

## **Annex B – Context Note: Comparison of the Sustainability of Food Waste Disposal Options (research project code WR1301) [FOR PUBLICATION]**

### **What is this study about?**

This study examined three possible options for the management of domestic kitchen food waste, including kerbside collection and treatment by composting or anaerobic digestion<sup>i</sup> and the use of domestic food waste disposal (FWD) units. FWD units are small macerators or grinders which can be installed in the kitchen sink outlet to fragment food waste to fine particles which are then flushed to the sewer in a flow of cold water.

The study aimed to compare, using readily available data, the whole life environmental emissions, financial costs and technical factors for the above options; including transport in the sewer and co-treatment at a wastewater treatment works (WwTW) for the FWD option.

A secondary aim of the work was to help identify significant gaps in knowledge and to assess uncertainties in the existing information so as to inform the direction of possible further research.

The key findings of this work are presented in the executive summary of the final report<sup>ii</sup>.

### **Why was this research commissioned?**

This study was jointly funded by Defra and the water industry, through the industries collaborative research body UK Water Industry Research (UKWIR), to highlight priorities for future research and evidence gaps on FWD use. It was not intended, alone, to directly inform policy development.

As the first phase of a series of work to provide evidence on food waste management through FWD units, the initial intention was that the model would be further developed as data arose from future practical [UK-based] trials. In the event, support for further practical research was limited and the initial modelling study is the main output from this work.

*To note: this study was not intended to inform more general food waste management policy making at the local authority level as this would require a much more detailed and specific assessment of the available options.*

### **What was the scope of this work?**

The scenarios used were relatively “simple” representations of how food waste management might be applied either with or without the use of FWD units; with a

lifecycle assessment based upon values readily available at the time of execution. This was done through the construction of a numerical model which sought to identify the key factors influencing the options. The model seeks to identify the relative magnitude of the key factors as a means of prioritising further research and data collection.

Despite the simple nature of the options an extensive numerical model was required to address the complexity of calculating the marginal effect of additional food waste on wastewater treatment.

*To note: to maintain a wider general readership the final report is a summary of the methodology and findings of the modelling exercise but does not seek to fully document the underlying mode itself. Detailed documentation of the many calculations used would have resulted in a more lengthy study focused primarily on the wastewater treatment aspects.*

### **Selection of assumptions and key values**

The limitations of desk-based modelling include the uncertainty inherent in many of the key factors considered, which can influence the resulting comparison. Specific assumptions and constraints are detailed in the report (Appendix A).

In particular, in the absence of robust independent data on the performance of FWD units under UK conditions, it was necessary to make a number of simplifying assumptions. Wide-scale FWD unit use in the UK does not currently exist and a large number of significant assumptions relating to their possible deployment and use had to be made.

The parameter values used in the model were selected on the basis of engineering judgement and where possible their selection was supported by reference to readily available literature sources. Whilst no intentional bias was introduced in parameter selection it was not feasible to conduct detailed numerical sensitivity analyses to support this assertion due to the complexity of the model itself.

*To note: the Study did not explore the effects of uncertainty in the many parameter values used (through for example numerical sensitivity analyses) and the Reviewers challenged whether a selective bias favouring FWD unit use had been introduced.*

### **Has this study undergone peer review?**

This study has been peer reviewed and key comments from the reviewers have been incorporated where the scope of the work allowed, or greater clarity has been provided in the text to address their queries.

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<sup>i</sup> <http://www.defra.gov.uk/environment/waste/ad/documents/anaerobic-digestion-framework-101130.pdf>