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Cost of Capital for Havant Thicket

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Executive Summary

We have been commissioned by Portsmouth Water (PRT) to prepare an independent report on the estimation of the cost of capital for Havant Thicket (HT) to inform PRT's PR24 submission on HT's cost of capital. In this report we show that HT's specific characteristics warrant a bespoke cost of capital that differs from the wholesale industry cost of capital.

HT requires a bespoke cost of capital to account for its specific characteristics

HT is subject to a separate 10-year price control, starting at PR19. Ofwat set HT's cost of capital for PR19 at the same level as the industry wholesale cost of capital and subject to the same cost of new debt reconciliation mechanism, i.e. based on a notional company approach. However, HT stands out from the wholesale industry for which the notional company cost of capital was designed because:

- HT exposes PRT to greater capex risk than other water companies based on measures of capex:RCV etc., which implies greater cash-flow volatility and a higher cost of equity. As the first reservoir to be built in 30 years, the construction process is also more complex than the standard capex programmes of the industry.
- As a consequence of the capex, HT has an atypical and concentrated debt profile, where all debt issued to fund the project will be new debt (i.e. post PR19 start) and the RCV growth is concentrated over a small 4-year window towards the end of PR19. The concentrated profile of debt is particularly relevant due to the material increase in benchmark interest rates observed since 2022, with HT needing to issue debt to fund RCV growth during this period of higher interest rates.

We show that other UK economic regulators have also allowed for bespoke cost of capital mechanisms when faced with similar circumstances and risks, i.e. involving large discrete schemes and/or companies facing higher investment risk than their sector peers. For example:

- On cost of debt, UK regulators have designed bespoke mechanisms to allow companies to recover efficiently incurred interest costs. For example, Ofwat designed a bespoke debt mechanism for Thames Tideway Tunnel (TTT) that accounts for its debt profile, whereas Ofgem set a bespoke cost of debt indexation mechanism tracking RAV growth for Scottish Hydro Electric Transmission (SHET) given the size of its investment programme relative to the asset base.
- On cost of equity, UK regulators have reflected higher investment risk through higher asset betas. For example, Ofgem recognised higher construction risk for TO projects through higher asset betas at RIIO-T1. The CMA and Utility Regulator in NI also allowed for the impact on beta risk of totex: RCV and similar measures.

Overall, we conclude that HT's specific characteristics warrant setting a bespoke cost of capital and that a bespoke cost of capital is consistent with past UK regulator approaches to large and atypical schemes such as HT.

For PR19 true-up, we propose adjustments to HT's PR19 cost of debt reconciliation model recognising that HT will be all new debt funded

At PR19, Ofwat set HT's cost of capital at the same level as the industry and subject to the same cost of debt reconciliation, i.e. a true-up for the new debt portion which comprises 20 per cent of the overall cost of debt allowance. At the time there was a market-wide expectation that the cost of new debt allowance would be lower than the cost of embedded debt allowance, and given that HT would be 100 per cent new debt financed, HT would enjoy an effective higher equity return than the wholesale cost of equity, in turn compensating it for bearing HT construction risks.

However, the increase in interest costs since PR19 means the reverse will be true and HT will under recover its cost of debt under Ofwat's approach.[1] Based on Ofwat's benchmark forecasts as of PR24 and HT's RCV profile from CAM we estimate HT's weighted average cost of debt allowance over PR19 at 2.25 per cent (real CPIH, 2017/18 prices and including 10bps issuance and liquidity costs) post-reconciliation, compared to HT's expected actual cost of debt of 3.58 per cent.[2] These calculations are based on Ofwat's PR24 final methodology information date of September 2022; HT's underperformance is likely to be worse based on updated market evidence.

The issue with Ofwat's PR19 cost of debt indexation mechanism is that it is designed for a notional company with a relatively uniform debt issuance. As discussed above, HT has an atypical and concentrated debt profile and has issued all its debt (new debt) over PR19. To provide HT with an allowance reflecting its efficiently incurred debt costs, we propose an alternative mechanism for PR19 that preserves Ofwat's overall mechanism but makes the following modifications:[3]

- New debt weight: A weight on new debt of 100 per cent (as opposed to 20 per cent) to recognise that HT issued all its debt within period, i.e. no embedded debt.
- Extending trailing average: The weights for the allowed cost of new debt trailing average based on HT's RCV growth (as opposed to equal weighting) to recognise that most of HT's RCV growth that needs to be funded occurs towards the end of PR19, where interest rates will be higher than at the start of PR19. Our approach to weight years by RCV growth, as a proxy for expected debt issuance, is consistent with Ofgem's approach for SHET, a Scottish TO, at recent reviews.
- Outperformance wedge: Remove Ofwat's outperformance wedge of 15bps given that Ofwat's wedge was based on industry-wide data, whereas HT's relatively small issuance size means that it is likely to underperform. In addition, HT's debt is likely to be more expensive relative to the rest of the industry because of construction related credit risk, making it more difficult for HT to achieve industry-wide notional rating.

Based on the three modifications described above, we estimate a weighted average cost of debt over PR19 post reconciliation for HT of 2.85 per cent (real CPIH, 2017/18 prices)

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1 HT will under-recover its cost of debt under all reasonable market forecasts over the remainder of PR19.

2 Our calculation of HT's expected actual cost of debt includes issuance and liquidity costs of 108bps based on the TTT liquidity building block approach. We note that HT's actual issuance and liquidity costs are higher than the TTT benchmark by around 15 bps. See Section 4.2.1 for a detailed explanation of how these were calculated.

3 See Section 4.1.3 for detailed description of proposed modifications.

including Ofwat's issuance and liquidity costs of 10bps. This estimate is 60bps higher than under Ofwat's default mechanism of 2.25 per cent, but still below HT's expected actual cost of debt of 3.58 per cent.

We propose bespoke cost of equity and debt adjustments for HT at PR24 to account for its greater risk and atypical debt profile

For HT's PR24 cost of capital, Ofwat stated it would take into account its decision for the wholesale determination at PR24 but also that it would consider HT's specific circumstances when setting the cost of capital.

On cost of debt over PR24, we rely on Ofwat's high level framework (weighted average of cost of embedded and new debt with reconciliation for new debt) but modified to allow HT to recover efficiently incurred debt costs consistent with our proposal for PR19 reconciliation:

- New debt issued over PR19 ("embedded cost of debt"): Rely on efficient cost of debt reflecting HT's PR19 RCV growth and associated benchmark index values. We propose relying on HT's efficient cost of debt as opposed to industry embedded cost of debt given the industry debt allowance reflects a 20-year or so issuance profile whereas HT has issued all its debt since PR19.
- New debt issued over PR24. We essentially propose Ofwat's reconciliation model but with similar changes to those we propose for PR19 true-up:
  - *PR24 debt weights ("Embedded:new debt weights"):* Rely on HT's RCV growth over PR19 and PR24, with the weights equal to PR19 notional closing debt and PR24 average notional debt issuance.
  - *Extending trailing average*: The weights for the cost of new debt trailing average reconciliation based on RCV growth. This approach ensures the cost of new debt takes account of the HT specific timing of debt issuance over PR24, as proxied by RCV growth.
  - *Outperformance wedge*: Removal of the outperformance wedge, given that the wedge is based on industry-wide data but HT's relatively small issuance size means that it will underperform the wider industry.
- Issuance and liquidity costs: We estimate an additional cost of borrowing for HT of 108bps based on the following efficient benchmarks:
  - approximately three-fold higher transaction costs (19 bps) than the notional allowance (ca 7 bps) reflecting HT's necessarily short-tenor of around 8 years, to match the construction period, relative to the wider industry of around 20 years.
  - requirement for liquidity facilities to provide funding ahead of investment, based on TTT liquidity allowance building block (88 bps).

Based on the modifications above, we estimate an HT cost of debt allowance over PR24 of 4.23 per cent, compared to Ofwat's estimate of the industry PR24 cost of debt of 2.60 per cent.

On cost of equity, allowing HT the same asset beta as the industry (0.26 to 0.29 under Ofwat's PR24 final methodology) would fail to recognise that HT will face a greater risk over PR24 than the wider sector as demonstrated by PRT's far higher capex:RCV ratio.

Therefore, we propose Ofwat sets an asset beta range of 0.45 to 0.55 based on Ofgem/CEPA proposed asset beta range for the construction phase of energy network assets.

Overall, we conclude on a HT cost of capital of 5.17 to 5.77 per cent for PR24, subject to a true-up on the cost of new debt (and embedded debt post-PR19 reconciliation), which is 194 to 254bps higher than Ofwat's PR24 final methodology estimate of 3.23 per cent as shown in Table 1.

Table 1: We Estimate HT's Bespoke Cost of Capital for PR24 at 5.17 to 5.77 per cent

Real, CPIH	Ofwat Industry	Bespoke HT (Lower Bound)	Bespoke HT (Upper Bound)
PR19 cost of new debt (embedded debt)	2.34%	3.12%	3.12%
PR24 cost of new debt	3.28%	3.42%	3.42%
Share of PR24 debt	17%	12%	12%
Issuance and liquidity costs	0.10%	1.08%	1.08%
Cost of debt	**2.60%**	**4.23%**	**4.23%**
Notional Gearing	55%	55%	55%
RfR	0.47%	0.47%	0.47%
ERP	5.99%	5.99%	5.99%
Asset beta (no debt beta)	0.28	0.45	0.55
Asset beta (debt beta)	0.33	0.51	0.61
Equity beta	0.61	1.00	1.22
Cost of equity	**4.14%**	**6.46%**	**7.79%**
Appointee WACC	3.29%	5.23%	5.83%
Retail margin deduction	0.06%	0.06%	0.06%
Wholesale WACC (real)	**3.23%**	**5.17%**	**5.77%**

Note: We assume a debt beta of 0.1 as per Ofwat's midpoint; we rely on notional gearing to convert asset beta from no debt beta to with debt beta.
Source: NERA analysis and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.7-8

1. Introduction

NERA was commissioned by Portsmouth Water (PRT) to prepare an independent report on the estimation of the cost of capital for Havant Thicket (HT). The report will be used to inform PRT's PR24 submission on HT's cost of capital.

The report's purpose is to describe the bespoke nature of the HT project including its specific risks and financing profile, and therefore estimate HT's cost of capital, including a HT specific cost of debt indexation mechanism which reflects its efficient financing costs. In doing so, we align our proposed approach for HT as closely as possible to Ofwat's approach to the cost of capital at PR19 and PR24.

The report is structured as follows:

- In Section 2, we summarise Ofwat's approach to cost of capital at PR19 and PR24 for HT and the wider industry.
- In Section 3, we set out how HT's characteristics require a bespoke cost of capital and how UK regulators have allowed bespoke cost of capital in similar circumstances.
- In Section 4, we present a bespoke cost of capital for HT that both: i) provides compensation for risks HT is exposed to and allow it to recover efficiently incurred debt costs; and ii) otherwise aligns as closely as possible with Ofwat's cost of capital methodology.

2. Ofwat Approach to HT Cost of Capital at PR19 and PR24 Methodology

In this section we first start with a brief description of the HT project. We then set out Ofwat's approach to estimating the cost of capital (or weighted average cost of capital (WACC)) for HT and the industry at PR19 and its proposed methodology for PR24.

For PR19, we explain how Ofwat set HT's cost of capital at the same level as the wholesale industry and subject to the same cost of new debt reconciliation at the end of PR19. For PR24, we set out Ofwat's early view on the industry cost of capital and how Ofwat has stated it will consider HT's specific circumstances when setting HT's cost of capital at PR24.

2.1. Background

HT is a reservoir being built by PRT to increase the amount of surplus water that it can provide to Southern Water. HT is expected to generate an additional 21Ml/d of available water to be traded with Southern Water – increasing its water transfers to 60Ml/d.[4] Ofwat "*strongly supported*" the proposed development of HT, which embraced the "*challenge to the sector for greater regional collaboration in delivering secure water resources*".[5] Both PRT and Southern Water stated that the project was the "*best value for money solution for the provision of future water resources in Hampshire*", even taking account of the revision to costs following further planning and procurement stages.[6]

At PR19, Ofwat proposed a separate 10-year price control for HT, to ensure cost transparency given that the reservoir will be funded by Southern Water's customers rather than PRT's customers. Ofwat determined the economic cost under a building block approach before netting off the revenues that PRT expects to receive under the bulk supply agreement. Ofwat assumed that the bulk supply revenues equal the costs of the reservoir, implying a zero price limit for PRT's customers over the period until PR29.[7] Overall, the arrangements seek to protect PRT customers from exposure to cost overruns and stranding risk which is instead shared between PRT shareholders and Southern's shareholders and customers.

The HT price control also includes the following arrangements:[8]

- Cost adjustment mechanism (CAM): Given the uncertainty in costs at PR19, Ofwat introduced a mechanism through which it would review the allowance following the planning and procurement stages, which would then be reflected via a PR24 adjustment.[9] We discuss the CAM in more detail in Section 2.3.3 and 3.2.1.

4 Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, Section 2.1

5 Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.5.

6 Ofwat (Dec 22), Havant Thicket – Cost Adjustment: Draft Decision, p.7. See Section 2.3.3 for discussion on HT cost increases.

7 Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.15.

8 We note that aside from the following arrangements, the HT price control also includes: i) a separate tax allowance, which is set at zero PR19 and subject to reconciliation at PR24 for economic profits and changes in corporate tax rates and capital allowances; ii) an adjustment to the cost allowance to reflect actual volume of water supplied and associated opex once the bulk supply transfer is operational, which was expected to happen towards the end of the 2020-30 period. See Ofwat (Dec 19) PR19 final determinations: Havant Thicket appendix, pp.26, 30 and 32.

9 Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.13.

