enclosure or portable screen.
- During the course of the construction programme, supervision of the works will include ensuring compliance with the limits
- Erecting portable screens around noisy items of plant in noise sensitive areas, where required.

**Working Hours**

Normal working times will be 07:00 to 19:00hrs Monday to Friday and 08:00 to 14:00hrs on Saturday. Works other than the pumping out of excavations, security and emergency works will

not be undertaken outside these working hours without the written permission of the Contracting Authority.

Works other than the pumping out of excavations, security and emergency works will not be undertaken at night and on Sundays without the written permission of the Contracting Authority.

**Emergency Work**

The emergency work referred to above may include the replacement of warning lights, signs and other safety items on public roads, the repair of damaged fences, repair of water supplies and other services which have been interrupted, repair to any damaged temporary works and all repairs associated with working on public roads.

# 12. Air Quality and Climate Change

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to consideration of risks arising due to Climate Change, and mitigating aspects of air quality.

The Main Contractor or equivalent must monitor the contractors' performance to ensure that the proposed construction phase mitigation measures are implemented, and that construction impacts and nuisance are minimised. The following mitigation measures are to be implemented during the construction phase:

**Air Quality**

The pro-active control of fugitive dust will ensure the prevention of significant emissions, rather than an inefficient attempt to control them once they have been released. The main contractor will be responsible for the coordination, implementation and ongoing monitoring of the Dust Management Plan. The key aspects of controlling dust are listed below.

In summary the measures which will be implemented will include:

- Hard surface roads will be swept to remove mud and aggregate materials from their surface while any un-surfaced roads will be restricted to essential site traffic.
- Any road that has the potential to give rise to fugitive dust must be regularly watered, as appropriate, during dry and/or windy conditions.
- Vehicles exiting the site shall make use of a wheel wash facility where appropriate, prior to entering onto public roads.
- Vehicles using site roads will have their speed restricted, and this speed restriction must be enforced rigidly. On any un-surfaced site road, this will be 20kph, and on hard surfaced roads as site management dictates.
- Public roads outside the site will be regularly inspected for cleanliness and cleaned as necessary.
- Material handling systems and site stockpiling of materials will be designed and laid out to minimise exposure to wind. Water misting or sprays will be used as required if particularly dusty activities are necessary during dry or windy periods.

- During movement of materials both on and off-site, trucks will be stringently covered with tarpaulin at all times. Before entrance onto public roads, trucks will be adequately inspected to ensure no potential for dust emissions.

At all times, these procedures will be strictly monitored and assessed. In the event of dust nuisance occurring outside the site boundary, movements of materials likely to raise dust would be curtailed and satisfactory procedures implemented to rectify the problem before the resumption of construction operations.

**Climate**

The embodied energy of construction materials is predicted to be the dominant source of greenhouse gas emissions as a result of the construction phase of the development.

Good practice to ensure emissions are reduced where possible is the prevention of on-site or delivery vehicles from leaving engines idling, even over short periods. Minimising waste of materials due to poor timing or over ordering on site will aid to minimise the embodied carbon footprint of the site.

The Contractor will also be required to mitigate against the effects of extreme wind/storms, temperature extremes, fog, lighting and hail, through site risk assessments and method statements.

All materials used during construction will be accompanied by certified datasheets which will set out the limiting operating temperatures.

Temperatures can affect the performance of some materials, and this will require consideration during construction.

The Contractor will be required to mitigate against the effects of fog, lighting and hail through site risk assessments and method statements.

# 13. Landscape and Visual Impact Assessment

A Landscape and Visual Impact Assessment has been prepared by Áit Urbanism + Landscape Ltd in order to consider the effect of the proposed development on the receiving landscape and visual environment.

The Final Schedule of Environmental Commitments (Chapter 16 of the EIAR) will be incorporated into the final CEMP for once statutory planning approval is obtained and will be included in the Contractor's CEMP.

Proposed mitigation measures are summarised below:

- Existing vegetation was considered from the outset of the design process in order to minimise the impact of the development, particularly on existing trees
- Site engineering, drainage, ducts and other infrastructure has been designed to minimise impact.
- Replacement planting is proposed as part of the landscape plans issued by Dermot Foley Landscape Architects.
- The following mitigation measures are proposed:
- To protect trees to be retained, fell adjacent trees to be removed and grind out stumps in accordance with BS5837:2012;
- Implement tree protection measures for trees to be retained in accordance with BS5837:2012 before any demolition or construction works proceed;
- Where required strip and store topsoil in accordance with BS4428:1989 and BS3882:2007;
- Install proposed replacement and additional proposed planting and seeded areas in accordance with the Typical Soft Landscape Details issued by Áit Urbanism + Landscape Ltd s and included separately as part of this planning submission.
- Install proposed tree, groundcover, grassland, and wetland planting in accordance with the proposed landscape plans;
- Where temporary construction is needed, lighting will be directed away from retained vegetation and ecological corridors where practicable. Light spill outside the working area will be minimised.

# 14. Archaeology

The objective of this chapter is to outline overarching principles for the implementation of mitigation measures during the construction phase, aimed at minimizing risks to the environment pertaining to consideration of aspects of archaeological significance.

Prior to the commencement of construction, the identified archaeological areas will be subject to preservation by record. These works will be carried out under licence to the DoCHG and full provision will be made available for the excavation and analysis of the remains.

All topsoil stripping associated with the proposed development will be monitored by a suitably qualified archaeologist. If any features of archaeological potential are discovered during the course of the works further archaeological mitigation may be required, such as preservation in-situ or by record. Any further mitigation will require approval from the National Monuments Service of the DoCHG.

