Memo to: Mr. John Mulholland, Director of Services, Infrastructure & Environment.

From: Mr. John Carley, Senior Engineer, Water Services & Environment

Re: Part VIII Planning – Myshall Sewerage Treatment Improvement Scheme

Date: 3rd December 2004

The Part VIII Planning documentation is attached for placing on public display. The treatment plant is proposed on a site approximately 300m North of the existing treatment plant in Myshall. The existing treatment plant is at its design capacity. The new plant will cater for a population equivalent of 800 people.

The plant is designed to treat the sewerage to:
- Biochemical Oxygen Demand (BOD) - 10mg/l
- Suspended Solids (SS) - 10mg/l
- Total Nitrogen (N) - 5mg/l
- Phosphorous (P) - 1mg/l

The plant proposed is the Stahlermatic Biological Treatment Unit, which incorporates fixed film and activated sludge growth mechanisms. The treatment process will treat 3 times day weather flow. Additional flows will be stored in a storm-water holding tank. The accommodation works will include a new roadway to access the site.

I consider the site chosen to be the most environmentally acceptable and economic site for the replacement of the existing treatment plant. I recommend the scheme proceed to planning.

Yours sincerely,

John Carley
Senior Engineer
Water Services
Myshall Sewage Treatment Works Improvement Scheme

Part VIII – Planning

John Mulholland,
Director of Services,
Infrastructure, Water Services & Environment,
Carlow County Council,
County Buildings,
Athy Road,
Carlow.

November 2004
Conclusion

EPA Export 26-07-2013:14:19:14
The existing inlet pipe to the works will discharge to a new inlet works which will consist of fine (6mm) screening and grit removal. Screenings will be compacted and discharged into a sealed bin for disposal. The grit removal system consists of a grit chamber, in which the grit is allowed to settle out of the flow. From this chamber, the settled grit is discharged to a sealed bin for disposal. The effluent will then discharge to an inlet pump sump from where it will be pumped to a proprietary Biological Treatment unit – the Stahlermatic Biological Treatment unit.

The Stahlermatic (STM) Process is an advanced process incorporating a combination of fixed film and activated sludge growth mechanisms in a single unit. Further details of the process are given in Appendix 1 and a brochure for the system is given in Appendix 2.

The effluent from this Stahlermatic unit will discharge to a settlement tank where the sludge will settle from the effluent. Clarified effluent from the settlement tank will then flow into the outfall chamber, which will consist of a wedge wire screening. This screening will remove any remaining suspended solids from the final effluent, thus producing the required final effluent standards.

Settled sludge will be removed to a sludge holding tank where it will be stored for removal off site.

The treatment works will treat flows up to 3 times the design Dry Weather flow of 184 m³/day. Flows in excess of this will pass through the fine screens and grit removal systems before flowing to a stormwater holding tank, which will provide storage for a further 3 times the Dry Weather flow. Any additional flow will then pass from the storm Water Holding tank to the stream. Following the storm event, the contents of the stormwater holding tank will be returned to the main treatment process stream where it will be fully treated.

The effluent from the plant will be treated to the following standards:

- Biochemical Oxygen Demand (B.O.D.) - 10 mg/l
- Suspended Solids (S.S.) - 10 mg/l
- Total Nitrogen - 5 mg/l
- Phosphorus - 1 mg/l

The works will also include necessary accommodation works for the new site including the construction of a new roadway to access the site.

**Impact of the Scheme**

The treatment works site is located a distance of approx. 500m from the Carlow to Garryhill Road. The site is adjoining the local GAA club pitches. An earthen berm is to be constructed around the site to screen the works from view and to lessen the visual impact of the scheme. The berm will be planted to a detailed landscaping plan to further screen the works and blend the site in
with the local environment. The site will also be fenced with a welded mesh panel security fence, which will be coloured green, again to reduce the visual impact of the site.

The major impact of the scheme will be the high quality treated effluent, which will be discharged from the works to a tributary of the Douglas stream. This will result in a lower impact on the water quality on the local watercourses than the current plant.

