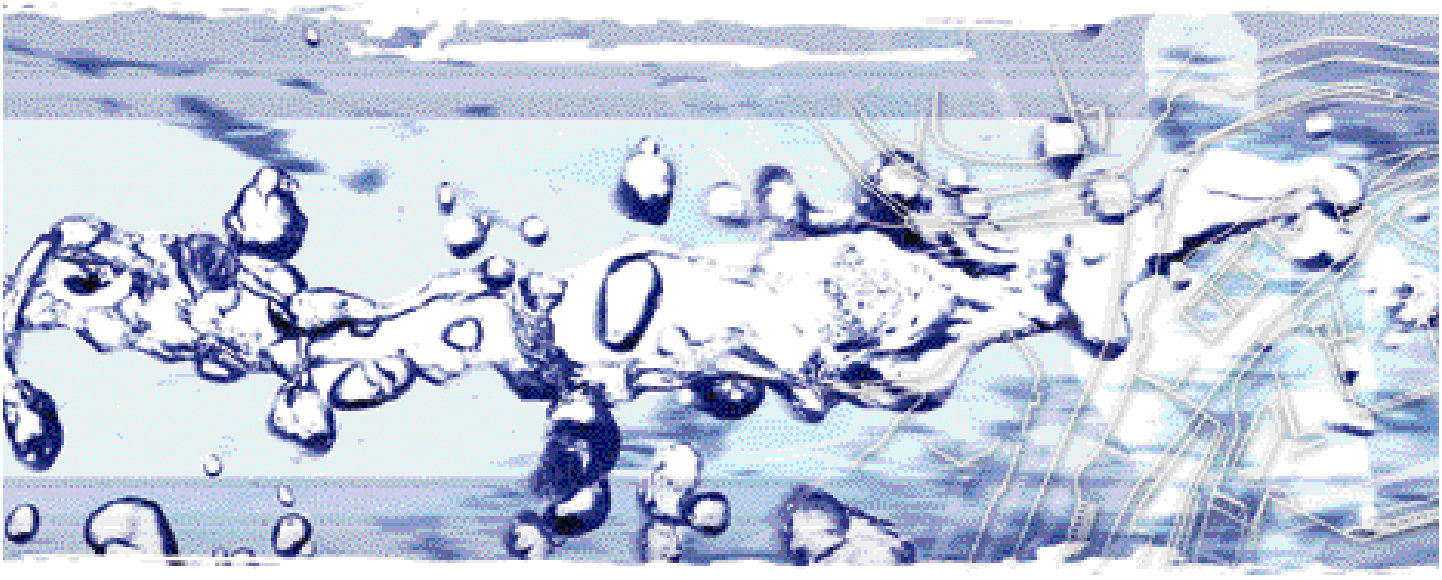


expansion
& upgrading

LEIXLIP
WATER TREATMENT
PLANT

OFFICIALLY OPENED BY

THE MINISTER FOR FINANCE
MR. CHARLIE McCREEVY TD
ON 1ST FEBRUARY 2002

Charlie McCreevy TD
MINISTER FOR FINANCE

I would like to congratulate Fingal County Council on the occasion of the official opening of the Leixlip Water Treatment Plant.

This vital infrastructural project, which was funded by the Exchequer and the EU Cohesion Fund, is the second largest treatment plant in the country, supplying over 30% of the Drinking Water requirements of the Greater Dublin Region, serving Fingal, Kildare and the northern part of Dublin City. The current upgrading and expansion of the plant at Leixlip has increased production capacity by almost 60%.

The availability of an adequate supply of Drinking Water meeting the stringent quality requirements of the EU Drinking Water Directive has been a major factor in underpinning the rapid economic expansion in the Dublin Region especially in Fingal, Kildare and the North City areas. It has not only supported the rapid population growth in the region, but has also been a major factor in attracting key state of the art industries to the region. In addition, the installation of a new sludge treatment plant has contributed to a substantial improvement in the water quality in the River Liffey downstream of the plant.

The success of infrastructure projects such as this underscores the importance of the investment programme contained in the National Development Plan.

CHARLIE McCREEVY TD
Minister for Finance

CATHAL Boland
CATHAOIRLEACH

I am delighted to be associated with the official opening of the Leixlip Water Treatment Plant Expansion Scheme and pleased that the Minister for Finance, Mr. Charlie McCreevy, TD could be present to perform the official opening ceremony.

