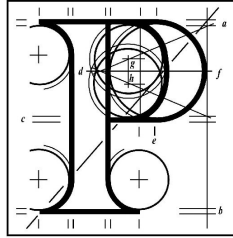


An Bord Pleanála



## **Inspector's Report**

**Offaly County Council**

**Comhairle Chontae Uíbh Fháili**

**Offaly County Council Proposed Edenderry**

**Rhode Groundwater Abstraction Scheme**

**Nominated Inspector: Pdraig Ó Gliasain BE., C.Eng., M.Sc.**

## **CONTENTS**

## **PAGE**

- 1.0 Statutory Requirements**
  
- 2.0 Summary of Environment Impact Statement**
  
- 3.0 Need for the Proposed Development**
  
- 4.0 Alternatives Considered**
  
- 5.0 Description of the Proposed Development**
  
- 6.0 Evaluation of the Environmental Impact Statement  
The Existing Environment, Potential Environmental  
Effects/Impacts and Mitigation Measures**
  
- 7.0 Assessment and Conclusion**
  
- 8.0 Recommendation**
  
- 9.0 Appendices 1 to 15**

## **1.0 STATUTORY REQUIREMENTS**

Offaly County Council, in letter dated 28<sup>th</sup> August 2006 to An Bord Pleanála (the Board), attached (i) three copies of the Environmental Impact Statement (EIS) for the proposed Edenderry Rhode Water Supply Groundwater Abstraction Scheme, (ii) three copies of the Non-Technical Summary, (iii) copy of the Public Notice in the Irish Independent, and (iv) list of Prescribed Bodies who received a copy of the EIS and included in Appendix 1 of my Report.

### **Written Submissions/Observations**

Closing date for Written Submissions/Observations to the Board was not later than 9<sup>th</sup> October 2006.

One Written Submission was received by the Board from the Southern Regional Fisheries Board on 15<sup>th</sup> September 2006 and a copy is included in Appendix 2 of my Report.

The submission referred to the proposed additional abstractions at Daingean and Clonbulloge, which, as stated, are within the river catchments of the Figile and Philipstown rivers, and advised that it was imperative that the proposed abstraction of groundwater does not reduce groundwater contributions to these rivers. It will be clear later for my examination of the proposed development, that the concerns as expressed in the Submission are fully taken care of and where no reduction of groundwater contributions to these rivers will result from the proposed additional abstractions.

### **Consultation Process**

The following bodies were consulted, either formally or informally during the preparation of the EIS.

- Central Statistics Office;
- Department of the Environment, Heritage and Local Government (DEHLG);
- Offaly County Council;
- Heritage and Planning Division of the DEHLG (formally Dúchas);
- Environmental Protection Agency;
- Geological Survey of Ireland;
- Met Eireann; and the
- OPW – Hydrometric Section.

## **Public Information Day**

A Public Information Day was held in Edenderry Town Hall on the 29<sup>th</sup> June 2006. An information booklet was produced which summarised the proposed development and the likely environmental effects. It is stated in the EIS that there were no visits from the public or other interested parties at the Public Information Day.

## **Request for Further Information**

I advised the Board on 18<sup>th</sup> October 2006 to request Offaly County Council to forward to the Board copy of the Preliminary Report as referred to in Section 3.3.2 of the EIS and copy of the Offaly County Council Water Pollution (Agriculture) Bye Laws 2001 as referred to in Section 6.6.3.3 of the EIS. These further documents were subsequently received by the Board.

I inspected the site of the Groundwater Abstractions at Edenderry, Kishawanny, Toberdaly, Daingean and Clonbulloge on 17<sup>th</sup> October 2006.

I have taken full account of the Submission received by the Board from the Southern Regional Fisheries Board in finalising my Report.

It appears that all of the Statutory Requirements have been complied with in this case.

## **2.0 SUMMARY OF THE ENVIRONMENTAL IMPACT STATEMENT**

The EIS, dated July 2006, was prepared by Consulting Engineers, Nicholas O'Dwyer Limited along with Entec Limited, Environmental and Hydrogeological Consultants.

The EIS relates to the Edenderry Rhode Groundwater Abstraction Scheme where the proposed development involves, as stated in the EIS, a combined abstraction of 10,249 m<sup>3</sup>/day from five groundwater sources at Toberdaly, Daingean, Clonbulloge, Kishawanny and Edenderry. The existing sustainable supply from these sources is given as approximately 6,000 m<sup>3</sup>/day and requiring therefore the development of additional supplies of 4,249 m<sup>3</sup>/day.

### **Requirement for the EIS**

An Environmental Impact Assessment (EIA) was required since the proposed development falls within Schedule 5, Part 2, Category 10(i) of the Planning and Development Regulations 2001 "*Groundwater abstraction and artificial groundwater recharge schemes not included in Part 1 of this schedule where the average annual volume abstracted or recharged would exceed 2 million cubic metres*" (5,480 m<sup>3</sup>/day).

The EIS presents the findings of the EIA which is a process which anticipates the effects of the proposed development on the environment and proposes

where necessary, measures to avoid, reduce or remedy any potentially significant adverse impacts that are identified.

### Study Team

The Study Team for producing the EIS was as follows:

<b>Role</b>	<b>Personnel</b>
Project Directors	Jerry Cronin/Stuart Sutton
EIS Co-ordinators	Jim Oliver/Richard Church
<b>Specialist Topics</b>	<b>Consultants</b>
Humans Beings	Jim Oliver/Richard Church
Terrestrial and Aquatic Flora and Fauna	Graham Morgan (Entec)
Geology and Soils	Richard Church (Entec)
Water – Hydrology, Climate, Hydrogeology and Water Quality	Richard Church (Entec)
Air Quality	Stuart Sutton (Entec)
Noise	Gail Hitchins (Entec)
Landscape and Visual	Richard Church (Entec)
Cultural Heritage	Simon Atkinson (Entec)
Material Assets	Richard Church (Entec)

The EIS is presented in two Volumes:

- Volume 1, the Non-Technical Summary.
- Volume 2, the single volume Main Report.

There are two Appendices to the Main Report:

- Appendix A – Ecology Data.
- Appendix B – Water Data.

Volume 2 is divided into sixteen chapters as follows:

- Chapter 1 Introduction
- Chapter 2 Scoping
- Chapter 3 Need for the Proposed Development and Alternatives Considered.
- Chapter 4 Proposed Development
- Chapter 5 Planning Context
- Chapter 6 Human Beings

Chapter 7	Terrestrial and Aquatic Flora and Fauna
Chapter 8	Geology and Soils
Chapter 9	Water – Hydrology, Climate, Hydrogeology and Water Quality
Chapter 10	Air Quality
Chapter 11	Noise
Chapter 12	Landscape and Visual
Chapter 13	Cultural Heritage
Chapter 14	Material Assets
Chapter 15	Interaction of the Foregoing
Chapter 16	Appendices

### **Scoping Report**

An Environmental Scoping Report prepared by the Consulting Team, was sent to Offaly County Council prior to the commencement of the EIS in December 2003. The scoping exercise identified and examined all topics and relevant issues required by the EIA Regulations.

In producing the EIS, the previously prepared Scoping Report was examined in order to determine the issues to be addressed. The following topics were examined as part of the EIA as required under the EIA and Planning Regulations, and thereby providing a means of measuring the scale and significance of any effects that may be identified:

- Human Beings
- Terrestrial and Aquatic Flora and Fauna
- Geology and Soils
- Water – Hydrology, Climate, Hydrogeology and Water Quality
- Air Quality
- Noise
- Landscape and Visual
- Cultural Heritage

- Material Assets
- Interaction of the Foregoing

### 3.0 NEED FOR THE PROPOSED DEVELOPMENT

The Edenderry Rhode Water Supply Scheme (WWS) covers an area of approximately 344 km<sup>2</sup> or 34,400 hectares (15,000 hectares given in the EIS) in north-east Offaly. This represents some 17.2% of the total county area.

The Supply Area is illustrated in Figure 3.1 of the EIS and copy attached in Appendix 3 of my Report.

#### Existing Demand

Section 3.3.1 of the EIS gives the existing average daily demand for the Supply Area (Edenderry Rhode Region) at approximately 5,258 m<sup>3</sup>/day but which can be significantly higher at seasonal peak periods.

The five groundwater sources are listed in Table 3.1 of the EIS.

Table 3.1 also sets out the existing demand at each source and gives the existing reliable output of the sources as set out below:

Source	Existing Demand (m <sup>3</sup> /day)	Existing Reliable Output (m <sup>3</sup> /day)
Toberdaly	3,606	3,600
Daingean	523	450
Clonbulloge	221	250
Kishawanny	428	500
Edenderry	480	1,200
<b>Total</b>	<b>5,258</b>	<b>6,000</b>

While it will be seen that the total existing reliable output is adequate to meet total existing demand, at points of seasonal peaks in demand, it is stated that water shortages have been experienced and which continues to require water rationing in parts of the Supply Area.

To deal with the current shortfall at peak periods, Offaly County Council appointed a dedicated water conservation team in 2004 to carry out detailed analysis of the existing networks, quantify current levels of 'Unaccounted for Water' (UFW) and recommend appropriate levels of monitoring, repairing and rehabilitation works within the Supply Area to reduce UFW.

