



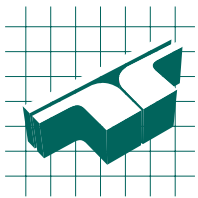
**Nicholas O'Dwyer**  
CONSULTING ENGINEERS

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**WASTEWATER SECTOR**  
CAPABILITY STATEMENT

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# Nicholas O'Dwyer

CONSULTING ENGINEERS

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## WASTEWATER SECTOR CAPABILITY STATEMENT

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Effective Wastewater treatment is key to public health. It involves maintaining a delicate balance between nature's own methods and technical intervention. To get it right, requires a mix of experience, expertise and flexibility that only decades of engineering practice can instill. With over 2.7 billion people predicted to be without basic sanitation in the next few years and many nations facing even higher demands, waste water treatment is set to continue as a major driver of all world economies.



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



Nicholas O'Dwyer  
CONSULTING ENGINEERS

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WASTEWATER SECTOR  
CAPABILITY STATEMENT

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# WASTEWATER SECTOR

## CAPABILITY STATEMENT

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Nicholas O'Dwyer has successfully delivered wastewater infrastructure projects across the global economy for over 80 years. Counting all of the International funding agencies amongst their client base, they have been at the forefront of many of the major infrastructural projects throughout the developing world. As leaders in innovative design and strategic management of such projects, the firm continue to match the latest technologies and industry developments and trends to provide the right solution for wastewater collection and sustainable treatment.

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.

Over the decades, the firm has built strong connections to the best engineering firms worldwide, positioning itself to combine its international expertise with local knowledge and experience. Working together, Nicholas O'Dwyer and its partners provide the most effective solutions resulting from a true understanding of the client's brief.

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/wastewater engineering to authorities serving over 5 million consumers
- Provided engineering services to sanitation sector projects with a construction value of over €640 million
- 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.



'HAS SUCCESSFULLY  
DELIVERED  
WASTEWATER  
INFRASTRUCTURE  
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 SANITATION'

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## WASTEWATER SECTOR

### OUR SERVICE

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Nicholas O'Dwyer is a full service engineering firm providing planning, design and implementation of innovative and affordable solutions in sanitation. Keeping abreast of all regulatory requirements, the firm is best placed to deliver projects that adhere to the increasingly stringent regulations in the sector that ensure all wastewater is treated in an environmentally sustainable manner. The firm has established best practices in the areas of:

#### **Strategic Planning**

Assisting clients in planning and managing urban, peri-urban and regional sanitation schemes, Nicholas O'Dwyer provides services relating to catchment hydraulics; energy efficient and sustainable urban drainage.

#### **Urban Drainage**

Its team provide comprehensive services across a wide range of collection systems. This encompasses all elements of the collection system from sanitary collections points to the large scale wastewater treatment plants; and includes gravity sewers, pump stations and transmission pipelines, for both wastewater and surface water.

#### **Municipal Wastewater Treatment Plants**

Its engineers and environmental consultants prepare studies and develop efficient designs for wastewater treatment plants, from village scale to municipal scale. Its services include influent 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. Industrial Wastewater Treatment Plants. Its services include influent quality analysis; nutrient analysis; co-treatment analysis; assessment of treatment systems for high strength loads; development and monitoring pilot plants to assess treatability; design of treatment facilities, including process, civil, building and, mechanical and electrical systems engineering.

#### **Sludge**

This by-product of wastewater treatment needs careful management, and requires significant planning for long term sustainability. Nicholas O'Dwyer services include sludge quality analysis; nutrient analysis; energy recovery, sludge treatment and beneficial re-use analysis;

#### **Alternative Technologies**

Nicholas O'Dwyer strive to use the most appropriate technology for any given situation, and its engineers can advise on the optimum solution for any given situation in relation to collection and treatment process technologies.

#### **Infrastructure Management**

The firm provides all aspects of wastewater management advisory and consultancy services to utilities. It has implemented water usage studies, operation efficiency studies, energy efficiency studies, pollutant source studies, 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.



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# WASTEWATER SECTOR

## OUR APPROACH

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At Nicholas O'Dwyer we understand water, and in particular, how to treat wastewater; we understand how the processes work and why sanitation is a fundamental contributor to the sustainable functioning of any society around the world. We understand what it takes to deliver a sanitation 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.

At Nicholas O'Dwyer we understand how critical sanitation is to the functioning of any economy. We understand the impact that varying conditions can have on the performance of any sanitation system. That is why, whether the project is in the most arid of conditions or in the wettest, we ensure that the right mix of expertise is employed to provide the best fit solution for that environment. Working in partnership with you the client and the team across all disciplines, we ensure that the project delivers results on time and in budget.

Our approach stems from our belief that

- **Complexity should be simplified. Wastewater 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 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.