- Totex: PRT shareholders and Southern Water will share 50/50 out/underperformance in totex over 2020-2030, calculated based on outturn cost performance and the adjusted baseline cost allowance.[10] Furthermore, by the end of the 2020-30 period, if PRT is unable to complete the HT project in its entirety, Ofwat will claw back unspent totex by multiplying the adjusted allowed totex by the proportion of HT programme not delivered times a 50 per cent sharing factor.[11]
- Economic profit: Ofwat expects the bulk supply agreement to be signed between PRT and Southern Water to qualify for Ofwat's water trading incentive scheme, through which PRT is allowed to maintain 50 per cent of lifetime economic profits.[12] Economic profits are defined as the difference between outturn revenues and forecast costs/adjusted economic costs (inclusive of return on capital).[13] We discuss the economic profit arrangement in more detail in Section 3.2.2.
- Project delivery milestones: Ofwat introduced a bespoke performance commitment for HT with an associated ODI, which results in a penalty in case of underperformance on the delivery of reservoir – underperformance is measured as delay in number of months relative to two milestone dates: 30 September 2026 for dry commissioning and 30 June 2029 for full wet commissioning and operation.[14] This specific ODI is penalty only and therefore introduces downside asymmetric risk for HT.

2.2. Ofwat's Approach to HT's WACC at PR19

At PR19, Ofwat set HT's cost of capital at the same level as the industry wholesale cost of capital of 2.92 per cent (real, CPIH).[15] Ofwat sets the industry wholesale cost of capital to "*provide a reasonable base level of return reflective of the sector's risks, and which is sufficient to cover efficient debt and equity financing costs for a company adopting our notional financial structure*", i.e. it reflects a return for a notional company.[16]

On the cost of debt parameter, Ofwat adopted the same approach to HT as it did for the industry wholesale WACC. In particular, Ofwat estimated the cost of debt as the weighted average of:[17]

- Cost of embedded debt of 2.42 per cent (real, CPIH), based on a 15-year average of the average of A and BBB rated iBoxx GBP corporate non-financial bonds of 10 years or more remaining index (benchmark index), and adjusted for 25bps of expected outperformance, cross-checked by company's actual embedded costs; and

[10] Ofwat defines the adjusted baseline cost allowance as the cost allowance adjusted for the outcomes of the gated cost adjustment mechanism, agreed cost adjustments for material changes in circumstance and operating costs from the bulk supply of water. See Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.16, footnote 8.

[11] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, pp.20 and 32.

[12] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.15.

[13] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, pp.15-16.

[14] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, pp.19-21.

[15] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[16] Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, p.3.

[17] Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, Section 6.

- Cost of new debt of 0.53 per cent (real, CPIH) based on Ofwat's benchmark index (adjusted for 15bps of expected outperformance), but which will be reconciled based on outturn benchmark index at PR24.

Ofwat applied a weight of 80 per cent for the embedded debt and 20 per cent for the new debt, which it estimated based on the expected proportions of embedded and new debt for the sector as a whole over PR19.[18] Ofwat also included an issuance and liquidity costs allowance of 10bps, drawing on company data and issuance cost data.[19] Ofwat did not include PRT's allowed cost of debt company specific adjustment of 33bps in HT's WACC.[20,21]

Ofwat's PR19 cost of new debt reconciliation allows companies to receive a revenue adjustment for the difference between the cost of new debt forecast at PR19 relative to outturn, as per the formula below. Companies will receive this revenue adjustment for the cost of new debt throughout PR24. For each year of PR19, Ofwat calculates a revenue adjustment based on the difference between the forecast benchmark index and outturn values, to be applied to the new debt portion of the RCV.[22] These annual figures are then carried forward at the WACC to the first year of PR24. The following formula summarises Ofwat's revenue reconciliation:[23]

$$Revenue\ Reconciliation = \sum_{t=1}^{5} [I_t(RCV_t \times G_{FD} \times N_t) - I_{FD}(RCV_t \times G_{FD} \times N_{FD})](1+D)^{5-t}$$

Where:

- **I_t (and I_{FD})** is the cost of new debt in year 't'. In its Final Determination (FD), Ofwat allowed a cost of new debt of 0.53 per cent (I_{FD}), in CPIH deflated terms. For reconciliation, I_t is equal to the actual financial year average levels of the iBoxx A/BBB non-financials yields of 10+ maturity. The cost of new debt for 'year t' is computed as an extending trailing average $I_t = \sum_{i=1}^{t-1} X_i + 0.5 * X_t$ where X_i is the financial year average of the iBoxx A/BBB for 'year t'.[24]
- **RCV_t** is the average Regulatory Capital Value in year 't' (in CPIH deflated terms).

[18] In particular, Ofwat relies on different approaches: i) notional approach, which is based on data on the years-to-maturity of companies existing embedded debt; ii) company-led data approach, which is based on company forecasts of debt issuance, debt balances and paydown; and iii) notional-actual hybrid approach, which is based on business plan data, latest evidence on totex allowances and Ofwat's assessment of equity's contribution to new RCV. See Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, pp.75-77.

[19] Ofwat (Dec 19) PR19 final determinations: Allowed return on capital technical appendix, pp.5 and 92 and Ofwat (Jul 19), PR19 draft determinations: Cost of capital technical appendix, p.80.

[20] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10, footnote 5.

[21] The expected differential between the cost of embedded debt (2.42 per cent) and the expected cost of new debt that HT expected to incur (of 0.53 per cent), of around 190 bps, would have compensated HT for the small company debt premium as well as compensate HT for higher equity risk relative to the notional company. However, as we describe in section 4.1.2, the reverse is true, and HT under-recovers its actual debt costs.

[22] Each year, the new debt portion of RCV of the outturn component is based on a linear approximation starting at 0% in 2020-21 and finishing at 40% by 2024-25.

[23] Ofwat (Aug 21), PR19 Reconciliation Rulebook: Guidance Document, pp.123-125.

[24] Ofwat puts a lower weight on 'year t' financial index because the debt issued in the most recent year will tend not to have a full year's worth of interest cost associated with it.

- **G_{FD}** is the notional gearing assumed at FD, i.e. 60 per cent.
- **N_t** is the notional share of new debt in year 't'. Ofwat sets N_t at 0 per cent in 2020-21 and then assumes it grows linearly each year such that the average notional share of new debt over PR19 is 20 per cent. N_{FD} is fixed at 20 per cent as per Ofwat's FD.
- **D** is the FD appointee-level allowed return on capital, i.e. 2.96 per cent (in CPIH deflated terms).

While Ofwat set HT's WACC at the level of the industry wholesale WACC, it recognised there may be factors that increase HT's shareholders risk during construction phase. However, Ofwat considered this risk would be sufficiently compensated by:[25]

- Outperformance on cost of debt given low expected cost of new debt relative to embedded. HT would be 100 per cent new debt financed which was expected to be at a lower rate than the HT and industry allowance based on 80 per cent embedded debt allowance and 20 per cent new cost of debt; and
- Some construction risks being shared with Southern Water's customers and shareholders through the bulk supply agreement.

Four water companies appealed Ofwat's PR19 decision to the Competition and Markets Authority (CMA), with the CMA deciding on an appointee WACC of 3.2 per cent (real, CPIH), 24bps above Ofwat's PR19 appointee WACC of 2.96 per cent.[26] However, given PRT did not appeal Ofwat's decision, the re-determined CMA WACC does not apply to PRT (or HT).

2.3. Ofwat's Approach to HT's Cost of Capital at PR24

At PR19 Ofwat stated it would reset the allowed return for HT for 2025-2030 to be consistent with its PR24 wholesale determination.[27] It also stated it would apply any equivalent mechanism to the cost of new debt indexation for 2025-2030 to the extent it is adopted for the wholesale controls at PR24.[28]

In December 2022, Ofwat published its PR24 final methodology, including an "early view" PR24 WACC.[29] As shown in Table 2.1, Ofwat's PR24 early view industry wholesale cost of capital of 3.23 per cent is higher than both Ofwat PR19 and CMA PR19, mainly reflecting a higher assumed cost of debt given increases in market interest costs. Ofwat's PR24 cost of capital was estimated assuming a cut-off date of 30 September 2022, although Ofwat also

[25] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[26] CMA (Mar 21), Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations, Final report, p.1099 and Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, p.5.

[27] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[28] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[29] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital.

noted that using a cut-off date of 31 October 2022 would increase the wholesale cost of capital to 3.47 per cent.[30]

Table 2.1: Ofwat's PR19 FD set an allowed return of 2.96 per cent (real, CPIH), 24bps below CMA's decision of 3.20 per cent (real, CPIH). Ofwat PR24 early view is 3.23 per cent

	Ofwat PR19 FD	CMA PR19 FD	Ofwat PR24 early view (Sep-22)	Ofwat PR24 early view (Oct-22)
Cost of Equity	4.19%	4.73%	4.14% (@55% gearing)	4.42% (@55% gearing)
Cost of debt	2.14%	2.18%	2.60%	2.81%
Appointee WACC (vanilla)	2.96%	3.20%	3.29%	3.53%
Retail net margin reduction	0.04%	0.08%	0.06%	0.06%
Wholesale WACC (vanilla)	**2.92%**	**3.12%**	**3.23%**	**3.47%**

Source: NERA analysis; Ofwat (Dec 19) PR19 final determinations, allowed return on capital appendix; CMA (Mar 21), Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited Price Determinations, Final report, p.1099. Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24 Appendix 11 – Allowed return on capital, pp.5-8.

In the next sections we describe Ofwat's proposed approach to cost of equity and cost of debt as per its PR24 final methodology, as well as Ofwat's comments on HT's cost of capital for PR24 in the cost adjustment mechanism ("CAM") decision.

2.3.1. Cost of Equity for PR24

As set out in Table 2.2, Ofwat has proposed a point estimate cost of equity equal to 4.14 per cent (real, CPIH), the midpoint of a 3.67 to 4.60 per cent range, based on its proposed notional gearing of 55 per cent. As at PR19, Ofwat relies on the CAPM model to estimate cost of equity.

[30] Calculated by deducting the retail margin assumption of 6bps from Ofwat's reported appointee WACC as of 31 October 2022 of 3.53 per cent. Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.5-6.

Table 2.2: Ofwat PR24 "Early View" Cost of Equity

Real, CPIH	Low	High	Central View
Gearing	55%	55%	55%
TMR	6%	6.92%	6.46%
RfR	0.47%	0.47%	0.47%
ERP (TMR – RfR)	5.53%	6.45%	5.99%
Asset beta (no debt beta)	0.26	0.29	0.28
Debt beta	0.15	0.05	0.10
Asset beta (debt beta)	0.34	0.32	0.33
Equity beta	0.58	0.64	0.61
Cost of equity	**3.67%**	**4.60%**	**4.14%**

Source: Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.7-8.

Ofwat's approach for each cost of equity parameter is as follows:

- Total Market Return (TMR): Ofwat estimates a TMR range of 6 to 6.92 per cent (real, CPIH), drawing on both historical ex-post data (i.e. long-run realised market returns) and historical ex-ante data, which adjusts historical realised returns for past unexpected events.[31]
- Risk-free Rate (RfR): Ofwat estimates an RfR of 0.47 per cent (real, CPIH) based on RPI ILG adjusted for expected CPI-RPI wedge.[32] However, Ofwat will update the cost of equity for changes in RFR as PR24 process progresses, and has also stated that it will consider indexation of the RFR if market volatility continues.[33]
- Asset beta: Ofwat estimates an asset beta (no debt beta) range of 0.26 to 0.29, drawing on United Utilities (UU) and Severn Trent (SVT) as its main comparators and 2-year and 5-year trailing averages of the 5-year and 10-year betas.[34] For debt beta, Ofwat estimates a range of 0.05 to 0.15 using a similar approach to that used at PR19.[35]
- Gearing: Ofwat adopts a notional gearing of 55 per cent, stating that the reduction from 60 per cent at PR19 reflects changes in gearing levels seen under actual financing structures and also evidence of changes in notional gearing by regulators between determinations.[36]

[31] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.24-38.

[32] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.11-24.

[33] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24 Appendix 11 – Allowed return on capital, p.24.

[34] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.38-48.

[35] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.47-48.

[36] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 10 – Aligning risk and return, p.25.

As at PR19, Ofwat set its early view PR24 cost of equity based on the midpoint of the range, i.e. not aiming up, recognising that this is contrary to the CMA's PR19 decision to include a 25bps aiming up. [37]

Ofwat did not include a company specific adjustment for cost of equity, stating that "*the theoretical case for a small size-related premium is weak and inconclusive, and we note the CMA as part of its PR19 redeterminations did not accept Bristol Water's arguments that it faced such a premium*".[38]

2.3.2. Cost of Debt for PR24

As set out in Table 2.2, Ofwat has proposed a point estimate cost of debt equal to 2.60 per cent (real, CPIH). As at PR19, Ofwat relies on a weighted average of the cost of embedded and new debt and includes an allowance for non-interest debt costs (issuance and liquidity costs).

Table 2.3: Ofwat PR24 "Early View" Cost of Debt

Real, CPIH	PR24 Early View
Cost of embedded debt	2.34%
Cost of new debt estimate	3.28%
Ratio of embedded to new debt	83:17
Issuance and liquidity costs	0.10%
Cost of debt	**2.60%**

Source: Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.8.

For the cost of embedded debt, Ofwat has stated that it will rely principally on the balance sheet approach, i.e. an examination of the industry's actual debt costs, as opposed to relying on a so-called benchmark approach, which draws on iBoxx indices.[39,40] In estimating the industry's actual debt costs, Ofwat excludes instruments such as interest rate swaps, junior/subordinated/Class B debt and liquidity facility/overdraft/RCF costs, although it states that it will consider including preference shares and intercompany loan/holdco debt at the draft and final determinations.[41] Based on these assumptions, it calculates an embedded cost of debt of 2.34 per cent based on the average of the industry median cost of debt under an

[37] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.54.

[38] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.88.

[39] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.69.

[40] According to Ofwat, the benchmark approach (or index-led approach) should only be used as a cross-check as various features of the sector were not consistent with a simple average of Ofwat's preferred benchmark index. See Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.59-61.

[41] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.67.

