

Water Supply Project – Eastern and Midlands Region

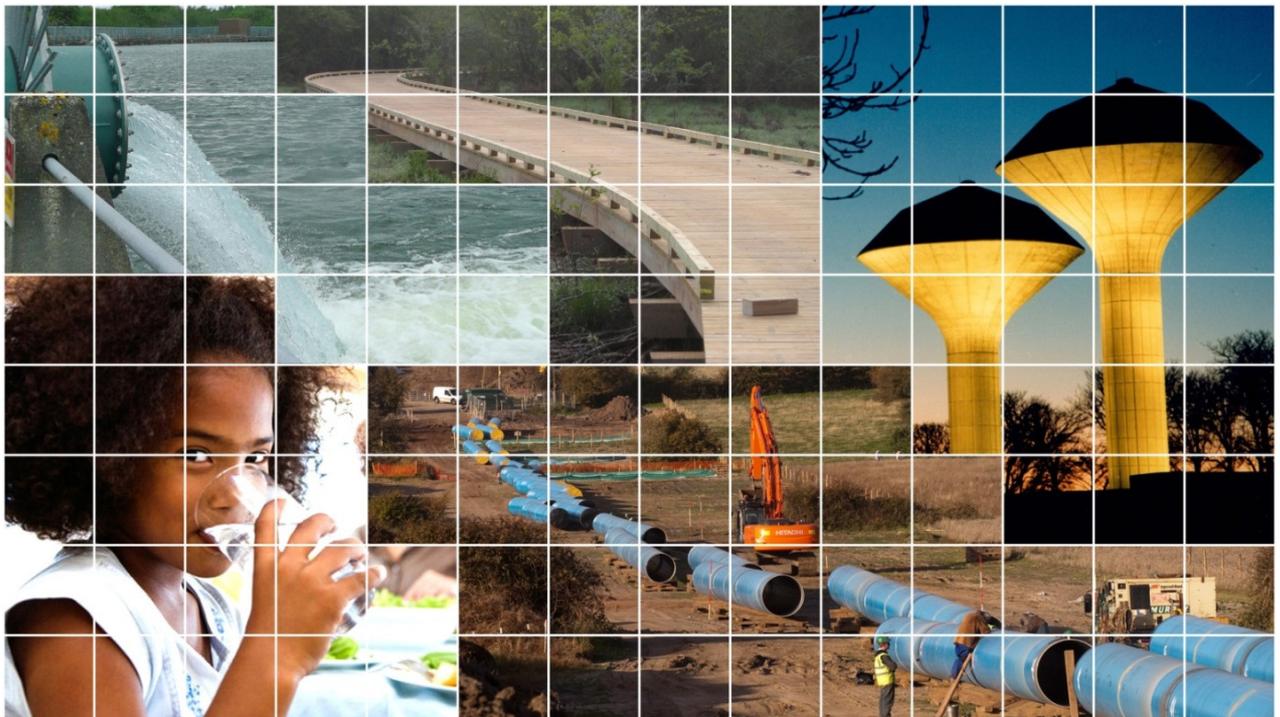
Water Supply Options Working Paper

Appendix F Strategic Environmental Assessment (2007-2011) Consultation Review



June 2015

Revision A01



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1 Introduction

This report outlines the Strategic Environmental Assessment Consultation Review carried out as part of Phase 2 of the option appraisal methodology.

