Appendix A3.1 Assessment of Domestic and Non-Domestic Load of Proposed Regional Wastewater Treatment Plant

Greater Dublin Drainage

Irish Water

Assessment of Domestic & Non-Domestic Load on Proposed Regional WwTP

32102902 – 2B – A3.1

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Appendix A. Loading Analysis on Wastewater Treatment Plants

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1. Introduction

1.1 Title

The official name of the project is *Greater Dublin Drainage – Regional Wastewater Treatment Plant, Marine Outfall & Orbital Drainage System.*

1.2 Client

At the commencement of the GDD project in 2011, the 34 local authorities of Ireland were responsible for providing water and wastewater services and infrastructure in their respective administrative areas under the Local Government Act 2001. Jacobs Engineering Ireland Ltd. (Jacobs) in association with TOBIN Consulting Engineers (Tobin) were appointed by Fingal County Council (FCC) (as the Contracting Authority on behalf of Meath, Kildare, Dun Laoghaire / Rathdown and South Dublin County Councils and Dublin City Council) in March 2011 to act as Project Engineering Consultant on this project.

However, under the Water Services (No. 2) Act 2013, the responsibilities of FCC on this project were transferred to Irish Water/ Uisce Éireann (IW), a subsidiary of Ervia (formerly Bord Gáis Éireann) on 1st January 2014. At that point the existing Jacobs / Tobin contract was novated across to IW who thereafter became the Project Client.

1.3 Previous Reference Studies

- *Greater Dublin Strategic Drainage Study (GDSDS) completed in April 2005, and*
- *Strategic Environmental Assessment of the Greater Dublin Strategic Drainage Study (SEA of GDSDS) completed in May 2008.*

1.4 Project Stages

The Project is divided into a number of stages as follows:

- Sub – Stage (a): Project Inception
- Sub - Stage (b): Alternative WwTP Site Assessment(ASA)/Pipeline and Marine Route Selection Report
- Sub – Stage (c): Concept Design Report
- Sub – Stage (d): Environmental Impact Assessment
- Sub – Stage (e): Wayleave / Land Acquisition
- Sub – Stage (f): Additional Reports
- Sub – Stage (g): Planning Process
- Sub – Stage (h): Any Other Work

1.5 Objectives

The primary project objective is to provide a long-term drainage solution that shall cater for existing & future development in the Greater Dublin Area (GDA) by implementing the recommendations of the Greater Dublin Strategic Drainage Study (GDSDS) Final Strategy and the Strategic Environmental Assessment (SEA) of the GDSDS. This requires an integrated programme of works to provide sustainable wastewater treatment and sewer network capacity in the region.

The key objectives of the GDD are to safely deliver through the planning process a:

- *Regional Wastewater Treatment Plant (WwTP) and associated marine outfall located at a site in the Northern part of the Greater Dublin Area (GDA), and*
- *an orbital sewer, associated pumping stations and outfall pipeline linking the regional WwTP to the existing regional sewer network and to provide for future connections for identified developing areas within the catchment.*

In April 2013, a review of Fingal's Sludge Management Plan (SMP) was completed which recommended that Fingal develop a single Sludge Hub Centre (SHC) to treat all wastewater sludges arising in Fingal and that this SHC should be co-located with the proposed Regional WwTP.

Irish Water reviewed this proposal as part of its national wastewater sludge management plan[1] and considered it to provide the most appropriate option for a sludge hub in Fingal.

The SHC is an element of the treatment process provided by the proposed WwTP, therefore any further reference to the WwTP includes the SHC.

1.6 Commencement Date

The official commencement date of the project is set as the 14th March 2011.

[1] *National Sludge Management Plan, Irish Water; 2016*

2. Background and Purpose of Report

2.1 Introduction

The Greater Dublin Drainage (GDD) project has its origins in the Greater Dublin Strategic Drainage Study (GDSDS)[2], 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 GDSDS 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 *GDSDS Final Strategy Report, April 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 GDSDS were the subject of a Strategic Environmental Assessment (SEA), which was completed in 2008. The SEA endorsed the fundamental concept and scale of the GDSDS 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 wastewater treatment plants (WwTPs) in the region, including Ringsend, to their ultimate capacity;
- Construction of a new regional WwTP, associated orbital sewer and marine outfall in the northern part of the Greater Dublin Area (GDA);
- Completion of a rigorous 4-stage 'Alternative Sites Assessment Study' to determine the preferred location for the Regional WwTP;
- The associated orbital sewer and marine outfall route to be defined; and
- A suite of mitigation measures and a Monitoring Programme to be undertaken during the construction and operation of the 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 (LAs) would be inhibited from effectively implementing their respective County and City Development Plans.

2.1.1 GDSDS – Assessment of Future Growth

In the preparation of the GDSDS Final Strategy Report a Population and Land Use Study 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[3]. This report estimated the future wastewater treatment requirements, defined on a WwTP catchment basis rather than

[2] *The GDSDS 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.*

[3] *GDSDS – Population and Land Use – Final Report, March 2003 (Ref.GDSDS/NE02057/094v2)*

administrative boundaries within the GDA for three design scenarios: 2002, 2011 and 2031, with a view to using 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 (2011) corresponded to the planning horizon of the Strategic Planning Guidelines at that time. The third (2031) represented a long-term horizon appropriate for the planning of major strategic infrastructure.

The projected wastewater loads from the GDSDS Final Strategy Report are set out in Table 2.1 below.

Table 2.1: Organic Loading on existing WwTPs (Source Table 10.4 of the GDSDS Final Strategy Report)

WwTP	Current (2002) Design PE	Ultimate Design PE	PE Load Existing (2002)	PE Load 2011	PE Load 2031	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 PE a.s.a.p.
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
Swords	60,000	90,000	34,254	75,241	109,567	Extend towards 2011
Totals	2,122,400	2,615,800 to 2,930,800	2,066,534 to 2,216,534	2,941,614	3,669,698	

As evident in Table 3.1 the GDSDS 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 these WwTPs.

The GDSDS 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, included the intensity of urban development, associated utilities and traffic. Considering the scale of the network upgrade work required GDSDS 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."

The GDSDS therefore determined that the optimum solution to the above treatment and network capacity deficits was to provide new wastewater treatment capacity in north County Dublin.

The proposed new wastewater treatment plant would primarily augment the treatment capacity provided at Ringsend WwTP through the diversion of flow and load out of the Ringsend catchment to the new WwTP thereby freeing up capacity at Ringsend WwTP and in its contributing network. Furthermore, the proposed new WwTP would also augment other WwTPs in the GDA through diversion of flow & load in excess of their ultimate treatment capacity to the proposed new WwTP.

2.2 Purpose of this Report

The strategies proposed by GDSDS to meet the GDA drainage infrastructural requirements, at the 2011 and 2031 design horizons adopted in that Study, were predicated on population projections base-lined 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[4] did not foresee the large inward migration that occurred, post 2004, following expansion of the EU nor did it foresee the extent of emigration that occurred during the economic recession between 2008 - 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 release of the results from Census 2016 presents an opportunity on which to base this review of 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 (published April 2013) and the Regional Population Projections 2016 - 2031 (published December 2013) also permitted a re-examination of population growth rates in the GDA, with particular emphasis on the contributing catchment to Ringsend WwTP.

In addition, a 'Demographic Study'[5] was commissioned by Irish Water in May 2014 as part of the Water Supply Project Eastern and Midlands Region (WSP). 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

[4] *GDSDS – Population and Land Use – Final Report, March 2003 (Ref.GDSDS/NE02057/094v2)*
[5] *Water Supply Project Dublin Region: Summary of Demographic Projections, AOS Planning, June 2014*

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 purpose of this report (*GDD Assessment of Domestic & Non-Domestic Load Report*) is to:

i. Re-examine population and required treatment capacity projections within the GDA to assess whether the recommendations of GDSDS and its SEA remain valid.

ii. Determine the requirement, both in terms of timing and treatment capacity, for the proposed Regional WwTP.

This determination is closely linked to the capacity of the existing plant at Ringsend and to the limited capacity and significant constraints in the existing drainage network serving Ringsend WwTP.

Given the passage of time since the GDSDS Final Strategy Report was published the baseline year for the review of future growth has been set at 2016. A design year horizon of 2050 has also being adopted as this represents a long-term horizon appropriate for the planning of major strategic infrastructure based on the anticipated commissioning date of the proposed Project.

2.3 Study Area

The study area for the GDD project is illustrated. in Figure 2.1 in Appendix B.

2.4 Contributing Catchment to Ringsend WwTP

The contributing catchment to Ringsend WwTP is illustrated in Figure 2.2 in Appendix B.

2.5 Potential Contributing Catchment to Regional WwTP

The GDD project will primarily serve the northern, north-western and western sub-catchments of the current Ringsend catchment. It is proposed to divert flow and load from these sub-catchments to the proposed Regional WwTP. The timing of these diversions will depend on the development of load in the Ringsend catchment and in each of the individual sub-catchments over time.

The sub-catchments located on the northern, north-western and western fringe of the Ringsend catchment are indicated in Figures 2.3 – 2.5 in Appendix B and comprise of;

- *The Blanchardstown (9C Sewer) sub-catchment of Ringsend WwTP (includes the Meath towns & villages of Ashbourne, Ratoath, Kilbride, Dunboyne & Clonee),*
- *The North Dublin (North Fringe Sewer &North Dublin Drainage Scheme (NDDS) Sewer) sub-catchment of Ringsend WwTP,*
- *The South Dublin – Lucan/Clondalkin (9B Sewer) sub-catchment of Ringsend WwTP.*

Additional catchments in the GDA, which may also influence future required treatment capacity of the new Regional WwTP, through diversion of flows & load in excess of ultimate treatment capability of

the individual wastewater treatment plants in these catchments, are indicated in Figure 2.6 in Appendix B and comprise;

- *Swords WwTP Catchment,*
- *Malahide WwTP Catchment,*
- *Lower Liffey Valley (Leixlip WwTP) Catchment (Includes Leixlip, Celbridge, Maynooth, Kilcock and Straffan),*
- *Upper Liffey Valley (Osberstown WwTP) Catchment (Includes Naas, Prosperous, Clane, Sallins, Kill, Johnstown, Newbridge, Athgarvan and Kilcullen).*

3. Existing Population and Future Growth Rates

3.1 Current Population within the GDA

The Census of 2016 indicates that the population in the Greater Dublin Area (GDA) in April 2016 was 1,907,332 persons. This is an increase of 5.72% from the 2011 population of 1,804,156 persons, which is ahead of the national increase of 3.8%, and represents an annual average percentage growth rate of 1.118% across the GDA.

The Census results for the GDA and its constituent regions and local authorities are shown in Table 3.1. Figures from the 2011 Census are also provided.

Table 3.1 Population Numbers in GDA from Census 2011 & 2016

Local Authority Area	2011	2016	Population Increase	Percentage Increase	Annual Average Growth Rate
	Final Census 2011 Results	Final Census Results	2011 - 2016	2011 - 2016	%
Dublin City	527,612	554,554	26,942	5.106	1.001
Dun Laoghaire - Rathdown	206,261	218,018	11,757	5.700	1.115
Fingal	273,991	296,020	22,029	8.040	1.559
South Dublin	265,205	278,767	13,562	5.114	1.002
Sub - Total for Dublin Region	**1,273,069**	**1,347,359**	74,290	5.836	1.141
Kildare	210,312	222,504	12,192	5.797	1.133
Meath	184,135	195,044	10,909	5.924	1.158
Wicklow	136,640	142,425	5,785	4.234	0.833
Sub - Total for Mid - East Region	**531,087**	**559,973**	28,886	5.439	1.065
GDA Total	**1,804,156**	**1,907,332**	103,176	5.719	1.118

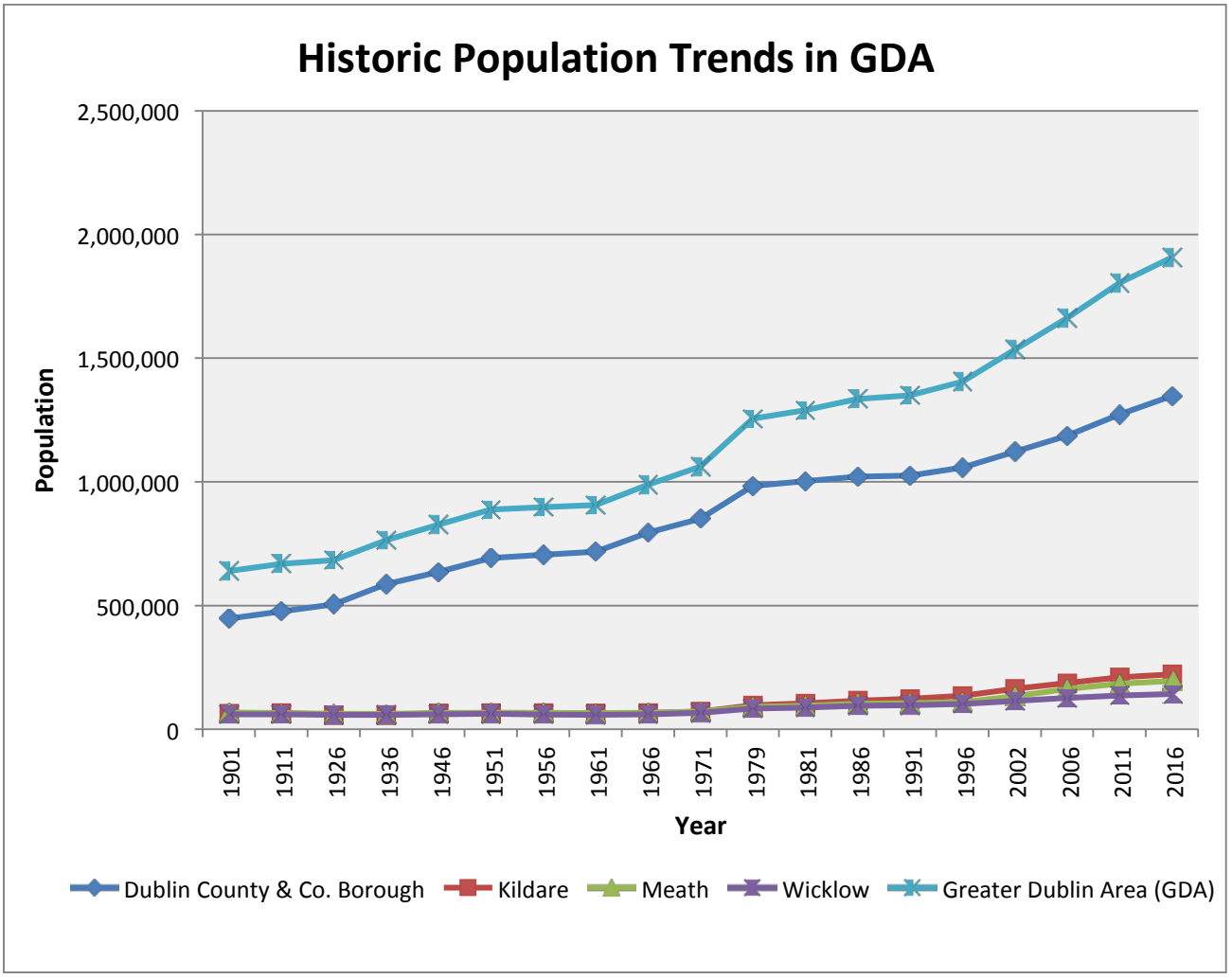
3.2 Historic Population Trends within the GDA

The population in the GDA at each Census year between 1901 and 2016 is illustrated in Table 3.2 and graphed in Figure 3.1.

Table 3.2 Historic Population Trends in GDA; 1901 - 2016

Census Year	Dublin County & Co. Borough	Kildare	Meath	Wicklow	Greater Dublin Area (GDA)
1901	448,206	63,566	67,497	60,824	640,093
1911	477,196	66,627	65,091	60,711	669,625
1926	505,654	58,028	62,969	57,591	684,242
1936	586,925	57,892	61,405	58,569	764,791
1946	636,193	64,849	66,232	60,451	827,725
1951	693,022	66,437	66,337	62,590	888,386
1956	705,781	65,915	66,762	59,906	898,364
1961	718,332	64,420	65,122	58,473	906,347
1966	795,047	66,404	67,323	60,428	989,202
1971	852,219	71,977	71,729	66,295	1,062,220
1979	983,683	97,185	90,715	83,950	1,255,533
1981	1,003,164	104,122	95,419	87,449	1,290,154
1986	1,021,449	116,247	103,881	94,542	1,336,119
1991	1,025,304	122,656	105,370	97,265	1,350,595
1996	1,058,264	134,992	109,732	102,683	1,405,671
2002	1,122,821	163,944	134,005	114,676	1,535,446
2006	1,187,176	186,335	162,831	126,194	1,662,536
2011	1,273,069	210,312	184,135	136,640	1,804,156
2016	**1,347,359**	**222,504**	**195,044**	**142,425**	**1,907,332**

Figure 3.1 Historic Population Trends in GDA



3.2.1 Historic Average Annual Growth Rates

Average annual percentage growth rates for Dublin County & County Borough, Counties Kildare, Meath & Wicklow and the GDA are shown in Table 3.3.

Table 3.3 Average Annual % Growth Rates

Period	Dublin County & Co. Borough	Kildare	Meath	Wicklow	Greater Dublin Area (GDA)
1901 - 2016	0.962	1.095	0.927	0.743	0.954
1911 - 2016	0.993	1.155	1.051	0.815	1.002
1926 - 2011	1.095	1.505	1.264	1.011	1.146
1936 - 2016	1.044	1.697	1.455	1.117	1.149
1946 - 2011	1.078	1.777	1.555	1.232	1.200
1951 - 2016	1.028	1.877	1.673	1.273	1.182

Period	Dublin County & Co. Borough	Kildare	Meath	Wicklow	Greater Dublin Area (GDA)
1961 - 2011	1.150	2.279	2.015	1.632	1.362
1971 - 2016	1.023	2.540	2.248	1.714	1.309
1981 - 2016	0.846	2.193	2.064	1.403	1.123
1991 - 2016	1.099	2.411	2.494	1.537	1.390
2002 - 2016	1.311	2.206	2.717	1.560	1.561
2011 - 2016	1.141	1.133	1.158	0.833	1.118

3.3 Future Projections of Population within the GDA

3.3.1 Introduction

In December 2013, the Central Statistics Office (CSO) published the 'Regional Population Projections' 2016-2031. This publication provides a regional breakdown of the CSO national projections and contains population projections for the eight Regional Authority areas in Ireland for 2016-2031. The assumptions used in the national model (fertility, mortality and international migration) have been regionalised based on recent historical data, and regional migration, but remain within the overall constraint of the national population projections. The regional data is presented in combinations of fertility and migration assumptions.

In May 2014, Irish Water commissioned a 'Demographic Study'[6] as part of the Water Supply Project (WSP) – Eastern and Midlands Region. The objective of the 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. Census 2011 provided data 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.

As a result of the WSP 'Demographic Study' and the CSO projections outlined above, the proposed growth scenarios with respect to the Greater Dublin Drainage project have been reviewed.

The WSP 'Demographic Study' outlines a range of assumption scenarios in order to assess future residential population. These scenarios are presented below;

- *A Planned Growth Scenario, providing for both 'High' and 'Low' population variations;*
- *A Most Likely Growth Scenario;*
- *A Minimum Expected Economic Growth Scenario;*
- *A Maximum Expected Economic Growth Scenario, providing for both 'High' and 'Low' population variations.*

[6] *Water Supply Project Dublin Region: Summary of Demographic Projections, AOS Planning, June 2014*

As emphasised in the WSP 'Demographic Study' the strategic approach adopted was to utilise the available CSO 2011 census population projection documentation as the 'spinal structure' upon which all projections were based. Specifically, the CSO Regional Population Projections to 2031 served to inform all projections up to and including that year. All subsequent date projections utilised the State projections to 2046.

As a result, the assumption scenarios contained in the WSP 'Demographic Study' also align with the assumptions scenarios presented in the CSO Projections as outlined below.

1. *Planned Growth Scenario 'Low' - (CSO 'M2F2 Recent' Scenario)*
2. *Planned Growth Scenario 'High' - (CSO 'M2F2 Traditional' Scenario)*
3. *A Most Likely Growth Scenario - (CSO 'M2F2 Modified' Scenario)*
4. *A Minimum Expected Economic Growth Scenario – (CSO 'M3F2' Scenario)*
5. *A Maximum Expected Economic Growth Scenario, providing for both 'High' and 'Low' population variations – (Combinations of CSO 'M2F1' and 'M1F2' Scenarios)*

Examination of the underlying characteristics and assumptions of each of the above growth scenarios determined that scenarios 4 and 5 were unlikely to be reasonable growth scenarios to plan the major strategic infrastructure required for the GDD and were therefore removed from further consideration.

Three future population growth scenarios were therefore selected for the Greater Dublin Drainage project. These growth scenarios are outlined below and in Table 3.4.

- *Growth Scenario 1 – Planned 'Low' - (CSO 'M2F2 Recent' Scenario)*
- *Growth Scenario 2- Planned 'High' - (CSO 'M2F2 Traditional' Scenario)*
- *Growth Scenario 3 - 'Most Likely' - (CSO 'M2F2 Modified' Scenario)*

Table 3.4 Proposed Residential Population Growth Scenarios

Growth Scenario	Time Period	Annual Average Growth Rate
Growth Scenario 1 – Planned 'Low'.	2016- 2021	Adopt the annual average growth rates derived from the 'M2F2 Recent' 2016 - 2021 population figures as set out in the CSO Regional Population Projections 2016 - 2031.
	2021- 2031	Adopt the annual average growth rates derived from the 'M2F2 Recent' 2021 - 2031 population figures as set out in the CSO Regional Population Projections 2016 - 2031.
	2031- 2041	Adopt the annual average growth rates derived from the 'Growth Scenario 1 – Low' 2031 - 2041 population figures as set out in the WSP 'Demographic Study' 2014.
	2041- 2050	Adopt the annual average growth rates derived from the 'Growth Scenario 1 – Low' 2041 - 2050 population figures as set out in the WSP 'Demographic Study' 2014.

Growth Scenario	Time Period	Annual Average Growth Rate
Growth Scenario 2 – Planned 'High'.	2016- 2021	Adopt the annual average growth rates derived from the 'M2F2 – Traditional' 2016 - 2021 population figures as set out in the CSO Regional Population Projections 2016 - 2031.
	2021- 2031	Adopt the annual average growth rates derived from the 'M2F2 Traditional' 2021 - 2031 population figures as set out in the CSO Regional Population Projections 2016 - 2031.
	2031- 2041	Adopt the annual average growth rates derived from the 'Growth Scenario 2 – High' 2031 - 2041 population figures as set out in the WSP 'Demographic Study' 2014.
	2041- 2050	Adopt the annual average growth rates derived from the 'Growth Scenario 2 – High' 2041 - 2050 population figures as set out in the WSP 'Demographic Study' 2014.
Growth Scenario 3 – Most Likely	2016- 2021	Adopt the annual average growth rates derived from the 'M2F2 Modified' 2016 - 2021 population figures as set out in the CSO Regional Population Projections 2016-2031.
	2021- 2031	Adopt the annual average growth rates derived from the 'M2F2 Modified' 2021 - 2031 population figures as set out in the CSO Regional Population Projections 2016-2031.
	2031- 2041	Adopt the annual average growth rates derived from the 'Growth Scenario 3 – Most Likely' 2031 - 2041 population figures as set out in the WSP 'Demographic Study' 2014.
	2041- 2050	Adopt the annual average growth rates derived from the 'Growth Scenario 3 – Most Likely' 2041 - 2050 population figures as set out in the WSP 'Demographic Study' 2014.

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 greater Dublin Drainage Project.

Table 3.5 summarises the population growth rates adopted.

Table 3.5 Proposed Residential Population Growth Rates (percentages)

Catchment Area	2016 - 2021			Post 2021-2031			Post 2031-2041			Post 2041-2050		
	Growth Scenario			Growth Scenario			Growth Scenario			Growth Scenario		
	1	2	3	1	2	3	1	2	3	1	2	3
Ringsend WwTP	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
9C Sewer												
Blanchards-town	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Ashbourne / Ratoath	0.99	1.17	0.99	0.90	1.23	0.90	0.70	0.84	0.84	0.66	0.56	0.81
Dunboyne / Clonee	0.99	1.17	0.99	0.90	1.23	0.90	0.70	0.84	0.84	0.66	0.56	0.81
North Fringe Sewer												
Fingal 'South Fringe'	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Dublin North City	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
NDDS Sewer												
Dublin North City	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Fingal - Howth/Sutton	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Other Catchments												
Swords WwTP	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Malahide WwTP	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Leixlip WwTP	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
Osberstown WwTP	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81
9B Sewer	0.75	0.85	0.96	0.79	1.02	1.09	0.70	0.84	0.84	0.66	0.56	0.81

It is to be noted that the residential population growth rates proposed above are lower than the long term average annual growth rates for the GDA indicated in Table 3.3.

