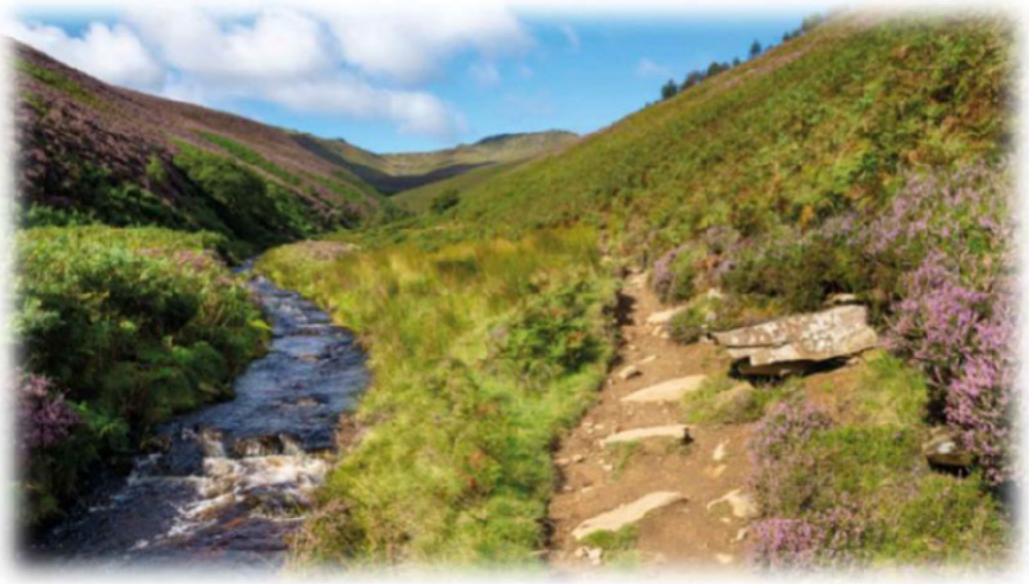

ANNEX A5

Netheridge Cost Report

This document has been written in line with the requirements of the RAPID gate two guidance and to comply with the regulatory process pursuant to Severn Trent Water's statutory duties. The information presented relates to material or data which is still in the course of completion. Should the solution presented in this document be taken forward, Severn Trent Water will be subject to the statutory duties pursuant to the necessary consenting process, including environmental assessment and consultation as required. This document should be read with those duties in mind.

STSources SRO
Severn Trent Water

Severn Trent Water

SEVERN TRENT SOURCES STRATEGIC RESOURCE OPTIONS

Netheridge Cost Report

70088464-WSP-NETHERO-RP-GT-2004
SEPTEMBER 2022

CONFIDENTIAL

Severn Trent Water

SEVERN TRENT SOURCES STRATEGIC RESOURCE OPTIONS

Netheridge Cost Report

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 70088464

OUR REF. NO. 70088464-WSP-NETHERO-RP-GT-2004

DATE: SEPTEMBER 2022

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QUALITY CONTROL

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Signature					
Checked by					
Signature					
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Signature					
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ABBREVIATION AND ACRONYM LIST

Table 1 – Abbreviation and Acronym List

Abbreviation or Acronym	Meaning
ACWG	All Company Working Group
AIC	Average Incremental Cost
BAF	Biologically active filtration
BAF	Biologically active filter
CAPEX	Capital expenditure
CDR	Concept design report
GAC	Granular activated carbon
ICA	Instrumentation, Control and Automation
kWh	Kilowatt hour
MBBR	Moving Bed Biofilm Reactor
MCC	Motor control centre
MLD	Megalitres per day
N/A	Not applicable
no.	Number
NPV	Net present value
OB	Optimism Bias
OPEX	Operational expenditure
PLC	Programmable logic controller
PS	Pumping station
QCRA	Qualitative Costed Risk Assessment
RAPID	Regulator's Alliance for Progressing Infrastructure Development
SCADA	Supervisory control and data acquisition system
SRO	Strategic resource option
STS	Severn Trent sources
STW	Severn Trent Water

Abbreviation or Acronym	Meaning
UV	Ultraviolet
VAT	Value added tax
WRMP	Water Resource Management Plan
WTW	Water treatment works
WwTW	Wastewater Treatment Works

1 INTRODUCTION

1.1 CONTEXT

This Cost Report sets out the cost estimation and risk assessment carried out for the Severn Trent Sources Strategic Resource Option Netheridge (Netheridge SRO) Concept Design.

It should be read in conjunction with the Severn Trent Sources Strategic Resource Option Netheridge Concept Design Report and is part of a suite of reports completed in support of Severn Trent Water's (STW) RAPID Gate 2 Submission.

Other reports completed as part of the Gate 2 concept design development include:

- Severn Trent Source SRO - Netheridge Concept Design Report (Annex A1)
- Severn Trent Source SRO - Netheridge Process Basis of Design (Annex A3)
- Severn Trent Source SRO - Pipeline Route Appraisal Report (Annex A2) and
- Severn Trent Source SRO - Netheridge Carbon Report (Annex A4).

1.2 REPORT SCOPE

This report details the cost estimates for the Netheridge SRO and includes calculation of:

- Capital Cost estimates (Capex);
- Optimism Bias (OB);
- Qualitative Costed Risk Assessment (QCRA);
- Operational Cost Estimates (Opex);
- Net Present Value (NPV); and
- Average Incremental Cost (AIC).

1.3 GATE 2 OPTIONS

The options developed for the Netheridge SRO are as follows:

- **Option 1** - Treatment (MBBR, CoMag, Ozone, BAF, GAC) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the River Severn downstream of the new STT SRO Deerhurst WTW.
- **Option 2** - Treatment (MBBR, CoMag, Ozone, BAF, GAC) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the River Severn upstream of the gauging station at Haw Bridge.
- **Option 3** – Treatment (MBBR, CoMag, Ozone, BAF, GAC, Ion Exchange) of effluent at Netheridge WwTW with transfer via 700mm dia. pipeline and discharge to the East Channel of the River Severn downstream of the intake for Gloucester Docks.

- **Option 4** - Treatment (MBBR, CoMag, Ozone, BAF, GAC, Ion Exchange, UV) of effluent at Netheridge WwTW with transfer via 600mm dia. pipeline and discharge to direct to the G&S Canal adjacent to the Netheridge WwTW.
- **Option 5** – Additional pipeline for diversion of flows form the main STT SRO pipeline for discharge to the East Channel of the River Severn downstream of the intake for Gloucester Docks.

2 CAPITAL COSTS

2.1 CAPEX COST ESTIMATION APPROACH

2.1.1 TREATMENT PLANT UPGRADE

The treatment capital cost estimate was developed using the STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022. The STW team provided uplifts to be applied where items fell outside the limits of the cost graphs within the tool. The STW 'Cost Tool Lite' applies a Non-Standard Adjustment, as well as Internal and External Costs as On-Costs, the percentage values of those applied were provided by STW.

Severn Trent's Cost Tool Lite is an in-house tool that contains more than 20 years of historic project cost data and cost models (generated by the Severn Trent Unit Cost Analysis tool) as well as historic uplifts for prelims and client costs.

Option 5 is costed as additional to Options 1 and 2; therefore, it has been costed as the additional pipeline and the additional treatment required for discharging to this location.

2.1.2 PIPELINE

The pipeline capital cost estimate was developed using the STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022.

The lengths for the pipeline, tunnel sections and crossings were measured off the Civil 3D drawing for the pipeline route.

'Watercourse crossings' were included in the model wherever the pipeline crosses a river, stream, or land drain that is not tunnelled, this is intended to cover the additional costs incurred when crossing a watercourse.

The pipeline will require several access tracks to drain points to facilitate draining the pipeline during standby periods as outlined in the Pipeline Route Appraisal Report. Access track, and security fencing was included for access to the drain-down chambers that will be included along the length of the pipeline.

The estimated cost for the outlets were compiled using SPONS and includes the excavation (including coffer dam), concrete surround, pipework, and wall penetration for the canal outlets.

The STW 'Cost Tool Lite' developed by Atkins/Arup, version April 2022, applies a Non-Standard Adjustment, as well as Internal and External Costs as On-Costs, the percentage values applied were provided by STW.

2.2 ASSUMPTIONS

2.2.1 TREATMENT PLANT UPGRADE

The key assumptions made during completion of the Cost Tool Lite are outlined below:

- Process and connection pipeline size has been assumed.
- All electrical new equipment will be housed in one building.
- A single CoMag process stream is provided.
- For Option 5 it is assumed that Option 1 or 2 is also provided.

2.2.2 PIPELINE

The assumptions that have been made during the cost build-up of the pipeline are outlined below:

- The pipeline will be constructed using the open cut method with tunnelled sections required only for the railway, canal, and river crossings.
- Small watercourse crossings will be constructed open cut with flows managed through pumping.
- The pipeline is 700mm diameter for all open cut sections (Option 4 is [redacted]mm dia.).
- The tunnelled sections are [redacted]mm diameter to facilitate construction with a [redacted]mm pipeline within.
- All washout, air value and isolation valves are to STW standard specification.
- The outfall to the River Severn requires eel screens.
- The surge vessel has been sized without detailed surge analysis.

2.3 EXCLUSIONS

No allowance has been made for modifications required to the existing WwTW site or equipment to facilitate the construction, operation, or maintenance of the new facilities.

2.4 ON-COSTS

The on-costs applied to Capex cost build up are the STW values provided on the standard 'STW Cost Tool Lite' template PR24, there is no functionality provided on the tool to break this down further.

The on-costs applied to the treatment and the pipeline estimates differ due to the complexity of the treatment upgrade and the relative simplicity of the pipeline.

2.5 SUMMARY

Table 2-1 summarises the overall Capex costs for the five options presented in the Concept Design Report. Option 5 includes only the Capex cost of the additional treatment (ion exchange) required to discharge into the River Severn East Channel and the additional pipeline required.

All costs stated exclude the optimism bias and risk which is addressed separately in this report.

Table 2-1 – Capital Cost Summary (Excluding OB and Risk)

Option No.	Option Name	Treatment Capex	Pipeline Capex	Overall Capex Cost
Option 1	Deerhust	£69,797,800	£32,625,300	£102,423,100
Option 2	Haw Bridge	£69,797,800	£28,595,700	£98,393,500
Option 3	East Channel	£78,240,000	£9,921,500	£88,161,500
Option 4	Canal	£79,535,400	£2,421,400	£81,956,800
Option 5	SW Branch	£8,442,200	£848,600	£9,290,800

Figures have been rounded to the nearest hundred as this is the level of detail the Cost Tool Lite provides. Full spreadsheets are available in **Appendix A**.

3 RISK ASSESSMENT AND OPTIMISM BIAS

3.1 APPROACH TO RISK ASSESSMENT AND OPTIMISM BIAS

The Optimism Bias (OB) and Qualitative Costed Risk Assessment (QCRA) assessment have been carried out in accordance with the approach outlined in the Mott McDonald ACWG Cost Constituency Methodology (Rev E Feb 2022) and the Optimism Bias and Qualitative Costed Risk Assessment Template (Rev C Feb 2022).

This approach has been developed by Mott McDonald to specifically address how OB and QCRA should be assessed for water resource schemes included in the WRMPs and SRO schemes for RAPID submissions at Gates 1 and 2.

The overall approach follows the HM Treasury Green Book methodology and advocates for a reduction in optimism bias as the project risks become better understood and therefore better quantified.

3.1.1 OPTIMISM BIAS

The ACWG methodology outlines an OB process in three stages[1]:

Stage 1: The first stage defines the project type with regard to standard and non-standard engineering project to define the upper bound of OB

Stage 2: The second stage scales back the OB based on the contributory factors outline in the Green Book methodology

Stage 3: The third stage reassess the OB based on the output of the QCRA to ensure that the OB allowance takes into account the risks that have now been costed and included separately to avoid overestimation of the OB and Risk costs.

The ACWG methodology suggests that the level of optimism bias at the conclusion of the first, second and third stages should be recorded as this will provide a point of reference for comparison across the companies.

3.1.2 QUALITATIVE COSTED RISK ASSESSMENT

The ACWG methodology for a qualitative costed risk assessment follows a typical risk assessment process with standardisation of the risk breakdown structure, risk status, likelihood estimation and impact scoring[2]. The ACWG mythology suggests a Monte-Carlo analysis to aggregate risk with the P10, P50 and P90 risk percentiles being recorded. The P50 output from the QCRA should be used to determine the total capital cost estimates for appraisal.

[1] Refer to ACWG Cost Consistency Methodology Rev E Section 6.2.
[2] Refer to ACWG Cost Consistency Methodology Rev E Section 3.8.

3.2 OPTIMISM BIAS RESULTS

3.2.1 OPTIMISM BIAS SCORING SUMMARY

Based on the ACWG recommendations, the STT SRO options were split into standard and non-standard civil engineering project elements for the calculation of optimism bias; the pipeline elements are considered as standard, and the treatment elements of the project are considered as non-standard.

The options were then assessed on the confidence in the following areas: Procurement, Project Specific, Client Specific, Environment and External Influences to allow for scaling back of the upper bound of the OB based on the specifics of each option. The confidence gradings in these areas were reviewed with the Client and project team to ensure they were suitable for the current project stage.

The options underwent a final OB assessment taking into account the QCRA to give the final OB value.

Table 3-1 – Optimism Bias Summary

Option No.	Option Name	STAGE 1 Combined Upper Bound OB (%)	STAGE 2 Adjusted OB (%)	STAGE 3 Adjusted OB Inc Risk (%)
Option 1 Treatment	Deerhurst	58.96	37.10	30.49
Option 2 Treatment	Haw Bridge	59.62	37.47	30.62
Option 3	East Channel	63.58	39.65	31.41
Option 4	Canal	65.34	40.62	31.77
Option 5	SW Branch	64.02	39.89	31.50

The full analysis of optimism bias is included in Appendix B.

3.3 COSTED RISK REGISTER

The risk register has been progressed over the course of the concept design development to capture the key issues and uncertainties affecting the Netheridge scheme. There are three categories of risk: those affecting the health and safety of personnel during construction and operation, and which must be addressed as part of the CDM regulations, those affecting the construction of the project and those that impact the overall viability or scope of the project or the premise on which the project has been developed.

Risks that affect H&S, but do not have a significant impact on the overall project cost or delivery, have not been included in the QCRA. These have been identified in the Significant H&S Risk Schedule included in the Netheridge Concept Design Report.

Risks that affect the delivery of the design and construction phase of the project have been identified and appropriate cost and likelihood values were assigned to enable a Monte-Carlo analysis to be completed.

Risks that impact the overall viability or scope of the project or the premise on which the project has been developed have not been included in the QCRA, as the impact of the realisation of these risks cannot be satisfactorily quantified.

Risks in the latter category include:

- **Operating regime of the Severn to Thames Transfer SRO project changes impacting the design assumptions used for the design of the treatment process, pipeline and pump station.**

  It is not possible to anticipate or quantify potential changes that may occur to the operation and requirements of the STT SRO. Given that the Netheridge scheme output is entirely dependent upon the STT SRO requirement, any changes will impact the overall design premise and project viability.

- **Changes to influent quality at Netheridge WwTW that require alteration to existing and proposed treatment processes to continue to meet consent standards.**

  It is possible that changes to the influent quality at Netheridge WwTW could impact the ability of the proposed new treatment plant to meet the required STT SRO discharge consent conditions at the discharge location. For example, increase in trace metals from an industrial process in the catchment. It is not possible to quantify or cost this risk.

- **Installation of new assets at Netheridge WwTW site to meet other project needs (i.e., Gas to Grid and AMP8 Phosphorus removal) that impact on the availability of land, power, potable water and sludge handling facilities for the proposed STS SRO treatment process.**

  It is understood that upgrades may occur at Netheridge WwTW in the AMP8 period. The extent and nature of these upgrades is not known but they may either utilise power, land, resources such as potable water or sludge handling, or they may render elements of the new SRO treatment process unnecessary or inappropriate. This risk cannot be costed or quantified.

- **Issues relating to access to land required for the construction of the pipeline and valve chambers, and wayleaves and easements for ongoing operation and maintenance of the pipeline.**

  Options 1, 2, 3 and 5 pipelines are up to 18km long and pass-through land owned by numerous stakeholders. It is possible that the selected pipe route cannot be constructed due to issues obtaining access or wayleaves. This will be addressed fully at Gate 3 when engagement with stakeholders will be undertaken. No engagement has been undertaken at Gate 2 and so this risk cannot be quantified or costed.

3.4 RISK RESULTS

3.4.1 RISK SUMMARY

The following tables show the output from the ACWG template Risk Register and @Risk Tabs. Note that Option 5 covers the risk for the construction of the additional branch only.

Table 3-2 – Risk Values

Option No.	Option Name	P10	P50	P90
Option 1	Deerhurst	£8,107,084.06	£20,012,655.77	£34,089,166.92
Option 2	Haw Bridge	£7,731,351.65	£19,122,964.60	£32,677,017.83
Option 3	East Channel	£3,965,783.46	£12,647,664.09	£23,032,875.76
Option 4	Canal	£597,119.45	£8,196,285.07	£16,917,953.62
Option 5	SW Branch	£348,123.71	£1,261,008.16	£2,338,110.59

The full analysis of optimism bias is included in Appendix B.

3.5 SUMMARY OF CAPEX COSTS (INCLUDING OB AND RISK)

The OB value, risk value and Overall Capex cost have been summed to determine the Total Project Capex cost for each option.

Table 3-3 – Capex Cost (Including OB and Risk)

Option No.	Option Name	OB Value	Risk Value (P50)	Total Project Capex Cost
Option 1	Deerhurst	£31,228,800	£20,012,656	£153,664,600
Option 2	Haw Bridge	£30,128,100	£19,122,965	£147,644,600
Option 3	East Channel	£27,691,500	£12,647,664	£128,500,700
Option 4	Canal	£26,037,700	£8,196,285	£116,190,800
Option 5	SW Branch	£2,926,600	£1,261,008	£13,478,400

4 OPERATIONAL COST ESTIMATES

4.1 COST ESTIMATION APPROACH

The annual operating expenditure has been calculated by assessing the electrical power used on site by the equipment, the cost of labour to operate and maintain the equipment and the cost of any consumables such as chemicals and media.

4.2 ASSUMPTIONS

The basis for the estimation of the operating costs includes a number of key assumptions on the operation of the plant:

- Netheridge SRO treatment plant will treat a minimum of 20MLD on a continual basis to ensure viability of the biological treatment process.
- 35MLD of treated effluent will be pumped to the STT SRO abstraction point on 35 days of the year throughout the 80-year operational period.
- 20MLD of 'sweetening' flows to the STT SRO abstraction point will be pumped for 120 days per year.
- For the remaining 210 days per year, a sweetening flow will be provided through the SRO treatment process and will be discharged to the existing outfall.

This is a simplification of the expected operating conditions, as the number of days on which the STT SRO will call for flow over the lifetime of the project is not currently confirmed, and the treatment process flexibility to operate at a lower flowrate on days in which there is no STT SRO call for flow has not been assessed. Without further detail on the demand profile establishing how the operating costs will vary with flowrate this cannot inform the annual cost. Additionally, certain technical assumptions as part of the preliminary process design have an influence on the operating costs, for instance power costs associated with blowers are based on an estimated oxygen demand of the effluent. Consequently, the annual operating costs estimated at this stage are suitable only for the comparison of options.

Other assumptions made during build-up of the Opex cost include:

- The GAC, Ion Exchange and UV units will not operate during days that the STT SRO does not call for flow, this reduces the replacement rate of media and power consumption.
- The STT SRO will only call for flow for one period during the year.
  - It is anticipated that during the notice period prior to transfer, greater operator input will be required due to bringing process units back online, and the Opex includes additional labour for this period.
  - It is also expected that when this is complete the transfer pipeline will be drained, the Opex includes labour cost for one drain down per year.
- Operator and maintenance time are assumptions made from previous project experience and expected levels of operator input.
- For Option 5, it is assumed that 35MLD of effluent will be pumped to Haw Bridge for 35 days of the year, 20MLD of sweetening flow will be pumped for 120 days of the year and 35MLD will be provided to the East Channel for 35 days of the year.

- The cost per unit of power used was 0.20 £/kWh and labour £38.11 per hour as provided by STW.

4.3 SUMMARY

Table 4-1 summarises the overall operational costs for the five options developed during the concept design.

The treatment process accounts for most of the annual Opex costs, Option 3 and 4 treatment Opex is increased due to the additional process units.

The pipeline Opex tends to decrease with the decrease in pipe length, however there are hydraulic differences between the Option 3 and 4 discharge point that affect the power consumption – this is discussed further in the Pipeline Hydraulics Assessment report.

Option 5 shows the additional Opex cost of the SW Branch.

Table 4-1 – Operational Cost Summary

Option No.	Option Name	Treatment Opex	Pipeline Opex	Annual Opex
Option 1	Deerhurst	£1,447,915	£217,745	£1,665,660
Option 2	Haw Bridge	£1,447,915	£171,422	£1,619,337
Option 3	East Channel	£1,485,967	£90,203	£1,576,170
Option 4	Canal	£1,504,087	£92,374	£1,596,462
Option 5	SW Branch	£38,052	£180,786	£218,838

The full breakdown of Opex costs is included in Appendix C.

5 NET PRESENT VALUE & AVERAGE INCREMENTAL COST

5.1 APPROACH

To calculate the Net Present Value (NPV) the Capex costs were split out into categories based on their purpose and construction. Each category has an expected asset life associated as outlined in the All Company Working Group Mott MacDonald Cost Consistency Methodology Rev E (Feb 2022).

The asset categories and the corresponding expected asset life are outlined below:

- Process-Related Carbon Media Including GAC (4 years);
- Building Services (10 years);
- Fencing (10 years);
- ICA (Instrumentation, Control & Automation) (10 years);
- Plant and Machinery (15 years) – This has been used to represent IX resin replacement only;
- M&E (Mechanical and Electrical) Works on Pumping Stations and Treatment Works (20 years);
- Power Supply (25 years);
- Steel/Timber/GRP Structures (30 years);
- Brick/Concrete Office Structures (50 years);
- Headworks/Valves (60 years);
- Roads and Car Parks (60 years); and
- Treatment and Pumping Station Civils (incl. Intakes) (60 years).

The costs were then inputted into the Mott MacDonald NPV and AIC template (Rev C, May 2021) provided by STW. The discount factor was provided in the template, the factor used was 3.5% for years 1-30, 3% for years 31-75 and 2.5% for years 76-80 as per the Green Book recommendation.

The minimum flow used was 20MLD and the deployable output was 35MLD. The construction Capex cost was split over years 1 and 2 to represent the expected construction timeframe of c. 24 months, and Opex costs, split into fixed and variable, were shown to start from Year 3.

5.2 SUMMARY TABLES

Table 5-1 summarises the NPV and AIC outputs for the five options developed during the concept design. Note that the AIC template assumes that the WwTW flows 365 days of the year which may not be the correct operating scenario for this scheme. This scheme is anticipated to transfer 35MLD for 35 days, 20MLD for 120 days and to run on ‘standby’ treating 20MLD but to the existing discharge not transferring for the remainder of the year.

