Draft Water Resources Management Plan 2024

Resource Options - Desalination Feasibility Report

Addendum

Contents

Executive summary

1. This report provides a summary of changes that have been made to the desalination options since Thames Water's 2019 Water Resources Management Plan (WRMP19) as part of the 2024 Water Resources Management Plan (WRMP24) development.

2. This report acts as an addendum to Thames Water WRMP19 Resource Options Desalination feasibility report, February 2018, Rev 02.

3. No new desalination options have been identified at WRMP24 but phasing variations have been incorporated within the WRMP19 options; Options (1a) Beckton Desalination treatment plant and (2d) Crossness desalination treatment plant. The option phasing allows greater flexibility in investment modelling and alignment with other large options in adopting a common phasing capacity of 50 Ml/d.

4. At WRMP24 backchecking of the WRMP19 screening decisions has been undertaken, where appropriate options have been further developed.

5. The updated WRMP24 feasibility assessment presents the WRMP19 options and the additional WRMP24 phasing options. The findings for Stage 1 and Stage 2 Assessments were unchanged from the WRMP19 feasibility assessments. The four WRMP24 additional phasing options all passed the Stage 3 feasibility assessment.

6. The WRMP24 assessment verifies that the additional proposed phasing options considered allow flexibility for a phased approach to be included in the investment modelling decisions.

7. The following list of options are the confirmed Feasible List of desalination options for WRMP24:

    - Option 1a (Beckton STW / Gascoigne Way): A new desalination plant located on the existing Beckton STW site to transfer desalinated water to Coppermills WTW for blending. This can be phased in 50 Ml/d or 100 Ml/d stages up to a limit of 150 Ml/d. The WRMP19 Stage 1-3 assessment findings for this option remains unchanged.
    - Option 2d (Crossness - Thamesmead Industrial Estate Extension, Waldrist Way): A new desalination plant located to the South of Erith Marshes to transfer desalinated water to Coppermills WTW for blending. This can be phased in 50 Ml/d or 100 Ml/d stages up to a limit of 300 Ml/d. The WRMP19 Stage 1-3 assessment findings for this option remains unchanged.

Introduction

8. Thames Water is developing options for the 2024 Water Resources Management Plan (WRMP24). These options build on options developed as part of Thames Water's 2019 Water Resources Management Plan (WRMP19). This report provides a summary of changes that have been made to the desalination options since WRMP19 and as part of WRMP24 development.

9. This report acts as an addendum to **Thames Water WRMP19 Resource Options Desalination feasibility report, February 2018, Rev 02**. This report should be read alongside the WRMP19 report. Information in this report supersedes information provided in the WRMP19 report.

10. Changes to the WRMP19 Desalination Options have been detailed in Section 2 – 'Updates since WRMP19'. A backchecking exercise has been completed to assess if any changes are required to WRMP19 as a result of identification of the new options or developments since WRMP19. Backchecking also provides the opportunity to take into account any changes of circumstance that might affect how an option is considered. This might include a change in the planning and environmental status of a site, changes in national and local planning policy and the emergence of viable technical solutions that were unavailable at the time the original assessment was undertaken.

11. The WRMP24 screening, option development and backchecking methodology is detailed in Section 7 - Appraisal of Resource Options.

12. This report summarises changes to the desalination options up to the end of feasibility screening. Information on option development and investment modelling can be found in WRMP24 Section 7 - Appraisal of Resource Options.