This major upgrading and expansion is a vital element in supporting the rapid economic development in Fingal and the neighbouring counties.

I want to pay tribute to my colleagues in Fingal County Council for their support for this project and to the management and staff of the Council and the Department of the Environment and Local Government and in particular the Consultants and Contractors for the manner in which this project was planned and executed.

This Project has been co-funded by the EU and the Department of the Environment and Local Government and I would like to take this opportunity to thank our partners in Europe for funding this project.

CATHAL BOLAND
Cathaoirleach

William M. Soffe
COUNTYMANAGER

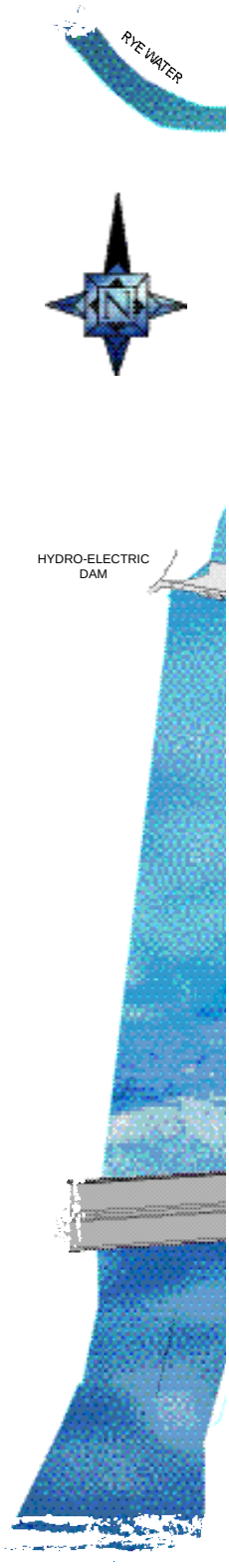
The planning and implementation of the Leixlip Water Treatment Plant Expansion Scheme represents a major improvement in the development of the infrastructural services for the County of Fingal and the Greater Dublin Region.

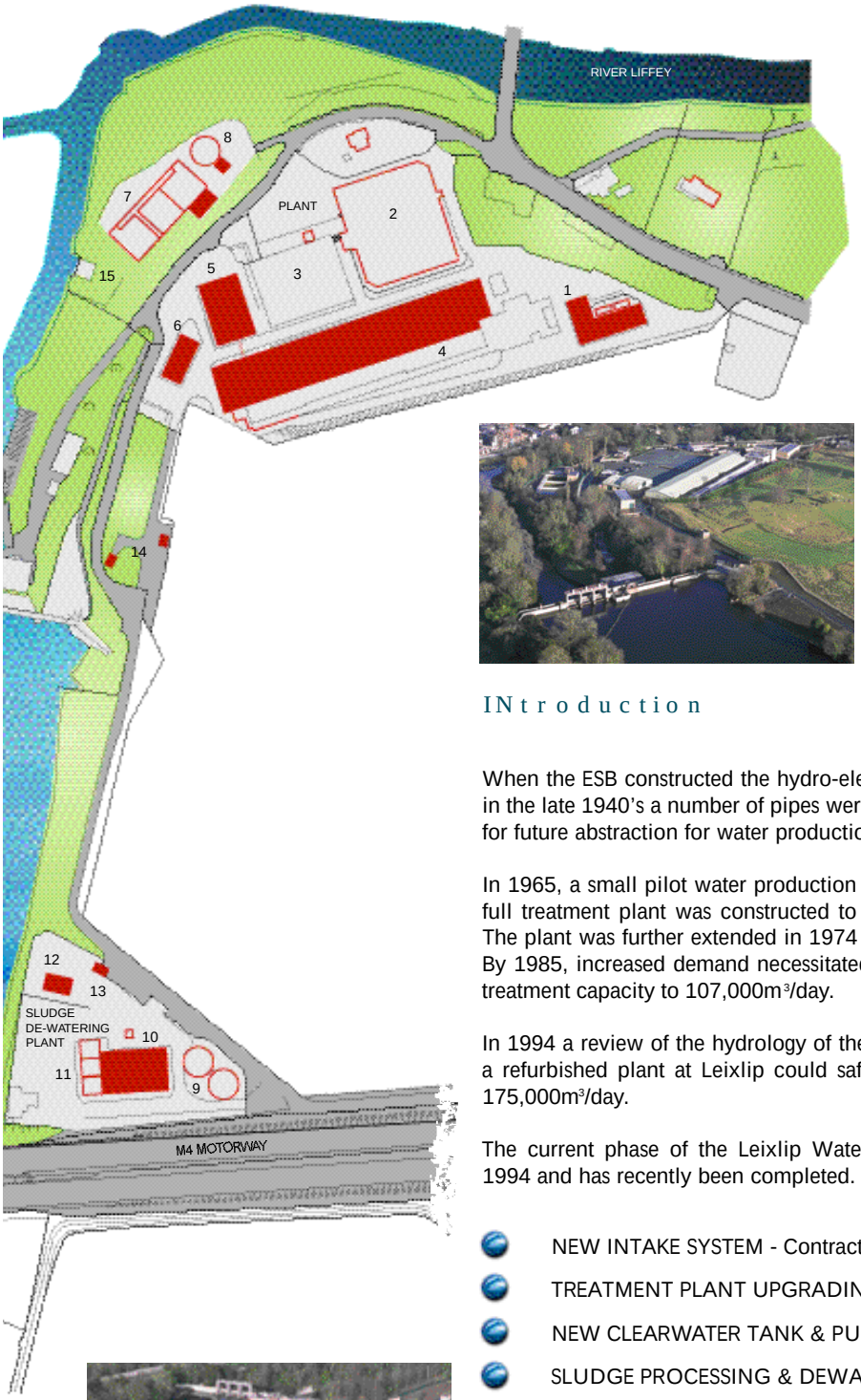
This major upgrading and expansion scheme which began in 1994 has increased Leixlip's production capacity by almost 60%.

