Fingal County Council

Expansion and Upgrading of Swords Wastewater Treatment Works

Environmental Impact Statement

Volume I

Non-Technical Summary

D.G. O'Connor B.A. B.A.I. C.Eng. F.I.E.I.
County Engineer
Fingal County Council
P.O. Box 174
46/49 Upper O'Connell Street
Dublin 1.

Tobin Environmental Services Ltd.
Consulting Environmental Engineers
23 Ballsbridge Terrace
Ballsbridge
Dublin 4.

May 1998

FINGAL COUNTY COUNCIL

EXPANSION AND UPGRADING OF SWORDS WASTEWATER TREATMENT WORKS

ENVIRONMENTAL IMPACT STATEMENT

VOLUME I
NON-TECHNICAL SUMMARY

MAY 1998

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Table Of Contents

1.0 Introduction

1.1 General

In accordance with their obligations under the Environmental Impact Assessment Regulations and The Local Government (Planning Regulations) 1994, Fingal County Council have had an Environmental Impact Statement prepared on their proposal for the Expansion and Upgrading of the existing Swords Wastewater Treatment Works, which is to be developed within the existing site and on a new site which is also owned by Fingal County Council to the North of, and immediately adjacent to the existing site.

The E.I.S. is one essential element of the E.I.A. process required under E.C. Directive 85/337/E.C. It should be noted that it is just one of three constituent parts of the process, the three being as follows:

- The Environmental Impact Statement (E.I.S.).
- The comments of the public, Local or State Authority or E.C. Member State.
- The Assessment of the E.I.S. by the Competent Authority.

The competent Authority in relation to the Upgrading and Expansion is the Minister for the Environment and Local Government as described in Part (IX) Environmental Impact Assessment of Certain Development by or on behalf of Local Authorities (S.I. No. 86 of 1994, Local Government (Planning and Development) Regulations, 1994.

1.2 Planning Context

The proposed development will consist of the Upgrading and Expansion of the existing Swords Wastewater Treatment Works in two phases, to cater for an overall population equivalent (P.E.) of 90,000 persons. This requires provision of a new Treatment Stream on lands immediately north of the existing Treatment Works. As the proposed development lies within the Administration area of Fingal County Council itself, the County Council must proceed in accordance with the requirements of Part IX of the Local Government (Planning and Development) Regulations 1994.

1.3 Site Location

- The site is situated some 150m to the north east of the most northern roundabout of the Swords By-Pass which is also the main Dublin - Belfast Road (N1).

- The site is located some 250m west of the "Big Marsh" at the Western Boundary of the Broadmeadow Estuary.

1.4 Surrounding Land Use

The lands surrounding the site are primarily residential or amenity in nature. To the south west boundary of the site there is a public open space between the existing Treatment Plant and the residential housing estates of "Newcourt" and "The Green" of Seatown Park. The public open space continues around the southeast boundary of the Treatment Plant and it separates the Treatment Plant from the Residential Housing Estates of Lissenhall Park and Gartan Drive. To the north east of the site, there are four detached residential properties along Estuary Road. Immediately west of the site there is a public footpath and the Spittal Hill Road which serves as the access road to the existing Treatment Plant and to the derelict lands north of the Plant. The site context is illustrated by way of an aerial photograph (Fig. 1.4.1).

The character of the area is generally determined by the mix of residential and industrial developments in the area together with the open space and amenities to the north west and south of the site and which could be described as suburban/light industrial fringe. The lands further to the northeast of the site which includes Estuary Road, the Big Marsh, Broadmeadow Estuary and Lissenhall House are far less developed and are of a generally rural nature. The site location and land use surrounding the site are illustrated on Fig. 1.4.2.

Figure 1.4.3 shows the site of the proposed development in greater detail.

Comhairle Chontae Fhine Gall
Bosca l 94,
áras an Chontae,
Baile Átha Cliath 1.
Fingal County Council
P.O. Box 174,
Áras an Chontae,
Dublin 1

Tobin Environmental Services Ltd.,
Consulting Environmental Engineers,
23 Ballsbridge Terrace,
Dublin 4.

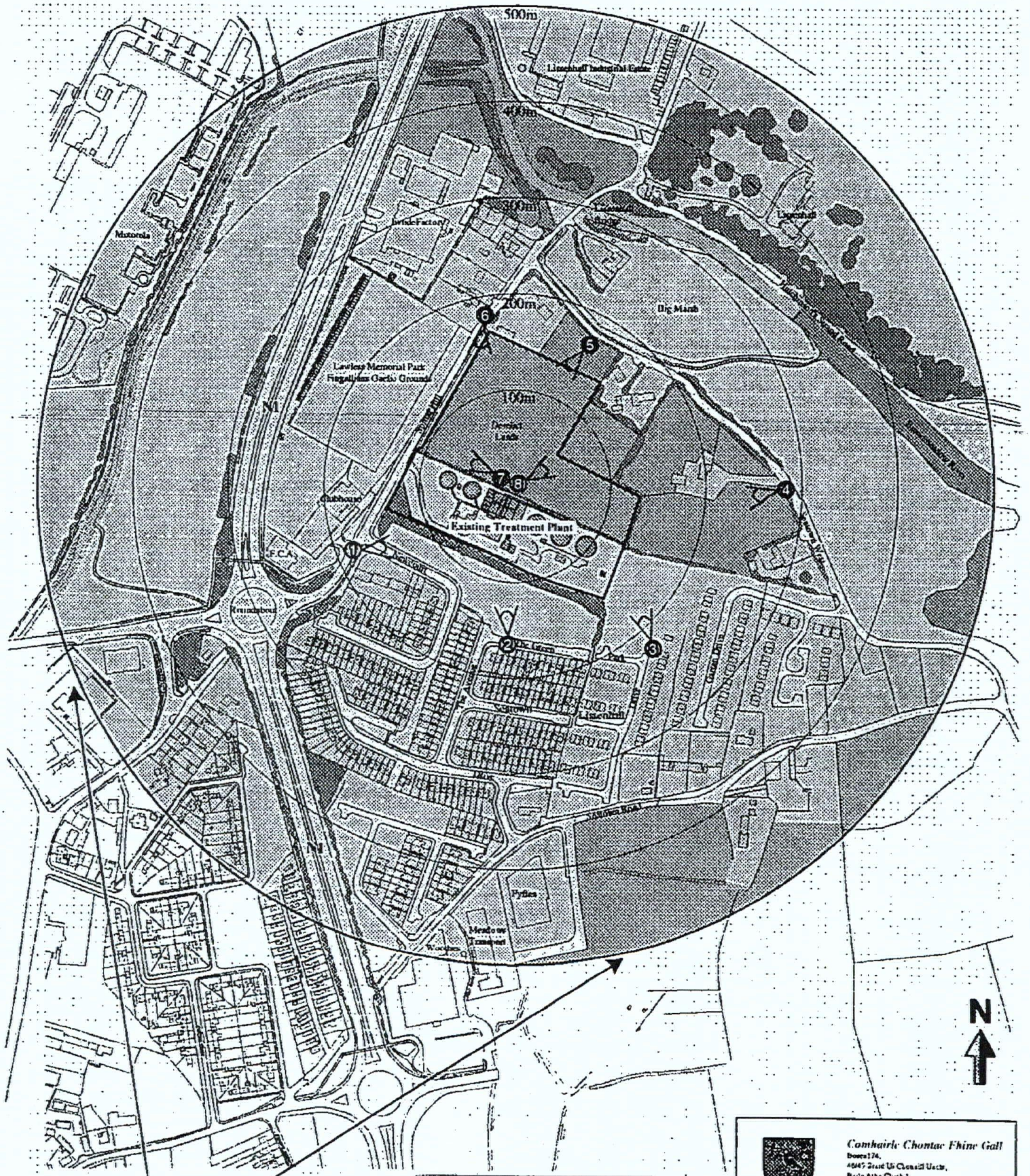
BRADY SHIPMAN MARTIN
Landscape Architects
26, Temple Road,
Dartry, Dublin 6.

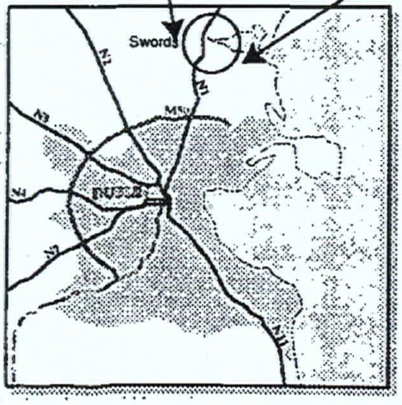
Swords Waste Water Treatment Plant

SITE CONTEXT

April 1998

Figure 1.4.1





LEGEND

- INDUSTRIAL DEVELOPMENT
- RESIDENTIAL PROPERTIES
- UNDEVELOPED/AGRICULTURAL LANDS
- PUBLIC/COMMUNITY OPEN SPACE
- SEA MARSH
- HIGH WATER MARK (BROADMEADOW ESTUARY)
- FRESHWATER
- EXISTING TREE VEGETATION
- PHOTOVIEW LOCATIONS

0 10 20 30 40 50 100metres

Comhairle Chontae Fhine Gall
Fingal County Council

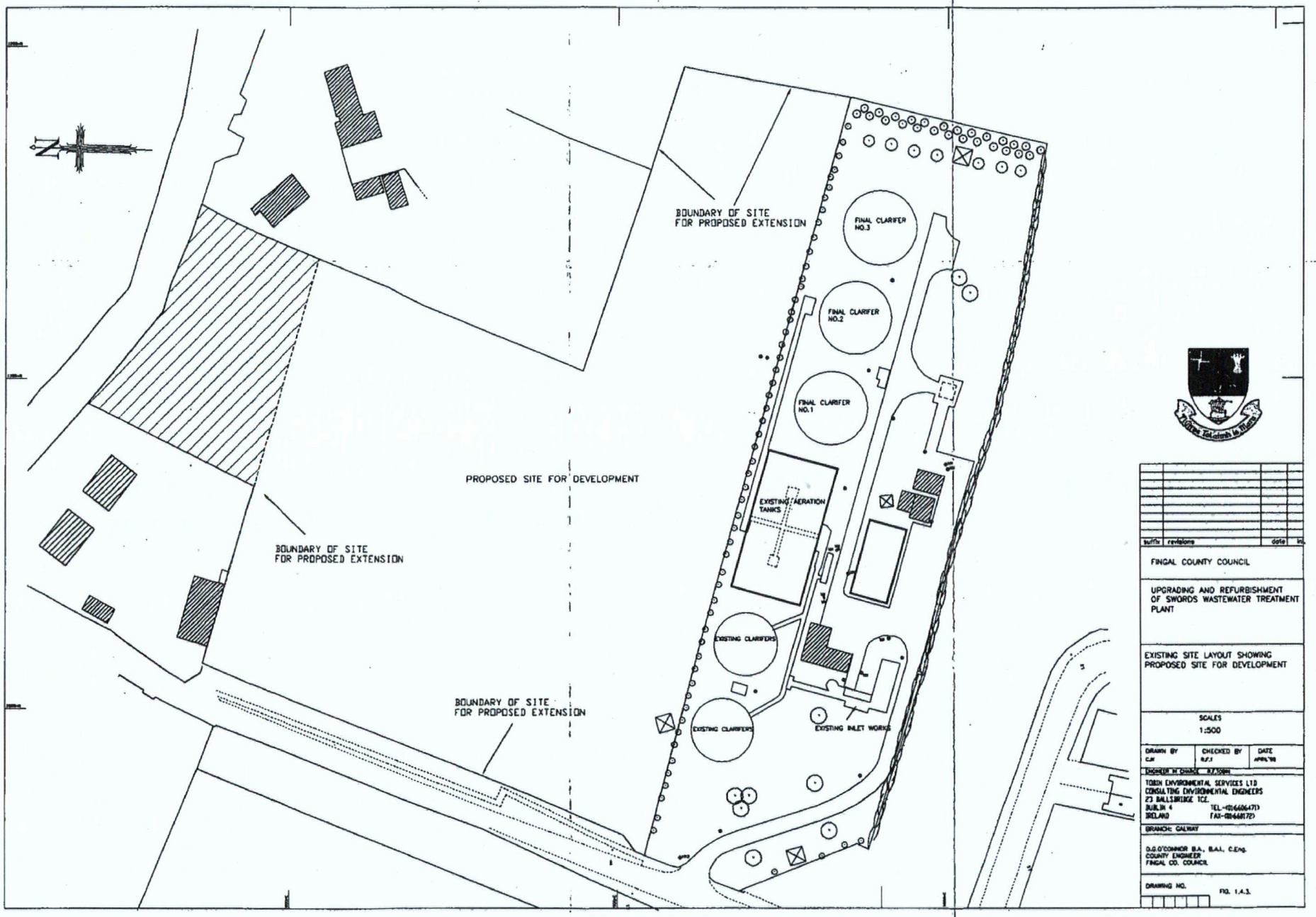
Tobin Environmental Services Ltd,
Consulting Environmental Engineers,
23 Ballsbridge Terrace,
Dublin 4.

