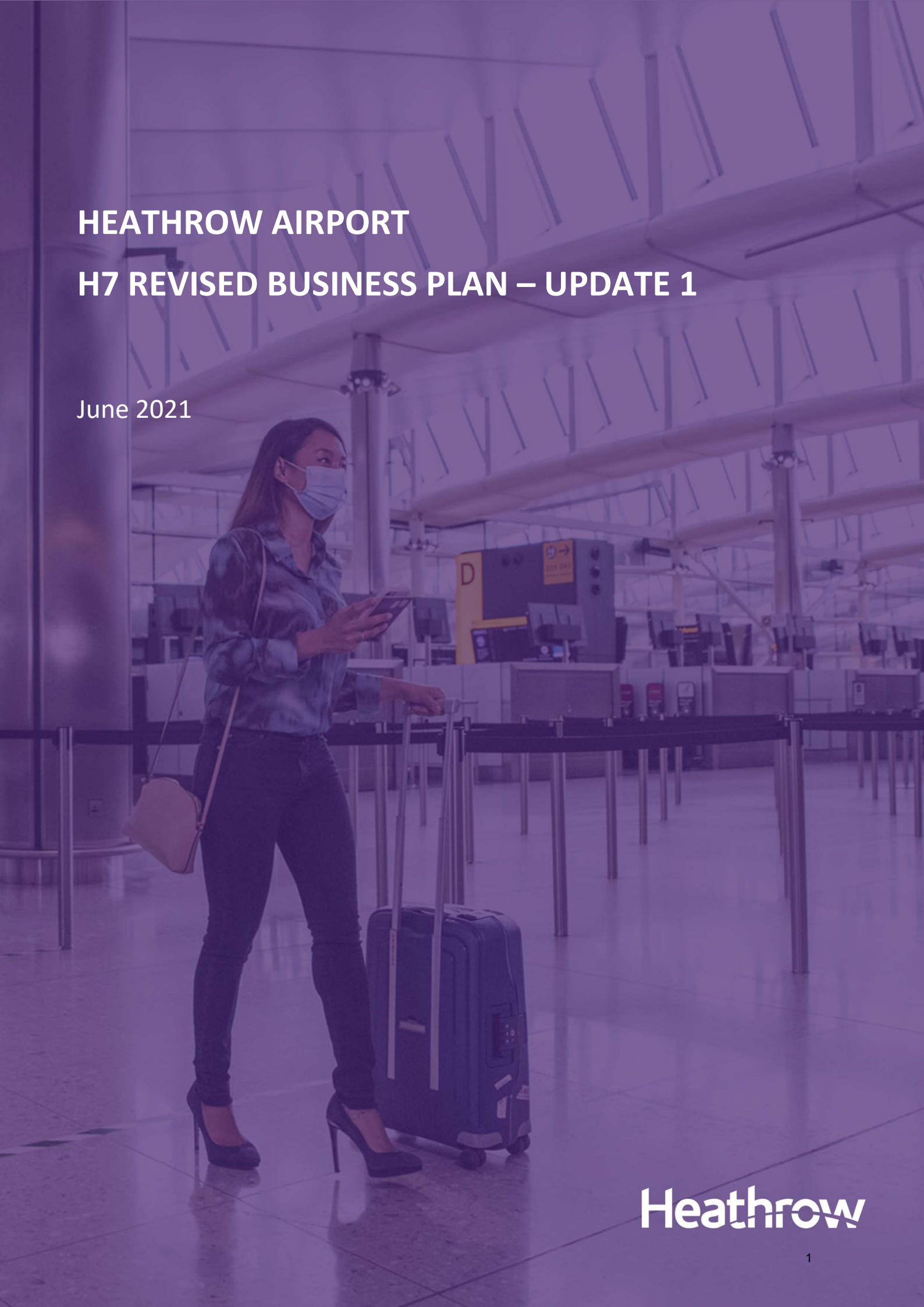

HEATHROW AIRPORT

H7 REVISED BUSINESS PLAN – UPDATE 1

June 2021

Heathrow

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1.0 Executive Summary

H7 will be our most challenging regulatory period, after decades of relative stability and 7 years of falling prices. Passenger numbers will be far lower than historically, and less predictable. The over £3bn losses that equity have suffered, the extreme asymmetric risk that was not reflected in the WACC and the CAA's failure to maintain the principles of return of the RAB and return on the RAB mean that the cost of capital will increase.

These two factors alone mean that charges will be significantly higher than today. This is compounded by external changes, such as the government's removal of VAT free shopping and new competition from the Elizabeth Line, which will reduce commercial revenues.

The upward pressure on charges does not only come from regulatory economics and a higher WACC, but also from financing. The WACC included in this update reflects the latest market data and the findings of the CMA in the recent water appeals. In addition, to maintain an A-credit rating, we have a minimum revenue requirement of c. £2.5bn in 2022 and c.£15bn across H7, over two-thirds of which is aeronautical revenue i.e. c.£1.8bn in 2022 and an average of c.£2bn p.a. 2018p in H7. This is equivalent to an average H7 charge of c.£29 2018p per passenger (at our mid-case traffic forecast) just to provide enough cashflow to meet minimum credit metrics. That is before any equity return – a fair equity return also being critical to make Heathrow investable for private capital, particularly after over £3bn of Covid-related losses.

This is a time when we want to attract as many airlines and passengers as possible to use Heathrow. We want to keep prices competitive and maintain a high level of service and resilience. The regulatory model could help – by smoothing regulatory depreciation over a longer period and making charges lower than they would otherwise be.

However, the CAA has not acted to give investors confidence that they will get a return of the RAB through a Covid-related adjustment. It would be irrational of investors to delay RAB recovery in H7 or to invest any more capital than is absolutely necessary to keep the airport safe, and compliant.

Unless the CAA reinforces RAB recovery with a Covid-related adjustment, the only investable proposition is an H7 settlement with a charge of over £40 and a skeleton capital investment plan, with deteriorating service and resilience.

But there is a better option for consumers, airlines and investors, if the CAA will use the regulatory levers in a more intelligent way. With a Covid-related adjustment, the charge could be over £10 lower and we could unlock investment to significantly improve our hub proposition and reduce total costs of operation. We could deliver the service and resilience that our consumer insight tells us passengers want and respond to the needs of our airlines.

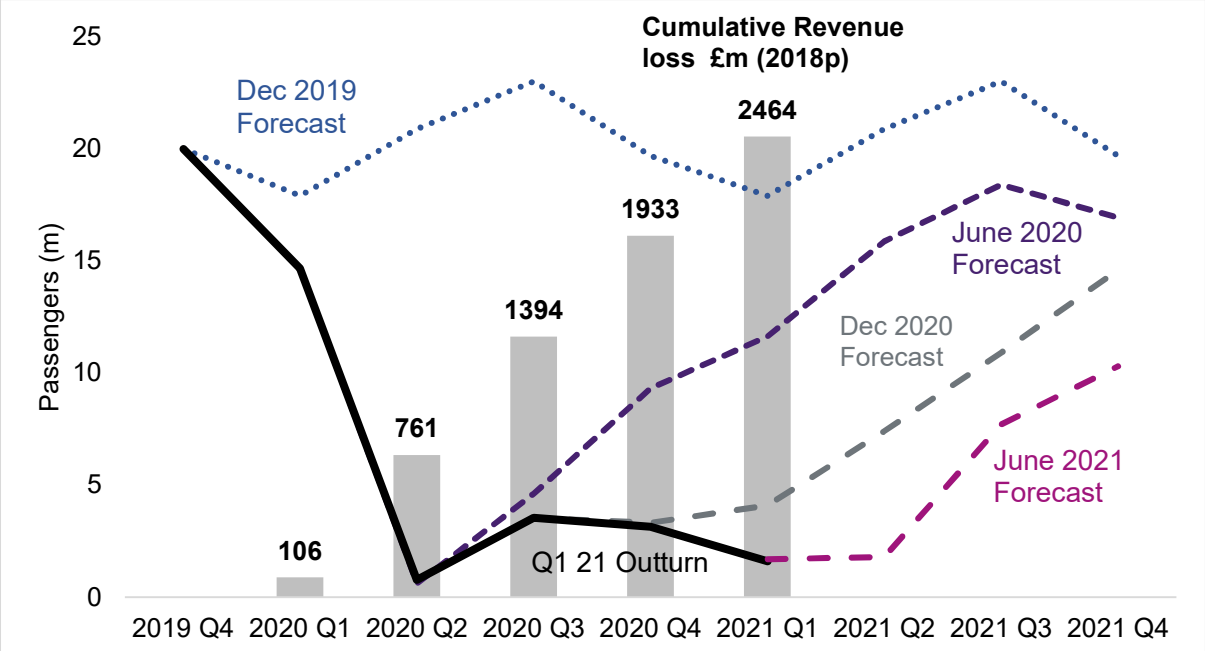
We think that this would be a better outcome, but it can only be achieved if the CAA makes a material RAB adjustment and delivers a package of other policy measures for H7 that reflect the need for the airport and airlines to recover from Covid-19.

To summarise, the key implications of the detail provided in this update are:

1. The outlook has deteriorated and Heathrow losses have grown since the RBP

In the 12 months to March 2021 Heathrow served fewer than 9 million passengers – 90% below 2019. Our losses before tax amounted to over £2.4bn. They continue to grow at a rate of £200m every month. This is despite further decisive action to protect consumers and the business, including further management cuts, extensive furlough and cost cutting, enhancing liquidity and a £600m capital injection into the regulated group.

The traffic outlook for 2021 has deteriorated since the RBP. We have published a new forecast of 21.5m passengers for 2021. A 13m downside forecast assumes the increasingly likely scenario of no UK summer season and only a very limited uplift at the end of 2021. In this low scenario, we forecast breach of covenants in our financing and potential corporate failures across the wider aviation sector. Consumer competition and choice will reduce and the cost of flying will increase.



Lower volumes in 2021 reduce the H7 forecast to 317m even as we reflect improved economic indicators later in H7. This translates into a £0.80 2018p higher charge than in the RBP.

2. Government policy has not helped consumers

Notwithstanding the public health merits of Government response to the Covid-19 pandemic, it has undercut every aspect of our commercial and operating model. The “traffic light system” continues in practice to severely limit consumers’ ability and confidence to travel. Urgent action is needed to focus on rational, data driven rules and reduce the cost and complexity of testing. At the same time Border Force’s failures to manage arrivals efficiently has led to unacceptable queues, complexity and cost for Heathrow.

Separate policy changes to airside shopping, and the removal of VAT exemptions, have undermined airport commercials, as a consequence adding c.£2 2018p per passenger to the net cost of operating.

In 2019 our business rates bill was £120m spread across 81m passengers. Despite the significant reduction in passenger volumes the government is currently legislating to prevent us claiming rates relief. We continue to pay one of the largest rates bills in the country as other industries have been exempted. In 2022 the same rates bill will be recovered from approximately half as many passengers, which also impacts airport economics for consumers.

Government financial support in the face of these headwinds has been totally insufficient for Heathrow and the wider aviation sector. While total furlough and AGOSS support of £57m has been welcome it only covers a mere 8 days of losses. Investors and consumers are facing the full economic impact of Covid as a result.

3. We can only deliver for consumers by remaining financeable

Maintaining resilience and delivering rising consumer expectations requires sustained investment. Since 2006 our shareholders have invested nearly £12bn of private capital to make Heathrow the best major hub airport in Europe even as operating costs have fallen 18%.

This winning formula has not changed as a result of Covid-19. The key to ensuring airport services are resilient and passenger experience improves is sustained investment with incentives for private capital to perform. That is the best way to provide a better airport for consumers.

All our insights suggest that passengers expect more, not less, after Covid. Passengers remain anxious about travelling, with new processes and stresses in their journey. They have higher expectations on cleanliness, social distancing and access to assistance. We have refined our plans to give consumers what they expect at a charge that is competitive.

But this can only happen if the right conditions exist to allow private investment. Financeability, service and the airport charge are linked. We cannot cherry-pick one element while ignoring the others. The legacy of the pandemic means that to make private investment possible we need action to protect our credit rating, to address the imbalance of risk and return and to restore the confidence of our debt and equity investors in RAB-based regulation.

As detailed on page one, this requires a minimum revenue of £2.5bn in 2022 and c.£15bn across H7. Two-thirds of this is aeronautical revenue i.e. c.£1.8bn in 2022 and an average of c.£2bn p.a. 2018p in H7. Even with the extreme assumption of zero dividends this is equivalent to an average H7 charge of c.£29 2018p per passenger - based on RBP Update mid-case passenger forecast and full RAB adjustment plan. That extreme assumption of zero dividends in the period is unsustainable for private finance and breaks the regulatory model. In reality we must determine a fair return calculated based on the actual risk borne by equity and market comparisons.

4. The CAA is risking a worse H7 for consumers by not facing into the challenge of financeability

Resilient private financing is therefore the central challenge of H7 to deliver the outcomes we know consumers value. The CAA must face into that challenge. But it is currently on course for an H7 package that fails consumers, sending Heathrow into a prolonged period of decline.

This is most evident in the CAA approach to the RAB Adjustment. We welcome that the CAA confirmed the need to act. But the interim £300m adjustment, less than 10% of over £3bn losses, is insufficient to mitigate the financial pressures we face under regulation.

The CAA has not provided assurance on the recovery of historic investment through regulatory depreciation. Regulatory depreciation is fundamental to RAB-based private financing. Without confidence in the return of historic capital it is illogical for investors to defer the returns of future capital or contemplate all but the most critical investment required to keep the airport safe. By undermining regulatory depreciation, the CAA is removing the biggest lever to reduce the airport charge over H7 and deterring the capital required to deliver consumer expectations.

The CAA's assumptions that investor risk can be mitigated by implementing forward looking risk sharing alone is flawed. We do agree that forward looking risk sharing helps create an affordable and financeable H7. Yet, if the CAA fails to uphold the key principles of regulation in both ensuring return of regulatory depreciation and a market based approach to cost of capital under the extraordinary circumstances of 2020/21, investors cannot have confidence that the CAA will in practice enforce these principles or any risk-sharing going forward. Risk sharing will only work if implemented with consistent and rational regulatory decision making.

The CAA appears to question whether Heathrow requires an 'A- 'credit rating to fund its operations. Given our structured financing platform, targeting A- for Heathrow is equivalent to targeting BBB+ for a notional company without structured debt. Recent regulatory practice is that BBB+ is an appropriate credit rating for a 60% geared notional company. Therefore, targeting the right level for the notional company is equivalent to targeting A- for Heathrow.

Any shift away from this standard will shrink Heathrow's access to the most cost-efficient sources of debt financing and hedging capacity, which is vital for accessing foreign currency debt. This would lead to significantly higher costs that would eventually have to be borne by consumers. The current pricing of Heathrow debt indicates that a downgrade would increase debt costs by around 60bps. Heathrow's funding requirements in H7 are anticipated to be £1bn to £2bn each year. A reduction in credit rating for the whole of H7 would therefore result in additional interest costs of around £700m over the life of the new debt raised in H7.

Another opportunity offered by strong financing is to smooth the airport charge to support the recovery period for aviation. But reducing the charge now by reprofiling or deferring depreciation has no net benefit for consumers in the long run. Therefore, using these approaches to reduce H7 charges to the extent they result in significantly higher interest costs overall can only be detrimental to consumers.

It is therefore indisputably in consumer interests to maintain the existing A- credit rating. This can only be achieved through ensuring cashflows are sufficient to meet A- credit metrics and creating confidence in the long term regulatory mechanisms for financing through a proper adjustment for the impacts of Covid-19.

5. Current CAA choices harm consumers with higher H7 charges and deteriorating service and resilience

The consequences of the current CAA approach are outlined in our Low Adjustment case. Not enforcing key regulatory principles in a timely manner drives up the cost of equity, increasing the WACC to 10.40%. Furthermore, we cannot defer depreciation if return of capital invested is not secure. That confidence will only exist if the loss of return of capital in 2020 and 2021 is addressed by the CAA by adjusting the RAB for Covid-related losses.

The result of a higher WACC and no depreciation profiling is an average H7 charge of £42.69 2018p.

The impact of poor policy is not just a higher charge. The interim RAB adjustment decision and indicative levels of return in the Way Forward Document remove any commercial incentive to invest beyond the £2.5bn minimum needed to operate the airport safely. The result is materially worse consumer outcomes as key projects are deferred.

We will work hard to mitigate the impact on consumers and other stakeholders. We will never compromise safety and we will do all we can to ensure the airport is as resilient as it can be.

Yet there is no avoiding the fact that if the CAA does not significantly increase the Covid-related RAB adjustment, we are deprived of the financial tools and investment to deliver the resilience and service current and future consumers expect at a competitive charge.

6. But there is a better option for consumers, airlines and investors, if the CAA use the regulatory levers in a more intelligent way.

H7 will be our most challenging regulatory period. The impact of Covid-19 makes it difficult to balance investment with a competitive charge and a financially viable private company. Yet the CAA has the regulatory levers to do it.

A full RAB Adjustment mitigates the pressure on cost of capital and, crucially, gives investors the confidence and financing headroom to defer cashflows to future periods by profiling regulatory depreciation.

Risk sharing calibrated to address extreme circumstances on upside or downside would further help financing and continue to provide sharp incentives for Heathrow to become more efficient while growing passenger numbers in H7. Removing deadbands on risk-sharing may help to assure the CAA there will be less deviation from H7 forecasts. But it dulls incentives for Heathrow to grow revenues and for Heathrow and airlines to work together commercially.

Some of the biggest challenges for H7 will be ensuring that the aviation industry faces up to the challenges of sustainability and Net Zero. The CAA needs to ensure that its capital efficiency incentives continue to facilitate and incentivise innovation in these areas, and avoid implementing policies from other regulatory sectors that lead to more inflexible decision-making at a time when we need maximum flexibility to support the recovery from Covid-19. It also needs to set a capital allowance sufficient to deliver the right outcomes for consumers.

This package would offer a more competitive H7 charge of £31.96 2018p. It also enables a plan that delivers what current consumers expect and enables Heathrow to serve future consumers with investment to:

- Significantly improve our hub proposition, reduce total costs of operation and respond to the needs of our airlines:
    - transforming our security product to make it faster, more efficient and less intrusive for passengers.
    - ensuring Heathrow is ready to serve passengers in H8 as well as H7 by improving connectivity in the western campus and beginning design work on a long-term solution to the T2 baggage system.
    - delivering airfield and baggage automation with cost efficiencies for us and airlines while ensuring more passengers travel with their bags on time.
- Deliver the service and resilience that our consumer insight tells us passengers want:
    - Touchless technology, service automation and more comfortable rest areas.
    - Introduce a new, more digital and resilient commercial offer that is forecast to support commercial revenues by £**[REDACTED]** over H7.

- Remain on course to deliver our net zero obligations with changes to airspace, pre-conditioned air and terminal energy.

The differences over H7 between this plan and the Low Adjustment scenario are stark:

- 96m more passengers will experience a security queue of 10 minutes or less.
- 3.2m more passengers will depart on time.
- 330,000 fewer bags will be misconnected.
- 99,000t more carbon will be removed from the atmosphere.

These better outcomes come for a charge £10.73 2018p lower than a Low Adjustment plan.

The resilience of the UK's international gateway and major port is also at stake. The wrong choice will lead to a decade long spiral of decline. All we ask of the CAA is to use the regulatory levers in an intelligent way to make a full RAB adjustment, assure on the return of regulatory depreciation, ensure minimum cashflows and create a coherent package that creates a balance of risk and return based on market data. It is clear that only one option can reasonably discharge the CAA's primary duty to current and future consumers while having reasonable regard to its duties on financeability, efficiency and sustainability.

RBP Update – Plans

	Full Adjustment	Low Adjustment
WACC	8.50%	10.40%
Depreciation Profiling	635m p.a. 2018p	£0
Capital Plan	£4.2bn 2018p	£2.5bn 2018p
Punctuality *(passengers departing on time)*	123.3m (80.5%)	120.1m (78.4%)
Baggage *(pax experiencing baggage misconnect)*	1.23m	1.53m
Overall Satisfaction	4.26	4.17
Carbon Saved in H7 *(tonnes removed by capital investment)*	99,000t	0t
Operating Costs / Pax	£17.54 2018p	£18.21 2018p
Commercial Revenues / Pax	£14.47 2018p	£14.18 2018p
Average unprofiled H7 Charge	**£31.96 2018p**	**£42.69 2018p**

2.0 Purpose of RBP Update 1

2.1 Introduction

The purpose of this document is to provide key updates to our building blocks and consumer insights following developments since the submission of our Revised Business Plan (RBP) to the CAA in December 2020.

It takes into account new market data and policy developments, which have been used to update our scenarios and building blocks, and additional consumer research carried out since publication of our RBP.

Where appropriate, we provide additional information to support the evidence base that was provided in our RBP – in particular where requests for additional information have been made by the CAA in response to the RBP.

We also use this update to respond to airline feedback received on our RBP since its publication, where there has been sufficient time for us to consider this and to provide a substantive response.

We consider the CAA's duties to consumers, financeability, efficiency and sustainability in the context of two cases in this update - "Full Adjustment" and "Low Adjustment". We conclude that only the "Full Adjustment" case can reasonably discharge the CAA's primary duty to consumers, whilst also having reasonable regard for its duties on financeability, efficiency and sustainability.

This update is intended to provide the CAA with the most up-to-date and relevant information as it progresses its thinking around Heathrow's H7 settlement, including developing its Initial Proposals.

It should be noted that responses to key policy issues raised by the CAA in CAP2139 *Way Forward* document have been included in our separate response to the CAA's consultation.

2.2 Structure of this document

The update is divided into five core sections:

1. **Developments since publication of the December 2020 RBP**

The Covid-19 pandemic has continued for longer than originally anticipated, and the evolving situation, both domestically and internationally, continues to significantly impact both Heathrow and the wider travel industry. We use this section to set out a summary of key industry and Heathrow-specific developments that have taken place since publication of the RBP. We also outline other key developments that are unrelated to Covid-19, but that remain significant considerations for our future business and operation.

2. **Updates to our consumer insights**

We continue to place consumers at the heart of our plans and have ensured that the golden thread of consumer insights informs the approach to all of our building blocks. We have continued work since the RBP to understand any changes to consumer needs in the wake of

the Covid-19 pandemic, including acceptability testing to determine consumer views on our RBP proposals. We share our updated views as a result of refreshed consumer insights as part of this update, including presenting the results of our consumer acceptability testing.

3. Updates to our key building blocks

We provide specific updates for the following H7 building blocks that were included in the RBP:

- RAB Adjustment and consequential impact on other building blocks.
- Passenger forecast
- Capital investment plan
- Operating cost forecast
- Commercial revenue forecast
- WACC
- Financeability

We have updated these building blocks with the latest market data and also provide key updates across the building blocks, including responding to specific CAA/airline feedback received since publication of the RBP in December 2020.

We consider how these changes to the building blocks flow through to the passenger charge and financeability. This is summarised in this document and outlined in full in the Price Control Model.

4. Updates to our H7 regulatory framework proposals

We use this section to provide a holistic update to our regulatory framework proposals to ensure that the RBP is consistent with the policy responses we have submitted since December 2020, including our response to the *Way Forward* document.

Specifically, this section covers:

- Regulatory Policy, including Capital Governance proposals.
- Measures, Targets & Incentives.

5. Additional evidence to support RBP scenarios

We use this section to provide evidence in response to the CAA's feedback relating to:

- The integration of our RBP range of alternative passenger scenarios across the building blocks.
- The integration of the capital plan across the building blocks.

2.2 Approach

This update considers two cases – a RAB "Full Adjustment" case and a RAB "Low Adjustment" case:

- The "Full Adjustment" case reflects Heathrow's request for a Covid-related RAB adjustment, consistent with that set out in our response to CAP2098 and ensuring the

application the underlying principles of our RAB-based framework, to enable both a lower H7 charge and a plan that delivers for both current and future consumers.

- The "Low Adjustment" case reflects a world where the CAA grants a lower than requested RAB adjustment, with no further adjustment to the RAB being made at the start of H7 beyond the £300m outlined in CAP2140, resulting in a higher charge and worse outcomes for consumers through H7.

Summary of cases

The table below summarises the core variances between the two cases. The justification for these variances is outlined in Chapter 5.1 - RAB Adjustment. The same chapter also summarises how these variances lead to different outcomes for consumers and stakeholders.

Table 1: Summary of RBP Update 1 cases

Assumptions	RBP Update 1 Cases	
	Full Adjustment	Low Adjustment
Passenger Forecast	Mid (P50)	Mid (P50)
Regulatory Period Length	5-years	5-years
WACC	8.50%	10.40%
Depreciation Profiling	£635m p.a.	£0
Capital Plan	£4.2bn	£2.5bn
Passenger Shock Factor	-1.46%	-5.16%

Source: Heathrow

Plan Sensitivities

We also include two passenger demand sensitivities in addition to the "Mid" forecast shown above, which we have modelled for both the "Full Adjustment" and "Low Adjustment" cases. The impact of these sensitivities on business plan is considered in Chapter 7.0 – Additional Evidence to support our Scenarios.

Table 2: Summary of RBP Update 1 sensitivities

	RBP Update 1 Cases	
	Full Adjustment	Low Adjustment
Sensitivities	Low Passenger Forecast (P10)	
	High Passenger Forecast (P90)	

Source: Heathrow

2.3 Governance

In producing this RBP update, Heathrow has followed a similar governance process to that undertaken for our IBP and RBP. The IBP set out the governance framework that operates at Heathrow and this remains unchanged. This document has been scrutinised by both the Board and management, who have engaged extensively throughout its development to understand consumer views and ensure affordability and financeability.

The ongoing situation with regards to the Covid-19 pandemic continues to generate a significant amount of unavoidable uncertainty for Heathrow and the wider aviation sector. However, we have made every effort to ensure we are using the most robust and up-to-date data as the basis for our updates. We are confident that the assurance undertaken in producing this update to our December 2020 RBP means that it is appropriate to be considered by the CAA as part of its ongoing work to determine the H7 regulatory settlement.

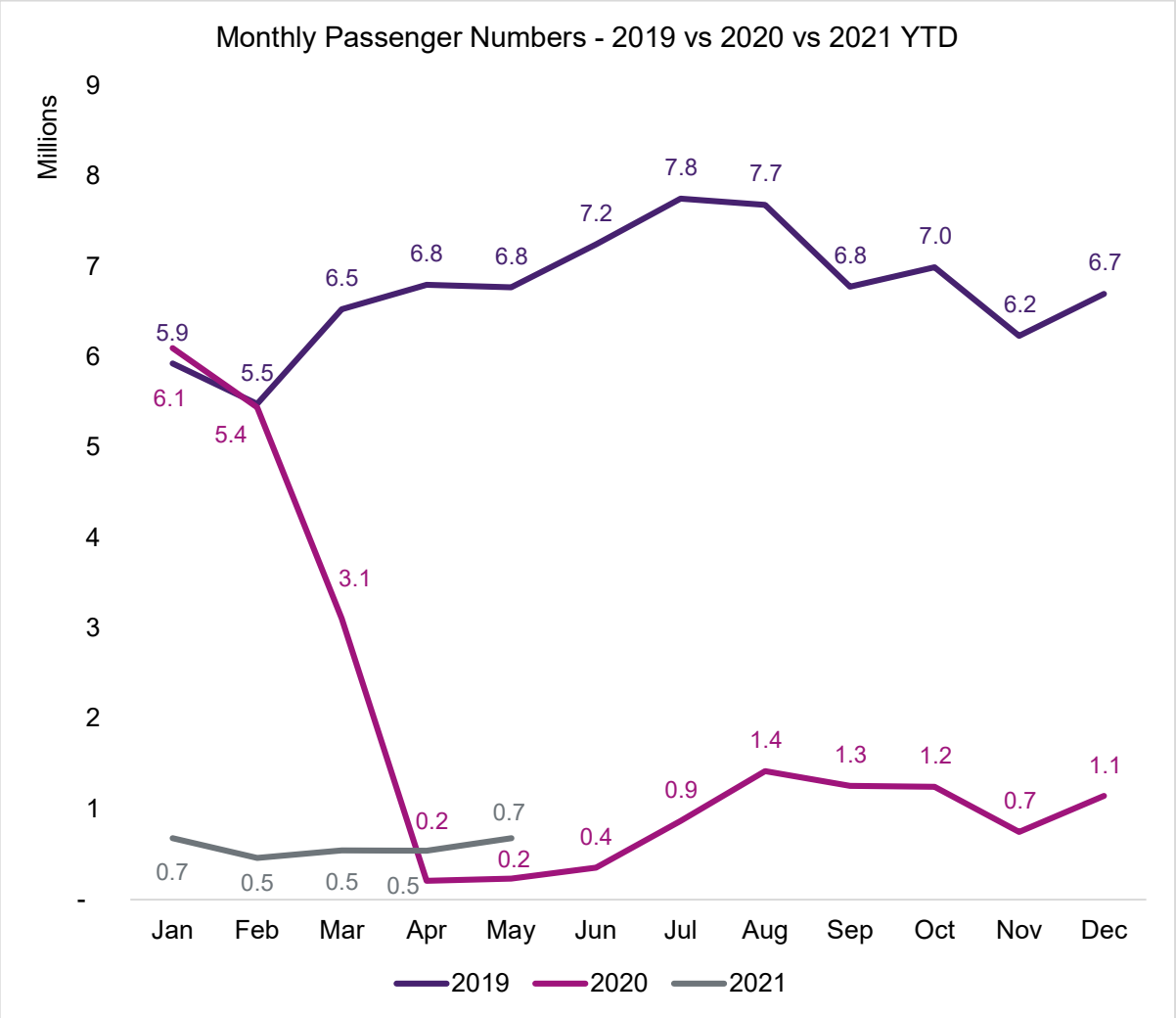
3.0 Developments since publication of the December 2020 RBP

3.1 Further significant Covid-19 related headwinds for the UK aviation sector

Continued deterioration of the outlook for passenger demand in 2021 – with consequential impacts on our revenues

Since the publication of the RBP in December 2020, the situation for the aviation industry has continued to deteriorate, with passenger numbers remaining at very low levels. This is primarily as a result of the travel restrictions imposed by governments to control the Covid-19 pandemic. Monthly passenger numbers in the first five months of 2021 were 91% lower than in the equivalent period in 2019, providing a clear illustration of the significant scale and ongoing nature of the Covid-19 crisis.

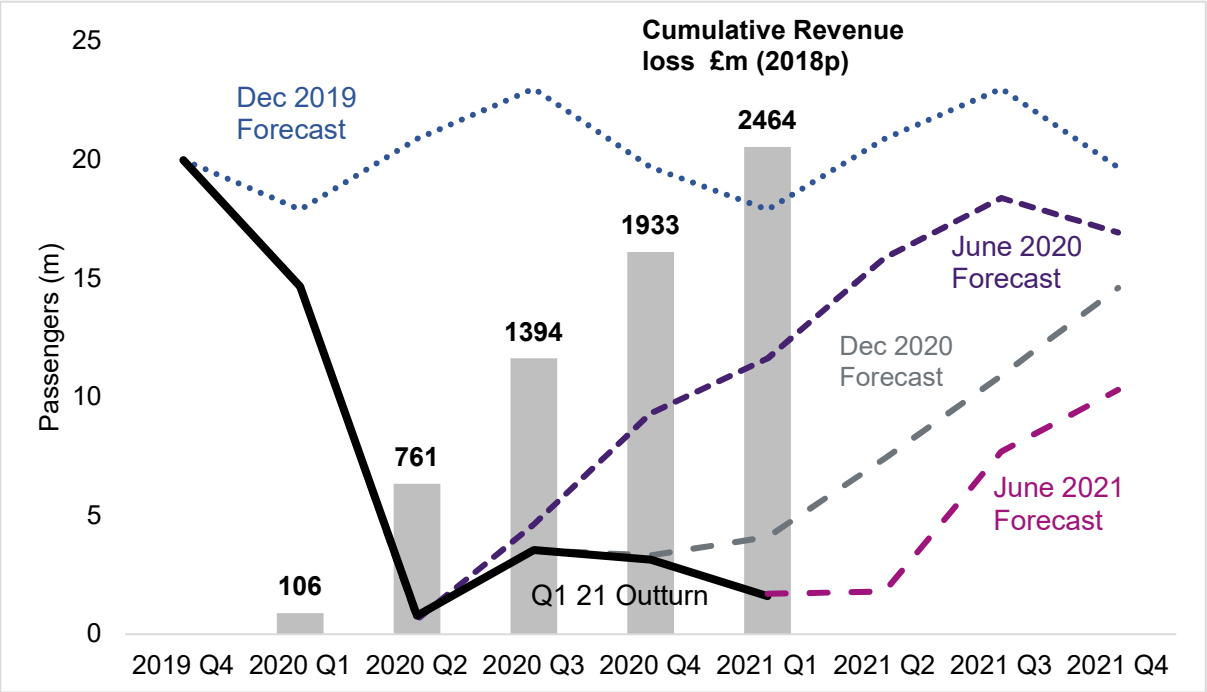
Figure 1: Monthly passenger number comparison, January 2019 to May 2021



Source: Heathrow traffic data

The continued deterioration of the situation has been reflected in our revisions to the 2021 passenger forecast since publication of our IBP in December 2019, as well as in our cumulative revenue loss figures.

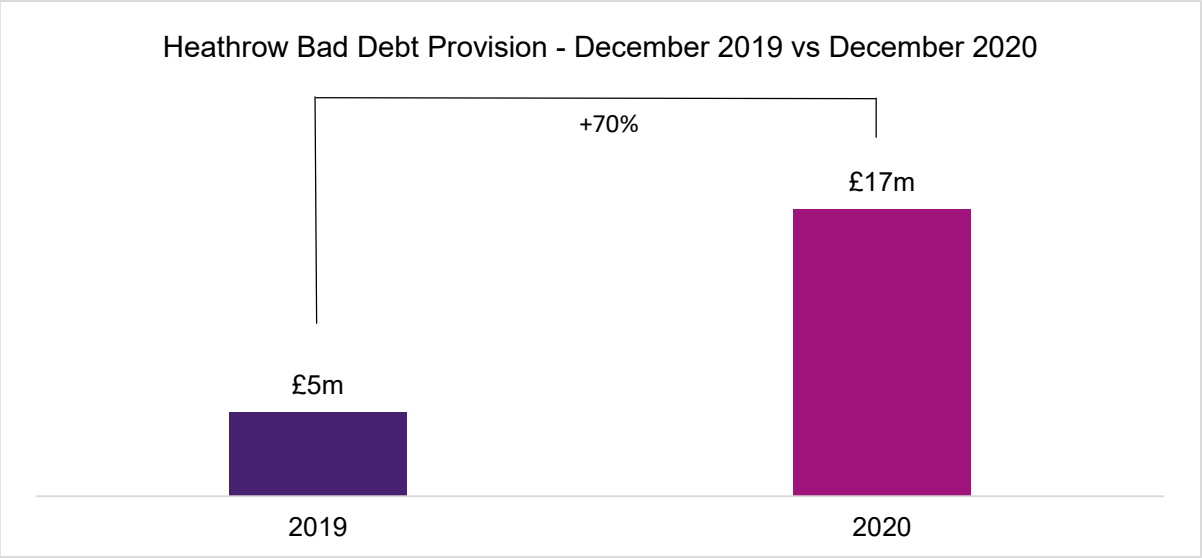
Figure 2: Comparison of 2019/2020/2021 passenger forecasts, and 2020/2021 revenue losses



Source: Heathrow

In addition to ongoing reduced aeronautical revenues resulting from the continued suppression of passenger volumes, there has been a reduction in our commercial revenues. Furthermore, the ongoing business challenges faced by our Team Heathrow partners has resulted in greater commercial risk exposure for our business. This was reflected in our December 2020 bad debt provision figure, which increased by £12m compared to the December 2019 figure.

Figure 3: Bad debt provision



Source: Heathrow

Increased restrictions on international travel

Restrictions on travel became more extensive during Q1 2021 than at any previous point during the Covid-19 pandemic. This further added to the challenges we have faced, as well as those faced by the wider UK aviation sector.

International travel became illegal for the majority of the UK population with the widespread enforcement of 'Tier 4' restrictions in December 2020, and then the third national lockdown on 4th January 2021. Under both of these scenarios, international travel was only permitted under a very limited set of exceptional circumstances.

The Government's "traffic light" approach to restarting international travel, while allowing legal non-essential international travel, still retains a significant number of restrictions for all international passengers, particularly with regards to quarantine and testing.

The initial categorisation of destinations by red/amber/green status from 17th May under the "traffic light" approach saw only twelve countries placed in the lowest-risk - and least restrictive - green category. These countries accounted for less than 5% of our 2019 passenger volumes. Furthermore, there are no reciprocity agreements between countries, and despite being labelled as "green", UK residents are currently prohibited from entering some green destinations, including Australia.

The initial list of green category countries was met with negative reactions from the travel industry upon its publication by the Government, with Airlines UK declaring the move *"a reopening of air travel in name only"* and EasyJet CEO Johan Lundgren stating the decision as *"simply not justified by the data or the science".*

Following the initial categorisation of countries according to the traffic light system, there was public confusion as to whether travel to amber countries (which accounted for 71% of our 2019 passenger volumes) was permitted. In response to this confusion, the Government then released clarification that the public should not travel to amber list countries.

The first review of the traffic light categorisations on 3rd June saw seven countries moved from the amber to red, and Portugal moved from green to amber.

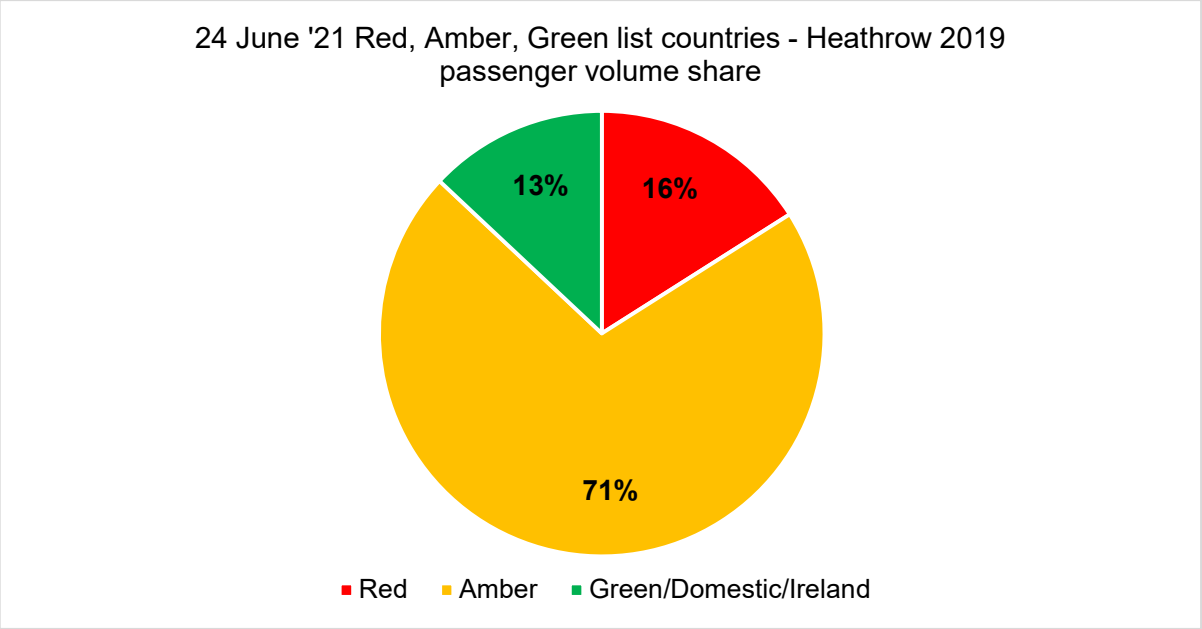
The second review on 24th June saw sixteen destinations, including a small number of smaller European and Caribbean holiday destinations, moved to the green list and six further destinations added to the red list.

Whilst the second review saw more countries move to the green list, the majority were either low volume travel markets from the UK, such as Madeira - or not travel markets at all, such as Antarctica. Overall, the countries added to the green list as part of this review represented 0.6% of our 2019 passenger traffic volumes. Furthermore, all bar one of the countries added to the green list are on the 'green watchlist', meaning that they are at risk of being moved back to amber at short notice.

The consensus amongst the travel industry was that the 24th June decision did not go far enough, with Airport Operators Association CEO Karen Dee saying "*any extension of the green list is welcome, however small, but we also have to be realistic: this is not yet the meaningful restart the aviation industry needs to be able to recover from the pandemic."*

With ministers also publicly expressing that they would prefer people not to travel internationally this summer[1], the likelihood of another lost summer for the UK aviation industry has increased.

Figure 4: 2019 % passenger volumes categorised by 24 June 2021 Red, Amber, Green travel lists



Source: Heathrow traffic data

Passengers travelling to and from all destinations are required to carry out at least one PCR test at their own expense, with travellers from amber and red destinations also required to quarantine at home or in a hotel on arrival.

The inconvenience of having to carry out testing, and where applicable of having to quarantine, will continue to significantly dampen passenger demand. In addition to this, the cost associated with having to take PCR tests is likely to further dissuade people from travelling, even where it is now legal to do so. Research carried out by ABTA and the Airport Operators Association (AOA) found that UK travellers pay an average of £128 for a PCR test[2], compared to an average of under £62 for eight "key destinations" in Europe.

We anticipate that additional costs associated with requirements to manage the Covid-19 pandemic will continue to be present into H7 and so are important to consider in the context of this update.

The below table shows that airport charges represent a small part of total journey costs and the additional journey costs from testing and quarantine are much more significant in consumers' assessment of the cost of travelling. As such, airport charges are a relatively small and shrinking part of consumer decision-making. As requirements for testing and quarantine

[1] Health minister: Overseas travel 'dangerous' and 'not for this year' | Evening Standard

[2] Some individual companies are now starting to offer more competitively priced PCR testing, often as part of a flight/holiday package bundle – but these are not universally available and in any case cost of travel remains significantly higher than before the Covid-19 pandemic.

increase, the percentage of total journey cost accounted for by Heathrow charges decreases significantly.

Table 3: Worked example showing impact of quarantine and testing costs on total journey cost

LHR-MAD illustrative example[3]	Mar '19 No PCR No Hotel Quarantine	Mar '21 (G) 2 PCR Tests No Hotel Quarantine	Mar '21 (A) 3 PCR Tests No Hotel Quarantine	Mar '21 (R) 3 PCR Tests Hotel Quarantine
Total Cost of Journey (incl. air fare, taxes, airport charge and testing/quarantine)	**£146**	**£369**	**£497**	**£2,247**
Heathrow Charges % of Total Cost of Journey	**18.4%**	**6.4%**	**4.7%**	**1.0%**

Sources: Heathrow Conditions of Use, Apex Fare Data, Gov.uk

There is little indication from Government that these restrictions will be reduced at any point in the near future. We now have to consider at what point in H7 these restrictions – and additional costs for passengers – are likely to fall away. This is considered in full in Chapter 5.2 – H7 Passenger Demand Updates.

[3] Note that this analysis does not include further additional costs associated with testing at international destinations. Assumes PCR cost of £128 and hotel quarantine cost of £1,750. Based on A32N operating at 80% l.f with 180 seats. All passengers assumed to be O&D. Fare data covers all operating carriers on LHR-MAD in March 2019 and March 2021. Heathrow charges include movement, departing passenger and emissions charges.

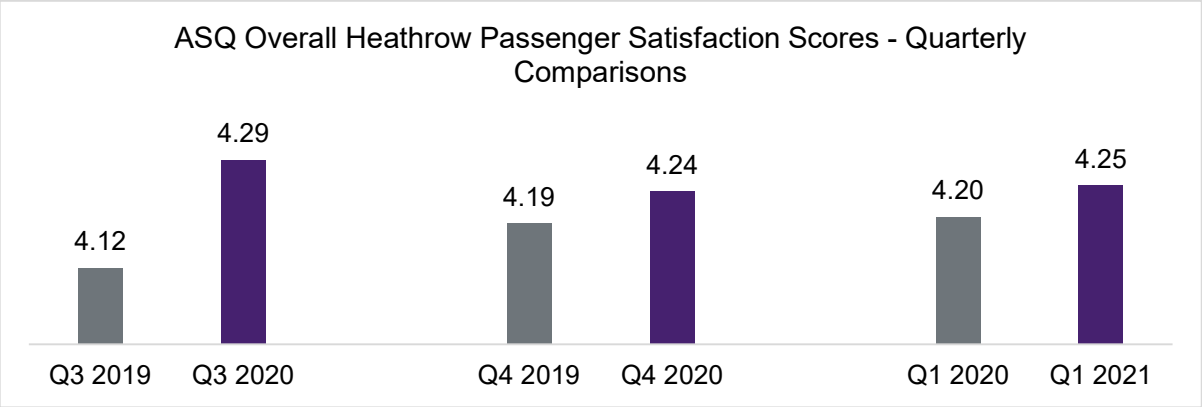
Continued operational challenges as a result of Covid-19

Increasing requirements imposed by the Government have had a significant impact on our operation and cost base. For example, the requirement for departing and arriving passengers to complete mandatory travel forms has increased transaction times at check-in and immigration. This has reduced the effective capacity of our operational terminals by as much as 60%[4].

Figure 5: **[REDACTED]**

Despite these headwinds, we have continued to deliver excellent service for our passengers and have ensured that passengers and colleagues remain safe. This has been reflected in the results of ACI's ASQ survey on passenger satisfaction. Q3 2020 saw us achieve our highest ever rating (4.29) and performance remained strong in Q4 2020 (4.24) and Q1 2021 (4.25).

Figure 6: ASQ Overall Passenger Satisfaction Comparison 2019 - 2021



Source: Heathrow

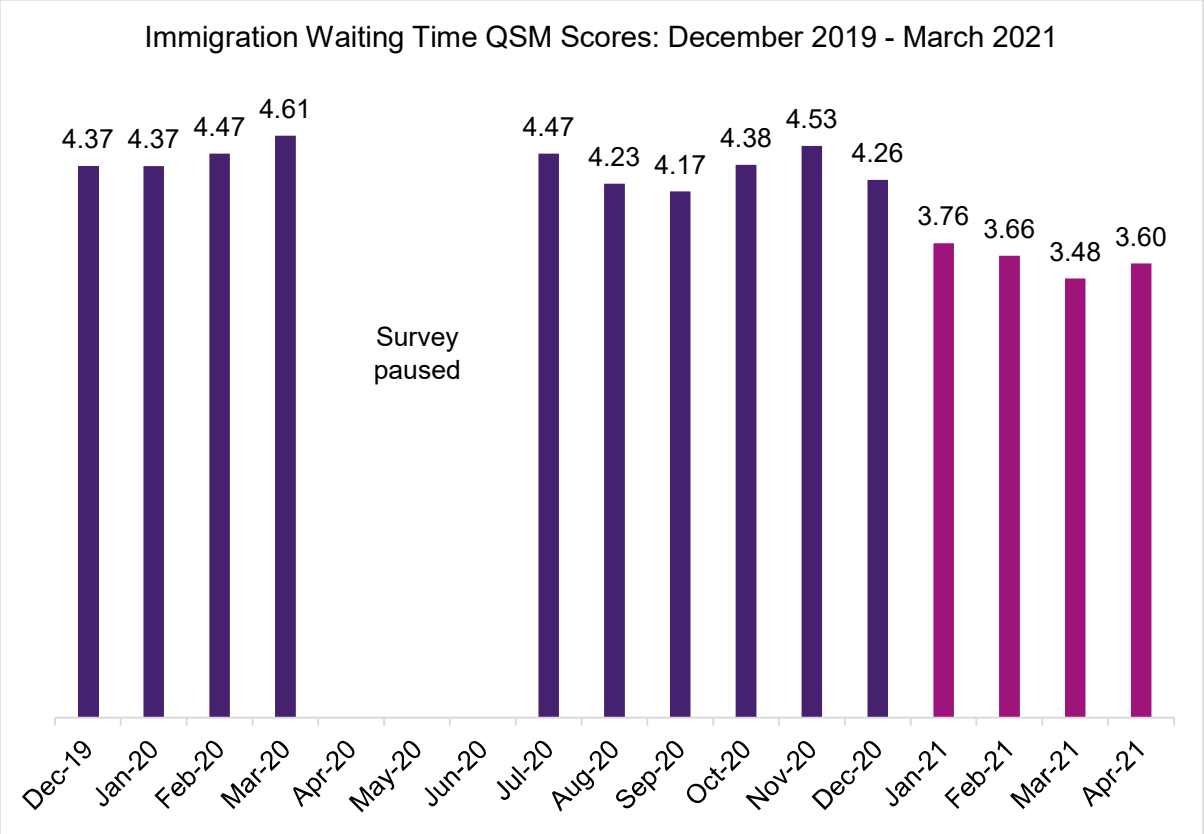
[4] Heathrow operational estimate based on comparison of H2 2020 performance vs 2019 baseline KPIs

We have had consistent problems at the UK Border in our immigration halls, but particularly since the introduction of enhanced checks in January 2021. It is the role of Border Force to manage and resource these processes. It is our role to facilitate these processes by ensuring the appropriate infrastructure and colleagues are in place to manage passenger movement safely.

We have delivered the changes necessary to support the new immigration processes, incurring £380k of additional costs[5] to deliver the increased levels of resourcing and queueing infrastructure. However, Border Force's own processes and resourcing have resulted in extreme scenarios of passengers queueing for up to seven hours at certain points in time.

The challenges associated with immigration have been clearly reflected in our QSM scores, with a significant decline in immigration waiting time scores observable from January 2021.

Figure 7: Immigration Waiting Time QSM Scores



Source: Heathrow. Note QSM survey was paused April – June 2020

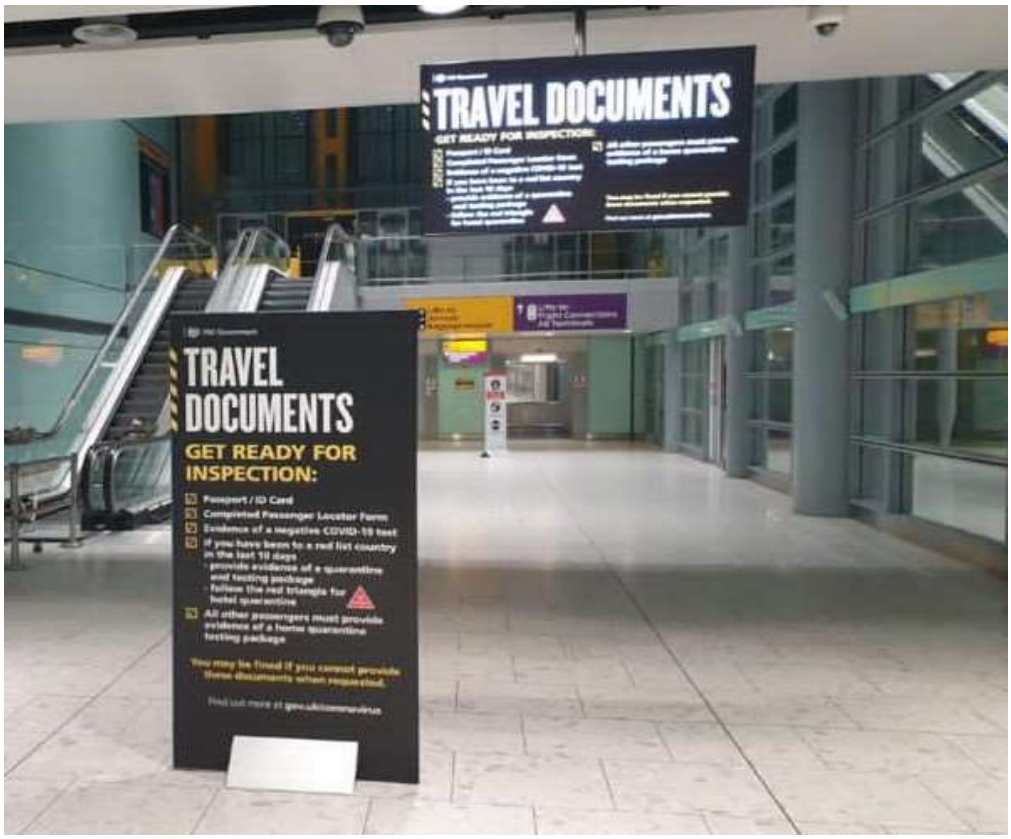
Even with passenger numbers 90% down on 2019 levels, the capacity challenges in immigration pose a significant risk of constraining our overall recovery once restrictions are eased and passenger numbers start to increase again.

[5] **[REDACTED]**

Figure 8: Infrastructure changes in Terminal 5 to accommodate 'red list' arrivals

Source: Heathrow

Figure 9: Signage in Terminal 5 relating to additional documentation requirements



Source: Heathrow

Ongoing response from other airports

Heathrow, like all airports, has had to respond to the dramatic fall in passenger numbers that has been driven by the international response to the Covid-19 pandemic since the first quarter of 2020, in order to protect our business.

Table 4: Comparison of European hub passengers, financial metrics and terminal consolidation

Metric	Heathrow (LHR)	Schiphol (AMS)	Paris (CDG and ORY)	Frankfurt (FRA)
Passengers YE March 2021	**9.1m**	10.7m	14.6m (CDG only)	10.1m
Passenger Volume Change (YE March 2020 vs YE March 2021)	**-88%**	-84%	-81% (CDG only)	-85%
2020 opex % change vs 2019	**-21%**	-20%	-28%	-25%
2020 capex % change vs 2015-19 5-yr average	**-46%**	+53%	-11%	+82%
Terminals consolidated	**Terminals 3/4**	Part terminal closure	Terminals 1/3	Terminal 2

Sources: Airport traffic figures, annual reports and conditions of use documents

We have experienced a greater year on year percentage reduction in passenger volumes compared to our key European hub competitors (for the year ending March 2021).

We acted quickly to cut costs with the onset of the Covid-19 pandemic, and our reduction in operating costs between 2019 and 2020 has been comparable to other European hubs, with most airports generally achieving in the range of 20-30% reductions over the period. We achieved a greater year on year percentage reduction in operating costs compared to Schiphol. Although Aéroports de Paris (ADP) and Frankfurt achieved greater reductions than Heathrow, it is to be expected given our 2019 gross operating costs per passenger (£14.20) represented a more efficient baseline compared to both Frankfurt (£19.10) and ADP (£18.60)[6].

Other factors less within control of individual airports, such as their regulatory environments and charges levied on them by governments, will also have influenced their ability to achieve operating cost savings. Our payments to the UK Government to cover our business rates and policing bills accounted for 13% of our cost base in 2019, increasing to 16% in 2020. These costs are essentially fixed, limiting our ability to deliver further cost savings.

Furthermore, it is important to note that differing levels of state support have influenced airports' ability to cut costs. For example, as of June 2021 we have received £49m from the UK government through the UK Coronavirus Job Retention Scheme, whilst ADP received €173m (c.£149m) through the French equivalent scheme in 2020 alone[7].

All the major European hub airports have taken some degree of action to consolidate their terminal operations over the last year in order to deliver temporary cost savings. Our approach to consolidating terminal operations has been mirrored by the other European hubs, with

[6] 2019 annual reports
[7] Livre_ADP2020_URD_EN.indb (parisaeroport.fr) (p.95)

Charles de Gaulle and Frankfurt having also taken entire terminals offline, whilst Schiphol has taken action to reduce the scale of its single terminal operation.

We reduced 2020 capital expenditure by 46% compared to the average annual figure of the preceding five years. This was a significantly greater reduction than delivered by ADP, where capital expenditure across Charles de Gaulle and Orly airports was reduced by 11%. Meanwhile, Frankfurt and Schiphol both increased their capital expenditure in 2020 compared to their preceding five-year average annual spend, by 82% and 53% respectively.

This demonstrates that our response to the Covid-19 pandemic has been appropriate and proportionate. Furthermore, Heathrow's ongoing responses to the Covid-19 crisis – aimed at protecting the business and ultimately the interests of consumers - are largely comparable to, and in some cases stronger than, those of other major European hub airports.

3.2 Changes to terminal reopening strategies

New requirements for international travel have led to new processes in our terminals, which alongside the continued need for social distancing to keep our passengers and colleagues safe, has limited the effective capacity of our terminals.

In the near term this has changed our strategy for terminal reopening and we are now anticipating that we may have to bring additional terminal capacity back online sooner than was set out in our RBP.

This has consequences for:

- H7 capital investment plans, as critical capital expenditure required to restart operations is brought forward. See Chapter 5.3 – H7 Capital Plan Updates for more details.
- Forecasts for operating costs, as terminals are required to be open despite lower passenger numbers, leading to greater inefficiencies. See Chapter 5.4 – H7 Operating Costs Updates for more details.

We consider both of these consequences in full later in this update.

3.3 Continued lack of support for the aviation sector from the UK Government

Limited support for UK aviation – particularly airports

The lack of dedicated and wide-ranging financial support for the aviation sector from the UK Government, particularly for airports, coupled with an inconsistent and uncertain application of the UK's risk-based approach to international travel, is severely impacting the UK aviation industry.

The Airport and Ground Operators Support Scheme (AGOSS), launched in November 2020, has offered up to £8m of business rates relief for all airports in the UK in its first round of funding.

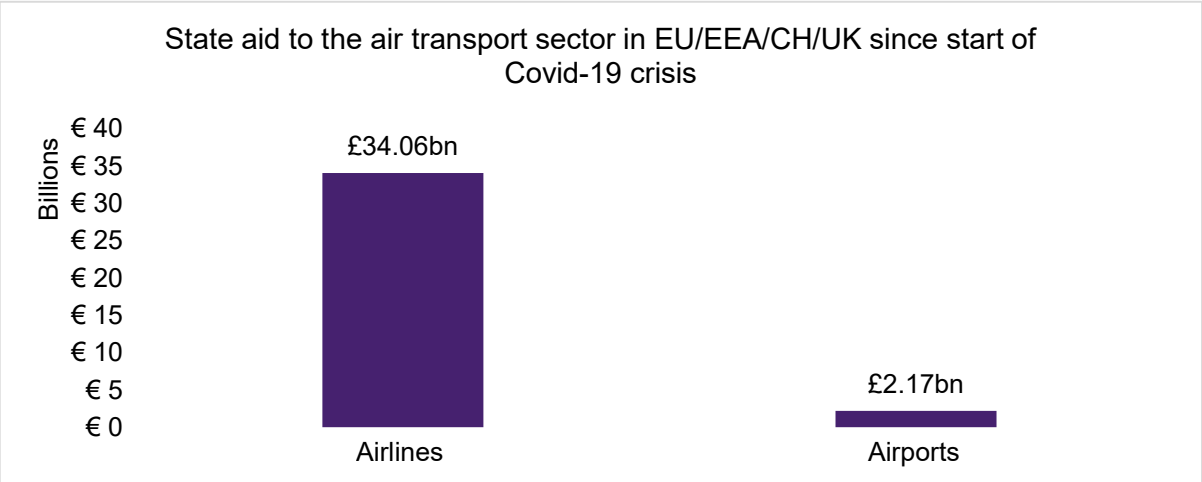
While the launch of the scheme was welcome, it has been designed to help smaller UK airports; Heathrow pays one of the highest rates bills in the UK, and the £8m maximum relief amount covers less than a month of our business rates bill. This is compounded by the Government's revised approach to business rates relief set out in March 2021 – which rules out appeals for revaluations due to Covid-19 – and is likely to prevent us securing further relief.

The Coronavirus Job Retention Scheme (JRS) has helped Heathrow to protect jobs but has not covered the full extent of our people costs and is due to end in September 2021.

Heathrow has received a combined total of £57m through AGOSS and the JRS as of June 2021, which equates to around one week's losses. The Spring Budget announced by the Chancellor in March 2021 did not include any further dedicated financial support for the UK aviation sector.[8]

Airports Council International (ACI) analysis has found that airlines across Europe, including in the UK, have received significantly more state aid than airports since the start of the Covid-19 crisis.

Figure 10: European airlines and airport levels of state aid



Source: Airports Council International – 12 May 2021[9]

UK airlines have benefitted from a far greater degree of support from the UK Government compared to UK airports. British Airways and easyJet have both received support from the UK Government under the Covid Corporate Financing Facility in 2020. More recently, in late 2020 and early 2021, both carriers have received further support in the form of 5-year Export Development Guarantee Facilities, partially underwritten by UK Export Finance.

Table 5: British Airways and easyJet UK Government backed financial support packages

Government Support Mechanism	British Airways	easyJet
Covid Corporate Financing Facility	£0.3bn	£0.6bn
Export Development Guarantee Facility	£2.0bn	£1.4bn
Total	**£2.3bn**	**£2.0bn**

Source: Online news outlets

[8] aside from a commitment for 6 month extension to AGOSS funds

[9] EU/EEA/CH/UK = European Union, European Economic Area, Switzerland and United Kingdom

Stronger responses from international governments to support aviation

Internationally, we have seen responses from governments that recognise the significant challenges faced by their aviation sectors and the importance that they will play in their economic recovery.

The German and French governments have provided far more extensive financial support to their aviation sectors, helping to mitigate job losses in the immediate term and better setting up both airports and airlines to effectively respond to the eventual return of demand as Covid-19 restrictions are lifted. Meanwhile, the Greek government is set to compensate €130m (c.£111m) to Athens International Airport and €177.8m (c.£152m) to Fraport Greece for "financial rehabilitation" of Covid-19 losses[10].

This is also against the backdrop of these nations – and the EU more widely – taking a greater and more proactive approach to lifting travel restrictions this summer to support their aviation sectors and to ensure their economies are able to recover from the effects of the pandemic.

There is therefore a risk of Heathrow and other UK aviation businesses exiting the Covid-19 crisis in a weaker position and being left at a significant competitive disadvantage.

Table 6: Job Losses and Government Financial Support for Aviation – UK vs. France and Germany

Country	Number of Aviation/Aerospace Jobs Lost (Feb 2020 – Jan 2021)	Government Financial Support per Sector Job	% GDP supported by air transport and tourists arriving by air
UK	61,973	€ 12,006	4.5%
Germany	28,964	€ 22,893	2.5%
France	20,409	€ 25,544	4.3%

Source: Acuity Analysis[11], IATA[12]

The proactive EU approach has also been adopted by other countries. The Australian government announced a new aviation industry support package in March 2021, which was in addition to extensive sector specific support worth AU$715m (c.£390m) that had previously been announced. This recognised the need for airport specific support, and included AU$90m (c.£49m) worth of funding available to all domestic airports, including those that are privately owned or operated, to cover costs incurred as a result of having to continue with mandated security processes in spite of low passenger volumes.

Support is not going far enough to mitigate job losses around Heathrow

The crisis at Heathrow has rippled outwards to our local community. Boroughs surrounding Heathrow, which are highly dependent on the airport for employment, have all seen dramatic increases in unemployment since the start of the Covid-19 pandemic.

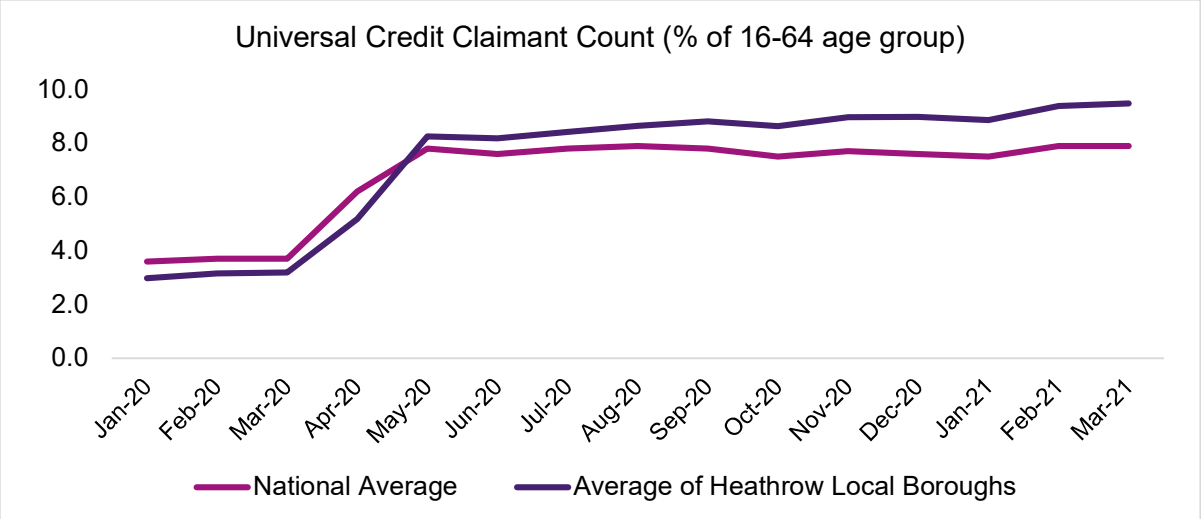
[10] Ekathimerini, *Support of €300m for airport companies*, June 2021 Link
[11] Acuity Analysis, *Final Call for UK Civil Aviation*, March 2020 (link)
[12] IATA, *The Importance of Air Transport to Germany (link), France (link), United Kingdom (link)*, 2018

The proportion of residents claiming Universal Credit has continued to increase in the first three months of 2021, reflecting the ongoing significant impact that Covid-19 is having on Heathrow's business, as well as the businesses of companies operating at Heathrow.

Prior to March 2020, the six local boroughs of Ealing, Hillingdon, Hounslow, Slough, South Bucks and Spelthorne had an average claimant count below the national average. As a result of the Covid-19 crisis, the average claimant count across these boroughs now sits noticeably higher than the national average.

Not only does this pose significant immediate challenges for residents of our local communities – particularly from a financial and wellbeing perspective – it also has the potential to hamper the recovery of businesses at Heathrow. The longer an individual is out of work, the greater the erosion of their skills and the harder it will be for them to re-enter the workforce when recovery of the aviation sector begins. Furthermore, people may simply choose to move to other sectors that have been less adversely impacted by the Covid-19 pandemic, or that are recovering more quickly.

Figure 11: Universal Credit claimant count across Heathrow local boroughs



Source: Office for National Statistics

3.4 Changes to the VAT Retail Export Scheme and tax-free airside shopping

In addition to the challenges posed as a consequence of the Covid-19 pandemic, we are also facing the impact of HM Treasury's decision to abolish the VAT Retail Export Scheme and airside tax free shopping.

Despite widespread criticism from sectors across the UK economy, these changes came into force on 1 January 2021. We, along with Global Blue and World Duty Free, made the decision to Judicially Review the Government's changes in November 2020. In May 2021 we received judgement on our legal case which deemed that, whilst the Court accepted a number of the arguments made against the policy, the new policy is legal.

Our decision to Judicially Review the changes recognised not only the detrimental impact that they will have on UK businesses and UK PLC, but also the material negative impact on the airport charge through the single-till mechanism. A reversal of the government's changes would have protected commercial revenues at Heathrow, thereby helping to keep charges down during H7 and benefitting consumers.

The changes implemented will result in negative outcomes for consumers, Heathrow, our retail partners and their colleagues, and the national economy. Heathrow has provided detailed witness statements to evidence the significant negative impact of HM Treasury's decision. The key impacts described in these witness statements are summarised below and expanded further in the section on commercial revenue:

- Significant and long-term harm to Heathrow's business in an already challenging environment that has arisen as a result of the Covid-19 pandemic.
- Total retail sale losses at Heathrow of **[REDACTED]** in the upcoming year.
- A corresponding loss of **[REDACTED]** retail income for Heathrow in the upcoming 2021 financial year, with a further loss of **[REDACTED]** in aeronautical income as a result of lower passenger demand driven by the changes.
- An increase in aeronautical charges through the single till mechanism due to lost retail income, and a potential increase in the cost of flights as a result of this.
- **[REDACTED]**
- **[REDACTED]**
- **[REDACTED]**

We have already started to see the consequences of the Government's changes playing out. In April 2021, Dixons Carphone announced its plans to close its airport store business and cited the removal of airside tax-free shopping as a key driver in this decision.

"We do not expect passenger numbers to recover sufficiently to compensate for the removal of airside tax-free shopping by the UK Government from 1 January. This has led to the difficult decision to close this business." – Dixons Carphone Group Announcement

Figure 12: Empty retail unit in Terminal 3: numerous retailers have already left Heathrow as a result of Covid-19 and the changes to airside tax-free shopping

Source: Heathrow

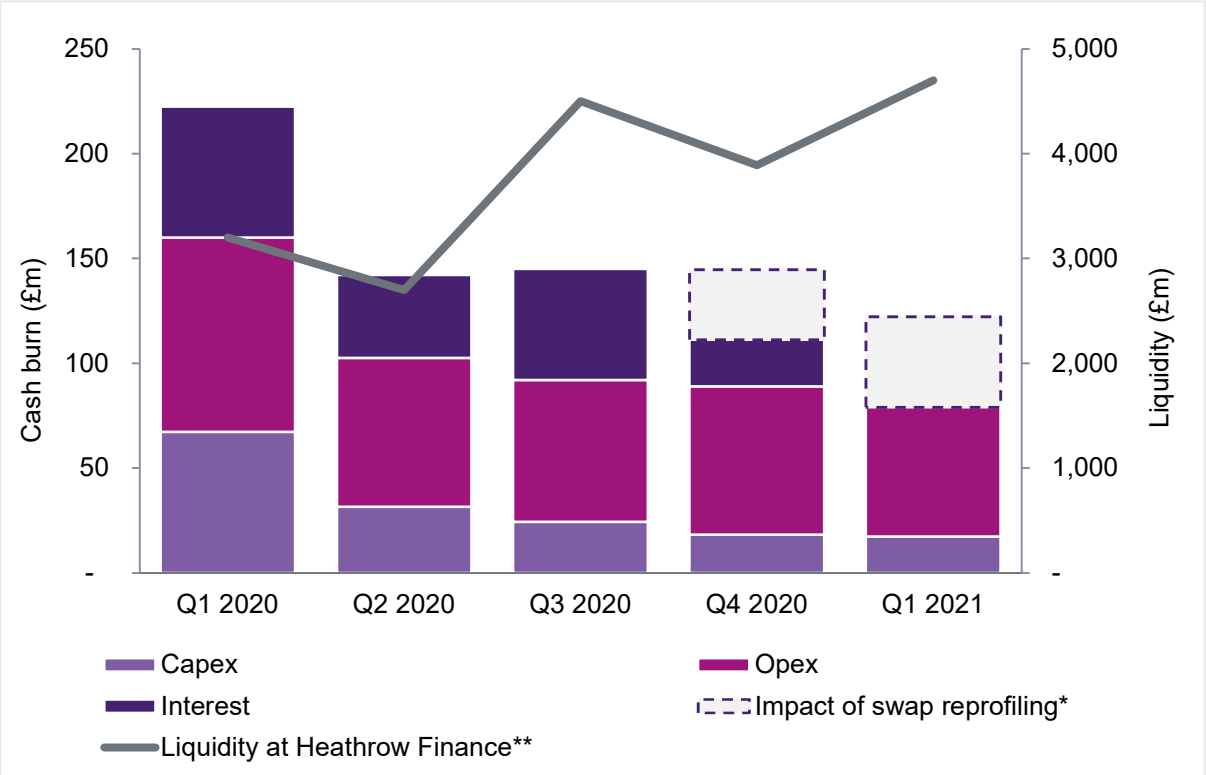
3.5 Heathrow has continued to serve the UK whilst taking further action to protect its business

In spite of these significant challenges, Heathrow has continued to play a vital role in keeping the UK connected – as it has done throughout the Covid-19 pandemic. Remaining open has enabled vital cargo to continue to enter and leave the UK, including Covid-19 vaccines and other essential medical supplies. It has also enabled those who have essential reasons to travel to continue with their plans and has allowed for the continued repatriation of both UK citizens and foreign nationals.

Recognising the ongoing significant challenges to our business, we have taken further decisive, and often difficult, action since December 2020 to reduce our cost base and protect the business. These actions have included:

- A second colleague consultation and organisational design programme has seen a further 138 management-grade colleagues leave the business. This is in addition to an original consultation process in April 2020, bringing the total reduction in company headcount since March 2020 to 1,800, or a 26% total reduction.
- Harmonisation of all colleague terms and conditions aligned to market rates – leading to an extended, and at the current time unresolved, industrial relations dispute, with 10 days of strike action having taken place since December 2020.
- Implementing a detailed contingency plan in response to industrial action in order to maintain a safe operation for colleagues and passengers.
- Temporary pay reductions of 10-20% for all colleagues between April and December 2020, and the cancellation of all company bonus schemes in 2020.
- The launch of a long-term incentive plan for colleagues to incentivise reduction in costs and to encourage talent retention.
- Continued furlough of colleagues, with a significant number of operational colleagues remaining on furlough and all management-grade colleagues, including the Executive Committee, taking periods of furlough between December and April 2021.
- Continued consolidation of our terminal operations, with all operations still being carried out of Terminals 2 and 5 (with the exception of red-list arrivals into Terminal 3), whilst continually reviewing the need to restart full operations from Terminals 3 and 4.
- Using the proceeds of our £600m capital injection into the regulated business to optimise our working capital. This included the prepayment of £282m of operating expenses and the reprofiling of some of our swap portfolio, resulting in circa £100m in interest being prepaid ahead of 2021. These actions have created more headroom in our financial covenants while traffic recovers.
- Further strengthening our liquidity position, raising an additional £1.3bn of debt financing in the EUR and CAD markets, and extending our liquidity horizon to at least August 2022 in the extreme scenario of no revenue.

Figure 13: Average monthly cash burn levels and liquidity (£m)



Source: Heathrow

3.6 Publication of the CAA's *Way Forward* document

In April 2021 the CAA published its *Way Forward* document. At the time of our RBP this document was due to be published in early Q1 2021 and was intended to:

- provide an assessment of our RBP against the CAP1940 business plan guidance; and
- set clear direction on key areas of policy to enable us to further refine our business plan.

The content of the document (CAP2139) do not meet the expectations the CAA had set:

- There are no CAA decisions on any specific policies or the approach to the building blocks. The absence of these does not support the efficient planning of H7, as stakeholders have no clarity on how they should refine their plans for the period ahead.
- Elements of the CAA's thinking appear contradictory. For example, part of the document suggests that dividends should recommence in line with that forecast by other European airports (c.2023), whereas another appears to suggest Heathrow investors could defer all dividends in H7. This inconsistency in approach is significant as it prevents Heathrow from being able to properly respond to the CAA as we are unclear what their proposals are, does not allow stakeholders to align expectations for H7 and at worst undermines investor confidence.

The Way Forward document mischaracterises the content of our RBP and its assessment does not reflect the large volume of information and clarifications the CAA have been provided since publication in December 2020:

- The CAA suggest that the capital plan is not integrated with the rest of the RBP.[13] This is incorrect given the demonstrable link between our capital plan and our drivers model (that generates operating cost and commercial revenue forecasts), and the capital plan and our service quality targets – which show how investment leads to improvements in service quality targets. We address this further in Chapter 5.3 – H7 Capital Plan Updates.
- The CAA suggest that the RBP capital plan lacked detail and that Heathrow "risk all its capex being treated as development".[14] This epitomises the CAA's misunderstanding of the process, which allows Heathrow and the airlines to work together to develop and deliver the capital plan that is right for consumers through the regulatory period. This avoids Heathrow being locked into the delivery of capital projects through the regulatory settlement which later may no longer be needed or be the most beneficial for consumers. Indeed, the CAA stated in its initial proposals for Q6 (CAP1027) that "A key lesson from Q5 learned by HAL, the airlines and the CAA was that forcing all capital projects to be agreed at the time of the price review for the next five or six years did not reflect the dynamic nature of the industry and the need for flexibility in the capital investment plan (CIP)."
- The CAA suggests that revenue and cost building blocks are not clearly linked to alternative passenger scenarios when the very nature of the drivers-based model we use is "driven" by passenger numbers.[15] The RBP models provided to the CAA show – line-by-line – how cost and revenue forecasts vary as a result of different passenger scenarios and is explained in full in RBP Chapter 10.2. We address this once more in this document in Chapter 7.0 – Evidence for our Scenarios.
- The CAA suggest that modelling assumptions for surface access – and mode share in particular – have not been updated in the RBP from the IBP.[16] This is incorrect, these assumptions have been updated to account for a two-runway price control and those updates are contained in the Surface Access chapter of the RBP and the models provided to the CAA.

As a consequence of both a lack of policy decisions and the failure of the CAA to engage with the evidence put forward in our previous plans, we have been forced to rely on our previous assessments for this update and sought to develop them as much as possible in line with the limited information received from the CAA.

3.7 The ongoing nature of the crisis has made decisive and effective action from the CAA and Government even more critical

In CAP2140 the CAA made a decision to adjust the Regulated Asset Base (RAB) by an interim £300m, with the potential for further adjustments at the start of the H7 period. This amount is less than 10% of the forecast losses Heathrow will incur as a result of the Covid-19 pandemic during 2020 and 2021. Crucially, it is only a small proportion of the recovery of regulatory depreciation that has been lost over this period. The implication, whether intended or not, is that investors cannot rely on the return of historic capital invested (as opposed to just losing their return on capital), materially damaging confidence in regulation and increasing risk.

[13] CAA, CAP2139, Page 24, Paragraph 1.24
[14] CAA, CAP2139, Page 42, Paragraph 2.57
[15] CAA, CAP2139, Page 17, Paragraph 1.9
[16] CAA, CAP2139, Page 38, Paragraph 2.41

This has significant consequences for a number of key building blocks and consumer outcomes in H7 and beyond. The consequences of no further adjustment are considered in our “Low Adjustment Case”. We contrast this case with one where a Full RAB adjustment, as requested by Heathrow, is made from the start of H7. The key differences between these cases is summarised in Chapter 5.1 – RAB Adjustment, but are considered in full throughout this document.

4.0 H7 consumer insights updates

4.1 Introduction

The purpose of this chapter is to set out developments in our consumer insights since our RBP was published in December 2020. The chapter is set out in three sections:

- A summary of our RBP findings.
- A detailed summary of new research undertaken since December 2020.
- A summary of our insights relevant to cargo.

The key conclusions are:

- Consumer outcomes and needs have not changed as a result of Covid-19 but just under a quarter of all passengers remain anxious about returning to flying. Other consumers are worried about the burden of travel restrictions, quarantine and testing, and are currently dissuaded from booking travel as a result.
- This anxiety to return to travel is most pronounced in Passengers Requiring Support (PRS), who are also the group least satisfied with their Heathrow experience. Focusing on their needs will be vital to accelerate their return to travel.
- Consumers continue to value resilience of airport assets, with 2 in 5 passengers experiencing a short delay to departure at an airport they have used in the last 2 years. Passengers want the airport and airlines to work together to provide more reassurance.
- Our acceptability testing indicates Heathrow is good value for money today and the upper bounds of net acceptability lies between a charge of £30 and £39 for the service levels proposed in our RBP. This means our Full Adjustment case is likely to be acceptable to consumers while the Low Adjustment case is not.

These conclusions, and our existing consumer evidence base, have informed our approach to all of the building blocks and proposed service targets – creating a "golden thread" through our plans.

Relevant chapters that are most informed by this work include:

- The prioritisation of our capital plans (Chapter 5.3 – H7 Capital Plan Updates)
- The provision of additional services, particularly with regards to cleanliness, resilience and PRS services (Chapter 5.4 – H7 Operating Costs Updates)

4.2 Consumer insights in our RBP

The RBP set out how we have built on the previously established consumer engagement foundations, with an additional ninety-nine consumer insight reports having added to our understanding since the IBP.

Extensive consumer insights research, culminating in our November 2020 consumer insights synthesis compiled by external research agency Blue Marble, confirmed that consumers still want the same outcomes as they did pre-Covid[1]. As a consequence, the six consumer outcomes in the RBP were largely unchanged from those included in the December 2019 IBP.

[1] Blue Marble Research, Consumer needs synthesis, November 2020: 72% of consumers expecting their priorities from an airport will remain unchanged over the next 5/6 years

Figure 1: Our H7 consumer outcomes

Source: Heathrow

We also concluded that the means to delivering consumer outcomes has changed as a result of Covid-19, and that our passenger proposition needs to adapt as a result[2]. Our consumer insights indicated that consumer outcomes would best be delivered through focussing on a proposition that is easy, clean, reassuring and value for money.

Through having a clear "Golden Thread" linking our consumer insights and our plans, we were able to describe in the RBP how our plans would improve the H7 passenger journey and meet passenger expectations around their airport experience.

Figure 2: Example of changed consumer needs requiring targeted investment to continue delivering outcomes

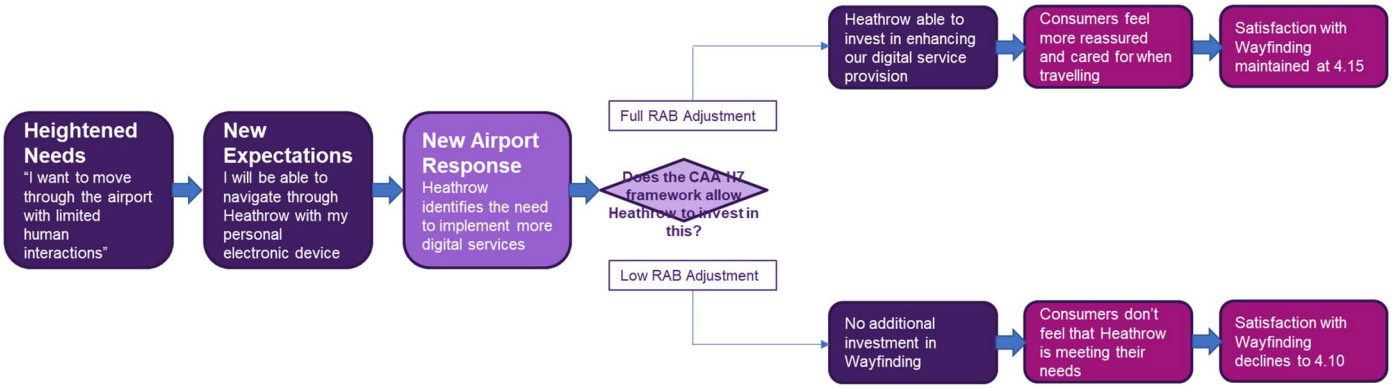
Source: Heathrow

We highlighted that failing to respond to these changes in consumer expectations would see consumer outcomes deteriorate during H7 and risk Heathrow falling behind its competitors.