All works along townland boundaries will be subject to archaeological monitoring in order to ensure a record of each boundary and their characteristics is compiled during the construction of the proposed development.

# 15. Site Compound Facilities and Parking

Temporary construction compounds will be required to provide stores, offices, material storage, parking and welfare facilities for the contractor and resident engineer's staff. The exact location, layout and size of the compounds will be at the discretion of the contractor with the agreement of DLRCC.

The construction compound will include :

- Adequate welfare facilities such as washrooms, drying rooms, canteen and first aid room as well as foul drainage and potable water supply
- Foul drainage discharge from the construction compound will be tankered off site to a licensed facility until a connection to the public foul drainage network has been established
- The construction compound's potable water supply shall be protected from contamination by any construction activities or materials
- The construction compound will be enclosed by a security fence
- Access to the compound will be security controlled and all site visitors will be required to sign in on arrival and sign out on departure
- A permeable hardstand area will be provided for staff car parking
- A separate permeable hardstand area will be provided for construction machinery and plant
- The construction compound will include a designated construction material recycling area
- A series of way finding signage will be provided to direct staff, visitors and deliveries as required
- All construction materials, debris, temporary hardstands etc. in the vicinity of the site compound will be removed off-site on completion of the works.

# 16. Site Security and Compound Plan

The Contractor shall prepare a Site Security & Compound Plan detailing security arrangements including hoarding, signage, signing in / out procedures, location of site and materials compound including areas identified for the storage of construction waste, location of areas for site offices and staff facilities, etc. and this shall be included in the Safety & Health Plan for Construction.

Temporary fencing will be installed on each side of the proposed road where development has not progressed to form the permanent boundary.

# 17. Conclusion

The construction management plan addresses construction activities on site that may result in noise, air quality, water quality, biodiversity or waste management issues, should the plan not be put in place and implemented.

These include procedures for monitoring and tracking construction activities and ensuring construction personnel are trained and educated as necessary. The construction & environmental management plan should be reviewed as the construction phase progresses to accommodate any changes in activities on site.

This CEMP should be read in conjunction with the Ecological Impact Assessment as produced by JBA on behalf of DLRCC for the Public Ream & Plaza – East/North of Waldemar Tce. Mitigation measures including invasive species management, habitat protection measures and all other wildlife protection measures shall be incorporated into the Contractor's Construction Environmental Management Plan and implemented throughout the construction phase.

ENVIRONMENT
ISO 14001:2015
NSAI Certified

HEALTH
& SAFETY
ISO 45001:2018
NSAI Certified

QUALITY
I.S. EN ISO 9001:2015
NSAI Certified

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# Technical Note

| | | | |
|---|---|---|---|
| Project Title: | **New Public Realm and Plaza East and North of Waldemar Terrace** | | |
| Document Title: | **Sustainable Surface Water Drainage Strategy** | | |
| Document Ref: | 260051-X-00-X-XXX-TN-DBFL-CE-001 - DRAINAGE STRATEGY | Rev: | 02 |
| Document Status: | S3-Review and Comment | | |

| Rev. | Date | Description | Prepared | Reviewed | Approved |
|---|---|---|---|---|---|
| 00 | 07/08/26 | First Issue for Review | Grant Humphrey | - | Aimee Dunne |
| 01 | 15/09/26 | Round 2 Issue | Grant Humphrey | - | Aimee Dunne |
| 02 | 12/11/26 | Part 8 Issue | Grant Humphrey | - | Aimee Dunne |

## 1. Introduction

DBFL Consulting Engineers (DBFL) have been commissioned by Dún Laoghaire-Rathdown County Council (DLRCC) to provide consulting engineering services for the design and development of the Public realm scheme.

The proposed public realm scheme seeks to transform an under-utilised urban area to create a communal space that prioritises safety, accessibility and the environment.

The purpose of this report is to provide supporting information about the proposed public realm scheme with regards to sustainable surface water drainage strategies.

## 2. Existing Drainage

The existing is site is currently a localised undeveloped urban area of predominantly hardstanding area consisting of asphalt road surfacing and concrete footpaths.

The existing surface water network is shown in Figure 2-1: Existing Surface Water Network, upon review of both DLRCC records and review of the utilities survey undertaken by Apex Surveys.

There are isolated informal green areas within the site area, but in it's current state, holds minimal ecological value, and limited ability to reduce peak storm flows. The site is generally drained through a combination of typical road gulleys. There is a large Ø750mm surface water outfall

transversing through the site, with multiple smaller connections, the outfall discharges into the River Slang, to the west of the development.

Upstream of the River Slang, is the culverted realignment of the stream, which enabled the construction of the Dundrum Bypass Road (R117) The culvert system is known for flow constraint issues, further discussed within this Report.

