



South East Water
Water Resources Options
Research

Final Report
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Prepared by:

Accent
Chiswick Gate
598-608 Chiswick High Road
London
W4 5RT

Prepared for:

South East Water

Contact: Christine Emmerson
Tel: 0131 220 2550

Contact: Tanya Sephton

E-mail: christine.emmerson@accent-mr.com

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ABBREVIATIONS

CBA	Cost benefit analysis
DCE	Discrete choice experiment
PpP	Phone-post/email-phone
PR14	Price Review 2014
SEG	Socio-economic grade
SP	Stated preference
SEW	South East Water
UKWIR	UK Water Industry Research
WTA	Willingness to accept
WTP	Willingness to pay

The research was undertaken in compliance with the market research standard ISO 20252:2006

1. EXECUTIVE SUMMARY

1.1 Introduction

South East Water (SEW) commissioned Accent to design and implement a quantitative stated preference (SP) survey with the aim of understanding customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance. Examples of such measures include leakage reduction, reservoir development, provision of water efficiency devices, etc.

The present study follows on from, and links into, a recently completed "Primary WTP" study by Accent for SEW. This study obtained willingness to pay (WTP) estimates for multiple service measures, such as the chances of suffering supply interruptions, discoloured water, etc. One of the service measures included in this Primary WTP study was the frequency of hosepipe bans – the key target design parameter in a water resource management plan.

The main research objective for the present study was to obtain estimates of customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance. The results are to be used to challenge and influence South East Water's water resources management plan.

1.2 Survey Design and Development

The survey design for the present study was based on the core idea that the utility of a water resources management plan, to a customer, can be decomposed into three factors:

- the impact on the frequency of hosepipe bans,
- the impact on the customer's bill, and
- the external costs/benefits of the supply-demand measures included within the plan.

Starting with this premise, the survey was designed around a single discrete choice experiment (DCE) in which respondents were asked make a sequence of choices between options each representing a potential water resource plan. The options were accordingly characterised by the combination of supply-demand measures included, the level of service (frequency of hosepipe bans), and the impact on the customer's bill.

The hosepipe ban chance attribute took the same levels as those used in the Primary WTP survey: the base level (1 in 10 years), a deterioration level (1 in 5 years), and two improvement levels (1 in 15 years; 1 in 20 years).

Consistent with UKWIR (2011) guidelines, the bill was presented as a monetary amount for household customers and as a percentage deviation from current bills for business customers.

The water supply demand measures included in the survey were as follows:

- Reduce the percentage of water leaked from SEW's pipes from 17% (current) to either 12% or 7%.
- Compulsory metering for all (not included in the business survey)

- New stepped tariff for all (not included in the business survey)
- New seasonal tariff for all
- New desalination plant
- Expand an existing reservoir
- New reservoir
- New wastewater recycling works
- New water transfer from another company
- Water saving measures offered to all households/businesses.

These measures were described via a series of showcards, and these descriptions included four impacts for each measure, qualitatively defined as either low, medium or high. These included impacts on:

- Water available in a dry period
- The environment
- Customers bills; and
- Local disruption.

Figure 1 displays an example choice card. To make things easier for respondents, choice cards included shading on the service levels where there is no change from now, so as to highlight what the new measures are in each option, and to facilitate comparison between the options.

Figure 1: Example choice card

CHOICE CARD 1		Which option do you prefer?	
	Option A	Option B	
SOUTH EAST WATER MEASURES			
Leakage rate (percentage of water lost)	As now (17%)	As now (17%)	
Metering policy	Optional	Optional	
Water tariff measures	New stepped tariff	No new tariffs	
Desalination	None	New desalination plant	
Reservoirs	Expand existing reservoir	Expand existing reservoir	
Water recycling	New water recycling works	No water recycling	
Water transfers	No new transfers	New transfer	
Household water saving measures	No new measures	No new measures	
Frequency of hosepipe bans	1 in 10 years	1 in 10 years	
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	
Which option do you prefer?			

Respondents were asked to make eight choices each in the exercise, where this number was chosen as a reasonable number to balance survey length and complexity against the statistical advantages of greater numbers of observations.

The experimental design randomly assigned each respondent one of 100 unique sequences of eight choice situations, where each of the sequences was forced to satisfy a number of imposed restrictions to ensure the options were internally consistent. For example, more included measures should equal an improved level of service, and a higher cost. Additionally, the design was restricted to make it simpler for respondents by not allowing too many attributes to vary at once.

The survey questionnaire was developed through consultation with SEW, and was peer reviewed by Prof. Richard Carson prior to two phases of pre-testing: a series of cognitive (depth) interviews and a pilot survey. A draft of the questionnaire was also provided to the Customer Challenge Group (CCG) set up by SEW.

In light of there being no significant amendments following the pilot survey, the pilot data were added to the main stage data to maximise the sample available for analysis.

1.3 Survey Administration

The household and business surveys were both undertaken using the well-established phone-post/email-phone (PpP) method, which involved recruiting respondents by telephone, sending them show materials by post or email, and then re-contacting them by phone for the main interview to be administered. In the case of households, this allowed the bill impacts of each option in the showcards to be tailored to the size of the respondent's current SEW bill.

The target respondent for the survey was whoever was responsible for paying the household's or organisation's water bills and/or for liaising with SEW.

Quotas were set to help ensure that the household sample was representative of SEW customers in terms of age, SEG, and sewerage area, and that the business sample was representative by bill size and sewerage area.

The total achieved samples including pilot interviews contained 500 household and 300 business interviews.

The sample profiles broadly matched the population structure by each of the quota characteristics, and so no weighting was applied to either household or business data.

1.4 Key Findings and Conclusions

The main results from this study were obtained via an econometric analysis of responses to the DCE questions. Our approach to analysis consisted of the following steps:

- estimating econometric models to explain respondents' choices;

- calculating willingness to pay (WTP);
- comparing WTP for hosepipe ban risk reduction against the Primary WTP survey results;
- exploring the extent to which WTP varies in line with expectation via an econometric analysis of the sources of WTP variation.

The main results from our analysis are presented in Figure 2 below. The figure shows the mean ‘external’ values associated with each measure, by customer type. External values are defined as the willingness to pay for the supply-demand measure, net of the direct value of the measure’s contribution to the supply-demand balance.

The most desired measure amongst households and businesses is for leakage reduction, and for this measure only, customers were willing to pay a premium for SEW to implement it in excess of its contribution to the water supply-demand balance. For example, households were willing to pay £1.78 per year on top of their water bills for SEW to reduce its leakage from 17% to 12%, holding the water supply-demand balance constant.

For all other measures, negative external values were obtained, which indicates that respondents would prefer not to see them put in place unless the value of their contribution to the water supply-demand balance outweighs the financial cost plus the additional net external cost.

The most disliked measures, again amongst both households and businesses, included building a new desalination plant, building a new reservoir, and implementing a new seasonal tariff. The size of the values obtained for these measures suggests that there is substantial aversion to these measures in the customer base.

This finding is corroborated by ‘naïve priority’ results from another question in the survey, which asked customers to state which, if any, of the measures they would not want to see implemented. The most commonly cited measures amongst households and businesses included building a new desalination plant (cited by 44% households, 41% of businesses), building a new reservoir (cited by 34% households, 25% businesses), and implementing a new seasonal tariff (cited by 28% households, 36% businesses).

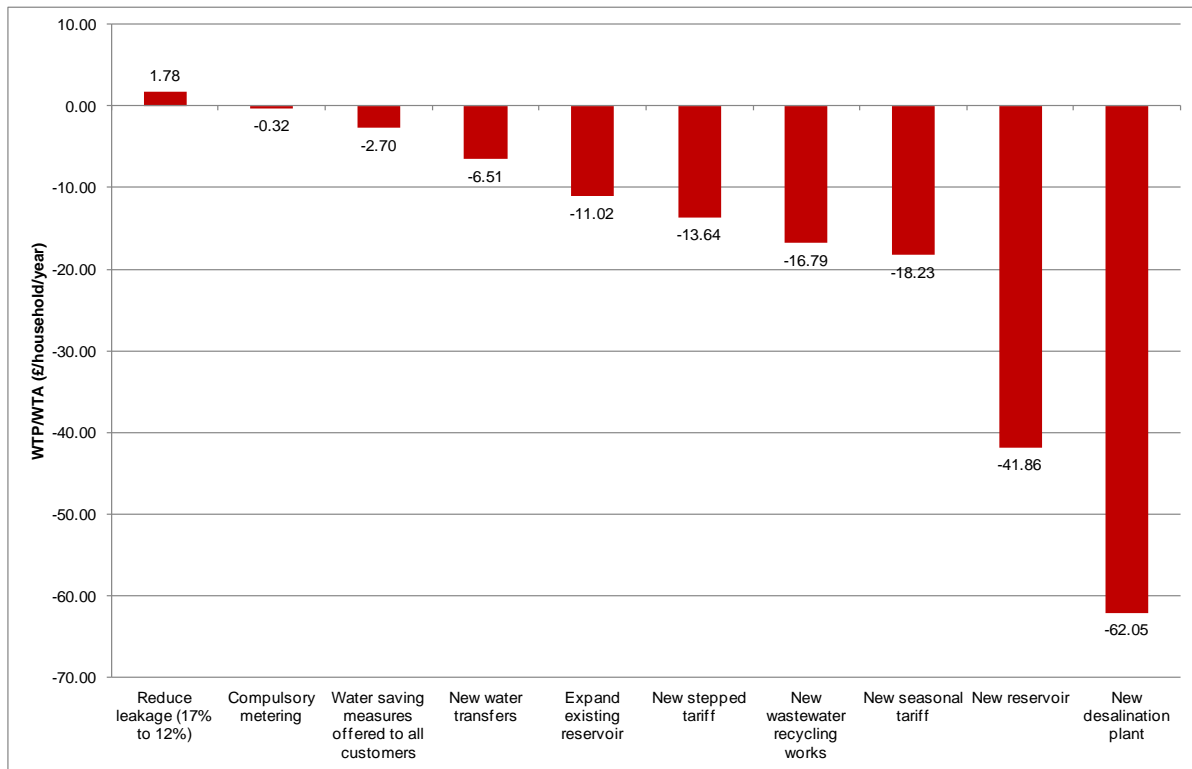
Overall, the valuation estimates presented appear to be meaningful measures of SEW customers’ values for the range of supply-demand measures contained within the survey, net of their effects on the water supply-demand balance, and we believe they are appropriate for use in cost benefit analysis for SEW’s water resources management planning.

Confidence in the results presented in this report can be gained from the following:

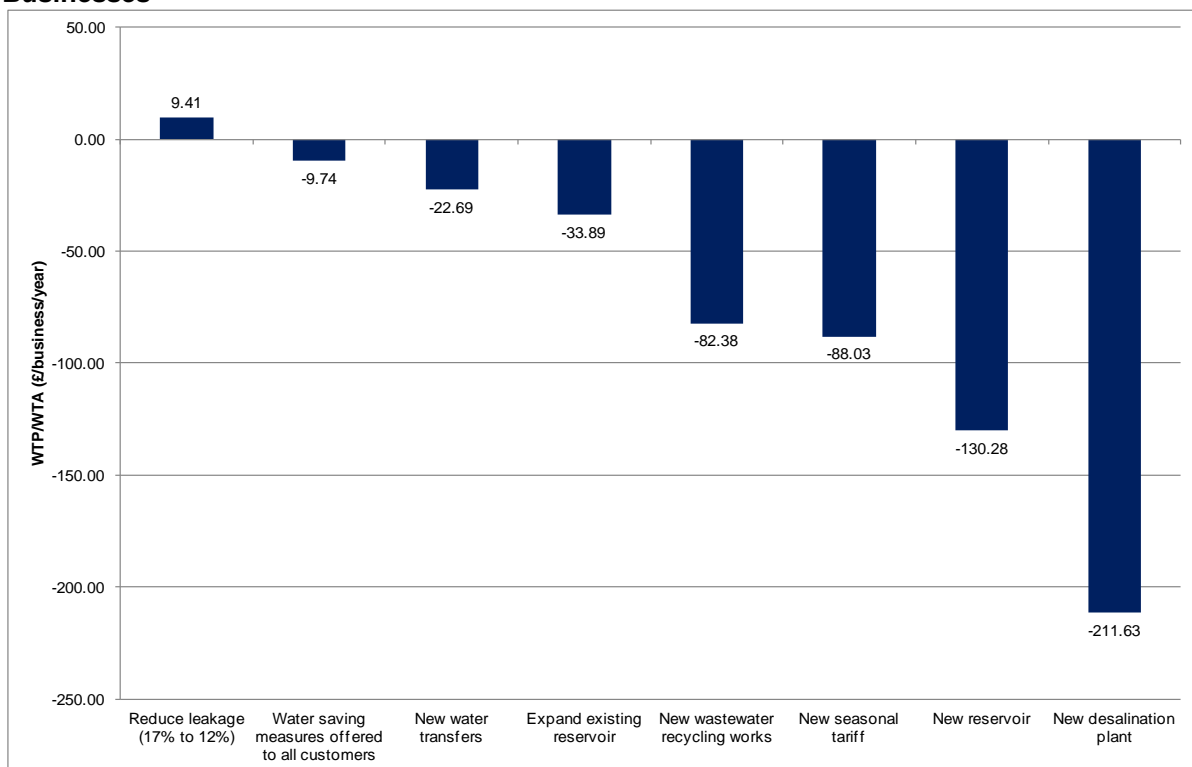
- The design of the questionnaire was carefully considered, peer reviewed by Prof. Richard Carson, and fully tested via cognitive interviews and pilot tests with households and businesses.
- The vast majority of responses are assessed as valid, taking into account respondent and interviewer feedback, and the reasons respondents gave for their choices. (See section 5.)
- Analysis of the sources of variation in WTP shows that results are consistent with expectation in many areas, and there are no anomalous results. (See section 7.5.)

Figure 2: WTP / WTA for water supply-demand measures

Households



Businesses



Source of WTP/WTA estimates: Table 12 for households; Table 15 for businesses. Positive values indicate that customers would be willing to pay for the measure to be implemented, in addition to their WTP for that measure's contribution to the water supply-demand balance. Negative figures indicate that the measure carries an external cost to customers, that should be offset against their WTP for that measure's contribution to the water supply-demand balance.

2. INTRODUCTION

2.1 Background and Objectives

South East Water (SEW) commissioned Accent to design and implement a quantitative stated preference (SP) survey with the aim of understanding customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance. Examples of such measures include leakage reduction, reservoir development, provision of water efficiency devices, etc.

The present study follows on from, and links into, a recently completed "Primary WTP" study by Accent for SEW. This study obtained willingness to pay (WTP) estimates for multiple service measures, such as the chances of suffering supply interruptions, discoloured water, etc. One of the service measures included in this Primary WTP study was the frequency of hosepipe bans – the key target design parameter in a water resource management plan.

The main research objective for the study was to obtain estimates of customers' preferences in relation to the various ways of maintaining or improving the water supply-demand balance. The results are to be used to challenge and influence South East Water's draft water resource management plan.

2.2 Overview of the Study

Figure 3 provides an overview of the research programme. This document is our final report on this survey. It provides a full description and explanation of the survey design and methodology, and reports all results including a detailed analysis of SEW customers' WTP for water supply-demand measures.

Figure 3: Overview of the research programme



2.3 Report Structure

The remainder of this report is structured as follows. In section 3, we report on the survey design and development. Section 4 provides details of the survey administration. Section 5 reports on aspects of the survey performance. In section 6 we present and summarise findings on attitudes, usage and experiences. Section 7 then presents the main valuation results. Finally, section 8 presents our conclusions and recommendations.

The appendices to this report contain the questionnaires and show cards that were used in the survey (Appendix A, for households, and Appendix B for businesses). In addition, Appendix C contains details of the sample characteristics, further to those reported in section 4; and Appendix D contains details of a supplementary econometric analysis of the sources of variation in WTP.

3. SURVEY DESIGN AND DEVELOPMENT

3.1 Introduction

The survey design for the present study was based on the core idea that the utility of a water resources management plan, to a customer, can be decomposed into three factors:

- the impact on the frequency of hosepipe bans,
- the impact on the customer's bill, and
- the external costs/benefits of the supply-demand measures included within the plan.

Starting with this premise, the survey was designed around a single discrete choice experiment (DCE) in which respondents were asked make a sequence of choices between options each representing a potential water resource plan. The options were accordingly characterised by the combination of supply-demand measures included, the level of service (frequency of hosepipe bans), and the impact on the customer's bill.

In the remainder of this section: 3.2 gives an overview of the structure of the survey questionnaire; 3.3 discusses the selection and definition of supply-demand measures that were included; 3.4 shows the levels of service that were shown, (ie the frequencies of hosepipe bans), 3.5 discusses the format used for the payment vehicle, and the levels that were included in the design, 3.6 gives details of the choice card format, and includes an example of the type of choice card shown to respondents; 3.7 explains the experimental design adopted for the DCE, and 3.8 summarises the testing and refinement carried out on the survey instrument prior to the main fieldwork.

3.2 Questionnaire Structure

The full survey questionnaire comprised the following components.

- 1) Screening questions, to control sample eligibility.
- 2) Background questions on awareness, use of water saving devices and attitudes.
- 3) Background information on water supply issues in the region, current chance of a hosepipe ban and an explanation of hosepipe ban restrictions.
- 4) Questions on the impact, if any, of hosepipe ban restrictions.
- 5) Contextual statement, explaining why action is needed and why customers are being consulted.
- 6) Information on each of the water supply-demand measures, including whether they would have a high, medium or low impact on the water balance, whether they are high, medium or low cost, and whether they have a positive, neutral or negative impact on the environment.
- 7) "Naïve" priority questions, asking which of the water supply-demand measures they would most like to see, and least like to see implemented.
- 8) Choice experiment questions, as described above
- 9) Follow-up questions.
- 10) Demographics.

This structure fulfils the needs of providing the appropriate context and information for respondents to reveal their preferences, and obtaining sufficient additional data to ensure representativeness, and to test and validate the ultimate results by means of covariate analysis.

3.3 Supply-Demand Measure Selection and Definition

One of the key tasks in the development of the survey instrument was to select and define the supply-demand measures to be included. At the outset of the study, we consulted with SEW on the selection of measures to be put forward for the survey. The selection agreed upon was based on the full set of options under consideration for SEW’s water resources management plan.

The final selection of measures, with the definitions and descriptions used in the survey, are shown in Table 1. (NB these are the household versions. Business versions were very similar, but see Appendix B for the precise wording.)

This table also shows that the measures were characterised via a matrix of “impacts”. These included the impacts of the measure on:

- Water available in a dry period
- The environment
- Customers bills; and
- Local disruption.

This table shows, for example, that the first measure “Reduce leakage to 12%” would have a medium impact on the water available in a dry period, as shown by the two water drops; no harmful impact on the environment, as shown by the absence of any crosses; it has a medium impact on customer bills, as shown by the two pound signs and would cause a medium amount of local disruption, as shown by the two tools symbols.

The impacts in this table contributed to a set of restrictions on the experimental design for the survey, as described in section 3.7.

Table 1: Measures, Descriptions and Impacts

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
1. Reduce leakage Currently 17% of water is lost from South East Water’s pipes due to leaks. Reducing this would lead to higher bills and also local traffic disruption when digging up roads to fix the pipes. Reduce leakage to 12% Reduce leakage to 7%				
	●●		££	✂✂
	●●●		£££	✂✂✂
2. Compulsory metering Currently, having a water meter is optional for most customers. Making it compulsory for everyone would lower water use because meters generally encourage people to use less. Bills would need to rise on average to pay for the meters being installed, but a rough rule of thumb is that if you have more bedrooms than people in the house, you’d be better off on a meter.	●		£	

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
3. Tariff measures				
- A stepped tariff would charge less per litre up to an allowance based on the number of people, and more per litre above this level. Heavy users would pay more, and so be encouraged to use less. Everyone else would simply pay less.	●			
- A seasonal tariff would charge more in summer per litre, when there is less water available, and less in winter.	●			
4. Desalination Removing salt from seawater would provide a reliable source of additional water for use in dry periods. But it would be expensive and would be harmful to the environment, and there would also be local disruption while the desalination plant was being built.	●●●	XXX	£££	✘
5. Reservoirs Reservoirs store water when it is plentiful, for use when it is scarce.				
- Expanding an existing reservoir would cause some local disruption due to construction. There would also be some environmental impact due to the requirement for land.	●●	XX	££	✘✘
- Building a new reservoir would cause major local disruption and have a significant environmental impact due to the requirement for land.	●●●	XXX	£££	✘✘✘
6. Wastewater recycling Wastewater can be treated so that it can be safely reintroduced into the public water supply. There would be some local disruption due to construction works while the recycling plant was being built, and environmental impacts through the use of concrete and requirements for land (although they are likely to be built on existing wastewater treatment sites). Also, some customers may object to the idea of reusing water.	●●●	X	££	✘
7. Water transfer from another company Currently, 8% of water comes from neighbouring companies. Building new pipelines would increase water supplies available to South East Water customers. There would be some local disruption due to construction works when the pipelines were being built.	●		££	✘✘
8. Household water saving measures South East Water could offer water saving measures to households to help them save water in the home. These would cost money for South East Water though, and so have an impact on everyone's bills. These measures would include: ●free water saving devices such as 'hippos' to put in toilet cisterns ●discount vouchers for money off water efficient white goods such as dishwashers or washing machines ●subsidised grey-water re-use systems (to re-use bath or sink water) ●free household water assessments ●subsidised rainwater harvesting systems ●subsidised adaptation of toilet cisterns to dual/variable flush ●subsidised repairs of leaking toilets	●		£	✘

3.4 Levels of Service

The hosepipe ban chance attribute took the following levels, with Level 0 referring to the current chance of a ban. These levels were the same as those used in the Primary WTP survey.

Table 2: Temporary Use Ban Frequency Levels

Level	Frequency
-1	1 in 5 years
0	1 in 10 years
1	1 in 15 years
2	1 in 20 years

Restrictions were imposed on the experimental design to ensure that the level of service associated with a plan was correlated with the total impact of the included supply-demand measures on the water available in a dry period. This meant that, in rough terms, the more that the set of included measures as a whole impacted on the water available in a dry period for a given option, the lower the frequency of temporary use bans would be. (See section 3.7 for details.)

3.5 Payment Vehicle Format and Levels

The bill impacts associated with each option were expressed in the same way as in the Primary WTP survey, which was itself consistent with recommendations in UKWIR (2011). Impacts were expressed in monetary terms for households and as a percentage of current bills for businesses.

The monetary amounts for households were themselves derived from a design based on percentages of current bills. At the recruitment stage of the survey, all household respondents were asked to indicate the size of their South East Water bill, if they knew it. For customers who did not know their bill, they were informed that the average annual bill for water services in the South East Water area was £204.¹

Accent's software translated the percentage values from the design into monetary amounts for each household between recruitment and main interview. (Show material was posted or emailed to the respondent in the intervening period.)

The bill impact took the following levels:

¹ They were able to provide figures on a monthly, quarterly, six monthly or annual basis, whichever they felt appropriate, and a total annual figure was calculated from this. For customers who received sewerage services from Thames Water, and whose South East Water bill therefore includes sewerage charges, respondents were told: "Previously you told me that your annual bill from South East Water is [VALUE] That includes both water and waste services, and of that amount, [VALUE*0.59] goes to South East Water for water services." The 0.59 value in this formula was equal to the average sewerage bill in the Thames area in 2012 divided by the sum of the average Thames Water sewerage bill and the average South East Water bill.

Table 3: Bill Impact Levels

Level	Bill impact
-1	Decrease of 5%
0	No change
1	Increase of 5%
2	Increase of 10%
3	Increase of 15%
4	Increase of 20%

Bill impacts refer to the total change from 2019 onwards as a percentage of respondents' current bills, following five cumulative increases of equal amounts leading up to this total change.

In the same way as for levels of service, restrictions were imposed on the experimental design to ensure that bill impacts shown for the options were correlated with the total bill impact of the included supply demand measures, as measured by the sum of “£” symbols over all the measures for an option. (Again, see section 3.7 for details.)

3.6 Choice Exercise Format

The choice cards were designed with two options for respondents to choose between, each showing the combination of measures that would be included, and excluded, and, separately, the hosepipe ban and bill impacts consistent with these.

Figure 4 displays an example choice card. To make things easier for respondents, choice cards included shading on the service levels where there is no change from now, so as to highlight what the new measures are in each option, and to facilitate comparison between the options.

Figure 4: Example choice card

CHOICE CARD 1 Which option do you prefer?		
	Option A	Option B
SOUTHEAST WATER MEASURES		
Leakage rate (percentage of water lost)	As now (17%)	As now (17%)
Metering policy	Optional	Optional
Water tariff measures	New stepped tariff	No new tariffs
Desalination	None	New desalination plant
Reservoirs	Expand existing reservoir	Expand existing reservoir
Water recycling	New water recycling works	No water recycling
Water transfers	No new transfers	New transfer
Household water saving measures	No new measures	No new measures
Frequency of hosepipe bans	1 in 10 years	1 in 10 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019
Which option do you prefer?		

3.7 Experimental Design

Respondents were asked to make eight choices each in the exercise, where this number was chosen as a reasonable number to balance survey length and complexity against the statistical advantages of greater numbers of observations.

The experimental design randomly assigned each respondent one of 100 unique sequences of eight choice situations, where each of the sequences was forced to satisfy a number of imposed restrictions, discussed below. The 100 sequences were chosen as a blocked design based on the D-efficiency criterion, using pilot estimates as priors. A larger-than-usual number of blocks was chosen for this design to ensure a large amount of variation in the sample, which was felt to be necessary given the range of restrictions put in place for theoretical reasons.

The first restriction put in place on the design was that the number of attributes that differed across the two options on any one choice card was restricted to be equal to four. This approach was to make the choices significantly less complex for respondents than having up to 11 attributes varying at once. This is known as the ‘partial profiles’ approach in the literature.²

² Kessels, R., Jones, B., and Goos, P. (2011) Bayesian Optimal Designs for Discrete Choice Experiments with Partial Profiles, *Journal of Choice Modelling*, 4(3), 52-74

The second issue taken account of in the experimental design is the link between measures, hosepipe ban risks, and bills. Clearly, the more measures that are included, the more risk reduction would be expected, and the more the impact on the bill would be. The experimental design was therefore restricted to take these links into account.

