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## **Greater Dublin Drainage Project**

Irish Water

**Environmental Impact Assessment Report: Volume 2 Part A of 6**

**Chapter 3 The Need for the Proposed Project**

June 2018

## Contents

<b>3.</b>	<b>The Need for the Proposed Project .....</b>	<b>1</b>
3.1	Introduction .....	1
3.2	Background .....	1
3.3	Greater Dublin Strategic Drainage Study – Assessment of Future Growth .....	2
3.4	Upgrade of the Existing Wastewater Treatment Plants .....	3
3.4.1	Ringsend Wastewater Treatment Plant .....	4
3.5	Review of Projected Future Organic Load on Wastewater Treatment Plants.....	5
3.5.1	Background .....	5
3.5.2	Existing Loading and Projected Treatment Capacity Requirements.....	5
3.5.3	Conclusion.....	9
3.6	Water Services Strategic Plan.....	9
3.7	National Wastewater Sludge Management Plan.....	10
3.8	Assessment of Projected Treatment Requirements at the Proposed Wastewater Treatment Plant .....	10
3.8.1	Ringsend Wastewater Treatment Plant Drainage Catchment .....	10
3.8.2	Projected Required Treatment Capacity in the Ringsend Wastewater Treatment Plant Catchment .....	11
3.8.3	Appraisal of Ringsend Wastewater Treatment Plant’s Treatment Capacity .....	12
3.9	Proposed Flow and Load Diversion to the New Proposed Wastewater Treatment Plant.....	13
3.9.1	Projected Utilisation of Treatment Capacity Provided at Proposed Wastewater Treatment Plant .....	13
3.10	Planning Need .....	15
3.11	References .....	16

## 3. The Need for the Proposed Project

### 3.1 Introduction

This Chapter discusses the ‘Engineering’ Need for the Greater Dublin Drainage Project (hereafter referred to as the Proposed Project). The ‘Planning’ Need is discussed in the *Planning Report* (AOS 2018) for the Proposed Project.

### 3.2 Background

The Proposed Project has its origins in the Greater Dublin Strategic Drainage Study (GSDSDS)<sup>1</sup>, which was a major region-wide strategic study conducted between 2001 and 2005 to examine and report on the medium- and long-term urban drainage needs. The GSDSDS was commissioned as a result of the broadening gap between the developing load in the Greater Dublin Area (GDA) and the maximum load which can be delivered to and treated at the existing Wastewater Treatment Plants (WwTPs) in the catchment and primarily at Ringsend WwTP. In order to address this, the GSDSDS *Final Strategy Report* (Dublin Drainage Consultancy 2005) made detailed recommendations on wastewater infrastructure requirements, which included the optimisation of the capacity of existing WwTPs and networks for near-term requirements, coupled with the development of new infrastructure to meet growth in the medium- and long-term.

The key findings of the GSDSDS were the subject of a Strategic Environmental Assessment (SEA), which was completed by Fingal County Council (FCC) in 2008 (FCC 2008). The SEA endorsed the fundamental concept and scale of the GSDSDS *Final Strategy Report*, but cautioned that the site selection needed to take place in a process of rigorous appraisal of alternatives. The key recommendations of the SEA are as follows:

- The upgrade of all WwTPs in the region, including Ringsend, to their ultimate capacity;
- Construction of a new Regional WwTP, associated orbital sewer route and outfall pipeline route (land based section and marine section) in the northern part of the GDA;
- Completion of a rigorous four-stage ‘Alternative Sites Assessment (ASA) Study’ to determine the preferred location for the new Regional WwTP;
- The associated orbital sewer route and outfall pipeline route (land based section and marine section) to be defined; and
- A suite of mitigation measures and a monitoring programme to be undertaken during the construction and operation of the Proposed Project.

In the absence of the implementation of the above proposed drainage strategy, the SEA considered that inadequate wastewater treatment and drainage management would result in development constraints within the area covered by the strategy. Thus, Local Authorities would be inhibited from effectively implementing their respective County and City Development Plans.

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<sup>1</sup> The GSDSDS was proposed by the Dublin Region Local Authorities in the Greater Dublin Area and was supported by the Department of the Environment, Heritage and Local Government. Dublin City Council was appointed as the contracting authority for the study which was conducted by the Dublin Drainage Consultancy.

The overriding purpose of the Proposed Project is to provide a long-term sustainable drainage solution that will cater for existing and future development in the GDA by implementing the key recommendations of the GSDSDS *Final Strategy Report* and the SEA of the GSDSDS

### 3.3 Greater Dublin Strategic Drainage Study – Assessment of Future Growth

In the preparation of the GSDSDS *Final Report on Population and Land Use* (Dublin Drainage Consultancy 2003) was carried out to determine land usage and planning requirements within the study area so that the capability of existing drainage infrastructure could be assessed against projected future flows and loads. The final report of this Population and Land Use Study was published in March 2003. This report estimated the future wastewater treatment requirements, defined on a WwTP catchment basis rather than administrative boundaries within the GDA, for three design scenarios: 2002, 2011 and 2031. The report used these projections as the basis for determining the extent of additional wastewater infrastructure required to meet this future demand.