4. Existing and Future Industrial, Commercial & Institutional Load

4.1 Industrial Loadings

Industrial discharges are licensed under either the Integrated Pollution Prevention Control (IPPC) License with the EPA as the competent authority or Waste License (Section 16) issued by the Local Authority / Irish Water.

4.1.1 Existing Industrial Loadings

Information on existing industrial discharges has been obtained from a review of the 2016 AER (Annual Environmental Reports) for the various industries.

4.1.2 Future Industrial Loadings

The basis for provision for industry within the assessment of required design capacity is as follows:

- Existing industrial load to remain unchanged out to the 2050 Design Year; and
- In accordance with Irish Water's Water Service Strategic Plan (WSSP) 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.

4.2 Commercial & Institutional Loadings

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

- Where the complete catchment to a wastewater treatment plant 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 treatment plant.
- 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 (source: National Urban Waste Water Study, DEHLG, vol 2, part A, section 5, 2004).

4.2.1 Future Commercial & Institutional Loadings

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

5. Analysis of Ringsend Catchment

5.1 Existing Load on Ringsend WwTP

The organic loading, expressed in terms of population equivalent (PE) on Ringsend WwTP as of 2016 was approximately **1.808** million. This was the average day loading for 2016 and it is noted that daily load measurements at Ringsend WwTP show wide fluctuations and variability[7].

5.2 Residential Population in Ringsend Catchment

5.2.1 Existing Population

The residential population contributing to the Ringsend WwTP in 2016 is calculated at 1,160,553 persons.

5.2.2 Future Population

A summary of the projected future residential population in the Ringsend WwTP catchment at years 2025, 2031, 2040 and 2050 for the three growth scenarios is shown in Table 5.1.

Table 5.1 Projected Future Residential Population in Ringsend WwTP catchment

Growth Scenario	Base Year	Design Year			
	2016	2025	2031	2040	2050
Scenario 1 - Planned Low	1,164,859	1,243,254	1,303,361	1,387,810	1,482,763
Scenario 2 - Planned High	1,164,859	1,260,881	1,340,041	1,444,820	1,532,053
Scenario 3 - 'Most Likely'	1,164,859	1,271,290	1,356,731	1,462,814	1,586,188

5.3 Existing Industrial Loadings in the Ringsend WwTP

The licensed industrial load expressed as a population equivalent (PE) in the Ringsend WwTP catchment is estimated as 1,038,300 PE.

However, the actual utilised industrial loading in 2016 from IPPC licenced facilities discharging to the Ringsend catchment was 230,026 PE as determined from the 2016 AER returns.

The utilised industrial loading from Section 16 licenced facilities discharging to the Ringsend catchment in 2016 is estimated at 105,632 PE

The total 2016 industrial loading discharging to the Ringsend catchment is therefore estimated at 335,658 PE

[7] See Table 3.8 of "Ringsend Wastewater Treatment Works – Design Review Report, June 2010" for details of the significant loading variability at Ringsend WwTP.

5.3.1 Future Industrial Loadings in the Ringsend WwTP catchment

Provision for future industry within Ringsend catchment is as follows:

- *Existing industrial load to remain unchanged at 335,658 PE out to the 2050 Design Year.*
- *An allowance of 150,000 PE is added from 2019 to provide for expansion plans of a specific Significant Industrial Customer (SIC), identified in confidential briefings to Irish Water, and.*
- *In accordance with Irish Water's Water Service Strategic Plan (WSSP) 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.*

5.4 Existing Commercial and Institutional Loading in the Ringsend WwTP

The load contribution from commercial and institutional sources in the Ringsend WwTP catchment have been estimated by deducting known residential and industrial contributions from the total load measured at the treatment plant. In this manner the commercial and institutional load contribution to Ringsend WwTP in 2016 has been estimated at **311,835** PE or c.27% of residential contribution.

5.4.1 Future Commercial and Institutional Loading in the Ringsend WwTP

Future commercial & institutional loadings in the Ringsend WwTP catchment are assumed to grow in line with population growth.

5.5 Projected Treatment Capacity Requirements at Ringsend

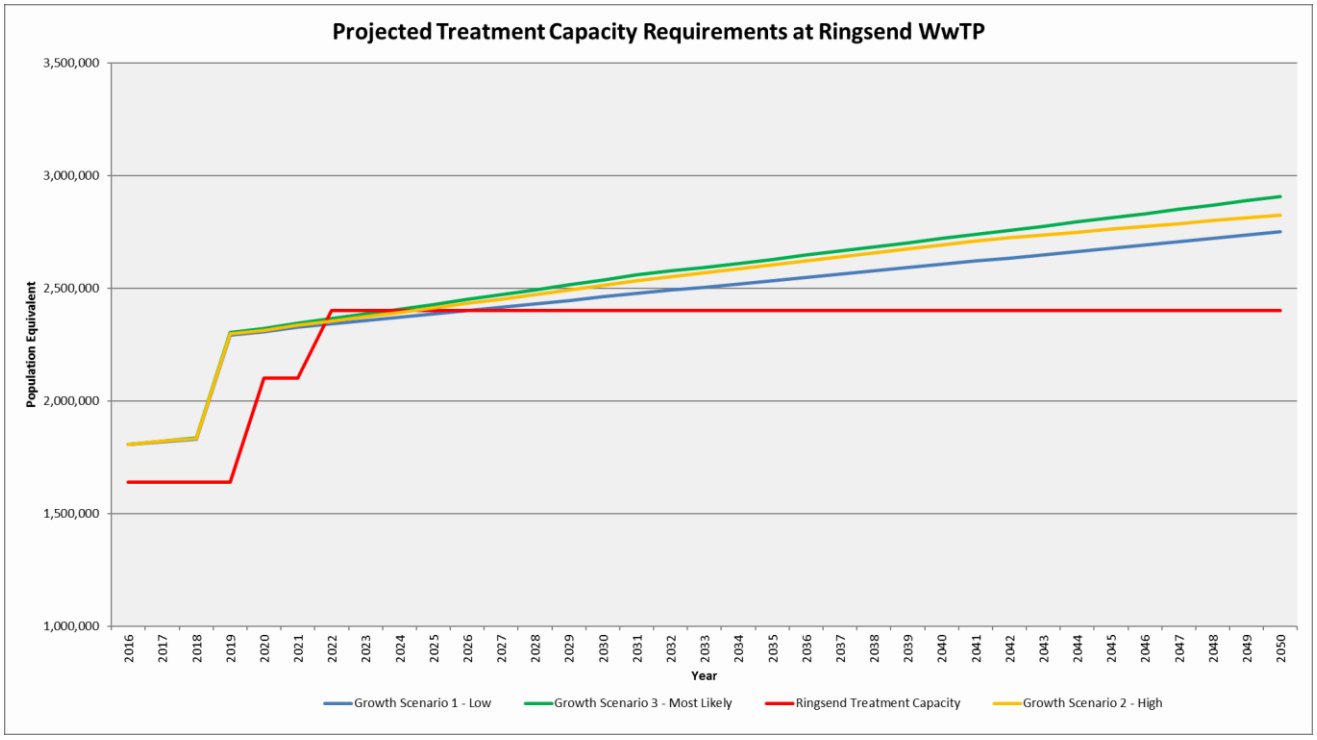
On completion of the current upgrade of Ringsend WwTP the works will have an installed treatment capacity of 2.4 million PE and further expansion beyond this level is not considered feasible.

The projected average day population equivalent, i.e. the combination of residential, commercial and industrial projections, treatment capacity requirements for the Ringsend WwTP Catchment under the three growth scenarios examined is summarised in Table 5.2 and illustrated in Figure 5.1. The treatment capacity of Ringsend WwTP of 2.4 million PE average day load is also shown. A detailed analysis of the projected population equivalent loadings is provided in Appendix B.

Table 5.2 Summary of Projected Treatment Capacity Requirements – Ringsend WwTP 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

Fig. 5.1 Projected Treatment Capacity Requirements – Ringsend Catchment



Under Growth Scenario 1 – 'Planned Growth – Low', the projected treatment capacity requirements exceed the ultimate installed treatment capacity of 2.4 million PE from year 2027. At 2050 this exceedance is projected at 350,567 PE.

Under Growth Scenario 2 – 'Planned Growth – High', the projected treatment capacity requirements exceed the ultimate installed treatment capacity of 2.4 million PE from year 2025. At 2050 this exceedance is projected at 425,608 PE.

Under Growth Scenario 3– 'Most Likely Growth' the projected treatment capacity requirements exceed the ultimate installed treatment capacity of 2.4 million PE from year 2024. At 2050 this exceedance is projected at 508,024 PE.

5.6 Appraisal of Ringsend WwTP's treatment capacity

As shown above, the projected treatment capacity requirements in the Ringsend catchment will exceed the ultimate installed treatment capacity of 2.4 million PE between 2024 and 2027 depending on the actual growth rate realised in the catchment. The deficit in treatment capacity requirements in the Ringsend catchment is projected to range between 350,567 PE and 508,024 PE at 2050.

5.7 Conclusions

The constraints on the future expansion of Ringsend WwTP beyond its ultimate capacity as originally identified by GDSDS remain relevant. Furthermore, the capacity constraints in the sewer network serving the Ringsend WwTP catchment, as identified by GDSDS, also remain relevant. Therefore, future development within this catchment cannot be catered for by Ringsend WwTP alone and additional treatment capacity is required in the catchment.

The GDD project, encompassing a new Regional WwTP, marine outfall pipe and orbital drainage system will provide the additional wastewater treatment capacity required in the catchment. By diverting flow and load out of the Ringsend catchment to the new Regional WwTP the GDD project will free up capacity at Ringsend WwTP and in its contributing network. The GDD project will therefore enable growth to continue out to 2050 in the sub-catchments that are diverted to the new Regional WwTP and also in the other sub-catchments that remain served by RingsendWwTP.

6. Analysis of Existing Regional WwTPs

6.1 Introduction

This chapter assesses the projected treatment capacity requirements in four drainage catchments served by existing Regional WwTPs that were identified by GDSDS as potentially having an influence on the future required treatment capacity of the proposed new Regional WwTP. The four catchments assessed are Malahide, Swords, Lower Liffey Valley (Leixlip WwTP) and the Upper Liffey Valley (Osberstown WwTP). A summary discussion of the assessment is provided hereunder with the full tabular analysis provided in Appendix A.

6.2 Malahide WwTP

6.2.1 Existing Organic Load

The average daily organic load on Malahide WwTP in 2016, expressed as population equivalents was 16,692 PE. The existing treatment capacity of the plant is 21,000 PE.

6.2.2 Growth in the Malahide WwTP Catchment

The projected treatment capacity requirements under the three growth scenarios examined are summarised hereunder.

Growth Scenario 1 – Planned Growth - Low

Under this growth scenario, the 21,000 PE capacity at Malahide WwTP is exceeded in year 2048. By year 2050 the required treatment capacity in this catchment is projected at 21,326 PE.

Growth Scenario 2– Planned Growth - High

Under this growth scenario, the 21,000 PE capacity at Malahide WwTP is exceeded in year 2042. By year 2050 the required treatment capacity in this catchment is projected at 22,035 PE.

Growth Scenario 3 – Most Likely Growth

Under growth scenario 3, the 21,000 PE capacity at Malahide WwTP is exceeded in year 2040. By year 2050 the required treatment capacity in this catchment is projected at 22,814 PE.

6.2.3 Impact of Future Growth

The location of Malahide WwTP precludes the possibility of physically expanding the plant to provide the projected future treatment capacity requirements.

The WwTP currently discharges to the environmentally sensitive water of the outer Broadmeadow Estuary, which places further constraints on the possibility of expanding the plant at its current location.

Options to provide for future projected treatment capacity requirements in this catchment include

- Diversion of flow from part of the catchment to the Swords WwTP catchment (short term solution);
- Diversion of flow from part of the catchment to the North Fringe Sewer for treatment at Ringsend WwTP (short term solution);
- Diversion of flow from part of the catchment to the new Regional WwTP (long term solution)

Diversion of flow from the Malahide catchment to either the Swords catchment or to the North Fringe sewer would only be temporary short term options. The recommended long term solution for the Malahide catchment is to divert flow from part of the catchment to the proposed Regional WwTP.

6.3 Swords WwTP

6.3.1 Existing Population

The average daily organic load on Swords WwTP in 2016, expressed as population equivalents was 58,341 PE. The existing treatment capacity of the plant is 90,000 PE.

6.3.2 Growth in the Swords Catchment

The projected treatment capacity requirements under the three growth scenarios examined are summarised hereunder.

Growth Scenario 1 – Planned Growth - Low

Under this growth scenario, the 90,000 PE capacity at Swords WwTP is not exceeded prior to 2050

Growth Scenario 2– Planned Growth - High

Under this growth scenario, the 90,000 PE capacity at Swords WwTP is exceeded in year 2048. By year 2050 the required treatment capacity in this catchment is projected at 91,228 PE.

Growth Scenario 3 – Most Likely Growth

Under growth scenario 3, the 90,000 PE capacity at Swords WwTP is exceeded in year 2045. By year 2050 the required treatment capacity in this catchment is projected at 94,380 PE.

6.3.3 Impact of Future Growth

Swords is one of Ireland's fastest growing towns. It is also worth noting that Swords has been identified as a Metropolitan Consolidation Town within the RPG Settlement Typology and Hierarchy for the GDA. It is therefore expected that long term growth could see Swords expanding up to 100,000 in a planned and phased manner (Source RPG 2010 & Fingal County Development Plan 2017 – 2023). This implies that Swords, given its current population, is likely to be the main growth area within the Metropolitan Area of Fingal for the foreseeable future.

The future treatment capacity requirements in this catchment are projected to exceed the installed capacity at Swords WwTP from 2045 onwards depending on actual growth realised. The long term solution, as recommended by GDSDS, to anticipated treatment capacity deficits in this catchment

post 2050 is to divert flow from part of the catchment to the proposed Regional WwTP. This solution could be developed in conjunction with flow diversions from the Malahide catchment.

6.4 Lower Liffey Valley (Leixlip WwTP) Catchment

6.4.1 Existing Population

The average daily organic load on Leixlip WwTP in 2016, expressed as population equivalents was 126,000 PE. The existing treatment capacity of the plant is 150,000 PE.

6.4.2 Growth in the Leixlip Catchment

The projected treatment capacity requirements in the Lower Liffey Valley catchment under the three growth scenarios examined are summarised hereunder. It should be noted that the projected growth in the Lower Liffey Valley catchment includes for the expansion plans of a specific Significant Industrial Customer (SIC), identified in confidential briefings to Irish Water.

Growth Scenario 1 – Planned Growth - Low

Under this growth scenario the 150,000 PE upgraded capacity at Leixlip WwTP is exceeded in year 2019. By year 2050 the required treatment capacity in this catchment is projected at 195,499 PE..

Growth Scenario 2 – Planned Growth - High

Under this growth scenario the 150,000 PE upgraded capacity at Leixlip WwTP is exceeded in year 2019. By year 2050 the required treatment capacity in this catchment is projected at 264,216 PE.

Growth Scenario 3 Most Likely Growth

Under this growth scenario the 150,000 PE upgraded capacity at Leixlip WwTP is exceeded in year 2019. By year 2050 the required treatment capacity in this catchment is projected at 267,969 PE.

6.4.3 Impact of Future Growth

The expansion of this catchment beyond 150,000 PE cannot be served by the Leixlip WwTP alone due to the limiting assimilative capacity of the receiving water (River Liffey) under low flow conditions[8]. GDSDS recommended transferring flow and load in excess of the 150,000 PE capacity of Leixlip WwTP to the proposed Regional WwTP. Irish Water advise that works to transfer the excess flow and load from Leixlip WwTP are currently at planning stage. These works would initially transfer the flows to the Blanchardstown catchment for onward transfer to Ringsend WwTP for treatment in the short term. Under the GDD project these flows would be diverted to the Regional WwTP with the flows from the Blanchardstown catchment.

[8] Leixlip WwTW Environmental Impact Statement – Effluent Quality for Leixlip WwTW

6.5 Upper Liffey Valley (Osberstown WwTP) Catchment

6.5.1 Existing Population

The average daily organic load on Osberstown WwTP in 2016, expressed as population equivalents was 80,239 PE. The existing treatment capacity of the plant is 130,000 PE.

6.5.2 Growth in Osberstown Catchment

Under all three growth scenarios, the 1300,000 PE treatment capacity at Osberstown WwTP is not exceeded prior to 2050

6.5.3 Impact of Future Growth

It is worth noting as part of the review of the County Development Plan Kildare County Council conducted a survey which indicated that residential and mixed-use zoned lands in the Upper Liffey Valley Catchment were in excess of 500ha. Significant development in this catchment could lead to treatment capacity requirements far in excess of the installed capacity of 130,000 PE.

Development in this catchment, which would require treatment capacity to be provided beyond the installed capacity of 130,000 PE will require further studies to determine the optimum manner in which such development could be catered for.

6.6 Summary

The impact of projected future growth in the catchments of these regional plants indicates that there will be significant challenges facing these catchments in the future. It may not prove to be technically feasible or economically sustainable to overcome these challenges by further upgrade works at the individual treatment plants and alternative solutions may have to be developed.

Potential solutions for each of the four regional WwTPs examined here are summarised below:

- Projected growth in the Lower Liffey Valley catchment requires that flow and load in excess of the installed 150,000 PE treatment capacity at Leixlip WwTP be diverted to the Regional WwTP as soon as this plant is commissioned. Irish Water advise that works to transfer the excess flow and load from Leixlip WwTP are currently at planning stage.
- Projected growth in the Swords and Malahide catchments requires that flow and load in excess of the installed treatment capacities be diverted to the Regional WwTP post 2050.
- Whilst the 130,000 PE treatment capacity at Osberstown WwTP is not exceeded in any of the three growth scenarios examined prior to 2050 it is possible, given the zoned lands available in this catchment, that the actual growth realised may exceed projections. Should this be the case further studies are recommended to ascertain the optimum solution to provide potential future treatment capacity requirements in this catchment.

6.7 Conclusions

Of the four existing regional WwTPs assessed in this chapter only the Lower Liffey Valley (Leixlip WwTP) will impact on the treatment capacity to be provided at the proposed Regional WwTP prior to 2050. 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 discussed in Chapter 5. Therefore, the additional treatment capacity required ranges between 350,567 PE and 508,024 PE to provide for growth in the Ringsend catchment out to 2050. This additional treatment capacity cannot be provided by further development of Ringsend WwTP beyond that which is already in planning. Therefore, a new wastewater treatment plant is required. The GDD project will provide the required additional treatment capacity.

In our view, the statutory requirement that Irish Water should be in a position to address in its strategic planning, '*existing and reasonably foreseeable deficiencies in the provision of water services'* requires a particular and very important perspective on the use of Planning Scenarios in infrastructural planning for assets of long working life.

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 GDD on the basis of this growth scenario. It is therefore recommended that the GDD project be designed to provide a wastewater treatment capacity of 500,000 PE.

7. Analysis of Northern & Western Sub-Catchments

7.1 Introduction

As recommended in Chapter 6 the GDD project will provide an additional 500,000 PE of treatment capacity, primarily to augment the existing treatment capacities provided at Ringsend WwTP and Leixlip WwTP. To mobilise this capacity, it is necessary to divert flow and load out of these catchments to the proposed Regional WwTP in order to keep the average daily organic loads on these plants below their installed treatment capacities.

As noted previously, Irish Water currently have work at planning stage to transfer excess flows away from Leixlip WwTP. In the short term, it is proposed to transfer these flows to the 9C sewer in Blanchardstown for onward transfer to the Ringsend WwTP. Ultimately, under the GDD project these flows will transfer with the flows from Blanchardstown to the proposed Regional WwTP.

The transfer of flows out of the Ringsend catchment revolve around the northern, north-western and western sub-catchments of the current Ringsend catchment. These sub-catchments comprise of,

- *The Blanchardstown (9C Sewer) sub-catchment of Ringsend WwTP (includes the Meath towns & villages of Ashbourne, Ratoath, Kilbride, Dunboyne & Clonee),*
- *The North Dublin (North Fringe Sewer &North Dublin Drainage Scheme (NDDS) Sewer) sub-catchment of Ringsend WwTP,*
- *The South Dublin – Lucan/Clondalkin (9B Sewer) sub-catchment of Ringsend WwTP*

This chapter examines the projected treatment capacity requirements for each of the above sub-catchments out to the design year horizon of 2050 to establish the optimum implementation strategy for the required flow diversions.

7.2 Analysis of Projected Treatment Capacity Requirements

7.2.1 Blanchardstown (9C Sewer) Sub-Catchment

The projected treatment capacity required, expressed as population equivalent, in the 9C Sewer Sub-Catchment north of the M50, under the 'most likely' growth scenario is summarised in Table 7.1. This includes population growth as per Table 3.5, commercial growth as per Section 4.2, provision for industry as per Section 4.1 and the proposed load transfer from the Leixlip WwTP catchment.

Table 7.1 Summary of Projected Treatment Capacity Requirements (PE) – 9C Sewer Sub-Catchment

	Design Year				
	2016	2025	2031	2040	2050
Scenario 3 – Most Likely Growth	166,040	363,385	376,151	392,697	411,939

7.2.2 North Dublin (North Fringe Sewer) Sub-Catchment

The projected treatment capacity required, expressed as population equivalent, in the North Fringe Sewer Sub-Catchment, under the 'most likely' growth scenario is summarised in Table 7.2. This includes population growth as per Table 3.5, commercial growth as per Section 4.2, and provision for industry as per Section 4.1.

Table 7.2 Summary of Projected Treatment Capacity Requirements (PE) – NFS Sub-Catchment

Growth Scenario	Design Year				
	2016	2025	2031	2040	2050
Scenario 3– Most Likely Growth	135,463	180,233	191,072	204,172	219,406

7.2.3 North Dublin (NDDS Sewer) Sub-Catchment

The projected treatment capacity required, expressed as population equivalent, in the NDDS Sewer Sub-Catchment, under the 'most likely' growth scenario is summarised in Table 7.3. This includes population growth as per Table 3.5, commercial growth as per Section 4.2, and provision for industry as per Section 4.1.

Table 7.3 Summary of Projected Treatment Capacity Requirements (PE) – NDDS Sub-Catchment

Growth Scenario	Design Year				
	2016	2025	2031	2040	2050
Scenario 3 – Most Likely Growth	220,078	284,087	302,068	324,393	350,356

7.2.4 South Dublin – Lucan/Clondalkin (9B Sewer) Sub-Catchment

The projected treatment capacity required, expressed as population equivalent, in the 9B Sewer Sub-Catchment, under the 'most likely' growth scenario is summarised in Table 7.4. This includes population growth as per Table 3.5, commercial growth as per Section 4.2, and provision for industry as per Section 4.1.

Table 7.4 Summary of Projected Treatment Capacity Requirements (PE) – 9B Sewer Sub-Catchment

Growth Scenario	Design Year				
	2016	2025	2031	2040	2050
Scenario 3 – Most Likely Growth	85,255	111,628	119,036	128,234	138,931

7.3 Discussion on Projected Treatment Capacity Requirements

It is evident from the above analysis that no one sub-catchment can provide the required 500,000 PE capacity on its own. Flow diversions from at least two catchments are therefore required. As the proposed Regional WwTP is located in north county Dublin the two catchments given prime

consideration for diversion are the Blanchardstown (9C Sewer) catchment and the North Fringe Sewer (NFS) catchment.

7.3.1 Blanchardstown (9C Sewer) Catchment

The largest flow and load diversion is available from the Blanchardstown catchment. This flow and load is inclusive of the transferred flows from Leixlip. Constraints on the 9C sewer network downstream of Blanchardstown, which severely limit its capacity to transfer the projected future flows in this catchment to Ringsend WwTP include:

- The 9C sewer twin syphons under the River Liffey;
- The Davitt Road/Dolphin Road Sewer, which also serves the Lucan/Clondalkin 9B sewer; and
- the inlet syphon from the Main Lift Pumping Station (MLPS) to Ringsend WwTP.

Diversion of this sub-catchment to the proposed Regional WwTP would therefore free up capacity in the downstream network, in particular the Davitt Road/Dolphin Road sewer and the Grand Canal Tunnel Sewer (GCTS), enabling growth to continue in the connected catchments. This applies in particular to the Lucan/Clondalkin (9B sewer) catchment where there is substantial scope for development for housing (Adamstown SDZ and Clonburris SDZ) and industrial units, and the City Centre catchment where growth through urban regeneration, development of brownfield sites and urban densification is occurring.

It is therefore recommended that diversion of this sub-catchment to the proposed Regional WwTP be considered a priority. This diversion will provide a projected 411,939 PE of the required 500,000 PE at 2050 under the ‘most likely’ growth scenario.

