

# R047i4 Portsmouth Water: Screening Feasible Options for WRMP19

---

## 1. Introduction

An unconstrained list of options was developed following review of previous Option Assessments by Portsmouth Water (in anticipation of deficit drivers that have not previously manifest), and review of options identified both in the UK and internationally to enable water utilities to secure reliable supplies. A total of 180 options were accepted on to the Unconstrained List of options.

128 of the unconstrained options were previously assessed during preparation of WRMP14. However, ultimately these were not required as no forecast deficit was identified at that time. In line with current industry approaches for WRMP19 Portsmouth Water has introduced a higher risk profile into its supply forecast (to take into account the risk of more severe drought conditions than previously experienced). That risk profile in combination with the potential additional 15 MI/d bulk supply to Southern Water drives a deficit for WRMP19 to consider.

The pre-existing 128 options were previously assessed via a stakeholder based expert panel in preparation for WRMP14. These options are highlighted in Appendix A of the Unconstrained Options report (R046i2). The comments and considerations raised at that time were documented and used to inform the re-assessment for WRMP19 in the context of updated environmental, regulatory, and societal developments.

### 1.1 The Screening Process

In line with Risk Base Planning and the deficit identified it was decided that the unconstrained list of 180 options should be screened to include the most credible options within different option types.

Consultants Amec Foster Wheeler prepared a two-stage, six-step screening process to develop the feasible list of options. In Stage 1 a three-step screening process is applied to remove the least credible options from the various option types. Options which pass to Stage 2 are then subject to a further three-step screening process.

Options are assessed on a Pass / Fail basis and are required to pass all six criteria to be included within the Feasible List. This process is summarised in Figures 1.1 and 1.2 and described in more detail in the following sections.

Figure 1.1 Stage 1: 3 Step Screening

| DEFINITIONS  |              | 1  | 2  | 3  |
|--|--------------|--|--|--|
| Portsmouth Water WRMP19 Stage 1 Screening Criteria |              | Baseline                                       | Duplication  | Mutual exclusivity   |
| Assessment Grade                                   | Category     |  |  |  |
| In   | Acceptable   | Option does not replicate a baseline activity. | Option is not a duplicate of another option.   | Option is either not mutually exclusive with another Portsmouth Water, or if so represents the most credible choice (operationally and environmentally).   |
| Out  | Unacceptable | Option too similar to a baseline activity.     | <p>Option too similar to another variant so that it is essentially a duplicate.</p> <p>Least credible version of an option with several other variations: a more constrained resource (volume and quantity); in a less ideal location; requires more auxiliary infrastructure required; higher water savings likely from other variations.</p> | <p>Option is less credible than a Mutually Exclusive option known to be considered by Southern Water.</p> <p>Option is less credible than another Portsmouth Water to which it is mutually exclusive.</p> <p>Option is likely to conflict with Southern Water's explicit need to access resources from the same source (e.g. from the River Itchen).</p> |

Step 1: Remove baseline and duplicate activities (i.e. options that are not materially different to baseline activities and options that are fundamentally the same as another within the unconstrained list);

Step 2: Remove options that are likely to compete with Southern Water's need for resources (this is based on communication with Southern Water regarding its own unconstrained list and feasibility assessment. Options to utilise treated effluent from Southern Water wastewater treatment works are considered on their merits under this category);

Step 3: Identify mutually exclusive options (including variations with option type) and remove those that are the least technically credible from a range of similar or mutually exclusive options. Considering the relatively limited extent of the challenge facing security of supply in the Portsmouth Water customer area (as forecast at this time) Portsmouth Water is adopting a Risk-Based Approach to developing and evaluating its range of potential options. Technical Feasibility is a basic premise for options being included in the Unconstrained List. Step 3 recognises that some options are more credible than others and only these should be taken forward in the assessment. Level of credibility is determined based on:

- ▶ the level of need for the specific option (i.e. the demand response to drought may negate the need for drought specific options);
- ▶ environmental objectives or regulatory constraints (i.e. known sustainability abstractions, clear risk of driving WFD deteriorations, conflicts with existing resources, National Environment Programme objectives, high risks to landscape objectives or known cultural heritage issues);
- ▶ the scale of technical intervention or level of technical complexity required to realise the deployable output; and
- ▶ the presence or absence of opportunities to mitigate potential negative impacts.

Figure 1.2 Stage 2: 3 Step Screening

| Portsmouth Water WRMP19 Stage 2 |              | 4   | 5  |  | 6  |
|---------------------------------|--------------|---|--|--|--|
| Assessment Grade                | Category     | Technical credibility   | Promotability (basic credibility)  |  | Other issues   |
|                                 |              |   | Political acceptability  | Customer acceptability   |  |
| In                              | Acceptable   | Option is technically feasible (cost not withstanding).<br>Option will address SDB need under dry year and/or drought conditions (supply and demand conditions).  | Option is in line with Portsmouth Water company policy and direction.<br>Option is unlikely to conflict with other local or national planning and social policy.   | Option is in line with customer expectations and (if applicable) supported by customer evidence (forums, willingness to pay etc).<br><br>Potentially difficult but contentions could be mitigated / resolved.  | Issues raised that Portsmouth Water should take into account when defining detail of options - but insufficient to screen out. |
| Out                             | Unacceptable | <b>Least technically credible from a range of similar options:</b><br><br>Required DO is highly likely to be unachievable due to technical issues, e.g. new and/or untested technology<br><br>Resource is unacceptably constrained: EA has already flagged the source as unsustainable; option would drive a WFD deterioration, source would threaten designated sites; conflicts with existing resources. Mitigation to prevent the impact is unlikely.<br><br>Demand response to conditions likely to negate need for option. | Option is counter to Portsmouth Water corporate/board policy, or established governmental / regulatory positions.<br><br>Risk that option significantly hinders Defra policy objectives; material concerns highly likely from local planning authorities (likely to refuse permissions). | Existing local campaigns, pressure groups known to be hostile to the option (includes hostility to hints of actions in the area);<br><br>Option conflicts with landscape objectives (will cause a long term/permanent impact on the designated landscape and mitigation is unlikely e.g. construction of large new infrastructure buildings).<br><br>Risk of failure to multiple Portsmouth Water customer service promises; drinking water quality (highly) likely deteriorate leading to regular customer complaints and/or concerns raised by many customers. | Issues such as: WRSE options (i.e. not directed at the Portsmouth Water WRMP)  |

Step 4: Assess the technical credibility of the option. The focus is on removing the least technically credible options. Basic technical credibility is assessed by considering whether under the conditions that will drive a deficit the option will be able to provide an appropriate solution, the likelihood of delivering the required deployable output; this can be constrained by technical issues, the sustainability of the source, and the ability to mitigate any highly negative impacts. For demand management options this includes consideration of will the option be able to deliver water savings if it is implemented.

During this step any dependencies on assets that are not yet in place or otherwise outside of Portsmouth Water's own control are assessed (e.g. options to reduce bulk exports on the basis of large scale storage that is not yet in any other company's baseline invoke too high a risk for Portsmouth Water's own customers). These options will remain under consideration in the longer-term.

Step 5: Assess how well the option could be promoted / accepted. This involves two elements. Firstly, political acceptability. This considers how appropriate the option is in the context of national (and if relevant) local policy (such as policy on water metering). It also considers the viability of the option in the context of Portsmouth Water's own commercial policies. Customer acceptability is the other element. Where Portsmouth Water has collated its own customer research (e.g. willingness to pay, forums, or via other communication routes) this evidence is used to assess the likely reaction of customers to a proposed option and the significance it may have.

Step 6: There is scope to consider any other bespoke or otherwise option specific issues that may either strongly suggest the option is feasible, or infeasible, or invalid for the WRMP. For example, there are a number of options that have been identified via the Water Resources South East group work which in reality rely on Portsmouth Water releasing its resources to benefit the wider South East. These are not options valid for inclusion in the WRMP to secure Portsmouth Water's own supply-demand balance.

Since WRMP14 there have been policy changes leading to a change in assessment of some options:

- ▶ For demand management options the main change has been the introduction of retail competition and the impact that this will have on Portsmouth Water's ability, as a wholesaler, to interact directly with commercial and industrial customers;
- ▶ The assessment of options depending on metering have also been modified to reflect social equity challenges of introducing potentially unfair tariff structures to parts of the customer base.

## 2. List of Feasible Options

The screening process returned a total of 21 feasible options for Portsmouth Water to consider further:

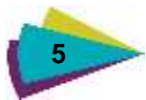
- ▶ Resource: 6 options
  - 5 groundwater abstractions (river, groundwater, or river and groundwater)
  - 1 new storage facility (to improve resilience to drought)
- ▶ Demand: 11 options
  - 3 metering
  - 5 water efficiency (options that enable users to reduce waste, effectively doing more with less water)<sup>1</sup>
  - 3 water conservation (options that enable customers to do less with less water)
- ▶ Distribution: 4 options
  - 4 leakage detection (to optimise baseline levels of leakage activity)
- ▶ Production: 0 options

The list of individual feasible options are listed in Table 2.1. The outcome of the screening process for all of the Unconstrained Options is shown in Appendix A. Table A.1 shows the outcome of the Stage 1 screening assessment (which examined options on the basis of whether or not they are already part of the baseline, identified duplicates and removed the least credible versions, and identified options which were mutually exclusive and removed the least credible for Portsmouth Water to pursue). Table A.1 also shows the outcome of the Stage 2 screening assessment. It confirms which options successfully passed through into the feasible list, and includes the rationale supporting the screening outcomes. The focus is on explaining the reasons for screening options out. However, there are many situations where it is necessary to include commentary on elements which are positive, either to justify the decision to retain options, or to clarify how the reason to screen out has been made despite positive considerations.

**Table 2.1 Feasible Options List**

|    | Option Number | Option Name   |
|----|---------------|---|
| 1  | C005          | Smart meter all households where a meter or meter box already exists.   |
| 2  | C069          | Target occupants of new build housing with smart meters & water efficiency advice.                                |
| 3  | C075          | Smart metering - replacing existing household water meters & provide water efficiency audit and advice.           |
| 4  | C026          | Subsidy to customers that purchase water efficient appliances (washing machines and dishwashers, showers and WCs) |
| 5  | C034          | Water saving devices - Retrofitting existing toilets  |
| 6  | C040          | Water saving devices - Spray taps   |
| 7  | C043          | Water saving devices - Trigger nozzles for hoses  |
| 8  | C046          | Household water efficiency programme (Partnering approach, home visit)  |
| 9  | C078          | Voluntary restraint & leakage action  |
| 10 | C079          | Mandatory restraint   |

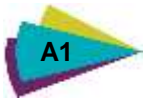
<sup>1</sup> Waterwise (2016) A Water Efficiency Strategy for the UK - Consultation



---

|    | <b>Option<br/>Number</b> | <b>Option Name</b>   |
|----|--------------------------|--|
| 11 | C080                     | Imposition of Drought Direction Restrictions (mandatory commercial restraint). |
| 12 | D004a                    | Deployment of permanent noise loggers – 25% of network                         |
| 13 | D004b                    | Deployment of permanent noise loggers – 75% of network                         |
| 14 | D005                     | Installation of district meters – partial network                              |
| 15 | D011                     | Installation of district meters – full network                                 |
| 16 | R013                     | Havant Thicket Winter Storage Reservoir Option A - 'Standard Design' 23 Ml/d   |
| 17 | R021a                    | Source O – Maximising DO   |
| 18 | R022a                    | Source J - Maximising DO   |
| 19 | R023a                    | Source H – Maximising DO   |
| 20 | R024a                    | Source C - Maximising DO   |
| 21 | R068                     | Source S Drought Permit  |

---



# Appendix A

## Screening Outcomes

Table A.2 Outcome of Options Screening

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|---|----------------|--|
| C001             | Meter remaining unmetered non-households                              | A small number of commercial and public sector premises remain unmetered. This option would involve additional activity and effort to go beyond the baseline non-household metering activity. It would require unmetered commercial and public sector properties to be revisited and property water supply line obstacles overcome in order to install the meters. The meter style would be either AMR or Smart Meters. | OUT            | <b>Baseline:</b> Residuals are unmetered due to inherent difficulties of installing meters on the site and therefore that additional investment here would not provide value (savings) for money. Portsmouth Water can advise on its number of residual unmetered non-households. | OUT            | Screened out at Stage 1.   |
| C005             | Smart meter all households where a meter or meter box already exists. | Transfer all households where meters already exist (but which remain on an unmetered tariff) on to a measured tariff. Give these customers the option to replace the meter with a smart meter that will enable them to take advantage of improved online accounts and more control of how they use and pay for water (upgraded billing systems are not within the scope of this specific option).                       | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | IN             | <p><b>Ability:</b> Evidence from UK and internationally confirms that residents' consumptive behaviour changes when they move into a property with a metered water bill. If compulsory metering was desired and permitted and implemented overall water savings would be achieved. The compulsory aspect has the risk to generate customer backlash, at least initially.</p> <p><b>Politic:</b> Note that potential introduction of compulsory metering may make this a feasible option. Portsmouth Water is currently in decisions to determine whether this is permitted.</p> <p>Technically this is a variation of compulsory metering and Portsmouth Water is not in an area of Serious water stress, the designation that would permit compulsory metering.</p> <p>There are suggestions from pressure groups that water scarcity status is sufficient to permit compulsory metering. At this time that view is unsupported.</p> <p><b>Customer:</b> Note that potential introduction of compulsory metering may make this a feasible option. Portsmouth Water is currently in decisions to determine whether this is permitted.</p> <p>In other parts of the South East where customers have been more exposed to drought restrictions within the last 5 to 10 years acceptance of water meters is widespread. Despite the benefits to customers of the water savings that metering drives (control over individual bills, and reduced demand for overall more financially or environmentally expensive options) the lack of restrictions or awareness of any previous deficits in Portsmouth has not increased awareness of the need for metering - especially not for compulsory metering.</p> |

| WRMP19 reference | Option Name                                 | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
| C006             | Metering on Change of Occupancy (when sold) | On change of ownership install meters into households that currently do not have a meter. These properties would then be invited to convert to a meter based water bill. Enforcing a metered bill would be akin to compulsory metering which is not a component of this option. This option would require Portsmouth Water to be notified by a relevant authority at point of sale and given access to the property. This does option does not apply to change of tenancy due to the potential high turnover of occupants, private lettings, and owner resistance. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Evidence from UK and internationally confirms that residents' consumptive behaviour changes when they move into a property with a metered water bill. Water savings are enhanced when the customers are provided with support and advice on how to save water and make the water meter work for them in the long-term. This is screened in on the basis that option C071 is also screened in (property retrofit and advice).</p> <p><b>Politic:</b> This is a policy that is common to many water companies in the UK. Portsmouth Water does have a legal right to compulsory meter on change of occupancy this is not currently a baseline activity. In practice, a water company can install a water meter and charge on that basis, if the household customer: is the new occupier of a property (provided an unmetered bill has not already been sent to that occupier).</p> <p><b>Customer:</b> This is a borderline IN. If this is not already a baseline option it may trigger a negative reaction from some customers initially. However, this is a fairly standard option across the UK, particularly in the South East and so should not be considered sufficiently severe to screen out this option.</p> |
| C084             | Meter void properties                       | Install external meters (no access to properties with no occupant). Metering voids enables better assessments of leakage and estimates of illegal use from void properties.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Evidence from UK and internationally confirms that residents' consumptive behaviour changes when they move into a property with a metered water bill (including if the property has been classed as void). Also increases ability of Portsmouth Water to identify illegal use or standard leakage from these properties (applying baseline leakage activities) both of which will save water. This assumes that void properties will return to occupied status.</p> <p><b>Politic (out):</b> A void property is one that is empty (either void of tenants or homeowner) but the property remains under the ownership of some party that is not the water utility. Accessing the property may be difficult and potentially risks trespass. That risk may vary between properties. Of all the metering options this is not recommended as one to pursue.</p> <p><b>Customer:</b> Other than the actual property owner most other customers are unlikely to have any major objections - other than concern about the status of properties falling into void status.</p>  |



| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
| C007             | Increasing volumetric charges (not block or seasonal) | Increase the volumetric charge for water supply for metered customers. The rationale behind this option is that increasing the volumetric charge would encourage customers to use water more wisely, reducing demand. This option would increase the charge at a flat rate (not a rising, block, or seasonal tariff).  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> The current economic regulatory system does not enable this type of charging method.<br><b>Customer:</b> This option has a very high risk of backfiring, penalising metered customers whilst unmetered customers continue to consume without financial impact. Until there is universal metered billing this is unacceptable from a social equity perspective.   |
| C008             | Consumption based tariffs                             | This option would apply a tier of volumetric charges based on the volume of water consumed. The unit charge for water would increase when greater volumes of water are consumed. The rationale behind this option is that increasing the volumetric charge would encourage customers to use water more wisely, reducing demand.  | OUT            | <b>Duplication:</b> This is essentially the same as C009.  | OUT            | Screened out at Stage 1.   |
| C009             | Rising block tariffs                                  | This option would apply a tier of volumetric charges based on the volume of water consumed. Consumption between specific volumes (or blocks) would be charged at different rates. The unit charge for water would increase for increasing 'blocks' of consumption. The rationale behind this option is that increasing the volumetric charge would encourage customers to use water more wisely, reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Tariffs that trigger suppressed use will curtail customer use. However, this approach can result in negative relationships with customers. This requires smart metering to improve the resolution of consumption data and a time period over which the consumption would be measured, e.g. a daily, weekly, monthly threshold. This option also requires consideration of the typical number of occupants.<br><b>Customer:</b> This option requires consideration of the typical number of occupants. A baseline average level of consumption would be used to identify and price elevated periods of consumption. This is a data intensive and potentially customer intrusive option. Whilst Portsmouth Water has relatively low levels of metering and little or no high resolution (wide scale) consumption data this is currently technically (and socially) infeasible. |
| C010             | Seasonal tariffs                                      | This option would vary the charge for water at different times of the year. There are various mechanisms that could be used to implement this option. For example consumption during a 'winter' period would be charged at a lower rate than consumption during the 'summer' period. Smart metering (or at least Automatic Meter Reading - AMR) would be required. The rationale behind this option is that reducing charges in winter periods and having higher charges during summer periods would encourage customers to use water more wisely, | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Customers would be likely to respond to the seasonal signal of a higher tariff.<br><b>Politic (out):</b> This sends out the wrong message that water conservation and efficiency are not important throughout the year.<br><b>Customer (out):</b> Universal metering required for effective implementation. Also risks that seasonal tariffs create mixed messages about efficient use of water. Without universal metering this also introduces the risk of customers perceiving unfair billing.  |