BRADY SHIPMAN MARTIN
Landscape Architects

Swords Waste Water Treatment Plant

SITE LOCATION AND LANDUSE SURROUNDING THE SITE

April 1998 Figure 1.4.2


BOUNDARY OF SITE
FOR PROPOSED EXTENSION
FINAL CLARIFER
NO.3
FINAL CLARIFER
NO.2
FINAL CLARIFER
NO.1
PROPOSED SITE FOR DEVELOPMENT
EXISTING AERATION
TANKS
BOUNDARY OF SITE
FOR PROPOSED EXTENSION
EXISTING CLARIFERS
BOUNDARY OF SITE
FOR PROPOSED EXTENSION
EXISTING CLARIFERS
EXISTING INLET WORKS
FINGAL COUNTY COUNCIL
UPGRADING AND REFURBISHMENT OF SWORDS WASTEWATER TREATMENT PLANT
EXISTING SITE LAYOUT SHOWING PROPOSED SITE FOR DEVELOPMENT
SCALES
1:500
DRAWN BY
CJH
CHECKED BY
R.F.I
DATE
APRIL '98
ENGINEER IN CHARGE R.F.TOBIN
TOBIN ENVIRONMENTAL SERVICES LTD
CONSULTING ENVIRONMENTAL ENGINEERS
23 BALLSBRIDGE TCE.
DUBLIN 4
IRELAND
TEL:-(01)6606471)
FAX-(01)6601172)
BRANCH: GALWAY
D.G.O'CONNOR B.A., B.A.I., C.Eng.
COUNTY ENGINEER
FINGAL CO. COUNCIL
DRAWING NO.
FIG. 1.4.3.

1.4.1 Swords Development Plan, 1997

The Swords Development Plan 1997 identifies the available capacity for foul effluent treatment as the most important constraint on development. Coupled with this constraint is the need to protect the Broadmeadow Estuary which is a Special Protection Area and into which final effluent from the Wastewater Treatment Works at Swords discharges.

The Swords Development Plan 1997 states that:

"The Swords Treatment Plant is overloaded. No planning permission can or will be granted for any development until additional drainage capacity is made available". Exceptions to this are short term commitments for which limited capacity is available, having been allocated as part of the 1995 variation to the Development Plan. These short term commitments provide limited capacity for expansion of town centre facilities, the County Hall, industrial development and County Council Housing.

- Because of the critical nature of this constraint, Fingal County Council have decided that one of it's major priorities is to provide as soon as possible for additional drainage facilities to the highest standards to serve Swords.

The current Development Plan has zoned large tracts of land for both residential and industrial development. If all of the zoned lands were to be developed in the short to medium term, then the population equivalent for the area would increase to 60,807 P.E. made up as follows:-

• Existing Development and Current Planning Permissions	39,903 P.E.
• Zoned Lands	18,904 P.E.
• Airport Environs	2,000 P.E.
Total	***60,807 P.E.***

Within the long term development boundary of the Swords Catchment Area, there remains further development potential, on lands as yet unzoned. Looking to the future, it has been estimated that if these lands are developed to their full potential, the population equivalent for the area could increase further, to 90,000 P.E.

As the Local Authority with responsibility for the Swords area, Fingal County Council are obliged to put infrastructure in place to support this development. In order to service this level of development, consideration must now be given to the upgrading and expansion of the existing Wastewater Treatment Plant at Swords, in order to ensure that it can cope with the increasing demands which are now being placed upon it.

Fingal County Council therefore propose to develop the existing Wastewater Treatment Facility in two phases.

Phase 1 of the development which will increase the capacity of the Treatment Works so that it can treat wastewater from an equivalent population of 60,807 persons. This work is scheduled to commence construction during 1999.

Phase 2 of the development, will further increase the capacity of the Treatment Works so that it can treat wastewater from an equivalent population of 90,000 persons. The construction of the second phase of the proposed scheme will therefore be a future development and it's implementation will depend on:-

- The extent to which the lands currently zoned for development are in fact developed.
- The extent to which further lands within the Swords Catchment Area are zoned for residential and industrial development.

The decision to Upgrade and Expand the Wastewater Treatment Works has led to the commissioning of an Environmental Impact Statement relating to the proposed Upgrading and Expansion of the Treatment Works at Swords. The Environmental Impact Statement examines among other things:-

- The impact of increasing the capacity of the Wastewater Treatment Works at Swords in two phases of development, from an existing design population of 22,500 P.E. to 60,807 P.E. at Phase 1 and to 90,000 P.E. at Phase 2.

- The impact of discharging treated effluent from the Expanded and Upgraded Works to the Broadmeadow Estuary.

- Proposed improvements to the existing Works which will mitigate against the effects arising, for example, from odour nuisance.

With reference to paragraph 1.6 of this Non-Technical Summary, it is noted that alternative design layouts/processes may be put forward by intending Contractors during the procurement phase of the Project. This E.I.S. is accordingly based on an indicative layout, which has been developed from a preferred process design, and which represents the optimum use of the site with the preferred process option.

1.4.2 Outline of Indicative Proposal

The key elements of this indicative proposal are as follows:

a) Upgrading of the Existing Treatment Works

- The demolition of the existing Pumping Station, Preliminary Units and Sludge Stabilisation.
- The provision of a new First Stage Aeration Basin.
- The provision of odour mitigation measures for the existing Primary Settlement Tanks.
- Replacement of the Surface Aerators in the existing Aeration Basins with a Fine Bubble Diffused Aeration System, along with re-organisation of these Aeration Basins into compartments to facilitate nutrient removal.
- General Upgrading of the Main Administration Building.
- Provision of a new Chemical / Air Blower Building.
- Revisions to interconnecting pipework and Flow Splitting Chamber.
- Undergrounding of the existing overhead power lines crossing the site.
- Implementation of further mitigation measures to deal with odour nuisance.

b) Development of a New Treatment Stream including:-

- Provision of a new Pumping Station, Preliminary Units and Stormwater Holding Tank.
- Provision of a new Two Stage Activated Sludge Process Treatment Stream comprising 1 No. First Stage Aeration Basin, 3 No. First Stage Clarifiers, 3 No. Second Stage Aeration Basins and 3 No. Second Stage Clarifiers.
- Sludge thickening, stabilisation and dewatering facilities.
- Tertiary Filters and Final Effluent Pumping Station.

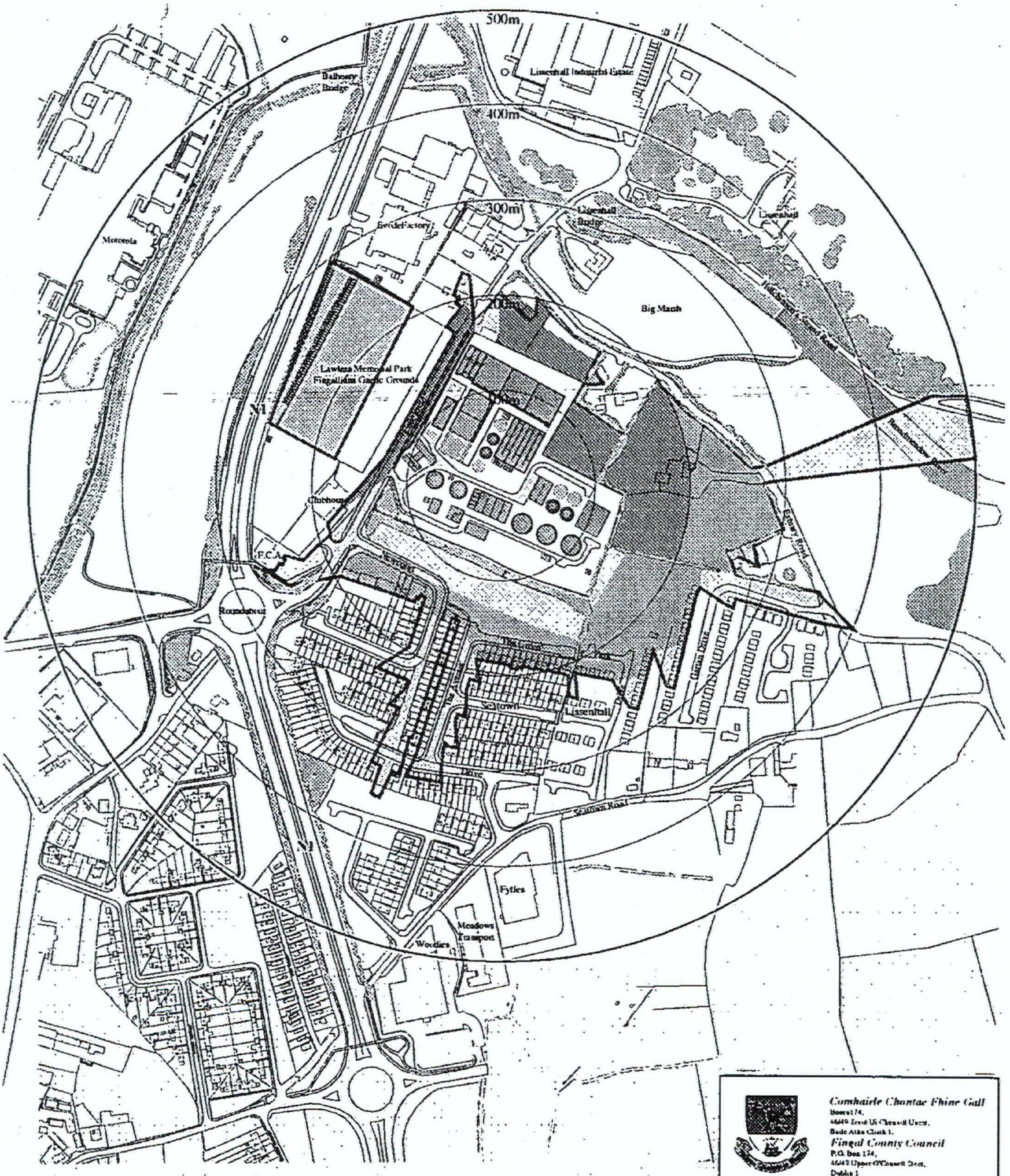
- Provision of a new Main Switchgear / Air Blower Building incorporating a diesel powered standby generator.
- Provision of a new Sludge Digestion and Dewatering Building.
- Provision of associated pipework, ducting, pump sumps, chambers and manholes.
- Site development including fencing, internal road way, boundary walls, landscaping and paved areas.
- Provision of mitigation measures to prevent odour nuisance.
- Provision of a new outfall pipeline.

The overall investment envisaged for the Phase 1 Scheme is IR£17.0 million based on current costs. A further investment of IR£5.0 million (again based on current prices) would be required to implement the second phase of the Scheme.

The proposed Upgrading and Expansion is illustrated on Figs. 1.4.4, 1.4.5 and 1.4.6.

Further illustrations in Figs. 1.4.7, 1.4.8, 1.4.9, 1.4.10, 1.4.11 and 1.4.12 show possible future views of the development from three critical locations in comparison with the existing views from the same locations at the present time.

It is noted that Fig. 1.4.8 outlines the height of the elements of the proposed development relative to the height of the existing boundary landscaping which will remain unaltered.

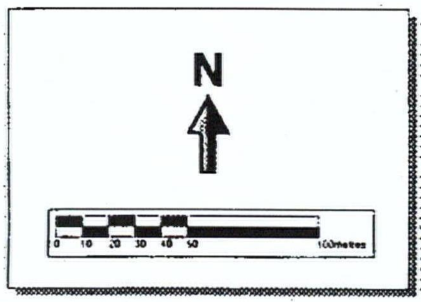


LEGEND

ZONE OF VISUAL INFLUENCE

DEGREE OF VISUAL IMPACT
(Assessed with no mitigation measures in place)

- Significant
- Moderate
- Slight
- Imperceptable
- EXISTING TREE VEGETATION



Comhairle Chontae Fhine Gall
Bosca 174,
46/49 Sráid Uí Chonaill Uacht.,
Baile Atha Cliath 1.
Fingal County Council
P.O. Box 174,
46/49 Upper O'Connell Street,
Dublin 1

Tobin Environmental Services Ltd.,
Consulting Environmental Engineers,
23 Ballsbridge Terrace,
Dublin 4.