[2] Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020,

Furthermore, we emphasised that even just to maintain the same outcomes as we achieved in 2019 during H7 will require more expenditure and investment to respond to consumers' new heightened needs and expectations[3].

Figure 3: Responses to new consumer expectations under Full and Low Adjustment cases



Source: Heathrow

Our Willingness to Pay research confirmed that anything more than a very short-term reduction in investment to deliver consumer outcomes would be inappropriate[4]; as passenger numbers are the greatest driver of the airport charge a failure to invest in delivering consumer outcomes would risk slowing down recovery, with the resulting lower passenger numbers flowing directly through to higher passenger charges.

4.3 Consumer insights updates since the RBP

Since the publication of our RBP, we have continued to monitor how consumers perceive travelling in a post-Covid world and how those who have actually travelled rated their airport experience. This ensures that we are basing our plans on delivering on consumers' wants and needs. In addition, we have undertaken two further consumer engagement projects:

- Consumers' views on resilience – the final quantitative stage of this project.
- Consumer Acceptability Testing – understanding consumers' views on our proposals in the December 2020 RBP.

Consumers' high-level needs

Our updated consumer evidence continues to suggest that passengers' high-level needs on the day of travel remains consistent with those presented in both our IBP and RBP.

[3] Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020
[4] Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020 p.47

Figure 4: Consumer Synthesis

Source: Blue Marble[5]

Consumers' return to travel and key drivers of likeliness to travel

The majority of UK Consumers (76%)[6] are keen to fly again in the next twelve months, mainly for leisure reasons, with the return of business travel remaining more uncertain[7]. Our research has shown a clear pattern by age, with younger consumers more likely to return to air travel sooner compared to older age groups. In March 2021, 90% of 18-24 year olds indicated that they were planning to travel in the next twelve months; this figure fell to 66% amongst over 55 year olds.

19% of UK consumers currently have at least one flight booked for travel over the next twelve months[8], with others avoiding booking until there is further clarity around the evolution of the Covid-19 pandemic and what level of travel restrictions will be in place in the future. The ongoing uncertainty relating to the pandemic itself, and the restrictions in place to mitigate its impacts, are having a significant impact on consumers' willingness and confidence to commit to travel.

Our research has concluded that there are several key drivers that make consumers more or less likely to book a flight:

Table 1: Key drivers of likelihood to book a flight

Positive drivers – more likely to book	Negative drivers – less likely to book
Travel corridors	Testing
Vaccination	Quarantine (at home and in hotels)

Source: Savanta, Heathrow Travel Behaviour Survey, March 2021

[5] Blue Marble Research, *Consumer needs synthesis*, November 2020
[6] Savanta, *Heathrow Travel Behaviours Survey*, March 2021
[7] YouGov, *Business Travel Survey*, Dec 2020 – Jan 2021
[8] Savanta, *Heathrow Travel Behaviours Survey*, March 2021

Figure 5: Factors influencing decision to book a flight

% shown are the net likelihood of booking a trip: More likely minus less likely.

Source: Savanta, Heathrow Travel Behaviour Survey, March 2021

'Newly nervous' consumers

In the RBP, we highlighted that 25% of consumers had become nervous about flying as a result of Covid-19[9], reiterating the importance of providing them with reassurance as they start to think about a return to air travel. Our March 2021 research showed that just under a quarter of UK Consumers (22%) continue to state that they weren't nervous about flying before the Covid-19 pandemic, but are nervous now[10]. Therefore, our RBP conclusion around the importance of reassurance along the passenger journey continues to hold true.

Further changes to the passenger journey and resulting impact on experience

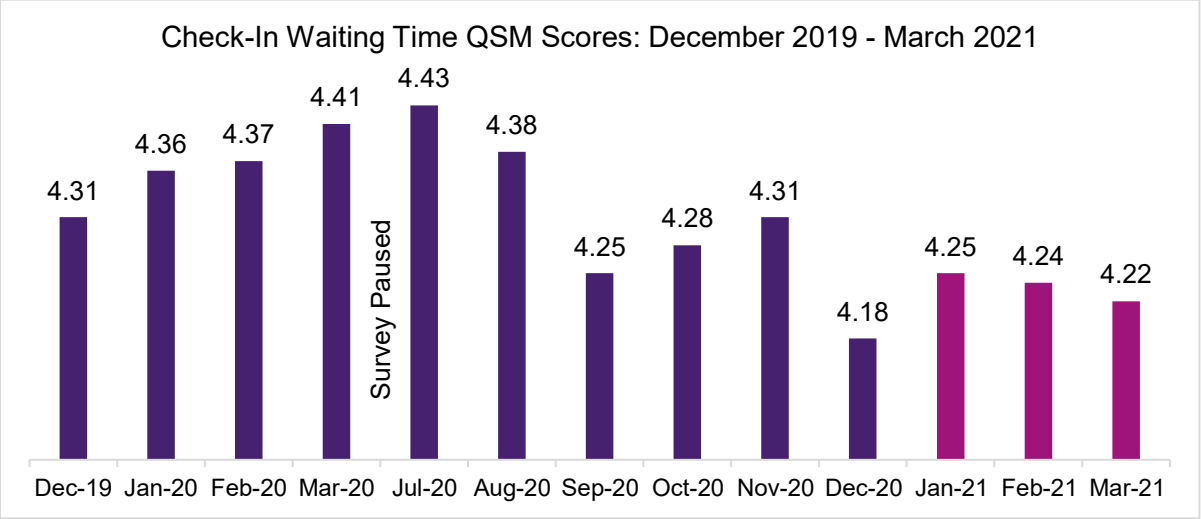
As already discussed in Chapter 3 – 'Developments since publication of the December 2020 RBP', we have seen changes to UK Government requirements due to Covid-19 introducing additional operational procedures at to two key points of the passenger journey:

- Check-in
- Immigration

This has resulted in a significant increase of transaction times in both areas compared to 2019 levels, and corresponding significant decreases in passenger satisfaction levels.[11] The decline in immigration satisfaction has been particularly pronounced, as illustrated in Figure 7 below.

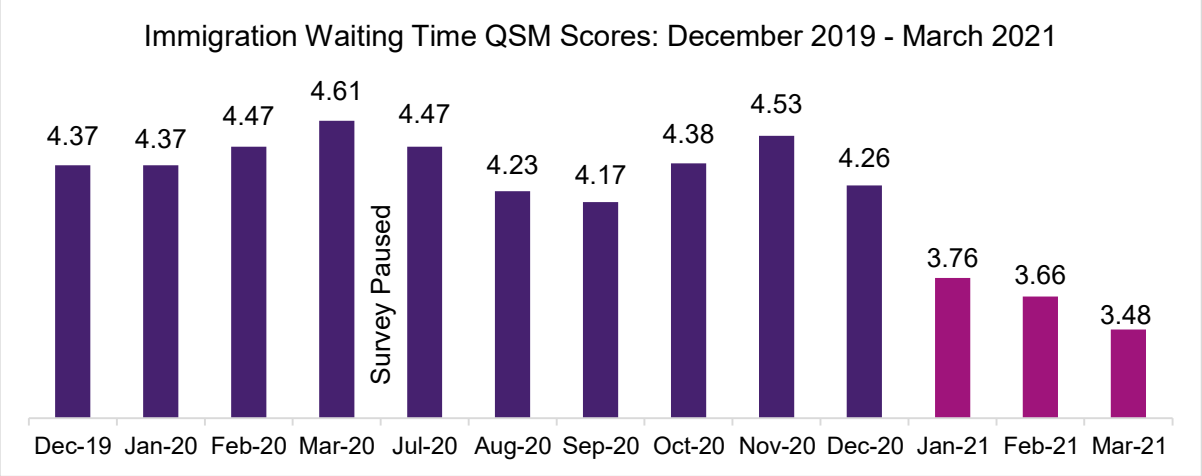
[9] Systra, *Understanding Consumer Need Priorities in a (Post) Covid-19 World*, November 2020
[10] Savanta, *Heathrow Travel Behaviours Survey*, March 2021
[11] Heathrow, *Departures and Arrivals QSM*, January – March 2021

Figure 6: Check-In Waiting Time QSM Scores



Source: Heathrow. Note: QSM survey was paused April – June 2020

Figure 7: Immigration Waiting Time QSM Scores



Source: Heathrow. Note: QSM survey was paused April – June 2020

It will be important to continue to monitor how these procedures evolve over the coming months as the Government provides more guidance around the safe restart of international travel. We will continue to work with all stakeholders at the airport to minimise disruption for consumers and ensure that their journeys remain as easy as possible.

Team Heathrow[12] will also need to adapt to the new expectations of those passengers that feel more nervous about flying. When these passengers return to flying we expect they will try to socially distance as much as possible and be more hygiene conscious than other passengers.[13]

[12] All businesses and organisations that operate at the airport
[13] InSites Consulting, *Post COVID Travel Behaviour Update*, February 2021

Our research suggests that Passengers Requiring Support (PRS), 39% of Heathrow's passengers in 2019[14], are the most likely to be nervous about travelling. As set out in our RBP, this group encompasses consumers who, on any given day, have one or more personal circumstances (see Figure 8) that the airport needs to consider when designing inclusive services. This group is much larger than the group of passengers who have physical disabilities and currently use Heathrow's Assistance Service.

Figure 8 - Broad categories of personal circumstances for Passengers Requiring Support

Source: Revealing Reality, 'Open to All Report'

An objective for our Business Plan is to ensure PRS needs are better met. Meeting these needs will help deliver a faster recovery of demand. When developing our plan, and particularly those elements most relevant to PRS, we have focused on the three principles identified in our consumer research:

Figure 9: Key principles identified in our PRS research

To trust	To choose	To enjoy
• Not feeling like staff just want to get you through airport processes • Knowing where to go for support • Ease of communicating with staff • Efficient problem resolution • Not made to feel embarrassed or ashamed • Systems and staff that understand needs	• Knowing all options available to you throughout the airport experience • Being able to move at a pace that is right for you • Facilities being readily available • Not forced into "the process", without any real choices	• Easy to relax and feel positive • Being able to access a range of food / drink options • Knowing how much time there is at each stage of the journey • Interesting things to experience or treat myself to

Source: Revealing Reality, 'Open to All Report'

[14] Revealing Reality, *Understanding the Airport Needs of Passengers Requiring Support*, Oct 2020

In Chapter 5.3 – H7 Capital Plan Updates we outline the capital projects that respond to these three priorities and in Chapter 5.4 – H7 Operating Costs Updates we outline an Enhanced Service overlay that would enable greater levels of support to PRS.

In addition to this wider group, it is vital that we continue to improve the service offered to the 1.9% of passengers who choose to use the dedicated Assistance Service at Heathrow. This group are currently the least satisfied with their airport experience, with 22% rating their experience as "Poor" or "Extremely Poor". They are also an increasing segment of our passengers, with the number increasing by 33% between 2016 and 2019. We will need to put particular focus on improving the service offered to them in H7 and in particular on ensuring that we give passengers using the service appropriate space to socially distance.

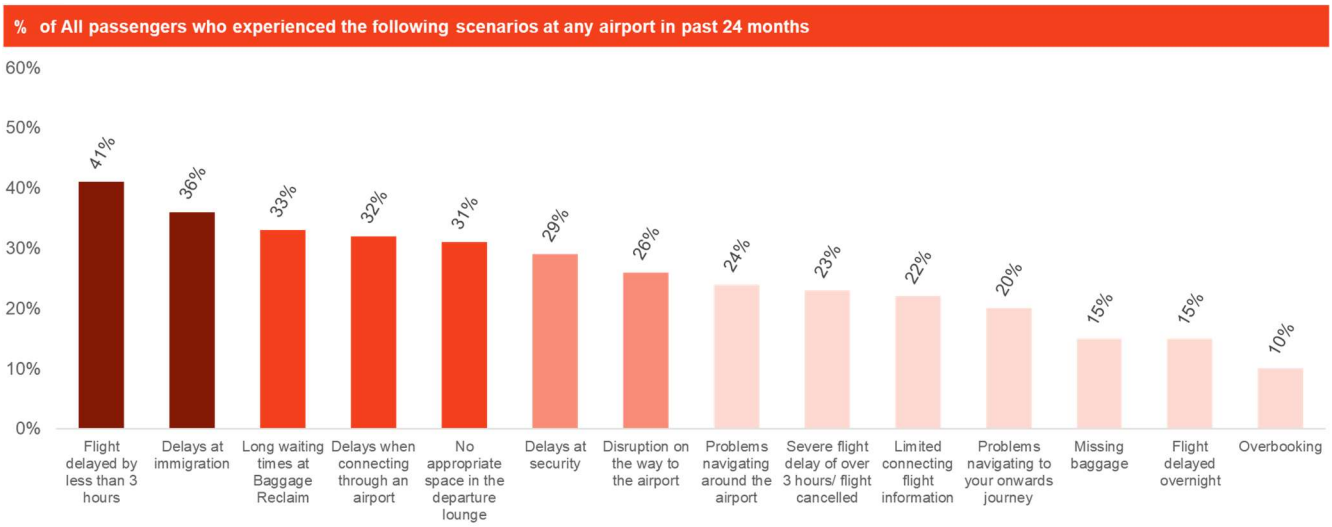
Consumer views around resilience when flying

The final quantitative stage of our resilience research study supports the findings that were used in formulating our RBP resilience chapter.

Consumers believe it is important that Heathrow and its partners invest to maintain resilience levels in order to minimise potential disruption to their end to end journey. Additionally, the areas that consumers have identified as priorities in terms of developing mitigation solutions reinforce our wider H7 consumer priorities for improvements in punctuality, baggage and elements of the overall passenger experience.

Where consumers had experienced disruption to their journey by air travel in the past two years, it tended to be either minor flight (punctuality) or immigration delays[15]. Both of these are outside Heathrow's direct control and resulted in relatively small impacts on consumers' overall travel experience.

Figure 10: Frequency of passenger disruption scenarios



Source: Yonder Research Consumer resilience at Heathrow, May 2021

The types of disruption that would have the greatest impacts on consumers' levels of anxiety and negatively impact their overall travel experience at Heathrow included[16];

- Overbooking

[15] Yonder Research, *Consumer resilience at Heathrow*, May 2021
[16] Yonder Research, *Consumer resilience at Heathrow*, May 2021

- Missing baggage
- Flights delayed overnight
- Severe flight delays / cancellations
- Delays when connecting
- Limited information when connecting
- Delays at security
- Disruption on the way to the airport

Consumers expect Heathrow and its partners to work together to increase resilience and minimise the frequency of disruption events.

The level of communication that consumers receive during periods of disruption is key. For all passenger groups, the effectiveness of this communication is determined by:

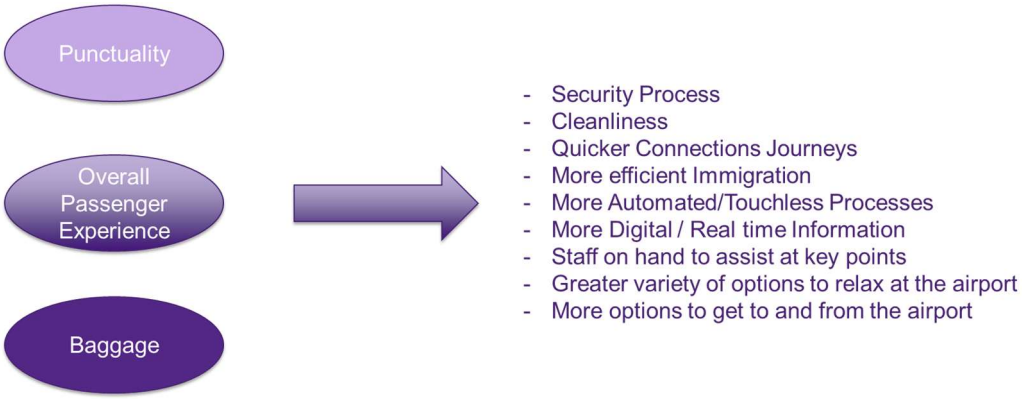
- Reassuring passengers that Heathrow and the airline is prepared to help them.
- Providing flight schedule change updates and the implications that this is likely to have for passengers' experience at the airport.
- Providing periodic updates as the situation unfolds.
- Updates coming directly from airline or airport colleagues, but also being clearly displayed on information boards across the airport.

Reassurance remains a key element of our proposition to passengers and is something that airport and airlines can jointly control. In Chapter 5.3 – H7 Capital Plan Updates we set out digital service investments that could deliver against the four reassurance priorities listed above.

Consumer service improvement priorities in H7

All of our research continues to support our RBP conclusions around what matters to consumers when flying, as well the elements of the end-to-end journey that consumers would most value Heathrow working with the wider airline community further improve during H7.

Figure 11: Consumer Priorities for improvement in H7



Source: Heathrow

We have used these priorities to inform:

- The prioritisation of our capital investment plans (see Chapter 5.3 – H7 Capital Plan Updates)
- The provision of services that passengers value (see Chapter 5.4 – H7 Operating Costs Updates), in particular enhanced cleaning and enhanced maintenance of assets to ensure resilience levels are retained.
- The measures and targets that we will be measured by in H7 (see Chapter 6.2 – H7 Measures, Targets and Incentives Updates).

Incorporating our Consumer Acceptability Testing

The purpose of Consumer Acceptability Testing (CAT) is to understand whether the level of the airport charge is acceptable to consumers in exchange for airport services received. There are certain limiting factors to this research that need to be understood before interrogating the results:

- Passengers do not pay the airport charge directly. They pay an airline fare. The amount airlines pass onto consumers is their commercial choice that Heathrow has no control over.
- The actual charges airlines pay varies depending on a number of factors that are determined solely in control of the airline:
    - movement charge (e.g. the environmental performance of the aircraft the airline chooses),
    - parking charge (e.g. how long an aircraft is parked on stand)
    - passenger charge (e.g. the number of passengers travelling on the aircraft).
- The cost of the air ticket is only one key factor in determining airport choice[17], other factors include whether a destination is offered and the ease of getting and from the airport.

These limitations are further compounded when considering the cost of passenger fares between different sector lengths. All other things being equal, the total cost of a long-haul journey is greater than that for a short haul journey.

Table 2: 2018 Heathrow average long haul /short haul return fares

Heathrow Short Haul Average Return Fare	£237
Heathrow Long Haul Average Return Fare	£1,080

Source: Frontier Economics[18]

Heathrow's charging structure is not flat across all sector lengths, with airlines being charged less for short haul (European destination) passengers using the airport compared to those passengers flying long haul (outside Europe).

[17] The Numbers Lab, Heathrow Brand Tracker Q3 2020
[18] Frontier Economics, *Estimating the congestion premium at Heathrow,* May 2019

Table 3: 2021 Heathrow Departing Passenger Charges

Destination	Heathrow 2021 Departing Passenger Charge[19]	% discount vs. long-haul
Long haul (outside Europe)	£38.33	
Short haul (Europe)	£15.98	-58%
Domestic	£10.98	-71%

Source: Heathrow

These complications – and the fact consumers rarely have perfect knowledge of all services rendered to facilitate their journey, nor differentiate which of those services are provided by the airline, airport or another third party – mean any acceptability testing must be considered alongside other evidence and not used independently.

When combined with further context, it can be a useful exercise in calibrating our existing Willingness to Pay (WTP) research[20] that indicates how much consumers are prepared to pay for the service levels they will be receiving. In order to create a point for comparison, we separately tested the acceptability of the actual 2020 airport charge for the service levels consumers received.

The study took place in three steps:

1. Unprompted consumers were asked what they considered the acceptable charge at Heathrow to be given the service they currently received.
2. They were then presented with the investments associated with our Optimal Plan (see Chapter 5.3 – H7 Capital Plan Updates for more details) and consequential service levels (see Chapter 6.2 – H7 Measures, Targets and Incentives Updates for more details).
3. Consumers were then presented with three different charge levels – associated with the High, Base Case and Low plans in our RBP[21] – and asked whether these would be acceptable, affordable and represent good value for money to them[22].

The key conclusions[23], noting the limitations outlined above, are:

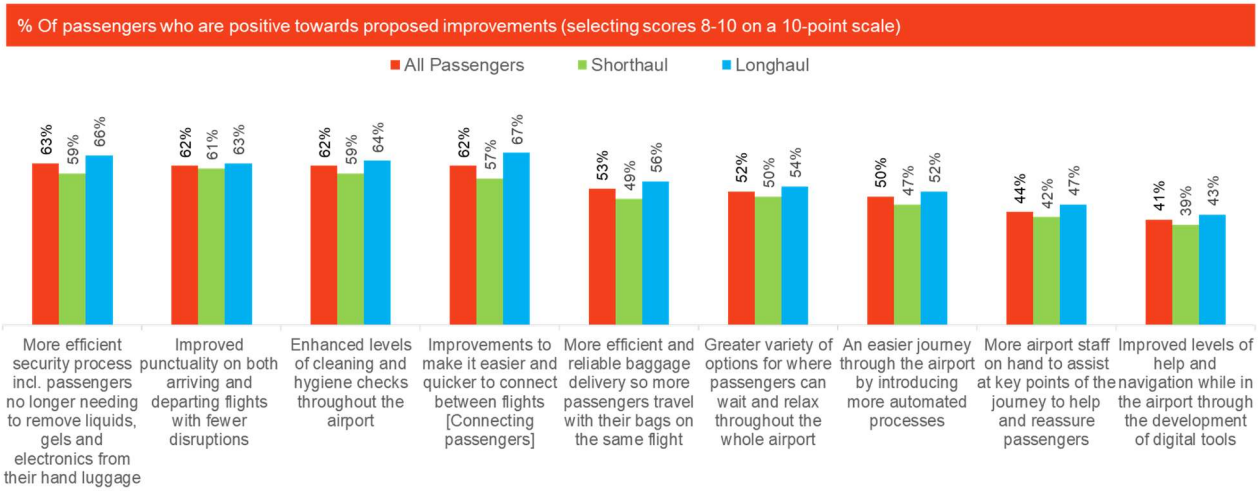
1. **Heathrow is currently good value for money.** On average, consumers consider the passenger service charge at Heathrow to currently be £26.33[24] for the level of service they receive while at the airport. The average charge in 2020 was £23.56[25].

2. **Customers value the proposed service improvements in our Optimal Plan.** Consumers were positive about all the proposed service improvements, with the most valued being punctuality, a more efficient security search process and enhanced levels

[19] 2021 price base
[20] Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020, Accent, H7 Service Package Choices Research, November 2019, Accent, H7 Service Package Choices Part 2 Research, June 2020, Systra, Heathrow Airport Customer Valuation Research, November 2018
[21] All assume "Full Adjustment".
[22] Consumers were prompted with charges expressed in a 2021 price base.
[23] The full Consumer Acceptability Testing Research Report is included as an appendix to this update (Appendix 4).
[24] 2021 price base
[25] 2021 price base

of cleaning. Consumers travelling on long haul flights were slightly more positive about all the proposed H7 service improvements than those travelling on short haul flights.

Figure 12: % of consumers positive towards proposed H7 service improvements



Source: Yonder, H7 Consumer Acceptability Testing Research, 2021

3. **Customers are willing to pay more for improved service.** Consumers will pay higher than the 2020 average charge to receive a better service. This confirms previous research outlined in our RBP.[26]

Table 4: Consumers' perception of Acceptability, Affordability and Value for Money for different levels of H7 airport charge

		Net levels* of consumers saying that proposed airport charge is:		
	Average H7 Charge (2018p)	**Acceptability**	**Affordable**	**Representing "Good" Value for Money**
High H7 Passenger Demand (P90)	£25.29	+23%	+44%	+20%
Mid H7 Passenger Demand (P50)	£29.89	+11%	+34%	+10%
Low H7 Passenger Demand (P10)	£39.59	-18%	+11%	-17%

* Net Levels = % Very/Acceptable - % Very/Unacceptable

Source: Yonder, H7 Consumer Acceptability Testing Research, 2021

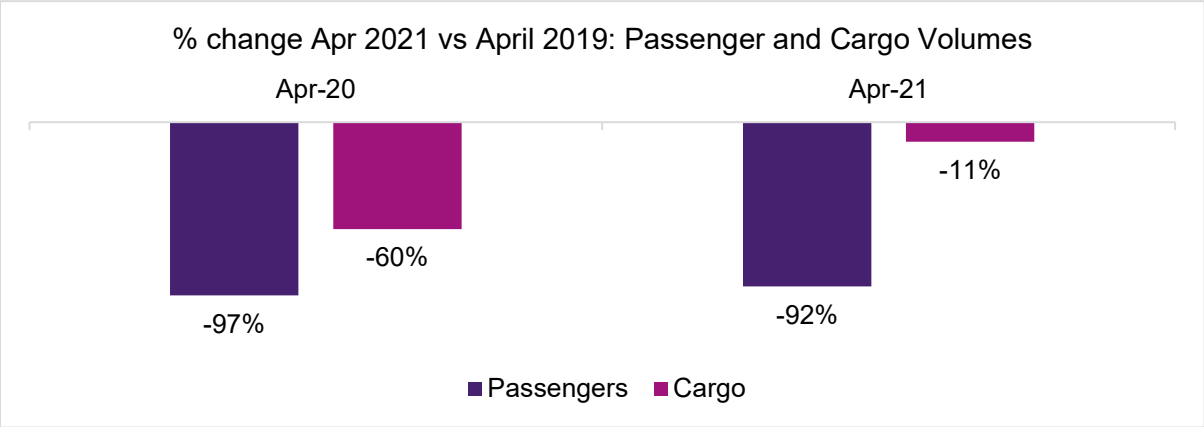
[26] 'Willingness to Pay', 'H7 Choices part 1', 'H7 Choices part 2' and 'Passenger Priorities post-Covid' research to confirm that consumers now expect more, not less, from their airport experience post-Covid.

4. **The acceptable level of charge in exchange for the service improvements made possible by our Optimal Plan ranges between £29.89 and £39.59.** Consumers want us to continue to deliver targeted improvements in service during H7 in return for them paying a higher airport charge. The upper limit of net acceptability for these improvements is between £29.89 and £39.59.

5. **A Safety Only Plan with Low Adjustment prices is not acceptable to consumers.** We can infer that consumers will not accept the Low Adjustment Case (see Chapter 5.1 – RAB Adjustment), where service levels deteriorate, and the charge increases to £42. This adds to the evidence that only a Full Adjustment case (with an Optimal Plan) can fulfil CAA duties to current and future consumers.

4.4 Cargo insights

Figure 13: Passenger and cargo volume % change vs April 2019



Source: Heathrow

As the UK's largest port, cargo is a key part of Heathrow's operations. The critical nature of cargo at Heathrow has been further emphasised through the Covid-19 pandemic and cargo volumes have seen a far stronger recovery over the last year compared to passenger volumes. Given the importance of cargo at Heathrow, it is crucial that we understand the needs of our cargo community as part of our consumer insights and inform our plans for H7 accordingly.

In order to understand the needs of our cargo community in the lead up to our 2019 IBP, we commissioned a programme of research amongst the extended community (carriers, forwarders, handlers, hauliers plus other, non-operational contacts such as sector consultants, industry associations and commentators).

The findings showed that infrastructure improvements were a key priority for the cargo community, with many expressing concerns about the current cargo infrastructure at Heathrow, and in particular its age and accessibility. Our quantitative study reinforced this and also identified that we could do more to enhance the ease and reliability of cargo operations at Heathrow.

These insights have informed our H7 capital allocation for cargo and the programmes that sit within this allocation.

5. Updates to our key building blocks

5.1 The Covid-related iH7 RAB adjustment

In CAP2140 the CAA made a decision to adjust the Regulated Asset Base (RAB) by an interim £300m, with the potential for further adjustments at the start of the H7 period. £300m is less than 10% of the forecast losses Heathrow will incur as a result of the Covid-19 pandemic during 2020 and 2021. As we set out below, it is also significantly less than the amount required to ensure the stability of the regulatory framework and the best possible outcomes for consumers in H7. We therefore expect the CAA to make further adjustments as part of the H7 decision. It is imperative for consumers that they do so to address the issues raised by the Covid-19 pandemic.

The first part of this chapter sets out why an appropriate RAB adjustment is fundamental to the long-term interests of consumers at Heathrow, for managing the pressures on the H7 airport charge and for investor confidence in the current regulatory model.

The second part then sets out the approach we have adopted for determining the RAB adjustment included in our plan. This shows that a RAB adjustment of £2.5bn 2018p is necessary based on our current forecast for passengers in 2021. We also describe how this would be implemented in the H7 settlement.

In the third part we explain the impact that the RAB adjustment will have on the building blocks included in our plan and the consequent impact for charges paid by airlines. We consider two cases to illustrate these impacts:

- A **Full Adjustment** case, which assumes that the adjustment at the start of the H7 period is based on an adjustment of £2.5bn 2018p; or
- A **Low Adjustment** case, which assumes no further adjustment to the RAB is made at the start of H7 beyond the interim £300m outlined in CAP2140[1].

In addition to determining the 2022 opening RAB, the size of the RAB adjustment influences the following five key building blocks:

- The WACC for H7
- The scope for and size of a depreciation adjustment
- The passenger demand shock factor
- The scale of the capital program; and
- The advisability of an Enhanced Service overlay.

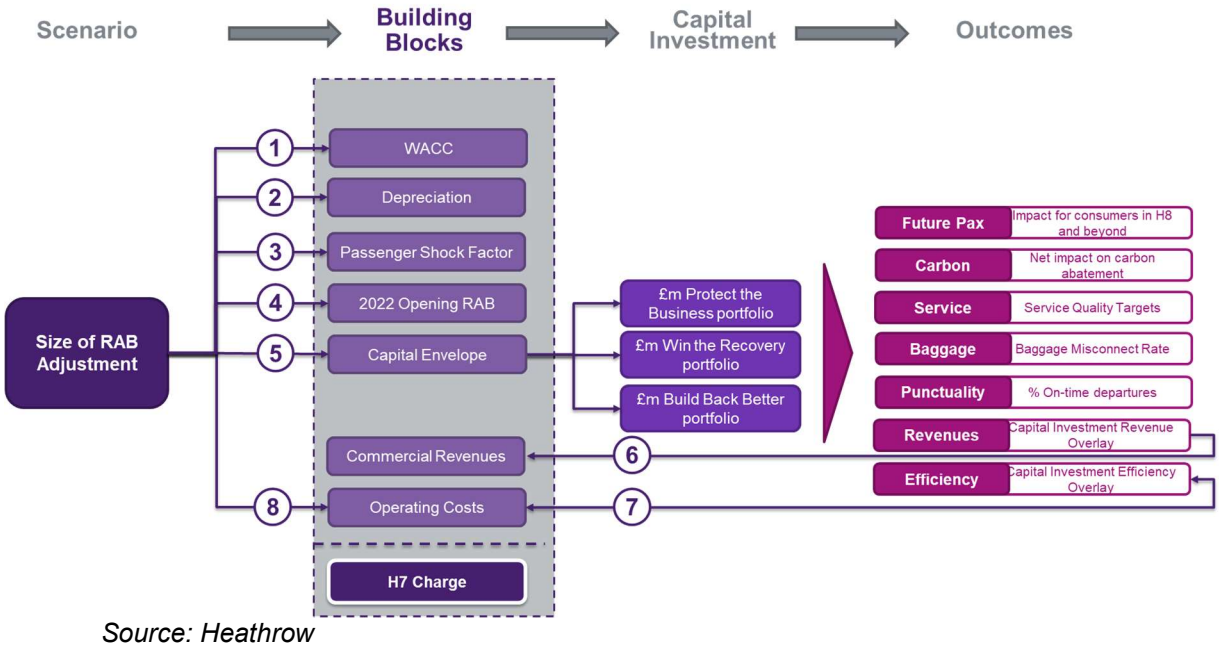
Moreover, there are smaller effects to other building blocks:

- Operating costs are increased as the lower capital programme allows less efficiency to be delivered; and

[1] This is a new consideration for this update. Previous considerations regarding “No Adjustment” or a “2021 RAB Adjustment” scenarios are no longer relevant given the CAA’s interim decision and have been discontinued.

- Commercial revenues are lower as the smaller capital programme allows less investment to help offset the impact of Government policy and other challenges to our commercial revenue in H7.

Figure 1: Flow of the RAB adjustment through the building blocks



Source: Heathrow

A key headline consequence of these combined impacts is that the unprofiled airport charge in the Low Adjustment case is £42.7 (2018p) and the unprofiled airport charge in the Full Adjustment case is £32.0 (2018p). This shows how the full RAB adjustment leads to a significantly lower H7 charge.

The fourth part of this chapter sets out the consequences in terms of the different service, resilience and other outcomes that the CAA approach to the RAB adjustment will result in. This demonstrates that the Low Adjustment case will result in poorer outcomes for consumers in H7 and beyond, including less improvement in service, resilience and sustainability.

The fifth part brings this together to show that the Full Adjustment case sees consumers receive a better service at a lower charge to airlines compared to the Low Adjustment case. It also maps back the benefits from the Full Adjustment case to the CAA's duties as outlined in the Civil Aviation Act.

Finally, we set out responses to some key issues raised in CAP2140.

5.1.1 Importance of an appropriate RAB adjustment

The impact of Covid-19 has been to reduce Heathrow's revenues by over £3.2bn (2018p) in 2020 and 2021 compared to the pre-pandemic forecast (excluding ORC income). While this impact is dramatic, the case for an adjustment is not based on pleading for special treatment in difficult financial circumstances. Rather it is based on the logic of the regulatory framework and the dire consequences for that framework and the consumers it was designed to serve if that logic is not respected.

RAB based regulation is designed to ensure private sector investment and management in businesses that are deemed to have significant market power is in consumers' long-term interests. This on the one hand means capping charges, limiting the potential upside for the business and its investors of charging what the market might bear. On the other it requires mechanisms to ensure that there is adequate investment even with this cap in place, to ensure there is the capacity and product consumers would demand in a normally functioning market.

At the heart of those mechanisms is the RAB - the return on the RAB and return of the RAB that mean that rational investors can put capital into the business for decades with a fair chance of getting it back with a return to compensate them for the time and risk involved. Central in turn to this model are the assumptions, and the internal logic of risk and return inherent in these assumptions, defined by the regulator, not the market, that define both the return on and return of the RAB – including cost of capital, regulatory depreciation and the expectations of risk which shareholders bear.

The impact of the Covid-19 pandemic has violated these assumptions in Heathrow's regulatory model. If left that way, there will be severe consequences for how regulation operates going forward. These can be seen in the relatively poorer outcomes for consumers in the Low Adjustment case. A proportionate, rationally calculated adjustment is a way to restore regulatory stability, to both the short and long-term benefit of consumers and airport stakeholders.

The most critical assumption undermined in the absence of an appropriate adjustment is the return of capital associated with revenue from regulatory depreciation. The scale of the 2021/22 losses are such that Heathrow has not recovered any of the revenue associated with regulatory depreciation for these two years. Crucially, this means that Heathrow in reality has not received the return of capital that the revenue associated with this depreciation represented. This in turn means that the RAB has been reduced without Heathrow recovering the investment associated with the efficient expenditure included in that part of the RAB. Contrary to the CAA's recent statement[2], this is in its actual impact is no different to a situation where the CAA arbitrarily reduce the RAB.

If this were to stand it would deliver a huge blow to regulatory certainty, financeability and the whole RAB model. The recovery of efficient investment is a fundamental aspect of RAB based regulation. The RAB based model has lowered costs for consumers by giving investors' confidence that, even though charges are capped, they will recover the investments they make over longer than a settlement period and be allowed to make a reasonable return on that investment commensurate with its risk. This leads to a lower cost of capital, which flows into long-term lower prices for consumers. The RAB based model will not give investors' confidence if they consider that the recovery of capital is at risk to factors beyond the control of management. The only rational responses are a combination of reducing investment and needing to see that capital is returned over far shorter time horizons with greater returns to compensate for the higher actual risk. This applies not just to Heathrow, but to all UK RAB based models. Therefore, the recovery of capital in situations like the Covid-19 pandemic is a fundamental regulatory issue.

The interim £300m adjustment the CAA propose is less than 10% of the losses Heathrow is forecast to incur as a result of Covid-19. This is insufficient to even reduce the losses to the level where Heathrow would begin to start recovering regulatory depreciation. Without correction, the implication, whether intended or not, is that investors should no longer enjoy a

[2] CAP2140, Para C46 and C48

legitimate expectation of the historic return of capital invested (as opposed to just losing their return on capital). This would fundamentally change the proposition for investors.

Such an approach would be extraordinary and at odds with decades of accepted regulatory practice in the UK, which recognises that consumers' interests are protected by providing a stable, low-risk regulatory environment. A business that has significant risk of not recovering investments and cannot make a return is simply not investable. The purpose of RAB based price control regulation is to incentivise private capital to behave efficiently and invest in the interests of consumers by lowering regulatory risk for investors. At its best, regulation can look through economic crises and deliver great service for consumers today, with steady improvements in the pipeline for the consumers of tomorrow. However, a regime where investments remain at risk of non-recovery to a degree never anticipated, and where upside returns are capped without taking the extent of downside risk into account, is a regulatory failure and not in the interests of consumers.

Successful regulatory outcomes have always been underpinned by predictable and fair regulation. Since the Covid-19 pandemic, the CAA seems to have abandoned the key principles of consistency and providing a 'fair bet' for Heathrow's investors.

In particular:

- The CAA's assumptions that investor risk can be mitigated by implementing forward looking risk sharing without also applying this to 2020 and 2021 is fundamentally flawed. If the CAA fails to uphold the key principles of regulation in this case and under such extreme circumstances, investors cannot have confidence that the CAA will enforce these principles going forwards. While we agree that forward looking risk sharing will help to create an affordable and financeable H7, its benefit can only be unlocked if implemented against a backdrop of consistent regulatory decision making.

- The CAA's assumptions that depreciation can be deferred even if there is no RAB adjustment is completely inconsistent with regulatory practice in other sectors and ignores that this would create a strong incentive for investors to minimise capital expenditure as much as possible. Such an approach would be inconsistent with the CAA's duties towards consumers, sustainability and financeability, and contrary to the consumer benefit delivered by the transformative investments over the previous 15 years.

In addition to breaching these key principles, the *Way Forward* document also presents base scenarios that assume investors absorb all the loss of capital resulting from Covid-19 and receive no dividends at all in the H7 period, effectively ignoring the requirements of equity investors. The CAA appear to assume that investors would continue to be willing to invest despite being placed in a position where they bear the enormous losses resulting from Covid-19 and also have any return on capital deferred until after the H7 period. Such a belief is mistaken and incoherent.

The consequences of such a low adjustment approach, if sustained at appeal, would be to set Heathrow on the road to a deteriorating spiral for the H7 period and beyond: investor confidence would be eroded and investment constrained; assets and service would deteriorate, leading to criticism, regulatory action and further loss of confidence for consumers. In the medium to long-term all stakeholders lose, – particularly future consumers.

5.1.2 Size of the required RAB adjustment

We set out our proposed approach, logic and calculations for the adjustment to be made at H7 in our response to CAP2098. We have considered the CAA policy statement CAP2140 carefully and address some of the issues raised below. In this consultation, the CAA have not provided quantitative financial analysis that alters or undermines the approach we proposed. We therefore continue to propose the same approach for determining the appropriate adjustment.

The scale of the adjustment we propose has been calibrated through a wide range of assessments. It is consistent with the WACC for Q6 and takes appropriate account of cost savings and the variation of returns over the previous economic cycle.

For completeness, the proposed approach is set out again below. We expect the CAA to reflect this in its preliminary findings and subsequent decisions.

For H7, the CAA should introduce a risk sharing approach based on a symmetrical approach:

- Heathrow bearing 100% of revenue risk of variations in revenue up to 8% either side of forecast revenue (excluding ORCs);
- Heathrow bearing 14% of revenue risk for variation from forecast revenue beyond 8% (i.e. a recovery rate of 0.86);
- A recovery amount would be determined for each year that revenue was outside the 8% threshold, with the final RAB adjustment reflecting the NPV of the sum of the amounts. This means that the recovery amount from 'extraordinary' underperformance in a particular year may be offset by the recovery amount from 'extraordinary' outperformance in a different year, but that variations in revenue that are less than 8% from forecast are excluded;
- This approach must also be applied to Q6/iH7, and the resulting recovery amount (less the £300m already included in the RAB) added to the RAB at the start of 2022 and the return on this RAB included in the H7 revenue allowance;
- Depreciation of this iH7 adjustment would not commence before 2027; and
- If required, the approach would include a final adjustment at the start of 2023 to reflect the difference in outturn of 2021 compared to that assumed for the H7 decision.

Table 1 sets out the amounts of revenue lost and proposed to be included in the RAB adjustment for the passenger scenario included in this update. The final adjustment would vary based on actual outcomes in line with the principles established and a fully transparent calculation based on actuals once known. The Table shows that Heathrow is only proposing to recover around three quarters of the losses incurred by Covid. It also shows that the revenue losses experienced in 2020 and 2021 amount to 50% of notional equity. To recover a loss of this size would require a 10-year period with RORE outperformance of over 8%. Such outperformance is not credible for a regulated company.

Table 1: Amounts to be recovered under proposed approach based on 2021 forecast

	£bn (2018p)	As % notional equity
Revenue Loss	3.2	50%
Amount borne by Heathrow	0.7	10%
Recovery Amount	2.5	40%

Source: Heathrow

5.1.3 Impact of the RAB adjustment on Heathrow's plans

As set out above, there are four key changes to the building blocks in our plan that differ as a result of the scale of the RAB adjustment.

Table 2 - Key Building Blocks in Low and Full Cases

	Full Adjustment Case	Low Adjustment Case
WACC	8.50%	10.40%
Depreciation Profiling	£635m p.a. 2018p	£0
H7 Traffic (Passenger Shock Factor)	-1.46%	-5.16%
Capital Envelope	£4.2bn 2018p	£2.5bn 2018p

Source: Heathrow

Further building blocks – operating cost and commercial revenue forecasts – will be impacted as a consequence of the difference between the capital investment plans between Full and Low Adjustment cases. This in turn leads to different efficiency and revenue assumptions. This effect is explored in Chapter 5.4 – H7 Operating Costs Updates and Chapter 5.5 H7 Commercial Revenues Updates.

5.1.3.1 WACC and RAB adjustment

The WACC reflects the return that investors require for exposure to the systematic risk faced by Heathrow. The pandemic has resulted in a step change in investors' perception of the risk of airports as demonstrated by the significant increase in airport asset betas since March 2020. Investors will take account of the mitigation provided by regulation in their assessment of the risk of Heathrow. Therefore, the greater the degree of mitigation provided, the lower the increase in the required return will be.

In Chapter 5.6 – H7 WACC Updates, we set out an update of our view of the WACC for Heathrow in the Full and Low Adjustment cases and conclude that the pre-tax WACC is 8.5% in the Full Adjustment case and 10.4% in the Low Adjustment case. The difference in these estimates is driven by:

- A higher asset beta in the Low Adjustment case (0.98 vs 0.82 in the Full Adjustment case). This leads to the majority of the difference in WACC;
- A higher gearing assumption in the Low Adjustment case (65% c.f. 60%), reflecting the higher initial gearing for the notional company in the No Adjustment case of 70.5% at the end of 2021;
- A lower percentage of new debt in the Low Adjustment case (7.5% vs 12.5%) reflecting the lower capex and degearing that happens during H7 in this scenario.

The majority of the difference in the WACC for the two cases is driven by the difference in asset beta. Current estimates for the asset beta of the comparator airports identified by the CMA are set out in the table below (see Chapter 5.6 – H7 WACC Updates).

Table 3 - Asset betas of comparator airports

	Fraport	ADP	AENA
Spot asset beta Daily data since March 2020	0.80	0.99	1.00

Source: Heathrow

In Chapter 5.6 – H7 WACC Updates we set out a quantitative approach that estimates the impact on beta for the Low Adjustment and High Adjustment cases. The asset beta in the Low Adjustment case of 0.98 is just below the current observed betas (since March 2020) of ADP and AENA (at 0.99 and 1.00 respectively). The asset beta in the Full Adjustment case is slightly above the observed asset beta of Fraport (0.80), which has received substantial assistance from the German government. This demonstrates that the asset betas used are consistent with current market data of investors' views of the riskiness of airports.

Indeed, this approach may underestimate the impact of Covid-19 on Heathrow's perceived risk and the impact of a full adjustment on reducing the required cost of capital in that:

- We show in Chapter 5.6 – H7 WACC Updates than the relative impact of Covid-19 on Heathrow is higher than for all three of these airports;
- Fraport was lower risk than Heathrow pre-Covid[3]; and
- AdP and Aena have already had some regulatory mitigation.[4]

This means that the asset beta in the Low Adjustment case could well be higher than the observed betas of AdP and AENA, and also that the asset beta in the Full Adjustment case could be significantly greater than the current asset beta of Fraport. In taking these asset beta assumptions, we are therefore adopting a conservative position on both the absolute level of return required and the difference in returns driven by a full adjustment.

The reduction in WACC delivered in the Full Adjustment case reflects the reduction in perceived risk by investors that the adjustment would provide. This reduction in perceived risk cannot be delivered only by making changes to risk allocation for the future. Investors' view of the risk will be primarily informed by the action the CAA takes in respect of 2020 and 2021. This is because:

- The adjustment the CAA make now (or CMA in the event of an appeal) will be based on its interpretation of what is in consumers' interest as is required by its legal duties;
- Irrespective of the specific ex-ante mechanism put in place for H7, the CAA can only make an adjustment for H7 if it (or the CMA) consider that such an adjustment would now be in consumers' interest;
- Investors will consider that the consumer interest case in any future decision (or appeal) will be identical to the outturn for 2020 and 2021 and that therefore the eventual adjustment for H7 will reflect the approach used then; and
- Third parties can appeal any CAA decision, so even were the CAA to somehow guarantee that it would take a different view in the two cases, no reliance could be placed on such a guarantee.

[3] See NERA, Cost of Equity for HAL at H7, 2019, p17. Also accepted by the CAA (e.g. CAP2139, Appendix J, para 56

[4] AdP have been allowed to terminate their Economic Regulatory Agreement allowing them to propose new charges annually. In addition they have received a €122m grant from the French government. AENA have received €400m in grants and loans from the Spanish Government.

Investors will also note the current CAA approach to NERL in which it has not implemented the ex-ante risk sharing arrangements exactly as it defined then in the settlement. This is precisely because the CAA considers that to do so would not be in consumers' interests and therefore not consistent with their duties. This further demonstrates that current and future investors in Heathrow will believe that the CAA will not implement an ex-ante mechanism directly if they consider that doing so would not be consistent with its duties. Consequently, investors' perception of risk will be primarily based on the actions the CAA take for 2020 and 2021, rather than any future risk sharing mechanisms ostensibly put in place.

The other reason that forward looking mechanisms alone, or an inadequate level of adjustment, cannot produce the full advantage for the cost of capital is because of how iH7 has undermined the core regulatory assumption of regulatory depreciation. Unless this principle is re-established, the basis for risk assumptions for private investment in Heathrow have been fundamentally changed by the CAA.

5.1.3.2 Depreciation and RAB adjustment

In our RBP we recognised that there were upwards pressures on the charge outside of our control (lower passengers, higher cost of capital and lower commercial revenues due to Government changes to VAT policy) and proposed means by which this could be partially mitigated so we can help Heathrow retain a competitive charge.

The key lever for doing so was the profiling of depreciation costs across regulatory periods, keeping the charge competitive in H7. In this update, we demonstrate that the upwards pressure on the charge is even more acute given developments to passenger demand and cost of capital since we published our RBP. This makes it ever clearer that it is in the interests of all stakeholders to deliver the conditions that would make depreciation profiling possible.

We consider the conditions necessary for profiling of depreciation to be:

1. That investors have confidence in the return of capital. If return of capital is at risk, then a deferral of depreciation is not acceptable as it increases the amount of capital for which the return is at risk; and
2. That the gearing impact of the pandemic can be unwound (for the notional company) whilst still providing an appropriate return to shareholders consistent with expectations for a notionally financed company.

For the Full Adjustment case, both of these conditions are met. We have therefore included a significant deferral of depreciation. In this case, the scale of the depreciation adjustment has been limited only to ensure that the charge is sufficient to deliver the minimum cashflow requirements early in H7 so that our rating and covenants metrics can be met. This profiling alone reduces the average unprofiled charge in H7 by £7.9 2018p.

In the Low Adjustment case, neither of these requirements are met. We have therefore not included profiling of regulatory depreciation. If anything, the financial analysis suggests we should assume acceleration of regulatory depreciation in H7, though this is not included in the estimated building block analysis.

Investor Confidence

In the Low Adjustment case, Heathrow will have not recovered revenues associated with regulatory depreciation for 2020 and 2021. This means that the RAB will have reduced without

Heathrow receiving commensurate income, and therefore there will have been a loss of return of base capital due to circumstances outside of Heathrow's control.

The security of return of capital, except when caused by management failure, is a fundamental aspect of RAB based regulation. In a situation where the Regulator has not acted to ensure the actual security of return, investors cannot possibly have confidence that the regulatory regime would provide a reasonable expectation of return of capital in the future. In these circumstances, trust in the RAB based model will fall.

As a consequence, the incentive to invest must also be significantly reduced. A rational investor in this situation would seek to reduce the amount of capital at risk by accelerating depreciation and increasing dividends. Such acceleration of depreciation has been used in regulated businesses in other sectors to underpin investor confidence, e.g. such as in telecoms where there is potential recovery risk due to technological change resulting in stranded assets.[5]

Applying a deferral of depreciation (rather than an acceleration) in the Low Adjustment scenario would be unprecedented in regulatory terms.[6] It would also be fundamentally inconsistent with the risk profile that the Low Adjustment case would represent. Therefore, in the Low Adjustment case, such a deferral of depreciation becomes unfinanceable.

Gearing Impact

In CAP2140 the CAA set out their view that a depreciation adjustment could be used in a case that included no RAB adjustment. This was demonstrated by including modelling of a notional company starting at 60% gearing, funding the impact of the pandemic through debt, and then returning to 60% gearing before the end of 2026 with a depreciation adjustment included.

However, this modelling assumed that absolutely no dividends were paid for the whole of the H7 period. This is not a justifiable assumption for a notionally financed company. It departs significantly from the approach used recently by the CMA in regulated settings[7]. We note the CAA has made no attempt to justify such an assumption for a notional company.

We have repeated the CAA's modelling whilst including a level of dividends appropriate for the notional company. We show the evolution of RAB and gearing in the Low Adjustment[8] case assuming no deferral of depreciation. In this case however, we include dividends paid at a rate of 72% of the real equity return. The dividend assumption is consistent with that used by the CMA in the water inquiry, which assumed that 72% of the equity return was issued as dividends in the financeability assessment it undertook[9]. The resulting profile of RAB and gearing is set out in Table 4 below.

[5] Ofcom, , (2020), Promoting investment and competition in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26 – Annexes 1-23 of 24 -

[6] We are not aware of any cases where depreciation has been deferred in a regulatory determination.

[7] For example, in the 2020 Water appeals the CMA assumed that 72% of the real equity return was distributed as dividends in their financeability analysis.

[8] This case included a £300m RAB adjustment, a Capital Programme of £2.5bn and a WACC of 10.4%

[9] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 10.101. The CMA scaled up Ofwat's approach of 3.0% dividend yield and 1.18% growth for its higher cost of equity (Ofwat, PR19 Final Determinations, Aligning Risk and Reward Technical Appendix, 2019, p9)

Table 4 - Gearing over H7 in Low Adjustment case with no depreciation adjustment

	2019	2020	2021	2022	2023	2024	2025	2026
RAB £bn	16.6	16.5	16.8	17.7	18.2	18.1	17.8	17.2
Gearing	60%	67%	70.5%	68.5%	66.5%	64.3%	62.1%	59.9%

Source: Heathrow

Table 4 shows that, in the Low Adjustment case with no deferral of depreciation, the RAB remains broadly stable over the period. A regulated company with stable RAB and constant notional gearing would distribute dividends exactly in line with the cost of equity (this is mathematically required in this situation), and therefore the normal expectation for dividends where RAB is constant is that all of the equity return is distributed. Therefore, the assumption in this case that only 72% is distributed is very conservative.

Table 4 also shows that even with zero depreciation adjustment, gearing is only just returned to the initial level of 60% by the end of the period. This demonstrates that even with no deferral of regulatory depreciation, returning the gearing of the notional company to 60% in H7 is a challenge and would be at risk if circumstances were more adverse than forecast. Indeed, this demonstrates that even with no deferral of depreciation, there will be significant pressure to minimise capital expenditure in the Low Adjustment case so that gearing can be returned to the right level by the end of the period to protect financial resilience and balance sheet efficiency.

This evidence demonstrates that in the Low Adjustment case with appropriate dividends for a notional company, no deferral of depreciation can be included if gearing is to return to the initial 60% level by 2026.

Impact

For the Low Adjustment case, we have shown that neither of the conditions set out above are met:

- Investors would not have confidence in the return of capital; and
- Including depreciation deferral would not allow gearing to return to the initial level by the end of the regulatory period.

Therefore, in this situation no deferral of depreciation can be included. Indeed, the appropriate response in this situation would be to accelerate depreciation to allow the initial notional gearing level to be restored during the period and address rational investor fears of stranded or disallowed assets in the longer term.

In the Full Adjustment case, both of the conditions would be met. Investors would be confident in the return of capital, as this would have been delivered by the adjustment, even though they would not have achieved the return on this capital. The adjustment would also restore gearing to close to the initial level at the start of the period, enabling deferral of depreciation to be accommodated in this scenario provided that the degree of deferral does not undermine minimum cashflow requirements. As a consequence, the Full Adjustment case includes a depreciation deferral of £635m p.a (2018p).

To include depreciation deferral in the Low Adjustment case, the CAA would have to believe both that:

- Equity investors' confidence in the RAB based model for Heathrow is not undermined as a result of the company losing return of capital through no fault of its own; and
- That equity investors would be content to defer dividends until after H7 despite the rational response of investors to higher recovery risk being to accelerate dividends.

It is clear from CAP2040 that the CAA has not considered this issue carefully and as a result appears to superficially consider these beliefs to be reasonable as they allow depreciation deferral in the Low Adjustment case. However, deferring depreciation and postponing dividends is completely opposite to the response a rational investor would take.

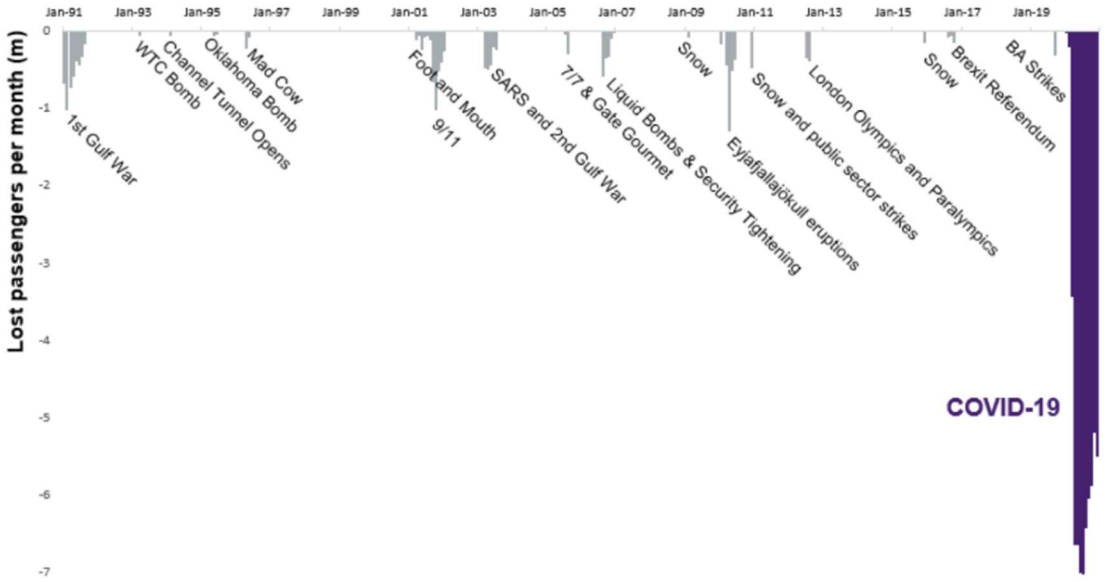
Were the CAA to impose such an approach on Heathrow, and in the unlikely event that such an approach survived the inevitable appeal, it would have a chilling impact on trust in regulation and would create an enormously strong incentive for investors to minimise investment to the maximum extent possible. The capital programme included for this case is already at the minimum level; the consequence of the further reductions leading to such strong day to day pressure for minimisation would be significantly less resilience and worse outcomes for consumers. This is clearly not in their interest and therefore contrary to the duties of the CAA.

5.1.3.3 Passenger Shock Factor and RAB adjustment

The passenger shock factor is the adjustment to the forward-looking passenger forecast to account for the likelihood of future demand shocks. This factor then adjusts the passenger forecast in aggregate for the period downwards. This has proved to deliver more accurate passenger demand forecasts in Q6 than in Q5 as it accounts for the asymmetric nature of market shocks, certainly at Heathrow, where lost traffic against an average forecast is not made up for with later upward deviation from the average forecast.

Estimating the unmitigated risk of future demand shocks is a function of historical data. The impact of Covid-19 has been significantly greater than any previous demand shock.

Figure 2: Passenger impact of historical shock events



Source: Heathrow

If the impact of Covid-19 were unmitigated, the resultant passenger shock factor would be 5.77%.

A RAB Adjustment for 2020 and 2021 would provide mitigation for some of the losses experienced from the huge Covid-19 impacts. Therefore, to be logically consistent, we have adjusted the estimation of the shock factor to take account of this mitigation. We have excluded the shock impacts beyond the implied risk bands from any adjustment from the calculation of the shock factor for the overall demand forecast.

Adjusting for the limited mitigation in the Low Adjustment case thus reduces the shock factor to 5.16% from 5.77%.

Further adjusting this to take account of the greater mitigation in the Full Adjustment case reduces the shock factor to 1.46%.

As a consequence, the shocked forecast for the total number of passengers in H7 is 305.8m, 11.9m lower than the shocked forecast of 317.7m for the Full Adjustment case.

As we demonstrated above in respect of the impact on WACC, investors will consider that any future risk mitigation will be consistent with that applied to 2020 and 2021, irrespective of any proposed future risk sharing mechanism. Therefore, the shock factor must reflect the actual adjustments made for 2020 and 2021.

5.1.3.4 Capital envelope and RAB adjustment

The interim £300m adjustment in 2021 has had a positive impact on consumer outcomes in 2021 and 2022 relative to no adjustment at all, even though the decision was taken by the CAA later than anticipated. It has provided Heathrow with the ability to begin the minimum required critical maintenance in Terminal 3 and Terminal 4. This has supported the opening of a red list country dedicated arrivals facility and helped planning for both terminals, particularly Terminal 3, to be ready for when passenger demand returns. This in turn means we are better placed to reassure consumers that they are receiving the safe and secure experience they desire and the capacity they might need in 2021. This is in line with the outcomes we said could be delivered if the CAA were to take a decision to make an adjustment in 2021 in our response to CAP2098.[10]

However, in the event that no further adjustment to that in CAP2140 is included for H7, the capacity for Heathrow to deliver investment, especially early in the period, would be severely eroded. This is because:

- The impact of the pandemic has led to higher gearing, and the need to restore gearing to pre-pandemic levels will significantly reduce the cash-flow available for capital expenditure;
- In addition, this is exacerbated by the unmitigated passenger volume risk faced by Heathrow that would be likely to result in gearing targets being lowered, reducing cash flow even further; and
- The risk profile arising from the return of capital being at risk would significantly reduce the appetite for investment in the RAB and growing the business. It is not rational for an investor to invest in a regulated business where on the one hand there is significant risk that the investment will not be recovered, and on the other returns are capped.

[10] Heathrow response to CAP2098, pages 21-24

The consequent pressures result in two key constraints for H7;

- Without confidence that there will be a return of historic capital it is unlikely the investment environment will be able to support a plan beyond that required to ensure the safe operation of the airport in H7.
- There would be limited financial capacity in the early years of H7 to deliver investment.

As a consequence, in a Low Adjustment case capital expenditure would be limited to £2.5bn, compared to the proposed expenditure of £4.2bn in the Full Adjustment case.

5.1.3.5 Operating cost and commercial revenue forecasts

This section covers two ways by which our operating cost and commercial revenue forecasts are impacted by different RAB Adjustment scenarios:

- The impact of different capital investment plans on the ability to achieve operating cost and commercial revenue efficiencies.
- The advisability of introducing additional service opex (Enhanced Service Overlay) to meet consumer expectations in H7.

The Impact of Capital Investment

Deferments to capital investment programmes related to Commercial Revenue Generation and Efficient Airport (detailed in the section below) impact our forecast for operating costs and commercial revenues. In the Low Adjustment case we therefore include different overlays in our drivers model:

- A 0.1% year-on-year efficiency rather than a 1.2% year-on-year efficiency in our operating cost model. This is supported by our assumptions on capital substitution (see Chapter 5.4 – H7 Operating Costs Updates).
- A capital investment overlay in our commercial revenues model to reflect no capital investment relating to increasing commercial revenues, leading to a decrease of **[REDACTED]** in commercial revenues over H7 (see Chapter 5.5 – H7 Commercial Revenues Updates for more details).

This is why in our RBP we forecast different cost lines and have significantly different operating costs per passenger between the Full Adjustment and Low Adjustment cases:

Table 5: H7 operating cost forecast lines - Full vs Low Adjustment cases

£m 2018p 2022-2026	Full Adjustment	Low Adjustment
People	[REDACTED]	
Operational Costs		
Insurance		
Facilities & Maint.		
Rates		
Utility Cost		
Distribution		
General Expenses		
Total Core Operating Costs	-5,334	-5,454
Covid-19 Costs	[REDACTED]	
Forecourt Access Charge Costs		
Surface Access Strategy Costs		
Enhanced Service Costs		
Total Operating Costs	-5,575	-5,569
Total Operating Costs / Pax £ 2018p	-17.5	-18.2

Source: Heathrow

This also has consequences for our commercial revenue forecasts:

Table 6: H7 commercial revenue forecast lines - Full vs Low Adjustment cases

£ 2018p	Full Adjustment	Low Adjustment
Retail	[REDACTED]	
Bureaux		
Car Parking / Car Rental		
Service		
Property		
Rail		
Other		
Total Core Revenues		
Forecourt Access Charge		
Total Revenues excl. ORC		
Total Rev. excl. ORC / Passenger £ 2018p		

Source: Heathrow

Figures 3 and 4 show the commercial revenue and opex per passenger in the two scenarios.

Figure 3: **[REDACTED]**

Figure 4: **[REDACTED]**

The consequence of higher revenues and lower operating costs in the Full Adjustment case relative to the Low Adjustment case is not just an airport that is structurally more efficient in H7 and beyond, but one where the higher investment alone leads to lower opex and higher revenues that contribute a reduction of £1.0 (2018) in the passenger charge for H7.

- In addition, there would be no scope for investing in areas airlines are particularly interested in such as improving connectivity and the hub, and automation that reduces their operating costs. This in turn would increase the detrimental impact of the Low Adjustment case on consumers beyond those set out in the table above.

Advisability of the Enhanced Service Overlay

In Chapter 5.4 – H7 Operating Costs Updates, we outline the need for an Enhanced Service Overlay (ESO) to meet the needs of H7 passengers. The full breakdown of the forecast **[REDACTED]** p.a. overlay is described in Chapter 5.4, but the key benefits include:

- **[REDACTED]** p.a. for maintenance opex to help mitigate the underinvestment in assets during 2020 and 2021. This enables more frequent maintenance and inspection regimes, limiting the risk of asset failure and allowing us to deliver the service targets outlined in Chapter 6.2 – H7 Measures, Targets and Incentives Updates.
- **[REDACTED]** p.a. to provide an enhanced service to Passengers Requiring Support (PRS), who currently have the least favourable experience ratings at Heathrow and are likely to have the greatest additional or heightened needs because of Covid-19. This enables our improvement to PRS satisfaction outlined in Chapter 6.2.

The advisability of introducing this overlay is sensitive to the RAB Adjustment outcome:

- In a Low Adjustment case there will be greater constraints on cashflow and a greater requirement to maximise EBITDA to recover lost value in 2020 and 2021. It is not rational for the business to introduce additional operating costs where they are not necessary to achieve the safe operation of the airport. In a Full Adjustment case, the value lost in 2020 and 2021 is recognised in the RAB and there are fewer cashflow

constraints, meaning the headroom to deliver the ESO is present and doing so is rational.

- In a Low Adjustment case there will be significant challenges to affordability, with the charge forecast to be £42.7 while our consumer acceptability testing is clear that charges above £39 would be unacceptable to a majority of consumers. The ESO would add **[REDACTED]** to the charge and is therefore not economical or commercially rational.
- A key learning from Covid-19 is the need for a lean cost base to be resilient to future demand shocks. In a Full Adjustment case we are able to fund a capital plan that increases the level of year on year efficiency from 0.1% to 1.2%, thereby removing £160m 2018p operating cost over H7; we can reinvest those savings in an ESO that improves passenger service in a way that we know passengers are willing to pay for (see Chapter 4.0 – H7 Consumer Insights Updates for more details) while not impacting our resilience to future demand shocks. In a Low Adjustment, these savings are not made due to a smaller capital plan. Introducing ESO would therefore add to the cost base, making the business less resilient.

As outlined in Chapter 5.4 – H7 Operating Costs Updates, the amount of benefits conferred by ESO at a cost of **[REDACTED]** per passenger is good value for money for consumers as it is well below the value consumers attach to the improvements in service (as outlined by our Willingness to Pay research).

5.1.3.6 Overall impact on Airport Charge

The impact of these changes to the building blocks is a significant impact on the charge in the two cases:

- In the Low Adjustment case, the average charge is £42.7 (2018p);
- In the High Adjustment case, the average charge is £10.7 lower at £32.0 (2018p).

Figure 5 below sets out a bridge from the Low Adjustment charge to the Full Adjustment charge, outlining each of the eight key steps identified in Figure 1 at the start of this chapter.

Figure 5: Bridge from Low Adjustment charge to Full Adjustment charge

Source: Heathrow

The key conclusions are:

- A lower WACC (step #1), profiling of depreciation (#2) and lower passenger shock factor (#3) are enabled by a Full RAB Adjustment (#4). These four effects have a net impact of lowering the charge by £11.20. They are all inextricably linked and cannot be cherry-picked.
- The shift to a higher capital plan (step #5) is only rational with a Full RAB Adjustment and is net neutral to H7 passengers due to the favourable commercial revenue (#6) and efficiency (#7) impacts of that investment. This means there is no trade-off between cost and service or between current and future passengers. A CAA true to its duty to passengers – and the quality, availability and reliability of airport services – would seek to facilitate the investment conditions that enabled the Optimal £4.2bn plan.
- The addition of an Enhanced Service Overlay (step #8) is rational in the Full Adjustment case only as the cost **[REDACTED]** is significantly less than the consumer willingness to pay for the forecast increase in service levels (£18.64).

5.1.4 Capital Investment & Consumer Outcomes

Section 5.1.3.4 above outlines why different RAB Adjustment values would result in different capital envelopes. Given the ongoing uncertainty over the final adjustment figure, Chapter 5.3 – H7 Capital Plan Updates considers two capital plans:

- An **Optimal Plan (£4.2bn)** – which requires a Full RAB Adjustment to be made at the start of the period – that invests an average of £830m p.a. in H7, equivalent to Q5 and Q6 levels. This plan helps us to include investments that lower the charge, boost

financial resilience and enhance operational performance to meet increasing consumer expectations on service.

- A **Safety Only (£2.5bn)** plan – the minimum required to operate the airport safely in H7, which is the maximum that can be expected absent of a further adjustment to the RAB – that invests an average of £490m p.a. in H7 – 42% lower than our historic capital run rate. This plan continues the trend of iH7 where we fall behind the curve of expectations and investments, while the gains of the last decade or more evaporate.

The £1.7bn difference in the plans drives significant differences in capital programmes taken forward:

Table 7: Summary of deferred capital programmes in the Safety Only Plan

Deferred Capital Programme	Anticipated Benefits	Consequence of Deferment for Consumer Outcomes
Security Transformation (£130m) & Further Compliance (£230m)	A transformation programme to reduce operating costs and enhance customer experience with a more reliable journey through security. It will introduce these benefits as close as possible to the deadline for the DfT mandate.	Implementing the regulatory compliance mandate without investment in transformation and without additional investment to achieve the mandate for all lanes in H7 will: • Increase queue times • Increase operating costs
Commercial Revenue Generation **(£600m)**	A programme of commercially driven projects which reduce the H7 user charge, while responding to consumer needs in areas such as digital and ecommerce.	Planned revenue not achievable, resulting in a higher user charge. Consumer expectations in digital transformation, ecommerce, retail and media not met. Lack of Surface Access investment will affect consumers ability to get to and from the airport.
Efficient Airport **(£374m)**	Driving down the total cost of operation at Heathrow through automation and investment to deliver service outcomes more efficiently	No further automation delivered during H7 for airlines or consumers. No corresponding reduction in operating costs for Heathrow or airlines.
Future Ready Airport **(£115m)**	Future proofing the airport to respond to future needs for capacity and service, as well as enhancing resilience.	We end H7 without improving capacity, service or resilience levels during the period, setting up for a challenging H8 in all 3 areas.
Carbon & Sustainability **(£150m)**	Key steps to remove and reduce sources of carbon on the ground and in the air, as well as reducing aircraft noise.	Higher investment required in H8 to catch up and meet UK legally binding net zero target.
Western Campus Connectivity & Efficiency **(£35m)**	A programme to increase capacity in T5 to allow colocation of partner carriers, increasing intra terminal transfers, improving experience, connectivity and realising new efficiencies.	Capacity restrictions in T5 prevent colocation of partner carriers, opportunities to resolve known inefficiencies not realised in H7.
T2 Baggage Solution **(£35m)**	A design programme to allow for the delivery of a permanent T2 baggage solution in H8 that enables better performance at lower opex.	Delay to the introduction of a permanent T2 baggage solution until mid H9 at earliest.

Source: Heathrow

The deferment of these programmes has consequences for other areas of our business plan:

- Anticipated improvements to consumer outcomes are not delivered, which in turn changes our proposed Service Quality Targets for H7.
- Lower investment in carbon and sustainability projects will meaningfully decelerate the journey towards net-zero.
- Less investment in commercial revenue generation and operating efficiencies will lead to changes to our forecasts for operating cost and commercial revenue forecasts (see Tables 6 and 7 above).
- Underinvestment in H7 flows through to worse outcomes in H8 and beyond, which is a key concern to the CAA's duty to future passengers.

As identified above the deferment of these programmes would not reduce the charge in H7:

- the £1.7bn lower capital reduces the charge by £1.0
- this is then counterbalanced by a less efficient airport (removal of **[REDACTED]** worth of opex gains) and lower commercial revenues (removal of **[REDACTED]** worth of revenue gains)

5.1.4.1 Impact on Resilience and Service

A lower capital plan and deferring key capital programmes would significantly impact a number of the measures that matter most to consumers. This, alongside the absence of an Enhanced Service overlay, would result in the following adjustments to our proposed targets for H7 being which are considered in full in the "Targets" section of Chapter 6.2 – H7 Measures, Targets and Incentives Updates:

Table 8: Summary of service differences between Full and Low Adjustment Cases

Full Adjustment Case	Measure	Low Adjustment Case
4.26	**Overall Satisfaction**	4.17
80.50%	**Dep. Punctuality**	78.40%
7 to 9 bags in every 1000	**Baggage Misconnect Rate**	9 to 11 bags in every 1000
99%	**Stand Availability**	95%
4.15	**Wayfinding**	4.10
95%	**Direct Passengers < 5-min Security Queue**	33% - 75%
99%	**Direct Passengers**	46% - 89%

	< 10-min Security Queue	
95%	**Connecting Passengers < 10-min Security Queue**	46% - 89%
95%	**Staff Search < 10-min Security Queue**	46% - 89%
95%	**Control Posts < 15-min Vehicle Queue**	46% - 89%
4.05	**Cleanliness**	4.00
4.00	**Wi-Fi Performance**	3.93
95.00%	**Pier Service (excl. T5)**	94.00%
99.00%	**Lifts, Escalators and Travelators**	97.00%
99.00%	**Stand Availability**	98.00%
99.00%	**Stand Facilities**	97.25%
99.00%	**T5 Track Transit System 1 Train Availability**	97.00%
97.00%	**T5 Track Transit System 2 Train Availability**	95.00%
99.00%	**Baggage Reclaim Belt Availability**	98.00%

Source: Heathrow

As outlined elsewhere in this document, the impact of these service differences is best understood in the aggregate impact on passenger journeys in H7. Examples include:

- 3.2m more passengers in the Low Adjustment case would experience a departure delay.
- 330,000 more passengers in the Low Adjustment case would travel without their bags.
- 96m more passengers in the Low Adjustment case would experience a security queue of 10 minutes or more.
- 2 million more passengers in the Low Adjustment case will experience a Poor or Fair journey (ASQ scores 1 & 2)

- 4.9 million less passengers in the Low Adjustment case will experience a Very Good or Excellent journey (ASQ score 4 & 5)

5.1.4.2 Impact on Carbon and Sustainability

Heathrow has an obligation to support the UK meet its net zero carbon target. The CAA also has a duty in respect of sustainability that requires it to ensure Heathrow is able to take reasonable measures to reduce the adverse environmental effects of the airport and of aircraft using the airport. This can be achieved through capital investment to remove carbon from ground operations and from flight.

Our Safety Only plan commits to the delivery of airspace modernisation, a critical way of not only delivering resilience and improving punctuality, but also reducing total time in the air, which in turn reduces total carbon emitted. This will not reduce carbon emitted in H7 but will remove up to 65,500t in H8 when changes are implemented.

Our Optimal plan allows for an additional £150m investment in Carbon & Sustainability projects. This creates the opportunity to move further along the carbon abatement curve, delivering projects such as pre-conditioned air (PCA) to all stands and changing the gas boilers that heat our terminals to a renewable source. These investments combined – alongside airspace modernisation – could reduce carbon emitted by 175,000t, with 99,000t removed in H7.

Table 9: Carbon & Sustainability investment and carbon savings in H7 - Full vs Low Adjustment cases

	Optimal Plan	Safety Only Plan
Capital invested in Carbon & Sustainability	£188m	£38m
Carbon removed in H7	99,000t	0

Source: Heathrow

5.1.4.3 Impact of underinvestment in H7 on future business plans

The service quality and standards delivered at airports reflect the impact of investments often made many years before. The impact of a lower capital programme in H7 would therefore also have an even greater detrimental impact on service and resilience in H8, and H9. This is explored in full in Chapter 5.3 – H7 Capital Plan Updates and summarised below.

The Civil Aviation Act (2012) requires the CAA to carry out its functions “in a manner which it considers will further the interests of users of air transport services” and defines those users as both current and future users.

In the Safety Only plan we are deferring projects in key areas that will impact potential service and financial outcomes in H8.

Table 10: Deferral of projects in the Safety Only plan

	Optimal Plan	Safety Only Plan
Security	All passengers travelling through compliant security at all times, with all security lanes upgraded by end of H7, better service and lower operating costs	All passengers travelling through compliant security at all times, but only 50% of security lanes available by end H7, increased queue times and worse service, same or worse operating costs
T2 Baggage	New system with better service and lower operating costs in place by early H9	New system not available until late H9 at earliest
Western Campus	New capacity in T5 by end H7, more intra-terminal connections, lower operating costs	New capacity in T5 by mid H8 at earliest
Passengers Requiring Support	Ability to continue enhancing the experience of our most vulnerable consumers	Service levels fall during H7 as passenger numbers return and no improvements until H8 at the earliest
Automation	More automation of service, airfield and baggage delivered from mid H7 – lower opex, lower charge.	No significant automation of service, airfield and baggage until mid H8 at earliest – higher opex, higher charge.
Digital Retail	Digital retail platform available from mid H7 – higher revenues, lower charge.	No digital retail platform until mid H8 at earliest – lower revenues, higher charge

Source: Heathrow

In addition to service impacts, deferred investments from H7 would need to take place in H8, where there is already a significant capital requirement:

- Significant spike in asset management requirements as T5 will be 20 years old and T3 approaching end of life at 70 years old.
- Continued material investments in carbon and sustainability to progress towards net-zero, including infrastructure adaptions to accommodate electric or hydrogen aircraft.
- Requirements to design and deliver a long-term solution for T2 baggage.
- Depending on the recovery of passenger demand in H7, a revisiting of capacity programmes for T5 and T2.

Attempting these investments all at once would pose significantly more deliverability and affordability challenges in H8 than is necessary. It also leaves Heathrow more susceptible to the inevitable next demand shock before it has dealt with the consequences of the previous one.

5.1.5 CAA duties and RAB adjustment

The decision of whether to undertake a further RAB adjustment, and the consequential impacts outlined here to consumer and other outcomes, are most relevant when considered against the CAA duties.

The Civil Aviation Act of 2012 states that the CAA must "carry out its functions…in a manner which it considers will further the interests of users of air transport services regarding the range, availability, continuity, cost and quality of airport operation services."

Section 69 of the Act defines "users of air transport services" as both current and future users.

Subsection (3) outlines the areas the CAA must have regard to when performing its duties, which include:

(a) "the ability for the [airport operator] to finance the provision of airport operation services…".
(c) "the need to promote economy and efficiency…"
(d) "the need to reduce, control or mitigate the adverse environmental effects of the airport…"

The CAA must review the measures we have used to assess the performance of the Full and Low Adjustment cases against these duties:

Table 11: Assessment of CAA duties against Full and Low Adjustment case measures

CAA Duty	Measure Assessed	Reason
Cost of airport operation services ("**Cost**")	Average H7 Charge	Although consumers ultimately pay air fares – and these are a function of competition between airlines – the charge is one available proxy for this analysis.
Quality of airport operation services ("**Quality**")	Overall Satisfaction Target	The Service Quality Target for Overall Satisfaction captures passenger experience that is delivered by each case.
	Wi-Fi Performance	Passengers value connectivity to the outside world. See Chapter 4.0 - H7 Consumer Insights Updates.
	Passengers with Reduced Mobility (PRM) Satisfaction	PRM passengers have some of the highest needs but some of the less favourable experiences of Heathrow
	Cleanliness	Passengers value cleanliness, particularly so following Covid-19. See Chapter 4.0 – H7 Consumer Insights Updates.
	Wayfinding	Passengers value ease of travel, and Wayfinding is a reasonable measure of ease.
Availability of airport operation services ("**Availability**")	Direct Passenger Security Queue Times < 10 mins	Timely availability of access to security processes is a key consumer interest.

	Stand Availability	Availability of stand facilities determine the quality of service for airlines and other airport users.
	Lifts, Travelators, Escalators	Availability of these determine speed and ease of passenger journey.
	Baggage System Reclaim Availability	Availability determines arrivals ease and predictability of journey.
	T5 TTS 1 Train Target	Availability determines ease and predictability of journey in T5 satellite terminals
Continuity of airport operation services ("**Continuity**")	Passengers departing on time (OTD%)	On time departure achieved in a period reflects the ability of the airport to recover from disruption/crises.
	Passengers departing with their bags (Misconnect Rate)	Baggage misconnections in a year is impacted by the resilience and availability of Heathrow's baggage systems.
Finance the provision of airport operation services ("**Financeability**")	WACC	WACC – a function of cost of debt and cost of equity – reflects at what cost Heathrow can access debt and equity capital.
Promote economy and efficiency of airport operation services ("**Efficiency**")	Commercial Revenues / Passenger	Heathrow's net non-aero position per passenger reflects the cost of operating the airport.
	Operating Costs / Passenger	
Reduce, control or mitigate the adverse environmental effects of the airport ("**Sustainability**")	Carbon removed from operation	Heathrow is committed to achieve net-zero by 2050, so tracking carbon removed from the operation in H7 is a relevant measure of how well sustainability duties have been met.

Source: Heathrow

When assessed quantitatively there is no doubt that only a Full Adjustment is consistent with CAA duties:

Table 12: Summary outturn of Full and Low Adjustment cases

CAA Duty	Measure	Full Adjustment	Low Adjustment
Cost	**H7 Charge**	£32.0 2018p	£42.7 2018p
Quality	**Overall Satisfaction**	4.26	4.17
	Wi-Fi Performance	4.00	3.93
	PRM Satisfaction	4.00	3.92
	Cleanliness	4.05	4.00
	Wayfinding	4.15	4.10
Availability	**Security Queue < 10 mins**	99.00%	46% - 89%
	Stand Availability	99.00%	97.25%
	Lifts, Travelators, Escalators	99.00%	97.00%
	Baggage Reclaim Availability	99.00%	98.00%
	T5 TTS 1 Train	99.00%	97.00%
Continuity	**OTD%**	80.50%	78.40%
	Baggage Misconnect Rate	7–9 in 1,000	9–11 in 1,000
Financeability	**WACC**	8.50%	10.40%
Efficiency	**Rev / Pax**	**[REDACTED]**	**[REDACTED]**
	Opex / Pax	(£17.5) 2018p	(£18.2) 2018p
Sustainability	**Carbon removed**	99,000t	0t

Source: Heathrow

The CAA also has a duty to future passengers. The Full Adjustment case is also clearly in the interests of consumers in the long-term, in H8 and beyond, as a result of the investments a H7 adjustment will allow Heathrow to make in H7.:

Table 13: Summary outturn of Full and Low Adjustment cases

CAA Duty	Full Adjustment	Low Adjustment
Cost	Lower charge as a consequence of structurally more efficient operation and commercial revenues.	Higher charge given a less efficient airport with lower revenues than otherwise. Pressure from spikes in capex will also place upwards pressure on H8 charge.
Quality	H8 entry point of 4.26	H8 entry point of 4.17
Availability	Shorter security queues	Longer security queues
Continuity	New, more reliable baggage system for T2 delivered by end H8	No new T2 baggage system until mid H9 at earliest
Financeability	Recovered financial platform	Challenge to return to notional gearing continues into H8
Efficiency	Structurally lower opex and higher revenues	Higher opex and lower revenues
Sustainability	On track to continue delivering carbon abatement investments	Behind on H7 programmes to deliver carbon abatement

Source: Heathrow

We expect that the CAA will comment on each of the following when considering this updated plan and the case for a further adjustment of the RAB :

- The link between a RAB adjustment outcome and the financial building blocks (including capital investment).
- The link between capital investment levels and consumer outcomes, both historic and future.
- The relevance of the assessed measures for financial and consumer outcomes and the CAA duties as outlined in the Civil Aviation Act of 2012 – with particular reference to the outcomes of future passengers.