| WRMP19 reference | Option Name                                     | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
|                  |   | reducing demand during periods when water availability is stretched.  |                |  |                |   |
| C011             | Daily peak/off peak tariffs                     | This option would vary the charge for water during the course of the day. During times of peak demand, the volumetric charge for water would increase. The volumetric charge for water would be reduced at off-peak times. Smart metering (or at least Automatic Meter Reading - AMR) would be required. The rationale behind this option is that reducing charges at off-peak times and having higher charges during peak periods would encourage customers to use water more wisely, reducing demand. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> A measure that triggers more awareness of consumption is likely to result in savings. However these are likely to be limited with properties simply changing their consumption patterns to exploit lower rate tariffs.<br><b>Political (out):</b> This option would be counter to company policy to charge on the basis of long-run costs. Portsmouth Water to confirm if that is their position.<br><b>Customer (out):</b> Universal AMR in practice would be required. This is likely to be considered an unnecessary and confusing tariff structure. Little evidence to show how customers would respond to such a charging model.   |
| C012             | Charge only above a defined 'subsistence' level | This option would vary the charge for water based on volumetric thresholds. A defined subsistence level of water would be free of charge or charged at a minimal rate. Consumption above this subsistence volume would be charged at a higher rate. The rationale behind this option is that it would encourage customers to reduce their discretionary water use, thus reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> Lack of robust occupancy data and widespread metering makes this difficult to implement fairly.<br><b>Political:</b> Whilst this is complex, and there are many issues regarding the definition of subsistence, there are no specific policies that this would be counter to.<br><b>Customer (out):</b> AMR/Smart metering and robust occupancy data would be required. Concerns from customer groups / data protection groups are emerging over the use of 'personal utility data'. This level of monitoring has a high risk of customer complaint.  |
| C013             | Introduce 'interruptible' industrial supplies   | This option would introduce interruptible supplies for industrial customers who do not require constant water supplies. Portsmouth Water would agree with industrial customers, times or periods during which they would not receive a supply from Portsmouth Water. Such arrangements would attract lower charges. The rationale behind this option is that the short term reduction in demand from industrial customers would 'free up' resources to be used by other customers.                      | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> This option would provide financial savings for commercial customers but are unlikely to trigger lower consumption compared to the baseline. Customers would be inclined to accept these offers if they already comply with the 'requirements'. Low uptake (amongst higher users) anticipated. Few industrial users are likely to be willing to reduce supply according to Portsmouth Water's water resource situation. Savings are therefore small.<br><b>Political:</b> No issue with active management of water supply contracts to non-household customers.<br><b>Customer:</b> No issue with active management of water supply contracts to non-household customers. |
| C014             | Introduce lower charges for major               | This option would introduce lower charges for larger industrial/commercial customers with significant on-   | IN             | No issues to screen out against Stage 1 criteria. No additional  | OUT            | <b>Ability:</b> Difficulties in determining whether significant on-site storage actually allows for reduced demand during   |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
|                  | customers with significant storage  | site storage (capturing either rainfall or treated wastewater, not storing mains supply). These customers would only be able to take water from Portsmouth Water at times when resources are more available and not during periods of high or peak demand. The rationale behind this option is that the short term reduction in demand from industrial/commercial customers would 'free up' resources to be used by other customers. This would encourage more on-site storage and a longer term decline in demand for mains supplied water (excluding the impact of growth).   |                | comment required to justify Stage 1 outcome.   |                | peak periods. This would entail significant effort on the part of both Portsmouth Water and the customer, with savings likely to be low overall as a result of relatively few customers meeting criteria.   |
| C015             | Introduce spot pricing for selected customers (industrial / commercial)       | This option would introduce spot pricing for selected industrial customers. Customers would be informed at relatively short notice of increases in unit charges for water to reflect availability of resources. These customers would be given access to resource availability data to enable them to anticipate and prepare for the switch to a higher unit charge. The rationale behind this option is that the short term increases in pricing during periods at which resources are most stressed would 'free up' resources to be used by other customers.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> This is similar to the Uber spot pricing rationale. In order to avoid developing a negative relationship with customers Portsmouth Water would need to develop this option into a more active service management option. This is particularly important from April 1 2017 when industrial customers will be able to switch suppliers. As it stands with the change in relationship between wholesaler and commercial customer this is probably not a feasible option.<br><b>Customer:</b> This risks developing a negative relationship with the customer. Significant changes to billing and service provision to these customers would be needed.   |
| C016             | Targeted water efficiency advice for <b>industrial /commercial</b> customers. | This option would issue targeted water efficiency advice to non-household customers. This option excludes targeting the university (New option C058). This would include information leaflets [via email] informing non-household customers about how they could reduce their demand and the potential financial benefits (relating to metered water charges and energy bills). A water audit would be undertaken by a qualified specialist to provide technical advice about water use. It would focus on the process use component and domestic-type use in a non-domestic setting. For the domestic element occupant surveys would ensure appropriate fittings are installed. A team of relevant experts would be deployed to target the different non-household sectors across Portsmouth. The rationale behind this option is that customers would be encouraged to reduce their demand, which | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Targeted advice is a much more powerful method than blanket messaging and there is significant scope to reduce both unnecessary process use and inefficient domestic-type use in these property types. These customers are usually on a metered supply so immediately more interested in receiving and acting upon advice. A combination of meters and multiple drivers to reduce unnecessary consumption with professional advice from the water utility will lead to action and savings.<br><b>Politic (out):</b> No issue with incentivising customers to use water more wisely. However, as a wholesaler Portsmouth Water may not be able / may not wish to deal with this customer group directly. To access non-household customers the wholesaler may need to go via the relevant water retail companies. This could dramatically reduce Portsmouth Water (wholesale) influence and thus the reliability of this as an option to secure the supply-demand balance. |

| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
|                  |   | would 'free up' resources to be used by other customers.   |                |  |                | <b>Customer:</b> No issue with incentivising customers to use water more wisely. Other: Impact of competition in water retail anticipated to reduce demand by 10% over time. There is a risk that additional targeted water efficiency action on the part of Portsmouth Water may be double counting potential savings.  |
| C017             | Targeted water efficiency advice for <b>designers</b> of hot water systems, taps and water using appliances | This option would target water efficiency advice to designers of hot water systems, taps and water using appliances. This would include providing information about the importance of designing systems/appliances to minimise water use. The rationale behind this option is that designers of water using fixtures and fittings would be encouraged to design products that would minimise water use.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> To be effective this would need to be widespread influencing the designs of major products supplied by major retailers. This could even involve targeting the international supply chain. This is more applicable to national work - and even then it would be very difficult to guarantee the water savings that would be achieved within the Portsmouth supply area.   |
| C018             | Targeted water efficiency advice for <b>purchasers</b> of water using appliances - at home                  | This option would target water efficiency advice to purchasers of water consuming appliances (homeowners rather than major developers). All household customers would be targeted by providing information (by leaflet and email) on the range of water performance levels of key appliances available on the market. Information would be maintained on the Portsmouth Water website. Messaging would include both the environmental need to reduce demand, and the ability for customers to take action to take action over a component of their energy bills, and their water bill (for those on a metered charge). This would include providing information about the importance of water conservation and water efficiency, and the links between hot water consumption and energy bills. The rationale behind this option is to encourage consumers to choose appliances with lower water consumption. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> This would generate savings if customers / procurers respond appropriately by selecting water efficient appliances over less efficient appliances. Advice that is correct with appropriate messaging and influencing strategy would lead to savings. However, the inherent uncertainty regarding purchasing decisions, and subsequent use of appliances makes this too weak as an option to secure the supply-demand balance.<br><b>Politic (out):</b> Success would depend on the method of intervention. There are no explicit regional or national policies on water efficient goods, but this could trigger complaints from brands objecting to the influence of the utility on customers - this could be construed as pressurising customers.<br><b>Customer:</b> No issue with being provided advice but this would be OUT if the approach taken was seen in any way as aggressive (at the point of purchase). |
| C019             | <b>Labelling</b> water consumption of appliances  | This option would introduce labelling on water efficiency appliances, similar to the energy efficiency labels currently included on appliances. The rationale behind this option is to encourage consumers to choose appliances with lower water consumption.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Ability to influence and yield payback low. This is beyond the scope of an individual water company.   |
| C020             | Targeted information concerning the benefits of <b>trickle</b>  | This option would provide information to spray irrigators in Portsmouth Water's supply area to inform them of the water conservation benefits of   | IN             | No issues to screen out against Stage 1 criteria. No additional  | OUT            | <b>Ability (out):</b> Targeted advice is a much more powerful method than blanket messaging and there is significant scope to reduce both unnecessary process use (in spray  |



| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
|                  | irrigation compared to spray irrigation.  | trickle irrigation. This would be done via a regional farmers' network. The rationale behind this option is to encourage spray irrigators to use trickle irrigation, which is a lower consumption form of irrigation. This would result in less demand for water from third parties. More water would then be available for other purposes such as public water supply. This option is distinct from Option No: C001, C002, and C003 which formerly seek traded licences (procure or rent). |                | comment required to justify Stage 1 outcome.   |                | irrigation). These users usually have access to their own abstractions and so the benefit of advice could be indirect on DO by reducing the frequency of Hands Off Flow conditions etc. More evidence would be required to confirm which farms (and which sources) to target. Alternatively, reduced agricultural use could generate opportunities for licence trading - however the uncertainties and lag times are too great for this to be a valid WRMP option.<br>This option considered less favourable than C001/02 because traded licence volumes are more likely to be obtained than new licenced volumes.<br><b>Politic (out):</b> No issue with incentivising customers to use water more wisely. However, as a wholesaler Portsmouth Water may not be able / may not wish to deal with this customer group directly. To access non-household customers the wholesaler may need to go via the relevant water retail companies. This could dramatically reduce Portsmouth Water (wholesale) influence and thus the reliability of this as an option to secure the supply-demand balance.<br><b>Customer:</b> No issue with incentivising customers to use water more wisely. |
| C022             | Targeted water efficiency information to other abstractors (reducing <b>evaporation</b> ) | Portsmouth Water would initiate the provision of information to third party abstractors in Portsmouth Water's supply area about control of evaporation. The rationale behind this option is to encourage third party abstractors to reduce evaporation and thus use less water. This would result in less demand for water from third parties. More water would then be available for other purposes such as public water supply.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> Targeted advice is a much more powerful method than blanket messaging and there is significant scope to reduce both unnecessary process use (in spray irrigation). These users usually have access to their own abstractions and so the benefit of advice could be indirect on DO by reducing the frequency of Hands Off Flow conditions etc. More evidence would be required to confirm which farms (and which sources) to target. Alternatively, reduced agricultural use could generate opportunities for licence trading - however the uncertainties and lag times are too great for this to be a valid WRMP option.<br>This option considered less favourable than C001/02 because traded licence volumes are more likely to be obtained than new licenced volumes.<br><b>Politic (out):</b> No issue with incentivising customers to use water more wisely. However, as a wholesaler Portsmouth Water may not be able / may not wish to deal with this customer group directly. To access non-household customers the wholesaler may need to go via the relevant water retail companies. This could dramatically reduce Portsmouth Water (wholesale)      |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|---|----------------|---|
|                  |   |   |                |   |                | influence and thus the reliability of this as an option to secure the supply-demand balance.<br><b>Customer:</b> No issue with incentivising customers to use water more wisely.  |
| C023             | Advice and information on leakage detection and fixing techniques (Industrial and Commercial Customers) | <p>Portsmouth Water would provide information on commercial site leakage detection and fixing techniques to industrial/commercial customers receiving mains supply. This option does not include Portsmouth Water undertaking subsequent find and fix measures. That activity is listed separately under Option C070.</p> <p>The rationale behind this option is encourage industrial customers to make leakage reduction measures and thus use less water. Their main incentive would be reduced a reduced water bill. This would 'free up' resources to be used by other customers. This option could supplement option C016 to support commercial customers to reduce their process and domestic-type use demands.</p> | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <p><b>Ability:</b> Experience from other water companies in the UK and internationally supports the assumption that advice generates savings. This is even greater in industrial and commercial properties where saving water translates into bottom line improvements (despite domestic type water use typically being one of the smaller overheads). This option assumes that by bringing the leak to the attention of the industrial user they will have sufficient incentives to resolve the problem.</p> <p><b>Politic (out):</b> No issue with incentivising customers to use water more wisely. However, as a wholesaler Portsmouth Water may not be able / may not wish to deal with this customer group directly. To access non-household customers the wholesaler may need to go via the relevant water retail companies. This could dramatically reduce Portsmouth Water (wholesale) influence and thus the reliability of this as an option to secure the supply-demand balance.</p> <p><b>Other (out):</b> Impact of competition in water retail anticipated to reduce demand by 10% over time. There is a risk that additional targeted water efficiency action on the part of Portsmouth Water may be double counting potential savings.</p> |
| C024             | Advice and information on leakage detection and fixing techniques (Agriculture)                         | <p>Portsmouth Water would provide (or initiate provision) of information on leakage detection/management to agricultural customers. The rationale behind this option is to encourage agricultural customers to make leakage reduction measures within their farms/sites/properties and thus use less water. This would 'free up' resources to be used by other customers.</p>   | OUT            | <b>Duplication:</b> This customer group is separated from the generic commercial customer option C023. However, C023 could be interpreted/amended to include all non-household customers. | OUT            | Screened out at Stage 1.  |
| C025             | Appliance exchange programmes   | <p>Appliance exchange programme for Portsmouth Water customers. This would include WCs, Showers, Dishwashers and Washing Machines. The rationale behind this option is to encourage customers to exchange less efficient appliances for more water efficient appliances and thus use less</p>   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <p><b>Ability:</b> Without consistent assessment/labelling of products, consistency and assurance in implementing this option would be doubtful. The uncertainties, responsibilities, opportunities for exploitation etc. render this option unfeasible.</p> <p><b>Politic:</b> May encourage disposal of appliances before</p>   |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|--|----------------|--|
|                  |   | water. The cost of providing the efficient water appliances would be borne by Portsmouth Water. This would 'free up' resources to be used by other customers. The measure would reduce per capita consumption in both dry year annual average and dry year peak week scenarios.   |                |  |                | they need to be replaced - thus increasing unnecessary waste.<br><b>Customer:</b> Easily promoted to customers although unless this is a universal option there is high potential to generate perceptions of social inequality.  |
| C026             | Subsidy to customers that purchase water efficient appliances (washing machines and dishwashers, showers and WCs) | This option would introduce a Portsmouth Water funded subsidy (i.e. vouchers) on water efficient appliances such as WCs, Showers, Dishwashers and Washing Machines. The rationale behind this option is to encourage wider uptake of water efficient appliances amongst customers. This would 'free up' resources to be used by other customers. (C026 is a rationalised version of previous a-d versions). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <b>Ability:</b> Action that would replace inefficient stock with more water efficient models would save water. In order to secure accurate savings the subsidy may need to relate only to models listed e.g. on the Water Technology List or other agreed source.<br><b>Politic:</b> No major issue regarding helping customers to access water efficient lifestyle choices. However there is a risk that Portsmouth Water could be perceived to be influencing procurement of certain brands over others which could generate some commercial concerns. This would need to be managed.<br><b>Customer:</b> No major issue regarding helping customers to access water efficient lifestyle choices. More sustainable than C025 due to the fact that customers taking up this option would likely be replacing appliances anyway, thus producing no additional waste. |
| C027             | Water saving devices<br>- Fitting of showers  | Install showers in homes where no shower is currently installed. The rationale behind this option is to encourage householders to take showers instead of baths. 'Standard' showers (not power showers) generally use less water than baths per use. This would 'free up' resources to be used by other customers.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Retrofit products do save water but the quantities vary significantly depending on product type, installation method, and property type. Longevity of savings is highly dependent on ongoing messaging and maintenance.<br>Offering the option of a shower in homes that currently only have a bath should (if the showers are low flow showers) save water in each case.<br><b>Politic:</b> No issues regarding distribution of devices to help customers save water and money. There are some concerns regarding the level of product waste and performance of some devices. These should be considered further but do not represent a reason for rejecting this option at this stage.<br><b>Customer (out):</b> there is no information to give the number of customers to whom this would apply. Suspected low eligibility and uptake.           |
| C028             | Water saving devices<br>- Low flow showerheads  | Install low flow showerheads in household and non-household properties where a shower is currently installed. The rationale behind this option is to  | OUT            | <b>Baseline:</b> Portsmouth Water already distributes low flow shower head and flow aerators for free.       | OUT            | Screened out at Stage 1.   |



