# Water Supply Project-Eastern & Midland Region

## Response to the December 2016 Submission from Emma Kennedy

# CONTENTS



## LIST OF TABLES

# LIST OF FIGURES



# APPENDICES

# 1 BACKGROUND AND CONTEXT

The Water Supply Project – Eastern and Midlands Region (WSP) represents the first major investment in water supply infrastructure for the Greater Dublin Water Supply Area (GDWSA) in over 60 years. The purpose of the project is to address the supply demand balance deficit in the region, and has been in development since the mid-1990s, originally under Dublin City Council as project sponsor on behalf of the then named Department of Environment Heritage and Local Government (DEHLG), and subsequently under Irish Water management since January 2014.

An overview of the project and the four consultations undertaken as part of this planning phase is provided in Appendix A. Irish Water has continually sought to consult with the public and engage with stakeholders at each stage of the project as outlined in the Project Consultation Roadmap (Appendix A). The Project Roadmap was itself subject to public consultation during the first public consultation on the February 2015 Project Need Report which commenced in March 2015.

From the outset of this project, Irish Water has committed to continuously reviewing and updating sustainable water availability from existing sources and demand forecasting for the Eastern & Midlands Region as the project evolves. In particular, Irish Water has committed to updating the February 2015 Project Need Report (2015 PNR) prior to lodging a planning application to An Bord Pleanála (anticipated in Q1, 2018). This updated PNR, anticipated Q4 2017, will enable comprehensive consideration of the following 'demand related' issues, many of which are still 'works-in-progress' as of Q1, 2017:

- Publication of Census 2016 results and analysis (anticipated June 2017)
- National Planning Framework considerations (currently out for public consultation)
- National Water Resource Planning, completion of strategic resource model for the GDA and supply demand assessment for the Midlands Region (benefitting corridor)
- Continuous improvement in knowledge of per capita consumption and associated leakage (based on up to 2 years continuous data from over 890,000 installed domestic meters)
- Impacts of on-going and planned network replacement programmes on leakage levels
- Changing economic environment resulting from domestic economic recovery and external global impacts incl. the changing international political environment
- Anticipated Climate Change considerations on 'safe yield' or 'sustainable yield' of existing sources and on forecast demand growth scenarios
- Potential impacts on sustainable yield of existing sources associated with Water Framework Directive (WFD), River Basin Management Plans (RBMP) and Catchment Flood Risk Assessment & Management (CFRAM) etc.

The updated 2017 PNR will also incorporate feedback from all four public consultations which were undertaken during the 'planning preparation' phase of the WSP project (2014-2016/2017), including the issues raised in your (23 Dec 2016) submission, issues raised at our meeting on 16th Feb 2017 and related correspondence over the past number of months.

This particular document is focussed on providing an overview of the 'best-international-practice' methodology used by Irish Water in its review of supply-demand balances in the Greater Dublin Water Supply Area (GDWSA), thereby providing the appropriate backdrop and framework for responding to the principal concerns raised by you on an issue-by-issue basis.

The issues raised by you and our responses (as of Q1, 2017, and pending the publication of 2017 PNR) are set out in Table 1.

**Table 1 Issues Raised & Response Index**

| **E. Kennedy Submission Ref & Section Title** | | **Irish Water Response (Q1, 2017)** |
|---|---|---|
| B - 1 | "*Dublin Leakage rates and the implications of the new First Fix Scheme"* | Irish Water has always intended on updating the 2015 Project Need Report (PNR) before submitting our application for planning permission. This will include new data, that wasn't available in 2015, from a number of sources including the First Fix Scheme. Water conservation plays its part in all sustainable water networks; however it is not a golden arrow solution for meeting increased demand. Furthermore, it is considered highly unlikely that these water conservation activities would adequately supply enough water to meet estimated future demand.<br><br>This is responded to in more detail in Section 4.6 of this document. |
| B- 2 | *"History of this 20-year project: in 2006 and 2010 DCC produced projections of the future water demand which are now known to have been significantly overstated, and yet the methodology underlying the fresh PNR projections is even more aggressive than the methodologies used in the 2006 and the 2010 Report."* | Irish Water do not accept this observation. The 2015 PNR report's methodology, was based on established methods developed by the UK water industry and are considered best practice for 'need' based assessments. The background data sets used to underpin the assessments were from recognised and authoritative sources. This is responded to in Section 4 of this document. |

| E. Kennedy Submission Ref & Section Title | | Irish Water Response (Q1, 2017) |
|---|---|---|
| B- 3 | *"The PNR understated the water treatment capacity of Dublin's Water Treatment Plants"* | Irish Water do not accept this observation. The 2015 PNR report's methodology was based on established methods developed by the UK water industry and are considered best practice for 'need' based assessments.<br><br>Please refer to Table 2 which provides a breakdown of the current Water Available for Use (WAFU) at each Water Treatment Plant, along with the Projected WAFU once the capital projects underway are completed. |
| B- 3a | *"The water treatment capacity of Dublin's water treatment plants has increased significantly since the 2010 report and the 2013 crises."* | |
| B- 3b | *"The PNR understated Dublin's water treatment capacity and blurred the distinction between sustainable and peak water treatment capacity."* | |
| B- 3c | *"The PNR blurred the distinction between the, on the one hand, water treatment capacity and, on the other hand the ability to deploy treated water around the supply system."* | |
| B- 3d | *"Limitations at Poulaphuca due to the ESB abstraction permission"* | The limiting factor at Poulaphuca is the hydrological yield or safe environmentally sustainable yield of the source. Please refer to Table 2 which provides a breakdown of the WAFU at each of the Water Treatment Plants, along with the Projected WAFU once the capital projects underway are completed. |
| B-4 | *"PNR disregarded the views of Indecon and instead adopted a method that Indecon had explicitly discredited"* | Irish Water do not accept this observation. The two methods used in the 2015 PNR to project Non Domestic Demand have always been presented as independent, and there is not an 'accidental' adopting of one over the other. There is a recognition that both define a range of potential outcomes. This will be reviewed as part of the update to the Project Need Report (anticipated in Q4, 2017). |
| B-5 | *"100Mld included as demand requirement in the PNR as a strategic industrial allowance."* | The Strategic industrial allowance is set to ensure that Irish Water has the capability to support the Country's Economic growth and we do not believe that limiting this from the current proposed estimate would fulfil our obligations, and could lead to the water supply restricting economic |

| E. Kennedy Submission Ref & Section Title | | Irish Water Response (Q1, 2017) |
|---|---|---|
| | | growth and job creation.<br><br>This is responded to in detail in Section 4.4 of this document |
| B-6 | *"The peaking factor and its relationship with the projected raw water requirements."* | It should be noted that the raw water storage at Poulaphuca and Vartry has been accounted for in the sustainable yield calculations and is not available for peak management in the manner suggested. This is responded to further in Section 3 and Section 4.1 |
| B-7 | *"IW misled the media, the Dail and the public about Dublin's future water need"* | Irish Water do not accept this observation. The technical reports produced for the WSP have been subject to a full quality assurance process.<br><br>The projected requirement at 2050 (893 Ml/d) inclusive of ambitious UFW targets is approximately 50% over the current WAFU. Some of this requirement will be met by the current capital programme works as detailed in Table 1. |
| B-8 | The benefit corridor | This is responded to in Section 7.2 |
| B-9 | Groundwater | This is responded to in Section 7.1 |
| B- 10 | Population Growth predictions: the danger of an "all or nothing" project like the Shannon pipeline | Irish Water do not accept this observation and is confident in the figures used for population growth, which have followed an internationally recognised best-practice methodology based on the best available census data.<br><br>The Preliminary 2016 census results reveal that the population predictions used, have already been exceeded – particularly in Dublin. As previously advised, it is Irish Waters' stated intention to review the demographic projections when the results of Census 2016 are to hand – these will be presented in the Q4, 2017 PNR.<br><br>This is responded to in more detail in |

| E. Kennedy Submission Ref & Section Title | | Irish Water Response (Q1, 2017) |
|---|---|---|
| | | Section 4.5 |
| C-1 | *"IW publications have repeatedly cited data which was known to be incorrect"* | Irish Water do not accept this observation. Irish Water stands behind the internationally recognised methodology, its base evidence, technical reports and consultation documents.<br><br>Reports have consistently used the best available data at the time of writing and all reports have been subject to a full quality assurance process. |
| C-2 | *"The soundbites, summaries and summary reports that IW has produced in the course of this project have repeatedly failed to accurately reflect the analysis/ findings of the underlying studies / reports"* | Irish Water do not accept this observation. It is always necessary to provide information in a way that it can be understood by the general public and used by media outlets. Irish Water has endeavoured to ensure that the technical reports produced for this project have been fairly and accurately summarised or simplified for all communications, engagement and consultation activity. |
| C-3 | *"Alternatives in Combination"* | This is responded to in Section 6 and will be further addressed in the Q4, 2017 PNR. |
| C-4 | *"Projection of Dublin future Water deficit / supply "* | Methodology used by Irish Water is in line with best international practice and is clearly set out in Section 6. |

## 1.1 KEY TERMS USED IN THIS DOCUMENT

For the purposes of clarity, some of the key terms and methodologies used in this document are defined below.

**Water Resource Zone (WRZ)** Irish Water must plan for water resources on a national basis to ensure that we can source, treat and distribute sufficient water to satisfy the needs of our domestic and non-domestic users. In order to achieve this, we split the country into spatial zones, known as Water Resource Zones (WRZs) and compare the available supplies of water against demand for water. A

water resource zone is the largest possible zone in which all resources can be shared. A water resource zone is formed by grouping a number of water supply zones.