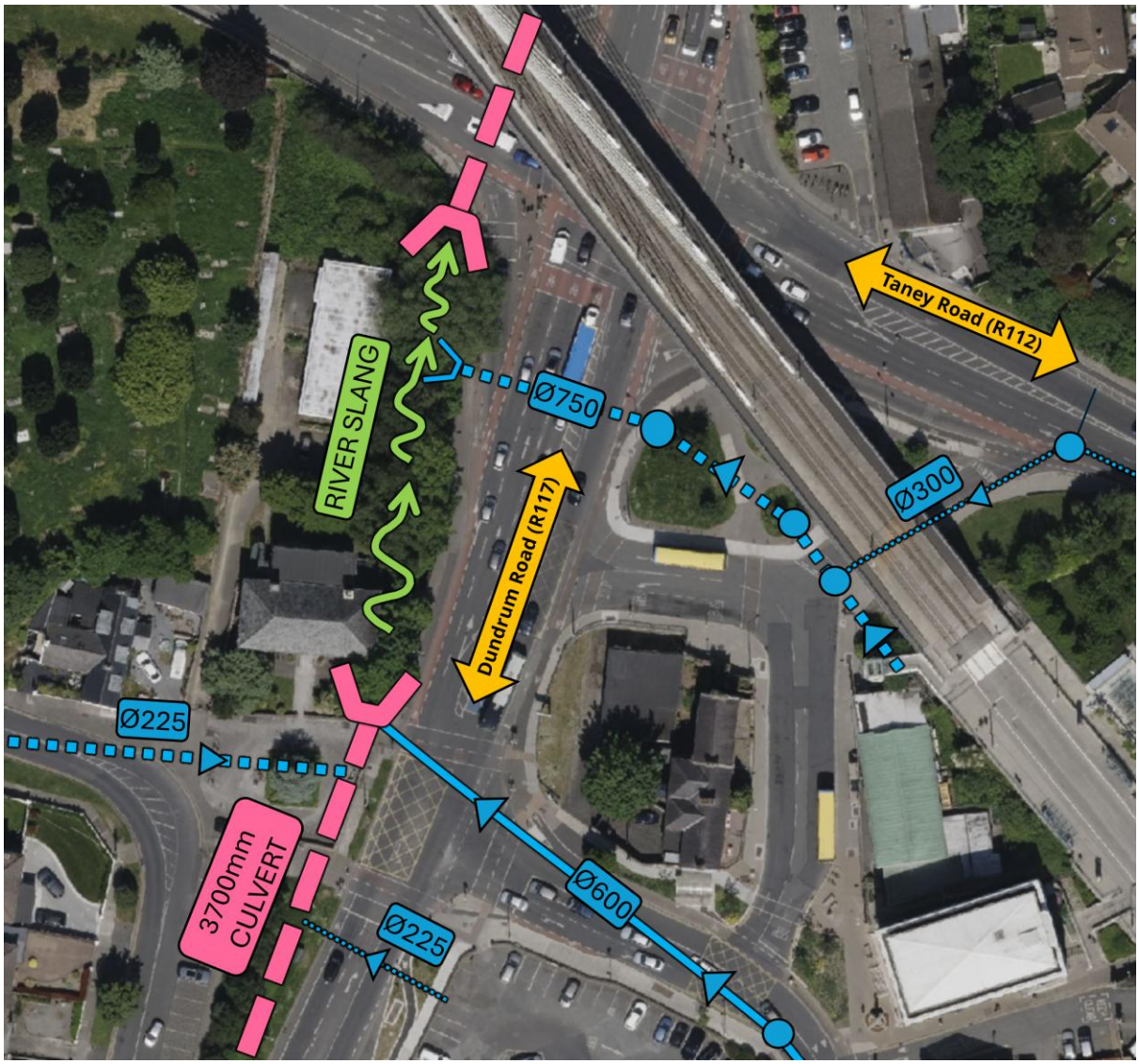


*Figure 2-1: Existing Surface Water Network*

The Strategic Flood Risk Assessment from DLRCC included within the County Development Plan has noted within the heavily culverted nature of the Dundrum Slang River and the limited capacity of the culverts located upstream of the Junction of Dundrum Bypass and Main Street Junction with

Centre generate excessive overland flood flow volumes that pond at low lying areas noted in Figure 2-2.

The extent of ponding is impacted by overland flood levels that would ultimately need to overtop the road kerb and railing plinth adjacent to the library , draining downstream back into the River Slang Channel.