**'A FUNDAMENTAL CONTRIBUTOR TO THE SUSTAINABLE FUNCTIONING OF ANY SOCIETY'**





## KINOYA SEA OUTFALL PIPELINE Suva City, Fiji Islands

A new effluent outfall was required at Kinoya Sewage Treatment Plant, near Suva City, Fiji. The outfall was to be designed to cater for phased discharge increases as the population equivalent moves from 90,000 to 360,000. Nicholas O'Dwyer carried out all the preliminary design, environmental impact assessment, detailed design and construction supervision for this 2,000m long sea outfall.

In order to complete the initial part of this project, Nicholas O'Dwyer needed to determine the optimum outfall alignment and end point. Nicholas O'Dwyer carried out detailed Hydrographic Surveys to examine the sea bed in the area, followed by mathematical dispersion modelling to rank various location options in relation to the treated effluent plume and its dispersion in the surrounding

“THE OUTFALL IS  
DESIGNED TO CATER  
FOR PHASED  
DISCHARGE INCREASES  
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environment. Fiji is world renowned for its sensitive coral reefs and consequently, detailed Environmental studies were required in order to ensure that there was no significant impact on the local ecosystems.

After the preliminary stage, Nicholas O'Dwyer carried out all the detailed design for the project including the hydraulic design of the outfall and the civil structural analysis and design. Detailed cost estimates were calculated based on quantity calculations and comprehensive tender documents were prepared. During the Tender Period, Nicholas O'Dwyer provided assistance to the client with tender procedures, tender evaluation and the contract negotiations.

The works comprised the installation of a main outfall made of 1,400 mm diameter HDPE pipeline (submerged below the seabed over a length of 1,800 m), the installation of 80 pipeline diffusers, concrete chambers, anchor blocks and other ancillary equipment. Nicholas O'Dwyer provided construction supervision including performance monitoring, progress reporting, claims management, general financial control, final account certification and detailed works inspection before successful acceptance.

# GALWAY MAIN DRAINAGE

## Galway, Ireland



“NICHOLAS O'DWYER PUT FORWARD PROPOSALS TO SUBSTANTIALLY INCREASE THE CAPACITY OF THE PLANT, FROM 91,000 pe TO 170,000 pe”

Galway City is the third largest city in Ireland. Galway City, and adjacent areas of Galway County, have experienced significant population growth which led to concerns regarding the adequacy of the infrastructural provision. Nicholas O'Dwyer and Entec, in association, were appointed to carry out a detailed examination of the wastewater infrastructure.

The entire drainage network of the City was camera surveyed and all manhole locations and interconnections were established. A Flow and Rainfall Survey was carried out to provide real data for verification of the hydraulic model built by Entec. This model enabled optimisation of the network performance particularly in relation to limiting Combined Storm Overflow (CSO) spills and the consequent pollution.

The treatment plant site at Mutton Island is surrounded by a wave wall, which set tight horizontal and vertical constraints in relation to any possible upgrade. Nicholas O'Dwyer put forward proposals to substantially increase the capacity of the plant, from 91,000 pe to 170,000 pe, based on the output from a process model, by modifying hydraulic bottle necks within the system and modifying the biological processes.

Additionally, the sludge line was modified to include proposals for a compact sludge drier on site to substantially reduce the volumes of sludge leaving the island.

The Environmental Impact Statement (EIS) for the upgrade of Mutton Island WwTW was a large scale task involving water quality, odour and noise modelling; visual and landscape assessments and various ecological and sociological surveys. All of these combined into the EIS ensuring the ongoing protection of Galway Bay.





### NAVAN SEWERAGE SCHEME Meath, Ireland

Navan Sewerage Augmentation Scheme was initiated to provide the required wastewater collection, treatment and disposal facilities conforming to the town Development Plan for a population equivalent of 60,000 to the year 2021.

The first phase of the scheme has been Implemented for a population equivalent of 40,000. The facility provides stringent standards of effluent quality to ensure no degradation of the River Boyne water quality. Nicholas O'Dwyer provided the full range of consultancy services for this project from feasibility to technical assistance during the operational phase.

The sludge generated from Navan, as well as those from other areas of the County, is treated at the NavanWorks, having a sludge handling capacity of 80,000 population equivalent. The plant recycles waste gases from the sludge treatment process to produce heat and power to offset the power demands of the plant. Considerable emphasis was given to the visual impact of the proposed development and renovation of the existing facilities and pumping stations. These facilities are screened from the surrounding countryside by extensive landscaping and all buildings are designed to blend with existing buildings in the vicinity.

“THE FIRST PHASE OF  
THE SCHEME HAS NOW  
BEEN IMPLEMENTED  
FOR A POPULATION  
EQUIVALENT OF 40,000”

# MORTARSTOWN W<sub>w</sub>TW UPGRADE Carlow, Ireland

Mortarstown Wastewater Treatment Plant (WwTP) serves the Carlow conurbation with the treated effluent being discharged to the River Barrow. It was originally commissioned in 1986 and is of conventional extended aeration design.



