Welcome to Thames Water‘s Water Resources Forum

Friday 6 June 2014
Welcome

Richard Aylard
External Affairs and Sustainability Director
Agenda

10:00  Registration & coffee
10:30  Welcome  Richard Aylard
10:35  Update on water resource matters  Chris Lambert
11:00  Southern Water’s metering programme  Jo Fielding-Cooke
11:30  Leakage Part A: Overview of leakage management  Andrew Oakes
11:50  Breakout session 1
12:10  Leakage Part B: Future leakage programme  Tony Owens
12:30  Breakout session 2
<table>
<thead>
<tr>
<th>Time</th>
<th>Event</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:50</td>
<td>Lunch</td>
<td></td>
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<tr>
<td>13:30</td>
<td>Review of water resource options</td>
<td>Paul Chadwick</td>
</tr>
<tr>
<td>13:50</td>
<td>Breakout session 3</td>
<td>Richard Aylard</td>
</tr>
<tr>
<td>14:20</td>
<td>Open discussion</td>
<td>Richard Aylard</td>
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<tr>
<td>15:00</td>
<td>Close</td>
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Update on water resource matters

Chris Lambert
Water Policy and Strategy Manager
**Business Plan Update**

<table>
<thead>
<tr>
<th>Dec ‘13</th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
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</thead>
<tbody>
<tr>
<td>TW published draft plan (2nd)</td>
<td>Ofwat consideration of draft plans</td>
<td>Feedback from Ofwat (4th)</td>
<td>Engage with Ofwat &amp; CCG</td>
<td>Updated plan to Ofwat (28th)</td>
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</table>

**Areas of focus:**

- Wastewater activities including Thames Tideway Tunnel, sewer flooding, Water Framework Directive solutions
- Performance incentives
- Review of the impact on customer bills
Update on Water Resources Management Plan 2014

• In April we provided additional information to Defra:
  – detailed 5-year work plan 2014-2019
  – stakeholder engagement plan
  – additional information on specific schemes from an environmental and cultural heritage perspective
  – information on potential impact of the proposed HS2 route
  – consistency in information on inter-company water transfers

• Defra will review information and the Secretary of State will advise TW on his determination in due course
## 2013-2014 Annual Performance

<table>
<thead>
<tr>
<th>Measure</th>
<th>Target</th>
<th>Actual</th>
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</thead>
<tbody>
<tr>
<td>Security of Supply (SOSI) – Annual Average</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Security of Supply (SOSI) – Critical Period</td>
<td>100</td>
<td>99</td>
</tr>
<tr>
<td>Leakage (ML/d)</td>
<td>673</td>
<td>644</td>
</tr>
<tr>
<td>Meters - Optant (No.)</td>
<td>27,000</td>
<td>30,627</td>
</tr>
<tr>
<td>Meters - Progressive (No.)</td>
<td>85,660 meters over AMP5</td>
<td>4,109</td>
</tr>
<tr>
<td>Water efficiency (ML/d)</td>
<td>4.42</td>
<td>5.19</td>
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</tbody>
</table>
Current work: Water resource options

- WRMP14 gives details of a 4 phase study to determine the ‘best value’ water supply scheme to promote in WRMP19
Current work: Severn Thames Transfer - Phase 2 study to examine water quality and ecology impacts

- HR Wallingford / Cascade Consulting appointed and work commenced in May 2014
Current work: Lower Thames abstraction

Findings of the Lower Thames environmental studies are being used to review the environmental objectives of the LTCD.
Current work: Innovative tariffs

- Populus undertaking customer research – tariff types, briefing materials, awareness during trial.
Current work: Evaluation of Defra’s proposals for abstraction reform

- Submitted response to Defra’s consultation
- Member of UKWIR water resources group examining Defra’s proposals
Current work: Refinement and development of technical methods and approaches for WRMP19

- Member of EA’s Technical Advisory Group for WRMP19
- Member of WRMP19 Steering Group