"all-in" and "actual-notional" measures.[42,43] As with other cost of capital parameters, Ofwat will update the cost of embedded debt calculations as the PR24 review process progresses.[44]

For the cost of new debt, Ofwat proposes to retain the true-up mechanism based on the iBoxx 10Y+ A/BBB rated index, as per its PR19 approach, which we describe in Section 2.2. Ofwat also retained its deduction of 15bps to the iBoxx index in setting companies' allowance, based on its assessment of companies' outperformance relative to the iBoxx benchmark. For its early view, Ofwat relies on a 1-month average to set the indicative cost of new debt at 3.28 per cent.[45]

For the share of new debt of 17 per cent, Ofwat draws on company data on planned debt issuance, refinancing, accretion and paydown, as well as inferences from other data (e.g. maturity profile of outstanding profile).[46]

Lastly, Ofwat also proposes a 10bps issuance and liquidity cost allowance on the overall cost of debt to fund non-interest costs associated with debt financing, consistent with its approach at PR19. While Ofwat did not allow for cost of carry and RPI-CPI basis risk in its PR24 early view, it stated it would consider arguments based on high quality evidence relevant to the water sector during the PR24 review process.[47]

Ofwat has also proposed a company specific adjustment of 30bps to the cost of embedded debt (which in HT's case means new debt issued over PR19) to reflect the additional costs that might reasonably be faced by a small notionally structured company, which Ofwat estimates based on Ofwat and CMA precedent.[48,49]

2.3.3. Ofwat's HT Cost of Capital Comments at CAM Decision

At PR19, Ofwat set an allowance of £123.6 million (in 2017/18 prices) for the 10-year HT price control period. However, due to the early stage of development of the project at PR19 and the significant uncertainty around costs, Ofwat provided for a cost adjustment mechanism (CAM) to enable PRT to apply for an amendment to the level of totex as a result

[42] The all-in measure is a weighted average of eligible instrument costs according to Ofwat's inclusion criteria, whereas the actual-notional measure is a weighted average of the company fixed-rate interest rate and its index-linked interest rate, re-weighted to be consistent with the notional structure of 33 per cent index-linked debt and 67 per cent floating rate debt. See Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.67.

[43] Ofwat also adjusts instruments report as of March 2022 to a 2025-30 average perspective and applies a refinancing assumption for instruments due to mature before 2030. See Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.66.

[44] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.61.

[45] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.72-78.

[46] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.80.

[47] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.80-85.

[48] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.87 and 89.

[49] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.88.

of the outcome of the planning and procurement processes for the project.[50] In late 2022, PRT submitted a re-estimated cost of £338.6 million, and in January 2023 Ofwat published a decision to allow £310 million (2017/18 prices) of costs, which will be implemented through a mid-period determination at PR24.[51]

As explained above, Ofwat set HT's allowed return at PR19 equal to wholesale industry level, which meant the allowed cost of debt only reflected a notional company debt issuance profile, e.g. including a new debt proportion of 20 per cent. However, as Ofwat recognised at the CAM draft determination, the HT project debt will all be new debt.[52]

As a result, Ofwat stated it would consider the extent to which HT's cost of debt should recognise that all of HT's debt will be new debt for the project and whether a company specific adjustment to cost of debt could be considered at PR24.[53]

[50] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.13.

[51] Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.5.

[52] Ofwat (Dec 22), Havant Thicket – Cost Adjustment: Draft Decision, pp.12-13.

[53] Ofwat (Dec 22), Havant Thicket – Cost Adjustment: Draft Decision, pp.12-13.

3. Is a Bespoke Approach to HT Cost of Capital Required?

In this section, we explain how HT's specific characteristics (e.g. size and debt issuance profile) warrant a bespoke cost of capital that differs from the wholesale industry WACC. We also explain that other regulatory features of the HT framework such as the CAM decision and Economic Profit arrangements do not negate the need for an HT bespoke cost of capital. Lastly, we present regulatory precedent for setting a bespoke cost of capital for large discrete schemes such as HT.

In section 4, having concluded that a bespoke approach is required, we describe the approach that should be taken.

3.1. HT Characteristics Set it Apart from the Notional Company

As explained above, Ofwat's approach at PR19 was to set HT's WACC at the same level as the wholesale industry WACC, which is based on a notional company approach.

However, as the first public reservoir to be built in thirty years in E&W and being subject to a separate price control, HT stands out from the wholesale industry and other investment programmes for which the notional company WACC was designed. Indeed, as Ofwat itself recognises, the HT project is ambitious and warranted a separate price control from PRT's wholesale activities, with Ofwat "*recognising it is distinct from Portsmouth Water's existing wholesale services that are driven by the needs of its own customers*".[54]

In the sections below we highlight in more detail the specific HT characteristics that make it distinct from the industry and how it warrants a bespoke cost of capital assumption.

3.1.1. HT Project Exposes PRT to Greater Capex Risk than Other Water Companies

To assess the higher relative risk associated with HT relative to the wider industry, we calculate HT's impact on PRT's capex to opening RCV (capex:RCV) ratio.

The capex:RCV ratio is a measure of exposure to cash flow risk which can be used to measure construction risk. For example, Ofgem used the capex:RCV ratio to measure riskiness of capex programmes[55] and has recognised higher construction risk for TO projects. The Utility Regulator (UR) in Northern Ireland has also recently considered totex:RCV for setting allowed return for NI gas distribution networks (GDNs).[56] Rating agencies also examine capex to RCV as a measure of credit risk.[57] We explain regulatory precedent for recognising capex risk in section 3.3 below.

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54 Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.5.

55 Ofgem (Feb 12), RIIO-T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd, para 5.19 and Ofgem (Dec 12), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas – Finance Supporting Document, para 3.25.

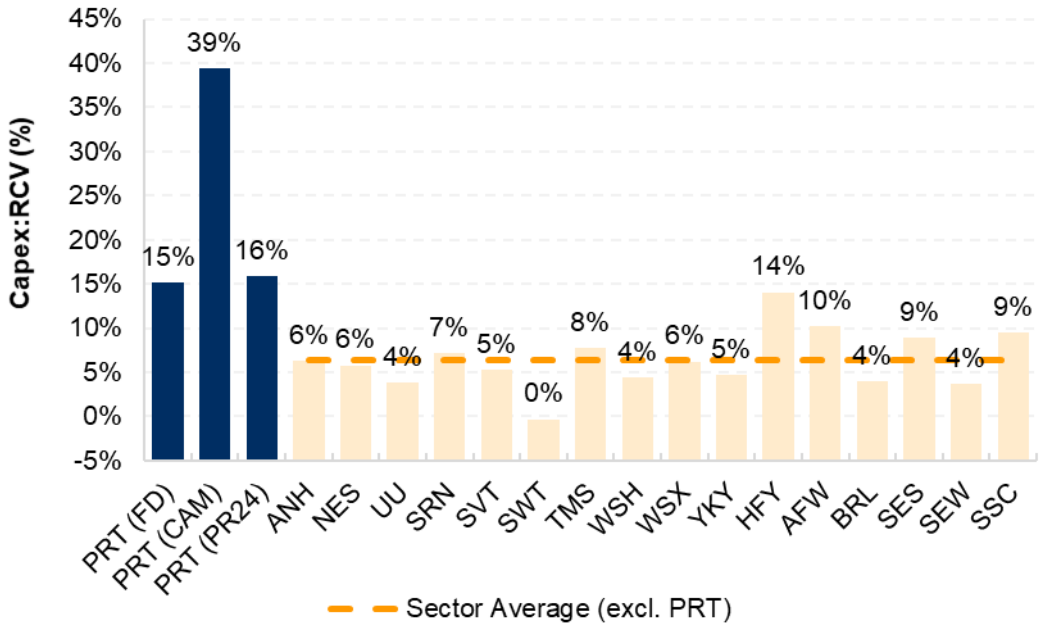
56 Utility Regulator (Oct 22), GD23 – Gas Distribution Price Control 2023-2028, Final Determination – Main Report, pp.86-88 and First Economics (Sep 22), An Estimate of the GD23 Cost of capital, prepared for the Utility Regulator, pp.4 and 6.

57 Moody's (Apr 22), Rating Methodology, Regulated Electric and Gas Networks, p.11.

We focus on PRT's capex:RCV ratio (including HT) because PRT is the group responsible for the construction of HT and therefore exposed to its risks.[58]

As Figure 3.1 shows, PRT's projected capex:RCV ratio over the PR19 period is materially higher than projected capex:RCV ratios in the water sector. Based on HT's PR19 cost allowance, PRT's capex:RCV of 15 per cent is 2.4 times the industry average at 6 per cent, with the only close licensee (Hafren Dyfrdwy) being an outlier relative to the wider sector and itself a small company owned by a wider group, Severn Trent. Following the CAM update, PRT's capex:RCV ratio of 39 per cent is more than 6 times higher than the sector average of 6 per cent.

Figure 3.1: PRT's Capex:RCV Ratio is Far Greater Than Sector



Note: Capex:RCV ratio for all except PRT (PR24) calculated as average capex over PR19 divided by 2020/21 opening RCV based on the PR19 final determination company-specific appendices; PRT capex includes both wholesale capex and HT's capex; sector average excludes PRT.
Source: NERA analysis of Ofwat PR19 company-specific appendices (allowed revenues), Ofwat (Jan 23), Havant Thicket - Cost Adjustment: Final Decision and Ofwat Regulatory Capital Values.

Figure 3.1 also shows our estimate for PRT's capex:RCV ratio for PR24. We calculate this ratio by relying on HT's projected costs and assuming PRT's capex programme over PR24 will represent the same proportion of opening RCV as it did at PR19.[59] We also proxy PRT's

[58] We note that we do not include HT's RCV in PRT's RCV given that cost recovery for HT starts only after construction and the reservoir is operational (i.e. water transfer becoming operational). See Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, pp.23-24 and 29-30.

[59] For HT's projected cost, we rely on the total PR24 allowance in the CAM decision of £72 million (real, 2017/18 prices) (Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.3.). For PRT's projected capex, we rely on the PR19 total capex to 2020/21 opening RCV ratio of 34 per cent and then multiply this by our proxy PRT opening 2025/26 RCV (see footnote 60), resulting in a forecast of total capex over PR24 of £54 million (real, 2017/18 prices) (Ofwat (Dec 19), PR19 final determinations: Portsmouth Water – Allowed revenue appendix).

opening 2025/26 RCV based on latest RCV available (closing 2022/2023 RCV).[60] Given these assumptions, we estimate a capex:RCV ratio of 16 per cent.[61] Assuming that water industry capex:RCV ratio for PR24 does not materially differ from PR19 ratio[62], then PRT will continue to be exposed to materially higher risk than the rest of the industry.

The higher capex:RCV ratio for PRT shown above is evidence of the greater risk PRT is exposed to due to the size of the HT investment. The higher capex:RCV ratio exposes PRT to higher cash flow risk through a greater expected variation in returns than other companies in the water sector, which inform Ofwat's notional company WACC.[63] At PR24, PRT should be compensated for greater risk through a bespoke cost of capital for the HT price control that reflects the higher construction risk relative to the wholesale price control, as we set out in Section 4.

The HT project also exposes PRT to greater risk due to its complexity. As the first reservoir to be built in 30 years, the construction process is likely to be more complex than the more standardised capex programmes of the industry. Indeed, Ofwat also stated the uncertainty surrounding costs resulting from HT being the first reservoir to be built in 30 years.[64]

We note that Ofwat has argued that "*some construction risks will be shared with Southern Water's customers and investors through the bulk supply arrangement*".[65] However, the 50/50 sharing with Southern Water of cost under or over-performance mirrors the arrangement in the wholesale price control, where in general construction or cost risk is 50 per cent shared with customers.[66] As a result, PRT and Southern Water's 50/50 sharing of cost under/ outperformance does not mitigate the additional risk of HT relative to the wholesale price controls.

3.1.2. HT's Debt Profile is Atypical and Concentrated

As a consequence of the high capex levels discussed above, HT also differs from the rest of the water industry in its financing arrangements, in particular its debt profile.

To illustrate the atypical nature of HT's debt profile, we compare the HT's new debt issuance profile, using HT's RCV growth as a proxy for debt issuance, with the notional company's

60 See Ofwat Regulatory Capital Values 2023 (https://www.ofwat.gov.uk/publications/regulatory-capital-value-update). We rely on PRT's 2022/23 closing RCV (£220.4 million, March 2023 prices), exclude HT's 2022/23 closing RCV (£27.9 million, March 2023 prices) and convert to 2017/18 prices using CPIH, which results in an RCV of £158.3 million (2017/18 prices).

61 Ratio calculated as yearly average PR24 capex (based on total capex as per footnote 59) to our proxy 2025/26 PRT opening RCV (as per footnote 60).

62 We note that there is an expectation that industry capex will increase for environmental programmes; however, we also understand that PRT capex may equally increase to meet water resource management plan requirements.

63 Ofgem (Feb 12), RIIO-T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd – Supporting Document, para 5.19 and Ofgem (Dec 12), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas – Finance Supporting Document, para 3.25.

64 Ofwat (Dec 22), Havant Thicket – Cost Adjustment: Draft Decision, p.6.

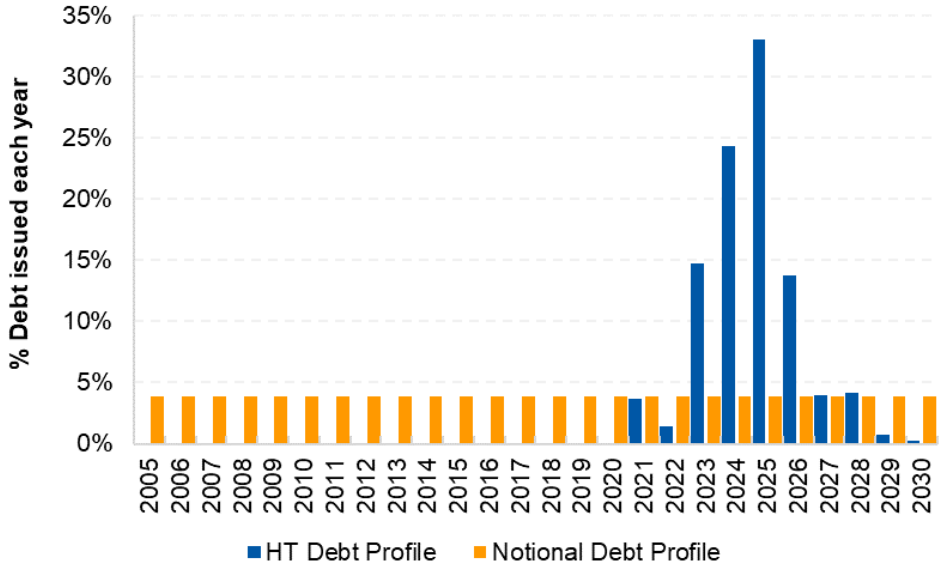
65 Ofwat (Dec 19), PR19 final determinations – Havant Thicket appendix, p.10.

