Consumers and Markets Group

UK Civil Aviation Authority

Appendices A to G to Provisional Decisions for the NR23 price control review

CAP 2553c

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APPENDIX A

Legal and Regulatory Frameworks

Introduction

A1 This appendix summarises the legal and regulatory frameworks which apply to the economic regulation of NERL.

A2 The CAA is a public corporation established[1] to act as the UK's independent aviation regulator, with civil aviation regulatory functions (economic regulation, airspace policy, safety regulation, consumer protection and aviation security regulation) being integrated within a single specialist body. As well as our responsibilities for aviation safety and consumer protection, we act as the economic regulator for certain UK airports and for air traffic services.

A3 Chapter I of the TA00 provides for the economic regulation of air traffic services.[2] NERL is currently the only licence holder under the TA00. Our approach to economic regulation includes price controls, given effect through conditions in the NERL licence, where we specify the maximum amounts that NERL can charge its customers for its regulated services. These amounts depend on how NERL performs against performance targets.

TA00 duties

A4 As explained in the relevant chapters, our Provisional Decision has been formulated on the basis of the CAA's general duties set out in section 2[3] of the TA00.

A5 The CAA's 'primary duty' is set out in subsection 2(1) as follows:

"*The CAA must exercise its functions under this Chapter so as to maintain a high standard of safety in the provision of air traffic services; and that duty is to have priority over the application of subsections (2) to (5)*."

A6 With respect to safety, most aviation regulation and policy is harmonised across the world to ensure consistent levels of safety and consumer protection. Worldwide safety regulations are set by ICAO. Throughout the development of this Provisional Decision, the CAA's economic regulation and safety teams have worked together to ensure that the provisional decisions are consistent with the

[1] See section 2 Civil Aviation Act 1982: https://www.legislation.gov.uk/ukpga/1982/16/section/2

[2] See section 98 TA00 for the definition of "air traffic services": Transport Act 2000 (legislation.gov.uk)

[3] See section 2 TA00: Transport Act 2000 (legislation.gov.uk)

CAA's primary duty. See from paragraph 1.57 of the Introduction for further information on this.

A7 The 'secondary duties' over which the primary duty has priority are set out in subsections 2(2) to 2(5) TA00.

A8 Subsection 2(2) TA00 provides that the CAA must exercise its functions under Chapter I of the TA00 in the manner it thinks best calculated:

- to further the interests of operators and owners of aircraft, owners and managers of aerodromes, persons travelling in aircraft and persons with rights in property carried in them (referred to as "customers and consumers" in this Provisional Decision). Subsections 2(3) and 2(4) further provide that:
    - the only interests to be considered are interests regarding the range, availability, continuity, cost and quality of air traffic services;
    - the reference to "furthering interests" includes a reference to furthering them (where the CAA thinks it appropriate) by promoting competition in the provision of air traffic services;
- to promote efficiency and economy on the part of licence holders;
- to secure that licence holders will not find it unduly difficult to finance activities authorised by their licences. We interpret this as referring to financeability of the notionally financed company;
- to take account of any international obligations of the UK notified to the CAA by the Secretary of State (whatever the time or purpose of the notification). See further below;
- to take account of any guidance on environmental objectives given to the CAA by the Secretary of State. It should be noted that no such guidance has been given to the CAA by the Secretary of State;

A9 Subsection 2(5) TA00 provides that if, in a particular case, there is a conflict in the application of the secondary duties noted above, the CAA must, in relation to that case, apply them in the manner it thinks reasonable having regard to them as a whole.

A10 Subsection 2(6) TA00 provides that the CAA must exercise its functions under Chapter I of the TA00 so as to impose on licence holders the minimum restrictions which are consistent with the exercise of those functions.

A11 The TA00 also places duties on NERL as a licence holder. It must:[4]

- secure that a safe system for the provision of authorised air traffic services in respect of a licensed area is provided, developed and maintained;[5]
- take all reasonable steps to secure that the system is also efficient and coordinated;
- take all reasonable steps to secure that the demand for authorised air traffic services in respect of a licensed area is met;
- have regard, in providing, developing and maintaining the system, to the demands which are likely to be placed on it in the future.

UK's International Obligations (section 2(2)(d) TA00)

A12 As required by section 2(2)(d) TA00, in developing our provisional decisions in respect of the price controls, the CAA has taken account of the UK's international obligations which have been notified to the CAA by the Secretary of State. These include:

- Article 15 of the Chicago Convention 1944;
- the Eurocontrol Multilateral Agreement relating to Route Charges 1981 (the Multilateral Agreement);
- air services agreements and provisions relating to the imposition of charges on airlines for the provision of air traffic services in agreements between the UK and third countries; and
- agreements between the UK and Republic of Ireland on parts of the Atlantic Ocean.

UK Performance Plan

A13 The UK and the other contracting states to the Multilateral Agreement (Contracting States) have agreed to adopt a common policy in respect of the calculation of the charges and of their cost-base, which is set out in the Principles for establishing the cost-base for en route charges and the calculation of the unit rates (Eurocontrol Principles).[6] The CAA will continue to take account of the determined costs methodology set out in the Eurocontrol Principles when determining the charges for the UK en route air traffic services. See from paragraph 1.49 of the Introduction for further information on this.

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[4] See section 8 TA00: Transport Act 2000 (legislation.gov.uk)

[5] Subsection 8(4) TA00 explains that for the purposes of subsection 8(1)(a), "*a system for the provision of services is safe if (and only if) in providing the services the person who provides them complies with such requirements as are imposed by Air Navigation Orders with regard to their provision*."

[6] Eurocontrol Principles dated January 2020 (EN): doc-20.60.01-eurocontrol-principles-january-2020-en.pdf

A14 Under the Eurocontrol Principles, Contracting States following the determined costs method are required, amongst other things, to have a performance plan. The Eurocontrol Principles do not prescribe in detail what needs to be included in a performance plan and nor do they set out a procedure for its adoption. We engaged with stakeholders on the proposed scope and procedure for adoption of the UK NR23 performance plan in July 2021.

A15 As explained in the Executive Summary and the Introduction, the UK's Performance Plan consists of two parts:

i. our decision in relation to NERL's UK en route price control which we will take following consideration of representations received in this consultation; and

ii. our decision in relation to the DfT, Met Office and CAA en route costs (the Non-NERL costs), which is set out in CAP2553b.

APPENDIX B

Abbreviations

Abbreviations	Term
AICR	Adjusted Interest Coverage Ratio
ADP	Aeroports De Paris
ANSP	Air Navigation Service Provider
ATSA	Air Traffic Services Assistant
ATC	Air Traffic Control
ATCO	Air Traffic Control Officer
ATCE	Air Traffic Control Engine
ATFM	Air Traffic Flow Management
ATM	Air Traffic Management
ATS	Air Traffic Services
ACOG	Airspace Change Organising Group
ACP	Airspace Change Proposal
ACOMS	Airspace Coordination and Obstacle Management Service
AMS	Airspace Modernisation Strategy
ADS-B	Automatic Dependent Surveillance-Broadcast
AWE	Average Weekly Earnings
CAA	Civil Aviation Authority
CAAPS	CAA Pension Scheme
capex	Capital Expenditure
CAPM	Capital Asset Pricing Model
CSU	Chargeable Service Units
CMA	Competition And Markets Authority

CMA determination	Competition And Markets Authority Determination on Reference Period 3
CAGR	Compound Annual Growth Rate
CPI	Consumer Price Index
CDO	Continuous Descent Operations
Contracting States	Contracting States to the Multilateral Agreement on Route Charges
CCWG	Customer Consultation Working Group
Decision on NERL's licence	Our Decision: The Decision taken by the CAA to modify NERL's Licence to implement the NR23 Price Control
DB	Defined Benefit
DC	Defined Contribution
DIWE	Demonstrably Inefficient and/or Wasteful Expenditure
DfT	Department for Transport
DUC	Determined Unit Cost
CRCO	Eurocontrol Central Route Charges Office
the Multilateral Agreement	Eurocontrol Multilateral Agreement Relating to Route Charges 1981
the Eurocontrol Principles	Eurocontrol Principles for establishing the cost base for en route charges and the calculation of unit rates
EUMETSAT	European Organisation for the Exploitation of Meteorological Satellites
FIR	Flight Information Region
Flint	Flint Global
FTE	Full-Time Equivalent
FFO	Funds From Operations
FMARS	Future Military Area Radar Service
GAD	Government Actuary's Department
HAL	Heathrow Airport Limited
IATA	International Air Transport Association

ICAO	International Civil Aviation Organisation
ILGs	Index-Linked Gilts
IMF	International Monetary Fund
IFR	Instrument Flight Rules
IRR	Internal Rate of Return
IR	Independent Reviewer
iSIP21	Interim Service & Investment Plan 2021
iSIP22	Interim Service & Investment Plan 2022
MoD	Ministry of Defence
NERL	NATS (En Route) Plc
NSL	NATS Services Limited
the NERL licence	NERL's Air Traffic Services Licence
NERL's business plan	NERL's NR23 business plan
NOP	Network Operations Plan
NWR	Network Weather Resilience
OBR	Office For Budget Responsibility
opex	Operating Expenditure
OFF	Opex Flexibility Fund
PBO	Pensions Benefit Obligation
PCA	Pension Cash Alternative
PCM	Price Control Model
Provisional Decision	Our provisional decision on the UK NR23 performance plan under the Eurocontrol Principles including statutory consultation on the modifications to NERL’s Licence
RRA	Redeployment & Redundancy Agreement
RP2 (2015 to 2019)	Reference Period 2
RP3 (2020 to 2022)	Reference Period 3
RAB	Regulatory Asset Base

RPI	Retail Price Index
reconciliation review	Review: The CAA review of NERL's efficient costs in 2020 to 2022
RfR	Risk-Free Rate
RIM	Rolling Incentive Mechanism
SARG	The CAA's Safety and Airspace Regulation Group
SoS	Secretary of State
SIP	Service and Investment Plan
SES	Single European Sky
SESAR	Single European Sky ATM Research
SOC	Standard Occupational Classification
SWIM	System Wide Information Management
TMR	Total Market Return
TSU	Total Service Unit
TATC	Trainee Air Traffic Controller
TRS	Traffic Risk Sharing
TA00	The Transport Act 2000
UTM	Uncrewed Aircraft System Traffic Management or Unified Traffic Management
VR	Voluntary Redundancy
WACC	Weighted Average Cost of Capital
WBS	Whole Business Securitisation
WAFS	World Area Forecast System

APPENDIX C

Cost of Capital

Context

C1 This appendix provides further information on the specific issues relating to our estimation of the WACC for NR23 that received detailed comments from stakeholders in response to our Initial Proposals where we have not responded to these comments in chapter 5. The purpose is to address these comments and provide a more detailed explanation of our Provisional Decision.

C2 The specific issues covered are:

- asset beta; and
- total market return (TMR).

C3 This should be read in conjunction with the WACC section of chapter 5 of this Provisional Decision. As set out in chapter 5, we have carefully considered the need to strike an appropriate balance between the risk of setting the WACC too high, potentially leading to consumers paying too much, and setting the WACC too low, potentially making long-term financeability unduly difficult and/or undermining incentives for investment. In reaching our Provisional Decision we have exercised our functions in the manner we think best calculated to apply our various secondary statutory duties, including to further the interests of customers and consumers.

Asset Beta

Our Initial Proposals

C4 The asset beta is a measure of the "systematic" risk to which a company is exposed. This is the proportion of total risk that cannot be eliminated by holding a diverse portfolio of assets. It is an important input into our cost of capital estimate because, under the CAPM, the beta is the parameter that determines shareholders' required return for holding a stock in a specific business, in this case NERL.

C5 Consistent with the CMA's approach in the PR19 determination[7] and its previous decisions, we estimate the asset beta and then consider how this

[7] CMA (2021), Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final report.

should translate into an estimated equity beta through our assumptions about the notional company's gearing and the debt beta.

C6 In our Initial Proposals[8], we set out a proposed approach for estimating the asset beta, which was informed by views from stakeholders and an expert report we commissioned from Flint.[9] This approach took a view of:

- the baseline beta without the impact of covid-19; and
- the increment for the probability-weighted impact of a future pandemic similar in nature to the impact of covid-19.

Summary of stakeholders' views

C7 NERL's response to our Initial Proposals was supported by an updated report commissioned by Oxera Consulting LLP (Oxera). British Airways response was supported by a report from CEPA consulting. Both reports focussed on our estimation of the cost of capital and commented on the asset beta.

C8 NERL's response said that the approach adopted by Flint in its report published at Initial Proposals makes incorrect assumptions around the end date of the covid-19 pandemic and understates the impact of covid-19 on the asset beta.

C9 NERL suggest that the pandemic adjustment approach will require adjustments to be made in all future price controls.

C10 NERL also disagreed with our focus on the bottom half of the range.

C11 NERL and British Airways disagreed with the comparator set relied upon by Flint.

C12 British Airways said that the methodology overestimates the impact of covid-19 on the asset beta.

Our views

C13 Our overall approach from Initial Proposals remains mostly unchanged. Below we address detailed stakeholder comments on the method for estimating the asset beta. We also set out the changes to this method that we have made since Initial Proposals.

Overall Approach

C14 While there is increasing evidence that aviation stocks and the wider market have moved beyond the covid-19 pandemic, we consider Flint's approach

[8] CAA (2022), Economic regulation of NATS (En Route) plc: Initial Proposals for the next price control review (NR23), Appendix C, C92-C110

[9] Flint, "Support to the Civil Aviation Authority: Estimating NERL's beta at NR23"

remains appropriate for estimating the balance of risks faced today by an investor in NERL. The approach reflects that covid-19-like events may happen in the future but cannot be expected to influence forward-looking systematic risk equivalent to that reflected in recent backward-looking aviation betas. The CMA stated the same view in the PR19 determination in March 2021.[10]

C15 Oxera characterises the approach as 'excluding outliers' from the beta analysis. However, the approach effectively reweights outliers in line with more plausible likelihood and impact. This provides a better basis from which to reflect the balance of systematic risk that NERL faces in the future than relying on raw estimates of beta.

C16 We disagree with CEPA's argument that Flint's approach gives outliers associated with covid-19 disproportionate influence. The extreme observations experienced during the covid-19 pandemic help assess the market's potential reaction to prospective future covid-19-like events and should be appropriately reflected in a forward-looking beta estimate.

C17 We consider that a covid-19 adjustment may need to be included when estimating the asset beta in future regulatory reviews, subject to the market data available at that time, whether this data accounts for the risk associated with the potential of future pandemic-like events and the overall approach that is adopted to estimating the cost of equity.

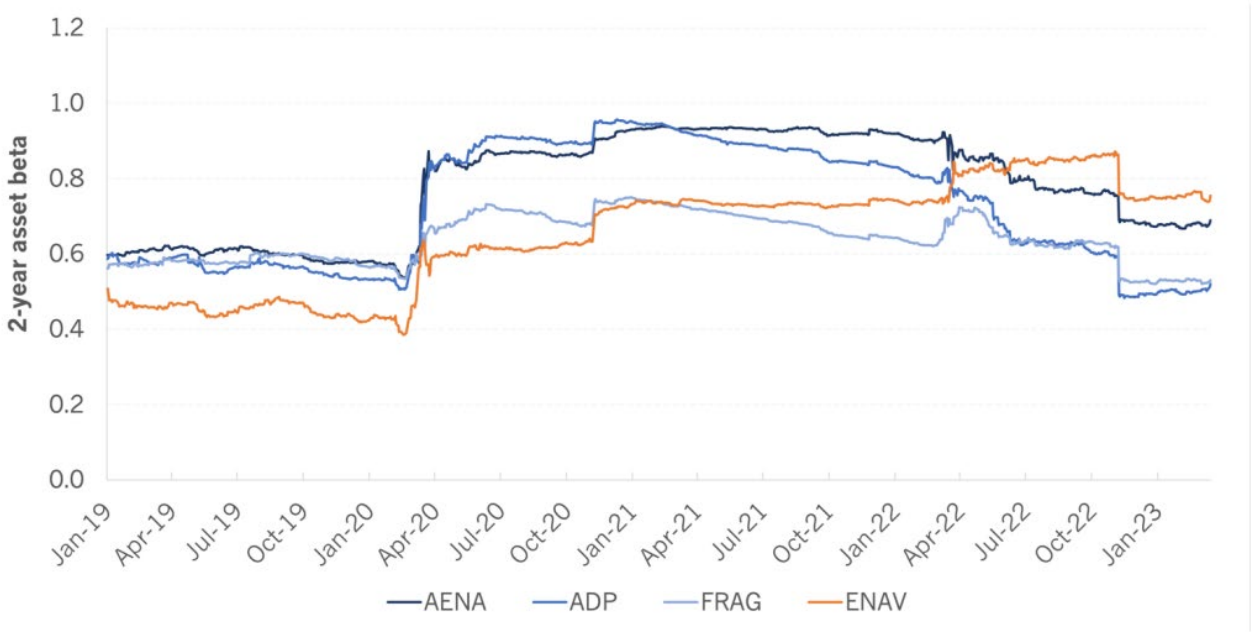
Recent data

C18 For our Initial Proposals, all data since the start of the pandemic up until March 2022 was considered 'covid-affected'. There were short-window betas suggesting the impact of covid-19 was no longer prominently affecting comparator betas in early 2022. However, our advisors Flint continued to take a cautious approach.

C19 Given that a further 12 months of data is now available, 2-year rolling asset betas for main comparators support a stronger conclusion in that airport betas appear to have reverted to pre-covid-19 levels. We discuss the trends for ENAV's (which is the only ANSP that has a stock exchange listing) beta below.

[10] CMA (March 2021), Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, p. 870, para 9.493

Figure C1: 2-year rolling beta estimates



Source: Flint (2023) Support to the Civil Aviation Authority: NR23 Updated Beta Assessment.

Notes: Thomson Reuters data as of 15th March 2023

C20 As recent evidence supports the view that the 'covid effect' has receded from recently observed comparator evidence, Flint has defined a conservative but clear cut-off date for the data we consider is 'covid affected' as the end of December 2021[11].

Comparator set

C21 Flint's previous report[12] evaluated evidence from six airport groups and ENAV, the only listed ANSP. To reduce the impact of company-specific factors, they averaged the observed COVID adjustment across groups of airport comparators:

- A broad set of suitable airport comparators: AENA, ADP, Fraport, Zurich, Vienna and Sydney.
- A subset of four airports considered more relevant: AENA, ADP, Fraport and Zurich .
- The CMA's preferred airport comparator group used for RP3: AENA, ADP and Fraport.

C22 Flint's updated approach to comparator selection is set out below.

[11] Flint (2023), Support to the Civil Aviation Authority: NR23 Updated Beta Assessment, April.

