Nicholas O'Dwyer

CONSULTING ENGINEERS

WATER SECTOR
CAPABILITY STATEMENT

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Water is life. It is essential to our daily lives, and key to successful economies worldwide. Yet over one billion people do not have access to clean water; and those economies that have a safe clean supply are ever challenged by the need for greater efficiencies and increasing demands.

Nicholas O'Dwyer, implements and maintains a management system which fullfills the requirments of the standard IQNET ISO 9001:2008
Registration Number: IE-19.3077HQ

WATER SECTOR
CAPABILITY STATEMENT

Nicholas O'Dwyer has successfully delivered water resource management and water supply projects across the global economy for over 80 years. Having worked with all of the international funding agencies on substantial projects in developing countries, the firm has earned its reputation as an innovator and leader in the field of construction design, procurement and management of major infrastructural projects at home and abroad. Its expertise ensures that clients are well positioned to take advantage of the latest technologies, methodologies and industry trends to provide sustainable solutions for the management of this valuable natural resource.

The firm's European and International clients include local and multi-national contractors, government departments, statutory bodies, private sector organisations, utility providers and International Funding Institutions (IFIs) responsible for funding and coordinating major infrastructure projects.

Since it's inception, Nicholas O'Dwyer has forged strong links with engineering firms across the Globe which allows the firm to bring together local knowledge and international expertise. This ensures the clients needs are truly understood and the best fitting solutions are delivered, using the most innovative technology.

Since its foundation Nicholas O'Dwyer has delivered hundreds of water, civil, transport, and environmental projects in more than 50 countries. During the past 15 years alone it has:

- Provided services in water supply engineering to authorities serving over 5 million consumers
- Provided engineering services to water sector projects with a construction value of over €1 billion
- Provided over a million man-hours of engineering services to the water industry
- Worked in over 20 countries throughout the developing world
- Developed a strong track record in the delivery of projects funded by IFI's
- Extensively used and is familiar with the conditions of contract of these agencies and with the FIDIC conditions.

Its team prides itself on a 'can do' approach delivered through sound management, technical excellence and teamwork.

'SUCCESSFULLY DELIVERED WATER RESOURCE MANAGEMENT AND WATER SUPPLY PROJECTS ACROSS THE GLOBAL ECONOMY FOR OVER 80 YEARS'

'THE FIRM CONSISTENTLY DELIVERS THE TECHNICAL AND ORGANISATIONAL EXPERTISE TO ENGINEER INNOVATIVE AND AFFORDABLE SOLUTIONS IN WATER SUPPLY'

WATER SECTOR
OUR SERVICE

The firm consistently delivers the technical and organisational expertise to engineer innovative and affordable solutions in water supply while successfully managing the stringent regulatory requirements which govern water quality. It provides a full-suite of engineering services for planning, design and implementation, establishing best practices in the areas of:

Water Resources, Planning & Management
Assisting clients in planning and managing urban and regional water supplies, Nicholas O'Dwyer provides services relating to catchment hydrology; river basins; groundwater and aquifers; strategic planning of water supply and distribution systems; water abstraction and irrigation.

Water Treatment
Its engineers and environmental consultants prepare studies and develop efficent designs for water treatment plants. Its services include water quality analysis; assessment of treatment systems; development and monitoring pilot plants; design of treatment facilities, including process, civil, building and, mechanical and electrical systems engineering.

Water Storage
Nicholas O'Dwyer provides a full range of services including planning, hydraulic engineering, structural engineering and contract supervision across a wide spectrum of storage facilities notably dams, reservoirs and tanks which are engineered to ensure security of water supply.

Water Transmission and Distribution
Its team provide comprehensive services across a wide range of transmission and distribution systems. This encompasses all elements of the distribution system to transmit water to end-users and includes water transmission pipelines, hydraulic structures, pump stations and distribution infrastructure.

