EXECUTIVE SUMMARY

Long-term planning for the provision of public water supplies is an important aspect of maintaining the security of supplies to customers whilst respecting the needs of the environment. Although water resource planning has been a regular activity for water companies for many years, the Government has recently introduced legislation to require companies to prepare Water Resources Management Plans on a formal basis and for public consultation to be carried out.

Portsmouth Water has a long tradition of serving Portsmouth and the surrounding area, having been established in 1857. Since then its area has expanded through amalgamation to supply the towns and cities of Gosport, Fareham, Chichester and Bognor Regis in South East Hampshire and West Sussex.

This Draft Plan is the first plan required by the statutory process and it has been prepared for public consultation in accordance with the *Water Resources Management Plan Guidance* prepared by the Environment Agency in May 2007 and published by the Department for the Environment, Food and Rural Affairs (Defra).

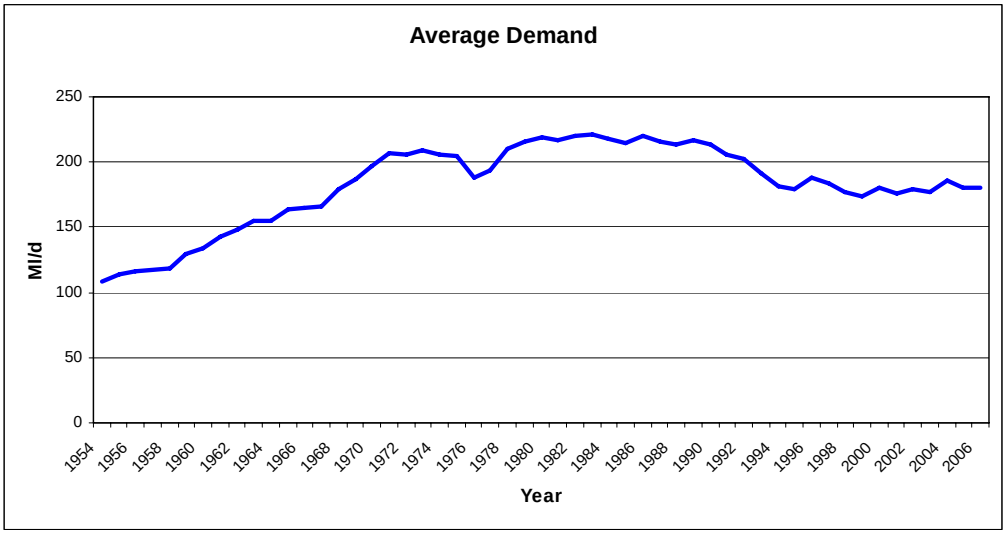
This Draft Plan assesses the Company's ability to maintain the security of supplies for the next 25 years (the planning period) by preparing a 'Supply Demand Balance' which compares the availability of supplies with forecast demands from 2010 to 2035.

Background

Throughout its long history of over 150 years as a public water supply undertaker, the Company has paid careful attention to the key aspect of ensuring that it has sufficient water resources to meet the needs of its customers. Only once during the National Drought of 1976 has it ever imposed a hosepipe ban. Its customers are not accustomed to the frequent imposition of supply restrictions; their expectations are for a reliable and continuous supply.

The Company's customers have enjoyed very high standards of drinking water quality and customer service, together with the lowest charges for water supply in England and Wales. Recent customer surveys have revealed satisfaction with the Company's standards of service and it proposes to maintain that position in the years ahead. The Company is ranked by Ofwat as the most efficient (Financial Performance Review 2006/07) and the Company's customers expect its activities to be operated in an efficient manner. A significant majority of customers believe that the Company's water supply service represents excellent value for money; its customers expect that any investment to balance supply with demand will be undertaken in a pragmatic cost-effective manner which minimises the impact upon water charges.

