

Executive Summary

1. CEO Introduction

- 1.1. The next 5 years is an opportunity for Heathrow to provide the service that consumers are looking for and to rebuild the UK's only hub airport after the devastating impact of Covid-19. We have a robust business plan to deliver this, but I am deeply concerned that a poorly constructed regulatory settlement will leave the business without enough cashflow to deliver the right consumer outcomes, taking us back to the days of "Heathrow hassle". I want to work with the CAA and airlines to avoid this.
- 1.2. Pre-Covid, Heathrow was one of the ten busiest airports in the world, delivering world-class service for passengers and significant value for the airlines: 6 out of the 10 most profitable global routes flew from Heathrow in 2019. We have remained open throughout the Covid-19 pandemic, providing essential cargo facilities to support trade and the delivery of medical supplies to fight the pandemic, and we have worked tirelessly to keep the airport safe for passengers and colleagues. We have welcomed fifteen new airlines at a time when most airports have lost airline customers and supported many incumbents who consolidated their operations at Heathrow, but this has come at a significant cost to investors. We have accumulated losses of over £3.4bn and continue to lose c.£3m every day.
- 1.3. Recovery will be unpredictable. We will not build back to 2019 passenger numbers until all travel restrictions in all the markets we trade with have been removed, and passengers are confident that they will not be reimposed at short notice. Currently travel restrictions exist in all the markets we serve. These have led to more manual checks at the airport in immigration and in check in, which has become a capacity constraint. During the early stages of the recovery, we have already seen how peaky demand has been, which requires us to commit more resources to meet peak needs, and for Heathrow to take a more active role in coordinating and planning supply across the airport to match demand.
- 1.4. Consumer expectations of service levels remain high and we will remain focused on working with all our partners across Team Heathrow to meet their needs and deliver the outcomes our insight tells us they value most: feeling comfortable and secure; having a predictable and reliable journey; feeling cared for and supported; having an enjoyable experience at an airport they want to travel from that offers a good value choice of flights; and feeling confident they can get to and from the airport. We also need to start the transition to net zero aviation, which is an existential challenge for our industry, but is a hygiene factor for consumers. Our plan for H7 is based around meeting these needs.
- 1.5. Returning to the level of service we achieved pre-pandemic will require significant investment of both operating and capital costs to rebuild capacity. Across the airport, all companies are currently struggling to recruit and train people fast enough to provide an acceptable level of service. This and the regularly changing airline flight schedule have contributed to a decline in punctuality, one of the key drivers of passenger satisfaction. During Covid we stopped funding the free travel zone on local trains and buses which provided vital connectivity for passengers and colleagues, and we need to rebuild this network. Longer processing times in departures and arrivals mean that wheelchair operators take longer to get passengers to their destination, increasing the number of people we require. Maintaining higher levels of cleanliness and enforcing mask wearing are essential to building confidence in passengers and colleagues but are services we did not need pre-pandemic.

- 1.6. Over the last seven years, we have consistently reduced our operating costs to the point where we were at the efficiency frontier. In the last 18 months, we have taken a zero-based budget approach to make permanent structural cost reductions of £38m. We are the only UK airport to have removed all legacy terms and conditions of employment, achieved through challenging negotiations with our trade unions and we have also renegotiated or terminated a number of key contracts including baggage services. In addition, we have achieved temporary cost reductions of c.£315m in 2021 compared to 2019 levels. Some of these are volume-related which we will need to build back as we recover, and some are savings that can be made in the short term but are not sustainable, such as maintenance, training and surface access. We also face a number of headwinds including utilities costs, price inflation and increases in National Insurance contributions.
- 1.7. During the pandemic we have cut capital spend, including maintenance, to a minimum in order to conserve cash. This has left us with a backlog of essential maintenance capex which will take at least five years to catch up on, and higher maintenance opex until then to prevent and deal with failures.
- 1.8. During H7 we will invest to sustain and improve service, security and productivity in the four main flows on the airport; passengers, planes, bags and cargo.
- 1.9. By June 2024, we will be required by the DfT to replace all of our current 2D cabin baggage screening machines with 3D CT scanners. As well as improving security, the new machines and associated new technologies will increase passenger satisfaction, as passengers will be able to leave laptops and liquids in their bags. In the long term, security costs per passenger will be reduced by allowing an increased flow rate (although in the short term efficiency will be reduced as separate teams trained in using both types of system are required). This is a major infrastructure investment, which will need to be carried out in a live operation, and it will be difficult to deliver in the DfT mandated 2½ years. Once the new system is installed, we plan to develop and introduce a new algorithm with machine learning, which will further increase security and improve efficiency from 2026 onwards.
- 1.10. We plan to build a new baggage system for Terminal 2 to replace the current system that is 50 years old and located in the old Terminal 1. This is a single point of service failure for passengers, which relies on spare parts which are no longer available, and replacement has already been deferred for nearly a decade. If the baggage system were to fail, at best it would lead to passengers travelling without their bags for a few days, but at worst it could lead to the closure of Terminal 2, which currently serves 50 airlines and represents 25% of our capacity, for several months.
- 1.11. We plan to invest in airspace change, which will reduce delays to passengers from aircraft stacking on approach, as well as reducing airline fuel burn and carbon emissions in flight by up to 8%. We also plan to invest in pre-conditioned air and fixed electrical ground power and the charging infrastructure across the airport to allow us, airlines and handlers to convert their current fleet of 6,000 vehicles to electric in order to meet our common decarbonisation plans and support the growing numbers of passengers and colleagues who will switch to electric vehicles, and we plan to start feasibility studies to define potential future needs for electric charging and hydrogen for aircraft, which could be required during H8.
- 1.12. Heathrow is the UK's biggest port, but our cargo facilities have seen limited investment for decades as we and the airlines instead prioritised investment in new, world-class terminal facilities and transformed passenger service. The importance of cargo has been highlighted during the pandemic, and Brexit has made it more

important for Heathrow to be competitive with Amsterdam, Paris and Frankfurt. Cargo is also critical to maintain the high value of slots for airlines at Heathrow, sustaining route economics and enabling a high frequency schedule that is valued by passengers. We are working with the Government, airlines and handlers to halve the time it takes to process cargo at Heathrow, automating procedures and replacing control posts with an airlock system, which is faster, more secure and lower cost. We are also aiming to facilitate the redevelopment of the cargo horseshoe in partnership with Segro.

- 1.13. For many years, Heathrow has had the highest level of commercial revenue per passenger globally, as well as being rated by passengers the best for airport shopping in the world for over a decade. We are continually improving our retail offer to remain relevant but have only seen material growth in revenue per passenger when we have opened new terminals, T5 and T2. These enabled us to increase the amount of retail space. Our plan for H7 is to keep refreshing our retail offer and to increase investment in digital sales and fulfilment, reflecting the consumer trend away from physical towards online. We face some significant headwinds, with the Government's decision to remove VAT free shopping reducing the attractiveness of luxury shops at Heathrow. The launch of the Elizabeth Line will be a step change in connectivity, offering change-free travel from the major markets in Canary Wharf, the City and West End in less than 30 minutes for less than half the current price of the Heathrow Express, which terminates in Paddington. This will be a significant benefit for passengers and Team Heathrow colleagues, but will reduce income from Heathrow Express.
- 1.14. We have updated our financial projections to reflect the latest forecasts for passenger numbers (up slightly in 2022, but down slightly overall), operating costs (similar despite a significant increase in energy costs) and commercial revenue (up slightly). We have also reflected the CAA's decision not to treat business rates as an "other regulated charge", or to use regulatory depreciation to smooth the charge over a longer period. The net result of these movements is that the charge remains broadly as it was in our last update, at £42 per passenger, before any regulatory smoothing.
- 1.15. The forecasts in the CAA's Initial Proposals do not allow us to deliver on our consumer outcomes nor are they financeable. The Initial Proposals include errors in methodology and calculations, covered in detail in our consultation response, which could have easily been picked up through proper engagement with us or through due diligence. Left uncorrected they would mean that the airport would have £6bn lower cashflow over the course of H7 - crystallising in £14.6 difference in charges in 2018 prices. This is not enough to maintain our service levels or invest in the improvements that consumers and airlines require.
- 1.16. Due to this, the CAA's assessment of financeability in its Initial Proposals is flawed and arrives at the wrong conclusions. By assuming that Heathrow can generate unrealistically high revenues at unrealistically low costs, with unrealistically high passenger numbers, the price control is not deliverable or financeable. The multibillion gap created is not obvious to investors and consumers as the CAA's Initial Proposals' headline charge includes a different indexation base, a different treatment of Business Rates and a different profiling of depreciation, which creates the illusion that the upper range in the Initial Proposals and Heathrow's request are not materially different. But the reality in pounds is very different. Over the pandemic our capital structure has been already downgraded by one notch and our credit being placed on negative credit watch; a lack of correction by CAA in its cashflow projections could add further pressure to our already stressed credit metrics and threaten access to debt capital markets.

- 1.17. These errors mean that the CAA has significantly underestimated the required charge for H7 and correcting them will lead to a charge that is much higher. We recognise that forcing all the impact of the recovery into a 5-year regulatory period would lead to a doubling of the charge to airlines, and while this may ultimately have no impact on the price of tickets to consumers, it could have a material impact on airline economics.
- 1.18. The CAA can provide a better solution for consumers by applying the regulatory levers at their disposal. We would support the CAA in smoothing the price by suspending regulatory depreciation during H7, so that it can be recovered when passenger volumes have recovered. This would have the effect of reducing dividend capacity during H7 and would only be acceptable if the same approach is applied for 2020 and 2021, to give investors the confidence that the regulatory framework allows investors to recover their efficiently incurred investment through the RAB if they meet the targets set in the regulatory framework, and that deferred dividends will be recovered in future regulatory periods. Taking this approach would bring the charge close to the level that the CAA has said would be affordable, would allow us to deliver the outcomes that consumers require, and would be financeable, which meets the CAA's statutory obligations.
- 1.19. Our ambition is to play a leading role in the recovery of aviation from the Covid pandemic, investing to deliver the levels of service and resilience expected by our consumers and working with our airlines to bring trade and tourism back to the UK. We ask the CAA to put the regulatory framework in place to enable us to deliver this ambition.

2. The H7 price control needs to deliver a safe, secure, resilient, sustainable and efficient Heathrow in the interests of consumers in order to ensure aviation can grow back and kickstart the UK economy after the impact of Covid-19

- 2.1. Consumers remain at the heart of our plans for H7. We have significantly increased our consumer engagement to develop all of our plans and have reflected the heightened consumer needs in light of the changing Covid-19 backdrop. The key to Heathrow's recovery is to provide passengers with the service they expect.
- 2.2. Organisations across the sector, including Heathrow, are continuing to suffer significant financial losses as a result of the impact of Covid-19. A July 2021 Airports Council International study reported that airports globally saw a reduction in revenue of \$129bn in 2020 compared to the pre-Covid industry revenue forecast, with a further \$108bn reduction forecast for 2021. The same report also forecast that European airports will remain the most affected in 2021, with regional losses estimated to be more than \$49bn by the end of the year.
- 2.3. The impact on airports is particularly severe given the high fixed cost base to finance and maintain infrastructure and keep it secure, even when there are no flights. The vast majority of airport revenues are recovered on a per passenger basis, so when airlines reduce their costs by ceasing or cutting flying, airports are left with similar costs but no revenue – we bear a disproportionate amount of the risk. This has been noted by ACI:

“Overall, airports are also businesses in their own right that have suffered great financial stress during the COVID-19 crisis and the historic downturn of passenger traffic. In fact, this may be a moment to rethink the economic oversight of airport

charges to something that is more reflective of market conditions allowing for risk to be shared across airlines and airports. Airports will remain infrastructure-intensive businesses—which means inevitable high fixed costs which must be maintained for the benefit of passengers and the communities that airports serve.”¹

- 2.4. The impact of Covid-19 on Heathrow in particular has been profound. Heathrow’s latest Q3 2021 results show a cumulative £3.4 billion loss since March 2020. We have taken quick and extreme action to ensure that Heathrow remains operational by restructuring our cost base and reducing our capital investment to minimum levels. Our investors have also injected £600m into the regulated company.
- 2.5. Unlike other aviation companies, Heathrow’s price control limits our ability to make additional returns once business recovers. We therefore welcome the CAA’s recognition that, under our price control structure, lower customer numbers until full recovery must mean a higher charge per passenger. This is simply the mechanics of the framework.
- 2.6. As acknowledged by the CAA in its Summary document, airport charges represent a modest proportion of the airfares at Heathrow. We firmly believe that the interests of consumers will be furthered by the CAA prioritising a charge which allows for investment in service, resilience and futureproofing the airport and a price control framework which aligns the interests of the airport with those of consumers.
- 2.7. We remain committed to providing the best possible passenger service. We believe this will be a key differentiator of our airport through recovery, but this relies on targeted, but consistent, investment to meet our consumers’ rising expectations.
- 2.8. Our H7 plan centres around ensuring the delivery of our consumer and stakeholder outcomes.

Figure 1: Heathrow’s consumer outcomes



3. A consistently applied RAB-based framework is right for long-term infrastructure such as Heathrow

- 3.1. Heathrow’s RAB-based regulatory framework has been successful in delivering increased service and efficiency in the interests of consumers. This can be clearly

¹ [ACI World responds to statements on airport charges by IATA - ACI World](#)

seen in the outcomes delivered across Q6 – increased passenger satisfaction, increased efficiency and increased commercial revenues.

- 3.2. We have transformed service, climbing from an ASQ score of 3.28 in 2006 to 4.22 in 2021 through substantial investment, and by creating a service culture in line with our vision “to give passengers the best airport service in the world”. We are the only wholly private airport rated by passengers in the top 10 worldwide for service – something that we and the CAA can be proud of.
- 3.3. Central to this improvement has been investing to respond to the needs of consumers and airlines. We have worked with our airlines and the CAA to agree an £11bn programme to rebuild two thirds of the airport while keeping it operating over the last 15 years. This investment has enabled us to build new terminals, such as BA’s home terminal, T5, which has given BA a better connecting offer and allowed them to achieve lower operating costs. *“Terminal 5 has allowed us to cut the cost of our Heathrow operations by more than expected.”*² We have also refurbished terminals 3 and 4 to provide competitive equivalence and allow colocation of airlines, replaced the T3 baggage system and control tower and upgraded key operational facilities.
- 3.4. Airlines expect a higher level of service at Heathrow than at other hubs, for example 95% pier service, compared to [X]% at Schiphol, which requires constructing more satellite buildings and piers, underground connectors and air bridges. This airline choice drives significantly higher capital and operating costs, increasing airport charges, but allows airlines to achieve a higher yield and reduce some operating costs. It has been proven to be a successful model; the higher service levels have significantly increased passenger satisfaction (premium passengers in particular do not like being bussed to a plane) and helped the airlines grow passenger numbers from 66.4m in 2006 to 80.9m in 2019 before the impact of Covid-19. We have provided all these assets at the request of our customers, and developed them in consultation with them, but they only pay for them when they use them, which has left us with a significant under recovery due to Covid-19.
- 3.5. This investment was enabled by investors, supported by a framework of stable returns, stated limited downside and the explicit ability to reopen the price control aiding credit strength as set out by the CAA in the Q6 decision: *“the ability of a licensing regime to revisit the price control if key assumptions, such as traffic, are significantly worse than the forecast, could be a credit strength”*.³
- 3.6. When properly and consistently applied, the RAB-based framework can create the right incentives for long term investment. The Government has applied the RAB-based model in other sectors that require long-term investment which must be delivered cost-effectively. This includes the development of nuclear power in the UK⁴. The RAB model offers investors return of the RAB through regulatory

² British Airways, 2008/09 Annual Report, P25

³ CAA,CAP1151, paragraph I29

⁴ In its decision on the future funding for nuclear plants, BEIS set out that it will introduce the RAB model as the option to fund nuclear projects. It highlighted that *“A RAB model is a tried and tested method, typically used in the UK, to finance large scale infrastructure assets such as water, gas and electricity networks”* and that it could have benefits for consumers in lowering the cost of finance and attracting investment *“In contrast, the RAB model shares the cost with consumers from the start, reducing the amount of interest owed on loans. This ensures the burden on consumers is much lower over the life of the plant whilst helping to attract private sector investment into nuclear projects.”*
[Future funding for nuclear plants - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/consultations/future-funding-for-nuclear-plants)

depreciation and a fair bet of receiving return on the RAB. Risk is typically limited and symmetrical.

- 3.7. However, investors have not had a good experience with their investment in Heathrow. Returns were below the regulatory settlement in Q4 and Q5, and only slightly above in Q6 until 2019, after which most equity value has been destroyed. Over the last 15 years, investors have received very low returns. This does not support future investment.
- 3.8. Without aeronautical revenues, Heathrow has not been able to recover regulatory depreciation (return of the RAB), which means that investors have lost c.£1.7bn of efficiently incurred investment. This could quickly have been addressed if the CAA had suspended regulatory depreciation for 2020 and 2021, which would have created confidence in the RAB model.
- 3.9. The loss on the RAB has been even bigger, revealing that extreme downside risk did exist and has materialised.
- 3.10. While the flexibility of the current framework and the credit-enhancing ability to revisit the price control was highlighted by the CAA in its Q6 decision⁵, this flexibility has not been effectively applied in practice. As a consequence, investors have lost confidence in the regulatory framework. This needs to be addressed by the CAA in its determination to ensure that regulation provides the foundations for Heathrow to continue to deliver the service our passengers expect.
- 3.11. The losses caused by Covid-19 were 'exceptional', outside of Heathrow's control and represented an outturn which was 'significantly worse than the forecast'. Without fully carrying out the review which was implicit within the Q6 framework, the CAA will undermine confidence in the RAB-based model and the consistent application of its framework.
- 3.12. In order to ensure that the RAB-based framework continues to be the right one, the CAA needs to:
 - Recognise that Heathrow needs to have incentives to invest and grow volume. This comes from both ensuring that there are still opportunities for upside and downside in the framework and that there are incentives to ensure Heathrow continues to be efficient. This can be achieved by retaining dead bands as part of the proposed risk sharing mechanism and removing ungrounded stretch such as that on commercial revenue management, which is not based on benchmarks or evidence and further reduces any potential upside and associated commercial incentives.
 - Recognise the advantages in the current approach to capex and the inherent flexibility within it which will allow us to flex the capital portfolio to respond to uncertainty in H7 through robust airline engagement. By continuing with the current Development and Core framework, we can determine the right business cases to invest in with our airline customers during the period through a robust and well documented governance process.

⁵ "The CAA's proposed licence did not propose fundamental changes to the form of regulation for HAL and hence is not expected to weaken HAL's credit strength. However, the ability of a licensing regime to revisit the price control if key assumptions, such as traffic, are significantly worse than the forecast, could be a credit strength" - CAA,CAP1151, paragraph I29

- Implement uncertainty mechanisms, such as the expansion of the S-Factor, the asymmetric risk allowance, sharing mechanism for the Terminal Drop Off Charge and the traffic risk sharing mechanism through the H7 licence. These should be accompanied by a clear licence condition setting out how and when the price control can be reopened. This licence-based implementation will ensure that stakeholders can have confidence in the consistent application of the regulatory framework with the appropriate regulatory protections, providing the right basis for investment.
- Be cautious about the changes it is proposing to make to key elements of the price control in light of the considerable traffic uncertainty, in particular its proposed capital efficiency mechanism and changes to service quality targets. The CAA should introduce ex-ante incentives of 15% only where these are appropriate, closely aligned with the incentive rate which has generated efficiency under our current scheme, and refrain from making further changes to service quality targets in its Final Proposals.

4. The CAA's plan in its Initial Proposals does not deliver the right consumer outcomes nor is it financeable.

4.1. The CAA has made some very basic errors in its methodology and calculations. If uncorrected this would mean that the airport would not have enough cashflow to support a basic level of consumer service, invest in the improvements that consumers and airlines require, or allow us to generate enough cash to be financeable. These errors include;

- Assuming that Heathrow's air traffic numbers could exceed our legal limit and our passenger numbers could exceed our physical capacity by the end of 2026
- The CAA's consultants understating operating costs in 2022 by £173m leading to a number of errors in its forecast across the period (equivalent to £851m over H7 or £2.68 per passenger)
- Assuming 2% per annum additional commercial revenue growth per passenger from an already efficient 2019 base (equivalent to £400m over H7 or around £1 per passenger)
- Omitting the capital expenditure required to deliver efficiency gains, revenue growth and service improvements
- Using the wrong gearing level for the notional company, 55% instead of 60%
- Assuming the asset betas have barely changed due to Covid-19 resulting in the CAA mid-point cost of equity being only 0.5% higher than the CMA pre-pandemic view for NERL whereas current market evidence would support an increase of 7.6%. A balanced assessment would result in a cost of equity 5.0% higher than the pre-pandemic value, (equivalent to £5 per passenger).

If the CAA's model is corrected for these errors, the calculation of the charge is in line with our own.

4.2. Overall, the approach used by the CAA to set its forecasts of opex and commercial revenues is bad practice and has resulted in an erroneous forecast. We have made four formal submissions of our H7 business over a two-year period and countless

other regulatory submissions, with detailed analysis behind our forecasts and based on robust evidence, benchmarking and regulatory precedent.

- 4.3. The CAA employed CEPA and Taylor Airey to carry out analysis on its behalf, but only gave them a few weeks to do their work, which the CAA then had little time to assess before finalising their Initial Proposals. The consultants have made some very basic errors of understanding that should have been corrected either by discussion with us prior to publication, or through due diligence by the CAA team. The CAA's Initial Proposals and its consultant reports have not engaged with our forecasts nor interrogated our assumptions. This is very poor process, and the lack of time may account for the poor quality of the work.
- 4.4. The CAA's Initial Proposals do not take an integrated approach between different building blocks. This leads the Initial Proposals to assume cost reductions in one section but provide no investment to achieve them in another. This reflects a mechanistic exercise, not a proper business plan appropriate to running the UK's only hub airport.
- 4.5. The CAA's Initial Proposals take our mid case forecasts as one end of the range, and CEPA/Taylor Airey's forecasts as the bottom end of the range. By choosing a midpoint between the two, they have given equal weight to each in defining the upper and lower charges, regardless of the very different quality of the assessments. This approach appears to be arbitrary and has resulted in outcomes that are not achievable.
- 4.6. It also provides a perverse incentive for all stakeholders in the regulatory process to take an extreme position. Heathrow has submitted an evidenced and reasonable forecast but, in an attempt to reduce the aeronautical charge for 2022 the airlines forecast that they will fly 90% of 2019 passenger numbers in 2022, in spite of covid restrictions and their own capacity constraints. Incentivising such an approach is clearly not in the interests of consumers.
- 4.7. The H7 passenger forecast is a key building block of the CAA's Initial Proposals given its impact across the price control as a whole, and the CAA has recognised the quality of Heathrow's forecasting model. In its CAP2139 consultation, the CAA noted that Heathrow had *"taken a reasonably well-considered and structured approach to passenger forecasting, consistent with good practice."*⁶
- 4.8. There appears to be a key error in the CAA's proposals centred around its passenger forecasting. While the CAA has used Heathrow's model it has materially changed the underlying assumptions in order to develop its own forecast. This has resulted in a forecast of 88.3m passengers in 2026 which cannot be physically delivered within Heathrow's terminal infrastructure or its legal cap of 480,000 Air Traffic Movements (ATMs), even if demand and border controls allowed it.
- 4.9. We have a legally binding cap of 480,000 movements per annum. If we exceed this cap, then it is permanently reduced by two movements for every movement that we have exceeded. We therefore schedule as close as possible to this cap without going over it, and this has led to a maximum flown schedule of 476k movements. The CAA has removed the ATM cap from the forecast model, which is not consistent with the real constraints under which Heathrow operates. This is another error which could

⁶ CAA, CAP2139, Paragraph 2.6

have been avoided with proper engagement or due diligence and leads to an overstatement of passenger numbers.

- 4.10. The only other ways to get to a forecast passenger number of 88.3m passengers would be to increase load factors to a level not achieved at any other hub airport in the world, and inconsistent with the airlines' historic policy of setting prices to maximise "yield" (i.e. margin) at Heathrow rather than load factor, or; to increase the seats per movement (SPM) by 10%, which is not possible given current fleet plans and the trend to smaller planes.
- 4.11. Even if those were possible, Heathrow has a physical capacity of 85m passengers per year. We have previously explored options to increase capacity in T5, which would take 6 years to implement at a cost of around £800m. This is not built into either our plan or the CAA's plan. This is a basic error that should have been picked up by the CAA. Further detail on this analysis is provided in our response as part of Section 2- Passenger Forecasts.
- 4.12. Our operating costs were efficient before the Covid-19 pandemic, with external benchmarking validating our operating cost performance against other global hub airports⁷. The "drivers model" was validated by the changes we have achieved in our cost base during the pandemic. Airport costs are very fixed in nature, and there is a high level of cost required to keep the airport safe and secure even when no planes are flying.
- 4.13. We have cut every cost possible across the airport, with redundancies at all levels, and renegotiated every single contract, which delivered a 22% reduction to our operating costs in 2020. Many of these actions were temporary in nature, such as furlough, closing terminals and runways. We also took a zero-based approach to costs which resulted in a permanent reduction in our cost base of £38m. This was only possible due to the shift caused by Covid-19. Our plan for H7 includes these cost savings and an ongoing efficiency improvement of 1% per annum, resulting in £328m of operating cost savings over H7.
- 4.14. In contrast, the CAA's operating cost forecasts are unrealistic and undeliverable. The CEPA/Taylor Airey conclusions, which the CAA use to set its opex range, forecasts opex for 2022 at lower levels than 2020 despite substantial parts of the airport being closed in 2020 and serving less than half the number of passengers. This is £173m (16%) less than the operating costs in our business plan that we will start to deliver only two weeks after the publication of this report. The consultant's figure is clearly an error as, after all the cost cutting due to Covid-19 there simply is not £173m of further cost savings to be made. Overall, the impacts of the errors made by Taylor Airey lead to an H7 forecast which is £851m, or £2.68 per passenger, below our RBP Update 2 forecasts of deliverable opex levels.

⁷ "The analysis shows that Heathrow was more efficient than the average airport in 2018, with a cost gap of between -0.36 and -1.63 depending on the model specification. It was also at or ahead of the frontier airport when we take account of the impacts of a broader range of cost drivers." KPMG, *Airport Operating Cost Efficiency Benchmarking*, October 2019

Table 1: Comparison of opex forecasts in 2020 and 2022

	2020	2022
Passengers (m)	22.1	45.5
Infrastructure	T3/4 closed for 8 months 1 runway closed for 8 months	T4 provision from summer 2022
Outturn / HAL RBP Update 2 (£m, 2018 RPI)	922	1,064
CEPA/TA forecast (£m, 2018 RPI)		891
Difference		-173

4.15. In addition, CEPA/Taylor Airey has made errors in its forecast which further impact the CAA's Initial Proposal range. These include:

- Double counting of the savings from the CAA approved Cost of Change programme, for which a £30m p.a. saving is already included in our plan.
- Using incorrect assumptions to forecast security staff costs which appropriate engagement with Heathrow could have easily identified and rectified.
- Including forecast opex efficiencies from the regulated security programme which is not currently allowed through capex in the CAA's Initial Proposals.
- Double counting savings by including an assumption of ongoing frontier efficiency changes for security in addition to bottom-up estimates of efficiency derived from assumptions about the outputs of our regulated security programme.

4.16. The CAA recognises that Heathrow has historically outperformed its peers regarding commercial revenue generation and achieves the highest commercial revenue of any airport in the world. This is also evidenced in our benchmarking work from Pragma⁸ and KPMG⁹. Retail income is a significant source of revenue, which helps to reduce the aeronautical charge in our single till model.

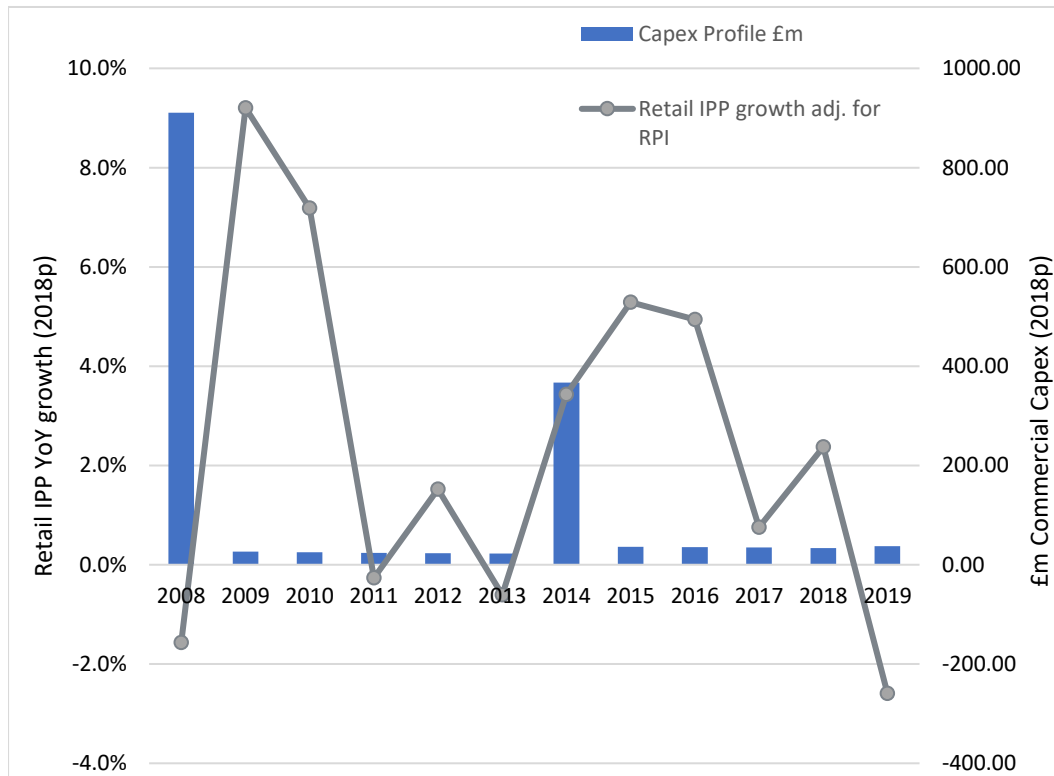
4.17. Retail is very competitive and fast moving to meet changing needs of passengers. We have to continually invest to reinvent our retail offer to stay relevant and maintain the high level of spend per passenger. Analysis shows that we have only seen

⁸ "At a total level, Heathrow generated a higher amount of non-aeronautical revenue per passenger than all other airports in the benchmark set. It has experienced strong gains, growing at a CAGR of +2.1% from 2012 to 2018." Pragma, *Commercial benchmarking 2019*, November 2019

⁹ "For an airport of Heathrow's size and customer-base, its relative performance in generating commercial revenue has generally improved since the 2007-08 financial crisis to a position where it is ahead of where we would expect it to be based on our models, and similar to the frontier airport in 2018. The trend for total commercial revenue is also generally true for the separate components of commercial revenue including retail revenue, property revenue and car parking revenue.", KPMG, *Airport Commercial Revenue Efficiency Benchmarking*, December 2019

significant increase in spend per passenger in the years immediately following the opening of new retail space when we open a new terminal. 90% of the growth in income per passenger between 2008 and 2019 takes place in the first two full years following terminal openings at T5 and T2. The average annual growth rate of the other years is just 0.4%. On average, including new terminal openings, nominal spend per head at Heathrow has grown by 2% per annum, which is in line with the benchmark for other airports.

Figure 2: Commercial Capital vs Income Per Passenger (2018p), 2008-2019



- 4.18. There is no new space planned in H7, though our business plan assumes that we can increase spend per head by 2% per annum through significant investment in digital retail, which is a stretching target.
- 4.19. The CAA forecast assumes that spend per head will grow faster than historical trends by implementing an additional 2% management stretch on its forecasts, with no investment and no new space. This is simply unrealistic and ungrounded and does not appear to have been sense checked. The consequence of this error is £400m overstatement of revenue, equivalent to over £1 per passenger.
- 4.20. There are other major errors in the consultant’s analysis that demonstrate a lack of understanding of the airport, such as assuming the revenue from cargo only operations - which have increased in number during the pandemic because of the lack of passenger flights – would continue once passenger flights have returned to full capacity. This is a basic error that should have been picked up by the CAA.
- 4.21. Inconsistencies in the CAA’s assumptions for H7 can be seen throughout the CAA’s Initial Proposals. The CAA assumes we are able to switch to lower carbon technology, provide a higher digital service, improve our cargo revenues and continue to increase efficiency in our security processes with no capital provision. In addition to this inconsistency between opex, commercial revenues and capital, the CAA does

not appear to recognise the fundamental link between costs and service, with views on service levels being set out in an entirely different document which was published after the Initial Proposals.

- 4.22. The CAA's assumptions on financeability and key financing issues such as the WACC also contribute to the price control not being deliverable.
- 4.23. The CAA's analysis on financeability is based on an input error. In its modelling, the CAA has assumed the wrong opening gearing for 2019 using 55% rather than 60%. This means that the amount of debt in 2022 is underestimated, and consequently the amount of Funds from Operations (FFO) is overestimated (due to interest costs being underestimated). The effect of correcting this error would reduce the FFO to net debt ratio for 2022 in the CAA's analysis to 4.5%. This is another basic error that should have been picked up by the CAA's due diligence.
- 4.24. The CAA's conclusions on debt financeability assume that credit rating agencies will overlook poor metrics for the first years of H7 due to the improvement in the later years of the period. This is not guaranteed. Credit rating agencies will not just have to look through two or three years of poor performance at the start of H7, but also the poor performance in 2020 and 2021. In making this assumption, the CAA is risking the deliverability of its target credit rating.
- 4.25. The CAA's assumptions on asset beta are materially out of line with current market data and do not reflect the increased risk post-Covid-19. In March 2020, the CMA identified a pre-covid range for the asset beta of airports of 0.52 to 0.62. The CAA's post-Covid range is 0.52 to 0.67. This means at the bottom of the range the CAA is assuming that Covid-19 has had no impact on investors' perception of risk. The current level of asset beta in the market is around 0.8 to 0.95, well above the top of the CAA range; there is no evidence to suggest that this will reduce to historical levels before the start of H7.
- 4.26. The consequence of these errors in forecast are very substantial. We estimate a £6bn cashflow gap between our plan and the CAA's mid-point at its Initial Proposals. If actual commercial revenues and operating costs are as we have forecast, Heathrow will remain loss making and will not generate enough cash to cover operating costs, capital spend and interest payments. The only response for management would be to minimise operating and capital spend as we have for the last two years – keeping T4 closed for as long as possible, minimising staff costs and maintenance spend, cutting all investment in security upgrades, T2 baggage and decarbonisation, as well as leading to no return to dividends. The low levels of service and resilience would be similar to the "Heathrow Hassle" of the 2000s. This is a bad outcome for passengers and a bad outcome for airlines, which generate a premium margin at Heathrow.
- 4.27. Even these actions may not be enough to avoid a covenant breach or to maintain Investment Grade credit ratings. If our debt is downgraded from Investment Grade, many existing holders will have to sell, which will flood the market with Heathrow debt, making it harder and significantly more expensive for us to raise new debt to maintain liquidity.
- 4.28. Basing its aeronautical charges on an integrated plan and well-grounded forecast is essential to the CAA fulfilling its responsibilities to both the consumer and to financeability.
- 4.29. For its Final Proposals, we ask the CAA to:

- Use Heathrow’s agreed consumer outcomes as the basis for its price control assumptions, in particular for capital and opex, to ensure that all its forecasts are consistent with delivering the right level of service and targeted improvements expected by passengers.
- Correct the factual and calculation errors within its H7 modelling of costs, revenues, passenger forecasts and financeability.
- Set a passenger forecast of 317.1m passengers across H7, in line with the outputs of our detailed probabilistic model, reflecting a reasonable balance of risk and opportunity through the period.
- Set an opex settlement of £5,698m (2018p) (including pension cash contribution) which reflects the resolution of the issues identified with the CAA’s modelling and includes realistic assumptions on frontier efficiency, on-going savings post-Covid, the reality of our operational planning in ramp up and updated assumptions on input price inflation.
- Set a commercial revenue forecast of £[3<] (2018p) which resolves the issues in the Initial Proposals and reflects the impact of the changes to VAT policy, our capital plan, updated assumptions on the start date for Crossrail and updated evidence on passenger behaviour.
- Set a capital envelope of £4.1bn (2018p) reflecting the investments needed to keep Heathrow safe and compliant and allow for the delivery of ongoing efficiencies and revenue generation.
- Set a cost of capital of 8.5% (real RPI pre-tax), based on an asset beta of 0.82 consistent with the current post-Covid asset beta of comparator airports, and a cost of debt of 1.87% that properly reflects Heathrow’s actual debt costs including the high liquidity costs Heathrow will incur in early H7 as a result of the need to retain large cash balances to ensure financial resilience in the face of Covid-19 uncertainty.

5. The CAA’s proposed arrangements to manage the change in risk are welcome but implementation will be key to restoring investor confidence for H7

- 5.1. It is positive that the CAA has recognised the shift in risk in its Initial Proposals through the use of new uncertainty mechanisms, however the key will be ensuring the effective implementation of the detailed mechanisms to provide sufficient certainty for investors through the H7 licence.
- 5.2. While we understand the CAA’s rationale for the use of a traffic risk sharing mechanism rather than a revenue sharing mechanism, we remain concerned that a traffic risk sharing mechanism does not take appropriate account of the impact of changes in traffic volumes on commercial revenues. Indeed, the CAA’s proposed mechanism only corrects for the difference between forecast and outturn aeronautical charges. The CAA’s proposed mechanism leaves Heathrow exposed to risk on commercial revenues even after the 10% threshold.
- 5.3. This is not appropriate for a single till regulatory structure. In order to address the exposure on commercial revenues, the CAA’s mechanism should include an additional per passenger adjustment to account for the net impact of incremental passengers above the impact on aeronautical revenues alone. This would also ensure that airlines are able to share in the opportunities and risks of Heathrow’s commercial revenue generation. This should be set using the implied elasticities of the opex and revenue forecasts at the start of the price control to ensure Heathrow

has the right incentive to continue to strive for efficiencies regardless of the level of passenger demand.

- 5.4. We agree in principle with the CAA's proposed allowance for symmetric risk, however there are a number of issues in the CAA's approach which should be reviewed ahead of its Final Proposals. The CAA's calculations on the length of the impact, three years, are not consistent with the forecast impact of Covid-19 on Heathrow's passenger volumes. The calculations also assume that there is no risk of a pandemic happening in 2022 which does not reflect the true risk.
- 5.5. Targeting an A- credit rating for Heathrow is critical to ensure it can access debt markets at an efficient cost with a prudent degree of downside resilience, however the CAA must not forget the important role of equity in ensuring financeability. We welcome the CAA's conclusion that a financeable price control should allow for a return to dividends by 2023/24 in line with market expectations, but the CAA's Initial Proposals do not achieve this.
- 5.6. The CAA's decision not to revisit its proposed £300m adjustment for the impact of Covid-19 on iH7 is flawed. As already set out, the CAA was clear in its Q6 decision that a strength of Heathrow's framework was the ability to review the price control should exceptional circumstances arise. To date, the CAA has not fully undertaken this review.
- 5.7. The £300m adjustment which resulted from the CAA's decision in April of this year is poorly justified. An adjustment of £300m is not enough to solve financeability issues, does not reflect the mis-pricing of risk in Q6, does not recover "return of the RAB" and is significantly lower than the adjustment the CAA would make going forward under its proposed H7 risk sharing framework, a mechanism which it states in its Initial Proposals would be in the interests of consumers.
- 5.8. Ahead of the Final Proposals, we request that the CAA:
 - Recalibrates its proposed traffic risk sharing mechanism to reflect the impact of commercial revenues by making an additional adjustment of [~~£~~] per passenger to provide sharing for the elasticity difference between cost and revenue evolution per passenger.
 - Changes its approach to traffic risk sharing so that the mechanism applies to each year separately, rather than a cumulative approach.
 - Recalibrates its asymmetric risk allowance to take into account that a major revenue impact can occur in any year and that the impact of Covid is likely to be material for four or five years rather than three.
 - Applies its corrected H7 TRS approach to iH7 resulting in a significantly greater RAB adjustment than the £300m proposed. This approach is consistent with the approach the CAA would have taken in Q6 if the risk of pandemic had been considered in advance. Given risk sharing is in consumers' interest for H7, it would also have been appropriate for iH7. Applying an appropriately calibrated TRS to iH7 results in a RAB adjustment of £2.5bn.

6. We have updated our plan with most up to date information and, where appropriate, incorporated feedback from the CAA and stakeholders

- 6.1. While we welcome the increased clarity of the CAA's Initial Proposals, the forecasts set out within them are simply undeliverable. Our key areas of concern are:

- The CAA's forecasts on opex, commercial revenues and passenger forecasting
- The CAA's proposed capital plan
- The CAA's views on asset beta
- The CAA's decision not to grant a further RAB adjustment at this stage

Our Revised Business Plan (RBP) Update 2, attached to this response as Appendix 16, reflects our latest views on these areas.

6.2. The RBP Update 2 takes into account requests for more information from the CAA on areas such as the capital plan and our opex cost overlays and includes changes to reflect key CAA policy areas, such as the CAA's Proposals on ORCs.

6.3. In addition to responding to the CAA's proposals, our RBP Update 2 also reflects our ongoing engagement with the Airline Community. Since our RBP Update 1 we have continued to engage with the Airline Community on operational matters, capital investment, ORCs and proposals for OBR. This engagement has taken place both through ad hoc forums on regulatory issues and our regular governance and engagement forums. Key engagement includes:

- Ongoing engagement through our monthly Capital Portfolio Board and Future Portfolio Group to develop and refine the capital plan for H7 and consider key issues such as the objective each of our programmes is seeking to achieve.
- Engagement on the recovery of ORCs and future forecasts and governance arrangements through ORCG. Our forecasts and cost allocation methodology for 2022 ORCs was shared at the ORCG forum on 28 October.
- Engagement to produce a joint submission to the CAA on OBR, agreeing around 20 of the proposed H7 OBR measures.

6.4. In summary, the key updated information and changes to our plan included within RBP Update 2 are:

- A passenger forecast of 317.1m passengers across H7.
- A single revised capital plan of £4.1bn which represents the investment needed in H7 to ensure that Heathrow is safe, secure, compliant, resilient and that the airport continues to develop in line with the expectations of consumers.
- Updated input price inflation assumptions and a 1% per annum Frontier Efficiency for our operating costs.
- The removal of our opex cost overlays for surface access, digital services and automated journeys and the reforecasting of our overlays for Covid-19, resilience and Passengers Requiring Support (PRS).
- An allowance to enable the full remobilisation of Terminal 4 from July 2022 in order to provide additional passenger processing capacity due to current Covid-19 process constraints.
- Revised assumptions on the impact of VAT policy changes following updated data and evidence.

- A WACC of 8.5% based on a cost of equity of 14.1% (real RPI post tax) and a cost of debt of 1.87%, to reflect current market data on airport asset betas, the additional debt costs Heathrow faces as a result of the higher price of its debt in the market and the cost of the cash balances it needs to maintain in the early part of H7.
 - A traffic volume risk sharing mechanism with a 10% dead-band outside of which 95% of revenue is shared alongside an adjustment of £[X] to account for the impact of commercial revenues net of operating costs
 - A marginal cost approach to all ORCs removing all business rates and including them in the airport charge
- 6.5. When correcting for the errors in the Initial Proposals and including our updated assumptions, our RBP Update 2 delivers an average unprofiled airport charge of £41.95 (2018, RPI) for the H7 period. This is the correct level for the charge based on the simple calculation of the regulatory building blocks.
- 6.6. In its document the CAA notes that it is *“still open minded about using depreciation to manage affordability and mindful of its impact on financeability”*. We recognise the need to continue to deliver good value for money for consumers and airlines and have sought to respond constructively to the challenge of low passenger volumes by building an alternative approach using deferred depreciation. This does not change the building block numbers, which are rigorously based on the facts, however it does create the opportunity to deliver lower prices throughout H7.
- 6.7. An appropriate deferral of regulatory depreciation would allow us to reduce the base charge of £41.95 to a lower level. Our analysis shows that a charge of £34.07 (2018, RPI) is achievable by deferring £635m per annum of depreciation over H7.
- 6.8. However, a deferral of depreciation would have the effect of reducing dividend capacity during H7 and would only be acceptable if the same approach is applied for 2020 and 2021 to give investors the confidence that the CAA will allow them to fully recover all efficiently incurred investment in the RAB and that deferred dividends will be recovered in future regulatory periods.
- 6.9. Taking this approach would bring the charge close to the level that the CAA has said would be affordable, allows us to deliver the outcomes that consumers require, and is financeable, which meets the CAA’s statutory obligations.

Table 2: Summary of RBP Update 2 outputs

Assumptions	RBP Update 2 Case
Passenger Forecast	317.1m
Opex (£m, 2018p)	£5,593*
Commercial revenues (£m, 2018p)	£[X]
Asymmetric risk adjustment (£m, 2018p)	£108
Cargo revenues (£m, 2018p)	£[X]
Capital Plan	£4.1bn
WACC	8.5%
RAB Adjustment	£2.53bn
Building block charge	£41.946

*Excludes Pension cash contribution

- 7. We will continue to engage with the CAA, our consumers and the Airline Community to ensure that the H7 settlement is the right one**
- 7.1. Engagement between Heathrow and the CAA will be vital to ensuring that we reach the right H7 outcome for consumers. As always, we are happy to engage with the CAA on any aspect of our response or business plan to ensure that simple misunderstandings do not impact the outcome of the price control review.
- 7.2. In addition to our response to the Initial Proposals, we are also engaging with the CAA on a number of other publications related to H7.
- 7.3. The key document is the CAA's decision on the interim price cap for 2022. At the time of writing, the CAA has released its decision on the level of the cap but has not published its detailed decision and licence modifications. At an overall level, we are disappointed with the CAA's decision to implement the £29.50 interim cap and have concerns about the use of CPI in setting the 2022 charge. We will continue to engage with the CAA about this through its separate process.
- 7.4. The CAA also released two additional documents related to its Initial Proposals on service quality targets and proposed licence changes.
- 7.5. We will continue to engage with the Airline Community, our other customers and consumers to understand their expectations of our H7 plans.

1. Overall Approach to Regulation

1.0.1 The impact of Covid-19 has highlighted that the previous regulatory framework did not have the necessary protections to deal with the asymmetric risk faced by Heathrow. In our business plans, we have proposed a regulatory framework which deals with the issue of asymmetric risk, delivers for consumers, and is aligned to best practice in regulation. We welcome the CAA's recognition that Covid-19 and its continuing impact necessitates changes to the framework, including new mechanisms to deal with uncertainty and a traffic risk sharing mechanism.

1.0.2 In this chapter we set out:

- The need for the CAA to implement its H7 framework, including the TRS mechanism and a price control reopener condition, through a clear and transparent Licence modification process set out under the Civil Aviation Act 2012.
- Our support for the use of a five-year regulatory period.
- Our agreement with the CAA's proposal to include a traffic risk sharing (TRS) mechanism as part of the H7 framework but that this should be calibrated using a 10% dead-band and a per passenger adjustment for commercial revenues.
- Our agreement with the CAA's proposals for alternative uncertainty mechanisms, including the S-Factor and Terminal Drop Off Charge (TDOC). We maintain our request for a full pass through of business rates.
- Our concerns regarding the lack of justification for the proposed move to an ex-ante capital efficiency framework and poorly scoped review processes.
- Our preference for the implementation of an RPI-based price control, aligned with the CAA's proposal to continue using RPI to index the RAB.

1.0.3 Additionally, we are concerned that the CAA's Proposals still require a large amount of additional detail to be worked through ahead of the start of H7. It will therefore be important that there is a full consultation on the CAA's proposed H7 package ahead of the CAA's Final Proposals. The very provisional nature of the Initial Proposals means that there is a higher risk that the CAA needs to include an additional step in its planned H7 process to ensure that this full consultation can be carried out. We will continue to engage with the CAA regarding the H7 timetable.

1.1 Accountable, Licence-based regulation

1.1.1 We ask the CAA to implement key policies, in particular its proposed TRS mechanism and a reopener condition, through licence changes to ensure its H7 framework is clear and accountable to all stakeholders. For H7, the CAA proposes a number of new mechanisms which are relied on by the CAA to justify many of its assumptions about investor confidence in H7. This is particularly the case for the CAA's proposed TRS mechanism. For example, in response to Heathrow's arguments on the reaction of rational investors to the crystallisation of historic risks, the CAA stated that it would *"expect investors to make decisions based on the forward-looking balance of risk and return, taking into account the protections available to them. This includes the*

existence of a TRS mechanism that will significantly insulate them from volume risk in future.”¹

- 1.1.2 To ensure that these mechanisms will lead to meaningful protection for both investors and stakeholders it is essential that they are precisely and properly implemented via Heathrow’s Licence for the H7 period. As the CAA has often noted, using Heathrow’s Licence to implement conditions of the price control ensures that the CAA’s decisions² are appealable and that the conditions of the price control are transparent. We also note that, in making its decision on the application of NERL’s risk sharing mechanism, the CAA explicitly referred to the risk sharing mechanism being part of NERL’s Licence in order to justify the fact that it was applied following the impact of Covid-19.³
- 1.1.3 As the CAA has noted, putting conditions into the Licence requires a degree of certainty about how they should be applied. Without this certainty, it is unclear how it can provide reassurance to investors that the relevant risk is mitigated. A simple licence condition supported by policy guidance detailing the implementation approach seems the most appropriate solution to provide the relevant reassurance.
- 1.1.4 As with the TRS mechanism, we consider it is important for a reopener condition to be implemented in the Licence, rather than through policy guidance. Addressing TRS or the reopener condition through another instrument would mean that the checks and balances in the Civil Aviation Act 2012 – which apply to Licence conditions but not to subsidiary instruments – would be circumvented. We do not accept this as a reasonable outcome.
- 1.1.5 Additionally, the CAA appears to be inconsistent in its approach to using the Licence versus guidance for implementing policy. The CAA is considering guidance for a reopener condition, yet when discussing the Licence modification for 2022 airport charges, the CAA notes *“the use of a licence modification ensures that any decision we make to implement these modifications will be accountable through the appeal processes stipulated in CAA12.”*⁴ It is not clear to us why the benefit of utilising the Licence should not also apply to vital mechanisms such as TRS and the reopener condition.
- 1.1.6 If the CAA does not codify its new mechanisms within Heathrow’s licence, there is no guarantee that in the future the CAA would enact any of its policy decisions. This would result in stakeholders, including Heathrow, having no recourse to challenge the CAA through an expert appeal route. This would undermine any forward-looking risk mitigation put in place by the CAA by circumventing the checks and balances in the Civil Aviation Act 2012, and would not provide sufficient certainty to enable investors to rely on the new mechanisms.

¹ CAA, CAP2265C, paragraph 6.53

² The CAA notes that section 22 requires the CAA to consult on modifications but does not require the CAA to seek the agreement of any particular person. *“If a person is not content with the CAA’s decision, they may apply to appeal against it to the CMA”* CAA, CAP1138, Page 66, Paragraph 2.159

³ *“As indicated in the March 2021 update, to the extent practicable and consistent with supporting NERL’s financeability, we intend to allow NERL to recover the full TRS revenue shortfall amount against this revised baseline. We consider that this is important for regulatory certainty, as NERL’s licence included an explicit TRS mechanism”* CAA, CAP2245, Page 9, Paragraph 1.7

⁴ P20 <https://publicapps.caa.co.uk/docs/33/CAP2265E%20H7%20Appendices.pdf>

1.2 Length of the regulatory period

- 1.2.1 We welcome the CAA's intention to use a five-year framework. In line with our responses to previous consultations, we believe that using this longer-term time horizon combined with the right regulatory framework will provide the stability needed to be able to invest in the interests of consumers. It also provides the right conditions to be able to smooth prices, which is particularly important for the upcoming period.

1.3 Risk Sharing

1.3.1 Introduction

- 1.3.1.1 In line with our previous responses to the CAA's consultations, we agree that a risk sharing mechanism is required for H7 and welcome the CAA's proposal to implement one. While we think a revenue sharing mechanism would be more appropriate and effective, we propose to accept a traffic risk sharing mechanism in line with the CAA's proposals. We have carried out further work to ensure that the TRS mechanism is properly calibrated for the H7 price control and propose the following:

- Dead-bands where Heathrow is exposed to full risk and reward up to the CAA's proposed threshold of 10%. This is in line with the structure of frameworks at other airports and reflects the level of risk/ reward which has previously formed part of Heathrow's framework and is in line with the principle that Heathrow should face some degree of risk within reasonable bounds.
- A sharing rate of 95% of aeronautical revenue above this threshold, in line with the middle of the CAA's proposed range.
- Additional sharing of £5.28 per passenger to reflect sharing of the non-aeronautical revenue impact to take account of the single till structure.
- Annual implementation of the mechanism through Heathrow's RAB without a cumulative impact.

- 1.3.1.2 Given that, under the single till, higher commercial revenues mean a lower per passenger airport charge, there is no clear rationale for excluding the commercial revenue risk from the CAA's calculation. As set out in paragraph 1.3.2.14-1.3.2.15, the elasticities of Heathrow's cost and revenues mean that Heathrow's commercial revenues vary per passenger to a higher extent than our operating costs. This means that every incremental passenger has a greater impact on revenue than operating cost. If the CAA implements a sharing mechanism based only on aeronautical revenue, Heathrow would either retain more upside or bear more risk than the CAA's TRS mechanism intends. To correct for this, we are proposing to include the per passenger adjustment detailed above in addition to the aeronautical revenue sharing.

- 1.3.1.3 We have calibrated our adjustment value using the implied elasticities of the opex and commercial revenue forecasts to passenger volumes. Calculating and setting the adjustment ex-ante at the start of the price control will ensure that Heathrow is still incentivised to generate efficient levels of opex and commercial revenue per passenger in line with the forecasts set at the start of the period.

- 1.3.1.4 We have carried out cross checks of the adjustment value based on the CEPA/TA forecasts, used by the CAA to calibrate its TRS mechanism, and based on the outturn

performance between 2019 and 2021. All models give a similar answer, suggesting that the magnitude of the proposed adjustment is appropriate.

1.3.2 Heathrow's views on the form of risk sharing

1.3.2.1 We are not in full agreement with the CAA's proposed description of the potential drawbacks of a revenue sharing mechanism, however we accept the CAA's intention to use a traffic risk sharing mechanism for H7 and will engage constructively in how this is structured.

Thresholds

1.3.2.2 The CAA rightly sets out that its proposed 10% shoulder reflects a threshold which has only been breached due to the impact of Covid-19. Traffic variations due to other shocks, including the Global Financial Crisis in Q5, would not have breached this 10% threshold. We can therefore conclude that risk sharing above a 10% threshold would appropriately capture circumstances which were beyond general variations in traffic experienced in other periods.

Dead-bands

1.3.2.3 Any TRS mechanism should serve to reduce the risk of potential windfall gains or losses that could arise from changes in passenger numbers over which Heathrow has limited control. It should clarify and set some limits to the volume and commercial risks that Heathrow is expected to bear over the period. With these objectives in mind, the risk sharing mechanism should include dead-bands.

1.3.2.4 We have been clear throughout our submissions and are aligned with the Airline Community that Heathrow should not be insulated from all risk through any risk sharing mechanism. A mechanism which ensures Heathrow retains incentives to grow passenger volumes, increase commercial revenues and reduce opex is in the interests of consumers as it aligns investor interests with the interests of consumers. The CAA's proposal risks muting those incentives and insulating Heathrow from risk to a level that is not required.

1.3.2.5 Retaining a dead-band with no risk sharing inside this 10% threshold will ensure that Heathrow continues to face the same sharp price control incentives as it has for previous periods. As set out in our executive summary, the Q6 RAB-based framework has generally provided the right conditions for Heathrow to grow passenger numbers, generate ongoing efficiencies in operating costs and commercial revenues and provide improved service for consumers. The CAA's H7 framework should ensure that this success is not lost through changes to the framework which may disrupt these incentives. A key element of Heathrow's incentive-based framework is the ability to outperform which, combined with the risk of retaining underperformance, is a key driver of ongoing efficiency. Therefore, removing both the risks and opportunities mutes these incentives.

1.3.2.6 Additionally, frameworks in place at comparator airports also shows that a dead-band is commonplace in their frameworks and therefore compatible with the level of asset beta seen at these other airports and being proposed by Heathrow for H7. For example, Aena's framework includes a dead-band of 10% outside of which the price control is reviewed⁵. We also note that the CAA has set NERL's framework with traffic

⁵ <https://www.boe.es/boe/dias/2014/10/17/pdfs/BOE-A-2014-10517.pdf>

risk sharing mechanism with dead-bands. NERL's structure. Under its mechanism NERL bears the risks of revenue deviations of up to +/- 2%.

- 1.3.2.7 We are also concerned that in setting a mechanism with sharing from the central forecast, the CAA's proposals are only focussed on solving the immediate short-term problem of H7 forecasting uncertainty. The Initial Proposals highlight that the mechanism is designed with the specific circumstances of H7 in mind.⁶ In contrast, we believe that the only rational reaction from the CAA given the prevailing uncertainty and potential for future exceptional events like the Covid-19 pandemic would be to implement a framework which could be consistently applied for future periods.
- 1.3.2.8 A mechanism which sought purely to mitigate the impact of windfall gains and losses outside of the normal course of business would be future proof. This would be both the best outcome for H7 as well as providing a clear mechanism for the basis of the future regulatory framework. This would provide stability for investors by clearly setting out the conditions under which they are investing, in line with the CAA's stated aims.
- 1.3.2.9 Applying a TRS mechanism without a dead-band will import complexity and volatility into the price control framework. While the CAA is not proposing that adjustments from the TRS mechanism be made through prices in-period, the constant application of adjustments from the TRS will cause volatility in Heathrow's RAB on an annual basis. This could cause uncertainty for stakeholders and complexity in understanding the movement of Heathrow's RAB through the period. If dead-bands were implemented, prices would only adjust in an extreme situation, which Heathrow believes is the right objective for this form of risk sharing.
- 1.3.2.10 For the above reasons, we are proposing to accept the CAA's 10% threshold as the right point from which to apply greater risk or reward sharing. However, given that variations within this threshold have been commonplace through previous price controls and could be considered an accepted part of the risk/reward package for investors, we believe that a dead-band with no sharing from the central band is most appropriate for H7 and beyond.

Sharing rate calibration

- 1.3.2.11 The CAA's document notes that it has calibrated its proposed sharing rates with regard to the impact of traffic on revenues and opex, however it does not provide any supporting analysis. We requested this analysis on 2 November 2021 at a bilateral meeting with the CAA. While we were given an overview of the process undertaken, we were told that the analysis was internal and could not be shared. We ask the CAA to provide more detail of its analysis alongside its final proposals to allow stakeholders to properly understand the basis on which the CAA is making its Final Proposals.
- 1.3.2.12 In the absence of any analysis from the CAA, we have carried out our own exercise to understand the correct calibration for any proposed mechanism. Our analysis has highlighted that the CAA's proposal, which only takes account of aeronautical revenue in its sharing, results in Heathrow continuing to have significantly more

⁶ "Our proposed TRS mechanism is designed for the specific circumstances of the exceptional uncertainty observable at the start of H7" CAA Initial Proposals, page 10, paragraph 1.19

exposure to the potential for windfall gains and losses than the CAA’s sharing rate would suggest.

- 1.3.2.13 The dual till structure at most other airports across Europe means that costs and revenues from non-aeronautical or non-regulated activities are not within the scope of the price control. Therefore, adjusting for aeronautical revenues or revenues from the regulated perimeter is appropriate. However, Heathrow’s single till framework means that non-aeronautical revenues are also within scope of Heathrow’s regulatory framework. Therefore, excluding them from the calibration of the risk sharing mechanism would be inconsistent with the framework.
- 1.3.2.14 As evidenced by the elasticities in the CAA’s forecasts, CEPA/TA’s forecasts, Heathrow’s own forecasts and outturn performance, commercial revenues have a significantly higher elasticity relative to passengers than opex. This means that for every incremental passenger gained above forecast Heathrow should generate more additional commercial revenue than additional opex. Equally, in a scenario with lower passenger volumes than forecast, Heathrow would incrementally lose more commercial revenue than it would save in opex. A mechanism based solely on aeronautical revenue fails to take this into account.
- 1.3.2.15 This means that the CAA’s mechanism would not provide protection of 40-60% within the central band or 90-100% on the outer band. Instead, for every passenger, looking at analysis using Heathrow’s elasticities, Heathrow would be gaining or losing on average an additional £[redacted] per passenger across the H7 period. This per passenger value is similar to the value derived from carrying out the same analysis using the forecasts from CEPA/TA. We have also tested the impact using the outturn performance of costs, revenues and passenger volumes during the Covid-19 crisis (2019-2021): this generates a similar per passenger value, demonstrating that the same impact would be seen through extreme shocks.

Table 1: Net value of incremental passenger

	Average net value per incremental passenger
Heathrow forecasts	[redacted]
CEPA/ TA forecasts	[redacted]
Outturn 2019-2021	[redacted]

- 1.3.2.16 For this reason, we are proposing a recalibration of the CAA’s risk sharing mechanism to include this per passenger adjustment reflecting the additional impact of commercial revenues.

1.3.3 Heathrow’s views on the implementation of risk sharing

- 1.3.3.1 The CAA proposes to adjust the risk sharing via a cumulative adjustment to Heathrow’s RAB over the H7 period with the sharing impacting charges in H8. We continue to agree with the CAA that a RAB based sharing mechanism is appropriate to ensure the stability of charges and note that this is in line with the CAA’s views on NERL.

- 1.3.3.2 We also agree with the CAA that any RAB additions or deductions should be adjusted through the period to reflect the time value of money using the WACC. This is in line with the approach taken by the CAA on the recovery of Category B costs.

Cumulative adjustment approach

- 1.3.3.3 We do not think the CAA should introduce a cumulative adjustment approach, as it would raise perverse incentives. Under other airport risk sharing approaches, deviations from passenger forecast are treated on an annual basis, with no interaction between years. This means that the incentive for the regulated company resets every year.
- 1.3.3.4 Under the CAA's proposed mechanism, under and over performance is subject to an ongoing cumulative adjustment. This means that if passenger volumes fall below the CAA's proposed 10% threshold, there is no incentive to increase passenger numbers in the coming years as each incremental passenger brings less value than the adjustment which can be gained through staying below the 10% threshold. This would be a perverse incentive and would cause charges to be higher than necessary into future periods through the RAB-based implementation of the mechanism. This is clearly not in the interests of consumers.

Implementation through Heathrow's Licence

- 1.3.3.5 Key to the implementation of the condition is ensuring that any risk sharing mechanism is codified within the Licence. The CAA has noted that it is considering whether the mechanism should be implemented through Heathrow's Licence or policy. In our view, it would be inappropriate for the CAA to implement a key price control mechanism without this being set out clearly in Heathrow's Licence.
- 1.3.3.6 The CAA's proposed approach is unclear in its Initial Proposals:
- Paragraph 1.17 states "*we continue to consider that a risk sharing mechanism should be included in the price control formula for H7*". This implies that the mechanism will be set out in Heathrow's licence as part of its price control formula.
 - Paragraph 6.31 states "*the application of a TRS, which reduces HAL's exposure to future shocks. The TRS will form part of HAL's licence.*"
 - Paragraph 1.45 states "*we intend to add to HAL's licence or include in policy guidance a description of how the RAB adjustments resulting from the TRS mechanism should be calculated. This will provide enhanced certainty to HAL and to other stakeholders.*"

We also note that the CAA's CAP2275 document does not provide draft wording for the implementation of TRS through Heathrow's Licence and again notes that "*we said that the RAB adjustments necessary to implement our proposals for traffic risk sharing and the capex incentive reconciliation process would be implemented in our Final Decision either through the licence or through other means such as policy statements*".

- 1.3.3.7 A TRS mechanism that is not implemented through Heathrow's Licence would not provide any confidence for stakeholders. The CAA would be able to change specifics of the mechanism and its implementation through the H7 period and neither Heathrow nor the airlines would have the right to appeal these changes. This would be an

unacceptable position for such a vital mechanism and is discussed more at Section E of the Legal Annex.

- 1.3.3.8 In our submission to the CAA on 3 August 2021 we provided draft wording setting out how the risk sharing mechanism could be implemented within Heathrow's Licence. The CAA has not acknowledged this submission in its Initial Proposals or CAP2275 document. We will respond with more details on our proposed wording in response to CAP2275.

1.3.4 Price control reopener condition

- 1.3.4.1 As set out in our response to the CAA's Way Forward document earlier this year and in our submission to the CAA regarding the H7 Licence, made on 3 August 2021, we are requesting that the CAA introduces a Licence condition to facilitate any request that the price control be adjusted if there is a major change in assumptions from those on which the price control was based or a material change in Heathrow's circumstances.
- 1.3.4.2 It has been made clear through the CAA's process to review Heathrow's price control in 2020 and 2021 that the current solution of relying on the CAA's previous policy statements and the ability to modify the Licence through Section 22 of CAA12 is not fit for purpose. The CAA's Q6 Notice granting the Licence noted the ability to reopen a price control as an important aspect of the regulatory framework, including "*the ability of a licensing regime to revisit the price control if key assumptions, such as traffic, are significantly worse than the forecast, could be a credit strength*"⁷. However, the RAB adjustment has demonstrated that there has been a lack of due process and clear criteria for the CAA to use in its decision-making.
- 1.3.4.3 A clear and transparent process would provide the opportunity for Heathrow to request a review of the price control in the event that outturn performance is materially different than the assumptions used to set the price control. This would clearly be in the interests of consumers and all stakeholders as it would ensure that the right framework was available for Heathrow to continue to be financeable, affordable and efficient in the case of extreme and prolonged shocks outside of management control. Ensuring this process is set out in Heathrow's Licence will allow all stakeholders the right of appeal should any modifications be made to this provision.
- 1.3.4.4 The CAA does not appear to accept that a Licence condition is appropriate and has outlined that it will consider the potential for guidance on a reopener in its Final Proposals. Regardless of whether the CAA utilises a Licence condition or policy guidance (we remain of the view that a Licence condition is necessary), neither the CAA's Initial Proposals nor CAP2275 provide sufficient detail for stakeholders to meaningfully engage with the CAA's proposals.
- 1.3.4.5 It should be noted that we have quantified and clearly articulated to the CAA the specific situations which we think constitute material changes in circumstances in a submission on 3 August 2021. The CAA's Initial Proposals describe these definitions as "*not helpful*", but it has not offered an alternative set of definitions or guidance. We would expect the CAA to have developed a detailed proposal by this stage in the process. It is unacceptable that Heathrow and other stakeholders have no indication of the CAA's views in practice and have not been presented with any detailed drafting from the CAA to engage with.

⁷ p298, CAA Q6 Notice granting the Licence, February 2014.

- 1.3.4.6 Lastly, we also disagree with the CAA's view that it is not sensible to have timescales on a process that will, by definition, be highly complex. If the CAA is clear upfront on the circumstances in which the price control would need to be reopened, then setting sensible timescales for the process and a decision point will be a much easier task. Indeed, this is the process for statutory appeals, a system which the CAA relies upon as providing assurance to stakeholders.

1.4 Other uncertainty mechanisms

1.4.1 S-Factor

- 1.4.1.1 Through our H7 submissions, we have continued to request that the CAA updates the current S-Factor Licence condition to account for changes in Health and Safety Policy as well as those for Security Policy. We welcome the CAA's in principle agreement to this approach. This will ensure that any unforeseeable changes to processes and operations put in place through a formal change to Government policy or guidelines through the H7 period can be accounted for and included within the price control.
- 1.4.1.2 We have provided the CAA with proposed drafting of the amended S-factor provision and note that the CAA has provided some wording in its CAP2275 paper. We will respond fully with our views on this wording in our response to the consultation.

1.4.2 Business Rates

- 1.4.2.1 In our RBP we confirmed our intention to recover business rates through the Other Regulated Charges (ORC) structure. This would mean that the business rates bill would be effectively subject to a 100% pass through alongside robust airline governance to ensure that Heathrow was managing the rates bill as efficiently as possible. This would have clear benefits for consumers by ensuring Heathrow was held to account for any actions it could take to ensure efficiency and ensuring that Heathrow was not exposed to windfall gains or losses on the rates bill outside of its control.
- 1.4.2.2 We accept the CAA's proposal that business rates should be included within the airport charge, rather than recovered as an ORC. Our RBP Update 2 is calculated on this basis.
- 1.4.2.3 However, we do not accept the proposal to retain the existing 80/20 cost sharing arrangement for business rates. This is contrary to the agreement between Heathrow and the Airline Community that business rates should be subject to a full pass through.⁸ On this basis, we ask the CAA to provide its justification for moving away from Heathrow and Airline Community agreement.
- 1.4.2.4 The CAA's view appears to be that in keeping the 80/20 arrangement "*HAL retains an efficiency incentive, including in relation to any negotiations on revaluation with the Valuation Office Agency.*" As we set out in the RBP, we have very limited control of business rates. It is also evident from the Government's actions in providing business rates relief during the pandemic, that business rates are viewed as a largely fixed cost which business are not able to influence, even in the face of extreme

⁸ Airline Community Constructive Engagement Feedback, October 2020. Annex 13, slide 2: "*Business Rates - process already exists so agree it should continue, but as a cost pass through where scrutiny must be allowed before finalising the charge to be passed on (twice a year has been muted). Risk/gain share no longer applicable.*"

shocks. It is therefore appropriate that we should neither benefit from windfall gains from reductions in rates nor bear the impact of any policy shift in the opposite direction. We therefore consider a 100% cost pass-through combined with engagement on the revaluation with the CAA and airlines remains appropriate.

- 1.4.2.5 The Valuation Office Agency (VOA) are planning to change the basis of assessment of Heathrow's business rates, moving from the current contractor basis model to a Receipts and Expenditure model. This has the potential to significantly change the valuation. Therefore, given this potential volatility, a full pass through of rates would be the logical approach to ensuring that Heathrow is not exposed to windfall gains or losses due to changes in government valuation methodologies. Such windfall gains or losses could have an impact on Heathrow's financeability, therefore a full pass through would be consistent with the CAA's statutory duties.
- 1.4.2.6 Heathrow is currently engaging with the VOA regarding the revaluation of business rates due to come into effect from April 2023. Under the current VOA timelines, we expect to have agreed the revaluation by June 2022. This means that, under the CAA's current H7 timelines, we will have a view on the value of business rates for H7 before the H7 Licence takes effect.
- 1.4.2.7 We therefore believe that the 80/20 pass through mechanism, designed to manage the uncertainty of the rates revaluation, is unnecessary for H7 as:
- We would have a final valuation ahead of the H7 period, meaning that an uncertainty mechanism is unnecessary.
 - The current process timelines mean that the CAA can be involved in the discussions with the VOA to understand our engagement and satisfy any concerns about potential inefficiency.
 - Heathrow could be exposed to windfall gains or losses from this new valuation approach if the impacts are not included within the price control.
- 1.4.2.8 We propose that the CAA replaces the current 80/20 mechanism with a provision to allow the H7 business rates forecast to be replaced with the updated business rates valuation once agreed with the VOA and reflected within the airport charge.

1.4.3 Terminal Drop-off Charge (TDOC)

- 1.4.3.1 As part of our RBP Update 1 and following extensive airline engagement, we set out proposed alternative treatment of the revenues from the TDOC to ensure that the uncontrollable legislative risks around this new revenue stream were managed through an adjustment in the case of legislation being passed which would leave Heathrow unable to enforce collection of the charge. We also proposed to include airline consultation around the level of the charge if Heathrow was planning to increase it.
- 1.4.3.2 We consider that the CAA's other initial proposals on the terminal drop-off charge are mostly appropriate, namely:
- A requirement for Heathrow to notify airlines and the CAA of any increases of the charge beyond 10% of the baseline levels noted above, but not to require Heathrow to formally agree any charge increase in advance with the CAA or airlines;

- Inclusion of a provision to adjust Heathrow’s price control in the event that a change to statutory legislation (for example a change made to introduce 10 minutes of mandatory free parking) prevented Heathrow from levying a terminal drop-off charge. Such an event would reset the assumption on drop off charge revenue to zero and allow Heathrow to recover the H7 projection of this revenue from airport charges; and
- Application of the above adjustments through a new term in Heathrow’s Licence with an in-period true up through the K-factor.

1.4.3.3 However, the CAA’s document does not provide justification for its proposed 65% sharing rate for over and under recovery against the forecast revenues in our H7 plan. The implementation of any additional sharing of this revenue could also risk a double count under our proposed TRS calibration which should be reviewed by the CAA ahead of its Final Proposals.

1.4.3.4 We will review and respond to the CAA’s drafting in our response to CAP2275.

1.4.4 Expansion trigger

1.4.4.1 In our RBP we set out a proposed trigger process through which the future delivery of Heathrow Expansion could be facilitated through the regulatory framework. We proposed that an upfront process with clear timescales would have clear benefits for consumers in facilitating the timely delivery of the benefits of expansion and would provide clarity for stakeholders.

1.4.4.2 Throughout 2020, the CAA noted that it would be important to retain the flexibility to deal with expansion in the future.⁹ Our proposal was designed to ensure that this was codified within Heathrow’s Licence for transparency, and we provided detailed wording suggestions in our submission to the CAA in August 2021.

1.4.4.3 It is unclear why the CAA’s proposals do not establish a clear process for resuming expansion at the appropriate time. The CAA *“agree with the general principle that work on the development of a revised regulatory framework should resume if there were to be a sufficiently strong likelihood of progress on expansion resuming”* but says the exact circumstances would be *“impossible to predict”*. While we recognise that we cannot predict the exact circumstances, we believe that setting out a clear process ahead of time is feasible and worthwhile for all stakeholders.

1.4.4.4 The intention of the proposed Licence condition is to confirm that there is a process in place as part of the H7 price control to ensure that expansion could be incorporated into the regulatory framework as required. As it stands, the CAA’s proposals do not set out how this would be done, which will create avoidable risks of delayed timescales and delaying consumer benefits.

1.4.4.5 We request that the CAA reconsiders this position and provides detailed drafting for stakeholders to engage with.

⁹ *“As for the expansion of Heathrow airport, the Government may choose to review the NPS with a view to dealing with the issues covered by the Court of Appeal’s judgment. Alternatively, that judgment could be successfully challenged at the Supreme Court. In these circumstances, we must retain the option of dealing with any proposals by HAL to reinstate the capacity expansion programme. Given the developments associated with Covid-19, it seems unlikely that we will see such proposals in the short term, but we retain the option of dealing with these matters in the future by adjusting or resetting HAL’s price control”*, CAA, CAP1914, Page 8, Paragraph 12

1.5 Capital Efficiency Framework

- 1.5.1 The CAA has not provided evidence that justifies a full movement towards ex-ante incentives. Nevertheless, the CAA's Initial Proposals set out its intentions to make a number of changes to the existing capex arrangements. This includes the introduction of additional ex-ante incentives for all H7 capex investment and a new ex-post evaluation of Delivery Obligations, both of which Heathrow disagrees with.
- 1.5.2 Heathrow's current capital efficiency framework and the introduction of Development and Core has proved a success in both allowing Heathrow and the airline community to adjust the portfolio during the regulatory period and ensuring that passengers only pay for the projects which have been carried out through airport charges. By the end of 2019 around 720 projects passed the Gateway 3 process with a total value of £2.9 billion (2018 prices).
- 1.5.3 The efficiency of this £2.9bn has been robustly reviewed throughout the process. Heathrow's capital efficiency is subject to constant scrutiny from the Independent Fund Surveyor (IFS), who has provided a wealth of information on Heathrow's efficiency through over 650 reports on Heathrow's delivery of capital projects. The projects in Heathrow's portfolio were completed within 0.5% of their estimated G3 value and the CAA's ex-post review identified £12.7m in potential inefficiency over the entire portfolio.
- 1.5.4 Overall, the Q6 framework has demonstrably provided benefits for consumers by allowing the flexible and efficient delivery of key capital programmes when they are required.
- 1.5.5 For H7, the CAA's Initial Proposals continue to confirm a movement towards an ex-ante framework, with ex-ante capital allowances set at G3. The CAA's proposals suggest an ex-ante incentive of 20%-30% should be applied to Heathrow's capital spend after estimates have been agreed at G3. The CAA's proposals also set out plans for the implementation of Delivery Obligations, against which Heathrow's delivery of capital projects would be reviewed to determine whether Heathrow has delivered what it set out to deliver.
- 1.5.6 Moving to a stronger ex-ante focused framework for capital efficiency will have an impact on the way we work and the level of risk we are exposed to, even under the CAA's proposals to implement ex-ante incentives only when capital is transitioned to Core. This does not mean it is not possible to do, but that the consequences should be thought through fully. Applying a stronger ex-ante incentive means that Heathrow is automatically exposed to more risk on its delivery of capital. To manage this, Heathrow will have to take actions, such as increasing risk allowances in projects or changing our approach to contracting. All these changes will have real world consequences for the prices consumers pay.
- 1.5.7 Additionally, the CAA's proposals are not yet fully scoped, and the CAA's proposals do not confirm any intention when it will provide further guidance on how key parts of the mechanism, such as its proposed 'ex-post' review of delivery against Delivery Obligations, would work in practice. Without these key details, Heathrow would be entering into a regulatory framework without knowing how its capital efficiency would be assessed. This would be inappropriate and expose Heathrow to unnecessary risk.
- 1.5.8 Given the potential detriment to consumers through higher costs and higher risk, the CAA should not implement ex-ante incentives for H7 or, at the least, should carry out

a substantial review of its proposals to be targeted and proportionate. We propose the following:

- Application of ex-ante is not suitable for all capex categories and must be targeted at those which are controllable, repeatable and benchmarkable;
- A 15% incentive rate reflects an appropriate risk profile and is aligned with the 13% incentive rate which has ensured efficiency through Q6;
- Delivery Obligations cannot be implemented for the purpose of assessing capital efficiency unless the CAA clearly articulates how it will carry out an ex-post review of performance against them; and
- Triggers are not suitable if the CAA introduces Delivery Objectives. Additional delay timing incentives are not required as they cut across other incentives such as OBR and incentive rates.

1.5.9 We provide more detail on the key considerations for capital efficiency in Chapter 9.

1.6 Indexation of the price control

1.6.1 The H7 price control should continue to retain RPI indexation for both the RAB and charges. This provides transparency and stability for stakeholders at a time of immense uncertainty and change.

1.6.2 The CAA has confirmed in its CAP2275 document that it intends to retain RPI indexation for Heathrow's RAB. This is aligned with the position shared by the CAA through the Constructive Engagement process. We agree with this proposal.

1.6.3 However, it also notes the possibility of moving to CPI indexation for prices. We do not agree that a move to CPI is required or justified at this time. An inappropriately applied move to CPI indexation for prices could impact cashflows at a time where financeability is a key consideration. This would not be in the interests of consumers.

1.6.4 We will respond in more detail with our views on indexation in response to the CAA's CAP2275 consultation.

2. Passenger Forecasts

2.1 Introduction

- 2.1.1 The impact of Covid-19 has made forecasting demand particularly uncertain. In the RBP we provided a transparent methodology to create the best possible forecasts. We have engaged extensively with the airline community and others to develop our approach and gather evidence to refine our assumptions.
- 2.1.2 In this chapter we respond to the CAA's feedback. We note areas of agreement with the CAA and provide detailed evidence for areas of disagreement. If applicable, we state our asks of the CAA for consideration in their final proposal.
- 2.1.3 We also provide a summary response to the airlines' representations in the context of 2022 charges. We disagree with the airline community and believe their analysis and evidence is insufficient, lacking the detail and rigour required to be considered a sensible and realistic forecast for H7.
- 2.1.4 In the RBP Update 2 Passenger Forecasting chapter we present our updated forecast with the most up to date view of our assumptions and evidence, please refer to RBP Update 2, provided at Appendix 20 of our response for these changes.
- 2.1.5 We note that the scenarios that form the basis for the updated forecast were developed before the discovery of the Covid-19 variant Omicron. However, we have not needed to make any last-minute adjustments to our scenarios because our methodology is designed to cope with the risk posed by new variants or any other scenario of reasonable likelihood. This reinforces the strength and resilience of our approach.
- 2.1.6 There is still a large amount of uncertainty around the impact of Omicron. Across our scenarios we reflect the potential scale of this impact. In the updated forecast we have erred on the side of optimism in terms of our weighting being towards the more minimal impact. This may prove to be overly optimistic and may need to be corrected later. We expect that there will be sufficient information for any update to the weightings to be made in the first quarter of 2022, once the impact of Omicron is better understood.
- 2.1.7 The structure of this chapter is as follows: Section 1 - Introduction, Section 2 – Executive Summary, Section 3 - Responding to CAA's feedback, Section 4 – Summary of response to airlines' representations of 2022.

2.2 Executive Summary

- 2.2.1 We note that the CAA broadly agrees with Heathrow on a number of key points of assumption and methodology. Not least that our forecasting approach reflects the impact of the pandemic on aviation and is a reasonable approach to modelling current uncertainty.
- 2.2.2 However, there are some important considerations that the CAA has not taken into account. The majority of these considerations are errors of fact or methodology, either where the CAA has misused Heathrow's models or overlooked or discounted key pieces of information that have a significant bearing on the output forecast. We set out each of these considerations below.
- 2.2.3 **Physical and legal restraints on the airport are not considered in the CAA's output – producing unrealistic passenger numbers for the end of the regulatory period.** Currently the CAA has a value for the end of the H7 period in the high case that physically can't be processed by Heathrow Airport. Heathrow's model is designed to be bound by those constraints and thus prevents the generation of unrealistic numbers.
- 2.2.4 **The CAA has made a series of 'off-model' adjustments to our outputs rather than run the process with different assumptions.** Heathrow asks that wherever the CAA wish to adjust assumptions that is done 'up front' in the inputs so that the model can prevent the output falling foul of the previously mentioned physical and legal constraints, as well as providing transparency on the ultimate impact on the final numbers. Heathrow also reiterates the offer of support in helping to carry out suggested adjustments to the model input assumptions based on CAA direction.
- 2.2.5 **The CAA has ignored the impact of Covid-19 on Heathrow's direct market share within London.** We ask the CAA to consider the actual data on market share during the pandemic recovery and in light of that request that the CAA updates its approach appropriately. The CAA estimate that their approach taken on market share in the Initial Proposals currently results in a c.6.7m addition to the H7 forecast.
- 2.2.6 **It is not clear how the CAA has considered the impact of carbon prices in developing their forecast.** Given the significance of this issue to our industry it is important that the CAA takes this into account in their final proposals. Heathrow asks that the CAA takes account of carbon prices in H7, including the latest BEIS emissions valuation.
- 2.2.7 **The CAA has made unsubstantiated claims on how Monte Carlo simulation outputs should be benchmarked to inputs.** The CAA has also made misjudged claims of a downside bias introduced to the process by Heathrow that are not supported by probability theory. The CAA should acknowledge that the asymmetric distribution is a function of the real-world ATM constraints that Heathrow faces, and update its modelling accordingly. The CAA estimate that their approach taken on asymmetric distributions results in an additional c.6.4m to the H7 forecast.
- 2.2.8 **The CAA has indicated that they are considering moving away from the rigour of Monte Carlo simulations to point estimates.** Heathrow strongly advises that the CAA continues to use Monte Carlo simulation rather than moving to point estimates. The use of Monte Carlo simulation was established in Q6 and is recognised as best practice and a method of accounting for uncertainty. Moving away from such an approach to a scenario-based, point estimate would mean that any deviations from those narratives instantly render the forecast out of date. Our current forecast

methodology allows us to consider different eventualities in a very uncertain world. As such, it was able to absorb the Omicron developments for precisely this reason.