For the hosepipe ban chance, the restrictions referred to the sum of water drop symbols over all the measures included within an option. (The maximum sum of drops possible for any option was 14.)

- Level -1 was allowed by the design only when the number of drops was less than 2
- Level 0 was allowed only when the number of drops was between 2 and 6
- Level 1 was allowed only when the number of drops was between 6 and 10
- Level 2 was allowed only when the number of drops was between 10 and 14.

Similarly, for the bill impact level, the restrictions referred to the sum of “£” symbols over all the measures for an option. (The maximum sum of “£” symbols possible for any option was 17.)

- Level -1 was allowed by the design only when the number of drops was less than 2
- Level 0 was allowed only when the number of drops was between 2 and 5
- Level 1 was allowed only when the number of drops was between 5 and 8
- Level 2 was allowed only when the number of drops was between 8 and 11
- Level 3 was allowed only when the number of drops was between 11 and 14
- Level 4 was allowed only when the number of drops was between 14 and 17.

Finally, the design was restricted to exclude choice situations where there was a dominated option against a dominating option. We interpret this to mean cases where the hosepipe ban chance is lower and the bill is lower in one option than the other.

A similar design approach was adopted for the pilot as for the main, with the only difference being that the main stage design was calibrated to the pilot estimates according to the D-efficiency criterion.

3.8 Testing and Refinement

The survey instrument was peer reviewed by Prof. Carson prior to field testing. Two phases of pre-testing of the survey instrument were then carried out prior to the main fieldwork. The first phase consisted of 15 cognitive interviews (9 with household customers and 6 with business customers), in which respondents were encouraged to “think aloud” and give feedback on the questionnaire as they worked their way through it. These interviews were conducted between 11-20 December 2012.

The second phase of pre-testing consisted of a pilot of 100 interviews with household customers and 48 interviews with business customers, conducted between 17 December and 2012 10 January 2013.

Cognitive interviews

The main objectives of the cognitive interviews were to test:

- the clarity and flow of the questionnaire
- the appropriateness of the language used
- ease of use of the show material
- the stated preference design and understanding of the stated preference exercises.

Respondents were recruited by telephone, then posted or emailed the survey showcards, and then telephoned again to complete the survey interview.

Respondents were taken through the survey instruments as they would in the main fieldwork. However, further questions were inserted throughout the interview to probe and test levels of understanding and where improvements could be made.

The results from the cognitive testing showed that overall, participants were able to complete the survey, with a high degree of comprehension, and no major issues with the design were uncovered.

A series of minor points were raised which led to some small amendments to improve the clarity and flow of the questionnaire and showcards. This involved some small changes in text and/or re-arrangement of the text and some specific notes being added to the interviewer briefing document.

Pilot surveys

Following on from the cognitive phase, the questionnaire was pilot tested via telephone interviews with 100 household and 48 business customers.

In all cases, respondents were recruited by telephone, then posted or emailed some show material, and then telephoned again to complete the survey interview.

The pilot survey was conducted in order to test:

- the recruitment process
- the clarity and flow of the questionnaire
- the appropriateness of the language used
- the accuracy of all routings
- ease of use of the show material
- the stated preference design and understanding of the stated preference exercise
- the interview duration
- the survey hit rate.

As the core deliverables of the study are concerned with customer priorities and willingness to pay data, the targets for this research were customers with responsibilities for paying bills.

Screening questions were used to ensure that the most appropriate target was selected for invitation to take part. Various quotas were used for the pilot phase to ensure the issues in question were explored with a full range of participants. For household customers, region,

age and socio-economic grouping quotas were applied. For business customers, region, bill size and sector quotas were applied.

The key findings from the pilot were:

- Interviewers assessed respondents as showing very good levels of understanding, effort and concentration.
- The vast majority of household respondents felt able to make comparisons between the options presented to them, found the service areas easy to understand, and believed that the levels shown were plausible.
- A proportion of business respondents claimed difficulty in make comparisons between the options, but on all other measures these respondents appeared to have understood and responded to the instrument well. It is typically more difficult for a respondent to choose on behalf of their business or organisation, particularly if it is large, than for their household.
- Reasons given by respondents for the choices they made in the stated preference exercises were valid, in that there were no cases of a significant number of respondents incorporating invalid beliefs or inferences when making their choices.
- All the econometric choice models satisfied the minimum theoretical standards for validity, in that they indicated respondents preferred better service levels to worse service levels, and preferred lower bills to higher bills, all else equal. Moreover, the levels of precision were reasonably good for the sizes of the pilot samples used in the analysis.
- The WTP findings are intuitively reasonable, and except for the lack of precision owing to a small sample size, could be used meaningfully within SEW's water resource planning.

In light of these findings, the pilot survey instrument was adopted for the main stage of the survey with only very minor changes to the wording in one or two places. Due to the lack of any substantial change in the questionnaire between pilot and main stages, the pilot data were added to the main stage data to maximise the sample available for analysis.

4. SURVEY ADMINISTRATION

4.1 Introduction

The survey was administered using a well established survey mode to two samples designed to be representative of the household and business customer bases. All fieldwork was undertaken in line with the requirements of the market research quality standard ISO 20252:2006.

In the remainder of this section, we provide full details of survey mode (4.2), sampling and quota controls (4.3), and fieldwork (4.4).

4.2 Survey Mode

The household and business surveys were both undertaken using the well-established phone-post/email-phone (PpP) method. This involves recruiting respondents by telephone, sending them show materials by post or email, and then re-contacting them by phone for the main interview to be administered.

A key advantage of the PpP method, in comparison with face-to-face interviewing, is that it allows interviews to be drawn randomly from across the region rather than from a small number of areas, or clusters, as would be the case with a face-to-face survey conducted for a similar cost. A telephone-based approach particularly suits businesses as it offers respondents the flexibility to schedule the interview for a time that best suits them, and to re-schedule at short notice if necessary. Furthermore, the PpP method allows for high levels of quality control and interviewer administration to ensure respondent comprehension is maximised.

4.3 Sampling and Quota Controls

Household

Sample for the household survey was sourced from Accent's preferred list supplier, Sample Answers. This firm provided 'random digit dialling' (RDD) and 'lifestyle' sample for householders across the South East Water region.

RDD sample is created by selecting a known, existing telephone number and randomising the last couple of digits to generate a new telephone number that may or may not exist. Checks are made to ensure, firstly that the number is valid, and, so far as is possible, that the number is not a business number. The main advantage of RDD is that all households in a given geographical area are given equal opportunity to participate in the research. The main disadvantage is that there is no information known about the person on the other end of the phone before the call.

Lifestyle sample comes from a database of people based on a questionnaire covering all or some aspects of their lives including age, number of people in household, income, housing, family, education, sports and activities etc. This has the advantage of enabling specific targeting for quotas for those respondents who tend to be under represented in RDD samples.

The overall target number of interviews to achieve was 400 for the main stage of the research. The total achieved including pilot interviews was 500.

Quotas were set to try to ensure that the overall dataset was representative of SEW customers in terms of age, SEG, and sewerage area. Age and SEG quotas were set on the basis of 2001 Census data for the South East region, using Household Reference Person (HHRP) as the proxy for bill payer. Quotas for region were based on customer data provided by SEW.

The quotas and achieved interviews are as follows:

Table 4: Target and Achieved Sample Profiles - Households

Demographic	Target ¹	Achieved ²
Age		
18-29	9%	4%
30-44	30%	25%
45-64	35%	40%
65-74	14%	16%
75+	12%	14%
SEG		
AB - Higher and intermediate managerial/ administrative/ professional	25%	28%
C1 - Supervisory, clerical, junior managerial/ administrative/ professional	33%	37%
C2 - Skilled manual workers	13%	15%
D/E - Semi-skilled/unskilled manual workers /On state benefit, unemployed	29%	20%
Sewerage area		
Thames sewerage area	40%	43%
Southern sewerage area	60%	57%

(1) Age and SEG quotas were set on the basis of 2001 Census data for the South East region, using Household Reference Person (HHRP) as the proxy for bill payer. Quotas for region were based on customer data provided by SEW. (2) Base=all household respondents: 500

The sample profile broadly matched the population structure with regard to age, SEG and sewerage area as set out in Table 4, and no weighting was applied.

Appendix C contains further information on household sample demographics.

Business

The business sampling frame for this survey was supplied by SEW, and comprised a database of all business customers. The target business respondent was whoever was responsible for paying their organisation's water bills and/or for liaising with SEW.

The overall target number of interviews to achieve was 252 for the main stage of the research. The total achieved including pilot interviews was 300.

Quotas were set for the business sample to try and ensure representativeness by bill size band and area. Table 5 shows the target and achieved proportions of customers for these two measures. The achieved interviews broadly matches the population structure with regard to bill size and sewerage area and no weighting was applied.

Table 5: Target and Achieved Sample Profiles - Businesses

	Target ¹	Achieved ²
Bill size		
Less than £1k	79%	78%
£1k-£5k	15%	15%
£5k+	6%	7%
Sewerage area		
Thames sewerage area	33%	31%
Southern sewerage area	66%	69%

(1) Source: SEW database of all business customers. (2) Base: all business respondents (300)

Appendix C contains further information on business sample demographics.

4.4 Fieldwork

The interviews were completed by experienced interviewing teams, trained to ISO 20252 standards, from Accent's telephone unit in Edinburgh. Computer-aided interviews were undertaken using Accent's proprietary software *Accis*.

All telephone work was fully supervised, and interviews were monitored on a regular basis in line with Accent's quality system requirements.

The main stage business and household survey was conducted between 23 January and 10 February 2013.

All research was undertaken in line with the requirements of the market research quality standard ISO 20252:2006.

5. SURVEY PERFORMANCE AND DATA SCREENING

5.1 Introduction

The SP element of the survey contained a large number of attributes being valued and some of them may have been unfamiliar to respondents. It was therefore important to carry out validity checks on respondents' understanding and ability to make comparisons. It is also good practice to examine the reasons given by respondents for their choices to check that they are consistent with valid motivations.

In this section, 5.2 contains findings from a collection of respondent and interviewer feedback questions on issues pertinent to the survey's performance in obtaining valid results. Section 5.3 then examines the reasons given by respondents for their choices to check their validity.

In summary, feedback from respondents and interviewers indicates that respondent understanding, effort, concentration and perceived ability to make comparisons in the choice questions were all very good. Furthermore, the reasons given by respondents for the choices all indicate that choices were consistent with preferences, as intended by the survey design.

5.2 Respondent and Interviewer Feedback

The SP element of the survey was potentially fairly complex, in that there were a large number of attributes being valued and some of them may have been unfamiliar to respondents. The questionnaire therefore included a question for respondents regarding their perceived ability to make comparisons between the options presented in the choice exercise, and questions for interviewers on respondents' understanding, effort and concentration.

Table 6 shows results from the respondent feedback question. This shows that the majority of household and business respondents felt able to make comparisons between the SP choices presented to them. The results for businesses are not quite as strong as for households, which may be due in part to the fact that it is typically more difficult for a respondent to choose on behalf of their business or organisation, particularly if it is large, than for their household.

Table 6: Respondent Feedback, by Customer Type

Question		Frequency, by customer type (%)	
		Households	Businesses
Q33/32	Did you generally feel able to make comparisons between the two options I presented to you?		
	Yes	93%	83%
	No	7%	17%

Base: all household respondents (500); all business respondents (300)

Table 7 shows results from the three feedback questions completed by interviewers immediately following completion of each survey. The levels of understanding shown were

very good for an SP survey in our experience³. Levels of effort and concentration did not appear to be a problem, with the vast majority of both households and businesses giving the questions careful consideration, and managing to maintain concentration throughout the survey.

Table 7: Interviewer Feedback, by Customer Type

Question	Frequency, by customer type (%)	
	Households	Businesses
Q41/36 In your judgement, did the respondent understand what he/she was being asked to do in the questions?		
Understood completely	87	70
Understood a great deal	11	24
Understood a little	2	5
Did not understand very much	0	1
Did not understand at all	0	0
Q42/37 Which of the following best describes the amount of thought the respondent put into making their choices?		
Gave the questions very careful consideration	84	60
Gave the questions careful consideration	13	32
Gave the questions some consideration	3	5
Gave the questions little consideration	0	2
Gave the questions no consideration	0	0
Q43/38 Which of the following best describes the degree of fatigue shown by the respondent when doing the choice experiments?		
Easily maintained concentration	92	81
Maintained concentration with some effort	6	15
Maintained concentration with a deal of effort	1	3
Lessened concentration in the later stages	1	1
Lost concentration in the later stages	0	1

Base: all household respondents (500); all business respondents (300)

Overall, the results from the respondent and interviewer feedback questions indicate that respondent understanding, effort, concentration and perceived ability to make comparisons in the choice questions were all very good.

5.3 Reasons for Choices

After their initial decision, and their fifth decision in the choice exercise, respondents were asked why they had made the selection they had. Analysis of these responses gives a good indication of whether the respondents were making their decisions on the basis of the information shown to them, as intended by the design, or were incorporating unintended inferences or reasoning.

Below are the responses given by household and business customers for each choice exercise. The vast majority of the reasons people gave were coded into one or more of valid reasons. Respondents generally cited the reason for their choice as being that one option was better than the other on the basis of the service levels that were shown to them in the corresponding

³ The wording of these questions is the same as used by Accent across the majority of its SP surveys to facilitate comparison.

choice situation. There were no cases of respondents incorporating invalid beliefs or inferences.

Table 8: Reasons for Choices, by Customer Type

	Frequency, by customer type (%)	
	Household	Business
Reasons for after choice 1		
No desalination	28	25
Better for water recycling	26	26
Better for water tariff measure	20	11
Better for reservoirs	14	13
Overall better service/option/Covers my previous choices	13	10
No new tariffs	9	17
Better for desalination	8	10
Better for water transfers	7	14
No water recycling	5	2
No new transfers	4	1
Better for impact on environment	3	1
Other	4	3
Reasons for after choice 5		
Better for leakage rate (percentage of water lost)	21	24
Cheaper option/smaller increase in annual water bill	13	16
Better for Metering policy	12	
No desalination	12	10
Better for reservoirs	12	14
Better for water recycling	10	15
Better for household/business water saving measures	9	6
Better for water tariff measure	8	4
Overall better service/option/Covers my previous choices	8	4
No new tariffs	5	6
Better for desalination	5	7
No additional reservoirs	5	7
Better for water transfers	5	7
No water recycling	3	1
Better for frequency of hosepipe bans	3	3
No change in annual water bill	3	4
No new metering policy	3	-
No new transfers	2	1
Better value for money	2	-
Other	3	3

Base= household respondents: 500; business respondents: 300. Reasons are excluded from this table if stated by fewer than 2% of households or businesses.

6. ATTITUDES, EXPERIENCE AND USAGE

6.1 Introduction

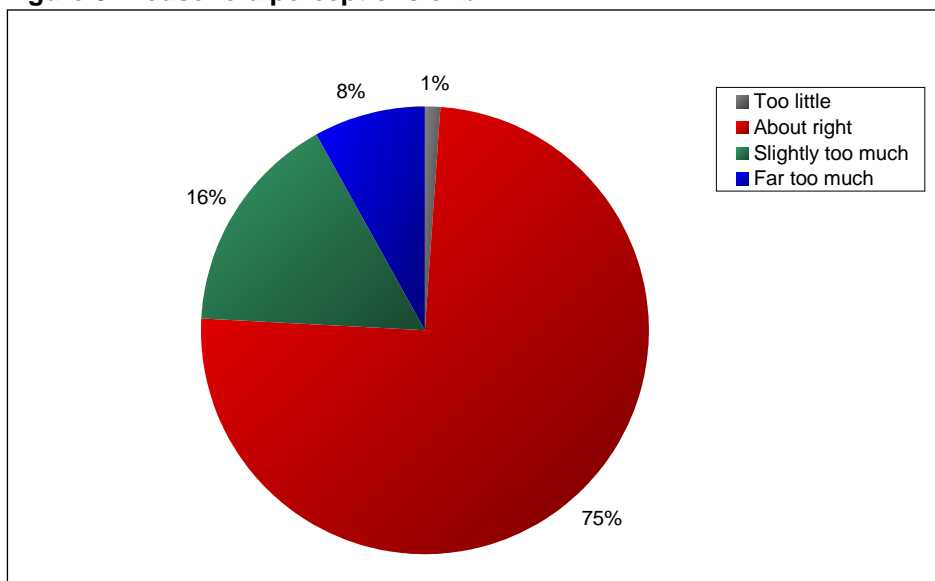
This section presents descriptive charts and statistics from various questions in the survey on attitudes, experiences and usage. This includes information on: attitudes towards current bill levels (6.2); awareness and usage of water saving information and measures, and attitudes towards their provision by SEW (6.3); types of water usage (**Error! Reference source not found.**); the perceived impact of a temporary use ban (6.5); and ‘naïve’ priorities among the selection of possible water supply-demand measures presented to respondents (6.6).

Responses to these questions are interesting in their own right, but they are also useful as a means of validating the main DCE results. This is done by analysing the extent to which the main DCE results vary as expected in line with answers to the attitude, experience and usage questions. This analysis is discussed in section 7

6.2 Attitudes towards Current Bill Levels

As shown in Figure 5, the majority of household customers (75%) thought what they paid was ‘about right’ but around a quarter thought they paid too much for water services.

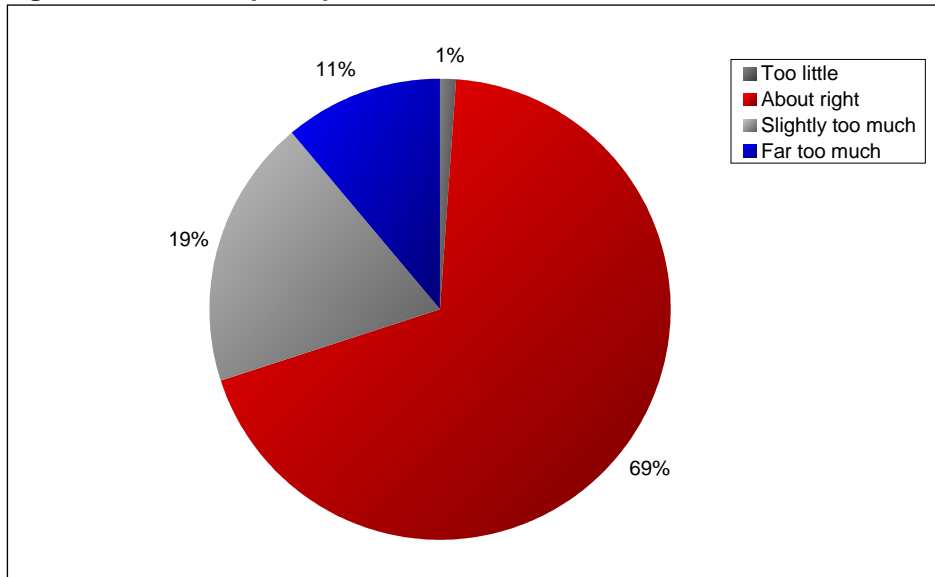
Figure 5: Household perceptions of bill



Base: all household respondents (500)

Businesses were more likely than households to feel they were paying too much for their water services. In this case, 69% thought the amount they were paying was ‘about right’, whereas 30% thought it was too much.

Figure 6: Business perceptions of bill



Base: all business respondents (300)

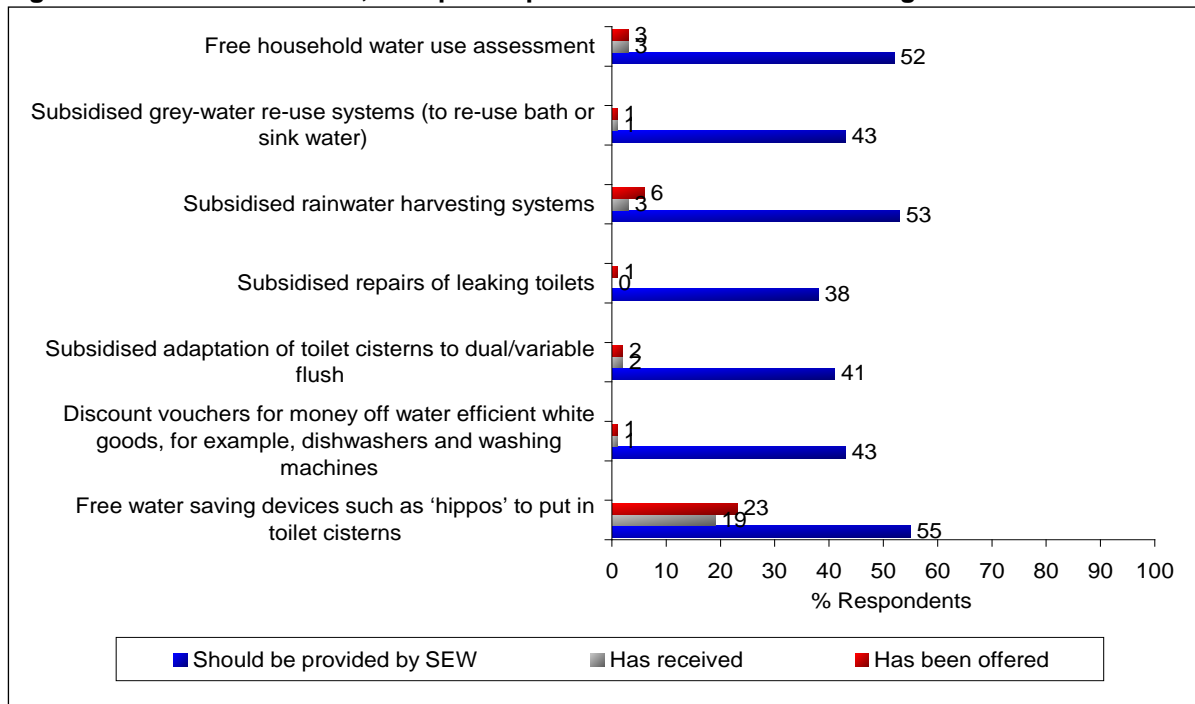
6.3 Awareness and Usage of Water Saving Information and Measures, and Attitudes towards their Provision by South East Water

A series of questions were asked to explore what knowledge and experience customers had of water saving information and measures. 64% of household customers were aware that South East Water provides information on its website about ways of saving water in the home. Of these people, 53% had used this information. Of those who weren't aware, 56% were likely to use this type of information.

Correspondingly, 52% of business customers were aware that South East Water provides information on its website about ways of saving water in their businesses. Of these people, 24% had used this information. Of those who weren't aware, 44% were likely to use this type of information.

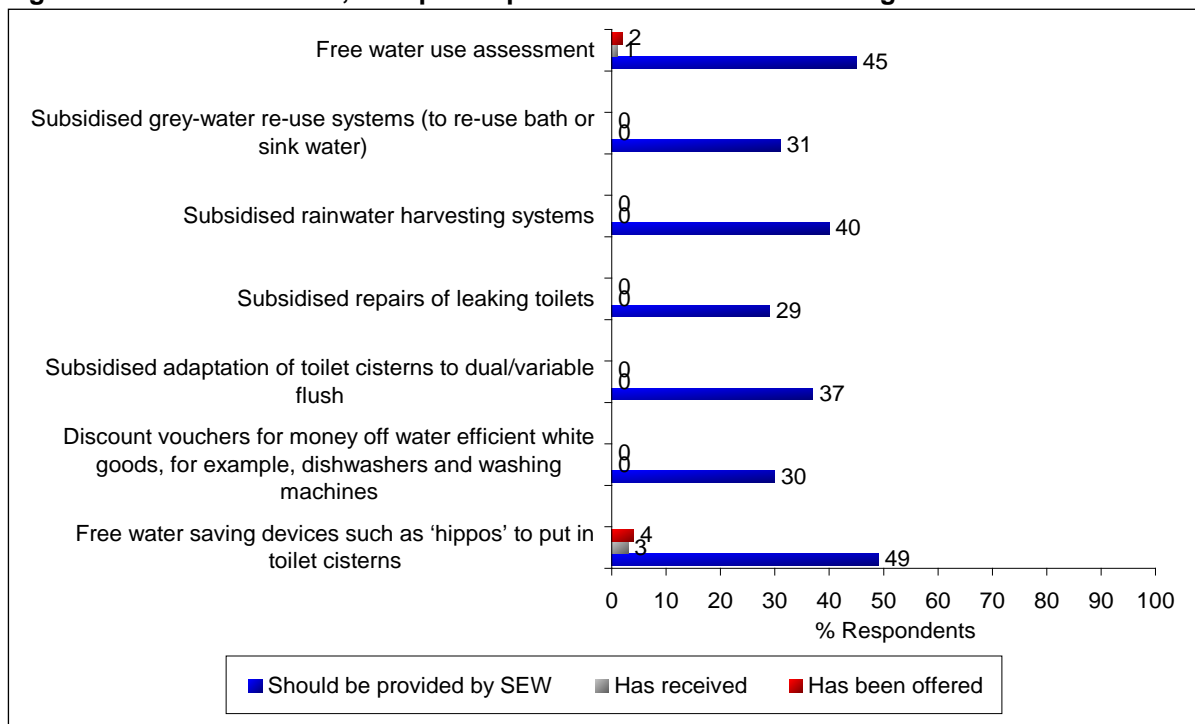
Customers were also asked if they had been offered or received a range of water saving measures, and whether these should be provided by South East Water. Figure 7 and Figure 8 present all these results, for households and businesses respectively.