Absent evidence that these factors have been properly considered – with quantified analysis rather than qualitative observations – we will explore all avenues to ensure the outcome is a settlement that delivers the best outcome for consumers.

5.1.6 Issues arising from CAP2140

There were a number of issues and points raised in CAP2140 with which we disagree. Many of these relate to issues of process around the scale of the interim adjustment set out in CAP2140 and the CAA reasoning behind this. Others relate to difference in views about the extent to which matters should be left to H7. We do not address these issues here as we are now focussed on helping the CAA make the right decisions for H7; nor do we intend to deal with all of the CAA's views in detail – the fact we do not challenge a CAA finding or view below should not be understood as Heathrow accepting that finding or view.

We have dealt directly with a number of areas such as the importance of protecting revenue associated with regulatory depreciation, the right size for the adjustment, the impact of the CAA's decision on the outcome for H7 including the use of depreciation deferral, and the impact on WACC and these are set out above.

Nevertheless, there remain a few issues raised in the consultation to which we wish to respond. These are set out below.

Actual Financial Structure and CAA Duty

In Paragraphs C24 to C29 the CAA responds to our statement in the response to CAP2098 that "*It is therefore incumbent on the CAA to demonstrate that Heathrow as it currently stands can be financed properly*." The CAA have misunderstood the point we were making and instead have focussed on the narrow issue of the use of a notional financial structure in price setting, with which we do not disagree.

The key issue that the CAA appear not to consider is that any impact on consumers from an unanticipated situation such as Covid-19 will depend on its impact on Heathrow's actual financial situation. If the CAA ignores or gives insufficient weight to Heathrow's actual situation as a result of focussing on an alternative notional company, then it exposes itself to the risk of real consequences that are detrimental to consumers, contrary to its duties, and that it could have avoided by taking appropriate action following the right analysis.

Therefore, in exercising its duties, the CAA must be mindful of Heathrow's actual financial situation and act in a way that it can continue to finance the provision of airport services so that consumer requirements are met. We note that in some parts of CAP2140 (e.g. para 3.26) the CAA more accurately recognises that there are circumstances (namely, when Heathrow's actual financeability is at risk) when it will have to place weight on concerns around Heathrow's actual financing structure.

Investor Expectations of the Level of Risk they Would be exposed to in Q6

In Paragraphs C142 to C166 the CAA discusses Heathrow's views that investors reasonably expected the CAA to intervene in the event of an extreme shock and that the extent of the impact of the pandemic is not consistent with investors' expectations under CAPM for a regulated business in a regime with clear mechanisms and expectation for regulatory intervention.

In paragraphs C144 to C149 the CAA dismiss the view that investors reasonably expected the CAA to intervene in the event of extreme circumstances. The CAA's statements contain a number of serious mis-representations of the arguments that Heathrow put forward and in other areas makes statements that contradict its own stated position in Q6.

- In paragraph C145 the CAA states that the shock factor addresses the asymmetry of passenger risk. This is not correct. The shock factor is intended to ensure that the

expected outcome reflects the asymmetry of risk of the demand forecast being wrong. It is about ensuring a more accurate set of average assumptions. It does not include *any* compensation for the additional capital cost that bearing asymmetric risk, or any investment performance risk to capital, incurs. Risk reflects the diversity of outcomes that may occur. A more diverse range of outcomes, even with the same expected outcome, carries a higher risk and therefore needs a higher return. An adjustment that adjusts the expected outcome, but not the range of outcomes does not address that risk.

- Also in paragraph C145, the CAA misrepresents Heathrow's argument in respect of the use of a two factor rather than three factor approach to CAPM. In its determination, the CAA deliberately and explicitly chose a representation of CAPM in which symmetry of returns is a fundamental assumption. Covid-19 has demonstrated that the risk is highly asymmetrical and therefore the approach used at Q6 is based on an assumption that is clearly void.
- In paragraph C146 the CAA argue that because the CAA did not explicitly set out what steps it would take in the event of a request to re-open the price control, and made no explicit promise to protect Heathrow from the impact of extreme traffic shocks, that investors could not possibly believe that the CAA would intervene in the event of such a traffic shock. This ignores the extensive discussions around this issue in Q6 where investors were assured that the CAA would intervene in the event of extreme circumstances. To argue that investors would not have expected the CAA to intervene in extreme circumstances given this debate is extremely disingenuous to the extent it amounts to a position that no reasonable person would consider was credible.

In paragraphs C149 to C166 the CAA address the extent to which the variation in returns observed in 2020 and 2021 is realistically consistent with the outcomes that would be expected given the WACC for Q6 and a regulatory regime for which intervention would be expected in extreme circumstances. We have a number of concerns with the CAA analysis here:

- In paragraph C151 the CAA argue that the distribution of returns for Q6 was normally distributed and therefore unbounded. This is a specious argument. The CAA's conduct and representation gave investors a clear and legitimate expectation that the CAA would intervene in the event of exceptional circumstances. Given this, there is a clear range of outcomes that investors would expect to bear and there are circumstances beyond that range which they would not. The fact that CAPM is theoretically unbound does not mean that investors would expect to bear the consequences of low frequency events.
- In paragraph C154 the CAA note that the relationship between the volatility of Heathrow's equity returns and market returns depends upon the correlation coefficient described in the paragraph. In our submission we noted we had assumed this was 1.0 and that it might be higher or lower. The analysis we presented estimating the impact of Covid-19 on asset betas was consistent with this coefficient being 1.0, the observed movement in asset beta for listed airports, and the pre-pandemic estimate of pandemic frequency of once every 30 years. This demonstrates that the use of a coefficient of 1.0 was consistent with the available data.
- In paragraphs C157 to C164 the CAA sets out its estimates of the standard deviation of annual returns. These estimates are significantly greater than the estimate by KPMG that we used in our analysis, which was consistent with the approach used by KPMG to estimate the additional systematic risk arising from expansion. Our preliminary view is that the CAA have not estimated these correctly, in that these estimates are not suitable for estimating the likelihood of a particular return being

beyond a certain level and that an incorrect scaling factor or approach has been included. As a consequence, the CAA have drawn the wrong conclusions. We will provide detailed evidence on this in due course.

5.2 H7 passenger demand updates

5.2.1. Introduction

This section provides the updated demand forecast used throughout the rest of the update. Passenger demand is a big driver of the overall economics of the H7 plan. It is both a building block in the regulatory settlement itself and affects in turn costs, revenues and outcomes.

The impact of Covid-19 has made forecasting Heathrow demand particularly uncertain. In the RBP we provided a transparent methodology to create the best possible forecasts. We had also engaged extensively at that point with airlines and others to develop our approach, and have continued to do so since the RBP. We have over 6 months more data not only on Heathrow traffic itself but pandemic trends, the impact of vaccines, government policies and industry developments. This update reflects the latest information from all of these.

The resulting forecast at p50 is for 317.7 million passengers over H7. This is lower than at the RBP in significant part because of the further waves of both Covid-19 and delays to the reopening of travel. There continue to be large uncertainties on assumptions and developments between now and 2022. Data and testing so far has reinforced the validity of our approach. We therefore intend to further review the forecast, mainly by inputting refreshed assumptions, in our final update.

The forecast presented allows for a range of outcomes and scenarios. We explain how in the discussion below. It also includes the shock factor, as established for Heathrow forecasts in Q6 and shown to increase forecast accuracy. The shock factor has been adjusted – down to 1.46% - to account for the adjustment mechanism proposed elsewhere. The forecast is therefore linked to that adjustment mechanism being adopted by the CAA. If it is not, the shock factor would be revised up to at least 5.16% and the forecast reduced accordingly.

This chapter begins by providing context since the RBP and responds to airline feedback, questions of methodology and scenarios. It then reviews the updates to key drivers for the travel restrictions model, the econometric and supply models. It concludes by presenting and calibrating the latest results.

Context

At the point of writing the Revised Business Plan in December, UK regulators had just granted authorisation for the Pfizer-BioNTech vaccine. The UK public were looking forward to a relaxation of restrictions in time to celebrate over the Christmas period. Just days later a first new variant of concern was found, Christmas plans were cancelled and more than 40 countries had banned arrivals from the UK[1].

The discovery of the new variant and the ensuing spike in cases and deaths led to the UK Government imposing a third national lockdown, closure of all travel corridors and introduction of pre-travel testing requirements for all international passengers. Travel bans were enforced on arrivals from red-list countries, initially focussed on South America, Portugal and South Africa. These bans were then escalated to require proof of essential travel and hotel quarantine at a cost of almost £2,000 per passenger. Any passengers found to be avoiding hotel quarantine faced a fine of £10,000 and up to ten years in prison.

[1] BBC news, 21st December 2021

Since variant Alpha was found in December 2020, alerts have been raised about further variants first seen in South Africa, Brazil and India amongst others. There are currently four designated Variants of Concern and six Variants under Investigation. Much is still unknown about these variants, including assessment of their transmissibility, severity and whether they respond to the vaccines currently in use[2].

There is some cause for optimism in that the vaccination rollout is progressing well in the UK. In the 6 months since publishing the RBP over 70 million vaccine doses have been administered. This allowed the UK Government to start proceeding with the roadmap for the easing of lockdown restrictions[3]. The first significant change to travel restrictions came on the 17th May, with the introduction of a framework that applies testing and quarantine requirements in a traffic light system depending on the level of risk associated with each country[4].

However, there are high levels of concern over vaccine-resistant variants coming to the UK. That concern is translating into public support for continued restrictions on foreign travel. A majority of the public (79%) are in favour of stopping people entering the UK from countries with higher levels of infections, 67% support stopping people returning from any other country. Seven in ten (70%) are in favour of making people quarantine in hotels when they return from any foreign country[5]. This is also backed by The Labour Party, The Liberal Democrats and The Green Party.

The restrictions associated with the traffic light system therefore reflect that extreme caution surrounding the re-start of international travel. Even the lowest risk category passengers are required to take a test before returning to the UK and then a subsequent PCR test after arrival. When announcing the first countries to be added to the green list, Secretary of State for Transport Grant Shapps warned:

"We in this country have managed to construct a fortress against Covid-19, but the disease is still prevalent in other parts of the world […] We must keep our fortress, built at such a huge cost to all of us"[6]

The initial categorisation of destinations by red/amber/green saw only twelve countries placed in the green category; these countries accounted for less than 5% of our 2019 passenger volumes. The initial list of green category countries was met with negative reactions from the travel industry, with Airlines UK declaring the move *"a reopening of air travel in name only"* and EasyJet CEO Johan Lundgren stating the decision as *"simply not justified by the data or the science".*

Following public confusion on the restrictions associated with the amber list, the Government are now advising against travel to those countries:

"You should not be going to an amber list country unless for some extreme circumstance such as the serious illness of a family member. You should not be going to an amber list country on holiday"[7]

Just three weeks later, the second review of countries' red/amber/green status saw the removal of Portugal from the green list. Ministers cited concerns over a new variant and

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[2] Public Health England, 10th May 2021
[3] UK Government press release, 22nd February 2021
[4] Global Travel Taskforce Report, 9th April 2021
[5] Ipsos Mori, 7th May 2021
[6] Transport Secretary Statement, 7th May 2021
[7] PMQs, 19th May 2021

increasing cases, despite Portugal having very similar case incidence to the UK. The decision was described as a *"safety first"* approach and one which would protect for the UK's domestic unlocking.

The latest review on 24th June saw sixteen destinations, including a small number of smaller European and Caribbean holiday destinations, moved to the green list and six further destinations added to the red list.

Whilst this review saw more countries move to the green list, the majority were either low volume travel markets from the UK, such as Madeira - or not travel markets at all, such as Antarctica. Overall, the countries added to the green list as part of this review represented 0.6% of our 2019 passenger traffic volumes. Furthermore, all bar one of the countries added to the green list are on the 'green watchlist', meaning that they are at risk of being moved back to amber at short notice.

The consensus amongst the travel industry was that the 24th June decision did not go far enough, with Airport Operators Association CEO Karen Dee saying "*any extension of the green list is welcome, however small, but we also have to be realistic: this is not yet the meaningful restart the aviation industry needs to be able to recover from the pandemic."*

With ministers also publicly expressing that they would prefer people not to travel internationally this summer[8], the likelihood of another lost summer for the UK aviation industry has increased.

The UK Government's approach to travel restrictions means our recovery will lag behind that of the US and Europe. Although most of Europe is on the UK amber list, many European tourist destinations have said they will welcome UK citizens this summer: Spain has no entry restrictions; Greece, Portugal and Italy need only proof of a negative PCR test; and France is allowing entry to travellers who are fully vaccinated with proof of a negative test.

EasyJet has announced that it is moving flights that had been planned to operate from the UK to elsewhere in Europe because of the UK Government's restrictive approach. Several aircraft that would have operated from the UK to Palma will instead fly from Berlin[9].

The decision to remove Portugal from the green list is against the domestic backdrop of increasing prevalence of the Delta variant and rising total cases. The UK incidence of Covid-19 is up to c.110 cases per million population in mid-June and growing at a rate that puts us on track for a peak as large as that seen in January 2020. The final stage of domestic unlocking that had been planned for 21st June has been delayed to at least the 19th July.

In this context, any further relaxation of travel restrictions or additions to the green list are finely balanced between a worsening domestic situation and increased caution on travel restrictions on one hand and progress with vaccine rollout on the other. In fact, with the significantly higher prevalence of Delta variant in the UK compared to other countries, we face the prospect of the recovery happening around us, whilst the UK remains isolated either through the choice of our own Government or other governments around the world.

At the time of writing the Building Blocks Update in July 2020 we had expected 62.8 million passengers in 2021. Five months later, at the time of writing the December RBP, expectations had dropped to 37.1 million. Now, another five months on and writing this RBP Update, expectations have dropped further to 21.5 million. What had been considered as worst-case

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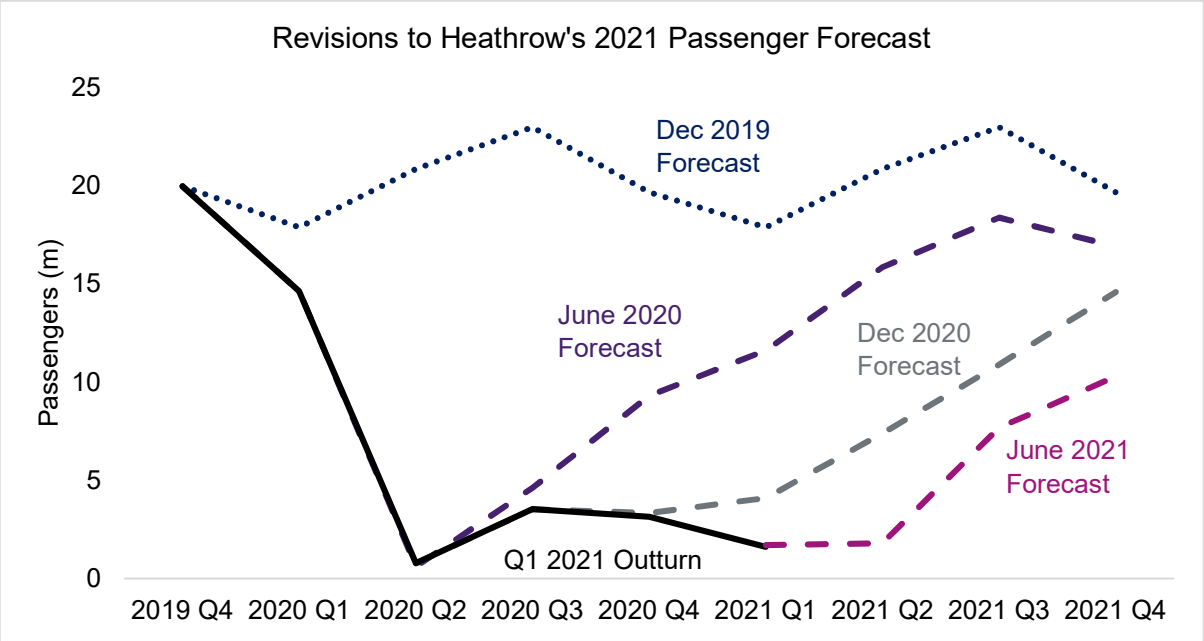
[8] Health minister: Overseas travel 'dangerous' and 'not for this year' | Evening Standard
[9] EasyJet moves capacity out of UK, Travel Weekly, June 2021

scenarios have become reality and been surpassed. Even ten months on from the Building Blocks Update, so much of what will define future levels of demand is outside of our control and in the hands of Governments around the world.

Figure 0: Revisions to the Heathrow passenger forecast Dec 2019 to June 2021



Source: Heathrow

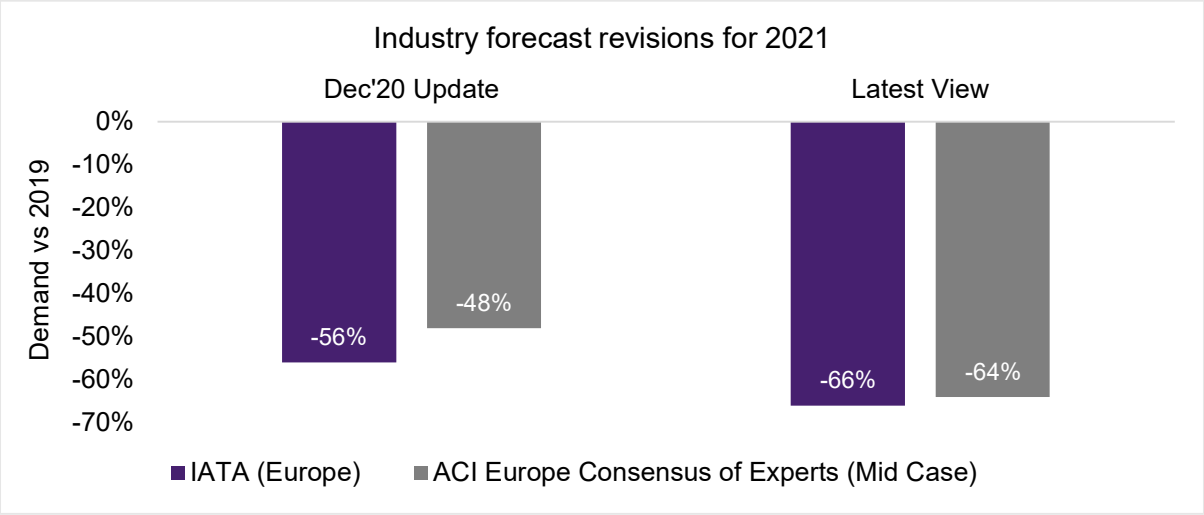
The situation is very much as uncertain as it was both in December and at any time in the recent past. There are feasible scenarios that cover almost the entire range of possibilities for at least this year and the initial years of the H7 period. There remain many aspects of the future that we cannot yet know with certainty.

The need for flexibility in our forecasting methodology is therefore as present now as it has been any time in the last year. Our approach for this RBP Update remains rooted in a scenario-based approach, grounded in a set of assumptions that we transparently update with each iteration. We have therefore set out in detail each change to our assumptions.

Industry views

Our own downward revisions to forecasts are mirrored in forecast updates across the aviation industry. What had been central case expectations of c.50% recovery for this year have now proved to be overly optimistic. Figure 1 shows the latest forecasts from IATA and ACI in comparison to their views at the time of publishing the December RBP.

Figure 1: Industry forecast revisions for 2021



Source: IATA, ACI

We note that the IATA and ACI forecasts were released in April so may now be outdated. During Constructive Engagement, IATA had stated that an updated forecast would be released in May. Moody's have recently released a forecast for 2021 to be -70% on 2019, which is more in line with our own expectations for this year.

We will have served just under 4 million passengers in the first half of 2021, which represents an average c.10% recovery on 2019. In order to reach a 35% recovery for the full year, as suggested by the IATA and ACI forecasts, we would need to serve an additional 24 million passengers in the second half of this year. If demand this summer is similar to that seen last summer, then the last quarter of this year would need to see 105% recovery to hit that 24 million passenger total.

The over-optimism of the early years of our forecast in the December RBP was noted by the CAA in their Consultation on the Way Forward[10]:

"The short-term forecasts for 2021 and 2022 could be somewhat optimistic given the more stringent travel restrictions that have come into force for the UK and other key markets since the RBP was published".

In hindsight, we agree that the mid-case forecast for 2022 of 51.9m passengers, as stated in the December RBP, was overly optimistic and now considered to be at the top end of potential outcomes for next year.

Many analysts are now projecting that this summer will be worse than last[11] and highlighting the isolating effect of the UK Government's overly cautious approach; leaving the UK behind as the rest of the world begins to open up. The delay comes at a crucial time for airlines. Seven months ago, IATA warned that the median airline had just over eight months of cash to survive[12], with no significant lifting of restrictions expected for at least another month, airlines are facing the very real prospect of bankruptcy. Those that do survive will be financially weakened for some years to come.

[10] Consultation on the Way Forward, CAA, April 2021
[11] If there is limited summer travel, government must step up financial support, AOA, May 2021
[12] Deep Losses Continue Into 2021, IATA, November 2020

As well as downward revisions to the short-term outlook, the expected timeline for full recovery has also been pushed back by c.1 year. As shown in Table 1, most forecasts pin the year of recovery to 2019 levels to 2025 in their central scenario:

Table 1: Industry forecasts for year of full recovery

Source	Date forecast published	Year of return to 2019
ACI	Apr 2021	2025
Eurocontrol	May 2021	2025
IATA West Europe	May 2021	2024
Fitch Ratings - UK Aviation Traffic	Apr 2021	2025

Source: ACI, Eurocontrol, IATA, Fitch Ratings

IATA is the most optimistic in suggesting recovery no earlier than 2024 in their Western Europe scenario. They also consider a downside scenario in which limited vaccine effectiveness delays recovery until 2029. IATA notes how significantly skewed the risk profile is; by 2025 their downside risk is over 4 times larger than the upside[13].

ACI and Eurocontrol's forecasts show a similarly skewed range around their central cases. By 2024, Eurocontrol's downside risk is 2.7 times larger than the upside and ACI's downside is 2.3 times larger.

IATA has produced separate forecasts for each region of the world, commenting on the significant differentiation that is emerging between regions with large domestic markets and those relying on international traffic[14]. In markets like the US, domestic recovery is already reaching over 70% compared to 2019[15]. In China, South Korea[16] and Russia[17] domestic numbers are either at or surpassing 2019 levels. Regions such as the UK, Africa and the Middle East, which do not have significant domestic markets, will lag behind.

Although useful for context, comparisons against external forecasts must be considered with some caution. In May we had only recovered 30% of 2019 domestic passengers. Our reliance on a cautious UK Government and lack of significant domestic market means a relatively slower recovery must be expected compared to other markets. Even in comparison against forecasts for Europe, we are at a disadvantage now that the UK is outside of the European Union and so excluded from that quasi-domestic market.

Added to that is the fact that we are more reliant on business passengers, a very extensive global network and are more exposed to the retirement of larger aircraft. All in all this creates a different and more difficult environment for recovery for us compared to other European and UK airports.

[13] Air passenger forecasts, Tourism Economics & IATA, April 2021
[14] Reduced Losses but Continued Pain in 2021, IATA, April 2021
[15] US Airline Recovery, Simple Flying, April 2021
[16] Asia Pacific aviation update, CAPA, March 2021
[17] Russian passenger traffic recovery, Simple Flying, March 2021

5.2.2. Changes since December RBP

Overview

Given the context set out above, we have made number of changes to the forecast we set out in the December RBP. Our approach remains grounded in a set of assumptions that we transparently update with each iteration. We have set out a summary of the changes here and then go into detail on each assumption later in this chapter.

Scenarios

The scale of change since the December RBP has warranted a refresh of the scenarios. The Early Vaccine, Testing & WHO Vaccine, Rolling Quarantine and Permanent Reduction scenarios have been replaced with four new scenarios: Pent-Up Demand, Steady Build, Gradual Opening and Autumn Reversal.

Each scenario is still created in the same suite of models and combined using the same methodology used for the December RBP. For an overview of the scenarios please see Section 5.2.5. The detailed assumptions associated with each scenario are explained in Sections 5.2.6 - 5.2.8.

Short-term drivers

The short-term outlook has changed significantly:

- Variants of concern have been discovered resulting in third and fourth waves of infection. This has delayed the opening of most markets, pushing back the timeline for recovery.
- The UK Government has set out their risk-based approach to the application of travel restrictions. Requirements for testing and quarantine will impact on passengers' propensity to travel and prove a blocker for some. Over time we expect the cost of testing to reduce and to see restrictions reducing for countries with lower risk.
- Numerous vaccines have now been approved for use and in many countries the rollout is well progressed. This allows us to project the point at which herd immunity will be reached in each market and so allow for relaxation of restrictions.

All of these changes have been reflected in our Travel Restrictions model. For more information on this, please see Section 5.2.6.

The impact of the changes to these short-term drivers on the forecast is to reduce the number of passengers expected in the initial few years of the H7 period. There is a reduction of c.17% to the mid-case forecast for 2022, which then tapers to just a c.3% reduction in the mid-case for 2023. The passenger numbers in the low and high cases are also reduced in 2022 and 2023.

Long-term – econometric drivers

The forecasted outlook for the economy has improved since December. Our econometric model uses GDP scenarios developed by Oxford Economics to relate passenger volumes to economic growth. With this update to the forecast we have updated our model to use the latest version of the GDP scenarios, published in April. The impact of the latest Baseline GDP scenario alone on passengers is a 2.5% increase over the H7 period.

Since publishing the RBP in December, there has been no improvement in business travel and our experience of working from home and videoconferencing has been further embedded. Although there is no further clarity over the long-term impact, we have carried out further

review on industry-wide analysis on this topic and have updated our assumptions as a result of our findings. This has resulted in a change of -10% to -20% impact for the second most optimistic scenario. Otherwise, the assumptions on business impact for all other scenarios remain unchanged.

In order to consider the impact of fares on demand, and increase the transparency of our assumptions, we have separated out the impact of cost of carbon from Covid-related pressures. On that latter impact, we have reviewed the feedback from the Airline Community, and the wider evidence base provided by their public statements, webinars and financial results and updated our assumptions accordingly.

For more information on the updates to the key econometric drivers, please see Section 5.2.7.

Long-term – supply drivers

There is ongoing work across the aviation industry to reduce the impact of Covid-19 on airport capacity. The clear intent is to liberate capacity such that it does not become a blocker to demand. With that work still underway it is unclear what impact it will make on the assumptions we set out in the December RBP. For this updated forecast we have therefore assumed that airport capacity will not constrain demand. Once more information is known about capacity improvements and they have been tested against the increased passenger numbers we hope to serve this summer, we will be in a better position to update our assumptions on airport capacity.

The Airline Community have declined to share details on their capacity plans for the H7 period but have pointed us towards publicly available information such as press releases and financial results. We have carried out further analysis based on these sources of information in order to build up an understanding of aircraft retirements, deliveries and deferrals. We have updated our assumptions on airline supply as a result of this analysis.

For more information on the updates to the key supply drivers, please see Section 5.2.8.

The combined impact of the long-term drivers has resulted in an increase to the mid case in 2024, 2025 and 2026 and an increase in all cases in 2026. This is largely driven by the more optimistic economic outlook. For the mid-case this results in an increase of over 3 million passengers for the later part of the period.

5.2.3. Airline Community engagement

The forecasting methodology and assumptions have been shaped by our discussions with the Airline Community during Constructive Engagement as well as other publicly available commentary and analysis. The table below sets out each piece of feedback and/or evidence and how we have responded:

Table 2: Airline feedback & commentary

Topic	Airline feedback	Heathrow response
A. General comments	Our overall assessment is that the forecasted passenger figures within the RBP are however significantly 'deflated' as a result of particularly pessimistic, or in some cases incorrect, assumptions and inputs that HAL have applied to each aspect of their assessment. Ultimately, this has produced a forecast range that, even in its 'high case', fails to align with the general industry comments of recovery by around 2023 – 2024. *Ref: Airline Community written feedback, Initial Comments to Heathrow's Revised Business Plan, March*	As set out in the December RBP, our forecasts are in line with others in the industry. We note that many industry forecasts have now been revised down since the December RBP and the general industry consensus is now of recovery by 2025. We include comparisons of forecast recovery years in Sections 5.2.1 and 5.2.9. Although we acknowledge high-level feedback such as this, it is much more useful to have feedback with accompanying evidence on specific assumptions so we can consider how to make any changes in the forecast.
B. GDP scenarios	GDP assumptions weighted too highly towards the more pessimistic scenarios. The latest Oxford Economics Global Scenarios Service key risks analysis, on which Heathrow's GDP scenarios are apparently based, shows a rather different weighting of subjective probabilities. *Ref: Section 5.7.1, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	The RBP was issued in December 2020. The Oxford Economics weightings noted by IATA in their feedback were issued in February 2021. We could not have taken account of the updated weightings referenced by IATA as they were published after the RBP. Oxford Economics regularly update their GDP forecasts. The version used for the December 2020 RBP was from November 2020. This update to the RBP includes the latest Oxford Economics GDP scenario, published in April 2021. For more information on the GDP assumptions used in our forecast, please refer to Section 5.2.7
C. Long-term business impact	Clearly business travel will be low in the initial stages of recovery, as companies restrict spending and because of duty of care issues. However, there is little solid evidence of long-lasting behavioural changes to	In the December RBP, our 'Testing & WHO Vaccine' scenario (which was given the highest weighting of 50%) assumed that business travel would reduce by 10%. As noted, IATA made the same assumption in their own forecast. During Constructive Engagement, IATA also agreed that the general industry consensus

Topic	Airline feedback	Heathrow response
	business travel, because of the 'Zoom effect'. IATA's own projections for passengers sitting on premium seats (mostly business travellers, and expected to follow a similar path to overall business travel) shows a recovery to within 10% of the pre-COVID19 trend within a few years. *Ref: Section 5.7.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	is to expect 10 - 30% reduction in business passengers. We disagree that there is no evidence of long-lasting behaviour. Based on that evidence and on further analysis since the December RBP, we have updated our assumptions on long-term business impact. For more information please see Section 5.2.7
	An additional important and frequent forecasting error is that the experience of the recent past often overly influences expectations of the future. It would be natural for people to expect permanent reductions in business travel, given the experience of the past year. However, the evidence clearly shows that, just as forecasters underestimate downturns they also underestimate upturns and the pace of recovery. There is no reason to think this time will be different. When the business travel recovery comes it is likely to be unexpectedly strong, based on the evidence from past shocks. *Ref: Section 5.7.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	Noted and agreed that an important aspect of forecasting is making sure not to fight the last battle. However, we are puzzled by the contradictory nature of this advice – the Airline Community warns against letting the past influence our expectations of the future yet uses the experience of past shocks as evidence for recovery from Covid-19. More fundamentally, we disagree with the Airline Community's position that there is no reason to think this time will be different for business recovery, as we have already seen evidence to the contrary. For more information please refer to Section 5.2.7
D. Fares	During CE the Airline Community provided insight to HAL on airline economics and how airlines were likely to react, particularly in the short to medium term, during the recovery period. Unfortunately, HAL has not reflected this sufficiently, or at all, within its plan. *Ref: Airline Community written feedback, Initial Comments to Heathrow's Revised Business Plan, March*	We have reflected the Airline Community's view that there will be no increase in fares in our most optimistic scenario. Although in Constructive Engagement the Airline Community were adamant in their view that there is no scenario in which fares would increase, we must also take account of public statements from airlines that take an alternative view. We have set out our assumptions and evidence on fares in full in Section 5.2.7
	There are some important errors in the reasoning given for Heathrow's unusual assumption for higher fares after a collapse in demand [..] the business travel market is separate from the leisure air travel market. Competition in markets for airline services will ensure the price for economy seats on direct flights or via hub connections will be set by supply	It is incorrect to characterise our assumptions on fares as unusual. We have previously shared our rationale and evidence with the Airline Community, along with multiple reports from others in the industry that share our view on likely increases to fares. In fact, as noted above, even many within the Airline Community that take the same view.

Topic	Airline feedback	Heathrow response
	and demand. Airlines have limited ability to cross-subsidize. *Ref: Section 5.7.3, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	We were clear during Constructive Engagement that our assumptions on increased fares are for the later years of H7 only and do not refer to the short-term. For more information on our assumptions on fares, please see Section 5.2.7
	HAL use the example of the Global Financial Crisis of 2008 to provide evidence that shocks result in fare increases. There are several concerns with the evidence that HAL have provided. *Ref: Section 1, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final*	The increase in fares after the GFC is used as one point of comparison. We also acknowledge that this shock is unlike any other and so comparisons to previous shocks are only of limited value.
	HAL argue that a drop in Business demand will result in a reduction in airline profitability and a resulting increase in economy fares. This assumption is deeply flawed. […] this would effectively mean that the airlines would have to increase fares for all leisure passengers. This can only be achieved if there is a sustained increase in demand for leisure travel over the H7 period. Airlines think long term and aim to build brand loyalty. They want to retain customers for their lifetime of flying. With this in mind it is reasonable to assume that airlines will favour volume over profit in the short term (certainly in getting the right balance for long-term benefits) and will take a hit to profit by subsidising growth building back. *Ref: Section 2, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final*	Not only are our assumptions on fares not flawed, but they are shared by many others in the aviation industry, including those in the Airline Community. There is a clear logic in our assumption that all of the following impacts will put an upwards pressure on fares: reduction in business passengers, increased cost of carbon, increased operating costs, limited capacity, move towards smaller aircraft and increased debt burden. We were clear during Constructive Engagement that our assumptions on increased fares are for the later years of H7 only and do not refer to the short-term. There is a point on cost of flying and how much this is inflated by the cost of testing. There are no explicit assumptions on this in our forecast. For more information on our assumptions on fares, please see Section 5.2.7
E. Airline capacity	A major problem airlines have today is that they cannot fly their capacity but need to. They are burning through cash because of having expensive fixed costs (aircraft) vastly underutilized. They will need all the cash flows they can get in the recovery years to service and repay debt so there is a strong incentive for airlines to put their fleets back into operation. We expect there will be more of a risk of over rather than under capacity	We agree that there is short-term over-capacity whilst demand is at such low levels, but we also note the Airline Community's public statements and disclosures in financial results on redundancies and retirement of aircraft, which have reduced their capacity. For more information on our assumptions on airline supply please see Section 5.2.8

Topic	Airline feedback	Heathrow response
	during the recovery period. […] This potential for excess capacity relative to demand is another reason for expecting air fares to be low rather than high. *Ref: Section 5.8.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	
	HAL also asserts that the airlines will "shift to smaller aircraft" and this will result in higher fares. This assumption is also flawed for several reasons: Airlines do not have the cash reserves to invest in fleet change, they will continue to have to operate their existing fleets for an extended period until cash reserves are built up – likely significantly post H7. Airlines are very likely to deploy the largest aircraft in their fleets on the LHR route as they always have done due to the strength of the London market. So even if they do have smaller aircraft in their fleet, they will not deploy them at LHR. The opposite is much more likely. *Ref: Section 2, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final*	It is understood that airlines do not have the reserves to invest in fleet changes and so will need to operate existing fleets until significantly post the H7 period We have seen in airlines' public statements and financial results that retirement of aircraft has been accelerated and delivery of replacements delayed. We also note that the retirements are focussed on larger aircraft, with the prime example being the retirement of BA 747s, which has already happened. We have taken account of these points in our assumptions on airline supply and fleet changes. For more information please see Section 5.2.8
F. Under-forecasting	Previous price regulation periods have included a negative 'shock factor' on the assumption that future shock will be the same as the average of past shocks. Aside from the future not likely to be the same as the past, this does not take into account the typical risk following a major shock of underestimating the subsequent upturn. […] There is a strong tendency for any forecaster, as is the case in the general public, to be unduly influenced by the recent past. There is so much flexibility in even highly structured forecasting models, that forecasters judgement is critical. This would argue for a positive rather than a negative shock factor. *Ref: Section 5.9.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	The principle of inclusion of a shock factor was established in Q6. It is there to account for events that cannot be forecasted, rather than make any sort of adjustment for bias. We agree that forecasters should not be unduly influenced by the recent past and have ensured that all our assumptions are grounded in logic and evidence to guard against any bias.

Topic	Airline feedback	Heathrow response
G. Heathrow resilience	The London market, and Heathrow in particular, has historically been more resilient to impacts of traffic shocks […]. This further emphasises the caution on underestimating the pace of recovery for operations at LHR post-COVID. *Ref: Section 5.1.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final* Given Heathrow's relative performance during times of crises and from observing actions taken during the covid pandemic, which has seen base carriers consolidate their operations at Heathrow as well as over 10 new entrant carriers and cargo operators taking advantage of available capacity, it is clear that HAL have failed to take such aspects into account. *Ref: Airline Community written feedback, Initial Comments to Heathrow's Revised Business Plan, March*	We agree that in the short-term the consolidation into Heathrow that we have already seen is likely to continue, and this features in all our scenarios. Over the longer term, Heathrow is more exposed than other airports on a number of fronts: the UK Government is taking a cautious approach compared to others, notably across Europe; Heathrow is reliant on international traffic resuming, and does not have a strong domestic market; Heathrow is therefore more dependent on global vaccine rollout than any other UK or European airport; Heathrow is more reliant on business traffic than others; the UK economy is more geared around services when compared to economies like Germany which has a higher manufacturing base so business recovery is expected to be particularly slow for the UK; Heathrow is more exposed when it comes to retirement of larger aircraft types. More information on each of these points is included throughout this document.
H. Decay function	What should be made explicit is that the off-model, arguably arbitrary, assumptions contained in the decay function dominate the shape of the passenger forecast. The 'peer-reviewed' and highly detailed model structure and process is almost completely irrelevant as a result. A lot of attention and discussion should be focused on the shape of the decay function, since this is the main driver of the passenger forecast. *Ref: Section 5.3.3, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final*	The decay function was explained during initial engagement sessions with the Airline Community in 2020. As requested, we have since discussed this in more detail during further engagement sessions in 2021 and have set out more information in this document. It is incorrect to say that the decay function is the main driver of the forecast and that the rest of our models are irrelevant. This is a significant misunderstanding of our models and methodology. For more information please see Section 5.2.4

5.2.4. Demand forecast methodology

Overview

Our forecast methodology for this RBP Update has not changed since that used for the December RBP. Our approach continues to be one which combines the advantages of using the full functionality of our proven, existing models, with a scenario-based approach that covers the range of outcomes, whilst giving the flexibility to update as we gain more information.

We welcome the comments from the CAA in their Consultation on the Way Forward document, that we have taken *"a reasonably well-considered and structured approach to passenger forecasting, consistent with good practice. In particular, HAL's use of specific modelling to take account of the impact of travel restrictions is based on evidence where available and appears to be reasonable*[18]*".*

We also welcome the comments from the Airline Community that accept the iterative and broad approach we are taking to forecasting.

The sections below give more detail on areas of the methodology that the Airline Community and CAA have expressed interest in, as well as explaining some improvements to the Travel Restrictions model.

Travel Restrictions Model

As explained in the December RBP, the Travel Restrictions model is built from actual data on the demand response to the changing restrictions over the last year. This fundamental approach remains the same, but with two notable improvements.

Firstly, we have updated the stages of recovery to reflect the red/amber/green categorisation from the Global Travel Taskforce's risk-based approach[19]. We include more detail on the testing and quarantine regimes associated with these categories in Section 5.2.6 of this chapter.

Secondly, we have updated the data on which the model is calibrated to make use of the additional actual data since the model was used for the December RBP.

Weighted combination of scenarios

In the December RBP we explained that our methodology incorporates a weighted combination of scenarios. This is fundamental to the approach and is designed to tackle the uncertainty associated with the forecasts.

This scenario-based approach with Monte Carlo simulation was discussed and agreed with the Airline Community from the very early stages of engagement.

In the Consultation on the Way Forward document the CAA commended our approach, in particular that it is consistent with good practice. The use of Monte Carlo modelling to reflect the uncertainty is an important aspect of our approach. Point and interval forecasting have been left behind as best statistical practice by probabilistic forecasting in many varied disciplines ranging from banking and finance, energy, disease modelling and even sports.

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[18] CAA, Consultation on the Way Forward, April 2021
[19] Global Travel Taskforce Report, 9th April 2021

While the scenarios can ultimately be rolled up to a single passenger number, they are in fact an aggregate of 40 different markets split by three passenger trip types all of which carry their own confidence levels. Having all this information captured allows for the case where one market is up and another down, the ranges around each considered and combined to show probabilistic outcomes, whereas for point and interval forecasting these ratios are set in stone.

Monte Carlo simulation modelling is an integral part of our models and was used for the Q6 regulatory period. To abandon use of that functionality, which is designed to tackle uncertainty, at a point when uncertainty is greater than it has ever been, would be counter intuitive.

Use of Monte Carlo allows us to produce probabilistic outcomes, namely the P10, P50 and P90 levels. Our approach utilises 10,000 simulations based on the four narrative input scenarios, which allows us to see the interaction of stochastic processes on the output. We are confident that the simulation outcomes give both the breadth and the depth to look at sensitivity and scenario analysis. It also allows the level of detail to understand likely outcomes and therefore calibrate our framework and approach to risk sharing.

An alternative and much simplified approach would have been to create scenarios to use directly as the low, mid and high cases. Aside from this approach not having the benefits of Monte Carlo simulation set out above, it would also be attaching a false sense of precision to narrative based scenarios. We can understand why reviewers may be reaching for simplicity, forecasting in the face of this uncertainty is difficult and complex, but to do so would mean a less robust methodology and not make the most of the tools we have available.

It should also be noted that applying a 50% weighting to a scenario is very different to a mid-case scenario or the P50 of the weighted combination of Monte Carlo runs. If we had set out with the approach of creating scenarios directly as the low, mid and high cases they would be different to the scenarios we now have.

Shock factor

A shock factor is included to reflect events that cannot be forecast, which reduce passenger volumes and are not explained by economic variables or supply metrics within the models. Historically, these have included the impact of 9/11, SARS, both Gulf Wars, industrial action and volcanic ash clouds.

The methodology for the calculation of the shock factor was established in Q6. It involves calculating the impact of the various shocks we have experienced over the last c.30 years on passenger numbers and averaging those against the passengers that would have been served without those shocks. There is no judgement made on how likely or not the shocks are to reoccur in any particular period; there is only the averaging effect of considering those shocks that have actually occurred over that c.30 year period. The fact that Covid-19 started in 2019 does not nullify the risk of another pandemic, or of other less material shocks (e.g. a volcano or geopolitical event), happening before the end of 2026.

In the past the Airline Community have queried why this calculation uses passenger numbers starting from 1991, which is the year of the shock from the first Gulf War conflict. The reason is a simple one in that this is the point at which our records start and so we take as wide a range of data as possible in order to be as robust as possible. To move the start point of the data period forward would be to reduce the number of data points we are considering; it would actually increase the shock factor as it is averaging over a shorter period of time.

In calculating the shock factor for the H7 period, we have assumed a 10% impact from Covid-19 in 2020 & 2021, which is associated with the full RAB adjustment that Heathrow has

requested. This assumes that Heathrow takes the first 10% of the traffic risk and the remainder is mitigated. The shock calculation therefore reflects only the first 10% of the traffic losses. This results in a shock factor of 1.46% to be applied to each annual forecast output for 2022 – 2026.

In the low adjustment case, there is limited mitigation and the impact of the pandemic is greater. Reflecting the partially mitigated impact of the actual shock in 2020 with the £300m adjustment and the forecasted shock in 2021, the shock factor is calculated at 5.16%.

It is thus important to recognise that the shock factor, and thus overall forecast, is dependent on the CAA adopting the adjustment and risk sharing mechanism as proposed. If it does not then the shock factor must be recalibrated.

To completely exclude the impact of Covid-19 in the shock factor would mean stating that there was no possibility of another pandemic occurring. In fact, the evidence shows that a pandemic akin to Covid-19 is a 1 in 25-year event. There were four pandemics in the 20th Century: Spanish Flu, Asian Flu, Hong Kong Flu and HIV/AIDS. The 21st century has seen outbreaks of SARS, MERS, swine-flu, avian-flu and Ebola as well as the Covid-19 pandemic. The UK Government's 2020 National Risk Register outlines the risk of a future pandemic, not related to SARS-CoV-2, as between 1-5% likelihood on an annual basis[20]. Using the central estimate of 3% suggests a 14% chance over a five-year period and 22-year return period (expectation exceeds 50% after 23 years).

Given that our shock factor calculation considers c.30 years of data, we are therefore comfortable that the inclusion of the Covid-19 impact on the shock factor does not constitute any double counting.

It is also interesting to note that the CAA refers to the application of a shock factor as a key mitigation to ensure that the expected outcome for Heathrow is fair given the asymmetric passenger volume risk to which it is exposed. The CAA notes that the continued use of a shock factor to baseline forecasts, alongside potential risk sharing, is a key factor in their view that the balance of the risk under the price control package is unlikely to warrant any aiming up of the WACC for the period.

We note that the shock factor does not reduce the risk – it merely adjusts the expected outcome so the Determination is a fair bet for Heathrow. It has been shown in Q6 to simply make the demand forecast more accurate. Because the shock factor does not impact risk it has no impact on WACC, and therefore the CAA are incorrect to make this link. However, if the CAA were to make any changes to how this shock factor is applied or calculated, this could have an impact on the expected outcome and therefore on whether the Determination was a fair bet for Heathrow.

Decay function

During engagement with the CAA and Airline Community we discussed the challenges of forecasting from the point of view of demand, that the first part of the shock from Covid-19 is a restriction of supply rather than a demand response; passengers want to fly, but they cannot. Of course, that is not to say there is no underlying demand impact, only that it is dwarfed by restrictions in the first years of the shock. As a result the demand elasticities in our econometric model alone are not sufficient to capture the low passenger volumes the industry is experiencing.

[20] National Risk Register, UK Government, 2020

In the December RBP we explained that to deal with this point we introduced an exponential decay function to model the initial stages of recovery and reflect the impact of travel restrictions on demand. The Airline Community requested more information on the basis for this decay function, which we shared and discussed in a series of additional engagement sessions. We also include more detail below.

First it is important to note that the demand model looks at flows of passengers around the world, not just for Heathrow, i.e. we are modelling the pool of traffic that Heathrow can tap into. This demand modelling is one half of our model suite and the comparison between the demand and supply is an integral aspect of our methodology, allowing comparison between the bottom up approach on the supply side and top down on the demand side.

The decay function is a feature of the demand model and as such is applied to global flows. As we are modelling such a broad range of flows, the decay function allows us to model a typical recovery profile without going into the level of detail required in the travel restrictions model. This typical recovery profile is best represented by a decay function, which is recognised as the expected recovery profile from a large shock such as a pandemic. During discussion with the Airline Community, IATA confirmed that their modelling also uses a decay function.

The decay function is characterised by two input variables: the length of time required to return to 2019 passenger levels, and the speed of recovery. As we are forecasting flows of passengers around the world, we use industry views as a guide for the point of recovery to 2019 passenger volumes. The speed of recovery is calibrated to the actual data available since April 2020, our forecast for the remainder of 2021 and the point of return to 2019 levels. The recovery profile is applied to the underlying econometric base to forecast a smooth return of demand.

The result of this methodology means the decay function represents the impact of travel restrictions in a way that is independent of econometric factors during the calibration period. Therefore, changes to GDP or fare assumptions have little effect on the forecast whilst travel restrictions are impacting the forecast. Once restrictions ease, the recovery function returns to the underlying level of demand determined by the econometric base forecast.

5.2.5. Scenarios

Overview

As for the December RBP, we have developed four scenarios to reflect the potential circumstances that may emerge over the coming years. Given the scale of the change there has been in the short-term outlook since the December RBP was published, each of the four scenarios has been updated and re-named. These scenarios are described here in headline terms, and then in detail in the following sections.

Pent-Up Demand

As the most optimistic scenario, Pent-Up Demand assumes that vaccines are rolled out quickly and without any further supply issues. We assume that borders are opened quickly in response to vaccine progress and then remain open with only temporary and local reversals. Travel without quarantine is allowed to Europe and the US by early summer and some parts of Asia see travel without quarantine in late summer.

Consumers respond to lifting restrictions with Pent-Up Demand, especially for Visiting Friends and Relatives and leisure travel. Business travel remains slow to recover in 2021. This Pent-Up Demand means growth beyond 2019 levels for some markets.

From an economic perspective, this scenario assumes a rapid upturn where longer-term scars are avoided as the successful roll-out of vaccine programmes and additional fiscal stimulus cement recovery[21].

Steady Build

This scenario sees a mix of fast and slower vaccine roll outs across countries. Delays may be linked to volume supplied, restricted approvals for some vaccines, the need for booster/revaccination programmes or vaccine hesitancy. We have seen examples of each of these in just the last few months.

Political caution combines with this more pragmatic expectation on vaccine progress which makes for a slower relaxation of border controls than the more optimistic 'Pent-Up Demand' scenario. We assume parts of Europe are open to travel without quarantine for the summer, but that free travel to the US is unlocked on a slower timeline and so begins to drive significant volumes just after the summer period.

We assume some bounce of pent-up consumer demand in the Visiting Friends and Relatives and leisure segments, but that this is somewhat dampened because of an ongoing sense of caution and uncertainty on government border rules.

From an economic perspective, this scenario assumes that economic output remains subdued in the early part of 2021 but then accelerates from Q2 as restrictions begin to ease. There is a moderate long-term hit to GDP from the pandemic[21].

Gradual Opening

This scenario starts with an assumption of slower vaccine rollout in all key markets, which delays the point at which travel restrictions lift. Alternatively, there could be a number of other

[21] Oxford Economics, Global Scenarios Service, Q1 2021

reasons for delayed border opening, including temporary resurgence in cases or continued Government and consumer caution against re-opening 'too soon'.

Consumer response is more muted in this scenario. There is a slower, more gradual build of demand throughout this year, as consumer confidence is regained after the damage done by unclear and changeable travel restrictions.

From an economic perspective, only a gradual exit from restrictions in 2021 leads to weakness in the financial market, which hits demand. This is followed by more solid recovery as restrictions ease. This scenario assumes a slightly greater long-term hit to GDP than in the baseline scenario[22].

Autumn Reversal

This scenario is the most conservative, assuming a resurgence in Covid-19 cases from mid-2021 and restrictions remaining in place for a protracted period as existing vaccines prove less effective against new and more transmissible coronavirus variants. The need for new vaccines to be developed cause significant delay to the start of recovery.

From an economic perspective, this scenario assumes a substantially greater long-term hit to GDP than in the baseline scenario. Tighter restrictions limit consumption spending, at the same time as the labour markets weaken and precautionary savings rise. Persistence of public health restrictions and risk aversion among households, businesses and investors weighs on demand and, in turn, supply over the medium term. Economic activity is only able to move towards full capacity in the latter stages of the scenario. Economic scarring occurs, reflecting persistently weak capital accumulation, depressed labour supply and disappointing productivity[22].

This scenario reaches a level of demand by 2026 that is comparable to that seen at Heathrow in c.2000-2005, with a reduced number of seats per movement and total number of movements compared to that seen in 2019, but with more healthy and sustainable load factors that those seen over the course of 2020.

[22] Oxford Economics, Global Scenarios Service, Q1 2021

5.2.6. Key drivers - travel restrictions model

Stages of travel restrictions

The Travel Restrictions model has been updated to reflect the red/amber/green categorisation from the Global Travel Taskforce's risk-based approach[23]. The testing and quarantine regimes associated with each of these categories are set out here:

- Stage 1 (red): if a country is in this category, passengers are subject to severe restrictions, including ban on travel, hotel quarantine and rigorous testing requirements.
- Stage 2 (amber): travel to these countries is discouraged and passengers are required to take tests and to quarantine, but there are no restrictions on the number of flights operated and quarantine can be carried out in a private residence.
- Stage 3 (green): testing requirements are in place but no quarantine is needed unless passengers receive a positive result.

Of course, the framework set out by the taskforce only considers the restrictions that the UK Government has imposed, and not the restrictions at the other end of the route. Clearly the restrictions at both ends will impact demand, so inclusion of a country on the UK government green list would not necessarily be reflected as stage 3 in the Travel Restrictions model. A good example of this is Australia: it was one of the first countries that the UK Government added to the green list on 17th May, but entry to Australia is essentially closed and is expected to be for the remainder of this year.

We also include a fourth stage in our model, which is the point at which there is free travel between two countries, i.e. no testing or quarantine requirements, but potentially a requirement to show proof of vaccination. Although this category was not included in the Global Travel Taskforce's framework, we are anticipating that this stage will be reached once significant vaccine rollout has been achieved by both countries at either end of a route. We note the date of 28th June for the first formal review of restrictions by the UK Government, and expect to see the addition of an unrestricted state of travel to the framework at that point. Subsequent reviews are then planned for checkpoints no later than 31st July and 1st October[24].

Progress into stage 4 for any particular country is forecasted based on vaccine rollout projections, which are explained in the following section. Progress through stages 1-3 is based on a combination of short-term infection and vaccine rollout projections, consideration of prevalence of variants of concern and the genomic sequencing ability of a country, as well as political factors and the approach that various Governments around the work are taking.

The uncertainty over when countries will be placed on the green-list and stage 3 is high; of course, we continue to use a scenario-based approach in our forecasting, which allows consideration of the different possible timelines over which countries progress to stages of lower travel restrictions.

Error! Not a valid bookmark self-reference. sets out the assumptions on when key markets will progress to stage 3.

[23] Global Travel Taskforce Report, 9th April 2021
[24] Global Travel Taskforce announcement, 9th April 2021

Figure 2: Stages of travel restrictions assumptions

The **Pent-Up Demand** scenario assumes that a number of tourism dependent countries, including Spain, Greece, Italy and Portugal will reach Stage 3 in June, followed by the majority of Europe, the USA, Hong Kong, Singapore, UAE and Qatar in July. It is assumed that the requirement for quarantine will remain in place for the majority of other countries throughout 2021.

The **Steady Build** scenario assumes that a number of tourism dependent countries, including Spain, Greece, Italy and Portugal will reach Stage 3 in July, followed by the majority of Europe in August. It is assumed that there will be a relaxation of the US restrictions for July, but that a quarantine-free travel corridor is not put in place until October. It is assumed that UAE, Qatar and Singapore all have travel corridors in time for the summer. It is assumed that the requirement for quarantine will remain in place for the majority of other countries throughout 2021.

The **Gradual recovery** scenario assumes that quarantine-free travel is not permitted for the majority of countries until Q2 2022. Then testing requirements remain through summer 2022. Other than Europe, the USA, Canada, UAE, Qatar, Hong Kong and Singapore it is assumed that quarantine is required for travel throughout 2022.

The **Autumn Reversal** scenario assumes that there is a further wave of Covid-19 this autumn which results in the mutation of a vaccine-resistant variant and requires quarantine restrictions to be reimposed across all markets. The return to quarantine-free travel is then dependent on the development and rollout of a new vaccine.

Vaccine rollout

As explained in Section 5.2.4, our model includes a fourth stage of travel restrictions which assumes free travel between two countries. Progress into stage 4 for any particular country requires significant vaccine rollout to be achieved by both countries that form a route. We assume the point of significant rollout to be when 70% of the population have received full vaccination.

For the Pent-Up Demand, Steady Build and Gradual recovery scenarios we assume that current vaccines are effective against known and future variants of concern, and that vaccine rollout to c.70% of the population will be sufficient to give herd immunity. To reflect the remaining uncertainty over the speed of vaccine rollout we consider three different timelines over the three scenarios – ranging from most optimistic in Pent-Up Demand, to most conservative in Gradual recovery.

We must note that this assumption of 70% rollout being sufficient to confer herd immunity may now be an overly optimistic one. That assumption was based on the basic reproduction number of the Alpha variant and the associated herd immunity level. If the transmissibility of the Delta variant is as much as 60% more than that of the Alpha variant, a significantly higher threshold for herd immunity is needed, perhaps as much as 85%.

With increasing concern over new variants that may resist current vaccines, in the Autumn Reversal scenario we assume that a resurgence in Covid-19 cases from mid-2021 leads to a new variant of concern being found in autumn 2021. We assume this requires a new vaccine to be developed, which is available by mid-2022. In this scenario we assume that

Governments take a cautious approach to re-opening, with no green-list countries established until each one has achieved vaccine rollout.

The narrative for this scenario is mirrored in the Limited Vaccine Effectiveness GDP scenario from Oxford Economics. It is their most conservative scenario and is given a weighting of 15%, which is a 10% increase to the 5% weighting given to their most conservative scenario from November.

Figure 3: Vaccine rollout assumptions

The **Pent-Up Demand** scenario assumes that Europe, the USA, Canada, UAE, Qatar, Hong Kong and Singapore reach levels of vaccine rollout to achieve herd immunity by August this year. Herd immunity is reached throughout 2022 for Central and Latin America then East Asia, and then South Asia. Rollout for some African and Central Asian countries is expected to take until early-mid 2023.

The **Steady Build** scenario assumes that Europe, the USA, Canada, UAE, Qatar, Hong Kong and Singapore reach levels of vaccine rollout to achieve herd immunity within 2021, but that testing-free travel is not permitted until Q2 2022. Herd immunity is reached throughout 2022 and early 2023 for Central and Latin America, East Asia, and South Asia. Rollout for some African and Central Asian countries is expected to take until early-mid 2024.

The **Gradual recovery** scenario assumes similar dates for reaching herd immunity to those in the Steady Build scenario yet assumes that a cautious approach from governments leads to testing remaining as a requirement for travel until Q4 2022.

The **Autumn Reversal** scenario assumes that there is a further wave of Covid-19 this autumn which results in the mutation of a vaccine-resistant variant. A new vaccine is then developed and begins to be rolled out from mid-2022. This delays the start of the recovery to mid-2023.

5.2.7. Key drivers – econometric model

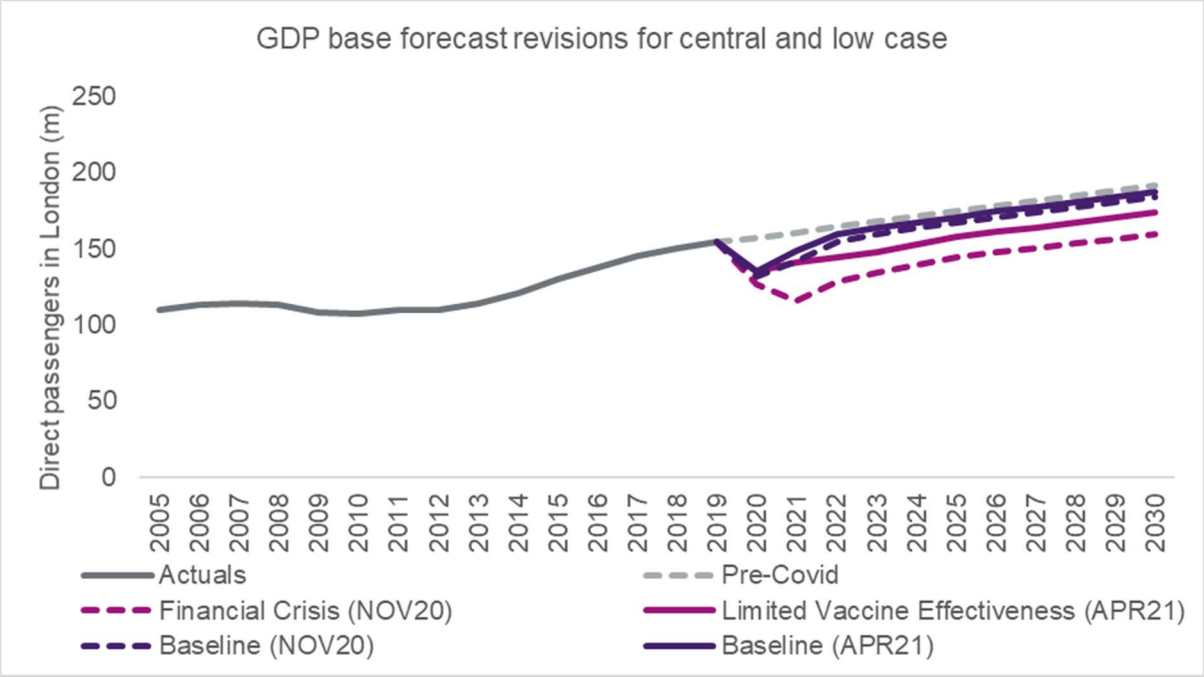
GDP Forecast

As set out in the December RBP, our econometric model uses GDP scenarios developed by Oxford Economics to relate passenger volumes to economic growth. The GDP scenarios are regularly updated by Oxford Economics. With this update to the forecast we have updated our model to use the latest version of the GDP scenarios, published in April.

Oxford Economics publish a weighting for each of their GDP scenarios. Similar to the weightings of our forecast scenarios, they are set based on the likelihood of each scenario occurring. In their feedback on the RBP, the Airline Community referred to a set of weightings that Oxford Economics published in February 2021 and queried why they had not been used in the December 2020 RBP. The explanation is a very simple one in that we could not have taken account of the weightings referenced by IATA as they were created after the RBP was published. It has always been our intention to use the latest GDP scenarios available from Oxford Economics and we will continue to do so for each further update.

The forecasted outlook for the economy has improved since November. The impact of the latest Baseline GDP scenario alone on passengers is a 2.5% increase over the H7 period. The downside risk has reduced with a 10.0% increase in the worst-case GDP scenario over H7. Although the individual scenarios have increased, and the range from most optimistic to most conservative has narrowed, the weighting attributed to the scenarios is now more evenly spread with increased weighting to the more conservative scenarios compared to the November version. This results in a weighted average sitting below the baseline scenario.

Figure 4: Updated GDP scenarios



Source: Oxford Economics

The revised Baseline scenario reflects a slower than hoped for vaccine rollout. It assumes a 'substantial and sustained' reduction in public health restrictions in Q2 2021 and an acceleration in world GDP. This scenario results in passenger volumes surpassing 2019

volumes in 2022 by 3%, but still remains below the pre-Covid trajectory by 2.2% from 2023 onwards.

Rapid Upturn remains the most optimistic scenario and has a weighting of 20%, up from 15% in November. It assumes a successful vaccine rollout results in a fast easing of public health restrictions, which provides a confidence boost for investors, businesses and households. Passenger numbers surpass 2019 levels in 2022 and are then 0.6% higher than the pre-Covid projection from 2023.

The Slow Vaccine Roll-out scenario assumes slower progress with vaccination rollout than anticipated in the baseline. As a result, social distancing measures are maintained for longer, which impacts the global economic recovery in the near term. In the longer term from 2025, the damage to the economy is only 1% higher than the baseline. The weighting on this scenario has reduced from 25% in November to 20% in this update.

The Return of Inflation scenario focusses on the impact of inflation on the economy rather than making any new assumptions on vaccine rollout or efficacy. In this scenario, the spread of coronavirus and its impact on public health restrictions remain in line with the baseline scenario. Instead, a deterioration in the inflation outlook negatively affects the financial markets and global economic recovery. This scenario is weighted 10%, down from 15% in November.

‘Limited Vaccine Effectiveness' is the revised worst-case scenario. This scenario represents vaccines failing to stop the spread of new, more transmissible forms of Covid-19. This triggers Governments reverting back to public health restrictions seen at the peak levels of infections. The result is a ‘sustained weakness’ in the global economy as financial markets react to new lockdowns and become more risk averse. This scenario has increased 10.0% on the previous worst-case scenario. It has been assigned an increased weighting of 15%, up from 5% in November. A return to 2019 levels is not achieved until 2025.

Figure 5: GDP assumptions

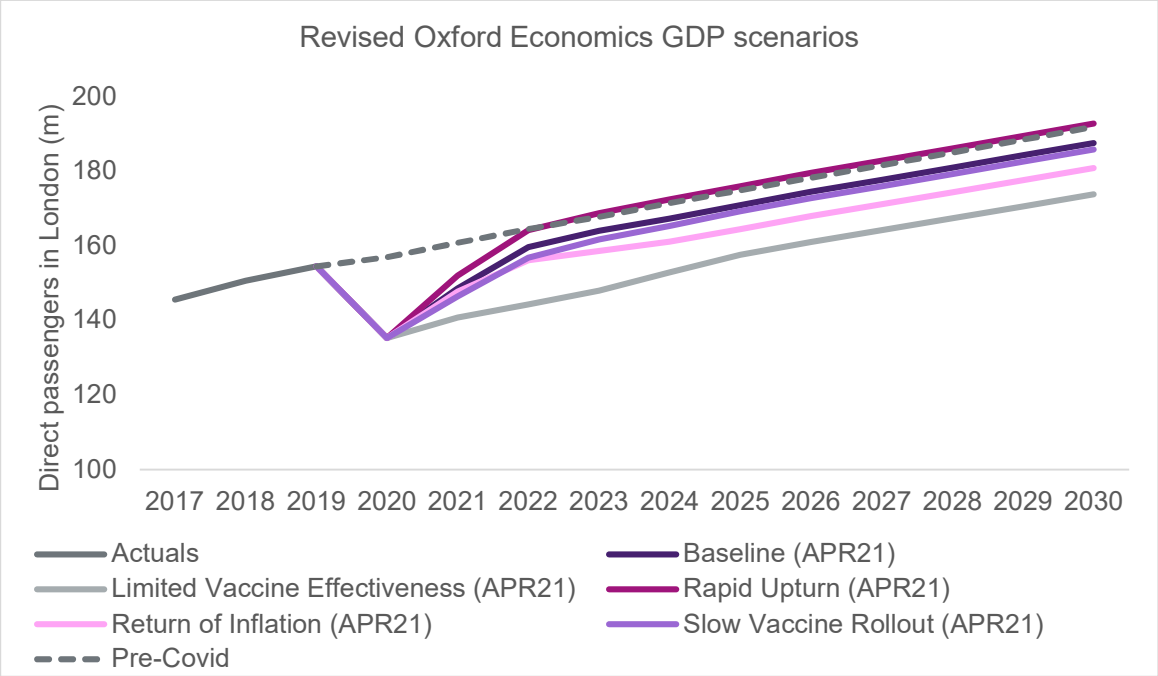
Baseline (weight=35%): Output remains subdued in the early part of the year, before accelerating from Q2 as restrictions ease.

Rapid upturn (20%): Longer-term economic scars are avoided as the successful roll-out of vaccine programmes and additional fiscal stimulus cement recovery.

Slow vaccine rollout (20%): Social distancing measures are withdrawn only gradually during 2021, as logistical issues and vaccine hesitancy delay the return to normal.

Return of inflation (10%): A deteriorating outlook for inflation is met with a sharp and sustained rise in bond yields.

Limited vaccine effectiveness (15%): Restrictions remain in place for a protracted period as existing vaccines prove less effective against new, more transmissible coronavirus variants.



Source: Oxford Economics

Long-term impact on business travel

Since publishing the RBP in December, there has been no improvement in business travel and our experience of working from home and videoconferencing has been further embedded.

Although the short-term impact of Covid-19 on business travel is clear, there is more uncertainty surrounding the long-term impact. In the December RBP we set out our assumptions of a 10-30% long-term reduction to business travel. In the Airline Community's feedback on the RBP, they gave this advice:

"An important and frequent forecasting error is that the experience of the recent past often overly influences expectations of the future. […] When the business travel recovery comes it is likely to be unexpectedly strong, based on the evidence from past shocks"[25].

There is an inherent contradiction in this advice – the Airline Community warns against letting the past influence our expectations of the future yet uses the experience of past shocks as evidence for recovery from Covid-19. More fundamentally, we disagree that there is no reason to think this time will be different, as we've already seen evidence to the contrary.

Unlike any previous shock, we have now experienced over a year of working from home and videoconferencing. We have already seen businesses make decisions to change their working practices for the longer term: British Airways is exploring the sale of its Waterside office[26]; Nationwide, Santander, HSBC, BP and Microsoft and many others are planning to continue with an increased amount of working from home even once Covid-19 restrictions are lifted.

The Airline Community is also wrong to say that business travel hasn't been impacted by previous shocks. In the December RBP we noted Alex Cruz' statement when giving evidence at the Transport Committee[27], explaining that BA's business passengers never recovered after the GFC.

There is also the ever-increasing awareness of the impact of aviation on the environment. What was already a trend pre-Covid is now being accelerated. Covid-19 has forced companies to operate with little to no business travel and that experience has broken down many of the perceived blockers to change. Companies have set targets to reduce their emissions from business travel, in the case of PWC by 33% per employee[28].

During our constructive engagement sessions the Airline Community have been clear in their view that there will be a maximum 10% reduction to business travel. However, there are other views taken by members of the aviation industry, including Jeffrey Goh the Chief Executive of Star Alliance, who thinks there will be structural change in terms of the business travel segment that could leave the sector up to 30% smaller[29].

Our assumptions on long-term business impact in the December RBP were based on the principle of differing impact on each segment of business travel. For example, we would expect business travel to visit a client to be less impacted than travel as part of a regular commute. A report from IdeaWorksCompany[30] took a similar approach and looked in more detail at the

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[25] Section 5.7.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final
[26] British Airways to continue work-from-home plan after Covid, BBC News, 18th March
[27] Alex Cruz evidence at Transport Committee, 16th September 2020
[28] Managing our travel emissions, PWC
[29] Business travel, Financial Times, January 2021
[30] The Journey Ahead, IdeaWorksCompany, December 2020

expected range in loss of business travel for each segment. An excerpt from this report is shown in Figure 6.

Figure 6: IdeaWorksCompany – Permanent airline trip loss due to technology

Table 2: Permanent Airline Trip Loss Due to Technology

Categories	Trip Loss		Rationale
	Low	High	
Sales and Securing Clients	0%	20%	Business development will stay consistent with pre-pandemic levels with 80 to 100% of trips kept because "being there" remains an important attribute for sales.
Support of Existing Customers	20%	30%	Travel occurring after the "sale is made" is a moderately good candidate for replacement by technology, with a drop of 20 to 30%.
Conventions and Trade Shows	10%	20%	The need to be physically present will remain a strong allure, but technology will flow to this category to create online events, resulting in losses of 20% or less.
Professional Services – Clients and Research	30%	50%	This category is a prime candidate for technology replacement, resulting in a loss of 30 to 50%. But a portion of this category involves clients and there is pressure to "be there" because of this.
Technical Support – Equipment and IT	20%	40%	Physical plant support will stay consistent with pre-pandemic levels. The large majority of the drop would occur with non-physical support, ranging from 20 to 40%.
Intra-Company Meetings	40%	60%	This category will be a strong candidate for cost savings and in-person activity will be condensed to fewer events. Technology suppliers will eagerly create products to replace the need for trips for meetings, with an overall reduction of 40 to 60%.
Commuters by Air	40%	60%	The need to be always present in the office, courtesy of a weekly trip, will diminish in the era of remote working. In effect, many commuters could be reclassified as remote workers with fewer trips to headquarters.
Overall Loss	**19%**	**36%**	*Overall Loss is the weighted average, determined by multiplying trip loss rates and trip purpose shares.*

Source: The Journey Ahead: Airline Business Travel, IdeaWorksCompany.com

The economy of the United Kingdom is more geared around services when compared to countries like Germany which have a higher manufacturing base. The types of business travel which are more likely to return because they can't be conducted virtually are therefore less relevant to the UK. We've seen this borne out with higher proportions of UK workers working at home and lower proportions of returning domestic traffic compared to Europe.

Applying these expected reductions to the proportions of business travel set out by the Department for Transport[31] leads to a range in impact from -20 to -38% as shown in Table 3.

[31] Department for Transport research paper, 2018

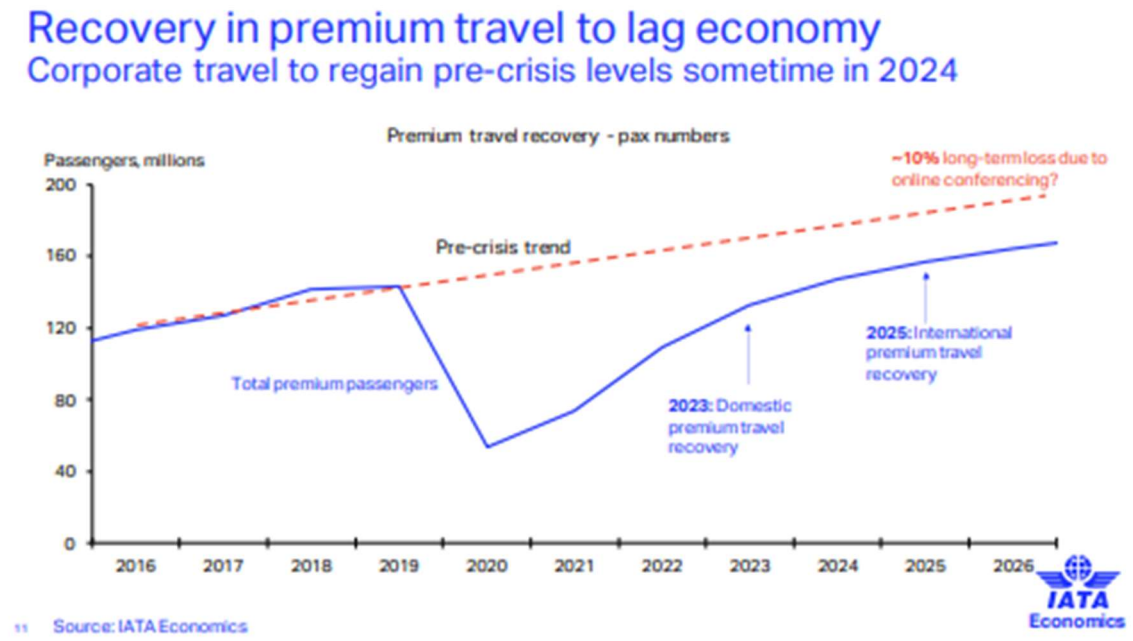
Table 3: Range in impact on each segment of business travel

Segment of Business Travel	Proportion	Low impact	High impact
Attend a meeting with client / supplier	32%	0%	-20%
Attend a meeting with people from same organisation	25%	-40%	-60%
Provide a service	19%	-20%	-40%
Conferences / trade shows	17%	-10%	-20%
As part of regular commute to work	4%	-40%	-60%
TOTAL	**100%**	**-20%**	**-38%**

Source: DfT, 2018

During discussion with the Airline Community, it was agreed that the range in reductions being considered by various groups across the aviation industry was -10 to -30%, with IATA's expectation being at the most optimistic end of that scale at -10% impact:

Figure 7: IATA expectation of long-term loss of premium travel



Source: IATA Economics, extract from Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final

Considering these various evidence points, and the need for a range to reflect the level of uncertainty, we have included the following assumptions in our scenarios:

Figure 8: Long-term impact on business travel assumptions

The **Pent-Up Demand** scenario assumes a long-term reduction in business travel of -10%.

The **Steady Build** and **Gradual recovery** scenarios assume a reduction of -20%.

The **Autumn Reversal** scenario assumes a reduction of -30%.

We note the particularly high uncertainty surrounding these assumptions and the unlikelihood that we will gain any new significant information to inform them over the next six months.

Whilst they are representative of the consensus view of forecasters across the industry, there are a number of commentators expecting reductions that are significantly greater than -30%, including: the IdeaWorksCompany report set out above at -36%; analysis from Skift and McKinsey that considers -40%[32] and an expectation of -50% from Bill Gates[33].

Fares

In the December RBP we set out a number of factors that have the potential to affect the cost of air travel during the recovery and beyond. Those factors include lower utilisation, increased operating costs, capacity constraints, loss in business passengers and shift to smaller aircraft. The Airline Community also noted the pressures resulting from their debt position, explaining that they will *"need all the cash flows they can get in the recovery years to service and repay debt"*[34].

These pressures on fares were acknowledged by IATA, in particular that over the long run the upward pressure on fares would outweigh any downward pressure[35].

In their feedback on the RBP, the Airline Community took a different position, disagreeing that there was any scenario which would result in an increase to fares. In particular the Airline Community voiced disagreement that fares would rise in the short to medium term. For clarity, the assumptions on fares we set out in the RBP related to long-term impact only. We did not model any assumptions on short-term increase to fares.

As part of their feedback, the Airline Community expressed disappointment that we had not considered their input on fares. We value the engagement and discussion with the Airline Community and as a result of that had included a scenario in the December RBP in which there was no increase in fares other than that consistent with the DfT's assumptions on increased cost of carbon. We continue to consider that scenario in this Update 1.

As well as the representatives of the Airline Community's written feedback in response to the December RBP, we also consider the wider evidence base provided by the Airline Community. Public statements, webinars and financial results all provide useful insight to the Airline Community's insight. Notable examples include:

- Shai Weiss, Virgin Atlantic CEO, encouraged passengers to purchase tickets as prices may go up, citing a reduction in supply as a result of mass retirement of four engine aircraft and the demise of Norwegian's UK long haul operation as the cause[36].
- In their April Air Passenger Forecast webinar, IATA and Tourism Economics explained that long haul traffic relied on premium paying business passengers to "*sustain yields at a level that made those routes pay*" and so the expected lag of business recovery will be a challenge to airlines and is going "*to limit capacity on some long haul markets at least for a while*". They also noted that the sustainability agenda will cause the cost of air travel to rise in the future[37].

Aside from the views from within the Airline Community, we also note the report from PWC that describes the need for airlines to focus on profit over volume: *"We expect investors to continue rewarding airlines that focus on profitability over revenue growth, which will require*

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[32] The travel industry turned upside down, Skift & McKinsey, September 2020
[33] Decline in business trips could impact future air travel prices, Global News, December 2020
[34] Section 5.8.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final
[35] Cost of air travel once restrictions start to lift, IATA, 5th May 2020
[36] Shai Weiss in conversation with Nick Cosgrove, February 2021
[37] 'Will air travel take-off again in 2021?' IATA and Tourism Economics, April 2021

painful cuts to the industry's pre-COVID-19 network of airline hubs, especially across international markets that are expected to lag during the recovery"[38].

Another example is Moody's Investor Services, who remark upon airlines' reliance on business travel for revenue. They conclude that airlines, particularly full-service carriers, will offset any reduction in business-class fares by increasing the mix of premium leisure and reducing the more deeply discounted economy fares on offer[39].

Aside from Covid-related pressures on fares, in the December RBP we noted the impact of carbon pricing. Those assumptions were set based on the DfT's 2017 carbon price forecast[40]. In this update, to increase the transparency of our assumptions, we have separated out the impact of costs of carbon from Covid-related pressures.

We have considered two scenarios for the cost of carbon. Our central case assumes Governments and industry take concerted action and limit warming to the lowest level of ambition in the Paris climate change agreement (2 degrees). This is equivalent to the DfT's 2017 carbon price forecast central case and results in a carbon price of £77 by 2030. In this scenario fares increase 1.4% by 2026 and 3.1% by 2030, with the increases being staggered and starting from 2021.

The second scenario aligns to the DfT's high case carbon price forecast of £116 by 2030. In this scenario, fares increase 4.1% by 2026 and 7.4% by 2030.

Table 4: Carbon price increases to 2050

	Carbon price (£ / tCO_2)		
	Low	**Central**	**High**
Current*		£21	
2025	£19	£41	£63
2030	£39	£77	£116

*Source: DfT, *European Union Emissions Trading System*

Considering this evidence and acknowledging the high uncertainty, we have considered the following scenarios on fares:

Figure 9: Fares assumptions

The **Pent-Up Demand** scenario assumes the central case carbon impact on fares (+1.4% by 2026) and no other impact relating to pandemic effects.

The **Steady Build** scenario assumes the central case carbon impact on fares (+1.4% by 2026) and a further increase of 10% from 2024 relating to pandemic effects.

The **Gradual Opening** scenario assumes the high case carbon impact on fares (+4.8% by 2026) and a further increase of 10% from 2024 relating to pandemic effects.

The **Autumn Reversal** scenario assumes the high case carbon impact on fares (+4.8% by 2026) and a further increase of 15% from 2024 relating to pandemic effects.

[38] How can airlines return to profitability, PwC
[39] Business travel faces higher substitution risk post-Covid, Moody's, March 2021
[40] DfT carbon price forecast, 2017

The impact of carbon on fares is an area that we intend to look at in more detail before the next update. We are conscious that within the aviation industry the conversation about sustainability has fundamentally changed over the last year. There is a move from discussion and acknowledgement of the challenge towards action and solutions. There is now a better understanding of carbon pricing and increased taxation and the impact of these on fares. It is therefore appropriate that we review these assumptions, rather than continuing to base them on the DfT's forecast from 2017.

5.2.8. Key drivers – supply model

Airport capacity

In the December RBP we shared a report from Eurocontrol[41], which found that *"airports already congested before the COVID crisis can expect to reach their maximum saturation capacity at just 60-75% of their peak 2019 traffic."*

During recent engagement sessions the Airline Community expressed the view that the findings from Eurocontrol were outdated and needed to be refreshed. As the report was only published in September 2020, we disagree with the characterisation of outdated, but acknowledge that there are ongoing efforts across the aviation industry to reduce the impact of Covid-19 on capacity.

That ongoing work includes development of digital passes to show proof of vaccination or negative tests, automation of border checks, increasing flow rates and reducing transaction times. The clear intent is to liberate capacity such that it does not become a blocker to demand for the summer peak that we hope will materialise.