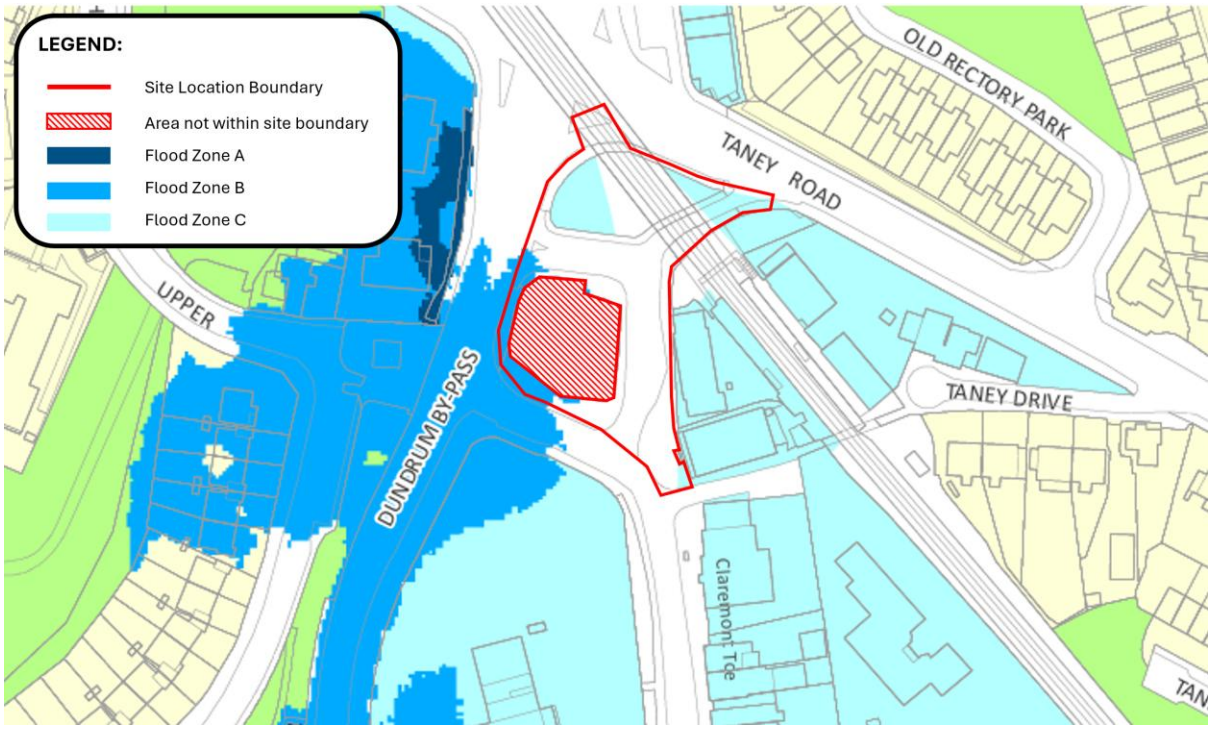


*Figure 2-2 : Adjacent Flooding Issues*

# 3. Drainage Strategy

## 3.1. Overview

Please refer to Proposed Drainage Layout, 260051-X-0500-Z00-DTM-DR-DBFL-CE-1301, for drainage proposals. The scheme's strategy at it's core is intended as an exemplarily example of a Sustainable Drainage Retrofit Design.

The management of surface water for the proposed development has been designed to comply with the policies and guidelines outlined in the Greater Dublin Strategic Drainage Study (GDSDS), the Ciria C753 Report '*The SuDS Manual*' and with the requirements of the "*Dún Laoghaire-Rathdown County Development Plan 2022-2028.*"

The primary management of surface water runoff will be through the utilisation of nature-based solutions, promoting the four 'pillars' of sustainable urban drainage as summarised in **Figure 3-1.**

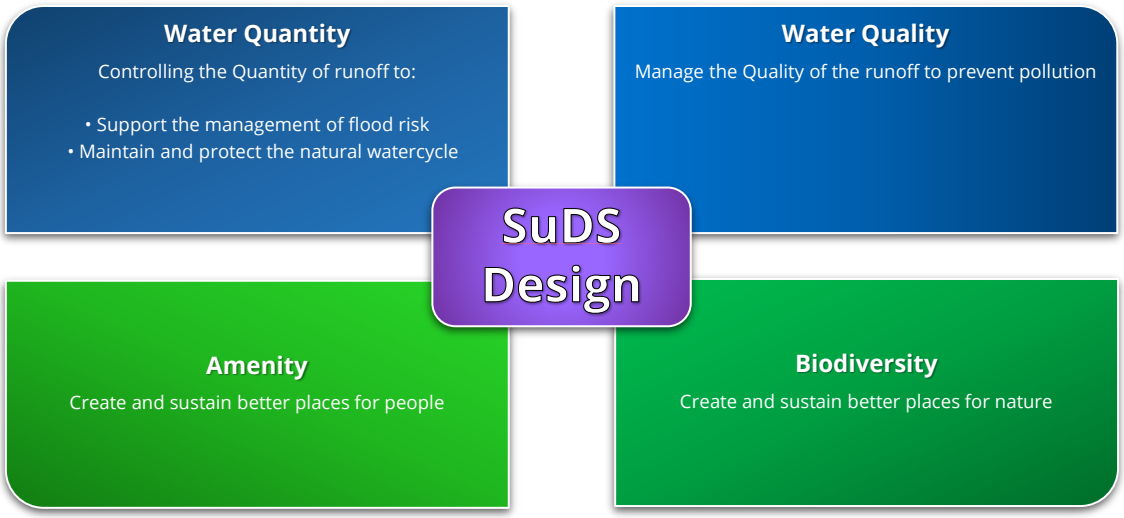


*Figure 3-1: Four fundamentals of sustainable urban drainage (Source: Ciria C753)*

The aim of the SuDS strategy for the site will be to;

- Reduce storm-water runoff,
- Reduce the likelihood of flooding,
- Promote infiltration where feasible,
- Reduce pollution impact,
- Replicate the natural characteristics of rainfall runoff for the site,

- Promote biodiversity, providing wildlife connectivity throughout the development.

### 3.2. SuDS Selection

The intention of SuDS selection hierarchy within the development was to implement a management train strategy, optimally replicating natural drainage paths with the sequential design and placement of various drainage elements to progressively control surface water pollution, flow, and volumes.

The seamless integration of SuDS elements into the urban landscape was thoughtfully planned and designed through coordination with the entire design team.

The development proposed is an exemplary example of nature based SuDS solutions provided by DLRCC within the public realm, therefore

The selection of SuDS ensures a well-organized network of SuDS elements intended on minimising and controlling runoff and pollution throughout. The goal of the development's SuDS selection is to ensure that low to average rainfall events are rather intercepted at the source thus reducing the reliance and over design of conventional piped systems. The proposed development has ensured effective land-use planning strategies by identifying key natural flow paths, existing water bodies and potential infiltration areas in order to understand opportunities and constraints within the site area. The development has promoted the reduction of impermeable areas and ensured that SuDS features present in the inception of the management train, ensuring SuDS elements are not relegated to token visual features.