| WRMP19 reference | Option Name                                  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|---|----------------|--|----------------|--|
|                  |  | reduce water use per shower by reducing the flow rate of the showerhead. This would 'free up' resources to be used by other customers.  |                |  |                |  |
| C029             | Water saving devices<br>- Low flush toilets  | Install low flush toilets in household and non-household properties to replace existing higher flush volume toilets. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Retrofit products do save water but the quantities vary significantly depending on product type, installation method, and property type. Longevity of savings is highly dependent on ongoing messaging and maintenance.</p> <p>C029 preferred over option C030 due to slightly increased certainty in yield (simplicity for users). In the longer term this option may not present significant yield benefit in addition to a natural progression and replacement of old fixtures with newer low-flush toilets.</p> <p><b>Politic:</b> No issues regarding distribution of devices to help customers save water and money. There are some concerns regarding the level of product waste and performance of some devices. These should be considered further but do not represent a reason for rejecting this option at this stage.</p> <p><b>Customer (out):</b> This option could trigger perceptions of customer inequality and inappropriate use of revenue. Not all customers will benefit from this option and the water savings could be achieved through retrofit flush mechanisms without incurring the full price of a WC unit. Even customers taking up the option may have issues regarding the size and style of the retrofit WC.</p> |
| C030             | Water saving devices<br>- Dual flush toilets | Install dual flush toilets (whole toilet, not a flush mechanism retrofit) in household and non-household properties to replace existing higher flush volume toilets. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability (out):</b> C029 preferred. Dual flush toilets give the option to use more water and also can cause uncertainty in use for customers. As such the yield benefit is uncertain.</p> <p><b>Politic:</b> No issues regarding distribution of devices to help customers save water and money. There are some concerns regarding the level of product waste and performance of some devices. These should be considered further but do not represent a reason for rejecting this option at this stage.</p> <p><b>Customer (out):</b> This option could trigger perceptions of customer inequality and inappropriate use of revenue. Not all customers will benefit from this option and the water savings could be achieved through retrofit flush mechanisms without incurring the full price of a WC unit. Even customers taking up the option may have issues regarding the size and style of the retrofit WC.</p>   |



| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
| C031             | Water saving devices<br>- Fitting new toilets           | Install the latest 'standard' toilets (i.e. not low or dual flush toilets) in household and non-household properties to replace existing older higher flush volume toilets. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers. This would be rolled out via Change of Occupancy and customer responses to Portsmouth Water advertising of the deal. | OUT            | <b>Duplication:</b> This would save less water than C029 or C030. However, most modern new single flush WC's are already relatively low flush. This is too similar to C029 but with lower savings. | OUT            | Screened out at Stage 1.  |
| C032             | Water saving devices<br>- Composting toilets            | Install composting toilets in household and non-household properties to replace existing toilets. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> This model of WC generates significant savings. However, uptake would likely be very low.<br><b>Politic:</b> No specific issues regarding helping customers save water (and money) but there would likely be major concerns over potential risks to customer health (perceived or real risks).<br><b>Customer (out):</b> The number of customers able and willing to take up this option is likely to be very low. Concerns over disconnecting from mains supply, installation and location within the property, ongoing management of a composter, odour etc.                            |
| C033             | Water saving devices<br>- Waterless urinals             | Install waterless urinals in non-household properties to replace existing urinals. The rationale behind this option is to reduce demand for water used for urinal flushing. This would 'free up' resources to be used by other customers.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> Waterless urinals are increasingly widespread. Whilst there have been reported issues regarding odour, the use of chemicals, and that they are not always completely waterless the technology continues to improve as do performance levels.<br><b>Politic (out):</b> No issues regarding the technology but commercial properties are now outside of Portsmouth Waters direct scope as the wholesaler.<br><b>Customer:</b> No issues from customers interested in this option. Other: Amongst options tackling water use in non-household urinals, option C059 is considered preferable. |
| C034             | Water saving devices<br>- Retrofitting existing toilets | Retrofit dual flush mechanisms in toilets in household and non-household properties to replace existing higher flush volume mechanisms. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | IN             | <b>Ability:</b> Retrofit devices (WRAS approved) generate water savings and are less intrusive than replacement of entire WC unit.<br><b>Politic:</b> No issues regarding helping customers become more water efficient.<br><b>Customer:</b> No major issues although there is some potential confusion over the operation for customers may still give some uncertainty in yield.  |

| WRMP19 reference | Option Name                                    | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
| C035             | Water saving devices<br>- Shallow trap toilets | Install shallow trap toilets in household and non-household properties to replace existing higher flush volume toilets. The rationale behind this option is to reduce demand for water used for toilet flushing. This would 'free up' resources to be used by other customers.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability</b> (out): Uncertainty remains in the savings potentially achieved through this type of toilet.<br><b>Politic</b> : No issues regarding helping customers become more water efficient.<br><b>Customer (out)</b> : Technical difficulties altering plumbing systems. Unfamiliarity with this WC technology type.  |
| C037             | Water saving devices<br>- Timing devices       | Distribute shower timing devices to household and properties. Shower timers are set at [5 minutes]. A range of 'timers' including colour changing lights are available to notify people of shower duration. The rationale behind this option is that shower timers (and supporting information) would encourage customers to take shorter showers, reducing demand for water used for showering. This would 'free up' resources to be used by other customers.   | OUT            | <b>Baseline</b> : Portsmouth Water already distributes four minute shower timers.                            | OUT            | Screened out at Stage 1.  |
| C039             | Water saving devices<br>- Self closing taps    | Install self-closing taps (e.g. push taps or infra-red taps) in household and non-household properties. The rationale behind this option is that it would reduce demand by encouraging customers to use taps for a shorter period and/or reduce wastage from taps left on accidentally. This would 'free up' resources to be used by other customers.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability</b> : Self closing taps would reduce unnecessary use in situations where a set volume of water is not required (e.g. teeth cleaning).<br><b>Politic</b> : No issues regarding helping customers become more water efficient.<br><b>Customer (out)</b> : Likely reluctance of customers to take up taps with non-standard operation. This type of tap may not meet customers 'volumetric' needs (i.e. to fill the basin, sink, or water for cooking). Taps unfit for purpose likely to be too unpopular and damage the message of water efficiency.   |
| C040             | Water saving devices<br>- Spray taps           | Install spray taps (new taps not inserts) in household and non-household properties. These would replace non-spray taps. The rationale behind this option is that the spray fitting reduces the volume of water that passes through the tap each time it is used (compared to a tap that does not have a spray fitting). This would reduce demand and 'free up' resources to be used by other customers. This is applied to cold taps only - to target the inefficient use of water for non-volumetric uses (e.g. teeth cleaning). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <b>Ability</b> : Spray taps would reduce unnecessary use in situations where a set volume of water is not required (e.g. teeth cleaning).<br><b>Politic</b> : No issues regarding helping customers become more water efficient.<br><b>Customer</b> : Spray taps are increasingly common in public facilities but this type of tap may not meet customers 'volumetric' needs (i.e. to fill the basin, sink, or water for cooking). Taps unfit for purpose likely to be too unpopular and damage the message of water efficiency. Quite possible that spray taps would be removed by customer. To mitigate these factors this option targets bathroom cold tap only. |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
| C041             | Water saving devices<br>- Retrofitting spray fittings to taps           | Install retrofit spray fitting inserts to existing taps in household and non-household properties. The rationale behind this option is that the spray fitting reduces the volume of water that passes through the tap each time it is used (compared to a tap that does not have a spray fitting). This would reduce demand and 'free up' resources to be used by other customers.  | OUT            | <b>Baseline:</b> Portsmouth Water already distributes tap 'bubblestreams'.   | OUT            | Screened out at Stage 1.  |
| C042             | Water saving devices<br>- Cistern displacement devices                  | Install cistern displacement devices such as 'Hippos' or 'Save a Flush' devices within existing toilets in household and non-household properties. The rationale behind this option is that the cistern devices reduce the volume of water used each time a toilet is flushed. This would reduce demand and 'free up' resources to be used by other customers.  | OUT            | <b>Baseline:</b> Enhanced WC water efficiency should be more ambitious than CDDs now. The number of toilets suitable for cistern displacement devices is declining. The yield certainty is low since retention of the device is dependent on customer behaviour.   | OUT            | Screened out at Stage 1.  |
| C043             | Water saving devices<br>- Trigger nozzles for hoses                     | Distribute trigger nozzles for use on hosepipes to household properties. The rationale behind this option is that the trigger nozzle would allow customers to control the amount of water used through hosepipes (when compared to a hosepipe with no control fitted). This would reduce demand and 'free up' resources to be used by other customers. Distribution would be supported with regular annual messaging about long-term sustainability in the garden (including distribution of devices). This will strengthen drought messaging and customers' ability to respond during drought. | IN             | Hose nozzles are not currently listed on the Portsmouth Water water saving website. Water efficiency in the garden is limited to a leaflet.  | IN             | <b>Ability:</b> Minimising flow rate / shutting off flow when not needed will reduce consumption compared to baseline hosepipe usage. Actual volumes that can be saved is not quantified.<br><b>Politico:</b> No issues regarding helping customers become more water efficient.<br><b>Customer:</b> No issues regarding helping customers become more water efficient. |
| C044             | <b>Household</b> water efficiency programme (Company led, self-install) | Distribute water efficiency information and devices to household customers for installation by the customer. The rationale behind this option is that water efficiency devices would be installed by the customer and they would be encouraged to change their water-using behaviour through the water efficiency information, reducing demand. This would include advice relating to 'technologies of demand' (i.e. behaviours that lead to unnecessary clothes washing, behaviours that lead to excessive shower durations e.g. watching TV, advice on the garden design, etc.).              | OUT            | This is not baseline on the proviso that the range of water efficiency products is enhanced and packaged as a complete water efficiency programme - not simply distribution of individual devices. However, in many ways this option is no different to the variety of individual self-retrofit options ( <b>out on duplication</b> ). | OUT            | Screened out at Stage 1.  |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|---|----------------|---|
| C045             | <b>Household</b> water efficiency programme ( <b>Company led</b> , home visit)         | A home visit by a Portsmouth Water Home Visit Team to improve customer satisfaction. During the visit leaks, dripping taps, damaged toilet siphons etc. are repaired/fixed, and water efficiency devices are installed together with information on how to save money, protect the home against water related damage, and water consumption positive behaviours. This would include written and verbal advice relating to 'technologies of demand' (i.e. behaviours that lead to unnecessary clothes washing, behaviours that lead to excessive shower durations e.g. watching TV, advice on the garden design, etc.). Each home would receive a follow up personalised family report.<br>The rationale behind this option is that water efficiency devices would be installed by a qualified plumber and householders would be encouraged to change their water-using behaviour through the water efficiency information, reducing demand. | IN             | This is not baseline. Portsmouth Water currently does not have a specific home intervention water efficiency programme. | OUT            | <b>Ability:</b> Retrofit products do save water but the quantities vary significantly depending on product type, installation method, and property type. Longevity of savings is highly dependent on ongoing messaging and maintenance. Evidence from UK and international indicates that savings are increased when combined with a meter, a smart meter, and a home visit with advice and products installed professionally.<br><b>Politik:</b> No issues regarding distribution of devices to help customers save water and money. Concerns regarding wastage and performance are mitigated when installed professionally (assumes all kit is installed and installed correctly).<br><b>Customer:</b> No issues regarding distribution of devices to help customers save water and money. Concerns regarding wastage and performance are mitigated when installed professionally (assumes all kit is installed and installed correctly).<br><b>Other (out):</b> This option is likely to require a team of home visit experts which is feasible but would incur costs (costs are not part of this screening exercise). However, in the context of similar options C045 is a weaker option than C046. |
| C046             | <b>Household</b> water efficiency programme ( <b>Partnering approach</b> , home visit) | A home visit by plumbers to install water efficiency devices in households and provide information to encourage and support behavioural changes. This would include written and verbal advice relating to 'technologies of demand' (i.e. behaviours that lead to unnecessary clothes washing, behaviours that lead to excessive shower durations e.g. watching TV, advice on the garden design, etc.). Each home would receive a follow up personalised family report. The home visit would be delivered through a partnering approach involving other organisations such as Energy Saving Trust, Housing Associations, or Local Authorities.<br>The rationale behind this option is that water efficiency devices would be installed by a qualified plumber and householders would be encouraged to change their water-using behaviour through the water efficiency information, reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.            | IN             | <b>Ability:</b> Retrofit products do save water but the quantities vary significantly depending on product type, installation method, and property type. Longevity of savings is highly dependent on ongoing messaging and maintenance. Evidence from UK and international indicates that savings are increased when combined with a meter, a smart meter, and a home visit with advice and products installed professionally.<br><b>Politik:</b> No issues regarding distribution of devices to help customers save water and money. Concerns regarding wastage and performance are mitigated when installed professionally (assumes all kit is installed and installed correctly).<br><b>Customer:</b> No issues regarding distribution of devices to help customers save water and money. Concerns regarding wastage and performance are mitigated when installed professionally (assumes all kit is installed and installed correctly).<br><b>Other:</b> Preferred over options C044 & C045 due to reduced burden on Portsmouth Water when compared against company led home visits, and increased certainty in uptake over self-installed option variant.  |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|--|----------------|--|----------------|--|
| C047             | Treated greywater reuse in existing households               | Retrofit greywater systems in existing households for non-potable uses (e.g. toilet flushing). The rationale behind this option is that greywater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> The technology (various versions of it) exists and is shown to work. From a technological point of view this option can deliver. However, little evidence to date of successful retrofitting beyond trials (multi-property) and individual led case studies.</p> <p><b>Politic (out):</b> Portsmouth Water area not in water stress and as such widespread retrofitting not fully justified. . Effective greywater systems often built into the design of a dwelling and practicalities and wide applicability of retrofit will be challenging.</p> <p><b>Customer (out):</b> Limited uptake likely. This is recognised as a technique for individual properties but customer appetite for large-scale retrofitting (sufficient to deliver a WRMP benefit) is likely to be low. There remain many concerns regarding human health, odour, spatial footprint, user maintenance.</p>  |
| C048             | Treated greywater reuse in new households                    | Install greywater systems in new build households for internal water uses (e.g. toilet flushing). The rationale behind this option is that greywater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> The technology (various versions of it) exists and is shown to work. From a technological point of view this option can deliver.</p> <p><b>Politic (out):</b> Effective greywater systems often built into the design of a dwelling but Portsmouth Water has no existing influence over this. Portsmouth Water have no mechanism to enforce this and developers are keen to minimise overheads in building programmes. Practicalities and wide applicability will be challenging.</p> <p><b>Customer (out):</b> Developers will be concerned over the likely concern of prospective new owners that their property will have this technology embedded within it. Even though the disruption and spatial footprint issues are addressed at the build stage, concern over performance and maintenance remain. The lack of chronic or publicised water resource issues in the Portsmouth supply area does not drive appetite for such ambitious forms of water conservation.</p> |
| C049             | Installation of rainwater harvesting in new build households | Install rainwater harvesting systems in new build households. Portsmouth Water would bear the costs of the installation of rainwater systems. The rationale behind this option is that rainwater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Rainwater harvesting systems do generate considerable savings and the technology involved is continually improving.</p> <p><b>Politic (out):</b> Current pressures to increase housing development have already been shown to drive down Government intervention on sustainability, e.g. withdrawn Code for Sustainable Homes etc. Many developers argue that any requirements above standard</p>   |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
|                  |  |  |                |  |                | <p>build are too costly and inhibits development. Installation of rainwater harvesting systems in anything other than demonstration projects or exemplar developments is unlikely to get traction.</p> <p><b>Customer (out):</b> No issues associated with the concept of rainwater harvesting and the benefits of installing at the time of build, but many customers are concerned about housing development rates and similarly may be unlikely to support Portsmouth Water subsidising developers with the additional costs associated with it. However, there is no willingness to pay evidence (available to this screening exercise) to prove this in the Portsmouth Water area.</p>   |
| C050             | Installation of rainwater harvesting in new build non-households | Install rainwater harvesting systems in new build non-households. Portsmouth Water would bear the costs of the installation of rainwater systems. The rationale behind this option is that rainwater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Rainwater harvesting systems do generate considerable savings and the technology involved is continually improving.</p> <p>However, widespread applicability will be limited and there is no certainty in how this option will be selected (threshold sizes/rainwater harvesting capacity etc.). Wide variance in non-household customer types with varying complexities in the use of water, and their respective business cases for adoption of sources of supply.</p> <p><b>Politic (out):</b> No issues regarding rainwater harvesting activity in non-households.</p> <p><b>Customer (out):</b> No issues associated with the concept of rainwater harvesting and the benefits of installing at the time of build, but many customers may be unlikely to support Portsmouth Water subsidising commercial businesses with the additional costs associated with it.</p> |
| C051             | Installation of rainwater harvesting in existing households      | Retrofit rainwater harvesting systems in existing households to provide alternative decentralised supply to those households. Portsmouth Water would bear the costs of the installation of rainwater systems. The rationale behind this option is that rainwater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Rainwater harvesting systems do generate considerable savings and the technology involved is continually improving.</p> <p><b>Politic:</b> No issues with the concept of rainwater harvesting. However, this IN is dependent on the implementation method and funding. No issues if this option is intended to provide support to households interested in retrofitting rainwater harvesting systems.</p> <p><b>Customer (out):</b> No issues associated with the concept of rainwater harvesting but this is not going to be available to all customers and there is unlikely to be support to subsidise a minority of homeowners (who</p>  |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
|                  |   |   |                |  |                | may then go on to enjoy reduced metered billing) via Portsmouth Water revenues.   |
| C052             | Installation of rainwater harvesting in existing non-households | Retrofit rainwater harvesting systems in existing non-households. Portsmouth Water would bear the costs of the installation of rainwater systems. The rationale behind this option is that rainwater would be used for non-potable purposes instead of potable water from the public supply system, reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.               | OUT            | <p><b>Ability:</b> Rainwater harvesting systems do generate considerable savings and the technology involved is continually improving.</p> <p><b>Politik:</b> No issues with the concept of rainwater harvesting. However, this IN is dependent on the implementation method and funding. No issues if this option is intended to provide support to households interested in retrofitting rainwater harvesting systems.</p> <p><b>Customer (out):</b> No issues associated with the concept of rainwater harvesting but this is not going to be available to all customers and there is unlikely to be support to subsidise commercial businesses (who then go on to enjoy reduced metered billing) via Portsmouth Water revenues. The exception could be public buildings e.g. schools and hospitals.</p>                       |
| C053             | Water Butts (Portsmouth Water bear costs)                       | Retrofit water butts in existing households. Portsmouth Water would bear the full costs of the installation of water butts. The rationale behind this option is that rainwater would be used for garden water use instead of potable water from the public supply system, reducing demand, particularly during or leading up to the peak period. The long-term roll-out of this option will support drought messaging and customers' ability to respond during drought. | IN             | This is not baseline. Portsmouth Water is not currently offering subsidies on water butts or installation.                 | OUT            | <p><b>Ability:</b> Evidence from UK and international that water butts do reduce demand for mains supplied potable water. Direct savings by replacing mains potable supply with harvested rainwater for garden watering and indications that the presence of this intervention reinforces messaging regarding water conservation and efficiency elsewhere in the property.</p> <p><b>Politik:</b> No issue supporting customers to reduce demand.</p> <p><b>Customer:</b> No major issues - although this may increase concerns from some customers that are not eligible to take up this option that they are subsidising direct benefit to other customers.</p> <p><b>Other (out):</b> C054 considered preferable due to reduced burden on Portsmouth Water which is unlikely to have capacity for widespread installation.</p> |
| C054             | Water Butts (Portsmouth Water subsidy)                          | Retrofit water butts in existing households. Portsmouth Water would subsidise the costs of the installation of water butts. The rationale behind this option is that rainwater would be used for garden water use instead of potable water from the public supply system, reducing demand.  | OUT            | <b>Baseline:</b> Portsmouth Water already supports a subsidised water butt programme via Save Water Save Money South East. | OUT            | Screened out at Stage 1.  |



| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
| C055             | Replacement of potable supply with sea water                  | Replace potable water from the public water supply system with sea water for industrial/commercial uses. The rationale behind this option is that sea water would be used for non-potable uses (such as cooling/process use) instead of potable water from the public supply system, reducing demand.  | OUT            | <b>Duplication:</b> See option C056 - dual supply - more feasible/flexible.                                  | OUT            | Screened out at Stage 1.   |
| C056             | Dual supply in coastal developments                           | Install a dual supply system in coastal areas so that sea water could be used to augment non-potable uses, replacing potable water from the public water supply system for industrial/commercial uses. The rationale behind this option is that sea water would be used for non-potable uses (such as cooling/process use) instead of potable water from the public supply system, reducing demand.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> If implemented this would reduce demand for freshwater. It would involve significant retrofit dual supply infrastructure (a cost constraint not applicable at screening stage).<br><b>Politic (out):</b> No specific issues with providing alternative sources so long as they are fit for purpose. However, this could initially create complications with DWI and ensuring that drinking water standards are not compromised (e.g. via cross-contamination).<br><b>Customer (out):</b> Significant practical challenges presented by replacement of freshwater with saline, depending on the user. Uptake may be low considering needs and business models of potential users of non-potable water.              |
| C057             | Find and fix leaks in households: supply-pipes, and plumbing. | Target metered households whose smart meter data suggests there are ongoing leaks in the property. The rationale is that households with a meter would be incentivised to let the water company experts fix leaks that the householder is paying for and which could be undermining the fabric of the property. It may also incentivise other smaller residence households into having a smart meter installed. This option is distinct from but would benefit from Option C062 'Seasonal Water Messaging' which will advise on the property maintenance benefits of troubleshooting plumbing leaks in the home. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> It is highly likely that there are significant water savings to be made by reducing USPL. However, lack of widespread smart metering make this option infeasible in terms of generating significant savings.<br><b>Politic:</b> The only potential political issues foreseen relate to the utility accessing customers' properties to find and fix leaks.<br><b>Customer:</b> Metered customers will benefit from reduced bills and reduced risk of leak related damage to their properties. This option is not imposing meters on customers. It could potentially be seen as providing extra personal benefit to metered customers, subsidised by all customers. This is not a reason to remove the option. |
| C058             | Target water consumption in university accommodation.         | Portsmouth Water has a student population of 25,000. This option specifically targets the university owned/managed accommodation: installing water meters (and sub-metering) to monitor and track consumption. Portsmouth Water would work with the university facilities and academic departments to target inefficient use and leakage with advice and devices. This option links to Option C074   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Evidence from UK studies (e.g. University of West of England) shows that the combined efforts of the water utility and the university (i.e. water science departments) can generate considerable water savings as well as provide experimental conditions and data for analysis. The student population of the university within the Portsmouth Water supply area is large and so there are many opportunities to save water.  |



| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
|                  |   | <p>Portsmouth Water Online Accounts - Gamification (a Metering category).</p> <p>This option would give Portsmouth Water an opportunity to engage with Portsmouth University One Water charity - which actively encourages students to buy bottled water.</p>  |                |  |                | <p><b>Politic:</b> No issue with incentivising customers to use water more wisely.</p> <p>Customer: No issue with incentivising customers to use water more wisely.</p> <p><b>Other (out):</b> Introduction of separate non-household retail water suppliers mean that Portsmouth Water's role in this option may be limited. Impact of competition in water retail anticipated to reduce demand by 10% over time. There is a risk that additional targeted water efficiency action on the part of Portsmouth Water may be double counting potential savings.</p>  |
| C059             | Water saving devices - Urinal flush mechanisms                              | Identify and replace inefficient urinal flushing systems in high density non-household properties, e.g. shopping centres, sports facilities etc. This would involve an audit of site specific consumption patterns and bespoke solutions, e.g. Passive Infra-Red controllers in low density situations, or timers in high-density situations. The rationale is that replacing flushing systems with systems appropriate to the level and frequency of use demand for water will be reduced.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Large volumes of potable water are wasted unnecessarily in inefficient urinal flushing mechanisms. Retrofit devices save water by reducing the flow per flush and / or by introducing a more appropriate timer or motion sensor flush trigger. Savings are achieved when a solution appropriate to the type of use is installed.</p> <p><b>Politic:</b> No issue with improving water efficiency in non-households and public buildings.</p> <p><b>Customer:</b> No issue with improving water efficiency in non-households and public buildings.</p> <p><b>Other (out):</b> Introduction of separate non-household retail water suppliers mean that Portsmouth Water's role in this option may be limited.</p> |
| C060             | Switch existing non-household meters from basic to Smart and provide advice | Upgrade standard water meters (in non-household properties) to Smart water meters. This option excludes the component to upgrade the billing and accounts system to provide commercial customers access to a more sophisticated online account (and mobile app) tracking and monitoring their own consumption and costs. The estimated water savings associated with this option are solely based on the impact of converting from unmeasured to measured billing. Additional water savings to be generated using online account tools and incentives are covered under other options (C061). This is an opportunity to revitalise water efficiency measures by 'upgrading' metering technology. Water savings estimated on basis of more visible water data combined with refreshed water saving messaging. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Evidence from UK and internationally confirms that occupants consumptive behaviour changes on transfer to a metered water bill. For non-household where total consumptive levels are often greater than in HH's this increases the financial incentives to reduce water wastage and use water more efficiently.</p> <p><b>Other (out):</b> Introduction of separate non-household retail water suppliers mean that Portsmouth Water's role in this option may be limited. Impact of competition in water retail anticipated to reduce demand by 10% over time. There is a risk that additional targeted water efficiency action on the part of Portsmouth Water may be double counting potential savings.</p>   |

| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
| C061             | Smart meter related online accounts / apps                                | Develop online account technology to let commercial customers with SMART meters upgrade to online/mobile consumption monitoring and billing. Household customers on the metered billing system would also be able to upgrade their accounts.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.           | OUT            | Screened out at Stage 1.   |
| C062             | Ongoing Seasonal messaging  | <p>Develop and issue seasonally relevant messaging to customers to encourage a more sustained mind-set that water is a precious resource and is linked to the consumption of other resources. It is continuous rather than the drought messaging which is triggered by drought triggers. Daily tweets, monthly emails, and messages on a Smart meter billing app would be used to regularly reach out to customers.</p> <p>Examples: Spring messaging advice on preparing water efficient gardens and minimising unnecessary water use during the spring clean. Summer messaging news on where to go to enjoy the water environment and how to minimise water use during warmer weather. Autumn/winter messaging focusing on how to stay safe near rivers and lakes, combined with messaging on how to prepare the home against freezing pipes, how to fix minor plumbing leaks, how to report external leaks. This option does not include individual customer billing related advice.</p> <p>The rationale is that by combining seasonal related messaging on the recreational value of the water environment with conservation and home maintenance advice customers will be more engaged and more inclined to use water more wisely.</p> | OUT            | <b>Baseline:</b> baseline activity includes garden watering and cold water advice in bills and on the company website. | OUT            | Screened out at Stage 1.   |
| C063             | Introducing spot rewards for selected customers (industrial / commercial) | This option is a reward version of the Spot Pricing option (C015). Selected customers would be notified of impending reductions in water availability and would be rewarded with cash (or other) incentives for meeting enhanced water conservation levels during the period of lower water availability. The rationale behind this option is that reward is more effective than stick, and highlighting the need for 'enhanced' water efficiency would have a longer term positive impact of 'standard' water efficiency.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.           | OUT            | <p><b>Ability (out):</b> This option requires smart metering (or high resolution AMR) to monitor consumption in response to notifications. This would likely drive reductions in the short term which may then support more sustainable longer-term efficient use patterns. However, many commercial/industrial users consume water in process use to meet their business needs and as they already pay metered charges the scope to further incentivise reductions may be limited.</p> <p><b>Politic:</b> No issues with reward schemes to support water savings.</p> |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|--|----------------|---|
|                  |  |   |                |  |                | <b>Customer (out):</b> Further work would be required to determine whether this would unfairly benefit a small subset of customers. A significant change to the way the customers are billed and the management of this would be needed. Rewards may need to be significant to encourage behaviour change.  |
| C064             | Targeted water efficiency advice for public sector customers and recreation facilities | This option recognises that many people's per capita consumption is demanded at locations outside of their own homes, e.g. in gyms, restaurants (dishwashing), launderettes, etc. This option involves providing messaging urging people to use water wisely everywhere they go, and also actively targeting core centres of 'demand re-location', e.g. large gyms, sports centres, restaurants etc. The rationale is that customers need to use water wisely wherever they go, and advice and messaging that reminds and enables customers to use water wisely in other places will suppress all their daily demands, not just those in the home.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Targeted advice is a much more powerful method than blanket messaging and there is significant scope to reduce domestic-type use in these property types.<br>These customers are usually on a metered supply so immediately more interested in receiving and acting upon advice. A combination of meters and multiple drivers to reduce unnecessary consumption with professional advice from the water utility will lead to action and savings.<br><b>Politic (out):</b> No issue with incentivising customers to use water more wisely. However, as a wholesaler Portsmouth Water may not be able / may not wish to deal with this customer group directly. To access non-household customers the wholesaler may need to go via the relevant water retail companies. This could dramatically reduce Portsmouth Water (wholesale) influence and thus the reliability of this as an option to secure the supply-demand balance.<br><b>Customer:</b> No issue with incentivising customers to use water more wisely. |
| C065             | Target shorter showers at adolescents.   | This option specifically targets teenagers' higher frequency and longer duration shower behaviours. The average adult shower duration is between 7 to 10 minutes. Case study research suggests teenagers' shower for average 20-30 minutes. This option involves going into secondary schools across the Portsmouth Water supply area to engage teenagers, identify water usage habits, and provide stimulus and materials to reduce those shower times. This also involves water auditing and retrofitting schools with water efficiency devices. It involves replacing school water meters with smart meters (and sub-metering) to enable schools to engage in Gamification programmes and prizes (annual and inter-school competitions). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> Evidence from recent UK (South East) programmes targeting adolescents has concluded that there are significant water savings to be made by reducing excessive shower times (Thames Water study suggesting shower durations of at least 30 minutes are increasingly common).<br>Effective interventions (including behaviour of adolescents and action by parents etc.) will drive down consumption - but Portsmouth Water only has a limited amount of influence over behaviour in the home. The inherent uncertainty in this makes it too weak as an option to secure the supply-demand balance. It is a good idea that Portsmouth Water may wish to pursue outside of the WRMP programme.<br><b>Politic:</b> No issue with incentivising customers to use water more wisely.  |

| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|--|----------------|--|----------------|--|
|                  |   |  |                |  |                | <b>Customer:</b> No issue with incentivising customers to use water more wisely.   |
| C066             | Target water consumption in university <b>private rental sector</b> . | This option relates to and would build on the success of Option C058 'Target water consumption in university accommodation' and C074 'Gamification'. It would target the student private rental sector in Portsmouth. Landlords would be invited to receive free household water audits including repairs of plumbing leaks, and free water saving devices. They would also be given a subsidy to replace any water inefficient appliances. This would be in return for letting Portsmouth Water install meters and sub-meters to monitor usage and wastage in high density student households. In metered properties students would be able to continue to claim prizes relating to their Gamified water online accounts. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability (out):</b> Evidence from UK studies (e.g. University of West of England) shows that the combined efforts of the water utility and the university (i.e. water science departments) can generate considerable water savings as well as provide experimental conditions and data for analysis. The university student population within the Portsmouth Water supply area is large and so there are opportunities to save water. Reliability would depend on the implementation method including partnership with relevant functions within the universities, and very targeted interventions. Even with universities' commitment Portsmouth Water would be able to exert much less influence than in the C058 variation. This would be an interesting research programme to pursue - with a view to upscaling for future WRMPs but currently the inherent uncertainty, not least levels of support from the universities makes this unrealistic as an option to secure supply-demand balance.<br><b>Politic:</b> No issue with incentivising customers to use water more wisely.<br><b>Customer:</b> No issue with incentivising customers to use water more wisely. |
| C067             | Target <b>property developers</b> : large scale                       | New homes are typically built with standard water fittings but the influence of programmes such as Code for Sustainable Homes etc. have declined. In this option Portsmouth Water would engage with the major house and commercial developers to influence and guide the choice of water fittings and fixtures being installed. Portsmouth Water would support developers exploring exemplar water efficiency and / or decentralised non-potable options.  | OUT            | <b>Duplication:</b> this duplicates C049 or C050.  | OUT            | Screened out at Stage 1.   |
| C068             | Target <b>property developers</b> : small scale                       | Portsmouth Water would provide advice on good quality 'experience' water fittings for smaller scale property developers to install. If Option C006 is implemented then Portsmouth Water would support new owners (including developers) by providing a subsidy / home visit to ensure water efficient fittings and appliances are installed.   | OUT            | <b>Duplication:</b> Options C044, C045, and C046 also involve providing homeowners (new and existing) with visits and support to ensure water efficient fittings and appliances are installed. | OUT            | Screened out at Stage 1.   |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|--|----------------|---|
| C069             | Target occupants of <b>new build</b> housing with smart meters & water efficiency advice. | All new homes are built including water meters. This option would ensure that all new build homes have a smart meter (rather than a basic meter) and new owners are provided with advice on the consumptive nature of fittings and appliances in the property. The information would explain the benefits of these fittings to them (including details on hot water and energy) and the environment / or advice on how to improve the water efficiency of their home. The rationale is that Portsmouth Water would be able to enhance the technology aspect with positive behavioural change that will sustain the water efficiency of the new build. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | Screened out at Stage 1.  |
| C070             | Find and fix leaks in industrial and commercial properties (non-household).               | This option would target industrial and commercial properties. Where leakage data (e.g. nightlines) suggests there are significant leaks on site, Portsmouth Water would find and fix. The rationale is that it could be effective to reduce leaks on a smaller number of larger sites/properties. Site owners are incentivised by reduced bills and 'free' leak repairs. This is a more involved option than C023 which is limited to providing advice on how to undertake leak detection and fixes.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> This option is similar to C023 but goes further to fix the leaks. This would probably increase and / or accelerate the leakage reduction.<br><b>Politic (out):</b> Two main issues: 1) as a wholesaler Portsmouth Water may not have direct access to these customers, and 2) as on a meter once industrial customers are aware of leaks they have the financial incentive to resolve the problem at their own expense.       |
| C071             | Property retrofit on Change of Occupancy  | This option involves Portsmouth Water entering a property at Change of Occupancy and replacing old water inefficient fittings, e.g. old high volume WCs, and retrofitting efficiency devices, e.g. fitting tap aerators, replacing showerheads. Portsmouth Water would engage with Portsmouth Estate Agents to manage the process and to provide new owners with information on the new water fittings, water meter, and efficiency advice at the point of key exchange. This option is distinct from C006 which is limited to installing meters on change of occupancy.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> This option would add significant value to option C006 (metering on change of occupancy).<br><b>Customer (out):</b> High likelihood of generating waste in households that have been re-fitted with owner-selected devices and fittings prior to sale (affecting property appeal and value). Wide applicability and desirability (affecting customer retention) of fittings may be an issues, raising technical difficulties. |
| C072             | Water saving devices - low flush urinals  | This option would replace existing high volume flush urinals with low volume flush varieties. The rationale behind this option is to reduce demand for water used for urinal flushing.  | OUT            | <b>Duplication:</b> See C059 which also targets reduced urinal water use.                                    | OUT            | Screened out at Stage 1.  |
| C073             | Rainshare: community rainwater harvesting   | Portsmouth Water works with communities with a significant annual average or critical period demand (e.g. allotments) to identify opportunities to utilise  | IN             | No issues to screen out against Stage 1 criteria. No additional  | OUT            | <b>Ability (out):</b> Evidence from a number of UK and international studies that community systems are desirable, achievable, and do deliver water demand  |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|--|----------------|---|
|                  |  | Rainshare, i.e. to direct harvested rainwater into a centralised shared resource. Under this same option Portsmouth Water would work with the Council to identify Rainshare twinning schemes, e.g. where buildings with low demand but which can generate high rainfall yields are located next to buildings or other demands with high non-potable demand (e.g. for irrigating or dual-supply toilet flushing). The rationale behind this option is that the harvested rainwater will replace water that had been, or would have been taken from public mains supply.  |                | comment required to justify Stage 1 outcome.   |                | savings. These systems work best when there is a shared need for a non-potable supply, e.g. shared garden spaces, allotments etc.<br>This would be an interesting research programme to pursue - with a view to upscaling for future WRMPs but currently the inherent uncertainty, not least uptake and demand substitution makes this unrealistic as an option to secure supply-demand balance.<br><b>Politic:</b> This is a borderline IN as the evidence base includes recognition of difficulties securing support from all relevant Council departments. E.g. example from Exeter revealed significant challenges securing agreement from highways and planning teams, despite strong support from the sustainability teams and the water utility.<br><b>Customer:</b> General customer acceptance that it makes sense to implement these types of schemes at community rather than property level. However, all schemes would need to be appraised on a bespoke basis considering the relationship between potential 'demand centre' and opportunities available from which to harvest water (e.g. from collections of terraced properties, from large commercial properties etc.). |
| C074             | Smart metering - Gamification. Development of an online app. | <p>This option targets existing <b>smart</b> metered households and non-households. It involves Portsmouth Water developing an App (or accessing an off-the shelf app) to enable customers to access their water account online. Customers with smart meters are able to take advantage of rewards for reducing or maintaining low consumption levels.</p> <p>The aim of this option is to increase the number of 'optants' specifically to adopt smart meters, incentivised by gamification measures. Customers are incentivised to have a smart meter installed by being entered into 'raffle draws' or cashback schemes if they meet water reduction targets. This option on its own is NOT linked to the roll-out of tariffs.</p> | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability (out):</b> The savings are largely dependent on installation of SMART water meters. Where such meters are in place there is international evidence that this form of engagement actively and routinely suppresses demand for water. However, metering penetration at ~30% is probably too low to yield major savings from investment in this area.</p> <p><b>Politic:</b> No issues with helping customers understand their water account, bill, and measures they can take to use water more wisely.</p> <p><b>Customer:</b> No issues with helping customers understand their water account, bill, and measures they can take to use water more wisely. There may be some issues with customers who are not able to access or understand gamification messaging or account management but this is not an issue on which to remove this option. In the longer term as a way to develop and maintain stronger personal links with customers improved online accounts and gamification could help increase the number of optants.</p>  |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|---|----------------|---|
| C075             | Smart metering - replacing existing household water meters                       | Replacing basic meters and installing smart meters in remaining unmetered households. Delivery of this option would increase the likely yield of Option C074 Gamification. Similarly, options C074 and C061 may incentivise customers to agree to a smart meter.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | IN             |   |
| C076             | Metered households proactive consumption support                                 | Portsmouth Water would use the data from smart meters to monitor individual household consumption rates and trends. Increases in consumption trigger an alert whereby Portsmouth Water contacts the customer to let them know that their usage is going up (and therefore their bill) and offers the customer advice on how to get their demand back to the lower level. Customers tracking their own consumption are able to contact Portsmouth Water to request a review of their data and either tips or a visit to identify ways to get demand back under control. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <b>Ability (out):</b> Without widespread smart metering the infrastructure required to deliver this will not be available. Options to introduce smart meters are included in this plan but there is insufficient certainty on which to include and develop this dependent option.   |
| C077             | Targeting perceptions and attitudes via <b>shared spaces</b> (urban environment) | This option would target landscaping and vegetating in public parks, garden centres etc. Portsmouth Water would work with other authorities to vegetate urban green areas with drought tolerant plants and notifications to update people's experiences and expectations of greenery in the south of England.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <b>Ability (out):</b> Targeting perception is a major issue, particularly regarding landscaping / gardening in preparation for a more water stressed future. However, it is unclear what water savings (volume) this would inspire and the level of certainty would be low.<br><b>Politic:</b> There is general acceptance that water sensitive urban design (Green Infrastructure in landscape architecture etc.) has many benefits and this is not counter to policy - however there are some concerns over the quality of schemes and implications on residents. Exemplar urban areas are unlikely to fall into that category.<br><b>Customer:</b> No issues with making improvements to shared urban spaces - and providing an information source. However, support levels would be influenced by the choice of urban site, perceptions on how it could otherwise be utilised, and perceptions over the cost. |
| C078             | Voluntary restraint & leakage action   | Enhanced public awareness campaigns on dry year versus drought situation as triggered by emergent conditions. This includes advice on benefits of mild restraint to households and non-households (less extreme than drought restraint appeals) - Target residents, tourists, and non-household customers. Increase leak detection activity (above DYAA levels) and increase priority of repairing leaks (accelerate response time and reduce leak volume threshold to   | IN             | This is an existing action in the drought plan but integrating the drought plan into the WRMP means integrating the options so this is not considered baseline. | IN             | <b>Ability:</b> UK and international evidence that calls for restraint triggered by drought (or risk of drought) are met with significant reductions in demand.<br><b>Politic:</b> This is standard practice in the drought guidelines. Companies are expected to demonstrate that they are addressing drought from multiple angles - not just restricting customer use.<br><b>Customer:</b> Generally customers understand that drought requires an appropriate demand response.   |



| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|--|----------------|---|----------------|--|
|                  |  | respond to, i.e. fix more, smaller leaks). Combined impact expected to reduce demand by 2.5%.  |                |   |                | However, they do expect to receive information on the status of the drought and other actions that the water company is doing to manage the situation (including the long-term investment plan and leakage reductions). They also expect to see other sectors respond accordingly which is not always within the control of the water company. Drought communications and messaging are critical to the success of these measures.   |
| C079             | Mandatory restraint  | The drought measure is 1 year in 20. This option would prohibit all activities (as listed in the legislation) at the same time in the interests of clarity of messages and equitable application of restrictions to customers [text from 2013 Drought Plan]. The option would only be effective during dry weather (not the full length of the drought). Expected to deliver a 5 % reduction in overall distribution input (a reduced saving since Portsmouth Water introduced a concession for micro-irrigation systems). This option would be very unlikely to be required in combination with raw water storage which would negate the need for mandatory restrictions. | IN             | This is an existing action in the drought plan but integrating the drought plan into the WRMP means integrating the options so this is not considered baseline. | IN             | <b>Ability:</b> UK and international evidence that during drought conditions imposition of mandatory restrictions on use (hosepipe bans, non-essential use etc.) are responded to well and met with significant reductions in demand. In the absence of significant raw water storage this option would be required during drought.<br><b>Political:</b> This is standard practice in the drought guidelines. Companies are expected to demonstrate that they are addressing drought from multiple angles - not just restricting customer use.<br><b>Customer:</b> Generally customers understand that drought requires an appropriate demand response. However, they do expect to receive information on the status of the drought and other actions that the water company is doing to manage the situation (including the long-term investment plan and leakage reductions). They also expect to see other sectors respond accordingly which is not always within the control of the water company. Drought communications and messaging are critical to the success of these measures. |
| C080             | Imposition of Drought Direction Restrictions (mandatory commercial restraint). | The drought measure is 1 year in 80. This applied to commercial uses and further domestic restrictions (beyond those imposed by the Temporary Use Ban and as listed in the Drought Direction 2011). This option would require a Drought Order but would then be effective for the remaining duration of the drought. This option would only be applicable during more severe droughts (1:50), at which point it would be expected to reduce DI by a further 5% (subject to operational review). This option would be very unlikely to be required in combination with raw water storage which would negate the need for mandatory restrictions.                            | IN             | This is an existing action in the drought plan but integrating the drought plan into the WRMP means integrating the options so this is not considered baseline. | IN             | <b>Ability:</b> UK and international evidence that during drought conditions imposition of mandatory restrictions on commercial use meet with significant reductions in demand. In the absence of significant raw water storage this option would be required during drought.  |



| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|---|----------------|---|
| C081             | Subsidy for community decentralised water sources (rainwater harvesting for allotments) | This option would provide a subsidy to support funding for large-scale rainwater harvesting for community group water demands (i.e. allotments). Organised groups could apply for the subsidy to support installation of appropriate decentralised water sources (i.e. harvesting and storing rainwater from nearby buildings). This would reduce demand for potable supplies during part or all of the growing season. [Potentially too much uncertainty regarding size of water saving (yield may be low from just one type of group), typical scheme costs, and therefore cost-beneficiary of the option). | OUT            | <b>Duplication:</b> see C073.   | OUT            | Screened out at Stage 1.  |
| C082             | Procure 3rd party licensed volumes (after advising on using less).                      | Target spray irrigation or other highly consumptive licence holders. Portsmouth Water would fund advice and (subsidised/fully funded) irrigation efficiency technology in return for a licence trade (either partial or complete). The rationale is that by proactively enabling third party abstractors to reduce their own demand for water this will enable a licence trade and reduce pressure on the environment to support further Portsmouth Water's abstraction. This particular option is to procure the abstraction licence.  | OUT            | <b>Duplication:</b> see R055.   | OUT            | Screened out at Stage 1.  |
| C083             | Trade (rent) 3rd party licensed volumes (after advising on using less).                 | Target spray irrigation or other highly consumptive licence holders. Portsmouth Water would fund advice and (subsidised/fully funded) irrigation efficiency technology in return for a licence trade (either partial or complete). The rationale is that by proactively enabling third party abstractors to reduce their own demand for water this will enable a licence trade and reduce pressure on the environment to support further Portsmouth Water's abstraction. This particular option is to rent/trade the abstraction licence.   | OUT            | <b>Duplication:</b> see R055.   | OUT            | Screened out at Stage 1.  |
| C085             | Third party (water retailer) generates water savings at new development sites.          | A third party (undisclosed water retailer) takes ownership for water management of new large scale housing developments and drives down demand by integrating water efficiency and water conservation in to new build - including by integrating decentralised water supply technologies.   | IN             | This is not a duplication of 067, C068, or C069 which would require delivery by Portsmouth Water. | OUT            | <b>Ability:</b> The purpose of market competition is to enable 3rd parties to provide services, including water efficiency measures to enable customers to save money. The technology is available, and now the market conditions are available to enable this type of action. However, this option is screened out as the 3rd party has not been able to commit to delivering the water efficiency savings in the new housing developments.<br><b>Politic:</b> This is borderline IN. It remains unclear whether |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|---|----------------|---|----------------|---|
|                  |   |   |                |   |                | <p>Portsmouth Water would be willing to accept the level of risk if the reductions in demand are not achieved.</p> <p><b>Customer:</b> Customers not satisfied with the water retailer would be able to switch. However, there would be practical difficulties associated with this.</p>  |
| D001             | Decrease time taken to fix reported leaks                                       | Accelerate the time taken to fix reported leaks. Due to human resource constraints, the time lag between a leak being reported and the leakage team attending and fixing the leak is longer than it could be. Employ additional leakage staff to decrease the time period between which leaks are reported and are fixed. This would reduce the amount of water lost through new leaks as they arise. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.    | OUT            | <p><b>Ability (out):</b> Accelerating response times to fix leaks would save water. However, it is already company policy to repair large reported leaks within 1 day and smaller reported visible leaks within 3 days. Under this option the significant additional effort to respond faster than this is likely to be disproportionate to the additional savings that would be made.</p> <p><b>Politic (out):</b> There are no politically contentious issues prohibiting water companies from improving the quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management. However, Portsmouth Water policy is already established.</p> <p><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system.</p> <p><b>Other (out):</b> Portsmouth Water is advised to focus resource on the smaller number of larger leaks (i.e. D002). Additional resources invested under option D002 could be diverted as required to respond to other reported leaks. It is likely that greater leakage reduction would be achieved by increasing monitoring and data analysis across the supply network to improve the efficiency of identifying leaks and using baseline resources to respond accordingly.</p> |
| D002             | Increase find and fix leakage control activity on trunk and distribution mains. | Increase the number of leakage control staff engaged on 'find and fix' activities to identify and repair more leaks on trunk and distribution mains (the larger mains found within the water supply network). When leaks are identified, pipes are excavated and either repaired or replaced. Reduce the total volume lost through leakage (compared to baseline find and fix).                       | OUT            | <b>Duplication:</b> This is largely duplicated by D007 and D010. D002 is likely to be a less efficient variant. | OUT            | Screened out at Stage 1.  |
| D003             | Increase find and fix leakage control   | Increase the number of leakage staff engaged on 'finding and fixing' leaks on communication pipes.  | IN             | No issues to screen out against Stage 1 criteria. No additional   | IN             | <b>Ability:</b> Accelerating response times to fix leaks would save water. Leaks on the bigger mains are likely to be   |

| WRMP19 reference | Option Name                           | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---------------------------------------|---|----------------|--|----------------|---|
|                  | activity on communication pipes.      | These are the higher number of smaller pipes in the supply network. Leaks are repaired and the total volume of water lost through leakage is reduced.   |                | comment required to justify Stage 1 outcome.   |                | larger in volume. This option would actively increase Portsmouth Waters ability to drive down leakage - if SELL model supports additional activity above baseline. These are likely to be a higher number of smaller volume leaks.<br><b>Politic:</b> No issue. There are no politically contentious issues prohibiting water companies from improving the quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management.<br><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system. This has disruption issues - but if implemented in conjunction with the increased district metering and noise loggers this could offer a systematic (and highly visual) approach to reducing leakage. |
| D004             | Deployment of permanent noise loggers | <p>Deploy permanent noise loggers throughout the distribution network. When leaks develop on distribution pipes, the flow of water under pressure through holes in pipes generates vibration and noise. Noise loggers help to identify the noise generated by leaks. By linking the noise loggers' telemetry, the loggers would automatically identify new leaks within the distribution network. This would result in an increase in the amount of leaks identified and repaired, reducing the amount of water lost through leakage.</p> <p>This option does not specifically include the additional staff required to respond more quickly to reported leaks. However, this technology would replace the baseline 'find' activities - freeing up more time to respond to automated leak alarms.</p> | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Improving the quality of information used to deploy baseline resources will increase the efficiency of leakage activity and water savings. This option would enhance and be enhanced by D007 (targeted mains replacement).</p> <p><b>Politic:</b> No issue. There are no politically contentious issues prohibiting water companies from improving the quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management.</p> <p><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system.</p>  |
| D005             | Installation of district meters       | Install additional district meters throughout the distribution network to monitor flows within the distribution network more accurately and identify leaks faster. Increase the number of identified leaks and repairs, and reduce volumes lost through leakage.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Improving the quality of information used to deploy baseline resources will increase the efficiency of leakage activity and water savings. This option would enhance and be enhanced by D007 (targeted mains replacement).</p> <p><b>Politic:</b> No issue. There are no politically contentious issues prohibiting water companies from improving the</p>   |