Due to the population growth in the town of Carlow and the necessity for improved discharge standards, it was required to upgrade the existing plant. The new plant is designed to cater for a population equivalent of 36,000 with an effluent standard of BOD 15 mg/l, Suspended Solids 25 mg/l, Total Phosphorus 1 mg/l, Ammonia 5 mg/l and Nitrate 10 mg/l. The aeration tanks were modified by the construction of internal nonstructural baffle walls to create discrete anaerobic, anoxic and aerobic zones. The aerobic zone is designed to achieve nitrification, while the anoxic zone is designed to achieve denitrification. The anaerobic zone, in conjunction with the aerobic zone, is designed to achieve enhanced biological Phosphorus removal. A new fine bubble diffused air (FBDA) aeration system was installed in the aeration tanks, which provides higher energy efficiency than the previous surface aerators.

At maximum hydraulic throughput, the system caters for a design organic loading capacity of 36000 pe, corresponding to 2.55 Dry Weather Flow. The throughput of the WwTP was limited to this peak hydraulic capacity with higher flows being diverted to the storm tank. Other upgrade works were carried out, including provision of fine screening with ancillary equipment for screenings washing, compaction and loading into disposal containers, provision of grit washing equipment, upgrading of the activated sludge recycle pumps including the provision of variable speed drives. Chemical dosing facilities were also provided to supplement biological removal of Phosphorus.

The new plant is operating successfully with the biological Phosphorus removal achieving a limit of 2 mg/l, and lower sludge volumes than a purely Chemical removal system.

“THE NEW PLANT IS  
DESIGNED TO CATER FOR A  
POPULATION EQUIVALENT  
OF 36,000 pe”



## CASESTUDY 5

# CAVAN WASTEWATER TREATMENT PLANT Cavan, Ireland



The Cavan Sewerage Improvement Scheme provides for the immediate and long term improvement and expansion of the existing scheme of collection, treatment and disposal of wastewater generated from the town and its surrounds. The collection network is a system comprising foul and storm sewers. Surcharging and flooding occur in several areas under normal rainfall conditions each year. The scheme involves the upgrade and expansion of the Wastewater Treatment Works on a phased basis (to 54,000 pe); the upgrade and remediation of the existing drainage network and pumping stations; improvements to the existing foul and storm water system, including repair and rehabilitation to pipelines and provision of increased pumping and storage capacity at pumping stations.



OVERALL PROJECT  
VALUE €30,700,000



# LETTERKENNY SEWERAGE SCHEME

## Donegal, Ireland



“UPGRADING AND EXPANSION OF THE DRAINAGE NETWORK AND THE PROVISION OF A NEW WASTEWATER TREATMENT PLANT, SLUDGE HUB CENTRE AND ASSOCIATED WORKS”

Letterkenny Sewerage Scheme comprises the upgrading and expansion of the drainage network and the provision of a new wastewater treatment plant, sludge hub centre and associated works. The network included for the provision of 8km of new and upgraded pipeline within the town. The scheme also included the design by Nicholas O’Dwyer of 22 km of pipelines with diameters ranging from 225mm to 375mm. Construction of 6 km of the network, consisting of up to 1,200mm diameter trunk sewer was completed in 2007, supervised by Nicholas O’Dwyer.

The work carried out by Nicholas O’Dwyer included preparation of documentation and reports as required including Preliminary Contracts (including flow & rainfall, topographical, site investigation and flow and load contracts), DBO Contract Documents, Water Services Pricing Policy Report, PPP Assessment Report, and preparation of an Environmental Impact Statement for the wastewater treatment plant and sludge hub centre.

Services provided by Nicholas O’Dwyer for the sewer network contract included for preparation of a Preliminary Report, network surveys (including CCTV, SUS, flow and rainfall), preparation of a Network Model and procurement of the network contract under a traditional contract. The procurement of the network contract included detailed design and preparation of tender documents, Tender Assessment and Report on Tenders and Supervision of Construction. Nicholas O’Dwyer were PSDS for this element of the scheme.

Nicholas O’Dwyer is currently responsible for the procurement of the DBO scheme including Prequalification, Tender Assessment and Recommendation. The DBO scheme includes a 40,000 PE wastewater treatment plant on the site of the existing WWTP, outfall to Lough Swilly, outlying storm tanks and pumping station, Sludge Hub Centre including imported sludge acceptance. Nicholas O’Dwyer are PSDS for the DBO scheme until the DBO Contractor is appointed.



# ENNISCRONE SEWERAGE SCHEME

## Sligo, Ireland



This project is for the provision of a modern sewerage scheme for Enniscrone in County Sligo. The scheme is a coastal WwTP which serves a seasonal population equivalent load, varying from 1,000 pe in winter to 4,500 pe in summer due to tourist influx. The pump stations in the system were also upgraded to modernise the electrics and controls and to provide increased pumping capacity.

