



GB6236

GB10116

19 Greenmount House,  
Harold's Cross Road,  
Dublin 6W

Telephone: 01-416 9486

Facsimile: 01-416 9487

E-mail: [mgill@ireland.komex.com](mailto:mgill@ireland.komex.com)

Direct line: 01-708 9311

Date: 21<sup>st</sup> March 2003

Our File: 50780/01

**Attention: Mr Michael Hoey**

Spencer Bidge,  
Rathangan,  
Co. Kildare

Dear Michael,

**Re: Confidential Review of the Water Strategy for County Kildare and Associated Reports**

---

## 1.0 INTRODUCTION

Komex were commissioned by Michael Hoey, Spencer Bridge, Rathangan, County Kildare (045-524019) to complete a brief technical and strategic review of reports relating to the development and implementation of the Water Strategy for County Kildare (the Strategy). Our review has been completed based on an agreed scope of works, as outlined in Section 2. Our review is also based solely on information provided by the client, relevant national legislation and European Community Directives. These are outlined in Section 3.

## 2.0 SCOPE OF REVIEW

The scope and methodology for the review was outlined in our proposal of 8<sup>th</sup> November 2002. This letter report addresses the scope of works as follows:

1. Complete a brief technical and strategic review of the documents listed in Section 3.0;
2. Provide an overall assessment of the strategy and how it has been implemented;
3. Discuss the technical aspects of the implementation with regard to hydrology and hydrogeology; and,
4. Provide a letter report outlining our main findings and conclusions.

## 3.0 REPORTS REVIEWED & RELEVANT LEGISLATION

In order to establish the context of the review and its potential limitations, we have outlined the reports and partial reports, which were provided. These are detailed as follows:

1. Kildare County Council – Water Strategy for County Kildare, Volume 1 – Report, Nicholas O'Dwyer Consulting Engineers, PJ Tobins & Company and KT Cullen & Co. Ltd, March 1999. *Not including Sections 2-6, Section 11-14 or any Figures or Appendices.*

2. Phase II – Further Investigative Work at Hybla and Hybla South, Monasterevin, County Kildare – Allenwood Aquifer Report, KT Cullen & Co Ltd., March 2001.
3. Phase I – Aquifer Proving Scheme, Allenwood Aquifer (Rathanagn), KT Cullen & Co. Ltd., May 2001.
4. Environmental Report – Groundwater Abstraction from Allenwood Limestone Aquifer at Hybla and Hybla South, Monasterevin, County Kildare, KT Cullen & Co. Ltd., November 2001.
5. Environmental Impact Statement for Groundwater Abstraction from North Kildare Aquifer, Robertstown, County Kildare, KT Cullen & Co. Ltd., November 2001.
6. Environmental Report – Groundwater Abstraction from Allenwood Limestone Aquifer at Rathangan, County Kildare, KT Cullen & Co. Ltd., April 2002.
7. Environmental Report for the Groundwater Abstraction from Calp Aquifer at Johnstown Bridge, County Kildare, KT Cullen & Co. Ltd., April 2002. *Pages 1-3 of the Non-Technical Summary, pages 2-1 to 2-3, pages 3-1 to 3-6 and Pages 4-4 to 4-6 only.*

The following national legislation and European Community directives have been referenced as part of this review:

1. The Water Supplies Act, 1942 (SI No. 1 of 1942)
2. European Communities (Environmental Impact Assessment) (Amendments) Regulations, 2001 (SI No 538 of 2001)
3. Local Government (Planning and Development) Act, 2000 (SI No. 30 of 2000)
4. The Water Framework Directive (2000/60/EC)
5. The Habitats Directive (92/42/EC)
6. Environmental Impact Assessment Directive (85/337/EEC and 97/11/EC)

#### 4.0 AIMS OF THE KILDARE WATER SUPPLY STRATEGY

The aims of the Water Strategy for County Kildare (the Study) are clearly outlined in the Executive Summary (pages i-ix) of the 1999 report. The opening paragraph of the strategy report, shown below, outlines the main objectives of the study.

*“The aim of the study is to develop a long term water strategy that will enable the demands of County Kildare to be met up to the design horizon of 2020. This entails formulating an effective policy to focus the direction of future investments. A controlled systematic approach to the management of water resources is required in order to achieve consistently acceptable standards of service to consumers. It is evident that, given trends in growth in the prevailing economic climate, particularly in the Greater Dublin region, water is set to become an increasingly limited resource and prudent forward planning is imperative to avoid serious shortfalls in supply in the foreseeable future. In addition, the strategy includes for extending the existing public water supply systems throughout County Kildare and into areas where it has not previously been available.”*

It is interesting at this point to note that the main concerns regarding the strategy were in relation to economic growth and investment requirements, rather than achieving a sustainable supply with the least or an acceptable level of environmental impact.

#### 5.0 MAIN FINDINGS & STRATEGIES OUTLINED IN THE STUDY

As of 1999, 80% of County Kildare's water was supplied from Ballymore Eustace Water Treatment Works (operated by Dublin Corporation, now Dublin City Council) and Leixlip Treatment Works (operated by Fingal County Council). The main source for both of these supplies was (and is) the River Liffey.