During the expansion of the Company and growth in water demand in the 1960s and 1970s, new resources were developed and existing sources expanded. Key interconnections between supply zones were implemented during the 1970s and 1980s in order to ensure that emergencies would not interrupt supplies. Significant leakage reductions have been achieved over many years, as have demand savings from the implementation of Pressure Control Systems and the reductions in commercial use as businesses have moved from manufacturing into the service sector. The overall impact is that the Company now abstracts, on average, 20% less water from the environment than it did in the 1980s.



The Company's last Water Resources Plan, prepared in 2004, revealed a potential shortage of supplies by 2020 and as a result a 'twin-track' package of both demand management and water resource measures was identified to provide a solution which would ensure adequate supplies through to 2030. These are outlined below:

- Continued Promotion of Water Efficiency Initiatives to customers from 2005 to 2030
- The Metering of all New Households from April 2005
- Significant Reductions in Mains Network Leakage by 2018
- Undertaking a further proactive Water Efficiency Programme in 2018
- Constructing a Washwater Recovery Plant in 2019 to reduce operational losses at the Farlington Water Treatment Works
- Developing a Winter Storage Reservoir at Havant Thicket by 2021

Since then Portsmouth Water has continued to promote water efficiency measures throughout its publicity including Customer Newsletters, its website and at Water Festivals. From 1st April 2005, the Company has required all new households to be metered in order to encourage new householders to be economical in their use of water.

The Havant Thicket Winter Storage Reservoir, required by 2021, is a major scheme which is expected to require fifteen years to develop. The Company set up a Stakeholder Group consisting of local authority officers and councillors, environmental groups, regulators and local community representatives to advise on the key elements of the proposals. A major public consultation exercise, to identify the views of the local community is being undertaken during 2008 prior to the submission of a planning application in 2009.

In South East Hampshire and West Sussex, there are many important wetland sites which are designated under the EU Habitats Directive as they support important wildlife species. The UK Habitats Regulations have required the Environment Agency to undertake a 'Review of Consents' in order to identify the impacts of abstractions and discharges upon these sites. As a result, the Environment Agency has notified the Company of its intention to reduce the Company's abstraction licences. This will have an impact upon the availability of water resources to meet demands. Where these reductions result in a shortfall in the supply demand balance, the Government has advised companies that it expects them to implement solutions in the first five-year period (AMP5) of this 25 year Draft Plan.

The demand reductions of the 1990s have enabled the Company to play a significant regional role in resolving the resource problems of other companies in the South East. Following a major study of water resource availability undertaken by the water companies in the South East, the Environment Agency, Ofwat and WaterVoice (now Consumer Council for Water), a Bulk Supply facility of up to 15 Ml/d has been provided by the Company to help resolve water shortages in Southern Water Services' Sussex area. The supply was commissioned in the summer of 2004 and was heavily used during the droughts in the South East in 2005 and 2006.

The collaborative group, commonly referred to as the Water Resources in the South East Group (WRSE) has carried out further studies in order to identify the impacts of the results of the Environment Agency's Habitats Review across the South East of England. The studies have identified a number of initial options which could have a very significant impact upon the Company's ability to maintain supplies. For this Draft Plan, the Company has not included the regional options in its baseline projections. Further work is expected by the Water Resources in the South East Group during 2008 to identify whether there are any options which should be incorporated into Final Plans in 2009.

In developing this Draft Plan, the Company has based its projections upon the principles set out in the Environment Agency Water Resources Management Planning Guidelines. Public consultation on this Draft Plan is being carried out during the summer of 2008 and after incorporating any modifications as directed by the Secretary of State, a Final Plan will be published in April 2009. This Draft has been heavily influenced by:

- The Government's new Regulations which designate the supply area as an 'area of water stress' requiring an assessment of the economics of implementing compulsory metering.

- The Company's 25 year Strategic Direction Statement entitled *'Sustainable Water Supplies for the Future'*, which sets out our overall strategy for meeting our obligations to customers, the environment and investors over the next 25 years.

The Government's water strategy *'Future Water'* was unfortunately published in February 2008, too late for detailed consideration to be included in this Draft Plan.

