

# Strategic Solution Gate 2 Submission: Submission Summary

6 December 2021



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# 1. Key Messages

## Context

Within the next decade Southern Water (SW) needs to deliver multiple new large water resources in Hampshire. As communicated at Gate 1, the ambition is to create an intelligent network which delivers greater environmental protection and a resilient water future in Hampshire.

Water is hugely valuable for the environment, health and wellbeing and leisure activities. We fully support the measures already in place to protect chalk streams, particularly the iconic chalk streams of the Rivers Test and Itchen and as per the legal agreement with the Environment Agency (EA) (Section 20, s20), we will use all best endeavours to deliver long term solutions, as close to 2027 as possible, to achieve permanent reductions in the abstractions from these rivers.

Our current WRMP plans to deliver resilience against a 1-in-200 year drought event by 2027. The National Framework published in March 2020 indicates a move for the whole sector to plan for resilience in a 1-in-500 year event, and to align with the optimal solutions chosen by regional plans. We are supportive of these changes and have selected an option through a robust appraisal process which will provide capability to address current defined needs as well as account for higher future resilience requirements in West Hampshire.

Our options appraisal process identified a direct raw water transfer from Havant Thicket Reservoir to Otterbourne Water Supply Works (WSW), supplemented with recycled water from a Water Recycling Plant as the Selected Option. This option integrates with other assets and projects being delivered regionally and is resilient to future changes in supply requirements by having the capacity to adapt to increased needs. This represents a clear way forward that enables us to provide a resilient water supply to our customers and customers regionally, while also being an active participant in regional water resource planning and supply now and into the future.

## Progress since Gate 1

Our current Base Case solution, as set out in our WRMP19, was to build a desalination plant on the south coast. We advised in September 2021 that we had developed strong evidence that this option would not be deliverable at that location, at this time. As part of our Gate 2 submission, we now propose to deploy all best endeavours to develop a new direct connection at the Havant Thicket Reservoir, with the addition of a water recycling plant to support Bedhampton and Havant Springs in refilling the reservoir, thereby creating a regionally resilient supply system.

This submission contains evidence of the robust options appraisal process which has been undertaken, following the outcome of Gate 1. This evidence is primarily focussed on an assessment of best value, the potential to secure consent to build, deliverability (including timescales) and alignment to our strategic objectives.

In August 2021, we engaged with RAPID and EA regarding an Interim Update. The purpose was to update regulators on key findings related to option appraisal and option selection.

## Progress since Interim Update

As part of the Interim Update on 27<sup>th</sup> September 2021, we presented evidence to support removal of desalination Options (A.1 and A.2) from consideration. We also addressed the requirement to further study potential future needs. Future needs, which have been considered since the Interim Update, are additional needs that provide a resilient water supply to customers during a 1-in-500-year drought scenario from a regional perspective (including Portsmouth Water's needs).

At the Interim Update we also committed to reassess the Supply Demand Balance (SDB) calculation to reaffirm the optimised sizing of the Strategic Resource Option (SRO) – to meet supply requirements during 1-in-200-year and 1-in-500-year drought scenarios. This analysis indicated a revised residual supply/demand deficit of 83Ml/d (to the distribution network) until 2040. The SDB calculation considers the requirements of

SW and Portsmouth Water to 2040. The distribution network supply/demand deficit (83MI/d) can be supported by the delivery of an SRO that provides a deployable output of 87MI/d, which makes allowances for up to 4MI/d of processes losses, in order to meet customer needs. This option can meet the needs identified in WRMP19 and is able to anticipate some of the future needs in moving to a 1-in-500-year drought scenario. SW have worked closely with WRSE in developing the Gate 2 submission. Our Selected Option identified through the options appraisal process has also been supported by WRSE's regional modelling (financial and economic), which has identified the same preferred option before 2040. After 2040, WRSE identified additional alternative water supplies for addressing potential increases in requirements based on population growth, climate change and environmental destinations.

Through the options appraisal process we have identified the Selected Option, a direct raw water transfer from Havant Thicket Reservoir to Otterbourne WSW, supplemented with recycled water from a Water Recycling Plant, and a Selected Back Up Option. The Selected Back Up option is water recycling direct to an Environmental Buffer Lake, prior to transfer to Otterbourne WSW. Both the Selected and Selected Back Up options will be progressed post Gate 2, with development of all other options within the RAPID Gate process stopped. Progress post Gate 2 will focus on development of the Selected Option, with a lesser degree of progress being made to the Selected Back Up Option. Progressing the Selected Back Up Option helps manage any risk that the Selected Option is found to be undeliverable at a later stage. We will also consider at what point this risk is suitably mitigated, enabling us discontinued earlier than Gate 3, therefore reducing overall cost to customers.

## Delivery Timeline

The Selected Option is not currently expected to be delivered until Q1 2030 and the Selected Back Up Option by Q4 2030. SW will work with the Environment Agency (EA) and Natural England (NE) on the s20 agreement commitment, and the consequences of the proposed preferred options being unable to meet the 2027 deadline. This will include discussion of changes in the s20 agreement about the timelines and other matters parties raise as well as active engagement on operational and environmental mitigation measures to be undertaken for the period between 2027 and the anticipated date the asset will be operational (Q1 2030 for the Selected Option). This will be progressed in alignment with the RAPID gated process.

## 1.1 Southern Water's Vision

In our PR19 business plan we set out our vision: to create a resilient water future for customers in Hampshire.

We support the need to protect the environment and the iconic chalk streams in the region, and the need to do so in ways that meet the needs and expectations of our customers. Recent abstraction reductions in place to protect the chalk streams mean there is now a significant supply and demand deficit in Hampshire in dry weather. We have an agreement with the EA that allows us to mitigate the risk in the short term via drought orders and drought permits. However, this is not a long-term solution and we are committed to delivering a strategic resource option (SRO), as a new water supply, as close to 2027 as possible.

The scale of the challenge is shown by the size of the supply deficit we will see in severe drought conditions, of about 190 MI/d (as per WRMP19). This is about two thirds of the water available for use in a drought before the reductions took place. The abstraction reductions to protect our rivers and habitats will be the first of many, and they will extend to other parts of the area we serve, and to other companies that abstract from chalk streams or the chalk aquifer. SW is the first company to address the need to protect chalk streams at this scale, the first to make submissions to RAPID and has a legal agreement to deliver with the EA (Section 20). All these factors will set important precedents about how all stakeholders respond to the ever-rising level of environmental ambition. Our timescales are very tight and speed of review by all regulators will be critical.

We need to deliver a wide-ranging solution within the decade, including consumption and leakage reduction, new storage facilities, new transfers from other companies and enhanced network transport capabilities. This presents challenges in terms of protecting the environment and providing best value to our customers, but also offers opportunities to take some significant steps in delivering our vision to create a resilient water future in Hampshire.

The Selected Option presents an opportunity to deliver upon this vision, within the context of the Water for Life Hampshire (WfLH) programme, that is regionally focused, resilient for the future while also supporting us protect the environmental.

## 1.2 Board Assurance

The SW Board endorses both this submission and the importance of delivering the best value for our customers and the environment. The full Board assurance statement is provided in Annex 7 of our submission. Further to this we have actively worked with a sub-group of the Southern Water Board, dedicated to the Water for Life Hampshire programme. Through regular briefings on programme status, the Board sub-group have contributed to strategic decisions and activities. Regular engagement with the SW Board has enabled the programme team to ensure that the long-term pathway we are taking fits with the future needs of customers and the environment in Hampshire. Our Gate 2 submission and decisions related to the selection of the Selected Option have been discussed, supported and approved by the SW Board.

We will need to work with RAPID and all our regulators and stakeholders to align the different regulatory requirements to allow us to deliver the right solution for our customers and the environment in a timely fashion. We also need continue collaboration with Portsmouth Water (PW) as we seek to deliver a regional asset to resolve needs greater than Southern Water’s alone.

Portsmouth Water’s Board, a key partner in the delivery of the Selected Option, has also provided the following statement:

Board statement	Assurance
The Board supports the recommendations for solution progression made in this submission.	<ul style="list-style-type: none"> <li>The recommendations about scheme progression have been agreed by all the scheme partners and discussed with RAPID.</li> <li>The PW Executive leadership team have been briefed on the conclusions and approved the recommendations set out in the RAPID submission.</li> <li>The recommendations were reviewed, discussed and approved by the Board</li> <li>Third party assurance by [REDACTED] and findings presented directly to the Board</li> <li>Assurance by PW project team and [REDACTED] presented directly to the Board</li> </ul>
The Board is satisfied that progress on solution is commensurate with the solution being in place and operating by the end of 2030.	<ul style="list-style-type: none"> <li>Regular cross team working level review and challenge meetings of progress, assumptions made and timelines</li> <li>A detailed project plan has been prepared by SW and reviewed by the PW engineering team</li> <li>Third party assurance by [REDACTED] focussing on reliability, consistency and quality of data, and efficient expenditure</li> </ul>
The board is satisfied that the work carried out to date is of sufficient scope, detail and quality (as would be expected of a large infrastructure scheme of this nature at this stage in its development) to support delivery of the solution by the end of 2030.	
The Board is satisfied that expenditure has been incurred by the PW team on activities that are appropriate for Gate 2 and is efficient.	<ul style="list-style-type: none"> <li>SW received 100% of the development funding for the Direct Pipe option up to Gate 2 and agreed to reimburse PW for any costs efficiently incurred by PW.</li> <li>The Board has been provided assurance by the PW project team.</li> </ul>

## 1.3 Opportunities to deliver future resilience

All of the solutions considered as part of this submission were designed to be resilient in a 1-in-200-year drought, as this is the standard planned in our WRMP19. The WRMP models scenarios in a 1-in-500-year event but relies on drought orders and permits to protect against the drought. The s20 between SW and the EA requires SW to use all best endeavours to implement the long-term scheme for alternative water resources set out in WRMP19. The Executive and Board of SW are aware of the National Framework for Water Resources published by the EA, which indicates that water supplies should be resilient to a 1-in-500-year drought by the late 2030s, and that future WRMPs should align with the new regional plans.