This project which cost over €42 million has been co-funded by the EU and the Department of the Environment and Local Government.

Ba mhaith liom mo bhuiochas a ghabhail le gach duine bhi pairtech san obair iontach seo.

WILLIAM M. SOFFE
County Manager





KEY BUILDINGS

1. High-lift pump station
2. 18,000m³ clear water tank
3. 4,000m³ clear water tank
4. Covered settling tanks & filtration block
5. Chemical dosing building
6. Manifold building
7. Washwater recovery tanks & pumping station
8. Sludge balancing tank & pumping station
9. Sludge thickening tanks
10. Sludge dewatering building
11. Sludge holding tanks
12. Intake building
13. ESB sub-station
14. Acid dosing buildings
15. Auxiliary intake

INtroduction

When the ESB constructed the hydro-electric dam on the River Liffey at Leixlip in the late 1940's a number of pipes were incorporated in the dam wall to allow for future abstraction for water production for North County Dublin.

In 1965, a small pilot water production plant was established. Later, in 1967 a full treatment plant was constructed to produce approximately 34,000m³/day. The plant was further extended in 1974 by doubling capacity to 68,000m³/day. By 1985, increased demand necessitated a further addition to the plant raising treatment capacity to 107,000m³/day.

In 1994 a review of the hydrology of the River Liffey catchment confirmed that a refurbished plant at Leixlip could safely increase the treatment capacity to 175,000m³/day.

The current phase of the Leixlip Waterworks redevelopment commenced in 1994 and has recently been completed. The main elements of the project were:

- NEW INTAKE SYSTEM - Contracts 1 & 2
- TREATMENT PLANT UPGRADING & REFURBISHMENT - Contract 3
- NEW CLEARWATER TANK & PUMPING STATION - Contracts 4 & 5
- SLUDGE PROCESSING & DEWATERING - Contracts 6 & 7

The combined value of the works carried out under the various stages amounts to €42.4m approximately. This expenditure was 85% co-financed by the Cohesion Fund of the European Union and the remaining 15% was funded by the National Exchequer. The role of the Department of the Environment was crucial to the smooth running of the project administration and fast-tracking of the original concept from feasibility stage, through design, construction and commissioning phases. Nicholas O'Dwyer Ltd. were the Consulting Engineers for the New Intake System, the New Clearwater Tank and Pumping Station and Sludge Dewatering Contracts while Patrick J. Tobin & Co. Ltd. were the Consultants for the Treatment Plant Upgrading and Refurbishment Scheme.

The plant at Leixlip, operated by Fingal County Council, is the second largest water treatment facility in Ireland.

