

PAPER 2

Surface Water Management Strategy

Presented by

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Introduction

Surface water is the rainwater that runs from roofs, highways and paved areas into the public sewerage system. For a number of reasons, including more frequent severe storms and the growth of built-up areas, Welsh Water's sewer network has to deal with increasing flows of surface water. Occasionally, the capacity of the network is exceeded in some areas and results in incidents of sewage flooding of homes, gardens and roadways and can cause pollution incidents in streams and rivers.

Background

Welsh Water has developed a Surface Water Management Strategy to address the problem. It aims to raise awareness of the issue and enable engagement with interested bodies, in order to work together to deliver a solution. In rural areas a high proportion of water that falls as rain soaks into the ground, then seeps into streams and rivers and flows to the sea.

However, in urbanised areas there is much less green and open space. Land in our villages, towns and cities has ever more houses and other buildings, tarmac roads and paths, paved patios and driveways. Natural drainage is therefore impeded. Rain falling on roofs and other hard-standing surfaces, runs down gutters and drainpipes and into the sewerage system. Increasing urbanisation (creep) causes increased flows, meaning urban sewers often have less capacity to cope with the severe rain storms that have become more frequent in recent years. This can result in flooding of people's homes and neighbourhoods, causing considerable distress.

In addition, surface water entering the sewers increases the amount of energy needed to pump it to the sewage works and to treat it, causing further environmental impact through higher carbon emissions. Welsh Water is a large energy user and we wish to reduce our carbon footprint. Tackling the issue of surface water run off will therefore produce a dual environmental benefit, by protecting local environments and reducing carbon emissions.

Objectives

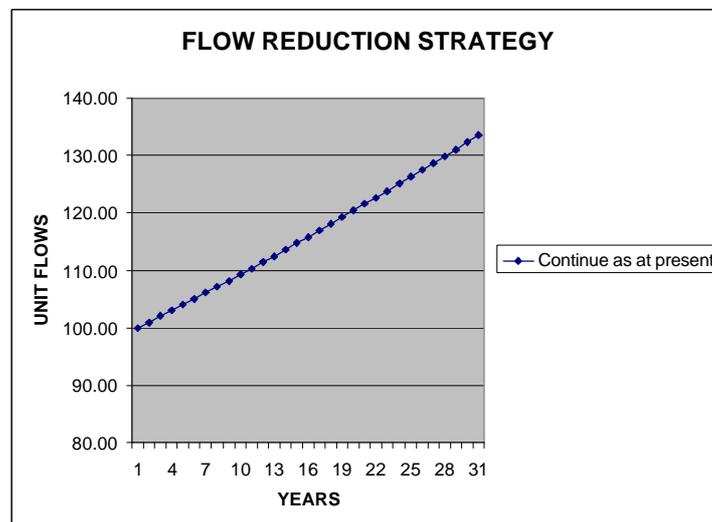
The problem of sewer flooding and pollution affects wide sections of society and involves various organisations. It is a problem that cannot be solved by Welsh Water alone, as the root causes need to be addressed. The company is determined to do all it can to reduce the risk of sewage flooding and pollution, and this requires working with others in a joint effort to reduce surface water flows in sewer systems that are ‘combined’ i.e. carrying both sewage and surface water.

The first step is to promote a greater understanding of the causes and consequences of surface water run off and how organisations and individuals can help to take preventative action. Digging up the streets to replace existing sewers with even larger ones is not the answer. It would be extremely disruptive, prohibitively expensive to customers, and would be unlikely to provide a sustainable long-term solution. Therefore, a number of alternative and innovative solutions are required.

Welsh Water and other organisations in Wales are taking a leading role in addressing this problem, which affects the whole of the UK. The long term objective is to have drainage systems in developed areas that, as far as practical, mimic the original green-field situation. Thereby most surface water is returned to the ground or open water courses at the earliest opportunity.

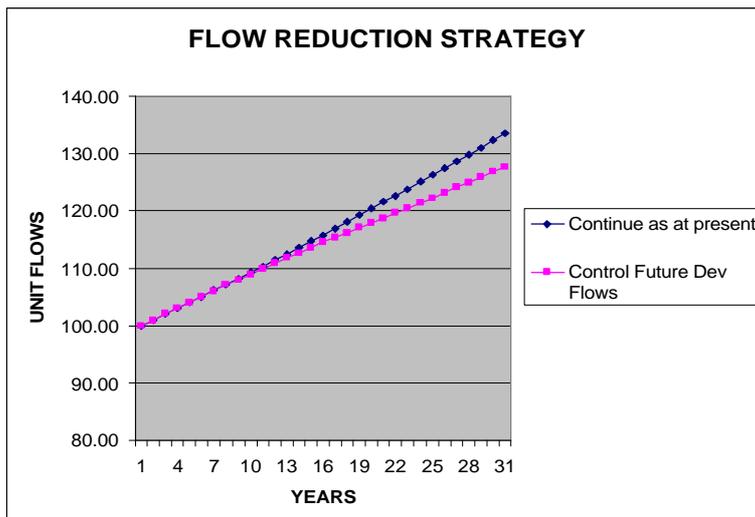
The following graphs are qualitative representations of possible future scenarios in Wales that take into account the predicted effects of climate change, new development and creep on unit flows in the sewerage system, and also the result of reduced unit flows through implementing Welsh Water’s Surface Water Management Strategy to mitigate against these predicted effects.