**Cost Benefit Analysis (CBA)** Cost-Benefit Analysis (CBA) is an economic appraisal tool for the comparison of costs and benefits associated with alternative approaches. CBA provides a useful basis for decision-making and assists in the systematic appraisal and management of capital and current projects.

### 1.1.1 Supply Side Terminology

**Hydrological Yield** An assessment of the amount of raw water available at a site, based on hydrological records, for a chosen probability or return period of failure.

**Outage allowance** is a percentage reduction allowed for all of the assets such as intake, treatment, and distribution not being fully operational at any given time (e.g. a burst on a trunk main).

**Process losses** are the amounts of water used up as part of the treatment process. This varies across treatment types, and whether process water is recirculated.

**Water Available for Use (WAFU)** is the value in Ml/d (million litres per day) of the water available for supply, composed of the deployable output minus the outage allowance, where the **deployable output** is the maximum output of a source or group of sources, as constrained by licences, hydrological yield (environmental conditions), raw water mains, treatment capacity, transfer constraints or water quality.

### 1.1.2 Demand Side Terminology

**Normal Year Annual Average** – the average daily amount of water used in a year with fairly normal weather conditions.
**Dry Year annual averages** – the average daily amount of water used in a year where there have been extended dry periods.
**Critical Periods** – these are peaks in water demand, usually, during drought or winter freeze periods.

**Peaking Factor** is a buffering allowance applied to demand projections to reflect the fact that demand for water varies throughout the year with seasonal peaks occurring (e.g. increased water usage in summer associated with warm dry weather or in winter resulting from increased leakage or usage as a result of frost action).

**Unaccounted for Water (UFW)** Real and apparent losses within the distribution system, calculated as the difference between Total Distribution Input (DI) and the total Accounted for Water (AFW).

Apparent losses include data errors, customer metering inaccuracies unauthorised consumption and real losses include leakage on transmission and distribution mains, leakage and overflow at network storage tanks and leakage on service connections up to the point of the customer meter.

**Accounted for Water (AFW)** The daily volume of water passed into supply that can be accounted for as legitimate use by authorised parties. This includes Domestic and Non-Domestic Demands (both metered and unmetered), Household Losses, and Operational Use.

**Sustainable Economic Levels of Leakage (SELL),** a methodology that balances the cost of reducing demand through leakage reduction against the social and economic costs associated with supply restrictions.

**Operational usage** covers water used in the operation and maintenance of the distribution system (e.g. scouring of mains and reservoirs). It also includes fire-fighting and street cleaning etc.

### 1.1.3 Supply Demand Terminology

**Available headroom** is the difference between water available for use and demand at a given point in time.

**Target Headroom** is a buffer to cater for uncertainties in the overall supply-demand balance (excluding operational outages). Such uncertainties include impact of climate change (on demand and on raw water source yields), impact of expansion in demand by very large water users, and uncertainty surrounding accuracy of assumptions for output levels from new sources.

**Unconstrained Options** is a complete list of options to address supply demand balance deficit, without consideration of sustainability, environmental issues, cost or practicality.

**Constrained Options** is a reduced list of options to address supply demand balance deficit, constrained by issues relating to environment, sustainability and practicality.

**Final Options** A further reduced list of options to address deficit, assessed using multi criteria analysis including cost, resilience and security of supply.

# 2 WATER RESOURCE PLANNING AND THE GREATER DUBLIN WATER SUPPLY AREA

Irish Water must plan for water resources on a national basis to ensure that we can source, treat and distribute sufficient water to satisfy the needs of our domestic and non-domestic users. In order to achieve this, we split the country into spatial zones, known as Water Resource Zones (WRZs) and compare the available supplies of water against demand for water.

In accordance with internationally accepted methodologies, supply/ demand balance review for a WRZ involves calculating the **maximum** sustainable amount of water available from our water resources (known as WAFU) and then comparing this with the demand requirements as outlined in Figure 1.

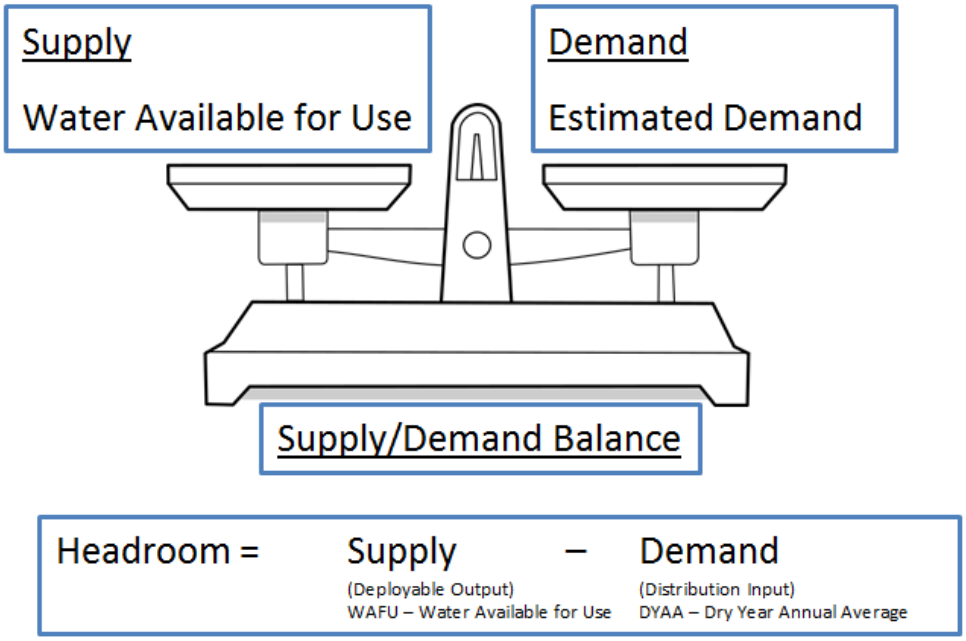



**Figure 1 Supply Demand Balance**

The Greater Dublin Water Supply Area (GDWSA) is the WRZ that includes County Dublin including Dublin City, along with significant sections of population in counties Kildare, Meath and Wicklow. In the context of the GDWSA, supply demand balance assessments have been on-going for many years. The GDWSA Water Resource Zone is a significant growth engine for the entire country, and has a relatively large number of major non-domestic water users, particularly in North East Kildare.

# 3 WATER AVAILABILITY - SUPPLY

The available supply of water is the **maximum** amount of **Water Available For Use (WAFU)** from a given source or group of sources (rivers, lakes, groundwater sources), based on some limiting factor(s), and taking account of process losses and outage allowances.

**Limiting factors** can relate to:

- Hydrological yield - the maximum sustainable amount that can be abstracted from a source based on an agreed level of service (probability of failure);
- Licenced quantities - the maximum amount we are licenced to take from a source;
- Intake and treatment capacity - the amount of water that can be taken into or treated in our facilities; or
- Distribution Capacity - the maximum amount of water we can distribute from a water treatment plant into the supply network.

The ultimate limiting factor for a given source is usually the hydrological yield (also referred to as the 'safe yield' or 'sustainable yield') or the licenced abstraction amount, as capital works can normally be used to address the other limiting factors, whilst these factors are limited by natural environmental or legal constraints.

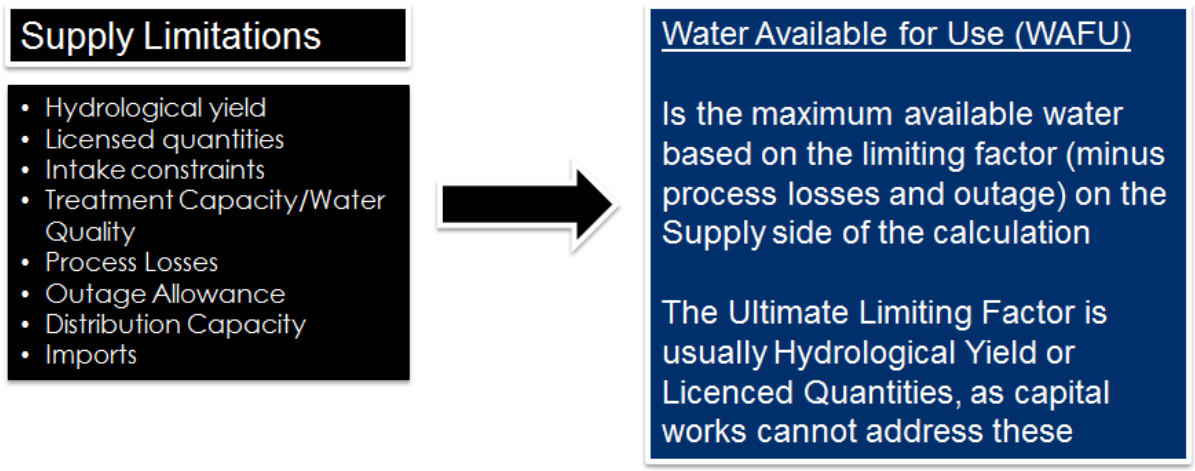



**Figure 2 Supply Side Components**

## 3.1 HYDROLOGICAL YIELD

For a typical 'unrestricted' river, the sustainable yield is usually based on a percentage of the dry weather flow in the river. Raw water storage and impoundments along rivers, increase the average daily amount of water that can be abstracted sustainably over an annual period. The sustainable yield is limited by the annual rainfall or groundwater ingress into the impoundment catchment over the

course of the year which varies from year to year. For each impoundment site, a target operating curve is developed. This profiles the optimal use of the storage to ensure that the maximum sustainable yield for the site can be provided over the entire year in all weather conditions with an acceptable frequency of drought occurrence, whilst ensuring that the appropriate flood attenuation provisions and compensation flows have been allowed for in the river. If the impoundment is operated according to this curve, the sustainable yield can be achieved on a daily basis.

