

Water Management & Conservation Plan

Proposed Development at Barnhill Garden
Village, Dublin 15

DOCUMENT CONTROL

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1.1 WATER MANAGEMENT & CONSERVATION

This plan seeks to ensure that best practise in water conservation can be achieved throughout the proposed development by limiting unnecessary water usage, leakage and excessive consumption.

The key regulatory instrument for water in Ireland and the EU is the Water Framework Directive (WFD), which reflects the need to conserve adequate supplies of water, along with protecting and preserving water quality. Water conservation is also one of three key themes set out by the Irish Government in the *Water Services Policy Statement 2018– 2025*. The National Planning Framework 2040 notes that a key future growth enabler for the Dublin region is *‘Improving sustainability in terms of energy, waste and water, to include district heating and water conservation’*. The Regional Spatial & Economic Strategy 2019-2031 (‘RSES’) for the Eastern & Midland Region also places an emphasis on water conservation noting that water conservation is increasingly important and sustainable water management practices can help in meeting our obligations under the Water Framework Directive and Climate adaptation. The RSES also states that the approach to water in the region should be *‘to ensure that water is used as efficiently as possible, address water wastage, water conservation and reduce leakage, minimising demand for capital investment.’*

At a more local level the Fingal County Council Development Plan 2017-2023 promotes water conservation through Objective DW06, the aim of which is to *‘Promote the sustainable use of water and water conservation in existing and new development within the County and encourage demand management measures among all water users.’* The proposed development is located on lands which are the subject of the Barnhill Local Area Plan (‘LAP’) 2019. The LAP contains the following Policy Objectives in relation to water conservation;

Policy Objective WS2

Promote water conservation to reduce the overall level of water loss in the public supply by encouraging the adoption of water saving measures in future development. Such measures will increase the extent of development capable of being serviced by the existing water treatment plant. Such measures can include:

- *Water butts to collect rainwater*
- *Low flush and dual flush toilets*
- *Low water use appliances*
- *Rainwater harvesting*

Policy Objective WS3

Require that a Water Management and Conservation Plan, detailing how best practice in water conservation shall be applied to include both watermains and internal plumbing, be prepared for development on these lands in order to limit unnecessary water usage, leakage and excessive consumption.

As well as the above policies and objectives there are a number of bodies which promote and support the domestic & commercial management and conservation of water. An overview of these is provided below;

IRISH WATER & LOCAL AUTHOIRTIES

Irish Water will be responsible for managing the provision and supply of water in the proposed development. Irish Water is a State Body established as the national water services authority to provide safe, clean, affordable and environmentally compliant water and wastewater services to households and businesses across the country. It took responsibility for the operation and maintenance of water and wastewater assets from local authorities on 1 January 2014. Irish Water have introduced a national Leakage Reduction Programme. This programme involves Irish Water and Local Authorities working in tandem to repair burst pipes and fix underground leaks to provide a more reliable water supply. Irish Water also offer free leak investigations and repairs where a constant flow of water is found on a customers' external water supply pipe. Furthermore, the Irish Water Find & Fix scheme involves leak detection experts using underground sound equipment in public areas to locate and repair leaks. Irish Water and many Local Authorities have educational campaigns in relation to water use and conservation.

Local authorities are the supervisory authorities in relation to private water supplies and they administer the Rural Water Programme at county level. Under the European Union (Water Policy) Regulations 2014, local authorities are the competent authorities for the purposes of regional co-ordination, public consultation, and the implementation of river basin management plans and programmes of measures in their functional areas.

WATER ADVISORY BODY

The Water Services Act 2017 provided for the establishment of the Water Advisory Body. It is assigned functions under Section 44 of the Act to: Advise the Minister on the measures needed to improve the transparency and accountability of Irish Water for the purpose of increasing the confidence of

members of the public in Irish Water, and Report to an Oireachtas Committee on a quarterly basis on the performance by Irish Water in the implementation of its business plan. The Water Advisory Body is a five-member body appointed by the Minister, with one nominee each from the Commission for Regulation of Utilities, the Environmental Protection Agency and the An Fóram Uisce.

