

Odour management and monitoring in Scottish waste water treatment plants

BACKGROUND

Wastewater treatment works in Scotland have evolved substantially in the past 20 years. During the 1990s, major investments were made to comply with the Urban Wastewater Treatment directive. These investments were designed to protect the environment from the adverse effects of urban waste water discharges, and were not specifically focused on odour control. Odours continued to present issues at some sites, and in 2005, a statutory Code of Practice (CoP) for odour control at sewage works in Scotland was published by the Scottish Executive.

Sewage works operators have been working under the CoP since the implementation of the Sewerage Nuisance (Code of

Practice) (Scotland) Order in April 2006. At the same time, a number of sites have moved into private sector operation under the Private Finance Initiative (PFI). These changes have delivered ongoing improvements in odour performance. However, odours continue to be reported by local communities living close to some sites. Consequently, CREW has commissioned this project on behalf of Scottish Government, with the aim of reviewing and identifying good practice for odour management and monitoring at wastewater treatment plants in Scotland.

The full report is available from the CREW library at <http://www.crew.ac.uk/publications>.

RESEARCH UNDERTAKEN

The focus of the project was firstly to draw together and summarise existing statutory and non-statutory guidance on odour control relevant to sewage works in Scotland. Additional research was carried out to investigate the existence of potentially relevant odour monitoring and control methods, so that any new methods could be integrated into the analysis. Based on this, a "site odour potential framework" was developed to enable appropriate odour controls to be identified for an individual sewage works.

Detailed discussions were then held with facility operators and with local authority officers responsible for regulating odours associated with sewage treatment works in Scotland. Five specific sites were evaluated (Shieldhall, Ardoch, Dalmeir,

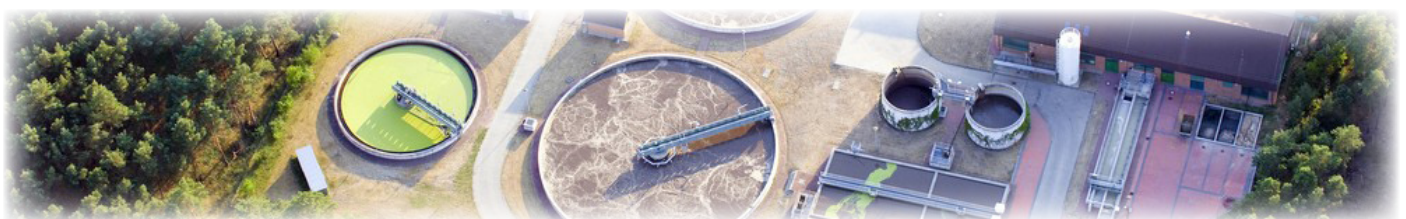
Seafield and Levenmouth). The odour controls in operation at these works were evaluated against the controls that would be expected at these sites based on the odour potential framework. The odour performance of these sites gives an insight into the effectiveness of the controls applied. Based on this discussion and the supporting information, a streamlined guide to management of odours at sewage works in Scotland was developed. This was designed to enable effective odour management techniques to be identified, taking into account the odour potential of individual sites.

An odour management and monitoring workshop consisting of representatives from Scottish water, regulators representing a number of local authorities, and operators was held. Feedback from the workshop has contributed to this report.

RECOMMENDATIONS

The analysis highlighted 10 principles for effective management of odours:

- Principle 1:** Effective site management is fundamental to good control of odours.
- Principle 2:** Effective treatment of odour & sludge is likely to result in minimal odours.
- Principle 3:** Careful attention to siting can be helpful in minimising odour risks.
- Principle 4:** Good housekeeping is an essential & low-cost means of minimising odours.
- Principle 5:** It is important to understand the nature and variability of influent.
- Principle 6:** Engagement with the regulatory authorities is important for managing odour incidents.
- Principle 7:** Engaging with the public, both individually and via elected representatives, is important.
- Principle 8:** Any sewage works is likely to benefit from an Odour Management Plan.
- Principle 9:** Odours are particularly likely to arise at locations on the works where sewage is agitated or aerated.
- Principle 10:** Operators should have a contingency plan in place to deal with fluctuations in influent flows, stormwater surges, failure of key plant, changes in wind direction etc.



A matrix was developed which can be used to assess a site's odour potential. This leads on to identification of appropriate odour management measures depending on the likelihood of odours occurring at the site.

Aspect	Weighting (A)	Low: Score 1	Medium: Score 2	High: Score 3	Your score (1, 2 or 3) (B)	Weighted score (A × B)
Throughput	10	<150,000 p.e.	150,000 to 500,000 p.e.	>500,000 p.e.		
Sewage odour potential	5	Neither industrial component; nor long rising or gravity mains	Either industrial component; or long rising or gravity mains	Both industrial component; and long rising or gravity mains		
Activities carried out	10	Screening only	Screening; primary treatment; no sludge processing	Screening; primary treatment; sludge processing		
Proximity of neighbours	5	Fewer than 50 properties within 750 metres	50 – 200 properties within 750 metres	More than 200 properties within 750 metres		
	5	No properties within 100 metres	1 to 20 properties within 100 metres	More than 20 properties within 100 metres		
History of genuine complaints	5	Fewer than 10 genuine complaints per year	10 to 50 genuine complaints per year	More than 50 genuine complaints per year		
Very low potential: Less than 65						Total weighted score
Low potential: 65 to 80						
Medium potential: 81 to 95						
High potential: More than 95						

Depending on the odour potential of a particular site, an appropriate range of odour management measures can be identified, from a wide range of potentially effective measures under the following headings:

- Odour control through process management
- Odour control through site management
- Odour control through low cost measures
- Odour control through capital investment measures
- Odour control through monitoring
- Odour control through stakeholder and public engagement

Guidance is provided on the specific measures likely to be appropriate for an individual site, depending on its odour potential. More extensive odour control measures are likely to be appropriate at sites with higher odour potential.

This was exemplified through consideration of five case study sites with a range of odour potentials and features of interest.

KEY WORDS

Odour, Sewage works, Sewage treatment, Wastewater treatment, Abatement, Nuisance, Guidance

RESEARCH TEAM

Brian Quinn, Iain McLelland
University of West of Scotland

Mark Broomfield, Nigel Gibson, Sabino del Vento
Ricardo Energy and Environment

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