

Greater Dublin Drainage

Alternative Sites Assessment - Phase Two Sites Assessment and Route Selection Report

Agronomy

May 2012

Executive Summary

Agronomy

The Agronomy study has compared nine sites for the location of a proposed regional wastewater treatment plant, marine outfall and orbital drainage system as part of the Greater Dublin Drainage Scheme. The study involved an evaluation of constraints within nine shortlisted land parcels. Following detailed technical and environmental investigations of the land parcels sites were identified within the land parcels. These sites were examined and a comparison between the sites was undertaken by the study team. The Agronomy assessment formed part of this study. The findings of the Agronomy study fed into the overall evaluation matrix of the sites. The agronomy assessment considered the sites under a number of categories including percentage reduction in overall farm holding, farming enterprise, number of landowners affected, land quality, land use, farming enterprise, impacts to existing facilities and or farm buildings, and impact on shelter.

All of the nine potential sites are primarily located in Agricultural lands in North County Dublin. Agriculture is intensive in North County Dublin due to the high quality of the soil type. A large proportion of landowners in the nine sites are involved in the horticultural sector and are vegetable or potato growers. The horticultural sector including the potato industry is of significant importance to the area.

The Agronomy assessment consisted of

- Desktop review of mapping information
- Walkover survey of land parcels
- Farm visits and consultation with affected landowners
- Consultations with stakeholders

11 Agronomy

11.1 Introduction

Philip Farrelly & Company was appointed by Fingal County Council to assess the Agricultural impacts of the Greater Dublin Drainage – Regional Wastewater treatment plant, marine outfall and orbital drainage system. This report is a study of the potential agricultural impact of the construction of the Regional Wastewater treatment plant, marine outfall and construction of the orbital Drainage system. It involves an assessment of the nine potential sites for construction of the wastewater treatment plant. All nine sites are located in areas predominately used for agriculture. The area to be acquired from agricultural production is approximately 20 hectares.

The proposed wastewater treatment plant will be located in one of nine potential sites which are all located in North Co. Dublin. Land holdings in the chosen site for the wastewater treatment plant will be affected by reducing the farmed area of the land holding and severance may be caused to the land holding depending on the location of the site within the land holding.

Philip Farrelly & Company carried out an assessment of the agricultural impact in December 2011, and January 2012.

11.2 Methodology

An assessment of the existing agricultural environment was carried out through a desktop survey of available mapping, and walk over surveys of eight land parcels. It was not possible to undertake a walkover survey on one of the nine land parcels therefore an inspection from adjacent roads was carried out of this land parcel. Farm visits were carried out at eight of the land parcels. Consultation with Bord Bia and Teagasc took place. The agricultural impacts on the nine sites was assessed and a comparison of the impact between the sites was undertaken.

11.2.1 Desktop Study

A desktop study was carried out on available mapping. This mapping included a study area outline for each land parcel option and orthophotography mapping with indicative landownership information.

11.2.2 Site Visits

Farm visits were undertaken on eight of the nine land parcels. Access to one land parcel was not possible at this time. The farm visit consists of a detailed farm survey and walkover survey of the land holding. An assessment of how the proposed wastewater treatment plant could impact on current farming operations is carried out following the farm visit.

The impact on agriculture is the overall potential effect of the construction of the wastewater treatment plant and associated infrastructure on a farm holding. The degree to which the wastewater treatment plant impacts upon an individual farm depends on:

- Land take
- Land quality

- The degree of severance
- The type of farm enterprises carried out
- Farm Size
- Impact on farm buildings and/or facilities
- Impact on shelter

Landtake

Individual Fields

In general the larger the field size the more useful the field. This is particularly because of the ease of use of machinery in larger fields. Reduction in the field size results in increased costs to the farmer.

Farm Holdings

The land take is one of the main impacts on a farm holding. The degree of the impact varies with the area of the land taken, the land quality, location and farm type. The greater the landtake and the higher the quality of the affected lands the greater will be the impact.

Landtake on the main land holding will have a greater impact on a fragmented farm holding than landtake from an outfarm i.e. land removed from the main land holding. Landtake on a dairy farm on lands used as grazing paddocks adjacent to a milking parlour may have a larger impact than taking land located on a beef farm.

The size of the affected farm holding is also a factor with landtake on a smaller farm generally having a greater impact.