Archaeological Impact

An Archaeological Desktop Study, including a site inspection, of the scheme was carried out by Tobar Archaeological Services in November 2004. This study found that there are "no recorded monuments located on or in close proximity to the proposes development site and pipeline route" and "no previously unrecorded monuments were detected during field walking of the proposed pipeline routes or development site".

Whilst there is no evidence to suggest that the works will interfere with any known archaeological remains, the archaeologist has recommended as a mitigation strategy that either "a suitably qualified archaeologist should monitor the removal of topsoil" or "archaeological testing of the proposed site should be undertaken". — see Appendix 3 for Archaeological Report.

Drawings & Appendices

The drawings which accompany this report are:

Existing Myshall sewer network
Myshall WWTW Site Location
Myshall WWTW Site layout
Myshall WWTW Site Sections
Fencing Standard Details

Appendix No. 1 Details of Proposed Treatment System
Appendix No. 2 S.T.M. / Stahlematic Aeration System – process brochure.
Appendix No. 1

Details of Proposed Treatment System
Appendix No. 1

DETAILS OF PROPOSED TREATMENT SYSTEM

The Stahlermatic (STM) process is an advanced process incorporating a combination of fixed film and activated sludge growth mechanisms in a single basin. Each of these processes has their own advantages.

Historically, fixed film systems such as Rotating Biological Contactors are single and stable with low maintenance. The activated sludge process is a more flexible process and will produce a higher quality of final effluent. The STM plant combines the advantages of both processes.

The system works like a conventional activated sludge system with activated biological sludge in the mixed liquor and with a return sludge circuit to increase the concentration of the suspended sludge. The efficiency of the typical activated sludge system is enhanced by working with higher concentrations of the suspended sludge than usual and by the additional effect of the total biofilm. The powerful effects of STM system results from this significant increase of the total biomass concentration.

The STM-system can be used in the same way and with the same process combinations as a conventional activated sludge system.

The immersed STM-contact aerators or "contactors" are attached radially around a large centre shaft. The plates and discs in the contactors are formed with a special surface profile. The process uses only a single mechanical drive system. A geared motor above water level rotates a contactor. Through it atmospheric air is dissolved in the mixer liquor to supply activated sludge sufficiently with oxygen. The biofilm on the contact aerators is supplied with oxygen when the contactors emerge above water level. During the downward rotation the air is trapped in the chambers created by the plates and discs of the contactors, and forced into the water. As it is conducted to the bottom of the biotank the air is compressed more and more. In principle the biofilm is supplied with oxygen during the total rotation of the contactor, in the atmosphere and in the mixed liquor. The trapped air is partially used to reduce the power requirements by buoyancy so that the power consumption of the system is relatively low. In effect, the contactor acts as an extremely efficient aerator.

The oxygen supply for the microorganisms is ensured by rotating the contactors slowly. As soon as a segment emerges from the chambers above water level during this rotation, the mixed liquor inside the chambers runs out. The segment will then be filled with atmospheric air. The necessary oxygen for the biological wastewater treatment dissolves on the wet surfaces on the fixed biofilm. Because this very large surface area is directly affected by the partial pressure of the air, an immediate saturation of the oxygen concentration is achieved. By diffusion oxygen penetrates into the biofilm due to the concentration gradient.
While the segments are submerging again into the mixed liquor the air cannot escape and is trapped in the segments. As the contactor rotates, the air is forced and conducted to the bottom of the biotank. In this way the air is compressed more and more. During the downward rotation some of the air can escape and is channelled in the form of middle fine and fine bubbles to the centre of the aerator caused by the shape of the segments. Finally the bubbles reach the water surface through the opposite segments.

This turbulence combined with the rotation of the wheel effects a homogeneous mixing of the biotank. The activated sludge in the mixed liquor is always sufficiently supplied with oxygen.

During the upward rotation of the contact aerator the partially filled segments provide buoyancy and tremendously reduce the propulsive power required for rotation. Only a few moments before emerging again the rest of the air is released in to the water.

The fixed film on the surface areas within the segments are supplied with oxygen up to saturation while open to atmosphere at the start of the cycle. The forced conducted air is contacting all inner surface areas of the plates or discs in the segments during rotation. By this all microorganisms of the fixed film are sufficiently supplied with oxygen during rotation in the mixing liquor too.