One of the facilities that is currently most under pressure is immigration, with the capacity being severely restricted based on Government policy making. This limited capacity has the potential to impact on demand, either through needing capacity caps to be imposed or passengers being discouraged from travel. To that effect, when Grant Shapps announced the re-start of international on 17th May, he was joined by the Director General of Border Force, Paul Lincoln, who warned potential passengers that there was a need to be cautious and that they should expect queues to be considerably longer than they are used to.

With capacity improvement works still underway it is unclear what impact that will have on the assumptions we set out in the December RBP. For this updated forecast we have therefore assumed that airport capacity will not constrain demand, i.e. airport capacity will keep pace with airline supply and passenger demand.

Once more information is known about capacity improvements and they have been tested against the increased passenger numbers we hope to serve this summer, we will be in a better position to update our assumptions on airport capacity. We expect to be able to do this for the next update to the RBP.

Airline supply

What was an already precarious position for airline balance sheets in December 2020 has only become more challenging. Writing in November 2020, IATA warned that the median airline had just 8.5 months of cash to survive[42]. Now seven months on and with no significant

[41] Impact assessment of COVID-19 measures on airport performance, Eurocontrol, September 2020
[42] Deep Losses Continue Into 2021, IATA, November 2020

lifting of restrictions expected for at least another month, airlines are facing the very real prospect of bankruptcy.

During engagement sessions with the Airline Community, IATA highlighted that airline survival is at the cost of a large debt burden; that on top of debt from government aid, debt from capital markets has also risen[43]. The Airline Community also note that they *"do not have the cash reserves to invest in fleet and so will need to continue operating their existing fleet for an extended period until cash reserves are built up, likely to be significantly post H7"*[44].

In the December RBP we set out the impact of fleet changes on passenger numbers. Our ATM cap and the fact that airlines have tended to fly their largest aircraft to Heathrow means that we are more exposed to the retirement of large aircraft than many other UK or European airports. We explained that we may see a decrease of up to 3.8 million seats per year, depending on the choices airlines made in replacing these larger aircraft.

The Airline Community's feedback was critical, stating that airlines would need to *"magically"*[45] purchase new aircraft for this to be the case. To be clear, much of our fleet analysis does not need to rely on assumptions, BA and Virgin have already retired their entire 747 fleet and the quotes we included on the uncertain future of the A380 come directly from the most senior members of the Airline Community.

The Airline Community have not shared information on their fleet plans for the H7 period, but instead have pointed us towards publicly available information. From press releases and financial results we are able to build up an understanding of aircraft retirements, deliveries and deferrals in order to support and develop the assumptions we made on airline supply for the December RBP. By the nature of financial results, this information lags behind current reality and with the short-term outlook having worsened since the last releases we acknowledge that expectations of planned aircraft deliveries may now be optimistic given the current circumstances.

Based on IAG's Q3 2020 financial results, their fleet size was reduced by 63 aircraft compared to 2019, which represents a reduction of 11%. Their A380s make up another 5% of their 2019 seat capacity, all of which are currently parked and face an uncertain future. In fact, at the point of writing, only c.35% of BA's 2019 capacity is in service.

With the early retirement of BA's 747s, they have a significant deficit in capacity. This is exacerbated by the management actions taken to protect the business in response to Covid-19, which included a reduction in fleet deliveries by 68 between 2020 and 2022. This double effect of early retirement and delayed delivery means that BA's 747 capacity will not be replaced until at least 2023, and likely much later given the Airline Community's feedback on not having the cash to invest in fleet.

Other airlines have also made public statements on their capacity plans for the coming years. For example, Lufthansa have stated they plan to reduce their fleet to 650 from 763 over the next two years, leaving their fleet at 85% of 2019 number in 2023[46].

There are countless examples of airlines either retiring their A380s or commenting on their uncertain future: Qantas have said there is significant uncertainty as to when their 12 A380s

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[43] Airline Community presentation to CAA and HAL, March 2021
[44] Section 2, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final
[45] Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final

[46] Lufthansa fleet reductions, aerospace-technology.com, March 2021

will return to service, noting that they will be idle for a significant percentage of their remaining useful life[47]; Qatar plan to retire at least half of their A380 fleet[48]; Etihad is very likely to retire their A380 fleet[49]; Singapore are retiring seven of their A380 fleet as they are deemed surplus to fleet requirements[50]; Thai Airways are selling a third of their A380 fleet[51]; Lufthansa retire their entire A380 fleet[52] and Air France retire all their A380s[53].

In their feedback on the December RBP the Airline Community expressed the following view:

"A major problem airlines have today is that they cannot fly their capacity but need to. They are burning through cash because of having expensive fixed costs (aircraft) vastly underutilized. They will need all the cash flows they can get in the recovery years to service and repay debt so there is a strong incentive for airlines to put their fleets back into operation. […] There will be more of a risk of over rather than under capacity during the recovery period"[54].

A more recent press release from IATA[55] does acknowledge that *"capacity is likely to return at a slower pace than demand. That reflects the pressure on airlines from debt and fuel prices to operate only cashflow-positive services".*

Another aspect of airline supply that must be considered is pilot and crew resource levels. In the December RBP we noted that IAG had reduced employee costs by 42% in the three months to September 2020[56], Virgin Atlantic had cut employee numbers by almost a half[57], and there was a similar picture across many other airlines.

Analysis done by Robert Boyle[58], previous Commercial Director at BA and Director of Strategy at IAG, looks at the deal struck between BA and its pilots and what that tells us about the airlines plans for capacity. He found that pilot numbers have been reduced by 650, which is c.15% of BA's pilots. Out of those 650, 350 are permanent job losses and the remaining 300 were placed into a rehire pool on 50% pay. It is understood that the reduction in pilot number is focussed on larger aircraft so the 15% reduction probably equates to at least a 20% overall reduction in capacity. The rehire pool will allow those 300 pilots to be rehired within 1-2 years depending on how well demand recovers.

Based on this analysis, Robert Boyle concludes that BA' capacity will be capped at 80% throughout 2021, if there is strong summer demand then he would expect those pilots in the pool could be returned to service in time for summer 2022 to give 90% capacity, then re-hiring would allow a return of capacity to 2019 levels for summer 2023. In a scenario of slower demand recovery, Robert Boyle expects the return of capacity to 90% of 2019 levels to be delayed until summer 2023, then re-hiring of pilots would allow a return of capacity to 2019 levels for summer 2024.

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47 Qantas Retires 747, Won't Fly A380 For Years, One Mile at a Time, June 2020
48 Qatar Airways Will Retire Half Of Its A380 Fleet, One Mile at a Time, Jan 2021
49 Sad: Etihad "Very Likely" To Retire A380 Fleet, One Mile at a Time, June 2021
50 Singapore Airlines Retiring 26 Planes, Including A380s, One Mile at a Time, Nov 2020
51 Thai Airways Selling Boeing 747, Airbus A380 Fleet, One Mile at a Time, Dec 2020
52 Lufthansa Retiring Entire A380 & A340-600 Fleet, One Mile at a Time, Sept 2020
53 Air France Becomes First Airline To Retire All A380s, One Mile at a Time, May 2020
54 Section 5.8.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review_Final
55 Reduced Losses but Continued Pain in 2021, IATA, April 2021
56 IAG Q3 2020 Financial Results, October 2020
57 Coronavirus: Virgin Atlantic to cut 1,150 more jobs - BBC News, 4th September 2020
58 British Airways pilot deal, what does it tell us? Gridpoint Consulting, July 2020

As with the information taken from financial results, this analysis is now likely to be on the optimistic side of things, as it was carried out in July 2020 and the outlook has since worsened.

Considering all of this evidence, we have included the following assumptions in our scenarios:

Figure 10: Airline supply assumptions

The **Pent-Up Demand** scenario assumes that airline supply will reach 90% of 2019 levels once the stage of restriction free travel is reached in each market and then 95% of 2019 levels by mid-2023.

The **Steady Build** scenario assumes that airline supply will reach 85% of 2019 levels once the stage of restriction free travel is reached in each market and then 95% of 2019 levels by early-2024.

The **Gradual Opening** scenario assumes that airline supply will reach 80% of 2019 levels once the stage of restriction free travel is reached in each market and then 90% of 2019 levels by early-2025.

The **Autumn Reversal** scenario assumes that airline supply will reach 80% of 2019 levels once the stage of restriction free travel is reached in each market and then have recovered to 85% of 2019 levels by the end of H7.

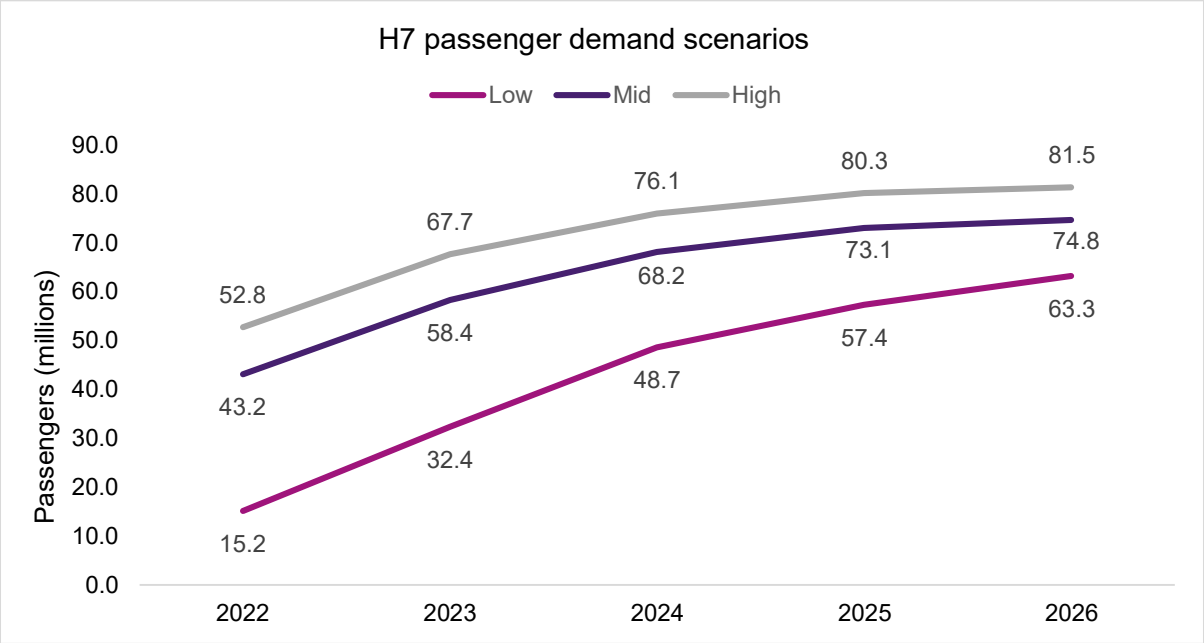
5.2.9. Results

H7 low, mid and high cases

The resulting low, mid and high cases for the H7 passenger forecast, with shock factor applied, are shown in Figure 11 and Source: Heathrow

Table 5.

Figure 11: H7 low, mid and high cases - chart



Source: Heathrow

Table 5: H7 low, mid and high cases – table

	2022	2023	2024	2025	2026	TOTAL
Low (P10)	15.2m	32.4m	48.7m	57.4m	63.3m	**217.0m**
Mid (P50)	43.2m	58.4m	68.2m	73.1m	74.8m	**317.7m**
High (P90)	52.8m	67.7m	76.1m	80.3m	81.5m	**358.5m**

Source: Heathrow

The range in the forecast, particularly in the earlier years is stark. Also notable is the reduction in passenger numbers compared to those in the December RBP, particularly in 2022 where there is a 17% in the mid-case. This has particular implications on Heathrow's financeability, which is discussed in detail in Chapter 5.7 – H7 Financial Modelling & Financeability Updates.

Weighting

We maintain the approach of assigning a weighting to each scenario, reflecting that each one is not equally as likely as another. The weightings are used to guide the combination of the four input scenarios to generate the output low, mid and high cases. Each input scenario is run through Monte Carlo simulation, then a number of runs proportional to the weighting are combined to give the probabilistic distribution that the P10, P50 and P90 are taken from. We use 10,000 runs so a 50% scenario weighting would mean that 5,000 of the runs are taken from that scenario.

We have assigned the following weightings:

- Pent-Up Demand – 10%
- Steady Build – 50%
- Gradual Opening – 30%
- Autumn Reversal – 10%

This is the same split of weightings that we applied to the scenarios in the December RBP. As with that forecast, the two outer scenarios are calibrated as reasonable best and worst case scenarios at the point of forecasting. Each of these scenarios is therefore assigned a 10% weighting. Of the remaining 80% weighting, based on the latest information we take the view that the assumptions set out in Steady Build are more likely than those in Gradual Opening. We therefore assign a 50% weighting to Steady Build and 30% to Gradual Opening.

It is more important than it has ever been that we build flexibility into our forecasting approach. The weighting of scenarios is an important aspect of that flexibility. Since the point of creating each of the four input forecast scenarios the short-term outlook for this summer has become more uncertain. Hopes for a strong summer driven by relaxation of travel restrictions are beginning to feel as though they may be optimistic. The success or not of the summer months is now balanced on a knife-edge and so we considered whether a split of weightings of 40% to Steady Build and 40% to Gradual Opening would be more appropriate.

It is notable that Oxford Economics have adjusted the weightings of their GDP scenarios since November, with more weighting now placed on the more conservative of their scenarios.

On balance, we have decided to land on the side of optimism and retain the 50/30% weighting as set out above. To give an idea of the sensitivity to the weighting, the 317.7 million passengers in the mid case with 10/50/30/10% weighting would be reduced to 305.8 million passengers with a 10/40/40/10% weighting. That is a c.4% difference as a result of the changed weighting.

We will continue to monitor how the situation develops over the summer. If our optimism in applying the weighting turns out to misplaced then we can correct and update in the autumn, in advance of the next full update to the RBP.

In the Airline Community's feedback on the December RBP, it was queried why we had not directly used the GDP scenario weightings from Oxford Economics. Aside from the fact that the specific weightings quoted by the Airline Community were published after the December RBP, it would not be appropriate to directly adopt these weightings as they relate to just one of many assumptions that build up the scenarios. Although the scenario weightings don't deviate significantly from the GDP scenario weightings, they are set considering the full suite of assumptions that make up the forecast scenarios, including travel restrictions, vaccine rollout, long-term business impact, changes to fares, airport capacity, airline supply and fleet changes.

Comparison of the weighting is set out in Table 6. To give visibility we have calculated the resulting mid case passenger numbers if we were to directly adopt the GDP scenario weightings. That would reduce the forecast by 3.6 million passengers, which is a 1% difference.

Table 6: Weightings of GDP scenarios compared to forecast scenarios

	GDP scenarios	Forecast scenarios
Most optimistic	20%	10%
↓	35%	50%
	25%	30%
Most conservative	20%	10%

Source: Oxford Economics, Heathrow

Ultimately the weightings give the flexibility to respond to changes in the outlook much more quickly than we could update the input scenarios. At a time where forecasting is more uncertain than it has ever been and the outlook changed rapidly, the flexibility and speed of response of this methodology is invaluable.

Shock factor

The shock factor calculated for use in the December RBP assumed a 10% impact from Covid-19 in 2020 & 2021, which is associated with the mitigation from the RAB adjustment. There is therefore no change to the shock factor calculation and as in December, a shock factor of 1.46% is applied to each annual forecast output for 2022 – 2026 in the full adjustment scenario.

In the low adjustment case, there is limited mitigation and the impact of the pandemic is greater. Reflecting the partially mitigated impact of the actual shock in 2020 with the £300m adjustment and the forecasted shock in 2021, the shock factor is calculated at 5.16%.

For more information on the methodology behind the shock factor calculation, please refer to Section 5.2.4.

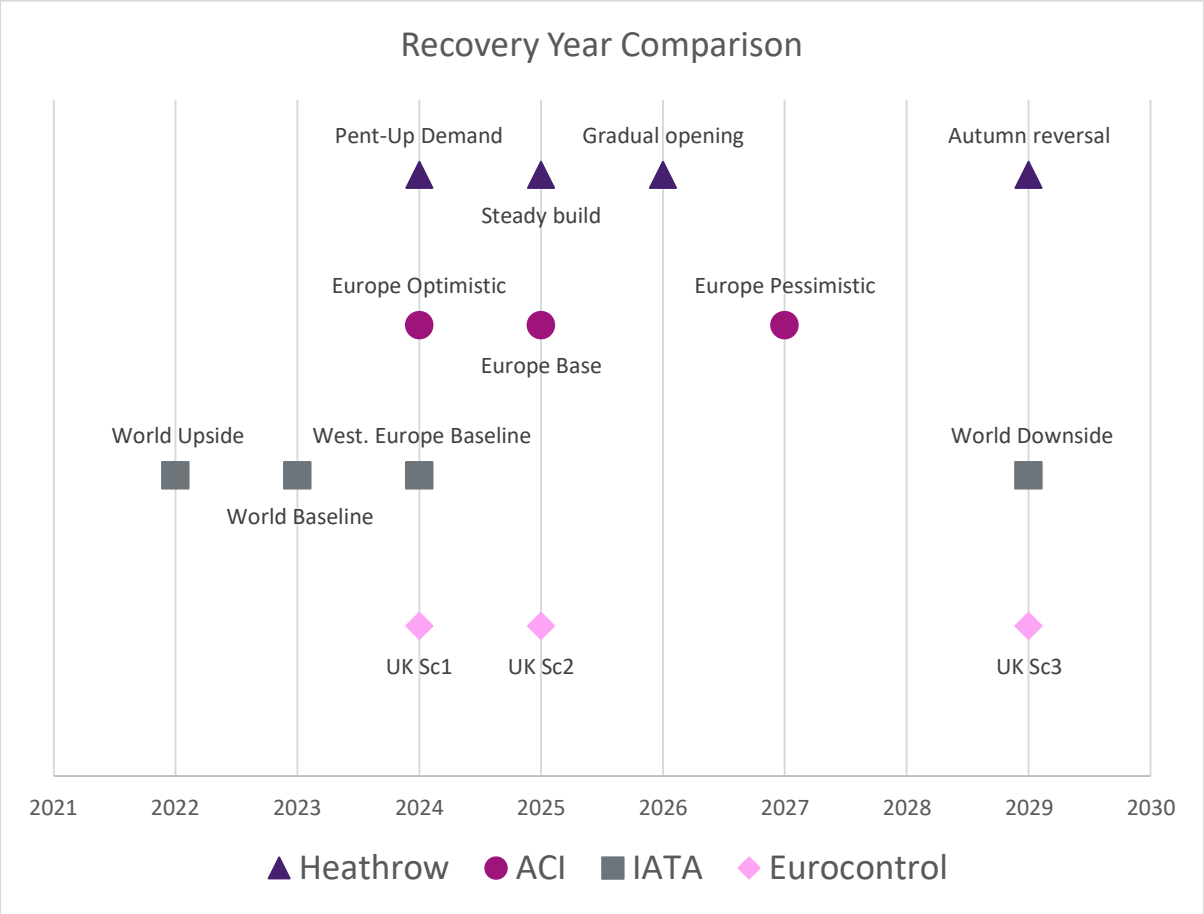
Comparison to external forecasts

To put these forecasts in context, the below chart compares the input scenarios against forecast scenarios from IATA, Eurocontrol and ACI.

During constructive engagement the Airline Community emphasised the importance of noting the year of recovery, we have therefore focused on this aspect in our comparison.

In Figure 12 the year in which traffic recovers to 2019 levels or higher is shown for each scenario. In the case of Eurocontrol, it should be noted that the forecast comparison is of ATMs rather than passengers. It should also be noted that IATA's forecast range applies to the global passenger outlook and is therefore an unconstrained forecast with high levels of expected growth. Only a baseline scenario is provided by IATA for Western Europe.

Figure 12: Comparison of recovery year



Source: ACI, IATA, Eurocontrol

Risks & opportunities

The high level of uncertainty has not changed since the December RBP and so there continues to be a correspondingly large amount of both risk and opportunity. To ensure that the H7 price control can be built on the best possible information, we will continue to update our views on demand through 2021. In addition to our regular engagement with the CAA and airlines we will provide another formal update to our assumptions and forecasts later in 2021. There are, however, some aspects impacting our forecast which will cause longer-lasting uncertainty and have the potential to remain uncertain through the H7 period.

We note the following particular risks and opportunities:

Failure to control Covid-19 – as was the case in December, the key risk in the immediate term relates to any potential need for further lockdowns and travel restrictions. Covid-19 will need to be kept under control until vaccines have been sufficiently rolled out. The current situation in the UK is a prime example of this, having one of the highest case rates in Europe despite having one of the most advanced vaccine programmes. We must acknowledge the potential for further impacts of this scale until vaccine roll-out is achieved in all of Heathrow's core markets.

Testing and quarantine requirements – even in the most unrestricted stage of the UK Government's travel framework there are requirements for pre-departure and post-arrival

testing. We assume these testing requirements will be relaxed and that the cost of testing reduces, otherwise the cost and hassle may prove too much of a blocker to travel for many.

Political decision making – with testing and vaccine rollout should come the lifting of travel restrictions, but there is risk that governments continue to delay because of over-caution or other political rationales for keeping borders closed.

Pace of vaccine rollout - despite good progress with vaccine rollout in the UK, US and Europe, our relatively high reliance on global vaccine rollout means there is still significant risk associated with the manufacture, distribution and uptake of vaccines.

New variants – with the risk of increase to cases comes the risk of new variants. Demand recovery in 2021 has turned out to be aligned with the scenarios that were thought to be conservative in December because of the prevalence of new variants. There remains the risk that another variant mutates and does so in such a way that it escapes vaccines.

Slots – there is uncertainty over when the suspension of slot rules will come to an end. As long as the alleviation is in place there is a risk of under-utilised capacity, with airlines holding slots that they will not fly so they cannot be reallocated, thereby slowing our recovery.

To address these risks, in addition to plans for updates in 2021, we are also clear that changes to the regulatory framework can help to manage uncertainty through the H7 period and ensure that the price control remains fit for purpose in all outturn scenarios.

In line with other airports, we are proposing a revenue risk sharing mechanism which automatically adjusts the price control to reflect deviations in outturn revenue against forecast. Our proposed mechanism, set out in more detail in Chapter 6.1 – Updates to our H7 Regulatory Policy Proposals, is calibrated to ensure the price control can appropriately balance risk and reward by setting an 8% deadband outside of which any over or under recovery of revenues is shared. Our mechanism works by using the RAB to smooth the adjustment to prices of future years and regulatory periods. This ensures price predictability and stability throughout the H7 period, increasing the framework's ability to deal with this unprecedented uncertainty in a manageable way.

5.3 H7 capital plan updates

5.3.1 Introduction

This chapter addresses updates to our capital plan. It considers information requests and feedback from the CAA and airlines. In particular it considers developments since our RBP was published in December 2020 and how these have caused us to update our approach to investment.

This chapter is set out in six sections:

1. The level and nature of capital investment in H7 will define consumer outcomes and shapes financial performance in this next period and beyond.
2. Given the uncertainty of the future we have prepared two capital plans – "Optimal" and "Safety Only"
3. The Optimal Plan represents good value for money for consumers and there is no trade-off between charge and service for H7 passengers.
4. We have updated elements of our capital plan to reflect feedback and learning since the publication of our RBP.
5. We share additional information on areas that have not changed.
6. We outline the next steps to shape capital investment in H7.

Throughout this chapter we articulate a capital plan based on a P50 demand scenario. For further information as to how our capital plans adapt to different demand scenarios please see Chapter 7.0 – Evidence to support our Scenarios.

We provide a level of detail that is consistent with the requests made by the CAA in CAP2139 and a higher level of detail than both our H7 RBP (December 2020) and the Q6 Full Business Plan (January 2013):

- We have provided detail of the investments that are already in progress within the relevant Portfolio and have set out greater detail of anticipated initiatives within each of the Portfolios. It is not feasible to provide project level cost estimates for those initiatives which have not yet commenced initial scoping work.
- We have provided detailed asset management plans, a more detailed capital plan, which includes the largest capital investments that are already in progress; and statements detailing the source of the forecast numbers throughout the narrative.
- We have provided Programme Mandate one-pagers that outline the high-level programme benefits and how individual projects within a programme will be prioritised.

5.3.2 Capital Investment defines Consumer Experience

This section set outs why investment in H7 will define outcomes for passengers in this period and beyond.

- **The last billion passengers:** the link between capital invested and consumer outcomes is self-evident in the transformation Heathrow has undergone since it was acquired in 2006.
- **The next billion passengers:** the CAA duties make clear it needs to consider the needs of current and future passengers when evaluating the capital plan for H7.

5.3.2.1 The last billion passengers

In 2006, the airport was renowned for “Heathrow hassle”:

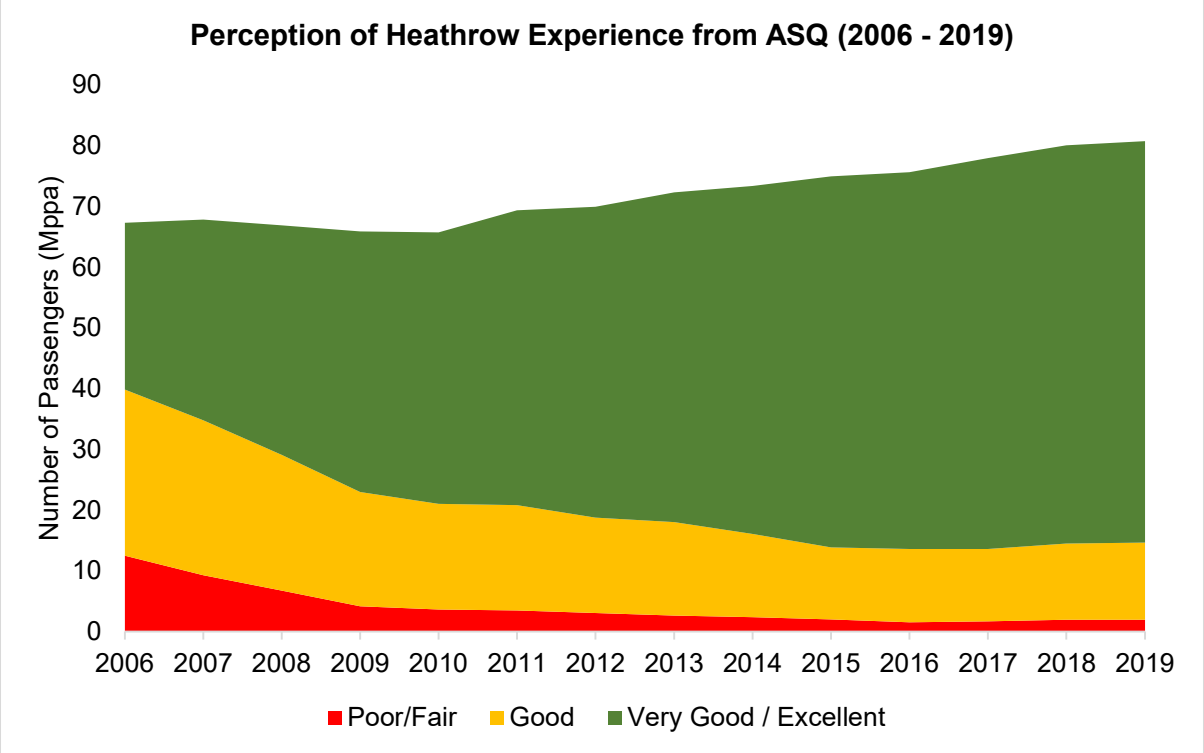
- 19% of passengers rated their Heathrow journey as Poor or Fair (1 or 2 in ASQ) and just 41% of passengers rated it as being Very Good or Excellent (4 or 5 in ASQ)[1].
- 41% of passengers experienced a departure delay of 15 minutes or more and 40.2 bags in every 1,000 did not travel with passengers.

Since then, over a billion passengers have travelled through Heathrow and our shareholders have invested £11.8bn of private capital:

- £5bn in maintaining and improving existing assets, ensuring we deliver reliable services to all airport users.
- £7bn in improving service through the development of two award-winning terminals in Terminal 2 and Terminal 5, the world’s largest integrated baggage system in T3IB and world-leading airspace management innovations.

Our ambition was to ensure **happy passengers travelled with their bags on time.** We now have the best ASQ scores of any major hub airport in Europe while operating costs per passenger have fallen by 18% since 2008[2].

Figure 1: Improvement in perception of Heathrow experience (ASQ score) between 2006 - 2019



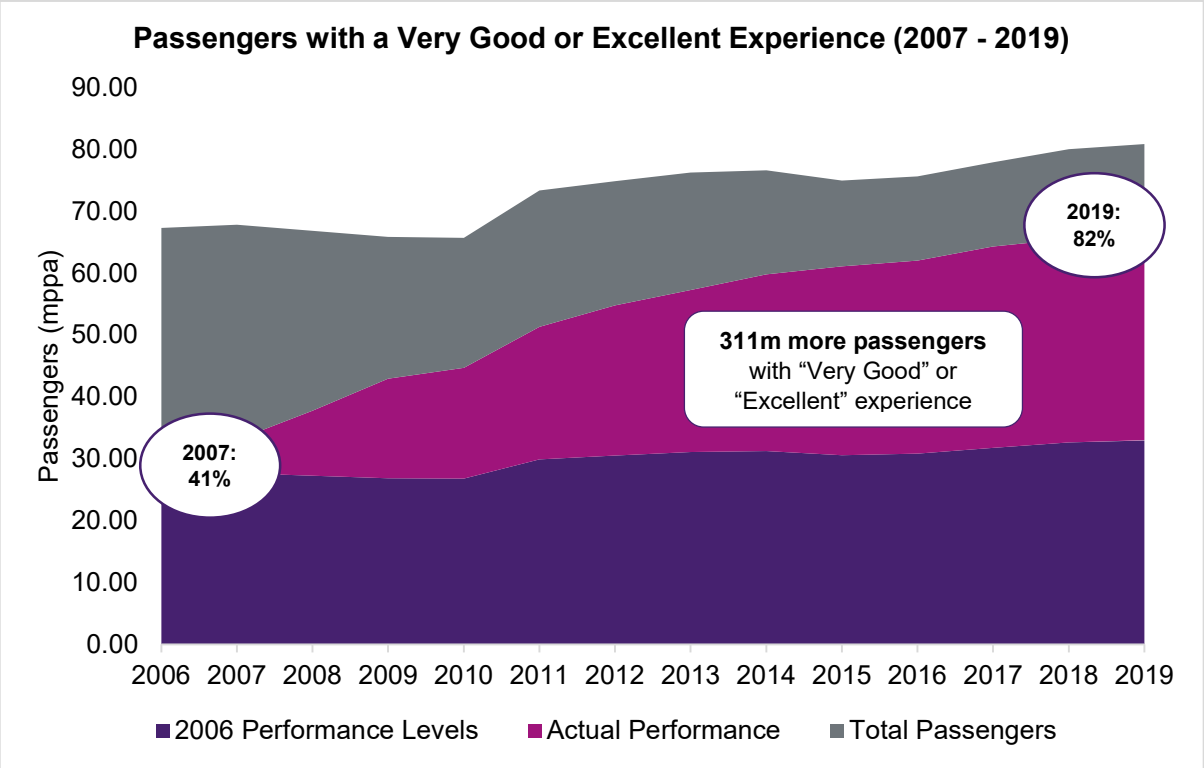
Source: Heathrow

This transformation can only be appreciated when considering the aggregate number of passenger journeys that have been changed as a result of the investments made:

[1] ACI, ASQ Passenger Satisfaction survey 2006 - 2020
[2] Please note: 2008 benchmark used to reflect the first year of operating costs with Terminal 5 to ensure a fairer comparison with 2019 capacity levels.

- **Service:** 311m more passengers have experienced very good or excellent service.

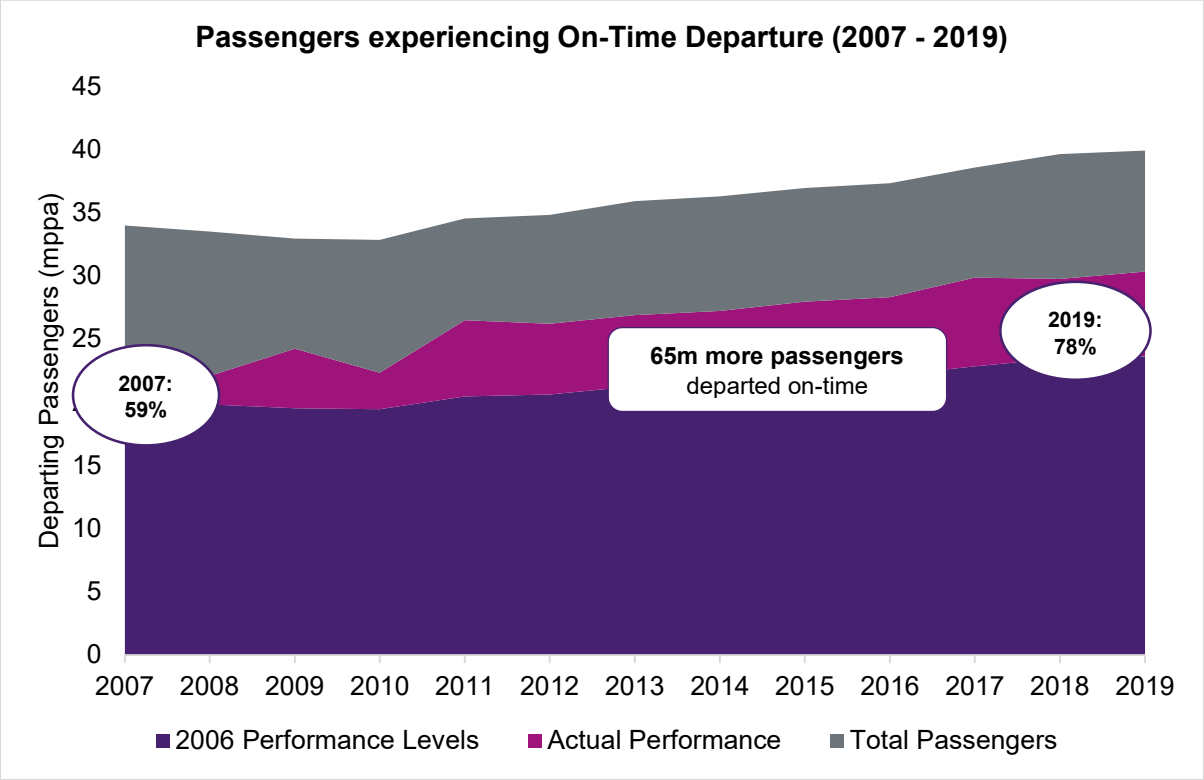
Figure 2: Increase in number of Heathrow passengers experiencing Very Good or Excellent service between 2007 - 2019



Source: Heathrow

- **Resilience:** 133m fewer passenger experienced a Poor or Fair journey.
- **Baggage:** 880,000 more passengers travelled with their bag.
- **Punctuality:** 65m more passengers had an on-time flight.

Figure 3: Increase in number of Heathrow passengers experiencing On-Time Departure between 2007 - 2019



Source: Heathrow

This transformation is rightly held up as an example of where economic regulation has been a success: stable and predictable regulation has allowed investors to look through short-term crises to deliver efficient investment that has improved the outcomes consumers value. Even in periods of significant turbulence – the Liquid and Gels policy, the Global Financial Crisis and Brexit – private capital was sufficiently patient and confident of a fair return to continue investing.

5.3.2.2 The next billion passengers

While targeted capital investment has enabled millions more passengers to have a better experience at Heathrow, the opposite can also be the case: constraint on capital investment can erode resilience as assets are under-maintained and service levels fall at the same time as consumer expectations outpace the ability of out-dated infrastructure to meet them.

This is precisely what threatens Heathrow in H7 and beyond:

- After two years of underinvestment in assets in order to protect liquidity, we risk less reliable services and more major failures.
- A quarter of passengers now describe themselves as newly anxious about travelling through an airport – with heightened expectations on cleanliness and distancing.

Unless we can deliver the investments necessary to catch-up on the backlog of asset management lost over Covid-19 and reshape our service proposition around new consumer needs then we will see the gains of the last decade erode. Investment can only take place if there are the financial circumstances to incentivise it. As discussed elsewhere in this update (notably Chapter 5.1 – RAB Adjustment), those circumstances do not necessarily exist in H7.

In the above context this chapter outlines two capital plans:

- An **Optimal Plan** – which requires a Full RAB Adjustment to be made at the start of the period – that invests an average of £830m p.a. in H7, equivalent to Q5 and Q6 levels. This plan helps us to include investments that lower the charge, boost financial resilience and enhance operational performance to meet increasing consumer expectations on service.
- A **Safety Only** plan – the minimum required to operate the airport safely in H7, which is the maximum that can be expected absent of a further adjustment to the RAB – that invests an average of only £490m p.a. in H7 – 42% lower than our historic capital run rate. This plan continues the trend of iH7 where we fall behind the curve of expectations and investments, while the gains of the last decade or more evaporate.

The nature of the investments forecast in each Plan are outlined in full in the sections below. Given the higher levels of investment, we expect that an Optimal Plan, in addition to an Enhanced Service Overlay (see Chapter 5.4 – H7 Operating Costs Updates for more details) will outperform a Safety Only Plan on a number of key metrics in H7:

Table 1: Effect of RAB adjustment on key metrics during H7 period

Measure	Full Adjustment	Low Adjustment
H7 Charge	£32.0 2018p	£42.7 2018p
Overall Satisfaction	4.26	4.17
Wi-Fi Performance	4.00	3.93
PRM Satisfaction	4.00	3.92
Cleanliness	4.05	4.00
Wayfinding	4.15	4.10
Security Queue < 10 mins	99.00%	46% - 89%
Stand Availability	99.00%	97.25%
Lifts, Travelators, Escalators	99.00%	97.00%
Baggage Reclaim Availability	99.00%	98.00%
T5 TTS 1 Train	99.00%	97.00%
OTD%	80.50%	78.40%
Baggage Misconnect Rate	7–9 in 1,000	9–11 in 1,000
WACC	8.50%	10.40%
Rev / Pax	**[REDACTED]**	**[REDACTED]**
Opex / Pax	(£17.5) 2018p	(£18.2) 2018p
Carbon removed in H7	99,000t	0

Source: Heathrow

Once again, the best way to understand these differences is to consider the aggregate number of passengers in H7 alone who do better with an Optimal Plan than a Safety Only one:

- 3.2m more passengers will depart on time

- 300,000 more passengers will travel with their bags
- 96.5m more passengers will experience a security queue time of less than 10 minutes
- 4.9 million more passengers will experience a Very Good or Excellent journey (ASQ rating of 4 & 5)
- 2 million fewer passengers will experience a Poor or Fair journey (ASQ rating of 1 & 2)

Outcomes for passengers in H7 are not the only consideration. The Civil Aviation Act (2012) requires the CAA to carry out its functions "in a manner which it considers will further the interests of users of air transport services" but defines those users as both current and future users[3].

The differences in the two plans become starker when we consider future periods:

Table 2: Outturn of Optimal and Safety Only plans in future regulatory periods

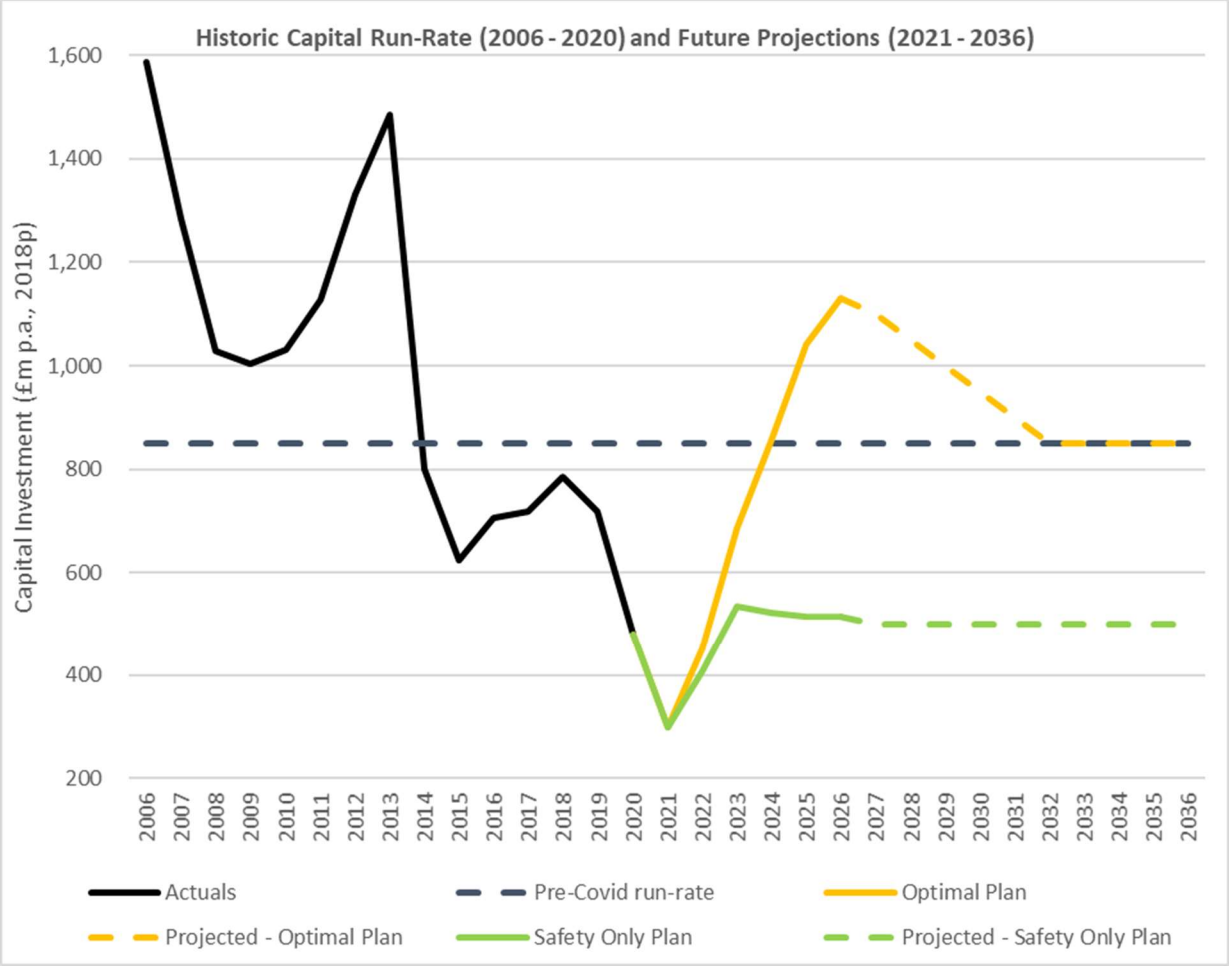
	Optimal Plan	Safety Only Plan
Security	All passengers travelling through compliant security at all times, with all security lanes upgraded by end of H7, better service and lower operating costs.	All passengers travelling through compliant security at all times, but only 50% of security lanes available by end H7, increased queue times and worse service, same or worse operating costs.
T2 Baggage	New system with better service and lower operating costs in place by early H9	New system not available until late H9 at earliest
Western Campus	New capacity in T5 by end H7, more intra-terminal connections, lower operating costs	New capacity in T5 by mid H8 at earliest
Passengers Requiring Support	Ability to continue enhancing the experience of our most vulnerable consumers	Service levels fall during H7 as passenger numbers return and no improvements until H8 at the earliest
Automation	Better automation of service, airfield and baggage delivered from mid H7	No significant automation of service, airfield and baggage until mid H8 at earliest
Digital Retail	Digital retail platform available from mid H7	No digital retail platform until mid H8 at earliest

Source: Heathrow

[3] Section 1(1) of the Civil Aviation Act 2012

Even clearer still is the trajectory of capital spending this sets us on. Whereas an Optimal Plan would allow us to catch-up lost capital investment by end of H7, a Safety Only Plan sets us on a trajectory that sees us fall further behind.

Figure 4: Heathrow's projected Capital Run-Rate between 2021 – 2036 for Optimal and Safety Only Plans



Source: Heathrow

Table 3: Heathrow's ability to catch-up lost capital investment under Optimal and Safety Only Plans

Cumulative £bn behind historic run-rate	**Optimal Plan** Projected forward	**Safety Only Plan** Projected forward
End H7	£1.1bn	£2.7bn
End H8	£0.3bn	£4.5bn
End H9	£0.3bn	£6.2bn

Source: Heathrow

It took £7bn additional investment between 2006 and 2019 over and above what was needed to maintain airport assets to transform Heathrow from "hassle" to delivering the best airport service of any major European hub.

A Safety Only plan projected forward would see Heathrow fall behind the investment curve by £6.2bn between 2020 and 2036, threatening to condemn the next billion passengers Heathrow serves to worse service that is less resilient and efficient.

These outcomes sit at the core of the CAA's primary duty to current and future passengers and the regard it must have for financeability, efficiency and sustainability. The decision the CAA must make on the RAB adjustment cannot be made in isolation to the consideration of what the decision means for capital investment, and in turn what that investment means for consumers.

5.3.3 Capital plans and outcomes

In this section we outline how we have approached the development of an Optimum Plan and a Safety Only Plan.

5.3.3.1 Approach to capital plans

In addition to never compromising the safety and security of passengers and colleagues, the optimal capital plan strikes a balance between a number of considerations:

- Improving consumer outcomes in H7 (see Chapter 4.0 – H7 Consumer Insights Updates).
- Improving the efficiency and commercial performance of the airport (placing downwards pressure on the airport charge).
- Meaningfully delivering against our sustainability commitments, with particular focus on achieving net-zero by 2050.
- Considering the interests of consumers and airport stakeholders in H8.
- Ability to deliver efficiently within the capacity of our delivery capability.
- Ensuring the airport charge remains competitive.

We also know that, at a conceptual level, any capital plan is bound by two extremes:

Figure 5: Heathrow H7 capital plan boundaries

On the basis of the considerations we are trying to balance, a capital plan at either extreme would not be favourable:

- A **Safety Only Plan (£2.5bn)** would prioritise safe operation in this period and would condemn Heathrow to a period of stagnation and inevitable decline without much higher investment in future periods. There is not sufficient capital to maintain current service and resilience levels in H7, nor to enable Heathrow to meet the challenges that will define future service, resilience, financial performance and sustainability in the periods ahead.
- A **Complete Plan (£6.6bn)** would stretch the capacity of our delivery capability, likely to lead to inefficiencies in how capital is delivered and place too significant a level of pressure on the airport charge.

Our attempts to strike the right balance have resulted in an **Optimal Plan,** which has matured as a result of a developing outlook, additional consumer insight and engagement with the airline community. This evolution is evident in the capital plans we have presented through the CAA process:

- In our Building Block Update (June 2020) we presented a high-level £5.3bn plan for 2R elements of our IBP that used M5 Entry cost estimates.
- In our Revised Business Plan (December 2020) we presented a refined £3.5bn plan that responded to airline requests to constrain capital further.

Since the publication of our RBP we have had to consider a changed outlook (see Chapter 3.0 – Developments since publication of the December 2020 RBP) and airline and CAA comments on our RBP plan. We have balanced that feedback with the findings of our consumer insights and have ensured that our plans deliver outcomes they value. These insights confirm that passengers:

- are willing to pay more for an improvement in service, and will not accept a degradation in service – even if it means paying a slightly lower charge.
- value resilience, punctuality and baggage performance, and since Covid-19 have a heightened focus on cleanliness.
- expect – and future consumers require – meaningful progress on decarbonisation in H7, which the CAA is also required to have regard to its statutory duties.

We must also reflect on our experience as an airport operator, particularly on the lessons we have learned in how to efficiently deliver capital projects in a complex operational environment, and also the long-term impact of constraining capital expenditure to protect liquidity:

- we will only secure investment beyond what is required to safely operate the airport if investors have confidence that they will achieve a return of, and on, the capital invested.
- by delaying a decision on the RAB adjustment and then only granting an initial £300m adjustment the CAA have triggered a second year of capital constraint, impacting asset management programmes in iH7.
- this has led to a backlog that will have inevitable consequences for service and resilience in H7.
- the speed at which this backlog is cleared will have consequences for capital investment and service in H8 and beyond – requiring careful consideration of the CAA's duties to both current and future consumers.
- efficiently scaling-up our delivery teams will take time, limiting the delivery capability in the early years of H7, even if financial constraint were not a factor.

5.3.3.2 Changes to capital plans

In reflecting on feedback from stakeholders, consumer insights and our experience as an airport operator, we have made changes to what we believe to be the Optimal Plan for H7:

- Increased forecast investment in **Asset Management and Compliance** to respond to the risks identified in a bottom-up assessment of our H7 pipeline and the consequence of underinvestment for two years in iH7 due to the impact of Covid-19 and no timely enforcement of regulatory principles.

- Brought forward investment in **Security** to ensure a solution for a security product is identified earlier in H7, and introduced a new programme line in our Optimal Plan that would enable all security lanes to meet new DfT standards by the end of H7.
- Introduced a new portfolio entry for **T2 Baggage** in the Optimal Plan to begin the works required to deliver a long-term solution in H8, enabling a better balancing of needs of current and future passengers as well as ensuring capex is efficiently delivered.
- Introduced a new portfolio entry for **Western Connectivity & Efficiency** in the Optimal Plan to address the capacity and efficiency challenges identified at the end of Q6 that would enable the efficient delivery of better outcomes for consumers and airport users in H8.
- Introduced a new portfolio entry for **iH7 Rollover** in all scenarios that would enable full ramp-up of T3 and T4, as well as the completion of existing business cases (such as the T5 TTS works) that are more efficient to complete than stop.
- Included a **Carbon & Sustainability** portfolio entry in all scenarios, reflecting the moral and consumer need to make meaningful progress on decarbonisation in H7 regardless of circumstances. We continue to include additional funding in the Optimal Plan to make further progress on carbon reduction.
- Removed **T5 Station Fit Out** from the plan as there are no longer requirements to deliver Western Rail Access infrastructure in H7.

Our updated **Optimal Plan** is below:

Table 4: Updated Optimal Plan portfolio

£ 2018 prices		2022	2023	2024	2025	2026	H7
Protect the Business	Asset Management & Compliance	235	309	314	317	325	**1,500**
	iH7 roll-over (KAD/TTS, T3/T4 ramp up)	63	19				**82**
	T2 Baggage (prolongation)	10	35	45	45	45	**180**
	Regulated Security	40	80	100	100	100	**420**
	Protect Efficiencies	10	25	25	20	20	**100**
	Protect Revenues	10	25	25	20	20	**100**
	Carbon - Airspace Modernisation	2	3	14	14	5	**38**
	Crossrail Contribution	39	39	0	0	0	**78**
	Subtotal Safety Only Plan	**409**	**535**	**523**	**516**	**515**	**2,498**
Win the Recovery	Security Compliance				100	130	**230**
	Security Transformation	10	30	75	10	5	**130**
	Commercial Revenues	10	70	160	170	190	**600**

	Efficient Airport	24	50	100	100	100	**374**
Build Back Better	T2 Baggage Solution				10	25	**35**
	Carbon, Sustainability				75	75	**150**
	Western Campus Connectivity & Efficiency				10	25	**35**
	Future Ready - Service, Resilience				50	65	**115**
	Total Optimal Plan	**453**	**685**	**858**	**1,041**	**1,130**	**4,167**

Source: Heathrow

As with our RBP, this **Optimal Plan** can only be delivered in certain conditions:

- Passenger numbers must not materially fall below the p50 forecasts. If they do:
  - Heathrow would be unlikely to meet its financial obligations and would need to ration capital to preserve liquidity.
  - Investors would be unlikely to recover existing capital invested and would therefore be unlikely to invest more.

- There must be a full RAB Adjustment (see Section 5.1 for more information). If there is no incentive for private capital investment, or little confidence that regulatory principles will be enforced to ensure a return of capital, then there is unlikely to be the market appetite or financing capacity to invest more.

The absence of one or both of those investment conditions means our capital plans necessarily revert to only what is necessary to ensure the safe operation of the airport in H7 ("**Safety Only Plan**"). In these circumstances we forecast capital investment of £2.5bn (2018p) to deliver the following portfolios and programmes only:

Table 5: Safety Only Plan portfolio

£ 2018 prices		2022	2023	2024	2025	2026	H7
Protect the Business	Asset Management & Compliance	235	309	314	317	325	**1,500**
	iH7 roll-over (KAD/TTS, T3/T4 ramp up)	63	19				**82**
	T2 Baggage (prolongation)	10	35	45	45	45	**180**
	Regulated Security	40	80	100	100	100	**420**
	Protect Efficiencies	10	25	25	20	20	**100**
	Protect Revenues	10	25	25	20	20	**100**
	Carbon - Airspace Modernisation	2	3	14	14	5	**38**
	Crossrail Contribution	39	39	0	0	0	**78**

	Total Safety Only Plan	**409**	**535**	**523**	**516**	**515**	**2,498**

Source: Heathrow

5.3.4 Net value of capital plan to consumers

As with our RBP, a key consideration is whether the additional £1.7bn investment in the Optimal Plan confers benefits to current and future passengers, and whether that benefit outweighs the cost of the investment.

We make this assessment by comparing:

- The total Willingness To Pay for the H7 outcomes in our Optimal Case relative to the outcomes in the Safety Only Plan.
- The net impact of the additional £1.7bn of investment on the average H7 airport charge.

5.3.4.1 Willingness To Pay

Chapter 6.2 – H7 Measures, Targets and Incentives Updates outlines the difference between a Full and Low Adjustment cases on our service quality targets. These are due to changes in capital investment and operating costs.

Those targets that are wholly influenced by differences in capital investment are:

Table 6: Service quality targets under Optimal and Safety Only Plans

Consumer Outcome	**Measure**	**Optimal Plan** (requires Full RAB Adjustment)	**Safety Only Plan** (Low RAB Adjustment)
Predictable and Reliable	Wayfinding	4.15	4.10
Predictable and Reliable	Central search queue time % queue times < 5 mins % queue times < 10 mins	 95.00% 99.00%	 33%-75% 46%-89%
Predictable and Reliable	Transfer search queue time % queue times < 10 mins	 95.00%	 46%-89%
Predictable and Reliable	Staff search queue time % queue times < 10 mins	 95.00%	 46%-89%
Predictable and Reliable	Control post vehicle Queue Time % vehicle queue times < 15 mins	 95.00%	 46%-89%
Enjoyable and Connected	Wi-Fi performance	4.00	3.93

Source: Heathrow

Those targets that are influenced by a combination of capital investment and the Enhanced Service Overlay include:

Table 7: Service quality targets influenced by capital investment plans and Enhanced Service Overlay

Consumer Outcome	**Measure**	**Optimal Plan** (requires Full RAB Adjustment)	**Safety Only Plan** (Low RAB Adjustment)
Predictable and Reliable	Provision of stand facilities	99%	97.25%
Basic Comforts	Baggage Misconnect Rate	7-9 bags in a 1000	9-11 bags in a 1000
Predictable and Reliable	Departures flight punctuality - % flights depart off stand within 15 mins	80.5%	78.4%
Overarching Measure	Overall Satisfaction	4.26	4.17
Cared For	Passengers with Reduced Mobility (PRM/PRS) satisfaction	4.00	3.92

Source: Heathrow

Our extensive consumer evidence base shows that the service improvements secured by our optimal capital plan and in combination with the Enhanced Service Overlay (ESO) are highly beneficial for consumers. To inform our IBP and RBP we carried out extensive consumer research and willingness to pay (WTP) work. This includes an updated exercise carried out by Systra to understand how passenger priorities had changed post-Covid and whether and how this had impacted consumer valuations of service.[4] Our consumer insight shows us that:

- A reduced wait time at security was shown to be a priority improvement for both current and future passengers whether direct or connecting. A two minute reduction in security queue time was one of the top seven priorities for improvement for all types of passenger.[5] Systra also tested the disbenefit to passengers of an increase in security wait times, looking at how passengers would value a change from going through security in less than 5 minutes in 9 out of 10 cases to 7 out of 10 cases. Passengers valued the disbenefit as equivalent to a 0.9% increase in their airfare[6]. In our Optimal Plan the full passenger benefit is retained, however under our safety only plan we are likely to see a drop to a service level similar to or lower than that tested in Systra's service degradations work. We can therefore conclude that our Safety Only Plan would lead to a disbenefit of £3.50 per passenger in regard to security wait time.

- The provision of highspeed Wi-Fi has been shown to be a key priority for consumers, even in a post-Covid world. Systra's work found that it was a particular priority for connecting passengers, with current connecting passengers ranking the provision of ultra-high speed Wi-Fi as their second highest priority area for improvement. Potential connecting passengers ranked it as their fifth priority.[7] Although not ranked as highly, directing passengers also saw Wi-Fi improvements as a priority listing with both current and potential passengers listing it as their ninth highest priority for improvement among the 27 improvements listed.[8] Overall, our insight shows that direct passengers value

[4] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020
[5] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Page 56
[6] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 25
[7] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Page 56
[8] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Tables 21 and 22

improved Wi-Fi performance at £4.86 per passenger and connecting passengers at £5.32. This clearly demonstrates the value to passengers of good Wi-Fi performance which can only be delivered in our Optimal Plan.

As also set out in Chapter 5.4 – H7 Operating Costs Updates, our Optimal Plan, in combination with the ESO, provides further benefits for consumers and avoids the disbenefit of degradations:

- Systra found that the least acceptable deterioration in service for passengers would be a fall in the number of passengers travelling with their bags.[9] In combination with the ESO, our Optimal Plan ensures that more passengers travel with their bags. Direct passengers value the potential disbenefit of the drop in performance set out in our safety only plan at £4.96 per passenger.

- Systra's work also highlighted the importance of punctuality to passengers. Enhanced punctuality was the seventh highest priority areas for improvement among current direct passengers and sixth highest for potential direct passengers.[10] Systra found that a service degradation similar to that seen between our two plans would have a disbenefit value for passengers equivalent to a 1.03% increase on their airfare.[11] This equates to a disbenefit of around £4.12 per passenger.

This evidence clearly shows that our Optimal Plan both generates real value for consumers and helps to avoid large disbenefits, with single elements of the plan being valued at as much as £5 per passenger.

5.3.4.2 Net Cost of Optimal Plan

To establish the net cost of the capital plan we need to identify:

- The additional cost of an incrementally higher RAB as a consequence of an additional £1.7bn invested over H7.
- The net benefit that the additional capital investment has on operating cost and efficiency forecasts that in turn lead to a lower charge.

To make this estimation we have to amend the capital investment assumption and efficiency assumptions of the Full Adjustment Case while keeping all other assumptions the same:

Table 8: Summary of capital investment and efficiency assumptions

	Full Adjustment Case + Optimal Plan	Full Adjustment Case + Safety Only Plan
Passengers	317.7m	317.7m
Capital Investment	£4.2bn	£2.5bn
2021 Closing RAB	£19.16bn	£19.16bn

[9] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Page 47
[10] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 21
[11] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 25

WACC	8.50%	8.50%
Depreciation Profiling	635m p.a.	635m p.a.
Capital Investment Efficiency Overlay	√	X
Capital Investment Revenue Overlay	√	X
Enhanced Service Overlay	√	√

Source: Heathrow

Running this additional sensitivity, we can demonstrate each of the three variances on the H7 average charge:

Table 9: H7 average charge sensitivities

	Impact on Charge
Impact of £1.7bn additional Capital Investment	c. + £1.0 2018p
[REDACTED]	**[REDACTED]**
[REDACTED]	**[REDACTED]**
Net Impact to Charge	c. £0.0 2018p

Source: Heathrow

Figure 6: Net impact of the Optimal Plan on the H7 average charge

Source: Heathrow

5.3.4.3 Value for Money Assessment

We have demonstrated that:

- Passengers value the additional service benefits provided by an Optimal Plan and are willing to pay up to £5 per improvement for receiving it.
- The actual cost of the Optimal Plan is £0.00 to H7 passengers given more favourable operating cost and commercial revenue forecasts associated with the Plan.

We can conclude that:

- The Optimal Plan represents good value for money for H7 passengers.
- There is no trade-off between cost and service, an Optimal Plan gives H7 passengers a better service for the same cost.

- There is no trade-off between current and future passengers, an Optimal Plan improves the outcomes for future passengers without additional burden to H7 passengers.

We can also conclude that the Optimal Plan unequivocally delivers against the duties the CAA must have regard to. The CAA must give due consideration to creating the framework that will facilitate the Optimal Plan, including implementing a Full RAB Adjustment at the start of H7.

5.3.5 Changes to our capital plan

This section summarises our changes to individual capital lines relative to our RBP plan. It has sub-sections covering the programme areas that have shifted since our RBP – either new, changed total value or rephased.

- Critical Asset Management & Compliance
- iH7 Rollover
- T2 Baggage
- Security
- Carbon & Sustainability
- Western Campus Connectivity and Efficiency
- T5 Station Fit Out

Table 10: Changes to H7 capital plan since RBP

		H7 Capital Plan - £ 2018p		
		RBP	RBP Update 1	Change
Protect the Business	Asset Management & Compliance	1,200	1,500	300
	iH7 roll-over (KAD/TTS, T3/T4 ramp up)		82	82
	T2 Baggage (prolongation)	180	180	0
	Regulated Security	420	420	0
	Protect Efficiencies	100	100	0
	Protect Revenues	100	100	0
	Carbon - Airspace Modernisation		38	38
	Crossrail Contribution	78	78	0
	Subtotal "Safety Only" plan	**2,078**	**2,498**	**420**
Win the Recovery	Security Compliance		230	230
	Security Transformation	130	130	0
	Commercial Revenues	600	600	0
	Efficient Airport	374	374	0
	T2 Baggage Solution		35	35

Build Back Better	Carbon, Sustainability	150	150	0
	Western Campus Connectivity & Efficiency		35	35
	T5 Station fit out	31		-31
	Future Ready - Service, Resilience	150	115	-35
	TOTAL	**3,513**	**4,167**	**654**

Source: Heathrow

5.3.5.1 Asset Management and Compliance

Table 11: Updated H7 Asset Management spend

	Portfolio	2022	2023	2024	2025	2026	Total
RBP	PTB	£240m	£240m	£240m	£240m	£240m	£1200m
Update 1	PTB	£235m	£309m	£314m	£317m	£325m	£1500m

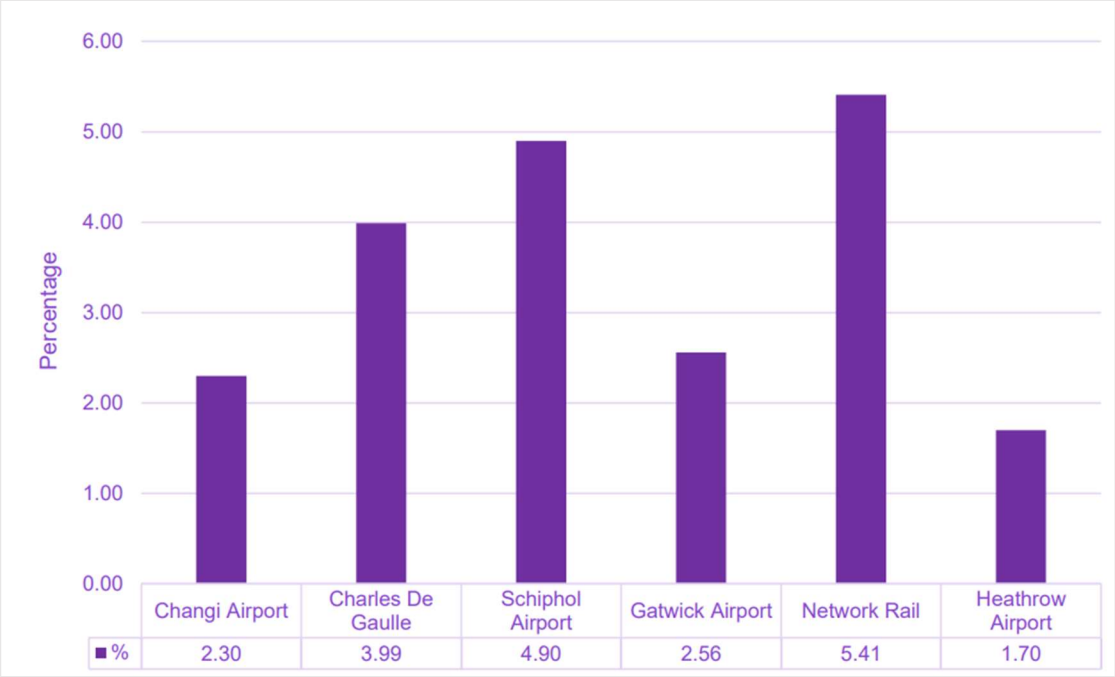
Source: Heathrow

In our RBP we responded to airline feedback in Constructive Engagement to identify as small a capital plan as reasonable for essential asset management and made a top-down forecast of £240m p.a. investment in H7. We stated that this level of investment was the minimum required to deliver four key requirements:

- Keep colleagues and passengers safe and secure.
- Ensure compliance to regulatory standards.
- Maintain the same resilience levels as Q6.
- Ensure performance against OBR measures is maintained at 2019 levels.

The £240m p.a. figure was understood to be at the very low end of what was required to achieve the outcomes desired but still within the bounds of acceptability. Historical analysis indicated that average asset replacement investment between 2008 and 2019 was £330m, equivalent to 1.7% of RAB. This 1.7% figure was lower but comparable to our competitors, such as Gatwick (2.56%), Charles de Gaulle (3.99%) and Amsterdam Schiphol (4.90%).

Figure 7: Heathrow's capital spend profile of asset replacement



Source: Expenditure Benchmarking Report, Amey Consulting July 2020

However, since the publication of our RBP in December 2020 we have:

- had to plan for an additional, unanticipated year of investment constraint in 2021 to protect liquidity (increasing the backlog of asset management needs), consider the consequential impact on service and resilience and the further erosion of our delivery capability.
- undertaken a bottom-up assessment of asset management requirements for H7, as well as the work that was required in iH7 but deferred to protect liquidity.
- developed a more mature understanding of the impact that cumulative underinvestment in assets over H7 would have on consumer outcomes in H8 and beyond.

In order to achieve the four original requirements of this programme we would need to invest £1.9bn in asset management alone over H7 – an average of £400m p.a. Our RBP proposal for £240m p.a. would have led to a cumulative underinvestment of £780m. This would not only degrade service and resilience throughout H7 – and store up huge challenges for H8 – but also result in unacceptable risks that could threaten major erosions to service and resilience and potentially even the safe operation of the airport. This assessment is apparent in the risk ratings included in the Asset Management Plans included in Appendix 6 to this Update. We judged this to be unacceptable, and discontinued the top-down £240m p.a. assumption.

By contrast, we do not believe the delivery of £400m p.a. in asset management alone is possible: delivery capability will take time to ramp up after two years of constraint in iH7 and it would crowd out other investments necessary to ensure the safe operation of the airport, as well having a significant impact on the smooth day to day running of the airport.

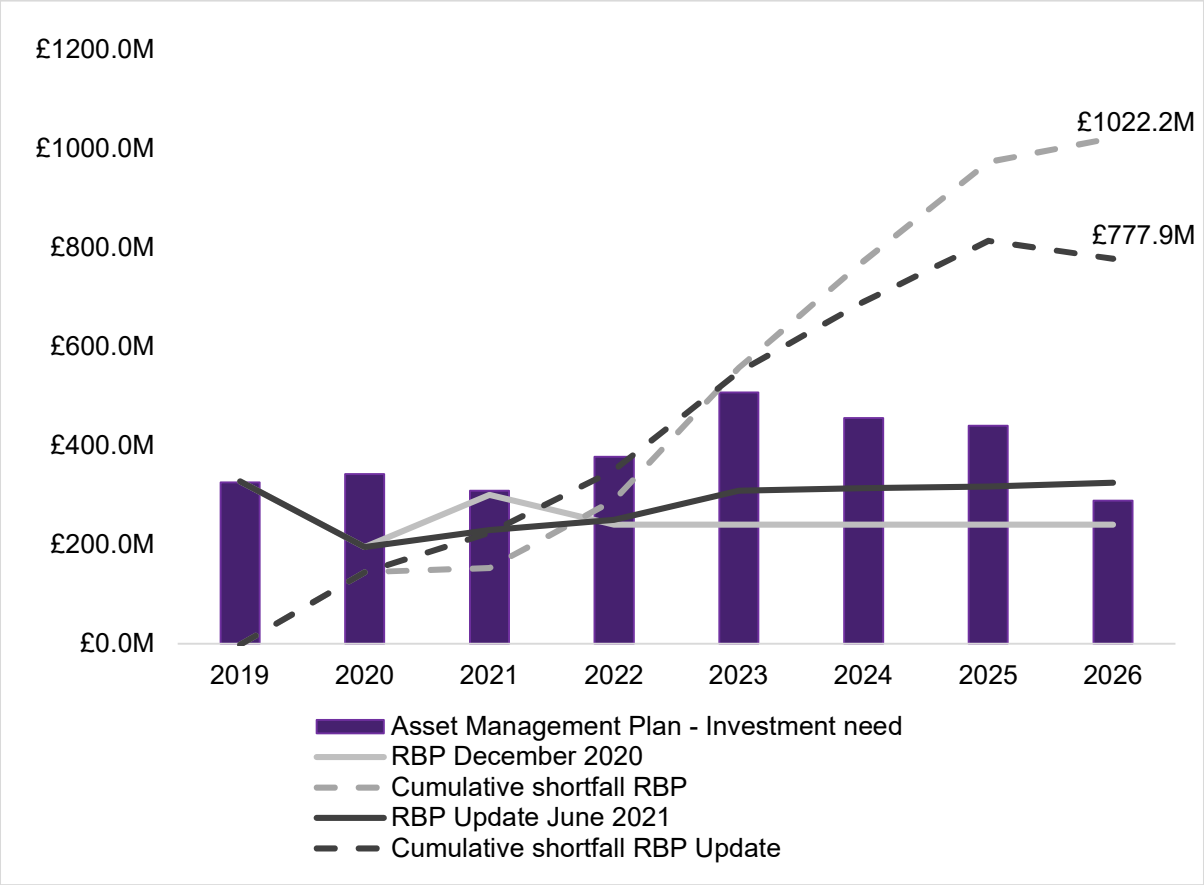
We have therefore had to make difficult choices about the appropriate level of asset management investment in H7 that guarantees the safety and security of passengers and colleagues while appropriately balancing the needs of current and future passengers.

We have approached this problem by:

- prioritising investments required to never compromise the safety and security of passengers or colleagues.
- prioritising the demands on delivery capability of other capital programmes needed to ensure the safe operation of airport.

This approach leads to an average £300m p.a. forecast spend in asset management and critical compliance – a 25% increase relative to our RBP assumption but still below Q6 levels. This would continue to result in a cumulative underspend against our asset management requirements but ensures we enter H8 having begun "catching-up" with deferred iH7 investments.

Figure 8: iH7/H7 asset management investment need, plans and shortfalls RBP vs. Update 1



Source: Heathrow

Once an envelope is set, we will prioritise investment in assets whose replacement is scored "Very High", "High" and "Medium" in our Corporate Risk Framework. This would ensure that safety is never compromised and capital is directed at the highest risk asset replacement demands first, with no deferral of spend on the highest risks.

While this underspend does not compromise the safety and security of passengers and colleagues, without mitigation it will impact consumer outcomes in H7:

- a reduction in resilience levels across the airport will mean that more assets will totally fail or need to be taken out of service for repairs for extended periods of time during H7.
- this will disrupt journeys by making them less “predictable and reliable” and make consumers feel less “comfortable and secure”.
- this will manifest itself in reduced levels of passenger satisfaction with their airport experience, which in turn will mean that they are less inclined to want to fly from Heathrow in the future.

Mitigation is possible through additional opex: our engineering team judge that a 10% uplift in maintenance opex to allow for increased maintenance regimes across the airport could extend the life of assets and help to mitigate against assets being out of service, thereby helping to ensure that passengers have a predictable and reliable journey.

We consider this in full in Chapter 5.4 – H7 Operating Costs Updates, where we also highlight why this additional opex could only be considered in a Full Adjustment case. As a consequence, the Measures, Targets and Incentives proposed in our RBP have also been revised and are outlined in Chapter 6.2 – H7 Measures, Targets and Incentives Updates, with better outcomes for the Full Adjustment case.

5.3.5.2 Security

Table 12: Updated H7 Security investment programme

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Regulated Security	-	£105m	£105m	£105m	£105m	**£420m**
	Security Transform.	£75m	£10m	£30m	£10m	£5m	**£130m**
	Total	**£75m**	**£115m**	**£135m**	**£115m**	**£110m**	**£550m**
Update 1	Regulated Security	£40m	£80m	£100m	£100m	£100m	**£420m**
	Security Transform.	£10m	£30m	£75m	£10m	£5m	**£130m**
	Security Compliance	-	-	-	£100m	£130m	**£230m**
	Total	**£50m**	**£110m**	**£175m**	**£110m**	**£235m**	**£780m**

Source: Heathrow

The aggregate of security investments in H7 amount to the largest capital programme and represent the greatest potential to transform consumer outcomes and deliver efficiency.

The objectives of the programme have always been:

1. Respond to the DfT mandate for new security regulations, with an updated deadline of 1st June 2024.
2. Keep colleagues and passengers safe and secure by enhancing our critical threat detection capability.
3. Harness new technology to improve passenger experience and speed through security.

4. Harness new technology and the opportunity for process change to reduce the unit cost of security.

Since the emergence of Covid-19 and the need to protect liquidity, the start of this programme has been deferred. In response to airline feedback in Constructive Engagement to outline as low a capital plan as possible to achieve compliance, we set out two portfolio entries in our RBP:

- A Regulated Security line, worth £420m over H7, that would have delivered the product development and enabling works to respond to the DfT mandate but delivered in isolation would increase the time consumers spend in security.

- A Transform Security line, worth £130m over H7, that would mitigate and potentially improve service levels and efficiency of the selected product.

Since the RBP we understand more about the strategic choices we have to make in H7:

- **Choice 1:** do we invest in a product that will deliver compliance, but potentially reduce service levels, or one that also transforms service and efficiency?

    - This product will likely define the passenger journey and our operating cost base for the next decade or more (meaning 1 billion passengers will be processed by the product selected).

    - The cheapest available products to achieve compliance are detrimental to current service levels: transaction times and rejection rates increase relative to today. These lead to lower flow rates and higher operating costs – impacting queue times and efficiency.

    - Only through additional investment - £130m Security Transformation – could we deliver a better outcome for consumers by harnessing new technology that delivers a faster, more efficient and less intrusive security experience.

    - Additional investment to improve security experience is consistent with our Willingness To Pay research, which indicates passengers would be willing to pay £3.50 more.

- **Choice 2:** do we invest capital to ensure all security lanes are compliant as close to the DfT deadline as possible (mitigating potential increases in queue times from the loss of non-compliant lanes) or ramp-up more efficiently, with fewer scanners available (with consequences for queue times and opex)?

    - The DfT deadline for compliance is 1st June 2024. No progress towards achieving that deadline has been made due to Covid-19 and the need to protect liquidity. Remobilising the programme to the scale required to deliver the mandate for all security scanners by the deadline is not possible.

    - **For the avoidance of doubt**: every passenger will travel through a compliant security process at all times. However, the number of compliant lanes will determine queue times.

    - A faster ramp up would increase the number of compliant lanes, mitigating the impact on queue times. Achieving compliance for all security lanes as soon as possible will also deliver the potential benefits of faster flow rates and less intrusive searches sooner.

- Achieving a faster ramp-up would require capital to be brought forward from H8 into H7, increasing pressures on our deliverability and financial capacity.
- A more efficient ramp-up of capital could be achieved – limiting capital while ensuring all passengers went through a compliant process, but the compromise would be longer queue times as passengers must make use of smaller number of compliant security lanes.

The interaction between these two choices creates four options that we evaluate below:

Figure 9: **[REDACTED]**

Source: Heathrow

Option A

[REDACTED]

Option B

[REDACTED]

Option C

[REDACTED]

[12] **[REDACTED]**
[13] **[REDACTED]**
[14] **[REDACTED]**

Option D

[REDACTED]

5.3.5.3 T2 Baggage

Table 13: Updated H7 Security investment programme

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	T2 Baggage	£29m	£26m	£41m	£42m	£42m	**£180m**
Update 1	T2 Baggage (prolongation)	£10m	£35m	£45m	£45m	£45m	**£180m**
	T2 Baggage Solution	-	-	-	£10m	£25m	**£35m**
	Total	**£10m**	**£35m**	**£45m**	**£55m**	**£90m**	**£215m**

Source: Heathrow

The T2 baggage requirement is a legacy from the original Terminal 2 development, where a new baggage system for the terminal was deferred to save costs and avoid the spatial constraints resulting from proximity to the London Underground and the then operational Terminal 1.

In our Initial Business Plan, we had anticipated that a permanent baggage solution would be delivered as part of wider set of capital works (Future T2) that would have increased the processing capacity of the existing T2 footprint, enabled its expansion and removed the requirement for ongoing investment in T1. This new product would have improved performance and been delivered by 2028.

In the meantime, it was envisaged that prolongation works would take place to extend the life of the existing T1 system and deliver the same levels of performance as seen in Q6. In February 2020 a G0 business case (B7402) was presented to the airline community that delivered prolongation to 2028 at a cost of £189m in H7.

Since the advent of Covid-19, the Future T2 programme has been paused, creating significant challenges for how we efficiently deliver a long-term baggage solution for T2:

- A long-term solution will not be available in 2028 as previously envisaged, meaning prolongation works will now need to extend the life of T1 beyond that date.
- The longer T1 is prolonged, the more inefficient the capital investment becomes (i.e. more capital is required to deliver the same service levels).
- Even in a more capital constrained world, there is a point at which a longer term T2 solution becomes more favourable than incremental – and increasingly less capital efficient – investments to prolong the T1 baggage system.
- Given the scale of investment and build-time we need to consider not just H7 capital and consumer outcomes, but also those in H8 – with particular consideration given to the trade-off between the needs of current and future passengers.

This challenge becomes more acute when we consider airline expectations: although they proposed a plan that does the minimum required to keep the airport operational, T2 airlines expect an improvement to Q6 performance levels and would prefer to move to a long-term solution, minimising interim investment in T1.

In our RBP we carved out T2 baggage as a separate programme from asset management, acknowledging the risks and challenges associated with any solution identified. We assumed a £180m investment in H7 to identify a solution to deliver the same baggage performance levels as Q6 for T2 in H7 – using the B7402 figure as the basis for this estimate.

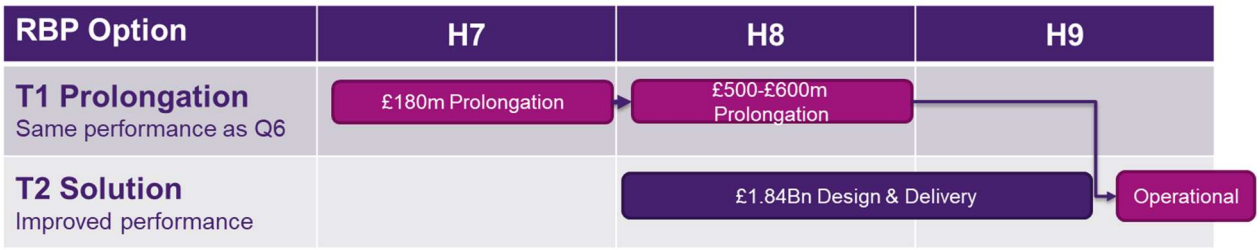
We no longer believe this alone adequately addresses the challenges outlined above because it provides no commentary beyond H7:

- It does not adequately consider the capital challenges left unaddressed until H8, creating investment inefficiencies borne by future consumers.
- It does not adequately consider the needs of future passengers and airlines, as it does not give sufficient direction as to when we anticipate a longer-term T2 baggage solution – including improved performance – will be delivered.

In this update we assess two alternative approaches, in addition to the one outlined in our RBP, and consider impacts in H8 and beyond, as well as H7:

- **RBP Option:** invest £180m in prolongation works or equivalent in H7 to deliver the same baggage performance levels in T2 as achieved in Q6. Decision on a longer-term solution deferred until start H8 and delivered no earlier than mid-H9, requiring a further prolongation investment in T1 to take place during H8 (estimated to be £500m-£600m in 2018p).

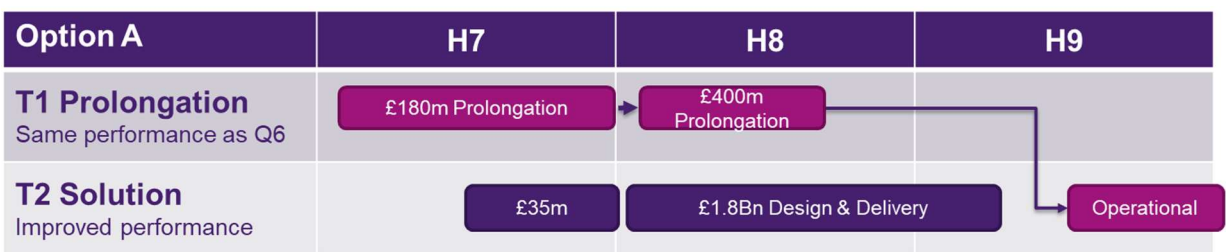
Figure 10: Heathrow baggage investment – RBP Option



Source: Heathrow

- **Option A:** invest £180m in prolongation works or equivalent in H7 to deliver the same baggage performance levels in T2 as achieved in Q6. Invest a further £35m in H7 to identify a long-term solution in T2 to achieve delivery by early H9. Some prolongation in H8 will still be needed but commencing Future T2 by the end of H7 presents an opportunity to reduce H8 investment in T1 and deliver an improved product sooner.