Whenever practicable, the Company has adopted the forecasting methodologies, mostly developed by UK Water Industry Research (UKWIR), Throughout this Draft Plan the Company utilises robust Company-specific data wherever possible.

The European Water Framework Directive (WFD) requires the UK Government to ensure that all waters, both surface and ground, are in 'good' ecological and chemical status preferably by 2015, but in any case by 2027. No account has been taken of the impact of the Directive in this Draft Plan. The specific impacts which might affect the Company's water resources have yet to be identified by the Environment Agency, who are the designated authority responsible for implementation of the requirements of the Directive.

Supply Side

There are a number of elements which make up the supply side of baseline supply demand balance calculations.

A **Source Yields Assessment** identifies the yields of each of the Company's abstractions during drought periods. A number of revisions to the last Assessment, carried out in 1997, have been undertaken following test pumping at various sites, but a comprehensive review was not possible as the Portsmouth Water supply area has not suffered significant drought conditions since 1997. Changes

to individual yield assessments following abstraction licence variations confirmed since the 2004 Water Resources Plan, and the provision of the Southern Water Services Bulk Supply, have been included.

The impacts of climate change upon surface water and groundwater yields were calculated and gave conflicting results. As a result no climate change impacts have been included in this Draft Plan. The Company expects to carry out further investigation to enable the incorporation of climate change impacts in the Final Plan.

The three **Water Resource Zones** separately identified for forecasting purposes in the 2004 Water Resources Plan are maintained despite the completion of a number of new links between individual reservoir zones.

The Company's customers expect high **Levels of Service**. The Company only anticipates the need for hosepipe restrictions occurring once in 50 years and non-essential use drought orders being required once in 100 years. This is consistent with the results of the Company's customer research and the previous 2004 Water Resources Plan. Adopting high levels of service for this Draft Plan ensures that impacts upon the water environment caused by drought orders are minimised.

Failures of a source can be due to pollution incidents, power and mechanical failures or treatment breakdown, all of which are referred to as 'Outage'. In calculating its **Outage Assessment** for its abstraction sources, the Company has adopted the principles of the UKWIR report *Outage Allowances for Water Resources Planning 1995* which uses a complex statistical methodology. The construction of new membrane filtration plants at several abstraction sites since 2000 has enabled the Company to significantly reduce its overall Outage Assessment.

There are many key wetland habitats sites in South East Hampshire and West Sussex and the Habitats Regulations Review of Consents process has resulted in the review of many of the Company's licensed abstractions. The Environment Agency has recently provided indicative conclusions for the Company's sources, resulting in what are termed **Sustainability Reductions** to the licensed abstraction. These indicative conclusions are:

- a significant reduction in abstraction at the Company's Gaters Mill source on the River Itchen in order to maintain river flows above a specified minimum level.

- a marginal reduction in abstraction from the Havant & Bedhampton Springs source to maintain freshwater flows into Langstone Harbour.

- the imposition of time-limited licences for the remaining Hampshire sources to enable the Environment Agency to carry out further investigations into the impacts of abstractions upon the freshwater flows in the Rivers Hamble and Meon where they meet the tidal waters of the Solent. There is, therefore, the possibility that licences may be reduced at some point during the planning period.

- the imposition of a new group licence for the majority of the Company's Sussex sources which will reduce the total capacity of these sources.

For the purposes of the Draft Plan, it has been assumed, on the basis of Government advice, that the Environment Agency will not impose these licence reductions until 2015 in order to allow the Company sufficient time to implement solutions to overcome any shortfalls in supplies.

The impacts of cryptosporidium, turbidity and nitrates in many groundwater sources have resulted in significant **Water Quality** investment over the last ten years to maintain supply capabilities. The

Company has now had to provide blending facilities to control nitrate levels at six sources. The Company urges the Government to further extend the geographical area covered by Nitrate Vulnerable Zones in order to curb rising nitrate levels, and for the Environment Agency to ensure that controls in these zones are enforced.