The Consultants state that the existing level of UFW in the Edenderry/Rhode Water Supply Scheme is estimated at between 50 to 60%. With the implementation of the recommendations of the water conservation project team and the adoption of active leakage control and mains rehabilitation, they are satisfied that these levels can be reduced to approximately 25% by the end

of the design horizon of 2025. This level of UFW has been adopted by the Consultants in the demand projections.

### Future Demand

A detailed assessment of the future demand for the Supply Area to 2025 was carried out as part of the 2004 Preliminary Report and is presented in Sections 5.3 to 5.5 of the final Preliminary Report dated October 2006, a copy of which was recently submitted on request to the Board.

The Supply Area is close to the new M4 Motorway and as stated in the EIS, is expected to experience significant growth in the coming years, particularly the main population centre of Edenderry Town which is expected to grow to at least 15,000 persons by 2025. The future demand for the domestic, agricultural, commercial, industrial and institutional sectors was calculated based on information from the Central Statistics Office (CSO) and Offaly County Council Planning Department through their Development Plans. Further reductions in UFW and leakage were built into the projected demand to a limit of 25% of the total demand.

The future water demand for the combined Supply Area is estimated at 10,249 m<sup>3</sup>/day. This is 4,249 m<sup>3</sup>/day greater than the combined existing abstraction from the existing sources.

A summary breakdown of the future demand projection is given in Table 3.2, 'Future Demand', of the EIS and as set out below:

Demand Category	2025 m <sup>3</sup> /day
Domestic	3,645
Commercial	1,079
Agricultural	1,046
Industrial	462
Operational Use (1%)	62
Customer Side Losses @ 40 l/prop/day	387
<b>Base Demand</b>	<b>6,681</b>
Distribution Losses m <sup>3</sup> /day	1,705
<b>Average Daily Demand</b>	<b>8,386</b>
Average Day Peak Week (20% Base Demand)	1,259
Production/Headroom factor (8% of ADPW Demand)	604
<b>TOTAL DEMAND m<sup>3</sup>/day</b>	<b>10,249</b>
Available from Existing Sources	6,000
<b>Deficit</b>	<b>4,249</b>

Future Demand Forecast is set out in more detail in Table 5.6 of the Preliminary Report 2006 and a copy of Table 5.6 is included in Appendix 4 of my Report.

Table 5.3 of the Preliminary Report gives breakdown of the 2025 target population of 24,000 for the Supply Area and as set out below:



<b>DED</b>	<b>Existing Population 2002</b>	<b>Future Population Targets</b>	<b>Areas Promoted to Encourage Growth</b>	<b>Areas of Organic Growth</b>	<b>Adopted Population 2025</b>
Ballaghassaan	34			38	38
Ballyburley (Rhode)	1,156		2,000		2,000
Ballymacwilliam	468			517	517
Clonbulloge	650		984		984
Clonmoe	344			380	380
Croghan	458			506	506
Edenderry Rural	789			883	883
Edenderry Urban	4,222	15,000			15,000
Esker	350			387	387
Knockdrin	138			153	153
Monasteroris	732			809	809
Daingean	1,169		1,769		1,769
Kilclonfert	301			333	333
Mountbriscoe	198			219	219
<b>Total</b>	<b>11,009</b>	<b>15,000</b>	<b>4,753</b>	<b>4,224</b>	<b>23,977</b>

The 2025 population projects of 15,000, 2,000, 1,769 and 984 for Edenderry, Rhode, Daingean and Clonbulloge respectively, will in my view most likely be exceeded before 2025.

#### **4.0 ALTERNATIVES CONSIDERED**

The alternative sources available to meet the future demand deficit were selected between surface water sources and groundwater sources. The alternatives are considered in Pages 13 to 20 of the EIS and the examination requires to be read in conjunction with the hydrology and hydrogeology description contained in Chapter 9 of the EIS.

The Supply Area is located in the upper outer reaches of the Shannon, Boyne and Barrow catchments as illustrated in Figure 3.2 Catchment Map of the EIS and copy attached in Appendix 5 of my Report. Existing Office of Public Works (OPW) and Environmental Protection Agency (EPA) hydrometric and water quality data was used to assess the suitability of each of these river sources to satisfy the future demand deficit.

Figure 9.1 is similar to Figure 3.2.

##### **River Shannon Catchment**

The closest hydrometric station in the River Shannon catchment, relative to the Supply Area, is on the Tullamore River in Tullamore Town which is

approximately 36 kms. from Edenderry Town (the main demand centre) and 5 kms. from the western boundary of the Supply Area. The estimated Dry Weather Flow (DWF) at this location is 8,640 m<sup>3</sup>/day. The supply deficit of 4,249 m<sup>3</sup>/day equates to 49% of the DWF and this would, as stated by the Consultants, be considered to be well above the normally accepted limit of 33% DWF for a surface water abstraction. In addition, they state that the river here is of poor water quality and would require additional treatment to achieve drinking water standards when compared to a source of higher water quality.

### **River Boyne Catchment**

The Consultants state that the highest flow relative to the Supply Area, is on the Yellow River at Clongall Bridge, immediately upstream of its confluence with the main Boyne Channel. This is located approximately 6 kms. north-west of Edenderry Town on the Offaly/Meath border. The estimated DWF at this location is 4,320 m<sup>3</sup>/day.

The supply deficit of 4,249 m<sup>3</sup>/day would therefore take almost 100% of the available DWF and would, as stated, have significant adverse environmental effects.

### **River Barrow Catchment**

The Philipstown and Figile Rivers are tributaries of the River Barrow and are located within the Supply Area. The hydrometric station with the highest flow relative to the Supply Area is located on the River Figile at Clonbulloge, immediately downstream of the confluence with the Philipstown River, and approximately 10 kms. south of Edenderry Town. The estimated DWF at this location is 14,896 m<sup>3</sup>/day but Edenderry Power Limited have a water abstraction consent from the Southern Regional Fisheries Board to abstract 33% of the DWF or 4,965 m<sup>3</sup>/day from the river which would reduce the available flow to 9,931 m<sup>3</sup>/day.

The supply deficit of 4,249 m<sup>3</sup>/day amounts to 43% of the reliable DWF having allowed for the existing abstraction licence to Edenderry Power Limited. When the supply deficit and existing abstraction licence are compared to the total DWF they amount to 70% of the DWF and well above the normally accepted limit of 33% DWF for a surface water Abstraction. The river, as stated by the Consultants, is unpolluted and would be readily treatable as a drinking water supply.

### **Groundwater Sources**

Groundwater Sources, not just for the Supply Area considered in the EIS, are the predominant sources for public water supply throughout County Offaly.

The Supply Area is at present served from five groundwater sources namely: Toberdaly; Kishawanny; Daingean; Clonbulloge and Edenderry and indicated in Figure 4.1 of the EIS and copy attached in Appendix 6 of my Report. The existing reliable yield from these sources is 6,000 m<sup>3</sup>/day. An assessment of the sustainable yield of the existing sources was carried out by the Consultants

based on local geology, rainfall, hydrogeology and water quality to determine the sustainable abstraction from these sources.

The results are summarised in Table 3.4 of the EIS and set out below:

Source	Existing Reliable Output (m <sup>3</sup> /day)	Sustainable Yield (m <sup>3</sup> /day)
Toberdaly	3,600	4,000
Kishawanny	500	500
Daingean	450	1,440
Clonbulloge	250	550
Edenderry	1,200	3,800
<b>Total</b>	<b>6,000</b>	<b>10,290</b>

It was determined by the Consultants that a sustainable yield of 10,290 m<sup>3</sup>/day is available from the existing sources subject to future minor augmentation development works to meet the future demand of 10,249 m<sup>3</sup>/day.

The proposed augmentation at the Edenderry Wellfield, with increased production of 2,600 m<sup>3</sup>/day, will provide over 60% of the deficit of 4,290 m<sup>3</sup>/day for the Supply Area.

The corresponding percentage for sources at Daingean, Toberdaly and Clonbulloge are 23.1, 9.3 and 7.0 respectively. 4,300 m<sup>3</sup>/day of this sustainable yield is from the Boyne Catchment (Edenderry and Kishawanny sources) and with 5,990 m<sup>3</sup>/day from the Figile/Philipstown catchment (Toberdaly, Daingean and Clongulloge sources).

Toberdaly Wellfield provides 60% of existing reliable output and about 38% of sustainable yield of 10,290 m<sup>3</sup>/day and slightly more than from the Edenderry Wellfield.

The Consultants have evaluated that the combined abstraction from the groundwater sources represents only 2% of the available re-charge in the overall catchment area and as set-out in Table 9.7 of the EIS, 'Abstraction as a Proportion of Catchment Recharge' and included below:

Catchment	Area <sup>1</sup> km <sup>2</sup>	Water Balance <sup>2</sup> ML/yr	Sources	Proposed Additional Abstraction ML/yr (m <sup>3</sup> /day)	% Water Balance
Boyne	432	53,400	Edenderry	949 (2600)	1.8
			Kishawanny	0 (0)	
Figile/Philipstown	268	23,400	Daingean	361.35 (990)	2.6
			Toberdaly	146 (440)	
			Clongulloge	109.5 (300)	
<b>Total</b>	<b>700</b>	<b>76,800</b>		<b>1565.851</b>	<b>2.04</b>

1. Catchment area impacted by the proposed abstraction.
2. Estimated from annual recharge minus current uses

Catchment area impacted by the proposed abstraction (700 km<sup>2</sup>) is over twice that of the Supply Area (344 km<sup>2</sup>). The Catchment Area Map is presented in Figures 3.2 and 9.1 of the EIS and in Figure 6.1 of the Preliminary Report 2006 and copy of the latter is contained in Appendix 7 of my Report.