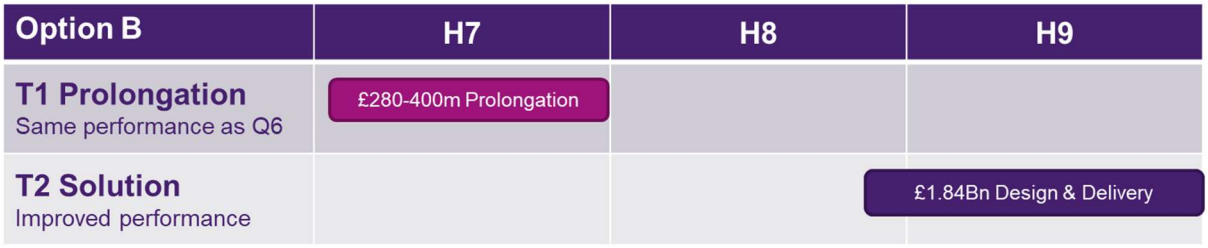
Figure 11: Heathrow baggage investment – Option A



Source: Heathrow

- **Option B:** invest £280m-£400m in prolongation works or equivalent in H7 to deliver the same baggage performance levels in T2 as achieved in Q6, extending life sufficiently to not require a decision on a longer-term solution until end H8, for delivery not before end H9.

Figure 12: Heathrow baggage investment – Option B



Source: Heathrow

Considering the needs of both current and future users – and not considering the potentially significant constraints of the investment environment in H7 – Option A would deliver an improvement in performance sooner in a more capital efficient way. In our Optimal Plan, where there is a Full RAB Adjustment and p50 (or higher) passenger demand, this is our preferred option which seeks to remobilise the baggage element of Future T2 by the end of H7 and reduces H8 investment in T1.

In a world where the investment environment is more challenging and (as a result of a Low RAB Adjustment or lower than p50 passenger numbers) no investment beyond that required for the safe operation of the airport is possible then the RBP option is the only choice available.

Option B places the greatest additional capital requirements in H7, likely our most constrained period, while deferring benefits of improved baggage performance to the latest possible period.

The consequences of this do not bear out in differences in H7 in either the Optimal Plan or the Safety Only Plan, consumers in T2 will receive the same baggage performance and as such there is no additional commentary on this in either the Measures, Targets and Incentives chapter or in the Operating Costs chapter

However, it is passengers in future periods that will see significant differences between an Optimal and a Safety Only Plan:

- An Optimal Plan would deliver the best baggage performance at a lower operating cost in a more capital efficient way. By early H9 passengers will receive a better service at a lower cost.
- A Safety Only Plan will mean that we will need to survive both H8 and most of H9 without a new baggage system. The risk of faults and total system failure increases, meaning that service levels to consumers are put under greater pressure, and they will bear the additional cost of inefficient capital investment.

5.3.5.4 Western Campus Connectivity & Efficiency

Table 14: Updated H7 Western Campus Connectivity investment programme

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Western Campus C&E	-	-	-	-	-	-
Update 1	Western Campus C&E	-	-	-	£10m	£25m	**£35m**

Source: Heathrow

Before Covid-19, Heathrow was at ATM capacity and a number of our terminals were at their effective processing capacity. In the years after achieving planning consent for expansion it was hoped that we could utilise our existing runways more effectively to drive more movements and more passengers. We therefore scoped out opportunities to achieve additional capacity through existing terminals before new passenger processing facilities were opened in the western campus as part of the expansion programme.

These capacity programmes were featured in our IBP, and brought together enabling works for security, baggage and other automation investments in T2, T3 and T5. They were essential programmes to deliver expansion affordably, but elements will be valuable even if Heathrow remains constrained at the current ATM cap.

In the latter years of H7 we expect that passenger numbers will return to those achieved within Q6, which is likely to see T5 close to capacity as before. All else being equal, this will not allow airlines to collocate with their joint venture partners. This will mean more inter-terminal connections, and bussing, which both increases operating costs and is a poor experience for transferring passengers.

Investments in the western campus – including new remote stands - allows for:

- Greater airline colocation, including between Joint Venture partners, growing consumer choice.
- Improved resilience to operational events and allows JV airlines to recover working collaboratively.
- Better transfer experiences and shorter minimum connection times through more intra-terminal connections and developing One Stop Security.
- Opportunities to reduce airport and airline operating costs, including addressing inefficiencies previously identified in western campus baggage operations.

This would also mean more capacity headroom – resulting in less operational disruption – to help manage the asset replacement of T3 and T5, which will be 70 and 20 years old in H8 respectively and require significant investment.

This investment delivers against several consumer outcomes in H7 and in the future:

- Greater choice of flights and destinations
- Comfortable and secure
- Predictable and reliable journeys

However, while it improves outcomes for current and future consumers, it is not strictly necessary to enable the safe operation of the airport and as such is not included in our Safety Only Plan.

Where circumstances enable an Optimal Plan, and when we know more about the nature of recovery and whether the western campus will be capacity constrained in H7, then we will bring forward a detailed business case to progress with the development of remote stands and enabling efficiency gains in baggage and elsewhere. In the event that recovery is slower than anticipated we could defer this programme to H8.

5.3.5.5 iH7 Rollover

Table 15: Updated iH7 Rollover investment

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	iH7 Rollover	-	-	-	-	-	**-**
Update 1	iH7 Rollover	£63m	£19m	-	-	-	**£82m**

Source: Heathrow

There are a number of investments that were begun in iH7 and require completion in the early part of H7. To stop or pause these further would be inefficient and unequivocally not in the interest of consumers. These include:

- Kilo Apron Development (KAD)
- T5 Track Transit works to enable the effective use of T5 satellites.
- Works to enable the restart of operations in T3
- Works to enable the restart of operations in T4

These were not specifically identified in our RBP, and in this update we decided it was best to ensure they were protected by their own portfolio entry rather than be absorbed - and lost - in a wider asset management line.

5.3.5.6 Carbon & Sustainability

Table 16: Carbon & Sustainability investment programme update

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Carbon & Sustain.	-	-	-	£75m	£75m	**£150m**
Update 1	Airspace Modern.	£2m	£3m	£14m	£14m	£5m	**£38m**
	Carbon & Sustain.	-	-	-	£75m	£75m	**£150m**
	Total	**£2m**	**£3m**	**£14m**	**£89m**	**£80m**	**£188m**

Source: Heathrow

Heathrow is committed to net-zero emissions from all our activity by 2050. We are clear that this cannot be done through just goodwill – it requires meaningful progress, driven by investments, to remove carbon from our operation. We also know from our consumer insights that passengers expect progress on decarbonisation, regardless of the Covid-19 crisis.

In the RBP we linked our approach to the industry carbon roadmap and forecast investment of £150m in specific carbon and sustainability improvements over H7. As we assessed these investments were not necessary for the safe operation of the airport in H7 we did not include these investments in the Safety Only Plan.

However, after careful review, we believe it is in the interest of future passengers to make meaningful progress on carbon in any scenario – including a Safety Only one. Moreover, airspace modernisation offers an incredibly cost-effective way of not only removing carbon from landing and take-off but also helps improve punctuality which was one of the key areas that consumers valued further improvements. We have therefore included an allowance specifically for the delivery of airspace modernisation in all scenarios.

We remain committed to a more material shift in carbon reduction in a higher plan and continue to include a £150m allowance beyond just airspace modernisation to be directed specifically at carbon and sustainability improvements. We will prioritise our resources to focus on those interventions which deliver the most material reductions in carbon whilst achieving a balance between achieving Net Zero “in the air” and “on the ground”.

Our Optimal Plan would set us up to structurally remove 175,000 tonnes from our carbon footprint – 99,000t would be delivered within H7 and a further 76,000t in H8 as changes in airspace are implemented. A Safety Only Plan would deliver no carbon removal in H7, but would allow for 65,500t to be removed in H8 in line with airspace changes.

Table 17: Optimal Plan impact on carbon reduction at Heathrow over H7 and H8 period

		Project	Estimated H7 Costs (£m)	Total Cost (£m)	Reduction in carbon footprint (tonnes)	H7 (tonnes)	H8 (tonnes)
Net Zero in the air	Decarbonising ground operations and landing and take off	Airspace modernisation and Easterly Alternation	38	64	65,500		65,500
		Air traffic management efficiency	20	20	56,150	44,920	11,230
		Upgrade existing PCA units	52	250	26,000	26,000	-
	Enabling zero emissions aircraft	Hydrogen infrastructure design and enabling work (linked to ongoing research)	5 (Initial provision)	-	TBC	-	-
Net Zero on the ground	Decarbonising surface access and vehicles	Active travel and small-scale surface access improvements	10.8	10.8	5,500	5,500	-

		Taxi and private hire vehicle demand management	2.4	2.4	2,300	2,300	-
		EV charging infrastructure (operational vehicles, colleagues and passengers)	37	28	10,000	10,000	-
	Decarbonising heat	Develop options and scheme design	1	1	Enabling	-	-
		Delivery of initial phase	20.8	<350	Up to 10,000	10,000	-
	HV infrastructure upgrade design	Scheme design for necessary HV upgrades to support increase in electricity demand for decarbonisation	1	50-100	Enabling investment	-	-
			173	<826	175,450	Up to 98,720	Up to 76,730

Source: Heathrow

Improving sustainability and tackling decarbonisation will require innovation and the development of new solutions which will involve technological changes and new ways of working. Our proposed £150m allowance set out in our Optimal Plan provides an envelope within which we can innovate and develop the right solutions for the problems we will be facing in H7. Ensuring regulated companies have the ability to do this has been a key goal of regulators such as Ofwat and Ofgem in setting their recent regulatory frameworks.[15] By using the inherent flexibility in our capital efficiency framework and our proposed allowance, the CAA can ensure it is following this regulatory best practice to facilitate and incentivise the innovation required to tackle these unique and complex issues.

This has clear benefits to current and, particularly, future passengers, supporting the delivery of the following outcomes:

- Predictable and reliable journeys
- Feeling Comfortable and Secure at the airport
- An airport I want to fly from

5.3.5.7 T5 Station Fit Out

Table 18: T5 Station Fit Out investment programme update

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	T5 Station Fit Out	-	-	-	-	£31m	**£31m**
Update 1	T5 Station Fit Out	-	-	-	-	-	**£0m**

Source: Heathrow

The RBP included a £31m allocation for the T5 Station Fit Out in preparation for the Western Rail investment, however subsequent re-evaluation based on the revised DCO timeframe, recommends that these works begin in H8. We remain fully supportive of the Western Rail initiative and continue to work with Government in the interim to define and agree a methodology which would determine the basis for a contribution in H8, and which would facilitate the continued progress of the DCO in H7. We are awaiting further clarity from Government and the CAA on next steps.

5.3.6 Additional detail for capital plan

This section addresses the capital programmes where we have not made changes to the planned investment in H7, however these programmes have been further developed as a result of airline engagement. We have also responded to requests from the CAA to provide further information regarding our proposed capital plans.

[15] https://www.ofwat.gov.uk/wp-content/uploads/2020/08/Innovation-funding-and-competition-decision-design-implementation.pdf
https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2013-2023-riio-1/riio-1-network-innovation-funding

Our updated plan continues to assume no significant changes to the current capital efficiency/governance processes. Q6 had a slower start than predicted as the new CAA initiatives (Development & Core, IFS) were embedded. The CAA's ex ante proposals have the potential to add further time into the process, either through more involvement from the CAA and their advisors during the regulated period, through the setting of ex-ante cost budgets as capital transitions from Development to Core, or through the establishment and agreement of delivery obligations. It is therefore crucial that the CAA's final policy decision on capital efficiency takes into account the potential impacts on both cost and timely delivery of our proposed capital plan. We have provided more detail on the potential impacts in our response to CAP2139 and in Chapter 6.1 – Updates to our H7 Regulatory Policy Proposals.

The CAA's guidance sets out its expectation that we will provide a capital plan, divided into capex categories with high-level delivery obligations defined for each of these categories. We are continuing to use programmes to categorise our capital spend. Our programmes divide our capital expenditure into categories of spend, which focus on the delivery of the same outcomes for consumers and which are united by a single 'Delivery Objective'. These objectives are still under development with input from the airline community. For the purpose of implementing capital efficiency incentives, programmes can therefore also be defined as 'capex categories'.

Given the different characteristics of each of our programmes, and the differing level of certainty around the investments they include, each of our programmes is at a different stage of development. We have developed Programme Mandate 'one-pagers' (provided in Appendix 7) to shape our programmes, which will develop into more detailed Programme Mandates and then Business cases; these set out the objectives for each programme, confirm how they help to deliver our consumer outcomes and the pipeline of investments for prioritisation within the programme. These one-pagers have been developed in collaboration with the airline community, who are supportive of the direction they provide and we will continue to develop the next level of detail through a series of ongoing airline reviews at the Future Portfolio Group (FPG).

This section provides a summary of the key developments in these programmes and portfolios since the RBP and sets out the next steps for the development of the portfolio pipeline.

5.3.6.1 Efficiencies

Table 19: Efficiencies investment programme update

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Protect Efficiencies	£10m	£25m	£25m	£20m	£20m	**£100m**
	Efficient Airport	£24m	£50m	£100m	£100m	£100m	**£374m**
	Total	**£34m**	**£75m**	**£125m**	**£120m**	**£120m**	**£474m**
Update 1	Protect Efficiencies	£10m	£25m	£25m	£20m	£20m	**£100m**
	Efficient Airport	£24m	£50m	£100m	£100m	£100m	**£374m**
	Total	**£34m**	**£75m**	**£125m**	**£120m**	**£120m**	**£474m**

Source: Heathrow

As outlined in our section on Operating Costs, there is no further scope to achieve reductions to operating costs through cuts alone without materially reducing service. Throughout iH7 we have sought to achieve every efficiency possible so as to protect liquidity without compromising the safe operation of the airport. The only means to achieve further reductions in operating costs in H7 is to invest in the process and technological solutions that deliver the same or better service more efficiently. Making these investments now is critical to mitigating the upwards pressure on the charge in H7 and in the future.

We have organised this investment across two categories:

- We need to be ready to react to changes in compliance and consumer needs that would otherwise increase operational costs. Having a programme ready to invest in permanent solutions that are cost effective and deliver the same or better service will lead to a better outcome for consumers and other stakeholders. This is the “Protect Efficiencies” line, and we will require it in all scenarios.
- There is also a strategic need to harness emerging technology to proactively drive step changes in operating costs for the airport and all of Team Heathrow. Emerging work on automation was established before Covid on how to deliver automation both back office and passenger facing. We will revisit this in the “Efficient Airport” programme line, which we have only included in the Optimal Plan.

Protecting Efficiencies

As passenger volumes return and increased pressure is put on our technology and infrastructure, we will need to invest to protect our existing resilience and service levels. There will also be new opportunities to be more efficient in ways that were not possible before.

By their very nature, these changes are unpredictable therefore we have set out an allowance in the minimum plan to ensure that unanticipated impacts do not put unnecessary upward pressure on the airport charge.

We have seen over the past two regulatory periods the need to respond to changing and new regulatory demands, along with adapting to new and evolving threats. Notable examples include the Hold Baggage Standard 3 change in Q6 which required £416m of investment, the enhancement in the PRM standards in 2018 to eliminate multi-mode journeys for passengers requiring infrastructure changes in T3 and T4 costing c. £30m, and the increasing threat of Cyber security attacks which have required c.£33m of technology investment between 2017 to 2020.

We can already see emerging challenges in T3 and T4 as we restart operations, where problems that currently require additional operating costs to solve could be better addressed through reactive capital investments. For example, our Covid-19 response workstream “Safe to Fly” has required us to implement new assets such as physical protection barriers to protect our colleagues and passengers where social distancing is not possible, rather than impacting on queuing times and requiring additional headcount to manage those queues. This investment delivers better outcomes for consumers – in this case, “Safe and Secure” – more efficiently than relying solely on opex.

These changes have often been unforeseen and the investment needed to respond and be compliant has resulted in sacrificing other non-discretionary spend. In the H7 Protect the Business portfolio we have set aside a prudent forecast allowance of £100m over the H7

period to keep colleagues and passengers safe and secure while avoiding significant, unforeseen, spikes in operating costs.

Efficient Airport

We believe there is significant scope to implement capital solutions to remove operating costs across the operation for ourselves and the whole of Team Heathrow[16]. This is not only beneficial for passengers – who receive the same or better service at a lower cost – but keeps us competitive with other airports who are making significant strides in harnessing technology solutions to make step changes in their cost base.

We see automation as a key lever in delivering the service outcomes our consumers expect more efficiently, and the airline community has informed us through its RBP response that automation remains a priority. We will continue to engage with the airline community on opportunities to deliver the following service outcomes more efficiently:

- Punctuality
- Baggage performance
- Security experience
- Cleanliness
- Border times
- Wheels down to doors open

The forward-looking nature of this programme, combined with the ongoing disruption to existing processes along the passenger journey brought about by Covid-19 make certainty around the scope of the programme challenging at this stage, but through engagement with the airline community and prioritisation through the benefits framework we will identify and deliver the investments which deliver our service outcomes for the lowest operating cost.

The Safe to Fly workstream is a current example of this type of investment. We see this continuing through H7 as beyond the core safety measures implemented to resume travel, further investment will be needed to develop and deliver solutions to mitigate the capacity loss due to Covid-19 and deliver these solutions more cost-efficiently.

Pre-Covid, we had a pipeline of initiatives at early stages of development such as Smart Stands, Arrivals Biometrics and Automated Baggage ULDs. We will reassess the prioritisation of potential solutions to identity those which perform best against the benefits and outcomes this programme is setting out to achieve. Currently we envisage three major elements of this programme:

- Tower Transformation that will make ATC services less labour-intensive and eliminate human error to deliver a safer and more predictable service – requiring c. £57m in H7.
- Automation of passenger, bag and plane, including the Safe to Fly programme and with a particular focus on our older assets (T3) where investments have the greatest

[16] Team Heathrow refers to all companies working at Heathrow airport, including Heathrow Airport Limited, the airlines and ground handlers.

capability of reducing operating costs for airport and Team Heathrow – requiring up to £274m in H7.

- The relocation of Compass Centre (including APOC and Data Centre), enabling lower operating costs – requiring c. £39m in H7.

Table 20: Efficient Airport investment summary

		22	23	24	25	26	H7
Efficient Airport	**Subtotal, of which:**	**24**	**50**	**100**	**100**	**100**	**374**
	Compass Relocation incl. APOC & Data Centre move	11	28				**39**
	Tower Transformation	4	17	36			**57**
	T3 Automation, new Automation initiatives		5	69	100	100	**274**

Source: Heathrow

As this programme is not necessary to ensure the safe operation of the airport we have only included it in the Optimal Plan, however it could deliver significant benefits to consumers through better service outcomes, reducing the cost of delivering that service and helping to mitigate the reduction in resilience levels caused by under investment in iH7.

- We will be better placed to deliver “Predictable and Reliable” and “Comfortable and Secure” outcomes by eliminating human error and giving passengers greater control over their journeys.
- will help to mitigate some of the reduction we will see in resilience levels based on the underinvestment during iH7
- These investments, alongside Security Transformation, contribute to a net 1.1% year-on-year efficiency overlay in our operating cost models – in addition to the 0.1% frontier shift assumed if only the Safety Only Plan was implemented.

5.3.6.2 Commercial Revenues

Table 21: Commercial Revenues investment programme update

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Protect Revenues	£10m	£25m	£25m	£20m	£20m	**£100m**
	Crossrail Contribution	£39m	£39m	-	-	-	**£78m**
	Commercial Revenues	£10m	£70m	£160m	£170m	£190m	**£600m**
	Total	**£59m**	**£134m**	**£185m**	**£190m**	**£210m**	**£778m**
	Protect Revenues	£10m	£25m	£25m	£20m	£20m	**£100m**

Update 1	Crossrail Contribution	£39m	£39m	-	-	-	**£78m**
	Commercial Revenues	£10m	£70m	£160m	£170m	£190m	**£600m**
	Total	**£59m**	**£134m**	**£185m**	**£190m**	**£210m**	**£778m**

Source: Heathrow

Investment in commercial revenue generation is critical to protect the interests of current and future passengers:

- our consumer insights confirm passengers value the good value choice services, products and experiences that allow them to tailor their journey.
- to meet the elasticities in our revenue modelling and ensure that non-aeronautical revenues reduce the net cost of operating the airport and mitigate upwards pressure on the charge in H7 and beyond.
- ensures the financial resilience of the business by growing – and where it is not linked to passenger volumes, diversifying – cashflow.

As outlined in Chapter 5.5 – H7 Commercial Revenue Updates, we are facing significant challenges to our revenue model:

- Covid-19 highlighted how reliant our revenue model is to passenger volumes and the proportion of fixed costs we face.
- changes to Government rules on VAT exemptions for airside shopping will dampen consumer demand.
- changes to passenger behaviours following Covid-19, including an acceleration in the trend to expecting digital services, different fulfilment options and easy payments.
- changes to passenger mix in recovery that could see fewer high-yielding passenger segments returning to travel.
- failure, or retrenchment, of commercial partners as a consequence of lower consumer demand following Covid-19.

Without action to meet these challenges we will likely see long-term damage to the performance and resilience of our commercial business model, which would result in:

- fewer passengers enjoying their journeys, which is contrary to the outcome of “Enjoyable Experience”.
- higher airport charges as a consequence of lower non-aeronautical revenues flowing through the single till.
- Heathrow revenues (and therefore the airport charge) being less resilient to future demand shocks.

In our Safety Only Plan we include two portfolio entries:

- Commercial assets are not included in asset management portfolios, but they require maintenance and replacement to be effective. This is covered by our “Protect Revenues” programme, which we estimate will require £100m in all scenarios.
- The Q6 settlement included a commitment to make £70m (in 2011 prices) contribution to the cost of Crossrail. Given delays to the project this was delayed to iH7 and now to H7. This is covered by the “Crossrail Contribution” line, making a £78m (2018p) contribution in all scenarios.

Only in our Optimal Plan do we consider an additional programme that can mitigate some of the headwinds, where £600m is allocated for a more strategic approach to commercial revenue generation that harnesses digital technologies, new propositions to passengers and commercial partners, to drive new, more resilient revenue streams.

Protect Revenues

Commercial assets that will require investment to maintain and replace in H7 include:

- CRM and loyalty systems
- Advertising screens and other media assets
- Car park payment machines
- HEX train replacements
- VIP suite assets
- Surface access assets, including car parks

We have estimated that the requirements for maintenance and replacement could exceed £200m over the H7 period, however we have allowed only £100m in the Protect the Business portfolio in, prioritising only those replacements for the highest risk categories.

Crossrail Contribution

The Q6 settlement included a regulatory commitment to make a one-off contribution for the introduction of Crossrail to Heathrow - £70m in 2011/12 prices. Crossrail presents a unique opportunity to grow the passenger catchment area, presenting consumers with greater airport choice and unlocking a more predictable journey for many more passengers who will choose to travel via train to Heathrow rather than by other, potentially less sustainable, means.

A series of delays has led to a revised service commencement date of mid-2023. Therefore, we have agreed to make the contribution in 2022 and 2023, deferring expenditure from iH7 to H7. The cost is agreed and committed and represents the deferral of the payment into the H7 period rather than a new investment decision.

Commercial Revenue Generation

We need to consider how capital investment can not only support the maintenance and replacement of existing commercial assets but also be forward thinking. We need investments to help us meet our elasticity in our commercial revenue modelling and we need to keep up with passenger expectations, which are shaped by a rapidly changing digital commercial offering outside of aviation.

This proactive, strategic investment in commercial revenue generation has always been part of our capital planning. Indeed, leveraging the opportunity provided by expansion to rethink our property portfolio, our Initial Business Plan assumed a £1.2bn investment in H7 for CPD alone.

While this Business Plan considers two-runway price control only, the need for strategic investment in commercial revenue generation is as important as ever:

- Covid-19 has accelerated consumer expectation of the availability of digital services.
- Covid-19 – and new passenger processes – have impacted both our passenger mix and their dwell time in terminals, requiring a different retail proposition.
- The unforeseen dip in traffic has increased the need to identify new revenue streams that are more resilient to future demand shocks.
- Government changes to airside VAT exemptions have challenged the airport revenue model with some retailers having already announced closures of airport stores. Further closures are anticipated, and Heathrow will be required to refurbish and re-let a significant number of units to ensure it can continue to maximise the potential of its retail portfolio.

In our RBP we presented a portfolio worth £600m. For this update we have organised these into logical groups of investments and estimated the payback years for each.

The investments have been grouped as follows:

- **Cargo:** initiatives associated with the Cargo business. These do not drive revenue directly for Heathrow, and so a long payback period has been assumed
- **Digital Transformation**: A range of investments to develop our eCommerce capability. This is expected to have a short payback period. A core consumer need that has developed over the last 10 years is for passengers to connect to fast and reliable Wi-Fi,. We have seen that when Heathrow hasn't kept up with wider technology developments in this area that customer satisfaction levels drop, so it is important we continue to invest to meet consumer needs in this area.
- **Property – Development**: Opportunities to drive revenue through development of our estate and ensure our model becomes less reliant on passenger volumes.
- **Retail & Media – Development**: A range of initiatives to develop our retail space and digital media.
- **Surface Access – Asset Replacement**: to replace parking assets. The proposed work on MSCP4 may be reclassified as Protect Revenues rather than Commercial Revenue Generation
- **Surface Access Electrification & Development**: Car park optimisation and consolidation work, along with the provision of EV charging. A relatively short payback is anticipated, although this is based on Q6 business cases that were not entirely comparable.

Table 22: Commercial revenue investment summary

		22	23	24	25	26	H7
Commercial Revenues	**Subtotal, of which:**	**10**	**70**	**160**	**170**	**190**	**600**
	Commercial Property Development			67	67	67	**200**

	Surface Access Asset Replacement			52	64	76	**192**
	Surface Access Electrification & Development	2	24	14	12	13	**65**
	Retail & Media Development	3	23	14	12	11	**63**
	Digital Transformation	3	11	10	12	19	**55**
	Cargo Development	2	13	3	3	5	**25**

Source: Heathrow

Work to refine the H7 revenue forecast is ongoing. This is covered in more detail in the revenue section. Taking the calculated payback for Q6 by investment group, and weighting these based on forecasted H7 capex, the estimated payback for commercial revenue investments in H7 is 9 years. Not all investments generate revenues for Heathrow, such as Cargo and Surface Access asset replacement yet they deliver improved consumer outcomes. If we are unable to invest in the Optimal Plan in the H7 period we will be unable to deliver the £**[REDACTED]** of revenues included in our commercial revenue forecast.

Table 23: Commercial revenue payback summary

Portfolio	Sub-Portfolio	Investment	2022	2023	2024	2025	2026	H7	H7 Payback	Q6 Payback
PTB	Protect Revenues		10	25	25	20	20	100	n/a	n/a
	Crossrail Contribution		39	39				78	n/a	n/a
WTR	Commercial Revenues	Subtotal, *of which:*	10	70	160	170	190	600		
		Commercial Property Development			67	67	67	*200*	9 yrs	9.1 yrs
		Surface Access Asset Replacement			52	64	76	*192*	15 yrs	15 yrs
		Surface Access Electrification & Development	2	24	14	12	13	*65*	2 yrs	1.6 yrs
		Retail & Media Development	3	23	14	12	11	*63*	5 yrs	7.9 yrs
		Digital Transformation	3	11	10	12	19	*55*	4 yrs	3.5 yrs
		Cargo Development	2	13	3	3	5	*25*	15 yrs	n/a
	TOTAL		59	134	185	190	210	778	9 yrs	9 yrs

Source: Heathrow

5.3.6.3 Future Ready Airport

Table 24: Future Ready Airport investment programme update

	Investment Category	2022	2023	2024	2025	2026	Total
RBP	Service & Resilience	-	-	-	£75m	£75m	**£150m**
Update 1	Service & Resilience	-	-	-	£50m	£65m	**£115m**

Source: Heathrow

Our consumer insights confirm that, even with Covid-19, passengers still want to see Heathrow making targeted improvements that benefit them, particularly with regards to punctuality, passenger experience and baggage. There is no evidence that passengers will accept less – even if this includes a small reduction in the fare they pay. The opposite is true: our consumer acceptability testing in our Consumer Insights section confirms consumers expect more and are willing to pay more for it.

It is prudent to not only forecast capital expenditure to react to efficiency and commercial revenue challenges, but also for service challenges too. Providing capital specifically targeted at delivering the improvements that consumers value the most is crucial if we are to meet consumer needs and encourage them to keep using Heathrow in the future.

Our IBP set out a plan to deliver a step change in our airport 'brilliant basics' including:

- enhancing charging capabilities across the campus including in-seat charging, charging lockers and wireless charging.
- improving the layout and variety of comfortable seating including reclining seats and options designed for passengers requiring support or with extended airport dwell times.
- taking ownership of our passenger assistance service and investing to upgrade the comfort of their experience throughout the journey.
- Improving the experience for the 39% of passengers who say that they require support during their air journey but chose to be independent and not to use the current assistance service.

Our consumer insights tell us that these things are still important for consumers and elements such as social distancing in Assistance Host Areas are becoming even more important. This is why our RBP sets an allowance to invest in delivering targeted enhanced service improvements for passengers when passenger volumes stabilise, with the resultant increase in relevant consumer measures and targets in the following areas:

Table 25: Service and Resilience allowance summary

Passenger Requiring Support (incl. Assistance Service)	£45m
Digital Service (incl. Digital Wayfinding, Digital Information points, Beacons, Virtual assistants)	£11m
Next Generation Touchless / Automated Journeys	£24m
Immigration (incl. Accessible e-gates)	£15m
Improved Relaxation Areas (seating) and Charging	£9m
Preparing for Consumer Service Expectations in H8	£11m
Total Service and Resilience	£115m

Source: Heathrow

We know that some of these passenger needs may change in the future and so will constantly review our service strategy throughout H7. However, if we invested in the examples we included in our IBP and RBP, we know this would meaningfully improve the outcomes we know consumers continue to value the most, particularly making journeys "Comfortable and Secure", improving overall satisfaction levels particularly of our least satisfied consumers and making consumers more likely to travel through Heathrow in the future.

In this update we assume the same allowance, minus the investment removed to deliver T5 capacity (£150m - £35m = £115m). We continue to assume this is only an option for investment in the Optimal Plan. We will work with the airline community in H7 to identify the right investments that align to consumer priorities in the later part of H7 when we know more about both the recovery and how consumer expectations have stabilised post-Covid.

5.3.7 Next Steps

The RBP set out our high-level forecast allocations of capital against our strategic priorities of Protect the Business (PTB), Win the Recovery (WTR) and Build Back Better (BBB) and the emerging Portfolio and Programmes framework, which we have developed with the airline community:

- Asset Management & Compliance
- T2 Baggage
- Security
- Commercial Revenues
- Efficient Airport
- Carbon and Sustainability
- Future Ready Airport

Figure 13: Airline engagement workstreams to develop the portfolio – as at February 2021

Workstream	Sub-set Portfolio (cost category)	Working Group	Report to CPB	Inputs	Outputs	Initial dates
Baggage	T2 Baggage £180m Baggage Asset Replacement £TBC Baggage IT £TBC Future Airport Baggage TBC	FPG then (New) Baggage working group	Monthly initially Then quarterly	• Continue Project list • Pause Project list • Emerging projects in the pipeline • Supporting evidence for Portfolio size • Draft objectives and measure for prioritisation	• Objective of the sub-portfolio • Benefits to support prioritisation • List of any agreements • List of any disagreements • Measure of sub-portfolio for prioritisation • Links with other RBP workstreams	1: 25th Feb 2: 6th April
Security	Security Compliance £420m Security Transformation £130m Future Airport Security £TBC	FPG then (New) Security working group	Monthly initially Then quarterly			1: 25th Feb 2: 6th April
Critical Compliance	Asset Replacement Compliance Maintenance of current service levels £1,200m	FPG	Monthly initially Then quarterly			1: 11th Mar 2: 22nd April
Commercial Revenues	Critical Revenue Protection £100m Win the Recovery £600m	FPG	Monthly initially Then quarterly			1: 11th Mar 2: 22nd April
Efficient & Future Airport	Critical opex protection £100m Reduction in total cost of operation £374m Future Service, Resilience and Capacity £150m	FPG	Monthly initially Then quarterly			1: 25th Mar 2: 4th May
Sustainability	Carbon & noise reduction £150m Surface access incl. Cross Rail and T5 Station fit-out £109m	TBC (SAWG?)	Monthly initially Then quarterly			1: 25th Mar 2: 4th May

Source: Heathrow

Through this engagement we have agreed on the framework outlined in Figure 3 below from which to further develop the capital programmes for H7, modified to reflect the changes set out in this RBP Update 1.

Figure 14: Programmatic Framework for the H7 capital plan

			PROGRAMMES						
Portfolio	**Objective**	**RBP Update #1**	**Asset Management**	**T2 Baggage**	**Security**	**Commercial Revenue**	**Efficient Airport**	**Carbon & Sustainability**	**Future Ready Airport**
Protect the Business	Asset Management & Compliance	£2,138m	Critical Safety, Security & Compliance Scope £1,500m	T2 Baggage £180m	Regulated Compliance £420m			Airspace Modernisation £38m	
	Protect Efficiency and Revenue	£360m				Protect existing Revenues £100m CrossRail £78m	Avoid material Opex Increases £100m iH7 Roll-Over £82m		
Win the Recovery	Efficient Airport	£734m			Security Transformation £130m Security Compliance £230m		Automation & Digitialisation £374m		
	Commercial Revenue Generation	£600m				Generate Incremental Revenues £600m			
Build Back Better	Carbon & Sustainability	£150m						Carbon & Sustainability £150m	
	Future Ready Airport	£185m	Potential to use some allocation for this activity	T2 Baggage Solution £35m			Potential to use some allocation for this activity		Build Resilience, Capacity & Service £150m
Total Portfolios		**£4,167**	**£1,500m**	**£215m**	**£780m**	**£778m**	**£556m**	**£188m**	**£150m**

Source: Heathrow

Through the Future Portfolio Group (FPG) we have continued to evolve these Programmes through a series of six workshops, setting out the proposed:

- Consumer outcomes
- Delivery Objectives
- Measures
- Benefits
- Prioritisation
- Existing or emerging business cases to deliver the objectives.

These will be developed in consultation with the airline community into the Programme Mandates, the initial phase of developing a full Programme Business Case as set out in Heathrow's Programme Lifecycle Guidance. We have agreed with the airline community to continue to collaborate on developing the mandates either through sub-working groups, which will report to the Capital Portfolio Board (CPB) on a quarterly basis, or through the FPG. The airline community are supportive of the approach and recognise the need to align on the mandates before developing the detailed portfolio of business cases to deliver them.

Minutes of the FPG meeting March 2021:

> *"With regards to the pre shared slides, Heathrow sought agreement in principle to the objectives and measures for prioritisation. The intention will be to develop the business cases that deliver the identified programme objectives.*
>
> ***IATA**: The airline community are broadly in agreement of the framework and we have further sessions planned to develop the measures in more detail, and there is to be a follow up session on the RBP proposed targets, incentives & measures."*

There is a potential for construction inflation to differ from RPI. We are reviewing market indices and will provide an update when there is more certainty both on the composition of the portfolio and the marketplace.

5.4 H7 operating costs updates

5.4.1 Introduction

In this chapter we make four key points:

Firstly, Heathrow was an efficient airport in 2019. We delivered over £600m (2018 prices) of cost savings in Q6, with external benchmarking demonstrating that, by the end of the period, we were efficient compared to similar airports.

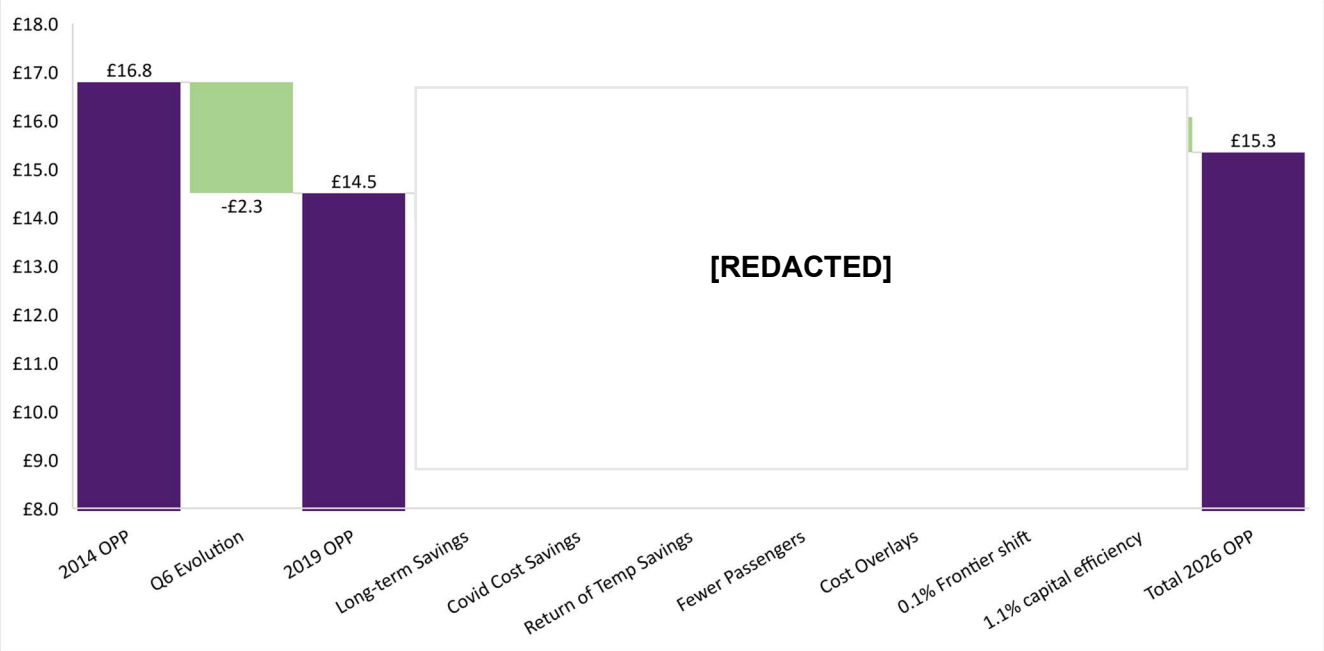
Secondly, Covid-19 has necessitated unprecedented cost reductions, which still do not mitigate the collapse in income resulting from the impacts of the pandemic. The 22% reduction in operating costs achieved in 2020 has been more than counterbalanced by headwinds that create upwards pressure on operating costs:

- A significant proportion of the cost-saving measures achieved in 2020 were temporary and will not be achievable in H7 (e.g. savings achieved through the furlough scheme).
- Passenger numbers remain lower than 2019 levels, and with a largely fixed cost base the same costs are shared between fewer passengers.
- The impact of Covid-19 has led to a significant increase in the cost of service per passenger, which is likely to persist through H7 regardless of changes in government policy due to changed consumer behaviours and service expectations:
    - Primary impacts, such as additional hygiene requirements and colleagues to provide additional assistance - from March 2020 to March 2021 the Safe to Fly programme led to an increase of **[REDACTED]** per passenger served.
    - Secondary impacts, such as new passenger processes (social distancing) and behaviours have reduced the effective capacity of our terminals – the average impact over H7 of our terminals being underutilised is £3 per passenger[1].
- Broader external impacts, such as unfavourable government policy on rates and rail access.

Thirdly, only capital investment can unlock additional cost savings without reducing service levels or creating long term implications for our infrastructure. Protecting the business through the Covid-19 pandemic has exhausted all operating cost reductions without impacting the safe operation of the airport and has enabled **[REDACTED]** of permanent efficiencies ahead of H7 on a 2019 throughput basis. During H7, only capital investment in automation and security transformation can remove additional operating costs.

[1] Comparing operating costs per passenger with 2019 vs Update 1 P50 passenger volumes

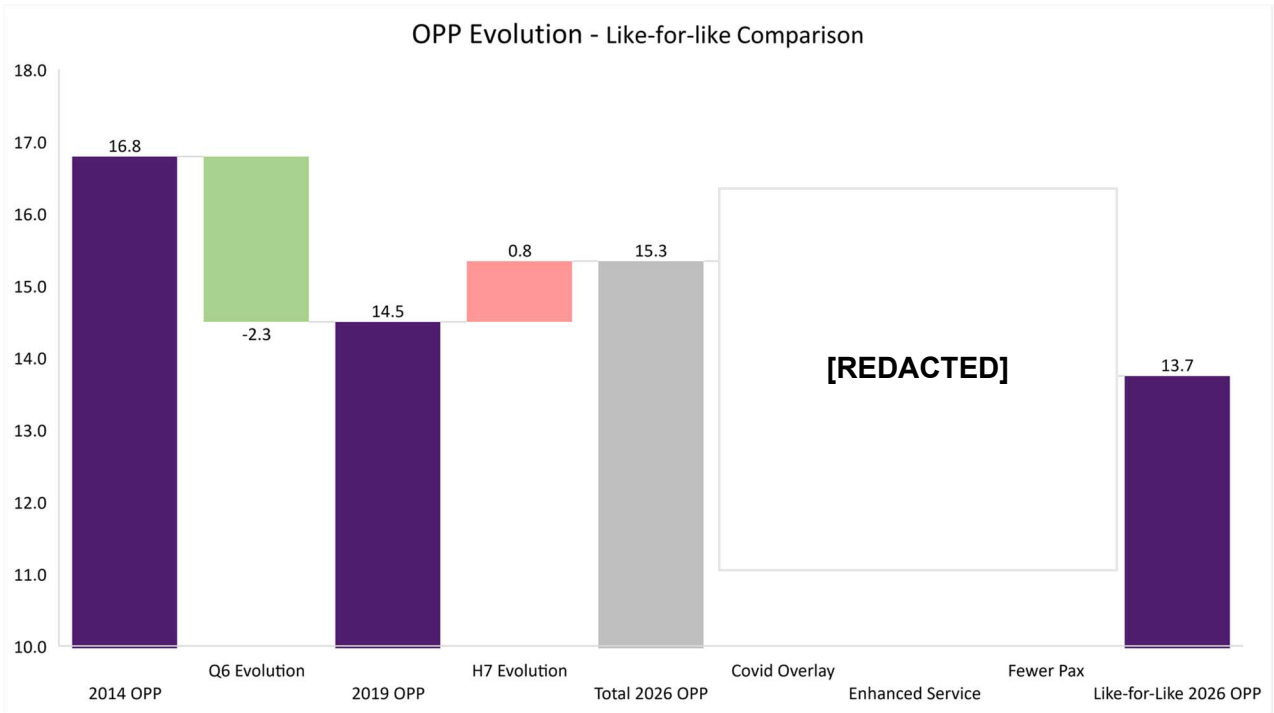
Figure 1: Factors driving the change in operating costs per passengers from 2019 to 2026



Source: Heathrow

Finally, although H7 operating costs per passenger are higher, this is not a like-for-like comparison with the operating cost performance of previous regulatory periods. Removing the volume effect of fewer passengers and costs of Covid-19 – both of which are beyond our control – translates to a reduction in operating costs per passenger of 1.4% in 2026 compared with 2019. Therefore, our plans for H7 see us shift to a structurally even more efficient airport than Q6.

Figure 2: Like-for-like comparison of operating costs per passenger (£, 2018p)



Source: Heathrow

5.4.2 Our updated H7 operating cost forecast

This section sets out our updated operating cost forecast, using the same drivers model approach as in the RBP with a flow through of the updated H7 passenger forecast. We have updated the relevant drivers to our operating cost model, and concluded the following change in our forecast operating costs in our two cases:

Table 1: H7 operating cost forecasts - Full Adjustment vs Low Adjustment

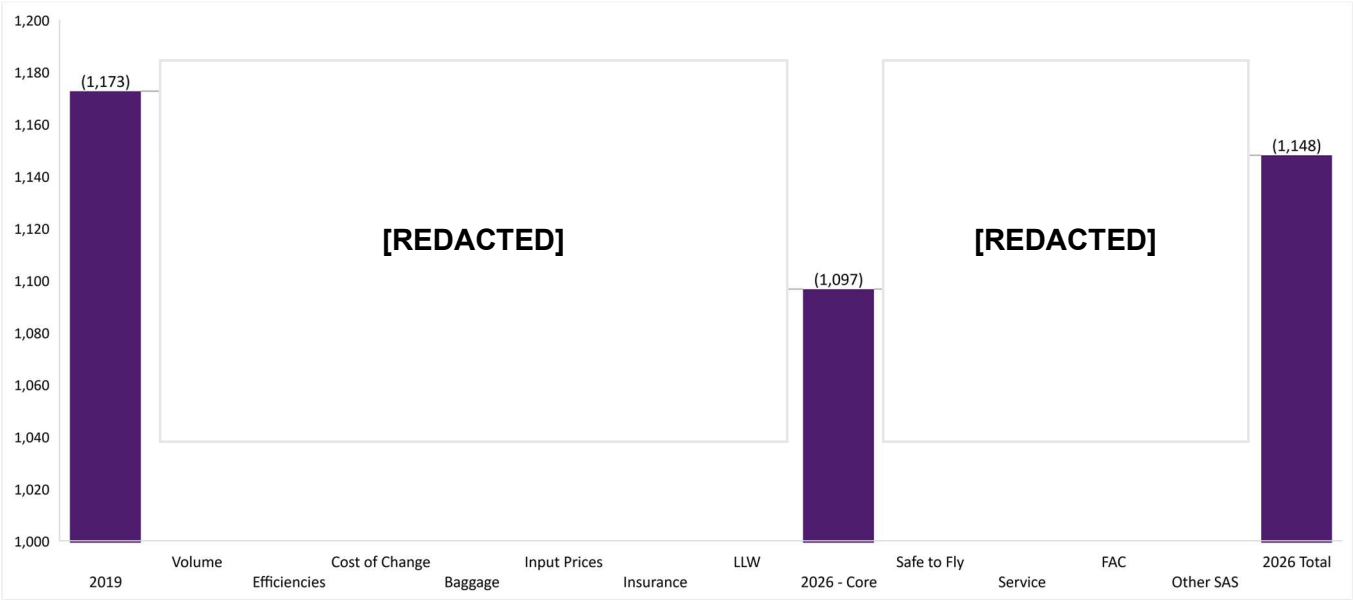
Total operating costs (£m, 2018p)	RBP	Full Adjustment	Low Adjustment
People	[REDACTED]		
Operational costs excl. insurance			
Insurance			
Facilities and maintenance costs			
Rates			
Utility costs excl. distribution contract			
Distribution contract			
General expenses			
Total Core Operating Costs	**5,336**	**5,334**	**5,454**
Covid-19 costs	[REDACTED]		
Forecourt Access Charge costs			
Surface access strategy costs			
Enhanced service costs			
Total Operating Costs	**5,567**	**5,575**	**5,569**

Source: Heathrow

The figure below provides a breakdown of the cost savings we will deliver by 2026, the cost pressures we are facing and the impact of the cost overlays. By 2026 our plan will deliver £100m (2018 prices) of savings per annum compared with 2019. Despite the cost pressures we are facing during H7, core operating costs in 2026 are £76m (2018 prices) lower than in 2019 and total operating costs[2] are £25m (2018 prices) lower. In total we will deliver £368m of savings to core operating costs over H7. As shown below the increases to costs in 2026 are either due to cost pressures outside of our control or are essential to delivering our outcomes.

[2] Core operating costs and Covid-19, service and surface access overlays

Figure 3: Changes in operating costs from 2019 to 2026 (£m, 2018p)



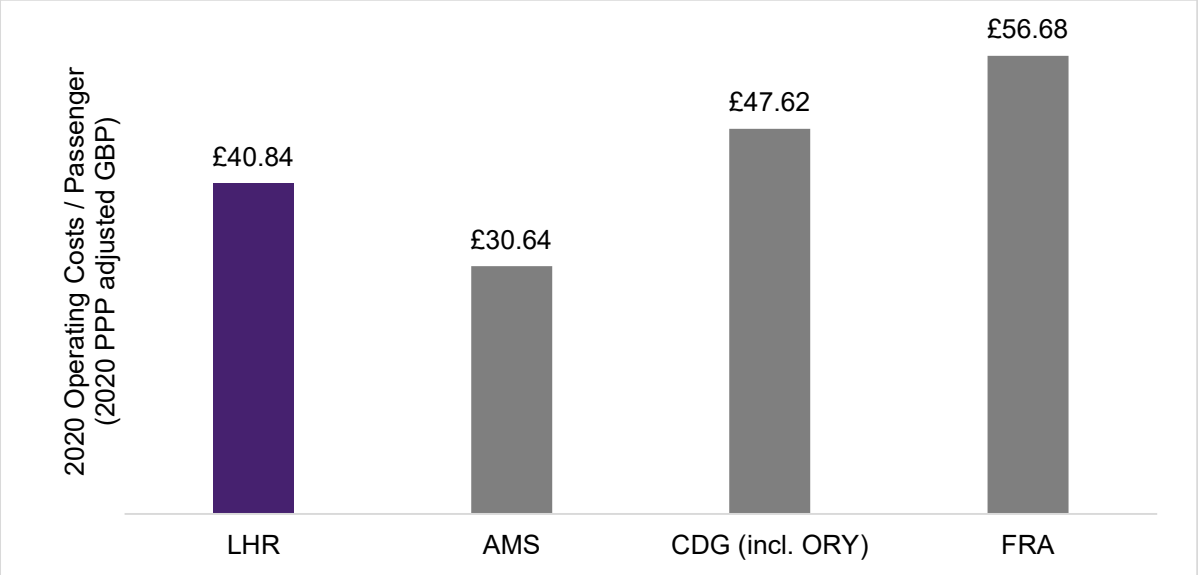
Source: Heathrow

5.4.3 2019 Baseline

In the RBP we presented a range of evidence to demonstrate that 2019 represents an efficient baseline for our H7 operating costs forecast. The Airline Community have challenged this assumption on the basis of the level of savings we achieved in 2020. However, the majority of those savings were temporary or volume-related savings including temporary pay cuts, furlough and changes to contract agreements to reflect lower passenger volumes. These savings do not demonstrate inefficiency in the 2019 baseline and indeed it would not have been possible to make these savings in 2019. The **[REDACTED]** long term savings we brought forward in 2020 were related to the Cost of Change business case and the baggage contract renewal. It has only been possible to implement the Cost of Change business case because of the Covid-19 crisis which enabled us to bring forward our strategy to deliver long term sustainable and efficient wages. It has been a major achievement, and something no other airport has done in response to the pandemic, to address our long-standing legacy contract issues and harmonise terms and conditions across the organisation. We are now entering H7 with all roles at all levels across Heathrow aligned to the market. The efficiency savings from the baggage contract renewal represent those that would be expected as part of ongoing efficiencies when contract renewals occur, reflecting current circumstances at the time of renewal and do not indicate that the previous contract was inefficient.

As a high-level comparison shown below, our operating costs per passenger in 2020 were lower than Frankfurt and Paris (Charles de Gaulle and Orly) but higher than Amsterdam. As discussed in our RBP, high-level benchmarking is useful to provide a simple comparison with our hub competitors. However, when comparing our efficiency to other airports, it is essential to consider the unique characteristics of Heathrow and the costs we incur that other airports may not, or those which are outside of our control.

Figure 4: European hub airports - 2020 operating costs per passenger (2020 PPP adjusted GBP)



Source: Airport accounts

In the *Way Forward* consultation, the CAA state that we have not provided sufficient assurance that the adjustments made to the 2019 baseline are appropriate, with particular reference to the removal of Expansion costs. As stated in the RBP, there was £1.8m (nominal) of Expansion costs in 2019 that we removed from the baseline. This was set out in our Cat B submission for 2019:

> *"During 2019 £1.8m of operating costs were incurred in support of seeking planning consent and are therefore included within the overall Category B total of £196.5m. This expenditure has been classed as operating costs in accordance with accounting standards. These activities were originally budgeted for within the capital expenditure forecast resulting in a negligible variance to the operating cost budget of £1.8m. There are two main areas spend which are summarised below:*
>
> *CAA Fees - This is the charge from the CAA to fund the additional headcount required to support the CAA's activities directly related to the development of the expansion of Heathrow. This has been completely categorised as Category B.*
>
> *Security - The Heathrow Expansion Programme activity has increased the threat of protestor activity. Additional security resource has been provided to mitigate this risk directly caused by our proposals to seek planning consent."*

In 2019 as part of Expansion, colleagues outside of the programme team carried out work on Expansion projects. A threshold of 50% was applied before their time was classified as Expansion. The costs that were reallocated and capitalised as a result of this process were £2m (nominal) in 2019. Any colleagues supporting Expansion on an ad hoc basis, less than the 50% threshold, would be significantly less than the allocated £2m and immaterial to the 2019 baseline. Indeed, if the costs were material, Heathrow would have been incentivised to ensure these costs were capitalised.

We have also provided the CAA with a reconciliation of our 2019 regulatory and statutory accounts that demonstrates that the operating costs for 2019 included in the RBP are net of any capitalisable Expansion costs. We will carry out further engagement with the CAA to

ensure there is a full understanding of the reconciliation process between our statutory and regulatory accounts.

As in the RBP, we have removed a one-off credit of £1.9m (nominal) from people costs in the 2019 baseline. This was a one-off credit for the pension cost actuarial valuation and should not therefore be included in the baseline for H7.

As in the RBP, we have also made an adjustment of an additional **[REDACTED]** to the 2019 baseline, to reflect the cost increase of all suppliers paying the London Living Wage from 2022 onwards. This adjustment is necessary as in 2019 only 64 out of 108 of our suppliers were paying the London Living Wage.

5.4.4 Impact of fewer passengers on a fixed cost base

This section outlines how a lower than expected passenger forecast in H7 and a largely fixed cost-base means a significant increase in forecast operating costs per passenger in H7.

Before Covid-19, **[REDACTED]** of airport costs were fixed or semi-fixed. This made Heathrow more vulnerable than airlines[3] or other industries to a demand shock on the unprecedented scale of that triggered by the Covid-19 pandemic. We are developing a plan to ensure we have a cost base that is more flexible and can respond to the highly uncertain passenger demand outlook for H7:

- we have renegotiated our supplier contracts;
- we are exploring a future workforce strategy that could allow for more flexible people costs; and
- in the long term, our capital plan (see Chapter 5.3 – H7 Capital Plan Updates) outlines the investments that could remove other fixed costs (the “Efficient Airport” programme).

However, this will not make a transformative difference to our cost base as it will take time to remove fixed costs and, despite these initiatives, it does not address the major areas of fixed cost that are out of our control such as:

- business rates and other taxes;
- surface access costs; and
- police costs including counter terrorism and drone security.

As such, we assume that we enter H7 with a cost base that is **[REDACTED]** fixed and **[REDACTED]** semi-fixed, equating to £**[REDACTED]** p.a.

[3] Only 50% of an airline’s costs are fixed - https://www.iata.org/en/iata-repository/publications/economic-reports/airlines-financial-monitor-september-2020/

Figure 5: **[REDACTED]**

As passenger volumes never recover to the levels forecast in our Initial Business Plan (IBP), we see the burden of those fixed costs shared across fewer passengers.

Table 2: Comparison of IBP and Update 1 passenger forecasts

Passenger Forecast (m)	2022	2023	2024	2025	2026	H7 Avg.
IBP P50	82.9	84.5	85.6	86.3	86.9	85.2
Update 1 P50 (% of IBP forecast)	52%	69%	80%	85%	86%	75%

Source: Heathrow

In order to fully understand the true impact of lower volumes, we can input 2019 passenger volumes through the drivers model, assume for the same operating cost assumptions – including the cost of Covid-19 – and see a completely different operating cost per passenger emerge:

Table 3: Operating costs per passenger with Update 1 P50 and 2019 passenger volumes

	2022	2023	2024	2025	2026	H7 Avg.
Opex/Pax with Update 1 P50	-23.9	-18.9	-16.7	-15.7	-15.3	-17.5
Opex/Pax with 2019 pax thru H7	-14.4	-14.6	-14.6	-14.5	-14.4	-14.5
Volume effect	-411.5	-252.0	-142.8	-87.0	-67.4	-192

Source: Heathrow

Table 3 shows that the lower passenger numbers are driving significantly higher unit operating costs over the period, increasing them by £3 per passenger on average over the period.

5.4.5 Impacts of Covid-19 and Government Policy on passenger service costs

The Covid-19 pandemic has led to a material increase in the cost of delivering the service levels required to meet consumer expectations and government requirements. This section outlines how the impact of the pandemic, and the government response to it, has resulted in additional costs in the Heathrow operation and has driven up our operating cost per passenger served. These are split into three effects that are outside of our control:

- The primary effect of greater expectations for cleanliness and service needs of passengers. This addresses our assumptions for cost overlays for Covid-19 and Enhanced Service.
- The secondary effect of travel restrictions and passenger behaviours, requirement for terminal facilities for arrivals from red-list countries and the reduction in the capacity of terminals. This addresses our assumptions for terminal use.
- The wider impacts of government policy on our cost base. This addresses our assumptions on surface access.

To deliver our consumer outcomes for H7, it is essential to address these effects and include the material additional associated costs in our operating cost forecast.

Primary Effects

Our consumer insights confirm that, since Covid-19, cleanliness is a greater priority than ever before.[4] We have invested heavily to change processes and the quality and cleanliness of our facilities to meet these new expectations. As a result, Heathrow is registering its highest ever levels of service measured by ASQ and is one of only two UK airports to have achieved a 4-star Covid-19 hygiene rating from Skytrax.

The cost of meeting these new expectations through enhanced cleaning regimes, availability of personal protective equipment and sanitisation gels for colleagues and passengers is significant. In the twelve months from February 2020 to March 2021, these costs were **[REDACTED]** (nominal) – **[REDACTED]** per passenger served over the period. These costs are not only required to meet consumer expectations, but also to ensure we are following government guidance to operate in a Covid-secure environment for both passengers and colleagues. However, even if government policy were to change, our consumer insights suggest that raised passenger expectations for cleanliness are likely to persist throughout H7.

As in our RBP, we are reflecting these additional costs in the **Covid-19 cost overlay,** which is essential to meeting passenger expectations in H7 and delivering the "I feel comfortable and secure at the airport" consumer outcome. The costs are based on the spend to date, with proportional increases when we reopen Terminals 3 and 4, and remain unchanged from the RBP:

[4] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020 – Systra's work shows that cleanliness is now the top priority for improvement for consumers who are current and potential connecting passengers and for potential direct passengers. It is the third highest priority for current direct passengers.

Table 4: Covid-19 cost overlay – RBP vs Update 1

Covid Overlay (£m, 2018p)	2022	2023	2024	2025	2026	H7 Total
RBP	**[REDACTED]**					
Update 1	**[REDACTED]**					

Source: Heathrow

In addition, research carried out in March 2021 showed that just under a quarter of UK Consumers (22%) weren't nervous about flying before the Covid-19 pandemic but are nervous now[5]. Our insights also indicate that passengers continue to value the availability of colleagues to assist them when they need it.[6]

Since the Covid-19 pandemic, we have observed a significant increase in welfare and assistance demands of our colleagues by passengers. In our RBP we assessed that meeting these enhanced expectations was critical to delivering the "I feel cared for and supported" consumer outcome. We therefore accounted for an ongoing expectation of enhanced service, as an **Enhanced Service cost overlay (ESO),** with a high-level assumption of £**[REDACTED]** p.a., consistent with that included in our IBP. For the avoidance of doubt, the ESO is only assumed in a Full RAB Adjustment case. The logic for not including this in a Low RAB Adjustment case is outlined in full in Chapter 5.1 – RAB Adjustment.

Since the publication of our RBP, we have observed even greater expectations of enhanced service from passengers:

- New government travel restrictions and passenger processes have led to greater anxiety among passengers, with more passengers seeking out colleagues for support.
- The introduction of new arrivals procedures, a dedicated arrivals terminal for red-list countries and the failure of Border Force to adequately manage the border has led to greater demands placed on colleagues to provide welfare support, crowd management and assistance.

We have itemised (and costed at a high level) the additional services we believe customers would value and deliver against the cared for and supported outcome:

- **Passenger Requiring Support** - £**[REDACTED]** – Including a dedicated in-terminal team to support our most vulnerable consumers (39%) who choose not to use our dedicated assistance service, offering them support with their journey – helping to reduce their stress levels and making their airport experience more enjoyable.
- **Resilience** - £**[REDACTED]** – Additional spend due to the capital under-investment to support asset resilience in 2020 and 2021. Our engineering team confirm this would require a **[REDACTED]** uplift in maintenance cost. We have assumed a £**[REDACTED]** spend here as a stretch target so as to strive for efficiency. This additional spend ensures that we can increase our maintenance regimes across the airport in order to extend the life of assets and help to mitigate against assets being

[5] Savanta, *Heathrow Travel Behaviours Survey*, March 2021

[6] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020 – Systra's work shows that having colleagues deployed to help through passengers' journeys was a top 5 priority for most groups of passengers, in particular connecting passengers

out of service, thereby helping to ensure that passengers have a predictable and reliable journey.

- **Digital Service** - £**[REDACTED]** – Consumers have told us that a current customer service gap is their ability to get support when they require it during their journey. This operating expenditure allows Heathrow to increase capacity to answer passengers' queries in the moment, in their own language and in real time through their personal digital devices. This helps to ensure that passengers continue to feel cared for when they are unable or do not want to find assistance from airport colleagues.
- **Touchless / Automated Journeys** - £**[REDACTED]** – To support the on-going maintenance and roll-out of new touchless and automated parts of the passenger journey to make them more predictable and reliable.

As with our RBP, the Enhanced Service Overlay is only considered in the case of our Full Adjustment/Optimal Plan. The premise of the Low Adjustment/Safety Only Plan is that we could, absent a RAB Adjustment, only secure investment to ensure the safe operation of the airport in H7. The Enhanced Service is not required to ensure the safe operation of the airport but does advance the interests of current and future consumers by maintaining or improving the service levels that consumers have come to expect from Heathrow during Q6 and expect to be delivered in H7.

The benefits of the Enhanced Service Overlay are captured in the service targets differences between the Full and Low Adjustment cases. The full justification for each difference is captured in full in Chapter 6.2 – H7 Measures, Targets and Incentives Updates and summarised below.

The ESO is wholly responsible for the following differences in targets:

Table 5: Targets wholly influenced by the Enhanced Service Overlay

Consumer Outcome	Measure	Optimal Plan (requires Full RAB Adjustment)	Safety Only Plan (Low RAB Adjustment)
Predictable and Reliable	Availability of lifts, escalators, travellators (renamed from PSE)	99%	97%
Predictable and Reliable	Terminal 5 Track Transit System (TTS) Availability 1 train target Availability 2 trains target	99.00% 97.00%	97.00% 95.00%
Predictable and Reliable	Stand Availability	99%	98%
Basic Comforts	Pier service – % passengers accessing pier served stand (excl. T5)	95%	94%
Basic Comforts	Baggage System Reclaim Availability – arrivals carousel	99%	98%

Source: Heathrow

The ESO is partially responsible (as it works in combination with additional capital investment) for the following differences in targets:

Table 6: Targets partially influenced by the Enhanced Service Overlay

Consumer Outcome	Measure	Optimal Plan (requires Full RAB Adjustment)	Safety Only Plan (Low RAB Adjustment)
Predictable and Reliable	Provision of stand facilities	99%	97.25%
Basic Comforts	Baggage Misconnect Rate	7-9 bags in a 1000	9-11 bags in a 1000
Predictable and Reliable	Departures flight punctuality - % flights depart off stand within 15 mins	80.5%	78.4%
Overarching Measure	Overall Satisfaction	4.26	4.17
Cared For	Passengers with Reduced Mobility (PRM/PRS) satisfaction	4.00	3.92

Source: Heathrow

Our Enhanced Service cost overlay remains unchanged from our RBP:

Table 7: H7 Enhanced Service Overlay – RBP vs Update 1

Enhanced Service Overlay (£m, 2018p)	2022	2023	2024	2025	2026	H7 Total
RBP	**[REDACTED]**					
Update 1	**[REDACTED]**					

Source: Heathrow

The aggregate cost to passengers of this overlay is £**[REDACTED**] on the average H7 charge. This represents good value for money for consumers as it is well below the value consumers attach to the improvements in service as evidenced by our extensive consumer insight.

To inform our IBP we carried out a robust Willingness To Pay (WTP) exercise in order to understand the value of service improvements and degradations to consumers,[7] and as part of preparation for the RBP (and following the impact of Covid-19) we commissioned Systra to carry out research into passenger priorities in a post-Covid world[8]. 2,877 current and 1,828

[7] Systra, Heathrow Airport Customer Valuation Research, November 2018
[8] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020

potential passengers were interviewed to understand how they would prioritise and value Heathrow's proposed initiatives and service improvements during H7. These pieces of work gave us a detailed understanding of the value consumers place on different elements of the service they receive throughout their airport journey, and allow us to understand and value the potential benefit for consumers of different opex and capex investments.

This WTP evidence base shows us that:

- Improvements in baggage are highly valued by passengers. Systra's work found that reduced time at baggage reclaim was the second highest rated priority for service improvement among current direct passengers and third highest among potential direct passengers.[9] Even when looking at the 67th percentile valuations for improvements, which represents a conservative estimate of consumer valuations, Systra's analysis shows that current direct passengers assign a value of 1.38% of their total air fare to an improvement in wait times at baggage reclaim.[10] This translates into a valuation of £5.52 per passenger. A deterioration in availability of the arrivals baggage reclaim system, as would be the case without the ESO, risks increasing waiting time for passengers when reclaiming their bags on arrival and losing this potential benefit.

- When looking at service deteriorations, Systra found that the least acceptable deterioration in service for passengers would be a fall in the number of passengers travelling with their bags.[11] Current passengers valued the disbenefit of change from 9 passengers out of a 1,000 travelling without their bags to 10 passengers out of every 1,000 travelling without their bags at 1.24% of their overall air fare.[12] This translates into a valuation of around £4.96 per direct passenger in H7. As set out above, without the ESO, the number of people travelling without their bags is likely to increase from 7-9 in 1,000 to 9-11 in 1,000. This clearly shows that the potential extreme loss of value to passengers clearly outweighs the proposed £**[REDACTED]** increase to the charge.

- Systra's work highlighted the importance of punctuality to passengers. Enhanced punctuality was the seventh highest priority area for improvement among current direct passengers and sixth highest for potential direct passengers.[13] Systra explored the value of the disbenefit to passengers of a degradation in punctuality, looking at the impact of a reduction from 80% of flights departing on time to 78% of flights departing on time. This showed that passengers would value this disbenefit as equivalent to a 1.03% increase on their airfare.[14] This equates to a disbenefit of around £4.12 per passenger. This further reinforces that at a cost of £**[REDACTED]** per passenger through H7, the important role of the ESO in ensuring punctuality is clearly cost beneficial.

- The fourth least acceptable service degradation was found to be a drop in the availability of lifts, escalators and travellators. In their work, Systra asked consumers to value the impact of a 14% drop in availability of these assets. Consumers attached

[9] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 21
[10] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 22
[11] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Page 47
[12] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 25
[13] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 21
[14] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, Table 25

a value of 1.01% of their airfare to this scale of degradation, which equates to a disbenefit value of £4.04 per passenger. This highlights the clear value passengers put on the availability of these assets as part of their airport journey. Even with a smaller scale of degradation such as the 2% impact without the ESO, the cost of the ESO is clearly outweighed by avoiding the disbenefit this would bring to passengers.

Secondary Effects

In response to the demand shock triggered by the Covid-19 pandemic, Heathrow suspended operations in Terminal 3 and Terminal 4. This was key to delivering the cost savings that protected liquidity and ensured Heathrow was able to financially weather the worst of the crisis.

As demand returns through H7, Heathrow will need to restart operations, first in Terminal 3 and then in Terminal 4. Terminal restarts are key drivers of capital costs, as well as operating costs. An efficient operator is incentivised to only re-open terminals when there is sufficient demand to warrant it, making the most efficient use of the terminals that are operational without impacting passenger service.

In our RBP, our terminal restart assumptions were made on the basis that airlines would be incentivised to use capacity in Terminals 2 and 5 effectively in order to see those operating cost efficiencies flow through to a lower charge. However, since the publication of our RBP, we have seen significant developments that warrant a change in these terminal opening assumptions:

- Introduction of new travel restrictions and passenger processes have increased transaction times at key pinch points in the passenger journey (see Chapter 3.0 – Developments since the December 2020 RBP for more details).
- Government has requested the opening of a separate terminal to process arrivals from red-list countries (see Chapter 3.0 – Development since the December 2020 RBP for more details).
- Passengers – as confirmed by our consumer insights (see Chapter 4.0 – H7 Consumer Insights Updates for more details) – continue to practice social distancing or demonstrate a desire for social distancing, which in turn contributes to:
    - the slowing down of transaction times and flow rates through key processes; and,
    - the need for more space in terminals to deliver the “comfortable and secure” outcome.

As a consequence, we are now assuming terminal restarts are triggered at a lower passenger volume. The **terminal use assumptions** for the mid-case in Update 1 are as follows:

Table 8: Terminal opening assumptions for Update 1 P50 passenger scenario

Opening Assumptions	2022	2023	2024	2025	2026
T2	Open				
T3	Open				

T4	Red list arrivals only	Open
T5	Open	

Source: Heathrow

This, alongside a slightly lower demand forecast for early years, means a significantly reduced number of passengers using the same available infrastructure in the early years of H7:

Table 9: Jan 2022 – Jan 2024 average passenger per stand throughput - RBP vs. Update 1

Passengers per Stand	Jan 2022	Jul 2022	Jan 2023	Jul 2023	Jan 2024
RBP	20,535	28,562	24,218	33,254	26,877
Update 1	11,846	26,406	22,352	33,051	25,034

Source: Heathrow

This is a significant net contributor to higher per passenger operating costs in Update 1. Assuming 2019 passenger volumes rather than the Update 1 P50 forecast, the average impact over H7 of our terminals being underutilised is £3 per passenger.

Wider Policy Effects

There are also other government policy initiatives that are contributing to upward pressure on Heathrow's cost base. An example of this is the potential for the proposals from the Government's recent rail review, which set out potential changes to the structure of the railway industry. These changes could have a lasting impact on our Heathrow Express service and its ability to generate revenues commensurate with those seen through the Q6 period. We will continue to monitor these developments and provide more information on the potential impacts of these changes as they are implemented.

As in our RBP, we have included a cost overlay to reflect the costs associated with delivering our surface access strategy. The costs associated with the Terminal Drop-off Charge (previously known as Forecourt Access Charge) have been updated to reflect the updated passenger numbers, with costs aligned to the business case and assumed to be 15% of revenues. The other surface access strategy costs are unchanged from the RBP and these costs are primarily related to sustainable travel initiatives. The updated surface access strategy cost overlay is shown below:

Table 10: H7 Surface Access Overlay - RBP vs Update 1

Surface Access Overlay (£m, 2018p)		2022	2023	2024	2025	2026	H7 Total
RBP	FAC costs	**[REDACTED]**					
	Other SAS costs						
Update 1	Terminal Drop-off Charge costs						

	Other SAS costs	**[REDACTED]**

Source: Heathrow

The role of capital investment in reducing operating costs

We have identified three headwinds that are creating upwards pressure on unit operating costs in H7:

- The volume effect of fewer passengers sharing the burden of a largely fixed cost base.
- The primary and secondary impact of Covid-19 on cost and the efficient use of infrastructure.
- The end of temporary cost reductions achieved in 2020.

We do not believe there are further operating cost reductions that can be achieved without compromising the safe operation of the airport or materially reducing service levels. We are confident of this given the thorough investigations undertaken throughout the Covid-19 pandemic to identify cost savings to protect liquidity. If there were any additional cost savings measures that could have been delivered without compromising the safety of the airport, they would have been undertaken by this point.

The only means to address operating cost headwinds in H7 without reducing service is to undertake capital investments that can unlock savings that are not otherwise available. In our RBP we set out a clear link between the level of capital investment included in the H7 plan and our ongoing operating cost efficiency targets. We set a target of 0.9% per annum, reflecting the capital substitution effect of the level of enhancement capital expenditure included in the £3.5bn capital plan. This meant our total year-on-year efficiency assumed in our base case was 1% (capital efficiency 0.9% + frontier shift 0.1%). As the lower capital plan contained no enhancement capital expenditure, no capital substitution adjustment was required (0.1% frontier shift only) in the Low passenger and No Adjustment cases.

The two programs that will deliver the majority of operational cost savings are Efficient Airport and Security Transformation. Example initiatives that these programmes could deliver include:

- Changes to security processes, including algorithms and Centralised Image Processing, which enable higher flow rates per security lane, as well as a faster and more pleasant experience for passengers.
- Automation of the airfield, which could create efficiencies for us and the airlines in how we safely operate the airfield, while also increasing throughput and resilience by eliminating human error.
- Automation of baggage systems, opportunities to drive operational efficiencies in the safe operation of the baggage systems, while also increasing throughput and resilience by eliminating human error.
- Changes to renewable energy supply, which will reduce total utility costs of operating the airport but will also enable Heathrow to meaningfully decarbonise in H7.

Since the RBP, we have worked with the Airline Community to refine the programmes as discussed in Chapter 5.3 – H7 Capital Plan Updates. However, both programmes are still not at the maturity of full business cases with robust benefit estimates that can be directly included in the operating cost forecast. Therefore, we have retained our approach from the RBP to link

the capital plan to operating cost efficiency using capital substitution. However, since the RBP we have revised our minimum and full capital plans to £2.5bn and £4.2bn respectively. As a result, our year-on-year efficiency assumed in our base case has been updated to 1.2% (capital efficiency 1.1% + frontier shift 0.1%) and this reflects the increase in investment in the security process. The details of the updated capital efficiency estimate are set out in section 5.4.4. below. To be clear, if specific benefits were included for either programme, the capital efficiency % assumed would need to be reduced or there would be double counting.

Our 1.2% ongoing efficiency target is more challenging than the latest regulatory precedent from the Competition and Markets Authority (CMA)[15]. The CMA applied a frontier shift of 1% per year in their final price control determination for four companies that rejected the Ofwat price determinations. This was based on analysis of historical comparator company productivity data and qualitative consideration of other factors including productivity gains from the totex framework. They noted that more recent company comparator data showed lower productivity and, more broadly, UK productivity has slowed but that the water sector would likely be less affected than other sectors. This is unlikely to be the case for Heathrow, particularly given the restrictions to airport operations as a result of Covid-19 impacting terminal capacity and productivity. It should also be noted that the CMA set the frontier shift with consideration to the determination in the round, considering if cost allowances are sufficient to deliver the required service levels and enhancement costs are included to enable potential productivity improvement projects.

5.4.6 Other modelling updates

In addition, there are a number of other elements of the operating cost forecast that have been reviewed since the RBP ("Modelling updates"):

- Utilities costs
- Operational costs
- Insurance cost assumption
- Model adjustments for 2020 and 2021 costs
- Cost impact of changes in terminal use
- Input price inflation
- Assumptions on ongoing efficiencies
- Update on the cost of change business case
- **[REDACTED]**
- Pensions

[15] CMA, Anglian Water Service Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Services Limited price determinations Final Report, March 2021

Utilities costs

In our RBP, we discussed reviewing our methodology for the utilities cost forecast to review if passenger volumes are the most appropriate driver. This work is still ongoing and we will provide an update on this later in the year. For this update, our approach for the utilities cost forecast remains unchanged from our RBP.

Operational costs

Since the RBP, we have further reviewed the variability of operational costs with respect to passenger volumes. During 2020/21 it has not been possible to make the level of savings that would be suggested by using the elasticity of **[REDACTED]** with respect to changes in passenger volumes. Costs such as IT, police and rent are largely fixed. Analysis of our 2019 operational costs suggests that around **[REDACTED]** of our operational costs are fixed in the medium term. As a result, we have reduced the passenger volume elasticity by **[REDACTED]** from **[REDACTED]** to **[REDACTED]** for operational costs.

Insurance costs

In the RBP we updated our approach for forecasting our insurance costs, basing our estimates on market conditions. Since publishing the RBP, we have completed the renewal process for 2021 and our updated insurance costs are forecast to be £**[REDACTED]** in 2021. This represents a reduction of £**[REDACTED]**compared with the RBP. There have been significant rate increases in the insurance markets in 2021; on a like-for-like basis compared with 2019 our costs would have been £**[REDACTED]** higher than 2019. However, our reduced outlook for passengers and turnover has resulted in lower than initially expected costs for 2021.

In the RBP we estimated a **[REDACTED]** per annum increase in insurance costs for H7 based on market conditions. We have reviewed the latest market data, as summarised below:

- Insurance Market Performance - Insurance markets have been hardening since 2019 following several years of catastrophic events that have had significant financial impacts on insurers i.e. Hurricanes Harvey, Irma & Maria cost the property insurance sector over $92bn whilst several civil sanction claims and litigation have cost the financial lines sector over $125bn. Insurers have been looking to recover their outlays for prior year events by reducing, or entirely removing, capacity on all classes of business. The result is that the demand for insurance products exceeds the supply of cover available, and therefore, premium rates have increased exponentially.

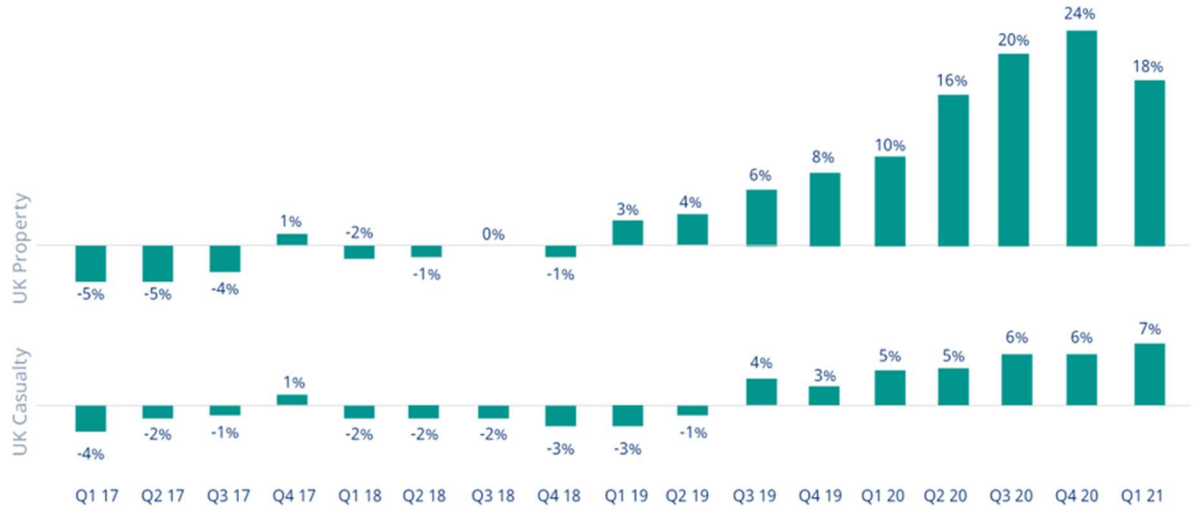
- Aviation Sector Performance - For many years, the aviation sector has benefited from soft market conditions and high levels of competition from insurers. Consequently, insurers are now considering this area as to have insufficient premium to cover the worldwide claims. All classes of insurance business have been affected and the aviation sector, in particular, has been classed as high risk by insurers with many refusing to cover risks within the sector. There have been aviation sector clients that have experienced premium rate increases in financial lines insurance of over 1,000%. Heathrow, like other airports, has a different risk profile from other aviation sector businesses – the predominant insurance purchase is based on physical assets and property values which therefore does not fluctuate with an increase or decrease in passenger numbers or turnover.

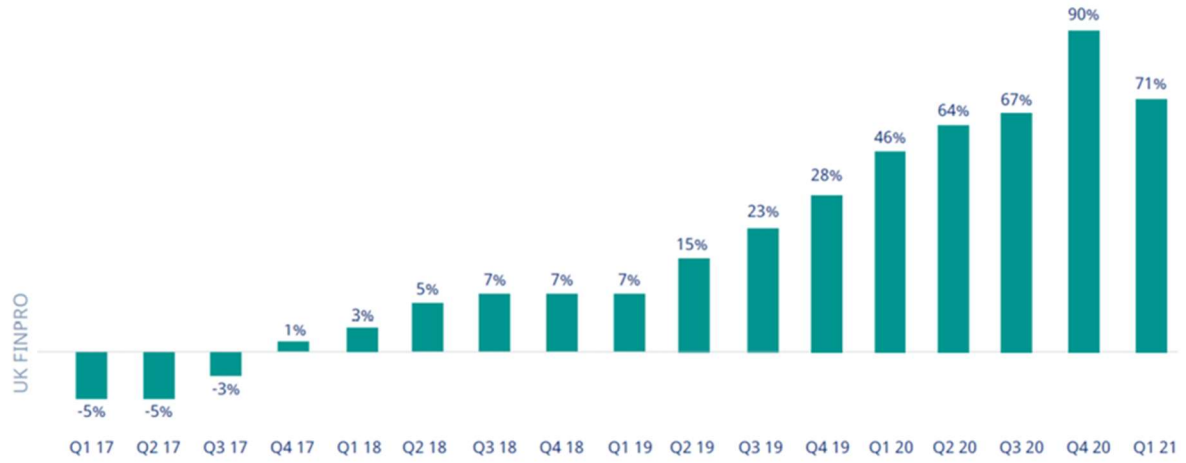
- Covid-19 Impact on Insurance Markets - The full financial impacts of the Covid-19 pandemic are yet to hit the insurance markets – claims have been lodged with insurers however, are not yet unsettled. The recent High Court judgment on the Financial Conduct Authority's (FCA) business interruption insurance test case found that insurers were obligated to pay out on business interruption claims related to the pandemic. The case was lodged against eight insurers with the aim of clarifying whether policy wordings covered disruption and government-ordered closures to curb the virus. Using current market intelligence, it is predicted that the extent and value of the Covid-19 related business interruption claims have the potential to cost the insurance market over $300bn which will mean insurers will further increase premiums or limit capacity to recover their costs. It is expected that these impacts will not be felt by policyholders until 2023/2024 at the earliest.