SW have endeavoured to align to regional modelling, being conducted by WRSE, when assessing the potential future needs and have used the draft results currently available as part of the decision-making process (as per Annex 12, Outline Option Evolution Plan) in order to identify the Selected Option. In addition, SW has conducted independent modelling on potential future needs, as defined by the 1-in-500-year drought scenario as well as future abstraction reductions, for SW and Portsmouth Water, to determine the optimal sizing for the SRO.

We have taken this into account, and this submission identifies how the Selected Option (Option B.4 – a direct pipe from Havant Thicket to Otterbourne; with Water Recycling Plant) could meet increased resilience requirements.

In identification of our Selected Option, we have taken a forward-looking approach that ensures we have an innate flexibility to adapt to future challenges as they arise. This allows treatment capacity at an optimum size for today's challenges, but also for those of the future, both locally and within Hampshire (including PW's needs). All remaining options, following the Interim Update, have been considered from their ability to evolve to meet future needs as outlined by the WRSE draft results. This has been reflected in their adaptability assessment as part of the decision-making process and is a key differentiator between the remaining options.

## 1.4 Working with stakeholders

Our customer and stakeholder engagement programme has been designed to ensure relevant insight was captured, engagement plans developed, and the right relationships built to deliver the Water for Life Hampshire programme. Insight from engagement activities undertaken has been a key input into the options appraisal process. Key findings in the engagement activities completed are reflected in the options selected to be developed further post Gate 2.

For Gate 2, engagement has taken place continuously with regulators, stakeholders (including local planning authorities, politicians and environmental groups) and customers using a range of approaches. Customer and stakeholder views and preferences have helped inform our decision-making in the options appraisal process. It is clear from the responses received that desalination is not considered by customers and stakeholders to be the most appropriate solution at this location at this time. The alternatives are preferred, as they provide resilience while being less environmentally impactful.

In early Jan 2021, we undertook a non-statutory consultation focused on desalination but also introduced direct water recycling. Customers and stakeholders were consulted in and around the Hampshire area. Water recycling was rated as the most preferred option. Of those consulted, customer types and stakeholders have a tendency to favour direct, as opposed to, indirect water recycling because it appears to offer the greatest benefits in terms of efficiency and sustainability. However, stakeholders recognise the benefit of using environmental buffers and the positive impact this could have in other areas, such as helping to reduce nitrates. The feasibility of delivering water recycling in the current regulatory environment contains much uncertainty and this needs to be considered in the context of meeting the timeframe of the s20 agreement.

We are committed to continuing to work and engage closely with customers and stakeholders, including collaboration with Portsmouth Water, to develop the Selected Option and Selected Back Up Option. Key activities for the near term include communication directly with key customers and stakeholders to understand their views and preferences and reflect these in designs as the project progresses.

From a financial perspective, in terms of the whole-life-cost, water transfers are expected to be the least costly relative to the other solution types, where desalination was modelled to be the most-costly relative to the other solution, which is expected to have associated impact to customer bills during asset operations.

## 1.5 Gate 2 Submission

The purpose of the Gate 2 submission is to select the solution which should be progressed through the remaining gates and delivered as part of the s20 agreement.

SW presented the Base Case SRO and eight alternative options at Gate 1 and has progressed each option, beyond Gate 1 to further assess and determine their feasibility. The nine alternative options are listed in Table 1.

**Table 1 - Options carried forward from Gate 1 for consideration during the Gate 2 period**

Option	Option description
<b>A.1 (Base Case)</b>	75 MI/d Deployable Output (DO) desalination at Fawley direct to Testwood Water Supply Works (WSW)
<b>A.2</b>	61 MI/d DO desalination at Fawley direct to Testwood WSW
<b>B.1</b>	61 MI/d Recycled water sent to Lower Itchen, abstraction and transferred for treatment at Otterbourne WSW
<b>B.2</b>	61 MI/d DO recycled water (indirect) sent to Environmental Buffer Lake (EBL) and treated at Otterbourne WSW (Water Recycling Plant (WRP) supplied by Budds Farm Wastewater Treatment Works (WTW))
<b>B.3</b>	61 MI/d DO recycled water (direct) sent to Otterbourne WSW
<b>B.5</b>	75 MI/d DO of recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW)
<b>D.1</b>	A combination of 40 MI/d Desalinated water to a large coastal industrial facility with existing South West Water (SWW) supply diverted to SW 30 MI/d. In addition, a 40 MI/d DO recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm WTW)
<b>D.2</b>	61 MI/d DO transfer between HTR and Otterbourne WSW.



**Figure 1 - Solutions considered in the Gate 2 submission**

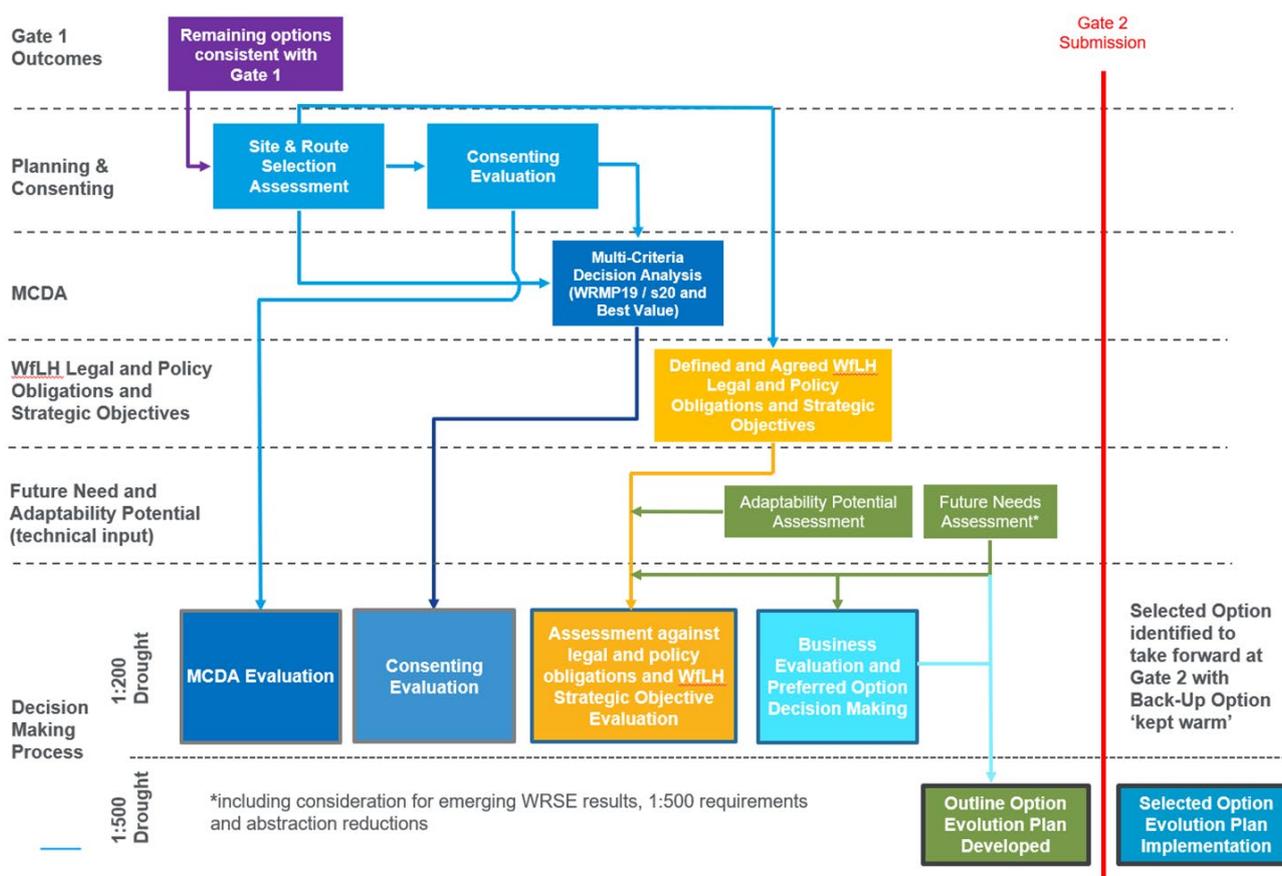
Three options (B.1, B.3 and D.1) have been discontinued between Gate 1 and Gate 2, and one water recycling option (i.e. the original B.4 option) has been shown to over supply the required Deployable Output (DO). The plant capacity has subsequently been reduced from 61 MI/d to 15 MI/d.

SW has developed and applied, in consultation with key stakeholders, a structured methodology to assess how the options compared to one another. The purpose is to provide 'Best Value' for customers (as defined by the Water Resources Planning Guideline (WRPG)<sup>1</sup>), while also being compliant with regulatory requirements (and legislation) and SW's strategic objectives for the SRO.

The Options Appraisal Process developed by SW involves six steps, illustrated in Figure 2.

<sup>1</sup> Environment Agency, Natural England and Ofwat, Water Resources Planning Guideline, July 2021, Section 9.1

# Option Appraisal Process



**Figure 2 – Overview of Options Appraisal process**

The objective of this Options Appraisal process was to rank the options against each other, to determine the selected option for delivery, as well as a back-up option, that will be developed beyond the Gate 2 submission to meet the s20 obligations.