Water Supply Management
The firm provides all aspects of water supply management advisory and consultancy services to water utilities. It has implemented water usage studies, operation efficiency studies, water conservation leakage reduction programs; metering and billing projects and institutional strengthening and capacity building initiatives.

Its team's range of engineering and technical services include:

- master planning;
- technical and economic feasibility studies;
- environmental impact assessments;
- project development planning;
- design;
- risk management assessment;
- optioneering of alternative designs;
- conceptual and detailed designs and documents;
- quality management;
- water quality monitoring;
- training and capacity building
- operational monitoring

WATER SECTOR
OUR APPROACH

At Nicholas O’Dwyer we understand water; we understand how it works and why it is the most fundamental contributor to the successful functioning of any society around the world.

We understand what it takes to deliver a water project in the most arid conditions and in the wettest, on time and in budget and we apply that experience to every project we undertake to ensure that you receive the best solution to meet your needs.

But most importantly we build relationships that work for you. It is this partnership with you the client and all members of the supply chain that ensures you benefit from the very best expertise across all disciplines.

Our approach stems from our belief that

- **Innovation is key**, yet we must deliver robust, practical solutions, guaranteed by our broad and varied experience in the water sector
- **Complexity should be simplified.** Water Infrastructure Projects are not simple but we know how to manage the complexities to deliver results.
- **Value for Money is critical.** That’s why we aim to do more with less – we use the latest in information and communication technology to deliver better performance with less of your resources
- **Encouraging our staff to excel in all that they do benefits the project, benefits you and benefits us**
- **The world is a changing place.**

We understand that your needs change and that we must be flexible to those needs.

MOROGORO WATER SUPPLY SCHEME

Morogoro, Tanzania

Morogoro City is in the southern highlands of Tanzania, approximately 190km west of Dar es Salaam, and has a population of about 250,000+ inhabitants. This USD$12 million project was required to provide improved water supply to the City.

Eighty percent of Morogoro's water supply comes the Ngerengere River. Water to the City is supplied by two water treatment plants, which both required upgrading. The main water treatment plant is the Mafiga Water Treatment Plant. The goal of the project was to rehabilitate and upgrade the Mafiga Water Treatment Plant to bring production up by 42%, bringing it to 27 ML/day. The project also included upgrading the smaller Mambogo water treatment plant by 50%.

In addition to upgrading the treatment plants, the design also allowed for expanding pumping and transmission from the plants to the City. The funding for this project originated from the Millennium Challenge Corporation, through the Millennium Challenge Account, Tanzania (MCA-T).

Nicholas O'Dwyer were appointed by MCA-T to carry out a thorough review of the detailed design and to provide construction supervision services. In addition, there was a requirement to carry out all environmental supervision and ensure best practice in relation to environmental management during the construction. A specialist team from Nicholas O'Dwyer was provided, including a full time Project Manager to manage the team of up to 14 specialists. The specialists included Resident Engineers, Surveyors, Environmental Specialists, Water Treatment Specialists and Social Specialists for the project.

'THIS USD $12 MILLION PROJECT WAS REQUREID TO PROVIDE AN IMPROVED WATER SUPPLY TO OVER A QUARTER OF A MILLION RESIDENTS'

ZARQA WATER RESTRUCTURING & REHABILITATION

Zarqa Governorate, Jordan

Jordan is one of the countries of the world which has the least water available per capita. Nicholas O'Dwyer was appointed Engineering Consultant on the USD $90 million water restructuring and rehabilitation project in Zarqa Governorate, Jordan. The Zara Governorate itself covers an area of about 4,000 km^2 and has a population of about 1 million persons, most of whom are in Zarqa City. Zarqa City lies just 25km north of the capital of Jordan, Amman and is a large industrial centre.

The principal objectives of the project were to identify the requirements for rehabilitation and/or upgrading of the water delivery system of Zarqa Water Governorate and develop an Investment Master Plan that is aimed at significantly reducing non revenue water in the Governorate in the most cost-effective manner. The project provided the framework for an improved water supply for over a million persons.