Note Option 5 outputs are just for the SW branch, and therefore are in addition to Option 1 or 2.

Table 5-1 – NPV and AIC Template Output

Option No.	Option Name	NPV Finance (£)		NPV Opex (£)		NPV WAFU (m^3)	AIC (p/m^3)	
		Min utilisation	Max utilisation	Min utilisation	Max utilisation		Min utilisation	Max utilisation
Option 1	Deerhurst	£168,185,540	£168,185,540	£51,419,650	£76,874,965	£263,267,297	£83.42	£93.08
Option 2	Haw Bridge	£163,915,721	£163,915,721	£49,468,463	£73,460,388	£263,267,297	£81.05	£90.17
Option 3	East Channel	£154,520,009	£154,520,009	£47,582,008	£70,083,464	£263,267,297	£76.77	£85.31
Option 4	Canal	£146,993,167	£146,993,167	£48,328,872	£71,329,031	£263,267,297	£74.19	£82.93
Option 5	SW Branch	£15,146,408	£15,146,408	£8,731,577	£15,016,144	£263,267,297	£9.07	£11.46

6 COST SUMMARY

The following **Table 6-1** combines all of the costs estimates for the five Netheridge SRO options.

Table 6-1 – Cost Summary Tables

Option No.	Option Name	Capex	OB	QCRA (P50)	Total Project Capex Cost	Annual Opex	NPV Finance	NPV Opex	AIC (p/m^3)
Option 1	Deerhurst	£102,423,100	£31,228,800	£20,012,656	£153,664,600	£1,665,660	£168,185,540	£76,874,965	93.08
Option 2	Haw Bridge	£98,393,500	£30,128,100	£19,122,965	£147,644,600	£1,619,337	£163,915,721	£73,460,388	90.17
Option 3	East Channel	£88,161,500	£27,691,500	£12,647,664	£128,500,700	£1,576,170	£154,520,009	£70,083,464	85.31
Option 4	Canal	£81,956,800	£26,037,700	£8,196,285	£116,190,800	£1,596,462	£146,993,167	£71,329,031	82.93
Option 5	SW Branch	£9,290,800	£2,926,600	£1,261,008	£13,478,400	£218,838	£15,146,408	£15,016,144	11.46

7 FUTURE WORK COST ESTIMATES

The anticipated next steps for Gate 3 and Gate 4 are outlined in the Concept Design report. The below table outlines these next steps and provides a high-level budget cost for the items of work.

	Item of Work	Cost Estimate
Gate 3	Design Development	£250,000
	Inflow flow availability review	£15,000
	Netheridge WwTW upgrades review	Inc in design development
	Advanced treatment performance pilot plant	£100,000
	Operations and Control system review and development	£15,000
	Potable water supply investigation	£7,000
	Ground investigation for pipeline & treatment site – incl. soil resistivity	£600,000
	Topographic survey for pipeline and treatment site	£75,000
	Utilities survey for treatment site	£30,000
	Pipeline LiDAR	£25,000
	Pipeline bathymetric survey	£100,000
	Discharge from drain down points	By others
	Utilities service provider engagement	By others
	Stakeholder and Landowner engagement	By others
	Environmental Surveys and reporting	By others
	Permitting Applications & consideration of permitting route	By others
	Water Resources Benefit	By others
Gate 4	Design Development	
	Permit and planning applications	
	Preparation of tender documents – incl. H&S Information	
	Land Purchase	By others

Appendix A

CAPEX COST ESTIMATE

SEVERN TRENT WATER

CAPEX Costs

ATKINS / ARUP

Element Reference:
Date Issued: 19 October 2022

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 12,868,900	£ 6,896,800	£ -	£ 19,765,700
	Non-Standard Cost	£ 32,159,900	£ 2,982,200	£ -	£ 35,142,100
0.5%	**Non-Standard Adjustment**	£ 64,300	£ 34,500	£ -	£ 98,800
	Construction Cost	**£ 45,093,100**	**£ 9,913,500**	**£ -**	**£ 55,006,600**
0.0%	**Design Fee**	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 45,093,100**	**£ 9,913,500**	**£ -**	**£ 55,006,600**
18.3%	**Internal Costs**	£ 8,238,500	£ 1,811,200	£ -	£ 10,049,700
8.6%	**External Costs**	£ 3,887,000	£ 854,500	£ -	£ 4,741,500
	Project Total	**£ 57,218,600**	**£ 12,579,200**	**£ -**	**£ 69,797,800**
30.5%	**Optimism Bias**	£ 17,446,000	£ 3,835,400	£ -	£ 21,281,400
	Business Case Cost Estimate	**£ 74,664,600**	**£ 16,414,600**	**£ -**	**£ 91,079,200**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	P	C	Quantity	Cost	M&E M	P	C	Quantity	Cost	Mains and Sewers M	P	C	Quantity	Cost	Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,496	172,940	0	0	120 m3	£ 353,493	0		0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW	£ 420,550					£ -	MBBR PS
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3	£ 318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,767	19,179	0	0	475 m3	£ 244,095					£ -	
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,794	3,057	1	0	m3	#VALUE!					£ -	BAFF Tank
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3,228,311					£ -	
NON-INFRA	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d	£ 15,178	178,910	0	0	2 kg/d	£ 203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,115	19,179	0	0	142 m3	£ 148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	19 kW	£ 186,443					£ -	Sludge Thickener Feed Pumps
FREE ENTRY	Sludge Treatment	No	Sludge Thickener Drum & Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£ 390,284					£ -	Sludge Thickener Drum & Belt
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£ 115,648					£ -	Thickened Sludge Pumps
FREE ENTRY	Outlet to River	No	Outlet		145,000	#N/A	#N/A	1	£ 145,000					£ -					£ -	Outlet
FREE ENTRY	MBBR	No	MBBR		#########	#N/A	#N/A	1	£ 11,353,500					£ -					£ -	MBBR
FREE ENTRY	Comag	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,198					£ -					£ -	Comag
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000	#N/A	#N/A	1	£ 2,175,000					£ -	BAFF M&E
NON-STANDARD	Site wide SCADA / control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#VALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,902					£ -					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£ -	164,503	#N/A	#N/A	1	£ 164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£ 252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£ 479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW	£ 258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	15 kW	£ 98,825					£ -	Dirty backwash

SEVERN TRENT WATER

Element Reference:
Date Issued: 19 October 2022

CAPEX Costs

ATKINS ARUP

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 12,868,900	£ 6,896,800	£ -	£ 19,765,700
	Non-Standard Cost	£ 32,159,900	£ 2,982,200	£ -	£ 35,142,100
0.5%	Non-Standard Adjustment	£ 64,300	£ 34,500	£ -	£ 98,800
	Construction Cost	**£ 45,093,100**	**£ 9,913,500**	**£ -**	**£ 55,006,600**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 45,093,100**	**£ 9,913,500**	**£ -**	**£ 55,006,600**
18.3%	Internal Costs	£ 8,238,500	£ 1,811,200	£ -	£ 10,049,700
8.6%	External Costs	£ 3,887,000	£ 854,500	£ -	£ 4,741,500
	Project Total	**£ 57,218,600**	**£ 12,579,200**	**£ -**	**£ 69,797,800**
30.6%	Optimism Bias	£ 17,520,300	£ 3,851,800	£ -	£ 21,372,100
	Business Case Cost Estimate	**£ 74,738,900**	**£ 16,431,000**	**£ -**	**£ 91,169,900**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	P	C	Quantity	Cost	M&E M	P	C	Quantity	Cost	Mains and Sewers M	P	C	Quantity	Cost	Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,496	172,940	0	0	120 m3	£ 353,493	0		0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW	£ 420,550					£ -	MBBR PS
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3	£ 318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,767	19,179	0	0	475 m3	£ 244,095					£ -	
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,794	3,057	1	0	m3	#VALUE!					£ -	BAFF Tank
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3,228,311					£ -	
NON-INFRA	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d	£ 15,178	178,910	0	0	2 kg/d	£ 203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,115	19,179	0	0	142 m3	£ 148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	19 kW	£ 186,443					£ -	Sludge Thickener Feed Pumps
FREE ENTRY	Sludge Treatment	No	Sludge Thickener Drum & Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£ 390,284					£ -	Sludge Thickener Drum & Belt
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£ 115,648					£ -	Thickened Sludge Pumps
FREE ENTRY	Outlet to River	No	Outlet		145,000	#N/A	#N/A	1	£ 145,000					£ -					£ -	Outlet
FREE ENTRY	MBBR	No	MBBR		#########	#N/A	#N/A	1	£ 11,353,500					£ -					£ -	MBBR
FREE ENTRY	Comag	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,198					£ -					£ -	Comag
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000	#N/A	#N/A	1	£ 2,175,000					£ -	BAFF M&E
NON-STANDARD	Site wide SCADA / control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#VALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,902					£ -					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£ -	164,503	#N/A	#N/A	1	£ 164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£ 252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£ 479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW	£ 258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	15 kW	£ 98,825					£ -	Dirty backwash

SEVERN TRENT WATER

CAPEX Costs

ATKINS ARUP

Element Reference:
Date Issued: 19 October 2022

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 13,395,000	£ 7,317,400	£ -	£ 20,712,400
	Non-Standard Cost	£ 33,935,100	£ 6,908,600	£ -	£ 40,843,700
0.5%	Non-Standard Adjustment	£ 67,000	£ 36,600	£ -	£ 103,600
	Construction Cost	**£ 47,397,100**	**£ 14,262,600**	**£ -**	**£ 61,659,700**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 47,397,100**	**£ 14,262,600**	**£ -**	**£ 61,659,700**
18.3%	Internal Costs	£ 8,659,500	£ 2,605,800	£ -	£ 11,265,300
8.6%	External Costs	£ 4,085,600	£ 1,229,400	£ -	£ 5,315,000
	Project Total	**£ 60,142,200**	**£ 18,097,800**	**£ -**	**£ 78,240,000**
31.4%	Optimism Bias	£ 18,890,700	£ 5,684,500	£ -	£ 24,575,200
	Business Case Cost Estimate	**£ 79,032,900**	**£ 23,782,300**	**£ -**	**£ 102,815,200**

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Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	P	C	Quantity	Cost	M&E M	P	C	Quantity	Cost	Mains and Sewers M	P	C	Quantity	Cost	Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,496	172,940	0	0	120 m3	£ 353,493	0		0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW	£ 420,550					£ -	MBBR PS
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3	£ 318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,767	19,179	0	0	475 m3	£ 244,095					£ -	
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,794	3,057	1	0	m3	#VALUE!					£ -	BAFF Tank
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3,228,311					£ -	
NON-INFRA	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d	£ 15,178	178,910	0	0	2 kg/d	£ 203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,115	19,179	0	0	142 m3	£ 148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	19 kW	£ 186,443					£ -	Sludge Thickener Feed Pumps
FREE ENTRY	Sludge Treatment	No	Sludge Thickener Drum & Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£ 390,284					£ -	Sludge Thickener Drum & Belt
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£ 115,648					£ -	Thickened Sludge Pumps
FREE ENTRY	Outlet to River	No	Outlet		145,000	#N/A	#N/A	1	£ 145,000					£ -					£ -	Outlet
FREE ENTRY	MBBR	No	MBBR		#########	#N/A	#N/A	1	£ 11,353,500					£ -					£ -	MBBR
FREE ENTRY	Comag	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,198					£ -					£ -	Comag
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000	#N/A	#N/A	1	£ 2,175,000					£ -	BAFF M&E
NON-STANDARD	Site wide SCADA / control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#VALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,902					£ -					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£ -	164,503	#N/A	#N/A	1	£ 164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£ 252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£ 479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW	£ 258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	15 kW	£ 98,825					£ -	Dirty backwash
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		1,775,152	#N/A	#N/A	1	£ 1,775,152	2,610,651	#N/A	#N/A	1	£ 2,610,651					£ -	Ion Exchange
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	IX Uplift						£ -	1,315,741	#N/A	#N/A	1	£ 1,315,741					£ -	Uplift oor
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	IX Lift PS

SEVERN TRENT WATER

Element Reference:
Date Issued: 19 October 2022

CAPEX Costs

ATKINS ARUP

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 13,395,000	£ 7,317,400	£ -	£ 20,712,400
	Non-Standard Cost	£ 34,114,100	£ 7,750,400	£ -	£ 41,864,500
0.5%	Non-Standard Adjustment	£ 67,000	£ 36,600	£ -	£ 103,600
	Construction Cost	**£ 47,576,100**	**£ 15,104,400**	**£ -**	**£ 62,680,500**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 47,576,100**	**£ 15,104,400**	**£ -**	**£ 62,680,500**
18.3%	Internal Costs	£ 8,692,200	£ 2,759,600	£ -	£ 11,451,800
8.6%	External Costs	£ 4,101,100	£ 1,302,000	£ -	£ 5,403,100
	Project Total	**£ 60,369,400**	**£ 19,166,000**	**£ -**	**£ 79,535,400**
31.8%	Optimism Bias	£ 19,179,400	£ 6,089,000	£ -	£ 25,268,400
	Business Case Cost Estimate	**£ 79,548,800**	**£ 25,255,000**	**£ -**	**£ 104,803,800**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	B&C P	B&C C	B&C Quantity	B&C Cost	M&E M	M&E P	M&E C	M&E Quantity	M&E Cost	Mains and Sewers M	Mains and Sewers P	Mains and Sewers C	Mains and Sewers Quantity	Mains and Sewers Cost	Notes
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	120 m3	£ 153,496	172,940	0	0	120 m3	£ 353,493	0		0	m3	#VALUE!	Ferrous Sulphite
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	330 kW	£ 770,868	17,996	1	0	150 kW	£ 420,550					£ -	MBBR PS
NON-INFRA	Sewage Treatment	Chem Dosing	P Removal	m3	76,090	0	0	60 m3	£ 138,666	172,940	0	0	60 m3	£ 318,734					£ -	Ferric Sulphate
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	475 m3	£ 102,767	19,179	0	0	475 m3	£ 244,095					£ -	
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	SPS Wet Well & Pumps Ozone
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,132 m3	£ 4,822,794	3,057	1	0	m3	#VALUE!					£ -	BAFF Tank
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	BAFF PS
NON-INFRA	Water Treatment	GAC	GAC , RGF Type	m3	4,260	1	0	1,056 m3	£ 4,499,002	3,057	1	0	1,056 m3	£ 3,228,311					£ -	
NON-INFRA	Water Treatment	Chlorination	Chlorination Dosing	kg/d	9,591	1	0	2 kg/d	£ 15,178	178,910	0	0	2 kg/d	£ 203,484					£ -	
NON-INFRA	Sludge Treatment	Sludge Holding Tank	Sludge Holding Tank	m3	1,538	1	0	142 m3	£ 45,115	19,179	0	0	142 m3	£ 148,295					£ -	Thickened Sludge Tank
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	19 kW	£ 186,443					£ -	Sludge Thickener Feed Pumps
FREE ENTRY	Sludge Treatment	No	Sludge Thickener Drum & Belt		75,838	#N/A	#N/A	1	£ 75,838	390,284	#N/A	#N/A	1	£ 390,284					£ -	Sludge Thickener Drum & Belt
NON-INFRA	Sludge Treatment	Sludge Pumping	Sludge Pumping	kW					£ -	35,373	1	0	8 kW	£ 115,648					£ -	Thickened Sludge Pumps
FREE ENTRY	Outlet to River	No	Outlet		145,000	#N/A	#N/A	1	£ 145,000					£ -					£ -	Outlet
FREE ENTRY	MBBR	No	MBBR		#########	#N/A	#N/A	1	£ 11,353,500					£ -					£ -	MBBR
FREE ENTRY	Comag	No	Comag		3,327,198	#N/A	#N/A	1	£ 3,327,198					£ -					£ -	Comag
FREE ENTRY	BAFF M&E	No	BAFF M&E						£ -	2,175,000	#N/A	#N/A	1	£ 2,175,000					£ -	BAFF M&E
NON-STANDARD	Site wide SCADA / control system	No.	x	No.	27,783	1	0	522 No.	£ 14,502,465	27,783	1	0	No.	#VALUE!					£ -	
FREE ENTRY	Ozone Curve	No	Ozone		2,755,902	#N/A	#N/A	1	£ 2,755,902					£ -					£ -	Ozone
FREE ENTRY	Interstage Pumps	No	Uplift oor						£ -	164,503	#N/A	#N/A	1	£ 164,503					£ -	Uplift oor
FREE ENTRY	Ferrous Dosing	No	Uplift oor						£ -	252,438	#N/A	#N/A	1	£ 252,438					£ -	Uplift oor
NON-INFRA	Water Treatment	Poly Dosing	Poly Dosing	kg/d	24,995	0	0	28 kg/d	£ 79,430	343,823	0	0	28 kg/d	£ 479,789					£ -	CoMag Poly dosing
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	69 kW	£ 258,053					£ -	Clean backwash
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	206 kW	£ 594,607	17,996	1	0	15 kW	£ 98,825					£ -	Dirty backwash
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		1,775,152	#N/A	#N/A	1	£ 1,775,152	2,610,651	#N/A	#N/A	1	£ 2,610,651					£ -	Ion Exchange
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	IX Uplift						£ -	1,315,741	#N/A	#N/A	1	£ 1,315,741					£ -	Uplift oor
NON-INFRA	Sewage Treatment	Interstage Pumping	Interstage Pumping	kW	31,579	1	0	165 kW	£ 526,172	17,996	1	0	150 kW	£ 420,550					£ -	IX Lift PS
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		179,055	#N/A	#N/A	1	£ 179,055	501,504	#N/A	#N/A	1	£ 501,504					£ -	UV
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	UV uplift			#N/A	#N/A		#VALUE!	340,279	#N/A	#N/A	1	£ 340,279		#N/A	#N/A		#VALUE!	Uplift oor

SEVERN TRENT WATER

Element Reference:
Date Issued: 19 October 2022

CAPEX Costs

ATKINS ARUP

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 1,217,300	£ 1,398,600	£ 16,250,900	£ 18,866,800
	Non-Standard Cost	£ 853,700	£ -	£ 1,567,800	£ 2,421,500
19.3%	Non-Standard Adjustment	£ 234,900	£ 269,900	£ 3,136,400	£ 3,641,200
	Construction Cost	**£ 2,305,900**	**£ 1,668,500**	**£ 20,955,100**	**£ 24,929,500**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 2,305,900**	**£ 1,668,500**	**£ 20,955,100**	**£ 24,929,500**
12.8%	Internal Costs	£ 294,900	£ 213,400	£ 2,680,200	£ 3,188,500
18.1%	External Costs	£ 416,900	£ 301,700	£ 3,788,700	£ 4,507,300
	Project Total	**£ 3,017,700**	**£ 2,183,600**	**£ 27,424,000**	**£ 32,625,300**
30.5%	Optimism Bias	£ 920,100	£ 665,800	£ 8,361,600	£ 9,947,500
	Business Case Cost Estimate	**£ 3,937,800**	**£ 2,849,400**	**£ 35,785,600**	**£ 42,572,800**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	P	C	Quantity	Cost	M&E M	P	C	Quantity	Cost	Mains and Sewers M	P	C	Quantity	Cost	Notes
INFRA	Distribution	Pressure Mains in Rural/Suburban Highway	Diameter: 700mm	m					£ -					£ -	950	1	11,113	650 m	£ 628,328	Includes 650m from Transfer PS to pipeline Ch 0
INFRA	Distribution	Pressure Mains in Field / Verges	Diameter: 700mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	772	1	11,113	17,750 m	£ 13,722,163	
INFRA	Distribution	Tunnelling / Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	4,223	1	0	450 m	£ 1,900,405	
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£ -					£ -	55,565	1	0	24 Nr	£ 1,333,560	
																		1		
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Overhead Electric Crossings (Pylons supported)	Nr					£ -					£ -	11,113	1	0	20 Nr	£ 222,260	
																		9		
																		1		
																		1		
NON-STANDARD	PERMANENT SITE WORKS	ACCESS	Access Track	m	4,137	1	0	2,400 m	£ 441,400					£ -					£ -	
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-STANDARD	PERMANENT SITE WORKS	PERMANENT SITE FEATURES	Security fencing	m	78	1	0	400 m	£ 31,116					£ -					£ -	
FREE ENTRY	Submerged Outlet	item	Submerged Outlet						£ -					£ -	12,000	#N/A	#N/A	1	£ 12,000	Submerged Outlet
NON-STANDARD	OTHERS	WORK ON EXISTING MAINS	Installation of new pumping station on existing main	Nr	38,896	1	0	8 Nr	£ 311,164					£ -					£ -	Pump chambers to drain down pipeline
FREE ENTRY	Eel screen	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	Eel weir chamber and flow metering
FREE ENTRY	Hydraulic Break	ITEM UNITS	OTHER DETAILS		20,000	#N/A	#N/A	1	£ 20,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Hydraulic break chamber
NON-INFRA	Water Treatment	Major Water Pumping Station	Major Water Pumping	kW	31,579	1	0	719 kW	£ 1,183,913	17,996	1	0	719 kW	£ 1,126,951					£ -	Transfer Lift PS

SEVERN TRENT WATER

Element Reference:
Date Issued: 19 October 2022

CAPEX Costs

ATKINS ARUP

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 1,089,200	£ 1,260,400	£ 14,203,900	£ 16,553,500
	Non-Standard Cost	£ 959,700	£ -	£ 1,142,400	£ 2,102,100
19.3%	Non-Standard Adjustment	£ 210,200	£ 243,300	£ 2,741,400	£ 3,194,900
	Construction Cost	**£ 2,259,100**	**£ 1,503,700**	**£ 18,087,700**	**£ 21,850,500**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 2,259,100**	**£ 1,503,700**	**£ 18,087,700**	**£ 21,850,500**
12.8%	Internal Costs	£ 288,900	£ 192,300	£ 2,313,400	£ 2,794,600
18.1%	External Costs	£ 408,400	£ 271,900	£ 3,270,300	£ 3,950,600
	Project Total	**£ 2,956,400**	**£ 1,967,900**	**£ 23,671,400**	**£ 28,595,700**
30.6%	Optimism Bias	£ 905,200	£ 602,600	£ 7,248,200	£ 8,756,000
	Business Case Cost Estimate	**£ 3,861,600**	**£ 2,570,500**	**£ 30,919,600**	**£ 37,351,700**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	P	C	Quantity	Cost	M&E M	P	C	Quantity	Cost	Mains and Sewers M	P	C	Quantity	Cost	Notes
INFRA	Distribution	Pressure Mains in Rural/Suburban Highway	Diameter: 700mm	m					£ -					£ -	950	1	11,113	650 m	£ 628,328	Includes 650m from Transfer PS to pipeline Ch 0
INFRA	Distribution	Pressure Mains in Field / Verges	Diameter: 700mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	772	1	11,113	15,100 m	£ 11,675,161	
INFRA	Distribution	Tunnelling / Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	4,223	1	0	450 m	£ 1,900,405	
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£ -					£ -	55,565	1	0	16 Nr	£ 889,040	
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Overhead Electric Crossings (Pylons supported)	Nr					£ -					£ -	11,113	1	0	12 Nr	£ 133,356	
NON-STANDARD	PERMANENT SITE WORKS	ACCESS	Access Track	m	4,137	1	0	3,000 m	£ 504,637					£ -					£ -	Assuming 9 chambers
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-STANDARD	PERMANENT SITE WORKS	PERMANENT SITE FEATURES	Security fencing	m	78	1	0	450 m	£ 35,006					£ -					£ -	Assuming 9 chambers
FREE ENTRY	Submerged Outlet	item	Submerged Outlet						£ -					£ -	120,000	#N/A	#N/A	1	£ 120,000	Submerged Outlet
NON-STANDARD	OTHERS	WORK ON EXISTING MAINS	Installation of new pumping station on existing main	Nr	38,896	1	0	9 Nr	£ 350,060					£ -					£ -	Pump chmabers to drain down pipeline
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	Eel Weir Chamber and Flow Metering
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		20,000	#N/A	#N/A	1	£ 20,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Hydraulic break chamber
NON-INFRA	Water Treatment	Major Water Pumping Station	Major Water Pumping	kW	31,579	1	0	584 kW	£ 1,055,747	17,996	1	0	584 kW	£ 988,782					£ -	Transfer Lift PS