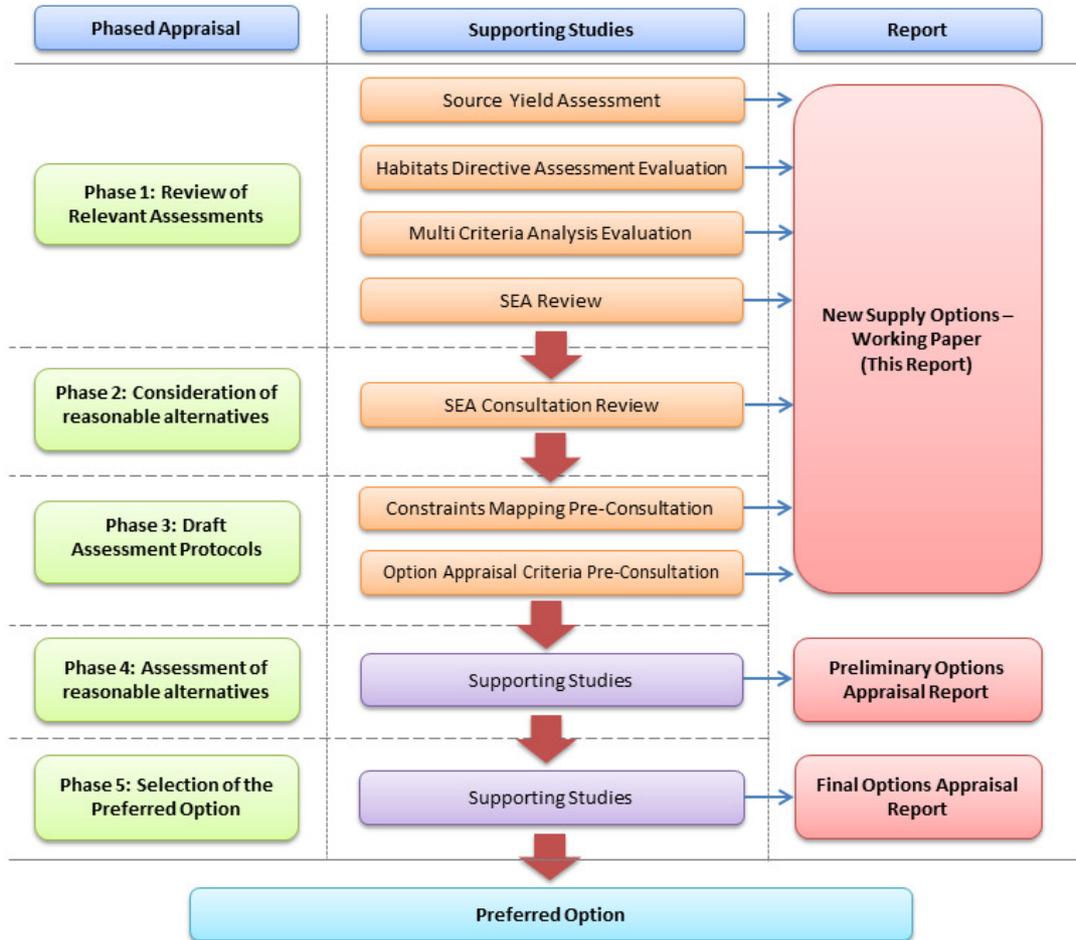


Table 1-A Options Appraisal Methodology

2**Stakeholder feedback****2.1 Background**

Formal public consultation under SEA Phase 2, in respect of the ten water supply options which were contained in the 2008 Draft Plan, took place from November 2008 to February 2009. Extensive feedback was received from stakeholders and the general public during the consultation periods. This feedback was collated and analysed in the SEA Phase 2 Public Consultation Summary Report (2011).

Further consultations were held post adoption of the Plan and publication of the SEA Statement (2010). This was a stakeholder briefing exercise advising stakeholders of the preferred option and consisted of a series of minuted meetings. Details of the presentations, minutes of meetings and questions & answers arising from the presentations / briefings were collated and analysed in the Stakeholder Briefing Report.

2.2 Review of submissions

Reflecting the consultation process outlined above, this review of submissions is presented as three sections:

- Review of submissions that identify additional options thought worthy of consideration.
- Review of submissions that include general comments on the ten water supply options contained in the draft Plan.
- Review of comments received on the adopted Plan that remain applicable to the planning stage.

The review is undertaken to consider if:

- Submissions received through the SEA process were considered and appropriately addressed.
- Submissions received post adoption of the Plan are captured and addressed appropriately in this planning stage.

3 Additional Options

A number of alternative options arose for consideration in feedback from consultation on the draft plan. They are as listed below:

- Water Conservation
- Water Abstraction below Ardnacrusha
- Lough Erne
- Changes to Operating regime at Pollaphuca
- Lough Dan/ Lough Tay
- Freshwater Lake in Dublin Bay
- Liffey Catchment
- Water Recycling/ Reuse
- Groundwater under Bogs
- Canals
- Quarries
- Wicklow Mountain Storage
- Groundwater + Shannon
- River Brosna
- River Boyne
- Lisheen Mine
- Relocation of Water Intensive Industry
- Local Storage
- Large Wetland National Park
- Flooding/Large Scale rainwater harvesting.

The submissions outlining these options are summarised in Table 3-A alongside the corresponding documented response provided during the SEA stage.