If additional water over and above the sustainable yield is abstracted, the risk of rationing and outages increases later in the year, as the levels of stored water fall below the target operational curve. Therefore, when Water Available for Use has been has been calculated for a source where hydrological yield is the limiting factor, the WAFU is based on the maximum ultimate amount that can be abstracted, and peaking cannot be applied above this amount.

Figure 3 is an example of a target operating curve for an impounding reservoir site. The graph shows a reservoir where the top water level gives a storage capacity of 2400 megalitres. As can be seen from the graph, if the TWL drops to even 1500 megalitres of storage in February or March, the source is considered to be in “Drought Warning”. If the level falls to 1000 megalitres, there will be impacts on supply. Some target operating curves graph convert volume stored, into days storage, for ease of comparison of impoundments with different capacity and varying abstractions. However, it is incorrect to say that a site with a TWL or Days storage of 200 days, means that water can be abstracted for 200 days continually with no inflow. Instead, if the site is operated with a target operating curve between 100-200 days over the course of the year, the maximum sustainable hydrological yield of the site can be maintained over the course of the entire year for a given probability of failure (say 1 in 50 years).

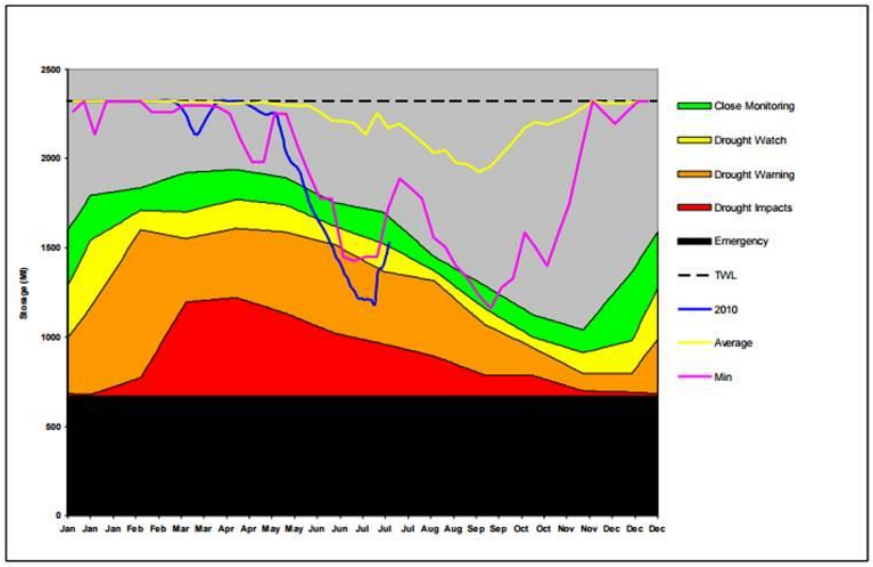



**Figure 3 Sample Target Operating Curve**

## 3.2 SUPPLY IN THE GDWSA

The GDWSA is served by eight individual water supplies / sources. However, over 80% of the entire water supply for the GDWSA is sourced from the River Liffey Catchment (Ballymore Eustace and Leixlip Water Treatment Plants), and a further 11% is sourced from the River Vartry Catchment.

In Table 2 the limiting factors for each of the water supplies / sources in the GDWSA are presented and the present and future maximum WAFU(s) have been assigned on this basis. As can be seen, at the Ballymore Eustace Plant, the hydrological yield is the limiting factor. While at Leixlip and Srowland, the current limiting factor relates to insufficient distribution capacity (pipelines / pumps etc.) leaving the Water Treatment Plant. At Vartry WTP, the current limiting factor is Water Treatment Capacity. Current limitations in supply mean that the WAFU in the GDWSA at present (2017) is 598 Ml/d, as shown in Table 2.

Under Irish Water's Capital Investment Plan 2017-2021, projects are being progressed to address all of the limiting factors relating to treatment and distribution capacity in the GDWSA. This investment will ensure we can achieve the maximum Water Available for Use from all of our existing sites by 2023. Once these works are completed, the ultimate limiting factor, hydrological yield, will maximise the WAFU in the region at approximately 661 Ml/d.

| Plant Name | Hydrological Yield/Licensed Absrtraction | Treatment Capacity 24 hr | Distribution Capacity | Maximum Present Deployable Output | Current Limiting Factor | Can Capital Works address limiting factor? | Capital Works Requirement | Ultimate Limiting Factor | Maximum Potential Deployable Output | Comment |
|---|---|---|---|---|---|---|---|---|---|---|
| Ballymore Eustace | 318 | 400 | 312 | 312 | A | No | Poulaphuca Reservoir is currently yielding its maximum sustainable output, based on 2005 Liffey Model | A | 312 | 6 Ml/d wastewater during process. Output based on 1 in 50 year failure probability and minimum required compensation flow to river Liffey |
| Leixlip | 215 | 258 | 175 | 175 | C | Yes | New trunk distribution mains are required to allow water supply areas to accept water from Leixlip. Being Progressed as part of CIP 2017-2022 | A | 215 | abstraction allowed to go to 225 over short period in the event of an emergency. However, as this is above the sustainable yield of the site, this water may not be available during the periods required. |
| Vartry | 75 | 70 | 75 | 70 | B | Yes | New Plant Upgrade being progressed as part of CIP 2017-2022) . 24 Hour treatment capacity will be 96Ml/d to allow for continuous plant output of 75 Ml/d on completion. | A | 75 | Based on 1 in 50 failure of source and minimum required environmental compensation flows for river Vartry |
| Ballyboden | 13.5 | 13.5 | 13.5 | 13.5 | A | No | Planned upgrades to address water quality, but WAFU limited by sustainable yield Bohernabreena Reservoir | A | 13.5 | Based on 1 in 50 failure of source and minimum required environmental compensation flows for river Dodder |
| Srowland | 38 | 48 | 20 | 20 | C | Yes | Network limitations at present cap output to 20ml/d. New pump station and rising main being progressed CIP 2017-2022. | A | 38 | Based on 1 in 50 failure of source and minimum required environmental compensation flows for river Barrow |
| Bog of the Ring | 2.5 | 5 | 3 | 3 | A | No | No. WAFU is limited based on at risk status of Groundwater Body. | A | 2.5 | Ground water source currently classified as "At Risk" under WFD due to abstraction |
| Rathangen Wellfield | 3 | 3 | 1 | 3 | A | No | Wellfields feed River Barrow, therefore increased abstract has knock on effect on Barrow Abstraction. | A | 3 | Pathways Connectivity between Kildare Wellfields and River Barrow. This has already been highlighted during application for River Barrow abstraction at Srowland |
| Monasterevin Wellfield | 2 | 2 | 1 | 2 | C | Yes | Currently supplied by BME and Srowland. As these supplies are used elsewhere the wellfields will be fully mobilised. | A | 2 | |
| Total | 667 | 799.5 | 600.5 | 598.5 | | | Ultimate Deployable Output | A | 661 | |

**Table 2 - Present WAFU from Existing GDA Sources**

It should be noted that the sustainable yield at Poulaphuca and Vartry is based on a target operating curve relating to the entire raw water storage available.

# 4 DEMAND ESTIMATES IN THE GDA

Estimated Demand is the amount of water Irish Water needs to deploy into a water resource zone in order to satisfy customer needs at the tap. Demand is not static and constantly changes over time, depending on seasonal issues such as droughts and other critical periods (e.g. frost action), peak demands and growth over a period of time. When estimating the demand, Irish Water must consider demand scenarios including peaking requirements and also short, medium and long term domestic and non-domestic growth (see Figure 4). Leakage reduction and water conservation which offset the increases in estimated demand over time must also be considered under this heading.

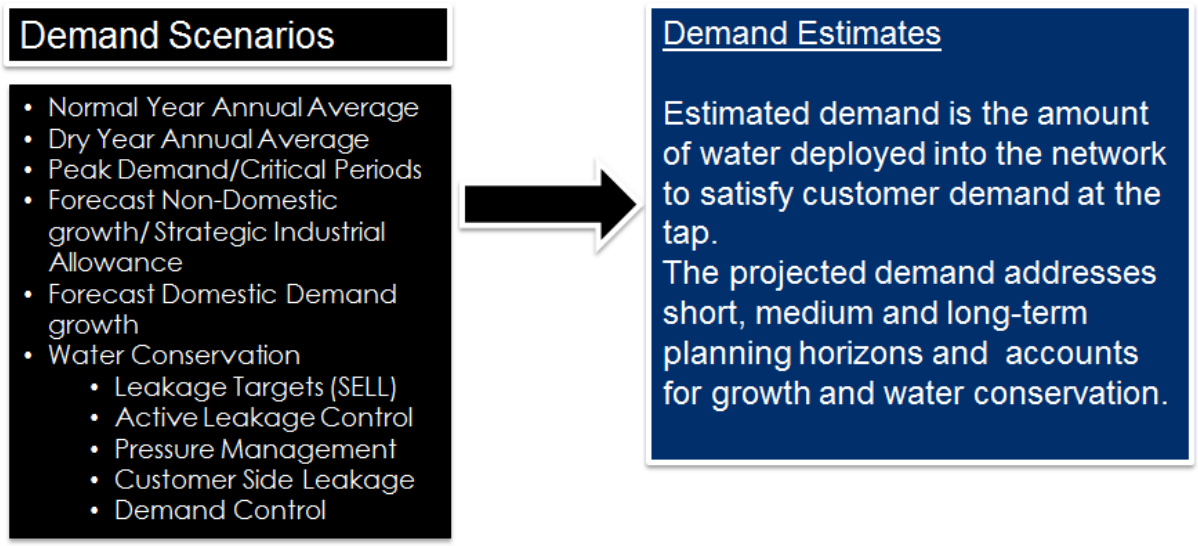



**Figure 4 Demand Side Components**

As a general response to some of the issues raised in your submission, Irish Water wish to state that all demand calculations in consultation documentation published to date, have been undertaken in line with international best practice in water resource planning.