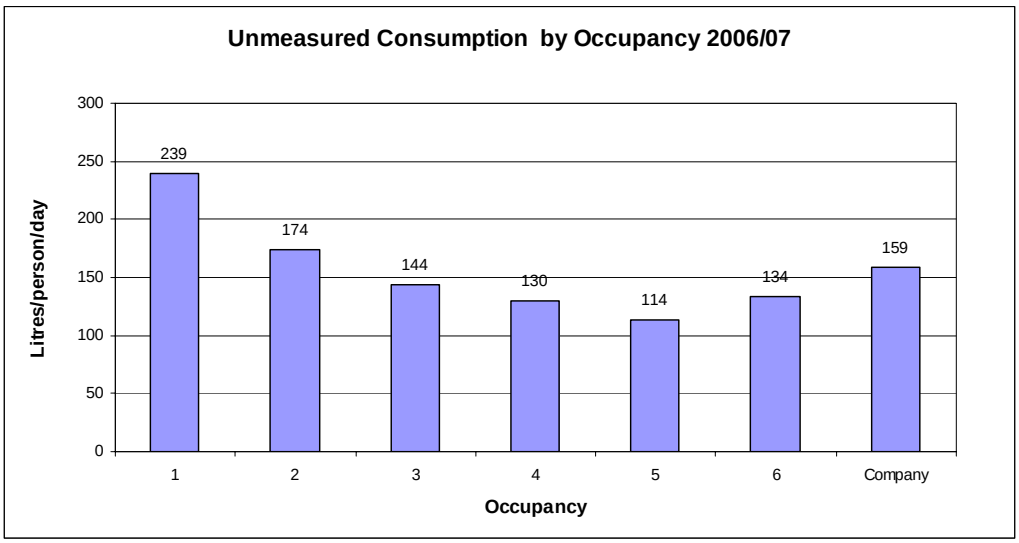
Although **Operational Losses** at groundwater sources are generally low, the completion of membrane filtration plants at three more sites since 2004 has resulted in a rise in the volumes of water used operationally, such as for backwashing filters.

Demand Side

Since the 2004 Water Resources Plan, the Company has undertaken further work to update the individual elements of its demand forecasts.

The **Domestic Demand** forecast is developed using a mix of population, households, per capita consumption and metering forecasts. Using Government Output Area (OA) statistics based upon the 2001 Census, the Company, together with seven other water companies in the South East, appointed EXPERIAN, a consultant, to develop its population forecast on 'trend-based' data. As a result the Domestic Demand forecast anticipates that the population will grow from 642,000 in 2006/07 to 709,444 by 2034/35. Demographic change leading to lower levels of occupancy in households is expected to lead to the number of domestic properties rising from over 281,600 in 2006/07 to 348,300 in 2034/35, a greater rate of increase than that of the population.

Per capita consumption, the average amount of water used per person in a household, has been rising steadily for many years. This has been measured by the Company through its monitoring of consumption patterns over many years in a database of representative properties. The principal driver of rising per capita consumption is the reducing number of people per household due to a wide range of lifestyle changes. The plot from the monitored database results below show the major impact that occupancy levels in households can have on per capita consumption.



Growing awareness of the need for careful use of water by customers is expected to slow the growth in per capita consumption. Nevertheless in unmetered households the per capita consumption is likely to rise over the 25 year planning period from 160 litres/head/day (l/h/d) to 174 l/h/d in an average year and from 169 l/h/d to 186 l/h/d in a 'Dry Year'. This forecast has been confirmed using micro-component analysis prepared by consultants.

More recently those domestic households which are **Metered** are recording per capita consumptions which are approximately 10% less than unmeasured households (until recently this has not been the case in the Portsmouth Water area). The Company has seen a sharp rise in households switching to the metered tariff since 2004 so that by March 2008 over 11% of households are metered. The Company anticipates that meter switching will continue at a rate of 4,000 households per annum for the 25 year period. As a requirement of new Government legislation, the Company has evaluated the economics of a compulsory metering programme as one of the options for overcoming some of the predicted shortfall in the future supply demand balance.