Ref No.	Option	Key points of proposal	Response to issues provided during the SEA stage.
1	Water Conservation	<p>- T. O'Mahony highlighted that the EPA are promoting water conservation within the region and are looking for a firm commitment to water conservation in both the DRWSA and the Shannon i.e. the footprint of the project (EPA)</p> <p>-Increases in demand could be met with the introduction of water conservation measures (rainwater harvesting, metering, hose pipe ban).A comprehensive programme of water conservation requires assessment as an alternative in its own right. (Birdwatch Ireland/ DCC SPC/ DLRCC/ Etc.)</p> <p>- Carrying out an EIA on three options is fair and reasonable to the stakeholders. A decision has to be made by DEHLG to move forward. There really needs to be a credible conservation plan (comment from T O'Mahony, EPA).</p>	<p>As part of the planning application & approval process, there will be an onus on the Dublin Region to demonstrate that it is maximising the sustainable production of its existing resources and implementing leakage reduction measures / water consumption reductions. Without such measures in place it is unlikely that an unconditional planning approval will be achieved. A planning approval from An Bord Pleanála may well be conditional on the achievement of specified leakage or renewal targets and water consumption reductions which would have to be met into the future, even with a new source being available (Stakeholder Briefing Report, 2011).</p>
2	Water Below Ardnacrusha	<p>Why not abstract the water below Ardnacrusha where the water enters the sea? (ShIRBD Advisory Council)</p>	<p>Water below Ardnacrusha is tidal and is not a suitable technical location. An additional 50 km of pipeline is required which will increase capital and operating costs (€150m). Water can be abstracted in a variable manner from north Lough Derg (including Storage) and achieve greater sustainability / flexibility & robustness through the use of storage at significantly reduced cost (Public Consultation Report, p. A73).</p>
3	Lough Erne	<p>Was any consideration given to abstracting water from L Erne? (Border, Midland and Western Regional Authority)</p>	<p>Sufficient sustainable options exist within the Republic's own jurisdiction with the result that the additional complexity and additional costs of a cross border option would not be justifiable. Lough Erne is further from the Dublin Region than the preferred recommended option from Lough Derg (Public Consultation Report, p. A7).</p>
4	Changes to Operating regime at Poulaphuca	<p>ESB is not in favour of a change in the operating regime at Poulaphuca (ESB)</p>	<p>Only relevant to Liffey Barrow option which is not recommended (Public Consultation Report, p. A29).</p>

Ref No.	Option	Key points of proposal	Response to issues provided during the SEA stage.
5	Lough Dan/ Lough Tay	In relation to new sources of water for Dublin please let me know if the catchment area of the Lough Dan/Lough Tay area of County Wicklow has been considered. This area is very close to the Vartry waterworks in Roundwood. A study of this area was done before the Vartry works was commissioned; I have seen this report on the web but failed to locate recently. (Hugh Lee)	It was considered in Year 2000 Review of 1996 Strategic Water Study (Public Consultation Report, p. A42).
6	Freshwater Lake in Dublin Bay	Vision for Dublin Bay Study by DCC proposes to create freshwater lake in Dublin Bay with a potential as a water resource for the city, possibly requiring a degree of desalination - should investigate but accept it's a very long shot. (Warren Whitney)	Noted.
7	Liffey Catchment	To what extent has the impact of future abstraction from the Liffey catchment been assessed?(EPA)	Proposed future abstractions from the Liffey (at Leixlip) were assessed separately by Tobins Consultants. Tobins and Fingal CoCo modelled abstraction and secured an abstraction licence. The proposed abstractions from the Liffey at Poulaphuca and Leixlip represent the maximum modelled sustainable capacity of the Liffey based on a wide range of climatic conditions (Public Consultation Report, p. A18).
8	Water Recycling/ Reuse	Need stringent standards for recycled water in place before recycling water for non-potable use in Ireland. (James Fenwick)	Accepted.
9	Groundwater under Bogs	In relation to the proposed Storage facility in Bord na Mona cutaway bogs - Are there water reserves under these bogs that could be useful as reserves in their own right. (EPA)	Plan does not include use of groundwater (Public Consultation Report, p. A19).
10	Canals	Are canals an option? (NTCC)	Not sufficient carrying capacity (Public Consultation Report, p. A42).
11	Quarries	Bog Storage proposals - could consideration be given to former Quarries in Huntstown / Belgard? (DCC CPC)	They were considered but are not as suitable as the cutaway bog given the scale of requirements (Public Consultation Report, p. A14).

