System for the assessment and review of the PPP’s within the water and wastewater sectors

Guidance Note
System for the Assessment and Review of PPP’s within the Water and Wastewater services sectors

Introductory Note
Purpose and Scope of Guidance Note

This Guidance Note is intended to be informative rather than prescriptive. It provides broad instructions on a system or methodology, which will:

- simplify the process of reviewing projects in the water and wastewater services sector to evaluate whether value for money has been achieved; and
- facilitate the creation of a valuable database of costs and risks for more accurate costing of future projects.

The DEHLG have been instrumental in the input and review of this Guidance Note.

This guidance note is divided into two separate parts:

- “Part One” - The General Guidance on the rationale and objectives of the Public Sector Benchmark and Post Project Review Stage; and
- “Part Two” - The “How to Do” working document for the construction of the Public Sector Benchmark and Post Project Review together with supporting schedules.

The rationale for this is that Part One is an explanatory document and Part Two represents the how to do document.

Where the user is responsible for producing the PSB and will be responsible for some element of the PPR then it is recommended that the user read both Part One and Part Two.

However where the user has a good understanding of the rationale and objectives of the Public Sector Benchmark and the Post Project Review it will not be necessary to read Part One.

Where the user has a supervisory role on the project they would need to familiarise themselves with the output from the PSB and ensure the PSB Construction Check List has been completed.
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Guidance Note – Part One

General Guidance
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Appendices- Part One

A. Local Government Policy Framework Document for PPP’s in Ireland
B. Proforma Format of Public Sector Benchmark
I. Introduction

Background

1.1 A Public Private Partnership (“PPP”) is a partnership between the public sector and the private sector for the purpose of delivering a project or service traditionally provided by the public sector. PPP’s are being used increasingly in the Water and Wastewater sector with the DBO contract being the preferred form of procurement.

1.2 PricewaterhouseCoopers together with its consortium partners RPS-MCOS were appointed by the Department of the Environment, Heritage and Local Government (the “DEHLG”) to construct a standard format for assessing and reviewing financial matters for Public Private Partnerships (“PPP’s”) in the Water and Wastewater services sector.

1.3 This assessment and review of financial matters will include the preparation of a Public Sector Benchmark (“PSB”) and a Post Project Review (“PPR”) document. This is in keeping with the Policy Framework Document for PPP’s - Project Implementation in the Local Government Sector issued by the DEHLG in December 2003 (the “Second Policy Framework” document).

1.4 This Guidance Note should be read in conjunction with:

- the Second Policy Framework document
- the Interim Guidelines for the provision of Infrastructure and Capital Investments through PPP’s the “Interim Guidelines”\(^1\)
- the Guidelines for the Appraisal and Management of Capital Expenditure Proposals in the Public Sector\(^2\)
- a Policy Framework Document for Public Private Partnerships the “First Policy Framework” document\(^3\)

Preferred Method of Procurement

1.5 To date the preferred method of procurement for Water and Wastewater projects has been the DBO approach. These guidelines are flexible in terms of whether a DB, DBO or a DBOF approach is being suggested.

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\(^1\) Issued by the Department of Finance – 2003
Structure of Guidance Note

1.6 The structure of the Guidance Note is as follows:

- **Section I** provides the background to the Guidance Note.

- **Section II** provides an overview of the methodology to be used. It provides an overview of the function of the PSB in public procurement. This includes a definition of the PSB, where a PSB is required in the context of the Second Policy Framework document and Interim Guidelines document, and highlights the importance of the output specification and the value for money comparison. This value for money comparison is critical in evaluating whether the private sector option delivered value for money versus the traditional procurement option.

- **Section III** deals with identifying the base costs or investment that the public sector would make under traditional procurement to be included in the PSB.

- **Section IV** goes on to explain how to incorporate the cost of risk into the PSB so as to arrive at a fully risk adjusted PSB. It further explains the rationale and methodology in applying discounting and sensitivity analysis to this risk adjusted PSB.

- **Section V** involves a description of the PPR stage so as to compare the outcome of the project versus the original projections in terms of time, cost, and quality standards.
II. Overview of Methodology

Second Policy Framework Document

2.1 The Second Policy Framework document and Interim Guidelines identify the stages in the PPP Procurement Process and the role of the PSB and the PPR within this process.

2.2 Section 2 of the Second Policy Framework Document sets out a route map entitled “Steps in a Public Private Partnership”. This sets out the stages/phases for a typical PPP Project undertaken by an Employer. This route map identifies where the PSB and PPR fit in the overall process. For the purposes of this Guidance Note the Contracting Authority is described as the Employer as defined in the Standard Contract Documents. The Second Policy Framework document is incorporated at Appendix A of this Part One.

Definition of the Public Sector Benchmark

2.3 A PSB as referred to in the Second Policy Framework document is a “comprehensive, detailed risk adjusted costing of the project elements using conventional procurement over the whole life of the project”. The PSB “focuses on whole life costs over the contract period and provides a detailed cost valuation of all risks (transferred and retained) within the project”.

2.4 This provides a benchmark against which the value for money of a PPP can be assessed. It should take into account all the assets, services, staff, consumables, and other elements required to deliver the project to the same standards and level of certainty required of the private sector under a PPP. To be a valid benchmark the PSB must also reflect the risk that additional costs may accrue to the public sector which, under PPP would be the responsibility of the private sector bidder.

2.5 It therefore comprises the following factors:

- The **base costs** that the Employer believes they would incur if they delivered the required services and performance in the public sector. These should take account of established good management practices in the public sector, such as design and build contracting and any efficiencies the public sector can be reasonably expected to achieve over time, but should exclude contingency amounts. Based on the best available public sector costing, the broad categories of costs will be Capital and Operating costs.

- For the comparison to be relevant, the costs of the PSB should be those required to achieve the new service level defined in the output specification for the project. However it may arise that the cost of procuring the same level of service through traditional procurement may be difficult to determine due to a lack of available information. In such circumstances the cost of the preferred PPP tender should be compared with the best available public sector costing (based on a lower or alternative standard). This lower or alternative standard needs to be recognised in the value for money comparison later in the process;
- **Transferred Risks** are risks which are to be assigned to the private sector and incorporated in the bidders priced tenders; and

- **Retained risks** are risks, which will reside with the Employer under both the PPP approach and traditional procurement. The cost of these items is likely to be similar for both traditional procurement and the PPP approach. But they need to be identified for two reasons:

  (i) firstly, so that there is a baseline for considering whether tenders have some impact on the cost of retained risks (for example by requiring marginally more land); and

  (ii) secondly, to establish that the Contracting Authorities can be satisfied that the total cost of the project, including items that are not covered in tenders, is affordable and manageable.

- **Shared Risks** are those risks that are shared by both the Employer and the Contractor. Where shared risks are identified, it is necessary for them to be examined in more detail to determine which element of the risk is to be retained by each party. In that way, for ease of risk costing, it is then possible to apportion the risk elements as either a Transferred or Retained Risk. This has been done in the case of the risk of unforeseen ground conditions, which has been divided into three separate risks (see Risks B1.4, B1.5 and B1.6 in Appendix F).

2.6 This is illustrated in the diagram below, which compares the PSB with the cost of the private sector bid (“PB”) and the simplifying assumption is that the PB came in at the same level as the PSB.

![Cost Diagram](image)

**Output Specification**

2.7 Implementation of infrastructure projects using a PPP approach requires a radical change of thinking from the approach adopted under traditional procurement. The PPP approach is output based as compared to the traditional approach, which involves specification of inputs to achieve the outputs.

2.8 The description of the output/operational requirements within the PPP process comprises an Output Specification. The initial Output Specification requirements should have been defined at the Project Appraisal and PPP Assessment stage.
2.9 A comprehensive and accurate Output Specification is an essential part of the procurement process and will underpin the entire PPP procurement. When preparing a PSB it is essential that the output specification has been defined and considered by the Employer as it will determine the costs to be included in the PSB. For example, the output specification sets out what the Employer wishes to achieve and the PSB should consequently illustrate the costs, which traditionally would have been incurred in order to achieve this output specification. It is recommended that sufficient time is invested in defining the output specification so that is reasonably robust and not subject to material change.

2.10 To ensure that the value for money comparison is valid, the output specification used in establishing the PSB should be the same as that utilised in preparing the contract documents on which the tenders are based. Any differences should be noted so that a realistic value for money comparison can be made.

**Value for Money Comparison**

2.11 The ultimate objective of preparing the PSB is:

- to form a basis by which the possibility of achieving value for money (or otherwise) can be established; and

- to establish an Affordability Cap for the project. The Affordability Cap will normally be the PSB submitted by the Employer or Sponsoring Agency and may include an agreed percentage margin. The Affordability Cap sets a cost limit which the private sector bidders cannot exceed. The Affordability Cap must be initially approved by the Sanctioning Authority and if, at any stage in the process the project exceeds the Affordability Cap, the Employer, must inform the Sanctioning Authority (in the case of PPP water and wastewater projects, the DEHLG).

2.12 This stage of the process illustrates whether the PPP approach has generated savings vis-à-vis the traditional procurement approach. This involves comparing the risk adjusted cost of designing and constructing a project traditionally to be operated by the Employer with the cost of doing the project via a PPP. The PSB represents an estimate of the cost of doing the project under the traditional approach, including the necessary adjustments in respect of the cost of risks transferred to the private sector. The most realistic cost of doing a project via a Public Private Partnership is the selected private sector preferred bid.

2.13 The ultimate value for money comparison can take place once the private sector bids have been received and have been evaluated to establish the cost of the bid and their consistency with the required risk transfer in the contract documents.

2.14 The comparison of the adjusted cost with the private sector bid should not be the only consideration. Other factors such as service quality, speed of delivery and wider policy objectives need to be considered and the lowest cost should not automatically equate to the best value. This is particularly important where the PPP option is close to the PSB on cost and in this situation these other factors would then be decisive.
2.15 Part Two of the Guidance Note incorporates more detailed instructions on the value for money comparison to ensure that the comparison between the PSB and the private sector bidder is on a consistent or like for like basis.
III. Contents of the PSB

3.1 This Section includes a brief description of the contents of the PSB while Part Two of the Guidance Note includes a more detailed description and explanation on How to Construct a PSB.

The Format of a PSB

3.2 The format described below and summarised at Appendix B is not a fixed format but rather an illustrative example of the elements that should be incorporated in a PSB. The precise format and structure of a PSB will vary from project to project and should reflect the particular aspects of that project. As discussed in Section II, the costs must reflect the defined output specification for the project. These costs should reflect where available previous experience of traditional procurement exercises including cost and time overruns.

3.3 The PSB for projects in the Water and Wastewater sectors should normally include the following elements:

- An Overview of the Project;
- Opportunity Costs/Benefits;
- Capital Costs including Plant Replacement Costs;
- Operating Costs;
- Risk Matrix;
- Discounted Cash Flow of the Project;
- Sensitivity Analyses; and
- Appendices.

Overview of the Project

3.4 The Overview to the project should incorporate the following:

- The purpose or objectives of the project;
- A brief description of the history of the project to its current status;
- An indication of the expected timing and phasing of the project;
- An overview of the project team and responsibilities; and
- A description of the scope of the project and the output specification.
Opportunity Costs/Benefits

3.5 Where a project involves the use of a pre-existing asset (cost) or the subsequent disposal of existing assets (benefit), which are owned by the Employer, the opportunity cost/benefit of these need to be incorporated in the PSB. Such costs or benefits should be incorporated at their fair value at the time that they are utilised in the project or realised, respectively.

Capital Costs, including Plant Replacement Costs

3.6 This Section should include an estimate of the basic costs of the capital assets, such as structures and buildings together with mechanical and electrical plant, equipment and instrumentation.

3.7 The capital costs included will depend on the output specification required and whether the proposed project is a new plant on a greenfield site or an upgrade to an existing plant on a brownfield site.

3.8 A comprehensive list of the type of capital costs that could be incorporated in the PSB are included in Part Two at Appendix B.

3.9 **Professional Fees** - Capital Costs should also include any professional fees that would be incurred in procuring the project under the traditional route. This should include any advisory fees, consultancy or architectural fees that are relevant.

3.10 **Employer Overheads** - Capital Costs should also include any Employer overheads which would be incurred in procuring the project under the traditional route.

3.11 **Plant Replacement Costs** - The capital costs should include not only the upfront capital costs but also the plant replacement costs to maintain the assets in the condition to deliver the output specification over the life of the contract. Where the output specification requires the “hand back of site and buildings to the Employer, such site and buildings being maintained to a standard that is appropriate to a modern water treatment facility and consistent with best industry practice” it is essential to implement a plant replacement programme to achieve this standard.

3.12 **Timing of Capital Expenditure** - It is important that the timing of the expenditure of the capital costs would accurately reflect the experience of the public sector so as to identify the differences in value vis a vis the private sector. The reason for this is two fold:

- Capital expenditure forms a significant part of the overall cost of the project; and

- The timing of capital costs has a significant impact on the overall Net Present Value “NPV” of a project.

3.13 The impact of the timing of capital expenditure is illustrated in the short example of the discounting process in Part Two at Appendix C.
**Operating Costs**

3.14 This section should include estimates of the operating costs required to provide the service specified in the output specification. The operating contract will commence on completion of the design build phase in the case of ‘greenfield’ projects and from the commencement date in the case of ‘brownfield’ projects.

3.15 Once a comprehensive list of operating costs has been established, any likely changes in the level of those costs over the operating period is then calculated.

3.16 A comprehensive list of the type of operating costs which could be incorporated in the PSB are included in Part Two at Appendix E.

**Risk Matrices**

3.17 A detailed risk assessment is required as part of the PSB analysis in order to identify and quantify the most significant risks in a project, and to consider how they might best be allocated. Section IV of this guidance note describes the methodology in identifying, assessment, allocation and calculation of the cost of risk. An extract of the proforma Risk Matrices for a PSB in water and wastewater sector are included in Part Two at Appendix G and I.

**Discounted Cash Flow**

3.18 The Discounted Cash Flow ("DCF") analysis is an important element in the calculation of the PSB. Appendix A at Part Two, when completed, will illustrate the cash flows of the operating and capital costs of the project together with the risk adjustments as quantified in accordance with Section IV. These cash flows will be generated over a number of years of the capital contract and operating contract.

3.19 These cash flows need to be discounted. The effect of discounting is to bring a variety of different values and ranges of future cashflows back to today’s values and to one single value.

3.20 This will produce the Net Present Value (NPV) of the stream of future cashflows. In the case of the PSB, the NPV is actually a net cost figure i.e. all the costs of the project to the client less any receipts associated with the project. The discount rate or rates to be applied to the cash flows should be as advised by the National Development Finance Agency. The process of applying these discount rates to cash flows is further detailed in Part Two. The rate should be applied consistently throughout the project.

**Sensitivity Analysis**

3.21 The final Net Present Cost (“NPC”) arrived at in constructing the PSB is dependant on the assumptions, which have been agreed by the Project Team. Sensitivity Analysis examines the impact on the NPC if these assumptions are varied.

3.22 Sensitivity Analysis also means that the Employer can look at specific variables within the PSB, which are beyond his control and look at different values for these.
This exercise also reinforces the fact that the construction of the NPC is not an exact figure but an estimate based on specific assumptions, which can vary. This provides a range of values for the NPC rather than a single estimate. The sensitivity analysis can also identify the point at which the changes in the assumptions are significant enough to change the conclusions drawn from the Net Present Cost calculation.

**Inflation**

3.23 Where the discount rates provided by the NDFA are nominal rates (which incorporate inflation) the cash flows incorporated in the PSB should also incorporate inflation. This is expected to be the standard or default position.

3.24 Alternatively if the discount rates provided are real rates the cash flows should not incorporate inflation. However adjustments can be made for expected changes in relative or real prices i.e. where the price of particular input is expected to rise faster than the average price level e.g. construction costs. These adjustments should only be made where these forecasts are based on reliable sources with a track record of accurate forecasts. If accurate forecasts are not available one can assume constant relative prices and perform sensitivity to reflect changes in the price of key inputs.

**Tax**

3.25 Unless there is clear evidence to illustrate that the traditional approach or PPP approach results in a significantly different inflows or outflows to the exchequer the assumption should be that there is no adjustment necessary to the PSB in respect of taxation. The rationale for this is that all forms of procurement result in tax payments back to the Exchequer e.g. through construction activity by private sector firms or public sector employees paying income tax etc.

**Assumptions**

3.26 In carrying out the construction of the PSB, which will be subject to review at the PPR stage, it is important to record all assumptions, and maintain appropriate documentation and record sources of information to support the conclusions reached. This ensures that at the end of the procurement process the differences between the PPP bid and the PSB can be fully understood and comprehensively evaluated.
**Decision Making**

3.27 The PSB informs the decision about value for money, but because of the number of variables involved in its computation it cannot be relied upon to give a definitive answer in the procurement process. It is the best estimate in light of the information available at the time.

3.28 It is important to recognise for decision-making purposes that the final NPC does not represent the **actual** cost but an **estimate** of the cost if the project was to be undertaken by the public sector in advance of a tender process.


**IV. Establishing Risks in the PSB**

**Introduction**

4.1 The purpose of this section of the Guidance Note in Part One and Part Two is to identify the risk elements associated with PPP projects in the Water and Wastewater sectors for which costings can be developed and incorporated in the PSB. These costings can then be used in the benchmarking of future projects. This section sets out a summary of the areas to be considered and Part Two provides an appropriate methodology for carrying out the risk assessment and in particular a method for evaluation and quantification of risk in monetary terms.

4.2 The methodology and advice provided have been developed with reference to Guidance Note 11 of the First Policy Framework Document and on the experience of Risk Assessment on a number of DBO projects in the Water and Wastewater sectors in Ireland. Reference has also been made to Public Private Partnership, Technical Note No. 2, Preparing a PPP Assessment Report (DoELG, 2001).

4.3 As detailed in Guidance Note 11, Risk Assessment is required to enable the objectives of risk transfer to be achieved. The assessment of risk is one of the most important activities in the development and procurement of infrastructure projects using a Public Private Partnership approach. This section should be read in conjunction with Guidance Note 11, which provides a comprehensive approach to Risk Assessment for PPP.

**Risk Categorisation & Identification**

4.4 Guidance Note 11 categorises risk under the headings of Planning, Design, Construction, Operating, Demand, Financial and Legislative. It has been found through practice that Demand, Financial and Legislative Risk can be incorporated into the first four risk categories.

4.5 Demand Risk relates to variation in the use of the service (i.e. variation in the demand for water by customers) and is specific to the operation of the facility. It is, therefore, considered more appropriate to include Demand Risk within the Operation & Maintenance category. Financial and Legislative Risk is common to all phases and has been incorporated into each of the four phases detailed below.

Risks have been categorised into four key phases as follows:-
4.6 Each phase is sub-divided into groups of risks, which have a common theme or may be inter-related in some way. The Risk Groups are outlined in Part Two and explained in detail in Appendix F of Part Two.

**Risk Assessment and Quantification Matrices**

4.7 Detailed Risk Assessment and Quantification Matrices have been produced as part of the development of these Guidance Notes. The Matrices are designed for practical use on PPP projects in the water and wastewater sectors and should provide a standard approach to Risk Assessment and Quantification. The Matrices for Risk Assessment and Risk Quantification are illustrated at Appendix G and I of Part Two respectively.

**Risk Allocation & Qualitative Assessment**

4.8 Part Two sets out a detailed methodology for this element of the risk allocation and qualitative assessment. Appendix G of Part Two sets out a matrix where risk can be allocated to either the Employer or the Contractor who will enter into a contract for the DBO project. A qualitative assessment must then be carried out to determine the probability of occurrence of each risk and the impact it will have on the project should it occur.

4.9 This risk allocation and qualitative assessment produces a list of high ranking risks for each project. Only those risks, which are considered by the project team to be high ranking are quantified in monetary terms. Risks need to be quantified in financial terms so that they can be evaluated in the context of the overall project cost.

4.10 Part Two sets out a detailed methodology for risk quantification. This methodology suggests the examination of risk under the headings of delay cost, material cost and consequential cost and provides suggestions for how such costs should be estimated and spread throughout the life of the DBO project.

4.11 Appendix H of Part Two provides worked examples of applying this methodology to the high-ranking risks for the particular project examined in the case study. The costings for the high-ranking risks are then incorporated in the Cost of Risk Matrix at Appendix I of Part Two and summarised at Appendix J of Part Two for inclusion in the PSB.

**Employer Retained and Transferred Risks**

4.12 The initial division of risks into those that are retained and transferred by the Employer is determined during the allocation of risk exercise, carried out during the early stages of the Risk Assessment. This allocation will be tested in the bid process to ensure optimum value for money.

4.13 The Employer Retained Risk costs will enable the Employer to quantify the risks he will have to carry during the contract and should enable the development of the Employer’s Risk Management Plan. It is important, for this reason, that the retained risks as well as transferred risks are quantified.
4.14 The Employer’s Transferred Risks, those transferred to the Contractor, and the Retained Risks are detailed at Appendix G of Part Two the costings of which are summarised at Appendix J of Part Two for incorporation in the PSB.

**Risk Management**

4.15 As part of risk management throughout the project it is essential, at the Risk Assessment stage of a project, to set out a management strategy and develop actions to ensure that the risk is managed effectively. This process is not essential to the quantification of risk but will provide the basis for the preparation of the Risk Management Plan, for risks to be retained by the Employer, as detailed in Guidance Note 11.

**Conclusion**

4.16 In summary Section I- IV of the Guidance Note outlines the methodology involved in preparing a PSB incorporates the estimated capital costs, operating costs and cost of risk of completing a project to a defined output specification under traditional procurement.

4.17 The following Section V outlines the methodology for the preparation of the Post Project Review document another key element in the system for assessment and review of PPP’s in the water and wastewater sectors.
V. Post Project Review

Rationale

5.1 The Post Project Review (“PPR”) is an essential stage in confirming whether value for money has been achieved, recognising efficiencies and updating costs and standards for future projects. For the purposes of these guidelines the focus is on the initial PPR that is carried out six months post the Design Build Phase. The rationale for the PPR review stage is two fold:

- To capture the evolution of the costs of the public sector versus the private sector over the period of the contract which will help assess the benefits of PPP as a procurement process; and

- To form a basis for more accurate costing of future projects. In utilising the costs for future PSB’s it is important to recognise that the updated costs are only relevant if they provide a more accurate representation of latest market prices from bidders for projects but are not utilised as a representation of public sector costs in the preparation of future public sector benchmarks.

Timing of the PPR

5.2 As indicated in the Second Policy Framework Document, the PPR should be carried out within six months of the end of the Design-Build phase and again at the end of the contract period.

5.3 The Second Policy Framework Document also requires that performance reviews, which are distinct from the PPR, should be carried out within one year of the commencement of the service and thereafter at intervals to be agreed with the DEHLG.

5.4 Final operating costs will not be available until completion of the contract. The Post Project review will not incorporate a review of operating costs until the completion of the operating contract. In the interim the Performance Management System will record operating costs throughout the operating contract.

Contents of a Post Project Review

5.5 For those projects where there is an identified requirement to complete a PPR, the PPR should contain the following elements:

- **Step 1: Overview of the project** – updating the documentation in respect of the project description for matters arising during the procurement and implementation stages;

- **Step 2: Prepare variance analysis on the project** – analysis of the performance to date of the project in comparison with earlier expectations in respect of time, cost and quality criteria; and
• **Step 3: Standardise database information** – standardisation of information for incorporation into the DEHLG cost database.

The activities identified in Steps 1 to 3 above are described in more detail in the Part Two of this Guidance Note.

**Step 1 – Overview of the Project**

5.6 The project overview that was developed for incorporation into the PSB analysis should be reviewed to confirm that the information continues to be relevant. This should be amended as necessary for the following:

- Any amendments or changes to the project such as amendments to the rationale, scope, output specification or risk allocation of the project;

- A description of the bidding process, a summary of the characteristics of the bid chosen and the rationale for the selection; and

- The current status of the project and any valid claims outstanding by the private sector bidder and the status of these claims.

**Step 2 – Prepare Variance Analysis on the Project**

5.7 Variance Analysis is required in order to analyse the performance to date of the project in comparison with earlier expectations in respect of time, cost and quality criteria. The process is a critical step in documenting experiences from a programme of projects and providing a basis for the comparison of individual projects against that programme. This document provides a framework for the preparation of the Variance Analysis exercise.

5.8 The principal steps in the completion of such an exercise are as follows:

- **Step 2.1: Compilation of data** – collection of specified key project metrics from differing stages in the project for comparative purposes, and arrangement in terms of time, cost and quality criteria;

- **Step 2.2: Investigation of variances** – interrogation of time, cost and quality data and investigation of any material variances that have arisen in respect of the project; and

- **Step 2.3: Commentary on variances** – provision of a commentary of the main reasons behind the material variances that have arisen.

5.9 The investigation of and commentary on variance analysis captures the evolution of costs of the public sector versus the private sector, which is essential in evaluating whether value for money has been achieved. Variance analysis can be sub-divided into time-based differences, cost based differences and quality-based differences. A more detailed description on how to complete this analysis is included in Part Two of this Guidance Note.
**Time-Based Differences**

5.10 This compares the time taken to complete various stages of the project versus the original estimates. The time taken to complete projects is a critical element in assessing whether projects have been completed efficiently or not.

**Cost-Based Differences**

5.11 As indicated in the Second Policy Framework document the PPR should include a variance analysis of the final outturn costs of the project compared against Initial Estimates, the PPP Assessment, the PSB, and the Final Contract Price. The final outturn cost should also be checked against the aggregate Affordability Cap.

5.12 In respect of each capital cost, operating cost and risk category (assuming the information is available) the PPR will include a variance analysis of the costs, which have been generated at various stages in the process. Because of the different level of detail that is available at the different stages of the process in some instances it may only be possible to compare costs i.e. total capital or operating costs on a summary basis where detailed information is available it may be possible to compare individual operating costs.

5.13 The output of this variance analysis then forms the basis for comparing the performance of projects against each other. It must be noted however that the validity and usefulness of variance analysis is dependent on the level of detail and comparability of the information prepared at different stages in the process.

**Quality-Based Differences**

5.14 The output specification sets out the performance requirements for the project. This element of the variance analysis should assess whether the key elements of the output specification have been achieved or not.

**Step 3 – Standardise Database Information**

5.15 The information captured in is Step 2.1 (Compilation of Data) should be extracted and incorporated in the DEHLG database. This database will be an important development in the public sectors knowledge base and critical for evaluating value for money on future contracts. (Note: all water/wastewater DBO contracts are procured through restricted procedure, so negotiation is not allowed).

5.16 As well as recording the actual outturns in respect of time, cost and quality, the variances data should be expressed on a percentage basis, so that a percentage range based on current or completed projects can be applied to future projects. These variances should be calculated in respect of the key project components for time, cost and quality criteria.
5.17 The suggested fields and format of the database should reflect the key requirements of its users for developing future contracts and negotiating PPP deals in the future. The information provided in the database is not an exhaustive list of the information that should be captured in the database. Additional fields should be added where they are considered to be necessary.

5.18 For cost data, the total costs should be recorded in a manner that allows comparison across a range of projects of different sizes and time periods. This can be done by expressing cost data in terms of the throughput of the plant or population equivalent as follows:

<table>
<thead>
<tr>
<th>Treatment Plant Type</th>
<th>Cost components per</th>
<th>Cost Rating Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Treatment</td>
<td>Cubic Metre (m$^3$)</td>
<td>Cost / million m$^3$</td>
</tr>
<tr>
<td>Waste Water Treatment</td>
<td>Population Equivalent (p.e.)</td>
<td>Cost / 10,000 p.e.</td>
</tr>
</tbody>
</table>
Appendices
Policy Framework for Public Private Partnership (PPP) in Ireland

Project Implementation in the Local Government Sector

November, 2003

**Foreword**

Public Private Partnerships have an important role in the Government's investment plans for public infrastructure and services. The aim of this document is to assist local authorities through the various steps involved in ensuring that suitable projects are chosen, that they are properly assessed, that the appropriate sanctions and approvals are obtained and that the project is managed in an efficient and effective manner.

The PPP model should only be used where it is appropriate and where it can deliver value for money. Typically, a PPP approach should be considered where there are major and complex capital projects with significant ongoing maintenance requirements. It should be used where the private sector can offer innovative design, management skills and risk incentivised expertise that can bring substantial benefits. The PPP model should not be used where the transaction costs of pursuing PPP are disproportionate compared to the value of the project or where fast-paced technological change makes it difficult to establish requirements in the long-term.

Under the PPP model contractors enter into long-term contracts and take responsibility for the quality of service they provide. To ensure the success of a project, there needs to be optimal sharing of risk between the public and private sector, with each partner retaining the risk which they are best placed to manage. The success of PPP arrangements depend in large measure on the continued engagement of both the public authority and the private contractor in a real partnership to deliver quality services to the public.

PPPs must deliver value for money. Enhanced competition, innovation, optimal risk transfer, the use of whole life costing, improved asset maintenance are some of the benefits of the PPP approach. But these potential benefits cannot be taken for granted and must be demonstrated in each case. A robust and transparent process for assessing the VFM of each project is therefore essential to underpin the case for PPP.

In order to assist in the assessment of what projects are cost effective the government, at the start of 2003, established the National Development Finance Agency [NDFA]. The NDFA provides financial advice to public bodies entering into PPPs. Its functions include assessing the optimal financing for major infrastructure projects set out in the National Development Plan and other infrastructure priorities.