THE NATIONAL WATER FORUM (AN FÓRAM UISCE)

The National Water Forum was established in 2017 with a view to providing a platform for public engagement in the drafting and implementation of the River Basin Management Plans for Ireland and on matters relating to water as an environmental, social and economic resource, as an input into water policy. The Forum is intended to provide an independent voice on water policy issues. The statutory functions of the Forum (as set out under Section 26 of the Water Services Act 2017) include advising the Minister for Housing, Planning and Local Government on water policy and water conservation. The Water Forum have published a number of reports in relation to domestic water conservation.

2. WATER USAGE IN IRELAND

The Commission for the Regulation of Utilities reported in 2019 that an average household in Ireland uses 125,000 litres (125 m³) of water each year, which is approximately 2,400 litres of water per week. How this translates into an amount of water used by each person depends on the number of people in each dwelling, however, an average water usage would be c. 133 litres per person per day (CRU, 2019).

The everyday ways we use water, but rarely think about are;

- Toilet flushing,
- Showering and bathing
- Teeth brushing,
- Dishwashing
- Garden watering

Figure 2 & Figure 3 show an approximate breakdown of water usage in a typical Irish house. It does not account for occasional water losses due to leaks or plumbing issues. Actual usage figures numbers can vary according to the water fittings being used and/or the behaviour of the occupants.

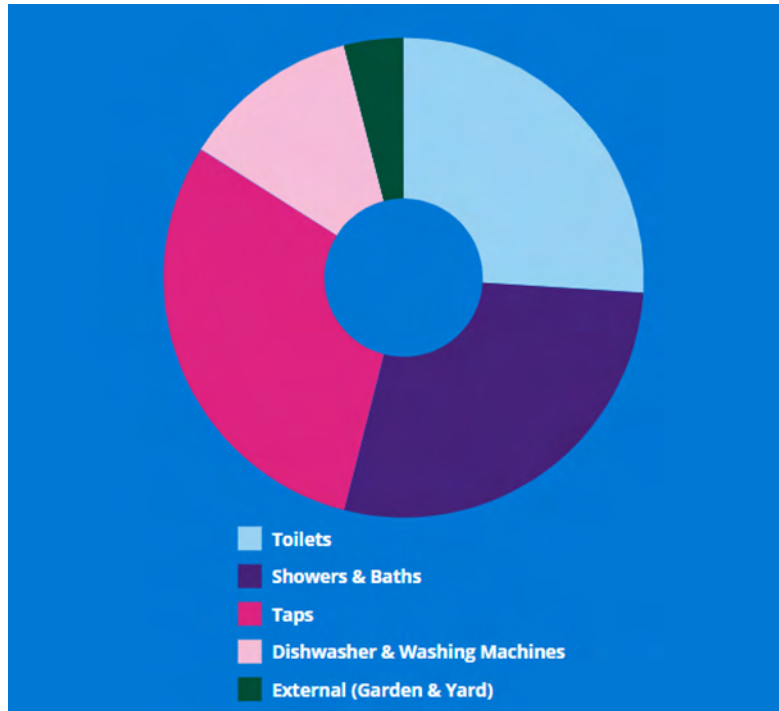


Figure 2: Typical Water Usage (source: Irish Water)

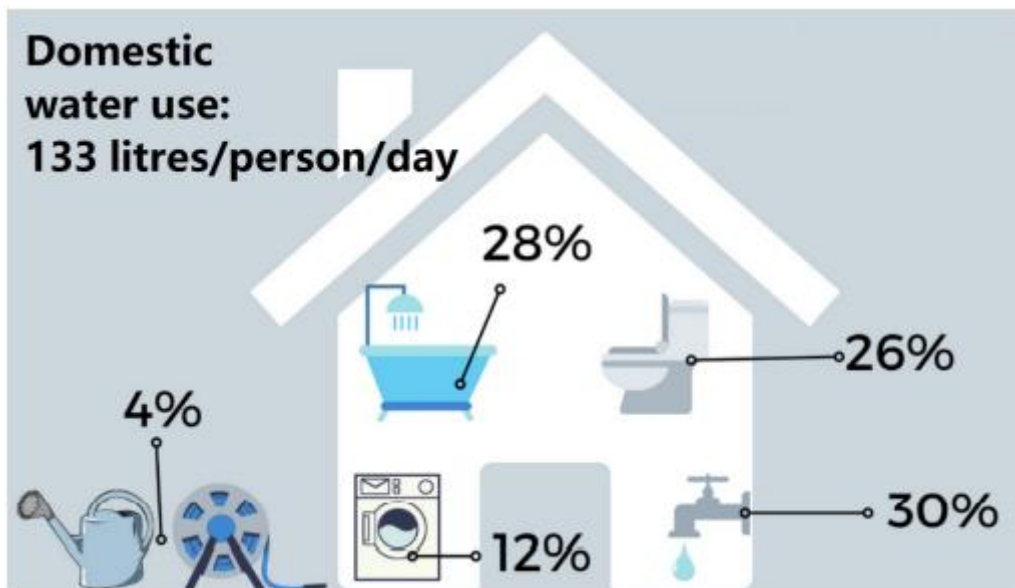


Figure 3: Domestic Water Usage (source: The Water Forum)