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1 Intake pipeline & screens
2 Inlet manifold building
3 Chemical dosing building
4 Internal view of intake building
5 Leixlip dam

new intake and pipeline

The key objective of this element of the project was to provide a secure supply of screened raw water to the Leixlip Water Treatment Plant. This was achieved by the construction of a new intake system of capacity 175,000m³/day, within the existing dam impoundment. Two 1600mm diameter Passive Screens were installed at a depth approximately 5 metres below Top Water Level in the impoundment to ensure that water could be drawn off at all times, even when the impoundment level is low during major overhauls of ESB equipment at Leixlip Dam.

The main components of the New Intake System were 2 No. 1600mm diameter Passive Intake Screens, 40 metres of 1400mm diameter submerged steel pipeline, the Intake Structure which incorporated submersible pumps for boosting flows during periods of impoundment draw-down, 350 metres of 1400mm diameter pipeline to the Treatment Works and the Inlet Manifold Building.

The New Intake System Contracts were completed by Jons Civil Engineering Ltd. and EPS Ltd. in 1994/1995 at a cost of €4.1m.

Increasing treatment capacity

The Treatment Plant Upgrading and Refurbishment Contract provided for increasing the treatment capacity of the works from 107,000m³/day to a maximum of 175,000m³/day and also for upgrading of equipment and controls associated with the water treatment process.
One of the most significant achievements of this Contract was the fact that full production capacity was maintained at the Treatment Works at all times. In addition, the plant was capable of producing additional water by April of 1995 – only four months after commencement of the contract period. This was significant in the context of water shortages in the preceding period and the new demands being placed on Fingal County Council to produce additional water to support the development of industry within the region.

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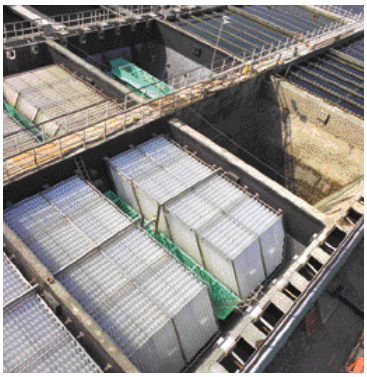
1 Settlement tank with travel bridge
2 Quality control “wet room”
3 Alum dosing pumps
4 Refurbishment of hopper-bottomed settlement tanks
5 View of sludge trough & lamella plates



The work elements carried out under this Contract included the following.

- *Provision of flow distribution and control equipment, for flows entering the works from the Leixlip Impoundment.*
- *Provision of new chemical bulk storage and dosing facilities for pre-treatment chemicals.*
- *Upgrading of the existing Hopper Bottomed Settlement Tanks through the addition of lamella plate modules. This measure increased the throughput of the Settlement Tanks from 68,000m³/day to 136,000m³/day. In addition, the existing Settlement Tanks were retro-fitted with a covering structure to mitigate against the effects of algae in the raw water.*
- *Upgrading of the existing filters (installed by Paterson Candy in 1967 and 1972) through the provision of a new underdrain system and the provision of deeper filter beds. The throughput of these filters was also increased from 68,000m³/day to 136,000m³/day.*
- *Provision of a new interconnecting pipework system from the raw water inlet stage to the filtered water outlet stage of the process.*
- *Provision of a new chemical dosing building to house bulk storage and dosing facilities for sulphuric acid, aluminium sulphate, polyelectrolyte, chlorine and fluorine.*
- *Provision of a new electrical distribution system throughout the Treatment Works including replacement of all electrical control panels.*
- *Provision of a modern instrumentation, control and automation system (SCADA), with particular emphasis on monitoring of treated water quality.*

This Contract commenced on site in January of 1995 and was substantially complete by July of 1996. The cost of this contract, which was carried out by Jones Environmental (Irl) Ltd., was €16m.

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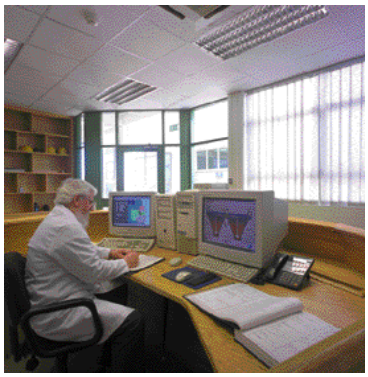
1 Pumpsets with 650kW motors
2 External view of pumping station
3 20kVa HT switch gear
4 Internal view of pumping station
5 Main control room

New clearwater tank & high lift pumping station

Work on the construction of the new 18,000m³ Clearwater Tank and High Lift Pumping Station commenced in October 1997.

