

GENERAL INFORMATION

PETUS description of tool in use						
Name of the case	Nefyn, Morfa Nefyn and Edern Sewage Treatment works					
Name of the tool	<ul style="list-style-type: none"> • A feasibility study, • Welsh Water Treatment Works Site Selection Matrix. 					
Country	North West Wales, UK					
City / region Total area (km2) Population Density (people/km2)	The population for the wards of Nefyn and Morfa Nefyn that contain the areas covered by the works is approximately 2,600 (2001 UK census).					
Tool user's profile a. Organization name (municipality, NGO, national or regional department, company, etc.) b. Field of activity c. Detailed contact/feedback (project website, e-mail, address, tel., fax)	<p>a. GallifordTry is part of the Welsh Water Capital Alliance group, a strategic partnering team, formed between Dwr Cymru Welsh Water, United Utilities, 6 strategic design/construction partners, 2 cost managers, a partnering facilitator and a supply chain advisor - to deliver around 60% of Welsh Water's capital investment programme during the period 2000-05.</p> <p>b. GallifordTry is a construction and house building firm.</p> <p>c. Angela Baines, Public Relations/Communication Manager, North Wales GallifordTry, http://www.gallifordtry.plc.uk/ tel: 01244 661628</p>					
Reviewer, date	AL/JP Visit date: Thursday 11th March 2004					
Short description of the case						
<p>This case involves the restructuring of a sewage system for three villages in North West Wales. The work is in response to the 1991 EU Urban Waste Water Treatment Directive (UWWTD) that was adopted into English and Welsh law through the Urban Waste Water Treatment Regulations 1994. The UWWTD requires discharges to coastal waters from communities of between 2,000 and 10,000 population, into which category the villages of Nefyn, Morfa Nefyn and Edern fall, to receive 'appropriate treatment' by the end of December 2005. Therefore the redevelopment of a suitably located sewage systems for Nefyn, Morfa Nefyn/Edern on the Lleyn Peninsular in North West Wales, was a necessity.</p> <p>The best location for the treatment works and the associated pipeline has been identified using evaluation processes that have been developed over a number of years from experience working with Welsh Water. It was concluded following a feasibility study that the most appropriate option was to combine the two catchments, that the three villages are located within, and construct one new sewage treatment works that serves both catchments.</p> <p>The PETUS key issue associated most closely with this case study is in the Water/sewage sector: Management and conception of urban water infrastructures.</p>						
Sector	Waste	Energy	Water	Transport	Green/blue	Building & Land Use
			X			
Scale of project	Component	Building	Neighbourhood	City	Region	
			X			
Status of project	Starting up	Ongoing	Finished	Start date	End date (exp.)	
		X				
Key words						
<i>Sewage, treatment works, restructuring, replaced, discharges, coastal water, location, pipeline, catchment.</i>						
Project a. Object (building, city park, wind farm, etc.) b. Type of activity (regeneration, etc.) c. Type of product (plan, project, etc.)	<p>a. A new sewage treatment works to serve three villages.</p> <p>b/c. This is a restructuring project where an existing system is being replaced due to a change in EU legislation.</p>					

<p>Tool</p> <p>a. Character (according to WP3final0704.doc)</p> <p>b. Benchmarks (qualitative or quantitative)</p> <p>c. Availability (paid/ free)</p>	<p><i>A feasibility study,</i></p> <p>a. This is an assessment tool</p> <p>b. The benchmarks for a feasibility study are :- Time it took to do the study; Data collection i.e. has all relevant information been collated?; Number of options considered and quality of technical discussion and argument; quality of presentation of final document.</p> <p>c. The feasibility report is paid for by the client (in this case Welsh Water). <i>Waste Water Treatment Works Site Selection Matrix</i></p> <p>a. This is a matrix/checklist.</p> <p>b. Benchmarks for site assessment are:- proximity of site to residential areas (ie too close and residents will not be happy); not in an environmentally sensitive area; planning constraints, odour nuisance etc..</p> <p>c. This is paid for by the client (in this case Welsh Water).</p>
<p>Decision-making process</p> <p>a. Stage of the tool implementation (preliminary, midterm, etc.)</p> <p>b. Level (political, technical, etc.)</p> <p>c. Public participation</p>	<p>a. The tools were implemented at the outline design stage of the project.</p> <p>b. The decision was made at a technical level by those directly involved in the project rather than at the political level although planning consent would have been required.</p> <p>c. Public participation has involved the local community council being consulted and asked for the preferred site option. Two public exhibitions also resulted in positive feedback.</p>