The first scenario (2002) represented the then baseline or existing situation. The second scenario (2011) corresponded to the planning horizon of the Strategic Planning Guidelines at that time. The third scenario (2031) represented a long-term horizon appropriate for the planning of major strategic infrastructure.

The contributing catchments for each of the eight WwTPs in the GSDSDS study area are illustrated in Figure 3.1 Contributing Catchments of Existing Wastewater Treatment Plants and the projected wastewater loads from the GSDSDS *Final Strategy Report* (Dublin Drainage Consultancy 2005) are set out in Table 3.1 below.

**Table 3.1: Organic Loading on Existing Wastewater Treatment Plants (Source: Table 10.4 of the GSDSDS Final Strategy Report)**

WwTP	Current (2002) Design Population Equivalent <sup>1</sup>	Ultimate Design Population Equivalent <sup>1</sup>	Population Equivalent Load Existing (2002) <sup>1</sup>	Population Equivalent Load 2011 <sup>1</sup>	Population Equivalent Load 2031 <sup>1</sup>	Comments
Ringsend	1,640,000	1,905,000 to 2,160,000	1,750,000 to 1,900,000	2,402,603	2,813,901	Extend to 2.16M Population Equivalent (PE) in the immediate future
Shanganagh Bray	167,400	200,000 to 240,000	106,900	162,505	249,016	Phase 1 to 180,000 PE. Extend after 2011
Osberstown	80,000	130,000	57,533	98,152	154,088	Extend towards 2011
Leixlip	90,000	130,800	68,189	100,343	183,378	Extend after 2011
Portrane	35,000	65,000	14,531	30,249	45,650	Extend towards 2011
Malahide	20,000	25,000	16,089	16,669	23,236	Extend after 2011
Balbriggan & Skerries	30,000	70,000 to 90,000	19,008	55,852	90,863	Extend towards 2011

WwTP	Current (2002) Design Population Equivalent <sup>1</sup>	Ultimate Design Population Equivalent <sup>1</sup>	Population Equivalent Load Existing (2002) <sup>1</sup>	Population Equivalent Load 2011 <sup>1</sup>	Population Equivalent Load 2031 <sup>1</sup>	Comments
Swords	60,000	90,000	34,254	75,241	109,567	Extend towards 2011
<b>Totals</b>	2,122,400	2,615,800 to 2,930,800	2,066,534 to 2,216,534	2,941,614	3,669,698	

Note 1: Expressed as average day PE

As evident in Table 3.1, the GSDSDS determined that the 2002 wastewater load, in terms of combined residential population, commercial, institutional and industrial sources, exceeded the installed wastewater treatment capacity in the GDA at that time. Furthermore, it determined that even with the expansion of each of the existing WwTPs to their ultimate design capacity the projected combined growth (residential population, commercial, institutional and industrial sources) in the GDA would exceed the treatment capacity provided by the existing WwTPs.

The GSDSDS also determined that the ability to expand the treatment capacity at each of the WwTPs beyond their ultimate design capacity was limited by either site and/or receiving water constraints at each WwTP. It also found that there was limited capacity in the existing drainage networks to accept flows from future development, noting significant overloading of sewers, deficiencies at combined sewer overflows and increased risk of sewer flooding throughout the network. Constraints on further upgrade works to address these capacity issues, particularly in the network serving Ringsend, include the intensity of urban development, associated utilities and traffic. Considering the scale of the network upgrade work required, the GSDSDS described them as representing:

*'a major engineering challenge, particularly where large diameter pipelines have to be constructed in roadways already saturated with utility services and traffic. Even with tunnel construction, the accommodation of shafts and protection of existing works, traffic management and general management of environmental impacts would be extremely difficult'* (Dublin Drainage Consultancy 2005).

Following from the above analysis, the GSDSDS determined that additional wastewater treatment capacity was required.

As the largest future treatment capacity deficit was predicted at Ringsend WwTP, it was determined that the provision of additional wastewater treatment capacity would require the construction of a new wastewater treatment facility for the contributing catchment to Ringsend WwTP to augment the treatment capacity provided at Ringsend WwTP.

### 3.4 Upgrade of the Existing Wastewater Treatment Plants

Since the publication of the GSDSDS *Final Strategy Report* (Dublin Drainage Consultancy 2005), the status of a number of the WwTPs within the study area has changed with upgrade work completed or currently in planning.

The status of the upgrade works for each of the WwTPs is summarised in Table 3.2.