Intensity of Land Use

Farming systems can vary with regard to the intensity of use to which the land is put. In general, the impact will be greater on more intensively farmed lands. All of the nine sites are intensively farmed.

Severance

Severance is the effect caused when a proposed development divides a farm holding or a field. Severance is important because it affects the future management of the remaining land, which is not taken for the proposed scheme. It extends the impact of the proposed scheme outside the footprint of the actual land take.

Severance of Individual Fields or Land holdings

Farm holdings are more efficient in single land units. Severance of a land holding occurs when a proposed development splits a field or land holding into two or more pieces. This results in the fragmentation of the farm holding into a greater number of management units. Access may involve a considerable distance to the severed area of land. Fragmentation of farm holdings results in greater costs due to increased livestock and grassland management involved in farming more than one unit. For example, movement of livestock between land units and increased travel distances for grassland, silage and tillage machinery.

Where farm buildings are located on the land unit being severed the impact of severing these buildings from the land must be considered. Land isolated from the farm buildings is left without access to facilities previously available. The greater the area of land severed from the farm buildings the greater the impact. Constructing new farm buildings in certain cases can mitigate this impact. The impact of severance on farm

buildings is particularly acute in the case of dairy farming where the dairy and milking parlour are severed from the grazing paddocks. The impact is greater because dairy cows require twice-daily access from the grazing area to a milking parlour.

Animal handling facilities such as cattle pens may be present for loading/unloading and treatment of livestock. The impact on severing such holdings can be mitigated by the replacement of the facilities on the severed area.

In many instances land units do not have any farm buildings or animal handling facilities. This may occur when the farm buildings are located on another part of the farm holding. Where it involves short distances it may be the traditional practice to walk livestock along the public road network to the farm buildings.

The following significance criteria presented in Table 11.1 prepared by Philip Farrelly & Company are used to assess severance of individual fields or land units.

Table 11.1 Significance Criteria used to assess Severance of fields or land units

EPA Glossary of Impacts	Level of Impact	Criteria
Profound or Significant Impact: Negative only	Severe	The proposed site is located on the land unit causing severance. It is divided into two units. There is no access to the severed area. The severed area is greater than two thirds of the land unit. There is a loss of access to farm buildings and / or facilities.
Significant Impact: Negative only	Major	The proposed site is located on the land unit causing severance. It is divided into two units and the severed area is greater than one third of the land unit. There is no access to the severed area or it may be a by way of a considerable distance. Farm buildings and facilities are left on less than half the original area. Remaining areas may be irregularly shaped and less suited to agricultural use.
	Moderate	The proposed site is located on the land unit causing severance. It is divided into two units. Access is available to the two areas. The severed area is less than one third of the land unit. Where present, the farm buildings and facilities remain on the larger area.
	Minor	The proposed site is located on the land unit along the external boundary leaving the bulk of the land in one unit. There may be severance of a small area. Farmyard facilities are not affected.
Neutral, Imperceptible or Slight Impact	Not Significant	The proposed site is located on the land unit along the external field boundary leaving the bulk of the land in one unit. There is no severance caused.

Farming Enterprise

The farm enterprise types that will be most severely affected by a proposed development are those of high stocking rates, which are intensively farmed. These would frequently be dairy farms and intensive beef farms. Dairy farming is one of the

most profitable farming enterprises in this country. A reduction in the available forage area may result in a reduction in the number of dairy cows that can be maintained on the farm holding. Significant landtake, or severance of the grazing paddocks from the farm buildings, may result in the farmer being forced to change the farm enterprise type to a less profitable enterprise.

Certain farm enterprises may be impacted to a greater extent by a proposed development. Horses are of a more nervous disposition than other stock types. They are prone to stress caused by irregular noise and moving vehicles. Land take and severance of land holdings may result in fields of an irregular shape (e.g. triangular shaped fields with sharp / narrow corners), which may be unsuitable for grazing with equine stock. Horses risk injury when galloping around such fields.

Drystock enterprises such as beef and sheep are generally less affected by a proposed scheme than dairy farms. Livestock on these farm holdings are not moved from field to field as frequently as on a dairy farm. Although there is a significant impact, the farming practices on these enterprises can be adapted to mitigate the overall impact.