Structure of this report

13. Table 1 summarises the structure of this report.

Table 1: Structure of this report

Section Name	Description
Executive summary	Summary of addendum report
Introduction	This section
Updates since WRMP19	Summary of the changes made to the options list since WRMP19, including changes to WRMP19 options, new WRMP24 phasing options and changes to Deployable Output (DO).
Updated feasibility assessment	Provides a summary of the current feasibility assessment for all options including options identified at both WRMP19 and WRMP24.
Option verification	Validation of risk and uncertainty for all options and the confirmation of the feasible list of options.
Appendix A: Reference information	A list of useful links and references
Appendix B: Option WRMP19 and WRSE IDs	List of Desalination Option WRMP19 and WRSE IDs

Updates since WRMP19

Option Identification

14. To ensure Thames Water is aligned with the Water Resources South East (WRSE) approach, the following updates have been made to option identification for WRMP24:

- Generic option screening has been revised to reflect the updated list of generic option types recommended by WRSE (refer to WRMP24 Section 7).
- The WRMP19 rejection register has been revisited to ensure that the rejection reasoning remains robust for all rejected options.
- Rejected options have been reviewed to identify any options which should be revisited due to potential for regional benefits, particularly in light of changes in requirements to plan for 1:500 drought resilience (previously 1:200 at WRMP19) and the need to plan for a long-term environmental destination that achieves and maintains a sustainable level of abstraction by 2050
- A review has been undertaken to identify new options to be considered in addition to the existing WRMP19 options, no new desalination options were identified through this process.

Feasibility Screening Updates

15. The overall changes to options and approach since WRMP19 are described in WRMP24 Section 7 Appraisal of Resource Options. Specific changes applicable to desalination options are detailed in Table 2 and Table 3. These tables should be read alongside the WRMP19 feasibility report.

16. The key changes made at WRMP24 are to the desalination option phasing. This was incorporated to allow greater flexibility in investment modelling, and to align with a common phasing capacity of 50 Ml/d for large options.

17. At WRMP24 the approach has changed to consider the regional need rather than the TWUL need alone through Water Resources South East (WRSE) regional planning. In the WRMP24 process fine screening has been replaced by regional planning investment modelling output, which has informed screening for the WRMP24 constrained options list. This has not resulted in any changes to the list of constrained desalination options.

Table 2: Option changes since WRMP19

WRMP19 Option Reference and name	WRSE ID Option Reference and name	Changes to the Option	WRMP19 Feasibility Screening Outcome	WRMP19 Feasibility Screening Outcome
Beckton Desalination treatment plant (150Ml/d) *RES-DES-BEC-150* (Option 1a Estuary North, Beckton)	5 phased elements were included in WRMP which can be combined up to a limit of 150 Ml/d, element names are as follows: Beckton Desalination - Phase 1: 100 Ml/d *TWU_LON_HI-DES_ALL_CNO_beckton desal 100p1* Beckton Desalination - 150 Ml/d *TWU_LON_HI-DES_ALL_ALL_beckton desal* Beckton Desalination - Phase 1: 50 Ml/d *TWU_LON_HI-DES_ALL_CNO_beckton desal 50 p1* Beckton Desalination - Phase 2a: 50 Ml/d Enhanced* *TWU_LON_HI-DES_ALL_ALL_beckton desal 50p2a* Beckton Desalination - Phase 2b: 50 Ml/d Enhanced* *TWU_LON_HI-DES_ALL_ALL_beckton desal 50p2b* *Enhanced indicates phase 2 or 3 elements which can only be implemented after Phase 1 elements.	**This is the treatment component of Beckton Desalination** At WRMP19 the option was a single phase of 150 Ml/d. The option can now be phased as follows: Three phases of 50 Ml/d One phase of 100 Ml/d and a second Phase 50 Ml/d One phase of 150Ml/d This has resulted in 5 Beckton desalination elements at WRMP24. This change has been made to allow maximum flexibility in how the option is built up and to create a consistent phase capacity of 50 Ml/d and 100 Ml/d across option types.	Passed Stage 3– on Feasibility List	WRMP19 option screening reviewed in light of the phasing. WRMP19 scoring considered appropriate for all options for WRMP24. All options have been included on the WRMP24 Feasible List.
Desalination Beckton to Coppermills tunnel *NET-DES-BEC-COP*	Beckton to Coppermills tunnel (treated) *TWU_LON_HI-TFR_LON_CNO_beckton-coppermills*	**This is the treated water conveyance component of Beckton Desalination** No changes from WRMP19	Passed Stage 3– on Feasibility List	Passed – included on Feasible List of options as part of the Beckton Desalination option
Crossness desalination treatment plant (100Ml/d)	Crossness Desalination (Blended) - Phase 1: 100 Ml/d	**This is the treatment component of Crossness Desalination**	Passed Stage 3– on Feasibility List	Phased WRMP19 options scoring reviewed in light of the new phasing.