66 Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 9 – Setting expenditure allowance, pp.39-45.

debt profile.[67] For the notional company profile, we assume the notional company issues debt in equal increments over a 20 year historical period as of 2025 and refinances debt as it falls dues over the PR24 period. Our notional assumption is consistent with Ofwat's statement in its PR24 final methodology that it would cross-check its balance sheet approach against an index-led approach that relies on 15 to 20 year trailing averages.[68]

Figure 3.2 below shows that HT's notional debt (issued at rate to fund RCV growth) will be materially more concentrated than the notional company profile.

Figure 3.2: HT's Debt Profile More Concentrated than Notional Company



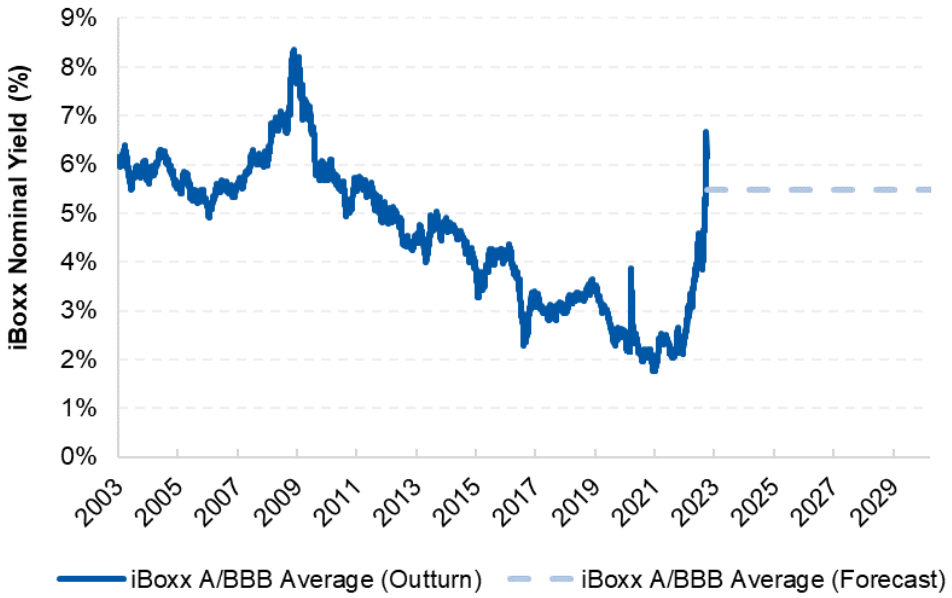
Source: NERA analysis based on Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15.

The discrepancy between the notional debt profile and HT is particularly relevant because new debt will have a materially different cost from the average cost of debt issued over the past 20 years. As Figure 3.3 below shows, the benchmark rates used by Ofwat have declined over a prolonged period from 2009 to the early 2020s, and have since early 2022 materially increased, with HT needing to issue debt to fund RCV growth during this period of higher interest rates.

[67] We understand that debt and equity secured aligns with agreement of CAM and award of main construction contracts, and that PRT's debt raising schedule was appropriate approach for large construction scheme ensuring deliverability and protection for PW customers. However, we set out HT's RCV growth as a proxy for required debt issuance, and therefore we abstract from PRT's actual debt issuance decisions. As we set out in subsequent sections, we also consider that adjusted cost of debt indexation mechanisms should also be based on RCV growth, again to abstract from PRT's actual timing of debt financing.

[68] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.71.

Figure 3.3: iBoxx Rates Show Material Increase from 2022 Onwards



Note: iBoxx figures do not include Ofwat's outperformance wedge adjustment of 15bps. We forecast iBoxx relying on Ofwat's PR24 final methodology assumptions – see Section 4.1.2 for a detailed description of the process.
Source: NERA analysis based on iBoxx data and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71.

Given the stark difference between HT and the notional company, HT's allowance should be based on a cost of debt allowance which compensates HT's efficient debt costs, as opposed to a notional allowance that does not take into account HT's specific profile. Ofwat has recognised that PRT is raising new debt for HT and in current elevated market conditions to fund its RCV growth.[69]

In Section 4, we set out a cost of debt mechanism for HT at PR19 and PR24 that would allow HT to recover its efficient cost of debt, adapting Ofwat's industry wide mechanism.

3.2. HT's Other Regulatory Framework Characteristics Do Not Address the Incremental Risks HT Faces Relative to Sector

In this section we explain how HT's other regulatory framework characteristics (CAM and economic profit) do not address the incremental risks identified in the previous section (greater investment risk and higher costs arising from atypically concentrated debt profile).

3.2.1. Even Post-CAM HT Still Faces Higher Investment Risk than the Sector

As set out in Section 2.3.3, at PR19 Ofwat provided for a CAM to enable PRT to apply for an amendment of the level of totex once there was more certainty on the projected cost of HT.[70] PRT applied for this amendment and requested an increase in totex from the PR19 level of £123.6 million (in 2017/18 prices) to £338.6 million (in 2017/18 prices).[71] In January 2023,

[69] Ofwat (Dec 22), Havant Thicket – Cost Adjustment: Draft Decision, pp.12-13.

[70] Ofwat (Dec 19), PR19 final determinations – Havant Thicket appendix, p.13.

[71] Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.3.

Ofwat published a decision to allow £310 million (2017/18 prices) of costs.[72] Additionally, Ofwat also stated in the CAM that certain insurance costs would be a pass-through cost to customers and that the cost allowances would be adjusted for changes in steel, concrete and diesel prices over and above those costs price in the main reservoir contract, although specific mechanism has not been provided yet.[73]

In Section 3.1, we noted that part of the reasoning for allowing a bespoke cost of capital for HT was the construction and cash flow risk associated with a project with HT's relative size. We do not consider that the CAM reduces the riskiness of the project and negates the need to set a bespoke cost of capital for HT.

While the CAM reduced some of the construction risk by providing an update of the allowance to reflect changes in costs between 2019 and 2022, substantial uncertainty in costs, and therefore construction risk, still remain. This is because the vast majority of projected costs are yet to be incurred (only 20 per cent of total allowed totex incurred up to March 2023) and construction is planned finish only towards the end of AMP8, meaning market conditions can still change and affect the project costs. Therefore the risk that costs are higher than projected still remains.

Indeed, HT still presents greater capex risk than the capex programme for the notional water company. This is because of the complexity of a new reservoir scheme, the first in 30 years, relative to a notional water company programme that will comprise a far greater element of standardised investment projects where the costs are well understood. The notional water company also comprises a diversified portfolio of projects which has a lower cost variance than an investment programme which is dominated by HT. Further, HT's cost allowance has now been agreed for an expected construction period out to 2030, whereas the notional water company benefits from a regulatory re-set every five years.

In conclusion, the CAM was designed to allow for the resetting of costs following further planning and procurement, but HT still presents greater capex risk relative to the wider industry given its scale (as measured by PRT's capex:RCV) and its complexity (first reservoir being built in 30 years).

3.2.2. The Economic Profit Mechanism is Not Exclusive to HT

As part of the HT price control, Ofwat expects the bulk supply agreement to be signed between PRT and Southern Water to qualify for Ofwat's water trading incentive scheme, through which PRT is allowed to maintain 50 per cent of lifetime economic profits.[74] Economic profits are defined as the difference between outturn revenues and forecast costs/adjusted economic costs (inclusive of return on capital), and include a fixed and variable rate.

In its PR19 determination for HT, Ofwat stated that PRT would be able to enhance returns above the notional cost of capital through its bulk supply agreement with Southern Water.[75] However, the return generated from the bulk supply agreement is not meant to compensate for HT's specific financing costs. Rather, according to Ofwat itself, the economic profits

[72] Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.5.

[73] Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.7.

[74] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.15.

[75] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

from Ofwat's water trading incentive scheme are meant to "*boost water trading, the levels of which had changed little since privatization*".[76] The economic profits are therefore not meant to be an adder or further compensation for risk above the notional cost of capital, but instead provide an incentive to engage in profitable water trading.

Indeed, given that other companies can and do engage in water trading and earn economic profits, this added return is not exclusive to HT and therefore does not negate the need for bespoke cost of capital which is designed to compensate for the risks identified in Section 3.1.[77]

3.3. There is Precedent for Setting Bespoke Cost of Capital for Large Discrete Schemes

In this section we show that there is substantial precedent in UK regulation for setting a bespoke cost of capital both in cases of large discrete schemes and in cases where companies faced higher investment risk than their sector peers.

3.3.1. Ofwat Designed Debt Mechanism Specific to TTT to Protect Against Movements in Debt Costs

The Thames Tideway Tunnel (TTT) was classified as a specified infrastructure project by the UK government given the scale, risk, and complexity of the project.[78] The tender to deliver the project was awarded to Bazalgette Tunnel Limited (or Infrastructure Provider (IP)), in 2015, with the IP being regulated by Ofwat under a project licence and a regulatory framework, separate to that of the incumbent Thames Water. While the regulatory model for the IP was based on the traditional framework in place for water and wastewater undertakers in E&W, it also included specific bespoke provisions for the IP, particularly during the construction and initial operating phases of the project.[79]

One of the key characteristics of the TTT regime is its bespoke cost of capital for the construction period and initial operating phase of the project, both the baseline set for 2015 and the within period financing cost adjustment (FCA).[80]

The FCA was a new mechanism introduced by Ofwat for TTT to protect the IP against movements in debt costs. By contrast, the FCA did not exist in Ofwat's standard regulatory framework applied to the wholesale industry at PR14, where the cost of capital was set fixed for the duration of the regulatory period.[81]

In general, the FCA allows for a change in the cost of debt allowance to reflect the change in the market cost of debt, as measured by a benchmark index (in this case, iBoxx BBB for UK non-financials with 10+ year maturity). The FCA provides the IP with an additional return

[76] Ofwat (Dec 17), Delivering Water 2020: Our final methodology for the 2019 price review, p.101.

[77] See for example https://www.ofwat.gov.uk/regulated-companies/markets/water-bidding-market/water-trading/.

[78] Department for Environment, Food and Rural Affairs (Jun 14), Thames Tideway Tunnel Project Specification Notice.

[79] Ofwat (Aug 15), Explanatory memorandum to the Project Licence issued to Bazalgette Tunnel Limited, p.1.

[80] See Ofwat (Aug 15), Explanatory memorandum to the Project Licence issued to Bazalgette Tunnel Limited, pp.5-6, 12-14, 21, 24-26.

[81] See Ofwat (Dec 14), Setting price controls for 2015-20, Final price control determination notice: policy chapter A7 – risk and reward, pp.2-3 and Section A7.4 Returns.

(positive or negative) to reflect both changes in the market cost of debt, and the IP's debt issuance profile.[82] In its guidance, Ofwat explains that it considered it appropriate to recognise the specific debt profile of the IP because "*due to the nature asset financing of future investment requirements may be significantly lower than that associated with a normal WASC or WOC.*".[83]

Overall, Ofwat set a separate price control that included a bespoke cost of capital and a financing cost adjustment to account for the specific debt profile and debt costs of TTT relative to the wider industry. We consider that there is a compelling reason to provide a bespoke cost of debt for HT for the same reasons: a substantive greenfield scheme that has a bespoke debt financing need and therefore an allowed return that is distinct from the wider sector.

3.3.2. Ofgem Set a Bespoke Cost of Capital for SHET to Reflect Magnitude of Investment Programme

In its RIIO-T1 determinations, Ofgem set a bespoke cost of capital for Scottish Hydro Electric Transmission (SHET) given the size of its investment programme relative to its regulated asset value (RAV).

For the industry cost of debt, Ofgem adopted a cost of debt indexation approach which involves an annual re-set of the cost of debt based on a 10-year trailing average of iBoxx GBP non-financials 10Y+ A and BBB indices.[84]

However, Ofgem considered that SHET's cost of debt indexation should be treated as a "*special case*" due to its "*very high*" capex:RAV ratio, which was materially higher than its (or the industry) ratio at the previous regulatory period.[85] According to Ofgem "*a simple trailing average index may not fully reflect the cost of debt of a company with a rapidly-growing RAV if interest rates change sharply*".[86] As a result, Ofgem decided to apply a bespoke cost of debt indexation for SHET where its allowance is based on the benchmark iBoxx index weighted by the incremental RAV growth, as a proxy for SHET's debt issuance. By contrast, the wider industry receives an allowance based on a trailing average of the iBoxx which assumes broadly a uniform debt issuance over time. The bespoke mechanism for SHET more accurately reflects SHET's cost of debt due to its greater reliance on new debt issuance relative to the wider industry. We set out in more detail cost of debt indexation mechanism in Appendix A.

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82 We set out in more detail the formulae underlying the FCA term in Appendix A. Further details also available in Project Licence for Bazalgette Tunnel Limited (2015), pp.72-74.

83 Ofwat (Aug 15), Ofwat guidance on approach to the economic regulation of the Infrastructure Provider for the Thames Tideway Tunnel, pp.24-25.