7.3.2 North Dublin (North Fringe Sewer) Catchment

A diversion of the entire North Fringe Sewer (NFS) catchment would provide a projected treatment capacity requirement of 219,406 PE at 2050 under the ‘most likely’ growth scenario at the proposed Regional WwTP. Coupled with the diversion of the Blanchardstown (9C Sewer) catchment this would provide a projected treatment capacity requirement of 631,345 PE at 2050 at the proposed Regional WwTP. This exceeds the required 500,000 PE load diversion therefore a full diversion of this catchment is not required before 2050. A partial diversion of the NFS, as discussed below, is instead proposed.

This partial diversion of the NFS catchment envisages intercepting the NFS between existing NFS manholes MH1-50 and MH1-51, which are located approximately 500m due south of the proposed Regional WwTP and immediately north of the R139. The diversion sewer would be routed into the Regional WwTP along the proposed access road off the R139. In this scenario all sub-catchments of the NFS located to the west of the Regional WwTP will be diverted, including north Finglas, Ballymun and Dublin Airport. The projected treatment capacity requirements expressed as population equivalent, for these sub-catchments under the ‘most likely’ growth scenario is summarised in Table 7.5

Table 7.5 Summary of Projected Treatment Capacity Requirements (PE) – NFS Sub-Catchments west of Regional WwTP

	Design Year				
	2016	2025	2031	2040	2050
Scenario 3 – Most Likely Growth	53,108	75,036	79,089	84,703	89,973

This proposed partial diversion of the NFS catchment will provide a projected 89,973 PE treatment capacity requirement at the proposed Regional WwTP. Coupled with the proposed diversion of the Blanchardstown (9C Sewer+ Leixlip transfer) catchment the required treatment capacity at the proposed Regional WwTP is projected as 501,912 PE at 2050. This proposed partial diversion would also reduce the flows arriving at Sutton Pumping Station thereby relieving operational pressures at this facility.

The required 500,000 PE diversion of projected treatment capacity requirement from the Ringsend catchment is therefore satisfied by diverting the Blanchardstown (9C Sewer + Leixlip transfer) catchment and the sub-catchments of the NFS located west of the proposed Regional WwTP.

7.3.3 North Dublin (NDDS Sewer) Catchment

With the proposed diversions of the Blanchardstown (9C Sewer) catchment and the NFS sub-catchments west of the proposed Regional WwTP there is no requirement to divert the NDDS Sewer catchment prior to 2050.

Furthermore, it should be noted that diversion of this catchment is dependent on the diversion of the entire NFS catchment as it is not considered feasible to divert the NDDS sewer until the NFS catchment (including Portmarnock and Baldoyle) is diverted as discussed in Chapter 8.

7.3.4 South Dublin – Lucan/Clondalkin (9B Sewer) Catchment

As discussed above the diversion of the Blanchardstown (9C Sewer) sub-catchment will free up capacity in the downstream sewer network, which also serves the Lucan/Clondalkin (9B Sewer) catchment. As a result, there is no requirement to divert this catchment to the proposed Regional WwTP before 2050.

8. Options for Diverting the Northern & Western Sub-Catchments

8.1 Introduction

This chapter examines options for diverting the main trunk sewers serving the catchments in the northern, north- western and western area of the Ringsend catchment to the proposed Regional WwTP.

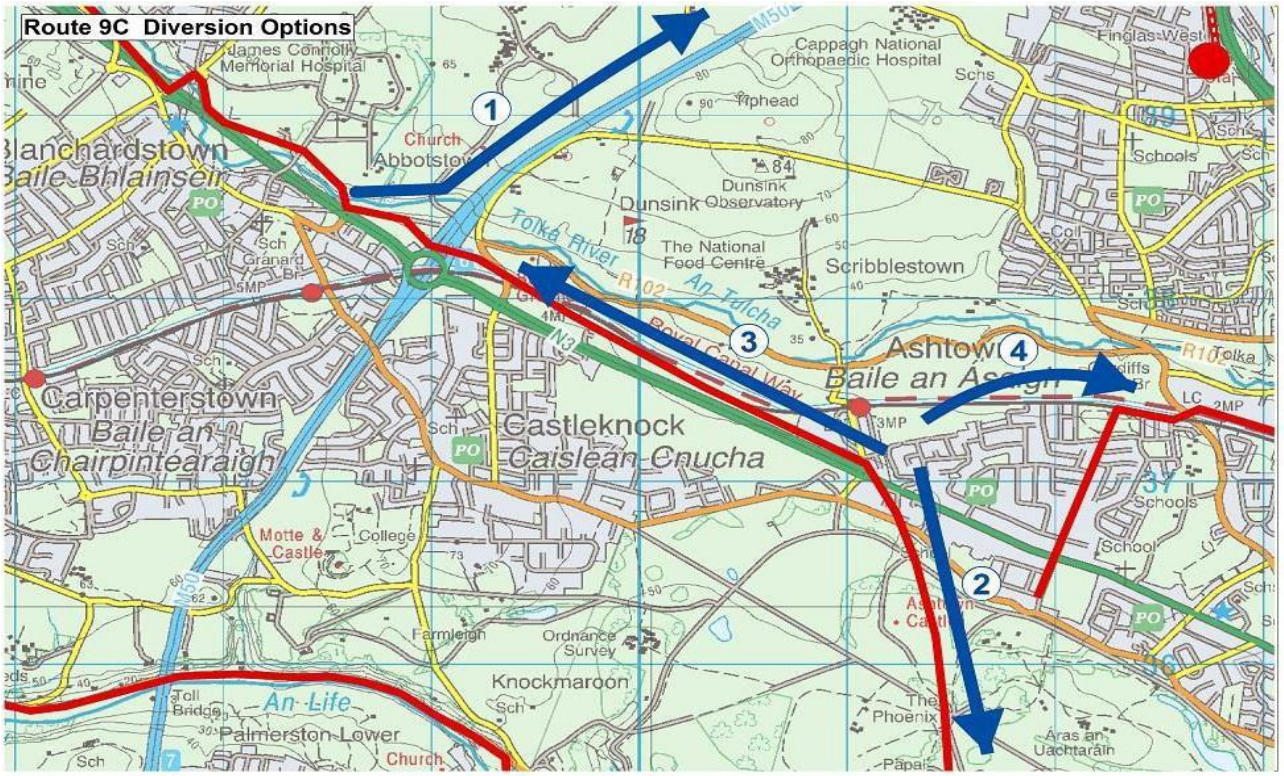
8.2 Blanchardstown (9C Sewer) Catchment

Irish Water have recently received planning permission (FW17A/0083) for a drainage scheme to duplicate the existing 9C sewer in the Tolka River Valley Park between the townlands of Parlickstown and Deanstown in Mulhuddart and Blanchardstown, Dublin 15.

In considering options for diverting flows from the 9C Sewer it is assumed that the works included in this planning permission will be completed in advance of or in parallel with the Greater Dublin Drainage project.

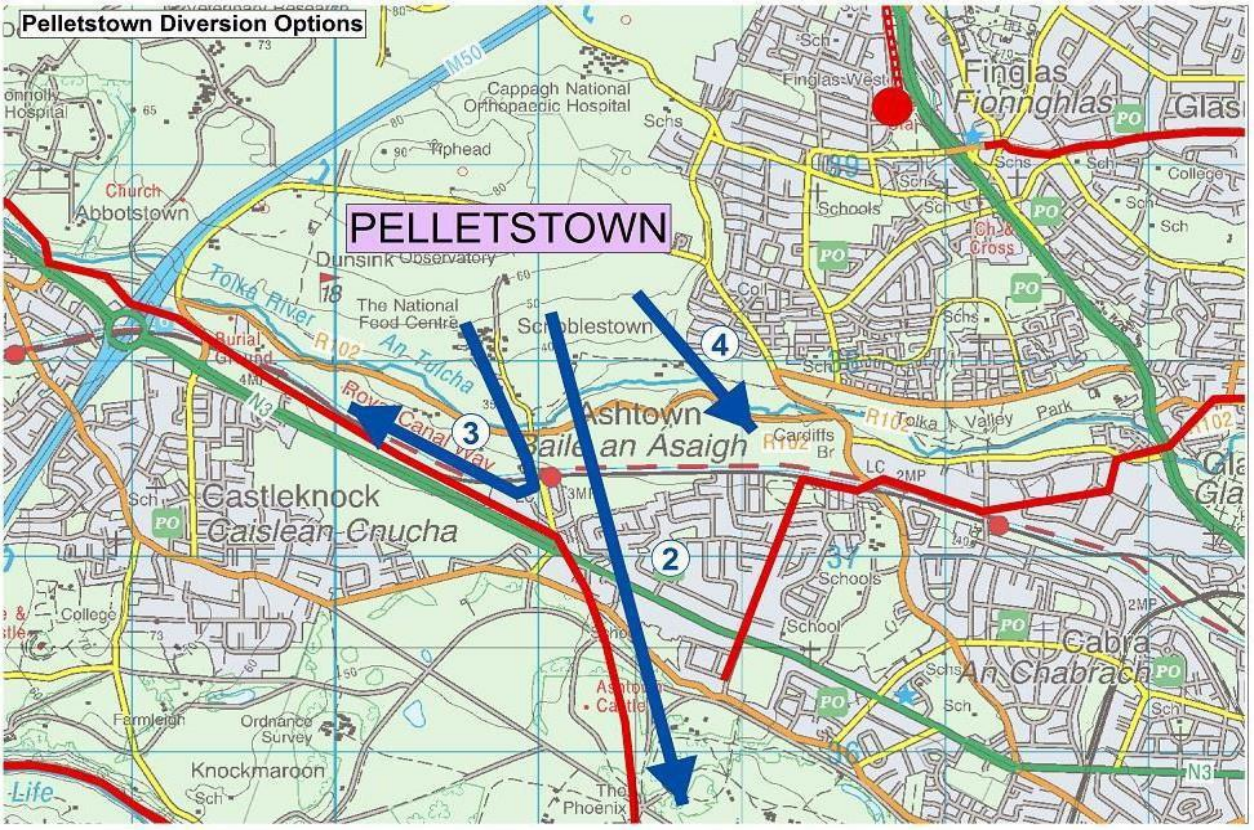
The Blanchardstown – Clonshagh Orbital Sewer will transfer flows from the existing Blanchardstown drainage catchment, which includes Blanchardstown and its environs and the Meath towns and villages of Ashbourne, Ratoath, Kilbride, Dunboyne & Clonee, to the proposed Regional WwTP at Clonshagh (Clonsgaugh). The orbital sewer commences in the grounds of Waterville Park, Blanchardstown where it intercepts the 9C sewer. From this point it is routed through the grounds of Connolly Hospital and the grounds of the National Sports Campus to the proposed Abbotstown Pumping Station, located adjacent to the M50 see Figure 8.1. From this pumping station the Orbital Sewer it is routed north of and generally parallel to the M50 to Clonshagh passing, en-route, south of the Dublin Airport complex. The lands along the length of the orbital sewer are generally open fields with agriculture the main land use pattern. The total length of this Orbital Sewer is 13,723 m.

Figure 8.1 Diversion Options for 9C Sewer to Orbital Sewer



For the residual 9C Sewer Catchment downstream of the M50 three options for dealing with the flows (ref. options 2, 3 & 4 on Fig 8.1) have been examined as set out hereunder. All options have been considered in conjunction with dealing with potential future flows from the Pelletstown area, refer to Fig. 8.2 below, which is identified as a Strategic Development and Regeneration Area (SDRA) in the Dublin City Development Plan 2016 – 2022 (Interim Publication) and therefore one of the key areas in the north city area for future development.

Figure 8.2 Foul Drainage Options for the Pelletstown SDRA



Option 2 as shown on Figure 8.1 is to leave these residual flows continue to flow through one of the Liffey Siphons to the Grand Canal Tunnel sewer. However, this residual flow is insufficient to maintain self-cleansing velocities in the Liffey siphon. This concern may be overcome by draining the Pellettstown area in this direction also (Option 2 on Figure 8.2).

Option 3, as shown on Figure 8.1, considered collecting these residual flows to a small pumping station and pump them back to the main 9C Sewer interception point. Crossing of the M50 could be achieved by using the existing pipe bridge as a pipe sleeve for the pumped main in the reverse direction. Future flows from the Pelletstown area could also be drained to the Orbital Sewer by using this pumping station (Option 3 on Figure 8.2).

Option 4 as shown on Figure 8.1 examined connecting the residual flows to the head of the NDDS sewer. This option would compete for capacity in the NDDS sewer with future flows from Pelletstown (Option 4 on Figure 8.2) and has the potential to impact unfavourably on downstream CSOs. Modelling of the NDDS sewer would be required to confirm this option.

Option 2, allowing the flows in the 9C Sewer Catchment downstream of the M50 to continue to flow to the GCTS, is the preferred option. Future flows from the Pelletstown SDRA should also be connected to the 9C Sewer once the catchment upstream of the M50 is diverted. It is recommended that the potential for diverting the Ashtown section of the NDDS sewer, south of the Railway and canal

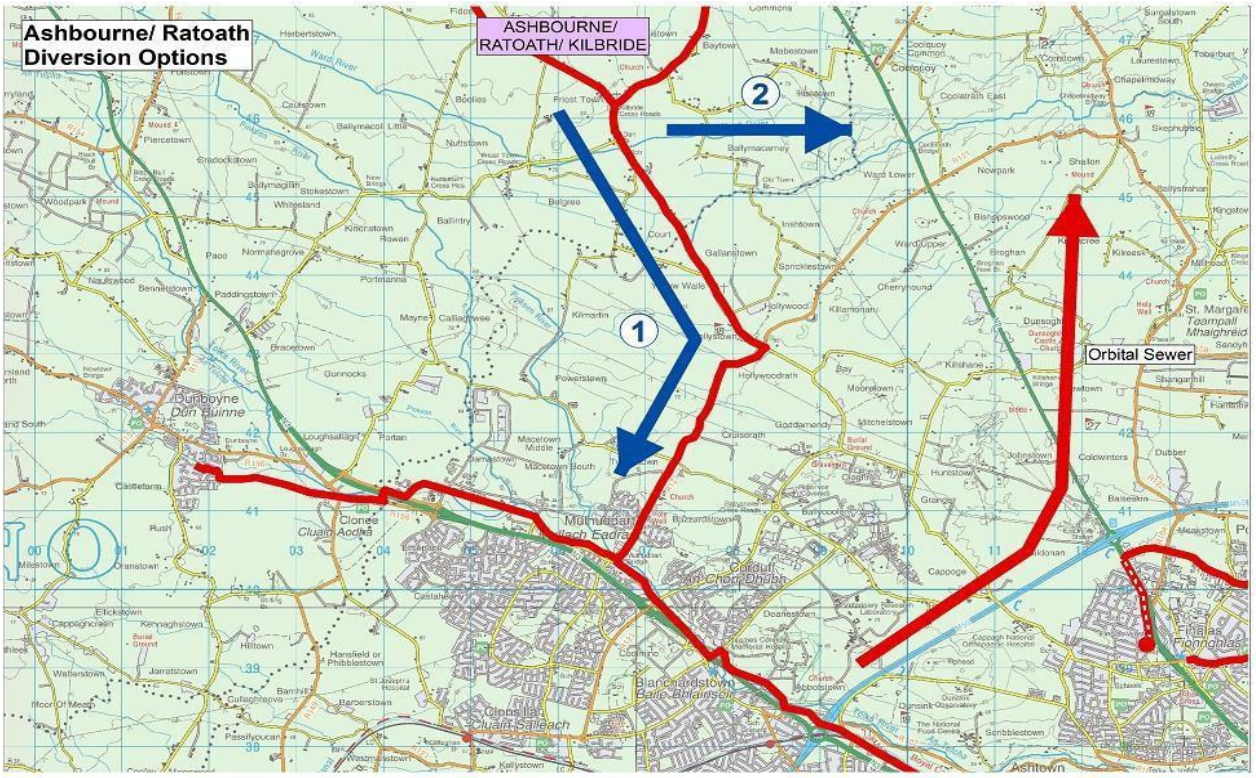
crossing, to the 9C Sewer in the vicinity of the Phoenix Park, to augment flows through the Liffey Syphons following diversion of the catchment upstream of the M50 be further examined.

Ashbourne/ Ratoath

The towns of Ashbourne and Ratoath in County Meath currently drain to the 9C Sewer via a pumping station at Kilbride. The GDSDS recommendations indicated that foul flows from both these towns would be pumped directly to the Orbital Sewer from Kilbride. Modelling work undertaken on the 9C Sewer as part of the BRDS Preliminary Report also assumed that Ashbourne and Ratoath would be pumped directly to the Orbital Sewer from Kilbride and thus the future foul flows from these two towns were not considered in model runs post 2020 in examining options for upgrading the 9C Sewer.

Additional model runs, testing revised design scenarios, on the BRDS 9C Sewer model indicate that capacity exists in the 9C duplication to retain the flows pumped from Ashbourne, Ratoath and Kilbride without significant detriment in the 9C Sewer Catchment. This is the preferred option for transferring of flows and is shown as Option 1 on Figure 8.3.

Figure. 8.3 Connection Options for Ashbourne/Ratoath to Orbital Sewer



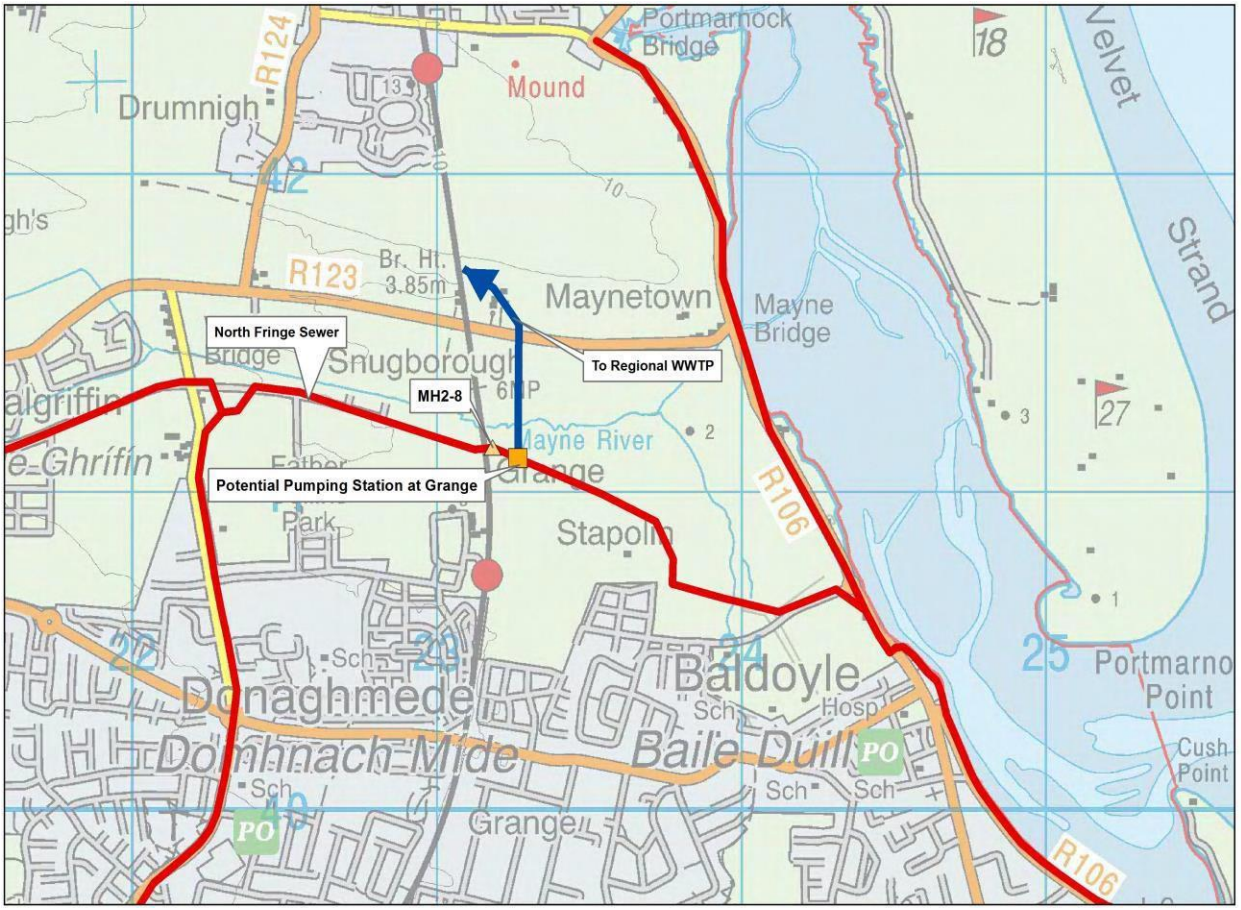
Option 1 (Figure 8.3) considers retaining the connection from Ashbourne and Ratoath to the 9C Sewer.

8.3 North Fringe Sewer (NFS) Catchment

Diversion options for this catchment considered diversion of the entire catchment and a partial diversion of the NFS sub-catchments west of the proposed Regional WwTP.

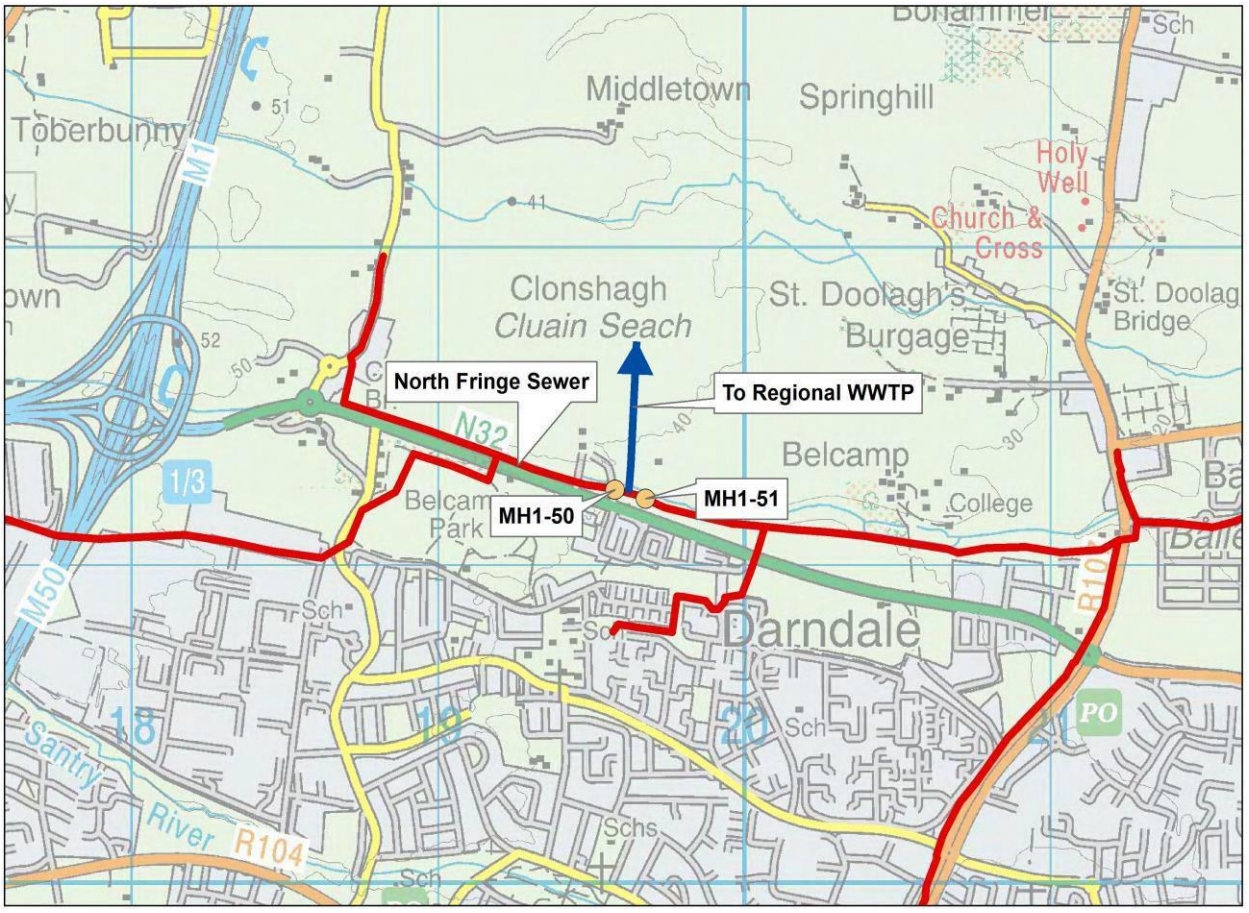
Diversion of the entire NFS catchment envisages interception of the NFS at manhole MH2-8, downstream of the Grange storm tank and immediately east of the Dublin-Belfast rail line in the townland of Grange (refer to Figure 8.4), and diverting flows to a new Grange pumping station for transfer to the proposed Regional WwTP. Flows from the existing Portmarnock and Baldoyle Pumping Stations would also be diverted to the new Grange Pumping Station at this stage.