111

The water demand in County Kildare in 1999 was calculated at 52 MLD. The study reports that the projected demand, based on population growth and industrial/commercial development, is likely to rise to 93.7 MLD by 2020.

In order to reduce the requirements to use the Liffey source, which was a primary requirement for Kildare County Council, a new surface water abstraction was recommended along the River Barrow, new groundwater abstractions were recommended from bedrock and gravel aquifers in the central and northern areas of the county and it was recommended that the potential of abstracting groundwater from the Curragh Gravel Aquifer should be assessed, but it was stated that abstraction from the Curragh Aquifer would require further studies and a detailed EIA/EIS due to the proximity to Pollardstown Fen (priority habitat under the Habitats Directive 92/43/EEC).

In order to meet the water demand up to 2020, the strategy document outlines a series of supply provisions that need to be implemented on a phased basis. Some of these recommendations have been implemented and others are intended to be completed in the coming years. The strategy recommends that provisions should be made for abstractions from each of the proposed sources to meet the projected 2020 demand. Projected supply quantities for 5-year intervals up to 2020 are outlined in Table A. Intermediate quantities are presented and options are discussed in relation to the implementation of the Barrow abstraction.

Table A presents a summary of the evolving strategy for water supply and formed the basis for the strategy recommendations produced in March 1999. However as can be seen from the information provided in Section 9, the implementation of some of the recommendations from the Strategy has altered the quantities significantly from those presented.

**Table A: County Kildare Water Supply and Demand – The Evolving Position**

	1999 (MLD)	2005 (MLD)	2010 (MLD)		2015 (MLD)	2020 (MLD)
			Barrow not on line	Barrow on line		
<b>Projected Water Demand</b>	<b>52</b>	<b>67.5</b>	<b>75.9</b>	<b>75.9</b>	<b>84.9</b>	<b>93.7</b>
Supplied By:						
River Liffey	43.5	50.4	55.4	50	50	50
New Groundwater	Nil	10	12	10	10	10.4
River Barrow	Nil	Nil	Nil	14.3	22.9	31
Athy UDC	2.3	2.0	2.0	Nil	Nil	Nil
Carlow RWSS	0.6	1.3	1.6	1.6	1.6	2.3
Other Existing Sources and Deficit	5.6	3.8	4.9	Nil	Nil	Nil

\*\*Adopted from Table 9.5, page 9/6, of the Water Strategy for County Kildare (1999).

## 6.0 GENERAL COMMENTS ON THE STRATEGY DOCUMENT

The following are general comments about the strategy document. Some of these comments are discussed in detail here and other aspects are referred to later on in this letter report.

### 6.1 Ordnance Datum

In section 1.2 of the Strategy report (KCC, 1999) the following is stated, "All levels referred to in this report and on the accompanying drawings relate to the Poolbeg Ordnance Datum".

However throughout the Strategy report, there is a random and inconsistent switch between Malin Head Datum and Poolbeg Datum. It is presumed that much of the older water supply infrastructure in the county was surveyed relative to Poolbeg Datum. Much of the newly proposed infrastructure up to 2020 has been included with levels relating to Malin Head Ordnance Datum.

Nowhere in the document does it state that levels have been transformed to the same datum in order to complete projected pumping costs associated with static lift requirements.

The vertical elevation at Malin Head is 2.70m above Poolbeg Datum. However this difference in elevation changes slightly across the country.

Malin Head Ordnance Datum has been used since 1970. It is the national ordnance datum and is used on all major infrastructure projects. Failure to use this datum and to transform older data to this datum may constitute a major flaw in the Strategy. With this in mind, the conclusions and recommendations outlined by the development of the Strategy should be re-evaluated.

## 6.2 Strategy Document/Not an EIA/EIS

The Water Strategy for County Kildare is a strategy document, which outlines recommendations for planning the water supply sources and distribution network in the County up to 2020. In terms of surface water abstraction options, Section 7.0 of the Strategy discusses the regional options for surface water abstractions. Surface water sources such as the River Liffey, the River Barrow and the River Shannon are discussed. In terms of potential groundwater abstraction options, Section 8.0 of the Strategy discusses the options for proposed groundwater abstractions. Groundwater sources such as the Calp Limestone, Allenwood Limestone Formation, the Richardstown Formation, the Curragh Gravels, the Naas Gravels and the Blessington Gravels are assessed as potential sources of groundwater supplies, based on desk study data.

For surface water abstractions, the only potential alternative addressed in the strategy report is the River Shannon. While the feasibility, logistics and potential economic constraints of pumping water from the Shannon to County Kildare are discussed, there is no comparison of environmental impacts of such a scheme with the favoured River Liffey or River Barrow abstractions.

A similar conclusion is drawn in relation to the consideration and assessment of viable alternative sources of groundwater supplies. The assessment made in Section 8 of the Strategy concerns known well yields and resource potential of the identified aquifers, rather than focusing on the potential environmental impacts of the different abstractions if they were installed.