This document seeks to bring together policy guidelines and regulatory requirements from a number of different sources. Guidelines issued by the Department of Finance on the carrying out of PPP projects refer to project Sponsoring and Sanctioning bodies. In the context of this document, local authorities are Sponsoring Authorities and the Department of the Environment, Heritage and Local Government is the Sanctioning Agency.
The means of procurement and the stage or stages at which the approval or sanction of the Department is required vary from sector to sector. Local authorities must ensure that the necessary approvals have been obtained before proceeding to procurement, such as:

- **Project approvals** - to obtain funding under a national investment programme, to proceed to tender or construction, to the form of contract or tender documentation, to sanction variations and cost increases and to the financial arrangements underpinning the project.


- **Approval to set up companies** - State Authorities (PPP Arrangements) Act, 2002 and/or sectoral legislation.

Throughout this document reference is made to other, more detailed, guidance that should be consulted by anyone engaged in managing a PPP project. The most important of these documents are:


- **Framework for PPPs [2001]**: Agreed with the Social Partners under the Programme for Prosperity and Fairness and published by the Department of Finance.

- **Interim Guidelines for the Provision of Infrastructure and Capital Investments through PPPs [2003]**: Procedures for the assessment, approval, audit and procurement of projects issued by the Department of Finance.

In January 1999, the DoEHLG established a dedicated Public Private Partnership Unit to promote and facilitate the development of PPP in the sectors for which the Department has responsibility. Further advice on PPP matters can be obtained by contacting the Unit at 8882000 / pppunit@environ.gov.ie.

Information on PPP projects, together with a range of supporting guidance and technical notes, can be found on the official government PPP website (www.ppp.gov.ie). For the local government sector there is also an online forum where participants can access information on previous projects, take part in discussions and make contact with other local authority staff engaged on PPP work.
PART 2

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1. Introduction to Public Private Partnerships

A Public Private Partnership is a partnership between the public and the private sectors for the purpose of delivering a project or a service traditionally provided by the public sector. Rather than simply providing an upfront asset to the specifications of the public sector, the private sector can be responsible for various elements of the project including designing, building and financing the asset, operating and maintaining the asset, and providing a long term service relating to the asset. This arrangement involves a transfer of risk to the private sector, and allows the local authority to draw on economic and other resources that might not have been otherwise available. In short, the public sector specifies the service outputs required and the private sector proposes the best means to achieve these objectives.

There are a range of contractual forms associated with PPPs. The most common in Ireland are:

- **Outsourcing and Service** contracts are a PPP relationship between the public and private sectors for the provision of a service and/or function for 5 or more years.

- **Design, Build & Operate** contracts are where the facility is financed and owned by the public partner. The private sector contractor designs and builds the facility to meet local authority requirements and is also responsible for operating and maintaining the facility for a predefined period, at the end of which the facility is transferred back to the public sector partner.

- **Design, Build, Operate & Finance** contracts are where the private sector contractor is responsible for the designing, building, operating and financing of the asset. The private partner recovers its costs out of annual payments from the public sector and after a predetermined period the facility commonly reverts back into public sector ownership. The private sector recovers its costs out of payments from the public sector.
- **Concession Contracts** are the same as DBOF contracts except that the private partner recovers its costs through direct user charges or through a mixture of direct user charges and public subventions.

- **Joint Ventures** are arrangements or companies through which private and public sector bodies come together in a long-term relationship to achieve an agreed set of objectives. Aspects of the project such as finance, operation, ownership, design and build are set out in the JV arrangement or based on the shareholders agreement for the JV Company. A JV arrangement is typically used in commercial or semi-commercial enterprises where profit sharing is favoured.

The general **vires** for local authorities to enter into PPPs can be found in the *State Authorities [PPP Arrangements] Act, 2002*. Local government legislation, and specific legislation dealing with housing, waste management and water services also contain provisions that support the use of PPP contracts.


There are also provisions within the *Planning and Development Act, 2000* that can be used to help implement PPP projects. Specifically, S49 provides for the use of supplementary levies to underpin PPP projects and Sections 4 and 179 allow private companies to enter into agreements with local authorities and use the procedures available to local authorities to obtain planning consents.
2. Steps in a Public Private Partnership

All public projects must go through a number of steps which serve to ensure that the project is properly examined and assessed, that the necessary statutory and administrative approvals are obtained and that the procurement process is carried out in an efficient manner.

Although not all projects go through exactly the same process, the following diagram provides a route map for a typical PPP project undertaken by a local authority.

<table>
<thead>
<tr>
<th>Stages/Phases</th>
<th>Decisions/Approvals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Identification</td>
<td>Local authority will undertake feasibility study or equivalent to determine the need for the project and outline the potential costs / benefits.</td>
</tr>
<tr>
<td>Options Appraisal</td>
<td>In most cases the approval of the Department will be required to proceed. The project may need to be included in an investment programme or sanction obtained to raise a loan. The NDFA will need to be consulted on major [&gt;£20 million] projects.</td>
</tr>
<tr>
<td>Investment Programme</td>
<td>The local authority and their advisers prepare an outline design for the project (including where required an Environmental Impact Assessment) and carry out a PPP Assessment where this approach is considered a likely option.</td>
</tr>
<tr>
<td>Approval as PPP Project</td>
<td>Approval as PPP Project</td>
</tr>
<tr>
<td>Appointment of Process Auditor</td>
<td>Appointment of Process Auditor</td>
</tr>
</tbody>
</table>
The local authority is responsible for preparing the project to go to procurement. This includes ensuring that the various planning and land acquisition and access consents are obtained. The scheduling of the statutory process phase may vary from project to project and also be undertaken in parallel with other activities.

Usually in parallel with undertaking the land acquisition and planning requirements on a project, the local authority and their advisers prepare the tender documentation. For PPP projects, a Public Sector Benchmark (PSB) study must also be undertaken.

The Department approves the project to go to procurement and sets an Affordability Cap on the project based on the PSB.

The local authority takes the project through the procurement process. Once this is done a Tender Recommendation Report is submitted to the Department.

Based on the Tender Recommendation Report the Department approves the project to go to construction.

The contractor commences construction with the local authority managing the contract, making stage payments and monitoring progress.

Variations involving cost escalation may need to be referred to the Department.

In due course and subject to satisfactory performance the local authority signs off on the commissioning of the works and the operational contract commences.

The performance of the project will be reviewed at a number of points during the contract and by different parties.
3. **Project Identification**

3.1 **Needs Assessment/Outline Business Case**

The local authority is responsible for the initial identification of the project. This may be based on a specific needs assessment or arise out of a regular review of investment opportunities and programme requirements.

Once the need or opportunity has been clearly identified it is up to the local authority to carry out an initial study into the scope and nature of the proposed project. Whether it is called a Feasibility Study, an Outline Business Case or some other term the broad intent is the same. In their initial appraisal of the project the local authority should:

- establish the business need,
- appraise the options for the delivery of the asset or service and
- prepare an initial estimate of costs and benefits.

It is essential to establish the business case for the project before coming to any conclusion about the possible use of a PPP approach. A PPP is only one of a number of ways in which a project can be delivered. It is sometimes the case, however, that even at this early stage the potential for use of a PPP [perhaps based on experience with other similar projects] is already evident. If this is the case then this should help inform the local authority in the way they approach the project and in their choice of external advisers.

On the basis that the potential for the use of a PPP approach is under active consideration for the particular project the local authority may wish to:

- undertake some market soundings especially if it is an unusual project which has not been brought to the market before,
- apply to the Department for a grant under the PPP Grant 'seed fund' Scheme [applies to projects outside of main investment programmes up to end of 2004]
- apply to the Department to include the project under one of the infrastructure investment programmes,
- seek initial approval from the Department to advance the project setting out the basis upon which it is to be funded. Approval of the Department will be needed to the raising of any loan finance and the advice of the Department [and the NDFA for major projects] will be required to determine the appropriate government accounting treatment for the project and if it can be allowed to proceed within Department of Finance approved financial envelopes.
3.2 Informal Market Assessment

Once the need for the project has been established or a business opportunity identified, the local authority must look at the possible solutions that would meet the objectives of the project. If this includes the possibility of involving a private partner the local authority may need to establish if there would be any market interest in the project.

**Market Soundings**

To measure the interest and capabilities of potential partners, the local authority would examine areas such as financial standing, technical capacity, management expertise and private sector experience in the area. For the project to be attractive to the private sector it should be large enough to encourage economies of scale so that the private partner can recover costs and make a profit. It will also depend on the bankability of the risk transfer proposed, along with the cost, length and complexity of the tender process. In order to hear the views of the private sector on a proposed project and to determine the potential for a PPP, the local authority should hold informal market soundings.

The informal market soundings will usually consist of meetings with the private sector, either individually or collectively. The project will be presented to a cross section of the private sector including those involved in construction, service and finance, and opinions will be expressed and discussed on all areas of the project. After the informal market sounding the local authority should have a clearer idea of whether the private sector is capable of providing the service/asset in a PPP and if there is a sufficient level of interest among the private sector to tender for such a project.

It is important that no sensitive information is divulged by either side at this stage in the process, and that no commitments are entered that would compromise the procurement of the project. This informal market sounding is merely to give the local authority an indication of the market, including whether there is likely to be a reasonable amount of competition for the project, and it should not give those involved in the discussions an unfair advantage over other potential bidders.

Market sounding may be carried out at any stage in the project prior to the commencement of procurement. For larger projects it may be necessary to undertake a more formal exercise to test the state of the market during the Options Appraisal Stage.

3.3 PPP Proposal

At the end of this stage the local authority should know if the project is to be considered as a potential PPP. If this is the case then the project will be classified as a 'PPP Proposal'.
4. Options Appraisal

If the local authority decides to initiate the project (after receiving any necessary approvals from the DoEHLG) the next stage will be the Options Appraisal Stage.

External technical, legal and financial advice is generally required on PPP projects. This will usually involve the local authority in appointing a Client Representative (which can be a consulting engineering firm or multi-disciplinary team depending on the size and scope of the project) which will be responsible for organising all aspects of the planning of the project.

Technical Note No. 1: The Appointment of Advisers in the Water Services Sector - provides information that may also be of interest to other sectors.

National Development Finance Agency [NDFA]

The NDFA provides financial advice on all major infrastructure projects, including PPPs. For projects costing more than €20 million their advice on financing the project must be sought. The Agency may act as financial adviser to local authorities where such independent advice is called for. Further details on the functions and duties of the NDFA and of the arrangements for dealing with them are set out in Appendix III.

As its name suggests, the option appraisal stage will examine the various options for carrying out the proposed project. If the preferred approach is a Public Private Partnership, the next steps would be decide what form of PPP to adopt, how the risks will be transferred between the public and private sectors and the procurement procedure to be followed when choosing a private partner. The option appraisal will involve a project appraisal, PPP assessment (including stakeholder consultation), statutory process assessment and a procurement procedure selection.

4.1 Project Appraisal

The Project Appraisal stage will result in an outline design/preliminary report, which will identify suitable options to meet service objectives and select the preferred option. The option chosen will depend on what best meets the strategic objectives and at the same time provide affordability and value for money. Technical consultants are usually appointed to undertake this stage and the appraisal will consist of constraint studies and preliminary reports which may include economic evaluations, cost estimates, outline requirements, site or route selection and environmental impact statements. This follows the traditional or conventional process. If PPP is perceived as a likely and affordable option then the contracting authority must prepare a PPP Assessment Report.
4.2 PPP Assessment

The PPP Assessment should help the local authority decide if the project in question is a potential PPP project, and if so what form of PPP is most appropriate. It will also determine the optimum allocation of risk between the public and private sector and the procurement procedure to be used. When preparing a PPP Assessment report full account should be taken of precedent reports in the same areas. The factors which will influence the outcome of the PPP assessment are:

- The nature of the project
  PPP arrangements are not suitable in all cases. A proper assessment, taking into account the nature of the project and any precedent projects that are known, must take place to confirm suitability or otherwise. As investment programmes progress it will become easier to determine the scope for PPP arrangements across the different sectors.

- The allocation of risks
  The local authority needs to assess the scope for transferring project risks to the private sector. If there is only limited scope then the prospects for a PPP are correspondingly diminished. The aim remains the optimal transfer of risks.

- Speed of Delivery
  The impact of using a PPP model on the project schedule needs to be carefully considered. Certain aspects of the project delivery may be speeded up by PPP but this must be balanced against the greater complexity of the contract and the time needed to procure it.

- Commercial Viability / Bankability
  If the project requires private finance to pay for it, the local authority needs to be confident that the market is willing to provide the investment needed. This requires consideration of the likely profitability of the venture but, for the local authority, also of the competitive environment within which procurement is to take place.

4.2.1 - Stakeholder Consultation
It is essential that persons and bodies that will be affected by the project should be consulted at an early stage and their views reflected in the PPP Assessment Report.

What is meant by Stakeholder:
- employees and trade unions or other employee representatives
- the general public, lobby groups, service users or their associations and public representatives.
Public Consultations
Existing legislation provides for public consultation in a number of areas – such as Planning and Roads legislation. Projects in the roads, water, waste and other sectors must be fully compliant in relation to these public consultation requirements.

The stakeholder consultation envisaged for PPP projects is in addition to the existing statutory processes.

Guiding Principles in relation to Stakeholder Consultation for a PPP project
In selecting, developing and implementing PPP projects, the economic, social and environmental concerns of those directly affected at both national and local level should be taken into account along with the statutory rights and legitimate economic interests of Stakeholders.

- the maximum level of information possible is made available to stakeholders in an accessible form
- the relevant stakeholders are informed of the existence of the Public Private Partnership project as soon as it is proposed; and
- systems are put in place at a local level to ensure that stakeholders are kept informed of significant developments throughout the process.

Insofar as it is possible, the involvement and co-operation of employees, trade unions and other local interests should be secured in advance of the procurement of a Public Private Partnership project. Stakeholders must not only have their statutory rights protected but also their legitimate economic interests taken into account.

Employee and Trade Union Consultation
The process of employee and trade union notification and consultation should commence as early as practicable, but in any event prior to the publication of any advertisement in the Official Journal of the European Communities.

An initial explanation of the project and the objectives that justify its development and procurement on the basis of a PPP should be made available upon request.

PPP Assessment Report
Consideration of stakeholder issues is a fundamental part of the PPP Assessment Report. Stakeholder issues should distinguish between those affecting employees and those affecting the general public.

In preparing a PPP Assessment Report, local authorities should identify issues which might impact on project delivery and develop an approach to deal with them. Details of consultations held should be outlined in summary in the Report, together with the proposed approach to stakeholder consultation during the course of project development.
Structures for Consultation

The Framework for PPP agreed by the Social Partners states 'Existing structures and agreements should be used to ensure extensive consultation and open communication in respect of PPP projects.'

The full extract from the Framework in relation to Consultation with Stakeholders follows:

Extract from Framework for Public Private Partnerships 'Working Together for Quality Public Services' paragraph 7. Consultation with Stakeholders

7.1 Stakeholders include employees and their trade unions, the public, the people who will use the assets and services provided, local community groups and sectoral interest groups. In selecting, developing and implementing PPP projects, the economic, social and environmental concerns of those directly affected at local level should be taken into account along with the statutory rights and legitimate economic interests of stakeholders in line with the NESC recommendations.

7.2 Existing structures and agreements* should be used to ensure extensive consultation and open communication in respect of PPP projects. Public service employees should be informed at the earliest possible stage of proposals for the introduction of PPPs and of significant developments throughout the process. They should also have the opportunity to contribute positively to the development of projects, building on progress in the development of workplace partnerships under the PPF. The partnership approach should be maintained throughout the project’s lifetime.

7.3 All parties to a PPP arrangement should have regard to appropriate industry norms in terms of pay and conditions and of prevailing national and/or industry-wide agreements including health and safety regulations. Such an approach should be consistent with protections provided under the Transfer of Undertakings (Protection of Employees) Regulations and the Acquired Rights Directive. PPPs should be approached on the basis that no less favourable terms than the Transfer of Undertaking Regulations apply.

* i.e. formal Partnership agreements and fora established under the Programme for Prosperity and Fairness (e.g. Public Transport Partnership Forum, Health Services Partnership Forum and the Local Authority Partnership Fora).

PPP Project Liaison Officer

To facilitate the consultation process envisaged it is desirable that Local Authorities give consideration to the designation of
an official as PPP Project Liaison Officer. It is envisaged that this official would be the first point of contact between the Local Authority and employees and their trade union representatives at both local and national level on PPP projects.

The Project Liaison Officer's functions would include advising of new PPP projects and reporting on the progress of existing projects, promoting co-operation in the successful development of PPP projects, and addressing potential difficulties as they arise. It is suggested that the Project Liaison Officer could be drawn from the Corporate Services Division of the Local Authority on the basis that they would be familiar with developments in the various PPP projects in the Authority across all sectors.

Given that specific expertise relating to any particular project would lie elsewhere within the Local Authority structure, the Project Liaison Officer would also redirect specific queries to the appropriate official of the Local Authority overseeing the project. This would ensure that such queries could be comprehensively addressed and that relevant information could be exchanged.

It is recommended that any such exchange of information would be routed via the Project Liaison Officer to facilitate their overall knowledge of the issues raised, thereby assisting them in the identification of any problems that might arise. Depending on the level of PPP activity, it is not envisaged that the role of Project Liaison Officer would need to be a full-time position.

Transfer of Undertakings (Protection of Employee) Regulations

The Framework for PPPs agreed by the Social Partners in May 2001 states clearly and unequivocally that 'All parties to a PPP arrangement should have regard to appropriate industry norms in terms of pay and conditions and of prevailing national and/or industry-wide agreements including health and safety regulations. Such an approach should be consistent with protections provided under the Transfer of Undertakings (Protection of Employees) Regulations and the Acquired Rights Directive. PPPs should be approached on the basis that no less favourable terms than the Transfer of Undertaking Regulations apply'.

In order to ensure the implementation of the above Regulations and the protection of the rights of employees, employers are obliged to:

- inform employees of the reasons for any transfer and the legal, economic and social implications of the transfer in good time before the transfer takes effect and
- consult with employees as to any new measures proposed with a view to seeking agreement

The main provisions of the Regulations can be summarised as follows:

- the rights and obligations of the Contracting Authority (the transferor) arising from a contract of employment or from an employment relationship which existed at the date of the transfer are, by reason of the transfer, automatically transferred to the Contractor;
- the transfer of an undertaking, business of part of a business does not constitute grounds for the dismissal of an employee by either the Contracting Authority or the Contractor. Such dismissals are prohibited except where there are economic, technical or organisational reasons entailing changes in the workforce;
• if a contract of employment or an employment relationship is terminated because a transfer involves a substantial change in working conditions which would operate to the detriment of the employee concerned, then the employer is regarded as having been responsible for termination of the employment.

• the rights of the employee that existed prior to the transfer are preserved after the transfer. The Contractor is obliged to honour all entitlements and will be bound by all collective agreements applicable at the date of transfer regardless of whether or not it had notice of such obligations or commitments, with the exception that it is not obliged to continue to provide pension benefits nor to observe the terms of any collective agreements concerning such benefits. However, the Contractor is obliged to ensure that pension rights are protected, although an Irish court has not yet clarified the precise meaning of this requirement— in practice liability may be apportioned by way of reciprocal indemnities.

Where a Public Private Partnership project is likely to involve the transfer of a large number of employees, the Contracting Authority should also consider the following actions:

• a copy of the Invitation to Tender or Invitation to Negotiate should be made available to employees and trade unions after it has been issued to tenderers; and

• tenderers should be provided with timely and accurate information in relation to the numbers, composition and terms and conditions of employees who could potentially transfer to the Contractor.

After a Public Private Partnership project has been awarded to the preferred tenderer, it is recommended that employees and trade unions are informed at the earliest point possible of any contract provisions that impact upon them.

Further information

- PWC Guidance Note Consultation 8 - Stakeholder
- A Policy Framework for Public Private Partnership Projects in the Water Services Section - DOEHLG August, 2001
- Public Private Partnerships in the Water Services Sector - Technical Note No. 2 - Preparing a PPP Assessment Report - DOEHLG August, 2001
- Framework for Public Private Partnerships agreed by the Social Partners (May, 2001)
- Briefing note No. 12 - Consultation with Stakeholders - DOEHLG August, 2002

Further information on the contents of the PPP Assessment Report are contained in Appendix IV.
**4.3 Risk Assessment and Allocation**

At various points during the project the local authority and there advisers will need to consider the key risks associated with the project and who is best able to manage them. One of the aims of PPP is to transfer risks to the private sector contractor [the Contractor] but one should not seek to maximise risk transfer but rather allocate risks to the party best able to manage them.

A Preliminary Risk Assessment is carried out at the Options Appraisal stage and will be reviewed periodically after this. The final allocation of risk between the parties should be reflected in the tender documents and in the final contract agreement.

<table>
<thead>
<tr>
<th>I. Risk Category</th>
<th>II. Allocation</th>
<th>III. Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning risk</td>
<td>May be retained by Contracting Authority for pilot projects</td>
<td>Further advice is provided in the separate Guidance Note entitled Statutory Process Assessment</td>
</tr>
<tr>
<td></td>
<td>However, there may be occasions when transfer in whole or part is appropriate or unavoidable</td>
<td></td>
</tr>
<tr>
<td>Design and construction risk</td>
<td>Transferred to Contractor through payment mechanism.</td>
<td>Contractor bears risk of cost and time overruns.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contracting Authority retains risk of changes to Output Specification</td>
</tr>
<tr>
<td>Operating risk</td>
<td>Transferred to Contractor under DBO, DBOF and Concession contracts through payment mechanism.</td>
<td>Deductions are made from payments for failure to meet service requirements</td>
</tr>
<tr>
<td>Demand risk</td>
<td>Often retained by Contracting Authority or shared.</td>
<td>An example of demand risk transfer is when the Contractor recovers its costs through user charges (e.g. road tolls).</td>
</tr>
<tr>
<td></td>
<td>May be transferred under DBOF and Concession contracts where the Contractor can control demand and forecast revenues with reasonable certainty.</td>
<td></td>
</tr>
<tr>
<td>Residual value risk</td>
<td>Retained under DB and DBO contracts</td>
<td>Contractor carries residual value risk if asset not automatically transferred to Contracting Authority at end of contract</td>
</tr>
<tr>
<td></td>
<td>May be transferred under DBOF and Concession contracts to ensure fitness for purpose throughout the duration of the contract</td>
<td></td>
</tr>
<tr>
<td>Other financial risk</td>
<td>Often transferred (or shared) under DBOF and Concession contracts</td>
<td>An indexation mechanism may be used</td>
</tr>
<tr>
<td>Legislative risk</td>
<td>Often retained (or shared). Government is often best placed to control regulatory and legislative risks</td>
<td>Key issue is whether the regulatory or legislative change is discriminatory in respect of the specific project or sector</td>
</tr>
</tbody>
</table>
4.4 Statutory Process Assessment

The statutory process involves obtaining the necessary permissions to undertake a project in accordance with law and regulations, to ensure that the project is carried out in an orderly manner and that its impact on the public and individual interest is taken into account. Statutory requirements could include obtaining planning permission or the preparation of an Environmental Impact Statement (EIS).

All statutory processes allow for public consultation, followed in some cases by a Public Inquiry. A Public Inquiry involves the appointment of an inspector who will investigate the scheme, and hear the opinions of those for and against the project. On the basis of the investigation, the inspector will submit a report on the outcome of the Inquiry to the relevant authority (e.g. the Department of Environment, Heritage & Local Government or An Bord Pleanala). The outcome of the statutory process could be obtaining statutory approval, obtaining approval but subject to conditions, or the refusal of permission.

The statutory process gives rise to significant risks including:

- Consent refused; or
- Consent granted, but
  - (a) the process took longer than expected;
  - (b) the process cost more than expected;
  - (c) consent is subject to a number of conditions.
- Risk of legislation changes leading to additional statutory process approvals

One of the principles of Public Private Partnership is that risk should be allocated to the best party able to manage it, and therefore any allocation of statutory risk to the private sector partner should only be considered if it offers greater efficiency and improved value for money. As part of the PPP assessment, risks should be identified and assessed and the nature of the project should determine whether some, all or none of the statutory risks could be transferred to the private partner. While there are some areas where the transfer of risk might not be possible (e.g. only the local authority would have the power to implement the statutory process for the compulsory purchase of land) transfer of risk to the private sector may be considered for the following:

- The private sector partner is capable of completing the statutory process in a faster, cheaper and more reliable manner;
- Transfer of risk is unavoidable as specific details of the project may be needed in order to achieve statutory approvals and these details may not be
known until the tenderer is selected and the project
details are decided upon:

- If a project is particularly innovative it might not be
  appropriate for the local authority to obtain statutory
  approvals that will leave insufficient scope for
  innovation.

The statutory process assessment will consist of the following
steps:

I. IDENTIFICATION OF RISKS

The local authority should identify the main activities and risks
associated with the statutory process for the project
concerned, and these should be listed in sequential order in the
form of a risk allocation matrix.

II. ALLOCATION OF RISKS

At this stage the local authority will assess the statutory risks
and allocate them to the most appropriate sector. In many
circumstances the local authority will be in a better position to
manage the statutory process risk due to its role in the provision
of public services, its legislative and regulatory authority, its
statutory responsibility and its familiarity with the process.
However, there are situations where it may be preferable to
transfer the risks to the private sector, while still making the
experience and expertise of the public sector available where
necessary.

The private sector may be more capable of managing the
statutory processes and risks in areas where they have greater
resources (e.g. skill and expertise) available and the transfer of
the risk could also incentivise the private sector partner to
complete the process in a faster, cheaper and more reliable
manner. Additionally, since a PPP often requires a Contractor to
operate and maintain an asset for a number of years (rather
than just build it) there is an incentive for a private partner to
reduce the whole life costs of a project. This can be achieved
through introducing new technology and exploiting economies of
scale, and transferring statutory process risks to the
Contractor provides them with greater scope for this type of
innovation.

When transferring statutory risks to the Contractor, the local
authority should consider private sector interest in managing
such risks and the resultant costs of the transfer. The private
sector interest in managing the risks can be measured through
market testing and precedent reviews. If it is found that the
private sector is not interested in accepting a risk over which it
has little or no control, it is likely to overprice the risk, which
leads to a lower value for money overall. The costs of transferring risks to a private partner are likely to be lower in certain circumstances, for example if the site is in ownership of the local authority and the proposed development will not alter existing use, the project will improve conditions of an existing facility or where the project has the support of the general public.

III. IDENTIFICATION AND SELECTION OF OPTIONS

The completed risk allocation matrix will present the optimum allocation of statutory risk between the local authority and the Contractor and will correspond to either a full retention of risk by the local authority or transfer (full or partial) of risk to the private partner. A full retention of risk will give the private partner less opportunity to innovate, but the views of the private sector can be solicited during the statutory process (however some private sector companies may be reluctant to aid this process where they are not guaranteed the end contract). Where risk is fully or partially transferred to the private sector the Contractor’s exposure to risk can be limited by the following:

<table>
<thead>
<tr>
<th>Caps</th>
<th>If the statutory process results in variations in the project details the Contractor would only be responsible for the resultant cost to a defined level (Cap)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long Stop Dates</td>
<td>If the Contractor has not received the required statutory approvals by this date, the contract can be terminated with appropriate conditions to compensate the Contractor.</td>
</tr>
<tr>
<td>Payment of Design Fees</td>
<td>The local authority could underwrite some or all of the fees associated with the statutory process, and would then pay these fees to the Contractor in the event of the statutory process failing.</td>
</tr>
</tbody>
</table>

If the local authority decides to transfer all or some of the statutory risks, the PPP procurement process should be completed and the partner selected prior to, or during, the statutory process. Alternatively, where the statutory process risk is to be retained by the public sector, the PPP procurement process will follow the statutory process. There may be a strong case for the use of the Negotiated procedure (see Section 6.1) when transferring risk, as it may difficult for tenderers to cost such a project without negotiation.
4.5 Procurement Procedure Selection

The purchasing of works, services and supplies by contracting authorities are governed by the EU and Irish Public Procurement rules. Contracts, which exceed a specified EU threshold are subject to EU Directives, and even where these directives are not directly applicable the general principles of the Treaty of Rome apply.


The basic principle of government procurement is that a procedure based on competitive tendering should always be used, except in exceptional circumstances. Every effort should be made to ensure adequate competition, and the contracting authority should aim to receive at least three realistic tenders in each case. In evaluating tenders, the contracting authority may decide which bid to accept based on either the lowest suitable tender or the most economically advantageous tender. If the Contracting Authority intends to use the latter method, it must state in the contract documents or in the award notice, which of the criteria it intends to apply to the award and if possible in order of their importance. The procedures used for competitive tendering will be the open procedure, where all interested parties may tender, or the selective procedure, where only short-listed firms who meet the pre-qualification criteria are invited to tender.

4.5.2 EU Procurement: Principles.

There may be instances where there is no strict requirement for local authorities to apply the EU rules to the selection process of a partner. However the principles derived from the EU treaties will apply and the local authorities should consider these when undertaking the procurement:

<table>
<thead>
<tr>
<th>Transparency</th>
<th>Procurement should be carried out with a degree of transparency.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal Treatment</td>
<td>All tenderers should be treated in an equal manner.</td>
</tr>
<tr>
<td>Mutual Recognition</td>
<td>Mutual recognition of technical specifications, educational qualifications etc across the member states.</td>
</tr>
</tbody>
</table>
Proportionality
Requirements must be proportional to the needs to be met.

4.5.3 EU Procurement : Directives

The EU public procurement market is a fundamental part of the Single Market and is governed by rules intended to remove barriers and open up competition between the member states. Once transposed into law, EU directives have a legal force in Ireland and therefore must be followed by contracting authorities where applicable. All contracts fall into one or other of the 4 following categories:

<table>
<thead>
<tr>
<th>Works¹</th>
<th>Building and civil engineering works.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplies</td>
<td>Procurement of products.</td>
</tr>
<tr>
<td>Services</td>
<td>Provision of services including engineering, architectural and other professional services.</td>
</tr>
<tr>
<td>Utilities</td>
<td>Covers contracts in the water, energy, transport and telecommunications sectors</td>
</tr>
</tbody>
</table>

Each category has a threshold above which the relevant Directive will apply. Thresholds are calculated every two years and last one came into effect in January 2002.