As stated, we have worked closely with WRSE in developing the Gate 2 submission. The Selected Option identified through the Options Appraisal process has also been supported by WRSE’s regional modelling (financial and economic), which has identified the same preferred option before 2040. After 2040, WRSE identified additional alternative water supplies for addressing potential increases in requirements based on population growth, climate change and Environmental destinations.

## 1.6 Summary of Options Appraisal results

At the point of Interim Update, an initial Options Appraisal process ranking was completed based on an SRO with a required deployable output of 51MI/d. This ranking is depicted in Table 2 below.

**Table 2 – Options Appraisal Rankings**

Rank	Deployable Output (DO) of 51MI/d (1-in-200-year scenario)	Deployable Output (DO) of 87MI/d (1-in-500-year scenario)
1	Option D.2	Option B.4 (Emerging Preferred Option)
2	Option B.4	Option B.5 (Emerging Back Up Option)
3	Option B.2	Option B.2
4	Option B.5	Option D.2
5	Options A.1 (Base Case) and A.2	Options A.1 (Base Case) and A.2

\*Options A.1 and A.2 were removed at the Interim Update 27<sup>th</sup> September

However, indicative assumptions suggested that an increase in the DO was required, from 51 MI/d to 87 MI/d, due to shortfalls in the delivery of other aspects of WRMP19, primarily from bulk transfers and demand reduction. The total supply deficit identified in WRMP19 was 192 MI/d which was to be addressed by a combination of an SRO with these other workstreams. This change in requirements then altered the ranking in Table 2 to result in Option B.4 being the highest ranked Option (due to Option D.2 being unable to mitigate for the extent of DO shortfall on account of finite water being available in Havant Thicket and the expected duration and severity of a severe drought) and becoming the Emerging Preferred Option and Option B.5, as the second highest ranked Option (due to the larger WRP and greater availability of effluent flow from Peel Common as well as Budds Farm) as the Emerging Back-up Option.

Post Interim Update, we continued to develop both the Emerging Preferred Option and the Emerging Back-up Option we have updated specific sections of our Gate 2 submission to related to these options – as opposed to areas covering the other options included in the submission.

As part of considering the potential adaptability of the options and ability to meet future supply needs, the supply/demand balance has been re-calculated since the Interim Update. Assumptions included in the future needs analysis are listed in Table 2.

**Table 3 - Future need analysis assumptions**

Assumptions	Associated commentary
Review of Demand Reduction and Bulk Transfer	<ul style="list-style-type: none"> <li>Review the progress and deliverability of the demand reduction and bulk transfer components of the WfLH – non-SRO components</li> </ul>
Future abstraction reductions WRSE outputs for 1-in-500-year drought requirements	<ul style="list-style-type: none"> <li>The future needs as indicated through WRSE draft results were then analysed to determine the 1-in-500-year requirements of SW, as well as PW, in addition to potential abstraction reductions</li> </ul>
Timeframe of up to 2040	<ul style="list-style-type: none"> <li>Selected timeframe for future analysis as future abstraction reductions are reasonably predictable up to this point</li> <li>Thames to Southern Transfer (T2ST) expected to be delivered by 2040 – WRSE currently identifying as the best value option for addressing needs arising beyond this point.</li> </ul>

The revised supply/demand deficit was calculated as **83MI/d** (an increase from 51 MI/d). Accounting for process losses, the required SRO capacity is **87MI/d**.

Through the development of the options in the lead up to Gate 2, it was concluded that for Options D.2 and B.2, the natural evolution would be into B.4 and B.5 respectively and as such, were removed from consideration in the Options Appraisal due to their inability to meet the increased requirements alone.

#### Asset Components – per Option:

Option B.4 was seen to be viable to evolve to meet the future need as follows:

- Increasing the capacity of the transfer pipeline and associated pumping assets between Havant Thicket Reservoir and Otterbourne WSW from 75 MI/d to 95 MI/d; and
- Increasing the capacity of the associated Water Recycling Plant (WRP) from 15 MI/d to 25 MI/d (this increase is dependent on the needs of PW as SW's can be met by a 15MI/d WRP; if PW needs are zero, then the WRP does not need to be expanded).

Option B.5 was seen to be viable to evolve to meet the future need as follows:

- Increasing the capacity of the transfer pipeline and associated pumping assets between the WRP and Otterbourne WSW from 75 MI/d to 95 MI/d;
- Increasing the capacity of the associated WRP from 75 MI/d to 95 MI/d; and
- Increasing the capacity of the Environmental Buffer Lake at Otterbourne WSW from 75 MI to 95 MI.

#### Option Appraisal – Validation

The impacts of these evolved Options were then assessed in order to validate the initial conclusions against the core components of the Options Appraisal and in particular, the 'adaptability' strategic objective.

**Figure 2 – Outcomes of Options Appraisal process**

Options	Consenting Evaluation	Typical MCDA Rankings	Legal Obligations	Strategic Objectives			Overall Ranking
				Best Value	Net Zero Carbon	Adaptability	
B.4	A	2	A	A	A	G	1
B.5	A	3	A	A	A	A	2
B.2	A	4	A	A	A	A	3
D.2	G	1	A	G	A	G	4

It was concluded that the option that best meets the requirements is Option B.4, the addition of a direct pipe plus a water recycling plant as an additional source to the Havant Thicket reservoir. The key differential benefits of this option as opposed to Option B.5, is that it is capable of being adapted to meet needs of both SW's and PW's customers. Other key differentiating factors are that;

- it is in the right location to support both SW and PW customer needs with the shortest possible additional distances for transporting water
- there is the potential for adapting the capacity of each option, which includes adapting the capacity and size of assets and infrastructure components. This includes increasing the use of effluent flow from Peel Common as well as Budds Farm thereby providing greater resilience for future changes
- the Water Recycling Plant could be constructed in a modular way so that future capacity increases could be added once future need becomes firmly established; and
- both PW and SW Boards support this conclusion.

The **Selected Option** identified by the Options Appraisal process and endorsed by the SW Board was **Option B.4**.

## 1.7 Back-Up Option identification

Option B.4 now becomes the new Selected Option, and its position as the highest-ranking option is confirmed through the Gate 2 submission. In addition, the Gate 2 submission illustrates how Option B.4 can be made sustainable and flexible, adapting to increasing needs of both SW and PW.

In addition, SW considers that it would be prudent to select a Back-up Option and continue the development of this option in specific areas. The primary basis for progressing a Back-up Option is in the event that the Selected Option is unable to be delivered through information that becomes apparent post Gate 2.

In identifying a viable back-up, there must be sufficient differentiation in routes and infrastructure to mitigate against consenting or delivery issues that may impact the Selected Option. Should insurmountable difficulties arise with the pipeline route from the reservoir, for example, a viable back up option would need to be independent of the reservoir.

Options B.2 and B.5 currently use similar routes to B.4 and D.2 pipeline routes and would also rely on the Otterbourne WSW, but importantly do not rely on the delivery of Havant Thicket reservoir.

The following actions will be carried out to develop the Back-up Option beyond Gate 2:

- Investigate potential for storage at Otterbourne WSW via a new environmental buffer lake
- Investigate potential alternative routes from the Water Recycling Plant to the Otterbourne environmental buffer lake; and
- Investigate whether additional storage capabilities would provide benefits in a 1-in-500 drought.

Consequential of the revised Supply Demand Balance calculation and the future needs statement, it has been determined that Option B.2 is not able to meet the revised residual deficit for the 1-in-200 year DO requirement. Therefore, the **Back-up Option**, which will also be developed beyond Gate 2 is **Option B.5**.

Further information on how this Back-up Option will need to be scaled to achieve the revised residual deficit is detailed in Annex 12, Outline Option Evolution Plan.

It is recommended that all other options than B.4 and B.5 be discontinued at Gate 2.

## 1.8 Moving from Gate 2 to Gate 3

Our ambition is to deliver a resilient water future for customers in Hampshire while ensuring bills are affordable and improving the environment. The timetable we need to work to in order to remedy the deficit using all best endeavours will place some limits on the extent to which we can anticipate and dovetail with the requirements and solutions that will be identified as part of the regional plan for Hampshire, including taking into account water use in other sectors including industry and agriculture.

Key activities that we will progress between Gate 2 and 3 include:

- Turning Havant Thicket Classic development into Option B.4 in collaboration with PW. We need to align with detailed design to prevent unnecessary costs being incurred
- Further testing of the Selected and Back-Up Options in the context of WRSE results and proposed mitigation scenarios within the Hampshire region
- Further testing of PW's supply/demand deficit post 2040 and establishing the extent to which the Selected Option needs to accommodate future regional needs
- Evolving the Selected Option consenting strategy
- Evolving the Selected Option Direct Procurement for Customers (DPC) strategy
- Refining and testing the delivery schedule
- Developing the detailed engineering solution for the Selected Option; and
- Regulator discussion on anticipating the regional future needs in collaboration with PW.

At Gate 2 we propose that our Selected Option (Option B.4) is supported by RAPID and progressed through the remaining gates. We also propose that Option B.5 be developed, between Gate 2 and Gate 3, into a viable Back-up Option; the final decision on progression of a single Option at Gate 3.

We consider that progressing with Option B.4 in this way will provide sufficient information to support the planning and consenting processes, which will support SW in delivering a new base case in accordance with the all best endeavours obligation and as close to 2027 as possible. WRMP19 will be updated through the Annual Review. Consultation on the move away from the Base Case (as outlined in s20) will be done through WRMP24.