According to Irish Water much of Ireland’s drinking water is lost to leaks before it reaches our taps. In an effort to conserve water, Irish Water have invested over €500 million up to the end of 2021 and are aiming to invest a further €250 million every year up to the end of 2030 in fixing leaks to provide a more reliable water supply. Irish Water estimate that every day approximately 38% of

treated water is currently lost through leaks before it even reaches our taps. Leaks can be difficult to find as they occur in the vast and complex network of pipes below ground. Many of these pipes are now old and damaged and need to be repaired or replaced to improve water quality and supply.

Despite the challenges leakage poses to water conservation, progress is being made. In 2018 the rate of leakage nationally was 46%, by the end of 2020 it was 40%. By the end of 2021 leakage was further reduced to 38% and Irish Water hope there will be further reduction to 25% by the end of 2030.

3. WATER MANAGEMENT & CONSERVATION MEASURES

A number of water saving and conservation devices will be used throughout the proposed development. These are outlined in the following sections.

3.1 WATERMAINS

Existing

The site is currently serviced by a 4" \varnothing uPVC watermain, installed in 1965, that travels through the site along the Barberstown Lane North Road. This watermain continues across the Royal Canal via Pakenham Bridge and traverses the existing Dublin to Maynooth Railway Line at the existing Barberstown Lane Level Crossing. This watermain services the existing dwellings and farm buildings within the site, located along the Barberstown Lane North Road. There are 2 no. hydrants and 2 no. air valves located on this section of watermain. The site is also serviced by a 4" \varnothing uPVC watermain, installed in 1965, and a 200mm \varnothing uPVC watermain, installed in 2004. These watermains are located along the existing R149 regional road that runs adjacent to the western boundary of the development site. A 300mm \varnothing MoPVC watermain shall be provided along the length of the proposed future Ongar – Barnhill Distributor Road. This proposed watermain is required to service the future Barnhill LAP development and will have a number of spurs to allow watermain connections to the internal watermain network within the proposed development. The Ongar to Barnhill Distributor Road Scheme shall be constructed prior to the commencement of construction works for the proposed development and, therefore, shall be considered part of the receiving environment for the Barnhill LAP development.

Proposed

The calculated post development average water demand for the Barnhill LAP development is approximately 530m³/day, with a post development peak water demand of approximately 3310m³/day. A proposed internal watermain network is to be constructed to supply the units within the development. This will be connected from the proposed watermain infrastructure installed during the construction of the Ongar to Barnhill Distributor Road that is to be in place prior to the construction of the Barnhill LAP development. Watermain pipe sizes will range from 150 – 200mm ϕ . The watermain network for the proposed development will be newly constructed using best practise methods and in accordance with most recent version of Irish Water's '*Code of Practice for Water infrastructure*' ensuing future leakage in the system is avoided as much as possible. As required by Irish Water standards, the watermain layout has been designed so that watermains are located in public spaces (i.e. roads, footpaths & open spaces) allowing easy access for future maintenance. Once constructed the management and maintenance of the network will become the responsibility of Irish Water. Wayleaves will be granted to Irish Water where necessary to allow future maintenance.

Please refer to the watermain details and drawings prepared by Clifton Scannell Emerson Associates which accompany the planning application.

3.2 RAINWATER HARVESTING

Rainwater harvesting is the process of collecting and storing rainwater. Rainwater butts are a popular method of rainwater harvesting and are proposed for all house and duplex units in the proposed development. Water butts are designed to collect rain water runoff from rooftops, rainwater is then redirected through downpipes and collected and stored in a water butt until needed.

They will typically have a storage capacity of approximately 0.5m³ and are easy to install at all types of development. The proposed Rainwater Butts will provide a good means of providing water for use in gardens, washing windows and cars whilst also conserving water. Water Butts can be especially useful during summer months when, as in recent years, water can be scarce and hosepipe bans and water restrictions are in place.