### 3.3. SuDS Design strategy

The SuDS strategy, at a minimum, intends to mirror the natural drained environment by considering and recognising natural flow paths, with the proposed infrastructure emulating and optimising the management of surface water through detailed site layout design and drainage infrastructure.

Proposed Nature Based SuDS include a combination of :

- Dry and Wet Swales
- Tree Pits
- Filter Drains
- Rain Gardens

- Biofiltration areas
- Permeable Paving

This includes surfaced impermeable paved areas within the central paved plaza positively draining into proposed nature-based SuDS solutions, while remaining hardstanding areas will infiltrate locally into permeable surfacing, collected by underlying filter drains. Collected surface water from SuDS elements will discharge into proposed conventional piped surface water networks that discharge ultimately into the River Slang.

The proposed scheme is illustrated in Figure 3-2 below.

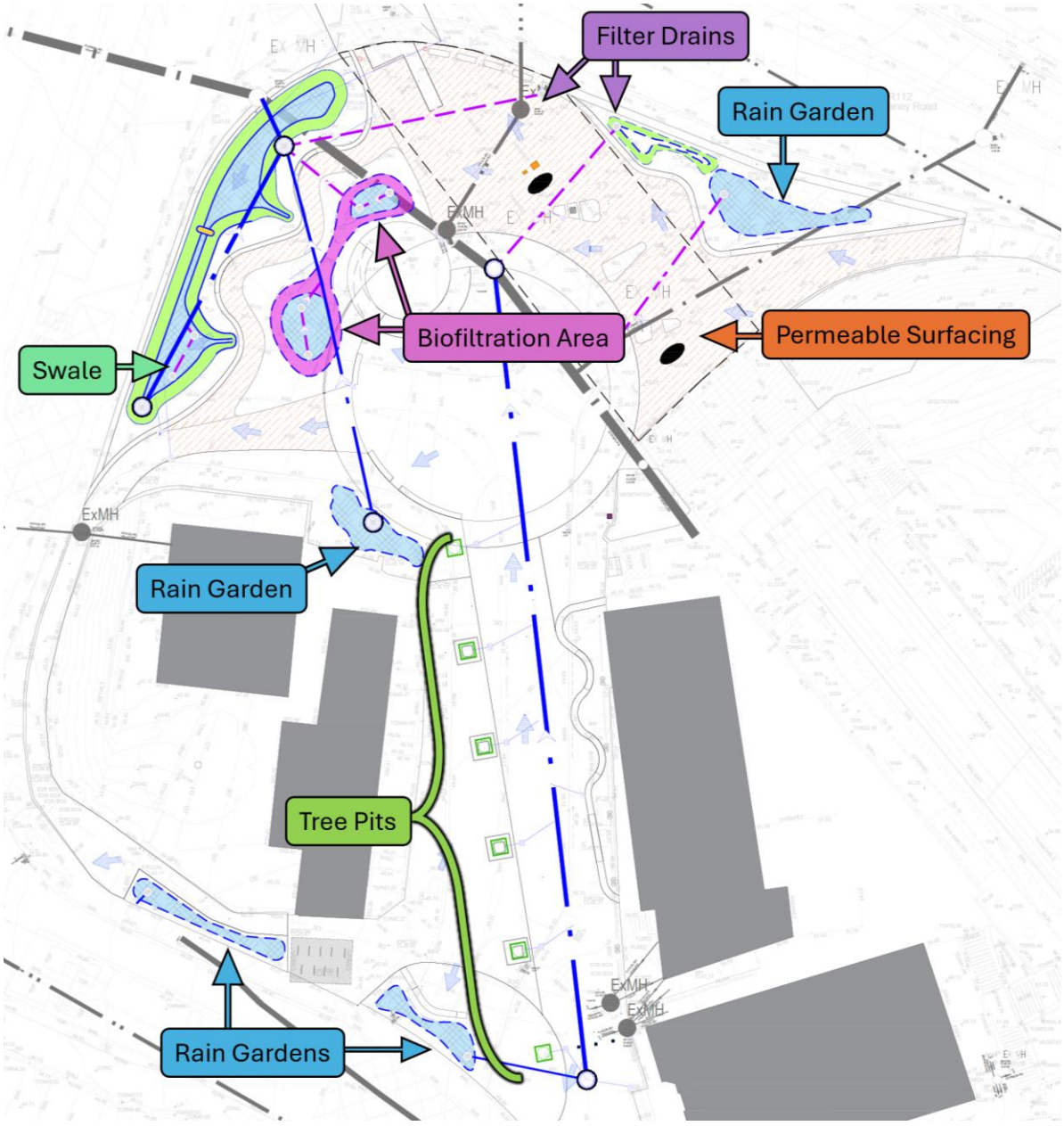


*Figure 3-2 : Proposed Drainage Strategy*

SuDS features typically promote a reduction of velocity which slows the run-off at source, changing the input hydrograph which will ultimately reduce the peak inflow required for attenuation calculations.

In addition, rainfall will 'wet' the initial surface of SuDS elements allowing water to be stored in the micro and macrotexture of the surfacing and will be lost to evapotranspiration, giving a reduction in volume. As run-off drains to these SuDS elements and through the build-up, the aggregate/soil

surface area will also 'wet' giving another reduction of volume due to evapotranspiration and natural storage within the SuDS feature.