[12] Flint (2022), "Support to the Civil Aviation Authority: Estimating NERL's beta at NR23", May.

C23 Sydney airport was delisted from the Australian stock exchange in February 2022 and so Flint has not been able to use this comparator as a baseline beta cannot be estimated using a comparable dataset.

C24 Since the previous May 2022 Flint report, Vienna airport's 1-year beta has fallen below zero. This is extremely unusual and calls into question the reliability of data for Vienna. Flint has not used this comparator to avoid it distorting the beta estimates.

C25 As discussed in our Initial Proposals, Zurich airport may be a less appropriate comparator for NERL than the group of three airport comparators. Flint also found inclusion of Zurich in the comparator set does not materially change the implied covid-19 adjustment compared to the average of only three airport comparators.

C26 CEPA's concerns about the comparator set have been addressed by Flint in its May 2022 report as to why betas from other comparators were insufficiently reliable.[13] Flint has now also updated its analysis to exclude Vienna and Sydney[14].

C27 CEPA considers results from both domestic indices and continental indices are relevant. Flint described why they disagree with this in its May 2022 report. This is also consistent with the CMA's RP3 determination for NERL.[15]

Updated conclusion on baseline asset beta

C28 In Flint's earlier report, the baseline beta recommendation (i.e. without the impact of covid-19) was based off the CMA's RP3 asset beta. Given that 12 months of new data is available, the baseline beta is now based off both pre-covid-19 (February 2015 to January 2020) and post-covid-19 data (January 2022 to March 2023). Beta estimates falling within these time periods are considered 'clean' of the impacts of covid-19.

C29 In their latest report, Flint focus on how new data since their previous 2022 report affects their earlier conclusions. Based on the method applied by the CMA at RP3, they updated their conclusion on the baseline asset beta. This is set out below.

C30 Table C1 compares new 'clean' beta estimates with the range the CMA relied-upon for each of its comparators.

[13] Flint (2022), "Support to the Civil Aviation Authority: Estimating NERL's beta at NR23", May.

[14] Flint (2023), Support to the Civil Aviation Authority: NR23 Updated Beta Assessment, May.

[15] CMA (2020) NATS (En Route) Plc CAA Regulatory Appeal Final Report. 13.96

Table C1: Comparison of non-covid-19 asset betas with earlier CMA ranges

	AENA	ADP	Fraport	3 airport average	ENAV
CMA decision at RP3					
Lower bound	0.57	0.52	0.47	**0.52**	0.45
Upper bound	0.67	0.62	0.57	**0.62**	0.55
Flint daily beta estimates using the non-covid-19 dataset					
Clean 6.2-year beta, spot estimate (blend)	0.56	0.56	0.54	**0.55**	0.62
Clean 5-year betas, 1.2 years average (blend)	0.57	0.54	0.54	**0.55**	-
Clean 1-year betas, 0.2 years average (post-covid)	0.69	0.54	0.49	**0.57**	0.76

Note: CMA estimates are based on spot estimates and 1-year, 2-years and 5-years averages (updated for consistent debt beta treatment). The CMA noted 2-year weekly betas were less reliable and put less weight on these estimates. Flint non-covid estimate includes 5-years of pre-covid data for the period from February 2015 to January 2020 (3.5-years for ENAV, from July 2016 to January 2020) and 1.2 years of post-covid data for the period January 2022 to March 2023. Flint adjusted the CMA estimates for a debt beta as described in the text above the table.

Source: Flint (2023) Support to the Civil Aviation Authority: NR23 Updated Beta Assessment. Flint analysis based on Thomson Reuters data as of 15th March 2023. CMA (Jul 2020).

C31 Flint found that the upper-bound of their range from their previous report (0.62) remains appropriate. The higher 1-year post-covid-19 beta estimated for AENA is likely to be an outlier, given the lack of similar pattern across our other comparators. It is also markedly higher than the 5-year beta estimates and the range the CMA estimated prior to COVID-19.

C32 Flint considered the implications of their updated findings on the lower-bound of their range (0.52 in their last report).

- For most of the preferred airport comparators, 'clean' long-window beta estimates support a beta below the mid-point of the previous range (0.56).
- For the three comparators, the long-window clean baseline beta is 0.55 on average (with a range of 0.54 to 0.56). All values sit below the midpoint of the previous range (0.56).
- Except for AENA, post-covid-19 evidence is lower still (0.49-0.54).
- For Flint's preferred baseline 'clean' estimate, the average across the three airport comparators is 0.55, which is also below the midpoint of Flint's previous range (0.56).

C33 Flint has concluded that the updated evidence supports a lower bound of 0.50. This is consistent with Flint's assessment of pre-covid-19 evidence applied by

the same comparators in their assessment for H7[16]. Flint also uses 2-year daily betas to cross check its recommended range.

C34 We agree with the recommended revised baseline (i.e., non-covid-19) beta range of 0.50 to 0.62 on the basis that the combination of old and new data points to baseline beta estimates slightly below the midpoint of the previous range.

Updated conclusion on covid-19 adjustment range

C35 The estimated range for the covid-19 adjustment for the three-airport comparator set is 0.02 to 0.08. This adds to the baseline beta range of 0.50 to 0.62 described in the previous section, to give an overall covid-19-adjusted beta range of 0.52 to 0.70.

C36 The covid-19 adjustment is slightly lower than the previous range of 0.02 to 0.11. The lower range reflects the small increases in the average baseline betas that result from the treatment of recent data as 'clean'. This reduces the implied effects covid-19 within the re-weighted betas.

C37 The covid-19 adjustment implied by ENAV's beta is now more closely aligned with the airport evidence. At the Initial Proposals, ENAV's covid-19 adjustment was estimated to be 0.04 to 0.17. This has fallen materially to 0.02 to 0.04. The decrease in ENAV's COVID adjustment is driven by including more recent, 'clean' data.

ENAV's beta values[17]

C38 For Initial Proposals, we set out concerns about ENAV as a comparator that undermined the reliability of its observed betas, such that we placed very limited weight on its beta estimates[18].

C39 Flint, based on the most recent data and updated analysis, still consider ENAV to be less reliable than the airport comparators. Figure C2 shows the 1-year rolling asset beta for each comparator. ENAV's beta has oscillated within a wider range than all comparator airports over the period. There is no clear underlying reason for the more volatile behaviour of ENAV's beta estimates.

[16] Flint (2022), Support to the Civil Aviation Authority: H7 Updated Beta Assessment

[17] ENAV is the Italian en route ANSP and is the only stock market listed ANSP.

[18] CAA (2022), Economic regulation of NATS (En Route) plc: Appendices to initial proposals for the next price control review ("NR23"), C106

Figure C2: 1-Year rolling beta estimates

Source: Support to the Civil Aviation Authority: NR23 Updated Beta Assessment.

Notes: Thomson Reuters data as of 15th March 2023

C40 Flint has also found that ENAV's beta estimates remain less statistically reliable than all the individual airport comparators over time.

C41 Furthermore, there has been a shift in the level of ENAV's beta between pre- and post- covid-19 periods making it more difficult to estimate the counterfactual beta which would have prevailed absent the covid-19 pandemic.

C42 Flint remains of the view that the airport evidence is more robust and appropriate for setting NERL's asset beta at NR23. However, as the only listed ANSP, it is a relevant data point.

C43 ENAV's evidence now points to a beta slightly above the mid-point of Flint's range, made up of a baseline of 0.62 and a covid-19 adjustment of 0.02 to 0.04, resulting in an overall beta for ENAV of 0.64 to 0.66.

C44 There remains significant uncertainty about ENAV's beta and, unlike the airport comparators, the results for ENAV are sensitive to alternative classifications of Flint's dataset. For example, when using an earlier covid-19 cut-off sensitivity, Flint found that ENAV's covid-19 adjustment was lower. However, when using a later covid-19 cut-off sensitivity, Flint found that ENAV's covid-19 adjustment was markedly higher. Conversely, the airports' beta analysis is relatively robust to alternative assumptions as to when covid-19 was driving the observed beta behaviours.

Asset Beta Range

C45 For Initial Proposals we did not consider that the top half of Flint's range was commensurate with NERL's risk profile due to the protections in place in the regulatory framework for NERL, including for pension costs.

C46 The updated evidence from ENAV leads to asset beta estimates that are slightly above the midpoint of Flint's updated range. Given the slightly wider range in comparator betas and the greater degree of uncertainty around where NERL's beta may be in Flint's range, we take Flint's full recommended asset beta range into account for our Provisional Decision.

Our Provisional Decision

C47 Applying the revisions set out above to the original methodology used by Flint, Flint has recommended an asset beta range of 0.52-0.70.

Table C2: Updated asset beta range

	Lower Bound	Upper Bound
Baseline beta	**0.50**	**0.62**
Covid-19 adjustment derived from airport evidence	**0.02**	**0.08**
Combined beta for NR23	**0.52**	**0.70**
Flint's Previous recommendation for NR23	*0.54*	*0.73*
CAA Initial Proposal range	*0.54*	*0.64*

Source: Flint analysis based on Thomson Reuters data as of 15th March 2023, CAA Initial Proposals

C48 Our Provisional Decision, using ENAV as a comparator, is therefore to adopt Flint's full recommended range of 0.52-0.70. We use this range in chapter 5 to help calculate a range for NERL's overall WACC and we then assess where our point estimate of the WACC should be within this range.

Total market return (TMR)

Our Initial Proposals

C49 The TMR is the return required by investors for investing in a diversified basket of equity securities.

C50 For Initial Proposals, we proposed a TMR range of 5.2%-6.5% RPI-real, which is in line with the CMA PR19 determination range.

Summary of stakeholders' views

C51 NERL and its advisors, Oxera, disagree with the use of historical *ex ante* estimates of the TMR.

C52 NERL considers that recent increases in interest rates means that there is no longer a downward skew to the TMR.

C53 Oxera conducted analysis of historical *ex post* estimates of TMR using CPIH backcast data and suggest that greater reliance can be placed on this approach.

Our views

Use of Historical Ex-Ante Evidence

C54 For Initial Proposals, and for H7, we proposed an estimated range of the TMR based on both historical *ex post* and historical *ex ante* approaches, in line with the CMA decision at PR19, of 5.2% to 6.5% (RPI real).

C55 The *ex post* approach used by the CMA at PR19 supported a range of 5.6% to 6.5% (RPI real) while the *ex ante* approach supported a range of 5.2% to 5.7% (RPI real). The *ex ante* range was based on an upper bound of 5.7%, based on the Fama-French approach, and a lower bound of 5.2%, based on the approach of Dimson, Marsh and Staunton (DMS) 2020 dataset.[19]

C56 We said that there was evidence to suggest historical outturn returns have included a substantial 'surprise' or 'windfall gain' element that would otherwise bias the estimates upwards. There also did not appear to be a valid reason as to why *ex ante* estimates would be any less reliable than *ex post* estimates.

C57 Oxera, on behalf of NERL, estimated a TMR range of 5.85% to 6.50% (RPI real). This comprised a range based on "market evidence" of 6.00% to 6.50% at the upper bound, with the CMA's PR19 point estimate for the TMR of 5.85% at the lower bound.[20] Therefore, *ex ante* evidence is only included in Oxera's estimate to the extent to include the CMA's PR19 point estimate for TMR.

C58 Oxera states that the adjustments made to derive *ex ante* estimates of TMR rely on subjective judgment rather than objective evidence and add noise and bias to estimates from actual returns. Oxera criticises the two models the CMA used to estimate an *ex ante* TMR, (1) the DMS decomposition method[21] and (2) the Fama-French model.[22]

(1) DMS Decomposition Method

[19] E. Dimson, P. Marsh, M. Staunton (2019), 'Credit Suisse Global Investment Returns Yearbook 2019'

[20] Oxera's "market evidence" range was based on the arithmetic average of (ex-post) historical UK equity market returns over non-overlapping 10-year and 20-year holding periods, deflated using an RPI series created by Oxera. Oxera did not place weight on historical ex-ante estimates, forward- looking evidence (e.g. Dividend Discount Models) or survey evidence, other than through recognition of the CMA's point estimate.

[21] Dimson, E., Marsh, P. and Staunton, M. (2019), 'Credit Suisse Global Investment Returns Yearbook 2021'.

[22] Fama and French (2002), 'The Equity Premium', Journal of Finance Vol 57, No 2

C59 The work of DMS assessed the historically observed equity risk premium (ERP) and considered how these might be used to develop a "reasonable guide" of the premium that investors can expect in the future.[23] DMS uses a long historical dataset (119 years), and note that, even over such a long period of time, investors may have enjoyed (or suffered) more (or less) good luck than they would have expected over that period. They make this observation considering the significant observed volatility of returns over time and the associated uncertainty about their future path.

C60 DMS deconstructs the historically observed ERP into four components:

- Real dividend income (i.e., the mean dividend yield net of the risk-free rate).
- Real dividend growth, which is observed to be 0.46% per year in the historical dataset, based on a weighted 'world' stock market index, denominated in US dollars.
- Growth in the price/dividend (P/D) ratio, which is 0.50% per year over the duration of the historical dataset (for the world index).
- Change in the real exchange rate, which is slightly negative in the historical dataset (-0.07%).

C61 DMS then provide an assessment on the relevance and reliability of this evidence as the basis for projecting the ERP that investors *would have* anticipated, and what can be inferred about what ERP investors might expect in the future.

C62 DMS set out that before 1950, real dividend growth was 2.7%. However, between 1950 and 1999 it was 8.6%., DMS conclude that this level of growth is not sustainable and there is a strong argument for expecting lower dividend growth in the future.

C63 The explicit adjustments by DMS focus on two elements of the historical risk premium they consider to be 'non-repeatable', and therefore not anticipated by investors in the future:

- The historical expansion in the P/D ratio is unlikely to be repeated in the future and the increase in the P/D ratio may be because equity markets have become more diversified over time and this trend may have already reached conclusion. DMS also observe the perpetual growth in P/D ratios

[23] Dimson, E., Marsh, P. and Staunton, M. (2019), 'Credit Suisse Global Investment Returns Yearbook 2021', pp.33-37.

is unlikely to be sustainable, and say a reasonable assumption would be no future growth in the P/D ratio.

- Over the long-run, expectations for the real exchange rate should match expectations on relative inflation. DMS therefore assume zero future change in real exchange rates.

C64 The combined effect of these two adjustments is a downward adjustment of approximately 0.5% to the observed world ERP over the period of 1900-2018[24].

C65 Oxera characterises the adjustments made by DMS as 'subjective', suggesting the authors have judgements about the repeatability of past trends and require a quantitative assessment of what investors expect. We do not agree as these adjustments reflect an unbiased attempt to derive an estimate of the future behaviour of the market from historical data.

C66 As the CMA also used DMS estimates in their PR19 determination, then they also did not consider the above issues to be such as to reject their use in estimating the TMR.

C67 Implicit in the alternative historical *ex post* approach for estimating the TMR is that the historical behaviour should be assumed to continue in the future, which is more subjective. Should the P/D ratio continue at a rate of 0.5% then in the very long-term, the outcome would imply the market cost of equity being driven closer, and eventually below, the risk-free rate.

C68 The DMS reasoning for adjusting *ex post* returns reflect reasonable assumptions about the repeatability of historical drivers of equity returns. The CAA's considered view is that the DMS conclusion – that their preferred estimate of the ex-post observed ERP should be adjusted downwards – is entirely reasonable. Oxera has not put forward evidence that would persuades us that the above conclusion is not valid.

(2) Fama-French Model

C69 Fama-French developed a model for equity valuation which evaluates the relationship between capital gains and growth in dividends. The model developed assumes that the market dividend yield (D/P) and the earnings yield (E/P) are stationary – aligning with the assumption made by DMS about the non-repeatable nature of continuous expansion in the price to dividend ratio.

C70 The Fama-French work concluded that the average stock return of the last half-century is "a lot higher than expected", and that "much of the high return for

[24] A similar downward adjustment is calculated for a cross sectional average of worldwide national stock markets, resulting in a downward adjustment of 0.2%.

1951 to 2000 is unexpected capital gain, the result of a decline in discount rates."[25] They find that dividend and earnings growth for 1950 to 2000 are largely unpredictable, while also inferring that the decline in the price ratios is mostly due to a decline in expected returns, which cannot persist.

C71 Oxera argued that the shortcomings of the DMS composition approach summarised above also apply to the Fama–French approach.

C72 However, the Fama-French model evaluated *ex post* stock returns, by comparing these with modelled *ex ante* estimates based only on the 'fundamentals' of stock return; dividend yield and growth or earnings growth. Growth in price to dividend and price to earnings ratios are ignored.

C73 Therefore, the Fama-French approach has a similar conclusion to the DMS approach. Capital gains which are not underpinned by dividend or earnings growth are unlikely to persist. This is essentially equivalent to the DMS suggestion that the expansion in the D/P ratio cannot persist.

C74 It is this assumption that, we understand, most prominently drives the CMA's lower estimates of TMR emerging from their Fama-French model, and we consider such an approach entirely justified in defining a relevant focal point for the CMA's, and our, forward-looking estimate of the TMR.

Conclusion on the use of historical ex ante evidence:

C75 The academic evidence points strongly to the validity of the *ex ante* approach, and it is widely recognised that the TMR used for the estimation of a regulatory cost of capital allowance should reflect investors' expectations of the future, not observations of the past. These suggest a material adjustment is needed to *ex post* evidence.

C76 Oxera's suggestion that this is an "unproven assumption that past good luck outweighed bad luck for equity investors" does not appear to be properly justified.

Stability of the TMR

C77 As set out in our Initial Proposals, we consider that both a historically low risk-free rate and high RPI inflation could result in a consequent reduction in the level of the TMR during NR23.[26] This therefore warrants consideration of the point estimate for the WACC overall.

[25] Fama E. F. and French K. R. (Apr 2002), The Equity Premium, The Journal of Finance, p.640.

[26] CAA, Economic regulation of NATS (En Route) plc: Appendices to Initial Proposals for the next price control review ("NR23"). C128- C138.

C78 Although interest rates have increased since we published Initial Proposals, inflation remains close to a 40-year high. Furthermore, interest rates remain below the long-term average over the period of which the TMR is measured.

C79 We therefore do not agree that the interest rates have increased to such an extent as to create the risk of a downward skew to the TMR. Our approach to assessing the point estimate of NERL's WACC is discussed further in chapter 5.

ONS CPI backcast series

C80 We set out our assessment of the ONS CPI backcast series in our Final Decision for H7.[27] We consider that the ONS' updated assessment of historical inflation (a) results in no material change in previous estimates of CPI-stripped historical returns and (b) gives a new estimate of CPIH-stripped historical returns that is broadly in line with the TMR estimate used in the Initial Proposals.

C81 Accordingly, the ONS' new backcast series give us no reason to change our TMR value.