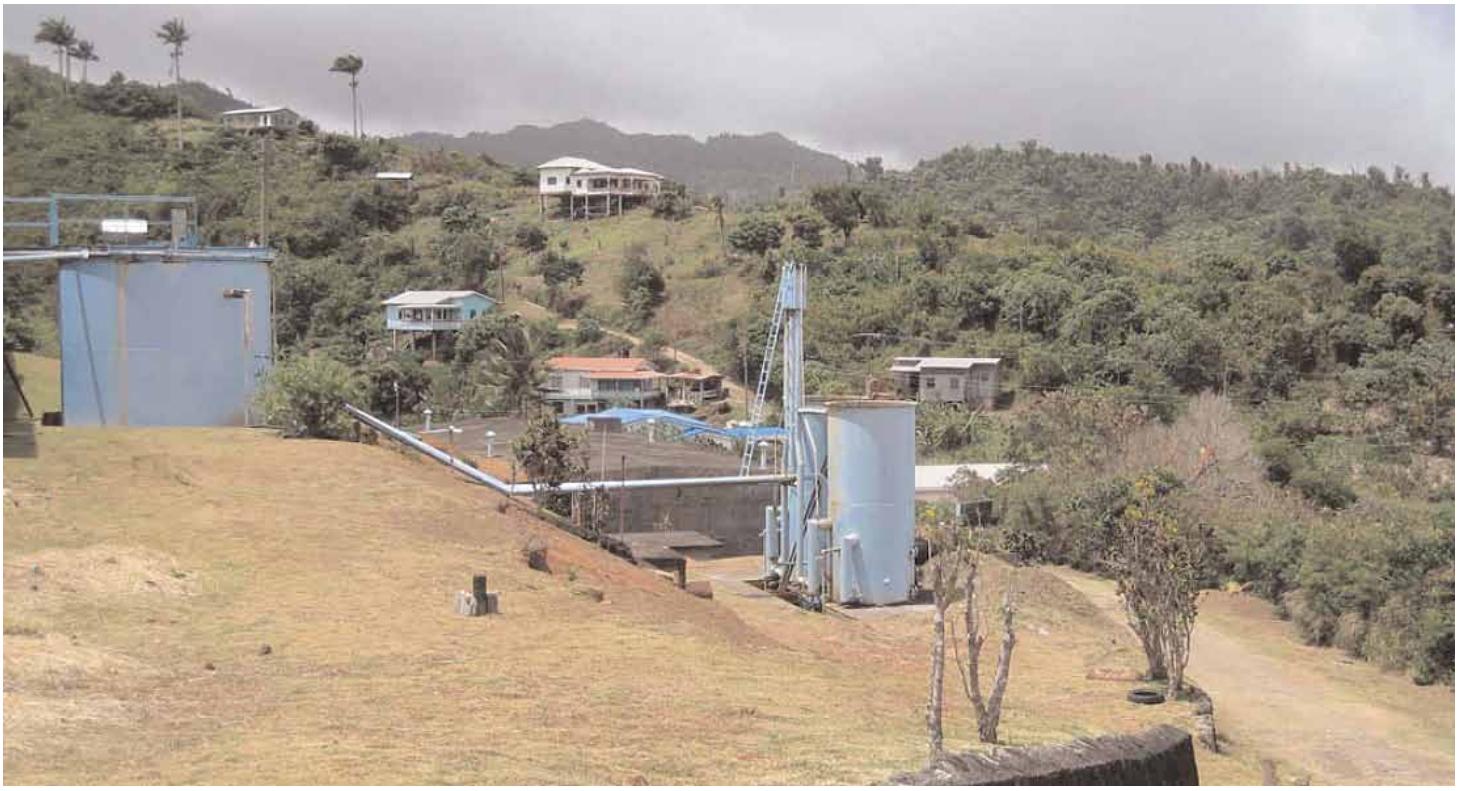
The project was structured into five parts:

- Preparatory work comprising of site surveys; investigations; initial environmental and social assessment; pilot leak detection studies and engineering analyses which identified rehabilitation and upgrading requirements.
- Development of the Investment Master Plan for the water system of the Zarqa Governorate.
- Feasibility assessment of all identified projects within the Investment Master Plan and selection of proposed investments.
- Preparation of environmental and social impact assessment, environmental management plan, and a resettlement action plan for the defined projects.
- Development of bid documents for the delivery of the selected projects.