| WRMP19 reference | Option Name                    | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--------------------------------|---|----------------|--|----------------|--|
|                  |                                | This option on its own does not include use of noise loggers (D004) or other enhanced leakage measures.   |                |  |                | quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management.<br><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system.   |
| D006             | Additional Pressure Management | Install additional pressure reduction valves (PRVs) throughout the distribution network to improve pressure control within the distribution system. This option does not include any find and fix measures.   | IN             | This is an enhanced version of baseline pressure management, not baseline.                                   | IN             | <b>Ability:</b> This would reduce the amount of water lost through existing (undetected) leaks and also reduce the rate at which new leaks occur (due to reduced pressure within mains). However, residual leaks would only be attended to via baseline activity.<br><b>Politic:</b> No issue. There are no politically contentious issues prohibiting water companies from improving the quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management.<br><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system. |
| D007             | Mains Replacement              | Targeted replacement of the parts of the network with greatest leakage. Existing distribution mains would be excavated and replaced with new mains, reducing leakage.   | OUT            | <b>Duplication:</b> D007 is viewed as a result of activity arising from option D010 (risk based selection).  | OUT            | Screened out at Stage 1.   |
| D008             | Trunk Main Expansion           | Increase the capacity of the trunk main network to move more water more easily within Portsmouth Water's supply area. This is to remove infrastructure constraints on DO from existing sources and would enable the output of all existing resources to be maximised during periods of high demand, such as dry year or peak periods. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Insufficient evidence for costing. Network modelling required to confirm constraints and DO impact of expansion works.   |
| D009             | Distribution Main Expansion    | Increase the capacity of the distribution main network to allow more water to be transferred within Portsmouth Water's supply area. This is similar to option D008 but would target a higher number of smaller infrastructure.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Insufficient evidence for costing. Network modelling required to confirm constraints and DO impact of expansion works.   |

| WRMP19 reference | Option Name                                    | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
| D010             | Risk based selection for mains renewal         | Enhance the mains leakage risk analysis system to refine decision making on risk based mains renewal. Not all trunk or distribution mains can or should be repaired or replaced. This option specifically targets the parts of the supply network where the cost: benefit ratio of renewal would be most favourable. | IN             | This is the smarter version of D002 and D007.  | IN             | <b>Ability:</b> Accelerating response times to fix leaks would save water. Leaks on the bigger mains are likely to be larger in volume. This option would actively increase Portsmouth Waters ability to drive down leakage - if SELL model supports additional activity above baseline.<br><b>Politic:</b> No issue. There are no politically contentious issues prohibiting water companies from improving the quality and robustness of their water distribution systems. Unattended leakage in contrast is a more politically contentious issue - especially when other options to secure supply include customer demand management.<br><b>Customer:</b> No issue. Customers would expect the water company to continually improve the quality and robustness of the water distribution system. |
| P004             | Washwater Recovery Works A - increased inflows | Increase the inflows to Works A (i.e. made available by increased resource available in Havant Thicket) and install a washwater recovery plant (larger than option P001) to treat washwater to a standard to enable it to be put back into the works for treatment and use for public water supply.                  | OUT            | <b>Baseline: Works A</b> Washwater is being commissioned and will match potential Havant Thicket flows.      | OUT            | Screened out at Stage 1.  |
| P001             | Washwater Recovery Works A - existing flows    | Install a washwater recovery plant at Works A to treat washwater to a standard to enable it to be put back into the works for treatment and use for public water supply. The yield of this option assumes no increase in the inflows to the WTWs.  | OUT            | <b>Baseline:</b> Now part of baseline  | OUT            | Screened out at Stage 1.  |
| P002             | Washwater Recovery Source F                    | Install a washwater recovery plant at Source F to treat washwater to a standard to enable it to be put back into the works for treatment and use for public water supply. The yield of this option assumes no increase in the inflows to the WTWs.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> There are no yield values associated with this option. No viable yield from membrane washwater. Further assessment required to quantify the volumes of water that are available to recover and the likely return rate.  |
| P003             | Washwater Recovery Source P                    | Install a washwater recovery plant at Source P to treat washwater to a standard to enable it to be put back into the works for treatment and use for public water supply. The yield of this option assumes no increase in the inflows to the WTWs.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> There are no yield values associated with this option. No viable yield from membrane washwater. Further assessment required to quantify the volumes of water that are available to recover and the likely return rate.  |
| R083             | Chickenhall wastewater reuse                   | Treated wastewater effluent from Chickenhall Wastewater Treatment Works would be redirected  | IN             | No issues to screen out against Stage 1 criteria. No additional  | OUT            | <b>Ability:</b> Not acceptable because it derogates Portsmouth Water abstraction at Gaters Mill. SWS is   |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|---|----------------|--|----------------|--|
|                  |  | upstream to augment flows in the River Itchen, u/s of Otterbourne WTWs.   |                | comment required to justify Stage 1 outcome.   |                | considering this in its WRMP and Portsmouth Water is actively objecting to that.   |
| R001             | Increase Source A Abstraction 10 MI/d                              | A licence variation would be required to increase the maximum abstraction.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability (out):</b> Considering work done to date to account for the impact of abstraction on the River Itchen it is unlikely that this licence variation would take place. Abstraction restrictions for the protection of in river habitat implemented following Habitats Directive review of this source. This option is presented based on the thought that a revised and perhaps lower level of flow restriction could be developed with additional migratory fish data. However, this data has not been collected and so there is no further evidence on which to base a revised licence condition. Furthermore, Environment Agency plans to replace the tidal sluice with an alternative structure has the potential to develop a new abstraction point further downstream infeasible.<br><b>Other:</b> Environment Agency plans to replace the tidal sluice. This will introduce uncertainty over deliverability. |
| R002             | Increase Source A Abstraction through augmentation 20 MI/d         | Utilise dedicated boreholes in the upstream catchment to increase flow in the Itchen to enable increased abstraction at Source A. Licence variation required to permit the increased abstraction and water treatment facilities at Source A would need to be enhanced [doubled] by 10MI/d to treat additional volume. | OUT            | <b>Mutual exclusion:</b> Southern Water option.  | OUT            | Screened out at Stage 1.   |
| R003             | New surface water abstraction on the Hamble at the tidal limit     | Construction of new intake and abstraction point on the River Hamble at a freshwater point by the tidal limit. Water would be transferred to a new dedicated treatment works before being put into supply.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Potentially limited yields on the Hamble and impacts on downstream designated sites. New dedicated treatment works and associated infrastructure also pose risks to landscapes and heritage features.  |
| R004             | New surface water abstraction on the Meon at the tidal limit       | Construction of new intake and abstraction point on the River Meon at a freshwater point by the tidal limit. Water would be transferred to a new dedicated treatment works before being put into supply.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Impacts on downstream designated sites. New dedicated treatment works and associated infrastructure also pose risks to landscapes and heritage features.   |
| R005             | New surface water abstraction on the Wallington at the tidal limit | Construction of new intake and abstraction point on the River Wallington at the freshwater point by the tidal limit. Water would be transferred to a new dedicated treatment works before being put into supply.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Yield uncertainty from river flows. Impacts on downstream designated sites. New dedicated treatment works and associated infrastructure also pose risks to landscapes and heritage features.   |

| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|--|----------------|--|----------------|---|
| R006             | Tidal barrage at mouth of Chichester Harbour              | Construction of a tidal barrage across Chichester Harbour. Freshwater inflows to the harbour would be retained by the barrage allowing abstraction for public water supply purposes. This would essentially turn the harbour into a large surface water storage reservoir. A new intake would need to be constructed in the harbour. Water would be transferred to a new dedicated treatment works before being put into supply. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Significant potential impacts on designations of the harbour and associated dedicated WTW.  |
| R007             | New surface water abstraction on the River Rother 15 Ml/d | New abstraction from the River Rother (15 Ml/d). Requires construction of new intake works on the River Rother. Water would be transferred to Portsmouth Water through a dedicated raw water transfer main, which would also require construction. Water would be treated at either an existing works or a new works if there are capacity issues.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Potential conflict with Southern Water plan on the Rother. Additional infrastructure (pipelines and treatment of lower quality water) leads to significant sustainability impact.   |
| R008             | Utilisation of gravel pits near Chichester                | Utilise existing gravel pits as raw water reservoirs. Groundwater would enter the gravel pits from the surrounding gravel. Option would require construction of new intake and abstraction point at the gravel pits. Water would be transferred to a new dedicated treatment works before being put into supply.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Uncertainty over the impact on existing users of gravel pits (anglers/water sports) and the yield likely to be available at a level that would not hinder these uses.   |
| R009             | New impounding reservoir on the Itchen                    | Construction of a dam on the River Itchen to create an impounding reservoir. Water would be abstracted using a draw-off structure. Water would be transferred through dedicated main to a new treatment works. This reservoir would impound water at all times, not just pumping of high-flows. Controlled releases to maintain environmental flow requirements downstream.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Low yield expected in a catchment with limited water availability. Impounding reservoir would have significant potential impact on the designated site and WFD objectives for a multitude of reasons. High social impact considering uses of the river. |
| R010             | New impounding reservoir on the Hamble                    | Construction of a dam on the River Hamble to create an impounding reservoir. Water would be abstracted using a draw-off structure. Water would be transferred through dedicated main to a new treatment works. This reservoir would impound water at all times, not just pumping of high-flows. Controlled releases to maintain environmental flow requirements downstream.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Low yield expected in a catchment with limited water availability. Impounding reservoir and associated infrastructure would have significant potential impact on various designated site and WFD objectives for a multitude of reasons.                 |



| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|--|----------------|--|
| R011             | New impounding reservoir on the Meon  | Construction of a dam on the River Meon to create an impounding reservoir. Water would be abstracted using a draw-off structure. Water would be transferred through dedicated main to a new treatment works. This reservoir would impound water at all times, not just pumping of high-flows. Controlled releases to maintain environmental flow requirements downstream.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Low yield expected in a catchment with limited water availability. Impounding reservoir and associated infrastructure would have significant potential impact on various designated site and WFD objectives for a multitude of reasons.  |
| R012             | New impounding reservoir on the Wallington  | Construction of a dam on the River Wallington to create an impounding reservoir. Water would be abstracted using a draw-off structure. Water would be transferred through dedicated main to a new treatment works. This reservoir would impound water at all times, not just pumping of high-flows. Controlled releases to maintain environmental flow requirements downstream.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Low yield expected in a catchment with limited water availability. Impounding reservoir and associated infrastructure would have significant potential impact on various designated site and WFD objectives for a multitude of reasons.  |
| R013             | Havant Thicket Winter Storage Reservoir<br><b>Option A - 'Standard Design'</b> 23 Ml/d  | Construction of a pumped storage reservoir at Havant Thicket. Water would be abstracted from Source B during the winter period (within the existing licence) and stored in the reservoir for use in the summer. Water would be abstracted using a draw-off structure. Water would be pumped to the reservoir for storage via a new pipeline but gravity feed back to the springs. Water would be transferred through dedicated main to Works A. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <b>Ability:</b> A winter pumped storage system would significantly increase the water resource available within Portsmouth and consequently freeing up resources to support the wider South East region. There are likely sufficient flows during the winter period to provide this resource (however no flow modelling work is available to the screening) - this has been modelled and assessed in detail by the WRSE group.<br><b>Politic:</b> Previously there had been a general presumption against major new storage systems - but WRSE, WaterUK assessments, and company specific supply-demand balances (under climate change) are all showing that the situation will require investment - and that additional storage should be a serious contender.<br><b>Customer:</b> Whilst some customers would be concerned over the impacts of constructing major storage (including on bills) and within the wider south-east region there are active anti-reservoir pressure groups, the strength of customer concern about water shortages and water company need to secure safe and reliable supplies lends support to new storage options.<br><b>Other:</b> Preferred over options R014/15. |
| R014             | Havant Thicket Winter Storage Reservoir<br><b>Option B - 'Supersize Design'</b> 45 Ml/d | Option description is the same as for Havant Thicket Option A - but with a larger design. The footprint of the reservoir could be twice as large. Twice the   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Option R013 preferred for reduced impacts on on-site designations and increased certainty in available yield.  |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
|                  |  | volume of winter spring water would be pumped into the reservoir for use during the summer.  |                |  |                |   |
| R015             | Havant Thicket Winter Storage Reservoir<br><b>Option C - 'Reduced footprint'</b> 16 Ml/d | This option would be a variation on Option A, and would involve construction of a smaller pumped storage reservoir at Havant Thicket. Water would be pumped to the reservoir via a new pipeline but gravity feed back to the Springs.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> Option R013 preferred for increased yield and lower complexity in design.   |
| R016             | Colden Common Winter Storage Reservoir 10 Ml/d   | Construction of a pumped surface water storage reservoir at Colden Common. Water would be sourced from the River Itchen through a new abstraction point. Abstraction would be during the winter period and stored in the reservoir for use in the critical period. Water would be released as raw water in to the River Itchen, for intake at existing Gaters Mill (River Itchen Water Treatment Works).                           | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.   | OUT            | Screened out at Stage 1.  |
| R017             | Testwood Lakes pumped storage 10 Ml/d  | Enlargement of pumped storage reservoir at Testwood Lakes. Water would be sourced from the River Test through a new abstraction point. Water would be abstracted during the winter period and stored in the reservoir for use in the critical period. Water would be abstracted using draw-off structure. Water would be transferred through dedicated main to a SWS's Testwood treatment works. The works would require uprating. | OUT            | <b>Mutual exclusion:</b> Southern Water option. The complexities of mitigating for designated sites and other users of both the Test and the reservoirs make this challenging to pursue. | OUT            |   |
| R018             | Woodend Winter Storage Reservoir (Meon) 10 Ml/d  | Construction of a pumped storage reservoir at Woodend. Water would be sourced from the River Meon through a new abstraction point. Water would be abstracted during the winter period and stored in the reservoir for use in the critical period. Water would be abstracted using draw-off structure. Water would be transferred through dedicated main to Farlington treatment works.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> There is significant uncertainty over availability of resource to fill the reservoir outside of highest flow periods. Abstraction in this location is highly likely to be unsustainable. The construction of a new water main poses risk to the environment during construction.<br><b>Politico:</b> The site incorporates ancient woodland making this an unfeasible option. Havant Thicket faces several similar challenges, but benefits from a more certain water availability without ancient woodland.<br><b>Customer:</b> In the context of other pumped storage reservoir options, the development of Woodend winter storage is a lesser known option that Havant Thicket. Promotion to customers and stakeholders may prove challenging as a result. |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|--|----------------|--|
| R019             | Southleigh Farm 20 Ml/d                                       | Construction of a pumped storage reservoir at Southleigh Farm. Water would be sourced from Havant & Bedhampton springs through a new abstraction point. Water would be abstracted during the winter period (within the existing licence) and stored in the reservoir for use in the critical period. Water would be abstracted using draw-off structure. Water would be transferred through a dedicated main to Farlington treatment works.         | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Site has been selected by Havant Borough Council for housing development.  |
| R020             | Source Group QRST – Increase in Licence/additional boreholes  | Application to vary the existing average and peak licence for the QRST Group to increase abstraction. Current licence limits are 28Ml/d average, and 41Ml/d peak. This would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing on-site water treatment works for treatment (enlarged works likely to be required). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Option R020a preferred (within licences). There is currently a presumption against further consumptive abstraction in this part of the catchment, recognising the importance of spring flow, e.g. the Swanbourne Lake.   |
| R020a            | Source Group QRST – Maximising DO                             | Increase DO to maximise use of the abstraction licence quantities.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Preferred over R020 (increasing licensed volumes). Maximising DO within existing licence limits is technically feasible (info not provided on how DO will be increased within licensed limits - other constraints must be the limiting factor).<br><b>Politico (out):</b> Likely to be easier to promote, but would still face opposition due to the presumption against further abstraction in the catchment. Even with the licences - the EA is highly unlikely to support this option.<br><b>Customer:</b> From a customer perspective this would possibly be easier to promote, but would still face opposition due to concerns regarding sustainable flows in the area. |
| R021             | Source Group LMNOP - Increase in Licence/additional boreholes | Application to vary the existing average and peak licence for the LMNOP Group to increase abstraction. Current licence limits are 64Ml/d average, and 94Ml/d peak. Would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing on-site water treatment works for treatment (enlarged works likely to be required).     | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Option R021a preferred (within licences). There is currently a presumption against further consumptive abstraction in this part of the catchment, recognising the importance of spring flow.   |