- 2.2.9 **The CAA has not considered the real-world operational challenges that the aviation industry is facing as it attempts to increase capacity to meet demand.** The CAA has not taken proper account of the available evidence in this aspect of their forecast. We ask the CAA to look at the evidence that airlines and airports around the world are struggling with current levels of demand, that are significantly lower than 2019, due to labour shortages, supply issues and capacity restrictions driven by Covid-19 regulations. The CAA estimate that their approach on dismissing any supply constraints adds c.5.3m to the H7 forecast.
- 2.2.10 **The CAA has indicated that it is considering reducing our assumption on the long-term impact of Covid-19 on business travel.** We have provided the evidence to support our assumptions. We ask the CAA to provide the evidence they propose to use to establish an alternative assumption.
- 2.2.11 As a result of these errors the CAA's Initial Proposals use unrealistic passenger forecasts for the H7 period. As passenger forecasts are such a fundamental, underpinning building block, the impact is significant for the entire price control.
- 2.2.12 Moreover, we are concerned by comments made by the CAA that seem to suggest their forecasts in the Initial Proposals are out of date because they don't take account of the latest government announcements, and that an upwards revision should be expected in the Final Proposals. We urge the CAA to follow the data and the evidence rather than reacting to the emotion of each new development. The last two years have given countless examples of just how quickly the situation can change. The response must be to follow the data and the evidence.
- 2.2.13 With the discovery of Omicron and a hesitant start to 2022 ahead, it is clear that the level of uncertainty is still significant. We urge the CAA to make full use of our methodology; the scenarios, the weighting, and the Monte Carlo Simulation, which are acknowledged as robust and designed to deal with the uncertainty we face.
- 2.2.14 Aside from the errors highlighted above there is also the additional significant concern that the adjustments made by CAA to our models and our forecasts have been done in a way that is opaque and prevents us from fully understanding either the methodology or the impact of the adjustments.
- 2.2.15 As the CAA acknowledges, the number of passengers using Heathrow airport is vital to the overall economics of the airport and setting the appropriate levels of operating and capital costs necessary for the effective provision of services by Heathrow. Failure to disclose such influential material that the CAA is seeking to rely on is wholly inadequate and is discussed further in Section F of the Legal Annex.

2.3 Responding to the CAA's feedback

Overview

- 2.3.1 In the following sections we address eight areas of concern Heathrow has regarding the CAA's Initial Proposals. In each area, we summarise the CAA's approach and decision, systematically review the merits of each proposed change to the model, provide evidence to substantiate our views and finally outline our conclusion and request to the CAA for consideration.

2.4 Physical and legal airport capacity constraints

- 2.4.1 Physical and legal restraints on the airport are not considered in the CAA's output – producing passenger numbers for the end of the regulatory period that are not practically achievable. This is achieved through 'off-model' adjustments which do not follow best practice and compromise the validity of the forecast.
- 2.4.2 The CAA's high case forecasts 88.3m passengers travelling through Heathrow in 2026, which exceeds the current declared capacity limit of 85m airport infrastructure. Even the mid case at 82m passengers in 2026 is at the very limit of what we believe to be achievable.

Evidence Point 1

- 2.4.3 Heathrow cannot physically serve 88.3m passengers with our current runway and terminal capacity. To ignore this, the CAA would be proposing a forecast that is not only not a fair bet for the price control period, but also not practically achievable in any real sense.
- 2.4.4 Whilst preparing the Development Consent Order application for the third runway, we carried out extensive analysis to understand our current runway and terminal capacity, to determine the additional capacity that was being sought as part of the planning application.
- 2.4.5 That work had concluded that our runway capacity is a maximum of 82 million passengers per annum and our terminal capacity is a maximum of 85 million passengers per annum. To increase above those figures would need significant capital investment to either extend terminal buildings or build new terminal satellites, neither of which are reflected in our H7 capital plan.
- 2.4.6 Further to that, Covid-19 has reduced our operational capacity, particularly at key points in the passenger journey. For example, the challenge of dealing with ever changing global governmental requirements has materially increased check-in transaction times. The limited data made available to us suggests that our airlines and handlers are currently able to operate at only c.50% of pre-Covid capacity. When this is coupled with the current marked peakiness in the schedule, we are not yet certain that we will have sufficient capacity to accommodate the 2022 forecast of 57% of 2019 demand in T2, T3, and T5. This may require us to reopen T4 as early as summer 2022.
- 2.4.7 The fact that we are considering the need for T4 capacity to serve only 57% of 2019 demand clearly demonstrates that we will have to work closely with the airlines and maximise operational efficiencies even to return to 2019 levels of capacity if the impacts of Covid-19 continue to be felt.

Evidence Point 2

- 2.4.8 Even if it were physically possible from an airport capacity point of view, achieving 88.3m passengers would require undeliverable load factors and ATMs.
- 2.4.9 We understand that the CAA’s forecast of 88.3m passengers is not based on a full set of supply metrics, including ATMs, seats and load factors. If the CAA had considered these fundamental supply metrics we believe they would have found their forecast to be unachievable due to unrealistically high load factors and ATMs.
- 2.4.10 In Table 1 below we show the combination of metrics that would be needed in order to achieve 88.3m passengers, with reference to 2019 metrics.

Table 1: Load factors required to deliver CAA passenger forecasts

Metric	2019	Scenario A	Scenario B
ATMs	473,406	480,000	517,000
Seats	101,150,188	102,559,094	110,464,690
Seats per movement	213.66	213.66	213.66
Load factor	80.0%	80.0%	80.0%
Passengers	80.9m	82.0m	88.3m

Metric	Scenario C	Scenario D
ATMs	476,500	476,500
Seats	110,405,050	101,811,267
Seats per movement	231.70	213.66
Load factor	80.0%	86.75%
Passengers	88.3m	88.3m

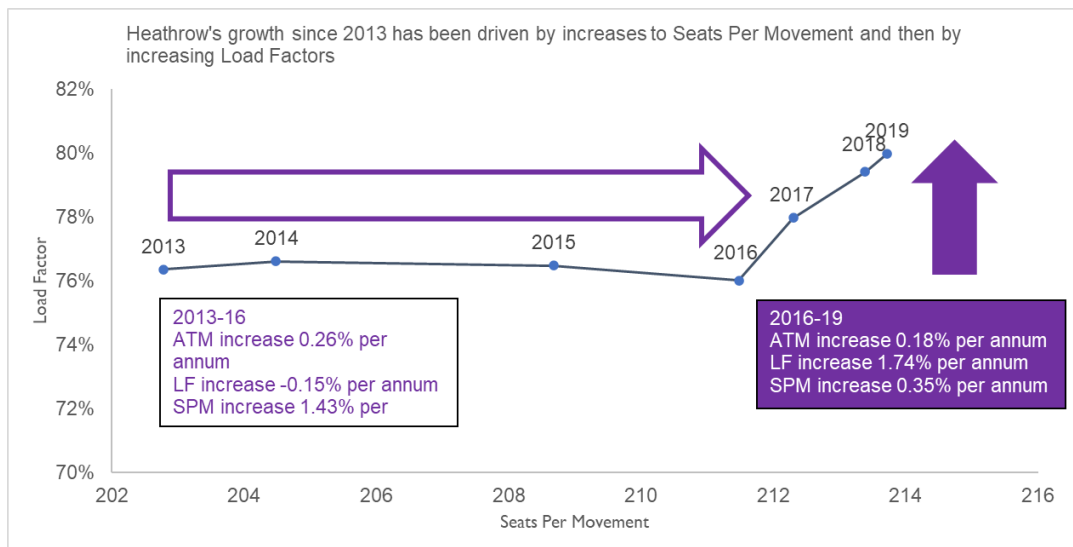
Source: Heathrow

- 2.4.11 The column headed ‘Scenario A’ in Table 1 above shows that even if Heathrow flew every slot within our ATM cap with no cargo or freight and zero resilience, and if recent changes on retirement of large aircraft like the B747s and A380s were to be reversed, we would still not achieve 88.3m passengers with 2019 load factors. In fact, we would only just achieve the 82.0m passengers in the CAA’s mid case.
- 2.4.12 In order to reach 88.3m passengers we would require the ATM cap to be lifted by 37k movements, an extra 100 flights for every day of the year. This is shown in the column headed ‘Scenario B’.
- 2.4.13 More realistically, if we retain the c.2,500 cargo movements we had in 2019 and consider the realities of scheduling up to, but not over, the 480k cap and so maxed out at 476.5k movements, then to achieve 88.3m passenger we would need to see one of two things: either significant increases to the size of aircraft flown; or significant increases in load factor. These are illustrated in Scenarios C and D respectively.
- 2.4.14 Taking each of those two points in turn. Firstly, looking at the degree to which seats per movement would need to increase to reach 88.3m passengers. There would need to be an overall increase of c.10% of seats. With short haul representing close to 45% of Heathrow’s traffic mix in 2019 with an average seats per movement of 168 a 10% uplift would mean reaching 185 seats per movement. To put this in context, to reach this level of uplift would require replacing all A319s flown to Heathrow with A320s, which would require replacement of almost 900 aircraft.
- 2.4.15 Similarly, to achieve a 10% increase for long-haul would require an uplift to over 300 seats per movement on average. That would require significant changes to fleet at a point when airlines are in the most precarious financial positions they have ever

experienced. In fact, the airline community were very clear in their feedback that they would need to fly existing aircraft at least until the end of the H7 period¹. This 10% increase is not only unfeasible but is a change contrary to the retirements and replacements that have already happened.

- 2.4.16 Secondly, we look at increasing load factors. To reach 88.3m passengers the average load factor would need to grow from 80.0% to 86.7%. In 2019 our monthly spread was from 73% in January to 87% in August, October was a good proxy for the annual average load factor with 79.8%.
- 2.4.17 To reach a new annual average of 87% load factor we would need October flights to be as full as flights in August 2019 and January flights to be as full as October. This suggests that in August 2026 flights would be 93% full, which would require the short haul load factor to approach low-cost carrier levels of 95% full. To be clear, to reach this level of load factor increase would require a wholly new operating model for the airlines operating at Heathrow, or a significant reallocation of existing slots to low-cost carriers.
- 2.4.18 To further put these increases in seats per movement and load factor in context, Figure 1 below shows the increases over the last c.10 years. The maximum increase in seats was at a rate of 1.4% per annum – compared to the CAA increase of 1.7% at a time of significant financial impact. The maximum increase in load factors was at a rate of 1.7% per annum – compared to the CAA increase of 1.4% at a time where average loads for the last year have been significantly below those experienced in at least the last 10 years.

Figure 1 – Heathrow seat per movement and Load Factor evolution



Source: Heathrow Airport

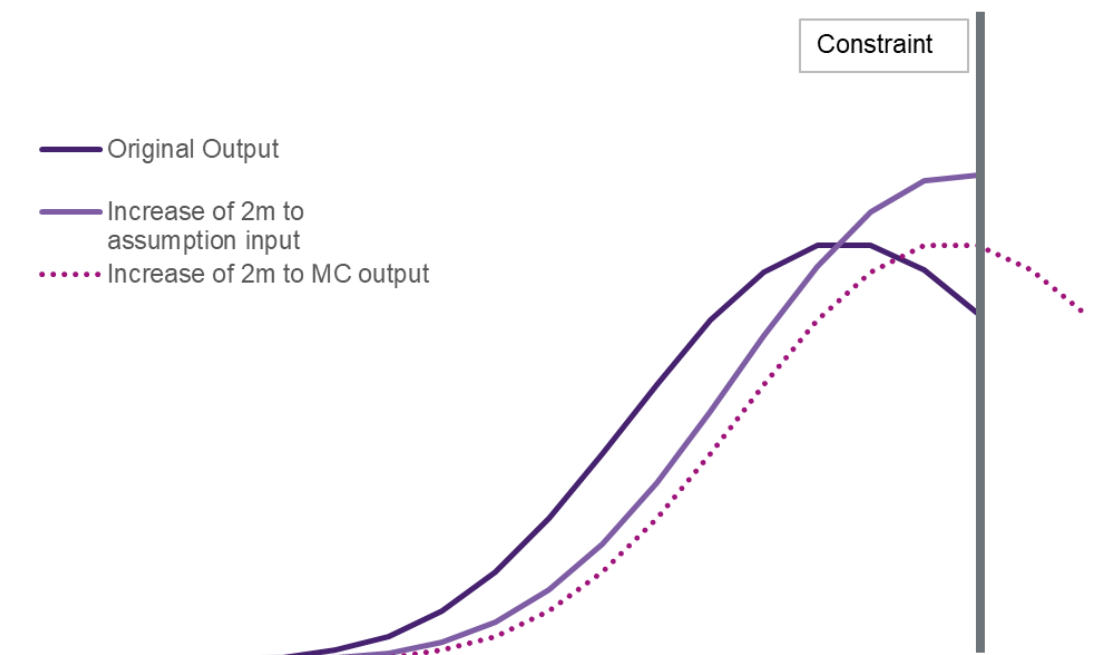
2.5 Off-model adjustments

- 2.5.1 The CAA has chosen to employ a methodology of altering our output forecast with 'off-model' corrections, rather than following best practice by carrying out adjustments to input assumptions directly within the model which will in turn impact the output.

¹ Ref: Section 2, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final

- 2.5.2 Editing the input assumptions rather than the output is best practice for very good reason, it avoids making adjustments that are not proportional and that contravene maximum or minimum limits. It also ensures that any interplay between assumptions is properly accounted for rather than risking double counting the impact of an edit or not reflecting dependencies between inputs.
- 2.5.3 In seeking to increase the output forecast after the fact, the CAA has implemented changes that have broken the physical and legal airport restraints set out in the two evidence points above. Figure 2 illustrates the effect of increasing every Monte Carlo output by an indicative 2m passengers, shifting the whole set of original outputs to the right and breaking the physical limit represented by the grey line, compared to the legitimate methodology of increasing the input assumptions to increase the overall output whilst staying within the physical constraint.

Figure 2: Illustrative effect of editing output rather than input in Poisson distributions



Source: Heathrow

- 2.5.4 Note that the CAA may have legitimate reason to need to adjust the forecast, with some new evidence or data that we have not yet considered. We are not arguing against that point here. However, any such adjustment needs to be made legitimately, transparently and following best practice in how it is implemented.
- 2.5.5 We acknowledge that there are single runs amongst the total 10,000 runs in our Monte Carlo output for scenario 2² which surpass 88.3m passengers in 2026. In our most recent modelling, there were 39 out of the 10,000 runs that exceeded 88.3m passenger, i.e. 0.39% of the runs. In Table 2 we look at the full set of supply metrics for one of those 39 runs, showing that almost every metric was above the 90th percentile.

² For more detail see RBP Update 2: 3.5 Changes since RBP Update 1 - Scenarios

Table 2: Monte Carlo output for scenario surpassing 88.3m passengers in 2026

Metric	Output	Percentile
Passengers	88.3m	99.60%
Movements	473,810	93.60%
Load factor	84.46%	97.90%
Seats per movement	220.75	89.00%

Source: Heathrow

- 2.5.6 These values aren't impossible, but to use them for a reasonable high case scenario, with a P90 probability is wholly inappropriate. To do so would suggest that the high case need to have only a very small likelihood of occurring to be valid.
- 2.5.7 In conclusion, the model has been designed to be bound by the physical and legal constraints in which we operate and so prevents the generation of unrealistic numbers. It is also designed to consider the full set of supply metrics of passengers, ATMs, seats and load factors, to ensure that none of those is set to unrealistic levels. Heathrow asks the CAA to use the model as it is intended and reiterates the offer of support in helping to carry out suggested adjustments to the model input assumptions based on CAA direction.

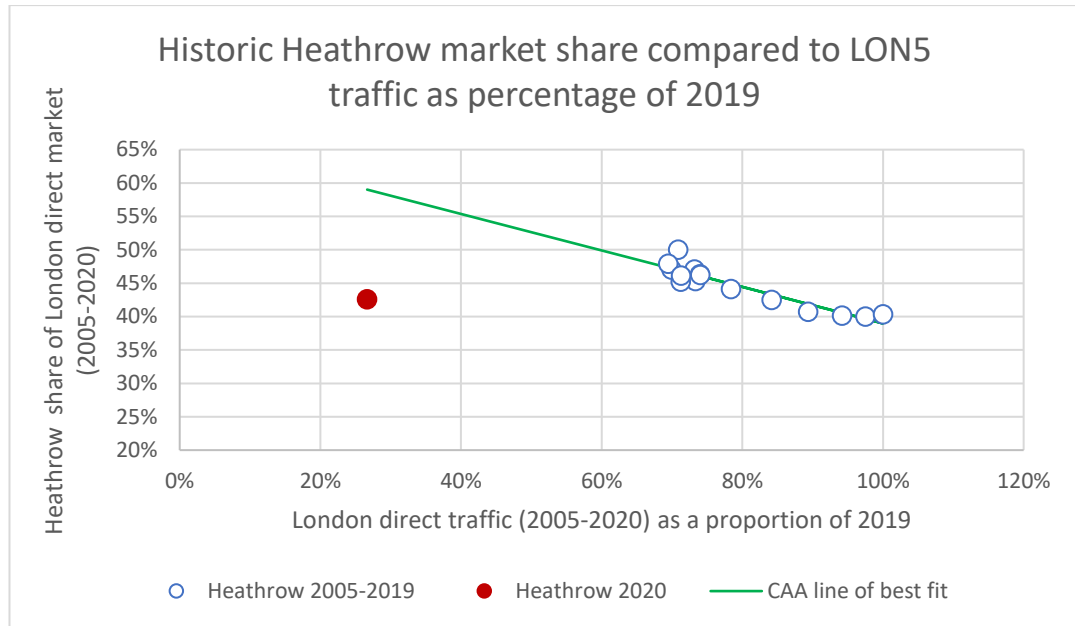
2.6 Market share methodology

- 2.6.1 The CAA has ignored the impact of Covid-19 on Heathrow's direct market share within London. As a result, it has applied a significantly inflated market share that in turn leads to an estimated upwards adjustment of 6.7m passengers.
- 2.6.2 The CAA's approach is to create a relationship between the historic Heathrow market share and the total volume of passengers in London as a proportion of 2019. This relationship is then used to determine an expected market share as we progress through the recovery period. For example, in 2014 Heathrow had a market share of 44% when the London market had 78% of the passengers it had in 2019, so when the London market recovers to 78% the CAA will assume that Heathrow will have the corresponding market share of 44%.
- 2.6.3 However, this newly developed methodology is based only on historic data points from prior to the impact of Covid-19. Over 18 months of more recent data is available, which show that the relationship developed by the CAA is flawed.

Evidence point 1

- 2.6.4 Figure 3 shows the relationship the CAA have used to determine an expected market share for Heathrow in H7. The line of best fit shows a reasonable relationship for pre-pandemic data. However, that relationship is quickly shown to be inappropriate for current use when the data point for 2020 is considered. That is, the most recent and only data point that is representative of the current situation shows that the relationship between historic market share and recovery cannot be used for forecasting the recovery.

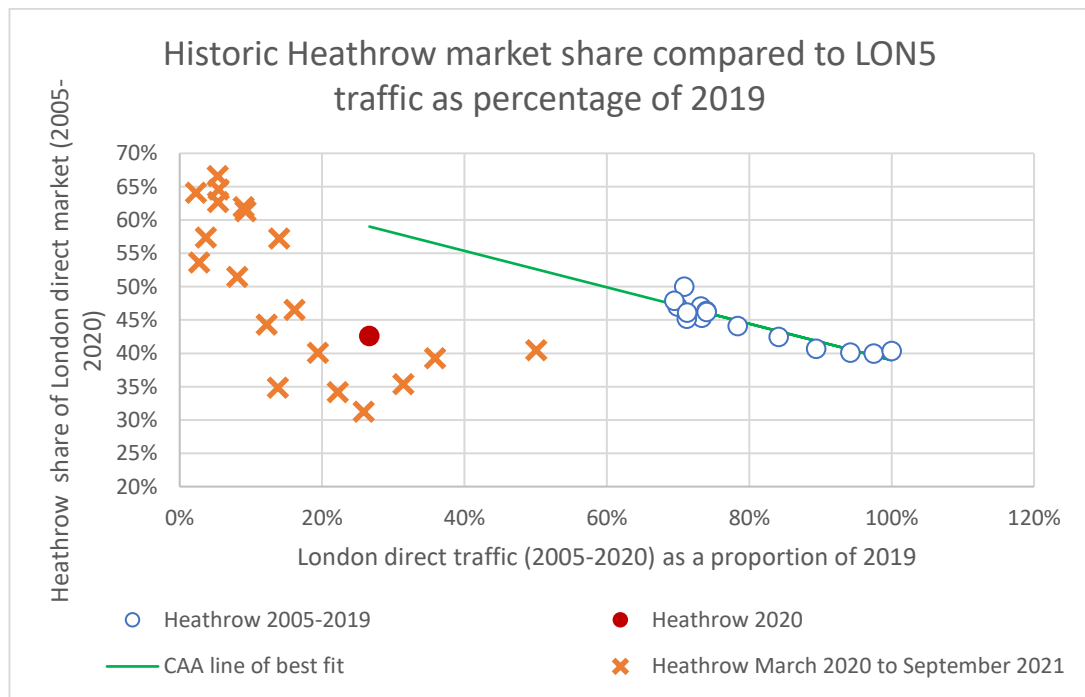
Figure 3 – Historic Heathrow market share compared to LON5 traffic as a percentage of 2019



Source: CAA, Heathrow Demand Model

2.6.5 Although 2021 is not yet at a close, we can examine the relationship further if we consider the monthly data from March 2020 to September 2021, as shown in **Error! Reference source not found.** This demonstrates even further that the actual relationship between market share and recovery that we have experienced over the last 18 months has not behaved as might be expected based on the data from prior to the Covid-19 impact. Furthermore, that this historic relationship is irrelevant for forecasting our recovery.

Figure 4: Historic Heathrow market share compared to LON 5 traffic as a percentage of 2019 – with a detailed 2020 view

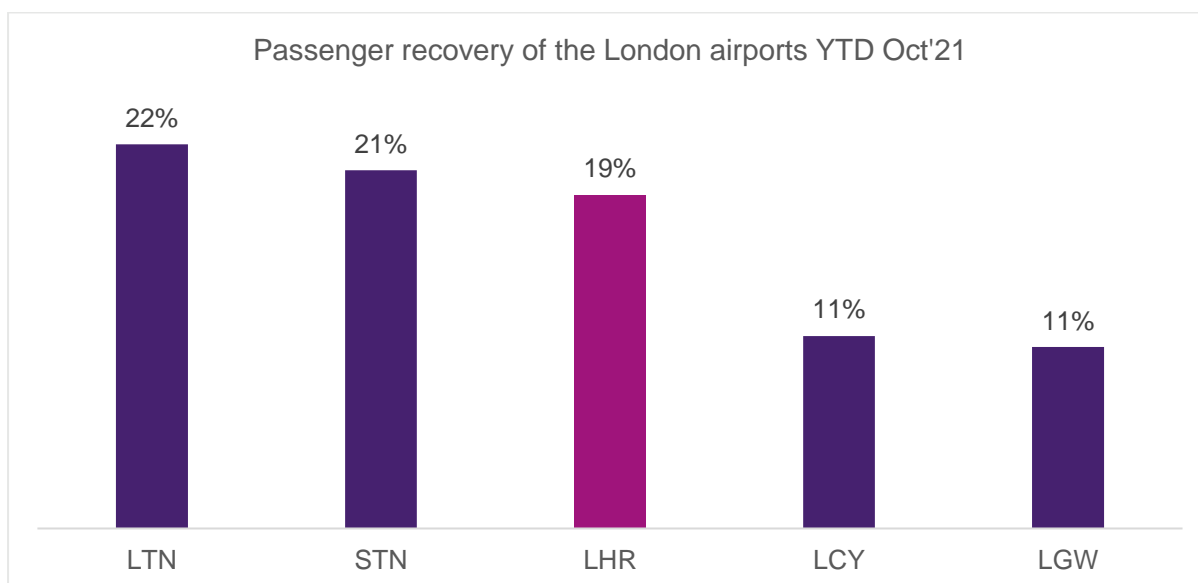


Source: CAA, Airport IS, Heathrow Demand Model

Evidence point 2

- 2.6.6 The CAA is making the mistake of assuming that recovery from this shock will follow a similar pattern to the recovery from previous shocks. This ignores the fundamental changes in the traffic makeup of the London aviation market over the last decade.
- 2.6.7 Aviation growth in that last decade has been predominantly driven by low-cost carriers. From 2011 to 2019, low-cost carriers grew 71% compared to just 5% for full-service carriers³. Whilst low-cost carriers have set up large bases at other London airports, most notably, Luton, Stansted, and Gatwick, lack of available capacity has blocked their entry to Heathrow.
- 2.6.8 In the UK, low-cost carriers have been driving the post-Covid passenger recovery. This is partly due to travel restrictions on short haul destinations being eased more quickly, and partly due to price-sensitive leisure passengers leading the recovery over business traffic. The low-cost carriers are also in a stronger position financially compared to many of the full-service carriers that serve Heathrow.
- 2.6.9 Heathrow’s role as a hub airport means we have a higher proportion of long-haul traffic. We also have higher levels of business and premium traffic. This has offset temporary gains in Heathrow’s market share resulting from consolidation of full-service carriers into Heathrow. This is evident when comparing the 2021 recoveries of the London airports year to date (to Oct’21) in **Error! Reference source not found.**

Figure 5 – Year to date (Sep’21) recovery of the five major London airports



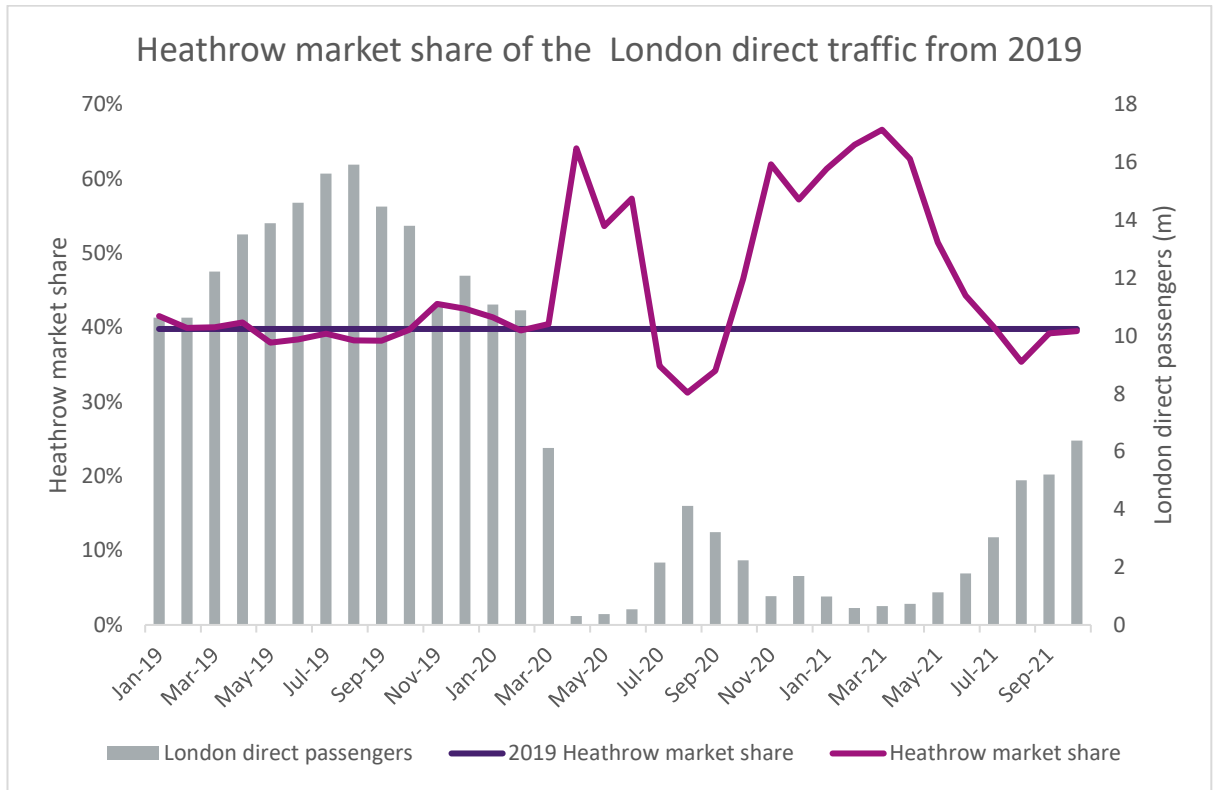
Source: Airport IS

- 2.6.10 The combination of the above factors meant that Heathrow’s market share for 2020 was 41% compared to 40% in 2019. For 2021 year to date (to Oct’21), Heathrow’s market share is slightly higher at 42%. As shown in **Error! Reference source not found.**, gains in market share above 2019 levels have only come during periods of

³OAG Analyser LCC versus FSC seat growth from 2011 to 2019

lockdown or severe travel restrictions when traffic volumes have hit rock bottom. As soon as any significant amount of demand returns, our market share has dipped below 2019 levels and fallen as low as c.30%.

Figure 6 – Heathrow market share of LON5 traffic compared to recovery volumes.



Source: Airport IS

2.6.11 We ask the CAA to consider what the recent data on market share in the pandemic recovery shows and in light of that to reconsider their approach on market share and the corresponding estimated 6.7m upward adjustment to the H7 forecast. We also request that the CAA share its analysis so any adjustments are transparent.

2.7 Carbon price assumptions

2.7.1 It is not clear how the CAA has considered the impact of carbon prices in developing their forecast. Given the significance of this issue to our industry it is important that the CAA take this into account in their Final Proposals.

2.7.2 In the RBP Update 2 we set out the latest information available on carbon pricing and how we have considered it in our forecasting. We also set out a summary of that information here.

2.7.3 The new greenhouse gas emission valuation published by BEIS in Oct'21 is significantly higher than the previous update in 2017, used in RBP Update 1.

2.7.4 In early 2020 the UK aviation sector set an ambitious target of net-zero emissions by 2050. It published its roadmap to get there which enables the industry to grow by 70% and achieve net zero by that date. Europe followed suit and there is a growing global shift to net zero including specific commitments from airlines and airline alliances.

- 2.7.5 The cost of carbon is an increasingly important consideration in the overall cost of aviation. Historically carbon has been an under-valued externality; carbon pricing is increasingly incentivising investments in lower carbon technology.
- 2.7.6 These costs can arise directly through policy instruments (for example the inclusion of emissions from flights in Europe's Emissions Trading System) or through voluntary means (such as a brand building the cost of planting a tree for every customer into its product price). In the voluntary and compliance markets the cost of carbon is increasing significantly.
- 2.7.7 Carbon costs can also arise indirectly, such as through the government considering the value of emissions in its appraisal of critical infrastructure development proposals.
- 2.7.8 We have updated our central case assumption on carbon price to take into account the new BEIS forecast valuation of emissions. We have used a trajectory from current traded carbon values, based on ETS prices, of €55 or £46 per tonne in 2020 to BEIS's latest central projection of £378 per tonne in 2050. We also consider a higher carbon cost assumption, which utilises BEIS's latest central projection of carbon value out to 2050 but recognises that aviation market levers will not start to expose airlines to this cost until the mid-2020's. The high case therefore tracks our central scenario in the short term until 2024, and then transfers over to the BEIS central case in 2035, again using a linear trajectory.
- 2.7.9 The future carbon price trajectory is influenced by a number of factors in the medium and long term which we plan to assess in more detail. Therefore to date our focus for the application of carbon prices to demand forecasts is the H7 period only.
- 2.7.10 There is also a broader question on passenger propensity to fly in a net zero world. Consumers may choose to fly less unless the aviation sector is acting and being seen to act to cut emissions. Around a third of UK consumers claim to avoid flying where possible and 40% say they expect to avoid it in the next few years⁴. With the increased awareness and understanding of climate change and its impacts, consumers in a net zero world could have a lower propensity to fly. We have already started to see this culture develop in Scandinavia with the "flight shaming" movement.
- 2.7.11 There is no evidence to suggest a shift in consumer behaviour today and consumers also acknowledge there is currently a lack of alternatives to flying for many journeys. As a result, we do not take into account the possibility of further reductions to propensity to fly and the increase in carbon prices are deemed a sufficient guide.
- 2.7.12 In the November presentation of their latest aviation forecast update, IATA and Tourism Economics stated a belief that the impact of rising carbon costs could have a significant impact on the industry. Currently, IATA only considers higher carbon costs in their downside risk scenario and not the central scenario in their forecast. The downside risk includes consumers not being able to afford travel due to higher fares and carbon taxes, but in their central scenario IATA still assumes a reduction in airfares due to technology advancements.
- 2.7.13 Heathrow asks that the CAA takes account of carbon prices in H7, including taking appropriate account of the latest BEIS emissions valuation.

⁴ Incite, Understanding the sustainability landscape in 2020 and future initiatives for Heathrow, September 2020

2.8 Asymmetric distributions

- 2.8.1 The CAA has made incorrect statement for how Monte Carlo Simulation outputs should be benchmarked to inputs. It has also made misjudged claims of a downside bias introduced to the process by Heathrow that are not supported by Probability theory.
- 2.8.2 The CAA has referred to the Q6 judgment and states that it has “*made adjustments to the forecasts to mitigate the effect of asymmetric distributions in [Heathrow Airport’s] [Monte Carlo] method, as [Heathrow’s] approach appears to introduce downside bias into the passenger forecast.*”⁵
- 2.8.3 As a result of this view the CAA has increased the H7 forecast by an estimated 6.4m. In the text below we set out evidence points to explain why the CAA’s view is statistically unfounded and why the resulting adjustment has therefore unnecessarily corrected for appropriate statistical properties.

Evidence point 1

- 2.8.4 We do not agree that a downside bias has been introduced to the passenger forecast through use of asymmetric distributions. Instead, the use of that distribution is wholly appropriate and reflective of the physical constraints that Heathrow operates within.
- 2.8.5 Due to the nature of the cap on Heathrow’s flight movements of 480,000 per annum, the distributions on the number of ATMs, seats, and passengers at Heathrow in any simulation will be a left/negative skewed distribution truncated at, or very close to, 480k.
- 2.8.6 As the outputs of ATMs per annum in the model run are continuous, unimodal and do not have a heavy tail it should be expected that the three measures of central tendency will have the textbook properties of left skewed, unimodal, distributions of continuous data without heavy tails. This will mean that the mode (peak) is larger than the median (p50) which is again larger than the mean.
- 2.8.7 This is because the properties of the mode are not impacted by the negative skew. The CAA suggestion that the simulation should be producing outputs with the mode equal to the median is only true if the outputs should be following a Gaussian distribution with all three measures of central tendency equal. In practice, a Gaussian distribution is not applicable to our forecast, and therefore the mode, median and mean will not be equal.
- 2.8.8 If Heathrow had taken the modelled ATMs from the most optimistic scenario for 2026 of 476,063 and applied the 480k cap, then to have an output that fitted a Gaussian distribution we would have also needed to truncate movements at the bottom end – enforcing a minimum number of outputs at 472,125. Heathrow has only flown more than 472,125 flights in 2011, 2018 and 2019 – it is therefore not an appropriate minimum or an appropriate distribution.

Evidence point 2

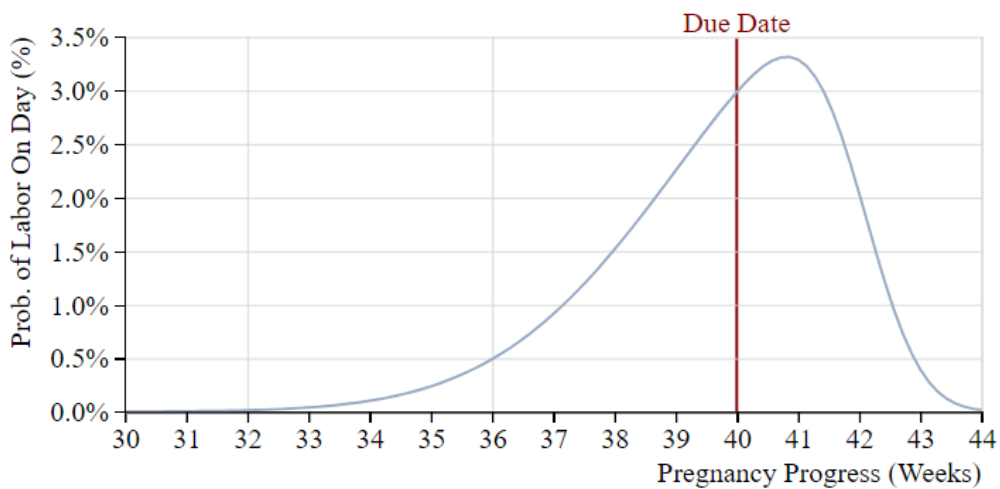
- 2.8.9 Asymmetric distributions with left skew and the associated properties of central tendency caused by a maximum truncation are not uncommon. Below we set out a

⁵ [Economic regulation of Heathrow Airport Limited: H7 Initial Proposals, CAA](#)

few examples of other areas of forecasting which feature such asymmetric distributions.

- 2.8.10 Figure 7 shows the daily odds of spontaneous labour relative to due date of labour based on historical records of gestation periods. It can be calculated that due dates are based on the median/P50 length of gestation, but the most likely date of birth (mode) is beyond that date.
- 2.8.11 The fact that many pregnancies which go beyond 42 weeks are induced introduces a truncation that gives the data a negative skew. Despite 40 weeks and 5 days or 40+6 being the most likely days of labour onset, there is a 66% chance that labour would begin before that. This is because the modal days are not considering the long tail and that almost 10% of births take place 37 weeks or earlier and less than half a percent go on beyond week 43.

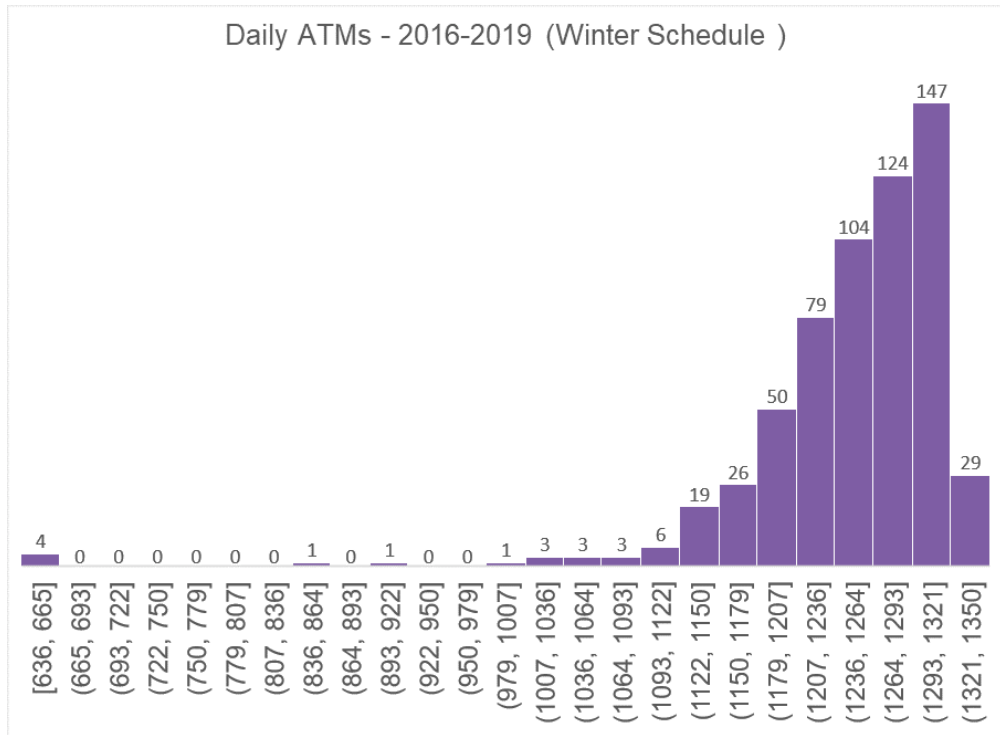
Figure 7: Labour date probability distribution



Source: Datayze model, labour probability graph

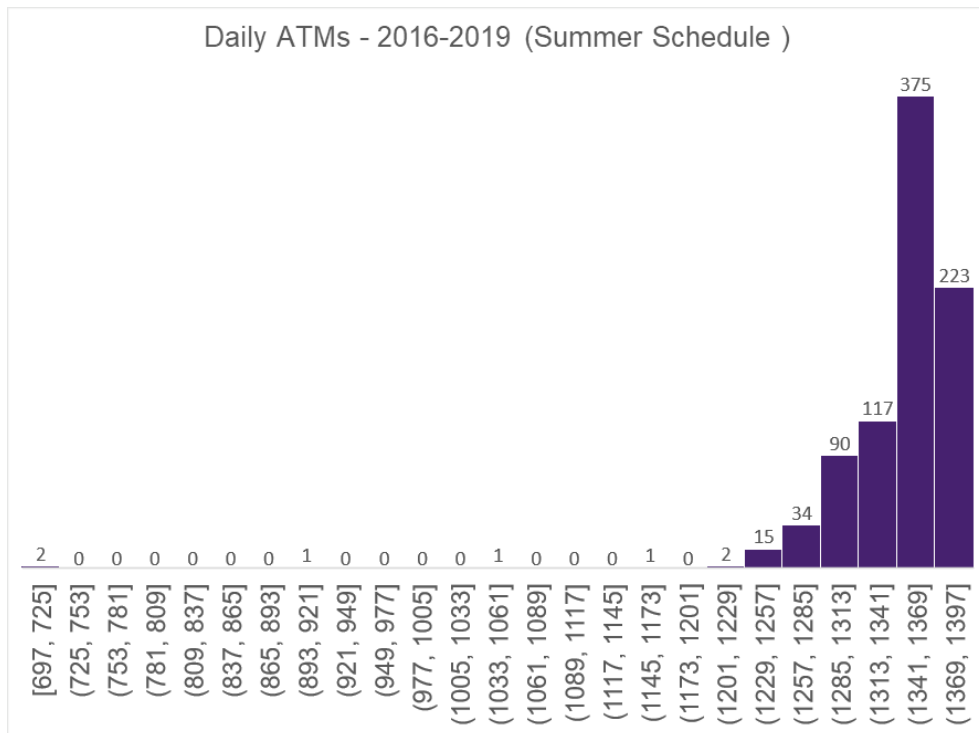
- 2.8.12 Another example of a left skewed distribution with a truncated maximum is daily ATMs at Heathrow Airport.
- 2.8.13 Prior to the impact of Covid-19, Heathrow would frequently see daily ATMs above 1,300 a day. However, while inclement weather or operational issues can drop the number of ATMs on a given day by dozens, hundreds or, in the case of the 2010 eruptions of Eyjafjallajökull, thousands, there is no mechanism available for the airport to catch-up.
- 2.8.14 If 400 flights are cancelled on a Tuesday in August, Heathrow can't 'catch-up' by flying those 400 additional flights on the Wednesday, the rest of the week or the following Tuesday by flying numbers significantly above 1,400 flights a day. Modelling work has shown that the actual daily limit for the runway is c.1,470 flights (16.5 hours with 89 movements an hour). It would therefore take at least six days to 'catch-up' the difference by running the airport at 100% of runway capacity.
- 2.8.15 Figure 8 and Figure 9 show the left skewed distributions of daily ATMs for the winter and summer schedules.

Figure 8 – Daily ATMs 2016-19 (Winter Schedule)



Source: Heathrow Airport

Figure 9 - Daily ATMs 2016-19 (Summer Schedule)



Source: Heathrow Airport

- 2.8.16 In Table 3 below we demonstrate that if you annualise the three measures of central tendency for summer and winter, the resulting figures surpass the ATM cap for the modal and median values. This is because these measures do not encapsulate the downside risk of a day with significantly fewer flights.

Table 3 – Daily Heathrow ATMs by time of year and measure of central tendency

	Daily		Annualised
	Summer	Winter	
Mode	1,358	1,290	485,810
Median	1,357	1,265	481,769
Mean	1,345	1,248	476,683

Source: Heathrow Airport

- 2.8.17 It is this reasoning that displays why using the modal figure from the annual Monte Carlo outputs is statistically incorrect.
- 2.8.18 In conclusion, the asymmetric distribution in our Monte Carlo simulation is not only valid but wholly appropriate and reflective of the constraints under which Heathrow operates. Heathrow asks that the CAA acknowledge that the asymmetrical distribution is a function of the real-world ATM constraints that Heathrow faces. As a result, the CAA must remove the addition of the estimated 6.4m passengers to the forecast.

2.9 Weighted scenarios methodology

- 2.9.1 The CAA has indicated that it is considering moving away from the rigour of Monte Carlo simulation to point estimates. This would be an imprudent adjustment to our methodology and one which would make the forecast less resilient to dealing with uncertainty at a point when we need that quality the most.

Evidence point 1

- 2.9.2 Our forecasting methodology incorporates the use of Monte Carlo simulation methods plus a weighted combination of scenarios. This is fundamental to our approach and is integral to dealing with the uncertainty that exists for the H7 period.
- 2.9.3 The precedent for use of Monte Carlo simulation methods was set in the relatively stable Q6 regulatory period. Extremely high levels of uncertainty still exist over the recovery of aviation from the impact of Covid-19, and therefore such an approach is even more important.
- 2.9.4 We have set out four distinct and internally consistent narrative scenarios for how the recovery might progress over the next five years and beyond. Each of these scenarios is modelled in its own right and has a likelihood of occurrence assigned.
- 2.9.5 By weighted combination of those scenarios, we are able to create an output that allows for planning on a basis that appropriately reflects the amount of risk we face. To pick any one scenario and use it as a mid-case, would be neglecting the level of risk and the possibility for other scenarios to occur.
- 2.9.6 It should also be noted that because this approach is so fundamental to our methodology, no single one of our scenarios could be selected as the ‘most likely’

scenario in order to plan on that sole basis. To create a single central scenario such as this would need an entirely different approach.

Evidence point 2

- 2.9.7 As we have previously set out in RBP Update 1, point and interval forecasting have been left behind as best statistical practice and superseded by probabilistic forecasting in many varied disciplines ranging from banking and finance, energy, disease modelling and even sports.
- 2.9.8 The use of Monte Carlo simulation methods and a scenario-based approach was agreed as best practice by Heathrow and the Airline Community during some of the very first engagement sessions on the H7 plan and has been a central tenet ever since.
- 2.9.9 Monte Carlo simulation methods enable uncertainty to be modelled and probabilistically assessed to create a balanced forecast in a way that considering a single scenario with a single narrative cannot possibly capture.
- 2.9.10 Although a level of comfort may be attached to having a single point forecast with a distinct narrative, unfortunately the uncertainty and ever-changing picture of the Covid-19 recovery would mean that comfort would be a false sense of security. If we used point estimate forecasts we would need to restart from scratch with each new development as the forecast would quickly become out of date.
- 2.9.11 In deterministic models, it is very difficult to model different combinations of values for different inputs to see the effects of different scenarios. Using Monte Carlo simulation allows these effects to be played out and the interactions between inputs assessed.

Evidence point 3

- 2.9.12 In fact, the importance of the use of probabilistic forecasting for the H7 period has already been tried and tested, most recently in facing the uncertainty posed by the new variant Omicron.
- 2.9.13 The scenarios which are the basis for our updated forecast in RBP Update 2 were developed prior to the discovery of Omicron. Despite this significant new development, we have not yet needed to make any adjustments to our forecast because our methodology reflects a range of underlying scenarios that include the current developing situation. This makes it more robust to the risk posed by new variants or any other scenario of reasonable likelihood. This underlines the strength and resilience of our approach.
- 2.9.14 If our methodology had featured only one central scenario, we would have needed to rapidly change that scenario to reflect the emergence of the new variant.
- 2.9.15 If needed, we then have the flexibility to adjust the weightings of scenarios to reflect the likelihood of each one occurring. We anticipate that there may be sufficient information for an update to the weightings to be made in the first quarter of 2022, once the impact of Omicron is better understood.
- 2.9.16 The CAA must continue to take a best practice approach by using a probabilistic approach rather than moving to single scenario estimates. The use of Monte Carlo simulation was established in Q6 and is recognised as best practice and a method of accounting for uncertainty. Moving away from such an approach to a scenario-based point estimate would mean that any deviations from those narratives instantly render

the forecast out of date. Our current forecast methodology allows us to consider different eventualities in a very uncertain world. As such, it was able to absorb the Omicron developments for precisely this reason.

2.10 Airline supply impact

- 2.10.1 The CAA has not considered the real-world operational challenges that the aviation industry is facing as it attempts to increase capacity to meet demand. The CAA have dismissed Heathrow's attempt to account for this, and simply assumed that these challenges do not exist. That has resulted in an inflation of Heathrow's forecast for H7 by an estimated 5.3m.
- 2.10.2 This position seems to ignore the significant amount of evidence that we have presented in RBP Update 1, Chapter 5.3.8, to support our assumption that the unprecedented reductions in airline capacity in 2020 and 2021 cannot simply be reversed overnight and that the financial burden from the pandemic will cast a shadow over the next few years for many airlines.

Evidence point 1

- 2.10.3 The evidence we have already put forward ranges from IATA's statements on airlines' precarious financial positions^{6,7,8}, public statements by airlines on their resource cuts^{9,10,11,12}, the Airline Community's feedback 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"*¹³, airlines' financial results showing retirement of aircraft and deferral of deliveries of new aircraft¹⁴, explicit public statements from airlines talking of how the ramp-up in supply will be impacted^{15,16}, analysis by industry experts on likely timeline for return of airline resource¹⁷.
- 2.10.4 Since publishing the RBP Update 1 we have seen issues with airline supply impacting on actual operations: severe shortage of ground handling skills and challenges in retaining and recruiting staff¹⁸, Christmas flights impacted by airline staff shortages¹⁹, KLM pilots loading bags onto flights at Schiphol due to baggage staff shortages²⁰, job vacancies in the travel industry hitting the second highest level since February 2019²¹, airlines cancelling thousands of flights across just a few days because of lack of resource²².

⁶ [IATA - Deep Losses Continue Into 2021](#), 24th November 2020

⁷ [Outlook for Air Transport and the Airline Industry](#), IATA, 24th November

⁸ Airline Community presentation to CAA and HAL, March 2021

⁹ [American Airlines Says Oct. 1 Job Losses Will Total 40,000, forbes.com](#), 25th August 2020

¹⁰ [IAG Q3 2020 Financial Results](#), 30th October 2020

¹¹ [Coronavirus: Virgin Atlantic to cut 1,150 more jobs - BBC News](#), 4th September 2020

¹² [Economic Performance of the Airline Industry, IATA](#), 24th November 2020

¹³ Section 2, Annex 3.2 – Airline H7 RBP Feedback – Airline Fares Shocks Business Travel_Final

¹⁴ [IAG Q3 2020 Financial Results](#), October 2020

¹⁵ [Lufthansa fleet reductions, aerospace-technology.com, March 2021](#)

¹⁶ [Reduced Losses but Continued Pain in 2021, IATA, April 2021](#)

¹⁷ [British Airways pilot deal, what does it tell us? Gridpoint Consulting, July 2020](#)

¹⁸ [IATA - Ground Handling Priorities Post Pandemic: Tackling Labor Shortages, Safety, Modernization](#)

¹⁹ [Christmas flights could be hit by staff shortages \(msn.com\)](#)

²⁰ [KLM asks pilots to help with baggage chaos: Telegraaf - DutchNews.nl](#)

²¹ [Travel job placements 'hit highest level in 19 months' | Travel Weekly](#)

²² [Ouch: American Airlines Cancels 2,200+ Flights - One Mile at a Time](#)

Evidence point 2

- 2.10.5 We understand the Airline Community have stated they disagree with our assumptions, but we would urge the CAA to consider the public statements by airlines that show clear contradictions with their feedback on our forecast. Just a few of examples of these contradictions include:
- 2.10.6 In their feedback on the RBP the airline community stated that “*there will be more of a risk of over rather than under capacity during the recovery period*”²³. Only a few months later IATA announced 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*”²⁴.
- 2.10.7 In their response to the 2022 charges consultation the Airline Community have set out a forecast of 72m passengers at Heathrow next year²⁵. This is out of line with any other forecast, requiring all impacts of Covid-19 to have gone by early in Q1 2022, but it is also in direct conflict with the public appeals being made by the airline community to the UK Government. In a letter to the Prime Minister, the chief executives of the UK’s biggest airlines express that they are “*deeply concerned about the haphazard and disproportionate approach by government to travel restrictions*”, request bespoke economic support packages and state that “*ticket sales cover just 30% of winter holiday capacity*”²⁶.
- 2.10.8 During constructive engagement the airline community disagreed that supply constraints and the loss of business passengers would apply upward pressures to fares and instead fares would likely drop to encourage demand to return. However, 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 cause²⁷. In April, IATA and Tourism Economics also 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”. IATA also noted that the sustainability agenda would cause the cost of air travel to rise in the future²⁸.
- 2.10.9 We ask the CAA to look at our evidence that airlines and airports around the world are struggling with current demand significantly lower than 2019 due to labour shortages and capacity restrictions driven by Covid-19 regulations. We ask that the CAA reviews the contradictions in the airline community’s public statements compared to their submissions made as part of the H7 passenger forecasts. The CAA must reflect data and evidence in its Final Proposals. Doing so will remove the estimated upward adjustment of 5.3m the CAA has made.

²³ Section 5.8.2, Annex 3.1 – Airline H7 RBP – IATA Demand Review Final

²⁴ Reduced Losses but Continued Pain in 2021, IATA, April 2021

²⁵ AOC Responses to CAP2265 2022 Charges

²⁶ <https://airlinesuk.org/airline-ceo-letter-to-prime-minister-covid-travel-restrictions/>

²⁷ [Shai Weiss in conversation with Nick Cosgrove, February 2021](#)

²⁸ [‘Will air travel take-off again in 2021?’ IATA and Tourism Economics, April 2021](#)

2.11 Long-term impact of Covid-19 on business travel

- 2.11.1 The CAA has indicated that it is considering reducing our assumption on the long-term impact of Covid-19 on business travel. It has not provided any evidence or rationale to support this view.
- 2.11.2 This is contrary to the numerous pieces of evidence we have laid out in previous iterations of the RBP, which we summarise below, and contrary to the consensus in the industry, including amongst members of the airline community.
- 2.11.3 When the Covid-19 pandemic struck, businesses around the world responded with blanket policies that restricted travel and set high thresholds for exceptions. Now, the extended experience of video conferencing will eliminate the need for some corporate travel. This increase in videoconferencing isn't comparable with the increases we've seen in the past. From December 2009 to December 2010, registered Skype users grew by 40%, and their net revenues increased by 20%²⁹. The use of Zoom in 2020 saw a 30-fold increase in April alone, their sales jumped 169% year-on-year in the three months to 30th April, and the number of customers with more than 10 employees has increased by 354%³⁰.
- 2.11.4 We have already seen businesses making decisions to change their working practices for the longer term: Nationwide, Santander, HSBC, BP, Microsoft and many others are planning to continue with an increased amount of working from home even once Covid-19 restrictions are lifted.
- 2.11.5 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 employee³¹.
- 2.11.6 When considering the scale of the longer-term impact, it is useful to consider to proportions for each of the various reasons for business travel and how each one might be impacted. In previous iterations of the RBP we have set out information on the different segments within business travel, taken from research by the Department for Transport³². We then used analysis from IdeaWorksCompany³³, which looks at the expected range in loss of business travel for each segment. The resulting range in impact is shown in Table 4 below. The result is a range of 20% to 38% long-term impact to business travel.

Table 4: 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%

²⁹ <https://techcrunch.com/2011/03/07/skype-revenue-up-20-percent-to-860m-in-2010-paid-users-up-19-percent/>

³⁰ <https://www.bbc.com/news/business-52884782>

³¹ [Managing our travel emissions, PWC](#)

³² [Department for Transport research paper](#), 2018

³³ [The Journey Ahead, IdeaWorksCompany, December 2020](#)

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 and IdeaWorksCompany

- 2.11.7 During discussion with the Airline Community in constructive engagement, 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.
- 2.11.8 Other views are taken by senior 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% smaller³⁴.
- 2.11.9 Notable additions to the growing consensus of an impact of 10-30% include the following statements from the Office for Budget Responsibility and McKinsey:
- 2.11.10 In October 2021, the Office for Budget Responsibility released its aviation forecast for APD purposes, in which they state, *"The profitable business travel area may be more persistently affected: in a May 2021 survey of large global businesses, 72 per cent expected to maintain limits on business travel after social distancing measures end"*. They also stated *"We assume a permanent reduction in business travel due to greater use of online meetings"*.³⁵
- 2.11.11 In April 2021, McKinsey stated: *"Business travel will take longer to recover, and even then, we estimate it will only likely recover to around 80 percent of pre-pandemic levels by 2024. Remote work and other flexible working arrangements are likely to remain in some form post-pandemic and people will take fewer corporate trips."* And *"...[business trips] ...had not yet recovered to pre-financial-crisis levels when COVID-19 broke out in 2020."*³⁶
- 2.11.12 The CAA must base its approach on a robust assessment of the broad range of evidence on this matter.

³⁴ [Business travel, Financial Times, January 2021](#)

³⁵ <https://obr.uk/box/the-behavioural-legacy-of-the-pandemic/>

³⁶ <https://www.mckinsey.com/industries/travel-logistics-and-infrastructure/our-insights/back-to-the-future-airline-sector-poised-for-change-post-covid-19>

2.12 Responding to the airlines' representations of 2022 charges

- 2.12.1 The AOC, British Airways and Virgin Atlantic Airways have recently responded to the CAA's interim airport charge proposal for Heathrow in 2022. In their responses they make exaggerated claims on Heathrow's traffic volume for 2022 in the context of 2022 charges.
- 2.12.2 The Airline Community is claiming an unachievable forecast of [redacted] passengers in 2022. These claims are built on incorrect assumptions and very little supporting evidence, and the resulting figure is clearly out of touch with the reality of the challenges the industry, Heathrow and the airlines are facing in its bid to recover from the global pandemic.
- 2.12.3 Passenger volumes of [redacted] in 2022 would require an average of [redacted] passengers a month. As both the airlines and we knew, before the discovery of Omicron variant, January and February were likely to be between 3m to 4m per month. This means to make achieve [redacted] in 2022 would require around [redacted] passengers per month for March to December, [redacted] recovery in Heathrow's passenger numbers.
- 2.12.4 In addition, we are concerned by the lack of detail in the airline forecasts. There does not appear to be any depth to their analysis. For instance, there is no clarity on: What do recoveries in key markets look like? How will travel restrictions evolve? What load factors can we expect? When will transfer volumes recover? When might East Asia open? What threat lies in new variants being discovered? This lack of detail contrasts with the attempts Heathrow has made to engage on critical questions like these that we have posed through constructive engagement session over the last two years.
- 2.12.5 Industry forecasts have consistently been too optimistic throughout this pandemic. The recent Omicron variant demonstrates that for the foreseeable future travel restrictions or the potential for them will continue to loom over the industry. However, the scenario produced by the airline community takes no consideration for further impacts to travel resulting from new variants like Omicron or for any other impact on consumer confidence or ability to fly.
- 2.12.6 It is very disappointing to be accused by our airline partners of producing "depressed, erroneous passenger forecasts"³⁷, our methodology has been backed as robust by the CAA and Skylark. It has served us well throughout 2021 and the thorough exercise is the output of thousands of hours of work. Despite this, at every stage, our forecasts have been proved too optimistic. The recent Omicron impact has highlighted yet again that for the foreseeable future governments will default to travel restrictions and the airline community response neglects to consider this.
- 2.12.7 We will provide a full response to the claims and evidence points provided by the airlines in early 2022. We will provide counter evidence to show the claims are false and we will provide the full picture rather than the carefully selected evidence chosen by the airlines.
- 2.12.8 The specific inaccuracies we will address are as follows:
- Eurocontrol forecasts are the best proxy for Heathrow's recovery
 - Heathrow recovery will outperform the UK, airlines are planning for a 90% recovery

³⁷ British Airways CAP2265 12.1

- Heathrow's forecast introduces bias
- IATA's forward bookings support a 90% recovery in 2022
- CAA and Heathrow's forecasts are out of date
- ACI tends to underestimate passenger forecasts.

2.12.8.1 The response will address each of these issue in a detailed and evidence based manner.

3 Capital Expenditure

3.1 Introduction

- 3.1.1 This chapter covers our response to the CAA's Initial Proposals (CAP2265B) on H7 capital investment. We provide additional information and further evidence that supports our proposed capital investment plan for H7. In order to deliver on key outcomes for consumers, accepted by the CAA in its Initial Proposals, and to generate further operational and commercial efficiencies, we propose a £4.1bn H7 Capital Plan. It may seem counterintuitive to invest more than the very minimum in the recovery phase of the cycle, but this is exactly when we should be investing, ahead of demand. Similarly, it may be tempting to invest in a piecemeal fashion, rather than setting out a single capital programme, but that would be inefficient, higher cost and risks significant delay to essential consumer benefits such as passenger security and T2 baggage.
- 3.1.2 We note the CAA's feedback in its Initial Proposals, which we address in this chapter.
- 3.1.3 In particular we:
- Provide justification to demonstrate why our £4.1bn plan is necessary to protect the interests of all our stakeholders over the course of the price control – and why the full allocation is required from the start of H7.
 - Provide more detail on the cost estimation process we employ for estimating our capital plan at portfolio, programme and project level, which is in line with industry best practice, and that we have the right checks and balances in place to set an efficient capital allowance in H7.
 - Provide further information on our capital programmes, including their scope and maturity.
- 3.1.4 We support the CAA's view that having clear objectives for the start of H7 for our capital programmes and the benefits we expect them to deliver is key to ensuring they deliver in the interests of consumers. Our response therefore provides Delivery Objectives for each of our programmes aligned to the SMART structure used by Arcadis in its report produced for the CAA.
- 3.1.5 We have also taken into consideration the views shared by our airport stakeholders, including our airline community, and our latest consumer insights research in the development of our plans for capital investment in H7.
- 3.1.6 While we are keen to address the CAA's feedback, we have significant concerns with the capital estimates set out in the CAA's Initial Proposals.
- 3.1.7 The CAA's proposed capital plans do not allow for delivery of key compliance activities or our consumer outcomes. They are not integrated with the CAA's H7 cost, and revenue forecasts, nor with the service quality targets set out in CAP2274.
- 3.1.8 This inconsistency within the Initial Proposals amounts to a manifest error that needs to be resolved in the CAA's Final Proposals. We provide examples below:
- The CAA's Initial Proposals do not deliver the upgrade to cabin baggage security, which is required by mid-2024, putting us in breach of compliance

- While the CAA acknowledges the importance of carbon and sustainability to consumers, it does not provide for investment in carbon and sustainability in its H7 capital estimates.
- The CAA's capital estimates do not allow for investment in commercial revenue projects, and yet the CAA's Initial Proposals assume material, incremental commercial revenue generation due to capital investment in its revenue forecasts (as well as ungrounded stretch).
- The CAA's capital estimates also fail to allow for investment in initiatives to drive operating cost efficiencies, which is in the interests of our airlines and supporting their growth.
- The Arcadis report, used by the CAA to inform its H7 service quality targets, references our proposed investment in Pre-Conditioned Air (PCA) as part of our carbon and sustainability programme and the importance of this investment to maintain our asset availability targets. The CAA's Initial Proposals do not allow the capital for this programme.
- The Arcadis report also highlights the importance of our proposed investment in services for Passengers Requiring Support, which it notes should be part of a minimum capital plan due to their impact on our ability to treat passengers with dignity and care. The CAA has omitted any investment in improvements for PRS.

3.1.9 In the absence of a correction, we have serious concerns that the Final Proposals would not be in line with the CAA's primary duty to consumers, nor in line with its duties to financeability and the environment.

3.1.10 We are keen to work with the CAA over the coming months as it continues to develop its thinking around capital investment in H7. In this chapter we therefore provide all the evidence at our disposal to address the CAA's feedback and to help the CAA determine a balanced H7 capital investment plan that is fully integrated with the other building blocks and consistent with its duties.

3.1.11 The chapter is structured as follows:

- Our updated H7 Capital Plan
- Our approach to developing cost estimations and programme maturity
- Setting out SMART H7 Capital Programme Delivery Objectives
- Individual H7 Capital Programme updates

3.1.12 In addition to this chapter, we are also submitting a series of appendices providing additional detail on each of our H7 capital programmes. We are also providing the CAA with a range of previously shared stakeholder and IFS engagement material extracted from the Development Information Portal; this includes further detail around key business cases referenced in this chapter.

3.2 Our updated H7 Capital Investment Plan for RBP Update 2

A £4.1bn H7 Capital Plan delivers the right outcomes for, and fulfils the CAA’s duty to, consumers in H7.

- 3.2.1 RBP Update 1 set out updates to our H7 Capital Plan since the publication of our December 2020 RBP – it included both a £4.2bn “Optimal Plan” and a £2.5bn “Safety Only Plan”.
- 3.2.2 We demonstrated that the £4.2bn “Optimal Plan” represented good value for consumers – with the additional cost efficiencies and commercial revenue generation driven by the plan offsetting the charge impact of the additional £1.7bn investment over the “Safety Only Plan”. In other words, the Optimal Plan would not result in higher costs for consumers but delivered improved consumer outcomes versus the “Safety Only Plan”.

Figure 1: Our H7 Consumer Outcomes



Source: Heathrow

- 3.2.3 Our extensive consumer evidence base has shown that the targeted service improvements secured by our “Optimal Plan” continue to be valued by consumers. Research conducted in November 2021 examining the interplay between different service levels and the airport charge found that consumer acceptability of our “Optimal Plan” and its associated airport charge were at the same or marginally higher levels than 2019 levels of acceptability. Meanwhile, the “Safety Only Plan” saw a notable drop-off in consumer acceptability, with an additional 6-9%pts of rejection (depending on the flight length category)¹.
- 3.2.4 As our thinking around our H7 Capital Investment Programmes has matured, we have concluded that a lower “Safety Only Plan”, as included in RBP Update 1, simply cannot deliver acceptable stakeholder outcomes. It would lead to significant negative impacts on service, resilience and affordability, as well as failing to deliver key investments to support airline re-growth.

¹ Incite Consulting, Service Degradation Research, November 2021

- 3.2.5 The same is true of the ‘High’, ‘Mid’ and ‘Low’ capital estimates included in the CAA’s Initial Proposals – with all three of these estimates delivering lower capital investment in H7 than the “Safety Only Plan” included in our RBP Update 1.
- 3.2.6 For this reason, we now present a single £4.1bn H7 Capital Plan (2018p). We have challenged ourselves to develop the most efficient capital investment plan possible, which we are confident will deliver targeted but consistent investment that will enable us to deliver optimal outcomes for consumers over the course of H7.
- 3.2.7 We present a summary of our £4.1bn H7 Capital Plan below:

Table 1: Our proposed £4.1bn H7 Capital Plan

RBP Update 2						
2018 Prices						
£ms	2022	2023	2024	2025	2026	H7
Asset Management & Compliance	290	341	356	366	351	1,704
iH7 Roll over	90	31	3			124
T2 Baggage	7	43	111	143	127	432
Regulated Security	51	159	216	204	117	747
Carbon & Sustainability	10	10	34	55	78	188
Crossrail	34	34				67
Commercial Revenues	59	119	120	112	85	494
Efficient Airport	34	50	36	92	102	315
Expansion	6	6	6	6	6	30
Prioritisation	-168	-147	-121	117	320	0
H7 Total	412	647	761	1,095	1,187	4,102

Source: Heathrow

- 3.2.8 We have now moved away from the RBP Update 1 ‘Protect the Business’, ‘Win the Recovery’ and ‘Build Back Better’ portfolios.
- 3.2.9 This approach reflected a phased approach to investments as recovery grew. Stakeholders feedback, a better understanding of consumers needs and an improved understanding of the capital required to deliver on these needs has enabled us to structure our investment plan in nine distinct programmes. This in turn has enabled us to:
- Address the CAA’s request for us to develop clear SMART Delivery objectives across the H7 plan.
 - Address the CAA’s feedback requesting more granular information.
 - Provide more clarity about how each programme would enable us to deliver different H7 outcomes.
 - Provide transparency to stakeholders on the phasing of investment and level of maturity of each programme.

- In the future, this approach will better enable us to transparently track investment through the price control relative to initial estimates.

3.2.10 Later in the chapter, and in subsequent annexes, we provide further detail on each programme – including an overall description, changes since RBP Update 1, benefits delivered, detailed cost estimates and relation to H7 stakeholder outcomes.

3.2.11 To provide further transparency, we present a summary of our updated H7 Capital Plan with the changes made since RBP Update 1 below:

Table 2: Changes to our plan since RBP Update 1

RBP Update 2							
2018 Prices							
£ms	2022	2023	2024	2025	2026	H7	Ys RBP Update 1
Asset Management & Compliance	290	341	356	366	351	1,704	204
iH7 Roll over	90	31	3			124	41
T2 Baggage	7	43	111	143	127	432	217
Regulated Security	51	159	216	204	117	747	-33
Carbon & Sustainability	10	10	34	55	78	188	0
Crossrail	34	34				67	-11
Commercial Revenues	59	119	120	112	85	494	-206
Efficient Airport	34	50	36	92	102	315	-159
Future Ready Airport							-115
Capacity							-35
Expansion	6	6	6	6	6	30	30
Prioritisation	-168	-147	-121	117	320	0	
H7 Total	412	647	761	1,095	1,187	4,102	-65
RBP Update 1	454	685	858	1,041	1,130	4,167	
Ys RBP Update 1	-42	-38	-97	54	57	-65	

Source: Heathrow

3.2.12 These changes are reflective of more work undertaken since RBP Update 1 to review our strategic options, further understanding of the maturity of our programmes, updated cost plans and a review of the benefits of business cases to align them to the right programme - maximising benefits across safety, resilience, service and future growth.

Characteristics of our updated H7 Capital Plan

Our plan is flexible in response to an environment of unprecedented uncertainty

3.2.13 We note the CAA's recognition in its Initial Proposals that we face challenges around developing our H7 Capital Plan as a result of the impact of the Covid-19 pandemic.

3.2.14 We have striven to mitigate the impacts of uncertainty driven by the Covid-19 pandemic through engaging with the CAA and airport stakeholders throughout the development and re-iterations of our capital plans for H7 over the last eighteen months. We have sought to ensure that we incorporate a wide range of views and have used the most up to date information available to develop our plan.

3.2.15 Nevertheless, and in spite of all possible mitigations, H7 will remain an uncertain period. The plan as defined here may need to be adapted to new circumstances - for

example, passenger numbers may radically differ from our forecast, new regulations or restrictions may come into force, new technological solutions will become available or consumer expectations may evolve rapidly.

- 3.2.16 We have therefore thought carefully about how best to deal with uncertainty in the delivery of our plan over the course of H7. We continue to believe that the best approach is to build on the proven 'Development and Core' approach.
- 3.2.17 Its strength has been put to test through the Q6 period, where capital investment was adjusted upwards in the initial phase of Expansion, and then rapidly reduced due to the impact of Covid-19.
- 3.2.18 We and the airline community have been able to progress business cases through Q6/iH7 to meet consumer and operational needs as they arose. We believe that any regulatory changes which undermine the flexibility of the current framework are not the right response to the conditions that we find ourselves in at the outset of H7.
- 3.2.19 In order to be able to manage investments in an efficient manner, we require the full allowances for each cost category. For example, in the case of T2 Baggage and Regulated Security, the overall programme size and shape are known and it would not be in the interests of consumers if the programme could only get half way through delivery due to a limited portfolio allowance being made available by the CAA.
- 3.2.20 The complexities of these programmes are such that we will need to appoint several supplier partners and experts to deliver the full solution. Having sight of the full scope of works from the start will enable them to work together to identify innovative solutions, identify delivery efficiencies across the entire scope, secure capability appropriate to the full scale of the works and ensure that learning is captured from one programme to the next. This efficiency and innovation leads to lower costs and quicker delivery, which is in the interests of consumers.
- 3.2.21 For example, in 2020 the airline community supported our decision to perform deep interventions to resurface the Southern Runway much earlier than planned in order to take advantage of operating on a single runway during covid. The entire business case was delivered in under six months, which could not be achieved under the framework proposed by the CAA in the Initial Proposals.
- 3.2.22 The ability to appoint and retain the supply chain will not be as successful if a piecemeal approach is taken by the CAA to approving Cost Categories. If there are multiple consultations during H7 about increasing the Portfolio with new business cases it will add time and cost to the overall investment programme and not benefit consumers.
- 3.2.23 The Asset Management & Compliance programme will look to manage the risks across the airport and sequence the works where appropriate to drive efficiency in the supply chain. This is especially important given our live operational environments and the resulting constraint on working windows to minimise impact on the operation and our passengers. Such opportunities would not be available if the portfolio was subject to regular consultation before increases were approved.
- 3.2.24 We are also currently undertaking a procurement process to appoint the supply chain for the next period, and we require certainty of the overall portfolio in order to be able to secure the appropriate resources and to scale up our own team, which was significantly downsized during covid. For this we need certainty of the pipeline of work over several years. The ability to appoint and retain the supply chain will not be as

successful if a piecemeal approach is taken by the CAA to approving Cost Categories. If there are multiple consultations during H7 about increasing the Portfolio with new business cases it will add time and cost to the overall investment programme and not benefit consumers.

- 3.2.25 In line with the new regulatory period, we are reviewing and updating our operating model to implement industry best practice programmatic processes and governance. In order to do this, it is essential we set up our client team to respond to the full portfolio as soon as practical in H7. This will ensure the full team can respond most efficiently through the period, rather than having to have a continued recruitment and training programme which would be the case if we were to incrementally increase the portfolio over time.
- 3.2.26 A particular consideration at the present time is the ever-increasing risk of skills shortage in our supply chain. If we cannot share the full scale of our portfolio now, we are at even more risk of not being able to secure resources later in H7 than may have previously been the case. The impact of this could range from incremental mobilisation of our suppliers as they secure resource, to having to look to new suppliers, which would incur longer lead times, less familiarity with operating safely in an airport environment and additional costs associated with managing and supporting new entrant suppliers.
- 3.2.27 Given the above, it is important that the CAA's Final Proposals allow for the full £4.1bn capital envelope to ensure that we can mobilise the appropriate supply chain in order to deliver efficiently and quickly for consumers.

We have developed a fully integrated H7 Capital Plan that will keep Heathrow safe and compliant, whilst enabling operating cost efficiencies and commercial revenue generation

- 3.2.28 Our H7 Capital plan is inextricably linked to our other H7 building blocks – in particular our commercial revenue and operating cost forecasts. Our £4.1bn plan includes targeted investments to further operational efficiencies over H7, as well as to protect and generate commercial revenues.
- 3.2.29 Any deviation from our plan will therefore have a direct impact on other H7 building blocks.
- 3.2.30 If the CAA does not allow an envelope of investment for H7 consistent with our plan, which it did not in the Initial Proposals, we will not be able to achieve our forecast operational efficiencies and levels of commercial revenue generation defined as part of the plan.
- 3.2.31 This would lead to a structurally less efficient Heathrow, with less ability to generate commercial revenues in and beyond H7 resulting upwards pressure on the airport charge in the future, which is not in the interest of consumers, airlines or Heathrow.
- 3.2.32 We need to work to an integrated business plan, so if the CAA chooses to remove capital investment, it should also reduce the passenger service targets and remove the commercial revenue and operating cost benefits.

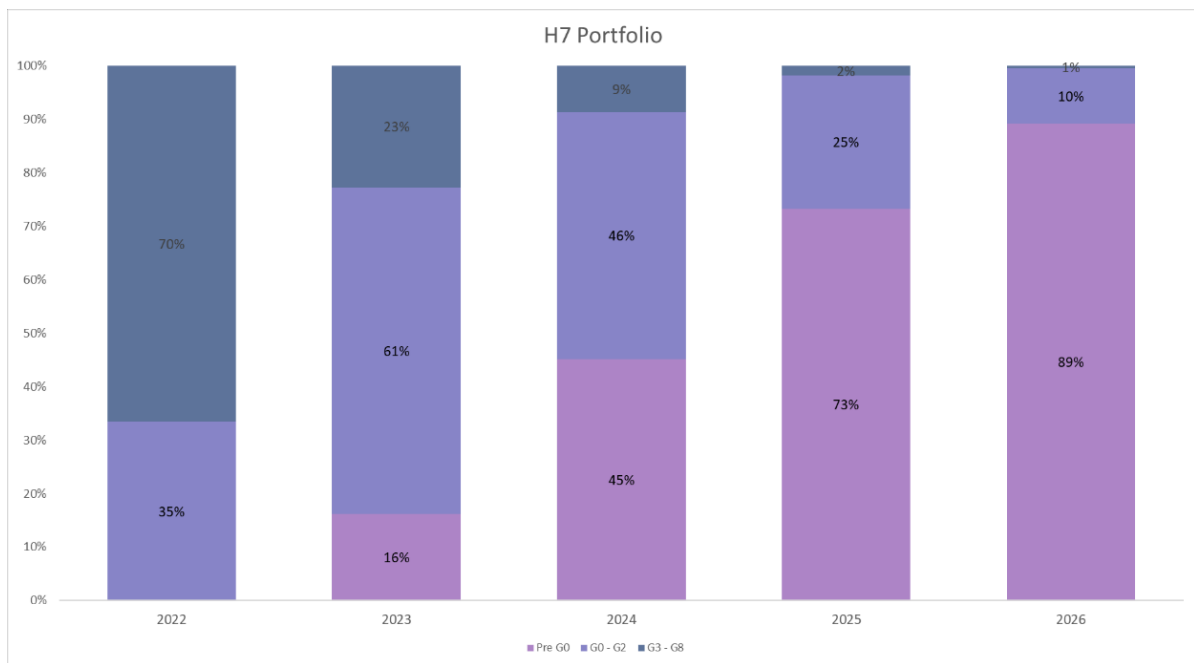
Our plan is built on extensive experience

3.2.33 We have clearly defined H7 capital programmes that are strongly aligned to delivering the best outcomes for consumers in H7. This has been achieved through internal and external stakeholder scrutiny.

3.2.34 Our plan has been developed using industry best practice cost estimation processes, as we demonstrate later on in this chapter. We take comfort that although Q6 and H7 plans have been developed under very different circumstances, the relative maturity of cost estimates at the outset of both periods is very similar. As would be expected, there is a greater degree of maturity of programmes in the earlier years of H7, as there was in Q6.

3.2.35 The below chart shows the current H7 year-by-year view of the level of maturity across the entirety of our H7 Capital Portfolio.

Figure 2: Current year by year level view of gateway status of the H7 Portfolio Programme

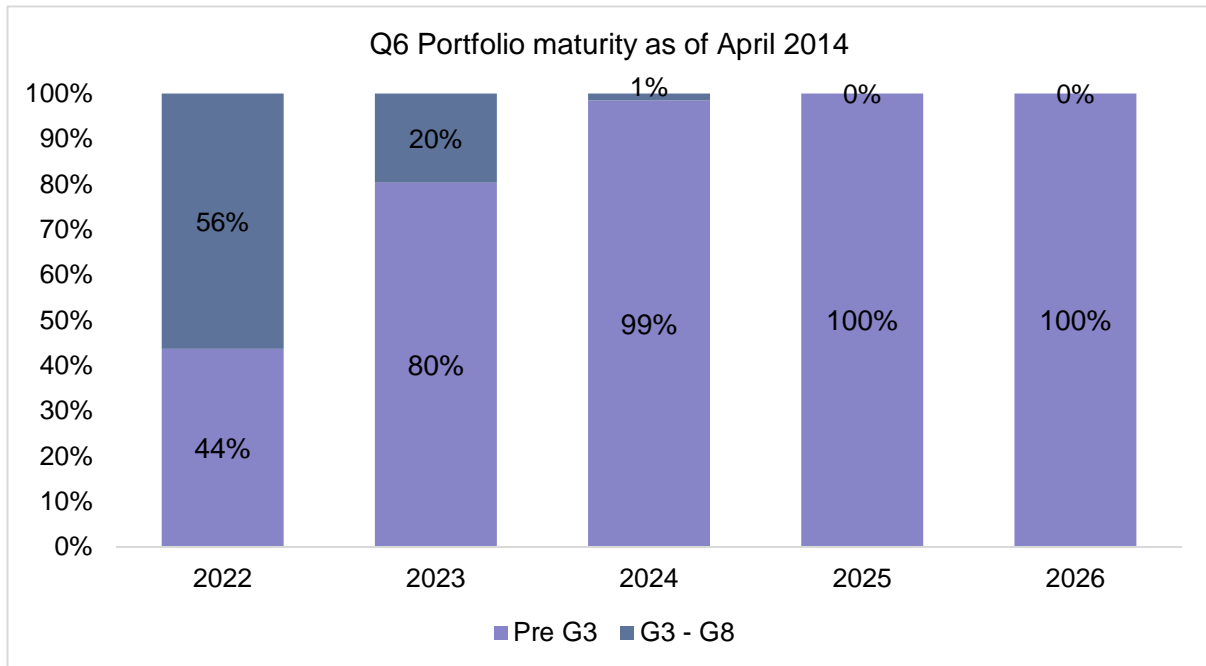


Source: Heathrow

3.2.36 We have compared this level of maturity across the H7 Capital Portfolio to the maturity of our Q6 Capital Portfolio at the start of the Q6 regulatory period. This shows that, in spite of the planning challenges faced in the lead up to H7, the degree of portfolio maturity is not dissimilar to that we had at the same point in the Q6 process.

3.2.37 We did not have a readily available categorisation of spend pre-Gateway 0 for Q6. More focus on the pre G0 elements came about during the Q6 period, following feedback from mid-Q6 work from CEPA. We have shown the starting position of Q6, as per April 14, below. There was an increased number of continuing large projects at the start of Q6, such as T2, T3IB and the main tunnel, which account for the slight increase in post G3-spend.

Figure 3: Q6 Portfolio maturity as of April 2014



Source: Heathrow

- 3.2.38 We have comprehensive and proven governance processes in place to ensure that only robust business cases are carried forward if they are in the interest of consumers and are agreed by the airline community.
- 3.2.39 We have successfully delivered investment over Q6, handling numbers of passengers and delivered improving passenger experience. With a few exceptions, projects were delivered very close to the Investment Decision budgets.
- 3.2.40 This performance has been recognised with a number awards being received – from the Association of Project Managers on T3IB, to the Terminal 3 Flight Connections Centre being selected as the Institution of Civil Engineers Project of the Year, and the Passenger Automation programme being recognised at the Future Travel Experience Awards.
- 3.2.41 Our strong performance is also reflected in our safety performance and culture, which is also industry leading:

Table 3: Safety performance vs industry benchmarks

(Number of incidents/100,000 hours worked)	Lost Time Injury Frequency Rate	Reportable Injury Frequency Rate
Heathrow (2020/2021)	0.07	0.00
HS2 – SCS JV (2020/2021)	-	0.04
Network Rail (2019/2020)	0.29	-
Crossrail (2018/2019)	0.13	0.08

Sources: Heathrow, Network Rail, TfL, The Construction Index

3.2.42 Given that Q6 capital delivery has been highly aligned to our initial forecast – with no escalations to the CAA, and very few airline rejections of projects that were subsequently stopped in the process - we are confident that we would be able to continue to deliver the same outcome for H7.

3.2.43 Furthermore, under the Development and Core framework if we were to spend less than the proposed £4.1bn over H7 because of changes in circumstances, the airport charge levied in-period would only reflect the capital actually been spent.

Our plan incorporates airline feedback

3.2.44 We continue to follow our established governance processes to share the development of business cases with the airlines community through our capital forums of Future Portfolio Group (FPG) and Capital Portfolio Board (CPB).

3.2.45 These forums review business cases from G0 to G3, and we share the published governance documentation for existing post-G0 business cases in our appendices included as part of this submission.

3.2.46 Airline representatives from these forums have engaged in a series of workshops to review the proposed Programmes and Delivery Objectives and their feedback has been represented in our revised H7 Plan.

3.2.47 During these discussions the importance of capturing and recording the assumptions and exclusions around each Cost Category became evident, these assumptions are set out in the appendices. We also reviewed where certain elements scope sat in our plan after receiving airline feedback. For example, the re-categorisation of Commercial Asset Management scope into the Asset Management and Compliance Programme was in response to specific airline feedback to group similar business case outcomes together.

Failure of the CAA to provide the right scope for capital investment in H7 risks Heathrow going backwards in time

3.2.48 £11bn worth of private investment over the last 15 years has delivered improved outcomes for stakeholders across Heathrow – including our airlines and consumers.

- 3.2.49 Neglecting to invest the appropriate level of capital in H7, as would be the case in any of the three capital estimates included in the CAA's Initial Proposals, risks seeing these gains of the last 15 years lost, and Heathrow going back in time.
- 3.2.50 This journey back in time would see passenger experience at Heathrow deteriorate, with lower residence, especially in T2 baggage, increased frequency and severity of operational disruption for our airlines and passengers, an airport that is less cost efficient and less able to generate commercial revenues – with resulting upwards pressure on the airport charge in the future.