Figure. 8.4 NFS Catchment Diversion



The partial diversion of the NFS catchment envisages interception of the NFS between manholes MH1-50 and MH1-51, which are located approximately 500m due south of the proposed Regional WwTP (refer to Figure 8.5), and diverting flows directly to the Regional WwTP. The diversion sewer would be routed into the Regional WwTP along the proposed access road off the R139. In this scenario all sub-catchments of the NFS west of the Regional WwTP would be diverted, including north Finglas, Ballymun and Dublin Airport. This option would also significantly reduce the pumping requirements at Grange Pumping Station when the entire catchment is diverted.

Figure. 8.5 Partial Diversion of the NFS Catchment



8.4 North Dublin Drainage Scheme (NDDS) Sewer Catchment

Diversion of this catchment is dependent on the diversion of the entire NFS catchment as it is not considered feasible to divert the NDDS sewer until the NFS catchment (including Portmarnock and Baldoyle) is diverted for the following reason:

- *A new pipe would have to be constructed from Sutton pumping station to the new Regional WwTP. Routing of this pipeline would be difficult as a land based route is not available and a sea route would take the pipe under the DART rail line and through the environmentally sensitive Baldoyle Estuary.*

When the NFS catchment, (including Portmarnock and Baldoyle flows) is fully diverted, as discussed in Section 8.3, the existing 1,600mm diameter pipe between the Grange Tank and Sutton Pumping Station would have no flow and could therefore be used to transfer flows from the NDDS sewer and Howth/ Sutton to a pumping station located at Grange via Sutton Pumping Station. This is illustrated as Option 2 on Figure 8.6. The 1,600mm diameter pipe may have to be lined with a suitable liner, depending on pressure analysis of this pipe, to allow it act in its new configuration as the rising main from Sutton Pumping Station to a proposed Grange Pumping Station.

Figure. 8.6 Connection Options for North Dublin Catchment to Orbital Sewer

8.5 9B (Lucan/ Clondalkin) Sub-Catchment

A strict limit of 2.0 m^3/sec was placed on pass forward flows from the 9B Sewer Catchment to the Grand Canal Tunnel Sewer (GCTS) in the GDSDS final strategy recommendations. This limit on pass forward flows was set, due to capacity constraints in the GCTS and particularly in the 9B/9C Sewer along Davitt Road / Dolphin Road, and the requirement to accommodate pass forward flows of 2.70 m^3/sec from the 9C Sewer Catchment in the Davitt Road / Dolphin Road sewer and the GCTS.

The interception and diversion of 9C Sewer (Blanchardstown) flows to the Orbital sewer, now proposed, will free up capacity in the Grand Canal Tunnel Sewer (GCTS) and more particularly in the 9B/9C Davitt Road/Dolphin Road sewer. This should allow flows greater than the 2.0 m^3/sec limit set by GDSDS to be passed forward from the 9B Sewer Catchment to the GCTS.

Modelling work carried out by others as part of the BRDS Preliminary Report indicates that the pipe full capacity of the sewer along Davitt Road/Dolphin Road varies from a minimum of 3.125 m^3/sec in the flattest sections of this sewer to a maximum of 6.175 m^3/sec in the steeper sections.

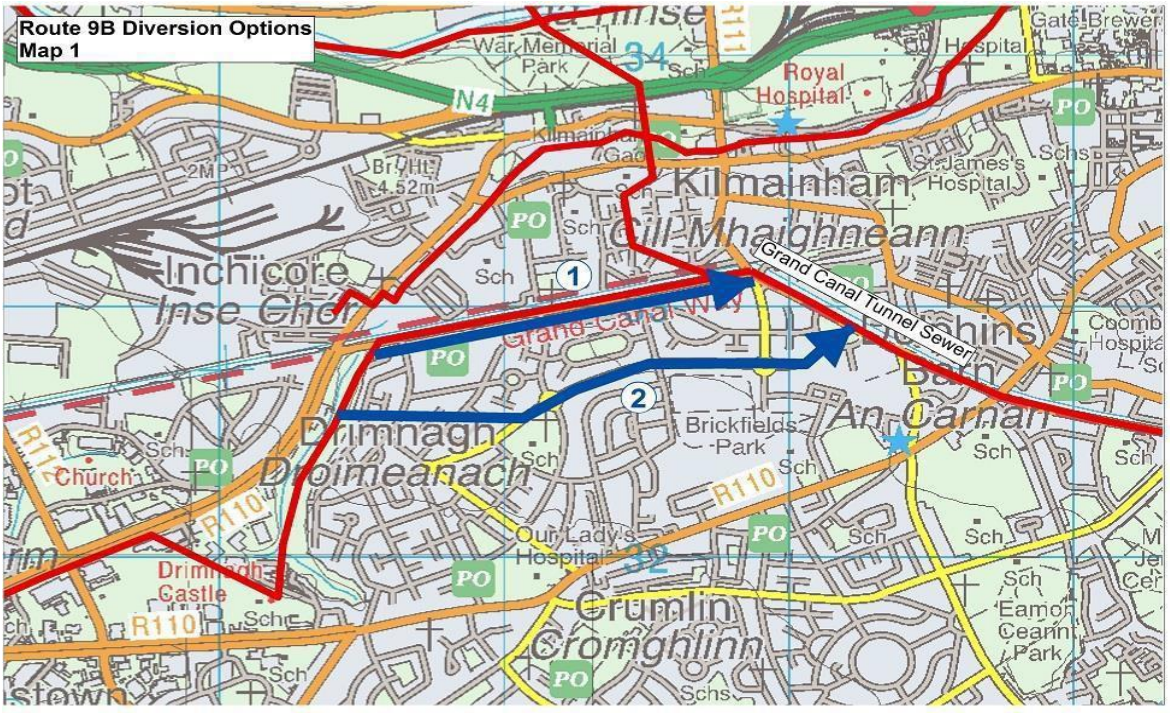
Flow measurement records for the years 2009 and 2010 indicate that flows from the 9B Sewer Catchment were significantly less than the GDSDS limit of 2.0 m^3/sec placed on pass forward flows from 9B Sewer Catchment to the GCTS.

Modelling work carried out on the 9B Sewer, as part of the GDSDS, projected year 2031 Dry Weather Flow at 1.42 m^3/sec, with a wet weather peak flow estimated as 12.03 m^3/sec, based on the 100-year return period rainfall of 180-minute duration. It should be noted that significant inflow of storm flows (equivalent to runoff from 7.5% of gross future development area) to the foul sewers was allowed for in the GDSDS models. This volume of storm inflow to the foul sewers is unsustainable as a matter of best practice design and it is recommended that the allowance for storm run-off equivalent to 7.5% of gross future development area to foul sewers be reconsidered, especially in light of the New Development Policies recommended as part of the GDSDS.

These modelling scenarios need to be validated in terms of catchment, storm run-off management and load issues. Irish Water advise that a separate strategic study will be commissioned on the 9B catchment to examine this in detail.

Pass forward flows from the 9B Sewer Catchment to the GCTS should be maximised to make best use of existing downstream infrastructure, before consideration of flow diversion to the Orbital sewer is considered. Furthermore, a realistic view of stormwater management in the existing development and effective planning control of future developments (using SUDS systems) should be taken. Options for maximizing use of downstream infrastructure, particularly the GCTS, include duplication of the Davitt Road sewer (Option 1 on Figure 8.7) or part diversion of the pass forward flows to the Dolphin Road sewer (Option 2 on Figure 8.7).

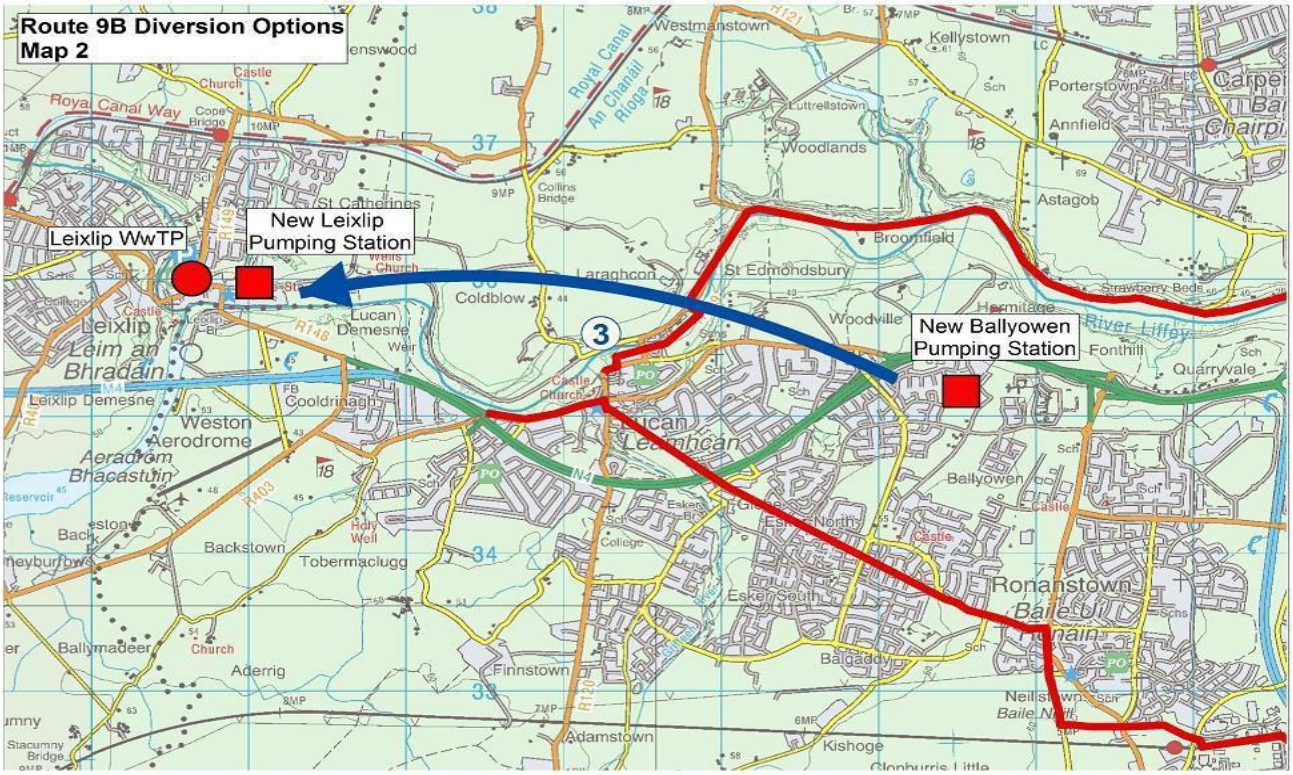
Figure 8.7 Duplication Options for 9B Sewer to GCTS



Should it be necessary to ultimately divert flows to the Orbital Sewer then a pumped option for the flows from the Lucan/ Clondalkin area of the 9B Catchment as shown on Figure 8.8 should be considered. It should be noted that significant constraints currently exist for this option including:

- Crossing of the River Liffey;
- Crossing of the Royal Canal and Dublin-Sligo Rail Line;
- Potential pipe routes constrained by existing pipelines and encroaching urbanisation; and
- Capacity of 9C sewer to accommodate additional flows

Figure 8.8 Connection Options for Lucan/ Clondalkin Catchment to Orbital Sewer



It is recommended that these options be explored in more detail through a DAP study of the 9B Sewer Catchment.

9. Conclusions and Recommendations

9.1 Conclusions

Domestic and Non-Domestic load on Ringsend WwTP will continue to grow under the growth scenarios examined.

The projected load development on Ringsend WwTP under the 'most likely' growth scenario indicates that the treatment capacity of 2.4 million PE to be provided at Ringsend WwTP will be exceeded in 2024. At 2050 this exceedance is projected at 508,024 PE.

Therefore, it will be necessary to divert flow and load out of the Ringsend catchment to the proposed Regional WwTP in order to maintain the loading on Ringsend WwTP below its treatment capacity of 2.4 million PE.

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 Regional WwTP will provide the necessary diversions from the Ringsend catchment to maintain the loading on Ringsend WwTP below 2.4 million PE.

It is feasible to divert wastewater from these catchments to the new Regional WwTP.

9.2 Recommendations

In developing the load transfer to the proposed Regional WwTP for planning purposes it is recommended that the 'most likely' growth scenario be used.

It is therefore recommended that the GDD project be designed to provide a wastewater treatment capacity of 500,000 PE.

Prudent planning suggests that load diversion from Ringsend WwTP commences before its treatment capacity is exceeded. Therefore, it is recommended that flow diversions commence as set out hereunder:

- 9C Sewer Catchment upstream of the M50 at 2025 (including the transferred flows from Leixlip); and
- NFS sub-catchments located west of the proposed Regional WwTP.

The required load diversions from the Ringsend Catchment would be satisfied at all stages up to and beyond 2050 (the design year horizon) by diverting the wastewater load generated in each of the above sub-catchments.

9.3 Projected Utilisation of Treatment Capacity provided at Regional WwTP

The projected utilisation of the treatment capacity to be provided at the Regional WwTP proposed under the GDD project is set out in Table 9.1 out to year 2050.

Table 9.1 Development of Required Treatment Capacity at Proposed Regional WwTP

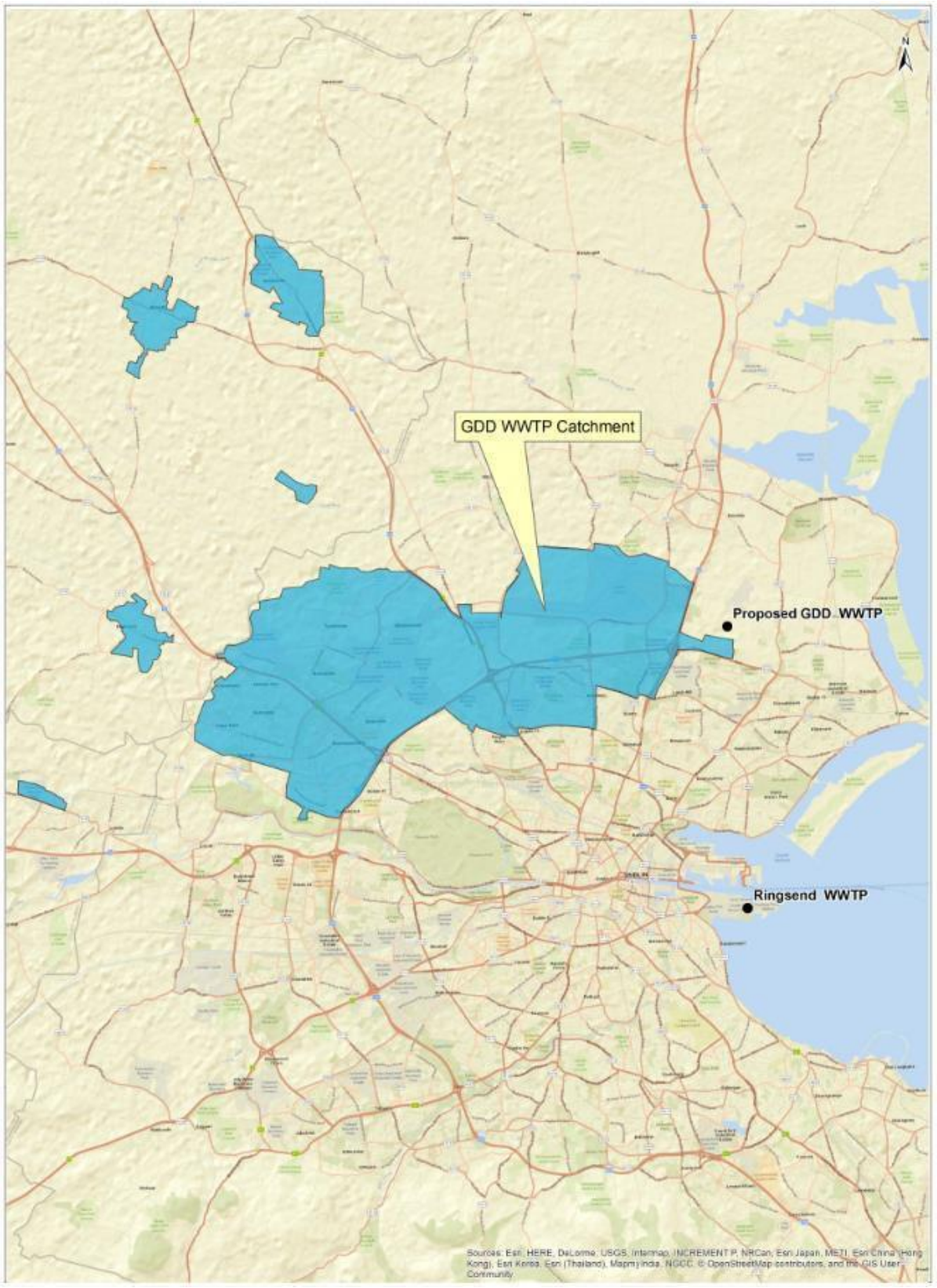
	Design Year			
	2025	2031	2040	2050
9C Sewer, incl load transferred from Leixlip WwTP	363,385	376,151	392,697	411,939
NFS sub-catchments west of proposed Regional WwTP	75,036	79,089	84,703	89,973
Total Treatment Capacity Required	438,421	455,240	477,400	501,912

The proposed 500,000 PE treatment capacity at the Regional WwTP will provide the projected treatment capacity requirements out to 2050 (the design year horizon for the GDD project).

9.4 Catchment of the Regional Wastewater Treatment Plant

The catchment of the proposed Regional WwTP is illustrated in Figure 9.1 below.

Figure 9.1 Catchment of the Proposed Regional WwTP



Appendix A. Loading Analysis on Wastewater Treatment Plants

Ringsend WwTP

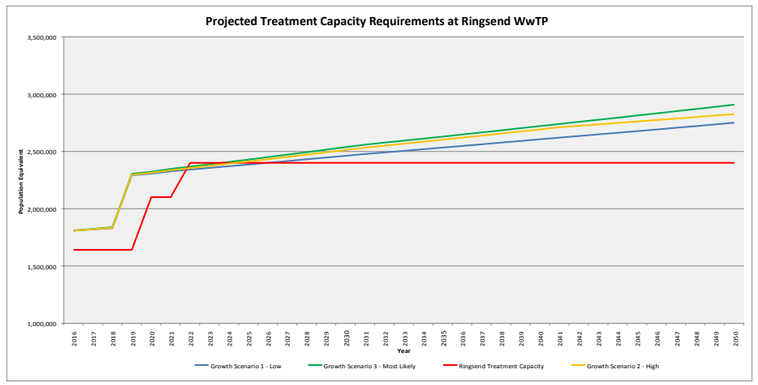
	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048 2049 2050	
Ringsend WwTP	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	1,160,553	1,169,257	1,178,027	1,186,862	1,195,763	1,204,731	1,214,249	1,223,841	1,233,510	1,243,254	1,253,076	1,262,975	1,272,953	1,283,009	1,293,145	1,303,361	1,312,484	1,321,672	1,330,924	1,340,240	1,349,622	1,359,069	1,368,583	1,378,163	1,387,810	1,397,524	1,406,748	1,416,033	1,425,378	1,434,786	1,444,256	1,453,788	1,463,383	1,473,041	1,482,763
	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Commercial**	311,835	314,174	316,530	318,904	321,296	323,706	326,263	328,840	331,438	334,056	336,696	339,355	342,036	344,738	347,462	350,207	352,658	355,127	357,613	360,116	362,637	365,175	367,732	370,306	372,898	375,508	377,986	380,481	382,992	385,520	388,065	390,626	393,204	395,799	398,411
	No Growth	**Industrial**	335,658	335,658	335,658	335,658	335,658	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158
		Headroom				301,153	303,412	305,687	308,102	310,536	312,990	315,462	317,954	320,466	322,998	325,550	328,121	330,714	333,029	335,360	337,707	340,071	342,452	344,849	347,263	349,694	352,142	354,607	356,947	359,303	361,674	364,061	366,464	368,883	371,317	373,768	376,235
Leixlip Diversion						**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**	**150,000**
		Total	**1,808,046**	**1,819,089**	**1,830,215**	**2,292,577**	**2,306,129**	**2,327,282**	**2,341,772**	**2,356,376**	**2,371,095**	**2,385,931**	**2,400,884**	**2,415,955**	**2,431,145**	**2,446,455**	**2,461,886**	**2,477,439**	**2,491,329**	**2,505,316**	**2,519,402**	**2,533,585**	**2,547,868**	**2,562,251**	**2,576,735**	**2,591,320**	**2,606,007**	**2,620,797**	**2,634,839**	**2,648,975**	**2,663,203**	**2,677,525**	**2,691,942**	**2,706,454**	**2,721,062**	**2,735,766**	**2,750,567**
																																				27%

	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048 2049 2050	
Ringsend WwTP	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	1,160,553	1,170,418	1,180,366	1,190,399	1,200,518	1,210,722	1,223,072	1,235,547	1,248,149	1,260,881	1,273,742	1,286,734	1,299,858	1,313,117	1,326,511	1,340,041	1,351,297	1,362,648	1,374,095	1,385,637	1,397,276	1,409,014	1,420,849	1,432,784	1,444,820	1,456,956	1,465,115	1,473,320	1,481,570	1,489,867	1,498,210	1,506,600	1,515,037	1,523,522	1,532,053
	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Commercial**	311,835	314,486	317,159	319,855	322,573	325,315	328,633	331,985	335,372	338,793	342,248	345,739	349,266	352,828	356,427	360,063	363,087	366,137	369,213	372,314	375,441	378,595	381,775	384,982	388,216	391,477	393,669	395,874	398,091	400,320	402,562	404,816	407,083	409,363	411,655
	No growth	**Industrial**	335,658	335,658	335,658	335,658	335,658	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158
	Headroom (20% of Pop + Comm)					302,051	304,618	307,207	310,341	313,506	316,704	319,935	323,198	326,495	329,825	333,189	336,588	340,021	342,877	345,757	348,661	351,590	354,544	357,522	360,525	363,553	366,607	369,687	371,757	373,839	375,932	378,037	380,154	382,283	384,424	386,577	388,742
Leixlip Diversion						150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
		Total	**1,808,046**	**1,820,561**	**1,833,183**	**2,297,963**	**2,313,367**	**2,336,403**	**2,355,204**	**2,374,197**	**2,393,383**	**2,412,766**	**2,432,346**	**2,452,125**	**2,472,107**	**2,492,292**	**2,512,683**	**2,533,282**	**2,550,420**	**2,567,701**	**2,585,127**	**2,602,699**	**2,620,419**	**2,638,288**	**2,656,307**	**2,674,478**	**2,692,801**	**2,711,278**	**2,723,699**	**2,736,191**	**2,748,751**	**2,761,383**	**2,774,085**	**2,786,858**	**2,799,703**	**2,812,619**	**2,825,608**
																																				27%

	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Ringsend WwTP	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	1,160,553	1,171,694	1,182,943	1,194,299	1,205,764	1,217,339	1,230,608	1,244,022	1,257,582	1,271,290	1,285,147	1,299,155	1,313,315	1,327,631	1,342,102	1,356,731	1,368,127	1,379,620	1,391,208	1,402,894	1,414,679	1,426,562	1,438,545	1,450,629	1,462,814	1,475,102	1,487,050	1,499,095	1,511,238	1,523,479	1,535,819	1,548,259	1,560,800	1,573,443	1,586,188
	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Commercial**	311,835	314,829	317,851	320,902	323,983	327,093	330,659	334,263	337,906	341,589	345,313	349,077	352,882	356,728	360,616	364,547	367,609	370,697	373,811	376,951	380,117	383,310	386,530	389,777	393,051	396,353	399,563	402,800	406,062	409,351	412,667	416,010	419,380	422,776	426,201
	No growth	**Industrial**	335,658	335,658	335,658	335,658	335,658	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158	343,158
	Headroom (20% of (Pop+Comm)					303,040	305,949	308,887	312,253	315,657	319,098	322,576	326,092	329,646	333,239	336,872	340,544	344,256	347,147	350,063	353,004	355,969	358,959	361,974	365,015	368,081	371,173	374,291	377,323	380,379	383,460	386,566	389,697	392,854	396,036	399,244	402,478
Leixlip Diversion						150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
		Total	**1,808,046**	**1,822,181**	**1,836,452**	**2,303,899**	**2,321,355**	**2,346,477**	**2,366,678**	**2,387,100**	**2,407,744**	**2,428,613**	**2,449,709**	**2,471,036**	**2,492,594**	**2,514,388**	**2,536,420**	**2,558,691**	**2,576,042**	**2,593,538**	**2,611,181**	**2,628,973**	**2,646,913**	**2,665,005**	**2,683,248**	**2,701,645**	**2,720,196**	**2,738,904**	**2,757,094**	**2,775,432**	**2,793,918**	**2,812,555**	**2,831,342**	**2,850,281**	**2,869,374**	**2,888,621**	**2,908,024**
																																				26%