Further details on the EU procurement processes and of the thresholds that apply are set out in Appendix V.

¹ The Works, Supplies and Services Directives are collectively known as the ‘Classic Directives’.
4.6 State Aid

An important reason for being fair and open in the selection of a private partner is to ensure that the PPP does not contain a state aid element.

According to Article 87 of the EC Treaty, "any aid granted...which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods, shall, in so far as it affects trade between Member States, be incompatible with the common market".

Therefore, a local authority should be careful to ensure that any financial aid given in the event of a Public Private Partnership does not constitute State Aid under EU regulations. As the application of rules can be complex, legal advice on state aid issues should be taken in any case where uncertainty exists.

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**State Aid**

In order for a measure to be deemed to contain state aid, all of the following must apply:

1. The measure distorts or has the potential to distort competition.
2. The advantage must be granted by the state or through state resources.
3. The measure must affect competition and trade between the Member States.
4. The measure should favour certain undertakings or the production of certain goods.

State aid occurs when the public sector partner confers a financial advantage on the private sector partner that would not normally be received in the normal course of business. This can be direct aid (e.g. a government subsidy) or a more indirect aid (e.g. a deferral of tax).

Any potential state aid activity must be notified to the Commission and must receive prior approval before being put into effect.

While the general principle of the EU is that state aid is prohibited, there are several exemptions to this principle. Aids listed under Article 87(2) of the Treaty are considered compatible with the common market, while aids listed under Article 87(3) may also be compatible. Therefore aid to promote the economic development of areas with economic and social problems may be compatible with the common market.

The implications of State Aid in forming a PPP should be considered on a case-by-case basis. The first test (that the measure distorts or threatens to distort competition) could be important as benefits may accrue to the private sector partner or the ultimate customer. To reduce the danger of inappropriate state aid the local authority should use a fair and open procurement process, thereby reducing the likelihood of distorting competition. To avoid possible aid to the ultimate customer the end service/product should be sold at a fair and commercial price. In the event of a local authority forming a Joint Venture company, possible aid to the newly formed Joint Venture company can be avoided by ensuring that any assets transferred from the public sector to the new company are fairly valued.

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For further information on the ‘state aid’ rules see:

*State Aid – A Guide for Public Bodies in Ireland.*
4.7 Project Approval

Before a project can proceed to procurement as a PPP the approval of the Department must be obtained.

Approval of the project by the Department [for reporting purposes the project will henceforth be referred to as an 'approved' PPP project], subject to what ever conditions may apply, authorises the local authority to proceed to prepare the documentation and to obtain the necessary consents to enable the project to go to procurement.

At the same time as approving the project, for major infrastructure investments, the Department will appoint a Process Auditor, reporting to the Secretary General of the Department, to monitor and certify compliance with procedures.

The Process Auditor

Every major PPP project will have a Process Auditor [PA] appointed to it who will attend Project Board meetings and will certify that all the necessary procedures in the management of the project have been complied with. The PA operates in an independent capacity and reports to the Secretary General of the Department. The PA must be given access to all key documents on the project. Further details on the responsibilities and functions of the PA can be found in PPP Technical Note No. 3: The Role of the Process Auditor, issued by the Department.

Upon receipt of the approval to proceed with the project the local authority should undertake the following actions:

- appoint [or re-appoint] the external advisers to the project – the Client Representative

- establish [if this has not already been done] a Project Board chaired by the local authority, and including representatives from the external advisers, the Department and the NDFA [if involved]. The Process Auditor will also attend Board meetings. The purpose of the Board is to oversee the management of the project, it is not a formal decision making body.

- for very large projects with multiple clients / stakeholders it may be necessary to also set up a Project Steering Group. All major interests, including if requested the Department of Finance, will be represented on the Steering Group which will ensure that all parties are kept fully informed of developments and that the views of the different parties are fully known to the Project Board.

- update or prepare the business plan for the project, including a detailed schedule for the implementation of the project.
4.8 Management Systems

The local authority is responsible for the efficient management of the project. Before proceeding further with the project the local authority, in consultation with the Process Auditor, should take stock of the systems in place for managing the project.

The key points to be addressed are:

- organisation structure: The responsibilities of the participants on the project should be clearly set out. Most PPP projects will have a dedicated Project manager and it will be his/her responsibility to ensure that there is a proper record of all the key events / decisions.

- procedural rules: The smooth running of the project is greatly assisted if the 'housekeeping' rules e.g. organisation of meetings, recording of decisions, management of documentation, change control systems, sign-off etc., are properly laid out,

- project schedule: An implementation plan setting out the project tasks and dates for completion is an essential part of good project management. It is a requirement that such a plan be produced and forwarded to the Department as soon as possible after the receipt of project approval. The implementation plan should also identify any risks to the schedule.

- cost estimates: A robust, detailed and up to date estimate of project costs is essential to the proper running of the project. Any significant changes in cost estimates should be recorded and notified to the Project Board and to the Department.

The project manager [or the external advisers] should ensure that the management systems as set out above are properly documented. A project control document [referred to as a Project Initiation Document in the PWC Guidelines] should be prepared and maintained through the life of the project. An examination of this document will be an essential part of any subsequent audit of the project.
5 Statutory Process [and Pre-Procurement]

During this phase of the project the local authority will ensure that the various steps that are needed to prepare the project to go to procurement are carried out.

These steps can be broken down under the following headings:

- securing of public approvals / consents,
- acquiring of land and/or access to land as required
- the preparation of contract documentation
- the development of the Public Sector Benchmark
- further market soundings [if needed]
- pre-procurement notices.

5.1 Statutory Process

A PPP project does not differ from any other project in its requirement to obtain planning and other statutory consents. While it is usual in PPP projects for the public authority to obtain the necessary consents before commencing procurement, this is not always the case. The Statutory Process Assessment should have determined the extent, if any, to which statutory process risk is to be transferred to the private sector.

Where the local authority has decided to obtain the necessary consents these must be secured before the project can proceed to procurement. Confirmation of this in writing, setting out the details of the consents acquired, must be provided to the Process Auditor before this phase of the project can be counted as complete.

5.2 Land issues

Where the project requires that the local authority acquire land or access to land, legal title or legally binding commitments must be obtained before the project can proceed to procurement. Confirmation of this in writing, setting out the details of the issues involved, must be provided to the Process Auditor before this phase of the project can be counted as complete.

In some projects a transfer of property or land from a public authority will form part of the contract. Where this land is not being offered as part of a competitive procurement process a valuation of the property or land must be obtained.
5.3 Preparation of Contract Documentation

The local authority is responsible for preparing the tender / contract documents for the project and should be aware of Departmental guidance on contract conditions and instructions to tenderers. The development of standard conditions of contract is part of the ongoing work of the Department and over time it is expected that an increasing part of the PPP programme will be subject to standard conditions and procurement procedures.

FIDIC 'New Yellow' Book*

An example of the development of standard contract conditions has been the creation of new model contract for DBO waste-water treatment works based on the FIDIC 'New Yellow' Book. This model sets out the responsibilities of the different parties to the contract and conditions covering, inter alia, service delivery, delays, changes in law, change procedures, dispute resolution, residual risk value, contract termination, 'step-in' rights, compensation, insurance and warranties.

Although not all contracts take the same form, the main documents that will be required by the local authority are:

- the project agreement, that sets out the respective rights and obligations of the local authority and the Contractor,

- the instruction to tenderers, setting out the conditions that must be complied with by the bidders during the procurement process,

- the technical requirements, including the output specification and the technical and service requirements.

- Collateral Warranties and Direct Agreements, the former between the local authority and individual sub-contractors and design teams and the latter between the local authority and the private sector financiers [if any].

In broad terms during the contract preparation phase the local authority will have to decide on such matters as procurement management, the output specifications, risk assessment, payment mechanisms, key contractual issues and accounting treatment. There are PWC Guidance Notes under each of these headings.

5.4 Financial issues

The funding of the project, whether from EU, national or private sources, is something that should be known at this stage. Details need to be finalised before proceeding further. For major projects this will involve discussions with the NDFA. Associated matters that need to be addressed are the tax and accounting treatment of the project.

* This model is currently being pilot tested.
5.5 The Public Sector Benchmark

Before going to procurement the local authority must prepare a Public Sector Benchmark [PSB] for the PPP project. The PSB provides an estimated cost of the project were it to be carried out by traditional means. It is an important part of the process for ensuring value for money and as a tool for helping analyse the financial calculations behind the proposals from the bidders for the PPP contract.

The PSB contains commercially sensitive material and should be kept confidential to the Project Board. The PSB Report must be sent to the Department and the local authority and must await receipt of the Affordability Cap for the project, which is based on the PSB before commencing the procurement process.

The Public Sector Benchmark

The requirement for a PSB is set out in the Interim Guidelines issued by the Department of Finance. The PSB is defined as 'a comprehensive, detailed risk adjusted costing of the project elements using conventional procurement over the whole life of the project. The PSB focuses on whole life costs over the contract term and provides a detailed cost valuation of all risks (transferred and retained) associated with the project.\(^2\)

5.6 Pre-procurement notice

The local authority may issue a Prior Indicative Notice in the Official Journal of the EU [OJEC] at the start of the budgetary year to advertise the total procurement that the local authority intends to procure in the subsequent year (a PIN expires after 12 months). This is not a commitment and no prior approval of the Department is required.

5.7 Approval to commence procurement

Before commencing procurement proper the local authority will be required to obtain the approval of the Department to proceed together with the Affordability Cap for the project set by the Department. The Affordability Cap is the absolute limit on the outturn capital cost\(^3\) and if at any point in the procurement process it becomes evident that the Affordability Cap is likely to be exceeded then the local authority must immediately inform the Department where a decision will be made, in consultation with the local authority, on the future of the project.

\(^2\) Interim Guidelines for the Provision of Infrastructure and Capital Investment through PPPs, p13.
\(^3\) Ibid, p14
6. The Procurement Procedure

**ADVERTISE**
1. Place PIN in OJEC
2. Place RFT/Contract Notice in OJEC
3. Place other advertisements

**PREQUALIFICATION**
(restricted and negotiated procedures only)
1. Develop prequalification criteria
2. Receipt of Requests for Prequalification
3. Shortlist potential tenderers
4. Issue Invitation to Tender (ITT) (or an Invitation to Negotiate (ITN) depending on the procedure)

**TENDER EVALUATION**
1. Establish evaluation criteria
2. Receipt of Tenders/Proposals
3. Evaluation of Tenders/Proposals
4. BAFO Stage [negotiated procedures only]
5. Negotiations
6. Tender Recommendation Report

**CONTRACT AWARD**
1. Award Contract
2. Debrief unsuccessful tenderers
3. Place Award Notice in OJEC.
6.1 EU Public Procurement Procedures

Depending on the nature and size of the project, the local authority with be required to follow the procedures set out in the relevant EU Public Procurement Directive. There are three main procedures:

**Open Procedure** A single step process where all potential bidders are asked to submit tenders. Not generally used with PPP contracts.

**Restricted Procedure** A two stage process whereby shortlisted bidders are asked to submit tenders.

**Negotiated Procedure** A two stage process whereby shortlisted bidders are asked to submit tenders except that the procedure gives the local authority the opportunity to negotiate the terms of the final contract with selected contractors before awarding the contract. This procedure may only be used in a limited number of circumstances and local authorities need to be sure of their legal grounds before using this procedure.

Once the local authority has chosen under which directive and according to which procedure to procure the contract, it can then proceed to issue the required notices and draw up the criteria for short-listing and for assessing the submitted tenders.

**Further details on the EU Procurement Directives are contained in Appendix V.**

**Consolidated EU Procurement Directive**

The EU is close to agreement on the consolidation and updating of the Public Procurement Directives. Apart from streamlining the procedures and bringing them together under a single document, the new directive will facilitate electronic tendering, allow for the use of environmental factors as part of the award criteria and will introduce new procedures, 'competitive dialogue'. This last provision is of particular relevance for PPP projects as it allows for negotiation with bidders on design and other contract conditions prior to the submission of a final bid. At the time of writing the new directive has not been approved.
6.2 National Procurement Procedures

Because of their size it is unlikely that many PPP projects will come under the various thresholds that mean that the EU public procurement procedures must be used.

Where the estimated cost of projects is below the EU thresholds, national procurement rules still apply as well as the principles in the EC Treaty on fair competition.

6.3 General

Local authorities should be aware that procurement can be an expensive process for the bidders and all reasonable steps should be taken to limit these costs. At all stages the local authority should operate with the backing of legal input from advisers experienced in public procurement.

The Irish Public Sector Procurement Portal (www.etenders.ie) should be used in conjunction with OJEC for advertising tenders. A short notice in local or national newspapers is normal.

6.4 Tender Recommendation Report

Once the local authority has completed the evaluation of the tenders [and has finalised negotiations where the negotiation procedure is used], a Tender Recommendation Report [TRR] should be prepared and submitted to the Department.

The TRR should include the following elements:
- a short account of the procurement process,
- a list of all the companies who submitted expressions of interest and tenders,
- the evaluation and award criteria used,
- the basis for the decision to shortlist,
- the basis for the recommendation of the award of the contract,
- a short note on any issues of general significance that arose during the course of the procurement.

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4 The website was developed as an interim measure to publish public sector procurement opportunities as part of the Government Action Plan ‘Implementing an Information Society in Ireland’.
7.0 Construction and Operation

7.1 Approval to proceed to construction

The approval of the Department will be required to proceed to construction of a PPP project. In making its decision the Department will consider:

- the Tender Recommendations Report
- where a PSB/AC has been set, the cost of the project as set out in the TRR compared to the PSB/AC
- the compliance certificate* from the Process Auditor

The Department will consider and confirm the policy and economic justification for the project. It will also need to be satisfied that the proper procedures have been used in the procurement of the project and that there is funding of the project within the Department’s and Department of Finance’s investment programmes / financial envelopes.

On the basis that the Department is satisfied on the above counts, an approval to proceed with the construction of the project will be issued to the local authority.

7.2 Contract Award

It will be up to the local authority to complete any outstanding arrangements [e.g. warranties, insurance] and to award the contract.

Once the contract is signed it becomes the responsibility of the contractor to deliver the project on time and within budget. At the same time the local authority must continue to manage the contract and ensure that the requirements as set out are met.

The work of the local authority can be viewed under two headings:

- Contract Management, to ensure that the roles and responsibilities of each party are understood and fulfilled according to the provisions of the project agreement.

- Performance Management, which forms part of the contract management function, is the day-to-day assessment of the service provided.

* See Technical Note 3: The Role of the Process Auditor
7.2.1 Contract Management

The role of the Contract Management team is to monitor the service delivery and assess the performance of the project relative to the standards specified in the project agreement. The team should ensure the provision of a quality service to the end of the operating period by spot-checking and monitoring performance throughout the life of the project. An important element of contract management is to ensure that the level of risk transfer that was specified in the project agreement is adhered to; if risk passes back to the Contractor during the construction and/or operating period optimum value for money may not be achieved. Failure of the Contractor to comply with standards could result in enhanced monitoring, proposals for rectification or payment deductions.

The role of Contract Manager is an important one, as he or she will be the formal point of contact between the local authority and the private partner for the duration of the construction and operational phases. The job of Contract Manager can be a full-time one, depending on the size and complexity of the project, and the local authority should ensure that sufficient administrative support and technical, legal and financial advice are provided as necessary. The size and composition of the project team will depend on the nature of the project.

The contract management role commences at the award of contract stage and extends to the end of the operating period (i.e. for the remainder of the duration of the PPP project). The Contract Management structures should be put in place at the procurement stage of the project, to ensure that those involved are familiar with the details of the project and the project agreement. It will also give the Contract Manager the opportunity to influence the project agreement, to ensure that contract monitoring and auditing processes are clearly defined and directly support the principles underlying the charging or payment mechanisms. As far as possible the Project Management and Contract Management functions should overlap to ensure continuity, and in some cases the Project Manager might be appointed as the Contract Manager also.

During the construction phase the team's function will be to monitor the development of the facility, in terms of both quality and timescales. During the operational phase the team's concerns will include the availability of the asset, the provision of services in accordance with the Output Specification, compliance with appropriate environmental standards, authorisation of payments, dispute resolution mechanisms, the management of change and the hand back of the asset [where this is provided for] at the end of the contract period. In the event of underperformance, there should be provisions for payment penalties and ultimately for the termination of the contract by the local authority.
During the construction phase the Contract Management team will generally be led [or at least involve] the technical advisers to the project [Client Representative]. The Client Representative role may extend into the immediate period after commissioning of the works to ensure that performance standards are being met, but as soon as possible after the commencement of service the local authority should assume full responsibility for the management of the contract. This does not preclude the local authority seeking assistance from external advisers from time to time as particular issues arise.

7.2.2 Performance Management

Key to the successful management of any PPP contract is the setting up of monitoring and control systems to ensure that the performance standards set out in the contract are met.

In some sectors [e.g. Water Services] there may already be a standard Performance Management System [PMS] that can be used by the local authority. In other cases systems will have to be put in place for the individual project. Such systems will need to details the procedures for reporting and auditing purposes and to deal with health and safety and emergency arrangements.

**Performance Management System [PMS] for Service Phase and Operational Contracts in the Water Sector. [Sept 2002]**

The PMS developed by the Water Services National Training Group [WSNTG] for PPP projects within the water sector sets out the detailed procedures for dealing with all aspects of the day to day running of the works/plant, the reporting arrangements, including the forms to be used and how these should be completed, how to register accidents and other events, what measures should be in place to deal with emergencies, the setting up of a complaints register and so on. Although designed for use in water services, the PMS provides a useful model for other sectors seeking to put in place systems for performance management.
8. REVIEW OF PPP PROCESS

It is a standard part of each PPP project that the whole process, from the project identification through to the operational phase and hand-back of the asset should be subject to formal review.

Project review is intended to:

- help public sector managers engaged in future PPP projects,
- provide data on costs as an input to assessments [Public Sector Benchmarks] of subsequent PPP projects,
- provide the public authorities with information on the economic benefits, or otherwise, of the PPP approach over alternative procurement approaches.
- identify strengths and weaknesses in the systems in place for managing PPP projects.

8.1 The Review Process

Because of the length of time before a PPP project can be said to be completed, there are a number of studies at different stages in the process.

The required review studies are:

<table>
<thead>
<tr>
<th>Title</th>
<th>Timing</th>
<th>By whom</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Audit Report</td>
<td>End procurement</td>
<td>Process Auditor</td>
</tr>
<tr>
<td>Post Project Review</td>
<td>End Construction</td>
<td>Independent or PA</td>
</tr>
<tr>
<td>Final Accounts</td>
<td>After all claims have been resolved and payments made post-construction</td>
<td>Client Representative</td>
</tr>
<tr>
<td>Performance Reviews</td>
<td>Within year of commencement of service and thereafter at agreed intervals.</td>
<td>Local authority</td>
</tr>
</tbody>
</table>

8.1.1 The Final Audit Report [FAR]

The FAR should be compiled by the Process Auditor as soon as possible, but not later than six months, after the award of the contract. The Report should contain the following:

- a brief outline of the project,
- a list of stakeholders/participants on the project and their respective responsibilities,
- a checklist of the documents produced and of the key events/decisions during the project,
- details of the procurement process
- costs estimates at various stages in the project, including the PSB, the Affordability Cap and the final Contract Price.
8.1.2 Post Project Review [PPR]

The PPR should be produced within six months of the completion of construction of the works. The PPR should be prepared by a person [who can be the Process Auditor for project where one is appointed] not directly involved in the management of the project. The purposes of the PPR is to provide details of the final outturn costs [with estimates where claims are still outstanding] and an assessment of the performance of the different parties to the project.

The PPR is likely to be compiled from material supplied by the Client's Representative, the local authority and the Department and to have regard to the FAR produced by the PA [where available].

The PPR should contain the following:

- a brief description of the project,
- an outline of the project history with key decisions /events highlighted,
- a variance analysis of the final outturn costs of the project compared against initial estimates, the PSB, Affordability Cap and the Final Contract price. [Note the figures in the variance analysis are to be updated by the Department when the Final Accounts are completed]
- an analysis of the time taken to complete different stages of the project compared with projections,
- the extraction of selected costs for the Department's database of costs on PPP projects [selected programmes]

8.1.3 Final Accounts

Final project accounts following resolution of any outstanding claims and the making of final payments. The figures should be used by the Department to update the variance analysis in the PPR.

8.1.4 Performance Reviews

Reports detailing the performance of the plant/works against the output requirements set out in the contract. Summary details of any contract variations, cost increases or financial penalties should be included. The first performance review should be sent to the Department within one year of the commencement of the service and thereafter at intervals to be agreed with the Department.

8.2 Termination of Contract

The Department should be informed immediately if the contractor issues a notice of termination of the contract and the Department should be informed in advance before the local authority issues a notice of termination.
9. EXPIRY OF CONTRACT

For most PPP projects that include an operational phase (e.g. DBO, DBOF, Concession), the asset will revert back to the local authority at the end of the contract. The conditions governing the hand-back will be set out in the original contract and are designed to ensure that the asset is handed back in good condition and fit for continued service.

If the hand-back of the asset leads to any liabilities the local authority should allow for these, and a decision should be made regarding the future of the service. If the local authority decides to continue providing the service in partnership with the private sector, and unless there is a provision in the original contract for an extension of time, a new procurement exercise must be organised.

The employees of the facility should also be consulted and their rights under TUPE *considered before any decisions are made about the long term future of the service.

*Transfer of Undertakings (Protection of Employees) Regulations.
Appendix I  The PPP Grant Seed Fund Scheme

This Fund for local authorities was launched in December, 1999. The funding available is €5.078m. The Fund will end in December, 2004.

The reason for setting up the Fund was the considerable potential for developing PPPs in other areas such as leisure facilities, alternative energy, car parks, urban development, environmental initiatives, etc.

Further information:
This Circular gave details of the setting up of the Fund and the conditions applying to it. Funding was to be confined to projects outside of the mainstream investment programmes. Grants from the Fund were to be used to meet the start-up costs of projects such as feasibility studies, planning and design costs, preparation of business plans, independent advice etc. Projects had to be considered to be commercially viable. Assessment of projects was to be based on criteria of importance of services/assets provided for the community, commercial viability, value for money, innovation and replicability.

This Circular notified local authorities that the Fund had been extended for a further two years until the end of 2004. Some changes were also made to the conditions applicable to the Fund. The level of grant aid which was previously available of 100% was reduced to 40% to 60% depending on the merit of the proposal. The Circular also stated that priority for funding would be given to priority sectors such as housing and urban renewal, new and innovative projects outside categories approved to that time, applications from local authorities who had not previously submitted applications and applications for the ‘start-up’ phase of projects.

The purpose of this Circular was to remind local authorities interested in making applications under the Fund of the conditions attached and to encourage them to start work on preparing necessary material in support of applications as the Fund would be expiring at the end of 2004.
Appendix II The duties and functions of the NDFA

National Development Finance Agency Act, 2002

The National Development Finance Agency (NDFA) was established on 1 January, 2003 under the National Development Finance Agency Act, 2002. The main functions of the NDFA are to:

- provide financial advice to State Authorities, including local authorities, to assist in the evaluation of financial risks and costs of infrastructure projects and to facilitate them in availing of the best financial package for each project. The NDFA will also advise on project insurance costs.

- assess the optimal financing for major infrastructure projects as set out in the National Development Plan and other infrastructure priorities.

- raise finance for projects (including PPP projects) where this could be more cost effective than private funding and where, in the case of conventionally procured capital projects, there are clear financial benefits in using Agency funding over Exchequer funding; and

- create special-purpose companies that can raise project finance with guarantees, raise revenues from projects with user charging and receive land or other property assigned or transferred from local authorities for use in financing infrastructure projects.

The legislation establishing the NDFA places a number of obligations on local authorities. In instructions issued by the Department of Finance these obligations are to be seen as follows:

- For all major projects and grouped projects with capital costs estimated to exceed €20 m, to seek the advice of the Agency on how best to finance the project as soon as practicable before commencement of the project;

- For projects where local authorities intend to appoint financial advisers, to ask the NDFA to act as financial adviser. Where the NDFA agrees to act as
financial adviser to a project, they would expect to be represented on the Project Board and to have access to all relevant correspondence and documentation:

- For projects involving the use of private finance, to provide the NDFA with the opportunity at an early stage of reviewing the financing options, including where appropriate, providing the funding itself.

Further Information:
- Interim Guidelines issued by the Department of Finance on 7 July, 2003 i.e Procedures for the Assessment, Approval, Audit and Procurement of Projects’

Memorandum of Understanding between the Department of the Environment, Heritage and Local Government and the NDFA

The purpose of the Memorandum of Understanding is to document the modus operandi between this Department and the NDFA in relation to financing for public investment projects.

Paragraph 7 of the Memorandum outlines the circumstances in which this Department will seek advice on the best financing approach for major capital projects, on its own behalf and on behalf of local authorities and other bodies under its aegis for the following:

- All projects with a capital value of €20 million or more.
- Groups of projects with a capital value exceeding €20 million.
- Capital Programmes containing projects or groups of projects valued at more than €20 million.

Projects will be referred to the NDFA for financial advice as soon as practicable after they have been approved to proceed to procurement. Paragraph 9 of the Memorandum outlines when it is appropriate to seek such advice in the water services, waste, local government and housing sectors and for relevant capital programmes.

Projects, groups of projects and programmes will be submitted to the NDFA by the Department [IPPP Section]. If local authorities approach the NDFA directly, the NDFA will inform this section accordingly.
The type of material to be submitted to the NDFA in support of a request for advice is outlined in Paragraph 12 of the Memorandum.

The Memorandum also provides (Paragraph 13) that the NDFA may, on request, provide advice on the development of Public Sector Benchmarks.

Paragraphs 14 to 19 of the Memorandum deal with issues of Financial Consultants/Insurance Brokers, including situations where local authorities have project teams in place already which include financial consultants or external advisers providing a range of information, including financial information.
Appendix III The PPP Assessment Report

A PPP Assessment Report should contain the following Sections:

I. EXECUTIVE SUMMARY AND MAIN CONCLUSIONS
This should be one to two pages in length and be written as a releasable document that should not contain any confidential or commercially sensitive information.

II. INTRODUCTION AND SCOPE OF ASSESSMENT
A short outline of the nature of the project, the scope of the PPP assessment and the key issues to be addressed.

III. INITIAL OUTPUT SPECIFICATION
An initial output specification defines the services and outputs required by the local authority. For traditional projects the Contracting Authority and its advisors prepare detailed specifications that describe the works required for a particular service, but for a PPP the focus is on the objectives rather than the means of achieving these objectives. The output specification should be flexible enough to allow innovation in asset design and service delivery, and therefore achieve the best possible value for money. The output specification should be developed from material gathered from the project appraisal stage (implementation plan) and the objectives should be specific, measurable, achievable, realistic and time-bound. A more developed output specification should be included in the tender documents during the procurement stage.

IV. VALUE FOR MONEY (VFM) ASSESSMENT
The value for money assessment is crucial, as the PPP should only be carried out where it is expected to deliver greater VFM than if the project was procured in the traditional way. The factors that will determine VFM should be identified and then each PPP option should be assessed in relation to its potential to deliver VFM in relation to these factors. Such factors may include:

- Reduced whole life costs
- Better allocation of risk
- Improved quality of service
- Speed and ease of implementation

A precedent review examines the experience of similar projects both nationally and internationally that have been procured using a PPP approach, and the local authority should look at the overall savings achieved through the use of PPP, as well as identifying particular aspects of the project that might be improved upon and thus provide a greater potential for VFM. Informal market soundings, where agreed with the Department, may also be used to assess VFM.

This assessment should conclude with the most appropriate form of PPP to deliver VFM, along with the parameters that should be used to assess VFM at the procurement stage.

The development of a Public Sector Benchmark (PSB) is required to allow the Sponsoring Agency to validate the continuation of the procurement process. The PSB should consist of a comprehensive, detailed risk adjusted costing of the project elements using conventional procurement over the whole life of the project. This is similar in many ways to the Detailed Appraisal in the Guidelines for Capital Appraisal, however, the PSB focuses on whole life costs over the contract period and provides a detailed cost valuation of all risks (transferred and retained) within the project.
The Sponsoring Agency/Project Board and its advisors compile the PSB which is derived from detailed output specifications. If necessary, a shadow bid may be used to assist in the determination of project cost. While it may not be possible to estimate all costs to a high degree of certainty, it is essential that a best estimate is made and supplied to the Sanctioning Authority for use in setting an Affordability Cap (see below). Upon receiving the PSB the Sanctioning Authority should compare it with the Preliminary Assessment outcome and satisfy themselves that the benefits of proceeding with the project outweigh the costs. Once agreed, the Public Sector Benchmark does not change throughout the procurement process. The Department of Finance Public Private Partnership Unit will provide more detailed guidelines on the structure and variables (e.g. the discount rate for the PSB). In addition the NDFA may also on request provide advice on the development of PSBs for Projects on behalf of the sponsoring body.

V. PRELIMINARY RISK ASSESSMENT

A risk is any factor, influence or event that can become a potential threat to the successful completion and operation/maintenance of a project. The consequences of risks can be measured in terms of cost, time or quality and the degree of risk transfer will depend on the nature of the project. The preliminary risk assessment will identify and quantify the key risks associated with the project and will determine the optimal allocation of risk between the sectors.