Flow-control devices are limited to the bioretention areas indicated, where limited attenuation volumes can be stored without increasing the risk of overland flooding near the confluence with the River Slang to the west of the scheme. It is proposed that orifice sizes be limited to 100mm within bioretention outlet chambers as shown in the Proposed Drainage Layout (Drawing 260051-X-0500-Z00-DTM-DR-DBFL-CE-1301), in accordance with GDSDS recommendations to mitigate blockage risk.

### 3.4. Site Runoff Management

The runoff coefficients consider are in line with the local authority guidelines as well as industry standards for specific elements and surfaces. The following runoff coefficients have been applied to the development, namely:

- Roads (draining into SuDS Structures): 85%
- Landscaped Paths (draining into SuDS Structures: Swales/bioretention facilities): 75%
- Permeable Surfacing: 70%
- Green areas: 30%

### 3.5. Climate Change and Creep

In line with the requirements of Appendix 7 of the DLRCC Development Plan, the site shall be designed to accommodate climate change by increasing rainfall intensities by 20%. An additional 10% has been applied to all captured areas Although the site at it's core, exemplifies the retrofitting of nature designed SuDS solutions, an additional 10% accounting for Urban Creep has been applied to all impermeable areas. Site Runoff Factors applied to impermeable surfaces draining to SuDS structures have increased from 85% to 93.5% which is still industry norm.

### 3.6. Network Design

The surface water pipe networks and SuDS elements such as the biofiltration areas and filter drains have been modelled within the Causeway Design Software and a copy of the calculations are provided in Appendix A.

*Table 3-1: Summary of surface water design parameters*

| | |
|---|---|
| **Design Rainfall Frequency**<br>**IS EN 752:2017 : 5.3.2.2 Table 2** | 5 Years (20% AEP): Public Schemes |
| **Time of entry:** | 5 minutes |
| **Pipe Friction (Ks):** | 0.6 mm (Concrete)<br>0.15 mm (uPVC) |
| **Minimum Full Bore Velocity:** | 1.0 m/s |
| **Standard Average Annual Rainfall (SAAR):** | 833 |
| **M5-60:** | 17.50 mm |
| **Ratio r (M5-60):** | 0.277 |
| **Climate Change:** | 20% for rainfall intensities |
| **Urban Creep:** | 10% |
| **Volumetric Coefficient ($C_v$)** | 1.0 |
| **Main Sewer minimum pipe diameter:** | 225mm |
| **Private drain minimum pipe diameter:** | 100mm |
| **Attenuation Storm Return Event:** | GDSDS Volume 2: Criterion 3 (pg. 61)<br>▪ 30 year no flooding on site<br>▪ 100-year check no internal property flooding<br>▪ Flood routing plan.<br>▪ Finished Floor Levels (FFL) 500mm freeboard above 100-year flood level plus climate change.<br>▪ No flooding to adjacent areas. |

### 3.7. Flood Risk

The Site-Specific Flood Risk Assessment of the proposed development, 260051-X-00-X-XXX-RP-DBFL-CE-002, as part of the planning package was undertaken with the requirements of the "Planning System and Flood Risk management Guidelines for Planning Authorities", November 2009.

The proposed public realm scheme would be classified as a 'water compatible development' according to Table 3.1 of the Guidelines, in which the Sequential Approach mechanism enables this type of development to be located within any Flood Zone including Flood Zone A, where the probability of flooding from rivers and the sea is highest, exceeding a 1% or 1 in 100 year for river flooding and 0.5% or 1 in 200 for coastal flooding.

The process of following flood risk assessment stages determined that the site is within Flood Zone Categories, B & C as defined by *The Guidelines*.

It was therefore concluded that:

- The development proposed is appropriate for the Site's flood zone category
- The Planning System and Flood Risk Management Guidelines Sequential Approach is met and the 'Avoid' principal achieved
- A Justification Test is not required

### 3.8. Exceedance Flood Provision

During an exceedance storm event, i.e. greater than the 1% AEP event, the development's layout is designed to direct over-land flows away from buildings. Adjacent flooding during an exceedance storm event caused by the surcharging of the River Slang Culvert System may interact within the proposed swale within the south-western corner of the development as indicated in Figure 7-2, strategic overflow brio manholes have therefore been placed providing local temporary relief back into the surface water network.

#### 3.8.1. Maintenance of Surface Water & SuDS features

Part of ensuring sustainable drainage elements is ensuring that they operate optimally in both reducing run-off volumes and treatment capacity within their design life, without regular maintenance this is not possible. Regular maintenance of the storm network reduces the chance of flooding, ponding and contamination of surrounding water courses.

Typical maintenance procedures should ensure at minimum that there is any:

- ✓ Evidence of any accidental damage to the system
- ✓ Abnormal surface clogging visible within SuDS elements
- ✓ Evidence of cross connections or other unauthorised inflows
- ✓ Evidence of tampering with the flow controls

Chapter 32 of the CIRIA SuDS Manual (C753: 2015) will be used as the general overarching guideline for the implementation of maintenance guidelines of proposed SuDS elements. It is intended that the following elements which are to be inspected regularly as part of the maintenance routine. Guidelines referenced within the SuDS Manual are not intended to be exhaustive, and respective indicated additional requirements/amendments may still apply where applicable. The SuDS features proposed above for the site will require the following maintenance:

