



Greater Dublin Drainage

Alternative Sites Assessment and Route Selection Report (Phase 4): Final Preferred Site and Routes

June 2013



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Executive Summary

Fingal County Council on behalf of Meath, Kildare, Dun Laoghaire / Rathdown and South Dublin County Councils and Dublin City Council, has engaged consultants to complete the planning phase of the Greater Dublin Drainage project. The key objectives of the project are to safely deliver through the entire planning process a:

- Regional Wastewater Treatment Plant (WwTP) and associated marine outfall located at a site, to be selected as part of this process, in the northern part of the Greater Dublin Area (GDA), and
- an Orbital Drainage System linking the Regional WwTP to the existing regional sewer network and to provide for future connections for identified developing areas within the catchment.

This report details Phase 4 of the Alternative Sites Assessment (ASA) and Route Selection which constitutes the final identification of the preferred site option (i.e. WwTP site, associated marine outfall, orbital sewers and outfall pipeline).

The objectives of the ASA and Route Selection are to identify:

- The best location for the proposed Regional WwTP in North County Dublin;
- The best location for the treated wastewater discharge to the Irish Sea including the route of the outfall pipeline connection to the WwTP; and
- The best routes for the orbital sewers connecting existing drainage networks to the proposed Regional WwTP, including trunk/branch sewer connections, and any necessary pumping stations.

The ASA is a four phase qualitative process which has regard to the recommendations of the Strategic Environmental Assessment (SEA) on the Greater Dublin Strategic Drainage Study (GSDSDS).

ASA Phase 1 – Preliminary Screening

During Phase 1 of the ASA a preliminary screening of the study area was undertaken to identify a short list of potential alternative land parcels of suitable size to accommodate the proposed Regional WwTP and also to identify marine outfall locations and orbital sewers and outfall pipelines. On completion of Phase 1 nine land parcels with associated pipeline corridors and marine outfall locations were shortlisted to be brought forward to Phase 2 of the assessment, as follows:

- Annsbrook
- Baldurgan
- Clonshagh
- Cookstown
- Cloghran
- Newtowncorduff
- Rathartan
- Saucerstown
- Tyrrelstown Little

Full details of Phase 1 of the ASA is available in the [ASA Phase One – Preliminary Outcomes Report \(October 2011\)](#)

ASA Phase 2 – Emerging Preferred Site Options

In ASA Phase 2 each of the nine shortlisted land parcels and associated pipeline corridors and marine outfall locations (henceforth called land parcel options) identified in Phase 1 were taken through an

eight week period of public consultation during which a significant number of submissions were received. The key issues and concerns raised were considered by the environmental and technical specialists during the assessment process.

In parallel with the public consultation each of the land parcel options were assessed by environmental and technical specialists against a range of environmental and technical criteria.

These assessments were used to identify the differentiating sub-criteria used in the identification of the preferred 20 hectare (Ha) site within each of the land parcels and the refinement of the associated pipeline corridors and marine outfall locations (henceforth called site options).

The outcomes of each of the assessments were combined into an overall assessment matrix detailing all potential constraints associated with each of the site options.

Through an assessment of most and least favourable constraints in the matrix by the project consultants with input from the environmental and technical specialists in a workshop forum, the three site options of **Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff** emerged from the nine short listed site options as the emerging preferred site options to be taken forward for further assessment (Figure 1).

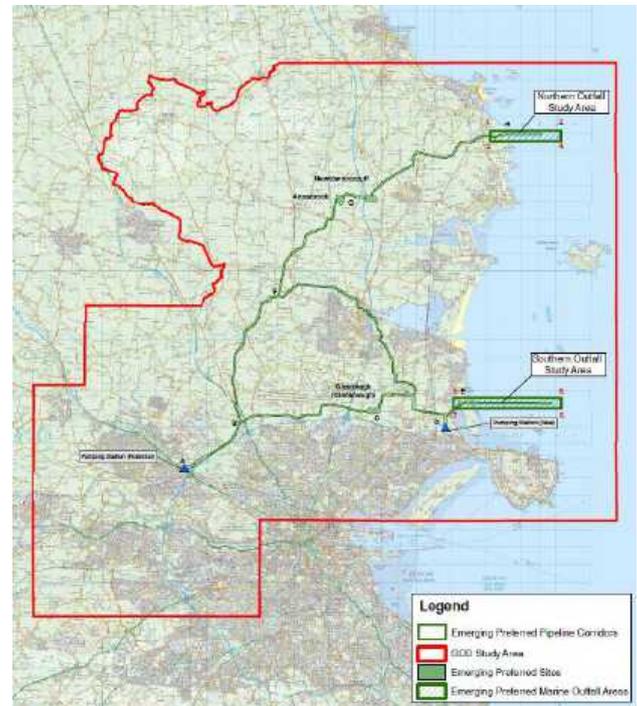


Figure 1.0 Emerging Preferred Site Options

Full details of ASA Phase 2 is available in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes (May 2012)*.

ASA Phase 3 – Public Consultation

Following completion of ASA Phase 2 and publication of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes (May 2012)*, the three emerging preferred site options were brought through Public Consultation held over an eight week period from 14th May 2012 to 6th July 2012. The primary objective of this phase was to gather any additional information on the three emerging preferred site options, (i.e. WwTP site, associated marine outfall, orbital sewers and outfall pipeline). Full details of this Phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes (October 2012)*.

Phase 4 – Final Preferred Site Option

In the ASA Phase 4 assessment each of the individual components (i.e. WwTP site, its associated marine outfall location, orbital sewers and outfall pipeline) of the three emerging preferred site options were assessed to determine the most and least favourable constraints in relation to the findings from ASA Phase 2, consideration of submissions received during ASA Phase 3 (Public Consultation) and the findings of further investigative studies undertaken during ASA Phase 4.

The further investigative studies for ASA Phase 4 were undertaken to supplement the data collected and assessed during the ASA Phase 2 and consisted of site visits and walkovers and pipeline corridor walkovers.

The further investigative studies were completed for the following aspects:

- Ecology (terrestrial, avian, freshwater and marine ecology surveys);
- Cultural Heritage (archaeological geophysical surveys);
- Landscape and Visual (Route Screening Analysis and development of photomontages);
- Soils and Geology (preliminary ground investigations);
- Hydrographic Surveys;
- Hydrodynamic Modelling;
- Planning Policy;
- Engineering Design;
- Traffic and Access; and
- Preliminary Cost Estimates.

The findings from the further investigative studies were evaluated to determine whether anything of such significance was identified which made the development of individual components and thus a site option unfeasible.

Nothing of such significance was identified, therefore all three emerging preferred site options were deemed suitable for further assessment.

The findings from the assessment of the individual components of each site option were then combined into an overall emerging preferred site option assessment matrix.

A comparative assessment was then undertaken that assigned a “more favourable” and “less favourable” classification to the identified constraints which allowed for the selection of the final preferred site option.

The ASA Phase 4 assessment has determined that it is technically feasible to construct all 3 site options. However, it was identified that all site options have, to varying degrees, ‘less favourable’ classifications under the aforementioned range of Environmental, Technical and Cost criteria considered.

In comparison to both the Annsbrook and Newtowncorduff site options, the Clonshagh site option (WwTP site, southern marine outfall and orbital sewers) was assessed as being ‘more favourable’ under a greater number of the Environmental and Technical criteria.

The Clonshagh site option was considered “more favourable” on account of:

- The Clonshagh site was identified as being of less ecological value when compared to the other two sites;
- The WwTP can be designed such that there is no impact on the archaeological remains identified at the edges of the Clonshagh site.

- The southern marine outfall is tunnelled under the Baldoyle Bay SAC/SPA and terminates within the Rockbill to Dalkey Island cSAC. The project will be designed, constructed and operated to ensure that it will not adversely affect the integrity of any Natura 2000 sites.
- The southern outfall exhibits better initial dilution and mixing characteristics for the effluent plume than the northern outfall;
- Tunnelling of the southern outfall poses less technical difficulty than tunnelling of the northern outfall; and
- The total length of pipeline for this site option is significantly shorter than the pipeline for the other two site options which provides for:
 - Less ecological impact
 - Fewer watercourse crossings
 - Lower number of crossings of key existing and proposed infrastructure
 - Less potential to disrupt the landscape structure during construction
 - Lower energy requirements

Under Cost criteria, preliminary cost estimates indicate that the Clonshagh site is over €80m less than the other two site options.

The Clonshagh site option is therefore considered to be the most environmentally, technically and economically advantageous option and is therefore recommended as the final preferred site option.

Next Steps

On completion of the EIA and AA processes a planning application for the project will be submitted to An Bord Pleanála.

Environmental Impact Statement

An Environmental Impact Assessment (EIA) will be carried out by the competent authority. The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997, Directive 2003/35/EC of 26 May 2003 and Directive 2009/31/EC of 23 April 2009, now codified in Directive 2011/92/EU of 13 December 2011, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given (See Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of the Environment, Community and Local Government, March 2013 which also refers to the applicable EU and Irish law provisions).

Appropriate Assessment

An Appropriate Assessment (AA) arises from the requirement under Articles 6(3) and 6(4) of Council Directive 92/43/EEC of 21 May 1992 (the 'Habitats Directive'). (See also Part XAB of the Planning and Development Act 2000 (as amended and substituted). The potential for development to have a likely significant effect either individually or in combination with other plans or projects on Natura 2000 sites

(i.e. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)) shall be considered as part of an Appropriate Assessment process which is required under the Habitats Directive.

Public Consultation

Public and stakeholder consultation will commence in June 2013 and issues raised during this consultation relevant to both the EIA and the AA will be separately considered and separately assessed within each respective process.

All reports relevant to the ASA and Route Selection process are available for download at the Greater Dublin Drainage website: <http://www.greaterdublindrainage.com/project-reports/>



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List of Acronyms

AA	Appropriate Assessment
ABP	An Bord Pleanála
ACDPs	Acoustic Doppler Current Profilers
ASA	Alternative Sites Assessment
ASP	Activated Sludge Plant
BAFF	Biological aerated flooded filter
BGL	Below Ground Level
BH	Borehole
BIM	Bord Iascaigh Mhara
BOD	Biochemical Oxygen Demand
CAPEX	Capital Expenditure
CH	Cultural Heritage
COD	Chemical Oxygen Demand
cSAC	Candidate Special Area of Conservation
DAA	Dublin Airport Authority
DCC	Dublin City Council
DLRCC	Dun Laoghaire Rathdown County Council
DoECLG	Department of the Environment, Community and Local Government
DRA	Dublin Regional Authority
EIS	Environmental Impact Statement
EIA	Environmental Impact Assessment
EPA	Environmental Protection Agency
ERBD	Eastern River Basin District
FCC	Fingal County Council
FEM FRAMS	Fingal East Meath Flood Risk Assessment and Management Study
FSAI	Food Safety Authority of Ireland
GDA	Greater Dublin Area
GDD	Greater Dublin Drainage
GDRDP	Greater Dublin Regional Drainage Project
GDSDS	Greater Dublin Strategic Drainage Study

GSI	Geological Survey of Ireland
HGV	Heavy Goods Vehicle
HISA	Health Impact Screening Assessment
IAA	Irish Aviation Authority
IFAS	Integrated Fixed film Activated Sludge
IFI	Inland Fisheries Ireland
KCC	Kildare County Council
LAP	Local Area Plan
LAT	Lowest Astronomical Tide
MBR	Membrane Bioreactor
MCC	Meath County Council
NDDS	North Dublin Drainage System
NFS	North Fringe Sewer
NIAH	National Inventory of Architectural Heritage
NPV	Net Present Value
NPWS	National Parks and Wildlife Service
NRA	National Roads Authority
OD	Ordnance Datum
OPEX	Operational Expenditure
OPW	Office of Public Works
PE	Population Equivalent
PR	Preliminary Report
RMP	Record of Monuments and Places
RPA	Rail Procurement Agency
RPG	Regional Planning Guidelines
RPS	Record of Protected Structures
RSA	Route Screening Analysis
SAC	Special Area of Conservation
SBR	Sequencing Batch Reactors
SDCC	South Dublin County Council
SEA	Strategic Environmental Assessment
SFPA	Sea Fisheries Protection Authority

SHC	Sludge Hub Centre
SPA	Special Protection Area
TSS	Total Suspended Solids
VP	Viewpoints
WFD	Water Framework Directive
WwTP	Wastewater Treatment Plant



1 Introduction

1.1 Introduction

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

1.2 Client

The Client is 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.

1.3 Project Engineering Consultant

Following a competitive tender process Jacobs Engineering Ireland Ltd. in association with TOBIN Consulting Engineers was appointed to act as Project Engineering Consultant on this project with formal signing of Contract on the 14th March 2011.

1.4 Project Communications Consultant

Following a competitive tender process RPS Project Communications was appointed by FCC to act as Project Communications Consultant on this project.

1.5 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).

1.6 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 Outfall Route Selection Report
- Sub-stage (c): Preliminary Report (PR)
- Sub-stage (d): Environmental Impact Statement (EIS)
- Sub-stage (e): Wayleave / Land Acquisition
- Sub-stage (f): Additional Reports
- Sub-stage (g): Planning Process

- Sub-stage (h): Any Other Work

1.7

Objectives of Overall Scheme

The core requirement of the Greater Dublin Drainage project is to safely deliver through the entire planning process a:

- Regional Wastewater Treatment Plant (WwTP) and associated marine outfall located at a site, to be selected as part of this process, in the northern part of the Greater Dublin Area (GDA), and
- an Orbital Drainage System linking the Regional WwTP to the existing regional sewer network and to provide for future connections for identified developing areas within the catchment.

1.8

Commencement Date

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

2 Outline of ASA Process

2.1 Introduction

A key recommendation of the GSDSDS Final Strategy as amended by its SEA is for a single regional wastewater treatment plant (WwTP) to be located in North County Dublin with the treated effluent to be discharged to the marine environment of the Irish Sea.

A key recommendation of the SEA of the GSDSDS is that a comprehensive Alternative Sites Assessment (ASA) study be undertaken, with the overall objective of selecting a preferred site for the proposed Regional WwTP, a preferred location for the marine outfall and preferred routes for the associated orbital pipelines.

The selection of the optimum location for the proposed Regional WwTP, orbital sewer and outfall pipeline corridor and marine outfall has entailed an assessment of the means to minimise potential adverse environmental impacts and to optimise environmental benefits.

2.2 ASA Process

The ASA/Route Selection was undertaken having regard to the recommendations set out in the SEA on the GSDSDS, which envisaged a process comprising four distinct phases, as outlined hereunder:

Phase 1 - Alternative Sites Identification (Preliminary Screening)

This phase involved the identification of a number of land parcels of suitable size within which the proposed Regional WwTP could be located, corridors for routing of the orbital sewer and outfall pipeline and potential marine outfall locations. The Phase 1 - Alternative Sites Identification included Public Consultation, desktop studies, mapping of constraints and a screening of the study area. Full details of this phase are provided in the *ASA Phase One – Preliminary Screening Outcomes Report* which was published in October 2011. This report recommended that nine land parcels, associated potential orbital sewer and outfall pipeline corridors and marine outfall study areas be brought forward for further consideration against a range of technical and environmental criteria under Phase 2 of the ASA.

Phase 2 - Alternative Sites Assessment

Phase 2 of the ASA process consisted of an assessment of the performance of each of the nine alternative land parcels, transfer pipeline routes and marine outfalls shortlisted in Phase 1 against a range of environmental and technical criteria leading to the identification of three emerging preferred sites for the proposed Regional WwTP and associated orbital sewer and outfall pipeline corridor and marine outfall location. The Alternative Sites Assessment (ASA) – Phase 2 included Public Consultation on the nine short listed land parcels, orbital sewer and outfall pipeline corridors and marine outfall study areas, desk-top studies, windshield surveys, site visits and impact

assessments by the project consultants including various engineering and environmental specialists. It also included consideration of issues and concerns identified during the consultation period.

Full details of this phase are provided in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes* which was published in May 2012. This report recommended that the three emerging preferred site options be brought forward for further consideration under Phase 3 and Phase 4 of the ASA process.

Phase 3: - Consultation stage

Following completion of Phase 2 and publication of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, the three emerging preferred site options were brought through Public Consultation held over an eight week period from 14th May 2012 to 6th July 2012. The primary objective of this phase was to gather any additional information on the three emerging preferred site options, (i.e. proposed Regional WwTP site, orbital sewer and outfall pipeline corridor and associated marine outfall location). Full details of this Phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

The Project Team's response to the issues raised was presented in the *Alternative Sites Assessment and Route Selection (Phase 3): Consultation Response Report*, which was published in June 2013 and is included as Appendix 4 of this ASA Phase 4 Report.

Phase 4: - Selection of the Preferred Site, Pipeline Routes and Outfall Location

Phase 4 is the basis of this Alternative Sites Assessment and Route Selection Report (Phase 4). It constitutes the final identification of the preferred site option (i.e. proposed Regional WwTP site, orbital sewer and outfall pipeline corridor and associated marine outfall location), and consisted of the following steps:

- Step 1* Review of the assessment findings from the ASA Phase 2 process which is reported in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, May 2012.

- Step 2* Consideration of the submissions received during ASA Phase 3 (Public Consultation) of the ASA process which was held over an eight week period from 14th May 2012 to 6th July 2012. Full details of this phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

- Step 3* Undertake further investigative studies to supplement the data collected and assessed during the ASA Phase 2 and which were also informed by consideration of submissions received.

- Step 4** Assessment of the findings of the further investigative studies to determine whether anything of such significance was identified which made the development of any of the three emerging preferred site options unfeasible.
- Step 5** Assessment of the individual components of the site options (WwTP site, marine outfall locations and associated orbital sewers and outfall pipelines) against the findings of **Step 1 to Step 3** above. Identification of constraints for the individual components and the identification of potential mitigation measures where the ASA Phase 4 assessment indicated that it was not possible to avoid impacts.
- Step 6** Preparation of preliminary cost estimates
- Step 7** Combine the assessment of the individual components from **Steps 5 and 6** into one overall emerging preferred site option assessment matrix. Through a comparative assessment assign 'more' and 'less' favourable classifications to the identified constraints.
- Step 8** Selection of final preferred site option based on the relative performance of each of the site options against the Environmental, Technical and Cost criteria considered.

2.3 Objectives of ASA Stage and ASA Phase 4 Report

The objectives of the Alternative Sites Assessment (ASA), Pipeline & Marine Outfall Route Selection sub-stage are to identify the following:

- The optimum location for the proposed Regional WwTP in North County Dublin (Fingal);
- The optimum location for the treated effluent discharge to the Irish Sea including the route of the outfall pipeline connection to the WwTP; and
- The optimum routes of the Orbital Drainage System connecting existing drainage networks to the proposed Regional WwTP, including trunk/branch sewer connections, and any necessary pumping stations.

The purpose of this Phase 4 – Alternative Sites Assessment and Route Selection is to assess the three emerging preferred site options identified in the [Alternative Sites Assessment and Route Selection Report \(Phase 2\): Emerging Preferred Sites and Routes](#). This process will result in a recommendation on the final preferred site option based on consideration of the submissions received during the consultation period and assessment of the findings of additional investigations and studies undertaken on the three emerging preferred site options identified in Phase 2.

2.4 Terminology and Descriptions

In order to ensure clarity on the terminology used in this report, the following definitions are provided:

- *Site* – An approximately 20Ha area of land on which the proposed Regional WwTP could be located.
- *Orbital Pipeline Corridors* – Corridors within which the pipelines from the load centres to the proposed Regional WwTP and from the proposed Regional WwTP to the North Dublin coast can be routed.
- *Orbital Pipeline Routes* – Routes of the pipelines, within the orbital pipeline corridors, from the load centres to the proposed Regional WwTP and from the proposed Regional WwTP to the North Dublin coast.
- *Marine Outfall Location* – The specific location within the marine environment where the treated effluent will discharge from the pipeline.
- *Marine Outfall Pipeline* – Pipeline from the North Dublin coast which will transfer the treated effluent to the marine outfall location.

The wastewater treatment sites cannot be considered in isolation from the orbital drainage network or the marine outfall locations, therefore the following terminology is used throughout this report with descriptions as provided:

- *Site Option* - A site of approximately 20ha on which the proposed Regional WwTP could be located, its associated marine outfall location, orbital sewer pipeline corridors from the load centres to the WwTP, and outfall pipeline corridors from the WwTP to the marine outfall location.

2.5 Outline of Report

Chapter 2 of this report provides an overview of the Alternative Sites Assessment (ASA) and Route Selection process.

Chapter 3 of this report provides information on the need for additional and alternative wastewater treatment within the Greater Dublin Area.

Chapter 4 of this report provides outline details of the proposed scheme. It includes details on the assessment of projected loadings on the proposed Regional WwTP, proposed key effluent design standards, summary information on the range of suitable wastewater treatment technologies currently being assessed for the proposed Regional WwTP, details of the orbital pipelines and marine outfall.

Chapter 5 provides an outline of the methodologies used throughout the ASA process from Phase 1 with the identification of nine short listed land parcel options, through Phase 2 and the identification of three emerging preferred site options and Phase 3, the consultation phase, with respect to the three emerging preferred site options and

finally this current Phase 4 the recommendation and selection of the final preferred site option. Full details of both the methodology used and the outcomes of Phase 1 are provided in the *ASA Phase One – Preliminary Screening Outcomes Report*. In addition, full details of the methodology used in Phases 2 to 4 are provided in the *ASA Methodology Report* which is provided as Appendix 3 of this report.

Chapter 6 provides a summary description of the three emerging preferred site options following completion of ASA Phase 2 and as reported in the *Alternative Sites Assessment and Route Selection Report (Phase 2):– Emerging Preferred Sites and Routes*. An indicative layout for the proposed Regional WwTP is provided for each emerging preferred site.

Chapter 7 includes outline details of the consultations undertaken with statutory bodies and interested parties to date, which helped inform the ASA. In addition, reference is made to the public consultation periods held following publication of the *ASA Phase One – Preliminary Screening Outcomes Report*, and the *Alternative Sites Assessment and Route Selection Report (Phase 2): - Emerging Preferred Sites and Routes* and the issues raised during these consultations. Further details of which are provided in the *Consultation Response Report* attached as Appendix 4 to this report

Chapter 8 provides a summary of the ASA Phase 4 assessment of the three emerging preferred site options identified in ASA Phase 2, including details of the additional investigative studies undertaken during ASA Phase 4. For full details of each of the assessments reference should be made to the individual specialist reports included as Appendices to this report

Chapter 9 provides details of the process by which the final preferred site option was identified, following the methodology outlined in Chapter 5 and detailed in full in Appendix 3 of this report.

Finally *Chapter 10* provides a conclusion and recommendations arising from the ASA process as well as an outline of the next steps required to progress the project to submittal of a planning application to An Bord Pleanála (ABP).

3 Need for the Scheme

The need for additional and alternative wastewater treatment within the Greater Dublin Area (GDA) has been identified in a number of planning documents published by various bodies including the Local Authorities within the area. However, it was considered prudent, in light of significant changes to the economic landscape within the region in recent years, to review the data used to determine the extent of treatment capacity required for the region in the future. The need for additional capacity within the region will still be necessary in the relatively near future and as such the objectives and recommendations within such documents still hold true and are outlined below. Details of the treatment capacity review are included in Chapter 4 of this report.

The *Greater Dublin Strategic Drainage Study (GDSDS) (Dublin Drainage Consortium)* was commissioned as a result of the broadening gap between developing effluent load in the GDA and the maximum load, which can be delivered to, and treated at, the existing treatment plants in the catchment, and primarily at Ringsend WwTP. In order to address this, the GDSDS Final Strategy Report, 2005 recommended the construction of a large WwTP (850,000 pe) in North County Dublin discharging to the Irish Sea and an Orbital Drainage Network to divert either in full or in part some existing foul drainage catchments to this new WwTP.

The subsequent *Strategic Environmental Assessment (SEA) of the GDSDS (Mott MacDonald Pettit Limited in association with ERM Limited; 2008)* endorsed the fundamental concept and scale, but cautioned that site selection needed to take place in a process of rigorous appraisal of alternatives.

The *Forfás Report: Assessment of Water and Waste Water Services for Enterprise*, September 2008, identifies the need for priority investment in future wastewater provision in the key development centres to ensure these locations (and therefore Ireland as a whole) has the capability to meet the future water and waste water capacity needs to ensure future enterprise development. The GDA is identified as one of the key development centres.

The *draft Dublin Region Water Services Strategic Plan 2009* recognises 'that there is a need for a new Wastewater Treatment Plant (WwTP) and outfall to serve the expanding environs of the Dublin Metropolitan area.' It further states that 'The provision of this new treatment facility, outfall and associated collector network will be essential if new development is to be facilitated in the Dublin Region'.

The *Water Services Investment Programme 2010 – 2012 (Department of the Environment Community & Local Government)* identifies the need 'for investment in wastewater infrastructure over the coming years' both to facilitate growth and 'to ensure compliance with the Water Framework Directive'. The programme specifically identified the GDRDP (now GDD): North Dublin Treatment Plant within the list of schemes currently at planning stages

The *Regional Planning Guidelines for the Greater Dublin Area 2010– 2022 (Regional Planning Guidelines Office; 2010)*, clearly highlight that provision of adequate wastewater treatment capacity is becoming a critical issue within the GDA. The Guidelines identify strategic recommendation PIR17 as the *'Identification and development of a suitable site for the Greater Dublin Regional Drainage Project- Regional Waste Water Treatment Plant, Marine Outfall and Orbital Drainage System.....'* Further strategic policy and recommendations reinforcing this recommendation are also included within the guidelines.

The current *Development Plans* for the relevant local authorities (Fingal, Dublin City, South Dublin, Dun Laoghaire Rathdown, Kildare and Meath) all reference the GDSDS. Furthermore, they all identify the need for appropriate and sufficient capacity in the public wastewater treatment plants to facilitate development.

Specifically, the *Fingal Development Plan* identifies development objectives (WT03) to *'facilitate the implementation of the Greater Dublin Regional Drainage Project'* and (WT11) to *'provide for the schemes listed in Table WT01 – Foul Drainage and Wastewater Schemes', which includes for the Greater Dublin Regional Drainage Project. The Dublin City Development Plan* identifies a policy objective *'to support the development of the Greater Dublin Regional Wastewater Treatment Plant, Marine Outfall and Orbital Sewer to be located in the northern part of the Greater Dublin Area to serve the Dublin Region as part of the Greater Dublin Strategic Drainage Strategy'*.

4 Outline Project Description

4.1 Introduction

A key recommendation of the GDSDS Final Strategy as amended by its SEA was for a single regional wastewater treatment plant (WwTP) to be located in North County Dublin with the treated effluent to be discharged to the marine environment of the Irish Sea off the North Dublin coastline.

The GDSDS and its SEA also made recommendations on the existing foul drainage catchments in the north, west and north-west of the Greater Dublin Area (GDA) that should be diverted, either in full or in part, to the proposed Regional WwTP.

This chapter provides an outline description of the drainage infrastructure required to deliver on the recommendations of the GDSDS and its SEA as identified in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes; May 2012*.

4.2 Definition of Study Area

The study area has been determined with reference to the key recommendations of the GDSDS as amended by its SEA.

These recommendations informed the initial selection of the study area, which included North County Dublin, the foul drainage catchments of Blanchardstown, the north city area (Finglas to Howth), the Lucan/Clondalkin foul drainage catchment in South County Dublin, the drainage catchment of Leixlip WwTP, and the County Meath towns of Ashbourne, Ratoath, Kilbride, Dunboyne, and Clonee.

The Study Area was then refined to omit the area north of Balbriggan following consideration of the topography in this area of north County Dublin, the location and extent of the Balbriggan/Skerries Shellfish Waters and the constraints imposed by locating a new marine outfall within these designated waters.

The study area is shown in **Drawing Nr 1** included in Appendix 13.

4.3 Assessment of Project Load on proposed Regional WwTP

The treatment capacity needs for the GDA identified in the GDSDS were predicated on population projections based on the 2002 Census, with industry and commercial wastewater data built up from considerations of sub-catchment planning potential. However in the intervening time since publication in March 2003 of the *GDSDS Population & Landuse Report*, there was a period of strong economic growth up to 2008 and significant inward migration post 2004 following the expansion of the EU but in more recent years a shrinking of the national economy with associated reductions in industry and commercial loads together with outward migration.

It was therefore deemed prudent to undertake a review of the load projections by the GDD to identify the treatment capacity required to facilitate continued growth within the GDA.

In particular, the release of results from Census 2011 and the December 2010 update of the Regional Planning Guidelines (RPG) for the GDA, presented an ideal opportunity to confirm existing population and non-domestic loads on the various wastewater treatment plants in the GDA. It also permitted a re-examination of the population and non-domestic growth rates in the GDA, up to and beyond the redefined design year horizon of 2040 for the Greater Dublin Drainage project, with particular emphasis on the catchment contributing to Ringsend WwTP. It should be noted that the GSDS originally identified a design year horizon of 2031 for the proposed Regional WwTP; however the design year horizon has been redefined as 2040 based on the current proposals for the GDD project.

The determination of the required treatment capacity for the proposed Regional WwTP is closely linked to the capacity of the existing plant at Ringsend (currently operating on a regional basis) and the requirement to divert load away from this plant when the ceiling on treatment capacity is reached at Ringsend. Therefore, the required treatment capacity at the proposed Regional WwTP has been determined in the context of the firm treatment capacity of 2.1 million PE to be provided at Ringsend WwTP.

4.3.1 Existing Loadings on Ringsend WwTP

Loading on a wastewater treatment plant arises from residential, commercial, institutional and industrial sources. Census figures are the primary source for residential load estimation. The contributing catchment to Ringsend WwTP is shown in **Drawing Nr 2** in Appendix 13. The 2011 population in the Ringsend catchment is estimated at 1,098,470 persons.

The load contribution from commercial and institutional sources is difficult to accurately assess due to the lack of legislation in place to provide complete monitoring and licensing of this sector. 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 2011 has been estimated at 420,660 PE

The accuracy of industrial loadings is thought to be very good since these users generally discharge to the public sewer under licence and their effluent quality is monitored, with the largest users metered. The measured industrial load on Ringsend WwTP is equivalent to 220,870 PE.