SEVERN TRENT WATER

Element Reference:
Date Issued: 19 October 2022

CAPEX Costs

ATKINS / ARUP

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 504,500	£ 665,200	£ 4,144,400	£ 5,314,100
	Non-Standard Cost	£ 452,400	£ -	£ 789,000	£ 1,241,400
19.3%	Non-Standard Adjustment	£ 97,400	£ 128,400	£ 799,900	£ 1,025,700
	Construction Cost	**£ 1,054,300**	**£ 793,600**	**£ 5,733,300**	**£ 7,581,200**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 1,054,300**	**£ 793,600**	**£ 5,733,300**	**£ 7,581,200**
12.8%	Internal Costs	£ 134,800	£ 101,500	£ 733,300	£ 969,600
18.1%	External Costs	£ 190,600	£ 143,500	£ 1,036,600	£ 1,370,700
	Project Total	**£ 1,379,700**	**£ 1,038,600**	**£ 7,503,200**	**£ 9,921,500**
31.4%	Optimism Bias	£ 433,400	£ 326,200	£ 2,356,800	£ 3,116,400
	Business Case Cost Estimate	**£ 1,813,100**	**£ 1,364,800**	**£ 9,860,000**	**£ 13,037,900**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	B&C P	B&C C	B&C Quantity	B&C Cost	M&E M	M&E P	M&E C	M&E Quantity	M&E Cost	Mains and Sewers M	Mains and Sewers P	Mains and Sewers C	Mains and Sewers Quantity	Mains and Sewers Cost	Notes
INFRA	Distribution	Pressure Mains in Rural/Suburban Highway	Diameter: 700mm	m					£ -					£ -	950	1	11,113	650 m	£ 628,328	Including 650m from Transfer PS to pipeline Ch 0
INFRA	Distribution	Pressure Mains in Field / Verges	Diameter: 700mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	772	1	11,113	4,100 m	£ 3,178,172	
INFRA	Distribution	Tunnelling / Pipejacking	Diameter: 1200mm	m	0		0	m	#VALUE!	0		0	m	#VALUE!	4,223	1	0	80 m	£ 337,850	
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Watercourse crossings	Nr					£ -					£ -	55,565	1	0	12 Nr	£ 666,780	
NON-STANDARD	PIPELINE EXTRA OVERS	CROSSINGS	Overhead Electric Crossings (Pylons supported)	Nr					£ -					£ -	11,113	1	0	11 Nr	£ 122,243	
NON-STANDARD	PERMANENT SITE WORKS	ACCESS	Access Track	m	4,137	1	0	350 m	£ 139,042					£ -					£ -	
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-STANDARD	PERMANENT SITE WORKS	PERMANENT SITE FEATURES	Security fencing	m	78	1	0	600 m	£ 46,675					£ -					£ -	
NON-STANDARD	OTHERS	WORK ON EXISTING MAINS	Installation of new pumping station on existing main	Nr	38,896	1	0	3 Nr	£ 116,687					£ -					£ -	Pump chambers to drain down pipeline
FREE ENTRY	Eel screen	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	Eel Weir Chamber and Flow Metering
FREE ENTRY	Outlet	ITEM UNITS	OTHER DETAILS		100,000	#N/A	#N/A	1	£ 100,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Submerged Outlet
NON-INFRA	Water Treatment	Major Water Pumping Station	Major Water Pumping	kW	31,579	1	0	135 kW	£ 471,099	17,996	1	0	135 kW	£ 393,585					£ -	Transfer Lift PS

SEVERN TRENT WATER

CAPEX Costs

ATKINS ARUP

Element Reference:
Date Issued: 19 October 2022

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ 504,500	£ 665,200	£ 195,700	£ 1,365,400
	Non-Standard Cost	£ 221,200	£ -	£ -	£ 221,200
19.3%	**Non-Standard Adjustment**	£ 97,400	£ 128,400	£ 37,800	£ 263,600
	Construction Cost	**£ 823,100**	**£ 793,600**	**£ 233,500**	**£ 1,850,200**
0.0%	**Design Fee**	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 823,100**	**£ 793,600**	**£ 233,500**	**£ 1,850,200**
12.8%	**Internal Costs**	£ 105,300	£ 101,500	£ 29,900	£ 236,700
18.1%	**External Costs**	£ 148,800	£ 143,500	£ 42,200	£ 334,500
	Project Total	**£ 1,077,200**	**£ 1,038,600**	**£ 305,600**	**£ 2,421,400**
31.8%	**Optimism Bias**	£ 342,200	£ 330,000	£ 97,100	£ 769,300
	Business Case Cost Estimate	**£ 1,419,400**	**£ 1,368,600**	**£ 402,700**	**£ 3,190,700**

These rates and notes may be adjusted from the standard rates
Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	B&C P	B&C C	B&C Quantity	B&C Cost	M&E M	M&E P	M&E C	M&E Quantity	M&E Cost	Mains and Sewers M	Mains and Sewers P	Mains and Sewers C	Mains and Sewers Quantity	Mains and Sewers Cost	Notes
INFRA	Distribution	Pressure Mains in Field / Verges	Diameter: 600mm	m					£ -					£ -	391	1	0	500 m	£ 195,745	
NON-STANDARD	PERMANENT SITE WORKS	ACCESS	Access Track	m	4,137	1	0	200 m	£ 99,386	0		0	m	#VALUE!					£ -	
NON-STANDARD						#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	
NON-INFRA	Distribution	Surge Vessel	Surge Vessel	m3	8,577	0	0	50 m3	£ 33,407	67,007	0	0	50 m3	£ 271,650					£ -	
NON-STANDARD	PERMANENT SITE WORKS	PERMANENT SITE FEATURES	Security fencing	m	78	1	0	280 m	£ 21,781					£ -					£ -	
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000					£ -					£ -	Outlet will be through the existing canal wall
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		50,000	#N/A	#N/A	1	£ 50,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Eel Weir Chanber and Flow Metering
NON-INFRA	Water Treatment	Major Water Pumping Station	Major Water Pumping	kW	31,579	1	0	135 kW	£ 471,099	17,996	1	0	135 kW	£ 393,585					£ -	Transfer Lift PS

SEVERN TRENT WATER

CAPEX Costs

ATKINS ARUP

Element Reference:
Date Issued: 19 October 2022

Notice *Values are rounded*

These on-cost rates may be adjusted from the default values

Rate		B&C	M&E	Mains & Sewers	Total
	Standard Cost	£ -	£ -	£ 320,100	£ 320,100
	Non-Standard Cost	£ 266,600	£ -	£ -	£ 266,600
19.3%	Non-Standard Adjustment	£ -	£ -	£ 61,800	£ 61,800
	Construction Cost	**£ 266,600**	**£ -**	**£ 381,900**	**£ 648,500**
0.0%	Design Fee	£ -	£ -	£ -	£ -
	Contractor D&B Cost	**£ 266,600**	**£ -**	**£ 381,900**	**£ 648,500**
12.8%	Internal Costs	£ 34,100	£ -	£ 48,800	£ 82,900
18.1%	External Costs	£ 48,200	£ -	£ 69,000	£ 117,200
	Project Total	**£ 348,900**	**£ -**	**£ 499,700**	**£ 848,600**
31.5%	Optimism Bias	£ 109,900	£ -	£ 157,400	£ 267,300
	Business Case Cost Estimate	**£ 458,800**	**£ -**	**£ 657,100**	**£ 1,115,900**

These rates and notes may be adjusted from the standard rates

Costs are calculated using a formula of M x (Quantity)^P + C
M is a multiplier adjuster, P is a power adjuster, C is a constant
For Linear Cost Curves set P = 1
For Unit Rate Items set P = 1, C = 0

Level 1	Level 2	Level 3	Level 4	Units	B&C M	B&C P	B&C C	B&C Quantity	B&C Cost	M&E M	M&E P	M&E C	M&E Quantity	M&E Cost	Mains and Sewers M	Mains and Sewers P	Mains and Sewers C	Mains and Sewers Quantity	Mains and Sewers Cost	Notes
INFRA	Distribution	Pressure Mains in Field / Verges	Diameter: 700mm	m					£ -					£ -	772	1	11,113	400 m	£ 320,094	
NON-STANDARD	PERMANENT SITE WORKS	ACCESS	Access Track	m	4,137	1	0	50 m	£ 43,260	0		0	m	#VALUE!					£ -	
NON-STANDARD	PERMANENT SITE WORKS	PERMANENT SITE FEATURES	Security fencing	m	78	1	0	300 m	£ 23,337					£ -					£ -	
FREE ENTRY	ITEM DESCRIPTION	ITEM UNITS	OTHER DETAILS		100,000	#N/A	#N/A	1	£ 100,000		#N/A	#N/A	1	#VALUE!					£ -	Eel Weir Chamber and Flow Metering
FREE ENTRY	Outlet	ITEM UNITS	OTHER DETAILS		100,000	#N/A	#N/A	1	£ 100,000		#N/A	#N/A		#VALUE!		#N/A	#N/A		#VALUE!	Submerged Outlet

Appendix B

ACWG TEMPLATE FOR OB AND QCRA

2. Optimism Bias Tab

Option Name	Netheridge SRO - Deerhurst
Option Reference	Option 1
Date of OB Review 1	
Date of OB Review 2	

Contr butory factors	Non-standard Qu. ing. (fixed values - do not adjust)	Standard Qu. ing. (fixed values - do not adjust)	Combined weight (calculated value - do not adjust)	Confidence Grade Criteria			Additional Guidance
				High Confidence	Medium Confidence	Low Confidence	
Desc pt on	Fixed values - do not adjust			Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng
Procurement							
Complex ty of cont act st uctu e				Clea , well establ shment p ocu ement oute and p ocesses and/o deta led p ocu ement plan o fu l comme c al bus ness case n place	Cont act st ategy o outl ne comme c al bus ness case n place, but deta ls st ll to be developed	No cont act st ategy o comme c al bus ness case n place.	*Fo bus ness as usual opt ons that w ll be p ocu ed th ough ex st ng wate company f amewo ks then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e deta led p ocu ements plans have not been developed*
Late cont acto nvolvement n des gn		3		Des gn s bus ness as usual and costs a e based upon accu ate cost models,o s gn f cant cont acto nvolvement n des gn	Des gn s bus ness as usual and costs a e based upon cost models w th med um conf dence,o n t al cont acto nvolvement n key aspects of des gn	Des gn s not bus ness as usual fo company and the cont acto has not been involved n des gn	*Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equ valent level of conf dence n the est mate*
Poo cont acto capab l t es				Cont acto s and suppl e s expected to b d fo wo k have ecent expe ence of s m la p o ects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l m ted ecent expe ence of s m la p ojects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l ttle/no ecent expe ence of s m la p ojects and supply of s m la p ocess plant and equ pment	*Opt on types whe e the e s l m ted ecent expe ence n the UK (nclud ng lo ge ese wo s ause and desal nat on opt ons) should be sco ed as med umyflow conf dence*
Gove nment gu del nes				The e s e mu t ple ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	Some ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	The e s l m ted ecent expe ence of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s not n place	*Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s o othe less we l estabi shed p ocu ement outes then low conf dence should be ass gned*
D sputes & cla ms occu ed		21		Scope and payment mechan sm clea ly def ned n cont act and no dependenc es on th d pa t es	Scope and payment mechan sm pa t ally def ned and the e a e no majo dependenc es on th d pa t es	Scope and payment mechan sm cu ently ll-def ned and/o the e a e s gn f cant dependenc es on th d pa t es	
Info mat on management				Info mat on management systems between key stakeholde s a e n place, clea ly def ned and effect ve (e g, p o ect spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Some key stakeholde s fo p ocu ement dent f ed and nfo mat on management system has been n t ated, but deta ls a e st ll to be developed befo e t can be effect ve.	Key stakeholde s fo p ocu ement not dent f ed, o nfo mat on management systems not n place and effect ve (e.g. p oject spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	*Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low conf dence*
Othe	2						
P ocu ement comb ned			18.0%				
Project specific							
Des gn complex ty	8			Des gn s bus ness as usual o des gn conta ns complex t es but these a e well unde stood and deta led plans and des gns a e n place to add ess them	Des gn s not bus ness as usual due to seve al complex t es. The des gn m t gat ons to add ess these complex t es have only been pa t ally unde stood and add essed.	Des gn s complex, fo example due to the natu e of the p oject o nte faces w th ex st ng assets, o const a nts. Des gn m t gat ons a e not yet n place.	*Opt ons w th s gn f cant des gn complex t es o const a ned s tes and s gn f cant nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low conf dence Opt ons that a e bus ness as usual on g eenf eld unconst a ned s tes may be ass gned h gh conf dence*
Deg ee of Innovat on	9			Des gn s bus ness as usual and/o novat ons a e w el developed and tested fo the spec f c appl cat on.	Des gn nco po ates technology / novat ons that have been pa t ally tested and p oven fo the spec f c appl cat on.	Des gn nco po ates new technolog es and these have not yet been fully tested and p oven fo the spec f c appl cat on.	*Opt ons us ng technolog es that a e well estabi shed n the UK should be ass gned h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es s less well estabi shed n the UK (e g euse desal nat on) should be ass gned med um conf dence*
Env onmental mpact	5	22		Env onmental mpacts well unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), m t gat ons dent f ed whe e equ ed and ncluded n costs	Some assessment of env onmental mpacts has been ca ed out and m t gat ons have been dent f ed and costed to add ess the most s gn f cant of these. Othe m t gat ons w ll be equ ed that have not yet been bu lt nto the costs.	Env onmental mpacts poo ly unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), o s gn f cant env onmental sues dent f ed w thout ag eement on m t gat on to be bu lt nto costs	*Except fo opt ons that a e f ee f om env onmental const a nts/ sks t s unl kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent f ed deta led and costed n the QCRA Fo opt ons w th s gn f cant env onmental sks that equ e nvest gat on a low conf dence sco e would be mo e appl cable befo e account ng fo the QCRA*
Othe		18					
P oject spec f c comb ned			31.0%				
Client specific							
Inadequacy of the Bus ness Case	35	10		Needs have been clea ly dent f ed. Key stakeholde s needs dent f ed and ncluded n scope whe e appl cable.	Pa t al dent f cat on of needs and n t al engagement w th stakeholde s to ef ne equ rements.	In t al dent f cat on of needs and output spec f cat on, w thout engagement w th stakeholde s to ef ne equ rements	*Conf dence l kely to be low at Gate 1 unless n t al stakeholde equ rements dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA*
La ge numbe of stakeholde s				Stakeholde app ovals not equ ed, o key stakeholde app ovals obta ned, o key stakeholde s la gely suppo t ve	Some key stakeholde s dent f ed and v ews obta ned, however some othe stakeholde s rema n un dent f ed.	Stakeholde s not clea ly dent f ed, v ews not known o some stakeholde s a e n act ve oppos t on	
Fund ng ava lab l ty	5			Fund ng fo the p oject s secu e (e.g. p o ect fully funded th ough p ce ev ew / pass th ough a angement)	P oject fund ng unce ta n e.g. p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be ev s ted	P oject fund ng not secu e, e.g. p oject dependent n pa t on pa tne sh p fund ng wh ch s not secu e.	*Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed app op ate*
P oject management team	2			Scope of wo k s bus ness as usual fo company del ve y teams.	Company del ve y team has some expe ence n mplement ng p o ects of th s natu e, but the elevant expe ence s not extens ve.	Company del ve y teams a e not expe enced n mplement ng p ojects of th s natu e	
Poo p oject ntell gence	9	7		Good unde stand ng of key p o ect data and no key assumpt ons made whe e the e s s gn f cant unce ta nty (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	Pa t al unde stand ng of key p oject data and the e has been some wo k unde taken to educe the unce ta nty a ound key assumpt ons (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	S gn f cant gaps n p oject data and key assumpt ons made whe e the e s s gn f cant unce ta nty	
Othe							
C ent spec f c comb ned			34.0%				
Environment							
Publ c elat ons		9		P o ect bus ness as usual and not expected to a se local oppos t on, o local stakeholde s awa e and la gely p ma ly suppo t ve, no p otest expected.	P oject could lead to some local oppos t on, howeve the e has been some engagement w th key stakeholde s and t s l kely that the majo conce ns a sed can be resolved	P oject could lead to local oppos t on once local stakeholde s awa e, o stakeholde s awa e and ev dence of s gn f cant local oppos t on	
S te cha acte st cs	5	3		S te nfo mat on well unde stood (e g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on pa t ally unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons not dent f ed	
Pe m ts / consents / app ovals				No pe m ts and consents equ ed, o pe m ts and consents obta ned.	Pe m ts and consents equ ed, but egulato s, plann ng autho t es and Gove nment suppo t ve	Pe m ts, consents and app ovals equ ed f om egulato s, plann ng autho t es and/o Gove nment and obta n ng these p esents a mate al sk	*Conf dence l kely to be low at Gate 1 unless opt on s bus ness as usual o sks well developed and costed n QRA*
Othe							
Env onment comb ned			8.5%				
External Influences							
Pol t cal				P o ect s e the unl kely to att act pol t cal attent on, o pol t cal stakeholde s a e suppo t ve	P oject could att act pol t cal attent on, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	P oject has the potent al to att act pol t cal attent on and lacks c oss-pa ty pol t cal suppo t	*P ojects that a e h gh p of le and cons de ed l kely to be cont ove s al should be ass gned low conf dence*
Econom c	3	7		P o ect has a sho t lead t me and s less vulne able to changes n fund ng and nput costs	P oject has a med um lead t me so the e s some sk that a change n the econom c env onment could mpact demands and / o nput costs.	P oject has long lead t me and change n econom c env onment could mpact demands and/o nput costs	*When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t fo ≤5 yea s Med um fo 6-10 yea s Long fo >10yea s*
Leg slat ons/ egulat ons	8			P o ect s bus ness as usual and /o equ ed standa ds and egulat ons a e well establ shed and unl kely to change	Requ ed standa ds and egulat ons a e elat vely new and the efo e less well establ shed.	Key standa ds and egulat ons a e unde development, o subject to change.	*Fo new technolog es o novel appl cat ons of ex st ng technolog es n the UK that potent ally equ e egulato y appr ovals (e g fo env onmental o d nk ng wate qual ty reasons) then a med um o low conf dence should be appl ed H gh conf dence should be appl ed fo bus ness as usual schemes whe e no egulato y o leg slat ve sks a e env saged*
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng technology) s well estabi shed, accepted by egulato s and unl kely to change du ng the p oject lead t me	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s elat vely new. Wh le t has not yet been accepted by egulato s, t s l kely to be and the efo e a change n the equ rements s unl kely.	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s new and/o s subject to ap d nnovat on wh ch may lead to changes n equ rements	*T eated wate t ansfe s and convent onal t eatment p ocesses should be sco ed h gh conf dence fo novel t eatment p ocesses o novel appl cat on of tested t eatment p ocesses (e g fo INNS t ansfe m t gat on desal nat on o euse) med um conf dence s cons de ed app op ate*
Othe	1						
Exte nal influences comb ned			13.5%				

Combined Upper Bound Optimism Bias (%)	Non-Standard Civil Engineering				Standard Civ l Engineering				Adjusted Optimism Bias (%)	Check whether cost proportions have been provided across the required confidence bands		Scor ng comment
	P opo t on of Non-Standa d C v l Eng nee ng Capex			68%	P opo t on of Standa d C v l Eng nee ng Capex			32%				
	Uppe Bound			66%	Uppe Bound			44%				
	Lowe bound			6%	Lowe bound			3%				
Result f om	Proportion of cost n each confidence band				Proportion of cost in each confidence band				Result f om			
	Non-Standard Civil Engineer ng Components included -				Standard Civil Engineer ng Components included -							
58.96%	Required High	Required Medium	Required Low	Mitigation Factor	Required High	Required Medium	Required Low	Mitigation Factor	37.10%	Check for Non-Standard components	Check for Standard components	
Calculated ce l	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Calculated cell	Check p opo t on sums to 1 whe e opt on conta ns Non-Standa d components	Check p opo t on sums to 1 whe e opt on conta ns Standa d components	Desc be the eason ng beh nd ass gnment to conf dence bands
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1			1	0		OK	OK	Cu ently unknown at th s p oject stage. KPMG that w ll not be p ocu ed v a DPC oute.
			1	0			1	0		OK	OK	Cost models fo t eatment elements may not be el able at th s scale. No cont acto nvolvement to date. ECI s now a well estabi shed p ocess the efo e, th s sk should be m n mal and w ll be m t gated. No ECI yet.
		1		0.5	1			1		OK	OK	The phys cal wo k of the p oject s not unusual. Howeve cont acto s w ll have l m ted expe ence of const uct ng these assets on a wastewate s te
			1	0			1	0		OK	OK	Lm ted expe ence of schemes of th s natu e, howeve the nf ast uctu e tself should be fam l a .
		1		0.5			1	0		OK	OK	Unclea at th s p oject stage.
		1		0.5		1		0.5		OK	OK	Unclea at th s p oject stage howeve some stakeholde s have been dent f ed du ng the Concept Des gn nvest gat ons
7.66%	Ave age M t gat on Facto			0.417	Ave age M t gat on Facto			0.250	5.028%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
			1	0		1		0.5		OK	OK	T eatment des gn const a nts a e st ll not clea ly def ned. P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
	1			0.5	1			1		OK	OK	P ocess technology s estabi shed - but not on a wastewate s te.
			1	0			1	0		OK	OK	Env onmental assessments not yet ava ilable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess s now des gned to meet all poss ble consent ng needs.
18.28%	Ave age M t gat on Facto			0.167	Ave age M t gat on Facto			0.500	14.136%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
		1		0.5		1		0.5		OK	OK	As one of 17 SROs, the need fo th s pa t cula scheme (o any othe) w ll be unclea unt l the gated p ocess s much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
	1			1		0.7	0.3	0.35		OK	OK	Many stakeholde s not yet engaged, full l st of stakeholde s not developed so the e may be un dent f ed stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
		1		0.5		1		0.5		OK	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance w th add t onal gu dance
		1		0.5		1		0.5		OK	OK	In house p oject management team have no expe ence of del ve ng p ojects of th s natu e whe e clean wate assets a e const ucted on a wastewate s s te.
			1	0			1	0		OK	OK	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case t eatment scena o used.
20.05%	Ave age M t gat on Facto			0.500	Ave age M t gat on Facto			0.370	11.460%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1		0.5	0.5	0.25		OK	OK	The scheme s la ge enough that the e could be local oppos t on, sco ed med um as the e s no ev dence of s gn f cant local oppos t on at th s po nt and t s l kely conce ns can be esolved.
			1	0			1	0		OK	OK	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of the p pel ne oute s poo , based solely on desktop study.
	1			1		0.5	0.5	0.25		OK	OK	Pe m ts a e equ ed, unce ta n of autho t es suppo t at th s stage. T eatment s BAT des gned fo wo st case so although pe m t not issued, no fu the m t gat on s poss ble
5.01%	Ave age M t gat on Facto			0.667	Ave age M t gat on Facto			0.167	2.514%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1			1	0		OK	OK	P oject could lead to pol t cal attent on, pa t cua ly unde a net ze o lense. Unclea f the es cu ently c oss-pa ty suppo t o not. When compa ed to othe SROs th s p oject s unl kely to att act pol t cal attent on
		1		0.5			1	0		OK	OK	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
		1		0.5		0.5	0.5	0.25		OK	OK	The cu ent key standa ds a e unde stood and have been pa t ally nvest gated. Howeve , sues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y sues ema n (DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the l fe cycle of the scheme wh ch, even f selected, may not be called upon fo decades.
			1	0.5	1			1		OK	OK	T eatment p ocesses p oposed a e estabi shed, howeve p lot t als needed to conf m v ab l ty of t eatment p oposed
7.96%	Ave age M t gat on Facto			0.625	Ave age M t gat on Facto			0.313	3.964%	Ave age M t gat on Facto		