## 4.1 DEMAND SCENARIOS AND PEAKING FACTORS

In estimating demand, Irish Water consider a number of baseline demand scenarios. These include:

- Normal Year Annual Average – the average daily amount of water used in a year with fairly normal weather conditions;
- Dry Year Annual Averages – the average daily amount of water used in a year where there have been extended dry periods;
- Critical Periods – these are peaks in water demand, usually, during drought or winter freeze periods

To cater for the Dry Year Annual Average and Critical Periods, a peaking factor is applied to a Normal Year Annual Average of Accounted for Water.

In the GDWSA, the most recent critical periods occurred during winter freeze periods in 2009/2010 and 2010 to 2011, where average daily demand jumped from 530 Ml/d to 620 ml/d before the water supply failed. The freeze periods lasted for up to 30 days and caused extensive water outages across the supply area. The 2010/2011 critical period represents a peak of 26% on Accounted for Water (AFW), whilst, in 2016, a fairly Normal Year in terms of weather conditions, the maximum demand in the supply area was measured at 574 Ml/d. This would represent a peaking factor of 8% on AFW.

Therefore, the allowed peaking factor in the PNR of 15% on AFW[1] is considered appropriate based on patterns over the past 10 years in the GDWSA. In 2016, the average demand was measured to be greater than 560 Ml/d for 33 days, and was greater than 550Ml/d for 148 days. The lengthy duration of periods where demand is above annual average figures, emphasises the need to apply a prudent peaking factor in demand calculations.

## 4.2 DEMAND GROWTH

It must be noted that growth factors are applied to Accounted for Water only. In terms of domestic and non-domestic forecast growth increases for the WSP, an annual growth factor up to 2050 of just 0.9% has been allowed for in the PNR of February 2015 (compared to 1.33% actual measured recorded growth in the 40 year period to 2011).

The annual average total production figures in the region, are as shown in Table 3. As can be seen, there has been a year on year increase in demand since 2014, even with the benefit of significant customer side leakage savings discussed below.

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 (to date) |
|---|---|---|---|---|---|---|
| Min | 327.01 | 461.13 | 474.52 | 511.94 | 511.25 | 543.43 |
| Max | 555.51 | 575.48 | 564.85 | 570.81 | 574.12 | 573.66 |
| Average | 527.40 | 537.73 | 535.80 | 539.87 | 547.17 | 557.84 |
| Increase | 0.00 | 10.33 | -1.93 | 4.08 | 7.30 | 10.68 |
| Cumulative Increase | 0.00 | 10.33 | 8.39 | 12.47 | 19.77 | 30.44 |

**Table 3 – Annual Average Total Production figures GDWSA**

## 4.3 NON DOMESTIC DEMAND

In the February 2015 PNR, the two methods (Population Growth Based / Econometric Modelling) were used to project Non Domestic Demand. These methodologies are independent and define a range of

[1] Peaking factors are only applied to accounted for water and is not applied to UFW

potential outcomes. This will be reviewed in greater detail as part of the update to the Project Need Report (anticipated in Q4 2017).

## 4.4 STRATEGIC INDUSTRIAL ALLOWANCE

Based on analysis of feedback from industrial and commercial interests combined with economic forecasting data, the February 2015 PNR allowed for a strategic industrial allowance of 100 Ml/d for the period up to 2041. This level of allowance is prudent and appropriate considering Irish Water's statutory requirement to ensure that it has the capability to support approved planned growth (wherever it occurs) under the Water Services (No 2) Act 2013.

In 2016, Irish Water received enquiries from five major non-domestic users for an additional 25Ml/d of water by 2021. This alone represents over 50% of the forecast organic growth provisions at 2041, thus reinforcing the requirement for this strategic provision.

The project phasing has accounted for modular growth in this strategic industrial allowance, which can be catered for over the entire length of the benefitting corridor associated with the project. The basis for this allowance is detailed within the February 2015 Project Need Report and will be reviewed as part of the update to the 2017 Project Need Report.

## 4.5 DOMESTIC GROWTH - POPULATION GROWTH PREDICTIONS

The demographic projections, contained in the February 2015 PNR, were prepared by AOS Planning, who were advised by Dr Brian Hughes, a member of the governments' expert group on demography. The projections taken at a point in time, are based on guided assessment and use of the available data sources. The Preliminary 2016 census results to date show that the population predictions used as part of the PNR, have already been exceeded – particularly in Dublin. Irish Water has committed to review the demographic projections when the comprehensive results of Census 2016 are available and to include them in the 2017 Project Need Report.

## 4.6 WATER CONSERVATION

Water Conservation measures such as reducing Unaccounted for Water (UFW) and Customer Side Leakage (CSL) are considered as part of the WSP demand calculations as this can help to counter balance domestic and non-domestic forecast demand growth levels. Irish Water is actively setting ambitious performance targets for itself in relation to Sustainable Economic Levels of Leakage (SELL). The on-going progress and latest information available will be considered in the 2017 Project Need Report. All demand projections published to date have taken account of anticipated water savings from network leakage reductions and household leakage reductions.

The ambitious leakage reduction targets for the GDWSA involve target 'network-based' water savings of 64 Ml/d by 2041, with 39Ml/d of these to be achieved by the early 2020's. Water savings of 64 Ml/d by 2041, will represent a reduction in UFW from current levels of 38% to approximately 20% of the total supply. These targets for the GDWSA are in line with those set for the majority of the water utilities in the United Kingdom, which have similar distribution networks to Ireland. For the past 25 years UK water companies have been targeting a 20% leakage rate and are only now beginning to see leakage rates in the low to mid 20%.

To meet these targets the following water conservation initiatives are currently being undertaken by Irish Water, with progress between 2014 and 2016 summarised as follows:

The **District Metering Programme** surveyed 4,407 District Metered Areas (DMA's) in 2014, and identified 50% which were not adequately defined. Irish Water set a 90% operability target and replaced thousands of broken assets. We are now at 77% operability and rising. (Note, some DMA's will be inoperable as works continue to be completed on the networks, and as quality tests are being carried out etc. A standard of 90% is best practice in the UK, recognising that operational activities continue on a regular basis.)

**Leakage Data** has improved significantly. We have standardised how leakage is calculated across the country and harnessed utility systems and domestic data to increase our accuracy. In order to accurately calculate leakage levels across the country, readings from over 4,407 DMAs need to be gathered and matched against domestic and non-domestic metered data. Each Local Authority has been submitting the majority of this information through manual reporting, which is not a sustainable way to manage leakage statistics. Irish Water has procured a national leakage management system, which will enable the automatic generation of daily water audit reports across the country so we can further increase efficiency in leakage targeting, saving money and resources. The system will be in operation by end 2017.

Our **Find and Fix Programme** to date has supplied us with the majority of our leakage reduction and will continue to do so. In this effort, we use the leakage data, obtained from both district and customer meters to send specialist leakage teams out to find and fix leaks in the worst affected areas. This dedicated leakage reduction programme will ensure we are swiftly and systematically targeting, locating and reducing network leakage. We are working with local authorities to mobilise the required resources to deliver this.

Our National **Pressure Management Programme** focuses on reducing excessive water pressure to a level that eases stress on pipelines, reduces bursts and reduces levels of leakage. In some cases, pressure on the networks is currently too low. This will also be addressed by pressure management, to ensure that all customers on the network receive sufficient pressure and water supply for their needs. Vitally, this work also extends the life of the network and our water treatment plants.

Our National **Pipeline Replacement Programme** is about finding the worst pipes on our networks and replacing them. Problems include high numbers of bursts, high leakage, poor pressure and drinking water quality risks ( like the presence of lead or a build-up of encrustation that makes it harder for us to ensure the water is clean and safe when it reaches our customers). A huge amount of work has been done already by Irish Water in this space: between 2000 and 2010, for example, the annual replacement rate for pipelines was 86 km per annum. Irish Water have replaced 840km in the last 3 years and another 1000km is approved (nationally) for the coming years.

Since 2015 Irish Water has been actively pursuing a programme of CSL reduction through **the First Fix Free Scheme**. The savings from this scheme are verified at the domestic water meter. *However, the significant measured savings achieved at the domestic meter, since commencement of the scheme, are not appearing as diminished production requirements at the WTPs in the Dublin area.*

There are a number of reasons behind this, including:

- **Restoration of suppressed demand in the network**: Historically large areas of the GDWSA have experienced low network pressure (compared to those that would be expected in a normal water utility), manifesting itself as low flows throughout the day and difficulty filling storage tanks. When water has been saved through UFW and leakage reduction, the pressure in these areas increases gradually until normal operating pressure is achieved requiring more water in the network and permitting greater water use at a more acceptable standard of customer service.
- **Natural Rate of Leakage Increase**: with 8,000 kilometres of network in the GDWSA, a continuous programme of watermains rehabilitation is required to maintain static leakage levels. Savings in CSL are likely offsetting part of the natural rate of leakage increase.
- **Contribution toward meeting demand of new connections**: Savings in CSL and water conservation are partially offset demand increases relating to new connections.