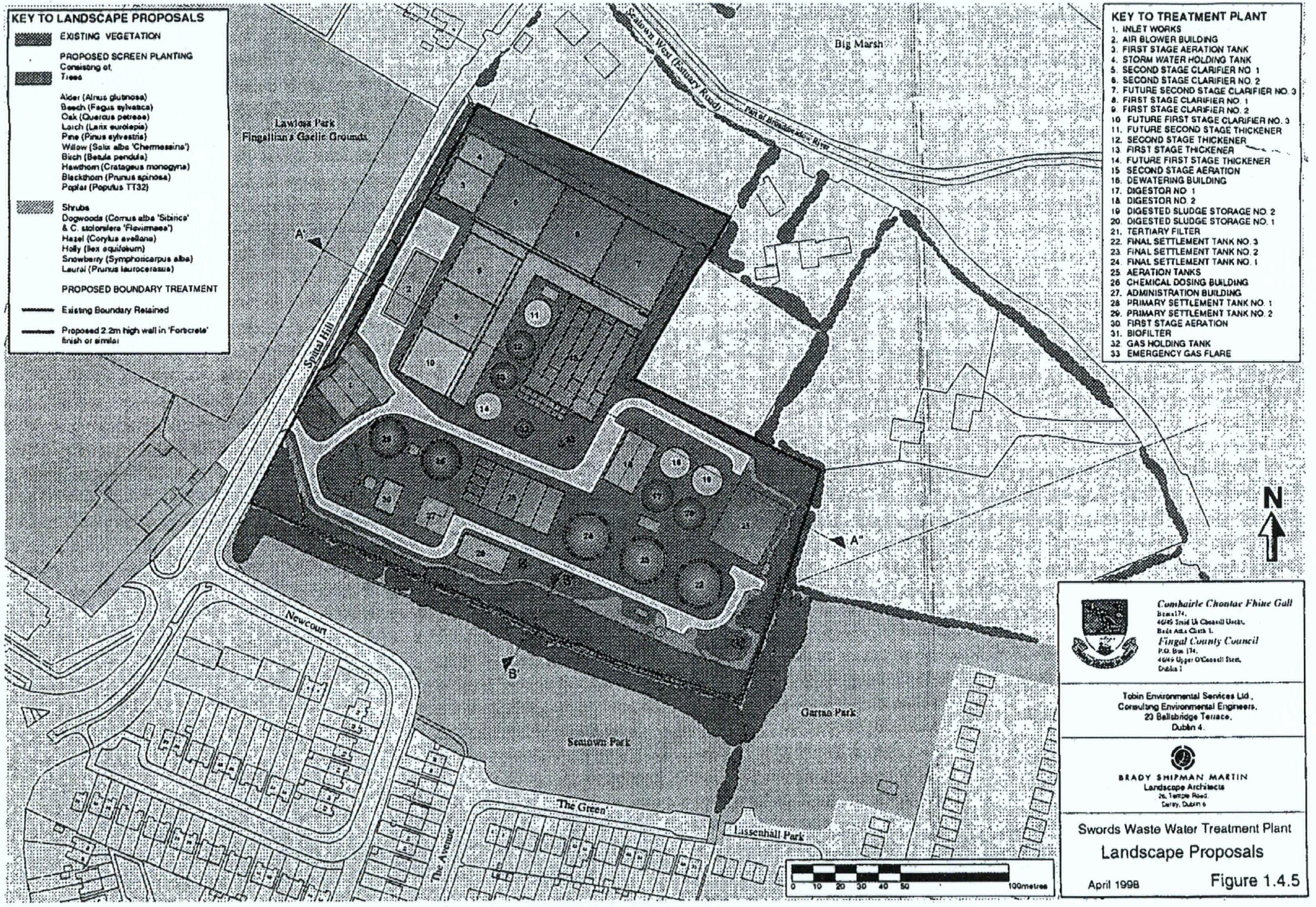
BRADY SHIPMAN MARTIN
Landscape Architects
26, Temple Road,
Dartry, Dublin 6.

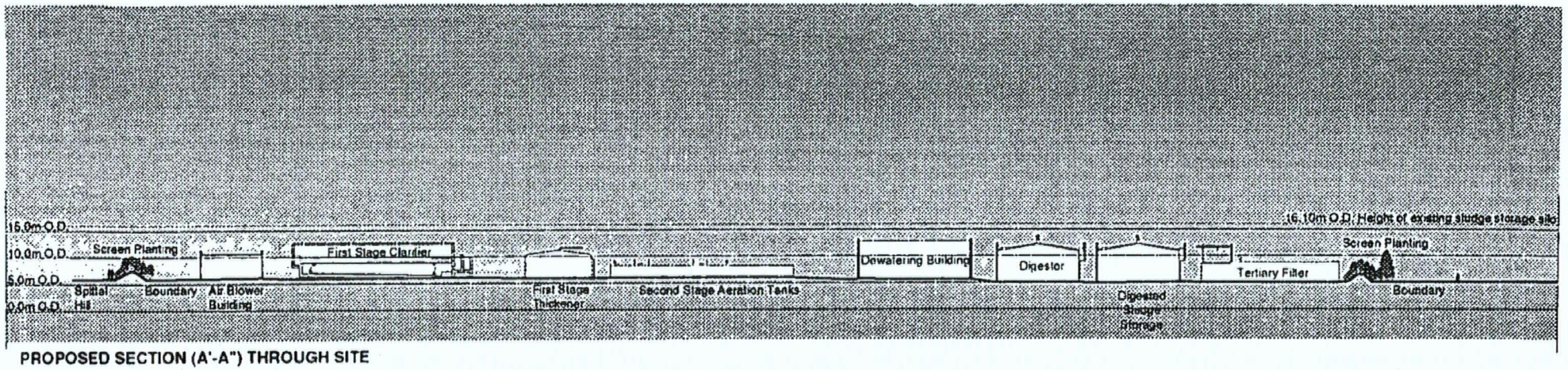
Swords Waste Water Treatment Plant

ZONE OF VISUAL INFLUENCE &DEGREE OF VISUAL IMPACT

April 1998

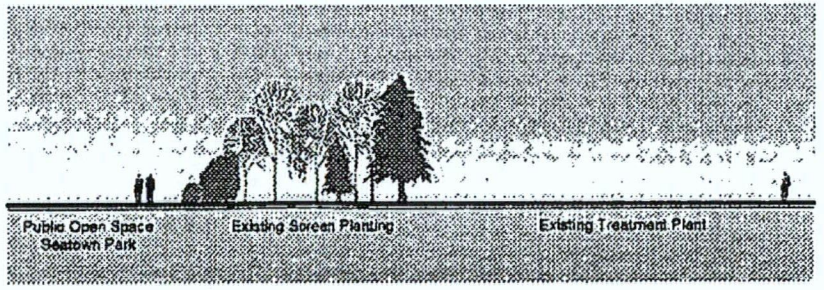
Figure 1.4.4


KEY TO LANDSCAPE PROPOSALS
EXISTING VEGETATION
PROPOSED SCREEN PLANTING
Consisting of;
Trees
Alder (Alnus glutinosa)
Beech (Fagus sylvatica)
Oak (Quercus petrea)
Larch (Larix eurolepis)
Pine (Pinus sylvestris)
Willow (Salix alba 'Chermessina')
Birch (Betula pendula)
Hawthorn (Crataegus monogyna)
Blackthorn (Prunus spinosa)
Poplar (Populus TT32)
Shrubs
Dogwoods (Cornus alba 'Sibirica' & C. stolonifera 'Flaviramea')
Hazel (Corylus avellana)
Holly (Ilex aquifolium)
Snowberry (Symphoricarpus alba)
Laurel (Prunus laurocerasus)
PROPOSED BOUNDARY TREATMENT
Existing Boundary Retained
Proposed 2.2m high wall in 'Fortcrete' finish or similar
KEY TO TREATMENT PLANT
1. INLET WORKS
2. AIR BLOWER BUILDING
3. FIRST STAGE AERATION TANK
4. STORM WATER HOLDING TANK
5. SECOND STAGE CLARIFIER NO. 1
6. SECOND STAGE CLARIFIER NO. 2
7. FUTURE SECOND STAGE CLARIFIER NO. 3
8. FIRST STAGE CLARIFIER NO. 1
9. FIRST STAGE CLARIFIER NO. 2
10. FUTURE FIRST STAGE CLARIFIER NO. 3
11. FUTURE SECOND STAGE THICKENER
12. SECOND STAGE THICKENER
13. FIRST STAGE THICKENER
14. FUTURE FIRST STAGE THICKENER
15. SECOND STAGE AERATION
16. DEWATERING BUILDING
17. DIGESTOR NO. 1
18. DIGESTOR NO. 2
19. DIGESTED SLUDGE STORAGE NO. 2
20. DIGESTED SLUDGE STORAGE NO. 1
21. TERTIARY FILTER
22. FINAL SETTLEMENT TANK NO. 3
23. FINAL SETTLEMENT TANK NO. 2
24. FINAL SETTLEMENT TANK NO. 1
25. AERATION TANKS
26. CHEMICAL DOSING BUILDING
27. ADMINISTRATION BUILDING
28. PRIMARY SETTLEMENT TANK NO. 1
29. PRIMARY SETTLEMENT TANK NO. 2
30. FIRST STAGE AERATION
31. BIOFILTER
32. GAS HOLDING TANK
33. EMERGENCY GAS FLARE
Big Marsh
Lawless Park
Fingallian's Gaelic Grounds
Spittal Hill
Newcourt
The Green
The Avenue
Sean Walsh Park
Garran Park
Swords River
A
A'
B
B'
N
0 10 20 30 40 50 100metres
Comhairle Chontae Fhine Gall
Fingal County Council
P.O. Box 174,
Upper O'Connell Street,
Dublin 1
Tobin Environmental Services Ltd.,
Consulting Environmental Engineers,
23 Ballsbridge Terrace,
Dublin 4.
BRADY SHIPMAN MARTIN
Landscape Architects
Swords Waste Water Treatment Plant
Landscape Proposals
April 1998
Figure 1.4.5



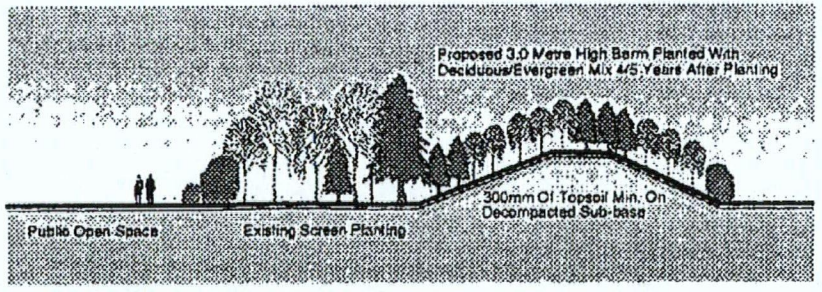
PROPOSED SECTION (A'-A") THROUGH SITE

0 5 10 20 30 40 50metres



EXISTING SECTION B'-B" (Looking West)

0 5 10metres



PROPOSED SECTION B'-B" (Looking West)

0 5 10metres

Comhairle Chontae Fhine Gall
Bosca 174,
Sráid Lí Chrosáin Uachtí,
Baile Átha Cliath 1.
Fingal County Council
P.O. Box 174,
Upper O'Connell Street,
Dublin 1

Tobin Environmental Services Ltd.,
Consulting Environmental Engineers,
23 Ballsbridge Terrace,
Dublin 4.