3.3 Our approach to developing cost estimations and programme maturity

- 3.3.1 In response to the CAA's feedback, this section sets out our overall approach to cost estimations and programme maturity to help establish the rigour we apply to capital planning and illustrate that it is an ongoing process of review, challenge and refinement until completion.
- 3.3.2 The Portfolio Definition & Budget Development Process (10000-XX-CP-XXX-000561) provides the guidelines on how Heathrow develop budgets and how this is established and managed through the cost planning process. For the purposes of alignment of the Heathrow Governance Lifecycle (HGL) and the Programme Governance Framework (PGF), P1 in the PGF is the equivalent to Pre-G0 / G0 stage in the HGL.
- 3.3.3 The process aligns with the principles outlined in the Programme Control Policy, Development Lifecycle and Q6 Controls Strategy and, where appropriate, it draws on best practice principles from professional bodies including Association for Business case Management (APM) and Royal Institution of Chartered Surveyors (RICS).

Portfolio Estimating Approach – Budget Development

- 3.3.4 At the beginning of a new regulatory period a portfolio level budget envelope is established, with an outline understanding of what business cases could be delivered.
- 3.3.5 The budget, therefore, is essentially undefined but includes all components of capital expenditure including risk and leadership and logistics. Different approaches have been taken to build the budget for each cost category, dependant on the type and maturity of the category.
- 3.3.6 The portfolio continues to mature as circumstances change and knowledge increases. Given the length of time that infrastructure takes to be designed and delivered it does not always fit neatly within a five-year regulated timescale. The Budget Development & Cost Planning process is our way of illustrating how the elements mature throughout the period and it is summarised below.
- 3.3.7 Setting the Budget – Capital Envelope Agreed
- At this point there is a low level of scope definition and therefore, little understanding of what business cases could be delivered within the budget envelope. The first step in the process is therefore to establish through consultation with the Functional leaders the pipeline of business cases earmarked for the next regulatory period. In this initial consultation period, it is critically important to engage with all of the key stakeholders within the business including the airline community.

- The breakdown of budget will be very high level and generally formulated through reference to previous business cases of a similar type and nature or ring-fenced sums to cover essential strategy planning work streams.

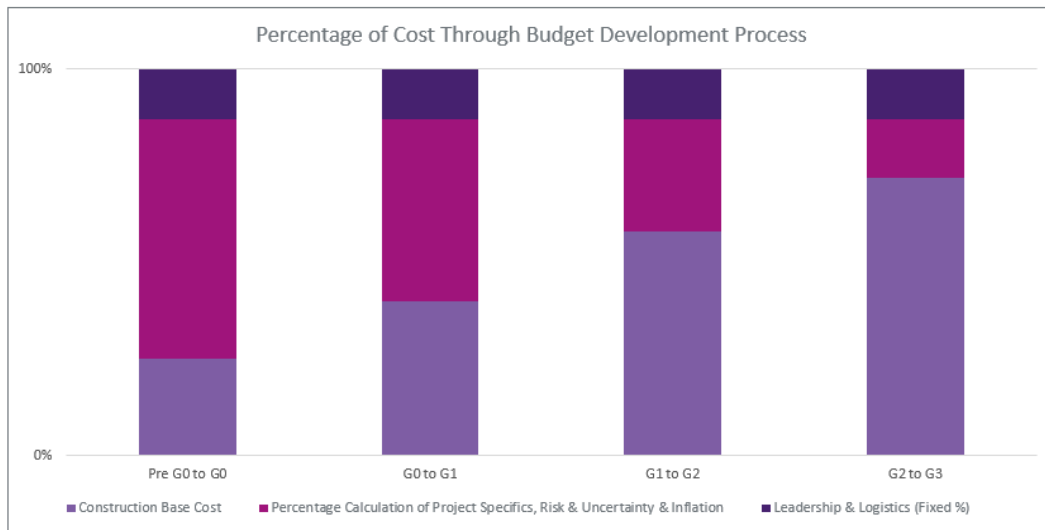
3.3.8 Pre G0 – Pipeline Established / P1

- The output from the first stage in the process is a pipeline of business cases which are unlikely to be affordable within the confines of the portfolio budget envelope but help formulate an initial view of the potential breakdown of budget into programmes based on an order of magnitude. The pipeline will be assessed to select the best performing candidate business cases.
- At this point the budget has generally been formulated through early high cost allowances or historical spend analysis.

3.3.9 G0 Business Case Endorsed in Principle / P1

- Once a business case has been endorsed in principle it is then assigned to a Project Manager who will engage the cost and commercial consultant to commence the formal cost planning process.
- The G0 to G1 development phase, builds upon the initial high level range of cost. This is the first stage at which the budget for each individual business case must be broken down into the core constituent elements, which form the basis of any cost plan:
 - Base Cost
 - Business case Specifics
 - Business case Risk & Uncertainty
 - Inflation
 - Leadership & Logistics
 - Pre-Contract Design & Investigation Works
 - At G0 'Business Case Endorsed in Principle' the majority of the budget breakdown is established by applying percentage additions, based on benchmark 'norms' to base costs, Business case specifics, risk, inflation, Leadership & Logistics and pre-contract design & investigation works.
- Establishing an initial breakdown of the budget, including the risk position generates the first baseline to track changes at a portfolio, programme and business case level through the HGL. As the scope definition begins to develop through the potential engagement of a design consultant to develop an initial concept design, the percentage additions will start to be replaced by a top down assessment of risk and business case specifics.
- The below chart shows in principle how the percentage calculation of business case risk diminishes as the business case matures into a business case approved for inclusion in 'Core' capex.

Figure 4: Percentage of cost through the budget development process



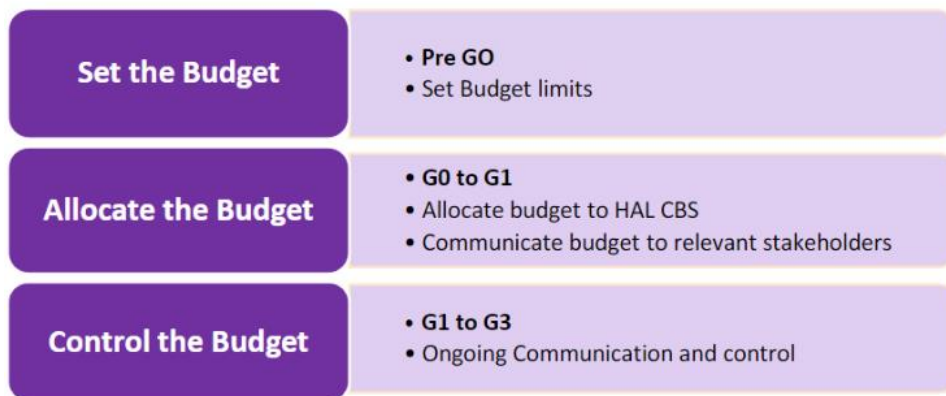
Source: Heathrow

Portfolio Estimating Approach – Cost Planning Process

3.3.10 The Cost Planning process underpins the budget development and management process, providing a control mechanism from the beginning of the HGL up to G3 when a project switches from ‘Development’ to ‘Core’ capex.

The three main steps in the cost planning process are:

Figure 5: Cost planning process



3.3.11 The Cost Plan is structured to enable comparison with the budget allowances and can be updated throughout the HGL, but a revision will typically be undertaken for each of the Gateway decision points within the HGL, up to G3.

There are different techniques that can be used to inform a cost plan - we use the following techniques at Heathrow:

- Cost Range
- Order of Magnitude
- Three Point Estimate

- Single Point Estimate

The technique applied is dependent on:

- The maturity of the scope
- The required level of accuracy (cost certainty)
- Time and resources available
- The level and quality of the available inputs

Summary of the typical levels of cost estimation at each stage in the Gateway Lifecycle

3.3.12 Consistent application of cost definitions and categories is one of the key principles in Heathrow Airport cost planning activities. A HAL specific Cost Breakdown Structure (CBS) named HAL CBS 1 has been created to serve this purpose which adopts the RICS - New Rules of Measurement (NRM1) structure which provides guidance on the quantification of building works for the purpose of preparing cost estimates and cost plans.

The cost estimates are coded as follows:

Table 4: Levels of cost estimation

Heathrow Gateway Lifecycle (HGL) Stage	Programme Governance Framework (PGF) Stage	Cost Estimate Basis	Cost Breakdown Level
Pre-G0 to G0	P1	Early stage cost advice Range of Cost Historic Cost / Cost per Functional Unit	Facility and / or Sub Facility, level 1 or 2 (i.e., Terminal / Departures Concourse)
G0 to G1			

	P1	G1 Cost Plan Three Point Estimate Top Down Estimating	HAL CBS Group Element, level 3 (i.e., Internal Finishes)
G1 to G2	P1 / P2	G2 Cost Plan Three Point Estimate Bottom Up Estimating	HAL CBS Element, level 4 (i.e., Floor Finishes)
G2 to G3	P2	G3 Cost Plan Single Point Estimate Bottom Up Estimating	HAL CBS Sub Element, level 5 (i.e., Finishes to Floor)

Source: Heathrow

3.4 Setting out SMART H7 Capital Programme Delivery Objectives

- 3.4.1 The CAA stated in its Initial Proposals that the objectives set out in the Programme Mandate One Pagers, included in our RBP Update 1, “do not meet the definition and criteria that we set out in the April 2020 Way Forward Document, including the requirement that they should be SMART”².
- 3.4.2 In its Initial Proposals, the CAA requested that we provide “fully developed delivery objectives for all the capex categories included in our plan; draft delivery obligations for any capex categories that are at a sufficiently advanced stage of development; and

² CAP2265D – Page 13, Para. 12.37

indicative dates for defining delivery objectives for categories that are currently not sufficiently developed to allow them to be defined”³.

3.4.3 We have responded the request made by the CAA on Delivery Objectives and have applied the illustrative examples of SMART Delivery Objectives provided by Arcadis⁴ to develop Delivery Objectives across our programmes.

Figure 6: SMART Delivery Objective example provided by Arcadis

Illustrative Example – A Security Programme		S	M	A	R	T
Programme						
Security Programme – Existing HAL 'Objective'	The delivery of an enhanced end to end next generation security product across Heathrow; enhancing threat detection, responding to the regulatory compliance mandate and realising more efficient and effective ways of working for frontline colleagues, whilst also delivering an improved customer experience.	Y	N	Y	N	N
Specific	Compliant , improves customer experience, asset work, threat detection	Y				
Measurable	Meeting CAA Security regulations by 2024 / Reduction or maintaining queuing times from XX minutes to YY minutes per pax / provide processing capacity of XX passengers per hour through security/ no incidents of non-compliance / Passenger experience		Y			
Achievable	Meets regulatory requirement / customer needs (Airline / passenger)			Y		
Realistic	Quantum of work suggested is deliverable within the time and HAL can programme in delivery in the time period				Y	
Time bound	Can set year on year improvement or delivery target / can deliver end of H7 target / specific regulator set timescale (June 2024 for regulatory compliance of equipment)					Y
New Delivery Objective*	To meet CAA requirements to upgrade security equipment by June 2024 to provide a compliant security function that improves the customer experience, HAL will utilise Capex over H7 to renew, replace or introduce security product that is capable of processing XX passengers per hour through security and ensure its security product offers greater threat detection and is fully regulatorily compliant with no incidents of non-compliance on an annual basis and to the end of H7.	Y	Y	Y	Y	Y

*The New Delivery Objective can incorporate more detail to be more specific or measurable so that HAL, airlines and the CAA can achieve a level of granularity that is proportionate to the requirement for Capex Incentive assessment

Source: Arcadis

3.4.4 We have now developed SMART Delivery Objectives across all of our H7 Capital Programmes, which are developed to enable the CAA and stakeholders to have a clear sight of the deliverables of our programmes at the start of H7.

3.4.5 We provide a single Delivery Objective per programme as part of the individual programme updates set out in the following sections of this chapter, with the exception of Asset Management, where a Delivery Objective is provided for each category within the programme.

³ CAP2265D – Page 13, Para. 12.39

⁴ Arcadis HAL RBP Update – Capex Plan Review, Final Report

3.5 Further Programme Update: Asset Management and Compliance

Our updated H7 Asset Management and Compliance Forecast

Table 5: H7 Asset Management and Compliance capital investment forecast

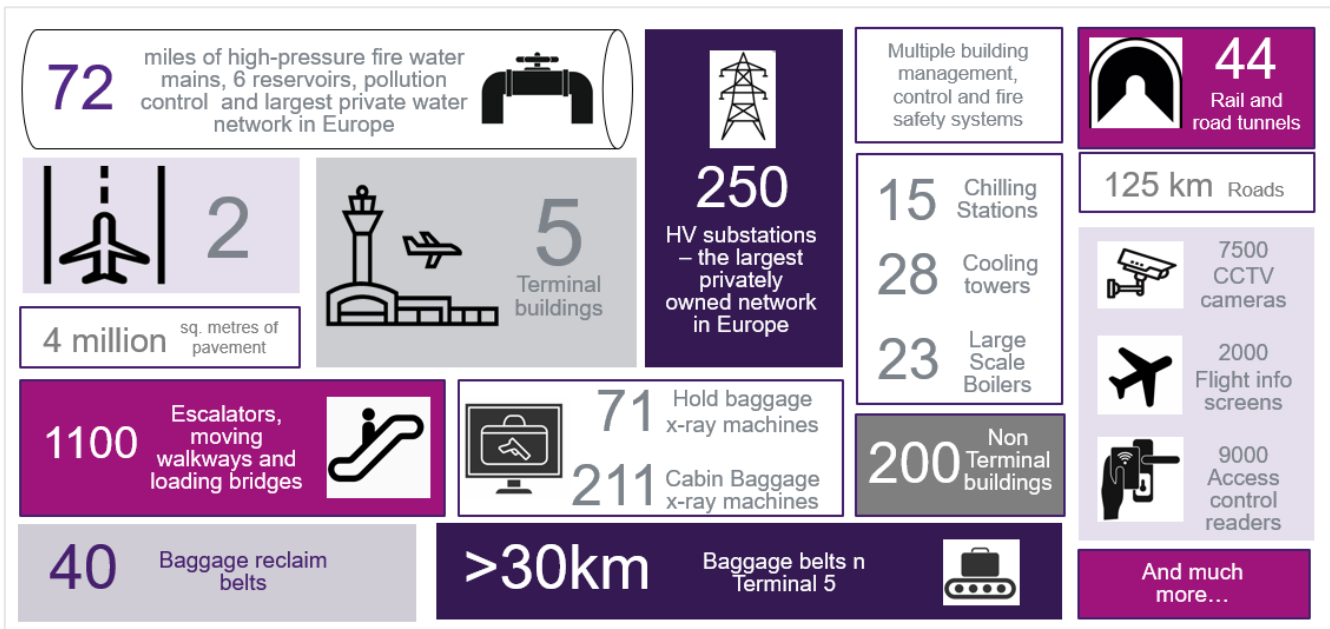
£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
Asset Management and Compliance	290	341	356	366	351	1704	+204

3.5.1 The Asset Management and Compliance programme is comprised of a number of business cases and capex categories. Detail on the maturity of business cases within the Programme can be found in Figure 13 below.

Background to asset management at Heathrow and key challenges for H7

3.5.2 Heathrow is formed of a very large number of diverse assets – from our two runways and five terminals, through to bridges, roads, electrical and technology systems, heating and ventilation, water treatment facilities, two hundred external buildings and rail infrastructure. This diversity of assets makes Heathrow unique amongst regulated businesses in the UK.

Figure 7: The diversity of Heathrow's Asset Base

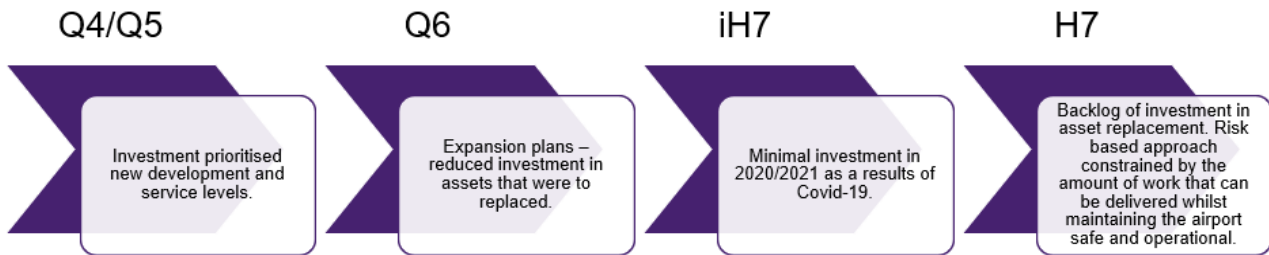


Source: Heathrow

3.5.3 Our Asset Management and Compliance Programme covers essential asset replacement across these myriad assets at the end of their life – ahead of the point at which they may cost more to maintain and before any failures which would reduce service or risk safety, physical or cyber security or a compliance breach.

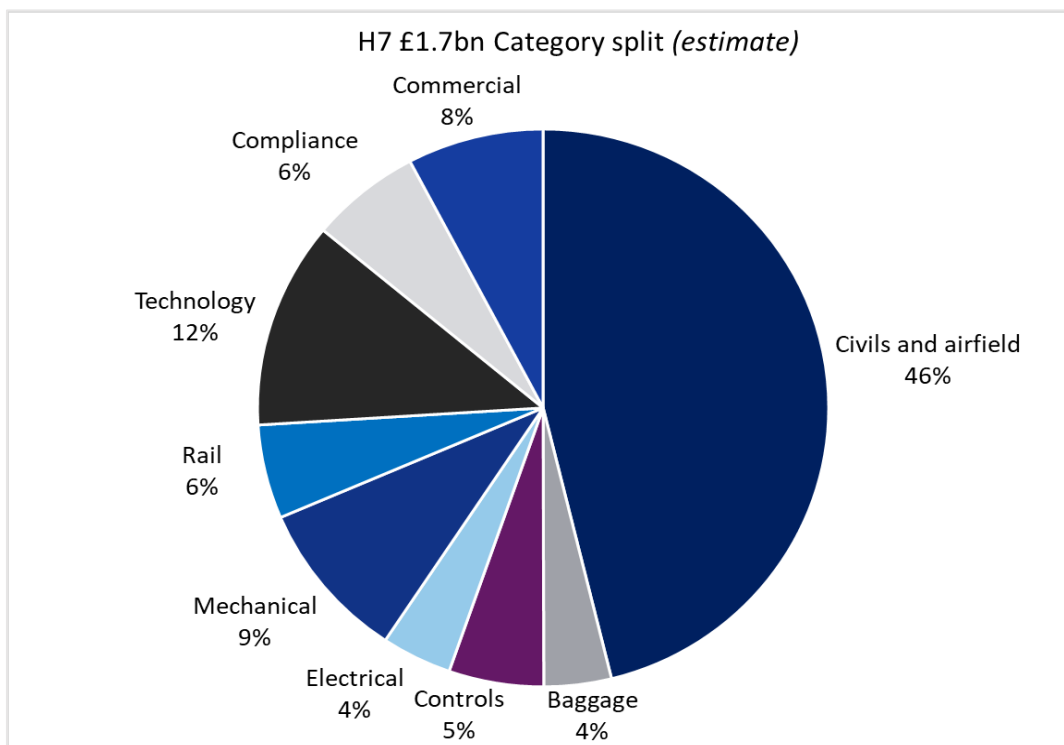
- 3.5.4 In this way, our Asset Management and Compliance Programme mitigates against any potential increase in maintenance costs, a higher likelihood of service interruption causing negative outcomes for our consumers, and higher replacement costs in the long run associated with assets failing at short notice. It is therefore central to us remaining efficient and delivering for consumers.
- 3.5.5 It is important to note that the Asset Management and Compliance Programme is perpetual in infrastructure businesses – the question is not one of whether an asset will need replacing, but rather one of when it will need replacing.
- 3.5.6 In the previous Q4 and Q5 regulatory periods, investment prioritised new development (for example Terminals 2 and 5) and service levels over investment in existing critical airport infrastructure. We are now in a position where long life infrastructure, such as utilities (electric, drainage, water systems) or civil structures (runways), now need investment in H7 in order to maintain safety and resilience (including cyber).
- 3.5.7 Furthermore, investment in 2020/2021 was reduced due to the financial impacts of Covid-19 has also had a significant impact on asset risk as we enter H7. However, where possible, we have made the most of opportunities presented by a quieter operation over the last eighteen months to carry out essential maintenance, such as runway resurfacing (B7218 Southern Runway 2020 Rehabilitation).

Figure 8: Summary view of asset management since Q4



Source: Heathrow

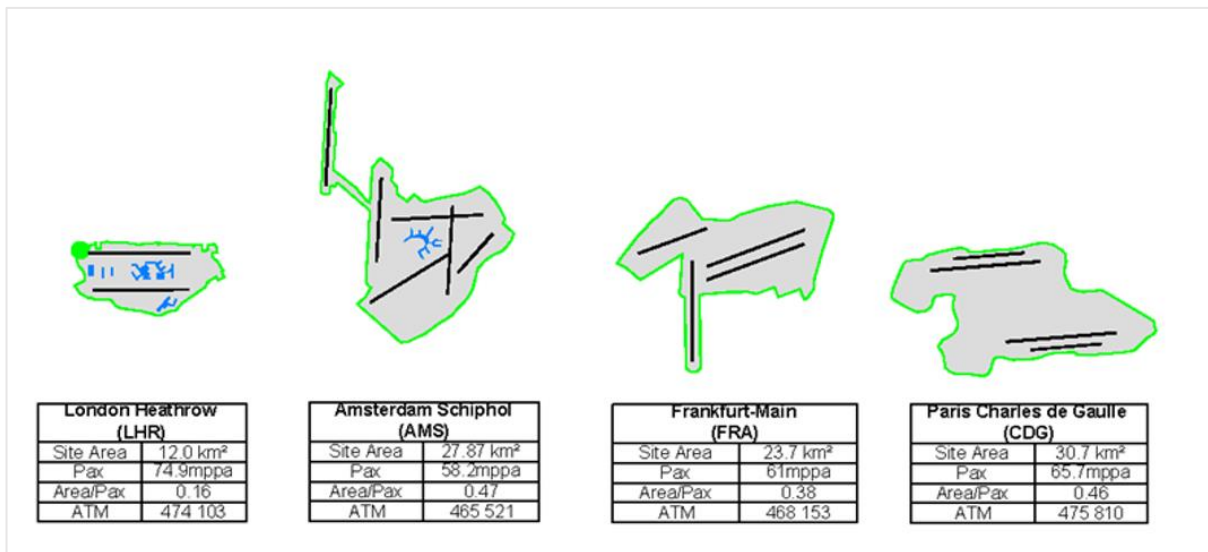
Figure 9: Total asset replacement demand for H7



Source: Heathrow

- 3.5.8 The 'newer' facilities across our estate will require attention in H7 – for example, Terminal 5 will have been operational for 18 years by end of H7. Examples of current business cases include - B6313 T5 LLC Obsolescence, T5 Building Management System, T5 Fire Detection System Renewal (part of B7227 Terminals Critical Asset Management and compliance).
- 3.5.9 We also face challenges around our older facilities, with Terminal 3 presenting a major challenge in terms of asset renewal across H7, H8 and H9 - in a similar way to the challenge that Terminal 1 presented from an asset management perspective in its final years of operation. Current examples of required asset renewal include T3 Reclaims and T3 South Wing Chillers (part of B7227 Terminals Critical Asset Management and compliance).
- 3.5.10 The intensive use of assets across Heathrow in comparison to other airports also means that many assets in these facilities are effectively even older than their absolute age in years. Without adequate expenditure, we will not be able to maintain levels of asset availability and will start to fall behind our competitor airports and deliver worse outcomes for consumers.
- 3.5.11 The below analysis of throughput at Heathrow compared to other major European hub airports dates back to work carried out as part of the Expansion Programme, but it visually demonstrates the efficiency with which the Heathrow estate is utilised in comparison to other European hub airports.

Figure 10: Comparison of ATMs, annual passengers and site area of major European hub airports



Source: Heathrow

- 3.5.12 This intensity of operation at Heathrow impacts all areas of asset management, across both the daily usage and performance requirements, and the ability to replace and re-life facilities in a manner that does not disrupt the passenger journey.
- 3.5.13 Unlike in previous regulatory periods, and directly as a result of the financial pressures resulting from the Covid-19 pandemic, there is no allowance for increasing service levels, resilience or capacity whilst replacing assets in H7. Rather, our focus will be entirely on maintaining the same resilience levels as Q6 and ensuring performance against OBR measures is maintained through the allowance of the Enhanced Service Operating Costs overlay, helping to ensure there isn't any deterioration of minimum service levels. It is important to note that to meet demand and ensure resilience and performance at all times, assets are required to be maintained to a level that ensures peak availability
- 3.5.14 This is consistent in our RBP and RBP Update 1 submissions, where we set out that our Asset Management Plan represents the minimum amount of investment required to carry out essential asset management in H7 to keep colleagues and passengers safe and secure and ensure compliance to regulatory standards.
- 3.5.15 The total capital demand for asset replacement over H7 exceeds that which we are able to deliver in the period. For this reason, we have taken a risk-based approach to asset management over the H7 period and supplemented it with an Enhanced Service Operating Cost Overlay to maintain Q6 service levels, which was supported in the Arcadis report¹, used by the CAA to inform its H7 service quality targets. We provide further detail later in this section, and in the H7 Management and Compliance Appendix included as part of this submission.
- 3.5.16 Whilst we will always ensure safety of our assets, failure to respond to the challenges we face in a proportionate and timely manner will negatively impact our resilience, as well as driving less efficient capital investment and increased operational inefficiencies.

¹ Arcadis report, [https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20\(CAP2274A\).pdf](https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20(CAP2274A).pdf),

We explore these considerations in more detail later in the H7 Asset Management and Compliance Appendix included as part of this submission.

3.5.17 Our Asset Management and Compliance Programme vision for H7 is to:

“Maintain physical and technological assets to keep colleagues and consumers safe and secure critical functions operational and ensure compliance to regulatory standards.”

3.5.18 Our Asset Management Strategic Objectives for H7 are as follows:

- Safety, security and compliance
- Operational continuity
- Maintaining resilience
- Meeting scheduled demand
- Predictable and efficient operating costs
- Cost effective asset renewal

Feedback provided by the CAA regarding our H7 Asset Management and Compliance Programme in its Initial Proposals

3.5.19 The CAA’s Initial Proposals highlighted concerns around our H7 Asset Management and Compliance Programme submitted as part of our June 2021 RBP Update, in particular referencing concerns around estimates being inconsistent with the rest of the plan and a lack of clear integration with the rest of the capital plan.

3.5.20 We have undertaken additional work since the publication of the CAA’s Initial Proposals in order to respond to feedback and provide the CAA with greater clarity around our H7 Asset Management and Compliance Programme. This includes detail around:

- our asset management categories
- our asset management Delivery Objectives (with one for each of the proposed categories)
- our spend forecasts across each of the categories

3.5.21 Further detail around the Programme – including our approach to cost estimation, building the asset management plan, risk-based prioritisation and more detail around current projects – is also provided in the H7 Asset Management and Compliance Appendix included as part of this submission.

Categorising our H7 Asset Management Plan

3.5.22 As part of its Initial Proposals, the CAA commissioned Arcadis to review the capital investment categories we proposed in our RBP and RBP Update 1, including our split of categories in the Asset Management and Compliance Programme.

3.5.23 In our RBP and RBP Update 1, we proposed the following split of the Asset Management and Compliance Programme categories:

- Asset Replacement – Asset Maintenance
- Asset Replacement – Generational Renewals (T2 Baggage)

3.5.24 The CAA stated in its Initial Proposals that, *“due to the variability of the ‘delivery risk’ for business cases included within the Asset Management ... categories, it is necessary to split these programmes into further capex categories that can better reflect our definition of a capex category”².*

3.5.25 Figure 4 below sets out the CAA’s proposed split of Asset Management and Compliance categories, which reflect the key findings from the Arcadis review. It also sets out our revised proposal for the split of Asset Management and Compliance categories in response to the CAA’s proposal, which is more closely aligned with our asset management structure.

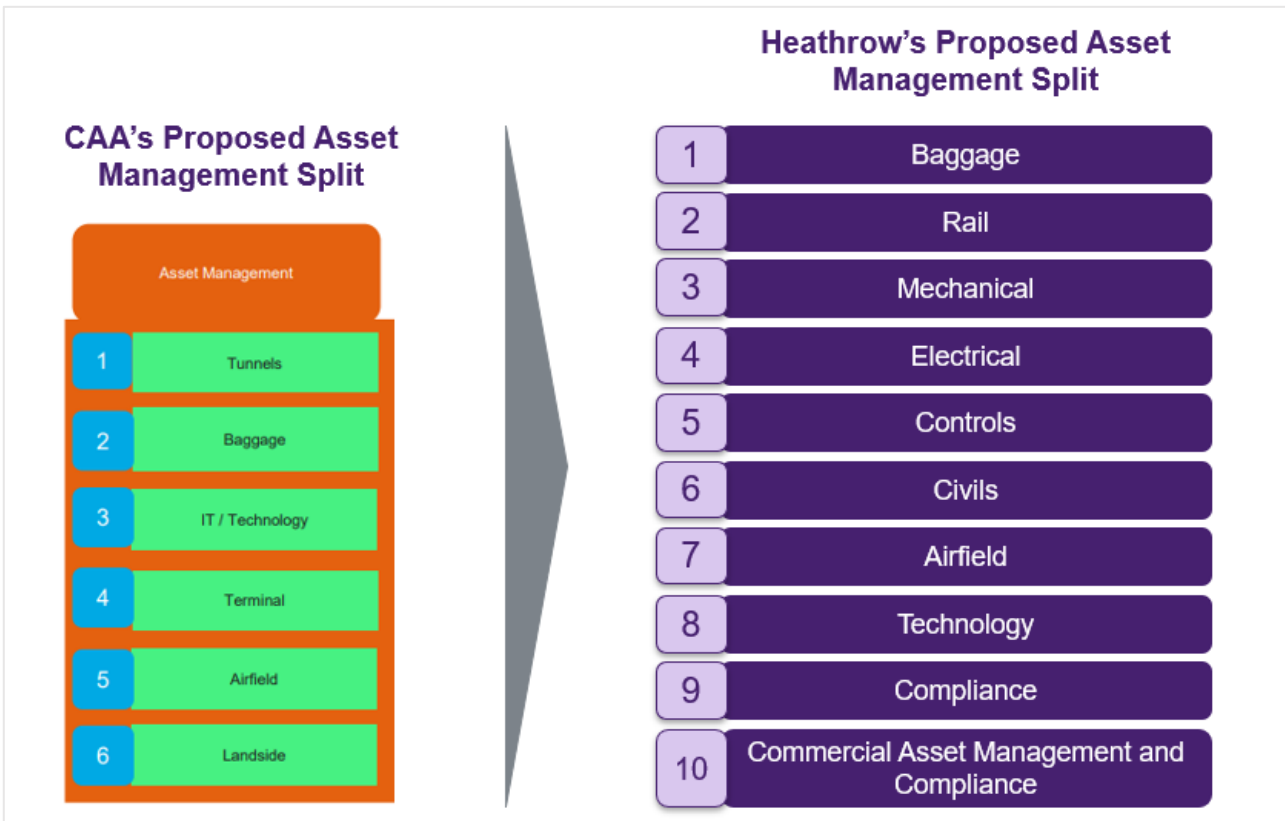
3.5.26 We believe the location-based split of the Asset Management programme proposed by the CAA is unworkable due to the need to articulate a single Delivery Objective for each cost category. For example, if the only thing that unites the projects in a cost category is that they are physically located close together (e.g. “Terminals”), it would not be possible to develop a single delivery objective articulating the scope, outcomes or benefits of the cost category, as these would be wide-ranging.

3.5.27 We also disagree with the CAA's use of “Tunnels” as a cost category on the basis that, aside from the 2 projects currently underway which are both already post G3 and therefore not considered within this new H7 framework, we are proposing no major investment in our tunnels estate over H7 and therefore this cost category would contain negligible investment within the context of the £1.7bn Asset Management programme.

3.5.28 We have used our proposed split of Asset Management and Compliance categories to develop the Delivery Objectives set out in the next section, as well as to present our category cost forecasts.

² CAP2265D – Page 11, Para. 12.27

Figure 11: CAA and Heathrow proposed Asset Management Split comparison



Source: Heathrow

Our proposed H7 Delivery Objectives for Asset Management and Compliance

3.5.29 Since RBP Update 1, and responding to CAA feedback, we have developed the following SMART Delivery Objectives across the categories of our Asset Management and Compliance Programme. In addition to our proposed Delivery Objectives, we have also highlighted where each of our Asset Management Categories contributes to the delivery of OBR measures and so where the delivery of consumer outcomes is captured.

Table 6: Proposed Delivery Objectives for Asset Management and Compliance

Asset Management and Compliance Delivery Objectives				
Baggage	Heathrow will invest £65m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.			
	<p>The scope includes Baggage systems – departures, arrivals, transfers; Inter terminal transfers; Threat Detection for hold baggage; Stillage.</p> <p>This contributes to the following OBR measures:</p> <table border="1" style="width: 100%;"> <thead> <tr> <th>OBR Measure</th> <th>Baggage</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> </tbody> </table>	OBR Measure	Baggage	
OBR Measure	Baggage			

	Cleanliness	✓																				
	Availability of check-in infrastructure	✓																				
	Availability of arrival baggage carousels	✓																				
	Timely delivery from departures baggage system	✓																				
	Baggage Misconnect Rates	✓																				
	Overall satisfaction	✓																				
	Customer effort (ease)	✓																				
	Airport that meets my needs	✓																				
	Feel safe & secure	✓																				
	Departures flight punctuality	✓																				
	Passenger injuries	✓																				
Rail	<p>Heathrow will invest £93m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes track, signalling, telecoms, stations, tunnel systems and overhead line equipment, TTS.</p> <p>This contributes to the following OBR measures:</p>																					
	<table border="1"> <thead> <tr> <th>OBR Measure</th> <th>Rail</th> </tr> </thead> <tbody> <tr> <td>Wayfinding</td> <td>✓</td> </tr> <tr> <td>Availability of T5 TTS</td> <td>✓</td> </tr> <tr> <td>Overall satisfaction</td> <td>✓</td> </tr> <tr> <td>Customer effort (ease)</td> <td>✓</td> </tr> <tr> <td>Enjoy my time at the airport</td> <td>✓</td> </tr> <tr> <td>Airport that meets my needs</td> <td>✓</td> </tr> <tr> <td>Feel safe & secure</td> <td>✓</td> </tr> <tr> <td>Ease of access to the airport</td> <td>✓</td> </tr> <tr> <td>Departures flight punctuality</td> <td>✓</td> </tr> </tbody> </table>		OBR Measure	Rail	Wayfinding	✓	Availability of T5 TTS	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Ease of access to the airport	✓	Departures flight punctuality	✓
	OBR Measure	Rail																				
	Wayfinding	✓																				
	Availability of T5 TTS	✓																				
	Overall satisfaction	✓																				
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	Enjoy my time at the airport	✓																				
	Airport that meets my needs	✓																				
	Feel safe & secure	✓																				
	Ease of access to the airport	✓																				
Departures flight punctuality	✓																					

	% of UK population within 3 hrs	✓																																				
	Passenger injuries	✓																																				
Mechanical	<p>Heathrow will invest £158m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes lifts, escalators and passenger conveyors, airbridges, heating ventilation and air conditioning, Pre Conditioned Air , potable water, fire main, foul network, surface water drainage and pollution control.</p> <p>This contributes to the following OBR measures:</p>																																					
	<table border="1"> <thead> <tr> <th>OBR Measure</th> <th>Mech</th> </tr> </thead> <tbody> <tr> <td>Cleanliness</td> <td>✓</td> </tr> <tr> <td>Control post vehicle queue time</td> <td>✓</td> </tr> <tr> <td>Availability of lifts, escalators and travelators</td> <td>✓</td> </tr> <tr> <td>Availability of stands</td> <td>✓</td> </tr> <tr> <td>Pier served stand usage</td> <td>✓</td> </tr> <tr> <td>Runway operational resilience</td> <td>✓</td> </tr> <tr> <td>Hygiene safety testing</td> <td>✓</td> </tr> <tr> <td>Overall satisfaction</td> <td>✓</td> </tr> <tr> <td>Customer effort (ease)</td> <td>✓</td> </tr> <tr> <td>Enjoy my time at the airport</td> <td>✓</td> </tr> <tr> <td>Airport that meets my needs</td> <td>✓</td> </tr> <tr> <td>Feel safe & secure</td> <td>✓</td> </tr> <tr> <td>Ease of access to the airport</td> <td>✓</td> </tr> <tr> <td>Passengers with reduce mobility - overall satisfaction</td> <td>✓</td> </tr> <tr> <td>Departures flight punctuality</td> <td>✓</td> </tr> <tr> <td>Airport Arrivals management</td> <td>✓</td> </tr> <tr> <td>Passenger injuries</td> <td>✓</td> </tr> </tbody> </table>		OBR Measure	Mech	Cleanliness	✓	Control post vehicle queue time	✓	Availability of lifts, escalators and travelators	✓	Availability of stands	✓	Pier served stand usage	✓	Runway operational resilience	✓	Hygiene safety testing	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Ease of access to the airport	✓	Passengers with reduce mobility - overall satisfaction	✓	Departures flight punctuality	✓	Airport Arrivals management	✓	Passenger injuries	✓
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Electrical	<p>Heathrow will invest £68m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes High Voltage and Low Voltage networks, airfield ground lighting, airfield standby generation; emergency escape lighting and lighting.</p> <p>This contributes to the following OBR measures:</p>	
	OBR Measure	Elec
	Cleanliness	✓
	Security queue time - central search	✓
	Security queue time - transfer search	✓
	Security queue time - staff search	✓
	Control post vehicle queue time	✓
	Availability of lifts, escalators and travelators	✓
	Availability of check-in infrastructure	✓
	Availability of arrival baggage carousels	✓
	Availability of T5 TTS	✓
	Availability of stands	✓
	Pier served stand usage	✓
	Runway operational resilience	✓
	Hygiene safety testing	✓
	Timely delivery from departures baggage system	✓
	Overall satisfaction	✓
	Customer effort (ease)	✓
	Enjoy my time at the airport	✓
	Airport that meets my needs	✓
Feel safe & secure	✓	
Ease of access to the airport	✓	

	passengers with reduce mobility - overall satisfaction	✓																														
	Departures flight punctuality	✓																														
	Airport Arrivals management	✓																														
	passenger injuries	✓																														
	Immigration queue times	✓																														
Controls	<p>Heathrow will invest £92m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes door access controls, fire detection and alarms, security threat detection, nav aids, HART (Heathrow Airport Remote Telemetry) and BMS (Building Management System).</p> <p>This contributes to the following OBR measures:</p>																															
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	Departures flight punctuality	✓																									
	Airport Arrivals management	✓																									
	Passenger injuries	✓																									
Civils	<p>Heathrow will invest £331m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes:</p> <p>Road network - all carriageways, pedestrian walkways, traffic signals, road signs, lighting, safety measures and protective barriers.</p> <p>Tunnels, subways and bridges for the flow of road and rail transport vehicles, pedestrians, baggage, and building services beneath airfield surfaces and terminal buildings. Airside boundary fence.</p> <p>The structure, fabric, décor and furniture of all terminals and buildings.</p> <p>Passenger and colleague car park facilities, including multi-story terminal car parks.</p> <p>This contributes to the following OBR measures:</p> <table border="1" data-bbox="467 1176 1409 2031"> <thead> <tr> <th data-bbox="467 1176 1278 1247">OBR Measure</th> <th data-bbox="1286 1176 1430 1247">Civils</th> </tr> </thead> <tbody> <tr> <td data-bbox="467 1247 1278 1319">Cleanliness</td> <td data-bbox="1286 1247 1430 1319">✓</td> </tr> <tr> <td data-bbox="467 1319 1278 1391">Wayfinding</td> <td data-bbox="1286 1319 1430 1391">✓</td> </tr> <tr> <td data-bbox="467 1391 1278 1462">Helpfulness/attitude of security staff</td> <td data-bbox="1286 1391 1430 1462">✓</td> </tr> <tr> <td data-bbox="467 1462 1278 1534">Control post vehicle queue time</td> <td data-bbox="1286 1462 1430 1534">✓</td> </tr> <tr> <td data-bbox="467 1534 1278 1606">Timely delivery from departures baggage system</td> <td data-bbox="1286 1534 1430 1606">✓</td> </tr> <tr> <td data-bbox="467 1606 1278 1677">Overall satisfaction</td> <td data-bbox="1286 1606 1430 1677">✓</td> </tr> <tr> <td data-bbox="467 1677 1278 1749">Customer effort (ease)</td> <td data-bbox="1286 1677 1430 1749">✓</td> </tr> <tr> <td data-bbox="467 1749 1278 1821">Enjoy my time at the airport</td> <td data-bbox="1286 1749 1430 1821">✓</td> </tr> <tr> <td data-bbox="467 1821 1278 1892">Airport that meets my needs</td> <td data-bbox="1286 1821 1430 1892">✓</td> </tr> <tr> <td data-bbox="467 1892 1278 1964">Feel safe & secure</td> <td data-bbox="1286 1892 1430 1964">✓</td> </tr> <tr> <td data-bbox="467 1964 1278 2031">Ease of access to the airport</td> <td data-bbox="1286 1964 1430 2031">✓</td> </tr> </tbody> </table>			OBR Measure	Civils	Cleanliness	✓	Wayfinding	✓	Helpfulness/attitude of security staff	✓	Control post vehicle queue time	✓	Timely delivery from departures baggage system	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Ease of access to the airport	✓
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	Departures flight punctuality	✓																											
	Airport Arrivals management	✓																											
	% of UK population within 3 hrs	✓																											
	Passenger injuries	✓																											
	Immigration queue times	✓																											
Airfield	<p>Heathrow will invest £455m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes airfield pavements, including all manoeuvring areas, stands, taxiways, runways aprons and signage.</p> <p>This contributes to the following OBR measures:</p>																												
	<table border="1"> <thead> <tr> <th data-bbox="467 958 1278 1025">OBR Measure</th> <th data-bbox="1286 958 1409 1025">Airfield</th> </tr> </thead> <tbody> <tr> <td data-bbox="467 1025 1278 1093">Availability of stands</td> <td data-bbox="1286 1025 1409 1093">✓</td> </tr> <tr> <td data-bbox="467 1093 1278 1160">Pier served stand usage</td> <td data-bbox="1286 1093 1409 1160">✓</td> </tr> <tr> <td data-bbox="467 1160 1278 1227">Runway operational resilience</td> <td data-bbox="1286 1160 1409 1227">✓</td> </tr> <tr> <td data-bbox="467 1227 1278 1294">Hygiene safety testing</td> <td data-bbox="1286 1227 1409 1294">✓</td> </tr> <tr> <td data-bbox="467 1294 1278 1361">Overall satisfaction</td> <td data-bbox="1286 1294 1409 1361">✓</td> </tr> <tr> <td data-bbox="467 1361 1278 1429">Customer effort (ease)</td> <td data-bbox="1286 1361 1409 1429">✓</td> </tr> <tr> <td data-bbox="467 1429 1278 1496">Enjoy my time at the airport</td> <td data-bbox="1286 1429 1409 1496">✓</td> </tr> <tr> <td data-bbox="467 1496 1278 1563">Airport that meets my needs</td> <td data-bbox="1286 1496 1409 1563">✓</td> </tr> <tr> <td data-bbox="467 1563 1278 1630">Feel safe & secure</td> <td data-bbox="1286 1563 1409 1630">✓</td> </tr> <tr> <td data-bbox="467 1630 1278 1697">Departures flight punctuality</td> <td data-bbox="1286 1630 1409 1697">✓</td> </tr> <tr> <td data-bbox="467 1697 1278 1765">Airport Arrivals management</td> <td data-bbox="1286 1697 1409 1765">✓</td> </tr> <tr> <td data-bbox="467 1765 1278 1832">Passenger injuries</td> <td data-bbox="1286 1765 1409 1832">✓</td> </tr> </tbody> </table>			OBR Measure	Airfield	Availability of stands	✓	Pier served stand usage	✓	Runway operational resilience	✓	Hygiene safety testing	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Departures flight punctuality	✓	Airport Arrivals management	✓	Passenger injuries	✓
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Passenger injuries	✓																												

IT & Cyber	<ul style="list-style-type: none"> • Heathrow will invest £204m (2018p) to: <ul style="list-style-type: none"> ○ Continue Cyber+ to meet cyber compliance as defined by regulatory regimes and sustain our cyber posture. ○ Replace, consolidate, and upgrade the IT asset footprint and deliver rolling maintenance schedules and service roadmaps. ○ Remove legacy technology components with known cyber vulnerabilities and ensure assets remain supportable, secure, and fit for purpose whilst delivering efficient total cost of ownership. <p>This contributes to the following OBR measures:</p>																																		
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #4b4b8b; color: white;"> <th style="text-align: center;">OBR Measure</th> <th style="text-align: center;">Tech</th> </tr> </thead> <tbody> <tr><td>Wayfinding</td><td style="text-align: center;">✓</td></tr> <tr><td>Wi-Fi performance</td><td style="text-align: center;">✓</td></tr> <tr><td>Security queue time - central search</td><td style="text-align: center;">✓</td></tr> <tr><td>Security queue time - transfer search</td><td style="text-align: center;">✓</td></tr> <tr><td>Security queue time - staff search</td><td style="text-align: center;">✓</td></tr> <tr><td>Control post vehicle queue time</td><td style="text-align: center;">✓</td></tr> <tr><td>Overall satisfaction</td><td style="text-align: center;">✓</td></tr> <tr><td>Customer effort (ease)</td><td style="text-align: center;">✓</td></tr> <tr><td>Enjoy my time at the airport</td><td style="text-align: center;">✓</td></tr> <tr><td>Airport that meets my needs</td><td style="text-align: center;">✓</td></tr> <tr><td>Feel safe & secure</td><td style="text-align: center;">✓</td></tr> <tr><td>Ease of access to the airport</td><td style="text-align: center;">✓</td></tr> <tr><td>passengers with reduce mobility - overall satisfaction</td><td style="text-align: center;">✓</td></tr> <tr><td>Departures flight punctuality</td><td style="text-align: center;">✓</td></tr> <tr><td>Airport Arrivals management</td><td style="text-align: center;">✓</td></tr> <tr><td>Passenger injuries</td><td style="text-align: center;">✓</td></tr> </tbody> </table>	OBR Measure	Tech	Wayfinding	✓	Wi-Fi performance	✓	Security queue time - central search	✓	Security queue time - transfer search	✓	Security queue time - staff search	✓	Control post vehicle queue time	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Ease of access to the airport	✓	passengers with reduce mobility - overall satisfaction	✓	Departures flight punctuality	✓	Airport Arrivals management	✓	Passenger injuries	✓
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Departures flight punctuality	✓																																		
Airport Arrivals management	✓																																		
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<p>Compliance</p>	<p>Heathrow will invest £107m (2018p) to replace life-expired assets to keep colleagues and consumers safe and secure. The investment is required to deliver operational continuity, predictable operating costs, and availability of assets.</p> <p>The scope includes responding to new or enhanced compliance requirements which are not yet explicitly foreseen, such as security equipment upgrades and environmental standards.</p> <p>This contributes to the following OBR measures:</p> <table border="1" data-bbox="467 555 1445 1055"> <thead> <tr> <th>OBR Measure</th> <th>Compliance</th> </tr> </thead> <tbody> <tr> <td>Overall satisfaction</td> <td>✓</td> </tr> <tr> <td>Customer effort (ease)</td> <td>✓</td> </tr> <tr> <td>Enjoy my time at the airport</td> <td>✓</td> </tr> <tr> <td>Airport that meets my needs</td> <td>✓</td> </tr> <tr> <td>Feel safe & secure</td> <td>✓</td> </tr> <tr> <td>Passenger injuries</td> <td>✓</td> </tr> </tbody> </table>	OBR Measure	Compliance	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓	Airport that meets my needs	✓	Feel safe & secure	✓	Passenger injuries	✓
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Customer effort (ease)	✓														
Enjoy my time at the airport	✓														
Airport that meets my needs	✓														
Feel safe & secure	✓														
Passenger injuries	✓														
<p>Commercial Asset Management and Compliance</p>	<p>Heathrow will invest £132m (2018p) to replace life-expired commercial assets to keep colleagues and consumers safe and secure. This investment is required to keep commercial facilities operational and therefore maintain existing revenue sources.</p> <p>The scope includes:</p> <ul style="list-style-type: none"> - Retail and media asset replacement including shell and core works - Refurbishment of MSCP4 within the existing footprint - Essential property works including Heathrow Consolidation Centre decant, BA crew car park refurbishment, Energy Performance Certificate compliance and Common area refurbishment <p>This contributes to the following OBR measures:</p> <table border="1" data-bbox="467 1621 1445 1973"> <thead> <tr> <th>OBR Measure</th> <th>Commercial</th> </tr> </thead> <tbody> <tr> <td>Cleanliness</td> <td>✓</td> </tr> <tr> <td>Overall satisfaction</td> <td>✓</td> </tr> <tr> <td>Customer effort (ease)</td> <td>✓</td> </tr> <tr> <td>Enjoy my time at the airport</td> <td>✓</td> </tr> </tbody> </table>	OBR Measure	Commercial	Cleanliness	✓	Overall satisfaction	✓	Customer effort (ease)	✓	Enjoy my time at the airport	✓				
OBR Measure	Commercial														
Cleanliness	✓														
Overall satisfaction	✓														
Customer effort (ease)	✓														
Enjoy my time at the airport	✓														

	Airport that meets my needs	✓
	Ease of access to the airport	✓

Our approach to building our H7 Asset Management Plan

3.5.30 Our H7 Asset Management Plan has been robustly developed through a triangulated analysis of three independent variables:

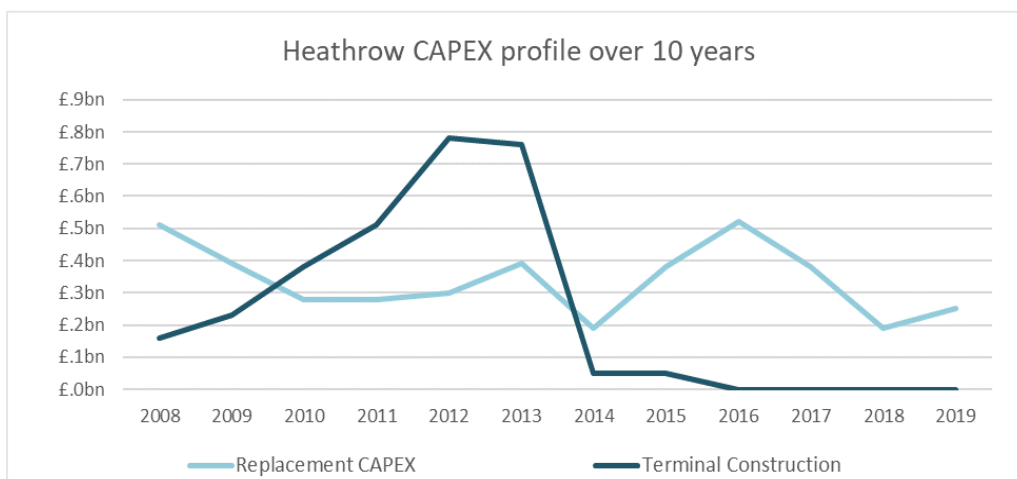
- Historical analysis of Heathrow’s asset replacement capital investment
- Benchmarked analysis of comparable organisations
- Modelled forecast of future asset replacement requirement

3.5.31 In addition, our asset management processes used to inform our approach to our H7 Asset Management Plan are accredited to ISO055001 Standard.

3.5.32 **The historical analysis** of Heathrow’s asset replacement compares different types of capital investment (replacement and terminal construction) with depreciation over eleven years to extrapolate where the organisation is in terms of its investment cycle and how much has been invested to maintain and grow the asset base.

3.5.33 New terminal construction (Terminal 5 and Terminal 2) between 2005 and 2015 avoided some asset replacement capital investment (for example in the previous Terminal 2 infrastructure and Terminal 3 baggage systems). New terminal construction in this period provided the benefits of extra capacity and improved service and efficiency, but also increased the size and complexity of the asset base.

Figure 12: Heathrow's 10 year capex profile



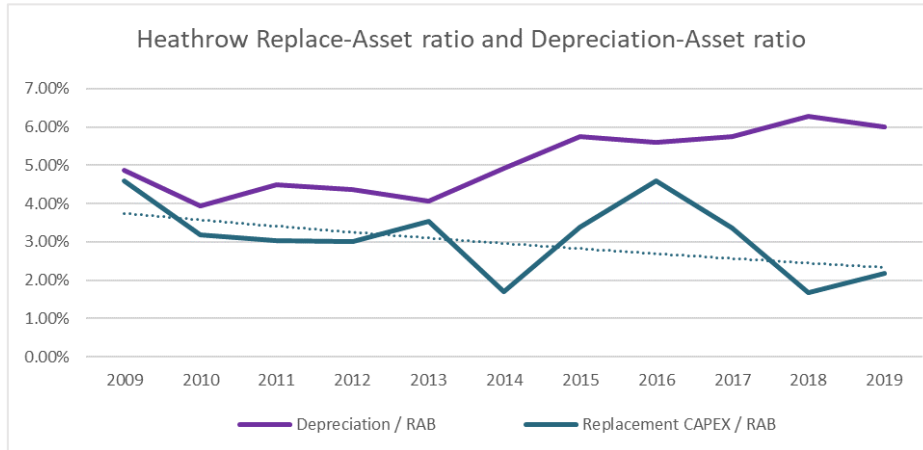
Source: Expenditure Benchmarking Report, Amey Consulting (July 2020)

3.5.34 The RAB grew consistently year-on-year until 2017. The ratio of depreciation over the RAB sat between 4% and 5% from 2009 through to 2013; it remained just above 6%

from 2015 until peaking at 6.7% in 2019. In the same period, the asset replacement ratio averaged 3.5% over the first five years, and then fell to 2% in 2019.

3.5.35 There has therefore been a declining trend in asset replacement over the period, despite an increasing asset base.

Figure 13: Heathrow's replacement capex and depreciation RAB ratios



Source: Expenditure Benchmarking Report, Amey Consulting (July 2020)

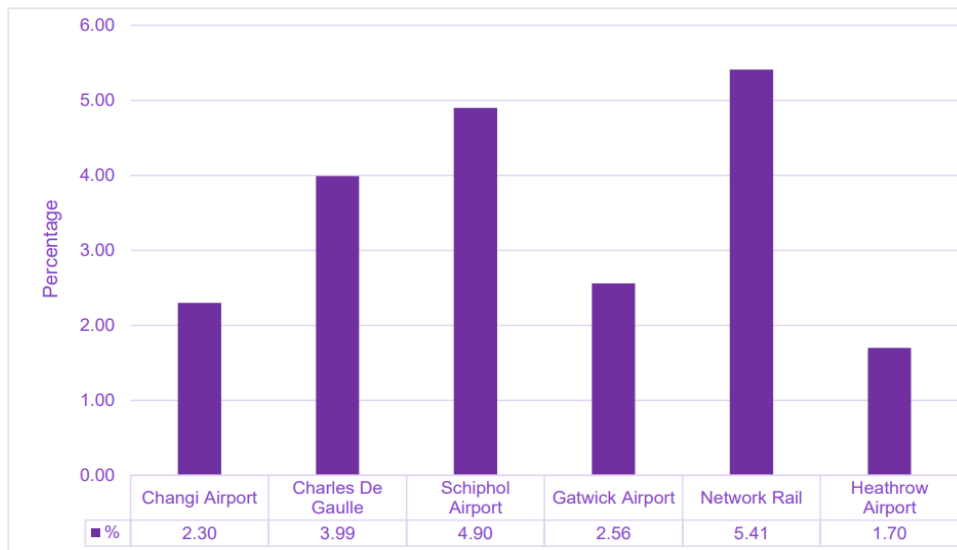
3.5.36 **The benchmarked analysis of comparable organisations** took the ten year average of replacement capital investment compared to asset base value, based on publicly available information. Our historical spend represented on average 1.7% to 2% of the RAB which we have benchmarked against the organisations listed below:

Table 7: Benchmark airports

Organisation	Sector	Geography	Regulated	Asset Base value (m)
Heathrow	Aviation	UK	✓	£ 11,561
Changi	Aviation	Asia	✓	\$ 6,254
Paris CdG	Aviation	EU	✓	€ 7,930
Schiphol	Aviation	EU	✓	€ 3,122
Gatwick	Aviation	UK	✓	£ 2,397
Network Rail	Rail	UK	✓	£ 71,147

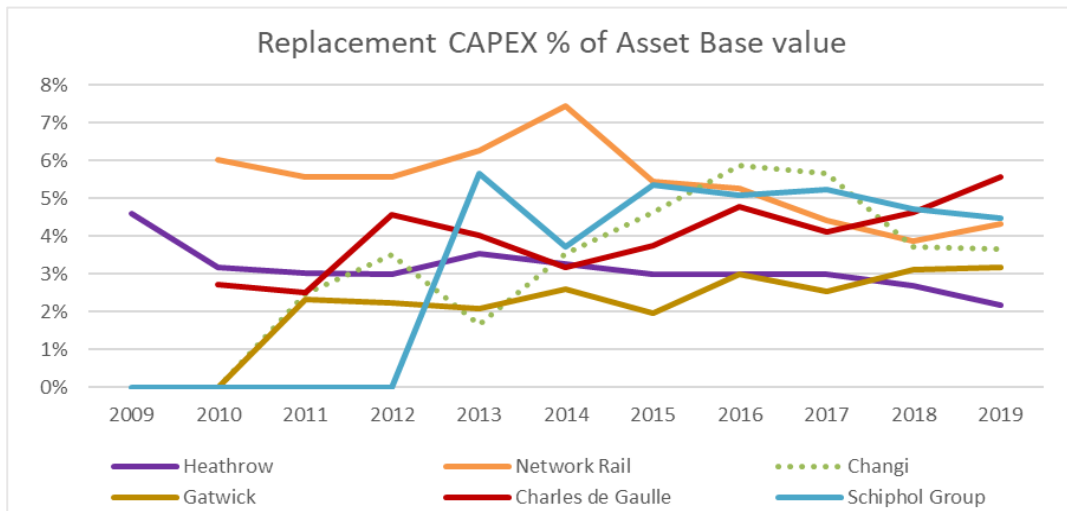
Source: Expenditure Benchmarking Report, Amey Consulting (July 2020)

Figure 14: Benchmark airports - 10-year average capital investment compared to asset base value



Source: Expenditure Benchmarking Report, Amey Consulting (July 2020)

Figure 15: Benchmark airports - annual replacement capex as a percentage of asset base value



Source: Expenditure Benchmarking Report, Amey Consulting (July 2020)

Our updated H7 Asset Management Programme forecast and use of risk based prioritisation

- 3.5.37 We provided a forecast of £240m p.a. (2018p) asset management capital investment in our December 2020 RBP.
- 3.5.38 Following our more detailed bottom-up assessment of H7 asset management requirements, a further year of unanticipated investment constraint in 2021, and a more mature understanding of the impact of cumulative underinvestment on consumer outcomes in H8 and beyond, we increased our forecast to an average of £300m p.a. (2018p) in our June 2021 RBP Update 1 (a total of £1.5bn over H7).
- 3.5.39 Our forecast for Asset Management and Compliance has increased to £1.7bn (2018p) for RBP Update 2 from the £1.5bn forecast included in RBP Update 1.
- 3.5.40 This increase is as a result of aligning Commercial Asset Replacement investments and the Tower Transformation investment (re-named to Virtual Control Facility to reflect the reduction of scope and ambition from when the business case was originally established) into the Programme. This appropriately classifies all investments which ensure safety, security and compliance into one category – and is also consistent with feedback we have had through engagement with the airline community.

Table 8: Investments transferred to Asset Management and Compliance since RBP Update 1

Investments transferred from the Commercial Revenues Programme	
Terminal 4 Multi Storey Car Park	Amount transferred: £70.3m
Retail & Media Asset Replacement	Amount transferred: £33.1m
Property – Essentials	Amount transferred: £28.2m
Investments transferred from the Efficient Airport Programme	
Virtual Control Facility	Amount transferred: £72.5m

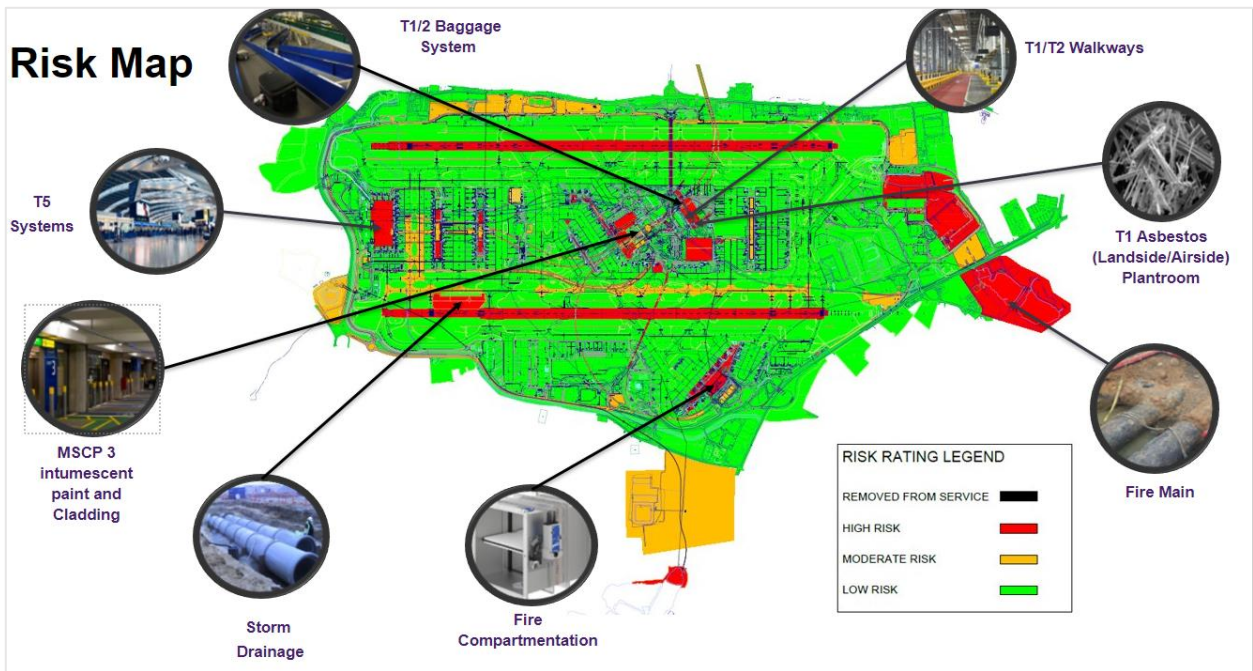
Source: Heathrow

- 3.5.41 However, it is important to note that the total demand on the Portfolio to maintain all assets to mitigate the level of risk through H7 adds up to a total of £2.8bn (2018p). The very broad asset base with variety of age and condition (Terminals 1 and 3 from the 1960s, Terminal 5 20 years old by end of H7), as well as the reduced investment in 2020/2021 due to Covid-19, has had a significant impact on demand in H7.
- 3.5.42 Therefore, we have taken a risk-based approach to prioritising our asset management programme for H7. This is done through carrying out a robust annual review process to ensure that assets which present the greatest risk are prioritised as part of the Programme.
- 3.5.43 The Heathrow Corporate Risk and Assurance team have developed a corporate risk framework to identify and rank potential life threatening and operational risks relating to assets across the airport.

3.5.44 The comprehensive ranking approach takes into account the likelihood of asset failure, the proximity of the risk event and the business/financial impacts. The framework enables us to quantify and rank the value of capital investment necessary to avoid potential catastrophic safety events and operational disruption across H7.

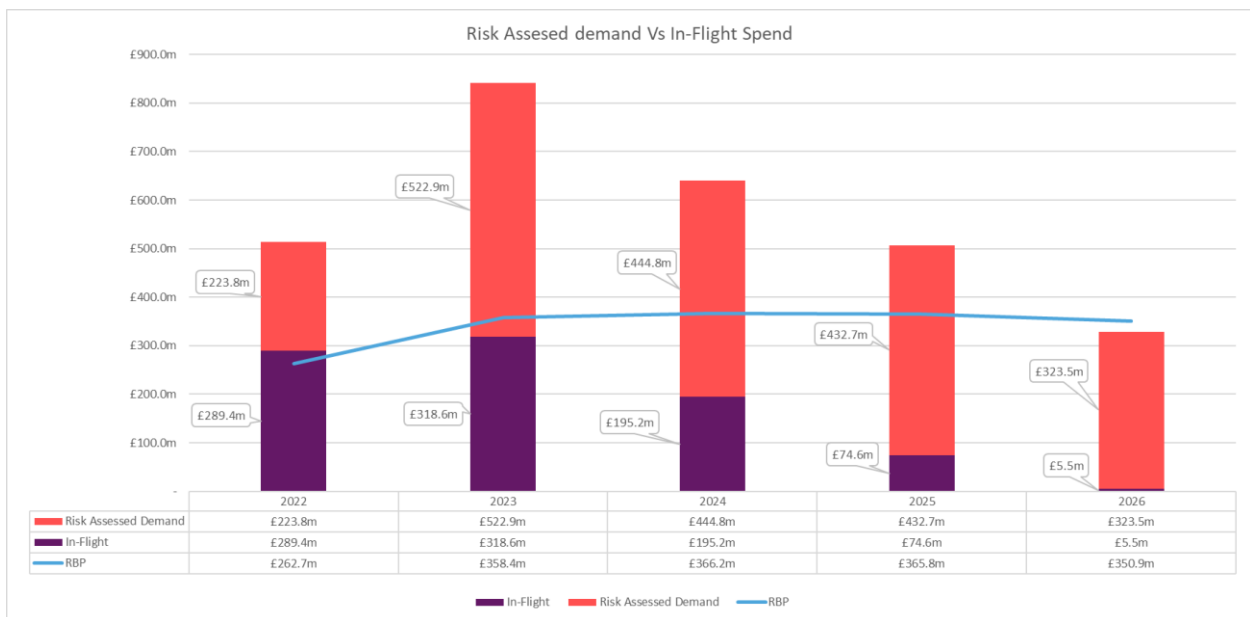
3.5.45 The H7 Asset Management & Compliance programme targets “Very High”, “High” or “Medium” risks.

Figure 16: Map illustrating high, medium and low risk assets across Heathrow



Source: Heathrow

Figure 17: Total asset replacement demand for H7 vs. In-Flight (relative to RBP)



Source: Heathrow

3.5.46 Below we provide a summary of the capital allocations against each of the Asset Management and Compliance categories for H7. The table sets out the total demand on the Portfolio for H7 (£2.8bn), and the amount of spend planned in our Capital Plan (£1.7bn). To derive the 'planned' values, we have applied a uniform reduction to the 'demand' value across all categories.

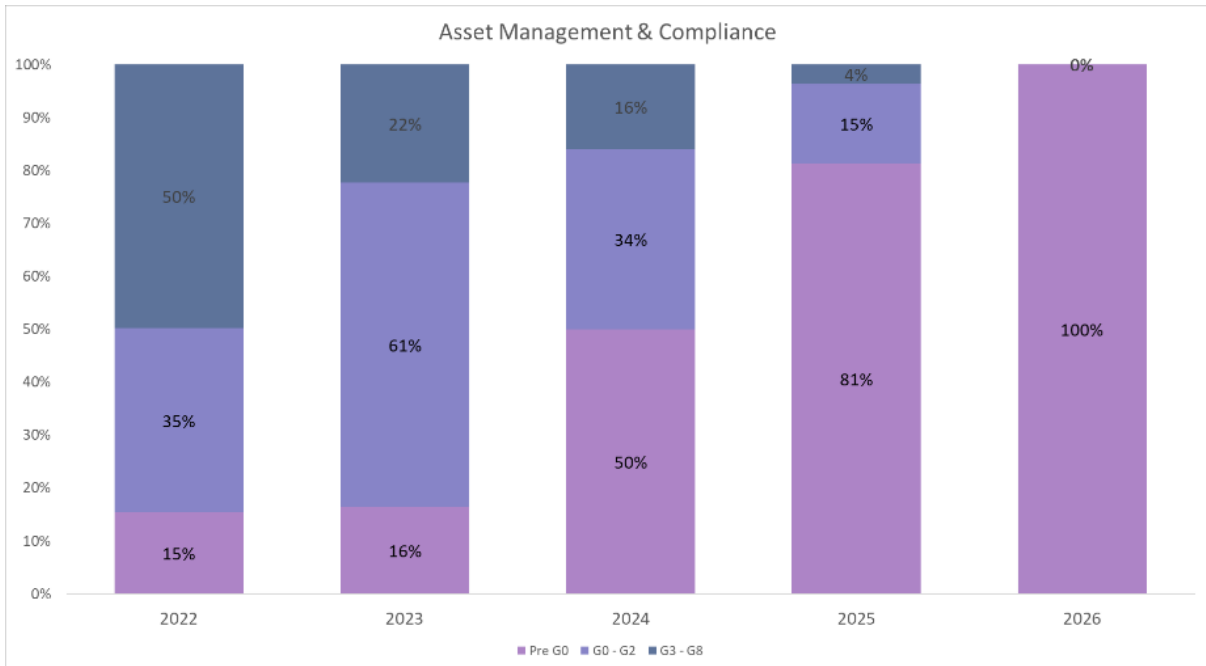
Table 9: H7 demand and planned spend by asset management category

H7 Asset Management and Compliance Categories (£m, 2018p)	H7 Total Demand	H7 Planned
Airfield	£631m	£455m
Baggage	£115m	£65m
Civils	£496m	£331m
Controls	£214m	£92m
Electrical	£151m	£68m
Mechanical	£372m	£158m
Rail	£134m	£93m
Technology	£397m	£204m
Compliance	£188m	£107m
Commercial	£132m	£132m
Total	£2,831m	£1,704m

Source: Heathrow

Current maturity of the Asset Management and Compliance Programme through H7

Figure 18: Current year by year level view of gateway status of the H7 Asset Management & Compliance Programme



Source: Heathrow

3.5.47 As set out in our introduction, those business cases not yet at G3 will be developed using our usual gateway processes and prioritised based on our corporate risk framework. Demand versus deliverability needs to be considered across the entire portfolio, which is reflected in our prioritisation overlay – as business cases develop we will only put forward those with a robust benefits case that aligns to outcomes/objectives set out in each programme.

3.6 Further Programme Update: Security

[X]

3.7 Further Programme Update: T2 Baggage

Our updated forecast for T2 Baggage

Table 13: H7 T2 Baggage capital investment forecast

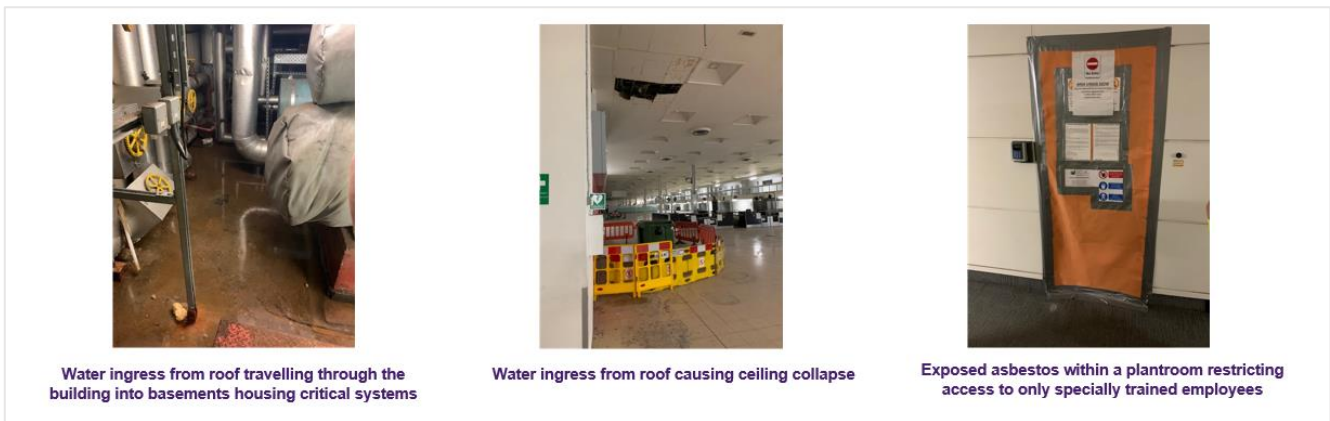
£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
T2 Baggage	7.5	43	111	143	127	432	217

3.7.1 The T2 Baggage programme is currently at P0 stage in the Programme Governance Framework. More detail on the maturity of the cost estimates can be found from paragraph 3.7.25.

Background and challenges for T2 Baggage in H7

- 3.7.2 Following the mothballing of the passenger facing areas of Terminal 1 in 2014, Terminal 1 continues to house the Terminal 2 departures and transfers baggage system. It also houses critical IT and services serving other key areas of the airport – including HAL Rail (ventilation systems), apron lighting, de-icing rigs, the Central Bus Station and the Terminal 1 to Terminal 4 Transfer Tunnel.
- 3.7.3 Planned asset replacement in the Terminal 1 building and supporting infrastructure has not occurred since circa 2002, due to the short remaining operational lifespan we had forecast for Terminal 1 as well as other investment priorities.
- 3.7.4 Under Expansion, and with the launch of the Future T2 Programme in 2019, we had planned to deliver a new T2 baggage system in T2A, T2 phase 2 substructure and T2B by 2027 to serve 30 million passengers per annum.
- 3.7.5 With the onset of the Covid-19, its associated financial challenges and the pausing of the Expansion Programme, the plans under the Future T2 Programme were stopped. The Terminal 1 building is now fifty-seven years old and a large number of its assets and systems are beyond economical repair.
- 3.7.6 The makeup and deterioration of Terminal 1 poses significant operational challenges and risks for H7. More than 85% of the component parts of the Terminal 1 baggage system are obsolete and nearing or are at the end of their technical life. They are no longer supported by their manufacturers and this has made purchasing spare parts and repairs increasingly difficult. The examples shown below illustrate some of the current issues:

Figure 19: Photos showing infrastructure challenges in Terminal 1

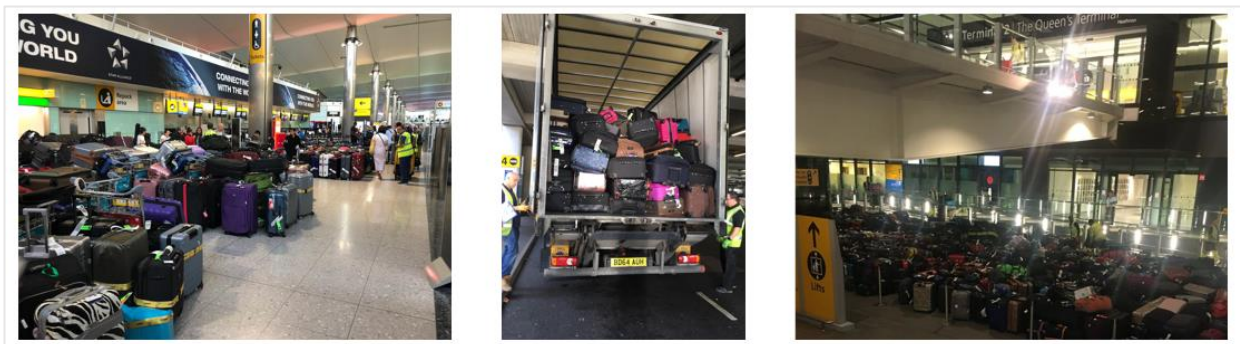


Source: Heathrow

3.7.7 The operational risks associated with the Terminal 1 baggage system naturally translate into risks for consumers with potential for:

- Increased disruption with more frequent system outages, resulting in more passengers travelling without their bags and potentially a reduction in Terminal 2 processing capacity during H7 from late 2026 / early 2027 onwards. Our consumer insights show that consumers particularly value their bags travelling with them – with missing baggage being identified by consumers as one of the greatest potential drivers of anxiety and a negative impact on their travel experience¹, meaning that avoiding increased disruption associated with the Terminal 1 baggage system must be a high priority for us in H7.
- In a worst case scenario, a total failure of the Terminal 1 baggage system at some point in H7, would render Terminal 2 unable to operate.

Figure 20: Photos showing scenes of baggage operational disruption in Terminal 2



Source: Heathrow

Feedback provided by the CAA regarding the H7 T2 Baggage Programme in its Initial Proposals

3.7.8 The CAA's Mid and High capital estimates in its Initial Proposals included the £180m (2018p) allowance for T1 Baggage Prolongation, which we included in our RBP Update 1.

¹ Yonder Research, Consumer resilience at Heathrow, May 2021

3.7.9 However, the CAA’s Low estimate did not include the allowance for T1 Baggage Prolongation, and none of the CAA’s estimates included the £35m (2018p) allowance for the T2 Baggage Solution that we included in our RBP Update 1.

3.7.10 Our response in this section sets our revised strategic approach to T2 Baggage – including bringing forward investment in a new Terminal 2 baggage system into H7 – and puts forward our case for the CAA to include a £432m (2018p) total investment allowance for T2 Baggage in H7.

3.7.11 We respond to the CAA’s feedback in this section, as well as the supporting H7 T2 Baggage Programme Appendix, by providing detail around our revised H7 T2 Baggage Programme. This includes our SMART Delivery Objective, detail of the rationale for our strategic approach, the impact on consumers and other stakeholders of a failure to invest in our plan, and the cost estimation basis for our proposed £432m (2018p) investment in H7.

Our proposed H7 Delivery Objective for the H7 T2 Baggage Programme

3.7.12 Since RBP Update 1, and responding to CAA feedback, we have developed the following SMART Delivery objective for the T2 Baggage Programme:

Table 14: T2 Baggage Delivery Objective

T2 Baggage Delivery Objective
<p>Heathrow will invest £432m (2018p) in H7 and £142m (2018p) in H8 with the H7 objective of contributing to achieve the OBR baggage misconnect rate of 9/1000*, timely delivery from departures baggage system, Overall Satisfaction, Customer effort (ease), Airport that meets my needs and protecting Terminal 2’s 2019 baggage peak daily throughput capability of 31,000 bags (typical peak day).</p> <p>This will be achieved by starting to migrate the majority of the existing baggage operation from Terminal 1 to Terminal 2A. Construction of the Terminal 2A baggage system will commence in H7 and the system will be operable in early H8.</p> <p>During H7, the programme will also deliver asset replacement of the Terminal 1 building and services to keep it safe and secure, protect the Terminal 1 baggage system/operation and relocate non-Terminal 1 related IT systems out of Terminal 1.</p> <p><i>*Misconnect rate is a measure of total product performance which includes system, airline and handler</i></p> <p>Assumptions:</p> <ul style="list-style-type: none"> • Terminal 1 will remain until 2035 • Terminal 2 will be home to airlines from 2019 and will maintain similar fly schedule and baggage peak volumes.

Stakeholder outcomes delivered by the H7 T2 Baggage Programme

3.7.13 The T2 Baggage Programme will deliver the following stakeholder outcomes in H7:

Consumers: I feel comfortable and secure at the airport

Consumers: An airport I want to travel from that offers me a good value choice of flights

Consumers: I have a predictable and reliable journey

Airlines: Heathrow provides efficient, reliable and affordable airport services

Changes to our T2 Baggage strategy since RBP Update 1

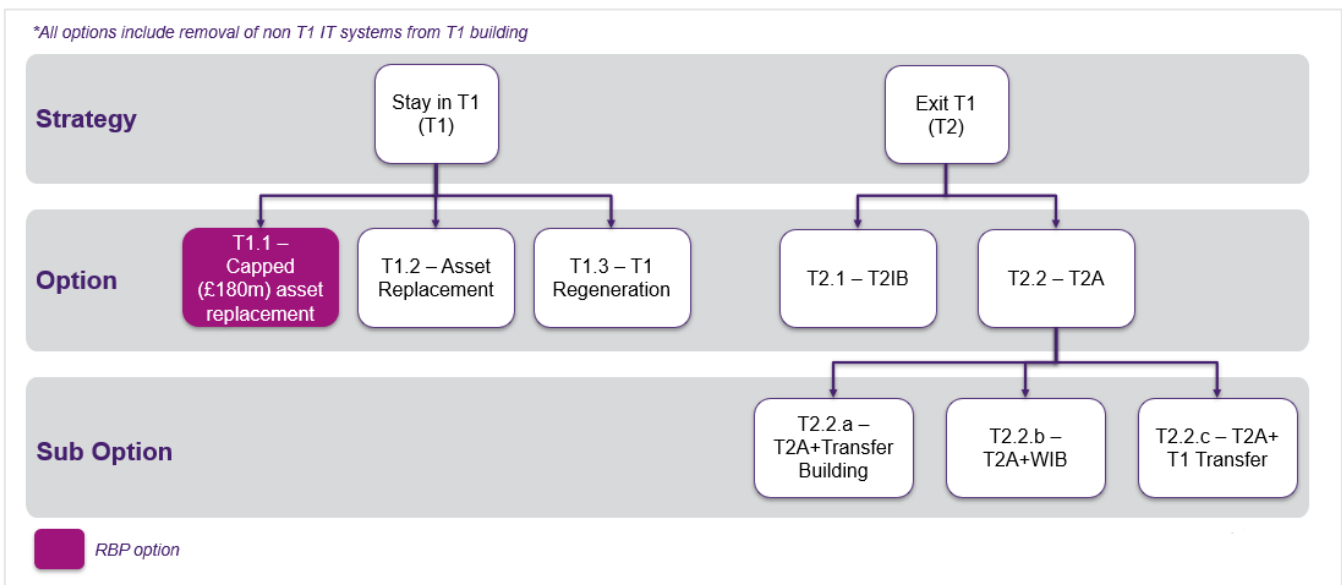
3.7.14 We have continued to develop and assess a range of strategic options to address the challenge that exists around Terminal 2 baggage since RBP Update 1, working closely with our Strategic Partner, [X]. This has included:

- looking at options previously developed and testing these under current circumstances; and
- developing new options through considering the ‘art of the possible’.

3.7.15 This continued development and assessment of strategic options led to us shortlisting two families of options, which we believe to be the strongest. We have carried out more detailed evaluations of these.

3.7.16 The first family of options is predicated on retaining the Terminal 1 baggage operation through H7 (as per RBP/RBP Update 1), and the second is predicated on us starting to exit the Terminal 1 baggage operation through H7. The diagram below sets out a summary view of these two options:

Figure 21: Terminal 2 Baggage Strategic Options

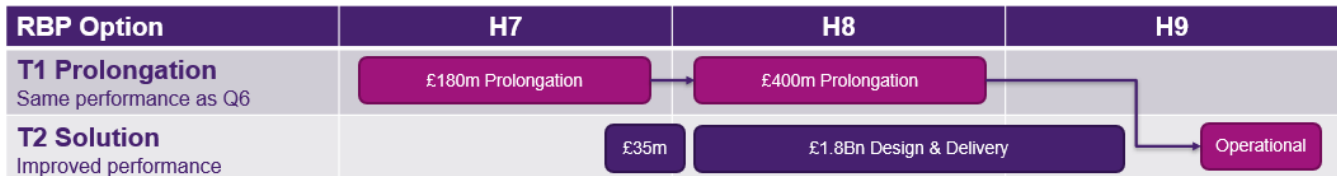


Source: Heathrow

3.7.17 The option highlighted in pink above was our approach for our December 2020 RBP and RBP Update 1. This option would see the baggage operation remaining in Terminal 1 for the whole of H7, with £180m (2018p) invested in prolonging the life of the system. This option then leads to a more significant investment requirement associated with replacing the system in H8.

3.7.18 For RBP Update 1, in addition to the £180m invested in prolongation, we also included an allowance of £35m (2018p) towards the end of H7, to be invested in starting to develop longer term solutions for Terminal 2 baggage. The view was then to deliver a long-term solution to Terminal 2 Baggage by early H9.

Figure 22: Summary of T1 Prolongation and T2A Solution H7 - H9 - RBP Update 1 view



Source: Heathrow

3.7.19 Having had more time to further develop and refine our thinking, we have now concluded that the RBP / RBP Update 1 strategy does not adequately address the challenges associated with Terminal 2 baggage and the condition of Terminal 1 in H7. More specifically, the implications of continuing this strategy would be:

- An increased frequency of significant failures of the current baggage system in Terminal 1 – with negative outcomes for consumers and other stakeholders.
- Performance and resilience degrading from 2019 levels and not recovering until late H8 – with negative outcomes for consumers and other stakeholders.
- Only circa 25% of assets required to see the Terminal 1 system through to H9 would be replaced in H7, resulting in pushing a very large amount of asset replacement into H8, which is ultimately undeliverable.
- An inability to sustain the passenger volume processing capacity of Terminal 2 at pre-Covid levels through H7 – with a 30% or greater reduction in capacity expected from 2027 and continuing to decline thereafter.