The civil works included substantial reinforced concrete structures and considerable pipework of varying diameters. Concrete work comprised a 10 metre deep twin cell clearwater tank, total refurbishment of the existing 4,000m³ clearwater tank and the construction of a 12 metre deep tiered pumping station. A major feature of the pipework element included a 62 metre long section of tunnel hewn out of limestone rock. The tunnel was formed using segmental tunnel lining sections to accommodate the 1400mm diameter pipework link between the new clearwater tank and pumping station structures.



Six new 650kW vertically mounted High Lift Pumps were installed in the New Pumping Station. These pumps have been designed to deliver up to 150,000m³/day of treated water to the Reservoir at Ballycoolen, which is the storage hub for the water distribution systems serving the Fingal County area and the North Dublin City area.

This element of the project was completed by P.J. Walls (Civil) Ltd. and Jones Environmental (Irl) Ltd. at a cost of €14.3m.

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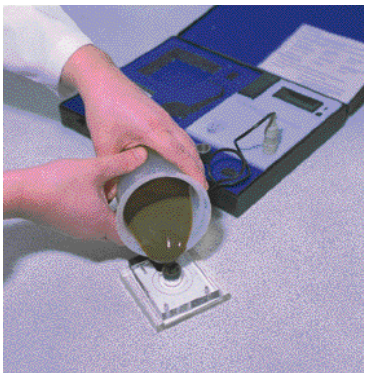
1 Aerial view of sludge dewatering building & thickening tanks
2 Membrane plate press
3 Laboratory testing
4 Testing thickened sludge
5 Testing sludge cake

Sludge dewatering

Pat Mulcair Civil Engineering and USF Bowen were appointed to undertake the Sludge Dewatering Contracts in 1996. The value of this element of the project was €8.0m.

These works involved the provision of new structures and mechanical equipment for the collection and processing of sludge and filter washwater arising from the treatment process.



These processes include the settlement of filter washwater, sludge balancing and homogenisation, sludge thickening and finally sludge dewatering. The overall treatment regime is such that the quantity of waste material that ultimately leaves the plant is reduced to a minimum.

The final dewatering process takes place in two large membrane plate presses. Each press containing 110 plates of nominal size 2 metres x 2 metres. Operating in parallel, the presses are sized to accommodate the total weekly volume of sludge produced from the plant during the normal working week.

The principal benefit of this section of the overall development work at Leixlip lies in the conversion of the normal liquid wastes produced by the plant in everyday water treatment to a solid material or sludge cake which is suitable for transportation by road and disposal to landfill.

acknowledgments

SCHEME PROMOTER

Fingal County Council
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Cathaoirleach	Cathal Boland
County Manager	William Soffe
Director of Services	Douglas Hyde
Senior Engineers	Peter O'Reilly
	John Mulcahy
	Lar Spain
Senior Executive Officer	Margaret Howard
Former County Engineer	D.G. O'Connor

SITE SUPERVISION TEAM

Project Resident Engineer	Brendan Curran
Resident Engineers	Ned Creed
	Francis Gaffney
	Bryan Evans
	Seamus MacSweeney
	John O'Connor
	Peter O'Connor
	John Reilly

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Consulting Engineers,
Carrick House, Dundrum Centre, Dublin 14.

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Project Managers	Alan Traynor
	Sean Kavanagh

Patrick J. Tobin & Co. Ltd.
Hynes Building, St. Augustine Street, Galway.

Managing Director	Eamonn Waldron
Project Director	Robert Tobin

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Dublin 17.

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Project Manager	John Keaveney

Jons Civil Engineering
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Project Director	John Pentony
Project Manager	Gerry Caffrey

Pat Mulcair Civil Engineering
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Project Director	Eamon O'Dowd
Project Manager	John Regan

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Project Manager	Billy Sheill

USF Bowen Water Technology
Kilkenny Industrial & Business Park,
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Project Director	Fergus Cronin
Project Manager	Vincent O'Shea

EPS Pumping & Treatment Systems
Quartertown Industrial Estate, Mallow, Co. Cork.

Project Director	Gerald Buckley