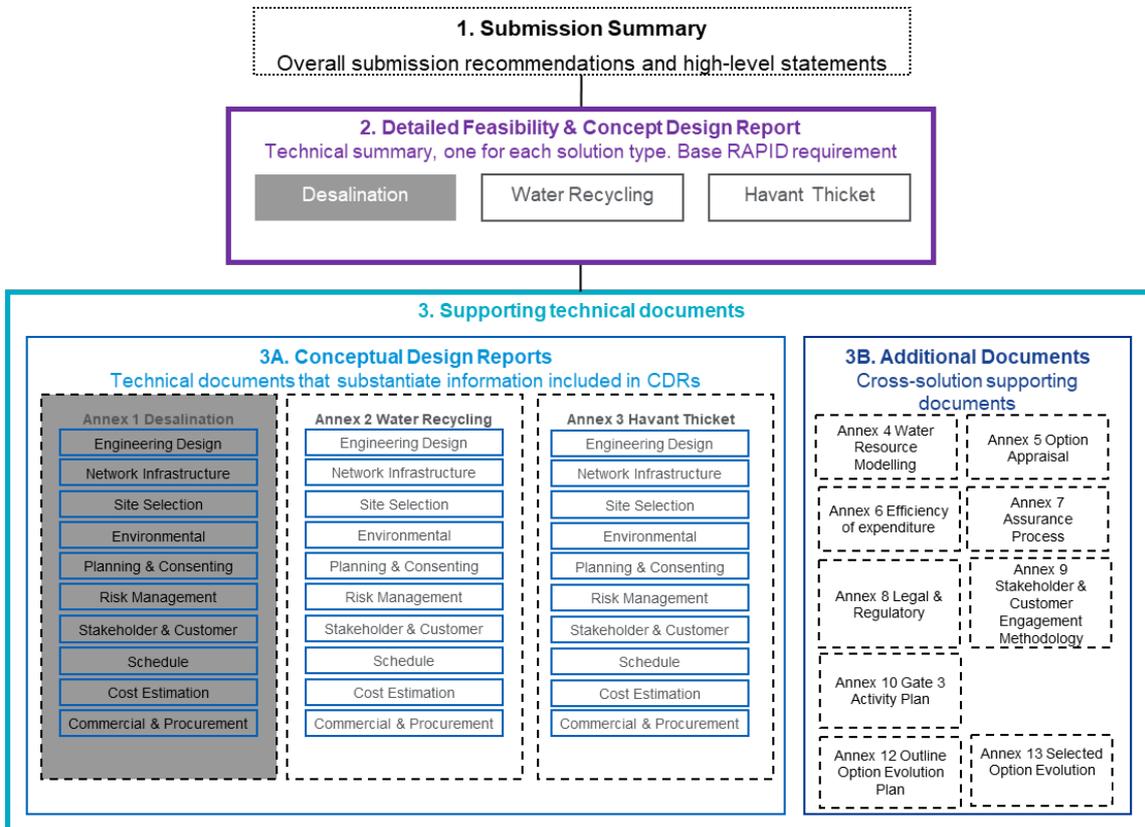
## 2. Conclusion

SW has met the requirements of Gate 2, through the identification of Option B.4 as the Selected Option and has gone beyond those requirements by bringing consideration of the future needs of the West Hampshire region into the decision-making process.

SW has also identified a Back Up Option (Option B.5) which will continue to be developed in the lead up to Gate 3 to mitigate against deliverability risks arising with the Selected Option. SW will consider if there is sufficient evidence to discontinue further development of this Back Up Option at an appropriate point.

# 3. Structure of the Submission

The hierarchy and structure of SW's Gate 2 submission is illustrated in Figure 3.



**Figure 3 – Gate 2 submission hierarchy and structure**

*Note: documents listed in grey were submitted previously as part of SW's Interim Update and have not been re-submitted as part of the Gate 2 submission*

A Gate 2 Submission Navigation Guide has been included as Appendix 1 of this document. This guide outlines the structure of the submission and other key information to read the Gate 2 submission. This also includes a glossary of key terminology used throughout the Gate 2 submission.

# Appendix 1 – Gate 2 Submission Navigation and Glossary

## 3.1 Gate 2 Submission Hierarchy

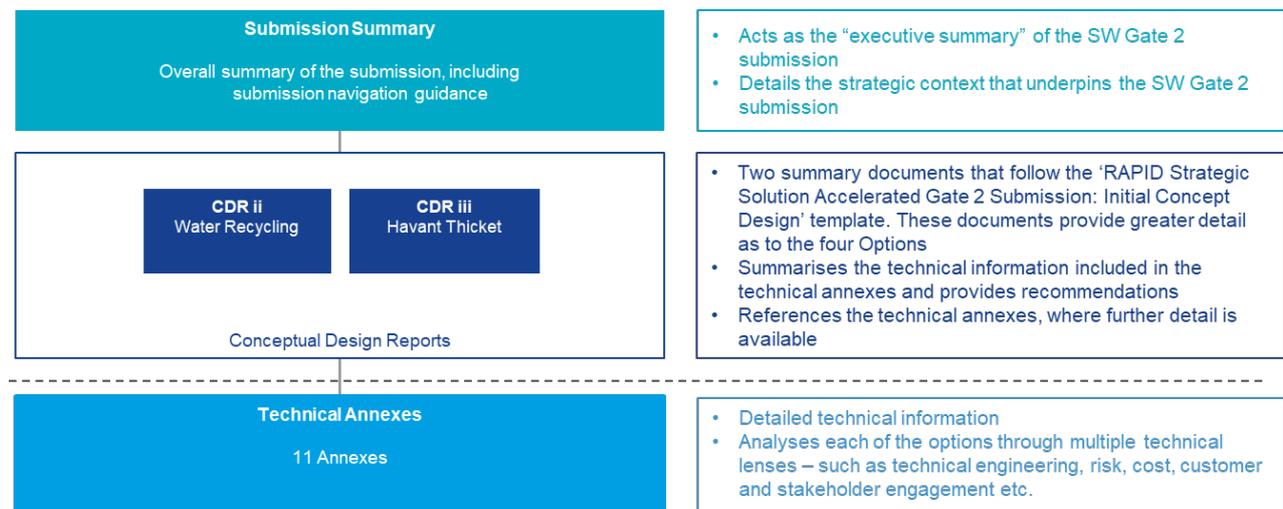
Southern Water (SW)'s RAPID Accelerated Gate 2 Submission includes a three-level document hierarchy – Submission Summary, Detailed Feasibility and Conceptual Design report and supporting technical annexes. The Detailed Feasibility and Conceptual Design Reports are aligned to the RAPID Gate 2 template.

In total, SW's Gate 2 Submission comprises of fourteen documents. These number of documents and the level of the documents within the Gate 2 submission hierarchy is detailed in Table 4.

**Table 4 - Number of Gate 2 submission documents, per document type**

Document Level	Document type	No. of documents
1	Gate 2 Submission Summary	1
2	Detailed Feasibility and Conceptual Design reports	2
3	Supporting Technical Annexes	11

The overall hierarchy of the Gate 2 Submission structure, including the purpose of the documents in each level of the hierarchy is illustrated in Figure 4.



**Figure 4 - Gate 2 Submission Structure**

Meeting RAPID requirements

Technical analysis and other supporting information that underpins the recommendations and conclusions presented in SW's Gate 2 submission has been prepared in-line with RAPID's requirements. These are based around the Detailed Feasibility and Conceptual Design Reports, which summarise the technical analysis completed across the WfLH programme between Gates 1 and 2. Due to the template requirements, various technical and solution supporting annexes have been prepared and included in this submission. These documents provide supporting detail that cannot be included in the Detailed Feasibility and Conceptual Design report.

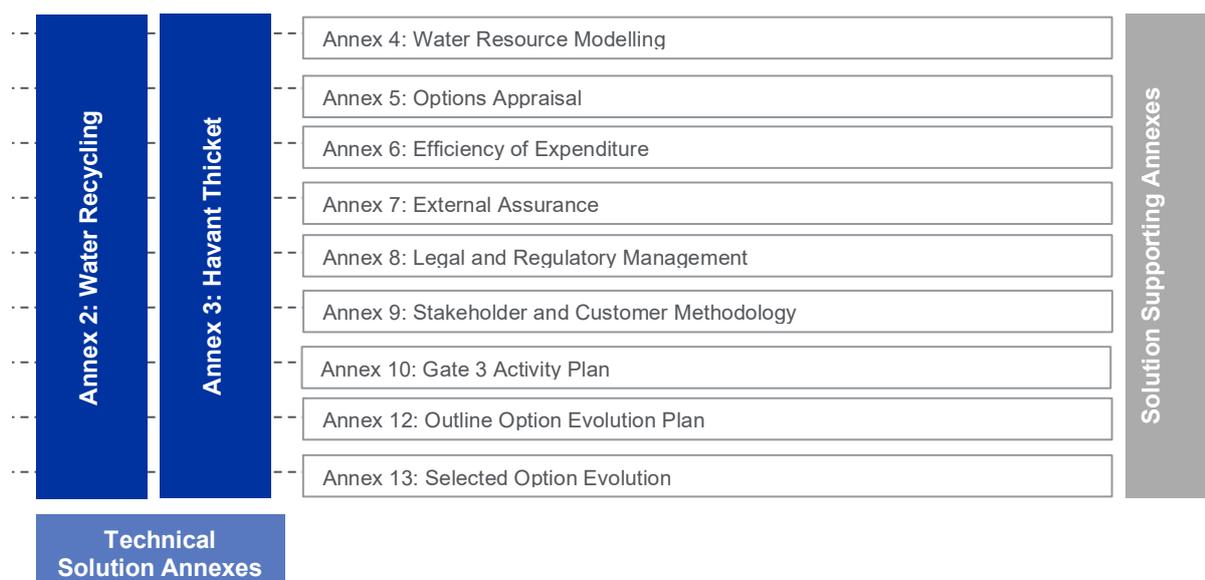
In line with RAPID requirement these documents were developed considering the technical requirements to deliver an SRO suitable to meet the supply/demand balance during a 1-in-200-year drought

scenario. Following the Interim Update, analysis considering how the SROs can be evolved to meet the supply/demand during a 1-in-500-year scenario has been undertaken. Where relevant and possible, information throughout the supporting technical and solution supporting annexes has been updated to include this analysis and has been presented through a combination of the initially drafted documents (i.e. alongside information relating to 1-in-200-year needs) or separate and dedicated sections of documents initially prepared.