Ringsend WwTP Summary

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Growth Scenario 1 - Low	1,808,046	1,819,089	1,830,215	2,292,577	2,306,129	2,327,282	2,341,772	2,356,376	2,371,095	2,385,931	2,400,884	2,415,955	2,431,145	2,446,455	2,461,886	2,477,439	2,491,329	2,505,316	2,519,402	2,533,585	2,547,868	2,562,251	2,576,735	2,591,320	2,606,007	2,620,797	2,634,839	2,648,975	2,663,203	2,677,525	2,691,942	2,706,454	2,721,062	2,735,766	2,750,567
Growth Scenario 2 - High	1,808,046	1,820,561	1,833,183	2,297,963	2,313,367	2,336,403	2,355,204	2,374,197	2,393,383	2,412,766	2,432,346	2,452,125	2,472,107	2,492,292	2,512,683	2,533,282	2,550,420	2,567,701	2,585,127	2,602,699	2,620,419	2,638,288	2,656,307	2,674,478	2,692,801	2,711,278	2,723,699	2,736,191	2,748,751	2,761,383	2,774,085	2,786,858	2,799,703	2,812,619	2,825,608
Growth Scenario 3 - Most Likely	1,808,046	1,822,181	1,836,452	2,303,899	2,321,355	2,346,477	2,366,678	2,387,100	2,407,744	2,428,613	2,449,709	2,471,036	2,492,594	2,514,388	2,536,420	2,558,691	2,576,042	2,593,538	2,611,181	2,628,973	2,646,913	2,665,005	2,683,248	2,701,645	2,720,196	2,738,904	2,757,094	2,775,432	2,793,918	2,812,555	2,831,342	2,850,281	2,869,374	2,888,621	2,908,024
Ringsend Treatment Capacity	1,640,000	1,640,000	1,640,000	1,640,000	2,100,000	2,100,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000	2,400,000



9C Sewer

9C Sewer	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	205	205	205	205	205	205	205	205	205	206	206	206	206	206	206
Blanchardstown (upstream of MS0)	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	Population	97,669	98,402	99,140	99,883	100,632	101,387	102,188	102,995	103,809	104,629	105,456	106,289	107,128	107,975	108,828	109,687	110,455	111,228	112,007	112,791	113,581	114,376	115,176	115,982	116,794	117,612	118,388	119,169	119,956	120,748	121,545	122,347	123,154	123,967	124,7	125,6	126,4	127,2	128,1	128,9	129,8	130,6	131,5	132,3	133,2	134,1	135,0	135,9	136,8	137,7
	16% of Residential Population;	Commercial	15,627	15,744	15,862	15,981	16,101	16,222	16,350	16,479	16,609	16,741	16,873	17,006	17,141	17,276	17,412	17,550	17,673	17,797	17,921	18,047	18,173	18,300	18,428	18,557	18,687	18,818	18,942	19,067	19,193	19,320	19,447	19,575	19,705	19,835	19,9	20,0	20,2	20,3	20,4	20,6	20,7	20,9	21,0	21,1	21,3	21,4	21,6	21,7	21,8	22,0
	No Growth	Industrial	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9	11,9
	Headroom (20% of P +C)			23,173	23,347	23,522	23,708	23,895	24,084	24,274	24,466	24,659	24,852	25,050	25,248	25,447	25,626	25,805	25,986	26,168	26,351	26,535	26,721	26,908	27,096	27,286	27,466	27,647	27,830	28,013	28,198	28,384	28,572	28,760	28,95	29,1	29,3	29,5	29,7	29,9	30,1	30,3	30,5	30,7	30,9	31,1	31,3	31,5	31,7	31,9	32,1
		Sub - Total	125,286	126,135	126,991	151,027	152,070	153,120	154,235	155,359	156,491	157,633	158,784	159,943	161,112	162,290	163,478	164,674	165,743	166,819	167,903	168,995	170,094	171,200	172,315	173,437	174,567	175,705	176,786	177,873	178,968	180,070	181,180	182,296	183,420	184,552	185,6	186,8	187,9	189,1	190,3	191,4	192,6	193,8	195,0	196,2	197,5	198,7	199,9	201,1	202,4	203,7
Meath																																																			
Ashbourne/Ratoath	0.99% (2016 - 2021); 0.9% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	Population	22,840	23,066	23,294	23,525	23,758	23,993	24,209	24,427	24,647	24,869	25,092	25,318	25,546	25,776	26,008	26,242	26,426	26,611	26,797	26,985	27,174	27,364	27,555	27,748	27,942	28,138	28,324	28,511	28,699	28,888	29,079	29,271	29,464	29,659	29,8	30,0	30,2	30,4	30,6	30,8	31,0	31,2	31,4	31,6	31,8	32,0	32,3	32,5	32,7	32,9
	16% of Residential Population	Commercial	3,654	3,691	3,727	3,764	3,801	3,839	3,873	3,908	3,943	3,979	4,015	4,051	4,087	4,124	4,161	4,199	4,228	4,258	4,288	4,318	4,348	4,378	4,409	4,440	4,471	4,502	4,532	4,562	4,592	4,622	4,653	4,683	4,714	4,745	4,7	4,8	4,8	4,8	4,9	4,9	4,9	5,0	5,0	5,0	5,1	5,1	5,1	5,2	5,2	5,2
Dunboyne/Clonee	0.99% (2016 - 2021); 0.9% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	Population	10,094	10,194	10,295	10,397	10,500	10,604	10,699	10,795	10,893	10,991	11,089	11,189	11,290	11,392	11,494	11,598	11,679	11,760	11,843	11,926	12,009	12,093	12,178	12,263	12,349	12,435	12,518	12,600	12,683	12,767	12,851	12,936	13,021	13,107	13,1	13,2	13,3	13,4	13,5	13,7	13,8	13,9	14,0	14,1	14,2	14,3	14,4	14,5	14,6	14,8
	16% of Residential Population	Commercial	1,615	1,631	1,647	1,663	1,680	1,697	1,712	1,727	1,743	1,758	1,774	1,790	1,806	1,823	1,839	1,856	1,869	1,882	1,895	1,908	1,921	1,935	1,948	1,962	1,976	1,990	2,003	2,016	2,029	2,043	2,056	2,070	2,083	2,097	2,1	2,1	2,1	2,1	2,1	2,1	2,2	2,2	2,2	2,2	2,2	2,2	2,3	2,3	2,3	2,3
	No Growth	Industrial	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5	2,5
	Headroom (20% of P +C)			7,870	7,948	8,026	8,099	8,172	8,245	8,319	8,394	8,470	8,546	8,623	8,701	8,779	8,840	8,902	8,964	9,027	9,090	9,154	9,218	9,283	9,348	9,413	9,475	9,538	9,601	9,664	9,728	9,792	9,857	9,922	9,98	10,0	10,1	10,1	10,2	10,3	10,3	10,4	10,5	10,5	10,6	10,7	10,8	10,8	10,9	11,0	
		Sub - Total	40,755	41,133	41,515	49,771	50,238	50,710	51,144	51,581	52,022	52,468	52,917	53,370	53,827	54,289	54,755	55,224	55,593	55,964	56,338	56,715	57,094	57,476	57,860	58,247	58,637	59,030	59,403	59,778	60,155	60,536	60,918	61,304	61,691	62,082	62,4	62,8	63,2	63,6	64,0	64,4	64,8	65,2	65,7	66,1	66,5	66,9	67,3	67,8	68,2	68,6
Leixlip Diversion						150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0	150,0
	Total 9C Sewer		166,040	167,268	168,506	350,797	352,308	353,830	355,379	356,940	358,514	360,100	361,700	363,313	364,939	366,579	368,232	369,899	371,336	372,784	374,241	375,709	377,187	378,676	380,175	381,684	383,204	384,735	386,188	387,651	389,124	390,606	392,098	393,600	395,112	396,633	398,1	399,7	401,2	402,8	404,3	405,9	407,5	409,1	410,7	412,4	414,0	415,6	417,3	419,0	420,7	422,3

9C Sewer	Growth Scenario 2- High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065
Blanchardstown (upstream of MS0)	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	Population	97,669	98,499	99,336	100,181	101,032	101,891	102,930	103,980	105,041	106,112	107,195	108,288	109,393	110,508	111,636	112,774	113,722	114,677	115,640	116,611	117,591	118,579	119,575	120,579	121,592	122,613	123,300	123,991	124,685	125,383	126,085	126,791	127,501	128,215	128,933	129,655	130,382	131,112	131,846	132,584	133,327	134,073	134,824	135,579	136,338	137,102	137,870	138,642	139,418	140,198
	16% of Res. Pop.	Commercial	15,627	15,760	15,894	16,029	16,165	16,303	16,469	16,637	16,807	16,978	17,151	17,326	17,503	17,681	17,862	18,044	18,195	18,348	18,502	18,658	18,815	18,973	19,132	19,293	19,455	19,618	19,728	19,838	19,950	20,061	20,174	20,287	20,400	20,514	20,629	20,745	20,861	20,978	21,095	21,213	21,332	21,452	21,572	21,693	21,814	21,936	22,059	22,183	22,307	22,432
	No Growth	Industrial	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990
	Headroom (20% of P +C)			23,242	23,439	23,639	23,880	24,123	24,369	24,618	24,869	25,123	25,379	25,638	25,899	26,164	26,383	26,605	26,828	27,054	27,281	27,510	27,741	27,974	28,209	28,446	28,606	28,766	28,927	29,089	29,252	29,416	29,580	29,746	29,913	30,080	30,249	30,418	30,588	30,760	30,932	31,105	31,279	31,454	31,631	31,808	31,986	32,165	32,345	32,526	
		Sub - Total	125,286	126,249	127,220	151,442	152,627	153,822	155,269	156,731	158,207	159,698	161,205	162,727	164,264	165,818	167,387	168,972	170,290	171,620	172,961	174,313	175,677	177,052	178,438	179,836	181,246	182,668	183,624	184,585	185,551	186,523	187,501	188,484	189,472	190,466	191,465	192,470	193,481	194,497	195,520	196,547	197,581	198,620	199,665	200,716	201,773	202,836	203,905	204,979	206,060	207,147
Meath																																																				
Ashbourne/Ratoath	1.17% (2016 - 2021); 1.23% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	Population	22,840	23,107	23,378	23,651	23,928	24,208	24,506	24,807	25,112	25,421	25,734	26,050	26,371	26,695	27,023	27,356	27,585	27,817	28,051	28,286	28,524	28,764	29,005	29,249	29,495	29,742	29,909	30,076	30,245	30,414	30,585	30,756	30,928	31,101	31,275	31,451	31,627	31,804	31,982	32,161	32,341	32,522	32,704	32,887	33,072	33,257	33,443	33,630	33,819	34,008
	16% of Res. Pop.	Commercial	3,654	3,697	3,740	3,784	3,828	3,873	3,921	3,969	4,018	4,067	4,117	4,168	4,219	4,271	4,324	4,377	4,414	4,451	4,488	4,526	4,564	4,602	4,641	4,680	4,719	4,758	4,785	4,812	4,839	4,866	4,894	4,921	4,948	4,976	5,004	5,032	5,060	5,089	5,117	5,146	5,175	5,204	5,233	5,262	5,291	5,321	5,351	5,381	5,411	5,441
Dunboyne/Clonee	1.17% (2016 - 2021); 1.23% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	Population	10,094	10,212	10,332	10,452	10,575	10,698	10,830	10,963	11,098	11,235	11,373	11,513	11,654	11,798	11,943	12,090	12,191	12,294	12,397	12,501	12,606	12,712	12,819	12,926	13,035	13,144	13,218	13,292	13,367	13,441	13,517	13,592	13,668	13,745	13,822	13,899	13,977	14,055	14,134	14,213	14,293	14,373	14,453	14,534	14,616	14,698	14,780	14,863	14,946	15,030
	16% of Res. Pop.	Commercial	1,615	1,634	1,653	1,672	1,692	1,712	1,733	1,754	1,776	1,798	1,820	1,842	1,865	1,888	1,911	1,934	1,961	1,987	1,984	2,000	2,017	2,034	2,051	2,068	2,086	2,103	2,115	2,127	2,139	2,151	2,163	2,175	2,187	2,199	2,212	2,224	2,236	2,249	2,261	2,274	2,287	2,300	2,313	2,326	2,339	2,352	2,365	2,378	2,391	2,405
	No Growth	Industrial	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551
	Headroom (20% of P +C)			7,912	8,005	8,098	8,198	8,299	8,401	8,504	8,609	8,715	8,822	8,930	9,040	9,151	9,228	9,306	9,384	9,463	9,542	9,622	9,703	9,785	9,867	9,950	10,005	10,061	10,118	10,174	10,231	10,289	10,346	10,404	10,463	10,521	10,580	10,639	10,699	10,759	10,819	10,880	10,941	11,002	11,063	11,125	11,188	11,250	11,313	11,377	
		Sub - Total	40,754	41,201	41,654	50,023	50,579	51,141	51,738	52,343	52,956	53,576	54,203	54,839	55,482	56,133	56,792	57,459	57,920	58,385	58,854	59,327	59,804	60,285	60,770	61,259	61,752	62,249	62,584	62,920	63,258	63,598	63,940	64,284	64,629	64,977	65,327	65,678	66,032	66,387	66,745	67,104	67,466	67,829	68,195	68,562	68,932	69,304	69,677	70,053	70,431	70,812
Leixlip Diversion						150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
	Total 9C Sewer		166,040	167,450	168,874	351,465	353,206	354,963	357,007	359,074	361,163	363,274	365,408	367,565	369,746	371,950	374,178	376,431	378,211	380,005	381,815	383,640	385,481	387,337	389,208	391,095	392,998	394,917	396,208	397,505	398,809	400,121	401,441	402,767	404,101	405,443	406,792	408,149	409,513	410,885	412,264	413,651	415,046	416,449	417,860	419,278	420,705	422,140	423,582	425,033	426,491	427,958

9C Sewer	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065
Blanchardstown (upstream of MS0)	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	Population	97,669	98,607	99,553	100,509	101,474	102,448	103,565	104,694	105,835	106,988	108,154	109,333	110,525	111,730	112,948	114,179	115,138	116,105	117,080	118,064	119,056	120,056	121,064	122,081	123,106	124,141	125,146	126,160	127,182	128,212	129,250	130,297	131,353	132,417	133,489	134,571	135,661	136,759	137,867	138,984	140,110	141,245	142,389	143,542	144,705	145,877	147,058	148,250	149,450	150,661
	16% of Res. Pop.	Commercial	15,627	15,777	15,929	16,081	16,236	16,392	16,570	16,751	16,934	17,118	17,305	17,493	17,684	17,877	18,072	18,269	18,422	18,577	18,733	18,890	19,049	19,209	19,370	19,533	19,697	19,862	20,023	20,186	20,349	20,514	20,680	20,848	21,016	21,187	21,358	21,531	21,706	21,882	22,059	22,237	22,418	22,599	22,782	22,967	23,153	23,340	23,529	23,720	23,912	24,106
	No growth	Industrial	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990	11,990
	Headroom (20% of P +C)			23,318	23,542	23,768	24,027	24,289	24,554	24,821	25,092	25,365	25,642	25,921	26,204	26,489	26,712	26,936	27,163	27,391	27,621	27,853	28,087	28,323	28,561	28,801	29,034	29,269	29,506	29,745	29,986	30,229	30,474	30,721	30,970	31,220	31,473	31,728	31,985	32,244	32,505	32,769	33,034	33,302	33,571	33,843	34,118	34,394	34,672	34,953	
		Sub - Total	125,286	126,374	127,472	151,898	153,242	154,598	156,152	157,723	159,312	160,918	162,541	164,182	165,841	167,518	169,213	170,927	172,262	173,608	174,966	176,335	177,715	179,107	180,511	181,927	183,354	184,794	186,193	187,604	189,027	190,461	191,907	193,364	194,833	196,314	197,807	199,312	200,829	202,359	203,901	205,456	207,023	208,602	210,195	211,800	213,419	215,050	216,695	218,353	220,025	221,710
Meath																																																			
Ashbourne/Ratoath	0.99% (2016 - 2021); 0.9% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	Population	22,840	23,066	23,294	23,525	23,758	23,993	24,209	24,427	24,647	24,869	25,092	25,318	25,546	25,776	26,008	26,242	26,463	26,685	26,909	27,135	27,363	27,593	27,825	28,058	28,294	28,532	28,763	28,996	29,231	29,467	29,706	29,947	30,189	30,434	30,680	30,929	31,179	31,432	31,687	31,943	32,202	32,463	32,726	32,991	33,258	33,527	33,799	34,073	34,349	34,627
	16% of Res. Pop.	Commercial	3,654	3,691	3,727	3,764	3,801	3,839	3,873	3,908	3,943	3,979	4,015	4,051	4,087	4,124	4,161	4,199	4,234	4,270	4,305	4,342	4,378	4,415	4,452	4,489	4,527	4,565	4,602	4,639	4,677	4,715	4,753	4,791	4,830	4,869	4,909	4,949	4,989	5,029	5,070	5,111	5,152	5,194	5,236	5,279	5,321	5,364	5,408	5,452	5,496	5,540
Dunboyne/Clonee	0.99% (2016 - 2021); 0.9% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	Population	10,094	10,194	10,295	10,397	10,500	10,604	10,699	10,795	10,893	10,991	11,089	11,189	11,290	11,392	11,494	11,598	11,695	11,793	11,892	11,992	12,093	12,194	12,297	12,400	12,504	12,609	12,712	12,815	12,918	13,023	13,128	13,235	13,342	13,450	13,559	13,669	13,780	13,891	14,004	14,117	14,231	14,347	14,463	14,580	14,698	14,817	14,937	15,058	15,180	15,303
	16% of Res. Pop.	Commercial	1,615	1,631	1,647	1,663	1,680	1,697	1,712	1,727	1,743	1,758	1,774	1,790	1,806	1,823	1,839	1,856	1,871	1,887	1,903	1,919	1,935	1,951	1,968	1,984	2,001	2,018	2,034	2,050	2,067	2,084	2,101	2,118	2,135	2,152	2,169	2,187	2,205	2,223	2,241	2,259	2,277	2,295	2,314	2,333	2,352	2,371	2,390	2,409	2,429	2,449
	No growth	Industrial	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551	2,551
	Headroom (20% of P+C)			7,870	7,948	8,026	8,099	8,172	8,245	8,319	8,394	8,470	8,546	8,623	8,701	8,779	8,853	8,927	9,002	9,078	9,154	9,231	9,308	9,386	9,465	9,545	9,622	9,700	9,779	9,858	9,938	10,018	10,099	10,181	10,264	10,347	10,430	10,515	10,600	10,686	10,773	10,860	10,948	11,036	11,126	11,216	11,307	11,398	11,491	11,584	
		Sub - Total	40,754	41,133	41,515	49,770	50,238	50,710	51,143	51,581	52,022	52,467	52,916	53,370	53,827	54,288	54,754	55,224	55,666	56,113	56,562	57,016	57,474	57,935	58,400	58,869	59,342	59,819	60,283	60,751	61,222	61,698	62,177	62,660	63,147	63,637	64,132	64,631	65,134	65,641	66,152	66,667	67,186	67,710	68,238	68,770	69,306	69,847	70,392	70,941	71,495	72,054
Leixlip Diversion						150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
	Total 9C Sewer		166,040	167,506	168,986	351,669	353,479	355,307	357,295	359,304	361,334	363,385	365,457	367,552	369,668	371,806	373,967	376,151	377,928	379,721	381,528	383,351	385,189	387,042	388,911	390,796	392,697	394,613	396,477	398,355	400,249	402,159	404,083	406,024	407,980	409,951	411,939	413,943	415,963	418,000	420,053	422,123	424,209	426,312	428,433	430,570	432,725	434,897	437,087	439,295	441,520	443,764

North Fringe Sewer

North Fringe Sewer	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Fingal	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	34,493	34,752	35,012	35,275	35,539	35,806	36,089	36,374	36,661	36,951	37,243	37,537	37,834	38,133	38,434	38,737	39,009	39,282	39,557	39,834	40,112	40,393	40,676	40,961	41,247	41,536	41,810	42,086	42,364	42,644	42,925	43,208	43,493	43,781	44,069
	16% of Res. Pop.	**Commercial**	5,519	5,560	5,602	5,644	5,686	5,729	5,774	5,820	5,866	5,912	5,959	6,006	6,053	6,101	6,149	6,198	6,241	6,285	6,329	6,373	6,418	6,463	6,508	6,554	6,600	6,646	6,690	6,734	6,778	6,823	6,868	6,913	6,959	7,005	7,051
	No Growth	**Industrial**	8,959	8,959	8,959	8,959	8,959	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459
	Headroom (20% of P+C)					8,184	8,245	8,307	8,373	8,439	8,505	8,573	8,640	8,709	8,777	8,847	8,917	8,987	9,050	9,113	9,177	9,241	9,306	9,371	9,437	9,503	9,569	9,636	9,700	9,764	9,828	9,893	9,959	10,024	10,090	10,157	10,224
		Sub - Total	**48,971**	**49,271**	**49,573**	**58,061**	**58,430**	**66,301**	**66,694**	**67,091**	**67,491**	**67,894**	**68,301**	**68,710**	**69,123**	**69,539**	**69,959**	**70,381**	**70,759**	**71,139**	**71,522**	**71,907**	**72,295**	**72,686**	**73,080**	**73,476**	**73,875**	**74,277**	**74,659**	**75,043**	**75,429**	**75,818**	**76,210**	**76,605**	**77,002**	**77,401**	**77,803**
Dublin City	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	68,458	68,971	69,489	70,010	70,535	71,064	71,625	72,191	72,762	73,336	73,916	74,500	75,088	75,681	76,279	76,882	77,420	77,962	78,508	79,057	79,611	80,168	80,729	81,294	81,863	82,436	82,980	83,528	84,079	84,634	85,193	85,755	86,321	86,891	87,464
	16% of Res. Pop.	**Commercial**	10,953	11,035	11,118	11,202	11,286	11,370	11,460	11,551	11,642	11,734	11,827	11,920	12,014	12,109	12,205	12,301	12,387	12,474	12,561	12,649	12,738	12,827	12,917	13,007	13,098	13,190	13,277	13,364	13,453	13,541	13,631	13,721	13,811	13,903	13,994
	No Growth	**Industrial**	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081
	Headroom (20% of P+C)					16,242	16,364	16,487	16,617	16,748	16,881	17,014	17,148	17,284	17,420	17,558	17,697	17,837	17,961	18,087	18,214	18,341	18,470	18,599	18,729	18,860	18,992	19,125	19,251	19,379	19,506	19,635	19,765	19,895	20,027	20,159	20,292
		Sub - Total	**86,493**	**87,088**	**87,688**	**104,535**	**105,266**	**106,002**	**106,784**	**107,572**	**108,365**	**109,166**	**109,972**	**110,785**	**111,604**	**112,430**	**113,262**	**114,101**	**114,850**	**115,604**	**116,364**	**117,129**	**117,899**	**118,675**	**119,456**	**120,243**	**121,035**	**121,833**	**122,590**	**123,352**	**124,120**	**124,892**	**125,670**	**126,453**	**127,240**	**128,033**	**128,832**
	Total North Fringe Sewer		**135,463**	**136,359**	**137,261**	**162,597**	**163,696**	**172,303**	**173,478**	**174,663**	**175,857**	**177,060**	**178,273**	**179,495**	**180,727**	**181,969**	**183,221**	**184,482**	**185,609**	**186,743**	**187,886**	**189,036**	**190,194**	**191,361**	**192,536**	**193,719**	**194,910**	**196,110**	**197,249**	**198,395**	**199,549**	**200,711**	**201,880**	**203,057**	**204,242**	**205,435**	**206,635**