The loadings on the Ringsend WwTP over the period 2008 - 2011 have been stable at approximately 1.8 million PE as shown in **Table 4.1** below.

Year	Load (millions)
2008	1.79 PE
2009	1.74 PE
2010	1.81 PE
2011	1.74 PE

Table 4.1 Measured Loads to Ringsend WwTP

(Source: Ringsend Wastewater Treatment Works Extension Environmental Impact Statement; March 2012)

4.3.2 Total PE Projections for the Ringsend WwTP

The projected population equivalent loadings for the Ringsend WwTP Catchment under the three growth scenarios examined are summarised in **Table 4.2** and illustrated in **Figure 4.1** below. The maximum operational treatment capacity at Ringsend WwTP of 2.1 million PE average daily load is also shown. The detailed analysis of projected loadings on Ringsend WwTP under all three growth scenarios is included in Appendix 2

Growth Scenario	Base Year	Design Year			Future Consideration
	2011	2020	2031	2040	2050
Scenario 1.	1,740,000	2,042,106	2,435,585	2,760,535	3,167,592
Scenario 2.	1,740,000	1,962,919	2,229,093	2,470,706	2,770,001
Scenario 3.	1,740,000	1,911,635	2,076,987	2,225,523	2,405,967

Table 4.2 Summary of Projected PE Loadings – Ringsend WwTP Catchment

Under Growth Scenario 1 the maximum treatment capacity of 2.1 million PE is exceeded from year 2022. Under Growth Scenario 2 the maximum treatment capacity of 2.1 million PE is exceeded from year 2026. Under Growth Scenario 3 the maximum treatment capacity of 2.1 million PE is exceeded from year 2033.

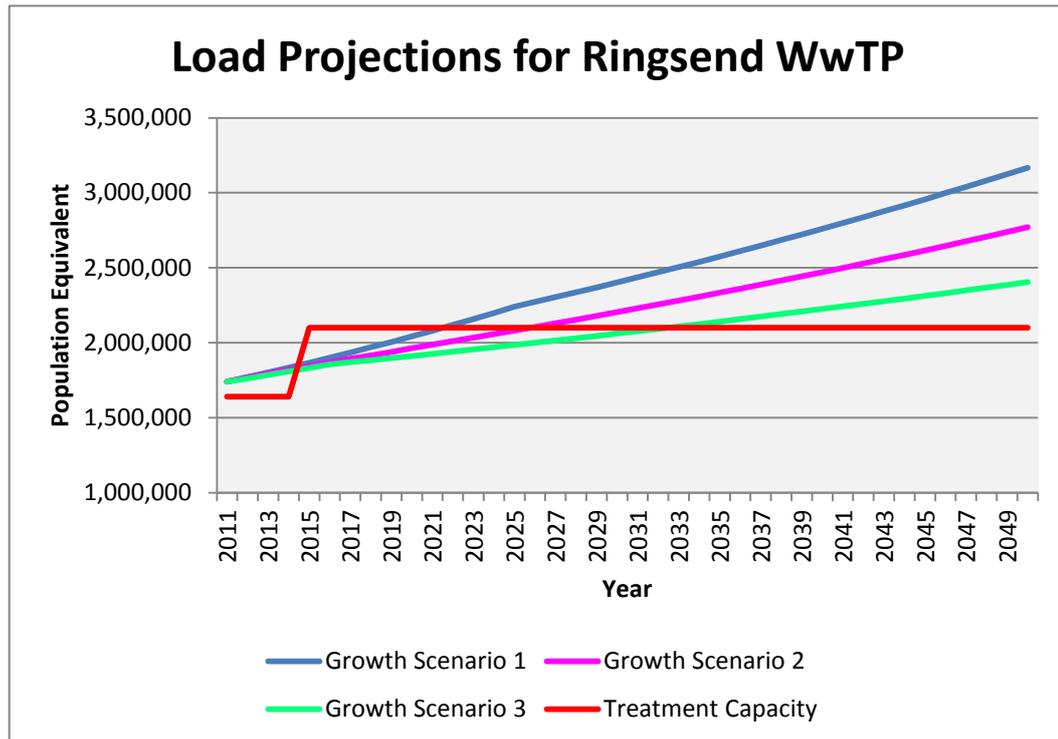


Fig. 4.1 Loading Projections for Ringsend WwTP.

4.3.3 Catchments

The GDSDS and its SEA identified the critical drainage catchments in the GDA, which have an influence on the required treatment capacities of both the upgraded Ringsend WwTP and the proposed Regional WwTP, as those which are located in the north, west and north-west of the existing catchment of Ringsend WwTP. These catchments are indicated in **Drawing Nr 3** included in Appendix 13 and comprise;

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

Additional catchments in the GDA, which may also influence future required treatment capacity of the proposed Regional WwTP, through diversion of flows and load in excess of ultimate treatment capability of the individual wastewater treatment plants in these catchments are indicated in **Drawing Nr 4** in Appendix 13 and comprise:

- 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);
- Swords WwTP Catchment; and
- Malahide WwTP Catchment.

4.3.4 Projected Loadings on the Proposed Regional WwTP

Analysis of the projected loadings to Ringsend WwTP discussed above demonstrates that it will be necessary under all three Growth Scenarios to divert some of the loadings from the Ringsend catchment to the proposed Regional WwTP in order to maintain the loading on Ringsend WwTP below its firm treatment capacity of 2.1 million PE.

In developing the load transfer to the proposed Regional WwTP for planning purposes it is recommended that Growth Scenario Two, which combines median residential population growth rates with the median commercial load projection and median to low industrial load projections, be used.

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:

- Route 9C Catchment upstream of the M50 at 2020
- North Fringe Sewer (NFS) Catchment at 2020
- North Dublin Drainage Scheme (NDDS) Catchment at 2035

The required load diversions from the Ringsend Catchment would be satisfied at all stages up to 2040 (the design year horizon) by diverting the wastewater load generated in each of the above catchments. These catchments are the 'primary' load centres for the proposed Regional WwTP.

Post 2045 it may be necessary, depending on actual growth realised, to divert additional wastewater loads from the Ringsend Catchment and this requirement could be satisfied by diverting wastewater load generated in the Route 9B (Lucan/Clondalkin) Catchment of South Dublin to the proposed Regional WwTP.

When the installed or planned treatment capacity at their respective wastewater treatment plants is exceeded diversions would also be required from:

- Lower Liffey Valley (Leixlip WwTP) Catchment in Kildare in 2020;
- Upper Liffey Valley (Osberstown WwTP) Catchment in Kildare post 2035;
- Malahide Catchment in Fingal post 2035; and
- Swords Catchment in Fingal post 2045.

The above catchments, including the Route 9B (Lucan/ Clondalkin) Catchment of South Dublin are considered as ‘secondary’ load centres for the proposed Regional WwTP.

The required treatment capacity of the proposed Regional WwTP is therefore estimated at approximately 334,000 PE at 2020 rising to approximately 720,000 PE at 2040 as indicated in **Table 4.3**.

Year	Sub - Catchment	Load Diverted (PE)	Cumulative Load (PE) on proposed Regional WwTP
2020	Route 9C Sewer	166,700	334,000
	North Fringe Sewer	132,300	
	Leixlip WwTP	35,000	
2035	NDDS Sewer	262,100	670,000
	Osberstown WwTP	2,000	
	Malahide	1,500	
2040	-	-	720,000

Table 4.3 Potential Load Diversions to proposed Regional WwTP

4.4 Key Effluent Design Standards

A key recommendation of the GDSDS Final Strategy as amended by its SEA is for a single regional wastewater treatment plant (WwTP) to be located in North County Dublin with the treated effluent to be discharged to the marine environment of the Irish Sea

The Urban Wastewater Treatment Regulations 2001 to 2010, require that an effluent discharging to the Irish Sea off the North Dublin coast from the proposed Regional WwTP be treated in a treatment plant which provides for secondary treatment

There is no legislative requirement for the provision of nutrient (nitrogen and phosphorous) reduction in addition to secondary treatment for the treated effluent. Therefore, the provision of nutrient reduction in addition to secondary treatment is not considered necessary for the proposed Regional WwTP at this time.

Therefore it is proposed, subject to the findings of the 3-dimensional hydrodynamic modelling studies, that the final effluent produced at the proposed Regional WwTP should conform to the standards outlined in **Table 4.4**.

Parameter		Emission Limit
pH		6 - 9
Toxicity		5 TU
Temperature		25°C (max)
BOD ₅	95 th Percentile	25 mg/l O ₂
	Not to be exceeded	50 mg/l O ₂
COD	95 th Percentile	125 mg/l O ₂
	Not to be exceeded	250 mg/l O ₂
TSS	95 th Percentile	35 mg/l
	Not to be exceeded	87.5 mg/l

Table 4.4 Final Effluent Emission Limits for proposed Regional WwTP

4.5 Area of Land Required for Proposed Regional WwTP

In order to contain all the necessary unit processes for a treatment plant of the required treatment capacity, it was determined from a study of similar sized plants in the UK, Europe and USA that a site of approximately 20 hectares (Ha) would be required to accommodate the proposed Regional WwTP. A site of this size ensures:

- flexibility in the final selection of the treatment process to be utilised;
- integration of Fingal County Council's proposed Sludge Hub Centre (SHC) with the proposed Regional WwTP;
- sufficient space to adequately construct and screen the site; and
- flexibility regarding purchase of the required land.

4.6 Waste Water Treatment Plant Technologies

Various treatment processes are currently available which would satisfy the proposed final effluent emission limits for the proposed Regional WwTP as set out in Section 4.4 above.

In accordance with current Government policy, it is likely that the project will be procured as a Design/Build/Operate (DBO) contract. Detail design will be undertaken by the DBO Contractor. The waste water treatment process proposed by the tendering contractors will be required to comply fully with specified Performance Requirements (e.g. effluent discharge standards) including such Development Consent Approval as may be granted by An Bord Pleanála (ABP).

An Environmental Impact Statement (EIS) is required for this project. In developing the EIS 'worst case' impact under each section of the EIS must be considered and

addressed. Therefore, a range of potentially suitable treatment technologies must be examined to determine the 'worst case' impact in each case for appropriate consideration in the EIS.

Assessment is currently ongoing into the range of suitable processes for the proposed plant which include the following secondary treatment processes:

- Conventional Activated Sludge Plant (ASP)
- ASP in Sequencing Batch Reactors (SBR)
- Submerged Attached Growth Processes (e.g. BAFF)
- Integrated fixed film activated sludge processes (e.g. IFAS)
- Membrane bioreactors (MBR)

In construction of a new WwTP, key opportunities exist for installation of a compact, energy efficient process which overcomes existing issues experienced at other WwTP and takes into account future considerations of population growth, regulatory and sustainability requirements.

Key considerations associated with the identification of the optimum technologies include the following:

- Efficient footprint
- Odour considerations
- Proven processes
- Process staging
- Required scale
- Future proofing
- Sludge impacts and options
- Carbon footprint and greenhouse gas reduction
- Climate Change

Each of the processes will be compared according to their relative advantages and disadvantages, including reference to the above, and whole life costs.

In order to provide a visual reference for the proposed Regional WwTP, an indicative site layout has been generated based on a Conventional Activated Sludge Plant (ASP), which would be expected to require the largest footprint and is shown on **Drawing Nr 5** included in Appendix 13.

4.7 Sludge Hub Centre

ASA Phase 2 report identified the possibility of co-locating Fingal County Council's proposed Sludge Hub Centre (SHC) on the site of the proposed Regional WwTP subject to review of the 2002 Sludge Management Plan for Fingal County Council.

The review of Fingal's Sludge Management Plan has since been completed. This review has recommended that Fingal develop a single Sludge Hub Centre to treat all wastewater sludges arising in Fingal and that this SHC should be co-located with the proposed Regional WwTP. Full details of this review are available in the draft report entitled '*Review of Sludge Management Plan for Fingal County Council; March 2013.*'

The proposed Fingal SHC will accept sludges from other WwTPs within the administrative area of Fingal. In addition, the plant will be required to accept sludge from private property owners within the administrative area of Fingal who are currently served by septic tank. It is estimated that sludge imports to the proposed Regional WwTP from Fingal would only increase the total sludge arisings at the plant by approximately 20-25%.

The ASA process has accounted for, where relevant, impacts associated with the proposed SHC.

4.8 Emerging Preferred Site Options

On completion of the ASA Phase 2 process, as reported in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes; May 2012*, three preferred site options emerged to be taken forward for further consideration under Phase 3 and Phase 4 of the ASA process.

The three emerging preferred site options, indicated on **Figure 4.2** below and **Drawing Nr 6** included in Appendix 13, are:

- Annsbrook Site Option
- Clonshagh (Clonshaugh) Site Option
- Newtowncorduff Site Option

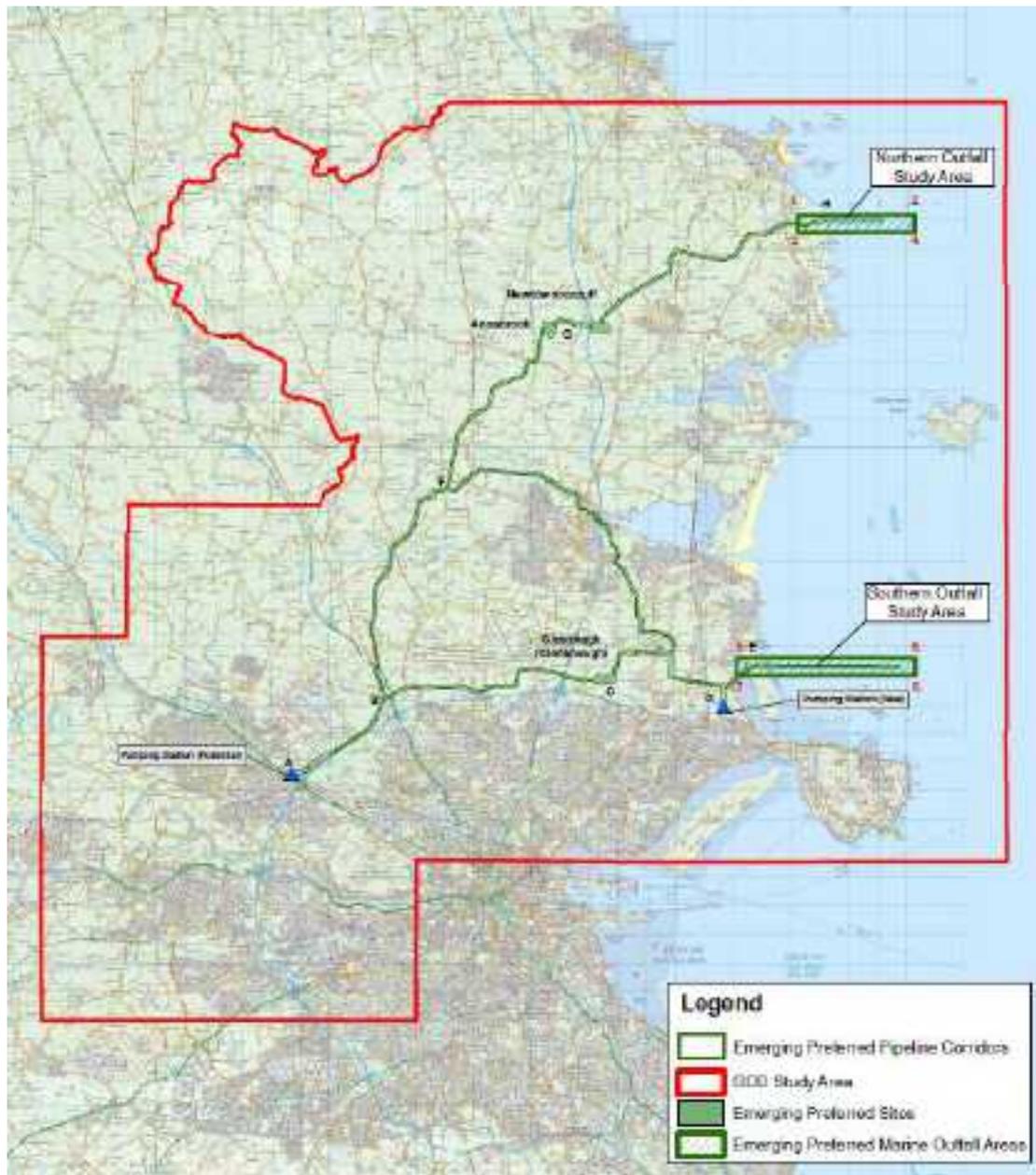


Figure 4.2: - Emerging Preferred Site Options

4.8.1 Preferred Sites for the WwTP

Annabrook: The proposed site for the Regional WwTP in the Annabrook Site Option, is located primarily in the townland of Annabrook, approximately 2.7km south-west of Lusk. Treated effluent from a WwTP located on this site would discharge to the northern outfall.

Clonsilla (Clonsillaugh): The proposed site for the Regional WwTP in the Clonsilla Site Option is located primarily in the townland of Clonsilla, approximately 2.5km east of Dublin Airport. Treated effluent from a WwTP located on this site would discharge to the southern outfall.

Newtowncorduff: The proposed site for the Regional WwTP in the Newtowncorduff Site Option is located primarily in the townland of Newtowncorduff, approximately 0.8km west of Lusk. Treated effluent from a WwTP located on this site would discharge to the northern outfall.

4.8.2 Marine Outfall

As stated previously a key recommendation of the GSDS Final Strategy as amended by its SEA was for the treated effluent from the proposed Regional WwTP to be discharged to the marine environment of the Irish Sea off the coast of North Dublin.

Examination of the marine and coastal zone constraint mapping mapped during the Preliminary Screening stage identified that significant constraints are posed to the location of a new marine outfall off the coast of North County Dublin by designated shellfish waters – the Balbriggan/Skerries Shellfish Area and the Malahide Shellfish Area. These designations are provided for under the Shellfish Waters Directive and are to protect and improve shellfish waters in order to support shellfish life and growth.

The undesignated area between these shellfish waters was identified as a potential area for the location of a new marine outfall (the Northern Outfall Study Area). Similarly the area to the south of the Malahide Shellfish Area was also identified as a potential area for the location of a new marine outfall (the Southern Outfall Study Area).

Other significant constraints to the provision and construction of an outfall pipeline include the Natura 2000 sites at Baldoyle Estuary and the Rush – Skerries Geological Heritage Site.

During the ASA Phase 2 assessment it was acknowledged that the environmental designations around the Baldoyle Estuary provide significant constraints to a southern outfall unless it is feasible to tunnel under these sites to avoid significant adverse impacts. Similarly to avoid impacts at the northern outfall, tunnelling construction methodologies will also have to be employed.

Ground Investigation studies were undertaken during the ASA Phase 4 assessment to assess the feasibility of tunnelling construction methodologies for both the northern and southern outfall areas. The findings of these ground investigation studies is reported on in Chapter 8 of this report.

ASA Phase 2 studies indicated the presence of a sub-marine gas pipeline and electrical sub-marine cable (EirGrid Interconnector) in the northern outfall study area. The presence of this gas pipeline and electrical cable constrains the location of an outfall in their immediate vicinity and as such effectively divides the northern outfall area into two distinct sections.

A hydrodynamic and solute transport modelling study was undertaken as part of ASA Phase 2 studies to predict the general hydrodynamic circulation patterns of the coastal waters off north County Dublin using a three dimensional numerical model. The modelling study was used to determine the dispersal conditions from a range of

possible outfall locations and thereby determine the preferable location(s) off the coast of north County Dublin for a proposed new treated effluent outfall by assessing the relative impact of a range of possible outfalls on the known designations within and adjacent to the marine environment.

The modelling study found that for the northern outfall study area the preferable outfall location(s) lay within a range of 1km – 2km offshore, with preferable location improving slightly in a northerly direction towards Skerries.

The modelling study also found that for the southern outfall study area the preferable outfall location(s) lay approximately 6km offshore and 1km off Irelands Eye, to both the north and east of the .

Both outfall areas were therefore refined to the areas shown on **Figure 4.2** above and **Drawing Nr 6** included in Appendix 13.

4.8.3 **Orbital Sewers and Outfall Pipeline**

The orbital sewers will transfer untreated wastewater from the primary and secondary load centres discussed in Section 4.3.4 above to the proposed Regional WwTP. Treated wastewater will be discharged to the Irish Sea via an outfall pipeline from the proposed Regional WwTP to the marine outfall location.

Routing of the orbital sewers and outfall pipelines has considered how to link the main load centres to the outfall locations via the potential WwTP sites while minimising the construction environmental impacts.

It is feasible to route the orbital sewers from the load centres to each WwTP site and the outfall pipelines from the WwTP site to the outfall area within the pipeline corridors to generally avoid impacts on designated sites and significant areas of habitat.

The orbital sewer and outfall pipeline routes associated with the three 'Emerging Preferred Sites' are shown in **Figure 4.2** above and **Drawing Nrs 6, 6A and 6B** included in Appendix 13.

5 ASA Methodology

5.1 Introduction

A key recommendation of the SEA of the GSDS was that a comprehensive Alternative Sites Assessment (ASA) study be undertaken, with the overall objective of selecting a preferred site for the proposed Regional WwTP, a preferred location for the marine outfall and preferred routes for the associated orbital sewer and outfall pipeline.

This recommendation envisaged an ASA process with four distinct phases comprising:

- Phase 1 – Alternative Sites Identification (Preliminary Screening)
- Phase 2 – Alternative Sites Assessment
- Phase 3 – Consultation stage
- Phase 4 – Selection of the Preferred Site, Pipeline Routes and Outfall Location

This chapter outlines the methodology used to identify the final preferred site option, commencing from the preliminary screening assessment through to final selection of preferred site option. It also provides generic detail on the environmental and technical specialist assessment methodologies used during Phase 2 assessment and the further investigations and studies undertaken on the three emerging preferred sites for Phase 4 assessment. Further detail can be obtained in the relevant reports which are referenced below and included where relevant in the appendices to this report.

5.2 ASA Phase 1 - Preliminary Screening

The *Alternative Sites Assessment – Phase One Preliminary Screening Outcomes Report* was published in October 2011 and outlined phase 1 of the ASA process which identified suitable land parcels within which the proposed Regional WwTP could be located; corridors for routing of the orbital drainage network and potential marine outfall locations (land parcel options). A brief outline of the methodology used is provided below, full details are included within the published report.

Phase 1 of the ASA process entailed preliminary screening of the study area to identify a short list (minimum of 6no.) of potential alternative land parcels of suitable size to accommodate the proposed Regional WwTP and also to identify marine outfall locations and potential orbital sewer and outfall pipeline corridors.

The land parcel options were identified through a step-by-step process as follows:

- Step 1* The approximate required treatment capacity at the design year horizon (2040) of the proposed Regional WwTP and the load centres from which wastewater could be transferred to the WwTP were determined;

- Step 2** The approximate area of land required to accommodate the proposed Regional WwTP was determined. The assessment identified a need for a site area of 20Ha;
- Step 3** A Constraints Consultation was held with relevant statutory bodies and the general public to assist in the identification of constraints within the Study Area;
- Step 4** Known environmentally designated areas (legislative or from the Fingal Development Plan) and sensitive receptors were mapped as potential constraints. Relevant details from submissions received following the Constraints Consultation were also mapped;
- Step 5** An appropriate buffer zone of 300m was applied to all identified sensitive receptors (residential and commercial);
- Step 6** Residual lands not subject to constraints were examined to identify land parcels of suitable size (20Ha or greater) for the proposed Regional WwTP;
- Step 7** The identified land parcels were assessed with respect to Planning Permissions granted but not yet constructed in their vicinity. Any parcels which had such permissions associated with them were removed from further consideration;
- Step 8** The constraint mapping was examined to identify areas not subject to constraints for the possible location for a treated effluent marine outfall and to identify potential orbital sewer and outfall pipeline corridors;
- Step 9** The identified land parcels were assessed in terms of their proximity and accessibility to the identified load centres, feasible outfall locations, and orbital sewer and outfall pipeline corridors. Land parcels considered less favourable from these aspects were removed from further consideration at this stage;
- Step 10** The remaining land parcels were assessed under high level defined engineering and design constraints. Again land parcels considered less favourable from these aspects were removed from further consideration at this stage; and
- Step 11** A shortlist of suitable land parcels and potential orbital sewer and outfall pipeline corridors, not subject to the constraints listed above, was compiled.

The purpose of the Phase 1 assessment was to identify a suitable number of favourable land parcel options for progression to the next phase of the assessment, therefore it was necessary to remove a number of land parcels, as outlined above, which did not compare as favourably to the others remaining in consideration. This process resulted in 9no. land parcel options being identified for assessment under Phase 2 of the ASA as follows:

- Annsbrook
- Baldurgan
- Cloghran
- Clonshagh
- Cookstown
- Newtowncorduff
- Rathartan
- Saucerstown
- Tyrrelstown Little

5.3 **ASA Methodology (Phases 2, 3 and 4)**

The methodology for identifying the preferred site option from the shortlist of land parcel options identified in Phase 1 and listed above is provided in the flow chart included as **Figure 5.1** overleaf and detailed in the *Alternative Sites Assessment (ASA) Methodology Report* included in Appendix 3.

5.3.1 **ASA Phase 2 - Emerging Preferred Site Options**

The *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes* was published in May 2012 and outlined Phase 2 of the ASA process which identified three emerging preferred site options (i.e. a WwTP site, its associated orbital sewer and outfall pipeline corridor and marine outfall location). A brief outline of the methodology used is provided below, full details are included within the published report.

The Phase 2 assessment was based on a qualitative process, in line with the recommendations of the SEA for the GSDSDS, which assessed the performance of each of the alternative land parcels, orbital sewers and outfall pipeline routes and marine outfall locations against a range of environmental and technical criteria in order to identify a number of emerging preferred site options.

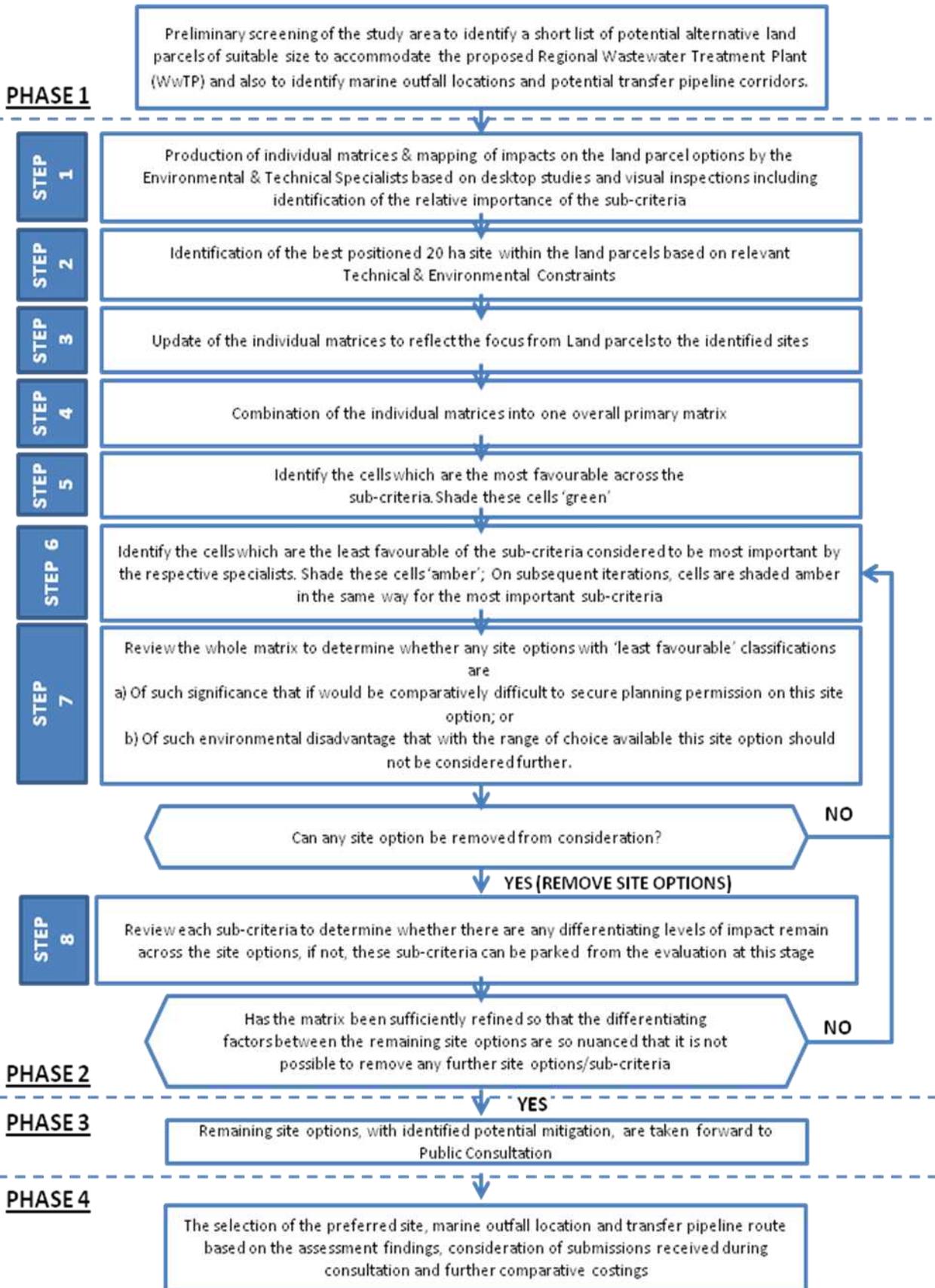


Figure 5.1 - Methodology Flowchart

The criteria used for the Phase 2 assessment are provided in **Table 5.1** below. Each land parcel option was assessed by the relevant technical and environmental specialist under each of these criteria. These assessments were used to identify the differentiating sub-criteria used in the identification of the preferred 20Ha site within each of the land parcels and subsequently the identification of emerging preferred site options. The full list of agreed sub-criteria for each of the Environmental and Technical criteria are provided in Appendix 3 of the Phase 2 report. The outcomes of each of these assessments were combined into an overall assessment matrix detailing all potential constraints associated with each of the site options. Through an assessment of most and least favourable constraints in the matrix, three emerging preferred site options were identified. This process is detailed in full in Chapter 7 of the Phase 2 report.