While alternative sources of surface water and groundwater may be considered in the Strategy report, no assessment of the potential environmental impact of these alternatives has been discussed. The basis for choosing the proposed groundwater abstraction sites at Monsesterevin, Rathangan, Robertstown and Johnstown Bridge seems to consider available yields and accessibility only.

The strategy document was completed in March 1999. The Strategic Environmental Assessment (SEA) Directive (2001/42/EC) was issued in June of 2001. Member States of the EC are required to transpose the Directive by 21<sup>st</sup> July 2004. The SEA Directive states that, when a planning or development authority are formulating strategies and plans, depending on the nature and scale of the plan, a Strategic Environmental Assessment (SEA) report should be prepared. While there are no current requirements for Member States to work within the guidelines of the Directive and it is not yet clear exactly which policies, plans and programmes will require SEA, the Directive was developed with strategy documents like the Water Strategy for County Kildare in mind, to ensure that the ecological, economic and social impacts of plans are taken into account when selecting a preferred alternative. An SEA must examine the likely significant environmental effects of the plan or programme including reasonable alternatives, as well as other information listed in Annex I of the Directive. The SEA Directive will also require assessment of in-combination effects of related development proposals or different types of proposal affecting sites of European nature conservation importance.

The Strategy report of 1999 is not an SEA, nor was it ever intended to be one. However, environmental reports and environmental impact assessment documents prepared in later phases of development of the strategy refer to it as if it were a SEA. Further details are outlined below in Section 9.

In addition, the draft SEA Directive was under discussion when the Strategy was produced and it would have been considered good practice to ensure that a thorough environmental appraisal of water supply options was carried out.

### 6.3 Water Framework Directive

Discussions regarding the requirement for water management policies in the EC date from as far back as 1988. However, it was not until 18<sup>th</sup> December 1995 that the Council of the European Union adopted a policy for drawing up a new framework Directive, which was to establish the basic principle of sustainable water policy within the EC.

The Water Strategy for County Kildare study commenced in 1997 and was completed in March 1999. The Water Framework Directive (WFD) (2000/60/EC) was issued by the EC on 23<sup>rd</sup> October 2000.

In relation to water management, the WFD is the single most important piece of policy which Member States are required to implement over the next 10 to 15 years.

Article 4 of the WFD states, in relation to surface waters that, "*Member States shall implement the necessary measures to prevent deterioration of the status of all bodies of surface water*", and "*Member States shall protect, enhance and restore all bodies of surface water, subject to the application of subparagraph (iii) for artificial and heavily modified bodies of water, with the aim of achieving good water status at the latest 15 years after the date of entry into force of this Directive*".

Good surface water status is defined in the Directive as "*the status achieved by a surface water body when both its ecological status and its chemical status are at least good*". The definition of "good" for ecological status and chemical status is given in Annex V of the Directive.

Article 4 of the WFD states, in relation to groundwater that, "*Member States shall protect, enhance and restore all bodies of groundwater, ensure a balance between abstraction and recharge of groundwater, with the aim of achieving good groundwater status at the latest 15 years after the date of entry into force of this Directive*".

Good groundwater status is defined in the Directive as "*the status achieved by a groundwater body when both its quantitative status and its chemical status are at least good*". The definition of "good" for ecological status and chemical status is given in Annex V of the Directive.

In relation to the Water Strategy for County Kildare, it is important to note that no reference in any form is made to the Water Framework Directive. While the Directive had not been issued at the time of development of the Strategy, there were a number of Drafts to the Directive that were available prior to 1999. Government bodies and Local Authorities involved in water management should have been aware of its impending adoption as a water management policy within the EC. The Strategy is intended to cover water demands up to 2020 as a design horizon. While the strategy was adopted in 1999 and the WFD was issued in October 2000, it seems amiss that the requirements of a policy Directive as important as the WFD were not taken into account, considering that 19 years of the intended lifetime of the Strategy will be governed by the WFD.

The South Eastern Catchment Management Plan, which includes the River Barrow catchment, commenced in April 2002 and will be managed by Carlow County Council. The lead engineering consultant for the project is E.G. Petit & Company. This study is being completed in order to comply with the WFD. The study will have to assess all major surface water and groundwater abstractions in the Barrow catchment. All of the proposed schemes in the Water Strategy for County Kildare should be included.

#### 6.4 Curragh Aquifer and the Kildare By-Pass

It is clear that the Curragh Gravel Aquifer has major water resource potential. Studies on the Curragh Gravels have been ongoing for many years. However, in recent years some of the most important and expansive datasets have been gathered. These data were obtained as part of the Kildare By-pass EIS, and subsequent groundwater modelling studies, when concern was raised in relation to the potential impact on Pollardstown Fen, by the proposed dewatering activities intended during the proposed road construction and thereafter, by the road drainage system which needs to be installed to maintain lower water levels along a 3.5km cut into the Curragh Gravel Aquifer south of Kildare town.