North Fringe Sewer	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Fingal	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	34,493	34,786	35,082	35,380	35,681	35,984	36,351	36,722	37,096	37,475	37,857	38,243	38,633	39,027	39,425	39,828	40,162	40,500	40,840	41,183	41,529	41,878	42,229	42,584	42,942	43,302	43,545	43,789	44,034	44,281	44,529	44,778	45,029	45,281	45,534
	16% of Res. Pop.	**Commercial**	5,519	5,566	5,613	5,661	5,709	5,757	5,816	5,876	5,935	5,996	6,057	6,119	6,181	6,244	6,308	6,372	6,426	6,480	6,534	6,589	6,645	6,700	6,757	6,813	6,871	6,928	6,967	7,006	7,045	7,085	7,125	7,164	7,205	7,245	7,286
	No Growth	**Industrial**	8,959	8,959	8,959	8,959	8,959	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459
	Headroom (20% of P+C)					8,208	8,278	8,348	8,433	8,519	8,606	8,694	8,783	8,872	8,963	9,054	9,147	9,240	9,318	9,396	9,475	9,554	9,635	9,716	9,797	9,879	9,962	10,046	10,102	10,159	10,216	10,273	10,331	10,388	10,447	10,505	10,564
		Sub - Total	**48,971**	**49,311**	**49,654**	**58,208**	**58,626**	**66,549**	**67,059**	**67,576**	**68,097**	**68,624**	**69,156**	**69,693**	**70,236**	**70,785**	**71,339**	**71,899**	**72,364**	**72,834**	**73,308**	**73,785**	**74,267**	**74,752**	**75,242**	**75,736**	**76,234**	**76,736**	**77,073**	**77,413**	**77,754**	**78,097**	**78,442**	**78,790**	**79,139**	**79,490**	**79,843**
Dublin City	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	68,458	69,040	69,627	70,219	70,815	71,417	72,146	72,882	73,625	74,376	75,135	75,901	76,675	77,457	78,247	79,046	79,710	80,379	81,054	81,735	82,422	83,114	83,812	84,516	85,226	85,942	86,423	86,907	87,394	87,883	88,376	88,870	89,368	89,869	90,372
	16% of Res. Pop.	**Commercial**	10,953	11,046	11,140	11,235	11,330	11,427	11,543	11,661	11,780	11,900	12,022	12,144	12,268	12,393	12,520	12,647	12,754	12,861	12,969	13,078	13,187	13,298	13,410	13,523	13,636	13,751	13,828	13,905	13,983	14,061	14,140	14,219	14,299	14,379	14,459
	No Growth	**Industrial**	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081
	Headroom (20% of P+C)					16,291	16,429	16,569	16,738	16,909	17,081	17,255	17,431	17,609	17,789	17,970	18,153	18,339	18,493	18,648	18,805	18,963	19,122	19,282	19,444	19,608	19,772	19,939	20,050	20,162	20,275	20,389	20,503	20,618	20,733	20,850	20,966
		Sub - Total	**86,493**	**87,168**	**87,848**	**104,826**	**105,656**	**106,494**	**107,508**	**108,533**	**109,567**	**110,613**	**111,669**	**112,736**	**113,813**	**114,902**	**116,002**	**117,113**	**118,037**	**118,969**	**119,909**	**120,857**	**121,812**	**122,776**	**123,748**	**124,728**	**125,716**	**126,713**	**127,383**	**128,056**	**128,734**	**129,415**	**130,100**	**130,789**	**131,482**	**132,178**	**132,879**
	Total North Fringe Sewer		**135,463**	**136,478**	**137,502**	**163,033**	**164,283**	**173,043**	**174,568**	**176,108**	**177,664**	**179,237**	**180,825**	**182,429**	**184,050**	**185,687**	**187,341**	**189,011**	**190,401**	**191,803**	**193,216**	**194,642**	**196,079**	**197,528**	**198,990**	**200,464**	**201,950**	**203,448**	**204,456**	**205,469**	**206,488**	**207,512**	**208,543**	**209,579**	**210,620**	**211,668**	**212,722**

North Fringe Sewer	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Fingal	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	34,493	34,824	35,158	35,496	35,837	36,181	36,575	36,974	37,377	37,784	38,196	38,612	39,033	39,459	39,889	40,324	40,662	41,004	41,348	41,696	42,046	42,399	42,755	43,114	43,477	43,842	44,197	44,555	44,916	45,280	45,644	46,010	46,389	46,765	47,144
	16% of Res. Pop.	**Commercial**	5,519	5,572	5,625	5,679	5,734	5,789	5,852	5,916	5,980	6,045	6,111	6,178	6,245	6,313	6,382	6,452	6,506	6,561	6,616	6,671	6,727	6,784	6,841	6,898	6,956	7,015	7,072	7,129	7,187	7,245	7,303	7,363	7,422	7,480	7,542
	No Growth	**Industrial**	8,959	8,959	8,959	8,959	8,959	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459	16,459
	Headroom (20% of P+C)					8,235	8,314	8,394	8,485	8,578	8,671	8,766	8,861	8,958	9,056	9,154	9,254	9,355	9,434	9,513	9,593	9,673	9,755	9,837	9,919	10,003	10,087	10,171	10,254	10,337	10,420	10,505	10,590	10,676	10,762	10,849	10,937
		Sub - Total	**48,971**	**49,355**	**49,742**	**58,369**	**58,843**	**66,822**	**67,371**	**67,926**	**68,487**	**69,054**	**69,628**	**70,207**	**70,793**	**71,385**	**71,984**	**72,589**	**73,061**	**73,536**	**74,016**	**74,499**	**74,987**	**75,478**	**75,974**	**76,474**	**76,978**	**77,486**	**77,981**	**78,479**	**78,981**	**79,488**	**79,998**	**80,513**	**81,032**	**81,555**	**82,082**
Dublin City	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	68,458	69,115	69,779	70,449	71,125	71,808	72,590	73,382	74,181	74,990	75,807	76,634	77,469	78,313	79,167	80,030	80,702	81,380	82,064	82,753	83,448	84,149	84,856	85,569	86,288	87,012	87,717	88,428	89,144	89,866	90,594	91,328	92,068	92,813	93,564
	16% of Res. Pop.	**Commercial**	10,953	11,058	11,165	11,272	11,380	11,489	11,614	11,741	11,869	11,998	12,129	12,261	12,395	12,530	12,667	12,805	12,912	13,021	13,130	13,240	13,352	13,464	13,577	13,691	13,806	13,922	14,035	14,148	14,263	14,379	14,495	14,612	14,731	14,850	14,970
	No Growth	**Industrial**	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081	7,081
	Headroom (20% of P+C)					16,344	16,501	16,659	16,841	17,025	17,210	17,398	17,587	17,779	17,973	18,169	18,367	18,567	18,723	18,880	19,039	19,199	19,360	19,523	19,687	19,852	20,019	20,187	20,350	20,515	20,681	20,849	21,018	21,188	21,360	21,533	21,707
		Sub - Total	**86,493**	**87,255**	**88,025**	**105,146**	**106,087**	**107,038**	**108,127**	**109,229**	**110,342**	**111,468**	**112,605**	**113,756**	**114,918**	**116,094**	**117,282**	**118,483**	**119,419**	**120,363**	**121,314**	**122,274**	**123,241**	**124,217**	**125,201**	**126,193**	**127,194**	**128,203**	**129,184**	**130,173**	**131,170**	**132,175**	**133,188**	**134,210**	**135,239**	**136,277**	**137,324**
	Total North Fringe Sewer		**135,463**	**136,610**	**137,767**	**163,515**	**164,931**	**173,860**	**175,498**	**177,155**	**178,829**	**180,522**	**182,233**	**183,963**	**185,711**	**187,479**	**189,266**	**191,072**	**192,480**	**193,899**	**195,330**	**196,773**	**198,228**	**199,695**	**201,175**	**202,667**	**204,172**	**205,689**	**207,164**	**208,652**	**210,151**	**211,663**	**213,187**	**214,723**	**216,271**	**217,832**	**219,406**

NDDS Sewer

NDDS Sewer	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Dublin City	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	160,335	161,538	162,749	163,970	165,199	166,438	167,753	169,079	170,414	171,761	173,117	174,485	175,864	177,253	178,653	180,064	181,325	182,594	183,872	185,159	186,456	187,761	189,075	190,399	191,731	193,074	194,348	195,631	196,922	198,221	199,530	200,847	202,172	203,506	204,85
	16% of Res. Pop.	**Commercial**	25,654	25,846	26,040	26,235	26,432	26,630	26,841	27,053	27,266	27,482	27,699	27,918	28,138	28,360	28,584	28,810	29,012	29,215	29,420	29,626	29,833	30,042	30,252	30,464	30,677	30,892	31,096	31,301	31,507	31,715	31,925	32,135	32,348	32,561	32,77
	No Growth	**Industrial**	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,55
		Sub - Total	**202,539**	**203,934**	**205,339**	**206,755**	**208,181**	**209,619**	**211,144**	**212,681**	**214,231**	**215,792**	**217,366**	**218,953**	**220,552**	**222,163**	**223,788**	**225,425**	**226,887**	**228,359**	**229,842**	**231,335**	**232,838**	**234,353**	**235,877**	**237,412**	**238,958**	**240,515**	**241,993**	**243,481**	**244,979**	**246,487**	**248,004**	**249,532**	**251,070**	**252,617**	**254,17**
Fingal	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	15,120	15,233	15,348	15,463	15,579	15,696	15,820	15,945	16,071	16,197	16,325	16,454	16,584	16,715	16,847	16,981	17,099	17,219	17,340	17,461	17,583	17,706	17,830	17,955	18,081	18,207	18,327	18,448	18,570	18,693	18,816	18,940	19,065	19,191	19,31
	16% of Res. Pop.	**Commercial**	2,419	2,437	2,456	2,474	2,493	2,511	2,531	2,551	2,571	2,592	2,612	2,633	2,654	2,674	2,696	2,717	2,736	2,755	2,774	2,794	2,813	2,833	2,853	2,873	2,893	2,913	2,932	2,952	2,971	2,991	3,011	3,030	3,050	3,071	3,09
	No Growth	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sub - Total	**17,539**	**17,671**	**17,803**	**17,937**	**18,071**	**18,207**	**18,351**	**18,496**	**18,642**	**18,789**	**18,937**	**19,087**	**19,238**	**19,390**	**19,543**	**19,697**	**19,835**	**19,974**	**20,114**	**20,255**	**20,397**	**20,539**	**20,683**	**20,828**	**20,974**	**21,121**	**21,260**	**21,400**	**21,541**	**21,684**	**21,827**	**21,971**	**22,116**	**22,262**	**22,40**
	Headroom (20% of P+C)					41,628	41,941	42,255	42,589	42,925	43,264	43,606	43,951	44,298	44,648	45,001	45,356	45,714	46,034	46,357	46,681	47,008	47,337	47,668	48,002	48,338	48,676	49,017	49,341	49,666	49,994	50,324	50,656	50,991	51,327	51,666	52,00
	Total NDDS Sewer		**220,078**	**221,604**	**223,142**	**266,320**	**268,193**	**270,081**	**272,083**	**274,102**	**276,137**	**278,188**	**280,254**	**282,338**	**284,437**	**286,554**	**288,687**	**290,837**	**292,757**	**294,690**	**296,637**	**298,598**	**300,572**	**302,560**	**304,562**	**306,578**	**308,609**	**310,653**	**312,594**	**314,548**	**316,515**	**318,494**	**320,487**	**322,493**	**324,513**	**326,545**	**328,59**

NDDS Sewer	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Dublin City	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	160,335	161,698	163,072	164,458	165,856	167,266	168,972	170,696	172,437	174,196	175,972	177,767	179,581	181,412	183,263	185,132	186,687	188,255	189,837	191,431	193,039	194,661	196,296	197,945	199,608	201,284	202,411	203,545	204,685	205,831	206,984	208,143	209,308	210,481	211,659
	16% of Res Pop	**Commercial**	25,654	25,872	26,092	26,313	26,537	26,763	27,036	27,311	27,590	27,871	28,156	28,443	28,733	29,026	29,322	29,621	29,870	30,121	30,374	30,629	30,886	31,146	31,407	31,671	31,937	32,205	32,386	32,567	32,750	32,933	33,117	33,303	33,489	33,677	33,865
	No Growth	**Industrial**	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550
		Sub - Total	**202,539**	**204,120**	**205,714**	**207,322**	**208,943**	**210,579**	**212,558**	**214,557**	**216,577**	**218,617**	**220,678**	**222,760**	**224,863**	**226,988**	**229,135**	**231,303**	**233,107**	**234,926**	**236,760**	**238,610**	**240,476**	**242,357**	**244,253**	**246,166**	**248,095**	**250,040**	**251,347**	**252,662**	**253,984**	**255,314**	**256,651**	**257,996**	**259,348**	**260,707**	**262,075**
Fingal	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	15,120	15,249	15,378	15,509	15,641	15,774	15,935	16,097	16,261	16,427	16,595	16,764	16,935	17,108	17,282	17,458	17,605	17,753	17,902	18,052	18,204	18,357	18,511	18,667	18,824	18,982	19,088	19,195	19,302	19,410	19,519	19,628	19,738	19,849	19,960
	16% of Res Pop	**Commercial**	2,419	2,440	2,461	2,481	2,503	2,524	2,550	2,576	2,602	2,628	2,655	2,682	2,710	2,737	2,765	2,793	2,817	2,840	2,864	2,888	2,913	2,937	2,962	2,987	3,012	3,037	3,054	3,071	3,088	3,106	3,123	3,141	3,158	3,176	3,194
	No Growth	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sub - Total	**17,539**	**17,688**	**17,839**	**17,990**	**18,143**	**18,297**	**18,484**	**18,673**	**18,863**	**19,055**	**19,250**	**19,446**	**19,644**	**19,845**	**20,047**	**20,252**	**20,422**	**20,593**	**20,766**	**20,941**	**21,117**	**21,294**	**21,473**	**21,653**	**21,835**	**22,019**	**22,142**	**22,266**	**22,391**	**22,516**	**22,642**	**22,769**	**22,896**	**23,025**	**23,154**
	Headroom (20% of P+C)					41,752	42,107	42,465	42,898	43,336	43,778	44,224	44,676	45,131	45,592	46,057	46,526	47,001	47,396	47,794	48,195	48,600	49,008	49,420	49,835	50,254	50,676	51,102	51,388	51,676	51,965	52,256	52,549	52,843	53,139	53,436	53,736
	Total NDDS Sewer		**220,078**	**221,808**	**223,552**	**267,064**	**269,194**	**271,341**	**273,940**	**276,565**	**279,218**	**281,897**	**284,603**	**287,338**	**290,100**	**292,890**	**295,708**	**298,556**	**300,925**	**303,313**	**305,722**	**308,151**	**310,601**	**313,071**	**315,562**	**318,073**	**320,606**	**323,160**	**324,877**	**326,604**	**328,340**	**330,086**	**331,842**	**333,608**	**335,383**	**337,169**	**338,96**

NDDS Sewer	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Dublin City	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	160,335	161,874	163,428	164,997	166,581	168,180	170,013	171,867	173,740	175,634	177,548	179,483	181,440	183,417	185,417	187,438	189,012	190,600	192,201	193,815	195,443	197,085	198,741	200,410	202,094	203,791	205,442	207,106	208,784	210,475	212,180	213,898	215,631	217,37	219,13
	16% of Res Pop	**Commercial**	25,654	25,900	26,149	26,400	26,653	26,909	27,202	27,499	27,798	28,101	28,408	28,717	29,030	29,347	29,667	29,990	30,242	30,496	30,752	31,010	31,271	31,534	31,799	32,066	32,335	32,607	32,871	33,137	33,405	33,676	33,949	34,224	34,501	34,78	35,06
	No Growth	**Industrial**	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,550	16,55	16,55
		Sub - Total	**202,539**	**204,324**	**206,127**	**207,947**	**209,784**	**211,639**	**213,766**	**215,915**	**218,088**	**220,285**	**222,506**	**224,751**	**227,020**	**229,314**	**231,633**	**233,978**	**235,804**	**237,646**	**239,503**	**241,376**	**243,264**	**245,169**	**247,089**	**249,026**	**250,979**	**252,948**	**254,863**	**256,793**	**258,739**	**260,701**	**262,678**	**264,672**	**266,682**	**268,70**	**270,75**
Fingal	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	15,120	15,265	15,412	15,560	15,709	15,860	16,033	16,207	16,384	16,563	16,743	16,926	17,110	17,297	17,485	17,676	17,824	17,974	18,125	18,277	18,431	18,586	18,742	18,899	19,058	19,218	19,374	19,531	19,689	19,848	20,009	20,171	20,335	20,49	20,66
	16% of Res Pop.	**Commercial**	2,419	2,442	2,466	2,490	2,513	2,538	2,565	2,593	2,621	2,650	2,679	2,708	2,738	2,767	2,798	2,828	2,852	2,876	2,900	2,924	2,949	2,974	2,999	3,024	3,049	3,075	3,100	3,125	3,150	3,176	3,201	3,227	3,254	3,28	3,30
	No Growth	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		Sub - Total	**17,539**	**17,708**	**17,878**	**18,049**	**18,222**	**18,397**	**18,598**	**18,801**	**19,006**	**19,213**	**19,422**	**19,634**	**19,848**	**20,064**	**20,283**	**20,504**	**20,676**	**20,850**	**21,025**	**21,202**	**21,380**	**21,559**	**21,740**	**21,923**	**22,107**	**22,293**	**22,473**	**22,656**	**22,839**	**23,024**	**23,211**	**23,399**	**23,588**	**23,77**	**23,97**
	Headroom (20% of P+C)					41,889	42,291	42,697	43,163	43,633	44,109	44,590	45,076	45,567	46,064	46,566	47,073	47,586	47,986	48,389	48,796	49,206	49,619	50,036	50,456	50,880	51,307	51,738	52,157	52,580	53,006	53,435	53,868	54,304	54,744	55,18	7 55,63
	Total NDDS Sewer		**220,078**	**222,032**	**224,004**	**267,885**	**270,298**	**272,734**	**275,526**	**278,349**	**281,203**	**284,087**	**287,004**	**289,951**	**292,932**	**295,944**	**298,990**	**302,068**	**304,466**	**306,885**	**309,324**	**311,783**	**314,263**	**316,764**	**319,286**	**321,829**	**324,393**	**326,979**	**329,493**	**332,028**	**334,584**	**337,160**	**339,757**	**342,374**	**345,014**	**347,67**	**350,35**

9B (Lucan/Clondalkin) Sewer

9B Sewer	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lucan/Clondalkin	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	Population	72,285	72,831	73,377	73,928	74,482	75,041	75,634	76,231	76,833	77,440	78,052	78,669	79,290	79,917	80,548	81,184	81,753	82,325	82,901	83,481	84,066	84,654	85,247	85,844	86,444	87,050	87,624	88,202	88,785	89,371	89,960	90,554	91,152	91,753	92,35
	16% of Res. Pop.	Commercial	11,566	11,653	11,740	11,828	11,917	12,007	12,101	12,197	12,293	12,390	12,488	12,587	12,686	12,787	12,888	12,989	13,080	13,172	13,264	13,357	13,451	13,545	13,639	13,735	13,831	13,928	14,020	14,112	14,206	14,299	14,394	14,489	14,584	14,681	14,77
	No Growth	Industrial	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,40
	Headroom (20% of P+C)					17,151	17,280	17,409	17,547	17,686	17,825	17,966	18,108	18,251	18,395	18,541	18,687	18,835	18,967	19,099	19,233	19,368	19,503	19,640	19,777	19,916	20,055	20,196	20,329	20,463	20,598	20,734	20,871	21,009	21,147	21,287	21,42
	Total 9B (Lucan/Clondalkin) Sewer		**85,255**	**85,884**	**86,518**	**104,307**	**105,079**	**105,857**	**106,682**	**107,514**	**108,352**	**109,197**	**110,049**	**110,907**	**111,772**	**112,644**	**113,523**	**114,409**	**115,200**	**115,996**	**116,798**	**117,606**	**118,420**	**119,239**	**120,064**	**120,894**	**121,731**	**122,573**	**123,373**	**124,178**	**124,988**	**125,804**	**126,625**	**127,451**	**128,283**	**129,121**	**129,96**

9B Sewer	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lucan/Clondalkin	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	Population	72,285	72,903	73,523	74,148	74,778	75,414	76,183	76,960	77,745	78,538	79,339	80,149	80,966	81,792	82,626	83,469	84,170	84,877	85,590	86,309	87,034	87,765	88,502	89,246	89,996	90,751	91,260	91,771	92,285	92,801	93,321	93,844	94,369	94,898	95,42
	16% of Res. Pop.	Commercial	11,566	11,665	11,764	11,864	11,965	12,066	12,189	12,314	12,439	12,566	12,694	12,824	12,955	13,087	13,220	13,355	13,467	13,580	13,694	13,809	13,925	14,042	14,160	14,279	14,399	14,520	14,602	14,683	14,766	14,848	14,931	15,015	15,099	15,184	15,26
	No Growth	Industrial	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,40
	Headroom (20% of P+C)					17,202	17,349	17,496	17,674	17,855	18,037	18,221	18,407	18,594	18,784	18,976	19,169	19,365	19,527	19,692	19,857	20,024	20,192	20,362	20,533	20,705	20,879	21,054	21,172	21,291	21,410	21,530	21,651	21,772	21,894	22,016	22,14
	Total 9B (Lucan/Clondalkin) Sewer		**85,255**	**85,968**	**86,687**	**104,614**	**105,491**	**106,376**	**107,447**	**108,529**	**109,621**	**110,725**	**111,840**	**112,967**	**114,105**	**115,254**	**116,416**	**117,589**	**118,565**	**119,549**	**120,542**	**121,542**	**122,551**	**123,569**	**124,595**	**125,630**	**126,674**	**127,726**	**128,433**	**129,145**	**129,860**	**130,580**	**131,303**	**132,030**	**132,762**	**133,498**	**134,23**

9B Sewer	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Lucan/Clondalkin	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	Population	72,285	72,983	73,684	74,391	75,105	75,826	76,653	77,488	78,333	79,187	80,050	80,922	81,804	82,696	83,597	84,509	85,218	85,934	86,656	87,384	88,118	88,858	89,605	90,357	91,116	91,882	92,626	93,376	94,133	94,895	95,664	96,439	97,220	98,007	98,80
	16% of Res. Pop.	Commercial	11,566	11,677	11,789	11,903	12,017	12,132	12,264	12,398	12,533	12,670	12,808	12,948	13,089	13,231	13,376	13,521	13,635	13,749	13,865	13,981	14,099	14,217	14,337	14,457	14,579	14,701	14,820	14,940	15,061	15,183	15,306	15,430	15,555	15,681	15,80
	No Growth	Industrial	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,400	1,40
	Headroom (20% of P+C)					17,259	17,424	17,592	17,783	17,977	18,173	18,371	18,572	18,774	18,979	19,185	19,395	19,606	19,771	19,937	20,104	20,273	20,443	20,615	20,788	20,963	21,139	21,317	21,489	21,663	21,839	22,016	22,194	22,374	22,555	22,738	22,92
	Total 9B (Lucan/Clondalkin) Sewer		**85,255**	**86,060**	**86,873**	**104,952**	**105,946**	**106,950**	**108,100**	**109,264**	**110,439**	**111,628**	**112,829**	**114,044**	**115,272**	**116,513**	**117,768**	**119,036**	**120,024**	**121,021**	**122,025**	**123,039**	**124,060**	**125,091**	**126,130**	**127,177**	**128,234**	**129,299**	**130,335**	**131,380**	**132,433**	**133,494**	**134,564**	**135,643**	**136,730**	**137,826**	**138,93**

Swords WwTP

Swords WwTP	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	46,358	46,706	47,056	47,409	47,764	48,123	48,503	48,886	49,272	49,661	50,054	50,449	50,848	51,249	51,654	52,062	52,427	52,794	53,163	53,536	53,910	54,288	54,668	55,050	55,436	55,824	56,192	56,563	56,936	57,312	57,690	58,071	58,454	58,840	59,229
	Grow at same rate as population	**Commercial**	9,943	10,018	10,093	10,169	10,245	10,322	10,404	10,486	10,569	10,652	10,736	10,821	10,906	10,993	11,079	11,167	11,245	11,324	11,403	11,483	11,563	11,644	11,726	11,808	11,891	11,974	12,053	12,132	12,212	12,293	12,374	12,456	12,538	12,621	12,704
	No Growth	**Industrial**	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040
	Headroom (20% of P+C)					11,516	11,602	11,689	11,781	11,874	11,968	12,063	12,158	12,254	12,351	12,448	12,547	12,646	12,734	12,824	12,913	13,004	13,095	13,186	13,279	13,372	13,465	13,560	13,649	13,739	13,830	13,921	14,013	14,105	14,199	14,292	14,387
	Total Swords WwTP		**58,341**	**58,763**	**59,189**	**71,133**	**71,651**	**72,173**	**72,727**	**73,286**	**73,848**	**74,416**	**74,988**	**75,564**	**76,145**	**76,730**	**77,320**	**77,915**	**78,446**	**78,981**	**79,519**	**80,062**	**80,608**	**81,158**	**81,712**	**82,269**	**82,831**	**83,397**	**83,934**	**84,474**	**85,018**	**85,566**	**86,117**	**86,672**	**87,231**	**87,793**	**88,359**

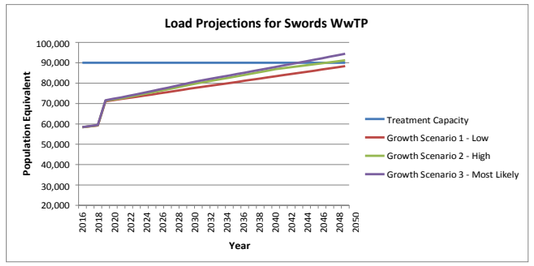
Swords WwTP	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	46,358	46,752	47,149	47,550	47,954	48,362	48,855	49,354	49,857	50,366	50,879	51,398	51,923	52,452	52,987	53,528	53,977	54,431	54,888	55,349	55,814	56,283	56,755	57,232	57,713	58,198	58,524	58,851	59,181	59,512	59,846	60,181	60,518	60,857	61,197
	Grow at same rate as population	**Commercial**	9,943	10,028	10,113	10,199	10,286	10,373	10,479	10,586	10,694	10,803	10,913	11,025	11,137	11,251	11,365	11,481	11,578	11,675	11,773	11,872	11,972	12,072	12,174	12,276	12,379	12,483	12,553	12,623	12,694	12,765	12,836	12,908	12,981	13,053	13,126
	No Growth	**Industrial**	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040
	Headroom (20% of P+C)					11,550	11,648	11,747	11,867	11,988	12,110	12,234	12,359	12,485	12,612	12,741	12,871	13,002	13,111	13,221	13,332	13,444	13,557	13,671	13,786	13,902	14,018	14,136	14,215	14,295	14,375	14,455	14,536	14,618	14,700	14,782	14,865
	Total Swords WwTP		**58,341**	**58,820**	**59,302**	**71,339**	**71,928**	**72,522**	**73,241**	**73,967**	**74,701**	**75,442**	**76,191**	**76,947**	**77,711**	**78,483**	**79,263**	**80,050**	**80,706**	**81,366**	**82,033**	**82,705**	**83,382**	**84,065**	**84,754**	**85,449**	**86,150**	**86,856**	**87,331**	**87,809**	**88,289**	**88,772**	**89,258**	**89,746**	**90,238**	**90,732**	**91,228**