WRMP19 Option Reference and name	WRSE ID Option Reference and name	Changes to the Option	WRMP19 Feasibility Screening Outcome	WRMP19 Feasibility Screening Outcome
RES-DES-CRO-100 (Option 2d - 100-300Ml/d Estuary South, Waldrist Way Blended-supply) This was proposed as 3 phases of 100Ml/d	TWU_LON_HI-DES_ALL_ALL_crossnessdesal Crossness Desalination (Blended) - 100Ml/d Enhanced * *TWU_LON_HI-DES_ALL_ALL_crossnessdesal100p2* Crossness Desalination (Blended) - Phase 1: 50 Ml/d *TWU_LON_HI-DES_ALL_CNO_crossnessdesal50p1* Crossness Desalination (Blended) - 50Ml/d Enhanced * *TWU_LON_HI-DES_ALL_ALL_crossnessdesal50p2* *Enhanced indicates phase 2 or 3 elements which can only be implemented after Phase 1 elements.	At WRMP19 the option was in Phases of 100 Ml/d up to a limit of 300 Ml/d. This has been updated at WRMP24 as follows: Initial phase of 50 Ml/d. Further phases can be 50 Ml/d or 100 Ml/d up to a limit of 300 Ml/d. the initial phase of 100 Ml/d. Further phases can be 50 Ml/d or 100 Ml/d up to a limit of 300 Ml/d. This has resulted in 4 Crossness Desalination option elements at WRMP24. This change has been made to allow maximum flexibility in how the option is built up and to create a consistent phase capacity of 50 Ml/d and 100 Ml/d across option types.		WRMP19 scoring considered appropriate for all options for WRMP24. All options have been included on the WRMP24 Feasible List.
Desalination – Beckton to Crossness tunnel *CON-RWS-BEC-CRO-300*	Beckton to Crossness tunnel (raw) *TWU_LON_HI-TFR_LON_CNO_beckton-crossness*	**This is the raw water conveyance component of Crossness Desalination** No changes from WRMP19	Passed Stage 3– on Feasibility List	Passed – included on Feasible List of options as part of the Crossness Desalination option
Desalination – Crossness to Beckton tunnel *NET-DES-CRO-BEC*	Crossness to Beckton tunnel (treated) *TWU_LON_HI-ROC_NET_CNO_crossness-beckton*	**This is the treated water conveyance component of Crossness Desalination** No changes from WRMP19	Passed Stage 3– on Feasibility List	Passed – included on Feasible List of options as part of the Crossness Desalination option
Option 3a (Crossness – Erith Southern Grazing Marshes) *No code as didn't reach Constrained List*	Crossness Desalination (Unblended) - 65 Ml/d - Option 3A *TWU_LON_HI-DES_RE1_ALL_crossdesalunblend-65*	No change since WRMP19	Passed Stage 3 but rejected at Fine Screening. Capacity also revised to 65Ml/d at Fine Screening.	Rejection reasoning reviewed and confirmed. Option remains rejected at WRMP24.