**Characteristics of the S.T.M. Process**

- Suitable for populations Equivalent to 50 PE to 5,000. (can go to 25,000 PE)
- Complete Waste Water Treatment System that needs no chemicals.
- Utilises a very small space.
- Totally Automatic. Normally no personnel required on site.
- Combines the process of fixed film contactors and Activated Sludge treatment.
- Low cost, saves over 50% of the power requirement of a conventional plant.
- Low maintenance (components have 20 year plus life)
- Automatic Nitrification and de-Nitrification, Automatic Oxygen level control.
- Simple to Install. Simple and robust construction.
- Replaces the technology of rotating Biological Contactors.
- No odours on any kind.
- Larger Tank operational volume to conventional Rotation Biological Contactors.
- Huge area for the growth of active biofilm.
- Constant mixing without additional equipment.
- Higher than normal concentration of the suspended sludge biomass.
- High process stability.
- Optimal Oxygen transfer Efficiency.
- Silent Operation.
- Better Sludge quality giving better dewatering capability.
➢ Over 500 installations world-wide. Patented and licensed in 66 Countries.

For an equivalent volume of waste water to be treated:-

➢ Compared to a conventional Activated sludge system the Stahlermatic consumes 55% less energy and occupies 48% less volume area.

➢ The system results in Higher B.O.D. and S.S. removal
  More advanced de-nitrification.
  More advanced biological P elimination.
  Simultaneous stabilisation of the sludge.

➢ The system can handle storm flows and dry weather flows equally well, with automatic Dissolved Oxygen sensing to speed or slow down process.

To summarise, this system has significant advantages over comparable processes. It has lower investment costs, lower running costs, and a complete absence of the use of any chemicals.
Appendix No. 2

The Aeration System with Specific Advantages
STÄHLERMATIC®
The combined wastewater treatment process

The technique of the "combined processes" for the biological treatment of wastewater is a combination of the submerged fixed film process and the activated sludge system.

Wastewater treatment according to the STÄHLERMATIC® technique is effected on the one side by suspended activated sludge in the mixed liquor and on the other side by fixed microorganisms in a biofilm on the surface of the contactors. This combines the advantages of activated sludge and fixed film processes in one. The system works like a conventional activated sludge system with activated biological sludge in the mixed liquor with sludge return. The efficiency of the typical activated sludge system is enhanced by working with higher concentrations in the suspended sludge as usual and by the additional effect of the biofilm.

The STÄHLERMATIC® system can be used in the same process combinations as conventional activated sludge systems, but with higher efficiency. Advanced nitrification and denitrification as well as effective biological P-elimination are carried out simultaneously and safely in one tank.

The immersed STÄHLERMATIC®-Aerotor is a wheel with a center shaft. The wheel is of a cage design. The plates and discs in the contact aerators are formed with a special surface profile in order to ensure maximum oxygen transfer. Only one mechanical drive is necessary. An electric gear motor above water level rotates the contact aerator. By this atmospheric air is dissolved in the mixed liquor to supply the activated sludge sufficiently with oxygen. The biofilm on the contact aerators is adequately supplied with oxygen when the contactors emerge above water level. During the downward travel the air is trapped in the chambers, created by the plates and discs of the contactors, and forced into the water. Moving downwards to the bottom of the biotank the air is compressed more and more. The biofilm is supplied with oxygen during the entire rotation of the wheel, in the atmosphere and in the mixed liquor. The trapped air is partially used to reduce the power requirements by buoyancy so that the power consumption of the system is very low.

The STÄHLERMATIC®-Aerotor complies with the requirements of an efficient aerator with lowest power consumption.

Mode of operation

In principle the mode of operation is identical for both kinds of contact aerators, the cell-segment- and the pipe-segment-contact-aerator.