A large majority of the affected landowners are involved in the horticultural industry. Horticultural enterprises are impacted to a greater extent than other enterprises because they are generally very intensive units. The farm infrastructure such as irrigation pipes and bore holes can be affected. Interruption of a water supply can have a serious impact on a horticultural enterprise. Land cannot be as easily replaced for a horticultural enterprise as not all land is suited for horticulture. Many Horticultural growers spend a long time getting the soil, pH balance and fertilizer levels to an optimum level to be able to grow vegetable crops.

Impact on Farmyard Buildings And/ Or Facilities

The removal of farm buildings and / or facilities on the farm will contribute towards the overall impact on the farm. This will depend on the type of farm buildings affected and extent that the facilities are affected.

Impact on Shelter

The removal of mature trees and strong hedgerows, which provide shelter to crops and livestock, especially younger stock, will have an impact on a farm holding. The level of impact will depend on the extent of the shelter removed and the type of enterprise. It should be noted that this is an impact that can be mitigated in certain cases by the replanting of boundary hedgerows and replanting of suitable tree species.

11.3 Existing Environment

All nine short listed land parcels for the proposed wastewater treatment plant are in County Dublin and are primarily located on agricultural land. County Dublin has a total Utilisable Agricultural Area of 40,384 hectares (CSO Census of Agriculture, 2010). This represents approximately 0.80% of the national agriculture land area. There are 798 farms in County Dublin with an average farm size of 47.8 hectares. This is considerably higher than the national average of 32.7 hectares.

The Horticultural Industry is of significant importance to the area and the majority of the landowners affected are involved in horticulture. The Irish Horticulture and Potato sector contributed approximately €370 million to farm output in 2009 (Source Food Harvest 2020 Department of Agriculture, Fisheries and Food 2010)

Dublin is the most important county for field vegetable production where almost half of national production is found. (Bord Bia). The majority of vegetable production in Dublin takes place in North County Dublin all nine potential sites are located in North County Dublin. In 2008 there were 2,157 hectares of field vegetables in County Dublin. This represented 47% of national production area. The farm gate value of field vegetables in 2008 was €69.7 million. The farm gate value of field vegetables in Dublin in 2008 was €32.2 million. (Source Bord Bia National Field Vegetable Census 2009)

In 2010 National Potato Production was 12,200 hectares, (Source CSO Area, Yield & Production of Crops, 2010 (June 2011). Dublin accounts for 15.8% of national potato production (Source IFA Trends & Challenges in Irish Potato Production)

The 2011 retail market for all fresh produce was valued at over €1.2 billion. The fresh produce category comprises of vegetables, fruit and potatoes. In 2011 the value of fresh vegetables was €526 million, the value of fruit was €535 million and Potato retail value was €143 million. (Bord Bia Food Alert)

In 2008 Dublin had 372 hectares of cabbage this represents 39% of total production area of cabbage, 258 hectares of carrots this represents 38% of total production area of carrots, 290 hectares of broccoli this represents 47% of total production area of broccoli, 184 hectares of Swedes this represents 36% of total production area of Swedes and 312 hectares of Cauliflower representing 72% of total Cauliflower production. (Bord Bia National Field Vegetable Census 2009).

11.3.1 **Agriculture within the study area**

All of the nine short listed land parcels are located in North County Dublin. Agriculture is intensive throughout the study area. The majority of landowners in the nine land parcels are involved in the horticultural sector and are vegetable and potato growers. Vegetables including cabbage, cauliflower, parsnips, leeks, onions and potatoes are grown on eight of the nine land parcels. The horticultural industry including the potato industry is of significant importance to this area. Horticulture is concentrated in this area because of the ideal growing conditions in the region: low rainfall amounts, sandy soils, and coastal location. The proximity to a large population centre in Dublin City ensures a market for the produce. The importance of the industry to this area can be further demonstrated by the number of vegetable buyers and distributors located within the region. The topography within the study area is gently flat to undulating lowland. The land quality in the area is considered good with the land elevations mostly below 100 meters above ordnance datum. Agriculture in this area is intensive in nature due to relative high quality of the soil type with all of the main types of enterprises carried out.

Lusk, Rush and Skerries are the predominant market gardening areas in North County Dublin. In our consultations with Bord Bia and Teagasc they emphasised the importance of the Lusk, Rush, and Skerries area to the horticultural industry. Horticulture is concentrated mainly between Lusk Rush and Skerries because of the presence of fertile lands suitable for vegetable growing. This area has a reputation for producing high quality vegetable and fruit crops all year round.