Our Provisional Decision

C82 Our Provisional Decision is to retain our approach from Initial Proposals in setting the TMR, and therefore retain a range of 5.20% to 6.50%.

C83 In giving weight to both *ex ante* and *ex post* evidence, we are adopting a balanced approach that is aligned to regulatory precedent.[28]

[27] CAA, H7 Final Decision Section 3: Financial issues and implementation. 9.35-9.36

[28] CMA PR19, Ofwat PR19, Ofgem RIIO-2

APPENDIX D

Summary of PCM Responses

Introduction

D1 This appendix summarises the responses received to our Initial Proposals relating to the Price Control Model (PCM) and RAB rules developed by the CAA to inform the price controls for NERL for the NR23 period, and sets out our views on these responses.

D2 When we published our Initial Proposals, we made available on request the PCM that informed the calculations and values set out in our Initial Proposals. Following our review of the stakeholder responses to Initial Proposals on the PCM, as set out in this appendix, we have updated the PCM for our Provisional Decision.

D3 NERL raised some specific queries regarding the PCM in its response to our Initial Proposals which we address in this appendix under "NERL IP PCM modelling queries".

D4 NERL also raised additional detailed PCM modelling queries which are addressed in this appendix under "NERL additional PCM modelling queries". This includes additional queries raised on the PCM, since the Initial Proposal responses received from NERL.

D5 The updated PCM reflecting the calculations and values shown in this Provisional Decision is published with this Provisional Decision.

NERL Initial Proposals PCM modelling queries

Summary of NERL views

Working Capital

D6 NERL asked for clarity regarding the proposed approach for calculating working capital as set out in the RAB rules. It said that the approach set out in our Initial Proposals[29] could be interpreted as meaning that working capital movements in the RAB will be fixed at NR23 PCM forecast levels for the entire NR23 period rather than being updated for actual results.

D7 NERL also identified that the PCM used for our Initial Proposals had a series of hard coded numbers for the NR23 working capital movement which did not

[2929] CAP2394, paragraph 5.15

agree to the final PCM calculated working capital movement which reduced the RAB in the PCM relative to the calculation arising from our input assumptions. NERL requested that this was rectified in our Provisional Decision.

Regulatory and backlog depreciation

D8 NERL raised queries regarding the calculation of depreciation in the PCM for the historical depreciation used in calculating the opening RAB balance on 1 January 2021 for UKATS and Oceanic. NERL also queried the values used in the PCM for the depreciation profiles of assets existing at 2020 which they considered had been changed. This affected the calculation of depreciation in the PCM provided at Initial Proposals.

D9 NERL also queried the calculation of backlog depreciation within the PCM as it said that the PCM had an incorrect mix of actual, calculated, and fixed values that affected the calculation of backlog depreciation between calendar year 2020 and 2024, as well as queries on the use of nominal and RPI 2020 prices in this calculation.

Allowed return and average RAB calculation

D10 NERL stated that the calculations used for the allowed return in the PCM was incorrect. It said that the method for calculating the average RAB (by discounting the closing RAB by the WACC) gave an incorrectly low value for the RAB.

D11 NERL requested that the previous method for calculating the average RAB in RP3 should be used. It referred to objections raised by Heathrow Airport Limited to this method which has been implemented for the Heathrow H7 price control.

PCM model labelling

D12 NERL also raised some queries around the labelling in the PCM as set out below:

i) **Temporary Unit Rate**: NERL said that the labelling in the PCM does not include the Temporary Unit Rate Term as set out in Condition 21 and 22 of the licence although the absence of these terms did not impact the Base case Initial proposals.

ii) **Oceanic traffic risk sharing**: NERL said that the functionality for traffic risk sharing in the PCM was incorrect as the TRS parameters had not been correctly set to ensure that no TRS was generated for Oceanic when different traffic scenarios were run.

Tax claw back calculation

D13 NERL questioned the source of the tax clawback calculations as set out below:

i) **Tax clawback**: NERL said that the PCM does not include the Tax Clawback calculation, instead the PCM includes an input for the results of these calculations. As these calculations are undertaken in a stand-alone model, NERL suggested that they should be included in the PCM.

Our views

D14 We have considered the views from NERL raised in its response to our Initial Proposals regarding the PCM and, where appropriate, we have made changes to the PCM to reflect its comments. Our views are described below.

Working capital treatment

D15 To provide clarity in response to NERL's comment, we have confirmed in the RAB rules that the RAB will be updated for the actual movements in working capital from NERL's regulatory accounts.

D16 The stored values in the PCM resulting from working capital calculations have been updated to ensure that the PCM model calculates the working capital movement correctly.

Regulatory and backlog depreciation treatment

D17 The PCM has been updated to reflect the correct historical depreciation and the depreciation of asset lives to align with NERL's business plan inputs.

D18 The PCM has also been updated to correctly reflect the NERL business plan inputs for backlog depreciation and align with the use of nominal and RPI 2020 price bases.

Allowed return and average RAB calculation

D19 We do not agree with NERL's suggestion that we have incorrectly calculated the average RAB used to calculate the allowed return. A similar approach to calculating the return on the RAB has been used for the Heathrow H7 price control as NERL noted in its response. We also note that Ofgem adopted a comparable approach in some of its price controls.

D20 As set out in our Heathrow H7 Final Decision, our approach to calculating the return on the RAB recognises that returns accrue within a year and can be reinvested. We consider that is important to allow for this cashflow timing and to ensure that in the PCM modelling the return that is available to NERL at the year end is equal to the estimated cost of capital.

PCM model labelling

D21 Where appropriate, we have amended the PCM to address the comments raised by NERL as set out below:

i) **Temporary Unit Rate:** The labelling for the Temporary Unit Rate in the PCM has been updated to correctly reflect the Temporary Unit Rate Term

as set out in Condition 21 and 22 of the licence. Functionality has also been added to the PCM to calculate the TUR and ATCA and TTCA values for 2024.

ii) **Oceanic traffic risk sharing**: The parameters in the PCM have been updated so that the functionality for calculating traffic risk sharing in the PCM is correct for Oceanic when different traffic scenarios are run.

Tax claw back calculation

D22 We do not consider it is necessary to include the stand-alone tax clawback model calculation in the PCM at this stage, as this calculation could be performed off-line if needed for scenario testing.

NERL additional PCM modelling queries

Summary of NERL views

Inflation

D23 NERL stated that the PCM used quarterly instead of monthly inflation in the PCM inflation calculations as set out in the RAB Rules.

D24 NERL also stated that the RAB Rules state that inflation should be recorded by NERL to four decimal places while NERL only receives actual inflation from the ONS to one decimal place.

Pension Contribution Variances

D25 NERL stated that the pension contribution variance values supplied by NERL from its financial model required conversion from outturn to 2020 prices and that the signage of the estimated pension contribution variance in the RAB Rules for 2022 was incorrect and did not align with the PCM.

D26 NERL also queried how we propose to calculate the pension contribution variance in the PCM which is currently provided for by an input value for both UKATS and Oceanic.

D27 NERL also proposed that the defined benefit pension rates (ongoing and deficit) and pensionable pay are included in section 5 of the RAB rules for consistency.

Capitalised Financing Costs

D28 NERL identified that the PCM used for the Initial Proposals was not consistent with the RAB rules as it set the opening values for the Closing Cumulative Capitalised variances for 2022 to zero, rather than being left at their actual values as set out in the RAB rules.

D29 NERL also stated that the RAB rules appeared to result in a double count of the Capitalised Financing Costs (CFC) as it did not deduct the estimated CFC in calculating the CFC for UKATS and Oceanic.

D30 Additionally, NERL identified that for 2021 and 2022 the CAA Assumed Capex for Oceanic did not match the values in the RAB rules '(4h) Capitalised Financing Costs for calendar year t'. NERL considered the values in the RAB rules were correct.

RPI-CPI wedge

D31 NERL queried the values being used in the PCM for the RPI-CPI wedge for UKATS and Oceanic which appeared to be the final calculated RAB values rather than the inputs of the movements of the relevant RAB items.

D32 NERL also stated that the RAB rules did not contain the calculation for the RPI-CPI wedge for 2021 and 2022, which had been included in the PCM. NERL also asked where the RPI/CPI wedge for NR23 appeared in the PCM.

D33 NERL noted that the closing RAB deflator within the RPI-CPI wedge calculation in the PCM was being calculated incorrectly for both UKATS and Oceanic.

D34 In an updated version of the PCM (since Initial Proposals), NERL stated that whilst Part B is working as per the RP3 RAB rules, Part C was incorrectly applying differential RPI growth as opposed to year-end outturn inflation.

Spectrum Cost Variance

D35 NERL stated that the Estimated Spectrum Cost variance was shown in the row for the Prior period Spectrum Cost variance rather than in the row for the Estimated Spectrum Cost variance.

D36 NERL also stated that the RAB rules did not show any values for the Spectrum Cost Variance for the NR23 years from 2023 to 2027.

Corporation Tax

D37 NERL highlighted that in our Initial Proposals we had not provided a tax allowance in the PCM for the indexation of the TRS revenues for the years 2020 to 2022. This had the effect of understating the modelled tax allowance in the price control model.

D38 NERL stated that the live and macro-pasted tax values used in the PCM were different to each other. This resulted in an unintended difference between the tax allowance and tax costs.

D39 NERL also noted that there were two calculations of the tax regulatory building blocks in the PCM (one for regulatory allowances and one for financial statements) which should produce a similar result but which appeared to be significantly different.

D40 In an updated version of the PCM (since Initial Proposals), NERL queried a timing assumption in the model's capital allowance calculations, relating to the expected end date of "Super deductions" for full-expensing against HMRC announcements at the time of modelling.

NR23 Traffic Risk Share

D41 NERL noted that to apply the NR23 UKATS TRS proposals then the Band 2 input would need to be the same as Band 1 to be able to apply Band 3 (where the bands represent bands for different proportions of risk-sharing).

D42 NERL also queried the NR23 UKATS TRS lag factors for Band 3, and noted that the PCM did not seem to correctly apply the lag factors for traffic variances of greater or less than 10 per cent.

D43 In an updated version of the PCM (since Initial Proposals), NERL noted that Band 2 (for shortfalls in traffic greater than 10%) was not included in the total TRS summary for UKATS, which may impact the downside modelling of TRS revenues.

Licence Conditions (21 and 22)

D44 NERL noted that the PCM includes functionality for traffic risk sharing (TRS) for Oceanic base costs within the logic for Condition 22. Although our Initial Proposals do not allow TRS for these costs, the TRS parameters had not been set correctly to ensure that there are no TRS adjustments. Therefore, when traffic downsides were run, TRS revenue adjustments were made for Oceanic.

Price Smoothing

D45 NERL noted that the modulation inputs for UKATS needed to be removed from the PCM as they reflected NERL's own price smoothing. The inputs should be replaced with the CAA's own price smoothing calculations.

General PCM Queries

D46 NERL also raised general comments regarding the PCM, as set out below:

i. **Inputs beyond 2027**: NERL noted a lack of inputs in the PCM beyond 2027. This does not allow them to run financeability analysis to cover the full repayment period of the RP3 TRS.
ii. **Sign convention of the MOD Deferred Income Balance**: NERL noted that the signage of line item 'MOD Deferred Income Balance' within UKATS Current Liabilities is incorrect, and should be negative as it is a liability, not positive as it is within the PCM.
iii. **Issue with the macro**: NERL noted that when they entered values for 'Equity Transfer (to)/from Shareholders - Override - 1' and ran the 'Optimise for current scenario' macro, the PCM had to be manually interrupted, to avoid being stuck in a loop.

iv. **RAB References**: NERL noted that the RAB References within PCM do not match the references within the RAB rules for each item of the RAB.

v. **CAA / DfT fee modelling**: In an updated version of the PCM (since Initial Proposals) NERL raised that the PCM does not correctly account for the CAA/DFT fees if actual traffic is different from CAA forecast (either higher or lower).

Our views

D47 We have considered the views from NERL raised in their additional PCM modelling queries and have made changes to the PCM and RAB rules, where appropriate, to reflect its comments which are described below.

Inflation

D48 We have updated our forecast of inflation using the latest inflation forecast and derived monthly values which have been used as inputs for the PCM.

D49 Inflation is recorded to at least four decimal places in the PCM even if actual inflation from the ONS is only to one decimal place. We have therefore left the RAB rules unchanged to record actual inflation to four decimal places where available.

Pension Contribution Variances

D50 We have aligned the PCM inputs for the pension contribution with the latest values from NERL as an input, rather than calculate these within the PCM. We have also corrected the conversion from outturn to RPI 2020 prices in the PCM to address the concerns raised by NERL.

D51 In the RAB rules, we consider it is appropriate to maintain the defined benefit pension rates and pensionable pay for RP3 as set out in our Initial Proposals. We have updated the RAB Rules to show defined benefit pension contribution costs in all sections of the RAB rules.

Capitalised Financing Costs

D52 The PCM has been amended to reflect the RAB rules by leaving the values for the Closing Cumulative Capitalised variances for 2022 to their actual values.

D53 The RAB rules have been updated to align with the PCM by excluding the estimated CFC in calculating the CFC for UKATS and Oceanic.

D54 In the PCM, the 2021 and 2022 CAA Assumed Capex for Oceanic values have been updated to match the RAB rules.

RPI-CPI wedge

D55 We have updated the PCM for the latest values received from NERL in calculating the RPI-CPI wedge.

D56 The RAB rules have been amended to include the calculation for the RPI-CPI wedge for 2021 and 2022 in Sections 3 and 4 of the RAB rules to align with the PCM.

D57 The closing RAB deflator calculations have been corrected in the PCM where the numerator and denominator for the calculation was previously incorrectly switched.

D58 We have updated the line in the PCM noted by NERL for Part C of the RPI-CPI wedge calculation to use year-end outturn inflation as opposed to differential RPI growth, as suggested by NERL.

Spectrum Cost Variance

D59 The PCM has been updated to correct the presentation of the Estimated Spectrum Cost variance. These values were previously shown under “Prior Period Spectrum Cost variance adjustment”.

D60 The RAB rules have been updated to show the values for the Spectrum Cost for the years 2023 to 2027, which were submitted by NERL.

Corporation Tax

D61 Our response to NERLs tax modelling queries in the PCM has been set out in Chapter 5 of our Provisional Decision, the summary of which is set our below:

i) We have included an allowance for indexation of the TRS revenues in the PCM.

ii) We have resolved the difference between live and macro-pasted tax values used in the PCM, and have simplified the regulatory tax building block calculations to a single calculation method.

iii) We have updated the timing of “super deductions” for full expensing to end on 31 March 2026, in line with HMRC announcements at the time of modelling, in line with NERLs comment.

NR23 Traffic Risk Share

D62 We have reviewed the NR23 UKATS TRS calculations within the PCM, to ensure they correctly reflect the Provisional Decision. The Nil Band, Band 1, and Band 2 apply the lag factors set out in the Provisional Decision. The Provisional Decision does not require the use of a third and fourth band.

D63 We have updated the PCM to include Band 2 (negative) which was previously missing from the TRS summary.

Licence Conditions (21 and 22)

D64 The parameters for traffic risk sharing for Oceanic within the PCM have been correctly set to ensure that no TRS adjustments are calculated for Oceanic in the base or downside scenarios.

Price Smoothing

D65 The Modulation inputs for UKATS have been removed. Price profiling applied in our Provisional Decisions is calculated within the PCM.

General PCM Queries

D66 Where appropriate, we have addressed general PCM queries raised by NERL, as set out below:

i) **Inputs beyond 2027:** We do not intend to populate values beyond 2027. There is uncertainty in longer-term forecasts and NERL did not provide longer term forecasts in its business plan. While some values beyond 2027 are populated in the PCM (e.g. where data has been rolled forwards), we have not put weight on any values after 2027 in our Provisional Decisions.

ii) **Sign convention of the MOD Deferred Income Balance:** The sign convention of the MOD Deferred Income Balance has been changed from negative to positive.

iii) **Issue with the macro:** The macros within the PCM have been reviewed and updated where appropriate. The 'Equity Transfer (to)/from Shareholders – Override – 1' can now be used as intended.

iv) **RAB References:** The RAB references within the PCM have been updated to align with the RAB rules.

v) **CAA / DfT fee modelling**: We understand that NERL may not have identified where these calculations are performed in the PCM under "Working Capital impact of DfT/CAA/METS Charge collection". We consider CAA / DfT fees to be modelled appropriately here.

APPENDIX E

Service Quality

E1 This appendix provides further details of service measures and incentives, including:

- an overview of the measures we use to assess NERL's performance in relation to environmental flight efficiency and delay;
- further analysis of the environment and delay targets carried out since our Initial Proposals; and
- details of our Provisional Decision on service quality targets and incentives, including the structure of incentives, the annual review of the environmental measure and exemption days for certain capacity measures.

Overview of service quality measures

Environment metric (3Di)

E2 NERL's environmental performance is measured and incentivised through the 3Di metric which aims to monitor and improve flight efficiency. 3Di stands for 3-Dimensional Inefficiency/Insight. It is a metric that calculates the score for the efficiency of a flight based on comparing the actual path flown against an optimal profile. The annual score is a combined score for all flights and indicates overall efficiency in UK airspace. It is a proxy measure for aircraft fuel burn and emissions.

E3 The 3Di score method is used to calculate an annual score as a combination of:

- horizontal flight efficiency - defined as the difference between the UK portion of the overall optimal flight distance and the actual flight path flown within UK airspace. Horizontal flight efficiency is measured from the actual entry and exit point into and out of UK FIR, where the optimal flight distance is calculated consistent with Eurocontrol methods; and
- vertical flight efficiency - defined as the difference in altitude between the reference (requested) flight level and the actual altitude of the period of level flight, alongside the time spent in level flight. Vertical inefficiency is split into flight phases of climb, cruise and descent.

E4 Vertical (in)efficiency is calculated for each individual flight phase as follows:

Vertical Inefficiency = $$V = \sum_{s} \frac{T_s}{T}\left(\frac{L - L_s}{L}\right)$$

where: V=Vertical Inefficiency, T=Total Flight Time (UKFIR), S=Step reference,[30] Ts=Duration of Step, L=Reference Level, Ls=Level of Step.

E5 Vertical and horizontal flight efficiency are combined using the following model form based on a multiple linear regression. This is a proxy estimate for the impact of the flight trajectory on fuel burn:[31]

$$\varphi = \beta_1 H + \beta_2 V_{CL} + \beta_3 V_{CR} + \beta_4 V_D$$

Where φ = 3D Inefficiency Score, β_1 , β_2, β_3 and β_4 are constants, V_{CL}= Vertical Inefficiency of Climb, V_{CR}= Vertical Inefficiency of Cruise, V_D = Vertical Inefficiency of Descent, and H = KEA Horizontal Inefficiency

E6 The 3Di coefficients for each of the four parameters (horizontal, climb, cruise and descent) are shown in Table E.1. They were developed through a base model which used a sample of 145,865 flights from 2013 and tested on a further sample of 72,935 flights.