84 Ofgem (Mar 11), Decision on strategy for the next transmission price control – RIIO-T1, pp.49-50.

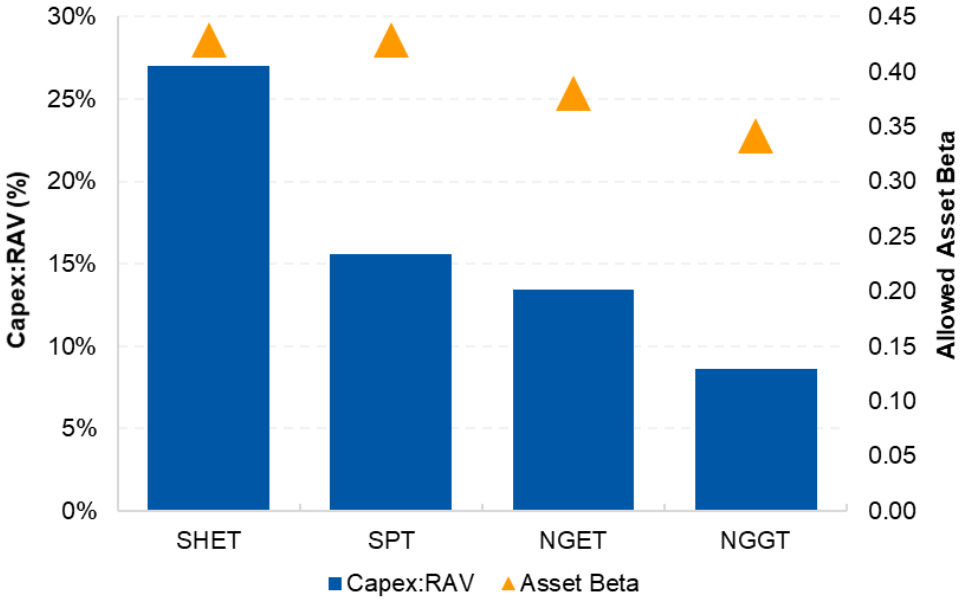
85 Ofgem (Feb 12), RIIO-T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd – Supporting Document, p.44.

86 Ofgem (Feb 12), RIIO-T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd – Supporting Document, para 5.24.

Ofgem continued to apply the bespoke cost of debt indexation for SHET at T2 as it still considers SHET's RAV growth profile and debt profile to be materially different than other networks.[87,88]

Ofgem also considered the impact of SHET (and SPT's) higher capex:RAV ratio on the cost of equity allowance. In assessing the relative risk of the different regulated companies, Ofgem considered that "*a higher capex:RAV ratio suggests a relatively high asset beta*".[89] Ofgem then determined higher allowed asset betas for companies with greater exposure to construction risk (capex:RAV ratio) – among the regulated companies, SHET (and SPT) faced the highest capex:RAV ratio and received the highest allowed asset beta (0.43) relative to NGET (0.38) and NGGT (0.34).[90] Figure 3.4 shows Ofgem's allowed asset betas and its reported capex:RAV ratios for RIIO-T1.

Figure 3.4: Ofgem's RIIO-T1 Allowed Asset Beta and Capex:RAV Ratios



Note: Capex:RAV data scraped from Ofgem's figure.
Source: NERA analysis of Ofgem (Dec 12), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas – Finance Supporting Document, Figure 3.1 and p.24 and

87 Ofgem (Feb 21), RIIO-2 Final Determinations – Finance Annex (REVISED), para 2.60.

88 We note that Ofgem switched the benchmark index from an average of iBoxx A and BBB GBP non-financials 10Y+ maturity to using iBoxx GBP Utilities 10Y+ maturity. See Ofgem (Feb 21), RIIO-2 Final Determinations – Finance Annex (REVISED), paras 2.16 to 2.18.

89 Ofgem (Feb 12), RIIO-T1: Initial Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd – Supporting Document, para 5.22.

90 Ofgem set an allowed cost of equity of 7 per cent and notional gearing of 55 per cent for SHET and SPT. Assuming an RfR of 2 per cent and ERP of 5.25 per cent (in line with T1 slow track determinations for NGGT and NGET) implies an equity beta of 0.95 and an asset beta of 0.43 for SHET and SPT at T1. Ofgem determined an equity beta of 0.95 for NGET and 0.91 for NGGT and notional gearing of 60 per cent for NGET and 62.5 per cent for NGGT, implying an asset beta of 0.38 for NGET and 0.34 for NGGT. Source: Ofgem (Dec 12), RIIO-T1: Final Proposals for National Grid Electricity Transmission and National Grid Gas – Finance Supporting Document, Figure 3.1 and pp.23-24 and Ofgem (Apr 12), RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd, pp.32 and 35.

Ofgem (Apr 12), RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd, pp.32 and 35.

Overall, Ofgem set a bespoke cost of capital for SHET recognising that the magnitude of the investment programme, as measured by capex:RAV ratio, meant that it faced a different level of risk and debt profile than the industry as a whole. It also provided a higher cost of equity depending on the capex:RAV ratio.

Similarly, as we explain in Section 3.1, HT's relative size (as measured by capex:RCV ratio) and resulting atypical debt profile warrant a bespoke arrangement that reflects its efficient cost of capital.

3.3.3. The CMA and UR Recognised Risks Associated with Higher Operational Leverage

At previous price control appeals, the CMA has also allowed for higher beta to reflect higher operational leverage. Operational leverage is a measure of the cost fixity of the business, and is akin to financial leverage in terms of its impact on beta. The higher the cost fixity of a business, the greater the volatility of returns for any given shock and the greater the beta risk.[91]

In its consideration of Bristol Water's appeal of Ofwat's PR14 decision, the Appellants and CMA considered a range of different measures of the cost fixity of a firm.[92] The CMA relied on Bristol Water's operational gearing (defined as the ratio of operating cash flow to revenue) as its measure of operational leverage, and compared Bristol Water's ratios to the listed WaSCs used when estimating the industry beta.[93,94] The CMA noted that Bristol Water's operating cash-flow to revenue was 45 per cent compared to 51 per cent for the listed comparators. This means that Bristol Water has a reduced cash cushion to withstand any shock. The CMA also considered the larger fluctuations of WoCs' historical RoRE compared to WaSCs as further evidence for WoCs' lower operational gearing.[95]

Although CMA noted that there was uncertainty as to the required scale of the uplift, the CMA did not consider that it was correct to provide for no uplift.[96] Therefore, based on the relative measures of operating cash-flow to revenue, it proposed a beta of 0.32 for Bristol Water relative to an industry average of 0.30.[97]

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91 The CMA notes that there is a straightforward theoretical case that operational gearing should have a positive impact on asset beta – as it is comparable in effects to financial gearing. However, CMA also acknowledged that: "*[…] it is difficult to identify a particular relationship between the actual form of operational gearing for water companies and the level of asset beta […] For example, operational gearing is different from financial gearing in that there is no measurable balance sheet obligation.*" CMA (Oct 15), Bristol Water plc, Appendix 10.1, para. 124.

92 For example, other measures presented include evidence on revenue to RCV; opex to RCV. See: CMA (Oct 15), Bristol Water plc, Appendix 10.1, Table 9.

93 The CMA computes operating cashflows as the proportion of wholesale and wastewater revenue (excluding adjustments) which is made up of return on capital and RCV run-off. See CMA (Oct 15), Bristol Water plc, Appendix 10.1, Table 9.

94 CMA (Oct 15), Bristol Water plc, Appendix 10.1, pp.25-26 and 32-33.

95 CMA (Oct 15), Bristol Water plc, Appendix 10.1, pp.26-27.

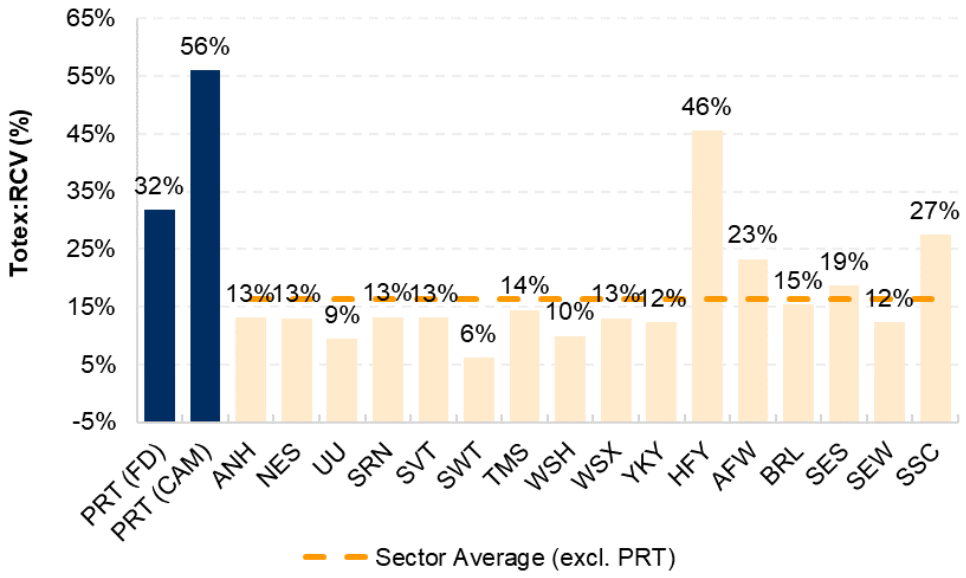
96 CMA (Oct 15), Bristol Water plc, Appendix 10.1, para 127.

97 CMA (Oct 15), Bristol Water plc, Final report, Table 10.4 p.335.

We acknowledge that the CMA measure of operating cash-flow to revenues does not directly take into account capex risk and therefore the risk in relation to HT. However, drawing on the CMA's calculation at PR14 but applied to PR19, PRT's ratio of operating cash-flow to revenue is 33 per cent compared to industry average of 47 per cent, indicating higher risk exposure through higher operational gearing.[98]

More recently, the Utility Regulator in NI has also considered operational leverage for NI gas distribution in determining asset betas, focusing on totex to RCV measures – i.e. considering both opex and capex (or totex) as relevant measures of cost fixity.[99] On this basis, our analysis shows similar results to the analysis of capex:RCV in Section 3.1.1: PRT's projected totex:RCV ratio over the PR19 period is materially higher than projected totex:RCV ratios in the water sector, with the only close licensee being an outlier (Hafren Dyfrdwy), indicating a higher operational leverage for PRT.

Figure 3.5: PRT's Totex:RCV Ratio is Far Greater Than Sector



Note: Totex:RCV ratio calculated as average totex over PR19 divided by 2020/21 opening RCV based on the PR19 final determination company-specific appendices; PRT totex includes both wholesale totex and HT's totex; sector average excludes PRT.

98 We calculate operational cash flow over PR19 as the sum of RCV run-off and allowed return on capital, as per the CMA approach. (CMA (Oct 15), Bristol Water plc, Appendix 10.1, Table 9). We rely on the PR19 final determination company specific appendices (allowed revenue), calculate a yearly operational leverage figure, and average these figures for each company over PR19. The industry average of 47 per cent does not include PRT.

99 In its report for the utility regulator in NI, First Economics states "*We continue to take the view that PNGL and FE could be viewed as less risky investments due to their relatively low totex-to-TRV ratios and relatively low operational intensity*.". See First Economics (Sep 22), An Estimate of the GD23 Cost of capital, prepared for the Utility Regulator, p.4.

Source: NERA analysis of Ofwat PR19 company-specific appendices (allowed revenues), Ofwat (Jan 23), Havant Thicket - Cost Adjustment: Final Decision.

3.3.4. Ofgem Has Recognised Higher Construction Risk for TO Projects

In 2018, Ofgem proposed a new competition proxy model (CPM) for the delivery of the Hinkley-Seabank project (HSB).[100] Under this model, Ofgem would set a "*regulatory model and revenue terms intended to reflect the outcome of an efficient competitive process for the financing, construction and operation of the projec*t".[101] In particular, the CPM involved applying a specifically determined cost of capital for the construction phase and the operational phases of proposed projects.[102 ,103]

To set the construction period WACC, CEPA relied on an asset beta (no debt beta) range of 0.45 to 0.65. For the lower bound, CEPA cited Ofgem's RIIO-T1 decision for Scottish TOs (SPT and SHET), which had a greater investment programme relative to the size of their operational assets than typical networks and received a higher beta allowance from Ofgem, as we discussed in section 3.3.2.[104] For the upper bound, CEPA estimated empirical betas from listed UK engineering and construction comparators.[105]

Both CEPA and Ofgem recognise that the HSB construction phase faces a higher risk than traditional regulated network companies, which CEPA states have had asset beta allowances in the region of 0.3 to 0.4.[106] According to CEPA, the HSB construction phase faces higher risk (and therefore require higher asset beta) than regulated networks because it is fully exposed to the higher risk activity of construction whereas regulated networks blend both construction and operational activities.[107]

The above approach is consistent with our proposed approach of a bespoke cost of capital for HT: HT will be effectively in construction phase until the end of PR24 and therefore will face a higher risk than the wholesale industry which blends both construction (higher risk) and operational (lower risk) activities. As a result, to provide HT with a WACC reflecting a blended set of activities would underestimate its risk exposure and one should instead estimate a bespoke cost of capital for HT that reflects its riskiness.[108]

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100 Ofgem (Jan 18), Hinkley-Seabank project: minded-to consultation on delivery model, p.6 and Ofgem (Jul 18), Hinkley-Seabank project: decision on delivery model, p.6.

101 Ofgem (Jan 18), Hinkley-Seabank project: minded-to consultation on delivery model, p.6.

102 Ofgem (Jul 18), Hinkley-Seabank project: decision on delivery model, pp.33-34.

103 Ofgem (Jul 18), Hinkley-Seabank project: decision on delivery model, p.8 and CEPA (Jul 18), Review of cost of capital ranges for new assets for Ofgem's networks division – final report, p.64.

104 CEPA states its lower bound is based on a "slightly aiming up on the asset beta estimate applied to the Scottish transmission companies in the RIIO-T1 price controls". See CEPA (Jul 18), Review of cost of capital ranges for new assets for Ofgem's networks division – final report, p.55.

105 CEPA (Jul 18), Review of cost of capital ranges for new assets for Ofgem's networks division – final report, pp.46-54.

106 CEPA (Jul 18), Review of cost of capital ranges for new assets for Ofgem's networks division – final report, pp.54-55.