Figure 7: Household offered, receipt and provision of SEW water saving measures



Base: all household respondents (500)

Figure 8: Business offered, receipt and provision of SEW water saving measures

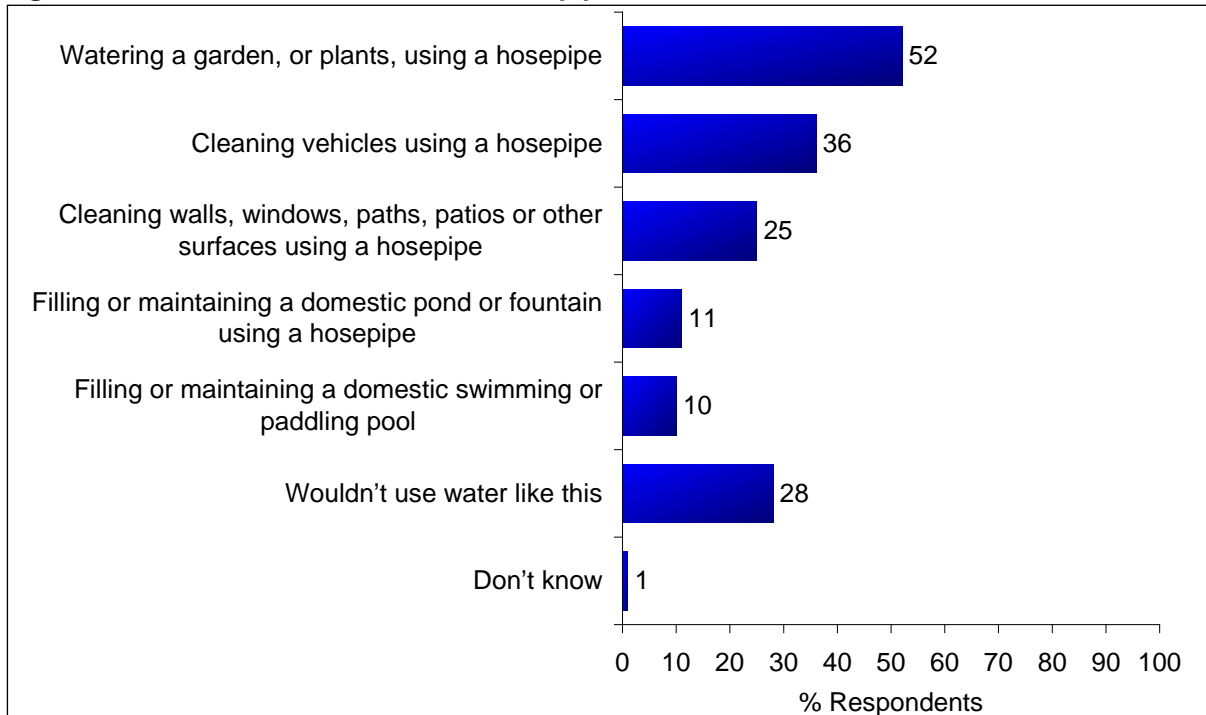


Base: all business respondents (300)

6.4 Water Usage

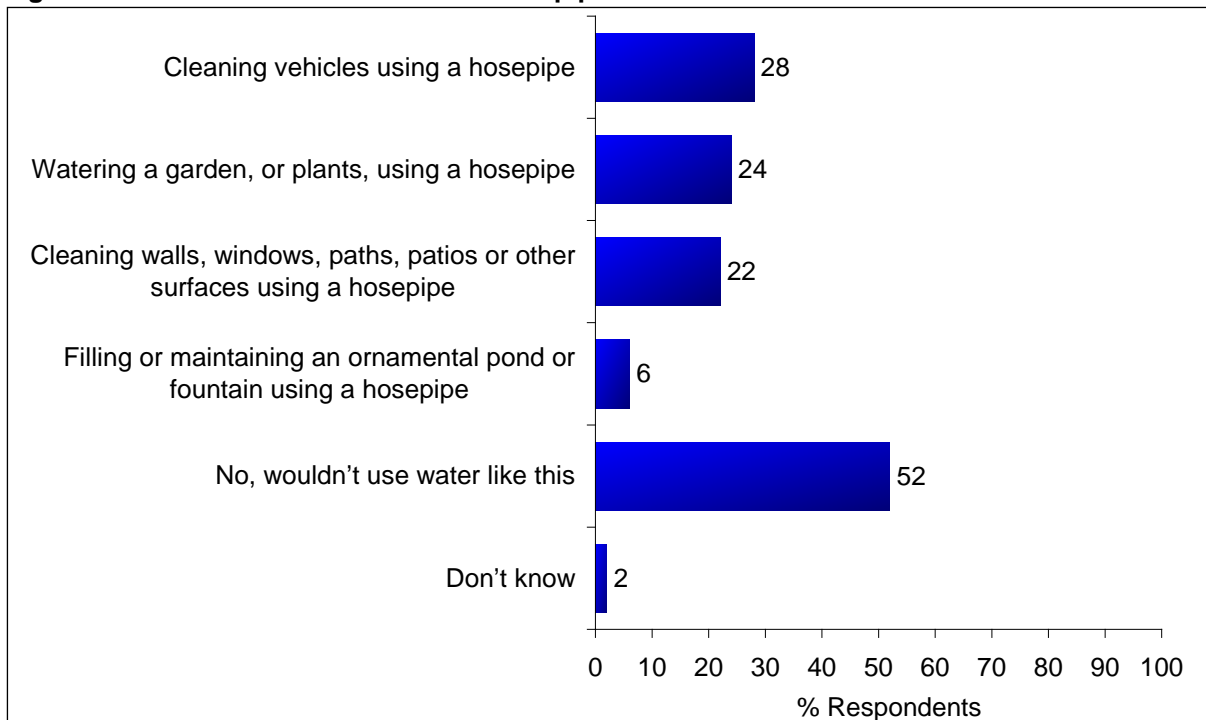
Customers were asked if there wasn't a hosepipe ban would water be used in a range of ways. The most common use for households, amongst the categories that would be prohibited under a hosepipe ban, would be watering a garden, or plants, using a hosepipe. The most common use for businesses would be cleaning vehicles using a hosepipe.

Figure 9: Household use of water if no hosepipe ban



Base: all household respondents (500)

Figure 10: Business use of water if no hosepipe ban

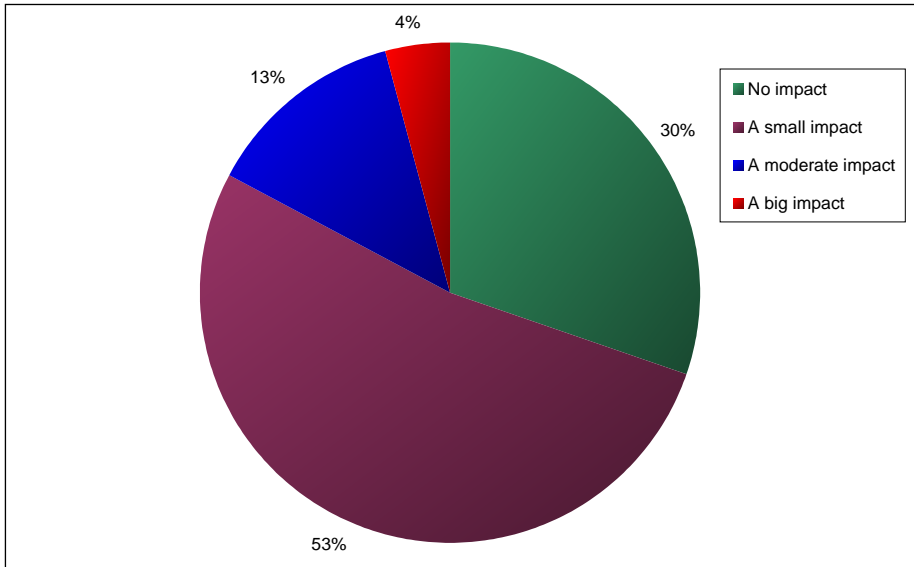


Base: all business respondents (300)

6.5 Impact of a Temporary Use Ban

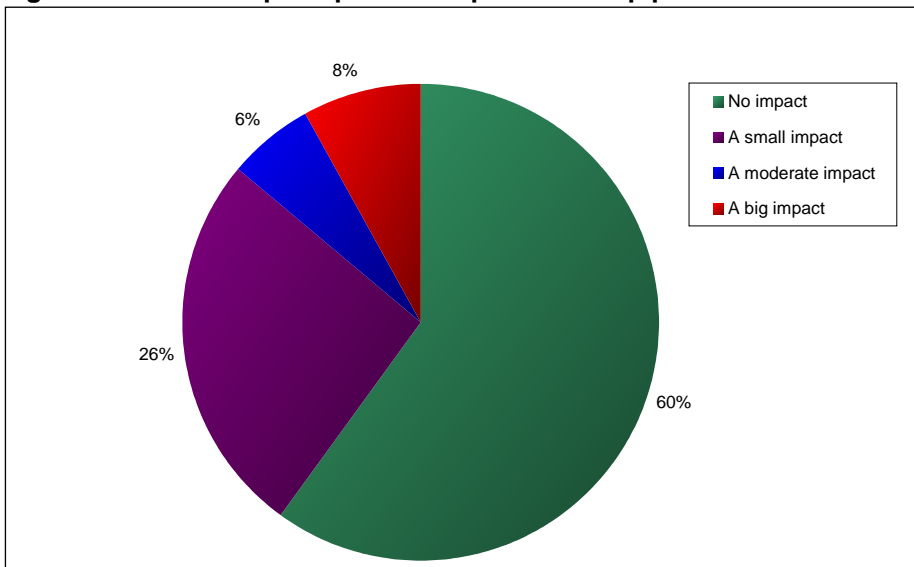
Customers were also asked directly how much impact a hosepipe ban would have. The majority of households (53%) said a hosepipe ban would have a small impact on them, whereas the majority of businesses said a hosepipe ban would have no impact on them.

Figure 11: Household perception of impact of hosepipe ban



Base = all household respondents: 500

Figure 12: Business perception of impact of hosepipe ban



Base: all business respondents (300)

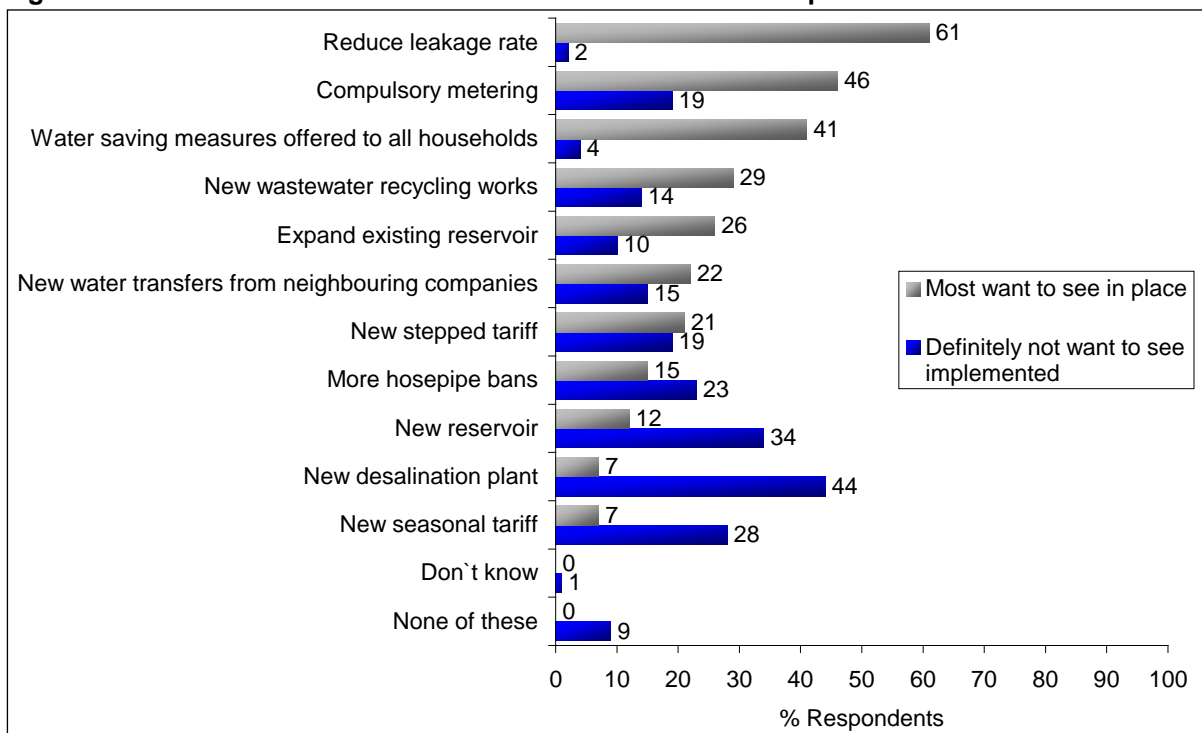
Finally, business were also asked if they thought they were exempt from a hosepipe ban with 15% saying yes, 69% responded no, and, 16% didn't know. They were also asked if their business relied on water and 58% said it did.

6.6 Naive Priorities Amongst Supply-Demand Measures

Following presentation of the supply-demand measures, customers were asked to consider the range of options, and which they would want to see South East Water to put in place (up to three), then conversely, which they wouldn't want to see South East Water put in place (up to three). The responses to these questions are shown in Figure 13 and Figure 14 for households and businesses respectively.

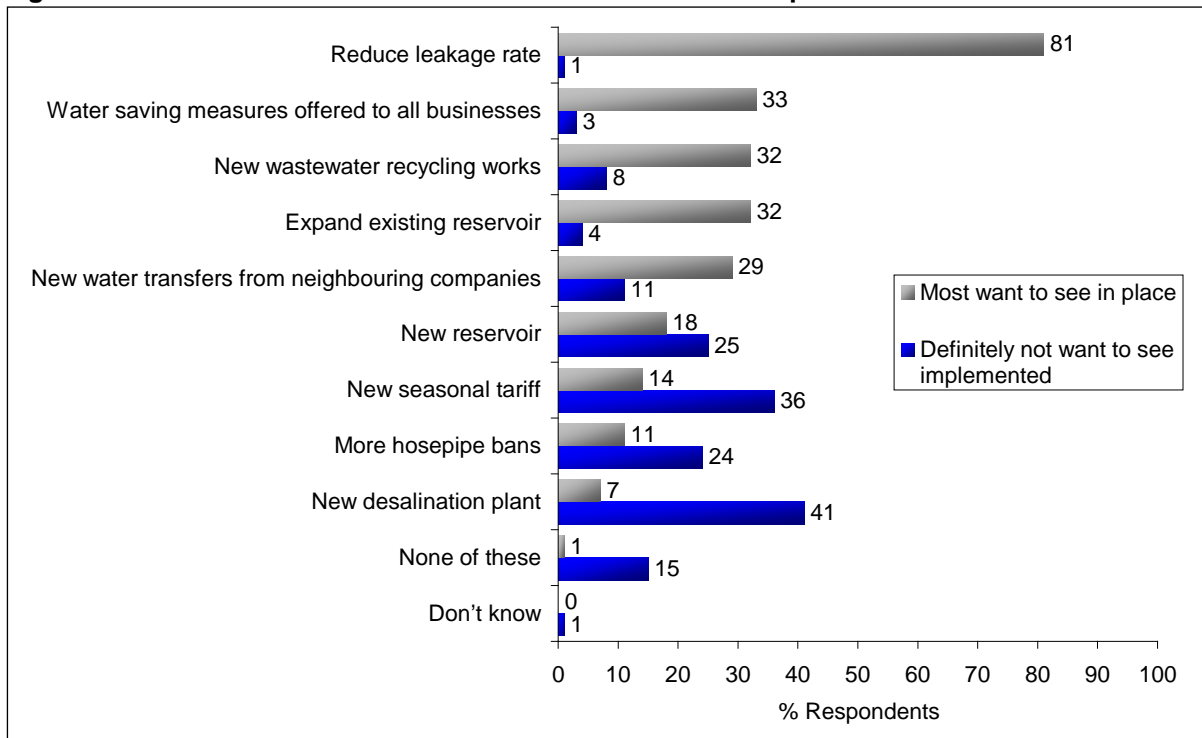
The most commonly cited measure to include, amongst both households and businesses, was for SEW to reduce the leakage rate. 61% of households cited this measure, and 81% of businesses. The most commonly cited measure not to include, again amongst both households and businesses, was for SEW to build a new desalination plant. 44% of households cited this measure, and 41% of businesses.

Figure 13: Household desired and least desired measures to implement



Base = all household respondents: 500

Figure 14: Business desired and least desired measures to implement



Base: all business respondents (300)

7. CHOICE ANALYSIS

7.1 Introduction

The main results from this study are obtained via an econometric analysis of responses to the DCE questions. Our approach to analysis consisted of the following steps:

- estimating econometric models to explain respondents' choices;
- calculating willingness to pay (WTP);
- comparing WTP for hosepipe ban risk reduction against the Primary WTP survey results;
- exploring the extent to which WTP varies in line with expectation via an econometric analysis of the sources of WTP variation.

In this section, we begin by providing an overview of our analysis. Sections 7.3 and 7.4 then present and discuss the household and business results respectively. Finally, section 7.5 summarises the results from a supplementary econometric analysis of the sources of WTP variation. This analysis is reported on in detail in Appendix D.

7.2 Overview of Analysis

The data from the DCE exercise, for both households and businesses, consisted in a sequence of eight choices per respondent, each between two alternatives.⁴ Choices are interpreted in our analysis as indicating that the utility of the chosen option is greater than the utility of the non-chosen option. This interpretation follows the principles of random utility theory (see e.g. Train, 2003).

The alternatives shown to respondents were generic, ie there were no systematic differences between Option A and Option B across the DCE exercises, hence a common utility specification was assumed for both alternatives in an exercise with no alternative specific constants.

The utility of an option for a respondent is modelled as being comprised of a component that depends deterministically on the levels of the attributes, and a second component that is assumed to be random for the purposes of estimation, but which may actually reflect non-random, but simply unobserved, respondent preferences.

Table 9 describes the variables used in the analysis. All of the supply-demand measures variables, except leakage reduction, are represented by dummy variables equal to one if the measure is included in the plan, and equal to zero if not. Leakage reduction is represented as a continuous variable, equal to the percentage of water leaked from SEW's pipes. As shown in Table 1, the base leakage level is 17%, and the two improved levels are 12% and 7%.

⁴ Data analysis was conducted using the Stata software package (StataCorp, 2013a). The data were organised so that an observation represented an individual option, so that for N respondents in the sample, there would potentially be $N*8*2 = 16N$ observations in each model, providing none were excluded.

Table 9: Variables used in analysis

Variable name	Description	Values taken by variable
<i>leakage</i>	Percentage of water leaked from SEW's pipes	{17, 12, 7}
<i>meter</i>	Metering policy = 'Compulsory'	{1='Yes'; 0='No'}
<i>steptariff</i>	New stepped tariff	{1='Yes'; 0='No'}
<i>seastariff</i>	New seasonal tariff	{1='Yes'; 0='No'}
<i>desal</i>	New desalination plant	{1='Yes'; 0='No'}
<i>resexp</i>	Expand existing reservoir	{1='Yes'; 0='No'}
<i>resnew</i>	New reservoir	{1='Yes'; 0='No'}
<i>recycle</i>	New water recycling works	{1='Yes'; 0='No'}
<i>transfer</i>	New water transfer from a neighbouring company	{1='Yes'; 0='No'}
<i>wsmeasures</i>	Water saving measures offered to all households/businesses	{1='Yes'; 0='No'}
<i>hose</i>	Frequency of hosepipe bans	{1/5; 1/10; 1/15; 1/20}
<i>waterimpact</i>	Sum of 'drops' associated with full set of included measures	Continuous in range [2, 15]
<i>pcost</i>	Percentage change in respondent's water bill.	{-5; 0; 5; 10; 15; 20}

Each supply-demand measure was described with an accompanying visual depiction, by either one, two, or three 'drops', to show its impact on water available in a dry period. See Table 1 for details.

We consider two model specifications in our analysis. The first model, for households, is specified such that the utility of an option is as follows.

$$(7.1) U_{ijt} = \beta_{1i}leakage_{ijt} + \beta_{2i}meter_{ijt} + \beta_{3i}steptariff_{ijt} + \beta_{4i}seastariff_{ijt} + \beta_{5i}desal_{ijt} + \beta_{6i}resexp_{ijt} + \beta_{7i}resnew_{ijt} + \beta_{8i}recycle_{ijt} + \beta_{9i}transfer_{ijt} + \beta_{10i}wsmeasures_{ijt} + \beta_{11i}hose_{ijt} + \gamma_i pcost_{ijt} + \varepsilon_{ijt}$$

For businesses, the model was the same as for households except that *meter*, and *steptariff* were excluded. This was because the corresponding supply-demand measures were not included on the business survey due to their being relevant only to households.

In equation (7.1), U_{ijt} indicates the utility associated with Option j for respondent i on choice occasion t . All of the variables from Table 1, except *waterimpact*, enter the utility function linearly with parameters $\beta_{1i}, \beta_{2i}, \dots, \beta_{11i}$ and γ_i . Finally, ε_{ijt} is a random error term.

Each of the econometric models is estimated as a panel mixed logit model (Revelt and Train, 1998), using the user-written *mixlogit* Stata command (Hole, 2007)⁵. The panel mixed logit modelling approach requires making two further assumptions: firstly, that the error term is independently and identically distributed according to the Extreme Value distribution, and secondly that the β parameters are distributed according to a specified family, to be decided by the analyst. In our analysis we have assumed that each parameter has a univariate normal distribution in the population, consistent with the approach taken in the Primary WTP study analysis.

In general, the marginal utility estimates (β_{ki} parameters) have meaning in this type of model as indicators of preference only in relation to one another, and not in absolute terms. The ratio of (minus) each β parameter to γ indicates the mean, and median, WTP for a change of 1 unit in the variable corresponding to the β parameter, holding all other variables constant.

⁵ Hole, A. (2007) Fitting Mixed Logit Models by using Maximum Simulated Likelihood, *The Stata Journal*, 7(3), 388-401.

WTP is defined here, in units of percentage points of customers' current bills. So, for example, $\beta_{1/\gamma}$ equals mean WTP, as a percentage of customers' current bills, for a one percentage point reduction in leakage; $-\beta_{2/\gamma}$ equals WTP for compulsory metering; etc.

We originally intended that equation 7.1 would be the only specification we would estimate, under the maintained assumption that all the value to customers that would derive from an improved water supply-demand balance, in a dry year, would be captured via the *hose* variable. Thus, holding *hose* constant, the derived WTP values could be interpreted as the external value of the supply-demand measure in question.

When reflecting on the values obtained under this approach, however, we considered some of the results to be implausible, as we will discuss below when we present the results. Instead, it seemed plausible to us that respondents were in fact attaching some value to the supply-demand contribution of the measures that was distinct from the hosepipe ban risk for the package as a whole. Possible sources of this value could include the contribution of the measure to reducing the risks of more serious restrictions, or the tendency of the measure to alleviate pressures on the environment elsewhere through a reduced need to take water from the most environmentally sensitive areas.

If it were the case that respondents were valuing the supply-demand contributions of the measures distinctly from the hosepipe ban risk for the package as a whole, then it would not be a fair reflection of respondents' preferences to treat the values obtained for each of the supply-demand measures as purely external values, attributable to factors such as their environmental impacts and local disruption effects, but net of any contribution made to the supply-demand balance.

In response to these considerations, we developed a second econometric specification that included all the original variables, plus one new variable *waterimpact*. This variable took values from 2 to 15, corresponding to the sum of the "water drops" associated with the water resource measures included in the choice option, as shown on Showcards 4a, 4b and 4c. These water drops were included on the showcard so as to communicate the impact of each measure on the water resources available in a dry period, so summing these over all the measures in the option would give an indicator for how much water would be available overall in a dry period.

Under our assumed scenario, the *hose* variable ought to have captured all of the value attributable to the water made available under each option as this is the relevant margin for SEW's management of the water resources balance. In practice, we found a positive and statistically significant coefficient on the *waterimpact* variable. This indicates, as we suspected, that respondents attached some significant value to the water supply-demand contribution in an option over and above its effect on the expected frequency of hosepipe bans.

In order to apply the results in a manner consistent with respondents' choices, it was important that the model was able to separate out the external value of each measure from the value of its contribution to water supply/demand. The external values could then be consistently added on to the value of water in SEW's water resources planning analysis. For this reason, given the significance of the *waterimpact* variable, we considered that the revised model should be used to derive the main results that are to be taken forward.

Once the *waterimpact* variable was included, the coefficients on the variables corresponding to water resource measures changed quite substantially in absolute size, although the relative ranking of each of the measures remained reasonably stable. The principal exception to this was in the case of the “New water recycling works” measure, which slipped down the household and business rankings from being one of the most preferred to being one of the least preferred.

The difference between the two models is most clearly seen once the variables have been transformed into WTP measures, as are presented in the next sections, and we discuss the results obtained following this presentation.

7.3 Household Results

Table 10 shows the main econometric model results for households, specified as described above. In both cases, mixed logit models are used assuming normal distributions for each of the coefficients. The coefficients can be interpreted as marginal utilities; so a negative sign means that respondents dislike it and a positive sign indicates that they like it. Note that the way the *leakage* variable was defined meant that a negative sign on its coefficient indicates that respondents preferred less leakage to more leakage, and so valued leakage reduction measures. For all other variables, a positive coefficient indicates that respondents attached value to the supply-demand measure in excess of its contribution to the water supply-demand balance and a negative coefficient indicates that this external value was negative.

The models shown in Table 10 both fit the data reasonably well, with pseudo R^2 values of above 0.15 in each case. The two variables that carried a strong theoretical prior, *hose* and *pcost*, both entered the models with the expected negative sign, indicating that people preferred less frequent hosepipe bans and cheaper bills, all else equal. In the case of the other variables, we had no such theoretical priors as they could conceivably have been considered either positively or negatively by respondents.

The second model includes the additional *waterimpact* variable discussed above. The coefficient on the *waterimpact* variable is positive and significant in the second model of Table 10. This indicates that respondents attached a significant value to the water contribution in an option over and above its effect on the expected frequency of hosepipe bans. This value may, for instance, be due to the perceived risks of more serious water restrictions, such as rota cuts to supply, even though these were not specified in the exercise.