Carrying out a preliminary risk assessment should include the following steps:

- Identify the main risks associated with the project, by analysing the experience of any previous projects of a similar nature and by conducting a workshop involving all the relevant sections within the local authority to ensure that all key issues are highlighted;
- Develop a risk matrix for the project, concentrating on major risks only and include an initial determination of the proposed allocation of risks;
- Prepare a plan for the management of risks that will be retained by the local authority, this does not need to form a part of the PPP Assessment Report;
- Assign monetary values to the main risks, a general estimation of the costs is sufficient at this stage.

A major part of the preliminary risk assessment involves consideration of the statutory process risks – see Section 4.3 of this document.

VI. BANKABILITY ASSESSMENT

A PPP assessment should include an assessment of project's ability to attract private finance where needed. The providers of finance will look favourably on characteristics such as bankable and secure cash-flows, opportunity to innovate and appropriate risk transfer. This assessment will generally be based on precedent review and where agreed with the Department, market soundings.

Optional Market Consultation

The EU Procurement Directives provides for an optional Market Consultation Procedure in order to establish whether the market has an interest in, and the capacity to deliver, the proposed PPP project. This exercise does not commit the State Authority to the procurement of the project. Market consultation may be needed to:

- identify or clarify suitable options or solutions;
- determine the bankability of, and the market interest in the proposed project;
- evaluate the risks that will be transferred; and
- assess the private sector's willingness to accept the required degree of risk transfer.
Market evaluation may begin when it has been decided that the project will be procured by means of a PPP arrangement. It must end when a call to competition is published after which time no market consultation may be undertaken. As noted earlier the project advisors will provide specific advice on this.

VII. LEGAL VIABILITY ASSESSMENT
Any legal issues that need to be addressed before entering into a PPP arrangement should be examined at this stage. While the State Authorities (Public Private Partnership Arrangements) Act, 2002, provides the legal certainty as to the powers of State Authorities to enter into PPP arrangements and form joint venture companies, additional legal issues should be considered.

These issues could include the implications of entering a PPP for existing employees of the local authority and the ability of the private partner to introduce user charges on a public service.

The conclusion of this element of the report should highlight any legal difficulties which would preclude or delay the advancement of the project using PPP arrangements, and where appropriate advise on any steps which could be taken by the local authority to manage this process.

VIII. STAKEHOLDER CONSULTATION
In the development of a PPP project the economic, environmental and social concerns of all those directly affected (the 'stakeholders') should be taken into account. Stakeholders will include employees and their representatives, the general public, service users, lobby groups and public representatives. Structures should be put in place to ensure extensive consultation and open communication between the local authority and stakeholders, while taking care not to divulge commercially sensitive information that will give an unfair advantage to competing tenderers. The local authority must pay attention to the Freedom of Information Acts, 1997 and 2003, which state that members of the public should have access “to the greatest extent possible consistent with the public interest and the right to privacy, to information in the possession of public bodies”. The local authority should also consider the commercial reality; that a Contractor is unlikely to complete a PPP transaction if there exists the potential for future industrial relations issues or public dissent.

The Framework for PPPs agreed by the Social Partners states that all parties involved in a PPP must have regard to the appropriate industry norms in terms of pay and conditions, and of prevailing national and/or industry-wide agreements including health and safety regulations. It also states that PPPs should be approached on the basis that the European Communities (Safeguarding of Employer’s Rights on the Transfer of Undertakings) Regulations, 1980 & 2000 apply, which allow for protection of employment terms and conditions, and information and consultation.

As outlined in the Department of Finance Framework for Public Private Partnerships, which was launched in November 2001, “all parties to a PPP arrangement should have regard to appropriate industry norms in terms of pay and conditions and of prevailing and/or industry-wide agreements, including health and safety regulations. Such an approach should be consistent with protection provided under the Transfer of Undertakings (Protection of Employees) Regulations and the Acquired Rights Directive. PPPs should be approached on the basis that no less favourable terms than the Transfer of Undertakings Regulations apply.”

In the light of the foregoing, it is recommended that existing structures and agreements, such as those established under the Programme for Prosperity and Fairness, and its
successor, "Sustaining Progress", should be used to ensure extensive consultation and open communications in respect of PPP projects. Employees and trade unions should be kept informed by the local authority from the outset of the progression of a PPP, particularly where there are issues regarding the transfer of staff from the Local authority to the private sector operator. Similarly, they should be advised of significant developments throughout the process. The opportunity should also be afforded to them to contribute positively to the development of projects, particularly where they would have had direct input into/experience of the delivery of the service in question prior to its development as a PPP project. This approach can assist in contributing to the development of workplace partnerships under the Programme for Prosperity and Fairness and Sustaining Progress. This partnership approach should be maintained throughout the project's lifetime.

To facilitate the consultation process outlined in the previous paragraph, it is desirable that Local Authorities give consideration to the designation of an official as PPP Project Liaison Officer. It is envisaged that this official would be the first point of contact between the Local authority and employees and their trade union representatives at both local and national level on PPP projects. The Project Liaison Officer's functions would include advising of new PPP projects and reporting on the progress of existing projects, promoting co-operation in the successful development of PPP projects, and addressing potential difficulties as they arise. It is suggested that the Project Liaison Officer could be drawn from the Corporate Services Division of the Local authority on the basis that they would be familiar with developments in the various PPP projects in the Authority across all sectors. Given that specific expertise relating to any particular project would lie elsewhere within the Local authority structure, the Project Liaison Officer would also redirect specific queries to the appropriate official of the Local authority overseeing the project. This would ensure that such queries could be comprehensively addressed and that relevant information would be routed via the Project Liaison Officer to facilitate their overall knowledge of the issues raised, thereby assisting them in the identification of any problems that might arise. Depending on the level of PPP activity, it is not envisaged that the role of Project Liaison Officer would need to be a fulltime position.

IX. INDICATIVE IMPLEMENTATION PLAN
After considering all forms of PPP, the assessment should conclude with a summary of the main findings, the comparative benefits of a conventional and PPP procurement and a recommendation on the preferred form of PPP. By examining initial output specification, value for money, preliminary risk, bankability and legal viability the local authority should be in a position to measure and weight the costs and benefits associated with each form of PPP. Additionally the optimum scope for the PPP project should be determined, i.e. the size of the project and the geographical area it will cover, the range of services covered and the bundling of projects. When determining the preferred PPP option and the optimum scope of the project the local authority should be mindful of VFM considerations.

The Indicative Implementation Plan should include conclusions of the Statutory Process Assessment and the Procurement Assessment, along with the organisational structures that should be established to manage procurement and a timetable with target completion dates.
EU Procurement: Principles are discussed in Section 4.5.2 of this document (Transparency, Equal Treatment, Mutual Recognition and Proportionality).

EU Procurement: Directives are referred to in Section 4.5.3 (Works, Supplies, Services, Utilities).

EU Public Procurement procedures (Open, Restricted, Negotiated) are referred to in Section 6.1 of this document.

**Time Scales for EU Procurement Procedures**

- For the open procedure the time limit for the receipt of tenders\(^5\) from the date of the dispatch of the notice to the date of the receipt of tenders should not be less than 52 days\(^6\);

- For the open procedure (Works & Services Directives) the time limit for the receipt of tenders from the date of the dispatch of the notice to the date of the receipt of tenders should be reduced to 36 days where the local authority has included the tender in a PIN at least 52 days and at most 12 months before the contract notice;

- For the restricted and negotiated procedures the time limit for the receipt of requests for participation from the date of the dispatch of the notice should not be less than 37 days;

- For the restricted procedure the time limit for the receipt of tenders from the date of the dispatch of written invitations to tender should not be less than 40 days;

- For the restricted procedure (Works & Services Directives) the time limit for the receipt of tenders from the date of the dispatch of written invitations can be reduced to 26 days where the local authority has included the tender in a PIN at least 52 days and at most 12 months before the contract notice;

- Provided they have been requested in good time, contract and support documentation should be sent out to suppliers 6 days after the application;

- Provided it has been requested in good time, additional information should be sent out to suppliers not less than 6 days before the closing date;

- Where contract documents, supporting documents or additional information are too bulky to be supplied within the said time limits, or where tenders can not be realistically provided without an on-the-site inspection of the documentation or a visit to the site, the time limits should be extended accordingly;

- Where the tender is urgent (e.g. in the event of a natural disaster) the time limits can be shortened according to the directives;

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\(^5\) The minimum acceptable format for the receipt of tenders is written, delivered by hand or mail. The contracting authority can specify additional formats.

\(^6\) Calendar days
For the Works Directive, the contract award notice should be sent at the latest 48 days after the award of the contract.

Thresholds for EU Procurement Directives

The thresholds for the local authority as a contracting authority, for contracts covered by EU Directives and the GPA are as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Notice</th>
<th>Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Works</td>
<td>PIN &amp; Contract Notice</td>
<td>€6,242,028</td>
</tr>
<tr>
<td>Supplies &amp; Services</td>
<td>Contract Notice</td>
<td>€249,681</td>
</tr>
<tr>
<td>Supplies &amp; Services</td>
<td>PIN</td>
<td>€750,000</td>
</tr>
<tr>
<td>Utilities (Works)</td>
<td>PIN</td>
<td>€5,000,000</td>
</tr>
<tr>
<td>Utilities (Works)</td>
<td>Contract Notice</td>
<td>€6,242,028</td>
</tr>
<tr>
<td>Utilities (Supplies &amp; Services)</td>
<td>PIN</td>
<td>€750,000</td>
</tr>
<tr>
<td>Utilities (Supplies &amp; Services)</td>
<td>Contract Notice</td>
<td>€499,362</td>
</tr>
</tbody>
</table>

There are slight differences between the thresholds for contracts covered by the EU Directives and the GPA, which are the vast majority of contracts, and those that are covered by EU Directives only. The principal exceptions are for service contracts of public bodies for research and development and for certain telecommunications services, as well as contracts of entities in certain utility sectors. Further information on current thresholds can be found on the public procurement website www.etenders.gov.ie (under Public Procurement News)

A contract could come under various categories such as a works contract, a services contract, a supplies contract or a contract awarded by a utility. The local authority should simply define the project and then follow the suitable Directive if the contract amount is higher than the threshold. However, the determination of the category may not be so easy where there is a mixture of objectives involved and where elements of public works, supplies and services are incorporated. For example, there may be a situation where a local authority wishes to procure a private partner to build and operate a swimming pool. The building of the pool would constitute a works contract and the operation of the pool would constitute a services contract. In order to determine which Directive should be followed the local authority should establish whether the works are incidental to the services, by determining what is the main object of the contract and what makes up the predominant value of the contract.

It is also possible that a contract will be a concession contract. A concession contract is where the recovery of expenditure will be through user charges, and since the contractor receives no guarantee of return from the local authority, he or she will bear the risks associated with this recovery of expenditure. Special rules apply in the works Directive for a works concession, however services and utilities concessions are not subject to EU Directives (although the Treaty of Rome and the Green Book will still apply).

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7 Government Procurement Agreement of the World Trade Organisation.
8 There are two types of services: Part A (Priority services) which are subject to the full set of procurement rules and Part B (non-Priority services) which are only subject to rules on technical specifications and post award notices.
The local authority will receive requests for participation in response to the contract notice entered in OJEC. Predetermined prequalification criteria should be used to assess the requests for participation and an invitation to negotiate sent out the successful candidates. For the negotiated procedure the contracting authority is allowed to limit the number of applicants invited to negotiate to three [and normally would not seek tenders from more than four]. The successful applicants submit their indicative bids, and one or more of the bidders are chosen to negotiate contract details.

Negotiations can take a number of different forms. The local authority may decide on a preferred bidder based on the indicative bids and seek to negotiate a final contract with this bidder. In other cases the local authority may prefer to enhance the competitive nature of the process by negotiating with two bidders following which both will submit final offers [Best and Final Offers - BAFO]. Other negotiating approaches are possible but great care must be taken to treat everyone fairly and make sure all understand the procedures being used in advance.
### PSB Guidelines - Part 1

#### Extract of Proforma Format of Public Sector Benchmark

**Appendix B**

| Opportunity costs/benefits | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 |
|---------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Land                      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Capital costs             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Contract 1 - Reervoir    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Contract 2 - Plant (Civil)|        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Contract 3 - Plant (M&E) |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Contract 4 - Sludge Treatment |    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Contract 5 - Scada Works  |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Professional Fees        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Employer Overheads       |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Plant Replacement Costs   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Operating Costs           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Staffing                 |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Energy                   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Chemicals                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Maintenance              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Insurance                |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Rates                    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Costs pre Risks          |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Retained Risks           |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Planning and Procurement Risks | |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Design Risks             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Build Risks              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Operations and Maintenance Risks |    |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Transferred Risks        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Planning and Procurement Risks | |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Design Risks             |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Build Risks              |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Operations and Maintenance Risks | |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Total Costs post Risks   |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| Discount Rate            | 100.00% | 97.68% | 95.19% | 92.41% | 89.29% | 86.13% | 82.91% | 79.58% | 76.16% | 72.91% | 69.75% | 66.59% | 63.61% | 60.71% | 57.86% | 55.08% | 52.57% | 50.14% |
| Total NPV of the Project |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
System for the Assessment and Review of PPP’s within the Water and Wastewater services sectors

Guidance Note – Part Two

Detailed Guidance
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J. Extract of Cost of Risk Summary
K. Calculation of Discount Factors
L. Calculation of Inflation Factors
M. Example of Assumptions
I. Introduction

1.1 The following Case Study incorporates the steps, which need to be followed in constructing a Public Sector Benchmark (“PSB”) and developing a Post Project Review (“PPR”) Document.

1.2 This Case Study is supported by working templates to facilitate the construction of the PSB and the preparation of the PPR. The Appendices, which incorporate these working templates are created in Microsoft Excel and are available for use in the construction of the PSB and PPR Document. Each worksheet template has a reference to the specific part to the element of the Case Study to which it relates.

1.3 The case study, which has been selected is a wastewater project. The principles and steps which are developed here can be applied equally to water projects. The cost information incorporated in the case study is used for illustrative purposes only and cannot be considered to be representative of actual or expected costs.
II. Preparation of Public Sector Benchmark

2.1 In general terms the PSB should include the following components:

- An Overview of the Project;
- Opportunity Costs/Benefits;
- Capital Costs including Plant Replacement Costs;
- Operating Costs;
- Risk Matrix;
- Discounted Cash Flow of the Project;
- Sensitivity Analyses; and
- Appendices.

An explanation of these components are included in the pages that follow:

Step 1 – Capture Overview of the Project

2.1.1 The Overview should include at a minimum:

- A brief description of the nature of the project and the need that the delivery of the project addresses;
- A brief description of the history of the project to its current status. This should include stages/phases and the decisions/approvals, which have been achieved to date so as to understand the background to the Project;
- The latest programme for the project and expected completion date;
- The Project Team and allocated responsibilities; and
- The scope of the project and the output specification.

2.1.2 A high level example of an extract of the type of output specification which could be included for a wastewater plant is as follows:

- The provision of a wastewater treatment plant capable of treating a pollutant load up to 20,000 population equivalent (p.e.) with a 10 year design horizon followed by an upgrade in year 10 of the Operation & Maintenance Phase to increase the capacity of the plant to 35,000 p.e. while meeting the quality standards set out in the European and National regulations; and
• The maintenance of the treatment plant, its infrastructure, site and buildings to a standard that is appropriate to a modern wastewater treatment facility and consistent with best industry practice.

2.1.3 The overview should make specific reference to the source of the output specification and the date of agreement by the Project Team.

Step 2 – Populate PSB Working Document

2.2.1 An illustration of the main working document for the construction of a PSB is included at Appendix A. This spreadsheet calculates the overall project cost and value of project risk in nominal terms and in net present value terms over its lifetime from Year -1 to Year 22. The rationale for this is that the PSB represents all the costs and risks incurred in the period prior to the commencement of the project and post commencement of the project.

2.2.2 The spreadsheet assumes that the PSB is prepared in Year – 1 and the period from Year - 1 to Year 0 equates to the planning and procurement period for the contract. Year 0 equates to the year in which the project is expected to be bid. Year 1 equates to the first year of construction e.g. 2006 and assuming a two year construction period, Year 3 would be the first year of operation e.g. 2008.

2.2.3 To arrive at the net present value of the project over its lifetime, all of the cash flows should be discounted back to Year -1. The methodology for calculating and applying the discount rates is detailed at Step 6 of this Part Two and illustrated at Appendix K.

2.2.4 As stated in Part One of the Guidance Notes, unless there is clear evidence to illustrate that the traditional or PPP approach results in significantly different inflows or outflows to the exchequer, the assumption should be that there is no adjustment necessary to the PSB in respect of taxation. All costs incorporated in the PSB should be stated Net of VAT.

Step 3 – Compute Capital Costs

2.3.1 The second step in populating the PSB is to incorporate the relevant capital costs.

2.3.2 **Capital Costs** - should be estimated so as to achieve the requirements of the output specification for the project. To facilitate a direct comparison between the capital cost incorporated in the PSB and the design-build element of the private sector tender, capital costs incorporated in the PSB should be analysed in the same format as required in the Design – Build Payment Schedules of the Contract documents. An example of the analysis and type of Capital Cost components which should be considered for incorporation in the PSB are included at Appendix B.

2.3.3 Capital Costs will vary significantly depending on whether the project involves the construction of a new plant on a greenfield site, or an upgrade to an existing plant on a brownfield site. Total capital costs of the project should be apportioned over the expected years of the construction for the project based on the expected construction
profile of publicly procured projects. As illustrated in the spreadsheet at Appendix C, the timing of capital costs has a significant impact on the overall NPV of the project.

2.3.4 **Opportunity Cost/Benefits** - Where the project involves the use of an existing site or asset the value of the asset or site needs to be estimated on an alternate use basis and incorporated in the costs of the project, e.g. if the project scope involves the refurbishment of an existing plant, the value of this site and plant on an alternate use basis needs to be incorporated as a cost of the project. It may arise that the cost of converting an existing plant to alternate use basis would be in excess of the value of the site and the land so in this scenario the alternate value would be nil. Where there is no alternative use for an asset, the opportunity cost is zero and the historic cost of the assets represent sunk costs.

2.3.5 Where the project involves the disposal or rationalisation of existing assets which are owned by the Employer, the estimated disposal value of those assets needs to be incorporated as a cash inflow.

2.3.6 Any opportunity cost or benefit calculated should be incorporated in the PSB in the year in which the expected opportunity cost or benefit would be expected to be realised. In either case the opportunity cost/benefit should be supported by a reasonable estimate or calculation.

2.3.7 **Professional Fees** - Capital costs should include any advisory fees, consultancy or architectural fees that are relevant in procuring the project under the traditional route.

2.3.8 **Employer Overheads** - Capital Costs should also include any Employer overheads which would be incurred in procuring the project under the traditional route. This requires quantifying the number and cost of Employer staff which would normally be required to directly manage the project and an allocation of other central administration overheads.

2.3.9 **Plant Replacement Costs** - An Asset Management Plan and Schedule of Major Plant replacement is necessary where the output specification requires ongoing maintenance and major plant replacement.

2.3.10 To build up the cost estimate for Major Plant Replacement it is necessary to determine the extent and frequency of its replacement over the lifetime of the contract. This requires a listing of the component parts of the plant and equipment and an indication of their cost and year(s) of replacement. This will form a significant element of the lifetime costs of the project. Appendix D includes a suggested format for the Plant Replacement Schedule.

2.3.11 If the cash flow of the project is being prepared in nominal terms the impact of inflation needs to be included while if the contract is being prepared in real terms, the impact of inflation should be excluded.

**Step 4 – Compute Operating Costs**

2.4.1 For illustrative purposes at Appendix E, an example has been included of the type of operating cost components, that are likely to be relevant for water and wastewater
projects. These are not exhaustive lists and for each project the project team needs firstly to consider those costs, and:

1) Select those costs which are relevant to the specific project and to the output specification; and

2) Consider the likely variability of those costs over the operating period of the project, which requires dividing the costs into those which are fixed and variable with reference to the level of throughput.

2.4.2 Fixed costs can be described as standing charges, i.e. charges which do not vary with the output or activity of the plant. For all non-fixed costs (or variable costs), a cost driver needs to be established which will determine the variability of these costs over the life of the contract. These variable costs should be related to the specific activity or throughput of the plant (e.g. volume and organic load, etc.).

2.4.3 The calculation of the variable costs in the PSB, on the basis of cost drivers, will facilitate direct comparison with the private sector bid. The bid documents normally require the bidder to propose unitary charges for the cost drivers (e.g. the organic load to be treated, the volume of wastewater accepted, etc.) and the final outturn operating costs will be based on the unitary charges applied.

2.4.4 Appendix E also includes a categorisation of operating costs into fixed (standing charges) and variable costs, some of which are described below for illustrative purposes.

**Standing Charges**

2.4.5 **Staffing** - The estimation of staff costs requires an evaluation of the staff which the Employer would employ at the wastewater plant in order to fulfil the operational standards defined in the output specification, e.g. in terms of wastewater quality and operation of the plant, standby facilities, etc.

Only the cost of direct staff should be included, namely those directly involved in the management, operation and maintenance of the plant, assuming that any Employer staff costs are incorporated in Employer Overheads.

2.4.6 **Maintenance costs** - Maintenance Costs should cover the costs associated with routine, planned and breakdown maintenance, excluding any allowance for major plant replacement, which are incorporated in the Capital Cost Section.

2.4.7 **Rates** - A calculation of rates is necessary to reflect the rates charge (if any) to the new wastewater treatment plant over the life of the project.

2.4.8 **Insurance** - An estimate of the likely insurance cost for the operation of the wastewater treatment plant will be required. In computing insurance costs it is important to look to ensure that this cost is not already incorporated in the costing of risk.
Operational Charges

2.4.9 Energy - A calculation of the estimated power costs of the water or wastewater treatment plant over the operational life of the project, reflecting winter/summer rates and tariff structures.

2.4.10 Chemicals - This requires a calculation of the chemical treatment costs sufficient to achieve the quality standards as defined in the output specification.

2.4.11 Sludge/Biosolids Management – Depending on the nature of the project, a calculation for the collection/delivery, treatment and disposal/reuse of the sludge or biosolid produced at both water and wastewater plants and sludge hub centres is required.

2.4.12 Arising from this exercise the pre risk cost figure is arrived at for the project.

Step 5 – Incorporate Costing of Risk in the Project

2.5.1 The Appendices F, G, H, I and J of this Part sets out the Risk Assessment element of the case study for a new wastewater treatment plant to cater for a population equivalent of 20,000. The steps that should be taken when completing such a risk assessment are provided in detail below. The allocation and qualitative assessment of risk, together with the rationale and costs established during the quantification process are provided for illustrative purposes only and should not be considered to be necessarily representative of actual risk allocation or risk quantification for individual projects.

Risk Categorisation & Identification

2.5.2 As detailed in Part One, risks have been categorised into four key phases as follows:-

PHASE 1

PHASE 2

PHASE 3

PHASE 4

PLANNING & PROCUREMENT

DESIGN (DB Phase)

BUILD (DB Phase)

OPERATION & MAINTENANCE (Service Phase)

The Risk Groups, outlined in the Table below, which are listed and explained in detail in Appendix F of this Part, may be assessed to the level of detail required of the project. Not all of the risk items may be applicable and where there are multiple risks within a group it may, in some cases, be more appropriate to assess them as a group rather than individually. There may also be risks not identified here which may be specific and unique to the project. These specific risks may be entered in the Risk Assessment Matrix under the ‘Project Specific Risks’ group at the end of each phase. The individual risks listed within the groups have been identified based on the experience of carrying out risk assessments on a number of water and wastewater PPP type projects.
Risk Categories and Groups

<table>
<thead>
<tr>
<th>Phase 1 - Planning &amp; Procurement</th>
<th>Phase 2 - Design (Overlaps With Build Phase)</th>
<th>Phase 3 – Build</th>
<th>Phase 4 – Operation &amp; Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 Financial Management</td>
<td>D1 Time and Cost Overrun</td>
<td>B1 Time and Cost Overrun</td>
<td>OM1 Contract Management</td>
</tr>
<tr>
<td>P2 Objections</td>
<td>D2 Variations</td>
<td>B2 Variations</td>
<td>OM2 Demand</td>
</tr>
<tr>
<td>P3 Planning Permission, Permits, Licences or Approvals</td>
<td>D3 Inflation</td>
<td>B3 Inflation</td>
<td>OM3 Pollution</td>
</tr>
<tr>
<td>P4 Land Acquisition/Wayleave</td>
<td>D4 Changes in Legislation</td>
<td>B4 Changes in Legislation</td>
<td>OM4 Financial Management</td>
</tr>
<tr>
<td>P5 Planning &amp; Development Co-ordination</td>
<td></td>
<td></td>
<td>OM5 Variations</td>
</tr>
<tr>
<td>P6 Time and Cost Overrun</td>
<td></td>
<td></td>
<td>OM6 Legislative Changes</td>
</tr>
<tr>
<td>P7 Changes in Legislation</td>
<td></td>
<td></td>
<td>OM7 Staff Management</td>
</tr>
<tr>
<td>P8 Employer Staff Management</td>
<td></td>
<td></td>
<td>OM8 Health &amp; Safety</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Phase 2 - Design (Overlaps With Build Phase)</th>
<th>Phase 3 – Build</th>
<th>Phase 4 – Operation &amp; Maintenance</th>
</tr>
</thead>
<tbody>
<tr>
<td>D3 Inflation</td>
<td>B5 Objections</td>
<td>OM9 Security</td>
</tr>
<tr>
<td>D4 Changes in Legislation</td>
<td>B6 Pollution &amp; Contamination</td>
<td>OM10 Utility Services</td>
</tr>
<tr>
<td>D4 Changes in Legislation</td>
<td>B7 Other Risks Common to Traditional &amp; DBO Projects</td>
<td>OM11 Maintenance and Defects</td>
</tr>
</tbody>
</table>

2.5.3 The Risk Assessment Matrix (an extract of which is detailed at Appendix G, being the Planning and Procurement Phase) sets out a method for the allocation and qualitative assessment of each potential risk. Each risk is allocated by simply selecting the appropriate ‘Risk Owner’, either the Employer or the Contractor, from the list menu in the Matrix. Where a risk is not applicable, ‘N/a’ should be selected.

2.5.4 Once the risk has been allocated it needs to be qualitatively assessed for both probability and impact. These functions are assessed in terms of having a ‘High, Medium or Low’ effect and are assigned the values of 3, 2 and 1 respectively. The ‘Rank’ of each risk is calculated by the multiplication of the Probability by the Impact. A low probability and high impact results in a Rank value of 3, as seen in Fig. 4.1. The Rank is automatically calculated in the Matrix, after the input of Probability and Impact values.

2.5.5 Those risks that are allocated a ranking of 4 and above should then be considered in greater detail in the quantification process. The high ranking risks should be prioritised, in terms of the time and resources allocated to their determination and subsequent management. Those risks that obtain a ranking of 3 and below are considered most likely to have a low effect and may be removed from further consideration.

2.5.6 However, caution should be exercised when deciding on the risks to be removed. For example, consider a risk that has been assigned a ranking of 3 based on a low probability and high impact. The risk might only occur once during the contract but could have a significant cost impact and such a detrimental effect on the project to
warrant further consideration in the quantification process. The removal of risks should only be done where the project manager or project team deem it appropriate.

2.5.7 Some of the risks identified in the Matrix are pre-allocated due to the standardisation of Contract Documents and specific document and clause references are provided in the worksheet which supports Appendix G. The allocation of these risks should not be changed without agreement with DEHLG. An example of this pre-allocation is provided in Fig. 4.2 overleaf. In this case, the risks relating to unforeseen sub-surface conditions need to be examined under three headings, due to the wording of Sub-Clause 4.11 of the Conditions of Contract.
Fig 4.2 Example of pre-allocation of Risks with the wording of the relevant Sub-Clause of the Conditions of Contract

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Risk Owner</th>
<th>Document Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1.4</td>
<td>Unforeseeable sub-surface conditions causing delay to project</td>
<td>Employer</td>
<td>Conditions of Contract Sub-Clause 4.11</td>
</tr>
<tr>
<td>B1.5</td>
<td>Unforeseeable sub-surface conditions causing additional cost to project</td>
<td>I. Contractor</td>
<td>Conditions of Contract Sub-Clause 4.11</td>
</tr>
<tr>
<td>B1.6</td>
<td>Unforeseeable sub-surface conditions - discovery of Fossils causing additional delay and cost to project</td>
<td>Employer</td>
<td>Conditions of Contract Sub-Clause 4.11</td>
</tr>
</tbody>
</table>

Sub-Clause 4.11 Unforeseeable Sub-Surface Conditions

Delete the wording of the Sub-Clause and insert the following:

If hydrological and/or sub-surface conditions are encountered by the Contractor which in his opinion were not foreseeable by an experienced contractor, the Contractor shall give notice to the Employer's Representative so that the Employer's Representative can inspect such conditions. After receipt of such notice and after his inspection and investigation, the Employer's Representative shall, if such conditions were not (at the Base Date) foreseeable by an experienced contractor, proceed in accordance with Clause 3.5 to agree or determine any extension of time to which the Contractor is entitled under Sub-Clause 8.3 (d) and shall notify the Contractor accordingly. The additional cost due to such conditions shall be borne by the Contractor subject to the provisions of Sub-Clause 4.24.

Note:- The Contractor is entitled to claim for delay and obtain an extension of time if he can show that the conditions found could not have been foreseen by an ‘experienced contractor’. He is not, however, entitled to claim for costs associated with dealing with the conditions that arise, except where fossils are found as defined by Sub-Clause 4.24.