BRADY SHIPMAN MARTIN
Landscape Architects
Terenure Road
Dublin 6

Swords Waste Water Treatment Plant

Landscape Sections

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Figure 1.4.6

Figure 1:4.7: Existing view north from The Green

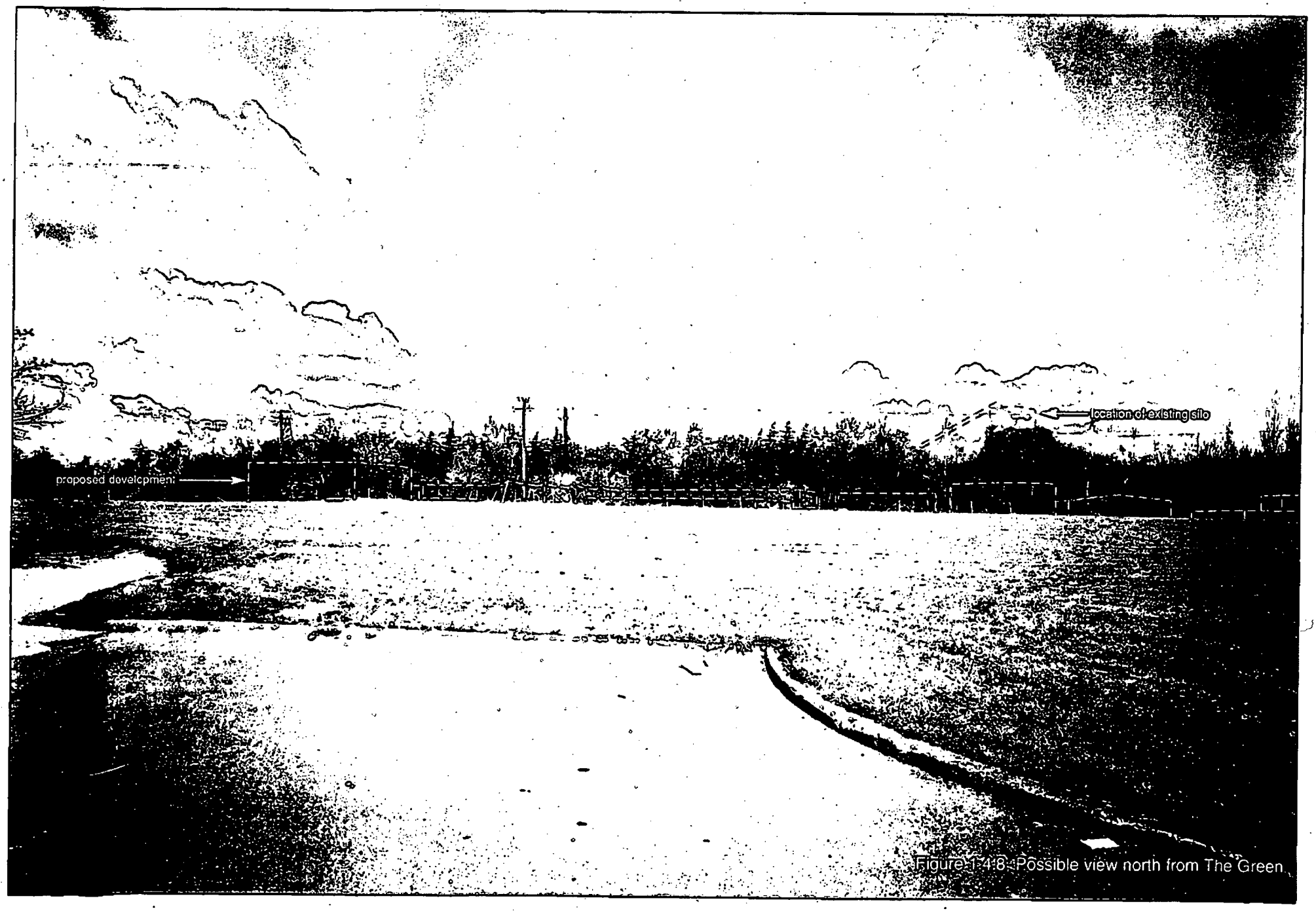


Figure 1.4.8 Possible view north from The Green

Figure 1.4.9 Existing view southeast from Spittal Hill Road

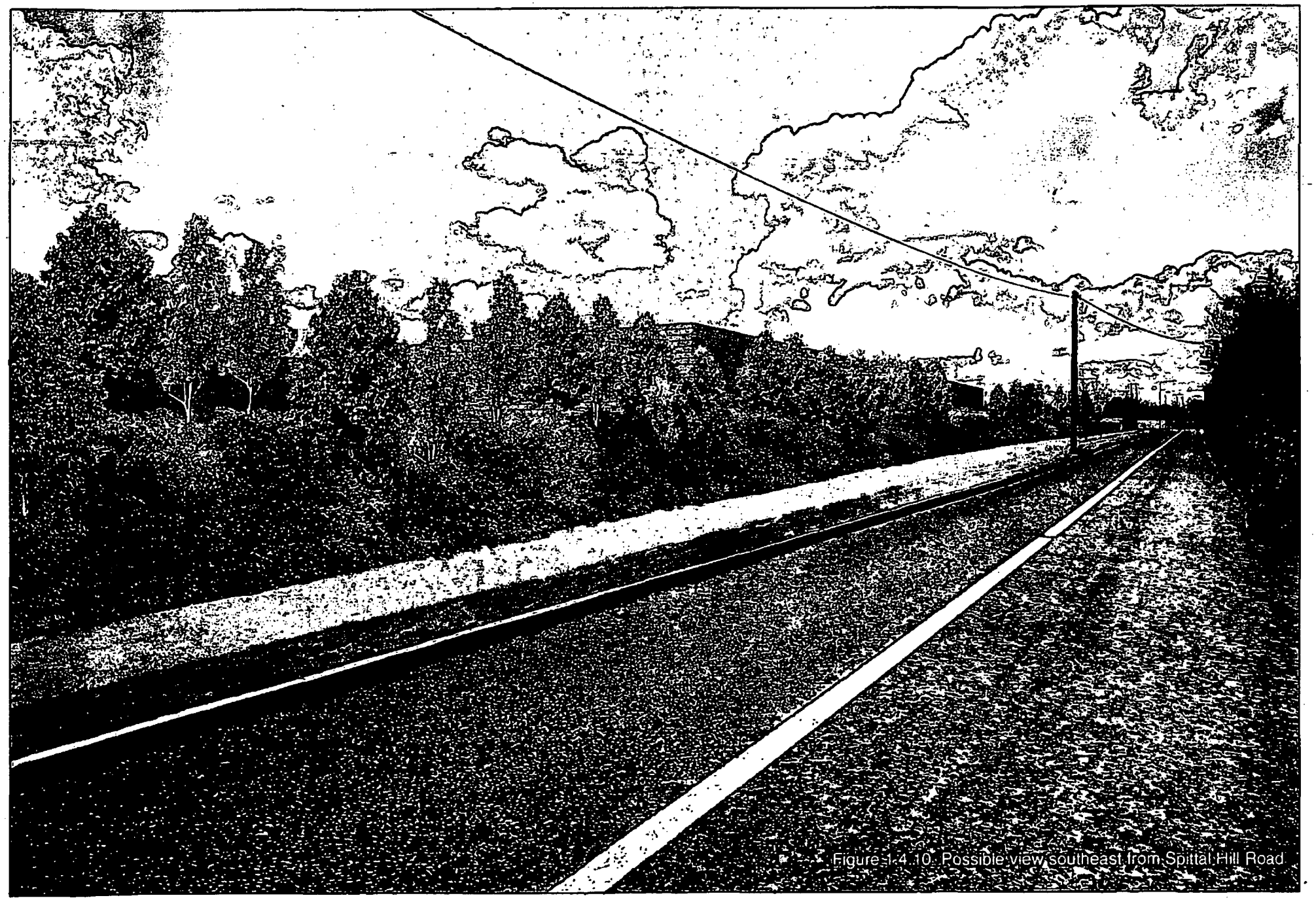


Figure 1.4.10. Possible view southeast from Spittal Hill Road

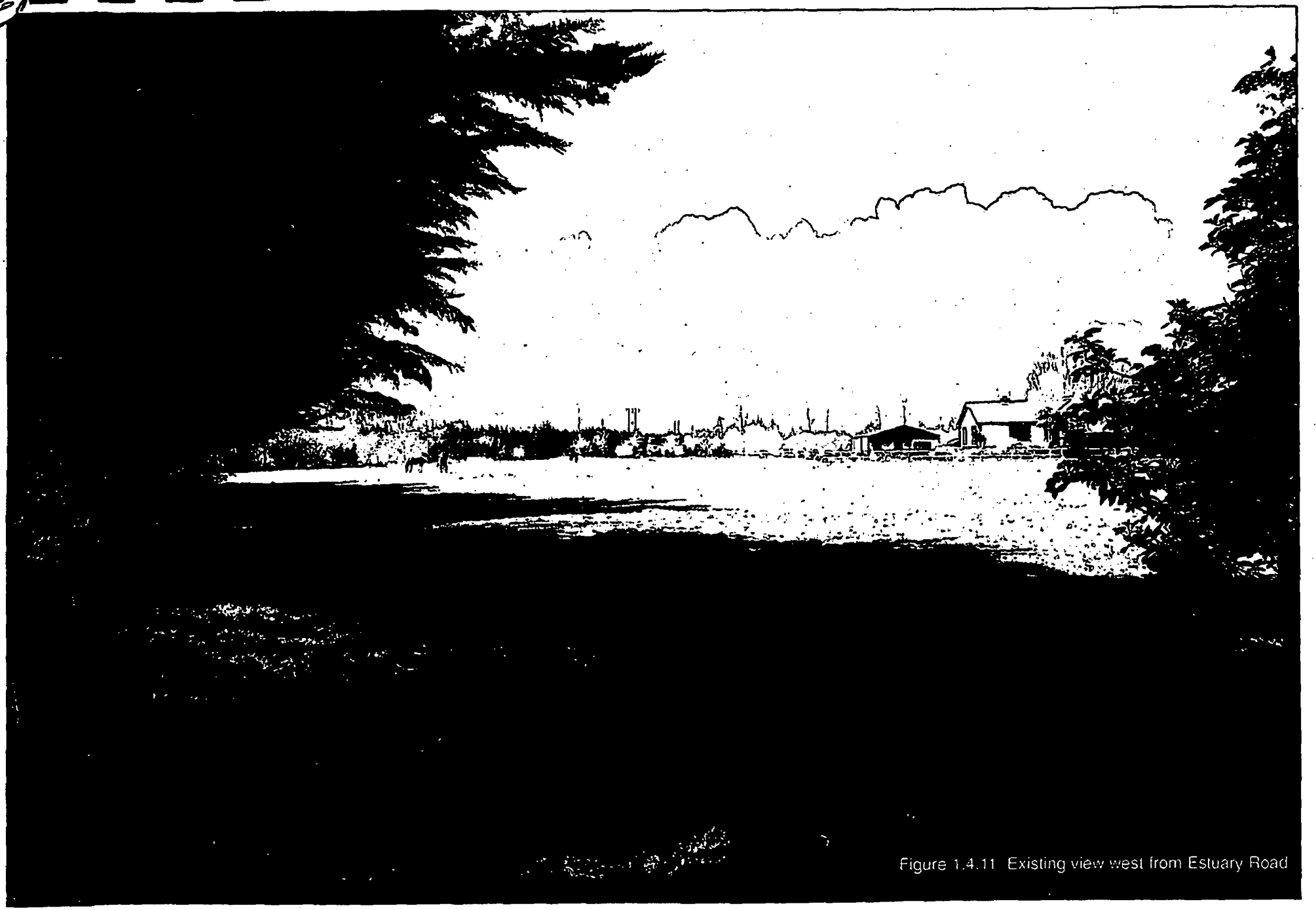


Figure 1.4.11 Existing view west from Estuary Road

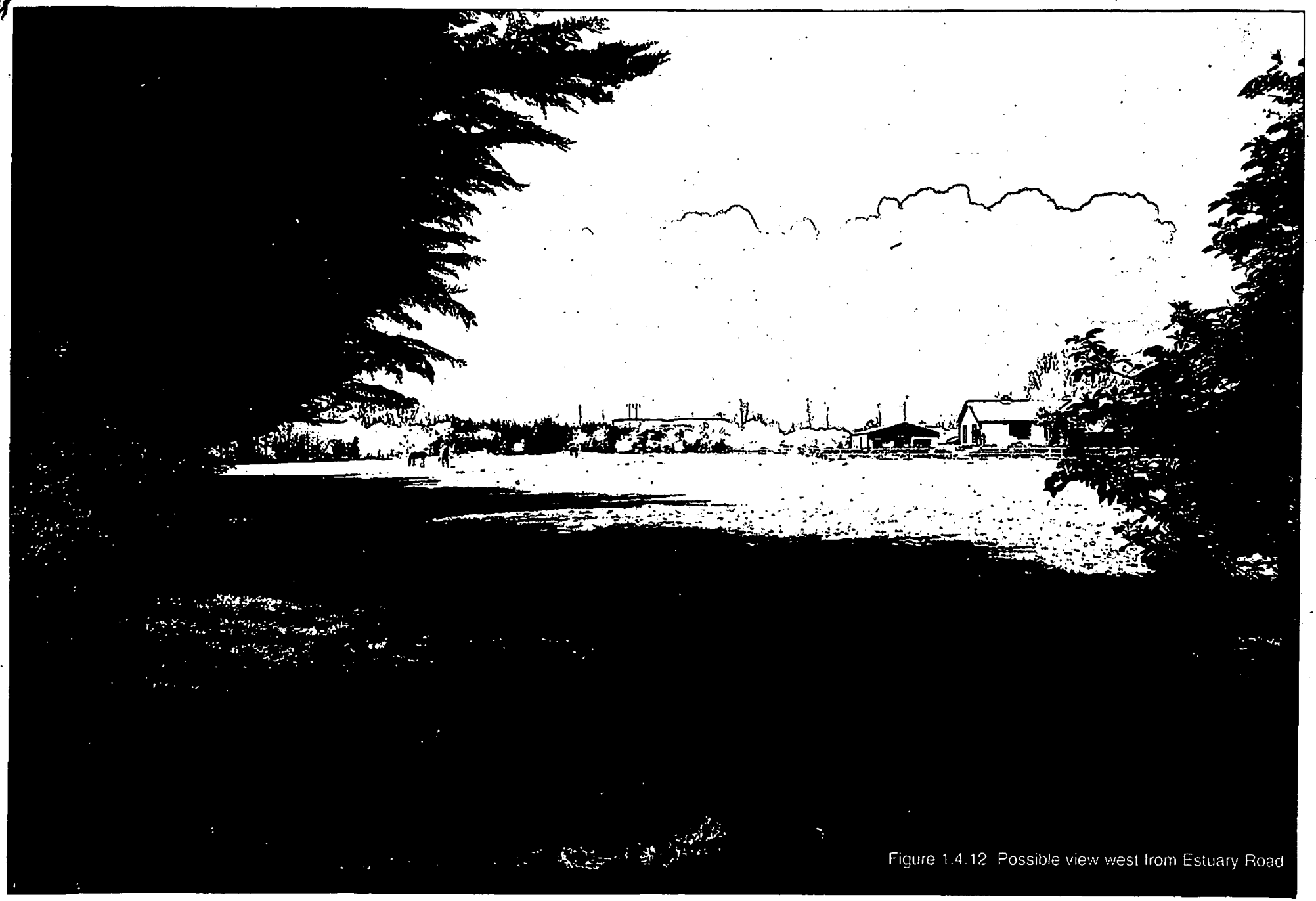


Figure 1.4.12 Possible view west from Estuary Road

1.5 Alternatives

In arriving at the conclusion that the Upgrading and Expansion of the Wastewater Treatment Works at the existing site in Swords is the best option, a number of alternatives were considered. In this E.I.S., a summary of the alternatives to the proposed development is presented against the following headings:

1.5.1 Do Nothing

The alternative of doing nothing and continuing with the operation of the Treatment Works as it exists at the present time is not valid because it would lead to increased levels of pollution to the Broadmeadow Estuary and deterioration of it's amenity value.

1.5.2 Alternative treatment options at the existing Swords Wastewater Treatment Works Site

Alternative treatment options were considered at the existing Treatment Works. The preferred process option is to upgrade the existing works to act as a single stage low loaded activated sludge plant and to provide a new treatment stream based on a two stage activated sludge process operating alongside, and using rectangular first and second stage clarifiers. The preferred process was selected because of it's suitability for dealing with shock loadings, and with nitrification inhibitors which are present from time to time in the incoming wastewater.

1.5.3 Transfer of wastewater to the Dublin Corporation Wastewater Treatment Works at Ringsend

The alternative of transferring wastewater to the Dublin Corporation Works at Ringsend, while technically feasible is not the best solution. It could cause considerable delay in the development of the *"Dublin Bay Project"* within the timescale required. Taking all aspects into account, separate treatment of wastewater for the Swords area at an Expanded and Upgraded Works is favoured on practical, procedural and environmental grounds.

1.5.4 Alternative sites in the Swords Area

The alternative of providing a new Treatment Works on a site in the Seapoint area to the North of the Broadmeadow Estuary is not practicable because -

(a) It is in direct contravention of the 1997 Development Plan for Swords because the construction of a new Treatment Works on the northern shoreline of the Broadmeadow Estuary would adversely affect the visual amenity of the area.

(b) It would entail excessive cost.

1.6 Basis of E.I.S.

The E.I.S. for the Scheme has been prepared on the basis of the preferred process design and layout. Under procurement procedures for the construction of the facility however, Tenderers will be at liberty to put forward Alternative designs and layouts. Such alternatives will be required to provide an equivalent level of performance to the Scheme described in this E.I.S.

If alternatives are submitted then the Tendering Authority (in this case Fingal County Council) must give due consideration to them, and should an alternative be deemed to meet the specified performance criteria, it must be considered on an equal footing with Tenders for the Specified Layout and Design, at the time of Tender Evaluation.

For this reason the layout of the Upgraded and Expanded Works on which this E.I.S. is based may be taken as being an indicative layout only.

The E.I.S. is concerned primarily with the overall impact of the development, on the environment and while the layouts shown as described above are indicative only, the specifications for the project will clearly set out the performance criteria which the finally constructed Treatment Works must achieve in terms of:-

- Final effluent standards.
- Odour dispersion levels.
- Noise levels.
- Heights of buildings and structures on the site.
- Proximity of buildings and structures to site boundaries.
- Screening at site boundaries.
- Sludge treatment and disposal.
- Capital costs.
- Running costs.
- Proven technology.
- Reliability of Plant and Equipment.
- Other impacts such as traffic movements, visual impacts of site lighting etc.

Accordingly an alternative design and layout will only be considered appropriate if:-

(i) It's impacts are equal to the impacts outlined in the E.I.S;
and / or

(ii) It's positive impacts are of greater significance than those outlined in this E.I.S;
and / or

(iii) It's negative impacts are of lesser significance than those outlined in this E.I.S.

2.0 Current Operations

The existing Swords Wastewater Treatment Works caters for an average estimated hydraulic load of 6,762m³/day from the existing catchment. The actual flow entering the Treatment Works on a daily basis varies due to groundwater infiltration and rainfall generated runoff discharging to the drainage system. The incoming pollutional loads also vary.

The existing Treatment Works is overloaded when compared against the original design figure and it is becoming increasingly difficult to attain the original final effluent design standards on a consistent basis.

The waste water which currently enters the Swords Wastewater Treatment Works passes through the following units:

- Coarse Screening
- Grit Trap
- Primary Settling Tanks
- Aeration Basins
- Final Settling Tanks
- Discharge pipeline to the Broadmeadow Estuary

The current sludge treatment practice at Swords involves aerobic stabilisation, dewatering using Centrifuges, and disposal at the Fingal County Council Landfill site in Baleally.

3.0 Existing Enviroment

The site is located in the Townland of Seatown West, quite close to the natural amenity of the Broadmeadow Estuary.