*Table 3-2: SuDS Maintenance Plan*

| **SuDS *Element*** | **Typical Maintenance Procedures** |
|---|---|
| *Permeable Paving* | <u>Annually</u><br>✓ Brushing and vacuuming (standard cosmetic sweep over whole surface)<br>✓ Removal of weeds or management using glyphosate (or similar approved) applied directly into the weeds by an applicator rather than spraying<br>✓ Monitor Inspection Chambers<br><u>Occasional (or as required)</u><br>✓ Quarterly inspection for evidence of poor operation and/or weed growth<br>If structural damage is present, repair any depressions, rutting, cracked or broken Cells considered detrimental to the structural performance or a hazard to users |
| *Tree Pits* | <u>Monthly:</u><br>✓ Remove litter and debris<br>✓ Manage other vegetation and remove nuisance plants<br>✓ Inspect inlets and outlets |

| | |
|---|---|
| *Bioretention Basins, Dry Swales and Rain Gardens* | <u>Annually</u><br>✓ Check tree health and manage tree appropriately<br><u>Occasional (or as required)</u><br>✓ Biannual inspection of silt accumulation rates and establish appropriate removal frequencies |
| | <u>Monthly:</u><br>✓ Remove litter and debris<br>✓ Cut grass – for spillways and access routes<br>✓ Manage other vegetation and remove nuisance plants<br>✓ Inspect inlets, outlets and overflows for blockages and silt accumulation.<br><u>Annually</u><br>✓ Check integrity of any penstocks and other mechanical devices including flow control devices<br>✓ Tidy all dead growth before start of growing season<br>✓ Manage wetland plants in outlet pool where provided<br><u>Occasional (or as required)</u><br>✓ Reseed areas of poor vegetation growth<br>✓ Prune and trim any trees and remove cuttings |

# 4. Conclusion

In summary, the proposed scheme, with the typical quantum of impermeable surfaces appropriate to the type of development would typically result in an increased runoff volume compared to an equivalent greenfield site. However, the effective drained area of the proposed development in comparison to its existing state , as described, has been significantly reduced and therefore any pluvial flood risk has been well-mitigated within the site when compliant to guidance documents. This also includes proposals incorporates substantial open spaces and well-designed Sustainable Drainage Systems (SuDS) further reducing pluvial risk and greatly improving water quality parameters of collected surface water.

# Appendix A : Supporting Information

## Design Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Maximum Time of Concentration (mins) | 60.00 |
| Return Period (years) | 5 | Maximum Rainfall (mm/hr) | 100.0 |
| Additional Flow (%) | 30 | Minimum Velocity (m/s) | 1.00 |
| FSR Region | Scotland and Ireland | Connection Type | Level Soffits |
| M5-60 (mm) | 17.500 | Minimum Backdrop Height (m) | 0.200 |
| Ratio-R | 0.277 | Preferred Cover Depth (m) | 1.200 |
| CV | 1.000 | Include Intermediate Ground | ✓ |
| Time of Entry (mins) | 5.00 | Enforce best practice design rules | ✓ |

## Simulation Settings

| | | | |
|---|---|---|---|
| Rainfall Methodology | FSR | Skip Steady State | x |
| Rainfall Events | Singular | Drain Down Time (mins) | 240 |
| FSR Region | Scotland and Ireland | Additional Storage (m³/ha) | 20.0 |
| M5-60 (mm) | 17.500 | Starting Level (m) | |
| Ratio-R | 0.277 | Check Discharge Rate(s) | x |
| Winter CV | 1.000 | Check Discharge Volume | x |
| Analysis Speed | Normal | | |

### Storm Durations

| 15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440 |
|---|---|---|---|---|---|---|---|---|---|---|---|

| Return Period (years) | Climate Change (CC %) | Additional Area (A %) | Additional Flow (Q %) |
|---|---|---|---|
| 100 | 20 | 10 | 0 |

## Node S-BR12 Online Orifice Control

| | | | | | |
|---|---|---|---|---|---|
| Flap Valve | x | Replaces Downstream Link | x | Diameter (m) | 0.100 |
| Downstream Link | 6.001 | Invert Level (m) | 43.967 | Discharge Coefficient | 0.600 |

## Node S-BR2-2 Online Orifice Control

| | | | | | |
|---|---|---|---|---|---|
| Flap Valve | x | Replaces Downstream Link | x | Diameter (m) | 0.100 |
| Downstream Link | 9.001 | Invert Level (m) | 44.000 | Discharge Coefficient | 0.600 |

## Node S-BR11 Tank Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Invert Level (m) | 44.000 | Time to half empty (mins) | 0 | Analyse flow through structure | x |

### Inlets

S-BR1

| Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) |
|---|---|---|---|---|---|---|---|
| 0.000 | 6.0 | 0.450 | 6.0 | 0.451 | 18.0 | 0.900 | 38.6 |

## Node S-BR2-1 Tank Storage Structure

| | | | | | |
|---|---|---|---|---|---|
| Invert Level (m) | 44.700 | Time to half empty (mins) | 0 | Analyse flow through structure | x |

### Inlets

S-BR2

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| Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) | Depth (m) | Area (m²) |
|---|---|---|---|---|---|---|---|
| 0.000 | 2.6 | 0.450 | 2.6 | 0.451 | 7.5 | 0.900 | 24.9 |