3.7.20 Having carried out detailed assessments of the available options, we now believe that the below strategic option (Figure 18) is the best way forward to ensure the most efficient long-term investment of capital, to protect Terminal 2 resilience and capacity, and ultimately to ensure that we protect consumer outcomes in H7 and beyond. Further detail of our assessments can be found in the H7 T2 Baggage Programme Appendix included as part of this submission.

3.7.21 This option brings forward into H7 the construction of a new baggage system using the baggage safeguarded space in Terminal 2A, which would include all the functions required to process departing bags (80% of the total volume of bags). This replicates the first step of the baggage system required to support an expanded Terminal 2 and is a subset of our Future T2 Programme that was halted with the pausing of the Expansion Programme in 2020.

3.7.22 A high level output of the costing exercise for the Programme (2018p) is shown below – it is split into three categories;

- T1 Prolongation - Protecting the T1 baggage operation until a T2A system is operational, and keep the building safe and secure until 2035.
- T2A Solution - Providing a new baggage solution within the T2A safeguarded space.

- Asset replacement and relocation of critical IT systems within T1.

Figure 23: Summary of the T2.2 - T2A Strategic Option H7 - H9

Current recommendation	H7	H8	H9	TOTAL
T1 Prolongation Same performance as Q6	£113-£163m Prolongation	£59-£109m Prolongation		£222M
T2A Solution Improved performance	£198 - £248m	£55 - £105m 2027 Go Live		£303m
Full T2 solution ONLY if increased capacity is required		£1.3Bn Design & Delivery ?		£1.3Bn
Move IT outside T1	£49m			£49m
TOTAL	£346 - £446m	£128m - £228m		

Source: Heathrow

3.7.23 It should be noted that the full T2 solution set out above, like Future T2, is only applicable when an increase in capacity is required for the T2 airlines to grow beyond 2019 levels/ 20mppa.

3.7.24 Further detail of the T2.2 – T2A strategic option can be found in the H7 T2 Baggage Programme Appendix included as part of this submission.

Cost estimate maturity for the H7 T2 Baggage Programme

3.7.25 The Three Point Estimates for the T2 Baggage Programme, provided by [redacted], are as follows:

(Note that the figures below are 2018 pricing)

- Total Optimistic Cost - [redacted] with [redacted] in H7
- **Total Most Likely Cost - [redacted] with [redacted] in H7**
- Total Pessimistic Cost - [redacted] with [redacted] in H7

3.7.26 The three point estimate noted above is a Range of Cost budget reflective of the programme being at P0 stage and is a view at this point of time based on the current scope and assumptions. The budget allowances will be updated throughout the evolution of the programme and our process notes a maximum and minimum accuracy range of -50%/+100% at this stage (this being the degree to which costs could fluctuate).

3.7.27 Further detail around our cost estimation process for the T2.2 – T2A strategic option can be found in the H7 T2 Baggage Programme Appendix included as part of this submission.

3.8 Further Programme Update: Commercial Revenues

Our updated forecast for the Commercial Revenue Programme

Table 15: H7 Commercial Revenues Capital Investment forecast including Crossrail

£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
Commercial Revenues	93	152	120	112	84	562	-216

The Commercial Revenues Chapter sets out our response to the CAA's Initial Proposals on commercial revenues

- 3.8.1 This includes our response to the CAA's view on commercial capital investment – where we draw the following three key conclusions in response to the CAA's Initial Proposals:
- 3.8.2 Capital investment is a driver of commercial revenues and key to meeting passenger expectations. Historical investment has driven commercial revenues in previous regulatory periods, and there remains a significant role for commercial capital in H7 to:
- Maintain commercial assets, protecting revenues and promoting efficiency.
 - Invest in digital retail to allow our offer to meet increased passenger expectations post Covid-19.
 - Diversify revenue streams to become more commercially resilient.
- 3.8.3 CAA and CEPA treatment of capital investment and consequential impact to revenue forecasts is manifestly inconsistent and at odds with regulatory precedent.
- Our proposed capital plan is in-line with historic investment and therefore no adjustment to the elasticities or stretch is necessary.
 - A removal or reduction in our commercial investment capital would lead to a reduction in forecasts.
 - The CAA have disallowed investment of commercial capital as part of its Initial Proposals, but have failed to reflect this in its H7 commercial revenue forecasts.
- 3.8.4 The CAA should include our revised £562m (2018p) (in addition to the £132m which has moved to the Asset Management & Compliance programme) Commercial Revenues Programme as part of its Final Proposals. A continued disallowing of our proposed commercial capital investment would result in the need for a [X] downwards adjustment to its commercial revenue forecasts.

- 3.8.5 Investing at this stage in the cycle, with these plans, is the right response of an efficient airport operating in a competitive market. The plans we propose have a strong business case, and only distortions created by regulation—stand in the way of investment.
- 3.8.6 We will not repeat the detail of the arguments set out above as part of this chapter, but note that the Commercial Capital section of the Commercial Revenues chapter should be read in conjunction with the narrative presented here.
- 3.8.7 This section, and the H7 Commercial Revenues Programme appendix included as part of our submission, respond specifically to the CAA's Initial Proposals to not include the "Protect Revenues" £100m and the "Commercial Revenues" £600m capital allocations on the basis that "*HAL has provided minimal evidence*¹".
- 3.8.8 We therefore evidence the robustness of our commercial business cases in this section and the supporting appendix through:
- Setting out the Delivery Objective for the H7 Commercial Revenues Capital Programme.
 - Setting out how the business cases respond to consumer needs.
 - Providing greater detail of the investments needed to achieve the outcomes.
 - Providing evidence and / or information of the cost and benefits of the proposed investments.

¹ CAP2265B – Page 39, Para. 3.40

Our H7 Delivery Objective for the H7 Commercial Revenues Programme

Table 16: Commercial Revenues Programme Delivery Objective

Commercial Revenues Programme Delivery Objective

Heathrow will invest £562m (2018p) (excluding scope moved to Asset Management & Compliance) in H7 to protect existing commercial revenue and unlock additional revenue. Absent this investment, our commercial revenue forecast over H7 will be lower by [X] – increasing the per passenger charge.

This delivery objective includes the following sub-objectives:

Surface Access: Invest £33m in car parking to deliver improvements to our passenger and colleague parking proposition, protecting [X] revenue at risk and delivering [X] incremental revenue through H7. Invest a further £2m in Terminal Drop Off Charge infrastructure to protect this revenue stream through H7. This investment will help to contribute to the following OBR measures; Ease of access to the airport, overall satisfaction and an airport that meets my needs. This business case delivers an average payback of [X].

Retail & Media Development: Invest £207m in retail initiatives throughout H7, which centre on Space Optimisation and Operational Compliance & Improvements. These investments will deliver improvements to passenger experience and will protect [X] revenue at risk and generate [X] incremental revenue. This investment will help to contribute to the following OBR measures; Enjoy my time at the airport, overall satisfaction and an airport that meets my need. This business case delivers an average payback of [X].

Digital Transformation: Invest a total of £62m in income generation digital propositions through H7 (One Heathrow Ecosystem, Curated Marketplace and Seamless Journey) to respond to changing consumer needs, enhancing passengers' digital experience - protecting [X] of revenue at risk and [X] incremental revenues over H7. This investment will help to contribute to the following OBR measures; Enjoy my time at the airport, overall satisfaction, helpfulness/attitude of airport staff, ease of understanding Heathrow's Covid-19 safety information and an airport that meets my needs. This business case delivers an average payback of [X].

Cargo Development: Invest £27m in redevelopment of the on-airport cargo estate, deliver an airside transshipment centre and ensuring a continued safe, sustainable and efficient cargo operation. These investments do not generate quantifiable commercial revenue in H7, but will deliver significant strategic value to the wider Heathrow commercial model to the benefit of passengers, airlines and Heathrow. This investment will help to contribute to the following OBR measures; Departures flight punctuality and control post vehicle queue time. This business case delivers an average payback of [X].

Property Development: Invest £161m to undertake a range of property development across the Heathrow estate – including Eastern Business Park and D'Albiac House replacement, car park densification, estates optimisation and perimeter/CTA redevelopment enabling studies/works. These investments will protect [X] revenue and generate [X] incremental revenue over H7, as well as ensuring safety and compliance across the Heathrow estate. This investment will help to contribute to the following OBR measures; Ease of access to the airport, enjoy my time at the airport, and an airport that meets my needs. This business case delivers an average payback of [X].

In addition, we have £68m in the portfolio for Crossrail and £4m for Agile Commercial works to respond to unplanned events

Stakeholder outcomes delivered by the H7 Commercial Revenues Programme

3.8.9 The Commercial Revenues Programme :will deliver the following stakeholder outcomes in H7

Consumers: I have an enjoyable experience at the airport

Consumers: An airport I want to travel from the offers me a good value choice of flights

Airlines: Heathrow provides efficient, reliable and affordable airport services

Investors: Heathrow delivers predictable and fair returns

Changes to our Commercial Revenues Programme since RBP Update 1

3.8.10 We have continued to develop and refine our H7 Commercial Revenue Programme since RBP Update 1, which we share the detail of in the remainder of this section.

3.8.11 A key change to the Programme has been the transfer of three business cases to the Asset Management and Compliance Programme, on the basis that they are more closely aligned with the objective of the Asset Management and Compliance Programme. This move of Commercial Asset Management and Compliance scope was recommended by the airline community at discussions in the Future Portfolio Group meetings.

3.8.12 The three business cases moved to Asset Management and Compliance, totalling £131.6m (2018p) over H7, are:

Table 17: Business cases moved to Asset Management and Compliance

Asset Management & Compliance (Commercial Scope)	2022	2023	2024	2025	2026	H7
T4	4.7	4.7	23.4	18.7	18.7	70.3
Asset replacement	8.9	13.3	9.7	0.2	0.9	33.1
Property - Essentials	8.4	4.3	4.6	4.6	6.2	28.2
Total	22.0	22.3	37.8	23.6	25.9	131.6

Source: Heathrow

3.8.13 It should be noted that the investments in these three business cases are still included in the total £693m commercial investment figure set out in the Commercial Revenues chapter, as is their contribution to the [X] of revenue lost / incremental revenue missed in the absence of any commercial capital investment in H7.

3.8.14 The table on the following page sets out our proposed investments as part of the H7 Commercial Revenues Programme – showing both the £562m investment, and the Asset Management and Compliance lines. It also provides a view of incremental revenue and revenue at risk associated with each investment category.

Table 18: H7 Commercial Revenue Programme investments incl. associated revenue at risk and incremental revenues

Commercial Revenues 2018 prices	2022	2023	2024	2025	2026	H7
CrossRail Contribution	33.7	33.7	0.0	0.0	0.0	67.5
Retail & Media - Asset Replacement	0.0	0.0	0.0	0.0	0.0	0.0
Retail & Media - Development	30.9	35.8	50.7	52.6	37.1	207.1
Property - Essentials	0.0	0.0	0.0	0.0	0.0	0.0
Agile Fund/Contingency	0.9	0.9	0.9	0.9	0.9	4.7
Maintain	65.6	70.5	51.6	53.5	38.1	279.3
Digital & Data Transformation	18.1	16.5	7.1	9.5	10.7	61.8
Digital	18.1	16.5	7.1	9.5	10.7	61.8
Cargo	1.7	7.4	6.6	6.6	4.7	26.9
Surface Access	6.7	12.1	9.7	3.2	0.8	32.6
Property Development	0.9	46.0	44.6	39.3	30.5	161.3
Diversify	9.4	65.5	60.9	49.0	36.0	220.8
Commercial Revenues Programme Total	93.1	152.5	119.6	112.0	84.8	562.0
Asset Management & Compliance (Commercial Scope)	2022	2023	2024	2025	2026	H7
T4	4.7	4.7	23.4	18.7	18.7	70.3
Asset replacement	8.9	13.3	9.7	0.2	0.9	33.1
Property - Essentials	8.4	4.3	4.6	4.6	6.2	28.2
Total	22.0	22.3	37.8	23.6	25.9	131.6
Total H7 Commercial Revenue Scope	115.0	174.8	157.4	135.6	110.7	693.6

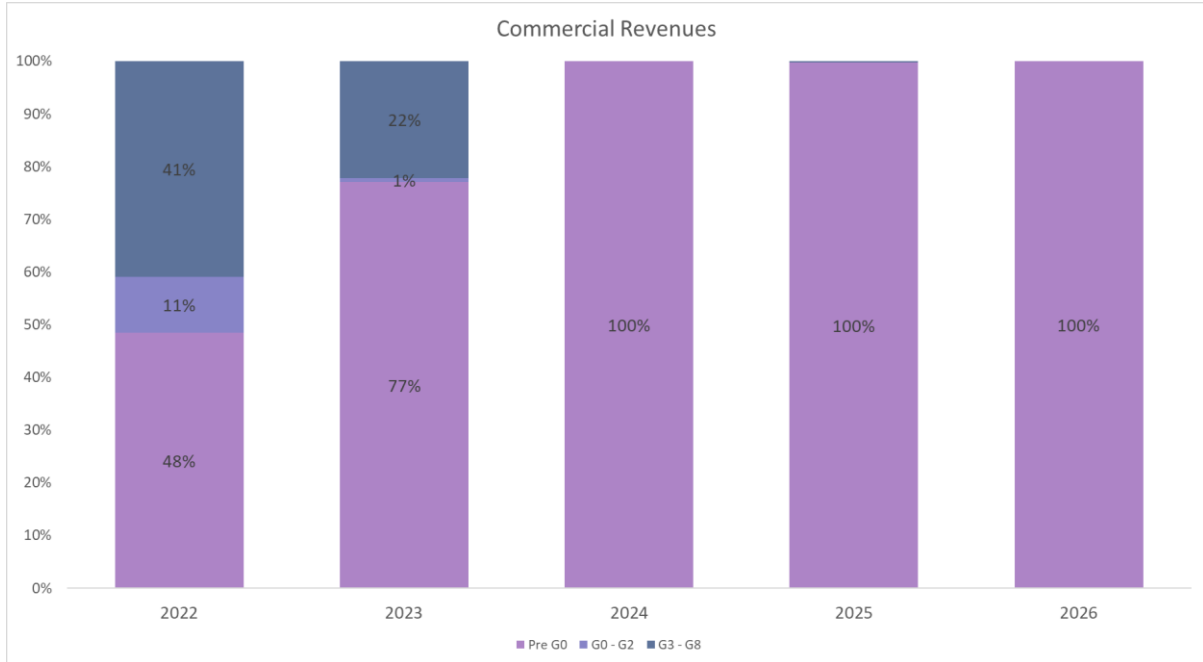
[X]

Source: Heathrow

Current maturity of the Commercial Revenues Programme through H7

3.8.15 Below we provide a year-by-year view of maturity of the Commercial Revenues Programme as it currently stands.

Figure 24: Current year by year level view of gateway status of the H7 Commercial Revenue



Source: Heathrow

3.8.16 We provide a more detailed business case by business case view of proposed commercial capital investment, maturity and basis for cost estimation in the H7 Commercial Revenue Programme Appendix included as part of this submission.

3.8.17 The H7 Commercial Revenue Programme Appendix also sets out more detail around the scope and cost estimate basis of our proposed commercial revenue capital investments in H7.

3.9 Further Programme Update: Efficient Airport

Our updated forecast for the Efficient Airport Programme

Table 19: H7 Efficient Airport Programme Investment forecast

£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
Efficient Airport	34	50	36	92	102	315	-159

Background and challenges for the Efficient Airport Programme in H7

- 3.9.1 There is significant scope to implement capital solutions to remove operating costs across the airport operation. This would benefit consumers and our Team Heathrow² partners and ensure that we can continue to compete with other airports who are making strides to harness technology and reduce their cost base.
- 3.9.2 We see automation as a key lever in delivering the service outcomes our consumers expect, more efficiently. Failure to invest in this programme risks:
- Heathrow not being able to take advantage of opportunities to operate more efficiently, including driving down costs for our airlines; and
 - Passengers would not benefit from the increased levels of service that the initiatives in the Programme would offer – and which we know from our consumer insights that they would value.
- 3.9.3 Through airline community responses to our RBP and RBP Update 1, as well as through our airline engagement forums, we know that automation in particular remains an airline priority. We have continued to take this into consideration in developing the Efficient Airport Programme and have included a variety of automation business cases that will have a positive impact on airline operating costs and processes at Heathrow.

Feedback provided by the CAA regarding our Efficient Airport Programme in its Initial Proposals

- 3.9.4 The CAA did not include any of the allowance included in RBP Update 1 for the Efficient Airport Programme as part of its Initial Proposals.
- 3.9.5 This section, and the supporting H7 Efficient Airport Programme Appendix, builds our case for investment in the Programme. To this end, we have included our SMART Delivery Objective, detail around cost maturity of the Programme and further detail around its objectives and benefits.

² Team Heathrow refers to all companies working at Heathrow Airport, including Heathrow Airport Limited, airlines and ground handlers.

Our proposed H7 Delivery Objective for Efficient Airport

Table 20: Efficient Airport Delivery Objective

Efficient Airport Delivery Objective

Heathrow will invest £315m (2018p) in H7 to improve resilience, reduce the total cost of operation, maintain service standards and provide targeted service improvements to consumers improving the predictability and reliability of their journeys with specific focus on those that are most vulnerable. Simplification & digitisation of baggage, aircraft & passenger processes will enable greater insight & improved performance of operational functions.

This investment will deliver significant benefit to airline operating costs, which Heathrow does not directly benefit from. This investment will also contribute to delivering the opex efficiency overlay applied to the H7 operating costs.

This includes the following sub-objectives delivered through sub-projects:

- Compass Centre Exit £44m – Transition APOC, data centres, critical surveillance equipment and operational support teams into new fit for purpose locations without disrupting airport operations, delivering operating cost savings through the elimination of the Compass Centre lease cost by 2024. This contributes to the OBR measures of value for money of overall Journey
- Passenger Process Automation £50m – Renew, replace and introduce new automation across the passenger journey to meet growing consumer expectations for predictable and reliable journeys. This will also support our airline customers to achieve operating cost savings and support airline customer propositions, ensuring we remain competitive against other airports. Scope includes T4 Self Boarding Gates, T3 Self Service, T4 CUSS Kiosks / Automated Check-in, Automated gate announcements (T2, T3 and T4), onboarding of airline automation requests and implementation of biometrics/ PAX ID across passenger journey. This contributes to the OBR measures of value for money of overall journey, overall satisfaction, customer effort (ease) and airport that meets my needs
- Baggage Optimisation £43m – Develop and implement automation of a range of baggage handling processes across Heathrow to meet growing consumer expectations for predictable and reliable journeys, and to support our airline customers to achieve operating cost savings and support airline customer propositions. This contributes to the OBR measures of value for money of overall journey, baggage misconnect rate and timely delivery of departures baggage
- Airfield Optimisation £39m – Drive airport efficiency through the implementation of new technology, integration of data and new business processes. The scope includes AI capable CCTV on stands, which can track and time stamp critical turnaround activity, further sharing and integration of telematics, integration of airfield systems and replacement of current stand planning platforms. This will meet growing consumer expectations for predictable and reliable journeys and support our airline customers to achieve operating cost savings and support airline customer propositions. This contributes to the OBR measures of departures punctuality, value for money of overall journey, airport arrivals management and runway operational resilience.

- Terminal Capacity Optimisation £33m – Provide three additional remote stands on GA20, delivering additional efficiency in the western campus through enabling more inter-terminal connections and a more efficient towing operation. This contributes to the following OBR measures; wayfinding, overall satisfaction, customer effort (ease), airport that meets my needs, and departures flight punctuality.
- Service Initiatives £106m – Deliver improved wait times at the Border, improved facilities and service for Passengers Requiring Support, improved seating and charging options for passengers and utilising digital wayfinding, ensuring their journeys are more predictable, reliable, comfortable and providing a more welcoming and accessible airport where passengers feel cared for. We have only prioritised the improvements most valued by consumers (see Consumer Insights chapter). This contributes to the following OBR measures; cleanliness, wayfinding, overall satisfaction, customer effort (ease), enjoy my time at the airport, airport that meets my needs, helpfulness/attitude of airport staff, immigration queue times and passengers with reduced mobility – overall satisfaction..

3.9.6 We provide a more detailed item by item summary of the objectives and benefits delivered by each Category in the Efficient Airport Programme in the H7 Efficient Airport Programme Appendix included as part of this submission.

Stakeholder outcomes delivered by the Efficient Airport Programme

3.9.7 The Efficient Airport Programme delivers the following stakeholder outcomes:

Consumers: I have a predictable and reliable journey

Consumers: An airport I want to travel from the offers me a good value choice of flights

Airlines: Heathrow provides efficient, reliable and affordable airport services

Investors: Heathrow delivers predictable and fair returns

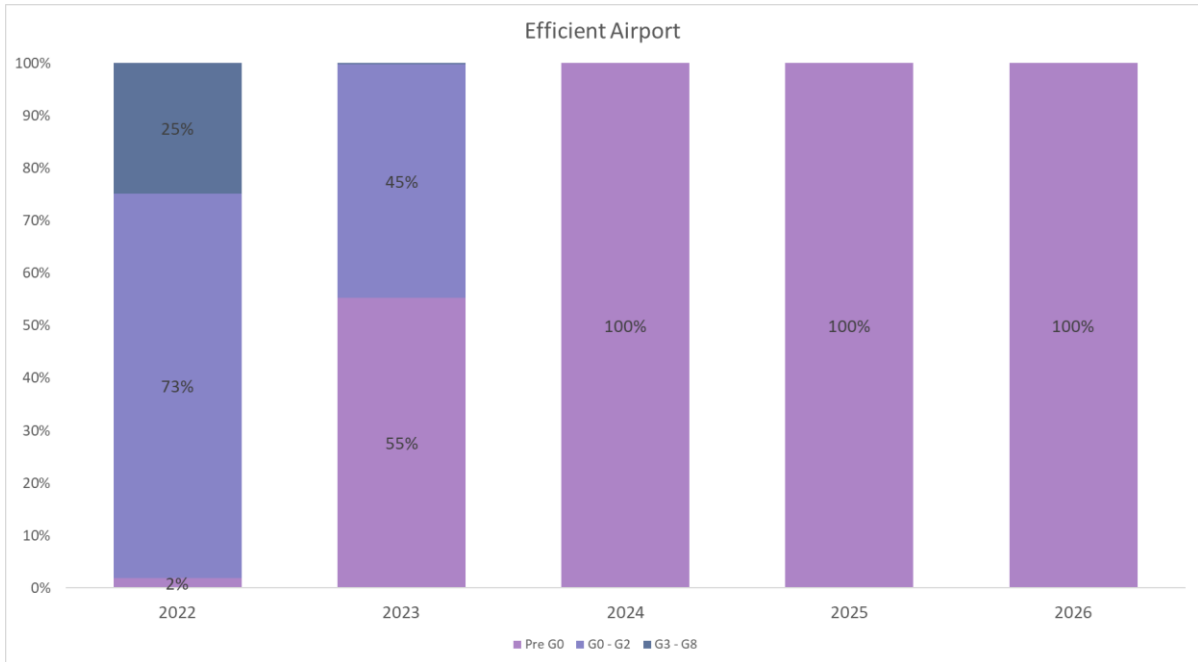
Changes to our Efficient Airport Programme since RBP Update 1

3.9.8 We have continued to develop our thinking around the Efficient Airport Programme since RBP Update 1 and now have greater certainty around the scope of the Programme. We have reduced the overall size of the portfolio, with the adjusted portfolio size reflecting the greater certainty we now have around scope and the likely costs associated with delivering the Programme over H7.

3.9.9 In RBP Update 1, we also included an allocation for the 'Future Ready Airport Programme', which was similarly forward-looking and aimed at making improvements to enhance passenger experience. Given the similarity between the two programmes, and having further refined the scope of both, we have now opted to merge the Future Ready Airport Programme into the Efficient Airport Programme.

Current maturity summary view of the Efficient Airport Programme through H7

Figure 25: Current year by year level view of gateway status of the H7 Efficient Airport Programme



Source: Heathrow

- 3.9.10 We note the high degree of maturity the above chart shows for 2022 spend, as would be expected. With a greater degree of maturity also shown in 2023. We would naturally expect the maturity of later years to progress as we move through H7, in line with our established governance processes.
- 3.9.11 We provide a more detailed business case by business case view of proposed capital investment, maturity and basis for cost estimation in the H7 Efficient Airport Programme Appendix included as part of this submission.

3.10 Further Programme Update: Carbon and Sustainability

Our updated forecast for the Carbon and Sustainability Programme

Table 21: H7 Carbon & Sustainability Programme investment forecast

£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
Carbon and Sustainability	10	10	34	55	78	188	0

Background and challenges for Carbon and Sustainability in H7

We must ensure the long-term viability of aviation in a Net-Zero world and protect its benefits.

- 3.10.1 Aviation is a force for good in the world, helping power economic growth and bringing people and cultures together. Our challenge is to protect the benefits of aviation in a world without carbon and to do that we need to get to Net-Zero aviation emissions by 2050.
- 3.10.2 Climate change is an existential risk to aviation and Heathrow. It is positive therefore that in-the-midst of the worst crisis in the aviation sector's history, momentum on addressing climate change has continued to build and progress has been made. It is clear what we must do and how long we have to turn plans into action. The focus now is to place climate change at the centre of the industry's recovery and accelerate progress towards achieving Net Zero during this decade.
- 3.10.3 The industry and Heathrow will be judged on delivery, both in H7 and in subsequent regulatory settlement periods. That is why we have put forward a proportionate and measured plan to cut emissions by the end of 2026.. Our plan is weighted towards initiatives that cut the most carbon for lowest cost, acknowledging the impact of Covid-19 and the importance of prioritising the recovery of air travel in this period.
- 3.10.4 Shrinking Heathrow's carbon footprint is a significant challenge and requires action across the whole airport community. Heathrow must lead by example and we must invest to put in place the enabling interventions, supported by the right policies, standards and incentives, that allow our airlines, partners and passengers to cut their emissions too.
- 3.10.5 The CAA, like economic regulators in other sectors, has a pivotal role to play in addressing climate change which cuts to the heart of the CAA's core responsibilities; to current and future consumers, and environmental protection. The CAA has an important role in embedding the government's ambition and policies on climate change into its mission and how it discharges its responsibilities, setting a clear direction for the whole airport community, in regulatory settlements, and the regulator's engagement with Heathrow, airlines and the broader airport community. The CAA must also ensure the right level of investment is available to deliver the volume and speed of emissions reduction necessary for Net Zero. That will protect the benefits that consumers enjoy today and support recovery, it will enable future

consumer benefits, such as greater competition and wider choice that will flow from growth, and it will keep operating costs down as carbon costs continue to rise.

We must respond to government policy and reduce risks to consumers.

- 3.10.6 Government policy on climate is clear, the UK must achieve Net Zero emissions by 2050 and that means cutting carbon emissions for the UK economy as a whole by 46% by 2030 from 2019 levels.
- 3.10.7 Heathrow and the aviation sector are not exempt, and we must play our part, demonstrating tangible carbon emission reduction this decade to build confidence among policy makers, consumers and investors and support our ability to recover from the pandemic, to operate, and to grow in future.
- 3.10.8 If we fall behind in cutting carbon, we could face passenger demand restrictions from the Government to bring down emissions, a loss of confidence from consumers who choose to fly less, and more difficulty attracting investment and increasing costs.
- 3.10.9 Heathrow and the sector must also consider the physical impacts of a warming climate, including more extreme weather events, which could affect our airport as well as key destinations, and cause significant harm to the global economy.
- 3.10.10 Climate change ultimately represents a risk to current and future consumers, limiting consumer choice, increasing costs and stretching our resilience.

We need to meet consumer expectations around carbon.

- 3.10.11 In our December 2020 RBP we shared consumer engagement research, where consumers expressed a clear view that airports and airlines should be doing more to reduce carbon emissions.³
- 3.10.12 In an economy on a Net Zero trajectory, consumers may choose to fly less unless the aviation sector is acting and being seen to act to cut emissions. Around a third of UK consumers claim to avoid flying where possible and 40% say they expect to avoid it in the next few years. ⁴Although we haven't seen that intent translated into current passenger levels, and there are few convenient alternative transport options to many destinations, the consumer signals are clear.
- 3.10.13 Consumers have also shared their priorities and where they want Heathrow, working with the wider industry to act⁵:
 - Make the airport itself zero carbon
 - Eliminate carbon from aircraft on the ground
 - Make aviation fuels more sustainable and lower carbon
 - Invest in research on zero-emissions flight technology

³ Incite, Understanding the sustainability landscape in 2020 and future initiatives for Heathrow. September 2020

⁴ Incite, Understanding the sustainability landscape in 2020 and future initiatives for Heathrow. September 2020

⁵ Incite, Understanding the sustainability landscape in 2020 and future initiatives for Heathrow. September 2020

- Reduce single-use plastics at the airport

We have developed a Net Zero Plan to achieve our goals.

3.10.14 Heathrow has developed a Net Zero Plan and consulted with airlines, partners policymakers and environmental groups. Our Net Zero Plan, sets out clear goals and strategies for cutting emissions. The plan is based on cutting emissions in line with UK government carbon budgets and Climate Change Committee guidance and projections. There is strong strategic alignment with airlines and the broader industry.

3.10.15 In 2020 the UK aviation sector set a goal for Net Zero emissions and published a road map to get there. In late 2021 IATA announced the same goal, the first complete sector to do so. Heathrow continues to work closely with airlines and other industry partners to build a strong coalition and advocate and influence for action, whilst making sure we are cutting emissions we directly control and enabling others to do the same.

3.10.16 Our Net Zero Plan has two goals and eight solutions to deliver Net Zero emissions in the air and on the ground.

Figure 26: Our Net Zero Plan solutions for carbon in the air

Our Net Zero plan has four solutions to carbon in the air



A. Use less fossil fuel by operating more efficiently & by modernising airspace



B. Use less fossil fuel by improving conventional aircraft and engines



C. "Change the fuel" to low carbon "Sustainable Aviation Fuel"(SAF) dropped into today's planes



D. "Change the plane" to new zero emission planes, likely hydrogen

All the actions in the net zero plan will help cut local air pollution too.

Heathrow ⁶

Figure 27: Our Net Zero Plan solutions for carbon on the ground

And four solutions to carbon on the ground



E. Enable net zero for passenger and colleague surface access



F. Leverage our procurement role to deliver a net zero supply chain



G. Shift airport vehicles to zero carbon



H. Get our buildings and infrastructure to zero carbon

7

3.10.17 Our H7 Carbon and Sustainability Programme includes capital investment to deliver targeted initiatives that enable emissions reduction in five of the eight solutions in our Net Zero Plan. This investment is necessary to put Heathrow on a Net Zero trajectory, consistent with government policy, by the end of 2026.

3.10.18 Our H7 Carbon and Sustainability Programme has been developed to:

- Support airline customers and their business partners to cut carbon and lower costs – investing/taking action where Heathrow can make a difference and working in partnership to advocate the right Government policies.
- Help passengers to cut carbon and support society-wide shifts (e.g. the UK wide transition to electric vehicles).
- Get our own house in order by decarbonising emissions from airport buildings, vehicles and infrastructure.
- Support colleagues to adopt low carbon alternatives to get to and from work.
- Be guided by the biggest carbon reductions for the lowest cost.
- Lower costs for Heathrow and our Team Heathrow partners and generate new revenue opportunities.
- Minimise continued investment in legacy assets

3.10.19 As the overwhelming majority of emissions in Heathrow's carbon footprint are generated by airlines, partners, colleagues and consumers, we will need to work with all our airlines and partners to achieve the necessary carbon savings and use a variety of different levers to advocate, influence and deliver reductions. Our new Net Zero plan will be published by the end of January 2022 and will provide further detail on our plans to cut carbon in H7. We will share that plan with the CAA as soon as it is published.

Feedback provided by the CAA regarding our H7 Carbon and Sustainability Programme in its Initial Proposals

3.10.20 The CAA included an allowance for the airspace modernisation investment as part of the High, Mid and Low capital estimates in its Initial Proposals (this was part of the 'Protect the Business' portfolio in RBP Update 1).

3.10.21 The CAA did not include any further allowances for investments related to carbon and sustainability in H7 as part of its Initial Proposals – our proposed investments beyond airspace modernisation were contained within the 'Build Back Better' portfolio in RBP Update 1.

3.10.22 The CAA has included a carbon performance measure that covers all airport emission sources as part of its Initial Proposals, which we support. However, as per the above two points, its proposals do not provide us with the necessary capital investment that enables the carbon reductions that are necessary or to deliver on consumer climate expectations.

3.10.23 This section, and the supporting H7 Carbon and Sustainability Programme Appendix, builds our case for investment in the Programme. To this end, we have included our

SMART Delivery Objective, detail around cost maturity of the Programme and further detail around its objectives and benefits.

Our proposed Delivery Objective for the H7 Carbon and Sustainability Programme

3.10.24 Since RBP Update 1, and responding to CAA feedback, we have developed the following SMART Delivery objective for the Carbon and Sustainability Programme:

Table 22: Carbon & Sustainability Delivery Objective

Carbon and Sustainability Delivery Objective
<p>Heathrow and the whole UK and global aviation sector, including all of Heathrow's airline customers, have committed to reach Net Zero emissions by 2050. Heathrow has developed and consulted on a new Net Zero plan which sets out carbon reduction goals for H7, 2030 and beyond that will deliver Net Zero emissions and is also aligned with the UK Government's Net Zero target. We need to cut carbon to enable Heathrow to operate and grow successfully in future, providing the benefits of affordable global air connectivity to UK consumers and cargo. Cutting carbon will also manage the risk of changing consumer and political sentiment on flying and rising carbon costs, which could all impact demand. We will also address other key sustainability impacts in our Heathrow 2.0 plan to maintain our commitments to the local community</p> <p>In H7 we will invest £188m, linked to the masterplan, and targeted at areas where direct Heathrow investment in H7 is necessary to deliver our Net Zero goals. This investment along with airport standards and incentives, investment and action by Team Heathrow companies, and the right Government policies, will reduce Heathrow's annual carbon footprint by 2.3 million tonnes against a 2019 baseline, by the end of 2026; and contribute to a reduction in Heathrow's annual carbon footprint of 3.48 million tonnes, against a 2019 baseline, by the end of 2030. This will keep Heathrow on a Net Zero trajectory in H7 and deliver improvements to aircraft noise, air quality and traffic congestion.</p> <p>This includes the following sub-objectives:</p> <ul style="list-style-type: none"> • Net Zero in the air (£110m) – airspace modernisation (including Easterly Alternation), air traffic management efficiency, upgrading Pre-Conditioned Air (PCA) units and enabling design work for zero emissions aircraft; and • Net Zero on the ground (£78m) – Surface Access projects to change mode share, electric vehicle charging, and design and operational trials for decarbonising heat and upgrading the airport electricity distribution network. • Easterly alternation will deliver aircraft noise improvements for the local community. Our Net Zero investment will deliver broader sustainability improvements, including a reduction in airport related air quality emissions and reduced traffic congestion as important secondary benefits. <p>This contributes to the following OBR measures; Value for money of Overall Journey, Reducing Heathrow's Carbon Footprint and an Airport that meets my needs</p>

Stakeholder outcomes delivered by the H7 Carbon and Sustainability Programme

3.10.25 The Carbon and Sustainability Programme will deliver the following stakeholder outcomes in H7:

Consumers: An airport I want to travel from that offers me a good value choice of flights

Consumers: I feel cared for and supported

Colleagues: Heathrow is Great Place to work

Community and Environment: Commitments made by Heathrow for sustainable airport growth are met

Changes to our Carbon and Sustainability Programme since RBP Update 1

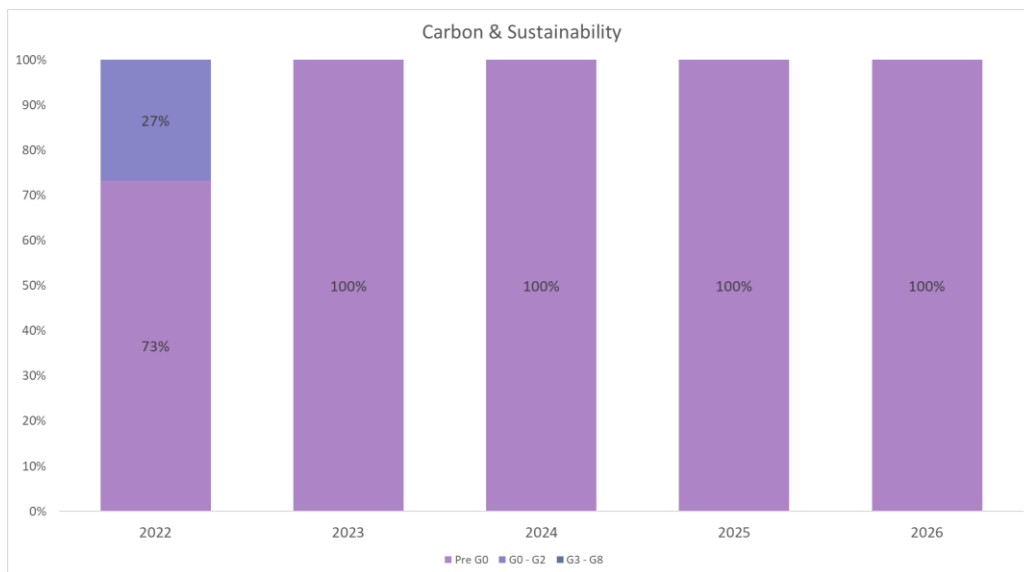
3.10.26 We have not adjusted the allowance allocated to our H7 Carbon and Sustainability Programme since RBP Update 1.

Current maturity summary view of the Carbon and Sustainability Programme through H7

3.10.27 The Carbon and Sustainability Programme is at a less mature stage than other programmes in our business plan. We have drawn on relevant existing business cases where they exist to inform the Programme, as well as the significant amount of data, modelling and forecasting and assessment that has been sourced and developed to create our Net Zero Plan.

3.10.28 A priority of the Programme mobilisation is developing solutions in greater detail and building maturity quickly, so we enable and then accelerate carbon reduction through the H7 period to hit our goals.

Figure 28: Current year by year level view of gateway status of the H7 Carbon and Sustainability Programme



Source: Heathrow

3.10.29 We provide a more detailed business case by business case view of proposed capital investment, maturity and basis for cost estimation in the H7 Carbon and Sustainability Programme Appendix included as part of this submission.

3.11 iH7 Rollover and Expansion

Our updated forecast for the iH7 Rollover and Expansion Programmes

Table 23: iH7 Rollover and Expansion investment forecasts

£m (2018p)	2022	2023	2024	2025	2026	H7	vs Update 1
iH7 Rollover	90	31	3	0	0	124	41
Expansion	6	6	6	6	6	30	30

iH7 Rollover £124m (2018p)

3.11.1 This enables ramp up related work for T3 and T4, as well as the completion of existing projects (such as the T5 TTS works and Kilo Apron Development) that are more efficient to complete than stop

3.11.2 Included in the iH7 rollover is the following:

- Terminal Track Transit (B6401) £32m
- Kilo Apron Development (B243) £45m
- T3 remobilisation £37m – this includes critical scope such as:
 - B6641.01 Care T3 Arrivals Level Transfer
 - B6203.03 Stands 309 311 and Pier 7 Airbridge Replacement
 - B6205.01 T3 BMS
 - B6205.05 T3 LV Switchboards
 - B6203.12 T3 UKBF - Phase 1
- T4 Critical Operational £9m – this includes:
 - B6201 T4 Fire Safety Systems

- B6203.07 T4 Toilets Renewal

All projects are post G3 and have been approved through external governance.

Expansion £30m (2018p)

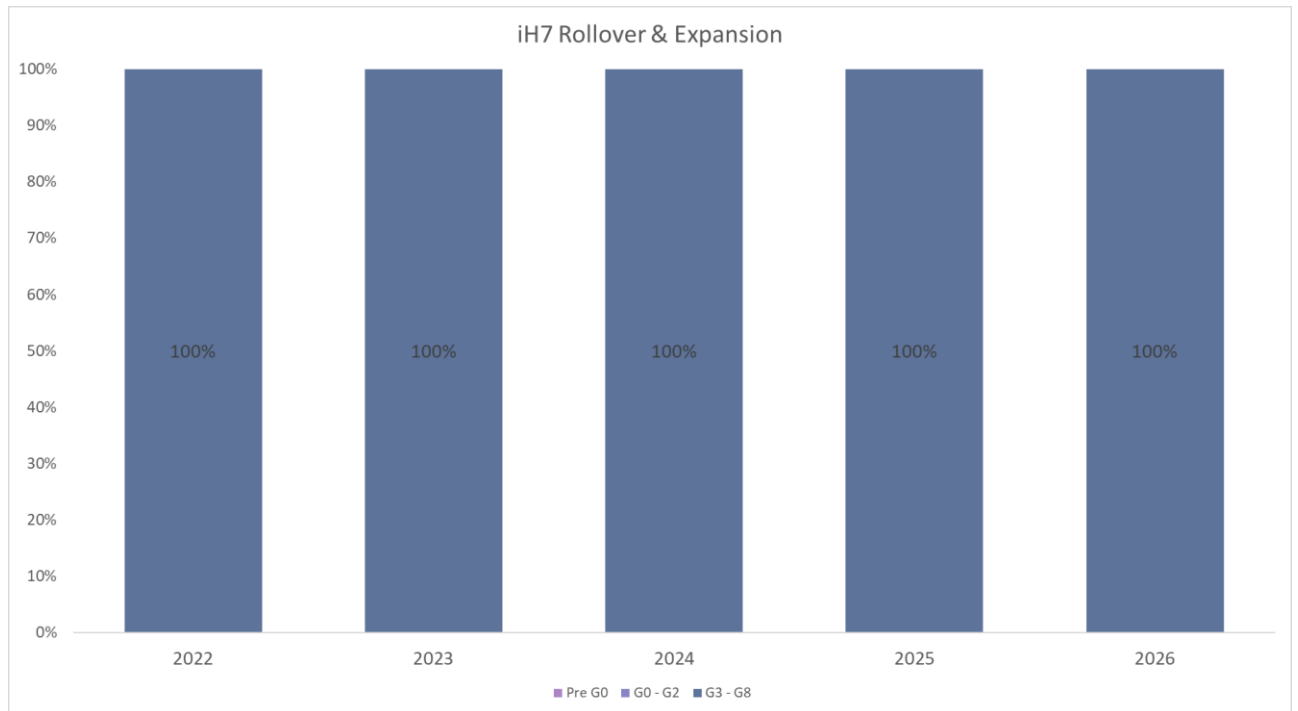
3.11.3 Heathrow Expansion Capital costs are largely associated to the IPHS (Interim Property Hardship scheme) and some ongoing commitments detailed below:

3.11.4 Heathrow recognises that the Supreme Court’s decision in December 2020 reinstating the Airports National Policy Statement (ANPS) has reignited interest in Heathrow Expansion and the property compensation schemes we had made available. Since that decision, Heathrow has been taking steps to reopen the Interim Property Hardship Scheme. We have had to consult with a range of stakeholders

3.11.5 From 1st May 2021 Heathrow’s Interim Property Hardship Scheme was reinstated. The Interim Property Hardship Scheme is available to eligible property owners who have a compelling need to sell their property but have been unable to do so, except at a substantially reduced price, as a direct result of the proposals for the Heathrow Expansion Project – and as a consequence are facing significant hardship. Therefore, we have estimated an annual spend of £6m.

3.11.6 In addition, in 2019 Heathrow entered into an agreement with [X].

Figure 29: Current year by year level view of gateway status of the iH7 Rollover & Expansion



Source: Heathrow

4 Operating Expenditure

4.1 Introduction

4.1.1 This section on operating expenditure sets out:

- The context for forecasting operating expenditure over H7 (see below);
- Errors in the CEPA/Taylor Airey (CEPA/TA) forecast that the CAA should correct before Final Proposals (see below);
- Updated operating cost forecasts using the evidence and assumptions described in the rest of this chapter (Section 4.2);
- Evidence to support the efficiency of 2019 as a base year and the inclusion of specific costs that CEPA/TA did not include (Section 4.3);
- Evidence used to derive the 2022 operating cost forecast (Section 4.4);
- Evidence in relation to estimating ongoing efficiency gains (Section 4.5);
- The need for capital investment in order to achieve further operating cost savings (Section 4.6);
- Evidence on additional costs to meet service obligations (Section 4.7);
- Evidence used to forecast how input prices will increase over time (Section 4.8);
- Description of the driver based forecast methodology used to forecast how costs vary with passenger volumes (Section 4.9);
- Evidence for other modelling updates including revised forecasts for costs associated with terminal reopening, insurance costs, business rates and pension costs (Section 4.10); and
- Our concerns relating to the CAA process for estimating operating expenditure and the choice of IP operating cost ranges (Section 4.11).

Context

4.1.2 As outlined in our RBP Update 1, we have externally verified that we were already approaching the efficiency frontier prior to Covid-19.¹ As a result of Covid-19, we rapidly sought to reduce our operating costs as much as possible through temporary and permanent savings. During this period, we have taken a zero-based budgeting approach to strip out costs and ensure we are entering H7 with an efficient base.

4.1.3 Our variable costs are intrinsically linked to our passenger volumes meaning most temporary savings made during the pandemic will not be sustainable over the medium to long term. As we move into the recovery period and passenger demand begins to return, our focus shifts to rebuilding the business in an efficient and sustainable manner so that our cost base is more flexible and can respond to the highly uncertain passenger demand outlook for H7.

¹ See RBP Update 1 Section 5.4.3 and RBP Section 7.1.4.

- 4.1.4 We have learnt from the experience of Covid-19, where our high proportion of fixed or semi-fixed costs made us more vulnerable than airlines² or other industries to a demand shock on the unprecedented scale of that triggered by the Covid-19 pandemic. Before Covid-19, 94% of efficient airport costs were fixed or semi-fixed³. 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 set outs the investments that are required to deliver future efficiencies in our operating costs towards the end of H7 and beyond.
- 4.1.5 However, as an asset-heavy service provider, in the short to medium term we are unable to significantly change our fixed costs (which account for more than 90% of total costs) without detrimentally impacting our infrastructure, resilience or service. For example, our asset availability targets set the expectation that all of our passenger sensitive assets, such as lifts, escalators and moving walkways are available 99% of the time. This reduces our ability to increase asset downtime or reduce maintenance even in the case of reduced demand. There are also major areas of our fixed costs that are out of our control, including business rates and other taxes, surfaces access costs and police costs.
- 4.1.6 The CAA has provided limited visibility of its calculations and assumptions meaning our review is partial and we are only able to respond to the operating cost assumptions set out by CEPA/TA. We provide a full discussion of the CEPA/TA key assumptions, highlighting errors in Sections 4.3 to 4.10 below. We provide an update of our own operating cost forecast based on our assumptions in Section 4.2.
- 4.1.7 The operating cost forecast proposed by CEPA/TA is not deliverable for consumers. It is based on flawed assumptions and contains double counting for both baseline adjustments and ongoing savings. Neither CEPA/TA or the CAA have carried out any validation of the forecast to assess its deliverability. In addition, the CAA has not recognised the level of stretch already included in our RBP Update 1 forecast.
- 4.1.8 The errors in the CEPA/TA operating cost forecast mean that the CAA substantially underestimates the cost of efficiently meeting demand over H7. This is evidenced by:
- Large differences between the CEPA/TA forecast costs and Heathrow forecast costs for 2022 which have been verified by our detailed budgeting process;
 - High level sense checks that show that the cost savings implied for H7 are unrealistic and unachievable (see below);
 - The CAA has not engaged with the critical role capital investment has on facilitating operating cost efficiency and appear to have constructed its forecast

² Only 50% of an airline's costs are fixed - <https://www.iata.org/en/iatarepository/publications/economic-reports/airlines-financial-monitor-september-2020/>

³ As shown in Figure 5, Section 4.4 below

ranges independently of any consideration to available capital spend. This approach directly contradicts the CAA's own business planning guidance for the revised business plan published in June 2020⁴:

“HAL should demonstrate that its forecasts of opex and commercial revenues are integrated with other areas of the RBP: opex forecasts should be clearly linked to anticipated operational activity (e.g. increased use of a particular terminal by passengers) and changes in service quality during the H7 period. HAL should show that its opex and commercial revenue forecasts are consistent with planned capital investment.”

- 4.1.9 The CEPA/TA forecast for 2022 would require serving 43m passengers with lower operating costs than was needed to serve 22m passengers in 2020. Their forecast is £173m below our updated forecast of £1,064m for 2022, which has been verified by our detailed budgeting process. Our budgeting process ensures our forecast reflects both the operational reality of ramp-up to serve 45.5m passengers and regulatory precedent for an airport with efficient costs. Section 4.4 describes the evolution of our costs from 2019 to 2022 and provides further discussion of the discrepancy between the CEPA/TA and our updated forecast for 2022.
- 4.1.10 By 2026, CEPA/TA suggest we can deliver operational cost savings of 18% (£216m) compared with 2019 despite assuming only 7% fewer passengers. On a like-for-like passenger basis, the CEPA/TA forecast would be £182m (15%) lower than in 2019 in 2026. There is no regulatory precedent for this level of stretch and to suggest we can make this level of savings from an efficient cost base is not credible and has not been in any way justified by the CAA or its consultants. Further details of the deliverability of the H7 forecast are set out in Section 4.2.
- 4.1.11 The errors in the CEPA/TA operating cost forecast relate to the following key areas:
- Overestimation of the efficiency gains that need to be achieved in the base year in order to be efficient relative to relevant benchmarks – Section 4.3 sets out the efficiency of our base year and the double counting from CEPA/TA by including both permanent savings and a 1.4% reduction to the base year.
 - Overestimation of the ongoing efficiency gains that need to be sustained in order to remain efficient relative to benchmarks – Section 4.2 sets out high level benchmarking showing how stretching the H7 forecast is, particularly as savings are assumed from capex but there is no allowance for the capital spend in the three envelopes proposed by the CAA. Section 4.6 provides details of the double counting from CEPA/TA by including both specific efficiencies related to the security transformation programme, and unspecific ongoing savings of 1% per annum.
 - Underestimation of the impact of increasing input prices – we have commissioned Frontier Economics to review our approach to input price inflation, which is set out in Section 4.8, including an update to the latest

⁴ CAA, CAP1940, Economic regulation of Heathrow: policy update and consultation, Appendix E: Guidance for the revised business plan, Criterion 18, page 100, June 2020.

external forecasts which reflect the significant increases in inflationary cost pressures since RBP Update 1.

- Overestimation of the impact of passenger volumes on operating costs, failing to recognise the level of fixed costs at an efficient airport – Section 4.4 sets out the temporary, volume related and permanent savings we have made since 2019. Section 4.3 sets out how CEPA/TA have double counted savings from the Cost of Change programme and organisational restructure.

- 4.1.12 The impact of the CEPA/TA errors on operating costs is over £850m through the H7 period. The cost categories with the largest variance over H7 are People [⌘] lower), Operational Costs [⌘] lower) and Utilities [⌘] lower).
- 4.1.13 Further, the choice of upper and lower ends of the range of cost estimates is arbitrary and sets the wrong regulatory incentives. In the Initial Proposals the CAA present an upper and lower range for the H7 operating cost targets. The range is constructed using two scenarios as lower (25% from floor to ceiling) and upper quartile (75% from floor to ceiling) forecasts for operating costs. The ceiling is Heathrow's RBP update 1 mid case low adjustment forecast, scaled to the CAA mid case passenger forecasts. The CAA appointed CEPA/TA to develop operating costs assessments and projections to support the Initial Proposals. The floor is the CEPA/TA mid case scenario. The CAA range is therefore skewed and does not reflect a bottom-up view of cost or even the centre of the range.
- 4.1.14 Finally, we have concerns about the basic process steps that the CAA has followed to establish an efficient operating cost forecast for H7. There is a profound lack of evidence from the work undertaken by the CAA. This is not what we would expect at this late stage in the process. The CAA does not appear to have considered any basic cross-checks to assess whether the proposed operating cost range could be delivered by an efficient operator. The CAA published its Initial Proposals on service targets a month after the main Initial Proposal consultation, which still only contains the service level targets for a subset of the measures. This means we are not able to fully understand the delivery requirements which sit alongside the CAA's operating cost proposals.

CEPA/TA errors the CAA should correct before Final Proposals

- 4.1.15 We identify **eight specific changes** to the CEPA/TA approach that would deliver a more accurate operating cost forecast and better consumer outcomes for H7:
- 1) Removal of double count in baseline adjustments - Applying an overall baseline efficiency adjustment as well as specific adjustments to reflect the effect of individual operational changes double counts the efficiency required to move Heathrow to the efficiency frontier. This means that CEPA/TA have used a baseline that is £47m below the baseline costs for an efficient airport, which results in an underestimation of £235m to the overall H7 operating cost forecast. See section 4.3 for full details.
 - 2) Removal of double count for ongoing efficiency - Applying an overall ongoing efficiency adjustment to reflect movement of the efficiency frontier during H7 as well as adjustments to reflect specific operational changes, such as those associated with the capital plan, double counts the future efficiency adjustments required to ensure Heathrow keeps up with the efficiency frontier. The impact of

CEPA/TA overestimating the ongoing efficiency requirements for H7, is to underestimate the efficient H7 operating cost forecast by £131m. See section 4.5 for full details.

- 3) Full inclusion of the additional Covid-19 costs - to deliver our obligations for hygiene and cleanliness - CEPA/TA have incorrectly assumed that our obligations for hygiene and cleanliness will not be present throughout H7 and as a result have underestimated the efficient H7 operating costs by [£]. See section 4.7 for full details.
- 4) Inclusion of the additional Enhanced Service costs for passengers requiring support (PRS) - CEPA/TA have failed to include the additional costs required to deliver our service obligations for PRS and underestimated the efficient H7 operating costs by [£]. See section 4.7 for full details.
- 5) Correcting the errors in input price assumptions – the assumptions CEPA/TA have made for input price inflation do not reflect the costs pressures we are exposed to, underestimating the efficient H7 operating cost forecast by £154m. See section 4.8 for full details.
- 6) Correcting for the adjustments to elasticities - CEPA/TA have made adjustments to elasticities at a cost category level that do not reflect the operational realities of our cost base, underestimating the efficient H7 operating cost forecast by £158m. See section 4.9 for full details.
- 7) Correcting errors in ramp-up assumptions for Terminal 4 reopening – CEPA/TA have underestimated the costs required to prepare Terminal 4 for reopening by [£]. See section 4.10 for full details.
- 8) Correcting the Insurance forecast error – CEPA/TA have reduced the forecast growth in insurance costs from [£]. They have provided no justification for this and the impact is an underestimation of our insurance costs over H7 by [£]. See section 4.10 for full details.

4.1.16 If the CAA is to use the CEPA/TA forecast as a basis for estimating the H7 efficient operating costs for the Final Determination, these errors must be corrected. This would increase the CEPA/TA forecast by £739m.

4.2 Our updated H7 operating cost forecast

4.2.1 This section sets out our updated operating cost forecast, reflecting the updated passenger demand forecast. The forecast also incorporates the modelling assumption updates we have made since RBP Update 1 based on the latest available evidence.

Table 1 - H7 operating cost forecasts – RBP Update 1 vs Update 2

Total operating costs (£m, 2018p)	RBP Update 1	RBP Update 2	CEPA/TA	CEPA/TA vs RBP Update 2
People				
Operational costs excl. insurance				
Insurance				
Facilities and maintenance costs	[X]	[X]	[X]	[X]
Rates				
Utility costs excl. distribution contract				
Distribution contract				
General expenses				
Total Core Operating Costs	5,334	5,363	4,634	-729
Covid-19 costs				
Terminal drop-off Charge costs				
Surface access strategy costs				
Enhanced service costs	[X]	[X]	[X]	[X]
Security Programme costs				
Terminal 4 ramp-up costs*				
Terminal 4 red list costs*				
Total Operating Costs	5,575	5,593	4,742	-851

*Note: In RBP Update 1, Terminal 4 ramp-up and red-list costs were included at a category level in core operating costs. For clarity we have separated out these costs in RBP Update 2.

Source: Heathrow

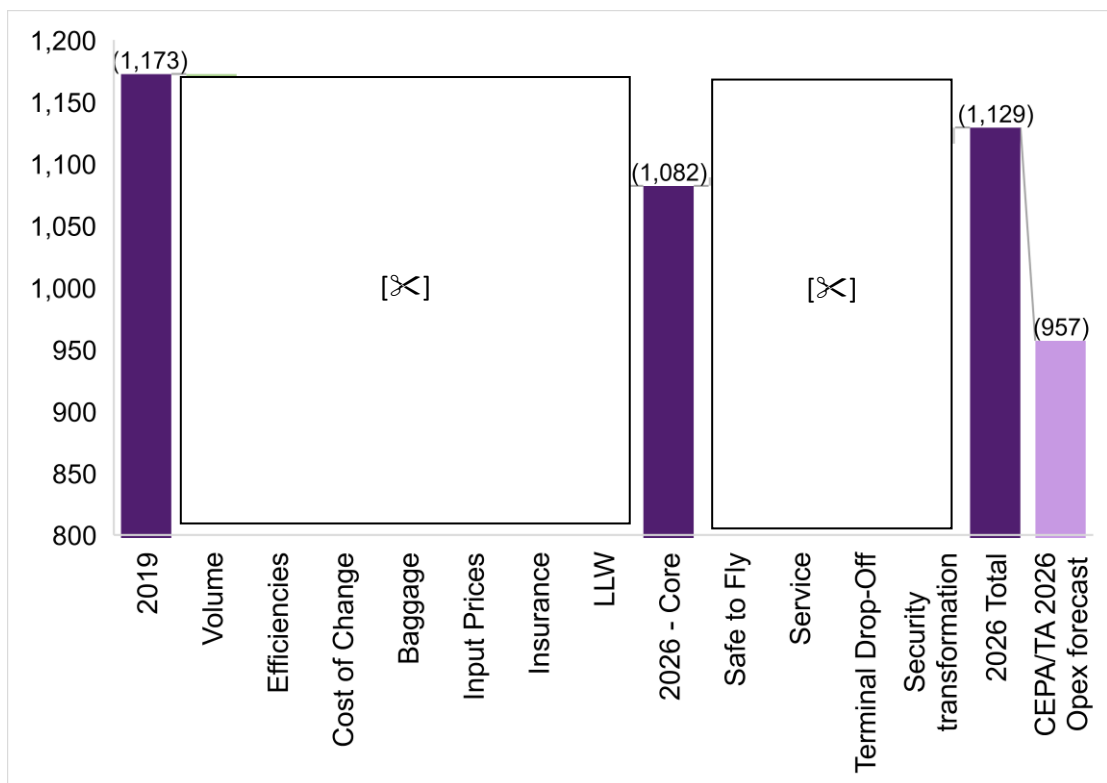
Deliverability

4.2.2 The CEPA/TA forecast is £851m below our RBP Update 2 forecast for H7. The cost categories with the largest variance over H7 are:

- People [X] lower),
- Operational Costs ([X] lower) and
- Utilities ([X] lower).

- 4.2.3 The variance in Utilities is primarily because in RBP Update 2 we have updated our forecast for energy prices (see section 4.8) to reflect the significant increases since RBP Update 1. However, the remaining variances are driven by errors in the modelling assumptions made by CEPA/TA and a failure to validate the model predictions. This has resulted in an unrealistic and undeliverable forecast for H7.
- 4.2.4 Further, the forecast implies efficiency gains that would move Heathrow well beyond the efficiency frontier of benchmark operators. This is a crucial point – applying an overall efficiency adjustment to reflect the movement of the efficiency frontier as well as adjustments to reflect specific operational changes double counts the efficiency adjustments required to ensure Heathrow keeps up with the efficiency frontier.
- 4.2.5 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 additional costs to meet service obligations (cost overlays). By 2026 our plan will deliver £87m of savings per annum compared with 2019. Despite the cost pressures we are facing during H7, core operating costs in 2026 are £50m lower than in 2019 and total operating costs are £65m lower. In total we plan to deliver £328m 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 for our outcomes.

Figure 1 – Changes in operating costs from 2019 to 2026 (£m, 2018p)



Source: Heathrow

- 4.2.6 As shown in the figure above, the CEPA/TA forecast for 2026 is 18% (£216m) lower than 2019 despite assuming only 7% fewer passengers. This implies a cost volume elasticity of 2.5 - an extremely aggressive assumption with no basis in commercial

experience, regulatory precedent or academic literature, where the established elasticity range is 0.3 – 0.7.⁵

- 4.2.7 In their analysis of comparator airport operating costs per passenger from 2000 – 2019, KPMG⁶ found that operating costs have increased at a rate of up to 2.3% per year faster than general inflation (CPI), after allowing for changes to outputs and input prices. In other words, all else equal airport costs are increasing over time. This further highlights the level of stretch included in the CEPA/TA forecast.
- 4.2.8 On a like-for-like passenger basis, the CEPA/TA forecast would be £182m (15%) lower than in 2019 in 2026. To suggest we can make this level of savings from an already efficient cost base is not credible. The savings assumed by CEPA/TA are largely driven by their assumptions on People costs, where they are forecasting costs to be [X] lower in 2026 than in 2019. By 2026, they are assuming we will be able to operate the airport with around [Y] fewer security colleagues than in 2019. CEPA/TA also suggest this can be achieved regardless of the level of capital investment in security. These assumptions highlight a significant lack of understanding of the fundamentals of our operation. We provide a more detailed discussion on CEPA/TA's assumptions for security in Sections 4.6 and 4.9.

Comparing the H7 forecast to regulatory precedent

- 4.2.9 Frontier Economics⁷ have reviewed our operating costs forecast and the CEPA/TA forecast in comparison to regulatory precedent. They note that academic literature and regulatory precedent suggest that operating cost elasticities tend to lie within a range of 0.3-0.7⁸. This included reference to CEPA's work in 2019 for the Commission for Aviation Regulation (CAR) for the price control for Dublin Airport:

“The general consensus of the regulatory studies is that the elasticity of opex with respect to passenger numbers is between 0.3 and 0.5, whilst the academic papers estimate an elasticity in the range 0.5 to 0.7. One explanation for this difference is that academic papers may take a long-run approach to estimating airport elasticity where capacity is treated as variable. If airports increase capacity in the long-run in response to growing passenger numbers, this can explain why academic studies find higher elasticity estimates than their regulatory counterparts.”⁹

- 4.2.10 The CEPA/TA forecast has an implied overall top-down passenger to operating costs elasticity of 0.16 when considering the growth in operating costs and passenger volumes from 2022 to 2026. This is in combination with the highly aggressive cost savings implied by their forecast when considering the changes in costs from 2019 to 2026, which implies an elasticity of 2.5 as discussed above.¹⁰ Frontier Economics conclude that as a high-level sense check this suggests that the CEPA/TA forecast is unrealistically stretching.

⁵ Frontier Economics, H7 IP Opex Review, December 2021.

⁶ KPMG, Airport Operating Cost Efficiency Benchmarking, December 2021.

⁷ Frontier Economics, H7 IP Opex Review, December 2021.

⁸ A list of the regulatory and academic studies Frontier Economics have reviewed is included in – Frontier Economics, Developing opex and commercial revenue elasticities for H7, October 2019, Figure 33.

⁹ <https://www.aviationreg.ie/fileupload/2019/Draft%20Determination/2020-2024%20Draft%20Opex%20Efficiency%20Study.pdf>

¹⁰ In the context of cost savings from reduced passenger demand, the higher the elasticity the more challenging the target; when considering growing passenger volumes, a lower elasticity indicates a more challenging cost target.

- 4.2.11 The RBP Update 1 forecast had an implied overall top-down passenger to operating costs elasticity of 0.21 and is therefore also significantly more stretching than regulatory precedent. Frontier Economics highlight that this appears to have gone largely unrecognised by the CAA.
- 4.2.12 In addition, Frontier Economics reviewed the outturn operating cost elasticities between 2013 and 2017 for over 30 comparator airports. They used ATRS data, selecting only airports with at least 40m passengers in 2017 to restrict the sample to include only airports of comparable scale and complexity to Heathrow. In this sample only 5 airports (15%) achieved an elasticity of 0.16 or lower¹¹.

4.3 Efficiency of our 2019 base year

- 4.3.1 In the RBP we presented a range of evidence to demonstrate that 2019 represents an efficient baseline for our H7 operating costs forecast. As set out below, there are three main areas where CEPA/TA's approach has led to underestimation of the efficient cost of operation given Heathrow's operating environment:
- The concerns raised by CEPA/ TA relating the Heathrow's operating efficiency are not supported by the evidence;
 - The efficient baseline for 2019 should be based on the 75th cost percentile in line with regulatory best practice and not based on unnecessarily simplistic averages; and
 - Adjustments should be made to the 2019 baseline to reflect the efficient costs of operation in 2019.

Evidence base to support efficiency assumptions

- 4.3.2 CEPA/TA noted three main limitations of our evidence base with respect to Heathrow's efficiency in 2019:
- 1) While Heathrow met the overall Q6 price control targets, *"this was not universal across all categories of cost and People costs were a notable exception."*
 - 2) The reasons for operating costs per passenger increasing between 2018 and 2019 *"are not clearly provided [and] cannot be explained by volume effects."*
 - 3) The data used in the benchmarking *"is dated and it is not always clear that comparators chosen are directly relevant."*

We address each of these points in the following sections.

People costs in Q6

- 4.3.3 We achieved [§<] in people cost efficiency savings in Q6, however, people costs in 2018 were still above the CAA target. This was driven by a number of identifiable cost drivers that were not foreseen with CAA set Q6 costs, they are:
- Passenger numbers were 5% higher than the CAA's forecast;
 - Unforeseen external factors such as the Apprenticeship Levy and increased employer National Insurance contributions; and

¹¹ Frontier Economics, Developing opex and commercial revenue elasticities for H7, October 2019

- Deliberate choices to improve passenger satisfaction by investing more in training and development¹² and increase security and resilience by increasing landside patrolling¹³.

- 4.3.4 In Q6 we took a balanced approach to people change to reflect the high degree of unionisation, which means that people change takes longer and requires care to minimise the risk of industrial action. We also need to balance cost with the service passengers receive and our desire to offer colleagues a great place to work. The impact of Covid-19 meant that we have accelerated our people change strategy to deliver long term sustainable and efficient wages, addressing the issue of legacy contracts for operational colleagues.
- 4.3.5 We ensure our people costs are efficient and salaries are in line with the market using a reward framework based on a broad band structure using the Willis Towers Watson grading methodology and a job family approach which groups job with similar skills and responsibilities. Our reward framework delivers pay parity, improved transparency and clear career paths whilst ensuring robust benchmarking against market data. All roles, and new hires, are now assessed annually against market rates using Willis Towers Watson benchmarking data as well as other data sources where appropriate.
- 4.3.6 Through the Cost of Change program, all negotiated grades have now been migrated to new broadband terms and conditions. This will deliver ongoing cost savings and ensures we are systematically aligned with the market for all roles at all levels across Heathrow. The savings from this are included in our plan as part of the Cost of Change program.
- 4.3.7 Our inclusion in H7 of the [£] savings per annum (relative to 2019 passenger volumes) associated with the cost of change program, addresses any perceived inefficiency in our 2019 people costs. It is significantly greater than the [£] (nominal) adjustment CEPA/TA propose making to the 2019 baseline to represent an efficient starting position. The inclusion of both adjustments is a double count, and, therefore, an error which must be reversed.

2019 operating costs per passenger

- 4.3.8 CEPA/TA state that it is unclear why costs increased in 2019. As set out in the RBP (Section 7.1.4.6, p25). The increase in operating costs per passenger in 2019 (£14.50 vs £14.12 in 2018 (2018 prices)) was primarily driven by:
- Additional [£] per passenger to improve security, resilience and service – implementing new hold baggage screening (in 2018 this cost had been paid for directly by the airlines), upgrading drone defence capabilities (in response to the drone incident at Gatwick Airport in December 2018), increased provision for passengers with reduced mobility to address identified service gaps and additional passenger ambassadors.

¹² The training packages ranged from service improvement, which was rolled out to all colleagues, leadership capability, which was designed for our line managers to support the changes to ways of working and process efficiency training, to up skill our operational leaders and key colleagues on identifying process efficiency enhancement to drive productivity.

¹³ This is best practice and secured Heathrow's boundaries whilst also protecting its passengers and colleagues. Large operational sites have this additional layer of protection, especially post Manchester arena bombing.

- Additional [£] per passenger due to the introduction of a new government carbon levy, a cost driver outside of Heathrow's control.
- Additional [£] per passenger to improve future efficiency – investment in the Magenta program and enhancements to our IT systems including increased cyber security. The increasing move to cloud-based IT services results in a shift from capital expenditure to operating costs for IT and will reduce overall costs. This increase of operating costs in IT reflects the nature of the digital revolution on which capital costs required to run and maintain on-premises activities are being replaced by subscription services to subscription-based solutions, which are more cost-effective, secure and resilient.

4.3.9 These cost increases were efficient as all either responded to airline requests and had airline support and/or were new regulatory requirements. Without these extra costs, 2019 costs were £14.05 and therefore lower than 2018 at £14.12 (2018p).

Update to KPMG benchmarking analysis

4.3.10 We have commissioned KPMG to update the detailed econometric benchmarking analysis of our operating costs they previously carried out in 2019, to now include 2019 data¹⁴. The KPMG analysis compares only like for like costs for comparators that are directly relevant and considers the characteristics of airports that drive costs. It provides a measure of the level of efficiency that would be expected from an airport with the characteristics of Heathrow. This approach is commonly used by regulators as the primary way of assessing efficiency.

4.3.11 As in their previous work, KPMG's analysis involved:

- Identifying key factors that influence airport operating costs:
 - Airport size – number of passengers served, amount of cargo and volume of non-aeronautical revenue;
 - Airport characteristics – proportion of international passengers and service quality measured by ASQ;
 - Airport congestion – number of runways and number of gates;
 - Airport infrastructure – scale of airport infrastructure measured overall value of core assets;
- Using a large dataset comprising of 28 UK and international airports that are directly relevant from 2000 to 2019;
 - Normalising the data across different airports by removing inflation and making adjustments that make the data more comparable, such as excluding business rates and other local taxes;
 - Adjusting for differences in operating environments such as utility prices that are outside the airports' control;
- Analysing a large number of potential models using different cost drivers, 1,727 possible combinations of cost drivers were reduced to 91 models using

¹⁴ KPMG, Airport Operating Cost Efficiency Benchmarking, December 2021.

quantitative and qualitative criteria, further analysis filtered the models to 5 preferred cost functions; and

- Applying the selected 5 econometric models to historical data to quantify the gap between the operating costs if Heathrow performed as an average or upper quartile airport and our actual operating costs.

4.3.12 Table 2 below shows the preferred models used by KPMG¹⁵. The coefficients show the estimated percentage change in core operating costs from a 1% change in the cost driver variable.

Table 2 – KPMG preferred model specifications

	Model 1	Model 2	Model 3	Model 4	Model 5
Number of Passengers	0.78				
Number of workload units (WLU)		0.94	0.65	0.51	0.41
Asset size (as measured by core assets)					0.11
Non-aero revenues (NAR)			0.31	0.24	0.25
Proportion of International Passengers (IP%)				0.83	0.80
Model specification	RE	RE	FE	RE	RE
Airport-Term for Heathrow	0.71	0.45	2.24	0.40	0.28
Intercept	5.69	2.83		5.09	4.35
Scale term (sum of scale coefficients)	0.78	0.94	0.96	0.75	0.77
Adjusted R2	67%	74%	84%	92%	92%
Number of observations in sample	476	446	426	367	367
Number of airports in sample	28	26	26	26	26

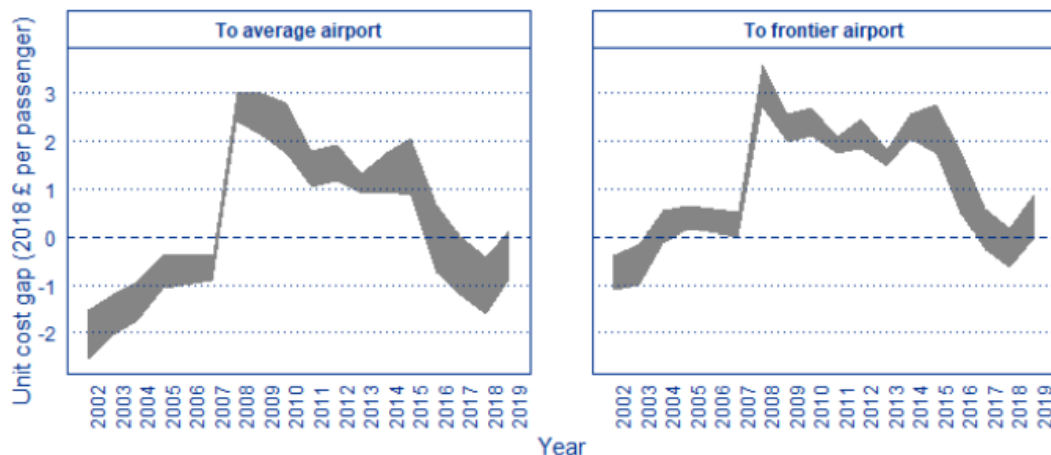
Note: All coefficients are significant at the 5% level

Source: KPMG

4.3.13 Using the preferred models, KPMG concluded that Heathrow’s relative efficiency has changed over time as shown in the figures below, where the shaded area below zero indicates our costs are lower than the average/frontier costs per passenger.

Figure 2 - Heathrow operating cost gap against the average and top performing airport operation

¹⁵ All variables were regressed in log form except the proportions of international passengers



Source: KPMG

4.3.14 In 2018, based on the mid case of the estimates from the preferred models, operating costs were 8% lower than the average airport and 2% lower than the frontier airport. In 2019, as we were gearing up for growth, our costs were 3% lower than the average airport and 4% higher than those of an airport at the efficiency frontier. The table below shows the estimated cost gap to the average and frontier airport. Note, econometric methods cannot capture all efficient drivers of cost. Therefore, we have followed regulatory precedent to consider companies with operating costs at the 75th cost percentile to represent an efficient business.

Table 3: Heathrow efficiency results using the mid case of estimates from the preferred models

	Cost gap to the average						Cost gap to the frontier					
	2014	2015	2016	2017	2018	2019	2014	2015	2016	2017	2018	2019
£ per passenger (2018 prices)	1.35	1.48	-0.02	-0.59	-1.01	-0.36	2.30	2.26	1.16	0.17	-0.22	0.47
%	11.6%	12.8%	0.2%	-4.8%	-8.4%	-2.9%	19.7%	19.1%	9.9%	1.6%	-1.7%	4.1%

Source: KPMG

4.3.15 In 2019, our costs per passenger ranged from £0-£0.93 above the frontier airport, with a central estimate of £0.47. In response to the Covid-19 pandemic, we brought forward [£] of permanent savings (relative to 2019 passenger volumes) associated with the Cost of Change program and the renewal of the baggage contract. This is equivalent to a saving of [£] operating cost per passenger on a 2019 passenger volume basis. Based on the KPMG central estimate (£0.47), the actions we took in 2020 bring our 2019 cost base in line with the efficiency frontier.

4.3.16 CEPA/TA stated that it was not always clear that the comparator airports in our benchmarking analysis are directly relevant. The KPMG analysis uses data from 28 UK and international airports. As shown below, the data largely relates to large European airports but also includes data from airports in the United States, Australia, Hong Kong, Singapore and South Korea. The airports were selected based on availability of data and comparability to Heathrow considering those which are also large, have high service quality, high passenger volumes and high utilisation. The

sample also included all 16 of the airports included in the CAA's analysis of operating costs for Q6¹⁶.

Figure 3 – Airports included in the KPMG analysis



Source: KPMG

Establishing an efficient baseline

4.3.17 Consistent with regulatory precedent, KPMG considers companies with operating costs at the 75th cost percentile to represent an efficient business. This approach is commonly used by regulators as the primary way of assessing efficiency.¹⁷ Most recently, in the Competition and Markets Authority's (CMA) final price control determinations for four water companies that rejected the Ofwat price determinations, the CMA decided that the 75th percentile is the appropriate level of efficiency benchmark¹⁸. The CMA also used a similar econometric modelling approach as KPMG when assessing the water companies' base costs.

4.3.18 Rather than following regulatory precedent, CEP/TA have instead adopted an overly simplistic approach to assessing the efficiency of the 2019 baseline. They take an average of the operating costs per passenger from 2017 to 2019, adjusted to 2018 CPI prices, and suggest that the variance in 2019 to the average is inefficiency. In contrast to regulatory precedent and our approach described above, this approach is limited in three key ways:

- it does not take account of any of the key drivers of cost other than passenger volumes;
- it does not consider costs outside the airport's control; and

¹⁶ CAA Airport Operating Expenditure Benchmarking Report 2012, June 2013, CAP1060.

¹⁷ Both Ofgem and Ofwat have used econometric benchmarking in their price reviews. (Ofgem, RIIOD1: Final determinations for the slow-track electricity distribution companies, Business plan expenditure assessment, November 2014; Ofwat, PR19 draft determinations: Securing cost efficiency technical appendix, July 2019)

¹⁸ CMA, Anglian Water Service Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Services Limited price determinations Final Report, March 2021, Paragraph 4.494, p232.

- it does not compare our performance to comparator airports to identify relative efficiency.

This means that it is not an appropriate basis to determine if an adjustment to the baseline is required.

Adjustments to the 2019 baseline

- 4.3.19 As previously stated in the RBP and Update 1, we have removed £1.8m (nominal) of Expansion costs from the 2019 baseline costs. This aligns to our Cat B submission for 2019.
- 4.3.20 In Update 1 we set out that as part of Expansion, colleagues outside of the programme team carried out work on Expansion projects. A threshold of [£] was applied before their time was classified as Expansion. The costs that were reallocated and capitalised as a result of this process were [£] in 2019. Any colleagues supporting Expansion on an ad hoc basis, less than the [£] threshold, would be significantly less than the allocated [£] and immaterial to the 2019 baseline. Indeed, if the costs were material, Heathrow would have been incentivised to ensure these costs were capitalised.
- 4.3.21 In CEPA/TA's assessment they recommend retaining the adjustment pending further assessment, raising that *"a lack of clarity in the treatment of capitalised staff costs in the Statutory and Regulated accounts may disguise inconsistencies or double counting."* It should be noted that we have provided the CAA with a reconciliation of our 2019 regulatory and statutory accounts at a cost category level and had a follow up session with them to ensure there was no such lack of clarity.¹⁹
- 4.3.22 In the RBP and Update 1, we made an adjustment to the 2019 baseline to reflect the cost increase of the commitment that all our suppliers would be paying the London Living Wage from 2022 onwards. Since RBP Update 1, we carried out further reviews of our major contracts including the timings for implementing the London Living Wage and the associated cost impact. The details of this review and examples of how the commitments are implemented are set out in Appendix A10 - Additional analysis to support operating cost assumptions. By April 2022 all of our contracts will be aligned to the London Living Wage, the full year impact of this is an increase of [£] compared with the 2019 baseline. This represents an increase of [£] compared with Update 1, driven by the increase in the London Living Wage rate and updated analysis on the cost impact as the commitment has been incorporated into our contracts agreements.
- 4.3.23 CEPA/TA suggest that suppliers would mitigate the cost increases themselves and have applied a 25% efficiency to our London Living Wage cost estimate. Aside from being poor business practice, it is not the nature, or frankly the spirit, of the London Living Wage commitment and not how the commitment is implemented in our contract agreements.
- 4.3.24 CEPA/TA have also included 50% of the [£] savings identified in 2020 associated with the reorganisation as a baseline adjustment. For negotiated grades this is straightforward double count with the savings associated with the Cost of Change program already included in the plan, which includes both colleagues who accepted revised terms and conditions and those who chose to leave through voluntary severance. For non-negotiated grades it double counts the volume related savings already included in the plan, reflecting the expected changes in people costs with

¹⁹ Reconciliation provided on 27/07/21, follow up engagement on 29/07/21

passenger volume. We have only been able to align our people costs to the current passenger volumes because of the actions taken in 2020/21 but this does not mean that costs will not return when passenger volumes grow.

- 4.3.25 Applying an overall baseline efficiency adjustment as well as specific adjustments to reflect the effect of individual operational changes double counts the efficiency required to move Heathrow to the efficiency frontier. This means that CEPA/TA have used a baseline that is £47m below the baseline costs for an efficient airport, which results in an underestimation of £235m to the overall H7 operating cost forecast.

4.4 2022 Operating Cost Forecast

- 4.4.1 As described in the rest of this sub-section, CEPA/TA have overestimated the level of savings in 2020 and 2021 that can be efficiently sustained without compromising resilience, safety and customer service. There are also a number of assumptions that CEPA/TA have used that do not appear to be justified. Given this, we provide our estimate of what efficient operating costs would be in 2022.

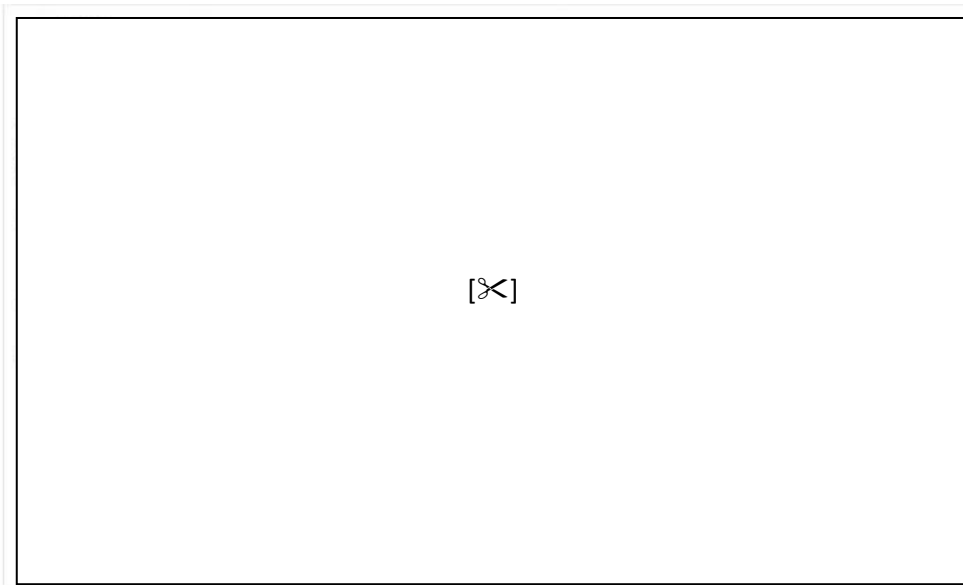
Sustainability of cost savings between 2019 and 2022

- 4.4.2 CEPA/TA have overestimated the level of savings Heathrow achieved in 2020 and 2021 that can reasonably be sustained without compromising resilience and service. For example, while we successfully reduced our variable and semi-fixed costs to protect our business and financial position through Covid-19, this was primarily achieved by making use of time-limited government schemes, temporarily reducing headcount and consolidating our operation. These are not replicable in the H7 period as they are largely driven by passenger numbers. The only permanent reductions are cost of change and baggage. Furthermore, despite significant scrutiny on our fixed cost, we are unable to significantly reduce these.
- 4.4.3 Assuming a lower cost point for 2022 has a significant impact on the overall viability of the airport's plans. It means that Heathrow would need to reduce our operating costs further on H7 entry, which would have a direct impact on resilience and service. This is further compounded by the stretching targets the CAA has proposed, which have no consideration of the link between passenger volumes, capital investments and operating cost.
- 4.4.4 KPMG assessed our operating costs and deemed that we were operating at the efficiency frontier prior to Covid-19, and therefore significant cost savings could not be achieved. Without capital investment to facilitate a step change in our operational environment, an assumption of significant further cost reduction is a basic unsubstantiated error in the initial proposals that must be addressed in the Final Proposals.
- 4.4.5 In our RBP Update 1, we provided the evolution of cost from 2019 to 2020. We achieved the largest saving in people costs which included;
- [X] from temporary pay reductions of 10-25% for all colleagues;
 - [X] from the negotiated grade reorganisation with over 1,100 fewer roles through voluntary severance, redundancies or leavers not being replaced;
 - [X] from the non-negotiated grade reorganisation with around 500 fewer roles through voluntary severance, redundancies or leavers not being replaced;

- [X] from the furlough scheme, where an annualised average of 1,336 FTE per month were furloughed, peaking at 3,329 FTE in May;
- [X] from other measured including reductions to overtime, bonuses and contractors; and
- Offset by [X] to account for capitalisation of people cost.