**Table 3.2: Status of Recommended Upgrade Works on Wastewater Treatment Plants**

Wastewater Treatment Plant	Design Population Equivalent (2002) <sup>1</sup>	2016 Installed Capacity (Population Equivalent) <sup>1</sup>	Ultimate Design Capacity <sup>1</sup>	Status of Upgrade Work	Comment
Ringsend	1,640,000	1,640,000	2,400,000	In Planning	Amended planning application scheduled to be lodged in Q2 2018
Shanganagh Bray	167,400	186,000	250,000	Phase 1 upgrade completed 2013	
Osberstown	80,000	130,000	130,000	Upgrade work completed in 2016	
Leixlip	90,000	150,000	150,000	Upgrade work completed in 2016	
Portrane	35,000	65,000	65,000	Completed 2013	
Malahide	20,000	21,000	21,000	No further upgrades possible	
Balbriggan & Skerries	30,000	70,000	70,000	Completed 2008	
Swords	60,000	90,000	90,000	Upgrade work completed in 2016	
<b>Totals</b>	<b>2,122,400</b>	<b>2,352,000</b>	<b>3,176,000</b>		

Note 1: Expressed as average day PE

The above table indicates that the majority of upgrade works to the existing WwTPs within the GDSDS study area have been completed, as per the recommendations of GDSDS, with only the planned upgrade work on Ringsend WwTP remaining to be completed in 2025.

### 3.4.1 Ringsend Wastewater Treatment Plant

Planning permission (PL29N.YA0010) was granted by An Bord Pleanála on 16 November 2012, subject to 16 conditions. This permission allows an extension to the plant to provide a treatment capacity of 2.4 million Population Equivalent (PE). Statutory responsibility for the Ringsend Wastewater Treatment Works (WwTW) Extension Project transferred from Dublin City Council to Irish Water in 2014 following the setting up of the Water Authority. Following a review of the Ringsend WwTW Extension Project, Irish Water has completed thorough reviews and evaluations of elements of the WwTP and particularly expansion plans, including the design as approved under the 2012 Planning Approval. The review identified the possibility to utilise advanced nutrient reduction treatment technology that was not available as a technically viable option to Dublin City Council in 2012. The technology, known as Aerobic Granular Sludge allows for the treatment of wastewater within the existing footprint of the site to a sufficiently high standard that meets discharge limits to sensitive waters, thereby avoiding the need to construct the 9km long sea outfall tunnel permitted under the 2012 permission. Irish Water now intends to progress an alternative design solution that utilises this technology at the Ringsend site.

Irish Water intend to apply for the necessary statutory approval for the revised project based on this alternative strategy in Q2/2018. Construction activity is expected to take place from 2018 to 2021, subject to planning.

## 3.5 Review of Projected Future Organic Load on Wastewater Treatment Plants

### 3.5.1 Background

The strategies proposed by GDSDS to meet the GDA drainage infrastructural requirements, at the 2011 and 2031 design horizons, were predicated on population projections baselined on the 2002 Census, with non-domestic and trade effluent data built up from considerations of sub-catchment planning potential. The detailed Population and Land Use Study, undertaken as part of the GDSDS and reported on in March 2003 (Dublin Drainage Consultancy 2003) did not foresee the large inward migration that occurred, post 2004, following expansion of the European Union, nor did it foresee the extent of emigration that occurred during the economic recession between 2008 and 2013. It is clear that the economic landscape has altered markedly since the GDSDS Population and Land Use Study was undertaken. It is therefore prudent to re-examine population and load projections within the GDA to assess whether the recommendations of GDSDS and its SEA remain valid.

The results from the 2016 Census have been reviewed and assessed to update the population and load projections and to re-baseline the proposed growth projections to 2016 data. The 2013 updates by the Central Statistics Office (CSO) of the *Population and Labour Force Projections, 2016 – 2046* (CSO 2013a) and the *Regional Population Projections 2016 - 2031* (CSO 2013b) have also been reviewed in relation to population growth rates in the GDA, with particular emphasis on the contributing catchment to Ringsend WwTP.

In addition, a 'Demographic Study' (AOS Planning 2014) was commissioned by Irish Water in May 2014 as part of the Water Supply Project (WSP) Eastern and Midlands Region. The objective of this study was to examine a range of population projections out to 2050, to be used as the basis for the estimation of water demand for the WSP. The study sets out regional population projections for the planning regions and the State to 2050. The projections were prepared as per the last census for the base year 2011, with projections for the years 2021, 2026, 2031, 2041, 2046 and 2050. Years 2031 and 2046, respectively, represent the furthest dates used for the CSO regional and State population projections.

The findings of the Proposed Project review of population and load projections are reported in the *Assessment of Domestic and Non-Domestic Load Report* (Jacobs Tobin 2017). Population and load projections were developed using 2016 Census data, the CSO (2013b) Regional Population Projections and the WSP Demographic Study (AOS Planning 2014). Future wastewater treatment requirements, defined on a WwTP catchment basis rather than administrative boundaries within the GDA, were estimated for three design scenarios: 2016, 2025 and 2050.