- Future Insurance Market Performance - Performance of insurance markets is cyclical and hardens/ softens based on market forces, capacity of cover and prior years' claims experiences. The current hardening of the insurance market is unrelated to the Covid-10 pandemic however it is predicted that the impact of Covid-19 related claims will, due to the timing in the cycle, push the softening cycle of the markets back further, possibly into 2026/2027.

The latest quarter-on-quarter increases in premiums for various classes of insurance are shown below:

Figure 6: UK Composite Insurance Pricing Change – By Major Coverage Line





Source: Marsh Global analytics. UK Composite Insurance Pricing Change — By Major Coverage Line

Having reviewed the latest market data, and taking into account increased passenger numbers, turnover and other base metrics, we have concluded that our assumption of a **[REDACTED]** increase per year for insurance costs from 2022 onwards remains a conservative estimate.

Model adjustment to 2020 and 2021 Costs

As in the RBP, we are using 2019 as the base year for operating costs forecast. We now have actuals for 2020 and an updated management business plan forecast for 2021. As in the RBP, we have applied one-off adjustments to the model for 2020 and 2021 to ensure the RBP and MBP actuals/forecasts are fully aligned. Overall, there is a close alignment between the two forecasts. At a total level they are within £**[REDACTED]** and £**[REDACTED]** respectively for 2020 and 2021. For individual cost categories, the model variances are related to the speed at which it is possible to implement cost-saving initiatives following a fall in passenger volumes and decisions to temporarily defer activity. The table below provides further details on the key reasons for the model variances by cost category.

Table 11: 2020 and 2021 forecast analysis (£m, 2018p)

	RBP Model		Variance to Actuals/MBP		Key reasons for variance
	2020	2021	2020	2021	
People	**[REDACTED]**				
Operational costs excl. insurance					
Insurance					

Facilities and maintenance	**[REDACTED]**
Rates	
Utilities excl. distribution contract	
Distribution contract	
General expenses	
Total	**[REDACTED]**

Source: Heathrow

Cost impact of changes in terminal use

As in our RBP, we are using 2019 as the base year for our forecast and therefore need to reflect the impact of changes in our terminal space on our operating cost forecast. In our RBP we used historical data to estimate the cost impact of changes in the use of our terminal space, considering that these are temporary changes in terminal utilisation rather than a reduction/increase in actual terminal floorspace. In this update we also need to take into account that terminals may be used for arrivals from red list countries. We are using the following assumptions for the update, full details of the analysis informing these assumptions is included in Appendix 5:

- People Costs – An estimate of £**[REDACTED]** per m^2 (unchanged from the RBP), based on £**[REDACTED]** per m^2, the actual average security and engineering people costs for Terminal 2 in 2018, applied to terminal floor space reductions/growth. We have used Terminal 2 costs as opposed to the average across all terminals to reflect the most efficient cost base. For this update, the estimate is reduced to £**[REDACTED]** per m^2 when considering reductions in costs when terminals are operating for arrivals from red-list countries. This assumes that we will still need **[REDACTED]** of security colleagues and **[REDACTED]** of engineering colleagues.
- Operational Costs - An estimate of £**[REDACTED]** per m^2 (unchanged from the RBP), the average variable operational costs directly related to terminal size from 2018-19, applied to terminal floor space reductions/growth. Examples of the type of costs used are PRM, commercial expenditure and passenger ambassador costs.

- Facilities and Maintenance - A terminal size elasticity of **[REDACTED]** (unchanged from RBP) based on Frontier Economics' analysis of our historical data. This implies that a 1% increase in terminal floor space leads to a **[REDACTED]** increase in facilities and maintenance costs. This is based on a statistically significant relationship Frontier identified from our historical costs. For this update, the elasticity is reduced to

[REDACTED] when considering reductions in costs when terminals are operating for arrivals from red-list countries. This reduction assumes that there will still be a **[REDACTED]** requirement for cleaning and maintenance and **[REDACTED]** of baggage costs are fixed.

- Utility Costs - An estimate of £**[REDACTED]** per m^2 (unchanged from RBP), based on £**[REDACTED]** per m^2, the average terminal utility costs from 2018-19 rounded down to account for the temporary nature of changes in terminal utilisation, applied to terminal floor space reductions/growth. For this update, the estimate is reduced to £**[REDACTED]** per m^2 when considering reductions in costs when terminals are operating for arrivals from red-list countries. This assumes that we will have **[REDACTED]** of utility costs.

The increases in costs when terminals are reopened do not start occurring on the opening day of the terminal for passengers. There is a build-up of costs when terminals are being prepared to reopen, for example where cleaning and maintenance will be required, utilities will be used and colleagues will undergo familiarisation training in the new-Covid secure environment. For this update we are reflecting the ramp up in costs leading up to terminals reopening. We have assumed **[REDACTED]**, **[REDACTED]** and **[REDACTED]** of the cost impacts set out above in the 3 months prior to a terminal reopening for passengers.

Input price inflation

For the IBP, we commissioned First Economics[16] to determine appropriate input price adjustments to be applied to H7 operating costs, reflecting the rate at which prices for labour and materials changes over time. First Economics recommends using forecasts prepared by the Office for Budget Responsibility (OBR) and other appropriate Government departments.

For the RBP, we updated the forecasts to reflect the latest available data and have done so again for this update. The table below shows the recommended nominal input price inflation forecasts.

Table 12: Nominal price inflation forecasts

	2020	2021	2022	2023	2024	2025	2026
Wages	1.1	1.9	2.7	2.2	2.8	3.5	3.5
Materials	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Power	1.3	3.9	4.2	2.1	2.0	3.0	3.0

Sources: First Economics, Frontier shift, input price inflation and productivity growth, August 2019; OBR Historical official forecasts database, March 2021; BEIS, Updated energy and emissions projections 2019, October 2020.

As in the RBP, the figures in Table 13 have been weighted together in accordance with the share that each input type has within the H7 operating cost categories and applied annually.

[16] First Economics, *Frontier shift, input price inflation and productivity growth*, August 2019

Full details are included in Appendix 5. The materiality of the input price inflation forecasts is shown below for each cost category with a comparison to using a RPI inflation forecast.

Table 13: Materiality of input price inflation forecasts

Operating costs (£m, 2018p)	H7 Impact of Input Price Inflation forecast vs RPI
People	**[REDACTED]**
Operational costs excl. insurance	
Insurance	
Facilities and maintenance costs	
Rates	
Utility costs excl. distribution contract	
Distribution contract	
General expenses	
Total Core Operating Costs	

Source: Heathrow

Input price inflation is not applied to the Covid-19, Surface Access or Enhanced Service cost overlays. This is because they are additional to the core operating cost model and are based on separate forecasts. However, if the input price inflation forecast were applied to the cost overlays, the impact would be in the region of £**[REDACTED]** over H7.

In the short term, protection against input price inflation may be within management control, for example through deferring salary increases or fixed price energy supply or maintenance contracts. However, this is not the case over a 5-year regulatory settlement where we will be exposed to the wider economic market changes. For example, it is necessary to retain talent with a market aligned reward package and contract renewals will be based on the prevailing market conditions. Reviewing the latest regulatory precedent on input price inflation, in the CMA's final price control determinations for four companies that rejected the Ofwat price determinations, they use criteria to decide if it is appropriate to apply input price adjustments based on management control but also the size and uncertainty of the wedge between the input price and inflation measure and if the inflation measure does not adequately capture the input price[17]. They also highlight the theoretical link between wages and labour productivity means including a labour input price is consistent with requiring a frontier shift in cost efficiency[18].

[17] CMA, *Anglian Water Service Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Services Limited price determinations Final Report*, March 2021, Paragraph 4.658, p273.
[18] CMA, *Anglian Water Service Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Services Limited price determinations Final Report*, March 2021, Paragraph 4.700, p283.

Ongoing efficiencies in H7 and the case for capital investment

To ensure our operating cost targets are stretching and evidence based, in the RBP we set out a number of factors to be considered when determining an ongoing efficiency challenge for H7:

- **Catch-up efficiency** – in the RBP, we demonstrated that we are now at the frontier of efficient operating costs and no catch-up allowance is required.
- **Frontier shift** – an estimate of the ongoing productivity improvements in operating costs at an efficient airport.
- **Capital investment in iH7** – committed capital investment in iH7 that is forecast to deliver operating cost savings.
- **Capital investment in H7** – level of capital expenditure available in H7 that is forecast to deliver operating cost savings.

Ongoing efficiencies are applied to all core cost lines with the exception of rates and the Distribution Fee. This is because it is not within our control to make efficiencies to business rates. This approach is aligned to the latest regulatory precedent, where the CMA did not apply frontier shift to business rates[19]. The Distribution Fee is based on the current contract terms and therefore we will not have the opportunity to make further efficiencies during H7. Ongoing efficiencies are also not applied to the cost overlays as these are based on separate forecasts to the core operating cost model and to maintain consistency with our approach to input price inflation. However, if the ongoing efficiencies were applied to the cost overlays, the impact would be in the region of £**[REDACTED]** over H7.

Frontier Shift

In the RBP, we assumed a frontier shift of 0.1% for H7. This was based on the Bank of England average annual total factor productivity forecast for 2020-23 Q1 included in their January 2020 Monetary Policy Report[20] and the productivity expectations of the Bank of England in the November 2020 Monetary Policy Report[21] and OBR July 2020 Fiscal Sustainability Report[22].

The latest view from the Bank of England in their May 2021 Monetary Policy Report[23] is that the scarring effects from Covid-19 reflect the impact on productivity:

"Business investment growth has been weak over the past year, lowering the capital stock relative to what it would have been in the absence of the pandemic. Lower investment is also expected to have reduced growth in 'total factor productivity' – the efficiency with which labour and capital are combined – a little. In addition, workers that were made unemployed or were furloughed during the pandemic will not have gained the skills that they usually would have done while working, and that is expected to weigh on productivity somewhat when they return to work."[24]

[19] CMA, Anglian Water Service Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Services Limited price determinations Final Report, March 2021, Paragraph 4.629, p266.
[20] Bank of England, *Monetary Policy Report*, January 2020
[21] Bank of England, *Monetary Policy Report*, November 2020
[22] OBR, Fiscal Sustainability Report, July 2020
[23] Bank of England, *Monetary Policy Report*, May 2021
[24] Bank of England, *Monetary Policy Report*, May 2021, pg39

Given that the pre-Covid Bank of England average annual total factor productivity forecast for 2020-23 Q1 was 0.1% and their latest view is that productivity is likely to be lower, our assumed frontier shift for H7 remains at 0.1%.

Capital investment in iH7

We reduced our 2020 capital expenditure by **[REDACTED]** compared to the average annual figure of the preceding five years. However, we have still been investing in transforming our support services efficiency through the Magenta project. As set out in the RBP the incremental savings associated with the Magenta G3 business case are not related to operating costs. There has been further engagement and clarification on this matter with the Airline Community at the CPB where we have explained how the identified benefits relate to capital expenditure processes and cashflow efficiencies.

In addition to the capital investment in iH7, we have also brought forward long-term efficiency savings in 2020. As described in the RBP, we have made significant cost savings in 2020 in response to Covid-19. £**[REDACTED]** of these savings, relating to the cost of change and baggage contract, have been identified as permanent long-term savings. In a more stable operating environment these savings would have been made over a longer period of time. However, the unprecedented nature of the Covid-19 crisis has resulted in these savings being brought forward.

Capital investment in H7

Since the RBP we have revised our minimum and full capital plans to £2.5bn and £4.2bn respectively. We have followed the same approach as in our RBP to estimate a capital substitution effect for operating cost efficiency. The updated calculations are as follows:

Table 14: Capital substitution effect % estimates - £2.5bn vs £4.2bn capital plans

Capital substitution % estimate		£2.5bn plan	£4.2bn plan
RAB (exc. investment properties) (£bn)	A	**[REDACTED]**	
Critical Capex (£bn, p.a.)[76]	B		
Enhancement Capex (£bn, p.a.)[77]	C		
Total Capex (£bn, p.a.)	D = B + C		
Growth in capex	E = D / A		
Operational Costs (£bn, p.a.)	F		
Capex % of Total Costs	G = D / (D + F)		
Enhancement Capex % of Total Capex	H = C / D		
Capital substitution % p.a.	I = E * G * H		

Source: Heathrow

The total year-on-year efficiency assumed in our base case is 1.2% (capital efficiency 1.1% + frontier shift 0.1%). As the £2.5bn plan contains no enhancement capital expenditure there is no capital substitution adjustment required (0.1% frontier shift only).

Update on the Cost of Change business case

At the time of the publication of the RBP in December 2020, ongoing negotiations with the trade unions, and consultation for some colleagues, meant that we assumed a cost of change of c. £**[REDACTED]**. We are now able to confirm a final cost of £**[REDACTED]**.

As agreed with the Airline Community, **[REDACTED]** of this cost is included in the operating cost forecast as a cost saving. In the RBP, this saving had been included in the operating cost model relative to 2019 passenger volumes. This means that the level of savings grew throughout H7 because cost increases related to passenger growth were from a structurally lower cost base. We have retained the same approach in this update. It should be noted that we have not adjusted the modelled saving to reflect the lower expected passenger outturn for 2021 (**[REDACTED]**), as the savings agreement with the Airline Community was based on the **[REDACTED]** passenger forecast for 2021.

As agreed with the Airline Community, this cost plus the capitalised return in the iH7 period will be added to the RAB. Heathrow and the Airline Community agreed that the RAB is an effective regulatory construct to transfer value between regulatory periods that can be applied to certain operational expenditure cases, where an investment in achieving a structural reduction of those operational expenditures would not otherwise be possible to achieve.

[SECTION REDACTED]

Pensions

During Q6, we have shown we can run our pension schemes responsibly and make effective changes when appropriate. This update assumes a continuation of the current pension deficit contribution to the DB scheme throughout H7. We are currently reviewing options for the DB pension scheme to ensure we recommend the best option for our business and will provide an update on our pension strategy in September this year. The RBP Update assumes a continuation of the current contribution to the DB scheme throughout H7.

Any material changes would require agreement with our unions and consultation with individual members. We are committed to doing the right thing for our people and we know that pensions are the second most valued benefit behind base salary.

5.4.7 Update on discussions with airlines regarding our RBP terminal restart strategies

Since the publication of the RBP, we have been engaging with the Airline Community on our terminal restart strategy. The Joint Heathrow Planning Group (JHPG) has been meeting on a fortnightly basis.

The JHPG is primarily a collaborative and consultative group which aims to promote structured and regular collaboration between Heathrow, airlines and the broader community around airport and terminal ramp up planning, and to facilitate fact-based, joint planning discussions and the development of an aligned recovery and ramp up plan over a one to nine month time horizon; it has no financial authority. Members of the group are expected to provide representation on behalf of their organisations and Heathrow uses the group to actively seek feedback on each other's proposals. It first met in mid-February 2021 and it succeeds the Joint Covid Planning Group (JCPG) which was formed in late Spring 2020 in response to the far-reaching impacts on demand of the Covid-19 pandemic.

Responsibilities include:

- Monitoring demand and capacity – including trigger led discussions for terminal capacity return.
- Aligning around a short-term forecast and medium-term demand scenarios.
- Sharing Early Warning Indicators from a Heathrow context to support the profile of returning passengers and their needs.
- Jointly focussing on the areas where process improvement is needed to unlock capacity efficiency.
- Building on recent successful planning activity (e.g. on days impacted by industrial action) to drive efficient use of capacity across the airport.
- Discussing any operating mode changes to reduce cost exposures across Team Heathrow during capacity return.
- Understanding the community's collective ability to ramp up capacity in response to demand returning.
- Identifying and developing demand management and operational intervention levels to provide peak surge capacity across the operation

The output from the JHPG has informed the assumptions included in this plan regarding the reopening of Terminals 3 and 4, and the costs associated with this activity.

5.5 H7 commercial revenue updates

5.5.1 Introduction

Heathrow's commercial products serve to reduce airport charges through the single till, play a key role in the overall airport experience and support the delivery of consumer, airline and cargo outcomes. Our RBP sets out the unprecedented impacts that Covid-19 has had, and continues to have, on Heathrow's commercial revenues, as well as the likely significant impact of HM Treasury's decision to withdraw both airside tax-free sales of all non-excise goods and the VAT Retail Export scheme.

We face a very challenging time with significant headwinds. In addition to Covid-19 and Government influenced issues, there are wider trends such as the demise of face to face retail and acceleration of digital we must respond to. If we fail to sufficiently respond, we face jeopardising the single till revenue in the H7 period and each subsequent period – there will likely be a significant compounding impact.

If we invest only £100m of capital in commercial activities, as outlined for the Low Adjustment case, our revenue will contract in the H7 period – this will further burden the passenger charge through the single till mechanism. If we invest the greater amount associated with the Full Adjustment case, we will help to protect our future revenue and reduce the H7 charge. We would achieve this by defending our commercial operation from emerging trends and enhancing adjacent revenue streams, particularly those less influenced by passenger volumes.

Our Update addresses the concerns raised in the CAA's *Way Forward* document and from our airline community through engagement forums. Key items to highlight which are addressed in this chapter include:

1. Our drivers-based approach to forecasting commercial revenues remains the most appropriate methodology, allowing us to transparently demonstrate the impact of different H7 scenarios on our commercial revenues using a robust external evidence base. While we anticipate that passenger mix is likely to change, particularly in the recovery period from Covid-19, the current Government "pick and mix" approach to green list countries means that we do not have clear sight of how this will affect passenger mix. We know from previous research that the presence of more UK based travellers will have a positive influence on commercial revenues through retail and surface access use. However, a reduction in business and Asian travellers combined with greater short haul and VFR travellers will have a downwards pressure on commercial revenues. On balance, therefore, given our current H7 forecast, we anticipate that there will be a negative impact on our commercial revenues from changes in passenger mix.

2. The introduction of changes to VAT/ airside shopping came into effect on 1 January 2021. This has a material impact on our retail revenue. We challenged the Government on their policy via Judicial Review, but it was decided that the new policy is legal. We have updated our estimate of the impact of this change, resulting in the following anticipated change to retail income (based on 2019 passenger numbers):

    - £**[REDACTED]** loss in income due to store reorganisation and VAT absorption by retailers
    - £**[REDACTED]** loss in income due to passenger behaviour change

- £**[REDACTED]** loss in income due to removal of VAT refunds
- £**[REDACTED]** loss in income from reduced advertising
- £**[REDACTED]** income opportunity in increased tobacco and liquor sales
- £**[REDACTED]** income opportunity in 'Rest of World' mitigations

On balance, we continue to anticipate a significant loss. Although we have updated our estimates of the majority of the impacts above, we have not updated our estimate of the impact of behavioural change. This is because non-essential retail shops have only been allowed to open since mid-April and therefore there is insufficient real-world evidence. We propose using the period between our RBP updates in 2021 to review and analyse this specific impact, providing further information in future submissions as more data becomes available.

3. In addition to the above factors, our commercial proposition faces significant headwinds as a result of the changing retail environment. Most notable is the negative impact Covid-19 has had on our retailers, many of whom have ceased trading, and the acceleration of digital channels. A significant proportion of our commercial capital investment in the Full Adjustment case is targeted at mitigating the impact of these trends. Without such investment our commercial revenue will continue to decline.

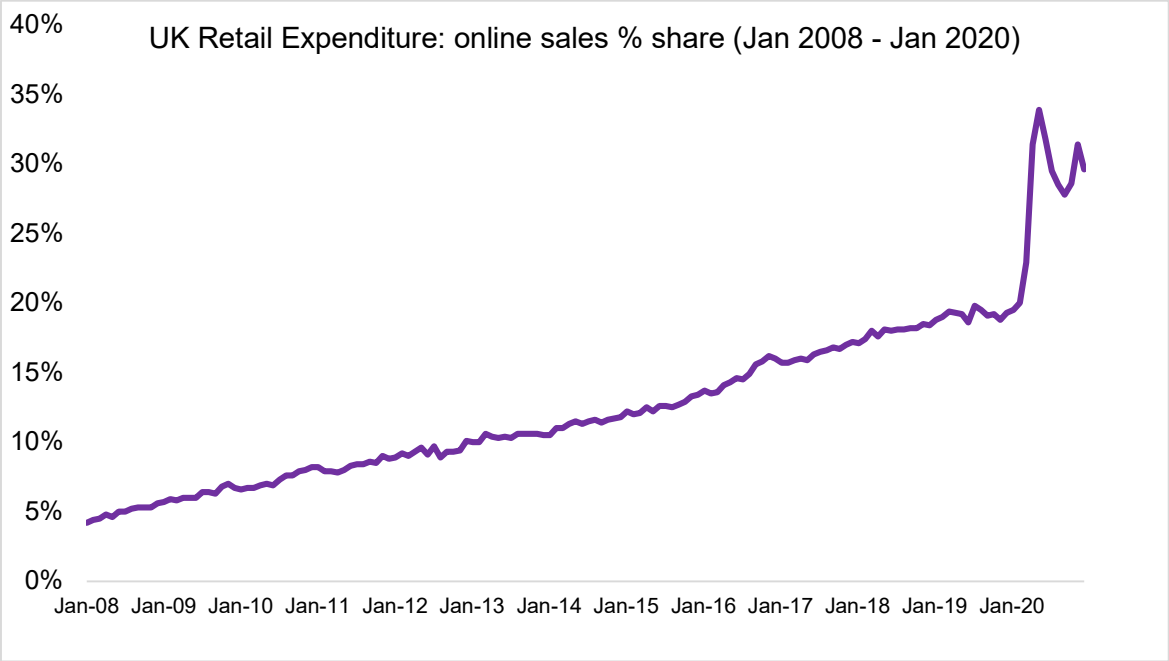
4. Furthermore, our surface access proposition will be impacted due to Covid-19. At a headline level, fewer passengers mean that there will be fewer surface access users and lower revenues. Additionally, mode share changes will also have an impact on Heathrow's revenues. In the H7 period Heathrow Express (HEx) continues to provide a strategically important role in our surface access proposition. Our consumers value the service[1] and it positively contributes to the single till[2]. In addition, any alternatives to the current HEx provision would require significant contractual payments which result in a net negative cash position.

5.5.2 Our updated H7 commercial revenue forecast

Heathrow will continue to experience uncertainty with its commercial revenues throughout H7. The pandemic has fundamentally changed the way in which consumers interact with retail and has accelerated pre-existing trends. In January 2020, the online share of retail expenditure in the UK stood at 20%. As of December 2020, this figure had risen to 30%.[3]

[1] In the 2020 National Rail Passenger HEx achieved a score of 94%, topping satisfaction ratings
[2] In 2019 HEx delivered a contribution of £62.4 million to the single till
[3] Office for National Statistics, *Impact of the coronavirus (COVID-19) pandemic on retail sales in 2020*

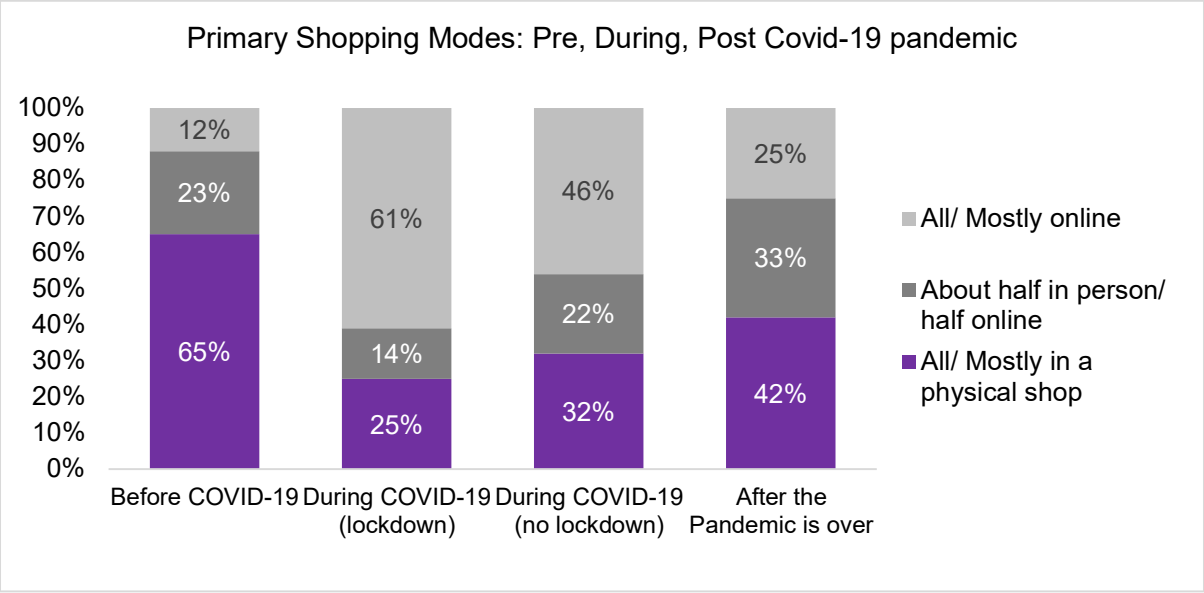
Figure 1: Share of online sales, UK



Source: Office for National Statistics – Monthly Business Survey

Consumer research suggests that changes to online shopping habits are here to stay with 25% of consumers suggesting they will mostly shop online post-pandemic compared to 12% pre-pandemic.[4]

Figure 2: Primary Shopping Mode - Pre, During and Post the Covid-19 Pandemic

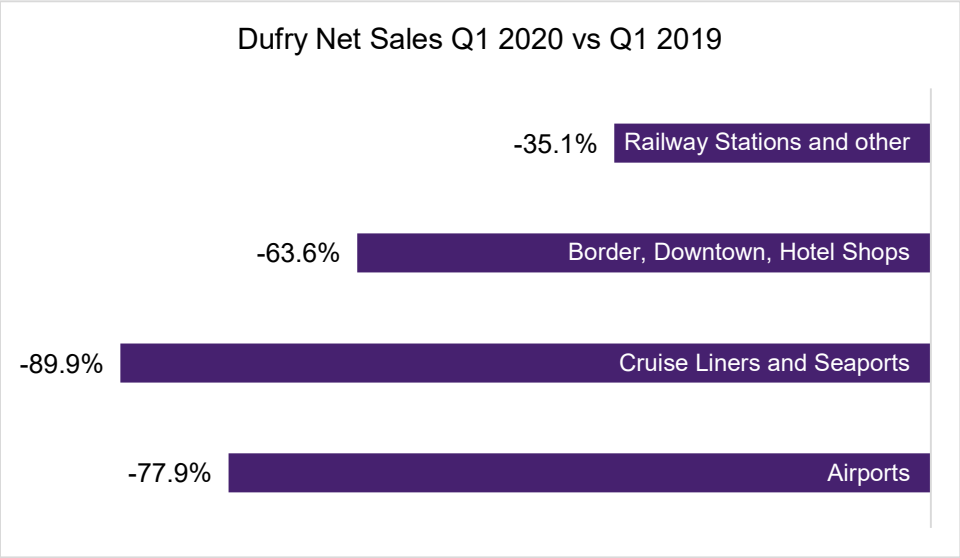


Source: Shopify (1,003 Respondents)

[4] Shopify, *New Shopping Behaviours in Post-Pandemic UK (1,003 Respondents),* April 2021

The travel retail segment continues to struggle due to travel restrictions and changing passenger behaviours. Dufry, the largest global travel retailer, has reported overall Q1 turnover -73.9% down compared to Q1 2019[5], with airports performing even worse.

Figure 3: Dufry Net sales Q1 2021 vs Q1 2019



Source: Dufry

Despite the pandemic and its impacts, our forecast shows Heathrow will to continue to lead in its ability to generate retail revenues among comparable airports.

Table 1: Retail Income per Passenger

Airport	2019	H7 Average
Amsterdam	£4.26	-
Frankfurt	£4.21	-
London Gatwick	£6.16	-
London Heathrow	£8.92	**[REDACTED]**
London Luton	£5.93	-
London Stansted	£6.50	-
Madrid (AENAS Group)	£3.63	-

Source: Airport Annual Reports / Heathrow

The tables below set out our updated commercial revenue forecast, using the same drivers model approach as in the RBP with a flow through of the updated H7 passenger forecast. We have updated the relevant drivers to our commercial revenue model, and concluded the following change in our forecast commercial revenues in our two cases:

[5] The Moodie Davitt Report, *Dufry turnover remains depressed in Q1; duty paid sales resilient in challenging market; retailer aims to reopen two-thirds of stores by this month,* May 2021

Table 2: Commercial revenue forecast - Full Adjustment

Commercial revenue forecast [£m, 2018p]	Q6	iH7		H7				
	2019	2020	2021	2022	2023	2024	2025	2026
Retail Revenue	[REDACTED]							
Bureaux Revenue								
Car Parking / Car Rental Revenue								
Service Revenue								
Property Revenue								
Rail Revenue								
Other Revenue								
Intercompany								
Total Core Revenues								
Forecourt Access Charge								
Total excl. ORCs								

Source: Heathrow

Table 3: Commercial revenue forecast- Low Adjustment

Commercial revenue forecast [£m, 2018p]	Q6	iH7		H7				
	2019	2020	2021	2022	2023	2024	2025	2026
Retail Revenue	[REDACTED]							
Bureaux Revenue								
Car Parking / Car Rental Revenue								
Service Revenue								
Property Revenue								
Rail Revenue								
Other Revenue								
Intercompany								
Total Core Revenues								
Forecourt Access Charge								
Total								

Source: Heathrow

Due to higher levels of capital investment in commercial revenue generating schemes, we forecast the Full Adjustment case would lead to £94m in additional revenue above the Low Adjustment case.

The section below provides an overview of the key assumptions and whether they have changed since RBP.

5.5.3 Cost of Covid-19 and Government Policy

5.5.3.1 Passenger forecast

Since the publication of our RBP, there has been a further UK national lockdown and since then only a gradual reopening of the UK economy. Many of Heathrow's more popular destinations are currently on the Government's amber or red list, with no clear pathway to reopening despite the promise that vaccination would support this. As discussed in Section 5.2, this results in a downgrade of the passenger forecast for this update, with implications for our commercial revenues:

- The reopening of non-essential shops led to a boost in high street demand, due to pent up demand. However, this was still significantly below demand seen pre-Covid on the high street. Demand remains fragile, and footfall is still down on the pre-pandemic period[6]. We have observed similar trends to the high street in our terminal shops, demonstrating some intention to spend, however if consumers are unable to travel there will be limited spending at the airport. In addition, the short haul led restart and absence of the majority of higher spending Asian passengers means that retail revenues are likely to remain suppressed.

- Several retail business partners have entered administration or terminated contracts early, most notably Dixons Travel[7] who are withdrawing from Travel retail altogether, and most other concessionaires have requested a material renegotiation of their commercial terms. Not only does this impact our income for the single till, but there is also a capital expenditure implication where additional shell and core works may be required.

- The supressed passenger demand has impacted parking revenues which are still trending far below pre-Covid revenue (**[REDACTED]**). This is compounded by the predominantly short haul led restart, meaning that there are generally shorter stays in the car parks, in addition to the absence of business passengers who tended to use car parking for convenience. Demand on Heathrow Express and coaching services is also significantly lower, resulting in lower revenues.

- Our rental income from property facilities, largely occupied by airlines, has been negatively impacted – applying pressure to our occupancy rate and increasing our business rates liability. This is worsened by the Government's lack of credible

[6] British Retail Consortium, 2021

[7] "We do not expect passenger numbers to recover sufficiently to compensate for the removal of airside tax-free shopping by the UK Government from 1 January. This has led to the difficult decision to close this business, which historically made an annual profit contribution of over £20m" Source: https://www.dixonscarphone.com/news-and-media/press-releases/year/2021/pre-close-trading-update

intervention with regard to business rates. In addition to helping our retailers, Heathrow has had to carry the burden of supporting property tenants with consolidating operations and rent alleviation packages. There is also a heightened risk of bad debt – this is reflected in our bad debt provision for property, which increased from £**[REDACTED]** at the end of 2019 to £**[REDACTED]** at the end of 2020.

5.5.3.2 VAT Export Scheme

On 21st May 2021, the judgement was handed down on of the Judicial Review hearing of HM Treasury's decision to withdraw the VAT Retail Export Scheme and enforce changes to airside tax-free sales. While the Court accepted a number of the arguments made in the challenge, it was decided that the new policy is legal and HM Treasury's decision has been upheld.

The impact of lockdown and the delayed recovery means there is no real-world data available for us to meaningfully update our view on the impact of VAT on passenger behaviour. A large proportion of Heathrow's retail stores were classified in the Government's 'non-essential' category and were unable to re-open until April 12th of this year, and with passenger volumes extremely low there is little data available to evidence the effect that the changes have made to passenger spending habits. The difficulty in estimating the VAT impact has been further hindered by the atypical passenger mix we have seen in early 2021, with many passengers flying due to repatriation or short haul leisure and fewer passengers from higher spend long haul markets.

Concessionaires are seeking and expecting substantial downward changes in contractual terms as a result of the removal of 'VAT free', or indeed are contemplating whether there is value to them of having a presence at the airport at all. Some retailers have already exited Heathrow because of the VAT legislative changes, and we anticipate that many others will make their decision once the Government's Coronavirus Job Retention Scheme has come to an end. While this will continue to be an area of uncertainty, there will be more data available to understand the full extent of the impact ahead of our second update of the RBP later in the year.

In absolute terms, the impact of the VAT changes will depend on passenger volumes in any given year. Based on 2019 passenger volumes, we estimate that removing tax-free shopping will lead to a significant reduction in retail income, forecast to be in the region of £**[REDACTED]** per annum (2019 prices) based on 80.9m annual passengers.

VAT changes are anticipated to have the following impacts over H7 assuming 2019 passenger volumes (80.9m):

Figure 4: **[REDACTED]**

- **£[REDACTED] loss** from retail store reorganisation and changes to contractual terms with concessionaires. Of this, **£[REDACTED]** is attributable to store reorganisation. In the RBP submission we had anticipated retail closures by luxury and fashion, technology, and duty-free categories. Some of these predictions have materialised with Dixons Carphone announcing the closure of its travel outlets in response to the legislative changes. Through ongoing conversations with retail brands many are continuing to assess the viability of their business model, with decisions likely to be delayed until the closure of the Government Coronavirus Job Retention Scheme. Given the time taken to re-let and refurbish units, it is forecasted that there will be a significant number of empty units in the portfolio in the early years of H7. These will then be re-let over the remainder of the period, albeit at lower incomes due to replacement of higher margin retailers with lower margin ones. A **£[REDACTED] loss** is attributable to the VAT absorption impact. We understand some categories of retailers (Affordable Luxury and WDF) currently plan to absorb the VAT change provided there are reductions to the concession fee. We estimate that these updated agreements would lead to an approximate 15% reduction in income for these categories.

Table 4: Retail Units Forecast

			Number of Retail Units					
Category		**Income Per Unit (£k)**	**2019 Base**	**2022**	**2023**	**2024**	**2025**	**2026**
High Street								
Affordable Luxury								
Luxury								
Gift								
WDF (non-excise)								
Essentials			**[REDACTED]**					
Technology								
Food and Beverage								
Experiences								
WDF (excise)								
Empty Units								
Total								

Source: Heathrow

Table 5: Store Reorganisation/ VAT Absorption Impacts

		2022	2023	2024	2025	2026	H7
RBP	Store Reorganisation	**[REDACTED]**					
RBP Update 1	Store Reorganisation						
RBP Update 1	VAT Absorption						

Source: Heathrow

- **£[REDACTED] impact** from lost sales due to passenger behaviour. This is calculated based on purchase motivation studies[8] [9] and specifically the proportion of passengers who list price as the number one factor in their purchasing decision. It assumes that when retailers put up their prices, they would lose this proportion of sales. All retailers operate a single pricing strategy, apart from a small number of luxury players (e.g., Chanel, Louis Vuitton), which means that the price will change for everyone, not just

[8] aba research, *Heathrow Purchase Motivators,* April 2019
[9] tns research international, *Project Terminal – Understanding the role of Price in LHR Shopping,* April 2011

non-EU passengers. Given non-essential retail has only been allowed to open since mid-April, we will continue to review the impact on passenger behaviour.

Table 6: Passenger Behaviour Impact

	2022	2023	2024	2025	2026	H7
RBP	**[REDACTED]**					
RBP Update 1						

Source: Heathrow

- **£[REDACTED] impact** from VAT Retail Export Scheme includes **£21m** directly lost from income Heathrow received from Travelex on VAT Refunds, this loss will remain throughout H7. This also includes **£[REDACTED]** lost indirectly from retail sales made in the International Departure Lounge (IDL) using cash received from VAT refunds in pounds sterling by non-EU passengers. Those passengers that receive their refunds in sterling are not UK residents, and are departing the UK. Evidence shows that the majority of these refunds are subsequently spent in the Departure Lounge. An analysis conducted in 2016 from Heathrow's profiler data showed 75% of people who obtained a VAT refund at Heathrow subsequently purchased in the IDL. We have applied this percentage to the amount of sterling cash refunds processed by Travelex in 2019 to determine the spending that will be lost. This is a conservative estimate of the impact as the spending of passengers who received a VAT refund in non-sterling currency has not been included.

Table 7: VAT Refund Impact

		2022	2023	2024	2025	2026	H7
RBP	VAT Refund Direct	**[REDACTED]**					
RBP	VAT Refund Indirect						
RBP Update 1	VAT Refund Direct						
RBP Update 1	VAT Refund Indirect						

Source: Heathrow

- **£[REDACTED] impact** from advertising is based on 25% of media advertising being bought by luxury and beauty brands through our advertising partner. Luxury and beauty stores are forecasted to be most heavily hit by store closures as a result of changes to VAT, we therefore anticipate a reduced demand for on airport advertising by these brands and retailers. Over H7 we forecast this reduction to recover straight line through other companies purchasing advertising space.

Table 8: Advertising Impact

	2022	2023	2024	2025	2026	H7
RBP	**[REDACTED]**					
RBP Update 1						

Source: Heathrow

- **£[REDACTED] opportunity** gain in tobacco and liquor sales to passengers travelling to EU destinations as a result of the extension to duty free. In the first three months of 2021 World Duty Free has seen higher alcohol and tobacco sales than those forecasted in the RBP submission (£6m).

Table 9: Duty Free Opportunity

	2022	2023	2024	2025	2026	H7
RBP	**[REDACTED]**					
RBP Update 1						

Source: Heathrow

- **£[REDACTED] opportunity** gain through 'Rest of World'. In the RBP submission Heathrow identified a £**[REDACTED]** 'Rest of World' opportunity (£**[REDACTED]** at 2019 passenger levels) to capture actions by Heathrow and retailers to mitigate through concessionaire negotiation and pricing changes. For the RBP update this estimate has been revised downwards as concessionaire negotiation and pricing changes have now been captured as part of the VAT absorption impact.

Table 10: Rest of World Opportunity

	2022	2023	2024	2025	2026	H7
RBP	**[REDACTED]**					
RBP Update 1						

Source: Heathrow

5.5.4 Other modelling updates

We have updated our drivers-based model to take into account the below changes.

Covid-19 Impact Overlay

In our RBP base case we assumed that changes to passenger mix and spending habits would impact revenue per passenger by **[REDACTED]**, falling to **[REDACTED]** by the end of the period. This was based on the observed impact in 2020 and assuming that it unwound during the recovery. We have updated this approach by using the O&D demand forecast for different markets. In the earlier years of H7 we forecast proportionally higher amounts of lower spending domestic and European passengers and reduced amounts of higher spending Asia/Pacific passengers. This has slightly lowered the passenger mix impact from

[REDACTED] to **[REDACTED]**, falling to **[REDACTED]** by 2024. Profiler passenger survey data has been provided as a sense check to retail transaction data by market. The resulting market based forecast is consistent with the simple market average approach from 2024, however the higher preponderance of European travel in 2022 means that revenue will be slightly lower and we have included this as an overlay to the driver model.

Table 11: Income per Passenger

	Profiler Survey Data				Retail Transactions
Market	**2017**	**2018**	**2019**	**Avg.**	**2019**
01-UK & CI	**[REDACTED]**				
02-EEA					
03- Other Europe & CIS					
04-Middle East					
05-Africa					
06-North America					
07-Latin America					
08-Asia/Pacific					
Average					

Source: Heathrow

Table 12: Passenger O&D Mix Forecast

Market	2022	2023	2024	2025	2026
01-UK & CI	**[REDACTED]**				
02-EEA					
03- Other Europe & CIS					
04-Middle East					
05-Africa					
06-North America					
07-Latin America					
08-Asia/Pacific					

Source: Heathrow

Table 13: H7 Covid-19 Impact Overlay – RBP vs Update 1

	Covid-19 Impact Overlay				
	2022	**2023**	**2024**	**2025**	**2026**
RBP	-11.5%	-6.6%	-3.1%	0.0%	0.0%
RBP Update 1	-6.8%	-1.8%	0.0%	0.0%	0.0%

Source: Heathrow

VAT Changes Impact Overlay

The updated VAT impact assumptions set out in section 5.5.3.2 lead to the following impact overlays across H7.

Table 14: H7 VAT Changes Impact

	2019		2022	2023	2024	2025	2026
Retail Income	[REDACTED]						
VAT Impact							
Overlay							

Source: Heathrow

Table 15: H7 VAT Impact Overlay - RBP vs Update 1

	VAT Impact Overlay				
	2022	2023	2024	2025	2026
RBP	[REDACTED]				
RBP Update 1					

Source: Heathrow

The impact of a further lockdown on non-essential retail and the delayed recovery means there is no real-world data available to robustly review the behavioural impact of the VAT changes. We have updated some of the assumptions where new data and information exists, but we have not updated the customer behaviour change. The degree of impact from this change should not be underestimated. We will review the impacts for RBP Update 2 when there will hopefully be more actual data on which to base the estimated impact.

Covid-19 Impact on Property Overlay

In the RBP base case we assumed the impact of Covid-19 would reduce commercial property revenues by **[REDACTED]** across the period. This was based on a combination of guide price reductions, rent protection plans and forecast vacation of space. The anticipated impact in 2021 is a c.20% reduction in revenue, which is driven by a combination of short-term rent protection plans and vacations of lounges and office space. We anticipate vacated space to recover over time but to be offset with reducing rental yield as the property market continues to deteriorate. Over the coming years we anticipate that office space will be in lower demand across the estate because of new post-Covid-19 working practices and do not foresee this improving over H7. We also anticipate further consolidation of airline lounges. We will review and update this forecast for Update 2 as more trend data becomes available.

Table 16: H7 Covid-19 Property Impact Overlay – RBP vs Update 1

	Property Impact Overlay				
	2022	2023	2024	2025	2026
RBP	**[REDACTED]**				
RBP Update 1					

Source: Heathrow

Terminal Drop Off Charging Revenue

In our RBP base case we assumed that from 2021 there would be a terminal drop off charge (previously known as Forecourt Access Charge) where all private car users dropping off in terminal forecourts would incur a charge to do so. This is in alignment with similar schemes implemented at all other larger UK airports. We forecast this would generate £**[REDACTED]** of revenue over the H7 period.

Following further work on the business case for this investment, we have updated this overlay in our base case to reflect changes to the passenger forecast, retaining the proposed £5 charge level for the first three years of H7. Current modelling assumes an increase to £6 from 2025 to account for an inflationary increase, to be reviewed and further refined later in the year. Based on the revised passenger forecast, our Update now assumes that £**[REDACTED]** of revenues from terminal drop off charging will be generated across the H7 period.

This forecast has factored in the following assumptions:

- Vehicle volume extrapolated from mode share assumptions derived from LASAM and the number of passengers per vehicle
- **[REDACTED]** infrastructure detection failure rate
- **[REDACTED]** for exemptions and overseas licence plates
- A gradual improvement in payment compliance rates as the scheme becomes established
- Parking Charge Notices of **[REDACTED]**

5.5.5 Mode share assumptions

Heathrow's surface access mode share forecast was updated as part of the RBP submission, to reflect the significant changes to transport usage behaviour caused by Covid-19.

Mode share data from 2019, the last full year pre-pandemic, was used and overlaid with the following assumptions to forecast mode shares through to 2026.

1. Using Heathrow's Profiler survey data, mode shares were rebased to August 2020 levels to take account of Covid-19 impacts. August 2020 data was used as this was the latest data available allowing time for analysis and forecasting before submission in December 2020. It has been assumed that surface access mode shares would then return to pre-pandemic levels (2019) by January 2024, which has been informed by forecasts from Network Rail[10] and TfL.[11] The intervening recovery period has been forecasted through interpolation. The Covid-19 impact and recovery period has been adjusted as part of the RBP update based on the latest available data and recovery forecasts.

[10] Network Rail presentation to the Western Route Supervisory Board, 29 January 2021
[11] https://content.tfl.gov.uk/financial-sustainability-plan-11-january-2021.pdf

2. Additional impacts to mode share due to the implementation of a £5 terminal drop off charge in January 2022 have been modelled using the London Airports Surface Access Model (LASAM). In the Initial Business Plan the access charge was assumed to be £15 applying from 2026. This assumption has been amended as part of the update to the RBP to take account of the planned earlier introduction of the £5 terminal drop off charge.
3. Likewise, LASAM modelling has been used to estimate the impacts of the full opening of the Elizabeth Line. In the IBP this had been assumed to be fully operational from the start of 2021, whereas for the RBP this was updated to be the beginning of 2024. For the RBP update this has been amended again to match the current programme of full opening in mid-2023.
4. Finally, we have reviewed assumptions on the continued trend of increased taxi/ PHV mode share and the impacts of other Surface Access proposals.

We believe the LASAM modelling carried out as part of the Expansion project remains an effective tool in assessing the impacts of the Elizabeth Line and Access Charging to mode share. Baseline runs for a two runway Heathrow have been used for these purposes providing robust assumptions for H7.

Table 17: Mode share assumptions

Mode	Mode Share- 2019 (%)	Mode Share- Jul 2020 (%)	Mode Share- Jan 2026 (%)	Mode Share Change (%)	
				Terminal Drop Off Charge (£5)	Elizabeth Line
Private Car	24.9%	38.2%	**[REDACTED]**	**[REDACTED]**	
Taxi	30.6%	26.6%			
Bus/Coach	9.0%	8.6%			
Tube	19.8%	20.6%			
Car Rental	2.0%	2.4%			
Heathrow Express	8.5%	1.3%			
Heathrow Connect	0.9%	0.2%			
Elizabeth Line	0.0%	0.0%			
Other	1.1%	0.9%			
Rail-air	0.3%	0.0%			
Charter Coach	2.9%	1.2%			
Public Transport Mode Share	42.6%	32.8%			

Source: Heathrow

5.5.6 The role of capital investment in generating commercial revenues

Capital Investment Overlay

For our RBP base case we used historic data for capital substitution and concluded that the £700m element dedicated to commercial was necessary to maintain and unlock commercial revenue performance. Absent of those investments, which include the digitisation of commercial services, there would be a reduction in commercial revenues of £**[REDACTED]**.

While our capital plan has updated, we have not assumed any further investment be made for commercial revenues.

In the *Way Forward* document, the CAA determined that there was no clear "line of sight" between the £600m capex programme supporting commercial revenue generation. We provide a breakdown of certain potential programmes that will be integral to establishing commercial revenues through the H7 period. We are continuing to develop the portfolio, plans and phasing with the airlines. So far, it is estimated that small change of phasing would have an adverse impact of c.£0.1 (2018p) on the charge. We haven't amended the revenue forecasts to reflect these changes as they are yet to be confirmed, but plan to do so as part of RBP Update 2 once the plan is more settled. We intend to keep some of the programme funding unallocated at the start of H7 to allow us to respond opportunistically to the market.

As highlighted in Chapter 5.3 – H7 Capital Plan Updates, we have ringfenced an amount of £100m in our minimum 'Safety Only' capital plan to conduct critical maintenance and replacement of commercial assets. The following programmes are being considered:

- CRM and loyalty systems
- Advertising screens and other media assets
- Car park payment machines
- HEx train replacements
- VIP suite assets
- Surface access assets, including car parks

Below, we provide examples of business-critical investments that are key to Heathrow sustaining a viable commercial business that reduces the charge. The specifics of these projects need further development, and we will provide a more detailed overview in RBP Update 2.

Retail

As outlined in the RBP, Heathrow uses Space, Experience, Digital and Offer as a four pillar framework for retail proposals. The initiatives we are pursuing are designed to help provide a productive source of income, to mitigate some of the income lost from the removal of airside tax-free pricing and declining revenues in traditional shops. In order to ensure our offer stays as relevant as possible, we will need to understand the timeline and degree to which passenger groups recover and how we can adapt to accommodate those needs. If we do not have a sufficient capital envelope, our ability to respond will be limited.

In this RBP Update 1, we have allocated the following investment for retail initiatives (in the Optimal Plan only):

Table 18: Retail initiatives H7 capital allowance (high scenario)

	Capex						
	2022	2023	2024	2025	2026	H7	Estimated payback
RBP Update 1	**[REDACTED]**						

Source: Heathrow

Within the Optimal Plan assumptions for the H7 period, some of the key retail initiatives we plan for include:

- **Back of house optimisation** – This is a key enabler to the growth of our digital agenda. We understand from consumers that having a touchless and contact free experience is preferred, as is a personalised shopping experience. If we optimise back of house areas to develop appropriate space for storage and dwell, while ensuring the areas remain compliant, safe and efficient, we anticipate that more retail products could be purchased and delivered through buy and collect. We would seek to start the work in 2022, but would benefit from a payback throughout the H7 period from higher retail revenues.

- **Space strategy** – We know that the amount of space in terminals impacts the provision of shops, services and facilities that can be provided. In addition, the space available needs to be optimised to drive commercial revenues and meet consumer needs. The design of our terminals has been planned to be reflective of the passenger mix and we have been creative to optimise our space mix as far as possible. To ensure we provide our consumers with an appropriate offering we will undertake space optimisation projects. This includes repurposing Bureau/VAT Refund units due to the decline in physical transactions and rolling out the 'Blended Essentials' concept after a successful trial in T2. Depending on Covid-19 restrictions, we will also seek to add in new concept formats such as "market halls" for Food and Beverage.

- **Other initiatives** – In addition, we are considering reinvigorating our 'end of life' VIP and premium service facilities, through refurbishing the Windsor Suite. If these initiatives commence when anticipated, they will all payback and provide commercial revenue in H7.

Digital

While there are heightened core needs for our consumers, which our passenger proposition aims to address, we also know that consumers' expectations for digital experiences have increased. This is particularly true if digital helps aid a touchless experience. Online sales, which were seeing exponential growth even prior to the Covid-19 pandemic, have accelerated further. Digital service is important for consumers; the ability to compare prices, security and predictable delivery are paramount. Digital is now a business critical requirement. We have seen many businesses that did not adapt to digital trends fail – for example, Debenhams and Toys R Us.

It would be timely for Heathrow to invest in digital in the H7 period – many of our competitors already have and consumers expect more digital interactions at the airport as they do in the rest of their lives. If we do not invest, including the replacement of systems beyond end of life, we risk falling further behind the market. This translates to lower revenues for the single till, making us less competitive and leading to an increase in airport charges. We have allocated the investment below to support digital initiatives in our higher 'Optimal' capital plan only:

Table 19: H7 Digital Capital Investment

	Capex						
	2022	2023	2024	2025	2026	H7	Estimated payback
RBP Update 1	**[REDACTED]**						

Source: Heathrow

Some of the initiatives we would choose to invest in include:

- **Digital transformation** – Pre-covid we were in the process of completing our 'Digital Foundations' transformation programme, which we had to pause. In the H7 period, we want to finish this by replacing our legacy systems in order to provide the security and seamless experience passengers expect post-Covid. In the early H7 period we want to launch a new Heathrow App, with a 'One Heathrow' service, supported by an enhanced digital payment capability.

  Once we have established these foundations, we will work on the continuous improvement of the Heathrow.com, eCommerce and retail product lines, improving our offer based on passenger feedback and ensuring we keep pace with trends and technologies within the budgets available. An example of this improvement is personalisation, including multilingual support. The payback we expect through this investment will be recognised in increased retail and surface access revenues rather than attributed solely to digital.

- **CRM & loyalty** – We are also planning to refresh our Heathrow loyalty programme, based on passenger visits. Having the data and insight from these apps will help us to provide a more relevant experience for our passengers, and will increase income per passenger.

Cargo

Cargo generates direct and indirect revenues for Heathrow, supporting the single till. It has proven to be a resilient revenue stream through the pandemic and is therefore a critical investment for us to make. Heathrow's role as the highest value cargo facility in the UK was reaffirmed through the Covid-19 pandemic, with large volumes of essential PPE and medical equipment travelling through the airport. We've listened to the requests from our cargo community that our cargo offer needs to be improved. We will seek to make these improvements in the H7 period; investing in cargo provides us with long term strategic benefits and could help make revenues more resilient from future passenger fluctuations.

Table 20: H7 cargo capital investment

	Capex						
	2022	2023	2024	2025	2026	H7	Estimated payback
RBP Update 1	**[REDACTED]**						

Source: Heathrow

Our cargo initiatives focus on getting a faster flow of cargo through Heathrow with improved safety and security. The initiatives include:

- **Truck call-forward facility and traffic management system –** this facility would reduce congestion on landside roads, improve safety of the on-airport cargo estate and bring sustainability benefits for our local community.

- **Airside transshipment facility** – we are working with Government to seek modification to historical operating procedures that currently do not permit cargo to be connected airside. The infrastructure solution would bring significant operational advantage, enabling airside connections of c.90 minutes versus today's four hours.

- We are also reviewing potential options to redevelop the 'southside' cargo estate and associated airfield frontage in conjunction with SEGRO, which would see the annual cargo handling capacity increase, become more efficient and would introduce greater flexibility in the operation to cater for specialist customer requirements. At present we do not know how much investment would be required from Heathrow so have not included any allowances within the cargo investment listed above.

Property

Our commercial property portfolio has been severely impacted by the Covid-19 pandemic. Rental income from property facilities, largely supported by airline use, has been negatively impacted due to reduced passenger volumes with retail units being vacated and consolidation of airline lounges. Therefore, much of H7 will focus on managing our vacancy rate and maximising opportunities as space becomes available.

Like cargo, investment in the right property portfolio is also important to help diversify a proportion of our revenue and make it more resilient to any future traffic fluctuations. Property development has to be considered over a longer term horizon – it can take a significant amount of time to go from "spades in the ground" to a fully functioning hotel or office. For that reason, we anticipate a payback period beyond the H7 period for any investment we make. We also plan to engage further on the most effective regulatory model to facilitate this investment.

We have established a number of sites for commercial property development. We have not accounted for all of this development in the H7 period, but continue to refine plans to be able to progress them if the opportunity arises. While a number of the sites we have identified provide good opportunities for development, they will also require significant groundwork development initially, for example those in the Central Terminal Area.

Table 21: H7 property capital investment

	Capex						
	2022	2023	2024	2025	2026	H7	Estimated payback
RBP Update 1	**[REDACTED]**						

Source: Heathrow

Our commercial development in H7 will be a very specific subset of investment.

- **Property development –** We are reviewing a range of opportunities including; redeveloping one of our business parks to potentially double the lettable floor space, changing the use of farmland subject to planning consent, relocating one of our control facilities for redevelopment for operational and / or commercial use and opportunities to redevelop sites in the Central Terminal Area.

Surface Access

In surface access our commercial revenues are driven by our car parking and car rental products and the operation of HEx. The revenues are heavily dependent on the total volume of passengers, passenger mix and mode share. We detail our mode share assumptions further in the document. While we do not anticipate adding significant volumes of car park spaces, or setting aside provision for Western Rail, we will seek to make improvements to our surface access infrastructure. This will help to provide consumers with a smoother journey to and from the airport.

Table 22: H7 surface access capital investment

	Capex						
	2022	2023	2024	2025	2026	H7	Estimated payback
RBP Update 1 – Asset Replacement	**[REDACTED]**						
RBP Update 1 – Electrification							

Source: Heathrow

- **MSCP4 –** One of our key car parks will come to the end of life in the H7 period. It has c.800 spaces and is a considerable contributor to total surface access revenues. We have developed a spectrum of solutions from either doing the minimum remediation works to extend life to 2035 through structural repairs, to a more robust option which would be to replace and rebuild the carpark. The proposed investment in Asset Replacement represents the most complete option, which will futureproof the carpark for 50 years, but would come at a greater cost and longer-term payback. We will continue to refine these options.

- **Car park optimisation –** should passenger demand not return until later in the H7 period we will need to consider opportunities that find alternative uses for car park

space. These alternative uses will be implemented on the basis they are able to secure fixed revenue streams without restricting the car parking for our passengers and will potentially require significant investment to enable their repurposing.

5.5.7 Heathrow Express

Heathrow Express (HEx) has operated since 1998 and provides a premium passenger service between Heathrow and Paddington station. In 2019 HEx carried 6.1 million passengers and delivered a contribution of £62.4 million to the single till whilst regularly topping the National Rail Passenger survey for passenger satisfaction, with a score of 96% achieved in 2019. From 2023, HEx will be facing new competition from Crossrail. This will significantly grow public transport mode share. However, it will also result in lower HEx revenues, as some HEx passengers will move to Crossrail.

Covid-19 has had a significant impact on HEx, driven primarily by the drop in airport passengers but magnified by the Government advice not to use public transport unless unavoidable. To reduce costs, HEx reduced operations to two trains per hour through 2020, furloughed colleagues and carried out a restructuring leading to a 35% reduction in HEx headcount. Despite these measures, it is expected to report a full year loss in 2020 and 2021.

Despite this loss, HEx remains of strategic importance for Heathrow and this will continue through the H7 period. It will provide a positive impact to the single till through the H7 period, reducing pressure on the charge, and offers our consumers the fastest route to central London with a predictable and reliable journey. Furthermore, the ease, convenience and cleanliness that HEx offers also provides our consumers with the reassurance desired when travelling during and after the Covid-19 pandemic in order to build back confidence in public transport as we work towards our carbon reduction goals.

Transport modelling suggests that HEx will continue to be used by passengers outside of the South East, despite the introduction of Elizabeth Line services. In the absence of HEx, these passengers may choose to travel through an alternative airport, thereby harming Heathrow's potential catchment and ability to provide a diverse route network. We have reviewed other potential options for HEx, but unless significant external and contractual factors changed it remains best for HEx to continue operating as a part of Heathrow.

Table 23: Heathrow Express Regional Mode Shares

	Heathrow Express Mode Share		
Region	**2017**	**2026**	**Change**
Central London	**[REDACTED]**		
London North East			
London South East			
London South West			
London North West			
SE England - SE			
SE England - SW			
SE England - NW			
SE England - NE			
South West England and Wales			
East Midlands			
West Midlands			
East Anglia			
Rest of UK			

Source: Heathrow

We have considered further change to how the HEx service is delivered, but given its positive contribution to the single till and the strategic importance to Heathrow it is not a viable option. In addition, and in extremis, there are considerable financial exit costs and legal considerations of discontinuing HEx before 2028. For further context:

- **[REDACTED]**

Additionally, HEx is the only dedicated airport service catering specifically for airport passengers. All other rail services to the airport are specified by the DfT and TfL and cater for both local commuter and airport which requires compromises to be made in either passenger journey time or customer service levels.

HEx is anticipated to make a positive contribution to the till over the total H7, as the below demonstrates:

Table 24 – HEx assumption (note – nominal)

	2022	2023	2024	2025	2026
Passengers	**[REDACTED]**				
Mode share					
HEx Pax					
Revenue					

EBITDA	

Source: Heathrow

Our HEx business case assumes a maximum mode share of **[REDACTED]** for the period 2022-28 (**[REDACTED]** 2019) and the average yield per passenger is assumed to be below the 2019 figure. This reduction reflects a shift away from the business segment toward leisure and also the introduction of the Elizabeth line.

Heathrow continues to explore options to reduce costs through contract negotiation and management actions, alongside using forecasting and planning to provide the optimum scheduling of the service to support recovery. However, DfT and GWR, together with track access costs, now represent the vast majority of the cost base, and these counterparties have been unwilling to contribute to further cost reduction efforts.

5.6 H7 WACC updates

5.6.1 Introduction

To deliver our H7 Plan Heathrow must privately finance itself with debt and equity from the international capital markets. Investors in these markets can only finance Heathrow if the price they receive (i.e. their return) adequately compensates them for the risks that they perceive in their investment. Investors will not provide finance for a return below the market rate available to them for an equivalent level of perceived risk. This means that the price Heathrow will have to pay for its finance is set by global capital markets, just like the price it must pay for other inputs e.g. power costs that are set by energy markets.

Heathrow's potential investors have choices in capital markets about where to invest their money. Given this, it is critical that the cost of finance assumed in the plan, the weighted average cost of capital (WACC), is set at a level aligned to actual capital markets. If it is not, Heathrow will not be able to access the finance it requires to efficiently deliver investments for consumers. This would contravene the CAA's statutory duty to have regard to the need to secure that Heathrow is able to finance its provision of airport operation services, under s1(3)(a) of the Civil Aviation Act 2012, and it would lead to adverse consumer outcomes due to less investment and ambition.

This reinforces the importance for the CAA basing its decisions firmly on evidenced market data and clear regulatory precedent. Heathrow has provided detailed evidence and transparent calculations of estimates based on this evidence. In a number of areas, the CAA has so far not responded with market-based evidence or transparent reasoning.

The impact of the Covid-19 pandemic has increased investors' perception of the risk of investing in airports. Market evidence shows that this has led to a significant increase in both the cost of debt and cost of equity for Heathrow in the last 15 months. This was reflected in the RBP and we have updated our estimate of WACC to reflect the latest market views, the relevant conclusions of the CMA in the water appeals, and the latest view of the impact of Covid on passenger numbers for 2021.

It is also important that the CAA consider properly the contribution of both equity and debt to private financing. One cannot be provided in a stable, long-term way without the other. Equity finance, while having a different risk profile, cannot be regarded as somehow optional or expected to bear only losses yet continue to attract rational private investors.

This section should be read in conjunction with Chapter 8.2 of the December 2020 RBP that set out a more detailed assessment of Heathrow's WACC. It also needs to be read in conjunction with Chapter 5.1 - RAB Adjustment and Chapter 5.7 – H7 Financial Modelling and Financeability of this update. There are important interactions between the RAB Adjustment, WACC, Depreciation adjustment, and charges. In particular, for the full RAB adjustment case, the charge is independent of WACC due to the link with financeability and depreciation deferral. A minimum charge to address cashflow issues means that artificially low headline cost of capital can have no impact on the revenue requirement or H7 charge.

5.6.2 Cost of Equity

5.6.2.1 Gearing

We have retained an assumption of 60% for the notionally geared company for a case with an appropriate RAB adjustment. We note this is consistent with the assumption of the CMA for Water Companies, which enables a wider range of read across from the CMA decision[1].

As set out in the RBP, we note that the shortfall in revenue arising from Covid-19 has led to increases in airports' gearing. This means that the case for a higher notional gearing for H7 has become stronger, especially in the absence of a substantial RAB adjustment. Therefore, we use a gearing of 65% for the case where the RAB adjustment is only £300m. This reflects the likely average gearing of a notionally financed Heathrow with gearing of 60% in 2019, using debt to manage the shortfall of cashflows in 2020 and 2021 and having a £300m RAB adjustment leading to 71% gearing at the end of 2022, and returning gearing to 60% by 2026.

5.6.2.2 Total Market Return

In the RBP we used a total market return of 6.0% consistent with the interim findings of the CMA in the water company price inquiry. This was based on the upper quartile of the range identified by the CMA in the interim findings.

The CMA updated its estimate of the TMR for its final conclusions for Water companies. It increased the range slightly to reflect the use of arithmetic returns to a range of 5.2% to 6.5% RPI.[2] In its approach, it also separated out the impact of aiming up from the parameter estimate and therefore used the middle, rather than the upper quartile, of the range to give a TMR estimate of 5.85% (real RPI).[3]

For this update therefore we have used 5.85% for the estimate of the TMR in line with this recently established CMA precedent.

5.6.2.3 Risk Free Rate

In the RBP we adopted an estimate of -1.85% for the risk-free rate (RFR) consistent with the interim findings of the CMA in the water company inquiry.

The CMA updated its approach to the RFR in its recent water decision. The CMA set the bottom of its estimated range as the 6-month average of the UK 20-yr ILG, and the top of the range as the 6-month average of the IHS iBoxx £ Non-Gilt AAA 10+ and 10-15 indices.[4] They did not include a forward adjustment. For their determination they adopted the middle of this range at -1.34% (CPIH) or -2.22% (RPI).[5]

[1] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.45
[2] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.395
[3] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.38
[4] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.241
[5] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.266 and Table 9.38

For this update we have adopted the CMA estimate directly as it is relatively recent and consistent with current market data. We will update the estimate at our RBP Update 2 to reflect up-to-date market data using the same approach as the CMA.

5.6.2.4 Asset Beta

5.6.2.4.1 Market Data

In identifying appropriate comparators for NERL, the CMA decided not to use data from smaller European Airports or Australian airports.[6] Instead it decided to focus on the data from the larger airports, namely AENA, AdP, and Fraport. The CMA considered that these comparators were suitable as they were relatively large, had liquid stocks, had regulatory regimes that although different in some specifics broadly exposed the companies to similar systematic risk to NERL, and that they were likely to give reliable estimates.

In the RBP we followed the approach set out in the CMA appeal of the NERL price control to estimate the asset betas for comparator airports using data for Fraport, AdP and AENA. We set out our view that the impact of Covid-19 in March 2020 represented a discontinuity in investors' views on the riskiness of airports, and therefore considered spot estimates for beta using 2-years of daily frequency data and 8-months of daily data using data up to the 31st October 2020. This showed estimates ranging from 0.72 to 1.00, with the average of the 2-year approach being 0.83, and the average of the 8-month approach being 0.92. This resulted in an overall average estimate of 0.87.[7]

We have used the same approach to update the estimates of beta using data up to the 6th May 2021. This has increased the period of estimation for the post-Covid estimate from 8 months to 14 months. The resulting estimates are set out in Table 1.

Table 1: Estimates of Asset Beta of Comparator Airports

	Fraport	AdP	AENA	Average
Spot (2-year daily frequency)	0.76	0.92	0.93	0.87
Spot (14-month daily frequency)	0.80	0.99	1.00	0.93

Source: Bloomberg/Heathrow analysis

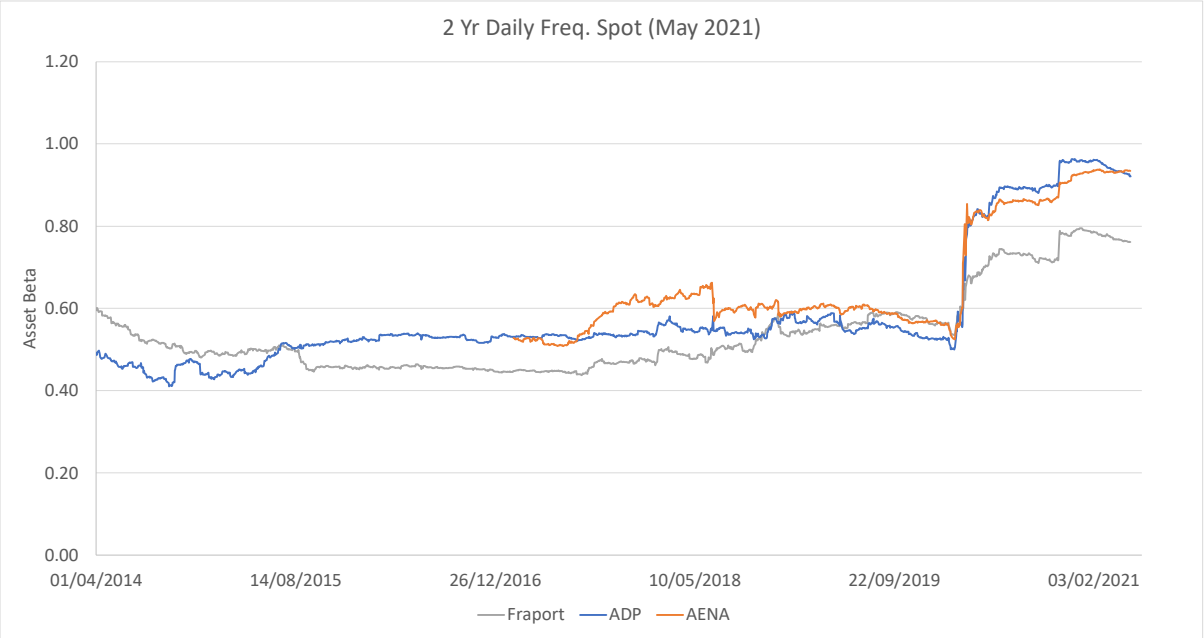
The estimates based on data since March 2020 have not moved significantly from those made at the end of October and used in the RBP. However, the two-year estimate has increased reflecting a greater proportion of the period being post the discontinuity in March. The overall range is slightly narrower at 0.76 to 1.00, and the average of the six estimates has increased from 0.87 to 0.90.

Figure 1 shows the rolling trend in 2-year asset betas since 2014. This shows that the step change since March 2020 remains and that there is no evidence of a return to pre-Covid levels of beta in the market data at this point.

[6] CMA, *NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report*, March 2020, Para 12.67

[7] Heathrow, RBP, 2020, Chapter 8.2, p17, Table 1

Figure 1 - Airport Asset betas since 2014



5.6.2.4.2 Impact of Covid-19 on Comparator Airports

The pandemic has had a significant impact on traffic numbers and revenue at all European airports. Figure 2 shows the impact in 2020 for a range of airports including the comparator airports used for estimating asset beta.

Figure 2 - Impact of pandemic on revenue and pax 2020 compared to 2019

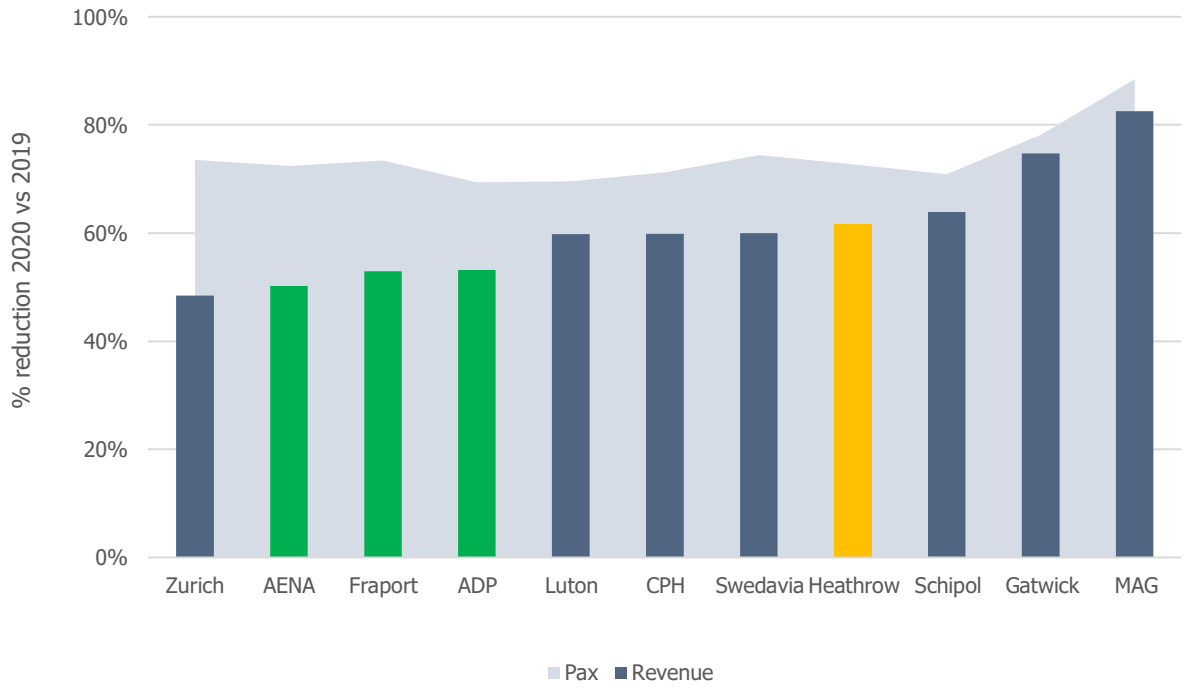


Figure 2 shows that although the passenger impact of Covid-19 in 2020 was similar for all of the airports apart from Manchester and Gatwick, there was a wider range of impact on

revenues. The reductions in revenue for 2020 compared to 2019 experienced by the three comparator airports are 50%-53% compared to 62% at Heathrow. This demonstrates that the financial impact of the pandemic on Heathrow has been greater than that for the comparator airports, and therefore that its systematic risk is likely to be higher. Consequently, the current asset betas of the comparator airports are most likely to underestimate the risk for Heathrow.

5.6.2.4.3 Estimated impact of Covid-19 on Heathrow Asset beta

In the RBP we set out a quantitative approach to estimate the impact of the pandemic on the asset beta of airports. This was not intended to supplement estimates derived from market data, but to help give them context and to help calibrate the benefits that would be delivered as a result of any mitigation. The approach examined how the impact of the pandemic affected the volatility of the returns of Heathrow compared to the market, and from this the impact on Heathrow's asset beta.

We have updated this assessment to take account of the latest estimate of the impact of Covid-19 on Heathrow. We have also adjusted it to reflect the impact of the CMA determination on the Water Companies in the WACC parameters. This update is set out in the table below for pandemic return timescales of 25, 30 and 35 years.

Table 2: Estimation of the impact of Covid-19 on airport asset betas

Airport Asset Betas	Impact	Impact	Impact
Standard deviation of stock market (A)[8]		3.36%	
Allowed asset beta (B)		0.575	
Allowed equity beta		1.43	
Target RORE		9.29%	
RoRE in 2020		-19%	
RoRE in 2021		-15%	
Time period (years)	25	30	35
New Variance[9]	0.188	0.198	0.205
New Standard deviation for Heathrow (C)	8.7%	8.1%	7.7%
New Equity beta (=B/A)	2.58	2.42	2.30
New Asset beta (D)	1.06	1.00	0.95
Increase in asset beta (=D-B)	0.49	0.42	0.37

Source: Heathrow

Table 2 shows that this approach of estimating the impact of the pandemic on airport asset betas identifies impacts that are consistent with the observed increases in asset beta of 0.25 to 0.43. The increase in the estimate since the RBP (0.04) in the central case is also consistent

[8] KPMG, Analysis of Risk and Returns for R3, Dec 2109, Table 32
[9] The variance is calculated as (time period – 2) times the variance of the market overall for a share with Heathrow equity beta, plus the variance in 2020 and 2021

with the observed increase in market data since October (0.03). As before, the resulting estimates are also consistent with the top of the current range for asset beta.

Return Period of Pandemics

In the *Way Forward* document the CAA question whether a return period of around 30 years is an appropriate estimate of pandemic likelihood.[10] There is considerable evidence that a 30-year return period is likely to be a reasonable estimate for the likelihood of pandemics, and no evidence to support a return period of as great as 100 years.

Historically, there have been 6 major pandemics in the last 132 years.[11] This suggests a return period of closer to 20 years than 30 years.

Pre-Covid expectations of pandemic likelihood are of a similar magnitude. For example, a 2006 EU paper[12] stated *"From a purely probability theoretical point of view, the probability for a pandemic to incur in any given ten years is roughly 30%."*

In addition, the UK Government's Risk Register (2020) includes a graphic that puts the annual risk of a non-Covid-19 pandemic as between 1% and 5%.[13] The mid-point of this range is 3%, equivalent to a 33-year return period.

This evidence is consistent with an expected return period for pandemics of the order of one every 30 years or so. This is consistent with the range of return periods used in the analysis presented above.

Correlation between Heathrow Equity Return and Market Return

In CAP2140, the CAA note that the analysis presented above assumes that the correlation between the variation in Heathrow equity returns and the market returns is one.[14] We acknowledged this in the RBP submission where we noted that the relationship between systematic risk and the impact of Covid-19 could be greater or smaller than this.[15] A key advantage of the method used is that it is independent of yet replicates the observed impact on airport asset betas well when based on a reasonable a-priori estimate of the likelihood of pandemics and observed market variability. It is not possible to replicate the observed changes in asset beta if a different assumption is made for the value of the correlation coefficient.

We also note in CAP2040 that the CAA's estimation of the standard deviation of market returns is around four times higher than that provided to us by KPMG.[16,17] Our current understanding is that the number calculated by the CAA is not appropriate for the use to which it is being put and is therefore in error. We will provide additional evidence on this in due course. We also note that it is not possible to replicate the observed impact on market betas using the market volatility as estimated by the CAA. This indicates a significant error is likely to be present in the CAA's estimation.

[10] CAP2139A, Appendix J, Para 62
[11] Russian Flu 1889-90 (1m deaths), Third Plague 1894-1922 (12m), Spanish Flu 1918-19 (50m), Asian Flu 1957-58 (2-5m), Hong Kong Flu 1968-69 (1-4m) and Covid (2020-21?, 3m+)
[12] GROUPE CONSULTATIF ACTUARIEL EUROPEEN, Actuarial reflections on pandemic risk and its consequences, 2006, p6
[13] UK Government, National Risk Register, 2020, p9
[14] CAP2140, Appendix C, Para C159
[15] RBP. Chapter 8.2, p20
[16] CAP2140, Appendix C, Table 2
[17] KPMG, Analysis of Risk and Returns for R3, Dec 2109, Table 32

5.6.2.4.4 Impact of RAB adjustment on asset beta

In the RBP we used an approach to estimate the impact of a RAB adjustment on Heathrow's WACC based on consideration of the reduction in the variance of returns that would happen as a result of the proposed mitigation.

This approach has been updated to reflect the latest view of the impact of the pandemic and the requested RAB adjustment. The calculation of the adjustment as a proportion of loss also now takes in the mitigation of losses from operating cost savings. The approach used to estimate the impact of a RAB adjustment on Heathrow's WACC is to consider the reduction in the variance of returns that would happen as a result of the proposed mitigation. This approach is set out in the table below for timescales of 25, 30 and 35 years.

Table 3: Estimation of the impact on asset beta of intervention using volatility

Asset Beta	Impact		
Adjustment as proportion of loss	83%		
Reduction in volatility		57%	
Return Period years	25	30	35
Assessed increase in asset beta without mitigation	0.49	0.42	0.37
Asset beta impact	0.20	0.17	0.15

Source: Heathrow

We have also calculated the impact of a RAB adjustment of only £300m. This results in an adjustment of only 0.02 in asset beta.

Figure 3 - Impact of Covid-19 on Airport Asset Beta

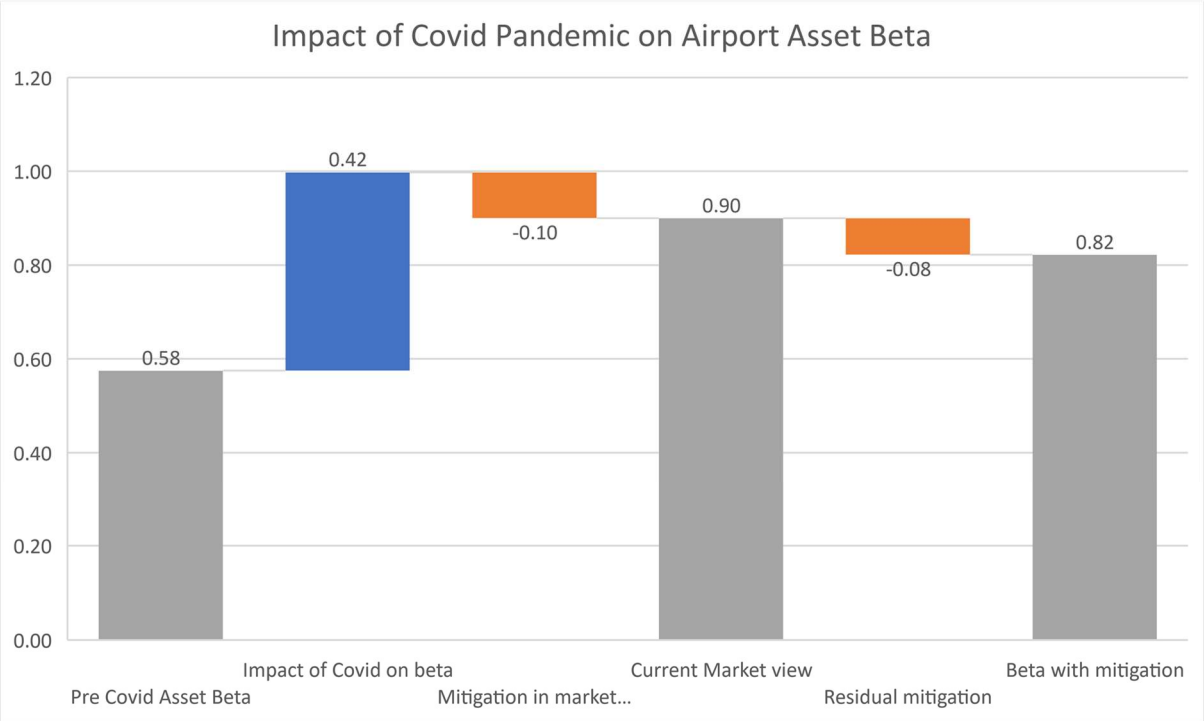


Figure 3 shows that the mitigated asset beta remains at 0.82, consistent with the estimate used for the RBP. This reflects the net impact of a greater effect from the pandemic, offset by a corresponding increase in the scale of the RAB adjustment sought.

For the case with a RAB adjustment of £300m, the unmitigated asset beta is 1.00, offset by mitigation of 0.02 giving a 0.98 asset beta for this case. This is identical to the no mitigation case in the RBP and reflects that an allowance of £300m only offsets the deterioration in the outlook of Covid-19 since the RBP.

The estimates set out above are based on the quantitative analysis described. As set out in the RBP, these estimates of the impact of Covid-19 and any associated recovery adjustment set out here are not intended to be precise estimates. The approaches used, whilst reasonable, are approximate in nature. Potential issues with them include the degree to which the impact of Covid-19 and any recovery therefrom can be considered a systematic risk. It is possible that the systematic element of the risk is greater than calculated here as well as lower. However, the consistency with market data suggests that the approach set out here is reasonable, and likely to be roughly right. Given this, we consider that this is a reliable approach to estimate the impact on WACC that the difference between the Low Adjustment and Full Adjustment cases would provide. In other words, we consider that the estimate of a difference in asset beta of 0.16 is a reasonable assessment of the benefit to WACC obtained from the Full Adjustment case.