11.3.2 **Soils within the study area**

Soil types influence the nature and intensity of farming that can be carried out. In this section reference is made to the 'Soil Associations of Ireland and their Land Use Potential' (Gardiner & Radford, 1980) and the 'General Soil Map of Ireland' (1980). Using the soil classifications referred to in this map the predominant soil encountered in

the study area can be described as Soil Association 38 and 40. The soil is associated with flat and gently rolling topography and occurs mainly in East Meath and County Dublin. It is moderately well drained soil of clay loam texture. This soil association has a moderately wide use range. It is suitable for grassland but is also suitable for tillage and intensive vegetable production. There is a tradition of vegetable and tillage crops throughout the study area due to the close proximity to the Dublin City market and low rainfall in this area

11.3.3 Land parcels

Annsbrook

Annsbrook is a 62ha land parcel. There are six landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. Beef farming, tillage farming, and vegetable production is carried out on the land parcel. The majority of the land parcel is in grassland and is used for beef farming. Winter wheat is also growing on the land. The vegetable crops are rotated every year. Depending on crop rotation potatoes are grown in some years. Cauliflower and leeks are currently growing on some of the land parcel. There are no farm buildings impacted within the land parcel area. There are two farm roadways within the land parcel. There are mature trees and hedgerows forming field boundaries within the land parcel.

Baldurgan

Baldurgan is a 57ha land parcel. There is one land owner within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. Tillage, vegetable and potato farming are carried out on the land parcel. The lands within the land parcel are currently planted in Winter wheat. Vegetables are grown in rotation on the farm. The main vegetables grown are cabbage, and sprouts, Potatoes are part of the rotation practised on the farm. There are no farm buildings impacted within the land parcel area. There are two farm roadways within the land parcel. There is not a significant amount of hedgerows or trees within this land parcel. The internal field boundaries have largely been removed within this land parcel.

Clonshagh

Clonshagh is a 40ha land parcel. There are five landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. Tillage, vegetable and grassland farming are carried out on the land parcel. The lands within the affected land parcel are currently used for growing cabbage. Broccoli, cauliflower and wheat are also grown in the rotation on the area currently in cabbage. There are no farm buildings impacted within the land parcel area. There are a small amount of trees and hedgerows within the land parcel.

Cookstown

Cookstown is a 80ha land parcel. There are five landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. Tillage, vegetable, potato and mixed livestock farming including a beef enterprise are carried out on the land parcel. The majority of the lands within the land parcel are currently planted in Winter wheat. We understand onions are going to be planted in the land parcel this year. Onions, potatoes, grain, cabbage and broccoli are part of the crop rotation. There are no farm buildings within the land parcel area. There is a farm roadway within the land parcel. There are a small amount of trees and hedgerows

within the land parcel. A vegetable processing plant “James Nugent and Sons” is located adjacent to the land parcel.

Cloghran

Cloghran is a 32ha land parcel. There are five landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. All of the land is in grassland and is mainly used for beef farming. There are no farm buildings or farm roadways within the land parcel area. There are mature trees and hedgerows within the land parcel.

Newtowncorduff

Newtowncorduff is a 43ha land parcel. There are three landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the affected land parcel are currently used for growing wheat, cauliflower, rapeseed, and grassland. A large area of the land is currently in grassland and a beef enterprise is carried out on the lands. Trees have been planted in a small area of the land parcel. Some of the land in the land parcel is leased and is currently being used to grow rapeseed. A large Agribusiness “Whites Agri” is located adjacent to the proposed land parcel. Whites Agri are one of the largest Agri Merchants in the region. There are no farm buildings located within the parcel area. There are mature trees and hedgerows within the land parcel.

Rathartan

Rathartan is a 41ha land parcel. There are nine landowners within the land parcel. The land is located in proximity to Lusk which is an area where intensive market gardening is carried out. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the land parcel are currently used for wheat, cauliflower, broccoli, and cabbage. A small area of the land parcel is currently in grassland but has in the past been used for growing lettuce. A large area of the land parcel is used for intensive vegetable production. Some of the land in the land parcel is currently being leased. The leased land is used to grow vegetables and tillage. There are no farm buildings in the located within the parcel area. A farm laneway giving access to a number of landparcels is located within the parcel area. There are a small amount of trees and hedgerows within the land parcel

Saucerstown

Saucerstown is a 36ha land parcel. There are eight landowners within the land parcel. The land quality is all good quality land suited to a wide range of farming enterprises. The land parcel is currently used for tillage, grassland and vegetable production. Currently parsnips winter wheat and grassland are grown within the land parcel. Potatoes and cauliflower are also part of the crop rotation. A beef enterprise is also carried out on the affected land parcel. Some of the land in the land parcel is currently being leased. There are no farm buildings located within the land parcel area. A farm laneway is located within the parcel area. There are a small amount of trees and hedgerows within the land parcel.