Environmental Criteria	Technical Criteria
Ecology	Safety
Cultural Heritage	Planning Policy
Landscape and Visual	Engineering and Design
Hydrology and Hydrogeology	Capital and Operational Costs
Soils and Geology	Sustainability
Traffic	
Air Quality and Odour	
Agriculture and Agronomy	
Noise and Vibration	
People and Communities	

Table 5.1 - ASA Phase 2 Criteria

The purpose of the Phase 2 assessment was to identify a suitable number of preferred site options for progression to the next phase of the assessment, therefore it was necessary to remove a number of site options, as outlined above, which did not compare as favourably to the others remaining in consideration. This process resulted in three emerging preferred site options been identified for further assessment under Phase 3 and 4 of the ASA as follows:

- Annsbrook site option
- Clonshagh (Clonshaugh) site option
- Newtowncorduff site option

5.3.2 ASA Phase 3 – Public Consultation

Phase 3 of the ASA process was a consultation stage.

Following completion of Phase 2 and publication of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, the three emerging preferred site options (Annsbrook, Clonshagh, and Newtowncorduff) were brought through Public Consultation held over an eight week period from 14th May 2012 to 6th July 2012. The primary objective of this phase was to gather public opinion and any additional information on the three emerging preferred site options, (i.e. WwTP site, its associated orbital sewer and outfall pipeline corridors and marine outfall locations).

Stakeholder feedback from this third phase of public consultation was documented in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

The purpose of this consultation report was to document stakeholder feedback and to ensure that the wider Project Team reviewed and considered issues raised by stakeholders, as appropriate.

The Project Team's response to the issues raised was presented in the *Alternative Sites Assessment and Route Selection (Phase 3): Consultation Response Report*, which was published in June 2012 and is included as Appendix 4 of this ASA Phase 4 Report.

This stakeholder feedback along with a technical and environmental assessment undertaken as part of ASA Phase 4 assessment aided the decision making process in selecting a single preferred site option and will lead to the eventual planning stage.

5.3.3 ASA Phase 4 – Final Preferred Site Option

Phase 4 is the basis of this Alternative Sites Assessment and Route Selection Report (Phase 4). It constitutes the final identification of the preferred site option (i.e. WwTP site, its associated pipeline corridor and marine outfall location), and consisted of the following steps:

Step 1 Review of the assessment findings from the ASA Phase 2 process which is reported in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, May 2012.

Step 2 Consideration of the submissions received during ASA Phase 3 (Public Consultation) of the ASA process which was held over an eight week period from 14th May 2012 to 6th July 2012. Full details of this phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

- Step 3** Undertake further investigative studies to supplement the data collected and assessed during ASA Phase 2 and which were also informed by consideration of submissions received.
- Step 4** Assessment of the findings of the further investigative studies to determine whether anything of such significance was identified which made the development of any of the three emerging preferred site options unfeasible.
- Step 5** Assessment of the individual components of the site options (WwTP site, marine outfall locations and associated orbital sewers and outfall pipelines) against the findings of *Step 1 to Step 3* above. Identification of constraints for the individual components and the identification of potential mitigation measures where the ASA Phase 4 assessment indicated that it was not possible to avoid impacts.
- Step 6** Preparation of preliminary cost estimates
- Step 7** Combine the assessment of the individual components from *Steps 5 and 6* into one overall emerging preferred site option assessment matrix. Through a comparative assessment assign ‘more’ and ‘less’ favourable classifications to the identified constraints.
- Step 8** Selection of final preferred site option based on the relative performance of each of the site options against the Environmental, Technical and Cost criteria considered.

In relation to the implementation of mitigation measures, it should be noted that such measures have not previously been considered as the preference always has been to avoid impact rather than mitigate. However, at this stage it is considered appropriate to consider mitigation measures for impacts to the three emerging preferred site options. Such measures are being incorporated into the assessment at this stage as differentiating factors across the site options are likely to be nuanced and the consideration of mitigation measures may in such instances be cost effective.

Following completion of the above, an *Alternative Sites Assessment and Route Selection Report (Phase 4): Final Preferred Site and Routes* will be prepared and published providing details of the process followed and with a recommendation for the final preferred site option.

6 Description of Emerging Preferred Site Options

6.1 Introduction

This section of the report provides an outline description of the three emerging preferred site options. These options were brought forward for further assessment following completion of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes* in May 2012 and the subsequent public consultation in Phase 3.

The order in which descriptions are presented is as follows:

- Emerging preferred sites;
- Outfall locations;
- Orbital sewers and outfall pipelines.

6.2 Emerging Preferred Sites

6.2.1 Annsbrook

This site is located primarily in the townland of Annsbrook approximately 2.7km south-west of Lusk (Dun Emer View Estate) and 2.2km north-east of Ballyboughal. The proposed site has a total area of c. 20ha.

The Annsbrook site and the environmental constraints in its immediate vicinity are detailed in **Drawing Nr 8A** included in Appendix 13. A schematic of that drawing is shown here as **Figure 6.1**.

The lands slope in a north-west / south-east direction with a central elevation of approximately 30.2mOD. The site lies in open agricultural land, primarily in grassland and tillage.

The Rath Little Stream and the Grallagh Stream (a tributary of the Ballyboghil River) run north and south of the site respectively. The site boundaries are set back a minimum distance of 50m from both streams.

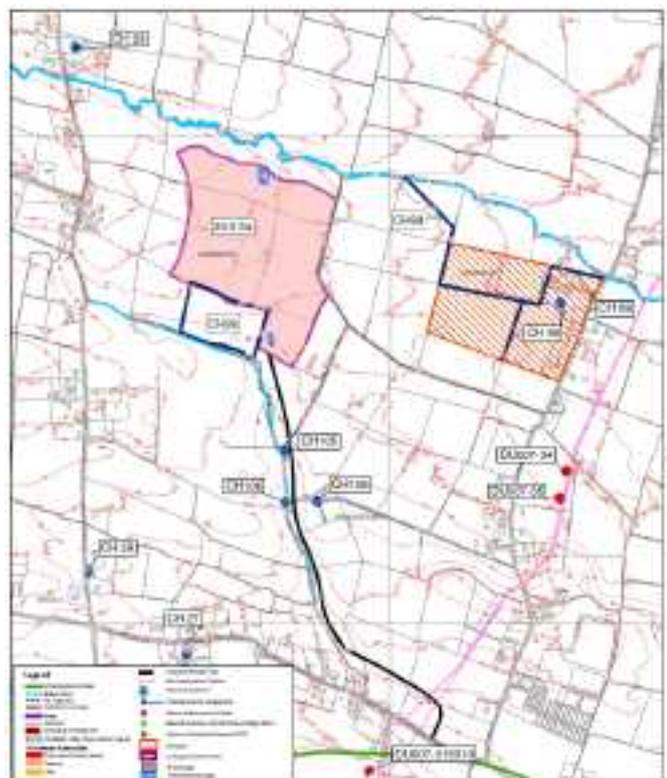


Figure 6.1 – Annsbrook (Emerging Preferred Site) - Constraints

Access to the site is proposed from the R129 to the south. The proposed access road is 1,230m in length, would cross over the Grallagh Stream and is routed along existing field boundaries as far as is feasible to avoid splitting land.

The lands within the proposed site and in its immediate environs are zoned as RU (rural) in the Fingal County Development Plan 2011 – 2017.

Treated effluent from a WwTP located on this site would discharge to the northern outfall.

6.2.2 Clonshagh (Clonshaugh)

This site is located primarily in the townland of Clonshagh, in Fingal. It lies approximately 2.5km east of Dublin Airport and the residential areas of Belcamp and Darndaleare c. 0.8km to the south. The proposed site has a total area of c.23.1ha.

The Clonshagh site and the environmental constraints in its immediate vicinity are detailed in **Drawing Nr 9A** included in Appendix 13. A schematic of that drawing is shown here as **Figure 6.2**.

The lands slope in a west-east direction with a central elevation of approximately 42.3mOD. The land is located in open agricultural land, primarily in tillage, vegetables and grassland.

The Cuckoo Stream (a tributary of the Mayne River) and the Mayne River run north and south of the site respectively. The northern site boundary is set back a minimum distance of 50m from the Cuckoo Stream with the Mayne River 400m to the south.

The proposed access road to the site is from the Clonshaugh Road to the west of the site and is 320m in length.

However, an alternative access to the site from the R139 is also being considered. The realignment of the Malahide Road is a stated objective of the Fingal County Development Plan, 2011 – 2017. As such the Malahide Road Realignment Scheme is currently under consideration by Fingal County Council. The alignment of one road forming part of this proposed road scheme passes south of and immediately adjacent to the site, while another road links to the R139 (formerly the N32). Future access to the site could be gained via the roads included in this scheme should it progress to full

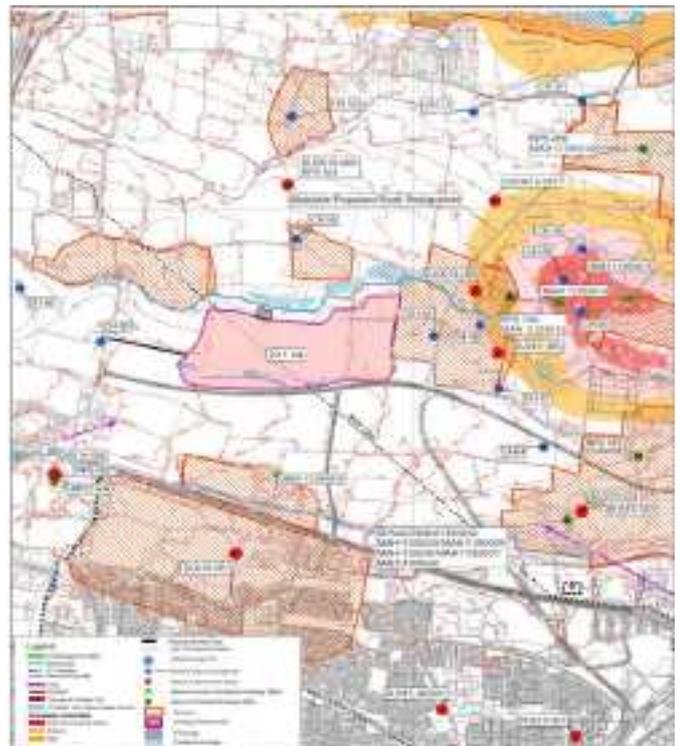


Figure 6.2 – Clonshagh (Emerging Preferred Site) - Constraints

construction. However, access to the site could be provided from the R139 by constructing the link road from the R139 as part of the proposed GDD scheme.

The majority of the Clonshagh site is zoned Greenbelt (GB) with a small area in the south-western section of the site zoned HT (High Technology) in the Fingal County Development Plan; 2011 – 2017.

Treated effluent from a WwTP located on this site would discharge to the southern outfall.

6.2.3 Newtowncorduff

This site is located primarily in the townland of Newtowncorduff approximately 0.8km west of Lusk (Dun Emer View Estate). The proposed site has a total area of c. 22.8ha.

The Newtowncorduff site and the environmental constraints in its immediate vicinity are detailed in **Drawing Nr 10A** included in Appendix 13. A schematic of that drawing is shown here as **Figure 6.3**.

The lands slope generally in a north / south direction with a central elevation of 20.5mOD. The land parcel is located in agricultural land, primarily in tillage, vegetables and grassland.

The Ballough River and one of its tributaries run east and south of the site respectively. The site boundaries are set back a minimum distance of 50m from both rivers.

The proposed access road to the site is from the R132 (formerly the N1) to the north east. It is 640m in length, crosses one watercourse and is routed close to existing field boundaries to minimize land severance.

The lands within the proposed site and in its immediate environs are zoned as RU (rural) in the Fingal County Development Plan; 2011 – 2017.

Treated effluent from a WwTP located on this site would discharge to the northern outfall.

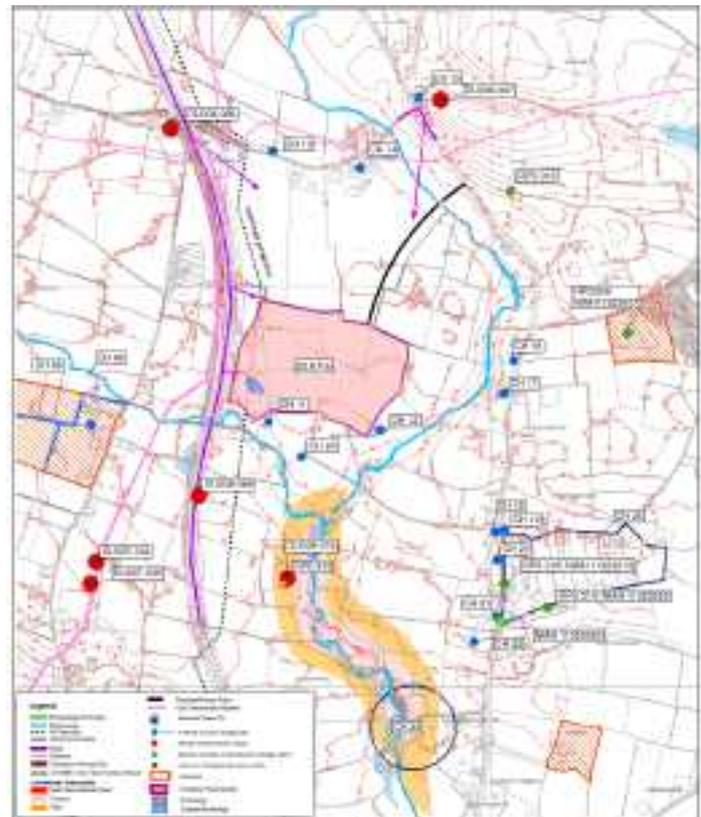


Figure 6.3 – Newtowncorduff (Emerging Preferred Site) - Constraints

6.3 Marine Outfalls

The Marine Outfall Study Areas are shown in **Drawing Nr 6** of Appendix 13 and are contained within the geographical positions listed in **Table 6.1**.

Point	Eastings	Northings
Northern Outfall Study Area		
1	326171.317E	258204.199N
2	330431.034E	258204.199N
3	326171.31E	257242.853N
4	330431.034E	257242.853N
Southern Outfall Study Area		
5	323422.398E	242699.988N
6	330431.034E	242699.988N
7	323422.398E	242038.541N
8	330431.034E	242038.541N

Table 6.1 - Marine Outfall Study Areas - Co-ordinates

Northern Outfall Study Area

The northern outfall study area, lies north of Loughshinney and south of Skerries.

The Skerries to Rush Geological Heritage Area (GHA) extends along the coast and is crossed by the proposed outfall corridor.

The coast here is characterised by small coves, inlets and cliffs. Water depths in this area range from 0m–20m LAT (lowest Astronomical Tide). The seabed is characterised by steeply inclined bedrock overlain in places by a sedimentary infill of varying depth.

This sedimentary cover is sandy in nature. There is an outcrop of rock in the NE section of the outfall study area.

The Environmental Designations in the vicinity of the Northern Outfall are shown in **Figure 6.4**.



Figure 6.4 – Environmental Designations in vicinity of Northern Outfall

Within the northern outfall study area the preferable outfall location lies within a range of 1.5 – 2km offshore with the pipeline terminating within the Rockabill to Dalkey Island cSAC (site code: 003000). This site has been recently transmitted as a candidate SAC for reefs listed on Annex 1 and Harbour Porpoise listed on Annex 2 of the Habitats Directive.

Treated effluent would discharge to this northern outfall location from wastewater treatment plants located at either the Annsbrook or Newtowncorduff sites.

Southern Outfall Study Area

The southern outfall study area, lies south of Portmarnock and north of Ireland's Eye.

At the coastline, the southern outfall pipeline corridor crosses the estuary habitats of the Baldoyle Bay SAC/SPA. The pipeline corridor then crosses the Portmarnock Spit (Portmarnock Golf Club) before re-entering and crossing the Baldoyle Bay SAC.

Within the southern outfall study area the preferable outfall location lies approximately 6km off the coast and 1km to the north and north-east of Ireland's Eye. The pipeline terminates within the Rockabill to Dalkey Island cSAC (site code: 003000).

The coast is characterised by sandy beaches. Water depths in this area range from 0m – 25m LAT (lowest Astronomical Tide). The seabed is gradually sloping eastward and the bottom is sandy in nature with varying depth to bedrock.

Treated effluent would discharge to this southern outfall location from a wastewater treatment plant located at the Clonshagh (Clonshaugh) site

The Environmental Designations in the vicinity of the Southern Outfall are shown in **Figure 6.5**.



Figure 6.5 – Environmental Designations in vicinity of Southern Outfall

6.4 Emerging Preferred Pipeline Routes

The orbital sewers will transfer untreated wastewater from the primary and secondary load centres to the proposed Regional WwTP. Treated wastewater will be discharged to the Irish Sea via a pipeline from the WwTP to the marine outfall location.

As discussed previously the main load centres are the Route 9C (Blanchardstown) Sewer Catchment and the North Dublin Catchment.

Routing of the orbital sewers and outfall pipelines has considered how to link the main load centres to the outfall locations via the potential WwTP sites while minimising the construction and environmental impacts.

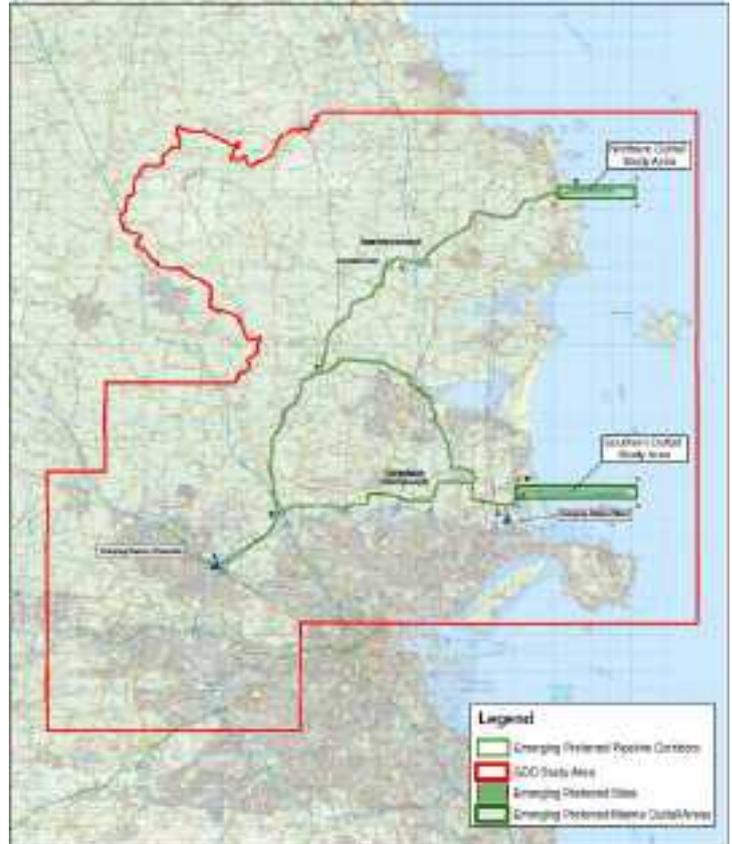


Figure 6.6 – Pipeline Corridors

The pipeline corridors are shown on **Drawing Nrs 6, 6A and 6B** in Appendix 13 and a schematic is shown here in **Figure 6.6**.

The topography along the pipeline corridors is shown in **Drawing Nr 7** in Appendix 13 and a schematic of the topography is shown here as **Figure 6.7**

It is feasible to route the orbital sewers from the load centres to each WwTP site and the outfall pipelines from the WwTP site to the outfall area within the pipeline corridors to generally avoid impacts on designated sites and significant areas of habitat.

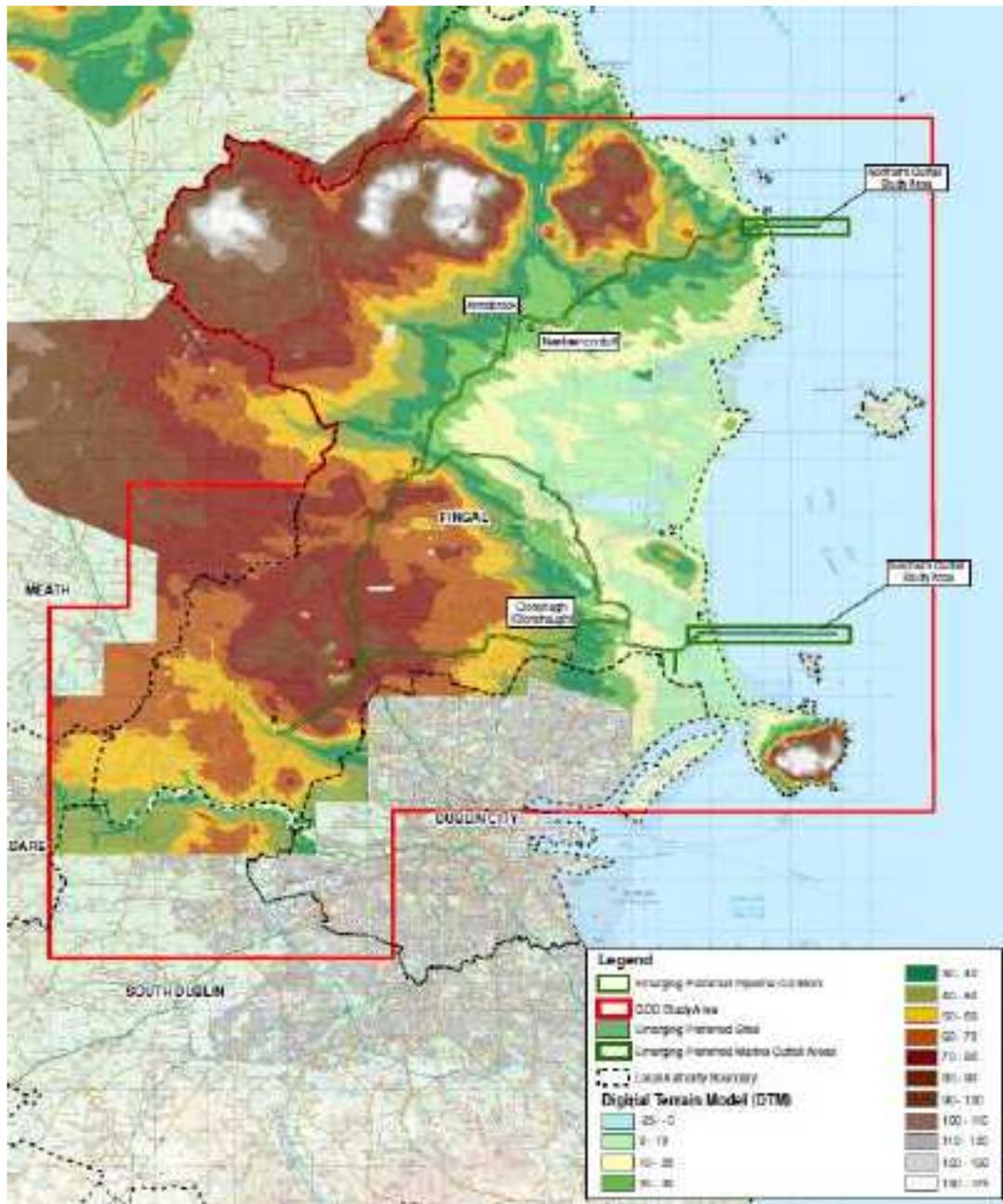


Figure 6.7: - Topography of North County Dublin

Annsbrook and Newtowncorduff Site Options - Pipeline Corridors

The orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment would be routed to the Annsbrook or Newtowncorduff sites via pipeline corridor ‘A-B-F-G’. The orbital sewer from the North Dublin Catchment would be routed to either of these sites via pipeline corridor ‘D – F’ where it would merge with the orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment.

The treated effluent pipeline from either of these sites to the northern outfall location would be routed via pipeline corridor ‘G – H’.

Total length of pipeline corridors is provided in **Table 6.2**.

Land usage along the pipeline corridors is predominantly agriculture with a mix of grassland, tillage and horticulture encountered.

The topography along corridor 'A-B-F-G' rises from the Tolka River Valley (point 'A'), at approximately the 40mOD contour, to in excess of 80mOD at point 'B'. This high level topography extends for approximately 12km towards point 'F' before dropping below the 30mOD contour at the Broadmeadow River. Extending from the Broadmeadow River to point 'G', the topography generally lies between the 20mOD and 30mOD contours.

The topography along pipeline corridor 'D-F' generally rises in an undulating profile from 2mOD at the Grange (point 'D') to approximately 32mOD at point 'F', with the highest point of 41mOD approximately 14.1km from point 'D'

The topography along outfall pipeline corridor 'G-H' generally rises from between the 20mOD and 30mOD contours at point 'G' to between the 40mOD and 50mOD contour before falling again to between the 10mOD and 20mOD contours at point 'H'.

Orbital sewers to the Annsbrook or Newtowncorduff sites site would consist of pumped rising mains and gravity sewers laid in open cut and tunnelled section. The outfall pipe to the northern outfall area would be a gravity sewer laid in open cut and tunnelled section

Clonshagh (Clonshaugh) Site Option – Pipeline Corridors

The orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment would be routed to the Clonshagh via pipeline corridor 'A-B-C'. The orbital sewer from the North Dublin Catchment would be routed to this site via pipeline corridor 'D-C'

The treated effluent pipeline from this site to the southern outfall location would be routed via pipeline corridor 'C-E'.

Total length of pipeline corridors is provided in **Table 6.2**.

Along pipeline corridor 'A-B-C' the topography rises from the Tolka River Valley (point 'A'), at approximately the 40mOD contour, to in excess of 80mOD at point 'B'. This high level topography extends for approximately 7km along the pipeline corridor 'B-C' before gradually dropping towards the potential WwTP site at Clonshagh (point 'C') at a level of the order of 42mOD.

The topography along corridor 'D-C' is generally a rising profile from 2mOD at the Grange (point 'D') to 42mOD at the potential WwTP site at Clonshagh (point 'C').

The topography along the outfall pipeline corridor 'C-E' is generally a falling profile from 42mOD at the potential WwTP site at Clonshagh (point 'C') to approximately 2mOD at the coast (point 'E').

Land usage along the pipeline corridors is predominantly agriculture with a mix of grassland, tillage and horticulture encountered.

Orbital sewers to the Clonshagh (Clonshaugh) site would consist of pumped rising mains and gravity sewers laid in open cut and tunnelled section. The outfall pipe to the southern outfall area would be a gravity sewer laid in open cut and tunnelled section.

6.4.1 Pipeline Lengths

Pipeline lengths are summarised in **Table 6.2**.

	Annsbrook	Clonshagh (Clonshaugh)	Newtowncorduff
Length of Orbital Pipelines	(m)	(m)	(m)
Length from 9C to WWTP Site	20,750	12,750	22,500
Length from North Dublin to WWTP Site	15,500	5,850	15,500
Length from WWTP Site to Coast	11,450	6,900	9,700
Length in Marine Environment	2,000	6,000	2,000
Totals	49,700	31,500	49,700

Table 6.2 – Summary of Pipeline Lengths

6.4.2 Land Zoning along Pipeline Corridors

Land zoning along the pipeline corridors as per the Fingal County Development Plan, 2011 – 2017 is shown on **Drawing Nr 14** included in Appendix 13 and summarised in **Table 6.3**:

Pipeline Corridor Section	Land Zonings Traversed
A – B	Healthcare, High Amenity, Open Space & Recreational Amenities, Residential, General Enterprise & Industry,
B – F	General Enterprise, Greenbelt, Agriculture,
D – F	Residential, Greenbelt, Agriculture
F - G	Agriculture
G - H	Agriculture, High Amenity
B - C	General Enterprise & Industry, Open Space & Recreational Amenities, Greenbelt
D - C	Residential, Greenbelt
C - E	Greenbelt, High Amenity

Table 6.3 – Summary of Land Zonings along Pipeline Corridors

7 Consultation

7.1 Introduction

Consultation with key stakeholders, interested parties and the general public is an important aspect of the development of the Greater Dublin Drainage project. At critical points in the development of the project, feedback has been sought from members of the public to assist in shaping the project.

7.2 Statutory Bodies and Interested Parties

Consultation has been sought from statutory bodies and interested parties throughout the project which to date has included the following:

- An Taisce
- An Bord Bia
- Ballymore Properties
- Birdwatch Ireland
- Bord Gáis Energy
- Bord Iascaigh Mhara (BIM)
- Department of Agriculture, Food and the Marine
- Department of the Environment, Communications and Local Government (DoECLG)
- Dublin Airport Authority (DAA)
- Dublin City Council (DCC)
- Dublin Regional Authority
- Eastern River Basin District (ERBD) Project Team
- Eirgrid
- Environmental Protection Agency (EPA)
- Fingal County Council (FCC) – various Departments
- FCC Internal Stakeholder Group, which includes senior representatives from divisions within FCC with an interest in the project;
- Food Safety Authority of Ireland (FSAI)

- Inland Fisheries Ireland (IFI)
- Irish Aviation Authority (IAA)
- Irish Rail
- Kildare County Council (KCC)
- Local Authority Representatives
- Local Fishermen
- Marine Institute
- Meath County Council (MCC)
- National Development Funding Authority
- National Roads Authority (NRA)
- National Parks and Wildlife Service (NPWS)
- Office of Public Works (OPW)
- Project Steering Committee including representatives from FCC, DCC, SDCC, Dun Laoghaire Rathdown County Council (DLRCC), KCC, MCC
- Rail Procurement Agency (RPA)
- Sea Fisheries Protection Authority (SFPA)
- South Dublin County Council (SDCC)
- Teagasc
- The Discovery Programme

Where necessary, throughout the project, further consultation will be arranged with the above bodies and additional parties identified as the project progresses.