2. Optimism Bias Tab

Option Name	Netheridge SRO - Haw Bridge
Option Reference	Option 2
Date of OB Review 1	
Date of OB Review 2	

Contr butory factors	Non-standard Ov. Ing. (fixed values - do not adjust)	Standard Ov. Ing. (fixed values - do not adjust)	Combined weight (calculated value - do not adjust)	Confidence Grade Criteria			Additional Guidance	Combined Upper Bound Optimism Bias (%)	Non-Standard Civil Engineering				Standard Civ l Engineering				Adjusted Optimism Bias (%)	Check whether cost proportions have been provided across the required confidence bands		Scor ng comment
									P opo t on of Non-Standa d C v l Eng nee ng Capex			71%	P opo t on of Standa d C v l Eng nee ng Capex			29%				
									Uppe Bound			66%	Uppe Bound			44%				
									Lowe bound			6%	Lowe bound			3%				
									Proportion of cost n each confidence band				Proportion of cost in each confidence band							
								Result f om	Non-Standard Civil Engineer ng Components included -				Standard Civil Engineer ng Components included -				Result f om			
									Required	Required	Required		Required	Required	Required					
				High Confidence	Medium Confidence	Low Confidence		59.62%	High	Medium	Low	Mitigation Factor	High	Medium	Low	Mitigation Factor	37.47%	Check for Non-Standard components	Check for Standard components	
Desc pt on	If xed values - do not adjust			Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce l	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Calculated cell	Check p opo t on sums to 1 whe e opt on comta ns Non-Standa d components	Check p opo t on sums to 1 whe e opt on comta ns Standa d components	Desc be the eason ng beh nd ass gnment to conf dence bands
Procurement																				
Complex ty of cont act st uctu e				Clea , well establ shment p ocu ement oute and p ocesses and/o deta led p ocu ement plan o fu l comme c al bus ness case n place	Cont act st ategy o outl ne comme c al bus ness case n place, but deta ls st ll to be developed	No cont act st ategy o comme c al bus ness case n place.	Fo bus ness as usual opt ons that w ll be p ocu ed th ough ex st ng wate company f amewo ks then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e deta led p ocu ements plans have not been developed		Requ ed	Requ ed	Requ ed	1			1	0			
Late cont acto nvolvement n des gn		3		Des gn s bus ness as usual and costs a e based upon accu ate cost models, o s gn f cant cont acto nvolvement n des gn	Des gn s bus ness as usual and costs a e based upon cost models w th med um conf dence, o nt al cont acto nvolvement n key aspects of des gn	Des gn s not bus ness as usual fo company and the cont acto has not been involved n des gn	Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equ valent level of conf dence n the est mate				1	0			1	0			OK	OK	Cost models fo t eatment elements may not be el able at th s scale. No cont acto nvolvement to date. ECI s now a well estabd shed p ocess the efo e, th s sk should be m n mal and w ll be m t gated. No ECI yet.
Poo cont acto capab l t es				Cont acto s and suppl e s expected to b d fo wo k have ecent expe ence of s m la cost uct on p o ects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l m ted ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l ttle/no ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	Opt on types whe e the e s l m ted ecent expe ence n the UK (nclud ng lo ge ese ve s euse and desal nat on opt ons) should be sco ed as med um/low conf dence		1			0.5	1			1		OK	OK	The phys cal wo k of the p oject s not unusual. However cont acto s w ll have l m ted expe ence of const uct ng these assets on a wastewate s te. t s l kely that the tende p ocess w ll be a staged OJEU p ocess w th only competant cont acto s pass ng th ough the second tende stage.
Gove nment gu del nes				The e e e mu t ple ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	Some ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	The e s l m ted ecent expe ence of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s not n place	Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s o othe less we l estabd shed p ocu ement outes then low conf dence should be ass gned				1	0			1	0			OK	OK	Th s p oject cons de ed unusual, n te ms of p ocu ement, based on s ze and scale. KPMG have conf med that p ocu ement w ll not be v a DPC outes
D sputes & cla ms occu ed		21		Scope and payment mechan sm clea ly def ned n cont act and no dependenc es on th d pa t es	Scope and payment mechan sm pa t ally def ned and the e e no majo dependenc es on th d pa t es	Scope and payment mechan sm cu ently ll-def ned and/o the e e e s gn f cant dependenc es on th d pa t es					1			0.5			1	0		OK	OK	No cont acts n place howeve , th s s a sk wh ch w ll be m t gated as the p oject p ocedu ess.
Info mat on management				Info mat on management systems between key stakeholde s a e n place, clea ly def ned and effect ve (e g, p o ect spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Some key stakeholde s fo p ocu ement dent f ed and nfo mat on management system has been n t ated, but deta ls a e st ll to be developed befo e t can be effect ve.	Key stakeholde s fo p ocu ement not dent f ed, o nfo mat on management systems not n place and effect ve (e.g. p oject spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low conf dence				1	0.5			0.5					OK	OK	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn mest gat ons. Th s sk w ll be m t gated as the scheme advances th ough the Gate p ocess. A s te set up but not effect ve yet.
Othe	2																			
P ocu ement comb ned			13.0%					7.75%	Ave age M t gat on Facto			0.417	Ave age M t gat on Facto			0.250	5.057%	Ave age M t gat on Facto		
Project specific									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Des gn complex ty	8			Des gn s bus ness as usual o des gn conta ns complex t es but these a e well unde stood and deta led plans and des gns a e n place to add ess them	Des gn s not bus ness as usual due to seve al complex t es. The des gn m t gat ons to add ess these complex t es have only been pa t ally unde stood and add essed.	Des gn s complex, fo example due to the natu e of the p oject o nte faces w th ex st ng assets, o const a nts. Des gn m t gat ons a e not yet n place.	Opt ons w th s gn f cant des gn complex t es o const a ned s tes and s gn f cant nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low conf dence Opt ons that a e bus ness as usual on g eenf eld unconst a ned s tes may be ass gned h gh conf dence				1	0			1	0.5			OK	OK	T eatment des gn const a nts a e st ll not clea ly def ned. P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
Deg ee of Innovat on	9			Des gn s bus ness as usual and/o novat ons a e w el developed and tested fo the spec f c appl cat on.	Des gn nco po ates technology / novat ons that have been pa t ally tested and p oven fo the spec f c appl cat on.	Des gn nco po ates new technolog es and these have not yet been fully tested and p oven fo the spec f c appl cat on.	Opt ons us ng technolog es that a e well estabd shed n the UK should be ass gned h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es s less well estabd shed n the UK (e g euse desal nat on) should be ass gned med um conf dence				1	0.5	1			1			OK	OK	P ocess technology s estabd shed - but not on a wastewate s te.
Env onmental mpact	5	22		Env onmental mpacts well unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), m t gat ons dent f ed whe e equ ed and ncluded n costs	Some assessment of env onmental mpacts has been ca ed out and m t gat ons have been dent f ed and costed to add ess the most s gn f cant of these. Othe m t gat ons w ll be equ ed that have not yet been bu lt nto the costs.	Env onmental mpacts poo ly unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), o s gn f cant env onmental sues dent f ed w thout ag eement on m t gat on to be bu lt nto costs	Except fo opt ons that a e f ee f om env onmental const a nts/ sks t s unl kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent f ed deta led and costed n the QCRA Fo opt ons w th s gn f cant env onmental sks that equ e mvest gat on at low conf dence sco e would be mo e appl cable befo e account ng fo the QCRA				1	0			1	0			OK	OK	Env onmental assessments not yet ava ilable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess s now des gned to meet all poss ble consent ng needs.
Othe		18																		
P oject spec f c comb ned			31.0%					18.48%	Ave age M t gat on Facto			0.167	Ave age M t gat on Facto			0.500	14.438%	Ave age M t gat on Facto		
Client specific									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Inadequacy of the Bus ness Case	35	10		Needs have been clea ly dent f ed. Key stakeholde s needs dent f ed and ncluded n scope whe e appl cable.	Pa t al dent f cat on of needs and n t al engagement w th stakeholde s to ef ne equ rements.	In t al dent f cat on of needs and output spec f cat on, w thout engagement w th stakeholde s to ef ne equ rements	Conf dence l kely to be low at Gate 1 unless n t al stakeholde equ rements dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA			1		0.5		1		0.5			OK	OK	As one of 17 SROs, the need fo th s pa t cula scheme (o any othe) w ll be unclea unt l the gated p ocess s much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
La ge numbe of stakeholde s				Stakeholde app ovals not equ ed, o key stakeholde app ovals obta ned, o key stakeholde s la gely suppo t ve	Some key stakeholde s dent f ed and v ews obta ned, however some othe stakeholde s rema n un dent f ed.	Stakeholde s not clea ly dent f ed, v ews not known o some stakeholde s a e n act ve oppos t on			1			1		0.7	0.3	0.35		OK	OK	Many stakeholde s not yet engaged, full l st of stakeholde s not developed so the e may be un dent f ed stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
Fund ng ava lab l ty	5			Fund ng fo the p oject s secu e (e.g. p o ect fully funded th ough p ce ev ew / pass th ough e angement)	P oject fund ng unce ta n e.g. p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be ev s ted	P oject fund ng not secu e, e.g. p oject dependent n pa t on pa tne sh p fund ng wh ch s not secu e.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed appl cab le			1		0.5		1		0.5			OK	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n ecco dance w th add t onal gu dance
P oject management team	2			Scope of wo k s bus ness as usual fo company del ve y teams.	Company del ve y team has some expe ence n mplement ng p o ects of th s natu e, but the elevant expe ence s not extens ve.	Company del ve y teams a e not expe enced n mplement ng p ojects of th s natu e				1		0.5		1		0.5			OK	OK	In house p oject management team have no expe ence of del ve ng p ojects of th s natu e whe e clean wate assets a e const ucted on a wastewate s s te. P pel ne nstallat on s bus ness as usual p oject
Poo p oject ntell gence	9	7		Good unde stand ng of key p o ect data and no key assumpt ons made whe e the e s s gn f cant unce ta nty (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	Pa t al unde stand ng of key p oject data and the e has been some wo k unde taken to educe the unce ta nty a ound key assumpt ons (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	S gn f cant gaps n p oject data and key assumpt ons made whe e the e s s gn f cant unce ta nty					1	0			1	0			OK	OK	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case t eatment scena o used.
Othe																				
Cl ent spec f c comb ned			34.0%					20.27%	Ave age M t gat on Facto			0.500	Ave age M t gat on Facto			0.370	11.533%	Ave age M t gat on Facto		
Environment									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Publ c elat ons		9		P o ect bus ness as usual and not expected to a se local oppos t on, o local stakeholde s awa e and la gely p ma ly suppo t ve, no p otest expected.	P oject could lead to some local oppos t on, howeve the e has been some engagement w th key stakeholde s and t s l kely that the majo conce ns a sed can be resolved	P oject could lead to local oppos t on once local stakeholde s awa e, o stakeholde s awa e and ev dence of s gn f cant local oppos t on				1		1	0.5	0.5	0.25			OK	OK	The scheme s la ge enough that the e could be local oppos t on, sco ed med um as the e s no ev dence of s gn f cant local oppos t on at th s po nt and t s l kely conce ns can be esolved.
S te cha acte st cs	5	3		S te nfo mat on well unde stood (e g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on pa t ally unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons not dent f ed					1	0			1	0			OK	OK	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of the p pel ne oute s poo , based solely on desktop study.
Pe m ts / consents / app ovals				No pe m ts and consents equ ed, o pe m ts and consents obta ned.	Pe m ts and consents equ ed, but egulato s, plann ng autho t es and Gove nment suppo t ve	Pe m ts, consents and app ovals equ ed f om egulato s, plann ng autho t es and/o Gove nment and obta n ng these p esents a mate al sk	Conf dence l kely to be low at Gate 1 unless opt on s bus ness as usual o sks well developed and costed n QRA			1		1	0.5	0.5	0.25			OK	OK	Pe m ts a e equ ed, unce ta n of autho t es suppo t at th s stage. T eatment s BAT des gned fo wo st case so although pe m t not ssued, no fu the m t gat on s poss ble
Othe																				
Env onment comb ned			8.5%					5.07%	Ave age M t gat on Facto			0.667	Ave age M t gat on Facto			0.167	2.485%	Ave age M t gat on Facto		
External Influences									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Pol t cal				P o ect s e the unl kely to att act pol t cal attent on, o pol t cal stakeholde s a e suppo t ve	P oject could att act pol t cal attent on, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	P oject has the potent al to att act pol t cal attent on and lacks c oss-pa ty pol t cal suppo t	P ojects that a e h gh p of le and cons de ed l kely to be cont ove s al should be ass gned low conf dence			1		1		1	0			OK	OK	P oject could lead to pol t cal attent on, pa t cua ly unde e net ze o lense. Unclea f the es cu ently c oss-pa ty suppo t o not. When compa ed to othe SROs th s p oject s unl kely to att act pol t cal attent on
Econom c	3	7		P o ect has a sho t lead t me and s less vulne able to changes n fund ng and nput costs	P oject has a med um lead t me so the e s some sk that a change n the econom c env onment could mpact demands and / o nput costs.	P oject has long lead t me and change n econom c env onment could mpact demands and/o nput costs	When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t fo ≤5 yea s Med um fo 6-10 yea s Long fo >10yea s				1	0.5		1	0			OK	OK	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
Leg slat ons/ egulat ons	8			P o ect s bus ness as usual and /o equ ed standa ds and egulat ons a e well estabd shed and unl kely to change	Requ ed standa ds and egulat ons a e elat vely new and the efo e less well estabd shed.	Key standa ds and egulat ons a e unde development, o subject to change.	Fo new technolog es o novel appl cat ons of ex st ng technolog es n the UK that potent ally equ e egulato y appo ovals (e g fo env onmental o d nk ng wate qual ty reasons) then a med um o low conf dence should be appl ed H gh conf dence should be appl ed fo bus ness as usual schemes whe e no egulato y o leg slat ve sks a e env saged				1	0.5		0.5	0.25			OK	OK	The cu ent key standa ds a e unde stood and have been pa t ally nvest gated. Howeve , ssues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y ssues ema n (DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the l fe cycle of the scheme wh ch, even f selected, may not be called upon fo decades.
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng technology) s well estabd shed, accepted by egulato s and unl kely to change du ng the p oject lead t me	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s elat vely new. Wh le t has not yet been accepted by egulato s, t s l kely to be and the efo e a change n the equ rements s unl kely.	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s new and/o s subject to ap d nnovat on wh ch may lead to changes n equ rements	T eated wate t ansfe s and convent onal t eatment p ocesses should be sco ed h gh conf dence Fo novel t eatment p ocesses o novel appl cat on of tested t eatment p ocesses (e g fo INNS t ansfe m t gat on desal nat on o euse) med um conf dence s cons de ed appl cable				1	0.5	1		1				OK	OK	T eatment p ocesses p oposed a e estabd shed, howeve p lot t als needed to conf m v ab l ty of t eatment p oposed
Othe	1																			
Exte nal influences comb ned			13.5%					8.05%	Ave age M t gat on Facto			0.625	Ave age M t gat on Facto			0.313	3.953%	Ave age M t gat on Facto		

2. Optimism Bias Tab

Option Name	Netheridge SRO - East Channel
Option Reference	Option 3
Date of OB Review 1	
Date of OB Review 2	