The oxygen supply for all microorganisms is ensured by rotating the STÄHLERMATIC®-Aerators slowly by an electric frequency controlled gear motor above water-level. As soon as a segment emerges above water level during rotation, the mixed liquor inside the chambers flows out. The segment will then be filled with atmospheric air. The necessary oxygen for the biofilm dissolves on the wet surfaces of the fixed bed biofilm. Because this very large surface area is directly affected by the partial pressure of the air, an immediate saturation of the oxygen concentration is achieved.

When the segments are submerge again the air cannot escape and is trapped in the segments. In the course of the rotation the trapped air is forced to the bottom of the biotank and compressed more and more. During the downward travel a part of the air can escape. The bubbles travelling with the rotation of the wheel result in a homogeneous mixing of the biotank. In addition the activated sludge in the mixed liquor is always effectively supplied with oxygen.

During upward travel of the contact aerator the partially airfilled segments provide buoyancy and reduce significantly the power consumption. The fixed film on the surface areas within the segments are supplied with oxygen up to saturation while passing the atmosphere. The forced air contacts all inner surface areas of the plates or discs in the segments during rotation. By this all microorganisms of the fixed film are fully supplied with oxygen during rotation in the mixed liquor.

The forced air contacts the specially profiled surfaces of the plates and discs. Due to these profiles continuously new, innumerable transition zones are formed for the oxygen transfer. This results in the typical oxygen supply for both components, fixed biofilm and suspended activated sludge.

Paper Mill Thailand

Waste water source: process water from paper mill
connected load: 74,000 p.e.
waste water flow: 2,000 m³/d
starting: 1986
influent load: BOD₅ 7.0 kg/d conc. 2500 mg/l
COD 7000 kg/d conc. 3500 mg/l
effluent concentration: BOD₅ ≤ 40 mg/l

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Design features

The characteristic properties of the STM-system are the high degradation efficiency, high quality effluent standards and a high flexibility caused by the combination of the advantages of the biological processes in a true hybrid system.

In local settled plants the facilities can be equipped for permanent use in any size. In cases of temporary use the facilities are placed in container or modular constructed units. Different sizes and design features comply with requirements specified.

The used materials are proved to guarantee a long service life. The solid and simple construction renders possible low maintenance, eminent safety in service and lowest power consumption. The STÄHLERMATIC® contact aerators can be constructed as a cell-segment or as a pipe-segment contact aerator.

The construction of the STM-contact aerators corresponds to the principles of the DIN 19569 - 3 - 1995 - 01 (equipment of waste water facilities).

The cell-segment contact aerator (ZR) consists of several segments, each with two airpockets. The segments are constructed of a series of plates, made of Polypropylene, to provide large growth surfaces for the fixed film biomass, and to create the airpockets for the oxygen supply. Sufficient oxygen transfer is guaranteed for any pollution load.

In principle the pipe-segment contact aerator is identical in function and operation with the cell-segment contact aerator. The growth surfaces for the fixed film and the volume of the airpockets are smaller. This construction comply with the requirements for special applications or for other functions. Parallel to the shaft several cylindric hollow bodies in form of pipes are radially arranged as contact aerators. The pipes are constructed of a series of discs made of Polypropylene.

Usually both kinds of contact aerators are equipped with a scraper. If required the contact aerators can be equipped with up to nine attached pipes. They increase the active surface area and the oxygen input.

Paper mill "Köhler - Kehl am Rhein"

kind of waste water
manufacturing waste waters from a papermill
population equivalents 5,000
starting 1994
effluent quality
3 - 5 mg BOD₅/l
65 - 70 mg COD/l
0,1 mg NH₄-N/l
1 mg N-Nit/l
1 mg P/l

Paper mill "Köhler - Oberkirch"

kind of waste water
manufacturing waste waters from a papermill
population equivalents 12,000
starting 1984
volume load 0,5-0,7 kg BOD₅/(m³·d)
effluent quality
< 5 mg BOD₅/l
< 70 mg COD/l
**Application fields**

The STM-technique is used
- for new waste water treatment facilities
- to equip existing plants to reach an advanced degree of treatment
- for reorganization, modernization and expansion of existing plants.

The contact aerator will be installed in a biotank built of concrete in great waste water treatment plants or in smaller local settled facilities. Smaller facilities or in cases of temporary use of such facilities the STM-system is built in a steel construction completely equipped: container-units, packaged units, modular constructed units.