Table 3: Option Deployable Output (DO) changes since WRMP19

WRMP19 Option Name	WRMP24 Option Name	WRMP19 DO (Ml/d)		WRMP24 DO (Ml/d)			Difference (Ml/d)		Impact on Feasibility Assessment Scoring (all options Passed Stage 3 and Fine Screening – on Constrained List at WRMP19)
		Average	Peak	1 in 2 average	1 in 500 average	1 in 500 peak	Average	Peak	
Beckton Desalination treatment plant (150Ml/d) RES-DES-BEC-150 (Option 1a Estuary North, Beckton)	Beckton Desalination - 50 Ml/d cumulative (see Table 2.1 for option ID and combinations)	NA*	NA*	44	44	44	NA	NA	New option capacity added in WRMP24. Screening reviewed against WRMP19 option capacities, no changes to screening made.
	Beckton Desalination - 100 Ml/d cumulative (see Table 2.1 for option ID and combinations)	NA*	NA*	89	89	89	NA	NA	New option capacity added in WRMP24. Screening reviewed against WRMP19 option capacities, no changes to screening made.
	Beckton Desalination - 150 Ml/d cumulative (see Table 2.1 for option ID and combinations)	142	142	133	133	133	-9	-9	Updated DO did not result in a change to screening.
RES-DES-CRO-100 Phase 1	Crossness Desalination (Blended) - 100 Ml/d cumulative (see Table 2.1 for option ID and combinations)	95	95	89	89	89	-6	-6	Updated DO did not result in a change to screening.
RES-DES-CRO-100 Phase 2 (200 Ml/d cumulative)	Crossness Desalination (Blended) - 200Ml/d cumulative (see Table 2.1 for option ID and combinations)	189	189	178	178	178	-11	-11	Updated DO did not result in a change to screening.
RES-DES-CRO-100 Phase 3 (300 Ml/d cumulative)	Crossness Desalination (Blended) - 300Ml/d cumulative (see Table 2.1 for option ID and combinations)	284	284	267	267	267	-17	-17	Updated DO did not result in a change to screening.
NA*	Crossness Desalination (Blended) - Phase 1: 50 Ml/d	NA*	NA*	44	44	44	NA	NA	New option capacity added in WRMP24. Screening reviewed against WRMP19 option capacities, no changes to screening made.

*WRMP19 option DO is marked as NA, where the option capacity is new to WRMP24

Strategic resource options

18. Section not in use: No desalination options have been identified as SROs by RAPID.

Cumulative limits

19. WRMP19 investigations identified that the decrease in freshwater inputs to the Tideway, arising from water reuse, desalination and DRA options, should be limited to no more than 275-366 Ml/d in order to mitigate impacts on potentially sensitive ecological receptors.

20. A cumulative limit on the total additional capacity of water reuse, direct river abstraction and desalination options, that decrease in freshwater inputs to the Tideway, of 366 Ml/d has therefore been included in the regional modelling. Beckton desalination and Crossness desalination capacity is included within this cumulative limit.

21. Further investigations at WRMP24 are ongoing and any updates will be included in the Final WRMP24.

Updated Feasibility Assessment

Feasibility Assessment Approach

22. This section of the report outlines the updates made in WRMP24 to the WRMP19 feasibility assessment. This should be read alongside the WRMP19 Desalination Feasibility Report. Where options have been rejected through the screening process the rejection reason is recorded in WRMP24 Appendix Q Scheme Rejection Register.

23. A three-stage feasibility screening approach was taken at WRMP24, this approach is unchanged from WRMP19, details of the approach can be found in the WRMP19 Desalination Feasibility Report.

24. At WRMP19, fine screening was undertaken for all options which passed the feasibility screening. The WRMP19 fine screening took account of the estimated volume of water resource needed by Thames Water and, where applicable, neighbouring companies. However, the potential water resources need for the region at WRMP24[1] is significantly higher than at WRMP19, owing to:

- Increased sustainability reductions
- A change to planning for water supply resilience for a 1 in 500 year drought from 1 in 200 at WRMP19[2]

25. Furthermore, potential new transfers identified by WRSE would allow new resource options in the Thames Water supply area to supply more WRSE WRZs than was considered at WRMP19. For these reasons, the potential resource need is not being used as a consideration in the screening process at WRMP24. This is to avoid rejecting options based on Thames Water's need where there could be a regional benefit. At WRMP24 the fine screening stage has therefore been replaced by use of the WRSE investment model to compare options against cost, environmental, and resilience criteria.