**Cost of recovering water through UFW and CSL**

The quoted costs in the Feb 2015 PNR for recovery of UFW in mains rehabilitation were based on actual contract cost outcomes for rehabilitation contracts implemented by Dublin City Council over a 10 year period, and costs given in the FAQs made due allowance for cost increases since these works were undertaken.

It is not accurate to base a projection of the cost per Ml/d saving on customer side leaks based solely on the figures reported to the CER under the First Fix Free Scheme. To ensure the greatest savings of water under Free First Fix Irish Water prioritised the notifications, leak investigations and repairs based on the volume of water being used at the property. In addition, a significant proportion of the savings achieved through the First Fix Free Scheme arise from customer repairs. These works are

undertaken privately and it is therefore not possible to assign a cost to these works. The savings on CSL and the cost of the First Fix Free Scheme will be considered as part 2017 Project Need Report.

## 4.7 HEADROOM

Headroom is the actual difference between the amount of water available for supply and the estimated demand. A water company usually sets a target for headroom in each water supply zone. This target headroom ensures that there is a prudent and sufficient amount of water available in the system to allow time for the water service provider to react to an uncertainty in the demand estimates (e.g. if growth turns out to be higher than anticipated) or if there are changes to the supply side (e.g. changes to the volumes of water we are allowed to abstract, due to environmental constraints). As capital projects and development of new sources take long periods of time to plan, design, fund and deliver, target headroom is essential to ensure that short, medium and long term security of supply can be planned for.

The target headroom for the GDWSA of 15% is deemed to be prudent and appropriate based on the uncertainties relating to future resource availability and demand projections. Irish Water would like to clarify that peaking in water demand is never catered for in target headroom for a WSZ, and is a separate calculation with its own specific rationale.

For the supply demand calculation a 5% operational outage allowance has also been included on WAFU. This compares well to those used by UK water companies, where outage allowances range from 2-8% in supply demand analysis calculations (at present a figure of 5% is used in Northern Ireland).

Therefore a total target headroom and outage allowance of 20% has been assigned to the project.

# 5 SUPPLY DEMAND BALANCE IN THE GDWSA

For a given Water Supply Zone, calculation of Supply Demand balance, is based on assessment of Water Available for Use, Demand Estimates and Target headroom requirements as summarised in Figure 5 Supply Demand Balance. Where the supply demand calculation is negative, the water resource zone is said to be in deficit, and options to restore the balance are investigated.

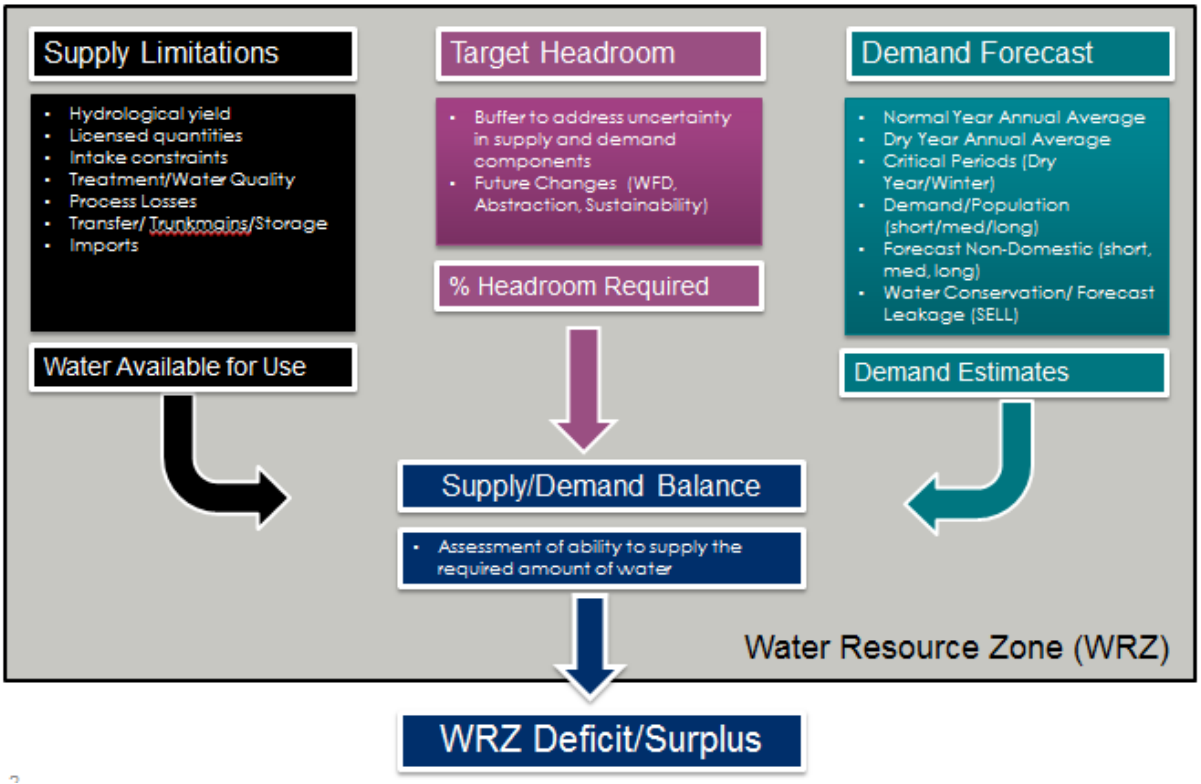



**Figure 5 Supply Demand Balance**

The GDWSA faces a significant challenge to provide a resilient supply which meets growing demand with increasingly constrained raw water resources. Following incremental expansions and improvements at existing WTPs over the past 10 years, the overall GDWSA Water Available for Use is still not sufficient to cater for peaking, headroom and growth requirements in the region. This lack of resilience has led to three major water outages in the region within the last ten years.

As discussed in Section 3 capital investment in trunk main and treatment infrastructure has the potential to increase the WAFU at the existing supply sites by a further 63 Ml/d by 2021 (598Mld to 661Mld) and ambitious water conservation targets will result in 64 Ml/d in verified water savings on the public distribution network by 2041. These targets have been set as savings at the water treatment plant, i.e. over and above amounts already saved at the customer meter.

However, even with these measures in place the supply demand balance will remain in deficit in the short, medium and long term. The GDWSA raw water sources will be utilised to full capacity by 2026

and no suitable additional raw water sources are available within the area to satisfy the projected growth and resilience requirements. Furthermore, many of these existing sources also face short and long term constraints relating to reduced abstraction allowances as a result of legally binding environmental obligations under the Water Framework Directive and vulnerability to Climate Change. In terms of resilience, the entire GDWSA is largely reliant on a single source (the River Liffey) for over 80% of its raw water supply. Addressing the demand side of the Supply/Demand balance calculation (e.g. water conservation, growth suppression etc.) does not address this dependence.

Irish Water must meet all of these challenges and ensure supply/demand balance across the network for the lowest practical cost. This will involve pursuing three principal solutions:

1. Water conservation to reduce demand (however this will only suppress overall demand growth);
2. Increasing network connectivity and fully utilising all available sources to their sustainable limits; and
3. Developing a new water resource.

In terms of water supply, the maximum Water Available for Use from the existing sources will be achieved byc.2023. As previously mentioned, Irish Water is pursuing ambitious leakage reduction targets. The target reduction in UFW has been considered as part of the projected water demand in the GDWSA. As can be seen from Table 4, without this UFW saving, the supply demand deficit would be 296.3 Ml/d at 2050 and even allowing for completely achieving the ambitious reduction in UFW, there will still be supply demand deficit of 232.4 Ml/d in the GDWSA, at 2050, which must be addressed.

| | 2011 | 2021 | 2026 | 2031 | 2041 | 2046 | 2050 |
|---|---|---|---|---|---|---|---|
| Existing Sources WAFU | **598** | **633** | **661** | **661** | **661** | **661** | **661** |
| ADPW+Headroom+ UFW Savings | **649.4** | **711.7** | **755.5** | **798.5** | **853.6** | **878.8** | **893.4** |
| ADPW+Headroom+ No UFW Savings | **649.4** | **750.5** | **807.1** | **858.2** | **917.5** | **942.7** | **957.3** |
| Supply/Demand Deficit with UFW Reduction | | | **94.5** | **137.5** | **192.6** | **217.8** | **232.4** |
| Supply/Demand Deficit with no UFW Reduction | | | **146.1** | **197.2** | **256.5** | **281.7** | **296.3** |

**Table 4 Supply/Demand Balance Deficit GDWSA**

# 6 OPTIONS TO ADDRESS GDWSA SUPPLY DEMAND BALANCE DEFICIT

Extensive appraisal has been completed for all viable options to resolve the supply demand balance, as detailed in three Irish Water reports– 1) the Options Working Paper, 2) the Preliminary Options Appraisal Report and 3) the Final Options Appraisal Report. These reports can be found at the following link http://www.watersupplyproject.ie/publications/. Each of these reports were published for public consultation during 2015 & 2016. Irish Water has considered all alternative options with potential to supply the Eastern and Midlands Region, including those raised in the submissions to the consultations.

The **Options Working Paper (OWP),** published June 2015, examined the work previously undertaken in the Strategic Environmental Assessment of ten options considered by Dublin City Council in 2010. It validated four options, identified at that time, as technically viable for consideration in the next stage of options appraisal (i.e. the current 'planning stage'). The OWP also published, for public consultation, the assessment criteria proposed for options appraisal, and the proposed approach to positioning infrastructure to achieve least environmental impact, through the use of 'constraint mapping'.