**Application fields**

- Treatment of domestic waste water in every size of the needed facility,
  - single step or multiple steps waste water treatment plants
- Treatment of domestic waste water influenced by industrial and manufactural waste water
- Treatment of organic loaded waste water from industry, manufacturing, trade a.o.
- STM-biological treatment facilities coupled with
  - conventional activated sludge systems
  - denitrification facilities
  - N-elimination facilities
  - P-elimination facilities
  - sewage lagoons or polishing ponds
  - treatment facilities for fecal sludge
- Aerobic sludge stabilization
  - primary sludge
  - excess sludge
  - fecal sludges
- Biological treatment of leachate from sanitary landfill.
- Treatment of liquid manure partial, basic treatment
- Aquaculture systems:
  - intensive fish farming in closed warm water circuits.

Wastewater treatment plant Siriraj Hospital Mahidol Universität, Bangkok, Thailand

The wastewaters are collected from the hospital and all university building in Siriraj campus and flow to the wastewater treatment plant. The solids will be separated before treatment in following processes. The wastewaters are treated biologically with the STÄHLERMATIC\textsuperscript{®}-system.

The STÄHLERMATIC\textsuperscript{®}-system is equipped with 12 pipe-segments-contact-aerators RR 4,3 x 2,5.

The excess sludge will be stabilized simultaneously. The sludge is biologically and sanitarily clean and is pressed, dried, packed into bags and used as fertilizer.

The table shows figures for the efficiency of the plant. Sanitary investigations of germs in the effluent water, in the sludge and in the air near the biological stage shows that hygienically the plant works unobjectionable.
**Cell-Wheels with cell-segments equipped without any additional pipe**

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<th>RR 4.3</th>
<th>RR 4.8</th>
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</table>

**Examples**
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**Pipe-segments-contact-aerators**

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<td>7.5</td>
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**Cell-Wheels with pipe-segments equipped**

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<th>RR 3.2</th>
<th>RR 4.3</th>
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</table>
The effluent standards are guaranteed independent of temperature (summer / winter)

Recommended datas for dimensioning

The ATV-Guidelines are the basis for all dimensionings, documented in the papers A 122, A 126, A 131, A 135, A 257 and H 254. Other informations are given in the report of the ATV-workshop 2.6.4 "Combined waste water treatment techniques". The following recommended datas are based on practical experience by operating more than 500 STAHLERMATIC®-facilities of long standing worldwide (actual states of the STAHLERMATIC® technique). These recommended datas have to be used in the dimensioning instructions according to the Guidelines mentioned above.

"Combined Waste water Treatment Techniques"

The principle of the datas specified in the guidelines mentioned above can be used for the dimensioning of the Stahlermatic wastewater treatment facilities.

Indications for the method used of dimensioning of the STAHLERMATIC®-system can be found in these guidelines: The influent load is divide in different proportions for the suspended activated sludge and for the fixed film. For both components the degradation efficiency has to be proofed separately in accordance with the guidelines. As a rule this method is used for all waste water treatment plants with a design capacity of not more than 10,000 population equivalents. Other informations are given in the ATV-Guidelines A 131 and H 254.

Biological treatment of leachate from the sanitary landfill Hengelo, Netherlands

The aim of the facility is the advanced degradation of nitrogen through simultaneous nitrification, denitrification and P-elimination in a single treatment which was accomplished in 1995 in a one year pilot project. The Hengelo facility went early 1997 into full scale operation.

Elimination rate (%)

<table>
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<tr>
<th>Parameter</th>
<th>COD</th>
<th>BODs</th>
<th>NH₄-N</th>
<th>N-ki</th>
<th>P total</th>
</tr>
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<tbody>
<tr>
<td>Elimination rate (%)</td>
<td>&gt;60</td>
<td>&gt;95</td>
<td>&gt;96</td>
<td>&gt;90</td>
<td>&gt;85</td>
</tr>
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</table>

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Flexibility of volume adaption and the dimensioning of the oxygen supply

The STM®-system offers various possibilities in the design:
Variation of the oxygen supply by
  • changing the number of revolutions of the contact aerators (adaption to changing operation conditions) by using a infinitely variable gear motor or a frequency regulated motor.
  • assembling additional pipes: increase of the total oxygen transfer and of degradation efficiency
  • Adaption of the volume of the biotank

Volume of the biotank

If the tank has to be completely aerobic, e.g. for advanced nitrification, smaller sizes of the biotank are recommended. The biotank volume is then always sufficiently supplied with oxygen. A high nitrification efficiency is always guaranteed.