Figure 4: Typical Rainwater Butt

3.3 DUAL FLUSH TOILETS

All units within the proposed development will have dual flush toilets which provide the option to use a smaller volume of water per flush instead of the full flush volume all the time in turn saving water. The Irish Building Regulations Part G 2008 introduced the requirement that *“Sanitary conveniences shall be of such design as to facilitate efficient use of water for flushing”* and the technical guidance document to part G (TGD G) requires that all new and replacement WC suites have *“a dual flush facility combining a maximum flush volume of 6 litres and a reduced flush volume no greater than two thirds of the maximum”*.



Figure 5: Typical Dual Flush Toilet with 6 Litre Cistern

Irish Water 's Code of Practice for Water Infrastructure suggests that *“Developers, in the interest of water conservation, are encouraged to adopt. . . the use of dual flush water cisterns’*. The EPA notes that with an average of 4.66 flushes per person in an average household, the water saving attributable to a 6L dual flush toilet would be 24.5 Lcd compared to a 9L single flush toilet. It is estimated that this will reduce the water consumption by 16.3%.

3.4 TAPS & SINKS

Domestic taps are one of the most frequently used water-using components. The amount of water used in a tap is determined by its frequency of use, duration of use and the flow-rate of the tap.

Whilst the first two are dependent on user behaviour, the latter is determined by the design of the tap, any additional sensors, controls or fittings installed, and other factors such as water pressure.

Aerator taps will be provided throughout the development. These taps pump air into the water flow, which reduces the amount of water used for sinks or the shower. Where practicable smaller than standard sinks will be provided

3.5 SHOWERS & BATHS

Water-used in showers and baths is one of the highest contributors to household demand. Given that water used in showers is primarily heated, any conservation of shower water will consequently result in an energy saving too. Total water consumption in showers is affected by components including local water governance, individual attitudes, household composition and socio-demographic characteristics, as well as the type and efficiency rating of the shower head or system installed.

Aerator showerheads will be used throughout the development. These showerheads pump air into the water flow, which reduces the amount of water used for the shower. It is intended that smaller than standard baths will be provided where practicable.

3.6 APPLIANCES

It is not intended that appliances such as washing machines, dishwasher etc. will be provided however during the course of development should they be provided to any units, these will be A rated. Future residents will be encouraged to use A rated, low water appliances and to conserve water where practicable. The Irish Water website provide advice in relation to day-to-day water

conservation and details of same will be provided as part of Operation & Maintenance Manuals provided to purchasers.

3.7 SUSTAINABLE URBAN DRAINAGE SYSTEMS

Sustainable Urban Drainage Systems (SuDS) offer a comprehensive approach to the management of rainwater to delay and reduce runoff through infiltration, transpiration, evapotranspiration and re-use whilst also providing improvements to water quality, amenity, and biodiversity. It is an objective of Fingal County Council to incorporate SuDS in all new developments throughout the Fingal County Council area. The Greater Dublin Strategic Drainage Study (GSDSDS) is the key guideline document used for the purpose of design of surface water drainage systems. The GSDSDS presents a regional strategic approach to sustainable drainage having regard to the EU Water Framework Directive (WFD). It establishes key policies and standards which should be applied throughout the Dublin Region. The implementation of the GSDSDS guidelines in the context the Barnhill LAP will aim to prevent adverse impacts of discharging the development runoff, which may include discharging pollutants, into existing watercourses.

A detailed SuDS Strategy Report and associated drawings prepared by Clifton Scannell Emerson Associates, in conjunction with Gannon + Associates Landscape Architects, has been submitted with planning application and we would refer the reader to same. A number of SuDS features have been included in the design of the proposed development, and outline of these is provided below;

RAIN GARDENS

Rain Gardens have been incorporated into the design of the proposed apartment buildings. These are small planted areas, situated in open areas outside the building, with stormwater controls that collect and treat stormwater runoff. Shallow landscaped basins make use of soils and vegetation in order to remove pollutants. This treated runoff shall be collected in these basins and form part of a wider SuDS approach.

RAISED PLANTERS

Raised planters have been incorporated into the design of the proposed apartment blocks as an additional SuDS source control. A downpipe discharges surface water collected from its roof to a raised planter. This allows a volume of water to be stored within the planter and integrated within the proposed surface water network of the development. The planter will have an overflow outlet pipe in times of storm events. The proposed raised planters will also provide increased ecological and aesthetic benefits.