107 CEPA (Jul 18), Review of cost of capital ranges for new assets for Ofgem's networks division – final report, pp.54-55.

108 We note that in 2020 Ofgem stated it would no longer rely on the CPM for HSB, given that its analysis indicated the CPM, updated for the most recent data, no longer offered the required consumer savings to justify a framework different from the SWW under RIIO. However, Ofgem continues to consider the CPM may provide consumer benefits and will continue to consider applying the CPM to future projects. Ofgem (May 20), Hinkley-Seabank: Updated decision on delivery model, pp.25-27.

3.4. Conclusion

Our analysis demonstrates that PRT faces greater risk that other water companies, based on measures of capex to RCV, which implies greater cash-flow volatility and a higher cost of equity. We also find that HT, as the first reservoir being built in 30 years, implies greater investment complexity relative to other standard industry capex programmes.

Our analysis also shows that HT has a concentrated and atypical debt issuance profile, which requires a bespoke cost of debt allowance. We have also shown that aspects of the HT price control – the CAM and allowance for economic profit – do not lessen risk relative to the wider industry.

We also show that UK regulators have allowed for both bespoke cost of equity to reflect greater risk from high capex – employing a number of measures such as capex to RCV, measures of operational leverage such as totex to RCV, and directly estimating betas for construction companies. Our review also shows that regulators allow for bespoke cost of debt allowances for companies with atypical investment profiles.

4. HT's Bespoke Cost of Capital Approach

In this section, we present a bespoke cost of capital approach for HT that provides compensation for the risks HT is exposed to and allows it to recover its efficiently incurred debt costs.

For PR19, we present an adapted version of Ofwat's PR19 debt reconciliation mechanism that recognises that HT is a new project with all new debt and therefore warrants a bespoke approach to reflect this atypical profile relative to the industry.

For PR24, we present both a bespoke cost of debt mechanism designed to account for HT's atypical debt profile and a cost of equity beta uplift to account for the incremental investment risk that HT is exposed to during the construction phase.

4.1. PR19

4.1.1. Ofwat's Intention Was to Allow for HT to Over Recover on Debt to Compensate for HT Risk

At PR19, Ofwat set HT's cost of capital at the same level as the industry wholesale cost of capital and subject to the same cost of debt indexation, i.e. a true-up for the new debt portion of cost of debt, which is based on the industry weighting of embedded:new debt of 80:20. We set out the cost of debt mechanism in detail in Section 2.2.

In setting HT's cost of capital at the wholesale WACC level, Ofwat's intention was to allow PRT to enjoy an effective higher equity return than the wholesale cost of equity, given the clear expectation that the cost of new debt allowance would be lower than the cost of embedded debt allowance but HT would be 100 per cent new debt financed, as evidenced by the following Ofwat quote:[109]

"*there may be inherent factors that increase the risks to Portsmouth Water's shareholders during the construction phase of the Havant Thicket reservoir. However, the impact of inherent equity risks are likely to be offset by lower actual debt costs, due to being financed entirely with new debt."*[110]

However, given the marked increase in debt costs since PR19 FD, the reverse will be true, and HT will under recover its cost of debt.[111]

4.1.2. HT Will Under-Recover Efficient Cost of Debt if PR19 Mechanism Not Amended

We estimate that under Ofwat's PR19 cost of new debt reconciliation mechanism HT's weighted average cost of debt allowance over PR19 post reconciliation would be 2.25 per

[109] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[110] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10. Ofwat also states that "*We also consider that some construction risks will be shared with Southern Water's customers and investors through the bulk supply arrangement*". However, as discussed in Section 3.1.1, this sharing does not lessen risk relative to the industry as the wider industry also benefits from risk sharing arrangements.

[111] HT will under-recover debt cost over PR19 under any reasonable forecast of debt costs for the remainder of the period.

cent (real CPIH, 2017/18 prices), including issuance and liquidity costs.[112] In particular, our estimate relies on:

- HT's projected RCV based on Ofwat's 2023 CAM decision;[113] and
- Ofwat's PR24 final methodology iBoxx outturn/forecast values: i) outturn values of the benchmark index until 30 September 2022; and ii) forecast of 5.49 per cent (excl. outperformance wedge) for values after 30 September 2022, consistent with Ofwat's cost of new debt assumption, which is based on a 1-month average of the benchmark index as of 30 September 2022.[114,115] In Appendix B we present updated cost of debt estimates using a more recent information cut-off date (30 June 2023).

By contrast, we estimate HT's actual cost of new debt over PR19 to be around 2.61 per cent, based on Ofwat's industry issuance cost allowance of 10bps, or 3.58 per cent based on our estimate of HT's additional costs of borrowing, as set out in section 4.2.1. Further, as shown in Appendix B, using updated market evidence as opposed to Ofwat's PR24 information date, our analysis shows that HT's is likely to even more substantively under-recover debt costs.[116]

HT will under-recover on its cost of debt because Ofwat's reconciliation mechanism is designed for a notional company with a relatively uniform debt issuance, given that: i) embedded:new debt weights based on expected proportions of embedded and new debt for the sector as a whole over PR24; and ii) the cost of new debt for each PR19 year being calculated based on an extending trailing average that assumes debt is issued in equal increments in each year of PR19.

Indeed, under Ofwat's extending trailing average approach, the earlier years of PR19 (with lower debt interest costs during the pandemic), have a higher weight than the later years under Ofwat's formula.[117] As a result, as shown in Figure 4.1, despite Ofwat's forecast of the

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112 To forecast HT's cost of debt allowance we rely on the approach set out in Ofwat's PR19 cost of new debt indexation model (version 6.3) and assuming Ofwat's suggested defaults on all fields aside from RCV and iBoxx. As explained in this report, we rely on HT's RCV following the CAM decision (Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15) and the Ofwat's PR24 final methodology iBoxx outturn and forecasts (Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71).

113 Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15.

114 Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71.

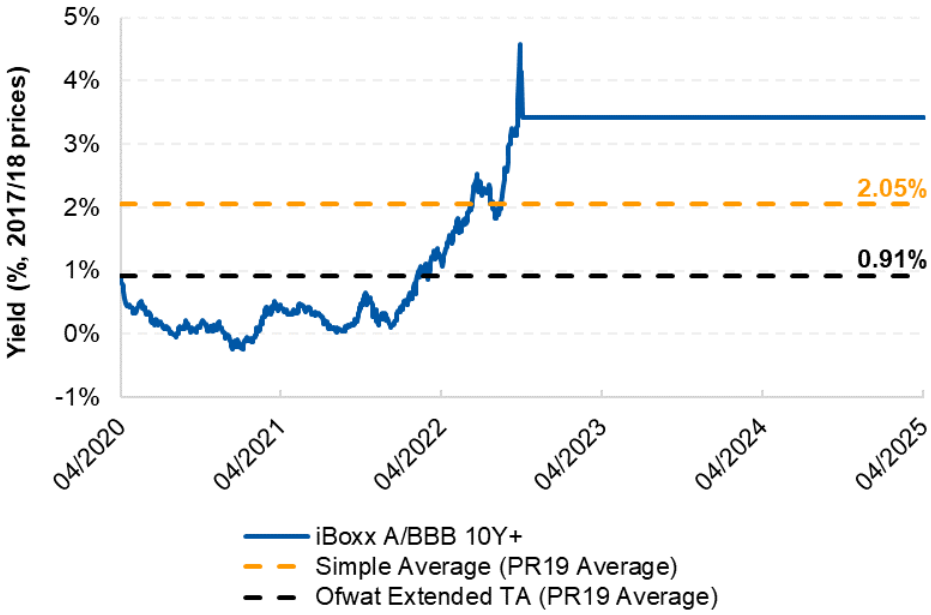
115 We note that since Ofwat's cut-off date of 30 September 2022, the benchmark index 1-month average has increased from 5.49 per cent to 5.89 per cent as of 30 June 2022. Source: NERA analysis of IHS Markit iBoxx data.

116 As shown in Appendix B, once accounting for updated market data, HT's actual cost of new debt over PR19 would be 2.89 per cent including Ofwat's industry issuance cost allowance of 10bps or 3.86 per cent including our estimate of HT's additional cost of borrowing. By contrast, our estimate of Ofwat's notional allowance would be 2.27 per cent (including Ofwat's industry issuance cost allowance of 10bps). The key driver behind the worsening performance is that the SONIA rate (which sets HT's variable cost of debt) has increased substantially more than iBoxx since Ofwat's PR24 information cut-off date: the benchmark index 1-month trailing average increased from 5.49 to 5.89 per cent as of 30 June 2023 whereas the SONIA 1-month trailing average increased from 1.86 to 4.59 per cent as of 30 June 2023. Source: NERA analysis of IHS Markit iBoxx data and SONIA data.

117 As shown in Section 2.2, under Ofwat's extended trailing average approach the interest in any given year is calculated as a weighted average of all previous PR19 years interest where all years except the final one are equally weighted. This means that the interest rate observed in first year will by definition always have a higher weight than interest observed in later years. For example, the interest rate assumed for debt in the final year of PR19 (2025) is a weighted average of previous year iBoxx values with only 11 per cent weight given to iBoxx observed in 2025, but 44 per cent weight to the lower iBoxx observed in 2021 and 2022. See Ofwat PR19 cost of new debt indexation model (version 6.3), tab "InpR" rows 63 onwards.

benchmark index resulting in a (simple) average of 2.05 per cent (real, CPIH, 2017/18 prices) over PR19, Ofwat's extended trailing average approach means the average allowed cost of new debt over PR19 would be lower at 0.91 per cent (real, CPIH, 2017/18 prices), given the greater weight on the earlier years.[118]

Figure 4.1: Ofwat's Extended Trailing Average Approach Places Greater Weight on Earlier Years with Lower interest Rates



Note: iBoxx yields are before Ofwat's outperformance wedge adjustment; assume inflation of 2 per cent as per Ofwat's long-term CPIH assumption.
Source: NERA analysis based on IHS Markit iBoxx data, Ofwat PR19 cost of new debt indexation model (version 6.3) and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71.

4.1.3. Our Proposed Amendments to Ofwat's PR19 Mechanism to Allow for HT Efficient Costs

As we describe in Section 3.1, HT's characteristics make it distinct from a notional company with a uniform debt issuance profile, which means that Ofwat's "default" cost of debt reconciliation mechanism would not compensate HT for its efficiently incurred debt costs. We therefore propose an alternative mechanism for HT that preserves Ofwat's overall mechanism but makes the following modifications:

- New debt weight: Assume 100 per cent new debt weight to account for the fact that HT issued all its debt in PR19, i.e. no embedded debt. Indeed, at its PR19 draft determinations, Ofwat set HT's cost of capital assuming 100 per cent new debt, stating that: "*Our decision to set a different cost of debt reflects two factors:* ***no embedded debt assumption****, as this would be* ***inappropriate for a project whose debt financing will be new debt only*** *(…)*".[119] This rational is consistent with our proposal above. While Ofwat

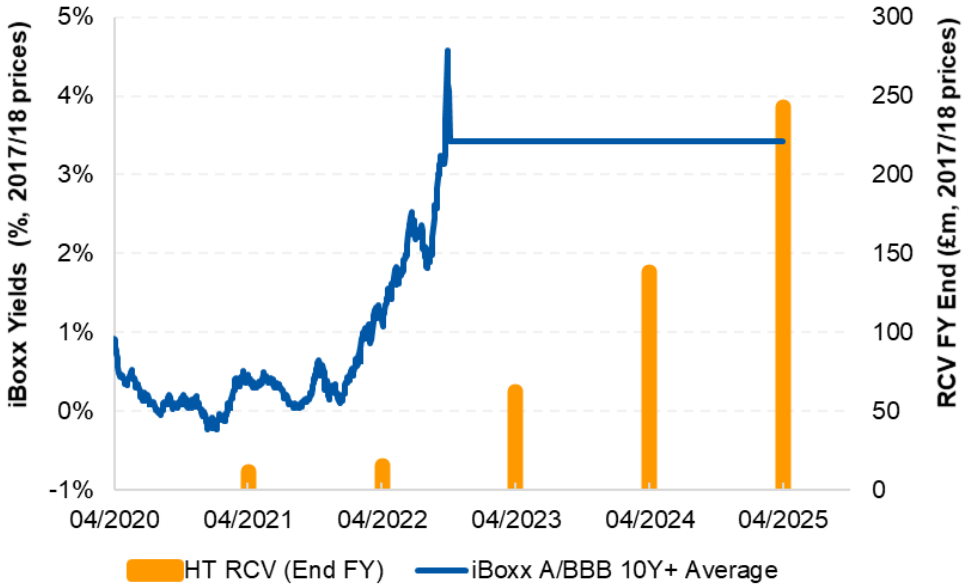
[118] Calculated following process described in footnote 112 and observing the results in Ofwat PR19 cost of new debt indexation model (version 6.3), tab "Cost of Debt" rows 14 and 48. These figures are before Ofwat's outperformance wedge adjustment of 15bps.

[119] Ofwat (Jul 19), PR19 draft determinations: Havant Thicket policy issues appendix, p.17.

changed its approach at the final determinations to rely entirely on wholesale cost of capital, we explain above that this was under an expectation that HT would outperform on the cost of debt and therefore offset some of the equity risk of HT, but which has not happened due to the marked increase in debt costs.

- Extending trailing average: Assume the weights for the allowed cost of new debt trailing average are based on RCV growth as opposed to equal weighting in all years, as per Ofwat's approach.[120] This modification recognises that most of HT's RCV growth that needs to be funded occurs towards the end of PR19 and therefore HT has had to issue its debt at a time where interest rates are higher (relative to earlier PR19 years), as per Figure 4.2 below. Ofwat's approach of an extended trailing average places too much weight on early years of PR19 when HT did not issue any material debt and would substantively under-compensate HT for the efficient market cost of debt.
  - Our approach to weight years by RCV growth, as a proxy for expected debt issuance, is consistent with Ofgem's approach for SHET as we described in Section 3.3.2. It ensures that a company's cost of debt allowance is independent of its timing of actual debt issuance.