Ref No.	Option	Key points of proposal	Response to issues provided during the SEA stage.
12	Wicklow Mountain Storage	Why has water from Wicklow mountains not been considered for storage? (Roscommon coco) - Build 20 or so small scale reservoirs in the Dublin / Wicklow mountains. Each reservoir would drain rainfall from 3 to 5 km ² of hillside, the combined total of water would be enough to meet the additional water needs of the GDA without serious negative impact! (Sinn Fein) Personal letter sent as response to Sinn Feins submission.	Abstractions from Poulaphuca and Roundwood are reaching their sustainable limits (Public Consultation Report, p. A69).
13	Groundwater + Shannon?	To what extent has the conjunctive use of groundwater and surface water been explored as an integrated option with one of the Shannon options? (EPA)	Groundwater sources which are of relatively small volume in the Dublin Region will continue to be developed for localised use where they are technically and economically feasible. The abstraction of supplies from a new source will supplement existing groundwater (and surface water) sources. A separate report on groundwater was prepared which recommended this approach. It is available on the project website (Public Consultation Report, p. A19).
14	River Brosna	Did you ever consider taking water from the Brosna at its entrance to the Shannon? (IFA)	Not in detail. The preferred option is based on the fact that L. Derg is a storage facility managed & controlled by ESB and abstractions can be implemented without changing operational water levels in all flow conditions. Levels can be managed by agreement with ESB. The same situations apply in Poulaphuca and Inniscarra where ESB work in conjunction with local authorities for water supplies at their hydroelectric power plants. Run of the river abstractions do not have the same levels of control (Public Consultation Report, p.A47).
15	River Boyne	Is the Boyne River too small to provide any of the requirements? (Kildare CoCo SPC)	Boyne is too small to provide any significant portion of Dublin's requirements (Public Consultation Report, p.A49).
16	Lisheen Mine	The meeting arose from a request by Mr. Tom Foley of Sisk to meet with representatives of Anglo-American, owners of Lisheen Mines in Co. Tipperary to consider the potential development of the mines as a source of water for the	- The available quantities of water at Lisheen are not sufficient to provide a strategic long-term source for Dublin. -There could also be environmental and

Ref No.	Option	Key points of proposal	Response to issues provided during the SEA stage.
		<p>Dublin Region following cessation of mining activity and in conjunction with remediation of the mines which is expected to occur sometime between 2009 and at the latest 2013. Based on current records, water potential at the site appears to be in the order of:</p> <ol style="list-style-type: none"> 1. A minimum of 20 MI/day and potentially up to 30 MI/day at then first level (-90 meters) using an existing 5 pump facility. 2. A further output of 30-38 MI/day from a base pumping facility at -220 meters. <p>-It would appear that a reliable yield of about 40-50 MI/day could be available having provided for reasonable compensation flows to local rivers.</p>	<p>ecological impacts from removing this quantity of water from the catchment. The groundwater is currently pumped from the mine and discharged in the two local rivers. The impacts from removing this water from the catchment could reduce the carrying and dilution capacities of the rivers. There is also a wastewater treatment plant discharging upstream of this area. Though substantial in its own right, the environmentally sustainable water export (say 40 MI/d) would be of limited strategic benefit to Dublin and would not obviate the need for supplies from a long term major source. It would involve major capital outlay to convey the water to Dublin (Public Consultation Report p. A50/1).</p>
17	Relocation of Water Intensive Industry	<p>It may make greater economic sense for new and expanding industry and commercial organisations which demand water that these should indeed be encouraged to locate to areas where water is available. This would also be in keeping with the Government's stated policy of decentralisation and National Spatial Strategy. (SRFB, now IFI)</p>	<p>The new scheme may open up a potential corridor between the Shannon and Dublin and industry can locate anywhere in this corridor. Industry / Foreign Direct Investment (FDI) has first choice as to where it wants to locate. Some decision may be between Dublin and N Ireland or UK or Europe and these must be catered for to ensure that Ireland as a whole benefits from all FDI opportunities (Public Consultation Report, p. A92).</p>
18	Local Storage	<ul style="list-style-type: none"> - A strategic plan to create smaller, more local reservoirs should be considered as an alternative option in order to capture excess runoff during periods of high rainfall. Consideration should be given to the use of dismantled quarries, existing wetlands and bogs and the creation of new storage areas. - Runoff could be diverted to these storage areas during flood periods and hence provide a local solution to flood alleviation. - WWTPs could be strategically located to treat water from several storage areas. - This would ensure locally security of water. If the water 	<ul style="list-style-type: none"> - Localised reservoirs, rainwater harvesting in industrial estates and in domestic premises can provide valuable savings in water use and localised initiatives such as these will increasingly be driven by water pricing policies which charge all consumers for treated water and encourage responsible use of water. Demand projections for the Dublin Region have already factored in significant savings from reduced consumption resulting from proposed metering & charging for water. However, the extent of projected water savings available are