As a result, in some specific areas such as those which are applicable to both the 1-in-200-year and 1-in-500-year scenarios have not been updated; the information initially prepared, specifically in relation to the 1-in-200-year challenge, remains in the submission.

SW's Gate 2 submission is a "snapshot" in time view of the progress in developing the SROs and should be considered as such. The project will continue to develop, so key inputs and considerations will continue to evolve and change over time as more data is sourced and analysis completed providing greater clarity and confidence. This includes items such as design and other external needs such as regulatory requirements. These documents set out the planned activities for testing, in the context of the move to a potential future need for a 1-in-500-year drought standard required for WRMP24, and the outcome of the Options appraisal work we have undertaken since Gate 1.

The structure of the technical and solution supporting annexes included within SW's Gate 2 submission is illustrated in Figure 5.



**Figure 5 - Gate 2 submission Technical Annex structure**

Please note that shortly prior to the submission, following engagement with the Environment Agency (EA), information related to programme deliverability and s20 were removed from SW's Gate 2 submission. As a result, there is no Annex 11 included in the submission. Agreement was reached between SW, RAPID and the EA to remove this document as it is primary related to items outside of the RAPID Gate process.

## 3.2 Gate 2 Submission Glossary

Term or acronym	Definition
1-in-200-year	A severe drought - the return period of a significant drought and is the design drought year in WRMP19
1-in-500-year	An extreme drought - WRMP19 models 1-in-500-year events as sensitivities but does not proposed infrastructure solutions to meet this drought
AA	Appropriate Assessment
AACE	Association for the Advancement of Cost Engineering
ABE	All Best Endeavours
ABMA	American Boiler Manufacturers Association
ABP	Association of British Ports
ACWG	All Company Working Group
ADO	Average Deployable Output
ADSL	Asymmetric Digital Subscriber Line
AEoI	Adverse Effect on Integrity (HRA terminology)
AI	Aggressiveness Index
AIC	Average Incremental Cost
ALC	Agricultural Land Classification
ALM	Access, Lifting and Maintenance review
ALP	Asset Lifecycle Process
ALS	ALS Laboratories (UK) Limited
AMC	Alarm Monitoring Centre
AMP	Asset Management Plan
AMP7	Asset Management Plan 7 - the UK water industry's seventh AMP, detailing the programme of capital works to be completed between 1st April 2020 and 31st March 2025
AMR	Automatic Meter Reading - A type of water meter that can be read remotely using drive-by technology
AOC	Assimilable Organic Carbon
AOD	Above Ordinance Datum
AONB	Area of Outstanding Natural Beauty - an area of countryside in England, Wales or Northern Ireland which has been designated for conservation under the Countryside and Rights of Way Act 2000 to protect, conserve and enhance its natural beauty
AOP	Advanced Oxidation Process
APC	Additional Project Costs
Appointee	Company that has been appointed by Ofwat to manage water services across a particular geographical area or region
Appraisal	Any form of assessment that follows a structured process, either standard industry practice or developed by SW, to evaluate certain criteria or characteristics
AQMA	Air Quality Management Area
ASR	Aquifer Storage Recharge

Term or acronym	Definition
Associated Development	Under the Planning Act 2008, development associated with the principal development, which supports the construction or operation of the principal development or to address its impacts
ASTR	Aquifer Storage Transfer and Recovery
Back-Up Option	Gate 2 will confirm a Selected Option for SW. The Back-Up Option is a secondary option which will be progressed on an alternative path and activated in the event that the Selected Option becomes undeliverable.
Back-Up Option Evolution Plan	A plan to be submitted by SW at Gate 2 of the Gated Process, detailing how the Back-Up Option is expected to evolve to meet the increasing future needs of water customers in SW's region as set out in the Future Needs Assessment
Base Case	The preferred strategy in WRMP19 including Option A.1 (75MI/d desalinated water from Fawley to Testwood WSW)
BAU	Business As Usual
BB	Building Blocks
BCM	Buildability Construction Management
BEIS	Department for Business, Energy & Industrial Strategy
Best Value for Customers	Design, delivery and operation of an asset that protects the water supply to SW customers with as little negative impact as possible on them and their local environment, whilst meeting national, regional and SW corporate objectives
BGS	British Geological Survey is a world-leading geological survey. It focuses on public-good science for government, and research to understand earth and environmental processes
BI	Business Intelligence
BIM	Building Information Modelling
BNG	Biodiversity Net Gain
BOD	Biological Oxygen Demand
BOTEX	Baseline Total Expenditure
BP	Bio-polymers
BPT	Break Pressure Tank
BS	British Standards
BWRO	Brackish Water Reverse Osmosis
CA	Cellulose Acetate
CAG	Customer Action Group
CAP	Competitively Appointed Provider
CAPEX	Capital Expenditure
Catchment	The area of region where all water flows to a single point, e.g. for a wastewater catchment, all wastewater flows to a single WTW for treatment. Note, refer to WWC for wastewater catchment.
CAW	Carbon Accounting Workbook
CBA	Cost Benefit Appraisal
CBS	Cost Breakdown Structure
CCMA	Coastal Change Management Area
CCPP	Calcium Carbonate Precipitation Potential
CCS	CCS Candy estimating platform used by Cost Estimating Team

Term or acronym	Definition
CCW	Consumer Council for Water
CDE	Common Data Environment
CDM	Construction Design and Management CDM Regulations
CDOC	Chromophoric Dissolved Organic Carbon
CDR	Conceptual Design Report
CEA	Cumulative Effects Assessment
CEB	Chemically Enhanced Backwash
CEC	Constituents of Emerging Concern Contaminants of Emerging Compounds
CEFAS	Centre for Environment, Fisheries and Aquaculture Science
CEMP	Construction Environmental Management Plan - document that details the measures and actions to be taken to minimise environmental impacts during construction
CFA	Continuous Flight Auger
CFD	Computational Fluid Dynamics
CIP	Cleaning In Place - an enhanced chemical cleaning cycle intended to remove the most strongly adhered fouling agents from an asset, in this context from MF, UF or RO membranes. CIP is a non-routine activity, typically occurring at intervals of a month or longer.
CIT	Cost Intelligence Team
Cluster (as used in MCDA in Options Appraisal)	A group of criteria with a common theme e.g. environment, society
Cluster (as used in Site and Route selection in Options Appraisal)	Geographical groupings of terrestrial, marine intake and marine outfall parcels which are configured together
CNI	Critical National infrastructure (Including water supply)
COD	Chemical Oxygen Demand
COMAH	Control of Major Accident Hazard Regulations 1999
Component	The key engineering items that contribute to each option e.g. pipeline, water recycling plant
Configuration	The structure of each Option (e.g. technology choice, route to deliver water)
Consenting Evaluation	Assessment of each option as part of the OAP against a range of planning, consenting, land and environmental criteria informed by relevant policy and legislative requirements in order to understand the likely consenting risks with each option
Constrained List	The options list from which the Long List Options were selected
CORMIX	CORMIX modelling software
COVID19	Coronavirus Disease
CP	Control Point
CPIH	Consumer Prices Index Including Owner Occupiers' Housing Costs (UK)
CRoW	Countryside and Rights of Way
CSMG	Common Standards Monitoring Guidance
CSMR	Chloride-to-Sulphate Mass Ratio
Ct	The product of the concentration of a disinfectant and the contact time with the water being disinfected

Term or acronym	Definition
CT	Contact Tank
CV	Curriculum vitae
D&B	Design and Build
DAF	Dissolved Air Flotation
DAPI	4',6-diamidino-2-phenylindole
DBFOM	Design, Build, Finance, Operate & Maintain
DBP	Disinfection By-products
DC	Data Centre
DCO	Development Consent Order - a DCO is a statutory instrument (law) that grants consent for a Nationally Significant Infrastructure Project under the terms of the Planning Act 2008. A DCO can combine consent to develop, operate and maintain a project, alongside a range of other approvals that would normally have to be obtained separately, such as listed building consent, deemed marine licence and certain environmental consents. A DCO can also contain powers for the compulsory acquisition and temporary possession of land.
Defra	Department for Environment Food & Rural Affairs - Defra is the government department responsible for environmental protection, food production and standards, agriculture, fisheries and rural communities.
DfT	Department for Transport
DI	Distribution Input
DIC	Differential Interference Contrast
Dissolved Air Flotation (DAF)	A water treatment process that clarifies wastewaters by the removal of suspended matter such as oil or solids.
DMA	District Metered Area
DMF	Dual-Media Filter
DMWG	Decision-Making Working Group
DN	Nominal Diameter
DNO	Distribution Network Operator
dNPS	draft National Policy Statement
dNPSWRI	draft National Policy Statement for Water Resources Infrastructure
DO	Dissolved Oxygen
DO	Deployable Output
DOC	Dissolved Organic Carbon
DOM	Dissolved Organic Matter
DP	Drought Plan
DPC	Direct Procurement for Customers
DPR	Direct Potable Reuse
DQM	Data Quality Management
Drought Order	Powers granted by the Secretary of State during drought to modify abstraction / discharge arrangements on a temporary basis
Drought Permit	An authorisation granted by the Environment Agency under drought conditions, which allows for abstraction / impoundment outside the schedule of existing licences on a temporary basis
DS	Dry Solids
DTM	Digital Terrain Model