The **Preliminary Options Appraisal Report** (POAR), published November 2015, considered and evaluated the four technically viable options, taking into account preliminary results of investigative surveys and modelling at that time, which are continuing. The POAR set aside options which abstract from north-east Lough Derg, either directly or with raw water storage in the Midlands, because Irish Water considered they potentially risked having significant impacts on water residence times in Lough Derg in prolonged dry summer conditions and consequently were not environmentally sustainable. The POAR also did not favour pumping raw water to a new storage reservoir in the Midlands, because of a) risks of transfer of alien aquatic species, b) construction and environmental risks at the Midlands storage site, and c) because transferring raw water does not meet Irish Water' broader objectives related to improving treated water supplies to communities in the Midlands Region (particularly Counties Tipperary, Offaly and Westmeath).

The POAR highlighted that abstraction from Parteen Basin, being sited downstream of Lough Derg, would avoid impacts on lake residence time. It identified abstraction from the River Shannon at the Parteen Basin area, downstream of Lough Derg, as an "Emerging Preferred Option", subject to continuing surveys and it identified a 2km corridor from Parteen to a termination point in South Dublin where a pipeline route of least environmental impact could be positioned. While Desalination remained as the second ranked viable option, it was noted that it was a "Dublin-centric" solution, and it did not address the problems of small isolated water supplies in the Midlands. Desalination also posed a potentially greater environmental impact through its use of chemicals and high energy consumption. It was also a significantly more expensive option.

The **Final Options Appraisal Report** (FOAR), published November 2016, having further examined the options of abstraction from the River Shannon at the Parteen Basin, and desalination of seawater at the coast in north Fingal, including a cost benefit analysis of both options, confirmed that Irish Water's Preferred Scheme is abstraction from the Shannon in the Parteen Basin area, downstream of Lough Derg, with water treatment nearby at Birdhill and delivery of treated water by pipeline through the Midlands to a termination point reservoir at Peamount in south Dublin.

# 7 OTHER ISSUES RAISED

## 7.1 GROUNDWATER

Groundwater plays an important role in public water supply in Ireland with 709 of Irish Waters 918 drinking water treatment plants utilising groundwater springs and boreholes as a source. These sources have significant positive benefits in terms of water supply, particularly for small isolated supplies in the rural environment, where sources can be protected via controlling land use in the catchment above the source, and where natural underground storage allows for sustainable abstraction throughout the year.

However, it must be recognised that groundwater sources also have their limitations, particularly for large supplies. As the geology in Ireland contains large regions of Karst limestone, the water is stored in the ground in fractures and fissures within the rock mass. Finding a water resource in this geological environment requires locating a productive area of rock and abstracting water at generally low and steady rates.

Typically, sustainable boreholes in Ireland provide 1Ml/d and therefore to meet the forecast demand volumes of the GDWSA extensive well fields would need to be established over a large area. Such a development would require land use restrictions over large amounts of land above the wellfields and a prohibitively expensive grid network of water mains to collect the water to a single pipe for onward transfer to the GDWSA. It must also be noted that aquifer recharge in the east of the country is lower than in the west due to significantly lower annual rainfall and low permeability geological materials.

The Water Framework Directive (WFD) prescribed methodology was used in the Options Working Paper review of groundwater as a potential new supply source. This supersedes the 2008 groundwater review in the SEA carried out by DCC which used an older methodology. It should be noted that both methodologies arrive at similar conclusions. However there are recharge and abstraction related differences between the methodologies in the two reports.

The study area considered in both reports (OWP & SEA) was an approximate 80km radius from Dublin extending northwards to Dundalk, westwards as far as Tullamore and southwards to Gorey. The study area was considered appropriate as beyond this area the aquifers are generally considered poor. Details of the assessments are contained in the OWP. The conclusion which was reached was that groundwater as a potential new source option was not considered suitable as a primary new source but that it could be used in a supplementary capacity particularly for meeting localised demand shortfalls.

## 7.2 THE BENEFITTING CORRIDOR

Irish Water has a total of 918 individual water treatment plants serving a population of 3.8 million connected to the public water supply. This represents a disproportionally large number of treatment facilities for a relatively small population (as a comparison, our nearest neighbour Northern Ireland Water serves a population of 1.4 million, via 24 water treatment plants). Many of these water treatment plants abstract water from unsuitable sources that are vulnerable to pollution or may not be environmentally sustainable. Irish Water is currently in the process of completing a National Water Resources Plan in order to assess the supply demand balance in all water resource zones. As part of this process, we will focus on sources with appropriate source protection, sustainable yield, water quality and resilience, in order to ensure appropriate Levels of Service for all water users on the public supply. This will result in consolidation of the total number of water treatment plants, an objective as set out in our 25 year Water Services Strategic Plan. As part of the National Water Resources Plan, the assessment of the current water supply demand balance in the Midlands is underway, and will be subject to Strategic Environmental Assessment and public consultation in 2018.

The projected 181 Mld (at 2050) would be provided by a combination of the consolidated sources which are suitable to be retained, supported by the WSP. In addition to this, the Strategic Industrial Allowance will allow for non-domestic growth and resilience along the entire benefiting corridor.

In relation to the query (included in Ms Kennedy's submission) regarding water supply to County Clare, Irish Water has already completed outline designs and modelling for proposals to augment the water supply in Ennis and South Clare, via a new trunkmain from the Limerick Supply (Clareville WTP). These proposals will be detailed and assessed for funding as part of the Capital Investment Programme 2022-2026. The project proposals include for a resilience connection between the WSP Water Treatment plant and Clareville Water Treatment Plant, which will further secure the South County Clare water supply.

## 7.3 COST PER DAY OF OUTAGE

For the purposes of the Cost Benefit Analysis, in identifying the likely cost per-day of water outages in the GDWSA, some estimates were provided in the Economic Needs Report (February 2015 PNR). These estimates were based on international studies which provided guidelines for the costs of water disruption. The estimates suggested an economic cost of €44 per-person per day of outage. The estimated total costs are presented in terms of a 1 day equivalent water supply disruption.

Research on the available international evidence shows the value of the economic loss to residential consumers range from a low of $22 to a high of $2,046. Given the range in estimates it was deemed useful by Indecon economists to consider two studies which attempted to provide an overall guidance

for the WSP project evaluations rather than estimates in any specific case as such estimates show very great variance.

One of the two studies referred to in the Feb 2015 PNR relates to FEMA estimates of a standard value of outage due to supply disruptions regardless of how the disruptions are caused (for example this could therefore apply to disruptions due to storms, or underinvestment, or earthquakes or floods or fires, as assessment of the economic costs for users are not determined by the cause of the outage). The figure quoted in the FEMA report is €44 (which was equivalent to $53 at the time of the study) – this was the median value of a number of scenarios estimated by FEMA. However, the mean value for the FEMA scenarios is almost six times as large, calculated at $330. A subsequent study by Aubuchon and Morley recommended that the preferred value to use was $146. It should be noted however that the FEMA estimates are in 2008 dollars.

**Expected number of days of outage**

For the purposes of forecasting the expected number of days of outage over the course of the appraisal period (for the Cost Benefit Analysis), account was taken of the Irish Water estimate that between 2010 and 2013 households in the Dublin region experienced annual outages equivalent to 0.9 days per year. This is not to suggest that nearly a complete full day of outage happens at any one time and this calculation is made based on a formula which weights pressure reductions and outages overnight lower than full-scale water outages during the day. Irish Water also estimate the likely expected annual number of days of outage in the region should the proposed (WSP) investment be completed. This is estimated at 0.23. This 0.23 is the prevailing level of outage when there is no supply deficit. This will be outlined in detail in an updated cost benefit assessment of the project which will be included in the 2017 PNR.

In interpreting the costs per day estimates it should be noted that this is simply a way of having an easily understood concept and it is not suggested that there would be a complete days' outage at any one time, although this can occur in certain circumstances. As noted in the Aubuchon and Morley report "'FEMA' value is presented as a per capita, per day (pcpd) value and is thus easily understood". This is similar to hourly or daily estimates of time savings used in transport project appraisals.

Whether a series of shorter outages impact on the values per capita per day is something which Irish Water will consider further in the 2017 PNR. Aubuchon and Morley suggest that: "*FEMA's estimates likely understate the true value of residential losses because the majority of water disruptions are primarily short term events*"

# 8 SUMMARY

A summary of Irish Water's response to the key issues raised in this submission are as follows

**Supply/ Demand Deficit within the GDWSA**

- **Water Availability (Considered as Water Treatment Capacity in the submission):** The Water Available for Use in the GDWSA is currently 598Ml/d. The ultimate limiting factor relates to Hydrological Yield (safe yield or sustainable yield) of the water source. Capital Works are planned in the coming years to address other limiting factors and once these are completed in c.2023 the maximum sustainable GDWSA WAFU will be 661 Ml/d.
- **Supply Demand Balance Methodology (Issues relating to allowed factors for peaking, headroom and operational outages):** The methodology used by Irish Water is in line with international best practice for water resource planning. Irish Water confirms that headroom, peaking and outage allowances are used appropriately in accordance with this methodology.
- **Estimated Demand (Issues relating to allowed factors for peaking, headroom and operational outage allowances):** Water Resource Planning considers these individual allowances separately.
- **Water Conservation measures and how these can be used to address supply demand balance (Raised as CSL and Public Network Leakage savings):** Water Conservation measures including UFW reduction and CSL savings do not fully address overall demand growth. Verified CSL and UFW savings measured at the meter, do not always reduce demand or increase the amount of water available at the water treatment plant. There are a number of reasons behind this, including restoration of suppressed network demand, offsetting natural rate of leakage increases and partially offsetting demand increases arising from new network connections. In addition only a percentage of UFW and CSL can be recovered sustainably.