The treated effluent from the Swords Wastewater Treatment Works discharges to the Broadmeadow River just upstream of its confluence with the Broadmeadow Estuary. The Broadmeadow Estuary is subdivided into two distinct regions namely the inner and outer estuaries by a railway viaduct. The Swords effluent discharges initially to the inner estuary. Wastewater from Malahide Wastewater Treatment Works discharges to the outer estuary.

The Broadmeadow River and its main tributary, the Ward River drain a catchment of 17,000 hectares. The other main freshwater contributions to the Broadmeadow Estuary are the Lissenhall, Swords, Gaybrook and Turvey streams. The main rivers are not regulated or controlled for water supply or electrical power supply.

The inner estuary acts as an artificial lagoon where freshwater enters from the west and tidal sea water from the east. The outlet from the inner to the outer estuary consists of a 200m wide opening in the railway viaduct. The inner estuary has a depth of no more than 2m except for a depth of 4m at the opening in the viaduct. It has a good mixing system but poor flushing characteristics. The outer estuary is cut off from the sea by a large sand dune system and has an average depth of 6 to 8m. A high sill level at the opening in the viaduct prevents the exchange of water between the inner and outer estuaries at low water levels. During spring tides, more water enters the estuary than exits it and water levels rise with successive tides. At such times, the water level in the inner estuary is above that of the outer estuary and exits as a waterfall through the viaduct opening.

The estuary is defined as an area of scientific interest due to its zoological, botanical and ornithological importance. It was classified as a "Special Protection Area" in 1994 under EC Directive No. 79/409 on conservation of wild life and has been confirmed under the European Communities (Conservation of Wild Birds) Amendments Regulations, 1994, S.I. No. 59 of 1994. Conservation steps must be taken concerning the habitats of birds which are listed in Annex 1 of that Directive and for regularly visiting migratory birds. The National Parks and Wildlife Service have designated the Broadmeadow estuary as a Natural Heritage Area. The estuary is not however a designated sensitive area under the Third Schedule of the Environmental Protection Agency Act, 1992 (Urban Wastewater Treatment)

Regulations, 1994. In the outer estuary, the beach at Malahide was designated as a bathing area under the first schedule of the European Communities (Quality of Bathing Waters) Regulations, 1988/1989 in 1995. The waters of the Inner Broadmeadow Estuary are not designated as Bathing Waters.

4.0 Description of Proposed Development

4.1 Future Loadings

The Swords Wastewater Treatment Works will be sub-divided into two separate Treatment Streams as follows:

- An upgraded and refurbished existing Treatment Works stream.
- A new Treatment Works stream adjacent to the existing works.

The sludges generated from both works will be treated in a single treatment facility on site.

The construction of the overall upgraded and expanded Swords Treatment Works will take place in two phases. Phase One will provide treatment for a wastewater load with a population equivalent of 60,807 persons (Residential component 38,722 persons) within a fully upgraded and refurbished existing works and within a phase one construction of the adjacent New Treatment Stream. Under Phase Two, a fully completed works will provide treatment for a wastewater load with a population equivalent of 90,000 persons.

4.2 Phase 1 Population Equivalent

The Swords Development Plan was adopted in January, 1997. The Water and Drainage Division of Fingal County Council compiled a Report entitled *"Swords Foul Sewerage Catchment Study"* in August, 1997. The purpose of the report was to quantify the up to date position regarding the extent of committed and potential development within Swords foul sewerage catchment based on zonings in the Swords Development Plan, 1997.

The Report concluded that the total committed population equivalent is now 39,903 persons (Residential component 29,515 persons). If all the zoned lands are developed, the population equivalent contributing to the Treatment Works would rise to 60,807 persons. The estimated population equivalent at present based on existing development is 30,160 persons, (Residential component 27,398 persons).

4.3 Phase 2 Population Equivalent

The Phase 1 Population Equivalent of 60,807 persons is based on all lands zoned in the Development Plan of 1997. Within the long term Swords Development boundary, there are large areas of land which are currently zoned for the preservation of agriculture. This land is potential future development land. In total, there are 235.7 hectares of agricultural zoned lands within the Swords Development boundary.

On the basis of a population density of 88 hd/ha. the 235.7 ha. has a potential development capacity with a population equivalent of 20,743 persons. When this is added to the 60,807 population equivalent for lands already zoned and developed, the population equivalent totals 81,550 persons.

The 81,550 population equivalent is based on typical design allowances for residential development with similar figures used for industrial developments which would be typical of dry industries with low biological loadings. Industrial development involves many varieties of technology and production techniques which may or may not be of a dry basis in terms of water usage. To allow for industrial development of a wet basis, an allowance for Phase 2 development of the Wastewater Treatment works and Main Drainage System must be made. A further 8,450 population equivalent is allowed bringing the total to 90,000 persons for full development within the long term boundary.

4.4 Effluent and Water Quality Standards

The future equivalent population at Swords is estimated to rise to 90,000 persons in the long term. The corresponding dry weather flow is estimated at 21,855m³/day. It is proposed to provide conventional secondary treatment for all flows within the Swords Works.

The design final effluent standards for the Swords Wastewater Treatment Works are as detailed in the following Table No. 4.4.1.