Choosing a larger size of the biotank equipped with the same contact aerator (expanding the biotank volume) results in a larger treatment volume. Consequently the anoxic environmental zones are increased, so that simultaneous denitrification takes place. These anoxic zones are mainly beneath the contact aerators. By expanding the biotank volume an always aerobic environment in the centre and right next to the contact aerator is guaranteed.

High nitrification efficiency is achieved independent of the number of revolutions of the contact aerator. The size of the zones with different oxygen environment is not fixed. The extension of the zones will change dependent on the number of revolutions, the oxygen demand and depending on the required degradation rate and the hydraulic loading rate (turbulence) of the tank.

Mainly the denitrification efficiency is influenced. The conditions for a high nitrification efficiency are always kept. Oxygen control in combination with operation control will keep nearly constant oxygen conditions in the different environmental zones. Advanced nitrification and simultaneous denitrification will always work with a high efficiency.

With the possibility to equip the contact aerators with additional pipes or to choose other sizes of the biotank, the STM®-system can comply with all requirements of degradation: advanced biodegradation of the organic carbon components, advanced nitrification and simultaneous denitrification.

Phosphate is extensively eliminated by biological uptake as the STM®-system will work with higher concentrations of the biomass compared to conventional systems. In an expanded biotank the suspended activated sludge changes continuously from one oxygen environment into another one (aerobic - anoxic). By this the P-uptake will be enhanced. Nevertheless the efficiency of the other degradation processes is kept without changing.

Comparision to other activated sludge systems

Example: 10,000 population equivalents
Advanced nitrification/denitrification, with simultaneous biological P-uptake and sludge stabilization.

STÄHLERMATIC®-biostage with simultaneous nitrification/denitrification and with advanced biological P-uptake

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Advantages

Stable Process Performance
High process stability and flexibility, even under high loadings, by combining the activated sludge and fixed film processes. Even the strictest effluent standards can be met consistently.

Solid and Simple Construction
Quality System assured construction, including long life polypropylene media, simple low-maintenance drive train, and nylon lined support bearings for extended life.

Lowest Capital Cost
Tank volume is reduced by 40% over conventional aeration by the STM®-Aerotor’s process efficiency.

Lowest Energy Usage
The STM®-Aerotor, which is 75% submerged, operates at slow speeds driven by a low-powered motor. This provides great savings in energy. Compared with a fine bubble aeration only 45% of the necessary energy is used.

Advanced Biological Nutrient Removal
The STM®-Aerotor can provide consistent simultaneous nitrification / denitrification, as well as biological phosphorus removal, in a single basin.

No Noise or Odor Problems
Simple slow-speed operation reduces operating noise. The STM®-Aerotor process operates with virtually no problem-causing odors.

Improved Sludge Quality
Better sludge settling characteristics (lower sludge volume index), better dewaterability, and smaller volumes of waste sludge.

STM®-Aerotor worldwide more than 800 references

STÄHLER GmbH · Mühlenhof · D-65589 Hadamar
Tel.: +49 64 33 / 93 00-0 · Fax.: +49 64 33 / 59 60
e-mail: staehler-hadamar@t-online.de
www.staehlergruppe.de
Appendix No. 3

Archaeological Report
ARCHAEOLOGICAL IMPACT ASSESSMENT
OF A PROPOSED WASTE WATER TREATMENT PLANT
EXTENSION AT MYSHALL, CO. CARLOW