Risk Management

2.5.8 To facilitate effective risk management it is important to give some consideration as to how each of the risks identified for the project should be managed. Provision is made in the Risk Assessment Matrix for the inclusion of details relating to how each risk will be managed and the actions to be taken throughout each phase of the project to ensure that effective management takes place. The public sector management strategy may be as simple as just stating that the risk is to be transferred to the Contractor. The action transpiring from this would be to ensure that the risk is actually transferred by making reference to it in the Contract Documents. Specific reference should then be made to the particular clause or section of the Contract Documents, which will act as check for the user that the action has been completed. Those risks that have pre-allocated document and clause references should be checked to ensure that the referencing is correct for the particular project. If additional documents are relevant to the
management strategy or action, then reference should be made to these documents in the Matrix. The risk management strategy has not been included in the Risk Assessment Case Study in Part Two as it is not considered essential to the quantification of risk but something which should be considered.

**Risk Quantification**

2.5.9 There are a number of different methods available for the quantification of risk and these are explained in more detail in Guidance Note 11.

2.5.10 Experience has shown that the best approach to risk quantification is through the use of factual information that may be available from previous projects. In the case of Design and Build risks, much of the information required can be obtained from both traditionally procured and more recent DB & DBO projects. Local authorities have long term experience of operating water and wastewater facilities and this expertise should be utilised for the Operation & Maintenance element of the process. In some instances there may be a lack of experience, particularly where complicated treatment processes are required. When this is the case, the user should consider the collection of information and experience from sources where such processes are in use.

2.5.11 The risk quantification process can be best achieved through brainstorming in a workshop type environment. The brainstorming workshop should involve Employer and Employer’s Representative personnel with the skills and experience necessary to carry out the risk quantification exercise across the range of phases (i.e. Planning & Procurement, Design, Build and Operation & Maintenance). The risk assessor or project manager for the particular scheme should ensure that preparation is done in advance so that the risks are refined to the project needs and are well explained and provided to the workshop attendees in advance. Information should also be prepared for use during the workshop, which would assist in providing the data necessary to quantify the risks under consideration. The Risk Quantification Matrix an extract of which is detailed at Appendix I being the Planning and Procurement Phase sets out a method for the quantification of each potential risk.

2.5.12 The user can quantify the cost of risk on an overall basis or may find it easier it to consider risk under the suggested headings given below:-

- Delay Cost
- Material Cost
- Consequential Cost

2.5.13 These elements may not always necessarily apply to each risk and it is left to the user to decide which of them are most appropriate. In Fig. 4.3 for example, the risk in question will only result in a delay to the project, so it is only necessary to consider the Delay Cost. The splitting of risk costs into these elements will help the user to maintain a focus on each aspect of the risk and to avoid double counting. These elements are explained in more detail below.
Delay Cost

2.5.14 The Delay Cost element relates to costs that may be incurred as a result of the project being delayed due to the occurrence of the particular risk. Delays that occur, during Phase 1 for example, may be due to:-

- Objections from stakeholders to the project or specific elements of the project during the planning and procurement phases;
- Objections by unsuccessful Applicants/Tenderers at Pre-qualification and Tender stage;
- Failure on the part of the Employer to obtain Planning Permission, permits, licences or approvals that are necessary for the project to progress to the procurement phase; or
- Delay in acquiring land and/or wayleaves & legal actions related to land acquisition.

More detailed explanations of the risk items provided in the Risk Assessment and Risk Quantification Matrices are contained in Appendix F of this Part Two.

2.5.15 Delays to the project may or may not be caused by the risk being assessed and the decision to include costs for delay is entirely dependent on the nature and extent of the project.

2.5.16 A worked example of the method for quantification of the Cost of Risk associated with delay is provided in Fig. 4.3. In this example, risk no. B1.4 ‘Unforeseeable sub-surface conditions causing delay to project’ is taken. It can be seen from the example that the probability and impact is determined based on the experience of the personnel carrying out the risk assessment. It is also determined on the basis of knowledge of the site on which the treatment plant will be built.

2.5.17 It is important, when quantifying a risk, to be clear about what the risk actually means. The risk examined in Fig. 4.3 states, ‘...causing delay to the project’. Therefore, only the delay aspect of the risk should be quantified and any other costs that could relate to it, e.g. the cost of removal of contaminated material, should not be considered. These costs must only be considered under Risk No. B1.5 ‘Unforeseeable sub-surface conditions causing additional cost to project’. 
The site for the new wastewater treatment plant is located near an old disused landfill. A thorough site investigation was carried out earlier in the planning phase of the project and some landfilled material was found on the south east corner of the site below top soil to a depth of 6 metres. A sample of the material was taken for further examination and found to be non-hazardous.

During the Risk Allocation and Qualitative Assessment stage it was agreed that there is a likelihood that landfilled material (Unforeseeable sub-surface conditions) might be found on other parts of the site during the Build Phase of the Project. It was agreed that there is a medium probability of occurrence with a medium impact. The determination of a medium impact was made on the basis that the landfilled material was found close to the surface but extended to a depth of 6 metres making it slow to remove possibly resulting in a medium-term delay. The delay was quantified as a 6 week delay to the project with extension of time given to the Contractor. The Matrix was completed, as shown in this example, to reflect the decisions made. It is estimated that the cost of a 6 week delay is €120,000. This risk also gave rise to a consequential cost of €48,000 for the retention of RE staff for the duration of the delay. A medium probability rating of 10% was applied to the cost estimate and it was decided that the risk should be spread evenly over Year 1 and Year 2 (DB Phase). The total cost of risk for each year amounted to €8,400. This equates to .22% of the Capital Costs of the Project. This risk is also detailed in Appendix H.

Note: The costs given in this example are provided for illustration purposes only.
Material Cost

2.5.18 The Material Cost element relates to costs that may be incurred as a result of any physical or material changes required during the project due to the occurrence of the particular risk. The material costs that occur, for example in Phase 3 of the project, may be due to:-

- Unforeseeable sub-surface conditions causing additional cost to project - as detailed in Fig. 4.4 below;

- Site contamination as a result of construction process;

- Employer directed construction changes (variation orders); or

- Discriminatory changes in legislation.

2.5.19 More detailed explanations of the risk items provided in the Matrix are contained in Appendix F. The example provided in Fig. 4.4 is a follow on from that provided in Fig. 4.2. Fig. 4.4 explains how the material cost relating to the risk of finding landfilled material on the site is arrived at in the context of Risk No. B1.5 ‘Unforeseeable sub-surface conditions causing additional cost to project’.
The Material Costs associated with this risk relate to the excavation and removal of the non-
hazardous landfilled material, if it occurs at the site during the Build Phase of the project. It was
assumed that, if found, the landfilled material would be found in small isolated locations but to a
depth that would make it difficult to remove. It was estimated that the quantities to be removed, if
found could be in the region of 400 m$^3$. It was estimated that the excavation and disposal costs
would be in the region of €150/m$^3$ and €300/m$^3$ respectively giving a total cost per occurrence of
€180,000. A medium probability rating of 10% was applied to the cost estimate and it was decided
that the risk should be spread evenly over Year 1 and Year 2 (DB Phase). The total cost of risk for
each year amounted to €9,000. This equates to 0.24% of the capital cost of the Project. This risk is
also detailed in Appendix H.

Note:- The costs given in this example are provided for illustration purposes only.
Consequential Cost

2.5.20 The Consequential Cost element relates to costs that may be incurred as a result of third parties being affected or a ‘knock-on’ effect to the Contractor or others as a consequence of occurrence of the particular risk. The consequential costs that occur, for example, in Phase 4 of the project may be due to:-

- Damage caused to 3rd parties by operational activities;
- Pollution of watercourse directly from the plant (e.g. from wastewater discharge, tank overflow, chemical spill, sludge spill on site); or
- Pollution in catchment (e.g. sludge spill during transport, pollution during land application of sludge/bio-solid).

2.5.21 More detailed explanations of the risk items provided in the Risk Matrices are contained in Appendix F. A worked example of the method for quantification of the Consequential Cost of Risk is provided in Fig. 4.5. In this example, risk no. OM2.4 ‘Abstracted water quality is lower than acceptable standards (e.g. from pollution incident or longer term deterioration of water quality)’ is taken. It can be seen from the example that the consequential costs relate to the need to provide temporary water supply to a town during a shut down of the treatment plant. There is also the possibility that claims will result from losses incurred by the business community in the town as a consequence of the incident.
The Risk examined in this example relates to the possibility of accidental pollution in the catchment potentially from Industrial/Commercial sources or from Road Spillage resulting in the pollutant entering the sewerage system. This type of event will have an impact on the process plus the deterioration of plant and equipment. It was agreed that there would be incidents of high load during the Operation and Maintenance Period but that these would be minor in cost terms and were not considered further.

It was decided that that there would be a high probability of occurrence of the risk during the 20 year O&M period with a medium impact if it did occur. Material costs were considered during the evaluation of this risk and these are shown in Fig. 7 of Appendix H. It was decided that consequential costs associated with clean up of spillage by the local authority and disposal of contaminated material would occur, costing approximately €30,000 and €200,000 respectively per event.

A high probability rating of 30% was applied to the cost estimate and it was decided that the risk could occur up to 4 times during the Operation and Maintenance Period spread evenly across years 7, 12, 17 & 22.

Note - The costs given in this example are provided for illustration purposes only.

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Name of Risk</th>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM3.2</td>
<td>Pollutant load is higher than predicted or influent has been contaminated by substances with concentrations greater than the Pollution Incident Limits detailed in Employer's Requirements</td>
<td>Employer</td>
<td>HIGH</td>
<td>MEDIUM</td>
<td>6</td>
</tr>
</tbody>
</table>

The Risk examined in this example relates to the possibility of accidental pollution in the catchment potentially from Industrial/Commercial sources or from Road Spillage resulting in the pollutant entering the sewerage system. This type of event will have an impact on the process plus the deterioration of plant and equipment. It was agreed that there would be incidents of high load during the Operation and Maintenance Period but that these would be minor in cost terms and were not considered further.

It was decided that that there would be a high probability of occurrence of the risk during the 20 year O&M period with a medium impact if it did occur. Material costs were considered during the evaluation of this risk and these are shown in Fig. 7 of Appendix H. It was decided that consequential costs associated with clean up of spillage by the local authority and disposal of contaminated material would occur, costing approximately €30,000 and €200,000 respectively per event.

A high probability rating of 30% was applied to the cost estimate and it was decided that the risk could occur up to 4 times during the Operation and Maintenance Period spread evenly across years 7, 12, 17 & 22.

Note - The costs given in this example are provided for illustration purposes only.
Estimating the Cost of Risk

2.5.22 The worked examples given in Figures 4.3, 4.4 and 4.5 show how the costed risk is calculated and equated to a percentage of the particular project cost elements (either CAPEX or OPEX). Clearly, some risks need to be quantified under more than one of the suggested elements and where this is the case each of the costs should be accumulated to give a total risk cost.

2.5.23 As already mentioned, the task of estimating cost should be carried out in a workshop type environment with expertise drawn from Employer and Employer’s Representative personnel using information gathered by the risk assessor or project manager. Where factual historic information is not available sensible and realistic approximations should be made.

2.5.24 When the costing for the particular elements of the risk has been completed a probability rating should be applied to reflect the cost of risk based on the likelihood of it actually occurring. The table below sets out a suggested rating for high, medium and low probability. The rating applied should be based on the probability selected during the qualitative assessment and the users own judgement regarding the extent of the rating for the particular risk.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Description</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Likely to occur</td>
<td>Probability &gt; 10%</td>
</tr>
<tr>
<td>Medium</td>
<td>Occasionally occurs</td>
<td>Probability 1-10%</td>
</tr>
<tr>
<td>Low</td>
<td>Unlikely but possible</td>
<td>Probability &lt; 1%</td>
</tr>
</tbody>
</table>

Risk Frequency and Occurrence

2.5.25 Once the cost of risk has been established it is necessary to determine the frequency at which the risk may occur during the project. It is also necessary to decide on the year or years when the risk is likely to occur. This process will facilitate the input of risk costs on an annual basis into the PSB.

2.5.26 The user should enter the appropriate cost against the year or years that the risk is estimated to be applicable to. See Fig. 4.6 for an explanation of this element of the Risk Quantification Matrix.

2.5.27 When the information has been inputted, the Matrix will calculate the total cost of risk for each phase and year of the project. Once a cost has been estimated it is important to ensure that it is reflected in the Matrix as a percentage of the particular project cost element, either capital cost (CAPEX) in the case of Phases 1, 2 & 3 or operating cost (OPEX) in the case of Phase 4. Proper completion of this element of the Risk Quantification Matrix will facilitate the development of a database to be used on future projects for the quantification of risk.
### Employer Retained and Transferred Risks

2.5.28 Appendix J illustrates an extract of the cost of risk summary of the Employer Retained Risks and Employer Transferred Risks for the Planning and Procurement Phase of the project.

### Re-evaluation of Risk Allocation & Qualitative Assessment

2.5.29 It is important, once the risks have been quantified, to re-examine the allocation of risk. It may become apparent at this stage that some of the Employer Transferred Risks are unlikely to be taken by the Contractor due to their order of magnitude or could be too expensive. This is a critical step in the process as an improper allocation of risk could result in expensive tenders or in contractors refusing to bid for the project. It is also important to re-evaluate the qualitative assessment and determine, based on the experience of risk quantification, whether or not the probability and impact values have been set correctly.

2.5.30 It is also worth evaluating the risk in terms of its management. It may be the case, after quantification, that it is worth carrying out further investigations or other work during the planning phase as a step in reducing the probability and impact. It might, for
example, be considered worth carrying out more extensive site investigations to further reduce the risk of unforeseen sub-surface conditions being discovered during the Build phase of the project. Where further work is done in this context, the Risk Quantification Matrix should be re-visited, once work is complete, and updated to reflect the most current situation.

**Step 6 – Calculate the NPC of the Project**

2.6.1 The calculation for the Net Present Cost ("NPC") if not applied properly can allow for a significant variation in terms of the NPC of the PSB option. Therefore it is important that in applying a discount rate the following criteria are followed:

- the discount rate applied is as advised by the National Development Finance Agency. Appendix K illustrates the worksheet for the calculation for the discount factors. This worksheet allows for two options in terms of discount rates, an annual discount rate which varies in line with the government yield curve and a single discount rate which is constant throughout the life of the project.

- where the discount rate is a real rate must be applied to real cash flows (i.e. cash flows for all periods excluding inflation). Where the discount rate is a nominal rate it is applied to cash flows incorporating inflation. Appendix L illustrates the worksheet for the calculation of inflation factors to be applied to the costs and cost of risks cash flows;

- where the automated spreadsheet function is utilised in the case of a single discount rate, it should be cross checked manually;

- ensure that the timing of the capital cost flows and the operating cost flows in the PSB are as realistic as possible to reflect public sector procurement; and

- ensure that the cash flows are discounted to the reference year that the private sector is expected to bid to. The costs should be expressed in cost terms at the base year of comparison e.g. if it is expected that the private sector bidder should tender at 2004 prices the PSB should correspondingly reflect 2004 prices.

2.6.2 Appendix C incorporates an example of the calculation of the NPC to illustrate the concepts referred to above.

**Step 7 – Document Assumptions**

2.7.1 The PSB will be subject to review at the PPR stage, therefore it is important to record all assumptions, and maintain appropriate documentation and record sources of information to support the conclusions reached.

2.7.2 This ensures that where differences arise between the PPP bid and the PSB they can be understood, explained and evaluated. The assumptions should be based on what is realistic through traditional procurement and not the private sector. These assumptions should be agreed by the project team as part of the review process of the PSB.
2.7.3 An example of the type of assumptions which could be incorporated are included at Appendix M. These are included for illustrative purposes only and will obviously vary depending on the type of project.

**Step 8 – Conduct Sensitivity Analysis**

2.8.1 The final NPC arrived at in constructing the PSB is dependant on the assumptions which have been agreed by the Project Team. The NPC Cost is not an exact figure but rather an estimate.

2.8.2 It is important to recognise that the estimate of the PSB forms the cost basis on which the affordability of the project is assessed. The Project Team and the Employer need to consider what is the impact of changing certain of the assumptions and specific variables within the PSB. By performing sensitivity analysis the project team can identify a range of costs within which the NPC might fall. This can be summarised in a Table in the PSB document.

2.8.3 A key part of this analysis is the point at which the changes in the assumptions are significant enough to change the conclusions drawn from the net present cost calculation.

2.8.4 Examples of the type of sensitivity analysis which could be conducted are as follows:

- Operating costs to change by 5% higher/ lower than estimated.
- Capital costs to change by 10% higher/lower than estimated.
- Risks to change by 15% higher/lower than estimated
- Alternatively the project team might select a specific operating or capital cost item on which a certain considerable degree of uncertainty is attached e.g. sludge disposal costs.

**Step 9 – PSB Construction Checklist**

2.9.1 On completion of the PSB it is recommended that the following checklist needs to be checked for completeness:

- What are the key assumptions underlying the PSB?;

- Are these key assumptions legitimate (not unrealistic) and sensible (what any other reasonable and informed person might think)?;

- Have these assumptions been formally listed and reality checks done on them?;

- What is the evidence to support the quantification of these risks and assumptions?;

- Have any costs or risks been forgotten?;

- Has sensitivity testing been carried out and if so has this been recorded?;
- Has someone checked the arithmetic and logic?; and

- Does the Employers team believe that the result shown by the PSB looks sensible and robust?.

**Step 10 – Use of PSB in Value for Money Comparison**

2.10.1 The PSB incorporates all costs incurred to date and to be incurred in procuring the project on a traditional basis together with the cost of all transferred and retained risks, i.e., all the cost prior to Year 0 and from Year 0 onwards. It quantifies the overall cost to the public sector of procuring a project traditionally and is the basis on which the Affordability Cap is established.

2.10.2 The PSB will also ultimately be used as the basis for evaluating value for money versus the private sector bid. However it is important to be vigilant in preparing the value for money comparison that the emphasis is on comparing like for like costs. The private sector bid will only incorporate costs for the output specification required for the project and for the risks which are transferred to the private sector bidder.

2.10.3 To ensure a like for like comparison the PSB should be adjusted:

- to include only costs to be incurred from Year 0 onwards, i.e. the year in which the contract is tendered so that all costs already incurred by the public sector must be considered to be sunk costs. The exception being where the authority is seeking compensation or reimbursement for any pre Year O costs;

- to include the costs of retained risks in the private sector bid; and

- to include costs which the public sector would incur irrespective of the procurement approach in the private sector bid.
III. Preparation of Post Project Review

3.1 The Post Project Review (“PPR”) is an essential stage in confirming whether value for money has been achieved, recognising efficiencies and updating costs and standards for future projects. It should be carried out within six months of the end of the Design-Build phase and again at the end of the contract period. For the purposes of these guidelines the focus is on the initial PPR that is carried out six months post the Design Build Phase. The rationale for the PPR review stage is two fold:

- To capture the evolution of the costs of the public sector versus the private sector over the period of the contract which will help assess the benefits of PPP as a procurement process; and

- To form a basis for more accurate costing of future projects. In utilising the costs for future PSB’s it is important to recognise that the updated costs are only relevant if they provide a more accurate representation of latest market prices from bidders for projects but are not utilised as a representation of public sector costs in the preparation of future public sector benchmarks.

Contents of a Post Project Review

3.2 For those projects where there is an identified requirement to complete a PPR, the PPR should contain the following elements:

- **Step 1: Overview** – updating the documentation in respect of the project description for matters arising during the procurement and implementation stages;

- **Step 2: Variance Analysis** – analysis of the performance to date of the project in comparison with earlier expectations in respect of time, cost and quality criteria; and

- **Step 3: Database Information** – standardisation of information for incorporation into the DEHLG cost database.

3.3 The activities identified in Steps 1 to 3 above are described in more detail in the paragraphs that follow.

Step 1 – Overview of the Project

3.4 The project overview that was developed for incorporation into the PSB analysis should be reviewed to confirm that the information continues to be relevant. This should be amended as necessary for the following:

- Any amendments or changes to the project such as amendments to the rationale, scope or output specification of the project;

- A description of the bidding process, a summary of the characteristics of the bid chosen and the rationale for the selection; and
• The current status of the project and any claims outstanding by the private sector bidder and the status of these claims.

**Step 2 – Prepare Variance Analysis on the Project**

3.5.1 Variance Analysis is required in order to analyse the performance to date of the project in comparison with earlier expectations in respect of time, cost and quality criteria. The process is a critical step in documenting experiences from a programme of projects and providing a basis for the comparison of individual projects against that programme. This document provides a framework for the preparation of the Variance Analysis exercise.

3.5.2 The principle steps in the completion of such an exercise are as follows:

• **Step 2.1: Compilation of data** – collection of specified key project metrics from differing stages in the project for comparative purposes, and arrangement in terms of time, cost and quality criteria;

• **Step 2.2: Investigation of variances** – interrogation of time, cost and quality data and investigation of any material variances that have arisen in respect of the project; and

• **Step 2.3: Commentary on variances** – provision of a commentary of the main reasons behind the material variances that have arisen.

3.5.3 The activities identified in Steps 2.1 to 2.3 above are described in more detail in the paragraphs that follow.

**Step 2.1: Compilation of data**

3.5.4 It is vital that the process of data compilation is completed comprehensively and accurately in order to ensure that PPR process yields meaningful results. The data should be compiled and recorded contemporaneously as the project proceeds through the project development, procurement and implementation stages. The analysis should be broken down into time, cost and quality criteria, and consideration given to the impact of variances in respect of one criteria on outcomes in respect of other criteria.

**Data in respect of Time**

3.5.5 The data captured in respect of time should enable a comparison to be performed of the original expected timetable for the project against the actual outcome. The reason for each time variance should be documented where they are significant. Estimates of duration [in months] are carried out at each major milestone event in the project. The estimate is updated each time for the subsequent milestone period or phase.
### Fig 4.7 Template for the capture of data in respect of time

<table>
<thead>
<tr>
<th>Milestone Event</th>
<th>Actual/Estimated Start Date</th>
<th>Expected Completion Date</th>
<th>Expected Programme (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Services Investment Programme</td>
<td>Jan 2005</td>
<td>Jan 2005</td>
<td></td>
</tr>
<tr>
<td>PPP Assessment</td>
<td>Jan 2005</td>
<td>June 2005</td>
<td>6</td>
</tr>
<tr>
<td>Commencement of Procurement</td>
<td>June 2005</td>
<td>Dec 2005</td>
<td>6</td>
</tr>
<tr>
<td>Submission of CD’s for approval to proceed to construction</td>
<td>Dec 2005</td>
<td>June 2006</td>
<td>6</td>
</tr>
<tr>
<td>Submission of Tender Recommendation Report</td>
<td>June 2006</td>
<td>Dec 2006</td>
<td>6</td>
</tr>
<tr>
<td>Date of Substantial Completion</td>
<td>Dec 2006</td>
<td>Dec 2008</td>
<td>24</td>
</tr>
<tr>
<td>Date of commencement of Operational Contract</td>
<td>Dec 2008</td>
<td>Mar 2009</td>
<td>3</td>
</tr>
</tbody>
</table>

3.5.6 The time taken to complete a particular milestone event needs to be recorded. The first Milestone Event should be recorded in terms of an expected or actual date, i.e., the date at which the project is incorporated in the Water Services Investment Programme, for example January 2005. The expected date and time to complete each milestone event also needs to be recorded.

### Fig 4.8 Update at Milestone Event of Template for the capture of data in respect of time

<table>
<thead>
<tr>
<th>Milestone Event</th>
<th>Actual/Estimated Start Date</th>
<th>Expected Completion Date</th>
<th>Actual Completion Date</th>
<th>Expected Programme (Months)</th>
<th>Actual Duration (Months)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPP Assessment</td>
<td>Jan 2005</td>
<td>June 2005</td>
<td>Sep 2005</td>
<td>6</td>
<td>9</td>
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<tr>
<td>Commencement of Procurement</td>
<td>Sep 2005</td>
<td>Mar 2006</td>
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<td>6</td>
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</tr>
<tr>
<td>Submission of CD’s for approval to proceed to construction</td>
<td>Mar 2006</td>
<td>Sep 2006</td>
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<td>6</td>
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<tr>
<td>Submission of Tender Recommendation Report</td>
<td>Sep 2006</td>
<td>Mar 2007</td>
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<td>6</td>
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<td>Mar 2007</td>
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<td>24</td>
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<td>Date of commencement of Operational Contract</td>
<td>Mar 2009</td>
<td>Sep 2009</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
</tr>
</tbody>
</table>

3.5.7 At the next milestone event e.g. the Production of the PPP Assessment the time elapsed to complete this event needs to be recorded and compared against the actual programme as estimated at the First Milestone Event. The expected completion date of all subsequent Milestone Events should be recorded to reflect the revised timetable or updated information on the project.
### Fig 4.9 Completed Template for the capture of data in respect of time

<table>
<thead>
<tr>
<th>Milestone Event</th>
<th>Actual Duration in months</th>
<th>Expected Programme</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPP Assessment</td>
<td>9</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Commencement of Procurement</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Submission of CD’s for approval to proceed to construction</td>
<td>5</td>
<td>6</td>
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</tr>
<tr>
<td>Submission of Tender Recommendation Report</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Date of Substantial Completion</td>
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<td>24</td>
<td></td>
</tr>
<tr>
<td>Date of commencement of Operational Contract</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46</strong></td>
<td><strong>51</strong></td>
<td></td>
</tr>
</tbody>
</table>

3.5.8 At the completion of the project the actual time taken to complete the project at the milestone events should be summarised as detailed above.

### Data in respect of Cost

3.5.9 As indicated in the Second Policy Framework document the PPR should include a variance analysis of the Final Outturn Costs of the project compared against Initial Estimates, the PPP Assessment, the Public Sector Benchmark, and the Final Contract Price. The Final Outturn Cost should be checked against the Aggregate Affordability Cap.

3.5.10 The following data should be captured in respect of cost to enable a comparison to be performed of the expected cost and risks for the project against the actual outcome. Because of the different level of detail that is available at the different stages of the process in some instances it may only be possible to compare costs i.e. total capital costs, operating costs or cost of risk on a summary basis however where detailed information is available it may be possible to compare individual costs.
Fig 4.10 Template for the capture of data in respect of cost

<table>
<thead>
<tr>
<th>Date</th>
<th>Cost Basis</th>
<th>Initial Estimates</th>
<th>PPP Assessment</th>
<th>Public Sector Benchmark</th>
<th>Private Sector Bid</th>
<th>Final Outturn Cost</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Retained (Local Authority) Costs:</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Consultants Costs</td>
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<td>N/A</td>
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<tr>
<td></td>
<td>Land Acquisition &amp; Wayleave Costs</td>
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<td></td>
<td>Other Non-Contract Costs</td>
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<td>N/A</td>
<td>N/A</td>
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<td></td>
<td>Net Retained Costs</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>N/A</td>
<td>Total</td>
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<tr>
<td></td>
<td>Retained (Local Authority) Risks:</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Planning &amp; Procurement</td>
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<td>N/A</td>
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<td></td>
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<td></td>
<td>Design Risks</td>
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<td>N/A</td>
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<td>N/A</td>
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<td>Build Risks</td>
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<td>O&amp;M Risks</td>
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<td>Total Retained (Local Authority) Risks</td>
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<td></td>
<td>Professional Fees</td>
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<td>Overheads (Preliminaries)</td>
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<td></td>
<td>Superstructures</td>
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<tr>
<td></td>
<td>Substructures</td>
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<td></td>
<td>Mechanical &amp; Electrical Installation</td>
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<tr>
<td></td>
<td>Total Contract Costs</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
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<td></td>
<td>Contract Risks:</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Planning &amp; Procurement</td>
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<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Design Risks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Build Risks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>O&amp;M Risks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
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<td></td>
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<tr>
<td></td>
<td>Total Contract Risks</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total Cost and Risk Transferred &amp; Retained</td>
<td>N/A</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td>Total</td>
<td></td>
</tr>
</tbody>
</table>
3.5.11 This data should be compiled and recorded contemporaneously as the project proceeds through the project development, procurement and implementation stages. For comparative purposes, costs and risks should be restated to a common base date. This should either reflect the base date as used for the PSB analysis, (or reflect the base date as used for tender evaluation purposes). The effects of historic inflation should be adjusted for by applying the index values for the Consumer Price Index to the historic values (or any generally recognised successor measure of general inflation) as shown on http://www.cso.ie/publications/prices/cpi.pdf, or successor reference website.

Data in respect of Quality of Performance

3.5.12 This data capture in respect of Quality of Performance assists in the assessment of whether the quality and performance of the project are as expected.

Fig 4.11 Template for the capture of data in respect of quality

<table>
<thead>
<tr>
<th>Quality Parameter</th>
<th>Initial Output Specification</th>
<th>Contract Specification</th>
<th>Commissioning Result</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter 1</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Parameter 1</td>
<td></td>
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</tr>
<tr>
<td>Parameter n</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5.13 This analysis should include a review as to whether the key requirements of the project which have been incorporated in the output specification have been met at the commissioning stage, subsequent to which the quality parameters will be measured by the performance management system. Each project will be different in terms of the key requirements however there will generally be consistent type of requirements for either water or wastewater projects. The parameters referred to should be consistent with those set out in the Urban Wastewater Directive, or the Drinking Water Directive.