| WRMP19 reference | Option Name                    | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--------------------------------|--|----------------|--|----------------|--|
| R021a            | Source O - Maximising DO       | Increase DO to maximise use of the abstraction licence quantities.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Preferred over R021 (increasing licensed volumes). Maximising DO within existing licence limits is technically feasible (info not provided on how DO will be increased within licensed limits - other constraints must be the limiting factor).</p> <p><b>Politic (out):</b> Likely to be easier to promote, but would still face opposition due to the presumption against further abstraction in the catchment. Even with the licences - the EA is highly unlikely to support this option.</p> <p><b>Customer:</b> This is a borderline IN. Likely to be easier to promote, but would still face opposition due to concerns regarding sustainable flows in the area.</p>  |
| R022             | Source J - Increase Licence    | Application to increase the existing licence for Source J. Current licence limits are 22MI/d average, and 25MI/d peak. Would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing orks for treatment .   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Option R022a preferred (within licences). There is currently a presumption against further consumptive abstraction in this part of the catchment, recognising the importance of spring flow and potential impacts on designated sites.</p> <p><b>Politic:</b> Even operating within the existing licence will likely face regulatory opposition. Very little scope if any for increasing abstraction permits.</p>   |
| R022a            | Source J - Maximising DO       | Maximise DO of Source J within existing licence limits. Would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing works for treatment   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Maximising DO within existing licence limits is technically feasible (info not provided on how DO will be increased within licensed limits - other constraints must be the limiting factor).</p> <p>The PIM/WFD Investigation found that Source J was sustainable because it is on the confined chalk. Portsmouth Water has reduced the licence at Source I to protect the river and the harbour. Portsmouth Water is proposing additional satellite boreholes to bring abstraction up to the existing licence.</p> <p><b>Politic:</b> This is a borderline IN.</p> <p><b>Customer:</b> This is a borderline IN. Likely to be easier to promote, but would still face opposition due to concerns regarding sustainable flows in the area.</p> |
| R023             | Source H - Increase in Licence | Application to increase the existing average and peak licence for the Source F to increase abstraction. Current licence limits are 9MI/d average, and 15MI/d peak. Would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing works for treatment. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> Option R023a preferred (within licences). There is currently a presumption against further consumptive abstraction in this part of the catchment, recognising the importance of spring flow and potential impacts on designated sites.</p> <p><b>Politic:</b> Even operating within the existing licence will likely face regulatory opposition. Very little scope if any for increasing abstraction permits.</p>   |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|--|----------------|---|
| R023a            | Source H - Maximising DO                             | Maximise the DO of Source H within the existing abstraction licence quantities. Would require new pumps to reach ADO in drought conditions.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Maximising DO within existing licence limits is technically feasible with modified pumps.</p> <p><b>Politic (out):</b> Likely to be easier to promote, but would still face opposition due to the presumption against further abstraction in the catchment. Even within the licences - the EA is highly unlikely to support this option and has already taken steps to time limit several licences in the catchment for later review.</p> <p><b>Customer:</b> This is a borderline IN. Likely to be easier to promote, but would still face opposition due to concerns regarding sustainable flows in the area.</p>  |
| R024             | Source C - Increase in Licence                       | Application to increase the existing average and peak licence for Source C to increase abstraction. Current licence limits are 20MI/d average, and 31MI/d peak. Would require construction of additional boreholes at the site to enable additional water to be abstracted. Borehole headworks would be required. Water would be transferred to existing works for treatment. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> There is currently a presumption against further consumptive abstraction in this part of the catchment, recognising the importance of spring flow and potential impacts on designated sites.</p> <p><b>Politic:</b> Even operating within the existing licence will likely face regulatory opposition. Very little scope if any for increasing abstraction permits.</p>  |
| R024a            | Source C - Maximising DO                             | Improve water treatment to maximise use of the abstraction licence quantities. Would require the construction of a building to house cartridge filters.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | <p><b>Ability:</b> Maximising DO within existing licence limits is technically feasible (turbidity reduction measures possible - cartridge filters during peak demand).</p> <p><b>Politic:</b> Likely to be easier to promote than option R024 (increase to licence). Opposition remains a possibility due to the presumption against further abstraction in the catchment. However, it is noted that this option is to use existing licenced quantities.</p> <p><b>Customer:</b> This is a borderline IN. Likely to be easier to promote, but would still face opposition due to concerns regarding sustainable flows in the area.</p> |
| R025             | Capture Additional Springs at Source B               | Application to vary the existing average and peak licence for Source B to increase abstraction. Current licence limits are 98MI/d average, and 137MI/d peak. Would involve capture of additional spring flow that is currently discharged to river. Water would be transferred to Works A for treatment.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <p><b>Ability:</b> As with other GW options, there is a presumption against further consumptive abstraction. Information suggests that existing licence is sufficient to fill Havant Thicket reservoir if it is developed.</p>  |
| R026             | Aquifer Storage and Recovery Southern Water Source D | Surplus treated water (available during the winter period) would be used to recharge the Greensand aquifer at Southern Water's Source D. The Greensand aquifer would operate as a reservoir to store the surplus water so that the water could then   | OUT            | <b>Mutual exclusion:</b> Southern Water option.  | OUT            | Screened out at Stage 1.  |

| WRMP19 reference | Option Name                           | Description  | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale        |
|------------------|---------------------------------------|--|----------------|---|----------------|--------------------------|
|                  |                                       | be abstracted when required, such as during a dry year or during peak periods. The option would require the installation of recharge facilities on site.   |                |   |                |                          |
| R027             | Portsmouth Harbour Desalination Plant | Construct a new desalination plant in Portsmouth Harbour (Whale Island). Water would be desalinated using membrane treatment processes (Reverse Osmosis) and pumped to a service reservoir for blending before being put into supply. Effluent management would be via either a long sea outfall, or sewerage to a WwTW. | OUT            | <b>Mutual exclusion:</b> Southern Water likely to have a stronger business case/need to build a more strategic/bigger desalination plant. This would offset any need on Portsmouth Water to invest in desalination. Further the Southern Water desalination plant would negate the need for the baseline 15Mld export (Hampshire/Southampton) due to begin in 2018. | OUT            | Screened out at Stage 1. |
| R028             | Hayling Island Desalination Plant     | Construct a new desalination plant on Hayling Island, utilising brackish groundwater abstracted from boreholes in the middle of the island. Water would be desalinated using membrane treatment processes (Reverse Osmosis) and pumped to a service reservoir for blending before being put into supply.                 | OUT            | <b>Mutual exclusion:</b> Southern Water likely to have a stronger business case/need to build a more strategic/bigger desalination plant. This would offset any need on Portsmouth Water to invest in desalination.   | OUT            | Screened out at Stage 1. |
| R029             | Arun Desalination Plant               | Construct a new desalination plant on the River Arun downstream of the tidal limit. Water would be desalinated using membrane treatment processes and pumped to Littlehampton Service Reservoir for blending before being put into supply.   | OUT            | <b>Mutual exclusion:</b> Southern Water likely to have a stronger business case/need to build a more strategic/bigger desalination plant at Fawley/Marchwood. This would offset any need on Portsmouth Water to invest in desalination.   | OUT            | Screened out at Stage 1. |
| R030             | Itchen Desalination Plant             | This option would involve the construction of a new desalination plant on the River Itchen downstream of the tidal limit. Water would be desalinated using membrane treatment processes and pumped to Hoads Hill Service Reservoir for blending before being put into supply.  | OUT            | <b>Mutual exclusion:</b> Southern Water likely to have a stronger business case/need to build a more strategic/bigger desalination plant at Fawley/Marchwood. This would offset any need on Portsmouth Water to invest in desalination.   | OUT            | Screened out at Stage 1. |

| WRMP19 reference | Option Name   | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|---|----------------|--|
| R031             | Reclaimed industrial and wastewater for use by industry | Reuse treated wastewater effluent from industrial customers in the Portsmouth harbour area for supply to industrial customers. This reclaimed water could be used for industrial/commercial use rather than potable water (drinking water).   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <b>Politic:</b> This is no longer an option for Portsmouth Water. It is an option for any industrial customer under the new competition rules. |
| R032             | Budds Farm Effluent Reuse Scheme (Direct)               | Direct reuse of treated wastewater effluent from Budds Farm Wastewater Treatment Works. Water would be treated using membrane treatment processes and pumped to a service reservoir for blending before being put into supply. Earliest start date 2025-26. Asset life 60 years. Full WAFU 20ML/d in all scenarios (DYAA, peak, MDO, normal) and (1:10, 20, 50, 100 year return period drought). However, under 200, & 500 year drought the yield would be lower at 18ML/d and 16.20 ML/d respectively. | OUT            | <b>Mutual exclusion:</b> Southern Water has the greater need for this option (likely difficult to obtain). [Drinking Water Inspectorate position being sought regarding use of direct effluent re-use]. | OUT            | Screened out at Stage 1.   |
| R033             | Portsmouth Effluent Reuse (Direct)                      | Direct reuse of treated wastewater effluent from Southern Water's Portsmouth Wastewater Treatment Works. Water would be treated using membrane treatment processes and pumped to a service reservoir for blending before being put into supply. Use of a service reservoir (non-controlled waters) makes this a direct reuse scheme.  | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.  | OUT            | Screened out at Stage 1.   |
| R034             | Peel Common Reuse Scheme (Direct)                       | Direct reuse of treated wastewater effluent from Southern Water's Peel Common Wastewater Treatment Works. Water would be treated using membrane treatment processes and pumped to a service reservoir for blending before being put into supply. Use of a service reservoir (non-controlled waters) makes this a direct reuse scheme.   | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.  | OUT            | Screened out at Stage 1.   |
| R035             | Portsmouth Effluent Reuse (Indirect to Itchen)          | Indirect reuse of treated wastewater effluent from Southern Water's Portsmouth Wastewater Treatment Works. Water would be treated using membrane treatment processes and put into the River Itchen upstream of Portsmouth Water's existing Gaters Mill abstraction. This treated effluent would provide greater flow in the Itchen and enable more water to be abstracted at the existing Gaters Mill.  | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.  | OUT            | Screened out at Stage 1.   |



| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
| R036             | Peel Common Reuse Scheme (Indirect to Hamble)            | Indirect reuse of treated wastewater effluent from Peel Common Wastewater Treatment Works. Water would be treated using membrane treatment processes, pumped west, and put into the River Hamble upstream of the tidal limit. This would take water out of the lower reaches of the River Meon (which is the current receiving waterbody for discharge from Peel Common) and introduce it into the Hamble. A new intake structure would be constructed on the River Hamble upstream of the tidal limit. The treated effluent would provide greater flow in the River Hamble, enabling abstraction through the new abstraction point. | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.   | OUT            | Screened out at Stage 1.  |
| R037             | Peel Common Reuse Scheme (Indirect to Meon)              | Indirect reuse of treated wastewater effluent from Southern Water's Peel Common Wastewater Treatment Works. Water would be treated using membrane treatment processes and put into the River Meon upstream of the tidal limit. A new intake structure would be constructed on the River Meon upstream of the tidal limit. The treated effluent would provide greater flow in the River Meon, enabling abstraction through the new abstraction point.   | OUT            | <b>Mutual exclusion:</b> More likely to be needed by Southern Water.   | OUT            | Screened out at Stage 1.  |
| R085             | Direct effluent reuse to supply agricultural glasshouses | Non-potable treated effluent from Appuldram, Tangmere and Ford WwTWs used to supply agricultural glasshouse demand. All 3 WwTW sites are adjacent to land suitable for horticulture which could accept effluent. The WwTWs and horticultural demands are downstream from Portsmouth Water abstractions.  | OUT            | <b>Mutual exclusion:</b> Any yield from these WwTWs would more likely be retained by Southern Water.         | OUT            | Screened out at Stage 1. However, even if this option passed Stage 1 it would be unlikely to contribute to Portsmouth Water's supply-demand balance as the glasshouses do not currently demand water from Portsmouth Water.   |
| R038             | Water from Thames to Itchen                              | Transfer raw water from the River Thames and discharge into the middle/upper reaches of the River Itchen (dedicated new pipeline - route not defined at this point). Water would be abstracted using the existing abstraction point at Gaters Mill.  | OUT            | <b>Mutual exclusion:</b> Southern Water option.  | OUT            | Screened out at Stage 1.  |
| R039             | Water from Thames to Arun                                | Transfer raw water from the River Thames and discharge into the middle/upper reaches of the River Arun (dedicated new raw water pipeline - route not defined at this point). Water would be abstracted from a new abstraction point on the River Arun (upstream of the tidal limit) and then transferred   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Thames Water's London zone supply-demand balance deficit strongly indicates that there will be little scope for transferring resource out of the Thames Water supply area.<br><b>Politic:</b> Likely conflict with existing users of the Thames (including TWUL). Transfer of river water between |

| WRMP19 reference | Option Name                                     | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|---|---|----------------|--|----------------|--|
|                  |   | through a new dedicated main to a new water treatment works and put into supply.  |                |  |                | catchments poses risks of INNS transfer and impacts on the Arun. Significant construction and infrastructure needs also present risk to landscapes and public response.  |
| R040             | Source A - Increased abstraction <b>10 MI/d</b> | Relocate an existing abstraction from the River Itchen to the tidal limit. This option would require construction of a new intake works on the River Itchen and a new transfer main. Existing treatment capacity would be used and abstraction would return to pre-HD review levels due to reduced impact on in river habitat.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Abstraction restrictions for the protection of in river habitat implemented following HD review of Source A abstraction reduced yield of this source. This option is presented based on the thought that a revised and perhaps lower level of flow restriction could be developed with additional migratory fish data. However, this data has not been collected and so there is no further evidence on which to base a revised licence condition. Furthermore, Environment Agency plans to replace the tidal sluice with an alternative structure has the potential to develop a new abstraction point further downstream infeasible. |
| R041             | Source A - Increased abstraction <b>20 MI/d</b> | Relocate an existing abstraction from the River Itchen to the tidal limit. This option would require construction of a new intake works on the River Itchen, a new transfer main and additional treatment capacity. This is a larger version of option R040 with abstraction above HD review levels due to reduced impact on in river habitat in shifting abstraction to the tidal limit. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Abstraction restrictions for the protection of in river habitat implemented following HD review of Source A abstraction reduced yield of this source. This option is presented based on the thought that a revised and perhaps lower level of flow restriction could be developed with additional migratory fish data. However, this data has not been collected and so there is no further evidence on which to base a revised licence condition. Furthermore, Environment Agency plans to replace the tidal sluice with an alternative structure has the potential to develop a new abstraction point further downstream infeasible. |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|--|----------------|--|----------------|--|
| R042             | Source A - Increased abstraction <b>30 MI/d</b>  | Relocate an existing abstraction from the River Itchen to the tidal limit. This option would require construction of a new intake works on the River Itchen, a new transfer main and additional treatment capacity. This is a larger version of option R040 with abstraction above HD review levels due to reduced impact on in river habitat in shifting abstraction to the tidal limit.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Abstraction restrictions for the protection of in river habitat implemented following HD review of Source A abstraction reduced yield of this source. This option is presented based on the thought that a revised and perhaps lower level of flow restriction could be developed with additional migratory fish data. However, this data has not been collected and so there is no further evidence on which to base a revised licence condition. Furthermore, Environment Agency plans to replace the tidal sluice with an alternative structure has the potential to develop a new abstraction point further downstream infeasible. |
| R043             | Share in new WRSE bulk transfer options - cessation of exports from Portsmouth Water to WRSE neighbouring companies. | Import water from regional sources developed through the Water Resources in the South East group. It is assumed that rather than dedicated mains being developed into Portsmouth Water's area the construction of new resources would enable benefits to be 'cascaded' through the South and East. This would enable the existing bulk supply exports from Portsmouth Water to cease, and the resources could be used to benefit Portsmouth Water. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Dependencies on other water companies. Portsmouth Water has no means of enforcing this.  |
| R044             | Cessation of bulk supply export to Southern Water: 15 MI/d at average, 15 Mld at peak                                | During drought conditions switch off the existing bulk supply export to Southern Water from Whiteways Lodge. The water would be retained and supplied to Portsmouth Water customers. Southern Water would be issued with reasonable notice of the cessation. The latest WRSE suggests cessation is a valid option to address drought conditions. A new 10 year agreement is now in place with supplies of 15 Mld at average and 15 MI/d at peak.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Portsmouth Water has re-negotiated the bulk supply agreement with Southern Water and it would require a 1:200 year drought condition to permit a cessation   |
| R045             | Import from Petersfield to Clanfield (10 MI/d)   | Import 10 MI/d from South East Water's sources in the Petersfield area. Water would be transferred to Clanfield service reservoir and put into supply.   | OUT            | <b>Mutual exclusion:</b> South East Water not expected to have spare capacity to support this option.        | OUT            | Screened out at Stage 1.   |
| R046             | Import from Petersfield to Farlington (20 MI/d).   | Import 20 MI/d from South East Water's sources in the Petersfield area. Water would be transferred to Farlington service reservoir and put into supply.  | OUT            | <b>Duplication:</b> Option R045 (10MI/d) preferred over this as the uncertainties in obtaining this yield    | OUT            | Screened out at Stage 1.   |

| WRMP19 reference | Option Name                                  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|--|----------------|---|
|                  |  |   |                | from South East Water is increased with the higher volumes proposed here. Mutual exclusion: South East Water not expected to have spare capacity to support this option. |                |   |
| R047             | Reversal of existing bulk supply to Southern | Portsmouth Water currently supplies Southern Water through a bulk supply. Under this option, the existing infrastructure would be used to reverse the bulk supply so that water would be imported from Southern Water.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Politic:</b> Additional water would need to be found in Southern Waters area to supply. SWS would therefore be likely to object. Infrastructure needs likely to be in close proximity to designated sites. |
| R048             | National Water Grid                          | This option would involve the development of a national water grid. This would enable surplus resources in the north of the country to be transferred south to areas of greater water stress.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> For the purposes of Portsmouth Water's WRMP it is highly unlikely that Portsmouth Water will be able to initiate the creation of a national water grid.                                       |
| R049             | Sea tankering from Kielder                   | Commission shipping tankers to transfer water from Kielder Water in Northumberland to Tyne Dock to Portsmouth Harbour. This option requires an agreement with Northumbria Water. It would also require a new dedicated water treatment works in the harbour from where the water would be put into supply.    | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> Multiple complexities and uncertainties during operation limit viability of this option.  |
| R050             | Sea tankering from Norway                    | Commission shipping tankers to transfer water from Norway to Tyne Dock to Portsmouth Harbour. This option requires an agreement with Norway. It would also require a new dedicated water treatment works in the harbour from where the water would be put into supply.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.   | OUT            | <b>Ability:</b> Multiple complexities and uncertainties during operation limit viability of this option.  |
| R051             | Bags from Kielder                            | Commission shipping tankers to tow bags of water from Kielder Water in Northumberland to Tyne Dock to Portsmouth Harbour. This option requires an agreement with Northumbria Water. It would also require a new dedicated water treatment works in the harbour from where the water would be put into supply. | OUT            | <b>Duplication:</b> no discernible difference between tankering and bagging.   | OUT            | Screened out at Stage 1.  |
| R052             | Bags from Norway                             | Commission shipping tankers to tow bags of water from Norway in Northumberland to Tyne Dock to Portsmouth Harbour. This option requires an  | OUT            | <b>Duplication:</b> no discernible difference between tankering and bagging.   | OUT            | Screened out at Stage 1.  |

| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|--|----------------|--|----------------|---|
|                  |  | agreement with Northumbria Water. It would also require a new dedicated water treatment works in the harbour from where the water would be put into supply.  |                |  |                |   |
| R053             | Conjunctive use of resources                         | Use existing resources conjunctively and operate differently to baseline to release additional DO. For example, operating certain sources during the winter period could result in greater resources remaining in the Chalk aquifer during dry or summer periods.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Portsmouth Water does not have storage capacity that would enable any benefit from changing winter abstraction. In a drought all the sources are needed all the time with a small allowance for outage and headroom.  |
| R054             | Transfer of a Southern Water Source                  | Transfer of an existing Southern Water source. This option would be part of a deal for Southern Water to buy Source A and for Portsmouth Water to develop Havant Thicket Reservoir. Southern are developing new sources in the Sussex area and may not need the source or the bulk supply in the future.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> This option is dependent on the availability of new resource from Havant Thicket.   |
| R055             | Purchase or trade third party abstraction licenses   | Purchase or trade existing third party abstraction licenses used for purposes other than public water supply. Under a trade agreement Portsmouth Water would enter into a contractual agreement with the licence holder. This reduces the difficulties associated with purchase - but does introduce risks associated with contracting. Portsmouth Water would apply to the Environment Agency to vary the licenses so that they can be used for public water supply purposes. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> As yet no licence holders identified as candidates to trade/procure licences from. No information regarding benefits in terms of water available for use or practical considerations relating to network connections. |
| R056             | Lumley Farm Winter Storage Reservoir - 18 MI/d       | A new Lumley Farm winter storage reservoir would be built to receive excess flows from the river during high flow events. The water would be transferred to a treatment works and then put into supply. DO assumed to be 18MI/d.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Option R013 (Havant Thicket) preferred due to landscape restrictions (high quality agricultural land, flat land, visibility, pumping requirements, full bunding).   |
| R057             | Loveders Farm Winter Storage Reservoir - 15 MI/d     | A new Loveders Farm winter (pumped) storage reservoir would be built to receive excess flows from the river during high flow events. The water would be transferred to a treatment works and then put into supply. DO assumed to be 15MI/d.  | IN             |  | OUT            | <b>Ability:</b> Option R013 (Havant Thicket) preferred due to landscape restrictions (high quality agricultural land, flat land, visibility, pumping requirements, full bunding/embankments limiting recreational opportunity).       |
| R058             | Southleigh Forest Winter Storage Reservoir - 15 MI/d | A new Southleigh Forest winter (pumped) storage reservoir would be built to receive excess flows from the river during high flow events. The water would   | IN             | No issues to screen out against Stage 1 criteria. No additional  | OUT            | <b>Ability:</b> Option R013 (Havant Thicket) preferred due to increased potential impacts on archaeology, designations on site, ancient woodland and protected  |

| WRMP19 reference | Option Name  | Description   | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|--|---|----------------|--|----------------|---|
|                  |  | be transferred to a treatment works and then put into supply. DO assumed to be 15MI/d.  |                | comment required to justify Stage 1 outcome.   |                | bats. Uncertainty over ground conditions and works required for use as reservoir add complexity. Adjacent landfill increases risk.  |
| R059             | Chichester Reuse Scheme (Indirect to Lavant)                   | Indirect reuse of treated wastewater effluent from Southern Water's Chichester Wastewater Treatment Works. Water would be treated using membrane treatment processes (Reverse Osmosis) and diverted away from inflows to Chichester Harbour put into the Lavant upstream of the tidal limit (nearby to Chichester). A new intake structure would be constructed on the Lavant upstream of the tidal limit. The treated effluent would provide greater flow in the Lavant, enabling abstraction through the new abstraction point. | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Discharge of effluent to the River Lavant may not be acceptable.  |
| R060             | Budds Farm Effluent Reuse Scheme (Indirect via Havant Thicket) | Treated wastewater effluent from Budds Farm Wastewater Treatment Works (by Langstone). Water would be treated using membrane treatment processes (Reverse Osmosis) and pumped to the Havant Thicket reservoir. This option is dependent on the Havant Thicket reservoir being in place.   | IN             | No issues to screen out against Stage 1 criteria.  | OUT            | No issues to screen out against Stage 2 criteria. The technology and evidence base to support IPR as a solution is available. Perception issues likely to be experienced so not included in the plan at this stage. |
| R067             | Towing Icebergs  | Commission shipping to capture and tow artic icebergs into Portsmouth Water. This option involves towing icebergs behind a vessel. It does not involve carrying icebergs. Ice that has not melted by the time it reaches the harbour will be transferred to a melt facility (not currently available) and residual salinity removed. Water would then be treated and put into supply.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Considerable complexities and restrictions in process and infrastructure needed.  |
| R068             | Source S Drought Permit:                                       | When Swanbourne Lake is already dry in a serious drought (1:100 or worse) increase abstraction from the Source S from the current licensed limit of 2.5MI/d to 11.5 MI/d. This would require a drought permit. Under normal dry conditions abstraction from Source S is limited due to its assumed impact on the SSSI at Arundel).The source is part of a Group Licence and abstraction is limited to 41 MI/d and not more than 2,100 MI in any period of 60 days. The permit would increase the group limit to 49.5 MI/d.        | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | IN             | No issues to screen out against Stage 2 criteria. No additional comment required to justify Stage 2 outcome.  |

| WRMP19 reference | Option Name   | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|--|----------------|--|----------------|---|
| R069             | Source H Drought Permit   | This option would involve a drought permit to remove the flow constraint on Source H (River Meon). This would allow abstraction to continue at peak periods despite low flows.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> Planning to secure supplies under a WRMP scenario (albeit drought) using options that will damage the environment is unlikely to be acceptable. The purpose of integrating drought planning into WRMP is to reduce the level of need to resort to damaging actions. |
| R070             | Source N Drought Permit   | This option would require a Drought Permit to remove the condition of a 2.16 Ml/d compensation discharge into the River Ems.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> Planning to secure supplies under a WRMP scenario (albeit drought) using options that will damage the environment is unlikely to be acceptable. The purpose of integrating drought planning into WRMP is to reduce the level of need to resort to damaging actions. |
| R071             | Source B Drought Permit   | This option would require a Drought Permit to override conditions imposed by the Habitats Directive Review of Consents and increase abstraction from the springs.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> Planning to secure supplies under a WRMP scenario (albeit drought) using options that will damage the environment is unlikely to be acceptable. The purpose of integrating drought planning into WRMP is to reduce the level of need to resort to damaging actions. |
| R072             | Source A Drought Permit   | This option would require a Drought Permit to override a Licence Variation imposed by the Habitats Directive Review of Consents. It would continue abstracting volumes permitted prior to the introduction of Minimum Residual flow (MRF). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> Planning to secure supplies under a WRMP scenario (albeit drought) using options that will damage the environment is unlikely to be acceptable. The purpose of integrating drought planning into WRMP is to reduce the level of need to resort to damaging actions. |
| R073             | Source P Drought Permit   | This option would require a Drought Permit to exceed abstraction limits at the Source P between August and November.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> Planning to secure supplies under a WRMP scenario (albeit drought) using options that will damage the environment is unlikely to be acceptable. The purpose of integrating drought planning into WRMP is to reduce the level of need to resort to damaging actions. |
| R074             | Drought ASR   | Recharge a groundwater aquifer with treated effluent.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Lack of evidence of successful similar schemes in the UK. Insufficient evidence or detail to take forward. Furthermore, a low likelihood that artificial storage would be retained, instead leading to increase baseflows to rivers.                                |
| R075             | Increase the drought yield of sources unaffected by Habitats Regulations Review of Consents | Sources not subject to Habitats Regulations Review of Consents. Amend the licences to increase yield beyond the current 'peak' quantity.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> Affected by WFD no deterioration conditions   |



| WRMP19 reference | Option Name  | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|--|----------------|--|----------------|--|
| R076             | Contractual supply of water from 3rd party (bulk supply)             | Under this option Portsmouth Water would take no responsibility for the source works (boreholes etc.) but would receive a supply of water under <b>contract</b> from the 3rd party supplier (non-water company).<br><br>[This was previously listed as a Customer option - C003]. This is re-listed as R075].  | OUT            | <b>Duplication:</b> See C001.  | OUT            | Screened out at Stage 1.   |
| R077             | Reservoir release  | This option assumes that Havant Thicket (pumped storage) reservoir is built and that Portsmouth Water has access to abstract from its releases.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Other:</b> this option is subsequent to implementing Havant Thicket - an option which itself is not yet baseline.   |
| R078             | Lower borehole pumps   | Use the existing stock of rising mains to lower pump intake levels (submersible pumps) as aquifer levels fall, to continue abstracting.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Politic:</b> The technology is available to do this but opposition to mining deeper groundwater levels is likely to be very strong.   |
| R079             | Recommission unused source Bishops Waltham                           | During a drought install temporary pumps (and associated infrastructure) on this decommissioned groundwater source to augment supplies. A maximum of 7.5ML/d is possible (less to avoid serious local environmental impact). Upon trigger to recommission Portsmouth Water will be required to deliver Drinking Water Quality investigations (safety plans) to satisfy DWI requirements (3 -6 month lead in time). | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability</b> A lead in time of 3-6 months is likely to make this option of limited use considering the timeframes for action during drought. It risks taking too long to recommission and becoming redundant (if drought breaks before the source is ready). It may provide relief if the drought is prolonged. Source is not intended to be retained as operational for ordinary service and so is at risk of abandonment or driving inefficient maintenance investment.  |
| R080             | Recommission unused source: Hayling Island                           | During drought recommission the source unused since the 1920s (up to 0.3ML/d) to augment supplies. It would require new pumps, disinfection, a power supply, and reconnection to the distribution system. Upon trigger to recommission Portsmouth Water will be required to deliver Drinking Water Quality investigations (safety plans) to satisfy DWI requirements (3 -6 month lead in time).                    | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> A lead in time of 3-6 months is likely to make this option of limited use considering the timeframes for action during drought. It risks taking too long to recommission and becoming redundant (if drought breaks before the source is ready). It may provide relief if the drought is prolonged. Source is not intended to be retained as operational for ordinary service and so is at risk of abandonment or driving inefficient maintenance investment. |
| R081             | Commission unused Portsmouth Water boreholes (increase source yield) | During drought install temporary pumping equipment into unused boreholes to generate additional yield and DO. Apply to the Environment Agency for licence variations or new licences to abstract.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> specific boreholes have not been identified. The yield from such boreholes is largely unexamined and therefore uncertain. Further work and WQ assessments would be required.   |

| WRMP19 reference | Option Name                                      | Description   | Stage 1 Result | Stage 1 Rationale   | Stage 2 Result | Stage 2 Rationale  |
|------------------|--|---|----------------|---|----------------|--|
| R082             | Commission unused private / commercial boreholes | Contact private borehole owners (list obtained from the EA) to utilise spare licence capacity during drought (see option R055). The water could be treated to provide Portsmouth Water's or to offset demand for non-potable use. Install new infrastructure to connect third party sources to the Portsmouth Water supply system.  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | OUT            | <p><b>Ability:</b> Currently the potential yield and likelihood of securing this water is unconfirmed. Similarly, information on the likely quality and applicable demand types is unknown. Potential significant investment in additional infrastructure to access 3rd party sources could be extensive but is unknown. Due to this lack of information this option is unlikely to be a feasible 'drought measure'.</p> <p><b>Politic:</b> There is a regulatory presumption against further groundwater abstraction and so drought permits or drought orders would be required (this conflicts with the intention of long-term planning to avoid the need to resort to drought permits).</p>   |
| C001             | Meter remaining unmetered non-households         | A small number of commercial and public sector premises remain unmetered. This option would involve additional activity and effort to go beyond the baseline non-household metering activity. It would require unmetered commercial and public sector properties to be revisited and property water supply line obstacles overcome in order to install the meters. The meter style would be either AMR or Smart Meters.                                   | OUT            | <b>Baseline:</b> Residuals are unmetered due to inherent difficulties of installing meters on the site and therefore that additional investment here would not provide value (savings) for money. Portsmouth Water can advise on its number of residual unmetered non-households. | OUT            | Screened out at Stage 1.   |
| C002             | Meter remaining unmetered swimming pool owners   | Install Smart meters in HHs with swimming pools but which are still unmetered. The estimated water savings associated with this option are solely based on the impact of converting from unmeasured to measured billing. It is assumed that there will be savings linked to the use of the swimming pool and ordinary domestic usage. Additional water savings to be generated using online account tools and incentives are covered under other options. | IN             | <p>The inclusion of other types of compulsory metering make this a similarly feasible option.</p> <p>Note - Option similar to baseline metering of households with swimming pool - savings likely to be very small.</p>   | IN             | <p><b>Ability:</b> If implemented this could save some water. However, owners of pools are unlikely to cease use on the basis of the water bill (especially given the relatively low cost of water - as perceived by wealthier customers). Similarly, if customers continue to fill pools they may not see any point in the smaller savings that could be achieved by using water more wisely elsewhere on the property.</p> <p><b>Politic:</b> Under the Water Industry Act 1991 water companies are permitted to meter on the basis of pools. Note that potential introduction of compulsory metering may make this a feasible option.</p> <p><b>Customer:</b> The majority of customers without pools may see this as a fair way to charge high users. However, high users are likely to respond either negatively, or neutrally.</p> |
| C003             | Meter all households with an outside tap         | Install Smart meters in all households with an outside tap. The estimated water savings associated with this option are solely based on the impact of converting from unmeasured to measured  | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome.  | IN             | <b>Ability:</b> This would reduce consumption from garden watering / outside use and the impact of the meter would impact on regular domestic use. If installed savings (to some degree) could be assumed. However, the wider  |

| WRMP19 reference | Option Name                                       | Description  | Stage 1 Result | Stage 1 Rationale  | Stage 2 Result | Stage 2 Rationale   |
|------------------|---|--|----------------|--|----------------|---|
|                  |   | billing. Assume that there will be savings linked to the use of the outdoor tap (e.g. gardening, car washing, but also ordinary domestic usage). Additional water savings to be generated using online account tools and incentives are covered under other options. |                |  |                | net reduction in co-operation from customers could diminish this particular win.<br><b>Politic:</b> Note that potential introduction of compulsory metering may make this a feasible option. Under the Water Industry Act 1991 water companies are permitted to meter on the basis of sprinkler ownership etc. - but this does not extend to ownership of an outdoor tap.<br><b>Customer:</b> Note that potential introduction of compulsory metering may make this a feasible option. It would be difficult to identify relevant properties, to contact owners, and to get access to install a meter. There is potential to create a negative impact on customer service/relationship which would be counterproductive particularly in light of need for strong customer relationships / trust to roll out water efficiency options. |
| C004             | Meter all households within a water stressed area | Compulsorily meter (AMR or Smart) all remaining unmetered households within a water stressed area (as assessed currently). Install meters where there is currently no meter and convert all households to metered billing.   | IN             | No issues to screen out against Stage 1 criteria. No additional comment required to justify Stage 1 outcome. | OUT            | <b>Ability:</b> If compulsory metering was desired and permitted and implemented overall water savings would be achieved. The compulsory aspect has the risk to generate customer backlash, at least initially.<br><b>Politic:</b> In the UK water utilities are not permitted to compulsorily meter and switch customers to measured billing unless the supply zone is in an area designated by the Environment Agency as Seriously Water Stressed. Portsmouth Water has not been assessed as Serious Water Stressed.  |

\*Where an option has been screened out but there are also positive considerations, the factors driving the decision to screen the option out are identified using the (out) suffix, e.g. Ability (out).

**Author**

Draft.....

**Reviewer**

Draft.....

**Copyright and non-disclosure notice**

The contents and layout of this report are subject to copyright owned by Amec Foster Wheeler (© Amec Foster Wheeler Environment & Infrastructure UK Limited 2016) save to the extent that copyright has been legally assigned by us to another party or is used by Amec Foster Wheeler under licence. To the extent that we own the copyright in this report, it may not be copied or used without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to you in confidence and must not be disclosed or copied to third parties without the prior written agreement of Amec Foster Wheeler. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests. Any third party who obtains access to this report by any means will, in any event, be subject to the Third Party Disclaimer set out below.

**Third party disclaimer**

Any disclosure of this report to a third party is subject to this disclaimer. The report was prepared by Amec Foster Wheeler at the instruction of, and for use by, our client named on the front of the report. It does not in any way constitute advice to any third party who is able to access it by any means. Amec Foster Wheeler excludes to the fullest extent lawfully permitted all liability whatsoever for any loss or damage howsoever arising from reliance on the contents of this report. We do not however exclude our liability (if any) for personal injury or death resulting from our negligence, for fraud or any other matter in relation to which we cannot legally exclude liability.

**Management systems**

This document has been produced by Amec Foster Wheeler Environment & Infrastructure UK Limited in full compliance with the management systems, which have been certified to ISO 9001, ISO 14001 and OHSAS 18001 by LRQA.