The Consultants make the important conclusion here as follows:

“Given that approximately 2% of available water, from each catchment is required for the additional proposed abstractions, no significant impacts on surface water flows are anticipated. The existing groundwater abstractions do not have any detectable impact on any of the surface water, wetland or terrestrial ecological features of the area. This no doubt would satisfy any concerns expressed to the Board from the Southern Regional Fisheries Board.

Given the small levels of abstraction with respect to available water, it is not anticipated that the proposed increases in groundwater abstraction would reduce water supplied to these features.”

The first line above requires to be corrected where “from each catchment” should read “from the combined catchments”. Even for the Figile/Philipstown catchment, the 2.6% of available water required for additional proposed abstraction from this catchment must be considered very low and would no doubt, satisfy the concerns expressed in the Southern Regional Fisheries Board Submission to the Board.

### **Comparative Assessment of Alternatives**

The Consultants concluded that in meeting the supply deficit solely from each surface water source assessed would require abstraction in excess of the normally accepted limit of 33% of the Dry Weather Flow and that these abstractions would result in likely adverse impacts on water quality, habitat for fisheries and other aquatic fauna and flora, amenity impacts and hydro-morphology. In addition, they advise that the impacts of climate change could reduce low river flows further, compounding the potential impact of an abstraction from surface waters in this case.

Their assessment of existing groundwater sources had determined that they can be developed further to satisfy the future water demand in a sustainable way and represent the sources least likely to have a significant adverse impact on the environment. In addition, they state that groundwater sources are likely to experience less of an impact as a result of climate change due to a lower change in annual precipitation and recharge.

A full comparative assessment, using the evaluation categories as described in Section 3.5.2 ‘Evaluation Categories’ to compare sources, is presented in Section 3.5.2 and 3.5.3 of the EIS.

The results of the evaluation exercise are shown in Table 3.2 of the EIS and copy included in Appendix 8 of my Report.

## Source Choice

Having assessed the available source options, the groundwater option was identified by the Consultants as the preferred supply option to satisfy the future water requirements of the Supply Area to 2025.

## Implications of Climate Change

It is important to quote here the Consultants comments in Section 9.4.2 'Climate', in relation to relevant adverse implications from future climate change in the context of their recommended source option.

“The most recent projections from Global Stimulation models relevant to Ireland are from the UK’s Climate Impacts Programme Report of April 2002. In general, winter precipitation totals are expected to increase and summer precipitation totals to decrease. For Offaly, the prediction is that for a 10% increase in annual rainfall by 2080 under the medium-high emissions scenario (the one considered most likely). However, this is made up of a 15% increase in winter, spring and autumn and a 20% decrease in summer. The average number of days with intense precipitation is likely to increased by 1.5 days, with the increase likely to occur in winter, spring or autumn. For intense precipitation amounts, the 2-year return period daily precipitation is likely to increase overall by 10%, but this is made up of increased of 10%, 15% and 20% for winter, autumn and spring respectively, and a decrease is predicted for the summer. Similar percentages can be applied to precipitation amounts for longer return periods, but with less confidence, because of the increased uncertainty.

Due to the increase in estimated temperatures and hence, evapotranspiration, climate change predictions suggest a decrease in total recharge. However, the amount of decrease has not been estimated yet for the UK and Ireland. The low percentage of recharge required to account for the total groundwater abstraction predicted for the scheme (~2%) does not indicate that a reduction in total groundwater recharge will have a significant impact on the proposed development.”

Notwithstanding the foregoing, it could transpire in my opinion that when decrease in total recharge is eventually estimated for the UK and Ireland, the longer term reduction in total groundwater within the Supply Catchment (as illustrated in Figure 3.2 of the EIS) could be significant in the much longer term. In any event, however, further augmentation for the Supply Area beyond the 2025 planning horizon may require the additional supply to come from the main River Shannon.

## 5.0 DESCRIPTION OF THE PROPOSED DEVELOPMENT

The proposed development comprises an extension of the existing groundwater abstraction scheme from an existing sustainable yield of 6,000 m<sup>3</sup>/day to 10,250 m<sup>3</sup>/day through the development of existing sources at Toberdaly, Daingean, Kishawanny, Clonbulloge and Edenderry.

The proposed development is summarised in Section 4.4 of the EIS and in the Non-Technical Summary as follows:

- Toberdaly – Increase of the yield from 3,600 to 4,000 m<sup>3</sup>/day through the deepening of Heavey’s well and installation of submersible pump.
- Daingean – Increase of the yield from 450 to 1,400 m<sup>3</sup>/day through the construction of 2 to 3 production wells and the installation of submersible pumps and interconnecting pipework. This will include extension to the existing pumping station and treatment building to house new filtration and chlorination equipment.
- Kishawanny – Remedial works at the existing borehole to sustain its output at 500 m<sup>3</sup>/day.
- Clonbulloge – Increase of the yield from 250 to 550 m<sup>3</sup>/day through the construction of two new production boreholes and the installation of submersible pumps and interconnecting pipework. This will include construction of a small treatment building to house filtration and other treatment facilities.
- Edenderry – Increase of the yield from 1,200 to 3,800 m<sup>3</sup>/day through the construction of 4-6 boreholes and the installation of submersible pumps and interconnecting pipework. This will also include a new treatment building and associated works. (nitrate concentrations close to drinking water limit at present).

The proposed development is illustrated on Figure 4.2 – 4.8 and copies attached in Appendix 9 of my Report.

Figure 9.1a of the Preliminary Report October 2006 (copy included on page 15 over) indicates the proposed source distribution and gives breakdown of 2025 total demand of 10,249 m<sup>3</sup>/day for the sub-areas of the Supply Area as follows:

- Edenderry Supply Area – 6,789 m<sup>3</sup>/day
- Croghan Supply Area – 2,921 m<sup>3</sup>/day
- Clonbulloge Supply Area – 554 m<sup>3</sup>/day  
(slight overstating of 15 m<sup>3</sup>/day)

It will be noted from the data on sources that over 60% of the future production of 4,000 m<sup>3</sup>/day at Toberdaly Wellfield is to be pumped to Edenderry Reservoir for the Edenderry Supply Area with the balance to the Croghan Supply Area. Figure 9.1a which indicates the proposed source distribution in clear presentation, should have been included in the relevant Section of the EIS.

Figure 9.1a also indicates the location of the Supply Area within the County.



A description of the proposed development at each of the sources is given in Sections 4.2.1 to 4.2.5 of the EIS.

The separate proposed developments are described as follows and should be read in conjunction with photographs in the EIS and in the Preliminary Report and with photographs taken at date of my inspection on 17<sup>th</sup> October 2006 and copies included in Appendix 10 of my Report.

### **Toberdaly Wellfield**

The Toberdaly groundwater sources are located approximately 11 kilometres west of Edenderry and 2 kilometres south of Rhode. At Toberdaly, there are 3 spring sources, Pool Well, Heavey's Well and Mount Well together with two boreholes providing a combined sustainable 'year round' yield of approximately 3,600 m<sup>3</sup>/day. The three springs have been developed into shallow dug wells (Pool Well, Mount Well and Heavey's Well) and two boreholes have been drilled into the underlying limestone (Pool Exploratory and Heavey's Boreholes). The Pool and Mount Wells are located within a fenced compound a short distance to the north of the Grand Canal. Heavey's Well is located across a public road and comprises a linear excavated gravel channel covered with pre-cast concrete units. There is a slight gradient throughout the length of the channel with a sump located near the road.

The wells are at an elevation of approximately 80 metres AOD. Locally, the lands slopes upwards to the north-east towards Toberdaly House to an elevation of approximately 100 metres AOD. To the west a topographic high of 234 metres AOD exists at Croghan Hill.

Previous pumping tests combined with more recent groundwater level monitoring and assessment of the recharge, indicate, as stated by the Consultants, that current abstraction is close to the maximum sustainable yield of the area.

They state that the deepening of the sump within the shallow groundwater abstraction of Heavey's Well would lengthen the period from which abstraction from this source could be taken by increasing the area of shallow dewatering of the Quaternary deposits and which would increase the summer sustainable yield from the Toberdaly Wells.

It is proposed that the sump area of Heavey's Well is deepened by 2 metres and that a pump is placed within a sump chamber. It is also proposed that the current concrete protection to the well is replaced to prevent surface water ingress during high rainfall events. The above improvements will, as stated, increase the sustainable output from the Toberdaly source to 4,000 m<sup>3</sup>/day.

### **Daingean Wellfield**

The existing Daingean supply comprises 3 shallow chambers in gravel that feed a central collection chamber. A temporary borehole was drilled near the existing source in the summer of 2003 to augment the infiltration system and



this is used when adequate supplies are not available. The yield from the existing arrangement is approximately 523 m<sup>3</sup>/day.

The source assessment by the Consultants indicates that a sustainable yield of 1,440 m<sup>3</sup>/day is available from this source and it is proposed to drill between two to three boreholes to realise this yield. Pumps will be installed in the new boreholes which will pump the groundwater to the existing treatment building. Some minor improvements to the existing treatment facilities will also be required.