DETAILED INFORMATION

A. Detailed description of project and tool	
<p>1. Description of context (existing strategies, laws, policy, action plans, etc.): EU, national, regional, municipal</p>	<p>The legal obligation upon Welsh Water to carry out the scheme is highlighted below. Welsh Water obtain funding through an increase in pricing to customers over/above normal charges which is approved by OFWAT. Once funding is approved the scheme is then programmed to be carried out within Welsh Water's Asset Management Plan (in this case the AMP3 programme which was 2000 to 2005).</p> <ul style="list-style-type: none"> • Section 121 of the Government of Wales Act made it a legal duty for the National Assembly for Wales to pursue sustainable development in all it does. • Water related companies are affected by a list of legislations (specific to Wales): <ul style="list-style-type: none"> ○ The Water Act 2003 works towards improving water conservation, protecting public health and the environment; ○ The Water Industry Act 1991 covers the appointment and regulation of undertakers, protection of customers, general duties, supply duties and the domestic connection of water, as well as for sewerage-services, provision of service and general issues concerned with sewerage; ○ The Water Industry Act 1999 set new water company charges; ○ The Water Resources Act 1991 outlined the legislation for the control of the pollution of water resources and the land and works powers; ○ The Anti-Pollution Works Regulations 1999, SI 1006 deals with compensation or notices to be served on works that are polluting; ○ Water Resources (Environmental Impact Assessment) (England and Wales) Regulations 2003, SI 164 includes details on what projects need to have an Environmental Impact Assessment completed. ○ The Water Supply (Water Quality) Regulations 2000, SI 3184 covers Regulatory Impact Assessment, the monitoring of water supplies, water treatment and legislation for enforcement; ○ The Water Supply (Water Quality) Regulations 2001, SI 3911 looks at

	<p>water supply, water treatment and enforcement.</p> <ul style="list-style-type: none"> • The third Asset Management Programme (AMP 3) is part of an investment programme known as the National Environment Programme. AMP3, the third phase in the programme since water privatisation, has been agreed by the Government following discussions with the Environment Agency, water companies and OFWAT (the UK water regulator). • Dwr Cymru Welsh Water is the regulated company that provides water supply and sewerage services to over three million people living and working in Wales. The company has an Environment Management Group and a Quality and Environment Committee at board level. This committee reviews the performance of the Company (and its contractors) against key performance measures with particular regard to public health, health and safety and environmental impact. This ensures the environmental practices of the company and those contractors working on behalf of Dwr Cymru Welsh Water.
<p>2. Description of project</p> <p>a. Background (What caused the initiation of the project?; What was the problem? Who initiated the project?);</p> <p>b. Objectives/aims (sustainability statement – what issues of sustainability were attacked);</p> <p>c. Time interval and stages of project realization;</p> <p>d. Financing – amount, sources, institutions involved, partnerships, levels.</p> <p>e. Other sectors involved in the particular project/problem (conflicts and/or links)</p>	<p>a. The villages of Nefyn, Morfa Nefyn/Edern in North West Wales are currently served by two distinct sewage systems or catchments.</p> <p>One system covers most of Nefyn (popn of 1,359), and the second covers Morfa Nefyn/Edern (popn of 1,260).</p> <p>The aim of the project, to improve the treatment of sewage in the area, was initiated as a result of the 1991 EU Urban Waste Water Treatment Directive (UWWTD) that was adopted into English and Welsh law through the Urban Waste Water Treatment (England and Wales) Regulations 1994. The regulation requires discharges to coastal waters from communities of between 2,000 and 10,000 population to receive ‘appropriate treatment’, which is to be put into action by the end of December 2005. The area encompassed by Nefyn, Morfa Nefyn/Edern fall into this category. Dwr Cymru Welsh Water were also required to undertake improvement works to combined sewer overflows in the sewer network to improve the quality of water in rivers.</p> <p>The existing catchment system includes:</p> <p>1) Nefyn catchment which drains by gravity to a macerating pump and tidal storage tank located in a steep gully. A lunar valve controls the discharge of sewage from the tidal tank. The sewage discharges to sea via a short outfall above the Mean Low Water Springs tide level, approximately 100m from the tank. The tank is shown in Figure 1.</p> <div data-bbox="699 1554 1353 2007" data-label="Image"> </div> <p><i>Figure 1 – Location of the tidal tank at Nefyn</i></p>