Table No. 4.4.1
Summary of Design Final Effluent Standards
Swords Wastewater Treatment Plant

Parameter	Concentration
BOD	25 mg/l
SS	35 mg/l
COD	125 mg/l

4.4.1 Nutrient Removal

The Broadmeadow Estuary is not designated as a Sensitive Area under the Third Schedule of the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994. Under article 4(1) of the Regulations, secondary treatment is the basic requirement for all waste water discharges. The only obligatory requirements are for treated effluent concentrations not to exceed 25 mg/l for BOD, 125 mg/l for COD and 35 mg/l for Suspended Solids (S.S.).

A survey carried out by Kirk McClure Morton, Consulting Engineers, of the Broadmeadow Estuary shows that it is subject to significant loadings of nitrates and phosphates from the catchment of the Broadmeadow River and from effluent discharges directly to the Estuary. Because of the high amenity value of the Estuary, Fingal County Council have decided to reduce the nitrate and phosphate concentrations in the final effluent being discharged to the Estuary by introducing nutrient removal at the Swords Wastewater Treatment Works.

Based on the flow modelling surveys carried out by Kirk McClure Morton, it has been demonstrated that with a population equivalent of 90,000 P.E. and with treatment provided at the upgraded works in order to significantly reduce the concentrations of nutrients in the final effluent to be discharged from the works, to the levels set out in the Second Schedule (Part II) of the Environmental Protection Agency Act, 1992 (Urban Waste Water Treatment) Regulations, 1994, that there is still a slight increase in the risk of eutrophication occurring.

Fingal County Council have designed the Treatment Works in such a way that the treatment levels set out in the Second Schedule (Part II) of S.I. No. 419 of 1994 can be achieved, when the contributing population equivalent for the Treatment Works reaches 90,000 P.E.

In the interim, it is proposed to provide for both nitrate and phosphate reduction in the proposed Treatment Works and so reduce the concentration of nutrients within the Inner Broadmeadow Estuary to appropriate levels in order to mitigate against the occurrence of eutrophication. The appropriate levels will be determined on the basis of an ongoing sampling programme of the waters of the inner Broadmeadow Estuary.

4.4.2 Recreational use of the Inner Broadmeadow Estuary

While the inner Broadmeadow Estuary waters have not been classified as designated Bathing Waters, Fingal County Council recognises that these waters have a high recreational value in terms of water contact sports.

The population equivalent of the Swords Wastewater Treatment Works will increase from the present level of 30,160 P.E. to an eventual level of 90,000 P.E. This increase will take place over an extended period of time. As the population equivalent increases, so too will the amount of faecal coliforms discharged in the final effluent. In order to determine the impact of this, Fingal County Council propose to implement a Water Quality Monitoring Programme. The Monitoring Programme will be used to establish whether or not the levels of faecal coliforms in the areas of the Estuary used for water contact sports, fall within acceptable levels. If it is found that acceptable levels are exceeded, then consideration will be given to the introduction of U.V. disinfection at the Swords Wastewater Treatment Works in order to ensure that the Estuary can continue to be safely used for the pursuit of established leisure activities.

During Phase 2 of the development, it is proposed to introduce tertiary filtration of the final effluent in order to further reduce the concentrations of B.O.D. and Suspended Solids in the final effluent.

The final layout of the works will be designed to allow for the addition of these facilities in the future.

4.5 Proposed Upgrading and Expansion of the Swords Wastewater Treatment Works

4.5.1 Existing Layout

The layout of the existing Swords Wastewater Treatment Plant is shown on Figure 1.4.1 It includes the following main elements:

- Three inlet sewers which discharge to an overflow / bypass chamber.
- Low Lift Pumping Station with three archimedian screw pumps.
- Preliminary Units comprising coarse screening, grit removal, flow measurement and flow splitting.
- 2 No. Primary Settlement Tanks.
- 2 No. Aeration Basins.
- 3 No. Final Settlement Tanks.
- Sludge Return / Wastage Control Chambers.
- Sludge Return Pump Sump.
- Sludge Stabilisation Tanks.
- Sludge Dewatering Building containing two centrifuges.
- Dewatered sludge storage silo.
- Main Control Building.

4.5.2 Proposal for Upgrading and Expansion

The present proposal involves two principal areas of development:-

(i) Alterations to the Existing Treatment Works.
(ii) Construction of a new Treatment Works Stream, in two phases.

As outlined in Section 1.5 of this Non Technical Summary, it is noted that alternative designs and layouts may be submitted for consideration at the time of Tender. The following descriptions are therefore based on the preferred process design and layout, which are indicative only of the nature and scale of the proposed development.

4.5.2.1 *Proposed Alterations to Existing Works*

The proposed alterations to the existing Treatment Works are as follows:

(i) It is proposed to abandon and demolish the existing (Archimedian Screw) Low Lift Pumping Station and Preliminary Units. These will be replaced with a new Pumping Station and Preliminary Units as part of the new Works.

(ii) It is proposed to add a first stage Aeration Basin and a first stage Sludge Return Pumping Station to the existing works. As outlined above this will allow this section of the works to be operated as a two stage Plant in extreme circumstances only (i.e. where all incoming wastewater contains nitrification inhibitors). However the existing Plant will normally operate as a low loaded activated sludge Plant. The first stage Aeration Basin will be fully covered to reduce odour emissions and will be provided with forced ventilation and scrubbing of the extracted air through Biofilters prior to discharge to atmosphere.

(iii) It is proposed to introduce odour mitigation measures for the existing Primary Settlement Tanks. This may entail covering of the tanks or use of other alternatives. If the alternative of covering these tanks is chosen, it will be necessary to provide forced ventilation and scrubbing of the extracted air from these Tanks through Biofilters.

(iv) It is proposed to re-organise the existing Aeration Basins to include a selector, anoxic zone and aerobic zones. The existing surface aerators will be replaced by means of a fine bubble diffused aeration system and a Mixed Liquor Return Pumping Station will be added to facilitate an internal sludge return circuit for denitrification.

(v) It is proposed to replace the existing (Archimedian Screw) Sludge Return and Sludge Wastage Pumps with close coupled submersible pumps in a newly constructed Pumping Station.

(vi) It is proposed to provide a new Flow Splitting Chamber upstream of the Final Settlement Tanks.

(vii) It is proposed to abandon the existing open channels which interconnect the Primary Settlement Tanks, Aeration Basins and Final Settlement Tanks. These will be replaced using appropriately sized Ductile Iron interconnecting pipework.

(viii) The existing Sludge Stabilisation Tank (with surface aerators) will be abandoned and replaced by a new Chemical Dosing and Air Blower Building. The Chemical Dosing Building will contain bulk chemical storage and dosing facilities for iron salts which are required for phosphate removal on occasion in the upgraded existing Plant but at all times in the New Treatment Stream. Methanol dosing may be required from time to time as a supplementary carbon source for denitrification. Bulk storage and dosing facilities will also be provided for the methanol dosing system.

(ix) The existing Sludge Dewatering Plant and Sludge Storage Hopper will be abandoned. These will be replaced with a new Sludge Digestion and Dewatering facility as part of the new works.

(x) It is proposed to extend the existing Administration Building.

4.5.2.2 Construction of a New Treatment Works Stream

The New Treatment Works stream will be a Two Stage Activated Sludge Plant working in parallel with the existing works.

A new Pumping Station with three wet wells or chambers will be constructed at the inlet to the works, (one wet well) for each of the incoming sewer lines. The Pumping Station will be configured in such a way that flow from any one of the incoming sewer lines can be pumped to the new Preliminary Units for the upgraded existing works and flow from any two of the incoming lines can be pumped to the Preliminary Units of the new Treatment stream.

It is proposed to construct the following process units adjacent to the existing works.

(i) The new Intake Pumping Station shall be as described above using dry installed submersible pumps. Wet wells and dry wells will be fully covered and provided with forced ventilation. The extracted air will be scrubbed through Biofilters prior to discharge to atmosphere.

(ii) New Preliminary Units shall be constructed comprising screening and grit removal equipment, Grit Classifiers, a Screenings Washing and Dewatering Unit, a container for holding dewatered grit and a container for holding dewatered screenings. This entire area will be covered with a superstructure which will be provided with forced ventilation. Foul air will be scrubbed through Biofilters prior to discharge to atmosphere. Separate screening and grit removal will be provided for both the existing (upgraded) Treatment Stream and the new Treatment Stream.

(iii) It is proposed to construct a Stormwater Holding Tank utilizing tipping buckets for cleaning the tank floor and incorporating dry installed Stormwater Return Pumps. This tank will be covered over approximately 80% of its surface area with the tipping buckets exposed to facilitate maintenance.

(iv) It is proposed to provide a covered first stage Aeration Basin directly above the Stormwater Holding Tank. Forced ventilation will be provided and the extracted foul air will be scrubbed through a Biofilter prior to discharge to atmosphere.

(v) It is proposed to provide three First Stage Settlement Tanks. These tanks will be designed to mitigate against the effects of odour. This may entail covering of the tanks or use of other alternatives. If the alternative of covering these tanks is chosen, foul air will be extracted from the covering structure and will be scrubbed through Biofilters prior to discharge to atmosphere.

(vi) It is proposed to provide a Selector Tank and three second stage Aeration Basins. As primary sludge from the Primary Clarifiers of the existing Upgraded Plant may be pumped across to the selector of the new Treatment stream (as a carbon source for denitrification), it is proposed to cover the selector and to scrub the extracted air from the selector through a Biofilter. The second stage Aeration Basins will be equipped with a fine bubble diffused aeration system. These basins will remain open to atmosphere.

(vii) It is proposed to provide three rectangular Final Settlement Tanks. These Tanks will remain open to atmosphere.

(viii) It is proposed to provide a new Main Switchgear and Air Blower Building in conjunction with the new streams of the Wastewater Treatment Works. The Building will also house a standby diesel generator.

(ix) It is proposed to provide an underground basement containing dry installed submersible pumps for first and second stage sludge return and wastage.

(x) At Phase Two, it is proposed to provide sandfilters for further treatment of the final effluent prior to discharge to the Broadmeadow Estuary.

(xi) It is proposed to provide submersible sump located below ground for provision of process water to various units.

(xii) It is proposed to provide a flow measurement chamber incorporating a flume or flow meter and new outfall pipework to discharge to the Broadmeadow Estuary.

(xiii) It is proposed to provide underground interconnecting pipework, manholes and chambers between the various tanks, pump sumps and chambers along with a new dia. 1000mm final effluent pipeline between the Treatment Works and the Broadmeadow Estuary.

(xiv) It is proposed to provide internal roadway and surfaced areas to provide access for construction and maintenance of the new Treatment Units.

(xv) It is proposed to provide additional palisade or chain link type fencing along the new boundary of the site.

(xvi) Provision has been made for landscaping along the boundaries of the expanded site.

The Preliminary Units will be capable of passing flows up to 74,800m³/day. The modified existing Treatment Works will provide full treatment for flows of up to 16,500m³/day and 825 Kg BOD/day. The new Treatment Stream will be constructed in two phases with the Phase One Plant being capable of providing full treatment for flows up to 34,000m³/day and 2,823 kg BOD/day. The Phase Two works will be capable of providing full treatment for 51,000m³/day and 4,575 kg BOD/day and

partial treatment for 23,800m³/day of stormwater which will be discharged through the outfall lines, following screening and grit removal.

The overall proposal for upgrading and expansion of the Treatment Works at Swords includes a full review and upgrading of the sludge handling and disposal facilities at the works in order to reduce the odour problem which exists at present.

In the upgraded works therefore, the process will be revised and upgraded as follows:

(i) First stage sludge from the new Plant along with primary sludge from the existing Plant will be thickened in two new first stage thickeners. (One to be constructed in Phase 1 and one to be constructed in Phase 2).

(ii) Surplus second stage sludge from the new Plant along with surplus activated sludge from the existing Plant will be thickened in two new second stage thickeners. (One to be constructed in Phase 1 and one to be constructed in Phase 2).

(iii) The sludges will be pumped forward to the Anaerobic Digesters where they will undergo stabilisation for a period of 15 to 20 days.

(iv) The digested sludge will be dewatered and will then be stored for a further period of 15 days.

(v) The dewatered sludge will be treated off site in accordance with Fingal County Council's Sludge Strategy which is being prepared at the present time with a view to converting the wastewater sludge into a recyclable biosolids product.