Term or acronym	Definition
DWF	Dry Weather Flow
DWI	Drinking Water Inspectorate
DWIRMAS	Drinking Water Inspectorates Risk Management Accreditation Scheme
DYAA	Dry year annual average - represents a period of low rainfall and unrestricted demand
DYCP	The period(s) during the year when water resource zone supply demand balances are at their lowest
DYMDO	Dry year minimum deployable output - this is the autumn period in a dry year when groundwater levels and river flows are at their lowest and sources are constrained to their minimum deployable outputs
E&C	Engineering & Construction
EA	Environment Agency
EAM	Enterprise Asset management
EBCT	Empty Bed Contact Time
EBL	Environmental Buffer Lake
EBU Emerging Back-Up Option	Approaching Gate 2 there will be an emerging Back-Up Option for SW. The Back-Up Option is a secondary option which will be progressed on an alternative path and activated in the event that the Selected Option becomes undeliverable
ECI	Early Contractor Involvement
EDC	Endocrine Disrupting Compound
EEM	Excitation Emission Matrix
EFM	Enhanced Flux Maintenance - also called chemically enhanced backwashing. EFM is specific to membrane filtration systems whereby chemicals are dosed into washwater to enhance the cleaning performance.
EFW	Energy from Waste
EHV	Extra High Voltage
EIA	Environmental Impact Assessment - the aim of EIA is to protect the environment by ensuring that a relevant authority (local planning authority or Secretary of State) when deciding whether to grant a planning permission or DCO for a project which is likely to have significant effects on the environment does so in the full knowledge of the likely significant effects and takes this into account in the decision making process. EIA also enhances public engagement in the process as consultation on EIA is mandatory.
EICA	Electrical, Instrumentation, Control and Automation
EMS	European Marine Site
ENCA	Enhancing a Natural Capital Approach
ENG	Environmental net gain
EP	Engagement Plan (with Regulators and other statutory bodies)
EPC	Engineering, Procurement and Construction
EPH	Extractable Petroleum Hydrocarbons
EPO Emerging Preferred Option	At the Interim Update an Emerging Preferred Option has been identified through the OAP, this will be become the Preferred Option at Gate 2
EPO Emerging Preferred Option	At the Interim Update an Emerging Preferred Option has been identified through the Options Appraisal process, this will be become the Selected Option at Gate 2
EPP	Evidence Plan Process
ERD	Energy Recovery Devices
ERP	Enterprise Resource Planning
ES	Environmental Statement required as part of a planning application that is EIA development.

Term or acronym	Definition
ESB	Engineered Storage Buffers
ESEV	Environmental, Social, Economic, Valuations
ESW	Essex and Suffolk Water
ETS	Engineering Technical Services
EU	European Union
EUECJ	European Union Court of Justice of the EU communities (translated)
EVH	Extra High Voltage
EVL	Environment Values Look-up
FA	Immunofluorescence assay
Fawley Site	The site described in WRMP19
FCERM	Flood and Coastal Erosion Risk Management
FD or Final Determination	Final Determination - set of documents published by Ofwat in December 2019 that specify the obligations during AMP7
FE	Final Effluent
FFT	Full Flow to Treatment (process capacity)
FOG	Fats, Oils & Greases
FRT	Failure Response Time
FTE	Full Time Equivalent
FTS	Find-a-Tender service
Future Needs Assessment	The further work to be carried out by SW prior to Gate 2 of the Gated Process to test the suitability of each of the Options to meet long term water supply requirements and therefore sustainability of supply. This work will test the outcome to date of our OAP, which has been undertaken in the context of a 1-in-200 year drought standard and WRMP19, by considering the suitability of each of the Options in the context of the transition to regional water resources planning, the requirements of WRMP24, a 1-in-500 year drought standard and the need to consider environmental destination.
FWL	Fawley Waterside Limited
Gated Process	The formal staged process, run by Ofwat, for specific water companies to investigate solutions and for regulators to review progress and determine how, and if, the solutions will progress.
GBNNSS	Great British Non-Native Species Secretariat
GFS	Glass Fused to Steel
GHGs	Green House Gases
GIS	Geographic Information System - computer software system for capturing, storing, checking, and displaying data related to positions on the Earth's surface.
GRC	Government Risk Control
Grid	Bulk transfer distribution infrastructure
Ground water	Water held underground in the soil or in voids in rock
GSP	Grid Supply Point
GW / Gateway	Gate/stage of the RAPID Gated Process
GWDTE	Groundwater Dependent Terrestrial Eco-systems
H&S	Health and Safety
HA	Hampshire Andover WRZ

Term or acronym	Definition
HAA	Haloacetic Acids
HAZOP	Hazard and Operability Review
HGVs	Heavy Goods Vehicles
HIC	Hazard Identification Checklist
HK	Hampshire Kingsclere WRZ
HLPS	High-Lift Pumping Station
HLR	Hydraulic Loading Rate
HMI	Human Machine Interface
HMWLP	Hampshire Minerals and Waste Local Plan
HoF	Hands off Flows - EA specifies a level of flow in a river below which any abstractor may take no water at all
HR	Hampshire Rural WRZ
HRA	Habitats Regulation Assessment - assessment to consider potential effects on designated European sites
HS	Humic Substances
HSE	Hampshire Southampton East
HSW	Hampshire Southampton West
HT	Havant Thicket
HTR	Havant Thicket Reservoir
HTWSR	Havant Thicket Winter Storage Reservoir
HV	High Voltage
HW	Hampshire Winchester WRZ
IAP	Initial Assessment of Plans - set of documents published by Ofwat in January 2019 which first set out the proposed strategic resource process and Gated Process
IAQM	Institute of Air Quality Management
IEMA	Institute of Environmental Management and Assessment
IEX	Ion Exchange
IIoT	Industrial Internet of Things
ILR	Inverse Larson Ratio
IMS	Immunomagnetic separation
Infra	Works outside of the boundary on existing or proposed Southern Water sites
INNS	Invasive Non Native Species
Inshore Fisheries and Conservation Authorities (IFCA)	Committees or joint committees of the local authorities that fall within an IFC district. They are tasked with the sustainable management of inshore sea fisheries resources in their local area. They are made up of representatives from the constituent local authorities along with people from across the different sectors that use or are knowledgeable about the inshore marine area, such as commercial and recreational fishermen, environmental groups and marine researchers, who offer their time voluntarily.
Interim Update (IU)	Submission to RAPID on 27 September 2021 focusing on SW's decision to no longer progress the desalination options as part of the Gated Process.
IoT	Internet of Things
IOW	Isle of Wight

Term or acronym	Definition
IP CCTV	Internet Protocol Closed-Circuit Television
IPR	Indirect Potable Reuse
IROPI	Imperative Reasons of Overriding Public Interest
IT	Information Technology
IT/OT	Information Technology / Operational Technology
ITA	Independent Technical Advisor
ITT	Invitation to Tender
IX	Ion Exchange
JNCC	Joint Nature Conservation Committee
LAT	Lowest Astronomical Tide
LCDR	Low Complexity Delivery Route
LC-OCD	Liquid Chromatography Organic Carbon Detection
LED	Light Emitting Diode
Legal and Policy Obligations	The legal obligations and government (including other public bodies) policy obligations relevant to the OAP and SW's selection of the SRO at the next stage of the Gated Process
LIDAR	Light Detection and Ranging
LMW	Low molecular weight
LNR	Local Nature Reserve
Local Harbour Authorities	Independent body that is responsible for running a harbour. Most harbours are administered by statutory harbour authorities that are governed in accordance with local legislation.
LOD	Limit of Detection
Long List	The ten Options, including the Base Case and the alternatives.
LPA	Local Planning Authorities - the local government body that is empowered by law to exercise planning functions for a particular area either of a district, borough unitary or county council.
LPCB	Loss Prevention Certification Board
LSE	Likely Significant Effect
LSI	Langelier Saturation Index
LSO	Long Sea Outfall
LVIA	Landscape and Visual Assessment
LWS	Local Wildlife Site
M	Million
M&E	Mechanical and Electrical
MAGIC	Multi Agency Geographic Information for the Countryside
Management Information System (MIS)	An information system used for decision-making, and for the coordination, control, analysis, and visualization of information in an organization.
MAR	Managed Aquifer Recharge
Marine Strategy Framework Directive (MSFD)	Directive 2008/56/EC of the European Parliament and of the Council of 17 June 2008 establishing a framework for community action in the field of marine environmental policy. A European Directive aimed at achieving or maintaining Good Environmental Status in European seas.