Scenario 1 - Continue as at Present



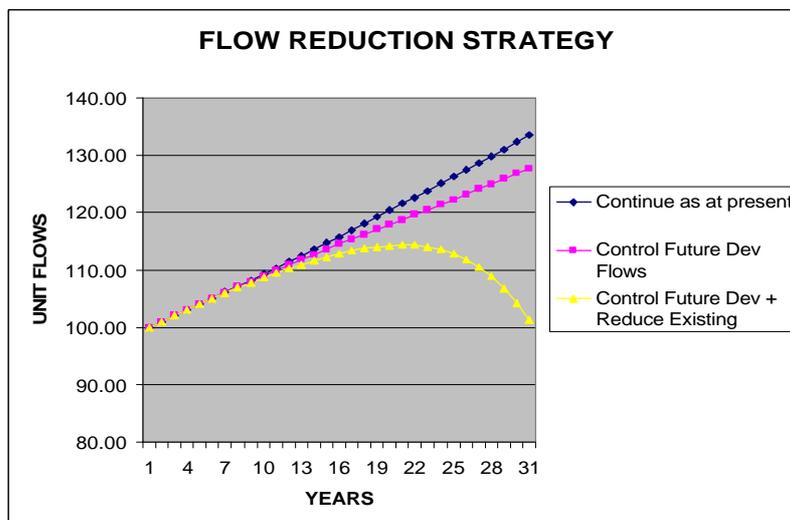
This graph shows the increase in unit flows if surface water continues to be managed into the future as it is at present. The increase to unit flows is primarily driven by new development adding to the amount of impermeable area contributing to the sewerage system, creep continuing in existing development again adding to the amount of impermeable area, and by increasing intensity in storms that is predicted to occur with climate change.

Scenario 2 - Control of Future Development Flows to the Sewerage System



This graph displays an alternative prediction (pink line) which represents the decrease in unit flows that could occur if new development is controlled and does not add any further contributing impermeable area to the sewerage system. However, the pink line still takes into account continuing creep and an increasing intensity in storms with climate change. It can be seen from the above graph, that controlling new development only marginally reduces unit flows and so will not enable DCWW's to maintain current unit flow levels in to the future.

Scenario 3 - Control of Flows to the Sewerage System through Integrated Surface Water Management



The yellow line in this graph represents how reductions in unit flows could be achieved with the implementation of DCWW's Surface Water Management Strategy and shows the effect on unit flows if:

1. Net creep within existing development ceases at the start of AMP7, but still the intensity of storms increases with climate change.
2. There is an accelerating success in achieving disconnections by customers and this ceases to increase unit flows to the sewerage system by the start of AMP8.
3. Further disconnections aid in mitigating the increase in intensity of storms with climate change by getting unit flows back down to the levels at the start of AMP4 by the end of AMP9.

Strategy Phase 1

Welsh Water has already commissioned two studies to initiate and implement the development of the strategy. Phase 1 has identified and categorised a range of initiatives that could achieve surface water flow reduction. This work was completed in March 2007 and broadly classified the initiatives as:

1. Engagement
2. Charging
3. Legislative
4. Technical

Strategy Phase 2

Phase 2 is being carried out during 2008 at a cost of £800,000. It will implement the recommendations of the Phase 1 report and identify additional areas for investigation and investment, to enable delivery of the long-term strategy. Through the application of sustainable urban drainage, the flow reduction strategy will aim to:

- Reduce predicted future flooding
- Reduce predicted future incidents of pollution
- Decrease energy costs
- Support conservation and recreational opportunities
- Counter impermeable area creep
- Be instrumental in minimising the impacts of climate change