Table E.1: 3Di coefficients

Parameter	Coefficient
Horizontal flight inefficiency (β_1)	1.1876
Climb vertical flight inefficiency(β_2)	0.6687
Cruise vertical flight inefficiency(β_3)	0.7617
Descent vertical flight inefficiency (β_4)	1.8712

Source: NERL

Capacity metrics (C1 to C4)

E7 NERL's capacity performance, in terms of the delays incurred by aircraft resulting from en route air navigation services, is assessed through the measures set out below.

30 A step is a period of the flight at constant level, each step having a corresponding duration and level.

31 This estimated impact is calculated by comparing the fuel burn for the journey based on an optimal trajectory (continuous climb and descent to/from the reference flight level) to the fuel burn for the actual trajectory followed. These fuel burn estimates are generated by the NATS Kerosene Emissions Research Model (KERMIT) model which uses data on aircraft performance from the Eurocontrol BADA 3.11 database.

E8 C1 (all delays) is a measure that captures all Air Traffic Flow Management (ATFM) delays attributable to ANS, expressed as the average delay per flight. We set targets for C1 but these are not subject to financial incentives.

E9 C2 (NERL-attributable delay) is a measure that includes only ANSP-attributable delays,[32] excluding for example delays caused by weather conditions. For NR23 the C2 targets are 3.84 seconds per flight lower than those that we set for C1 delays, based on the average difference between these two metrics between 2015 and 2019.The targets we set for C2 delays in NR23 also determine the targets for C3 delays.

E10 C3 (impact score) is a measure that places greater weight on long delays and delays in the morning and the evening peaks. NERL's performance is measured by applying the weights shown in Table E.2 below, which were developed through consultation between stakeholders in a previous control period and will continue to apply in NR23.

Table E.2: Weights for C3 impact score

	Morning peak period	Evening peak period	Other times
Delay > 0 and <= 15 minutes	3	2	1
Delay > 15 and <= 30 minutes	6	3	2
Delay > 30 and <= 60 minutes	9	6	3
Delay > 60 minutes	18	9	6

Source: CAA

Notes: "Morning peak" means flights with an off-block estimated time between 0400 and 0800 UTC in Summer (April – October inclusive) and between 0500 and 0900 UTC in Winter (January – March inclusive and November-December inclusive). "Evening Peak" means flights with an off-block estimated time between 1500 and 1900 UTC in Summer (April –October inclusive) and between 1600 and 2000 UTC in Winter (January-March inclusive and November-December inclusive).

E11 Consistent with our approach in RP3, we have set the upper threshold (above which NERL incurs penalties) for C3 as 2.0 times the C2 target, and the lower threshold (below which NERL earns bonuses) at two-thirds of the upper threshold (or four-thirds of the C2 target). The target for C3 is midway between these two thresholds and is therefore equal to five-thirds of the C2 target.[33]

[32] These causes are ATC capacity (C), ATC routeings (R), ATC staffing (S), ATC equipment (T), airspace management (M) and Special Event (P), as set out in the Eurocontrol, ATFCM Users Manual.

[33] In RP3 we calculated the upper and lower thresholds as described, but did not identify a specific target. For NR23 we are identifying a target for C3 with deadbands either side of the target, so that our approach is consistent with that for other service quality metrics.

E12 C4 (daily excess delay score) is a weighted measure that is triggered each day that the average delay per flight exceeds a certain threshold. The thresholds and weightings are shown in Table E.3 below. Delays on days when the average is below the threshold are weighted as zero.

Table E.3: Weights for C4 excess delay score

Season	Daily delay thresholds (average delay per flight)		Weighting
Winter	Lower threshold	40 seconds	1
	Upper threshold	80 seconds	2
Summer	Lower threshold	60 seconds	1
	Upper threshold	110 seconds	2

Source: CAA. Summer is April–October inclusive, winter is January–March inclusive and November-December inclusive.

E13 For both C3 and C4 measures NERL is able to exclude up to 100 days (over the whole of NR23) when new systems or airspace changes are being implemented and transitions are made. This is explained further below alongside other details of our Provisional Decision.

E14 On days when C4 is triggered and at least some C3 delays are attributed to equipment failure, the delays for that day will count towards only one of the annual scores for C3 or C4, depending on which has the highest implied penalty for that day.

Further analysis of environment and capacity targets

E15 We said in chapter 2, that the targets proposed in our Initial Proposals remained appropriate. We said our view was informed by a number of different sources of information and evidence, which we discuss further here, including:

- analysis of the possible impact of future traffic growth and investment on NERL's 3Di score and on C2 delays;
- Network Operations Plan (NOP) forecasts for 2022 to 2026; and
- historical data for the average C2 delay for the five largest European ANSPs.

E16 We also took account of other information discussed in chapter 2 and not repeated here, including the 3Di score that NERL achieved in the second half of 2022, the reduction in traffic forecasts between STATFOR's October 2022 and March 2023 forecasts, target setting during previous regulatory periods, NERL's assumptions about the impact of future investment, expected increases in overall capacity and ATCO numbers compared with the expected increase in traffic, and the change to modulate C2 delay targets if there are significant variations in traffic growth.

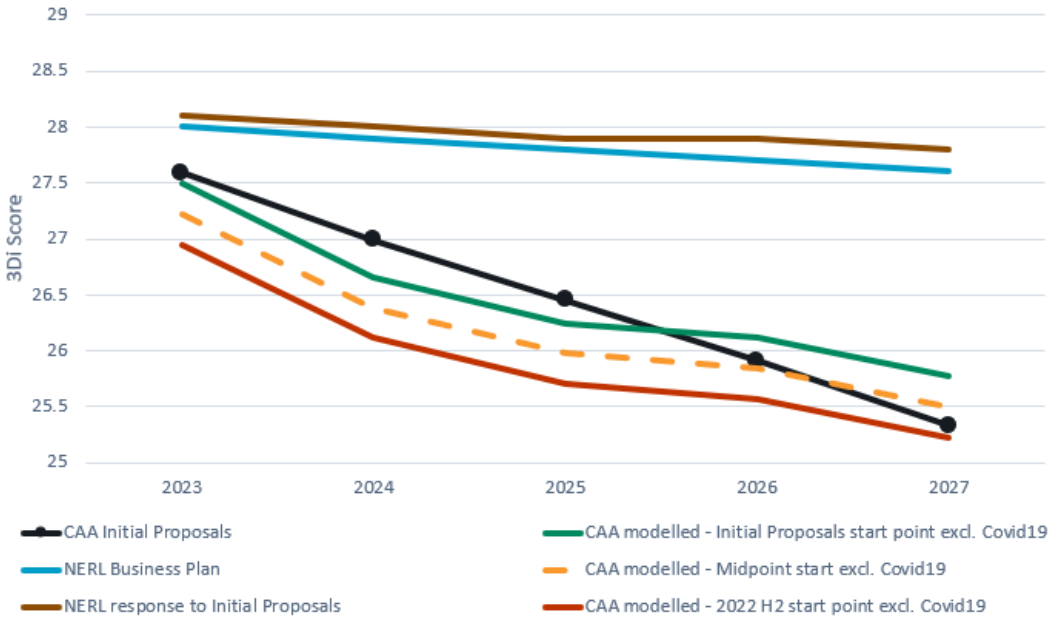
Modelling of 3Di scenarios

E17 Our Initial Proposals examined the relationship between 3Di and flight volumes and concluded that the relationship was weak and there was no robust argument to modulate the 3Di score on the basis of flight volumes in a normal traffic situation.[34] As part of our further consideration of 3Di targets since Initial Proposals, we have modelled some possible future scenarios.

E18 From a range of starting points, we modelled the impact of the traffic growth in STATFOR's March 2023 forecast using our own assessment of the relationship between 3Di and flight volumes, based on data from January 2018 to March 2020.[35] We also allowed for the benefits of future investment using the 2.3 point reduction adopted for our Initial Proposals and NERL used in its response to our Initial Proposals.[36]

E19 We applied this profile to different starting points, including our Initial Proposals (27.6), the H2 2022 outturn score (27.0) and a mid-point between these two scores. Figure E.1 illustrates these scenarios, along with our Initial Proposals and NERL's proposed targets.

Figure E.1: 3Di modelled scenarios



Source: CAA analysis

E20 Figure E.1 shows that our Initial Proposals fall within, or sometimes above, the range established by our modelled scenarios.

[34] See paragraphs D23 to D30 in Appendix D to our Initial Proposals.

[35] See Figure D.3 in Appendix D to our Initial Proposals.

[36] See Table 5.1 of NERL's response to our Initial Proposals.

Modelling of C2 delay scenarios

E21 For capacity targets, we modelled some possible scenarios for the impact of traffic growth and future investment on C2 delays:

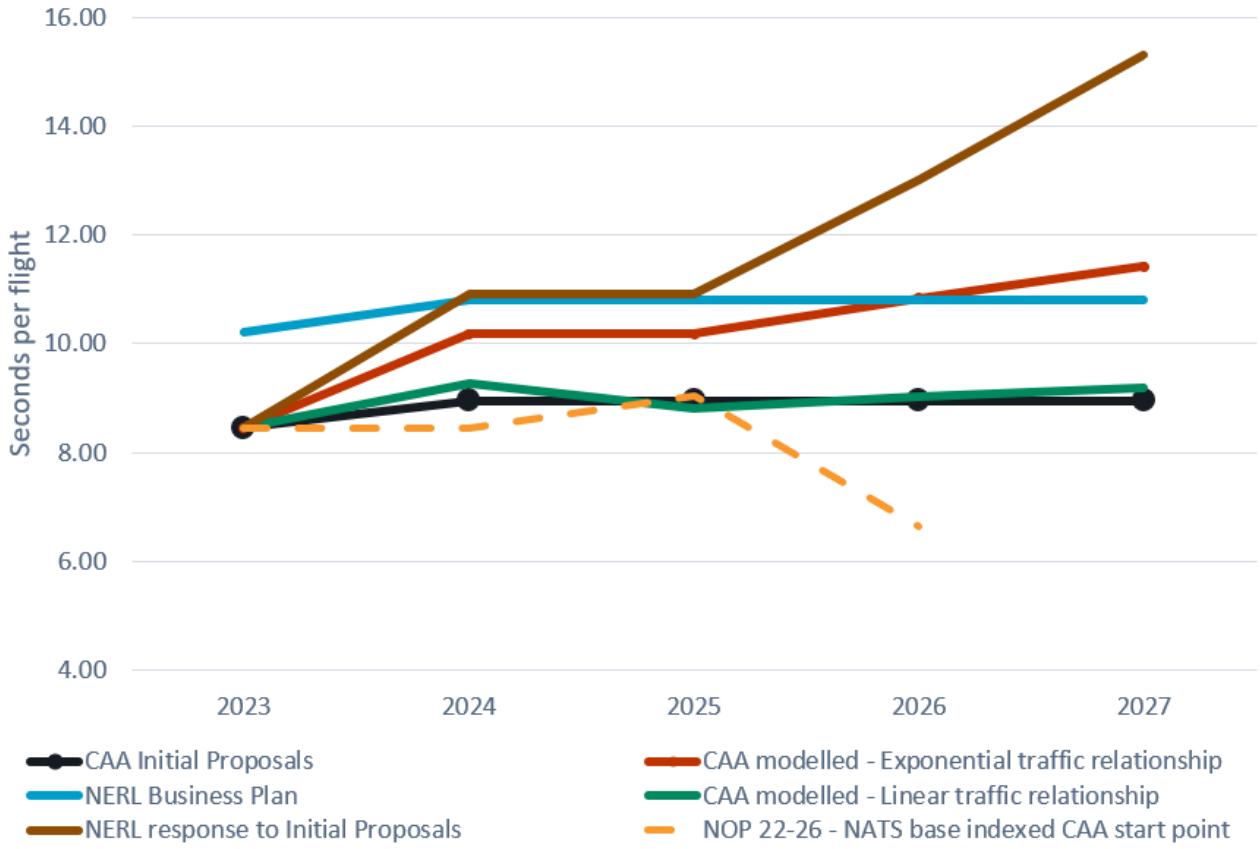
- we adopted the starting point of 8.45 seconds/flight from our Initial Proposals, which NERL has accepted;[37]
- as explained below, we used two different approaches to model the impact of the traffic growth in STATFOR's March 2023 forecast; and
- we assumed a reduction of 0.75 seconds/flight applied from 2025 to 2027 to reflect the benefits of future investment. This figure is derived from NERL's business plan.[38]

E22 This generated the range of outcomes shown in Figure E.2, alongside NERL's proposed targets and the 2022-2026 Network Operations Plan baseline network delay targets forecast, which have been indexed and applied to the agreed stating point of 8.45 seconds/flight for C2. Our Initial Proposals targets fall within this range. We discuss below why we place more weight on the linear traffic relationship that generated the lower end of the range. Taken alongside the other factors discussed in chapter 2, we therefore consider that the targets in our Initial Proposals remain reasonable. In contrast, the targets included in NERL's response to our Initial Proposals are significantly above the modelled range.

[37] See page 39 of NERL's response to our Initial Proposals.

[38] NERL's business plan projected a C2 score benefit of 0.7-1.2 from 2025 onwards. However, its response to Initial Proposals had a lower overall capacity benefit for NR23 (6.5% rather than 8%). We have assumed a benefit of 0.75 to reflect NERL's original range adjusted for the updated investment programme.

Figure E.2: C2 capacity modelled scenarios

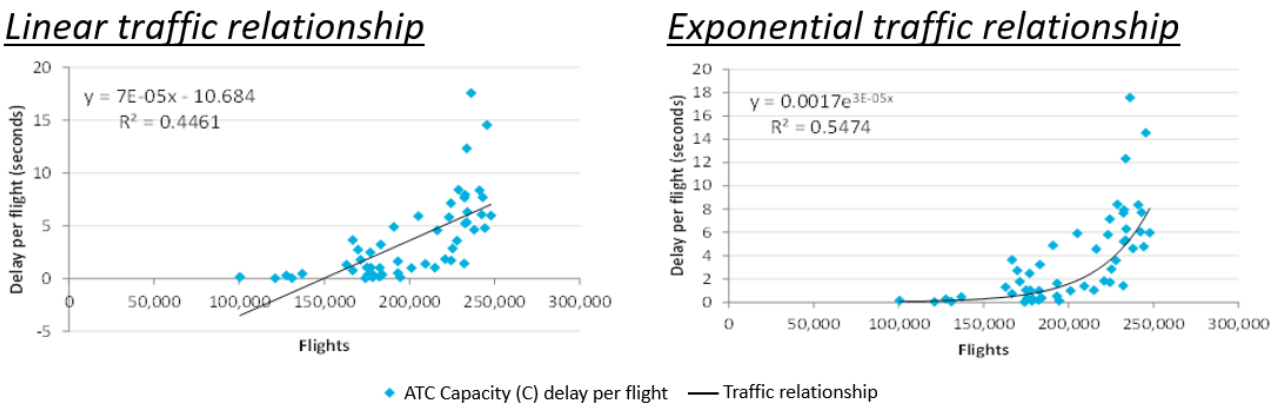


Source: CAA

E23 To model the possible impact of future traffic growth, we examined the relationship between traffic growth and capacity delays (that is, ATFM delays coded 'C' for capacity). As noted in our Initial Proposals, the relationship with traffic growth is stronger for these delays than for other codes contributing to total C2 delays.

E24 Using monthly data from January 2016 to December 2021, though excluding months with zero delays (which removes the majority of pandemic months), we modelled several different functional forms including the linear and exponential relationships shown in Figure E.3. We place more weight on the results generated using the linear relationship as it appears to better represent outcomes under "normal" traffic levels, whereas we have some concerns that the exponential relationship may be unduly influenced by the very highest and very lowest observations. We are also concerned that the exponential relationship may not reflect the impact of traffic growth where this is predicted in advance and therefore NERL can make appropriate plans to accommodate it, or where the severe delays are mitigated through other management actions.

Figure E.3: Historical ATC Capacity (C) delay code traffic relationships



Source: CAA analysis and Eurocontrol data (January 2016 to December 2021)

Network Operations Plan forecasts for 2022 to 2026

E25 We reviewed forecast delay from the Eurocontrol Network Operations Plan (NOP). This included:

- the baseline and high forecasts in the 2022-2026 plan,[39] which are based on STATFOR's October 2021 traffic forecast (base and high) and "capacity plans agreed with all ANSPs during the period November 2021 to February 2022";
- the forecasts in the 2023-2027 plan (baseline only),[40] which are based on STATFOR's base-case October 2022 traffic forecast.

E26 These forecasts are shown in Table E.4 below. We consider that the NOP 2022-26 forecasts are valid comparators for our Initial Proposals, as they were based on STATFOR's October 2021 forecasts. The base case forecast in particular is only 0.3 per cent lower (over NR23 as a whole) than the STATFOR March 2023 base case forecast that we have used for this Provisional Decision.

E27 In contrast, we attach less weight to the NOP 2023-27 forecast, as this was based on STATFOR's October 2022 forecast which is materially higher than the March 2023 forecast (by 3.8 per cent over NR23 as a whole, and by 5.1 per cent in the last two years of the period).