2) Morfa Nefyn/Edern catchment has four pumping stations. The sewage from these plus the remainder of the catchment drain by gravity joining together at Pont Ederm, where the combined flow runs to Afon Geirch valley. The untreated sewage is discharged at Aber Geirch into the sea via a short outfall. Three combined sewer overflows (CSOs) operate only after heavy rainfall, these are connected to additional outflows, which in storm conditions may discharge diluted sewage into the river.



Figure 2 – Existing Aber Geirch Outfall

The proposed work involves the construction of one sewage treatment works to serve the two catchment areas covering Nefyn, Morfa Nefyn/Edern. This is to replace the two systems currently in place. The chosen site is located on agricultural land just outside an Area of Outstanding Natural Beauty, close to the existing sewage system for Edern/Morfa Nefyn with easy access for maintenance from the main road. The preferred location of the pipeline to the treatment works will follow the main road, the B4417.

Further development will occur for the Nefyn pumping station, which is to be built behind a farm near Nefyn fire station. This is located downstream of the Nefyn catchment to collect all the flows from the catchment.

b. The sustainability objectives are the same as the project driver: to improve the standard of treatment required for sewage discharges into coastal water adopted as part of the European Union (then European Economic Community) 1991 Urban Waste Water Treatment Directive (UWWTD). This objective is supported by the selection of a site that incorporates the most suitable method and location of sewage treatment with regards to sustainability.

c. Following the Urban Waste Water Treatment (England and Wales) Regulations 1994, a feasibility study was commissioned to investigate the most appropriate options for providing sewage treatment for the areas of Nefyn, Morfa Nefyn/Edern. This study was completed in 1997 and identified that the most appropriate option was to merge the two catchment areas. Two public exhibitions took place in March and November 2003, and following positive public feedback planning applications were submitted for the development. Dŵr Cymru Welsh Water's Asset Management Plan 3 (AMP3) requires that Nefyn, Morfa Nefyn/Edern will be provided with full biological treatment by March 2005 at the latest.

d. More than £3 million is being invested into the project, to be carried out by Dŵr Cymru Welsh Water Alliance North Wales Delivery Team, a strategic

	partnership between Dŵr Cymru Welsh Water, Galliford Northern and EC Harris.
<p>3. Description of tool</p> <p>a. Character (according to WP3final0704.doc) - calculation tools, process tools, assessment methods, generic tools, simulation tools, guidelines, framework tools, schemes, indicators and monitoring, checklists, case-specific tools;</p> <p>b. Availability of the tool (web-based / paper, paid / free, etc.)</p> <p>c. Based on existing tool or newly elaborated;</p> <p>d. Adaptation of the tool to the local context (are there local experts involved in tool's development?)</p> <p>e. Other tools implemented to support the project development</p>	<p><i>A feasibility study,</i></p> <p>a. The feasibility study consisted of a general assessment study to investigate the most appropriate option for providing a suitable sewage treatment works. The assessment compared the differences between constructing two treatment plants or one treatment plant and a pumping station. A single treatment plant offers advantages of less manpower, economy of scale and less power consumption. A combined plant also reduces the environmental impact as only one location is disrupted during construction but had the disadvantage of requiring a pipeline to be installed from the pumping station. However, the pipeline was considered to have only a temporary environmental impact as once works are complete further disturbance of the site will be unnecessary.</p> <p>The study concluded that the two catchment areas of Nefyn, and Morfa Nefyn/Edern should be combined to construct one new sewage treatment works serving both catchments. This feasibility study was reviewed again recently, and the conclusions were confirmed.</p> <p>This feasibility study also investigated three possible routes for the transfer main. The preferred route was identified as along the B4417 main road between Nefyn and Edern. This was chosen to prevent construction delays from external factors and to allow easy access for pipe maintenance. Some disturbance may be experienced by road users during development but work would be programmed to minimise disruption during holiday periods.</p> <p>b. The feasibility study is produced on CD and in hard copy. In this case it was issued within the design team and to Welsh Water. It is not normally made available to the general public. However it is sometimes made available to the Environment Agency, who are the leading public body for protecting and improving the environment in England and Wales if requested (not in this case). The only way it could be made available to the general public would be if Welsh Water used their powers to Compulsory Purchase the land for the treatment works or if planning permission was refused and a public inquiry is held whereby all relevant information would need to be made public.</p> <p>c. Welsh Water do not have a Specification for feasibility studies. It is newly developed but the person(s) carrying out the study must have experience of having done similar before. Sometimes examples of previous feasibility studies may be provided as a template – it is uncertain whether this was the case for Nefyn.</p> <p>d. Local experts were involved in tools development, the people who operate the sewerage system in Nefyn were consulted.</p> <p><i>Welsh Water Treatment Works (WWTW) Site Selection Matrix</i></p> <p>a. This assessment was carried out on potential sites for the sewage treatment works. The assessment compared possible impacts of various options. Each potential site was ranked to consider its impact across a number of 'topic areas' which included access, public disruption, environmental, land, residential proximity, planning, Public relations, odour nuisance, proximity to suitable discharge location and proximity to sewage system. Each site is given a score (1 poor to 3 good) for each aspect which are then combined to give an overall sustainability score for each site.</p> <p>A copy of the assessment tool is available from the PETUS website. Local experts involved in the development of the tool include Planning advisor, Welsh Water Treatment Works Operator and Environmental Specialist.</p>