Swords WwTP	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	46,358	46,803	47,252	47,706	48,164	48,626	49,156	49,692	50,234	50,781	51,335	51,894	52,460	53,032	53,610	54,194	54,650	55,109	55,571	56,038	56,509	56,984	57,462	57,945	58,432	58,923	59,400	59,881	60,366	60,855	61,348	61,845	62,346	62,851	63,360
	Grow at same rate as population	**Commercial**	9,943	10,039	10,135	10,233	10,331	10,430	10,544	10,659	10,775	10,892	11,011	11,131	11,252	11,375	11,499	11,624	11,722	11,820	11,920	12,020	12,121	12,223	12,325	12,429	12,533	12,638	12,741	12,844	12,948	13,053	13,159	13,265	13,373	13,481	13,590
	No Growth	**Industrial**	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040	2,040
	Headroom (20% of P+C)					11,588	11,699	11,811	11,940	12,070	12,202	12,335	12,469	12,605	12,742	12,881	13,022	13,164	13,274	13,386	13,498	13,612	13,726	13,841	13,958	14,075	14,193	14,312	14,428	14,545	14,663	14,782	14,901	15,022	15,144	15,266	15,390
	Total Swords WwTP		**58,341**	**58,881**	**59,427**	**71,566**	**72,233**	**72,907**	**73,680**	**74,460**	**75,250**	**76,048**	**76,855**	**77,670**	**78,494**	**79,328**	**80,170**	**81,022**	**81,685**	**82,354**	**83,029**	**83,709**	**84,395**	**85,087**	**85,785**	**86,488**	**87,197**	**87,913**	**88,608**	**89,310**	**90,016**	**90,729**	**91,447**	**92,172**	**92,902**	**93,638**	**94,380**

Swords WwTP - Summary

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth Scenario 1 - Low	58,341	58,763	59,189	71,133	71,651	72,173	72,727	73,286	73,848	74,416	74,988	75,564	76,145	76,730	77,320	77,915	78,446	78,981	79,519	80,062	80,608	81,158	81,712	82,269	82,831	83,397	83,934	84,474	85,018	85,566	86,117	86,672	87,231	87,793	88,359
Growth Scenario 2 - High	58,341	58,820	59,302	71,339	71,928	72,522	73,241	73,967	74,701	75,442	76,191	76,947	77,711	78,483	79,263	80,050	80,706	81,366	82,033	82,705	83,382	84,065	84,754	85,449	86,150	86,856	87,331	87,809	88,289	88,772	89,258	89,746	90,238	90,732	91,228
Growth Scenario 3 - Most Likely	58,341	58,881	59,427	71,566	72,233	72,907	73,680	74,460	75,250	76,048	76,855	77,670	78,494	79,328	80,170	81,022	81,685	82,354	83,029	83,709	84,395	85,087	85,785	86,488	87,197	87,913	88,608	89,310	90,016	90,729	91,447	92,172	92,902	93,638	94,380

Note: PE load on plant was reported as 58,341 PE in 2016 AER



Swords WwTP - Load Transfer to Regional WwTP

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity Swords WwTP	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000	90,000
Growth Scenario 1 - Low	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Scenario 1 - High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Growth Scenario 2 - Most Likely	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Leixlip WwTP

Leixlip WwTP	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	57,882	58,236	58,672	59,112	59,556	60,002	60,476	60,954	61,436	61,921	62,410	62,903	63,400	63,901	64,406	64,915	65,369	65,827	66,287	66,751	67,219	67,689	68,163	68,640	69,121	69,604	70,064	70,526	70,992	71,460	71,932	72,407	72,885	73,366	73,850
	16% of Residential Population	**Commercial**	9,248	9,318	9,388	9,458	9,529	9,600	9,676	9,753	9,830	9,907	9,986	10,065	10,144	10,224	10,305	10,386	10,459	10,532	10,606	10,680	10,755	10,830	10,906	10,982	11,059	11,137	11,210	11,284	11,359	11,43 4	11,509	11,585	11,662	11,739	11,816
	Co Meath Reserve Capacity (8,000 PE)	**Meath Contrib**			4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000
	Intel (reserve capacity)	**Industrial**	58,950	59,446	59,446	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,700	84,70 0	84,700	84,700	84,700	84,700	84,700
	Headroom (20% of P+C)					13,714	13,817	13,921	14,031	14,141	14,253	14,366	14,479	14,594	14,709	14,825	14,942	15,060	15,166	15,272	15,379	15,486	15,595	15,704	15,814	15,925	16,036	16,148	16,255	16,362	16,470	16,579	16,688	16,798	16,909	17,02 1	17,133
	Total Leixlip WwTP		**126,000**	**126,999**	**131,506**	**170,984**	**171,601**	**176,223**	**176,883**	**177,548**	**178,218**	**178,894**	**179,575**	**180,261**	**180,953**	**181,650**	**182,353**	**183,061**	**183,694**	**184,331**	**184,972**	**185,618**	**186,268**	**186,923**	**187,583**	**188,247**	**188,916**	**189,589**	**190,229**	**190,873**	**191,521**	**192,173**	**192,829**	**193,490**	**194,155**	**194,825**	**195,499**

Leixlip WwTP	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	205
	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	57,882	58,293	58,789	59,289	59,792	60,301	60,916	61,537	62,165	62,799	63,439	64,087	64,740	65,401	66,068	66,742	67,302	67,867	68,438	69,012	69,592	70,177	70,766	71,361	71,960	72,565	72,971	73,380	73,790	74,204			74,619	75,037	75,457	75,880	76,30
	16% of Residential Population	**Commercial**	9,248	9,327	9,406	9,486	9,567	9,648	9,747	9,846	9,946	10,048	10,150	10,254	10,358	10,464	10,571	10,679	10,768	10,859	10,950	11,042	11,135	11,228	11,323	11,418	11,514	11,610	11,675	11,741	11,806	11,873			11,939	12,006	12,073	12,141	12,20
	Co Meath Reserve Capacity (8,000 PE)	**Meath Contrib**			4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,00
	Intel (reserve capacity)	**Industrial**	58,950	59,446	59,446	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,00
	Headroom (20% of P+C)					13,755	13,872	13,990	14,132	14,277	14,422	14,569	14,718	14,868	15,020	15,173	15,328	15,484	15,614	15,745	15,878	16,011	16,145	16,281	16,418	16,556	16,695	16,835	16,929	17,024	17,119	17,215			17,312	17,409	17,506	17,604	17,70
	Total Leixlip WwTP		**126,000**	**127,066**	**131,641**	**236,530**	**237,231**	**241,939**	**242,795**	**243,660**	**244,533**	**245,416**	**246,308**	**247,208**	**248,118**	**249,038**	**249,966**	**250,904**	**251,685**	**252,472**	**253,265**	**254,065**	**254,872**	**255,686**	**256,507**	**257,334**	**258,168**	**259,010**	**259,575**	**260,144**	**260,716**	**261,292**	**261,870**	**262,452**	**263,037**	**263,625**	**264,21**

Leixlip WwTP	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	205
	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	57,882	58,357	58,917	59,483	60,054	60,630	61,291	61,959	62,635	63,317	64,007	64,705	65,410	66,123	66,844	67,573	68,140	68,713	69,290	69,872	70,459	71,051	71,648	72,249	72,856	73,468	74,063	74,663	75,268	75,878	76,492	77,112	77,737	78,366	79,00
	16% of Residential Population	**Commercial**	9,248	9,337	9,427	9,517	9,609	9,701	9,807	9,913	10,022	10,131	10,241	10,353	10,466	10,580	10,695	10,812	10,902	10,994	11,086	11,180	11,273	11,368	11,464	11,560	11,657	11,755	11,850	11,946	12,043	12,140	12,239	12,338	12,438	12,539	12,64
	Co Meath Reserve Capacity (8,000 PE)	**Meath Contrib**			4,000	4,000	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,00
	Intel (reserve capacity)	**Industrial**	59,446	59,446	59,446	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,00
	Headroom (20% of P+C)					13,800	13,932	14,066	14,220	14,375	14,531	14,690	14,850	15,012	15,175	15,341	15,508	15,677	15,809	15,941	16,075	16,210	16,346	16,484	16,622	16,762	16,903	17,045	17,1 83	17,322	17,462	17,604	17,746	17,890	18,035	18,181	18,32
	Total Leixlip WwTP		**126,000**	**127,140**	**131,790**	**236,800**	**237,595**	**242,397**	**243,317**	**244,247**	**245,187**	**246,138**	**247,098**	**248,070**	**249,051**	**250,044**	**251,047**	**252,061**	**252,851**	**253,648**	**254,452**	**255,262**	**256,079**	**256,903**	**257,733**	**258,571**	**259,416**	**260,268**	**261,096**	**261,931**	**262,773**	**263,622**	**264,477**	**265,340**	**266,209**	**267,086**	**267,96**

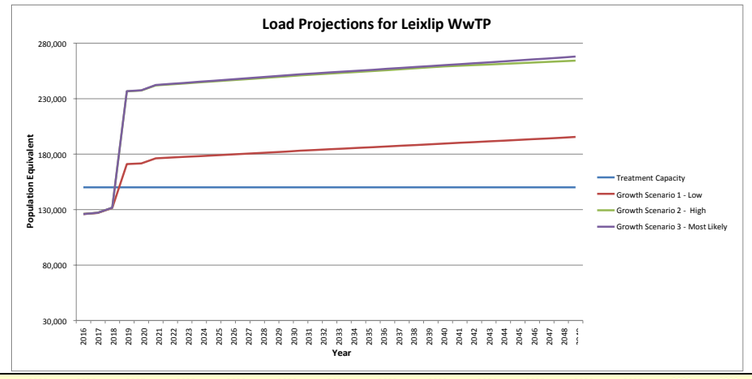
Leixlip WwTP

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Growth Scenario 1 - Low	126,000	126,999	131,506	170,984	171,601	176,223	176,883	177,548	178,218	178,894	179,575	180,261	180,953	181,650	182,353	183,061	183,694	184,331	184,972	185,618	186,268	186,923	187,583	188,247	188,916	189,589	190,229	190,873	191,521	192,173	192,829	193,490	194,155	194,825	195,499
Growth Scenario 2 - High	126,000	127,066	131,641	236,530	237,231	241,939	242,795	243,660	244,533	245,416	246,308	247,208	248,118	249,038	249,966	250,904	251,685	252,472	253,265	254,065	254,872	255,686	256,507	257,334	258,168	259,010	259,575	260,144	260,716	261,292	261,870	262,452	263,037	263,625	264,216
Growth Scenario 3 - Most Likely	126,000	127,140	131,790	236,800	237,595	242,397	243,317	244,247	245,187	246,138	247,098	248,070	249,051	250,044	251,047	252,061	252,851	253,648	254,452	255,262	256,079	256,903	257,733	258,571	259,416	260,268	261,096	261,931	262,773	263,622	264,477	265,340	266,209	267,086	267,969

Diverted Load to 9C sewer - Most Likely Scenario	0	0	-18,210	86,800	87,595	92,397	93,317	94,247	95,187	96,138	97,098	98,070	99,051	100,044	101,047	102,061	102,851	103,648	104,452	105,262	106,079		106,903	107,733	10	,571	109,416	110,268	111,096	111,931	112,773	113,622	1	4,477	115,340	116,209	117,086					117,969
Diverted Load to 9C sewer - Low	0	0	-18,494	20,984	21,601	26,223	26,883	27,548	28,218	28,894	29,575	30,261	30,953	31,650	32,353	33,061	33,694	34,331	34,972	35,618	36,268	36,923	37,583	38,2	87	38,916	39,589	40,229	40,873	41,521	42,173	42,829	43,490	44,155	4	2,825					45,499
Diverted Load to 9C sewer - High	0	0	-18,359	86,530	87,231	91,939	92,795	93,660	94,533	95,416	96,308	97,208	98,118	99,038	99,966	100,904	101,685	102,472	103,265	104,065	104,872		105,686	106,507	10	,334	108,168	109,010	109,575	110,144	110,716	111,292	1	1,870	112,452	113,037	113,625					114,216

Note Average annual loading PE reported in 2016 was 177,744

Average daily loading from Intel in 2010 was 295kg/day equivalent to 4,916 PE



Leixlip WwTP - Transfers to Regional WwTP

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity - Leixlip WwTP	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000
Growth Scenario 1 - Low	0	-23,001	-18,494	20,984	21,601	26,223	26,883	27,548	28,218	28,894	29,575	30,261	30,953	31,650	32,353	33,061	33,694	34,331	34,972	35,618	36,268	36,923	37,583	38,247	38,916	39,589	40,229	40,873	41,521	42,173	42,829	43,490	44,155	44,825	45,499
Growth Scenario 1 - High	-24,000	-22,934	-18,359	86,530	87,231	91,939	92,795	93,660	94,533	95,416	96,308	97,208	98,118	99,038	99,966	100,904	101,685	102,472	103,265	104,065	104,872	105,686	106,507	107,334	108,168	109,010	109,575	110,144	110,716	111,292	111,870	112,452	113,037	113,625	114,216
Growth Scenario 2 - Most Likely	-24,000	-22,860	-18,210	86,800	87,595	92,397	93,317	94,247	95,187	96,138	97,098	98,070	99,051	100,044	101,047	102,061	102,851	103,648	104,452	105,262	106,079	106,903	107,733	108,571	109,416	110,268	111,096	111,931	112,773	113,622	114,477	115,340	116,209	117,086	117,969

Osberstown WwTP

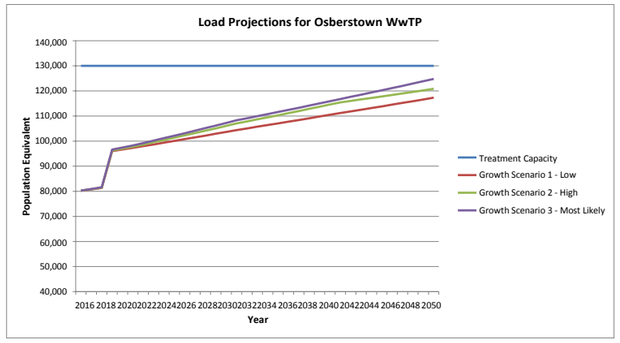
Osberstown WwTP Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**Population**	59,949	60,399	60,852	61,308	61,768	62,231	62,723	63,218	63,718	64,221	64,728	65,240	65,755	66,275	66,798	67,326	67,797	68,272	68,750	69,231	69,715	70,203	70,695	71,190	71,688	72,190	72,666	73,146	73,629	74,115	74,604	75,096	75,592	76,091	76,593
16% of Residential Population	**Commercial**	9,592	9,664	9,736	9,809	9,883	9,957	10,036	10,115	10,195	10,275	10,357	10,438	10,521	10,604	10,688	10,772	10,848	10,923	11,000	11,077	11,154	11,233	11,311	11,390	11,470	11,550	11,627	11,703	11,781	11,858	11,937	12,015	12,095	12,175	12,255
No Growth	**Industrial**	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698
Headroom (20% of P+C)					14,223	14,330	14,438	14,552	14,667	14,782	14,899	15,017	15,136	15,255	15,376	15,497	15,620	15,729	15,839	15,950	16,062	16,174	16,287	16,401	16,516	16,632	16,748	16,859	16,970	17,082	17,195	17,308	17,422	17,537	17,653	17,770
Total Osberstown WwTP		**80,239**	**80,760**	**81,286**	**96,039**	**96,679**	**97,324**	**98,008**	**98,698**	**99,393**	**100,094**	**100,800**	**101,512**	**102,229**	**102,952**	**103,681**	**104,416**	**105,072**	**105,732**	**106,397**	**107,067**	**107,742**	**108,421**	**109,105**	**109,794**	**110,488**	**111,186**	**111,850**	**112,517**	**113,189**	**113,866**	**114,547**	**115,232**	**115,922**	**116,616**	**117,315**

Osberstown WwTP Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**Population**	59,949	60,459	60,972	61,491	62,013	62,541	63,178	63,823	64,474	65,131	65,796	66,467	67,145	67,830	68,522	69,221	69,802	70,388	70,980	71,576	72,177	72,783	73,395	74,011	74,633	75,260	75,681	76,105	76,531	76,960	77,391	77,824	78,260	78,698	79,139
16% of Residential Population	**Commercial**	9,592	9,673	9,756	9,839	9,922	10,006	10,109	10,212	10,316	10,421	10,527	10,635	10,743	10,853	10,963	11,075	11,168	11,262	11,357	11,452	11,548	11,645	11,743	11,842	11,941	12,042	12,109	12,177	12,245	12,314	12,383	12,452	12,522	12,592	12,662
No Growth	**Industrial**	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698
Headroom (20% of P+C)					14,266	14,387	14,509	14,657	14,807	14,958	15,111	15,265	15,420	15,578	15,737	15,897	16,059	16,194	16,330	16,467	16,606	16,745	16,886	17,028	17,171	17,315	17,460	17,558	17,656	17,755	17,855	17,955	18,055	18,156	18,258	18,360
Total Osberstown WwTP		**80,239**	**80,830**	**81,426**	**96,293**	**97,021**	**97,754**	**98,642**	**99,539**	**100,446**	**101,361**	**102,286**	**103,220**	**104,164**	**105,117**	**106,080**	**107,053**	**107,862**	**108,679**	**109,502**	**110,332**	**111,168**	**112,012**	**112,863**	**113,722**	**114,587**	**115,460**	**116,046**	**116,636**	**117,230**	**117,826**	**118,426**	**119,029**	**119,636**	**120,246**	**120,860**

Osberstown WwTP Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	59,949	60,525	61,106	61,692	62,284	62,882	63,568	64,261	64,961	65,669	66,385	67,109	67,840	68,579	69,327	70,083	70,671	71,265	71,864	72,467	73,076	73,690	74,309	74,933	75,562	76,197	76,814	77,437	78,064	78,696	79,334	79,976	80,624	81,277	81,935
16% of Residential Population	**Commercial**	9,592	9,684	9,777	9,871	9,966	10,061	10,171	10,282	10,394	10,507	10,622	10,737	10,854	10,973	11,092	11,213	11,307	11,402	11,498	11,595	11,692	11,790	11,889	11,989	12,090	12,192	12,290	12,390	12,490	12,591	12,693	12,796	12,900	13,004	13,110
No Growth	**Industrial**	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698	10,698
Headroom (20% of P+C)					14,313	14,450	14,589	14,748	14,908	15,071	15,235	15,401	15,569	15,739	15,910	16,084	16,259	16,396	16,533	16,672	16,812	16,954	17,096	17,240	17,384	17,530	17,678	17,821	17,965	18,111	18,258	18,405	18,554	18,705	18,856	19,009
Total Osberstown WwTP		**80,239**	**80,906**	**81,580**	**96,573**	**97,398**	**98,230**	**99,184**	**100,149**	**101,124**	**102,109**	**103,106**	**104,113**	**105,131**	**106,161**	**107,201**	**108,253**	**109,073**	**109,899**	**110,732**	**111,572**	**112,420**	**113,274**	**114,136**	**115,005**	**115,881**	**116,764**	**117,624**	**118,490**	**119,363**	**120,243**	**121,130**	**122,025**	**122,927**	**123,836**	**124,752**

Osberstown WwTP	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000	130,000
Growth Scenario 1 - Low	80,239	80,760	81,286	96,039	96,679	97,324	98,008	98,698	99,393	100,094	100,800	101,512	102,229	102,952	103,681	104,416	105,072	105,732	106,397	107,067	107,742	108,421	109,105	109,794	110,488	111,186	111,850	112,517	113,189	113,866	114,547	115,232	115,922	116,616	117,315
Growth Scenario 2 - High	80,239	80,830	81,426	96,293	97,021	97,754	98,642	99,539	100,446	101,361	102,286	103,220	104,164	105,117	106,080	107,053	107,862	108,679	109,502	110,332	111,168	112,012	112,863	113,722	114,587	115,460	116,046	116,636	117,230	117,826	118,426	119,029	119,636	120,246	120,860
Growth Scenario 3 - Most Likely	80,239	80,906	81,580	96,573	97,398	98,230	99,184	100,149	101,124	102,109	103,106	104,113	105,131	106,161	107,201	108,253	109,073	109,899	110,732	111,572	112,420	113,274	114,136	115,005	115,881	116,764	117,624	118,490	119,363	120,243	121,130	122,025	122,927	123,836	124,752

Note PE Loading on Oberstown Plant as of 2016 was reported as 80239 in the 2016 AER



Osberstown WwTP - Load Transfers to Regional WwTP	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity - Osberstown WwTP	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**	**130,000**
Growth Scenario 1 - Low	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15,453	-14,768	-14,078	-13,384	-12,685
Growth Scenario 2 - High	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15,413	-14,540	-13,954	-13,364	-12,770	-12,174	-11,574	-10,971	-10,364	-9,754	-9,140
Growth Scenario 3 - Most Likely	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-15,864	-14,995	-14,119	-13,236	-12,376	-11,510	-10,637	-9,757	-8,870	-7,975	-7,073	-6,164	-5,248

North Fringe Sewer - Phase 1 Diversion

North Fringe Sewer (Sub-catchments west of WwTP)	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065
Fingal	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**Population**	39,548	39,928	40,311	40,698	41,089	41,483	41,935	42,392	42,854	43,322	43,794	44,271	44,754	45,241	45,735	46,233	46,621	47,013	47,408	47,806	48,208	48,613	49,021	49,433	49,848	50,267	50,674	51,084	51,498	51,915	52,336	52,760	53,187	53,618	54,052	54,490	54,931	55,376	55,825	56,277	56,733	57,193	57,656	58,123	58,594	59,068	59,547	60,029	60,515	61,005
	16% of Res. Pop.	**Commercial**	6,328	6,388	6,450	6,512	6,574	6,637	6,710	6,783	6,857	6,931	7,007	7,083	7,161	7,239	7,318	7,397	7,459	7,522	7,585	7,649	7,713	7,778	7,843	7,909	7,976	8,043	8,108	8,174	8,240	8,306	8,374	8,442	8,510	8,579	8,648	8,718	8,789	8,860	8,932	9,004	9,077	9,151	9,225	9,300	9,375	9,451	9,527	9,605	9,682	9,761
	No Growth	**Industrial**	7,232	7,232	7,232	7,232	7,232	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732	14,732
	Headroom (20% of P+C)					9,442	9,533	9,624	9,729	9,835	9,942	10,051	10,160	10,271	10,383	10,496	10,610	10,726	10,816	10,907	10,999	11,091	11,184	11,278	11,373	11,468	11,565	11,662	11,756	11,852	11,948	12,044	12,142	12,240	12,339	12,439	12,540	12,642	12,744	12,847	12,951	13,056	13,162	13,269	13,376	13,484	13,594	13,704	13,815	13,927	14,040	14,153
Total North Fringe Sewer			**53,108**	**53,548**	**53,993**	**63,884**	**64,427**	**72,476**	**73,106**	**73,742**	**74,385**	**75,036**	**75,693**	**76,357**	**77,029**	**77,708**	**78,395**	**79,089**	**79,629**	**80,174**	**80,724**	**81,278**	**81,837**	**82,401**	**82,969**	**83,543**	**84,121**	**84,703**	**85,270**	**85,842**	**86,418**	**86,998**	**87,584**	**88,174**	**88,769**	**89,368**	**89,973**	**90,582**	**91,197**	**91,816**	**92,440**	**93,070**	**93,704**	**94,344**	**94,989**	**95,639**	**96,294**	**96,955**	**97,621**	**98,292**	**98,969**	**99,652**

Malahide WwTP

Malahide WwTP	Growth Scenario 1 - Low		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.75% (2016 - 2021); 0.79% (2021 - 2031); 0.7% (2031 - 2041); 0.66% (2041 - 2050);	**PE Load**	16,692	16,817	16,943	17,070	17,198	17,327	17,464	17,602	17,741	17,881	18,023	18,165	18,309	18,453	18,599	18,746	18,877	19,009	19,142	19,276	19,411	19,547	19,684	19,822	19,961	20,100	20,233	20,367	20,501	20,636	20,772	20,910	21,048	21,186	21,326
	16% of Residential Population	**Commercial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No Industrial Load in Malahide	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No headroom allowed due to lack of industrial load.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Malahide WwTP		**16,692**	**16,817**	**16,943**	**17,070**	**17,198**	**17,327**	**17,464**	**17,602**	**17,741**	**17,881**	**18,023**	**18,165**	**18,309**	**18,453**	**18,599**	**18,746**	**18,877**	**19,009**	**19,142**	**19,276**	**19,411**	**19,547**	**19,684**	**19,822**	**19,961**	**20,100**	**20,233**	**20,367**	**20,501**	**20,636**	**20,772**	**20,910**	**21,048**	**21,186**	**21,326**