Step 2.2: Investigation of variances

3.5.14 An initial review of the data tables compiled above should provide a high level understanding of the main areas where variances have arisen on the project in terms of the important time, cost and quality criteria. This initial review should be supplemented by a more detailed review, which compares the actual outturn with the expectations at earlier comparative stages. This more detailed review should use the following template as a working aide:
Fig 4.12 Template for variance analysis

<table>
<thead>
<tr>
<th>Basis of Comparison</th>
<th>Final Outturn</th>
<th>Comparative Stage</th>
<th>Variance (Months, €, etc.)</th>
<th>Variance (%)</th>
<th>Explanation/ Commentary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milestone Events (Time)</td>
<td></td>
<td></td>
<td>Months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost Basis (Cost)</td>
<td></td>
<td></td>
<td>€</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quality Parameter (Quality)</td>
<td></td>
<td></td>
<td>/cubic m</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3.5.15 The template should be applied to each of the Milestone Events (Time) as summarised at Fig 4.9, Cost Basis (Cost) and Quality Parameter (Quality) as specified in Step 2.1, above. The more detailed review should be limited to the comparing the Actual Outturns with the following Comparative Stages:

**Time** – The Actual Programme v:

- The PSB Programme.

**Cost** – The Final Outturn Cost v:

- The Private Sector Bid;
- The Public Sector Benchmark; and
- The PPP Assessment.

**Quality** – The Commissioning Result v:

- The Contract Specification; and
- The Initial Output Specification.

**Step 2.3: Commentary on variances**

**Commentary on Time Variances**

**Actual Programme versus PSB Programme**

3.5.16 The variance between the project programme as documented at the Water Services Investment Programme stage and the actual programme could be due to a number of reasons such as:

- Delays in the appointment of the Clients representative;
- Delays in the planning process, including appeals;
- Delays in the tender process, including the approvals process;
• Delays in the design build phase, including delays due to unforeseen ground conditions or revised planning permission being required; and

• Delays in the commissioning process.

3.5.17 Any delays (or indeed acceleration) in the programme should be recorded, with a detailed explanation being provided for each variance. In some cases, adverse variances may be offset by positive variances, for example, where the design-build programme is accelerated due to good weather, but the gains are lost due to unforeseen ground conditions. In these circumstances, both of the variances should be investigated and explained.

Commentary on Cost Variances

3.5.18 In preparing cost variances the overriding principle should be to compare like with like. All sunk costs should be excluded and where a project includes a PPP and non PPP element all non PPP related costs should also be excluded from the analysis.

Final Outturn Costs versus Private Sector Bid

3.5.19 The comparison of the final outturn cost versus the private sector bid illustrates whether actual outturn costs are significantly different to what was originally projected by the bidders. In preparing the cost variance analysis, the following factors should be considered:

• Final outturn costs for capital costs will generally not be available until the completion of the Design-Build phase. Any valid claims outstanding by the Contractor should be noted and explained.

• Final outturn operating costs will not be available until the end of the contract period. In the interim, however, the PMS will record the operating costs incurred throughout the operating contract.

• Caution is required when conducting the review at the end of the Design-Build phase, as it is only possible to compare capital costs at that point in time. The selected tender would have been taken on the basis of presenting best value for money over the entire contract, including both capital and operating costs.

• This comparison will exclude all local authority retained costs and risks as the bidder will have not incorporated these in their bid.

Final Outturn Costs versus Public Sector Benchmark

3.5.20 The comparison of the final outturn costs versus the PSB will be the most realistic assessment of whether value for money has been generated by the PPP Process. In making this comparison Step 9 of the PSB should also be referred to.

3.5.21 Again, caution is required when conducting the review at the end of the Design-Build phase, as it is only possible to compare capital costs at that point in time. The selected tender would have been taken on the basis of presenting best value for money over the
entire contract, including both capital and operating costs. The capital spend might be higher than PSB due to higher quality but the expenditure during the Operating & Maintenance phase may be commensurately lower. In conducting this analysis, before or at an early stage in the Operating & Maintenance phase, a realistic estimate should be made of the likely O&M phase cost based on the operating costs identified in the latest performance review or the operating costs contained in the private sector bid.

Final Outturn Costs versus PPP Assessment

3.5.22 The cost variance between the final outturn costs and the initial estimate of the cost of the project as set out in the PPP Assessment or equivalent study/preliminary report could be due to a number of reasons such as

- The PPP Assessment estimates being “initial estimates” only, which may not fully incorporate the cost of risk;
- Changes in the scope or output specification;
- Cost inflation in excess of general price inflation, e.g. if a significant amount of time has elapsed between the preparation of the initial estimates and the generation of the actual outturn costs; and
- More stringent environmental standards or regulations, which cause increased operational costs.

Final Outturn Costs versus Affordability Cap

3.5.23 In addition to the detailed analysis set out above, the PPR should also include a final check that the final outturn cost is within the envelope of the Affordability Cap. This should be done on an aggregate basis, only. The reasons for any material variances should be explained within the comparison of the final outturn costs with the Public Sector Benchmark.

3.5.24 It would be expected that the final outturn costs for the project would not exceed the Affordability Cap set for the project. However circumstances may have emerged which may not have been known at the time of the preparation of the PSB and the Affordability Cap.

Commentary on Quality Variances

3.5.25 This analysis should summarise quality variations at the commissioning stage. The Performance Management System will then record and measure the quality variations and parameters subsequent to this.

Commissioning Result versus Contract Specification

3.5.26 The variance between the standards actually achieved at the commissioning result stage and the standards specified in the contract and initial output specification stage could be due to a number of reasons such as:
• Change in the quality or quantity of water intake;
• Change in standards as required by regulation;
• Inability of the plant to meet the required performance standards; or
• Change in the volume throughput resulting from population or other demographic changes.

Commissioning Result versus Initial Output Specification

3.5.27 This analysis is principally used in supporting the explanations provided for cost and time variances between the final outturn and PSB stages. The variance between the commissioning result and the initial output specification could be due to any of the factors set out in 11.25 above.

Step 3 – Standardise Database Information

3.6.1 The information captured in the tables referred to above should be extracted and incorporated in the DEHLG database. As well as recording the actual outturns in respect of time, cost and quality, the variances data should be expressed on a percentage basis, so that a percentage range based on current or completed projects can be applied to future projects.

3.6.2 The following key data should be extracted.

Timing Data

3.6.3 The timing data and variances should be based on the information extracted in Step 2.1:

Fig 4.13 Timing Variance analysis

<table>
<thead>
<tr>
<th>Time to</th>
<th>Original Estimate</th>
<th>Actual Date / No of Months</th>
<th>Variance v. Original Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPP Assessment</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commencement of Procurement</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submission of CD's for approval to proceed to construction</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Submission of Tender Recommendation Report</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of Substantial Completion</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Date of commencement of Operational Contract</td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Cost Data

3.6.4 The cost data and variances should be based on the information extracted in Step 2.1:

**Fig 4.14 Cost Variance analysis**

<table>
<thead>
<tr>
<th>Cost Basis</th>
<th>Final Outturn Cost</th>
<th>Final Outturn Cost Rating</th>
<th>% Variance of Outturn Cost v. PPP Assessment</th>
<th>% Variance n of Outturn Cost v. Public Sector Benchmark</th>
<th>% Variance of Outturn Cost v. Private Sector Bid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retained (Local Authority) Costs:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consultants Costs</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Land Acquisition &amp; Wayleave Costs</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Other Non-Contract Costs</td>
<td></td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Residual Value</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Net Retained Costs</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Total (Local Authority) Retained Risks</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Contract Costs:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Professional Fees</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overheads (Preliminaries)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Superstructures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Substructures</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mechanical &amp; Electrical Installation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capitalised Operating Phase Costs</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Total Contract Costs</td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Contract Risks</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>Total Cost and Risk Transferred &amp; Retained</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
</tbody>
</table>

3.6.5 In addition, for cost data, the total costs should be recorded in a manner, which allows comparison across a range of projects of different sizes and time periods. This can be done by expressing cost data in terms of the throughput of the plant or population equivalent.
3.6.6 Where this data relates to “bundled” Group Water projects, the data should be included for each individual component of the scheme, as well as for the scheme in its entirety.

3.6.7 In addition for specific items such as Professional Fees a separate cost rating basis may be appropriate. Professional Fees typically vary as a % of capital costs and this percentage should be calculated for reference purposes. The variable elements of operating costs should be expressed as a unitary charge of their costs drivers.

3.6.8 This approach will assist in assessing the likely costs of future projects. This approach does not allow for exceptional circumstances applying to a project so any exceptional circumstances should be documented and incorporated in the database.

**Capital Costs**

3.6.9 Capital Costs can be considered to be broadly determined by the treatment capacity of the plant which is being provided. Capital Costs are therefore standardised by expressing them based on the cost of treating per million m$^3$ or cost per 10,000 p.e. This data will assist to benchmark individual plants against plants of similar size, as over time a “curve” will emerge which will predict the standard cost per million m$^3$, or cost per 10,000 p.e. for a plant of a particular size. Variations from this “curve” should be investigated and explained. The explanations should be consistent with those provided under Step 2.3 above.

**Professional Fees**

3.6.10 Professional Fees typically vary as a % of capital costs and this percentage should to be calculated for reference purposes. For projects with a smaller capital value professional fees would normally calculate as a higher percentage of the capital value than projects with a larger capital value. This will establish a percentage range for professional fees as a proportion of capital costs.

**Operating Costs**

3.6.11 For the initial PPR Post Design Build Phase, the final outturn operating costs will not be available. Operating Costs will be reviewed throughout the operational contract by the Performance Management System and at the end of the operational contract in the Final Post Project Review.
Residual Value

3.6.12 The outturn cost of the residual value will only be available on completion of the project and will not be available for the initial PPR Post Design Build Phase.

Quality Data

3.6.13 The quality of performance data and variances should be based on the information extracted in Step 2.1:

Fig 4.16 Quality Variance Analysis

<table>
<thead>
<tr>
<th>Quality Parameter</th>
<th>Commissioning Result</th>
<th>% Variation v. Initial Output Specification</th>
<th>% Variation v. Contract Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parameter n</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendices
## Proforma Discounted Cash Flow of a PSB in the Wastewater Sector

### Cost Items

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy 4.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Buildings</td>
</tr>
<tr>
<td>Chemicals 4.1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Grounds</td>
</tr>
<tr>
<td>Insurance 4.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total Costs</td>
</tr>
<tr>
<td>Rates 4.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total Transferred</td>
</tr>
<tr>
<td>Transferred Risks 420,032</td>
<td>708,292</td>
<td>-</td>
<td>9,594</td>
<td>9,949</td>
<td>16,183</td>
<td>45,261</td>
<td>16,837</td>
<td>...</td>
</tr>
</tbody>
</table>

### Total Costs per Risks

<table>
<thead>
<tr>
<th>Planning and Procurement Risks</th>
<th>Design Risks</th>
<th>Build Risks</th>
<th>Operations and Maintenance Risks</th>
<th>Total Relevant Costs</th>
<th>Total Transfer of Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>43,845</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>43,845</td>
<td>43,845</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>43,845</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>43,845</td>
<td>43,845</td>
</tr>
</tbody>
</table>

### Total NPV of the Project

17,210,042

### Discount Rate

Costs - Nominal
- Opportunity costs/benefits
- Capital costs
- Contract 1- Reservoir
- Contract 4- Sludge Treatment
- Contract 5- Scada Works
- Professional Fees
- Employer Overheads
- Plant Replacement Costs
- Operating Costs
- Energy
- Chemicals
- Insurance
- Rates
- Costs pre Risks
- Retained Risks
- Transferred Risks
- Planning and Procurement Risks
- Design Risks
- Build Risks
- Operations and Maintenance Risks
- Total Relevant Costs
- Total Transfer of Risks
- Total NPV of the Project
Appendix B – Suggested Capital Cost Components

- Preliminaries & Project Management
- Design
- Site Establishment, Preparatory Works & Temporary Facilities
- Demolition and/or Modification of Existing Works (where appropriate)
- Preliminary Treatment
- Stormwater Management System
- Primary Treatment
- Secondary Treatment (incl. Intermediate phases where provided)
- Tertiary Treatment (where required)
- Sludge Treatment
- Ancillary Building & Works
- Site Pipework, Ductwork & Cabling
- Site Infrastructure and Services
- Tests on Completion
- Provisional Sums
- Future Plant Expansion
### Example of Discounting Process

#### Assumptions

<table>
<thead>
<tr>
<th></th>
<th>2004</th>
<th>2006</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bid date</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Start</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Construction Completion</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Construction Costs</td>
<td>200</td>
<td>200</td>
<td>200</td>
</tr>
</tbody>
</table>

#### Construction Profile

<table>
<thead>
<tr>
<th>Year</th>
<th>Scenario 1</th>
<th>Scenario 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>50%</td>
<td>25%</td>
</tr>
<tr>
<td>2007</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>2008</td>
<td>25%</td>
<td>25%</td>
</tr>
<tr>
<td>2009</td>
<td>25%</td>
<td>25%</td>
</tr>
</tbody>
</table>

#### Notes

<table>
<thead>
<tr>
<th>Notes</th>
<th>Reference to Part Two</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Discount Factor</td>
</tr>
<tr>
<td>B</td>
<td>Capital Costs (Real) - Scenario 1</td>
</tr>
<tr>
<td></td>
<td>Inflation rate per Inflation worksheet</td>
</tr>
<tr>
<td></td>
<td>Capital Costs (Nominal) - Scenario 1</td>
</tr>
<tr>
<td></td>
<td>Capital Costs (Present Value) - Scenario 1</td>
</tr>
<tr>
<td>C</td>
<td>Capital Costs (Real) - Scenario 2</td>
</tr>
<tr>
<td></td>
<td>Inflation rate per Inflation worksheet</td>
</tr>
<tr>
<td></td>
<td>Capital Costs (Nominal) - Scenario 2</td>
</tr>
<tr>
<td></td>
<td>Capital Costs (Present Value) - Scenario 2</td>
</tr>
<tr>
<td>Differential</td>
<td>1.2</td>
</tr>
</tbody>
</table>

The above example illustrates the material impact a change in the timing of the construction profile can have on the NPV of the project.

Under Scenario 1 which reflects an earlier completion time, the NPC of the project is €188.9m.
Under Scenario 2 which reflects a later completion time, the NPC of the project is €183.9m.

**Note A:** The discount factor is based on nominal rates calculated at the discount factors worksheet.

**Note B:** These reflect the nominal capital costs and NPC under Scenario 1.

**Note C:** These reflect the nominal capital costs and NPC under Scenario 2.
### Plant Replacement Schedule

| Plant Area | Mechanical/Electrical | No. of Elements | Estimated Current Cost of Replacement (each) | Reference to Part Two | Total Cost | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 | Year 21 | Year 22 |
|------------|-----------------------|----------------|---------------------------------------------|-----------------------|------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| **Example** | New Water Pumps | 4 | 12,000 | 3,10 | |
| **A** Total Real Replacement Costs | | | 1,800,000 | 0 | 0 | 0 | 0 | 300,000 | 0 | 0 | 0 | 1,500,000 | 0 | 41,000 | 0 | 85,000 | 0 | 561,000 | |
| **B** Nominal Replacement Costs | | | 2,721,494 | 0 | 0 | 0 | 0 | 300,000 | 0 | 0 | 0 | 1,487,849 | 0 | 41,918 | 0 | 821,353 | 0 | 597,796 | |

**Note A:** Where the construction of the PSB is on the basis of real cash flows and a real rate of return applied to those cash flows, the estimated cost of replacement over the operating period should be based on prices in the year for which the bids are tendered.

**Note B:** Where the construction of the PSB is on the basis of nominal cash flows and a nominal rate of return applied to those cash flows, the estimated cost of replacement over the operating period should be based on current prices as adjusted for inflation to the year of replacement.
Appendix E – Suggested Operating Components

Standing Charges (Fixed)

- Labour, operational services and supervisory management
- Analytical services for process and compliance checking
- Insurances & rates
- The transport and disposal/recycle of screenings, grit and waste products other than sludge
- Administration
- Consumables associated with provision and management of office accommodation, laboratory and workshop
- Provision of personal protective equipment to personnel engaged in the operation, maintenance and management of the Works
- Callout by operations personnel to telemetry alarms
- Training of all personnel to the standards required by the Contract
- Routine, preventative, corrective and planned maintenance including regular testing and calibration of instrumentation and control equipment

Operational Charges (variable)

- Energy in the form of electricity, oil or gas
- Processing of returned liquors and wash waters
- Chemicals where used for phosphorus removal, thickening or dewatering of sludge or for any other process
- Plant and equipment operation
- The handling and treatment of wastewater and storm water
- Collection, treatment and reuse/disposal of sludge.
## PHASE 1 - PLANNING & PROCUREMENT

**Financial Management**

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1.1</td>
<td>Delays in obtaining funding from DEHLG for domestic element of the Capital Expenditure</td>
<td>May result from delays to the completion of reports and applications for funding, approval delays, changes in government allocation of funding post approval resulting in postponement of project.</td>
</tr>
</tbody>
</table>

**Objections**

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P2.1</td>
<td>Any known or potential new objections from stakeholders</td>
<td>Objections from stakeholders to the project or specific elements of the project during the planning and procurement phases. Stakeholders may include the public, landowners adjacent to the proposed site, employees of the local authority, other statutory bodies. The result here could be a delay to the project and potential costs associated with managing objections and providing additional information and alterations to project scope where objections are successful.</td>
</tr>
<tr>
<td>P2.2</td>
<td>Objections by unsuccessful Applicants/Tenderers at Pre-qualification and Tender stage</td>
<td>May result in delays to the final decisions at pre-qualification and tender stages and time spent by the Employer and Employer’s Representative dealing with issues and attending meetings.</td>
</tr>
</tbody>
</table>

**Planning Permission, Permits, Licences or Approvals**

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P3.1</td>
<td>Failure to obtain Planning Permission, permits, licences or approvals</td>
<td>Failure on the part of the Employer to obtain Planning Permission, permits, licences or approvals that are necessary for the project to progress to the procurement phase resulting in additional time spent preparing new applications and potentially carrying out further studies/reports.</td>
</tr>
<tr>
<td>P3.2</td>
<td>Onerous conditions in Planning Permission (incl. EIS where applicable)</td>
<td>For example, stringent conditions imposed in relation to wastewater discharges, odour, noise, dust, etc that may result in additional treatments being required that were not initially envisaged. If planning permission was obtained prior to the preparation of the Risk Assessment then this risk will not apply.</td>
</tr>
</tbody>
</table>

**Land Acquisition/Wayleave**

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P4.1</td>
<td>Delay in acquiring land and/or wayleaves</td>
<td>These delays may be due to difficulties in establishing land ownership or negotiating acquisition and may result in additional time required by the Employer and/or Employer’s Representative to complete land searches and negotiations.</td>
</tr>
<tr>
<td>P4.2</td>
<td>Legal actions related to land acquisition</td>
<td>Delays and costs associated with defending legal challenges taken by land owners or with the taking of a legal action by the Employer to acquire land or compulsory purchase order.</td>
</tr>
<tr>
<td>P4.3</td>
<td>Extra cost associated with land acquisition</td>
<td>Where the cost of acquiring land for the treatment plant costs more than the market rate. This may be due to the land owner being in a good negotiating position particularly when land acquisition is left too late and requires urgent attention so as not to cause delay to the project.</td>
</tr>
<tr>
<td>P4.4</td>
<td>Unexpected land acquisition or wayleave</td>
<td>May be due to the need to take additional land, more than was expected during initial planning, resulting in delays and additional land costs.</td>
</tr>
<tr>
<td>P4.5</td>
<td>Unforeseen legal covenant or right of way</td>
<td>Due to the discovery of a legal covenant or right of way that remained unknown until raised by a land owner.</td>
</tr>
</tbody>
</table>
### Planning & Development Co-ordination

**P5**

**P5.1** Failure to coordinate planning and development of Urban Catchment with plant capacity

May be due to the Local Authority planning section allowing planning permission for development which cannot be catered for at the treatment works. A large industry, for example, could use up spare capacity causing water shortage at water treatment plant or overload at wastewater treatment plant. This failure could result in costs associated with:

- tankering of water from alternate sources,
- fines and clean up costs associated with potential water pollution from wastewater discharges,
- provision of temporary and permanent plant to increase capacity.

### Time and Cost Overrun

**P6**

**P6.1** Delays or changes during procurement

May be due to delays in preparation, review or approval of procurement documentation (e.g. pre-qualification & contract documents). Delays and additional cost (e.g. additional consultancy fees) may also be caused due to possible changes made to the procurement process resulting in the need to redraft documents, carry out additional surveys or produce additional reports.

### Changes in Legislation

**P7**

**P7.1** Discriminatory legislative changes

Due to changes in law applying specifically to the project, the Contractor or PPP projects.

**P7.2** Non-discriminatory legislative changes

Due to general legislative or regulatory changes.

### Employer Staff Management

**P8**

**P8.1** Industrial action by Employer's employees

May be due to the introduction of the PPP approach on facilities requiring upgrading where there are existing employees engaged at the facility. This may result in delay and additional cost associated with disruption to service.

**P8.2** Difficulties with Existing Employees (redundancy/re-deploy/transfer)

May be due to problems encountered with the management of existing employees requiring redundancy, re-deployment or transfer to the Contractor.
<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHASE 2 – DESIGN</strong></td>
<td><strong>Time and Cost Overrun</strong></td>
<td></td>
</tr>
<tr>
<td>D1.1</td>
<td>Delay in design review period or to receipt of information by the Contractor from Employer</td>
<td>May result in extension of time being given to the Contractor for delay caused by the Employer.</td>
</tr>
<tr>
<td>D1.2</td>
<td>Re-design or correction of design defects - result of poor initial design or design not meeting Employer's Requirements</td>
<td>Will occur if a “statement of no objection” is withheld by the Employer following a design review. The Contractor will be required to resubmit his design which may result in delay to the project and additional costs in relation to consultancy fees, RE staff, accommodation, etc. The correction of a design defect may also be the result of problems discovered during a HAZCON or HAZOP exercise, which may result in delays to the submission of designs for review.</td>
</tr>
<tr>
<td>D1.3</td>
<td>Missing, variable or inaccurate design information and site data from the Employer resulting in re-design or additional design work</td>
<td>May result in a claim by the Contractor for extension of time and costs associated with the re-design or additional design work. The costs (if any) inputted into the Matrix should relate specifically to the cost of design and not the cost of any additional plant or equipment that may result.</td>
</tr>
<tr>
<td>D1.4</td>
<td>Inadequate level and quality of design team resources</td>
<td>May result in delays to the design process and repeated re-design.</td>
</tr>
<tr>
<td>D1.5</td>
<td>Delay in provision of detailed design by Contractor</td>
<td>May result in delay to the project and additional costs in relation to consultancy fees RE staff, accommodation, etc.</td>
</tr>
<tr>
<td><strong>Variations</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D2.1</td>
<td>Employer directed design changes</td>
<td>Any changes or variations in the Contractor’s design that is made under instruction from the Employer. May result in delays to the design phase of the project with possible additional material and consequential costs.</td>
</tr>
<tr>
<td><strong>Inflation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D3.1</td>
<td>Costs in excess of tendered amounts and indexation</td>
<td>Where costs associated with the design element of the project exceed those originally tendered after indexation has been applied. May result in cash flow problems for the Contractor or his design subcontractor that could slow down the project and, if serious, could result in default by the contractor or sub-contractor.</td>
</tr>
<tr>
<td><strong>Changes in Legislation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>D4.1</td>
<td>Discriminatory changes in legislation</td>
<td>Relates to changes in legislation in Ireland, which are specific to the Design, Build, Operation and Maintenance of water/wastewater treatment plants. Such legislation means laws, orders, regulations or by-laws having the force of law, which are specific to the Contract or type of Contract. Specific reference should be made to Sub-Clause 13.16 of the Conditions of Contract. May result in the need to change or upgrade treatment plant or processes to meet new environmental standards.</td>
</tr>
<tr>
<td>D4.2</td>
<td>Discriminatory changes with regard to the disposal of sludge</td>
<td>Changes in legislation in Ireland with regard to the disposal of sludge, which affects the Contractor in the performance of his obligations including changes to technical standards and regulations in accordance with Sub-Clause 5.4 of the Conditions of Contract. Specific reference should be made to Sub-Clause 13.16 of the Conditions of Contract.</td>
</tr>
<tr>
<td>D4.3</td>
<td>Discriminatory changes with regard to registered pay agreements</td>
<td>Specific reference should be made to Sub-Clause 6.2 of the Conditions of Contract.</td>
</tr>
<tr>
<td>D4.4</td>
<td>Non-discriminatory changes in legislation</td>
<td>Relates to general legislative or regulatory changes made during the contract period.</td>
</tr>
</tbody>
</table>
### Explanation of Risks