Contributory factors	Non-standard Cont. Eng. (fixed values - do not adjust)	Standard Cont. Eng. (fixed values - do not adjust)	Combined weight (calculated value - do not adjust)	Confidence Grade Criteria			Additional Guidance	Combined Upper Bound Optimism Bias (%)	Non-Standard Civil Engineering				Standard Civil Engineering				Adjusted Optimism Bias (%)	Check whether cost proportions have been provided across the required confidence bands		Scoring comment
									Proportion of Non-Standard Civil Engineering Capex			89%	Proportion of Standard Civil Engineering Capex			11%				
									Upper Bound			66%	Upper Bound			44%				
									Lower bound			6%	Lower bound			3%				
									Proportion of cost in each confidence band				Proportion of cost in each confidence band							
									Non-Standard Civil Engineering Components included -				Standard Civil Engineering Components included -							
									Required	Required	Required		Required	Required	Required					
				High Confidence	Medium Confidence	Low Confidence		Result from	High	Medium	Low	Mitigation Factor	High	Medium	Low	Mitigation Factor	Result from	Check for Non-Standard components	Check for Standard components	
								63.58%									39.65%			
Description	Fixed values - do not adjust			Guidance to inform scoring	Guidance to inform scoring	Guidance to inform scoring	Guidance to inform scoring	Calculated cell	Insert typical % confidence band (0 - 1)	Insert typical % confidence band (0 - 1)	Insert typical % confidence band (0 - 1)	Calculated mitigation factor	Insert typical % confidence band (0 - 1)	Insert typical % confidence band (0 - 1)	Insert typical % confidence band (0 - 1)	Calculated mitigation factor	Calculated cell	Check typical % confirms to the whole project contains Non-Standard components	Check typical % confirms to the whole project contains Standard components	Describe the reasoning behind assignment to confidence bands
Procurement																				
Complexity of contract structure				Clear, well established shipment procurement route and processes and/or detailed procurement plan in place	Contract strategy routine commercial business case in place, but details still to be developed	No contract strategy or commercial business case in place.	For business as usual opt ons that will be procured through existing company framework s then these may be assessed as high confidence Opt ons should score low confidence while they involve multiple waters company assets owned s or may be procured through Direct Procurement for Customer s and where details procurements plans have not been developed		Required	Required	1		Required	1	0			OK	OK	Currently unknown at this project stage. Potential to be procured via DPC as part of STT SRO
Late contract involvement in design		3		Design s business as usual and costs are based upon accurate cost models, o sign f cant contract involvement in design	Design s business as usual costs are based upon cost models within med um confidence, o nt al contract involvement in key aspects of design	Design s not business as usual for company and the contract has not been involved in design	Where the e has not been early contract involvement then low confidence should be assigned unless the confidence in the cost models gives an equivalent level of confidence in the est mate				1	0			1	0		OK	OK	Cost models for t eatment elements may not be reliable at this scale. No contract involvement to date. ECI s now a well estab shed process therefore, this should be m n mal and will be m t gated. No ECI yet.
Poor contract capability				Contract s and supplier s expected to b d fo wo k have recent experience of s m la contract uct on p o ects and supply of s m la process plant and equipment	Contract s and supplier s expected to b d fo wo k have l m ted recent experience of s m la const uct on p ojects and supply of s m la process plant and equipment	Contract s and supplier s expected to b d fo wo k have l ttle/no recent experience of s m la const uct on p ojects and supply of s m la process plant and equipment	Opt ons types where the e s l m ted recent experience in the UK (nclud ng lo ge exe vo s euse and desal nat on opt ons) should be scored as med um/low confidence			1		0.5	1	1			OK	OK	The phys cal wo k of the project s not unusual. However contract s w ll have l m ted experience of const uct ng these assets on a wastewater s te. t s l kely that the tender process w ll be a staged OJEU process w th only competant contractors pass ng th ough the second tender stage.
Government guidelines				The e a e mu t ple recent p cedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement guidance s n place	Some recent p recedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement guidance s n place	The e s l m ted recent experience of p ocu ng p ojects of a s m la natu e and deta led p ocu ement guidance s not n place	Where an opt on may be implemented though Direct Procurement for Customer s o othe less well estab shed p ocurement outes then low confidence should be ass gned				1	0			1	0		OK	OK	This project consider ed unusual, in terms of p ocurement, based on s ze and scale. KPMG have confirmed that p ocurement w ll not be v a DPC outes
Disputes & claims occurred		21		Scope and payment mechanism clear ly def ned n cont act and no dependenc es on th d pa t es	Scope and payment mechan sm pa t ally def ned and the e a e no majo dependenc es on th d pa t es	Scope and payment mechan sm cu rently ill-def ned and/or the e a e s gn f cant dependenc es on th d pa t es					1	0.5			1	0		OK	OK	No cont acts n place however, this s s a sk wh ch w ll be m t gated as the p oject p ocedu ess.
Information management				Info mat on management systems between key stakeholde s a e n place, clear ly def ned and effect ve (e g, p o ect spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Some key stakeholde s fo p ocu ement dent f ed and nfo mat on management system has been n t ated, but deta ls a e st ll to be developed befo e t can be effect ve.	Key stakeholde s fo p ocu ement not dent f ed, o nfo mat on management systems not n place and effect ve (e.g. p oject spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Where e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low confidence			1		0.5		1	0.5		OK	OK	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn mest gat ons. Th s sk w ll be m t gated as the scheme advances th ough the Gate p ocess. A s te set up but not effect ve yet.
Other	2																			
Project uncertainty			13.0%					8.27%	Average Mult gat on Factor			0.417	Average Mult gat on Factor			0.250	5.226%	Average Mult gat on Factor		
Project specific																				
Design complexity	8			Design s business as usual or design conta ns complex t es but these a e well unde stood and deta led plans and des gns a e n place to add ess them	Design s not business as usual due to seve al complex t es. The design m t gat ons to add ess these complex t es have only been pa t ally unde stood and add essed.	Design s complex, for example due to the natu e of the project o nte faces w th ex st ng assets, o const a nts. Design m t gat ons a e not yet n place.	Opt ons w th s gn f cant design complexit es or const a ned s tes and s gn f cant nteg at on w th ex st ng ope at onal inf ast uctu e may be ass gned low confidence Opt ons that a e bus ness as usual on g eenf eld unconst a ned s tes may be ass gned h gh confidence		Required	Required	1	0	Required	1	0.5		OK	OK	Treatment des gn const a nts a e st ll not clear ly def ned. Pref ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
Degree of innovation	9			Design s business as usual and/or renovat ons a e w ll developed and tested fo the spec f c appl cat on.	Design nco po ates technology/ renovat ons that have been pa t ally tested and p oven fo the spec f c appl cat on.	Design nco po ates new technolog es and these have not yet been fully tested and p oven fo the spec f c appl cat on.	Opt ons us ng technolog es that a e well estab shed within the UK should be ass gned h gh confidence Opt ons whe e technolog es or the appl cat on of technolog es s less well estab shed within the UK (e g euse desal nat on) should be ass gned med um confidence			1		0.5	1		1		OK	OK	P ocess technology s estabi shed - but not on a wastewater s te.
Environmental impact	5	22		Environmental impacts well unde stood (e.g. impact on ecev ng wate bod es, no se, INNS t ansfe, des gnated s tes, v sual amen ty etc), m t gat ons dent f ed whe e equ ed and ncluded n costs	Some assessment of environmental impacts has been ca ed out and m t gat ons have been dent f ed and costed to add ess the most s gn f cant of these. Other m t gat ons w ll be equ ed that have not yet been bu lt into the costs.	Environmental impacts poo ly unde stood (e.g. impact on ecev ng wate bod es, no se, INNS t ansfe, des gnated s tes, v sual amen ty etc), o s gn f cant environmental issues dent f ed w thout agreement on m t gat on to be bu lt into costs	Except for opt ons that a e f ee f om environmental constra nts/ ski s t s unl kely that opt ons at Gate 1 would ach eve a h ghe level of confidence than med um at Gate 1 unless environmental ska have been dent f ed data led and costed n the QCRA Fo opt ons w th s gn f cant environmental ska that equ e nvest gat on at low confidence sco e would be mo e appl cable befo e account ng fo the QCRA				1	0		1	0		OK	OK	Environmental assessments not yet available, potential for impacts and m t gat on s not yet spec f ed. P ocess s now des gned to meet all poss ble consent ng needs.
Other	5	18																		
Project specific contingency			31.0%					19.71%	Average Mult gat on Factor			0.167	Average Mult gat on Factor			0.500	14.252%	Average Mult gat on Factor		
Client specific																				
Inadequacy of the Business Case	35	10		Needs have been clear ly dent f ed. Key stakeholde s needs dent f ed and ncluded n scope whe e appl cable.	Partial dent f cat on of needs and n t al engagement w th stakeholde s to ref ne requirements.	Initial dent f cat on of needs and output spec f cat on, w thout engagement w th stakeholde s to ref ne requirements	Confidence likely to be low at Gate 1 unless n t al stakeholder requirements dent f ed and effected n opt on scope and/or spec f cally accounted for n QCRA		Required	1		0.5	Required	1	0.5		OK	OK	As one of 17 SROs, the need for th s pa t cula scheme (o any othe) w ll be unclear unt l the gated p ocess s much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
Lack genuine stakeholders	5			Stakeholder app ovals not equ ed, o key stakeholde app ovals obta ned, o key stakeholde s la gely suppo t ve	Some key stakeholde s dent f ed and v ews obta ned, however some othe stakeholde s rema n un dent f ed.	Stakeholde s not clear ly dent f ed, v ews not known o some stakeholde s a e n act ve oppos t on			1			1		0.7	0.3	0.35		OK	OK	Many stakeholde s not yet engaged, full l st of stakeholde s not developed so the e may be un dent f ed stakeholde s. For Nethe dge t eatment the only stakeholde s the EA, and we have des gned for two st case.
Funding availability	5			Funding for the p oject s secu e (e.g. p o ect fully funded th ough p ce ev ew / pass th ough e angement)	P oject funding unce ta n e.g. p oject subject to eff c ency challenges at p ce ev ew wh ch may requ e bus ness case to be ev s ted	P oject funding not secu e, e.g. p oject dependent n pa t on pa tne sh p fund ng wh ch s not secu e.	For opt ons to be funded through the RAPID gated SRO process o th ough a p ce ev ew a med um confidence sco e s cons de ed appropr ate			1		0.5		1		0.5		OK	OK	P oject to be funded through the RAPID gated SRO process so assessed as med um n acco dance with addit onal gu dance
Project management team	2			Scope of work s bus ness as usual for company del ve y teams.	Company del ve y team has some expe ence n mplement ng p o ects of th s natu e, but the elevant expe ence s not extens ve.	Company del ve y teams a e not expe enced n mplement ng p ojects of th s natu e				1		0.5		1		0.5		OK	OK	In house project management team have no expe ence of del ve ng p ojects of th s natu e whe e clean water assets a e const ucted on a wastewate s s te. P ojel ne nstallat on s bus ness as usual p oject
Poor project intelligence	9	7		Good understanding of key p o ect data and no key assumpt ons made whe e the e s s gn f cant unce ta nty (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ ements)	Partial understanding of key p oject data and the e has been some work unde taken to educe the unce ta nty a ound key assumpt ons (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ ements)	Significant gaps in p oject data and key assumpt ons made whe e the e s s gn f cant unce ta nty					1	0			1	0		OK	OK	A s gn f cant number of assumpt ons have been made by all d sc pl nes at this stage, however wo st case t eatment scena o used.
Other																				
Client specific contingency			34.0%					21.62%	Average Mult gat on Factor			0.500	Average Mult gat on Factor			0.370	11.972%	Average Mult gat on Factor		
Environment									Required	Required	Required		Required	Required	Required					
Public relations		9		P o ect bus ness as usual and not expected to a se local oppos t on, o local stakeholde s awa e and la gely p ma ly suppo t ve, no p otest expected.	P oject could lead to some local oppos t on, however the e has been some engagement w th key stakeholde s and t s l kely that the majo conce ns a sed can be resolved	P oject could lead to local oppos t on once local stakeholde s awa e, o stakeholde s awa e and ev dence of s gn f cant local oppos t on			1		1	1	0.5	0.5	0.25		OK	OK	The scheme s la ge enough that the e could be local oppos t on, sco ed med um as the e s no ev dence of s gn f cant local oppos t on at th s po nt and t s l kely conce ns can be resolved.
Site characteristics	5	3		Site nfo mat on well unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	Site nfo mat on on pa tially unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	Site nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons not dent f ed					1	0			1	0		OK	OK	Understand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of the p jel ne oute s poo , based solely on desktop study.
Permits / consents / approvals				No permits and consents equ ed, o pe m ts and consents obta ned.	Permits and consents equ ed, but egulato s, plann ng autho t es and Gove nment suppo t ve	Permits, consents and app ovals equ ed f om egulato s, plann ng autho t es and/o Gove nment and obta n ng these p ssents a mate al sk	Conf dence l kely to be low at Gate 1 unless opt on s bus ness as usual o sks well developed and costed n QRA			1		1		0.5	0.5	0.25		OK	OK	Permits a e equ ed, unce ta n of autho t es suppo t at th s stage. Treatment s BAT des gned fo two st case so although permits not issued, no fu the m t gat on s poss ble
Other																				
Environment contingency			8.5%					5.40%	Average Mult gat on Factor			0.667	Average Mult gat on Factor			0.167	2.314%	Average Mult gat on Factor		
External influences									Required	Required	Required		Required	Required	Required					
Political				Project could attract political attention, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	Project could attract political attention, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	Project has the potential to attract political attention and lacks cross-party political suppo t	Projects that a e h gh profile and cons de ed l kely to be cont ove s al should be ass gned low confidence			1		1		1	0		OK	OK	Project could lead to political attention, partially unde a net zero license. Unclear f the ex cu ently c oss-pa ty suppo t or not. When compa ed to other SROs th s project s unl kely to attract political attention
Economic	3	7		Project has a short l ead t me and s less vulne able to changes in fund ng and nput costs	Project has a med um lead t me so the e s some sk that a change in the economic env onment could mpact demands and/or nput costs.	Project has long lead t me and change in economic env onment could mpact demands and/or nput costs	When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t for <5 yea s Med um for 6-10 yea s Long for >10yea s				1	0.5			1	0		OK	OK	Project lead t me s long 6-10 yea ho zon, unce ta n economic cyc le and ahead.
Legislations/ regulations	8			Project s bus ness as usual and/or equ ed standa ds and regulat ons a e well estab shed and unl kely to change	Requ ed standa ds and regulat ons a e elat vely new and the efo e less well estab shed.	Key standa ds and regulat ons a e unde development, o subject to change.	For new technolog es or novel appl cat ons of ex st ng technolog es n the UK that potent ally equ e regulato y appr ovals (e g for env onmental o d nk ng water qual ty reasons) then a med um o low confidence should be appl ed High confidence should be appl ed for bus ness as usual schemes whe e no regulato y o leg slat ve sks a e env saged			1		0.5		0.5	0.25		OK	OK	The current key standa ds a e unde stood and have been pa t ally nvest gated. However, issues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and regulato y issues emerging (DCO/Put & Take). These external influences could also change s gn f cantly over the l fe cycle of the scheme which, even f selected, may not be called upon for decades.
Technology	8			Technology (e.g. t eatment p ocesses, sma t metering technology) s well estabi shed, accepted by regulato s and unl kely to change dur ng the p oject lead t me	Technology (e.g. t eatment p ocesses, sma t metering technology) s elat vely new. Wh le t has not yet been accepted by regulato s, t s l kely to be and the efo e a change in the equ ements s unl kely.	Technology (e.g. t eatment p ocesses, sma t metering technology) s new and/or s subject to ap d nnovat on wh ch may lead to changes in equ ements	Treated water t ansfe s and convent onal t eatment p ocesses should be scored h gh confidence For novel t eatment p ocesses or novel appl cat on of tested t eatment p ocesses (e g for INNS t ansfer m t gat on desal nat on or euse) med um confidence s cons de ed appropr ate			1		0.5	1		1		OK	OK	Treatment p ocesses proposed are estabi shed, however p lot tests needed to confirm v ab l ty of t eatment proposed
Other	1																			
External influences contingency			13.5%					8.58%	Average Mult gat on Factor			0.625	Average Mult gat on Factor			0.313	3.887%	Average Mult gat on Factor		

2. Optimism Bias Tab

Option Name	Netheridge SRO - Canal
Option Reference	Option 4
Date of OB Review 1	
Date of OB Review 2	

Contr butory factors	Non-standard Qu. Ing. (fixed values - do not adjust)	Standard Qu. Ing. (fixed values - do not adjust)	Combined weight (calculated value - do not adjust)	Confidence Grade Criteria			Additional Guidance	Combined Upper Bound Optimism Bias (%)	Non-Standard Civil Engineering				Standard Civ l Engineering				Adjusted Optimism Bias (%)	Check whether cost proportions have been provided across the required confidence bands		Scor ng comment
									P opo t on of Non-Standa d C v l Eng nee ng Capex			97%	P opo t on of Standa d C v l Eng nee ng Capex			3%				
									Uppe Bound			66%	Uppe Bound			44%				
									Lowe bound			6%	Lowe bound			3%				
									Proportion of cost n each confidence band				Proportion of cost in each confidence band							
									Non-Standard Civil Engineer ng Components included -				Standard Civil Engineer ng Components included -							
									Required	Required	Required		Required	Required	Required					
				High Confidence	Medium Confidence	Low Confidence		65.34%	High	Medium	Low	Mitigation Factor	High	Medium	Low	Mitigation Factor	40.62%	Check for Non-Standard components	Check for Standard components	
Desc pt on	If sed values - do not adjust			Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Calculated ce l	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Calculated cell	Check p opo t on sums to 1 whe e opt on comta ns Non-Standa d components	Check p opo t on sums to 1 whe e opt on comta ns Standa d components	Desc be the eason ng beh nd ass gnment to conf dence bands
Procurement																				
Complex ty of cont act st uctu e				Clea , well establ shment p ocu ement oute and p ocesses and/o deta led p ocu ement plan o fu l comme c al bus ness case n place	Cont act st ategy o outl ne comme c al bus ness case n place, but deta ls st ll to be developed	No cont act st ategy o comme c al bus ness case n place.	Fo bus ness as usual opt ons that w ll be p ocu ed th ough ex st ng wate company f amewo ks then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e deta led p ocu ements plans have not been developed		Requ ed	Requ ed	Requ ed	1			1	0		OK	OK	Cu ently unknown at th s p oject stage. Potent al to be p ocu ed v a DPC as pa t of STT SRO
Late cont acto nvolvement n des gn		3		Des gn s bus ness as usual and costs a e based upon accu ate cost models, o s gn f cant cont acto nvolvement n des gn	Des gn s bus ness as usual and costs a e based upon cost models w th med um conf dence, o n t al cont acto nvolvement n key aspects of des gn	Des gn s not bus ness as usual fo company and the cont acto has not been involved n des gn	Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equ valent level of conf dence n the est mate				1	0			1	0		OK	OK	Cost models fo t eatment elements may not be el able at th s scale. No cont acto nvolvement to date. ECI s now a well estabd shed p ocess the efo e, th s sk should be m n mal and w ll be m t gated. No ECI yet.
Poo cont acto capab l t es				Cont acto s and suppl e s expected to b d fo wo k have ecent expe ence of s m la const uct on p o ects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l m ted ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l ttle/no ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	Opt on types whe e the e s l m ted ecent expe ence n the UK (nclud ng lo ge ese wo s euse and desal nat on opt ons) should be sco ed as med um/low conf dence		1			0.5	1			1			OK	OK	The phys cal wo k of the p oject s not unusual. However cont acto s w ll have l m ted expe ence of const uct ng these assets on a wastewate s te. t s l kely that the tende p ocess w ll be a staged OJEU p ocess w th only competant cont acto s pass ng th ough the second tende stage.
Gove nment gu del nes				The e e e mu t ple ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	Some ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	The e s l m ted ecent expe ence of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s not n place	Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s o othe less we l estabd shed p ocu ement outes then low conf dence should be ass gned				1	0			1	0		OK	OK	Th s p oject cons de ed unusual, n te ms of p ocu ement, based on s ze and scale. KPMG have conf med that p ocu ement w ll not be v a DPC outes
D sputes & cla ms occu ed		21		Scope and payment mechan sm clea ly def ned n cont act and no dependenc es on th d pa t es	Scope and payment mechan sm pa t ally def ned and the e e no majo dependenc es on th d pa t es	Scope and payment mechan sm cu ently ll-def ned and/o the e e e s gn f cant dependenc es on th d pa t es				1		0.5		1		0		OK	OK	No cont acts n place howeve , th s s a sk wh ch w ll be m t gated as the p oject p ocedu ess.
Info mat on management				Info mat on management systems between key stakeholde s a e n place, clea ly def ned and effect ve (e g, p o ect spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Some key stakeholde s fo p ocu ement dent f ed and nfo mat on management system has been n t ated, but deta ls a e st ll to be developed befo e t can be effect ve.	Key stakeholde s fo p ocu ement not dent f ed, o nfo mat on management systems not n place and effect ve (e.g. p oject spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low conf dence			1		0.5		1		0.5		OK	OK	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn mest gat ons. Th s sk w ll be m t gated as the scheme advances th ough the Gate p ocess. A s te set up but not effect ve yet.
Othe	2																			
P ocu ement comb ned			13.0%					8.49%	Ave age M t gat on Facto			0.417	Ave age M t gat on Facto			0.250	5.302%	Ave age M t gat on Facto		
Project specific									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Des gn complex ty	8			Des gn s bus ness as usual o des gn conta ns complex t es but these a e well unde stood and deta led plans and des gns a e n place to add ess them	Des gn s not bus ness as usual due to seve al complex t es. The des gn m t gat ons to add ess these complex t es have only been pa t ally unde stood and add essed.	Des gn s complex, fo example due to the natu e of the p oject o nte faces w th ex st ng assets, o const a nts. Des gn m t gat ons a e not yet n place.	Opt ons w th s gn f cant des gn complex t es o const a ned s tes and s gn f cant nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low conf dence Opt ons that a e bus ness as usual on g eenf eld unconst a ned s tes may be ass gned h gh conf dence				1	0			1	0.5		OK	OK	T eatment des gn const a nts a e st ll not clea ly def ned. P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
Deg ee of Innovat on	9			Des gn s bus ness as usual and/o novat ons a e w el developed and tested fo the spec f c appl cat on.	Des gn nco po ates technology / novat ons that have been pa t ally tested and p oven fo the spec f c appl cat on.	Des gn nco po ates new technolog es and these have not yet been fully tested and p oven fo the spec f c appl cat on.	Opt ons us ng technolog es that a e well estabd shed n the UK should be ass gned h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es s less well estabd shed n the UK (e g euse desal nat on) should be ass gned med um conf dence				1	0.5	1			1			OK	OK	P ocess technology s estabd shed - but not on a wastewate s te.
Env onmental mpact	5	22		Env onmental mpacts well unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), m t gat ons dent f ed whe e equ ed and ncluded n costs	Some assessment of env onmental mpacts has been ca ed out and m t gat ons have been dent f ed and costed to add ess the most s gn f cant of these. Othe m t gat ons w ll be equ ed that have not yet been bu lt nto the costs.	Env onmental mpacts poo ly unde stood (e.g. mpact on ece v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), o s gn f cant env onmental sues dent f ed w thout ag eement on m t gat on to be bu lt nto costs	Except fo opt ons that a e f ee f om env onmental const a nts/ sks t s unl kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent f ed deta led and costed n the QCRA Fo opt ons w th s gn f cant env onmental sks that equ e nvest gat on at low conf dence sco e would be mo e appl cable befo e account ng fo the QCRA			1	0			1	0		OK	OK	Env onmental assessments not yet ava ilable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess s now des gned to meet all poss ble consent ng needs.
Othe	5	18																		
P oject spec f c comb ned			31.0%					20.26%	Ave age M t gat on Facto			0.167	Ave age M t gat on Facto			0.500	17.058%	Ave age M t gat on Facto		
Client specific									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Inadequacy of the Bus ness Case	35	10		Needs have been clea ly dent f ed. Key stakeholde s needs dent f ed and nclusded n scope whe e appl cable.	Pa t al dent f cat on of needs and n t al engagement w th stakeholde s to ef ne equ rements.	In t al dent f cat on of needs and output spec f cat on, w thout engagement w th stakeholde s to ef ne equ rements	Conf dence l kely to be low at Gate 1 unless n t al stakeholde equ rements dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA			1		0.5		1		0.5		OK	OK	As one of 17 SROs, the need fo th s pa t cula scheme (o any othe) w ll be unclea unt l the gated p ocess s much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
La ge numbe of stakeholde s				Stakeholde app ovals not equ ed, o key stakeholde app ovals obta ned, o key stakeholde s la gely suppo t ve	Some key stakeholde s dent f ed and v ews obta ned, however some othe stakeholde s rema n un dent f ed.	Stakeholde s not clea ly dent f ed, v ews not known o some stakeholde s a e n act ve oppos t on			1			1		0.7	0.3	0.35		OK	OK	Many stakeholde s not yet engaged, full l st of stakeholde s not developed so the e may be un dent f ed stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
Fund ng ava lab l ty	5			Fund ng fo the p oject s secu e (e.g. p o ect fully funded th ough p ce ev ew / pass th ough e angement)	P oject fund ng unce ta n e.g. p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be ev s ted	P oject fund ng not secu e, e.g. p oject dependent n pa t on pa tne sh p fund ng wh ch s not secu e.	Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed appl cab le			1		0.5		1		0.5		OK	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance w th add t onal gu dance
P oject management team	2			Scope of wo k s bus ness as usual fo company del ve y teams.	Company del ve y team has some expe ence n mplement ng p o ects of th s natu e, but the elevant expe ence s not extens ve.	Company del ve y teams a e not expe enced n mplement ng p ojects of th s natu e				1		0.5		1		0.5		OK	OK	In house p oject management team have no expe ence of del ve ng p ojects of th s natu e whe e clean wate assets a e const ucted on a wastewate s s te. P pel ne nstallat on s bus ness as usual p oject
Poo p oject ntell gence	9	7		Good unde stand ng of key p o ect data and no key assumpt ons made whe e the e s s gn f cant unce ta nty (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	Pa t al unde stand ng of key p oject data and the e has been some wo k unde taken to educe the unce ta nty a ound key assumpt ons (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	S gn f cant gaps n p oject data and key assumpt ons made whe e the e s s gn f cant unce ta nty					1	0			1	0		OK	OK	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case t eatment scena o used.
Othe																				
Cl ent spec f c comb ned			34.0%					22.22%	Ave age M t gat on Facto			0.500	Ave age M t gat on Facto			0.370	12.167%	Ave age M t gat on Facto		
Environment									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Pol c elat ons		9		P o ect bus ness as usual and not expected to a se local oppos t on, o local stakeholde s awa e and la gely p ma ly suppo t ve, no p otest expected.	P oject could lead to some local oppos t on, howeve the e has been some engagement w th key stakeholde s and t s l kely that the majo conce ns a sed can be resolved	P oject could lead to local oppos t on once local stakeholde s awa e, o stakeholde s awa e and ev dence of s gn f cant local oppos t on				1		1		0.5	0.5	0.25		OK	OK	The scheme s la ge enough that the e could be local oppos t on, sco ed med um as the e s no ev dence of s gn f cant local oppos t on at th s po nt and t s l kely conce ns can be esolved.
S te cha acte st cs	5	3		S te nfo mat on well unde stood (e g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on pa t ally unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons not dent f ed					1	0			1	0		OK	OK	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of the p pel ne oute s poo , based solely on desktop study.
Pe m ts / consents / app ovals				No pe m ts and consents equ ed, o pe m ts and consents obta ned.	Pe m ts and consents equ ed, but egulato s, plann ng autho t es and Gove nment suppo t ve	Pe m ts, consents and app ovals equ ed f om egulato s, plann ng autho t es and/o Gove nment and obta n ng these p esents a mate al sk	Conf dence l kely to be low at Gate 1 unless opt on s bus ness as usual o sks well developed and costed n QRA			1		1		0.5	0.5	0.25		OK	OK	Pe m ts a e equ ed, unce ta n of autho t es suppo t at th s stage. T eatment s BAT des gned fo wo st case so although pe m t not ssued, no fu the m t gat on s poss ble
Othe																				
Env onment comb ned			8.5%					5.55%	Ave age M t gat on Facto			0.667	Ave age M t gat on Facto			0.167	2.238%	Ave age M t gat on Facto		
External Influences									Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
Pol t cal				P o ect s e the unl kely to att act pol t cal attent on, o pol t cal stakeholde s a e suppo t ve	P oject could att act pol t cal attent on, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	P oject has the potent al to att act pol t cal attent on and lacks c oss-pa ty pol t cal suppo t	P ojects that a e h gh p of le and cons de ed l kely to be cont ove s al should be ass gned low conf dence			1		1		1		0		OK	OK	P oject could lead to pol t cal attent on, pa t cua ly unde a net ze o lense. Unclea f the es cu ently c oss-pa ty suppo t o not. When compa ed to othe SROs th s p oject s unl kely to att act pol t cal attent on
Econom c	3	7		P o ect has a sho t lead t me and s less vulne able to changes n fund ng and nput costs	P oject has a med um lead t me so the e s some sk that a change n the econom c env onment could mpact demands and/o nput costs.	P oject has long lead t me and change n econom c env onment could mpact demands and/o nput costs	When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t fo ≤5 yea s Med um fo 6-10 yea s Long fo >10yea s				1	0.5			1	0		OK	OK	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
Leg slat ons/ egulat ons	8			P o ect s bus ness as usual and/o equ ed standa ds and egulat ons a e well estabd shed and unl kely to change	Requ ed standa ds and egulat ons a e elat vely new and the efo e less well estabd shed.	Key standa ds and egulat ons a e unde development, o subject to change.	Fo new technolog es o novel appl cat ons of ex st ng technolog es n the UK that potent ally equ e egulato y appo ovals (e g fo env onmental o d nk ng wate qual ty reasons) then a med um o low conf dence should be appl ed H gh conf dence should be appl ed fo bus ness as usual schemes whe e no egulato y o leg slat ve sks a e env saged				1	0.5	0.5	0.25		OK	OK	The cu ent key standa ds a e unde stood and have been pa t ally nvest gated. Howeve , sues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y sues ema n (DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the l fe cycle of the scheme wh ch, even f selected, may not be called upon fo decades.
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng technology) s well estabd shed, accepted by egulato s and unl kely to change du ng the p oject lead t me	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s elat vely new. Wh le t has not yet been accepted by egulato s, t s l kely to be and the efo e a change n the equ rements s unl kely.	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s new and/o s subject to ap d nnovat on wh ch may lead to changes n equ rements	T eated waste t ansfe s and convent onal t eatment p ocesses should be sco ed h gh conf dence Fo novel t eatment p ocesses o novel appl cat on of tested t eatment p ocesses (e g fo INNS t ansfe m t gat on desal nat on o euse) med um conf dence s cons de ed appl cable			1	0.5	1		1		OK	OK	T eatment p ocesses p oposed a e estabd shed, howeve p lot t als needed to conf m v ab l ty of t eatment p oposed
Othe	1																			
Exte nal influences comb ned			13.5%					8.82%	Ave age M t gat on Facto			0.625	Ave age M t gat on Facto			0.313	3.858%	Ave age M t gat on Facto		