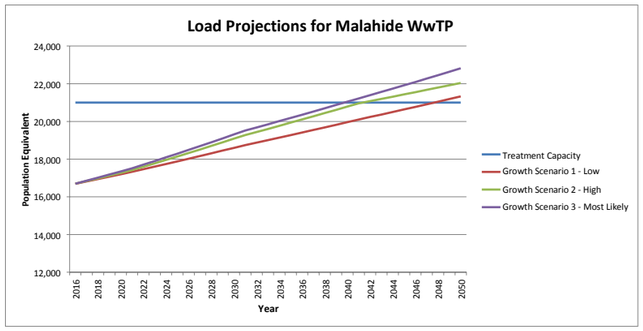
Malahide WwTP	Growth Scenario 2 - High		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.85% (2016 - 2021); 1.02% (2021 - 2031); 0.84% (2031 - 2041); 0.56% (2041 - 2050);	**PE Load**	16,692	16,834	16,977	17,121	17,267	17,414	17,591	17,771	17,952	18,135	18,320	18,507	18,696	18,886	19,079	19,274	19,435	19,599	19,763	19,929	20,097	20,266	20,436	20,607	20,781	20,955	21,072	21,190	21,309	21,428	21,548	21,669	21,790	21,913	22,035
	16% of Residential Population	**Commercial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No Industrial Load in Malahide	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No headroom allowed due to lack of industrial load.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Malahide WwTP		**16,692**	**16,834**	**16,977**	**17,121**	**17,267**	**17,414**	**17,591**	**17,771**	**17,952**	**18,135**	**18,320**	**18,507**	**18,696**	**18,886**	**19,079**	**19,274**	**19,435**	**19,599**	**19,763**	**19,929**	**20,097**	**20,266**	**20,436**	**20,607**	**20,781**	**20,955**	**21,072**	**21,190**	**21,309**	**21,428**	**21,548**	**21,669**	**21,790**	**21,913**	**22,035**

Malahide WwTP	Growth Scenario 3 - Most Likely		2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
	0.96% (2016 - 2021); 1.09% (2021 - 2031); 0.84% (2031 - 2041); 0.81% (2041 - 2050);	**PE Load**	16,692	16,852	17,014	17,177	17,342	17,509	17,700	17,893	18,088	18,285	18,484	18,685	18,889	19,095	19,303	19,514	19,677	19,843	20,009	20,178	20,347	20,518	20,690	20,864	21,039	21,216	21,388	21,561	21,736	21,912	22,089	22,268	22,449	22,631	22,814
	16% of Residential Population	**Commercial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No Industrial Load in Malahide	**Industrial**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	No headroom allowed due to lack of industrial load.		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total Malahide WwTP		**16,692**	**16,852**	**17,014**	**17,177**	**17,342**	**17,509**	**17,700**	**17,893**	**18,088**	**18,285**	**18,484**	**18,685**	**18,889**	**19,095**	**19,303**	**19,514**	**19,677**	**19,843**	**20,009**	**20,178**	**20,347**	**20,518**	**20,690**	**20,864**	**21,039**	**21,216**	**21,388**	**21,561**	**21,736**	**21,912**	**22,089**	**22,268**	**22,449**	**22,631**	**22,814**

Malahide WwTP

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000
Growth Scenario 1 - Low	16,692	16,817	16,943	17,070	17,198	17,327	17,464	17,602	17,741	17,881	18,023	18,165	18,309	18,453	18,599	18,746	18,877	19,009	19,142	19,276	19,411	19,547	19,684	19,822	19,961	20,100	20,233	20,367	20,501	20,636	20,772	20,910	21,048	21,186	21,326
Growth Scenario 2 - High	16,692	16,834	16,977	17,121	17,267	17,414	17,591	17,771	17,952	18,135	18,320	18,507	18,696	18,886	19,079	19,274	19,435	19,599	19,763	19,929	20,097	20,266	20,436	20,607	20,781	20,955	21,072	21,190	21,309	21,428	21,548	21,669	21,790	21,913	22,035
Growth Scenario 3 - Most Likely	16,692	16,852	17,014	17,177	17,342	17,509	17,700	17,893	18,088	18,285	18,484	18,685	18,889	19,095	19,303	19,514	19,677	19,843	20,009	20,178	20,347	20,518	20,690	20,864	21,039	21,216	21,388	21,561	21,736	21,912	22,089	22,268	22,449	22,631	22,814

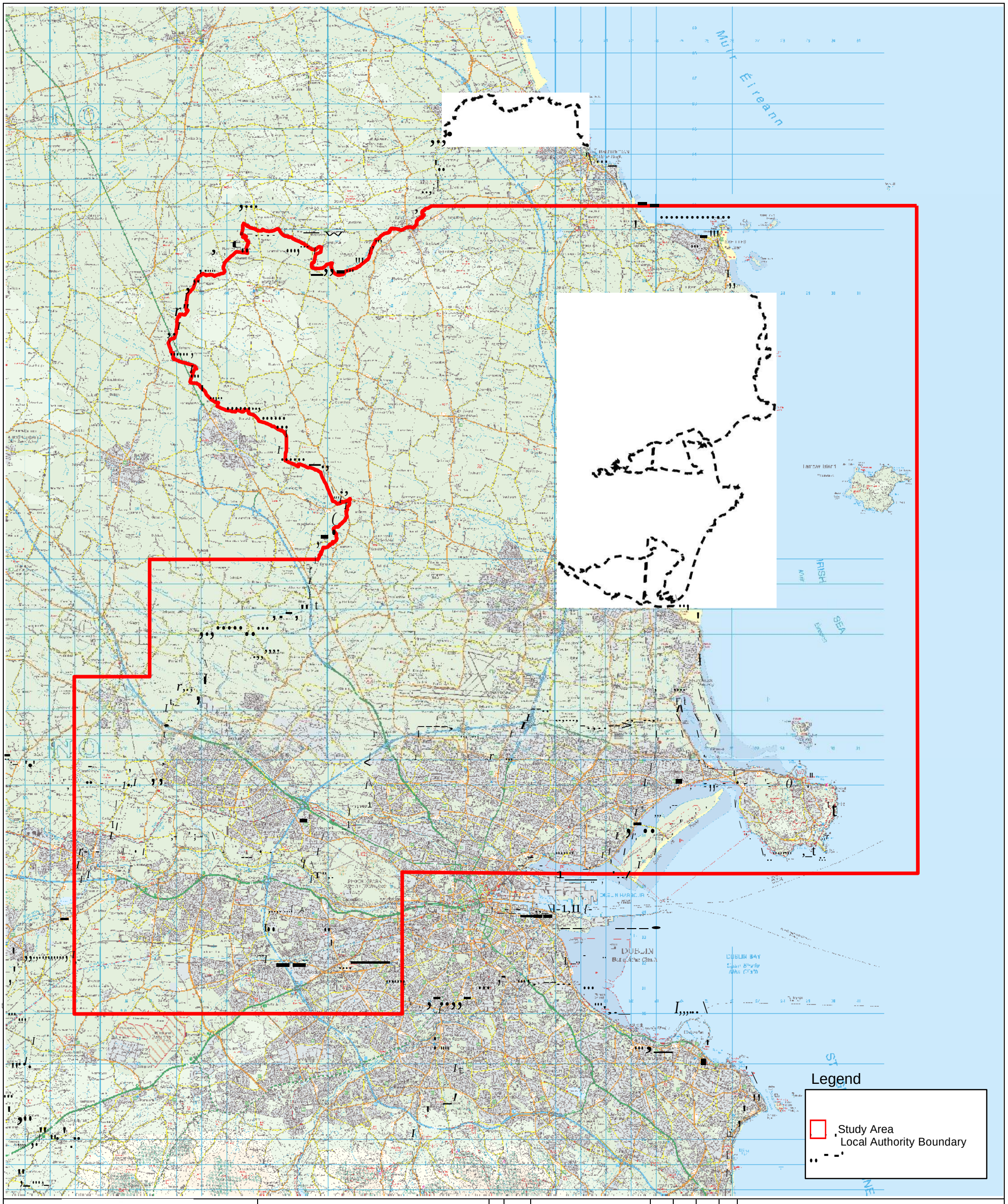
Note: Average Daily Loading to Malahide WwTP for 2015 (Jan - Nov) is reported by IW at 16,344 PE



Malahide WwTP - Load Transfers to Regional WwTP

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050
Treatment Capacity Malahide WwTP	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000	21,000
Growth Scenario 1 - Low									-3,259	-3,119	-2,977	-2,835	-2,691	-2,547	-2,401	-2,254	-2,123	-1,991	-1,858	-1,724	-1,589	-1,453	-1,316	-1,178	-1,039	-900	-767	-633	-499	-364	-228	-90	48	186	326
Growth Scenario 1 - High								-3,229	-3,048	-2,865	-2,680	-2,493	-2,304	-2,114	-1,921	-1,726	-1,565	-1,401	-1,237	-1,071	-903	-734	-564	-393	-219	-45	72	190	309	428	548	669	790	913	1,035
Growth Scenario 2 - Most Likely							-3,300	-3,107	-2,912	-2,715	-2,516	-2,315	-2,111	-1,905	-1,697	-1,486	-1,323	-1,157	-991	-822	-653	-482	-310	-136	39	216	388	561	736	912	1,089	1,268	1,449	1,631	1,814
							Sc.1	0%	-16%	-15%	-14%	-13%	-13%	-12%	-11%	-11%	-10%	-9%	-9%	-8%	-8%	-7% (10%-20% overcapacity is acceptable)														
							Sc.2	-15%	-15%	-14%	-13%	-12%	-11%	-10%	-9% (10%-20% overcapacity is acceptable)																							
								-15%	-14%	-13%	-12%	-11%	-10%	-9%	-8% (10%-20% overcapacity is acceptable)																						

Appendix B. Drawings



Greater Dublin Drainage

Drawing Title

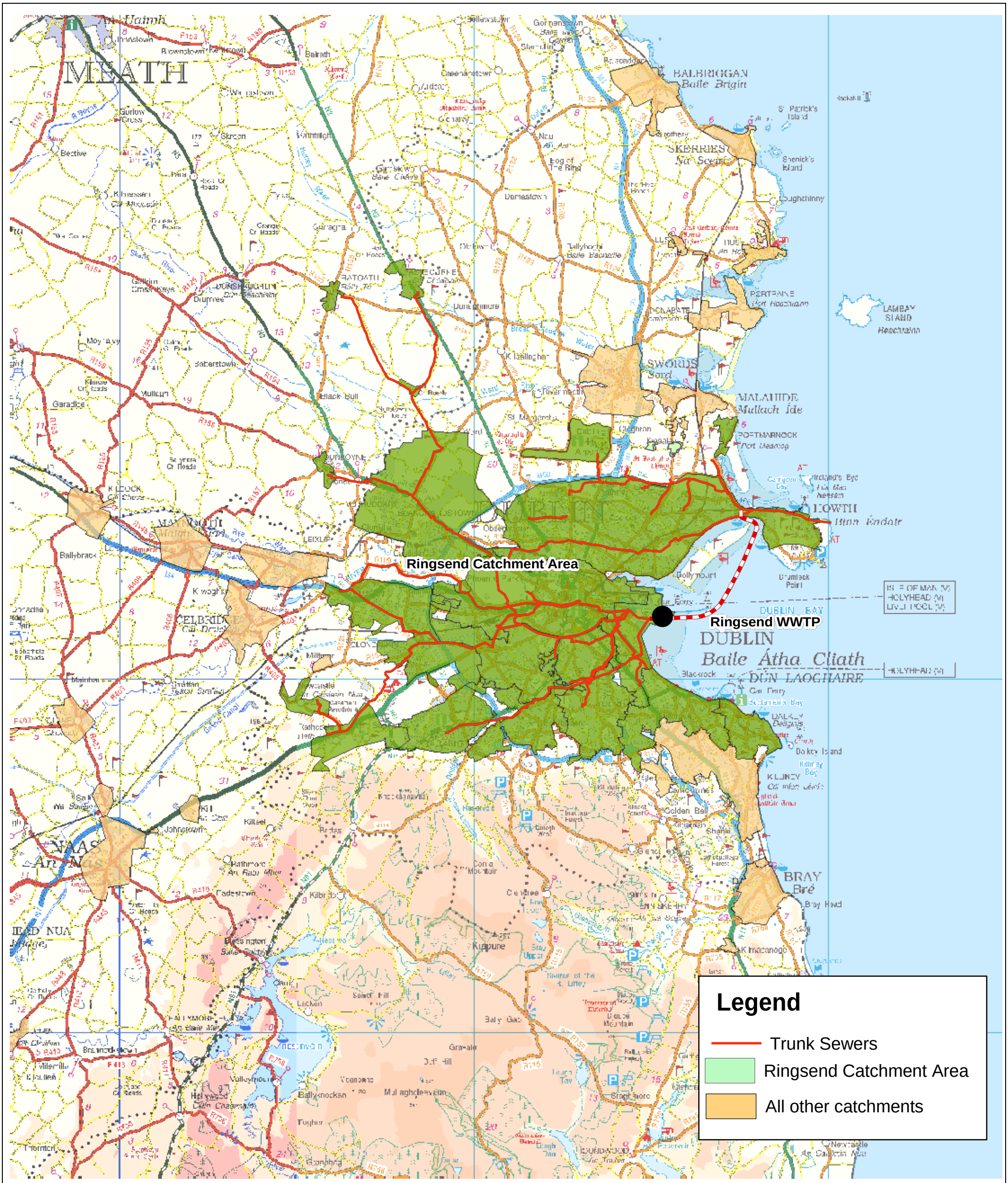
GREATER DUBLIN DRAINAGE
STUDY AREA

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
C	10/05/12	ISSUED	GF	OM	JB	COK
B	01/12/11	ISSUED	AG	ED	JB	COK
A	19/09/11	ISSUED	AG	ED	JB	COK

0 1 2 3 4 5
Kilometres

JACOBS TOBIN

Drawing Status ISSUED
Scale @ A3 1:140,000 DO NOT SCALE
Job No. 32102900
Drawing No. FIGURE 2.1



Greater Dublin Drainage

Drawing Title

RINGSEND CATCHMENT AREA

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	12/07/11	ISSUED	JenC	NC	JB	KO

0 0.95 1.9 2.85 3.8 4.75
Kilometres

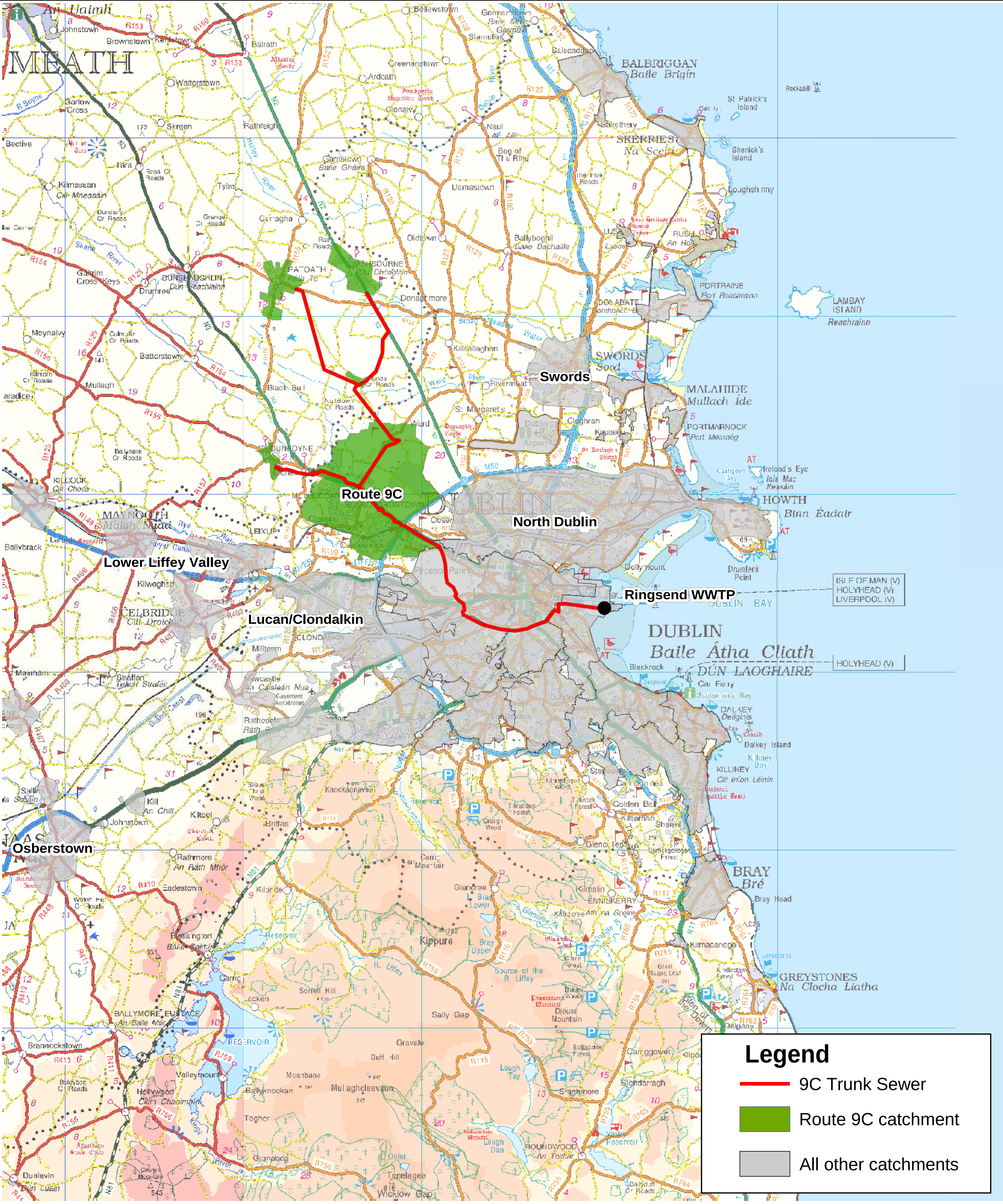
JACOBS TOBIN

Drawing Status: ISSUED

Scale @ A3: 1:200,000 — DO NOT SCALE

Job No.: 32102900

Drawing No.: FIGURE 2.2



Greater Dublin Drainage

Drawing Title

ROUTE 9C CATCHMENT

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	12/07/11	ISSUED	JenC	NC	JB	KO

0 0.95 1.9 2.85 3.8 4.75
Kilometres

JACOBS TOBIN

Drawing Status	ISSUED	
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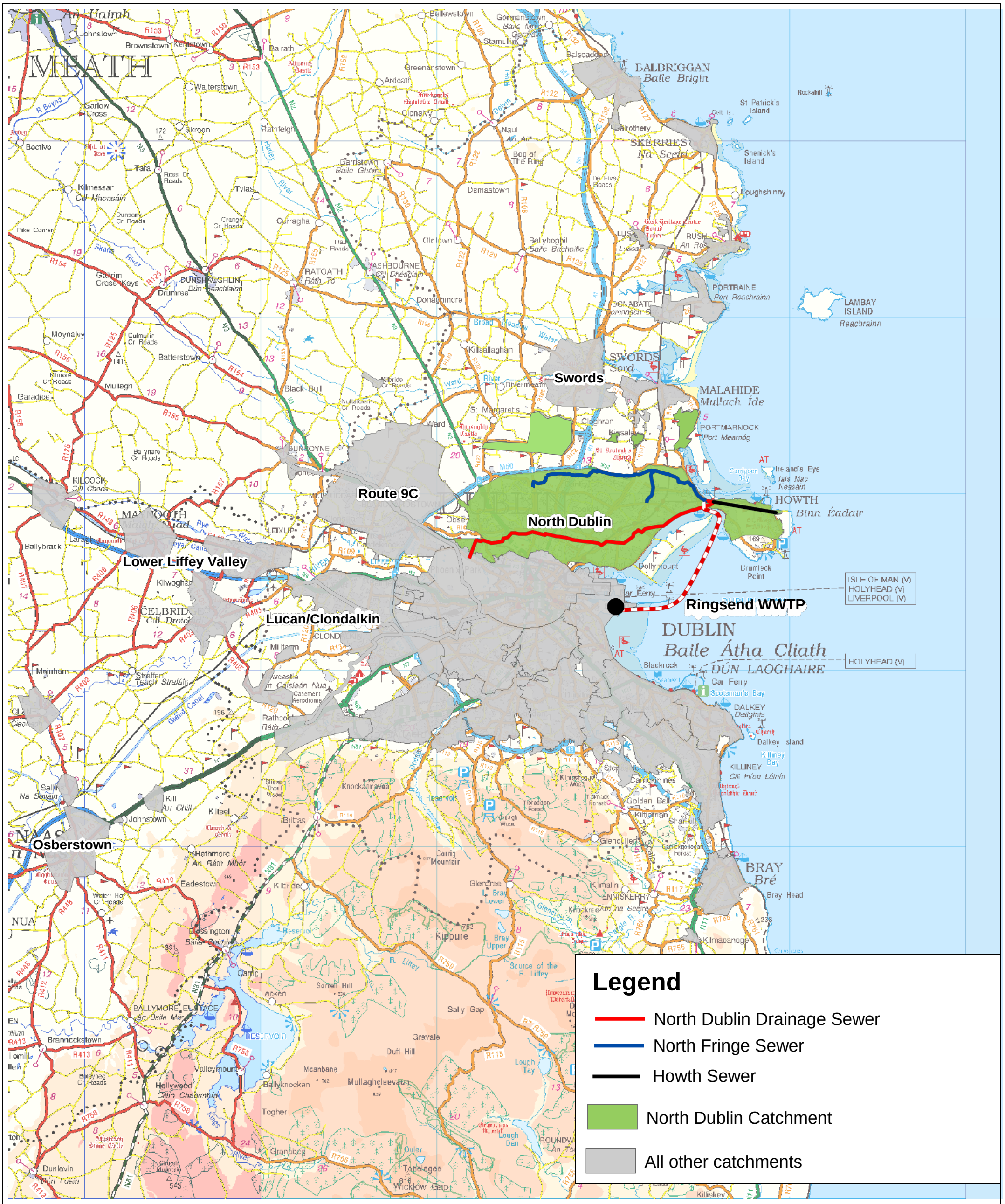
Job No.	32102900	
Drawing No.	FIGURE 2.3	



Greater Dublin Drainage

Drawing Title

NORTH DUBLIN SEWER CATCHMENT

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	12/07/11	ISSUED	JenC	NC	JB	KO

This drawing is not to be used in whole in or part other than for the intended purpose and project as defined on this drawing. Refer to the contract for full terms and conditions.

0 0.95 1.9 2.85 3.8 4.75
Kilometres

JACOBS TOBIN

Drawing Status	ISSUED
Scale @ A3	1:200,000 DO NOT SCALE
Job No.	32102900
Drawing No.	FIGURE 2.4

Swords

Route 9C

North Dublin

Lower Liffey Valley

Ringsend WWTP

Lucan/Clondalkin

Osberstown

Legend

- 9B Trunk Sewer
- Route 9B Catchment
- All other catchments

Greater Dublin Drainage

Drawing Title

ROUTE 9B CATCHMENT

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	12/07/11	ISSUED	JenC	NC	JB	KO

0 0.95 1.9 2.85 3.8 4.75
Kilometres

JACOBS TOBIN

Drawing Status: ISSUED

Scale @ A3: 1:200,000 — DO NOT SCALE

Job No.: 32102900

Drawing No.: FIGURE 2.5

Barnageeragh WWTP
Portrane WWTP
Swords WWTP
Malahide WWTP
Proposed GDD WWTP
Leixlip WWTP
Ringsend WWTP
Bray - Shanganagh WWTP
Osberstown WWTP

Legend

- Waste Water Treatment Plant (WWTP)

Barnageeragh
Bray-Shanganagh
Leixlip
Malahide
Osberstown
Portrane
Ringsend
Swords

Greater Dublin Drainage

Map Title:

KEY WASTEWATER TREATMENT STANDARDS

WASTEWATER TREATMENT SITES & CATCHMENTS

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
A	16/05/2018	Final	RG	SmG	PW	CoK

0 1 2 3 4 5 Kilometres

JACOBS TOBIN

File Path: Y:\GDD\Mxds\LoadAssessment\Figure2.6_WWTP_SitesandCatchments.mxd

Drawing Status: ISSUED

Scale @ A3 1:200,000

Job No. 32102902

Drawing No. Figure 2.6