**Options to address the supply demand deficit in the GDWSA including Issues relating to Groundwater as an option.**

Extensive appraisal has been completed for all viable options to resolve the supply demand balance, as detailed in three Irish Water reports - 1) the Options Working Paper, 2) the Preliminary Options Appraisal Report and 3) the Final Options Appraisal Report. These reports can be found at the following link http://www.watersupplyproject.ie/publications/. Each of these reports was published for public consultation during 2015 & 2016 and Irish Water has considered all alternative options with potential to supply the Eastern and Midlands Region, including all suggestions submitted to the consultations.

# APPENDIX A

# Project Overview

# Water Supply Project

**Eastern and Midlands Region**

# Project Overview

March 2017

**The Water Supply Project – Eastern and Midlands Region (WSP) is the first major comprehensive upgrade to Ireland's "New Source" infrastructure in the region in over 60 years. It has been in development since the mid 1990s, originally under Dublin City Council as project sponsor on behalf of the Department of Environment Heritage and Local Government (DEHLG), and under Irish Water Management since January 2014.**

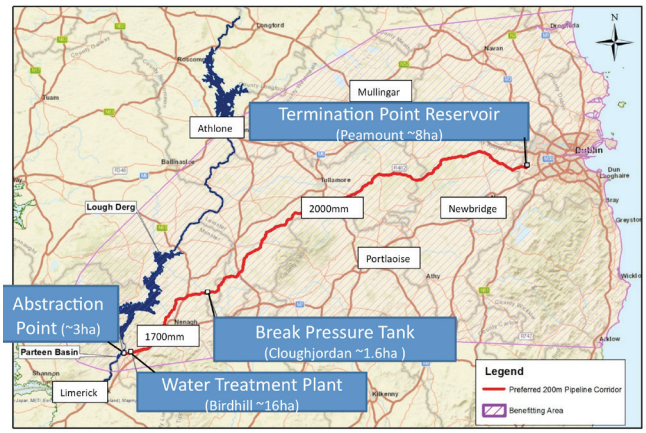
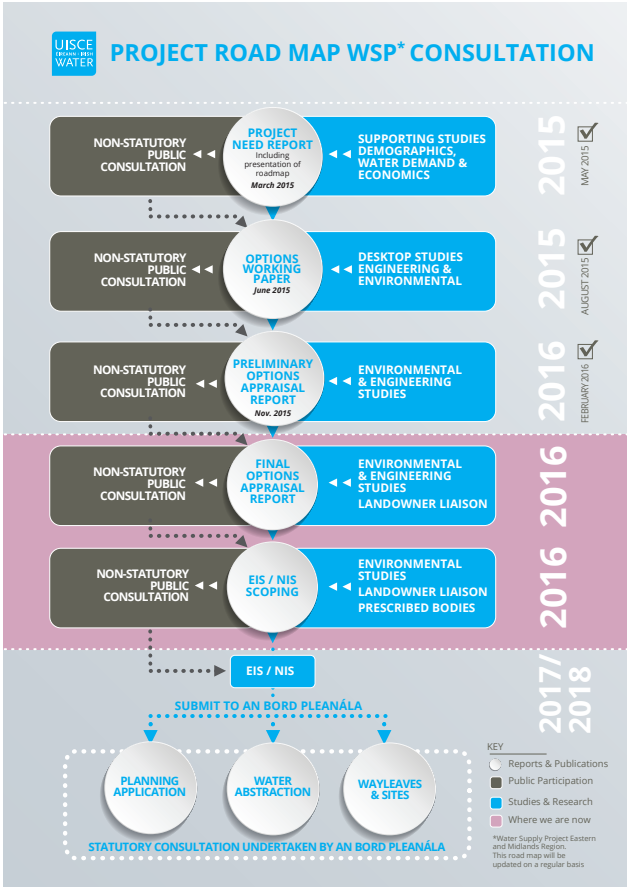



**Figure 1 Preferred Scheme**

The research work and public consultations since January 2014 have concluded that existing supply sources and infrastructure for the Eastern and Midlands region do not have the capacity or resilience to meet future requirements in a sustainable away. Population and industrial growth will generate a demand for an additional 330 million litres of water per day by 2050 (which is the equivalent of 130 Olympic sized swimming pools) to ensure security of supply. The present infrastructure is struggling to meet current need as evidenced by a number of significant and costly outages in Dublin over the past 6 years.

As part of the planning process, Irish Water has recently completed the fourth round of non-statutory public consultation. This consultation invited feedback on the proposed development of the Preferred Scheme and on what should be considered in the Environment Impact Statement (EIS) which will accompany a planning application to An Bord Pleanála. The preferred scheme (see Figure 1) comprises the abstraction of water on the eastern shore of Parteen Basin in Co. Tipperary, with water treatment nearby at Birdhill. Treated water would then be piped 170km to a termination point reservoir at Peamount in South County Dublin, connecting into the Greater Dublin network. Supplies of treated water would be made available to Midland communities along the route from Parteen Basin to Dublin.



# Project History

## Greater Dublin Water Supply Strategic Study

In 1996, the Greater Dublin Water Supply Strategic Study (GDWSSS) with published by the then Department of Environment, Heritage and Local Government (DEHLG), identified the requirement for a new supply source for the metropolitan area of Dublin and surrounding areas. The need for this new source was again confirmed in a review of the GDWSSS in 2000.

## Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is the process of identifying and evaluating the significant environmental effects that are likely to result from the implementation of a plan or programme at a national, regional or local level. The SEA process gives interested parties and the general public the opportunity to comment on the environmental impacts of a proposed plan or programme and to also be kept informed during the decision making process.

Dublin City Council (DCC), who led the project on behalf of the DEHLG, undertook two phases of Strategic Environmental Assessment (SEA) between 2005-2011. The SEA assessments identified, and considered, three options initially and then subsequently ten potential new source options to cater for the projected water supply - demand deficit (see Figure 2)

In the second phase of SEA assessment, 2007 to 2011, ten new water supply options for meeting projected growth in water demand in the East and Midlands were evaluated at a desktop level. Out of the ten Water Supply Options evaluated at this 'high level,' four were identified as technically viable options as follows:

- LOUGH DERG AND STORAGE: abstraction of raw water on the north eastern shore of Lough Derg in combination with raw water storage in the Midlands.
- LOUGH DERG (DIRECT): abstraction and treatment on the north eastern shore of Lough Derg
- PARTEEN BASIN (DIRECT): abstraction and treatment of water on the eastern shore of Parteen Basin.
- DESALINATION: Abstraction of sea water from the Irish Sea in north Fingal; removal of salt by Reverse Osmosis (RO).

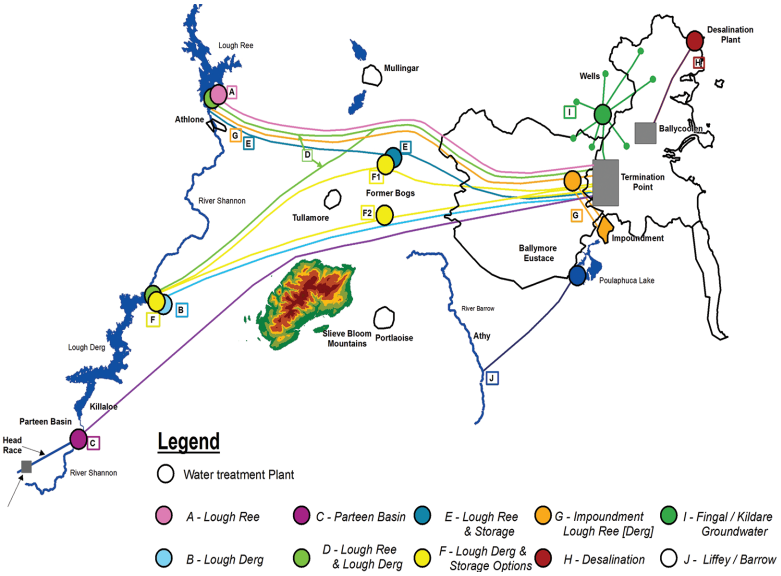



**Figure 2 SEA Options**

The phase 2 SEA Plan expressed a preference for the Lough Derg and Storage option subject to further detailed ground investigations combined with modelling simulations of water abstraction. This Plan was adopted in 2010 by Dublin City Council and the SEA Statement and adopted plan were published in 2011.

# Current Phase

## Environmental Impact Assessment (EIA) & Planning Phase

In January 2014, Irish Water assumed responsibility for the provision of public water services from 34 local authorities. This included the transfer of responsibility for the Water Supply Project - Eastern and Midlands Region (WSP) from Dublin City Council to Irish Water.

Irish Water identified four key stages of non-statutory public consultation and various 'on-the-ground' investigations that would be undertaken in the development of a planning application for a preferred new water supply project for the Eastern and Midlands Region. Each consultation phase allowed feedback to be incorporated into the development of the preferred new water supply scheme for the Eastern and Midlands Region. A summary of the four non-statutory public consultations (2015-2017) is provided overleaf.

# Next Steps - Moving to a Planning Application

Following the conclusion of the consultation process in February 2017, Irish Water is continuing to engage directly landowners affected by the proposed pipeline route. Four dedicated Landowner Liaison Officers have been, and will continue to be available to meet face-to-face with Landowners to discuss any aspect of the proposed project.