The first scenario (2016) represents the re-defined baseline or existing situation for the Proposed Project. The second scenario (2025) corresponds to the planning horizon when it is anticipated that the Proposed Project will be commissioned. The third scenario (2050) represents a long-term horizon appropriate for the planning of major strategic infrastructure based on the anticipated commissioning date of the Proposed Project.

### 3.5.2 Existing Loading and Projected Treatment Capacity Requirements

Organic load on WwTPs arise from residential population, commercial, institutional and industrial sources. This load is generally measured as kilograms (kg) of Biochemical Oxygen Demand (BOD) per day and expressed in terms of PE, with 1 PE equal to 60g BOD per day. Each element of load is discussed in the following paragraphs.

### Residential Population

Existing population figures have been derived from the 2016 Census.

Three future population growth scenarios with respect to the Proposed Project have been adopted based on the assumption scenarios in the WSP Demographic Study (AOS Planning 2014) and the CSO (2013b) Projections. The three growth scenarios are outlined below, with further details available in the *Assessment of Domestic and Non-Domestic Load Report* (Jacobs Tobin 2017):

- Growth Scenario 1 – Planned ‘Low’ (equivalent to CSO ‘M2F2<sup>2</sup> Recent’ Scenario);
- Growth Scenario 2 – Planned ‘High’ (equivalent to CSO ‘M2F2 Traditional’ Scenario); and
- Growth Scenario 3 – ‘Most Likely’ (equivalent to CSO ‘M2F2 Modified’ Scenario).

For each of the three growth scenarios, annual average growth rates, derived from CSO Regional Population Projections and the WSP Demographic Study population projections, have been examined for each of the catchment areas. These growth rates have been adopted for the Proposed Project to develop population projections out to 2050.

### Industrial

Industrial discharges are licensed under either the Integrated Pollution Prevention Control Licence with the Environmental Protection Agency as the competent authority or a Waste Licence (Section 63) issued by Irish Water. The quality and quantity of these discharges are regularly monitored by the licensing authority. It is also a policy of Irish Water for new and amended trade licence applications to reduce permitted industrial discharges to domestic strength.

Information on existing industrial discharges has been obtained from a review of the 2016 Annual Environmental Reports (EPA 2016) for the industries located in the catchments of the eight WwTPs examined within the GDA.

The proposed design capacity of the Proposed Project makes provision for industrial discharges on the following basis:

- Existing industrial load to remain unchanged out to the 2050 Design Year; and
- In accordance with the *Water Services Strategic Plan* (WSSP) (Irish Water 2015), a headroom allowance of 20% of the sum of the residential and commercial loads is provided in the design, from which capacity can be made available for future industrial loads.

### Commercial/Institutional

The existing load contribution from commercial and institutional sources (e.g. shops, offices, schools) has been estimated as follows:

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<sup>2</sup> M= net migration  
F= Total fertility rate  
2= scenario 2  
(CSO 2013a)



- Where the complete catchment to a WwTP is being considered, the commercial and institutional load contribution has been estimated by deducting the known population and industrial loadings from the measured BOD load at the WwTP; and
- Where individual sub-catchments are being considered, the commercial and institutional load contribution has been assumed as 16% of the population load. This relationship has been used extensively in the estimation of flow and load for design purposes and is widely accepted at a local and national level in Ireland (Department of Environment, Heritage and Local Government 2004).

Future commercial and institutional loadings are assumed to grow in line with population growth.

#### Combined Loadings

The combined existing loadings and future projected treatment capacity requirements in each catchment for the three growth scenarios examined are summarised in Table 3.3.

**Table 3.3: Projected Treatment Capacity Requirements<sup>1</sup> in Catchments of Existing Wastewater Treatment Plants**

Wastewater Treatment Plant	2016 Installed Capacity <sup>1</sup>	Ultimate Design Capacity <sup>1</sup>	Population Equivalent Load 2016 <sup>2</sup>	Projected Treatment Capacity Requirements (Population Equivalent) 2025			Projected Treatment Capacity Requirements (Population Equivalent) 2031			Projected Treatment Capacity Requirements (Population Equivalent) 2050		
				1	2	3	1	2	3	1	2	3
<b>Growth Scenario</b>			<b>1</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>Ringsend<sup>4</sup></b>	1,640,000	2,400,000	1,808,046	2,385,931	2,412,766	2,428,613	2,477,439	2,533,282	2,558,691	2,750,567	2,825,608	2,908,024
<b>Shanganagh Bray</b>	186,000	250,000	96,389	123,821	125,940	126,607	129,793	133,828	135,095	147,615	152,959	157,890
<b>Osberstown</b>	130,000	130,000	80,239	100,094	101,361	102,109	104,416	107,053	108,253	117,315	120,860	124,752
<b>Leixlip<sup>3</sup></b>	150,000	150,000	126,000	178,894	245,416	246,138	183,061	250,904	252,061	195,499	264,216	267,969
<b>Portrane</b>	65,000	65,000	17,591	39,316	39,938	40,313	41,119	42,446	43,023	47,391	48,528	50,299
<b>Malahide</b>	21,000	21,000	16,692	17,881	18,135	18,285	18,746	19,274	19,514	21,326	22,035	22,814
<b>Balbriggan &amp; Skerries</b>	70,000	70,000	29,798	37,830	38,361	39,170	39,641	40,745	41,802	45,045	46,529	48,872
<b>Swords</b>	90,000	90,000	58,341	74,416	75,442	76,048	77,915	80,050	81,022	88,359	91,228	94,380
<b>Totals</b>	2,352,000	3,176,000	2,233,096	2,958,183	3,057,359	3,077,283	3,072,130	3,207,582	3,239,461	3,413,117	3,571,963	3,675,000