	A cost evaluation for transferring sewage flows to each site was also undertaken.
B. Tool implementation	
1. Argumentation for choosing the tool a. What were the reasons for the implementation of the tool? (voluntary or requested by what local, national, etc regulation) b. Who took the initiative for choosing /elaboration the tool? c. What were the criteria for choosing the tool? d. Was there knowledge of other tools and were they considered?	The <i>feasibility study and WWTW Site Selection matrix</i> have been developed over a number of years from experience working with DCWW. The assessment procedures used on this study are the same as those used on other GallifordTry (Welsh Water Capital Alliance) projects. No other known tools.
2. Barriers for the tool implementation What were the main problems in the tool implementation? (Regulation, information available, public awareness, lack of clear SD definitions and benchmarks, communication etc.)	Some lack of information on expected discharge quality expected by the Environment Agency. Landowners were not consistent on whether they would be willing to sell.
C. Influence of the tool on the decision-making process	
1. Description of the decision-making process/ procedures a. Stages b. Levels (political, technical, etc.) c. Sources of information used during the dmp; d. Who are the decision-makers? e. Who made the final decision for the project implementation? Was it political or technical decision?	The decision to develop a new sewage treatment works was as the result of the European Directive. The Feasibility study and assessment helped in the decision making process associated with the location for the treatment works, and the route for the transfer main. Decision on providing a treatment works within the Nefyn area (as opposed to transferring flows to another treatment works outside of Nefyn) was made at commencement of the study. Decision to proceed with the recommended site was made in the following (Outline design) stage. The decisions were made by Welsh Water's Capital Manager, who is two levels below the Managing Director of the organisation. Time was a barrier to obtaining information during the decision making process. Capital Manager made the final decision for project implementation. This was assisted by Public Relations and Technical staff.
2. Tool in decision-making process a. At what stage was the tool implemented? By whom? (experts, politicians, etc.)	<i>Feasibility Study and Assessment of potential sites</i> a. The assessments were carried out at the very beginning of the project in order to identify the most efficient sewage treatment works set up for the situation and the best location for the sewage treatment works. b. The tools were the deciding factor for the number and location of the sewage treatment works. The tools were designed to incorporate