39 https://www.eurocontrol.int/publication/european-network-operations-plan-2022-2026

40 https://www.eurocontrol.int/publication/european-network-operations-plan-2023-2027

Table E.4: NOP forecast delay for NATS (C1 equivalent)

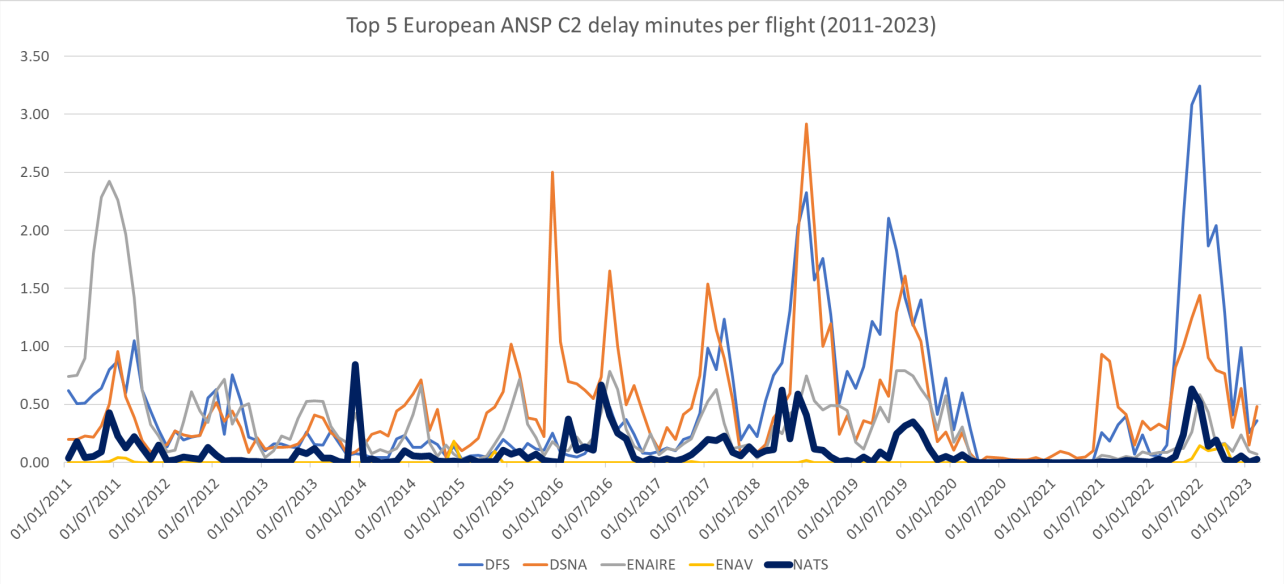
Seconds/flight	2022	2023	2024	2025	2026	2027
NOP 22-26 forecast for base-case traffic	9.60	8.40	8.40	9.00	6.60	n/a
NOP 22-26 forecast for high-case traffic	20.40	48.00	32.40	31.80	25.20	n/a
NOP 23-27 forecast for base-case traffic	n/a	16.20	16.20	20.40	19.20	20.40

Source: NOP (translated from minutes/flight to seconds/flight)

Historical record of the largest European ANSPs

E28 Figure E.4 below shows C2 delays for the five largest European ANSPs over the period since 2011. As discussed in chapter 2, this does not suggest that it is unreasonable to expect NERL's delay performance to remain broadly flat and not deteriorate significantly during NR23.

Figure E.4: European ANSP C2 delay minutes per flight 2011-2023



Source: CAA analysis of Eurocontrol data

Details of our Provisional Decision

E29 Table E.5 below shows our Provisional Decision on the targets for each service quality metric. Chapter 2 discusses the factors we have taken into account when setting these targets.

Table E.5: Provisional Decision on service quality targets

		2023	2024	2025	2026	2027
3Di	score	27.59	26.99	26.45	25.91	25.33
C1	seconds/flight	12.29	12.79	12.79	12.79	12.79
C2	seconds/flight	8.45	8.95	8.95	8.95	8.95
C3	seconds/flight	14.08	14.91	14.91	14.91	14.91
C4	score	1800	1800	1800	1800	1800

Source: CAA

E30 As stated in our Initial Proposals, we are mindful of customer priorities and industry goals towards net zero. Noting the expected review of the 3Di metric in NR23 as well as the benefits delivered through the capex programme, we expect to strengthen the incentives in future control periods.

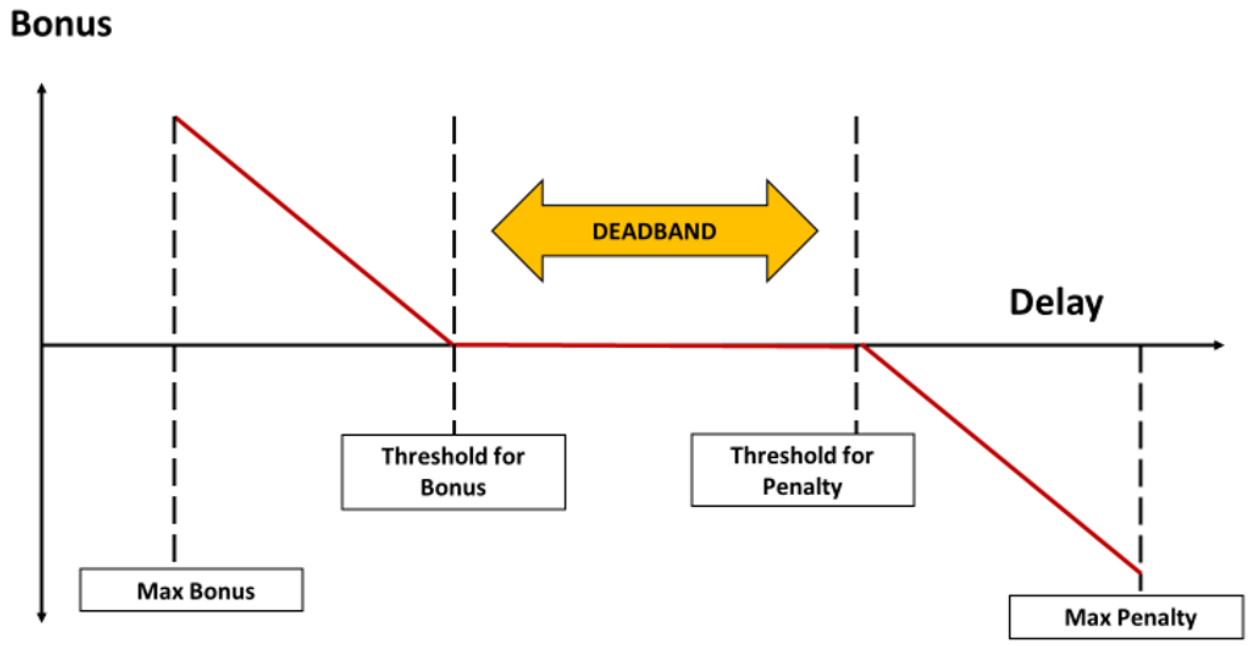
E31 The sections below give further details of how these targets will be implemented, including the structure of financial incentives (for 3Di and C2 to C4), the annual review protocol for 3Di, and the exemption days that NERL is able to exclude from the C3 and C4 measures.

Structure of incentives

E32 NERL is subject to financial incentives for all measures described above, except for C1. The basic structure of the incentives for 3Di, C2 and C3 are illustrated in Figure E.5 below. In each case, there is a deadband around the target where no bonuses or penalties are incurred. Outside of the deadband, the amount of bonus or penalty increases until a further threshold is reached at which the maximum bonus or penalty applies. The maximum bonuses and penalties are set out in chapter 2 and reproduced in Table E.6 below.

E33 The incentive for C4 is “penalty” only and there is no deadband. Consistent with the other measures, the size of the penalty increases gradually until it reaches the maximum.

Figure E.5: Indicative summary of incentive structure



Source: CAA

Table E.6: Maximum bonuses and penalties

	Bonus (% of Determined Cost)	Penalty (% of Determined Cost)
3Di	0.5%	0.5%
C1	0%	0%
C2	0.05%	0.25%
C3	0.25%	0.75%
C4	0%	0.25%

Source: CAA

E34 Within this overall approach, the size of the deadbands and the method for determining the thresholds where the maximum bonus or penalty occur differ between the measures, as explained below and summarised in Table E.7.

E35 For 3Di, the deadband is ±5% and the maximum bonus or penalty is reached when performance is 20% greater or less than the deadband threshold, i.e. a difference of ±25% from the target).

E36 Similarly, for C2, the deadband is ±15% and the maximum bonus or penalty is reached when performance is a further 40% greater or less than the deadband threshold, i.e. a difference of ±55% from the target.

E37 For C3, the deadband is ±20%, but the calculation of bonuses and penalties is based on pre-determined incentive rates. These are calculated, based on Determined Costs and traffic forecasts for 2023, so that the maximum bonus is

awarded if the C3 score is zero, and the maximum penalty is incurred if the C3 score exceeds the upper threshold by an amount equal to that threshold (i.e. the outturn C3 score is 140% above the target). The incentive rates are calculated based on 2023 values, and then uplifted by (CPI) inflation in subsequent years.

E38 With the 2023 Determined Cost of £639.858 million (2020 CPI prices), the maximum bonus and penalty for C3 are respectively £1.600 million (i.e. 0.25% of £639.858 million) and £4.799 million (i.e. 0.75% of £639.858 million). Given the C3 bonus threshold of 11.27 seconds per flight (i.e. four-thirds x the C2 target of 8.45 seconds), the C3 penalty threshold of 16.90 seconds (i.e. 2 x the C2 target of 8.45 seconds) and the 2023 traffic forecast of 2.422 million flights, the C3 incentive rates for 2023 are:

- a bonus rate of 0.059 (= 1.600 / (11.27 x 2.422)); and
- a penalty rate of 0.117 (= 4.799 / (16.90 x 2.422)).

E39 As noted above, the C4 incentive is penalty only and there is no deadband. As for C3, penalties are calculated on the basis of a pre-determined incentive rate. This is calculated, again based on a traffic forecast of 2.422 million flights, so that the maximum penalty of £1.600 million (i.e. 0.25% of £639.858 million) would be incurred if NERL's 2023 C4 score is 20% (or 360 = 20% of the target of 1800) above the target.

E40 The C4 incentive rate for 2023 is therefore 0.00183462 (= 1.600 / (360 x 2.422)). As with C3, this incentive rate will be uplifted by (CPI) inflation in subsequent years.

Table E.7: Summary of bonus and penalty ranges (% difference from target)

	Max bonus payable	Threshold for bonus	Threshold for penalty	Max penalty payable
3Di	- 25%	- 5%	+ 5%	+ 25%
C2	- 55%	- 15%	+ 15%	+ 55%
C3	-100% *	- 20%	+ 20%	+ 140% *
C4	n/a	n/a	0%	+ 20% *

Source: CAA

* For C3 and C4 bonuses and penalties are calculated using a pre-determined incentive rate. The rates for 2023 are calculated based on 2023 Determined Costs and traffic forecasts, together with the thresholds shown in this table. The rates for subsequent years are not recalculated but are uplifted in line with (CPI) inflation.

Traffic modulation of C2 and C3 thresholds

E41 The same approach to modulating C3 for traffic volumes that was used in RP3 will be maintained in NR23 for both C2 and C3 measures. If traffic is more than ±4% different from the level forecast for that year, the bonus/penalty thresholds

will be adjusted. The thresholds will be modulated by the net change in traffic beyond the ±4% threshold, multiplied by an “elasticity factor” of 5.

E42 For example, if the traffic growth in a particular year is 7% higher than forecast, the thresholds will be adjusted upwards by 15% (i.e. (7% - 4% = 3%) x 5). To illustrate, should this be the case in 2023, the C3 bonus threshold would increase from 11.27 to 12.96 (= 11.27 x 1.15) and the penalty threshold would increase from 16.90 to 19.44 (= 16.90 x 1.15).

3Di annual review protocol

E43 The continued appropriateness of the modelling coefficients used to generate the 3Di score is currently tested on an annual basis based on a representative sample of data from the previous year. If the difference between the mean 3Di score produced by the base model and the annual review test model is greater or equal to 8%, then the test is considered failed and the financial incentives for that year are suspended.

E44 We intend that the flight efficiency regression model and output will continue to be reviewed each year. The annual review will test the continued appropriateness of the regression modelling coefficients that underpin the 3Di as described above. As noted in chapter 2 we will consider changes to the annual 3Di review metric as part of a wider review of the 3Di model in NR23.

E45 The annual review will use a sample of the review year data chosen (using cluster sampling) to provide a sample reflective of the underlying population, with a target of 50,000 flights, and apply the same linear regression methodology used to derive new 3Di model coefficients.

E46 The test model will be applied to the full calendar year data from the review year and the calculated mean 3Di score is compared to the actual mean 3Di score using the base model (3DI) for the year.

E47 If the difference between the mean 3Di score produced by the base model and the test model is greater than or equal to 8% of the base model score (3DI), then our intention is that the 3Di bonus/penalty for the year would not be applied. If the difference between the mean scores falls within the pre-specified threshold, then the bonus/penalty is applied.

E48 The test will be verified by us, and NERL should supply all data used to undertake the analysis (and any other relevant data requested) to us by end of March in each year to allow the verification to be undertaken.

E49 The data to be supplied to us will comprise:

- dataset to comprise of 50,000 sample flights representative of the population of all flights in the year;

- details of how the sample has been chosen using cluster sampling, including number of clusters identified, total number of days falling within each cluster, number of days sampled from each cluster and number of flights operated on the days sampled;
- the test model coefficients;
- the test model estimate of 3Di for the review year (X) based on the test and base model adjusted by -0.6 to account for exempt non-revenue flights;
- the existing set of coefficients from the base model;
- the existing estimate of 3Di for the review year (Y) based on the base model coefficients; and
- for each flight - values for I, H, VCl, VCr & VD as used in the existing model.

E50 The result of the annual review will be published by 30 April in the year following the review year to allow financial statements to reflect the outcome.

E51 If the annual review test falls outside the accepted tolerance in a given year, then the test will be repeated in the following year as per the protocol set out above.

E52 If the annual review test falls outside the accepted tolerance in two consecutive years, we would expect the incentive to be withdrawn for the remainder of the period. If, however, the CAA and NERL are in agreement that the retention of the incentive is justified then it may remain in place until the following annual review. This justification would require sufficient analytical work, to be conducted and shared by NERL, to demonstrate:

- an understanding of the underlying causes of the variation in test results, and
- that continuing the model in its existing form would not lead to the generation of unwarranted bonuses/penalties in future years.

Exemption days for C3 and C4

E53 The principles for the application and use of exemption days are consistent with those set out for RP3 and are as follows:

i. the mechanism allows NERL to exclude up to 100 days from counting against the C3 and C4 incentives when major new systems or airspace changes are being implemented and transitions are made;

ii. the exemption days apply only to the C3 and C4 measures;

iii. the amount of days NERL will be allowed to use towards its transitions is capped at 100 days for the entire five-year period of NR23;

iv. NERL will consult airspace users on the exemption days in advance under currently existing consultation mechanisms (e.g. SIP) or targeted consultation;

v. the length of any given transition should be limited to three weeks (unless otherwise agreed with users) and will be agreed in advance as well as the amount of days from the overall cap that NERL wishes to use towards this transition;

vi. the number of days agreed during the consultation will be fixed (unless subsequently revised with the agreement of users) but the particular exempt days within the agreed transition period would not need to be specified as part of the consultation;

vii. NERL will carry out the transition by means of the detailed steps and timing that are most operationally practical and *ex post* nominate the exempt days (up to the pre-agreed maximum) for the transitional period (length of which is also pre-agreed); and

viii. if at the end of the transition period NERL does not need/wish to use the pre-agreed amount of exempt days, these will still count against the overall 100 day cap (i.e. they cannot roll over of unused exclusions).

E54 In addition to the above, NERL shall include a section in its quarterly performance reports on the proposed and actually used exemption days.

APPENDIX F

Benchmarking

Introduction

F1 In our Initial Proposals, we said that we would develop an approach to the new price control which furthers the interests of customers and consumers by protecting the affordability of charges while supporting NERL's financeability, including over the longer-term.[41] This includes providing appropriate incentives for efficiency while also protecting the quality of service.

F2 We set out the link between our duties under the Transport Act 2000 and our approach to 'affordability'.[42] We did not adopt a simple definition of affordability such as 'no real increase in charges' but considered that affordable charges are those which are set at a level that broadly supports users in re-establishing and operating services, given the difficult circumstances created by the impact of covid-19. We considered this was also closely linked with NERL providing value for money based on comparisons with peers and historical levels of services, costs and charges.

F3 We presented analysis to support our assessment of the affordability of our Initial Proposals, where we identified metrics and analysed data from a range of sources including from relevant Eurocontrol databases.

F4 Here we summarise our updated analysis and conclusions as to the how charges in our Provisional Decision compare with historical charges, other comparable ANSPs in terms of value for money, and their materiality to consumers. This analysis is similar to that undertaken for the Initial Proposals, but it considers more recent data and information.

F5 This appendix has the following four sections:

- our Initial Proposals and stakeholders' views;
- approach to our analysis;
- assessing the value for money of our Provisional Decision; and
- conclusions for our Provisional Decision.

[41] See Appendix F of CAP2394b - www.caa.co.uk/cap2394b.

[42] See paragraphs F7 to F10 of Appendix F of CAP2394b.

Our Initial Proposals and stakeholders' views

F6 Our analysis indicated that our proposed NERL charges were likely to be broadly similar to those of comparators and to deliver comparable or slightly better levels of service over NR23. We did not find evidence that NERL's charges over NR23, even taking into account the forecast increases, would lead to significant affordability concerns.

F7 In response to our Initial Proposals, NERL reiterated its view that the CAA should assess "affordability" of ATS charges in the wider context of users' overall costs, and to balance these concerns with wider user interests of NERL delivering a resilient service, including meeting the developing needs for service and future capacity. Furthermore, NERL said that we should also consider the impact of NERL's charges on ticket prices faced by passengers, the resulting demand for flights, and the extent to which this demand (which will drive the pace and scale of recovery in aviation) would be affected by the potential increases in charges which are in prospect.

F8 NERL's view is that we have focused on affordability to the detriment of a wider assessment of all users' interests and failed to consider the materiality of our proposals on airlines and on NERL, such that we have made errors of fact and in the exercise of our regulatory discretion.

F9 In general, airlines who responded on this topic considered that the CAA should ensure that only efficiently incurred costs are passed through to charges and that the service provided by NERL was comparable to other relevant ANSPs. While some airlines welcomed our proposals to spread the impact of covid-19 TRS revenues from RP3 over a 10-year period, to avoid a short-term price spike, they were concerned that the proposed price increases would add considerably to carrier operating costs at a time when the sector was still recovering from the pandemic's extraordinary financial impact. Several stakeholders commented on our approach to profiling TRS revenues over 10 years. This is discussed in chapter 6.

F10 Airlines UK considered that the headline 27% price control increase was simply too high and risked disadvantaging the UK aviation sector. easyJet considered that a double-digit increase in prices for an essential facility was neither proportional nor justified by a proportional increase in service performance. Loganair noted that the UK unit rate is already among the highest of the 41 Eurocontrol member regions and, the Initial Proposals would likely make UK unit rates one of the highest in Europe. Loganair was particularly concerned with the impact on its costs and domestic air services. In its view, domestic air services should pay a lower unit rate.

F11 On the detail of the analysis, IATA urged caution on comparisons with France, Germany and Spain, as from 2024, these states would undergo a new round of

economic regulation and, in IATA's view, their future unit rates would likely be further reduced below the projected levels for NERL in NR23.

Approach to our analysis

F12 The Provisional Decision to profile TRS revenues over 10 years is discussed in chapter 6. Although NERL's charges represent only a small proportion of consumers' ticket prices, we have considered airline responses on the undesirability of significant real price increases and remain of the view that it is appropriate to smooth unit rate increases over time. This should allow NERL's charges to remain close to comparator EU ANSPs, while also ensuring the proposed package is financeable.