The references made to the Curragh Gravels in the Strategy document seem to be slightly inconsistent. On one hand, the strategy excludes the Curragh Gravels as a recommended source, stating:

*"The Curragh Aquifer clearly emerges as a groundwater source of great potential. It is not included in the Strategic Planning Proposals at this stage however, because any major water extraction development would require an extensive Environmental Impact Assessment in view of the proximity of the highly sensitive Class I Habitat of the Pollardstown Wetlands".*

While on the other hand, the strategy acknowledges the considerable resource potential of the Curragh Aquifer, and in Section 10.3.5 discusses possible options for potential use of water from the Curragh Aquifer, and/or water from the drainage system of the Kildare By-pass, to augment other groundwater supplies proposed in the Strategy. The final two paragraphs of Section 10.3.5 state the following:

*"Any proposed groundwater abstraction from the Curragh Gravels should take account of Pollardstown Fen and be integrated into the drainage aspects of the Kildare By-pass. A 12 month period should be adequate to satisfactorily address the stated ecological concerns of Dúchas regarding the Fen and to integrate the proposed well field into the road drainage design".*

*"In summary, groundwater supplies in the order of 5 megalitres/d are readily available from the Curragh gravels by pumping from a standard well field either as a stand alone operation or as part of the By-pass drainage design".*

In Section 7.2.6, it is suggested that there will be an increase of groundwater inflow into the Barrow catchment through the drainage system of the Kildare By-pass, and that this may help mitigate against potential low flow occurrences in River Barrow. The calculated potential output of the Kildare By-pass drainage system is estimated in the strategy document, tentatively, in the order of 17MLD ( $\sim 200\text{l/s}$  or  $\sim 0.2\text{ m}^3/\text{s}$ ).

It is understood that the Strategy report was written at a time when detailed plans for the Kildare By-pass were out to tender and the Strategy was written in a way to cover all potential options, but it is not possible to use the drainage water from the Kildare By-pass as a water supply source and to use the same source to augment flows in the River Barrow in times of low flow.

It may be prudent to request clarification from Kildare County Council regarding the current status of plans in relation to use of the drainage discharge from the Kildare By-pass.

## 7.0 DEVELOPMENTS FOLLOWING ON FROM THE 1999 STRATEGY DOCUMENT

Following the issue of the strategy document in 1999, a number of the recommendations have been implemented and aquifer proving investigations have been completed at the four proposed groundwater abstraction sites at Monasterevin, Rathangan, Robertstown and Johnstown Bridge.

A water abstraction order from the River Barrow has been made recently for an abstraction of 40MLD. The proposed abstraction point is located approximately 1km north of Athy.

## 8.0 BRIEF REVIEW OF ADDITIONAL REPORTS

### 8.1 General Comments

In order to avoid repetition, the points outlined below are general comments from Komex's review of the site specific reports for Hybla & Hybla South, Rathangan (Mount prospect), Robertstown and Johnstown Bridge.

The exact report titles are listed as follows:

- Environmental Report – Groundwater Abstraction from Allenwood Limestone Aquifer at Hybla and Hybla South, Monasterevin, County Kildare, KT Cullen & Co. Ltd., November 2001.
- Environmental Impact Statement for Groundwater Abstraction from North Kildare Aquifer, Robertstown, County Kildare, KT Cullen & Co. Ltd., November 2001.
- Environmental Report – Groundwater Abstraction from Allenwood Limestone Aquifer at Rathangan, County Kildare, KT Cullen & Co. Ltd., April 2002.
- Environmental Report for the Groundwater Abstraction from the Calp Aquifer at Johnstown Bridge, County Kildare, KT Cullen & Co. Ltd., April 2002. *Pages 1-3 of the Non-Technical Summary, pages 2-1 to 2-3, pages 3-1 to 3-6 and Pages 4-4 to 4-6 only.*

#### 8.1.1 Requirement for an EIS

In order to assess the requirements for an EIS for each of the above-mentioned schemes, we have first outlined the changing requirements for project specific EISs, based on the relevant legislation since 1999 when the strategy was developed.

Prior to 1989, the requirements to complete an EIS for water abstraction projects were covered under Section 2 (Extractive Industry), of Part II, of the First Schedule of S.I. No. 349 of 1989 (European Communities (Environmental Impact Assessment) Regulations, 1989). An EIS was required if the expected supply would exceed 5,000m<sup>3</sup> per day.

The European Communities (Environmental Impact Assessment) Regulations were amended in April 1999 with the issue of S.I. No. 93 of 1999 (the 1999 Regulations). The regulations have been amended since then, but the requirements for an EIS for a water supply project remain the same as outlined in the 1999 Regulations. An EIS is currently required if the expected supply would exceed 2,000,000m<sup>3</sup> per year, which equates to approximately 5,480m<sup>3</sup> per day.

In Section 1.2 of each of the above listed reports, the requirements for an EIS are outlined and related to each of the individual schemes. Of the four groundwater abstractions sites investigated under the Water Strategy for County Kildare, only the proposed scheme at Robertstown is identified as requiring an EIS based on the 1999 Regulations.