'THIS PROJECT PROVIDED THE FRAME WORK FOR AN IMPROVED WATER SUPPLY FOR OVER A MILLION PERSONS'

CASESTUDY 3

SOUTHERN GRENADA WATER SUPPLY PROJECT



Grenada Island, West Indies

The USD $7.8 million Southern Grenada Water Supply Project was implemented under European Union finance. Its purpose was to enhance the capacity and reliability of the pipeline network and upgrade the seven contributing Water Treatment Plants for central automatic operation and control using a new SCADA System linked to installed automatic valves and water quality control systems. As this was a live water network, depended on by the local citizens, a continuous supply of water to the network was a critical requirement of the project. This required detailed planning and programming in conjunction with the Operator, National Water and Sewerage Authority so that disruption to citizens was kept to a minimum.

The works included replacement of 17km of water pipelines and connections and upgrading 7 small treatment works from manual to automatic operation. Nicholas O'Dwyer provided an expert site team which was responsible for the supervision of construction to ensure works were carried out to design and specification, in budget and within the contract programme.

As part of the project, Nicholas O'Dwyer created a detailed computer hydraulic model of the network. The firm also provided capacity building for the client in the form of training in the use of a Hydraulic Network Modelling Programme for the works.

Nicholas O'Dwyer were responsible for the examination and approval of all detailed designs, construction approvals and ensured the successful completion of the project.

'REPLACEMENT OF 17KM OF WATER PIPELINES AND CONNECTIONS AND UPGRADING 7 SMALL TREATMENT WORKS FROM MANUAL TO AUTOMATIC OPERATION'

TORUÑ WATER TREATMENT PLANT UPGRADING

Lubicz, near Toruñ City, Central Poland

The Toruñ Water Treatment Plant was upgraded to improve the drinking water quality standards. This was achieved through reducing the formation of trihalomethanes; more efficient removal of mineral compounds and organic materials; and reduced turbidity. The smell, taste and quality of the drinking water were all improved and brought within acceptable EU and National standards.

The existing treatment plant served a population of over 240,000 people (80,000 ML/day), hence the maintenance of a continuous supply of water during the modernisation works was of absolute importance. Nicholas O'Dwyer staff ensured that the contractor's works programme did not jeopardise continuity of supply and that the works were carried out with a minimum of disruption to the residents of Toruñ. Works were carried out to EU procedures and FIDIC Conditions of Contract for Construction.

Nicholas O'Dwyer was responsible for the successful supervision of the USD $11 million project to ensure design specifications were met on time and in budget.

The project involved the manufacture of specialist water treatment equipment including a new ozonizing station and automatic process control systems. It also included modernisation of chlorinating system sieves, screens, pumps, filter plant and coagulation system. The electircty supply was also upgraded with 6 kV HV power supply lines, transformer station and area lighting.

Architectural area improvements were also carried out including internal road works, fencing, refurbishment of buildings, offices and control rooms.

'UPGRADING OF A WATER TREATMENT PLANT FOR OVER A QUARTER OF A MILLION PEOPLE'

LEIXLIP WATER TREATMENT PLANT
Kildare, Ireland

Leixlip Water Treatment Plant is the second largest water treatment plant in Ireland. The plant serves an area of 454 km^2 and approximately 500,000 people.