Tyrellstown Little

Tyrellstown Little is a 104ha land parcel. There are 10 landowners within the land parcel. The land is in close proximity to Lusk and is in an area where intensive market gardening is carried out. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the land parcel are currently used for wheat,

barley parsnips, cabbage, and grassland. A beef enterprise is carried out on the grassland area of the land parcel. There are no farm buildings located within the parcel area. A farm roadway giving access to a number of land parcels is located within the parcel area. There are mature trees and hedgerows within the land parcel.

11.3.4 Sites

Following detailed technical and environmental studies including the Agronomy assessment the study team identified sites within the land parcels for the location of the proposed regional wastewater treatment plant. The Agronomy assessment informed the study team of the Agricultural impact of the proposed development.

Annsbrook

There is one landowner within the proposed site area. The majority of the lands are in grassland and are used for a beef enterprise. Some of the affected lands are currently planted with leeks. Crop rotation is practised on the farm. The land quality is all good quality land. A farm roadway will be impacted. There are mature trees and hedgerows forming field boundaries within the site area. No farm buildings are located within the site area. Minor severance will occur where land to the north of the site will be severed.

Baldurgan

There is one land owner within proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. Tillage, vegetable and potato farming are carried out on the site. The lands within the site area are currently planted in Winter wheat. Crop rotation is practised on the farm and vegetables & potatoes are grown as part of the rotation practised on the farm. There are no farm buildings within the site area. A farm roadway will be impacted. There is not a significant amount of hedgerows or trees within the site area. Minor severance will occur where land to the south of the site will be severed.

Clonshagh

There are three landowners within proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. Tillage and vegetable farming are carried out on the land parcel. The majority of the site area is used for vegetable growing. Cabbage is currently grown within the site area. Crop rotation is practised on the lands. Broccoli, cauliflower and wheat are part of the rotation practised. There are no farm buildings impacted within the site area. There will be an impact on an existing farm roadway. There are a small amount of trees and hedgerows within the site area. Minor severance will occur where land to the north of the site will be severed.

Cookstown

There is one landowner within proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. The lands are currently in tillage. Crop rotation is practised on the lands and vegetables and potatoes are part of the rotation. There are no farm buildings or farm roadways located within the site area. Moderate severance will occur where land to the western boundary of the land holding will be severed from the remaining lands.

Cloghran

There are four landowners within proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. All of the land is in grassland and is mainly used for beef farming. There are no farm buildings or farm roadways within the proposed site area. There are mature trees and hedgerows within the proposed site area. Minor severance will occur where land to the north of the site will be severed.

Newtowncorduff

There is one landowner within the proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the proposed site area are currently growing grass and rapeseed. A beef enterprise is carried out on the lands. The lands that are currently in rapeseed are currently leased to a local farmer. There are mature trees and hedgerows within the proposed site area. There are no farm buildings within the site area. Minor severance will occur where land on the western boundary of the holding will be severed.

Rathartan

There are seven landowners within the proposed site area. The land is located in proximity to Lusk which is an area where intensive market gardening is carried out. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the proposed site area are currently used for tillage, cauliflower, parsnips, spinach and cabbage. A large proportion of the proposed site area is used for intensive vegetable production. Some of the land within the proposed site area is currently being leased. The leased land is used to grow vegetables and tillage. There are no farm buildings located within the site area. A farm laneway giving access to a number of landowners is located within the site area. Moderate severance will occur. Land to the north of the proposed site will be severed.

Saucerstown

There are three landowners within the proposed site area. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the proposed site area are used for tillage and vegetable production. Wheat and parsnips are currently growing on the land. Crop rotation is practised on the lands and potatoes are part of the rotation. There are no farm buildings or farm roadways located within the site area. There are a small amount of trees and hedgerows within the proposed site area. Minor severance will occur where land to the north of the proposed site will be severed.