F13 As such, for our Provisional Decision we have retained the analytical approach to benchmark NERL's charges and service levels used in the Initial Proposals, using more recent data as appropriate. This analysis helps inform our Provisional Decision, which also considers all other available evidence and responses to the Initial Proposals. This approach is consistent with our statutory duties, including to exercise our functions in the manner we think best calculated to apply our secondary duties, in particular to further the interests of customers and consumers, to promote economy and efficiency on the part of the licence holder and to secure that the licence holder does not find it unduly difficult to finance activities authorised by their licences.

F14 To assess the value for money, economy and efficiency of our Provisional Decision, we considered the following:

- how NERL's charges compare with its own historical charges and those charges of comparator ANSPs;[43]
- service levels and performance provided by NERL in return for its charges, compared with that provided by comparator ANSPs;
- the materiality and likely significance of NERL's charges to passengers and airlines; and
- how other European ANSPs are planning to recover traffic risk sharing (TRS) revenue resulting from the impact of covid-19.

F15 We consider that the most relevant metric for charges is the en route unit rate for which there are already well-established service unit metrics (TSU and CSU) as administered through the Eurocontrol Central Route Charges Office (CRCO). We

[43] As part of this we have also considered the relevance and impact of adjusting international comparisons for purchasing power parity.

have also considered metrics which include cost per composite flight hour and a measure of cost effectiveness.

F16 Comparative en route unit rates and cost reporting information from other Eurocontrol Member State ANSPs is accessible through the ETNA portal[44] and the Eurocontrol dashboard[45] has a comparator section.[46] In this analysis, we have used NERL's usual comparators in Eurocontrol's ACE Benchmarking reports: DFS (Germany), ENAIRE (Spain), ENAV (Italy) and DSNA (France). These comparators are based on ANSPs with similar traffic volumes and airspace complexity, and who operate in a similar economic environment.

F17 Additional data sources for NERL include ACE benchmarking reports,[47] which provide information on performance indicators relating to the benchmarking of cost-effectiveness and productivity performance.

F18 While we have based our analysis on European comparators, we recognise that the consideration of ANSPs from a wider geographic area may be helpful in assessing the affordability of NERL's charges. For example, as we said as part of our evidence to the CMA RP3 determination,[48] it would seem comparators drawn from the US have, in the past, performed better than European ANSPs on a cost efficiency basis. Furthermore, the UK may be more similar to US ANSPs in terms of scale and controlled area.

F19 Therefore, we recognise that the choice of comparators may affect the findings of our analysis and the conclusions which we reach. If international evidence indicates that ANSPs can be significantly more cost efficient than those we observe in Europe, it is possible that NERL will perform reasonably well in comparison to the other large European ANSPs.

F20 The output of the analysis is described in the following sections.

Assessing the value for money of our Provisional Decision

How NERL's charges compare with its own historical charges and those of comparator ANSPs

F21 We considered the UK en route unit rate over time and compared it with that of four comparator countries: Germany, Spain, Italy and France.

[44] https://etna.crco.eurocontrol.int/

[45] https://www.eurocontrol.int/ACE/ACE-Home.html

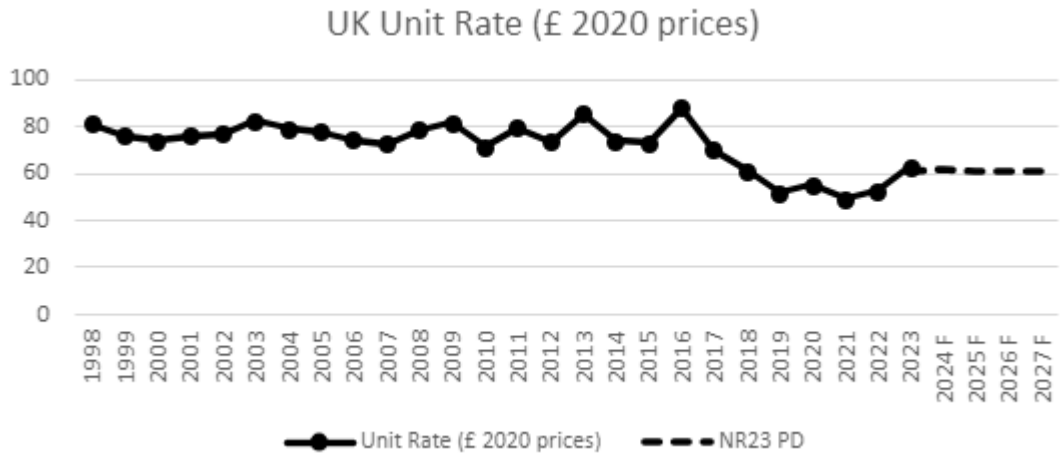
[46] See here and here

[47] Reports up to 2020 can be found at https://ansperformance.eu/publications/prc/ace/.

[48] Paragraphs 5.79 - 5.80 of CAP 1870 CAA response to Statement of Case (publishing.service.gov.uk)

F22 The UK's en route unit rates hovered mostly between £70 to £80 (2020 prices) between 1998 and 2016/2017, falling significantly since then as shown in Figure F.1 below. The UK unit rate of approximately £61 being proposed for NR23 (of which the NERL unit rate is approximately £53 and non-NERL component is approximately £8, in 2020 prices), means that the UK unit rate will still be below that historical range during NR23.

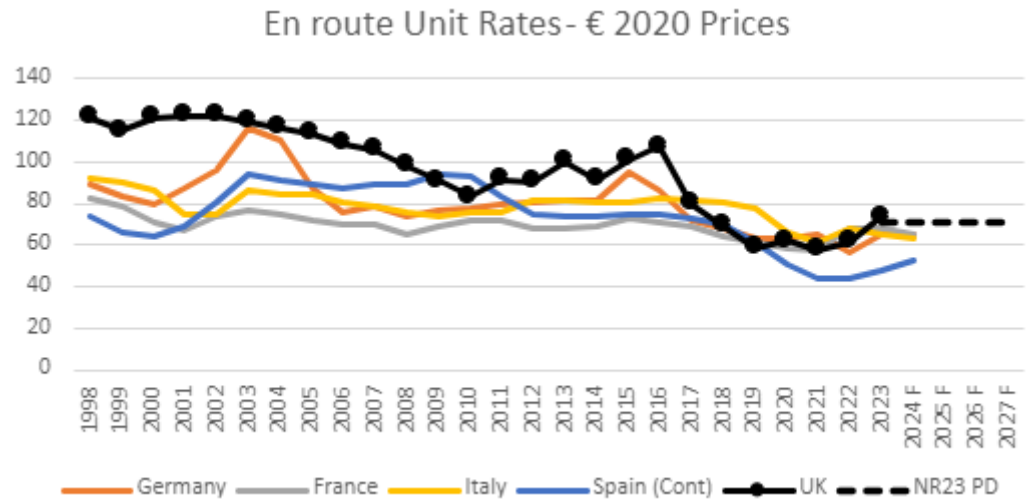
Figure F.1: UK en route unit rate time series – NR23 Provisional Decision



Source: CAA analysis of Eurocontrol unit rate dashboard and CAA's Provisional Decision.

F23 The UK's unit rates have been, in recent years, similar to (or lower than) those of countries with comparable ANSPs. While, under our Provisional Decision, UK unit rates would increase in NR23 compared with 2022, they would still be reasonably close to those of other comparable countries based on available RP3 performance plan data and would remain around or slightly below the levels of charges for these comparator ANSPs prior to 2019. Also, the UK's unit rates have recently declined faster than comparators and there is a long-term trend of UK convergence towards comparators (since UK unit rates were historically higher), as shown in Figure F.2 below.

Figure F.2: Comparison of en route unit rates – NR23 Provisional Decision

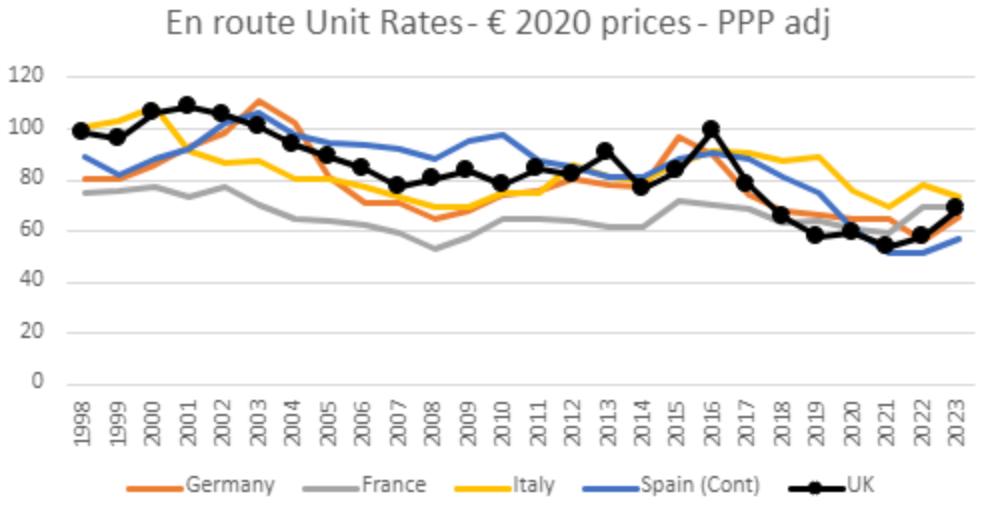


Source: CAA analysis of Eurocontrol unit rate dashboard, November 2022 CRCO tables and CAA Provisional Decision.

Note: Comparator unit rates for 2022-2024 are based on States' submissions produced in a different context and for a different timeframe to our Initial Proposals and Provisional Decision for NR23. EU states revised their numbers in mid-2021, at a time of greater uncertainty and still very much focused on cost-containment for their RP3 period (up to 2024), so it is possible that these numbers will change over the NR23 period.

F24 This long-term convergence may to some extent be explained by the relative weakening of Sterling against the Euro. Adjusting for purchasing power parity, UK unit rates have been comparable to those in other European countries, particularly in recent years (see Figure F.3 below).

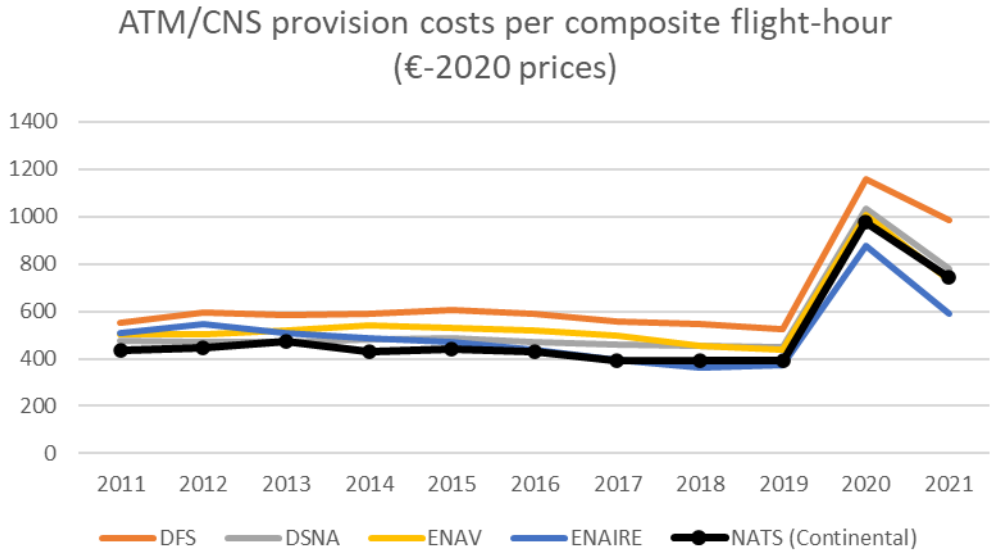
Figure F.3: Comparison of en route unit rates – PPP adjusted



Source: CAA analysis of Eurocontrol unit rate dashboard

F25 We have also compared NERL's costs per composite flight (a headline Eurocontrol Performance Review Unit benchmarking metric) with those of four comparator ANSPs: DFS (Germany), ENAIRE (Spain), ENAV (Italy) and DSNA (France). NERL's costs per composite flight has generally been below the average of comparators and, generally, NERL costs seem comparable with the main ANSPs in France, Italy, Germany and Spain. That said, even though the selected comparator group may well be the most appropriate given the UK's operational and economic environments, these are a relatively expensive group of ANSPs (in nominal terms), compared with others in Europe and the US (see previous section). Figure F.4 shows that, in the atypical years of 2020 and 2021 (when traffic was significantly depressed due to the impact of covid-19), NERL's costs per composite flight had been similar to ENAV and DSNA, lower than DFS but higher than ENAIRE.

Figure F.4: ATM/CNS provision costs per composite flight-hour



Source: CAA analysis of Eurocontrol's benchmarking data

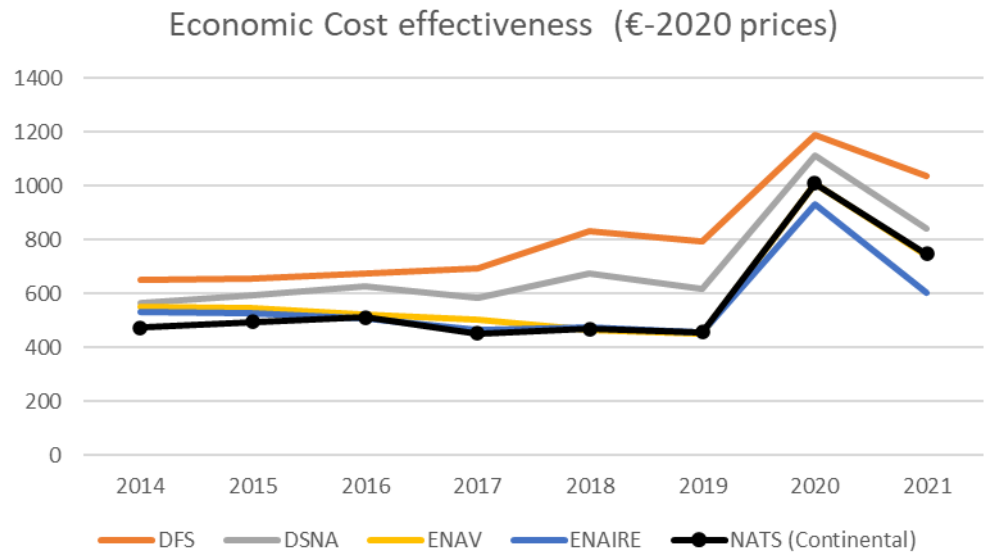
Service levels and performance provided by NERL in return for its charges, compared with that provided by comparator ANSPs

F26 We considered NERL costs per composite flight metric also taking into account delay costs to users, with those of four comparator ANSPs: DFS, ENAIRE, ENAV and DSNA. The Economic Cost Effectiveness indicator in ACE Benchmarking reports add the costs of delays to users to the provision costs per composite flight-hour.[49] NERL ranks particularly well against some comparators

[49] The cost of ATFM delays (€109 per minute in 2021) is based on the findings of the study "European airline delay cost reference values" realised by the University of Westminster in March 2011 and updated in

when delay costs are also taken into account, particularly before the traffic downturn due to the impact of covid-19 (see Figure F.5 below). In the atypical years of 2020 and 2021, NERL's economic cost effectiveness indicator was similar to ENAV, lower than DFS and DSNA, but higher than ENAIRE's.

Figure F.5: Economic Cost Effectiveness

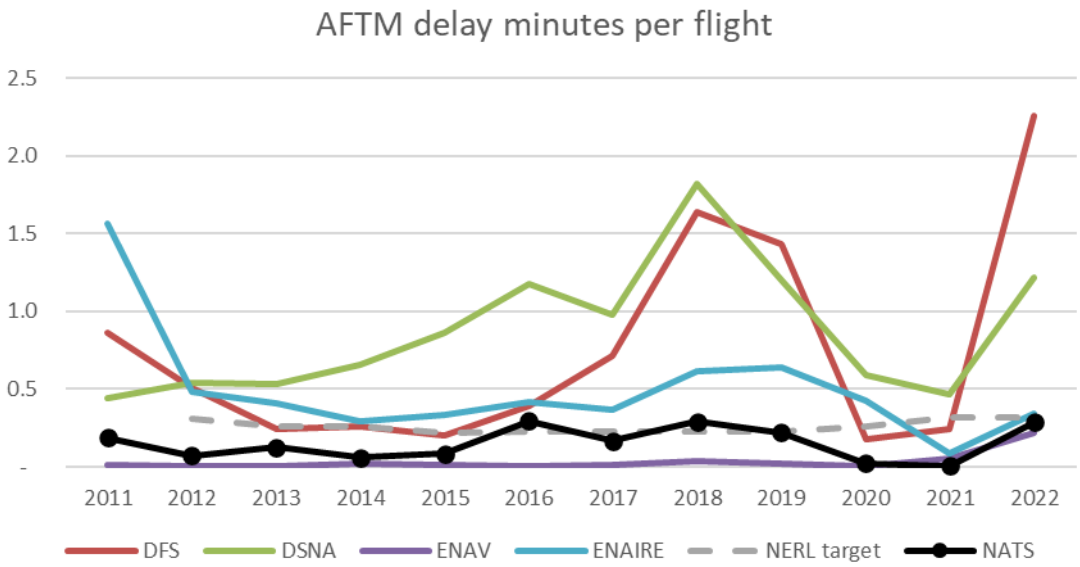


Source: CAA analysis of Eurocontrol's ACE benchmarking data

F27 These comparisons indicate that NERL delays experienced by airspace users have been lower than comparators (See Figure F.6) for unit rates and unit costs that are broadly similar. With the traffic downturn due to the impact of covid-19 delays fell significantly across Europe, but in 2022 delays returned to levels similar to the relatively bad year of 2018 (both in the UK and elsewhere), despite traffic being lower than in 2019. Traffic recovery will likely continue to bring challenges to ANSPs' preparedness. We consider it is likely that NERL's service quality will remain significantly better than DFS and DSNA's over the NR23 period based on the service level targets in our Provisional Decision for NR23.

December 2015. Further details on the computation of the economic costs per composite flight-hour at ANSP and Pan-European system level are available in Annex 2 of Eurocontrol's ACE 2021 benchmarking report and in the ACE handbook.