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<tr>
<th>Risk No.</th>
<th>Risk Item</th>
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<tbody>
<tr>
<td><strong>PHASE 3 - BUILD</strong></td>
<td><strong>Time and Cost Overrun</strong></td>
<td></td>
</tr>
<tr>
<td>B1.1</td>
<td>Employer delay in making the required DBO payments</td>
<td>May be due to cash flow problems on the part of the Employer or administrative delays to payment deadlines. May result in Contractor claiming additional cost for late payments.</td>
</tr>
<tr>
<td>B1.2</td>
<td>Adverse weather conditions</td>
<td>Weather conditions that may result in stoppages to construction with consequential delays and additional costs to the project. Conditions may result in flooding or poor ground conditions, for example.</td>
</tr>
<tr>
<td>B1.3</td>
<td>Unforeseen site conditions as a result of missing or inaccurate site data</td>
<td>Where site conditions are discovered during construction, which could have been foreseen had the site data, provided at tender stage, been correct or more complete. These may include, for example, existing works problems after demolition or unknown services resulting in additional delay or cost in remedy of problem.</td>
</tr>
<tr>
<td>B1.4</td>
<td>Unforeseeable sub-surface conditions causing delay to project</td>
<td>This risk relates specifically to the requirements of Sub-Clause 4.11 of the Conditions of Contract. The Contractor may be entitled to an extension of time for delays caused by the discovery and remedy of unforeseeable sub-surface condition, which in his opinion were not foreseeable by an experienced contractor.</td>
</tr>
<tr>
<td>B1.5</td>
<td>Unforeseeable sub-surface conditions causing additional cost to project</td>
<td>This risk relates specifically to the requirements of Sub-Clause 4.11. of the Conditions of Contract. The Contractor is required to bear the additional cost associated with the remedy of unforeseeable sub-surface condition. This is subject to the provisions of Sub-Clause 4.24, which relates to Fossils.</td>
</tr>
<tr>
<td>B1.6</td>
<td>Unforeseeable sub-surface conditions - discovery of Fossils causing additional delay and cost to project</td>
<td>This risk relates specifically to the requirements of Sub-Clause 4.24 of the Conditions of Contract. Delays and additional costs may occur where 'fossils, coins, articles of value or antiquity, and structures and other remains or things of geological or archaeological interest' are discovered on the site.</td>
</tr>
<tr>
<td>B1.7</td>
<td>Subcontractor performance problems or default</td>
<td>Where a Contractor runs into problems with the performance or delivery of a sub-contractor and possible default by the sub-contractor. This may result in delay in the delivery of the construction programme. It may also be the cause of extra cost to the Contractor due to the possible need to provide additional resources and employment of a new sub-contractor.</td>
</tr>
<tr>
<td>B1.8</td>
<td>Unavailability of site services (water, power, telecoms) to enable construction works</td>
<td>Delays in obtaining necessary site services, both temporary and permanent, at the start of the build phase. These would include the provision of water supply, power supply and telecommunications. There may also be unavailability of such services during the build phase due to breakdown either by the service provider outside the site or by the Contractor on site.</td>
</tr>
<tr>
<td>B1.9</td>
<td>Delays in transfer of site to contractor preventing access for construction works to begin</td>
<td>May be caused due to delays in transfer of land title where land acquisition is made; problems with rights of way; public protest over contentious issues relating to the project; problems with existing employees (of the Employer) rights. These issues may cause significant cost to the project.</td>
</tr>
<tr>
<td><strong>Variations</strong></td>
<td><strong>B2</strong></td>
<td></td>
</tr>
<tr>
<td>B2.1</td>
<td>Employer directed construction changes</td>
<td>Any changes or variations in the Contractor’s construction that is made under instruction from the Employer. May result in delays to the build phase of the project with possible additional material and consequential costs.</td>
</tr>
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<td><strong>Inflation</strong></td>
<td><strong>B3</strong></td>
<td></td>
</tr>
<tr>
<td>B3.1</td>
<td>Costs in excess of tendered amounts and indexation</td>
<td>Where costs associated with the build element of the project exceed those originally tendered after indexation has been applied. May result in cash flow problems for the Contractor or his sub-contractors that could slow down the project and, if serious, could result in default by the contractor or sub-contractor.</td>
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<td>Discriminatory changes in legislation</td>
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<td>B4.2</td>
<td>Discriminatory changes with regard to the disposal of sludge</td>
<td>Changes in legislation in Ireland with regard to the disposal of sludge, which affects the Contractor in the performance of his obligations including changes to technical standards and regulations in accordance with Sub-Clause 5.4 of the Conditions of Contract. Specific reference should be made to Sub-Clause 13.16 of the Conditions of Contract.</td>
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<tr>
<td>B4.3</td>
<td>Discriminatory changes with regard to registered pay agreements</td>
<td>Specific reference should be made to Sub-Clause 6.2 of the Conditions of Contract.</td>
</tr>
<tr>
<td>B4.4</td>
<td>Non-discriminatory changes in legislation</td>
<td>Relates to general legislative or regulatory changes made during the contract period.</td>
</tr>
<tr>
<td>B5.1</td>
<td>Any known or potential new objections from stakeholders other than the Contractor, Employer and Employer's Representative</td>
<td>May result from public protest or objections by third party organisations causing disruption and possible stalling of construction. This disruption may result in delays to the construction programme; maintenance of already constructed elements of the project; costs associated with retention of employer and contractor site staff, accommodation, plant and materials on site.</td>
</tr>
<tr>
<td>B6.1</td>
<td>Pollution to Watercourse from construction works</td>
<td>May result from pumping out of excavations or spills of materials used during construction to nearby watercourses (streams, rivers, lakes, estuaries, aquifers).</td>
</tr>
<tr>
<td>B6.2</td>
<td>Site contamination as a result of construction process</td>
<td>Contamination of the soil on the site caused by spillages (e.g. diesel, lubricants, other chemicals) occurring as a result of the construction process. May require the removal of contaminated material off site.</td>
</tr>
<tr>
<td>B7.1</td>
<td>Failure by the Employer to recover charges from non-domestic users</td>
<td>May result in the Employer having to borrow finance in order to make payments to the Contractor.</td>
</tr>
<tr>
<td>B8.1</td>
<td>Construction workmanship &amp; quality problems</td>
<td>Where problems are encountered with the workmanship and quality of finishes to structures, plant and equipment that may result in re-working of such finishes to meet the required standards.</td>
</tr>
<tr>
<td>B8.2</td>
<td>Correction of construction defects</td>
<td>Where installed structures, plant and equipment cannot meet the contract standards and require correction.</td>
</tr>
<tr>
<td>B8.3</td>
<td>Site security</td>
<td>The provision of security of the site and managing the risk of intrusion. May result in stealing of or damage to plant and materials, etc. if site security is breached.</td>
</tr>
<tr>
<td>B8.4</td>
<td>Environmental management during construction</td>
<td>Management of environmental controls (noise, dust, odour) during construction. Disputes may result where there is objection from residents and other third parties due the excessive production of noise, dust or odour.</td>
</tr>
<tr>
<td>B8.5</td>
<td>Health &amp; safety management</td>
<td>Management of health and safety of all site personnel, visitor and the general public. Mismanagement may result in delays, claims in excess of insurance, additional cost of remedy and, in severe cases, site closure until resolution of the issues in question.</td>
</tr>
<tr>
<td>B8.6</td>
<td>Construction labour &amp; material resource shortages</td>
<td>Where shortages occur in labour and/or materials resulting in delays to the project and possible cost inflation due to the shortage.</td>
</tr>
<tr>
<td>B8.7</td>
<td>Industrial action by Contractor's staff</td>
<td>May result if disputes arise, either locally on site or due to a more widespread national action.</td>
</tr>
<tr>
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</tr>
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<td>---------</td>
<td>----------------------------------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>B8.8</td>
<td>Industrial action by Employer's staff</td>
<td>May result if disputes arise, either locally on site or due to a more widespread national action.</td>
</tr>
<tr>
<td>B8.9</td>
<td>Traffic management</td>
<td>Relates to the management of traffic outside of the site boundary or where a right of way may exist through a site where there is a need to disrupt or re-direct traffic to allow the completion of construction works. Possible cause for delay in construction.</td>
</tr>
<tr>
<td>B8.10</td>
<td>Damage caused to 3rd Parties</td>
<td>Relates to damage caused, as a result of construction activities, to people or property other than that of the Contractor, Employer or Employer’s Representative.</td>
</tr>
<tr>
<td>B8.11</td>
<td>Interface with other construction</td>
<td>Relevant where there are other construction activities impacting on the project. Mismanagement of the interface with these activities may result in dispute, delays, denial of responsibility and additional costs in making good any defects or resolving issues between the parties.</td>
</tr>
<tr>
<td>B8.12</td>
<td>Interface problems with Employers other facilities</td>
<td>The Employers other facilities include the sewer network, outfall, distribution system and water abstraction system. Interface problems may occur if there is incompatibility between those facilities and new plant possibly due to inaccurate information regarding the facilities or due to poor design on the part of the Contractor.</td>
</tr>
<tr>
<td>B8.13</td>
<td>Force majeure event above insured limits</td>
<td>Relevant where force majeure events occur as described under Clause 19 of the Conditions of Contract.</td>
</tr>
<tr>
<td>B8.14</td>
<td>Contractor default costs higher than performance bond</td>
<td>Where a Contractor defaults on the Contract, the situation may arise where the amount that can be recovered from the performance bond does not meet the costs associated with the default.</td>
</tr>
<tr>
<td>Risk No.</td>
<td>Risk Item</td>
<td>Explanation</td>
</tr>
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<td>-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>PHASE 4 – OPERATION AND MAINTENANCE</td>
<td>Contract Management</td>
<td></td>
</tr>
<tr>
<td>OM1</td>
<td>OM1.1 Failure to insist on contract standards</td>
<td>Applies to a failure on the part of the Employer to insist on compliance with the standards set out in the Contract. This failure could result in continued non-compliance with the reduced standards being achieved becoming the de-facto standards for the remainder of the Contract.</td>
</tr>
<tr>
<td></td>
<td>OM1.2 Default of contractor resulting in Termination of the Contract</td>
<td>Where the Contractor terminates the contract resulting in the Employer having to take over or hire another contractor for the operation and maintenance of the treatment plant.</td>
</tr>
<tr>
<td></td>
<td>OM1.3 Default of subcontractor</td>
<td>Where a subcontractor to the Contractor defaults resulting in possible disruption to the service being provided by that subcontractor.</td>
</tr>
<tr>
<td>Demand</td>
<td>OM2.1 Quantity of water/wastewater is lower than predicted due to lower than anticipated customer demand or influent discharge</td>
<td>Results where flows of water/wastewater entering the treatment plant are reduced due to a low demand for treated water or low wastewater influent discharge (perhaps caused by very dry weather or problems in collection system). Results in reduced revenue for the Contractor and may cause problems with treatment processes.</td>
</tr>
<tr>
<td></td>
<td>OM2.2 Quantity of water/wastewater is higher than predicted and is in excess of limits set out in the Guarantee Schedules of Contract Documents</td>
<td>Where the demand for water is higher than can be delivered by the treatment plant or where, in the case of wastewater treatment, the quantity of wastewater received is greater than the treatment plant capacity. This may result in water shortages and/or reduced water quality, in the case of water treatment and in overload of the wastewater treatment process and possible exceedence of discharge limits.</td>
</tr>
<tr>
<td></td>
<td>OM2.3 Abstracted water quality is lower than acceptable standards</td>
<td>Specific to water treatment. May result from pollution of the water source or longer term deterioration in water quality causing the need for additional treatment or sourcing of an alternative supply.</td>
</tr>
<tr>
<td>Pollution</td>
<td>OM3.1 Inlet main or sewer failures</td>
<td>May be due to breakdown, maintenance, repair replacement, inspection or interruption to elements of the water abstraction or sewerage systems. This would result in a possible shortage in water supply and potential failure to meet the demands of the catchment. In the case of wastewater treatment, a sewer failure would result in reduced or interrupted flow to the plant with potential deterioration of the treatment process depending on the length of the interruption. Any costs associated with the repair and return to service of the main or sewer should not be considered where it is outside of the scope of the Contract.</td>
</tr>
<tr>
<td></td>
<td>OM3.2 Pollutant load is higher than predicted or influent has been contaminated by substances with concentrations greater than the Pollution Incident Limits detailed in Employer's Requirements</td>
<td>Specific to wastewater treatment. Where the influent load is higher than the plant capacity and/or contains substances at concentrations that could cause damage or total failure of the treatment plant. The result may be reduced performance of the treatment process causing the exceedence of discharge limits. In extreme cases, a total failure could occur resulting in pollution of the receiving waters and the need to take steps to recover/repair the treatment process, plant or equipment.</td>
</tr>
<tr>
<td></td>
<td>OM3.3 Exceedence of wastewater discharge limits- influent within Pollution Incident Limits detailed in Employer's Requirements</td>
<td>Specific to wastewater treatment. The discharge limits set in the Contract have been exceeded while the influent remains within the pollution incident limits stated. This may result from poor operation and maintenance of the treatment plant. Costs relating to recovery and repair to the treatment plant as well as fines/penalties and possible clean-up of the watercourse may result.</td>
</tr>
<tr>
<td></td>
<td>OM3.4 Failure of sludge quality limit</td>
<td>The extent of this risk depends on the way in which sludge is to be managed and the conditions attached to the quality required.</td>
</tr>
<tr>
<td></td>
<td>OM3.5 Failure of Noise, Odour, Dust limits causing nuisance &amp; complaint</td>
<td>Where noise, odour and dust limits are exceeded to such an extent that they cause nuisance in the surrounding area. Complaints may result from the local community resulting in the need for remedy on site.</td>
</tr>
</tbody>
</table>
## Explanation of Risks

<table>
<thead>
<tr>
<th>Risk No.</th>
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</tr>
</thead>
<tbody>
<tr>
<td>OM3</td>
<td>OM3.6</td>
<td>Pollution of watercourse directly from the plant</td>
</tr>
<tr>
<td>OM4</td>
<td>Financial Management</td>
<td></td>
</tr>
<tr>
<td>OM4.1</td>
<td>Employer delayed in making or unable to make required DBO payments</td>
<td>May be due to cash flow problems on the part of the Employer or administrative delays to payment deadlines. May result in Contractor claiming additional cost for late payments. Inability to pay may be due to problems in recovery of charges from non-domestic users or in meeting payments from the domestic user element from within the Employers own resources. If severe, this could result in termination by the Contractor.</td>
</tr>
<tr>
<td>OM4.2</td>
<td>Capital Replacement Fund inadequate to meet major plant replacement requirements</td>
<td>May be due to poor management by the Employer of the Capital Replacement Fund meaning that there is not enough money in the Fund to meet the requirements for major plant replacement. May also be due to the inadequacy of the costs provided in the Schedule of Major Plant Replacement by the Contractor meaning that deposits were lower than should have been provided. May result in the Employer borrowing to meet his obligations.</td>
</tr>
<tr>
<td>OM4.3</td>
<td>Costs in excess of tendered amounts and indexation</td>
<td>Where costs associated with the operation and maintenance element of the project exceed those originally tendered after indexation has been applied. May relate, for example, to consumables (water/power/telecoms); insurance cost inflation; performance bond cost increases; labour cost increases due to shortage. May result in cash flow problems for the Contractor or his sub-contractors that could result in a reduced level of attendance and quality of service and, if serious, could result in default by the contractor or sub-contractor.</td>
</tr>
<tr>
<td>OM4.4</td>
<td>Inability to obtain certain insurance cover</td>
<td>May result from an inability by the Contractor to obtain certain insurance cover at some stage during the O&amp;M phase of the Contract.</td>
</tr>
<tr>
<td>OM4.5</td>
<td>Inability of Contractor to obtain O&amp;M performance bond</td>
<td>Where the O&amp;M performance bond is renewed annually, as required by the Conditions of Contract, the Contractor may find it difficult to renew due to over commitment on other projects.</td>
</tr>
<tr>
<td>OM4.6</td>
<td>Failure by the Employer to recover charges from non-domestic users</td>
<td>May result in the Employer having to borrow finance in order to make payments to the Contractor.</td>
</tr>
<tr>
<td>OM5</td>
<td>Variations</td>
<td></td>
</tr>
<tr>
<td>OM5.1</td>
<td>Employer directed Operation &amp; Maintenance changes</td>
<td>Any changes or variations in the Contractor’s operation and maintenance regime that is made under instruction from the Employer. May result in additional material and consequential costs.</td>
</tr>
<tr>
<td>OM6</td>
<td>Legislative Changes</td>
<td></td>
</tr>
<tr>
<td>OM6.1</td>
<td>Discriminatory changes in legislation</td>
<td>Relates to changes in legislation in Ireland, which are specific to the Design, Build, Operation and Maintenance of water/wastewater treatment plants. Such legislation means laws, orders, regulations or by-laws having the force of law, which are specific to the Contract or type of Contract. Specific reference should be made to Sub-Clause 13.16 of the Conditions of Contract. May result in the need to change or upgrade treatment plant or processes to meet new environmental standards.</td>
</tr>
<tr>
<td>OM6.2</td>
<td>Discriminatory changes with regard to the disposal of sludge</td>
<td>Changes in legislation in Ireland with regard to the disposal of sludge, which affects the Contractor in the performance of his obligations including changes to technical standards and regulations in accordance with Sub-Clause 5.4 of the Conditions of Contract. Specific reference should be made to Sub-Clause 13.16 of the Conditions of Contract.</td>
</tr>
<tr>
<td>OM6.3</td>
<td>Discriminatory changes with regard to registered pay agreements</td>
<td>Specific reference should be made to Sub-Clause 6.2 of the Conditions of Contract.</td>
</tr>
<tr>
<td>OM6.4</td>
<td>Non-discriminatory changes in legislation</td>
<td>Relates to general legislative or regulatory changes made during the contract period.</td>
</tr>
</tbody>
</table>
## Appendix F

### Explanation of Risks

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>OM7.1</td>
<td>OM7.1 Industrial action by Employer's staff</td>
<td>May result if disputes arise, either locally on site or due to a more widespread national action.</td>
</tr>
<tr>
<td>OM7.2</td>
<td>OM7.2 Industrial action by Contractor's staff</td>
<td>May result if disputes arise, either locally on site or due to a more widespread national action.</td>
</tr>
<tr>
<td>OM7.3</td>
<td>OM7.3 Contractor's Employees Rights at the end of the contract period-</td>
<td>Contractor employees are protected under the European Communities (Safeguarding of Employees’ Rights on Transfer of Undertakings) Regulations, 1980 and 2000. It may be that at the end of the Contract Period the Contractor’s employees wish to remain employed at the treatment plant in which case the Employer will have to take account of their rights under the said regulations and may have to maintain their employment or enter into re-deployment or redundancy issues with the Contractor.</td>
</tr>
<tr>
<td>OM8</td>
<td>OM8.1 Health &amp; safety management</td>
<td>Management of health and safety of all site personnel, visitor and the general public. Mismanagement may result in claims in excess of insurance, additional cost of remedy and, in severe cases, site closure until resolution of the issues in question.</td>
</tr>
<tr>
<td>OM9.1</td>
<td>OM9.1 Plant security</td>
<td>The provision of security of the site and managing the risk of intrusion. May result in stealing of or damage to plant and materials, etc. if site security is breached</td>
</tr>
<tr>
<td>OM10.1</td>
<td>OM10.1 Failure of utility services outside site</td>
<td>May be due to a failure on the part of utility service providers to deliver water/power/telecoms services to the site.</td>
</tr>
<tr>
<td>OM11.1</td>
<td>OM11.1 Technological obsolescence leading to replacement of plant earlier</td>
<td>Where plant and equipment becomes obsolete, parts are no longer available resulting in the need for replacement of the entire item of plant or equipment. The risk here is that the item in question becomes obsolete before the Contractor expected that it would resulting in an earlier spend on capital replacement.</td>
</tr>
<tr>
<td>OM11.2</td>
<td>OM11.2 Pre-mature replacement of plant and equipment</td>
<td>Where plant and equipment requires replacement earlier than planned due to poor design, poor quality plant, poor maintenance, poor maintenance programme, etc.</td>
</tr>
<tr>
<td>OM11.3</td>
<td>OM11.3 Plant defects occurring during O&amp;M phase</td>
<td>Where plant and equipment malfunctions during operation causing replacement. In severe cases possible interruption to service may occur.</td>
</tr>
<tr>
<td>OM11.4</td>
<td>OM11.4 Latent defects after hand-over of the Works at the end of the</td>
<td>Where plant and equipment becomes defective after the treatment plant has been handed back to the Employer at the end of the Operation and Maintenance phase. A Maintenance Reserve Fund has been specified in the Contract to ensure, as far as possible, that the treatment plant is handed back to the Employer in good order so as to minimise the risk of latent defects. However, such defects can occur if the Contractor repairs plant only enough to last a short time beyond the hand-over date.</td>
</tr>
<tr>
<td>OM12.1</td>
<td>OM12.1 Damage caused to 3rd parties</td>
<td>Relates to damage caused, as a result of operation and maintenance activities, to people or property other than that of the Contractor, Employer or Employer’s Representative.</td>
</tr>
<tr>
<td>OM12.2</td>
<td>OM12.2 Force majeure event</td>
<td>Relevant where force majeure events occur as described under Clause 19 of the Conditions of Contract.</td>
</tr>
<tr>
<td>OM12.3</td>
<td>OM12.3 Damage caused by 3rd Parties to treatment facilities, costs of</td>
<td>Relates to damage that may be caused to structures, plant and equipment by third parties, either accidentally or deliberately, where costs cannot be recovered by the Contractor or the Employer from the third party.</td>
</tr>
<tr>
<td></td>
<td>which are unrecoverable</td>
<td></td>
</tr>
</tbody>
</table>
## Explanation of Risks

### Appendix F

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| OM13    | Upgrades, Alterations and Improvements                                      | **OM13.1** Future Planning Permission, Permits, Licences or Approvals in relation to Upgrades, alterations and/or improvements  
Under Clause 4.25 of the Conditions of Contract, the Contractor is responsible at his own cost for preparing documentation for new planning permissions, consents, permits or approvals. The Contractor must fully take this into account in his Tender. The Contractor must allow for any time delays associated with obtaining a revised planning permission. He will not be entitled to any extension of Time for Completion of the Works, or to any compensation or payment due to the need to obtain the permission or other consents or permits. Clause 14.6 sets out the responsibilities for the implementation of any upgrade, alteration or improvement.  
Risks may relate, for example, to delays, objections, the requirement for more detailed investigations, problems with treatment plant capacity or water/wastewater quality if significant delays occur and if timing of upgrades, etc. has been poorly managed. An underestimation of the initial design horizon could also result in a need for an upgrade earlier than expected and consequential pressure on the treatment plant to maintain capacity ahead of demand. |
|         |                                                                           | **OM13.2** Failure to agree Upgrades, alterations and/or improvements  
Clause 14.6 sets out the responsibilities for the implementation of any upgrade, alteration or improvement. Failure to agree may result in another contractor coming on site to carry out work with consequential problems in terms of working relations, latent defects, poor performance of the upgrade, problems with contractor interfaces leading to confusion of responsibility. If significant, such a failure could result in a breakdown between Employer and Contractor and potentially causing termination. |
| OM14    | Existing Works - Specific Risks                                            | **OM14.1** Problems with hand over to Contractor during transition phase  
Relates to the transition period during which a hand over of the operation of the existing works takes place from the Employer to the Contractor at the start of the Contract Period. Problems may include, lack of information provided to the Contractor in terms of the operation of the plant, poor co-operation of employer staff with the Contractor due to grievance with hand over to Contractor, poor level of attention given by the Contractor during the transition phase. |
|         |                                                                           | **OM14.2** Incorrect assessment of life expectancy of existing plant  
May be due to poor or inaccurate information given by the Employer at tender stage or from poor attention to detail given by the Contractor in examining the existing plant. This incorrect assessment may lead to changes in design, modifications during construction or inefficiency of the treatment plant operation. |
| OM15    | Sludge Hub Centre (as part of WwTP) - Specific Risks                       | **OM15.1** Problems with the collection and/or transportation of sludge from Satellite treatment plants  
The arrangements for sludge management and treatment where hub centres are to be provided needs to be scoped for the specific project. Once this is done the specific risks should be defined. The areas for consideration are provided in the Matrix, as listed here and should be modified to suit the particular project needs.  
**OM15.2** Satelite sludge collection - inappropriate strategy proposed in Contract Documents  
**OM15.3** Incoming satelite sludge quality and quantity variations from contract  
**OM15.4** Problems with Sludge/Biosolid disposal/re-use |
## Risk Assessment Matrix

### Extract of Risk Assessment Matrix Appendix G

Reference to Part Two - 5.3

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Project Type</th>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1.1</td>
<td>Delays in obtaining funding from DEHLG for domestic element of the Capital Expenditure</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>HIGH</td>
<td>3</td>
</tr>
<tr>
<td>P2.1</td>
<td>Any known or potential new objections from stakeholders</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P2.2</td>
<td>Objections by unsuccessful Applicants/Tenderers at Pre-qualification and Tender stage</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P3.1</td>
<td>Failure to obtain Planning Permission, permits, licences or approvals</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>LOW</td>
<td>1</td>
</tr>
<tr>
<td>P3.2</td>
<td>Unforeseen legal covenant or right of way</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>HIGH</td>
<td>3</td>
</tr>
<tr>
<td>P4.1</td>
<td>Delay in acquiring land and/or wayleaves</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>LOW</td>
<td>1</td>
</tr>
<tr>
<td>P4.2</td>
<td>Legal actions related to land acquisition</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>LOW</td>
<td>1</td>
</tr>
<tr>
<td>P4.3</td>
<td>Extra Cost associated with land acquisition</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P4.4</td>
<td>Unexpected land acquisition or wayleave</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>HIGH</td>
<td>3</td>
</tr>
<tr>
<td>P4.5</td>
<td>Unforeseen legal covenant or right of way</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P5.1</td>
<td>Failure to coordinate planning and development of Urban Catchment with plant capacity</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P6.1</td>
<td>Delays or changes during procurement</td>
<td>C</td>
<td>Employer</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
<tr>
<td>P7.1</td>
<td>Discriminatory legislative changes</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P7.2</td>
<td>Non-discriminatory legislative changes</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>LOW</td>
<td>1</td>
</tr>
<tr>
<td>P8.1</td>
<td>Industrial action by Employer’s employees</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>MEDIUM</td>
<td>2</td>
</tr>
<tr>
<td>P8.2</td>
<td>Difficulties with existing employees rights (redundancy/re-deploy/transfer)</td>
<td>C</td>
<td>Employer</td>
<td>LOW</td>
<td>LOW</td>
<td>1</td>
</tr>
</tbody>
</table>

### Project Specific Risks (list below)

- 0
- 0
- 0
## Selected High Ranking Risks

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>P6.1</td>
<td>Delays or changes during procurement</td>
<td>Employer</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>B1.4</td>
<td>Unforeseeable sub-surface conditions causing delay to project</td>
<td>Employer</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>B1.5</td>
<td>Unforeseeable sub-surface conditions causing additional cost to project</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>B2.1</td>
<td>Employer directed construction changes</td>
<td>Employer</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>B7.1</td>
<td>Failure by the Employer to recover charges from non-domestic users</td>
<td>Employer</td>
<td>High</td>
<td>Medium</td>
<td>6</td>
</tr>
<tr>
<td>OM3.2</td>
<td>Pollutant load is higher than predicted or influent has been contaminated by substances with concentrations greater than the Pollution Incident Limits detailed in Employer's Requirements</td>
<td>Employer</td>
<td>High</td>
<td>Medium</td>
<td>6</td>
</tr>
<tr>
<td>OM3.5</td>
<td>Failure of Noise, Odour, Dust limits causing nuisance</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM4.3</td>
<td>Costs in excess of tendered amounts and indexation</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>6</td>
</tr>
<tr>
<td>OM4.6</td>
<td>Failure by the Employer to recover charges from non-domestic users</td>
<td>Employer</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM6.1</td>
<td>Discriminatory changes in legislation</td>
<td>Employer</td>
<td>High</td>
<td>High</td>
<td>9</td>
</tr>
<tr>
<td>OM6.4</td>
<td>Non-discriminatory changes in legislation</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM7.3</td>
<td>Contractor's Employees Rights at the end of the contract period- (redundancy/re-deploy/transfer)</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM11.2</td>
<td>Pre-mature replacement of plant and equipment</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM11.3</td>
<td>Plant defects occurring during O&amp;M phase</td>
<td>Contractor</td>
<td>Medium</td>
<td>Medium</td>
<td>4</td>
</tr>
<tr>
<td>OM13.1</td>
<td>Future Planning Permission, Permits, Licences or Approvals in relation to Upgrades, alterations and/or improvements</td>
<td>Contractor</td>
<td>High</td>
<td>Medium</td>
<td>6</td>
</tr>
</tbody>
</table>
## Selected High Ranking Risks

### Appendix H

**Fig. 1  Summary of Project Costs**

<table>
<thead>
<tr>
<th>Cost Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consultancy fees</td>
<td>€ 500,000</td>
</tr>
<tr>
<td>CAPEX (Pre-risk adjusted)</td>
<td>€ 7,600,000</td>
</tr>
<tr>
<td>OPEX for 20 years (Pre-risk adjusted)</td>
<td>€ 9,000,000</td>
</tr>
</tbody>
</table>
### Risk Item P6.1 Delays or changes during procurement

<table>
<thead>
<tr>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYER</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is assumed that there will be delays in preparation and review of documents at the various stages of the procurement process and that changes may be made arising in the need to revise documents, produce additional revisions, carry out assessments and surveys and provide additional reports.

#### Delay Cost

12 month delay to project, say 5% of CAPEX € 380,000

#### Material Cost

Additional consultancy fees, say, 10% of fee of €500,000 € 50,000

#### Consequential Cost

None € 0

#### Probability Rating

10%

#### Spread of Costs per annum

Total cost spread evenly across Year –1 & 0 of Phase 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year -1</td>
<td>€ 215,000</td>
<td>€ 21,500</td>
</tr>
<tr>
<td>Year 0</td>
<td>€ 215,000</td>
<td>€ 21,500</td>
</tr>
</tbody>
</table>

---

**Fig. 2**

**Selected High Ranking Risks**

**Appendix H**
### Risk Item B1.4 Unforeseeable sub-surface conditions causing delay to project

<table>
<thead>
<tr>
<th>4 Risk Owner</th>
<th>5 Probability</th>
<th>6 Impact</th>
<th>7 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYER</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

Some landfilled material was found during the site investigation. It is assumed that landfilled material (Unforeseeable sub-surface conditions) might be found on other parts of the site during the Build Phase of the Project. The determination of a medium impact was made on the basis that the landfilled material was found close to the surface but extended to a depth of 6 metres making it slow to remove possibly resulting in a medium-term delay. The delay was quantified as a 6 week delay to the project occurring on 1 occasion with extension of time given to the Contractor. It is estimated that the cost of a 6 week delay is €120,000. As a result of the delay the resident engineering staff must be retained for an additional 6 weeks at a cost of €8,000 per week equating to €48,000 in total.

#### Delay Cost

- 6 weeks at €20,000 per week €120,000

#### Material Cost

- None €0

#### Consequential Cost

- Retention of RE staff €48,000

#### Probability Rating

- 10%

#### Spread of Costs per annum

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>€ 84,000</td>
<td>€ 8,400</td>
</tr>
<tr>
<td>Year 2</td>
<td>€ 84,000</td>
<td>€ 8,400</td>
</tr>
</tbody>
</table>

Note: The material cost associated with this risk is dealt with under Risk No. B1.5. The risk costing is split between these risks as B1.4 is an Employer’s Risk and B1.5 is a Contractor’s Risk.
Risk Item B1.5 Unforeseeable sub-surface conditions causing additional cost to project

<table>
<thead>
<tr>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTOR</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

The Material Costs associated with this risk relate to the excavation and removal of the non-hazardous landfilled material, if it occurs at the site during the Build Phase of the project. It was assumed that, if found, the landfilled material would be found in small isolated locations but to a depth that would make it difficult to remove. It was estimated that the quantities to be removed, if found could be in the region of 400 m³. It was estimated that the excavation and disposal costs would be in the region of €150/m³ and €300/m³ respectively giving a total cost per occurrence of €180,000.

**Delay Cost**

None  €  0

**Material Cost**

Excavation and removal of material €180,000

**Consequential Cost**

None  €  0

**Probability Rating**  10%

**Spread of Costs per annum**

Total cost spread evenly across Year 1 & 2 of Phase 3

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>€ 90,000</td>
<td>€ 9,000</td>
</tr>
<tr>
<td>Year 2</td>
<td>€ 90,000</td>
<td>€ 9,000</td>
</tr>
</tbody>
</table>

Note:- The delay cost associated with this risk is dealt with under Risk No. B1.4. The risk costing is split between these risks as B1.4 is an Employer’s Risk and B1.5 is a Contractor’s Risk.
Fig. 5

Risk Item B2.1 Employer directed construction changes

<table>
<thead>
<tr>
<th>4 Risk Owner</th>
<th>5 Probability</th>
<th>6 Impact</th>
<th>7 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYER</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is assumed that there will be construction changes to the build works following instructions by the Employer/Employer's Representative or agreement on a claim from the Contractor. It is assumed that the material cost of the risk will amount to 20% of CAPEX. It is also assumed that there will be additional time required by the contractor to carry out the instructed or agreed changes and this is estimated to be 5 weeks at a cost of €20,000 per week.

**Delay Cost**

5 weeks at €20,000 per week € 100,000

**Material Cost**

Assumed 20% of total CAPEX €1,520,000

**Consequential Cost**

None € 0

**Probability Rating** 10%

**Spread of Costs per annum**

Total cost spread evenly across Year 1 & 2 of Phase 3

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 1</td>
<td>€ 810,000</td>
<td>€ 81,000</td>
</tr>
<tr>
<td>Year 2</td>
<td>€ 810,000</td>
<td>€ 81,000</td>
</tr>
</tbody>
</table>
### Risk Item B7.1 Failure by the Employer to recover charges from non-domestic users

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>EMPLOYER</td>
<td>HIGH</td>
<td>MEDIUM</td>
<td>6</td>
</tr>
</tbody>
</table>

A charging mechanism and metering is not in place for those non-domestic users to be served by the project. Consequently, it is likely that there will be difficulties with the recovery of charges from these users during the early phase of the project. It is assumed that systems will not be operating efficiently for the first three years of the contract, which will take up the entire period of the Design and Build phase (2 years) and the first year of the Operation and Maintenance phase (Risk No. OM4.6). A 70% non-recovery of costs has been assumed in the first three years. It is also assumed that there will be a 20% non-recovery of charges for the remainder of the O&M phase. It is assumed that the non-domestic element of CAPEX is 19.5%.