Commercial (Non-Domestic) Demand in the Portsmouth Water area has fallen by 48% in the last thirty years as the emphasis for commercial businesses has moved out of manufacturing into the service sector. For the 2004 Water Resources Plan, the Water Research Centre (WRc) conducted an econometric study reviewing the service and non-service sectors in the Region. As the downward trend has continued, much as forecast, the Company has seen no need to update the previous forecast for this Draft Plan.

The Company's long history of active **Leakage** management since the 1970s has ensured that the overall rate of leakage continues to remain below the Economic Level of Leakage of 32.1 Ml/d as determined in June 2007. Ofwat has been working with the Environment Agency to develop an approach to leakage target setting for the future. The outcome of this work is awaited and it is expected to be available in time for inclusion in the Final Water Resources Management Plan.

The **Bulk Supply** facility for Southern Water Services, completed in 2004, is expected to remain available throughout the Plan period. The WRSE Group's regional modelling work identifies the potential for further Bulk Supplies to overcome regional shortfalls. However, none have been requested to date and so none are included in this Draft Plan.

The Company continues to provide **Water Efficiency** advice at every opportunity through the provision of self-audit advice and the availability of Save-a-Flush bags. The Company anticipates continued promotion of water efficiency through advisory measures and more proactive programmes are included as options to overcome future deficits.

The Company currently has no long-term water storage and is dependent upon the availability of its groundwater yields from borehole, well and spring sources. Consequently the **Critical Period** in each year for the Company's supply demand balance is providing sufficient supplies to meet the summer peak demand. These peaks are forecast using a risk-based approach, on a statistical basis, for the next 25 years.

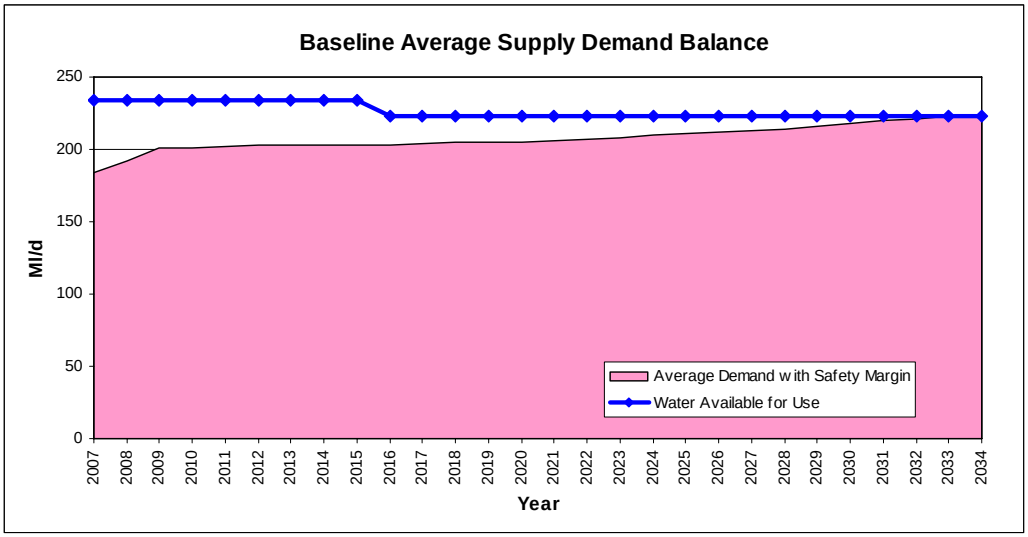
Baseline Supply Demand Balance

In order to assess the Company's ability to maintain the security of supplies for the 25 year planning period, a baseline supply demand balance compares the availability of supplies with forecast demands through to 2035.