AUTHORS: MIRIAM CARROLL AND ANNETTE QUINN

DATE: NOVEMBER 2004

CLIENT: CARLOW COUNTY COUNCIL
COUNTY BUILDINGS
ATHY ROAD
CARLOW

TOBAR
archaeological services

CARLOW COUNTY COUNCIL
WATER SERVICES ENVIRONMENT

10 NOV 2004
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8. References

**Figures**

**Plates**
1. INTRODUCTION

This report presents the results of an archaeological impact assessment of a proposed extension to a waste water treatment plant at Myshall, County Carlow. The project involves the construction of a new sewer line and extension to an existing treatment plant. This report amalgamates desk-based research and the results of field walking to identify areas of archaeological significance or potential likely to be impacted by the proposed development. A number of mitigating measures will also be recommended in order to minimise any such impact.

2. METHODOLOGY

A desk-based study of the proposed development was undertaken in order to assess the archaeological potential of the area and to identify the impacts of the proposed development on this landscape.

Cartographic Sources
A primary cartographic source and base-line data for the assessment was the consultation of the Sites and Monuments Record (SMR) and Record of Monuments and Places (RMP) for County Carlow. All known recorded archaeological monuments are indicated on 6 inch Ordnance Survey (OS) maps and are listed in this record. The 1st (1837) and 2nd edition OS maps for the area were also consulted.

Documentary Sources
The published Archaeological Inventory of County Carlow was consulted as were all local journals such as Carloviana.

Field walking
A programme of field walking in the proposed development area was undertaken. The proposed pipeline route and the site of the proposed extension were inspected to assess the likely impact, if any, on the recorded monuments in this area and also to determine if previously unrecorded archaeological monuments existed on or near to...
the location of the proposed site and pipeline. A photographic and descriptive record was made of the proposed development site.

3. DEVELOPMENT PROPOSAL

The proposed development consists of the construction of an extension to an existing waste water treatment plant. The new works will be located c. 250m north-west of the existing plant and will be connected to the latter by a new 300mm sewer line. The proposed pipeline will extend along the west bank of a small stream for a distance of c. 260m. The project will involve ground disturbance in the form of the excavation of a pipe trench and some topsoil removal on the proposed site.

4. RECEIVING ENVIRONMENT

The proposed development area is located in the townland of Myshall to the east of Myshall village (Fig. 1). The village is located in the centre of county Carlow and is nestled in the foothills of the Blackstairs mountains to the east of Bagnelstown. The proposed development site presently consists of a flat greenfield area at the north-west end of a long, narrow field ( Plates 1-2) (Fig. 2). The field is bound by a mature field boundary to the south-west and by a narrow stream to the north-east. The Douglas River bounds the site to the north-west. The topography of the Myshall area consists of undulating terrain to the north and west and is comprised of both pasture and arable land. The terrain to the south and east of the village is more mountainous as it extends into the Blackstairs mountain range.
5. DESCRIPTION OF THE CULTURAL HERITAGE WITHIN THE PROPOSED DEVELOPMENT AREA

Recorded Monuments within Proposed Development Area

No recorded monuments are located on or in close proximity to the proposed development site and pipeline route (Fig. 1). No previously unrecorded monuments were detected during field walking of the proposed pipeline routes or development site.

Recorded Monuments in Vicinity of Proposed Development Area

The nearest recorded monument (RMP CW017-039/01, 02 and 03) is located in Myshall village c. 450m east of the existing sewage treatment plant and c. 700m from the proposed development site (Fig. 1). The monument consists of a church (CW017-039/01), well (CW017-039/02) and bullaun stone (CW017-039/03) and comprises one of several early ecclesiastical sites recorded in the county. The Irish church was dominated by scattered rural monasteries from the 6th century A.D. onwards, however, not all early ecclesiastical sites had monastic communities. The precise dating of such sites is not always possible due to the absence of standing remains - early churches were often constructed of wood - or the replacement of the original church with a medieval or post-medieval structure. In County Carlow the standing remains of such sites generally consist of churches, round towers, fonts, bullaun stones and wells, although only one or two of these features may survive (Brindley and Kilfeather 1993, 53).