Nicholas O'Dwyer was appointed consultant for the original Leixlip Water Treatment Plant (Stage 1) which was constructed in the 1960's. Nicholas O'Dwyer's involvement has continued since then through to the completion of plant augmentation schemes in the 1970's, 1980's and 1990's.

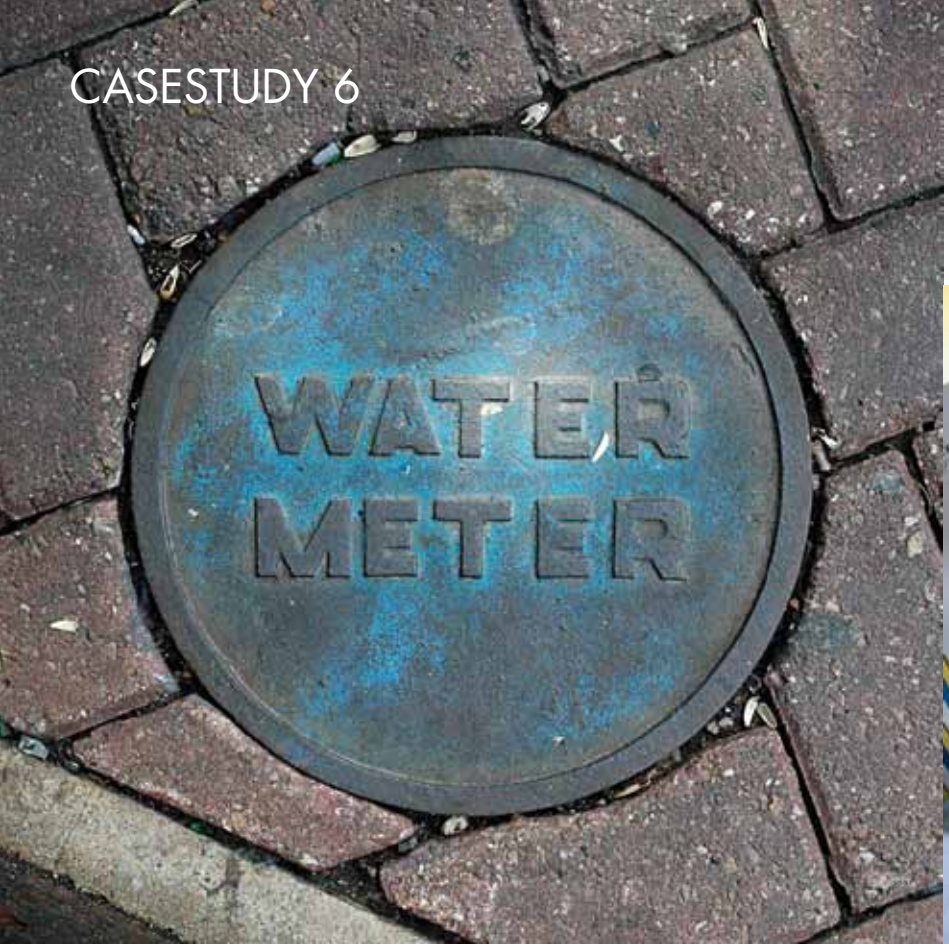
Under the Stage 4 expansion, the capacity of the plant was increased by 75% to 175ML/day. Nicholas O'Dwyer was responsible for the design and project management of the new Intake System, the new Clear Water Tank, High Lift Pumping Stations, the Sludge Processing and Dewatering Plant. Some of the processes involved were the first of their kind to be installed in Ireland.

In 2004, Nicholas O'Dwyer was appointed Lead Consultant for the next stage of development: Leixlip Water Treatment Plant Expansion - Stage 5. We believe this ongoing working relationship with the client is testament to the client's satisfaction and the quality of the service delivered.