26. Appendix B provides a list of the WRMP19 and WRSE option identification numbers (IDs). These can be used to cross reference options to WRSE lists and WRMP19 documentation.

Stage 1 Assessment Results

27. At WRMP19 total of eight potential desalination sites were identified taking account:

- The various desalination technologies available
- The potential sources of water that can be treated
- How the treated water can be introduced into the water distribution network
- What sites are potentially suitable for the development of a new desalination plant

28. These sites were then assessed against a number of absolute and other key constraints.

29. The options identified are listed below, grouped into desalination site locations north and south of the River Thames:

1.

[1] https://wrse.uk.engagementhq.com/the-challenge
[2] A 1 in 500 year event explained: This does not refer to an event that will occur every 500 years, it is better considered an event where there is a 1 in 500 chance of the event occurring in a given year, or a 0.2% chance. The probability of it happening in one year remains the same in each of the following years.

- Option 1 Estuary North – A new desalination plant with capacity up to 300 Ml/d, conveying desalinated water to Coppermills WTW for blending.
  - Option 1a : Locate the desalination plant adjacent to Beckton gas works (Armada Way), with abstraction from the River Thames and return of brine effluent back to the River Thames.
  - Option 1b : Locate the desalination plant on industrial land adjacent to the River Lee, with abstraction from the River Thames and return of brine effluent to the River Lee.
- Option 2 Estuary South – A new desalination plant with capacity up to 300 Ml/d, conveying desalinated water to Honor Oak service reservoir or Coppermills WTW for blending.
  - Option 2a : Locate the desalination plant at Manor Road, near Erith, with abstraction from the River Thames and return of brine effluent back to the River Thames.
  - Option 2b : Locate the desalination plant south of Crossness STW, at Erith Marshes, with abstraction from the River Thames and return of brine effluent back to the River Thames.
  - Option 2c : Locate the desalination plant near Thamesmead, with abstraction from the River Thames and return of brine effluent back to the River Thames.
  - Option 2d : Locate the desalination plant to the south of Erith Marshes on Thamesmead Industrial Estate Extension, Waldrist Way, with abstraction from the River Thames and return of brine effluent back to the River Thames.
- Option 3 Estuary South – A new 75 Ml/d desalination plant conveying desalinated water to Northumberland Heath service reservoir for direct supply to Riverside WRZ.
  - Option 3a : Locate the desalination plant next to Crossness STW, near Erith Marshes, with abstraction from the River Thames and return of brine effluent back to the River Thames.
- Option 4 Battersea – A new 25 Ml/d desalination plant and 50Ml/d blending site. Water would be abstracted from the Battersea Thames Water Ring Main shaft, blended with desalinated water and returned to the shaft for supply. Brine effluent would be returned to the River Thames.

30. No additional sites were identified for WRMP24.

31. The Stage 1 assessment of all WRMP19 and WRMP24 options is presented in Table 4 according to the assessment of the criteria described in the WRMP19 desalination feasibility report.

32. There are no changes from the WRMP19 assessment Seven options passed the Stage 1 assessment and were taken forward to Stage 2 assessment.