Table 10: Main Household DCE Model Results

Variable	Excluding water impact variable		Including water impact variable	
	Mean (Coef, Std. error)	Std dev. (Coef, Std. error)	Mean (Coef, Std. error)	Std dev. (Coef, Std. error)
<i>leakage</i>	-0.218 (0.022)***	0.180 (0.030)***	-0.018 (0.065)	0.181 (0.03)***
<i>meter</i>	0.659 (0.164)***	2.056 (0.269)***	-0.016 (0.266)	2.091 (0.265)***
<i>steptariff</i>	0.019 (0.108)	0.831 (0.215)***	-0.695 (0.246)***	0.953 (0.194)***
<i>seastariff</i>	-0.219 (0.127)**	0.849 (0.276)***	-0.929 (0.248)***	0.753 (0.279)***
<i>desal</i>	-0.931 (0.149)***	1.922 (0.209)***	-3.163 (0.688)***	1.999 (0.218)***
<i>resexp</i>	0.853 (0.159)***	0.757 (0.338)**	-0.562 (0.446)	0.079 (0.903)***
<i>resnew</i>	-0.012 (0.152)	1.094 (0.293)***	-2.134 (0.663)***	1.095 (0.290)
<i>recycle</i>	1.146 (0.152)***	1.354 (0.203)***	-0.856 (0.645)	1.408 (0.207)***
<i>transfer</i>	0.324 (0.110)***	0.894 (0.192)***	-0.332 (0.233)	0.955 (0.195)***
<i>wsmeasures</i>	0.546 (0.127)***	1.079 (0.263)***	-0.138 (0.252)	1.125 (0.244)***
<i>hose</i>	-3.330 (4.082)	28.622 (10.783)***	-2.596 (4.195)	28.276 (9.474)***
<i>waterimpact</i>			0.704 (0.218)***	0.232 (0.073)***
<i>pcost</i>	-0.112 (0.014)***	0.130 (0.019)***	-0.112 (0.013)***	0.129 (0.019)***
No. obs. (=N*8*2)	8000		8000	
LL	-2341.138		-2331.402	
Pseudo R²	0.156		0.159	

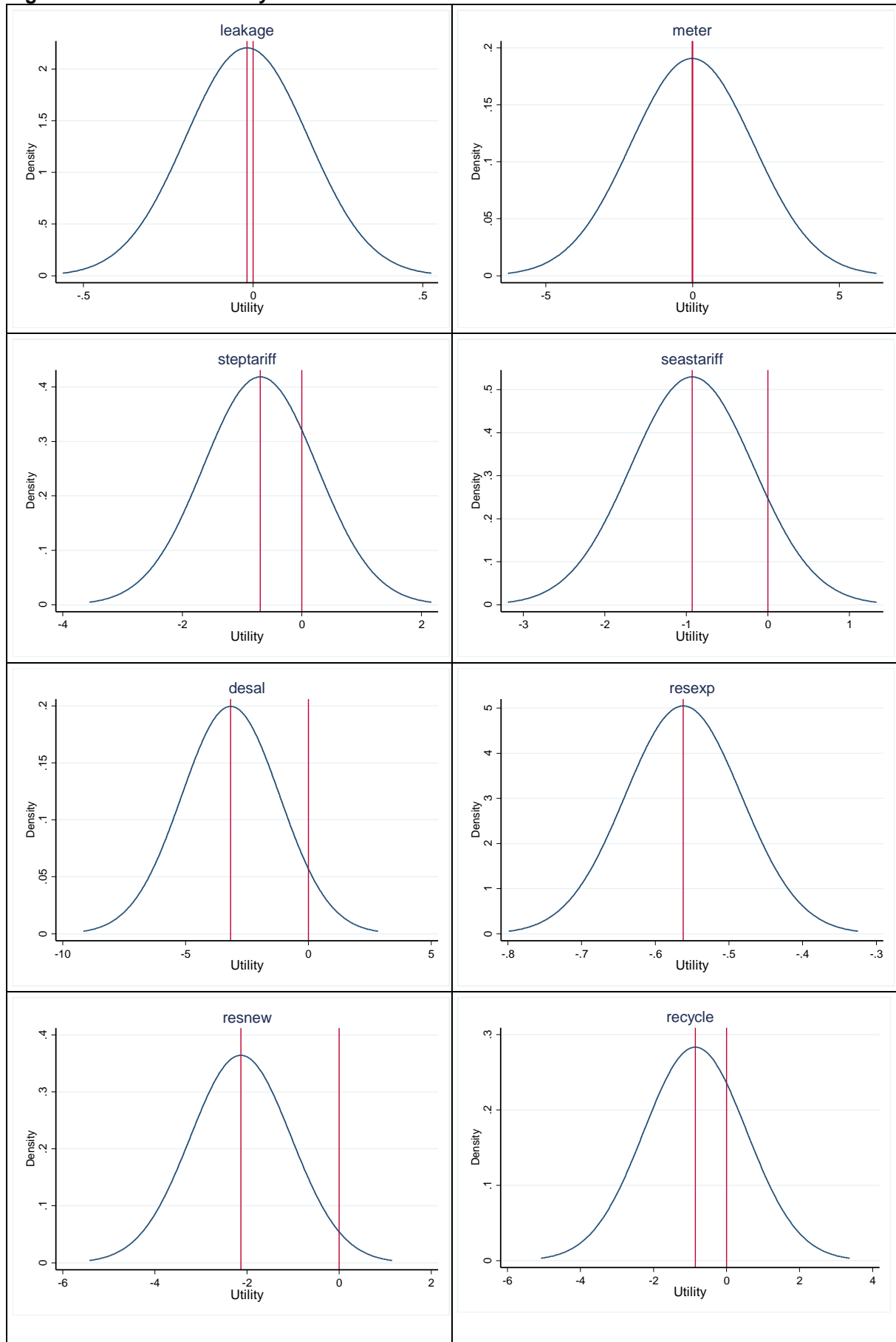
*Model = mixed logit, with normal distributions assumed for all variables; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; robust standard errors in parentheses, allowing for clustering on individuals; * significant at 10%; ** significant at 5%; *** significant at 1%. Variable definitions are shown in Table 9. “LL” values show the log likelihood of the model at convergence.*

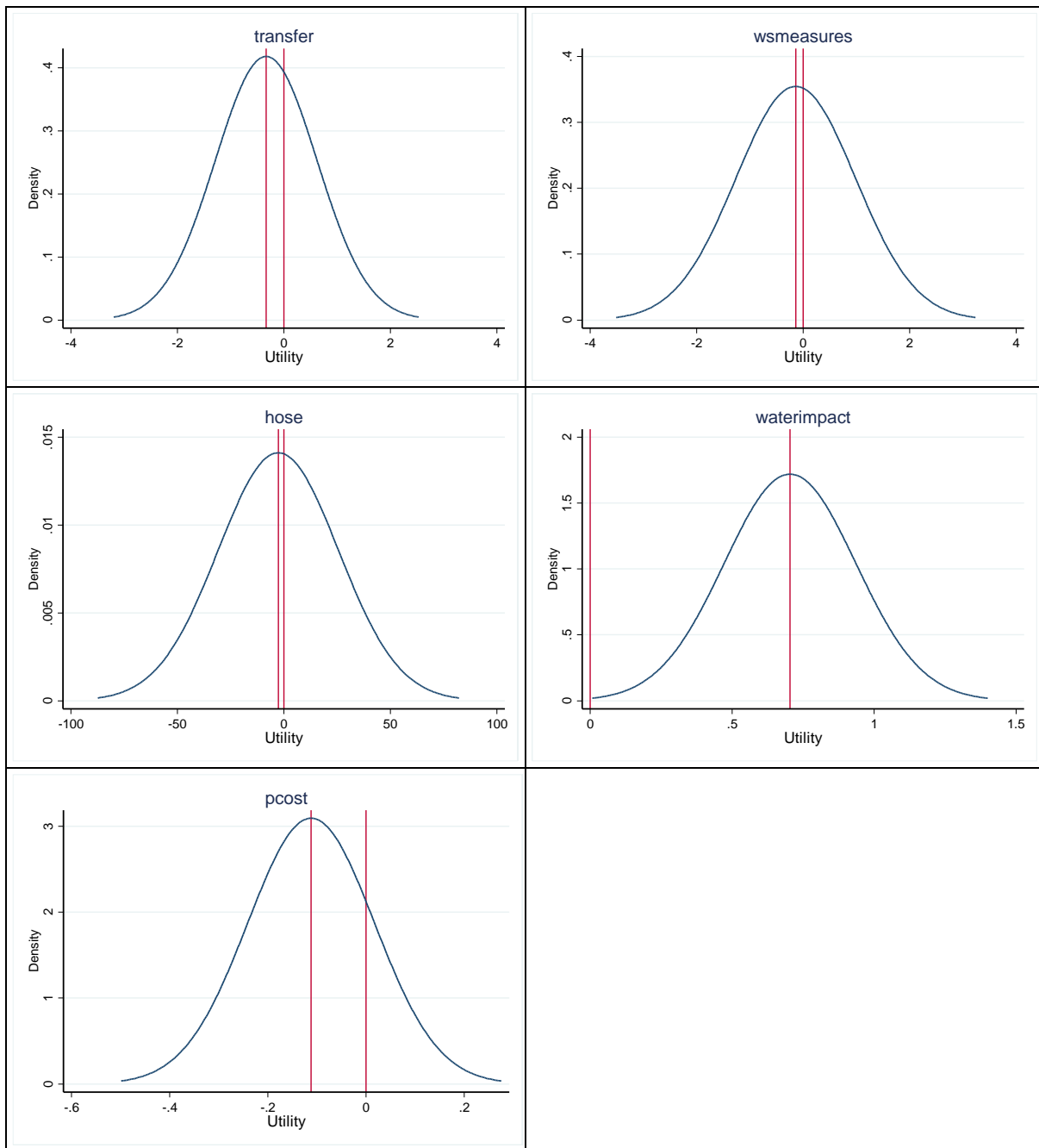
The results in Table 10 show standard deviations of the parameter distributions as well as the means, and these give a good indication of how dispersed, or similar, are the preferences across the household customer base. The results show that in all cases, except for *resnew*, the standard deviation parameters are statistically significant at the 1% level. Moreover, the standard deviation parameter estimates are in many cases large relative to the corresponding means. Both of these findings together indicate that customers’ preferences are significantly dispersed across the population.

Figure 15 plots the parameter distributions from the “including water impact variable” model of Table 10 on a single graph for each variable in the model. The graphs include vertical lines showing the mean of the distribution and zero. These graphs give a good visual indication of the proportion of the customer base that value the external impacts of a measure positively (greater than zero) or negatively an option (less than zero). In the case of *leakage*, for example, the mean is very close to zero in the context of the distribution as a whole, with around half the distribution either side of zero. Thus in this case, even though the mean parameter is negative, which indicates that households value leakage reduction positively on average after accounting for the supply-demand impact of the water saved, there seems to be approximately half the population with a positive value and half with a negative value.

Looking across the full set of measures, we see several similar cases where significant proportions of the population value the measure positively even where the mean is negative. At some level this is not surprising. All of these different options for dealing with scarce water resources are under consideration and even a generally unpopular technology like desalination appears to have some strong supporters.

Figure 15: Household Utility Parameter Distributions





Graphs are based on the parameter estimates shown in Table 10 for the “Including water impact variable” model.

The next table shows WTP results derived from the above models by dividing each coefficient by minus the coefficient on *pcost*. In doing so, we are effectively applying an approximation, since both the coefficient on *pcost* and the coefficients on each of the supply-demand measures are estimated as varying over the population. The WTP results can be interpreted as being valid for the mean respondent.

In addition to the *hose* variable, we also present a transformed WTP value for hose (0.1 to 0.05), which is the mean WTP for an improvement from “1 in 10” to “1 in 20”. (The original figure shows WTP for an improvement from “1 in 1” to “never”.)

The results in the first column show respondents' WTP for each measure holding hosepipe ban risk constant. By contrast, the results in the second column show respondents' WTP for each measure holding both hosepipe ban risk and total water available in a dry period constant. For the reason discussed above, we consider that the estimates in the second column are more consistent with the intended application of the figures as the external costs and benefits of the various measures, after separate accounting for the value of the water they would contribute in a dry year.

Table 11: Household Willingness to Pay Results (Intermediate)

Variable	Excluding water impact variable (WTP (%/hh/year), Std. error)	Including water impact variable (WTP (%/hh/year), Std. error)
<i>leakage</i>	-1.942 (0.218)***	-0.162 (0.582)
<i>meter</i>	5.867 (1.498)***	-0.143 (2.375)
<i>steptariff</i>	0.168 (0.963)	-6.200 (2.262)***
<i>seastariff</i>	-1.951 (1.151)*	-8.288 (2.333)***
<i>desal</i>	-8.291 (1.599)***	-28.204 (6.655)***
<i>resexp</i>	7.600 (1.372)***	-5.009 (4.041)
<i>resnew</i>	-0.105 (1.354)	-19.028 (6.222)***
<i>recycle</i>	10.205 (1.421)***	-7.633 (5.839)
<i>transfer</i>	2.888 (0.945)***	-2.958 (2.13)
<i>wsmeasures</i>	4.867 (1.153)***	-1.229 (2.253)
<i>hose</i>	-29.663 (37.064)	-23.153 (37.983)
<i>hose (0.1 to 0.05)</i>	1.483 (1.853)	1.158 (1.899)
<i>waterimpact</i>		6.281 (2.021)***

Results derived from the models shown in Table 10 by dividing the coefficient of each variable by minus the coefficient on *pcost*. In the case of *hose (0.1 to 0.05)*, figures are derived by multiplying WTP for *hose* by 0.05. * significant at 10%; ** significant at 5%; *** significant at 1%. Variable definitions are shown in Table 9.

The preferred WTP numbers indicate the following:

- *leakage* - respondents are willing to pay 0.16% per percentage point of leakage reduced, holding both hosepipe risk and total water available constant. So if SEW reduces leakage from 17% to 7% (max change), this works out as a 1.6% increase in bills. However, this value is statistically insignificant ($p > .10$).

- *meter* - respondents would need to have at least a 0.14% lower bill on average to accept the introduction of compulsory metering, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *steptariff* - respondents would need to have at least a 6.2% lower bill on average to accept the introduction of a stepped tariff, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *seastariff* - respondents would need to have at least an 8.3% lower bill on average to accept the introduction of a seasonal tariff, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *desal* - respondents would need to have at least a 28.2% lower bill on average to accept the company building a desal plant, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *resexp* - respondents would need to have at least a 5.0% lower bill on average to accept a reservoir expansion, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *resnew* - respondents would need to have at least a 19.0% lower bill on average to accept a new reservoir, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *recycle* - respondents would need to have at least a 7.6% lower bill on average to accept the company building a water recycling plant, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *transfer* - respondents would need to have at least a 3.0% lower bill on average to accept the building of a transfer between neighbouring companies, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *wsmeasures* - respondents would need to have at least a 1.2% lower bill on average to accept the company giving out free water saving devices, holding hosepipe risk constant. However, this value is statistically insignificant ($p > .10$).

- *hose* – household respondents are willing to pay a 1.2% higher bill on average (from 2019) for an improvement in hosepipe risk from 1 in 10 to 1 in 20, all else equal (ie not accounting for the utility/disutility of any of the measures used to get there). However, this is statistically insignificant ($p > .10$).

Overall, although the magnitudes of the estimates presented here differ from those shown in the first column of Table 11, the results are reasonably stable in terms of their relative rankings. For example, although leakage reduction is not statistically significant under the revised approach, it is still preferred to every other measure as it is the only measure to be valued positively. (A negative coefficient indicates less leakage is preferred to more.) This indicates that an optimised programme of measures that takes account of these external values will still rank leakage more highly than an optimised programme that ignores these values. The principal exception to this was in the case of the “New water recycling works” measure, which slipped down the rankings from being one of the most preferred - preferred to all except the maximum leakage reduction (to 7%) measure - to being one of the least preferred.

Table 12 below presents our main monetised valuation results for households. The central estimates are calculated by multiplying the percentage results for the “including water impact variable” column in the table above by £220 – the sample average household water bill. The lower and upper bounds of the range are based on the 95% confidence interval.

Note that the results are not calibrated to the Primary WTP survey results here. This is because the Primary WTP survey obtained an estimate of £108.25 per avoided hosepipe ban per household, while the present survey obtained an estimate of £50.93 (23.15% * £220). The difference is not statistically significant at the 10% level (based on a t test comparison of means), but it is potentially economically significant. The theory of packaging effects suggests that the value from the present survey should be lower than the Primary WTP value because the present survey value is obtained in the context of a more limited package than

was valued in the Primary WTP survey. Since the present value is in fact higher, we consider that it is not appropriate to scale upwards to the Primary WTP value. We believe that the most likely explanation for finding a higher value in the Primary WTP survey than in the water resources survey is that the Primary WTP survey value of the hosepipe ban attribute included some of the value attributed to the *waterimpact* variable in the present survey. This could happen, for example, if some proportion of the Primary WTP survey respondents believed that the hosepipe ban risk actually incorporated some additional information on the resilience of the water infrastructure to more serious restrictions.

The results in Table 12 show a wide range for the values of many of the measures. This is an indication of the fact that these numbers are estimated somewhat imprecisely. We advise that they are to be considered draft results at this stage, and subjected to common sense checking in relation to how they impact upon the choice of water resource plan when they are used in practice.

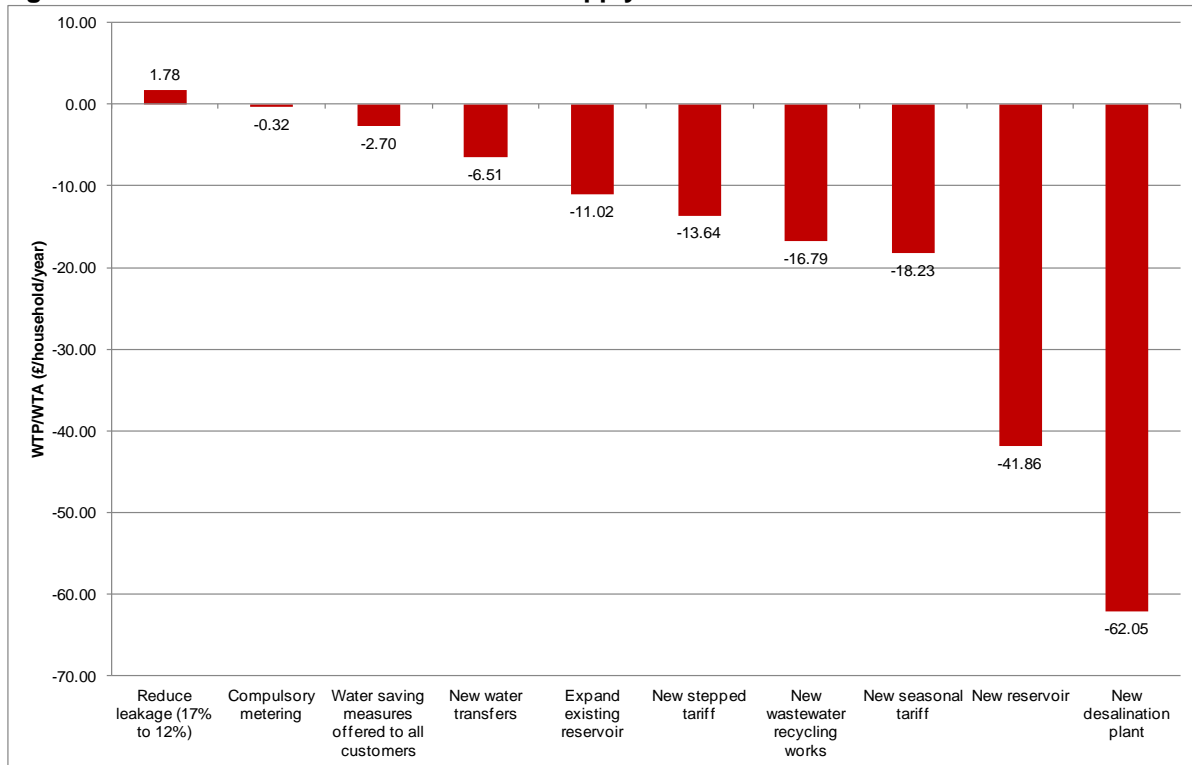
Table 12: Main Household Willingness to Pay Results

Variable	Household WTP (£/hh/year)		
	Central	Range	
<i>leakage</i>	-0.36	-2.87	2.15
<i>meter</i>	-0.32	-10.56	9.93
<i>steptariff</i>	-13.64	-23.39	-3.89
<i>seastariff</i>	-18.23	-28.30	-8.17
<i>desal</i>	-62.05	-90.74	-33.35
<i>resexp</i>	-11.02	-28.44	6.40
<i>resnew</i>	-41.86	-68.69	-15.03
<i>recycle</i>	-16.79	-41.97	8.39
<i>transfer</i>	-6.51	-15.69	2.68
<i>wsmeasures</i>	-2.70	-12.42	7.01

Results are calculated by multiplying the percentage WTP results for the “including water impact variable” column from Table 11 by £220 – the sample average household water bill. The lower and upper bounds of the range are based on the 95% confidence interval. Variable definitions are shown in Table 9.

Figure 16 below plots the results from Table 12 on a chart to show the relative value placed on each of the measures more clearly. In order to make the leakage result comparable basis, the figure shows a value for this measure corresponding to a reduction in leakage from 17% to 12%.

Figure 16: Household WTP / WTA for water supply-demand measures



Source of WTP/WTA estimates: Table 12.

7.4 Business Results

The results presented in this section follow exactly the same format as for the household results. Moreover the results themselves are very similar to the household results.

Table 13 shows the main model results. Again, the models fit the data reasonably well, with pseudo R^2 values of above 0.15 in each case, and the expected negative signs on *hose* and *pcost*.

Table 13: Main Business DCE Model Results

Variable	Excluding water impact variable		Including water impact variable	
	Mean (Coef, Std. error)	Std dev. (Coef, Std. error)	Mean (Coef, Std. error)	Std dev. (Coef, Std. error)
<i>leakage</i>	-0.214 (0.025)***	0.189 (0.034)***	-0.027 (0.081)	0.209 (0.036)***
<i>seastariff</i>	-0.522 (0.148)***	1.390 (0.218)***	-1.261 (0.314)***	1.501 (0.242)***
<i>desal</i>	-0.896 (0.182)***	1.725 (0.244)***	-3.031 (0.825)***	1.789 (0.258)***
<i>resexp</i>	0.798 (0.179)***	1.079 (0.292)***	-0.485 (0.564)	1.191 (0.285)***
<i>resnew</i>	0.165 (0.169)	1.017 (0.261)***	-1.866 (0.801)**	0.988 (0.313)***
<i>recycle</i>	0.806 (0.143)***	0.652 (0.255)***	-1.180 (0.787)	0.718 (0.267)***
<i>transfer</i>	0.298 (0.12)**	0.450 (0.347)	-0.325 (0.276)	0.623 (0.261)**
<i>wsmeasures</i>	0.467 (0.147)***	1.226 (0.248)***	-0.139 (0.295)	1.163 (0.269)***
<i>hose</i>	-7.658 (4.319)*	15.596 (13.065)	-9.121 (4.663)*	19.461 (12.97)
<i>waterimpact</i>			0.696 (0.264)***	0.266 (0.076)***
<i>pcost</i>	-0.123 (0.017)***	0.147 (0.023)***	-0.133 (0.019)***	0.160 (0.025)***
No. obs. (=N*8*2)	4800		4800	
LL	-1412.02		-1400.18	
Pseudo R²	0.151		0.158	

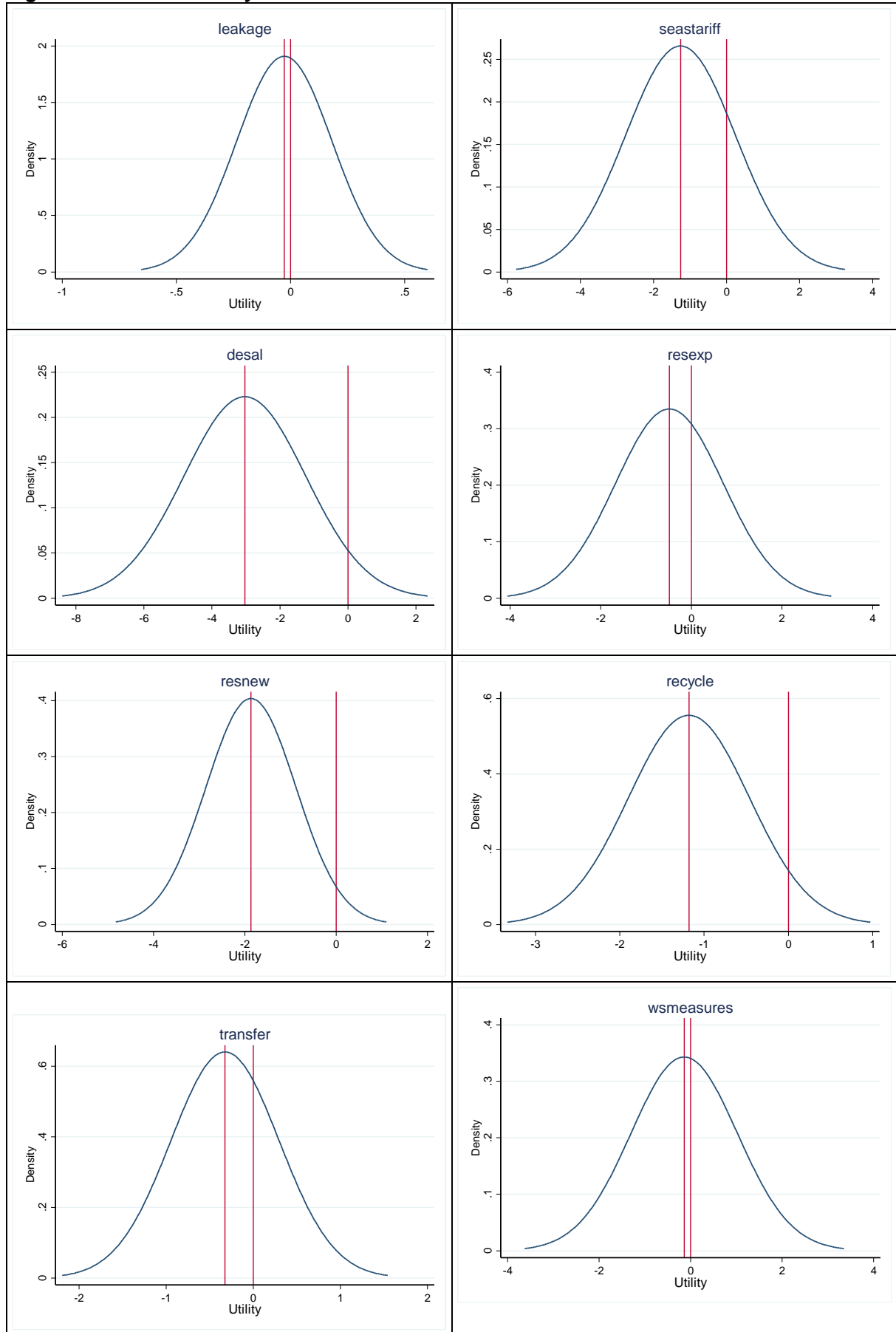
*Model = mixed logit, with normal distributions assumed for all variables; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen; robust standard errors in parentheses, allowing for clustering on individuals; * significant at 10%; ** significant at 5%; *** significant at 1%. Variable definitions are shown in Table 9. “LL” values show the log likelihood of the model at convergence.*