In respect of the absolute values adopted for asset beta we consider that the estimates quantified above are also consistent with the observed market data for the systematic risk of airports. The asset beta in the Low Adjustment case of 0.98 is just below the current observed betas (since March 2020) of ADP and AENA (at 0.99 and 1.00 respectively). Both have only had limited public support to date. The asset beta in the Full Adjustment case is slightly above the observed asset beta of Fraport (0.80), which has received substantial assistance from the

German government.[18] This demonstrates that the asset betas used are consistent with current market data of investors' views of the riskiness of airports and placed appropriately in the range given the degree of mitigation in the two cases.

We consider that these estimates may in practice underestimate the impact of Covid-19 on Heathrow's systematic risk:

- The impact of Covid-19 on revenue is greater for Heathrow than the comparator airports (see above);
- Fraport was lower risk than Heathrow pre-Covid[19]; and
- AdP and Aena have already had some regulatory mitigation.[20]

This means that the asset beta in the Low Adjustment case could well be higher than the observed betas of AdP and AENA. It also means that the asset beta in the Full Adjustment case could be significantly greater than the current asset beta of Fraport. We therefore regard the current estimates of asset beta in this update as conservative.

5.6.2.5 Debt Beta

In the RBP we assumed a debt beta of 0.05.[21]

In their determinations for Water Companies, the CMA identified a range for debt beta of 0.05 to 0.10 for water companies and adopted the mid-point of the range 0.075 for their determination.[22]

We have considered whether this decision for water company debt is relevant for the estimation of the debt beta of Heathrow. We note that:

- The CMA adopted an estimate of debt beta for airports of 0.05 in their determination for NERL;[23] and
- In their report on Water, the CMA noted that evidence showing A rated debt would be expected to have a debt beta of 0.05 was a useful cross check for their estimate.[24] The majority of Heathrow's debt is A rated, and therefore this is relevant to the estimation of the debt beta for Heathrow.

We have therefore retained the estimate of debt beta used in the RBP of 0.05.

In CAP2139A, the CAA note that this approach is not consistent with its emerging approach of using a debt beta of 0.10 for regearing the asset beta identified from comparators to Heathrow's notional gearing.[25] We again note that the CAA has not provided any evidence to

[18] The German Government has set out a €1.2bn support package for German Airports
[19] See NERA, Cost of Equity for HAL at H7, 2019, p17. Also accepted by the CAA (e.g. CAP2139, Appendix J, para 56
[20] AdP have been allowed to terminate their Economic Regulatory Agreement allowing them to propose new charges annually. In addition they have received a €122m grant from the French government. AENA have received €400m in grants and loans from the Spanish Government.
[21] Heathrow, RBP, 2020, Chapter 8.2, p24
[22] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.530
[23] CMA, NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report, March 2020, para 12.115
[24] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.521
[25] CAP2139A, Appendix J, Para. 27

support this difference in debt beta between Heathrow and its comparators. We note that evidence provided to the CMA, and which they took into account in their decisions showed that debt beta was closely tied to credit rating rather than the gearing of the issuer,[26] and that given Heathrow's A- rated debt, the difference between its debt beta and that of its comparators would be small. We also note that the CAA have not engaged with the market evidence we provided that showed the debt beta was small and not significantly different from zero.[27]

In addition, even if credit rating is ignored, using a structural approach with input parameters the same as those used by CEPA/Oxera suggests that the impact of changing gearing from 35% to 60% would be expected to increase debt beta by only c0.01.[28] The structural approach is the only one that provides a theoretical link between gearing and debt beta.

Given this evidence, a difference of 0.05 in asset beta as proposed by the CAA is neither supported by market evidence nor theoretical considerations.

5.6.2.6 Aiming Up

In its decisions on the Water companies, the CMA considered the issue of aiming up very carefully. They concluded that it was in consumers interest to aim up in the cost of equity to help preserve the incentive for investors to continue to invest in the sector. In their preliminary findings they adopted an estimate at the upper quartile of the range identified. This was implemented by adjusting each of the key parameters to the upper quartile of their range. This resulted in a cost of equity uplift for water companies of 0.5%.

In its Determination the CMA identified two key concerns that the point in the range needed to consider: firstly, that regulation should create a supportive long-term investment environment; and secondly, that the allowed return needs to be set in a way that encourages the right level of new investment. They were concerned that if the WACC were set too low, companies will not have the incentive to identify, develop and implement new and often complex investment programmes.[29]

For their final determination, the CMA undertook additional Monte Carlo modelling to help calibrate the degree of aiming up they should include based on the potential range of cost of equity input parameters. This modelling showed that for water companies, a 0.25% uplift represented the 77% percentile of the cost of equity distribution based on their assumptions.[30] The CMA therefore reduced the uplift to 0.25% to reflect this modelling. In contrast to the approach adopted for the preliminary findings, this was implemented as an explicit adjustment to the cost of equity rather than by adjustments to each of the input parameters.

In the RBP, we followed the approach adopted by the CMA for its interim findings. This automatically adapted the uplift identified for water companies to an uplift for Heathrow's

[26] Oxera, Estimating Debt Beta for regulated entities, June 2020, p4
[27] Professor Zalewska, *Estimation of the Debt Beta of the Bond Issued by NATS (En-Route) plc*, April 2019
[28] Using the structural approach with T of 12 years, y of 1%, and sigma squared of 30% - see Oxera, Estimating Debt Beta for regulated entities, June 2020, Section 2.2
[29] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.1388
[30] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.1306

different situation. For this update we propose to use the approach subsequently adopted by the CMA, and therefore include an explicit adjustment for aiming up.

The CMA concluded that an addition of 0.25% was appropriate for water companies resulting in a final estimate of the cost of equity of 4.73% (CPIH) (based on a pre-adjustment mid-point of 4.47%).[31]

Applying the same Monte Carlo approach for Heathrow would result in a larger uplift reflecting the larger cost of equity estimate. Based on the cost of equity parameters set out above, all of which are consistent with the CMA decisions, and an asset beta of 0.82, the cost of equity for Heathrow is 13.7% (RPI) or 14.6% (CPIH). The range for water company asset beta in the CMA modelling was 0.28 to 0.30.[32] If the range for Heathrow asset beta was 0.79 to 0.85 (i.e. 28/29*0.82 to 30/29*0.82) then the results of the CMA modelling would scale directly with the overall cost of equity as the ranges for the other parameters would be unchanged. This would result in an equivalent uplift for Heathrow of 0.8%.

Estimating the potential range of asset beta for Heathrow in the current circumstances is difficult and intrinsically linked to the approach the CAA take to the RAB adjustment. However, we consider that it is extremely unlikely that the potential range for Heathrow is relatively narrower than that for water companies, and that therefore an even greater uplift would result from the CMA's approach. We will consider this issue further for the RBP update 2. For this update we have conservatively included an uplift of 0.5%.

5.6.2.7 Taxation

In the RBP we assumed a corporate tax rate of 19% consistent with Government policy at that time.

Subsequently, the Government has changed its outlook for the rate of corporation tax, setting out its plan to increase corporation tax to 25% from April 2023. This results in an average tax rate for H7 of 23.5%. We have reflected this latest view in our update.

We have set out our views on the right approach to taxation in our response to the Way Forward document (pp 30-32 of our response).

5.6.2.8 Conclusions on Cost of Equity

Table 4 sets out equity beta estimates for Heathrow for Update 1 compared to the IBP and RBP.

[31] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Para. 9.1404
[32] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.36

Table 4: Equity Beta Estimates for Heathrow

	IBP	RBP	Update 1 Full RAB adjustment	Update 1 RAB adjustment £300m
Asset Beta	0.55	0.82	0.82	0.98
Debt Beta	0.05	0.05	0.05	0.05
Gearing	60%	60%	60%	65%
Equity Beta	1.30	1.98	1.98	2.71

Source: Heathrow

The significantly higher equity beta compared to the IBP reflects the step change in market data on asset beta since the IBP was published. Our estimate for the full RAB adjustment case has not changed since the RBP.

Table 5 sets out the resulting estimate of the cost of equity for Heathrow alongside the estimates in the IBP and RBP.

Table 5: Cost of Equity for Heathrow

	IBP	RBP	Update 1 Full RAB adjustment	Update 1 £300m RAB adjustment
TMR	6.0%	6.0%	5.85%	5.85%
RFR	-1.67%	-1.85%	-2.22%	-2.22%
Gearing	60%	60%	60%	65%
Equity Beta	1.30	1.98	1.98	2.71
Aiming Up	N/A	In TMR	0.5%	0.5%
Cost of Equity Post Tax	8.3%	13.7%	14.2%	20.2%
Tax Rate	17%	19%	23.5%	23.5%
Cost of Equity Pre-Tax	10.0%	16.9%	18.6%	26.3%

Source: Heathrow

Table 5 shows that the post-tax cost of equity for Update 1 is slightly higher than the RBP as a result of the changes in the CMA approach to TMR, RFR and aiming up. The larger increase in the pre-tax rate mainly reflects the Government's proposed increase in corporation tax rate.

5.6.3 Cost of Debt

5.6.3.1 Inflation

For inflation we continue to use an assumption of 2.9% based on the Government target of 2.0% for CPI inflation, and the OBR's current estimate of the wedge between CPI and RPI of 0.9%. This approach is consistent with the CMA determination for water companies[33].

5.6.3.2 Cost of Embedded Debt

In the RBP we based the cost of embedded debt on the forecast cost of current embedded debt for Heathrow over the period between 2022 and 2026. This resulted in an estimate of 5.0% nominal and 2.1% real. We compared this to a number of notional approaches towards the cost of embedded debt showing these had a range between 2.2% real and 2.4% real, showing that Heathrow's actual debt costs were efficient.[34]

In the RBP we noted that the CMA had used NERL's actual cost of debt, whereas they had used a notional approach for the interim determination of the Water Companies. In their final determination, the CMA moved to an approach based on the median cost of actual embedded debt for Water companies.[35] This is consistent with the approach we adopted in the RBP of using Heathrow's actual debt costs.

We also noted in the RBP that there were issues with using a notional approach for companies such as Heathrow where the spread of its debt to the index varied over time. This led to relatively higher debt costs for Heathrow at the time of the financial crisis in a similar way to how the Covid-19 crisis has impacted our current debt costs. Any notional approach therefore must take account of this varying spread in the historical debt otherwise the resulting estimate will not be representative of the actual market conditions the company faced. In practice, this is difficult to do without basing the cost of debt on Company specific data, which in turn means that a company specific approach would be required.

The RBP estimate of the cost of embedded debt was based on the debt in place at the end of September 2020. Subsequently, Heathrow has raised significant amounts of additional debt. Therefore, we have updated the estimate to reflect the debt position at the end of March 2021.

5.6.3.2.1 Actual cost of embedded debt

To estimate the cost of embedded debt over H7 we have made a forecast of the interest costs of existing debt over the period. Table 6 sets out the forecast cash cost of embedded debt for Heathrow SP based on debt existing at the end of March 2021. It takes account of the retirement of debt over the period. It shows the cost of debt is relatively stable over the period.

[33] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.35
[34] Heathrow, RBP, Chapter 8.2, p38
[35] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.553

Table 6: Forecast cost of embedded debt

Embedded Debt	2022	2023	2024	2025	2026	Average
Cash Interest %	2.61%	2.64%	2.47%	2.49%	2.71%	2.58%
Interest including accretion with RPI of 2.9%	4.12%	4.56%	4.54%	4.69%	5.07%	4.60%

Source: Heathrow

The Cash interest line in the first row of Table 6 does not include the cost of accretion for Index Linked debt, including swaps. The second row shows the total cost of debt that would arise for RPI inflation at 2.9% in each year based on the existing swap and debt portfolio. This results in total interest costs being 4.60% nominal over the period at that inflation rate. The corresponding average real rate of debt is 1.70%.

As in the RBP, the rates set out above exclude the impact of the swaps Heathrow has entered into that reprofile its interest rates and underpin its financial resilience during the Covid-19 pandemic. These swaps remove interest rate charges from 2021 and 2022, pushing them back into 2023 onwards. These do not affect the actual cost of debt.

We note that in their determination for Water companies, the CMA effectively used an estimate at the midpoint of the regulatory period for the cost of debt of the companies.[36] Our approach is therefore consistent with that adopted by the CMA, in that it gives the average cost of current embedded debt over H7.

5.6.3.2.2 Cross-check using historical iBoxx indices

The appropriate period over which to average the index was a subject of significant debate in the water company CMA inquiry. The CMA concluded that in the round, a 20-year trailing average is likely to be preferable when considering the costs of bond debt that water companies should reasonably be expected to incur. They noted that while higher than the average tenor deployed by companies over the last decade, the approach is better matched to the financing of long-term infrastructure assets than shorter trailing averages.[37]

The CMA noted 20-year average of the iBoxx Non-Financials A/BBB 10+ index is 5.12%, while the collapsing average[38] is 4.95%.[39] They also noted that the 15-year collapsing average was 4.54% and used this as a cross-check to ensure that the median estimate they used was not too low and therefore likely to push companies to a riskier financing approach.[40]

The cost of Heathrow debt is higher than that of water companies. NERA showed that historically Heathrow's yield at issue spread relative to the iBoxx benchmark suggests a debt premium of 40 bps .[41] Applying this to the collapsing iBoxx average results in an estimate for

[36] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.25
[37] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.697
[38] A collapsing average is the average of an approach that has 20 years of data for year 1 reducing to 16 years of data at year 5
[39] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.712
[40] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Table 9.714
[41] NERA, *The cost of debt for HAL in H7*, April 2019, Section 2

Heathrow's embedded debt of between 4.94% and 5.35% based on the 15 and 20 year averages.

In the RBP we presented evidence on the difference in spread between equivalent Heathrow and Anglian Water bonds. Prior to the pandemic, the spread was around 0.3%, however since then it has widened to around 1.5% reflecting the impact of the pandemic on investors' perception of Heathrow's risk.[42] This evidence only relates to the period since 2018. During the period before this, especially during periods such as the financial crisis, Heathrow debt may well have also exhibited a considerably wider spread than the average between 2015 and 2019. Therefore, this spread difference of 0.3% should be considered as a minimum in respect of the difference between Heathrow and Water companies. In particular, it should be noted that the cost of the recent debt issuances during the pandemic is well in excess of 1% more expensive than water companies could issue at the same time. Based on a minimum spread of 0.3%, and the CMA estimate for the cost of debt for the water sector of 4.52%, the minimum equivalent cost of embedded debt for Heathrow is 4.82%.

We note that the range from these approaches of 4.82% to 5.35% is above the actual cost of embedded debt over the period of 4.60%.

5.6.3.2.3 CAA Views on Embedded Debt

In CAP2139 the CAA state that the CMA ruled out using individual companies actual cost of debt as a basis for estimating the embedded cost of debt.[43] The CAA fail to note that this is in the context of water companies, where there are a range of regulated companies that give them more information than for a decision with a single company. The CAA also fail to note that in the NERL appeal, the CMA did use NERL's actual cost of debt, as did the CAA itself.[44] For determinations with single companies, the CMA has always used the actual cost of debt for embedded debt. Therefore, the CMA precedent for the H7 determination is that Heathrow's actual cost of embedded debt should be used.

The CAA note that the spread at issue of Heathrow bonds was different at different times and was close to the iBoxx index for the last two issuances.[45] The spread between Heathrow bonds and the iBoxx index does vary with time. This is especially evident at the current time with the spread of Heathrow Debt to the index being as high as 1.4% (see Figure 4 below). For the purposes of estimating the cost of embedded debt, it is important to take account of these variations over time. Over the last fifteen months, and also during the financial crisis, the cost of Heathrow debt was much greater than the index. At other times it was only a little higher. If the estimate of the cost of embedded debt is based on the lowest difference only, then it will underestimate the cost of debt actually achievable by Heathrow. This is addressed by using the average spread over the period as NERA have correctly done[46].

In CAP2139 the CAA state that as a matter of principle they consider that the cost of debt should increase with gearing and that this is consistent with corporate finance theory.[47] We are surprised by the CAA's view that gearing is a more important determinant of the cost of debt than credit rating. This view is completely contrary to market evidence and practice.

[42] RBP, Chapter 8.2, Figure 6, p36
[43] CAP2139a, Appendix J, Para 122
[44] CMA, *NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report*, March 2020, para 12.154
[45] CAP2139a, Appendix J, Para 124
[46] NERA, *The cost of debt for HAL in H7*, April 2019, Section 2
[47] CAP2139a, Appendix J, Para 126

Effectively the CAA are postulating that Heathrow Debt issued at A- would be more expensive because of their higher gearing than the notional cost of BBB+ debt issued by the notional company at 60% gearing. This is financially incoherent and at odds with all market evidence. Oxera clearly demonstrate that the cost of debt depends primarily on credit rating and not on the gearing of the issuing company.[48]

In practice, Heathrow has incurred its embedded debt through the issuance of debt at A- and BBB ratings, consistent with the assumption of a BBB+ credit rating for the notional company. This means that Heathrow's gearing has not resulted in a higher cost of debt than would be expected for the notional company. Therefore, its actual embedded debt cost is appropriate to use in the estimation of the cost of debt.

Overall, we note that we have provided a range of evidence on the higher cost of Heathrow debt compared to the iBoxx index. This includes: the cost of Heathrow debt at issuance, the spread of Heathrow debt relative to the iBoxx index; and the spread of Heathrow debt to water company debt, the cost of which the CMA has accepted is in line with the index. We are therefore surprised that the CAA state they still remain sceptical that any uplift to the iBoxx is warranted based on comparisons with Heathrow's actual cost of debt. Moreover, we are disappointed that the CAA to date has still not provided any proper engagement with the evidence we have provided.

5.6.3.2.4 Conclusions on embedded cost of debt

The average cost of Heathrow's existing embedded debt during H7 will be 4.60% nominal (if RPI inflation is 2.9%), or 1.70% real (RPI). This is a reduction of 0.4% from the estimate included in the RBP reflecting the lower cost of the significant additional debt raised since September 2020.

5.6.3.3 Cost of new debt

We have replicated the approach to cost of new debt included in the RBP, updated for the latest market data. This approach used recent iBoxx data to determine a starting index; used data from gilts to estimate the iBoxx index that would be in place in H7; and then included an uplift for the higher cost of Heathrow's debt relative to the iBoxx index. Each of these components has been adjusted to reflect current market data.

5.6.3.3.1 iBoxx Index

In the RBP we based the iBoxx index on the 6-months data to the end of October 2020, resulting in a current basis for the iBoxx index of 2.17% (nominal).

For this update, we have used 6-months data up to the end of March 2021. For this period:

- The average yield on the iBoxx 10+ NFC A was 1.94%; and
- The average yield on the iBoxx 10+ NFC BBB was 2.23%.

This results in an updated estimate of the current basis for the iBoxx index of 2.09% (nominal).

[48] Oxera, *Asset risk premium relative to debt risk premium*, September 20, Table 4.1

5.6.3.3.2 Forward Adjustment

In the RBP, we used data from UK nominal 20-year gilts to produce a forecast for the iBoxx index over H7 based on the implied movement in interest rates over the period. This resulted in a forward adjustment of 0.20% on average over the period.

This assessment has been updated to reflect the gilt data at March 2021, which resulted in a slightly higher forward adjustment of 0.24%. The resulting forecast for the iBoxx index is shown in the table below.

Table 7: Forecast iBoxx index

	2022	2023	2024	2025	2026
Uplift	0.14%	0.19%	0.24%	0.29%	0.32%
Forecast iBoxx index	2.23%	2.27%	2.33%	2.38%	2.41%

Source: Heathrow

The forecast iBoxx index set out above is an important input for debt indexation. Adjustments should be based on the differences between the outturn iBoxx index and the values set out above for each year.

The CMA did not include a forward adjustment in its approach for Water companies, partly because the impact was small for the period 2020-2025, partly because they did not consider that the market data was a good forecast of the likely outturn, and mainly because Ofwat's debt indexation approach meant that there would be a correction for the actual outturn of debt costs.[49]

We have retained a forward adjustment for the cost of new debt as we consider that the adjustment is not small in Heathrow's case, market data is the best forecast we have at the current time for rates during H7, and consumers benefit from any adjustment at the end of H7 from debt indexation being as small as possible which means that the best forecast should be used.

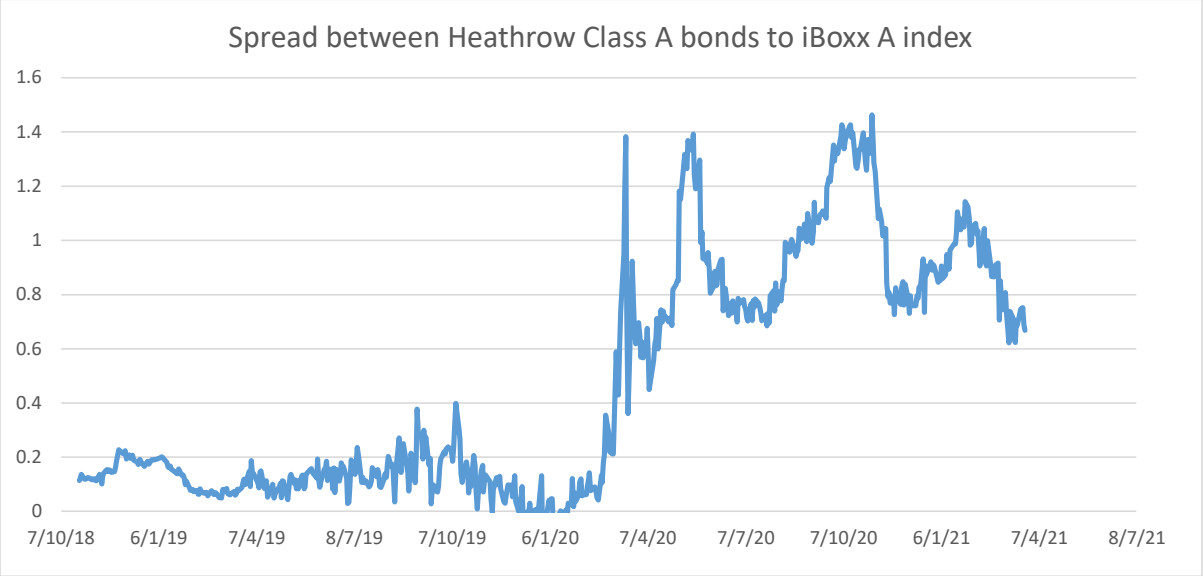
5.6.3.3.3 Cost of Heathrow debt relative to the iBoxx index

In the RBP we estimated the cost of Heathrow debt relative to the iBoxx index using an approach that: (i) Compared the yield on Heathrow debt with the yield on the comparable iBoxx index; (ii) then made an adjustment to reflect the cost of debt is higher at issuance than when it subsequently trades and; (iii) made an adjustment to reflect that a proportion of debt will be index linked, and this debt has a higher cost.

We have updated the estimate of the spread of Heathrow's debt relative to the iBoxx index based on data up to the end of March. This comparison uses debt of similar credit rating and tenor to the iBoxx index to ensure that the comparison is valid. Figure 4 below shows the spread since 2018.

[49] CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Para 9.826

Figure 4 - Spread between Heathrow Bonds and Iboxx



Source: Bloomberg/Heathrow analysis

Figure 4 shows that the spread of Heathrow debt to the iBoxx has remained significantly above the pre-pandemic average of 0.1% to 0.2%, peaking several times as high as 1.4% more expensive. In the RBP we used the average spread for the six months up to the end of October 2020 (1.01%). For this update, we use the average spread over the six months to the end of March 2021, which is slightly higher at 1.06%.

We have not updated the estimates of the new issue premium and the additional cost of index-linked debt. The overall uplift is therefore 1.25% as set out in the table below.

Table 8 - Uplift from iBoxx index for new Heathrow Debt

Yield %	RBP	Update 1
Spread to iBoxx	1.01%	1.06%
New Issuance Premium	0.1% to 0.2%	0.1% to 0.2%
Additional Cost of IL Debt	0.05%	0.05%
Overall Spread	1.20%	1.25%

Source: Heathrow

In CAP2139 the CAA state that they do not consider that Heathrow has presented any substantial new evidence on the new issuance and Index Linked premiums and that they therefore view that no such premiums should apply in H7."[50] The CAA to date has failed to engage at all with Heathrow on the evidence it has provided on these premiums. This is both disappointing and a failure of proper regulatory process.

A company cannot issue new debt at the current market yield of its bonds, even though once issued, the spread of the new bond will be consistent. The difference between the cost of debt of the bond at issuance and the subsequent yield of the bond is the new issue premium (NIP).

[50] CAP2139a, Appendix J, Para. 159

In the RBP we provided market evidence of the NIP of our most recent bond issuances showing this was in the range 10-20bp. This NIP needs to be added to the spread of Heathrow's current bonds in order to obtain the actual cost to Heathrow of new debt. Given the approach we have set out above is effectively based on the current yield of Heathrow debt (i.e. the yield of the iBoxx plus the spread between Heathrow debt and the iBoxx) the NIP must be included to obtain a reasonable estimate of Heathrow's cost of debt at issuance. In CAP2139, the CAA appear to be questioning the existence of NIPs, and provide no supporting evidence for the view. We find this surprising and concerning.

In the RBP (and IBP) we argued that the cost of index linked debt was higher, and that previous assumptions of the notional balance sheet had assumed that a proportion of debt was index linked. We therefore included an uplift based on the 30% proportion assumed at Q6 and market evidence on the higher cost of index linked debt for Heathrow. The CAA have provided no evidence that this approach is not reasonable, nor have they provided any evidence that the cost of index linked debt is not higher than fixed debt. Indeed, the CAA approach effectively assumes that Heathrow can obtain index linked/fixed swaps at zero cost. Given this, we do not understand why the CAA has drawn the conclusions it has, and we consider that its approach is not robust.

5.6.3.3.4 Overall conclusion on cost of new debt

The cost of new debt for H7 is based on the forecast of the iBoxx index set out above and the uplift for Heathrow. The resulting forecast cost of new debt for Heathrow in H7 is set out in Table 9.

Table 9: Forecast Cost of New Debt

	2022	2023	2024	2025	2026
Nominal cost of new debt	3.48%	3.52%	3.58%	3.63%	3.66%
Real cost of new debt	0.58%	0.62%	0.68%	0.73%	0.76%

Source: Heathrow

Over the H7 period, the forecast cost of new debt is 0.67% real (RPI).

The cost of new debt set out above to reflects the current high spread of Heathrow debt that has been triggered as a result of investor concern following the pandemic. As noted at the RBP, it is not clear whether this change reflects a permanent (or very long-duration) effect. However, there is no evidence that the spread is reducing or that it will reduce in H7. Regulatory precedent in this area is that current interest rates give the best prediction of future rates.[51] We therefore consider our approach is appropriate for H7.

5.6.3.4 Weighting of new debt

In the RBP we assumed that the proportion of new debt would be 12.5% consistent with a notional gearing of 60% and an average tenor at issuance of 20 years.

[51] The Brattle Group (2016), *Review of approaches to estimate reasonable rate of return for investments in telecoms networks in regulatory proceedings and options for EU harmonization*, section VI.A.4

For the case with a full RAB adjustment we have retained this approach.

For the case with a £300m RAB adjustment, the need for new debt is reduced as gearing is reduced from 71.5% to 60% over the period. As a result, we have assumed a lower proportion of new debt in this case of 7.5%.

5.6.3.5 Issuance and Liquidity Costs

In the RBP we provided a detailed analysis of issuance and liquidity costs. Issuance costs for Heathrow were shown to be 0.06%. The cost of an 18-month liquidity facility for a notionally geared company was shown to be 0.12%. This resulted in total issuance and liquidity costs for Heathrow of 0.18%.

We have retained the RBP estimate of 0.18% for this estimate. However, we are concerned that the actual need for liquidity during the pandemic was significantly higher than the amount assumed in the RBP calculation. Therefore, we will consider and update our approach to liquidity costs for RBP update 2.

In CAP2139 the CAA continues to ignore the evidence we have provided and assert that an allowance of 0.1% is sufficient for issuance and liquidity costs combined.[52] The CAA has neither engaged with the evidence we have provided, nor undertaken any analysis to support its estimate of 0.1%. This is a serious failure of regulatory due process. Our approach clearly links the costs of liquidity to the size of the liquidity facility required for a notional company and the costs of such a facility. If the CAA believe the cost should be lower, they should explain this by reference to alternative assumptions that are grounded in market data.

5.6.3.6 Overall cost of debt

Table 10 sets out our estimates of the cost of debt for Heathrow in H7. The table shows the direct interest cost of the debt and the additional interest costs incurred for issuance and to maintain liquidity.

Table 10: Overall Cost of debt for H7

	IBP	RBP	Update 1 Full RAB Adjustment	Update 1 £300m RAB adjustment
Cost of embedded debt	1.98%	2.10%	1.70%	1.70%
Cost of new debt	0.06%	0.65%	0.67%	0.67%
Weighting of new debt	12.5%	12.5%	12.5%	7.5%
Cost of Debt	1.74%	1.92%	1.57%	1.62%
Issuance and Liquidity Costs	0.20%	0.18%	0.18%	0.18%
Overall Cost of Debt	1.94%	2.10%	1.75%	1.80%

Source: Heathrow

[52] CAP2139A, Appendix J Para. 161

The overall cost of debt of 1.75% is lower than the 2.10% included in the RBP. This difference is driven by the lower cost of embedded debt following the substantial raising of debt since September 2020.

5.6.4 Overall WACC

Setting the right level of WACC is important for encouraging investment and achieving the right long-term outcome for consumers. Table 11 sets out Heathrow's estimate of the WACC required for H7 for our base case, and for a case with a RAB adjustment of only £300m. The estimates are soundly based on current market evidence and robust and transparent analysis. We consider that the level of WACC set out in Table 11 is the minimum efficient level required for H7.

Table 11: Heathrow WACC for H7

	IBP	RBP	Update 1 Full RAB adjustment	Update 1 £300m RAB adjustment
Gearing	60%	60%	60%	65%
Cost of Equity Post Tax	8.3%	13.7%	14.2%	20.2%
Cost of Equity Pre-Tax	10.0%	16.9%	18.6%	26.3%
Cost of Debt	1.93%	2.10%	1.75%	1.80%
Post-tax (Vanilla) WACC	4.48%	6.73%	6.75%	8.23%
Pre-tax WACC	**5.2%**	**8.0%**	**8.5%**	**10.4%**

Source: Heathrow

The post-tax WACC for the case with full RAB adjustment is very close to that used for the RBP. The increase in pre-tax WACC largely reflects the increase in taxation rate.

We will continue to review developments in market data during 2021 and provide the CAA updates on our estimate of the appropriate WACC later this year.

5.7 H7 financial modelling and financeability updates

5.7.1 Introduction

Since the publication of our RBP, our traffic outlook for 2021 and H7 has deteriorated further. This has been despite constructive developments around vaccination rollout and reducing infection rates in the UK and abroad, which have allowed for a partial reopening of air travel.

Despite the extensive business protection programme implemented since early 2020 to reduce costs, boost our liquidity position and protect our financial covenants; lower traffic and therefore lower cashflow generation continue to be meaningful risks for our financial covenants. Our June 2021 Investor Report outlined for instance the limited headroom we anticipate to one of our cashflow-based covenants this year: "*no covenant breach forecast at Heathrow Finance but a reduction of only £66m in cashflow/EBITDA is likely to lead to a breach of Heathrow Finance ICR covenant under the base case scenario*". These challenging trading conditions may also have knock-on effects on our credit ratings as evidenced by the negative outlook put on by Standard & Poor's and Fitch in their latest reviews.

While further management actions may be required and sufficient to mitigate some of the risks to our financial covenants in the short-term, appropriate regulatory support must come through to support our swift return to appropriate credit metrics commensurate with a strong A- credit rating. This is a critical assumption used by credit rating agencies in forming their most recent opinions as well. Returning to a strong A- credit rating will ensure that we can maintain our credit community's trust, raise debt financing in a cost-efficient manner and thus, keep airport charges lower than they would be otherwise.

In this section, we outline the additional management actions taken to continue protecting Heathrow's financial resilience given the slower than expected recovery of air travel. We also reiterate our approach to debt financeability during H7 in line with our December 2020 RBP. In particular, we stress again the need for:

- A stable, consistent and supportive regulatory framework;
- A swift return to a strong A- credit rating to unlock access to cost-efficient debt financing;
- A minimum cashflow generation during H7 to protect our credit ratings using a P0 adjustment at the start of the settlement

We also provide several sensitivity analyses to demonstrate the robustness and financeability of our plans.

5.7.2 Further management actions implemented to protect Heathrow's financial resilience since our RBP

Heathrow's management has continued to take a proactive and cautious approach in handling the airport's cashflows and balance sheet.

As it became evident that the traffic recovery was stalling in late Summer 2020, Heathrow implemented a second wave of cost reduction initiatives in the last quarter of 2020 to protect its financial resilience. This, combined with the actions put in place from the start of the crisis, allowed us to secure overall c.£400m of gross operating cost savings during 2020.

By the end of the first quarter of 2021, the benefits of these swift and decisive management actions were crystallised in a year on year reduction of over 33% in our operating costs

between Q1-2020 and Q1-2021, while Heathrow's cash burn reduced by over 50% between Q1-2020 and Q1-2021.

As part of our prudent financing approach, we also accessed global debt capital markets and raised just over £1.3bn of additional liquidity, meaning that as of the end of May 2021, we could cover our forecast obligations into 2025 under our current base case scenario which assumes 21.5m passengers travel through Heathrow in 2021.

The £600m capital injection secured in 2020 combined with the interim £300m RAB adjustment recently confirmed by the CAA have provided more headroom to our gearing covenants.

Finally, as an additional precautionary step, we also elected to extend the reprofiling of some of our swap portfolio so that we could secure additional interest savings in 2021 and 2022 while traffic recovers. This mitigation means that we now anticipate around £358m of interest savings in 2021 and £257m interest savings in 2022 and provides additional headroom to our cashflow based covenant – Interest Cover Ratio ('ICR').

As reported in our June 2021 Investor Report, we do not forecast any covenant breach across our debt financing platform, but the headroom to our cashflow based covenant is limited and remains under pressure until traffic and cashflow generation recover more meaningfully. We are considering all options available to address these challenges in 2021.

During H7, we will continue managing Heathrow's finances and capital structure in a prudent and proactive manner. The CAA will, however, have a critical role in supporting our financeability, especially through allowing minimum cashflows to be recovered in a timely manner so that we can meet our cashflow based covenants and other credit metric requirements.

5.7.3 Consistent and stable regulation must underpin Heathrow's financeability

The aim of regulation is to provide a framework that allows for efficient debt and equity financing. This minimises costs for consumers in the short-term while allowing the long-term interests of users to be served by maintaining and improving assets, and thereby service levels.

The role of strong and stable regulation in providing efficient access to debt markets is highlighted by the three major credit rating agencies:

> **Standard & Poor's**
>
> ***04/03/21 -*** *"We think the U.K. aviation regulator, the CAA, will take a balanced approach that will support Heathrow Funding Ltd.'s (HFL) financeability. We therefore think the regulatory framework in the period starting January 2022 (H7: 2022-2026) should remain supportive and transparent […]""We still expect HFL to deliver its weighted average FFO to senior debt of 6%-7% during 2021-2023 and FFO to total debt of 4%-5%. We consider these ratios to be very tight for the rating, limiting the company's financial flexibility given the high level of debt issued by entities outside the group ring fence. However, we expect these ratios to improve in 2022, subject to the outcome of the regulatory reset in 2022." "Based on the CAA's track record and statutory duty, we think it will take a balanced approach such that HFL can sustain credit metrics at least commensurate with the current ratings, considering our traffic assumptions. We think the CAA will support HFL's financeability while considering the affordability of charges for airlines and ultimate customers, as well as future expansion*

needs." "We would also downgrade the Class A and Class B debt if the regulatory tariff set for H7 is such that HFL cannot achieve weighted average FFO to senior debt of at least 7% and weighted average FFO to total debt of at least 5%"

09/08/19 - *"Key strengths: A supportive regulatory environment, ensuring recovery of investment and good predictability of cash flows over five yearly resets." "In our view, the regulatory framework under which Heathrow operates is predictable and supportive. It is based on the RAB concept, which encourages investment by allowing recovery of capex costs via tariffs. A fair return over the RAB ensures the business' profitability and shareholder returns, which grow in line with capex."*

Fitch

31/03/21 - *"The affirmation reflects our expectation that Heathrow's supportive regulation and significant market power as primary hub airport, will allow it to significantly increase 2022 aero tariffs, by around 40% to 50% in nominal terms …" "We also note the regulator's mandate to ensure capex can be financed in addition to affordability to end-users as supportive"*

Moody's

15/12/20 - *"Credit strength: long established framework of economic regulation" "LHR is subject to a framework of economic regulation that is considered appropriate and transparent. It is a form of price cap regulation that has proven to permit fair recovery of costs and generates a reasonable return on invested capital."*

There are at least four areas that underpin consistent and stable regulation:

- A "regulatory reset" that is genuinely informed by current market conditions, rather than goal-seeking to meet a short-term challenge on the airport charge and gives Heathrow a "fair bet" to earn a return.
- The timely enforcement of regulatory principles, in particular the "Full" adjustment to the RAB at the start of H7 that underpins equity support for the long-term. This is discussed in full in Chapter 5.1 – RAB Adjustment.
- A WACC that is aligned to the systemic risks that investors face, including a market-based approach to calculating the Cost of Debt and Cost of Equity. This is discussed in full in Chapter 5.6 – H7 WACC Updates.
- A Regulatory Framework that evolves to meet the challenges of the period, rather than one that introduces revolutionary new concepts that add complexity and rigidity at a moment where flexibility and predictability are key. This is discussed in full in Chapter 6.1 – Updates to our H7 Regulatory Policy Proposals.

5.7.4 Restoring a strong A- credit rating to unlock cost efficient debt financing

Heathrow's senior debt is rated BBB+/A- by Standard & Poor's (S&P) and Fitch, both with negative outlook.

In March 2020, as the passenger traffic outlook worsened, S&P downgraded Heathrow's debt by one notch from A- to BBB+, moving Heathrow's debt to BBB in some investor portfolios. In early March 2021, S&P affirmed Heathrow's debt and took it off CreditWatch negative, signalling that a further downgrade was delayed for the time being. The decision reflected the benefits of Heathrow's management actions throughout the crisis to cut costs, to strengthen its liquidity position and protect its covenants through a £600m capital injection into the regulated business and the reprofiling of its swap portfolio to secure interest savings during 2021 and 2022. Critically, the decision also reflected S&P's expectation that the CAA will take a 'balanced approach' in defining the H7 settlement and ensure that Heathrow can generate sufficient cashflows to meet its credit ratings requirements through higher airport charges. In a similar vein, Fitch affirmed Heathrow's senior debt credit rating at A- in late March 2021, recognising the benefits of management actions and highlighting their assumption that the regulatory reset due in 2022 would allow credit metrics to return to levels commensurate with an A- rating from 2022.

Credit rating agencies have been clear that further action could be taken in the event that passenger volume outlooks worsen or if, as shown above, the CAA does not take appropriate regulatory action. This is evidenced by the negative outlook maintained by both rating agencies on Heathrow's senior and junior debt. Any further downgrade by either S&P or Fitch at Class A to BBB/BBB+ would firmly anchor Class A debt into BBB territory. It would also move Class B debt to sub-investment grade territory as rating agencies apply a systematic gap between the two tranches.

In sections 8.1.4 and 8.1.6 of the RBP we clearly state and evidence that Heathrow must return to an A- credit rating swiftly through H7 in order to ensure that Heathrow can retain creditors' confidence and effectively and efficiently finance H7. Returning to stronger credit metrics is also critical to ensure access to deeper pools of liquidity and to the most cost-efficient sources of debt financing and hedging capacity. This is ultimately to the benefit of consumers, who would bear the costs of inefficient debt financing caused by targeting a credit rating lower than A-.

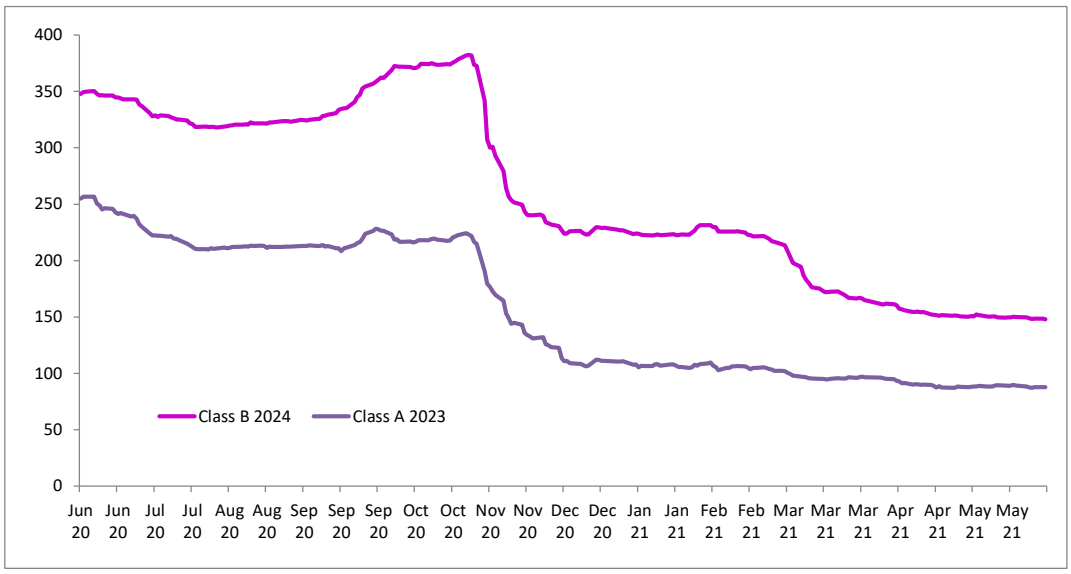
In our RBP and response to CAP1966 we set out that, assuming we raised around £3bn in the next two years with an average duration of 10 years, a one notch credit rating downgrade would lead to an increase of at least 100bps or a £300m additional interest cost to be reflected in charges over the duration of this debt financing. This cost would be borne by consumers.

We have refreshed this assessment with updated market data using a similar approach based on the credit spread differential between Class A and Class B debt. While this differential has recovered from its widest level at the peak of the crisis from over 100bps to circa 60bps currently, we would still anticipate an incremental interest cost of at circa. £190m over the duration of the £3bn debt financing considered for our illustration. The chart below illustrates the evolution of this differential over the last 12 months.

It should also be noted that such a downgrade would have additional implications, which are difficult to quantify at this stage but cannot be ignored. We mentioned earlier that an A- credit rating ensures access to not only deeper pools of liquidity but also better hedging capacity. Hedging capacity is critical to Heathrow's non-sterling debt financing, which is absolutely needed due to the size of Heathrow's financing requirements and has proved to provide more cost-efficient sources of financing since the debt financing platform was set up. A continuing credit rating downgrade could reduce Heathrow's pool of hedging counterparties and therefore its capacity to access the non-sterling market resulting in an increased cost of debt financing. In summary, while we would expect sterling credit spreads movements to provide a reasonable proxy to assess a minimum incremental cost of debt related to a credit rating

downgrade, we should not ignore additional collateral damages to Heathrow's ability to fund itself efficiently – hedging capacity provides a relevant illustration for that purpose.

Figure 1: Heathrow Class A and Class B £ secondary spreads over gilts



Source: Bloomberg

A- is also a rating that the CAA and DfT acknowledged allows us to invest efficiently:

- *"A credit rating materially lower than the existing A- rating referred to above would not be compatible with efficient financing."* CAP1876
- *"It is important that the price control we set for HAL allows it to finance investment efficiently. While the level of capex will be much lower, given we are focusing on HAL operating a two-runway airport with expansion paused, HAL will continue to have a very substantial RAB to finance as well as its ongoing investment."* CAP1940

The CAA appear to have indicated they are now willing to target a lower rating, with analysis in the *Way Forward* document focusing on the thresholds required for a BBB+ credit rating.

In line with our view that it is appropriate for the CAA to take a notional approach to Heathrow's financing, we set out in the RBP that, at a notional gearing of 60% the appropriate financial ratios to target are those for BBB+ assuming the necessary RAB adjustment of £2.5bn (2018p) is put in place. The use of BBB+ is consistent with the view taken by the CMA in 2008 for Heathrow with a notional gearing of 60%[1] and in 2020 for water companies with a gearing of 60%. However, in practice, credit rating agencies give a one notch benefit for companies with structured debt. This means that the credit rating thresholds for a BBB+ rated company without structured debt are the same as those used for an A- rating with structured debt. If the CAA is proposing to target a BBB+ rating for the notional structure at a 60% gearing, it should set thresholds commensurate with this rating for a company without structured debt. These are equal to those that Heathrow, with structured debt, requires for A-. Without targeting these thresholds, the CAA will not set an H7 settlement that can be funded efficiently through debt financing. If the CAA were to only allow a £300m RAB adjustment, we would still expect the notional gearing to return to the 60% target by the end of the price control period in 2026. That

[1] Competition Commission, *Heathrow Airport Ltd and Gatwick Airport Ltd price control review*, 2007, Appendix F, paragraph 27

would effectively mean an average 65% notional gearing in this scenario but no change on expected credit metrics requirements to ensure cost effective financing.

Investors have been explicit with Heathrow about the need to maintain and return to A- credit ratings. For some investors, their capacity to invest in Heathrow's credit is defined by their portfolio mandate and will be constrained to holding A- rated bonds. A downgrade below A- will mean they need to reduce or remove any exposure to Heathrow's credit. For other investors, Heathrow losing its A- rating will mean they would face higher capital requirements to continue holding their Heathrow bonds. In both cases, the capacity to support refinancing will become more limited. A downgrade to BBB+ will likely lead investors to sell their position or choose not to further increase their exposure. Without a settlement from the CAA which allows a return to credit metrics aligned with an A- credit rating, raising debt will become increasingly difficult and expensive, which would be inefficient for consumers who would bear these costs.

The fact that Heathrow has been able to continue accessing financing despite being downgraded should not be mistaken for a signal that creditors will be content to retain this credit rating throughout the H7 period or that Heathrow can achieve the same cost efficient financing at this downgraded rating for H7. Continued access to debt financing was only possible during the last 18 months due to:

- The pandemic being considered a temporary issue in nature. Creditors expect a return to stronger metrics and an A- credit rating. This is reinforced by the fact that Heathrow is regulated and with a regulatory reset due in 2022 allowing building blocks to be reset to reflect current market and trading conditions.
- Higher spreads than pre-pandemic and relatively higher spread than other regulated businesses offering creditors a good opportunity to buy bonds with Heathrow's credit fundamentals remaining effectively unchanged and the expectation that credit ratings will recover to A- after the impact of the pandemic.

As we set out in section 8.1.6.2 of the RBP, while credit rating agencies take a forward-looking approach to forming their credit opinions and the temporary hampering of credit metrics may be smoothed out by agencies looking at a horizon of longer than one year, it is not likely that credit rating agencies will be able to look past both the impact of Covid-19 over recent years and lower performance against thresholds in the early years of H7 when making their assessments. This is evidenced by comments made by Fitch stating "*Overall, we expect that this will enable Heathrow to deleverage below our rating sensitivities of 8x for the class A and 9x for the class B by 2022 and 10x for the HY notes by 2023*."

The table below is a reminder of the key credit rating thresholds required by S&P and Fitch to meet metrics commensurate with an A- rating. These thresholds have been sourced from recent credit opinions or historical engagement with these ratings agencies.

Table 1: Credit metrics and their thresholds

Credit Metrics	Thresholds
FFO/Net Debt (S&P's)	>8%
Net Debt/RAB (S&P's)	<70%
PMICR (Fitch)	>1.6x
Net Debt/EBITDA (Fitch)	<8.0x

Source: Heathrow, Standard & Poor's, Fitch

It is important to note that these metrics:

- are assessed in conjunction with other credit fundamentals, helping agencies to assess Heathrow's business risk profile. A stable, transparent and supportive regulatory environment is one of these key considerations.
- are negative rating action thresholds so an appropriate level of headroom needs to be maintained.
- have a critical time component, so for instance, while rating agencies may choose to look through a temporary impairment of credit metrics due to the pandemic, their credit opinion will be based on a time-bound return to stronger metrics.

5.7.4.1 Minimum cashflow requirements and P0 adjustment

In addition to the regulatory reset in 2022 reflecting Heathrow's current trading conditions, it will be critical that the settlement enables timely recovery through charges to cover our costs and support our cashflow credit metrics – or we risk a downgrade in our credit rating.

Heathrow must generate sufficient cashflows to support its metrics

We have to protect our A- credit rating. This will ensure we can maintain the trust of our credit community and the stability of our spreads and therefore unlock access to cost efficient debt financing that will help fund our operations and continued capital investment costs. Financing costs contribute to c.52% of our airport charge hence the importance of keeping them efficient for the benefit of consumers.

The key metric to strengthen and protect our credit ratings is our FFO to Net Debt, which must be returned to healthier levels and demonstrate consistently sufficient headroom above the 8% threshold set by S&P historically – including before any dividend distribution. While the FFO/Net Debt metric is the more constraining measure to return to appropriate level, Fitch's Net Debt/EBITDA is also under pressure in 2022 in the Full Adjustment case in particular, reinforcing the need for minimum cashflow generation to avoid any further negative rating action.

[REDACTED]

[REDACTED], we require a minimum average charge of £29 (2018p) or £33 (nominal) prior to equity remuneration. This is an absolute minimum threshold as continued dividend forbearance cannot be a sustainable approach to Heathrow's financeability.

As a result, the CAA will need to use other levers such as the RAB (additions through capex and return of RAB through depreciation), return on RAB (WACC) and profiling of charges (P0) to find the best possible combination whilst hitting a minimum average annual revenue of £3bn.

For both cases considered, our plan provides the best combination to optimise charges for the benefit of consumers while protecting Heathrow's financeability.

A P0 adjustment remains critical to Heathrow's financeability

The even more gradual recovery in passenger traffic and especially lower passenger forecast in 2022 and 2023 than anticipated in our RBP exacerbates the challenge of meeting these

requirements. In both cases considered, our financial analysis shows that a higher P0 than was estimated in our RBP is now required to maintain our credit metrics as a result of lower traffic volumes anticipated in the early part of H7. According to our financing analysis, the pressure on credit metrics in the early years of H7 is particularly acute in the Full Adjustment case, due to a relatively lower WACC. Consequently, a combination of higher P0 and a declining tariff would be required to sustain appropriate credit metrics in that case.

In both cases, it remains critical that our tariff profile includes a one-off P0 adjustment in 2022 to appropriately support our cashflow-based credit metrics from the start of H7. The adjustment will smooth airport charges during H7. It will avoid a steep increase over the five-year period and support our credit metrics by bringing forward revenues from later years. While this approach brings no net present value benefit to Heathrow, it mitigates the highly likely risk of credit rating downgrades which would lead to a higher cost of debt and higher airport charges for consumers.

There is no other magic solution to this challenge – an equity injection cannot fix the fundamental need to meet minimum cashflow metrics to retain our A- investment grade credit rating. That is a rating that the CAA and DfT acknowledge allows us to invest efficiently as mentioned earlier.

5.7.5 Financeability assessment

This section provides a refresh of the financeability assessment run in our RBP. It considers our P50 traffic scenario and two cases in relation to our request for a RAB adjustment. The first case ('Low Adjustment') assumes a £300m (2018p) RAB adjustment where the CAA does not go beyond the interim intervention confirmed in April 2021. The second case ('Full Adjustment') assumes a £2.5bn (2018p) RAB adjustment where the CAA grants the adjustment requested by Heathrow. Our assessment also assumes a notional balance sheet consistent with regulatory precedent. It sets out the tariff profile required and compares key credit metrics against the targets set out earlier to return to a strong A- credit rating. The analysis also includes the RAB profiling adjustment mechanism that was used in Q5 and that was part of our Q6 licence. This adjustment compensates for the impact of the lower or higher revenue generated compared to revenue requirements. The assessment has been undertaken using the CAA's Price Control Model ('PCM').

Since our RBP, and after further investigation of our metrics in the PCM, we have uncovered a few more modelling challenges in the PCM explaining the discrepancies we see between the ratios obtained on our actual balance sheet and those calculated by the PCM. We are, however, confident that under our actual structure, our credit metrics would return to or above required thresholds from 2022 under both cases, albeit with limited headroom in 2022 compared to required thresholds. This would be subject to securing the terms put forward in both plans in terms of WACC, tariff profile, P0 adjustment and depreciation adjustment where appropriate.

In the first subsection, we set out an analysis of the two cases outlined above using the PCM.

In the subsequent section, we test the robustness of our plans with possible stress scenarios:

- Using a tariff profile without a P0 adjustment
- Using a lower WACC reduced by 200bps
- Increasing the cost of new debt to 5% nominal from 2022
- Reducing inflation by 2% over H7

- Reducing passenger numbers to our P10 forecast and factoring in a RAB based only risk sharing mechanism

5.7.6 Assessing the financeability of our two cases

Liquidity requirements

Both cases are financeable with a mix of cashflows from operations and debt financing, supported by ongoing equity commitment provided we secure an appropriate WACC for the cases considered and minimum cash inflows to support our credit metrics from the start of H7.

Taking into account the additional £1.3bn debt financing raised since our RBP, our liquidity horizon currently extends into 2025 under both cases considered. Above and beyond this, we expect that up to £1bn to £2bn (nominal) of gross debt financing per annum will be needed during H7 in addition to cashflows from operations so that we can meet our forecast obligations.

Assessment of our credit metrics

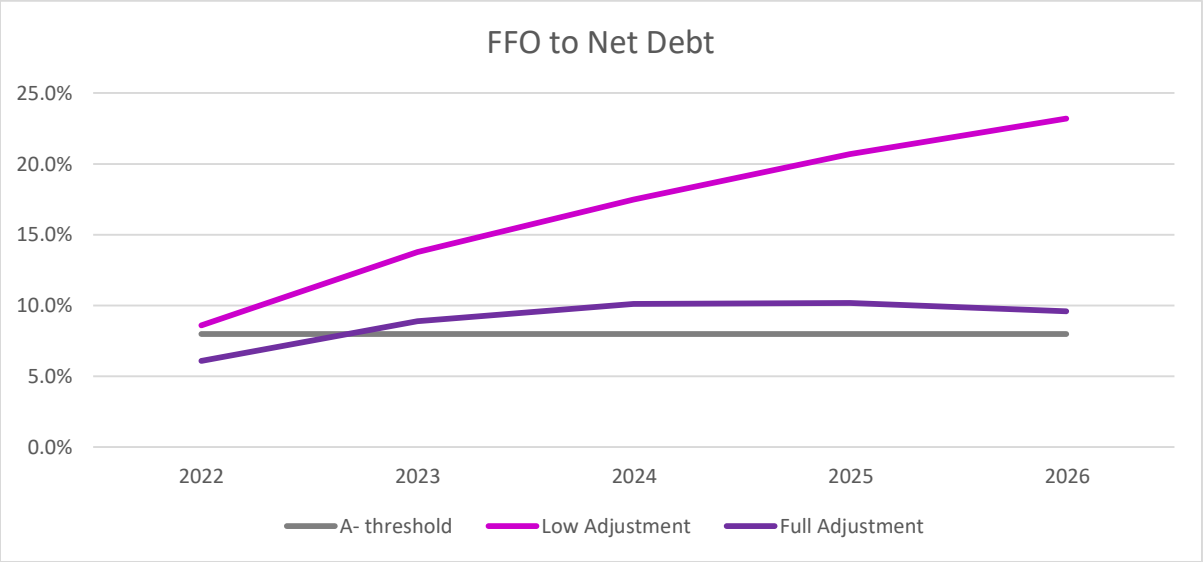
Our senior debt is rated BBB+ by S&P and A- by Fitch. We have reiterated the criticality of an A- rating to ensure we can fund Heathrow's operations efficiently for the benefit of consumers.

Considering the key target ratios, firstly on a notional balance sheet basis, we assumed an average gearing of 65% under 'Low Adjustment' (£300m RAB adjustment) and 60% under 'Full Adjustment' (£2.5bn RAB adjustment). We expand on the rationale for these assumptions in the WACC chapter. Despite the differentiated approach, these notional gearings remain well within S&P's threshold of 70%, confirming this metric is not a material constraint for our financeability assessment.

The most constraining credit metric in our analysis remains our Funds From Operations to Net Debt (FFO/Net Debt). Under the notional structure, this metric will hardly be above the required threshold of 8% in 2022 in the Low Adjustment case and only return above the threshold from 2023 in the Full Adjustment case with an adequate P0 adjustment. This illustrates the risk of credit rating downgrade we could face without appropriate regulatory support to ensure minimum cashflows are generated and appropriate headroom is maintained compared to this 8% threshold through a P0 adjustment.

Figure 2 below sets out the FFO/Net Debt ratio for 'Full Adjustment' and 'Low Adjustment'. It illustrates the cashflow pressures that Heathrow will be facing in the early part of H7 and the lack or inappropriate headroom to the required threshold we are likely to experience in 2022 in both cases. The issue is more acute under the Full Adjustment case with a relatively lower WACC.

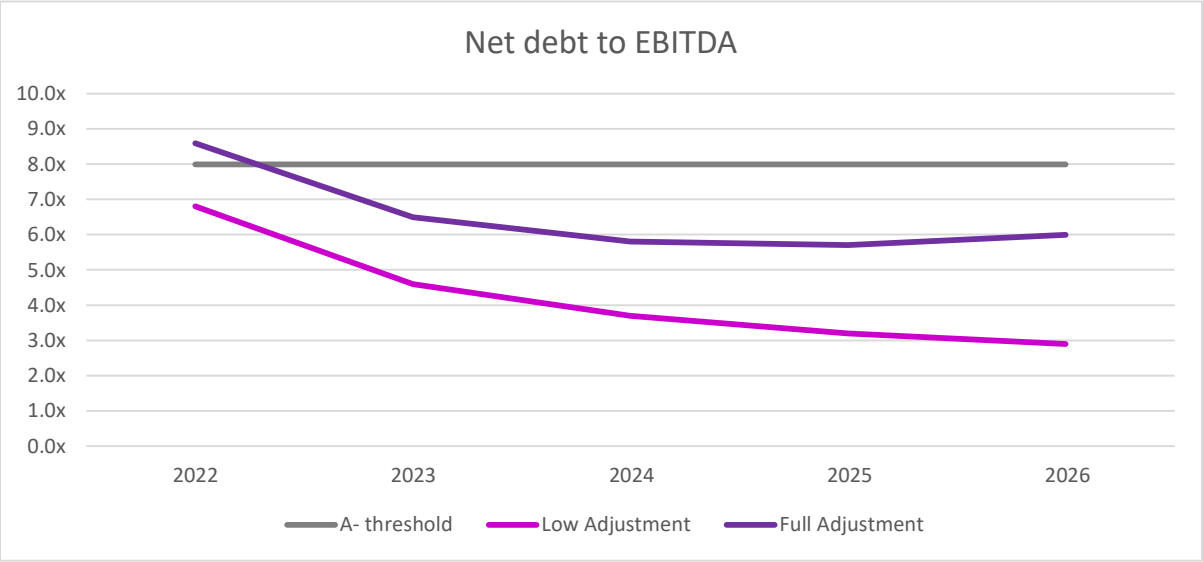
Figure 2: FFO to Net Debt



Source: Heathrow, PCM

Turning to Net Debt to EBITDA, 'Full Adjustment' and 'Low Adjustment' present two different outcomes driven by the different WACC profiles envisaged. Under the Low Adjustment case, the higher WACC will result in relatively better cashflow credit metrics although the limited headroom remains a risk in 2022 in particular. The Full Adjustment case sees this credit metric returning below the required threshold only in 2023 despite a P0 adjustment. From 2023 onwards, the metric returns to adequate levels under our plans.

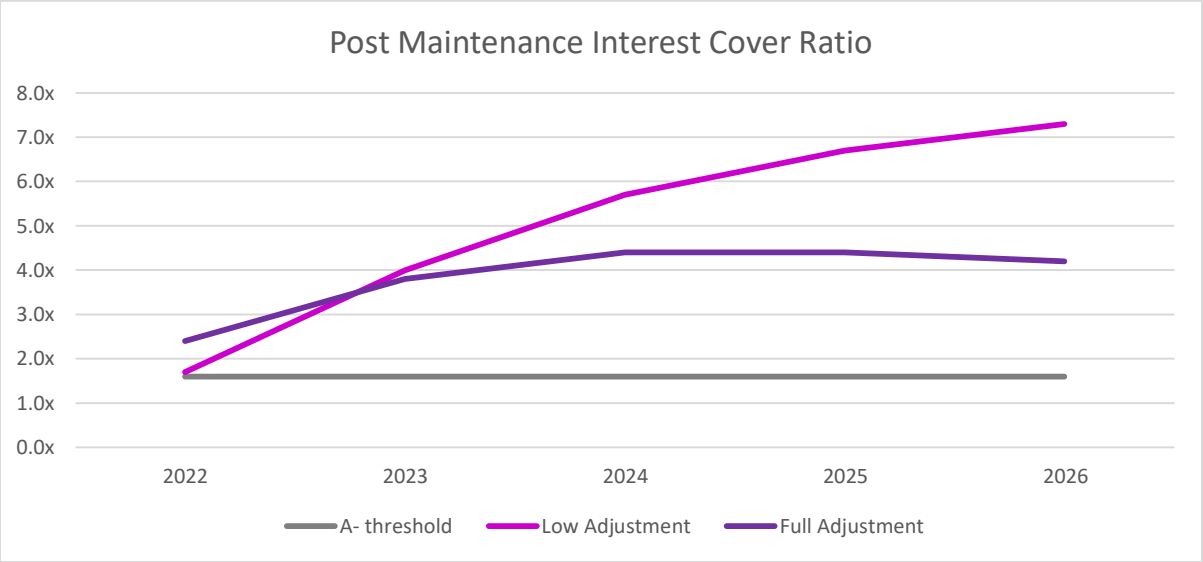
Figure 3: Net debt to EBITDA



Source: Heathrow, PCM

Finally looking at our Post Maintenance Interest Cover Ratio (PMICR), the picture is similar to that of the two other metrics with more pressure/limited headroom in 2022 and a return to adequate levels including headroom from 2023 onwards. Under the Full Adjustment case, the metric is further supported by the lower regulatory depreciation recovery built into our plans.

Figure 4: Post Maintenance Interest Cover Ratio



Source: Heathrow, PCM

Overall conclusions

The analysis above demonstrates that, under a notional structure and based on historic rating agency guidance, the two cases considered are only financeable by utilising existing regulatory mechanisms such as a P0 adjustment to restore stronger credit metrics towards A- and minimise any incremental cost of debt that would lead to higher airport charges and be detrimental to consumers.

As our liquidity requirements are to be met by cashflows from operations and debt financing, ongoing equity support will remain key to support Heathrow's creditworthiness, providing comfort to debt investors and effectively underpinning debt raising activities.

5.7.7 Sensitivity assessment

In line with the approach used in our RBP, we have tested the resilience of both cases envisaged to manage unexpected events. We outline below the key sensitivities that we believe are relevant to assessing the debt financeability of these plans. These scenarios are consistent with those considered in our RBP and include:

1. No P0 adjustment
2. A lower WACC
3. A higher cost of debt
4. A lower inflation
5. Lower passengers

Scenarios descriptions

No P0 adjustment ('No P0')

This scenario assumes our plans are fully materialised except for the regulatory P0 adjustment required at the start of H7. As a result, we apply a tariff profile of RPI + 24% in the Low Adjustment case and RPI + 13% in the Full Adjustment case as per the PCM.

Lower WACC scenario ('Low WACC')

In this scenario, we assess financeability based on a WACC decreasing by 200bps.

Higher cost of debt ('High CoD')

This scenario reflects a risk of debt costs increasing and having to be absorbed by Heathrow before being corrected through the debt indexation mechanism. In this case we assume that the cost of new debt increases to 5% nominal from the start of 2022.

Lower inflation scenario ('Low inflation')

In this scenario, we assume inflation decreases by 2% across H7.

Lower passenger numbers scenario ('Low Pax')

In this scenario, we assume passenger numbers are at P50 for our revenue requirement, but outturn passengers are at P10. We also assume that a RAB based only risk sharing mechanism applies.

Liquidity requirements

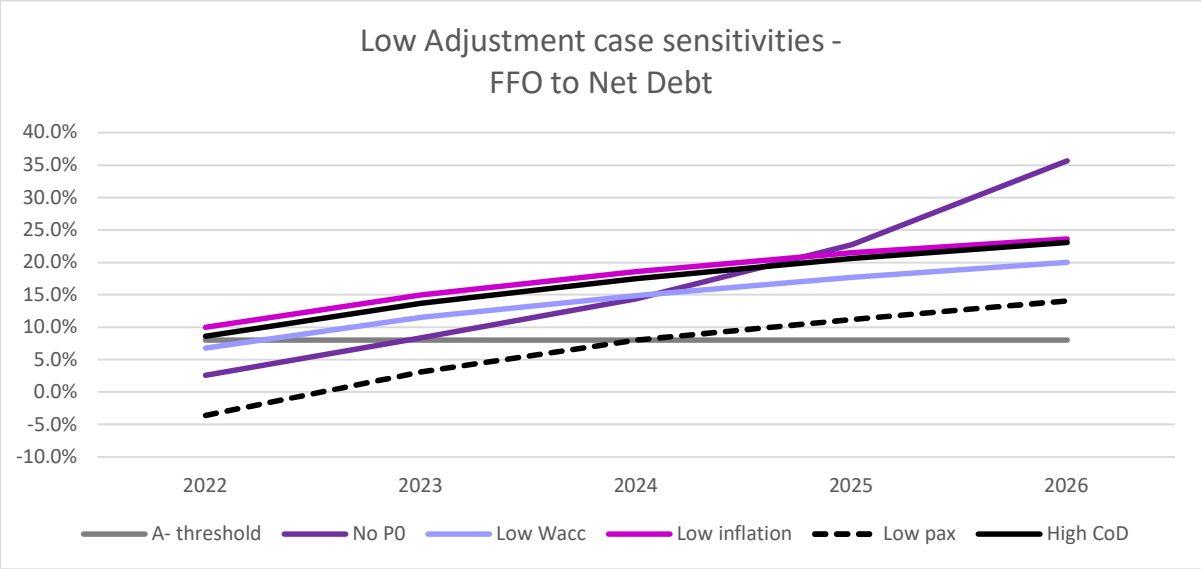
Among the five sensitivities and consistent with our RBP findings, the passenger volume underperformance has the biggest impact on our capacity to raise cost-effective debt financing and would likely lead to covenant breaches and credit rating downgrades.

In that case, assuming the tariff was set using a P50 forecast to establish revenue requirements, cashflow based covenants would be at risk as a RAB based only risk sharing mechanism would not bring sufficient cashflow forward. Cashflow metrics would also not meet required thresholds and Heathrow's debt would most likely be downgraded.

Assessment of key credit metrics

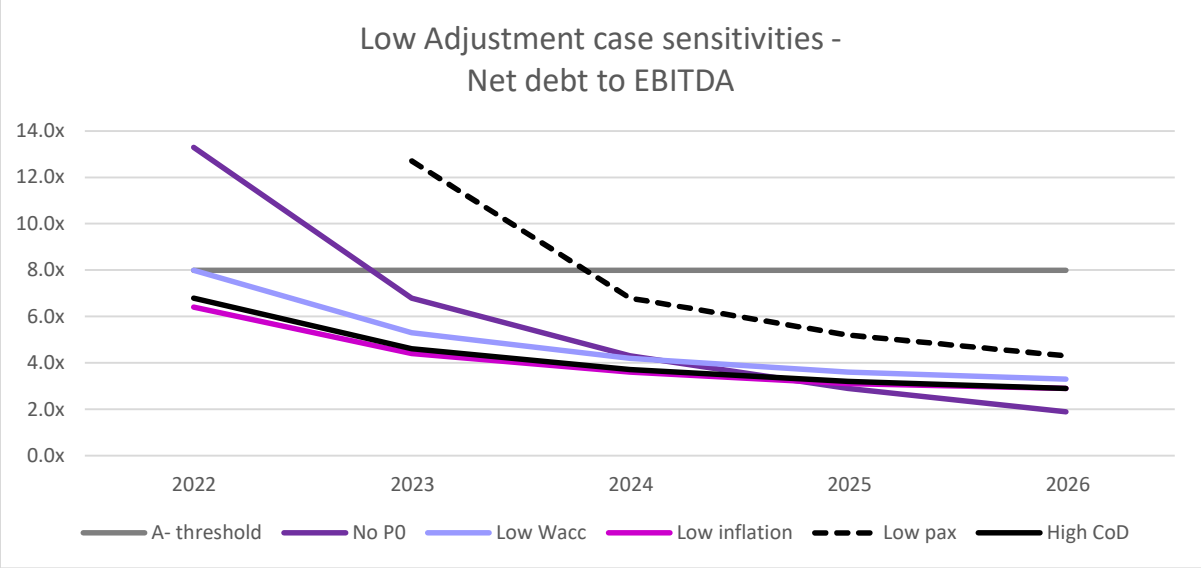
Low Adjustment case sensitivities

Figure 5: FFO to Net Debt



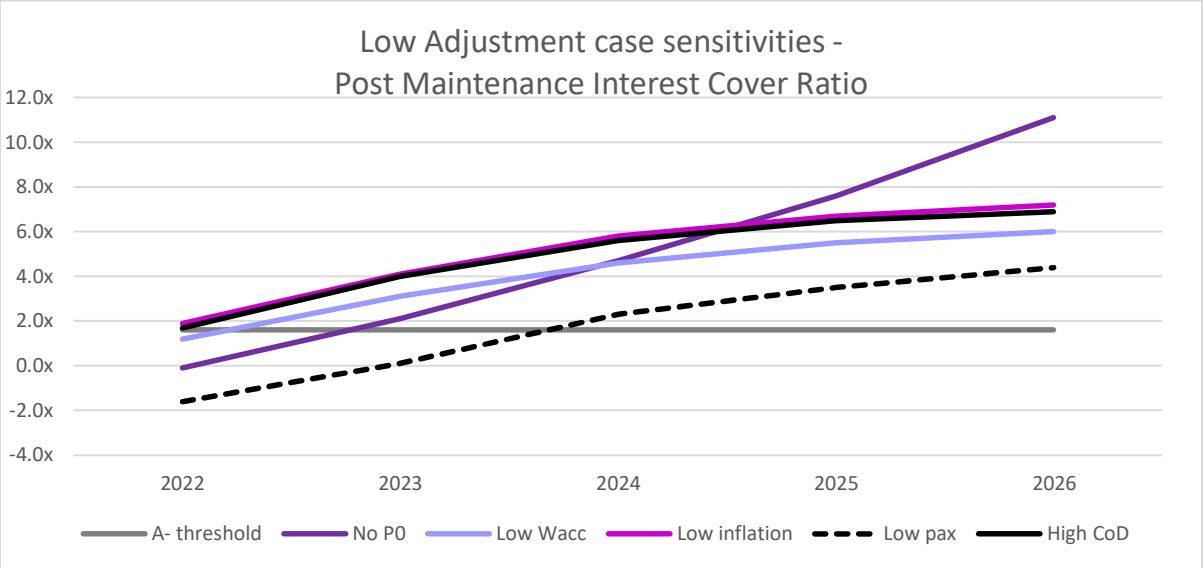
Source: Heathrow, PCM

Figure 6: Net debt to EBITDA



Source: Heathrow, PCM

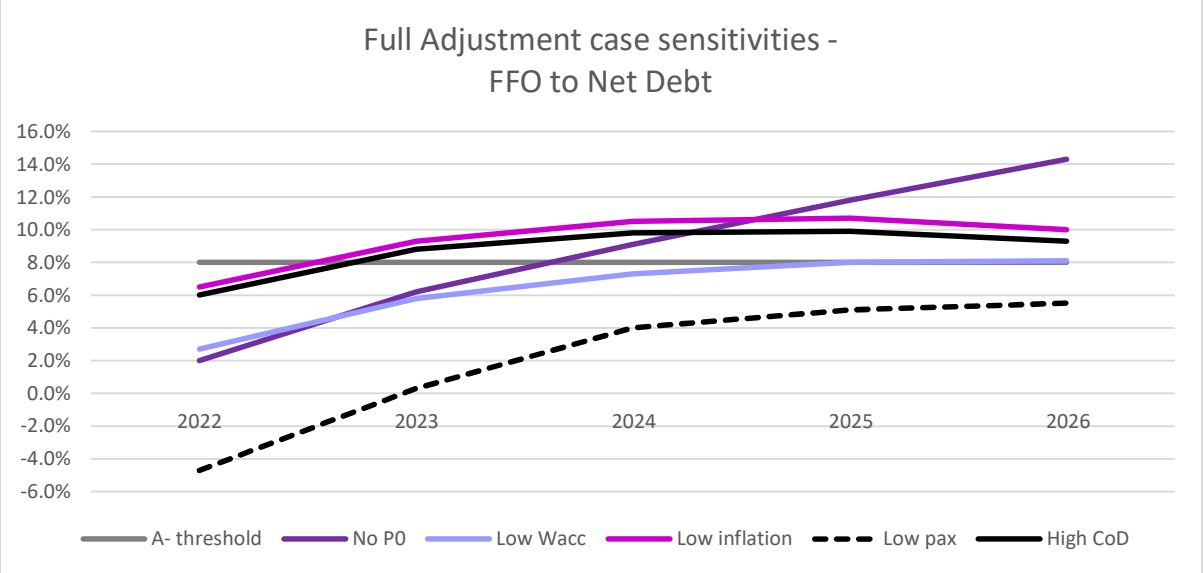
Figure 7: Post Maintenance Interest Cover Ratio



Source: Heathrow, PCM

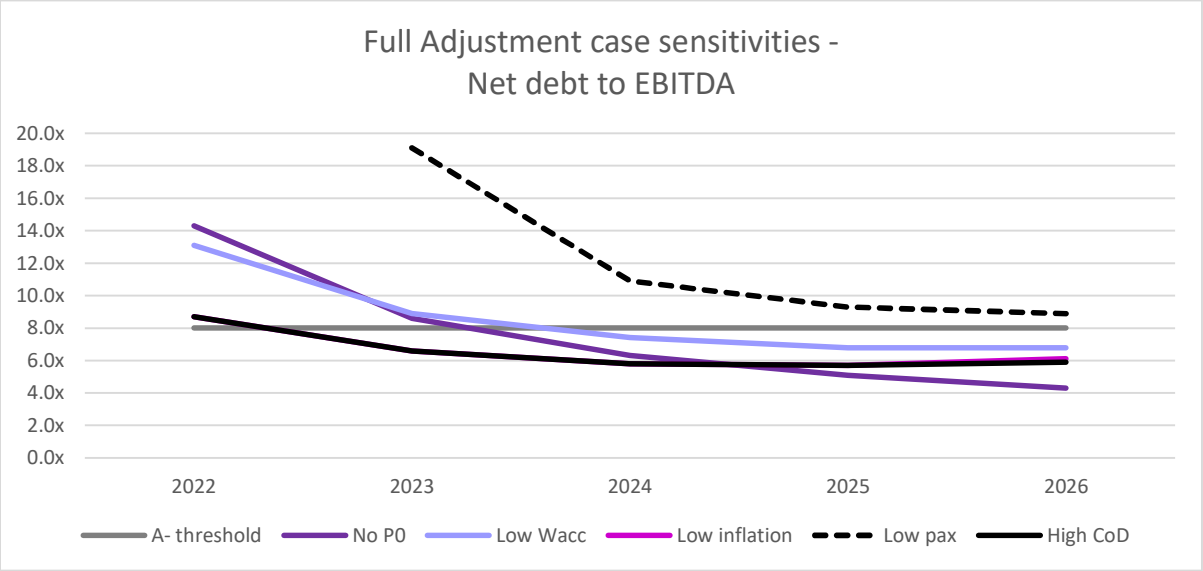
Full Adjustment case sensitivities

Figure 8: FFO to Net Debt



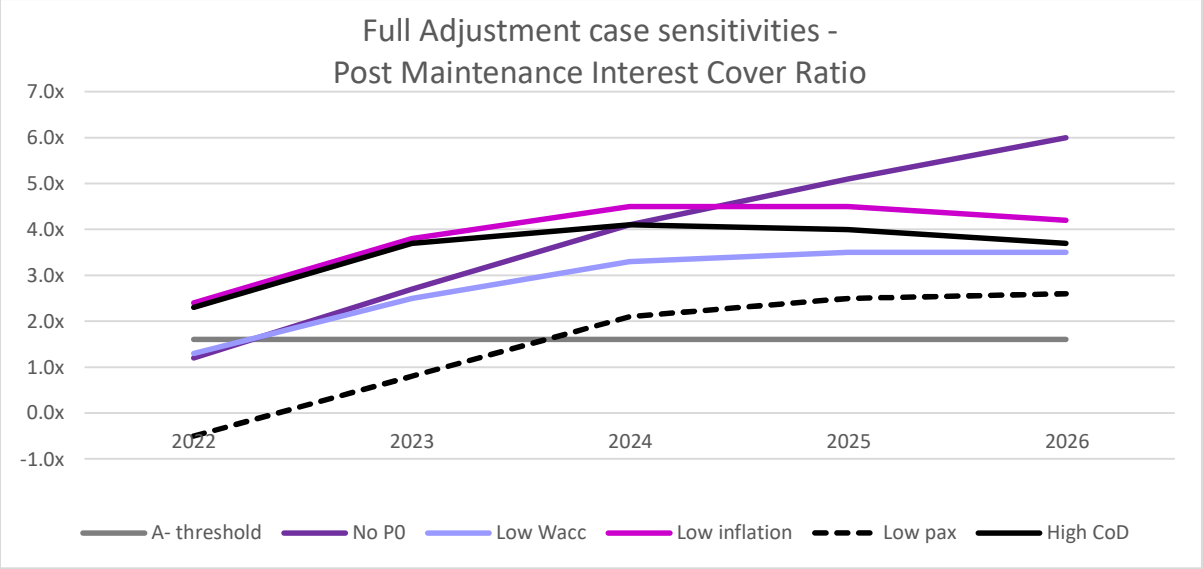
Source: Heathrow, PCM

Figure 9: Net debt to EBITDA



Source: Heathrow, PCM

Figure 10: Post Maintenance Interest Cover Ratio



Source: Heathrow, PCM

Without a P0 adjustment, all our credit metrics are under pressure in 2022 and 2023 for both cases considered, increasing the risk of a downgrade given the weaker metrics we have had during 2020 and 2021 as a result of the pandemic. As a reminder, we have already seen a one-notch downgrade from S&P's in early 2020, while Fitch stated in March 2021 that our A- rating was affirmed on the basis of a return to metrics commensurate with this rating by 2022.

In a low WACC scenario, we will not meet our credit metrics thresholds either in the early part of H7. The issue is particularly exacerbated in the Full Adjustment case for our FFO/Net Debt and Net debt/EBITDA, especially if we maintain the same level of depreciation adjustment,

reinforcing the fact that these features cannot be cherry picked. Most importantly, the assumed cost of equity would not be investable for our shareholders so would have consequences on investment decisions and future benefits for consumers.

The low inflation and high cost of debt scenarios present similar outcomes under both cases considered. While all credit metrics are under pressure in 2022, we can see overall a relatively more limited impact compared to other sensitivities.

Passenger underperformance vs forecast of the magnitude considered would have the biggest impact on our metrics, increasing significantly the risk of covenant breaches and credit rating downgrades from both S&P's and Fitch. In this updated analysis, we have included a risk sharing mechanism feature based on a RAB adjustment only. We also note that the Net Debt/EBITDA 2022 data was removed from the charts for ease of reading as it was well above 100x in both cases considered. Our financial analysis demonstrates that in a scenario with a material or prolonged deviation from our traffic central case, cashflows will need to be brought forward in a timely manner to protect our financeability. Failing this, our cashflow based covenants would be at risk of breaching during H7 and our credit metrics would also be impaired significantly. We consider the potential regulatory mechanisms for this further in the risk sharing section of Chapter 6.1 - Updates to our H7 Regulatory Policy Proposals.

5.7.8 Overall conclusion

Our analysis shows that both cases considered are only financeable if the interlocked assumptions of WACC, RAB adjustment, regulatory depreciation and P0 tariff adjustment are protected as a single integrated package.

Further analysis also demonstrates that while a RAB based risk sharing mechanism will support an appropriate balance of risk and reward over the long term, bringing forward cashflows in a timely manner becomes a necessity if we were to face a material or prolonged deviation of traffic outturn compared to our settlement forecast. Failing this, our cashflow based covenants and credit metrics will be breaching required thresholds.

Our plans pulled all our financing levers as far as possible to balance financeability and affordability. This means that minimum cashflows will be required to support our credit metrics and any attempt to cherry-pick would require other adjustments resulting in a negligible net impact on aeronautical charges.

6.0 Updates to our H7 regulatory framework proposals

6.1 Updates to our H7 regulatory policy proposals (including capital governance proposals)

6.1.1 Introduction

Following further engagement with the airline community, review of the airline community feedback on our RBP and the publication of the CAA's CAP2139 *Way Forward* document, we are providing an update on our proposals for the H7 regulatory framework.

Heathrow's RAB-based regulatory framework has been, for the most part, successful in delivering increased service and efficiency in the interests of consumers. This can be clearly seen in the outcomes delivered across Q6 – increased passenger satisfaction, increased efficiency and increased commercial revenues. While the impact of Covid-19 has highlighted some important issues which must be resolved for H7, it is important that we do not lose sight of the success of the framework we have and why it was established.