Term or acronym	Definition
MarLIN	Marine Life Information Network
MBR	Membrane Bio-Reactors
MCC	Motor Control Centre
MCDA	Multi Criteria Decision Analysis
MCZ	Marine Conservation Zone
MCZA	Marine Conservation Zone Assessment
MDL	Minimum Detection Limit
MDO	Minimum Deployable Output - Deployable output for the period when groundwater levels are at their lowest
MEAT	Most Economically Advantageous Tender
Mechanical, Electrical, Instrumentation, Control and Automation (MEICA)	Discipline related to mechanical and electrical engineering
MED	Multi-effect Distillation
MF	Microfiltration
MF-UF	Microfiltration/Ultrafiltration
MGD	Million Gallons per Day
MGJv	Southern Water Delivery Partner
MHCLG	Ministry of Housing, Communities and Local Government - This has recently been changed to Department of Levelling Up, Housing and Communities.
MI/d	Megalitres (million litres) per day
MML	Mott MacDonald Limited
MMO	Marine Management Organisation - licence, regulate and plan marine activities in the seas around England so that they're carried out in a sustainable way. MMO is an executive non-departmental public body, sponsored by the Department for Environment, Food & Rural Affairs.
MOD	Ministry of Defence - the British government department responsible for implementing the defence policy set by Her Majesty's Government
MRF	Minimum Retained Flow
MSF	Multi-Stage Flash
NC	Natural Capital
NCA	National Character Area
NCA	Natural Capital Assessment
NCSC	National Cyber Security Centre - NCSC.GOV.UK
ND	Nominal Diameter
NDMA	N-nitrosodimethylamine
NE	Natural England
NEC	New Engineering Contract
NFNP	New Forest National Park
NIS	Network and Information Systems Regulations 2018: Security standard
NNR	National Nature Reserve

Term or acronym	Definition
NOM	Natural Organic Matter
Non Infra	Works carried out on existing or proposed Southern Water sites
NPPF	National Planning Policy Framework - sets out the Government's economic, environmental and social planning policies for England. The policies set out in the framework apply to the preparation of local and neighbourhood plans and to decisions on planning applications under the TCPA regime. The policies set out in the framework apply to the preparation of local and neighbourhood plans and to decisions on planning applications under the TCPA regime.
NPS	National Policy Statement - produced by government under the Planning Act 2008. They comprise the government's objectives for the development of nationally significant infrastructure in a particular infrastructure sector (energy, transport, water, waste water and waste). There are currently 12 designated NPS, setting out government policy on different types of national infrastructure development. Applications for DCOs are decided in accordance with any relevant NPS(s). The Water Resources Infrastructure NPS is currently in draft form and must include an explanation of how the policy takes account of government policy relating to the mitigation of, and adaptation to, climate change and design. They comprise the government's objectives for the development of nationally significant infrastructure in a particular infrastructure sector (energy, transport, water, waste water and waste). There are currently 11 designated NPS, setting out government policy on different types of national infrastructure development. Applications for DCOs are decided in accordance with NPSs.
NPV	Net Present Value
NSI	Net Social Impact
NSIP	Nationally Significant Infrastructure Project
NTU	Nephelometric Turbidity Units
NWEBS	National Water Environment Benefit Survey
O&M	Operation and Maintenance
OAM	Operational Asset Management Programme (EAM and GIS)
OAP	Options Appraisal Process
OB	Optimism Bias
OBC	Outline Business Case (DPC related)
OBR	Office for Budget Responsibility
ODI	Outcome Delivery Incentive
ODPM	Office of Deputy Prime Minister
OEP	Option Evolution Plans
OFTO	Offshore Transmission Owner
Ofwat	Water Services Regulation Authority - The economic regulator of the water sector in England and Wales
OGP	Oxford Global Projects
OH	Overhead
OJEU	Official Journal of the European Union
OPC	Open Platform Communications
OPEX	Operational Expenditure
OPH	Contractor Overhead & Profit.

Term or acronym	Definition
Option	Single proposed method considered as part of Gate 2 submission. The Options include A.1, A.2, B.2-B.5, D.1 and D.2. Please note, some options were removed prior to Interim Update. For consistency with the terminology used in PR19 Final Determinations and the RAPID Strategic Solution Accelerated Gate 1 Submission: Initial Concept Design template. These alternatives are described as Options, however, because SW is using all best endeavours to deliver the Base Case, these are seen as alternatives, rather than 'options' as such.
Option A.1	75 MI/d Deployable Output (DO) desalination at Fawley direct to Testwood WSW;
Option A.2	61 MI/d DO desalination at Fawley direct to Testwood WSW
Option B.1	61 MI/d Recycled water sent to Lower Itchen, abstraction and transferred for treatment at Otterbourne Water Supply Works (WSW)
Option B.2	61 MI/d DO recycled water (indirect) sent to Environmental Buffer Lake (EBL) and treated at Otterbourne WSW (Water Recycling Plant (WRP) supplied by Budds Farm Wastewater Treatment Works (WTW));
Option B.3	61 MI/d DO recycled water (direct) sent to Otterbourne WSW
Option B.4	75 MI/d DO transfer between HTR and Otterbourne WSW (augmented with a 15 MI/d WRP to supplement HTR)
Option B.5	75 MI/d DO of recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm and Peel Common WTW);
Option D.1	A combination of 40 MI/d Desalinated water to a large coastal industrial facility with existing South West Water (SWW) supply diverted to SW 30 MI/d In addition a 40 MI/d DO recycled water (indirect) sent to EBL and treated at Otterbourne WSW (WRP supplied by Budds Farm WTW);
Option D.2	61 MI/d DO transfer between HTR and Otterbourne WSW
Option hierarchy	The 'best value for customers' hierarchy of Options requested in the RAPID Strategic Solution Accelerated Gate 1 Submission: Initial Concept Design template
ORAT	Operational Readiness and Training
ORVal	Outdoor Recreation Valuation Tool
OSEC	On-site Electrolytic Chlorination
OT	Operational Technology
OTT	Operational Technology Transformation programme
Outline Option Evolution Plan	A plan to be developed by SW for each Option for the purposes of the remainder of the OAP, outlining how the Option would be expected to evolve to meet the increasing future needs of water customers in SW's region as set out in the Future Needs Assessment
P&IDS	Piping and Instrumentation Diagram
PA	Polyamide
Parcel	Identification of potentially suitable sites for the Options
PB	Preferred Bidder (procurement)
PCC	Per Capita Consumption - Amount of water typically used by one person per day
PCV	Prescribed Concentration or Value
PD	Permitted Development - the Town and Country Planning (General Permitted Development) (England) Order 2015 (the GPDO 2015) automatically grants water undertakers planning permission for certain types of development, in accordance with the provisions of the GDPO 2015
PDO	Peak Deployable Output - Deployable output for the period in which there is the highest demand
PDT	Pressure Decay Test

Term or acronym	Definition
PEA	Preliminary Ecological Appraisal
PEI	Preliminary Environmental Information
PEIR	Preliminary Environmental Information Report
PFA	Preliminary Feasibility Assessment
PFAS	Per- and PolyFluorAlkyl Substances
PFD	Process Flow Diagram - a diagram commonly used in chemical and process engineering to indicate the general flow of plant processes and equipment.
PFI	Private Finance Initiative
PHE	Public Health England
PID	Probability Impact Diagram
PIM	Programme Insight Manager (Southern Water Risk Management System)
PIN	Prior Information Notice (procurement)
Planning Inspectorate (PINS)	The Planning Inspectorate for England and Wales is an executive agency of the Ministry of Housing, Communities and Local Government of the United Kingdom Government with responsibility to make decisions and provide recommendations and advice on a range of land use planning-related issues across England and Wales.
PLC	Programmable Logic Controller
PMO	Project Management Office
POC	Particulate Organic Carbon
PoC	Proof of Concept
PPCP	Pharmaceuticals and Personal Care Products
PPP	Public Private Partnership
PQQ	Pre-Qualification Questionnaire (procurement)
PR19	2019 Price Review
PRA	Preferred Route Announcement (in DCO process)
Preferred Strategy	Final strategy for the Western Area as described in WRMP19 (formerly referred to as Strategy A in draft WRMP19) and is what is required to be delivered by the Section 20 agreement
PRISM	Southern Water Cost Management System
Programme	All activities included within the scope of WFLH
Project	Specific activities required to deliver one of the options / solutions / schemes
PRoW	Public Rights of Way - public right of way is a right by which the public can pass along linear routes over land at all times. Although the land may be owned by a private individual, the public have a legal right across that land along a specific route.
PS	Pumping Station - facilities including pumps and equipment for pumping fluids from one place to another.
PSTN	Public Switched Telephone Network
PW	Portsmouth Water
PWWS	Passive Wedge Wire Screens
QCRA	Quantitative Cost Risk Analysis
QSRA	Quantitative Schedule Risk Analysis
R&V	Risk and Value (Southern Water collaborative review meeting and technical checkpoint)

Term or acronym	Definition
RAG	Red Amber Green
RAMS	Risk Assessment Method Statements
RAP	Remediation Action Plan (provided to RAPID on 31st March and 26th July 2021)
RAPID	Regulatory Alliance for Progressing Infrastructure Development - formed to help accelerate the development of new water infrastructure and design future regulatory frameworks. Made up of the 3 water regulators: Ofwat, Environment Agency and Drinking Water Inspectorate. It was established with the intention of providing a seamless regulatory interface, working with the industry to promote the development of national water resources infrastructure that is in the best interests of water users and the environment.
RBMP	River Basins Management Plan
RBMP2	River Basin Management Plans 2
RCC	Regional Control Centre
RCV	Regulatory Capital Value
Regional Plan / Regional Planning (WRSE related)	Water Resource South East's Regional Plan
Reject Water	Waste product from the Reverse Osmosis process
RFI	Request for Information
RGF	Rapid Gravity Filters
RIGS or RIGGS	Regionally Important Geological Sites (RIGS) or Regionally Important Geological and Geomorphological Sites (RIGGS). Locally designated sites of local, national and regional importance for geodiversity (geology and geomorphology).
RO	Reverse Osmosis - the process used for removing salt from either sea or brackish water.
Routes	A number of alternative routes have been identified for the pipeline component for the sub-option and configurations.
RPI	Retail Price Index
RPS	Royal Pharmaceutical Society
RTU	Remote Terminal Unit / Remote telemetry Unit
RTW4	WRc water quality model
RWPS	Raw Water pumping station
S&I	Studies and Investigations
s20	Section 20 - the agreement signed by Southern Water and the Environment Agency during the abstraction licence Inquiry in March 2018 under Section 20 of the Water Resources Act 1991.
SAC	Special Area of Conservation - land designated under Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora. Important high-quality conservation sites that will make a significant contribution to conserving the habitats and species identified in Annexes I and II, respectively, of the Habitats Directive. The listed habitat types and species are those considered to be most in need of conservation at a European level (excluding birds).
SACO	Supplementary Advice on Conservation Objectives
SANG	Suitable Alternative Natural Greenspace - an area that is aimed at protecting a Special Protection Area. Surrounding these SPAs are buffer zones in which development is constrained to prevent damage to the SPA itself. These buffer zones are called the SANGs and development is limited in these areas.
SAR	Sodium Adsorption Ratio
SCADA	Supervisory Control and Data Acquisition