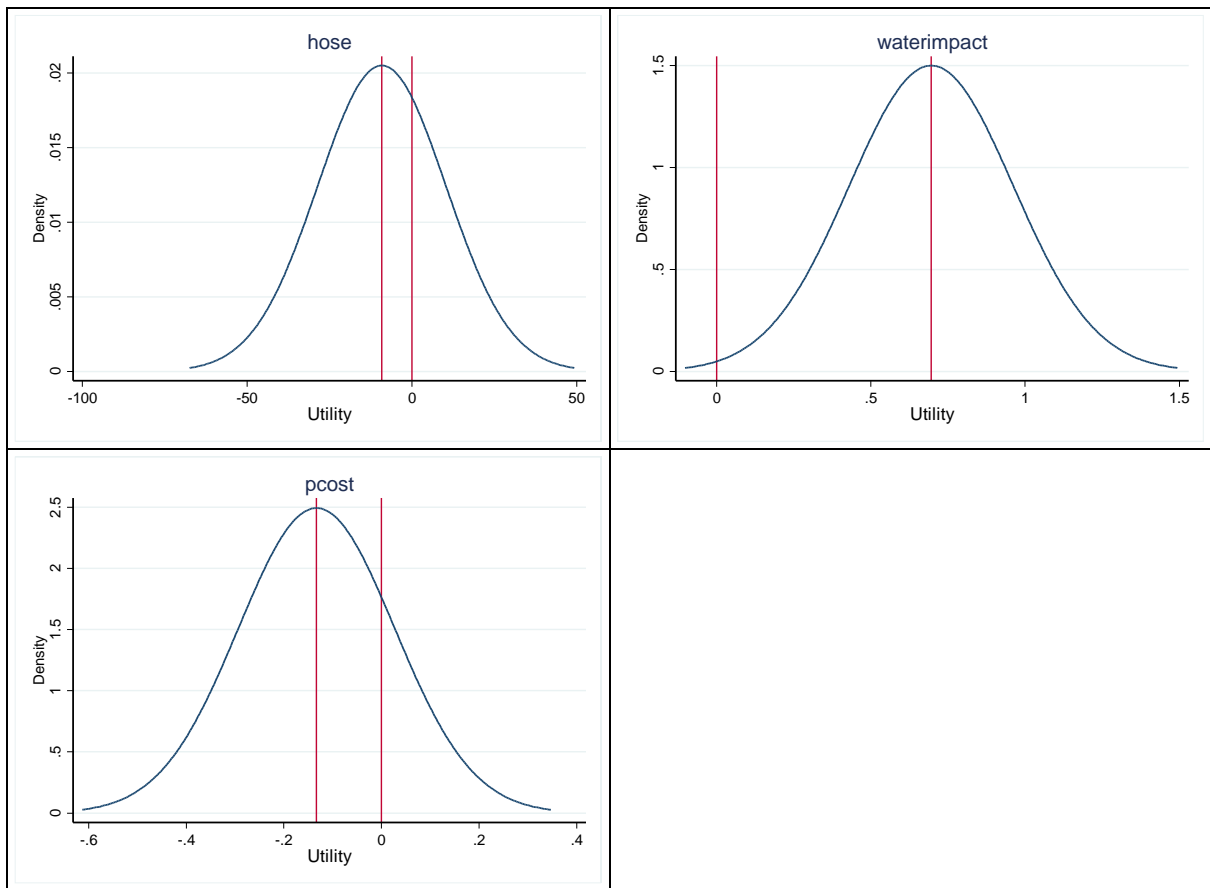
The results in Table 13 show standard deviations of the parameter distributions as well as the means, and these give a good indication of how dispersed, or similar, were the preferences across the business sample. The results show that in all cases, except for *hose* and *transfer*, the standard deviation parameters were statistically significant at the 1% level, and the transfer standard deviation estimate was itself statistically significant at the 5% level. Moreover, the standard deviation parameter estimates were in many cases large relative to the mean parameter estimate. Both of these findings together indicate that customers’ preferences are significantly dispersed across the population.

Figure 17 plots the parameter distributions from the “including water impact variable” model of Table 13 on a single graph for each variable in the model. As with the household graphs, these include vertical lines showing the mean of the distribution and zero. They give a good visual indication of the proportion of the customer base that value the external impacts of a measure positively (greater than zero) or negatively an option (less than zero). In the case of *leakage*, the mean is very close to zero in the context of the distribution as a whole, with around half the distribution either side of zero. Thus in this case, even though the mean parameter was negative, which indicates that business respondents valued leakage reduction positively on average after accounting for the supply-demand impact of the water saved, there seems to be approximately half the population with a positive value and half with a negative value.

Looking across the full set of measures, we see several similar cases where significant proportions of the population value the measure positively even where the mean is negative. The results are thus qualitatively very similar to the household results. Even a generally unpopular technology like desalination appears to have some strong supporters, although substantially fewer than for some of the other measures.

Figure 17: Business Utility Parameter Distributions





Graphs are based on the parameter estimates shown in Table 13 for the “Including water impact variable” model.

The results in Table 14 show WTP as derived from the above models by dividing each coefficient by minus the coefficient on *pcost*. In doing so, we are effectively applying an approximation, since both the coefficient on *pcost* and the coefficients on each of the supply-demand measures are estimated as varying over the population. The WTP results can be interpreted as being valid for the mean respondent.

As for households, in addition to the *hose* variable, we also present a transformed WTP value for hose (0.1 to 0.05), which is the mean WTP for an improvement from “1 in 10” to “1 in 20”. (The original figure shows WTP for an improvement from “1 in 1” to “never”.)

The results in the first column show respondents’ WTP for each measure holding hosepipe ban risk constant; those in the second column show respondents’ WTP for each measure holding both hosepipe ban risk and total water available in a dry period constant. For the reason discussed above, we consider that the estimates in the second column are more consistent with the intended application of the figures as the external costs and benefits of the various measures, after separate accounting for the value of the water they would contribute in a dry year.

Table 14: Business Willingness to Pay Results (Intermediate)

Variable	Excluding water impact variable (WTP (%/bus/year), Std. error)	Including water impact variable (WTP (%/bus/year), Std. error)
<i>leakage</i>	-1.738 (0.243)***	-0.203 (0.604)
<i>seastariff</i>	-4.241 (1.283)***	-9.476 (2.561)***
<i>desal</i>	-7.286 (1.711)***	-22.781 (6.715)***
<i>resexp</i>	6.484 (1.461)***	-3.649 (4.303)
<i>resnew</i>	1.340 (1.343)	-14.023 (6.316)**
<i>recycle</i>	6.552 (1.222)***	-8.868 (6.047)
<i>transfer</i>	2.422 (0.952)**	-2.443 (2.122)
<i>wsmeasures</i>	3.796 (1.223)***	-1.048 (2.23)
<i>hose</i>	-62.249 (37.609)*	-68.564 (37.643)*
<i>hose (0.1 to 0.05)</i>	-3.112 (1.88)*	-3.428 (1.882)*
<i>waterimpact</i>		5.229 (2.071)*

Results derived from the models shown in Table 13 by dividing the coefficient of each variable by minus the coefficient on *p*cost. In the case of *hose* (0.1 to 0.05), figures are derived by multiplying WTP for *hose* by 0.05. * significant at 10%; ** significant at 5%; *** significant at 1%.

The results in Table 14 indicate the following:

- *leakage* - respondents are willing to pay 0.20% per percentage point of leakage reduced, holding both hosepipe risk and total water available constant. So if SEW reduces leakage from 17% to 7% (max change), this works out as a 2.0% increase in bills. However, this value is statistically insignificant ($p > .10$).

- *seastariff* - respondents would need to have at least a 9.5% lower bill on average to accept the introduction of a seasonal tariff, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *desal* - respondents would need to have at least a 22.8% lower bill on average to accept the company building a desal plant, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 1% level.

- *resexp* - respondents would need to have at least a 3.6% lower bill on average to accept a reservoir expansion, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *resnew* - respondents would need to have at least a 14.0% lower bill on average to accept a new reservoir, holding both hosepipe risk and total water available constant. This figure is statistically significant at the 5% level.

- *recycle* - respondents would need to have at least a 8.9% lower bill on average to accept the company building a water recycling plant, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *transfer* - respondents would need to have at least a 2.4% lower bill on average to accept the building of a transfer between neighbouring companies, holding both hosepipe risk and total water available constant. However, this value is statistically insignificant ($p > .10$).

- *wsmeasures* - respondents would need to have at least a 1.0% lower bill on average to accept the company giving out free water saving devices, holding hosepipe risk constant. However, this value is statistically insignificant ($p > .10$).

- *hose* – business respondents are willing to pay a 3.4% higher bill on average (from 2019) for an improvement in hosepipe risk from 1 in 10 to 1 in 20, all else equal (ie not accounting for the utility/disutility of any of the measures used to get there). This value is statistically significant at the 5% level.

As for households, the magnitudes of the estimates presented here are consistent with those reported previously in terms of their relative significance, even though they differ in absolute terms.

Table 12 below presents our main monetised valuation results for businesses. The central estimates are calculated by multiplying the percentage results for the “including water impact variable” column in the table above by £929 – the population average business water bill. The lower and upper bounds of the range are based on the 95% confidence interval. (The population average bill is used for businesses, rather than the sample average bill as was the case for households, because the business survey presented costs in percentage terms whereas the household survey presented costs in monetary terms.)

Again, the results in Table 15 show a wide range for the values of many of the measures, which is an indication of the fact that these numbers are estimated somewhat imprecisely. We advise that they are to be considered draft results at this stage, and subjected to common sense checking in relation to how they impact upon the choice of water resource plan when they are used in practice.

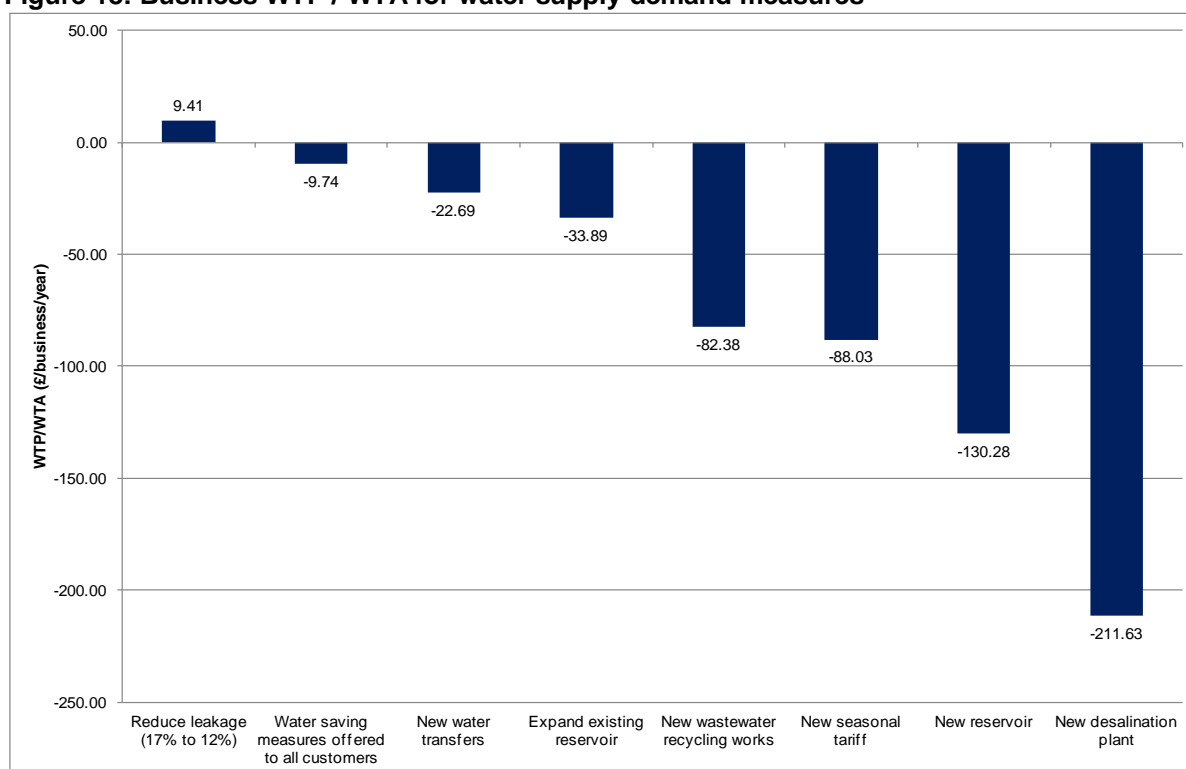
Table 15: Main Business Willingness to Pay Results

Variable	Business WTP (£/bus/year)		
	Central	Range	
<i>leakage</i>	-1.88	-12.89	9.12
<i>seastariff</i>	-88.03	-134.66	-41.40
<i>desal</i>	-211.63	-333.89	-89.37
<i>resexp</i>	-33.89	-112.25	44.46
<i>resnew</i>	-130.28	-245.27	-15.28
<i>recycle</i>	-82.38	-192.49	27.72
<i>transfer</i>	-22.69	-61.33	15.94
<i>wsmeasures</i>	-9.74	-50.35	30.87

Results are calculated by multiplying the percentage WTP results for the “including water impact variable” column from Table 14 by £929 – the population average business water bill. The lower and upper bounds of the range are based on the 95% confidence interval. leakage is a continuous variable taking values {7,12,17} indicating the percentage of water leaked from the system; seastariff is a dummy indicating the introduction of a seasonal tariff; desal is a dummy indicating the building of a new desalination plant; resexp is a dummy indicating the expansion of an existing reservoir; resnew is a dummy indicating the building of a new reservoir; recycle is a dummy indicating the building of a new recycling plant; transfer is a dummy indicating the building of a new pipeline to allow the transfer of water from a neighbouring company; wsmeasures is a dummy indicating the rollout of free or subsidised household/business water saving measures.

Figure 18 below plots the results from Table 15 on a chart to show the relative value placed on each of the measures more clearly. In order to make the leakage result comparable basis, the figure shows a value for this measure corresponding to a reduction in leakage from 17% to 12%.

Figure 18: Business WTP / WTA for water supply-demand measures



Source of WTP/WTA estimates: Table 15.

7.5 Analysis of WTP Variation

An important test of the validity of the WTP results from an SP survey concerns analysing the extent to which WTP varies in line with expectation (Bateman et al. 2002). In Appendix D we report on an econometric analysis of the determinants of choice, and WTP, variation which performs this test.

In summary, we test the following hypotheses:

- Responses given to the choice exercise should be consistent with the responses to the earlier “naive priority” questions in the survey, which asked respondents to choose their preferred measures for inclusion in SEW’s plan, and the measures they would least like to see implemented. (Figure 13 and Figure 14 showed the responses to these questions for households and businesses respectively.)
- Household WTP should be increasing with income
- Respondents saying their current bill was “Too much” or “Far too much” should be more cost sensitive than other respondents.
- Respondents saying they would prefer none of the supply-demand measures to be included, when asked to choose their preferred measures for inclusion in SEW’s plan, should be more cost sensitive, ie willing to pay less, than other respondents.

- Respondents stated that a hosepipe ban would have a “moderate impact” or a “big impact” on them should give greater weight to the frequency of hosepipe bans when choosing between options – that is, they should be relatively more averse to more frequent hosepipe bans than other respondents.
- Finally, households on a metered tariff should be relatively less averse to compulsory metering than other households. This is because households that are currently unmetered would presumably prefer to retain the option over whether to switch to a meter or not, rather than it be made compulsory, whereas this option has no value for households already on a metered tariff.

The results from our econometric analysis, reported in full in Appendix D, find no statistically significant coefficients that have the opposite sign to expected, and many statistically significant findings that do have the expected sign. Overall, the results from our econometric analysis are therefore uniformly supportive of the validity of the results.

8. CONCLUSIONS AND RECOMMENDATIONS

The research presented in this report has examined customers' preferences in relation to the many ways that SEW could manage its water resources in future. A robust stated preference approach was used, which was able to obtain monetary estimates of customers' willingness to pay for certain measures, and willingness to accept other measures in exchange for lower bills. These results were obtained as 'external' values, net of the value of the impact of each measure on the water supply-demand balance itself.

The results from our analysis show some consistent findings across households and businesses. The most desired measure amongst households and businesses is for leakage reduction, and for this measure only, customers are willing to pay a premium for SEW to implement it in excess of its contribution to the water supply-demand balance. For all other measures, negative external values were obtained, which indicates that respondents would prefer not to see them put in place unless the value of their contribution to the water supply-demand balance outweighs the financial cost plus the additional net external cost.

The most disliked measures, again amongst both households and businesses, included building a new desalination plant, building a new reservoir, and implementing a new seasonal tariff.

Confidence in the results presented in this report can be gained from the following:

- The design of the questionnaire was carefully considered, peer reviewed by Prof. Richard Carson, and fully tested via cognitive interviews and pilot tests with households and businesses.
- The vast majority of responses are assessed as valid, taking into account respondent and interviewer feedback, and the reasons respondents gave for their choices. (See section 5.)
- Analysis of the sources of variation in WTP shows that results are consistent with expectation in many areas, and there are no anomalous results. (See section 7.5.)

Overall, the valuation estimates presented appear to be meaningful measures of SEW customers' values for the range of supply-demand measures contained within the survey, net of their effects on the water supply-demand balance, and we believe they are appropriate for use in cost benefit analysis for SEW's water resources management planning.

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APPENDIX A

Household Questionnaire and Showcards

Interviewer name: Date: Time:

Recruitment Section

Good morning/afternoon/evening. My name is Could I please speak to whoever is responsible – either jointly or solely – for paying your household’s water bills? **(WHEN SPEAKING TO APPROPRIATE CONTACT CONTINUE WITH EXPLANATION)**

My name is from Accent, an independent research consultancy, and we are carrying out an important research study for South East Water to investigate customers’ views on issues concerning the supply of water in the coming years. This is a *bona fide* market research exercise. It is being conducted under the Market Research Society Code of Conduct which means that any answers you give will be treated in confidence. Could you please spare a couple of minutes to see if you are the type of customer we need to speak to for this research?

Q0 Can I just check that you are responsible, either jointly or solely, for paying your household’s water bills?

- Yes
- No **THANK & CLOSE**

Q1. Do you or any of your close family work or have worked in the past in any of the following professions: marketing, advertising, public relations, journalism, market research or the Water Industry (including working for South East Water)?

- Yes **THANK & CLOSE**
- No

Q2. What is the job title of the chief wage earner of your household or, if you are the chief wage earner, your own job title? if retired, probe whether state or private pension. if state only code as ‘E’. If private ask what their occupation was prior to retirement. probe

What are/were his/her/your qualifications/responsibilities? **PROBE**

WRITE IN AND CODE SEG

- | | |
|-------|---------------|
| 1. A | 4. C2 |
| 2. B | 5. DE |
| 3. C1 | 6. Not stated |

Q3. Which of the following age groups do you fall into?

- | | |
|----------|----------------|
| 1. 18-29 | 4. 65 to 74 |
| 2. 30-44 | 5. 75 or older |
| 3. 45-64 | 6. Refused |

Q4. Do you have a water meter?

- 1. Yes
- 2. No
- 3. Don’t Know

Q4A Does your property have a septic tank or cess pit? **[IF REQUIRED]** If you do have one, this would mean that your property is not connected to the main sewer and you would periodically arrange to have the septic tank emptied.

1. Yes

2. No

3. Don't Know

Q5. What is your postcode?

First part

Second part

Q6. Hidden question

PROGRAMMER: LOOKUP POSTCODE TO IDENTIFY:

1. Thames Water area

2. Southern Water area

Q7. **IF Q4A=1 SKIP TO Q8B IF Q6=1** According to our records, you receive a bill from South East Water that includes billing for your sewerage services on behalf of Thames Water **ELSE IF Q6=2** According to our records, you receive a bill from South East Water for your water services and a separate bill from Southern Water for sewerage services **END IF** Is that correct?

1. Yes **PROCEED**

2. No **CHECK POSTCODE, IF STILL NO, CLOSE**

3. Don't know **PROCEED**

Q8B Do you pay your South East Water bill ...**[READ OUT]**

1. Monthly

2. Quarterly (every three months)

3. Every six months

4. Annually

5. Other

6. Don't know

Q8C How much is your bill from South East Water **[IF Q4A=1]** for your water supply **[ELSE IF Q6=1]** for your water supply and sewerage services from Thames water combined **[ELSE IF Q6=2]** for your water supply? **[END IF]** You can say how much a month, a quarter, every six months or a year – whichever is easiest for you. If you're not sure, please give your best estimate.

1. £ per month

2. £ per quarter

3. £ per six months

4. £ per year

5. Don't know **GO TO Q8A**

Q8D Please say if that is an estimate or not

1. Estimate

2. Exact amount

Q8E HIDDEN QUESTION: CALCULATE ANNUAL BILL FROM Q8C

£ per year

Q8F That would make your total annual bill from South East Water **[IF Q4A=1]** for your water supply **[ELSE IF Q6=1]** for your water supply and sewerage services from Thames water combined **[ELSE IF Q6=2]** for your water supply **[END IF]** £ **INPUT BILL FROM Q8E** Does that sound right to you?

- 1. Yes **GO TO Q8A**
- 2. No

Q8G What would be a more accurate figure for your annual bill from South East Water?

£ per year

Q8A Do not ask – note gender

- 1. Male
- 2. Female

Q8. [DELETED]

Recruitment

RECRUITMENT Thank you for answering those questions. As I mentioned, we are carrying out an important research study for South East Water to investigate what is most important for customers in the coming years. I would be very grateful if you could spare another **15-20** minutes – either now or at a more convenient time – to run through some questions with me. This is your opportunity to influence the company’s future plans. Those who take part would receive a £5 voucher (either Amazon or Boots) or this could be donated to ‘WaterAid’ the charity. You do need to have some materials in front of you which I can either email to you now and we can carry on or I can email or post them to you and we can make an arrangement to talk at a convenient time for you.

email, now **SEND EMAIL THEN AND PROCEED**
cannot continue with interview now **SEND EMAIL THEN RECORD APPOINTMENT ON NEXT SCREEN**
do not have access to email **BRING UP APPOINTMENT/ADDRESS BOX**
no **ATTEMPT TO REASSURE & PERSUADE; IF STILL NO, THANK & CLOSE**
continue without sending email (practise/design/completes)

Date: Time:.....

Name:

Address:

Email Address:

Tel No.

Introduction to Main Survey

Thank you for agreeing to take part in this survey. As I said previously, we are conducting research for South East Water looking at what is important for customers in the coming years.

The questionnaire will take 15-20 minutes. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

Can I check to see if you have your materials ready to refer to? These will have either been sent in the post or by email. And what is the reference number on the materials? **INTERVIEWER: CHECK THE NUMBER IS CORRECT AND PROCEED OR RE-SCHEDULE AS APPROPRIATE.**

Correct – **PROCEED**

Incorrect – **GO TO APPOINTMENTS SCREEN AND RE-SCHEDULE, RE-SENDING MATERIALS**

Background Questions

Q9. DO NOT READ OUT: Bill size [INPUT FROM Q8E OR Q8G]

READ OUT: As you may know, South East Water only supplies drinking water and other companies provide waste water sewerage.

IF Q8C= DON'T KNOW: The average annual household water bill in your area is £204

IF Q4A=1 (septic tank) OR Q8C=5 (don't know bill) SKIP TO Q10

ELSE: Previously you told me that your annual bill from South East Water is [INPUT FROM Q9].

IF Q6=1 That includes both water and waste services, and of that amount, [VALUE FROM Q9*0.59] goes to South East Water for water services.

ELSE IF Q6=2 That covers water services and you pay another company separately for sewerage services **END IF**

END IF

[PROGRAMMING INSTRUCTION –CALCULATE NEW BILL VARIABLES FROM THE INFORMATION GIVEN FOR THAMES AND SOUTHERN BASED ON THE FORMULA SHOWN BELOW. THESE WILL BE USED IN THE CHOICE EXERCISE]

F Q8C=5 (Don't know) SHOW AVERAGEBILL (ie £204)

ELSE

IF Q6=1 AND Q4A=2 or 3 (THAMES CUSTOMER WITHOUT SEPTIC TANK) BILLTHAMES=Q9*0.59

IF Q6=1 AND Q4A=1 (THAMES CUSTOMER WITH SEPTIC TANK) BILLTHAMESSEP=Q9

IF Q6=2 AND Q4A=2 or 3 (SOUTHERN CUSTOMER WITHOUT SEPTIC TANK) BILLSOUTH=Q9

IF Q6=2 AND Q4A=1 (SOUTHERN CUSTOMER WITH SEPTIC TANK) BILLSOUTHSEP=Q9

Q10. How do you feel about the amount that you pay for water services? Is it:

Far too little

Too little

About right

Slightly too much

Far too much

Q11. Are you aware that South East Water provides information on its website about ways you can save water in your home?