7.3 Landowners

Separate and direct engagement has been undertaken by Fingal County Council with each of the landowners affected by the locations three emerging preferred sites, as identified from available land registry data. In addition direct engagement has been undertaken by Fingal County Council with landowners along the pipeline corridors affected by locations of ground investigation trial pits and boreholes as part of the investigative surveys undertaken for Phase 4 of the ASA process.

7.4 Public Consultation

Public engagement in the project is important in the progression of all stages of the project and to that effect three periods of public consultation have been held to date. A further period of public consultation will commence on publication of this *Alternative Sites Assessment and Route Selection Report (Phase 4): Final Preferred Site and Routes*, to gather information and knowledge from the public which should be considered at the environmental impact assessment (EIA) stage.

Statutory consultation will commence once the planning application for the project has been submitted to An Bord Pleanála.

All public consultation is being managed by the project Communications Consultant with input from the technical team. It should be noted that while the details provided below relate to the formal consultation periods, interaction with all stakeholders is ongoing throughout the project by means of the project information service. Furthermore all reports referenced below are available on the dedicated project website www.greaterdublindrainage.ie.

Three distinct periods of Public Consultation have been held to date as follows:

- Constraints Consultation (30 May 2011 to 24 June 2011);
- Consultation following identification of and short-listing of the nine potential land parcels within which the proposed Regional wastewater treatment plant (WwTP) could be located (10 October 2011 to 02 December 2011).
- Consultation following identification of the emerging preferred site options took place between 14 May 2012 and 06 July 2012.

The first consultation period was in relation to identification of all constraints within the study area which should be considered as part of the ASA process. All submissions received were reviewed by the Project Team in order to identify key issues. Full details of the consultation are included in the *Constraints Consultation Report* published in August 2011. Additional details were included, where relevant, by the Technical Team in the *Alternative Sites Assessment – Phase One Preliminary Screening Outcomes Report* published in October 2011.

The second consultation period was in relation to the nine potential land parcels within which the proposed Regional WwTP could be located. The consultation ran for a total of eight weeks from the 18 November 2011 to the 02 December 2011. Full details of the consultation are included in the *Alternative Sites Assessment (ASA) Consultation Report* published in April 2012. A significant number of submissions were received during this period and the key issues raised were identified in the consultation report. The issues and concerns identified by stakeholders during the consultation have been considered by the project team as part of the alternative site assessment process to identify the emerging preferred site options. A brief indication of how this has been achieved is provided in Table 4.1 of the Phase 2 report with further details included in

Appendix 2 of the Phase 2 report. It is intended that this table and corresponding appendix be read in conjunction with and as a response to the consultation report.

The third public consultation period, which related to the emerging preferred site options, took place over an eight week period from 14 May 2012 to 06 July 2012. Full details of the consultation are included in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012. A significant number of submissions were received during this period and the key issues raised were identified in the consultation report.

The issues and concerns identified by stakeholders during the consultation have been considered by the project team as part of Phase 4 of the alternative site assessment process to identify the final preferred site option. A brief indication of how this has been achieved is provided in **Table 7.1** below with further details provided in the *Alternative Sites Assessment and Route Selection: Consultation Response Report*, which is included in Appendix 4 of this report. It is intended that this table and corresponding appendix be read in conjunction with and as a response to the Public Consultation Report.

In particular, there were a small number of comments / queries during the public consultation which resulted in corrections to the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*. These corrections have been incorporated into the Phase 4 assessment and detailed in Appendix 1 of this Report.

Stakeholder Issues	Reponses
Agriculture and Horticulture	<p>Potential impacts on agriculture and horticulture were identified by the Project Team as soon as the locations of the land parcels became apparent during the preliminary screening stage. As a result an Agronomist was brought into the team at this early stage. A detailed assessment was undertaken by the Agronomist as part of the ASA and relevant data has been used both in the selection of the sites within the land parcels and in the assessment process. Details of this assessment, including land quality, details of crop production figures and values obtained from the relevant bodies, are provided in the ASA – Phase 2 Agronomy Assessment report included as Appendix 11 of the “Alternative Sites Assessment and Route Selection Report (Phase 2)”. This assessment will continue as part of the Environmental Impact Assessment on the preferred site option, once identified.</p> <p>Furthermore, consultation has been ongoing throughout the process with relevant bodies including the Food Safety Authority of Ireland, BordBia; Teagasc and representatives of the local crop growers to ensure that the high quality agricultural and horticultural standards for Fingal remain intact.</p>
Climate Change	<p>The potential impacts of Climate Change are being considered during the design process. These impacts generally relate to consideration of rainfall events of higher intensity, typically in the range of 10% - 20% increase, and greater frequency of occurrence, and also to consideration of rise in sea levels. These considerations inform the design of the orbital sewers, outfall pipe and any requirements for the provision and sizing of stormwater storage facilities, both on the site of the proposed Regional WwTP and upstream in the relevant catchments.</p>
Community Impact, Community Burden/Overburden	<p>The potential for impact on people and communities has been considered specifically under the People and Communities criteria in the ASA Phase 2 assessment. More significantly, impact is intrinsically considered by each of the individual environmental and technical criteria e.g. Air and Odour is considered with respect to adjacent sensitive receptors; Traffic is considered with respect to the impact on the surrounding road network which arises as a result of considerations to the impact to road users etc.</p> <p>It is acknowledged that there may be some disruption to local residents during the construction period; however this will be mitigated through implementation and enforcement of appropriate environmental management measures. During the Operational phase of the plant, the use of appropriate architectural treatments and screening techniques combined with appropriate management of the plant will ensure that any potential impacts are minimised.</p>
Livelihood	<p>While operation of the plant itself will create a small number of jobs, the main benefit of the implementation of the GDD will be to facilitate future growth and development across the entire GDA.</p> <p>Although there may be a disruption to local businesses in the area during construction, the presence of construction workers and the potential for industrial growth would provide a positive contribution to the local economy. Overall, impacts of the project on employment and household income will be beneficial.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Property Devaluation	<p>During the next phase of the socio-economic assessment, consideration will be given to the potential impact on property valuations in the vicinity of</p>

Stakeholder Issues	Reponses
	<p>the preferred site for the proposed Regional WwTP. Compensation will be provided to landowners and those who are directly affected by the purchase of the site, acquiring the land for the road access and acquiring access for the construction and maintenance of the pipelines.</p>
Recreation and Amenity	<p>The project team are aware of the impact water quality can have on recreation and amenity value within Fingal and to the local community. This awareness is strengthened by the need to comply with the relevant legislation designed to protect water quality, including the requirement for a waste water discharge licence to be granted by the EPA under the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I No. 684 of 2007) prior to commissioning of the WwTP. This licence will set emission discharge limits for a range of parameters, which the treated effluent discharge will be required to comply with.</p> <p>Within the coastal zone of the study area there are many designated bathing waters as well as designated shellfish waters, SPA's and SAC's all of which set additional water quality standards which will also apply to the discharge from the proposed Regional WwTP.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Socio-economic Issues	<p>The potential for impact on people and communities has been considered specifically under the People and Communities criteria at the ASA Phase 2 assessment. An in-depth socio-economic assessment will be undertaken on the preferred site option as part of the EIA.</p>
Consultation	<p>Fingal County Council has endeavoured, and will continue, to achieve an accessible, meaningful and accountable consultation.</p>
Cultural Heritage and Archaeology	<p>All designated cultural heritage or archaeological sites within the study area were identified at the Phase 1 - Preliminary Screening assessment and were avoided in the identification of the original land parcels. Cultural Heritage and Archaeological potential on all of the sites, were considered as part of the ASA Phase 2 assessment</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Ecology and Environment	<p>The project team are aware of the impact of water quality on the marine eco-system. This awareness is strengthened by the need to comply with the relevant legislation designed to protect water quality, including the requirement for a waste water discharge licence to be granted by the EPA under the Waste Water Discharge (Authorisation) Regulations, 2007 (S.I No. 684 of 2007) prior to commissioning of the treatment plant. This licence will set emission discharge limits for a range of parameters, which the treated effluent discharge will be required to comply with. Effluent treated to these standards will have no negative impact on the marine eco-system. It should be noted that consultations have been ongoing with relevant marine bodies and the local fishermen.</p> <p>Legislatively designated areas (such as SACs and SPAs) were identified at the Phase 1 - Preliminary Screening assessment and avoided in the identification of the land parcels. Such designated areas were also avoided where possible in the development of the pipeline route. Consultations have been ongoing with NPWS with respect to any potential impacts on these designated areas. Furthermore, following identification of the</p>

Stakeholder Issues	Reponses
	<p>preferred site and routes, an Appropriate Assessment (AA) in accordance with the Habitats Directive will be carried out to determine whether the project may have any impact on any designated areas and whether proposed mitigation measures will be sufficient to facilitate development of that particular site option.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Fishing	<p>Consultation has been ongoing with relevant bodies including Bord lascaigh Mhara (BIM) and the Sea Fisheries Protection Authority (SFPA) in relation to the fishing industry in existence along the North Dublin Coast. Furthermore, meetings have been held with representatives of the local fishermen. The treated effluent will be required to comply with the licensing limits set by the EPA, in addition to a number of other water quality standards including those set by the Quality of Shellfish Waters Regulations (S.I. No 200 of 1994) as amended. The ongoing hydrodynamic modelling will also serve to ensure that the treated effluent will not impact on the shellfish within the area.</p> <p>The shellfish designations at Malahide and Skerries have been implemented by the Department of the Marine and as such are afforded legal status. From information gathered during the first public consultation, the Project Team are aware of the presence of shellfish along the full length of coastline within the study area. As a result, the effluent discharged from the proposed Regional WwTP will be required to comply with the requirements of the relevant Quality of Shellfish Waters Regulations.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Health	<p>The provision of adequate and safe wastewater collection, treatment and disposal is an essential requirement for ensuring the health of communities. Modern WwTPs are operated with appropriate safeguards to ensure that there are no significant health risks to the general population.</p> <p>In accordance with the EPA Guidelines for Environmental Impact Statements, human health will be considered within the EIS through observance of and reliance upon recognised national and international standards.</p> <p>Furthermore, while not a statutory requirement, in order to ensure all potential health issues raised by stakeholders are addressed, a Health Impact Screening Assessment (HISA) will be undertaken in advance of the EIA. Health issues, which are of local concern to the GDD project will be identified by this assessment and will be considered as part of the relevant individual assessments in the EIA.</p>
Hydrology and Hydrogeology	<p>Known flood locations within the study area were identified at the Phase 1 - Preliminary Screening assessment and were avoided in the identification of the original land parcels. Areas prone to flooding in the vicinity of all of the sites, were considered as part of the ASA Phase 2 assessment. Based on the specialist assessment, the potential for any impact was considered imperceptible. Any potential hydrological impacts were accounted for in the ASA matrix assessment.</p>
Need for the Project	<p>The need for additional wastewater treatment capacity within the GDA was determined as part of the GDSDS and its associated SEA which were</p>

Stakeholder Issues	Reponses
	<p>completed in 2005 and 2008 respectively. From the outset it has been acknowledged by the Project Team that the assessment of potential growth in the catchment would need to be reconsidered in light of current economic conditions. Such a review has been undertaken and is summarised in Chapter 2 of the Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes. Further detail will be provided in the Preliminary Report for the project.</p> <p>Furthermore, reviews of available population data will continue throughout the lifetime of the project, as more recent data becomes available in order to ensure that the scale of the proposed plant continues to be appropriate.</p>
Cost	<p>One of the requirements of the GDD project is to ensure that, within the already agreed parameters, the most cost effective solution is determined.</p> <p>Cost surrogates have been used in Phase 2 of the ASA matrix assessment, included length of pipeline; power requirements and number of infrastructure crossings. The inclusion of cost surrogates within the ASA Phase 2 matrix assessment, effectively constituted a cost comparison for the 9 site options at that stage.</p> <p>It should be noted that the overall cost of the GDD project is expected to be in the region of several hundred million. The € 2 billion figure referenced in a number of stakeholder submissions refers to all wastewater projects undertaken in the GDA identified by the GDSDS, including the upgrade to the Ringsend Treatment Plant.</p> <p>Preliminary cost estimates for the 3 emerging preferred site options have been undertaken for Phase 4 of the assessment in order to aid in the identification of the preferred site option details of which are included in Chapter 8 and Appendix 10 of this report.</p>
Size	<p>The population growth figures which inform the determination of the need for and the size of the proposed plant have been reviewed as part of the GDD project and will continue to be throughout the project's lifetime.</p>
Odour	<p>The project team are fully aware of the importance of odour control for the GDD, in particular to minimise any potential impact on the local community. New and refurbished WwTPs generally incorporate covers to exposed tanks and provision of odour treatment for any released emissions. Furthermore strict odour limits will be set at the boundary of the site and it will be the responsibility of the operating contractor to meet these limits.</p> <p>Prevailing winds and the potential resulting odour impacts to communities have been considered as part of the preliminary odour assessment in the ASA Phase 2 assessment. Furthermore, detailed odour modelling will be undertaken once the preferred site option has been identified and will be used to determine the odour treatment processes which will satisfy the identified limits. Limits will be based on best practice at new and refurbished plants within Ireland.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Outfall	<p>The location of the outfall discharge point has been considered from the outset of Phase 1 of the ASA. Initially, the whole of the North Dublin coastline was subjected to a detailed study. Following identification of known constraints, including the designated Shellfish Waters, this was reduced to two areas, the northern marine study area and the southern marine study area. The first stage of the proposed hydrodynamic modelling was undertaken to determine the optimal locations within these study areas</p>

Stakeholder Issues	Reponses
	<p>for the outfall. Both current and tidal dispersion were taken into account during this stage.</p> <p>Further tide and current data gathering has been completed and the data collected is currently being used to update the hydrodynamic model developed and to ensure that the potential for impact on any designated sites and amenities is minimised.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Planning and Development	<p>A planning policy review for each of the sites was undertaken as part of the ASA Phase 2 assessment and included within the matrix assessment. The report produced was provided as Appendix 14 of the <i>Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes</i>.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Population Density	<p>As part of the initial Phase 1 - Preliminary Screening assessment, each of the 9 sites identified were at a minimum 300m from the nearest sensitive (residential and commercial) receptors. As part of the ASA Phase 2 assessment, the potential for each of the sites to impact on areas of Significant Population Densities was considered as part of the matrix assessment. This element is not considered in isolation and must be considered in conjunction with all other potential impacts included in the assessment.</p>
Proximity to Load Centres	<p>The GDD project is required to facilitate the development of a Regional WwTP which will serve, either directly or indirectly, the entire GDA. The initial study area, was informed by the recommendations of the GSDSDS and its subsequent SEA and encompassed the North County Dublin area. Further details on the development of the study area are included in the <i>Alternative Sites Assessment – Phase One Preliminary Screening Outcomes Report</i>.</p> <p>The GDD is one of a number of recommendations of the GSDSDS which was commissioned as a result of the broadening gap between developing load in the GDA and the maximum load which can be delivered to, and treated at, the existing treatment plants in the catchment, and primarily at Ringsend WwTP.</p>
Proximity to Sensitive Receptors	<p>At Phase 1 - Preliminary Screening assessment each of the sites were identified on the basis that there were no sensitive (residential or commercial) receptors within 300m of the site boundaries. The numbers of sensitive receptors outside of this distance was then considered as part of the ASA Phase 2 matrix assessment under the socio-economic sub-criteria.</p> <p>Inconsistencies in the figures provided in the <i>Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes</i> have been reviewed and any corrections were minor and had no impact on the overall Phase 2 matrix assessment outputs. Full details of any corrections required are provided in Appendix 1 of this report.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>

Stakeholder Issues	Reponses
Risk and Health and Safety	All elements of the project will be subject to a comprehensive and thorough risk analysis to ensure that potential hazards are identified and assessed and mitigation measures adopted to minimise the risk of failure in line with best international practice.
Tourism Recreation and Amenity	<p>The effluent discharged at the marine outfall location will be treated to the required standard in accordance with the EPA licence to be granted and other relevant water quality standards as detailed previously above. Furthermore, the hydrodynamic modelling undertaken will demonstrate that there will be no negative impact from the plant, when operated and maintained appropriately, on the water quality and therefore the amenities, both recreational and tourist, along the coastline.</p> <p>Where site specific issues were identified in stakeholder submissions, these have been checked by the relevant specialist to ensure they have been included in the assessment.</p>
Traffic and Road Infrastructure	<p>As part of this current ASA stage, road infrastructure, site access and traffic impacts have been considered by the project team.</p> <p>Any potential impact from increased traffic will be managed through appropriate restrictions included in the Environmental Impact Statement and subsequently incorporated in to the contractors Environmental Management Plan.</p>
Treatment	The range of treatment processes identified as capable of achieving the required effluent discharge standards for the proposed WwTP will be detailed in the Preliminary Design Report to be developed for the project. The potential treatment processes identified are based on the limits imposed on the discharge from the plant by the EPA wastewater discharge licence and other relevant water quality standards.
Other Issues	<p><i>Alternatives</i> - As part of the Phase 1 - Preliminary Screening assessment, available sites were sought throughout the whole of the study area including at and close to the coastline. No appropriate sites, which satisfied the requirements set out at the preliminary screening stage, were available at the coastline. The length of the outfall pipe into the marine environment has been determined, and will be refined, in conjunction with the hydrodynamic modelling currently ongoing.</p> <p><i>Community Gain</i> - All communities within the GDA will benefit either directly or indirectly from the construction of the proposed Regional WwTP.</p> <p><i>Compensation</i> - Compensation will be provided to landowners and those who are directly affected by the purchase of the site, acquiring the land for the road access and acquiring access for the construction and maintenance of the pipelines. Compulsory Purchase is a legislative mechanism which allows the Local Authority and relevant landowners to ensure all legal issues are met and addressed. Consultation with all relevant landowners has commenced and will be ongoing throughout the lifetime of the project.</p> <p><i>Impact on Business</i> - The GDD project is required in order to provide additional wastewater treatment capacity within the GDA which will facilitate future economic growth and development in the region. Without this critical infrastructure, development within the region would likely cease which would negatively impact on all businesses within the area.</p>

Stakeholder Issues	Reponses
	<p>Issues raised regarding the ASA Phase 2 Report</p> <p><i>Buffer Zones</i> - Consideration of buffer zones was addressed in the Alternative Sites Assessment – Phase One Preliminary Screening Outcomes Report. A buffer zone of 300m was considered appropriate as it is in excess of any buffers identified in the relevant guidance documents including the minimum distance of 100m set out by the Fingal County Council Development Plan (2011 – 2017). It should be noted that the 300m buffer was applied to the original land parcels and therefore in most instances is now a minimum distance to sensitive receptors for each of the sites.</p> <p><i>Community Impact</i> - Sensitive receptors within the Dublin City Council administrative area were also considered during both Phase 1 and Phase 2 of the ASA, this is evidenced both in the figures included within the Alternative Sites Assessment – Phase One Preliminary Screening Outcomes Report which include sensitive receptors and designations within Dublin City Council and also within the ASA Phase 2 matrix assessment where communities within Dublin City are identified i.e. Belcamp and Darndale. It is noted that there was an inconsistency in the document text which neglected to specify the inclusion of Dublin City communities where relevant.</p> <p><i>Odour</i> - Inconsistencies in the figures provided within the Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes have been reviewed with respect to the final recommendations of the report. There is no impact on the recommendation that the Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff site options be brought forward for further consideration as the emerging preferred site options. Furthermore, all corrections were incorporated in to the assessment for Phase 4.</p> <p><i>Population Density</i> – Inconsistencies in the figures provided within the Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes have been reviewed with respect to the final recommendations of the report. There is no impact on the recommendation that the Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff site options be brought forward for further consideration as the emerging preferred site options. Furthermore, all corrections were incorporated in to the assessment for Phase 4..</p> <p><i>Prevailing Winds</i> - Wind speed and direction data was obtained from the Met Eireann weather station at Dublin airport as it is the closest station to the emerging preferred sites. This information has been used to inform the preliminary Air and Odour assessment completed as part of the ASA Phase 2 assessment and will also feed into the air dispersion models which will be developed at the EIA stage</p> <p><i>Risk of Flooding</i> - Risk of flooding at the site was considered as part of the hydrology assessment in the Phase 2 ASA matrix assessment. It is standard practice for stormwater and balancing tanks to be provided at new WwTP's and current best practice also provides for storage tanks in the upstream catchments for plants of this scale.</p>

Table 7.1 Stakeholder Issues

8 Assessment of Emerging Preferred Site Options

8.1

Introduction

The Alternative Sites Assessment (ASA) and Route Selection was undertaken having regard to the recommendations set out in the Strategic Environmental Assessment (SEA) on the GDSDS, which envisaged a process comprising four distinct phases, as outlined hereunder:

Phase 1 - Alternative Sites Identification (Preliminary Screening)

This phase involved the identification of a number of land parcels of suitable size within which the proposed Regional WwTP could be located, corridors for routing of the orbital sewer and outfall pipeline and potential marine outfall locations. The Phase 1 - Alternative Sites Identification (Preliminary Screening) included Public Consultation, desktop studies, mapping of constraints and a screening of the study area. Full details of this phase are provided in the *ASA Phase One – Preliminary Screening Outcomes Report* which was published in October 2011. This report recommended that nine land parcels, associated potential pipeline corridors and marine outfall study areas be brought forward for further consideration against a range of technical and environmental criteria under Phase 2 of the ASA.

Phase 2 - Alternative Sites Assessment

Phase 2 of the ASA process consisted of an assessment of the performance of each of the nine alternative land parcels, orbital sewer and outfall pipeline corridors and marine outfalls shortlisted in Phase 1 against a range of environmental and technical criteria leading to the identification of three emerging preferred sites for the proposed Regional WwTP, orbital sewer and outfall pipeline route and associated marine outfall location. The Alternative Sites Assessment (ASA) – Phase 2 included Public Consultation on the nine short listed land parcels, orbital sewer and outfall pipeline corridors and marine outfall study areas, desk-top studies, windshield surveys, site visits and impact assessments by the project consultants including various engineering and environmental specialists. It also included consideration of issues and concerns identified during the consultation period.

The Phase 2 assessments were based on the identification of differentiating sub-criteria under each of the technical and environmental criteria which were combined into an overall assessment matrix detailing all potential constraints associated with each of the shortlisted site options. Through an assessment of most and least favourable constraints in the matrix, the three emerging preferred site options of Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff were identified.

Full details of this phase are provided in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes* which was published in May 2012. This report recommended that the three emerging preferred site options

be brought forward for further consideration, including consultation and investigative studies, under Phase 3 and Phase 4 of the ASA process.

Phase 3: - Consultation stage

Following completion of Phase 2 and publication of the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, the three emerging preferred site options were brought through Public Consultation held over an eight week period from 14th May 2012 to 6th July 2012. The primary objective of this phase was to gather any additional information on the three emerging preferred site options, (i.e. WwTP site, its associated orbital sewer and outfall pipeline corridor and marine outfall locations). Full details of this Phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

Phase 4: - Selection of the Preferred Site, Pipeline Routes and Outfall Location

Phase 4 is the basis of this Alternative Sites Assessment and Route Selection Report (Phase 4). It constitutes the final identification of the preferred site option (i.e. WwTP site, its associated orbital sewer and outfall pipeline corridor and marine outfall location), and consisted of the following steps:

- Step 1* Review of the assessment findings from the ASA Phase 2 process which is reported in the *Alternative Sites Assessment and Route Selection Report (Phase 2): Emerging Preferred Sites and Routes*, May 2012.

- Step 2* Consideration of the submissions received during ASA Phase 3 (Public Consultation) of the ASA process which was held over an eight week period from 14th May 2012 to 6th July 2012. Full details of this phase are provided in the *Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes*, which was published in October 2012.

- Step 3* Undertake further investigative studies to supplement the data collected and assessed during the ASA Phase 2 and which were also informed by consideration of submissions received.

- Step 4* Assessment of the findings of the further investigative studies to determine whether anything of such significance was identified which made the development of any of the three emerging preferred site options unfeasible.

- Step 5* Assessment of the individual components of the site options (WwTP site, marine outfall locations and associated orbital sewers and outfall pipelines) against the findings of *Step 1 to Step 3* above. Identification of constraints for the individual components and the identification of potential mitigation measures where the ASA Phase 4 assessment indicated that it was not possible to avoid impacts.

- Step 6** Preparation of preliminary cost estimates
- Step 7** Combine the assessment of the individual components from *Steps 5 and 6* into one overall emerging preferred site option assessment matrix. Through a comparative assessment assign ‘more’ and ‘less’ favourable classifications to the identified constraints.
- Step 8** Selection of final preferred site option based on the relative performance of each of the site options against the Environmental, Technical and Cost criteria considered.

This chapter provides details of the ASA Phase 4 assessment from Step 1 through to and including Step 6 as outlined above. Chapter 9 presents the ASA Phase 4 assessment findings from Step 7 and 8 above.

8.2 Addendum to the ASA Phase 2 Report

This addendum resulted from:

- Review of the assessment findings from the ASA Phase 2 process by the Project Team post publication of the Phase 2 Report, and
- Comments / queries raised during the ASA Phase 3 Public Consultation;

A small number of amendments / corrections were required to the Socio-Economic, Noise & Vibration, Air & Odour, and Pipeline ‘C’ corridor aspects of the report. Clarifications are provided to the original Alternative Sites Assessment in each of these areas. Full details of these amendments/corrections are provided in Appendix 1 of this report.

It should be noted that none of the required amendments / corrections were found to impact on the overall identification of the emerging preferred site options.

8.3 ASA Phase 4 Investigative Studies

The further investigative studies undertaken during this Phase 4 of the ASA process, which supplement data collected and assessed during the ASA Phase 2 process are outlined hereunder. The studies consisted of the following elements:

- Site visits and walkovers;
- Pipeline corridor walkovers, and
- Investigative studies;

Ecology

Studies consisting of Ecological Baseline Surveys across the three emerging site options were undertaken as set out in **Table 8.1**. These studies were informed by the ecological data collected during the ASA Phase 2 process. The findings of these investigative studies is provided in Appendix 5.

Survey Type	Summary Description
Terrestrial Surveys	<ul style="list-style-type: none"> Proposed treatment plant sites were surveyed and habitats mapped between July – August 2012 Proposed pipeline route was surveyed and mapped between October – December 2012 Potential badger sites identified during previous surveys were re-surveyed January – February 2013; Bat surveys (roosting behaviour, feeding and commuting activity) of the proposed treatment plants sites were surveyed July 2012; and Bat surveys of proposed pipeline route were surveyed June – August 2012.
Bird Surveys	<ul style="list-style-type: none"> Breeding season walkover surveys (June 2012) and Winter walkover surveys (December 2012) of the proposed treatment plant site(s); Baldoyle Bay bird habitat surveys June 2012; Baldoyle Bay High tide roost counts August – December 2012; Baldoyle Bay Low tide counts June 2012 – January 2013; Broadmeadow River Valley Survey June 2012; Brent Geese Surveys around Baldoyle Area November 2012 – January 2013; Land-based observations of seabird usage of areas around the proposed outfall location(s): June 2012, August 2012, November 2012, December 2012, January 2013, March 2013;
Freshwater Surveys	<ul style="list-style-type: none"> Macroinvertebrate biodiversity surveys of all watercourses potentially impacted by the proposed treatment plant sites and crossed by pipeline routes (as identified on a 1:50,000 OSI map) between July – August 2012; Salmonid, lamprey and crayfish habitat surveys of all watercourses potentially impacted by the proposed treatment plant sites and crossed by pipeline routes between July – August 2012; Otter surveys of all watercourses potentially impacted by the proposed treatment plant sites and crossed by pipeline routes between July – August 2012; Aquatic flora surveys of all watercourses potentially impacted by the proposed treatment plant sites or crossed by pipeline routes between July – August 2012.
Marine Surveys	<ul style="list-style-type: none"> Summer benthic survey (site map below) between 31.07.12

Survey Type	Summary Description
	to 06.08.12. - Water profiles & samples, benthic sampling, chemistry and seabed photography. <ul style="list-style-type: none"> • Winter water quality campaign repeated on the 11.12.12. - Water profiles & samples

Table 8.1 – Ecological Baseline Surveys

Cultural Heritage

Archaeological Geophysical surveys of the three emerging preferred sites were carried out during March and April 2013 under licence to the Department of Arts, Heritage and the Gaeltacht (Licence Refs 13R23, 13R24, 13R25) to identify the possible presence of archaeological remains and to supplement the cultural heritage data collected during the ASA Phase 2 process.

The archaeological geophysical survey employed fluxgate gradiometry to investigate all available lands within the proposed sites at Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff with data collected along parallel traverses using a sensor spacing of 1m, and crossline sampling rate of 10hz equivalent to 1 reading every 10 - 15cm.

The findings of the archaeological geophysical survey were assessed by the project cultural heritage sub-consultant. Their report and full details of the archaeological geophysical surveys are provided in Appendix 6.

Landscape and Visual

In landscape and visual terms the studies during this phase examined the inherent screening surrounding each of the three preferred sites using Route Screening Analysis (RSA). In simple terms Route Screening Analysis consists of driving roads in the vicinity of each of the preferred sites and ascertaining whether full screening, partial screening or no screening exists at the roadside. A full description of this methodology is provided in Appendix 7. The RSA surveys were undertaken during March and April 2013.

A clearer understanding of the visual exposure and appearance of the site was also achieved through the production of basic photomontages from the most sensitive viewing locations surrounding each site. Using this combination of RSA and photomontages it was possible to assess the following;

- The extent of existing screening around each site
- The extent of exposure to sensitive visual receptors
- The potential to provide effective mitigation screening within each site
- The likely form of mitigation with regard to planting and external finishes in relation to each site context

These studies were informed by and supplement the work undertaken on Landscape and Visual assessment for the ASA Phase 2 process. Full details of these ASA Phase 4 studies are provided in Appendix 7.