2. Optimism Bias Tab

Option Name	Netheridge SRO - East Channel SW Branch
Option Reference	Option 5
Date of OB Review 1	
Date of OB Review 2	

Contr butory factors	Non-standard Qu. Ing. (fixed values - do not adjust)	Standard Qu. Ing. (fixed values - do not adjust)	Combined weight (calculated value - do not adjust)	Confidence Grade Criteria			Additional Guidance
				High Confidence	Medium Confidence	Low Confidence	
Desc pt on	If sed values - do not adjust			Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng	Gu dance to nfo m sco ng
Procurement							
Complex ty of cont act st uctu e				Clea , well establ shment p ocu ement oute and p ocesses and/o deta led p ocu ement plan o fu l comme c al bus ness case n place	Cont act st ategy o outl ne comme c al bus ness case n place, but deta ls st ll to be developed	No cont act st ategy o comme c al bus ness case n place.	*Fo bus ness as usual opt ons that w ll be p ocu ed th ough ex st ng wate company f amewo ks then these may be assessed as h gh conf dence Opt ons should sco e low conf dence whe e they nvolve mult ple wate compan es / asset owne s o may be p ocu ed th ough D ect P ocu ement fo Custome s and whe e deta led p ocu ements plans have not been developed*
Late cont acto nvolvement n des gn		3		Des gn s bus ness as usual and costs a e based upon accu ate cost models, o s gn f cant cont acto nvolvement n des gn	Des gn s bus ness as usual and costs a e based upon cost models w th med um conf dence, o n t al cont acto nvolvement n key aspects of des gn	Des gn s not bus ness as usual fo company and the cont acto has not been involved n des gn	*Whe e the e has not been ea ly cont acto nvolvement then low conf dence should be ass gned unless the conf dence n the cost models g ves an equ valent level of conf dence n the est mate*
Poo cont acto capab l t es				Cont acto s and suppl e s expected to b d fo wo k have ecent expe ence of s m la const uct on p o ects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l m ted ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	Cont acto s and suppl e s expected to b d fo wo k have l ttle/no ecent expe ence of s m la const uct on p ojects and supply of s m la p ocess plant and equ pment	*Opt on types whe e the e s l m ted ecent expe ence n the UK (nclud ng lo ge ese wo s euse and desal nat on opt ons) should be sco ed as med umyfow conf dence*
Gove nment gu del nes				The e s m t ple ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	Some ecent p ecedents of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s n place	The e s l m ted ecent expe ence of p ocu ng p ojects of a s m la natu e and deta led p ocu ement gu dance s not n place	*Whe e an opt on may be mplemented though D ect P ocu ement fo Custome s o othe less we l estabi shed p ocu ement outes then low conf dence should be ass gned*
D sputes & cla ms occu ed		21		Scope and payment mechan sm clea ly def ned n cont act and no dependenc es on th d pa t es	Scope and payment mechan sm pa t ally def ned and the e a e no majo dependenc es on th d pa t es	Scope and payment mechan sm cu ently ill-def ned and/o the e a e s gn f cant dependenc es on th d pa t es	
Info mat on management				Info mat on management systems between key stakeholde s a e n place, clea ly def ned and effect ve (e g, p o ect spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	Some key stakeholde s fo p ocu ement dent f ed and nfo mat on management system has been n t ated, but deta ls a e st ll to be developed befo e t can be effect ve.	Key stakeholde s fo p ocu ement not dent f ed, o nfo mat on management systems not n place and effect ve (e.g. p oject spec f c, o al eady ex st ng fo a p oject unde an ex st ng f amewo k)	*Whe e nfo mat on management systems fo cont act and stakeholde management have not been n t ated then ass gn low conf dence*
Othe	2						
P ocu ement comb ned			13.0%				
Project specific							
Des gn complex ty	8			Des gn s bus ness as usual o des gn conta ns complex t es but these a e well unde stood and deta led plans and des gns a e n place to add ess them	Des gn s not bus ness as usual due to seve al complex t es. The des gn m t gat ons to add ess these complex t es have only been pa t ally unde stood and add essed.	Des gn s complex, fo example due to the natu e of the p oject o nte faces w th ex st ng assets, o const a nts. Des gn m t gat ons a e not yet n place.	*Opt ons w th s gn f cant des gn complex t es o const a ned s tes and s gn f cant nteg at on w th ex st ng ope at onal nf ast uctu e may be ass gned low conf dence Opt ons that a e bus ness as usual on g eenf eld unconst a ned s tes may be ass gned h gh conf dence*
Deg ee of Innovat on	9			Des gn s bus ness as usual and/o novat ons a e w el developed and tested fo the spec f c appl cat on.	Des gn nco po ates technology / novat ons that have been pa t ally tested and p oven fo the spec f c appl cat on.	Des gn nco po ates new technolog es and these have not yet been fully tested and p oven fo the spec f c appl cat on.	*Opt ons us ng technolog es that a e well estabi shed n the UK should be ass gned h gh conf dence Opt ons whe e technolog es o the appl cat on of technolog es s less well estabi shed n the UK (e g euse desal nat on) should be ass gned med um conf dence*
Env onmental mpact	5	22		Env onmental mpacts well unde stood (e.g. mpact on nce v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), m t gat ons dent f ed whe e equ ed and ncluded n costs	Some assessment of env onmental mpacts has been ca ed out and m t gat ons have been dent f ed and costed to add ess the most s gn f cant of these. Othe m t gat ons w ll be equ ed that have not yet been bou lt nto the costs.	Env onmental mpacts poo ly unde stood (e.g. mpact on nce v ng wate bod es, no se, INNS t ansfe , des gnated s tes, v sual amen ty etc), o s gn f cant env onmental sues dent f ed w thout ag eement on m t gat on to be bu lt nto costs	*Except fo opt ons that a e f ew f om env onmental const a nts/ sks t s unl kely that opt ons at Gate 1 would ach eve a h ghe level of conf dence than med um at Gate 1 unless env onmental sks have been dent f ed deta led and costed n the QCRA Fo opt ons w th s gn f cant env onmental sks that equ e nvest gat on a low conf dence sco e would be mo e appl cable befo e account ng fo the QCRA*
Othe		18					
P oject spec f c comb ned			31.0%				
Client specific							
Inadequacy of the Bus ness Case	35	10		Needs have been clea ly dent f ed. Key stakeholde s needs dent f ed and ncluded n scope whe e appl cable.	Pa t al dent f cat on of needs and n t al engagement w th stakeholde s to ef ne equ rements.	In t al dent f cat on of needs and output spec f cat on, w thout engagement w th stakeholde s to ef ne equ rements	*Conf dence l kely to be low at Gate 1 unless n t al stakeholde equ rements dent f ed and effected n opt on scope and/o spec f cally accounted fo n QCRA*
La ge numbe of stakeholde s				Stakeholde appr ovals not equ ed, o key stakeholde appr ovals obta ned, o key stakeholde s la gely suppo t ve	Some key stakeholde s dent f ed and v ews obta ned, however some othe stakeholde s rema n un dent f ed.	Stakeholde s not clea ly dent f ed, v ews not known o some stakeholde s a e n act ve oppos t on	
Fund ng ava lab l ty	5			Fund ng fo the p oject s secu e (e.g. p o ect fully funded th ough p ce ev ew / pass th ough a angement)	P oject fund ng unce ta n e.g. p oject subject to eff c ency challenges at p ce ev ew wh ch may equ e bus ness case to be ev s ted	P oject fund ng not secu e, e.g. p oject dependent n pa t on pa tne sh p fund ng wh ch s not secu e.	*Fo opt ons to be funded th ough the RAPID gated SRO p ocess o th ough a p ce ev ew a med um conf dence sco e s cons de ed appl op ate*
P oject management team	2			Scope of wo k s bus ness as usual fo company del ve y teams.	Company del ve y team has some expe ence n mplement ng p o ects of th s natu e, but the elevant expe ence s not extens ve.	Company del ve y teams a e not expe enced n mplement ng p ojects of th s natu e	
Poo p oject ntell gence	9	7		Good unde stand ng of key p o ect data and no key assumpt ons made whe e the e s s gn f cant unce ta nty (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	Pa t al unde stand ng of key p oject data and the e has been some wo k unde taken to educe the unce ta nty a ound key assumpt ons (e.g. g ound cond t ons, cond t on of ex st ng assets, t eatment equ rements)	S gn f cant gaps n p oject data and key assumpt ons made whe e the e s s gn f cant unce ta nty	
Othe							
C ent spec f c comb ned			34.0%				
Environment							
Publ c elat ons		9		P o ect bus ness as usual and not expected to a se local oppos t on, o local stakeholde s awa e and la gely p ma ly suppo t ve, no p otest expected.	P oject could lead to some local oppos t on, howeve the e has been some engagement w th key stakeholde s and t s l kely that the majo conce ns a sed can be resolved	P oject could lead to local oppos t on once local stakeholde s awa e, o stakeholde s awa e and ev dence of s gn f cant local oppos t on	
S te cha acte st cs	5	3		S te nfo mat on well unde stood (e g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on pa t ally unde stood (e.g. a chaeology, he tage assets, contam nat on etc.), m t gat ons dent f ed whe e equ ed and ncluded n costs	S te nfo mat on poo ly unde stood (e.g. a chaeology, he tage assets, contam nat on etc.) and m t gat ons not dent f ed	
Pe m ts / consents / app ovals				No pe m ts and consents equ ed, o pe m ts and consents obta ned.	Pe m ts and consents equ ed, but egulato s, plann ng autho t es and Gove nment suppo t ve	Pe m ts, consents and app ovals equ ed f om egulato s, plann ng autho t es and/o Gove nment and obta n ng these p ssents a mate al sk	*Conf dence l kely to be low at Gate 1 unless opt on s bus ness as usual o sks well developed and costed n QRA*
Othe							
Env onment comb ned			8.5%				
External influences							
Pol t cal				P o ect s e the unl kely to att act pol t cal attent on, o pol t cal stakeholde s a e suppo t ve	P oject could att act pol t cal attent on, wh le the e s not c oss-pa ty pol t cal suppo t the ma o ty of pol t cal stakeholde s a e l kely to be suppo t ve	P oject has the potent al to att act pol t cal attent on and lacks c oss-pa ty pol t cal suppo t	*P ojects that a e h gh p of le and cons de ed l kely to be cont ove s al should be ass gned low conf dence*
Econom c	3	7		P o ect has a sho t lead t me and s less vulne able to changes n fund ng and nput costs	P oject has a med um lead t me so the e s some sk that a change n the econom c env onment could mpact demands and / o nput costs.	P oject has long lead t me and change n econom c env onment could mpact demands and/o nput costs	*When cons de ng lead t mes (nclud ng plann ng and development t me) assume sho t fo ≤5 yea s Med um fo 6-10 yea s Long fo >10yea s*
Leg slat ons/ egulat ons	8			P o ect s bus ness as usual and /o equ ed standa ds and egulat ons a e well establ shed and unl kely to change	Requ ed standa ds and egulat ons a e elat vely new and the efo e less well establ shed.	Key standa ds and egulat ons a e unde development, o subject to change.	*Fo new technolog es o novel appl cat ons of ex st ng technolog es n the UK that potent ally equ e egulato y appr ovals (e g fo env onmental o d nk ng wate qual ty reasons) then a med um o low conf dence should be appl ed H gh conf dence should be appl ed fo bus ness as usual schemes whe e no egulato y o leg slat ve sks a e env saged*
Technology	8			Technology (e.g. t eatment p ocesses, sma t mete ng technology) s well estabi shed, accepted by egulato s and unl kely to change du ng the p oject lead t me	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s elat vely new. Wh le t has not yet been accepted by egulato s, t s l kely to be and the efo e a change n the equ rements s unl kely.	Technology (e.g. t eatment p ocesses, sma t mete ng technology) s new and/o s subject to ap d nnovat on wh ch may lead to changes n equ rements	*T eated wate t ansfe s and convent onal t eatment p ocesses should be sco ed h gh conf dence fo novel t eatment p ocesses o novel appl cat on of tested t eatment p ocesses (e g fo INNS t ansfe m t gat on desal nat on o euse) med um conf dence s cons de ed appr op ate*
Othe	1						
Exte nal influences comb ned			13.5%				

Combined Upper Bound Optimism Bias (%)	Non-Standard Civil Engineering				Standard Civ l Engineering				Adjusted Optimism Bias (%)	Check whether cost proportions have been provided across the required confidence bands		Scor ng comment
	P opo t on of Non-Standa d C v l Eng nee ng Capex			91%	P opo t on of Standa d C v l Eng nee ng Capex			9%				
	Uppe Bound			66%	Uppe Bound			44%				
	Lowe bound			6%	Lowe bound			3%				
Result f om	Proportion of cost n each confidence band				Proportion of cost in each confidence band				Result f om			
	Non-Standard Civil Engineer ng Components included -				Standard Civil Engineer ng Components included -							
	Required	Required	Required	Mitigation Factor	Required	Required	Required	Mitigation Factor		Check for Non-Standard components	Check for Standard components	
64.02%	High	Medium	Low		High	Medium	Low		39.89%			
Calculated ce l	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Inse t p opo t on n conf dence band (0 - 1)	Calculated m t gat on facto s	Calculated cell	Check p opo t on sums to 1 whe e opt on comta ns Non-Standa d components	Check p opo t on sums to 1 whe e opt on comta ns Standa d components	Desc be the eason ng beh nd ass gnment to conf dence bands
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1			1	0		OK	OK	Cu ently unknown at th s p oject stage. Potent al to be p ocu ed v a DPC as pa t of STT SRO
			1	0			1	0		OK	OK	Cost models fo t eatment elements may not be el able at th s scale. No cont acto nvolvement to date. ECI s now a well estabi shed p ocess the efo e, th s sk should be m n mal and w ll be m t gated. No ECI yet.
		1		0.5	1			1		OK	OK	The phys cal wo k of the p oject s not unusual. However cont acto s w ll have l m ted expe ence of const uct ng these assets on a wastewate s te. t s l kely that the tende p ocess w ll be a staged OJEU p ocess w th only competant cont acto s pass ng th ough the second tende stage.
			1	0			1	0		OK	OK	Th s p oject cons de ed unusual, n te ms of p ocu ement, based on s ze and scale. KPMG have conf med that p ocu ement w ll not be v a DPC outes
		1		0.5			1	0		OK	OK	No cont acts n place howeve , th s s a sk wh ch w ll be m t gated as the p oject p ocedu ess.
		1		0.5		1		0.5		OK	OK	Info mat on management at ea ly stage of development. Some stakeholde s have been dent f ed du ng the Concept Des gn nvest gat ons. Th s sk w ll be m t gated as the scheme advances th ough the Gate p ocess. A s te set up but not effect ve yet.
8.32%	Ave age M t gat on Facto			0.417	Ave age M t gat on Facto			0.250	5.245%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
			1	0		1		0.5		OK	OK	T eatment des gn const a nts a e st ll not clea ly def ned. P pel ne const a nts a e bette unde stood howeve they a e not yet fu ly add essed
	1			0.5	1			1		OK	OK	P ocess technology s estabi shed - but not on a wastewate s te.
			1	0			1	0		OK	OK	Env onmental assessments not yet ava ilable, potent al fo mpacts and m t gat on s not yet spec f ed. P ocess s now des gned to meet all poss ble consent ng needs.
19.85%	Ave age M t gat on Facto			0.167	Ave age M t gat on Facto			0.500	14.453%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
		1		0.5		1		0.5		OK	OK	As one of 17 SROs, the need fo th s pa t cula scheme (o any othe) w ll be unclea unt l the gated p ocess s much fu the developed. Needs pa t ally dent f ed and some stakeholde s engaged
	1			1		0.7	0.3	0.35		OK	OK	Many stakeholde s not yet engaged, full l st of stakeholde s not developed so the e may be un dent f ed stakeholde s. Fo Nethe dge t eatment the only stakeholde s the EA, and we have des gned fo wo st case.
		1		0.5		1		0.5		OK	OK	P oject to be funded th ough the RAPID gated SRO p ocess so assessed as med um n acco dance w th addi t onal gu dance
		1		0.5		1		0.5		OK	OK	In house p oject management team have no expe ence of del ve ng p ojects of th s natu e whe e clean wate assets a e const ucted on a wastewate s s te, P pel ne nstallat on s bus ness as usual p oject
			1	0			1	0		OK	OK	A s gn f cant numbe of assumpt ons have been made by all d sc pl nes at th s stage, howeve wo st case t eatment scena o used.
21.77%	Ave age M t gat on Facto			0.500	Ave age M t gat on Facto			0.370	12.021%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1		0.5	0.5	0.25		OK	OK	The scheme s la ge enough that the e could be local oppos t on, sco ed med um as the e s no ev dence of s gn f cant local oppos t on at th s po nt and t s l kely conce ns can be esolved.
			1	0			1	0		OK	OK	Unde stand ng of the t eatment s te s pa t ally unde stood, fu the nvest gat on s equ ed. Unde stand ng of the p pel ne oute s poo , based solely on desktop study.
	1			1		0.5	0.5	0.25		OK	OK	Pe m ts a e equ ed, unce ta n of autho t es suppo t at th s stage. T eatment s BAT des gned fo wo st case so although pe m t not issued, no fu the m t gat on s poss ble
5.44%	Ave age M t gat on Facto			0.667	Ave age M t gat on Facto			0.167	2.295%	Ave age M t gat on Facto		
	Requ ed	Requ ed	Requ ed		Requ ed	Requ ed	Requ ed					
	1			1			1	0		OK	OK	P oject could lead to pol t cal attent on, pa t cua ly unde a net ze o lense. Unclea f the es cu ently c oss-pa ty suppo t o not. When compa ed to othe SROs th s p oject s unl kely to att act pol t cal attent on
		1		0.5			1	0		OK	OK	P oject lead t me s long 6-10 yea ho zon, unce ta n econom c pe od ahead.
		1		0.5		0.5	0.5	0.25		OK	OK	The cu ent key standa ds a e unde stood and have been pa t ally nvest gated. Howeve , sues such as the equ ed standa d of effluent t eatment could potent ally change. Leg slat on and egulato y sues ema n (DCO/Put & Take). These exte nal influences could also change s gn f cantly ove the l fe cycle of the scheme wh ch, even f selected, may not be called upon fo decades.
		1		0.5	1			1		OK	OK	T eatment p ocesses p oposed a e estabi shed, howeve p lot t als needed to conf m v ab l ty of t eatment p oposed
8.64%	Ave age M t gat on Facto			0.625	Ave age M t gat on Facto			0.313	3.880%	Ave age M t gat on Facto		

3a. Quantitative Costed Risk Assessment - Register Tab

Option Name	Netheridge SRO - Deerhurst
Option Reference	Option 1
Date of QCRA Review	26/07/2022

Score - Description	Probability	Cost Impact	Schedule Impact	Score	Min Cost	Max Cost
1 - Ve y Low	Imp obable (1-10%)	M n mal (1%) effect on p o ect cost	No delay to p oject del ve y	1	[redacted]	[redacted]
2 - Low	Remote (11-30%)	Small (1-2%) effect on p oject cost	M n mal (1-2%) effect on p oject del ve y	2		
3 - Mod um	Poss ble - L kely (31-50%)	Mode ate (2 1-5%) nc ease n p oject cost	Sma l (2.1 - 5%) delay to p oject del ve y	3		
4 - H gh	P obable (51-70%)	S gn f cant (5 1-15%) nc ease on p oject cost	S gn f cant (5 1-15%) delay to p oject del ve y	4		
5 - Ve y H gh	Almost ce ta n (71-99%)	Maj o (>15%) nc ease n p o ect cost	Maj o (>15%) delays to p oject del ve y	5		

Capex: [redacted] *Inse t total scheme capex exclud ng opt m sm b ss*

R sk (Stat c) values

P10	[redacted]	*Inse t output f om @ sk epo t fo 10 pe cent le*
P50		*Inse t output f om @ sk epo t fo 50 pe cent le*
P90		*Inse t output f om @ sk epo t fo 90 pe cent le*