Figure 4.2: HT's Higher RCV Growth Occurs Towards End of PR19



Note: iBoxx yields do not include Ofwat's outperformance wedge adjustment; assume inflation of 2 per cent as per Ofwat's long-term CPIH assumption.
Source: NERA analysis based on IHS Markit iBoxx data, Ofwat PR19 cost of new debt indexation model (version 6.3) and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71 and Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15.

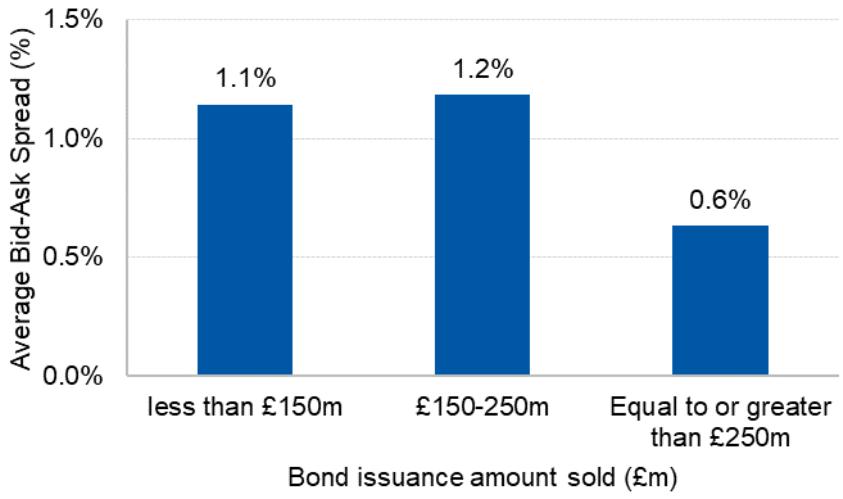
- Outperformance wedge: Remove Ofwat's outperformance wedge of 15bps. Ofwat justifies its 15bps outperformance wedge based on an analysis of industry wide debt costs

[120] We rely on HT's RCV growth as forecasted in Ofwat's CAM decision (see Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15). We then modify Ofwat's extended trailing average approach such that in each year, the weight on each previous years' interest costs is equal to the proportion of RCV growth that needs to be funded for those particular years, based on average RCV position.

relative to the benchmark. At PR19 appeals, the CMA considered that there was insufficient evidence to apply to the new cost of debt.[121] Moreover, in the case of HT, the evidence shows that it faces higher costs than notional companies, given the necessarily smaller size of HT's debt issuance.[122] For example, we have undertaken analysis of the size of tenor of issuance and the bid-ask spread, a measure of the small debt premium. Our analysis shows that the bid-ask spread is around 60bps higher for issue sizes less than £250 million relative to those that are greater than this amount. Also at RIIO-2, Ofgem allowed for a small company premium on new debt issuance of 15bps.[123] Ofgem permitted this premium for issues less than £250 million. For all these reasons, there is a compelling reason to disregard the 15bps for HT.

– As a further reason that the outperformance wedge should not apply, HT's debt is likely to be more expensive relative to the rest of the industry because of construction related credit risk, making it more difficult for HT to achieve the industry-wide notional rating and notional A/BBB iBoxx debt cost.

Figure 4.3: We Estimate Greater Bid-ask Spread of 60bps for Small Debt Issuances



Sources: NERA analysis of GB networks' bond data.

Based on the three modifications described above, we estimate a weighted average cost of debt (excl. issuance and liquidity costs) over PR19 post reconciliation for HT of 2.75 per cent (real CPIH, 2017/18 prices), 60bps higher than under Ofwat's default mechanism 2.15 per cent).[124] Including Ofwat's issuance and liquidity costs allowance of 10bps, our approach would result in a weighted average cost of debt of 2.85 per cent.

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121 CMA (2021) Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, para 90

122 For example, PRT has issued debt instruments with a nominal face value of between £75 and 105 million to finance HT and therefore far below the minimum efficient size of around £250 million.

123 Ofgem allowed a small company premium of 6bps on all debt, but assuming 40 per cent new debt over RIIO-2 period, this translated to a liquidity premium on new debt of 15bps. Ofgem (2020) Decision - RIIO-2 Final Determinations – Finance Annex (REVISED) para 2.62 p.23.

124 NERA analysis based on IHS Markit iBoxx data, Ofwat PR19 cost of new debt indexation model (version 6.3) and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.70-71 and Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.15.

Table 4.1: PR19 Allowed Cost of Debt Under Ofwat's Default Mechanism and NERA's Modified Mechanism

	PR19 Allowed Cost of Debt (real, CPIH, 2017/18 prices)
Ofwat default mechanism	2.25%
Ofwat modified mechanism (NERA)	2.85%
HT actual cost	3.58%

Note: Ofwat default and modified mechanism include 10bps of issuance and liquidity costs as per Ofwat's PR19 decision.
Source: NERA analysis.

We note that, even under our modified reconciliation mechanism, HT will still not recover its actual cost of debt, which we estimated at 3.58 per cent over PR19 as explained in the previous section based on Ofwat's information date.

HT's under-recovery of its expected cost of debt contrasts with the expected differential between the cost of embedded debt (2.42 per cent) and the expected cost of new debt that HT expected to incur (of 0.53 per cent), of around 190 bps, as expected by all parties at PR19 FD.[125] The differential would have compensated HT for higher debt costs than notional (from smaller issuance and greater credit risk) as well as higher equity risk relative to the notional company. However, the result is that neither higher debt nor equity costs have been compensated (even under our proposed mechanism).

4.2. PR24

As we explain in Section 3, HT's higher investment risk and debt profile mean a WACC based on the industry characteristics will not compensates investors for the greater risk. Therefore, we propose below modifications to Ofwat's PR24 cost of equity and cost of debt approach to account for HT's greater risk and atypical debt profile.

4.2.1. Cost of Debt

For PR24, we propose adjustments to Ofwat's PR19 cost of debt overall framework to reflect HT's specific characteristics. We note that in its CAM decision Ofwat stated it would consider a specific adjustment to cost of debt at PR24 to reflect the fact HT's debt will be all new debt for the project.

As explained in Section 2.3.2, Ofwat proposes to retain the same high-level framework for PR24 as it did for PR19, i.e. calculate cost of debt as a weighted average of the cost of embedded and the cost of new debt, with a reconciliation of the cost of new debt at the end of the period. We consider this framework would allow HT to recover efficiently incurred interest costs subject to the following modifications:

- New debt issued over PR19 ("Embedded cost of debt"): Rely on efficient cost of debt reflecting HT's opening PR24 position based on RCV growth (as discussed in previous section) and iBoxx values associated with this issuance. In particular, we rely on the allowed cost of new debt for the closing PR19 year (opening PR24 figure), which is a weighted average cost of debt reflecting debt issued at the benchmark index with the

[125] See section 2.2.

weights matching RCV growth over each of the PR19 years (i.e. extended trailing average outcome for final PR19 year). We rely on HT's efficient cost of debt as opposed to industry embedded cost of debt, which will reflect debt issued over the last decades, whereas our HT efficient debt issued will only start from 2021 onwards (start of PR19).

  - We estimate HT's efficient embedded cost of debt at 3.12 per cent based on Ofwat's PR24 final methodology iBoxx.[126] We note that this value will be updated once outturn data on iBoxx values is available.

- PR19: PR24 debt weights ("Embedded:new debt weights"): Rely on HT's RCV growth over PR19 and PR24 as the weights, with the closing PR19 notional debt (i.e. RCV times notional gearing) informing the weight on PR19 issued debt and PR24 new debt reflecting RCV growth over PR24. Under this approach, the cost of debt allowance accounts for HT's debt issuance profile as proxied by its RCV growth. We estimate weights on PR19 new debt:PR24 new debt of 88:12 (average over PR24) based on the allowed totex profile following the CAM decision, as shown in Table 4.2.[127]

Table 4.2: PR19 New debt:PR24 New Debt Weights

	2025 (PR19)	2026	2027	2028	2029	2030
Closing RCV	243	286	299	312	314	315
Notional gearing	60%	55%	55%	55%	55%	55%
Closing debt	146	158	164	172	173	173
Avg debt	n.a.	152	161	168	172	173
Embedded debt (avg)		146	146	146	146	146
New debt (avg)		6	15	22	26	27
Share of new debt		**4%**	**9%**	**13%**	**15%**	**16%**

Note: Years reflect financial year end; we estimated closing RCV each year by adding totex under CAM to opening RCV; all £ figures in 2017/18 prices.
Source: NERA analysis of Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, pp.14-15 and Ofwat (Dec 22), Final methodology for PR24, Appendix 11, p.80.

- Extending trailing average: We propose that the cost of new debt is based on an extending trailing average of the iBoxx benchmark index, where the weights are based on RCV growth as per our PR19 proposal. The approach ensures that the cost of new debt takes account of the timing of debt issuance over PR24, as proxied by RCV growth.

  - For the purposes of this report, we rely on an ex-ante cost of new debt over PR24 of 3.42 per cent, in line with Ofwat's holding assumption for cost of new debt excluding the outperformance wedge.[128] This figure would then be subject to a true-up based on our proposed mechanism described above.

[126] As explained in Section 4.1.3, we do not include Ofwat's outperformance wedge adjustment.

[127] In particular we calculate the proportion of embedded debt as the proportion of HT's total allowed totex after Ofwat's CAM decision that is part of the PR19 period. See Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, p.14.

[128] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24 Appendix 11 – Allowed return on capital, p.79.

- Outperformance wedge: Remove Ofwat's outperformance wedge of 15bps on both embedded and new debt cost, as per our recommended approach for PR19.
- Issuance and liquidity costs: We propose an estimate for issuance and liquidity costs that reflects an efficient benchmark cost given HT's specific circumstances, as opposed to the industry figure of 10bps. We calculate an efficient benchmark cost of 108bps as follows:
  - Transaction cost allowance of 19bps, based on HT's actual data on arrangement fees and where the cost is amortised over the life of the bonds, with an average tenor at issuance of around 8 years. The necessarily shorter tenor – to match the construction period – is the key reason why HT faces higher costs than the notional company.[129] In terms of benchmarks, the HT cost is around 3 times Ofwat's industry average allowance of 7 bps, reflecting that HT's debt tenor is around one-third the notional tenor. Otherwise, the Utility Regulator in NI has allowed transactions costs of around 20 bps for PNG, which also has a similar shorter tenor. [130]
  - Liquidity cost allowance of 88bps, based on the TTT liquidity building block approach. Under the TTT approach, the IP is allowed to earn 12 months of pre-financing costs on expected new expenditure at the cost of capital. In practice, the liquidity building block is calculated based on the expected RCV growth over the next year, multiplied by the cost of capital.[131] For HT, we rely on the TTT approach applied to HT's RCV as per the CAM decision and over both PR19 and PR24 to ensure that we capture the entire HT construction period, as per the TTT liquidity building block allowance.[132] This results in a liquidity cost allowance of 88bps.[133] We note that our proposed liquidity cost allowance under the TTT approach is lower than the actual liquidity costs HT expects to incur over PR19 and PR24 of 104bps.[134]

Overall, we estimate a HT cost of debt allowance over PR24 of 4.23 per cent compared to Ofwat's estimate of the industry PR24 cost of debt of 2.60 per cent per cent as summarised in Table 4.3.

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129 Companies issue shorter tenor as credit risk and therefore debt financing costs are higher during the construction period. The shorter tenor debt can then be refinanced at the end of the construction period on more favourable terms. The refinancing on more favourable terms is beneficial to customers, as the cost of debt allowance is based on the sector wide average cost of debt.

130 UR has made a transaction and liquidity cost allowance of 33 bps for PNG and 41 bps for Firmus Energy of which we understand around 20 bps is for transaction costs. See: UR (October 2022) GD23 Gas Distribution Price Control, Final Determination, Main report, p. 90. Link: https://www.uregni.gov.uk/files/uregni/documents/2022-10/GD23%20FD%20Main%20Document.pdf

131 In particular, $Liquidity\ block_t = [Forecast\ Avg\ RCV_{t+1} - Forecast\ Avg\ RCV_t] * BWACC * Change\ in\ RPI_t$. See Ofwat (Aug 15), Project Licence – Bazalgette Tunnel Limited, Part A: Construction Revenue, Section 4, pp.69-71.

132 For the RCV growth, we rely on HT's PR19 RCV growth as per the CAM decision and then assume RCV grows at the same rate as allowed totex on the CAM (Ofwat (Jan 23), Havant Thicket – Cost Adjustment: Final Decision, pp.14-15). For the cost of capital assumption, we rely on Ofwat's PR19 industry determination of 2.92 per cent and Ofwat's PR24 early view cost of capital of 3.23 per cent (Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, p.5 and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24 Appendix 11 – Allowed return on capital, p.8).

133 To calculate this figure we: i) calculate the liquidity cost per year; ii) average the liquidity cost over PR19 and PR24; and iii) divide the liquidity cost by the average notional debt RCV over the same period.

134 In particular, we rely on HT's estimated average undrawn facility amounts over PR19 and PR24 and their associated fees to calculate an annuitised RCF cost. We then divide this RCF cost by the average notional debt over PR19 and PR24.

Table 4.3: We Estimate HT PR24 Cost of Debt of 4.23 per cent

Real, CPIH	NERA	PR24 Early View	Basis for NERA estimate
PR19 cost of new debt (embedded debt)	3.12%	2.34%	PR19 closing cost of debt, based on adjusted PR19 cost of debt reconciliation model
PR24 cost of new debt	3.42%	3.28%	Ofwat estimate, exc. outperformance wedge
Ratio of embedded to new debt	88:12	83:17	PR19:PR24 RCV weights
Issuance and liquidity costs	1.08%	0.10%	HT actual costs
Cost of debt	**4.23%**	**2.60%**	

Source: NERA analysis and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.8.