4.5.2.3 Odour Control

Odour nuisance can occur at present in the vicinity of the Wastewater Treatment works due to odours generated from the Inlet Works, Preliminary Units, Primary Sedimentation Tanks and Sludge Handling Facilities.

An odour study which has been based on the preferred process option (indicative layout of the Upgraded and Expanded Works) has determined that covering of

various Treatment Units, extraction of air and treatment of ventilated air in odour abatement facilities will significantly reduce the odour nuisance.

Based on the indicative layout which illustrates the preferred proposal for Upgrading the existing Treatment Works, it is proposed to cover the following units:-

- First Stage Aeration.
- Existing Primary Settlement Tanks.

Also within the existing Treatment Works, it is proposed to abandon the following open tanks and chambers:

- Existing Low Lift Pumping Station.
- Existing Preliminary Units.
- Existing Sludge Stabilisation Tank.
- Existing Sludge Dewatering Plant.
- Existing Sludge Storage Hopper.
- Existing Open Flow Channels.

Based on the indicative layout for the new Treatment Stream, the following units will also be covered:-

- Intake Pumping Station.
- Preliminary Units.
- Stormwater Holding Tank excluding tipping buckets.
- First Stage Aeration Basin.
- Primary Settlement Tanks.
- Selector Tank.
- Sludge Thickeners.
- Sludge Digesters.
- Biofilters.

In the event that an alternative proposal is deemed to be acceptable, such an alternative would be required to mitigate odours to an equivalent level of performance to that proposed in this E.I.S.

4.6 Construction

The proposed upgrading and expansion of the Swords Wastewater Treatment Works will involve the construction of large reinforced concrete and steel tanks, interconnecting pipework, sludge handling facilities and major mechanical Works.

It is envisaged that the overall expansion and upgrading of the Swords Wastewater Treatment Works will be carried out in a number of Phases. Phase One will commence during 1999 and will include all of the necessary works for the upgrading of the existing waste stream as well as the new waste stream to cater for a population equivalent of 60,807 persons and the sludge treatment and handling facilities including the odour control measures. The further extension of the works to cater for a population equivalent of 90,000 persons will follow on as the loadings to the Works build up in the future.

5.0 Significant Environmental Effects and Proposed Remediation Measures

This document has described the Project which is the subject of this E.I.S. and has assessed the full range of headings in the E.I.A. Legislation.

5.1 Overview of Principal Impacts

The Project in question relates to the Upgrading and Expansion of the Wastewater Treatment Works at Swords. The following points are noted:-

5.1.1 Water Quality

- The waters of the Inner Broadmeadow Estuary are not designated as bathing waters. However, because the waters are used for the pursuit of water contact sports, Fingal County Council propose to introduce a water quality sampling programme with respect to those areas of the Estuary which are used for such established leisure activities. If, on the basis of this sampling programme, it transpires that unacceptable levels of faecal coliforms are present within these areas of the Estuary, then consideration will be given to the introduction of U.V. disinfection.

  The provision of U.V. disinfection at the Swords Wastewater Treatment Works to reduce the bacterial concentration of the effluent by a further 90% when compared with normal secondary treatment would ensure that the future maximum discharge of faecal coliforms is less than at present.

- Biological treatment will reduce the concentration of BOD in the final effluent to 25 mg/l. The proposal to add tertiary filtration during Phase 2 of the Scheme will further reduce the concentrations of BOD in the final effluent. These measures will ensure that similar dissolved oxygen concentrations will be maintained within the Inner Broadmeadow Estuary to those occurring at present.

- The proposals include for significant nutrient removal in the proposed waste water treatment process. The nutrient loading from the Broadmeadow River however forms a very significant proportion of the total nutrient input to the Broadmeadow Estuary. Unless the water quality in the River is improved therefore, the benefits to be gained by providing for nutrient removal at the Swords Wastewater Treatment Works will be masked by the impact of the River discharge.

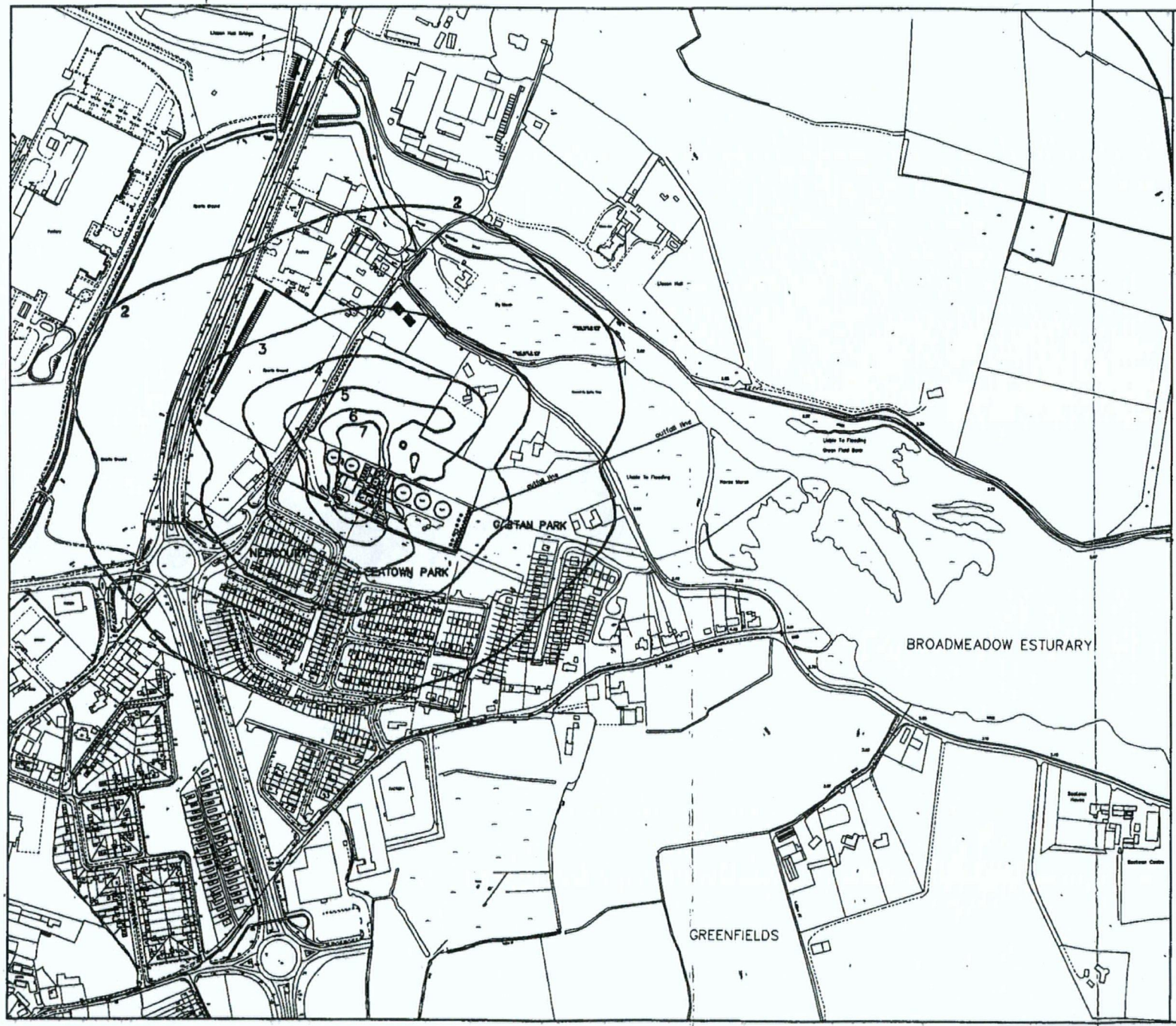
The proposed phosphate removal facilities for Swords Wastewater Treatment Works will ensure that despite the forecasted substantial increase in population, the actual loading entering the Estuary from this source can be reduced. The nitrogen loading entering the inner estuary from the Swords Wastewater Treatment Works is however expected to ultimately increase by a factor of two which will increase the nitrogen concentrations within the estuary slightly. Hence there is likely to be a slight increase in the risk of eutrophication occurring.

5.1.2 Air (Odour and Noise)

5.1.2.1 Odour

The Project will include a substantial capital investment for the provision of odour mitigation measures and the total odour emanating from the works will be reduced from 74.3 x 10^6 ou/m^3 to 25.9 x 10^6 ou/m^3 representing a significant improvement (of the order of 65%) from the present situation in normal circumstances. The existing odour concentrations in worst case circumstances and in normal circumstances and the reduced odour concentrations following the implementation of mitigation measures are detailed in Fig. 3.2.4.1, Fig 3.2.4.2 and Fig. 5.2.2.1 respectively.

The odour nuisance at present which can on occasion be detected will be very significantly reduced with odours not being detectable at the residential areas of Newcourt, Seatown, Garton Park and Lissenhall Drive.



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FINGAL COUNTY COUNCIL

UPGRADING AND REFURBISHMENT OF SWORDS WASTEWATER TREATMENT PLANT

ODOUR CONCENTRATION FROM THE EXISTING TREATMENT WORKS SHOWING 2,3,4,5,6,7, o.u./m^3 CONTOURS (WORST CASE CIRCUMSTANCES)

SCALES
1:5000

DRAWN BY	CHECKED BY	DATE
CJK	R.F.J	APRIL'98

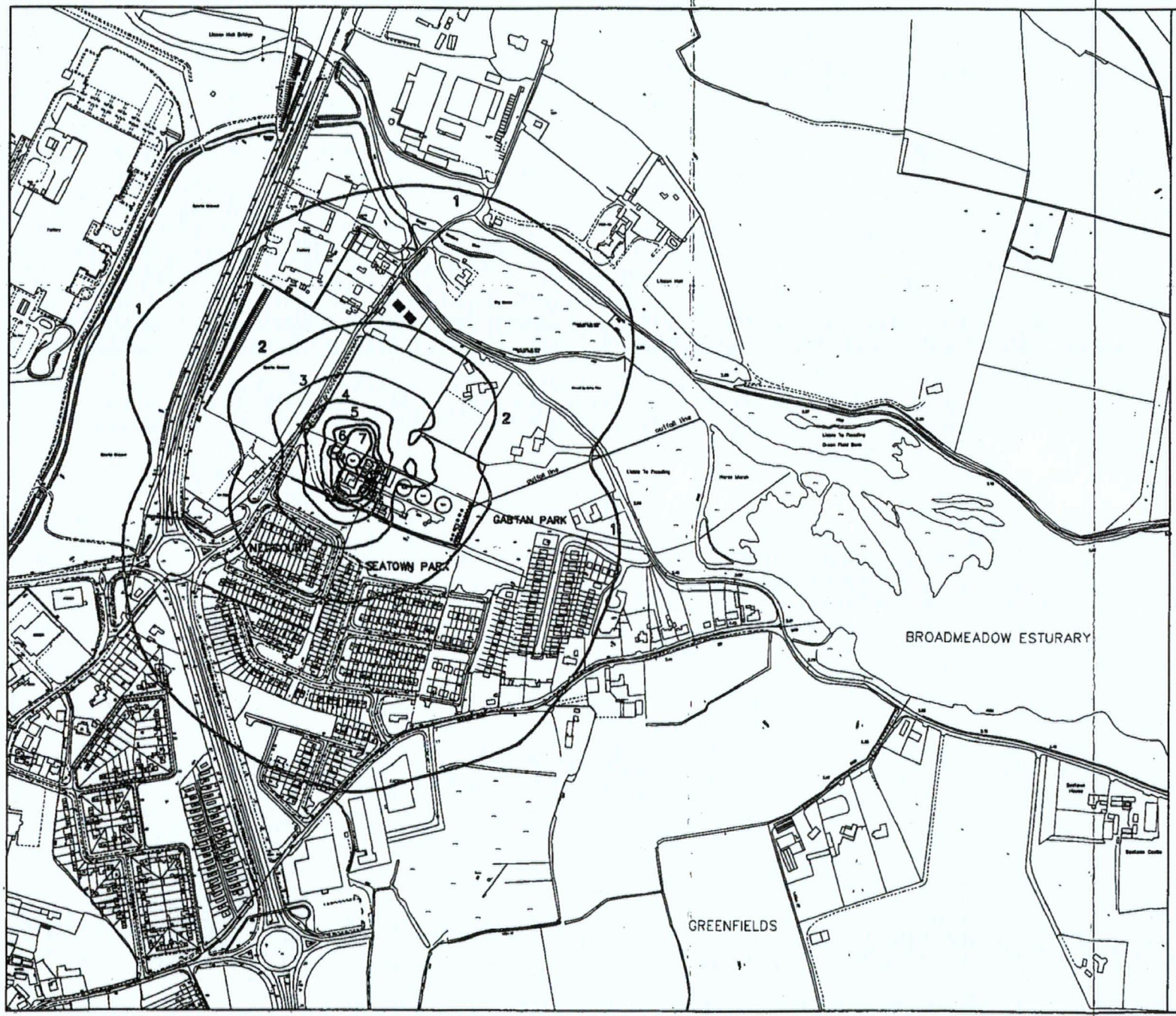
ENGINEER IN CHARGE R.F.J.O'Brien

TOBIN ENVIRONMENTAL SERVICES LTD
CONSULTING ENVIRONMENTAL ENGINEERS
23 BALLSBRIDGE ICE.
DUBLIN 4 TEL.-(01: 6606471)
IRELAND FAX-(01: 660172)

BRANCH: GALWAY

D.G.O'CONNOR B.A., B.A.I., C.Eng.
COUNTY ENGINEER
FINGAL CO. COUNCIL

DRAWING NO. FIG. 3.2.4.1.