- WRPG
- Demand forecasting
- Stochastic modelling
- Decision making process
- Climate change
- Benefits Assessment Guidance
- Source yields
- Leakage
- Linkage between WRMP & Drought Plan
Inside looking out

The Future

NEXT EXIT

Jo Fielding-Cooke
Southern Water
The story of our journey begins……………..
Background

The South East has been classified as water stressed
- Population growth
- Climate change

Southern Water’s UMP
- 5-year programme
- Part of 25-year Water Resource Management Plan
- Installing nearly 500,000 Automated Meter Reading (AMR) meters across our region
- Exchanging 100,000 existing meters for new AMR meters

Why metering?
- Most cost effective solution for customers
- Least environmental impact

Benefits
- Fairest way to charge
- Alarm system that detects leaks
- Meters can be read using drive-by technology
The results so far.............

- So far, we have installed nearly 350,000 meters across Sussex, Kent and Hampshire
- We have exchanged more than 60,000 existing meters
- To date, 60 per cent of households which have received a metered bill have seen a reduction averaging £12 a month
- The remaining 40 per cent of households have seen their bills increase by an average of £14 a month
- Since 2010, 36,000 customers have benefitted from a Green Doctor visit
- IncomeMAX have secured our customers over £2 million in unclaimed benefits and tax credits since 2010
Definition of Madness

Doing the same thing over and over again and expecting different results.

Albert Einstein
Working with partners
Key to success – our customers and our team
Building the team

- Major Project - Universal Metering Team is a Directorate within SW organisation
- Project team set up from Sept 2009 through to April 2010
  - Drawn from experts in the business
    - over 40 staff
  - Structured into functional teams
- Decision taken to tender Installation/Customer Engagement/Meter Supply
- SW to overarch and manage these suppliers

![Diagram with flow of communication and service teams]
Knowing what we know now, what does good and not so good look like?
Lessons learned

- If we started again what would we do differently?
  - Increase internal communications
  - Plan to plan - Don’t underestimate the complexity of moving a construction site to customers streets

- It’s going well and we will continue to carry on…..
  - Briefing key stakeholders on plans and progress
  - Have transparent customer communications
  - Work with local communities and schools
  - Customer engagement – the power of talking to people face to face and in their homes
  - Supporting a customer affordability problem
  - Building a energised team
What we know now about our customer so far........
Mrs A Evans - Starting to Settle

- Unmetered RV bill - £353.72
- Annual Metered Bill (3 month letter forecast) - £521.15
- Bill swing RV to Metered £167.43
- 6 month bill forecast £413.31
- Average daily consumption between install and switch 0.73 cubic meters
- Average daily consumption between switch and 3 month letter 0.44 cubic meters
- Average daily consumption between 3 month letter and 6 month bill 0.22 cubic meters

- Couples and young singles
- Some with children
- Newly built terraced houses
- Middle incomes
- Mid market tastes
- Receptive to advertising
- Internet is preferred channel
- Estimated bill swing: 7% increase
- Below average water consumption
Mrs S Baxter - **Comfortable in the Community**

- Large, middle-aged families
- Some single parents, older children
- Relatively low incomes
- Intransient - long term residents
- Low-mid value terraced social housing
- Difficult to cope on income
- Limited qualifications
- Manual employment
- Likely to pay via plastic card
- Average water consumption

- Unmetered RV bill - £289.72
- Annual Metered Bill (3 month letter forecast) - £255.90
- Bill swing RV to Metered £33.82
- 6 month bill forecast £294.20
- Average daily consumption between install and switch 0.28 cubic meters
- Average daily consumption between switch and 3 month letter 0.18 cubic meters
- Average daily consumption between 3 month letter and 6 month bill 0.24 cubic meters
Miss L Fleckner - Financially Stretched Families:

- Large, young families
- Many single parents, young children
- Low incomes
- Low rise council estates
- High unemployment
- Benefits claimants
- Tabloid press
- Likely to pay via plastic card
- Extremely price sensitive
- High estimated bill swing: 24% increase
- Most impacted segment