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**Results for 100 year +20% CC +10% A Critical Storm Duration. Lowest mass balance: 100.00%**

| Node Event | US Node | Peak (mins) | Level (m) | Depth (m) | Inflow (l/s) | Node Vol (m³) | Flood (m³) | Status |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | SE-3 | 1 | 42.520 | 0.000 | 0.0 | 0.0000 | 0.0000 | OK |
| 15 minute winter | SE-2 | 11 | 42.479 | 0.189 | 42.2 | 0.4806 | 0.0000 | OK |
| 15 minute winter | SE-1 | 12 | 42.467 | 0.209 | 80.6 | 0.5314 | 0.0000 | OK |
| 15 minute winter | SE-0 | 12 | 42.389 | 0.169 | 80.7 | 0.0000 | 0.0000 | OK |
| 15 minute winter | SE-2-1 | 11 | 44.658 | 0.078 | 9.6 | 0.0901 | 0.0000 | OK |
| 15 minute winter | S-SW1 | 10 | 45.649 | 0.049 | 3.7 | 0.0658 | 0.0000 | OK |
| 15 minute winter | SA-1 | 10 | 45.245 | 0.105 | 29.7 | 0.2011 | 0.0000 | OK |
| 15 minute winter | S-RG1 | 10 | 45.482 | 0.082 | 8.9 | 0.1164 | 0.0000 | OK |
| 15 minute winter | SB3 | 10 | 44.035 | 0.055 | 4.8 | 0.0708 | 0.0000 | OK |
| 15 minute winter | SB2 | 11 | 44.003 | 0.061 | 6.2 | 0.0715 | 0.0000 | OK |
| 15 minute winter | SB1 | 11 | 43.841 | 0.178 | 39.9 | 0.2161 | 0.0000 | OK |
| 15 minute winter | S-RG2 | 10 | 44.511 | 0.066 | 7.1 | 0.0872 | 0.0000 | OK |
| 15 minute winter | SB1-1 | 11 | 43.943 | 0.078 | 12.5 | 0.0888 | 0.0000 | OK |
| 15 minute winter | S-PP1 | 10 | 45.384 | 0.064 | 6.1 | 0.0937 | 0.0000 | OK |
| 15 minute winter | 9 | 11 | 44.950 | 0.135 | 29.3 | 0.0000 | 0.0000 | OK |
| 15 minute winter | S-BR11 | 12 | 44.116 | 0.116 | 7.9 | 0.7990 | 0.0000 | OK |
| 15 minute winter | S-BR12 | 12 | 44.111 | 0.144 | 6.1 | 0.2830 | 0.0000 | OK |
| 15 minute winter | S-BR2-1 | 9 | 44.758 | 0.058 | 14.0 | 0.2241 | 0.0000 | OK |
| 15 minute winter | S-BR2-2 | 12 | 44.647 | 0.647 | 13.9 | 0.3626 | 0.0000 | SURCHARGED |
| 15 minute winter | S-BR1 | 12 | 44.114 | 0.114 | 0.9 | 0.0000 | 0.0000 | OK |
| 15 minute winter | S-BR2 | 10 | 44.756 | 0.056 | 0.3 | 0.0000 | 0.0000 | OK |

| Link Event (Upstream Depth) | US Node | Link | DS Node | Outflow (l/s) | Velocity (m/s) | Flow/Cap | Link Vol (m³) | Discharge Vol (m³) |
|---|---|---|---|---|---|---|---|---|
| 15 minute winter | SE-3 | 3.000 | SE-2 | 0.0 | 0.000 | 0.000 | 0.8879 | |
| 15 minute winter | SE-2 | 1.002 | SE-1 | 40.8 | 0.438 | 0.091 | 2.2400 | |
| 15 minute winter | SE-1 | 1.003 | SE-0 | 80.7 | 0.928 | 0.181 | 2.5083 | 41.0 |
| | | | | | | | | |
| 15 minute winter | SE-2-1 | 2.001 | SE-2 | 9.6 | 0.690 | 0.136 | 0.1634 | |
| 15 minute winter | S-SW1 | 4.000 | SE-2 | 3.6 | 0.729 | 0.222 | 0.0775 | |
| 15 minute winter | SA-1 | 1.000 | 9 | 29.3 | 1.129 | 0.264 | 0.8458 | |
| 15 minute winter | S-RG1 | 2.000 | SE-2-1 | 8.7 | 0.910 | 0.538 | 0.1483 | |
| 15 minute winter | SB3 | 7.000 | SB2 | 4.7 | 0.499 | 0.067 | 0.0880 | |
| 15 minute winter | SB2 | 7.001 | SB1 | 6.1 | 0.618 | 0.086 | 0.1542 | |
| 15 minute winter | SB1 | 5.002 | SE-1 | 39.9 | 0.995 | 0.562 | 0.1755 | |
| 15 minute winter | S-RG2 | 5.000 | SB1-1 | 6.9 | 0.744 | 0.174 | 0.1639 | |
| 15 minute winter | SB1-1 | 5.001 | SB1 | 12.5 | 0.941 | 0.231 | 0.1768 | |
| 15 minute winter | S-PP1 | 8.000 | SB1 | 5.9 | 0.835 | 0.363 | 0.1552 | |
| 15 minute winter | 9 | 1.001 | SE-2 | 29.0 | 0.966 | 0.410 | 0.9771 | |
| 15 minute winter | S-BR11 | 6.000 | S-BR12 | 6.1 | 0.494 | 0.376 | 0.0636 | |
| 15 minute winter | S-BR12 | 6.001 | SB1-1 | 5.8 | 0.830 | 0.327 | 0.0189 | |
| 15 minute winter | S-BR2-1 | 9.000 | S-BR2-2 | 13.9 | 2.237 | 0.260 | 0.0394 | |
| 15 minute winter | S-BR2-2 | 9.001 | SB1 | 11.6 | 1.487 | 1.481 | 0.0631 | |

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