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FINGAL COUNTY COUNCIL

UPGRADING AND REFURBISHMENT OF SWORDS WASTEWATER TREATMENT PLANT

ODOUR CONCENTRATION FROM THE EXISTING TREATMENT WORKS SHOWING 1.2.3.4.5.6.7. o.u./m^3 CONTOURS (PRESENT NORMAL CIRCUMSTANCES)

SCALE: 1:5000

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C.M	R.F.T	APRIL'98

ENGINEER IN CHARGE R.F.TOBIN

TOBIN ENVIRONMENTAL SERVICES LTD
CONSULTING ENVIRONMENTAL ENGINEERS
23 BALLSBRIDGE ICL
DUBLIN 4 TEL.-(01:6608471)
IRELAND FAX-(01:660172)
BRANCH: GALWAY

D.G.O'CONNOR B.A., B.A.I., C.Eng.
COUNTY ENGINEER
FINGAL CO. COUNCIL

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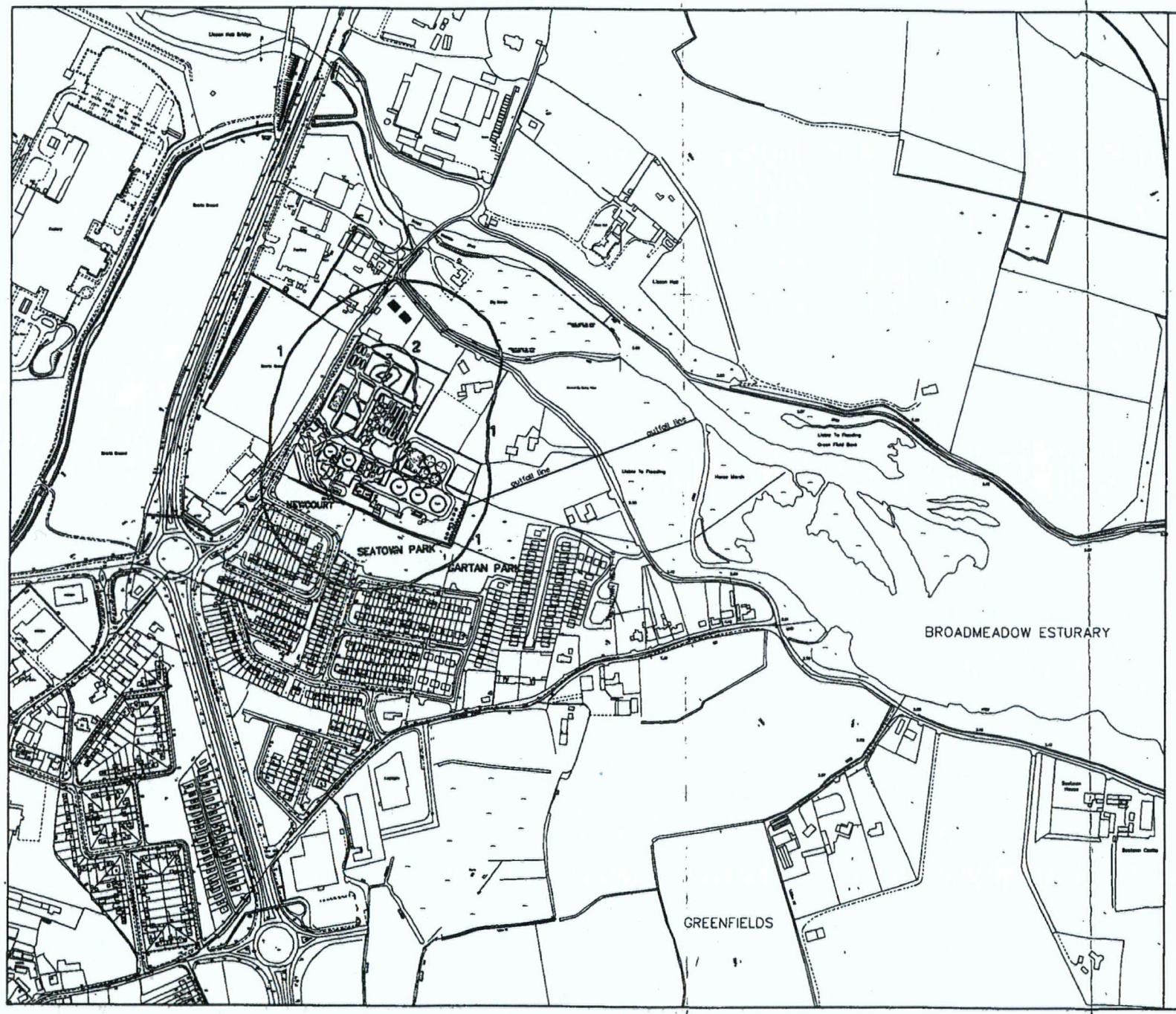

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FINGAL COUNTY COUNCIL

UPGRADING AND REFURBISHMENT OF SWORDS WASTEWATER TREATMENT PLANT

ODOUR CONCENTRATION FROM THE PROPOSED UPGRADED & EXPANDED WORKS (INCORPORATING MITIGATION MEASURES)
SHOWING 1.2&3 o.u./m ^{3} CONTOURS

SCALES
1:5000

DRAWN BY	CHECKED BY	DATE
C.M	R.F.T	APRIL '98

ENGINEER IN CHARGE R.F.TOBIN

TOBIN ENVIRONMENTAL SERVICES LTD
CONSULTING ENVIRONMENTAL ENGINEERS
23 BALLSBRIDGE TCE.
DUBLIN 4 TEL.-(01:6608471)
IRELAND FAX-(01:660172)

BRANCH: GALWAY

D.G.O'CONNOR B.A., B.A.I., C.Eng.
COUNTY ENGINEER
FINGAL CO. COUNCIL

DRAWING NO. FIG.5.2.2.1.

5.1.2.2 Noise

While some of the additional noise sources will be located relatively close to residential properties, the proposed noise control measures will significantly attenuate the intensity of any noise emissions. The Sludge Dewatering and Digestion Building, for example, will be located within 90m (approximately) of the nearest dwelling (to the Northeast), however, none of the individual noise sources will be audible at that dwelling. The building enclosure will ensure that no individual noise source gives rise to a noise level in excess of 30 dBA at the perimeter of the site. No significant noise impacts will, therefore, be caused by the proposed plant.

In view of the fact that the proposed Upgrading of the Plant will result in the removal or containment of a number of existing noise sources, the proposed development is likely to reduce the overall noise emissions from the Wastewater Treatment Plant. The existing surface aerators will, for example, be decommissioned and replaced with a quieter diffused air system. In addition, the existing inlet works will be decommissioned and replaced with a fully enclosed alternative. A series of mitigation measures are nonetheless proposed to ensure that noise impacts are minimised.

5.1.3 Landscape

The site of the proposed extension is derelict and has a poor visual aspect at the present time. The majority of the new elements will be of minimal height above surrounding ground levels and will therefore be of minor impact on most views. The main visual impacts will arise from the taller elements of the proposal, i.e. the Sludge Digester Tanks, the Administration Building, Inlet Works Building, Air Blower Building and First Stage Aeration Tanks. While there will be a significant permanent impact caused by development along the Spittal Hill Road, the New Buildings, Boundary Wall, Landscaping and Footpath realignment will replace the unkempt appearance of the site for the proposed extension, with a well organised and visually attractive aspect.

Due to the site's location within a flat landscape which is generally built up, thus limiting views of the proposal to a relatively small area, the overall development will only have a slight to imperceptible impact on the wider landscape.

In terms of the permanent works therefore, an overall view of the Environmental impacts confirms that the significant permanent impacts are confined to the Treatment Works site, the development of which will have a permanent impact on the local environment. The tidy appearance of the proposed boundary arrangement

along the Spittal Hill Road which will replace the unkempt appearance of the existing derelict site will in particular offer a significant visual improvement.

5.1.4 Flora / Fauna

The proposed development will have some impact on water quality, but the design criteria are such as to have minimum impact on existing water quality. Reductions in Phosphorous and Nitrogen concentrations in the final effluent will ultimately comply with the requirements of the Environmental Protection Agency Act (Urban Wastewater Treatment) Regulations, 1994 and the total Phosphorous load will be reduced to four fifths of present loadings, even at the higher population figure of 90,000 P.E.

5.1.5 Human Beings

The construction stage of the development will cause some increase in traffic movements in the vicinity of the site but these are not expected to cause any significant impact. The traffic movements in the future when the works is fully operational will not cause a significant increase in the overall traffic movements in the area. As previously outlined, the impact of odour from the works will be significantly reduced.

5.1.6 Cultural Heritage

There is no recorded evidence or visible evidence for archaeological remains on the site. It is possible that anything that may have been present would have been removed in the course of sand digging.

5.2 Impacts in the Event of Breakdown of Equipment

In the event of breakdown of equipment on the Wastewater Treatment Works Site, the following circumstances could arise:-

- Under adverse weather conditions and assuming failure of the odour scrubbing equipment, sewage related smells could arise. However, the probability of this coincidence of extreme conditions is very low.

- Failure of the ESB power supply would result in operation of the standby diesel generator, which could give rise to a slight increase in ambient noise levels, particularly if it occurred at night time. This represents an extreme eventuality and in any event, the standby generator will be provided with an acoustic cover to mitigate against the effects of noise.

- Failure in operation, could result from time to time in the need for repairs to mechanical plant and equipment, which would involve additional traffic and activity which could result in some disturbance, particularly, if required at unsociable times.

5.3 Investment in Mitigation Measures

The overall development takes into account the concerns which have been expressed in recent years from the local residential housing developments nearby, resulting in substantial investment in odour mitigation measures. The proposed site layout seeks to minimise landscape and visual impact as well as general environmental impacts.

The construction stage will involve significant short term impacts particularly associated with increased traffic and traffic disruption, local disturbance particularly to residential development close to the site. The adoption of good management practices and specific environmental control measures will mitigate these impacts.

5.4 Summary of Cumulative Effects

The cumulative environmental effects of the proposed development are summarised as follows:

- **General Environment:** The effects to the general environment are positive with improvement in water quality where this is currently being impaired by the unacceptable discharges from an existing Treatment Works which is becoming increasingly overloaded.

- **Amenity:** The preservation of the quality of the water environment will benefit the general amenity of the area. The high standard of works proposed, including comprehensive landscaping and architecturally sensitive building works will ensure that there is no diminution in the amenities enjoyed in the area.

- **Socio-Economic:** The overall effects of the scheme will be positive in clearing the way for residential and commercial development within zoned areas of Fingal, which have been largely suspended due to the fact that the existing Treatment Works is overloaded. General protection of the Broadmeadow Estuary will also facilitate economic benefits of contact water sports and other tourism related activities.

- **Physical Assets:** The principal impact on physical assets arises from the fact that the proposed site, which is in the ownership of Fingal County Council, having now been designated for the expansion and upgrading of Swords Wastewater Treatment Works is no longer available for other uses.

Local Issues: The perception associated with Wastewater Treatment Works is regarded as negative in respect of local residential properties. The development of the site with a high standard of architectural and landscape finishes will enhance visual amenity compared with the existing situation, while odour and noise levels will be controlled and monitored.