- Unmetered RV bill - £257.74
- Annual Metered Bill (3 month letter forecast) - £1018.42
- Bill swing RV to Metered £760.68
- 6 month bill forecast £752.87
- Average daily consumption between install and switch 0.69 cubic meters
- Average daily consumption between switch and 3 month letter 0.94 cubic meters
- Average daily consumption between 3 month letter and 6 month bill 0.36 cubic meters
- Targeted customer
Leak detection

The new meters we are installing have a built-in leak alarm which activates when water runs continuously through it for 4 hours.

By detecting leaks alone, water meters are expected to save the South East 7.6 million units of water a day – that’s enough water to fill 3 Olympic sized swimming pools.
Our Engagement Model
Never stop learning……
We are not the definition of madness...........

...........however, we are going MAD – we are Making A Difference with our customers.
Leakage management

Key issues to consider

6th June 2014
Geography and history
The London factor
Our performance is dominated by the capital…

- 3.69 million properties
  77% in London
- 31,100 km of water mains
  58% in London
- 50,000 repairs per year
  72% in London
- Leakage 644ML/d
  78% in London
- Distribution input 2,567 ML/d
  78% in London

78% of our leakage is in the capital
Our leakage journey

Leakage down by over 300MI/d (32%) in the last ten years
Comparison with rest of the industry

2012/13 Leakage - % of water delivered

- Anglian
- Dwr Cymru
- Northumbrian
- Severn Trent
- South West
- Southern
- Thames
- United Utilities
- Wessex
- Yorkshire

Legend:
- Thames 2029/30
- Thames 2019/20
- Thames 2012/13
Key considerations
The three types of leakage:

1. **Visible leaks**
   - 15,000 repairs per year, but only account for 2% of leakage

2. **Hidden leaks**
   - 27,000 detected and repaired per year

3. **Leaks on customers’ pipes**
   - 10,300 detected/reported and repaired per year
The impact of weather
Leakage can increase by more than 50% (350 Ml/d) in winter

- In summer night use increases apparent leakage by 60 Ml/d
- During Ramadan night use increases apparent leakage by 40 Ml/d
Mains replacement has had a positive impact
Performance vs condition

Performance is *not* necessarily the best proxy for condition…

- Manage **performance deterioration** through pressure management and operational activity
- Manage **material deterioration** through mains replacement

Deterioration over the life of a pipe

- Corrosion slowly decays pipe over time
- Leakage and customer impacts begin to occur as pipe ages
Output from the independent review jointly sponsored by Ofwat

- **Targeting Solutions**: move from DMA level to pipe level targeting with condition assessment

- **Improved Cost Benefit Analysis**: as well as reduction in leakage and bursts include impacts on customers such as interruptions to supply, low pressure and unwanted customer contacts

- **Customer Metering**: utilise advanced metering technologies to allow improved assessment of customer leakage / wastage and use prior to mains replacement

Used to shape our plans for 2015-2020
Our approach
Key elements of our approach (1)

A balanced programme of activities…

- Detection and repair – visible, active, CSL
- Pressure management
- Mains rehabilitation and replacement
- Trunk mains leakage and risk management

If we stopped leakage control, leakage would increase by 400Ml/d (c.60%) in a year
Key elements of our approach (2)

Focus across all parts of the business…

- Optimised pumping regimes
- Metering accuracy
- DMA and zonal management
- Sewer walking and seepage investigations
- Meter installation
- Winter contingency planning
How we target leakage control activity

District meter areas
It is not always as simple as replacing pipes

Investigating Woodford 65

- Bus depot assigned to wrong area
- Demolition site suspected fire main leak repaired
- Broken revenue meter exchanged
- Fire main leak
- 3 inactive supplies shut
- New build - 12 revenue meters set up and billed
- Additional private mains found
- Bulk meter installed
- Hidden leak on private land repaired
- Illegal connection
- Illegal connection
- Investigation Woodford 65
- Broken revenue meters exchanged
Private mains