Note 1: Expressed as average day PE

Note 2: The PE Load stated at 2016 is the annual mean organic load (source: Annual Environmental Reports (EPA 2016))

Note 3: The projected growth in the Lower Liffey Valley (Leixlip) catchment includes for the expansion plans of a specific Significant Industrial Customer, identified in confidential briefings to Irish Water

Note 4: The projected growth in the Ringsend catchment includes for a diversion of flow and load out of the Leixlip catchment.

Examination of Table 3.3 indicates that, even with all the WwTPs upgraded to their ultimate design capacity, the projected future total treatment capacity requirement in these catchments will exceed the combined total installed design capacity between 2025 and 2031 (dependent on actual growth realised). Specifically, the table indicates that the predicted future wastewater treatment capacity deficit in the study area will be concentrated at the following plants:

- Ringsend WwTP: capacity deficit arising c. 2025; and
- Leixlip WwTP: capacity deficit arising between 2016 and 2025;

As further expansion of Ringsend and Leixlip WwTPs, beyond their ultimate design capacity is not possible., additional wastewater treatment capacity is required to cater for these catchments.

Works to transfer excess flow and load from Leixlip WwTP to the Blanchardstown (9C Sewer) catchment are currently at planning stage. These excess flows from Leixlip WwTP have been considered in the assessment of the Ringsend catchment. Therefore, the predicted future wastewater treatment capacity deficit is concentrated on the Ringsend catchment. The additional wastewater treatment required is most effectively provided by the construction of a single new WwTP, i.e. the proposed WwTP element of the Proposed Project, to augment the treatment capacity provided by Ringsend WwTP. To achieve this additional treatment capacity, it is necessary to divert flow and load out of the Ringsend catchment to the new proposed WwTP. The proposed WwTP will cater for the projected growth in the Ringsend catchment, inclusive of the planned flow transfer from Leixlip WwTP, out to the design year horizon of 2050.

### **3.5.3 Conclusion**

The review of projected treatment capacity requirements undertaken for the Proposed Project has therefore confirmed the key recommendations of the GDSDS and its SEA.

## **3.6 Water Services Strategic Plan**

The WSSP is Irish Water's strategic national plan for the delivery of water and wastewater services over the next 25 years.

The WSSP was developed following two phases of public consultation and underwent an SEA and an Appropriate Assessment (AA). The initial consultation was non-statutory and took place from July to September 2014. As part of the second statutory phase of public consultation, Irish Water invited submissions on the Draft WSSP together with the SEA Environmental Report and Natura Impact Statement (AA process) from the 19 February to 17 April 2015.

The final WSSP was approved by the Minister for Environment, Community and Local Government in October 2015.

The GDSDS and its SEA were reviewed by Irish Water in framing the WSSP. It was determined that the conclusions of the GDSDS and the associated SEA were entirely valid and that the additional wastewater treatment capacity was required.

### 3.7 National Wastewater Sludge Management Plan

The *National Wastewater Sludge Management Plan* (NWSMP) (Irish Water 2016) outlines Irish Water's strategy to ensure a nationwide, standardised approach for managing wastewater sludge over the next 25 years. This Plan was published in September 2016

A national approach will ensure that, for the first time, treated wastewater sludge across the country is effectively managed, stored, transported and disposed of, or re-used in a sustainable way, to the benefit of the public and the environment we all live in.

The NWSMP makes the point that the *'use of Sludge Hub Centres backed by Satellite Dewatering Sites allows for economies of scale and greater flexibility in the selection of sludge treatment processes, particularly energy recovery. Quality control over the outputs from any sludge treatment process is also improved using this system'* (Irish Water 2016). It also highlights the fact that this system is commonly used internationally.

Key actions proposed within the NWSMP include the provision that the location of hubs will be considered on a regional rather than county basis and will maximise the use of energy recovery where possible, and that *'the preferred option for re-use of treated wastewater sludge (biosolids) is reuse on land. Non-food tillage crops will be the primary focus for agricultural reuse of biosolids'*.