GREEN AND SEDUM ROOFS

Green and Sedum roofs have been incorporated into the design of the proposed apartment buildings. This type of roofing involves covering the roof or part of the roof of a building with vegetation laid over a drainage layer and a waterproofing membrane. They are designed to intercept and store rainwater and therefore reduce surface water runoff. They are suited to the flat type of roof being proposed for the apartment buildings (please refer for the drawings prepared by CSEA Engineers and Gannon + Associates for green roof locations). Green and Sedum roofs have ecological and aesthetic benefits and remove pollutants from rainwater. Disadvantages are that they are more expensive than conventional roof drainage systems and require maintenance of the roof vegetation.

UNDERGROUND STORMWATER ARCHED CHAMBER SYSTEMS

The proposed underground stormwater system is comprised of arched or boxed chambers laid in parallel, subsurface stormwater chambers, such as those produced by Triton™ and Stormtech™. They offer a cost-effective method to temporarily store stormwater for a period of time until the storm passes. The water is released into the surface water pipe network at a controlled rate using flow controls such as a hydrobrake manhole. They are simple and cost effective to construct and allow for the space above the tanks to be used for other purposes, i.e. parkland, play areas etc. Although they have no water quality benefits, they will be linked with other SuDS measures throughout the Barnhill site that will treat the water discharged from the underground stormwater chamber systems upon its release. Please refer to CSEA Engineers drawings for details of same.

TREE PITS

Tree pits have been incorporated into the design of proposed development for all planted trees. These tree pit systems are porous surfacing systems which are laid around the base of trees that are designed to take surface water runoff from adjacent impermeable areas within an urban environment. Using tree pits as a SuDS measure also allows water, air and nutrients to reach the tree roots thus encouraging the trees' growth. Tree pits also have ecological and aesthetic benefits.

PERMEABLE PAVING

Permeable block paving has been incorporated into the design of the proposed house units. This type of paving will be used for on curtilage carparking areas in order to reduce surface water runoff from hardstanding areas within the development. This type of paving allows rainwater to infiltrate through the surface and into the underlying layers where it is collected and conveyed to the proposed sealed drainage network. Permeable paving reduces peak surface water flow, is effective in removing urban pollutants, has low maintenance costs and requires no additional land space.

However, if not properly maintained there is a risk that clogging and weed growth between the permeable paving blocks may occur. The permeable block paving runoff will discharge to a SuDS sealed system with perforated pipe before discharging to the main surface water network for the proposed development.

INFILTRATION TRENCHES

Infiltration trenches have been incorporated into the design of larger landscaped area within development. These trenches are long narrow soakaways filled with a void forming material, typically stone which will be used to drain larger areas, such as large landscaped areas, within the proposed development.

EXISTING DITCHES, TREES AND HEDGEROWS

The proposed development has been designed to maintain, where possible, existing ditches, trees and hedgerows (please refer to drawings prepared by Gannon + Associates for details of same). Incorporating these existing drainage features into the proposed overall SuDS strategy provides for greater storage volume capacity within the site and will assist in the conveyance and treatment of the generated surface water runoff. The retention of existing trees and hedgerows will also assist in the reduction of surface water runoff by evapotranspiration.

CONSTRUCTED POND/ WETLAND

In accordance with the Barnhill Local Area Plan it is proposed to provide a constructed pond / wetland area within the public parkland. This has been designed to form part of the overall SuDS network for the development and will be a regional site control to provide water quality and ecological benefits for the overall site catchment. Ponds / wetlands are open basins which have a permanent depth of water and are generally recommended at the end of the SuDS Management Train. Runoff that enters the pond / wetland from the proposed surface water network shall be detained and treated by settlement and biological uptake. The Pond / Wetland shall be designed to have a constant turbulent flow passing through it and a constant adequate depth to prevent stagnation of the water. The primary objective of the pond / wetland shall be to provide treatment of the collected surface water runoff.

4. CONCLUSION

Having regard to national, regional and local planning policy and also the information published by bodies such as Irish Water and the Water Forum etc. in relation to water conservation, a range of measures for the management and conservation of water have been considered in the design of the proposed development. These measures will ensure that best practice for the management and conservation of water can be achieved.