Leakage is a shared problem

• Large lengths of main in private ownership…

• …but leakage is included in our figures

• We are not responsible for leak detection and repair - but customers don’t know

• We’ve changed our approach – and now offer to repair customers’ leaks for free
Private mains network
Peabody Estate in Norwood 35

Private mains = 10% of DMA
Properties = 18%
Estate recently replaced their mains
reducing water delivered by 0.3ML/d

Now working with Peabody Trust and the g15
Wastage in commercial properties
Leak at Milestone Hotel, Kensington
Wastage in large blocks of flats
New Providence Wharf

Reduction of consumption following fix

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<tr>
<th>Date</th>
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<td>14/03/2012</td>
<td>160</td>
</tr>
<tr>
<td>28/03/2012</td>
<td>180</td>
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<tr>
<td>13/03/2012</td>
<td>200</td>
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<tr>
<td>27/03/2012</td>
<td>150</td>
</tr>
<tr>
<td>10/04/2012</td>
<td>120</td>
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<tr>
<td>24/04/2012</td>
<td>90</td>
</tr>
<tr>
<td>08/05/2012</td>
<td>70</td>
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</table>

- 04W303042
- 110178195
- Average

Thames Water
A dramatically changing city

The housing has been replaced but not the pipes
….and the speed of change is accelerating

Conversions and HMOs

- Whole streets are changing very rapidly
- Many properties are being converted to flats and HMOs
- A lot go unmetered, so water use gets counted as leakage

<table>
<thead>
<tr>
<th></th>
<th>8 Manstone Road</th>
<th>9 Manstone Road</th>
<th>10 Manstone Road</th>
<th>12 Manstone Road</th>
<th>16 Manstone Road</th>
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<tbody>
<tr>
<td>Billing</td>
<td>1 unmeasured property</td>
<td>1 unmeasured property</td>
<td>1 unmeasured property</td>
<td>1 unmeasured property</td>
<td>1 unmeasured property</td>
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Next steps
Thinking ahead…

- Growing population means continued pressure on supply / demand balance, and growing pressures on the network.

- Leakage targets need to reflect customers’ priorities and willingness to pay, as well as supply / demand considerations.

- Customers want lower leakage - but less traffic disruption. Traffic management restrictions add to the challenge.

- Despite mains replacement we still have very old assets.

- Find and fix has its limits.

- Biggest step change in the short term will come from metering.
Breakout groups
Leakage
Developing our future programme
Tony Owen
Key points to cover

• Customers and stakeholders’ views
• How much do we need to do?
• What is the balance of work within our plan involve?
• SELL – what is it, and how is it calculated?
• What role will smart metering play?
• Delivering an integrated plan
The challenge – a reminder

Population increasing by approx. 1.4 m

Climate change reducing available water

Water Available for Use Vs Demand

Units (ML/d)


WAFU plus AMP5 committed schemes

132.7 ML/d
Customer and stakeholder views

- Our customers want a reliable service and lower leakage
- Most support metering – but want an affordable bill
Leakage - what do we need to do?

Two key elements to our work:

1) Prevent leakage from increasing beyond 665 Ml/d:
   - Recurrence
   - Deterioration

2) Reduce leakage from 665 Ml/d to 606 Ml/d

But managing leakage is like being on a treadmill...
Running to stand still……

Annual components of our work

- Prevent leaks recurring - ~700 MI/d
- Prevent network from deteriorating - ~6 MI/d
- Balance supply and demand - ~12 MI/d

Over the AMP:
- 3,500 MI/d
- 31 MI/d
- 59 MI/d
But at what cost?