Yes
No

Q12. **[IF Q11=1]** Have you ever used any of this information from South East Water to save water in your home?

Yes **[GO TO Q14]**
No **[GO TO Q14]**
Don't know/Can't remember **[GO TO Q14]**

Q13. **[IF Q11=2]** Would your household be likely to use this sort of information to help reduce its water usage?

Yes
No
Don't know

Q14. There are a range of additional measures that can help customers save water. South East Water has provided each of the following items to some of its customers, but is considering rolling out the offer to all customers. Take a look at Showcard 1, for each item, please tell me:

- 1) If you have been offered the item from South East Water, and
- 2) If you have received the item from South East Water, and **[LOGIC CHECK WITH 1]**
- 3) If you think that the item should be provided by South East Water to all customers. Please note that the cost of the item would be paid for through all customer bills.

TICK ALL THAT APPLY

	Offered from South East Water? (Yes/No/DK)	Received from South East Water? (Yes/No/DK)	Should be provided by South East Water? (Yes/No/DK)
Free water saving devices such as 'hippos' to put in toilet cisterns			
Discount vouchers for money off water efficient white goods, for example, dishwashers and washing machines			
Subsidised adaptation of toilet cisterns to dual/variable flush			
Subsidised repairs of leaking toilets			
Subsidised rainwater harvesting systems			
Subsidised grey-water re-use systems (to re-use bath or sink water)			
Free household water use assessment			

Choice Experiment Introduction

Background on Water Supply Issues

Please look at Showcard 2. **[ENSURE RESPONDENT HAS SHOWCARD 2]**

The amount of water available for use by South East Water customers is determined by:

- The amount of rainfall;
- The amount of water storage, for example, in reservoirs;
- The amount of leakage from water pipes; and
- The amount of water used by customers.

When there is low rainfall for a long period, less water is available for use so there may be a need to ration the supplies by imposing a hosepipe ban.

Based on historic rainfall records, and current levels of demand, leakage and storage capacity, the chance of a needing a hosepipe ban in your area is estimated to be 1 in 10. This means that in 1 out of every 10 years, on average, there will be a hosepipe ban in the area. However, this does not mean that if you have had one hosepipe ban on water use you are guaranteed not to have another one for 10 years or that you will have one at all in any 10 year period.

Hosepipe Bans

Showcard 3 gives some information on the types of uses that are prohibited by a hosepipe ban. **[ENSURE RESPONDENT HAS SHOWCARD 3]**. Please take a moment to review this card.

[WAIT A MOMENT, THEN ASK:] Would you like more time? **[IF YES, WAIT SOME MORE; IF NO, CONTINUE]**

Q15. If there wasn't a hosepipe ban, would you typically use water in any of the ways shown on this card? If so, which ones? **[DO NOT READ - MULTICODE]**

1. Watering a garden, or plants, using a hosepipe.
2. Cleaning vehicles using a hosepipe.
3. Filling or maintaining a domestic swimming or paddling pool.
4. Filling or maintaining a domestic pond or fountain using a hosepipe.
5. Cleaning walls, windows, paths, patios or other surfaces using a hosepipe.
6. Wouldn't use water like this
7. Don't know

Q16. How much impact would a hosepipe ban have on your household? Would it have: **[READ OUT – SINGLE CODE]**

1. No impact
2. A small impact
3. A moderate impact
4. A big impact

Choice Experiment - Contextual Statement

Over the past few years, the population of the South East has been growing. This is increasing the amount of water consumed by customers, and is putting additional pressure on water resources. Unless further investment is made, hosepipe bans will be needed more often in future to restrict water use even when rainfall has not been especially low.

South East Water is currently putting together its plan for the next five years, and it wants to know your views now on the mix of measures it has available for managing the water supply in future.

Description of Water Resource Measures

One option for South East Water is to have **more hosepipe bans**. This will be the lowest cost solution, but customers may not want to have their water use restricted in this way.

To prevent this from happening there are a number of measures that South East Water could put in place.

Please look at Showcard 4A for the first three measures. The impacts of each measure are also shown. The more of each symbol there are in each column, the greater the impact, and where it is blank there are no significant impacts [ENSURE RESPONDENT HAS SHOWCARD 4A] READ OUT THE MEASURES.

- The first measure on this card is **Reduce leakage** - Currently 17% of water is lost from pipes due to leaks. Reducing this would lead to higher bills and also local traffic disruption when digging up roads to fix the pipes. There are two levels shown on your card – reducing leakage to 12%, and to 7% with the impacts shown for each.

Taking the measure of reducing leakage to 7%, you will see this has a ‘High’ impact on the water available in a dry period denoted by the three water drops. However, this has a high impact on customer bills denoted by the three pounds signs and a high level of local disruptions denoted by the three tool symbols.

- The second measure on this card is **Compulsory metering** – Currently, having a water meter is optional for most customers. Making it compulsory for everyone would lower water use because meters generally encourage people to use less. Bills would need to rise on average to pay for the meters being installed, but a rough rule of thumb is that if you have more bedrooms than people in the house, you’d be better off on a meter.
- Next on the card are two **Tariff measures**
- A **stepped tariff** would charge less per litre up to an allowance based on the number of people and more per litre above this level. Heavy users would pay more, and so be encouraged to use less. Everyone else would simply pay less.
- A **seasonal tariff** would charge more in summer per litre, when there is less water available, and less in winter.

NEW SCREEN

Now, please look at Showcard 4B, which shows three more measures and the associated impacts. [ENSURE RESPONDENT HAS SHOWCARD 4B]

- **Desalination** – Removing salt from seawater would provide a reliable source of additional water for use in dry periods. But it would be expensive and would be harmful to the environment, and there would also be local disruption while the desalination plant was being built.
- **Reservoirs** – Reservoirs store water when it is plentiful, for use when it is scarce.
 - **Expanding an existing reservoir** would cause some local disruption due to construction. There would also be some environmental impact due to the requirement for land.
 - **Building a new reservoir** would cause major local disruption and a significant environmental impact due to the requirement for land.

- **Wastewater recycling** – Wastewater can be treated so that it can be safely reintroduced into the public water supply. There would be some local disruption due to construction works while the recycling plant was being built and environmental impacts through the use of concrete and requirements for land (although they are likely to be built on existing wastewater treatment sites). Also, some customers may object to the idea of reusing water.

NEW SCREEN

Please look at Showcard 4C, which shows two more measures and the associated impacts. **[ENSURE RESPONDENT HAS SHOWCARD 4C]**

- **Water transfer from another company** - Currently, 8% of water comes from neighbouring companies. Building new pipelines would increase water supplies available to South East Water customers. There would be some local disruption due to construction works when the pipelines were being built.
- **Household water saving measures** – South East Water could offer water saving measures to households to help them save water in the home. These would cost money for South East Water though, and so have an impact on everyone’s bills. On the card is a list of the measures South East Water would provide for their customers. Please take a moment to read these. **[WAIT A MOMENT]**

Q17. **[FOR COGNITIVE TESTING ONLY]** Was any of the information shown on these cards unclear to you, or difficult to understand? What was unclear or difficult to understand? **RECORD CLEARLY WHERE THE DIFFICULTIES LIE IE DESCRIPTIONS OR MATRIX OR BOTH – TAKE RESPONDENT THROUGH ALL SHOW CARDS BUT ESPECIALLY 3A, 3B, 3C.**

Q18. **[FOR COGNITIVE TESTING ONLY]** Do you find any of the information shown on the cards to be significantly different to what you would have expected? Which bits? Why? **PROBE.**

Q19. **[FOR COGNITIVE TESTING ONLY]** We used the term ‘stepped tariff’ earlier – did you understand what this meant? Can you think of a better name? **PROBE.**

Q20. Take a look at Showcard 5. Considering all the options, which, if any, would you most want to see South East Water put in place? If more than three, then please just say your top three. **REVERSE ORDER FOR HALF**

Measure	In top 3?
More hosepipe bans	
Reduce leakage rate	
Compulsory metering	
New stepped tariff	
New seasonal tariff	
New desalination plant	
New reservoir	
Expand existing reservoir	
New wastewater recycling works	
New water transfers from neighbouring companies	
Water saving measures offered to all households	
None of these DO NOT READ	
Don't know DO NOT READ	

Q21. Which measures, if any, would you definitely not want to see South East Water implement? If more than three, then please just say your worst three options.

Measure	In worst 3?
More hosepipe bans	
Reduce leakage rate	
Compulsory metering	
New stepped tariff	
New seasonal tariff	
New desalination plant	
New reservoir	
Expand existing reservoir	
New wastewater recycling works	
New water transfers from neighbouring companies	
Water saving measures offered to all households	
None of these DO NOT READ	
Don't know DO NOT READ	

Choice Experiment

Please leave Showcard 5 aside for now.

The next eight questions will each ask you to choose between two options for your water service. In each case, the options will show the measures to be implemented by South East Water, the frequency of hosepipe bans that you should expect, and the impact on your water bill overall.

The aim of this exercise is to encourage you to consider your preferences carefully and decide which option is best for you overall. You may not like all the parts of an option, but you still need to decide overall which one you would prefer.

If a measure in Option A or B is shaded, then this means it will be the same as now. If it is not shaded then this means there will be some new action taken by South East Water to improve the water situation

Please look at Choice Card 1. **[INTERVIEWER CHECK THAT RESPONDENT HAS CHOICE CARD 1 IN FRONT OF THEM]**

PROGRAMMER INSTRUCTION – MAKE SURE CORRECT TEXT AND LEVELS ARE INSERTED IN THE FOLLOWING TEXT BASED ON THE EXPERIMENTAL DESIGN.

On this card, in Option A, South East Water measures would include the following:

- The leakage rate would remain as now, at 17%;
- Metering would remain optional;
- There would be a new stepped tariff.
- There would be no new desalination plant;
- There would be an expansion to an existing reservoir;
- There would be a new water recycling works;
- There would be no new transfers of water from another company; and
- There would be no new water saving measures offered to customers.

The outcome of these measures would be the following.

- The frequency of hosepipe bans would be 1 in 10 years;
- Your water bill would show an increase of $\pounds<0.2*15%*CURRENT\ BILL>$ every year for 5 years, from $\pounds<CURRENT\ BILL>$ in 2014 to $\pounds<(1+15%)*CURRENT\ BILL>$ from 2019 onwards.

In Option B:

- The leakage rate would remain as now, at 17%;
- Metering would remain optional;
- There would be no new tariffs.
- There would be a new desalination plant;
- There would be an expansion to an existing reservoir;
- There would be no new water recycling works;
- There would be a new transfer of water from another company;
- There would be no new water saving measures offered to customers.

The outcome of these measures would be the following.

- The frequency of a hosepipe ban would be 1 in 10 years;
- Your water bill would show an increase of $\pounds<0.2*15%*CURRENT\ BILL>$ every year for 5 years, from $\pounds<CURRENT\ BILL>$ in 2014 to $\pounds<(1+15%)*CURRENT\ BILL>$ from 2019 onwards.

When making your choices between the different options please bear in mind the following:

- that your bill would also increase by the rate of inflation each year;
- that any money you would pay for measures to improve water resourcing here will not be available for you to spend on other things;
- that other bills may go up or down affecting the amount of money you have to spend in general; and

- that the new bill level will also apply in all later years, i.e. your South East Water bill will not drop back to the level it was before.

[IF Q6=1 AND Q4a=2 or 3 [ie Thames and no septic tank]] The change in bill refers to the water part of your bill only, the amount that goes to South East Water and covers the services they provide. **END IF**

Please take a moment to review these options.

Q22. Looking at Choice Card 1, which option do you prefer, A or B?

- A
- B

Q23. Why did you choose the option you did?
RECORD VERBATIM

Q24. Now turn to Choice Card 2. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q25. **[FOR COGNITIVE TESTING ONLY]** Why did you choose the option you did?
RECORD VERBATIM

Q26. Now turn to Choice Card 3. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q27. **[FOR COGNITIVE TESTING ONLY]** Why did you choose the option you did?
RECORD VERBATIM

Q28. Now turn to Choice Card 4. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q29. Now turn to Choice Card 5. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q29A Why did you choose the option you did?
RECORD VERBATIM

Q30. Now turn to Choice Card 6. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q31. Now turn to Choice Card 7. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q32. Now turn to Choice Card 8, the last choice. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Follow-up Questions

I would now like to ask you a few questions about the choices you have just made.

Q33. Did you generally feel able to make comparisons between the two options I presented to you?

- 1. Yes **GO TO Q35**
- 2. No

Q34. Why weren't you able to make the comparisons in the choices?
RECORD VERBATIM

Demographics

Q35. Which of these statements best describes your current employment status?

Self employed	1
Employed full-time (30+ hrs)	2
Employed part-time (up to 30 hrs)	3
Student	4
Unemployed – seeking work	5
Unemployed – other	6
Looking after the home/children full-time	7
Retired	8
Unable to work due to sickness or disability	9
Other (please specify).....	10

Q36. At what level did you complete your education? If still studying, which level best describes the highest level of education you have obtained until now?

- No qualifications
- O levels / CSEs / GCSEs (any grades)
- A levels / AS level / higher school certificate
- NVQ (Level 1 and 2). Foundation / Intermediate / Advanced GNVQ / HNC / HND
- Other qualifications (e.g. City and Guilds, RSA/OCR, BTEC/Edexcel))
- First degree (e.g. BA, BSc)
- Higher degree (e.g. MA, PhD, PGCE, post graduate certificates and diplomas)
- Professional qualifications (teacher, doctor, dentist, architect, engineer, lawyer, etc.)

Q37. Thinking about all the people in your household, including yourself, please indicate how many people there are in each of these age groups:

Up to 15 years	0.....1	2	3	4	5+
16 to 60 years	0.....1	2	3	4	5+
61+	0.....1	2	3	4	5+

Q38. To help us analyse your responses can you tell me which band on showcard Z1 best describes your total annual household income, before tax and other deductions?

	Per Week	Per Year
A	Up to £100	Under £5,200
B	£101-£200	£5,201-£10,400
C	£201-£300	£10,401 – £15,600
D	£301-£400	£15,601 - £20,800
E	£401-£500	£20,801,-£26,000
F	£501-£600	£26,001-£31,200
G	£601-£800	£31,201-£41,600
H	£801-£1000	£41,601 - £52,000
I	£1001-£1200	£52,001 - £62,400
J	£1201-£1400	£62,401 - £72,800
K	£1401-£1600	£72,801 - £83,200
L	£1601+	£83,201+
M	Prefer not to say	

Q39. Are you a member of any of the organisations shown on showcard Z2?

Yes
No

Local community or volunteer group
RSPB (Royal Society for Protection of Birds)
Surfers Against Sewage/Marine Protection Society
Canoeing/Boating/ Windsurfing Club or similar
Angling Club
Ramblers Association
Friends of the Earth/Greenpeace
National Trust
Local Wildlife Trust or Environmental Organisation
Other national or international environmental organisation
Other
Not a member of any similar organisations

That was the last question. Thank you very much for your help in this research

Please can I take a note of your name and telephone number for quality control purposes?

Respondent name:

Telephone: home: work:

Q40. We really appreciate the time that you have given us today. Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for South East Water?

Yes, for both clarification and further research
Yes, for clarification only
Yes, for further research only
No

INSERT INCENTIVE QUESTIONS FOR HOUSEHOLD

Thank you

I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature:

Debriefing Questions – to be completed by the interviewer when interview is over

Q41. In your judgement, did the respondent understand what he/she was being asked to do in the questions?

- Understood completely
- Understood a great deal
- Understood a little
- Did not understand very much
- Did not understand at all

Q42. Which of the following best describes the amount of thought the respondent put into making their choices?

- Gave the questions very careful consideration
- Gave the questions careful consideration
- Gave the questions some consideration
- Gave the questions little consideration
- Gave the questions no consideration

Q43. Which of the following best describes the degree of fatigue shown by the respondent when doing the choice experiments?

- Easily maintained concentration throughout the survey
- Maintained concentration with some effort throughout the survey
- Maintained concentration with a good deal of effort throughout the survey
- Lessened concentration in the later stages
- Lost concentration in the later stages

SHOWCARD 1 ADDITIONAL MEASURES THAT CAN HELP CUSTOMERS SAVE WATER

1. Free water saving devices such as ‘hippos’ to put in toilet cisterns
2. Discount vouchers for money off water efficient white goods, for example, dishwashers and washing machines
3. Subsidised adaptation of toilet cisterns to dual/variable flush
4. Subsidised repairs of leaking toilets
5. Subsidised rainwater harvesting systems
6. Subsidised grey-water re-use systems (to re-use bath or sink water)
7. Free household water use assessment

SHOWCARD 2 BACKGROUND ON WATER SUPPLY ISSUES IN THE SOUTH EAST

- The amount of water available for use by South East Water customers is determined by:
 1. The amount of rainfall;
 2. The amount of water storage, for example, in reservoirs;
 3. The amount of leakage from water pipes; and
 4. The amount of water used by customers.
- When there is low rainfall for a long period, less water is available for use and so there may be a need to ration the supplies by imposing a hosepipe ban.
- Based on historic rainfall records, and current levels of demand, leakage and storage capacity, the chance of a needing a hosepipe ban in your area is estimated to be 1 in 10. This means that in 1 out of every 10 years, on average, there will be a hosepipe ban in the area. However, this does not mean that if you have had one hosepipe ban on water use you are guaranteed not to have another one for 10 years or that you will have one at all in any 10 year period.









SHOWCARD 3 HOUSEHOLD HOSEPIPE BANS

- The following water uses are prohibited under a hosepipe ban.
 - Watering a garden, or plants, using a hosepipe.
 - Cleaning vehicles using a hosepipe.
 - Filling or maintaining a domestic swimming or paddling pool.
 - Filling or maintaining a domestic pond or fountain using a hosepipe.
 - Cleaning walls, windows, paths, patios or other surfaces using a hosepipe.

SHOWCARD 4a SOUTH-EAST WATER MEASURES

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption	
<ul style="list-style-type: none"> 1. Reduce leakage Currently 17% of water is lost from pipes due to leaks. Reducing this would lead to higher bills and also local traffic disruption when digging up roads to fix the pipes. 					
	Reduce leakage to 12%	●●		££	✂✂
	Reduce leakage to 7%	●●●		£££	✂✂✂
<ul style="list-style-type: none"> 2. Compulsory metering <p>Currently, having a water meter is optional for most customers. Making it compulsory for everyone would lower water use because meters generally encourage people to use less. Bills would need to rise on average to pay for the meters being installed, but a rough rule of thumb is that if you have more bedrooms than people in the house, you'd be better off on a meter.</p>	●		£		
3. Tariff measures <ul style="list-style-type: none"> - A stepped tariff would charge less per litre up to an allowance based on the number of people, and more per litre above this level. Heavy users would pay more, and so be encouraged to use less. Everyone else would simply pay less. - A seasonal tariff would charge more in summer per litre, when there is less water available, and less in winter. 	●				
	●				

SHOWCARD 4b SOUTH-EAST WATER MEASURES (CONTINUED)

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
<p>• 4. Desalination</p> <p>Removing salt from seawater would provide a reliable source of additional water for use in dry periods. But it would be expensive and would be harmful to the environment, and there would also be local disruption while the desalination plant was being built.</p>		<p>XXX</p>	<p>£££</p>	
<p>5. Reservoirs</p> <p>Reservoirs store water when it is plentiful, for use when it is scarce.</p> <ul style="list-style-type: none"> - Expanding an existing reservoir would cause some local disruption due to construction. There would also be some environmental impact due to the requirement for land. - Building a new reservoir would cause major local disruption and have a significant environmental impact due to the requirement for land. 		<p>XX</p>	<p>££</p>	
		<p>XXX</p>	<p>£££</p>	
<p>6. Wastewater recycling</p> <p>Wastewater can be treated so that it can be safely reintroduced into the public water supply. There would be some local disruption due to construction works while the recycling plant was being built, and environmental impacts through the use of concrete and requirements for land (although they are likely to be built on existing wastewater treatment sites). Also, some customers may object to the idea of reusing water.</p>		<p>X</p>	<p>££</p>	

SHOWCARD 4c SOUTH-EAST WATER MEASURES (CONTINUED)

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
<p>7. Water transfer from another company</p> <p>Currently, 8% of water comes from neighbouring companies. Building new pipelines would increase water supplies available to South East Water customers. There would be some local disruption due to construction works when the pipelines were being built.</p>	●		££	✂✂
<p>8. Household water saving measures</p> <ul style="list-style-type: none"> • South East Water could offer water saving measures to households to help them save water in the home. These would cost money for South East Water though, and so have an impact on everyone's bills. • These measures would include <ul style="list-style-type: none"> free water saving devices such as 'hippos' to put in toilet cisterns discount vouchers for money off water efficient white goods such as dishwashers or washing machines subsidised grey-water re-use systems (to re-use bath or sink water) free household water assessments subsidised rainwater harvesting systems subsidised adaptation of toilet cisterns to dual/variable flush subsidised repairs of leaking toilets 	●		£	✂

SHOWCARD 5 (a) OPTIONS AVAILABLE

1. More hosepipe bans
2. Reduce leakage rate
3. Compulsory metering
4. New stepped tariff
5. New seasonal tariff
6. New desalination plant
7. New reservoir
8. Expand existing reservoir
9. New wastewater recycling works
10. New water transfers from neighbouring companies
11. Water saving measures offered to all households

SHOWCARD 5 (b) OPTIONS AVAILABLE

1. Water saving measures offered to all households
2. New water transfers from neighbouring companies
3. New wastewater recycling works
4. Expand existing reservoir
5. New reservoir
6. New desalination plant
7. New seasonal tariff
8. New stepped tariff
9. Compulsory metering
10. Reduce leakage rate
11. More hosepipe bans

CHOICE CARD 1 Which option do you prefer?

	Option A	Option B
SOUTH EAST WATER MEASURES		
Leakage rate (percentage of water lost)	As now (17%)	As now (17%)
Metering policy	Optional	Optional
Water tariff measures	New stepped tariff	No new tariffs
Desalination	None	New desalination plant
Reservoirs	Expand existing reservoir	Expand existing reservoir
Water recycling	New water recycling works	No water recycling
Water transfers	No new transfers	New transfer
Household water saving measures	No new measures	No new measures
Frequency of hosepipe bans	1 in 10 years	1 in 10 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to <u>£250 from 2019</u>	Increase of £10 every year for 5 years, from £200 in 2014 to <u>£250 from 2019</u>
Which option do you prefer?		

CHOICE CARD 2 Which option do you prefer?

	Option A	Option B
SOUTH EAST WATER MEASURES		
Leakage rate (percentage of water lost)	Lower (12%)	Lower (12%)
Metering policy	Optional	Optional
Water tariff measures	Stepped tariff	Stepped tariff
Desalination	None	New desalination plant
Reservoirs	Expand existing reservoir	New reservoir
Water recycling	New water recycling works	New water recycling works
Water transfers	No new transfers	No new transfers
Household water saving measures	No measures	Measures offered to customers
Frequency of hosepipe bans	1 in 5 years	1 in 5 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	Increase of £20 every year for 5 years, from £200 in 2014 to £300 from 2019
Which option do you prefer?		

CHOICE CARD 3 Which option do you prefer?

Option A

Option B

SOUTH EAST WATER MEASURES

Leakage rate (percentage of water lost)
Metering policy
Water tariff measures
Desalination
Reservoirs
Water recycling
Water transfers
Household water saving measures

As now (17%)
Optional
No new tariffs
None
No additional reservoirs
No water recycling
New transfer
Measures offered to customers

Lower (12%)
Optional
Stepped tariff
None
No additional reservoirs
No water recycling
No new transfers
No measures

Frequency of hosepipe bans
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 5 years
No change

1 in 5 years
No change

Which option do you prefer?

CHOICE CARD 4 Which option do you prefer?

	Option A	Option B
SOUTH EAST WATER MEASURES		
Leakage rate (percentage of water lost)	Much lower (7%)	Much lower (7%)
Metering policy	Optional	Compulsory for everyone
Water tariff measures	No new tariffs	No new tariffs
Desalination	New desalination plant	New desalination plant
Reservoirs	Expand existing reservoir	No additional reservoirs
Water recycling	No water recycling	New water recycling works
Water transfers	New transfer	New transfer
Household water saving measures	Measures offered to customers	Measures offered to customers
Frequency of hosepipe bans	1 in 10 years	1 in 10 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £20 every year for 5 years, from £200 in 2014 to £300 from 2019	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019
Which option do you prefer?		

CHOICE CARD 5 Which option do you prefer?

Option A

Option B

SOUTH EAST WATER MEASURES

Leakage rate (percentage of water lost)
Metering policy
Water tariff measures
Desalination
Reservoirs
Water recycling
Water transfers
Household water saving measures

As now (17%)
Optional
No new tariffs
None
New reservoir
No water recycling
No new transfers
No measures

As now (17%)
Compulsory for everyone
Seasonal tariff
New desalination plant
New reservoir
No water recycling
No new transfers
No measures

Frequency of hosepipe bans
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 5 years
Increase of £20 every year for 5 years, from £200 in 2014 to £300 from 2019

1 in 10 years
Increase of £20 every year for 5 years, from £200 in 2014 to £300 from 2019

Which option do you prefer?

CHOICE CARD 6 Which option do you prefer?

	Option A	Option B
SOUTH EAST WATER MEASURES		
Leakage rate (percentage of water lost)	Much lower (7%)	Lower (12%)
Metering policy	Compulsory for everyone	Compulsory for everyone
Water tariff measures	Stepped tariff	Stepped tariff
Desalination	None	None
Reservoirs	No additional reservoirs	No additional reservoirs
Water recycling	New water recycling works	New water recycling works
Water transfers	New transfer	No new transfers
Household water saving measures	No measures	Measures offered to customers
Frequency of hosepipe bans	1 in 10 years	1 in 5 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019
Which option do you prefer?		

CHOICE CARD 7 Which option do you prefer?