Term or acronym	Definition
Scheme	Something to be delivered which is outside of the solutions and Gate 1 but is a requirement of the WRMP19 or Section 20 agreement or other SW commitments.
SD	Software Defined
SDB	Supply Demand Balance
SDI	Silt Density Index
SDNPA	South Downs National Park Authority
SEA	Strategic Environmental Assessment - study of the impacts of a proposed plan, programme, policy or legislative action on the environment and sustainability under the Environmental Assessment of Plans and Programmes Regulations 2004
SEC	Size exclusion chromatography
Section 35 direction s.35	A direction by the relevant Secretary of State to confirm that a project is to be regarded as a 'Nationally Significant Infrastructure Project' (NSIP) where that project falls below the thresholds for automatically qualifying as a NSIP.
Selected Option	How Option B4 will be referred to following the Gate 2 submission
Selected Option Evolution Plan	A plan to be submitted by SW at Gate 2 of the Gated Process, detailing how the Selected Option is expected to evolve to meet the increasing future needs of water customers in SW's region as set out in the Future Needs Assessment.
SEMD	Security & Emergency Measures Direction
SIA	Stantec Insight Analytics - the 'SIA' routes are the ones produced by SIAs tool
SINC or SNCI	Site of Importance for Nature Conservation (SINC) or Site of Nature Conservation (SNCI) Sites that have substantive local nature conservation value.
SLD	Single Line Diagram
SLM	Southampton Link Main
SLP	Southampton to London
SLT	Senior Leadership Team
SM	Scheduled Monument
SMART targets	Indirect costs calculated from Southern Water's percentage uplifts
SMEs	Subject Matter Experts
SOC	Strategic Outline Case (DPC)
Solution	The overarching method for provision of water i.e. desalination, water recycling, transfer or Additional Solution
SOM	Site Operating Manual
SOP	Standard Operating Procedure
SoS	Secretary of State - cabinet minister in charge of a government department. In this instance, the Secretary of State for Environment, Food and Rural Affairs (DEFRA).
SPA	Special Protection Area - areas classified in accordance with European Council Directive 2009/147/EC on the conservation of wild birds, known as the Birds Directive. SPAs protect rare and vulnerable birds (as listed on Annex I of the Birds Directive), and regularly occurring migratory species.
SQ	Selection Questionnaire
SRO	Strategic Resource Option, one of the solutions due to be submitted to RAPID via the gated process.
SRWRS	Strategic Regional Water Resource Solution
SSEN	Scottish and Southern Electricity Networks

Term or acronym	Definition
SSO	Short Sea Outfall
SSP	Strategic Solutions Partner
SSSI	Site of Special Scientific Interest - formal conservation designation describing an area that's of particular interest to science due to the rare species of fauna or flora it contains - or important geological or physiological features that may lie in its boundaries.
STPR	Social Time Preference Rate
Strategic Objectives / Strategic Objective	The three strategic objectives set by SW for the SRO and therefore the three objectives relevant to the OAP and SW's selection of the SRO at the next stage of the Gated Process.
Strategy A	Strategy A in the draft WRMP19, which was superseded by the Preferred Strategy in the final WRMP19.
SUDS	Sustainable Urban Drainage Systems
Supply-demand balance	The difference between total water available for use (as supply) and forecast distribution input (as water demand) at any given point in time over the Water Resource Management Plan's planning period / horizon
SVOC	Semi-Volatile Organic Carbon
SW	Southern Water
SWRO	Sea Water Reverse Osmosis
SWW	South West Water
T100	Target 100 Initiative
TAB	Technical Application Bulletin
TBM	Tunnel Boring Machine
TCPA	Town and Country Planning Act 1990
TDS	Total Dissolved Solids
The Office of Gas and Electricity Markets (OFGEM)	Regulator for the electricity and downstream natural gas markets in Great Britain
Third-Party Pass-Through Costs	Costs undertaken by others outside of Southern Water
THM	Trihalomethanes
TKN	Total Kjeldahl nitrogen
TN	Total Nitrogen
TOC	Total Organic Carbon
TOTEX	Total Expenditure (Combination of CAPEX and OPEX)
TPH	Total Petroleum Hydrocarbons
Triad	The three half hour settlement periods of highest demand on the GB electricity demand system, between Nov and Feb each year.
TRS	Tender Revenue Stream
TS2T	Thames to Southern Transfer
TSS	Total Suspended Solids
TTRO	Temporary Traffic Regulation Order

Term or acronym	Definition
TUB	Drought restriction imposed by water companies on customers. Restrictions include not using water supply for leisure pursuits such as watering a 'garden' using a hosepipe, filling a pool such as watering a 'garden' using a hosepipe, filling a pool
TWAO	Transport and Works Act Orders - an order made under the Transport and Works Act 1992 is the usual way of authorising a new railway or tramway scheme in England or Wales. TWA orders may also relate to the construction or operation of inland waterways and certain types of works (e.g. bridges, piers, barrages and tunnels) that interfere with rights of navigation in waters up to the limits of the territorial sea.
UCR	Utilities Contract Regulations
UF	Ultrafiltration - a pressure-driven barrier to suspended solids, bacteria, some viruses, endotoxins and other pathogens to produce water with very high purity and low silt density. Ultrafiltration is a variety of membrane filtration in which hydrostatic pressure forces a liquid against a semi permeable membrane.
UK	United Kingdom
UKAS	UK Accreditation Service
UKWIR	UK Water Industry Research
Uncertainty	Allowance for specific unit costs to fluctuate, not covered in the Risk Register or Optimism Bias
Unconstrained List	List of potential options to be considered for initial screening. Preceding step to the Long List
UPC	User Programmable Controls
UPS	Uninterruptable Power Supply
UPT	Under Pressure Tapping
USEPA	United States Environment Protection Agency
UV	Ultraviolet
UVAOP	Ultraviolet with Advanced Oxidation Process
UVT	UV transmittance
UXO	Unexploded Ordnance
VfM	Value for Money
VOC	Volatile organic compound
VOWD	Value of Work Done
VPN	Virtual Private Network
WAA	Water Authorities Association
WAAC	Weight Average Cost of Capital
WAACS	Work and Asset Control System (WAG project)
WACC	Weighted Average Cost of Capital
WAFU	Water available for Use - combined total of deployable output; future changes to deployable output from sustainability changes, climate change etc.; transfers and any future inputs from a third parties; short term losses of supply and outage; and operational use or loss of water
WAG	Way Ahead Group
WALLRUS	Hydraulics Research Computer Software system
WAN	Wide Area Network
WAP	Wireless Application Protocol
WaSC	Water and Sewerage Company

Term or acronym	Definition
WASSP	Hydraulic Research Computer Software
WBS	Water Booster Station
WBS Work Breakdown Structure	Work Breakdown Structure
WCSN	West Country Sources (North)
WE&RF	Water Environment and Reuse Foundation
WERF	Water Industry Research Foundation
Western Area	Supply area comprising the Hampshire Andover, Hampshire Kingsclere, Hampshire Winchester, Hampshire Rural, Hampshire Southampton East, Hampshire Southampton West and Isle of Wight Water Resource Zones
WFD	Water Framework Directive - a framework for the protection of inland surface waters, estuaries, coastal waters and groundwater.
WFDA	Water Framework Directive Assessment
WfLH	Water for Life Hampshire
WFMC	Workflow Management Coalition
WHO	World Health Organisation
WIA	Water Industry Act
WINEP	Water Industry National Environment Programme
WIPS	Work Improvement Scheme
WIS	Water in Supply or Water Information System
WLANS	Wireless Local Area Networks
WLC	Whole Life Cost
WLL	Wireless Local Loop
WoC	Water Only Company
WOM	Works Operation and Maintenance Manuals
WORM	Write Once, Read Many
WPC	Water Production Centre
WPS	Water (or Wastewater) Pumping Station
WQM	Water Quality Monitoring System
WQO	Water Quality Objective
WQRA	Water Quality Risk Assessment
WQSD	Water Quality Shutdown
WRA	Waste Regulation Authority
WRC	Water Research Centre
WRc	Found in Level 3 Desalination section 2.2.3
WRc	Found in Annex 1 section 2.2.3
WRIS	Water Resource Information System
WRMP	Water Resource Management Plan

Term or acronym	Definition
WRMP, WRMP19, WRMP24	Water Resource Management Plan - statutory plan setting out how water companies will supply healthy, reliable drinking water to homes and businesses for at least the next 25 years. These plans are published at least every five years. The plan published in 2019 is WRMP19 and the next update will be WRMP24 which is intended to be published in 2023.
WRP	Water Recycling Plant - a site whereby wastewater effluent is purified into water that can be reused as a raw water for providing drinking water.
WRPG	Water Resources Planning Guideline/Guidance?
WRSE	Water Resources South East, the regional body relevant for Southern Water's area of operation Zone
WRZ	Water Resource Zone
WSA	Water Services Association
WSI	Written Scheme of Investigation (in relation to EIA / HRA)
WSP	Water Safety Plan
WSP301	WSP Risk Assessment & Monitoring Methodology
WSPS	Water Supply Pumping Station
WSR	Water Service Reservoir
WST	Weather Station
WSW	Water Supply Works - A site whereby raw water is taken from the environment, treated and discharged into the distribution network supplying homes, businesses and industry.
WTW (Also expanded as Wastewater Treatment Works)	Waste Treatment Works - A site whereby wastewater and sewerage is treated and discharged back into the environment.
WWC	Waste Water Catchment
WWSS	Waste Water Scheduling System