The two proposed groundwater abstraction schemes at Hybla and Hybla South and Mountprospect (Rathangan) exist within one aquifer unit, the Allenwood Limestone Formation. The Hybla and Hybla South abstractions are located in sub-catchments of the River Barrow and the proposed abstraction at Johnstown Bridge is within the North Kildare Aquifer (Calp Limestone), but falls within a separate surface water catchment (the River Boyne).

The proposed groundwater abstraction at Robertstown is also located within the upper sub-catchments of the River Barrow.

The assessment of these groundwater abstraction schemes on a piecemeal basis potentially conflicts with the requirements of the Water Framework Directive and the potential cumulative effects of these schemes on the water (groundwater and surface water) environment has not been assessed adequately.

#### 8.1.2 Alternatives

Each of the four reports listed above refer to the original Strategy document of 1999 for discussions relating to alternatives.

The Strategy document of 1999 does not constitute an appropriate assessment of alternatives. The strategy document of 1999 is not an Environmental Impact Assessment, nor is it an Environmental Impact Statement, nor does it assess the potential environmental impacts of the suggested alternatives on any part of the environment. The discussion on alternatives in the Strategy document mainly deals with economic considerations and physical constraints rather than potential environmental impacts of the suggested alternatives.

On the other hand, if one was to consider the Strategy report as an EIS, then the definition of the project becomes the entire Water Strategy for County Kildare and therefore the subsequent project splitting, i.e. identifying each scheme (the proposed abstraction from the River Barrow, the proposed well fields at Monesterevin, Rathangan, Robertstown and Johnstown Bridge) as a separate project, may need to be reconsidered by the developer.

#### 8.1.3 Description and Interpretation of Site Geology and Hydrogeology

In general, the descriptions of the site geology given in each of the reports listed above are poor and show that the developer has an incomplete understanding of the soil and water environment at each of the four sites.

There has been intrusive investigation and monitoring completed at each of the sites. Section 3.4 of the reports describes the local geology and soil environment for each of the sites. No geological cross section has been provided and in some cases, the final completion details for production wells are not included on the well logs appended to the reports. For example, Logs WW3 and WW4 in Appendix A of the Robertstown EIS, contain no annotated details of well construction or materials used to construct the well.

Simple but important hydrogeological details, such as a map confirming the direction of groundwater flow at each of the sites, are not presented in any of the reports. Also, there is no interpretation of the geological conditions at any of the sites. For example, at the Robertstown site, based on the geological borehole logs contained in Appendix A, it would appear that the gravel aquifer at Robertstown may be confined, or semi-confined, by the overlying peat and boulder clay layers. The recharge area for the gravels is not discussed within the text of the EIS or in the text for the source protection plan presented in Appendix G.

There is a general lack of interpretation and presentation of the existing soil and water environment exists in all the four site reports listed above. This lack of understanding is not considered to be an appropriate platform or baseline for assessing the potential impact of any of the proposed water abstraction schemes. The absence of geological and hydrogeological interpretation and the identification of actual recharge area shows that the developer has a poor understanding of the site, and can therefore not complete an adequate assessment of the potential environmental impacts of any of the schemes, particularly the proposed Robertstown well field.

#### 8.1.4 Pumping Test Data and Analyses

The main impact from a water abstraction scheme is generally the local impact on groundwater and surface water features from continued pumping of the aquifer. Therefore understanding of the local and regional geology and hydrogeology and the presentation of the pre-development pumping test data are essential.

Based on the data contained within the reports listed in Section 3 above, the following table shows a summary of pumping tests completed at Hybla, Mountprospect and Robertstown.

**Table B. Pumping Tests Completed**

Site	Well(s) tested	Type of pumping test	Observation Wells monitored	Dates completed	Reference Report
Hybla & Hybla South	WW6, WW7, WW8 and WW9	28 day combined	DW1, DW2, DW3, DW4	Nov/Dec 2000	Phase II – Aquifer Proving, March 2001 (KTC & Co)
Mountprospect	TW5	72 hour	n/a	2-5 Dec 1998	Water Strategy for County Kildare (1999)
Mountprospect	TW5, WW24, WW25 and WW26	72 hour combined	n/a	9-12 April 2001	Phase I – Aquifer Proving, May 2001 (KTC & Co)
Mountprospect	WW24, WW25, WW26, WW27, WW28, WW29, WW30	28 day combined	Hipwell's Well, O'Loughlin's Well, TW5, MW2, MW3, MW4, MW5, MW6,	Oct/Nov 2001	Phase I – Aquifer Proving, May 2001 (KTC & Co)
Robertstown	BH3	72 hour	n/a	20-23 Nov 1998	Water Strategy for County Kildare (1999)
Robertstown	BH3	72 hour	n/a	Dec 1998	EIS – Robertstown, App B, Nov 2001, (KTC & Co)
Robertstown	WW2	72 hour	BH5	June 2000	EIS - Robertstown, App B Nov 2001, (KTC & Co)
Robertstown	WW3	72 hour	Not clear from Appendix B or text	June 2000	EIS - Robertstown, App B, Nov 2001, (KTC & Co)
Robertstown	WW6	72 hour	n/a	Jan 2001	EIS - Robertstown, App B, Nov 2001, (KTC & Co)
Robertstown	WW7	72 hour	n/a	Jan 2001	EIS - Robertstown, App B, Nov 2001, (KTC & Co)
Robertstown	WW2, WW3	28 day	MW2, MW3	Aug 2000	EIS - Robertstown, App C, Nov 2001, (KTC & Co)
Robertstown	WW1, WW2, WW3, WW4, WW5,	28 day	MW1, MW2, MW3, MW4, MW5, MW6, SG1, SG2, SG3, SG4, SG5, SG6*	No date provided (possibly Oct/Nov 2000)	EIS - Robertstown, App D, Nov 2001, (KTC & Co)