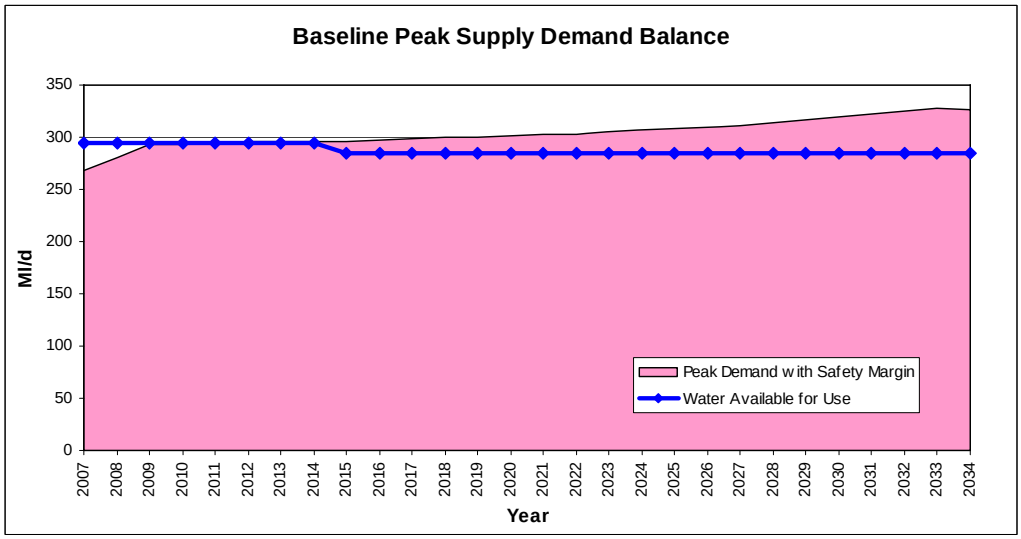
In accordance with the Defra guidelines, the Company incorporates an element of **Headroom** in its forecast to provide for uncertainties in both demand projections and future supply availability. For the Draft Plan the Company has utilised the principles set out in the *'Improved Methodology for Assessing Headroom' (UKWIR 2003)*. The 2003 methodology uses a risk-based approach for calculating headroom which takes account of, amongst many aspects, the vulnerability of and time-limitations on abstraction licences, the accuracy of supply and demand forecasts, and the impacts of climate change.

The methodology utilises an iterative statistical process which enables the level of risk of exceedence of the headroom calculation to be identified. For this Draft Plan the headroom (uncertainty allowance) rises from 27.8 Ml/d in 2009/10 to 55.6 Ml/d by 2034/35.

The Baseline Supply Demand Balance tables reveal that for **Average Demand**, the Company remains in surplus until the final year of the Draft Plan 2034/35.



For the **Critical Period**, during peak demand in a dry year, a small deficit first develops by 2011/12. For the purposes of this Draft Plan, the Company has assumed that the Environment Agency will not impose its indicative sustainability reductions to abstraction licences until 2015. At that time a significant shortfall of 11.7 Ml/d occurs. However, the shortfall could occur much earlier if the Environment Agency seeks to impose reductions sooner.



As demand and headroom increase over the planning period the deficit at the critical period of peak demand grows to 41.7 Ml/d by 2035.

Options for Resolving Deficits

Portsmouth Water recognises the need to adopt sustainable options which will deliver long-term solutions to overcome forecast shortfalls occurring during this 25 year planning period. The Company needs to adopt a 'twin-track' approach to managing water supplies and in this respect must give full consideration to options for managing the level of demand as well as options for enhancing the water resources available for public water supplies. In developing a solution, it must identify credible options which have a high degree of certainty in their delivery whilst minimising impacts upon the environment as well as the costs which will inevitably be met by increases in customers' charges.

As recommended by the Environment Agency's Water Resources Management Planning Guidelines, the Company has adopted the options assessment methodology set out in *'The Economics of Balancing Supply and Demand' (Environment and UKWIR 2002).*

The Environment Agency's Guidelines suggest that preferred options should consider feasibility, environmental and social impacts, the Water Framework Directive, the costs, the opportunities, risks and uncertainties, any links and inter-dependences, as well as the carbon costs. As the impacts of the Water Framework Directive have yet to be determined, the Company has developed its assessment based upon:

- Average Incremental Social Costs (AISCs) taking into account the social and environmental impacts of the option together with the cost per cubic metre of water produced or saved.
- Carbon costs in relation to the operating costs associated with the option (it has not been possible to include 'embedded carbon costs' at this point in time).
- The risks associated with the yield/savings calculations which are expected to be achieved for the option.
- The risks associated with the delivery of each option, taking into account legal, policy and other practical constraints.