Soils and Geology

A preliminary ground investigation programme was commissioned to be undertaken along the alignment of the emerging preferred site options to supplement the soils and geology data collected and collated during the ASA Phase 2 process. This preliminary ground investigation was undertaken between January and April 2013 and focussed on the emerging preferred sites and the land fall areas of the proposed marine outfall study areas. As this was a preliminary investigation offshore ground investigations of the outfall study areas were not included at this time. The investigations included the following:

- 17no. Trial Pits
- 22no. Cable Percussive Boreholes
- 16no. Rotary Core follow-on selected cable percussive boreholes
- 8no. standpipes within rotary core boreholes
- Geophysical surveys to assist in the determination of geological features such as faults and depth to bedrock in three areas across the two proposed outfall locations and included 2D resistivity and seismic surveys
- Laboratory testing of soils and rock.

The locations of all trial pits, cable percussive boreholes, rotary core follow-on boreholes and geophysical survey areas are shown on **Drawing Nr 12** included in Appendix 13.

The findings of the preliminary ground investigation programme were assessed by the project 'soils and geology' sub-consultant who prepared a Preliminary Ground Investigation – Geotechnical Interpretative Report. The Geotechnical Interpretative Report and full details of the preliminary ground investigation programme are provided in Appendix 8.

Hydrographic Surveys

Hydrographic surveys were commissioned for both outfall areas. These surveys provided data for the hydrodynamic modelling studies and for preliminary engineering design of the outfall. The surveys were undertaken in two stages consisting of:

Stage 1(Summer 2012)

- Collection of tide, current, water depths, water temperature and water salinity data;

- Dye tracer and drogoue surveys (dispersion characteristics at outfall locations);

Stage 2 (January – May 2013)

- Bathymetric surveys (sea bed character and profile);
- Sub-bottom profiling (depth below sea bed to rock);
- Magnetometer survey (for presence of ship wrecks)

The findings of the hydrographic surveys were assessed by the project team and incorporated into the hydrodynamic modelling studies and preliminary engineering design. Full details of the Hydrographic survey reports are attached as Appendix 11 to this Report.

Hydrodynamic Modelling

Modelling studies were undertaken, using the CORMIX model, which is an industry standard software package, to determine the near-field dilution and dispersion characteristics of a proposed outfall discharging to the receiving waters in both the northern and southern outfall study areas. The CORMIX model predicted the initial plume development, dilution and effluent concentrations within the plume.

The modelling study assessed the relative merits of each outfall location against predicted dilution rates and concentrations of effluent discharged from each outfall.

The hydrodynamic data used in the CORMIX model was obtained from the Acoustic Doppler Current Profilers (ACDPs) and the tide gauges deployed during the course of the hydrographic surveys discussed above.

The Hydrodynamic modelling report is provided as Appendix 12 of this report.

Engineering Design

Engineering Design work during ASA Phase 4 studies built on the preliminary engineering design work completed for ASA Phase 2 and in particular examined the following:

- Indicative layouts for the proposed Regional WwTP at each site;
- Refinement of the pipeline corridors,
- Assessment of the volumes of wastewater to be transferred from the load centres to the proposed Regional WwTP,
- Preliminary sizing of pipes (diameters and gradients),
- Preliminary pumping requirements;
- Potential construction methodologies;

- Preliminary Cost Estimates

The full Engineering Design Report is attached as Appendix 10.

Traffic and Access

Assessment of traffic and access during ASA Phase 4 considered the relative merits of the three emerging preferred sites for the proposed Regional WwTP in terms of the ability to achieve suitable vehicular access. In comparing the potential sites, the requirements for a new access onto the public road network, the construction of a new access road leading to the facility and the suitability of the public road network to cater for traffic associated with the facility are taken into consideration.

Full details of the Traffic and Access Report are attached as Appendix 9 to this Report.

Preliminary Cost Estimates

Preliminary Cost Estimates, including construction and operational costs, mitigation costs, utility services provision and land acquisition costs have been developed for the three emerging preferred site options. These preliminary Cost Estimates are included in Appendix 10 of this report.

Planning Policy

The Fingal County Development Plan, 2011 – 2017 was reviewed to determine whether there had been any changes or variations to the Development Plan since publication of the ASA Phase 2 Report in May 2012, which might impact on the emerging preferred site options.

It was noted that there is one proposed variation, dated 24 April 2013, to the Fingal County Development Plan, 2011 – 2017 for Lands at Charlestown, Finglas, Dublin 11. The GDD project has no impact on this proposed variation to the County Development Plan.

In addition the following Local Area Plans (LAP) were also reviewed and do not identify or constitute a significant or material planning policy constraint.

- Barrysparks LAP
- Ballyboghil LAP
- Oldtown LAP
- Hansfield SDZ Amendment
- Dardistown LAP
- Cherryhound LAP
- Rivermeade LAP

- Kilmartin LAP
- Baldoyle-Staploin LAP
- Draft Rivermeade LAP
- Draft Portmarnock South LAP
- Draft Rathingle LAP

8.4 Assessment of Emerging Preferred Site Options

Three preferred site options (Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff) emerged from the ASA Phase 2 process following rigorous assessment of the performance of each of the nine land parcel options shortlisted in ASA Phase 1 against a range of environmental and technical criteria and differentiating sub-criteria.

Each of the three emerging preferred site options are technically feasible and meet the majority of environmental attributes that the best site option requires.

In the ASA Phase 4 assessment each of the individual components (i.e. WwTP site, its associated marine outfall location, orbital sewers and outfall pipeline) of the three emerging preferred site options were assessed to determine the most and least favourable constraints in relation to the findings from ASA Phase 2, consideration of submissions received during ASA Phase 3 (Public Consultation) and the findings of the further investigative studies undertaken during ASA Phase 4.

In Chapter 9, the findings from the assessment of the individual components of each site option are then combined into an overall emerging preferred site option assessment matrix detailing all identified constraints associated with each site option. Through a comparative assessment of the most and least favourable constraints in the matrix the optimum site option is identified.

This chapter presents the detail of the assessment of the individual components of the emerging preferred site options in the following order:

- Assessment of emerging preferred sites;
- Assessment of Marine Outfall study areas;
- Assessment of orbital sewers and outfall pipelines.

8.4.1 Emerging Preferred Sites

8.4.1.1 Annsbrook

The site location and transfer pipeline corridors for the Annsbrook site option are illustrated in **Drawing Nr 6A** included in Appendix 13. The treated effluent pipeline from this site would discharge to the northern outfall location.

Ecology

The Annsbrook site comprises cultivated fields. Approximately 2.4km of the site boundary is defined by hedgerow. The Rath Little Stream, which is also part of an ecological corridor identified in the Fingal County Development Plan 2011-2017, lies to the north of the Annsbrook site. The Grallagh Stream (a tributary of the Ballyboghil River) runs to the south of the site. The site is located 4.1km upstream of Rogerstown Estuary SPA and SAC.

Terrestrial Ecology

The habitats recorded during survey are predominately intensively managed agricultural lands, most notably cultivated fields and improved arable grasslands. Such habitats are generally considered to be of low conservation value but provide foraging and breeding opportunities for birds and mammals. No rare or protected plant species were recorded at the time of survey.

Hedgerows at Annsbrook are typical of agricultural boundaries with regards structure and composition. Field boundaries are of hawthorn and blackthorn hedgerows with ash trees, largely abutting dry drainage ditches.

Badger tracks were noted across the site. An active badger sett was subsequently located outside of the site, to the south, on the southern bank of the Grallagh Stream.

Evidence of bat usage was not found in hedgerow trees and no bats were audible within any of the trees examined in the daytime (this may occur if bats are active on a warm day).

There is no water body or water course within the site and this would reduce the attractiveness for some bat species. There are no suitable buildings (e.g. farm sheds) within or immediately adjacent to the lands that would serve as bat roosts. Farm buildings and the house to the west of the site offer the best roosting opportunities.

Three bat species; common pipistrelle (the most frequently encountered species), soprano pipistrelle and Leisler's bat (the least encountered species) were recorded within and around the site. Bat activity was high overall with very high activity noted by the passive monitors in a farmyard to the north of the site.

Natterer's bats and brown long-eared bats have been noted in the Ballyboughal and Naul areas as well as the species recorded during the surveys. Daubenton's bats are

noted from the Delvin River to the north of the region but were not recorded in the current surveys and are considered unlikely in the immediate area of the site.

The site supports a diverse community of common breeding bird species including breeding Yellowhammer, a Red Listed Bird of Conservation Concern in Ireland. The site is however not of particular importance to significant congregations of overwintering birds such as waders or wildfowl. The site is considered to be only of marginally higher value for birds than Newtowncorduff, and of substantially higher value than Clonshagh (Clonshaugh).

Freshwater Ecology

The northern boundary of the Annsbrook site is a minimum of 50m from a tributary of the Ballough River, the Rath Little Stream. The proposed access road to the WwTP will cross a tributary of the Ballyboghil River.

The Ballough River system supports local populations of both resident Brown trout and migratory Sea trout (both *Salmo trutta*) and importantly a small but biological significant population of Atlantic salmon (*Salmo salar*). The fisheries habitat along this section of the Rath Little Stream is classified as fair for salmonids.

The Ballyboghil River supports Brown trout throughout and Sea trout, Eels (*Anguilla anguilla*) and importantly a small but biologically significant population of Atlantic salmon in its lower reaches, in addition to other fish species. The fisheries habitat at the proposed crossing point of the Ballyboghil River for the access road and immediately downstream is classified as poor to fair for salmonids.

The biological water quality for both the Rath Little Stream and the Grallagh Stream at the sampled locations is Q4 and Q3, respectively in accordance with the current Environmental Protection Agency (EPA) Q-value determinations. A Q4 determination is considered to be of satisfactory water quality and of good ecological status under the Water Framework Directive (WFD) for the invertebrate element. While a Q3 determination is considered to be of unsatisfactory water quality and of poor ecological status under the WFD for the invertebrate element.

Any development of this site must not impact on these watercourses.

In terms of ecological (terrestrial and freshwater) value, the site remains a valid alternative for the development of the proposed Regional WwTP. Based on the ecological surveys undertaken between June 2012 and March 2013, the site is of a lower ecological value when compared to Newtowncorduff and of a higher ecological value when compared to Clonshagh (Clonshaugh).

Cultural Heritage

The proposed site is located within the townland of Annsbrook, although part of the eastern boundary is formed by the boundary that separates Annsbrook and Woodpark. The proposed access route to the site crosses this townland boundary.

The ASA Phase 2 cultural heritage studies noted that there are two sites from the Record of Monuments and Places (RMP)¹ within 1km of the proposed site. These are located c. 885m and 910m to the east of the proposed site and consist of an excavated pit burial (DU007-034) and an excavated burnt pit (DU007-035). Over 1.2km to the south of the Annsbrook site is the archaeological complex associated with the Augustinian monastery at Gracedieu. There are ten sub-constraints listed within this site (DU007-01501-10), all of which are located between 1.26km and 1.51km of the proposed site. In addition to being listed within the RMP, Gracedieu nunnery and the two holy wells at Gracedieu are also recorded on the Record of Protected Structures² (RPS) as RPS 322 and RPS 321 respectively.

Five Cultural Heritage sites³ (CH) of archaeological potential were identified during the Phase 2 assessment within the boundary of the site (Annsbrook House (CH26), the site of a mill race (CH89) associated with Woodpark House (CH90), two potential bridge sites (CH105, CH106), and a site of post medieval structures (CH108)). Refer to **Drawing Nr 8A** in Appendix 13 for location of cultural heritage sites.

There are no National Monuments⁴ or structures recorded within the National Inventory of Architectural Heritage (NIAH)⁵ within 1km of the Annsbrook site boundary.

In the evaluation of the site during the ASA Phase 2 studies, one imperceptible negative impact was anticipated on the RMP site of the monastery at Gracedieu, (DU007-015). Four moderate negative impacts were anticipated on the cultural heritage sites. CH26, CH105, CH106, and CH108. One slight impact was anticipated on the designed landscape associated with Woodpark House and two moderate impacts on townland boundaries.

As noted above, ASA Phase 4 cultural heritage studies on the Annsbrook site consisted of geophysical surveys carried out under licence to the Department of Arts, Heritage and the Gaeltacht. The survey areas are referred to as AG 1-7 and marked on Figure 2 of Appendix 6 of this report.

The geophysical survey noted responses of possible archaeological origin in the following areas

- In the north-eastern most part of area AG1 a series of responses were identified, which may represent a ploughed out enclosure. No indication of this site exists within the desk based resource. Three other scattered responses were noted within the area, which may have an archaeological origin and

¹RMP: These are archaeological sites which are afforded legal protection under Section 12 of the 1994 National

² RPS: These are architectural heritage sites that are subject to statutory protection under the Planning Act (2000).

³ Cultural Heritage where used generically is a collective term for features/structures of architectural, archaeological or local (folklore/traditional) heritage merit. Where used specifically in this report cultural heritage sites (CH sites) are those potential archaeological sites and structures of architectural merit, which have been identified as part of the ASA Phase 2 Assessment. These can range from potential ringfort sites to the sites of post medieval structures or derelict vernacular cottages. These sites are not subject to specific statutory protection.

⁴ National Monuments: Archaeological sites of national importance, which can be under the ownership or guardianship of the state. Subject to statutory protection under the National Monuments Act (1930-2004).

⁵NIAH: Structures are included within the NIAH survey in order to inform county councils in the development of the record of protected structures. Whilst inclusion in the NIAH denotes a structure of architectural merit, it does not mean that it is subject to specific statutory protection.

represent pits. These could be any date and may also represent geological or modern ferrous material.

- Two small isolated responses of possible archaeological origin were noted in area AG2 and AG3.
- A cluster of possible archaeological features was noted in area AG7. These are located c.80m north of the development area boundary. Whilst no obvious features are marked within the material assessed at the desktop stage, this area is in proximity to the site of Annsbrook House (CH 26). Rocque⁶ shows the house to the west in his map of 1760. It is possible that these anomalies relate to an outbuilding connected to the house. No evidence of an outbuilding to the north of the house, which was shown as present in Rocque's map, was identified in the survey.

The geophysical responses noted above require that further archaeological investigation and assessment be undertaken should this site be selected as the final preferred site. However, a WwTP on this site could be designed to minimise and mitigate impact on these potential archaeological remains. The results of the cultural heritage assessment, along with the geophysical results would suggest that the Annsbrook and Clonshagh sites are more preferable for development than the Newtowncorduff site.

Landscape and Visual

The route screening analysis (RSA) undertaken during ASA Phase 4 studies for the Annsbrook site and shown schematically in **Figure 8.1** indicates that it is a relatively well screened site when viewed from the surrounding road network with the majority afforded no visibility. Very limited visibility is afforded from the R129 to the south of the site. Otherwise, sections of road with full visibility are evenly distributed in short sections.



Figure 8.1 RSA for public roads surrounding site - Annsbrook

Photomontages from three viewpoints (VP) were developed for this site and are shown in **Figure 8.2**.

Annsbrook VP1 is from the local road to the east of the site looking in a westerly direction at a distance of nearly 1km. From this viewpoint the proposed Regional

⁶John Rocque's Map of County Dublin 1760

WwTP is largely screened by intervening hedgerows so that only the upper most sections of the tallest structures would be partially visible.

Annsbrook VP2 is from the local road to the west of the site looking in an easterly direction at a distance of approximately 250m. The proposed Regional WwTP is substantially visible from here and there is a sense of its full extent. The taller elements of the facility rise above the dense lower portion of the intervening hedgerow, but are still seen below the taller trees that rise out of the hedgerow.

Annsbrook VP3 is from an elevated local road that is designated as a scenic route some 2.5km to the north of the site. From this viewpoint the proposed Regional WwTP is barely discernible from here amongst the hedgerows that become stacked together in perspective.



Figure 8.2 Viewpoints selected for photomontage - Annsbrook

From the RSA data and photomontages it is apparent that mitigation screen planting would be very effective at the Annsbrook site. Hedgerows tend to be quite low but with intermittent taller trees rising out of them. In order to tie in with the existing landscape context a similar form of screen planting should be applied with tall vegetation focussed around the taller elements of the site.

With respect to external finishes to the structures within the proposed Regional WwTP a frequent combination of matt, dark medium and light tones could be applied at this site in order to break up the massing and camouflage the scheme within screening vegetation. The colour swatch should reflect the rural context of this site taking its cue from both the screening elements as well as other large farm storage buildings in the vicinity.

Based on consideration of the Route Screening Analysis data and photomontages prepared in respect of the Annsbrook site, it remains a valid alternative for the proposed Regional WwTP from a landscape and visual perspective.

Soils and Geology

Grey brown podzolics/ brown earths dominate the soil deposits within the site. To the north and south of the site, along the banks of the watercourses, surface water/groundwater gleys and alluvium have been mapped. The superficial deposits covering the majority of the site are limestone till (carboniferous). Alluvium has been mapped along the streams however these are outside the site boundaries.

The bedrock lithology mapped beneath the site is the Lucan Formation. This lithology is composed of dark grey, well bedded, cherty, graded limestones and calcareous shales. No faults have been mapped within the site boundary, however a fault has been mapped to the north of the site, the extent of which is unknown and may run parallel to the eastern boundary of the site.

The preliminary ground investigation for the ASA Phase 4 process at the Annsbrook site included the following:

- 6no. Trial Pits (TP04 – TP09) to depths ranging between 2.9m - 3.3m below ground level (BGL);
- 3no. Cable percussive boreholes (BH05 – BH06) to depths ranging between 13.2m- 13.7mBGL;
- 2no. Rotary follow-on corehole (RC05 & RC06) in one of the cable percussive boreholes to 24.0mBGL; and
- 2no. Standpipes (RC05 &RC06).

A summary of the soil profile across the Annsbrook site is provided in **Table 8.2**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Topsoil	0.0	0.1 – 0.4
Soft to firm Brown Boulder Clay	0.0 – 0.4	0.4 – 2.9
Firm to stiff Brown Boulder Clay	0.6 – 4.0	4.1 – 4.6
Gravel Lens	2.9 – 8.6	0.6 – 2.4
Stiff to very stiff Brown Boulder Clay	8.2 – 9.2	9.8 – 14.8
Limestone bedrock	18.0 – 24.0	-

Table 8.2 – Summary of Soil Profile at Annsbrook

Bedrock was encountered in RC06 at 18.0m BGL, in the form of highly fractured limestone.

The preliminary ground investigation at Annsbrook indicates that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the proposed Regional WwTP at this location.

Traffic and Access

The Annsbrook site is within lands bounded by the R129 to the south and local roads to the north, east and west. As such the access has been located on the R129 and is shown on **Drawing Nr 13A**, included in Appendix 13 of this Report. The R129 is a single carriageway road linking the R122 to the R132 via Ballyboughal. It has a carriageway width of approximately 6m, no hard shoulders, verges or footpaths. The road pavement shows signs of wear to the west of the proposed entrance, and localised repairs are apparent at the entrance location.

The proposed entrance is located within an 80km/hr speed zone and as such, a 160m visibility splay is required from a 3m setback. Visibility at the entrance is restricted by the existing hedgerows, ditch and boundary treatments to both sides, however the required visibility could be achieved by setting back vegetation and by lowering the existing mound, replacing it with a verge. Due to the proximity of a stream to the road's edge, a safety barrier may be required to accommodate this verge.

The R129 has a straight horizontal alignment at the location where the entrance is proposed, however there are several sharp bends along the R129, which restrict forward visibility in places. The closest of these to the proposed entrance are approximately 250m from the entrance in both directions.

The accident history in the vicinity of the site has been reviewed and indicates that there have been a small number of accidents on the R129 in recent years. One accident recorded as minor occurred in 2006 approximately 50m to the west of the proposed entrance. To the east, 2 minor accidents were recorded at the junction between the R129 and the R132 also in 2006.

Access into the proposed Regional WwTP site would be provided by an access road approximately 1.3km long. The carriageway width would be 4m with passing bays provided at regular intervals to provide passing opportunities for vehicles travelling in opposing directions. This access road will cross a stream at the entrance which would require either a bridge crossing or large culvert and crosses a field drain further along the access which would have to be culverted.

Due to the location of the main circulation routes in relation to the site and the condition of roads to the west of the site, traffic generated by the proposed Regional WwTP will be routed east, turning left out of the proposed entrance. Similarly, incoming WwTP traffic will be directed to approach from the east.

With regard to proposed Regional WwTP operations staff traffic, Fingal County Council aim to promote sustainable transport through the implementation of the National Transport Authority's (NTAs) smarter travel policy and have included the following policy statement within the County Development Plan: *'Promote and facilitate movement within, and to, the County of Fingal, by integrating land use with a high quality, sustainable transport system that prioritises public transport, cycling and walking. In facilitating such movement, the natural and cultural heritage of the County must be protected.'*

Due to its semi rural location, alternate modes of travel to and from the WwTP by operations staff would not be feasible and it is likely that operations staff would travel to and from the WwTP by private car.

Based on consideration of site access, visibility, and accident history on the surrounding road network the Annsbrook site remains a valid alternative for the proposed Regional WwTP.

Planning Policy

The relevant statutory planning documents, e.g. RPGs, Development Plan, etc. have been reviewed and do not identify or constitute a significant or material planning policy constraint.

Engineering and Design

As part of the ASA Phase 4 assessments a preliminary indicative layout for a WwTP of the size and scale of the proposed Regional WwTP has been developed for the site. This layout is based on a conventional activated sludge plant (ASP), which would be expected to require the largest footprint, and is shown on **Drawing Nr 8B** included in Appendix 13 and illustrated schematically here as **Figure 8.3**.



Figure 8.3 -WwTP Indicative Layout - Annsbrook

It is feasible to route the Orbital sewers from the load centres to the WwTP and from the WwTP to the outfall within the pipeline corridors shown on **Drawing Nr 6** of Appendix 13.

A WwTP located on the Annsbrook site would outfall to the northern outfall area.

There are no identified technical constraints to the construction of the proposed Regional WwTP on the Annsbrook site.

8.4.1.2 Clonshagh (Clonshaugh)

The site location and transfer pipeline corridors for the Clonshagh site option are illustrated in **Drawing Nr 6B** included in Appendix 13. The treated effluent pipeline from this site would discharge to the southern outfall location.

Ecology

The Clonshagh site comprises tilled earth, a hedgerow network and adjacent watercourses.

The Cuckoo Stream, which is a tributary of the Mayne River, lies just to the north of the Clonshagh site, while the main channel of the Mayne River, which is also part of an ecological corridor identified in the Fingal County Development Plan 2011-2017, lies to the south of the site.

The site is located 4.6km upstream of Baldoyle Bay Special Protection Area (SPA) and Special Area of Conservation (SAC) with a potential pathway of effect available via the Mayne River.

Terrestrial Ecology

At the time of the survey the site comprised cultivated cereal fields and tilled land. Field boundaries were predominantly comprised of hawthorn with mature ash trees abutted by dry and wet drainage ditches.

Habitats present on the site are considered to be of low conservation value.

There was no confirmed badger activity within this site however a number of mammal paths were noted crossing drainage ditches at field boundaries.

There are few hedgerows given the area of the proposed site with one continuous hedgerow at the southern side of the site with lesser hedges emanating north from this.

There are no trees with high roost potential for bats within the hedgerow.

There were three species of bat recorded at this site, common pipistrelle, soprano pipistrelles and Leisler's bat; however, none of these bats are considered to be roosting within the trees on this site.

This site has a low diversity of bird habitats and supports a limited range of common breeding bird species, but like Annsbrook, it also supports breeding Yellowhammer. The site is not of particular importance to overwintering birds such as waders or wildfowl.

This site is considered to be of least value to both breeding and non-breeding birds than either the Annsbrook or Newtowncorduff sites.

Freshwater Ecology

The northern boundary of the Clonshagh site is a minimum of 50m from the Cuckoo Stream, a tributary of the Mayne River, and the proposed development must not impact on this watercourse.

The Mayne River constitutes a non-salmonid system because of the presence of an impassable barrier to fish movement at the lower end of the system. However, water quality has been noted as improving and Inland Fisheries Ireland is currently assessing the viability of a salmonid reintroduction programme.

The biological water quality for the Cuckoo Stream at the sampling location is Q3 in accordance with the current EPA Q-value determinations. A Q3 determination is considered to be of unsatisfactory water quality and of poor ecological status under the Water Framework Directive (WFD) for the invertebrate element.

In terms of ecological (terrestrial and freshwater) value, the site remains a valid alternative for the development of the proposed Regional WwTP. Based on the ecological surveys undertaken between June 2012 and March 2013, the site is of a lower ecological value when compared to both the Annsbrook and Newtowncorduff sites.

Cultural Heritage

The Clonshagh site is located within two townlands (Clonshagh and Clonshagh (E.D Kinsaley)). The boundary that separates the two crosses the proposed site.

The ASA Phase 2 cultural heritage studies noted there are seven sites from the Record of Monuments and Places located within 1km of the proposed site at Clonshagh. The closest of these consists of DU015-056, which is the site of an enclosure located c.295m to the east. It is probable that this site represents a levelled ringfort.

A total of seven areas of archaeological potential were identified within the vicinity of the site. The closest of these consists of a possible enclosure CH62, which was marked as a tree ring on the first edition OS map. This is located c.150m east of the site. Two additional ring fort sites have also been identified within the aerial photographs. CH58 is located c.530m north-east, whilst CH66 is located c.730m to the west. A total of four structures of architectural merit are located within the vicinity of the proposed site. The closest of these CH65 is a vernacular house located c.305m to the west of the proposed site. A further house and farm CH56 are located c.335m to the north.

There are three protected structures (RPS) located within 1km of the proposed site. The closest of these consists of Springhill House (RPS 792) located c.420m east of the site. The former demesne lands associated with this building are located to the immediate east of the proposed site.

There are a total of five structures from the National Inventory of Architectural Heritage (NIAH) located within 1km of the proposed site. The closest of these was Belcamp

House (NIAH 11349005), which was located c.400m south of the site. However, this structure was badly damaged in a fire and was recently demolished.

There are no National Monuments within 1km of the Clonshagh site boundary.

In the evaluation of the site during ASA Phase 2 studies three imperceptible negative impacts were anticipated on existing RMP sites;

- DU015-056, Ringfort c.295m east
- DU015-057, Enclosure c.515, north east
- DU015-095, Enclosure c. 405m north east

Three imperceptible negative impacts were also anticipated on cultural heritage sites (enclosure (CH62), vernacular house (CH65) and house & farm (CH56)). Three slight impacts were anticipated on surrounding demesne landscapes, whilst one imperceptible impact was predicted on the protected structure of Springhill House (RPS 792). Two moderate impacts were predicted on townland boundaries.

As noted above ASA Phase 4 cultural heritage studies on the Clonshagh site consisted of geophysical surveys carried out under licence to the Department of Arts, Heritage and the Gaeltacht. The survey areas are referred to as CG 1-5 and marked on Figure 3 of Appendix 6 of this report.

The geophysical survey noted responses of possible archaeological origin in the following areas:

- The geophysical results in area CG1, the western most field within the proposed development area, are characterised by the presence of a broad linear response, likely to represent a former paleo-channel.
- Discrete curving linear anomalies were noted in the north-west part of area CG2, which have the potential to represent a possible early medieval field system. These features extend outside of the proposed development area. Similar features were noted in the narrow eastern part of the survey area. These may represent an enclosure, although interpretation is difficult due to the narrow nature of the survey area.
- A response indicating the remains of a possible sub-circular enclosure was noted in the north-east corner of area CG3. The entire feature could not be identified during the survey due to disturbance around the corner of the field. However, it is located to the immediate north-east of the boundary of the proposed development area. It occupies an area to the immediate south-east of a paleo-channel, which was also identified as an anomaly in the survey and is clear on some of the aerial photograph sets. The topography in the area shows that it partially occupies a gradual north facing slope that runs towards the stream, which currently borders the field.

The geophysical responses noted above require that further archaeological investigation and assessment be undertaken should this site be selected as the final preferred site. However, a WwTP on this site could be designed to minimise and mitigate impact on these potential archaeological remains. The results of the cultural heritage assessment, along with the geophysical results would suggest that the Annsbrook and Clonshagh sites are more preferable for development than the Newtowncorduff site.

Landscape and Visual

The route screening analysis (RSA) undertaken during ASA Phase 4 studies for the Clonshagh site and shown schematically in **Figure 8.4** reveals a very high degree of full screening from the surrounding road network. The majority of full visibility occurs from the motorway overpasses to the west. There is little to no visibility from roads to the south and west and this can be comfortably assumed to apply to all of the suburban streets to the south of the N32 as well.



Figure 8.4 RSA for public roads surrounding site – Clonshagh (Clonshaugh)

Photomontages from three viewpoints (VP) were developed for this site and are shown in **Figure 8.5**.

Clonshagh VP1 is from the local road adjacent to the west of the site at a distance of approximately 300m. A reasonable degree of screening is provided by the taller sections of hedgerows, but the hedgerows are predominantly low in this area. Despite the screening there is a sense of the extent of the development and the taller elements, which are viewed in silhouette, may intrude on the distant views of Howth Head from some receptors.



Figure 8.5 Viewpoints selected for photomontage – Clonshagh (Clonshaugh)

Clonshagh VP2 is from the upper level corridor in Bewleys Airport Hotel some 600m to the southwest of the site. This elevated location affords an oblique view over the site and a clear comprehension of the scale and extent of the proposed Regional WwTP. Existing screening is of little or no value from this receptor.

Clonshagh VP3 is from a local access road approximately 500m to the east of the site. There is a high level of existing screening that will limit potential views of the proposed Regional WwTP from this location.

It was not possible to produce a photomontage from the motorway overpass to the west for safety reasons. However, this would not be considered a particularly sensitive receptor.

From the RSA data and photomontages it is apparent that there is a strong potential to effectively mitigate the visual impact from the proposed development on this site from ground based receptors using screen planting. This should take the form of low hedgerows with frequent taller trees in order to reflect the existing landscape context. It will be difficult to screen the view from the upper storeys of Bewleys Hotel; however a considered strategy for external finishes will provide amelioration.

The lands immediately to the south of the proposed site at Clonshagh are zoned objective HT in the Fingal County Development Plan 2011 – 2017, to provide for office, research and development, and high technology / high technology manufacturing type employment in high quality built and landscaped environment. It is also an objective of the Development Plan 2011 – 2017 to provide a new distributor road to service this. Consequently, the current rural context is likely to change to that of a campus of modern buildings.