\*Note – SG stands for staff gauge (used to monitor water level in local surface water features)

The main comment on the pumping test data presented for each of these three schemes is that there has been no presentation of how the data has been assessed to derive the cone of influence of the extended pumping tests of each of the well fields. Standard practice for analysis of pumping test data depends on the geological conditions of the aquifer in which the pumping well is installed. For example, analysis of data for an unconfined aquifer under steady-state conditions is usually completed using the Thiem-Dupuit method. The Thiem method is used for analysis of pumping test data from a confined aquifer under steady-state conditions, and the Theis method, or the Jacob method, are commonly used to analyse data from confined aquifers under unsteady-state flow conditions. In cases where a well field is used, such as the 28-day tests completed at Hybla, Mountprospect and Robertstown the combined impact should be assessed using the Cooper-Jacob method. Other data analysis methods for pumping tests are applicable for different aquifer types and flow conditions.

The pumping test data for the completed 72-hour and extended 28-day tests are poorly presented. This makes it difficult for others to understand and interpret. It is difficult to understand which data applies to which tests and whether tests are individual pumping tests or combined/extended pumping tests on a number of wells within one well field.

Examples of these difficulties are outlined below for the Robertstown EIS. These examples have been highlighted because the Robertstown report is an EIS, and therefore, its significance in terms of presenting data and outlining the potential impacts on the environment are important, and have a legal context.

The time-drawdown data and plots for WW6 and WW7, in Appendix B of the Robertstown EIS suggests that the pumping tests completed in January 2001 were combined pumping tests, rather than individual tests as indicated in paragraph 1 of Section 3.5.6.

However, on a plot with the title "*Drawdown vs Time for pumping test on WW6 for Kildare Co Co, Jan 2001*", there is a blip in the data between 300 and 500 minutes. A text box inserted beside the plot states that "*WW2 stopped for 75 mins*". If the tests were individual tests, no pumping should have been occurring at WW2. The same text box is inserted for the next plot, which is the time drawdown plot for the 72-hour pumping test completed in WW7. The summary data in Table 3.5.1., also indicates that the pumping tests completed in WW 6 and WW7 were single 72 hour tests. The inconsistencies and the presentation of the data are misleading and therefore cannot be used to assess the impact of the scheme on the local water environment.

The pumping tests analysis methods discussed above and the data are commonly used to calculate aquifer properties such as storativity and transmissivity. Understanding these properties can be critical when assessing the potential impacts of a water abstraction scheme. The developer shows a lack of understanding of these parameters, and therefore the Robertstown EIS and the other Environmental Reports remain incomplete and are inadequate for assessing the impacts of each of the proposed schemes.

## 8.2 Report Specific Comments

### 8.2.1 Environmental Report - Hybla and Hybla South - Monasterevin

This well field development is for a new abstraction of 2.5MLD (0.7MLD existing, 2.5MLD new, 3.2MLD total) and associated collection and water treatment system. In Section 1.3, the background and need for the development is outlined. It is stated that a supply of 3.2MLD for the west Kildare area will meet future demands up to 2020.

The proposed well field at Monasterevin is located in the River Barrow catchment.

In Section 3.5.1, it is stated that the "*pale grey limestones of the North Kildare Aquifer display karst features and constitute a regionally important aquifer*". If this is the case, then no details of local karst features are outlined in the report, and no assessment has been made regarding potential impacts from agriculture, septic tanks and other sources of pollution. Although some of these issues are addressed in the Source Protection Report appended to the Environmental Report (Appendix F), there is no detailed discussion in the main report.

In Section 3.5.2, details of the pumping tests completed at the site are presented. A combined pumping test on all four production wells indicated that the well field has a capacity of 4MLD, excluding the existing 0.7MLD already being pumped at the site.

In Appendix A, the final installation details of production wells WW6, WW7, WW8 and WW9 are not annotated with enough information to assess the well designs. For example, no details are shown for well construction materials, casing and screen diameter and gravel pack size. It is difficult to assess the overall impact of the scheme if all the well data are not provided.

In Section 4.5, factors which determine the extent of drawdown radiating from a pumping well are outlined. While we agree with these in general, we would also consider that the purpose of completing the baseline investigations and pumping tests at the site would allow the developer to address and define aquifer properties and the predicted extent of the drawdown when the scheme is operational.