Table 4: Stage 1 assessment of all options

Desalination stage 1 assessment criteria	Option 1a Estuary North-Beckton	Option 1b Estuary North-River Lee	Option 2a Estuary South-Manor Road, Erith	Option 2b Estuary South-Erith Marshes south of Crossness STW	Option 2c Estuary South-Thamesmead West of Crossness STW	Option 2d Estuary South-Waldrist Way south of Crossness STW	Option 3a Estuary South-Erith Marshes south of Crossness STW direct-supply	Option 4 Battersea-new treatment / blend site direct-to Thames Water ring Main
Land availability	✓	✓	✓	✓	✓	✓	✓	X
Impact on National/ International conservation sites	✓	✓	✓	✓	✓	✓	✓	
Impact on any National / International heritage sites	✓	✓	✓	✓	✓	✓	✓	
Environmental viability of the abstraction	✓	✓	✓	✓	✓	✓	✓	
Impact on downstream abstractors (including unlicensed)	✓	✓	✓	✓	✓	✓	✓	
Source Quality (Treatability)	✓	✓	✓	✓	✓	✓	✓	
STAGE 1 Assessment	PASS	PASS	PASS	PASS	PASS	PASS	PASS	FAIL
	Back-checking completed for changes to phasing capacities					Backchecking completed for changes to phasing capacities		

Note - Yellow background indicates backchecking completed at WRMP24 for changes to phasing capacities.

33. One option, Option 4 at Battersea, failed the Stage 1 assessment; the reasons for the option rejection are included in the Rejection Register [WRMP24 Appendix Q - Scheme rejection register].

34. Further details regarding the Stage 1 assessments are included for WRMP19 options in the WRMP19 Desalination Feasibility Report.

Stage 2 assessment results

35. Options that passed Stage 1 were developed further for Stage 2, see WRMP19 Desalination Feasibility Report.

36. During the WRMP19 assessment at Stage 2 it became apparent that the proposed treatment site for Option 1a – using the land adjacent to Beckton gas works (Armada Way) - had significant issues and that a more viable location was to use land potentially available on Beckton STW site itself.

37. The Stage 2 assessment of the WRMP19 and WRMP24 options that passed Stage 1 is presented in Table 5 providing the red, amber, green assessment of the criteria described in the WRMP19 Desalination Feasibility Report.

38. The additional options identified at WRMP24 are phasing variations incorporated within the WRMP19 options (Options 1a and 2d respectively). There were no changes to the WRMP19 RAG status as indicated in Table 5.

Table 5: Stage 2 assessment of all options

Criteria	Option 1a (Beckton STW)	Option 1b	Option 2a	Option 2b	Option 2c	Option 2d	Option 3a
Property & legal							
Ownership of Site and Tenancies							
Estimated Land Acquisition Cost							
Planning & environmental							
Land Use and Land Use Quality							
Floodplain encroachment (loss of floodplain / need for compensation storage)							
Landscape Character Sensitivity							
Views and Visual Amenity							
Nature Conservation and Biodiversity							
Archaeology and Historic Environment							
Non-traffic impact of construction on local residents							
Impact of construction on traffic							
Impact on recreation							
Water resources & water quality							
Engineering Criteria							
Length of conveyance							
Pumping head							
Access during construction and operation							
Connectivity to waste stream							
Construction Complexity							
STAGE 2 ASSESSMENT	PASS	FAIL	FAIL	PASS	FAIL	PASS	PASS

Note - Yellow background indicates backchecking completed at WRMP24 for changes to phasing capacities

39. Three options were rejected at Stage 2; the reasons for the option rejection are included in the Rejection Register [WRMP24 Appendix Q - Scheme rejection register].

40. There were no changes to the WRMP19 RAG status this is indicated in Table 5

41. There are no changes to the WRMP19 Stage 2 feasibility assessment outcomes and the following four options were therefore taken forward to Stage 3:

- Option 1a : Desalination plant located at Beckton STW, with abstraction from the River Thames and brine returned with Beckton STW final effluent back to the River Thames. Option capacity up to 150 Ml/d. Treated water conveyed to Coppermills WTW for blending.
- Option 2b : Desalination plant located south of Crossness STW, near Erith Marshes, with abstraction from the River Thames and brine returned with Crossness STW final effluent back to the River Thames. Option capacity up to 300 Ml/d. Treated water conveyed to Honor Oak or Coppermills for blending.
- Option 2d : Desalination plant located south Erith Marshes on Thamesmead Industrial Estate Extension, Waldrist Way, with abstraction from the River Thames and brine returned with Crossness STW final effluent back to the River Thames. Option capacity up to 300 Ml/d. Treated water conveyed to Honor Oak or Coppermills for blending.
- Option 3a : Desalination plant located south of Crossness STW, near Erith Marshes, with abstraction from the River Thames and brine returned with Crossness STW final effluent back to the River Thames. Option capacity of 75 Ml/d. Treated water conveyed to Northumberland Heath service reservoir for direct supply to Riverside WRZ.