The NWSMP provides a summary of the current Sludge Hub Centres' (SHCs) status. Within this, it is clear that the proposal in relation to Fingal involved the development of a sludge hub as part of the proposed WwTP. This is reflected within Table 3.3 (Summary of the Recommended Hub Centres and Satellites in County Sludge Management Plans) and reiterated in Sections 7.4.9 and 9.7 (Selection of SHCs) of the NWSMP.

The NWSMP (Section 7.3.5) recognises that there is a requirement to provide storage for sludge which is to be used for landspreading during periods when application of fertilisers to land is prohibited in accordance with the European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (as amended).

The NWSMP makes the point that Sludge Storage Facilities will no longer be considered solely on a per-plant or per-county basis and will instead be developed, where appropriate, to serve a number of local plants and/or a wider regional need.

It specifically acknowledges that the proposed upgrade to the Ringsend WwTP and this Proposed Project will result in a significant increase from current sludge volumes with a consequent increase in storage requirements. Therefore, a dedicated sludge storage facility should be developed in conjunction with these projects to take account of future needs in the region.

### 3.8 Assessment of Projected Treatment Requirements at the Proposed Wastewater Treatment Plant

#### 3.8.1 Ringsend Wastewater Treatment Plant Drainage Catchment

The drainage catchment discharging to Ringsend WwTP is the largest drainage catchment in the GDA. The Proposed Project is intended to augment the treatment capacity provided at Ringsend WwTP. Specifically, the Proposed Project will serve the northern and western sub-catchments of the existing Ringsend catchment by

diverting flow and load from these areas to the proposed WwTP. This section examines the timing for when flow and load is required to be diverted from the Ringsend catchment.

The organic loading on Ringsend WwTP as of 2016 was approximately 1.808 million PE. This was the average day loading for 2016, and it is noted that daily load measurements at Ringsend WwTP show wide fluctuations and variability<sup>3</sup>. On completion of the current planned upgrade of Ringsend WwTP, the plant will have an installed treatment capacity of 2.4 million PE. However, further expansion beyond this level is not feasible.

In addition to the constraints on increasing treatment capacity beyond 2.4 million PE, there is also limited capacity in the existing Ringsend drainage network.

### 3.8.2 Projected Required Treatment Capacity in the Ringsend Wastewater Treatment Plant Catchment

The projected treatment capacity requirements, expressed as average day PE, for the Ringsend WwTP catchment under the three growth scenarios as set out in Section 3.5.2 are summarised in Table 3.4 and illustrated in Diagram 3.1 below. The planned treatment capacity at Ringsend WwTP of 2.4 million PE average daily load is also shown. The detailed analysis of projected treatment capacity requirements for Ringsend WwTP under the three growth scenarios is included in the Assessment of Domestic and Non-Domestic Load on the Proposed WwTP in Appendix A3.1.

**Table 3.4: Summary of Projected Treatment Capacity Requirements<sup>1</sup> – Ringsend Wastewater Treatment Plant Catchment**

Growth Scenario	Base Year	Design Year			
	2016	2025	2031	2040	2050
Scenario 1 – Planned Growth – Low	1,808,046	2,385,931	2,477,439	2,606,007	2,750,567
Scenario 2 – Planned Growth – High	1,808,046	2,412,766	2,533,282	2,692,801	2,825,608
Scenario 3 – Most Likely Growth	1,808,046	2,428,613	2,558,691	2,720,196	2,908,024

Note 1: expressed as Average Day PE

<sup>3</sup> See Table 3.8 of “Ringsend Wastewater Treatment Works – Design Review Report, June 2010” for details of the significant loading variability at Ringsend WwTP.