The purpose of RAB-based price control regulation is to create long-term incentives for private capital to behave efficiently, invest in assets and increase service levels in the interests of end users. It does this by setting out the basic principle that investors are entitled to receive remuneration of their efficiently incurred capital and to have a 'fair bet' of earning their cost of capital. The benefits of this form of regulation can be seen at Heathrow and have been highlighted by bodies including the Government in its review of the funding arrangements for nuclear power stations, who see that, when working as it should, RAB-based regulation can lead to better long-term outcomes for consumers than other funding models.

Covid-19 has shown that aspects of the framework, in particular the balance of risk and reward for Heathrow's investors, are not fit for purpose. It has also highlighted the CAA's apparent reticence to enforce the basic principles of the price control due to a misguided focus on lowering the short-term airport charge instead of focussing on consumer interests more widely. This imbalance and the destabilising impact of the CAA's behaviour must not be construed as a problem only for Heathrow's investors, as ultimately it will adversely impact consumers. Without regulatory stability and the appropriate balance of risk and reward, consumers will pay more for lower service over time.

For H7, the CAA needs to build on and preserve this stable base to develop a regulatory framework fit to meet the challenges ahead. As set out in the RBP and in our response to the CAA's CAP2139 document, ensuring that H7 is built on a stable and consistent regulatory framework will be important for managing the uncertainty of the H7 period and for ensuring financeability and affordability. The CAA has chosen to set the price control on the basis of a five-year period, which will be important to bring much needed stability into the recovery of aviation post-Covid-19. It is also clear that the CAA has all of the tools at its disposal to ensure that the regulatory framework can manage the current uncertainty and deliver an affordable and financeable outcome. It needs to ensure that these tools are deployed correctly and in a timely manner for H7. Our proposed regulatory framework, along with our proposals for a Covid-related RAB adjustment, effectively uses these tools to create a balanced and financeable H7 settlement which leads to the lowest possible airport charge under the current circumstances.

The CAA must not lose sight of the key issues which need to be resolved for H7 when setting its framework. We are concerned that the CAA's current proposals do not tackle these key issues, but instead focus on creating regulatory remedies for problems which do not exist using precedent from other sectors as the sole justification. A key example of this is the CAA's proposals on capital efficiency. Rather than focus on the key requirement of maintaining flexibility, the CAA is focused on introducing a regulatory mechanism to combat inefficiencies on capital investment, a problem it has not proved exists and therefore cannot prove is harming consumers. The CAA's objective to introduce a mechanism based on that seen in other sectors risks sacrificing the much-needed flexibility which has proven successful in Q6 for a cost certainty which cannot be shown to be beneficial for consumers. In a recent report reviewing the Australian model of airports regulation, authors Dr Harry Bush and Dr Warren Mundy I noted the following key lesson "*In making judgments on market power and regulatory remedies evidence should be considered in the round and simplistic translation of regulatory techniques from other, different sectors should be avoided*"[1]. We are concerned that the CAA's simplistic translation of capital efficiency incentives risks the delivery of outcomes for consumers.

In this section we provide an updated view of our proposed regulatory framework in its totality. In setting out our updated view, we take into account the decisions confirmed by the CAA in its *Way Forward* document, namely:

- The assumption of a five-year price control settlement, in line with the framework presented in our RBP.
- A price control set on a single till basis using RAB-based building blocks, in line with the framework presented in our RBP.
- That there should be some form of risk sharing included within the framework, in line with our RBP proposals.

Alongside a view of our proposed framework, we provide more detail around key areas of proposed change following the RBP. These include:

- Changes to the proposed sharing rate for our revenue risk sharing proposals.
- More targeted treatment of the revenue from terminal drop off charges following airline comments.
- Changes to ensure simplicity in the recovery of ORCs.
- Changes to our capital efficiency proposals following increased detail provided by the CAA in CAP2139.

It should be noted that responses to key policy issues raised by the CAA in CAP2139 are included in our response to the CAA's consultation. As the CAA has still not made any clear decisions on any of these policy areas this section instead sets out our proposed overall framework in light of the CAA's recent publication.

[1] Airport Council International, Lessons for Europe from Australia: The review of Australian airport economic regulation, page 31

6.1.2 Regulatory Framework

In order to provide a clear view of our proposed framework, we have followed the structure used in our RBP and set out our proposals for each component of the framework. The framework below underpins the delivery of our RBP. If one of these components is changed, the viability of the plan will need to be reviewed holistically.

Table 1: Summary of the regulatory framework underpinning our H7 plans

Building Block	Component	H7 Framework	Change from RBP?
Price Control Structure	Price Control Duration	We propose to base the framework on price control duration of at least five years.	No
	Risk sharing mechanism	In line with our proposed mechanism to implement the Covid-related RAB adjustment. We propose that upfront conditions are set for when the price control can be adjusted through Heathrow's Licence. We propose an 8% revenue dead band threshold after which Heathrow is entitled to recover 86% of its lost revenues. In order to preserve price predictability, we propose that this revenue sharing be implemented through the RAB.	Yes Sharing rate revised from 95% to 86% to reflect the observed relationship between revenues and costs following the impact of Covid-19. This also aligns with our forecast elasticities
	Price control review mechanism	We propose that there should be a qualitative condition allowing stakeholders to request that the price control be adjusted in the case that there is a major change in assumptions from those on which the price control was based.	No Separated from risk sharing proposals for clarity
	Expansion Framework Trigger	When the decision is taken to commence further work on the delivery of Expansion, a process for establishing the regulatory framework for the delivery of Expansion is triggered.	No

		The starting point for these discussions is the framework proposed in the IBP. Alongside this framework, we will need a clear policy on early Expansion spend from the CAA to allow timely development and delivery of an expanded Heathrow.	
Passenger Forecasts	Overall Forecasts	Large deviations against forecast are protected against through our price control adjustment mechanism.	No
Capex	Incentives and Framework	Retention of Development and Core framework for capital delivery. Introduction of a moderate ex-ante incentive for capex categories which meet the criteria and are suitable for ex-ante treatment. Delivery objectives set at the start of the period at a capex category level. Delivery obligations set as projects or tranches transition to Core using agreed scope. Annual reconciliation process with the IFS looking at movement between capex categories. Reconciliation at the end of the period using a sample of underspend projects. Increased benefits tracking and collaboration with airlines.	Yes Revised to set clear criteria for treatment of capex categories, setting of delivery obligations and reconciliation
	RAB Indexation	RPI for duration of the settlement as per the Q6 mechanism. This has been confirmed by the CAA through Constructive Engagement.	No
Opex	General Opex	As per Q6.	No

	Costs relating to changes in Security and Safety Policy	Expansion of the current S-factor to adjust for changes to security policy and policy relating to ensuring Heathrow's operations are safe, for example Covid-secure.	No
	Uncontrollable Costs	Pass through of uncontrollable costs such as business rates through ORCs. CAA licence fees to be subject to a pass through as part of the airport charge.	No
Commercial	General Commercial	Large deviations against forecast are protected against through our price control adjustment mechanism.	No
	Terminal Drop Off	Costs and revenues included within the single till. 'Notified Items' type approach implemented through licence to allow for changes to the revenue forecast if a 'qualifying change' occurs in period. Stakeholder consultation process carried out for any proposed changes in the charge of 10% above the level set out in the H7 settlement.	Yes More targeted regulatory treatment
ORC	ORCs	Recategorisation to better reflect ORC decision tree. Removal of fixed costs (e.g. allocated costs and annuities) from the ORC recovery mechanism.	No
Service Quality	Incentives	Outcomes based measures and targets replacing SQRB with potential for on-going evolution over the period.	Yes

WACC	Cost of Debt	Debt indexation for new debt and defined allowance for embedded debt based on the actual cost of embedded debt.	No
	Cost of Equity	Fixed for duration of H7, including Beta and TMR.	No
	Financial Structure	60/40% Debt to Equity notional fixed to 2026.	No
	Tax	Based on notional structure, updated for corporation tax.	No

Source: Heathrow

6.1.3 Price control adjustment mechanism

As set out in our response to CAP2139, we continue to believe that our proposed revenue risk sharing mechanism is the most appropriate mechanism for ensuring the risk-reward balance is restored in H7. As the impact of Covid-19 has highlighted, the current framework does not provide clarity on the level of risk to which Heathrow's investors are exposed, creating a situation where upside performance is capped, but the downside risk is unlimited. In order to ensure that Heathrow remains and investible proposition going forwards, these issues need to be addressed.

Our proposed mechanism uses revenue risk sharing to restore this balance. While passenger volume risk sharing is more often used, revenue risk sharing has a number of benefits which we think make it more appropriate:

- Revenue risk sharing takes into account Heathrow's financial performance in the round, rather than focusing solely on passenger numbers. For example, a focus solely on passenger volumes during the current crisis would have ignored the positive impact of increased cargo revenues or the larger than would have been forecast negative impact on commercial revenues due to retail closures. Using revenues ensures that all of these factors are considered when any adjustments are made.
- For H7, there is significant uncertainty around how commercial revenues will develop. The impact of Covid-19 on passenger behaviour and the impact of the VAT policy changes are largely unknown. Using a revenue risk sharing mechanism will allow the price control to be flexible to these uncertainties.
- Performance against revenue assumptions can be clearly and transparently tracked by using Heathrow's regulatory accounts for which the CAA sets guidance on preparation and publication.

In order to implement the mechanism, we have proposed a dead band of 8% within which Heathrow takes full risk on performance. We think that dead bands are important for the following reasons:

- To ensure that the risk-reward balance for Heathrow investors in the event of extreme circumstances is made clear. As supported by the CAA in its CAP2139 document, this

is one of the key reasons to implement risk sharing in H7. Covid-19 has highlighted that if an extreme and unforeseeable event occurs, which is fully outside of management control, there is no mechanism to ensure the risk reward balance envisaged at the start of the period is maintained. A risk sharing mechanism with clear deadbands achieves this.

- To continue providing sharp incentives for Heathrow to continue to become more efficient while growing passenger numbers in H7. Without deadbands, the CAA risks muting the very incentives it should be seeking to maintain when setting a price control to facilitate the recovery of aviation.
- To allow space for Heathrow and the airline community to conclude commercial agreements, which would otherwise be impeded by risk sharing arrangements around the central forecast.

Our proposed 8% threshold is in line with the thresholds in place at other European airports and, in particular those comparator airports used to estimate Heathrow's asset beta.[2] This proposed threshold is therefore consistent with the level of WACC set for Q6 and with the asset betas we are seeing for those airports moving into H7.

In regard to the sharing rate, we are proposing to revise this to 86% from our RBP proposal of 95% as set out in our response to CAP2098. An 86% sharing rate better reflects the relationship of our costs to revenues and passenger numbers. This has been calibrated using the actual impact of Covid-19 on our opex and revenues through 2021.

In regard to the implementation of the mechanism, we agree with the CAA's assessment that mechanisms which rely only on adjusting prices one or two years later have proven to be difficult to implement following the impact of Covid-19. It is for this reason that we proposed to use the RAB to make adjustments required under our proposed risk sharing mechanism.

Any required changes to the RAB due to the application of the mechanism should be made on an annual basis. This can be implemented easily as part of Heathrow's RAB roll forward policy and would allow for transparency on how and when the adjustment is being applied when outturn revenues are realised each year. Ensuring that the RAB is updated annually will help mitigate the impacts of these large deviations on Heathrow's performance against credit metrics and financial covenants.

However, the CAA should note that it cannot rely solely on using the RAB and recovering the impact of deviations from forecast in future periods. The CAA must consider how it can best ensure revenues are brought forward in a timely manner to ensure that Heathrow continues to be financeable in the event of material or prolonged deviations from forecast. Further analysis of the financeability impact of material and/or prolonged deviations from forecast has shown that, even with a RAB-based risk sharing mechanism Heathrow's plan would not be financeable. In this situation, the CAA would need to ensure that revenues are advanced in a timely manner to ensure minimum cashflow requirements are met and Heathrow remains financeable.

This issue is clearly demonstrated in Chapter 5.7 – H7 Financial Modelling and Financeability Updates. We have identified two potential options that could mitigate this:

a. The introduction of a second shoulder in the proposed risk sharing mechanism after which at least a proportion of the over or under recovery is passed on through charges. This would set a clear threshold, which could be calibrated to align with Heathrow's

[2] RBP annex 36 sets out the regulatory frameworks in place at our European comparator airports. This is also set out in Table 6 of our July 2020 application for a Covid-related RAB adjustment

debt and financeability requirements and provide a clear mechanism for when and how the revenue would be passed back through charges.

b. The treatment of any annual RAB additions made through the risk sharing mechanism effectively as capital expenditure. This would function in a similar way to the current Development and Core framework under which the return on actual Development capital and actual Core capital forecast and spend within the year is factored into the airport charge. This would effectively mean that the return on additions to the RAB under the mechanism are factored into the airport charge more quickly, allowing Heathrow to remain financeable. Heathrow would favour this option due to its simplicity as it would use existing well-tested regulatory mechanisms.

We will continue to work with the CAA to understand the options available and identify the best solution.

6.1.4 Regulatory treatment of the terminal drop off charge

Following further review of the implementation of a terminal drop off charge and discussions with the airline community, we are revising our proposal for the regulatory treatment of the revenue. Heathrow and the airline community agree that specific alternative regulatory treatment is required for the terminal drop off charge. At the regulatory treatment session on 26 March, it was agreed that this could be achieved through a 'Notified Items' type measure, which allows for flexibility to reflect the changing context around the charge through the H7 period and provides targeted regulatory protections where needed.

Discussions with the airline community about the precise nature of the regulatory treatment are on-going. A key consideration will be ensuring that the treatment is aligned to the risk sharing mechanism put in place by the CAA. While we are continuing to work with the airline community on the detail of the proposal, we have set out our current view at a high level below.

As a Heathrow community we agree that:

- The costs and revenues of the terminal drop off charging scheme should be included within the single till for H7
- Within the single till, alternative treatment will be needed to reflect the unique nature of the revenue and the potential for perverse incentives to be created
- This treatment should be proportionate and targeted only at the key elements needed to ensure the correct incentives are created. As far as possible the incentives for efficiency created by the regulatory framework should apply
- An option for this could be to use a 'Notified Items' type approach. This would allow for flexibility to review the charge and the baseline revenues included in the settlement through the period.

Our proposed treatment has two aspects:

- Consultation with the airline community and other stakeholders on potential changes to the level of the terminal drop off charge above/ below a threshold of 10%, carried out as part of the annual airport charges consultation and incorporating a justification for the change.

- Adjustment to the baseline revenues included in the price control if a ‘qualifying change’ occurs:
    - An external statutory change is made which means that the terminal drop off charge can no longer be enforced by Heathrow
    - Heathrow is not able to gain statutory enforcement powers if required

Looking at precedent available under the current regulatory framework we think that this flexibility can be created within the price control condition in the licence for the H7 period. Current terms in the price control, such as the S-Factor and business rates pass through, allow for flexibility to amend the airport charge in period to respond to changing requirements and external factors. A similar mechanism could be included for the terminal drop off charge to allow the airport charge to be amended if there are any qualifying changes, with no action if there are no qualifying changes.

Ahead of making any changes to the level of the terminal drop off charge we propose a consultation period with the airline community and other interested stakeholders. We propose that airline consultation is carried out in two stages:

- Preliminary notification at SAASC that we plan to make a change which triggers consultation and the reasons for making this change
- Consultation through the annual airport charges process setting out the justification for any change in the charge, which would provide the airline community with a view of the impact of any changes on the airport charge ahead of submitting a consultation response

In the case that a ‘qualifying change’ relating to external legal factors occurs we will set out the nature of the change and the impact on our ability to levy the terminal drop off charge at to the airline community at SAASC ahead of revising the baseline to remove the revenues as part of the annual charges consultation.

6.1.5 Other regulated charges

In our RBP we set out updated proposals for the treatment of ORCs in H7. We are proposing to continue using the ORC mechanism, which allows for the clear implementation of the ‘user pays’ principle and helps to foster collaboration and joint working between Heathrow and the airline community. However, we proposed to make two key changes to address the issues which have become apparent through Q6:

- We proposed to move to a marginal cost approach for all ORCs. This will move any fixed costs paid by airlines into the airport charge, as opposed to recovering them through the ORC. This will not only support the sustainability initiatives identified at IBP but will also provide greater price stability for airlines in the face of uncertain passenger volumes. It will also promote greater simplicity in ORCs, allowing Heathrow and the airline community to focus on the manageable elements of the cost base and simplifying the recoverable cost base.
- We proposed to recover all business rates through a separate ORC. This reflects the agreement we reached with the airline community that business rates should be subject to a full pass through for H7 as they are largely outwith Heathrow’s control. The airline community also requested robust governance to ensure that Heathrow was

taking all required action to ensure that the rates bill was efficient. We therefore proposed using the ORC mechanism which would allow us to transparently pass through the costs of business rates on a per passenger basis using ORC governance arrangements to allow for full consultation.

In addition, we proposed some changes to the costs recovered through ORCs, in particular removing ORCs for recovering the costs of check-in and automation, heating, Common IT and Bus and Coach.

We continue to believe that our approach to allocated costs and annuities is the right solution for H7. Recovering all annuities and allocated costs through the airport charge will ensure that costs recovered through ORCs are fully transparent and represent only the costs which can be influenced through collaboration between Heathrow and the airline community in-period.

Through Q6, it became clear that including these fixed allowances set at the start of the period could lead to perverse incentives for the use of services such as electricity or FEGP. However, the impact of Covid-19 highlighted the issues this structure caused across all ORCs when the cost recovery principle led to large under recoveries of these fixed costs. Moving to a more marginal cost approach will help to reduce the impact of any future deviations in demand and create a more stable ORC cost base.

We also continue to believe that using the ORC mechanism is the right solution for the recovery of business rates. The ORC mechanism allows for transparent governance of costs which are passed on to the airlines. Charging for business rates through this mechanism ensures transparency and a forum for discussion and collaboration.

In our IBP and RBP we proposed an update to the ORC decision tree reflecting that the ORC is the best mechanism through which to transparently pass on costs outside of our control. This was also picked up by the CAA in its response on the treatment of HBS costs: "*We remain of the view that the costs of HBS fit within the definition of an Other Regulated Charge ("ORC") because they meet the following criteria …. It has arisen due to an external policy impact over which Heathrow has limited control and therefore should not be able to earn windfall gains"*[3]

In discussion on the recovery of business rates, the airline community noted the need for transparency and a robust governance process to ensure that we had, as far as possible, negotiated efficient business rates. The ORC mechanism allows for transparent governance of costs which are passed on to the airlines. Charging for business rates through this mechanism ensures transparency and a forum for discussion and collaboration as well as a clear and transparent method for reporting pricing and over and under recovery through the General Notice and Trading Statements.

On further review, there are also other areas where airline collaboration and review of costs which are largely outside of Heathrow's control could help to provide transparency and better regulatory outcomes. A key example is police costs.

In relation to our proposals of the services to be covered within the ORC mechanism, we are proposing to remove the recovery of costs associated to the use of bus and coach services. We are instead proposing to set charge levels for access on a commercial basis. This will allow us the flexibility to set charging levels to encourage route development and the use of sustainable vehicles, while increasing the options available for users of public transport. This is in line with our surface access mode share aspirations for H7 and beyond.

[3] https://www.caa.co.uk/WorkArea/DownloadAsset.aspx?id=4294997856

Figure 1:Proposed changes to ORC services in H7

Retain	Remove	Include*
Airside Licences	Check-In & Automation	Winter Resilience
Baggage Systems	Gas	Cargo Services
Staff Car Park	Heating	
Fixed Electrical Ground Power	WLAN	
Electricity	Common IT	
Pre-Conditioned Air	Bus and Coach services	
Water & Sewerage		
Waste, Recycling, & Refuse Collections		
Staff IDs		
Apron Passes and Driver Training		
PRS Service Taxi Feeder Park		
Hold Baggage Screening		
Business Rates (as a separate ORC)		

* *Subject to future consultation with relevant parties, not included in H7 forecast*

A key issue in 2020 and 2021 has been how we can effectively deal with large over and under recoveries of ORCs cause by extreme fluctuations in usage volumes. In our RBP we suggested that our proposed risk sharing mechanism could be the right tool to manage any future extreme over and under recoveries. However, as set out in our response to CAP2139, on further review, we do not think this would be the right approach.

In the first instance, our proposal to remove the annuities and allocated costs from the ORC mechanism will largely remove the fixed cost base of ORCs, which contributed to the significant challenges caused by under recovery in 2020 and 2021. The airlines agreed that this proposal would help avoid future under recoveries of the size seen in recent years in their response to the RBP.[4]

Additionally, following the successful discussions over the last year which resolved issues regarding under recovery through agreement with the airlines, we propose that using the ORC protocol and current governance to develop a mechanism for over and under recovery in

[4] Airline Community H7 RBP Feedback – Reg Framework response – "*14.3 As a result of the annuities and allocated costs, ORC Governance had become problematic, as costs uncontrollable to the ORCG formed part of the pricing 14.4. We therefore agreed with HAL that ORCs should take a more marginal cost approach, which would bring the cost base more in line with the costs of the contracts that support those ORCs"*

period is the best mechanism going forward. This allows us to transparently manage over and under recoveries with the airline community and ensure that costs for services delivered can be fully recovered or that over recoveries can be passed back to airlines. Ensuring that costs can be fully recovered will be particularly important in ensuring that we can meet our minimum cashflow requirements required for a financeable H7.

In order to ensure clarity in the process, we propose that this be implemented through:

a. Agreement with the airline community of a recovery methodology for extreme circumstances as part of the future development of the ORC protocol; and

b. Development of a clear CAA role in the arbitration of any disagreements regarding over and under recovery through the period.

6.1.6 Capital Governance

In CAP2139, the CAA provided further detail on its plans for capital efficiency incentives in H7. In our response we provided further views on the CAA's proposals alongside further independent evidence on how ex-ante incentives should be implemented at Heathrow to ensure the benefits of the current framework for consumers are maintained.

In summary we set out that:

- While ex-ante incentives have been implemented extensively across a number of regulated sectors, they have been shown to be most appropriate for implementation where capital programmes are well-known, benchmarkable, able to be confidently and transparently costed and within the broad control of the regulated company.

- Where larger schemes have been delivered through an ex-ante framework, this is in combination with mitigations such as, in the case of Thames Tideway, government guarantees and ex-post true-ups.

- Where ex-ante incentives are implemented on programmes which are unsuitable, they risk increasing costs and delaying delivery through the use of increased risk allowances, fixed-price contracting and higher levels of work carried out at the development phase.

Based on this evidence, we continue to believe that ex-ante incentives should only be applied to a subset of Heathrow's capital portfolio which fit with the criteria set out by Jacobs in their report.

Table 2: Ex-ante criteria

No.	Criteria	Rationale	Example
1	*Ex-ante* should be considered for capex where HAL has **regular and repeated experience** in development.	Asset classes with a renewal cycle of up to 5-10 years allow regulated companies to build detailed benchmarks and project briefs that can support ex-ante capex forecasting.	• Vertical transport (lifts/escalators) refurbishment • Apron resurfacing (Taxiway and Runway)

			• Retail shell and core fitout • Asset Refurbishments (under £5m value e.g. toilets)
2	*Ex-ante* should be considered for capex that can be **efficiently contracted** with a high degree of certainty.	Regulated companies can use procurement methods such as work packaging and bundling to achieve enhanced cost control with their supply chains – but only where projects can be efficiently grouped and contracted.	• IT Networks • Airfield Ground Lighting
3	*Ex-ante* should be considered for capex that can be **sequenced** with a high degree of certainty without reducing benefits to consumer.	Projects that have to be delivered in limited time frames (such as possession windows) are inherently more risky and difficult to forecast – this is the case for certain aviation and rail capital interventions.	• Automation: Self-Service Bag Drops, Self Boarding Gates. • EV Charging
4	*Ex-ante* should not be considered for **generational renewals**.	Regulators are using 'conditional allowances' to allow for the efficient development and delivery of large scale 'once in a generation' capital solutions that cannot be assessed in line with more standardised maintenance renewals.	• Heathrow Expansion • Security Transformation
5	*Ex-ante* should not be considered for **complex capex**.	Complex projects require detailed development and inherently are not part of standard asset management plans during a regulatory period. Ex-ante forecasting is not appropriate for projects facing these increased complexities and challenges.	• Baggage systems project • Multiple asset types being delivered in one project (E.g. Kilo Apron Development)
6	*Ex-ante* should be considered for capex that has **limited customer impact**.	Applying ex-ante forecasting requirements to a suite of projects with elongated approvals pathways and limited	• Back of house projects • Commercial and office scope

		historic benchmarks will result in increased risk allowances and by extension increased costs to end customers.	
7	*Ex-ante* should not be considered for capex **that does not have sufficient HAL management control**.	A determined management cannot reasonably be held accountable for ex-ante forecasting of projects that are subject to significant third party influence.	• Baggage Handling Systems • Technology projects (3rd Party eg NATS) • UKPNS and HhOPCO
8	*Ex-ante* should not be considered for capex that **exhibits unobservable risks**.	HAL will be required to invest in some projects that will by their nature uncover additional scope/compliance requirements during the project lifecycle.	• Contaminated soil (PFAS) Hydrocarbons • Known Asbestos and Legionella

Source: Jacobs, H7 capital efficiency

In order to accurately implement ex-ante incentives on the right categories of spend, we reviewed our proposed capex categories. We continue to believe that our proposed programme level categorisation provides a robust categorisation of our capex, in line with CAA guidance. This is demonstrated through our programme mandates which set out the joint objective that the business cases in each programme of capex are seeking to achieve as well as the prioritisation criteria and measures to ensure that the right business cases are prioritised and assessed to ensure that these objectives are delivered. However, we do see that further categorisation could be necessary for the implementation of capital efficiency incentives, we therefore proposed to include the following capex categories:

Table 3: H7 capex categories and incentive type

Capex category	% of H7 portfolio	Suitable for ex-ante treatment
Asset replacement – asset maintenance	36%	✓
Asset replacement – generational renewals (T2 baggage)	5%	X
Regulated security (compliance and transformation)	20%	X
Commercial revenue – protect existing revenues	2%	✓
Commercial revenue – Generate incremental revenues	17%	X
Efficient airport – avoid material opex increases	2%	✓
Efficient airport – automation and digitalisation	9%	X
Carbon and sustainability	5%	X
Future ready airport	4%	X

Source: Heathrow

A key factor for H7 will be ensuring that our regulatory framework, and in particular our capital efficiency framework, retains the flexibility to react to changing circumstances and encourage innovation. This will be particularly important on areas such as carbon and sustainability. Improving sustainability and tackling decarbonisation will require innovation and the development of new solutions which will involve technological changes and new ways of working. Our proposal to ensure that these more innovative categories of capex remain subject to the current, largely ex-post, framework will ensure that this innovation is facilitated and incentivised. Ensuring regulated companies have the space to do this through has been a key goal of regulators such as Ofwat and Ofgem in setting their recent regulatory frameworks.[5] By using the inherent flexibility in our capital efficiency framework and our proposed allowance, the CAA can ensure it is following this regulatory best practice to facilitate and incentivise the innovation required to tackle these unique and complex issues.

The CAA's proposals for H7 continue to lack a significant amount of detail, in particular regarding how any incentivisation and reconciliation might work. Due to this, we have continued to provide our view of how capital efficiency should work in H7, set out in summary in the table below:

[5] https://www.ofwat.gov.uk/wp-content/uploads/2020/08/Innovation-funding-and-competition-decision-design-implementation.pdf
https://www.ofgem.gov.uk/energy-policy-and-regulation/policy-and-regulatory-programmes/network-price-controls-2013-2023-riio-1/riio-1-network-innovation-funding

Table 4: Heathrow's proposed H7 capital efficiency process

<table>
<tr><td rowspan="2">Start of the period</td><td colspan="2">Overall capital envelope set for H7 period by the CAA
This will be split into capex categories, aligned to the programmes agreed with airlines. This will set out the sum of Development expenditure and Core expenditure which has already been committed to. Noting majority of capex will be Development.
Each capex category will have a Delivery Objective agreed between Heathrow and the airlines setting out what the programme is seeking to achieve with agreed prioritisation criteria for projects within the programme.
Capex categories would be assigned as either ex-ante or ex-post depending on whether ex-ante incentives are suitable using the criteria set out by Jacobs in their report:</td></tr>
<tr><td>EX-ANTE (Programmes with higher controllability, a higher ability to define outputs and which we are able to confidently cost)
Incentive rate set for each capex category</td><td>EX-POST (Programmes which are less controllable, higher risk and with a lower ability to define outputs and costs)
No incentive rate set for these programmes/ categories</td></tr>
<tr><td rowspan="3">During the period</td><td colspan="2">Transition to Core (consistent with today’s framework)
Capex category baseline adjusted as projects/ tranches go through airline governance and transition to Core
Airport charges adjusted for the difference in return on capex between the forecast in regulatory settlement and the latest capex forecast, this reflects ‘Core expenditure’ through the period and ‘Development expenditure’ pre-G3 and will be defined in the Price Control Condition
Actual capex added to the RAB
Regulatory settlement depreciation used for rolling forward the RAB and adjusted at the next regulatory period</td></tr>
<tr><td>EX-ANTE
Transition to core event agreed with airlines
‘Delivery obligations’ agreed with airlines and linked to service quality where applicable
Where timing is critical to the delivery of consumer benefit, triggers are set as per today’s process
Change control process for adjusting baseline if required and agreed with airlines
Quarterly reporting on delivery against G3 baseline</td><td>EX-POST
Trigger incentives set as per today’s methodology
Transition to core agreed with airlines</td></tr>
<tr><td colspan="2">Governance and benefits
Monthly tracking of benefits and performance against capex category envelopes and reporting process through governance forums
Focus monitoring and engagement at programme/ category level to ensure strategic input
Refocus IFS role on technical scrutiny at programme level to enable programme level monitoring</td></tr>
</table>

	• CAA involvement in case of dispute	
End of the period	EX-ANTE 1. RAB adjusted at end of period for delivery against delivery obligations and cost	EX-POST 2. Ex-post review process to review efficiency and make adjustments to the RAB

Source: Heathrow

6.2 H7 measures, targets and incentives updates

In line with CAA requests in CAP2139, we will be providing a joint Heathrow/airline community response to the CAA setting out a final view on the areas of agreement and disagreement regarding the implementation of OBR for H7. Engagement on developing this response has been positive and has focused on how and what we should measure through the period. In order to allow this process to continue, we will not provide an update to our proposed measures in this document.

However, our engagement has highlighted a number of areas of disagreement on which further engagement would not be productive, these include:

- The inclusion of reputational measures covering the entire end to end passenger journey;
- The inclusion of bonuses as part of the proposed incentive framework; and
- Heathrow's proposals to move to a sliding scale incentive structure.

While we continue to engage constructively with the airline community on some areas of the service quality framework for H7, the CAA must be careful not to assume that the view of the airline community is equivalent to the views of consumers. This was identified by the Australian Competition and Consumer Commission and quoted by the Productivity Commission in its 2019 review of airport regulation in Australia "*airline interests do not necessarily coincide with the interests of the broader community. Airlines naturally care about their own profitability which depends primarily on their position relative to competitors*"[1]. Our proposals below set out our view of the right service quality regime for H7 built on a robust evidence base of consumer views.

In addition, the Commission noted that regulators need to take a clear-eyed approach to the nature of airport-airline interactions, with the recognition that these will generate noise and disagreement, and that regulators should avoid being distracted by such surface turbulence and focus instead on the underlying economics and incentives influencing the parties.

6.2.1 Targets

As we set out in the RBP, consumer targets for H7 need to be closely linked to the investments and initiatives we are able to deliver. In the RBP we set out the targeted improvements to punctuality, passenger experience and baggage – the three areas we know that our consumers value the most. We outlined the conditions required to deliver these improvements:

- a Full RAB adjustment
- a £3.5bn capital plan
- an Enhanced Service operating cost overlay

Since the publication of our RBP, the CAA have further delayed a decision on a Full RAB adjustment. The interim £300m RAB adjustment has not improved our capacity to make investments beyond what is necessary to operate the airport safely. The consequence of this level of capital rationing for an additional year means there is now a significant asset

[1] Airport Council International, Lessons for Europe from Australia: The review of Australian airport economic regulation, page 21

maintenance backlog, which will impact resilience and, inevitably, the service levels consumers receive during H7 and potentially H8.

In our Chapter 5.3 – H7 Capital Plan Updates we outline two capital plans:

- An **Optimal Plan** – which requires a Full RAB Adjustment to be made at the start of the period – that invests an average of £830m p.a. in H7, equivalent to Q5 and Q6 levels. This plan helps us to include investments that lower the charge, boost financial resilience and enhance operational performance to meet increasing consumer expectations on service.

- A **Safety Only** plan – the minimum required to operate the airport safely in H7, which is the maximum that can be expected absent of a further adjustment to the RAB. This plan invests an average of £490m p.a. in H7 – 42% lower than our historic capital run rate - and continues the trend of iH7, where we fall behind the curve of expectations and investments, while the gains of the last decade or more evaporate.

Below we assess seventeen different H7 measures where the capital plan delivered will determine the appropriate target level. In all cases the Safety Only Plan will see a reduction in service relative to 2019 service levels as well as being lower than the Optimal Plan, which delivers the targeted service improvements that consumers value.

Table 1: Measures and associated targets under the Optimal and Safety Only Plans

Consumer Outcome	**Measure**	**Optimal Plan** (requires Full RAB Adjustment)	**Safety Only Plan** (Low RAB Adjustment)
Predictable and Reliable	Wayfinding	4.15	4.10
Predictable and Reliable	Central search queue time % queue times < 5 mins % queue times < 10 mins	95.00% 99.00%	33%-75% 46%-89%
Predictable and Reliable	Transfer search queue time % queue times < 10 mins	95.00%	46%-89%
Predictable and Reliable	Staff search queue time % queue times < 10 mins	95.00%	46%-89%
Predictable and Reliable	Control post vehicle Queue Time % vehicle queue times < 15 mins	95.00%	46%-89%
Predictable and Reliable	Availability of lifts, escalators, travellators (renamed from PSE)	99%	97%
Predictable and Reliable	Terminal 5 Track Transit System (TTS) Availability 1 train target Availability 2 trains target	99.00% 97.00%	97.00% 95.00%
Predictable and Reliable	Provision of stand facilities	99%	97.25%
Predictable and Reliable	Stand Availability	99%	98%
Basic Comforts	Pier service – % passengers accessing pier served stand (excl. T5)	95%	94%

Basic Comforts	Cleanliness	4.05	4.00
Basic Comforts	Baggage System Reclaim Availability – arrivals carousel	99%	98%
Enjoyable and Connected	Wi-Fi performance	4.00	3.93
Cared For	Passengers with Reduced Mobility (PRM/PRS) satisfaction	4.00	3.92
Basic Comforts	Baggage Misconnect Rate	7-9 bags in a 1000	9-11 bags in a 1000
Predictable and Reliable	Departures flight punctuality - % flights depart off stand within 15 mins	80.5%	78.4%
Overarching Measure	Overall Satisfaction	4.26	4.17

Source: Heathrow

Wayfinding

Passenger perception of wayfinding is linked to their experiences of wayfinding outside of airports, which in turn shapes their expectations of what will be available at the airport. This is confirmed by our passenger priority research[2], which shows an increasing desire, especially among non-UK residents (64% of 2019 passengers)[3], to get wayfinding support through their personal electronic devices.

Our Optimal Capital plan includes programmes ("Efficient Airport" and "Future Ready - Service, Resilience") to make investments in digital wayfinding to keep pace with consumer expectations and deliver our 2019 improvements on Q6 perception of wayfinding.

Our Safety Only plan does not allow for these investments and therefore we anticipate some deterioration in wayfinding satisfaction as we fail to keep up with consumer expectations.

Central search queue time / Transfer search queue time / Staff search queue time / Control Post vehicle queuing time

The Security search experience is a critical element in a passenger's overall satisfaction with their departures experience (see Figure 1 below).

The requirement to meet the DfT mandate by June 2024 has some superficial benefits for passenger experience, as when regulation allows passengers will no longer need to remove electronics and liquids/gels from their bags – something we know passengers value highly.

Other aspects of meeting the mandate present significant challenges as new processes and the timing of the roll out of new compliant lanes threatens to significantly increase queue times:

- As outlined in Chapter 5.3 – H7 Capital Plan Updates, an efficient ramp-up of capital programmes will mean not all lanes are compliant by the time of the mandate beginning. As all passengers must go through a compliant process, there will be the same number of passengers going through fewer lanes. In the Optimal Plan we mitigate this by bringing forward investment from H8 ("Regulated Security – Further Compliance" programme). In the Safety Only Plan we have no equivalent investment, leading to higher queue times.

[2] Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020 and Systra, Heathrow Airport Customer Valuation Research, November 2018

[3] Heathrow, Passenger Profiler Survey, 2019

- The mandate requires all passengers to be processed through a body scanner rather than an archway. Using a body scanner benefits consumers by making them comfortable and secure but takes 68% longer than going through an archway. We estimate that without mitigation this will reduce flow rates by 10-15%, with significant consequences for queue times. But we will only know the full impact of this change once we have been able to install a full prototype lane. In our Optimal Plan we mitigate this through our Security Transformation programme, which is intended to develop new technology to reduce the impact of compliance on queue times and experience. In the Safety Only Plan we do not include this investment, leading to higher queue times.

The aggregate impact of fewer lanes and reduced flow rates in the Safety Only Plan is a reduction in the security queue time targets for direct and transfer passengers, colleagues (at staff search) and vehicles (at control posts). This means that 96.5 million more passengers will have to queue for more than 10 minutes in security during H7.

Availability of lifts, escalators, travellators (renamed from PSE)
Due to the underinvestment in asset maintenance and asset replacement in 2020 and 2021, the resilience levels of lifts, escalators and travellators will be impacted during H7. In both plans this will lead to an increase in category B defects, which in turn leads to an increase in category A defects, resulting in more unplanned unavailability of assets. Therefore, we are proposing moving back to the Q5 T2 service level in the Safety Only Plan.

In the Optimal plan we are able to finance increases in the maintenance regime through the Enhanced Service opex overlay, and therefore this target is unchanged from the equivalent in Q6. In the Safety Only plan this will not be possible, meaning that consumers will experience more lifts, escalators and travellators being unavailable thus making their journey less predictable and reliable. We have therefore revised down the target, which also creates an opportunity to rest some assets during off-peak periods to preserve the asset and ensure it is available for when consumers need it.

Terminal 5 Track Transit System (TTS)
During H7, the Track Transit System will be approaching the mid-point in its life cycle. At this point there are a number of elements that require replacement in order to maintain existing levels of resilience and service levels.

These are not included in the proposed capital in either the Optimal or Safety Only plan as they are not considered to have a risk rating of at least medium (see Chapter 5.3 – H7 Capital Plan Updates for more details). In the Optimal Plan we account for an Enhanced Service overlay that can mitigate the residual risk of failure and maintain the Q6 target as a consequence. The Safety Only Plan does not include this overlay and as a result we have revised down the targets.

Provision of stand facilities
This measure assesses the availability of four facilities:

- Stand Entry Guidance System
- Jetty
- Fixed Electrical Ground Power (FEGP)
- Pre-Conditioned Air (PCA)

We forecast that the underinvestment in asset maintenance in iH7 will have a consequential impact on the resilience of these facilities in H7. In the Optimal Plan, the Enhanced Service Overlay allows for the increase in the inspection and maintenance regime to ensure we continue to meet the same target as we had in Q6. This overlay is not present in the Safety Only Plan, and thus we assume a decrease in the target as assets will need to be rested during off-peak periods to reduce the total number of failures.

The availability levels for PCA are likely to be impacted by those assets coming to end of their life in H7. Their replacement is accounted for in the Carbon & Sustainability programmes in the Optimal Plan only. As this is not accounted for in the Safety Only Plan, we assume a reduction in availability of PCA in particular, not least to rest assets in off-peak periods.

Stand Availability / Pier Service

With more stand facilities not being available due to reduced resilience levels in the Safety Only Plan there will be a consequential impact on the stand availability and pier service that consumers will be able to receive.

In the Optimal Plan this risk would be mitigated through the increase in opex for stand facilities and further improvements can be made through the planned investments in airfield automation and the delivery of Smart Stand. As none of these investments are present in the Safety Only Plan, we have reduced the target.

Cleanliness

Chapter 4.0 – H7 Consumer Insights Updates confirms that one of the most significant changes for consumers since the start of the Covid-19 pandemic is heightened expectations around cleanliness. If we do not respond to these changes with more visible and more frequent cleaning, then we can expect perceptions of cleanliness at Heathrow to fall.

Our Optimal Plan is designed to respond to this need and increase the perception of cleanliness relative to Q6:

- An enhanced cleaning regime as part of our Covid-19 Cost Overlay.
- More reassurance about cleanliness and social distancing through the digital service programmes included in the Efficient Airport and Future Ready Airport capital lines.

Only the Covid-19 Cost Overlay is accounted for in the Safety Only Plan. We therefore anticipate that heightened expectations are only partially met, leading a different target in H7.

Baggage System Reclaim Availability – arrivals carousel

Chapter 4.0 – H7 Consumer Insights Updates confirms that key to a “Predictable and Reliable” arrivals journey is being able to reclaim bags and exit the airport as quickly as possible.

By the start of H7, the majority of baggage carousels in T3 and T4 will be over 25 years old and at the end of their asset life. T5 baggage carousels will be 18 years old by the end of H7 and, with greater age, the risk associated with outages increases. We therefore forecast that, without mitigation, there will be increased periods where reclaim belts will be unavailable.

In the Optimal Plan we mitigate this through the Enhanced Service overlay, which allows for increased maintenance and inspection regimes and therefore the Q6 target to be maintained

in H7. This overlay is not present in the Safety Only Plan, and therefore we reduce the H7 target to be in line with targets set in Q5.

Wi-Fi performance

We know that consumer expectations of Wi-Fi performance are informed by consumer experience of the ever-improving availability and quality of Wi-Fi performance outside of airports. We have upgraded our Wi-Fi performance twice in the last decade to keep pace with consumer expectations. In advance of Heathrow deploying this technology, we saw satisfaction levels with the service decline by 0.07 and then recover once the new service was introduced.

In the Optimal Plan we expect to upgrade our Wi-Fi service (accounted for in the "Commercial Revenue Generation" programme) and therefore we expect to continue to achieve our Q6 target. In the Safety Only Plan we will have existing Wi-Fi capability until at least 2027, leaving us lagging behind consumer expectations; we therefore forecast a drop in satisfaction below Q6 levels.

Passengers with Reduced Mobility (PRM/PRS) satisfaction

Passengers with Reduced Mobility (PRM) are currently the consumer group who are least satisfied with their Heathrow experience: in 2019, **[REDACTED]** of PRM were dissatisfied with their overall experience compared to only 0.5% of non-PRM passengers.

Our Optimal Plan is designed to make significant improvements to the PRM experience of Heathrow:

- An Enhanced Service Overlay to provide additional assistance to PRM passengers who require it.
- Higher availability of lifts, travelators and escalators – which PRM passengers value relatively more than non-PRM passengers – due to increased maintenance and inspection regimes (see above).
- Shorter queues at security to enable greater social distancing, which our consumer insights indicate PRM passengers value relatively more than non-PRM passengers.

We forecast that an additional 5 million PRM passengers will have an improved experience of Heathrow in H7 as a result of delivering our Optimal Plan. The opposite is the case in the Safety Only Plan, where no additional assistance, longer queues and lower availability of key facilities that improve journey time and experience contribute to a worse experience than Q6.

Baggage Misconnect Rate

Critical to delivering the service consumers want is ensuring we consistently deliver the basics that consumers value more than anything else. One of the most important is ensuring passengers arrive at their destination with their bag. In 2019, only 9 bags in every 1,000 were misconnected – significantly improved from 40.2 in every 1,000 in 2007.

Delivery of this basic requirement is the product of close collaboration between multiple parties across the Heathrow community and is also sensitive to the demands placed on the system (e.g. a higher mix of transfer passengers results in greater demands). It is therefore impossible to be precise about the misconnect rate in H7, so we publish a range of expectations based on our two investment plans:

- In the Optimal Plan, where we have an additional allowance for maintenance (Enhanced Service Overlay), we expect to at least meet the same service levels as Q6, with potential to improve further through strong collaboration and focus with airlines and ground handlers. Our proposed range is 7-9 bags in every 1,000.
- In the Safety Only Plan, where we have no additional allowance for maintenance, we do not believe service levels can improve on H7 and in fact are likely to fall due to the underinvestment in asset maintenance accumulated in iH7. Our proposed range is 9-11 bags in every 1,000.

The aggregate impact is that over the course of H7 approximately 300,000 more bags will travel with their bags in the Optimal Plan than the Safety Only plan.

Punctuality (Departures)

Chapter 4.0 – H7 Consumer Insights Updates confirms that punctuality is the key area where passengers want improvement. In 2019, 78.4% of flights departed on time, up from 59% in 2007.

The ability to achieve on-time departure is a function of a number of areas, not all of which are within our control:

- The resilience and capacity of the airfield.
- The resilience and capacity of airspace.
- The resilience and quality of ground handler processes and the ability to reach their aircraft.
- The resilience and quality of airline staff and their ability to reach their aircraft.
- The resilience and availability of below-wing facilities that support efficient turnaround times.
- The reliability and availability of passenger facilities that support efficient passenger movements in the terminals (including queue times at check-in) to arrive at their aircraft.

There is a clear difference between our two plans:

Table 2: Impacts of punctuality of the Optimal and Safety Only Plans

Optimal Plan		Safety Only Plan
Airfield automation and Smart Stands improve efficiency and reduce human error. Additional maintenance opex to mitigate underinvested assets in iH7.	**Airfield**	No investment in automation. No additional asset maintenance opex, likely leading to more asset failures/downtime.
Airspace modernisation delivered.	**Airspace**	Airspace modernisation delivered.

Airfield automation and Smart Stands improve efficiency and reduce human error. Same staff and vehicle search times as Q6 (95% of staff in 10 minutes / 95% of vehicles in 15 minutes).	**Ground-handler**	No investment in airfield automation. Longer queues times at staff and vehicle security search. (46%-89% of staff in 10 minutes / 46%-89% of vehicles in 15 minutes)
Same staff and vehicle search times as Q6. (95% of staff in 10 minutes / 95% of vehicles in 15 minutes)	**Airline Staff**	Longer queues times at staff and vehicle security search. (46%-89% of staff in 10 minutes / 46%-89% of vehicles in 15 minutes)
Additional maintenance spend to mitigate underinvested assets in iH7.	**Stand Facilities**	No additional asset maintenance spend, likely leading to more asset failures/downtime.
Same security search times as Q6. (99% direct passengers within 10 minutes)	**Passengers**	Worse security search times (46%-89% direct passengers within 10 minutes)

Source: Heathrow

As a consequence, we forecast that:

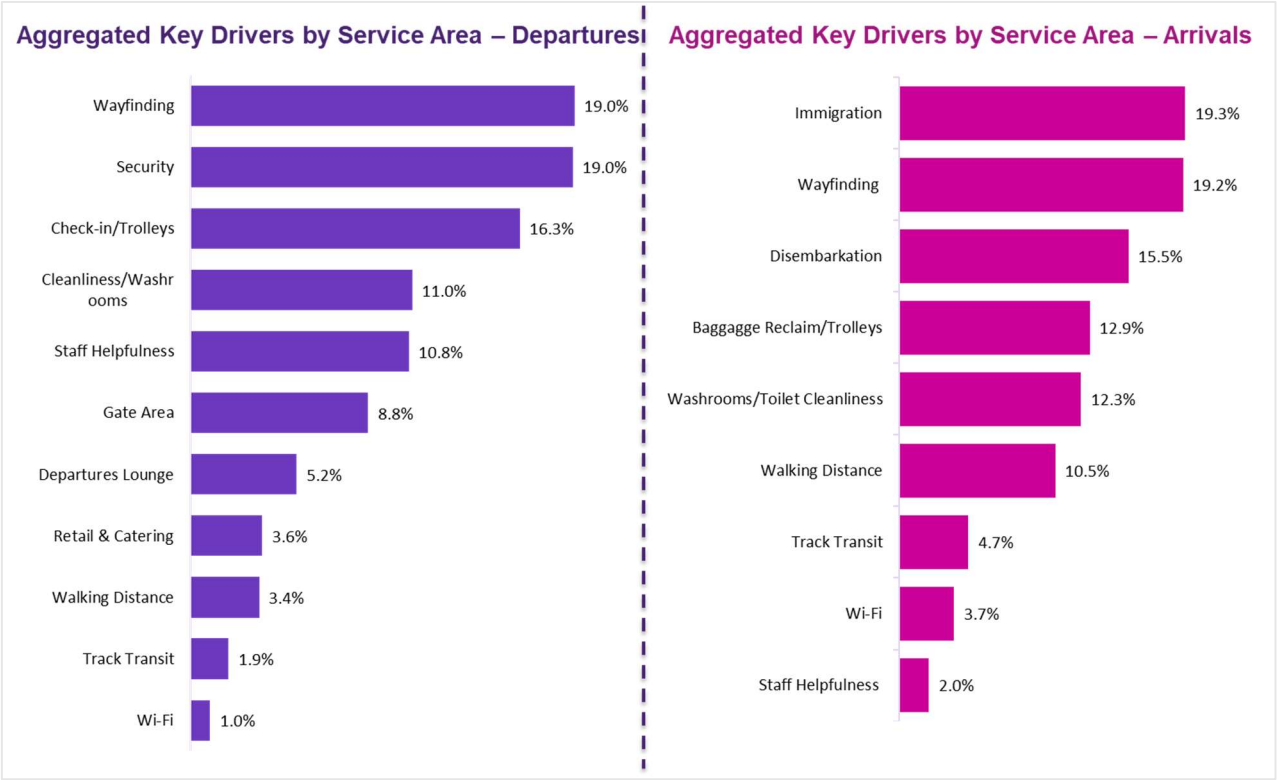
- 80.5% of passengers in the Optimal Plan will depart on time.
- 78.4% of passengers in the Safety Only Plan will depart on time.

The aggregate impact in H7 is that 3.2 million more passengers will depart on time in the Optimal Plan relative to the Safety Only Plan.

Overall Satisfaction

Figure 1 below, and Chapter 4.0 – H7 Consumer Insights Updates, confirms the key drivers to overall satisfaction.

Figure 1 - Key Drivers of Overall Passenger Satisfaction



Source: Heathrow Departures and Arrivals QSM

This section has underlined how key areas that drive overall satisfaction will see either improvements or deterioration in H7 depending on which plan is delivered. Our model therefore estimates that Overall Satisfaction differs significantly between the two cases.

Table 3: Measures and Overall Satisfaction differences between the Optimal and Safety Only Plans

Optimal Plan		Safety Only Plan
99%	**Security** (< 10 min queue %)	46% - 89%
4.15	**Wayfinding**	4.10
4.05	**Cleanliness**	4.00
4.00	**Wi-Fi**	3.93
???	**Disembarkation**	???
99%	**Baggage Reclaim** (Availability)	98%
99%	**Track Transit** (1-train target)	97%
4.26	**Overall Satisfaction**	**4.17**

Source: Heathrow

The aggregate of this impact is significant. Over H7 an Optimal Plan will, relative to a Safety Only Plan, mean:

- 4.9 million more passengers will experience a Very Good or Excellent journey (ASQ score 4 & 5)
- 2 million fewer passengers will experience a Poor or Fair journey (ASQ scores 1 & 2)

Additional Measures Considered

In addition to the seventeen measures identified above, there are other areas that are likely to be impacted by the Capital Plan delivered:

- *Reducing Heathrow's Carbon Footprint* – The Safety Only Plan only allows for minimal investment in meeting the aviation industry's climate challenge, so we will have less ability to reduce Heathrow's carbon footprint. The Optimal Plan reduces emissions by 99,000 tonnes of Carbon in H7 compared to the Safety Only Plan.
- *An Airport that meets my needs* – With more disruption across a passenger journey, perception that Heathrow is able to meet an individual passenger's needs will be reduced.
- *Enjoy my time at the airport* – Without being able to invest in commercial propositions and improving some of the basics consumers expect from an airport, fewer passengers will state that they have had an enjoyable time at the airport.
- *Helpfulness/Attitude of security staff* – Inevitably there will be a consequential impact of longer queuing times in security on all perception measures related to security.
- *Customer Effort (Ease)* – As more consumers experience a less predictable and reliable journey through Heathrow, perception of their end to end journey as being easy will decline.
- *Future Intent to use Heathrow* – As consumers become less satisfied with their journey experience, they will be less likely to want to travel through Heathrow in future.

6.2.2 Incentives

Our proposed incentive framework, set out in the RBP, was developed on the basis of robust consumer evidence and regulatory precedent across multiple sectors. Appropriately calibrated rewards and penalties align consumer, management and shareholder interests by increasing the focus on improving services and giving shareholders a return for the effort and risk-taking needed to deliver higher levels of service quality. Our consumer insight shows that consumers are willing to pay more for better service and that consumers attach value to improved performance in many areas.[4] It is therefore appropriate to implement the right incentives to ensure that Heathrow is incentivised to continue to develop new and innovative ways of delivering service improvements over and above the baseline service required in order to generate this added value for consumers.

Our RBP framework proposed a sliding scale incentive with a more symmetrical approach to rebates and bonuses for the H7 period. Our approach is aligned to best practice in other regulated sectors:

- In Water, Ofwat has determined a 'unit rate' for each financial incentive, such that as under / out-performance increases, the size of penalties / bonuses also increases.[5]

[4] Systra, *Heathrow Airport Customer Valuation Research,* November 2018

[5] https://www.ofwat.gov.uk/wp-content/uploads/2017/07/Appendix-2-Outcomes2.pdf

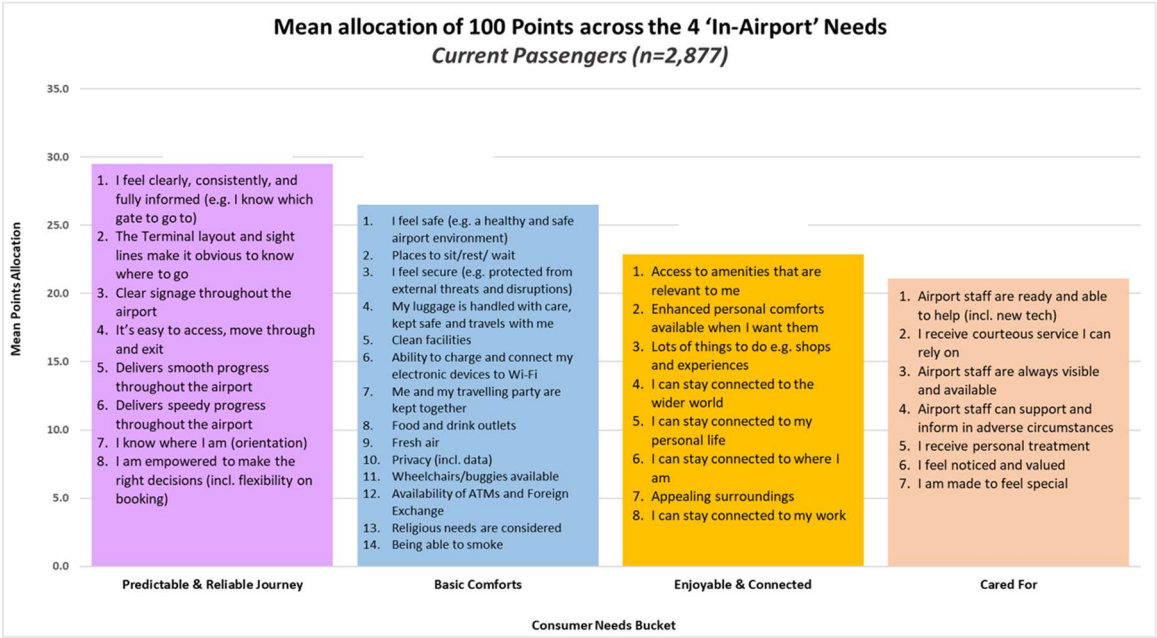
This is based on the principle that every unit of performance should count. (This idea was supported in a Frontier Economics report, prepared for Ofwat, outlining the principles of incentive design) [6]

- Ofgem also opted for a unit rate approach to setting their incentives for service through its RIIO framework.

Our entire proposed framework is centred around consumer views and ensuring we deliver the outcomes consumers want to see:

- In order to calibrate our rebates and bonuses, we carried out an exercise to understand the relative importance of aspects of service to consumers. This allowed us to derive a relative importance weighting for each financial measure in our proposed package. We used this to ensure that our potential bonus and rebate exposure was aligned to how important each service aspect was to consumers.

Figure 2: Allocation of priorities



Source: Systra, Passenger Priorities Post Covid-19 Research, 2020

- When establishing which measures should have both rebates and bonuses, we reviewed our proposed measures to ensure that our proposals only set bonuses in areas where they would be appropriate to drive better outcomes for consumers. We are not proposing bonuses on two measures where we judged that a bonus would not be appropriate or incentivise the right outcomes for consumers:
    - Runway Operational Resilience: This measure looks at cancellations and delays caused by congestion on the airfield for reasons under Heathrow's control. A bonus would not be appropriate here.
    - Hygiene testing: Our proposed hygiene safety test measure has a target set at 100% with no opportunity for bonus due to the safety critical nature of the measure.

[6] https://www.frontier-economics.com/media/2253/ofwat-report_performance-commitments-outcome-delivery-incentives-pr19.pdf

- We then applied this relative weighting across the 7% downside exposure, which was agreed by the airline community through Constructive Engagement. From the relative weighting we assigned a unit rate to each measure. This reflects the findings from our extensive consumer research which show that passengers value every unit of increased performance and, also, that they attach a value to every unit of service degradation.[7]

- To ensure that no drop in service is considered to be 'acceptable' we set our incentive structure so that Heathrow would pay rebates as soon as performance drops below the target set with no deadband. This ensures that Heathrow continues to be incentivised to meet this minimum service level.

- To ensure that bonuses were challenging to achieve and only paid for exceptional service, well above the level expected and planned for within the settlement, we included a deadband before Heathrow earns a bonus. For satisfaction measures, this is a deadband of 0.25. For asset availability measures, as the service level for the majority of these measures is set at 99%, there was limited scope for bonuses. We therefore set a deadband of 100% performance for these bonuses to be paid. For other measures below 99% we set a deadband of 2% before bonuses are paid.

In the CAP2139 document, the CAA noted that it was not minded to move towards a sliding scale mechanism. However, it is clear to us that moving to a sliding scale incentive structure for H7 is required to transition to a fully outcomes focused framework. The current knife edge structure does not reflect consumer valuations and has bad incentive properties. If Heathrow fails a target, there is no incentive within the service quality framework to continue to deliver the best possible service as the full rebate is payable. While there are obviously a number of incentives on Heathrow to ensure we provide the right levels of service, the service quality framework set by the CAA would not incentivise this. The fact that, under a sliding scale structure, Heathrow would not pay the 'full' rebate for a measure until it had failed the target by 2% rather than as soon as the measure was missed should not be interpreted as more generous. Instead, it is correcting the current bad incentive design which does not drive the right outcomes or reflect consumer views.

Reporting on a sliding scale mechanism would also be as transparent and certain as the current knife edge structure. As in the current scheme, targets will be set for each measure at the start of the period and we will continue to transparently report against these targets through our monthly reports. Underperformance against these targets will continue to be highlighted in red so stakeholders can clearly see we did not meet the target. If a unit rate for each rebate and bonus is then set at the start of the period this can be easily incorporated into our calculation process. This would provide no less certainty or transparency than the process today.

[7] Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020, 20. A smaller-scale survey of current passengers also obtained a priority order of proposed deteriorations in service quality. The most acceptable of the service deteriorations proposed was '7 out of 10 times you will go through security in less than 5 minutes' from a base of 9 out of 10 times. However, this reduction in service would be equivalent to an increase in average fare of 0.9%. The least acceptable deterioration would be '10 out of 1000 passengers' baggage will not travel with them on the same flight' from a current base of 9 out of 1000. This would be the equivalent of a 1.24% increase in air fare.

7.0 Additional evidence to support our scenarios

This section focuses on how different passenger scenarios impact our building blocks and the passenger charge..

This section is in response to the CAA request for greater information on the Low passenger scenario in particular:

> *Explain how the various aspects of the plan derive from integrated scenarios based on a range of passenger forecast scenarios.*
>
> - *How and why the cost and revenue building blocks vary for each passenger forecast scenario*
> - *Include details of key assumptions and cost or revenue drivers for each line item.*
> - *For example – passenger forecasts provided by market segments, linked through to commercial revenue elements (such as retail) by market or passenger type.*
> - *Explain the relationship between estimated opex, capex and OBR targets for the low passenger forecast scenario.*
> - *Include detailed narrative on cost drivers and key assumptions.*

Unlike our evaluation of RAB Adjustment scenarios, the demand scenarios are not binary. There are infinite possibilities of demand levels (and mixes) that could be modelled. Doing so does not increase the likelihood we will be any more correct. Instead, we focus on the guiding principles that will shape our business plan in the event of changes to demand:

- The more passengers there are, the more efficiently our asset base is being utilised and the lower the charge becomes.
- The more passengers there are, the stronger the investment case to invest additional capital to improve consumer outcomes is.
- The more passengers there are, and the more investment has taken place to structurally remove other operating costs, the more value for money enhanced service proposals become to consumers.

The application of these principles to our business plan, and consequences to the building blocks and consumer and stakeholder outcomes, is brought to life by our three demand scenarios:

- High, based on a P90 demand scenario
- Mid, based on a P50 demand forecast
- Low, based on a P10 demand scenario

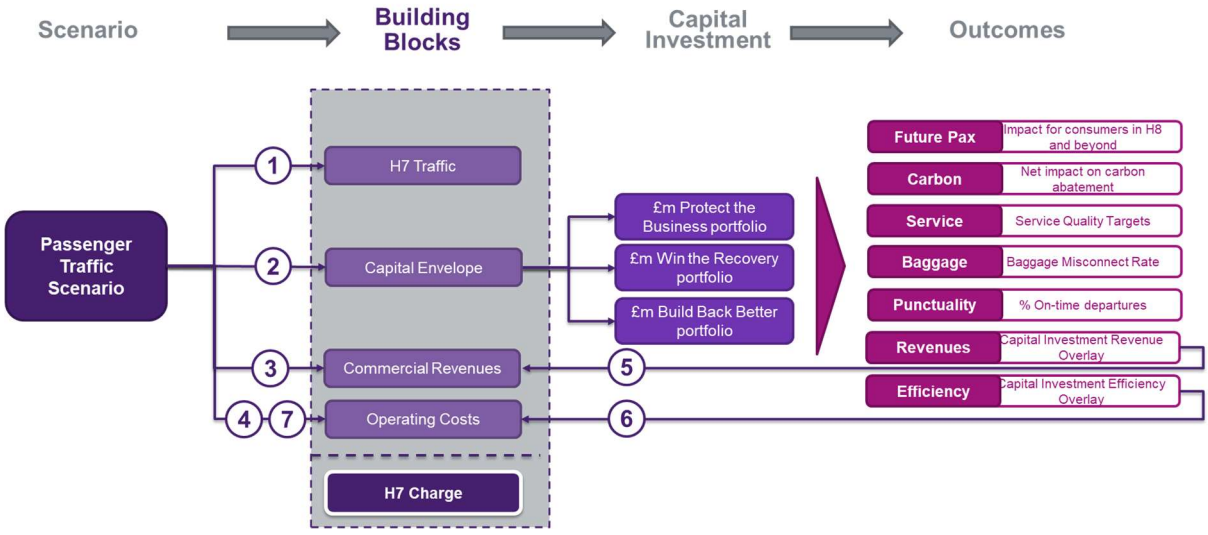
Further detail on the assumptions behind each scenario is found in the Chapter 5.2 – H7 Passenger Demand Updates.

There are seven different impacts to our building blocks that we can observe from different passenger scenarios:

1. Passenger numbers are a key building block in themselves, determining how efficiently our asset base is utilised – the more passengers there are, the lower the charge (**Step #1**).
2. Passenger numbers impact our ambitions for capital investment, as it would be difficult to secure investment beyond that required to operate the airport safely in a scenario where passengers do not come close to recovering to pre-Covid levels (**Step #2**).
    a. As a consequence of capital investment, there will be a secondary effect on operating costs (**Step #6**) and commercial revenue modelling (**Step #5**), which is discussed in section 7.2.1.
3. Passenger numbers are a key driver to our operating cost (**Step #4**) and commercial revenue models (**Step #3**), both as a direct driver and also as a determinant for the space assumption used in our cost drivers.
4. Passenger numbers also determine the advisability of the Enhanced Service Overlay (**Step #7**), in Low scenarios it would not be economical or commercially rational to introduce new operating costs, even if it conferred a significant service benefit.

The consequences of each of these steps is a different passenger charge and different outcomes. These are illustrated in the model below which demonstrate these scenarios are fully integrated across our Business Plan:

Figure 1: The impact of passenger volumes of our business plan



Source: Heathrow

For the avoidance of doubt, the core assumptions in this chapter is that there has been a Full RAB Adjustment in all cases (High, Mid, Low). Our models, attached as an appendix to this Update, show the equivalent outputs for High, Mid and Low cases for a Low Adjustment scenario.

7.1 H7 Traffic

This relates to **Step #1** in Figure 1 above.

We have now updated these three passenger scenarios for Update 1 – see Chapter 5.2 – H7 Passenger Demand Updates for more information.

Table 1: Passenger volume scenarios for Update 1

Update 1 Passenger Scenarios	2022	2023	2024	2025	2026	H7 Total
High (P90)	52.8	67.7	76.1	80.3	81.5	358.5
Base Case (P50)	43.2	58.4	68.2	73.1	74.8	317.7
Low (P10)	15.2	32.4	48.7	57.4	63.3	217.0

Source: Heathrow

7.2 Capital envelope

This relates to **Step #2** in Figure 1 above.

Passenger volumes also determine the ambitions of our capital investment plans. We have updated our understanding of the appropriate capital plans for each scenario:

Table 2: Capital envelopes for each passenger volume scenario in Update 1

Capital Envelope	RBP	Update 1
High (P90)	£3.5bn 2018p	£4.2bn 2018p
Mid (P50)	£3.5bn 2018p	£4.2bn 2018p
Low (P10)	£2.1bn 2018p	£2.5bn 2018p

Source: Heathrow

The logic of each plan continues to be based on the same outlined in our RBP:

- In all scenarios there is a minimum amount of capital required to ensure the safe operation of the airport. We now understand this to be £2.5bn 2018p and refer to this as the "Safety Only Plan" – see Chapter 5.3 – H7 Capital Plan Updates for more details.
- In scenarios where there is the opportunity to do so – a RAB Adjustment and sufficient recovery in passenger demand – we can make targeted improvements to consumer outcomes and make the airport more efficient. We now understand this additional amount to be £1.7bn. Where we include this additional amount, we refer to it as the "Optimal Plan" – see Chapter 5.3 – H7 Capital Plan Updates for more details.

It is a reasonable commercial response to constrain capital investment to only the minimum required to safely operate the airport when passenger numbers in the Low scenario are 31.7% lower than that assumed in our base case. Given passengers are not close to reaching pre-Covid levels, the investment environment is likely to be too challenging to secure capital beyond that required to operate the airport safely.

Discontinued projects in the Low scenario include:

- Security transformation, at cost to efficiency and the consumer outcome of “I have a predictable and reliable journey”. While we will deliver the regulatory requirements, we will not be able to introduce elements that will increase efficiency and improve the passenger experience further.
- Some commercial revenue generation, and a negative impact to the consumer outcome of “I have an enjoyable experience at the airport”. Heathrow will not be able to invest in digital transformation, increasing the range of retail or offering wider services.
- Investment in efficient airport initiatives, impacting on the charge and limiting our ability to deliver further efficiencies for Team Heathrow operations. It will also limit investment in automation and touchless technologies that we know are critical to the “I feel comfortable and secure at the airport” outcome.
- Investment in carbon and sustainability that would support the infrastructure changes to reduce the impact of Heathrow’s operation on the local community and the environment.

Conversely, if passenger numbers are expected to return to pre-Covid levels within H7 it is reasonable to make investments to improve service in the areas where we know passengers value it and to invest to make Heathrow structurally more efficient. If investors face the appropriate commercial incentives – and have confidence in the regulatory framework – then it is likely investment could be efficiently secured.

7.3 Operating costs and commercial revenues

This relates to **Steps #3, #4 and #7** in Figure 1 above.

Passenger numbers are a driver and also a consideration in our overlay assumptions in both our operating cost and commercial revenue models:

- Passenger volumes are a key driver in our operating cost and commercial revenue models. When passenger numbers go up or down, this naturally flows through the model, using our elasticities which are robustly evidenced by independent research and reports.
- Passenger volumes also mean different assumptions for when terminals restart. These assumptions also lead to different space assumptions impacting our operating cost forecasts.
- Passenger volumes determine the advisability of including an Enhanced Service Overlay.

Our RBP focused on making the best use of infrastructure to reduce operating costs and help ensure our charges were affordable. We assumed airlines would cooperate to make best of use of existing terminals, and that in our P50 case T3 would be open from the start of H7 and T4 would not be required until mid-2023.

Table 3: Terminal opening dates for different passenger volume scenarios in the RBP

RBP Terminal Opening Dates	T4
High (P90)	March 2022
Mid (P50)	June 2023
Low (P10)	April 2024

Source: Heathrow

Since then, we have seen:

- A significant effective reduction in terminal capacity as a result of higher transaction times at check-in and arrivals, driven by new passenger processes and travel restrictions.
- Government requirements for all red-list passengers to processed in a separate terminal facility.

We have therefore updated our assumptions for opening dates to be a four-terminal operation from the start of H7 in all passenger scenarios:

Table 4: Updated terminal opening dates for different passenger volume scenarios in Update 1

Updated Terminal Opening Dates	T4 Open For Red List Arrivals	T4 Open to all Arrivals
High (P90)	June 2021	June 2023
Mid (P50)	June 2021	June 2023
Low (P10)	June 2021	June 2025

Source: Heathrow

In Chapter 5.4 – H7 Operating Costs Updates we outline the need for an Enhanced Service Overlay (ESO) to meet the needs of H7 passengers. The full breakdown of the forecast £**[REDACTED]** p.a. overlay is described in the Chapter 5.4, but key benefits include:

- £**[REDACTED]** p.a. for maintenance opex to account for the underinvestment in assets during 2020 and 2021. This enables more frequent maintenance and inspection regimes, limiting the risk of asset failure and allowing us to deliver the service targets outline in Chapter 6.2 – H7 Measures, Targets and Incentives Updates.

- £**[REDACTED]** p.a. to provide an enhanced service to Passengers Requiring Support (PRS), who currently have the least favourable experience ratings at Heathrow and likely to have the greatest additional or heightened needs as a result of Covid-19.This enables our improvement to PRS satisfaction outlined in Chapter 6.2 – H7 Measures, Targets and Incentives Updates.

We assume the size of the overlay does not vary with passenger numbers as the additional maintenance opex is a fixed cost and is required regardless of the passenger throughput. The impact on the charge of ESO is therefore sensitive to passenger demand scenario:

- In a Low scenario, fewer passengers share the same fixed cost of the overlay – leading to a higher cost of ESO per passenger.

- In a High scenario, more passengers share the same fixed cost of the overlay – leading to a lower cost of ESO per passenger.

Table 5: Cost of Enhanced Service Overlay per passenger in different passenger volume scenarios

	Cost of ESO/pax – H7 Average
High (P90)	£**[REDACTED]**
Mid (P50)	£**[REDACTED]**
Low (P10)	£**[REDACTED]**– if included (shown for illustration)

Source: Heathrow

The advisability of introducing this overlay is sensitive to the passenger scenario outcome:

- In a Low scenario there will be significant challenges to affordability, with the charge forecast to be £47.8 2018p while our consumer acceptability testing is clear that charges above £39 would be unacceptable to a majority of consumers. The ESO would add £**[REDACTED]** to the charge and is therefore not economical or commercially rational.

- A key learning from Covid-19 is the need for a lean cost base to be resilient to future demand shocks. In a Low scenario, there is a lower capital investment plan (see below) and therefore fewer favourable operating cost and commercial revenue impacts (see Chapter 5.3 – H7 Capital Plan Updates for more details).

As a consequence, we only assume ESO in the High and Mid cases, but not in the Low case. This has consequential impacts to service levels in each scenario, summarised below.

7.4 Outcomes

The consequence of the changes to assumptions highlighted above are different outcomes for consumers and other stakeholders:

- Lower capital investment and no Enhanced Service overlay impacts passenger experience, baggage and punctuality in the Low scenario relative to the Mid and High scenarios.
- Lower capital investment impacts progress towards carbon abatement in the Low scenario relative to the Mid and High scenarios.
- Lower capital investment (in addition to different passenger numbers and overlays outlined in the section above) impacts efficiency and revenues in the Low scenario relative to the Mid and High scenarios.

7.4.1 Passenger experience, baggage and punctuality

A notable consequence of a smaller capital envelope and no Enhanced Service Overlay in the Low scenario leads to different targets:

Table 6: Service quality targets in different passenger volume scenarios for Update 1

Consumer Outcome	Measure	High P90	Mid P50	Low P10
Predictable and Reliable	Wayfinding	4.15	4.15	4.10
Predictable and Reliable	Central search queue time % queue times < 5 mins % queue times < 10 mins	95.00% 99.00%	95.00% 99.00%	33%-75% 46%-89%
Predictable and Reliable	Transfer search queue time % queue times < 10 mins	95.00%	95.00%	46%-89%
Predictable and Reliable	Staff search queue time % queue times < 10 mins	95.00%	95.00%	46%-89%
Predictable and Reliable	Control post vehicle Queue Time % vehicle queue times < 15 mins	95.00%	95.00%	46%-89%
Predictable and Reliable	Availability of lifts, escalators, travellators (renamed from PSE)	99%	99%	97%
Predictable and Reliable	Terminal 5 Track Transit System (TTS) Availability 1 train target Availability 2 trains target	99.00% 97.00%	99.00% 97.00%	97.00% 95.00%
Predictable and Reliable	Provision of stand facilities	99%	99%	97.25%
Predictable and Reliable	Stand Availability	99%	99%	98%
Basic Comforts	Pier service – % passengers accessing pier served stand (excl. T5)	95%	95%	94%
Basic Comforts	Cleanliness	4.05	4.05	4.00
Basic Comforts	Baggage System Reclaim Availability – arrivals carousel	99%	99%	98%
Enjoyable and Connected	Wi-Fi performance	4.00	4.00	3.93
Cared For	Passengers with Reduced Mobility (PRM/PRS) satisfaction	4.00	4.00	3.92
Basic Comforts	Baggage Misconnect Rate	7-9 bags in a 1000	7-9 bags in a 1000	9-11 bags in a 1000
Predictable and Reliable	Departures flight punctuality - % flights depart off stand within 15 mins	80.5%	80.5%	78.4%

Overarching Measure	Overall Satisfaction	4.26	4.26	4.17

Source: Heathrow

The role of lower capital and no Enhanced Service Overlay for each individual target is explored in full in Chapter 6.2 – H7 Measures, Targets and Incentives Updates.

7.4.2 Carbon

Heathrow has an obligation to support the UK meet its net zero carbon target. The CAA also has a duty in respect of sustainability that requires it to ensure that Heathrow is able to take reasonable measures to reduce the adverse environmental effects of the airport and of aircraft using that airport.

We estimate that carbon emitted is partially sensitive to passenger demand: a Low scenario will have fewer Air Traffic Movements than a Mid or Low scenario, and therefore we should expect the total carbon emitted from Heathrow operations to be lower as a consequence.

However, we also anticipate that higher demand scenarios will see higher load factors, which in turn can expected to lower total carbon emitted per passenger relative to the Low scenario. We therefore expect carbon emitted per passenger to be lower in Mid and High scenarios relative to a Low one.

In any case, the obligation is to deliver net zero, not just a net reduction or greater carbon efficiency per passenger. Therefore, in any future demand scenario – even one where demand is significantly below 2019 levels – investment in carbon and sustainability is required. We prioritise investments based on how much carbon can be removed per pound invested. As is clear from Chapter 5.3 – H7 Capital Plan Updates, airspace modernisation delivers the most efficient reduction, improves resilience and enjoys Government support. As such it is included in all scenarios as there is a unique opportunity to deliver a significant step change in outcomes for current and future passengers.

In the Optimal Capital Plan – as envisaged in the Mid and High cases – we forecast an additional £150m investment in Carbon & Sustainability projects. This creates the opportunity to move further along the carbon abatement curve, delivering projects such as pre-conditioned air (PCA) to all stands and changing the gas boilers that heat our terminals to a renewable source. It is unlikely there will be an investment environment to support further capital investment in carbon & sustainability projects in a Low scenario.

As we cannot baseline the underlying carbon in the period for each scenario, it is not possible – as we have for other scenario evaluation we have published in this document where passenger numbers are constant – to estimate the total carbon difference in each scenario. However, structurally speaking, in the Low case Heathrow will be further behind in delivering investments required to achieve carbon abatement necessary to meet the net zero obligation.

Table 7: Carbon & Sustainability investment in H7

	High (P90)	Mid (P50)	Low (P10)
Capital invested in Carbon & Sustainability	£188m	£188m	£38m
Tonnes of carbon removed from Heathrow operation in H7	98,720t	98,720t	0t

Tonnes of carbon removed from Heathrow operation in H8	76,730t	76,730t	65,500t

Source: Heathrow

7.4.3 Capital investment impact on net non-aero

This refers to **Steps #5 and #6** in Figure 1 above.

The deferral of capital programmes in the Low case has consequences for the net cost of operating the airport as we are unable to make investments that would lead to efficiencies (e.g. automation of service, airfield and baggage) or improve how we generate commercial revenues (e.g. the digitisation of retail). We therefore include different overlays in our drivers model:

- A 0.1% year-on-year efficiency rather than a 1.2% year-on-year efficiency in our operating cost model. This is supported by our assumptions on capital substitution (see above).
- A capital investment overlay in our commercial revenues model to reflect no capital investment relevant to supporting commercial revenues, leading to a decrease of £**[REDACTED]** 2018p in our commercial revenues over H7.

These overlays resulting from different capital investment, combined with different driver inputs and service and space overlays outlined above (**Steps #3, 4 and 7** in Section 7.3) lead to different operating cost and commercial revenue forecasts across the three passenger scenarios.

Table 8: H7 operating cost forecasts in different passenger volume scenarios

Full Adjustment	High P90	Mid P50	Low P10
People	**[REDACTED]**		
Operational Costs			
Insurance			
Facilities & Maintenance			
Rates			
Utility Costs			
Distribution			
General Expenses			
Total Core Operating Costs	-5,465	-5,334	-4,952
Covid-19 Costs	**[REDACTED]**		
Forecourt Access Charge Costs			
Surface Access Strategy Costs			
Enhanced Service Costs			

Total Operating Costs	-5,728	-5,575	-5,040
Total Operating Costs / Pax	-16.0	-17.5	-23.2

Source: Heathrow

Table 9: H7 Commercial revenue forecasts in different passenger volume scenarios

Full Adjustment	High P90	Mid P50	Low P10
Retail	[REDACTED]		
Bureaux			
Car Parking / Car Rental			
Service			
Property			
Rail			
Other			
Total Core Revenues	**3,212**	**2,929**	**2,018**
Forecourt Access Charge	[REDACTED]		
Total Revenues	**3,519**	**3,199**	**2,198**
Total Revenues / Passenger	**9.8**	**10.1**	**10.1**

Source: Heathrow

7.5 Conclusion

The aggregate impact of the seven steps described above drives significant differences in the passenger charge between the three scenarios:

Table 10: H7 passenger charge and associated drivers in our passenger scenarios

	High (P90)	Mid (P50)	Low (P10)
Step 1: H7 Traffic	358.5m	317.7m	217.0m
Step 2: Capital Investment	£4.2bn	£4.2bn	£2.5bn
Step 3: Commercial Revenue Drivers	358.5m pax T4: Jun 23	317.7m pax T4: Jun 23	217.0m pax T4: Jun 25
Step 4: Operating Cost Drivers			
Step 5: Capital Investment Revenue Overlay	√	√	X
Step 6: Capital Investment Efficiency Overlay	√	√	X
Step 7: Enhanced Service Overlay	√	√	X

H7 Unprofiled Avg. Charge	£27.8	£32.0	£47.8

Source: Heathrow

In addition to driving significant differences to the airport charge, we also anticipate significant differences to consumer outcomes and the efficiency of the airport.

Table 11: H7 efficiency and service outcomes in our passenger scenarios

	High (P90)	Mid (P50)	Low (P10)
Operating Cost/Pax	(16.0)	(17.5)	(23.2)
Revenues/Pax	**[REDACTED]**	**[REDACTED]**	**[REDACTED]**
Overall Satisfaction	4.26	4.26	4.17
Baggage	7-9 / 1,000	7-9 / 1,000	9-11 / 1,000
Punctuality	80.5%	80.5%	78.4%

Source: Heathrow

Moreover, from a qualitative point of view, we also anticipate significant differences to carbon and outcomes for passengers in H8 and beyond:

- Lower capital investment in carbon & sustainability projects in a Low scenario will limit Heathrow's ability to make structural progress towards meeting our net zero obligation.

- Outcomes for future passengers are worse in a Low scenario as investments that will improve their experience will be deferred from this period, leading to both an accumulation of required capex in H8 (leading to inefficiencies) but also a delay to the realisation of benefits associated with those capital programmes.

As outlined at the very start of this section, these scenarios are not binary. It is highly likely actual demand will not be precisely that outlined in any of the three scenarios evaluated. They are illustrative as to how our guiding principles would influence our business planning and in turn the impact this would have on building blocks and outcomes.

The key conclusion of this chapter is as much about the importance of flexibility of our business planning, and therefore the regulatory framework, to apply those guiding principles in a timely manner as know more about a future demand scenarios. Our conclusions on capital efficiency (see Chapter 6.1 – Updates to our H7 Regulatory Policy Proposals) make for critical reading given the significant variances that could result from different demand scenarios.