42. Further information regarding the investigations into the options is included in the WRMP19Desalination Feasibility report.

Stage 3 assessment results

43. Assessment against Stage 3 criteria of options has been undertaken for all options that passed Stage 2.

44. The Stage 3 assessment of the WRMP19 and WRMP24 options that passed Stage 2 is presented in Table 6 providing the red, amber, green assessment of the criteria described in WRMP19 Desalination Feasibility report.

45. There were four additional phasing options identified in WRMP24 which have been included within the initial Options 2a and Option 2d of Table 6. These were found to have no changes from the WRMP19 RAG status for the original, maximum capacity option.

Table 6: Stage 3 assessment

Criteria	Option 1a			Option 2b		Option 2d			Option 3a
Option Capacity (Ml/d)	50	100	150	150	300	50	100	300	75
Property & legal									
Ownership of Site and Tenancies									
Planning & environmental									
Planning policy and history									
Land Use and Land Use Quality									
Floodplain encroachment (loss of floodplain / need for compensation storage)									
Landscape Character Sensitivity									
Views and Visual Amenity									
Employment and local economy									
Nature Conservation and Biodiversity									
Opportunity for biodiversity improvement									
Archaeology and Historic Environment									
Non-traffic impact of construction on local residents									
Impact on recreation									
Water resources & water quality									
Engineering Criteria									
Length of conveyance									
Normalised Cost									
Water treatability / process complexity									
Power Supply									
Construction Complexity									
STAGE 3 ASSESSMENT	PASS	PASS	PASS	FAIL	FAIL	PASS	PASS	PASS	PASS

**Yellow background indicates backchecking completed at WRMP24 for changes to phasing capacities.*

47. Two options were rejected at Stage 3; the reasons for the option rejection are included in the Rejection Register [WRMP24 Appendix Q - Scheme rejection register].

48. The following list of options passed Stage 3 feasibility assessment and were taken forward for further consideration:

- Option 1a (Beckton STW / Gascoigne Way) – A new 150 Ml/d desalination plant located on the existing Beckton STW site to transfer desalinated water to Coppermills WTW for blending. Source water to be abstracted from the River Thames upstream of the current Gateway abstraction, with the waste brine discharged with Beckton STW final effluent.
- Option 2d (Crossness - Thamesmead Industrial Estate Extension, Waldrist Way) - A new 300 Ml/d desalination plant located at Waldrist Way to transfer desalinated water to Coppermills WTW for blending. Source water to be abstracted is abstracted from the River Thames, with the waste brine discharged with Crossness STW final effluent.
- Option 3a (Crossness – Erith Southern Grazing Marshes) - A new 75 Ml/d desalination plant located to the south of Crossness STW to transfer desalinated water to Northumberland Heath Reservoir for direct supply to Riverside WRZ. Source water is abstracted from the River Thames, with the waste brine discharged with Crossness STW final effluent.

49. All new phasing options passed the Stage 3 assessment.

50. Further information regarding the investigations into the options is included in the WRMP19 Desalination Feasibility report.

Option Verification and Conclusion

51. At WRMP19 Option 3a (Crossness – Erith Southern Grazing Marshes) was rejected at Fine Screening. The rejection reasoning has been reviewed at WRMP24 and has been found to remain valid. Option 3a has therefore been rejected at validation and has not been included on the Feasible List of options for WRMP24.