A Landscape and Visual Strategy for a proposed Regional WwTP could reflect this planning context by utilising high quality modern finishes to all structures. Hedgerow screen planting may not be appropriate to the roadside and public facades of the proposed Regional WwTP in the context of the stated objective in the Development Plan 2011 – 2017 for a high quality built and landscaped environment. Instead, ornamental shrub planting and specimen trees would better serve to blend the facility with its surroundings. Rather than a dispersed and frequently interrupted colour scheme using subtle tones (rural context), the external finishes to suit this high quality built and landscaped environment might be bold, blocky and reflective. This strategy would provide for amelioration to the views from the upper storeys of Bewleys Hotel.

Based on consideration of the Route Screening Analysis (RSA) data and photomontages prepared in respect of the Clonshagh site, it remains a valid alternative for the proposed Regional WwTP from a landscape and visual perspective.

Soils and Geology

Limestone till deposits of Carboniferous age underlie the soils over the majority of the site, however, gravels derived from limestone have been mapped in the north western corner. No alluvium deposits have been mapped within the site boundaries.

The Tober Colleen Formation is the bedrock lithology which underlies the majority of the site. This lithology is described as a calcareous shale and limestone conglomerate. The Lucan Formation, a dark grey, well bedded, cherty, graded limestone and calcareous shale has been mapped at the western extent of the site.

There are two historic unregulated landfills located close to the site as identified from Fingal County Council unregulated landfill data. Belcamp Lane Landfill (approximately 400m to the south) has been assigned as a moderate risk site by Fingal County Council in terms of potential risk from contaminants; Doolaghs Quarry Landfill (approximately 850m to the east) has been assigned as a low risk site by Fingal County Council in terms of potential risk from contaminants.

The preliminary ground investigation for the ASA Phase 4 studies at the Clonshagh site included the following:

- 3no. Trial Pits (TP01 – TP03) to depths ranging between 3.15m - 3.85m below ground level (BGL);
- 4no. Cable percussive boreholes (BH01 – BH04) to depths ranging between 10.0m–14.8m BGL;
- 2no. Rotary follow-on corehole (RC01 & RC02) in two of the cable percussive boreholes to 18.0m BGL; and
- 3no. standpipes (BH04, RC01& RC02).

A summary of the soil profile across the Clonshagh (Clonshaugh) site is provided in **Table 8.3**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Topsoil	0.0	0.4
Brown Boulder Clay	0.0 – 0.4	1.2 – 1.8
Black Boulder Clay	1.6 – 3.2	8.2 – 15.4
Gravel Lens	5.8 – 7.3	0.3 – 1.5
Sand Lens	17.4	0.4

Table 8.3 – Summary of Soil Profile at Clonshagh (Clonshaugh)

No Bedrock was encountered on this site. All of the boreholes terminated at 18.0m BGL.

The preliminary ground investigation at Clonshagh indicates that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the proposed Regional WwTP at this location.

Traffic and Access

The Clonshagh site is situated near the N32 and the Clonshaugh Road, the former being to the south and the latter to the west. The N32 was a National Primary Route but has recently been re-designated as Regional Road R139. The R139 is a single carriageway with 2 lanes in both directions and carries a significant volume of traffic.

Access to the site is proposed from the Clonshaugh Road and is shown on **Drawing Nr 13B**, included in Appendix 13 of the main ASA Phase 4 Report. The Clonshaugh Road has a carriageway width of approximately 6m, has no hard shoulders and generally no verges or footpaths. The proposed entrance is located at the location of an existing field access. Visibility at this location is limited to approximately 25m to the right and 30m to the left from a setback of 3m. The speed limit of this road is 60km/hr resulting in a desired visibility of 120m from a setback of 3m. This visibility splay could be achieved, by setting back of boundaries and verge widening as well as some service diversions.

Forward visibility along the Clonshaugh Road is restricted by the presence of sharp bends in the road approximately 375m to the north. The accident data for this road indicates infrequent accidents, with one minor accident recorded in 2005 located slightly south of the proposed entrance.

Access into the WwTP site would be provided by an access road approximately 320m long. The carriageway width would be 4m with passing bays provided at regular intervals to provide passing opportunities for vehicles travelling in opposing directions.

Due to the location of the main circulation routes in relation to the site and the poor forward visibility along the Clonshaugh Road immediately north of the site, traffic generated by the proposed Regional WwTP will be routed south, turning left out of the proposed entrance. Similarly, incoming WwTP traffic will be directed to approach from the south, turning right into the facility.

With regard to staff traffic, Fingal County Council aim to promote sustainable transport through the implementation of the NTAs smarter travel policy and due to its location on the fringe of Dublin City and in close proximity to Swords, it is possible that staff could access the WwTP by public transport or by walking or cycling.

An alternative access to the site from the R139 (formerly the N32) is also under consideration. The realignment of the Malahide Road is a stated objective of the Fingal County Development Plan, 2011 – 2017. As such the Malahide Road Realignment Scheme is currently under consideration by Fingal County Council. The alignment of one road forming part of this proposed road scheme passes south of and immediately adjacent to the site, while another road links to the R139. Future access to the site could be gained via the roads included in this scheme should it progress to full construction. Access to the WwTP site could be provided from the R139 by constructing the link road from the R139 as part of the proposed GDD scheme.

Should this link road be constructed as an access to the WwTP only, it would be appropriate that the junction with the R139 be constructed with a left-in, left-out arrangement. However, should the road be used as part of the overall Malahide Road Realignment Scheme this junction would operate more efficiently as a signalised junction.

There have been several accidents along the R139 including one serious accident in 2002. Two minor accidents, both of which were recorded in 2002, occurred close to the proposed junction with the R139.

The road from the R139 would be approximately 600m in length and would have a carriageway width of approximately 10.5m, 1.5m hard strips and a 2m verge. This access road would cross the Mayne River and would require the construction of a bridge or culvert. This structure would be constructed in accordance with Section 50 of the Arterial Drainage Act.

The potential accesses to the Clonshagh site are shown on **Drawing Nr 13B**, included in Appendix 13 of the main ASA Phase 4 Report.

Based on consideration of site access, visibility, and accident history on the surrounding road network the Clonshagh site remains a valid alternative for the proposed Regional WwTP.

Planning Policy

While GB (greenbelt) zoning would generally be considered to be a more restrictive zoning objective than RU (rural), often more sensitive to development, with respect to the Clonsaugh site, it is considered that its proximity to adjacent 'industrial' type zonings, existing urban land uses/developments within the area and the continued preservation/retention of significant and more sensitive GB zoned lands in this area allow the planning authority's vision for the area continue to be met. As such the GB zoning does not constitute a planning policy constraint such as would preclude the proposed development.

Engineering and Design

As part of the ASA Phase 4 assessments a preliminary indicative layout for a WwTP of the size and scale of the proposed Regional WwTP has been developed for the site. This layout is based on a conventional activated sludge plant (ASP), which would be expected to require the largest footprint, and is shown on **Drawing Nr 8B** included in Appendix 13 and illustrated schematically here as **Figure 8.6**.



Figure 8.6 -WwTP Indicative Layout - Clonshagh

It is feasible to route the Orbital sewers from the load centres to

the WwTP and from the WwTP to the outfall within the pipeline corridors shown on **Drawing Nr 6B** of Appendix 13.

A WwTP located on this site would outfall to the southern outfall area

There are no identified technical constraints to the construction of the proposed Regional WwTP on the Clonshagh site.

8.4.1.3

Newtowncorduff

The site location and transfer pipeline corridors for the Newtowncorduff site option are illustrated in **Drawing Nr 6A** included in Appendix 13. The treated effluent pipeline from this site would discharge to the northern outfall location, see section 6.4 above for further details.

Ecology

The Newtowncorduff site comprises a mixture of arable and tillage grasslands. The proliferation of hedgerows and adjacent watercourses provide good potential for occurrence of protected species, notably badger.

The site is located 2.9km upstream of Rogerstown Estuary SPA and SAC. Two converging watercourses (Rath Little stream and Ballough River) in the vicinity of the site form part of an ecological corridor identified in the Fingal County Development Plan, 2011 - 2017.

Terrestrial Ecology

At time of survey the site comprised cultivated cereal fields and brassicas, improved grassland, dry calcareous/natural grassland and dry meadow. Field boundaries were typical of hawthorn hedgerows.

Dry calcareous/natural grassland occurs in the most south-westerly corner of this site. It is noted for its high ratio of broadleaved herbs to grasses, a generally low sward and the presence of at least one orchid species. Species include sweet vernal grass, crested dog'd tail, glaucous sedge, self-heal, birdsfoot trefoil, ribwort plantain, and meadow thistle.

The two fields to the north more resemble dry meadow with a longer sward and less frequent broadleaved herbs. Yorkshire fog, meadow foxtail, creeping bent, clovers. and the climbing broadleaved herbs, meadow vetchling and tufted vetch all occur. At least one orchid species occurs in the south corner of the lower field. There are areas of impeded drainage with rushes occurring.

Watercourses lie to the southwest (Rath Little Stream) and southeast (Ballough Stream) of the site boundaries, converging approximately 400m to the south of the site from where they continue to the south.

There is badger sett located along the eastern boundary of this site. Four entrances were along a 40m stretch of hedgerow and underlying ditch. This sett would require closure following approval under licence prior to construction works should this site be selected as the preferred site.

The principal areas of high quality habitat for bats lie to the south-of-centre section of the proposed site. There is a stream flowing through this area with mature trees flanking it. The best quality trees in this area in terms of bat potential include a mature willow, mature poplar and mature ash tree. It is noted that this area and the trees are

entirely outside of the proposed site boundaries. Also outside of the site boundaries and to the south, there are trees in a hedgerow leading to a partially ruined shed. Both the trees and the shed offer bat roost potential. Away from this hedgerow, there are very few trees with roost potential. One tree to the north has low to moderate potential while all other trees have very low to no potential.

In all, three bat species: common pipistrelle, soprano pipistrelles and Leisler's bat were recorded on site with feeding activities concentrated along the streams. A brown long-eared bat was recorded at the farm buildings adjacent to the main road and at the end of the lane way leading to the site.

Other surveys in the Donabate and Ballyboughal areas have recorded the presence of Natterer's bat in this region of Fingal, but this species was not recorded during these surveys. Daubenton's bats are noted from the Delvin River to the north and have also been recorded in the Swords area, but were not recorded in this case and are considered unlikely in the immediate area of the site.

This site supports diverse community of common breeding bird species including breeding Yellowhammer, a Red Listed Bird of Conservation Concern in Ireland. Buzzards also nest in the vicinity of the site. The site is not of particular importance to overwintering birds such as waders or wildfowl. The site is of marginally lower value for birds than Annsbrook, but of substantially higher value than Clonshagh.

Freshwater Ecology

The south eastern boundary of the site is a minimum of 50m from the Ballough River, while the south western boundary of the site is a minimum of 50m from a tributary of the Ballough River, the Rath Little Stream. The proposed access road to the WwTP will cross the Ballough River. Any development of this site must ensure that it will not impact on these watercourses as part of the proposed development.

The Ballough River system supports local populations of both resident Brown trout and migratory Sea trout and importantly a small but biological significant population of Atlantic salmon. The fisheries habitat at the proposed crossing point of the Ballough River and immediately downstream is classified as poor to fair for salmonids. The fisheries habitat downstream at the convergence of the Ballough River and the Rath Little Stream is classified as fair to good for salmonids.

The biological water quality for both the Rath Little Stream and the Ballough River at these sampled locations is Q3-4 and Q2-3, respectively in accordance with the current EPA Q-value determinations. A Q3-4 determination is considered to be of unsatisfactory water quality and of moderate ecological status under the Water Framework Directive (WFD) for the invertebrate element. While a Q2-3 determination is considered to be of unsatisfactory water quality and of poor ecological status under the WFD for the invertebrate element.

In terms of ecological (terrestrial and freshwater) value, the site remains a valid alternative for the development of the proposed Regional WwTP. Based on the

ecological surveys undertaken between June 2012 and March 2013, the site is of a higher ecological value when compared to both the Annsbrook and Clonshagh sites.

Cultural Heritage

The site is located within the townland of Newtowncorduff. The northern border of the site is formed by the townland boundary that divides Newtowncorduff and Ballough. This boundary is crossed by the proposed site access. The site access also crosses a stream to the north-east, water courses are considered to possess archaeological potential as they have attracted human activity since the prehistoric period.

The ASA Phase 2 cultural heritage studies noted that there are six sites from the Record of Monuments and Places located within 1km of the proposed site, the closest of these being a fulacht fiadh (DU008-069) c. 410m to the south-west and a moated site (DU008-016), which is also a protected structure (RPS 319) located c.600m to the south.

Four Cultural Heritage sites of archaeological potential were identified in the ASA Phase 2 studies within the vicinity of the proposed site (the site of two mounds (CH11), a possible ring ditch site (CH12), a possible medieval village site (CH25) and a possible castle and mill site (CH23), of possible medieval date). The proliferation of medieval and potential medieval sites indicates that the proposed site may be located within a landscape that has a higher potential for medieval archaeological remains.

Twelve structures of architectural merit were identified during ASA Phase 2 studies, which were not listed in the RPS or NIAH. The closest of these (CH 24) is a possible vernacular farm building, late 19th century.

There are five protected structures located within 1km of the proposed site. The closest of these being the aforementioned moated site (RPS 319).

There are four NIAH structures located within 1km of the proposed site the closest of these consists of a vernacular cottage (NIAH 11323013), which is located c. 760m to the south-east.

There are no National Monuments within 1km of the Newtowncorduff site boundary.

In the evaluation of the site during ASA Phase 2 studies no predicted impacts were anticipated upon the RMP sites, designed or demesne landscapes, protected structures or NIAH structures. Four imperceptible were anticipated on the following cultural heritage sites;

- CH13: Vernacular cottage, c.550 m north
- CH14: Vernacular farm building c. 435m north
- CH16: Vernacular cottage c.370m east
- CH17: Vernacular cottage c. 380m east

Three slight negative impacts were anticipated on the following cultural heritage sites;

- CH 11: Two small mounds c.25m south
- CH12: Possible ringditch c. 50m south east
- CH24: Possible Vernacular farm building c.160m south.

One potentially significant impact was identified on a watercourse and one moderate impact was predicted on a townland boundary. As noted above ASA Phase 4 cultural heritage studies on the Newtowncorduff site consisted of geophysical surveys carried out under licence to the Department of Arts, Heritage and the Gaeltacht. The survey areas are referred to as NG 1-9 and marked on Figure 4 of Appendix 6 of this Report. The geophysical survey noted responses of possible archaeological origin in the following areas:

- The most interesting results of the geophysical survey were noted within area NG3 of the proposed development area. These include a sub-square enclosure with associated field system and the presence of a possible further circular enclosure to the south-east. These remains were not identified within the desktop resource during the assessment. However, the main enclosure is similar in size and plan to the medieval moated site (DU008-016) located c.720m SSE. It is likely that the sub-square enclosure is medieval in date, with an associated field system.

The geophysical responses noted above require that further archaeological investigation and assessment be undertaken should this site be selected as the final preferred site. The geophysical survey results at Newtowncorduff suggest that significant archaeological remains survive within a portion of the site. These may represent a medieval farmstead and associated field systems, as well as a possible circular enclosure. The associated field system may occupy a relatively large area. A WwTP on this site could be designed to minimise and mitigate impact on these structures, however, the presence of these remains means that more archaeological mitigation in the form of archaeological testing and possibly excavation would be required on this site when compared to the other two sites. The results of the cultural heritage assessment, along with the geophysical results would suggest that the Annsbrook and Clonshagh sites are more preferable for development than the Newtowncorduff site.

Landscape and visual

The route screening analysis undertaken during ASA Phase 4 studies for the Newtowncorduff site and shown schematically in **Figure 8.7** shows a similar degree of 'full screening' from the surrounding road network as for the Annsbrook site, but a higher proportion of full visibility also.

The majority of full and intermittent visibility occurs along the motorway to the west of the site and the R132 (formerly the N1) to the east of the site. Little to no visibility occurs from the nearby settlement of Lusk.

Photomontages from four viewpoints (VP) were developed for this site and are shown in **Figure 8.8**.



Figure 8.7 RSA for public roads surrounding site – Newtowncorduff

Newtowncorduff VP1 is from the intersection of the R132 and a local road to the north-east, which are both subject of a scenic route designation. The viewing direction is to the south and the distance is approximately 750m. The proposed Regional WwTP is partially screened from here but the taller elements provide a slight intrusion on the distant view of the Dublin Mountains.

Newtowncorduff VP2 is from the R132 directly east of the site at a distance of approximately 350m. The lower elements are relatively well screened by clumps of existing conifers close to the site, but the taller elements are prominently visible in silhouette.

Newtowncorduff VP3 which is also the location of Annsbrook VP3 represents a scenic route designation on a local road nearly 3km to the northwest of the site. As can be seen from the photomontage the proposed Regional WwTP will be barely discernible at this distance amongst the stacked hedgerows and other development within the plains below.



Figure 8.8 Viewpoints selected for photomontage – Newtowncorduff

Newtowncorduff VP4 is from a local road overpass of the M1 approximately 750m to the north of the site. From this slightly elevated location there is a relatively comprehensive view of the proposed Regional WwTP partially in silhouette. Little screening is currently provided by the low level hedgerows and roadside vegetation in the foreground.

The RSA data and photomontages indicate there is a reasonable potential to screen the proposed Regional WwTP at this site. However, given the generally low level of existing hedgerow screening it will be important that proposed screen planting does not contribute to the visual impact, essentially as a tall vegetative wall. This is particularly true from VP1 where distant views towards the Dublin Mountains are currently afforded. A cue could be taken from the clumps of conifers that exist in close proximity to the site with additional clumps used to strategically screen taller elements of the scheme from sensitive viewing locations.

Matt finishes could be applied to all structures in a varied tone colour scheme that would break up the massing of development. Although this is generally a rural context there are a number of significant scale rural industry, retail warehousing and commercial enterprises along this stretch of the M1 motorway. Thus, there is some flexibility as to how the development could best blend in with the surrounding landscape context.

Based on consideration of the Route Screening Analysis (RSA) data and photomontages prepared in respect of the Newtowncorduff site, it remains a valid alternative for the proposed Regional WwTP from a landscape and visual perspective

Soils and Geology

The soils on this site are grey brown podzolics/brown earths in the centre and groundwater gleys around the edges. Limestone tills of Irish Sea basin origin lie beneath these. There are no alluvium deposits within the site.

The Lucan Formation, a dark grey, well bedded, cherty, graded limestone and calcareous shale is mapped as the bedrock beneath this site.

The preliminary ground investigation for the ASA Phase 4 studies at the Newtowncorduff site included the following:

- 4no. Trial Pits (TP10 – TP13) to depths ranging between 2.3m –3.2m below ground level (BGL),
- 3no. Cable percussive boreholes (BH07 – BH09) to depths ranging between 10.6m–11.7m BGL,
- 2no. Rotary follow-on corehole (RC07 & RC09) in two of the cable percussive boreholes depths ranging between 17.8 - 18.0mBGL

- 2no. Standpipes in RC07 and RC09

A summary of the soil profile across the Newtowncorduff site is provided in **Table 8.4**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Topsoil	0.0	0.1 – 0.5
Upper Brown Boulder Clay	0.0 – 0.5	2.2 – 3.2
Sand	2.2 – 12.0	0.6 – 0.8
Upper Black Boulder Clay	2.3 – 3.2	3.7 – 4.1
Boulder Lens	7.8	2.0
Lower Brown Boulder Clay	6.8 – 8.9	0.6 – 3.1
Lower Black Boulder Clay	9.0 – 10.4	5.4
Gravel Lens	9.4 – 9.8	0.2 – 0.6
Bedrock	13.5 – 15.0	-

Table 8.4 – Summary of Soil Profile at Newtowncorduff

Bedrock was encountered at 13.5m and 15.0m BGL in RC07 and RC09 respectively. This is described as limestone with bands of mudstone.

The preliminary ground investigation at Newtowncorduff indicates that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the proposed Regional WwTP at this location.

Traffic and Access

The Newtowncorduff site is bordered to the west by the M1 Motorway, which is not suitable for access. The nearest roads with potential for an access are the R132 to the east of the site and a local road to the north. The local road is of lower standard than the R132 and not suitable for an access therefore it is proposed to provide an access onto the R132. The proposed access location is shown on **Drawing Nr 13C**, included in Appendix 13 of the main ASA Phase 4 Report. The R132 was formerly part of the N1/M1 National Route linking Dublin to Belfast and is a well maintained single carriageway road. The section between Blake's Cross and the Five Roads where the proposed access has been located has a running carriageway of approximately 7m in width and 2.5m hard shoulders.

The R132 has a straight horizontal alignment at the location where the entrance is proposed and the proposed entrance is located within an 80km/hr speed zone. In such a speed zone, a visibility splay of 160m from a 3m setback is required. The required 160m visibility splay can be achieved to both the left and right by trimming the hedgerows.

Forward visibility along the R132 is restricted in places, most notably due to the presence of tight bends approximately 280m south of the proposed entrance and a crest in the hill to the approximately 370m to the north.

A review of the accident history along this road revealed that there have been several accidents along this section of the R132 with 1 recorded serious accident in 2006 and a cluster of 3 minor accidents recorded, 2 of which occurred in 2002 and 1 in 2008.

Access into the facility would be provided by an access road approximately 630m long. The carriageway width would be 4m with passing bays provided at regular intervals to provide passing opportunities for vehicles travelling in opposing directions. This access road will cross a stream approximately 100m from the entrance which would require a bridge or culvert to be constructed.

With regard to WwTP operations staff traffic, Fingal County Council aim to promote sustainable transport through the implementation of the NTAs smarter travel policy, however due to the sites semi rural location, alternate modes of travel to and from the WwTP by operations staff would not be feasible and it is likely that operations staff would travel to and from the WwTP by private car.

In relation to traffic and access and based on the consideration of site access, visibility, and accident history on the surrounding road network, the Newtowncorduff site is identified as the more favourable alternative for the proposed Regional WwTP.

Planning Policy

The relevant statutory planning documents, e.g. RPGs, Development Plan, etc. have been reviewed and do not identify or constitute a significant or material planning policy constraint.

Engineering and Design

As part of the Phase 4 assessments a preliminary indicative layout for a WwTP of the size and scale of the proposed Regional WwTP has been developed for the site. This layout is based on a conventional activated sludge plant (ASP), which would be expected to require the largest footprint, and is shown on **Drawing Nr 9B**



Figure 8.9 -WwTP Indicative Layout - Newtowncorduff

included in Appendix 13 and illustrated schematically here as **Figure 8.9**.

It is feasible to route the Orbital sewers from the load centres to the WwTP and from the WwTP to the outfall within the pipeline corridors shown on **Drawing Nr 6A** of Appendix 13.

A WwTP located on this site would outfall to the northern outfall area.

There are no identified technical constraints to the construction of the proposed Regional WwTP on the Newtowncorduff site.

8.4.2 Marine Outfall Study Areas

The Marine Outfall Study Areas are shown in **Drawing Nr 6** of Appendix 13. This section considers both the marine area and the outfall pipeline landfall area.

8.4.2.1 Northern Outfall Area

Ecology (Landfall Area)

The northern pipeline corridor reaches the coastline at Thomastown. It passes through improved pasture and cereal fields to the coastal outfall location. The coastal outfall location is categorised by sheltered rocky shores, sea cliffs and shingle and gravel banks. The sea cliff is well-vegetated with coverage exceeding 50% in part. Brambles were dominant and therefore the overriding habitat resides as scrub.

No protected plant species were recorded.

The landfall area of the northern outfall location is considered to have less ecological sensitivity in comparison to the landfall area of southern outfall location.

Cultural Heritage

As detailed in Section 8.3 magnetometer surveys were commissioned for both outfall areas to confirm the presence of shipwrecks. No shipwrecks were noted in the northern outfall study area.

Soils and Geology

It is noted that the Skerries to Rush Geological Heritage Area (GHA) extends along the coast and is crossed by the proposed outfall corridor.

The preliminary ground investigation for the ASA Phase 4 process in the landfall areas of the northern outfall pipeline corridor consisted of trial pits, cable percussive boreholes, rotary core follow-on in cable percussive boreholes, geophysics, including seismic and 2D resistivity as per **Table 8.5**. The location of these trial pits, cable percussive and rotary core boreholes and the geophysical survey areas are shown on **Drawing Nr 12** included in Appendix 13.

Ground Investigation Type	Northern Outfall Area
Trial Pits	2no. to 3.3m BGL (TP14 & TP15)
Cable Percussive Boreholes	3no. (BH10, BH11 & BH12) to depths ranging between 4.7m to 7.2m BGL
Rotary Core follow-on boreholes	2no. in BH(RC)11 & BH(RC)12 to 19.3m and 24.8m BGL respectively
Geophysics, including Seismic and 2D Resistivity	Yes.

Table 8.5: - Ground Investigations at Northern Outfall Area

A summary of the soil profile in the Northern Outfall Area is provided in **Table 8.6**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Topsoil	0.0	0.3
Upper Brown Boulder Clay	0.0	4.4
Sand	1.1	2.0
Upper Black Boulder Clay	3.0	1.7
Boulder Lens	5.3	0.7
Lower Brown Boulder Clay	6.3	2.9
Weathered Rock	12.1	4.3
Bedrock*	13.4	5.1

* - Bedrock geology in this area is very complex with faulting and erosional or faulted contacts present between the rock types.

Table 8.6 – Summary of Soil Profile in Northern Outfall Area

Regarding soil profile, the two trial pits located in and around the proposed Northern Outfall location encountered differing ground conditions. TP14 encountered what appeared to be firm brown boulder clays overlying dense sand from 1.1 - 3.1m BGL. TP15 encountered soft to firm brown boulder clay overlying stiff brown boulder clay from 3.0 to 3.3m BGL.

BH10, showed ground conditions that indicated boulder clays of increasing stiffness with depth. BH11 and BH12 both refused at depths of 4.8m BGL and 4.7m BGL respectively and the deposits were recorded as soft to firm boulder clays

Bedrock geology in this area is very complex.

RC11 encountered weathered bedrock between 12.1m BGL and 13.4m BGL. Intact limestone was then encountered but this material appeared to have undergone some karstification, with dissolution features noted within the core. The affected material continued down to approximately 16.1mbgl. Below this the core was described as an Argillaceous Limestone. This material most likely belongs to the Lane Formation.

RC12 encountered material described as possible weathered bedrock at 13.2m BGL. The weathered bedrock continued down to 20.5m BGL. Competent Limestone was then encountered. However there was very poor recovery over the next 4.3m with non-intact angular to sub-angular limestone recovered. This material is thought to be part of the Lane Formation. This layer between 20.5m BGL and 24.8m BGL is described as a highly fractured and brecciated layer of rock and could be influenced by the presence of a number of faults, trending north east, south west nearby.

The preliminary ground investigations in the northern outfall area indicate that special attention will be required when it comes to considering tunnelling methodologies for the construction of the outfall pipe. The karstified area may contain voids or clay filled caverns of unknown size, while the brecciated area may require some form of rock stabilisation to be employed. Both of these features need to be taken into account when assessing tunnelling methodologies.

Hydrographic Surveys

The hydrographic surveys in the northern outfall area indicate that the seabed is characterised by steeply inclined bedrock overlain in places by a sedimentary infill. Outcropping rock was located in the north east section of the outfall study area. The sedimentary infill cover was noted as sandy in nature.

No shipwrecks were noted in the northern outfall study area.

Hydrodynamic Modelling

A near-field modelling study was undertaken to predict the dilution characteristics of the two outfall locations.

The modelling study assessed the relative merits of each outfall location against predicted dilution rates and concentrations of effluent discharged from each outfall.

The primary influencing factor in relation to the dilution capacity of the outfalls is the depth from which the outfall discharges. The northern outfall location discharges into a mean water depth of 15m, which is less than that for the southern outfall.

The modelling study indicated that the initial dilution capacity is available at the northern outfall location; however, it exhibits lower initial dilution and mixing characteristics for the effluent plume than the southern outfall.

8.4.2.2 Southern Outfall Area

Ecology (Landfall Area)

The southern outfall pipeline corridor reaches the coastline at Maynetown. The corridor diverges southeast before the coastline towards Baldoyle, entering neutral grassland and recolonising bare ground. Once at the coastline, this corridor again meets dry calcareous natural grassland before crossing Baldoyle Bay cSAC / SPA to the south of Portmarnock Bridge.

Once through the estuary habitats, the corridor then passes over the Portmarnock Spit, which is now the Portmarnock Golf Club (the "Old" course). The corridor passes over fixed dunes, managed fairways and a narrow belt of marram dunes at this point before re-entering and crossing Baldoyle Bay cSAC reaching the coastal outfall location on the Portmarnock Velvet Strand.

No protected plant species were recorded during survey but the coastal habitats here are considered of high-conservation value.

The corridor passes through Baldoyle cSAC which contains four habitats listed on Annex I of the EU Habitats Directive: *Salicorniamud*, Mediterranean salt meadows, Atlantic salt meadows and Tidal mudflats. Portmarnock Spit previously had a well-developed sand dune system but has been largely replaced by golf courses.

The marram dunes recorded within the pipeline corridor at the Portmarnock Spit, correspond to the Annex I Habitat shifting dunes along the shoreline with *Ammophila arenaria*.

It is anticipated that should the southern outfall be brought forward the pipeline would be tunnelled under Baldoyle Bay to avoid direct and indirect impacts on Baldoyle Bay cSAC and SPA. Any proposed tunnelling will have to ensure that both noise and vibrations from the tunnelling process will not impact species at the surface or habitats and species in the marine environment.

Given the international ecological designations associated with Baldoyle Bay, the landfall area of the southern outfall location is considered to have a significant ecological value and is therefore considered more ecologically sensitive in comparison to the landfall area of the northern outfall location.

Cultural Heritage

As detailed in Section 8.3 magnetometer surveys were commissioned for both outfall areas to confirm the presence of shipwrecks. No shipwrecks were noted in the southern outfall study area.