	Option A	Option B
SOUTH EAST WATER MEASURES		
Leakage rate (percentage of water lost)	Much lower (7%)	As now (17%)
Metering policy	Optional	Compulsory for everyone
Water tariff measures	No new tariffs	No new tariffs
Desalination	New desalination plant	New desalination plant
Reservoirs	Expand existing reservoir	Expand existing reservoir
Water recycling	No water recycling	No water recycling
Water transfers	No new transfers	No new transfers
Household water saving measures	Measures offered to customers	Measures offered to customers
Frequency of hosepipe bans	1 in 20 years	1 in 5 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £30 every year for 5 years, from £200 in 2014 to £350 from 2019	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019
Which option do you prefer?		

CHOICE CARD 8 Which option do you prefer?

	Option A	Option B
South East Water measures		
Leakage rate (percentage of water lost)	As now (17%)	Lower (12%)
Metering policy	Compulsory for everyone	Compulsory for everyone
Water tariff measures	Seasonal tariff	Seasonal tariff
Desalination	None	None
Reservoirs	Expand existing reservoir	No additional reservoirs
Water recycling	New water recycling works	No water recycling
Water transfers	New transfer	New transfer
Household water saving measures	No measures	No measures
Frequency of hosepipe bans	1 in 10 years	1 in 5 years
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.	Increase of £10 every year for 5 years, from £200 in 2014 to £250 from 2019	Increase of £20 every year for 5 years, from £200 in 2014 to £300 from 2019
Which option do you prefer?		

SHOWCARD Z1

	Per Week	Per Year
A	Up to £100	Under £5,200
B	£101-£200	£5,201-£10,400
C	£201-£300	£10,401 – £15,600
D	£301-£400	£15,601 - £20,800
E	£401-£500	£20,801,-£26,000
F	£501-£600	£26,001-£31,200
G	£601-£800	£31,201-£41,600
H	£801-£1000	£41,601 - £52,000
I	£1001-£1200	£52,001 - £62,400
J	£1201-£1400	£62,401 - £72,800
K	£1401-£1600	£72,801 - £83,200
L	£1601+	£83,201+

SHOWCARD Z2

Local community or volunteer group
RSPB (Royal Society for Protection of Birds)
Surfers Against Sewage/Marine Conservation Society
Canoeing/Boating/ Windsurfing Club or similar
Angling Club
Ramblers Association
Friends of the Earth/Greenpeace
National Trust
Local Wildlife Trust or Environmental Organisation
Other national or international environmental organisation

APPENDIX B

Business Questionnaire and Showcards

Interviewer name:

Date: Time:

Recruitment Section

Good morning/afternoon/evening. My name is Could I please speak to whoever is responsible for paying your business/organisation's water bills and for liaising with your water company? **(INTERVIEWER PLEASE TARGET SOMEONE WHO KNOWS HOW MUCH THE BUSINESS/ORGANISATION PAYS BUT ALSO HAS AN UNDERSTANDING OF THE BUSINESS/ORGANISATION EG. OPERATIONS MANAGER, FACILITIES MANAGER, UTILITIES MANAGER ETC – IN SMALL BUSINESSES MIGHT BE MD/OWNER. WHEN SPEAKING TO APPROPRIATE CONTACT CONTINUE WITH EXPLANATION)**

My name is from Accent, an independent research consultancy, and we are carrying out an important research study for South East Water to investigate what is most important for customers in the coming years. This is a *bona fide* market research exercise. It is being conducted under the Market Research Society Code of Conduct which means that any answers you give will be treated in confidence. This is your opportunity to influence the company's future plans. Could you please spare a couple of minutes to see if you are the type of customer we need to speak to for this research?

Q1. Can you confirm that you are the person who is responsible for paying your business/organisation's water bills and for liaising with your water company?

Yes

No **ASK FOR REFERRAL**

Q2. And what business sector best defines the main activity of your company?

1. Agriculture, Forestry and Fishing
2. Mining and Quarrying
3. Manufacturing
4. Energy
5. Water service & supply **THANK AND CLOSE**
6. Construction
7. Wholesale and retail trade (incl motor vehicles repair)
8. Transport and storage
9. Hotels & catering
10. IT and Communication
11. Finance and insurance activities (incl real estate activities)
12. Business services
13. Government, health & education
14. Arts, entertainment and recreation
15. Other service activities
16. Other **SPECIFY**

Q3. Do you have more than one site in the South East Water area?

No, one site only

Yes, more than one site **SPECIFY NUMBER**

no **ATTEMPT TO REASSURE & PERSUADE; IF STILL NO, THANK & CLOSE**
continue without sending email (practise/design/completes)

Date: Time:.....

Name:

Address:.....

Email Address:.....

Tel No.

Introduction to Main Survey

Thank you for agreeing to take part in this survey. As I said previously, we are conducting research for South East Water looking at what is important for business customers in the coming years.

The questionnaire will take 15-20 minutes. You do not have to answer questions you do not wish to and you can terminate the interview at any point.

Can I check that you have your materials ready to refer to? These will have either been sent in the post or by email. And what is the reference number on the materials? **INTERVIEWER: CHECK THE NUMBER IS CORRECT AND PROCEED OR RE-SCHEDULE AS APPROPRIATE.**

Correct – **PROCEED**

Incorrect – **GO TO APPOINTMENTS SCREEN AND RE-SCHEDULE, RE-SENDING MATERIALS**

Background Questions

READ OUT: As you may know, South East Water only supplies drinking water and other companies provide waste water sewerage.

Q9. How do you feel about the amount that you pay for water services? Is it:

1. Far too little
2. Too little
3. About right
4. Slightly too much
5. Far too much

Q10. Are you aware that South East Water provides information on its website about ways businesses can save water?

- Yes
No

Q11. **IF Q11=1 ASK ELSE SKIP** Have you ever used any of this information from South East Water to help your business save water?

- Yes **[GO TO Q14]**
No **[GO TO Q14]**
Don't know/Can't remember **[GO TO Q14]**

Q12. Would your business be likely to use this sort of information to help reduce its water usage?

- Yes
- No
- Don't know

Q13. There are a range of additional measures that can help customers save water. South East Water has provided each of the following items to some of its customers, but is considering rolling out the offer to all customers. Take a look at Showcard 1, for each item, please tell me:

- 1) If you have been offered the item from South East Water, and
- 2) If you have received the item from South East Water, and **[LOGIC CHECK WITH 1]**
- 3) If you think that the item should be provided by South East Water to all customers. Please note the cost of the item would be paid through all customer bills.

TICK ALL THAT APPLY

	Offered from South East Water? (Yes/No/DK)	Received from South East Water? (Yes/No/DK)	Should be provided by South East Water? (Yes/No/DK)
Free water saving devices such as 'hippos' to put in toilet cisterns			
Discount vouchers for money off water efficient white goods, for example, dishwashers and washing machines			
Subsidised adaptation of toilet cisterns to dual/variable flush			
Subsidised repairs of leaking toilets			
Subsidised rainwater harvesting systems			
Subsidised grey-water re-use systems (to re-use bath or sink water)			
Free business water use assessment			

Choice Experiment Introduction

Background on Water Supply Issues

Please look at Showcard 2. **[ENSURE RESPONDENT HAS SHOWCARD 2]**

The amount of water available for use by South East Water customers is determined by:

- The amount of rainfall;
- The amount of water storage, for example, in reservoirs;
- The amount of leakage from water pipes; and
- The amount of water consumed by customers.

When there is low rainfall for a long period, there is less water available for use and so there may be a need to ration the supplies by imposing a hosepipe ban.

Based on historic rainfall records, and current levels of demand, leakage and storage capacity, the chance of a needing a hosepipe ban in your area is estimated to be 1 in 10. This means that in 1 out of every 10 years, on average, there will be a hosepipe ban in the area. However, this does not mean that if you have had one

hosepipe ban on water use you are guaranteed not to have another one for 10 years or that you will have one at all in any 10 year period.

Hosepipe Bans

Showcard 3 gives some information on the types of uses that are prohibited by a hosepipe ban and the exemptions which may be applicable. **[ENSURE RESPONDENT HAS SHOWCARD 3]**. Please take a moment to review this card.

[WAIT A MOMENT, THEN ASK:] Would you like more time? **[IF YES, WAIT SOME MORE; IF NO, CONTINUE]**

Q14. If there wasn't a hosepipe ban, would you typically use water in any of the ways shown on this card? If so, which ones? **[DO NOT READ - MULTICODE]**

1. Watering a garden, or plants, using a hosepipe.
2. Cleaning vehicles using a hosepipe.
3. Filling or maintaining an ornamental pond or fountain using a hosepipe.
4. Cleaning walls, windows, paths, patios or other surfaces using a hosepipe.
5. No, wouldn't use water like this
6. Don't know

Q15. How much impact would a hosepipe ban have on your business? Would it have: **[READ OUT – SINGLE CODE]**

1. No impact
2. A small impact
3. A moderate impact
4. A big impact

Q15A To your knowledge, is your business/organisation exempt from hosepipe bans?

1. Yes
2. No
3. Don't know/not sure

Q15B Does your business/organisation rely on having a water supply to conduct its main activity?

1. Yes
2. No

Choice Experiment - Contextual Statement (DO NOT DISPLAY)

Over the past few years, the population of the South East has been growing. This is increasing the amount of water consumed by customers, and is putting additional pressure on water resources. Unless further investment is made, hosepipe bans will be needed more often in future to restrict water use even when rainfall has not been especially low.

South East Water is currently putting together its plan for the next five years, and it wants to know your views now on the mix of measures it has available for managing the water supply in future.

Description of Water Resource Measures (DO NOT DISPLAY)

One option for South East Water is to have **more hosepipe bans**. This will be the lowest cost solution, but customers may not want to have their water use restricted in this way.

To prevent this from happening there are a number of measures that South East Water could put in place.

Please look at Showcard 4A for the first three measures. The impacts of each measure are also shown. The more of each symbol there are in each column, the greater the impact, and where it is blank there are no significant impacts **[ENSURE RESPONDENT HAS SHOWCARD 4A] READ OUT THE MEASURES.**

- **Reduce leakage** - Currently 17% of water is lost from pipes due to leaks. Reducing this would lead to higher bills and also local traffic disruption when digging up roads to fix the pipes. There are two options shown on your card – reducing leakage to 12%, and to 7% with the impacts shown for each.

Taking the measure of reducing leakage to 7%, you will see this has a ‘High’ impact on the water available in a dry period denoted by the three water drops. However, this has a high impact on customer bills denoted by the three pounds signs and a high level of local disruptions denoted by the three tool symbols.

- **Tariff measures**
 - o A **seasonal tariff** would charge more in summer per litre, when there is less water available, and less in winter.
- **Desalination** – Removing salt from seawater would provide a reliable source of additional water for use in dry periods. But it would be expensive and would be harmful to the environment, and there would also be local disruption while the desalination plant was being built.

NEW SCREEN

Now, please look at Showcard 4B, which shows three more measures and the associated impacts. **[ENSURE RESPONDENT HAS SHOWCARD 4B - READ OUT THE MEASURES]**

Reservoirs – Reservoirs store water when it is plentiful, for use when it is scarce.

- **Expanding an existing reservoir** would cause some local disruption due to construction. There would also be some environmental impact due to the requirement for land.
 - **Building a new reservoir** would cause major local disruption and a significant environmental impact due to the requirement for land.
- **Wastewater recycling** – Wastewater can be treated so that it can be safely reintroduced into the public water supply. There would be some local disruption due to construction works while the recycling plant was being built and environmental impacts through the use of concrete and requirements for land (although they are likely to be built on existing wastewater treatment sites). Also, some customers may object to the idea of reusing water.

NEW SCREEN

Please look at Showcard 4C, which shows two more options and the associated impacts. **[ENSURE RESPONDENT HAS SHOWCARD 4C – READ OUT THE MEASURES]**

- **Water transfer from another company** - Currently, 8% of water comes from neighbouring companies. Building new pipelines would increase water supplies available to South East Water customers. There would be some local disruption due to construction works when the pipelines were being built.
- **Business water saving measures**– South East Water could offer water saving measures to businesses to help them save water. These would cost money for South East Water though, and so have an impact on everyone’s bills. On the card is a list of the measures South East Water would provide for their customers. Please take a moment to read these. **[WAIT A MOMENT]**

Q16. **FOR COGNITIVE TESTING ASK:** Was any of the information shown on these cards unclear to you, or difficult to understand? What was unclear or difficult to understand? **RECORD CLEARLY WHERE THE DIFFICULTIES LIE IE DESCRIPTIONS OR MATRIX OR BOTH – TAKE RESPONDENT THROUGH ALL SHOW CARDS BUT ESPECIALLY 3A, 3B, 3C.**

Q17. **FOR COGNITIVE TESTING ASK:** Do you find any of the information shown on the cards to be significantly different to what you would have expected? Which bits? Why? **PROBE.**

Q18. **FOR COGNITIVE TESTING ASK:** We used the term ‘stepped tariff’ earlier – did you understand what this meant? Can you think of a better name? **PROBE.**

Q19. Take a look at Showcard 5. Considering all the options, which, if any, would you most want to see South East Water put in place? If more than three, then please just say your top three. **REVERSE ORDER FOR HALF**

Measure	In top 3?	Why do you think South East Water should put these in place?
More hosepipe bans		
Reduce leakage rate		
New seasonal tariff		
New desalination plant		
New reservoir		
Expand existing reservoir		
New wastewater recycling works		
New water transfers from neighbouring companies		
Water saving measures offered to all businesses		

Q20. Which measures, if any, would you definitely not want to see South East Water implement? If more than three, then please just say your worst three options.

Measure	In worst 3?	Why do you think South East Water should not implement these?
More hosepipe bans		
Reduce leakage rate		
New seasonal tariff		
New desalination plant		
New reservoir		
Expand existing reservoir		
New wastewater recycling works		
New water transfers from neighbouring companies		
Water saving measures offered to all businesses		
None of these DO NOT READ		
Don't know DO NOT READ		

Choice Experiment

Please leave Showcard 5 aside for now.

The next eight questions will each ask you to choose between two options for your water service. In each case, the options will show the actions and policies to be implemented by South East Water, the frequency of hosepipe bans that you should expect, and the impact on your water bill overall.

The aim of this exercise is to encourage you to consider your preferences carefully and decide which option is best for you overall. You may not like all the parts of an option, but you still need to decide overall which one you would prefer.

If a measure in Option A or B is shaded, then this means it will be the same as now. If it is not shaded then this means there will be some new action taken by South East Water to improve the water situation.

Please look at Choice Card 1. **[INTERVIEWER CHECK THAT RESPONDENT HAS CHOICE CARD 1 IN FRONT OF THEM]**

On this card, in Option A, South East Water measures would include the following:

- The leakage rate would remain as now, at 17%;
- There would be a new seasonal tariff.
- There would be no new desalination plant;
- There would be an expansion to an existing reservoir;
- There would be a new water recycling works;
- There would be no new transfers of water from another company; and
- There would be no new water saving measures offered to customers.

The outcome of these measures would be the following.

- The frequency of hosepipe bans would be 1 in 10 years;
- Your water bill would show an increase of 2% every year for 5 years, a total change of 10% from 2019.

In Option B:

- The leakage rate would remain as now, at 17%;
- There would be no new tariffs.
- There would be a new desalination plant;
- There would be an expansion to an existing reservoir;
- There would be no new water recycling works;
- There would be a new transfer of water from another company;
- There would be no new water saving measures offered to customers.

The outcome of these measures would be the following.

- The frequency of a hosepipe ban would be 1 in 10 years;
- Your water bill would show an increase of 2% every year for 5 years, a total change of 10% from 2019.

When making your choices between the different options please bear in mind the following:

- that your bill would also increase by the rate of inflation each year;
- that any money you would pay for measures to improve water resourcing here will not be available for you to spend on other things;
- that other bills may go up or down affecting the amount of money you have to spend in general; and that the new bill level will also apply in all later years, i.e. your South East Water bill will not drop back to the level it was before

Please take a moment to review these options.

Q21. Looking at Choice Card 1, which option do you prefer, A or B?

- A
- B

Q22. Why did you choose the option you did?

RECORD VERBATIM – ENCOURAGE PARTICIPANT TO THINK ALOUD – IE WHAT WAS IMPORTANT/UNIMPORTANT

Q23. Now turn to Choice Card 2. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q24. **FOR COGNITIVE TESTING** Why did you choose the option you did?

RECORD VERBATIM – ENCOURAGE PARTICIPANT TO THINK ALOUD – IE WHAT WAS IMPORTANT/UNIMPORTANT

Q25. Now turn to Choice Card 3. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q26. **FOR COGNITIVE TESTING** Why did you choose the option you did?

RECORD VERBATIM – ENCOURAGE PARTICIPANT TO THINK ALOUD – IE WHAT WAS IMPORTANT/UNIMPORTANT

Q27. Now turn to Choice Card 4. Please review these options carefully. Which option do you prefer, A or B?

- A
- B

Q28. Now turn to Choice Card 5. Please to review these options carefully. Which option do you prefer, A or B?

- A
- B

Q28A Why did you choose the option you did?

RECORD VERBATIM – ENCOURAGE PARTICIPANT TO THINK ALOUD – IE WHAT WAS IMPORTANT/UNIMPORTANT

Q29. Now turn to Choice Card 6. Please to review these options carefully. Which option do you prefer, A or B?

- A
- B

Q30. Now turn to Choice Card 7. Please to review these options carefully. Which option do you prefer, A or B?

- A
- B

Q31. Now turn to Choice Card 8, the last choice. Please to review these options carefully. Which option do you prefer, A or B?

- A
- B

Follow-up Questions

I would now like to ask you a few questions about the choices you have just made.

Q32. Did you generally feel able to make comparisons between the two options I presented to you?

1. Yes **GO TO Q34**
2. No

Q33. Why weren't you able to make the comparisons in the choices?
RECORD VERBATIM

Demographics

Q34. How many employees are there at your business/organisation's premises?

1. 0 - 4
2. 5 - 9
3. 10 - 19
4. 20 - 49
5. 50 - 99
6. 100 - 249
7. 250 - 499
8. 500 - 999
9. 1,000 +
10. Don't know/not stated

That was the last question. Thank you very much for your help in this research

Please can I take a note of your name and telephone number for quality control purposes?

Respondent name:

Telephone: home: work:

Q35. We really appreciate the time that you have given us today. Would you be willing to be contacted again for clarification purposes or be invited to take part in other research for South East Water?

- Yes, for both clarification and further research
- Yes, for clarification only
- Yes, for further research only
- No

Thank you

I confirm that this interview was conducted under the terms of the MRS code of conduct and is completely confidential

Interviewer's signature:

Debriefing Questions – to be completed by the interviewer when interview is over

Q36. In your judgement, did the respondent understand what he/she was being asked to do in the questions?

- Understood completely
- Understood a great deal
- Understood a little
- Did not understand very much
- Did not understand at all

Q37. Which of the following best describes the amount of thought the respondent put into making their choices?

- Gave the questions very careful consideration
- Gave the questions careful consideration
- Gave the questions some consideration
- Gave the questions little consideration
- Gave the questions no consideration

Q38. Which of the following best describes the degree of fatigue shown by the respondent when doing the choice experiments?

- Easily maintained concentration throughout the survey
- Maintained concentration with some effort throughout the survey
- Maintained concentration with a good deal of effort throughout the survey
- Lessened concentration in the later stages
- Lost concentration in the later stages

SHOWCARD 1 ADDITIONAL MEASURES THAT CAN HELP CUSTOMERS SAVE WATER

1. Free water saving devices such as ‘hippos’ to put in toilet cisterns
2. Discount vouchers for money off water efficient white goods, for example, dishwashers and washing machines
3. Subsidised adaptation of toilet cisterns to dual/variable flush
4. Subsidised repairs of leaking toilets
5. Subsidised rainwater harvesting systems
6. Subsidised grey-water re-use systems (to re-use bath or sink water)
7. Free business water use assessment

SHOWCARD 2 BACKGROUND ON WATER SUPPLY ISSUES IN THE SOUTH EAST

- The amount of water available for use by South East Water customers is determined by:
 - The amount of rainfall;
 - The amount of water storage, for example, in reservoirs;
 - The amount of leakage from water pipes; and
 - The amount of water consumed by customers.
- When there is low rainfall for a long period, less water is available for use and so there may be a need to ration the supplies by imposing a hosepipe ban.
- Based on historic rainfall records, and current levels of demand, leakage and storage capacity, the chance of a needing a hosepipe ban in your area is estimated to be 1 in 10. This means that in 1 out of every 10 years, on average, there will be a hosepipe ban in the area. However, this does not mean that if you have had one hosepipe ban on water use you are guaranteed not to have another one for 10 years or that you will have one at all in any 10 year period.

SHOWCARD 3 BUSINESS HOSEPIPE BANS

- The following water uses are prohibited under a hosepipe ban.
 1. Watering a garden, or plants, using a hosepipe.
 2. Cleaning vehicles using a hosepipe.
 3. Filling or maintaining an ornamental pond or fountain using a hosepipe.
 4. Cleaning walls, windows, paths, patios or other surfaces using a hosepipe.
- The following exemptions apply.
 1. Using a hosepipe where necessary for health and safety reasons.
 2. Use of a hosepipe for vehicle and window cleaning as a commercial service to customers.
 3. Use of a hosepipe where this is needed for a national or international sports event.

SHOWCARD 4a SOUTH-EAST WATER MEASURES

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
1. Reduce leakage Currently 17% of water is lost from pipes due to leaks. Reducing this would lead to higher bills and also local traffic disruption when digging up roads to fix the pipes.				
	Reduce leakage to 12%	●●	££	✂✂
	Reduce leakage to 7%	●●●		£££
2. Tariff measures - A seasonal tariff would charge more in summer per litre, when there is less water available, and less in winter.	●			
3. Desalination Removing salt from seawater would provide a reliable source of additional water for use in dry periods. But it would be expensive and would be harmful to the environment, and there would also be local disruption while the desalination plant was being built.	●●●	XXX	£££	✂

SHOWCARD 4b SOUTH-EAST WATER MEASURES (CONTINUED)

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
<p>4. Reservoirs Reservoirs store water when it is plentiful, for use when it is scarce.</p> <ul style="list-style-type: none"> - Expanding an existing reservoir would cause some local disruption due to construction. There would also be some environmental impact due to the requirement for land. - Building a new reservoir would cause major local disruption and have a significant environmental impact due to the requirement for land. 				
	●●	XX	££	✂✂
	●●●	XXX	£££	✂✂✂
<p>5. Wastewater recycling Wastewater can be treated so that it can be safely reintroduced into the public water supply.</p> <p>There would be some local disruption due to construction works while the recycling plant was being built and environmental impacts through the use of concrete and requirements for land (although they are likely to be built on existing wastewater treatment sites).</p> <p>Also, some customers may object to the idea of reusing water.</p>	●●●	X	££	✂

SHOWCARD 4c SOUTH-EAST WATER MEASURES (CONTINUED)

	Impact on water available in a dry period	Impact on the environment	Impact on customers' bills	Local disruption
<p>6. Water transfer from another company Currently, 8% of water comes from neighbouring companies. Building new pipelines would increase water supplies available to South East Water customers. There would be some local disruption due to construction works when the pipelines were being built.</p>	●		££	✂✂
<p>7. Business water saving measures South East Water could offer water saving measures to businesses to help them save water. These would cost money for South East Water though, and so have an impact on everyone's bills.</p> <p>These measures would include</p> <ul style="list-style-type: none"> • free water saving devices such as 'hippos' to put in toilet cisterns • discount vouchers for money off water efficient white goods for example, dishwashers and washing machines • subsidised grey-water re-use systems (to re-use bath or sink water) • free business water use assessments • subsidised rainwater harvesting systems • subsidised adaptation of toilet cisterns to dual/variable flush • subsidised repairs of leaking toilets 	●		£	✂

SHOWCARD 5 (a) OPTIONS AVAILABLE

1. More hosepipe bans
2. Reduce leakage rate
3. New seasonal tariff
4. New desalination plant
5. New reservoir
6. Expand existing reservoir
7. New wastewater recycling works
8. New water transfers from neighbouring companies
9. Water saving measures offered to all businesses

SHOWCARD 5 (b) OPTIONS AVAILABLE

1. Water saving measures offered to all businesses
2. New water transfers from neighbouring companies
3. New wastewater recycling works
4. Expand existing reservoir
5. New reservoir
6. New desalination plant
7. New seasonal tariff
8. Reduce leakage rate
9. More hosepipe bans

CHOICE CARD 1

Which option do you prefer?

Option A

Option B

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

As now (17%)
New seasonal tariff
None
Expand existing reservoir
New water recycling works
No new transfers
No new measures

As now (17%)
No new tariffs
New desalination plant
Expand existing reservoir
No water recycling
New transfer
No new measures

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 10 years
Increase of 2% every year for 5 years, a total change of +10% from 2019

1 in 10 years
Increase of 2% every year for 5 years, a total change of +10% from 2019

Which option do you prefer?

CHOICE CARD 2 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

Lower (12%)
Seasonal tariff
None
Expand existing reservoir
New water recycling works
No new transfers
No measures

Option B

Lower (12%)
Seasonal tariff
New desalination plant
New reservoir
New water recycling works
No new transfers
Measures offered to customers

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 15 years
Increase of 2% every year for 5 years, a total change of +10% from 2019

1 in 20 years
Increase of 4% every year for 5 years, a total change of +20% from 2019

Which option do you prefer?

CHOICE CARD 3 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

As now (17%)
No new tariffs
None
No additional reservoirs
No water recycling
New transfer
Measures offered to customers

Option B

Lower (12%)
Seasonal tariff
None
No additional reservoirs
No water recycling
No new transfers
No measures

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 5 years
No change

1 in 5 years
No change

Which option do you prefer?

CHOICE CARD 4 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

Much lower (7%)
No new tariffs
New desalination plant
Expand existing reservoir
No water recycling
New transfer
Measures offered to customers

Option B

Much lower (7%)
No new tariffs
New desalination plant
No additional reservoirs
New water recycling works
New transfer
Measures offered to customers

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 15 years
Increase of 4% every year for 5 years, a total change of +20% from 2019

1 in 10 years
Increase of 2% every year for 5 years, a total change of +10% from 2019

Which option do you prefer?