Ref No.	Option	Key points of proposal	Response to issues provided during the SEA stage.
		<p>supply is interrupted for maintenance purposes or health issues, a much smaller catchment area would be affected and close by alternative supplies may be available in the short-term.</p> <p>- The creation of local water storage areas such as reservoirs and wetlands have the potential to greatly enhance the local area for biodiversity and recreation and would make a significant contribution to the local environment. (An Taisce)</p>	<p>insufficient to meet future water supply needs on their own and require to be supplemented with supplies from a new source.</p> <p>- Water supply projections for the Dublin Region to cater for anticipated population (and economic) growth are such that localised water conservation initiatives, whilst valuable, will be insufficient to meet demand needs on their own and will require to be supplemented, in time, with supplies from a new source (Public Consultation Report, p. A1).</p>
19	Large Wetland National Park including provision for Dublin adjacent to L.Ree	<p>Golden Eagle Trust: But if a new larger wetland basin was created this could absorb some of the water at peak periods and conceivably lower the predicted extraction rate of 4% of current levels. The proposal above, with its economic benefits for local residents, could become a key part of any negotiations with local representative bodies over water extraction. There is a famous wetland reserve outside of Paris, which was artificially created specifically to supply its large water scheme system. Dublin City Council is planning to spend up to 600 Million euro on either of its proposals, but early indications are that the desalinisation plant would be very costly as regards the ongoing energy costs for such a plant. Many commentators suggest that the value of clean freshwater will become an important commodity internationally, due to global warming, over the coming fifty years. Early plans to procure increased water supplies in Ireland now would seem prudent.</p>	<p>RPS working with Bord na Mona to develop environmental plan for bogs which are proposed for water storage (Public Consultation Report, p. A35).</p>
20	Flooding/ Large Scale rain water harvesting	<p>The problem with flooding in the GDA with heavy rainfall should be solved by capturing and storing excess water in purpose built reservoirs for later use (Sinn Fein)</p>	<p>Scale of projected growth over the next half century requires a new source to supplement water savings from localised collection initiatives / rainfall harvesting/ water conservation and leakage reduction (Public Consultation Report, p. A93).</p>

Table 3-A Proposed options identified from consultation feedback and response provided.

3.1 Further Clarification

In addition to responses provided during the SEA process, additional investigation was undertaken on two additional options that warranted further investigation, specifically:

- The Shannon and Groundwater conjunctive use option (Table 3-A, no. 13).
- The Local Storage option (Table 3-A, no. 18).

These assessments supported the exclusion of these options from the adopted Plan, noting that:

- Available groundwater resource should not be used as a contribution to meeting the increased demands of the region and would be better deployed in meeting local supply needs.
- Local storage would have hydrological impacts on groundwater, rivers and lake systems that already rely on rainwater for recharge. Recharge rates and dilution factors of these systems would be affected by creating new local storage and this could have ecological impacts.

4**General Concerns**

This section summarises the general concerns which arose from the public consultation on the draft Plan and SEA Phase 2 Environmental Report.

Table 4-A summarises the main comments received. Issues that were raised included:

- The impact that the proposed development would have on environmentally sensitive areas.
- Concerns with regard to the Lough Ree options and the impact the proposed abstraction would have on European Sites.
- Ecological concerns with regard to abstraction locations and the pipeline routing.
- Probability that abstractions from Lough Derg and the subsequent pipeline route to Dublin could impact on the integrity of a European Site and therefore be in breach of the Habitats Directive.