Tyrellstown Little

There is one landowner within the proposed site area. The land is in close proximity to Lusk and is in an area where intensive market gardening is carried out. The land quality is all good quality land suited to a wide range of farming enterprises. The lands within the proposed site area are all in grassland and used for a beef enterprise. The lands adjacent to the proposed site area are used for intensive horticulture. There are no farm buildings or farm roadways located within the site area. There are some hedgerows within the site area. Severance will not occur.

11.4 Predicted Impacts

The impact on agriculture and farming generally of any substantial development will vary from farm to farm depending on a number of factors. Under the Environmental Protection Agency Glossary of Impacts five levels of impact are defined:-

- **Profound Impact**
- **Significant Impact**
- **Neutral Impact**
- **Imperceptible Impact**
- **Slight Impact**

The following significance criteria presented in Table 11.2 prepared by Philip Farrelly & Company are used to assess the overall impact on a farm holding.

Table 11.2 Significance criteria for overall impact on the farm holding

EPA Glossary of Impacts	Level of Impact	Criteria
Neutral, Imperceptible or Slight Impact	Not Significant	An impact is not significant where the farm enterprise suffers a slight inconvenience such as relocation of access or loss of shelter.
Significant Impact: Negative only	Minor	Minor impact occurs where the farm enterprise suffers inconvenience as a result of the proposed development. Severance would not occur or is insignificant and the farm buildings and facilities would be left in place. Typically only a small portion of land would be removed at the boundary of the farm.
	Moderate	Moderate impact occurs where the farm enterprise can be continued as before but with increased management or operational difficulties. While portions of the land would be severed the enterprise mix would be such that the farming system could continue perhaps with reduced stock numbers or additional labour, contractor or other charges.
	Major	Major impact occurs where the farm enterprise cannot be continued without considerable management or operational changes. There would be significant severance on the affected land parcel(s). The proposed development may affect farm buildings and / or facilities. Access to the severed portions of land can only be achieved through the use of non-farm roads to access severed lands. Where the impact is major an enterprise change may be necessitated e.g. from dairy to drystock.
Profound or Significant Impact: Negative only	Severe	Severe impact occurs where the farm enterprise cannot be continued as a result of the proposed development. This would occur where land-take and severance was of such a nature to make the holding unworkable and/or where important farm buildings and facilities were removed. Impact of this degree would be rare and is most likely to occur on a dairy or stud farm.

In order to assess the predicted impact that any major development may have on agriculture either at individual farm level or at a local, regional or national level it is necessary to:

- Define the possible impacts
- Assess when these impacts may occur, during construction, during operation

The impact on agriculture and farming generally of any substantial development will vary from farm to farm and from development to development depending on a number of factors. In the case of a Wastewater treatment plant and associated infrastructure loss of land, severance, noise and dust during construction, drainage impacts may be the greatest impacts

Since the entire construction of this development will require the acquisition of a 20ha site on one of the nine shortlisted sites it is likely that the site will be located as close as possible to existing land parcel boundaries and severance of land parcels will be curtailed. The acquisition of 20ha of land will have an impact on the farm holdings affected and will reduce their overall farm holding.

The potential impacts are as follows:-

- Noise during construction and during operation
- Dust during construction.
- Impact on land during construction of the pipeline
- Odour during operation.
- Malfunction of the plant including spillages and leakages
- Impact on surface water during construction and operation.
- Impact on groundwater during construction, operation and during the residual life of the facility.
- Impact on drainage
- Impact on marketing perceptions

11.4.1 Predicted Impacts Construction Phase

11.4.1.1 Construction Noise

The activity of earth moving machinery, transport lorries and other ancillary vehicles will generate additional noise emissions in the immediate vicinity of the construction of the wastewater treatment plant. Noise can be of significance for farm animals (i.e. when noise becomes excessively loud). In general, animals become accustomed to regular noises and sounds. Intermittent noises can cause fright and distress. Blasting activity can be of particular concern with certain farm enterprises such as breeding and training of horses. Intermittent noises close to farm buildings, particularly milking parlours, can distress livestock.

11.4.1.2 Construction Dust

Dust generated from the exposure of soil to the atmosphere during construction may cause annoyance or nuisance to the farmer and farm animals. The proliferation of dust during construction has a nuisance effect and, if produced in high volumes near milking

parlours or on-farm bulk milk storage tanks, may constitute a risk as a source of contamination to the milk. Dust may accumulate on vegetable crops growing adjacent to the construction site.