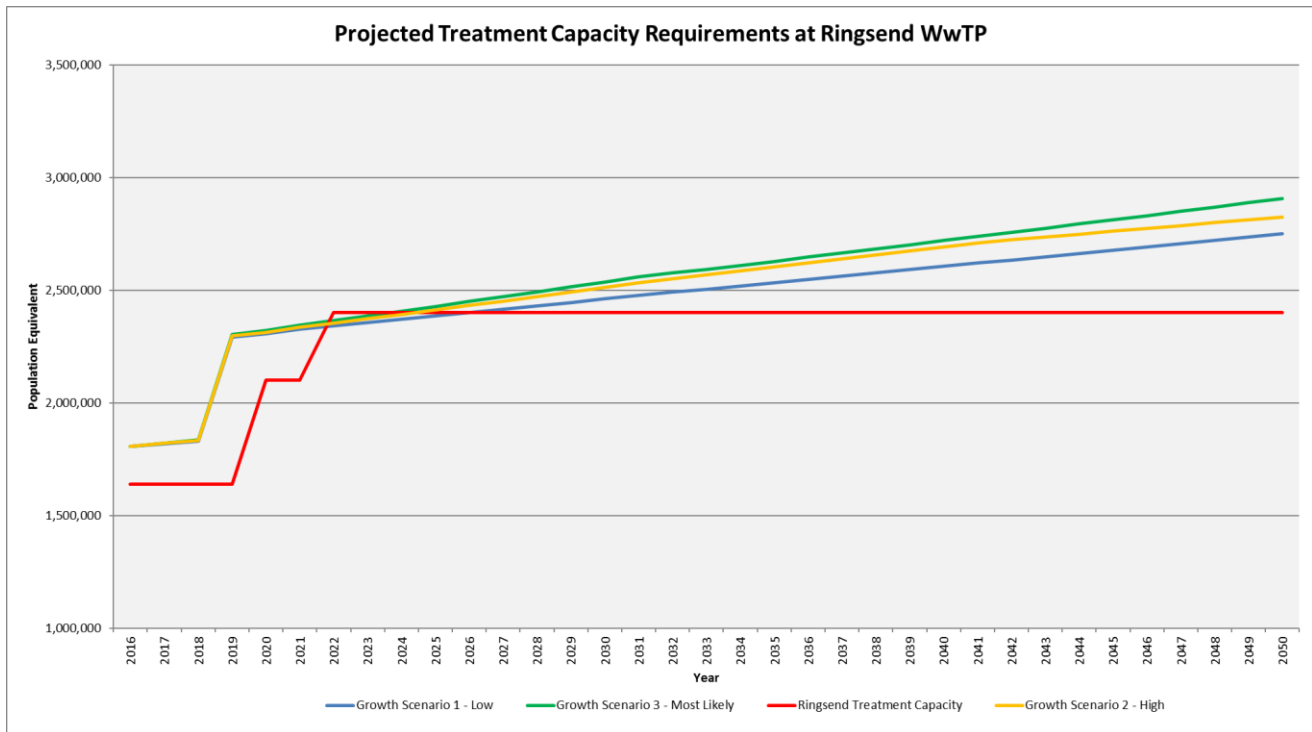


Diagram 3.1: Population Equivalent Treatment Capacity Requirement Projections for Ringsend Wastewater Treatment Plant

### 3.8.3 Appraisal of Ringsend Wastewater Treatment Plant’s Treatment Capacity

Examination of Table 3.4 and Diagram 3.1 above indicates that:

- Domestic and non-domestic load on Ringsend WwTP will continue to grow under the three growth scenarios examined;
- The projected treatment capacity required at Ringsend WwTP will exceed the proposed installed treatment capacity of 2.4 million PE (subject to planning) between 2024 and 2027 depending on the actual growth rate realised in the catchment; and
- The deficit in treatment capacity requirements in the Ringsend catchment is projected to range between 350,567 PE and 508,024 PE at 2050.

The constraints on the future expansion of Ringsend WwTP beyond its ultimate capacity as originally identified by the GSDS remain relevant. Furthermore, the capacity constraints in the sewer network serving the Ringsend WwTP catchment, as identified by GSDS, also remain relevant. Therefore, future development within this catchment cannot be catered for by Ringsend WwTP alone. The Proposed Project will provide the required additional wastewater treatment facilities through the construction of a new proposed WwTP in the townland of Clonshagh (Clonshaugh) in north County Dublin.

Of the three growth scenarios examined, the ‘most likely’ scenario (or growth scenario 3) sets out the treatment capacity requirement profile of greatest probability given what is known at the present time. Therefore, it is prudent for planning purposes to develop the Proposed Project on the basis of this growth scenario. It is therefore recommended that the Proposed Project be designed to provide a wastewater treatment capacity of 500,000 PE.

By diverting flow and load out of the Ringsend catchment to the new proposed WwTP, the Proposed Project will free up capacity at Ringsend WwTP and in its contributing network, thereby enabling growth to continue out to 2050 in the other sub-catchments which remain served by Ringsend. This applies in particular to the Lucan/Clondalkin catchment, where there is substantial scope for development both for housing and industry, and the City Centre catchment, where growth through urban regeneration, development of brownfield sites and densification is occurring in areas such as the Docklands Strategic Development Zone (SDZ), Grangegorman Development and the proposed Poolbeg SDZ.

### **3.9 Proposed Flow and Load Diversion to the New Proposed Wastewater Treatment Plant**

As discussed above, the Proposed Project will provide an additional 500,000 PE of treatment capacity, primarily to augment the existing treatment capacity provided at Ringsend WwTP. To mobilise this capacity, it is necessary to divert flow and load out of the Ringsend catchment to the proposed WwTP by 2025 in order to keep the average daily organic load on Ringsend WwTP below its installed treatment capacity.

The critical drainage sub-catchments located in the northern and western areas of the Ringsend catchment, which have been examined for potential flow and load diversion to the proposed WwTP, are illustrated in Figure 3.2 Critical Catchments and comprise:

- The existing catchment and future residual catchment of Ringsend WwTP;
- The Blanchardstown (9C Sewer) sub-catchment of the Ringsend WwTP (includes the towns and villages of Ashbourne, Ratoath, Kilbride, Dunboyne and Clonee in Co. Meath);
- The North Dublin (North Fringe Sewer (NFS) and North Dublin Drainage Scheme Sewer) sub-catchment of Ringsend WwTP; and
- The South Dublin – Lucan/Clondalkin (9B Sewer) sub-catchment of Ringsend WwTP.