Inse t R sk ID	*Select e the Th eat o Oppo tun ty*	*Select sk status*	*Inse t sk catego y*	*Select sk catego y*	*Select sk catego y*	*Desc be natu e of sk nclud ng cause and event*	*Desc be consequences f sk s eal sed*	*Calculated based on Quant P rob %*	*Inse t sco e*	*Inse t sco e*	*Calculated sk sco e*	*Inse t p obab l ty as pe centage that sk occu s*	*Values p ov ded f om sco es but f bette nfo mat on ava lable then should be use w tten*	*If us ng a t angula d st but on then ente most l kely value be e*	*Values p ov ded f om sco es but f bette nfo mat on ava lable then should be use w tten*	*Not used on Tab 3a - see Tab 3b*	*Inse t spec f c sk esponse act ons e the steps equ ed to m t gate the sk*	*Set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated p obab l ty of the sk occu ng f dent f ed sk esponse act ons o e successful*	*Should be set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated n n mum cost mpact f dent f ed sk esponse act ons o e successful*	*Should be set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated most l kely cost mpact f dent f ed sk esponse act ons o e successful*	*Should be set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated mos mum cost mpact f dent f ed sk esponse act ons o e successful*	*Not used on Tab 3a - see Tab 3b*
ID	**Type**	**Status**	**Category**	**RBS1**	**RBS2**	**Description**	**Consequence**	**Prob score**	**Cost score**	**Schedule score**	**Score**	**Quant Prob %**	**Cost Est mates Min £**	**ML £**	**Max £**	**Risk**	**Risk response action**	**Post Mt t Quant Prob %**	**Post Mit Min £**	**Post Mit ML £**	**Post Mit t Max £**	**Post Mit Risk**
Nethe dge WwTW Influent Volume	Th eat	X = Est mate	Capex	Techn cal	S te cha acte st cs and p oject data	Inadequate flow nto Nethe dge WwTW du ng d y weathe flow to exceed 35 Ml/d	STS SRO unable to supply equ ed volume to STT SRO Scheme	1	4	2	8	15%				See Tab 3b.	Sto age tank to buffe flows ove 24 hou ne od	5%				See Tab 3b.
~~N th g W TW I fl ~~ ~~t Q ~~ ~~t y~~	Th eat	I = igno ed				Qual ty of the nfluent nto Nethe dge WwTW changes/dete o ates	New t eatment p ocess does not meet STS SRO d echa ge pe m t standa ds. P ocess upg adec equ ed.				0						Cannot quant fy potent al 'dete o at on' so cannot quant fy to ed on o cost	0%				
~~U g t N th g W TW~~	Th eat	I = igno ed				Upg ade occu wt Nethe dge WwTW that ut l se ex st ng land, powe , wate , sludge wou ces assumed to be ava lable fo the SRO scheme	Redes gn of p oposed new t eatment layout. Add t onal powe and wate equ ed to s te.				0						Cannot quant fy to act on o cost	0%				
STS SRO D scha ge Pe m t Requ rements	Th eat	X = Est mate	Capex	Techn cal	Environmental constraints	Wate qual ty standa ds fo the STS SRO d scha ge e e h ghe than ant c pated	New t eatment p ocess does not meet STS SRO d echa ge pe m t standa ds. P ocess upg adec equ ed.	1	4	2	8	25%					Inc ease Opt ons 1,2,3 to Opt on 4 t eatment p ocess	25%				
STS SRO T eatment P ocess Effluent Qual ty	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	The new STS SRO t eatment p ocess does not p oduce effluent to the qual ty ant c pated at des gn stage	New t eatment p ocess does not meet STS SRO d echa ge pe m t standa ds. P ocess upg adec equ ed.	1	4	2	8	40%					Inc ease Opt ons 1,2,3 to Opt on 4 t eatment p ocess.	40%				
STS SRO T eatment P ocess Layout at WwTW	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Spec f ed t eatment p ocess un ts do not f t w th p oposed WwTW layout equ ng adeq gn	Add t onal p pewo k and anc lla es equ ed d e to alte ed layout.	1	1	1	1	15%					Assume add t onal 20% p pewo k equ ed. Assume 20% mo e ced/he ddtand/d e nage etc	15%				
Nethe dge WwTW Powe Upg ade	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Spec f c t eatment p ocess un ts equ ed add t onal powe equ ng add t onal elect cal upg ades	Add t onal substat on/elect cal equ pment equ ed.	1	2	2	4	50%					Engagement w th powe suppl e equ ed.	50%				
Nethe dge WwTW Potable Wate Upg ade	Th eat	X = Est mate	Capex	Techn cal	Site characteristics and pro ect data	Spec f c t eatment p ocess un ts equ ed add t onal potable wate equ ng upg ade to ncom ng wate supply	Upg ade to ncom ng wate supply to nc ease volume of wate suppl ed	1	1	1	1	70%					Upg ade to ncom ng wate supply p pel ne - study equ ed	70%				
~~A h W pl~~	Th eat	I = igno ed				Issues elat ng to landowne sh p, wayleaves and access.	Alte at on of p pe outs, delay to const uct on o d ffe ent const uct on methods.				0						Cannot quant fy to act on o cost	0%				
~~g~~	Th eat	I = igno ed				Issues elat ng to obta n ng plann ng pe m ss ons fo WwTW o p pel ne bu ld ngs and st uctu es	Alte at on of bu ld ng/st uctu e s se/locat on, d ffe ent const uct on methods.				0						Cannot quant fy to act on o cost	0%				
Env onmental Pe m ts (Ai rey)?	Th eat	X = Est mate	Capex	Exte nal	Planning and approvals	Opt ons 1 2 and 3 must pass th ough Airey Natu e Rese ve at Ch.XXX. Pe m ss ons have not been g anted/ const uct on methods ag eed.	Alte nat ve locat on equ ed fo c oss ng nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed. Add t onal m t gat on and e nstatement equ ed.	1	2	2	4	40%					Assume add t onal cost fo m c o tunnel OR double e nstatement ate	40%				
P pel ne - Ra l C oss ng	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 and 2 must pass unde the a leway at Ch XXX. Pe m ss ons have not been g anted/ const uct on methods ae eed.	Alte nat ve locat on equ ed fo c oss ng nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed.	1	4	2	8	40%						40%				
P pel ne - Road C oss ng	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass unde the A40 at Ch.XXX. Pe m ss ons have not been g anted/ const uct on methods ag eed.	Alte nat ve locat on equ ed fo c oss ng nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed.	1	1	1	1	30%						30%				
P pel ne - R ve C oss ng	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass unde East Channe R Seve n at Ch XXX. Pe m ss ons have not been g anted/ const uct on methods ag eed.	Alte nat ve locat on equ ed fo c oss ng nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed.	1	1	1	1	30%						30%				
P pel ne - Ut l t es D ve s ons	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough sem u al end u ban e eau. P pel ne oute could uncove unknown se v ces/ut l t es	Se v ces equ e d ve s on o p pe oute alte ed to avo d se v ce/ut l ty.	2	2	1	4	60%					Assume an add t onal % fo add t onal se v ce d ve s ons	60%				
P pel ne - Contam nated Land	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough old landf ll s te at Ch.XXX. Pe m ss ons have not been g anted/ const uct on methods ag eed.	Alte nat ve oute equ ed nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed.	2	2	1	4	40%						40%				
P pel ne - Contam nated Land	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass th ough old a leway s d ng at Ch.XXX. Pe m ss ons have not been g anted/ const uct on methods ae eed.	Alte nat ve oute equ ed nc ease ng p pel ne length. Alte nat ve const uct on methods equ ed.	1	1	1	1	30%						30%				
P pel ne G ound Wate	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 must pass close to R Seve n and East Channel R Seve n, T ench excavat on could expe ence excess ve g oundwate ng ess.	Alte nat ve const uct on method o dewate ng method equ ed.	2	3	2	6	60%						60%				
P pel ne D a nage Po nts	Th eat	X = Est mate	Capex	Techn cal	Design uncertainty / complexity	Opt ons 1 2 and 3 equ ed a nage po nts along the oute to allow the p pe to be d a ned when not n use. Pe m ss ons have not been g anted.	P pel ne could not be d a ned when not n use lead ng to ope at onal issues. Alte nat ve p pel ne oute equ ed to accommodate fees ble d a n po nts.	1	3	2	6	45%						45%				
											#VALUE!							0%				
BLANK ROW - nse t ows above to add sks						BLANK ROW - nse t ows above to add sks		1	1	1	1	0%				See Tab 3b.		0%				See Tab 3b.

3a. Quantitative Costed Risk Assessment - Register Tab

Option Name	Netheridge SRO - Haw Bridge
Option Reference	Option 2
Date of QCRA Review	25.7.22

Score - Description	Max Cost
1 - Very Low	983 935
2 - Low	1 967 870
3 - Medium	4 919 675
4 - High	14 759 025
5 - Very High	29 518 050

Capex: 98 393 500 *Insert total scheme capex excluding optimism bias*

Risk (Static) values:

P10 7 731 351.65 *Insert output from @risk report for 10 percentile*

P50 19 122 964.60 *Insert output from @risk report for 50 percentile*

P90 32 677 017.83 *Insert output from @risk report for 90 percentile*

Insert Risk ID	*Describe nature of risk including cause and event.*	*Describe consequences if risk is realised*	*Calculated based on Quant Prob %*	*Insert score*	*Insert score*	*Calculated risk score*	*Insert probabili ty as percentage that risk occurs*	*Values provided from scores but if better information available then should be overwritten*	*If using a triangular distribution then enter most likely value here*	*Values provided from scores but if better information available then should be overwritten*	*Not used on Tab 3a - see Tab 3b.*	*Insert specific r sk response actions i.e. the steps required to mitigate the risk.*	*Set by default to the pre-mitigation value. However can overwrite to record the anticipated probability of the risk occurring if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated minimum cost impact if identif ed risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated most like y cost impact if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated maximum cost impact if identified risk response actions are successful.*	*Not used on Tab 3a - see Tab 3b.*
								Cost Estimates									
ID	**Description**	**Consequence**	**Prob score**	**Cost score**	**Schedule score**	**Score**	**Quant Prob %**	**Min £**	**ML £**	**Max £**	**Risk**	**Risk response action**	**Post Mit Quant Prob %**	**Post Mit Min £**	**Post Mit ML £**	**Post Mit Max £**	**Post Mit Risk**
Netheridge WwTW Influent Volume	Inadequate flow into Netheridge WwTW during dry weather flow to supply 35 Ml/d	STS SRO unable to supply required volume to STT SRO Scheme	1	4	2	4	15%	[redacted]			See Tab 3b.	Storage tank to buffer flows over 24 hour period					See Tab 3b.
~~Netheridge W TW influent Quality~~	Quality of the influent into Netheridge WwTW changes/deteriorates	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.				0						Cannot quantify potential 'deterioration' so cannot quant fy to action or cost	0%				
~~Upg d N h ldg T~~	Upgrade occur at Netheridge WwTW that utilise existing land power water sludge resources assumed to be available for the SRO scheme	Redesign of proposed new treatment layout. Additional power and water required to site.				0						Cannot quantify to action or cost	0%				
STS SRO Discharge Permit Requirements	Water quality standards for the STS SRO discharge are higher than anticipated	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	25%					Increase Options 1 2 3 to Option 4 treatment process	25%				
STS SRO Treatment Process Effluent Quality	The new STS SRO treatment process does not produce effluent to the quality anticipated at design stage	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	40%					Increase Options 1 2 3 to Option 4 treatment process.	40%				
STS SRO Treatment Process Layout at WwTW	Specified treatment process units do not fit with proposed WwTW layout requiring redesign	Additional pipework and ancillaries required due to altered layout.	1	1	1	1	15%					Assume additional 20% pipework required. Assume 20% more road/hardstand/drainage etc	15%				
Netheridge WwTW Power Upgrade	Specific treatment process units required additional power requiring additional electrical upgrades	Additional substation/electrical equipment required.	1	2	2	2	50%					Engagement with power supplier required.	50%				
Netheridge WwTW Potable Water Upgrade	Specific treatment process units required additional potable water requiring upgrade to incoming water supply	Upgrade to incoming water supply to increase volume of water supplied	1	1	1	1	70%					Upgrade to incoming water supply pipeline - study required	70%				
~~Landownership/Wayleaves~~	Issues relating to landownership wayleaves and access.	Alteration of pipe route delay to construction or different construction methods.				0						Cannot quantify to action or cost	0%				
~~Planning Permission~~	Issues relating to obtaining planning permissions for WwTW or pipeline buildings and structures	Alteration of building/structure size/location different construction methods.				0						Cannot quantify to action or cost	0%				
Environmental Permits (Ainey)?	Options 1 2 and 3 must pass through Ainey Nature Reserve at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required. Additional mitigation and reinstatement required.	1	2	2	2	40%					Assume additional cost for micro tunnel OR double reinstatement rate	40%				
Pipe ine - Rail Crossing	Options 1 and 2 must pass under the railway at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.	1	4	2	4	40%						40%				
Pipe ine - Road Crossing	Options 1 2 and 3 must pass under the A40 at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.	1	1	1	1	30%						30%				
Pipe ine - River Crossing	Options 1 2 and 3 must pass under East Channe R Severn at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.	1	1	1	1	30%						30%				
Pipe ine - Utilities Diversions	Options 1 2 and 3 must pass through semi rural and urban areas. Pipeline route could uncover unknown services/utilities	Services require diversion or pipe route altered to avoid service/utility.	2	2	1	4	60%					Assume an additional % for additional service diversions	60%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old landfill site at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	2	2	1	4	40%						40%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old railway siding at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	1	1	1	1	30%						30%				
Pipe ine Ground Water	Options 1 2 and 3 must pass close to R Severn and East Channel R Severn. Trench excavation could experience excessive groundwater ingress.	Alternative construction method or dewatering method required.	2	3	2	6	60%						60%				
Pipe ine Drainage Points	Options 1 2 and 3 require drainage points along the route to allow the pie to be drained when not in use. Permissions have not been granted.	Pipeline could not be drained when not in use leading to operational issues. Alternative pipeline route required to accommodate feas ble drain points.	1	3	2	3	45%						45%				
						#VALUE!							0%				
BLANK ROW - insert rows above to add risks	BLANK ROW - insert rows above to add risks		1	1	1	1	0%				See Tab 3b.		0%				See Tab 3b.

3a. Quantitative Costed Risk Assessment - Register Tab

Option Name	Netheridge SRO - East Channel
Option Reference	Option 3
Date of QCRA Review	26/07/2022

Score - Description	Max Cost
1 - Very Low	[redacted]
2 - Low	
3 - Medium	
4 - High	
5 - Very High	

Capex: [redacted] *Insert total scheme capex excluding optimism bias*

Risk (Static) values:

P10 [redacted] *Insert output from @risk report for 10 percentile*

P50 *Insert output from @risk report for 50 percentile*

P90 *Insert output from @risk report for 90 percentile*

Insert Risk ID	*Describe nature of risk including cause and event.*	*Describe consequences if risk is realised*	*Calculated based on Quant Prob %*	*Insert score*	*Insert score*	*Calculated risk score*	*Insert probabili ty as percentage that risk occurs*	*Values provided from scores but if better information available then should be overwritten*	*If using a triangular distribution then enter most likely value here*	*Values provided from scores but if better information available then should be overwritten*	*Not used on Tab 3a - see Tab 3b.*	*Insert specific r sk response actions i.e. the steps required to mitigate the risk.*	*Set by default to the pre-mitigation value. However can overwrite to record the anticipated probability of the risk occurring if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated minimum cost impact if identif ed risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated most like y cost impact if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated maximum cost impact if identified risk response actions are successful.*	*Not used on Tab 3a - see Tab 3b.*
								Cost Estimates									
ID	**Description**	**Consequence**	**Prob score**	**Cost score**	**Schedule score**	**Score**	**Quant Prob %**	**Min £**	**ML £**	**Max £**	**Risk**	**Risk response action**	**Post Mit Quant Prob %**	**Post Mit Min £**	**Post Mit ML £**	**Post Mit Max £**	**Post Mit Risk**
Netheridge WwTW Influent Volume	Inadequate flow into Netheridge WwTW during dry weather flow to supply 35 Ml/d	STS SRO unable to supply required volume to STT SRO Scheme	1	4	2	4	15%	[redacted]			See Tab 3b.	Storage tank to buffer flows over 24 hour period					See Tab 3b.
~~Netheridge W TW influent Quality~~	Quality of the influent into Netheridge WwTW changes/deteriorates	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.				0						Cannot quantify potential 'deterioration' so cannot quant fy to action or cost	0%				
~~Upg d N h idg T~~	Upgrade occur at Netheridge WwTW that utilise existing land power water sludge resources assumed to be available for the SRO scheme	Redesign of proposed new treatment layout. Additional power and water required to site.				0						Cannot quantify to action or cost	0%				
STS SRO Discharge Permit Requirements	Water quality standards for the STS SRO discharge are higher than anticipated	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	25%					Increase Options 1 2 3 to Option 4 treatment process	25%				
STS SRO Treatment Process Effluent Quality	The new STS SRO treatment process does not produce effluent to the quality anticipated at design stage	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	40%					Increase Options 1 2 3 to Option 4 treatment process.	40%				
STS SRO Treatment Process Layout at WwTW	Specified treatment process units do not fit with proposed WwTW layout requiring redesign	Additional pipework and ancillaries required dle to altered layout.	1	1	1	1	15%					Assume additional 20% pipework required. Assume 20% more road/hardstand/drainage etc	15%				
Netheridge WwTW Power Upgrade	Specific treatment process units required additional power requiring additional electrical upgrades	Additional substation/electrical equipment required.	1	2	2	2	50%					Engagement with power supplier required.	50%				
Netheridge WwTW Potable Water Upgrade	Specific treatment process units required additional potable water requiring upgrade to incoming water supply	Upgrade to incoming water supply to increase volume of water supplied	1	1	1	1	70%					Upgrade to incoming water supply pipeline - study required	70%				
~~Landownership/Wayleaves~~	Issues relating to landownership wayleaves and access.	Alteration of pipe route delay to construction or different construction methods.				0						Cannot quantify to action or cost	0%				
~~Planning Permission~~	Issues relating to obtaining planning permissions for WwTW or pipeline buildings and structures	Alteration of building/structure size/location different construction methods.				0						Cannot quantify to action or cost	0%				
Environmental Permits (Ainey)?	Options 1 2 and 3 must pass through Ainey Nature Reserve at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required. Additional mitigation and reinstatement required.	1	2	2	2	35%					Assume additional cost for micro tunnel OR double reinstatement rate	35%				
~~Pipe ine - Rail Crossing~~	Options 1 and 2 must pass under the railway at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.															
~~Pipe ine - Road Crossing~~	Options 1 2 and 3 must pass under the A40 at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.															
Pipe ine - River Crossing	Options 1 2 and 3 must pass under East Channe R Severn at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.	1	1	1	1	30%						30%				
Pipe ine - Utilities Diversions	Options 1 2 and 3 must pass through semi rural and urban areas. Pipeline route could uncover unknown services/utilities	Services require diversion or pipe route altered to avoid service/utility.	2	2	1	4	50%					Assume an additional % for additional service diversions	50%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old landfill site at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	2	2	1	4	40%						40%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old railway siding at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	1	1	1	1	15%						15%				
Pipe ine Ground Water	Options 1 2 and 3 must pass close to R Severn and East Channel R Severn. Trench excavation could experience excessive groundwater ingress.	Alternative construction method or dewatering method required.	2	3	2	6	45%						45%				
Pipe ine Drainage Points	Options 1 2 and 3 require drainage points along the route to allow the pie to be drained when not in use. Permissions have not been granted.	Pipeline could not be drained when not in use leading to operational issues. Alternative pipeline route required to accommodate feas ble drain points.	1	3	2	3	30%						30%				
						#VALUE!							0%				
BLANK ROW - insert rows above to add risks	BLANK ROW - insert rows above to add risks		1	1	1	1	0%				See Tab 3b.		0%				See Tab 3b.