Livestock are at risk of eye irritations from high levels of windblown dust particles. This stress may reduce productivity and increase management difficulties, especially on dairy and equestrian farms.

11.4.1.3 Impact on land during construction of the pipeline

It is to be expected that land will be disturbed during the construction of the pipeline. A detailed programme of works will be agreed with the contractor before any works take place. The programme of works will detail items such storage of topsoil, measures taken to alleviate soil compaction, levelling of soil, drainage, and reinstatement processes to be undertaken. All agricultural lands will be reinstated after the construction of the pipeline.

11.4.2 Predicted Impacts Operational Phase

11.4.2.1 Odour during operation

During farm visits, landowners have expressed fears of mal odours emanating from the site during operation of the plant onto adjoining farmlands and on to vegetable crops. In the unlikely event that this should occur the odours could impact on the market perception of the quality of the produce. Vegetable crops require intensive labour and if significant odours were present it may impact on routine labour operations.

11.4.2.2 Malfunction of the plant during operation

If the plant malfunctioned during operation there is a danger that spillages and leakages could occur and contaminate produce grown in proximity to where a spillage or leakage occurred. In addition to this spillages and leakages could contaminate surface and groundwater sources. Growers have to adhere to strict environmental conditions in order to maintain contracts with buyers. Any leakages or spillages could have environmental consequences and could impact on the ability of the farmers to sell their produce.

11.4.2.3 Impact on surface water during construction and operation

A high proportion of farm animals on the proposed land parcels depend on surface waters for drinking. In addition consumer demands and quality assurance schemes dictate that the highest standards of purity be maintained in surface waters. Any damage to surface waters could have far reaching affects on farmers' ability to market their products.

11.4.2.4 Impact on ground water during construction and operation

Any contamination of the groundwater from the operational phase could have a serious affect on farming in the area as many of the farm homes and farmyards receive their water supplies from local groundwater sources. Many of the farmers are using wells or boreholes to irrigate their crops when soil moisture deficits occur. Farmers are also using water for washing their produce.

In addition consumer demands and quality assurance schemes dictate that the highest standards of purity be maintained in groundwater. Any damage to groundwater could have far reaching affects on farmers' ability to market their products.

11.4.2.5 Impact on drainage

It is to be expected that field drainage systems currently in situ may be disturbed and in places severed by the construction of Wastewater treatment plant and orbital drainage system. These systems will be restored as part of the completed works, but there may be impaired drainage in the period of time between initial disturbance and final reinstatement of such drainage works.

11.4.2.6 Impact on marketing perceptions

During farm visits, landowners have voiced their concerns in relation to the negative perception the proposed wastewater treatment plant and associated pipelines will have on their ability to market their produce. Growers must adhere to the highest standards in order to maintain contracts with purchasers. Wastewater treatment plants and wastewater pipelines are located throughout the country and impact on agricultural lands and their location is not perceived to affect marketing of the produce grown in these areas because they are settled and accepted within the environment.

11.5 Evaluation

Evaluation of all nine sites was undertaken after the walkover surveys, and desktop surveys of available mapping was completed. It was not possible to undertake a walk over survey on one the sites therefore an inspection from adjacent roads was carried out of the site. Farm visits were also conducted on eight of the nine sites. Following the walkover surveys and farm visits a matrix was compiled detailing the potential agricultural impacts on the farm holdings. This matrix includes a provisional assessment of the potential agricultural impact on the farm holdings not visited based on a desktop survey of scheme mapping and a roadside survey of the lands.

11.5.1 Evaluation of Land Sites

The evaluation of the sites was based on percentage reduction in overall farm holding, farming enterprise, number of landowners impacted, land quality, severance, impact on shelter, impact on farm buildings, impact on farm roadways. Intensive farming is carried out on all of the nine sites. Eight of the nine sites are involved in horticulture. The sites in Rathartan and Tyrellstown Little are located in the intensive market gardening area of Lusk, Rush and Skerries and should be avoided if possible. Approximately 20ha of land will be lost to agricultural production as result of the construction of the proposed regional wastewater treatment plant. This loss while significant to individual farmers is not significant on a county or national level.