<p>b. How did the tool output influence the process (added or skipped levels/stages in the existing decision-making process, etc.)?</p> <p>c. Quantitative goals or benchmarks defined? (If YES, which – and what were they compared to?)</p> <p>d. Was the tool used to support argumentations?</p>	<p>requirements such as the need to have the site close to the existing sewage infrastructure (to avoid the need for pumping) and the need to have a suitable watercourse for discharge of treated effluent. Thus the assessment gave lower rankings to sites which required extensive pumping to transfer flows to the new plant and also to transfer flows back to a suitable point of discharge.</p> <p><i>WWTW Site Selection matrix</i></p> <p>The reason for using the matrix is to make a decision on the choice of site and also have a record which is auditable. Meetings relating to the matrix comprise about 8 to 12 key people from the project team. The merits and constraints of each of the sites are discussed and the headings to score are agreed. The scoring system eg. 1 to 3 or 1 to 5 etc. is agreed as a team. Good means that this topic is less likely to hinder development of a site or is a cheaper solution and bad means that more problems will have to be overcome in developing the site or that it will cost more. Each person then scores each site under the agreed headings so that an average can be produced, hopefully providing a clear winner!</p> <p>The site chosen was both adjacent to the existing sewage infrastructure and a suitable watercourse was available for discharge. The watercourse is of high environmental sensitivity and thus the treatment plant chosen (Membrane Biological Reactor) produces a high quality effluent but at significantly higher power consumption than other process which produce lower quality effluent.</p> <p>The Environment Agency gave an indication of the level of treatment they would expect for a discharge into the watercourse (quantitative benchmark). The study therefore had to consider treatment processes which could achieve this level. Information on the potential levels of treatment for different types of process was obtained from the process plant suppliers.</p> <p>The tool was used in order to support arguments regarding the development.</p>
<p>3. Transparency of decision-making process</p> <p>a. How was the information of the dmp disseminated? - directly (decision makers – public) or indirectly (decision makers - NGO, PR company, etc. - public); sources of dissemination used (mass media, internet, brochure, etc.)</p> <p>b. How was the public involved?</p> <p>c. Was there a public discussion over the project and at what stage of the project development?</p>	<p>Two public exhibitions took place during March and November of 2003 with the backing of Nefyn Community Council. Safety presentations have also been made to local schools. Following positive feedback from the public exhibitions planning applications were prepared.</p> <p>Consultation with Nefyn Community Council revealed that a site on agricultural land east of Ederm was selected as the preferred option as it is close to the existing sewerage system, has potential easy access from the main road and is outside the Area of Outstanding Natural Beauty.</p>
<p>D. Expert assessment/analysis/comment of the tool effectiveness</p>	
<p>1. Assessment by tool</p>	<p>Without a tool like this it is not possible to collate all the necessary</p>

<p>users</p> <p>a. Were there measurable improvements as a result of the tool implementation? If YES, what? If no: why not?</p> <p>b. Were there any spin-offs or unintended consequences?</p> <p>c. General view on the tool? Lessons learned?</p> <p>d. Potentials for further use of the tool?</p> <p>e. Will the actors recommend it or use it in other cases - why / why not?</p>	<p>information in order to make a qualified decision. Without the tool the decision would have been subjective, probably political and without any technical substantiation. This could have led to the wrong decision which would have been impossible to implement.</p> <p>The spin off is that it allows the scheme to progress on programme through the following stages to completion.</p> <p>Whilst we have been using this type of tool for many years there is always room for improvement and introduction of new approaches. Secondly, it is only as good as the amount of effort put in and the amount of time allowed. This tool will always be used for this type of work. It can also be used for similar industries such as gas, oil, electricity, perhaps more recently the positioning of telephone communication masts.</p> <p>The actors would recommend the use of the tool for similar work in the water industry since it has been tried and tested.</p>
<p>2. Reviewer's assessment of the tool (usefulness, sustainability relevance, who are the actors excluded? etc.) Suggestions and needs for further development of the tool</p>	<p>The WWTW Site Selection Tool is a very basic checklist that is open to subjective assessment. However, even though it is a very basic it is a good starting point to initiate the consideration of factors that may otherwise be ignored and also provides an opportunity for the project team to sit down and make the assessment together.</p>
<p>E. Additional information on the case study available</p>	
<p>Websites</p>	<p>http://www.dwrcymru.com/English/homepage.asp</p> <p>http://www.environment-agency.gov.uk/</p> <p>http://www.gallifordtry.plc.uk/</p>
<p>References concerning the case but also the key words or problem (papers, articles, reports, laws, etc.)</p>	<p>Dŵr Cymru Welsh Water, <i>Nefyn, Morfa Nefyn and Ederm Sewage Treatment Works Leaflet</i> on the proposed sewage treatment work.</p>
<p>Other sources (Interviews, conferences, discussions, etc.)</p>	<p><i>Notes from:</i> Meeting between Joanne Patterson and Anna Lermom of Welsh School of Architecture, Cardiff University, and staff at GallifordTry and Dŵr Cymru Welsh Water on 11th March 2004 at Bretton, North Wales.</p>