**Delay Cost**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>€ 0</td>
</tr>
</tbody>
</table>

**Material Cost**

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-domestic element of CAPEX is 19.5%</td>
<td>€ 1,482,000</td>
</tr>
<tr>
<td>Non-domestic element of CAPEX per annum over 20 years</td>
<td>€ 74,100</td>
</tr>
<tr>
<td>Non-domestic element of CAPEX for first 3 years</td>
<td>€ 222,300</td>
</tr>
</tbody>
</table>

Assume 70% non-recovery of costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unrecovered Non-domestic element of CAPEX for first 3 years</td>
<td>€ 155,610</td>
</tr>
<tr>
<td>Unrecovered Non-domestic element of CAPEX per annum</td>
<td>€ 51,870</td>
</tr>
</tbody>
</table>

Assume 20% non-recovery for year 2-20 inclusive

**Consequential Cost**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>€ 0</td>
</tr>
</tbody>
</table>

**Probability Rating**

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>20%</td>
</tr>
</tbody>
</table>

**Spread of Costs per annum**

<table>
<thead>
<tr>
<th>Year</th>
<th>CAPEX</th>
<th>CAPEX x Probability Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>€ 51,870</td>
<td>€ 10,374</td>
</tr>
<tr>
<td>2</td>
<td>€ 51,870</td>
<td>€ 10,374</td>
</tr>
</tbody>
</table>

Note: This risk is linked to Risk No. OM4.6 where the non-recovery of both CAPEX and OPEX during the Operation & Maintenance Phase is calculated (see Fig. 10 below).
**Selected High Ranking Risks**

### Risk Item: OM3.2 Pollutant load is higher than predicted or influent has been contaminated by substances with concentrations greater than the Pollution Incident Limits* detailed in Employer's Requirements

<table>
<thead>
<tr>
<th>4 Risk Owner</th>
<th>5 Probability</th>
<th>6 Impact</th>
<th>7 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYER</td>
<td>HIGH</td>
<td>MEDIUM</td>
<td>6</td>
</tr>
</tbody>
</table>

The Risk relates to accidental pollution in the catchment potentially from Industrial/Commercial sources or from Road Spillage resulting in the pollutant entering the sewerage system. The net effect will have an impact on the process plus the deterioration of plant and equipment. It is assumed that the risk could occur up to 4 times during the Operation and Maintenance Period. It was agreed that there would be incidents of high load during the O&M Period but that these would be minor in cost terms and were not considered further.

This risk is specific to wastewater projects.

**Delay Cost**

None \(\text{€ } 0\)

**Material Cost**

- Disruption to Operations Contract \(\text{€ } 50,000\) per event x 4 \(\text{€ } 200,000\)
- Tankering of Sludge to Re-Activate Process \(\text{€ } 15,000\) per event x 4 \(\text{€ } 60,000\)
- Damage repair \(\text{€ } 15,000\) per event x 4 \(\text{€ } 60,000\)

**Consequential Cost**

- Local Authority Costs / Clean Up \(\text{€ } 30,000\) per event x 4 \(\text{€ } 120,000\)
- Disposal of Contaminated Material (Both Spill & Process) \(\text{€ } 200,000\) per event x 4 \(\text{€ } 800,000\)

**Probability Rating**

30%

**Spread of Costs per annum**

Total cost spread evenly across years 7, 12, 17 & 22 of Phase 4

<table>
<thead>
<tr>
<th>Year</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 7</td>
<td>€ 93,000</td>
</tr>
<tr>
<td>Year 12</td>
<td>€ 93,000</td>
</tr>
<tr>
<td>Year 17</td>
<td>€ 93,000</td>
</tr>
<tr>
<td>Year 22</td>
<td>€ 93,000</td>
</tr>
</tbody>
</table>

* Pollution Incident Limits – The defined thresholds on influent quality set out in the contract documents that limit the Contractor’s responsibility for guaranteeing final effluent quality.
Selected High Ranking Risks

Appendix H

Fig. 8

Risk Item OM3.5 Failure of Noise, Odour, Dust limits causing nuisance & complaint

<table>
<thead>
<tr>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Owner</td>
<td>Probability</td>
<td>Impact</td>
<td>Rank</td>
</tr>
<tr>
<td>CONTRACTOR</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is likely that there will be complaints from local residents and the general public during the Operation and Maintenance Period, which could result in the need to modify certain processes and cover tanks. The costs provided are based on a lump sum estimate of the cost associated with the modifications. It is assumed that modifications would be carried out in year 4 of Phase 4 as objections are likely to come early in the O&M lifetime of the project. There will be complaints from time to time from local residents and the general public, which would only lead to minor modifications. These complaints are only likely to result in minor cost and are not considered here.

**Delay Cost**

None € 0

**Material Cost**

Lump sum estimate € 250,000

**Consequential Cost**

None € 0

**Probability Rating** 10%

**Spread of Costs per annum**

Total cost applied in year 4 of Phase 4

<table>
<thead>
<tr>
<th>Year 4</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>€ 250,000</td>
<td>€ 25,000</td>
</tr>
</tbody>
</table>
### Risk Item OM4.3 Costs in excess of tendered amounts and indexation

<table>
<thead>
<tr>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTOR</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is assumed that the costs associated with provision of the service, while linked to indexation, are likely to exceed the prices originally tendered. The risks relate to increases in taxation; inflation cost increases that result in a higher than expected price fluctuation payment to the contractor; exchange rate fluctuations that influence costs of materials, consumables and services being procured outside of the Eurozone; fluctuations in interest rates and any major changes in base costs, such as, utilities.

#### Delay Cost

<table>
<thead>
<tr>
<th>Probability Rating</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Material Cost

Will vary with respect of characteristic of individual projects, but will typically be in the range of 10% to 25% of annual OPEX, with a justification to be provided for individual projects by reference to:

- Inflation Outside Parameter
- Fluctuation in Interest Rates
- Exchange Rate
- Major Change in Base Costs
  - Electricity
  - Chemicals
  - Labour Costs
  - Rates
  - Insurances
  - Etc

In this instance, assumed risk exposure calculated at 13% of annual OPEX or €58,500

#### Consequential Cost

<table>
<thead>
<tr>
<th>Probability Rating</th>
<th>€</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Spread of Costs per annum

Total cost spread evenly across each year of Phase 4

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-22</td>
<td>€ 58,500</td>
<td>€ 5,850 p.a</td>
</tr>
</tbody>
</table>
### Fig. 10

**Risk Item**  OM4.6  Failure by the Employer to recover charges from non-domestic users

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Risk Owner</td>
<td>5</td>
<td>Probability</td>
</tr>
<tr>
<td></td>
<td>EMPLOYER</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
</tr>
</tbody>
</table>

A charging mechanism and metering is not in place for those non-domestic users to be served by the project. Consequently, it is likely that there will be difficulties with the recovery of charges from these users during the early phase of the project. It is assumed that systems will not be operating efficiently for the first three years of the contract, which will take up the entire period of the Design and Build phase of 2 years (Risk No. B7.1) and the first year of the Operation and Maintenance phase. A 70% non-recovery of costs has been assumed in the first three years. It is also assumed that there will be a 20% non-recovery of charges for the remainder of the O&M phase.

### Delay Cost

None  € 0

### Material Cost

- Non-domestic element of CAPEX is 19.5%  € 1,482,000
- Non-domestic element of OPEX is 50%  € 4,500,000
- Non-domestic element of CAPEX per annum over 20 years  € 74,100
- Non-domestic element of OPEX per annum  € 225,000
- Non-domestic element of CAPEX for first 3 years  € 222,300
- Non-domestic element of OPEX for year 3  € 225,000

Assume 70% non-recovery of costs

- Unrecovered Non-domestic element of CAPEX for first 3 years  € 155,610
- Unrecovered Non-domestic element of CAPEX per annum  € 51,870
- Unrecovered Non-domestic element of OPEX for Year 3  € 157,500

Assume 20% non-recovery for year 3-22 inclusive

- Unrecovered Non-domestic element of CAPEX for years 3-22 inclusive  € 296,400
- Unrecovered Non-domestic element of CAPEX for years 3-22 inclusive p.a.  € 14,820
- Unrecovered Non-domestic element of OPEX for years 3-22 inclusive  € 900,000
- Unrecovered Non-domestic element of OPEX for years 3-22 inclusive p.a.  € 45,000

### Consequential Cost

None  € 0

### Probability Rating

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Probability</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Spread of Costs per annum

<table>
<thead>
<tr>
<th>Year</th>
<th>CAPEX</th>
<th>OPEX</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>€ 51,870</td>
<td>€ 157,500</td>
<td>€ 209,370</td>
<td>€ 20.937</td>
</tr>
<tr>
<td>3-22</td>
<td>€ 14,820</td>
<td>€ 45,000</td>
<td>€ 59,820</td>
<td>€ 5,982</td>
</tr>
</tbody>
</table>
Fig. 11

OM6.1 Discriminatory changes in legislation

<table>
<thead>
<tr>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>EMPLOYER</td>
<td>HIGH</td>
<td>HIGH</td>
<td>9</td>
</tr>
</tbody>
</table>

It is assumed that there will be changes in legislation that will directly impact on the treatment plant in terms of increased standards. Being a coastal discharge near a bathing area the likely and most serious effect will be in relation to final discharge standards. These may be in the form of tighter controls on phosphorus and nitrogen discharges, the requirement for dis-infection and further reductions in organic load. All of these measures are considered possible during the lifetime of the contract and will require capital investment and increases in operational costs. The consequential impact of these measures will be an increase in sludge production resulting in additional treatment and disposal costs. It is assumed that P & N removal will be required in Year 9 of Phase 4, UV disinfection in Year 12 and Tertiary treatment in year 14.

Delay Cost

None

Material Cost

<table>
<thead>
<tr>
<th></th>
<th>CAPEX</th>
<th>OPEX/yr</th>
<th>No of years</th>
<th>OPEX</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phosphorus / Nitrogen</td>
<td>€ 320,000</td>
<td>€ 50,000</td>
<td>14</td>
<td>€ 700,000</td>
<td>€ 1,020,000</td>
</tr>
<tr>
<td>UV Disinfection</td>
<td>€ 380,000</td>
<td>€ 25,000</td>
<td>11</td>
<td>€ 275,000</td>
<td>€ 655,000</td>
</tr>
<tr>
<td>Tertiary Treatment</td>
<td>€ 200,000</td>
<td>€ 25,000</td>
<td>9</td>
<td>€ 225,000</td>
<td>€ 425,000</td>
</tr>
</tbody>
</table>

Consequential Cost

Additional Sludge Removal | € 8,000 | 14 | € 112,000

Probability Rating

40%

Spread of Costs

After application of probability rating

<table>
<thead>
<tr>
<th>Year</th>
<th>CAPEX</th>
<th>OPEX</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>€ 128,000</td>
<td>€ 23,200</td>
</tr>
<tr>
<td>10</td>
<td>€ 23,200</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>€ 23,200</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>€ 152,000</td>
<td>€ 33,200</td>
</tr>
<tr>
<td>13</td>
<td>€ 33,200</td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>€ 80,000</td>
<td>€ 43,200</td>
</tr>
<tr>
<td>15</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>€ 43,200</td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>€ 43,200</td>
<td></td>
</tr>
</tbody>
</table>
**Risk Item** OM6.4  Non-discriminatory changes in legislation

<table>
<thead>
<tr>
<th>4 Risk Owner</th>
<th>5 Probability</th>
<th>6 Impact</th>
<th>7 Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTOR</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is assumed that there will be changes in general legislation that is not specific to the water business or the project. These may include changes to Working Time Regulations; minimum wage requirements; health and safety legislation and so on. These changes will primarily affect the cost of labour so the risk is evaluated in this context. From the project cost estimates it has been calculated that labour makes up €180,000 of the annual OPEX of €450,000. Therefore over 20 years total labour element is €3,600,000. It is assumed that a 5% increase in labour costs will arise due to non-discriminatory changes.

**Delay Cost**
- None  € 0

**Material Cost**
- 5% increase in labour costs  € 180,000

**Consequential Cost**
- None  € 0

**Probability Rating** 80%

**Spread of Costs per annum**
Total cost spread evenly across each year of Phase 4

| Year 3-22 | 9,000 | 7,200 p.a |
At the end of the contract period it is likely that the contractor’s employees will wish to remain employed at the treatment plant. The directly employed staff is likely to include a plant manager, technician and caretaker. Should this occur all employees will be entitled (based on today’s standards) to transfer their employment and entitlements to the Employer. It is assumed that each employee will have 30 years service by the end of the contract period. The cost to the Employer will be the higher wage cost for employees with greater service than those they might employ otherwise and the cost of pension entitlements. As the costs associated with this risk would be incurred after completion of the Contract Period, the risk cost has not been brought into the assessment. However, it should be considered by the Employer.
**Selected High Ranking Risks**

**Appendix H**

**Fig. 14**

**Risk Item** OM11.2  
**Pre-mature replacement of plant and equipment**

<table>
<thead>
<tr>
<th>Risk Owner</th>
<th>Probability</th>
<th>Impact</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTRACTOR</td>
<td>MEDIUM</td>
<td>MEDIUM</td>
<td>4</td>
</tr>
</tbody>
</table>

It is assumed that there will be some amount of earlier than planned plant replacement. The total estimate for asset replacement during the life of the contract amounts to €1,800,000. It is estimated that plant replacements will occur primarily in years 12 (€260,000), 17 (€1,000,000), 19 (€40,000) and year 22 (€500,000). It is taken that 10% of plant will require replacement prematurely which may be due to inferior plant being installed first day or from poor maintenance. Plant that is replaced early will result in a earlier than planned spend and, at the end of its useful life, will need to be renewed at an earlier point in time. It is taken, for the purpose of evaluating the risk, that the plant replacement will occur 2 years earlier than planned.

**Delay Cost**

None  

€ 0

**Material Cost**

- Year 10 replacement - 10% of €260,000  
  € 26,000
- Year 15 replacement - 10% of €1,000,000  
  €100,000
- Year 17 replacement - 10% of €40,000  
  € 4,000
- Year 20 replacement - 10% of €500,000  
  € 50,000

**Consequential Cost**

None  

€ 0

**Probability Rating**

10%

**Spread of Costs per annum**

<table>
<thead>
<tr>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 10</td>
<td>€26,000</td>
</tr>
<tr>
<td>Year 15</td>
<td>€100,000</td>
</tr>
<tr>
<td>Year 17</td>
<td>€4,000</td>
</tr>
<tr>
<td>Year 20</td>
<td>€50,000</td>
</tr>
</tbody>
</table>
**Fig. 15**

<table>
<thead>
<tr>
<th>Risk Item</th>
<th>OM11.3</th>
<th>Plant defects occurring during O&amp;M phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 Risk Owner</td>
<td>CONTRACTOR</td>
<td></td>
</tr>
<tr>
<td>5 Probability</td>
<td>MEDIUM</td>
<td></td>
</tr>
<tr>
<td>6 Impact</td>
<td>MEDIUM</td>
<td></td>
</tr>
<tr>
<td>7 Rank</td>
<td>4</td>
<td></td>
</tr>
</tbody>
</table>

It is assumed that plant defects will occur during the O&M phase over and above routine and planned maintenance. The defects will result in emergency callout of maintenance crews with the possible replacement of parts or entire items of plant. It is assumed that there will be up to 6 no. breakdown callouts per year at a cost of €4,000 per callout. It is assumed that 3 no. additional callouts may be required in any one year. The OPEX estimate for spare parts is €22,000 per annum. It is assumed that 30% of this value would be required to cater for plant repair/replacement in the event of plant defect.

**Delay Cost**

- None: €0

**Material Cost**

- Additional 3 No. callout per year @ €4,000 per callout: €240,000
- Additional cost of parts @ 30% of €22,000 per annum: €132,000

**Consequential Cost**

- None: €0

**Probability Rating**

- 7%

**Spread of Costs per annum**

Total cost spread evenly across each year of O&M Phase

<table>
<thead>
<tr>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 3-22 Labour</td>
<td>€12,000 p.a.</td>
</tr>
<tr>
<td>Year 3-22 Parts</td>
<td>€6,600 p.a.</td>
</tr>
</tbody>
</table>
### Selected High Ranking Risks

#### Appendix H

#### Fig. 16

<table>
<thead>
<tr>
<th>Risk Item</th>
<th>OM13.1 Future Planning Permission, Permits, Licences or Approvals in relation to Upgrades, alterations and/or improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Owner</td>
<td>CONTRACTOR</td>
</tr>
<tr>
<td>Probability</td>
<td>HIGH</td>
</tr>
<tr>
<td>Impact</td>
<td>MEDIUM</td>
</tr>
<tr>
<td>Rank</td>
<td>6</td>
</tr>
</tbody>
</table>

It is assumed that a delay is encountered in completion of a new EIS and planning permission which is compounded by a delay to the approval of same. The delay in approval is caused by objections by adjacent landowners and residents who do not want to see the plant increased in size. The matter is appealed and requires an oral hearing. There are additional consultancy costs incurred in revision of the EIS, preparation of additional information and reports to refute claims made by objectors and attendance at public consultations and oral hearings. It is assumed that the delay in total will be 12 months with a requirement of 12 months for implementation of the upgrade. As a result of this delay it is found that the Contractor cannot comply with Employer's Requirements due to overloading of the plant and must mitigate this situation by installing temporary plant with chemical dosing for the removal of excess solids and consequent increase in sludge production. It is estimated that the upgrade required will cost €3,500,000 and is expected to occur in year 12.

#### Delay Cost

12 month delay to project say 5% of upgrade CAPEX  € 175,000

#### Material Cost

- Consultancy fees - lump sum estimate  € 50,000
- Employer time costs - lump sum estimate  € 20,000

#### Consequential Cost

- Costs associated with maintaining quality at the treatment plant
  - Temporary Plant for 24 months @ €6,000 per month  € 144,000
  - Increased O&M Costs @ 5% of OPEX  € 45,000
  - Increased Sludge disposal @ €100/week  € 10,400  € 199,400

#### Probability Rating

40%

#### Spread of Costs per annum

Delay cost in year 12, Material Cost in Year 12, Consequential Cost spread across Years 12 and 13

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Total x Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>12</td>
<td>€344,700</td>
<td>€ 137,880</td>
</tr>
<tr>
<td>13</td>
<td>€ 99,700</td>
<td>€  39,880</td>
</tr>
</tbody>
</table>
### Risk Quantification Matrix

<table>
<thead>
<tr>
<th>Risk No.</th>
<th>Risk Item</th>
<th>Cost of Risk as % of Project Cost Element</th>
<th>Cost of Risk</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PHASE 1 - PLANNING &amp; PROCUREMENT</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P1</td>
<td>Delays in obtaining funding from DEHLG for domestic element of Capital Expenditure</td>
<td>0.00%</td>
<td>CAPEX €0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P2</td>
<td>Objections</td>
<td></td>
<td></td>
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<tr>
<td>P2.1</td>
<td>Any known or potential new objections from stakeholders</td>
<td>0.00%</td>
<td>CAPEX €0</td>
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<tr>
<td>P2.2</td>
<td>Objections by unsuccessful Applicants/Tenderers at Pre-qualification and Tender stage</td>
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<td>CAPEX €0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3</td>
<td>Planning Permission, Permits, Licences or Approvals</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P3.1</td>
<td>Failure to obtain Planning Permission, permits, licences or approvals</td>
<td>0.00%</td>
<td>CAPEX €0</td>
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<td></td>
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</tr>
<tr>
<td>P3.2</td>
<td>Onerous conditions in Planning Permission (incl. EIS where applicable)</td>
<td>0.00%</td>
<td>CAPEX €0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P4</td>
<td>Land Acquisition/Wayleave</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>P4.1</td>
<td>Delay in acquiring land and/or wayleaves</td>
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<tr>
<td>P4.2</td>
<td>Legal actions related to land acquisition</td>
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<td>P4.3</td>
<td>Extra cost associated with land acquisition</td>
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<td>CAPEX €0</td>
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<td>P4.4</td>
<td>Unexpected land acquisition or wayleave</td>
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<td>P4.5</td>
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<td>P5</td>
<td>Planning &amp; Development Co-ordination</td>
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<tr>
<td>P5.1</td>
<td>Failure to coordinate planning and development of Urban Catchment with plant capacity</td>
<td>0.00%</td>
<td>CAPEX €0</td>
<td></td>
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<tr>
<td>P6</td>
<td>Time and Cost Overrun</td>
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<tr>
<td>P6.1</td>
<td>Delays or changes during procurement</td>
<td>0.57%</td>
<td>CAPEX €63,000</td>
<td>€21,500</td>
<td>€21,500</td>
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<td>P7</td>
<td>Changes in Legislation</td>
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<tr>
<td>P7.1</td>
<td>Discriminatory legislative changes</td>
<td>0.00%</td>
<td>CAPEX €0</td>
<td></td>
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<td></td>
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<tr>
<td>P7.2</td>
<td>Non-discriminatory legislative changes</td>
<td>0.00%</td>
<td>CAPEX €0</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>P8</td>
<td>Employer Staff Management</td>
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<tr>
<td>P8.1</td>
<td>Industrial action by Employer’s employees</td>
<td>0.00%</td>
<td>CAPEX €0</td>
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<tr>
<td>P8.2</td>
<td>Difficulties with existing employees rights- redundancy/deploy/transfer</td>
<td>0.00%</td>
<td>CAPEX €0</td>
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<td></td>
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<tr>
<td>P9</td>
<td>Project Specific Risks (list below)</td>
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</tbody>
</table>

**Extract of Risk Quantification Matrix Appendix I**

**Part Two Reference:**

Phase 1 Project Cost: €7,600,000

OPEX (Pre-risk adjusted) €9,000,000
Cost of Risk Summary

Extract of Cost of Risk Summary

Cost of Risk - Nominal

<table>
<thead>
<tr>
<th>Risk Type</th>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>Employer Retained Risks</td>
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</tr>
<tr>
<td>Phase 1 Total</td>
<td>€ 21,500</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 21,500</td>
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<tr>
<td>Phase 2 Total</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
</tr>
<tr>
<td>Phase 3 Total</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
</tr>
<tr>
<td>Phase 4 Total</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
</tr>
<tr>
<td>TOTAL</td>
<td>€ 21,500</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 0</td>
<td>€ 22,145</td>
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</tbody>
</table>

| Employer Transferred Risks |         |         |         |         |       |
| Phase 1 Total | € 0     | € 0     | € 0     | € 0     | € 0   |
| Phase 2 Total | € 0     | € 0     | € 0     | € 0     | € 0   |
| Phase 3 Total | € 0     | € 0     | € 0     | € 0     | € 0   |
| Phase 4 Total | € 0     | € 0     | € 0     | € 0     | € 0   |
| TOTAL       | 0       | € 0     | € 0     | € 0     | € 0   |

TOTAL COST OF RISK  € 21,500  € 22,145
Calculation of Discount Factors

| Reference | Year-1 | Year 0 | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 | Year 15 | Year 16 | Year 17 | Year 18 | Year 19 | Year 20 | Year 21 | Year 22 | Year 23 | Year 24 | Year 25 | Year 26 | Year 27 |
|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Period    | 0      | 1      | 2      | 3      | 4      | 5      | 6      | 7      | 8      | 9      | 10     | 11     | 12     | 13     | 14     | 15     | 16     | 17     | 18     | 19     | 20     | 21     | 22     | 23     |
| Scenario  | A      |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |        |
| A         | Single Point Discount Rate | 6.1 | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     | 3%     |
| Government Yield Curve | 6.1 | 0.00%  | 2.37%  | 2.50%  | 2.66%  | 2.87%  | 3.03%  | 3.17%  | 3.32%  | 3.46%  | 3.57%  | 3.67%  | 3.77%  | 3.84%  | 3.91%  | 3.98%  | 4.06%  | 4.10%  | 4.14%  | 4.19%  | 4.23%  | 4.28%  | 4.30%  | 4.32%  | 4.33%  | 4.33%  |
| Risk Margin | 6.1 | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  | 0.00%  |
| B         | Annual Discount Rate |       | 0.00%  | 2.37%  | 2.50%  | 2.66%  | 2.87%  | 3.03%  | 3.17%  | 3.32%  | 3.46%  | 3.57%  | 3.67%  | 3.77%  | 3.84%  | 3.91%  | 3.98%  | 4.06%  | 4.10%  | 4.14%  | 4.19%  | 4.23%  | 4.28%  | 4.30%  | 4.32%  | 4.33%  |
| B         | Annual Discount Rate |       | 0.00%  | 2.37%  | 2.50%  | 2.66%  | 2.87%  | 3.03%  | 3.17%  | 3.32%  | 3.46%  | 3.57%  | 3.67%  | 3.77%  | 3.84%  | 3.91%  | 3.98%  | 4.06%  | 4.10%  | 4.14%  | 4.19%  | 4.23%  | 4.28%  | 4.30%  | 4.32%  | 4.33%  |

Discount Rate

100.00% 97.68% 95.19% 92.41% 89.29% 85.13% 82.41% 79.58% 76.16% 72.91% 69.75% 66.66% 63.61% 60.71% 57.86% 55.08% 52.57% 50.14% 47.78% 45.50% 43.28% 41.34% 39.48% 37.68%

Instructions

**Step 1**
Insert the Government Spot or Zero Coupon Yield Curve and risk margin as supplied by the NDFA or alternatively insert the single point discount rate.

The government yield curve is based on the Euro Swap Annual rate for each year of the operational contract. The risk margin is based on the NDFA’s assessment of the risks associated with the individual project.

The figures provided above for the government yield curve and the risk margin are illustrative only and in the case of the government yield curve are representative of rates applicable in January 2005.

**Step 2**
Insert the number of years of the project for which the discount rate is calculated.

Note: Period 1 should represent the Year in which the project is expected to be bid.

For the purposes of our calculations the following assumptions have been made:

- **Bid Date**: 01/2004
- **Planning and Procurement**: 2004-2005
- **Construction Cost**: 2006
- **Risk Margin**: 1.00%
- All cashflows arise at the beginning of the year.
### Inflation

<table>
<thead>
<tr>
<th>Year</th>
<th>Inflation Rate</th>
<th>Cumulative Inflation Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>6.1%</td>
<td>100.00%</td>
</tr>
<tr>
<td>2005</td>
<td>3%</td>
<td>103.00%</td>
</tr>
<tr>
<td>2006</td>
<td>3.5%</td>
<td>106.61%</td>
</tr>
<tr>
<td>2007</td>
<td>4.0%</td>
<td>110.55%</td>
</tr>
<tr>
<td>2008</td>
<td>3.5%</td>
<td>112.76%</td>
</tr>
<tr>
<td>2009</td>
<td>5.0%</td>
<td>115.02%</td>
</tr>
<tr>
<td>2010</td>
<td>2%</td>
<td>117.32%</td>
</tr>
<tr>
<td>2011</td>
<td>2%</td>
<td>119.66%</td>
</tr>
<tr>
<td>2012</td>
<td>2%</td>
<td>122.06%</td>
</tr>
<tr>
<td>2013</td>
<td>2%</td>
<td>124.50%</td>
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<tr>
<td>2014</td>
<td>2%</td>
<td>126.99%</td>
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<td>2015</td>
<td>2%</td>
<td>129.53%</td>
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<tr>
<td>2016</td>
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<td>132.12%</td>
</tr>
<tr>
<td>2017</td>
<td>2%</td>
<td>134.76%</td>
</tr>
<tr>
<td>2018</td>
<td>2%</td>
<td>137.45%</td>
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<tr>
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<td>2%</td>
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<td>2%</td>
<td>151.76%</td>
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<tr>
<td>2024</td>
<td>2%</td>
<td>154.60%</td>
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<td>2%</td>
<td>157.89%</td>
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<tr>
<td>2026</td>
<td>2%</td>
<td>161.05%</td>
</tr>
<tr>
<td>2027</td>
<td>2%</td>
<td>164.27%</td>
</tr>
</tbody>
</table>

**Instructions**

**Step 1**

Enter the inflation rate applicable for the period.

Where a project starts mid period then the inflation rate for this mid period needs to be incorporated.

This inflation rate should be based on a reliable source and it is recommended that the “Consumption Deflator” rates projected in the most recent ESRI Medium Term Review are used.

This data may be obtained from the following website, or successor reference points: [http://www.esri.ie/content.cfm/MediumTermReview](http://www.esri.ie/content.cfm/MediumTermReview).

Estimates are normally available for one to at most five years in the future after which a long range forecast has to be assumed.

**Step 2**

Document the inflation rate assumed and the source of this inflation rate.

<table>
<thead>
<tr>
<th>Year</th>
<th>Rate</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>6.1%</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>3.5%</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>4%</td>
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</table>
Assumptions

An example of the type of assumptions which could be included for the PSB are as follows:

♦ **Economic assumptions** - all of the cash flows associated with the project are stated in 2004 prices (or the year of the relevant tender) and are discounted over the appraisal term using a public sector cost of capital as advised by the National Development Finance Agency.

♦ **Scope Assumptions** - The scope of the project is assumed to include the construction and operation of a wastewater treatment Plant to meet projected demand.

♦ **Timing assumptions** - the construction phase of the project is assumed to last 24 months while the operational phase of the project is assumed to have a term of 20 years, the overall length of the contract being twenty two years. The construction profile of the contract is 50% completion in Year 1 and 50% completion in Year 2.

♦ **Cost assumptions** - all items of capital and operating expenditure are derived from estimates prepared by the Project Managers or Professional Advisors and are stated net of value added tax.

♦ **Demand Assumptions** – The plant is to be constructed in Phase 1 to cater for up to a population equivalent of 20,000.

♦ **Opportunity Cost/Benefits** – the alternate use of the value of the site is assumed to be one million euro in 2004 prices.