11.5.2 Pipeline Corridors

A desktop survey of mapping was used to examine land use and constraints within the pipeline corridors.

11.5.3 Outfall areas

A desktop survey of mapping was used to examine land use and constraints within the land based areas of the marine outfall areas.

Phase 2 Alternative Sites Assessment - Environmental Criteria Evaluation Matrix

Stage 1 of Criteria Evaluation (Land Parcels)

1.0	Agromony	Annsbrook	Baldurgan	Clonshagh	Cookstown	Cloghran	Newtowncorduff	Rathartan	Saucerstown	Tyrrelstown Little
1.1	Farming Enterprise	Beef, Tillage,& Horticulture,	Tillage, Potato and Horticulture	Horticulture Tillage & Grassland	Tillage, Horticulture, Potato and mixed livestock	Beef	Tillage, Horticulture, Beef, part forestry, part leased	Horticulture Tillage & part leased (Intensive market gardening area)	Tillage, Potatoes, Horticulture, Beef & part leased	Tillage, Horticulture,Beef & part leased (Intensive market gardening area)
1.2	Number of landowners within land parcel	6	1	5	5	5	3	9	8	10
1.3	Land Quality	Good								
1.4	Potential Impacts on farms	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings	Reduction in farm size, severance of individual land parcels, possible impact on access points to land parcels, field angulation, impact on drainage, impact on shelter, impact on farm buildings
1.5	Crop rotation practiced	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes
1.6	Overall Impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Major negative impact	Moderate negative impact	Major negative impact
1.7	Assessment	favorable	less favorable	less favorable	less favorable	favorable	favorable	least favorable	less favorable	least favorable

Phase 2 Alternative Sites Assessment - Environmental Criteria Evaluation Matrix

Stage 1 of Criteria Evaluation (Sites)

1.0	Agronomy	Annsbrook	Baldurgan	Clonshagh	Cookstown	Cloghran	Newtowncorduff	Rathartan	Saucerstown	Tyrrelstown Little
1.1	Approximate% Reduction in overall farm holding	36%	21%	28%, 18%,24 %	21%	8.6%, 49%, 9.6%, 26%	21%	30%, 16.75%, 100%,9.3%,34% 98%,19%	7%15%51%	31%
1.2	Farming Enterprise	Beef & Horticulture (The majority of the site is used for a beef enterprise)	Tillage, Potatoes & Horticulture	Horticulture & Tillage	Tillage, Horticulture, & Potatoes	Beef	Mixed livestock & tillage	Horticulture & Tillage, (intensive market gardening area)	Tillage, Potatoes& Horticulture	Beef (site is located in an intensive market gardening area)
1.3	Number of landowners impacted within site boundary	1	1	3	1	4	1	7	3	1
1.4	Land Quality	Good	Good	Good	Good	Good	Good	Good	Good	Good
1.5	Severance based on site location within overall land holdings	Minor	Minor	Minor	Moderate	Minor	Minor	Moderate	Minor	Not significant
1.6	Potential Impacts on landholdings	Reduction in farm size, field angulation, removal of trees and hedgerows, impact on land drainage, impact on existing farm roadway	Reduction in farm size, field angulation, impact on land drainage, impact on existing farm roadway	Reduction in farm size, field angulation, impact on land drainage, impact on existing farm roadway	Reduction in farm size, field angulation, impact on land drainage,	Reduction in farm size, field angulation, impact on land drainage	Reduction in farm size, field angulation, removal of trees and hedgerows, impact on land drainage,	Reduction in farm size, field angulation, removal of hedgerows, impact on land drainage, impact on existing farm roadway	Reduction in farm size, field angulation, removal of hedgerows, impact on land drainage,	Reduction in farm size, field angulation, removal of trees and hedgerows, impact on land drainage
1.7	Crop rotation practiced	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	No
1.8	Overall Impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Moderate negative impact	Major negative impact	Moderate negative impact	Moderate negative impact
1.9	Assessment	favorable	less favorable	less favorable	less favorable	favorable	favorable	least favorable	less favorable	least favorable

Phase 2 Alternative Sites Assessment - Environmental Criteria Evaluation Matrix**Stage 1 of Criteria Evaluation (Marine Outfall)**

1.0	Agronomy	Northern Outfall Study Area	Southern Outfall Study Area
1.1	Land Quality	Good	Good
1.2	Land Use	Intensive horticulture & tillage	Grassland