Ref No.	Option	Consultation Feedback
1	Option A - Lough Ree (Direct)	Overall opposition was noted to this abstraction from L.Ree. NPWS supported the findings of the AA. IFA welcomed abstractions here if it alleviates flooding. Abstraction was a matter of significant concern to ESB.
2	Option B - Lough Derg (Direct)	NPWS: Option B consists of four components: - B1 Abstraction (generally) from L.Derg - B2 Abstraction (specifically) from Slevoir Bay - B3 Treating and pumping facilities as Slevoir Bay - B4 Water Pipeline from L.Derg to Dublin- concern over pipeline crossing the Barrow & more SACs. A significant impact in relation to AA cannot be ruled out until the feasibility of an appropriate design is confirmed. Options which incorporate storage are generally preferred
3	Option C - Parteen Basin (Direct)	- With regard to Option C, the abstraction area indicated in Fig. 4.7 of the Environmental Report was of particular concern to ESB. The area shown is entirely within the length of Fort Henry Embankment, which is located on the left bank of the River Shannon upstream of Parteen Weir. A breach of this embankment would result in a major flooding emergency. Therefore, a site upstream of Fort Henry Embankment should be used if Option C is to be constructed. (EPA) - It would be beneficial if abstraction occurred from the lowest point in the river system (i.e. Parteen). This would allow for maximum use of water by freshwater biota before its extraction. (ESB) - Heritage Council recommends Option C be considered with storage. - NPWS stated that design of abstraction structure should reduce velocities to a level that even small fish and macrocrustacea can escape, if confirmation of this then this options would not adversely affect the integrity of the site. But clarification of compensatory flow regime mechanism will also be needed if the option is not going to adversely affect the site. - ESB: If Option C was constructed and at a future stage additional work was required at the intake structure, it would not be possible to draw down the water level. Therefore, provision of a dam beam arrangement would have to be considered during the design of the intake.
4	Option D - Lough Ree and Lough Derg	Overall opposition was noted to this abstraction from L.Ree. NPWS supported the findings of the AA. IFA welcomed abstractions here if it alleviates flooding. Abstraction was a matter of significant concern to ESB.
5	Option E - Lough Ree and Storage	NPWS request that if this option is to be considered further that additional studies be carried out and that it be subject again to AA. Overall opposition was noted to this abstraction from L.Ree. IFA welcomed abstractions here if it alleviates flooding. Abstraction was a matter of significant concern to ESB.

Ref No.	Option	Consultation Feedback
6	Option F - Lough Derg and Storage	-It may be worthwhile carrying out a desk based study into the site at Edenderry (F3) (Bord na Mona) -Lots of support for this option -Fisheries supportive of storage
7	Option G - Lough Ree with Impoundment	NPWS request that if option G is to be considered further that additional studies be carried out and that it be subject again to AA. Overall opposition was noted to this abstraction from L.Ree. IFA welcomed abstractions here if it alleviates flooding. Abstraction was a matter of significant concern to ESB.
8	Option H - Desalination	- Was any consideration given to using power from the proposed “Waste to energy” incinerator in Poolbeg to supply the desalination plant? (Birdwatch Ireland) or co-locating a windfarm. - In relation to the UK experience re Desalination/ Bulk storage. Have we considered any combinations of Desalination as a back up to other sources? Which is the best back-up option - storage or desalination?(SPA) - Desalination is the most future-proof option capable of expanding and would make economic sense in the longer term as it is likely that the other options will not have sufficient storage to meet increased demand after 2030.(SRFB) - Site selection criteria require good quality raw seawater and brine dispersion capability; most obvious of places is off Wicklow head. This location has the best tidal range and would not require the water to be pumped too far for dispersion. (SPA) - Need to include forestry considerations in studies Carbon sink/ Deforestation impacts etc. - NPWS- geotechnical and geophysical survey would be required to consider suitable pipeline sites. There is also potential from the dispersal of hyper-saline and possibly thermally altered effluent from the plant.
9	Option I - Groundwater	- The Geological Survey of Ireland (GSI) strongly suggests that the use of groundwater should not be overlooked, because it is an important natural resource that has a number of advantages over the use of surface water. It is a viable and widely available resource that would be relatively inexpensive to develop at a local level. (GSI) - The estimate by Eugene Daly Associates that 125 million litres / day of groundwater would be available for development within 80 km of Dublin is much lower than our estimate of 197 million litres per day obtainable from the aquifer beneath Fingal County alone (section 5.1 of our previous report); but it should be noted that Eugene Daly’s estimate is based on a very conservative view of the aquifers’ potential. (SPA)
10	Option J - Conjunctive Use of the River Barrow	ESB: Pollaphuca is operated in accordance with the ESB’s ‘Regulations and Guidelines for the Control of the R. Liffey’ and has a major influence in reducing flooding along the course of the R, Liffey. It is likely that this option would require changes to the operating regime in Pollaphuca Reservoir, which could have an impact on flooding. ESB is not in favour of any such changes in operating regime being implemented in Pollaphuca Reservoir.