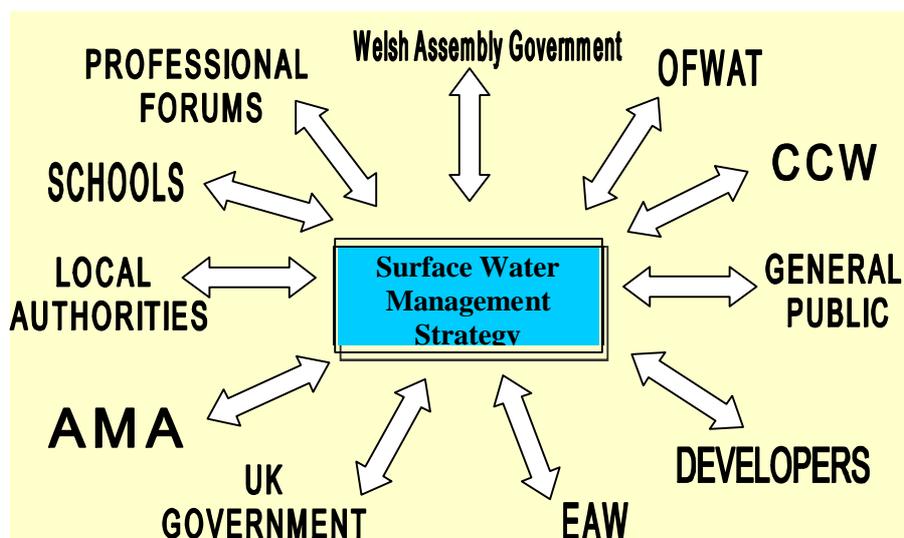
Applying the principles of this strategy will ensure that the most sustainable solutions will be adopted. There will be a greater proportion of expenditure on preventative measures, rather than on reacting to events.

The initiatives being developed during Phase 2 of the Surface Water Management Strategy for implementation in the future are:

Engagement:

The greatest potential for the success of the strategy is under the direct control of other parties. Therefore, effective engagement with them is essential to achieve significant flow reduction - to offset the adverse impact on the sewerage network of climate change and increasing urbanisation.

Some of the audiences to be engaged are:



Charging:

Welsh Water currently charges customers for surface water drainage as part of its sewerage services. If customers have their surface water drainage disconnected from the sewer they can benefit from a reduced tariff and lower bills.

The key issues are:

1. *Should tariffs be related to the amount of surface area drained?*
2. *Would amendments to the infrastructure charge stop new connections of surface water to the system?*
3. *Should surface water run-off from highways be part of the tariff?*

Legislative:

The Surface Water Management Strategy fits well with Government Environment Strategy policies on sustainability and climate change. The intention of the Surface Water Strategy is therefore to explore the potential for any legal changes by the Welsh Assembly Government and UK Government that will facilitate a reduction in surface water flows.

The key issues are:

1. *The alternatives to the automatic right to connect surface water drains to the public sewerage system.*
2. *Whether householders should be allowed to continue to pave over their front gardens without planning permission.*
3. *Sewerage byelaws (similar to water byelaws) to influence and police private sewers, particularly regarding tackling infiltration and surface water misconnections.*
4. *The issues and barriers to take up of Sustainable Drainage Systems (SUDS), including options for ownership and adoption across the bodies involved in urban and land drainage.*
5. *Whether funding for surface water drainage should be changed to reflect the 'polluter pays' principle including highway drainage.*

Technical:

This will include a review of previous flow reduction and infiltration schemes. Long-term flow monitoring will be explored to identify the benefits this approach can bring, and where it

should be done. Rainwater harvesting equipment is to be tried at suitable company buildings and domestic properties.

A 'SUDS Showcase Site' is required, that is, a development where people can see, first hand, examples of available devices and systems. In addition, it is planned to identify a suitable sewerage catchment area where as many of these strategic initiatives as practical, can be deployed, and to prepare to implement the work during our five year spending programme from 2010 to 2015.

The surface water management initiatives depend on the implementation of the technical solutions. These have already been identified, but many are not in common use in this country. Therefore, an engagement process is required alongside these technical solutions in order to increase awareness about what is possible and the provision of assistance to anyone willing to take them up.

Summary

In order to implement successfully the principles of the Surface Water Management Strategy in Wales, it is considered imperative for Welsh Water to have the endorsement of influential bodies such as the Welsh Assembly Government, Environment Agency Wales, Consumer Council for Water, and the Welsh Local Government Association.

This should ensure that further engagement by Welsh Water with a wider group of audiences will have a greater effect in persuading others to be more supportive of a sustainable urban drainage strategy, and to allow an integrated approach for the delivery of an effective surface water management plan.

Unless there is a huge effort to reduce volumes of surface water entering sewers, and radical changes in the way that we manage run-off, it is very clear that the current problems of flooding, pollution, high power consumption and carbon output will continue to grow, fuelled in the future by climate change.

Reducing the amount of flow to the network will be by management of the system, so that it is not automatically chosen as the disposal route for surface water. At the same time, Welsh Water will strive to reduce the existing impermeable area connected to the system. This is considered the only way to secure a sustainable solution. Building ever bigger sewerage systems is not a realistic option. The solution lies in raising awareness of the issue, and bringing together the people and organisations who can work together to achieve a common objective.