CHOICE CARD 5 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

As now (17%)
No new tariffs
None
New reservoir
No water recycling
No new transfers
No measures

Option B

As now (17%)
Seasonal tariff
New desalination plant
New reservoir
No water recycling
No new transfers
No measures

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 10 years
Increase of 2% every year for 5 years, a total change of +10% from 2019

1 in 20 years
Increase of 3% every year for 5 years, a total change of +15% from 2019

Which option do you prefer?

CHOICE CARD 6 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

Much lower (7%)
Seasonal tariff
None
No additional reservoirs
New water recycling works
New transfer
No measures

Option B

Lower (12%)
Seasonal tariff
None
No additional reservoirs
New water recycling works
No new transfers
Measures offered to customers

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 10 years
Increase of 1% every year for 5 years, a total change of +5% from 2019

1 in 5 years
No change

Which option do you prefer?

CHOICE CARD 7 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

Much lower (7%)
No new tariffs
New desalination plant
Expand existing reservoir
No water recycling
No new transfers
Measures offered to customers

Option B

As now (17%)
No new tariffs
New desalination plant
Expand existing reservoir
No water recycling
No new transfers
Measures offered to customers

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 20 years
Increase of 3% every year for 5 years, a total change of +15% from 2019

1 in 5 years
No change

Which option do you prefer?

CHOICE CARD 8 Which option do you prefer?

South East Water measures

Leakage rate (percentage of water lost)
Water tariff measure
Desalination
Reservoirs
Water recycling
Water transfers
Business water saving measures

Option A

As now (17%)
Seasonal tariff
None
Expand existing reservoir
New water recycling works
New transfer
No measures

Option B

Lower (12%)
Seasonal tariff
None
No additional reservoirs
No water recycling
New transfer
No measures

FREQUENCY OF HOSEPIPE BANS
CHANGE IN YOUR ANNUAL WATER BILL The new bill level will also apply in all later years and excludes inflationary changes.

1 in 10 years
Increase of 1% every year for 5 years, a total change of +5% from 2019

1 in 5 years
No change

Which option do you prefer?

APPENDIX C

Sample Characteristics

APPENDIX C SAMPLE CHARACTERISTICS

Household Demographics

Table 16 shows the sample profile by household income. Some 21% of households interviewed had an income below £300 per week, normally considered 'low income' households.

Table 16: Household Income

Household income	Sample frequency (%)
A. Up to £100 Per Week (Under £5,200 Per Year)	2
B. £101-£200 Per Week (£5,201-£10,400 Per Year)	8
C. £201-£300 Per Week (£10,401 - £15,600 Per Year)	10
D. £301-£400 Per Week (£15,601 - £20,800 Per Year)	10
E. £401-£500 Per Week (£20,801,-£26,000 Per Year)	7
F. £501-£600 Per Week (£26,001-£31,200 Per Year)	7
G. £601-£800 Per Week (£31,201-£41,600 Per Year)	10
H. £801-£1000 Per Week (£41,601 - £52,000 Per Year)	9
I. £1001-£1200 Per Week (£52,001 - £62,400 Per Year)	9
J. £1201-£1400 Per Week (£62,401 - £72,800 Per Year)	5
K. £1401-£1600 Per Week (£72,801 - £83,200 Per Year)	4
L. More than £1601 Per Week (More than £83,201 Per Year)	6
Prefer not to say	12

Base=all household respondents: 500

The next two tables show the profiles of respondents' employment status and education respectively. Over half (54%) of respondents were economically active (employed full- or part-time or self-employed). Nearly two-fifths (39%) were educated to at least degree level; 11% had no qualifications.

Table 17: Employment Status

Employment Status	Sample frequency (%)
Self employed	8
Employed full-time (30+ hours)	34
Employed part time (up to 30 hours)	12
Student	1
Unemployed – seeking work	1
Unemployed – other	1
Looking after the home/children full time	5
Retired	37
Unable to work due to sickness or disability	1
Other	1

Base=all household respondents: 500

Table 18: Level of Education Achieved

Level of Education	Sample frequency (%)
O levels/ CSEs/ GCSEs	21
A levels/ AS level/ higher school certificate	10
NVQ (Level 1 and 2). Foundation/ Intermediate/ Advanced GNVQ/ HNC/ HND	12
Other qualifications (e.g. City and Guilds, RSA/OCR, BTEC/Edexcel)	7
First degree (e.g. BA, BSc)	18
Higher degree (e.g. MA, PhD, PGCE, post graduate certificates and diplomas)	12
Professional qualifications (teacher, doctor, dentist, architect, engineer, lawyer etc.)	9
No qualifications	11

Base=all household respondents: 500

A quarter (27%) of households had children aged under 16 in residence. Just over two-fifths had adults over the age of 60 in residence.

Table 19: Household Structure

Age band	Frequency, by number in age band (%)				
	0	1	2	3	4+
0-15	73	12	11	3	1
16-60	32	18	37	8	5
61+	57	22	20	-	-

Base=all household respondents: 500

All household respondents were asked to indicate the size of their South East Water bill, if they knew it. They were able to provide figures on a monthly, quarterly, six monthly or annual basis, whichever they felt appropriate, and a total annual figure was calculated from this. Over two-thirds (70%) of customers were able to provide a figure for their bill.

For customers who received sewerage services from Thames Water, and whose South East Water bill therefore includes sewerage charges, the water services portion of the bill was calculated at 59% of their total bill. This was based on figures provided by South East Water for average water and sewerage bills in the Thames sewerage area. This calculated water services figure was stated back to respondents in the interview in this form: “Previously you told me that your annual bill from South East Water is [VALUE] That includes both water and waste services, and of that amount, [VALUE*0.59] goes to South East Water for water services.”

For customers who did not know their bill, they were informed that the average annual bill for water services in the South East Water area was £204.

Table 20 shows the values of the annual water bill for all respondents.

Table 20: Annual water bill – Household Respondents

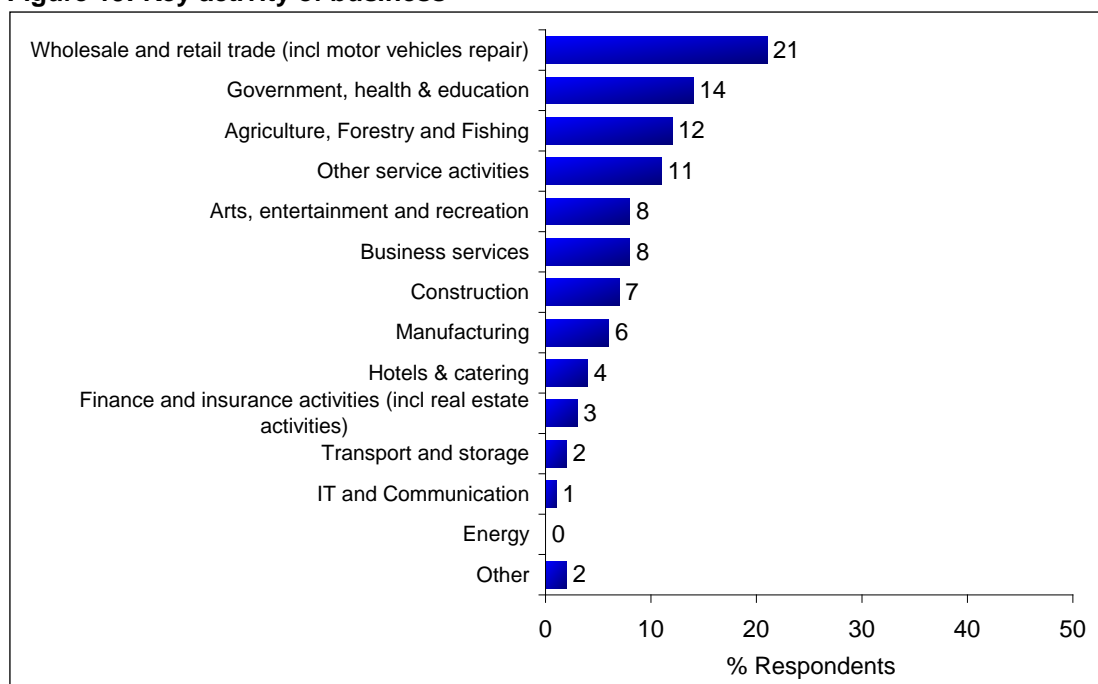
Annual bill size	Sample frequency (%)
£0 to £100	5
£101 to £200	19
£201 to £300	21
£301 to £400	13
£401 to £500	5
£501 +	6
Don't know	31

Base=all household respondents: 500

Business Demographics

The main business activities of businesses in the sample were: wholesale and retail trade (21%); government, health and education (14%); and, agriculture, forestry and fishing (12%).

Figure 19: Key activity of business



Base = all business respondents: 300

Most of the businesses covered were relatively small with just over three-fifths (61%) having fewer than 10 employees.

Table 21: The Number of Employees at the Business Premises

Number of employees	Sample frequency (%)
0 to 4	36
5 to 9	24
10 to 19	17
20 to 49	12
50 to 99	5
100 to 249	2
250 to 499	1
500 to 999	1
1,000 +	1
Don't know/ not stated	0

Base = all business respondents: 300

Three-quarters of businesses (78%) are paying less than £1000 per annum.

Table 22: Business Annual Bill

Annual bill size	Sample frequency (%)
Less than £1,000	78
£1,000 - £5,000	15
£5,001 - £20,000	7
£20,001 - £100,000	1
Over £100,000	0

Base = all business respondents: 300

APPENDIX D

Econometric Analysis of WTP Variation

APPENDIX D ECONOMETRIC ANALYSIS OF WTP VARIATION

An important test of the validity of the WTP results from an SP survey concerns analysing the extent to which WTP varies in line with expectation (Bateman et al. 2002). This appendix reports on the econometric analysis we have conducted to perform this test.

The analysis incorporates a number of variables in addition to those included within the main results described in section 7. The following table shows the variables that were used in this analysis, and the mean of the variables in the household and the business samples.

Table 23: Additional Variables used in Explanatory Choice Models

Variable name	Description ⁽¹⁾	Mean	
		Households	Businesses ⁽²⁾
<i>prefleakage</i>	Leakage reduction cited as a top priority	0.608	0.810
<i>prefmeter</i>	Compulsory metering cited as a top priority	0.462	
<i>prefsteptariff</i>	New stepped tariff cited as a top priority	0.214	
<i>prefseastariff</i>	New seasonal tariff cited as a top priority	0.066	0.143
<i>prefdesal</i>	New desalination plant cited as a top priority	0.068	0.073
<i>prefresexp</i>	Expanding existing reservoir cited as a top priority	0.264	0.320
<i>prefresnew</i>	New reservoir cited as a top priority	0.120	0.177
<i>prefrecycle</i>	New water recycling works cited as a top priority	0.290	0.320
<i>preftransfer</i>	New water transfer cited as a top priority	0.224	0.290
<i>prefwsmeasures</i>	Water saving measures offered to all cited as a top priority	0.414	0.333
<i>prefhose</i>	More hosepipe bans cited as a top priority	0.152	0.113
<i>prefnone</i>	Would prefer none of the measures were implemented	0.002	0.013
<i>notleakage</i>	Leakage reduction cited as not wanted	0.024	0.007
<i>notmeter</i>	Compulsory metering cited as not wanted	0.192	
<i>notsteptariff</i>	New stepped tariff cited as not wanted	0.194	
<i>notseastariff</i>	New seasonal tariff cited as not wanted	0.276	0.363
<i>notdesal</i>	New desalination plant cited as not wanted	0.440	0.413
<i>notresexp</i>	Expanding existing reservoir cited as not wanted	0.096	0.043
<i>notresnew</i>	New reservoir cited as not wanted	0.336	0.250
<i>notrecycle</i>	New water recycling works cited as not wanted	0.138	0.080
<i>nottransfer</i>	New water transfer cited as not wanted	0.148	0.107
<i>notwsmeasures</i>	Water saving measures offered to all cited as not wanted	0.044	0.030
<i>nothose</i>	More hosepipe bans cited as not wanted	0.232	0.240
<i>incl</i>	Household income less than £300 per week	0.206	
<i>inclH</i>	Household income more than £1,000 per week	0.244	
<i>inmiss</i>	Household income not stated	0.118	
<i>toomuch</i>	Current bill cited as being "Too much" or "Far too much"	0.242	0.303
<i>impact34</i>	A hosepipe ban would have a "moderate impact" or a "big impact"	0.178	0.143
<i>metered</i>	Respondent is currently on a metered tariff.	0.582	

(1) All variables are dummies equal to one if the description is true for the respondent and equal to zero otherwise. (2) Blank cells in this column indicate that the variable was not included in the business dataset.

The variables in Table 23 entered into the explanatory models as interactions with the original variables from Table 9 in order to test specific sources of variation which carried a theoretical prior. Interaction variables are simply the product of two variables, and are shown in the following models as $Var1 \times Var2$, where $Var1$ represents one of the variables from Table 23 and $Var2$ represents one of the variables from Table 9.

The first set of interactions included are between indicators from the "naïve priority" questions (Figure 13 and Figure 14) and the corresponding supply-demand measures. For example, *prefleakage* is a dummy variable equal to one if the respondent cited leakage reduction as one of their top priorities for improvement, and equal to zero otherwise. Likewise, *notleakage* is a dummy variable equal to one if the respondent cited leakage reduction as one of the measures they would most like not to see implemented, and equal to zero otherwise. These variables were created for all of the supply-demand measures, and then interacted with the variables representing the corresponding measures before entering into the

model. For example, *prefleakage* was interacted, ie multiplied by, *leakage*, to obtain the variable *prefleakage* x *leakage*. This variable would then be equal to the percentage leaked from SEW's pipes if the respondent cited leakage reduction as one of their top priorities for improvement, and equal to zero otherwise. Interactions corresponding to each of the “*pref*” and “*not*” variables were created and entered into the model likewise.

The purpose of including these interactions was to test that the responses given to the choice exercise were consistent with the responses to the earlier “naive priority” questions in the survey. To be consistent with expectation, the “*pref*” interaction variables should take a positive sign for all supply-demand measures except leakage, for which a negative sign is expected; and the not interaction variables should take a negative sign for all supply-demand measures except leakage, for which a positive sign is expected. Such a finding would indicate, for example, that respondents choosing a measure as one of their priorities for inclusion in SEW's plan should give that measure a higher decision weight when making their choices between options than other respondents.

For households only, interactions between income category dummy variables and *pcost*. Households were split into four groups defined by their weekly household income level – Low (less than £300), Medium (£300 to £1,000), High (more than £1,000), and Missing (respondent refused to provide their income). Each income category was assigned a dummy variable, *incL*, *incM*, *incH* and *incmiss* respectively, equal to one if the respondent was in the income category and equal to zero otherwise. The *incM* variable was treated as the base case and so did not feature in the model specification. The *incL*, *incH* and *incmiss* dummies were interacted with, ie multiplied by, *pcost* prior to entering into the model.

The purpose of including the income interaction variables was to test whether low income households were more cost sensitive, ie willing to pay less, than higher income households. To be consistent with expectation, the *incH* x *pcost* interaction variable would have to be non-negative and the *incL* x *pcost* variable would have to be non-positive.

We include an interaction between *pcost* and a variable, *toomuch*, which indicates that the respondent said their current bill was “Too much” or “Far too much”. We expect that those saying their current bill was “Too much” or “Far too much” would be more cost sensitive than other respondents and we would therefore expect that the *toomuch* x *pcost* interaction variable would have a negative coefficient in the explanatory models.

For a similar reason, we also include an interaction between *pcost* and the *prefnone* variable. We expect that those saying they would prefer none of the supply-demand measures to be included would be more cost sensitive, ie willing to pay less, than other respondents. We would therefore expect the *prefnone* x *pcost* interaction variable to have a negative coefficient in the explanatory models.

The variable *impact34* indicates that the respondent stated that a hosepipe ban would have a “moderate impact” or a “big impact” on them. We expect that these respondents would give greater weight to the frequency of hosepipe bans when choosing between options – that is, they should be relatively more averse to more frequent hosepipe bans than other respondents. We therefore include an interaction between this variable and *hose*, and expect the coefficient on this variable to be negative.

Finally, for households only, we include the variable *metered*, which indicates that the household is on a metered tariff, interacted with the supply-demand measure *meter*, indicating

compulsory metering. The expectation here was that households on a metered tariff should be relatively less averse to compulsory metering than other households. This is because those households that are currently unmetered would presumably prefer to retain the option over whether to switch to a meter or not, rather than it be made compulsory, whereas this option has no value for households already on a metered tariff. We therefore expect the interaction variable *metered* x *meter* to have a positive coefficient.

The explanatory models were estimated using the conditional logit estimator, rather than the mixed logit estimator, due to the fact that a much larger number of parameters were being estimated in the explanatory models than in the main models shown in section 7. The conditional logit models are estimated with robust (Huber-White) standard errors which allow for correlation within individuals' responses.

Table 24 presents two models for households. The first is the full model, including all the variables described above; the second is a restricted specification that includes only interaction variables where they are statistically significant at the 10% level.

The restricted model shows the following findings:

- All the “*pref*” interaction variables have the expected sign and are statistically significant ($p < .05$) except for *prefseastariff* x *seastariff*, which was statistically insignificant ($p > .10$) and so excluded.
- All the “*not*” interaction variables have the expected sign and are statistically significant ($p < .05$) except for *notleakage* x *leakage*, *notwsmeasures* x *wsmeasures*, and *nothose* x *hose* which were statistically insignificant ($p > .10$) and so excluded.
- The variable *incl* x *pcost* has a negative coefficient, and is statistically significant ($p < .05$), indicating that low income households had lower WTP than higher income households, as expected. The variables *inch* x *pcost* and *incmiss* x *pcost* were statistically insignificant ($p > .10$) and so excluded.
- The variables *toomuch* x *pcost* and *impact34* x *hose* were statistically insignificant ($p > .10$) and so excluded from the model.
- The variable *prefnone* x *pcost* enters the model with a negative and statistically significant ($p < .01$) coefficient, indicating, as expected, that those saying they would prefer none of the supply-demand measures to be included were more cost sensitive, ie willing to pay less, than other respondents.
- Finally, *metered* x *meter* enters the model with a positive and statistically significant ($p > .01$) coefficient. This indicates, as expected, that households on a metered tariff were relatively less averse to compulsory metering than other households.

Overall, the results in Table 24 are uniformly supportive of the validity of the results. There are no statistically significant coefficients that have the opposite sign to expected, and there are many statistically significant findings that do have the expected sign.

Table 24: Explanatory Model Results - Households

Variable	Full model (Coef, Std. error)	Restricted model (Coef, Std. error)
<i>leakage</i>	0.030 (0.041)	0.033 (0.041)
<i>meter</i>	-0.637 (0.211)***	-0.645 (0.208)***
<i>steptariff</i>	-0.442 (0.157)***	-0.447 (0.156)***
<i>seastariff</i>	-0.431 (0.164)***	-0.394 (0.164)**
<i>desal</i>	-1.421 (0.409)***	-1.439 (0.407)***
<i>resexp</i>	-0.394 (0.285)	-0.404 (0.283)
<i>resnew</i>	-1.178 (0.415)***	-1.192 (0.412)***
<i>recycle</i>	-0.613 (0.398)	-0.633 (0.397)
<i>transfer</i>	-0.356 (0.147)**	-0.368 (0.146)**
<i>wsmeasures</i>	-0.178 (0.162)	-0.227 (0.160)
<i>hose</i>	-3.132 (2.975)	-4.896 (2.427)**
<i>pcost</i>	-0.053 (0.010)***	-0.058 (0.007)***
<i>waterimpact</i>	0.439 (0.134)***	0.445 (0.133)***
<i>prefleakage x leakage</i>	-0.046 (0.020)**	-0.047 (0.019)**
<i>prefmeter x meter</i>	0.876 (0.183)***	0.874 (0.181)***
<i>prefsteptariff x steptariff</i>	0.770 (0.148)***	0.772 (0.149)***
<i>prefseastariff x seastariff</i>	0.470 (0.341)	
<i>prefdesal x desal</i>	1.506 (0.228)***	1.519 (0.229)***
<i>prefresexp x resexp</i>	0.442 (0.185)**	0.452 (0.185)**
<i>prefresnew x resnew</i>	0.868 (0.237)***	0.863 (0.234)***
<i>prefrecycle x recycle</i>	0.487 (0.168)***	0.482 (0.167)***
<i>preftransfer x transfer</i>	0.680 (0.154)***	0.691 (0.153)***
<i>prefwsmeasures x wsmeasures</i>	0.298 (0.147)**	0.337 (0.145)**
<i>prefhose x hose</i>	15.215 (7.488)**	16.740 (7.286)**
<i>notleakage x leakage</i>	0.011 (0.047)	
<i>notmeter x meter</i>	-0.990 (0.247)***	-0.993 (0.246)***
<i>notsteptariff x steptariff</i>	-0.879 (0.160)***	-0.873 (0.159)***
<i>notseastariff x seastariff</i>	-0.450 (0.157)***	-0.489 (0.155)***
<i>notdesal x desal</i>	-1.349 (0.148)***	-1.345 (0.148)***
<i>notresexp x resexp</i>	-0.532 (0.239)**	-0.530 (0.243)**
<i>notresnew x resnew</i>	-0.888 (0.183)***	-0.885 (0.183)***
<i>notrecycle x recycle</i>	-0.969 (0.205)***	-0.975 (0.206)***
<i>nottransfer x transfer</i>	-0.366 (0.163)**	-0.364 (0.163)**
<i>notwsmeasures x wsmeasures</i>	-0.571 (0.365)	
<i>nothose x hose</i>	-2.558 (5.324)	
<i>incl x pcost</i>	-0.034 (0.017)**	-0.035 (0.016)**
<i>inCH x pcost</i>	-0.006 (0.015)	
<i>inmiss x pcost</i>	0.000 (0.018)	
<i>toomuch x pcost</i>	-0.015 (0.015)	
<i>prefnone x pcost</i>	-2.781 (0.200)***	-2.712 (0.200)***
<i>impact34 x hose</i>	-4.836 (6.155)	
<i>metered x meter</i>	0.555 (0.182)***	0.558 (0.180)***
No. observations	8000	8000
LL	-2154.0	-2158.3
Pseudo R2	0.223	0.222

Model = conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen. Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. Variables are as defined in Table 9 and Table 23.

Table 25 shows the corresponding explanatory model results for businesses. Again, unrestricted and restricted models are shown.

The restricted model shows the following findings:

- All the “*pref*” interaction variables have the expected sign and are statistically significant ($p < .05$) except for *prefleakage x leakage*, *prefwsmeasures x wsmeasures* and *prefhose x hose* which were statistically insignificant ($p > .10$) and so excluded.

- All the “not” interaction variables have the expected sign and are statistically significant (p<.05) except for *notresexp x resexp*, *nottransfer x transfer*, *notwsmeasures x wsmeasures*, and *nothose x hose* which were statistically insignificant (p>.10) and so excluded.
- The variables *toomuch x pcost*, *prefnone x pcost* and *impact34 x hose* were statistically insignificant (p>.10) and so excluded from the model.

Overall, the results in Table 25 are again uniformly supportive of the validity of the results. There are no statistically significant coefficients that have the opposite sign to expected, and there are many statistically significant findings that do have the expected sign.

Table 25: Explanatory Model Results - Businesses

Variable	Full model (Coef, Std. error)	Restricted model (Coef, Std. error)
<i>leakage</i>	0.024 (0.055)	-0.004 (0.047)
<i>seastariff</i>	-0.662 (0.193)***	-0.647 (0.190)***
<i>desal</i>	-1.406 (0.491)***	-1.370 (0.485)***
<i>resexp</i>	-0.681 (0.340)**	-0.701 (0.334)**
<i>resnew</i>	-1.188 (0.493)**	-1.160 (0.485)**
<i>recycle</i>	-0.880 (0.482)*	-0.833 (0.475)*
<i>transfer</i>	-0.494 (0.185)***	-0.454 (0.178)**
<i>wsmeasures</i>	-0.174 (0.192)	-0.122 (0.185)
<i>hose</i>	-2.929 (3.428)	-5.320 (2.743)*
<i>pcost</i>	-0.064 (0.010)***	-0.071 (0.009)***
<i>waterimpact</i>	0.436 (0.161)***	0.428 (0.159)***
<i>prefleakage x leakage</i>	-0.033 (0.028)	
<i>prefseastariff x seastariff</i>	0.913 (0.224)***	0.934 (0.221)***
<i>prefdesal x desal</i>	1.101 (0.321)***	1.081 (0.325)***
<i>prefresexp x resexp</i>	0.950 (0.198)***	0.981 (0.195)***
<i>prefresnew x resnew</i>	0.879 (0.225)***	0.843 (0.221)***
<i>prefrecycle x recycle</i>	0.616 (0.166)***	0.579 (0.166)***
<i>preftransfer x transfer</i>	0.798 (0.156)***	0.746 (0.155)***
<i>prefwsmeasures x wsmeasures</i>	0.204 (0.202)	
<i>prefhose x hose</i>	-10.239 (8.979)	
<i>notleakage x leakage</i>	0.144 (0.062)**	0.183 (0.045)***
<i>notseastariff x seastariff</i>	-0.751 (0.180)***	-0.752 (0.179)***
<i>notdesal x desal</i>	-1.383 (0.193)***	-1.383 (0.192)***
<i>notresexp x resexp</i>	-0.753 (0.458)	
<i>notresnew x resnew</i>	-0.758 (0.215)***	-0.717 (0.217)***
<i>notrecycle x recycle</i>	-0.662 (0.275)**	-0.638 (0.277)**
<i>nottransfer x transfer</i>	0.140 (0.213)	
<i>notwsmeasures x wsmeasures</i>	-0.643 (0.463)	
<i>nothose x hose</i>	-1.431 (6.971)	
<i>toomuch x pcost</i>	-0.019 (0.018)	
<i>prefnone x pcost</i>	-0.044 (0.061)	
<i>impact34 x hose</i>	-7.526 (7.806)	
No. observations	4800	4800
LL	-1338.8	-1345.6
Pseudo R ²	0.195	0.191

Model = conditional logit; dependent variable = choice, a {0,1} dummy variable indicating that the option was chosen. Robust standard errors in parentheses; * significant at 10%; ** significant at 5%; *** significant at 1%. Variables are as defined in Table 9 and Table 23.