Figure F.6: AFTM delay minutes per flight



Source: CAA analysis of En-route ATFM delay data in **ansperformance.eu/data/**

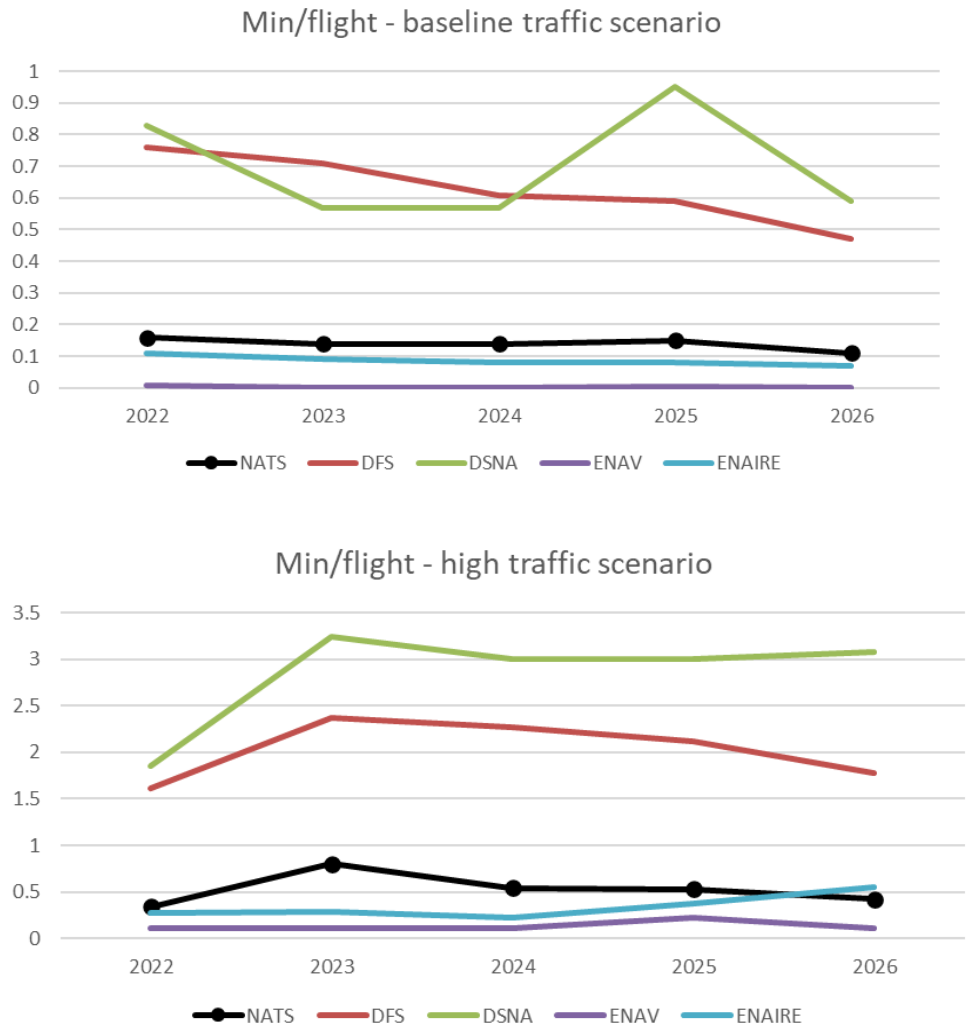
F28 Overall, NERL charges appear to be providing reasonable value for money to airline customers and passengers when compared with comparable international ANSPs. For NR23, NERL had proposed to maintain a target of approximately 0.25 minutes for ATFM delay per flight[50] and, in response to our Initial Proposals, NERL proposed weaker targets than its business plan to reflect higher traffic. Consistent with our Initial Proposals, our Provisional Decision is that the target for NERL's all-cause ATFM delays should be approximately 0.21 minutes per flight – we discuss service quality further in chapter 2.

F29 According to the European Network Operations Plan 2022-2026, the UK was expected to have sufficient capacity to meet the baseline traffic forecast scenario, resulting in forecast delays that are below 0.2 minutes per flight.[51] There would only be a capacity gap for the high traffic growth scenario, resulting in forecast delays of between 0.3 and 0.8 minutes per flight in 2022-2026. DFS and DSNA were expected to continue to have significant delays in 2022-2026 both in the baseline and high traffic scenarios, while ENAIRE was expected to have sufficient capacity to meet baseline traffic scenario, with its forecast delay exceeding reference values in the high-traffic scenario. ENAV's low delay forecast seemed to reflect that it plans to provide sufficient capacity to meet its delay targets even in a high-traffic scenario, in contrast with forecasts for NERL and other comparators. This is shown in Figure F.7 below.

[50] See page 5 of Appendix E of NERL's business plan

[51] See pages 203 and 204 of the European Network Operations Plan 2022-2026, available at www.eurocontrol.int/publication/european-network-operations-plan-2022-2026.

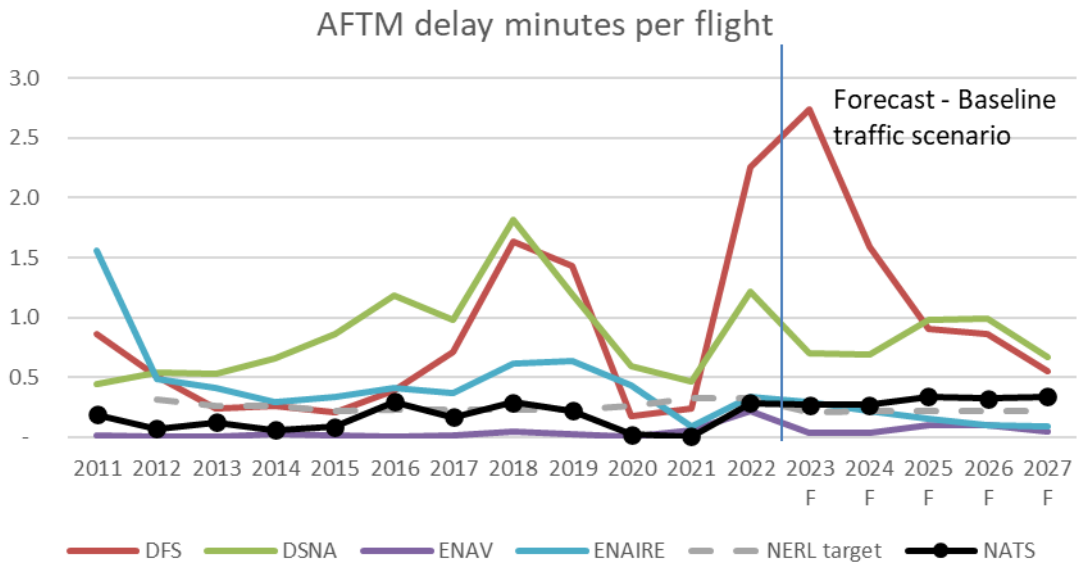
Figure F.7: Forecast AFTM delay minutes per flight by traffic scenario



Source: European Network Operations Plan 2022-2026

F30 The draft European Network Operations Plan 2023-2027, based on more recent traffic forecasts and capacity data provided by ANSPs, shows NERL delays are expected to be above the target in our Provisional Decisions particularly between 2025 and 2027 but still better than those forecast for DFS and DSNA (see Figure F.8). The target of 0.21 minutes per flight for NERL's all-cause ATFM delays should incentivise NERL to continue to provide good levels of service quality when assessed with other comparable ANSPs.

Figure F.8: AFTM delay minutes per flight



Source: CAA analysis of En-route ATFM delay data in **ansperformance.eu/data/** and draft European Network Operations Plan 2023-2027.

The materiality and likely significance of NERL's charges to passengers and airlines

F31 ANS charges from all ANSPs globally approximately equate to between 3% to 9% of airlines' revenues, depending on the airline business model and route network.[52] ANSP charges are in general at the bottom end of this range for full-service carriers with significant long-haul operations like Virgin Atlantic and British Airways, and at the top end of the range for short-haul low-cost airlines. For comparison, fuel costs can vary significantly from year to year and can represent between a quarter to a third of airline revenues in a typical year.[53]

F32 Specifically, we estimate that NERL's charges (a subset of the above) per passenger are as follows:

- in 2019, NERL's en route charges were approximately £1.67 per passenger and Determined Costs were about £1.95 per passenger;[54]

[52] Source: CAA analysis of UK airline financial data for 2019

[53] Source: CAA analysis of UK airline financial data for 2019

[54] Source: CAA analysis of NERL NR23 business plan appendix C and appendix I and assuming 129 passengers per flight, as per Eurocontrol's standard inputs for economic analyses

- based on NERL's business plan, we estimate that its en route charges would be £2.31 per passenger over NR23, with £0.35 of that being the 75% of the covid TRS revenue being recovered during NR23;[55] and
- in our Provisional Decision, NERL's en route charges are estimated to be £2.08 per passenger over NR23[56], with £0.24 of that relating to covid TRS revenue – to be recovered evenly over NR23 and NR28.

F33 These figures indicate that, for across a range of diverse types of airlines, changes in NERL's charges within the ranges set out in our Provisional Decision should have a relatively small impact on airlines' costs and on ultimate ticket prices paid by passengers.

How other European ANSPs are planning to recover traffic risk sharing (TRS) revenue resulting from the impact of covid-19

F34 The impact of covid-19 on traffic levels has had a significant effect on all ANSPs' revenues in 2020 and 2021. The UK was relatively more affected than the rest of Europe in 2021, when UK traffic was down 56% on 2019 levels, compared with 46% down for all Eurocontrol states.[57]

F35 It has been difficult to compare the recovery of the TRS revenue from the RP3 period, where special measures were put in place given the exceptional circumstances, with European comparators as the EU plans and forecasts conclude in 2024, while recovery of revenues has been extended beyond that. However, based on the information we have seen, EU ANSPs seem to have spread the recovery of their TRS revenue shortfalls evenly over 5, 6 or 7 years. This means that for comparator countries, the recovery of TRS revenue is expected to represent between 14% to 17% of Determined Costs in 2023 and 2024, as shown in Table F.1 below.

F36 NERL's business plan proposed unit rate increases that would be comparable to this (TRS covid-19 revenue being approximately 18% of Determined Costs over the NR23 period as noted above). In our Initial Proposals, we proposed TRS revenue recovery effort of approximately 13% of Determined Costs during NR23, which mainly reflected the longer recovery period of the revenue spread over the 10 years of NR23 and NR28. We retain this approach in our Provisional Decision.

[55] Source: CAA analysis of NERL NR23 business plan appendix C and appendix I and assuming 129 passengers per flight, as per Eurocontrol's standard inputs for economic analyses

[56] This has been estimated by dividing the total revenue allowance (£3,468m) by the forecast number of flights of flights for the NR23 period (12.908m) and assuming an average of 129 passengers per flight, as per Eurocontrol's standard inputs for economic analyses value for 2019.

[57] Source: EUROCONTROL Seven-Year Forecast 2023-2029: Annex tables for en-route service units (TSU)

Table F.1: Covid TRS revenue recovery in comparator countries

	Covid TRS revenue shortfall £m	No. of years	Covid TRS revenue per year as a % of Determined Costs (2023/24)
France	1,488	7	15.2%
Germany	885	6	14.4%
Italy	588	5	17.30%
Spain	624	7	14.10%

Source: CAA analysis of ETNA submissions in November 2022

F37 The NR23 unit rates proposed by NERL in its business plan would still result in large headline increases in unit rates (around 35%) from 2023 compared with 2019. We considered that a more extended recovery profile for the covid TRS revenue would moderate this increase to support recovery in the short-term and allow airlines and consumers more time to adapt to higher unit rates.

Conclusions for our Provisional Decision

F38 Our analysis set out above indicates that:

- NERL's en route unit rate has been similar to (or lower than) those of comparable ANSPs. In recent years, its unit rate had declined faster than comparators and there is a long-term trend of convergence towards comparators (NERL rates were historically higher);
- generally, NERL's charges appear to be providing value for money to airline customers and passengers when compared with those of comparable international ANSPs. For example, NERL delays experienced by airspace users have been lower than those of comparators for unit rates that are broadly similar;
- NERL's charges form a small proportion of airlines costs and of the ultimate ticket prices experienced by passengers even in respect of low-cost carriers. This materiality is unlikely to be significantly affected by the increase in charges in our Provisional Decision, as we estimate that NERL's charges will increase from approximately £1.67 per passenger in 2019 to approximately £2.08 per passenger over NR23; and
- although evidence for other countries is limited, the covid-19 TRS revenue recovery approach in our Provisional Decision seems to be reasonably comparable to what we know of what other countries might do.

F39 This analysis indicates that NERL's charges in our Provisional Decision are likely to be broadly similar to those of comparators and to deliver comparable or

slightly better levels of service over NR23. We have not seen evidence that our Provisional Decision for NERL's charges, even taking into account the forecast increases in charges over NR23, will lead to significant affordability or value for money concerns.

F40 While our analysis has not raised any specific concerns regarding the likely affordability of NERL's future charges, there are significant relative increases in costs and charges over NR23 for consumers and customers. These, for example, are due to the high level of protection provided to NERL from recovery of the shortfall in revenues during the period 2020-2022 resulting from the impact of covid-19.

F41 Consistent with our statutory duties, we have considered actions to ensure that charges represent economic and efficient costs, provide value for money, and are no higher than necessary to broadly support users in re-establishing and operating services following the covid-19 pandemic. This has been balanced with consideration of our duty around financeability in chapter 6.

F42 In addition to setting allowances for efficient costs that provide for an appropriate level of service, our Provisional Decision reduces NERL's proposed increase in charges, particularly in the short-term. This includes reprofiling the recovery of TRS revenue from the RP3 period affected by the impact of covid-19 over a 10 year period of NR23 and NR28.

APPENDIX G

The capex engagement incentive

Introduction

G1 When we introduced the capex engagement incentive in RP3, we provided guidance on how the Independent Reviewer (IR) should assess and score NERL's engagement with stakeholders on its capex plan.[58] This included setting out the expectations associated with each score and each of the assessment criteria, together with details of the process and timings, and how any financial penalty should be calculated.

G2 We said that we may revise the guidance to reflect best practice, the law and our developing experience. The sections below summarise our Initial Proposals for clarifying the scoring criteria, the stakeholder responses we received and provides the revised guidance (which is set out in full in section G1 at the end of this appendix) on which we are consulting.

G3 Chapter 7 discusses the design and structure of the incentive, including our Provisional Decision on the score that NERL will need to achieve to avoid a penalty and changes to the number of scores and assessment criteria.

Our Initial Proposals

G4 Following the review of the incentive conducted by Egis (the RP3 IR), we proposed some clarifications to the scoring criteria to ensure they capture the timeliness of mitigating/corrective actions, are more explicit about the importance of the traceability of information (especially milestones and financial information) and ensure that the consideration of optioneering includes the benefits of options and the opex impact of capex changes.

G5 We proposed that the criteria should clarify the need for NERL to engage clearly and transparently on changes to a project's scope and milestones, including: deliverables moving between projects, elements of projects no longer being delivered, changes to delivery dates, reconciling changes in the scope/timing of projects to benefits accruing from those projects, NERL's approach to optioneering, and how changes to optioneering would affect opex. The scoring would seek to measure how well NERL communicates changes from previous Service and Investment Plans (SIPs).

[58] See Economic regulation of NATS (En Route) plc: Decision on licence modifications and guidance, Appendix E (CAP2011): www.caa.co.uk/CAP2011.

G6 We considered that these clarifications would help address the need for high quality engagement as NERL moves to a ”2+5” approach to capex planning, would significantly assist NERL in its engagement, and would improve the traceability of the elements of the capex plan over time.

Summary of stakeholders’ views

G7 NERL agreed with Egis’ view that more clarity was needed on the scoring criteria and considered this to be the main improvement to make the incentive work better in practice. However, NERL said that our proposed wording was still vague, asking for example how NERL or the IR should differentiate between “clear traceability” and “comprehensive traceability” when deciding on a score of 3 or 4.

G8 It also requested that we confirm that the scope of the incentive does not include NERL’s delivery of capex which could be suggested by using terms such as “timelines of mitigating/corrective actions”.

G9 NERL suggested specific changes to the current scoring guidance, setting out specific and often quantified deliverables to help codify the requirements for each score. For:

- “user focus”: setting timescales for both the publication of SIP documents and responding to user comments, and setting out specific details of what the documents should include;
- “optioneering”: specifying the level of information that needs to be provided by reference to a specific number of elements, and the time and opportunity given to users to respond;
- “responsiveness”: scoring by reference to the percentage of user or IR submissions that NERL acknowledges and responds to and the level of detail given in each case; and
- “mitigations/corrective actions”: where such actions are appropriate, the percentage of actions that are taken and that are communicated to users, and the amount of evidence and justification provided by NERL.

G10 In addition, NERL suggested clarifying the scoring criteria through consultation or preferably a workshop with customers, the IR and the CAA in the first half of 2023.

G11 Of the airline respondents that submitted comments relevant to the scoring criteria:

- British Airways supported the clarification of the scoring criteria to improve the traceability of information, and advocated improvements in the quality of information provided by NERL to enable costs, benefits, and wider

implications to be assessed. It also requested confirmation that the "timeliness of mitigating/corrective actions" refers to the timeliness of NERL's engagement with customers on mitigating/corrective actions, rather than the timeliness of the actions themselves;

- Aer Lingus supported our proposals to strengthen and clarify the incentive, especially on the quality of the information provided; and
- IATA made a number of comments about specific shortcomings in NERL's current engagement.

Our views

G12 We agree that the quality and clarity of the guidance is essential for the IR to decide on a specific score, particularly with the more stretching "baseline expectations" target score of 3 (out of 4) that we will apply for NR23, and that there may be scope to further clarify the scoring criteria included in our Initial Proposals.

G13 However, we consider that the extensive and specific additions proposed by NERL could risk leading to a process-driven approach to the application of the incentive, rather than dealing effectively with the substance of running an effective and meaningful engagement process.

G14 Nevertheless, we see merit in making targeted refinements to the scoring criteria by integrating some of NERL's suggestions to the scoring criteria included in our Initial Proposals. We consider that this will help to clarify our expectations to both NERL and the IR, provide greater clarity to NERL on how to improve its performance and so avoid a penalty and further distinguish between different scoring levels. At the same time, it will avoid undue prescriptiveness and will allow the IR sufficient flexibility to reflect the range of circumstances that may need to be addressed.

Draft guidance for consultation

G15 The draft guidance for consultation is set out in section G1 below. The main changes from the previous guidance are summarised below.

Clarifying the scoring criteria

G16 We propose further changes to the scoring criteria as set out in the table in section G1 below. These reflect those clarifications proposed by NERL that we consider are most relevant to the quality of stakeholder engagement, including:

- the level of stakeholder involvement and the type of information captured under "user focus";
- the level and type of information required under "optioneering";

- the timeliness and level of response to stakeholders required under "responsiveness"; and
- the timeliness and the level of communication to stakeholders concerning "mitigating/corrective actions".

G17 In addition, we have revised our description of the mitigating/corrective actions criteria to clarify that it should be capturing NERL's engagement with its customers and not capex delivery.[59]

Overall aim of the guidance

G18 We have also proposed an introductory statement summarising the overall aim of the guidance.