### **Clonbulloge Wellfield**

The existing borehole at Clonbulloge is tapping a groundwater spring located on the bank of the Figile River upstream of the confluence with the Philipstown River. The existing spring is approximately 2 metres from the river edge.

It is proposed to develop up to 2 new production wells to replace the existing arrangement further away from the banks of the River Figile and which should be welcomed by the Southern Regional Fisheries Board. The replacement of the existing treatment facilities will also be required with a new building and the installation of filtration, chlorination and fluoridation equipment.

The above works will, as stated, increase the sustainable yield from 250 m<sup>3</sup>/day to 550 m<sup>3</sup>/day.

### **Kishawanny Borehole**

The borehole at Kishawanny currently provides approximately 428 m<sup>3</sup>/day. The source assessment concluded that the Kishawanny Borehole was close to or slightly above the limit of its sustainable abstraction. Several boreholes have been drilled historically within the area and only one has delivered reliable yields. The estimated sustainable yield at Kishawanny is 500 m<sup>3</sup>/day.

The construction of the current borehole is uncertain and the Consultants recommend the carrying out of a CCTV survey of the existing borehole and to seal the surface area of the well head to prevent surface contamination from entering the borehole and provide a locked pump house over the borehole.

### **Edenderry Wellfield**

Exploratory works were carried out at Edenderry that identified a significant groundwater resource adjacent to the existing Edenderry Reservoir site. Pumping results from the tests wells confirmed that a suitable yield of 3,800 m<sup>3</sup>/day can be achieved through the development of 6 to 8 production wells at this location.

It is stated that emergency supplies were required in 2005 to satisfy water shortages which involved the development of two previously drilled test wells into production wells and the provision of a control building. These works were approved under Part 8 of the Planning and Development Regulations

2001 up to an abstraction of 1,200 m<sup>3</sup>/day and are currently under construction.

It is proposed to extend the new source to the adjacent open land south of the existing park through the development of a further 4-6 production wells. Water will be delivered to a new treatment building for filtration and treatment before being supplied to the existing storage and distribution network.

### **Production Wells**

Production wells consist of 200-350 mm. diameter boreholes drilled into the underlying strata. When the aquifer is gravel based, such as at Daingean, these boreholes will be relatively shallow and approximately 4-10 metres below ground level. When the borehole is drilled into the underlying bedrock, such as at Edenderry, these boreholes can be up to 100 metres deep.

A concrete plinth will be constructed above the borehole and will slope away from it to ensure surface water run-off cannot enter the top of the borehole. A pre-fabricated capping pipe will be attached to the casing/plinth to protect against surface water infiltration.

It is proposed to construct a kiosk on the plinth over the borehole to house local electrical and control gear. The size of these kiosks will vary but will be limited to 3 metres wide by 2 metres deep by 3 metres high and will typically be constructed from Prefabricated Steel or Glass Reinforced Plastic and finished to an approved colour (typically dark green).

Abstraction from the wells will be by submersible pumps located below the low water level and driven by electric motors attached to the pumps. Water from these pumps will be delivered through interconnecting pipework to the existing raw water sumps or receiving reservoirs.

### **Planning Context**

A review of relevant planning policies and guidance documents at varying levels including the European Union (Natural Habitats) Regulations 1997, the National Spatial Strategy 2002 – 2020, and the Offaly County Development Plan 2003-2009 (Volume 1 to Volume 4) was carried out and confirmed that the proposed development is consistent with these policies.

This EIS assesses the likely significant impacts on the environment as a result of the proposed groundwater abstraction scheme. It does not deal with the upgrading of the storage and distribution network to be carried out on a phased basis as recommended in the Preliminary Report 2006 for the Edenderry Rhode Water Supply Scheme. These works will be subject to the requirements of the Planning and Development Act 2000 and the Planning and Development Regulations 2001 under separate procedures and are estimated in the Preliminary Report 2006 to cost €11.7 million (2004 prices) to include cost of the proposed groundwater abstraction works. A schematic presentation of the proposed upgrading of the storage and distribution network is given in

Figure 9.1b of the Preliminary Report and copy contained in Appendix 11 of my Report.

The estimated cost of the proposed groundwater abstraction works is given at €1.6 million (2004 prices).

I quote below some of the relevant Sections of the County Development Plan, Volume 1 to Volume 3.

### **“Section 3 – Objectives**

#### **Water Supply Services**

*In respect to the Edenderry-Rhode, Clonbulloge and Daingean Water Supply Schemes, “Offaly County Council proposes to develop and extend the existing water supply schemes to provide a potable water supply to all households where it is economically viable and that these supplies will be in full compliance with the relevant drinking water regulations. All schemes are to be designed with a 20-year design life.”*

The Council recognises in the development plan that there are a number of difficulties associated with the provision of public water supply and sewerage services in County Offaly.

*“Firstly, providing services across peaty soils is problematical (i.e. peaty soil represents difficulties for all aspects of development – building, roads and services). These areas are widespread throughout the County and sometimes are a constraint to the expansion of “Urban” areas. Also, the flat topography of the County often makes pumping a necessity. There are relatively few large rivers or lakes in the County, this precludes the possibility of river abstraction of water supplies and also presents effluent discharge problems. Because of this, there is a heavy dependence on groundwater sources for public water supplies.”*

### **Development Plan Volume 3 – Town Development Plan for Edenderry (Adopted October 2003)**

The proposed Edenderry groundwater abstraction wellfield is located within Edenderry town boundary. Edenderry Town Plan therefore provides the essential planning policy for planning proposals within its boundary. Policy 1.2 designates Edenderry as a District Centre.

Due to the unprecedented pressure to develop Edenderry, Offaly County Council acknowledged in 2002 that an extensive variation of the Town Development Plan is required. Preliminary recommendations are provided in Volume 3 of the Development Plan, for the re-zoning of the Plan, responding to immediate zoning constraints. Nevertheless, before a full variation of the Plan can be adopted a complete review is required of all issues involved in the strategic planning of the town.

Of significance for this EIS, the preliminary review states that *“the deficiency of the existing infrastructure services at Edenderry is the major constraint compromising the expected population growth of the town”*.

### **Population Changes**

The existing population of Edenderry is approximately 5,000 people. This number is expected to increase due to the town’s proximity to Dublin and its country appeal.

The Population Policy in Section 2.2 aims *“to ensure that adequate facilities are available in Edenderry at the right time and the right location to cater for the anticipated increase in population”*.

### **Section 2 – Development Strategies and Policies**

#### *District Centres (1,500 – 5,000 population)*

Edenderry is a district centre and so is a town that can be enhanced through the provision of improved water services. Rhode (Ballyburley) is not identified as a separate district centre within the County Development Plan.

#### *Village and Rural Areas (<1,000 population)*

Clonbulloge, Daingean and the hinterland surrounding Edenderry form villages and rural areas under the Development Plan. The demand for housing in these areas can be harnessed to develop these emerging centres. This can be achieved by enabling villages to attract residential and other developments through availability of land and services.”

This concludes the quotations from the County Development Plan.

As I have previously stated, overall population projections are set out in the Preliminary Report 2006.

The Supply Area population is expected to increase from 11,000 in 2002 to 24,000 by 2025.

### **Urgency for the Proposed Development**

It is clear from all of the foregoing that there is urgent need to deal with deficiencies in the existing water supply for the Edenderry Rhode area in both augmentation of supply and improvements to the network to meet anticipated population growth.

## **6.0 EVALUATION OF THE EIS. THE EXISTING ENVIRONMENT, POTENTIAL ENVIRONMENTAL EFFECTS/IMPACTS AND MITIGATION MEASURES**

The evaluation of the EIS under the above headings is contained in pages 32 to 124 of Volume 2 – Main Report and in pages 5 to 13 in Volume 1, the Non-Technical Summary.

### **The Existing Environment**

The topics as listed on pages 6 and 7 of my Report were examined as part of the Environmental Assessment as required under the EIA and Planning Regulations. The EIS highlights the current status and relevant features associated with each topic and provides a means of measuring the scale and significance of any effects that may be identified.

Under **Human Beings** it is stated that the primary purpose of the Edenderry Rhode Groundwater Abstraction Scheme is to satisfy the future water requirements for the domestic, industrial, commercial and agricultural sectors. This will inevitably have socio-economic benefits by encouraging and accommodating commercial and industrial expansion in the region.

Edenderry, which is the second largest town in County Offaly, and the surrounding areas of Rhode, Daingean and Clonbulloge have undergone significant growth in recent years within the housing, commercial and industrial sectors. This is due in part to the areas proximity to Dublin and more recently due to the proximity of the Supply Area to the M4 Motorway.

The key industries in the county are:

- Peat harvesting – Bord na Mona (commercial harvesting of milled peat);
- Healthcare – Tyco Healthcare, Boston Scientific, Isotron, Steripak;
- Public Services – Midland Health Board, Local Authorities;
- Building and Construction – Loughnane Concrete, Banagher Concrete, Condron Concrete, M. Galvin and Sons, Flanagan Group; and
- Food Processing – Glanbia.

The provision of water supply is clearly an important factor in facilitating the rate of growth within the town and the wider county. As the current supply is beyond its sustainable limit, the Consultants state that there is a clear need for further development to meet existing and future predicted expansion of the residential and commercial population.

The population for the Supply Area increased from 9,336 to almost 11,000 or by 18% between 1996 and 2002.