'THE CAPACITY OF THE PLANT WAS INCREASED by 75% TO 175ML/day'

Clear Water Tank under construction

Membrane Type Sludge Presses



DONEGAL NON DOMESTIC METERING

Donegal, Ireland

This project required the installation of water meters for all Non-Domestic customers for a Local Water Authority, Donegal County Council. The project covered an area of 4,841 km^2 and involved the survey of all existing non-domestic customers and connections, which included 15,000 individual customers.

Nicholas O'Dwyer developed a customer database to store all relevant information, and 8,000 new meters were installed. The reading of meters was carried out using the latest technologies for Automatic Meter Readings with 21,000 readings per annum. The project also involved billing of customers, collection of revenue and management of customer communications which were handled by the Local Water Authority, with technical assistance and capacity building provided by Nicholas O'Dwyer.

Nicholas O'Dwyer carried out extensive baseline surveys and analysis in order to inform detailed feasibility studies. The feasibility studies included examination of appropriate procurement options, the definition of the requirements of a service contract and a detailed cost estimate for the scheme.

Following on from client approval, the firm also prepared specifications and contract documents for the design build and operate phases. The pre-qualification and tendering processes, management and supervision of the Contract was all successfully handled by Nicholas O'Dwyer.

Throughout the project Nicholas O'Dwyer facilitated successful consultations with Stakeholders.

Nicholas O'Dwyer have carried out this type of project for other Local Authorities in Ireland giving a total of 44,300 individual customer surveys and the installation of 23,000 individual meters.

'THE PRE-QUALIFICATION & TENDERING PROCESSES, MANAGEMENT AND SUPERVISION OF THE CONTRACT WAS ALL SUCCESSFULLY HANDLED BY NICHOLAS O'DWYER'

WATER STRATEGY FOR COUNTY KILDARE

Kildare, Ireland

This project, for Kildare County Council, involved the review of existing water supply systems and the development of a county wide strategy to satisfy the future water supply needs of the county. The existing population at the time was about 190,000 persons. The water demand was projected to increase from approximately 55 ML/day to over 100 ML/day over the 20 year design period. This was as a result of Kildare's location to the Greater Dublin Area and the associated development pressures within the county.

Nicholas O'Dwyer was tasked with the assessment of existing water supply system, future water demand and water treatment requirements. The firm was responsible for the identification and analysis of potential surface water and groundwater sources and development of water distribution strategy to satisfy future requirement. Water distribution models were prepared together with econmonic assessment and phasing.

A detailed assessment of available groundwater and surface water sources was carried out and identified the development of a number of wellfields and the River Barrow as new water sources to augment existing supplies from the River Liffey. The strategy also identified that the infrastructure needed to distribute water throughout the county and provide the necessary security of supply. The main works, valued at €160 million, included 40 ML/day Water Treatment Plant on the River Barrow, 18 ML/day Wellfield Development, 40 ML Reservoir Storage and 240km of 1000mm to 150mm diameter pipelines.

'THE MAIN WORKS, VALUED AT €160 MILLION'

RIVER BARROW ABSTRACTION SCHEME
Kildare, Ireland

The River Barrow is the second longest river in Ireland, travelling approximately 200km from its source to the sea at the southern coast of the country. This €44 million project involved the construction of a new 40ML/day Water Treatment Plant a significant addition to the local water supply infrastructure.

Nicholas O'Dwyer was appointed by Kildare County Council to carry out detailed feasibility studies, including a full Environmental Impact Assessment. The feasibility studies identified an optimum location and following client approval, Nicholas O'Dwyer carried out the full detailed design, contract documents and project management of the scheme.

'THIS €44 MILLION PROJECT INVOLVED THE CONSTRUCTION OF A NEW 40ML/DAY WATER TREATMENT PLANT'

In order to ensure adequate electricity supplies for the scheme, an Electricity Distribution Building was constructed under an advance Contract as part of this scheme.

The treatment plant works included an Intake and Raw Water Pumping Station, a new 120ML Raw Water Storage Reservoir, a Clear Water Storage Tank, 40ML/day Water Treatment Plant and Sludge Dewatering Facilities. The scheme also included Administration Buildings, Control & Chemical Buildings, Site Works and internal roads.