Table 4-A Consultation feedback on options presented within the Adopted Plan with response provided

5**Post Adoption of The Plan**

This section summarises the general concerns which arose from Consultations which occurred post adoption of the Plan and publication of the SEA Statement.

5.1 Stakeholder Briefings

A number of stakeholder briefings were conducted over the July 2010 to January 2011 period in relation to the need for the project and the recommendations contained in the Plan, the following is a list of the key issues raised by stakeholders during these briefings:

- Concern with the growth of Dublin (at the perceived expense of the Midlands & Mid West Regions).
- Foreign Direct Investment involving water intensive industry should be located on Shannonside.
- Repairing Leaks, Water Conservation & Charging for Water will resolve supply shortages.
- Focus will go off Leakage Management / Water Conservation if New Source developed.
- Need for project not there now as a result of economic downturn and decline in population growth.
- Desalination is a better option than the Shannon and can be located within Dublin Region.
- Abstraction should be from Parteen Basin and not from northern Lough Derg.
- Abstraction impacts on water quality and potential for conflict with the Water Framework Directive.
- Cumulative Impacts of Abstraction / Local Catchment current & future Needs.
- Socio-Economic impacts of abstraction – Navigation, Angling, Tourism / Agriculture (Flooding) etc.
- Policing of DCC Abstractions / Role of Shannon Local Authorities & ShIRBD / ESB / EPA / WI etc.
- Impacts of proposed infrastructure on SACs, SPAs and NHAs.
- Community Gain / Compensation proposals by Dublin for use of water.
- Need for Single Authority to manage Shannon.
- Need for National Water Authority.
- Operation of proposed Eco Park in conjunction with water supply activities.
- Longterm Sustainability e.g. post 2040 / 50.
- Summary responses to each issue were provided for in the Stakeholder Briefing Report.

5.2 An Bord Pleanála Stakeholder Engagements

An Bord Pleanála held a series of stakeholder engagements in March and April 2012. A summary of the main comments received from each of the stakeholder engagements is outlined below:

(a) Mid West Regional Authority

- A comprehensive communications plan is needed.
- Socio-economic impact on the counties around L.Derg. Tourism will be affected. The proposed lake amenity area (Garryhinch) is of particular concern as it may be in competition with the tourism product at Lough Derg.
- Findings of the L. Derg sustainable Marina, Recreational and Tourism Development Study 2008 should be considered.
- The abstraction may result in the deterioration of water quality which is currently moderate. This may affect European Sites. The entirety of Lough Derg has been proposed as a Special Area of Conservation (SAC), Special Protection Area (SPA) and Natural Heritage Area (NHA).
- Concerns were raised over the long term environmental impact as the future abstraction volumes in comparison to the flow in the lake, especially during dry periods, were unclear.
- Reference was made to Parteen Basin, and the impact on local communities, existing infrastructure, settlements and any mitigation measures.
- The implication for the planning policy for the land catchment around the proposed development and how this would impact on current and future land uses was raised. There were concerns that there was a lack of information as to whether a higher standard of agricultural effluent control would be required and whether there may be any constraints on communities in the vicinity of the abstraction body if water quality in the region needed to be improved.

(b) Midland Regional Authority

- Expressed concern with the comparison between the Eco Park and Rutland Water.
- Is keen for the proposed Eco Park to have a separate identity and niche to the Lough Boora Parklands.
- Questioned whether the potential connections to the pipelines in strategic areas within the region would form an integral part of the proposed project.
- Raised the possibility of including 'broadband or fiber optics as a possible community gain'.
- Eco park would also be considered community gain.

(c) Mid-East Regional Authority

- Future leakage target of 20% seems high.
- Security of supply and dangers of contamination with scheme.

- Does the board consider, or is it satisfied that all alternatives have been exhausted, and will it be engaging in specialists in relation to desalination.
- Asked if formal planning application would consider how wastewater could be treated so it could be re-used.

(d) Dublin Regional Authority

In summary the Authority stated its contention that the project should in fact be seen as a national necessity as opposed to a regional benefit.