The residential, commercial and industrial populations are predicted to increase significantly over the next 20-25 years, and this is the key drive for the proposed augmentation scheme. The future population for the Supply Area is predicted to reach at least 24,000 by 2025. In addition, the existing non-domestic demand is expected to rise from 961 m<sup>3</sup>/day (2005 estimate) to 2,587

m<sup>3</sup>/day (2025 prediction). Without further expansion of the existing water supply scheme, it is stated that the socio-economic development of Edenderry and its surrounding area may be compromised.

As already stated, the Supply Area account for some 17.2% of the full county area. In 2002, the Supply Area also accounted for a similar percentage of the Offaly County population of 63,663.

From my examination of the Central Statistics Office 2006 Preliminary Population Census data, the Supply Area population increased to approximately 12,750 and which accounts for 18% of the 2006 County population of 70,604.

While the County population increased by just over 10%, 2002 to 2006, the Supply Area population increased to 12,767, a 16.7% increase. The population of Edenderry Urban Area increased from 4,216 to 5,403 over 28.2% increase. The population of Rhode increased from 1,148 to 1,290 a 12.4% increase. The population of Daingean increased from 1,168 to 1,461, a 25.1% increase. The population of Clonbulloge increased from 656 to 712, a 9.5% increase.

It will be clear from the foregoing, that the Supply Area population is increasing at a faster rate than the County population and with Edenderry Urban area increasing, in relative terms, much faster than the County Town, Tullamore which increased from 10,270 to 10,907 or a 6.2% increase 2002-2006.

### **Land Acquisition**

With regard to land acquisition for the proposed development, minor land takes only will be required from landowners. Land acquisition is required at Edenderry, Daingean and Clonbulloge. The Local Authority already own the land at Toberdaly and Kishawanny. The additional land is required to locate and develop boreholes and extend or provide treatment facilities. These areas are indicated on Figures 4.2, 4.4 and 4.5 of the EIS and are approximately 1-2 hectares in area for Daingean and Clonbulloge and 2 no. Wellfield sites of 15 metres by 15 metres at Edenderry.

### **Groundwater Source Protection**

Source protection zones have been defined for each source. The existing sources at Daingean, Toberdaly, Clonbulloge and Kishawanny already have source protection plans in place and are protected by the Offaly County Council 'Water Pollution (Agriculture) Bye-Laws (2001)'. These zones were identified in conjunction with studies by the Groundwater Section of the Geological Survey of Ireland (GSI) on groundwater in County Offaly. The GSI have defined a Groundwater Protection Scheme for County Offaly which makes recommendations for restrictions to land use within the Source Protection Zones based on the vulnerability of the groundwater aquifers to contamination. The scheme is detailed fully in the Offaly Groundwater Protection Scheme Report.

The Groundwater Source Protection Zones (SPZs) for each source are presented in Figures 6.1 to 6.4 of the EIS and copies are included in Appendix 12 of my Report. The proposed abstractions at Daingean, Toberdaly and Clonbulloge do not amend the existing SPZs delineated for these sources. The proposed boreholes in the Edenderry SPZ increases the size of the combined Edenderry/Kishawanny SPZ area from 75 hectares to 150 hectares.

The purpose of the SPZs is to guide planning policy within areas that could potentially impact on the groundwater sources. The policy is included within the Water Pollution (Agriculture) Bye-Laws (2001) for Offaly County Council and copy attached in Appendix 13 of my Report. The groundwater protection policy uses 'response matrices' to guide the location of landfill sites, septic tank systems and landspreading. These activities would generally not be acceptable within the inner source protection zones defined for the boreholes.

This protection policy is strengthened through the provisions of S.I. No. 788 of 2005 'European Communities (Good Agricultural Practice for Protection of Waters) Regulations 2005', in force since 1<sup>st</sup> February 2006. These regulations set out certain restrictions on agricultural activity around water sources including groundwater sources to include the following:

- Organic fertiliser or soiled water not to be spread within 200 metres of a groundwater source.
- Storage of manure at a minimum distance of 250 metres from a groundwater source.
- Various restrictions with regard to the required ground conditions prior to spreading fertilisers or soiled water.

As stated by the Consultants, no known storage or spreading of fertiliser occurs within 250 metres and 200 metres respectfully of the proposed borehole locations. Therefore, no additional impacts are anticipated as a result of the implementation of the proposed development.

The SPZ for Daingean was agreed in consultation with the GSI in January 2004 (Ref.: GSI, 2004). The topography of the area indicates that the zone of recharge, and therefore source protection zone, from the current and future groundwater abstraction at the site could extend from Killaderry in the north, southwards towards the borehole. The area is estimated at 68.5 hectares. The proposed additional boreholes at Daingean will derive their water from the same source protection zone and will not alter the defined SPZ.

The SPZ for Clonbulloge was developed in consultation with the GSI in 2004. The zone extends northwards to Ballinlowart along the R401 and covers an area of approximately 90 hectares. The SPZ is defined for the proposed abstraction of 550 m<sup>3</sup>/day and the proposed new boreholes will not, as stated alter the SPZ.

The SPZ for the Toberdaly Springs (Ref. GSI 1996) is defined by flowline and topographic boundaries to the north of the sources and covers an area of 217

hectares. Determination of the area indicates, as stated, that significant groundwater flow to the Toberdaly source comes from areas outside the SPZ and Croghan Hill has previously been postulated as the area for this additional water (GSI, 1996). The proposed hydrogeological works at Toberdaly (deepening of Heavey's Well) will, as stated, not alter this defined SPZ and I am not therefore proposing a Condition to be attached to any approval of the proposed development that may be considered requiring the SPZ to be extended to include the Croghan Hill area.

The SPZ for the Kishawanny source amounts to approximately 150 hectares to the east and north of Edenderry Town. This area was discussed and agreed with the GSI in February 2004 and was published by the GSI in a draft source protection zone report in February 2004.

An area has been proposed by the Consultants to extend the source protection zone for the proposed Edenderry groundwater abstraction wellfield as indicated in Figure 6.4. This is estimated to extend the existing SPZ in place for Kishawanny by approximately 75 hectares and resulting in the largest overall SPZ of 225 hectares in area.

The total area then of the SPZs of 600.5 700 hectares will account for only 1.7% of the Supply Area of 34,400 hectares.

The Consultants conclude that no significant adverse impacts on population and employment/industry are predicted to arise as a result of the proposed development, but rather, **a most significant beneficial impact to facilitate growth and development will accrue as a result of the proposed development.**

They go on to state that "all five sources are existing sources and have existing SPZs identified and implemented with the only zone to be extended by the proposed development being the Edenderry/Kishawanny Zone from 75 hectares to 150 hectares and which is not expected to involve any additional restrictions to those already in place". The latter should of course have read "from 150 hectares to 225 hectares" for "from 75 hectares to 150 hectares".

The impacts from SPZs on human beings is not considered by the Consultants to be significant.

They say that no significant impacts on Human Beings are anticipated as result of localised drawdown of groundwater in the vicinity of the boreholes and they therefore propose no mitigation measures.

They do state however in Section 6.6.3.5, 'Localised Drawdown', that while there are no known wells within the drawdown zones for any of the proposed sources, "if any wells are impacted then the Local Authority could either deepen the existing well or provide a new supply from the distribution network". **The latter should be included as a Condition in any approval that may be considered for the proposed development.**



On the assumption that Offaly County Council is strictly implementing the requirements in its Water Pollution (Agriculture) Bye-Laws 2001 for the existing SPZs and for the expanded overall SPZ area of 600.5 hectares, **I am not recommending a Condition to be attached to any approval that may be considered to ensure for the latter.**

Under **Terrestrial and Aquatic and Flora and Fauna** it is stated that designated sites within the Supply Area consist of the Long Derries SAC and NHA, a dry calcareous grassland; Black Castle Bog NHA, a lowland raised bog; Raheenmore Bog SAC and NHA, a raised bog and the Grand Canal NHA.

The fields at Edenderry, Kishawanny and Clonbulloge are characterised by poor semi-improved neutral grassland or improved neutral grassland interspersed with fragmented hedgerows, scrub/and treelines along the field boundaries. The River Figile at Clonbulloge has a range of aquatic/marginal species which are tolerant to a relatively high degree of nutrient enrichment. The Toberdaly source is located in an area of broad leaved plantation with areas of poor semi-improved grassland nearby.

The Daingean source has the Daingean Bog NHA, a raised bog, to the south-west. The site is surrounded by poor to semi-improve grassland which has signs of periodic inundation.

The potential impacts at construction stage associated with the proposed upgrades/installation of proposed infrastructure are, as stated, land take, noise/vibration disturbance, and at Clonbulloge, pollution of the river from sediment laden run-off.

The effect on terrestrial and aquatic flora and fauna from upgrades/installation of proposed infrastructure is considered by the Consultants not to be significant, and therefore further more detailed surveys were not recommended and for the following reasons:

- Minor localised construction is proposed at Kishawanny Bridge and Toberdaly.
- For all other source locations, the terrestrial habitats impacted by land take associated with construction are considered to be of minimal nature.
- The restricted working area for borehole installation and the habitats within 50 metres of the new installation are considered not to support significant numbers of protected or other conservation notable species.
- Construction will be restricted in duration and undertaken mainly by light machinery.
- The proposed borehole locations and fencing will be restricted to predominantly short grazed pasture. The Consultants state that it is highly unlikely that key habitat for Irish hare, otter, bats and badger, or the species will be disturbed by construction.