In Section 4.5, the cone of influence of the proposed well field is discussed. Based on a recharge value of 200mm/yr, the radius of the cone of influence of the well field is shown as 1.2km. The well survey completed around the proposed well field only covers an area within 500m radius of the site. The baseline survey of local domestic wells was inadequate and does not cover stated potential area (1.2km) that could be impacted if the scheme goes ahead.

#### 8.2.2 Environmental Report - Mount Prospect - Rathangan

This well field development is for a new abstraction of 5MLD from six production wells. In the Executive Summary it is stated that the cone of influence associated with the scheme will extend 5 to 6 km from the site when the well field is operational (after six to seven years pumping).

The proposed well field at Mount Prospect, Rathangan is located in the River Barrow catchment.

In Section 2.0, the description of the project does not include the installation of the pipeline from the well field to the proposed new reservoir at Redhills.

In Section 3.5.1, paragraph 3 states, "*the Allenwood Limestone Formation displays Karst features*". No site data, or drilling data, is used to confirm whether karst features exist in the area or in the bedrock at the site. Therefore the overall assessment of groundwater vulnerability is incomplete.

Section 3.5.2, paragraph 2, line 1 states, "*An extended pumping test was carried out during the period October/November 2001 and involving the pumping of all the wide diameter trial wells simultaneously over a period of 28 days*". Two lines later it is stated that only wells WW24 and WW30 were pumped. This lack of clarity means that the overall impact of the extended pumping test cannot be assessed, although based on the yield of 8.1MLD, it could be assumed that more than two wells were pumped.

Only two domestic wells have been monitored during the pumping tests. If the cone of influence of the well field will extend 5-6 km from the site, then no baseline data exist for other domestic wells within the cone of influence of the well field.

The overall capacity of the existing well field is 8.1 MLD as proven by the extended 28 day pumping test. Figure 2.2(c) shows that there is provision for extending the capacity of the reservoir at Redhills. This may indicate that a future increase of abstraction at the Mountprospect well field is intended depending on future water supply requirements in the area. If there is an intention to extend the scheme in the future the overall impact of the total abstraction should be considered now as part of an EIS and public consultation process.

The cone of influence of the well field extend 5 to 6 km from the site. This is a significant impact on the environment and warrants a complete Environmental Impact Assessment. The current proposal is to abstract 5MLD, which is close to the overall requirements to complete an EIS for the scheme (5.48MLD).

The distance between the Monesterevin well field and the Rathangan well field is approximately 7km. The predicted cone of depression for the two well fields is expected to extend some 1.2 km and up to 6 km respectively from the Monesterevin and the Rathangan well fields. These figures are based on lower recharge data, as outlined in the relevant Environmental Reports. The data presented in the reports suggest that there may be some overlap of impact on these adjacent proposed abstraction schemes. Their cumulative impact on the local water environment has not been mentioned or assessed in either report.

### 8.2.3 Environmental Impact Statement – Roberstown

This well field development (9 No. Production Wells) consists of a new abstraction of 6.5 MLD from the Robertstown Gravel Aquifer.

The proposed well field at Robertstown is situated within the catchment of the Slate River, which is a sub catchment of the River Barrow.

The Grand Canal (pNHA) to the south of the proposed well field has not been considered as a sensitive receptor. There has been no attempt to assess the connectivity of the canal system to the underlying gravel deposits. While it is accepted that the canal is probably perched above the regional groundwater table, evidence from elsewhere in the country suggests that the canals are leaky and in some cases act as controlling levels for groundwater flow and recharge. Figure 4.5.1 shows that the potential cone of drawdown around the proposed well field will extend below the canal for over 3.5 km. Continued abstraction of water from the gravels is likely to cause some change in the geotechnical properties of the soils below the canal. Page 7/25 of the Strategy document discusses the potential use of the canal system as a delivery channel for water from the River Shannon to County Kildare. Paragraph (c) states that failures of the canal embankments have occurred in the past and that the canal system is in need of repair. Differential settlement may occur below the canal as a result of the water table drawdown from the proposed abstraction. This could cause failure of the canal embankment. The developer has failed to address these issues.

In Section 3.4, the description of the “Geology and Soils Environment” is poorly presented. A considerable amount of site data is available, however the description is general and does not include much site-specific information. For example, there is no indication whether the gravel aquifer is confined or unconfined, and this lack of understanding of the site geology means that the potential impacts and the groundwater vulnerability of this scheme cannot be assessed adequately. The recharge area for the Robertstown Gravel aquifer has not been identified in the main EIS report or in the Source Protection Plan (Appendix G of the EIS).