**Annual cost of the components**

- Prevent leaks recurring = ~£50m
- Prevent network from deteriorating = £33m
- Balance supply and demand = £44m
AMP6 Demand Management Options

£m per Ml/d

- Additional ALC 10%: 0.14
- Water Efficiency following metering: 1.62
- Pressure Management: 1.69
- Metering: 5.83
- Mains Rehab: 8.46
What have we learnt – a recap

• Better understanding of customers’ views
• Know more about customer usage
• Clearer view of deterioration rates
• Delivery of complex solutions in urban areas
• Benefits of metering data networks
• Cost / benefit of solutions
• Independent mains replacement review

Used to development of our plan.....
# Reducing Leakage

## Tackling the Supply Demand Deficit

<table>
<thead>
<tr>
<th>Category</th>
<th>AMP6 Option</th>
<th>MI/d</th>
<th>Activity</th>
<th>Unit</th>
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<tbody>
<tr>
<td><strong>Raw Water Transfer</strong></td>
<td>BT ESW Chingford reduction</td>
<td>17</td>
<td>2015/16</td>
<td>Year</td>
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<td></td>
<td>BT RWE Didcot</td>
<td>17</td>
<td>2015/16</td>
<td>Year</td>
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<tr>
<td><strong>Groundwater development</strong></td>
<td>GW ELRED, Tottenham BH</td>
<td>2.4</td>
<td>2015/16</td>
<td>Year</td>
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<tr>
<td></td>
<td>GW Honor Oak &amp; Horton Kirby</td>
<td>6.5</td>
<td>2019/20</td>
<td>Year</td>
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<td><strong>Leakage Reduction</strong></td>
<td>CSL from metering</td>
<td>14.8</td>
<td>5,652</td>
<td>Units</td>
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<td></td>
<td>Mains Rehab: network &amp; CSL</td>
<td>13.3</td>
<td>405</td>
<td>km</td>
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<td></td>
<td>Pressure Management</td>
<td>20</td>
<td>162</td>
<td>DMAs</td>
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<td>Active Leakage Control</td>
<td>11.2</td>
<td>494</td>
<td>DMAs</td>
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<td><strong>Metering</strong></td>
<td>Progressive Metering Usage</td>
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<td><strong>Water Efficiency</strong></td>
<td>Water Efficiency household</td>
<td>11.9</td>
<td>604,203</td>
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<tr>
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<td>Water efficiency commercial</td>
<td>0.9</td>
<td>8,298</td>
<td>Comms</td>
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<td></td>
<td>Commercial reduction from competition &amp; TW Buildings</td>
<td>5.7</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tariffs</strong></td>
<td>Tariff trial and behaviour change</td>
<td>5</td>
<td>6,000</td>
<td>Trial customers</td>
</tr>
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</table>

59.3 or 12 MI/d per year
## WRMP leakage strategy

**Leakage targets for next 15 years**

<table>
<thead>
<tr>
<th>MI/d</th>
<th>2015-20</th>
<th>2020-25</th>
<th>2025-30</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progressive metering – customer-side leakage</td>
<td>14.8</td>
<td>18.2</td>
<td>1.4</td>
</tr>
<tr>
<td>Mains replacement &amp; CSL</td>
<td>13.3</td>
<td>4.4</td>
<td>-</td>
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<tr>
<td>Pressure management</td>
<td>20.0</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Enhanced find and fix</td>
<td>11.2</td>
<td>1.9</td>
<td>-</td>
</tr>
<tr>
<td>Post-metering find and fix</td>
<td>-</td>
<td>12.9</td>
<td>12.9</td>
</tr>
<tr>
<td><strong>Total reduction</strong></td>
<td><strong>59.3</strong></td>
<td><strong>35.4</strong></td>
<td><strong>14.3</strong></td>
</tr>
<tr>
<td>End of period target</td>
<td>605.7</td>
<td>570.3</td>
<td>556.0</td>
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</table>
Sustainable Economic Level of Leakage

What is it – and how is it calculated?

- Water Resources Management planning (WRPG):
  “A preferred solution will have to be decided on the basis of it being the best value for water company customers and the environment.”

In practice, it is the point at which it becomes more costly* to find the water you need by reducing leakage than by other means.