The discharge location is close to a Blue Flag beach and also to environmentally designated areas. 3D dispersion modelling was carried out to ensure the water quality of the Blue Flag beach and the designated areas.



THE MAIN WORKS,  
VALUED AT €3,400,000



### SOUTH TIPPERARY WASTEWATER TREATMENT BUNDLE Tipperary, Ireland

Nicholas O'Dwyer were appointed by South Tipperary County Council to act as Client's Representative for the procurement of a new wastewater treatment plant for Carrick-on-Suir.

Under this appointment, a review was carried out which examined the wastewater treatment options for South Tipperary. It was concluded that a grouped operational contract would provide a cost-effective long-term solution for the operation and maintenance of wastewater treatment plants in the County. Twelve WwTP's were selected for inclusion in the scheme. This included seven existing WwTP'S and five new WwTP's which were approved for construction.



The project was implemented under a single Contract with an operation and maintenance period of twenty years. The main purpose of selecting this route as a method of procuring the project was to ensure that a high level of service would be provided to South Tipperary County Council over the twenty year period of operation including proper maintenance and protection of the asset.

The existing WwTP's varied in age and condition. The relatively new plants at Clonmel and Killenaule required only minor works whereas the remaining existing plants required substantial refurbishment and/or additional works. The scheme is now complete and all twelve plants are operational and meeting the performance criteria.

“A COST-EFFECTIVE LONG-TERM  
SOLUTION FOR THE OPERATION AND  
MAINTENANCE OF WASTEWATER  
TREATMENT PLANTS”

## SLUDGE MANAGEMENT PLANS Ireland



Nicholas O'Dwyer has produced Sludge Management Plans for 10 Local Authorities, in partnership with Entec. The plans were developed for the following councils; Carlow, Cavan, Fingal, Kildare, Kilkenny, Leitrim, Longford, Meath, Waterford and Waterford City.

The plans analysed the existing sludge quantities produced in the counties and projected these forward for 20 years. Based on these quantities and logistics a Hub, Satellite and Transportation Plan was derived to ensure a cost-effective transportation model was proposed.

A sludge treatment and beneficial re-use analysis was also carried out. Treatment options investigated included alkaline stabilisation, composting, digestion, microwave and thermal drying. The European Union recognises that the re-use of treated sludge (biosolid), in agriculture, is the best Practicable Environmental Option due to the nutrient content of the biosolid. Therefore, a nutrient balance and metals content analysis was carried out for each Local Authority to examine the potential for spreading biosolids on agricultural lands in the county. In some counties there was potential to reduce the dependency on fertiliser use by using biosolids. However, it was noted that metal concentrations, intensive farming practices and water table / sub-surface conditions prohibited the practice in others. The treatment and re-use options proposed all comply with the Code of Good Practice for the use of Biosolids in Agriculture and Statutory Instruments 148 of 1998 and 267 of 2001.

The final step in the development of the plan was to cost the suitable treatment options so that a preliminary budget range could be derived. As the plans are strategic a range of possible solutions are identified thus promoting flexibility in the potential contracts that could be let to implement the plan.

All Sludge Management Plans are now complete and have been adopted by their respective councils as a subset of their Waste Management Plans.

## DOCKLANDS RISING MAINS Dublin, Ireland

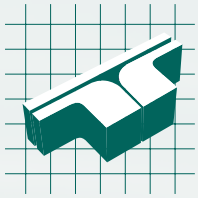


Dublin City Council procured Nicholas O'Dwyer, to act as specialists in relation to the design and provision of 3.5km of twin 500mm dia. rising mains, along with supervision of the design and construction of a 250,000 pe pumping station. The work was carried out in highly urbanised areas with high traffic, population and service densities. Nicholas O'Dwyer provided all services from route selection to design to construction supervision.

Part of the project entailed a review of the existing network model of the area to optimise the performance of the system to allow for future development in the area in a phased manner and the elimination of flooding.



“NICHOLAS O'DWYER  
PROVIDED ALL  
SERVICES FROM ROUTE  
SELECTION TO DESIGN  
TO CONSTRUCTION  
SUPERVISION”



# Nicholas O'Dwyer

CONSULTING ENGINEERS

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## WASTEWATER SECTOR

### SAMPLE CLIENT LIST

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Department for Regional Development, Northern Ireland

Department of the Environment, Community & Local Government, Ireland

Environmental Protection Agency, Ireland

European Union

Irish Aid

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

VALUE SOLUTIONS  
FOR YOUR NEEDS





# Nicholas O'Dwyer

CONSULTING ENGINEERS

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## WASTEWATER SECTOR CAPABILITY STATEMENT

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