Summary of Options Considered

A **Do Nothing** option is briefly considered although the regular imposition of restrictions and the damaging impacts of regular drought orders upon the environment is not considered an acceptable solution.

Existing legislation enables water companies to install meters on existing domestic supplies when a new occupant takes charge of the supply. Thus **Change of Occupancy Metering** has been evaluated with an estimated 11,000 meters being installed each year. It is estimated that savings of 10% at average demand and 12% of peak demand might be achieved, although with such low water charges Portsmouth Water has no experience on which to base these assumptions.

Research has shown that **Cistern Displacement Devices** (installing Save-a-Flush bags in toilet cisterns) will reduce the volume of water used in toilet flushing by 10%. Small scale trials have shown that 25% of customers receiving an unsolicited mailshot will install the bags. The bags only have a relatively short life and it is assumed that they need to be replaced on a five-yearly basis.

Leakage Savings Initiatives to reduce leakage levels by installing new district meters and reducing response times to leakage calls are considered.

The **Budds Farm Direct Effluent Re-use Scheme** proposes the conversion of waste water from the Portsmouth and Havant Waste Water Treatment Works into drinking water for augmenting the spring supplies to Portsmouth.

Havant Thicket Winter Storage Reservoir anticipates the construction of a raw water storage reservoir holding surplus winter yield from the Company's Havant & Bedhampton springs.

Retrofit of Dual Flush Devices incorporating an initiative to fit dual flush devices to existing single flush toilet cisterns has been assessed.

At **Worlds End Water Treatment Works** the Company's three boreholes produce less yield than the fully licensed abstraction. The Company is therefore considering the possibility of delivering the fully licensed yield although it should be noted that the Environment Agency's recent Catchment Abstraction Management Strategies (CAMS) for East Hampshire identifies the local area as being 'over-licensed'.

As at Worlds End, the Company's five boreholes at **Lavant and Brickkiln** produce less yield than the licensed abstraction. The Company has evaluated the possibility of developing further boreholes to achieve the licensed yield.

In the East of the supply area the Company has an **Eastergate Group Licence** covering four sources which are the principal supply for the bulk transfer to Southern Water Services. The combined yield from the four sources is considerably greater than the current abstraction licence allows, and this option considers the possibilities of increasing the current abstraction licence.

Water from the Havant & Bedhampton Springs is treated at **Farlington Water Treatment Works** and a two-stage filtration process is required to meet water quality standards. The feasibility of recovering most of the **washwater** for use as drinking water is evaluated.

Given the proximity of seawater to the Company's area, an option to construct a **Portsmouth Harbour Desalination Plant** is assessed.

The benefits and costs associated with implementing **Compulsory Metering** for all domestic households have been evaluated as required by new Regulations. The Company has prepared a long-term programme over 25 years to deliver this solution, the principal aim being to minimise the impact upon customers' charges.

The provision of **Rainwater Harvesting in New Properties** by using the planning process is identified although there may be legislative complications which may preclude its adoption.

By adopting the principles embodied in the Government's *Code for Sustainable Homes*, the Company could encourage the use of **Low Use Fittings in New Properties**, possibly by offering subsidies to developers of new households.

The provision of free **Water Butts**, although already widely used by many gardeners, is considered a possibility for further constraining the volume of water used for garden watering.

A new **Winter Storage Reservoir at Colden Common** has been identified within the River Itchen catchment and this would enable the licence reductions proposed for the Company's abstraction at Gaters Mill to be mitigated as well as providing new wetland habitats.

A scheme to retain **Portswood Waste Water Treatment Works Effluent for Re-use** as a compensation discharge to the River Itchen could also enable the licence reductions on the River Itchen to be recovered.