4.2.2. Cost of Equity

At PR19, Ofwat set the cost of equity for HT at the same level as the wholesale industry, and therefore implicitly assumed the industry asset beta of 0.29 (no debt beta) was appropriate for HT.[135] For PR24, Ofwat is currently proposing an asset beta of 0.26 to 0.29 (no debt beta).[136]

However, as explained in Section 3.1.1, HT (and PRT) is exposed to greater risk over PR24 relative to the wider sector as demonstrated by PRT's far higher capex:RCV ratio. Indeed Ofwat itself recognised the existence of inherent risk factors during the HT construction phase at PR19.[137] Therefore, setting HT's asset beta at the same level as the wholesale industry WACC would not adequately compensate investors for HT's greater risk.

An alternative that compensates HT for its inherently higher risks during the construction phase is to draw on the asset beta range proposed by Ofgem/CEPA for construction phase CPM, which reflects many of the same construction risks that HT faces. As discussed in Section 3.3.4, Ofgem/CEPA propose an asset beta (no debt beta) range of 0.45 to 0.65 for the construction phase WACC, reflecting the higher risk of construction activities relative to regulated networks which blended construction and operational activities.

The lower bound of the range (0.45) is based on the Scottish TOs allowed asset betas at RIIO-T1, including a slight aiming up. As explained in Section 3.3.2, Scottish TOs were allowed a higher asset beta to reflect the construction risk associated with their sizeable investment programmes at T1. These are the same type of risks that HT faces and that set it apart from the notional company. However, this lower bound may understate HT's risk exposure given that: i) despite the size of the Scottish TOs investment programmes relative to their asset base, this is still not comparable to the delivery of a single greenfield asset with limited existing RCV and no lower operational risk activities; and ii) while the implicit asset

[135] Ofwat (Dec 19), PR19 final determinations: Allowed return on capital technical appendix, p.4 and Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

[136] Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24 Appendix 11 – Allowed return on capital, p.7.

[137] Ofwat (Dec 19), PR19 final determinations: Havant Thicket appendix, p.10.

beta uplift granted by Ofgem applied to the entire asset base of Scottish TO and not just new investments, our proposed modification would only apply to HT, i.e. a new investment, and not PRT's asset base.

The upper bound (0.65) is based on listed UK engineering and construction comparators. We acknowledge that this reflects the underlying risk of (HT) construction, absent the greater protections and mitigations provided for by the PR24 regulatory regime relative to the construction sector. Therefore, we consider that an asset beta upper bound of 0.55 (i.e. midpoint of the TO precedent and construction companies) for HT would be more appropriate.

Overall, we conclude on an asset beta range for HT of 0.45 to 0.55. We note that the introduction of a bespoke cost of debt mechanism (as we propose) would not mitigate HT's higher equity risk exposure relative to the industry. This is because the bespoke cost of debt mechanism only leads to HT recovering efficiently incurred interest costs, but does not reduce the greater capex risk that HT is exposed to. This conclusion is consistent with other regulators approaches such as Ofgem and the UR, where neither regulator adjusted asset betas following introduction of bespoke cost of debt mechanisms.[138]

4.3. Conclusion

In this section, we have set out proposed modifications to Ofwat's PR19 cost of new debt reconciliation mechanism to reflect HT's specific cost of debt profile. Namely, we propose three modifications: the weight on embedded:new debt is 100 per cent on new debt, the weights on the extending trailing average reflect HT incremental RCV growth in each year of PR19 (as opposed to assuming a uniform debt issuance profile as per Ofwat's sector wide approach), and the removal of the outperformance wedge adjustment.

For PR24, we also propose similar modifications to Ofwat's cost of new debt reconciliation mechanism, namely a weighted average of embedded:new debt of 88:12, the extending trailing average reflect HT incremental RCV growth in each year of PR24, remove the outperformance wedge adjustment and estimate higher issuance and liquidity costs that reflect HT's specific circumstances. We also propose an embedded cost of debt based on efficient issuance (i.e. at iBoxx benchmark index rates) over PR19.

For the cost of equity, we propose an asset beta range of 0.45 to 0.55, where the lower bound draws on regulatory precedent for TOs and the upper-bound as the midpoint between regulatory precedent and construction company betas.

Overall, we conclude on a HT cost of capital of 5.17 to 5.77 per cent for PR24, subject to a true-up on the cost of new debt (and embedded debt post-PR19 reconciliation). As shown in Table 4.4, our bespoke HT cost of capital for PR24 is 194 to 254bps higher than Ofwat's PR24 final methodology estimate of 3.23 per cent as a result of the modifications discussed in

[138] For example, at RIIO-2, Ofgem determined a SHET specific cost of debt mechanism but awarded SHET the same industry asset beta. Likewise, at GD23, UR determined a bespoke cost of debt mechanism for NI GDNS, but made no adjustment to beta risk. See: UR (2022) GD23 Gas Distribution Price Control, Final Determination, pp 88-91. Link: https://www.uregni.gov.uk/files/uregni/documents/2022-10/GD23%20FD%20Main%20Document.pdf Ofgem (2021) Decision - RIIO-2 Final Determinations – Finance Annex (REVISED), pp 10 & 24. Link: https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/final_determinations_-_finance_annex_revised_002.pdf

this section designed to allow HT to recover its efficiently incurred cost of debt and its systematic risk exposure during PR24.

Table 4.4: We Estimate HT's Bespoke Cost of Capital for PR24 at 5.17 to 5.77 per cent

Real, CPIH	Ofwat Industry	Bespoke HT (Lower Bound)	Bespoke HT (Upper Bound)
PR19 cost of new debt (embedded debt)	2.34%	3.12%	3.12%
PR24 cost of new debt	3.28%	3.42%	3.42%
Share of PR24 debt	17%	12%	12%
Issuance and liquidity costs	0.10%	1.08%	1.08%
Cost of debt	**2.60%**	**4.23%**	**4.23%**
Notional Gearing	55%	55%	55%
RfR	0.47%	0.47%	0.47%
ERP	5.99%	5.99%	5.99%
Asset beta (no debt beta)	0.28	0.45	0.55
Asset beta (debt beta)	0.33	0.51	0.61
Equity beta	0.61	1.00	1.22
Cost of equity	**4.14%**	**6.46%**	**7.79%**
Appointee WACC	3.29%	5.23%	5.83%
Retail margin deduction	0.06%	0.06%	0.06%
Wholesale WACC (real)	**3.23%**	**5.17%**	**5.77%**

Note: We assume a debt beta of 0.1 as per Ofwat's midpoint; we rely on notional gearing to convert asset beta from no debt beta to with debt beta.
Source: NERA analysis and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.7-8.

Appendix A. Formulae from Bespoke Cost of Capital Precedent

In this Appendix we set out in more detail the mathematical formula underlying the precedent on bespoke cost of capital mechanisms presented in Section 3.3.

A.1. Ofwat TTT FCA Mechanism

As explained in Section 3.3.1, Ofwat designed the FCA for TTT to protect the IP against movements in debt costs.

The FCA for each of the Charging Year t is calculated based on the following formula:[139]

$$FCA_t = [Net\ debt_{t-2} - Net\ debt_{t-3}] * MCDAF_{t-2} * (1 + BWACC)^2 * Inflation\ adj$$

Where:

- $Net\ debt_t$ is the IP's closing Net Debt at the end of Charging Year t. If any given Charging Year actual gearing exceeds notional gearing, then Net Debt for that Charging Year will be calculated as notional gearing*RCV(current prices).
- $MCDAF_t$ is the Market Cost of Debt Adjustment Factor for Charging Year t and is calculated as the difference in yield for a benchmark debt index for Charging Year t (Annual Reference Point, ARP) relative to the Base Year (Base Reference Point, BRP). The benchmark debt index is defined as the 12 months average of the iBoxx BBB index for UK non-financials with 10+ year maturity, deflated by breakeven inflation, calculated as of 31 March of each Charging Year for the ARP and 31 March 2015 for the BRP. The MCDAF is subject to a deadband mechanism, with the IP bearing full risk of deviations in debt costs of up to 50bps, 50 per cent of the risk for deviations between 50 and 100bps and no risk for deviations beyond 100bps. For example, if the difference between ARP and BRP is 130bps, the adjustment factor will be 55bps.
- $BWACC$ is the bid WACC of 2.497 per cent.
- $Inflation\ adj$ is an inflation adjustment factor to inflate the FCA from prices at t-2 to prices at t.

A.2. Ofgem Bespoke Cost of Debt Indexation for SHET

As explained in Section 3.3.2, Ofgem set a bespoke cost of debt mechanism for SHET to reflect its greater reliance on new debt issuance.

SHET's cost of debt (COD) for year t is set according to the following formula:[140]

[139] Ofwat (Aug 15), Project Licence – Bazalgette Tunnel Limited, Part A: Construction Revenue, Section 6, pp.72-74.

[140] Ofgem (Apr 12), RIIO-T1: Final Proposals for SP Transmission Ltd and Scottish Hydro Electric Transmission Ltd, p.34.

$$SHET\ COD_t = \left[Industry\ CoD_t * \frac{Opening\ RAV_{2013/14}}{Closing\ RAV_{t-1}}\right] + \left[\sum_{t=2013/14}^{t-2} iBoxx\ A/BBB\ (FY\ avg)_t * \frac{Change\ in\ RAV_t}{Closing\ RAV_{t-1}}\right] + \left[iBoxx\ A/BBB\ (Apr-Oct\ avg)_{t-1} * \frac{Change\ in\ RAV_{t-1}}{Closing\ RAV_{t-1}}\right]$$

Where:

- $Industry\ CoD_t$ is the allowed industry cost of debt in year t.
- RAV_t is the regulated asset value in year t (equivalent to RCV for the water sector).
- $iBoxx\ A/BBB\ (FY\ avg)_t$ is the average of the iBoxx UK A and BBB-rated non-financials with 10+ years maturity indices over the period April t-1 to March t.
- $iBoxx\ A/BBB\ (Apr-Oct\ avg)_t$ is the average of the iBoxx UK A and BBB-rated non-financials with 10+ years maturity indices between April and October of year t (October being the date when Ofgem undertakes the calculation.

Appendix B. Updated Market Evidence

In this appendix we update the values presented in Section 4 to reflect the latest market evidence on the benchmark index (iBoxx) and SONIA. In particular, instead of relying on Ofwat cut-off date of 30 September 2022, we rely on a cut-off date of 30 June 2023 where we: i) rely on outturn date until 30 June 2023; ii) forecast benchmark indices using 1-month trailing average as of 30 June 2023.

Table B.1 shows our forecasted PR19 allowed cost of debt under Ofwat's default mechanism, our proposed modified mechanism and HT's actual cost of debt under the updated market data.

Table B.1: PR19 Allowed Cost of Debt Under Ofwat's Default Mechanism, NERA's Modified Mechanism and HT's Actual Cost of Debt

	PR19 Allowed Cost of Debt (real, CPIH, 2017/18 prices)
Ofwat default mechanism	2.27%
Ofwat modified mechanism (NERA)	3.06%
HT actual cost of debt	3.86%

Note: Ofwat default and modified mechanism include 10bps of issuance and liquidity costs as per Ofwat's PR19 decision. HT's actual cost of debt includes issuance and liquidity cost of 108bps.
Source: NERA analysis.

Table B.2 shows our updated estimate of HT's cost of debt allowance at PR24 and Ofwat's estimate of the industry PR24 cost of debt. We note that for Ofwat's PR24 cost of debt, we only update the cost of new debt component.

Table B.2: We Estimate HT PR24 Cost of Debt of 4.53 per cent once Updated for Recent Market Data

Real, CPIH	NERA	PR24 Early View (Updated)
PR19 cost of new debt (embedded debt)	3.41%	2.34%
PR24 cost of new debt	3.82%	3.67%
Ratio of embedded to new debt	88:12	83:17
Issuance and liquidity costs	1.08%	0.10%
Cost of debt	**4.53%**	**2.67%**

Note: Ofwat and NERA's cost of new debt PR24 both set based on 1-month trailing average as of 30 June 2023, but Ofwat's figure is adjusted downwards for 15bps outperformance wedge.
Source: NERA analysis and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, p.8.

Table B.3 shows our updated estimate of HT's cost of capital for PR24, subject to a true-up on the cost of new debt (and embedded debt post-PR19 reconciliation), as well as Ofwat's estimate of the industry PR24 cost of capital. We note that for Ofwat's PR24 cost of capital,

we only update the cost of new debt component, whereas for HT we update both cost of new debt and cost of embedded debt (cost of new debt PR19).[141]

Table B.3: We Estimate HT's Bespoke Cost of Capital for PR24 at 5.34 to 5.94 per cent

Real, CPIH	Ofwat Industry	Bespoke HT (Lower Bound)	Bespoke HT (Upper Bound)
PR19 cost of new debt (embedded debt)	2.34%	3.41%	3.41%
PR24 cost of new debt	3.67%	3.82%	3.82%
Share of PR24 debt	17%	12%	12%
Issuance and liquidity costs	0.10%	1.08%	1.08%
Cost of debt	**2.67%**	**4.53%**	**4.53%**
Notional Gearing	55%	55%	55%
RfR	0.47%	0.47%	0.47%
ERP	5.99%	5.99%	5.99%
Asset beta (no debt beta)	0.28	0.45	0.55
Asset beta (debt beta)	0.33	0.51	0.61
Equity beta	0.61	1.00	1.22
Cost of equity	**4.14%**	**6.46%**	**7.79%**
Appointee WACC	3.33%	5.40%	6.00%
Retail margin deduction	0.06%	0.06%	0.06%
Wholesale WACC (real)	**3.27%**	**5.34%**	**5.94%**

Note: We assume a debt beta of 0.1 as per Ofwat's midpoint; we rely on notional gearing to convert asset beta from no debt beta to with debt beta.
Source: NERA analysis and Ofwat (Dec 22), Creating tomorrow, together: our final methodology for PR24, Appendix 11 – Allowed return on capital, pp.7-8.

[141] We have not updated the risk-free rate (RFR) component of the cost of equity for June 2023 information date given the small impact on cost of capital under Ofwat's total market return (TMR) approach. For example, under our lower bound where the equity beta is equal to 1 a change in the RFR does not affect the overall cost of equity under Ofwat's methodology.

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