Soils and Geology

The preliminary ground investigation for the ASA Phase 4 process in the landfall areas of the southern outfall pipeline corridor consisted of trial pits, cable percussive boreholes, rotary core follow-on in cable percussive boreholes, geophysics, including seismic and 2D resistivity as per **Table 8.7**. The location of these trial pits, cable percussive and rotary core boreholes and the geophysical survey areas are shown on **Drawing Nr 12** included in Appendix 13.

Ground Investigation Type	Southern Outfall Area
Trial Pits	2 no to 3.0m – 3.4m BGL
Cable Percussive Boreholes	2 no (BH13 & BH14A) to 13.0m & 13.4m BGL
Rotary Core follow-on boreholes	2no in BH13 & BH14A to 22.7m & 27.45m BGL respectively.
Geophysics, including Seismic and 2D Resistivity	Yes

Table 8.7: - Ground Investigations at Southern Outfall Area

A summary of the soil profile in the Southern Outfall Area is provided in **Table 8.8**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Topsoil	0.0	0.175
Upper Brown Boulder Clay	0.0	2.45
Sand	0.0	3.675
Upper Black Boulder Clay	2.5	6.5
Silt	5.1	6.6
Lower Brown Boulder Clay	11.7	1.7
Gravel	13.4	0.1
Weather Rock	13.5	5.35
Bedrock	15.4	5.575

Table 8.8 – Summary of Soil Profile in Southern Outfall Area

Glacial tills were noted in both trial pits, becoming stiffer with depth. BH13 also recorded glacial tills becoming stiffer with depth. BH14 and BH14A were both located nearer the coast than BH13 and showed loose to medium sands and silts down to 11.7m BGL, with very stiff brown boulder clays below.

The depth to bedrock was proven by RC13 and RC14 at 23.6m and 15.4m BGL respectively. This weathered bedrock extended down to 24.5m BGL and 20.2m BGL in RC13 and RC14. The bedrock recovered was intact competent rock and appeared typical of the Malahide formation, i.e. an argillaceous bioclastic limestone with some shales.

The preliminary ground investigation at southern outfall area indicates that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the outfall by tunnelling methodologies. The depth to bedrock indicates deep excavation will be required for the tunnel drive shaft, which will require the use of a retaining wall to support the sides during excavation.

Hydrographic Surveys

The hydrographic surveys in the southern outfall area indicate that the seabed is gradually sloping eastward and the bottom is sandy in nature.

No ship wrecks were noted in the southern outfall study area.

Hydrodynamic Modelling

A near-field modelling study was undertaken to predict the dilution characteristics of the two outfall locations.

The modelling study assessed the relative merits of each outfall location against predicted dilution rates and concentrations of effluent discharged from each outfall.

The primary influencing factor in relation to the dilution capacity of the outfalls is the depth from which the outfall discharges. The southern outfall location discharges to a mean water depth of 23m. The southern outfall location has a larger depth (and therefore volume) of water to facilitate greater initial dilution of effluent discharges than the northern outfall location.

The modelling study indicated that the initial dilution capacity is available at the southern outfall location and that it exhibited better initial dilution and mixing characteristics for the effluent plume than the northern outfall.

8.4.2.3 Marine Ecology – Northern and Southern Outfall Locations

The marine ecological survey was carried out over an area of approximately 28 x 12 kilometres, calculated to encapsulate the main extent of a modelled dispersion plume based on one tidal excursion. Sites were selected on a combination of regional locations and a reference site, separating the two proposed routes for a marine outfall

The survey works were broken down into two phases relating to the main habitat and ecological baseline survey carried out in the summer of 2012 (August), and an additional supplementary sampling campaign taking water quality measurements at repeated stations during the winter of 2012 (December). The main aim of the surveys were to provide baseline environmental information as to the habitats found along the proposed outfall routes that might be impacted by construction, as well as near and far field sites within the survey area that might be impacted by the resulting discharge plume. This information included physio-chemical and biological qualities of the sediments, further supplemented by two seasons of water quality profiling and sampling.

For seabed sampling, the majority of stations exhibited a fine sandy substrate which was processed for both macro-invertebrate populations in addition to physio-chemical determination, whilst selected stations were further profiled for water quality assessed over two seasonal periods.

Results showed typical sandy communities along both of the pipeline routes. Area of geogenic reefs (cobble and possible bedrock), which are classified as Annex 1 habitat, were recorded in a number of areas, particular relating to the coastal areas north and east of the Howth peninsula, along the southern pipeline corridor, in the central part of the survey area west/southwest of Lambay Island, and isolated patches in the north.

These were typically associated with developed communities of rhodophytes (red seaweeds), encrusting sponges and soft corals (*Alcyoniumdigitatum*) and foliose bryozoa (in particular *Flustrafoiacea*). The pipeline routes themselves were generally granular and mobile with low level rippled bedforms throughout, but particularly along the southern route where the sands were slightly coarser. Mobile faunal species includes numerous brittle stars (ophiuroids) and common starfish (*Asteriasrubens*) as well as other common shoreline species.

With the exception of geogenic reefs, no other Annex 1 habitats (as designated by the European habitats directive), no species or communities of particular conservational concern were recorded at these sites.

Further geomorphological data has been acquired following the acquisition multibeam bathymetric data for the two outfall corridors since the ecological survey was completed. Analysis of this data will inform further survey work and ground truthing of sites scheduled as part of the EIA surveys.

Until this data is analysed, together with additional ground truthing of sites proposed for the as part of the EIA surveys, the full extent of the geogenic reefs cannot be determined. However, to date more geogenic reefs have been noted along the southern pipeline corridor in comparison to the northern pipeline corridor during the summer surveys in 2012.

The Rockabill to Dalkey Island cSAC (site code:003000) has recently been transmitted to the European Commission as an cSAC for reefs listed on Annex I and Harbour Porpoise listed on Annex II of the Habitats Directive. Both of the proposed outfall locations terminate within the cSAC. The development of the proposed Regional Wastewater Treatment Plant and its marine outfall location, whether it is the northern or southern outfall, will have to ensure that it will not impact on the qualifying features of this cSAC.

Chemical analysis has been undertaken on both sediment and water samples at selected sites in order to provide a broad background for existing conditions within the survey area prior to any development. All results show general low level background values for the parameters analysed.

Both proposed outfall locations terminate within the Rockabill to Dalkey Island cSAC, The marine ecology surveys to-date have indicated more geogenic reefs in proximity to the southern outfall corridor in comparison to the northern pipeline corridor and may therefore, be more ecologically sensitive. However, the actual full extent of the geogenic reefs will be determined as part of the EIA surveys for the final preferred site option.

The environmental designations in the vicinity of the Northern and Southern outfalls are shown in **Figure 8.10** and **Figure 8.11** respectively.

it is indicated that in the southern outfall area the outfall pipe is to extend approximately 6.0km to the -23mOD contour.

WwTP Location	Approx. WwTP Top Water Level (mOD)	Distance of Site from Shore (m)	Assumed Outfall Distance into Irish Sea (m)	Assumed High Tide Level (mOD)	Available Head (m)	Peak Discharge Through Outfall (m ³ /s)	Selected Outfall Diameter (mm)
Annsbrook	22.0	11,450	2,000	3.5	18.5	4.635	2,000
Clonshagh	36.0	6,900	6,000	3.5	32.5	4.635	1,800
Newtowncorduff	18.0	9,700	2,000	3.5	14.5	4.635	2,000

Table 8.9: - Summary of Preliminary Outfall Design

Construction methodologies being considered takes into account all the various constraints and in particular the ecological designated areas (e.g. Baldoyle Bay SPA and SAC in the southern outfall area), and geotechnical considerations.

To avoid impact on the ecological designated areas and geological heritage areas tunnelling methodologies are proposed for both the northern and southern outfall.

Tunnelling methodologies at both the northern and southern outfall locations will require an onshore tunnel inlet shaft to be constructed, the final selected diameter and depth will depend on a combination of the vertical alignment selected for the tunnel section and geotechnical design considerations noted in the Preliminary Ground Investigation Interpretative Report summarised in the Soils and Geology section above.

Conclusion of Engineering Design of Marine Outfall

Preliminary Engineering Design of the outfall pipe has indicated that there are no identified technical constraints to the construction of either outfall.

The shortest total length of outfall pipe is from the Newtowncorduff site at 11,700m. The outfall pipe from the Clonshagh site is 12,900m in length whilst the outfall pipe from the Annsbrook site is 13,450m in length.

The Clonshagh site is at a higher elevation than either the Annsbrook or Newtowncorduff sites, therefore greater head is available to discharge the treated effluent against the tide, including consideration of potential higher tides resulting from the effects of climate change.

It will be necessary to construct the outfall pipe at both the southern and northern outfall locations using tunnelling methodologies.

The preliminary ground investigations for ASA Phase 4 have indicated that tunnelling of the southern outfall posed less technical difficulty than tunnelling of the northern outfall.

The hydrodynamic modelling study has indicated that the southern outfall location exhibited better initial dilution and mixing characteristics for the effluent plume than the northern outfall.

8.4.3 Orbital Sewers and Outfall Pipelines

The pipeline corridors for the orbital sewers and outfall pipelines to / from the emerging preferred sites for the location of the proposed Regional WwTP are shown on **Figure 8.12** and **Drawing Nr 6** included in Appendix 13 of this report.

As discussed previously in Section 6 the orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment would be routed to the Annsbrook or Newtowncorduff sites via pipeline corridor 'A-B-F-G'. The orbital sewer from the North Dublin Catchment would be routed to either of these sites via pipeline corridor 'D – F' where it would merge with the orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment. The treated effluent pipeline from either of these sites to the northern outfall location would be routed via pipeline corridor 'G – H'. The pipeline corridors associated with the proposed Regional WwTP sites of Annsbrook and Newtowncorduff are illustrated graphically on **Drawing Nr 6A** included in Appendix 13 of this report.

The orbital sewer from the Route 9C (Blanchardstown) Sewer Catchment would be routed to the Clonshagh site via pipeline corridor 'A-B-C'. The orbital sewer from the North Dublin Catchment would be routed to this site via pipeline corridor 'D–C'. The treated effluent pipeline from this site to the southern outfall location would be routed via pipeline corridor 'C-E'. The pipeline corridors associated with the proposed Regional WwTP site at Clonshagh are illustrated graphically on **Drawing Nr 6B** included in Appendix 13 of this report.

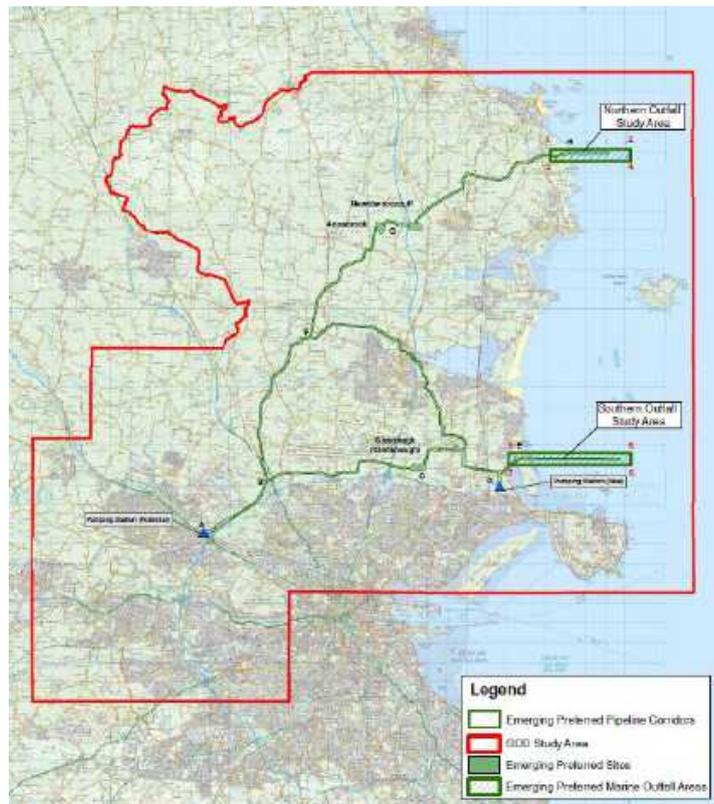


Figure 8.12 - Emerging Preferred Site Options

The ASA Phase 4 environmental and technical assessments for these pipeline corridors are summarised hereunder.

Ecology

The habitats throughout most of the pipeline corridors are predominately intensively managed agricultural lands, particularly improved agricultural grassland arable crops and horticultural lands. Amenity grasslands and grassy verges are particularly

common around infrastructure nearing Dublin City. The only woodlands are immature woodland typically common abutting new road infrastructure.

No rare or protected plant species were recorded within the pipeline corridors. Invasive plant species were also limited throughout the pipeline corridors, however, the corridor intercepts a small stand of Japanese Knotweed in the Roganstown Golf Course. A small stand of Giant Hogweed also exists on the boundary of an electricity station at Kildonan just outside of the pipeline corridor at this location.

It is noted that for the pipeline corridors for the both Annsbrook and Newtowncorduff sites, there is the potential for impact on the Broadmeadow/Swords Estuary SPA and Malahide Estuary SAC. This is as a result of the routing of pipeline east of Swords which runs adjacent to the designated sites and is adjacent to the Broadmeadow Estuary.

Field boundaries typically comprise defunct hedgerows in-line with those described in the proposed sites (Section 8.4) above. The majority of hedgerows have an accompanying wet or dry drainage ditch.

Badger activity is largely confined to the most outreaching pipeline corridor sections in the north and east of the scheme area. A number of active badger setts were recorded within or immediately adjacent to the proposed pipeline route options and are outlined below.

- An active badger sett was located immediately to the south of the Annsbrook site on the bank of the Grallagh Stream. Four well-used entrance holes were noted at the time of survey and is likely to be a main sett. The sett lies directly within the pipe line route corridor and will require closure under licence prior to construction.
- A second active badger set is located within the proposed pipeline corridor 'F-G' approximately 150m north of Skidoo Stud. Two well-used entrance holes were recorded at the time of survey. This sett is likely to be an outlier sett and will require closure under licence prior to construction.
- A third active badger sett was located within the pipeline corridor 'F-G' in the townland of Cookstown. This is likely to be the main sett linked to the outlier sett above. Four well-used entrance holes were recorded within a drainage bank at the time of survey. This sett will require closure under licence.
- A fourth active badger sett with two well-used entrance holes occurs approximately 300m northwest of farm buildings at Baldurgan and lies directly within the proposed pipeline corridor 'F-G'. This sett will require closure under licence prior to construction.
- An active badger sett is located immediately to the north of the pipeline corridor 'D-F' as it passes through the Emmaus Retreat and Conference centre at Balheary. Five entrance holes were recorded on an east-facing bank of a wet ditch beneath mixed woodland. A further two mammal entrance holes were also

located c20m north of the sett but were not considered to be in use by badgers, with only evidence of rabbit use. This is likely to be a main sett but it is unlikely it will require closure to facilitate construction.

- An active badger sett was located in the townland of Suralstown North approximately 5km west-northwest of Swords. The sett occurs in hedgerow, along the pipeline corridor 'D-F' boundary. The sett was not in use at the time of survey and appears abandoned. Badger tracks were however confirmed on the opposing side of this section of hedgerow approximately 5-10m inside the corridor boundary.

The bat fauna of the lands crossed by the proposed pipeline corridors for the Greater Dublin Drainage Project was examined between June and August 2012. In all there were three widespread bat species two of which; common and soprano pipistrelle, were abundant. Leisler's bats were widespread but less abundant. Brown long-eared bats were encountered in one location only but due to their faint navigational signals, they are much more difficult to encounter during surveys.

While there are no buildings within the land take there is the potential for roost loss from tree removal and there will be a loss of habitat and of hedgerow elements that assist in bat feeding and orientation.

Freshwater Ecology

Routing of the pipelines within the proposed pipeline corridors will involve 38 watercourse crossings (33no. on pipeline corridors associated with the sites at Annsbrook and Newtowncorduff; 5no. on pipeline corridors associated with the site at Clonshagh).

A total of 12 catchments will be potentially impacted by the proposed pipeline route, some more so than others. For example, the Broadmeadow River itself will be crossed by the pipeline corridor to Annsbrook and Newtowncorduff at 3 locations, while a further 10 crossings are proposed for tributaries of the Broadmeadow River. The Broadmeadow River constitutes a salmonid system. The system (main channel and tributaries) supports Brown trout throughout, Sea trout and a small but biologically significant population of Atlantic salmon and Eels in its lower reaches, in addition to other fish species.

Cultural Heritage

- Known Cultural Heritage constraints located within the orbital sewers and outfall pipeline corridors associated with the proposed Regional WwTP site at Clonshagh include the following: 20 features from Record of Monuments & Places
- 15 recorded Protected Structures and 6 features from National Inventory of Architectural Heritage
- 10 Cultural Heritage features

- 14 historic design landscapes
- Known Cultural Heritage constraints located within the orbital sewers and outfall transfer pipeline corridors associated with the proposed Regional WwTP sites at Annsbrook and Newtowncorduff include the following: 32 features from Record of Monuments & Places
- 1 National Monument
- 28 features from Record of Protected Structures and 12 features from National Inventory of Architectural Heritage
- 26 Cultural Heritage features
- 22 historic design landscapes

Additionally 1 partial Architectural Conservation Area is located within the Newtowncorduff orbital sewer and outfall pipeline corridor. Pipeline alignments shall be adopted within the orbital sewer and outfall pipeline corridors which avoid impacts on the above recorded sites.

Landscape and Visual

In terms of landscape impacts, the pipeline corridor will inevitably encounter tree lines and hedgerows, short sections of which will need to be removed and then replaced or replanted depending on the nature of the vegetation affected.

Where well established vegetation must be replaced, the landscape and visual impact may extend from temporary (less than one year) to short term (one to seven years).

There is a greater potential to disrupt this landscape structure as a result of the greater length of pipeline corridor associated with Annsbrook and Newtowncorduff sites than that associated with the Clonshagh site.

Soils and Geology

The preliminary ground investigation for the ASA Phase 4 process along the pipeline corridors consisted of cable percussive and rotary core boreholes carried out on pipeline corridors 'G-H' and 'D-F' as per **Table 8.9**. This programme of preliminary ground investigation supplements the soils and geology data collected and assessed during the ASA Phase 2 process.

Ground Investigation Type	Pipeline Corridor 'G-H'	Pipeline Corridor 'D-F'
Cable Percussive Boreholes	4 no(BH15, BH17, BH19 and BH20) to 12.8m BGL	3 no (BH24, BH25 and BH26) to 10.0m BGL
Rotary Core follow-on boreholes	4no (RC15, RC17, RC19 and RC20) to a maximum of 30.0m BGL	1 no (RC24) to a depth of 10.1m BGL

Table 8.9: - Ground Investigations along Pipeline Corridors

A summary of soil profiles along pipeline corridor ‘G-H’ is provided in **Table 8.10**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Upper Brown Boulder Clay	0.0	3.4 – 7.4
Upper Black Boulder Clay	6.7 – 7.7	8.15
Lower Brown Boulder Clay	12.8 – 17.9	1.2 – 2.1
Weathered Rock	4.5 – 16.1	0.9 – 8.5
Bedrock	3.4 – 17.0	N/A

Table 8.10: - Summary of Soil Profile along Pipeline Corridor ‘G-H’The depth to bedrock along the alignment was variable but appeared to increase as one travelled towards the Northern Outfall. Depth to bedrock started at 3.4m BGL in BH15, increasing to 4.5m BGL for weathered bedrock in BH17, to not encountering bedrock in BH19, even though BH19 reached a depth of 20.0m BGL.

The bedrock encountered in BH15 was described as a dark grey black fine grained argillaceous Limestone, consistent with either the Rush or Tober Colleen Formations, based on the Bedrock map. Some cubic pyrite was noted within the bedrock at 15.45m BGL.

BH17 encountered a fine grained argillaceous Limestone, with very thin weak Mudstone beds. This would be considered consistent with the Lucan Formation, as shown on the bedrock map.

BH20 encountered weathered bedrock at 16.1m BGL, and intact bedrock was observed at 17m BGL. The borehole terminated at a depth of 21.2m BGL. This rock was described as an argillaceous Limestone. This material would be consistent with the Walshestown Formation, as shown on the bedrock map.

A summary of soil profiles along pipeline corridor ‘D-F’ is provided in **Table 8.11**.

Strata	Depth to Top of Strata (m BGL)	Thickness of Strata (m)
Upper Brown Boulder Clay	0.0	2.1 – 10.0
Upper Black Boulder Clay	2.1 – 2.9	1.9 – 4.0
Lower Brown Boulder Clay	6.9	3.1
Bedrock	5.0	N/A

Table 8.11: - Summary of Soil Profile along Pipeline Corridor ‘D-F’

Bedrock was only encountered in BH24. The cable percussive borehole terminated at 5.0m BGL, with rotary core follow on from that depth encountering fine grained argillaceous limestone, which appears to be a member of the Malahide Formation.

The preliminary ground investigation along the pipeline corridors in conjunction with existing available information indicate that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the proposed pipelines required for the three emerging preferred site options.

Engineering Design

The design of the orbital sewers from the load centres to the emerging preferred sites for the proposed Regional WwTP is influenced by

- Volume of wastewater to be transferred from the load centres to the proposed Regional WwTP
- Length of orbital sewer
- Topography along the pipeline corridors
- Ground Conditions along pipeline corridor
- Crossing of watercourses and key existing infrastructure

As discussed previously in Chapter 4 the key load centres from which wastewater flows are to be transferred are the following:

- The Blanchardstown (Route 9C Sewer) sub-catchment of Ringsend WwTP (includes the Meath towns and villages of Ashbourne, Ratoath, Kilbride, Dunboyne and Clonee);
- The North Dublin (North Fringe Sewer and NDDS Sewer) sub-catchment of Ringsend WwTP;

Wastewater Flows

Predicted wastewater flows are summarised in **Table 8.12**.

Sewer Catchment	2011 Estimated DWF (m ³ /s)	2040 Predicted DWF (m ³ /s)	2040 Predicted Peak Flow for Transfer (m ³ /s)
Route 9C	0.31	0.60	1.85
North Fringe Sewer	0.26	0.40	1.125
NDDS Sewer	0.55	0.70	1.66
Total	-	1.70	4.635

Table 8.12: - Predicted Wastewater Flows

Pipeline Lengths

Pipeline lengths are summarised in **Table 8.13**.

	Annsbrook	Clonshagh	Newtowncorduff
Length of Orbital Pipelines	(m)	(m)	(m)
Length from 9C to WwTP Site	20,750	12,750	22,500
Length from North Dublin to WwTP Site	15,500	5,850	15,500
Length from WwTP Site to Coast	11,450	6,900	9,700
Length in Marine Environment	2,000	6,000	2,000
Totals	49,700	31,500	49,700

Table 8.13 – Summary of Pipeline Lengths

Impact of Topography

The topography along the pipeline corridors is shown in **Drawing Nr 7** included in Appendix 13. The following is a brief description of the impact of the topography of North Dublin on the design of transfer pipelines to and from the various potential WwTP Sites.

- a) The topography between Blanchardstown and the proposed WwTP sites at Annsbrook and Newtowncorduff along pipeline corridor 'A-B-F-G' will require either:
- a pumped solution, which will require the construction of a pumping station as indicated in **Drawing Nr 6**, with some 11.5km of rising main followed by a gravity sewer constructed using open cut and/or tunnelling techniques.
 - or a gravity sewer constructed using tunnelling techniques at significant depths (of the order of 40m deep)

In addition it will be necessary to provide an inlet lift pumping station at the head of the treatment works at both WwTP sites.

- b) The topography between Blanchardstown and the proposed WwTP site at Clonshagh along pipeline corridor 'A-B-C' will require either:
- a pumped solution, which will require the construction of a pumping station as indicated in **Drawing Nr 6**, with some 3.5km of rising main followed by a gravity sewer constructed in part using open excavation and in part using tunnelling techniques

- or a gravity sewer constructed using tunnelling techniques at significant depths (of the order of 40m deep)

In addition it will be necessary to provide an inlet lift pumping station at the head of the treatment works.

c) The topography between the North Fringe Sewer (NFS) and the proposed Regional WwTP sites at Annsbrook and Newtowncorduff along pipeline corridor 'D-F', will require:

- a pumped solution, which will require the construction of a pumping station as indicated in **Drawing Nr 6**, with some 15.2km of rising main connecting to the gravity sewer conveying the Blanchardstown flow diversion

d) The topography between the NFS and the proposed Regional WwTP site at Clonshagh along pipeline corridor 'D-C' will require:

- A pumped solution, which will require the construction of a pumping station as indicated in **Drawing Nr 6**, with some 5.6km of rising main connecting to the gravity sewer conveying the Blanchardstown flow diversion

e) The elevation of the three proposed Regional WwTP sites is such that a gravitational outfall can be achieved at all of them.

Power Requirements

The estimated power requirements to pump wastewater flows from the Route 9C sewer at Blanchardstown and the North Dublin Catchment at Stapolin / Sutton are summarised in **Table 8.14**.

	Annsbrook	Clonshagh	Newtowncorduff
Pipeline Option 1 - Gravity Sewer from Route 9C and Rising Main from North Dublin			
Power Requirement from Route 9C to WwTP Site <i>(this is the lift into the inlet of the WwTP)</i>	1,798kW	598kW	1,593kW
Power Requirement from North Dublin to WwTP Site	4,800kW	2,678kW	4,800kW
Total	6,598kW	3,276Kw	6,393kW
Pipeline Option 2 - Rising Main/Gravity Sewer from Route 9C and Rising Main from North Dublin			
Power Requirement from Route 9C to WwTP Site <i>(this includes the lift into the inlet of the</i>	4,254kW	2,044kW	4,049kW

	Annbrook	Clonshagh	Newtowncorduff
WwTP)			
Power Requirement from North Dublin to WwTP Site	4,800kW	2,678kW	4,800kW
Total	9,054kW	4,722kW	8,849kW

Table 8.14: - Estimated Power Requirements

Ground Conditions

The preliminary ground investigation programme undertaken for the Phase 4 ASA assessment in conjunction with existing available ground investigation data and reference to the soils and bedrock mapping for Fingal indicate that in general the soil profile consists of glacial tills overlaying limestone bedrock. These ground conditions pose no technical difficulty to the construction of the orbital sewers or outfall pipelines.

Crossing of Watercourses and Infrastructure

Routing of orbital sewers from the load centres to the proposed Regional WwTP sites at Annbrook and Newtowncorduff and subsequently to the northern outfall location along pipeline corridors 'A-B-F-G' and 'D-F' and 'G-H' would necessitate the following crossings:

- 5no. gas transmission line crossings
- 2no. M1 crossings, 1 no. N2 crossing and numerous regional and local road crossings
- 1no. crossing of the Eirgrid East-West Interconnector
- 2no. crossings of the Belfast – Dublin railway
- 1no. crossing of the proposed Metro West

33no. watercourse crossings including the Ward and Broadmeadow Rivers Routing of orbital sewers from the load centres to the proposed Regional WwTP site at Clonshagh and subsequently to the southern outfall location along pipeline corridors 'A-B-C' and 'D-C' and 'C-E' would necessitate the following crossings:

- 2no. gas transmission line crossings
- 1no. M1 crossings, 1 no. N2 crossing and numerous regional and local road crossings
- 1no. crossing of the Eirgrid East-West Interconnector
- 1no. crossings of the Belfast – Dublin railway
- 1no. crossings of the proposed Metro North

- 1no. crossing of the proposed Metro West
- 5no. number of crossings of small watercourses

Pipe Diameters

Selected pipe diameters are summarised in **Table 8.15**.

	Annbrook	Clonshagh	Newtowncorduff
Pipeline Option 1 - Gravity Sewer from Route 9C and Rising Main from North Dublin			
Gravity Sewer from Route 9C to WwTP Site	2,400mm	2,400mm	2,400mm
Rising Main from North Dublin to WwTP Site	Twin Main - 800mm and 1,000mm	Twin Main - 600mm and 1,000mm	Twin Main - 800mm and 1,000mm
Pipeline Option 2 - Rising Main/Gravity Sewer from Route 9C and Rising Main from North Dublin			
Rising Main / Gravity Sewer from Route 9C to WwTP Site	1,000mm / 2,400mm	1,000 / 2,400mm	1,000mm / 2,400mm
Rising Main from North Dublin to WwTP Site	Twin Main - 800mm and 1,000mm	Twin Main - 600mm and 1,000mm	Twin Main - 800mm and 1,000mm

Table 8.15: - Selected Pipe Diameters

Conclusion of Engineering Design of Orbital Sewers and Outfall Pipelines

Preliminary Engineering Design of the orbital sewers and outfall pipelines has indicated that there are no identified technical constraints to the construction of these sewers and outfall pipelines to / from the three emerging preferred sites.

The total length of orbital sewers and outfall pipeline associated with the Clonshagh site is 31,500m which is 18,100m shorter than the orbital sewers and outfall pipelines associated with either the Annbrook or Newtowncorduff sites.

The estimated power requirements for pumped flows to the Clonshagh site are significantly lower than those required for pumped flows to either the Annbrook or Newtowncorduff site.

The routing of the orbital sewers and outfall pipeline to / from the Clonshagh site involves a lower number of crossings of key existing and proposed infrastructure than either the Annbrook or Newtowncorduff site.

The routing of the orbital sewers and outfall pipelines to / from the Clonshagh site entails a lower number of river / stream crossings than either the Annbrook or Newtowncorduff site.

8.4.4 Preliminary Cost Estimates

Preliminary cost estimates have been prepared for each of the three emerging preferred site options (i.e. a WwTP site, its associated orbital sewers and outfall pipeline). These budget cost estimates include construction and mitigation costs for the proposed Regional WwTP, construction costs for access roadway to the proposed Regional WwTP, costs for provision of electricity and gas supply to the proposed Regional WwTP, construction costs for the orbital sewers and outfall pipelines, construction costs for pumping stations, land and wayleave acquisition costs. In addition a Net Present Value (NPV) of the pumping costs over a 30 year period has been calculated based on estimated pump power requirements. In all cases capital costs include a 35% contingency factor. These costs are summarised in **Table 8.16** and full details are provided in Appendix 10 of this report.