4.4.6 Where possible, we also made significant cuts in contract costs, rates and non-essential spend. This is demonstrated below by Figure 4.

Figure 4 - Operating costs in 2019 and 2020 (2018p)



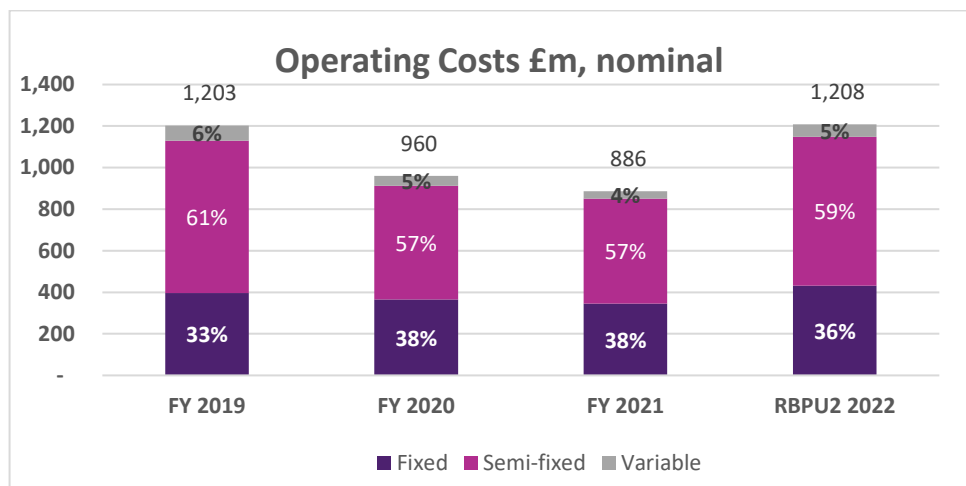
Source: Heathrow

4.4.7 We have reviewed the evolution of our costs from 2019 to 2022, to assess which of these changes are permanent, or not. The key theme is that most of these changes are indeed not permanent. Adjustments to fixed cost are only possible if we restrict capacity over the longer term (for example, having fewer NATS controllers). We believe it is not appropriate to compromise recovery.

4.4.8 As stated in our RBP Update 1, it is only cost of change and baggage costs that will have a permanent reduction. Figure 5 shows the evolution of our cost profile, where;

- Fixed costs – include costs such as Rates, Police, NATs and Insurance;
- Semi-fixed costs – include costs such as people, pension, maintenance, utilities, cleaning and marketing; and
- Variable costs – include costs such as PRS, bussing and service agents.

Figure 5 - Evolution of fixed, semi-fixed and variable costs (£m, nominal)



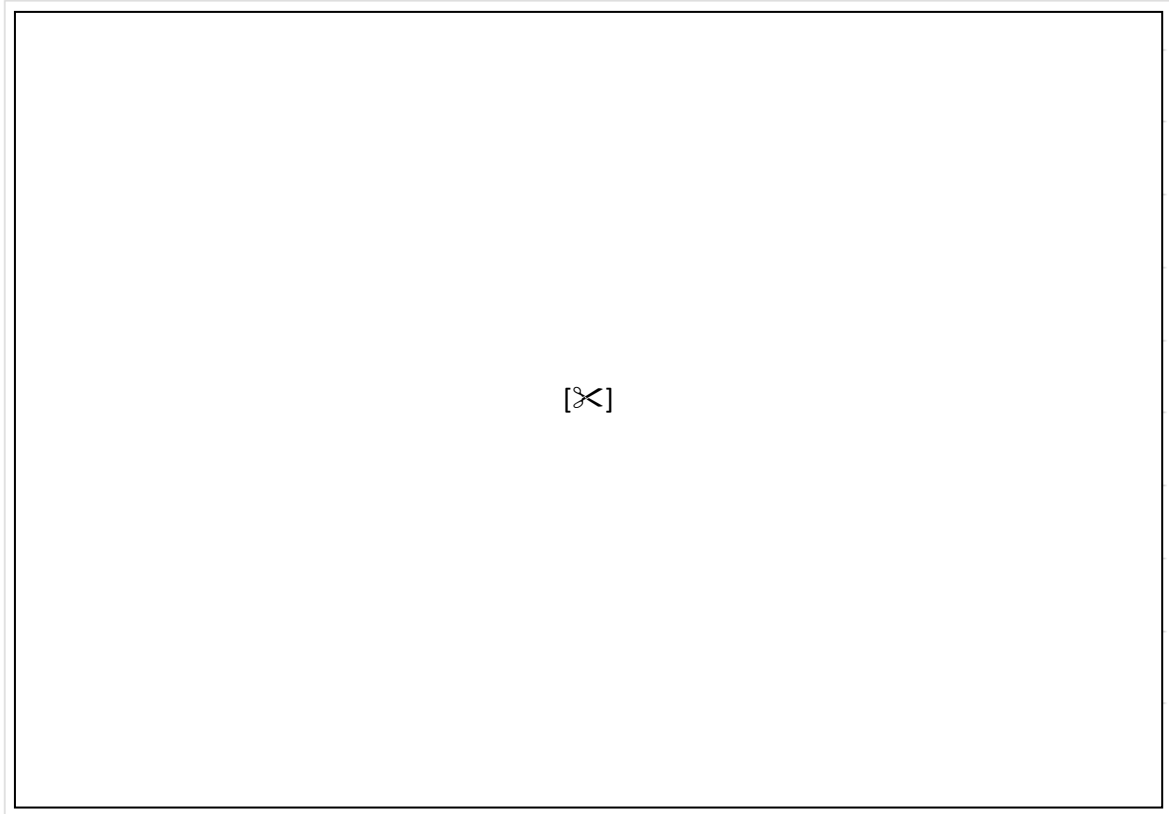
Source: Heathrow

4.4.9 We provide justification per cost line below:

- People costs – in 2020 and 2021, we saw [X] colleagues leave the business. In order to appropriately scale operational capacity back up in 2022 to accommodate our passenger forecast, we anticipate that we will require an additional [X] colleagues. The majority of these roles (c.95%) will be operational colleagues in front-line roles such as security.
- General expenses – we anticipate all of these costs returning. The exceptional items include marketing, car park advertising commission and retail ambassadors which will all be proportionate to passenger numbers and noise and vortex, which is our spend on insulating homes and is currently paused.
- Facilities and maintenance – We continue to incur cost to make our terminals “safe to fly” to provide passengers with the reassurance that our facilities are clean and safe with regular additional sanitisation. We did not factor this into our 2019/Q1 2020 cost to the same degree, as that was pre-pandemic. We expect this to continue into 2022, as passengers’ Covid-anxiety has not disappeared. These costs have also increased from 2019, for the implementation of London Living Wage to the colleagues of our supplier contracts, which has not yet been implemented due to the timing of the pandemic.
- Operational – If we are to re-open T4 in mid-2022, this will incur costs to prepare it for reopening, in addition to the general running expenses. In RBP Update 1, we assumed a much later opening of T4 and therefore this is additional expense. Passenger service agents have been temporarily removed and start to build back with passenger growth in 2022, whilst in the 2019 base for the full year. PRS costs are also temporarily lower in 2022 based on passenger volumes, and both service agents and PRS costs will again be proportionate with passenger numbers. Operational costs have also increased from 2019, for the implementation of London Living Wage to the colleagues of our supplier contracts, which have not yet been implemented due to the timing of the pandemic, in addition to the new operational cost for the Terminal Drop Off Charge introduction from November 2021.

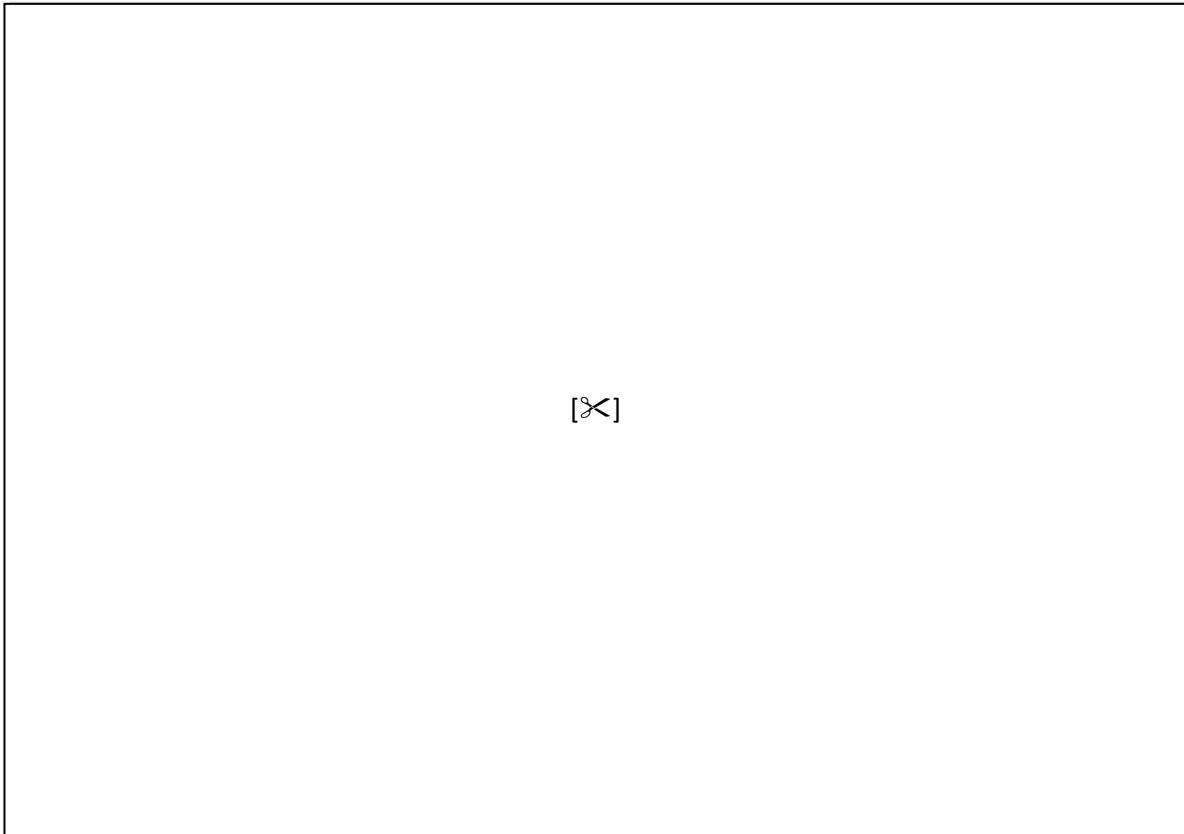
- Utilities – As stated previously, energy prices have increased which will impact our 2022 utilities bill, given our significant use of gas and electricity and despite having transitioned to renewable energy, such as solar where possible. We have not budget for significant changes to our heating provision in our H7 capital plans.

Figure 6 - Variable cost evolution 2019 – 22 (Nominal)



Source: Heathrow

Figure 7 – FTE evolution 2019 – 22



Source: Heathrow

4.4.10 If passenger demand returns in line with our forecast, it is anticipated this cost trajectory will continue through to 2023. 2024-26 will see the return of more ‘normal’ operations, as outlined later in this chapter.

Our updated 2022 operating cost forecast

4.4.11 Our updated operating cost forecast for 2022 is £1,064m. This is an increase of £245m compared with 2021 and is £173m higher than the CEPA/TA forecast. We have cross-checked our RBP Update 2 forecast with the detailed budget forecast for next year and the evolution of our costs since 2019 described above. This ensures our 2022 forecast reflects both the operational reality of ramp-up to serve 45.5m passengers and regulatory precedent for an airport with efficient costs.

4.4.12 The focus of the last two years has been cutting our costs to ensure the survival of the business. As we move into the recovery period, the focus for 2022 shifts to rebuilding the business in an efficient and sustainable manner as passenger demand begins to return. This necessary change in focus to ensure we have the operational capability to handle the ramp-up in passenger demand is a key driver of the increase in costs in 2022 compared with 2021. The other drivers of cost increases are external cost pressures such as the increases in energy prices and full implementation of our London Living Wage commitment. In addition to new operational and cleaning costs for the introduction of the Terminal Drop Off Charge and the Safe to Fly cleaning regime.

- 4.4.13 Our budget forecast for next year is developed through a bottom-up assessment of the efficient costs required to serve 45.5m passengers. As part of this process, we have developed a People Model to forecast resource requirements for next year.
- 4.4.14 The people model is a bottom up, demand driven model used to generate resource requirements across Heathrow, with a particular focus on the operational roles. The complexity of the model comes from the fact that it goes down to role level detail, with different drivers for every individual role across the operational teams. These drivers include the following:
- **Airport** – whether the airport is open
 - **Campus** – whether campus security is open
 - **Date** – requirement by certain dates
 - **Movements** – total number of flights at the airport
 - **Passengers** – total number of passengers at the airport
 - **Security Lanes** – number of open security lanes by 15 minutes
 - **Security Officers** – total number of security officers required
 - **Terminal 2** – whether Terminal 2 is open
 - **Terminal 2 Pax** – total number of passengers in Terminal 2
 - **Terminal 3** – whether Terminal 3 is open
 - **Terminal 3 Pax** – total number of passengers in Terminal 3
 - **Terminal 4** – whether Terminal 4 is open
 - **Terminal 4 Pax** – total number of passengers in Terminal 4
 - **Terminal 5** – whether Terminal 5 is open
 - **Terminal 5 Pax** – total number of passengers in Terminal 5
- 4.4.15 The roles are split into two groups: fixed support roles and variable front-line roles. The fixed support roles are not directly linked to any clear demand driver and are therefore required regardless of the number of passengers, flights, and operational terminals. These roles are derived through organisation design and workload needs and are periodically reviewed between the functional area and the People team. This organisation design is used as a direct input to the model for all the fixed roles. Within the model, they use the airport status as the driver so drop to zero if the airport were to completely close, otherwise these are fixed at the required total when the airport is open.
- 4.4.16 It is important to note that our security team work to a shift pattern. There is a minimum resource requirement to cover each of the shifts, which is generally aligned to serve the peak. For instance, we have witnessed that our terminals have been very busy early morning, but this has trailed off through the day. Nevertheless, we have to provide security staff to cover the peak to avoid queues. We are using tactical forecasting to help manage this in the most efficient way.
- 4.4.17 The variable front-line roles have a clear link to some form of demand at the airport, such as passenger volumes, flights, and open terminals. These roles therefore grow and shrink in line with their demand driver taken from the latest forecast. The exact methodology varies from role to role based on how that individual role is managed in the operation. For example, security officers are modelled against passenger volumes, flow rates, number of staff per security lane and the shape of demand and how it fits against current rosters. Whereas Passenger Experience Managers are modelled as a requirement per open terminal. Each of these assumptions and calculation methodologies have been created with input from the operational teams and the colleague planning team to ensure their accuracy.

- 4.4.18 For each shift-based role, the starting point is the number of colleagues on shift at any one time, which is then multiplied by the number of shifts each day and the amount of non-operational time for roster patterns (e.g. 4 days on, 2 days off), annual leave, training and any other time that colleagues are out of the business. The result is the total number of people required to cover that role all year round.
- 4.4.19 Whilst the model is capable of generating the requirements for the variable front-line roles against the forecast demand in the short-term, there is less clarity on longer-term predictions, particularly for fixed roles. As these roles are reviewed for the following year as part of the budget setting process, the outputs of the model can only therefore be used in the short term, i.e., 1-2 years ahead. Beyond that, the evolution of the fixed roles is less certain at a detailed role level and the people model is not the best approach to predict these requirements. There will also be greater uncertainty around the input assumptions for the variable roles such as flow rates and the shape of demand so whilst the people model will be better at predicting these roles, there will be inaccuracies the further into the future you are modelling.
- 4.4.20 Security officers make up approximately 60% of the total number of operational roles and due to this and the complexity of their relationship to demand, we use a separate model to generate these requirements. The security model uses a number of inputs including:
- Passengers by terminal
 - Movements
 - Departing passenger percentage
 - Direct/transfer split
 - Daily demand profile
 - Security flow rate (passenger throughput per hour)
 - Coverage efficiency (resource shift coverage of demand)
 - Staff per security lane
 - Fixed post requirement
 - Non-Operational absences
 - Overtime percentage
- 4.4.21 For the variable pool of security officers, which scale with terminal openings and passenger volumes, the model uses the monthly passenger demand by terminal and calculates an average daily volume. The daily total is then split into directs and transfers and spread across a daily profile by 15 minute time slices. The 15 minute demand is then converted to lane requirements by dividing demand by the flow rate for that area, and the result scaled to the nearest whole number as you can't open part lanes. The lanes are then multiplied by the number of staff per lane and divided by the coverage efficiency to provide the total number of staff needed to operate the day. The final step is to include the non-operational time per colleague to account for rest days, annual leave, training and other absences, which is added to the operational requirement to provide the total number of officers.

CEPA/TA 2022 operating cost forecast

- 4.4.22 The CEPA/TA 2022 forecast is neither realistic nor credible. Their forecast is based on a material number of incorrect assumptions. Further, they have failed to consider whether an efficient operator would be able to practically achieve such significant cost savings. As a result, they have produced an of operating costs significantly below the level required to effectively run the airport.

4.4.23 We address all of the errors in their assumptions in our review of the detailed modelling assumptions in the sections below. In this section we focus on the accuracy of their model in 2022, which highlights the fundamental issues with the absence of realism in their approach.

4.4.24 Table 4 below shows a comparison of our 2020/21 actuals, 2022 RBP Update 1 and 2 forecast and the CEPA/Taylor Airey operating cost forecast.

Table 4 – Comparison of CEPA / Taylor Airey forecast with 2020/21 performance

	2020	2021	2022 RBP Update 1	2022 RBP Update 2
Passengers (m)	22.1	20.5	43.2	45.5
Infrastructure	T3/4 closed for 8 months 1 runway closed for 8 months	T3 Closed for 6 months T4 Closed* 1 runway closed for 6 months	T4 Closed	T4 open for red list arrivals only for 6 months T4 open for all passenger for 6 months
Outturn / Heathrow Forecast (£m, 2018 RPI)	922	819	1,033	1,064
CEPA/TA Operating Costs (£m, 2018 RPI)		756	891	

**T4 was open for red list arrivals, however, these costs were recovered from the government*

Source: Heathrow

4.4.25 In 2022, CEPA/TA forecast that operating costs will only increase by £72m (9%) even though passenger volumes will double compared to the previous year. CEPA/TA has not accounted for the loss of a number of one-off temporary savings including furlough, having Terminal 3 and Terminal 4 closed and a one runway operation for six months of the year, as we have done in 2021.

4.4.26 Our outturn costs in 2021 are as low as they could possibly be whilst providing a safe and resilient service to passengers. The impact of Covid has resulted in large cash outflows and the need to preserve cash and maintain financial resilience means that every cost has been challenged and avoided if possible. The continued financial impact of Covid-19 is reflected in Heathrow's latest Q3 2021 results, showing a cumulative £3.4 billion loss since March 2020. This financial pressure has resulted in extremely strong incentives to maximise efficiency subject to maintaining the safety and well-being of our passengers.

4.4.27 Airport demand varies greatly over the course of a given day, but efficient levels of staff cover need to be based on the peaks to avoid queues. This, combined with minimum shift requirements means that actual operating costs per passenger are higher than those that could be obtained if demand was steady throughout the day.

4.4.28 The CEPA/TA work ignores this fact and relies on efficiency measures that do not take any account of a very peaky schedule and temporarily under-utilised infrastructure. In other words, the CEPA/TA work ignores on the ground operational reality.

4.4.29 In addition to reviewing the RBP model with the 2022 budget forecast, as in RBP Update 1, we have also reviewed the RBP model outputs against the outturn for 2020 and expected outturn for 2021. This validation process has allowed us to update our

estimates of the people cost elasticity so that it accurately reflects the cost changes delivered and the people cost impact of changes in the demand profile. Full details of the model changes and rationale are set out in Sections 4.9 and 4.10 below.

- 4.4.30 This model validation process is essential to ensure that our 2022 and overall H7 operating cost forecast is both realistic and deliverable. This is a critical piece of work that CEPA/TA failed to carry out, resulting in errors in their modelling assumptions and an unrealistic forecast for 2022, which is then magnified in their overall forecast for H7.

4.5 Ongoing efficiency gains

- 4.5.1 In the RBP and RBP Update 1, we based our ongoing efficiency target on two elements, frontier shift and the level of capital investment in H7.
- 4.5.2 In RBP Update 1, we based our estimate of 0.1% frontier shift on the Bank of England's total factor productivity (TFP) forecast from January 2020²⁰ and their view in their May 2021 Monetary Policy Report²¹ on the scarring effects from Covid-19 on productivity.
- 4.5.3 CEPA/TA agreed that ongoing efficiency improvements are likely to come from both TFP and efficiencies beyond TFP – such as those arising from capital investment. However, they only considered precedent from previous price controls when choosing to apply a frontier shift of 1%. They also stated that the frontier shift estimate should not be linked to the size of the capital plan.
- 4.5.4 Since RBP Update 1, we have commissioned Frontier Economics to review our approach to setting an ongoing efficiency target²². As previously highlighted by First Economics²³, the 1% per annum regulatory precedent is based on productivity data prior to the 2008 global financial crisis. Frontier Economics agree with First Economics, that there should not be significant weight on historical data prior to the financial crisis when determining a baseline for ongoing efficiency at Heathrow. They have reviewed the latest regulatory precedent and note that in the recent energy and water appeals, the CMA agreed with the regulators' approach of using a relatively long-term time horizon to estimate productivity gains as productivity is generally considered to be pro-cyclical²⁴. However, Frontier Economics highlight, as First Economics did, that recent literature and data indicate that there may be a break in cyclicity since the financial crisis.
- 4.5.5 The CMA also discounted more recent productivity data on the basis that the energy and water sectors are not affected by the trend of lower productivity. Frontier Economics highlight that this is not the case for airports. Productivity data since the financial crisis in sectors that operate in similar conditions as Heathrow shows evidence of relatively stagnant productivity growth. They note that as part of their supporting analysis for the RIIO-2 draft determinations, CEPA also observed a reduction in productivity for comparators sectors relevant to regulated energy networks.

²⁰ Bank of England, Monetary Policy Report, January 2020

²¹ Bank of England, Monetary Policy Report, May 2021

²² Frontier Economics, H7 IP opex review, December 2021

²³ First Economics, Frontier shift, input price inflation and productivity growth, August 2019

²⁴ In the case of the energy determinations, this covered the years 1997 – 2016 and in water this covered 1990 – 2007.

- 4.5.6 More recently, Covid-19 has also resulted in supply-side shocks and potential productivity scarring which point towards increased downside risks to medium-term productivity. It remains the view of the Bank of England in their latest Monetary Policy Committee report²⁵, that there is likely to be scarring on future productivity growth:

“Although potential supply growth is expected to return to its pre-Covid trend, the level of potential supply is expected to be around 2% lower at the end of the forecast period than would have been implied by the MPC’s pre-pandemic projections. In part, that reflects longer-term effects resulting from Covid, for example from a drag to productivity from foregone investment and learning on the job, as well as lower migration leading to slower population growth since 2020.”

- 4.5.7 Similarly, the Office for Budget Responsibility (OBR)²⁶ highlight the medium-term effects of the pandemic on productivity:

“Since the start of the pandemic, a key assumption underpinning our medium-term economic forecast has been the extent to which the pandemic has done lasting damage to the path of potential output – also known as ‘scarring.’ This scarring effect can come from the pandemic’s adverse impact on the size of the future labour force, the capital stock, and the level of total factor productivity.”

- 4.5.8 Although there is uncertainty on the scale of the impact of Covid-19 on productivity, Frontier Economics conclude it would be reasonable to take into account the downside effects of a prolonged supply chain crisis and generally low investment across the economy when it comes to estimating the frontier shift.

- 4.5.9 Frontier Economics also highlight that it would be reasonable to expect that a hypothetical efficient airport operator may struggle to make changes to their costs in an efficient way in response to sudden changes in demand. This is evident by the inefficiency in security costs that is inherent when attempting to resource for a more volatile demand profile, as we have experienced this year.

- 4.5.10 Frontier Economics have also considered that in the Initial Proposals, the CAA have proposed a significantly lower level of capital expenditure compared with Q6. They suggest that this additional constraint would mean it is less plausible that we could achieve a frontier shift comparable to historical precedent, noting that in practice a sizeable portion of operating cost efficiency gains can only be delivered through capital substitution.

- 4.5.11 Both the Heathrow and CEPA/TA H7 forecasts reflect lower capital spend relative to operating costs than in previous price control periods and when benchmarked with Ireland. This reflects the strong operating cost efficiency targets that we have met and plan to continue to meet. As can be seen from the table below, the CAA forecasts significantly underestimate the capital required in order to be able to operate efficiently and deliver the service level targets required as they are lower than both Heathrow's optimal and safety only plans.

²⁵ Bank of England, Monetary Policy Report, November 2021

²⁶ Office for Budget Responsibility, Economic and fiscal outlook, October 2021

Table 5 – Comparison of Opex and Capex allowances

Review	Year	Unit	Opex	Capex	C:O ratio	Price level
Heathrow Q5	2008	£m	4,228	3,902	0.92	2007/08 RPI
Heathrow Q6	2013	£m	4,943	2,885	0.58	2011/12 RPI
Dublin 2014 FD	2014	€m	1,000	880	0.88	July 2014 CPI
Dublin 2019 FD	2019	€m	1,530	1,266	0.83	Feb 2019 CPI
H7 HAL Optimal	2021	£m	5,802	4,470	0.77	2020 CPI
H7 HAL Safety Only	2021	£m	5,802	2,672	0.46	2020 CPI
H7 CAA (LQ opex, mid capex)	2021	£m	5,455	2,402	0.44	2020 CPI
H7 CAA (UQ opex, mid capex)	2021	£m	5,903	2,402	0.41	2020 CPI

Source: CAA²⁷, CAR²⁸

- 4.5.12 It should also be noted in this context, the reductions in capex that we have made in the last two years as a response to Covid-19. Indeed, CEPA/TA note that they would expect capital investment to have a lagged effect when it comes to delivering operating costs benefits.
- 4.5.13 Reflecting the impact of a lagged effect between capital spend and operating cost savings, we have adjusted our approach to calculating the capital efficiency assumption included in the plan as a result of capital substitution. We have included a one-year lag in our calculation and incorporated the specific phasing of investment included in the capital plan. Full details are included in our RBP Update 2. Our revised approach, combined with refinement to the capital plan since RBP Update 1, has resulted in an updated capital efficiency assumption of 0.9%. This combined with our frontier shift assumption of 0.1%, results in an ongoing efficiency target in RBP Update 2 of 1.0% per annum.
- 4.5.14 The reduction in ongoing efficiency target since RBP Update 1, is supported by our more detailed analysis of the benefits of our capital plan. For example, the investment in the security transformation programme will take time to deliver cost savings, with the full operating costs benefits only being realised towards the end of H7 and into H8.

²⁷

[https://publicapps.caa.co.uk/docs/33/CAP2265B%20H7%20Overall%20approach%20and%20building%20blocks%20\(p\).pdf](https://publicapps.caa.co.uk/docs/33/CAP2265B%20H7%20Overall%20approach%20and%20building%20blocks%20(p).pdf),

https://webarchive.nationalarchives.gov.uk/ukgwa/20140605050545mp_/http://www.caa.co.uk/docs/5/ergdocs/heathrowgatwickdecision_mar08.pdf,

<https://publicapps.caa.co.uk/docs/33/CAP%201103.pdf>,

²⁸ <https://www.aviationreg.ie/fileupload/2014final/2014%20Final%20Determination.pdf>,

<https://www.aviationreg.ie/fileupload/2020-2024%20Determination.pdf>

CEPA/TA ongoing efficiency assumptions

- 4.5.15 CEPA/TA have applied an ongoing efficiency target of 1% per annum, based purely on the regulatory precedent based on pre-financial crisis productivity data. They have not engaged with the evidence presented on post-financial crisis productivity or considered the impact of Covid-19 on productivity during H7.
- 4.5.16 Although they agreed that ongoing efficiency improvements are likely to come from both TFP and efficiencies beyond TFP – such as those arising from capital investment, they also contradicted this by stating that the frontier shift estimate should not be linked to the size of the capital plan.
- 4.5.17 CEPA/TA then go on to make estimates of the ongoing efficiency impact of the capital plan on our operating cost forecast, specifically those associated with the security transformation programme. The efficiency assumptions they make related to the security transformation programme neither reflect the operational realities of the scope of the programme or the level of capital investment required, further details of the errors in their estimate are set on in Section 4.6.
- 4.5.18 Applying an overall ongoing efficiency adjustment to reflect movement of the efficiency frontier during H7 as well as adjustments to reflect specific operational changes, such as those associated with the capital plan, double counts the future efficiency adjustments required to ensure Heathrow keeps up with the efficiency frontier.
- 4.5.19 The impact of CEPA/TA overestimating the ongoing efficiency requirements for H7, is to underestimate the efficient H7 operating cost forecast by £131m.

4.6 Operating costs and the capital plan

- 4.6.1 The unprecedented impact of the Covid-19 pandemic has led us to investigate all possible measures to make cost savings and protect liquidity. If there were any additional cost savings that could have been delivered without compromising the safety of the airport, they would have been undertaken by this point.
- 4.6.2 The only means to deliver significant future operating cost savings in H7 and beyond without reducing service is to undertake capital investments that can unlock savings that are not otherwise available. For example, as described below, our investment in the security transformation programme. In our RBP and RBP Update 1, we set out a clear link between the level of capital investment included in the H7 plan and our ongoing operating cost efficiency targets. In RBP Update 1, we set a target of 1.1% per annum, reflecting the capital substitution effect of the level of enhancement capital expenditure included in the £4.2bn capital plan. This meant our total year-on-year efficiency assumed in our base case was 1.2% (capital efficiency 1.1% + frontier shift 0.1%).
- 4.6.3 In this update, we have revised this figure to 1% (capital efficiency 0.9% + frontier shift 0.1%) reflecting the changes in the planned capital expenditure and to incorporate feedback received. Details of the updated calculation are included in RBP Update 2 section 4.11.
- 4.6.4 The CAA appear to have given no regard to the impact on our operating cost target of their proposals for the H7 capital plan. The construction of their operating cost ranges is carried out independently of any assumptions on capital expenditure. This

is a serious failing of the Initial Proposals and contradicts the CAA's own business planning guidance.

4.6.5 Since RBP Update 1, we have worked with the Airline Community to refine the capital plan programmes as discussed in Chapter 3 – Capital Expenditure. In the remainder of this section, we describe the operating cost implications of the updated capital programme:

- Regulated security and security transformation;
- The Efficient Airport programme which identifies capital solutions to remove operating costs; and
- Delivery of our ongoing efficiency target through specific elements of the capital plan.

Regulated Security and Security Transformation

4.6.6 In Chapter 3, Section 3.6 we provide an update to the Security Programme, including both the Regulated and Compliant Security and Security Transformation elements. Further details are included in Appendix A2 – H7 Security Programme Appendix. The overriding priority of the programme is to [X]. [X]. This will see increased queue times for passengers, meaning a worse airport experience and compromised consumer outcomes.

4.6.7 The Regulated Security and Security Compliance spend deliver compliance. However, it is only the Security Transformation element that delivers additional service and efficient benefits. The programme will deliver a transformational product roadmap through the introduction of security screening equipment and technologies across all our terminals and campus. The investment delivers:

- A permanent operating costs reduction of [X] at Business case completion, driven by technology enhancements enabling transformational change to operational processes; and
- A temporary increase in operating costs within H7 of £87m, due to operational inefficiency mitigations and training costs during the works.

4.6.8 The Security programme impacts operating costs in the following areas during H7:

- Security officer resource requirements;
- Additional mitigation measures for non-compliance;
- Business change to support security and engineering and training;
- Engineering for transition through construction; and
- Additional Technology systems.

4.6.9 Operating costs will increase during the implementation of the regulated equipment as a greater number of resources are required to operate the new additional equipment. In addition to this, the transition through the delivery of the programme will create a significant cost pressure. The transformational elements of the programme enable these operational cost pressures to be offset through the introduction of technologies which enable optimised ways of working.

- 4.6.10 The business change activity required to support the level of change needed will be significant as Security Officers will need to be trained to work across the full estate of equipment as it transitions from existing to new. This requires training and on-going familiarisation across all systems. We will need to deliver training to over 3,500 security colleagues and over 230 engineers. The requirement for new starter training is unexplored and requires substantial development in 2022, so that appropriate capacity, facilities, and resource can be built. Until the CAA publishes the national standard for Next Generation Security training (2024 regulation) and the test protocols, we cannot rule out further costs.
- 4.6.11 Under current regulations Security Officers are only permitted to work on either old or new lanes in a single shift. This drives an inefficiency and a highly onerous training and rostering regime with dual rosters being maintained with no flexibility for the workforce to be agile to meet peak daily demands. In addition, the impact of the construction work site boundaries within the security search areas will lead to operations disruption which will create a further inefficiency.
- 4.6.12 Engineering and Technology will also incur increased transitional costs as a result of the implementation of the new equipment. Engineering will be maintaining the existing systems and providing the service levels for the new systems in tandem, which drives additional engineering servicing costs. At this early level of maturity in product development, the servicing costs related to the transformational scope impacting engineering service delivery have been excluded.
- 4.6.13 Technology will have to provide service delivery across both the new and existing networks plus the additional equipment and licence costs. There will also be new technology introduced which will require support such as CCTV, Body & CT Scanners, CIP and Algorithms.
- 4.6.14 The transformational elements of the programme enable a reduction in costs by the end of H7 through the introduction of technologies that enable optimised ways of working. Pre-2025 there is an increase in headcount, which is attributable to the implementation of the new regulated equipment before the transformational scope benefits are realised (as described above).
- 4.6.15 From 2025 onwards the benefits start to be realised. This includes the replacement of existing manned infrastructure with Transformation infrastructure in the Campus environment (e.g., Airlocks and Speedgates) and the removal of Other Airside Areas in the South, [X]. The ambition for Transformation also includes the ability to adopt automated vehicle screening. However, the product roadmap for the development of this solution is currently immature and therefore no operational efficiency savings have been identified for this area of scope.
- 4.6.16 Transformational scope also includes CIP (Centralised Image Processing), new algorithms and flexible resourcing across both terminal and campus areas - realised from 2025.
- 4.6.17 When CIP is operating at scale across terminals, and is embedded in the operating model, it will enable lane flow rates to increase and [X]. It is assumed that from Tranche 3 of the Programme onwards the flexible resourcing model will be adopted, which will enable higher lane resourcing during peak periods to meet demand, whilst having lower resourcing off peak [X]. [X]. [X].

- 4.6.18 The table below summarises the discussed operating cost impacts of our proposed security programme. In this update we have included the annual estimated increases in operating costs as an additional cost overlay within the forecast. The annual estimated cost savings are already included in the plan as they contribute to the delivery of our 0.9% capital efficiency target. If we were to include the explicit savings, we would need to reduce our capital efficiency target or there would be double counting.

Table 6 – Operating cost impacts of security programme

[X]

- 4.6.19 CEPA/TA suggest we can make savings in security regardless of the level of investment. As described above, this assumption has no grounding in the operational reality at Heathrow and misunderstands the scope of the regulated security and security transformation programmes.
- 4.6.20 CEPA/TA suggest that we should have mature benefits for the security transformation programme because we have experience of installations in some terminal areas. This confuses safety only regulated compliance with transformation. We have installed four pilot lanes of new equipment in passenger search areas which are in line with safety only Regulated compliance scope. The first two lanes went into operational use in Terminal 2 in September 21, after we submitted our RBP Update 1, and are in very early stages of operation and data collection. Two further lanes will be in operational use in Terminal 5 from the start of December. The pilot lanes are enabling data collection to inform the product design solution and optimal configuration of the lane together with flow rate and operating model information. Estimating impacts on flow rates and queue times also requires testing the equipment under peak passenger demand which we are yet to experience.
- 4.6.21 With respect to the Transformation scope, we have deployed the local image sharing capability of Central Image Processing (CIP) at Terminal 2 and Terminal 5 in conjunction with Pilot Network, as an early Operating Model identification and learning stage to gain feedback on this capability and benefits. Other transformational scope items are not yet developed, in particular advanced screening algorithms which could enable [X]. The benefits of the transformation scope will only be realised when there are enough new regulated compliant security lanes in operation in a search area to enable CIP roll out and therefore sustainable changes to the operating

model. Development of an open architecture environment and algorithms to enable [X].

- 4.6.22 CEPA/TA have developed a security officer resource model to establish an elasticity for security officer FTEs with respect to passenger demand. They have attempted to use this model to estimate the impacts of the security transformation programme, through assumptions relating to improvements in flow rates and resourcing requirements. As described above these assumptions are not aligned to the scope of the programme, where benefits will only be realised towards the end of H7 with the Transformation scope.
- 4.6.23 CEPA/TA have assumed that through process improvements initiatives we can deliver a [X] reduction in security lane resource over 5 years and have modelled a 4.4% annual saving (not 2% as stated in their report) from 2023. They assume we can increase security flow rates from 140 to 220 passengers per hour over 5 years from 2023, equivalent to an 11% reduction per year. Although they state they have used their model to derive elasticities to account for the impact of the security transformation programme²⁹, they appear to have applied these percentage reductions directly in the model.
- 4.6.24 They also assume we can deliver an additional 1% annual efficiency in fixed staff levels from 2023 through process efficiency and technological improvements (despite stating no investment is required to make efficiency savings).
- 4.6.25 Finally, they apply a further 1% per annum efficiency based on their estimate of frontier shift. The inclusion of specific adjustments to account for future efficiency and an overall adjustment to account for future efficiency is double counting.
- 4.6.26 They state these assumptions are based on experience and aspirations of other UK and international airports. A handful of international hub airports have transitioned to the use of CT x-ray technology and millimetre-wave screening technology ahead of UK Airports e.g. Schiphol. All airports have done this in response to their Regulators imposing the requirement and have delivered solutions that are compliant to their specific national regulations. The variances in national regulations are not visible in the layout or model of equipment installed, but determine the processes followed by the security operators and inform the number of assets installed and the officer resourcing levels on the lanes. Heathrow understands those national variances and has collaboratively worked with international regulators and airports over the past three years to carry over learnings from earlier installations into equipment selection and our proposed operational methodology.
- 4.6.27 Notwithstanding this, the proposed way of operating the new security lanes for UK airports is determined by the approved processes dictated by the CAA Policy team. The methodology that must be followed to compliantly screen all cabin baggage and bodies in turn determines the roles required on the lanes and the total number of assets and officer headcount required. We have worked collaboratively with the CAA Policy team over the past three years to refine these process maps to ensure we maximise the automated and inherent capability of the security equipment. [X].
- 4.6.28 Furthermore, the 2024 mandate imposes the requirement for Heathrow to retrain all Security colleagues (and Engineering colleagues). Heathrow has worked with the CAA Training team over the past three years to develop the training package for

²⁹ CEPA/Taylor Airey, Review of H7 Opex and Commercial Revenues: Initial Assessment and Forecasts, September 2021, page 69

existing officers (to enable pilot projects) but UK Airports are yet to receive confirmation of the future next generation security training syllabus and assessment methodology (the CAA is currently tendering, targeting an update to airport in Q1 2022). Using the benchmark for existing officers (permitted for pilots but not approved as final) we have estimated the future training requirement for ~3,500 Security colleagues to be re-trained to operate the new equipment and their mandated annual refresher training (in addition to all existing refresher training as old equipment remains on site). The requirement for new starter training is unexplored and requires substantial development in 2022 so that appropriate capacity, facilities and resource can be built.

- 4.6.29 The maturity of the millimetre-wave security scanner market does not allow Heathrow to simply increase the number of bodies being screened by the same assets (this has been proven since the 2016 mandate and industry has had not been incentivised to improve). Therefore, the 2024 mandate dictates a direct increase in the number of millimetre-wave security scanners (for body screening all persons, and associated Security Officers to operate the equipment) required to achieve the higher percentage that must be achieved for passenger screening compliance and the absolute increase for non-passenger screening compliance. This has been reflected in the operating cost estimates for the cost of operating the future security lanes, as set out in the table above.
- 4.6.30 [X]. That is why the ‘Transformational’ scope of the Security Programme declares this intent and the potential benefits, but does not commit to delivery without the associated capex and time investment required to materialise what currently does not exist.
- 4.6.31 Like other UK Airports, Heathrow has decades of data on historical passenger behaviours and demand trends. We have used this information to best forecast the capacity requirements of our search areas and profiled our construction delivery in line. However, as we recover from Covid-19 we see a substantial change in behaviours, demand profiles and customer expectations. We are using the pilot project lanes to observe the short-medium term changes in passenger trends to inform our future performance and capacity modelling but need to closely monitor this over the long-term. Additionally, we are working closely with UK Airport groups to consolidate learning from pilot projects to ensure greater consistency in the passenger journey through security (already built into our proposals).

Efficient Airport

- 4.2.1 Automation is a key lever in delivering the service outcomes our consumers expect, more efficiently. Through the Efficient Airport programme, we have identified capital solutions to remove operating costs across the airport operation, both for ourselves and our Team Heathrow³⁰ partners. This is both beneficial for our passengers – who would receive the same or better service at a lower cost – and our airlines, through driving down the cost of operating at Heathrow.
- 4.2.2 The programme will improve resilience, reduce the total cost of operation, maintain service standards and provide targeted service improvements to consumers improving the predictability and reliability of their journeys with specific focus on those that are

³⁰ Team Heathrow refers to all companies working at Heathrow Airport, including Heathrow Airport Limited, airlines and ground handlers.

most vulnerable. It is broken down into these areas of activity, with full details included in Chapter 3 Capital Expenditure, Section 3.9:

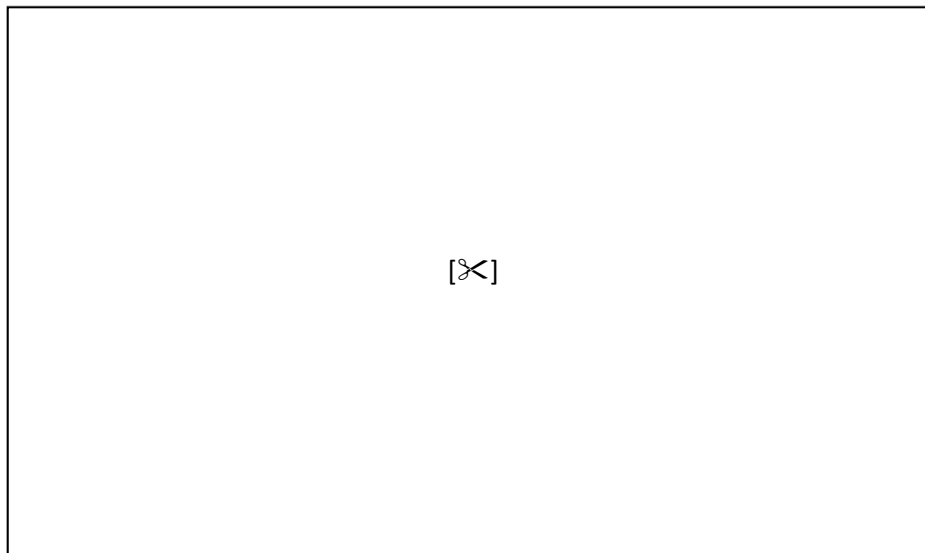
- Compass Centre exit;
- Passenger process automation;
- Baggage automation;
- Airfield automation;
- Terminal capacity optimisation; and
- Service initiatives.

- 4.6.32 The Efficient Airport programme will target investments to deliver fixed operational cost reductions for Heathrow, contributing to the operating cost efficiency stretch across H7. The Compass Centre exit business case will reduce fixed costs by between [X] per annum.
- 4.6.33 The programme also delivers significant benefit to airline operating costs, which Heathrow does not have visibility of. During Q6, we increased automation across the airport, reducing the number of airline colleagues required across all stages of the passenger journey. A successful implementation of automation is self-service bag drop. There are now 188 self-service bag drop machines installed across all four terminals, reducing the number of check-in colleagues required to resource desks. In 2019 this enabled 66% of our departing passengers to use a self-service bag drop. This improved check-in transactions time by up to 20%. Similarly, 60% of gates now have self-service boarding gates enabling 75% of passengers in 2019 to use the self-service facilities. This reduces the number of airline colleagues required to carry out transactional processes, enabling them to focus on supporting passengers who require assistance, manage exceptions and get the aircraft away on time. In 2019, self-service delivered boarding times which are up to 30% faster with less queuing time for our passengers.
- 4.6.34 Due to the impacts of the Covid-19 pandemic, we had to pause the implementation of automation. The Efficient Airport programme looks to continue the automation of our operating processes and reduce costs for our airline partners. Despite repeated requests to airlines over many years for these operating cost benefits to be made transparent we have failed to make progress. There is a risk that further opportunities to reduce costs are missed as a result, as we lack the data to quantify the benefits of automation to our airline community.
- 4.6.35 Whilst automation delivers significant benefits for our airlines, it also has implications for our cost base. Every additional piece of equipment we install increases our asset base which must be maintained to ensure a predictable and reliable journey for our passengers. There are also increased IT and electricity costs associated with increased automation. It should be noted that we have not included any specific adjustment to our operating costs forecast to account for these cost increases.
- 4.6.36 CEPA/TA assume that we can make future efficiency savings through changes in technology through automation. For example, they assume we can reduce fixed staffing levels by 1% per annum through technological improvement. However, they explicitly state that capital expenditure is not required to achieve these improvements and do not account for any increase in maintenance costs as a result of higher levels of automation. This is plainly an incorrect and unsubstantiated position.

Delivery of our ongoing efficiency target

- 4.6.37 The figure below sets out how the benefits identified above associated with specific elements of the capital plan contribute to the delivery of our 1% per annum ongoing efficiency target. The remaining cost savings will be delivered by as yet unidentified initiatives.

Figure 8 – Contribution of capital plan to delivery of annual efficiency savings



Source: Heathrow

- 4.6.38 If the specific benefits of the capital programmes were applied to our operating cost forecast in addition to the ongoing efficiency 1% per annum target, this would be double counting. This is because the 1% efficiency target reflects the movement of the efficiency frontier during H7 and therefore represents the future efficiency savings required to ensure Heathrow keeps up with the efficiency frontier. As a result including further savings associated with the benefits of the capital plan would overestimate the level of savings required to remain at the efficiency frontier during H7.

4.7 Additional costs to meet our new service obligations

- 4.7.1 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. Where our driver-based methodology cannot capture these material changes in our cost base we continue to use cost overlays. As in the RBP and RBP Update 1, we apply a materiality threshold of £5m per annum or 1% of total operating costs to assess if an overlay should be included. To be clear this is for cost increases and decreases. As described below, we take account of costs in this way for additional costs related to Covid-19 (enhanced cleaning regimes, personal protective equipment and sanitation gels). In RBP Update 1 we included costs for enhanced services (assisting passengers requiring support, increasing the resilience of assets, providing real time digital support to passengers, and the roll-out of touchless/automated journeys). In light of new evidence, we deem that only some of the enhanced service cost categories previously included are sufficiently material to include in RBP Update 2. In RBP Update 1, we also included the costs associated with surface access and the Terminal Drop-off charge, we have since updated these costs as set out in our RBP Update 2 document Section 4.9.

Covid-19 costs

- 4.7.2 Our consumer insights confirm that, since Covid-19, cleanliness is a greater priority than ever before³¹. Recent research conducted by Heathrow³² and ACI³³ suggest that consumer expectations for enhanced cleaning is not going to change as their importance have remained high even with the lifting of restrictions away from the Airport (Figure 9). We have invested heavily to change processes and the quality and cleanliness of our facilities to meet these new expectations which has been appreciated by our passengers (See Consumer Engagement Chapter in RBP Update 2). As a result, Heathrow is registering its highest ever levels for the perception 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.

Figure 9 - Which of the following precautions would you still expect to see at an airport, even as rules relaxed elsewhere?

Hand Sanitising Stations	86%
Enhanced Hygiene Processes	82%
Enforced Mask Wearing	64%

Source: Insites Consulting, Passenger Priorities Post Covid-19 Wave 3, October 2021.

- 4.7.3 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. It is also additional and separate from business-as-usual cleaning.
- 4.7.4 As in our RBP and RBP Update 1, 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, meeting our new service measure on Hygiene Safety Testing and meeting the CAA’s proposed higher service target for cleanliness, moving from a target of 4.00 in Q6 to 4.15 in H7.³⁴
- 4.7.5 CEPA/TA proposed using an overlay which tapers from £9.7m (2018 RPI prices) in 2022 to 0 in 2026. They acknowledge that there have been significant costs incurred as a response to the Covid-19 pandemic that could not be captured by the driver-based model. However, they challenge our assumptions in three areas:
- Overlap with business as usual (BAU) cleaning – as described below there is a clear distinction between the two activities;
 - Efficiency of costs to date; and
 - Costs required thought out H7.

³¹ 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.

³² Insites Consulting, Passenger Priorities Post Covid-19 Wave 3, October 2021

³³ ACI, Global Traveller Survey, November 2021

³⁴ CAA CAP2274, Table 2.1

- 4.7.6 BAU cleaning involves ensuring the terminal is clean and litter free using a team of cleaners with general cleaning products and machines. The Safe to Fly programme ensures a heightened cleaning and hygiene regime exists above the scope of BAU cleaning. The requirements are:
- Team of Hygiene Technicians – specialist cleaners with an emphasis on customer service. They use specialist equipment to sanitise touchpoints, carry out swab testing, check and refill sanitise dispensers and are trained to answer passenger queries on their activities.
 - Enhanced regular cleaning of identified key touchpoints using a variety of methods and equipment (under regular review)
 - Regular UV sanitisation of agreed locations (under regular review)
 - The undertaking of a daily ATP testing³⁵ regime to ensure the enhanced measures taken are providing the protection expected
 - Use of materials and consumables as agreed with the Heathrow (anti-bacterial spray, gloves, masks, hand sanitiser, wipes, UV nano septic stickers, etc.)
 - Work completed to the standards set out in the ‘COVID Protection Standards Document’ which is a live document.
- 4.7.7 In the RBP Update 1, we included a breakdown of costs from February 2020 to April 2021. These were the basis of our cost estimate for H7 with proportional increases when we expected to open Terminals 3 and 4. Since RBP Update 1, we have been able to refine our approach to delivering the Safe to Fly program and have optimised our costs. Our forecast costs for next year are [§<]. Details of the breakdown of this estimate are included in Appendix A10 - Additional analysis to support operating cost assumptions. As in RBP Update 1, we included a proportional increase to the costs when we reopen Terminal 4 in July 2022.
- 4.7.8 CEPA/TA suggest that the additional Covid-19 costs will not be needed throughout H7. However, this contradicts the inclusion on service targets related to hygiene, cleanliness, and our response to Covid-19 that we will be expected to deliver for the entirety of H7.
- 4.7.9 In its CAP2274 document, the CAA notes the importance of cleanliness to passengers, particularly post-Covid and states that “*We recognise that cleanliness and hygiene may be more important to consumers in the future than they were in Q6*”³⁶. The CAA’s proposals go on to implement more stretching targets for cleanliness in H7 as well as additional measures:
- Increased target for passenger satisfaction with cleanliness, up from 4.00 in Q6 to 4.15 in H7;
 - A new measure of hygiene safety testing, measuring the speed at which Heathrow resolves red and amber safety tests and targeting a resolution of red test within 4 hours; and
 - A new measure on the ease of understanding of Heathrow’s Covid-19 safety information.

³⁵ The ATP test is a process of rapidly measuring actively growing microorganisms through detection of adenosine triphosphate.

³⁶ CAA, CAP2274, Page 16, Paragraph 3.7

4.7.10 Table 7 below presents our updated Covid-19 cost overlay for H7.

Table 7 – Covid-19 cost overlay – RBP Update 1 vs Update 2

[X]

4.7.11 By not fully reflecting the additional costs to deliver our obligations for hygiene and cleanliness, CEPA/TA have underestimated the efficient H7 operating costs by [X].

Enhanced Service Costs

4.7.12 In the RBP and RBP Update 1, we included an Enhanced Service cost overlay to address identified service gaps in the following areas:

- Passengers Requiring Support;
- Resilience;
- Digital Service; and
- Touchless / Automated journeys.

Enhanced Service Costs - PRS

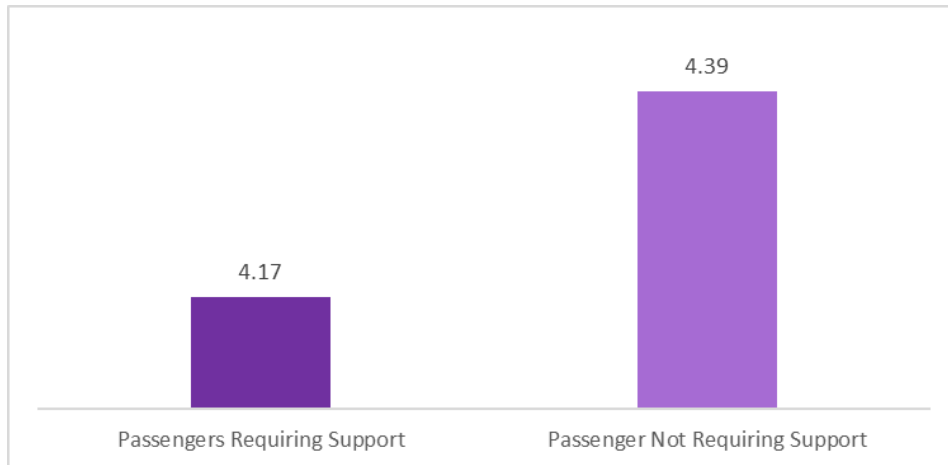
4.7.13 In RBP Update 1 we included [X] to enhance our service offering to support Passengers Requiring Support, our most vulnerable consumers (39% of all passengers³⁷) who mostly choose not to use our dedicated assistance service and are currently Heathrow’s least satisfied segment, offering them the additional support they require to improve their journey – helping to reduce their stress levels and making their airport experience more ease and enjoyable.

4.7.14 CEPA/TA challenge the inclusion of this overlay on the grounds there is not a service quality issue at Heathrow. It is correct that overall service quality scores are high, however, it is factually incorrect to state this is the case for the segment of Passengers Requiring Support whose satisfaction levels have remained behind that of other passenger even since Covid-19³⁸.

³⁷ Revealing Reality, Open to All, 2020

³⁸ Heathrow, New Departure QSM Pilot Survey – July/August 2021

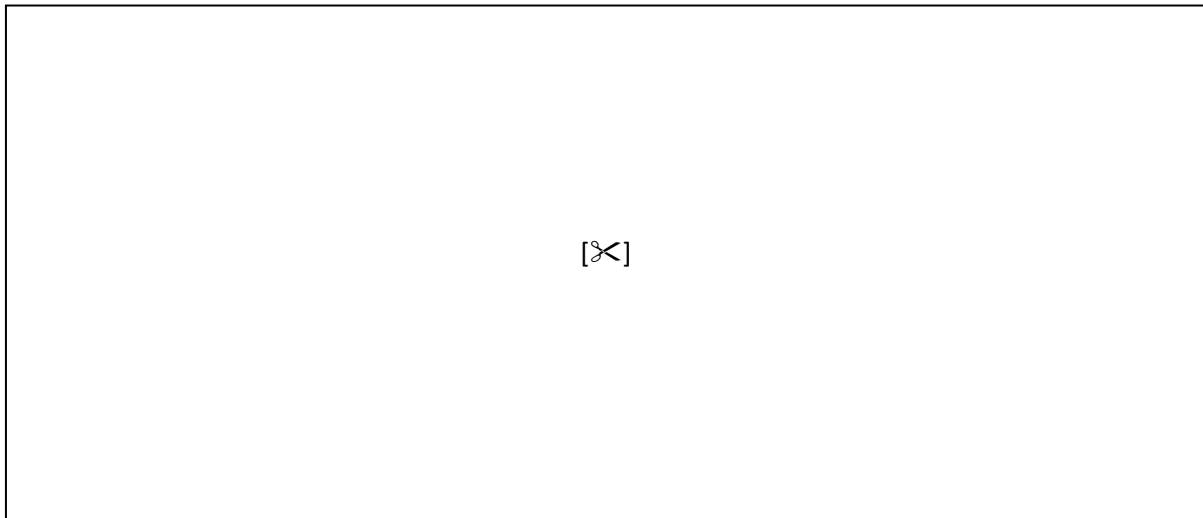
Figure 10 - Mean Score Overall Satisfaction Levels with Departures Journey by segment



Source: Heathrow, New Departure QSM Pilot Survey – July/August 2021

4.7.15 And more specifically as set out in June 2021 RBP update amongst the proportion of this wider group that use Heathrow’s Assistance Service, where 22% of users in 2019 rated their experience as Poor/Extremely Poor putting levels of dissatisfaction above that seen other UK sectors (figure 10).

Figure 11 - Levels of customer dissatisfaction across UK Sectors



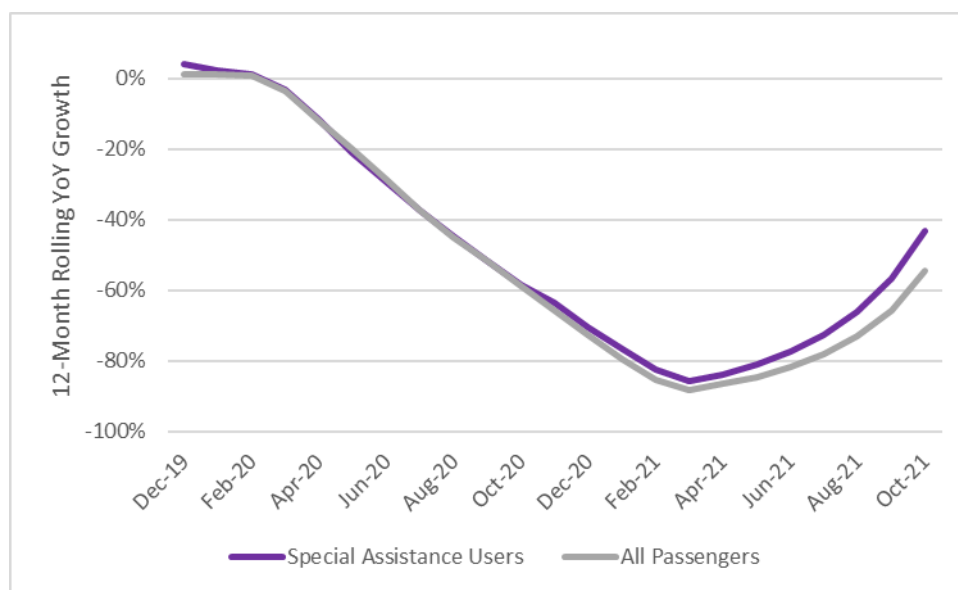
Source: IPSOS UK Customer Satisfaction Survey 2020 and Heathrow Special Assistance Service Survey 2019

4.7.16 Recent research undertaken by IATA³⁹ also concluded that the ‘The industry could do better to meet special assistance needs’, with 20% of Passenger Requiring Support stating that they did not believe that the current special assistance services provided them were seamless, 16% felt better technology solutions could be deployed to better meet their needs and 22% believed that the air transport industry is not sufficiently adaptive and innovative to meet their service needs.

³⁹ IATA, Global Passenger Survey, October 2021

- 4.7.17 CEPA/TA’s challenge on providing no cost overlay for Passenger Requiring Support also conflicts with the views of Arcadis in their OBR Assessment⁴⁰ where they state ‘...offers the means to provide PRM / PRS passengers with dignity and care and therefore we would challenge why HAL considers this could not be delivered in the Safety Only Plan’. Failure to allow any additional opex for passenger requiring support will mean that service levels for Heathrow’s most vulnerable consumers will remain behind expectation until at least H8.
- 4.7.18 Since RBP Update 1, we have reviewed the phasing of spend in this area and aligned it to the forecast passenger demand. However, it should be noted that we have seen faster recovery for this segment than total passenger growth, as shown below, so now expect to see the capacity issues we saw in 2019 for this group returning earlier in H7.

Figure 12 - Year on Year MAA Passenger Volume Changes



Source: Heathrow, Assistance Users and Passenger Traffic Data, 2019-2021

Enhanced Service Costs – Resilience

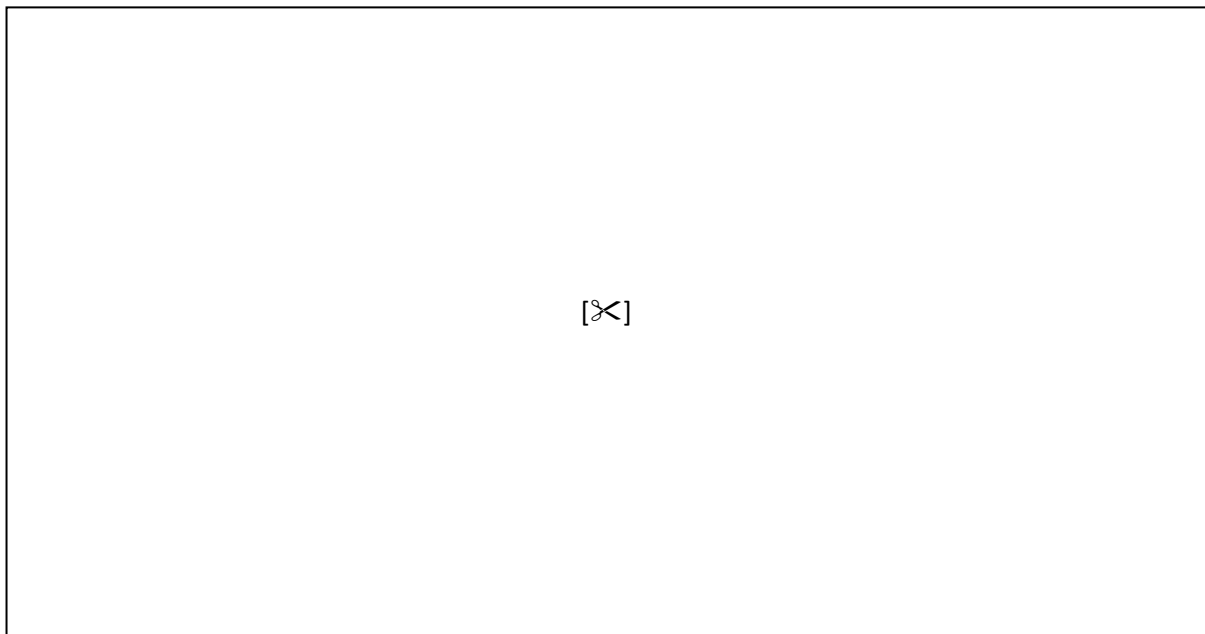
- 4.7.19 In RBP Update 1, we included [£] additional spend due to the capital under-investment to support asset resilience in 2020 and 2021. The additional spend ensures that we can increase our maintenance regimes across the airport in order to extend the life of assets and help to mitigate against assets being out of service, thereby helping to ensure that passengers have a predictable and reliable journey.
- 4.7.20 CEPA/TA reduced this element of the overlay to [£] and applied efficiencies going forward on the grounds that the link between the increased maintenance spend and reduced risk of low availability and reliability is not clear. They also challenged that many of our assets would not be nearing end of life and therefore would not require enhanced maintenance.
- 4.7.21 The Arcadis report, used by the CAA to evidence its views on targets, supports the need for an Enhanced Service Overlay (ESO) for resilience purposes given our capital constraints and the age of many of our assets: “The concept of an Enhanced Service Overlay (ESO) is deemed reasonable for asset related measures to ensure

⁴⁰ Arcadis, OBR Targets Assessment, November 2021

*the reliable delivery of services and to mitigate against low frequency, but high impact events*⁴¹. The implementation of the ESO is then assumed in the service levels set by the CAA in its CAP2274 document.

- 4.7.22 By the end of H7, average life of many of Heathrow’s assets will be approaching the end of their life, as shown in the figure below, and reaching the point of asset replacement. However, due to the limited capital spend over the last 2/3 years due to Covid-19, it will not be possible to do this during H7 without creating significant disruption to users across the airport. This means that our asset resilience levels will remain below 2019 levels until at least 2028 and so causes a reduction in capability to withstand asset failure. To answer this challenge in the most efficient way and in the interests of our consumers, Heathrow has proposed an asset replacement plan supported by the ESO Resilience overlay in order to manage its existing asset base and maintain Q6 service levels. If we are to maintain the same service levels as in Q6 it is critical that this overlay is delivered in full alongside the planned Maintenance Capital Plan.

Figure 13 - Average Asset Life of Heathrow Lifts, Escalators and Moving Walkways by Terminal



- 4.7.23 Heathrow’s recent consumer research⁴² on potential acceptable service levels in H7, supports investing in order to maintain service levels with the consumers optimised preference being at the levels delivered in Q6.

⁴¹ Arcadis report, [https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20\(CAP2274A\).pdf](https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20(CAP2274A).pdf), page 8

⁴² Incite Consulting, Service Degradation Research, November 2021

Figure 14 - Consumers preferred Service Levels in H7

	Realistic Consumer driven target level
Availability of lifts etc.	99%
Direct connection between plane and terminal building	99%
Availability of Baggage reclaim	99%
Baggage misconnect rate (in a 1000 bags)	8
Flight punctuality	90%

Source: Incite Consulting, Service Degradation Research, November 2021

4.7.24 Since RBP Update 1, we have reviewed the asset maintenance capital programme and associated additional operating cost requirements. This has led to reprofiling the operating costs requirement in-line with expectations of when we need to undertake a higher level of servicing and repair throughout H7 as more and more assets pass their midlife point and reach their end of life. This means we can maintain and extend the operational life of the assets and maintain service levels to consumers. This overlay to operating costs allows for:

- Additional equipment hire to mitigate when faults occur;
- Purchase of additional spares when elements of an asset wear out;
- Additional resources for servicing and maintenance: including specialist attendance from manufacturer, specialist support for obsolete systems, increase number of baggage operatives; and
- Incident and incident recovery costs.

Enhanced Service Costs Overlay

4.7.25 In RBP Update 1, we included to enable passengers to get support when they require it during their journey. The operating expenditure would allow Heathrow to increase capacity to answer passengers' queries in the moment, in their own language and in real time through their personal digital devices. We also included [X] to support the on-going maintenance and roll-out of new touchless and automated parts of the passenger journey.

4.7.26 For RBP Update 2, we have reviewed both of these elements of the enhanced service overlay. Although this spend is clearly additional and required to address current service gaps, we have deemed it not sufficiently material to include in the forecast.

4.7.27 The updated enhanced service cost overlay is shown below:

Table 8 – Enhanced service cost overlay – RBP Update 1 vs Update 2

[X]

4.7.28 By excluding the additional costs to deliver our service obligations for passengers requiring support from the enhanced service costs, CEPA/TA have underestimated the efficient H7 operating costs by [X].

4.8 Input price inflation

4.8.1 In the RBP and RBP Update 1, our approach to input price inflation was based on the work by First Economics⁴³ 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. In RBP Update 1, we updated the forecasts to reflect the latest available data. We also provided full details of how the forecasts had been weighted together in accordance with the share that each input type has within the H7 operating cost categories.

4.8.2 Whilst CEPA/TA acknowledged that the principles to input price inflation we have applied are sensible, there are some key areas of disagreement:

- Use of CPI or RPI;
- Application of wage inflation to our people costs, where CEPA/TA claim we should discount 2020/21 wage inflation because of the pay constraints during this period;
- Application of wage inflation to our operational costs, where CEPA/TA argue only CPI should be applied; and
- Inclusion of adjustment of materials costs.

4.8.3 When considering the application of wage inflation to our people costs, it is correct that we did not carry out annual salary reviews in 2020 and 2021 for our non-negotiated grades. A 4% pay deal for negotiated grades was implemented in January

⁴³ First Economics, Frontier shift, input price inflation and productivity growth, August 2019

2020. This was agreed as part of the two and half year pay deal following the resolution of the pay disputes with unions in 2019, where we agreed to implement a £175 increase in July 2019, 4% increase in January 2020 and 4% increase in January 2021. However, as part of our response to the Covid-19 pandemic, we did not implement the pay deal in 2021.

- 4.8.4 During this period, we also went through the process of aligning all roles at all levels to the market rate for the role, using external market data, with the primary source of data from Willis Towers Watson. This allowed us to address our longstanding issue of legacy contracts. However, it also meant in some cases that colleagues received salary uplifts where previously they had been paid below the market rate for their role. Going forward, our salaries will be reviewed on an annual basis to ensure they continue to be aligned to the prevailing market rates and therefore reflect the wage inflation in the general economy over time. Due to the pay freezes, we are therefore also anticipating a need to reflect the market movement during this time.
- 4.8.5 As we enter a period of recovery and are rebuilding the business, we will have to recruit additional colleagues and offer market competitive rates to attract talent. This means throughout H7 we are fully exposed to the wage inflation pressures of the UK labour market, regardless of the pay restraint in 2020 and 2021. The Government's furlough scheme helped to avert an unemployment crisis. However, the UK now faces record vacancies, but unemployment has fallen back. There are now 1.45 unemployed people per vacancy, making this the tightest labour market we have seen for some time.
- 4.8.6 To address the other areas of disagreement, we have refined our approach based on contractual evidence and advice from Frontier Economics, as discussed in more detail below.
- 4.8.7 Since RBP Update 1, there have been significant rises in energy prices. 2021 gas prices have risen to a record high in Europe due to a recovery in global demand and tighter supplies (an unusually cold April and May in 2021 depleted European gas reserves by 20% more than usual). This is increasing the cost of heating buildings and pushing up electricity prices. Alongside this, there has been low wind generation across Europe in 2021 that has driven demand from gas-burning electricity-generating power stations. With the price of carbon emissions doubling since last year, this has also had a knock-on effect of making gas burning rather than coal burning more appealing for power generation. Using gas reserves to generate power and electricity has exacerbated the demand for gas and had a large knock-on effect on the price of electricity. We were protected from the impact of these high prices on our cost base in 2021 as a result of the hedging strategy in place, where we bought electricity and gas in advance until April 2022.
- 4.8.8 However, beyond April 2022 we are exposed to the cost rises in the energy market as we currently have no hedging in place for H7. This is because hedging is appropriate if there is a prediction of prices going up, whereas current forecasts suggest prices will be on a downward trajectory from the current spot level. There is also a limit on the ability to buy energy in advance, particularly given the current volatility in the supplier market. This is reflected in the current consumer market, where current advice is against consumers fixing prices. These price rises beyond April 2022 are reflected in the increase in our utilities costs in our 2022 forecast (see Section 4.4).

- 4.8.9 For RBP Update 1 we used the BEIS retail electricity price forecast published in October 2020.⁴⁴ This forecast is now significantly out of date and BEIS have not published an update. As a result, we have commissioned EIC to develop electricity and gas price forecasts based on the latest available data⁴⁵.
- 4.8.10 Since RBP Update 1, we have also commissioned Frontier Economics to review our approach to input price inflation⁴⁶. Frontier Economics support the use of a bespoke inflation forecast for each cost category as suggested by First Economics. However, recognising the regulatory precedent set by the CMA in their final price control determinations for four water companies that rejected the Ofwat price determinations, they have used the Ofwat criteria to determine when to recommend the use of a bespoke series⁴⁷. The criteria are based on the size and volatility of the wedge between the input price and general inflation measure, sufficient reasoning that the general inflation measure does not adequately capture the input price and level of management control. For cost categories where we have used a combination of several series to reflect different cost components they have also reviewed the appropriateness of the split applied with respect to the CMA’s criteria.
- 4.8.11 Before applying the input price criteria, Frontier Economics assessed whether CPI or RPI should be used as the measure of general inflation. Based on the ONS guidance and regulatory precedent from Ofwat for PR19 and Ofgem for RIIO-2, they recommend the use of CPI. They highlight the exception to this would be if we had contracts which specify that costs will rise in line with RPI. As a result, for RBP Update 2 we have reviewed our contracts and updated our approach to input price inflation for Operational Costs and Facilities and Maintenance.
- 4.8.12 Based on their assessment against the Ofwat input price criteria, Table 9 presents a summary of the Frontier Economics recommendations and how we have reflected them in RBP Update 2.

Table 9 – Frontier Economics input price inflation recommendations

	RBP Update1	Frontier Economics Recommendations	RBP Update 2
People	OBR March 2021 Average Earnings forecast	Use of OBR wages series consistent with the CMA On the basis of the evidence that all Heathrow roles align to market rates, Frontier Economics disagree with CEP/TA that there should be a nominal pay freeze in 2020 and 2021	OBR October 2021 wages forecast
Operational costs excl. insurance	55% labour using OBR Average Earnings	Use of OBR wages series for labour, CPI for materials/RPI	Based on a review of our contracts

⁴⁴ BEIS, Updated energy and emissions projections 2019, October 2020.

⁴⁵ EIC, Delivered Electricity Price Forecast, November 2021.

⁴⁶ Frontier Economics, H7 IP Opex Review, December 2021.

⁴⁷ 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.

	RBP Update1	Frontier Economics Recommendations	RBP Update 2
	30% materials using First Economics materials price estimate 15% RPI	Support 55%/45% split as evidenced by cost breakdown	25% labour using OBR October 2021 wages forecast 50% CPI and 25% RPI using OBR October 2021 forecasts
Insurance	RPI	CPI	No indexation, assumption of [X] price rise per annum is nominal forecast
Facilities and maintenance costs	60% labour using OBR Average Earnings 40% materials using First Economics materials price estimate	Use of OBR wages series for labour, CPI for materials Support 60%/40% split as evidenced by cost breakdown	Based on a review of our contracts 15% labour using OBR October 2021 wages forecast 45% CPI and 40% RPI using OBR October 2021 forecasts
Rates	RPI	CPI	CPI
Utility costs excl. distribution contract	BEIS October 2020 industrial retail electricity price forecast	Support the use of an up-to-date bespoke series	EIC forecasts for electricity and gas prices CPI for water, waste and telecoms
Distribution contract	RPI	CPI	Contract is linked to RPI
General Expenses	50% labour using OBR Average Earnings 50% RPI	100% CPI, noting Heathrow need to provide a cost breakdown to support inclusion of labour	50% labour using OBR October 2021 wages forecast 50% CPI

4.8.13 In RBP Update 2, the materiality of the input price inflation forecasts is an increase of £62m over H7 compared with using a RPI forecast. In RBP Update 1, the materiality was an increase of £104m over H7. CEPA/TA estimated the impact of their alternative input price assumptions to be a reduction of £254m over H7 compared with our RBP Update 1 forecast. Compared with our updated assumption the impact of the errors in the CEPA/TA assumptions would be £154m over H7.

4.9 Driver-based forecast methodology

4.9.1 In this sub-section, we describe:

- Our approach to modelling how passenger volumes drive operating costs and the evidence we have used to support this; and
- Our concerns in relation to the CEPA/TA elasticity assumptions (for cost categories relating to people, operational, general expenses, and facility and maintenance).

Elasticity of operating costs

4.9.2 Our driver-based methodology uses an elasticity assumption that links changes in passenger volumes to a change in total operating costs. The elasticities we have applied are based on the robust, independent evidence base developed by Frontier Economics⁴⁸. Frontier Economics combined evidence from historical Heathrow data, benchmarking from a wide sample of comparator airports, a literature review and regulatory precedent. Frontier Economics developed a short run passenger elasticity range of [X]. They recommended using the lower range of the short run elasticity, [Y], as an estimate which is fit for purpose in producing our H7 operating cost forecast. This implies that, over the 5-year period, a 1% increase/decrease in passenger volumes leads to a [Z] increase/decrease in operating costs.

4.9.3 In RBP Update 1, we made an adjustment to the passenger volume elasticity we applied for operational costs, where we reduced it by [X] from [Y]. This was as a result of reviewing the actual reduction of operational costs with reduced passenger volumes. Costs such as IT, police and rent are largely fixed. Analysis of our 2019 operational costs suggested that around [Z] of our operational costs are variable in the medium term and this was the adjustment we applied to the elasticity.

4.9.4 For RBP Update 2, we have undertaken a similar validation exercise for people costs. Validation of our model outputs against our bottom-up outturn estimates for people costs in 2021 and 2022, has highlighted that using an elasticity of [X] is overestimating the ability of an efficient airport to make people savings when faced with sudden changes in passenger demand. This is primarily due to two key factors:

- Operational reality of aligning security resourcing to the current passenger demand environment, with shift pattern constraints which are bound by terms and conditions
- Practical reality of ramping-up or down total colleague population for changes in passenger demand.

4.9.5 A consequence of Covid-19 safety measures and the current reduced levels of demand on our security resourcing levels is the negative impact to security flow rates and resource coverage efficiency. Flow rates have been negatively impacted by Covid-19 safety measures such as social distancing and increased liquids due to hand sanitiser in bags. We have also seen a change to our passenger mix, with less business travellers (30% to 20% Apr-Sep 19 vs 21⁴⁹) and more leisure particularly visiting friends and family travel (25% to 46% Apr-Sep 19 vs 21⁵⁰), some of which are

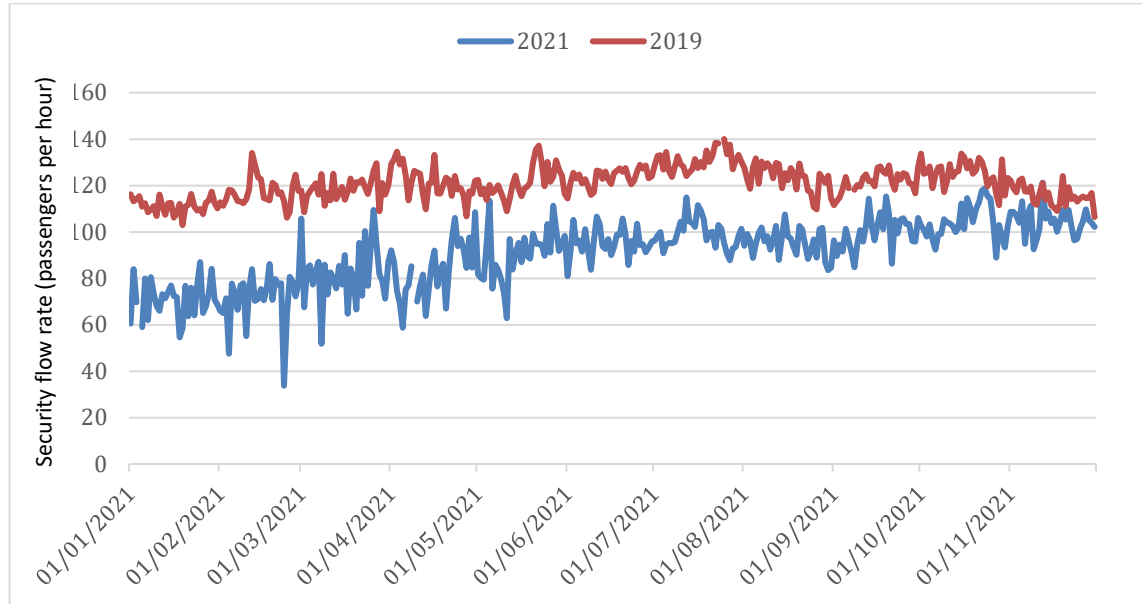
⁴⁸ Frontier Economics, Developing opex and commercial revenue elasticities for H7, October 2019

⁴⁹ Heathrow, Passenger Profiler Survey, April – September 2019 and April – September 2021

⁵⁰ Heathrow. Passenger Profiler Survey, April – September 2019 and April – September 2021

not as familiar with flying and the security process, and therefore take longer to pass through security. Whilst some of these issues have improved over the course of 2021, flow rates were still 25% lower than 2019 on average and were 13% lower across October and November, as shown in Figure 15 below.

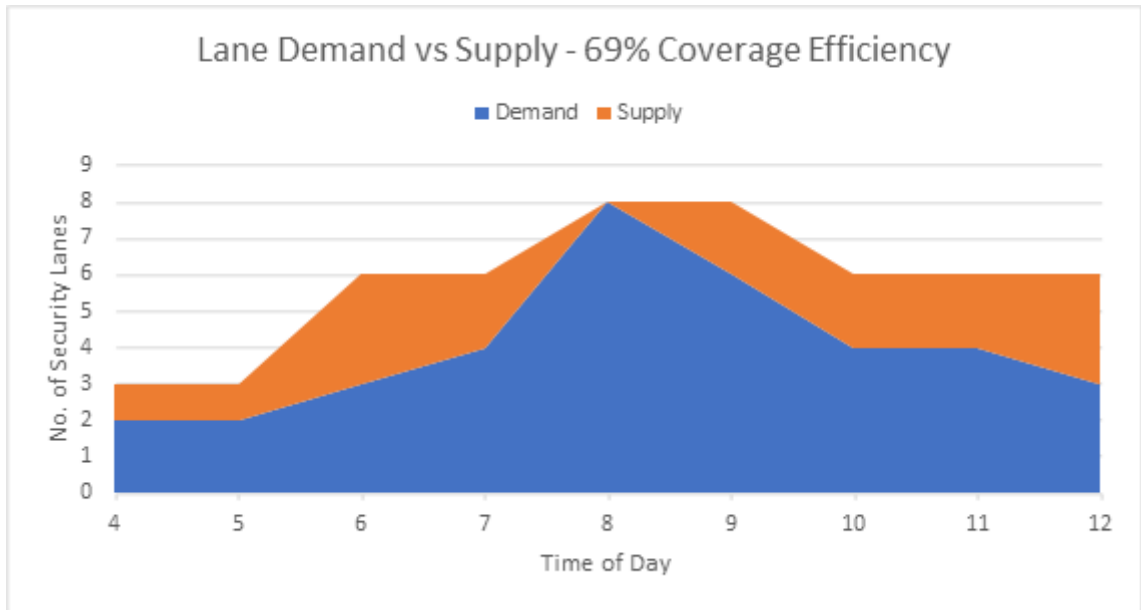
Figure 15 – 2019 and 2021 security flow rate comparison



Source: Heathrow

- 4.9.6 We have therefore reduced the flow rates in our People Model (see Section 4.4 for a description of the model methodology) to reflect this reality and whilst we expect them to continue to grow closer to 2019 levels through 2022, we don't expect a full recovery until at least 2023.
- 4.9.7 Coverage efficiency has also been impacted by the lower demand and the shape of the demand. Coverage efficiency is a measure of the percentage of time that a colleague can service demand when on shift. This is based on types of rosters, shift patterns and lengths, overtime and the shape of demand. If demand is peakier then the coverage efficiency is lower as the operation needs enough resource to cover the peak, which is then unneeded for the rest of the shift. Whilst some of this can be covered by overtime, the rest requires staff to be brought in for a full shift. This impact is missing from the CAA and CAPA/TA analysis. The figure below shows an example of higher supply required to cover the peak demand, resulting in a coverage efficiency of 69%:

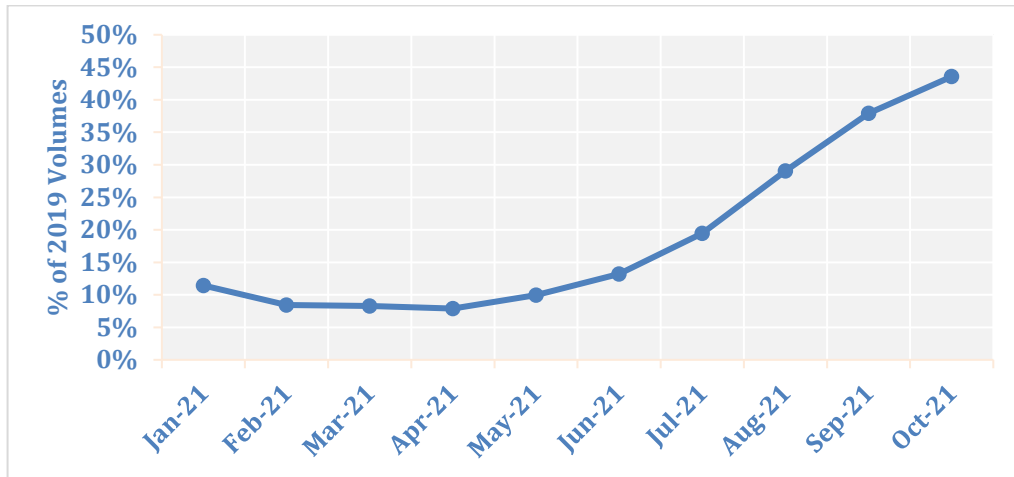
Figure 16 – Lane demand vs supply at 69% resource coverage efficiency



Source: Heathrow

- 4.9.8 The other element that reduces coverage efficiency is the peak day and peak hour in comparison to the average levels of demand seen at a more aggregated level. For Oct 21, monthly passenger volumes were at 44% of 2019 levels, as shown below.

