

# Eire's Economic 'miracle' Brings Prosperity but creates major water supply problem for capital city Dublin

by  
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**W**hilst Ireland and Dublin's economic miracle has brought increased prosperity to the capital city, it is placing pressure on water supplies. Demand is rising despite the significant achievements of the Dublin Regional Water Conservation Project to reduce levels of leakage. This is due to rapid growth in population, combined with unprecedented commercial and industrial development.



Dublin: Islandbridge Weir

courtesy: Hyder Consulting

Over the last five years alone, more than 40,000 new homes have been built in the water distribution area covered by Dublin City Council. In the same period, about 5,500 new manufacturing jobs have been created. Some forecasts also predict that housing stock in the region will rise from 450,000 to 800,000 in the next ten years.

Dublin City Council commissioned *McCarthy Consultants* to act as Client Advisor on the development of new short-term water sources.

Major programmes have been advanced to conserve drinking water. First phase rehabilitation schemes have involved installing infrastructure (particularly bulk water meters to measure water consumption at key points within the water distribution system) and via telemetry, convey that information to regional control centres. This data is used to direct repair resources to find and fix leakage before it results in level of service problems for customers. The Dublin region which covers over 40% of the national population has reduced leakage from 42.5% to 28% with this investment. Leakage reduction below this figure will require extensive replacement of old pipes.

In the Dublin region 800km of water mains are over 100 years of age. Pipes of this vintage are beyond repair due to extensive corrosion and leak repairs are ineffective.

The Government has recently allocated E276m for the most ambitious replacement programme for water mains in the history of the State, with over E120m allocated in the Dublin region.

## Development of new resources needed

Strategic development of the water supply network for the city and the Greater Dublin area (including Co.Wicklow and Co.Kildare) for the 20 year period to 2016 was set out in the 1996 Strategy Report. In terms of resources, the study identified that there was insufficient production capacity to meet the current and projected water demands and this could have placed a restriction on future industrial and commercial development.

The 1996 study concluded that there was finite potential for further development of existing water resources and consequently there was a need to consider the development of alternative water sources and to implement immediate water demand management measures.

Dublin City Council has given strong leadership in the field of conservation and has proposed a range of new Bye-laws to ensure conservation of water. The new Bye-laws will come into effect from the 1st January 2004 and will act as a strategic driver for active demand management.

Whilst the City Council has sunk its teeth into the problem with longer term projects, including the expansion of the existing Ballymore Eustace supply and the implementation of a long term strategy for developing a major new supply within the next 10-12 years, possibly from the Shannon and Barrow rivers, it needs solutions to tide the city over in the shorter term.

**Revised findings**

In September 2003, DCC received the draft initial findings of the Dublin Water New Sources Development Study, carried out by *McCarthy Hyder Consultants*. From an initial examination of 12 options, five schemes in particular have been identified as having potential worthy of further investigation and development (in addition to schemes already included in DEHLG Capital Investment Programme).

- \* groundwater development at Ballymore Eustace, adjacent to the main water treatment plant serving the region;
- \* development of the existing waterworks on sections of the Grand Canal;
- \* development of a new water treatment facility at Islandbridge, where an existing water abstraction licence is available;
- \* refurbishment/redevelopment of an existing water treatment plant at Ballyboden so that it can meet its rated design output on a consistent basis;
- \* expansion of treatment capacity at Leixlip.

**The measures proposed in the new sources report involve extending output from existing sources as well as developing new ones.**

The Ballymore Eustace reservoir and treatment plant currently accounts for just over half of the 500 Mld output from the city's water treatment plants. The proposals for development of local groundwater sources involve a number of springs adjacent to the treatment works. The springs have a potential to yield 5-10 Mld. Phased development of the springs as a source will also have the benefit of acting as a low cost pilot scheme for a potentially larger one. The report recommends the installation of membrane barrier treatment combined with the addition of disinfection and fluoridation to achieve the required water quality.

By comparison the **Grand Canal** has not been used as a source of potable public water, although it has long been a source of industrial water, particularly for the brewer Guinness. Despite its long history, very little hydrological data was found for the canal, resulting in the study team developing a water balance model. This showed a reliable (1 in 50 year) winter yield for the canal, given current operating rules, of 8 Mld.

**Process solution**

The likely process solution will involve the conversion of existing filters at the 5th lock, in the Bluebell area of the City, to slow sand filters and the installation of granular activated carbon contactors

with disinfection by sodium hypochlorite. The settlement tanks upstream at the 8th lock, near the M50 would act as a buffer storage against pollution and the short term loss of canal water..

Environmental issues and safeguards will figure strongly in proposals for a new water treatment plant at Islandbridge, which sits upstream of the weir that separates the tidal and non-tidal zones of the Liffey. An abstraction licence of 90 Mld exists for the site and proposals to date have focused on the development of a 20 Mld treatment plant.

Plans for the Ballyboden water treatment works call for an uprating of capacity to enable an additional 7 Mld of winter flows to be handled. Looking longer-term, this would also support optimisation of the combined output from all Dublin City Council sources in the event that a conjunctive use plan is established.

Initial assessments of the potential environmental and planning constraints associated with the potential options were made. These were primarily a desk study involving review of existing material and consultation with relevant statutory and non-statutory bodies. In some cases site visits for preliminary ecological and landscape assessment were also carried out.

**Five new potential sources**

The next step for the five potential new sources of water supply is currently under consideration in consultation with DEHLG. In the meantime, advance works on the stage 3 extension to Ballymore Eustace Treatment Works will increase sustainable output by 22 million litres to 274 Mld in 2004. Completion of the full stage 3 works which will take capacity to 318 Mld will be commissioned in the following years.

But these are just the tip of the iceberg of a whole raft of water and wastewater projects that aim to keep pace with the rate of development.

Along with the mains replacement programme, other initiatives under consideration include reductions in the use of potable water for industry, surveys for which suggest savings of more than 20% amongst larger business users.

**Potential 20% saving**

The study of non-domestic users identified the potential for saving of up to 20% of daily drinking water use by small scale capital investment, with payback periods of between three months and two years. Per capita usage in Ireland is of the order of 160 litres per person per day. With strong investment and emphasis on water conservation practices this could reduce significantly, without reducing in any way the level of service being delivered. The Bye Laws also allow for use of "Grey" or recycled water in certain applications.■

**Note:** Dave Turner was Hyder Consulting's Project Manager for the Dublin New Sources Development Study.