Mitigation Measures

Mitigation measures were identified for the potential impacts arising from the identified constraints.

Up to ASA Phase 4, the preference always had been to avoid impact rather than mitigate. However, mitigation measures have now been incorporated into the ASA Phase 4 assessment as the assessment of the individual components of the site options has identified most and least favourable constraints, their potential impact and associated mitigation measures. This has allowed an informed valuation of mitigation costs to be included in the preliminary cost estimates for each of the emerging preferred site options.

Item	Annsbrook	Clonshagh	Newtowncorduff
WwTP	176,000,000	177,000,000	176,500,000
Access Roadway	1,300,000	2,000,000	650,000
Pipelines (Option 1)	509,700,000	314,500,000	508,500,000
Pumping Stations – Pipeline Option 1	incl	incl	incl
Pipelines (Option 2)	324,300,000	234,100,000	321,200,000
Pumping Stations – Pipeline Option 2	incl	incl	incl
Utilities	826,000	570,000	545,000
Land & Wayleave Acquisition	5,500,000	6,500,000	5,500,000
Total with Pipeline Option 1	693,326,000	527,570,000	691,695,000
Total with Pipeline Option 2	507,926,000	420,170,000	504,395,000

Table 8.16: - Summary of Preliminary Cost Estimates

Notes: Pipeline Option 1 consists of a tunnelled gravity sewer from Blanchardstown and a pumped rising main from North Dublin

Pipeline Option 2 consists of a pumped rising main followed by gravity sewer from Blanchardstown and a pumped rising main from North Dublin

8.4.5 Summary of Assessment

The findings from the further investigative studies were evaluated to determine whether anything of such significance was identified which made the development of individual components and thus a site option unfeasible.

Nothing of such significance was identified, therefore all three emerging preferred site options were deemed suitable for further assessment.

Further assessment of the findings of ASA Phase 2 process, consideration of the submissions received during ASA Phase 3 (Public Consultation) and the further investigative studies identified potential constraints on each of the individual components of the site options.

Chapter 9 will combine the assessment of the individual components as presented in Chapter 8 into one overall emerging preferred site option assessment matrix such that a comparative assessment of the 'more' and 'less' favourable classifications assigned to identified constraints can be undertaken to allow for the selection of the final preferred site option.

9 Selection of Final Preferred Site

9.1 Introduction

The ASA Phase 4 process, consisted of the following steps

- Step 1* Review of the assessment findings from the ASA Phase 2 process which is reported in the [Alternative Sites Assessment and Route Selection Report \(Phase 2\): Emerging Preferred Sites and Routes, May 2012](#).
- Step 2* Consideration of the submissions received during ASA Phase 3 (Public Consultation) of the ASA process which was held over an eight week period from 14th May 2012 to 6th July 2012. Full details of this phase are provided in the [Public Consultation Report on Alternative Site Assessment Phase Two: Emerging Preferred Sites and Routes](#), which was published in October 2012.
- Step 3* Undertake further investigative studies to supplement the data collected and assessed during the ASA Phase 2 and which were also informed by consideration of submissions received.
- Step 4* Assessment of the findings of the further investigative studies to determine whether anything of such significance was identified which made the development of any of the three emerging preferred site options unfeasible.
- Step 5* Assessment of the individual components of the site options (WwTP site, marine outfall locations and associated orbital sewers and outfall pipelines) against the findings of [Step 1 to Step 3](#) above. Identification of constraints for the individual components and the identification of potential mitigation measures where the ASA Phase 4 assessment indicated that it was not possible to avoid impacts.
- Step 6* Preparation of preliminary cost estimates
- Step 7* Combine the assessment of the individual components from [Steps 5 and 6](#) into one overall emerging preferred site option assessment matrix. Through a comparative assessment assign 'more' and 'less' favourable classifications to the identified constraints.
- Step 8* Selection of final preferred site option based on the relative performance of each of the site options against the Environmental, Technical and Cost criteria considered.

Chapter 9 combines the assessment of the individual components as presented in Chapter 8 into one overall emerging preferred site option assessment matrix such that a comparative assessment of the 'more' and 'less' favourable classification assigned to

identified constraints could be undertaken ([Step 7](#) above) to allow for the selection of the final preferred site option ([Step 8](#) above).

9.2 Emerging Preferred Site Options Assessment Matrix

Table 9.1 overleaf presents the emerging preferred site options assessment matrix.

Criteria	Annsbrook Site Option			Clonshagh Site Option (Clonshaugh)			Newtowncorduff Site Option		
	WwTP site	Northern Outfall	Pipeline Routes	WwTP site	Southern Outfall	Pipeline Routes	WwTP Site	Northern Outfall	Pipeline Routes
Ecology	The Annsbrook site was identified as being of higher ecological value than the Clonshagh site but less than the Newtowncorduff site.	The northern outfall pipe terminates within the Rockabill – Dalkey cSAC	It was noted that badger activity is largely confined to the most outreaching pipeline corridor sections serving the Annsbrook and Newtowncorduff sites. Potential impact on the Broadmeadow/Swords Estuary SPA and Malahide Estuary SAC from routing of pipeline along corridor 'D' east of Swords and adjacent to the Brodmeadow Estuary. Greater length of pipeline when compared to Clonshagh site option with resulting increased potential for bat roost loss from tree removal and loss of habitat and hedgerow elements that assist in bat feeding and orientation 33 no watercourse crossings on pipeline route	The Clonshagh site was identified as being of least ecological value when compared to the other two sites.	The outfall pipeline corridor crosses the Baldoyle Bay SAC / SPA. The southern outfall pipe terminates within the Rockabill – Dalkey cSAC	Shortest length of pipeline when compared to the Annsbrook and Newtowncorduff site options 5no watercourse crossings on pipeline route.	The Newtowncorduff site was identified as being of higher ecological value when compared to the other two sites.	The northern outfall pipe terminates within the Rockabill – Dalkey cSAC	It was noted that badger activity is largely confined to the most outreaching pipeline corridor sections serving the Annsbrook and Newtowncorduff sites. Potential impact on the Broadmeadow/Swords Estuary SPA and Malahide Estuary SAC from routing of pipeline along corridor 'D' east of Swords and adjacent to the Broadmeadow Estuary. Greater length of pipeline when compared to Clonshagh site option with resulting increased potential for bat roost loss from tree removal and loss of habitat and hedgerow elements that assist in bat feeding and orientation 33 no watercourse crossings on pipeline route
Cultural Heritage	The archaeological remains identified at the edges of the Annsbrook site are less significant than those found on the Newtowncorduff site	No items of archaeological interest such as shipwrecks are located within the proposed outfall locations	It is possible to route the orbital sewers and outfall pipelines to avoid/minimise impact on protected archaeological and architectural features.	The archaeological remains identified at the edges of the Clonshagh site are less significant than those found on the Newtowncorduff site	No items of archaeological interest such as shipwrecks are located within the proposed outfall locations	It is possible to route the orbital sewers and outfall pipelines to avoid/minimise impact on protected archaeological and architectural features.	The archaeological remains identified within the Newtowncorduff site are more significant than those found at either the Annsbrook or Clonshagh sites.	No items of archaeological interest such as shipwrecks are located within the proposed outfall locations.	It is possible to route the orbital sewers and outfall pipelines to avoid/minimise impact on protected archaeological and architectural features.
Landscape and Visual	A Plan of effective screen planting and external building finishes appropriate to this site and its surroundings can provide suitable mitigation from a landscape and visual perspective	Landscape and visual impacts associated with the construction of the northern outfall will be temporary.	Landscape and visual impacts associated with the construction of this pipeline corridor will be temporary to short-term. Greater potential to disrupt landscape structure as a result of the greater length of pipeline corridor than that associated with the Clonshagh site.	A Plan of effective screen planting and external building finishes appropriate to this site and its surroundings can provide suitable mitigation from a landscape and visual perspective	Landscape and visual impacts associated with the construction of the southern outfall will be temporary.	Landscape and visual impacts associated with the construction of this pipeline corridor will be temporary to short-term. Less potential to disrupt the landscape structure than the Annsbrook and Newtowncorduff site options	A Plan of effective screen planting and external building finishes appropriate to this site and its surroundings can provide suitable mitigation from a landscape and visual perspective	Landscape and visual impacts associated with the construction of the northern outfall will be temporary.	Landscape and visual impacts associated with the construction of this pipeline corridor will be temporary to short-term. Greater potential to disrupt landscape structure as a result of the greater length of pipeline corridor than that associated with the Clonshagh site.
Soils and Geology	The sub-soil ground conditions encountered on this site pose no technical difficulty to the construction of a WwTP.	It will be necessary to construct the outfall pipe at this location using tunnelling methodologies. Tunnelling of the northern outfall poses more technical challenges than tunnelling of the southern	The sub-soil ground conditions encountered pose no technical difficulty to the construction of the pipelines.	The sub-soil ground conditions encountered on this site pose no technical difficulty to the construction of a WwTP.	It will be necessary to construct the outfall pipe at this location using tunnelling methodologies. Tunnelling of the southern outfall poses less technical challenges	The preliminary ground investigation along the pipeline corridors in conjunction with existing available information indicate that the sub-soil ground conditions encountered pose no technical difficulty to the construction of the pipelines.	The sub-soil ground conditions encountered on this site pose no technical difficulty to the construction of a WwTP.	It will be necessary to construct the outfall pipe at this location using tunnelling methodologies. Tunnelling of the northern outfall poses more technical	The sub-soil ground conditions encountered pose no technical difficulty to the construction of the pipelines.

Criteria	Annsbrook Site Option			Clonshagh Site Option (Clonshaugh)			Newtowncorduff Site Option		
	WwTP site	Northern Outfall	Pipeline Routes	WwTP site	Southern Outfall	Pipeline Routes	WwTP Site	Northern Outfall	Pipeline Routes
		outfall The outfall pipeline crosses the Skerries to Rush Geological Heritage site.			than tunnelling of the northern outfall			challenges than tunnelling of the southern outfall The outfall pipeline crosses the Skerries to Rush Geological Heritage site.	
Hydrographic Surveys	Not applicable to the WwTP site	This outfall location is characterised by a rocky shoreline with gradual sandy sloping seabed with rocky outcrops in places.	Not applicable to the pipeline routes	Not applicable to the WwTP site	This outfall location is characterised by flat sandy beaches and gradual featureless sloping seabed.	Not applicable to the pipeline routes	Not applicable to the WwTP site	This outfall location is characterised by a rocky shoreline with gradual sandy sloping seabed with rocky outcrops in places.	Not applicable to the pipeline routes
Hydrodynamic Modelling	Not applicable to the WwTP site	Initial dilution capacity is available at the outfall location; however, it exhibits less initial dilution and mixing characteristics for the effluent plume than the southern outfall.	Not applicable to the WwTP site	Not applicable to the WwTP site	Initial dilution capacity is available at the outfall location. This outfall exhibits better initial dilution and mixing characteristics for the effluent plume than the northern outfall.	Not applicable to the WwTP site	Not applicable to the WwTP site	Initial dilution capacity is available at the outfall location; however, it exhibits less initial dilution and mixing characteristics for the effluent plume than the southern outfall.	Not applicable to the WwTP site
Planning Policy	There are no known planning policy constraints associated with this site.	There are no known planning policy constraints associated with this outfall.	There are no known planning policy constraints associated with this pipeline route	The GB zoning on this site does not constitute a planning policy constraint such as would preclude the proposed development.	There are no known planning policy constraints associated with this outfall.	There are no known planning policy constraints associated with this pipeline route	There are no known planning policy constraints associated with this site.	There are no known planning policy constraints associated with this outfall.	There are no known planning policy constraints associated with this pipeline route
Engineering Design	There are no identified technical constraints to the construction of the WwTP at this site.	Tunnelling of the northern outfall poses more technical challenges than tunnelling of the southern outfall	There are no identified technical constraints to the construction of the pipeline route. The total length of pipeline is significantly greater than that required for the Clonshagh site option The estimated power requirements for pumped flows are significantly greater than those required on the Clonshagh site option. A greater number of crossings of key existing and proposed infrastructure are required than for the Clonshagh site option A greater number of river/stream crossings are required than the Clonshagh site option.	There are no identified technical constraints to the construction of the WwTP at this site.	Tunnelling of the southern outfall poses less difficulty than tunnelling of the northern outfall	There are no identified technical constraints to the construction of the pipeline route. The total length of pipeline is significantly shorter than that required for the Annsbrook and Newtowncorduff site options The estimated power requirements for pumped flows are significantly lower than those required for the Annsbrook and Newtowncorduff site options. A lower number of crossings of key existing and proposed infrastructure are required than for the Annsbrook and Newtowncorduff site options A lower number of river/stream crossings are required than for the Annsbrook and Newtowncorduff site options.	There are no identified technical constraints to the construction of the WwTP at this site.	Tunnelling of the northern outfall poses more technical challenges than tunnelling of the southern outfall	There are no identified technical constraints to the construction of the pipeline route. The total length of pipeline is significantly greater than that required for the Clonshagh site option The estimated power requirements for pumped flows are significantly greater than those required on the Clonshagh site option. A greater number of crossings of key existing and proposed infrastructure are required than for the Clonshagh site option A greater number of river/stream crossings are required than the Clonshagh site option.
Traffic and Access	Access to this site is considered the least	Potential construction based traffic and access	Potential construction based traffic and access impacts at	Access to this site is considered less	Potential construction based traffic and access	Potential construction based traffic and access impacts at the	Access to this site is considered the most	Potential construction based traffic and	Potential construction based traffic and access impacts at

Criteria	Annsbrook Site Option			Clonshagh Site Option (Clonshaugh)			Newtowncorduff Site Option		
	WwTP site	Northern Outfall	Pipeline Routes	WwTP site	Southern Outfall	Pipeline Routes	WwTP Site	Northern Outfall	Pipeline Routes
	favourable	impacts at the outfall locations are short term / temporary in nature.	the outfall locations are short term / temporary in nature.	favourable than that for the Newtowncorduff site	impacts at the outfall locations are short term / temporary in nature.	outfall locations are short term / temporary in nature.	favourable	access impacts at the outfall locations are short term / temporary in nature.	the outfall locations are short term / temporary in nature.
Preliminary Cost Estimates	Preliminary Cost Estimates indicate that the greatest cost is associated with the Annsbrook site option.			Preliminary Cost Estimates indicate that the lowest cost is associated with the Clonshagh site option.			Preliminary Cost Estimates indicate that the cost associated with the Newtowncorduff site option is greater than the Clonshagh site option and marginally less than the Annsbrook site option.		

Table 9.1: Emerging Preferred Site Option Assessment Matrix

9.3 Constraints Identified

Key environmental and technical constraints identified for each emerging preferred site option are as follows:

Annsbrook

The northern outfall pipe terminates within the Rockabill – Dalkey Island cSAC (site code: 003000), which has been recently transmitted as a candidate SAC for reefs listed on Annex 1 and Harbour Porpoise listed on Annex 2 of the Habitats Directive. Harbour Porpoise have been noted in proximity to the northern outfall area and geogenic reefs (Annex 1 habitat) were recorded in proximity to the pipeline corridor and this is recognised as a potential constraint. However, the northern outfall is not considered as ecologically sensitive as the southern outfall as in addition to terminating within the Rockabill to Dalkey Island cSAC (site code: 003000) the southern outfall pipe also crosses the Baldoyle Bay SAC/SPA.

The longer length of pipeline route associated with the Annsbrook site option is considered 'less favourable' under ecology criteria when compared to the Clonshagh site option as there is increased potential for impacting on badgers and loss of bat roosts from tree removal and loss of habitat and hedgerow elements that assist in bat feeding and orientation. In addition this pipeline corridor involves 33no watercourse crossings as against 5no. watercourse crossings on the pipeline corridors associated with the Clonshagh site option and therefore there is increased potential for impacting on freshwater ecology.

The longer length of pipeline associated with the Annsbrook site option has greater potential to disrupt the landscape structure from a landscape and visual perspective than the shorter length of pipeline associated with the Clonshagh site option.

Tunnelling of the northern outfall poses more technical challenges than tunnelling of the southern outfall and is therefore considered 'less favourable' under soils and geology criteria than the southern outfall.

The northern outfall exhibits less initial dilution and mixing characteristics for the effluent plume than the southern outfall and is therefore considered 'less favourable' under the hydrodynamic modelling criteria than the southern outfall.

The Annsbrook site option is considered 'less favourable' than the Clonshagh site option under 'engineering design' criteria due to the greater technical challenges associated with tunnelling the northern outfall, the significantly longer length of pipeline required, the significantly higher power requirements for pumped flows, the greater number of crossings of key existing and proposed infrastructure required and the greater number of river/stream crossings required.

Under traffic and access criteria the access arrangements for the Annsbrook site are considered 'less favourable' than either of the other two preferred sites.

Preliminary cost estimates indicate that the Annsbrook site option is less favourable than the Clonshagh site option.

Clonshagh (Clonshaugh)

The southern outfall pipe terminates within the Rockabill – Dalkey Island cSAC (site code: 003000), which has been recently transmitted as a candidate SAC for reefs listed on Annex 1 and Harbour Porpoise listed on Annex 2 of the Habitats Directive. Harbour Porpoise have been noted in proximity to the southern outfall area and geogenic reefs (Annex 1 habitat) were recorded in proximity to the pipeline corridor and this is recognised as a potential constraint. The southern outfall pipeline corridor also crosses the Baldoyle Bay SAC/SPA and is therefore considered to be more ecologically sensitive than the northern outfall location.

The southern outfall is therefore considered 'less favourable' under ecological criteria than the northern outfall.

Part of the lands on which the Clonshagh site is located are zoned 'Greenbelt', which is considered 'less favourable' under the planning policy criteria than either of the other two sites.

Newtowncorduff

The northern outfall pipe terminates within the Rockabill – Dalkey Island cSAC (site code: 003000), which has been recently transmitted as a candidate SAC for reefs listed on Annex 1 and Harbour Porpoise listed on Annex 2 of the Habitats Directive. Harbour Porpoise have been noted in proximity to the northern outfall area and geogenic reefs (Annex 1 habitat) were recorded in proximity to the pipeline corridor and this is recognised as a potential constraint. However, the northern outfall is not considered as ecologically sensitive as the southern outfall as in addition to terminating within the Rockabill to Dalkey cSAC (site code: 003000) the southern outfall pipe also crosses the Baldoyle Bay SAC/SPA.

The Newtowncorduff site is considered to be of higher ecological value than the Clonshagh site and is therefore considered 'less favourable' than the Clonshagh site under ecology criteria.

Similar to the Annsbrook site option the longer length of pipeline route associated with the Newtowncorduff site option is considered 'less favourable' under ecology criteria when compared to the Clonshagh site option as there is increased potential for impacting on badgers and loss of bat roosts from tree removal and loss of habitat and hedgerow elements that assist in bat feeding and orientation. In addition this pipeline corridor involves 33no. watercourse crossings as against 5no. watercourse crossings on the pipeline corridors associated with the Clonshagh site option and therefore there is increased potential for impacting on freshwater ecology.

The Newtowncorduff site is considered to be of higher cultural heritage value than either the Annsbrook or Clonshagh sites and is therefore considered 'less favourable' than either the Annsbrook or the Clonshagh site under cultural heritage criteria.

Similar to the Annsbrook site option the longer length of pipeline associated with the Annsbrook site option has greater potential to disrupt the landscape structure from a landscape and visual perspective than the shorter length of pipeline associated with the Clonshagh site option.

Similar to the Annsbrook site option tunnelling of the northern outfall poses more technical challenges than tunnelling of the southern outfall and is therefore considered 'less favourable' under soils and geology criteria than the southern outfall.

Similar to the Annsbrook site option the northern outfall exhibits less initial dilution and mixing characteristics for the effluent plume than the southern outfall and is therefore considered 'less favourable' under the hydrodynamic modelling criteria than the southern outfall.

Similar to the Annsbrook site option the Newtowncorduff site option is considered 'less favourable' than the Clonshagh site option under 'engineering design' criteria due to the greater technical challenges associated with tunnelling the northern outfall, the significantly longer length of pipeline required, the significantly higher power requirements for pumped flows, the greater number of crossings of key existing and proposed infrastructure required and the greater number of river/stream crossings required.

Preliminary cost estimates indicate that the Newtowncorduff site option is less favourable than the Clonshagh site option.

9.4 Comparative Assessment

The overall evaluation of the three emerging preferred site options and the selection of the preferred site option are based on the relative performance of each of the site options against the individual Environmental and Technical criteria considered. This comparative assessment assigns 'more favourable' and 'less favourable' classifications to the constraints identified.

Table 9.2 – Summary Evaluation Table presents a summary of the results of the assessment process.

Table 9.2: - Summary Evaluation Table

Criteria	Annsbrook Site Option			Clonshagh Site Option (Clonshaugh)			Newtowncorduff Site Option		
	WwTP site	Northern Outfall	Pipeline Routes	WwTP site	Southern Outfall	Pipeline Routes	WwTP Site	Northern Outfall	Pipeline Routes
Ecology	↔	↔	↓	↑	↓	↑	↓	↔	↓
Cultural Heritage	↔	↔	↔	↔	↔	↔	↓	↔	↔
Landscape and Visual	↔	↔	↓	↔	↔	↑	↔	↔	↓
Soils and Geology	↔	↓	↔	↔	↑	↔	↔	↓	↔
Hydrographic Surveys	N/A	↔	N/A	N/A	↔	N/A	N/A	↔	N/A
Hydrodynamic Modelling	N/A	↓	N/A	N/A	↑	N/A	N/A	↓	N/A
Planning Policy	↔	↔	↔	↓	↔	↔	↔	↔	↔
Engineering Design	↔	↓	↓	↔	↑	↑	↔	↓	↓
Traffic and Access	↓	↔	↔	↔	↔	↔	↑	↔	↔
Preliminary Cost Estimates		↓			↑			↓	

Legend:

- ↑ = 'more favourable' when compared to the other options
- ↓ = 'less favourable' when compared to the other options
- ↔ = 'neutral' when compared to other options

9.5 Discussion on Comparative Assessment and Selection of Preferred Site Option

The selection of the final preferred site option is based on a cumulative consideration of the various 'more favourable', 'less favourable' and 'neutral' assessment results in Table 9.2 - Summary Evaluation Table, in addition to the discussion on same presented above.

The ASA Phase 4 assessment has determined that it is technically feasible to construct each site option. However, it was identified that all site options have, to varying degrees, 'less favourable' classification under the range of Environmental, Technical and Cost criteria considered.

The Annsbrook site option has 7 'less favourable' classifications under Environmental and Technical criteria summarised below

- WwTP site - traffic and access constraints has been assigned 'less favourable' classification when compared to either of the other two WwTP sites.
- Outfall - soils and geology, hydrodynamic modelling, and engineering design constraints have been assigned less favourable classification when compared to the southern outfall.
- Pipeline Route - Ecology, landscape & visual, and engineering design constraints have been assigned less favourable classification when compared to the pipeline routes associated with the Clonshagh site.

The Clonshagh site option has 2 'less favourable' classifications under Environmental and Technical criteria as summarised below:

- WwTP site - planning policy constraints. The GB zoning has been assigned 'less favourable' classification than the RU zoning applicable on the other two WwTP sites.
- Outfall - ecology constraints have been assigned less favourable classification when compared to the northern outfall.

The Newtowncorduff site option has 8 'less favourable' classifications under Environmental and Technical criteria as summarised below:

- WwTP site - ecology and cultural heritage constraints have been assigned 'less favourable' classification when compared to either of the other two WwTP sites.
- Outfall - soils and geology, hydrodynamic modelling, and engineering design constraints have been assigned less favourable classification when compared to the southern outfall.

- Pipeline Route - Ecology, landscape & visual, and engineering design constraints have been assigned less favourable classification when compared to the pipeline routes associated with the Clonshagh site

In comparison to both the Annsbrook and Newtowncorduff site options the Clonshagh site option was assessed as being 'more favourable' under 7 of the Environmental and Technical criteria considered as summarised below:

- WwTP site - 'more favourable' classification for ecology criteria
- Outfall - 'more favourable' classification for soils and geology, hydrodynamic modelling, and engineering design criteria
- Pipeline Route - 'more favourable' classification for ecology, landscape & visual, and engineering design criteria

Under Cost criteria preliminary cost estimates indicate that the substantially lowest and therefore 'more favourable' cost is associated with the Clonshagh site option.

The ecological constraints relating to the southern outfall pipe crossing the Baldoyle Bay SAC/SPA and terminating within the Rockabill to Dalkey cSAC (site code: 003000) are acknowledged. Further studies will be undertaken to inform the EIA and AA processes and appropriate construction methodologies will be implemented to ensure that the outfall pipe and its discharge will not impact on the qualifying features of these designated areas.

In conclusion, the Clonshagh site option is selected as the final preferred site option on the basis that it is the least constrained of the three emerging preferred site options on account of

- The proposed site at Clonshagh has the least ecological sensitivity when compared to the two other proposed sites.
- The WwTP can be designed such that there is no impact on the archaeological remains identified at the edges of the proposed site.
- The southern outfall exhibits better initial dilution and mixing characteristics for the effluent plume than the northern outfall
- Tunnelling of the southern outfall poses less difficulty than tunnelling of the northern outfall
- The southern marine outfall is tunnelled under the Baldoyle Bay SAC/SPA and terminates within the Rockbill to Dalkey cSAC (site code: 003000). The project will be designed, constructed and operated to ensure that it will not adversely affect the integrity of any Natura 2000 sites.
- The total length of pipeline for this site option is significantly shorter than the pipeline for the other two site options which provides for

- Less ecological impact
- Fewer watercourse crossings
- Lower number of crossings of key existing and proposed infrastructure
- Less potential to disrupt the landscape structure during construction
- Lower energy requirements

In addition the Clonshagh site option presents the substantially lowest cost option (greater than €80M).

Therefore the Clonshagh site option is considered to be the most environmentally, technically and economically advantageous option and is therefore recommended as the final preferred site option.

It is noted that when comparing the Annsbrook and Newtowncorduff site options the difference between the preliminary cost estimates is negligible, however, the Newtowncorduff site is considered 'least' favourable on the basis of having more 'less' favourable classifications under the Environmental and Technical criteria assessed.

10 Conclusions and Recommendations

10.1 Conclusions

This Report concludes the Alternative Sites Assessment (ASA) study which was a key recommendation of the SEA of the GSDSDS and with the overall objective of selecting a preferred site for the proposed Regional WwTP, a preferred location for its associated marine outfall and preferred routes for the orbital sewers and outfall pipeline.

Since May 2011, the ASA process was undertaken in four distinct phases:

- Phase 1 – Alternatives Site Identification (Preliminary Screening).
- Phase 2 – Alternatives Sites Assessment (Emerging Preferred Site Options).
- Phase 3 – Public Consultation Stage.
- Phase 4 – Selection of the final preferred site option.

From a comprehensive series of technical and environmental assessments and public consultation during ASA Phase 2, the three site options of **Annsbrook, Clonshagh (Clonshaugh) and Newtowncorduff** emerged from the nine site options short listed under ASA Phase 1 as the emerging preferred site options to be taken forward for Public Consultation in ASA Phase 3 and further assessment in ASA Phase 4.

In the ASA Phase 4 assessment each of the individual components (i.e. WwTP site, its associated marine outfall location, orbital sewers and outfall pipeline) of the three emerging preferred site options were combined into one overall emerging preferred site option assessment matrix such that a comparative assessment of the 'more' and 'less' favourable classification assigned to identified constraints could be undertaken to allow for the selection of the final preferred site option.

The ASA Phase 4 process has determined that it is technically feasible to construct all three site options. However, it was identified that all site options have, to varying degrees, 'less favourable' classification under the range of Environmental, Technical and Cost criteria considered.

In comparison to both the Annsbrook and Newtowncorduff site options the Clonshagh site option (WwTP site at Clonshagh, southern marine outfall and orbital sewers) was assessed as being 'more favourable' under a greater number of the Environmental, Technical and Cost criteria assessed.

The Clonshagh site option is therefore considered to be the most environmentally, technically and economically advantageous option.

10.2 Recommendation

On completion of the ASA and Route Selection process the Clonshagh site option (i.e. WwTP site at Clonshagh, southern marine outfall location and its associated orbital sewers and outfall pipeline) is recommended as the final preferred site option and that it is brought forward for further assessment under the Environmental Impact Assessment and Appropriate Assessment processes.

10.3 Next Steps

On completion of the EIA and AA processes a planning application for the project will be submitted to An Bord Pleanála. Until planning consent is granted for the preferred option Clonshagh, the Annsbrook and Newtowncorduff site options will continue to be possible options for the project should Clonshagh be found unsuitable at any future stage.

Environmental Impact Assessment

An Environmental Impact Assessment (EIA) will be carried out by the competent authority. The EIA Directive, Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment as amended by Council Directive 97/11/EC of 3 March 1997, Directive 2003/35/EC of 26 May 2003 and Directive 2009/31/EC of 23 April 2009, now codified in Directive 2011/92/EU of 13 December 2011, is designed to ensure that projects likely to have significant effects on the environment are subject to a comprehensive assessment of environmental effects prior to development consent being given (See Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment, Department of the Environment, Community and Local Government, March 2013 which also refers to the applicable EU and Irish law provisions).

Appropriate Assessment

An Appropriate Assessment (AA) arises from the requirement under Articles 6(3) and 6(4) of Council Directive 92/43/EEC of 21 May 1992 (the 'Habitats Directive'). (See also Part XAB of the Planning and Development Act 2000 (as amended and substituted). The potential for development to have a likely significant effect either individually or in combination with other plans or projects on Natura 2000 sites (i.e. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs)) shall be considered as part of an Appropriate Assessment process which is required under the Habitats Directive.

Public and stakeholder consultation will commence in June 2013 and issues raised during this consultation relevant to both the EIA and the AA will be separately considered and separately assessed within each respective process.