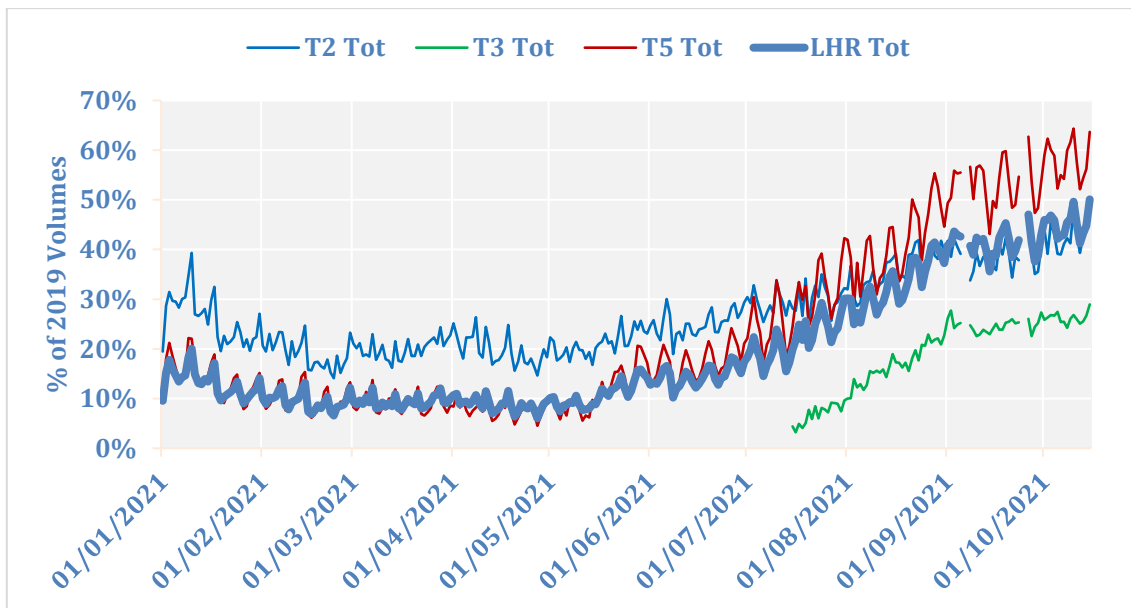
Figure 17 – 2021 passenger volume recovery



Source: Heathrow

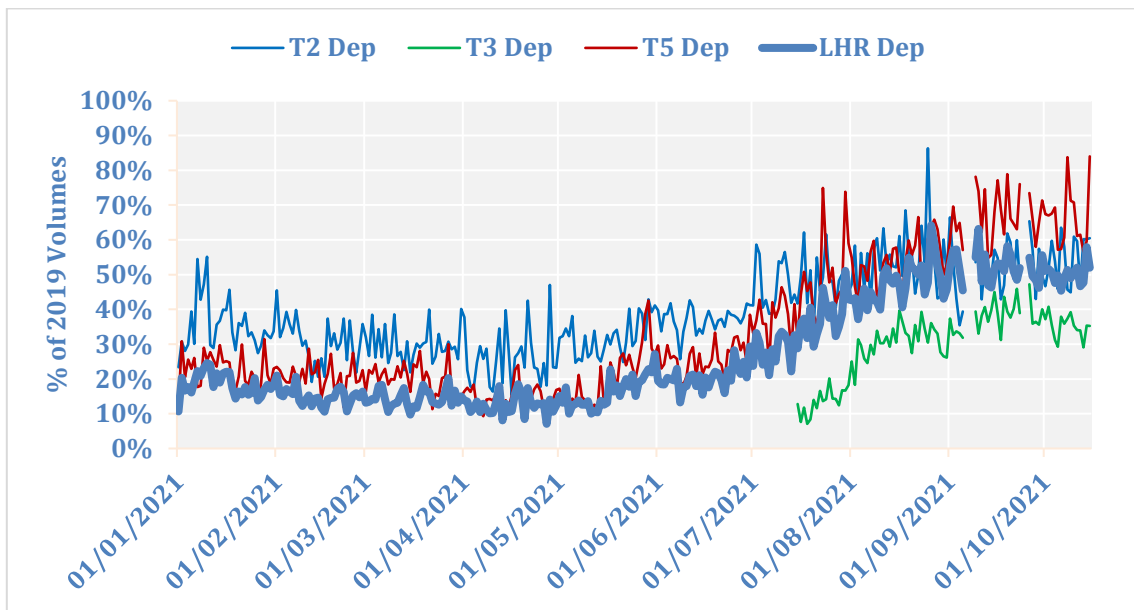
4.9.9 However, the level of recovery varied significantly across terminals and for the peak days and hours.

Figure 18 – 2021 peak day passenger volume recovery



Source: Heathrow

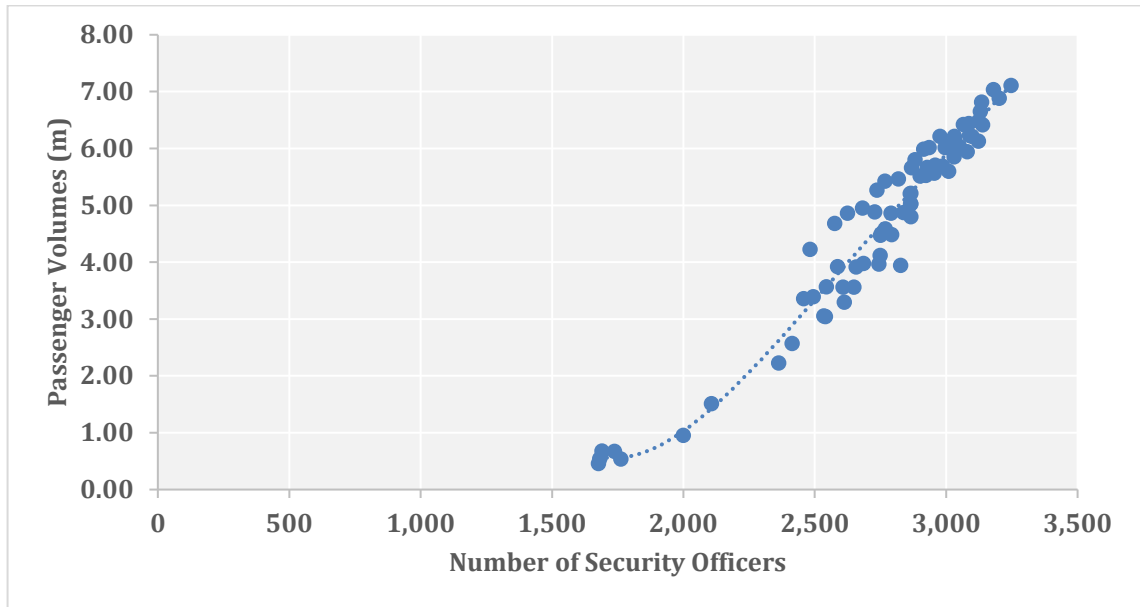
Figure 19: 2021 peak hour passenger volume recovery



Source: Heathrow

- 4.9.10 With peak days getting up to 64% of 2019 volumes and peak hours getting up to 84%, this requires a higher volume of resource than the annual or monthly passenger volumes might suggest. This is reflected in a lower coverage efficiency as we need to deploy more staff on the day to cover the peaks, but shifts are 8.5 hours long and outside of the peaks they are not needed due to lower demand.
- 4.9.11 Fixed posts represent about a third of the security officer pool and are all the fixed desks and doors across the airport that need to be manned to maintain the airside boundary. As these are fixed, they don't vary with demand and with lower passenger volumes, they represent a larger proportion of the total and hence explain some of the variance versus an elasticity-based approach.
- 4.9.12 The chart below demonstrates the relationship between passenger volumes and the requirement for security officers, which tends to a linear relationship at higher passenger volumes but is more fixed at lower passenger volumes. This is based on the RBP Update 2 passenger forecast to 2026 and there is some variation at the 4-5m passenger level due to improvements in flow rates expected through 2022 and 2023.

Figure 20: Security officer requirement vs passenger demand



Source: Heathrow

- 4.9.13 The impact of the lower flow rates and coverage efficiency in 2022 results in the requirement for an additional 273 people across operations, predominantly security officers. This is in comparison to modelling the expected 2022 passenger volumes in line with the monthly seasonality seen in 2019 and the 2019 flow rates and coverage efficiency, reflecting the removal of any Covid-19 restrictions and measures, and the shape of the demand being less peaky and more in line with 2019. Similarly, the impact in 2021 was a requirement for 304 additional people in operations.
- 4.9.14 Using average salary rates by role, we have reflected this additional resource requirement in the RBP Update 2 model for 2021 and 2022. Full details are included in Appendix A10 - Additional analysis to support operating cost assumptions.
- 4.9.15 There are also practical challenges to ramping-up or down the total colleague population for changes in passenger demand. Due to union negotiations and legal consultation periods, there is a time lag from a fall in passenger volumes to the practical ability to implement cost reductions. Agreements with the unions and high rates of absence due to Covid-19 have also impacted our ability to align resources with demand. The furlough scheme partially supported alignment of resource to passenger demand in 2020 and 2021. However, we chose to partially top up salaries, as the scheme changed we were required to make contributions and the scheme closed in September 2021. It is also not always desirable to reduce headcount in response to demand shocks. It takes times time to backfill roles and get colleagues trained and therefore risks us not being able to respond as passenger growth returns. This is particularly the case given the challenging recruitment market that currently exists in the UK.
- 4.9.16 As passenger volumes suggest a recovery, subject to Omicron impact, we must ramp-up our resource to meet the forecast growth in passenger demand. However, due to recruitment and training lead-in times, it is necessary to bring back resource

before demand. If outturn passenger demand is lower than forecast, as was the case in the first half of 2021⁵¹, we are already committed to the higher level of resource.

- 4.9.17 As the forecast outturn for people costs in 2021 reflects the cost implications of these practical challenges, we have adjusted the people costs elasticity in the RBP Update 2 model to align to the 2021 costs (after adjustment for furlough, which is not available in 2022). This results in the people costs elasticity being reduced from [§<]. Full details of the analysis are included in Appendix A10 - Additional analysis to support operating cost assumptions.
- 4.9.18 CEPA/TA broadly accept our overall elasticity estimate of [§<] for total operating costs with respect to passenger volumes. However, they have made adjustments at a cost category level. Our concerns relating to these are described below.

CEPA/TA People Cost Elasticity Assumptions

- 4.9.19 CEPA/TA have attempted to make separate elasticity assumptions for the security, operational, non-operational and pension costs.
- 4.9.20 For security, they further separate fixed and variable security officer roles, assuming fixed roles do not vary with passenger volumes. However, we have some concerns with their approach and they have made a number of errors in their assumptions:
- Security officed elasticity model does not appear to reflect operational reality. For variable roles, they have developed a security officer resource model to establish an elasticity for security officer FTEs with respect to passenger demand. The modelling approach is similar to Heathrow's People Model in that it is based on demand by 15-minute time slices across the day and accounts for the expected growth in passenger volumes from the forecasts. However, it is not clear whether CEPA/TA have undertaken modelling on a terminal-by-terminal basis and split between direct and transfer search areas. These areas need to be modelled separately in order to avoid introducing an efficiency to the modelling that cannot actually be achieved operationally or practically. The same principle applies when Terminal 4 reopens. It is also not clear if the conversion from passenger demand to lane demand rounds to the nearest whole number as we are unable to open part lanes. For example, if the calculation outputs 0.4 lanes for direct and 0.4 lanes for transfers, it is unclear whether the final requirement in the CEPA/TA model would be 0.8 lanes. For our own modelling and for operation delivery, we would open 1 lane in directs and 1 lane in transfers, totalling 2 lanes across the whole terminal.
 - Security flow rate and lane resource requirement assumptions are not correct. Security flow rate assumptions of 140 to 220 are highly ambitious, especially considering the current challenges due to Covid-19 and changes to passenger demographics (see description and charts above). Flow rates are currently peaking at 120 in Terminal 2 and Terminal 5, and 90 in Terminal 3, and these lower rates are expected to continue into 2022 and 2023. We are currently in the process of collecting data from the Pilot Lanes to determine validated flow rate assumptions for the new lanes. The assumptions CEPA/TA make in terms of the number of security officers per lane are also incorrect. Our current security operating model is configured in pairs of lanes with 11 security officers required per pair. [§<].

⁵¹ In the RBP our passenger forecast for 2021 was 37.1m, the expected outturn is now 20.5m

- The approach to calculating an elasticity of security FTEs with respect to passenger volumes is not correct as it incorrectly assumes a linear relationship between the two. Modelling at an annual level ignores the monthly seasonality in flow rates and non-operational time per FTE. However, the evolution in flow rates and inefficiencies of initially opening terminals will increase the costs in the shorter term when demand is lower. We are also seeing peakier demand profiles which lead to higher resource requirements for certain hours and due to how security officers are rostered, means those higher volumes of staff are in the business for a whole shift. This is captured in Heathrow's People Model through an additional input called coverage efficiency but appears to be missing from the CEPA/TA approach.

4.9.21 CEPA/TA did not engage with us at any point to understand our security operating model, discuss modelling approaches or verify assumptions. As a result, the modelling is based on flawed assumptions and is not appropriate for use in either forecasting our security officer costs in H7 or estimating the efficiency impact of the security transformation programme.

4.9.22 For other operational colleagues and pension costs, CEPA/TA revert to using their general costs elasticity of 0.4. For non-operational colleagues, they have assumed an elasticity of 0, assuming that these costs do not vary with passenger numbers. This is clearly not the case, whilst management roles may not be directly linked to passenger demand in the way that operational roles are, the number of management roles will always be aligned to the volume of passengers the airport is required to serve. In 2020 and 2021, around [X] management colleagues left the business as a result of the fall in passenger volumes, and as passenger volumes recover, we will bring roles back, including in 2022.

CEPA/TA Operational Costs Elasticity Assumptions

4.9.23 CEPA/TA agree that a proportion of these costs are likely to be fixed in the medium term. They suggest that contract forecasts should be used, removing any volume element and assuming an elasticity of 0. Despite this they apply an elasticity of 0.4, which then overestimates the level of savings compared with 2019 we could achieve during H7. As discussed above, around [X] of our costs within operational costs are largely fixed. However, [X] do vary with passenger volume for example PRS costs, passenger ambassadors and commercial expenditure. Therefore, the approach we have used reflects contract details. Essentially, we are assuming [X] of our operational costs have an elasticity of [X] and [X] have an elasticity of [X], resulting in the overall elasticity of [X].

CEPA/TA General Expenses Elasticity Assumptions

4.9.24 CEPA/TA suggest some aspects of General Expenses would not be expected to be volume related such as marketing or professional services (consultancy) costs so would not expect any elasticities to be applied to these categories. Despite this they apply an elasticity of 0.4. However, it is correct to apply this elasticity with respect to passenger volumes. We have made general expenses savings of [X] in 2021 compared with 2019, largely in the areas of marketing and consultancy costs, in response to the fall in passenger volumes. However, we will resume activities in these areas as passenger volumes recover.

CEPA/TA Facilities and Maintenance Elasticity Assumptions

- 4.9.25 We have applied an elasticity of [∞] with respect to changes in utilised terminal floor space as Frontier Economics were able to find a plausible and statistically significant relationship for this category using our historical costs. CEPA/TA state that it would be more consistent to apply the [∞] elasticity with respect to passenger volumes to all cost categories. This contradicts their approach in other cost categories where they have applied alternative elasticities. It is also clear that terminal use rather than passengers is the main driver of costs in facilities and maintenance. The savings we have made in this area are related to infrastructure consolidation. Once we reopen Terminal 4, costs will return to 2019 levels with the exception of the permanent savings associated with the baggage contract and the impact of the London Living Wage. However, even though passenger volumes are forecast to grow throughout H7 we do not expect these costs to grow, rather they will fall in real terms as a result of ongoing efficiencies.
- 4.9.26 More generally CEPA/TA state that it should be possible to disaggregate the cost categories and their drivers to apply elasticities for each category rather than applying a single elasticity to passenger growth to all main categories. They also state that within the cost categories, they would also expect there to be significant differences between the elasticities that should be applied to the various components of cost that make up that category. Whilst we agree with this in principle, the challenge is estimating realistic and evidence-based elasticities on such a granular basis and whether this would lead to materially different results. Frontier Economics found no plausible elasticities from analysis of our historical data at a cost category level except for Facilities and Maintenance. Data for comparator airports is not consistently available at a sufficient level of granularity to use as a basis for elasticity estimates. Attempts at deriving elasticities from bottom-up estimates are reliant on a high number of assumptions, typically with limited supporting evidence and are therefore based on management judgement. Whilst individual assumptions may seem plausible, when combined can lead to an unrealistic elasticity estimate. CEPA/TA's use of this approach to estimate our security costs is a clear example of this.
- 4.9.27 Correcting for the adjustments to elasticities that CEPA/TA have made at a cost category level would increase their forecast by £158m over H7.

4.10 Other modelling updates

- 4.10.1 Since RBP Update 1 there are a number of other elements of the operating cost forecast that have been reviewed:
- Update to the estimate of the change in operating costs resulting from changes in terminal use;
 - Insurance rates have increased faster than previously forecast;
 - Business Rates should be modelled to increase in line with CPI to reflect government policy; and
 - Pension deficit costs should continue to be included as previously estimated.

Cost impact of changes in terminal use

- 4.10.2 In RBP Update 1, we assumed that in the high and mid passenger forecast scenarios Terminal 4 would reopen for all passengers in June 2023. In the low passenger forecast scenario, Terminal 4 would not be required until June 2025. Due to the processing constraints introduced by Covid-19, for the purposes of RBP Update 2 we are now assuming an opening date of July 2022 for Terminal 4. See the RBP Update 2, Section 1.3 for further information on the assumption to open Terminal 4.
- 4.10.3 In the RBP we included assumptions to reflect the impact of changes in terminal utilisation on our operating cost forecast, considering that these are temporary changes rather than a reduction/increase in actual terminal floorspace. In RBP Update 1 we also needed to take into account that terminals may be used for arrivals from red list countries. Full details of the analysis informing the assumptions were included as an Appendix to RBP Update 1⁵².
- 4.10.4 On the 1st November 2021, the government removed all countries from the red list and Terminal 4 closed for red list arrivals. The agreement with the government to recover our costs associated with operating Terminal 4 as red list arrival facility was terminated. However, the discovery of the Omicron variant led to southern African countries being added to the red list from the 26th November 2021. In response we reopened Terminal 4 for red list arrivals. However, there is no agreement in place to recover the associated costs.
- 4.10.5 For the purposes of the H7 operating cost forecast, we are assuming that Terminal 4 will be required for red list arrivals until it reopens for all passengers in July 2022. It may be the case that there is an ongoing requirement for a segregated red-list arrivals facility, however, these potential costs are not included in the forecast.
- 4.10.6 CEPA/TA stated that limited breakdown of the incremental costs of the red list operation were provided in Update 1 even though we set out our assumptions clearly in Appendix 5 of RBP Update 1. Since RBP Update 1, we now have details of the actual incremental costs incurred, as set out in Appendix A10 - Additional analysis to support operating cost assumptions. We have included [X] of incremental costs associated with operating the red-list facility from January to the full reopening of Terminal 4 at the beginning of July 2022. These costs are based on the incremental costs occurred in September 2021, as this represents efficient spend where we were neither ramping up or down the operation.
- 4.10.7 As we are now using the direct costs for red-list operation, for this update it is only necessary to apply assumptions in the model for changes in utilised terminal space for all passengers.
- 4.10.8 CEPA/TA agreed with our approach of reflecting the cost impact of changes in terminal use for operational costs and utilities costs and retained our assumptions. However, there was disagreement over the treatment of people costs.
- 4.10.9 CEPA/TA argued that because Frontier Economics did not find a relationship between our historical people costs and passengers or floorspace, the cost per square metre assumption may not be appropriate or efficient. During Q6 we reduced our total people costs despite a growth in passenger volumes. This would imply a negative elasticity for people costs with respect to passenger volumes and as such is not appropriate for use in forecasting future costs. The analysis to determine the

⁵² RBP Update 1, Appendix 5 - Additional analysis to support Operating Cost modelling assumptions

cost per square metre assumption is based on isolating the people costs that are directly related to terminal operation. It considered the most recent costs for Terminal 2 to reflect the most efficient operation and is therefore also not impacted by changes in costs in relation to changes in passenger volumes.

- 4.10.10 However, since RBP Update 1 we have considered an alternative approach by using our People Model to estimate the impact on resource of opening or closing terminals. The re-opening of terminals increases resource requirements as it triggers growth for some role types such as passenger experience managers and engineering technicians. It also increases the number of security officers required and can lead to inefficiencies if opened too soon. Whilst each terminal can handle a specific volume of capacity and opening will be triggered as demand returns, opening and moving demand in too soon can lead to an inefficient operation due to minimum lane requirements and also lower resource coverage efficiency (due to the reasons explained in Section 4.9 above). Whenever a terminal is reopened, there is a step increase in the number of staff required, therefore it is more efficient and cost effective to operate the least amount of terminals for the longest period possible. Although, the forecast demand for 2022 suggests an operation across three terminals, the peakiness of the demand and Covid related process inefficiencies, especially at Check-in may require the early opening of Terminal 4. Comparing the People Model output for a three and four terminal operation with 2022 passenger demand, indicates that we will require over [X] additional staff. The cost impact of this has been estimated using the average salary for each additional role, full details are included in Appendix A10.
- 4.10.11 CEPA/TA also argued that our proposed ramp up of people costs was overly cautious and means that 100% of terminal people costs return on the day that the terminal is opened regardless of the passenger volume served. This is not correct and misunderstands the purpose of the terminal space overlay. The overlay is combined with the use of the passenger volume elasticity and therefore 100% of terminal people costs would only return when passenger volumes also return to 100%. The terminal space overlay captures the colleagues required to operate the terminal regardless of passenger volumes.
- 4.10.12 Since RBP Update 1, we have also refined our assumptions for the ramp-up of people costs, to reflect the training requirements of the additional roles required for reopening. Some of the additional roles, such as technicians, have to be recruited as far as 6-9 months in advance in order to complete the required training. However, the majority of the roles are security officers who have a training requirement of 6 weeks. Therefore, we have assumed a ramp-up of [X] of costs from 6 months before opening, increasing to [X] in the 2 months prior to opening.
- 4.10.13 As in RBP Update 1, we have assumed [X] of the cost impacts for operational and utilities in the three months prior to a terminal reopening for passengers to reflect the build-up of costs when terminals are being prepared to reopen. In Update 1, we did not include ramp-up facilities and maintenance costs, which was an oversight we have now corrected and have also used a [X] build-up of costs.
- 4.10.14 These assumptions are summarised below and for completeness the analysis informing the assumptions are again included in Appendix A10 - Additional analysis to support operating cost assumptions.

Table 10 - Cost impacts of changes in terminal use – RBP Update 1 vs Update 2

[REDACTED]

4.10.15 The impact of CEPA/TA's ramp-up assumptions was to include £0.3m of ramp-up costs in their forecast. In RBP Update 2, our updated assumptions forecast that we will incur [REDACTED] of ramp-up costs in advance of Terminal 4 opening. This means CEPA/TA have underestimated ramp-up costs by [REDACTED].

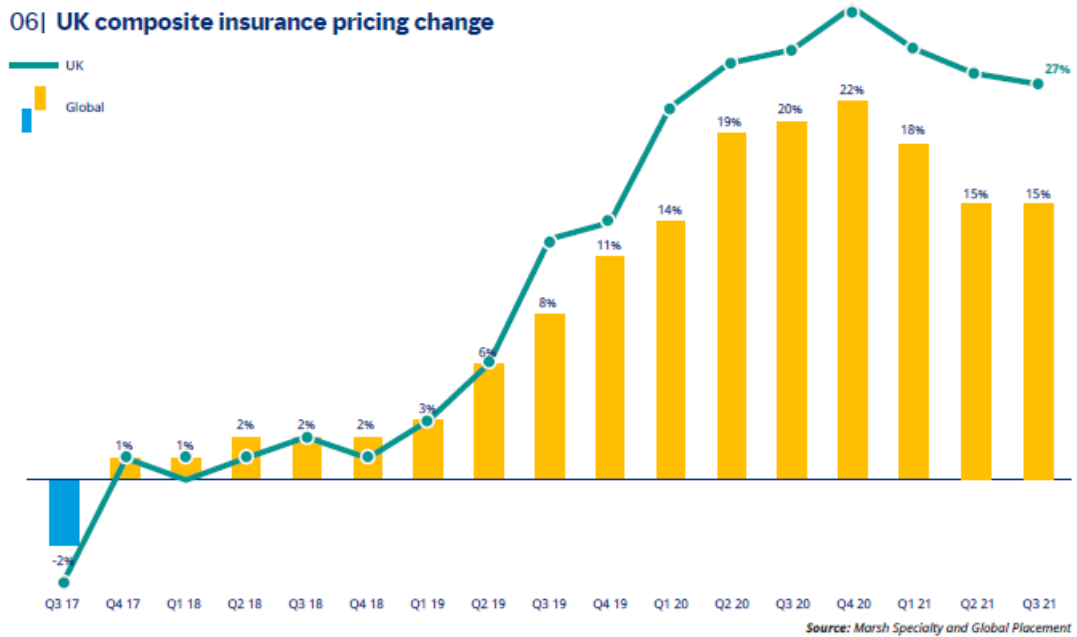
Insurance

4.10.16 In the RBP we updated our approach for forecasting our insurance costs, basing our estimates on market conditions. There have been significant rate increases in the insurance markets since 2019. In RBP Update 1, as a result of the rate increases in 2021, we used 2021 as the base year for the forecast rather than 2019. We reviewed the latest insurance market data and confirmed that an estimate of a [REDACTED] per annum increase in insurance costs for H7 remained a conservative estimate.

4.10.17 Rather than applying a [REDACTED] increase, CEPA/TA applied a 5% increase which they state is based on an alternative interpretation of the market data. However, they have provided no further details of their approach to enable us to respond on this matter. The impact of this is an underestimation of our insurance costs over H7 by [REDACTED].

4.10.18 Since RBP Update 1, we have reviewed the latest market data shown below. Taking into account the proportion of each insurance type in our total cover, shows that a forecast increase in costs of [REDACTED] per annum for H7 remains a conservative estimate.

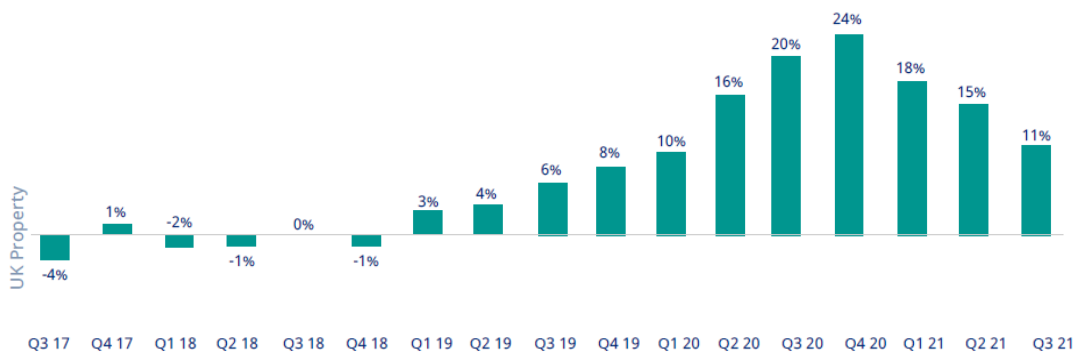
Figure 21 – UK composite insurance pricing change



Source: Marsh Speciality and Global Placement

4.10.19 In Q3 2021, **Property** insurance pricing increased 11%. Most renewals have been less volatile which, in part, is a reflection of the increased competition from alternative insurers. The claims environment remains challenging due to Covid-19 claims disputes concerning interpretation and application of policy wording. Cyber and communicable disease restrictions continue to be applied to policies.

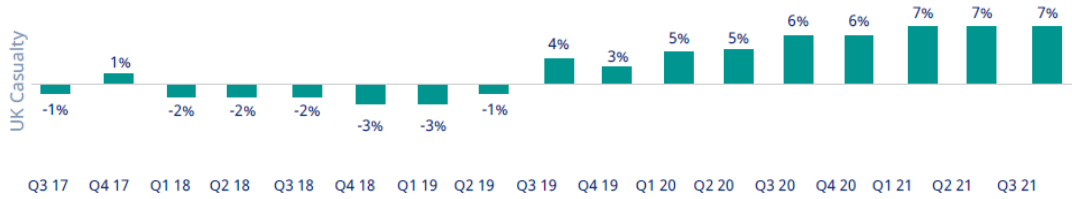
Figure 22 – UK property insurance pricing



Source: Marsh Speciality and Global Placement

4.10.20 In Q3 2021, **Casualty (aka liability)** insurance pricing increased 7%. There is increased scrutiny around sanctions, cyber, and Covid-19 meaning a longer timeframe and the provision of significantly more additional information is vital to placement of cover successfully. The outlook for rate increases for the next renewal period remain stable.

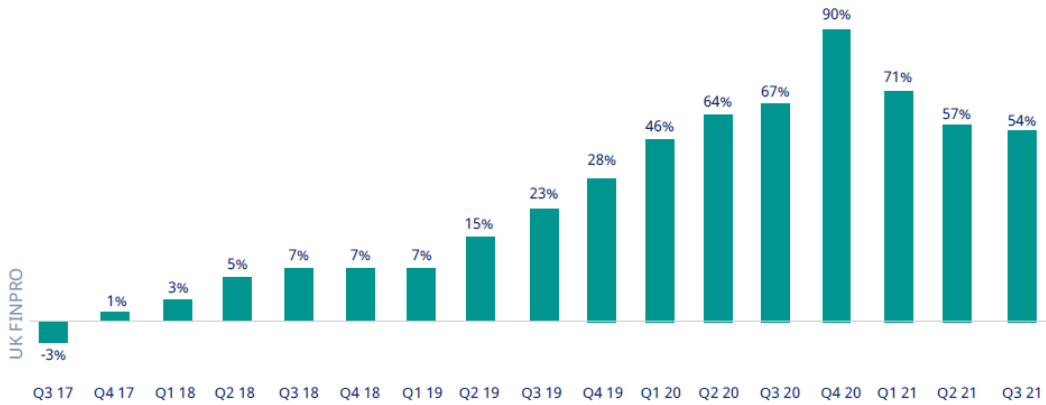
Figure 23 – UK casualty (aka liability insurance pricing)



Source: Marsh Speciality and Global Placement

4.10.21 In Q3 2021, **Financial & Professional** insurance pricing increased 54%, largely due to Directors & Officers (D&O) liability. D&O rate increases declined significantly from 121% in Q2 to 61% in Q3 as insurers increased appetite and competition. The cyber insurance market continues to deteriorate with capacity reducing and rates rising. Commercial crime rates increased 50% to 60% with a limited number of insurers writing this cover.

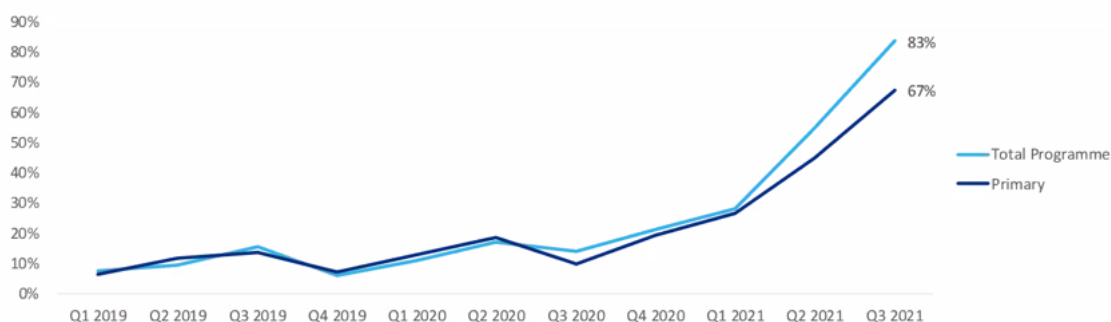
Figure 24 – Finance and professional insurance pricing



Source: Marsh Speciality and Global Placement

4.10.22 In Q3 2021, standalone **cyber** insurance pricing increased by 83%. There has been an accelerated deterioration of market conditions due to an increase in the frequency and severity of ransomware claims that continue to dictate loss ratios and premium. Insurers are defining their capacity management strategy in response to large loss volatility and deteriorating performance, and now look at this product line as both long tail (liability, regulatory) as well as short tail (ransom demand and breach response expenses). Insurers are pushing clients to increase their retention levels (in other words excesses) to make placement of cover a realistic proposition.

Figure 25 – Cyber insurance price change (percentage)



Source: Marsh Speciality and Global Placement

Business Rates

4.10.23 We are expecting a revaluation of our business rates bill to come into force in 2023. The outcome of this review is still uncertain and we are continuing to engage with the Valuation Office Agency on both the methodology for the valuation and this size of the resultant rates bill. However, under the current timeline we expect to have an outcome from this process by mid-2022.

4.10.24 Given the current uncertainty, for the purpose of this update we are maintaining our forecasting approach from the RBP, where we assume rates are constant in real terms. However, we are now using CPI rather than RPI as the inflation measure reflecting government policy.

4.10.25 For a discussion on the treatment of business rates see Chapter 6.2 ORCs.

Pensions

4.10.26 The triennial pension valuation date is 30 September 2021 and it must be concluded by 31 December 2022. At this time, an estimate of the outcome of the deficit repair is not known, as the covenant review, to establish the “strength” of the sponsoring employer (Heathrow), is yet to take place. This will commence in February 2022, once 2021 financial results are published, and the outcome will be known in April 2022. After this point, taking into consideration the covenant review and initial valuation outcomes, it will be possible to establish an initial estimate of the new deficit repair and future service contributions, which will inform the wider pensions strategy development. The pensions strategy will be presented for a decision in principle in June 2022, pending the final valuation outcome, which will not be known until September 2022 at the earliest.

4.10.27 We welcome that the CAA has proposed to retain Heathrow’s forecasts of £23m pa for pension deficit repair costs during H7 and that the CAA has recognised that pension deficit repair costs should receive consistent treatment over time. In Q6 it decided that they should be included in the operating cost allowance, consistent with the policy principle that consumers pay for deficits and benefit from surpluses.

4.11 CAA process and IP operating cost ranges

4.11.1 We have concerns about the CAA process in establishing an efficient operating cost forecast for H7 and the choice of ceiling for the range of estimates.

- 4.11.2 The lack of evidence supporting the work undertaken by the CAA is not what we would expect at this late stage in the process. The CAA has not provided any discussion or views on any of its key assumptions. The CAA have also provided limited visibility of its range calculations and assumptions. The CAA published its Initial Proposals on service targets a month after the main Initial Proposal consultation, and this document still only contains the service level targets for a subset of the measures. This means we are not able to fully understand the context of the CAA's operating cost proposals, so our review is partial and we are only able to respond to the operating cost assumptions set out by CEPA/TA.
- 4.11.3 Examples of specific areas where engaging with Heathrow more actively would have resulted in better opex forecasts include:
- Understanding the need for capital investment in order to achieve operational efficiencies (see Section 4.6);
 - Understanding the operational and practical realities of reducing headcount in response to changes in passenger volumes (see Section 4.9); and
 - Understanding how security is provisioned to account for the peakiness in demand and the modularity of capacity (see Section 4.9).
- 4.11.4 We have significant concerns with the H7 operating cost range proposed by the CAA:
- Establishing the ceiling of the range - the use of our forecast as the ceiling is poor regulatory practice and the CAA is setting precedent for the wrong regulatory incentives. Rather than setting incentives to provide the most robust forecasts possible, it incentivises Heathrow to submit an extreme forecast in order to move the CAA's range to a more attractive point. This is clearly not in the interests of consumers. The CAA have also failed to acknowledge the stretch already included in our forecast.
 - Establishing the floor of the range – as described in this section, the CEPA/TA forecast costs includes significant errors that result in their estimate of operating costs being significantly too low. Further, the CAA appear to have carried out no assessment of whether an efficient operator would actually be able to achieve such cost savings in practice.
 - Range construction – the choice of the 25th and 75th percentile appears to be arbitrary as no justification is provided by the CAA in the Initial Proposals.
 - Deliverability of cost target – the CAA appear to have carried out no assessment of the deliverability of the forecast range

Alternative approach to establishing the top of the range

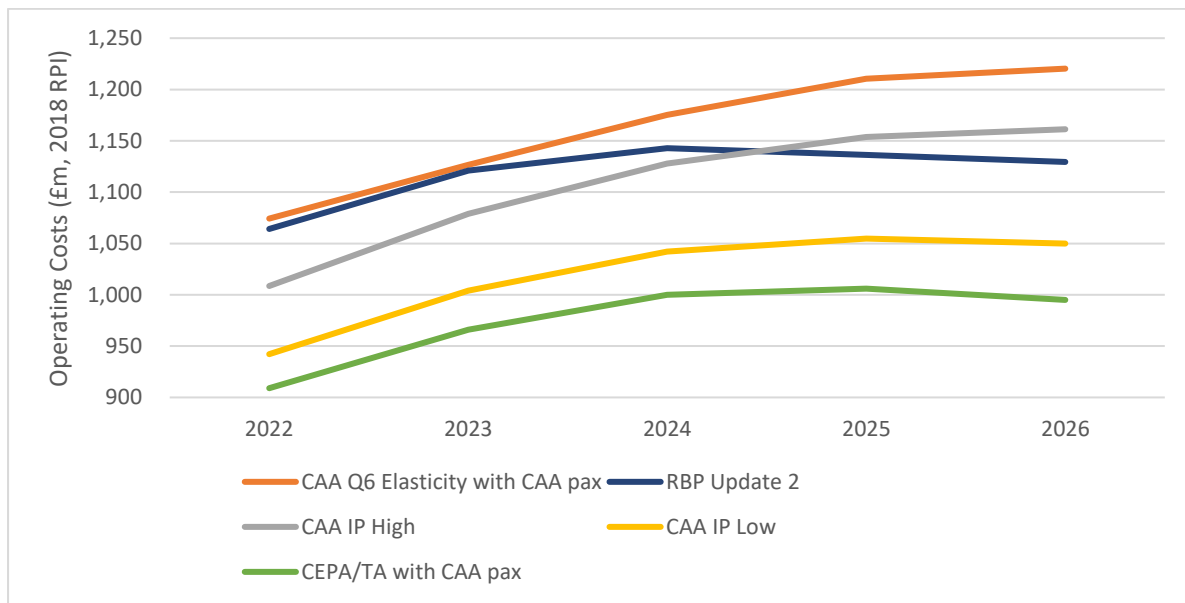
- 4.11.5 For Q6, the CAA used an elasticity of 0.3 between operating costs and passenger numbers for the final determination⁵³. An alternative approach would have been to use this as a basis for forecasting the top of the range. Indeed, the CAA used this

⁵³ CAA, CAP 1151 Economic regulation at Heathrow from April 2014: Notice granting the licence, Appendix E: Operating Expenditure, Paragraph E103, p261, Feb 2014.

elasticity when scaling our RBP Update 1 operating cost forecast for their IP passenger volume forecast when constructing the IP range.⁵⁴

- 4.11.6 Figure 26 below compares the Heathrow, CAA and CEPA/Taylor Airey operating cost forecasts for H7 with those if we were to use the elasticity used by the CAA in Q6. This has been modelled using the 2019 base year, applying the passenger volume elasticity of 0.3 respectively to all cost categories excluding rates and including a 1% per annum efficiency from 2020 consistent with the CMA approach in energy and water. It should be noted that the Heathrow forecast includes efficiencies associated with the capital plan that were not included in the CAA baseline.

Figure 26 – Comparing Q6 expectations with the Heathrow, CAA and CEPA/TA H7 operating cost forecasts



Source: Heathrow, CAA, CEPA/TA

- 4.11.7 This shows that our forecast is already more stretching than the CAA’s expectations at Q6 and the CAA’s H7 ranges are significantly lower than Q6 expectations.

CEPA/TA errors the CAA should correct before Final Proposals

- 4.11.8 To conclude, we reiterate the changes to the CEPA/TA approach that would deliver a more accurate operating cost forecast and better consumer outcomes for H7:

- 1) Removal of double count in baseline adjustments - Applying an overall baseline efficiency adjustment as well as specific adjustments to reflect the effect of individual operational changes double counts the efficiency required to move Heathrow to the efficiency frontier. This means that CEPA/TA have used a baseline that is £47m below the baseline costs for an efficient airport, which results in an underestimation of £235m to the overall H7 operating cost forecast. See section 4.3 for full details.
- 2) Removal of double count for ongoing efficiency - Applying an overall ongoing efficiency adjustment to reflect movement of the efficiency frontier during H7 as

⁵⁴ CAA, Initial Proposals deep dive: opex, Appendix 1: ranges methodology, November 2021.

well as adjustments to reflect specific operational changes, such as those associated with the capital plan, double counts the future efficiency adjustments required to ensure Heathrow keeps up with the efficiency frontier. The impact of CEPA/TA overestimating the ongoing efficiency requirements for H7, is to underestimate the efficient H7 operating cost forecast by £131m. See section 4.5 for full details.

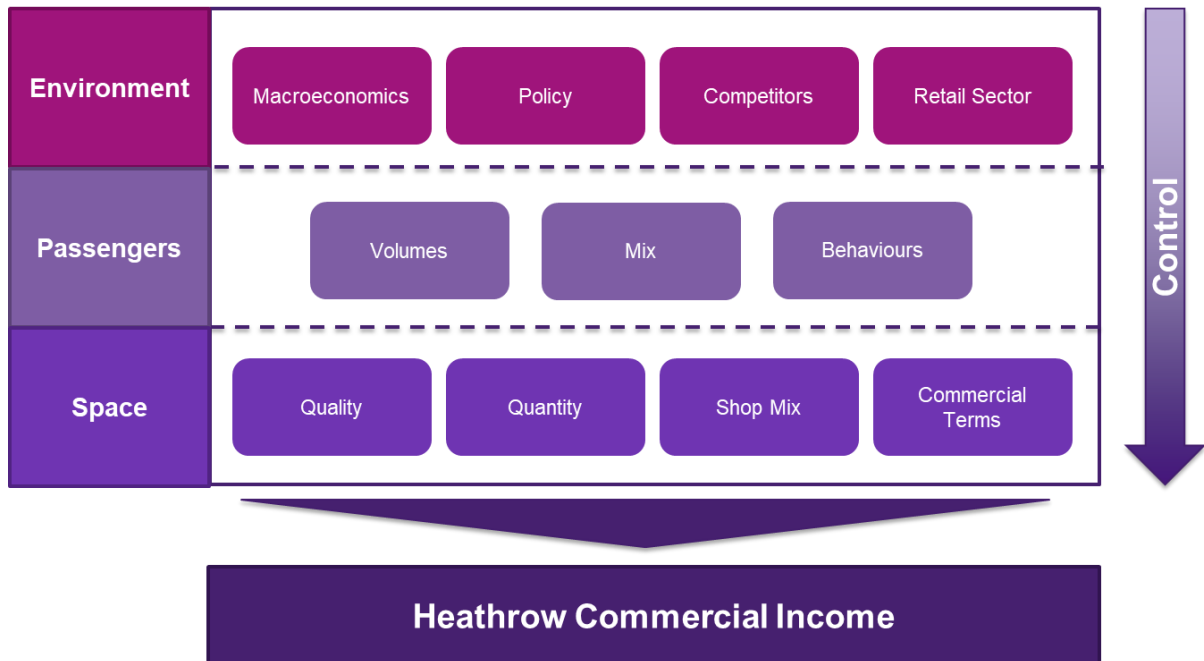
- 3) Full inclusion of the additional Covid-19 costs - to deliver our obligations for hygiene and cleanliness - CEPA/TA have incorrectly assumed that our obligations for hygiene and cleanliness will not be present throughout H7 and as a result have underestimated the efficient H7 operating costs by [X]. See section 4.7 for full details.
 - 4) Inclusion of the additional Enhanced Service costs for passengers requiring support (PRS) - CEPA/TA have failed to include the additional costs required to deliver our service obligations for PRS and underestimated the efficient H7 operating costs by [X]. See section 4.7 for full details.
 - 5) Correcting the errors in input price assumptions – the assumptions CEPA/TA have made for input price inflation do not reflect the costs pressures we are exposed to, underestimating the efficient H7 operating cost forecast by £154m. See section 4.8 for full details.
 - 6) Correcting for the adjustments to elasticities - CEPA/TA have made adjustments to elasticities at a cost category level that do not reflect the operational realities of our cost base, underestimating the efficient H7 operating cost forecast by £158m. See section 4.9 for full details.
 - 7) Correcting errors in ramp-up assumptions for Terminal 4 reopening – CEPA/TA have underestimated the costs required to prepare Terminal 4 for reopening by [X]. See section 4.10 for full details.
 - 8) Correcting the Insurance forecast error – CEPA/TA have reduced the forecast growth in insurance costs from [X]. They have provided no justification for this and the impact is an underestimation of our insurance costs over H7 by [X]. See section 4.10 for full details.
- 4.11.9 If the CAA are to use the CEPA/TA forecast as a basis for estimating the H7 efficient operating costs for the Final Determination, these errors must be corrected. This would increase the CEPA/TA forecast by £739m.

5. COMMERCIAL REVENUE

5.1. Introduction

- 5.1.1. Our commercial offering relates to a wide range of products and services available across the airport, from car parking to telecoms and lounges to retail stores. Revenues from these products and services are a very significant component of the single till, representing approximately a third of our total revenues, and play a key role in the overall airport experience – supporting the delivery of consumer and airline outcomes.
- 5.1.2. Our offering is considered among the best, if not *the* best, in the world. In 2019 we had the highest non-aeronautical revenue per passenger of a group of over 20 benchmarked airports. Passengers recognised our success in this area, voting Heathrow to have the “World’s Best Airport – Shopping” for the last 11 years in the annual Skytrax awards. Heathrow is at the frontier of commercial revenue generation at airports and has been for some time.
- 5.1.3. This is no coincidence. The opening of new terminals at T2 and T5 has transformed the quantity and quality of retail space. The composition of Heathrow passengers became increasingly high-spending as new direct services were added to high-yielding markets like China. This was underpinned by a relatively benign policy environment where favourable exchange rates, coupled with VAT free airside shopping, meant Heathrow prices were better than competitors’ on the high street and abroad.

Figure 1: Drivers of Heathrow Commercial Income



- 5.1.4. Known events and impacts over this next regulatory period threaten to unwind the drivers of our historic success. New evidence commissioned in support of this response outlines the challenges across all those drivers:

- Frontier Economics (“**Frontier 2021**”) examines the CEPA proposals for a management stretch, and in doing so examines the relationship between capital investment and commercial forecasts.
- Pragma (“**Pragma 2021**”) examines retail trends, and in particular the impact of VAT changes on Heathrow income and shop mix.
- Way Ahead (“**Red Route 2021**”) highlights consumer research to establish awareness of VAT changes and change consumer behaviour post-Covid.
- OC&C (“**OC&C 2021**”) outline the impacts of Covid on passenger engagement with digital and their appetite to interact with physical retail post-Covid.

Table 1: Drivers of Heathrow Commercial Income and H7 challenges

Driver	Expert Commentary
<p>Macroeconomics Moderate negative</p>	<p>GDP: “Prior to Covid-19, the UK experienced the lowest rate of real GDP growth relative to the USA and China, and also experienced the largest contraction in 2020. Whilst growth is forecast to recover in the UK, the medium-term outlook to 2026 is relatively benign, at under 2% year-on-year compared to higher rates in the USA and China”¹</p> <p>Consumer Confidence: “By historic standards, the UK’s GfK Consumer Confidence Index has been relatively low since a high in 2016, decreasing sharply due to the pandemic, and then rebounding in 2021, but currently still below pre-pandemic levels. Similarly, quarterly UK consumer spending for Q3 2021 was -4.2% below the prior high of Q2 2019”²</p> <p>Foreign Exchange: “Since 2020, the GBP has appreciated against the USD and Euro, but remained on a largely downward trend against the Chinese Yuan... A high level of negative correlation of SPDP at Heathrow from 2016 to 2019 can be seen against the appreciation of major currency values against the GBP in the same period. This demonstrates the sensitivity of retail sales to relative currency prices and the variable attractiveness to foreign travellers of purchasing at Heathrow”³</p>
<p>Policy Strong negative</p>	<p>VAT: “The VAT tax reforms make the UK the only country in Europe not to offer tax-free shopping to international visitors, this is likely to reduce demand for goods in the country and reduces the potential opportunity for the UK to benefit from increased spend by making the UK less attractive compared to European destinations... Views from industry executives suggest that the UK retail market may be permanently changed because of Brexit and the changes to the VAT legislation. Effects will be most prevalent in the luxury sector, as consumers risk shifting behaviours to take advantage of price advantages in other European destinations and retailers follow suit”⁴</p>

¹ Pragma (2021)

² Pragma (2021)

³ Pragma (2021)

⁴ Pragma (2021)

	<p>VAT: <i>“The higher-priced point luxury items risk a significant reduction in demand, leading to a lower level of luxury fashion space being supportable, and a movement towards increasing the allocation to upper and mid-market fashion which is less sensitive to VAT changes...this risks being further exacerbated by Heathrow losing market share in visitors and spend to competing EU destinations”⁵</i></p> <p>VAT: <i>“Only one in five are aware of VAT changes, but of those who are aware, one in two will spend less at Heathrow as a result”⁶</i></p> <p>Duty Incentive for Alcohol and Tobacco: <i>“Following Brexit, passengers flying from Heathrow to European destinations benefit from duty free savings on alcohol and tobacco...[however] the growth opportunity does not include any potential growth for an arrivals duty free offer as this is currently not possible under UK law.”⁷ ...as alcohol is typically purchased by homebound passengers, this excludes UK passengers from benefiting.</i></p>
<p>Competitors Strong Negative</p>	<p>Hainan: <i>“The Chinese government is making significant attempts to increase retail spend and tourism within its borders, demonstrated by the substantial growth of spend in Hainan and increased duty-free allowances. Whilst this will have been accelerated in the short term by Covid restrictions, it risks diluting international Chinese spend over time”⁸</i></p> <p>Hainan: <i>“Being the single operator previously, the Hainan duty free market has historically been dominated by CDFG...however, with the entry of other domestic travel retail giants such as CNSC... International operators have partnered with domestic groups to capitalise on continuing demand... as a result, by the end of 2021, Hainan is expected to have 10 duty free complexes... This will likely result in Chinese consumers allocating a good proportion of their historically international luxury spend to Hainan”⁹</i></p> <p>Europe: <i>“High net worth shoppers are very informed and will consider VAT effects when purchasing. While tourists may continue to visit London, places like Paris and Milan may become the preferred destinations on their trip for luxury spend... Information spreads fast globally - for instance, when the sterling depreciated during Brexit there were immediate messages on Chinese social media, and positive spikes in UK luxury sales... Some retailers have started lobbying the French government to publicly announce the tax savings seen in France over the UK”¹⁰</i></p> <p>Crossrail: Heathrow Express will be competing with a service that is cheaper, more frequent and seamlessly connects to the rest of the TfL</p>

⁵ Pragma (2021)

⁶ Red Route (2021)

⁷ Pragma (2021)

⁸ Pragma (2021)

⁹ OC&C (2021)

¹⁰ Pragma (2021)

	network. We estimate an 18% impact to yields and a 21% impact to mode share from its introduction. ¹¹
Retail Sector Moderate negative	<p>Travel Retail: <i>“Travel retail sales in the UK decreased by 78% between 2019 to 2020...only returning to pre-pandemic levels in 2026”</i>¹²</p> <p>Response to VAT: <i>“High-street and flagship stores are viewed as brands to be more strategically important for driving brand engagement and prestige, whereas airport stores are typically perceived to be revenue generators. If the tourist customer base doesn’t return, combined with the lack of VAT refund, brands may look to pull out of airports first”</i>¹³.</p> <p>Rise of Experiential: <i>“The combination of increased consumer demand for experiences and growth of online sales is changing the role of the physical retail store more towards customer acquisition and brand experience, and away from traditional on-site transactions...[this] puts pressures on the conventional commercial model of linking store value and Heathrow retail income directly to in-store sales.”</i>¹⁴</p>
Passenger Volumes Moderate negative	Our P50 passenger forecast does not recover to 2019 levels at all in H7. See more detail in our passenger demand chapter.
Passenger Mix Moderate negative	Chinese Passengers: <i>“Although Chinese passengers will continue to over-index on spend per head at airports, spend to date has largely been driven by the higher incomes, which will dilute as volumes from lower incomes rise... Average spend per trip is decreasing for Chinese travellers, registering a drop of 23% between 2015 and 2019.”</i> ¹⁵
Passenger Behaviours Moderate negative	<p>Online Sales: <i>“UK internet sales as a percentage of total retail sales were growing steadily prior to Covid-19, then experienced a rapid increase in market share during the months of lockdown to a high of 37% in February 2021. This subsequently reduced to 27% in October 2021 as stores re-opened, but the share is forecast to continue rising over time... Ecommerce penetration by country varies significantly, with China reporting the highest share of 34% of sales in 2019, rising to an estimated 53% in 2023. The UK also has a high penetration, significantly above that of both the USA and France. This demonstrates the importance of Heathrow delivering an effective digital retail proposition... The luxury consumer is becoming younger, with greater numbers of the Gen Z demographic embracing the category. In response to this, many luxury retailers are adopting global pricing and are starting to embrace digitisation and ecommerce to a greater extent”</i>¹⁶</p> <p>Online Sales: <i>“there has been a generational shift online during Covid which will stick more with older generations, younger generations</i></p>

¹¹ See section on surface access below

¹² Pragma (2021)

¹³ Pragma (2021)

¹⁴ Pragma (2021)

¹⁵ Pragma (2021)

¹⁶ Pragma (2021)

	<p><i>expect to return closer to the pre-Covid norm...online spending has grown by 9%pts for baby boomers relative to a 4%pts rise for Gen Z... as this digital shift takes hold, Boomers and Gen X much more likely to stay home; Gen Z and Millennials expect to come out to play”.</i>¹⁷</p> <p>Purchase Motivation: <i>“After quality of product, price is clearly a fundamental component in influencing consumers’ purchase considerations for luxury goods, cited by 69% of consumers, with brand name the third highest component, cited by just 28%. This demonstrates the potential sensitivity of price changes in luxury goods to consumer demand. The removal of the VAT advantage poses a clear risk to the attractiveness and incentive to purchasing at Heathrow, particularly for higher value luxury items”</i>¹⁸</p> <p>Rise of Experiential: <i>“Over the past 20 years, there has been a general trend experienced in the UK and globally, of consumers shifting their household spending towards experience-led purchases of recreation and culture, and eating out, over traditional consumer product categories such as clothing, alcohol, and tobacco – traditional drivers of airport retail”</i>¹⁹</p> <p>Revenge Spending: <i>“Despite the fact that the majority are worried about the rise in the cost of living, many recent flyers are now able to spend more and have been treating themselves...this is a temporary effect that will unwind once passengers return to flying”</i>²⁰</p>
<p>Quality of Space Moderative negative</p>	<p>Behind the Investment Curve: on comparable commercial capital business cases – Property, Surface Access, Retail & Media – Heathrow is £135m behind Q6 investment levels after constraining investment in iH7 as a response to Covid-19²¹. This impacts the quality of commercial space and therefore our forecasts: <i>“this would suggest that downward adjustments should be made as the historical elasticity based on higher capex figures may be too stretching”</i>²²</p>
<p>Quantity of Space Small negative</p>	<p>Rise of Experiential: <i>“the high-street trend is for luxury brands to create experience driven customer engagement over relatively large spaces, and this is much more challenging to deliver within a smaller airport store footprint, which also has the constraint of a more limited stock range and choice.”</i>²³</p>
<p>Shop Mix Strong negative</p>	<p>Luxury Exit: <i>“Prior to the VAT changes, units at Heathrow typically generated high sales. However, [X]. Retailers are now showing hesitancy at remaining at Heathrow if the same rental model is to remain in place, when combined with the risk of lower pax volumes and the removal of the VAT rebate... There is a risk that luxury brands will seek to pull out of retailing at Heathrow as the combination of lower</i></p>

¹⁷ OC&C (2021)

¹⁸ Pragma (2021)

¹⁹ Pragma (2021)

²⁰ Red Route (2021)

²¹ Heathrow analysis, see Commercial Capital Investment section below

²² Frontier (2021)

²³ Pragma (2021)

	<p><i>sales driven by reduced passenger volumes and lower spend reduces profitability.</i>²⁴</p> <p>Luxury Exit: <i>“Although Pragma have taken a different approach on calculating the space impact, we would agree with Heathrow’s assessment on the loss of c.[[<]] [Luxury] units”</i>²⁵</p>
<p>Commercial Terms Strong negative</p>	<p>Margins: <i>“Prior to the VAT changes, units at Heathrow typically generated high sales. However, [[<]]. Retailers are now showing hesitancy at remaining at Heathrow should the same rental model remain in place, when combined with the risk of lower pax volumes and the removal of the VAT rebate”</i>²⁶</p>

5.1.5. This negative outlook is already manifesting itself in emerging data from this year. Spend per passenger is significantly lower since the reopening of non-essential retail in April ([[<]]) than the same (Apr-Sep) period in 2019.

Table 2: Total SPP 2019 vs 2021

	Total Spend Per Passenger (2021p)
Apr – Sep 2019	[[<]]
Apr – Sep 2021	[[<]]

Figure 2: Components of change in SPP (Apr-Sep 2021 vs Apr-Sep 2019)

[[<]]

5.1.6. Our traditional approach to modelling begins to explain why that spend per passenger change has taken place and hints at a worsening future, as the factors that are driving spend downwards in 2021 are forecast to remain the same or become worse in H7:

Table 3: Upwards and downwards trends in 2021 SPP

Downward trends that are staying the same or worse	Upwards trends that will wind away in H7
<p>Exchange Rates ([[<]] vs 2019): The £ has appreciated relative to a basket of global currencies since 2018 and long-term forecasts anticipate further appreciation against the \$ and € (Pragma 2021)</p>	<p>Congestion ([[<]] vs 2019): passengers per sqm of retail space has fallen dramatically (~30% lower) as passenger numbers have reduced. But as passenger numbers return to Q6 levels then we expect this effect to be eliminated, and even become negative, as passenger value space more after the pandemic.</p>

²⁴ Pragma (2021)

²⁵ Pragma (2021)

²⁶ Pragma (2021)

Outlet Changes ([<] vs 2019): Store closures have taken place across all key categories but in particular in luxury, where we have our highest sales density, driven by changes to VAT, and we expect to have [<] outlets by 2023 compared to 2019 (as validated by Pragma 2021).

Dwell Time ([<] vs 2019): passengers are arriving at the airport earlier to get through Covid protocols before flying, leading to higher F&B spend. We can expect this to unwind as short leisure passengers return to other London airports, Covid protocols become more streamlined or passengers become used to flying.

Passenger Mix ([<] vs 2019): our passengers are currently more likely to fly short haul, younger and fly less frequently. While we expect some recovery in long-haul share, our mix will be more European throughout H7 than 2019 – with lower spend profiles as a result.

5.1.7. This only tells part of the story. We need to account for new, material impacts that our traditional approach was never set up to model:

- **VAT Changes:** The UK is now the only European country not to offer tax free shopping and initial evidence suggests that high-value passengers are already switching their purchases to non-UK destinations as a result. Awareness remains low – fewer than 20% of surveyed UK residents are aware of the changes, with even lower awareness abroad – but once aware [<] (Red Route 2021). Combined with improved offers and awareness of competitors elsewhere in Europe and China (Hainan), we should expect to see the impact of VAT changes increase over H7 and need to build a forecast for how this overlay impacts revenues over H7.
- **Margins and Shop Mix:** As passenger spending behaviours change in response to increased prices from VAT, we expect [<].
- **Revenge Spending:** 50% of passengers claim an increase in spend on returning to flying after Covid-19 in the context of “treating themselves”. This impact has increased Luxury Average Transaction Values (ATV) of European travellers from [<] in 2019 to [<] in 2021. While welcome, this does not counterbalance the fall in Luxury ATV for Asian passengers ([<]) and as people return for their second and third flights after Covid we expect this increase in European Luxury ATV to unwind back to 2019 levels.
- **Crossrail:** From Q3 2022 we expect Crossrail services to begin from London Paddington, directly competing against Heathrow Express services – undercutting fares and a seamless journey from central and east London to the airport. While great for passengers, this will have a direct impact on Heathrow Express volumes and yields – which in turn will reduce commercial revenues and needs to be accounted for in a future commercial forecast.

5.1.8. We have considered all of the above throughout our Business Planning process. Getting the commercial revenue forecast right is critical to ensuring there is a “fair bet” of achieving them. The consequences of an unfair bet would be distorted incentives to invest and operate, which ultimately lead to worse outcomes for current and future consumers:

- If there is no capacity to meet or outperform a revenue forecast, then it dulls the financial incentive to invest in commercial revenue generation in H7. This means at end of H7, revenues are otherwise lower than they could be.
 - Due to single till regulation, this means the airport charge in H8 and beyond is needlessly higher to compensate for lower capacity for revenue generating activity, to the detriment of future consumer interest.
- 5.1.9. Given the consequences of getting these forecasts wrong, it is disappointing that the CAA have outsourced all consideration of commercial revenues for its Initial Proposals to an external consultancy (CEPA). Despite the CAA having sight of Heathrow commercial revenue modelling since the submission of our Initial Business Plan in December 2019 there is no substantive comment on its own views. As a result, the CAA will not publish a view on future commercial revenues until its final proposals, which is unprecedented and undermines the quality of those forecasts if no stakeholder has had the opportunity to engage in the assumptions they make. This is a failure of process.
- 5.1.10. The quality of this process is further called in to question by poor CAA management of CEPA to date:
- There is no evidence that CEPA had access to CAA plans for other related building blocks like capital and passenger forecasts before finalising its forecasts. Consequently, the revenues forecast are manifestly inconsistent, and the CAA Initial Proposals are not an integrated plan.
 - CEPA assumptions contain several significant errors of fact and interpretation that could have been identified and corrected through engagement that we offered but never took place until after publication.
- 5.1.11. The result is Initial Proposals that do not stand up to scrutiny, and a commercial revenue forecast that fails to effectively consider the challenges we have consistently raised throughout the business planning process. This must be corrected for Final Proposals.
- 5.1.12. To ensure those proposals are as informed as they can be, our response highlights where CEPA have made errors of fact, inconsistent application of principles and judgements based on unsubstantiated evidence. We also take the opportunity to refine our assumptions and improve our RBP Update 1 forecast²⁷.
- 5.1.13. We identify **eight specific changes** to the CEPA/CAA approach that would deliver a more accurate revenues forecast and better consumer outcomes for H7:
- **VAT** – the proposed VAT overlay is unsubstantiated, unsophisticated and the product of errors of fact and arithmetic. This should be changed from -13.5% to [✗]See Section 5.2.
 - **Other Retail Overlays** – we have updated passenger mix assumptions so they are aligned with our new forecast and have added a new overlay to explain the

²⁷ We submit a separate “RBP Update 2” document that aggregates all changes across the building blocks.

bridge between 2019 and H7 entry for the purposes of accurate modelling. **See Section 5.3.**

- **Management Challenge** – the proposal lacks precedent and is patently unreasonable considering the challenges to revenues in H7. Attempts at substantiation fall well short of what would be necessary, and in any case are the product of unsophisticated analysis of historical revenue performance. This should be lowered from 2% to 0%. **See Section 5.4.**
- **Capital Investment** – the CAA proposal for no commercial revenue related capital investment is manifestly at odds with consumer interests, has no precedent and gives no consideration to the airport being operated efficiently through a single till. Our revised £694m commercial capital programme should be the basis of CAA and CEPA assumptions, but if the CAA continue to disallow commercial capital then revenue forecasts need to adjust by [X] over H7. **See Section 5.5.**
- **Cargo** – the forecast is based on obvious errors of fact and is manifestly inconsistent with the CAA passenger forecasts. A more considered approach, aligned to how cargo revenues are generated and cognisant of the dynamics of the air cargo market, is to lower forecast from £[X] to £[X]²⁸. **See Section 5.6.**
- **Mode Share** – several of the CEPA assumptions on mode share are based on errors of fact, including the assumption that Crossrail will open in 2024. A more accurate approach would consider the impact of Crossrail on mode share from the date it opens, forecast by TfL to be Q2 2022. For consistency, we have profiled the recovery of mode share to be aligned with recovery of passenger volumes. **See Section 5.8.**
- **Terminal Drop-Off Charge** – the CEPA forecast is based on several errors of fact including not being net of VAT that would be payable on those revenues and assumes that pick-up passenger vehicles are charged when it is only a drop-off charge. A more accurate approach would lower forecast revenues from £[X] to £[X]²⁸. **See Section 5.9.**
- **Property** – the CEPA elasticity is inappropriate given the stickiness of commercial rents. A more considered approach would use the existing agreement with airlines for property guide prices for the period, updating the property forecast from £[X] to £[X]²⁸ over H7. **See Section 5.10.**

5.1.14. There are areas where we agree with CEPA commentary, or CEPA proposals have caused us to reconsider our approach, and have amended our assumptions accordingly:

- **Service Revenues** - The proposed CEPA elasticity is based on the understanding that fuel and advertising form part of Other Revenues – they do not. However, they are correct insofar as there are revenue lines not

²⁸ RPI 2018 Prices (Heathrow Mid-Case)

necessarily sensitive to passenger numbers. These amount to an elasticity of [X]. **See Section 5.11.**

- **Heathrow Express** – we have retained a [X] overlay to account for the fact 2022 yields will not have increased in nominal terms since 2019. We have adjusted our assumptions for Crossrail yield impact to make them more transparent in the context of application to non-TAC revenue, but CEPA made an error of interpretation regarding any shift from our position on the 18% yield impact to Heathrow Express from Crossrail introduction. **See Section 5.7.**
- **Mode Share** – CEPA disallowed our proposal for a negative overlay for Average Transaction Values for car parking revenues for 2022 and 2023. Having considered ATV evolution over 2021, and the strong performance of car parking, we have added a positive overlay for 2022 and 2023. **See Section 5.8.**
- **Terminal Drop-Off Charge** – there is an error in Heathrow modelling, where vehicles with both departing and arriving passengers are charged. Only departing passengers should be charged as arriving passengers are not permitted to use drop off, and vehicles collecting passengers at Terminals already need to use short stay car parks. This has now been corrected. **See Section 5.9.**
- **Modelling Alignment** – we have made a one-off adjustment to 2022 revenues to align our RBP model with our Management Business Plan, ensuring consistency with Investor Report and making best use of a more detailed bottom-up model where it is available. **See Section 1.12.**

5.1.15. The sum of our proposed changes underpins our RBP Update 2 and a new commercial revenue forecast:

Table 4: H7 Commercial Revenues Forecast (HAL Mid-Case 2018p)

Assumptions	Pax Forecast	2022	2023	2024	2025	2026	H7	Var
RBP Update 1	Update 1	[X]	[X]	[X]	[X]	[X]	[X]	[X]
CEPA	Update 1	[X]	[X]	[X]	[X]	[X]	3,980.2	
RBP Update 2	Update 1	[X]	[X]	[X]	[X]	[X]	[X]	[X]
RBP Update 2	Update 2	[X]	[X]	[X]	[X]	[X]	[X]	[X]

5.1.16. The remainder of this chapter outlines each proposed change, the lines of argument that justifies the change and the evidence that underpins them.

5.2. VAT OVERLAY

	RBP Update 1	RBP Update 2	CEPA
VAT Overlay	[X]	[X]	-13.5%

5.2.1. CEPA propose a top-down approach to estimating the impact of VAT changes based on just two components:

- An estimate for the loss of VAT refund concession income. This is estimated at £[X], aligned with our own evidence.
- A single elasticity to estimate both removing airside tax free shopping and extending excise duty free for alcohol and tobacco to EU/EEA passengers.

5.2.2. We believe the approach to the elasticity is fundamentally flawed:

- The CEPA top-down approach to VAT is unsubstantiated, unsophisticated and is at odds with emerging evidence. If we improve the approach with better evidenced inputs, then we reach an overlay of [X] (as opposed to 13.5% proposed by CEPA).
- The improved bottom-up approach used by Heathrow accurately captures the full breadth of consequences and is validated by third parties. This indicates an overlay of [X] by end of H7.

5.2.3. We believe an overlay of [X] is more balanced and better evidenced than either the approach taken by us at RBP Update 1 or CEPA at Initial Proposals.

The CEPA top-down approach is unsubstantiated, unsophisticated and at odds with emerging evidence – it can be improved with evidenced adjustments

5.2.4. While we acknowledge that CEPA are doing their best to forecast an incredibly complex change to pricing for our highest yielding retail categories, we believe their approach should be radically improved:

- The elasticity cannot account for secondary impacts to concession margins, store reorganisation and advertising. It is an error of fact and arithmetic for CEPA to claim that it does.
- The elasticity used in a top-down model requires careful consideration given how consequential it is, the assertion that consumers behave the same with respect to price changes in all products is at odds with data, and the chosen elasticity of -1.25 lacks any reasonable substance.

5.2.5. We believe that correcting for these errors will yield a more accurate top-down approach:

- We transparently forecast how margin changes will reduce Heathrow income per sqm for VAT impacted retailers, and even those changes will still result in retailers to exit. The forecast we produce for future shop mix has been externally validated by Pragma.

- We use separate elasticities to more accurately estimate passenger behavioural changes by impacted retail categories and ensure the elasticities used are evidenced for how consumers have previously reacted to price changes in those categories. These elasticities are provided by Red Route.

5.2.6. The consequence of these changes is a [X] overlay, not 13.5% as calculated by CEPA.

The elasticity does not account for impacts to concession margins

5.2.7. In our RBP and RBP Update 1 we forecasted that VAT changes would have multiple impacts on our revenues:

- **Primary:** Passengers will spend less on VAT-impacted product lines – increasingly so as awareness of the changes increases. Stores offering VAT Retail Export Scheme (Res) services will – and have – closed.
- **Secondary:** Stores offering VAT-impacted product lines will exit, consolidate and/or renegotiate terms. Lower margins lead to lower income for Heathrow (as proven above). Any exit and reorganisation will see lower-yielding stores replace them, with likely periods of friction when stores are closed.

5.2.8. CEPA outline that their elasticity can explain “*any loss in sales from price increases, any loss in concession income from retailers absorbing the rise in VAT, any impact on store closures, and any reduction in advertising revenues*”. In effect, they claim their elasticity can explain primary, secondary, and tertiary impacts. This is an error of fact and it has significant consequences for forecasting.

5.2.9. A price elasticity can explain primary impacts only: consumer propensity to spend (and therefore volume of sales) relative in proportion to a price change. It cannot explain the changes to concession margins that VAT-impacted retailers can expect to extract from Heathrow.

5.2.10. VAT-impacted retailers have the highest sales density of any category at Heathrow, significantly above that of other categories (Pragma 2021). Absent intervention from Heathrow, retailers losing 25% of revenues – as the CEPA elasticity predicts – will likely exit as this is larger than their operating margins, so store economics become unviable. Retailers will seek, and are already seeking, to renegotiate their contracts before they do. The economically rational response, despite leading to even lower income, is for Heathrow to compensate the retailers through lower margins to ensure they do not exit, up to the point the VAT-impacted retailer generates higher revenues than another category of retailer.

5.2.11. The CEPA approach assumes that concession margins are constant, or that if concession margins are reduced, that this lowers the price consumers face and therefore generates more volume. They assert that the impact to Heathrow is neutral. This is an error of arithmetic that leads to a material underestimate to the CEPA estimate for the impact of VAT changes.

5.2.12. The tables below present a simple model – assuming the same elasticity (-1.25) as CEPA use in their forecast – and outline three moments in time:

- **Position A:** Before the VAT changes, where price and revenues are indexed to 100, and Heathrow margin is assumed to be 25%.

- **Position B:** After the VAT changes, where price and revenues change based on what the CEPA elasticity predicts, with the Heathrow margin constant at 25%, informing Heathrow and Retailer Revenue.
- **Position C:** After a 5%pt reduction in Heathrow margin to 20%.

5.2.13. We consider three separate retailer responses to Position C:

- **Table 5:** Where the retailer absorbs the margin change for itself.
- **Table 6:** Where the retailer passes on the margin change directly to consumers through a lower price.
- **Table 7:** Where the retailer passes on the margin change directly to consumers and matches it.

Table 5: Modelling concession fee reduction and impact to Heathrow, where retailer retains the margin gain for own profit.

		Price	Total Revenue	Heathrow Margin	Heathrow Revenue	Retailer Revenue
A	<i>Before VAT Change</i>	100	[X]	[X]	[X]	[X]
B	<i>Do Nothing</i>	120	[X]	[X]	[X]	[X]
C	<i>Reduce by 5%pts</i>	120	[X]	[X]	[X]	[X]

Table 6: Modelling concession fee reduction and impact to Heathrow, where retailer passes on margin change to consumer through a lower price.

		Price	Total Revenue	Heathrow Margin	Heathrow Revenue	Retailer Revenue
A	<i>Before VAT Change</i>	100	[X]	[X]	[X]	[X]
B	<i>Do Nothing</i>	120	[X]	[X]	[X]	[X]
C	<i>Reduce by 5%pts</i>	115	[X]	[X]	[X]	[X]

Table 7: Modelling concession fee reduction and impact to Heathrow, where retailer passes on margin change to consumer and matches it.

		Price	Total Revenue	Heathrow Margin	Heathrow Revenue	Retailer Revenue
A	<i>Before VAT Change</i>	100	[X]	[X]	[X]	[X]
B	<i>Do Nothing</i>	120	[X]	[X]	[X]	[X]
C	<i>Reduce by 5%pts</i>	110	[X]	[X]	[X]	[X]

5.2.14. Table 8 below summarises the primary and secondary impacts for each retailer response. For the avoidance of doubt, the CEPA elasticity only assumes a primary impact – which is constant in all cases. The size of the secondary impact in each case is equal to the size of the CEPA underestimate and varies according to retailer behaviour.

Table 8: Summary of primary and secondary impacts to Heathrow by retailer behaviour

	Primary Impact	Secondary Impact
Retailer retains margin reduction	-25%	-15%

Retailer passes on margin reduction	-25%	-10%
Retailer passes on and matches	-25%	-8%

5.2.15. From this model we can draw at least four conclusions:

- Margin reductions are a credible way for Heathrow to improve retailer store economics post VAT changes and prevent exit (and replacement by an even lower yielding store).
- Margin reductions necessarily worsen Heathrow’s position no matter what the retailer response – it is not neutral to Heathrow revenues as CEPA suggest.
- The CEPA elasticity can explain the shift from Position A to Position B (“Primary Impact”) but not the shift from Position B to Position C (“Secondary Impact”).
- This Secondary Impact is material (accounting for a further 8% to 15% reduction in revenue), self-evidently additional to the Primary Impact considered by the elasticity and therefore a necessary component of any forecast for impacts of VAT changes.

5.2.16. Nearly all VAT-impacted retailers have approached us to secure lower margins or risk their exit. In several cases these negotiations have concluded, and are presented (anonymised to protect commercial sensitivities) below in Table 9: Concession Fee Renegotiations post VAT change.

Table 9: Concession Fee Renegotiations post VAT change

		2019 Margin	2021 Margin	Change
Retailer X		[X]	[X]	[X]
Retailer Y		[X]	[X]	[X]
Retailer Z	<i>Product A</i>	[X]	[X]	[X]
	<i>Product B</i>	[X]	[X]	[X]
	<i>Product C</i>	[X]	[X]	[X]
	<i>Product D</i>	[X]	[X]	[X]

5.2.17. Assuming the same elasticity as CEPA (-1.25), and assuming retailer pass the margin reduction to consumers, we can demonstrate the materiality of lower concession fees to Heathrow revenues, beyond that predicted by the CEPA model:

Table 10: Impacts to Heathrow revenue by primary and secondary impacts due to concession fee changes

		Margin (vs 19)	Price (vs 19)	Primary Impact	Secondary Impact	Total Impact to Heathrow income
Retailer X		[X]	[X]	[X]	[X]	[X]
Retailer Y		[X]	[X]	[X]	[X]	[X]
Retailer Z	<i>Product A</i>	[X]	[X]	[X]	[X]	[X]
	<i>Product B</i>	[X]	[X]	[X]	[X]	[X]
	<i>Product C</i>	[X]	[X]	[X]	[X]	[X]
	<i>Product D</i>	[X]	[X]	[X]	[X]	[X]

5.2.18. The average margin across luxury stores has reduced from [X]% in 2019 to [X] %. Combined with reduced sales, it is not in Heathrow’s economic interests to reduce margins further as it then becomes rational to accept another store category:

Table 11: Heathrow income/sqm (2019), comparing VAT impacted retail to other categories, Heathrow analysis.

	Heathrow Income/sqm (2019)	Effective Margin
Luxury	[X]	[X]
Luxury adjusted for VAT	[X]	[X]
Affordable Luxury	[X]	[X]
Pharmacy	[X]	[X]
Tech/Music	[X]	[X]
High St. Gifting	[X]	[X]

5.2.19. As such we can expect:

- All VAT-impacted retailers to renegotiate and secure lower margins, in line with those already secured (average change from [X]% to [X]%).
- Some luxury retailers to exit, even after the margin change, because the level of margin change required to restore store economics is irrational for Heathrow to give.

To estimate the latter, we assume they will take place at expiry of current contracts ([X] % of current contracts have 2023 as an exit year without penalty) or after one full year of VAT operations, whichever is sooner.

5.2.20. To project total exits we can make an estimate of store profitability by retailer after assuming the average margin change outlined above and a forecast reduction in total sales in line with the passenger behaviour trends outlined below. Table 12 below outlines this outcome and confirms a reduction of 20 luxury shops relative to 2019.

Table 12: Retail Unit forecast by category by year

Category	2019	2021	2022	2023	2024	2025	2026
High Street	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Affordable Luxury	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Luxury	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Gift	[X]	[X]	[X]	[X]	[X]	[X]	[X]
WDF (Excise/ Non-Excise)	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Essentials	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Technology	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Food and Beverage	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Entertainment and Services	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Luggage	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Experiences	[X]	[X]	[X]	[X]	[X]	[X]	[X]
Pop-Up Space	[X]	[X]	[X]	[X]	[X]	[X]	[X]
	[X]	[X]	[X]	[X]	[X]	[X]	[X]

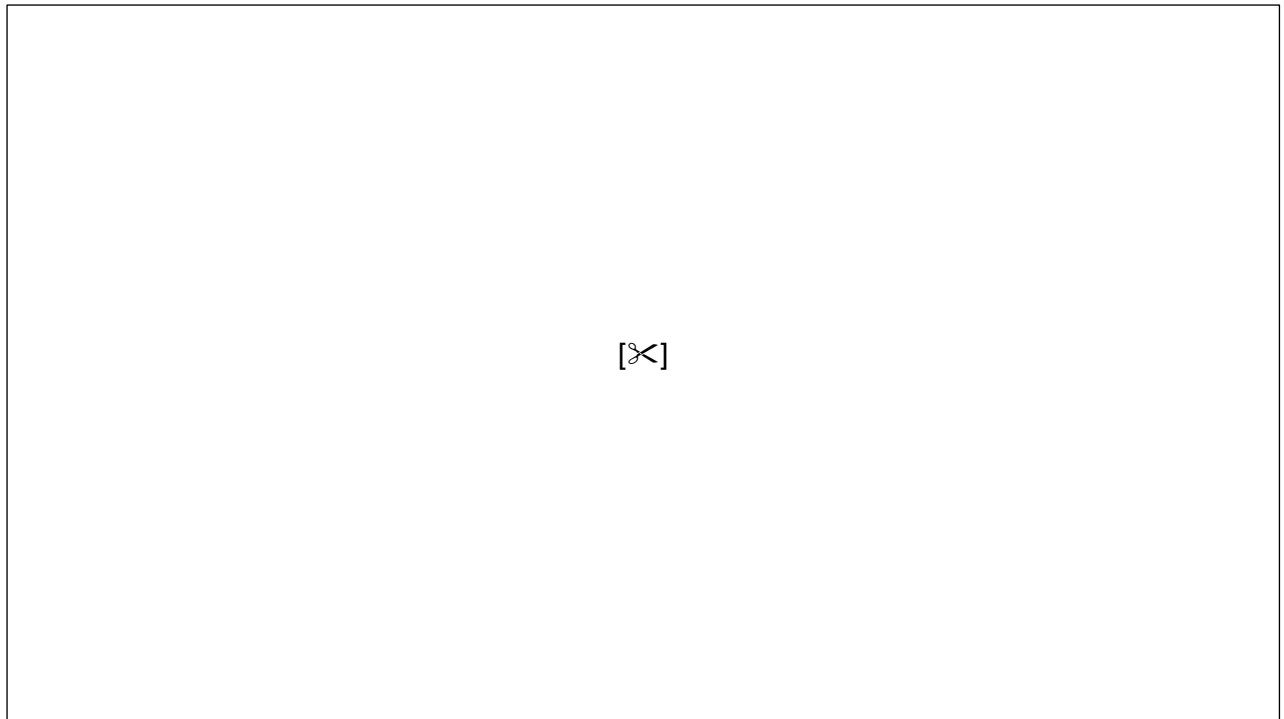
Empty Space	[<]	[<]	[<]	[<]	[<]	[<]
Total	301	[<]	[<]	[<]	[<]	[<]

5.2.21. The annualised impact of exits of some VAT-impacted retailers and lower margins for those that remain is equivalent to £[<] p.a. relative to 2019 retail income. These impacts are not accounted for by the CEPA elasticity. They are additional, material and can be evidenced and forecast. Therefore, in any top-down approach must be considered as an additional overlay to the model.

5.2.22. We have validated the above with Pragma, who confirm:

- There is a ~[<]% income reduction from luxury shops by 2026 driven by:
 - ATV and Conversion Impact (“Primary Impacts”)
 - Margin reduction (“Secondary Impact”)
 - Mix Impact (which we consider separately in the next section)

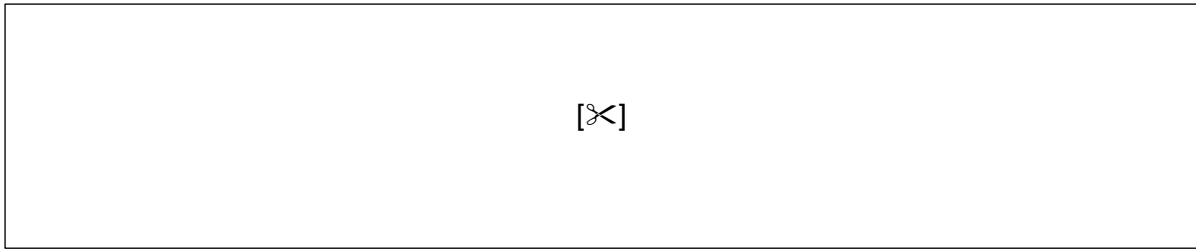
Figure 3: 2019 to 2026 bridge for Heathrow Luxury Income, Pragma Analysis



- The difference in revenue assumption between Pragma and us is with regards to the consideration of external factors (e.g. the impact of Hainan and other European countries with lower price points than Heathrow).

- Considering this lower forecast sales, they forecast a reduction in Luxury Stores at Heathrow by [X], which compares favourably to our forecast of [X].²⁹

Figure 4: Luxury store requirement 2026, Pragma Analysis



The -1.25 Elasticity lacks substance

5.2.23. CEPA outline how they came to their proposal for a value to use for an elasticity:

“The OBR used a price elasticity of demand estimate of 0.5 and 2 when estimating the impact of the tax changes. This elasticity estimate accounted for both changes in the number of tourists travelling to the UK following the tax change, and any changes in their spending patterns. We propose using the mid-way estimate of 1.25 to only account for the second of these impacts (as the former is considered separately through the passenger forecasts).”