The detailed review of treatment capacity requirements in the GDA indicates that diversion of the Blanchardstown (9C Sewer) catchment, inclusive of flows transferred to it from Leixlip WwTP, and the NFS sub-catchments located west of the proposed WwTP will provide the necessary diversions from the Ringsend catchment to maintain the loading on Ringsend WwTP below 2.4 million PE at all stages up to the design year horizon of 2050 (Jacobs Tobin 2017).

#### **3.9.1 Projected Utilisation of Treatment Capacity Provided at Proposed Wastewater Treatment Plant**

The projected utilisation of the treatment capacity to be provided at the proposed WwTP out to year 2050 is set out in Table 3.5.

**Table 3.5: Development of Required Treatment Capacity at the Proposed Wastewater Treatment Plant**

Catchment	Design Year			
	2025	2031	2040	2050
9C Sewer, including Load Transferred from Leixlip WwTP	363,385	376,151	392,697	411,939
NFS Sub-Catchments West of proposed WwTP	75,036	79,089	84,703	89,973
Total Treatment Capacity Required	438,421	455,240	477,400	501,912

The proposed 500,000 PE treatment capacity at the proposed WwTP will provide the projected treatment capacity requirements out to the design year horizon of 2050.

### Sludge Hub Centre

In accordance with Irish Water’s (2016) NWSMP, a proposed SHC will be co-located with the proposed WwTP at the Clonshagh site. The SHC will have the capacity to provide sustainable treatment for municipal wastewater sludge and domestic septic tank sludges generated in Fingal. The SHC will provide advanced anaerobic digestion treatment to the sludge and domestic septic tank sludges to produce a ‘biosolid’ end-product suitable for reuse in agriculture, with the biogas produced during the treatment process used on-site for energy recovery.

The sludge treatment capacity to be provided under the Proposed Project is 18,500 tonnes of dry solids (TDS)/annum to provide for a projected 750,000 PE at the design year horizon of 2050. This figure caters for the import of sludge from other municipal WwTPs in Fingal.

The ‘biosolid’ end-product produced at the SHC will be transported to the Regional Biosolids Storage Facility for seasonal storage.

### Regional Biosolids Storage Facility

The purpose of the RBSF is to store treated biosolids that will be produced at the Ringsend WwTP and the proposed GDD WwTP. The *National Wastewater Sludge Management Plan* (Irish Water, 2016) (NWSMP) identifies reuse of treated wastewater sludge (biosolids) as a fertiliser on agricultural land as the preferred outlet in the short to medium term. Constraints on land spreading due to legislation and due to demand for the product require that biosolids must be stored during certain times of the year. The development of regional facilities for the storage of biosolids from wastewater treatment plants is recommended in the NWSMP. In relation to sludge storage in greater Dublin the NWSMP concluded:

*“In line with the approach taken to other facilities in this Plan, the development of Sludge Storage Facilities will no longer be considered solely on a per-plant or per-county basis. Where appropriate, Sludge Storage Facilities will be developed to serve a number of local plants and/or a wider regional need. In particular, the upgrade to the Ringsend WwTP sludge hub and the proposed GDD WwTP will result in a significant increase from current sludge volumes with a consequent increase in storage requirements. Therefore, a dedicated sludge storage facility should be developed in conjunction with the expansion of Ringsend to meet its requirements and take account of other future needs in the region”.*



Biosolids from Ringsend WwTP are currently stored at a facility in Thornhill, Co. Carlow. The Thornhill facility has a certificate of registration from Carlow County Council for a maximum annual throughput of 25,000 tonnes of biosolids. It is proposed to transition to the use of the RBSF on a phased basis if and when the RBSF is permitted by ABP, constructed and available for use.

The proposed facility will be used solely for storage purposes. No treatment of the biosolids will take place at the facility.

### **3.10 Planning Need**

Planning Need for the Proposed Project is discussed in the *Planning Report* (AOS 2018) for the Proposed Project.

### 3.11 References

AOS Planning (2014). Water Supply Project Dublin Region: Summary of Demographic Projections, AOS Planning, June 2014

AOS (2018). Planning Report

CSO (2013a). Population and Labour Force Projections, 2016 – 2046. April 2013.

CSO (2013b). Regional Population Projections 2016 – 2031. December 2013.

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EPA. 2016. Annual Environmental Reports. [ONLINE] Available at: <http://www.epa.ie/enforcement/how/aer/>. [Accessed May 2018]

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Irish Water (2016). National Wastewater Sludge Management Plan.

Jacobs Tobin (2017). Assessment of Domestic and Non-Domestic Load Report, November 2017.

#### Directives and Legislation

European Union (Good Agricultural Practice for Protection of Waters) Regulations 2014 (as amended) – S.I. No. 31 of 2014