They go on to state that the potential impact associated with operation of new and existing boreholes is the slight reduction in near-surface groundwater levels and the potential for reduced baseflow to the rivers. The effect on terrestrial and aquatic flora and fauna from operation of new and existing boreholes is considered therefore not to be significant, and therefore further more detailed surveys were not required and for the following reasons:

- There are no known wetland habitats within 0.5 kilometres that may be critically dependent on/significantly supported by groundwater and that may be potentially affected by the potentially slight drawdown of near surface water levels.
- The habitats potentially impacted within 0.5 kilometres are predominantly terrestrial and considered to be of parish level nature conservation importance.
- Reduction to baseflow of the Boyne and Figile River catchments will be negligible and therefore the aquatic ecology will be unaffected.

It is considered by the Consultants that the potential impact on Raheenmore Bog SAC is insignificant. This is because, as stated, the potential impact on the lowland raised bog of slightly reduced groundwater levels from the new abstractions will be negligible, if at all, due to reasons of distance. The boundary of the SAC is 4,500 metres from the Daingean source and outside the defined SPZ.

It is also considered by the Consultants that the potential impact on The Long Derries SAC is insignificant. This is because the dry calcareous habitat for which the site has been designated is not crucially dependent on, or significantly supported by groundwater. Furthermore the potential impact of lightly reduced groundwater levels from the new abstractions will be negligible, if at all, due to reasons of distance. The boundary of the SAC is 3,000 metres from the Clonbulloge source and outside the defined SPZ.

They go on to state that for the Grand Canal, which is believed to be lined by clay to aid retention of water, many of the spring sources that supplied the canal no longer feed the canal, and so there is a minor link between the canal and groundwater. The canal is therefore considered not to be critically dependent on, or significantly supported by groundwater. The Grand Canal is 300 metres south of the proposed boreholes at Edenderry and 100 metres south of the existing boreholes at Toberdaly and 200 metres north of the boreholes of Daingean. Only the Daingean source has an SPZ which overlies the Canal and therefore it is considered that the canal could be in hydraulic connection. It is considered by the Consultants that the wet modified bog area to the south-west of the Toberdaly source is more directly impacted by existing management activities, including drainage, than the potential for light lowering of groundwater levels from the Toberdaly abstraction. The potential impact of slightly reduced groundwater levels on the Grand Canal NHA is therefore considered to be negligible. As the increased abstraction is not

postulated to result in significant drawdown below the canal, **the potential for instability of the Grand Canal is none to negligible.**

The potential impact on the Long Derries NHA, Raheenmore Bog NHA, Black Castle Bog NHA, and Daingean Bog NHA from the proposed development is considered by the Consultants to be negligible, if at all, due to reasons of distance and the effects on the NHAs from the operation of abstraction boreholes, is therefore considered by them not to be significant.

They conclude here that the potential impact on aquatic and terrestrial flora and fauna is not significant and that no specific Mitigation Measures are required. They do recommend however that best practice measures should be followed during borehole upgrade/installation to prevent potential impacts on protected species such as:

- Best practice pollution prevention guidelines should be followed when working near the Figile River.
- Access to the proposed borehole locations at Edenderry should use existing tracks and avoid dense areas of scrub, hedgerows and trees.
- Due to the mobile nature of certain protected species (e.g. badger) it is recommended that a site walkover within 50 metres of proposed borehole installation is undertaken, by a suitably experienced ecologist, prior to installation to check that the status of the site has not changed.
- Should any protected species be discovered during work then all work must cease and National Parks and Wildlife Service (NPWS) contacted for advice on how to proceed.

Under **Geology and Soils** it is stated that the area is immediately underlain by limestone rocks of the Lower Carboniferous age and intrusive igneous rocks probably also from the Carboniferous. Dolomitisation of much of the limestone has occurred. The Allenwood limestone is adjacent to the Calp Limestone in the Edenderry area.

Subsoils overly the majority of the solid geology in the area, but with some outcrops of the volcanic bedrock at the higher elevations. There are some patches of peat in the lower lying boggy area, and a few of the river valleys contain patches of alluvium. The area has extensive till, till with gravels and some gravel eskers.

The Consultants conclude here that the limited land take for the drilling of production boreholes and location of treatment buildings will have no impact on the geology and soils of the Edenderry Rhode area and the predicted impacts are therefore considered not significant.

Within the proposed Edenderry boreholes, the bulk of the groundwater flow to the boreholes will be through fracturing and fissuring in the limestone bedrock. The drawdown within the overlying sands and gravels as a result of the abstraction will, as stated, be negligible and therefore no drying out of the

subsoil is expected. Within the proposed Daingean and Clonbulloge boreholes, and in Edenderry where boreholes are completed within the sands and gravels, the abstraction as a percentage of recharge is considered to be negligible and therefore drying of the soils and subsoils is not expected.

Some localised disturbance to subsoils will occur during the construction stage but these will be local disturbances and temporary in nature. No significant environmental impacts on the soils and geology of the site are predicted as a result of the proposed development and therefore no mitigation measures as such are recommended by the Consultants but any disturbances caused during the construction stages should, as stated, be mitigated by best construction practice.

Under **Water-Hydrology, Climate, Hydrogeology and Water Quality** which is considered in some detail in key Chapter 9 (pages 72 to 89 of the EIS), it is stated that the region is close to the watershed of the Shannon, Boyne and Liffey catchments. Specifically, the area of interest is contained within the Upper Boyne and Figile catchments as noted from the surface drainage map presented in Figures 3.2 and 9.1 of the EIS and in Figure 6.1 of the Preliminary Report and as already referred to.

Discharge data is available for a number of relevant locations from Offaly County Council and the Environmental Protection Agency. There is a good rating relationship available for the high flows.

The flows were assessed for two gauging locations at Clonbulloge and Boyne Aqueduct on the Figile and Boyne catchments respectively. The baseflow was calculated for the stations. This is the volume contributed to river flow by groundwater for the catchment area above the gauging station.

Figure 9.3 indicates the EPA River Quality Monitoring Stations and copy is included in Appendix 14 of my Report.

### **Groundwater Flow**

Groundwater flow within the catchments is dominantly through fissure zones within the bedrock. Minor matrix flow may occur in the defined volcanic units. Away from the known fissure zones groundwater yields are low (<100 m<sup>3</sup>/d). Groundwater is also present within the more permeable of the Quaternary subsoil deposits overlying the bedrock.

Borehole yield data from the GSI Groundwater Database are presented on Figure 9.2. The database does not detail groundwater levels, however, the Offaly County Council boreholes at Toberdaly indicate shallow groundwater levels in Quaternary deposits in the low lying areas with deeper levels within the bedrock in the elevated areas.

The groundwater level at the Edenderry Water Tower borehole is approximately 22 metres below ground level. Groundwater gradients are shallow and dominantly follow the surface topography. Local confining of groundwater occurs where low permeability till is present and drilling in the

low lying areas had indicated locally artesian conditions. Localised perching of recharging groundwater can also be associated with the low permeability till cover.

Logging of water levels at the existing groundwater sources was carried out between February 2004 and September 2004 to enable the impact of the summer low groundwater level conditions to be assessed. The results are summarised in Table 9.2.

Groundwater recharge within the Boyne and Figile catchments upstream of the OPW flow gauging locations was estimated using a spreadsheet developed by Entec and estimations of the inflows and outflows to the catchment.

### **Groundwater Quality**

The proposed groundwater abstractions are located within a regionally important limestone aquifer which has medium to high vulnerability to surface contamination.

There is, as stated, very limited groundwater quality information from the aquifer and the available information is from existing sources within the catchment. However, the existing boreholes all have groundwater quality generally within the drinking water regulations (S.I. 439, 2000) as summarised in Table 9.6 of the EIS and copy attached in Appendix 15 of my Report.

Nitrate concentrations in the Daingean borehole are high (42.5 mg/l) and close to the drinking water limit of 50 mg/l. However, all other boreholes have very low concentrations of nitrate and the water could be considered for blending with Daingean.

The EIS goes on to state that water analysed during the initial pumping test at Edenderry had a manganese concentration which exceeded the drinking water limit of 50 ug/l. Experience at other locations, and evidence in this catchment, indicate that manganese concentrations can reduce with ongoing abstraction from the source. Manganese removal could be considered, if required. Total coliforms are present at Heavey's well but the proposed works here are intended to reduce the potential for these and chlorination is to be provided as for the other sources.

The hydrogeology studies and conclusions are at the core of this EIS and I quote Section 9.4.3 here as follows:

“Given that only 2% of available recharge is required for the proposed abstractions no significant impacts on groundwater flows are anticipated. Some localised lowering of groundwater levels will occur at new boreholes; however, the impact will be greatest at the borehole and will reduce considerably away from the borehole. Hydrogeological analytical solutions have been used to predict the drawdown away from the borehole based on the abstraction rate and the estimated hydraulic properties of the aquifers”.

Full details and the results from the solutions are presented in Appendix B of the EIS and summarised as follows:

### **Toberdaly**

At Toberdaly the lowering of Heavey's well may lower the groundwater level within the well by up to 1 metre. Predictions, based on distance drawdown curves indicate that these will reduce to less than 1 centimetre within 100 metres from the borehole.