SO HOW DO WE BALANCE THIS?....

*Taking into account economic, environmental and social costs
Balancing Demand: Integrated Demand Management

Usage Reduction

Leakage Reduction
Optimal view achieves 59ML/d. ....
Why don’t we reduce leakage further?

Further reductions wouldn’t represent value for money for customers – at the moment…….

But Smart Metering can change that…….
Smart metering

Potentially the biggest step-change since DMAs

- Identifying customer-side leaks and usage
- Targeting distribution main leaks
- Faster response times
- Better data for our customers
- c900,000 in AMP6
Delivering the plan

• Our plan involves the integrated delivery of multiple solutions:
  • Customer meters, pressure management, mains replacement, CSLs, lead pipe replacement….

• It will require access to –
  • The customer’s garden and their property
  • Many urban streets to install meters / replace mains

Communication with customers and stakeholders will be critical to successfully deliver the Economic Level of Leakage.
Breakout groups
Lunch
Development of large scale water resource options for London

Thames Water: Water Resources Forum – 6 June 2014
1. Background

2. Objectives

3. Approach
   a) Phase 1 overview
   b) Review of options
   c) Options appraisal

4. Timescales for engagement

5. Getting your views
### Four-phase work programme:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Objective</th>
<th>Timescale</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>To help reduce the number of options and target Phase 2 studies by examining uncertainties</td>
<td>April 2015</td>
</tr>
<tr>
<td>2</td>
<td>To undertake detailed studies to reduce uncertainties and focus on leading options</td>
<td>Aug 2016</td>
</tr>
<tr>
<td>3</td>
<td>To update information on options for WRMP19</td>
<td>Aug 2017</td>
</tr>
<tr>
<td>4</td>
<td>To progress outline design and planning for preferred option</td>
<td>Post approval of WRMP19</td>
</tr>
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</table>
Approach – Phase 1 Overview

- Review WRMP14 options appraisal process
- Review constrained options & identify strategic options
- Develop & test uncertainty/option appraisal process
- Apply revised option appraisal process
- High-level comparison of strategic options & shortlist
- Phase 1 Reporting

Discussion Questions:
- How do we ensure effective engagement throughout this work?
- Are there other stakeholders who you think should be involved in the forum?
Approach – Review of options

- Critical review of the options
- Identification of new options
- Focus on large resource options (50 ML/d+)

Discussion Questions:
- Do you have any comments on the options considered in WRMP14?
- Are there other options that we should consider?
Discussion Questions:
- Views on the WRMP14 options appraisal process & what would you do differently?
- Views on proposed approach to investigating uncertainty?
Approach – Options appraisal
Including non-monetised aspects

- WRMP14: quantitative and qualitative environmental and social assessment
- Options for refining approach
  - Apply existing approach with consideration of uncertainties
  - Adopt a multi-criterion analysis (MCA) approach
  - Adopt a simplified MCA analysis
  - Adopt an ecosystem services approach

Discussion Question:
- Views on options appraisal approach for incorporating non-monetised dimensions?
# Timescales for engagement

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WRF 6 June</td>
<td>Introduction to Phase 1 including the approach, methodologies, milestones and engagement</td>
</tr>
</tbody>
</table>
| Stakeholder Technical meeting early September (tbc) | Presentation and discussion on work completed on:  
  a) review of the options appraisal process  
  b) review and update of the options  
  c) assessment and presentation of uncertainty |
| WRF September (tbc) | Update on the work completed to review the approach, options and uncertainty assessment, including initial results |
| Stakeholder Technical meeting December (tbc) | Results of the comparison of the water resource options to enable shortlisting of options |
| WRF January 2015   | Update on the comparison of water resource options and the recommended shortlist |
Breakout groups
Open discussion
Open floor: Are there any issues you would like to raise?

What topics you would like us to cover in future Forums?

Do you have any feedback on how you would like to work with us as we progress our work programme?

Date of the next forum is 26 September 2014