Section 3.5.5 describes the local and regional groundwater flow patterns around the site. These descriptions are general in nature and do not draw on the actual data from the intrusive investigations, water level monitoring and pumping tests completed at the site. No groundwater

contour map for the area around the well field is provided with the EIS. No baseline monitoring has been presented. Water level monitoring data for the exploration wells or for local surface water features has not been tabulated. Data is presented with the pumping tests, but these are during or after pumping tests have been completed and so not represent an undisturbed condition in the aquifer or local water features. Without establishing the baseline condition for these features and installations, there will be no way of determining the potential impact in the future if the scheme goes ahead. This indicates a lack of understanding or an incomplete understanding of the baseline water environment at the site.

The EIS is therefore considered to be inadequate and cannot be used to assess the full potential environmental impact of the scheme.

#### 8.2.4 Environmental Report - Johnstown Bridge

A full copy of this report was not available for review. However, the proposed scheme consists of a new water abstraction of 3.75MLD of groundwater from the Calp Limestone Formation.

### 9.0 REVIEW OF SUPPLY QUANTITIES

Based on the currently available data from the four groundwater abstraction schemes mentioned above, the current new groundwater quantity proposed for the Kildare supply system is 18.45MLD (Monesterevin 2.5MLD new supply and 0.7MLD existing supply, Rathangan 5MLD, Robertstown 6.5MLD and Johnstown Bridge 3.75MLD). This is almost twice the predicted new groundwater supply from the 1999 Strategy report, which was set at 10MLD (refer to Table A).

Also the abstraction order for the River Barrow has been submitted at 40MLD, which is almost 25% above the projected 31MLD suggested in the 1999 Strategy report.

The overall intention of the Water Strategy for County Kildare was to reduce the requirements to abstract water from the River Liffey System. Based on the current data it seems that the 2020 supply will be formed from 18.45MLD from groundwater sources, 40MLD from the River Barrow, 2.3MLD from the Carlow RWSS (from Table A) and the remainder, 32.95MLD, will probably come from the River Liffey.

### 10.0 SUMMARY & CONCLUSIONS

The Water Strategy for County Kildare was issued in March 1999 by Kildare County Council. The strategy recommended a shift of supply from the River Liffey to the River Barrow and new groundwater abstractions within the County. To a certain extent the proposed surface water abstraction from the River Barrow and the proposed groundwater abstraction from the four sites in mid-Kildare will achieve this objective.

However, the Water Strategy for County Kildare has failed to consider the overall potential environmental impacts of project (the Strategy). A number of points, which have been outlined above, are summarised as follows:

- The original strategy was developed based on elevation data from the old Poolbeg datum (pre 1970) and the current Malin Head national datum level. Calculations based on these data may be flawed, as there is a 2.7m discrepancy between these elevations;
- The Strategy report does not discuss potential alternatives in relation to their potential environmental impact. References to this report in the subsequent Robertstown Environmental Impact Statement, and the other Environmental Reports is not considered to be appropriate;

- The Strategy report is not a Strategic Environmental Assessment. References to this report in the subsequent Robertstown Environmental Impact Statement, and the other Environmental Reports is not considered to be appropriate;
- The requirements of the Water Framework Directive have not been assessed or included in any part of the strategy document or subsequent site-specific reports;
- The cumulative impact of all the proposed water abstraction schemes has not been addressed;
- The predicted cone of influence of the Hybla scheme and the Rathangan Scheme overlap. The potential cumulative impact of these schemes has not been addressed in EIS format;
- The proposed use of the Curragh Aquifer as a potential water source, or the suggested use of the drainage water from the Kildare By-pass have not been fully explained or assessed;
- The issue of alternatives to the proposed water abstractions scheme has not been addressed in correct EIS format. Reference to the Strategy report as discussing alternatives is considered inadequate;
- The site-specific reports discussed in Section 8.0 of this letter show that the developer has a limited understanding of the local geological and hydrogeological conditions at each of the proposed groundwater abstraction sites. Pumping test data at these sites is poorly presented and has not been analysed in a standard hydrogeological manner;
- The pale grey limestone of the North Kildare Aquifer is known to karstified in areas. The implications of this karstification have not been considered in terms of potential environmental impact and have only been addressed in a limited fashion in the source protection report for the proposed Hybla scheme;
- The proven capacity of the proposed well field at Rathangan is 8.1MLD. The proposed scheme is only intended to abstract 5MLD. However there are indications within the Environmental Report that an extension of the treatment works at Redhills may be planned. If there is an intention to extend the proposed abstraction scheme in the future, then the overall impact of the total abstraction should be considered now as part of an EIS and public consultation process;
- At the proposed Robertstown scheme, the Grand Canal has not been considered as a sensitive receptor. Potential settlement and failure issues to the dewatering associated with the abstraction scheme have not been addressed; and,
- General baseline conditions at each of the proposed groundwater abstraction sites have not been presented in a manner that shows the developer has a full understanding of the existing environment at the individual sites. Therefore it is considered that a full assessment of the potential impacts of the individual schemes cannot be made, either by the developer or an independent stakeholder.

Yours sincerely,  
KOMEX

Michael Gill  
Environmental Engineer

Jane Dottridge  
Director of Hydrogeology

T:\Komex Ireland\Projects\50780 (Kildare Water Supply Strategy)\Report\01-Final Report 210303mgjd.doc

124