Awarding marks

G19 As discussed in chapter 7, we propose to allow the IR to award half marks. This will reduce the risk that NERL's average score may be unduly affected by specific judgements that the IR will have to make, for example whether NERL's performance against a particular criterion should be scored as "Baseline expectations" or "Excellent". Similarly, it will provide greater scope for NERL to achieve a score higher than "Baseline expectations" even if it does not quite meet all the requirements needed to earn a score of "Excellent".

G20 For projects that have reached a sufficient stage of maturity, where NERL's focus should be on delivery and further optioneering may not be appropriate, we clarify that NERL should be awarded a score of 3 ("Baseline expectations") for the optioneering criterion.

Timing and periodicity of scoring, and relevant score

G21 The previous guidance stated that NERL should receive an initial and a final score for each project or programme, with the timing of these assessments agreed between NERL and us. However, this does not reflect what has happened in practice over RP3, with the IR scoring all relevant projects and programmes at each SIP and interim SIP (so NERL received two scores each year). As noted in chapter 7, we intend to maintain the approach that has been followed in RP3 in NR23 and therefore propose to modify the description of the scoring process in the guidance to reflect this arrangement, while clarifying that the relevant score for the incentive it is the final score for each project or programme awarded during the price control period and prior to the decision for the next price control review.

[59] We also clarify in the guidance that the incentive focuses on NERL's capex engagement, not the delivery of the capex programme.

Incorporating stakeholder views

G22 As stated in our Initial Proposals, stakeholders will have an opportunity to express their views on the quality of NERL's engagement to the IR. This could be done at the publication of the annual SIP but there may be merit in allowing the IR some discretion in how and when it seeks stakeholders' views.

Other changes

G23 We have made a number of changes to reflect our Provisional Decision on the structure of the incentive, as set out in chapter 7, which includes:

- a reduction in the number of assessment criteria from six to four, combining the previous "Timeliness", "User-focus" and "Proportionality" criteria into a single new criterion;
- the removal of the lowest score of 1 ("Weak") from the scoring range and renaming the middle scores 2 and 3 to "Below expectations" and "Baseline expectations" respectively; and
- confirmation that the score that NERL will need to achieve in order to avoid a penalty will now be 3 ("Baseline expectations").

G24 We have removed explanatory material that is no longer necessary as it was included in the RP3 guidance to facilitate the introduction of the incentive. Our proposed statement of overall aim now addresses what the incentive is trying to achieve and frames the IR's approach.

G25 In addition, we have modified the guidance to recognise the impact that NERL's "2+5" approach to capex planning could have on the capex plan, including the need for possible adjustments to the weightings used to calculate the overall capex engagement score.

G26 Finally, we have modified the section on calculating the penalty to reflect the reduction in scoring criteria and scoring ranges as well as the higher baseline score that NERL needs to achieve to avoid a penalty.

Next steps and views invited

G27 We welcome views on the proposed guidance set out in section G1 below, including in particular:

- the revised scoring criteria
- the statement of overall aim for the guidance

- our proposals to allow the IR to award half marks, and to award a mark of 3 ("baseline expectations") for optioneering in the case of projects or programmes that have reached a sufficient degree of maturity such that further optioneering would not be appropriate;
- the revised description of the timing and process for awarding scores;
- the way that other changes to the incentive (as described in chapter 7) have been reflected in the guidance.

G28 We are not requesting views on our Provisional Decision on the structure of the incentive, discussed in chapter 7, including the reduction in the number of scores and assessment criteria, and the score that NERL will need to achieve to avoid a penalty, as these were consulted on in our Initial Proposals.

G29 Responses to this consultation should be sent to economicregulation@caa.co.uk by noon on 4 August 2023.

G30 Any questions related to this consultation should be sent to Stewart Carter at stewart.carter@caa.co.uk

G1: Revised guidance on NERL's capex engagement incentive

Overall aim of the guidance

1. This guidance sets out how we intend to assess NERL's performance in respect of the capex engagement incentive set out in Condition 10 of the NERL Licence. Subject to appropriate engagement and consultation, and taking account of our statutory duties, it may be revised from time to time to reflect best practice, the law and our developing experience.

2. This guidance addresses the following issues:

   - Measuring performance: building on our experience of the operation of the incentive, the guidance provides details on how we intend to assess NERL's capex engagement including detailed scoring criteria.
   - Process and timings: setting out the processes and timings involved in the assessment of NERL's capex engagement.
   - Calculating financial penalties: setting out how financial penalties should be calculated.

3. The Independent Reviewer (IR) should score NERL's performance using this guidance and assess NERL's performance from the perspective of what users of its services expect from meaningful engagement by NERL on its capex plans, so that:

   - there is sufficient transparency of NERL's capex plans and enhanced accountability by NERL to its stakeholders; and
   - the incentive encourages NERL to seek improvements to the development of its capex plan to benefit both current and future users of its services.

4. In assessing the appropriate score that should be awarded to NERL in relation to each assessment criterion, the IR shall consider NERL's engagement with its stakeholders on its plans for capex as a whole, including, the information it provides to stakeholders and/or the IR through:

   - the Service and Investment Plans ("SIPs"), published in accordance with Condition 10 of the Licence;
   - any "interim" SIPs published during the regulatory year; and
   - any other meetings, forums or other forms of engagement relating to the development of its capex plan, such as the Technical Customer Advisory Board (TCAB) or other meetings or forums with a similar purpose.

5. As part of this, the IR should consider the extent to which NERL has sought to provide information to stakeholders on an equal basis and given them

reasonable opportunity to engage with NERL on these matters. While the focus of this incentive is NERL's capex engagement, the IR may consider opex where appropriate, for example in relation to the "optioneering" criterion.

6. In determining the specific score for each of the criteria, the IR's assessment shall include (but not be limited to) assessment of the matters set out in the Table G1.1 below.

Measuring Performance

Criteria for assessment

7. In assessing the quality of NERL's engagement on its capex plans, we intend to use the following criteria.

    1. **User Focus**: including timeliness of information, traceability and proportionality: NERL should provide information to users, the IR and us:

        a. in forms, and through mechanisms, that reflect user priorities and resource constraints and that are clear and accessible;

        b. in a timely manner, including through providing early warning and explanation of factors that may put planned delivery timelines at risk;

        c. that enables specific elements of projects or programmes that have moved between programmes (such as the scope, costs, delivery timescales and benefits accruing from those changes, and any impacts on opex) to be traced from one consultation to another; and

        d. the level of substantiation NERL provides should reflect the materiality of the change under consideration.

    2. **Optioneering**: NERL should seek to identify a range of different responses that might be adopted where practicable, explain the need for the programme and the outcomes and benefits it is seeking to deliver, and to provide opportunities for engagement and scrutiny of those options by users and the IR. In addition, NERL should be transparent about the opex impacts of different options presented.

    3. **Responsiveness:** NERL should respond constructively, meaningfully and in a timely manner to submissions by users, the IR and us, and explain clearly how it has considered and taken account of those submissions.

    4. **Mitigating/corrective actions:** NERL's engagement with its customers should include appropriate mitigating and/or corrective actions in the light

of submissions by users, the IR and us, and it should communicate those actions to stakeholders in a timely manner.

Scoring system

8. NERL's performance for each capex project during the period will be scored for each of the assessment criteria against a points-based scoring system on a scale of 1 to 4, where:

   1 = poor;

   2 = below expectations;

   3 = baseline expectations; and

   4 = excellent.

9. The IR will also be able to awards half marks of 1.5, 2.5 and 3.5 when scoring NERL's performance under the assessment criteria.

10. Further guidance of what NERL would need to achieve to obtain each of these scores is set out in Table G1.1 below.

Table G1.1: Proposed guidance on scoring[60]

	Underperformance		Baseline expectations (3)	Excellent (4)
	Poor (1)	Below expectations (2)		
1. User Focus, including timeliness of information, traceability and proportionality	Some delay in providing information to at least some stakeholders, limited early warning of factors that may affect delivery. Unclear, inaccessible or perfunctory provision of information on the capex (and other details, including what is proposed, cost, delivery timescales and benefits, and any impacts on opex) with limited regard for user priorities and resource constraints. Limited additional information provided for material changes to the capex plan and unclear on traceability of changes back to previous plans.	Information provided in a timely but not proactive manner to some/all stakeholders, reasonable early warning of factors that may affect delivery. Reasonably clear, accessible and meaningful information provided on the capex proposed (and other details, including what is proposed, cost, delivery timescales and benefits, and any impacts on opex) with reasonable regard for user priorities and resource constraints. The level of substantiation provided reasonably reflects the materiality of the change under consideration but does not allow users systematically to trace changes to the plan to previous plans.	Information provided to all stakeholders proactively and promptly, early warning and (where relevant) explanation of factors that may affect delivery. Clear, accessible and meaningful information on the capex proposed, including what is proposed, cost, delivery timescales and benefits, and any impacts on opex, with good regard for user priorities and resource constraints. Comprehensive substantiation for all material changes to the capex plan under consideration, including clear traceability of all material changes from previous plans.	Information provided to all stakeholders proactively and promptly, excellent quality early warning and (where relevant) explanation of factors that may affect delivery. Extremely clear, accessible and meaningful information on the capex proposed, including what is proposed, cost, delivery timescales and benefits, and any impacts on opex, with excellent consideration of user priorities and resource constraints. Excellent substantiation for all material changes to the capex plan under consideration and comprehensive traceability of all changes from previous plans.
2. Optioneering	Poor information on the overall approach to optioneering adopted (including the need for the	Limited information on the overall approach to optioneering adopted (including the need for the	Good information on the overall approach to optioneering adopted (including the need for the	Excellent information on the overall approach to optioneering adopted (including the need for the

[60] Changes from the proposed guidance in Initial Proposals are underlined.

	programme or the outcomes and benefits that NERL is seeking to deliver). Limited information on alternative options presented (including limited discussion of costs, risks, timing, how benefits would be delivered, opex interactions and service quality), limited opportunity for meaningful scrutiny of relative merits of different options by users and IR.	programme or the outcomes and benefits that NERL is seeking to deliver). A range of different options identified where possible (including costs, risks, timing, how benefits would be delivered and explicit consideration of opex interactions and service quality), reasonable opportunities for meaningful user and IR engagement and scrutiny.	programme and the outcomes and benefits that NERL is seeking to deliver). Good information provided on a range of alternative options where possible (including costs, risks, timing, how benefits would be delivered and explicit consideration of opex interactions and service quality), good opportunities for meaningful user and IR engagement and scrutiny.	programme and the outcomes and benefits that NERL is seeking to deliver). Excellent information provided on alternative options where possible (including costs, risks, timing, how benefits would be delivered and explicit consideration of opex interactions and service quality), extensive opportunities for meaningful user and IR engagement and scrutiny.
3. Responsiveness	Perfunctory response to at least some user and IR submissions, insufficiently clear or untimely explanation how these submissions have been accounted for.	Generally constructive response to user and IR submissions, reasonably clear and timely explanation to some/all stakeholders of how these submissions have been accounted for.	Engaged and constructive response to user and IR submissions, clear and timely explanation to all stakeholders of how these submissions have been meaningfully accounted for.	Engaged and highly constructive response to user and IR submissions, very clear and timely evidence to all stakeholders that submissions have been meaningfully accounted for after substantial consideration.
4. Mitigating/corrective actions	Limited evidence of mitigating and/or corrective actions, where appropriate, following user and IR submissions. Actions not communicated to at least some stakeholders in a timely manner.	In most cases reasonable mitigating and/or corrective actions taken, where appropriate, following user and IR submissions. Actions communicated to some/all stakeholders in a timely manner.	In almost all cases appropriate mitigating and/or corrective actions taken promptly, where appropriate, following user and IR submissions. Actions clearly explained to all stakeholders in a timely manner.	In all cases appropriate mitigating and/or corrective actions taken promptly and proactively, where appropriate, following user and IR submissions. Actions very clearly explained to all stakeholders in a timely manner.

Notes:

“timeliness” includes not only the timeliness of the overall engagement with stakeholders, but also the timeliness of responding to stakeholders’ feedback;

“traceability” applies to identifying where specific deliverables and costs have either changed or moved between projects or programmes. Traceability should be such that changes to deliverables, project milestones, project costs and benefits can be clearly identified between the plans published by NERL over time. NERL should reconcile those changes to deliverables, project milestones and project costs to the delivery of the specific benefits that would accrue from those elements and any impacts on opex or other capex projects. Traceability should also indicate those elements of projects that are no longer planned to be delivered or which NERL plans to deliver later. Particular attention should be given to addressing the traceability of changes to those elements of the capital plan that are to be delivered in the two years following the date of the Service and Investment Plan in question; and

“optioneering” includes not only the setting out how NERL has considered different options and seeking stakeholders’ views on them, but also the benefits of those options and the opex impact of changes to the capex programme the consequential changes to the overall capex plan that any such changes bring. The IR should award a score of “baseline expectations” (3) in respect of those projects of programmes which have reached a sufficient stage of maturity that it would not be appropriate for NERL to engage in further optioneering but should be focusing on delivery.

Process and timings

Timings, periodicity and relevant score

11. The IR will score NERL's performance twice a year, after publication of the SIP and interim SIP. For the purpose of assessing any possible penalty, the relevant score will be the final score for each project or programme awarded during the price control period and prior to the decision for the next price control review. This score will be based on the last engagement assessed in the latest SIP or interim SIP (rather than, for example, a look back over the whole of the period). Should a capex programme end before the end of the period, the final score for that programme will be used.

12. We will take account of the findings of the IR and representations from stakeholders (including NERL) in forming our assessment. We will make the final decision on scoring NERL's performance. If our score is different from the IR's score, we will clearly explain why this is the case. Any final penalty will be calculated and applied at the price control review, which will provide NERL and other relevant stakeholders with an opportunity to appeal any decision (in addition to its procedural rights to judicial review).

Calculating an overall capex engagement score

13. The IR will calculate an average final score for each project using a simple average across the scores achieved under each assessment criterion. For calculating the overall engagement score, average project scores will continue to be weighted according to their forecast capex spend. We explain below what may happen to the weightings if changes in scope occur to certain projects.

Projects included in the incentive

14. We will engage with NERL and users before deciding on the projects and programmes that are to be included in the scope of the scoring. It may be appropriate to condense individual projects into a smaller number of larger programmes to be reviewed together, although some individual projects may also be of sufficient importance to users to warrant scoring on an individual basis.

15. We envisage having a relatively small number of projects/programmes which collectively represent a large share of NERL's overall total capex.

Assessment steps

16. NERL's consultation of users on its capex should be continuous and engagement is not restricted to the SIP. The SIP should be viewed as a

summary of NERL's consultations. While the SIP would be a natural basis for our assessment, we will consider the quality of NERL's engagement more broadly.

17. It is for NERL to clarify the purpose of each discussion forum at which information on capex is being presented (for instance, the TCAB) and how this fits into the consultation process for the SIP. We expect the IR to consider NERL's approach to consultation in subsidiary forums to support the SIP process in the assessment of the appropriate score. As part of this, the IR should consider whether the role of each forum is clear to users, and whether all users have appropriate access to equivalent information in a timely manner to be able to contribute to NERL's consultation processes.

18. The IR and users may engage with each other directly, either at the publication of the annual SIP or at any other point in time. However, users' primary interface should continue to be with NERL and they should use all reasonable endeavours to work within the SIP processes.

19. The assessment will proceed in the following steps:

Step 1) Initial and ongoing assessments

- NERL will provide us, the IR and users with continuous updates on capex projects/programmes. In doing so, it will use feedback from the IR, users and us and engage with users and the IR. The regular SIPs and interim SIPs, supplemented by quarterly updates, will represent a record of NERL's consultations.
- The IR will then give a score for the quality of NERL's engagement following the publication of each SIP and interim SIP. For the initial assessment, the IR will score NERL's engagement on the basis of the next SIP or interim SIP after the publication of the final version of this guidance.
- We and the IR will work with NERL to set out the reasons for how we have scored its performance and help NERL to understand where improvements should be made to meet baseline expectations.

Step 2) Final capex engagement assessment

- Should a capex programme end before the end of the price control period, the final score for that programme will be used. Otherwise, the scores for the last SIP or interim SIP assessed during the period will be used.
- We will make the final decision on scoring NERL's performance. We can deviate from the IR's score, but if we do so, we will explain why we have done so.

Step 3) Weighted average overall capex engagement score

- Once there is a final score for each project/programme, the weighted average score across all projects/programmes will be calculated in line with the approach described above. We presently envisage that steps (3) and (4) would take place at the price control review.

Step 4) Calculation of penalty (if relevant)

- The maximum penalty will be capped at a value equal to NERL's return on equity (used in the calculation of NERL's cost of capital in the price control) on its actual capex in the price control period.
- This penalty will be increasing with the level of underperformance. As any final penalty will be calculated and applied at the price control review, NERL and relevant stakeholders will have an opportunity to appeal (in addition to its procedural rights to judicial review).
- The incentive is penalty-only.

Changes to the capex plan within the period

20. The IR will assess the quality of NERL's engagement on its capex plan across several projects/programmes. This is important to ensure a sufficiently broad and proportional appraisal of NERL's capex engagement and to identify areas of consistent underperformance.

21. However, we recognise that NERL's capex programmes and projects may change over the regulatory period. If during the period the value of projects is changed, new projects are added, or projects are discontinued or deferred, it may be appropriate to adjust the weighting of projects in the overall score.

22. When adjusting the weighting of projects where the capex plan changes during the period:

- If the budget of a project is reduced or the project is cancelled or deferred, then it is important that NERL is held to account for the quality of its engagement with stakeholders on why the decision was made. Therefore, we may not reduce the weighting of such projects or remove them from the assessment but may keep the initial weights as they were.
- If the budget of a project is increased, then it is important that NERL's accountability is also increased. Therefore, in these instances, we may update the value of the project in the weightings. We would then adjust all weightings such that the overall sum of weightings does not exceed 1.

- If the overall capex plan changes significantly, we may engage with NERL and users again before deciding on more significant changes to the projects and programmes that are to be included in the scope of the scoring and/or the weighting applied to those projects and programmes.

Calculating the penalty

23. The incentive is focused on NERL's capex engagement, not the delivery of the capex programme. The incentive is penalty-only and, except for the impact of capex changes on opex mentioned above, relates only on engagement on NERL's capex plan.

Method for calculating penalties

24. The maximum penalty shall be capped at NERL's rate of return on its actual capex in the price control period. Any penalty will be implemented by either a RAB adjustment or a revenue adjustment at the price control review.

25. Only the final scores for each project or programme would be used to calculate the incentive. Specifically, we will use the overall capex engagement score, calculated as the weighted average final score across projects, as described above.

26. The penalty will continue to apply on a "sliding scale" basis to performance scoring below 3 (baseline expectations), with the maximum penalty payable if NERL's score is 1.5 or below. The penalty will increase linearly with the level of underperformance up to the maximum, at a rate of 0.1 units of underperformance with scores rounded to the nearest 0.1 decimal.