This drawdown is not considered significant and will not impact on the other sources at Toberdaly.

### **Kishawanny**

No additional boreholes or changes in abstraction are proposed at Kishawanny, therefore no impacts are anticipated at this source.

### **Daingean**

The proposed 2 - 3 boreholes at Daingean will be similar to the existing source and will have similar drawdown curves associated with them. These curves predict a drawdown of 1-1.5 metres at the borehole reducing to less than 0.5 metres a distance of 100 metres away and less than 0.1 metres 200 metres away. The seasonal variation in the groundwater level in this area is estimated to vary by up to 1 metre and so any noticeable impact at Daingean will be within 50-100 metres of the proposed boreholes.

The proposed boreholes at Daingean are located approximately 200 metres from the existing Grand Canal. A potential impact of lowering the water table under the canal embankments would be to cause some settlement leading to cracking in the embankment and potential failure. However, as outlined previously, no noticeable lowering of groundwater will occur at the Canal Embankments and no impacts are anticipated.

### **Clonbulloge**

At Clonbulloge it is proposed to replace the existing borehole close to river bank with two new boreholes of similar size to the existing borehole with similar outputs. Therefore, the predicted impact from the proposed boreholes will be similar to that and no additional impacts are anticipated.

### **Edenderry**

The proposed boreholes at Edenderry will extract water from the bedrock aquifer underlying the site. They will therefore have no impact on the local water table as they will draw water from bedrock fissures and potential impacts on the Canal as described earlier are not anticipated to occur. The proposed boreholes will deliver similar yields to the existing borehole at the reservoir site and will result in similar drawdown curves local to each borehole. These curves predict a drawdown of up to 22 metres at the borehole.

reducing to 2 metre a distance of 100 metres away and further reducing to 0.1 metres a distance of 200 metres away. Therefore there will be no noticeable difference in groundwater levels a distance of 200 metres from the proposed boreholes.

In summary here, from assessment of the likely significant impacts of the proposed development on the existing hydrogeology, the Consultants state that since only 2% of available recharge is required for the proposed abstractions, (but based on overall supply catchment) no adverse significant impacts on groundwater flows are anticipated – and as further stated, there are no known existing boreholes or other groundwater sources within the zone of influence of the existing or proposed boreholes, no significant adverse impacts on the local hydrogeology are anticipated.

### **Impacts on Water Quality**

With regard to any adverse impacts of the proposed development on surface water quality (and a concern also of the Southern Regional Fisheries Board), the EIS states that the potential sources for water contamination are construction activities associated with the drilling of each borehole or associated building works and any potential discharges from the water treatment facilities.

Borehole locations at Edenderry, Toberdaly and Daingean are at a distance of over 200m from the nearest surface water (canals, rivers and their tributaries). At Clonbulloge, the proposed borehole will be approximately 100m from the Figle River. The existing borehole is less than 5m from the river edge.

Some discharges may arise from the backwashing of filters during the operation of the scheme but these, as stated by the Consultants, will be discharged to the existing sewerage collection system at Edenderry and Clonbulloge. They go on to state that no discharges presently occur at Toberdaly or Kishawanny and none are proposed. At Daingean some filter backwash water may, as stated, be discharged to the local land drain systems but this discharge will be of high water quality given the quality of the groundwater source and it is anticipated will be a considerable level below those discharge levels set in the EU Waste Water Treatment Directive and associated Irish Regulations.

They conclude therefore that no significant adverse impacts on surface water quality are anticipated by the proposed development.

They advise however that pollution of groundwater could have an adverse effect on the water quality in any nearby boreholes and springs and where borehole construction and foundation excavations could penetrate local water tables and provide a pathway for pollutants to enter the aquifer, they recommend use of pollution prevent guidelines during construction which will minimise this risk and therefore no significant impacts in the latter respect are predicted from the proposed development.

### **Mitigation Measures**

Mitigation Measures are set out in Sections 9.5.1 to 9.5.4 under Hydrology, Climate, Hydrogeology and Water Quality respectively and I quote as follows:

### **“Hydrology**

Given that only 2% of available recharge (for the combined supply catchment) is required for the proposed abstractions no significant impacts on surface water flows are anticipated therefore no mitigation measures are proposed. It is recommended that monitoring of flows at existing flow gauging stations is maintained.

### **Climate**

The proposed development will not have an adverse impact on existing climate. The potential impact of climate change on the proposed development is not significant given low percentage of recharge required (~2) to account for the total groundwater abstraction. As no significant adverse impacts on climate or as a result of climate change are predicted then no mitigation measures are proposed.

### **Hydrogeology**

Some localised impact on groundwater levels will occur at existing and proposed boreholes. However, the impact is considered local and insignificant. Groundwater level monitoring is already in place at Toberdaly and is proposed for the existing sources at Edenderry and Daingean. Groundwater level monitoring should be extended to all borehole sources to ensure that impacts experienced are within anticipated limits.

There are no anticipated impacts on local water levels under the canal embankments at Daingean or Edenderry. However, it is recommended that monitoring boreholes be located close to the canal embankments to ensure that no impacts arise and that water level monitoring is conducted in these to confirm the distance drawdown predictions.

No significant impact on groundwater flows are anticipated given that the total combined abstractions (both existing and proposed) are but 2% of the available recharge within the overall catchment and no mitigation measures are proposed.

### **Water Quality**

Due to the location of the boreholes from the nearest surface water courses the risk of water quality impacts by borehole construction are not anticipated. Best practices will be implemented during the construction of the boreholes and ancillary works to ensure that runoff from the borehole drilling or building works does not enter any nearby watercourses or drains.

An excavations that may impact on groundwater quality will be lined with an impermeable layer to ensure that potential pathways for pollutants to enter the aquifer are not available.



Water quality monitoring will be implemented at each borehole location to ensure that the quality of groundwater is acceptable. All groundwater will undergo the necessary treatment processes to ensure that it complies with the Drinking Water Regulations (S.I. 438 of 2000).”

**In the consideration of any approval of the proposed development, Conditions should be attached to include for groundwater level monitoring and groundwater quality monitoring.**

Surface water monitoring for the overall catchment will continue by the EPA at the monitoring stations as indicated in Figure 9.3 of the EIS.

The Consultants conclude here by stating that it is not anticipated that the proposed development will have a significant adverse impact on hydrology, climate, hydrogeology or water quality. Some minor impacts may arise, as stated, and mitigation measures have been identified and summarised in Table 9.8 and set out below:

<b>Impact</b>	<b>Type</b>	<b>Mitigation Proposed</b>
Reduced surface water flows.	Negligible.	Monitor flows
Lowering of groundwater levels and flows.	Negative, local, insignificant.	Ongoing monitoring of groundwater levels.
Impact on surface water quality during construction.	Negative, local, temporary, insignificant.	Implement best construction practice.
Impact on groundwater quality during construction.	Negative, local, temporary, insignificant.	Implement best construction practice.
Impact on groundwater quality during operation.	None.	Ongoing monitoring of groundwater quality at each borehole.

### **Summary of Hydrological Impacts and Mitigation Measures**

Under **Air Quality** and **Noise**, considering the small scale and nature of the proposed development, the Consultants did not conduct defined surveys and analysis for these particular parameters and no significant adverse impacts under these parameters are predicted.

Under **Landscape and Visual** as presented in Chapter 12 of the EIS, this Section examines the potential impacts on the landscape and visual receptors resulting from the proposed development. Due to the small envisaged impact a full landscape and visual assessment has not been conducted by the Consultants but an overview is presented in Chapter 12 for completeness. The

EIA guidance allows for an appropriate level of assessment and in this case a full assessment was, as stated, not justified.

The final borehole installations at all locations are principally below ground surface with kiosks sized to contain the pump housing and electricity supply above the borehole. The proposed groundwater abstractions at the sites will not, as stated by the Consultants, have a significant impact on the landscape or on the visual character of the area.

The most significant development is proposed at Edenderry which will involve the development of 4-6 additional boreholes. The final borehole installations will principally be below ground surface with a kiosk sized to contain the pump housing and electricity supply above the borehole. The size of these kiosks will vary but will be limited to 3 metres wide by 2 metres deep by 3 metres high and will, as stated, typically be constructed from Prefabricated Steel or Glass Reinforced Plastic and finished to an approved colour (typically dark green). The boreholes will be connected by underground pipework.

In addition to the borehole development a new treatment building, pumping station and underground potable water storage tank is to be constructed. The proposed treatment building will have a floor plan of 19.5 metres by 13.2 metres and be approximately 9 metres high. The pumping station will have a floor plan of 14.2 metres by 6.3 metres and be approximately 5.4 metres high. The potable water storage tank is required to balance water treatment production and allow contact time prior to delivery to supply.

The external finishes to buildings are proposed to be in masonry textured blockwork or plastered blockwork to an approved colour and the roof is to be constructed with insulated metal deck roof cladding to an approved colour.

The Consultants state that the proposed groundwater abstraction at Edenderry will have no impact on the landscape or on the visual character of the area. The associated structures at the boreholes and treatment works will, as they state, have limited impact on the landscape and visual character of the area. The proposed development site is an existing grassland surrounded on two sides by two-storey residential development. To the north of the proposed site is the existing reservoir and water tower compound. The development line of the proposed structures will not exceed the development horizon. Furthermore sympathetic finishes in terms of colour and texture are to be selected to mitigate any impacts as a result of the kiosks or buildings. The Consultants also propose that a detailed landscape plan be developed for the entire site to screen the proposed development and further mitigate potential visual impacts.