As the treatment plant was located in a green field site, the new location required the the laying of approximately 7.5km of large diameter rising mains to connect the new water treatment plant to the existing main water transmission network. 2 High Lift pumping stations were also provided to feed reservoirs.

BOHERBOY WATER SUPPLY SCHEME

Dublin, Ireland

Dublin City is home to approximately 1 million inhabitants. The objective of the €32 million Boherboy Water Supply Scheme was to augment and extend the water supply infrastructure for much of the southern section of Dublin.

This was achieved by providing two additional large water storage reservoirs, one at high level and one at low level, and a series of distribution mains from each reservoir to serve large areas of the southern part of the capital city.

The project included the provision of 24,000m^3 and 17,500m^3 reservoirs, together with ancillary services and site works. Two high flow pumping stations were also required to feed the reservoirs. These pump stations had duty and standby pumps, and auxiliary booster pumps to ensure security of storage and supply pressure. Control Buildings were provided at each reservoir site for valving control, pump control and chlorine dosing boosting system.

A series of large diameter interconnecting pipework was also provided on the main water transmission network, including a draw off an existing live 1,600mm diameter water main from the primary Water Treatment Plant in the City.

Nicholas O'Dwyer was appointed by the local Authority, South Dublin County Council, and was responsible for preliminary design, detailed design, procurement and project management for the construction of the scheme.

'THE OBJECTIVE OF THE €32 MILLION BOHERBOY WATER SUPPLY SCHEME WAS TO AUGMENT AND EXTEND THE WATER SUPPLY INFRASTRUCTURE FOR MUCH OF THE SOUTHERN SECTION OF SOUTH DUBLIN'

VARTRY TUNNEL REHABILITATION AND UPGRADE
Wicklow, Ireland

The Vartry Water Treatment Plant, (WTP) supplies approximately 80ML/day of treated water to Dublin and to a considerable area of North Wicklow. This constitutes approximately 16% of the total volume of water supplied to the Greater Dublin Regional Water Supply System. The Vartry System is the only source of supply to North Wicklow, as well as being the primary source of supply for a considerable portion of the administrative areas of Dun Laoghaire - Rathdown County Council and Dublin City Council.

The objective of the €20.9 million Vartry Tunnel Rehabilitation and Upgrade Project was to secure the transfer of treated water through the tunneled conduit between Vartry WTP and Callowhill BPT, known as the Vartry Tunnel. The 4km long tunnel was constructed in the 1860's and inspections confirmed the need to carry out extensive rehabilitation works.

Nicholas O'Dwyer was responsible for the detailed options assessment for this major water transmission project. This included project management, structural assessment, options assessment, whole life costs and value for money assessment.

'THIS CONSTITUTES APPROXIMATELY 16% OF THE TOTAL VOLUME OF WATER SUPPLIED TO THE GREATER DUBLIN REGIONAL WATER SUPPLY SYSTEM'

Nicholas O'Dwyer
CONSULTING ENGINEERS

WATER SECTOR
SAMPLE CLIENT LIST

Department for Regional Development, Northern Ireland
Department of the Environment, Community & Local Government, Ireland
Environmental Protection Agency Ireland
European Union
Irish Aid
Millennium Challenge Account - Jordan
Millennium Challenge Account - Tanzania
Ministry of Energy and Water, Zambia
Ministry of Minerals, Energy and Water Resources, Botswana
Ministry of Water and Irrigation, Jordan
Ministry of Water Resources and Development, Zimbabwe
Ministry of Works and Energy, Fiji
Presidency of Meteorology and Environment, Kingdom of Saudi Arabia
Various Local Authorities in Ireland
Water Services National Training Group, Ireland

Nicholas O'Dwyer

CONSULTING ENGINEERS

WATER SECTOR
CAPABILITY STATEMENT

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