5.2.24. No other evidence is presented. Nor is there any analysis that considers the range of possible outcomes for Heathrow revenues as a result of the -0.5 and -2 range that the Office for Budgetary Responsibility (OBR) nominate. The below table illustrates the implied impact on Heathrow revenues for different elasticities within the OBR range:

Table 13: Model demonstrating the impact of different OBR estimates for price elasticity on revenues

	-0.5 ε	-1.25 ε	-2.0 ε
Loss of Airside Tax-Free	[X]	[X]	[X]
Excise for EEA (alcohol)	[X]	[X]	[X]
Excise for EEA (tobacco)	[X]	[X]	[X]
Implied Overlay (%)	[X]	[X]	[X]

5.2.25. There is also no analysis presented as to why it is reasonable to assume that consumer behaviour will be uniform in response to price changes in markedly different product categories. The CEPA model assumes passengers will behave the

²⁹ Pragma: “Although Pragma have taken a different approach on calculating the space impact, we would agree with Heathrow’s assessment on the loss of c.20 units, particularly as the initial passenger mix and volume impacts in the forecast period on the overall profitability of luxury retailers has not been taken into account”

same in response to a 20% increase in perfume as they will to a 20% increase in luxury handbags.

5.2.26. Price is critical to consumer demand for luxury goods:

“After quality of product, price is a fundamental component in influencing consumers’ purchase considerations for luxury goods, cited by 69% of consumers, with brand name the third highest component, cited by just 28%. This demonstrates the potential sensitivity of price changes in luxury goods to consumer demand.”³⁰

5.2.27. It is commonplace in retail to observe different elasticities for different product lines. The below table outlines the observable elasticities of non-UK consumers as a consequence to changes in foreign exchange, again revealing an enormous range between product lines and potential impact.

Table 14: Price elasticities for foreign exchange impacts, Red Route (2021)

Category	Elasticity vs Exchange Rate (non-UK elasticity) (a)	Non-UK Residents 2019 (%) 2019 Profiler (b)	Price Elasticity (All) (a)/(b)
SST (Overall)	[<]	[<]	[<]
Luxury (Split from SST)	[<]	[<]	[<]
Other SST (Split from SST)	[<]	[<]	[<]
WDF	[<]	[<]	[<]

5.2.28. We have no in-principle objection to top-down approaches: used appropriately they are the appropriate way of aggregating several complex drivers that underpin outturn. For example, we appropriately use a top-down approach to estimate the elasticity between passenger volumes and revenues for retail and other commercial lines. These were informed by over 60 monthly data points taken the previous five years, benchmarked against similar airports, and validated by an independent party (KPMG).

5.2.29. A top-down approach in the case of VAT overlay is limited: having been introduced in January 2021 (and non-essential retail closed until April) there is a limited evidence base to use as data points for a regression. As such the only robust approach is to use bottom-up estimates for how a material price change across the majority of our revenues will play out in passenger behaviours and retailer behaviours. Top-down

³⁰ Pragma, 2021

approaches can at best be a useful sense check to the outcomes of a rigorous bottom-up approach – which is how we propose to use a top-down approach later in this response.

5.2.30. Regardless of the judgement of the appropriate forecasting methodology, the approach CEPA have taken to a top-down approach is unsophisticated and flawed. Top-down approaches make a virtue of simplicity but given how the value of the chosen elasticity can swing outcomes, the burden for evidence is high, and CEPA have not come close to meeting it.

- No evidence as to how they have come to consider the mid-point of a range as the appropriate assumption.
- No evidence as to why it is appropriate to consider the same elasticity for all consumer products even though all experience indicates that consumers have vastly different attitudes to price changes depending on the product line.

5.2.31. It would be an error of process for the CAA to consider this analysis to be sufficient to determine such a significant portion of the commercial revenue forecast for H7. We recommend that:

- At least two separate elasticities are used: one for specialist (SST) and one for world duty free (WDF).
- Those elasticities are made consistent with the Red Route modelling, which evidences these elasticities from passenger spending behaviour in response to foreign exchange changes.

An improved top-down approach would imply an overlay of [X]%

5.2.32. We do not think a top-down approach is intellectually robust to be used in isolation but can be a useful sense-check. But to perform that function it requires a more evidenced and reasonable approach than the one proposed by CEPA:

- We propose to explicitly include an assumption for lower concession fees and shop reorganisation. This has been validated by Pragma (2021).
- It is not appropriate to assume the same price elasticity for different product categories. We propose a price elasticity for specialist (SST) stores and another for world duty free (WDF).
- We propose to use the elasticities observed in Q6 for changes in foreign exchange, weighted to apply for all passengers (rather than just overseas citizens). This is the best proxy available for how passengers behave in response to price changes.

5.2.33. Applied together, highlighted in the steps below, the overlay increases from -13.5% to [X]%

Table 15: Step changes to CEPA top-down model, Heathrow improvements.

[X]

Our improved bottom-up approach is better evidenced and validated by third parties

5.2.34. We continue to believe a bottom-up approach to be more appropriate in capturing the complexity of VAT changes and the numerous consequential impacts it will have across our revenue lines. In this section we outline why:

- It is more intellectually robust to consider the full potential range of impacts and these impacts are already observable in real world data just nine months on from the policy change. We outline the commercial impacts we already observe in 2021 that we expect to continue into H7.
- It is clear these impacts will evolve and magnify in effect over H7 as awareness of the price change – and our position with respect to our emerging competitors – becomes more common knowledge among our passengers. We outline research from Pragma, Red Route and McKinsey that informs our approach as to how some commercial impacts will evolve and worsen in H7.

5.2.35. This approach suggests an evolving impact over H7, peaking with a [x] % impact in 2026. This bottom-up approach is evidenced and better placed to give an accurate forecast for the impact of VAT and is in-line with the [x] % outcome of the improved top-down model outlined above.

A bottom-up model is more intellectually robust and supported by emerging data

5.2.36. It is indisputable that a significant change to Heathrow's price point on its highest yielding product lines will have impacts beyond just passenger behaviour:

- **Primary:** Passengers will spend less on VAT-impacted product lines – increasingly so as awareness of the changes increases. Stores offering VAT RES services will – and have – closed.
- **Secondary:** Stores offering VAT-impacted product lines will exit, consolidate and/or renegotiate terms. Lower margins lead to lower income for Heathrow (as proven above). Any exit and reorganisation will see lower-yielding stores replace them, with likely periods of friction when stores are closed.

5.2.37. It is also reasonable to conclude that each of these effects are discrete, and any model can isolate the different effects to an individual commercial driver, so we can be confident each modelled impact is additional rather than duplicative:

- Primary effects, such as changed passenger behaviour in response to higher prices, will impact total sales.
- Secondary effects, such as retailers securing lower concession fees or lower yielding stores replacing retailer exits, will impact Heathrow margins.

Equation 1: Bottom-up model drivers relative to Heathrow revenue

Primary Impact Secondary Impact



$$\text{Total Sales} * \text{Concession Fee} = \text{Heathrow Revenue}$$

5.2.38. We can therefore be confident each impact is additional. We can already observe these impacts in real world data just nine months on from the change in policy and prove they are material.

5.2.39. **Primary** – of current data we can see, and will continue to assume:

- the [x] %pts deterioration in conversion for luxury (worth [x] % decline in LFL Sales).
- the [x] % deterioration of participation in WDF beauty, watch and jewellery.
- the [x] % reduction in Average Transaction Value from Asian passengers.
- the [x] % uplift in participation in WDF tobacco and liquor.

5.2.40. **Secondary** - VAT-impacted retailers are already renegotiating terms, as noted in the previous section in Table 11. This includes an average margin reduction in luxury shops from [x] % to [x] %.

These impacts will magnify over H7, and our model needs to reflect this

5.2.41. While the observed data is the basis of our assumptions in H7, it is reasonable to assume the impact of the VAT change will be markedly different from before.

5.2.42. Travel restrictions and continued balance towards short haul flying mean that the highest spending and yielding passengers in VAT affected retail have not yet returned to flying. In 2019, Chinese resident passengers made up 1% of all departing passengers from Heathrow but [x] % of all sales in VAT-impacted product lines. In the first three quarters of 2021 they accounted for just 0.4% of our passenger base.

5.2.43. Passenger awareness of VAT changes is low – among UK based Heathrow passengers just one in five were aware of the changes, and one in two said it would likely make them spend less at a UK airport. As time progresses, we should anticipate that awareness will grow, and the impact on conversion to increase as it does. We therefore assume a growth in awareness of [20%] per annum (to a peak of [60%]) and a decline in participation of [x] pts per annum as a consequence.

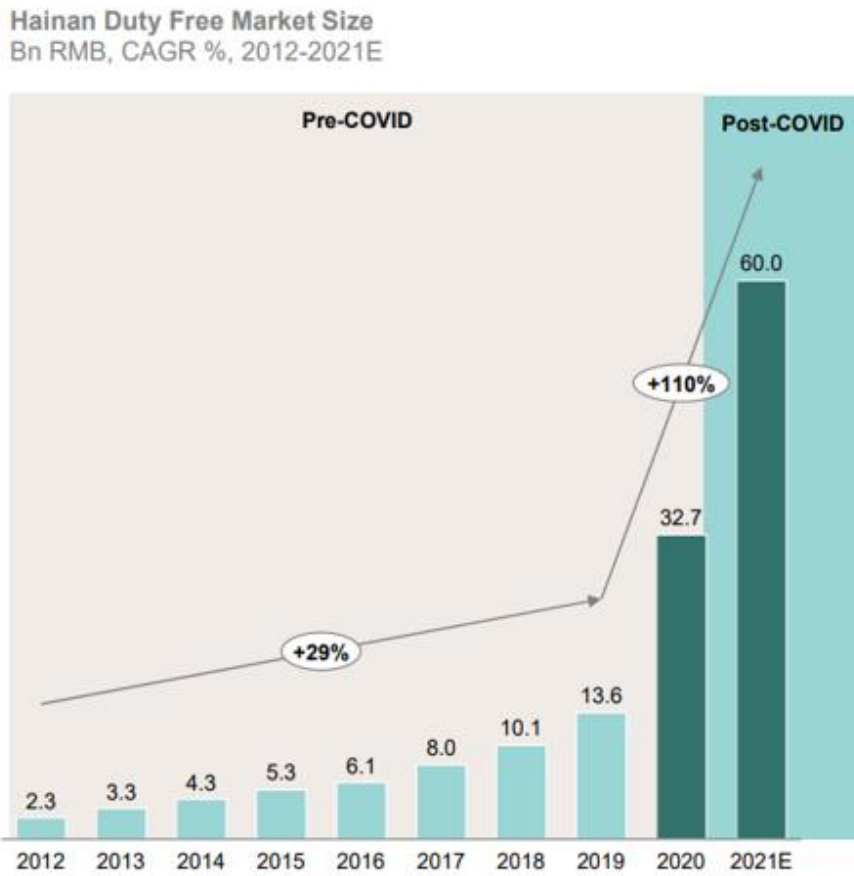
5.2.44. We also need to specifically consider the dimension of awareness of alternatives to Heathrow, particularly for Chinese passengers given their historic participation at Heathrow and the numerous options other than Heathrow:

- They can switch spending to other European destinations that continue to offer the same items but tax free, like Paris.

- They can switch spending to domestic destinations that are tax free, like Hainan.

5.2.45. Travel outside of China has declined by 90% and as a result the Government has increased efforts to repatriate consumer spend to China. During this period Chinese domestic Duty Free Spend in the Duty-Free shopping location Hainan has more than doubled to be worth 60 billion RMB or £7.2bn. There has been an 80% increase in luxury brands at Hainan and there are forecast to be 10 duty free complexes by the end of 2021, including Dufry and Lagardere.

Figure 5: Hainan Duty Free Market Size, McKinsey (2021)



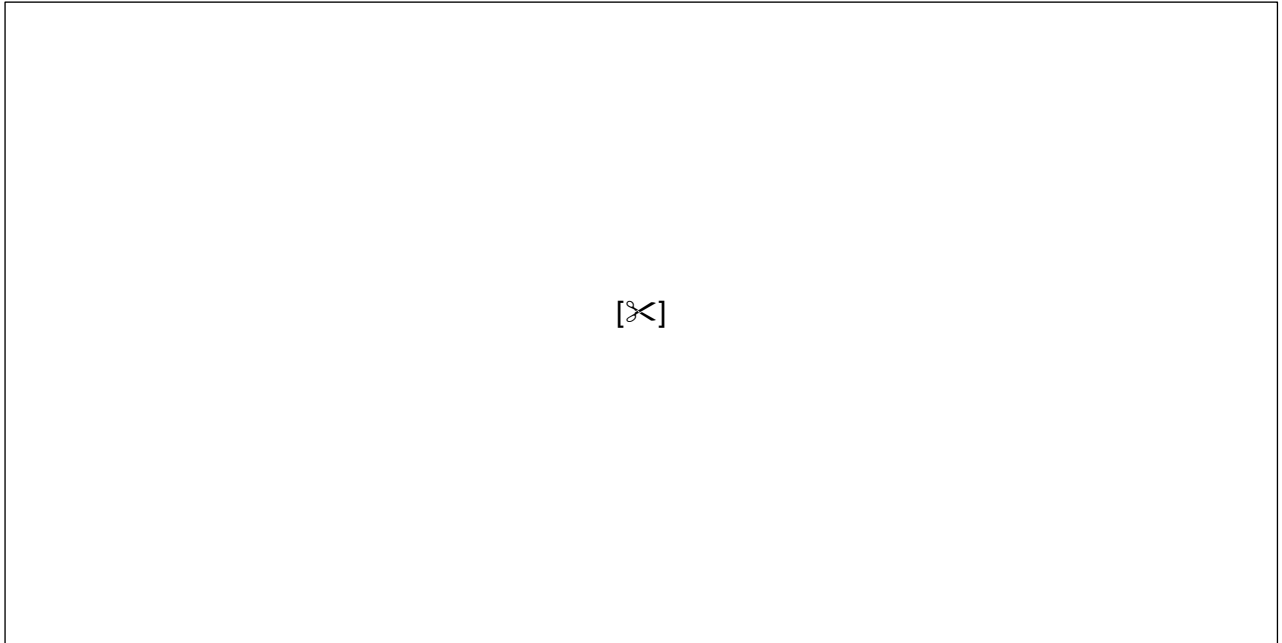
5.2.46. A narrowing price gap with overseas duty free and 30% cheaper than the Chinese domestic market. Visitors to Hainan are entitled to duty-free shopping online for up to six months after they have visited.

5.2.47. This has significant and permanent implications for Heathrow:

- Chinese passengers seeking luxury are price conscious (Pragma, 2021) and used to need to travel abroad to secure them and avoid paying a luxury tax in China. It is now the policy of the Chinese government to onshore consumer spend on luxury goods that typically leaked to European markets, and the UK in particular.

- Of all international destinations, the UK used to have the most competitive price point, now it is behind France and Hainan.

Figure 6: Index of Prices for key Luxury products, UK vs France vs China, Pragma Analysis



- Hainan now has more luxury brands and outlets than Heathrow. Chinese passengers that travelled to the UK for tourism would have only encountered luxury items at Heathrow. Now, if they have been to Hainan they can access more products and services at a cheaper price.
- Chinese passengers that had travelled to the UK for retail would have accumulated VAT receipts that would have been exchanged at the airport for cash. Of the cash disbursed at the airport, [X] of all VAT refund users went on to spend at the airport before departure (Heathrow, 2016).

5.2.48. This permanence of a Hainan impact on future commercial revenue for Heathrow is confirmed by survey data³¹:

- 62% of shoppers surveyed said they would return to Hainan even after the reopening of international travel.
- 95% of shoppers surveyed said they would compare prices with Hainan going forwards
- 45% said they would at least partially spend their usual travel spend at Hainan from now on.

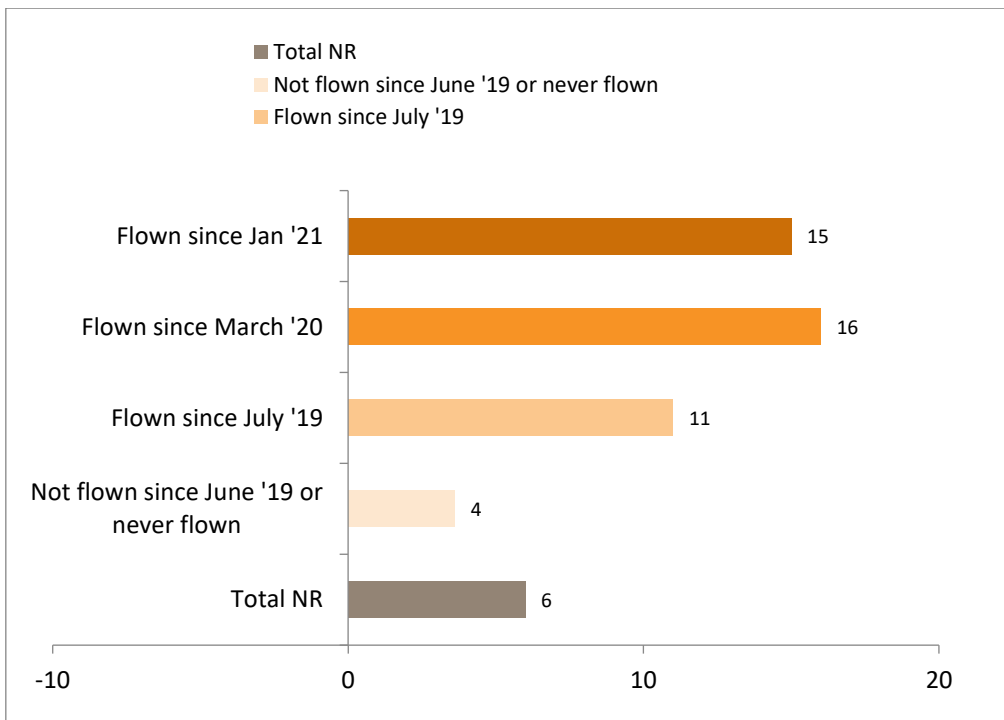
³¹ OC&C (2021)

5.2.49. We therefore assume a further conversion impact of [3<] %pts for Chinese passengers. Given the proportion of spend Chinese passengers made up in 2019, this is a [3<] % annual overlay to our model.

5.2.50. We also observe a +12.9% increase in Average Transaction Values for European travellers. We expect this to unwind over H7:

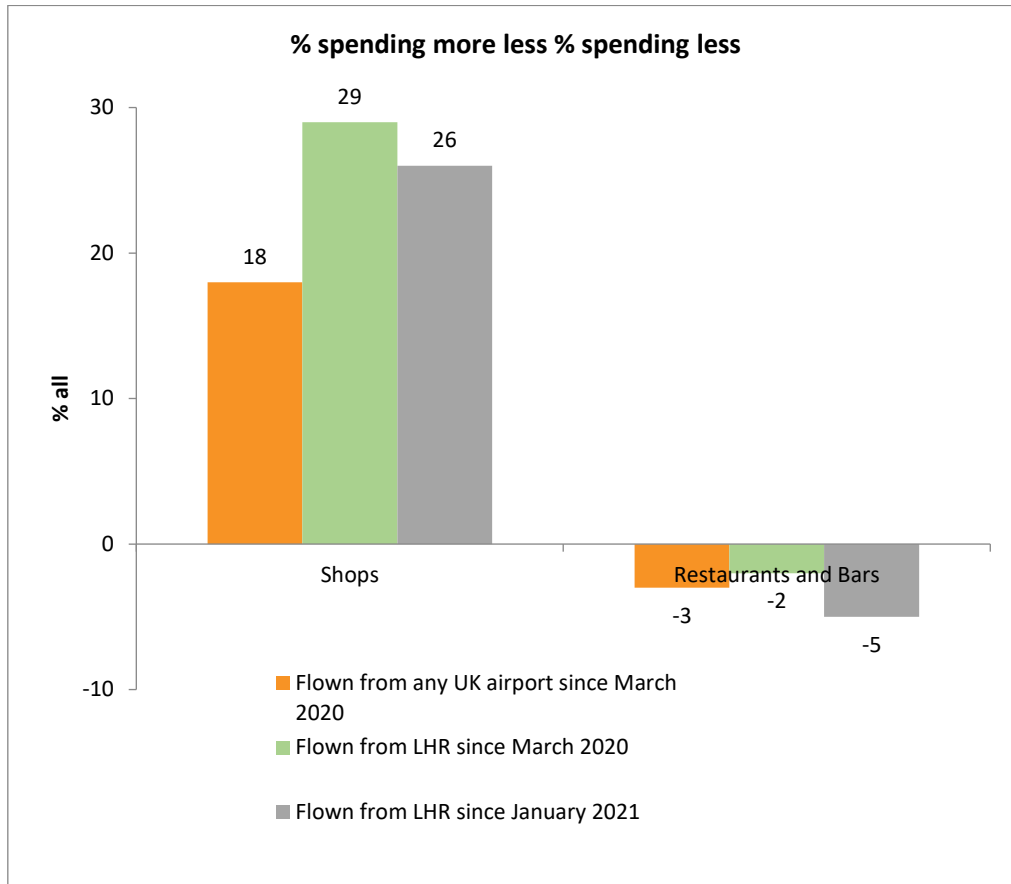
- Red Route (2021) outline: “Most are worried about cost of living increases, but some recent flyers are now able to spend more and have been treating themselves.” Red Route demonstrate that those spending more since Covid-19 are more likely to have been recent flyers:

Figure 7: Spend increases post Covid by recently flown



- Red Route also outline that: “Those flying from LHR particularly likely to claim they had spent more in departure lounge shops.”

Figure 8: Spending increases by category, LHR vs other airports, Red Route analysis



5.2.51. We can observe the outcome of this survey data in our revenue figures: European passenger ATV for luxury has increased from £[X] in 2019 to £[X] in 2021. We therefore assume that this is the “revenge spending” phenomenon that has been observed throughout Europe and North America post the pandemic³² and do not believe it will be permanent:

- Some people are spending more after Covid-19, those people are likely to have flown recently. This is not a permanent effect and will dissipate once that deferred spending has caught up.
- There is a general desire to “treat oneself” post the pandemic, and this is more pronounced among recent flyers. This is also a temporary effect that will dissipate once people have returned to flying.

5.2.52. We also assume the same margin and shop mix changes outlined above.

Table 16: Bottom-up model assumptions, Heathrow analysis

Category	Assumption
Destination Mix	Re-base all 2021 data for 2019 data.

³² [WHO says omicron variant could change the course of the Covid pandemic \(cnbc.com\)](#), [How to trade Europe’s incoming ‘revenge spend,’ according to BlackRock \(cnbc.com\)](#)

Awareness	Assume awareness grows linear from [20%] to [60%] by 2026 <ul style="list-style-type: none"> Luxury participation declines from [[<]]% to [[<]]%
Chinese Conversion Impact	Downwards adjustment: <ul style="list-style-type: none"> [<]% WDF [<]% Luxury
Revenge Spending	Luxury ATV for European passengers reverts to 2019 levels
Average Heathrow Margin	Average margin reduces from [<]% to [<]%
Luxury: Non-Luxury Shop Mix	[<]% in 2019 to [<]% from 2023

Accounting for real world data, shop mix and increasing awareness, we have refined our bottom-up overlay to [<]%

5.2.53. Our updated bottom-up model is intellectually robust:

- It uses real world data observed in the first three quarters of 2021 as a starting point.
- Where there are known evolutions to this impact, we include a balanced and evidenced forecast for that evolution.
- The final figure is within the [<]% envelope predicted by the improved top-down model.

5.2.54. The bottom-up model also allows us to understand impacts by category, by year.

Table 17: Phasing of bottom-up drivers across retail revenue lines

Retail impacts phased	2022	2023	2024	2025	2026
WDF	[<]	[<]	[<]	[<]	[<]
<i>Spend Behaviour</i>	[<]	[<]	[<]	[<]	[<]
<i>Awareness</i>	[<]	[<]	[<]	[<]	[<]
<i>Shop Mix</i>	[<]	[<]	[<]	[<]	[<]
<i>Concession Fee</i>	[<]	[<]	[<]	[<]	[<]
<i>Duty Free Opportunity</i>	[<]	[<]	[<]	[<]	[<]
<i>Conversion Impact</i>	[<]	[<]	[<]	[<]	[<]
Luxury	[<]	[<]	[<]	[<]	[<]
<i>Spend Behaviour</i>	[<]	[<]	[<]	[<]	[<]
<i>Awareness</i>	[<]	[<]	[<]	[<]	[<]
<i>Shop Mix</i>	[<]	[<]	[<]	[<]	[<]
<i>Concession Fee</i>	[<]	[<]	[<]	[<]	[<]
<i>Duty Free Opportunity</i>	[<]	[<]	[<]	[<]	[<]
<i>Conversion Impact</i>	[<]	[<]	[<]	[<]	[<]
VAT Refund	-100%	-100%	-100%	-100%	-100%

5.2.55. Translated into an overlay, we conclude that as awareness grows, so too does the size of the overlay:

Table 18: Proposed overlay for VAT Impacts by year

2022	2023	2024	2025	2026	H7 Average
[X]	[X]	[X]	[X]	[X]	[X]

5.2.56. This bottom-up prediction is within the envelope predicted by our improved top-down model, which uses evidenced and specific elasticities and accounts for known impacts that the original CEPA model did not account for. On balance we are confident that the methodology and evidence we have presented is robust and superior to that proposed by CEPA.

5.3. OTHER RETAIL OVERLAYS

	RBP Update 1	RBP Update 2	CEPA
Passenger Mix	See below	See below	See below
Q6 → H7 Bridge	-	[X]	-
Terminal 4 Opening	-	[X]	-

5.3.1. There are other overlays to retail that the CEPA model needs to consider:

- We note that CEPA have attempted to model passenger mix impacts by triangulating between different publicly available reports on passenger spend profiles. It would be an error of process to consider this evidence above the actual spend profiles derived from retail sales data.
- We need to account for a bridge between 2019 – the base year for the model – and the quantifiable changes that have taken place since to concession fees and store closures. We propose this as a new retail overlay.

5.3.2. Taken together, along with the VAT overlay outlined above, total overlays applying to retail are as the table below:

Table 19: Retail Overlays

	2022	2023	2024	2025	2026
VAT Overlay	[X]	[X]	[X]	[X]	[X]
Pax Mix	[X]	[X]	[X]	[X]	[X]
Q6 → H7 Bridge	[X]				
Overlay into RBP	[X]	[X]	[X]	[X]	[X]

It would be an error of process to use CEPA methodology for passenger mix impacts over our own.

5.3.3. Our methodology for estimating the impacts of passenger mix impacts on retail at RBP Update 1 and for this update is the same:

- We use actual sales data by market (the data collected at checkout, by transaction, rather than survey data *Retail Futures*) and actual passenger journeys by destination in 2019 to allocate average spend per passenger by region of travel.
- We then reweight this using the destination mix in our H7 passenger forecast, which is supported by transparent and validated assumptions.
- The difference between H7 and 2019 is then used as an overlay to forecast income per passenger.

5.3.4. For this update we have re-weighted the destination mix based on new passenger forecasts associated with this update.

Table 20: Heathrow H7 Passenger Mix Forecast (Mid-Case)

Market	2019	2022	2023	2024	2025	2026
UK & CI	6.0%	[X]	[X]	[X]	[X]	[X]
EEA	38.3%	[X]	[X]	[X]	[X]	[X]
Other Europe & CIS	2.8%	[X]	[X]	[X]	[X]	[X]
Middle East	9.6%	[X]	[X]	[X]	[X]	[X]
Africa	4.3%	[X]	[X]	[X]	[X]	[X]
North America	23.3%	[X]	[X]	[X]	[X]	[X]
Latin America	1.7%	[X]	[X]	[X]	[X]	[X]
Asia/Pacific	14.0%	[X]	[X]	[X]	[X]	[X]

Table 21: Income per Market 2019 (Heathrow Retail Futures)

Market	Income per Passenger 2019
UK & CI	[X]
EEA	[X]
Other Europe & CIS	[X]
Middle East	[X]
Africa	[X]
North America	[X]
Latin America	[X]
Asia/Pacific	[X]
Average all markets	£6.35

Table 22: Passenger Mix Overlay

	2022	2023	2024	2025	2026
Mix Weighted Income	[X]	[X]	[X]	[X]	[X]
Average	[X]	[X]	[X]	[X]	[X]
Passenger Mix Effect	[X]	[X]	[X]	[X]	[X]

5.3.5. We note CEPA have attempted to come to their own views on the value of passenger spend profiles by "triangulating" between different reports and between our regulatory and statutory accounts to come to their own view.

5.3.6. It is unclear to us why this is an improvement on the simplicity of our position:

- It is unclear why survey data should be used instead of, or in addition to, actual sales data. The former can help sense check the latter, but it is irrational to pretend they have equal validity (for instance, we do not survey passengers on

a day to estimate how many passengers travel to North America when we have the actual that shows how many passengers fly to North America).

- It is unclear how opaque attempts at triangulation of either different passenger profile reports or our statutory and regulatory accounts lead to a more verifiable outcome than using 2019 actuals and rebasing them.

5.3.7. Absent further justification from CEPA, it would be an error of process for the CAA to accept this self-evidently less sophisticated and less transparent approach to estimating passenger mix impacts.

The modelling approach requires a bridge from Q6 to H7 to ensure it is accurate

5.3.8. Our modelling approach uses 2019 as the base year for the forecast. This is the appropriate choice given the shock to demand and passenger behaviours as a result of the Covid-19 pandemic.

5.3.9. However, we need to account for the differences in retail that have taken place since 2019 to ensure that there is an accurate entry point to H7. Changes that need to be considered include:

- [redacted].
- Changes to shop mix (Q4 2019 – Q4 2021), including friction from closures, this is inclusive of the impacts of VAT, but the forecast deterioration of shop mix over H7 are contained in the VAT overlay.

5.3.10. This is a reasonable approach and is consistent with our approach to other parts of the model (we propose a similar adjustment to account for flat nominal prices since 2019 in our Heathrow Express overlays). We can be confident it is material, because of the significant changes to concession fees and shop mix since 2019:

Table 23: 2019 - 2021 Store Closures and Openings

	2019 to 2021	Average Effective Margin
Store Closures	[redacted]	[redacted]
Store Openings	[redacted]	[redacted]
Store Temporary COVID Closures	[redacted]	[redacted]

5.3.11. For the avoidance of doubt: this bridge for concession fees is separate (and additional) to the overlay proposed within the VAT overlay:

- This proposed bridge accounts for known concession fee changes from 2019 to end 2021.
- The VAT overlay accounts for forecast changes to concession fees and shop mix from 2022 onwards, additional to those observed to end 2021 (e.g. we expect an exit of [redacted] luxury units between 2022 and 2023).

5.3.12. We can be confident it is efficient and verifiable because they are the transparent outputs of our management accounts. Indeed, this adjustment ensures that our

business plan for 2022 is aligned in our internal management plans for the year and the regulatory five-year plan, which can also be transparently demonstrated.

A modifier is required to retail revenues to account for T4 opening

5.3.13. At the point T4 opens, the density of passengers per sqm falls. In congestion terms this is positive – more space in shops tends to mean more people shopping. However, there are two opposite and larger impacts to consider:

- [X]
- [X]

5.3.14. The opening of T4 leads to a less efficient use of retail space, which is material and additional to our RBP model. It therefore requires an additive overlay.

5.3.15. We have assumed an impact on Terminal 4 retail that we will work to refine as we understand more about what retail will be available to passengers when it reopens.

5.4. MANAGEMENT CHALLENGE

	RBP Update 1	RBP Update 2	CEPA
Management Challenge	0%	0%	2%

5.4.1. We dispute the principle and approach CEPA have taken:

- Heathrow is already at the efficient frontier, a management challenge for commercial revenue lacks regulatory precedent.
- The justification for a management stretch and the 2% estimate lacks substantiation and is evidently unreasonable.

5.4.2. We conclude that there is no precedent or justification for any management stretch on commercial revenues.

There is no regulatory precedent for what CEPA propose

5.4.3. We infer that one of the key questions CEPA needed to answer was whether Heathrow was at the efficient frontier for commercial revenues in 2019. It is the key question before considering any management challenge. We believe:

- the CEPA approach lacks substance, and it is only reasonable to conclude that Heathrow remains at the efficient frontier for commercial revenues.
- If Heathrow is at the efficient frontier then there is no regulatory precedent for a management stretch in commercial revenues.

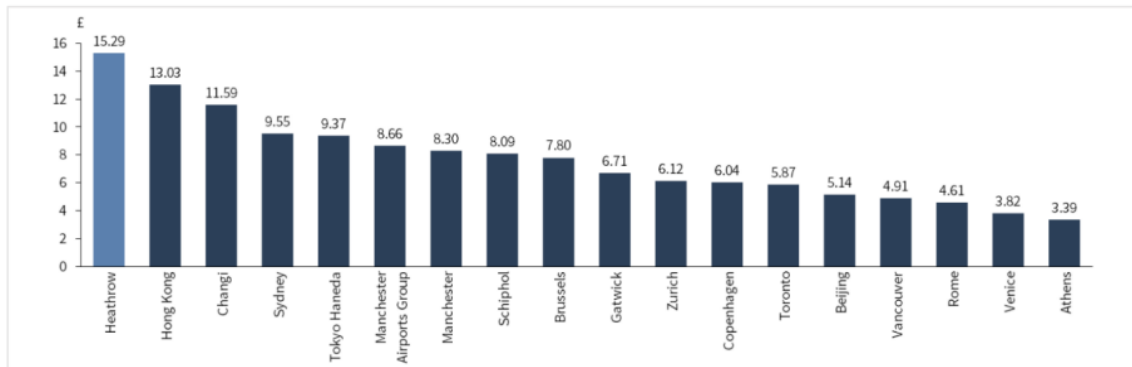
i. Heathrow is already at the efficient frontier

5.4.4. In their analysis CEPA accept the work undertaken by SDG for the CAA in 2015, which confirmed that Heathrow was at the efficient frontier. They also accept that the

2019 KPMG report demonstrates Heathrow’s position relative to other comparable airports improved over Q6.

- 5.4.5. CEPA do not appear to consider that Heathrow remains the best performing airport for non-aeronautical revenue of its size and passenger base, 17% higher than the next best placed airport (Pragma 2019).

Figure 9: Non-aeronautical revenue per passenger, benchmarked airports, Pragma (2019)



- 5.4.6. CEPA do not appear to consider that if Heathrow had become materially inefficient then there would be a significant narrowing of the gap between Heathrow and other comparable hubs. According to Frontier (2021): *“if CEPA/TA believe that Heathrow is at the efficiency frontier with respect to commercial revenues, then we might expect to have seen similar improvements at other airports – or arguably even greater improvements at other airports as those not at the frontier would have greater scope to achieve catch up efficiencies.”*
- 5.4.7. CEPA do not appear to consider that Heathrow has improved its position relatively compared to other airports, leading KPMG to conclude *“for an airport of Heathrow’s size and customer-base, its relative performance in generating commercial revenue has generally improved since the 2007-08 financial crisis to a position where it is ahead of where we would expect it to be based on our models, and similar to the frontier airport in 2018. The trend for total commercial revenue is also generally true for the separate components of commercial revenue including retail revenue, property revenue and car parking revenue.”*
- 5.4.8. CEPA do not appear to consider that passengers validate the data that demonstrates Heathrow offers a better commercial offering than competitor airports by voting Heathrow the “best airport for shopping” 11 years in a row (SkyTrax).
- 5.4.9. CEPA assert that *“beyond 2015, we see that HAL’s ability to grow revenue has stagnated”* but provide no analysis as to why that would have been the case. In any case, they accept it is *“probably not enough for it to now be materially inefficient”*. Establishing whether a regulated business is efficient is at the heart of every price control, but particularly in the context of proposing a stretch. The level of analysis provided by CEPA as to whether Heathrow is at the efficient frontier for commercial revenues falls short of what is reasonable to provide and is materially less than that provided for assessing the efficiency of Heathrow operating costs. Frontier (2021) note:

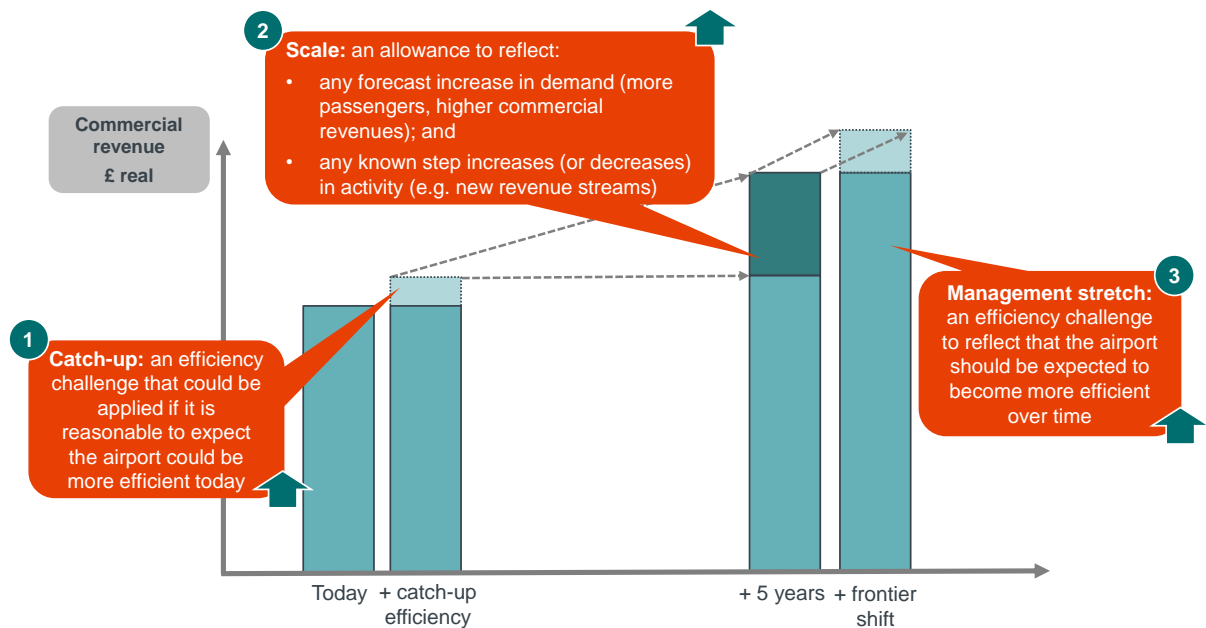
“For their analysis on opex, CEPA/TA carried out a review of regulatory precedents and various productivity studies to help inform their frontier shift assumptions, and they also considered inflation / real price effects for different cost components. Given the parallels, we might have expected to have seen a similar framework and similar levels of detail for the management stretch – especially given the size of the challenge. For instance, this could have included a review of management stretches at other airports and sectors (akin to TFP studies), and analysis of factors such as exchange rates, retail capacity, and consumer trends, etc. (akin to real price effects – albeit they did consider some overlays, but not for all factors).”

5.4.10. It is an error of process that so little scrutiny of this point has taken place, or that CEPA can imply there is an inefficiency without providing any analysis to support it. To that end it is only reasonable to assess that Heathrow was efficient in 2015, remains efficient now, and CEPA have provided no reason to conclude otherwise.

ii. There is no regulatory precedent for a management challenge being applied to commercial revenues for a company deemed to already be at the frontier

5.4.11. A management challenge is a different concept to a catch-up efficiency, as highlighted by Frontier (2021) below:

Figure 10: Approach to commercial modelling, Frontier (2021)



5.4.12. We find no evidence of management challenges for commercial revenues applied to airports already at the efficient frontier. Frontier (2021) outline:

“While there are parallels with frontier shift for opex, we would note that management stretch is less understood and researched. Achieving a management stretch for commercial revenues is arguably less controllable than achieving a frontier shift for opex. For opex, Heathrow has a reasonable degree of control over large parts of its spending, and might be expected to achieve efficiency gains over time, for instance through automation, and new software, etc. However, commercial revenue is arguably less controllable, and a hypothetical efficient operator might not expect to see an increase in revenues over time.”

- 5.4.13. CEPA assert that their management challenge proposal is in line with that proposed by Heathrow for iH7. This is a misrepresentation of our position in iH7, as Frontier (2021) explain:

First, [Heathrow] used elasticities to produce a baseline forecast: “The impact of increased passenger numbers on non-aeronautical revenue has been incorporated by applying an elasticity of [3%] to retail and rail revenue, and an elasticity of [3%] to services revenue.” However, it is worth noting that these elasticities (which are lower than those being applied for H7) were estimates of volume-effects only and not inclusive of ongoing efficiencies. This appears to have been noted by CEPA in its review of Heathrow’s iH7 plan: “We understand that these forecasts have not been analytically derived, but instead are assumptions based on HAL’s judgement. The elasticity of [3%] is based on the view that the marginal passenger is less valuable (in terms of non-aero revenue) than the average passenger, and that not all retail revenue is driven by passenger numbers”. This is in contrast with Heathrow’s elasticities for H7 which do include ongoing efficiencies.

Heathrow then noted than applying an elasticity capturing volume-effects only would understate its ability to grow revenues in future. It noted that revenue per passenger over the period 2015-2018 had grown by 1% per annum in real terms (shown below) and on this basis it decided to include a management stretch on top of its elasticities. “We have included a management stretch of 1% per annum on top of RPI inflation in our forecasts of revenue, reflecting achieved performance over the last few years. We consider that this will be challenging for Heathrow to deliver”

Heathrow’s decision to apply a management stretch on top of its elasticities for iH7 did not amount to double counting as the elasticities did not include ongoing efficiencies ... Heathrow’s approach for H7 has therefore changed as it now uses elasticities which do include on-going efficiencies...Therefore, for H7, CEPA/TA’s reference to Heathrow’s 1% figure from its iH7 plan is inconsistent with Heathrow’s new approach.

- 5.4.14. CEPA provide no other regulatory precedent for a management stretch for commercial revenues.

a) CEPA proposal lacks necessary substantiation

- 5.4.15. On the basis that Heathrow is at the frontier, and there is no precedent, the burden of evidence required to justify such a proposal is high. We do not believe CEPA have come close to meeting this:

- The CEPA justifications for a management challenge using historic data are unsophisticated and an error of interpretation.
- The CEPA justifications for a management challenge in the context of future frontier shift are unsubstantiated.

- 5.4.16. We agree with the Frontier (2021) conclusion:

The 2% figure is therefore ultimately presented as a judgement, but one that has a huge impact on its revenue forecast for Heathrow – around £400 million over H7. To make this sort of adjustment we believe CEPA/TA should be required to provide credible supporting evidence to demonstrate that such an assumption is reasonable.

However, for both iH7 and H7, CEPA/TA have presented little to no supporting evidence.

i. Justifications using historic performance are unsophisticated and are errors of interpretation

- 5.4.17. If there is no precedent for a management challenge for commercial revenues, then we should expect a level of evidence as to why it is reasonable and why the level is achievable (and the overall forecast remains a “fair bet”). No reasonable level of evidence has been provided.
- 5.4.18. CEPA assert that a challenge is reasonable because “Between 2008 and 2017, HAL’s per passenger commercial revenues increased by roughly 3% per annum in real terms”. This is unsubstantiated and lacking critical thought.
- 5.4.19. The years CEPA assessed are cherry picked to include the years between Terminal 5 opening and the end of foreign exchange effects on passenger price perceptions (with Terminal 2 opened in the middle). It excludes 2018 and 2019, where income per passenger was flat in real terms. If those latter years were included, as they ought to be, then the growth rate falls from 3% to 2.5%.

Table 24: Income Per Passenger per annum (2018p), 2007 - 2019

	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
IPP (Real, 2018p)	£6.43	£ 7.03	£7.53	£7.51	£7.63	£7.58	£7.84	£8.25	£8.66	£8.73	£8.93	£8.70
Annual Growth	-1.6%	9.2%	7.2%	-0.3%	1.5%	-0.6%	3.4%	5.3%	4.9%	0.8%	2.4%	-2.6%

- 5.4.20. CEPA make no assessment on the role of capital investment in growing historic commercial revenues and are not aligned with the CAA on whether there will be commercial revenue capital investment in H7 (a point of manifest inconsistency, outlined in full below):

- In 2008, Terminal 5 increased Heathrow’s retail sqm by 36% relative to the previous year.
- In 2014, Terminal 2 increased Heathrow’s retail sqm by 10% relative to the previous year.
- Over the course of the period, and because of both terminals opening, the number of car parking spaces at Heathrow grew from 14,000 in 2008 to 22,000 in 2019.

- 5.4.21. It is no surprise that 90% of the growth in income per passenger between 2008 and 2019 takes place in the first two full years following terminal openings at T5 and T2. The average IPP growth in these years is 6.7%. The average annual growth rate of the remaining years is just 0.4%.

Table 25: Income Per Passenger Growth, sorted by whether it proceeds terminal opening or not

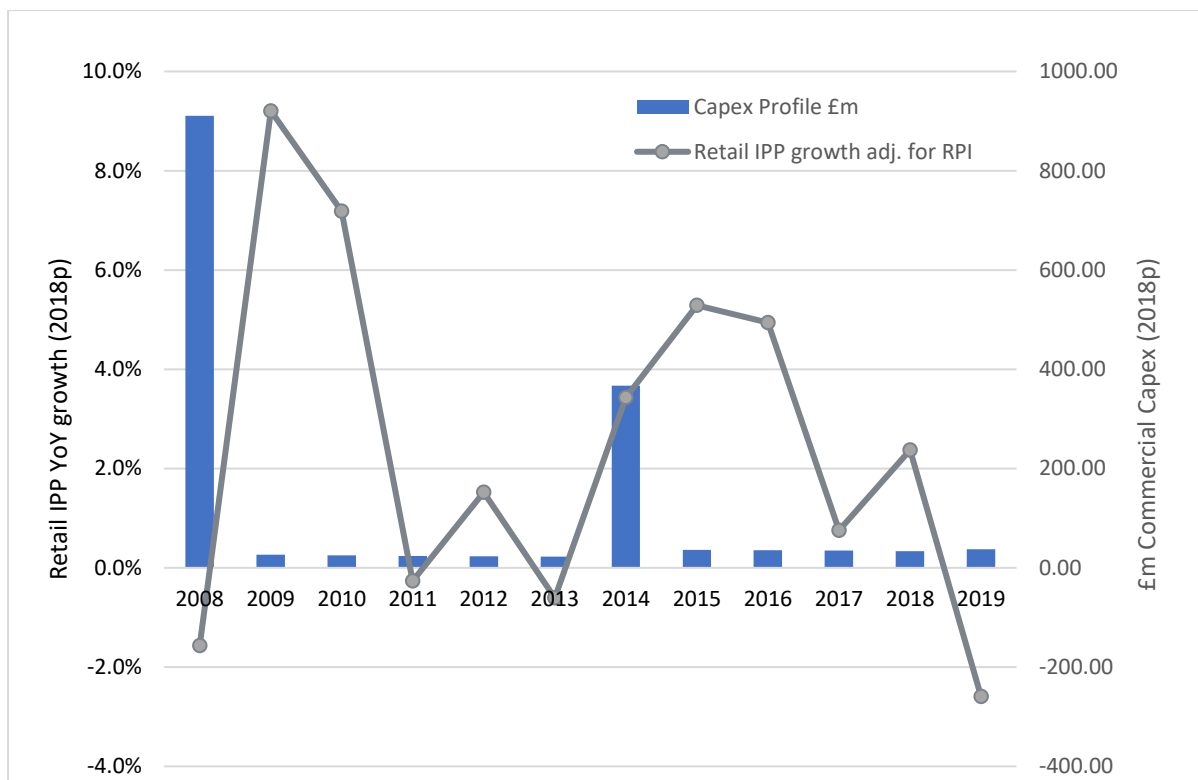
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	Avg
Growth	-1.6%	9.2%	7.2%	-0.3%	1.5%	-0.6%	3.4%	5.3%	4.9%	0.8%	2.4%	-2.6%	2.5%
Without	-1.6%			-0.3%	1.5%	-0.6%	3.4%			0.8%	2.4%	-2.6%	0.4%

With		9.2%	7.2%					5.3%	4.9%				6.7%
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5.4.22. Even if we were able to invest what we proposed in RBP Update 1 on commercial capital, there would be no significant increase in retail floor area or car parking. Additional commercial property would not be available to let until H8. In any case, the CAA proposals disallow all commercial revenue capital investment.

5.4.23. Figure 11: Commercial Capital vs Income Per Passenger (2018p), 2008-2019 below demonstrates the transformational nature of commercial capex associated with Terminal openings when compared to other commercial capital invested in previous years:

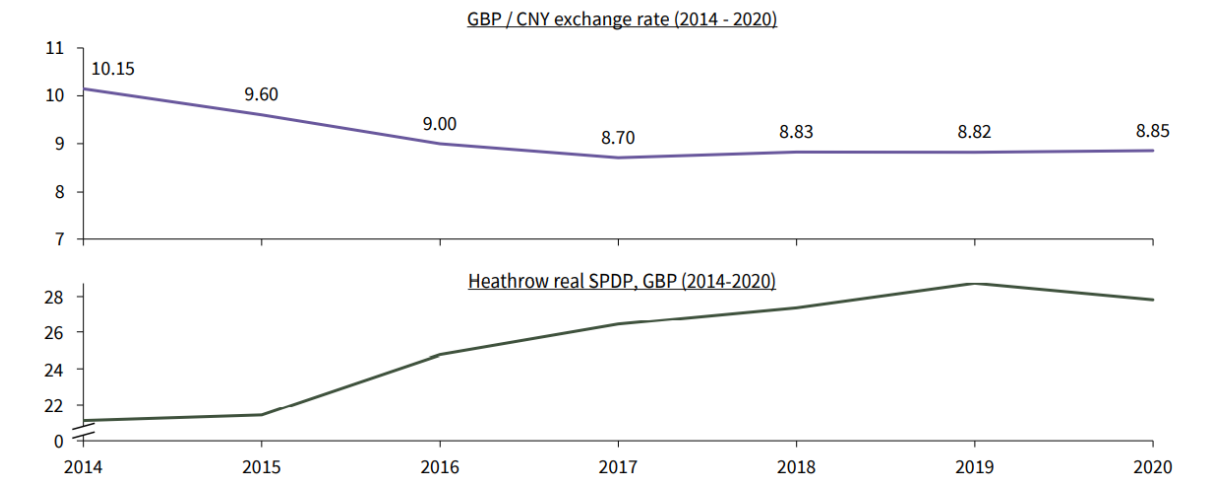
Figure 11: Commercial Capital vs Income Per Passenger (2018p), 2008-2019



5.4.24. CEPA do not consider changes to passenger mix and behaviours in driving short-term increases in IPP, before plateauing once that impact has matured. Q6 was typified by the growth in East Asian passengers, with 3,300 direct flights to China by 2018 – up from 2,300 in 2014. East Asian passengers, with an affluent passenger base, appetite for luxury goods, and the longest flight durations, those flying to the Far East, South Asia and Oceania spend over 2.5 times more than average in airside departures.

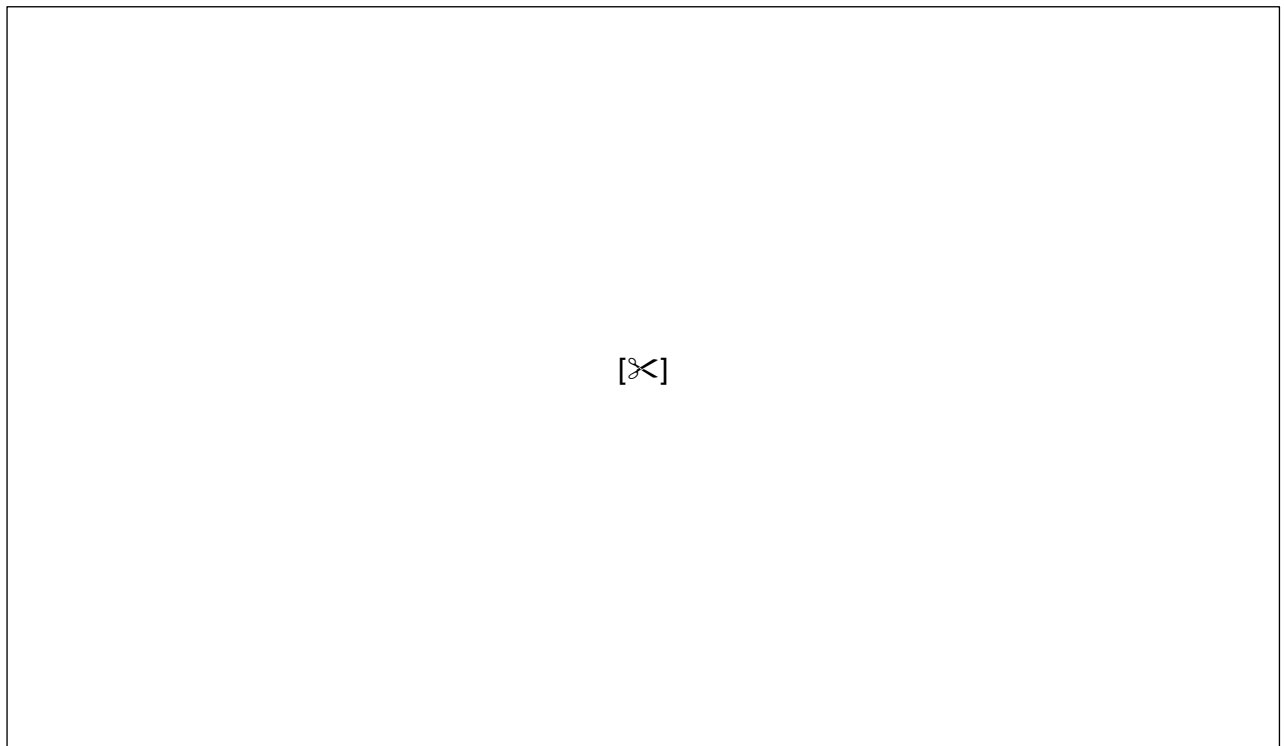
5.4.25. The proportion of Heathrow passengers travelling to or from East Asia grew from 8.2% in 2013 to 9.0% to 2018. At the same time, exchange rates became favourable to make prices cheaper for East Asian passengers, particularly Chinese passengers who say the GBP/CNY exchange rate fall to historic low levels between 2016 and 2019 – 15% lower than 2014.

Figure 12: GBP/CNY Exchange Rate and Heathrow Spend per Departing Passenger (2014-2020), Pragma Analysis



5.4.26. Pragma (2021) confirm that, taken together, the growth in total passengers and the favourable conditions for their spending mean “East Asian destinations had driven 1ppt. of SPDP growth at the aggregate total level.”

Figure 13: Spend per departing passenger growth, East Asia vs RoW

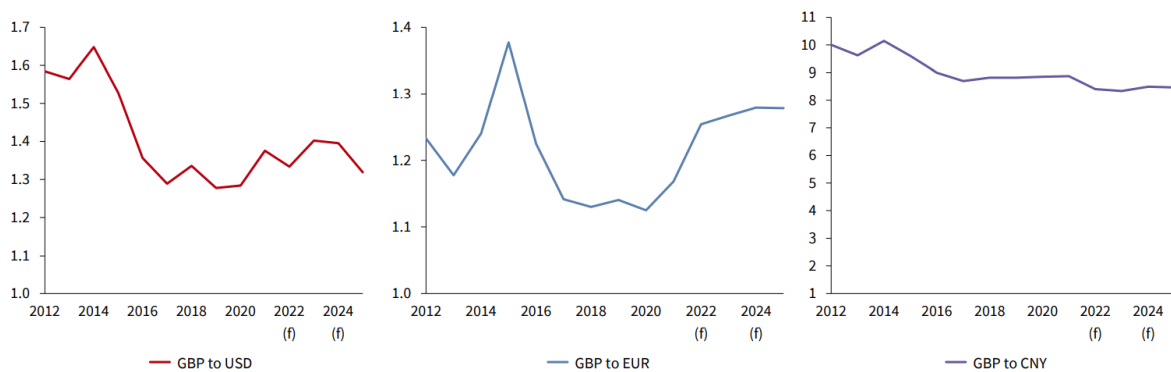


5.4.27. We note that in their analysis, CEPA have not considered whether these conditions will be replicated in H7:

- There is no transformational capital investment in our plan, and in any case, the CAA currently disallow any commercial capital investment.
- Chinese passengers will not return to the same mix and volumes as 2019 until 2025.
- GBP/CNY rates are forecast to remain flat until 2024 (arresting the downward trend observed before Covid-19), while Sterling appreciates versus the dollar and Euro, reversing the favourable conditions observed 2016 to 2019.

5.4.28. Absent the continuation of the above conditions, it is unclear why the growth in IPP evident in Q6 should be expected to continue into H7.

Figure 14: Exchange Rate projections, Pragma (2021)



ii. Justifications on the basis of future frontier shift are unsubstantiated and unreasonable

5.4.29. As well as historical performance, CEPA justify their proposals on future frontier shift, artificial and real:

We see this 2% estimate as capturing several factors:

- *All the mitigations against the downside step changes assumed in our forecasts (e.g. the mitigation against the retail tax changes)*
- *Returns from recent capital investments aimed at increasing revenue generation*
- *Our switch from RPI indexation for future revenues to CPI indexation*

5.4.30. No further justification beyond these three bullet points is provided. As outlined above, there is no precedent for a stretch, and we do not agree with the principle for a stretch. But it is also self-evident that CEPA justification for the capacity for a stretch is wholly insufficient:

5.4.31. The CEPA justification on the basis of headroom to mitigate downsides is manifestly unreasonable, as outlined by Frontier (2021):

“[We] note that the downside step changes appear to amount to around £600m (CPI 2020 prices) in total over H7. The fact that the management stretch amounts to around £400m (CPI 2020 prices) over H7 suggests that CEPA/TA appear to believe

that Heathrow should be expected to mitigate this impact by around 66%. In order words, CEPA/TA have estimated these negative impacts (often using more conservative assumptions than Heathrow), but they then argue that Heathrow should actually be able to mitigate a large part of the impact – which is a judgement based on no supporting evidence. In our view this is unreasonable. Presumably, the basis for the downside adjustments in the first place is that external market conditions are expected to change and they are relatively uncontrollable by Heathrow. Therefore, a 66% mitigation would seem implausible.

If CEPA/TA believes that the downside step changes can be mitigated against, then arguably the management stretch should be applied to the downsides only rather than to commercial revenue as a whole.”

- 5.4.32. CEPA claim that there has been recent capital investment that is likely to create incremental revenues in H7 that was not evident in Q6. This is a demonstrable error of fact. Tellingly, CEPA are not specific as to which investment they refer to.
- 5.4.33. Commercial capital investment was already falling post Q6 and paused almost entirely in response to liquidity concerns during the demand crisis, as evidenced in Table 26: Commercial Capital Spend per year, 2018p below:

Table 26: Commercial Capital Spend per year, 2018p

Commercial Capex £m (2018p)	2019	2020	2021	Total iH7
Cargo	£1.8m	£1.0m	£3.2m	£6.0m
Digital & Data Transformation	£16.6m	£7.1m	£0.3m	£24.0m
Property	£2.9m	-£0.1m	£0.1m	£3.0m
Retail & Media - Asset Replacement	£5.7m	£2.1m	£2.5m	£10.2m
Retail & Media – Development	£4.5m	£2.4m	£1.2m	£8.1m
Surface Access	£6.7m	£6.6m	£13.1m ³³	£26.4m
Total	£38.2m	£19.0m	£20.4m	£77.7m

- 5.4.34. Of the investment in 2019-2021, only 16 projects were greater than £1m, and almost all were paused in 2021 as part of the need to protect liquidity. None of these investments can be described as transformative and their primary purpose was commercial asset replacement, and therefore protecting existing revenues (observed in Q6 and accounted for in our elasticities) and not drivers of incremental revenues.
- 5.4.35. It is therefore unreasonable for CEPA to conclude there are material new or enhanced revenue opportunities realisable in H7 as a result of capital invested in Q6 or iH7. Indeed, it would indicate that Heathrow is substantially behind its usual trend of capital investment in commercial activity, which will make the historic elasticities more challenging to deliver, not less so.
- 5.4.36. There is clear regulatory precedent to consider historical levels of capital and their contribution to commercial performance that historical elasticities are based on. Frontier (2021) note the example of CAR in Ireland when considering the commercial

³³ Majority of commercial 2021 spend was £9m to deliver the infrastructure for Road User Charging, which is account for already as a separate revenue stream for H7.

revenue forecast for the 2020-24 control for Dublin Airport. Like our modelling they have a baseline forecast taking the passenger forecast and applying revenue elasticities based on historical data. They then consider commercial capital investments and whether baseline forecasts need to be uplifted to take account for incremental revenue potential:

“Increases in commercial revenues derived from projects in past capital investment programs since 2001 are implicit in the data and the elasticities. Examples of these large-scale projects are the opening of new retail and office space in Terminal 1 (T1X) or Terminal 2 and associated car parks. Therefore, we concluded, for the most part, our targets were sufficiently challenging without adding further uplifts”³⁴

“The CIP [Dublin Airport’s large Capital Investment Programme] contains a number of projects specific to this category of revenue, a number of capacity projects that include retail elements and a couple of IT projects that contain enabling technology. We do not propose uplifting retail revenues for these projects as, first, similar projects in previous periods would be captured in our elasticity and, second, part of this expenditure is required to protect this revenue stream into the future”

5.4.37. Frontier (2021) rightly note:

“This highlights that a commercial revenue forecast should take the historical capex run-rate into account. In the case of a significantly reduced capex programme, this would suggest that downward adjustments should be made as the historical elasticity based on higher capex figures may be too stretching.”

5.4.38. The correct application of regulatory precedent in this case would not be a stretch but rather an overlay to account for the lack of investment over iH7 relative to the Q6 years where the elasticities were calculated.

5.4.39. CEPA imply that by indexing to CPI rather than RPI, there is additional scope for Heathrow to outperform, on basis that RPI is generally higher. There is no assessment by CEPA as to the materiality of this headroom, and their approach seems manifestly inconsistent with that applied to Opex. Frontier (2021) note:

“For opex, CEPA/TA have considered for each cost category the most reasonable input price trend to use. For instance, for labour costs, this includes applying forecast levels of wage increases, rather than applying more general inflation measures such as CPI. And for energy costs, this includes applying more bespoke forecasts as opposed to CPI. However, for commercial revenues, CEPA/TA have not engaged in the same level of detail on the most appropriate approach for each revenue stream.”

5.4.40. It is an error of process that CEPA apply the management stretch across almost all revenue streams without any substantiation as to why it is reasonable to do so. Frontier (2021) highlight:

For instance, the stretch has been applied to track access revenue. However, based on our discussions with Heathrow, we understand that its agreements with track

³⁴ <https://www.aviationreg.ie/fileupload/2019/Draft%20Determination/2020-2024%20Draft%20Determination.pdf>

access-seekers are based on fixed long-term contracts, meaning in practice Heathrow has no scope to increase revenues – and these charges are also regulated.

5.4.41. They also highlight a manifest inconsistency in approach:

The decision not to apply the management stretch to ORCs is also interesting, and is not discussed in detail by CEPA/TA. If the rationale is that Heathrow has limited ability to grow these revenues on a per passenger basis, then arguably a similar logic would apply to other elements of commercial revenue.

5.4.42. It is a further error of process that CEPA consider these so-called “opportunities” to outperform yet make no assessment of the headwinds Heathrow faces that are not captured in any of the overlay – summarised in Table 1 in the introduction.

5.4.43. Considering this evidence, Frontier (2021) conclude:

Taken as a whole, these points suggest that a 2% management stretch can be considered particularly optimistic. It is plausible that in the coming years an efficient operator at Heathrow would see a decrease in commercial revenue per passenger, even accounting for the overlays.

5.4.44. A reasonable analysis of the capacity for there to be a frontier shift in H7 could only conclude there is basis for a management stretch for commercial revenues:

- Headwinds caused by Covid-19 and unaccounted for by the overlays elsewhere in this plan are sufficiently challenging.
- This challenge is magnified by the fact Heathrow is £176m behind the historic commercial capital investment curve.
- Given Heathrow is already at the efficient frontier, the only regulatory precedent is to account for the shrinking of the frontier – not arbitrarily expand it based on unsophisticated, unsubstantiated, and factually incorrect assertions to justify a 2% stretch like CEPA has done.

5.5. COMMERCIAL CAPITAL INVESTMENT

	RBP Update 1	RBP Update 2	CEPA/CAA
Commercial Capital Investment	£700m	£693m	£0
Capital Investment Overlay	[X]	[X]	£0

5.5.1. The CAA has proposed to disallow all commercial related capital investments in H7 as part of their capital proposals. CEPA make no adjustment to commercial revenues to account for this decision, despite explicitly banking the benefits of proposed investments that the CAA have disallowed the costs to deliver.

5.5.2. This manifest inconsistency is proof of an error of process and confirms that the Initial Proposals were not an integrated plan. This must be corrected in the Final Proposals.

5.5.3. Our view, which we outline and evidence in full below, is that:

- Capital investment is a key driver of commercial revenues and key to meeting passenger expectations – our updated £693m plan secures £[X] of revenue that would have been at risk if we did nothing, and creates the opportunity for £248m incremental revenue in H7.
- The CAA and CEPA approach to commercial capital investment and forecasting is manifestly inconsistent and at odds with regulatory precedent. The investment we propose is consistent with historic investment that underpins our elasticities. Not investing would lead to a necessary downwards adjustment in commercial revenues for H7.
- Investing at this stage in the cycle is the reasonable response of an airport operating in a competitive market. The plans we propose have a strong business case, and only distortions created by regulation – and the regulator – stand in the way of investment.

5.5.4. We therefore conclude:

- The CAA should forecast a £693m Commercial Capital Investment Programme. As this is consistent with our historic investment, no additional stretch can be added to the forecast in exchange for this revenue taking place.
- If the CAA continue to disallow investment in Commercial Capital, revenue forecasts would need to adjust downwards by £[X] – the sum of revenue lost and the opportunity cost of incremental revenue missed.

a) **Capital investment is a driver of commercial revenues and key to meeting passenger expectations**

5.5.5. Previous sections outlined the role of transformative capital investment – new terminals that add new retail, property and car parking spaces – in driving commercial revenues. Given the fall in passenger numbers relative to Q6, there is no need for significant new terminal space in H7 to drive commercial revenues.

5.5.6. Even if no significant new retail space is needed, there remains a significant role for commercial capital in H7:

- Maintaining commercial assets protects current revenues and promotes efficiency in H7.
- Investment in digital retail allows us to transform our service and commercial proposition to meet materially increased passenger expectations post-Covid.
- Strategic investment enables Heathrow to diversify revenue streams to become commercially resilient.

5.5.7. Our Commercial Capital Programme is a blend of these three roles and delivers two measurable outcomes in H7:

- Protects existing revenue that would otherwise be lost in H7 due to obsolescence or failure. This outcome is quantified by “Revenue Risk”
- Creates an opportunity for incremental H7 revenue in addition to that currently generated. This outcome is quantified by “Incremental Revenue”.

Table 27: Heathrow proposed Commercial Capital Programme

	H7 Capex	Incremental Revenue	Revenue at Risk
Agile Fund/Contingency	£ 4.69	[X]	[X]
Cargo	£ 26.90	[X]	[X]
Digital & Data Transformation	£ 61.81	[X]	[X]
Property – Development	£ 161.22	[X]	[X]
Retail & Media – Development	£ 207.15	[X]	[X]
Surface Access	£ 32.62	[X]	[X]
Property – Essentials	£ 28.19	[X]	[X]
Retail & Media - Asset Replacement	£ 33.09	[X]	[X]
MSCP4	£ 70.30	[X]	[X]
Crossrail Contribution	£ 67.50	[X]	[X]
Total	£ 693.46	[X]	[X]

i. Maintaining existing assets protects existing revenues and promotes efficiency

5.5.8. The primary function of any commercial capital programme is to protect the revenue we already raise. Most capital business cases for commercial are small and have the

primary function of maintaining and maximising revenue from existing assets, products, and services. The following H7 business cases to fall under this definition:

- **Retail & Media (Asset Replacement)** – this includes the minor works required to maintain commercial assets, ensure compliance, or minor reconfigurations to promote efficiency. £23.6m was invested in Q6, the most significant of which is the £7.5m replacement of the T5 advertising towers, ensuring the revenue is protected.
- **Retail and Media (Development)** – this includes the more significant development of retail space and the shell and core investments required to launch or refurbish stores. £32.5m was investment in Q6, the most significant of which was the £17.3m refurbishment of T5 airside retail, ensuring that the retail space continues to be attractive to passengers.
- **Property (Essentials)** – this includes the maintenance and development of non-retail commercial space, including hotels, lounges and non-passenger facing facilities. £72.9m was investment in Q6, one of the most significant of which was the £[<]development of a new T3 East Wing hotel, helping to maximise the revenue from the land we already own.
- **Surface Access** – this includes the development and maintenance of parking, bus, coach and rail products and services. £13.9m was invested in Q6, one of the most significant of which was the £5m refurbishment of the N2 Staff Car Park, which is leased out to Team Heathrow partners.
- **T4 MSCP and Forecourt** – this is the major asset replacement of the car park and road access to Terminal 4, which life expires in 2026, and without which, the continued operation of Terminal 4 – and all the aeronautical and non-aeronautical revenue it generates – would be at risk.

5.5.9. In H7 we expect to face additional challenges for these capital business cases:

- Significant investment planned for 2020 and 2021 was slowed, paused, or stopped completely in response to the Covid-19 pandemic and now needs to be caught up in H7. We therefore anticipate a spike in Property – Essentials and Retail & Media Asset Maintenance.
- The rollover of commercial contracts in iH7 means several major contracts expire, increasing new shell and core. This is compounded by a changed passenger mix, evolved passenger behaviours and no VAT-free shopping changing the future mix of our retailers. We therefore anticipate a spike in retail & media development to adapt our commercial offer accordingly.

5.5.10. These challenges are evident in our plans, where our investment is larger than that at Q6, but the revenue at risk from not investing is too significant to ignore, and therefore has a payback period within H7:

Table 28: Heathrow Commercial Capital Programme - Maintain programmes only

	H7 Capex		Incremental Revenue	Revenue at Risk
Retail & Media - Development	£ 207.15		[<]	[<]

Surface Access	£ 32.62	[X]	[X]
Property - Essentials	£ 28.19	[X]	[X]
Retail & Media - Asset Replacement	£ 33.09	[X]	[X]
MSCP4	£ 70.30	[X]	[X]
Total	£371.35	[X]	[X]

5.5.11. Further details on the delivery objectives and projects that sit beneath each business case are available in the capital chapter.

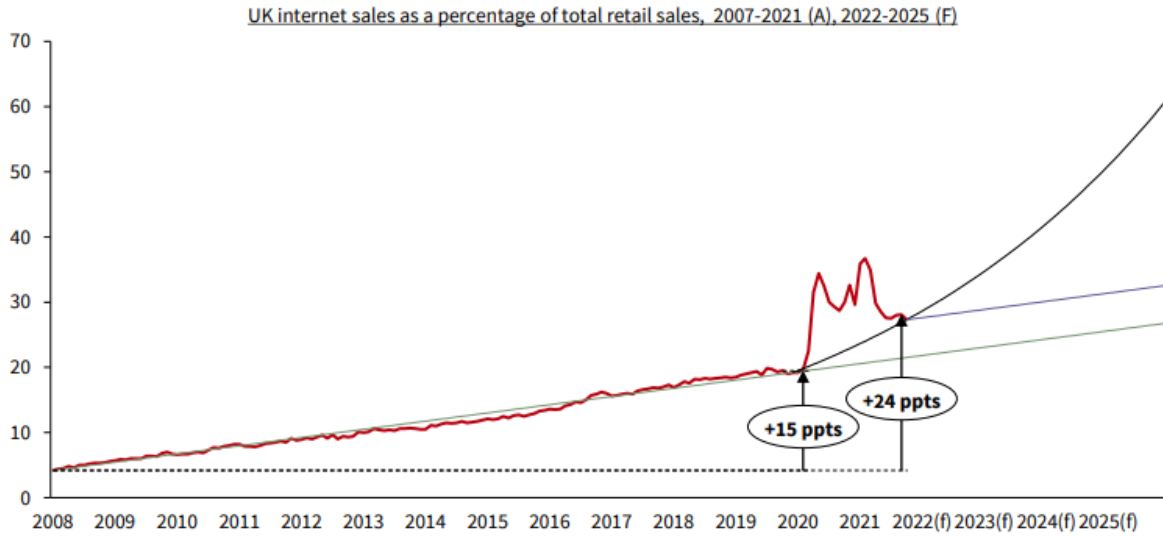
ii. Passenger expectations on digital and physical retail have accelerated because of Covid-19

5.5.12. Commercial capital can also be used to respond to changing passenger expectations, improving existing products and services or introducing new ones. Some of this generates incremental revenue, others ensure that existing yields are not diluted from not keeping up with evolving service expectations.

5.5.13. In Q6, significant investment took place to update some elements of Heathrow's digital and data infrastructure to keep up with rapidly evolving consumer expectations on internet and mobile phone access while airside: over £20m was invested to deliver 4G mobile signal across the Heathrow Estate.

5.5.14. Digital and data expectations evolve relentless regardless, but Covid-19 and lockdown accelerated changes in passenger behaviours and expectations. Pragma (2021) outline: "*UK internet sales as a percentage of total retail sales were growing steadily prior to Covid-19, then experienced a rapid increase in market share during the months of lockdown to a high of 37% in February 2021. This subsequently reduced to 27% in October 2021 as stores re-opened, but the share is forecast to continue rising over time.*"

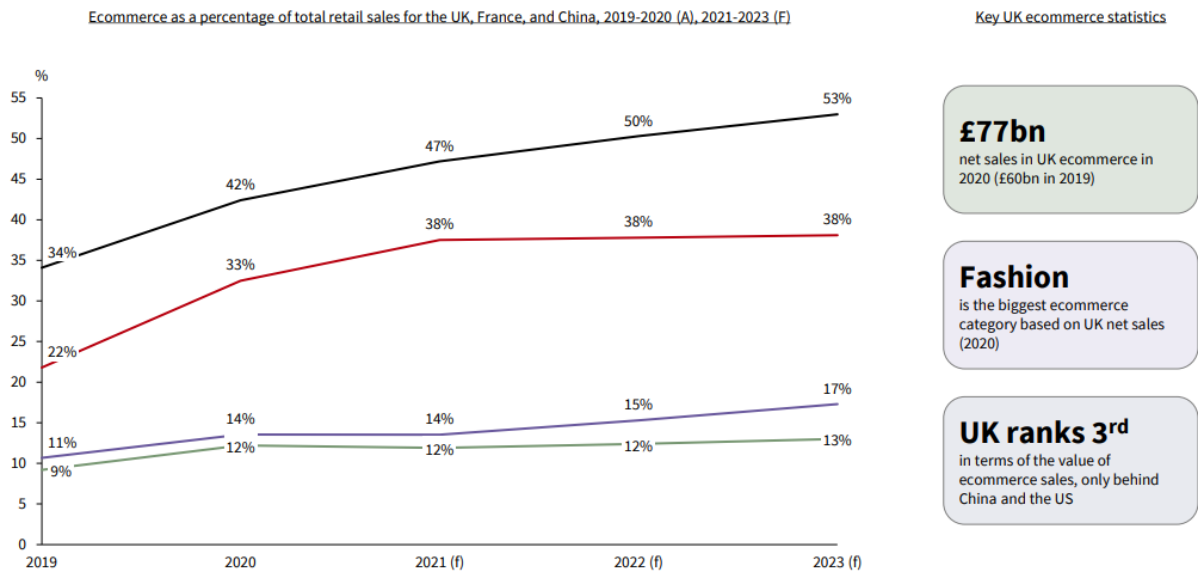
Figure 15: Online Sales as % of total Sales, UK (2007 - 2025)



5.5.15. Pragma go on to add: “greater emphasis and investment has been put into ecommerce strategies by most retailers...this will continue to put pressure on the sales potential of physical stores on the high street and airport retail environments.”

5.5.16. Ecommerce penetration by country varies significantly, with China reporting the highest share of 34% of sales in 2019, rising to an estimated 53% in 2023. The UK also has a high penetration, significantly above that of both the USA and France. This demonstrates the importance of Heathrow delivering an effective digital retail proposition (Pragma 2021).

Figure 16: UK online sales vs other countries



5.5.17. Expert interviews with luxury retailers confirm that the luxury consumer is becoming younger, with greater numbers of the Gen Z demographic embracing the category. In response to this, many luxury retailers are adopting global pricing and are starting to embrace digitisation and ecommerce to a greater extent. (Pragma, 2021)

- 5.5.18. All generations are spending more money online versus offline, and this has only accelerated since Covid-19. However, the greatest shift before and after the pandemic has taken place among our oldest passengers, who are also our highest yielding. OC&C research observe a 9%pt increase in online sales pre- and post-pandemic among baby boomers compared to 4%pt increase in Gen Z. The same older generations are also increasingly less likely to engage in physical retail offerings, particularly in larger shopping hubs (like an airport). This is more pronounced among baby boomers, who expect to spend 32% less in shopping hubs than they used to (OC&C, 2021).
- 5.5.19. This is a change in consumer behaviours and expectations that is permanent and material and we have to respond to, or risk lower revenues. We therefore plan a £61.8m investment in digital and data transformation that will enable:
- The integration of surface access services and products to be purchased online in a single app.
 - The ability to “click and collect” from Heathrow retailers.
 - The delivery of key services online: from wayfinding, personal shopper and online.
- 5.5.20. This investment will not just protect £[>] of current revenue at risk but generate the opportunity for £[>]of incremental revenue. Although this is a completely different role for commercial capital investment, it delivers a similar competitive payback period within H7.

iii. Capital investment now delivers financial resilience in the future by diversifying revenue streams

- 5.5.21. The Covid-19 pandemic threw into sharp focus how reliant Heathrow’s commercial model is on revenue streams that are sensitive to passenger volumes – with 95% of revenues elastic, or nearly elastic, to passenger volumes.
- 5.5.22. Other airports, including our closest competitors, are more balanced. Amsterdam Schiphol is just 81% elastic to passenger volumes, underpinned by a property estate and cargo proposition that dwarfs Heathrow. This enabled a more resilient financial position – notwithstanding state aid, state ownership and less restrictive border controls – during and after Covid-19.
- 5.5.23. We need to consider investments that may not contribute significant revenues in H7 but will deliver significant benefits to consumers now and in the future. Such investments:
- rebalance long-term revenues to improve financial resilience to future shocks to passenger demand.
 - enable the wider commercial model by improving route economics, and thereby consumer choice – a key duty of the CAA.
 - grow non-passenger revenues and, through single-till economics, ensure the long-term charge is affordable.

5.5.24. We propose an ambitious, but deliverable and reasonable, strategic commercial capital programme, focused on three major investments:

- **Property Development** – investment in Q6 was aimed at lounge extensions for airlines, new business centres and new hotels adjacent to existing terminals –investment that underpins our offer to premium passengers, on land that Heathrow already owns. Neither the level of investment nor the approach taken in Q6 will rebalance Heathrow revenue exposure to passenger demand. Moreover, it is not significant enough to grow property revenues to contribute to single till economics and keep the airport charge low. We have the opportunity for a refreshed approach in H7 that will grow property – and non-passenger – revenues in H8 and beyond, improving our financial resilience and keeping the charge affordable.
- **Cargo** – investment in our cargo proposition in Q6 was minimal, and consequently processing times, storage and transshipment possibilities at Heathrow fell well behind those of competitors. If we do not invest in H7, the gap between our proposition and our European competitors will grow. Investment in cargo in H7 is critical in improving route economics for passenger aircraft and recovers our competitive position against other European airports³⁵. This will grow network breadth, improving choice for consumers – a key duty of the CAA. It will also enable more trade, supporting the “Global Britain” ambitions of the Government. Investment is also tailored to the feedback airlines have given us as to how they want the cargo proposition to be improved. Moreover, if passenger demand collapses as it has as a result of Covid-19, Heathrow will have the facilities to compete and win freighter traffic in support of consistently strong cargo demand.
- **Crossrail** – an existing commitment to contribute to the development of Crossrail, which while it reduces Heathrow Express revenues it does increase access to Heathrow from London and thereby our potential passenger base. Aggregating more demand improves route economics, improving network breadth and therefore passenger choice. Growing catchment is a strategic response to suppressed demand because of the Covid-19 pandemic.

5.5.25. While there are no forecast direct benefits to commercial revenues in H7, these investments all improve the revenue potential of the entire Heathrow commercial model. We have taken appropriate steps to both size this programme to ensure it balances the burden on the H7 charge, the unquantifiable benefits in H7 and the significant benefits realisable in future regulatory periods. We have also ensured that investment is backended in H7 to enable recovery to take hold before progressing.

Table 29: Heathrow Commercial Capital Programme, Strategic business cases only

H7 Capex	Revenue Opportunity ³⁶	Revenue at Risk
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³⁵ Feedback from airline community is that XXXX

³⁶ For the avoidance of doubt, this refers to non-aeronautical revenues only that are quantifiable in H7. These investments will have significant revenue benefits in future periods and more widely support the revenue model.

Cargo	£26.90	-	-
Property Development	£161.22	[X]	[X]
Crossrail	£67.50	-	-
Total	£255.63	[X]	[X]

b) CAA and CEPA treatment of capital investment and consequential impact to revenue forecasts is manifestly inconsistent

5.5.26. We outline:

- CEPA and CAA approaches in Initial Proposals are manifestly inconsistent.
- Our proposed capital plan is in line with historic investment and therefore no change to the elasticities is required.
- A removal or reduction of our capital plan would have consequential impact of revenue in H7.

5.5.27. We therefore conclude that:

- If our capital plans are adopted there is no grounds for the CAA or CEPA to include a stretch.
- If our capital plans are disallowed, CAA and CEPA must account for this in their forecast through a capital investment overlay.

i. CAA and CEPA plans are manifestly inconsistent

5.5.28. The CAA have disallowed capital investment in commercial revenue generation and protection in their Initial Proposals. In RBP Update 1 we outlined that absent this investment we would need to adjust our commercial revenue forecast downwards through a Capital Investment Overlay. CEPA, nor the CAA, have engaged in the evidence present in favour of a capital investment overlay.

5.5.29. CEPA, despite the CAA disallowing the plan, have based their forecasts on capital investment in commercial revenue generating activity taking place in H7 – this is a manifest inconsistency:

- Of the £63m forecast investment in digital and media, CEPA say “*we agree with HAL that the other initiatives and the back of house optimisation work in 2022 would benefit from a payback throughout the H7 period from higher retail revenues*”.

- Of the £257m forecast investment in surface access, CEPA say “*as investment in alternative uses for car parks, will protect commercial revenue streams, it is likely that this will generate additional revenue in H7*”.
- Of the £25m forecast investment in cargo, CEPA say “*this is likely to generate some revenue in H7*”.

5.5.30. Frontier (2021) identify this error:

“In other words, CEPA/TA appear to have been instructed to take this revenue into account, even though the CAA has not allowed the associated costs. This appears to be an error, or at least an inconsistency in the CAA’s overall approach.”

5.5.31. The CAA position is unreasonable, manifestly inconsistent, and demonstrates that the Initial Proposals were not an integrated plan. The CAA must carefully consider this for their Final Proposals.

5.5.32. It is self-evident, and laid out in full in our response, the role of capital investment in underpinning commercial revenues. As Frontier (2021) outline:

“this historical run rate of capex in part explains Heathrow’s historical performance on commercial revenues and therefore impacts on the observed elasticities and management stretch – although this has not been discussed by CEPA/TA. Or in other words, if Heathrow had spent less capex historically on commercial revenue activities, we would expect to have seen lower commercial revenues.”

ii. Our proposed capital plan is in-line with historic investment and therefore no adjustment to the elasticities or stretch is necessary

5.5.33. Of additional concern is that CEPA and the CAA have suggested through our engagement sessions since the publication of Initial Proposals that if the commercial capital Heathrow proposes could be linked to the management stretch. This is also unreasonable, manifestly inconsistent and has no regulatory precedent.

5.5.34. The regulatory precedent is to account for whether proposed capital investment is proportionate to the capital investment that took place in the period where the elasticities were calibrated. This is consistent with the CAR proposals for Dublin Airport, that considered the level of capital investment and whether it was in line with previous periods where a retail elasticity was considered:

The CIP [Dublin Airport’s large Capital Investment Programme] contains a number of projects specific to this category of revenue, a number of capacity projects that include retail elements and a couple of IT projects that contain enabling technology. We do not propose uplifting retail revenues for these projects as, first, similar projects in previous periods would be captured in our elasticity and, second, part of this expenditure is required to protect this revenue stream into the future

5.5.35. A similar approach can be taken to Heathrow’s proposed elasticities, where the historic rate of investment can be ascertained by:

- Accounting for equivalent investment in Q6, where the elasticities were measured.