**In any approval of the proposed development that may be considered, Conditions should be attached to include for the latter mitigation measures.**

Under **Cultural Heritage**, the Consultants state that the proposed development works do not affect known archaeological sites or areas but note that there are recorded features within 500 metres of the Daingean and Edenderry sites.

Tables 13.1 to 13.4 list Cultural Heritage Features within 2 kilometres of the 5 sources and Figures 13.6 to 13.9 give locations of Cultural Heritage Features. Figures 13.1 to 13.5 are photographs in the EIS of the sources, Toberdaly, Daingean, Kishawanny, Clonbulloge and Edenderry respectfully and copies are included in Appendix 10 to my Report as previously stated.

With regard to impacts here, it is stated in the EIS for each site as follows:

### **Toberdaly**

Minor upgrade works in the form of deepening an existing well and extending the existing treatment building. There are no recorded features at the site and any construction works will occur in the existing County Council compound which has undergone significant disturbance when the existing facilities were constructed.

### **Daingean**

Minor works will include several new production boreholes and a monitoring borehole in fields immediately west of the existing source compound, followed by erection of fencing around the boreholes. An upgrade to the existing source borehole is also proposed in addition to an extension of the existing treatment building. A Holy Well is recorded in this area at N 4674027770 and marked on Ordnance Survey maps as Toberronan Well. Drilling of a borehole at the well could disturb it, and this will need to be avoided.

### **Kishawanny**

The proposed works here are limited to remedial works to an existing borehole and upgrading works to the existing pump house. Therefore no impacts are anticipated.

### **Clonbulloge**

Minor works would be undertaken at the Clonbulloge source to include the drilling of two new boreholes adjacent to the existing source, and erecting a fence around each installation. In addition the existing treatment building will be replaced with a new structure. There are no recorded features at the site, through drilling of the borehole, interconnecting pipework and construction of a new building could result in some slight disturbance to any unrecorded features in the site.

### **Edenderry**

These works include several new production boreholes in an extensive area of fields to the south of the existing source. Fencing will also be required around the new boreholes. In addition a new treatment site comprising a treatment building, pumping station and underground potable water tank are required.

There are no recorded features at the site, though drilling of borehole and the other construction activities could result in some disturbance to any unrecorded features.

With regard to mitigation measures, it is stated that while the proposed development works will not affect known archaeological sites or areas, there are recorded features within 500 metres of the Daingean and Edenderry sites.

A Holy Well, known as Toberronan Well is recorded at Daingean, in the vicinity of proposed new boreholes. In order to avoid disturbance to the site, it is proposed that no boreholes will be located within 50 metres of the well **and this should be included as a Condition in any approval that may be considered.**

A mine, tower house and Blundells Castle are located within 200 metres of the proposed development area in Edenderry and there may be potential for the proposed works to disturb unknown features of archaeological interest at these locations.

There are no known features of archaeological interest within 1 kilometre of the proposed development site at Clonbulloge.

As no new infrastructure will be required at Kishawanny Bridge or Toberdaly, no mitigation measures will, as stated, be required at these sites with respect to archaeology.

The Consultants recommend that monitoring of topsoil stripping be carried out at the Daingean, Edenderry and Clonbulloge sites during the construction phase to ensure that any unknown features of archaeological significance are fully preserved **and this should be included as a Condition in any approval that may be considered.**

Under **Material Assets**, only very minor negative impacts will result from the proposed development and were **the single most significant positive impact will be that resulting from the augmented water supply to be available to the Supply Area.**

The mitigation measures for Material Assets are given as below:

- Best practise in relation to traffic management for construction traffic to be written into the engineering specification.
- Ongoing monitoring of the condition of the minor roads to each site during the construction period and reinstatement works where required.

Under **Interaction of the Foregoing**, it is stated that the extent of overlap between the foregoing EIS topics is set out in Table 15.1, “Matrix of Interaction between EIS Topics”. In summary here, the Consultants state that no significant cumulative impacts have been identified and therefore no additional Mitigation Measures were proposed.

Separate from the individual Conditions already recommended to be attached to any approval that may be considered for the proposed development, a **Condition should also be included to ensure, in addition, for the full implementation by the Contractor and the Local Authority of the Mitigation Measures listed in Tables 6.1, 7.1, 8.2, 9.8, 10.1, 11.1, 12.1 and 13.6 of the EIS and in Pages 12 and 13 of Volume 1, the Non-Technical Summary.**

## **7.0 ASSESSMENT AND CONCLUSION**

### **ASSESSMENT**

It would appear that all of the statutory requirements have been fulfilled.

Having (i) read the File and the various reports attached, (ii) from my observations during my site inspection on 17<sup>th</sup> October 2006 of the sites of the Groundwater Abstractions at Edenderry, Kishawanny, Toberdaly, Daingean and Clonbulloge and the immediate environs, I am satisfied from my full assessment that the case has been clearly made by Offaly County Council for the need and urgency for the proposed development for the purposes as stated.

The Environmental Impact Statement together with the further information received on request by the Board, provides a comprehensive and balanced analysis of the positive and negative impacts of the proposed development and adequate for my overall assessment, conclusion and recommendation in this case.

I am satisfied that the proposed development is in conformity with the Offaly County Development Plan 2003-2009.

I am in agreement with the Consultants choice from the alternatives considered, namely the groundwater sources as described.

The Code of Mitigation Measures recommended in the Environmental Impact Statement appears to be adequate for the purposes as stated.

I have taken full account in my overall assessment of the proposed development of the Submission received by An Bord Pleanála from the Southern Regional Fisheries Board. I am satisfied that the matters raised in the Submission have been fully taken account of by the Consultants in the design of the proposed development as previously described in my Report.

### **CONCLUSION**

Based on my full assessment, I am satisfied that the proposed development would not have significant adverse effects on the environment and would be consistent with the proper planning and sustainable development of the area subject to the Conditions as contained in the Schedule to Section 8 of my Report.

**I conclude therefore that the proposed development should be approved subject to the said Conditions.**

## **8.0 RECOMMENDATION**

I recommend that the proposed Edenderry Rhode Groundwater Abstraction Scheme be approved for the following Reasons and Considerations and subject to the Conditions as set out in the Schedule included.

### **REASONS AND CONSIDERATIONS**

Having considered:-

- (a) Offaly County Council Development Plan 2003-2009,
- (b) Edenderry/Rhode Water Supply Scheme Preliminary Report, October 2006,
- (c) Environmental Impact Statement, Volume 2, July 2006,

it is considered that, subject to the Conditions set out in the attached Schedule, the proposed development

- would not have adverse effect in reducing groundwater contributions to the rivers in the Figle and Boyne catchments and would not have adverse effects on the water quality of these rivers,
- would not have a significant effect on the archaeological heritage of the area,
- would not seriously injure the visual amenities of the area,
- would not interfere to any significant extent with existing land uses in the vicinity,
- would be acceptable in terms of traffic safety and convenience,
- would not be likely to result in significant adverse effects on the environment,
- would be in accordance with the proper planning and sustainable development of the area.

### **SCHEDULE**

<b>Condition No.</b>	<b>Description</b>
1.	Groundwater level monitoring shall be conducted by the Local Authority at all borehole and well sources.  <b>Reason:</b> To ensure that impacts experienced are within anticipated limits.

2.	<p>Water quality monitoring shall be conducted by the Local Authority at all borehole and well sources.</p> <p><b>Reason:</b> To ensure that the quality of groundwater is to acceptable standard.</p>
3.	<p>A detailed landscaping plan shall be prepared by the Local Authority for the entire Edenderry Wellfield.</p> <p><b>Reason:</b> To ensure adequate screening of the proposed development in the interest of the amenities of the area.</p>
4.	<p>Sympathetic finishes in terms of colour and texture shall be chosen by the Local Authority for buildings and kiosks at Edenderry and Daingean.</p> <p><b>Reason:</b> In the interest of the amenities of the area.</p>
5.	<p>Offaly County Council shall employ a suitably qualified archaeologist to supervise the stripping of any topsoil related to the proposed development.</p> <p><b>Reason:</b> To ensure the protection of any items of archaeological interest which may be impacted upon.</p>
6.	<p>Where any private wells within the drawdown zones are adversely impacted, the Local Authority shall either deepen the existing well or provide a new supply from the distribution network.</p> <p><b>Reason:</b> To ensure the availability of necessary supply at the private wells or the provision of an adequate alternative supply.</p>
7.	<p>No boreholes shall be located within 50 metres of the Holy Well, Toberronan Well, at the Daingean Site.</p> <p><b>Reason:</b> To avoid any disturbance to the site of the Holy Well.</p>
8.	<p>Close liaison shall take place between the Local Authority and the Contractor to ensure full implementation of all the Mitigation Measures listed in Tables 6.1, 7.1, 8.2, 9.8, 10.1, 11.1, 12.1 and 13.6 of the Environmental Impact Statement and to include Conditions 1 to 7 as listed above.</p> <p><b>Reason:</b> To ensure the protection of the groundwater and surface water sources and to protect the amenities of the area.</p>

---

**Padraig Ó Gliasain**  
**8<sup>th</sup> November, 2006.**