3a. Quantitative Costed Risk Assessment - Register Tab

Option Name	Netheridge SRO - Canal
Option Reference	Option 4
Date of QCRA Review	30.05.21

Score - Description	Probability	Cost Impact	Schedule Impact	Score	Min Cost	Max Cost
1 - Ve y Low	Imp obable (1-10%)	M n mal (1%) effect on p o ect cost	No delay to p ject del ve y	1	409,784	819 568
2 - Low	Remote (11-30%)	Small (1-2%) effect on p oject cost	M n mal (1-2%) effect on p oject del ve y	2	819,568	1,639 136
3 - Mod um	Poss ble - L kely (31-50%)	Mode ate (2 1-5%) nc ease n p oject cost	Sma l (2.1 - 5%) delay to p oject del ve y	3	1,721,093	4,097 840
4 - H gh	P obable (51-70%)	S gn f cant (5 1-15%) nc ease on p oject cost	S gn f cant (5 1-15%) delay to p oject del ve y	4	4,179,797	12,293 520
5 - Ve y H gh	Almost ce ta n (71-99%)	Majo (>15%) nc ease n p o ect cost	Majo (>15%) delays to p oject del ve y	5	12,975,477	24,587 040

Capex: 81,956 800 — *Inse t total scheme capex exclud ng opt m sm b ss*

R sk (Stat c) values

P10	597,119.45	*Inse t output f om @ sk epo t fo 10 pe cent le*
P50	8 196,285.07	*Inse t output f om @ sk epo t fo 50 pe cent le*
P90	16 917,953.62	*Inse t output f om @ sk epo t fo 90 pe cent le*

Inse t R sk ID	*Select e the Th eat o Oppo tun ty*	*Select sk status*	*Inse t sk catego y*	*Select sk catego y*	*Select sk catego y*	*Desc be notu e of sk nclud ng cause and event*	*Desc be consequences f sk s eal sed*	*Calculated based on Quant P ob %*	*Inse t sco e*	*Inse t sco e*	*Calculated sk sco e*	*Inse t p obab l ty as pe centage that sk occu s*	*Values p ov ded f om sco es but f bette nfo mat on ava lable then should be use w tten*			*If us ng a t angula d st but on then ente most l kely value he e*	*Values p ov ded f om sco es but f bette nfo mat on ava lable then should be use w tten*		*Not used on Tab 3a - see Tab 3b*	*Inse t spec f c sk esponse act ons e the steps equ ed to m t gate the sk*	*Set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated p obab l ty of the sk occu ng f dent f ed sk esponse act ons a e successful*	*Should be set by default to the p e-m t gat on value However can ove w te to eco d the ant c pated mum cost mpact f dent f ed sk esponse act ons a e successful*	*Should be set by default to the p e-m t got on value However can ove w te to eco d the ant c pated l kely cost mpact f dent f ed sk esponse act ons a e successful*	*Should be set by default to the p e-m t got on value However can ove w te to eco d the ant c pated mos mum cost mpact f dent f ed sk esponse act ons a e successful*	*Not used on Tab 3a - see Tab 3b*
ID	**Type**	**Status**	**Category**	**RBS1**	**RBS2**	**Description**	**Consequence**	**Prob score**	**Cost score**	**Schedule score**	**Score**	**Quant Prob %**	**Cost Est mates**						**Risk**	**Risk response action**	**Post Mit t Quant Prob %**	**Post Mit Mbs £**	**Post Mit ML £**	**Post Mit t Max £**	**Post Mit Risk**
													Min £	**ML £**	**Max £**										
Nethe dge WwTW Influent Volume	Th eat	X =Est mate	Capex	Techn cal	S te cha acte st cs and p oject data	Inadequate flow nto Nethe dge WwTW du ng d y weathe flow to supply 35 Ml/d	STS SRO unable to supply equ ed volume to STT SRO Scheme	1	4	2	4	15%							See Tab 3b.	Sto age tank to buffe flows ove 24 hou pe od	15%				See Tab 3b.
[redacted]	Th eat	I =Igno ed				Qual ty of the nfluent nto Nethe dge WwTW changes/dete o ates	New t eatment p ocess does not meet STS SRO d scha ge pe m t standa ds. P ocess upg ades equ ed.				0									Cannot quant fy potent al 'dete o at on' so cannot quant fy to act on o cost	0%				
[redacted]	Th eat	I =Igno ed				Upg ade occu at Nethe dge WwTW that ut l se es st ng land, powe , wate , sludge ecou ces assumed to be ava lable fo the SRO scheme	Redes gn of p oposed new t eatment layout. Add t onal powe and wate equ ed to s te.				0									Cannot quant fy to act on o cost	0%				
STS SRO D scha ge Pe m t Requ rements	Th eat	X =Est mate	Capex	Techn cal	Environmental constraints	Wate qual ty standa ds fo the STS SRO d scha ge a e h ghe than ant c pated	New t eatment p ocess does not meet STS SRO d scha ge pe m t standa ds. P ocess upg ades equ ed.	1	4	2	4	25%								Inc ease Opt ons 1,2,3 to Opt on 4 t eatment p ocess	25%				
STS SRO T eatment P ocess Effluent Qual ty	Th eat	X =Est mate	Capex	Techn cal	Design uncertainty / complexity	The new STS SRO t eatment p ocess does not p oduce effluent to the qual ty ant c pated at des gn stage	New t eatment p ocess does not meet STS SRO d scha ge pe m t standa ds. P ocess upg ades equ ed.	1	4	2	4	40%								Inc ease Opt ons 1,2,3 to Opt on 4 t eatment p ocess.	40%				
STS SRO T eatment P ocess Layout at WwTW	Th eat	X =Est mate	Capex	Techn cal	Design uncertainty / complexity	Spec f ed t eatment p ocess un ts do not f t w th p oposed WwTW layout equ ng ades gn	Add t onal p pewo k and enc ls es equ ed d e to alte ed layout.	1	1	1	1	15%								Assume add t onal 20% p pewo k equ ed. Assume 20% mo e oad/he ddenid/d a nsse etc	15%				
Nethe dge WwTW Powe Upg ade	Th eat	X =Est mate	Capex	Techn cal	Design uncertainty / complexity	Spec f c t eatment p ocess un ts equ ed add t onal powe equ ng add t onal elect cal upg ades	Add t onal substat on/elect cal equ pment equ ed.	1	2	2	3	50%								Engagement w th powe suppl e equ ed.	50%				
Nethe dge WwTW Potable Wate Upg ade	Th eat	X =Est mate	Capex	Techn cal	Site characteristics and pro ect data	Spec f c t eatment p ocess un ts equ ed add t onal potable wate equ ng upg ade to ncom ng wate supply	Upg ade to ncom ng wate supply to nc ease volume of wate suppl ed	1	1	1	1	70%								Upg ade to ncom ng wate supply p pel ne - study equ ed	70%				
[redacted]	Th eat	I =Igno ed				Issues elat ng to landowne sh p, wayleaves and access.	Alte st on of p pe outle, delay to const uct on o d ffe ent const uct on methods.				0									Cannot quant fy to act on o cost	0%				
[redacted]	Th eat	I =Igno ed				Issues elat ng to obta n ng plann ng pe m ss ons fo WwTW o p pel ne bu ld ngs and st uctu es	Alte st on of bu ld ng/st uctu e s ze/locat on, d ffe ent const uct on methods.				0									Cannot quant fy to act on o cost	0%				
											#VALUE!										0%				
BLANK ROW - nse t ows above to add sks						BLANK ROW - nse t ows above to add sks		1	1	1	1	0%							See Tab 3b.		0%				See Tab 3b.

3a. Quantitative Costed Risk Assessment - Register Tab

Option Name	Netheridge SRO - East Channel SW Branch
Option Reference	Option 5
Date of QCRA Review	30.05.21

Score - Description	Max Cost
1 - Very Low	92 908
2 - Low	185 816
3 - Medium	464 540
4 - High	1 393 620
5 - Very High	2 787 240

Capex: [redacted] *Insert total scheme capex excluding optimism bias*

Risk (Static) values:

P10 [redacted] *Insert output from @risk report for 10 percentile*

P50 *Insert output from @risk report for 50 percentile*

P90 *Insert output from @risk report for 90 percentile*

Insert Risk ID	*Describe nature of risk including cause and event.*	*Describe consequences if risk is realised*	*Calculated based on Quant Prob %*	*Insert score*	*Insert score*	*Calculated risk score*	*Insert probabili ty as percentage that risk occurs*	*Values provided from scores but if better information available then should be overwritten*	*If using a triangular distribution then enter most likely value here*	*Values provided from scores but if better information available then should be overwritten*	*Not used on Tab 3a - see Tab 3b.*	*Insert specific r sk response actions i.e. the steps required to mitigate the risk.*	*Set by default to the pre-mitigation value. However can overwrite to record the anticipated probability of the risk occurring if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated minimum cost impact if identif ed risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated most like y cost impact if identified risk response actions are successful.*	*Should be set by default to the pre-mitigation value. However can overwrite to record the anticipated maximum cost impact if identified risk response actions are successful.*	*Not used on Tab 3a - see Tab 3b.*
								Cost Estimates									
ID	**Description**	**Consequence**	**Prob score**	**Cost score**	**Schedule score**	**Score**	**Quant Prob %**	**Min £**	**ML £**	**Max £**	**Risk**	**Risk response action**	**Post Mit Quant Prob %**	**Post Mit Min £**	**Post Mit ML £**	**Post Mit Max £**	**Post Mit Risk**
Netheridge WwTW Influent Volume	Inadequate flow into Netheridge WwTW during dry weather flow to supply 35 Ml/d	STS SRO unable to supply required volume to STT SRO Scheme	1	4	2	4	15%	[redacted]			See Tab 3b.	Storage tank to buffer flows over 24 hour period					See Tab 3b.
~~Netheridge W TW influent Quality~~	Quality of the influent into Netheridge WwTW changes/deteriorates	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.				0						Cannot quantify potential 'deterioration' so cannot quant fy to action or cost	0%				
~~Upg d N h ldg T~~	Upgrade occur at Netheridge WwTW that utilise existing land power water sludge resources assumed to be available for the SRO scheme	Redesign of proposed new treatment layout. Additional power and water required to site.				0						Cannot quantify to action or cost	0%				
STS SRO Discharge Permit Requirements	Water quality standards for the STS SRO discharge are higher than anticipated	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	25%					Increase Options 1 2 3 to Option 4 treatment process	25%				
STS SRO Treatment Process Effluent Quality	The new STS SRO treatment process does not produce effluent to the quality anticipated at design stage	New treatment process does not meet STS SRO discharge permit standards. Process upgrades required.	1	4	2	4	40%					Increase Options 1 2 3 to Option 4 treatment process.	40%				
STS SRO Treatment Process Layout at WwTW	Specified treatment process units do not fit with proposed WwTW layout requiring redesign	Additional pipework and ancillaries required die to altered layout.	1	1	1	1	10%					Assume additional 20% pipework required. Assume 20% more road/hardstand/drainage etc	10%				
Netheridge WwTW Power Upgrade	Specific treatment process units required additional power requiring additional electrical upgrades	Additional substation/electrical equipment required.	1	2	2	2	50%					Engagement with power supplier required.	50%				
Netheridge WwTW Potable Water Upgrade	Specific treatment process units required additional potable water requiring upgrade to incoming water supply	Upgrade to incoming water supply to increase volume of water supplied	1	1	1	1	50%					Upgrade to incoming water supply pipeline - study required	50%				
~~Landownership/Wayleaves~~	Issues relating to landownership wayleaves and access.	Alteration of pipe route delay to construction or different construction methods.				0						Cannot quantify to action or cost	0%				
~~Planning Permission~~	Issues relating to obtaining planning permissions for WwTW or pipeline buildings and structures	Alteration of building/structure size/location different construction methods.				0						Cannot quantify to action or cost	0%				
Environmental Permits (Ainey)?	Options 1 2 and 3 must pass through Ainey Nature Reserve at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required. Additional mitigation and reinstatement required.	1	2	2	2	25%					Assume additional cost for micro tunnel OR double reinstatement rate	25%				
~~Pipe ine - Rail Crossing~~	Options 1 and 2 must pass under the railway at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.															
~~Pipe ine - Road Crossing~~	Options 1 2 and 3 must pass under the A40 at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.															
Pipe ine - River Crossing	Options 1 2 and 3 must pass under East Channe R Severn at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative location required for crossing increasing pipeline length. Alternative construction methods required.	1	1	1	1	30%						30%				
Pipe ine - Utilities Diversions	Options 1 2 and 3 must pass through semi rural and urban areas. Pipeline route could uncover unknown services/utilities	Services require diversion or pipe route altered to avoid service/utility.	2	2	1	4	40%					Assume an additional % for additional service diversions	40%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old landfill site at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	2	2	1	4	40%						40%				
Pipe ine - Contaminated Land	Options 1 2 and 3 must pass through old railway siding at Ch.XXX. Permissions have not been granted/ construction methods agreed.	Alternative route required increasing pipeline length. Alternative construction methods required.	1			0							0%				
Pipe ine Ground Water	Options 1 2 and 3 must pass close to R Severn and East Channel R Severn. Trench excavation could experience excessive groundwater ingress.	Alternative construction method or dewatering method required.	2	3	2	6	45%						45%				
Pipe ine Drainage Points	Options 1 2 and 3 require drainage points along the route to allow the pie to be drained when not in use. Permissions have not been granted.	Pipeline could not be drained when not in use leading to operational issues. Alternative pipeline route required to accommodate feas ble drain points.	1	3	2	3	20%						20%				
						#VALUE!							0%				
BLANK ROW - insert rows above to add risks	BLANK ROW - insert rows above to add risks		1	1	1	1	0%				See Tab 3b.		0%				See Tab 3b.

Appendix C

OPEX COST ESTIMATES

Netheridge SRO Treatment Plant Operational Cost Estimate (19/10/22) - Option 1

Days pumping per annum	[redacted]
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

		Power Consumption - Variable						Person Costs - Fixed			Fixed			
Process Equipment	Power Rating (kW)	35MLD kWh/d	20MLD - kWh/d	Used during standby?	Daily Cost 35 MLD	Daily Cost 20MLD	Annual Power Cost	Operator Time (days)	Maintenance Time (days)	Annual Person Cost (£/pa)	Consumables Costs (£/pa)	Total Annual Opex Cost	Average Daily Cost	
Ferrous Sulphate	1	24	13.68	Yes	[redacted]			16	12	[redacted]				
MBBR Lift Pump Station	150	1456	829.92	Yes				13	3					
MBBR, incl blowers	480	5760	3283.2	Yes				39	3					
CoMag Equipment	16	200	114	Yes				26	10					
Ferric Sulphate	1	24	13.68	Yes				16	12					
Polymer	1	24	13.68	Yes				16	12					
Magnetite		0		Yes				16	1					
Sludge Recycle System		50	28.5	Yes				13	12					
Ozone Pump Station	150	1456	829.92	Yes				13	12					
Ozone Plant Equipment		2562	1460.34	no				26	12					
BAFF Lift PS	150	1456	829.92	Yes				13	12					
BAFF, incl blowers	156	1806	1029.42	Yes				39	12					Assuming additional 5% m
Backwash Pumps	69	18.5	10.545	Yes				13	12					
Backwash Return pumps	15	35	19.95	Yes				13	12					
GAC Equipment		43	24.51	no				26	12					
GAC Media		0		no				0	22					
Sodium Hypochlorite	1	24	13.68	Yes				16	12					
Sludge thickener (incl feed pumps)		39	22.23	Yes				13	12					
Thickened Sludge Pumps	8	32	18.24	Yes				13	12					
Pump to Existing Outfall	74	1400	798	Yes				10						
Transfer Pump Station (Pipeline Option 1)	645	7140	4069.8	no				15						

Treatment	Total annual	[redacted]
	Total daily	
Pipeline	Total annual	
	Total daily	
	Rounded combined Total	

CHEMICALS BELOW:

		Daily Cost		Annual Cost
Ferrous Sulphate	yes	[redacted]		
Ferric Sulphate	yes			
Polymer	yes			
Magnetite	yes			
Liquid Oxygen	yes			
Sodium Hypo	yes			
Sludge polymer	yes			

Annual Fixed	[redacted]
Annual Variable co	
Variable (£/ML)	

Netheridge SRO Treatment Plant Operational Cost Estimate (19/10/22) - Option 2

Days pumping per annum	[redacted]
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

					Power Costs			Person Costs					
Process Equipment	Power Rating (kW)	35MLD - kWh/d	20MLD - kWh/d	Used during standby?	Daily Cost 35 MLD	Daily Cost 20MLD	Annual Cost	Operator Time (days)	Maintenance Time (days)	Total Person Cost (£/pa)	Consumables Cost	Total Annual	Average Daily Cost
Ferrous Sulphate	1	24	13.68	Yes	[redacted]			16	12				
MBBR Lift Pump Station	150	1456	829.92	Yes				13	3				
MBBR, incl blowers	480	5760	3283.2	Yes				39	3				
CoMag Equipment	16	200	114	Yes				26	10				
Ferric Sulphate	1	24	13.68	Yes				16	12				
Polymer	1	24	13.68	Yes				16	12				
Magnetite		0		Yes				16	1				
Sludge Recycle System		50	28.5	Yes				13	12				
Ozone Pump Station	150	1456	829.92	Yes				13	12				
Ozone Plant Equipment		2562	1460.34	no				26	12				
BAFF Lift PS	150	1456	829.92	Yes				13	12				
BAFF, incl blowers	156	1806	1029.42	Yes				39	12				Assuming a
Backwash Pumps	69	18.5	10.545	Yes				13	12				
Backwash Return pumps	15	35	19.95	Yes				13	12				
GAC Equipment		43	24.51	no				26	12				
GAC Media		0		no				0	22				
Sodium Hypochlorite	1	24	13.68	Yes				16	12				
Sludge thickener (incl feed pumps)		39	22.23	Yes				13	12				
Thickened Sludge Pumps	8	32	18.24	Yes				13	12				
Pump to Existing Outfall	74	1400	798	Yes				10					
Transfer Pump Station (Pipeline Option 2)	510	4900	2793	no				15					

Treatment	Total annual	[redacted]
	Total daily	
Pipeline	Total annual	
	Total daily	
	Rounded Combined Total	

CHEMICALS BELOW:

		Daily Cost		Annual Cost
Ferrous Sulphate	yes	[redacted]		
Ferric Sulphate	yes			
Polymer	yes			
Magnetite	yes			
Liquid Oxygen	yes			
Sodium Hypo	yes			
Sludge Polymer	yes			

Annual Fixed	[redacted]
Annual Variable cos	
Variable (£/ML)	

Netheridge SRO Treatment Plant Operational Cost Estimate (19/10/22) - Option 3

Days pumping per annum	[redacted]
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

					Power Costs			Person Costs					
Process Equipment	Power Rating (kW)	35MLD - kWh/d	20MLD - kWh/d	Used during standby?	Daily Cost 35 MLD	Daily Cost 20MLD	Annual Cost	Operator Time (days)	Maintenance Time (days)	Total Person Cost (£/pa)	Consumables Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate	1	24	13.68	Yes	[redacted]			16	12	[redacted]			
MBBR Lift Pump Station	150	1456	829.92	Yes				13	3				
MBBR, incl blowers	480	5760	3283.2	Yes				39	3				
CoMag Equipment	16	200	114	Yes				26	10				
Ferric Sulphate	1	24	13.68	Yes				16	12				
Polymer	1	24	13.68	Yes				16	12				
Magnetite		0		Yes				16	1				
Sludge Recycle System		50	28.5	Yes				13	12				
Ozone Pump Station	150	1456	829.92	Yes				13	12				
Ozone Plant Equipment		2562	1460.34	no				26	12				
BAFF Lift PS	150	1456	829.92	Yes				13	12				
BAFF, incl blowers	156	1806	1029.42	Yes				39	12				Assuming a
Backwash Pumps	69	18.5	10.545	Yes				13	12				
Backwash Return pumps	15	35	19.95	Yes				13	12				
GAC Equipment		43	24.51	no				26	12				
GAC Media		0		no				0	22				
Sodium Hypochlorite	1	24	13.68	Yes				16	12				
Sludge thickener (incl feed pump	16	39	22.23	Yes				13	12				
Thickened Sludge Pumps	8	32	18.24	Yes				13	12				
Ion Exchange Pump Station	150	1456	829.92	no				13	3				
Ion Exchange		0	0	no				13	12				
Pump to Existing Outfall	74	1400	798	Yes				10					
Transfer Pump Station (Pipeline Option 3)	135	1120	638.4	no				5					

Treatment	Total annual	[redacted]
	Total daily	
Pipeline	Total annual	
	Total daily	
	Rounded Combined Total	

CHEMICALS BELOW:

		Daily Cost		Annual Cost
Ferrous Sulphate	yes	[redacted]		
Ferric Sulphate	yes			
Polymer	yes			
Magnetite	yes			
Liquid Oxygen	yes			
Sodium Hypo	yes			
Sludge Polymer	yes			

Annual Fixed	[redacted]
Annual Variable co	
Variable (£/ML)	

Netheridge SRO Treatment Plant Operational Cost Estimate (19/10/22) - Option 4

Days pumping per annum	[redacted]
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

					Power Costs			Person Costs					
Process Equipment	Power Rating (kW)	35MLD - kWh/d	20MLD - kWh/d	Used during standby?	Daily Cost 35 MLD	Daily Cost 20MLD	Annual Cost	Operator Time (days)	Maintenance Time (days)	Total Person Cost (£/pa)	Consumables Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate	1	24	13.68	Yes	[redacted]			16	12				
MBBR Lift Pump Station	150	1456	829.92	Yes				13	3				
MBBR, incl blowers	480	5760	3283.2	Yes				39	3				
CoMag Equipment	16	200	114	Yes				26	10				
Ferric Sulphate	1	24	13.68	Yes				16	12				
Polymer	1	24	13.68	Yes				16	12				
Magnetite		0		Yes				16	1				
Sludge Recycle System		50	28.5	Yes				13	12				
Ozone Pump Station	150	1456	829.92	Yes				13	12				
Ozone Plant Equipment		2562	1460.34	no				26	12				
BAFF Lift PS	150	1456	829.92	Yes				13	12				
BAFF, incl blowers	156	1806	1029.42	Yes				39	12				Assuming a
Backwash Pumps	69	18.5	10.545	Yes				13	12				
Backwash Return pumps	15	35	19.95	Yes				13	12				
GAC Equipment		43	24.51	no				26	12				
GAC Media		0		yes				0	22				
Sodium Hypochlorite	1	24	13.68	Yes				16	12				
Sludge thickener (incl feed pump	16	39	22.23	Yes				13	12				
Thickened Sludge Pumps	8	32	18.24	Yes				13	12				
Ion Exchange Pump Station	150	1456	829.92	no				13	3				
Ion Exchange			0	no				13	12				
UV	44	684	389.88	no				13	12				
Pump to Existing Outfall	74	1400	798	Yes				10					
Transfer Pump Station (Pipeline Option 4)	135	1225	698.25	no				5					

Treatment	Total annual	[redacted]
	Total daily	
Pipeline	Total annual	
	Total daily	
	Rounded Combined Total	

CHEMICALS BELOW:

					Daily Cost		Annual Cost
Ferrous Sulphate			yes		[redacted]		
Ferric Sulphate			yes				
Polymer			yes				
Magnetite			yes				
Liquid Oxygen			yes				
Sodium Hypo			yes				
Sludge Polymer			yes				

Annual Fixed	[redacted]
Annual Variable co	
Variable (£/ML)	

Netheridge SRO Treatment Plant Operational Cost Estimate (19/10/22) - Option 5

Days pumping per annum	[redacted]
Days pumping sweetening flow	
Days on standby	
Power Unit Cost (£/kWh)	
Operator Cost (£/hr)	

				Power Costs			Person Costs					
Process Equipment	35MLD - kWh/d	20MLD - kWh/d	Used during standby?	Daily Cost 35 MLD	Daily Cost 20MLD	Annual Cost	Operator Time (days)	Maintenance Time (days)	Total Person Cost (£/pa)	Consumables Costs (£/pa)	Total Annual	Average Daily Cost
Ferrous Sulphate	24	13.68	Yes	[redacted]			16	12	[redacted]			
MBBR Lift Pump Station	1456	829.92	Yes				13	3				
MBBR, incl blowers	5760	3283.2	Yes				39	3				
CoMag Equipment	200	114	Yes				26	10				
Ferric Sulphate	24	13.68	Yes				16	12				
Polymer	24	13.68	Yes				16	12				
Magnetite	0		Yes				16	1				
Sludge Recycle System	50	28.5	Yes				13	12				
Ozone Pump Station	1456	829.92	Yes				13	12				
Ozone Plant Equipment	2562	1460.34	no				26	12				
BAFF Lift PS	1456	829.92	Yes				13	12				
BAFF, incl blowers	1806	1029.42	Yes				39	12				Assuming a
Backwash Pumps	18.5	10.545	Yes				13	12				
Backwash Return pumps	35	19.95	Yes				13	12				
GAC Equipment	43	24.51	no				26	12				
GAC Media	0		no				0	22				
Sodium Hypochlorite	24	13.68	Yes				16	12				
Sludge thickener (incl feed pum	39	22.23	Yes				13	12				
Thickened Sludge Pumps	32	18.24	Yes				13	12				
Ion Exchange Pump Station	1456	829.92	no				13	3				
Ion Exchange	0	0	no				13	12				
Pump to Existing Outfall	1400	798	Yes				10					
Transfer Pump Station (Pipeline Option 2)	4900	2793	no				15					
Transfer Pump Station (Pipeline Option 3)	1120	638.4	no				5					

Full system

Treatment	Total annual	[redacted]
	Total daily	
Pipeline	Total annual	
	Total daily	
	Rounded Combined Total	

CHEMICALS BELOW:

		Daily Cost		Annual Cost
Ferrous Sulphate	yes	[redacted]		
Ferric Sulphate	yes			
Polymer	yes			
Magnetite	yes			
Liquid Oxygen	yes			
Sodium Hypo	yes			
Sludge Polymer	yes			

Annual Fixed	[redacted]
Annual Variable co	
Variable (£/ML)	

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