Overall Ranking

Using a simple scoring mechanism to evaluate each cost, carbon impact and risk at three levels, the scores from each category are multiplied to enable those with the lowest overall scores as representing the options of highest priority.

		Yield Ml/d	AISC	Carbon	Yield Risk	Delivery Risk	Total
10)	Worlds End Additional Boreholes	9.0	1	2	3	3	18
12)	Lavant & Brickkiln Addnl Boreholes	5.2	1	2	2	2	8
14)	Farlington Washwater Recovery	4.8	1	2	1	1	2
13)	Increased Licence at Eastergate Group	8.5	2	2	1	3	12
6)	Havant Thicket Winter Storage Rsvr	30.0	2	2	1	2	8
3)	Water Efficiency Programme	1.3	2	1	2	2	8
7)	Retro-fit Dual Flush Devices	0.4	2	1	2	2	8
29)	Water Butts	0.6	2	1	3	2	12
27)	Low Use Fittings in New Properties	0.4	2	1	2	3	12
31)	Colden Common Winter Storage Rsvr	40.0	2	2	2	3	12
32)	Portswood Effluent Re-use Scheme	27.0	2	3	1	3	18
4)	Leakage Saving Initiative	3.0	2	1	2	1	4
21)	Compulsory Metering	7.7	2	1	2	1	4
2)	Metering on Change of Occupancy	7.7	3	1	2	2	12
5)	Budds Farm Effluent Re-Use	20.8	3	3	1	3	27
16)	Portsmouth Harbour Desalination Plant	25.0	3	3	1	3	27
24)	Rainwater Harvesting on New Propties	24.3	3	1	3	2	18

Key	AISC p/m^3	
	High	>500
	Medium	99 - 500
	Low	0 - 99

Carbon
High
Medium
Low

Yield Risk
High
Medium
Low

Delivery Risk
High
Medium
Low

Final Solution

Customer research during 2007 to help develop the Company's 25 year Strategic Direction Statement '*Sustainable Water Supplies for the Future'*, confirmed that customers were prepared to pay up to £11 per annum more for improvements to their water supply service. The single item for which they expressed greatest willingness to pay, up to £3 per year, was to maintain a reliable and continuous supply of water.

The key feature in the final solution identified in this Draft Plan, as in previous plans, is a 'twin-track' approach of both demand management and resource development measures which over the longer-term will continue to maintain supplies whilst minimising costs to customers and the environment.

It must be recognised that the Final Solution as set out in this Draft Plan is prepared on the basis that the Environment Agency will impose proposed licence reductions no earlier than 2015 (at the end of the AMP5 period) so as to allow the Company sufficient time to implement the sustainable solutions which are necessary.

Principal Elements of the Final Planning Solution

To ensure that Portsmouth Water continues to maintain the availability of adequate and sufficient supplies to its customers, it proposes the following:

- The development of a **Farlington Washwater Recovery Plant** in the AMP5 period by 2011/12.
- Initiating a **Leakage Savings Programme** which will reduce leakage levels from the current target of 29.7 Ml/d to a new target of 26.7 Ml/d by 2014/15.
- Instigating a promotional **Water Efficiency Programme** which will include sending cistern devices to all customers starting in 2010/11. The programme will be repeated on a five-yearly basis as the devices only have a short life expectancy.
- Beginning a 25 year programme of **Compulsory Metering** for all domestic households, where practicable, beginning in 2010/11. The Company plans a targetted programme which will minimise the overall costs of meter installation.
- Developing **Additional Boreholes at Lavant and Brickkiln Water Treatment Works** within the currently licensed abstraction limits by 2014/15.
- Promoting a programme of **Retrofit Fitting of Dual Flush Devices** in toilets from 2015/16.
- Continuing the development of **Havant Thicket Winter Storage Reservoir** for completion by 2021.

The impact of implementing the final solution is represented on the graph below which confirms the availability of sufficient supplies through to 2035.