The feedback from all consultations alongside further technical and environmental studies and engagement with landowners and the general public will inform the details of the final preferred scheme.

A full Environmental Impact Statement (EIS) will be produced which will present the results of on-going environmental investigations and consultations and will influence the detailed development of the preferred scheme, identifying and evaluating any potential impacts and appropriate mitigation measures to be considered.

The EIS will accompany Irish Water's Planning application to An Bord Pleanála which will be submitted towards the end of 2017 / early 2018 for their independent adjudication. At that point An Bord Pleanála will undertake all necessary statutory consultations.

Should planning permission be granted for the project construction and commissioning would take approximately three to four years.

# Project History

This project has been subject to extensive research, assessment and public consultation. Figure 3. outlines the chronological development of all the work undertaken on the project from 1996 to date.

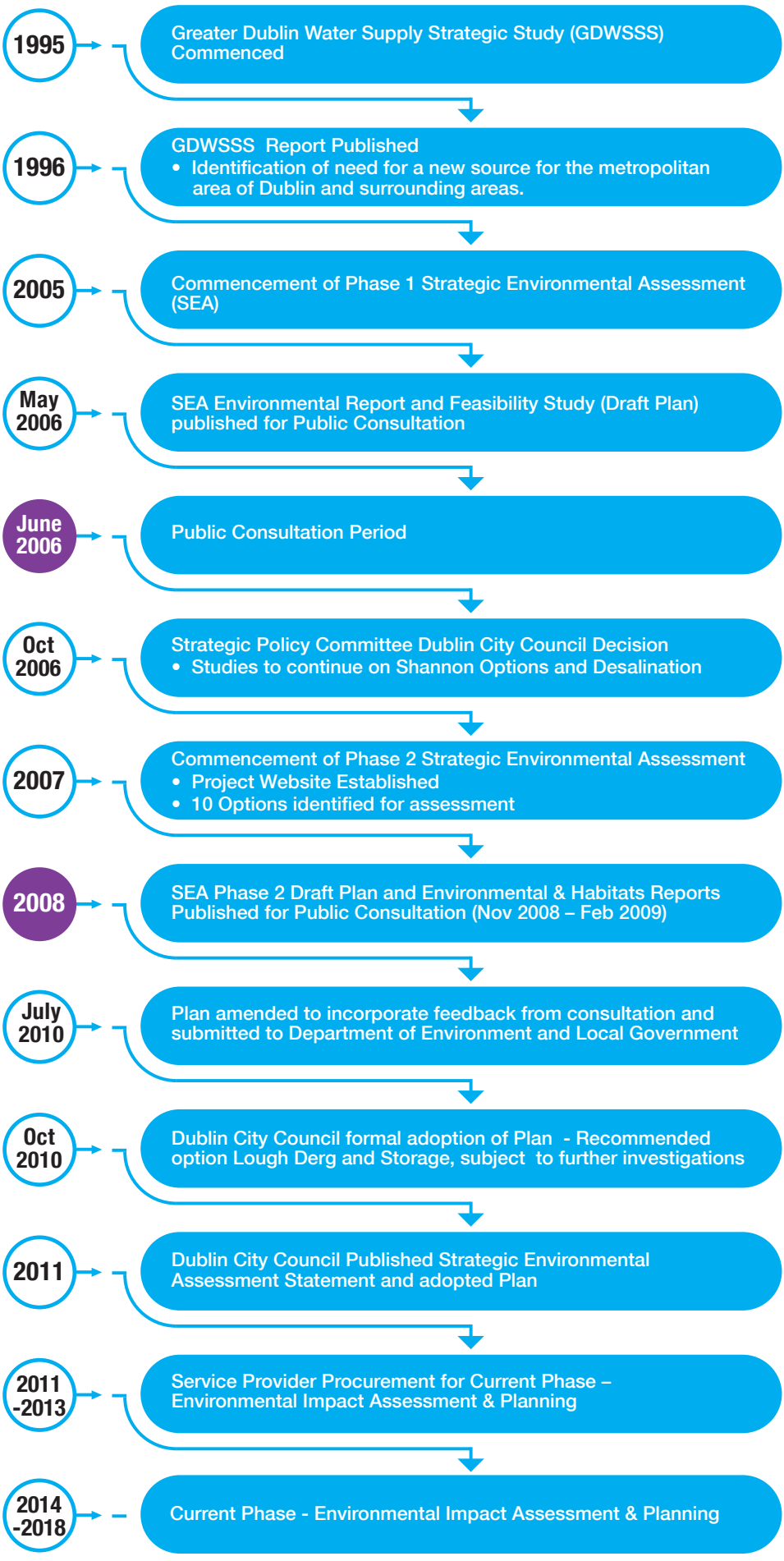



**Figure 3: Project Timeline**

# EIA & Planning Stage Public Consultation Summary

| Subject | Consultation Terms of Reference | |
|---|---|---|
| **March 2015 - May 2015 (8 weeks)**<br>**Project Need Report (PNR) & Project Road Map**<br>The PNR draws on extensive independent expert research and recommendations in relation to population projections and economic forecasting (2015 – 2050) and it concludes definitively that a new water supply source is needed for Irish Water's Eastern & Midlands Region.<br>A report on this consultation is available at www.watersupplyproject.ie/wp-content/uploads/2015/06/Appendex-A_Options-Working-Paper-OWP.pdf | • Has the Project Team considered all issues related to need? Have all factors been considered?<br>• Would you like to be kept informed of project updates and if so would you be happy to be added to our database and to receive regular project updates?<br>• The Roadmap we propose to follow in bringing forward a solution to meet the need, is presented as part of this consultation | • 16 stakeholder meetings<br>• 1 Oireachtas Open Day<br>• 27 submissions |
| **June 2015 – Sept 2015 (8 weeks)**<br>**Options Working Paper (OWP)**<br>The OWP contains an independent review of all previous studies undertaken on providing a new source of water supply for Dublin and other parts of the Eastern & Midlands Region. It concluded that the four technically viable options which emerged from the SEA process remained appropriate to be brought forward into the planning & EIA process and that all four options should be considered on an equal footing pending further detailed investigations. It also outlined the assessment criteria in options appraisal, and the proposed approach to positioning infrastructure to achieve least environmental impact, through the use of constraint mapping.<br>A report on this consultation is available at www.watersupplyproject.ie/wp-content/uploads/2015/11/Vol-6_Appendix-H.pdf | • What other national, regional or locally important constraints should Irish Water take into account when locating the infrastructure associated with each water supply option?<br>• Have you any comments on the proposed Constraints and the approach to their use?<br>• Are there any Assessment Criteria other than those proposed which should be used in the next phase of options appraisal?<br>• How would you like to be communicated with, as the project progresses | • 12 stakeholder meetings<br>• 1 Oireachtas Open Day<br>• 46 submissions |
| **Nov 2015 to Feb 2015 (10 weeks)**<br>**Preliminary Options Appraisal Report (POAR)**<br>The POAR set out the detail of the assessment process for the four technically viable options. The report concluded, after undertaking 'on-the-ground investigations', abstraction modelling simulations and analysis of stakeholder feedback, that the two options located on the North East of Lough Derg are unsuitable, primarily for environmental reasons. The two options which remained technically viable and environmentally sustainable were desalination (from the Irish Sea) and the abstraction of water from the lower Shannon at Parteen Basin in County Tipperary. Of these two, the Report identified abstraction from the River Shannon at Parteen Basin as the "emerging preferred option".<br>A report on this consultation available at www.watersupplyproject.ie/wp-content/uploads/2016/11/appendix_j_preliminary_options_appraisal_consultations_submissions.pdf | • Whether Irish Water has taken all relevant factors into account in reaching the findings outlined in the Preliminary Options Appraisal Report?<br>• How you would like Irish Water to communicate with you on future developments in this project. | • 46 stakeholder meetings<br>• 1 Oireachtas Open Days<br>• 4 public Open days<br>• 42 submissions |
| **Nov 2015 to Feb 2016 (14 weeks)**<br>**Final Options Appraisal Report (FOAR) & Environmental Impact Statement (EIS) Scoping Report**<br>The FOAR confirmed that the preferred scheme for a new water supply is abstraction of water from the Lower Shannon at Parteen Basin, water treatment nearby at Birdhill and treated water piped to a termination point reservoir in Peamount, Co. Dublin, with supplies of treated water available to Midland communities along the route. The EIS Scoping Report describes any potential environmental impacts of the scheme and how these will be assessed / mitigated in the final Environmental Impact Statement (EIS).<br>A report on this consultation is currently being prepared. | • Is there any additional information that should be considered in the development of the Preferred Scheme?<br>• Are there any additional environmental issues or alternative methodologies that should be taken into consideration in preparing the EIS?<br>• How would you like Irish Water to communicate with you as the project progresses towards planning approval? | • 67 stakeholder meetings<br>• 2 Oireachtas Open Days<br>• 8 public Open days<br>• 6 Landowner Evenings<br>• 409 submissions |

## Further information can also be obtained by calling 1890 252 848

## Contact Us

Should you have any questions or queries about this project, wish to request hard copies of any of the publications mentioned in this newsletter or wish to be included on a mailing list for project updates, please do contact us using the details below.

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An Irish version of this newsletter is available to you if you prefer. Please contact us and we can send one to you, or alternatively you can download it from the website at www.watersupplyproject.ie or email watersupply@water.ie

**Más mian leat cóip den leabhrán seo a fháil as Gaeilge, déan teagmháil linn ar an uimhir thuasluaite.**