RMP CW017-039/01-03 - Ecclesiastical Remains

The early ecclesiastical site at Myshall consists of the partial remains of a pre-Norman church (CW017-039/01), a two-basin bullaun stone (CW017-039/02) and a well (CW017-039/03). The original church is represented by its west gable, an adjacent portion of the north wall and a portion of the south wall (ibid., 58). These original walls are constructed using large, finely dressed granite stones and an entrance in the west gable has a round arch and simple mouldings along the jamb edges (ibid.).
The nearby bullaun stone consist of a granite boulder with two hollows or basins. Bullaun stones are usually found in association with early ecclesiastical enclosures, penitential stations, holy wells and burial grounds. Their precise function is unclear but some suggest that they may have been used as mortars for crushing and grinding foodstuffs and dyes. Many surviving traditions, however, suggest that they had curative powers similar to holy wells.

The holy well at Myshall is located within the graveyard to the south of the church. It is dedicated to Saint Brigid and presently consists of a modern shrine (Brindley and Killfeather 1993, 58). A pattern was held at the well on the 14th September each year but has since been discontinued (Hennessy 1981, 15). The practice of visiting holy wells is one of the oldest traditions of Irish Christianity and has its origins in pre-Christian ritual activities.

**General Historical Background**

The place name Myshall is derived from the Irish *Muigh-isel* and is translated by Joyce (1870, 80) and others (O’Toole 1937, 30) as the Low Plain. Lewis (1837, 417) describes the village as having 19 houses, a penny post to Leighlin Bridge and a constabulary police station. A fair was also held in Myshall on May 10th and September 14th for cattle, sheep and pigs (*ibid.*). Lewis (*ibid.*) also refers to the ruins of the ‘old church’ (CW017-039/01) and to Myshall Lodge, the residence of J. Brady Esq. Myshall lodge was built in the late eighteenth century by Robert Cornwall who acquired land in County Carlow during the latter half of the eighteenth century (O’Toole 1993, 38-40). The last of the Cornwall family to live in Myshall was Major John Cornwall who married Jane Brady in 1810. The couple had no children and the estate was later inherited by Jane’s brother John Beauchamp Brady (*ibid.*, 40).
6. IMPACT OF THE DEVELOPMENT ON THE CULTURAL HERITAGE LANDSCAPE

Visual Impact

No recorded archaeological monuments are located on or near to the proposed pipeline route or development site at Myshall. The nearest recorded monument is located c. 700m from the proposed site therefore the construction of the pipeline and the extension to the existing waste water treatment plant will have no visual impact on the latter.

Archaeological Impact

As stated the nearest recorded monument is located c. 700m east of the proposed development site. The groundworks associated with the development will not therefore have any impact on the monument. Due to its riverine location, however, it is possible that ground disturbance associated with the construction of the pipeline and extension to the waste water treatment plant may uncover the remains of buried archaeological features or deposits which are no longer visible above ground.
7. MITIGATION STRATEGIES

The proposed development is not located within the constraint zones for any recorded monuments nor were any previously unrecorded monuments detected during fieldwalking. It is possible, however, that previously unrecorded or sub-surface archaeological remains may exist within the development area. In order to minimise the impact of such works on the archaeological and cultural heritage landscape the following mitigating strategies are recommended:

- Archaeological testing of the proposed development site should be undertaken by a suitably qualified archaeologist prior to the commencement of ground works in order to establish if buried archaeological remains exist within the development area.

**OR**

- A suitably qualified archaeologist should monitor the removal of topsoil during the construction phase of the development in order to prevent the loss of or damage to previously unrecorded or sub-surface archaeological remains.

- Should archaeological remains be uncovered during monitoring of groundworks provision should be made for the appropriate resolution of such remains through preservation *in situ* or preservation by record.
8. REFERENCES


Lewis, S., 1837, A Topographical Dictionary of Ireland Vol. II. London.

O' Toole, E., 1937, Place Names of County Carlow.

Figure 1: Extract from Record of Monuments and Places Carlow Sheet 17, showing proposed development site and pipelines in red.
Plate 1: Location of proposed sewer pipeline at east side of green field site, looking north-west.

Plate 2: Proposed development area at north-west end of field, looking NW.