(e) Inland Fisheries Ireland

- Habitats are diverse, dynamic environments that are subject to environmental changes: they should not be seen as predictable entities whose future development can be mapped out. The interaction between rivers and Lough Derg must also be considered.
- Bigger need to account for climate change, low flows and the knock on negative effect on nutrients available to protect species.
- Spawning point for Irish Pollan remains unknown.
- Need for incorporation of a permanent cill into the abstraction mechanism
- A full fish stock survey and how different fish utilise the lake for breeding and spawning etc. would be needed. It was noted that this information is retained by the IFI should the prospective applicant wish to avail of it.
- Baseline studies need to include:
 - Complete bathymetric mapping of the lake to examine lake depth and terrain.
 - Full examination of the various flora and fauna zones around Lough Derg and other affected watercourses.
 - A full fish stock survey of affected watercourses and how different fish utilise the lake breeding, feeding etc.
- Recommends:
 - Installation of permanent cill to reduce velocity and prevent sucking in of juvenile fish into the abstraction pipe.
 - Adequate screening to prevent fish entering the abstraction pipe.
 - Necessary cleaning of pipe to remove zebra mussels will result in sludge, the reintroduction of mussels into the lake should be monitored.
 - Pipe should be laid outside spawning season.
 - Abstraction point should have no fisheries interest and be laid outside of spawning season and be constructed at a preferable time to minimise silt deposition.
 - Flora and fauna surveys and identification of breeding and spawning grounds should be undertaken within the relevant time periods for the various species.
 - Flood events and future temperature fluctuations should be considered.

- Anthropogenic effects need to be considered.
- Issues relating to Garryhinch, especially with the transfer of raw water from one RBD to another, transfer of invasive species, mixing waters and loss of designation under WFD. Need to consider:
 - Pipe crossings and drainage regime.
 - Overflow at Garyhinch.

(f) West Regional Authority

- Main concerns:
 - Leakage in Dublin.
 - Effects of Climate Change.
 - Depth of Lake at Abstraction location.
 - Alien species e.g. pondweed.
 - Identified IROPI in the event that the proposed development receives permission.
- Possibility of community gain with:
 - Alien species are treated in the lake as a result of the project.
 - Funding for waste water treatment.
 - Possible power generation at L. Derg.

(g) Office of Public Works (OPW)

- Negligible impact on flooding.
- Storage would have to be extensive and proximate to the river to have any marked effect.
- Flooding would need to be addressed at construction stage.
- Impact on heritage.
- Prospective applicant should consult OPW data such as flood risk assessment maps and catchment area studies.
- Flood risk trends difficult to identify.
- The board commented that a common unit needs to be used in relation to abstraction volumes, flooding and supply.

(h) Environmental Protection Agency (EPA)

Confirmed that it met with prospective applicant regarding monitoring and modelling in Lough Ree but not with regards to the current proposed abstraction in Lough Derg.

6**Conclusion**

In consideration of responses provided to feedback as part of the SEA process the following outcome has been reached:

- No valid additional options arose and reasonable options were sufficiently addressed within the public consultation.
- No submissions received on the new supply options raised points that brought into question the engineering merit of the options.

In addition, the additional options which were referenced in the submissions received on the SEA have been reviewed and the following represents the outcome of that review:

- The minimisation of water demand, through water conservation, rainwater harvesting, and grey water reuse was extensively covered in the original Preliminary Report, and has again been revisited in the Project Need Report where Irish Water national policy on water conservation has been taken on board, and an exacting review of water demand has been carried out.
- Proposals to locate large water using industry closer to the available sources of water are also addressed in the Project Need Report, and specifically in Economist's and Demographer's work on the factors which influence industrial siting.
- Optimisation of the use of existing assets in the Liffey catchment, will be part of conjunctive use of both existing and new sources, and will be part of any solution which is taken forward.
- The use of Loughs Dan, or Tay, in Co. Wicklow, or further reliance on the Rivers Boyne, or Brosna, or multiple local storage options are not favoured on yield and environmental considerations.
- Groundwater options have been considered in review of the original groundwater studies, updated for changes in law and environmental guidance related to groundwater since 2008.

The points raised in the Stakeholder Briefings which were carried out post adoption of the Plan, and the issues raised by the Regional Authorities in consultation with An Bord Pleanála, have been reviewed. The substantive issues have either been addressed in the Project Need Report, or are being addressed in the Water Quality Survey, Lake Bed survey and Hydrographic (Bathymetry) Survey on Lough Derg, and in the Geophysical Investigation of the Garryhinch Storage site.

Comments received post adoption have been summarised and will be considered in respect to the ongoing planning stage.