52. The validation discussion of risk and uncertainty in Section 7 of the WRMP19 Desalination Feasibility Report remains unchanged. Where options have been rejected through the screening process the rejection reason is recorded in Appendix Q Scheme Rejection Register.

53. The WRMP24 assessment verifies that the additional proposed phasing options considered allows flexibility for a phased approach to be included in the investment modelling decisions.

Confirmation of feasible list of options:

54. The following list of options are the confirmed list of feasible desalination options for WRMP24:

- Option 1a (Beckton STW / Gascoigne Way): A new desalination plant located on the existing Beckton STW site to transfer desalinated water to Coppermills WTW for blending. This can be phased in 50 Ml/d or 100 Ml/d stages up to a limit of 150 Ml/d. The WRMP19 Stage 1-3 assessment findings for this option remains unchanged.
- Option 2d (Crossness - Thamesmead Industrial Estate Extension, Waldrist Way): A new desalination plant located to the South of Erith Marshes to transfer desalinated water to Coppermills WTW for blending. This can be phased in 50 Ml/d or 100 Ml/d stages up to a limit of 300 Ml/d. The WRMP19 Stage 1-3 assessment findings for this option remains unchanged.

55. Information on option development and investment modelling can be found in WRMP24 Section 7 - Appraisal of Resource Options.

Appendix A: Reference information

The draft WRMP24 and Technical Appendices can be found on the Thames Water website at:

Water resources | Regulation | About us | Thames Water

Please contact consultation@thames-wrmp.co.uk for access to WRMP19 reports.

Appendix B: Option WRMP19 and WRSE IDs

Table B. 1: Option WRMP19 and WRSE IDs

	WRMP 19 ID	WRSE ID
Option 1a Estuary North-Beckton	RES-DES-BEC-150	TWU_LON_HI-DES_ALL_CNO_beckton desal 100p1 TWU_LON_HI-DES_ALL_ALL_beckton desal TWU_LON_HI-DES_ALL_CNO_beckton desal 50 p1 TWU_LON_HI-DES_ALL_ALL_beckton desal 50p2a TWU_LON_HI-DES_ALL_ALL_beckton desal
Beckton to Coppermills tunnel (treated)	NET-DES-BEC-COP	TWU_LON_HI-TFR_LON_CNO_beckton-coppermills
Option 1b Estuary North-River Lee	See note	TWU_LON_HI-DES_RE1_ALL_rivleec'millsblended
Option 2a Estuary South-Manor Road, Erith	See note	TWU_LON_HI-DES_ALL_ALL_manorrd erith hr oak
Option 2b Estuary South-Erith Marshes south of Crossness STW	See note	TWU_LON_HI-DES_RE1_ALL_crossness(erith) 150 TWU_LON_HI-DES_RE1_ALL_crossness(erith) 300
Option 2c Estuary South-Thamesmead West of Crossness STW	See note	TWU_LON_HI-DES_RE1_ALL_tripcock ness 150 TWU_LON_HI-DES_RE1_ALL_tripcock ness 300
Option 2d Estuary South-Waldrist Way south of Crossness STW	RES-DES-CRO-100	TWU_LON_HI-DES_ALL_ALL_crossnessdesal TWU_LON_HI-DES_ALL_ALL_crossnessdesal100p2 TWU_LON_HI-DES_ALL_CNO_crossnessdesal50p1 TWU_LON_HI-DES_ALL_ALL_crossnessdesal50p2
Beckton to Crossness tunnel (raw)	CON-RWS-BEC-CRO-300	TWU_LON_HI-TFR_LON_CNO_beckton-crossness
Crossness to Beckton tunnel (treated)	NET-DES-CRO-BEC	TWU_LON_HI-ROC_NET_CNO_crossness-beckton
Option 3a Estuary South- Erith Marshes south of Crossness STW direct-supply	See note	TWU_LON_HI-DES_RE1_ALL_crossdesalunblend-65

Note - Options rejected prior to Constrained List were not assigned a WRMP19 ID


Thames
Water