- Accounting for underinvestment in iH7 and what needs to be caught up in H7.
- 5.5.36. This can then be compared against the proposed rate of investment in H7, and if it is proportionate, no adjustment to elasticities needs to be made.
- 5.5.37. We believe it is reasonable to compare historical and proposed investment between four comparable business cases (which, absent the MSCP4 investment, make up the “maintain” bucket outlined above):
- Surface Access
 - Property – Essentials
 - Retail & Media – Asset Maintenance
 - Retail & Media – Development
- 5.5.38. We estimate that the historic annual investment for these four business cases to be £58.36m in Q6³⁷. In the three years of iH7, commercial capital investment fell significantly behind the curve, with just £39.8m invested³⁸ against an expected £175.01m. Heathrow therefore enters H7 £135.28m behind on critical investment necessary to meet historical revenue performance.
- 5.5.39. Our proposals to invest £509m across these business cases in H7 is proportionate to Q6 levels when accounting for underinvestment in iH7:

Table 30: Investment (Actual and Forecast) vs Historic Level and Investment Gap (2019 - 2026)

	2019	2020	2021	2022	2023	2024	2025	2026
Investment	20.3	10.5	9.0	64.9	57.9	133.1	133.2	119.9
Historic Level	58.4	58.4	58.4	58.4	58.4	58.4	58.4	58.4
Investment Gap	-38.1	-85.9	-135.3	-128.7	-129.1	-54.4	20.4	82.0

- 5.5.40. Considering we are behind the investment curve for the majority of H7, it is reasonable to conclude that the elasticities are sufficiently stretching considering the capital investment that is proposed. If Heathrow proposals are proportionate to those delivered during the years of performance used the measure the relevant elasticity then there is no justification for a stretch, as the elasticity is dependent on capital investment.

³⁷ We £142.77m of investment for these business cases in Q6 (2014-2018) for these business cases plus £447.07m for T2 (cost of IDL and MSCP2), the latter spread out over 15 years to reflect assumed average asset life of new infrastructure.

£142.77m / 5 years = £28.55m

£447.07m / 15 years = £29.80m

£28.55m + £29.80m = £58.36m p.a. run-rate for Q6 commercial capital investment

³⁸ We do not account for investments in Road User Charging and Terminal Drop Off (~£10m in iH7) as the benefits of these are separately accounted in a new revenue line, outside our elasticities.

iii. A removal or reduction in our commercial investment capital would lead to a reduction in forecasts

5.5.41. If the CAA continue to disallow any commercial investment capital, as they do in their Initial Proposals, then not only must the incremental revenue benefits of that investment be stripped out of commercial revenue forecast but due consideration needs to be given to the capital investment necessary to maintain and operating existing commercial assets (and protect existing commercial revenue streams). As Frontier outline:

“Given the CAA’s proposals to not allow any capital investment in commercial activities, it is reasonable to expect that Heathrow may have limited scope to keep up with historical performance, and arguably a less stretching forecast should be used.”

5.5.42. In our RBP and RBP Update 1 we identified an overlay to account for the differences to revenue forecasts between a £700m and £100m commercial capital plan, where a smaller plan would see a £[<] reduction in forecast revenues over H7. Given the CAA proposals for no capital investment in commercial revenue at all, and our updated commercial capital plan, it is incumbent on us to produce a new overlay.

5.5.43. Our logic remains that absent investment:

- we will not be able to achieve our elasticities.
- in that instance, regulatory precedent is to apply an overlay to adjust forecast revenues.
- that overlay should be proportionate to the benefits associated with those programmes in H7.
- The benefits of those proposed investments are sum of the revenue that is now at risk from not investing (“Revenue at Risk”) and the lost opportunity of incremental revenues (“Incremental Revenue”).

5.5.44. Therefore, the necessary, efficient and proportionate Capital Investment Overlay is £[<]- the sum of the revenue protected and new revenue generated by our capital investment programme in H7, highlighted in Table 29 above.

c) Investing at this stage in the cycle, with these plans, is the reasonable response of an efficient airport operating in a competitive market

5.5.45. Capital investment in commercial revenue activity is the natural response to the challenges we face and would be the actions of an efficient airport in a competitive market.

5.5.46. We explicitly state our desire to ensure that airport services are efficient, reliable and affordable for airport users. Those users have responded to this price control process insisting that the airport charge is too high.

5.5.47. As stated elsewhere, any increase in the charge is a function of there being fewer passengers to service an asset base designed for many more, and a material and permanent change in the risk our investors face. That said, at a single till airport like Heathrow, a key lever to reduce the charge in this period and the future is to generate more commercial revenues to offset the costs of operating the airport.

- 5.5.48. As is clear in the table above, and in our capital investment overlay: the revenues generated or protected by our commercial capital investment programme in H7 are greater than the estimated cost of that programme. In other words, the charge would be higher and passenger experience worse absent the investment.
- 5.5.49. Moreover, the most efficient way of delivering capital investment at an operational airport is when you do not have to bear the cost of disruption from taking assets offline. Delivering capital investment like MSCP4 now, when it is least needed/utilised, lowers the total cost of the project relative to when Heathrow is full again and T4 is required. That confirms:
- The commercial capital programme represents excellent value for money for both current and future consumers – there is no trade-off.
 - The time to make and deliver capital investment efficiently is now when assets are least utilised.
 - A rational actor that had access to liquidity in a competitive market would invest on these terms (average payback within 5 years) without question.
- 5.5.50. The only reasons that investment would not take place, if future passenger forecasts are accurate, are a consequence of regulatory distortion:
- Investment capacity, because of unfavourable terms for investors imposed by regulation, is limited and the nature of the single till crowds out commercial capital in favour of capital necessary to operate the airport.
 - The commercial forecast imposed by the CAA is unreasonable and unachievable and so investors have no incentive to invest in commercial capital.

5.6. CARGO REVENUES

	RBP Update 1	RBP Update 2	CEPA
Cargo Elasticity	[X]	Bottom-Up Approach	-8.5
2022 Cargo Revenues	[X]	[X]	£62m

5.6.1. CEPA has prepared a cargo revenue forecast based on two components:

- A cargo revenue to passenger numbers elasticity of -8.5. This elasticity has been calibrated on four years of actual data (2017-20) and one year of forecast (2021).
- Heathrow would earn an additional £[X] cargo revenue per annum from 2024 through investments made in its cargo assets in the capex plan.

5.6.2. We believe this is fundamentally flawed and fails to account for the fact that revenues from cargo are only raised from cargo-only movements. We do not currently charge for cargo carried on passenger movements, the mode of transport for the majority of cargo through Heathrow. There are very significant limits to the potential revenue that could be generated from cargo-only movements that CEPA do not consider:

- Cargo-only movements lack runway slots and have only benefitted from ad-hoc slots during the pandemic as they have become available as a consequence of slot alleviation. Once that alleviation ends, the numbers of cargo-only movements will dramatically fall.
- Demand for cargo-only movements falls once more passenger movements fly and more bellyhold capacity is therefore available.
- Airlines generally prefer night-time slots to carry overnight express cargo, a preference that cannot generally be met at Heathrow given our strict night-time flights regime.

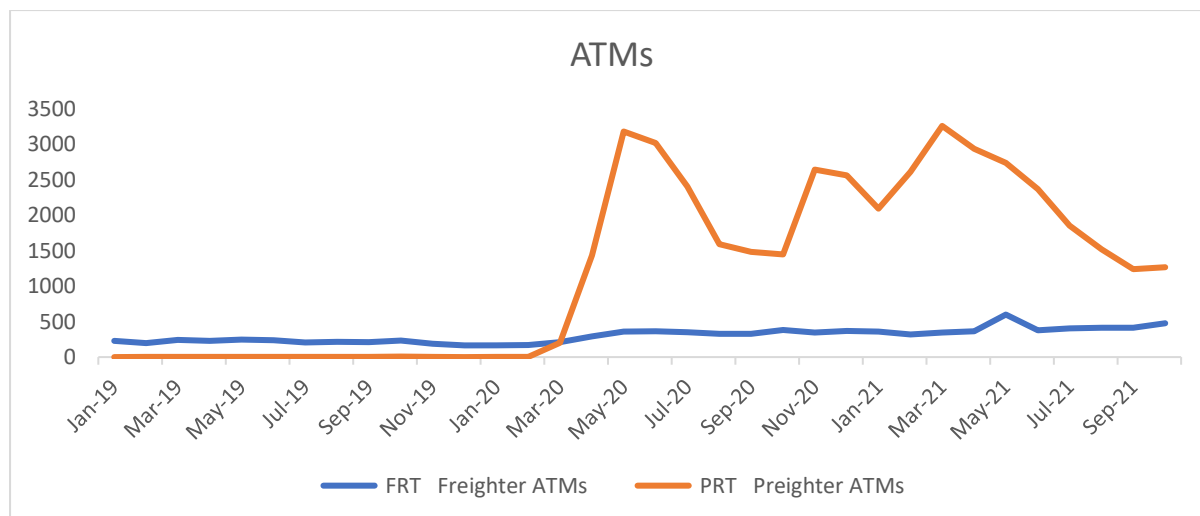
5.6.3. In this section we outline and evidence three reasons why we disagree:

- The use of an elasticity calibrated on four years of actuals is neither robust nor appropriate for forecasting the next five years of cargo revenues. This fails to capture the unique market and contractual circumstance Heathrow operates within, and the unusual growth in cargo-only movements during the pandemic.
- The bottom-up approach used by Heathrow provides a more accurate forecast informed by real world events.
- The inclusion of additional cargo revenue from 2024 from investments into cargo assets is without rationale and is inconsistent with the CAA disallowance of capital investment.

a) The use of an elasticity calibrated on four years of actuals is neither robust nor appropriate for forecasting the next five years of cargo revenues

- 5.6.4. We recognise that during the pandemic Heathrow has seen higher cargo-only movements because of the dramatically increased availability of historically passenger-flown slots that could be repurposed for cargo at a time when demand for air cargo was high. The airport has seen the entrance of new cargo-only airlines, existing cargo-only airlines increasing frequencies, and passenger airlines repurposing aircraft into ‘preighters’ (passenger aircraft carrying cargo only).
- 5.6.5. CEPA in its forecasting of cargo revenues has prepared an elasticity of cargo revenues to passenger demand based on four years of actuals data (2017-2020) and a forecasted revenue figure for 2021. We question the robustness of an elasticity which is calibrated on four years of actual data and its ability to accurately forecast the coming five years of revenues.
- 5.6.6. We also believe, given the unique circumstances of the previous years, the methodology used to prepare the cargo revenues elasticity will perform poorly and exaggerate cargo revenues. As visible in Figure 17, the increase in cargo movements during the pandemic has been driven to a greater extent by the increase in ‘preighter’ movements to markets which have seen travel restrictions. Of the five years on which the elasticity has been calibrated, two of these years has the ‘preighter’ effect. The return of passengers would increase the number of passenger ATMs and reduce the number of cargo-only ATMs; this would be accelerated by the end of slot alleviation and airlines having fewer aircraft available due to recent retirements.

Figure 17: Cargo ATMs since 2019



- 5.6.7. Table 31 has removed the management challenge applied by CEPA from revenues (HAL Mid-Case Update 1) to only show revenues associated with movements. These figures have then been divided through by an assumed cargo yield of £4,085 from 2019. This would lead to a forecast of 4,786 cargo movements in 2026. This is approximately 84% higher than 2019 levels. The HAL Mid-Case Update 1 passenger forecast assumes that passenger ATMs will be back at 94% of 2019 levels by 2026. We believe CEPAs cargo ATMs forecast to be inconsistent in comparison to the recovery of passenger movements expected.

Table 31: CEPA Cargo Revenues Forecast (HAL Mid-Case Management Stretch Removed)

	2019	2020	Source	2022	2023	2024	2025	2026
Passenger ATMs	473,232	177,269	HAL Mid-Case Update 1	[X]	[X]	[X]	[X]	[X]
Cargo Revenue (£) (Management Stretch Removed Real 2018p)	£10.65m	£72.53m	CEPA Forecast (HAL Mid-Case Update 1)	[X]	[X]	[X]	[X]	[X]
Cargo ATMs (Freighter+ Preighter)	2,606	23,550	Calculation (Cargo Revenue/Yield)	[X]	[X]	[X]	[X]	[X]
Cargo Yield per Flight £	£4,085	£3,106	Assumed	[X]	[X]	[X]	[X]	[X]
Passenger ATMs (% of 2019)		-63%		[X]	[X]	[X]	[X]	[X]
Cargo ATMs (Freighter + Preighter) (% vs 2019)		804%		[X]	[X]	[X]	[X]	[X]

b) The bottom-up approach used by Heathrow provides a more accurate forecast informed by real world events

5.6.8. Table 32 shows air traffic movements at Heathrow during the pre-pandemic and pandemic phases. From Table 33 it is clear that there has been a greater increase in preighter movements as a percentage of passenger movements during the pandemic as compared to freighter movements.

Table 32: Cargo Movements at Heathrow Pre/During Pandemic

	Pre-Pandemic (Jan19-Feb20)	Pandemic (Feb20-Nov21)	2019
Passenger	545,809	227,418	473,024
Freighter	2,944	7,548	2,606
Preighter	40	42,302	31

Table 33 : Freighter and Preighter movements as a percentage of passenger movements

	Pre-Pandemic (Jan19-Feb20)	Pandemic (Feb20-Nov21)
Freighter	0.54%	3.32%
Preighter	0.01%	18.60%

5.6.9. This data has been used to prepare a bottom-up analysis which forecasts freighter and preighter movements across H7. Using the passenger ATM forecast from the H7 mid-case, we have assumed that as passenger flights increase, freighter and preighter flights would decrease in proportion and return towards their pre-pandemic percentage levels. This is in line with actual observed trends as passenger demand has returned. Since the re-opening of the US to visitors in November 2021, cargo-only movements have remained broadly stable, with passenger movements serving much of the extra cargo demand during the 2021 Christmas peak. This contrasts with the Christmas 2020 peak, where cargo-only movements grew significantly to

compensate for a lack of belly hold cargo capacity usually provided by passenger movements.

Table 34: H7 Heathrow Mid-Case Passenger ATM Forecast

	2019	2022	2023	2024	2025	2026
UK & CI	41,272	[X]	[X]	[X]	[X]	[X]
EEA	237,453	[X]	[X]	[X]	[X]	[X]
Other Europe & CIS	13,805	[X]	[X]	[X]	[X]	[X]
Middle East	30,300	[X]	[X]	[X]	[X]	[X]
Africa	15,226	[X]	[X]	[X]	[X]	[X]
North America	83,405	[X]	[X]	[X]	[X]	[X]
Latin America	6,004	[X]	[X]	[X]	[X]	[X]
Asia-Pacific	45,767	[X]	[X]	[X]	[X]	[X]
		[X]	[X]	[X]	[X]	[X]
Total	473,232	[X]	[X]	[X]	[X]	[X]
% of 2019		68.3%	83.7%	93.3%	95.7%	96.2%

5.6.10. It has been assumed that there will be no preighter flights in the UK & CI, EEA and North America markets given their full opening to passenger traffic during H7. Cargo will be carried in the belly hold of passenger aircraft or on dedicated freighters for these destinations.

5.6.11. Our overall Cargo ATMs forecast results in 3,823 movements in 2026, approximately 20% lower than those back calculated from CEPAs revenues. This is, however, still approximately 1,200 higher than the number of movements seen in 2019 so we do not assume a full return to normal.

Table 35: H7 Cargo ATM Forecast

	2022	2023	2024	2025	2026
Freighters ATM	4,591	3,929	3,201	2,982	2,936
Preighters ATM	4,840	3,105	1,265	977	887
Total Cargo ATM	9,431	7,033	4,466	3,959	3,823

5.6.12. A charge of £4,531 per movement has been assumed in 2022 rising with RPI over H7. This charge is approximately 50% higher than the average cargo movement charge of £3,106 in 2020.

Table 36: H7 Cargo Revenue Forecast (2018p)

	2022	2023	2024	2025	2026
CEPA	56.9	40.5	29.6	24.2	22.5

RBP Update 1	[X]	[X]	[X]	[X]	[X]
RBP Update 2	[X]	[X]	[X]	[X]	[X]

c) The inclusion of additional cargo revenue from 2024 from investments into cargo assets is without basis and is inconsistent with the CAA disallowing capital investment in another part of the Initial Proposals

5.6.13. As part of its capital expenditure plans in RBP Update 1, we proposed £25m of investment into Cargo Development over H7 with the following two projects:

- **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 the local community. This is consistent with the feedback airlines have given us as to how they want the cargo proposition to be improved.
- **Airside trans-shipment facility:** we are working with Government to seek modification to historical operating procedures that currently do not permit cargo to be connected airside. Changes in procedure, and subsequent investment in facilities, will improve cargo connection times, and thereby our cargo proposition.

5.6.14. As mentioned above, the CAA has disallowed capital investment in its Initial Proposals, so it would be inconsistent to recognise revenues from projects for which there is no funding forecast. This is further evidence of the manifest inconsistencies between the CEPA revenue forecasts and the CAA capital plan, and proof that Initial Proposals are not an integrated plan.

5.6.15. We have stated that neither of these projects would generate quantifiable commercial revenue in H7, however these projects do deliver significant strategic value to the wider Heathrow commercial model to the benefit of passengers, airlines and Heathrow. This is consistent with other strategic commercial investments we propose in H7 (see Section 4):

- Cargo investment enables our wider commercial model by improving route economics – growing network breadth and therefore passenger choice.
- By improving choice for cargo shippers and forwarders, an improved cargo proposition supports the Government’s “Global Britain” ambitions.
- Cargo investment improves resilience to future collapses in passenger demand by increasing the competitiveness of our cargo proposition for dedicated freighter aircraft.
- Cargo investment protects our competitive position relative to other European airports.

5.6.16. CEPA has assumed that these projects would deliver increased cargo revenue of £3.5m per annum from 2024 having based this number on our proposed WACC to

approximate the IRR. There is no rationale provided as to why these projects would enable increased cargo revenues:

- Truck call-forward and traffic management have safety, operational efficiency and sustainability benefits only.
- Airside trans-shipment facilities will deliver improved efficiency to cargo connecting between passenger aircraft, which has no direct link with cargo revenues.

5.6.17. In this update, Heathrow has proposed the following investments in Cargo as part of its capital plan (further details are available within Chapter 4 Capital Expenditure):

- Cargo Redevelopment Enabling
- Airside Transshipment Centre
- Cargo Safety and Efficiency Improvements, to include Truck Call Forward Facility

5.7. RAIL YIELD OVERLAYS

	RBP Update 1	RBP Update 2	CEPA
Covid / Indexing Impact on HEx Yield	[X]	[X]	0%
Crossrail Impact on HEx Yield	[X]	[X]	13%
TAC Revenues (%)	[X]	[X]	20%

5.7.1. Considering CEPA comments we have refined our approach to the rail overlays we proposed in the original RBP (and did not alter in RBP Update 1):

- Our previous modelling approach accounted for overlays applying to Track Access Charges (TAC) but did not do so transparently and did not account for TAC revenues increasing over H7 as more Crossrail trains entered service. We now account for this: splitting out the impact of Track Access Charges we now show the original forecast for Crossrail impacts on HEx yields of [X]%.
 While we accept a flat [X] overlay throughout H7 is not needed, an adjustment needs to be made to account for 2021 prices being nominally flat relative to 2019, therefore an overlay equal to two years of RPI is needed [X]%.
 We agree with CEPA that rail overlays should apply to non-Track Access Charge revenue only. Indeed, our previous modelling approach baked in this estimate already.

5.7.2. We recognise the need to transparently demonstrate the rail overlays absent of adjusting for non-TAC revenues, and therefore unpack these assumptions (see

below). We also recognise the need to acknowledge that – given the introduction of Crossrail from 2022 – TAC revenues (and the proportion of rail revenues they represent) will change over H7 and these need to be considered annually when calculating the overlay.

- 5.7.3. Track access revenue in 2019 was £7m from 2 TfL trains per hour. This represented 5.03% of Heathrow Rail Revenue (£139m). We forecast the following growth in TfL trains per hour and estimate proportionately the same revenue.

Table 37: Track Access Charge forecast, 2022-2026

	2022	2023	2024	2025	2026
TfL tph	2	4	6	6	6
£m TAC (2018p)	7.01	14.01	21.02	21.02	21.02

- 5.7.4. We recognise that our previous proposal for a flat [$\%$] impact on HEx yields due to Covid-19 is not sufficiently substantiated. However, there is a need to consider the impact of flat prices: our models use 2019 as a base year, HEx prices have been flat in nominal terms, and therefore lower in real terms. This leads to a flat [$\%$] overlay applied throughout H7.

Table 38: Flat Fares Overlay

	2022	2023	2024	2025	2026
Indexing Flat Fares 19 – 22	[$\%$]	[$\%$]	[$\%$]	[$\%$]	[$\%$]
Outcome (constrained to non-TAC)	[$\%$]	[$\%$]	[$\%$]	[$\%$]	[$\%$]

- 5.7.5. CEPA make an error of interpretation in believing our assumption for the yield impact of Crossrail to have shifted from [$\%$] to [$\%$]. Our forecast commercial response to Crossrail introduction remains as per our iH7 proposals: to maximise revenues, HEx should maintain a price premium to Crossrail – the incremental volumes from price matching do not compensate for the reduced revenue per passenger. If Crossrail charge £12, the optimal HEx price is likely to be £[$\%$] – an [$\%$] drop in fares relative to the current fare. We therefore continue to assume an [$\%$] impact on yields.

- 5.7.6. At RBP Update 1 we made a reduction of [$\%$] to overall revenue to reflect the impact of a [$\%$] covid impact and an [$\%$] price impact on the non-TAC proportion of the revenue. This was implemented as an additional adjustment of [$\%$] to the [$\%$] covid impact, but the overall impact was based on an [$\%$] reduction. Given the forecast changes in non-TAC revenues highlighted above, we have refined our overlay to the below:

Table 39: Crossrail Impact Overlay

	2022	2023	2024	2025	2026
Crossrail Impact to HEx Yields	-	[$\%$]	[$\%$]	[$\%$]	[$\%$]
Constrained for non-TAC only	[$\%$]	[$\%$]	[$\%$]	[$\%$]	[$\%$]

- 5.7.7. Blending the same Crossrail assumption with more accurate TAC and indexing suggests the below overlay for rail revenues in H7:

Table 40: Total Rail Yields Overlay

	2022	2023	2024	2025	2026
Rail Revenue Overlay	[<]	[<]	[<]	[<]	[<]

- 5.7.8. We consider that the impact of Crossrail entry on HEx could potentially be much greater than assessed here if more passengers choose Crossrail than we have forecast. Consequently, there are significant downside risks to HEx revenue above and beyond the adjustments set out above.
- 5.7.9. We note that the modelling to suggest an £[<] fare for Heathrow Express assumed that Crossrail would charge £12. We now know the fare will be £11.10 (peak) or £10.40 (off-peak) from Paddington to Heathrow. Furthermore, TfL proposes that passengers using Crossrail and other TfL services will be subject to a fare cap of £13.50 a day.
- 5.7.10. The difference between HEx and Crossrail fares for door-to-door public transport journeys from TfL stations is therefore likely to be significantly higher than the £6 previously assumed.

Table 41: Heathrow Express vs Crossrail fares comparison

	LUL + Crossrail Fare	LUL + HEx Fare	Difference
Wimbledon → LHR	£13	[<]	[<]
Archway → L:HR	£13	[<]	[<]
Enfield Town → LHR	£13	[<]	[<]

- 5.7.11. We also note the significant downside risks to Heathrow Express revenue from any future review of track access, which could change the terms by which HEx has access to Heathrow. Combined with the greater than expected yield impact, the proposed overlay is already very stretching.

5.8. MODE SHARE OVERLAYS

		RBP Update 1	RBP Update 2	CEPA
Crossrail Opening		Jan 2023	VOL: Jun 2022 YLD: Jan 2023	Jan 2024
Parking ATV Overlay	2022	[X]	[X]	0%
	2023	[X]	[X]	0%
	2024	[X]	[X]	0%
	2025	[X]	[X]	0%
	2026	[X]	[X]	0%
HEX Mode Share	2022	[X]	[X]	6.90%
	2023	[X]	[X]	7.00%
	2024	[X]	[X]	7.00%
	2025	[X]	[X]	7.10%
	2026	[X]	[X]	7.10%
P&F Mode Share	2022	[X]	[X]	9.20%
	2023	[X]	[X]	8.20%
	2024	[X]	[X]	7.20%
	2025	[X]	[X]	7.30%
	2026	[X]	[X]	7.30%

5.8.1. We propose several minor changes to CEPA modelling on mode share:

- The Crossrail opening data should be aligned to TfL assumptions for opening date (by end H1 2022).
- Passenger behaviour with regards to car parking will continue into H7 but slowly unwind, which we have captured through a new, positive ATV overlay.
- Mode share assumptions should be linked to our latest profiler data and recover in-line with recovery in passenger volumes.

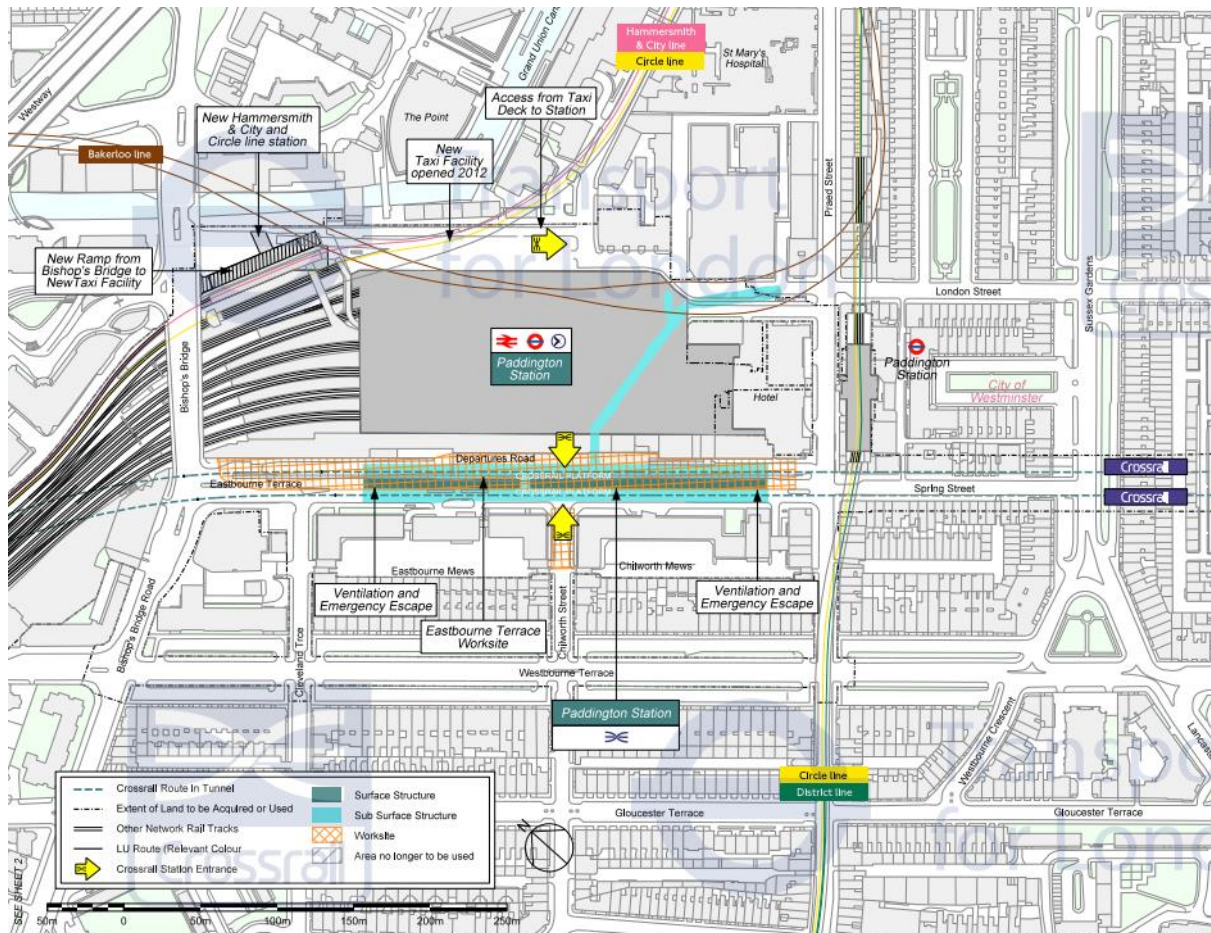
a) **Crossrail will impact Heathrow Express at the moment it enters the market (when it sells through tickets)**

5.8.2. CEPA assume that Crossrail will not have a yield or volume impact to Heathrow Express until the point full services are operational and through trains run through the tunnel from central London – with no need to change at Paddington. This is implied, and therefore unsubstantiated. It is also illogical: Heathrow Express will lose share to Crossrail once Crossrail begin selling through tickets (which TfL forecast will be in H1 2022). At that point passengers will not arrive at Paddington with the equal choice

between Heathrow Express and TfL Rail, as they do today, but already have a ticket and will be directed to continue their journey using Crossrail trains.

- 5.8.3. This is reinforced by the layout of Paddington Station, where passenger flows from London Underground avoid the station concourse and therefore bypass Heathrow Express platforms, signage and ticket machines.

Figure 18: Paddington Station and Crossrail



- 5.8.4. It is therefore reasonable to assume volume impacts from H2 2022, and that we will need to respond with lower fares by Q1 2023 if not earlier. To assume that there will be no impact for the first 18 months of Crossrail selling through tickets, as CEPA do, is illogical and unsubstantiated.

b) ATV for Car Parking and Car Hire will remain positive in 2022 and 2023

- 5.8.5. In the previous update, while real world data was scarce, we had assumed that average transaction values for car parking and car hire would be lower because of fewer business passengers using the airport. Now that we have access to actual data for a length of time, average transaction values have in fact been higher than pre-pandemic. Passengers have been parking their cars in short stay for longer periods than before at higher yields.

- 5.8.6. Heathrow’s car rental facilities have also become a hub for residents wanting to hire cars as rental companies consolidated their operations in the local area. This is

further compounded by Heathrow having minimum guarantees in place which has shielded revenues from lower volumes.

- 5.8.7. In 2021 we have seen our average transaction value at approximately [X]% higher than 2019 levels. As passenger demand recovers and lower yielding, long stay car parks are used more, we anticipate the average transaction value overlay to return to zero. A similar unwinding effect for car hire is also anticipated as rental companies reopen in surrounding areas.

Table 42: Proposed Parking ATV overlay

	2022	2023	2024	2025	2026
ATV Overlay	[X]	[X]	0%	0%	0%

c) Mode share assumptions are linked to latest profiler data and recover in line with passenger demand

- 5.8.8. CEPA modelling makes some noble attempts at forecasting mode share changes. While a respectful attempt, it is unlikely to prove more accurate than our own modelling, which has a starting point calibrated on current passenger profiler data.
- 5.8.9. We have also reprofiled the recovery of mode share so that recovery is consistent with the forecast recovery in passenger numbers. This is more logical and consistent than previous assumptions that all Covid-19 impacts to mode share will have been eliminated by 2024.

Table 43: Heathrow H7 Mode Share Forecast

	2022	2023	2024	2025	2026
Park & Fly	[X]	[X]	[X]	[X]	[X]
Kiss & Fly	[X]	[X]	[X]	[X]	[X]
Taxi	[X]	[X]	[X]	[X]	[X]
Bus/Coach	[X]	[X]	[X]	[X]	[X]
Tube	[X]	[X]	[X]	[X]	[X]
Car Rental	[X]	[X]	[X]	[X]	[X]
Heathrow Express	[X]	[X]	[X]	[X]	[X]
Heathrow Connect	[X]	-	-	-	-
Elizabeth Line	[X]	[X]	[X]	[X]	[X]
Other	[X]	[X]	[X]	[X]	[X]
Rail- Air	[X]	[X]	[X]	[X]	[X]
Charter Coach	[X]	[X]	[X]	[X]	[X]

5.9. ROAD USER CHARGING

	RBP Update 1	RBP Update 2	CEPA
Revenue	[X]	[X]	Full Charge
Opex	[X]	[X]	~12% of Full Charge
Passengers per Vehicle (PPV)	[X]	[X]	1.5
Movements Captured	Arriving and Departing	Departing Only	Arriving and Departing

5.9.1. CEPA have made several errors of fact and unsubstantiated judgements. In addition, we have both made errors in modelling that have led to overestimations in revenues, which we correct for in this updated.

5.9.2. We nominate four changes to the CEPA approach in Initial Proposals:

- CEPA have made an error of fact with regards to not accounting for the charge net of VAT. This needs to be corrected.
- CEPA estimates for opex are unsubstantiated, with no evidence for how they have engaged with our estimate of [X]%.
[X]%
- CEPA assume 1.5 passengers per vehicle based on a 2014 Jacobs report. It would be an error of process to consider this old evidence above the evidence we provide below, including from the CAA's own passenger surveys.

5.9.3. In addition, we made a modelling error in previous business plans, which is repeated by CEPA in their forecasts. Our previous estimates for revenue mistakenly assume vehicles associated with both arriving and departing passengers would be subject to a charge. In fact, it is only departing vehicles that are charged, and all modelling to date – Heathrow or CEPA – has overestimated revenues by a factor of two.

a) **Our Passenger Per Vehicle modelling assumptions are evidenced and robust**

5.9.4. We note that the CAA passenger surveys for 2017, 2018 and 2019 of all passenger car movements that do not include use of Heathrow parking.

Table 44: Passengers per vehicle, 2017 – 2019, CAA passenger surveys

	January – December 2017	January – December 2018	January – December 2019	Average
Travelling party size of passengers dropped off by Taxi/Minicab/Uber/Chauffeur or Private Car driven Away	[X]	[X]	[X]	[X]

- 5.9.5. This is further validated by a forecast study undertaken in 2016 to understand the difference in occupancy between private hire and private car drop off:

Table 45: Passengers per vehicle, 2016, Survey

	Private Car Drop-off	Taxi/Minicab Drop-off	Weighted average for Private Car and Taxi/Minicab combined
Average number of passengers dropped off	[REDACTED]	[REDACTED]	[REDACTED]

- 5.9.6. Moreover, emerging data from the first weeks of operation of Terminal Drop Off Charge (TDOC) confirm an average occupancy of 1.64. This is in a period (November) where we have fewer leisure travellers and more (single occupancy) business travellers.
- 5.9.7. We therefore remain comfortable using the [REDACTED] passengers per vehicle assumption and do not believe CEPA use of an older report (2014) that has been invalidated by 7 years of additional evidence and modelling undertaken since that have used the [REDACTED] passengers per vehicle assumption.

b) We have corrected our modelling approach

- 5.9.8. Previous models assumed that all vehicles associated with both departing and arriving passengers were liable for a charge.
- 5.9.9. This is not the case: the TDOC is levied against vehicles depositing departing passengers only. Vehicles associated with arriving passengers use the Meet & Greet car parking products, whose revenue is already accounted for in the revenue forecast.
- 5.9.10. This means the passenger base for the charges is half of that previously modelled, and as a consequence the total revenue assumption for TDOC falls by a factor of two.

Table 46: TDOC Revenues (HAL Mid-Case, 2018p)

	Update 1 - TDOC Revenues	Update 2 – TDOC Revenues
2022	[REDACTED]	[REDACTED]
2023	[REDACTED]	[REDACTED]
2024	[REDACTED]	[REDACTED]
2025	[REDACTED]	[REDACTED]
2026	[REDACTED]	[REDACTED]
Total	[REDACTED]	[REDACTED]

5.10. PROPERTY

	RBP Update 1	RBP Update 2	CEPA
Property Elasticity	[X]	[X]	0.25 Alternative Calc.

- 5.10.1. We have updated to reflect an airline agreement that fixes rents well into H7, with an adjustment made in until T4 reopens halfway through 2022³⁹.
- 5.10.2. Since 1996 Heathrow has had a list of published Guide Prices for most standard property products. These prices have been adjusted by the percentage change in a rental formula applied annually to the Guide Prices.
- 5.10.3. The components of the rental formula are passenger numbers, retail price index and the Investment Property Databank (IPD) Annual Property Index – the average of Central, Outer and West of London Office indices. The formula gives equal weighting to each component and seeks to provide consistent growth, flattening the peaks and troughs associated with the external property market.
- 5.10.4. Considering the Covid-19 impacts to passenger demand and uncertainty caused in the property market, a consultation was launched in February 2021 by Heathrow on its proposals to adjust Guide Price implementation. The consultation concluded in April with Heathrow publishing its decision in May 2021.
- 5.10.5. Heathrow decided to retain Guide Price Rents at 2019/20 levels effective from 1 April 2020 and would not implement the formula generated increase in Guide Prices initially proposed for 2020/21.
- 5.10.6. Heathrow also decided to hold Guide Price Rents at 2019/20 levels banking an anticipated formulaic reduction caused largely by the Covid-19 pandemic effect on passenger numbers at the Airport until such a time as the formula produces a net increase based on the cumulative level of guide prices (off a 2001 base) above these rates.
- 5.10.7. Therefore, in RBP Update 2 we have decided to move away from a drivers based elasticity approach and now only apply an overlay to capture expected property revenue loss due to the closure of T4. This is demonstrably more accurate than either our RBP Update 1 or CEPA elasticities, which attempts to link sticky property prices with volatile passenger volumes. We have assumed, based on our demand forecast, that property yields will remain flat through H7.

³⁹ At the time of writing no final and formal decision has been made to bring forward the opening of T4 as a normal passenger terminal. It is currently only for red list arrivals and as such does not have a full complement of commercial opportunities available to it.

5.11. SERVICE REVENUES

	RBP Update 1	RBP Update 2	CEPA
Other Rev Elasticity	[X]	[X]	0.80

5.11.1. CEPA propose an elasticity of 0.8 on basis they believe that advertising and fuel revenue are included in this revenue stream and these are not sensitive to passenger numbers.

5.11.2. This is an error of fact:

- Fuel revenues sit under property
- Advertising revenues sit under retail

5.11.3. However, on review, Service Revenues includes Telecoms contracts, some of which are not sensitive to passenger numbers. It is therefore appropriate to revise the elasticity to [X].

5.12. MODELLING ALIGNMENT

	RBP Update 1	RBP Update 2	CEPA
Adjustment to 2022 forecast	None	[X]	None

5.12.1. The Heathrow RBP model is a top-down model that, from a base year, uses:

- benchmarked and externally validated elasticities to peg revenue lines to changes in passenger volumes (“multiplicative adjustments”).
- overlays that account for material changes in circumstance (e.g. changes to VAT policy) that are evidenced and demonstrated to be additional and proportionate (“additive adjustments”).

5.12.2. This approach is appropriate for forecasting revenues over a five-year regulatory period.

5.12.3. However, given the timing of this response and associated RBP Update 2, it is appropriate to align the outcome of this model with the more detailed bottom-up forecast that informs our annual Management Business Plan (MBP).

5.12.4. The 2022 MBP is an internal business view of Heathrow performance in the year ahead considering the passenger forecast and other known factors. As such it is more accurate than the RBP model for 2022, and ensures there is a single consistent position as to Heathrow’s revenue (and operating cost) position for next year.

5.12.5. We therefore include a one-off adjustment of [X] to our RBP model to align it with the MBP. This is a [X]% adjustment, demonstrating how accurate our model is relative to our bottom-up, one-year forecast.

5.12.6. For the avoidance of doubt:

- There is no MBP for 2023 onwards as it is the product of in-year, bottom-up, internal forecasting.
- This is different, and additional to, the overlays that include a bridge from 2019 (the base year of the model) and 2021 where there are significant and quantifiable differences in performance (e.g. flat fares for Heathrow Express) – these are considered in earlier sections.

6 The H7 Regulatory Asset Base and request for a RAB Adjustment

6.1 Introduction

6.1.1 Heathrow asked the CAA to adjust the Regulatory Asset Base (RAB) to reflect the impact of the clearly exceptional circumstances of the Covid-19 pandemic. The CAA carried out a process to review the request and finalised its work in CAP2140 in April 2021. In this document, the CAA rightly concluded that the impact of Covid-19 was exceptional and that an adjustment was required.

6.1.2 The CAA concluded that an adjustment of £300m would be appropriate as an interim step, with the prospect of an increase to that amount at a later point, saying this in its decision of April 2021:

“We have...decided that an early RAB adjustment of £300 million is proportionate. We consider that an intervention of this scale is more appropriate than HAL’s proposed RAB adjustment ahead of H7 which, in its latest response, was around £800 million in 2021 and a commitment for a total adjustment of around £2.6 billion (in 2018 prices).

For the H7 price review, we will consider further the issues raised by HAL and stakeholders relating to the case for any further intervention in relation to HAL’s revenue losses in 2020 and 2021.”¹

6.1.3 In the consultation² the CAA sets out its view that the £300m initial adjustment is sufficient to ensure that the interests of consumers would be protected.

6.1.4 It is our position that:

- The CAA consultation was correct to decide that a RAB adjustment is an appropriate measure to deal with the unprecedented shock of Covid-19³; and
- The consultation is wrong to conclude that £300m is a sufficient final level for that adjustment.

6.1.5 The CAA’s Initial Proposals do not substantiate the view that £300m is the appropriate adjustment in any level of detail. As explained further in this section of our response, we do not agree with it for the following reasons:

- The CAA’s acknowledged flexibility to intervene in exceptional circumstances is a key mitigant to risk, particularly in the context of the asymmetric downside risk that is characteristic of airports. The CAA created a legitimate expectation that it would intervene in such circumstances with the same evidential rigour as a formally re-opened price control.

¹ Paragraphs 27 and 4.26, CAA Publication CAP 2140: Economic regulation of Heathrow Airport Limited: response to its request for a covid-19 related RAB adjustment

² Chapter 6

³ And in its decision that the minimum appropriate value for that adjustment is £300m; Heathrow expects that both of these points will be affirmed in the CAA’s decision on the holding cap for 2022

- It is commonly accepted that the Covid-19 pandemic has given rise to exceptional circumstances.
- If the CAA now fails to act on that flexibility in a well-evidenced manner, it blunts the ‘flexible’ regime’s risk mitigation properties and risks creating the long-term perception among investors of an unpredictable regulatory regime. As explained in Section 6.4 below, investors will reasonably infer from a failure to intervene at the appropriate scale that the reopener mechanism is not an effective way to deal with risks that cannot be computed when the price control is set.
- By applying inconsistent risk-sharing frameworks to H7 and the Q6 intervention, the CAA risks signalling to investors that it cannot credibly commit to intervene in exceptional circumstances in a consistently evidence-led manner. As explained in Section 6.5 investors will reasonably infer that even where the reopener mechanism is used to deal with large asymmetric downside risks, they cannot rely on an evidence-led approach to its implementation.
- In the long-term, this uncertainty will hurt consumers because it will increase the rate of return investors demand to be compensated for the risks created by the regulatory framework. This is acknowledged by KPMG who note that losses in 2020 and 2021 are not ‘sunk costs’ but in fact embody important considerations for equity investors as if they are not remunerated a) investors may expect future losses to go unremunerated and b) investor confidence in regulatory support for the RAB may be undermined.⁴
- It is incumbent on the CAA to explain its methodology for establishing the value of the RAB adjustment in full. It is not enough for it to merely test £300m against a narrow set of specific measures.⁵
- By any appropriate methodology, the £300m final value proposed by the CAA is significantly too low.

6.1.6 This risk of damaging regulatory certainty is particularly high given the weight the CAA placed on the regime’s flexibility in Q6:

- **Flexibility as an alternative to a specific reopener:** In the Q6 process, the CAA consulted on the possibility of including a specific reopener provision in Heathrow’s licence. Throughout the process, we requested that the CAA include a specific mechanism with clear guidance as to how and when the price control could be reopened. The CAA decided not to include a specific reopener mechanism, relying instead on what it claimed was an inherent flexibility within the price control. The CAA decided that this flexibility would allow it to review price control assumptions in exceptional circumstances where the outturn was significantly different from the forecast. In doing so, the CAA created legitimate expectations that the same degree of rigour would be applied to an intervention as to a formally re-opened price control.
- **Impact of flexibility on financeability:** This flexibility was construed as a key advantage of Heathrow’s regime and as improving Heathrow’s credit strength. British Airways also acknowledged that the ability to reopen the price control in

⁴ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Page 44

⁵ See Legal Annex, Section F for further detail

exceptional circumstances was a positive element of Heathrow's regime, helping to reduce the required WACC⁶.

- 6.1.7 Further, we also presented well-evidenced arguments during Q6 to show Heathrow was particularly exposed to downside asymmetric risk compared to other regulated sectors. Despite these arguments, the CAA concluded that Heathrow was not exposed to asymmetric downside risk but retained the possibility of revisiting matters should this turn out to be wrong. Covid-19 has shown that this was wrong because the downside risk Heathrow explained has materialised, but the CAA has not met legitimate expectations in the reassessment. Investors reasonably expect to be compensated for this impact given the commitments made by CAA and the evident mispricing of Q6 risk, particularly in the context of the precedent set in other industries that the RAB is recoverable. A radical, unsubstantiated, departure from precedent inevitably affects financeability and long-term consumer benefit.
- 6.1.8 We demonstrate below that the CAA's £300m adjustment is:
- Not enough to secure financeability;
 - Inconsistent with the adjustment that would result from treating the Q6 covid shock under the CAA's H7 risk sharing proposals, which it considers to be in the best interests of consumers; and
 - Not enough to ensure investors are remunerated for the efficiently incurred investment they undertook while not being compensated for asymmetric downside risk during the Q6 regime.
- 6.1.9 We have carried out work to quantify the level of adjustment required under these circumstances, with all potential adjustments being higher than £300m. The details of the calculation methodologies used are set out in the sections below.

Table 1: Heathrow quantification of appropriate iH7 RAB adjustment

	Adjustment value (£bn, 2018p)
Depreciation	£2.5
Risk allocation implied by Q6 settlement	£2.8
Equity financeability adjustment	£2.8
Debt financeability adjustment	£2.6
Cumulative risk premium	£2.6 - £5.6
CAA risk sharing	£2.2
Heathrow risk sharing	£2.5

⁶ Equity Betas for Heathrow and Gatwick in the Q6 Price Control Review: Note Prepared for British Airways by CEPA, June 2013, page 2

- 6.1.10 Our H7 plan uses the £2.5bn value derived from the application of our recalibrated TRS mechanism.
- 6.1.11 Ahead of its Final Proposals, the CAA should review its position in light of our modelling and correct its proposed £300m adjustment. In particular, the substantial deviation of the CAA's TRS-implied RAB adjustment (applied to iH7) from the CAA's £300m intervention suggests that the CAA has committed a factual error in its analysis and/or a procedural error by failing to apply the same level of evidential rigour in the iH7 intervention as it proposes to do in H7.
- 6.1.12 Failure to engage properly with these investor concerns in a well-evidenced manner creates long-term uncertainty that ultimately acts against consumer interests.
- 6.2 The CAA's Q6 decision set a legitimate expectation that the CAA would intervene to respond to exceptional circumstances with the same degree of evidential rigour as a formally reopened price control.**
- 6.2.1 Throughout the Q6 review, the CAA's documents were clear that the flexible, licence-based regime that applied to Heathrow included the ability to revisit the price control if (i) outturn assumptions differed significantly from the forecast; or (ii) exceptional circumstances materialised.
- 6.2.2 We requested that the CAA include a specific trigger point for when the price control could be reopened as it would be impossible to imagine a scenario where all parties would agree to lifting prices without a specified trigger point as is seen in other sectors. However, the CAA maintained that its flexible licence-based regime already included the necessary means of intervening mid-period.
- 6.2.3 In the process of setting the Q6 licence, we also argued that the risk around our return was asymmetric and that there was a much greater range of potential downside returns compared to upside returns. We argued that this led to co-skewness in returns and that investors would seek a premium to bear this additional risk. In its determination, the CAA concluded that it would not include an additional allowance for the co-skewness of equity returns and that the standard CAPM, which assumed a symmetrical, normal distribution of risk was appropriate.
- 6.2.4 The CAA's Q6 decision did not act on our points regarding the need for a clear reopener mechanism or the asymmetry of returns. Instead, the decision continued to argue that the inherent flexibility of the licence-based framework allowed for a price control reopening and that Heathrow faced limited downside risk:
- In the CAA's Notice Granting the Licence it set out the following "*HAL may request that its price control be reopened at any time. The CAA would consider such a request in the light of its statutory duties under the circumstances prevailing at the time.*"⁷ It also noted that the Airline Community had agreed that reopening should take place in light of extreme circumstances.⁸
 - The CAA also noted in its Notice Granting the Licence that this ability to revisit the price control if key assumptions were significantly worse than forecast was

⁷ CAA, CAP1151, Page 167, Paragraph A2

⁸ "*The Heathrow Airline Community continues to believe that any reopening of the price cap should only be in extreme circumstances. Note that the CAA is not proposing to include a price cap re-opening provision but that stakeholders can request the CAA use its section 22 modification powers*" CAA, CAP1151, Page 67, Paragraph 2.167

credit positive for Heathrow: *“The CAA’s proposed licence did not propose fundamental changes to the form of regulation for HAL and hence is not expected to weaken HAL’s credit strength. However, the ability of a licensing regime to revisit the price control if key assumptions, such as traffic, are significantly worse than the forecast, could be a credit strength.”*⁹

- The CAA concluded that, taking evidence from the impact of shocks such as the Global Financial Crisis, Heathrow only experienced a *“limited effect of downside risks.”*¹⁰
- The CAA also concluded that Heathrow experienced lower risk than other airports: *“The CAA set out various beta estimates for comparative airports... The CAA considered that its final proposals set out the reasons why it was appropriate to conclude that HAL was lower risk than Fraport and AdP - Heathrow had strong demand and was operating closer to capacity.”*¹¹

6.2.5 The strengths of this flexibility in protecting Heathrow from downside risk were also acknowledged by British Airways in its submission regarding the asset beta: *“Through the licences and the regulatory regime set out in the Initial Proposals, one key aspect in which systematic risks are further reduced is through the ability of the CAA to revisit the price control should the assumptions made in the final determination be found to be inappropriate. The current regulatory setting meant that a fixed allowance for the quinquennium left airports with a high degree of volume risk. This is the key risk faced by airports and the option for the CAA to revisit their assumptions removes a significant element of this risk.”*¹²

6.2.6 Taken together, (i) the CAA’s indication that its intervention was a suitable substitute for a specified price control re-opener; and (ii) the self-evident asymmetric downside risk (which the CAA did not adjust for in Q6), created a legitimate expectation from investors that the CAA would intervene in exceptional circumstances and that this intervention would follow a similarly high evidential standard to a formal re-opening of the price control.

6.3 It is commonly accepted that the impact of Covid-19 is exceptional. The CAA was right to intervene. The scale of the intervention, however, was an error

6.3.1 In July 2020 we requested that the CAA recognise the exceptional circumstances brought about through Covid-19 by making an adjustment to the RAB. We requested an adjustment of £1.7bn to reflect recovery of 92% of projected revenue losses beyond a threshold of 8%. Our following submission updated our requested RAB to reflect:

- A suggested a change to the sharing rate, moving from 92% to 86% to better reflect the observed relationship between costs and revenues, and

⁹ CAA, CAP1151, paragraph I29

¹⁰ *“All other risks being equal, the CAA considers that airport operator betas should be higher than those of revenue capped regulated companies, which face little or no volume risk. The CAA also considered that HAL and GAL’s resilient performance in economic downturn during Q5 demonstrated the limited effect of downside risks”* (CAP1140, paragraph 6.28)

¹¹ CAA, CAP1151, Paragraph 6.24

¹² Equity Betas for Heathrow and Gatwick in the Q6 Price Control Review: Note Prepared for British Airways by CEPA, June 2013, page 2

- A worsening traffic outlook for 2021.

This change led to an increased required adjustment of £2.6bn.

- 6.3.2 The CAA acknowledged that the circumstances surrounding Covid-19 were exceptional: *“The circumstances created by the impact of the covid-19 pandemic are unprecedented and have raised several difficult issues for the H7 price control review. These include issues in relation to the management of future risks, affordability and financeability.”*¹³
- 6.3.3 The CAA was also clear in its CAP2098 consultation that the risk allocation used in Q6 did not consider the outturn of an extreme downside risk such as that caused by Covid-19, clearly showing that the Q6 framework underestimated and mispriced the risk to which Heathrow was exposed: *“focus on the approach to risk allocation that was used to set the Q6 price control appears to give relatively little weight to the genuinely exceptional circumstances created by the covid-19 pandemic and the wide-ranging impacts associated with the present very difficult circumstances.”*¹⁴
- 6.3.4 Even responses from the Airline Community agree that the impacts of Covid-19 have been exceptional and have shown that the recognition of potential downside risk and its allocation in Q6 was wrong: *“It is clear that Covid-19 has raised issues over the allocation of future volume risk and that the price control could benefit from a risk-sharing mechanism.”*¹⁵
- 6.3.5 The CAA thus chose to take action in the form of a RAB-based intervention, which it noted was required due to the impacts of Covid-19: *“We consider that an early regulatory intervention, in the form of a RAB adjustment, ahead of the H7 price review (in line with Package 2) is the best way to further in the interests of consumers in response to the impact of the covid-19 pandemic having regard to our secondary duties”*¹⁶. We support the CAA’s decision that intervention is appropriate and believe that this was aligned with the statements made in the Q6 price control review.
- 6.3.6 However, the CAA’s intervention is not in line with the legitimate expectations set out through the Q6 review. The CAA determined that a £300m addition to the RAB was appropriate. To put this in perspective, the adjustment represents less than 2% of HAL’s RAB, equivalent to a one-off adjustment of 4.4% to RoRE (based on a 60% notional gearing assumption). This compares with a cumulative actual RoRE impact to 30 September 2021, calculated on the same basis, of about 50%. It implies that substantially all the risk of extreme circumstances arising in Q6 rested with HAL and its investors, not customers.¹⁷
- 6.3.7 The mismatch between the scale of the intervention and Heathrow’s risk burden has not been substantiated. It fails to reflect either the mispricing of risk at Q6 in light of new information or the CAA’s commitment to reopen in order to maintain credit strength set out in the Q6 decision documents.

¹³ CAA, CAP2140, Page 27, Paragraph 3.11

¹⁴ CAA, CAP2098, Page 10, Paragraph 15

¹⁵ British Airways response to CAP2098, Page 5, Paragraph 1.7

¹⁶ CAA, CAP2140, Page 11, Paragraph 24

¹⁷ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Section 2.3, Page 16

6.3.8 The following sections explain why the scale of intervention (i) does not secure financeability; (ii) is not in consumers' long-term interests; and (iii) contrary to precedent, does not ensure that investors are appropriately remunerated.

6.4 An adjustment of £300m does not secure financeability and therefore fails to discharge the CAA's statutory duty

6.4.1 The Initial Proposals set out that a further RAB adjustment is not required to secure either debt or equity financeability. As set out above, we disagree with this assessment. We have commissioned KPMG to review the level of adjustment that would be necessary to secure both debt and equity financeability.

6.4.2 Not all risk can be captured when a price control is set. New information about risk emerges throughout the price control period. When some of these risks that fall within the range of normal commercial risk crystallize, a RAB adjustment may not be needed because they may well be covered by existing shock adjustments. However, there is a separate question as to what should happen when the event does not reasonably fall within the characterisation of risk anticipated in the price control at the start of the relevant control period. Such an event would provide material new information about risk, risk that had existed during the control period but had not been anticipated in the specification of the price control.

6.4.3 In retrospect, this would be a deficiency in the price control and correcting that deficiency - particularly in light of the CAA's statements about reopening the Q6 price control - signals to investors that they can be confident the CAA would act similarly in future similar events to create the conditions for future financeability.

6.4.4 Indeed, investors operating in Q6 had such confidence. Had the CAA intended not to protect Heathrow from such losses, it would logically have provided another adjustment to account for this additional asymmetric risk (i.e. beyond that allowed for in the "shock factor" adjustment to its traffic forecasts), a principle it later recognised in CAP2265C. It did not do so in its Q6 determination. The reasonable inference for investors would have been that the potential of a reopener in extreme circumstances would intend to remedy this deficit, thus justifying not making an adjustment to the price control to reflect asymmetric risk.

6.4.5 As such, this deficiency must be remedied under the CAA's section 22 powers to ensure financeability in the short- and long-term.

6.4.6 In its analysis KPMG first carried out an exercise to understand whether intervention from the CAA would be necessary to ensure both debt and equity financeability following the onset of Covid-19. In line with the views set out above, KPMG concluded that intervention would be necessary for the following reasons:¹⁸

- The Q6 decision relied on Section 22 to take account of the risk of extreme downside event, with the CAA concluding that it *"therefore intends to rely on the modification mechanism in section 22 of the Act to make any necessary changes during the period covered by the price control."*¹⁹ Therefore, in light of Covid-19 a review under this provision should be carried out

¹⁸ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Section 3

¹⁹ CAA, CAP1103, October 2013, Paragraph 12.114

- The Q6 price control was not calibrated for pandemic size risks. KPMG notes that *“This meant that the overall risk allocation at Q6 was incomplete”*²⁰. The CAA made some adjustment for asymmetric traffic risk through the shock factor, however, as acknowledged by the CAA in its Initial Proposals, this did not account for pandemic magnitude events.²¹ Given this, it would be appropriate to recalibrate the price control based on the allowances that would have been set had it been appropriately calibrated.
- Maintaining investor confidence in regulatory decisions is central to the assessment of both debt and equity financeability. The absence of regulatory intervention would create a precedent that there would be no future intervention to mitigate pandemic-size losses and would increase the future cost of equity. Given this, an intervention would be in the interests of consumers.
- Without an ex-post intervention, investors are likely to require an ex-ante allowance going forwards. An ex-ante intervention would have to be larger than the expected costs of the risk to account for the risk that the size or frequency of the risk is underestimated.

6.4.7 KPMG concludes that, given the above, if the CAA fails to address the impact of Covid-19 it is likely that investors will not be willing to provide funding or will do so at a higher cost. To ensure future investment in the long-term interests of users, investors need to be able to earn their required return if they meet the targets set by the price control. Without this, regulatory conditions are not a ‘fair bet’.

6.4.8 After concluding that an adjustment is required, KMPG goes on to review what size of adjustment would be necessary. It uses four calculations:

- **Risk allocation implied by the Q6 settlement**²²: This method calculates an adjustment scaled to reflect the difference between the losses implicitly covered by Q6 price control conditions and the actual impact of Covid-19.

KPMG carries out a calculation to estimate the maximum implied traffic downside exposure in the Q6 framework using the CAA’s 1.2% passenger shock factor, its Q6 reference to the correlation between GDP and passenger volumes and a review against of the previous highest cumulative traffic loss of 9.5% following the 9/11 terrorist attack. It calculates that outturn EBITDA variance to forecast due to Covid-19 was £3.2bn compared to a £300m impact under a low case using the CAA’s Q6 assumptions.

KPMG, therefore, estimates a required adjustment of **£2.8bn** under this approach.

- **Cumulative risk premium**²³: This approach considers the uplift to the WACC for the Q6 price control that would be commensurate with taking on the risk of

²⁰ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Page 21

²¹ *“We do not agree with the airlines that HAL is compensated in full for bearing demand risks through the allowed return. The Capital Asset Pricing Model (“CAPM”) framework that we use when assessing the allowed return on equity assumes that the risks faced by investors are symmetrically distributed, but experience shows that risks around passenger numbers tend not to be equally balanced. This requires us to allow for asymmetric risks through a separate mechanism”* CAA, CAP2265C

²² KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Section 4.1

²³ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Section 4.2

a downside commensurate with the impact of Covid-19. This value is then extrapolated to previous price controls since privatisation to calculate the cumulative risk premium Heathrow would have received had it been consistently remunerated for Covid-19 magnitude events.

KPMG simulated expected returns for Heathrow under two scenarios, a 1 in 20 year chance of the risk occurring and a 1 in 50 year chance. The model uses the CAA's proposed H7 risk sharing mechanism to calibrate the traffic impact of a pandemic magnitude event in both scenarios. It used the outputs to generate a 'premium to break even' – the increase in WACC needed to break even – and a 'premium for systematic risk' – an adjusted equity beta based on the standard deviation of returns in the scenarios.

KPMG calculated that the cumulative risk premium is substantial in both scenarios, leading to an adjustment of between **£2.6bn and £5.6bn**.

- **Debt financeability adjustment²⁴**: This approach estimates the adjustment necessary to meet debt financeability targets under the notional financial structure using the CAA's H7 financeability models.

KPMG uses the target ratios for both BBB+ and BBB- credit ratings to estimate the scale of intervention necessary to ensure that Heathrow's notional structure reaches these credit ratings. It concludes that in 2020, 2021 and 2022, the notional company would not be able to reach target thresholds for a number of ratios.

KPMG concludes that an intervention of **£2.6bn** would be required to ensure that the notional company could achieve these ratios.

- **Equity financeability**: This approach assesses the intervention required to ensure that Heathrow is financeable from an equity perspective – meaning that Heathrow is able to access required equity at efficient cost for the notional company.

KPMG states that, under both the CAA's high and low charge scenarios, Heathrow cannot expect to earn its H7 cost of equity, even before taking account the negative returns due to Covid-19. This is because the regulatory allowance for the cost of equity is paid only on the depreciated RAB and therefore the portion of the equity lost during 2020 and 2021 remains unremunerated. This indicates that *Heathrow "would not represent a viable investment for equity capital"*²⁵.

KPMG concludes that an intervention of £1.7bn would restore the RAB to pre-Covid levels and so ensure Heathrow was financeable on the basis of RoRE and dividend yields. However, an additional intervention of £1.2bn would be required in addition to this to minimise the increase required in future returns to compensate investors for the expectation of future similar risks. This leads to a required equity financeability adjustment of **£2.8bn**.

6.4.9 KPMG's analysis therefore concludes that:

²⁴ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Section 4.3

²⁵ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Page 44

- An appropriate adjustment would be in the interests of consumers to ensure their long term interests are protected through future investment which can be efficiently funded.
- The CAA's proposed adjustment of £300m fails to properly compensate Heathrow for the financeability impact of Covid-19.

6.5 An adjustment of £300m is inconsistent with the adjustment that would result from treating the Q6 Covid shock under the CAA's H7 risk-sharing framework, which the CAA proposes would be in the best interests of consumers

- 6.5.1 For H7, the CAA has proposed new uncertainty mechanisms and a TRS mechanism to manage the future uncertainty and provide stakeholders with confidence in how future traffic risks would be treated. It considers this will be in the best interests of consumers and will increase investor confidence going forwards to mitigate increases to the H7 WACC. The CAA plans to implement its TRS mechanism through Heathrow's RAB.
- 6.5.2 The CAA has been led by the evidence in setting this mechanism for H7, a new price control. While we do not agree with every aspect of the CAA's proposed mechanism, we agree that risk sharing of this type is broadly correct.
- 6.5.3 In contrast, although the CAA created legitimate expectations that the flexibility of the regime in Q6 would be a suitable substitute for re-opening a price control, the £300m adjustment does not meet the same rigorous standards of evidence as the TRS mechanism in H7. Our analysis shows that, if applied to the Q6 Covid shock, the TRS mechanism would result in a RAB adjustment of £2.1 billion, significantly higher than the scale of the CAA's Q6 intervention.²⁶
- 6.5.4 As such, without a further Q6 RAB adjustment, the CAA would apply inconsistent risk-sharing frameworks between price controls despite in principle agreement that the economic conditions necessitating risk sharing in H7 are largely identical to those in Q6.
- 6.5.5 Discriminating between price controls in this way risks signalling to investors that the CAA's commitments to intervene cannot be considered credible. Therefore, investors will reasonably conclude that the CAA can discretionarily apply a lower evidential standard when it intervenes in exceptional circumstances and cannot guarantee a consistent approach to risk sharing in coming price controls.
- 6.5.6 The long-term effects of this uncertainty will ultimately be borne by consumers. Indeed, the benefits of any H7 TRS mechanism are also contingent on investors having confidence in its implementation in the case of a future shock. By not implementing an adjustment in line with Q6 policy, the CAA could undermine confidence in its ability to implement a future adjustment of the same scale. In contrast, other regimes have specified triggers that credibly commit to future intervention by accounting for Covid-19 losses. Schiphol, for example, has a mechanism that allows it to recover the losses incurred due to Covid-19 over a three-year period. Using this mechanism, it will be increasing charges by a total 37% over

²⁶ For H7, we have proposed some changes to the CAA's TRS mechanism to reflect the single till structure and the impact of commercial revenues on the charge. Adjusting for these changes, the required RAB adjustment for 2020 and 2021 would sit at £2.5bn.

the next three years. This predictable increase in charges is allowing Schiphol to continue to invest in key projects to ensure resilience and future airport capacity.²⁷

- 6.5.7 The inconsistency also raises an important question about the CAA's approach, if an adjustment to the RAB would be in the interests of consumers and investors in future traffic shocks such as Covid-19, why was the application of a TRS mechanism not in the interests of consumers to adjust for the impact of the shock caused by Covid-19? It is curious that just six months after its decision on the potential for intervention in the current price control where a small and unsubstantiated adjustment was made, the CAA now thinks that a codified mechanism which could result in a large adjustment for future shocks is in the interests of consumers.
- 6.5.8 This inconsistency is a breach of the principle in section 1(4) of the CAA 2012 that "*regulatory activities should be carried out in a way which is.... consistent.*"
- 6.5.9 We have calculated the scale of intervention which would be made if the CAA applied its proposed H7 risk sharing mechanism to iH7. This indicates an appropriate intervention of **£2.1bn**.
- 6.5.10 We have also calculated the appropriate adjustment under our recalibrated risk sharing mechanism, the details of which are set out in Section 1 of our response. This indicates that the appropriate adjustment would be **£2.5bn**. This £2.5bn adjustment is reflected in our RBP Update 2.

6.6 An adjustment of £300m does not ensure that investors are appropriately remunerated for the efficiently incurred expenditure Heathrow made

- 6.6.1 Regulatory depreciation – or “return of the RAB” has been fundamental to all UK RAB regulation for over 30 years. It is a fundamental plank of how investors have lent to and invested in UK companies like Heathrow. The impact of Covid-19 has meant that Heathrow's investors have not been able to recover their efficiently incurred expenditure through circumstances entirely outside of Heathrow's control.
- 6.6.2 The CAA's document sets out the view that the return of regulatory depreciation, although a fundamental plank of RAB-based regulation, is not fully guaranteed. It sets out that, as long as the forward-looking price control is set on the basis of a reasonable expectation of returns, no ex-post reassessment is required to correct for shocks. However, evidence from KPMG and Frontier Economics sets out that if investors do not have confidence in the long-term regulatory approach taken by the regulator and its support of the RAB investors would either not invest or would require higher returns to do so.
- 6.6.3 In its report, KPMG highlights the importance of the RAB in ensuring financeability:

The mechanism that generally underpins longer-term investor confidence in regulated firms is the RAB. The RAB is a regulatory concept that allows regulated entities to recover its investments in regulated assets. This improves investor confidence re the recoverability of their investment, even though regulatory interventions cap the returns available to investors on the upside (in HAL's case through a price cap).

²⁷ <https://www.schiphol.nl/en/route-development/page/ams-airport-charges-levies-slots-and-conditions/>

The concept of the recoverability of the RAB is underpinned by numerous MMC/CC/CMA decisions.²⁶ It has the unique ability to quasi-commit a regulator's successors.

The RAB is coupled with an expectation that the regulator will, for each price control period, provide allowances for a fair return on the RAB as well as a return of the RAB. That expectation is founded on the knowledge that any unfairly low allowance that may undermine investor confidence in investing in regulated businesses more widely and therefore increase the cost of financing to the detriment of consumers is appealable.²⁸

- 6.6.4 The importance of the RAB is also evidenced in the submission made by Frontier Economics. It sets out that allowing for the non-recovery of regulatory depreciation due to actions outside of the company's control is contrary to all regulatory precedent and is likely to have a material impact on investor risk perceptions:

"It is evident that the security of capex within the RAB is an implicit assumption shared across all sectors of regulation, and that it is precisely this assumption that allows the low financing costs that we have seen associated with the RAB model in the UK. To make adjustments to the RAB could jeopardise its predictability and stability, which would likely have knock-on effects for future financing costs"²⁹

- 6.6.5 Frontier Economics highlights that the non-recovery of depreciation due to Covid-19 without intervention from the CAA is effectively a 'write down' of Heathrow's RAB which has impacts for Heathrow's risk profile: *"non-recovery of depreciation has never been considered, either by investors or regulators in setting the allowable WACC for Heathrow. Consequently 'writing off' historic depreciation because the public health interventions mean there is no customer base from which to recover them in 2020 is functionally identical to writing down Heathrow's RAB."³⁰*

- 6.6.6 This point, and the ongoing implications of a write off of depreciation, is also acknowledged by KPMG in its assessment of an adjustment to ensure equity financeability:

"These results are driven by the fact that, under the H7 initial proposals, a regulatory allowance for the CoE is only paid on the depreciated RAB, even though equity investors have not received the return of RAB in 2020 and 2021. This lost depreciation equates to c.£1.4bn (nominal) in the 2020 and 2021 under both the high and low charge scenarios. This is after taking account of the benefit of the £300m RAB adjustment in April 2021.

These results indicate that HAL would not represent a viable investment for equity capital; the cost of both equity and debt financing would increase on a forward-looking basis, or there would be suboptimal investment decisions."³¹

- 6.6.7 Frontier's report also highlights the strong regulatory precedent around interventions to maintain the integrity of the RAB:

²⁸ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Page 23

²⁹ Frontier Economics, Heathrow Depreciation Recovery, March 2021, Page 5

³⁰ Frontier Economics, Heathrow Depreciation Recovery, March 2021, Page 2

³¹ KPMG, Recovery of COVID-related losses for Heathrow Airport Limited, December 2021, Page 44

- In the context of NERL, the CAA states that it: *“will allow all efficiently incurred capex spending [into the RAB] provided that it satisfies the governance proposals”*³²
- In water, Ofwat explicitly stated that it had: *“set regulated charges to be sufficient to allow the recovery of all capital invested”*³³
- In the case of Pheonix Gas, the Competition Commission rejected the attempt by UReg to reduce the RAB: *“In line with normal regulatory practice...to reduce ex post and without clear signalling the opening value of the RAB is a step that should not normally be taken without very good justification”*³⁴
- In its RIIO handbook, Ofgem states that it *“will commit to not making retrospective adjustments to the RAV so long as outputs are delivered”*³⁵

6.6.8 We have, therefore, also carried out analysis to understand the size of the required adjustment to reflect the recovery of the regulatory depreciation not recovered by Heathrow solely due to the impact of Covid-19. This calculation looks at the non-recovery of depreciation for the notional company by taking into account the impact of Covid-19 on FFO in 2020 and 2021. This leads to an adjustment of **£2.5bn**.

6.7 Conclusions

- 6.7.1 Given the above, we continue to believe that it is fully consistent with the CAA’s duties to implement a RAB adjustment. We also believe that the CAA’s proposed £300m adjustment is unsubstantiated and not fit for purpose. All objective measures of calculating an appropriate adjustment are materially higher than the CAA’s proposal.
- 6.7.2 The CAA took the right decision in principle that it was appropriate to intervene following the impact of Covid-19. This is in line with Heathrow’s framework, as set out by the CAA in Q6. However, the level of that intervention is insufficient and not in line with the size of adjustment which could reasonably be expected by Heathrow’s investors.
- 6.7.3 The CAA’s Q6 price control did not account for the asymmetric risk Heathrow was facing. This is evidenced by the CAA’s assessment that Heathrow’s beta should be lower than comparator airports due to its lower exposure to risk and its assessment that downside risk as limited. This led to a mispricing of the risk Heathrow was facing.
- 6.7.4 Heathrow relied on the CAA’s commitment that it could revisit the level of the price control in the event of exceptional circumstances and took it for granted that any such reassessment would be rigorous and evidence-based.
- 6.7.5 The impact of Covid-19 showed the reality of Heathrow’s risk exposure. The magnitude of this impact has been acknowledged by all parties and is of such a scale that the CAA is proposing fundamental changes to the H7 framework to account for it.

³² CAA, (2019), Reference to the CMA of NERL RP3 price controls: CAA response to NERL’s Statement of Case

³³ Ofwat, (2015), *Financeability and financing the asset base – a discussion paper* -

³⁴ Competition Commission, (2012), *Phoenix Natural Gas Limited price determination*

³⁵ Ofgem, (2010), *Handbook for implementing the RIIO model*

- 6.7.6 The CAA's proposed £300m adjustment is neither in line with the CAA's assessment of how a future shock of this magnitude should be handled nor in line with the adjustment needed to reflect that the Q6 price control was not financeable as set due to its fundamental mispricing of risk.
- 6.7.7 Our H7 plans therefore continue to include a full RAB adjustment of £2.5bn to ensure that investors' legitimate expectations of the risk they expected to bear are met and that consumer needs can continue to be met through a financeable H7 settlement.

7. WACC

7.1 Summary

- 7.1.1 The CAA set out its view of Heathrow's WACC for H7 in its Initial Proposals. It identified a range of between 3.6% and 5.6% (vanilla) based on an assessed cost of debt of between 1.72% to 1.73% and a cost of equity of between 6.6% and 11.8%.
- 7.1.2 In the Initial Proposals, the CAA did not set out the point in the range it intended to use for its final determination.
- 7.1.3 In its Initial Proposals, we consider that:
- the CAA has made a significant error in its assessment of Heathrow's cost of equity due to a flawed and erroneous approach to estimating asset beta; and
 - although it has made a reasonable estimate of Heathrow's cost of debt overall, its assessment contains errors and inappropriate approaches that should be addressed for the Final Proposals.

Errors in the Estimate of Asset Beta

- 7.1.4 The CAA's estimated range for the asset beta for Heathrow is 0.52 to 0.67.
- 7.1.5 The CMA estimated a range for airport asset beta of 0.52 to 0.62 in March 2020 in the NERL appeal. At the bottom end of its range therefore, the CAA's estimate assumes that there might be no impact of Covid-19 on investors' perception of risk at airports. Even at the top end of its range, the CAA estimates means that they must consider that the impact is likely to be small. At the mid-point of their range, the CAA estimate of the cost of equity is only 0.5% higher than the pre-Covid estimate by the CMA. Given the material impact of Covid-19 on Heathrow and other airports, such a small increase is not credible.
- 7.1.6 In addition, this view is inconstant with contemporaneous market data. The asset beta of AENA, the airport the CAA identify as closest in characteristic to Heathrow, was 0.95 at 30th November 2022 (based on daily data since March 2020). This would result in an increase of 7.4% in the cost of equity compared to the pre-Covid view. The CAA's estimate of an impact of only 0.5% is therefore materially below the level indicated by current market data.
- 7.1.7 The key reason for the incorrect CAA estimate of asset beta is that it used an approach to calculate the range that is flawed, inconsistent with market data, and not grounded in financial theory. In particular, the approach makes two erroneous assumptions in that for this approach to be accurate:
- The asset betas of airports must fall from current levels to the new lower level from the 1st January 2022. Market reaction to news reflects investors' expectations about the future. Therefore, recent estimates of asset beta also reflect market expectations of the future and should therefore be the starting point for estimating beta for H7. The CAA provides no evidence to support its assumption that current market expectations will change so dramatically in the next two weeks; such an assumption is unevicenced and extremely unlikely to occur; and

- There is a requirement that investors response to risk is linear. There is no evidence or financial theory that supports such a view, and indeed such a view is contrary to accepted views of investor behaviour that include risk aversion.

7.1.8 This means that the approach applied by the CAA is in error and should not be used.

7.1.9 In addition, the CAA has made an error in adjusting its asset beta range to account for the introduction of traffic risk sharing (TRS). This is an error because:

- The comparator airports from which the asset beta is being estimated all benefit from some form of risk sharing and therefore their observed asset betas already reflect any benefits from TRS;
- It is contrary to regulatory precedent. The CMA did not adjust the observed airport asset betas to apply to NERL even though NERL benefitted from TRS; and
- The magnitude of the adjustment is not consistent with previous CAA estimates of the correlation of Heathrow risk to market risk.

7.1.10 We set out each of these errors in more detail below.

Issues in the assessment of the cost of debt

7.1.11 Although the CAA's estimate of the cost of debt for Heathrow is close to that of Heathrow's, there are three areas where the CAA has made errors in its approach that should be corrected for the Final Proposals:

- Its approach to adjusting for inflation is incorrect;
- It has made errors in its assessment of the costs of Heathrow's foreign currency debt; it has ignored the cost of Heathrow's sterling bonds, and it has ignored the cost of Heathrow's class B bonds. These errors mean it has underestimated Heathrow's historic cost of debt relative to the iBoxx indices, and significantly underestimated its cost of new debt;
- It has underestimated the cost of liquidity facilities required by Heathrow.

7.1.12 In addition, the CAA needs to revise its approach to liquidity costs to reflect the high cash balances that Heathrow is likely to carry into 2022 and also into 2023. These high cash balances result in a significant cost of carry the CAA must take into account.

What the CAA must do

7.1.13 The CAA has not identified an appropriate point in the range for its point estimate of the cost of capital. A key issue with a decision about a point in the range is the extent to which the identified ranges are appropriate. In the Initial Proposals, the errors in analysis by the CAA mean that the whole of the range they have identified for asset beta at the Initial Proposals is below a credible lower limit. This demonstrates that the assessment of the appropriate point in the range needs to take into account the risk and uncertainty around each of the parameters in the WACC calculation. In this submission we propose an approach similar to that adopted by the CMA for Water companies that makes an adjustment to achieve the 75th centile in the range for the cost of equity arising from uncertainty about the level of TMR and asset beta. This

results in an uplift in the cost of equity of 0.5% that the CAA must reflect in their Final Proposals.

- 7.1.14 The CAA's estimate of asset beta needs to be increased to properly reflect contemporaneous market data and to be consistent with a wide range of evidence and financial theory. We set out below why we consider that a point estimate of 0.82 is appropriate. This estimate lies below the mid-point of the range of current market estimates of airport asset beta if Fraport, the comparator least like Heathrow is excluded. It also lies below that of Aena, the closest comparator to Heathrow.
- 7.1.15 The CAA must update its estimate of the cost of debt to properly take into account the additional cost of Heathrow's debt compared to the iBoxx, use the right treatment for inflation.
- 7.1.16 We have increased our estimate of liquidity costs in this submission to reflect the need to hold large cash balances in 2022 and 2023 that was not included (but was signalled) in our previous submissions. These large cash balances reflect the need to ensure adequate liquidity is in place until passenger numbers have recovered substantially and the ongoing risk from Covid-19 is reduced. The CAA must include an appropriate allowance for the issuance and liquidity costs actually faced by Heathrow.
- 7.1.17 Heathrow's point estimate of the appropriate WACC for H7 is set out in Table 1.

Table 1: Heathrow estimate of WACC for H7

	RBP Update 1	RBP Update 2
Gearing	60%	60%
Cost of Equity Post Tax	14.2%	14.1%
Cost of Equity Pre-Tax	18.6%	18.4%
Cost of Debt	1.57%	1.52%
Cost of Debt Including Issuance and Liquidity costs	1.75%	1.87%
Post-tax (Vanilla) WACC	6.75%	6.77%
Pre-tax WACC	8.5%	8.5%

Source: Heathrow

7.2 Cost of Equity

7.2.1 There are four parameters that impact on the estimate of the cost of equity for Heathrow:

- The Total Market Return (TMR);
- The Risk Free Rate;
- The debt beta; and
- The asset beta

7.2.2 The CAA has aligned its estimates of the TMR with those estimated by the CMA in the Water Company appeal. This is also the approach adopted by Heathrow and we consider it is appropriate.

7.2.3 The CAA has also adopted the approach of the CMA for its estimate of the risk-free rate, albeit it has updated the estimate to take account of data up to June 2021. This is also the approach adopted by Heathrow and we consider it is appropriate. In this update, we have adjusted the estimated risk-free rate to reflect movement in data up to the end of November 2021. This results in an estimated risk-free rate of -2.1% (RPI real).

7.2.4 The CAA has used a range for debt beta of 0.05 to 0.10. We consider that the bottom end of this range is appropriate. However, the CAA has provided no evidence to support the top end of this beta range and it is inconsistent with the approach taken by the CMA for NERL. In addition, the CAA has taken an inconsistent approach to debt beta by using a different value of debt beta to degear the observed equity beta to obtain the asset beta from the debt beta than used to regear back to the equity beta at the notional level of gearing. No other regulator has taken this approach, and the CAA has provided no quantitative evidence to support such an approach. More specifically, it has not provided evidence as to why the debt beta of Heathrow's class A debt is higher than the debt beta of the debt of comparator airports. In the absence of such evidence, it is an error for the CAA to use this approach. We consider that the CAA must adopt the same approach as the CMA for NERL and use an estimate for debt beta of 0.05.

7.3 Asset Beta

7.3.1 Under CAPM, the cost of equity for a firm depends upon the covariance of its share price with the market. This means that the cost of equity of a firm over a period reflects the actual beta of that firm during the period. If the asset beta is high, then the cost of equity is high (and vice versa). This means that in setting a cost of equity for a regulatory period, the regulator should effectively aim to estimate the level that the outturn beta will be measured to be during that period.

7.3.2 This is analogous to the 'cost of tomatoes' issue raised by the CMA and UKRN in respect of the risk-free rate¹. If the outturn asset beta (the cost of tomatoes) is at a

¹ UK Regulators Network (UKRN) (2018), Estimating the cost of capital for implementation of price controls by UK Regulators. A report by Wright, Burns, Mason and Pickford, section 4.3

particular level, then the allowed asset beta (the price paid for tomatoes) should be set at that level.

- 7.3.3 In practice, identifying an asset beta for a future regulatory period involves a measurement issue, and a view about how relevant that measure is for the future period. To address this, Regulators normally consider that an asset beta is likely to be relatively stable over time, and they therefore use a range of estimation durations and frequencies to measure an appropriate range for the parameter.
- 7.3.4 The impact of Covid-19 on investors' perception of airport risk means that this standard approach cannot be applied. The market data from before March 2020 does not reflect investors' new view of the riskiness of airports and therefore should be excluded from the data. The key questions that therefore arise are:
- What is the appropriate current estimate of beta from market data post March 2020; and
 - How should this be reflected in a forecast for the asset beta of H7; and
 - How the estimate should be adjusted for the proposed introduction of risk sharing.
- 7.3.5 It is in the second and third of these issues that the CAA has taken an erroneous approach.
- 7.3.6 In the second, the CAA has assumed that the asset beta of airports will fall substantially and immediately from 1st January 2022 without presenting any evidence to support this view. In addition, the process it has used to estimate the new asset beta is not consistent with CAPM or finance theory. We explain these errors in more detail below.
- 7.3.7 We then show that available evidence does not support a view that the current level of beta will fall during H7, other than by a small amount and therefore the estimate for H7 should be based on current market values.
- 7.3.8 In the third issue the CAA have made an error in assuming that the current estimates of beta exclude any potential mitigation to Covid-19 and therefore need to be adjusted to reflect the introduction of traffic risk sharing. The estimates of asset beta reflect market participants expectations of mitigation, which is unlikely to be zero. It also reflects the traffic risk sharing arrangements that some of these airports already had. In addition, the regulatory precedent from the CMA in the NERL case is not to adjust asset betas to reflect traffic risk sharing.
- 7.3.9 In the sections below we set out:
- An estimation of asset betas;
 - How asset beta should be estimated for H7;
 - Adjustment to be made to reflect the introduction of TRS; and
 - Conclude on the appropriate beta range for H7.

7.4 Estimating Asset Beta

7.4.1 In this section we:

- Review the appropriate comparators for Heathrow;
- Set out current estimates of asset beta;
- Draw conclusions on the appropriate range of asset beta for Heathrow in 2020 and 2021.

Comparators for Estimating Beta

7.4.2 Heathrow is not listed and therefore it is not possible to directly observe the asset beta of Heathrow. Consequently, it must be inferred from the asset betas of other listed airports that are appropriately comparable to Heathrow.

7.4.3 In identifying appropriate comparators for NERL, the CMA decided not to use data from smaller European Airports or Australian airports.² 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.

7.4.4 The CAA and Flint examined eight airport groups: Aena, ADP, Fraport, Zurich, Vienna, Copenhagen, Sydney and Auckland. Copenhagen was excluded due to a very small free float, and Auckland was excluded due to an undiversified home market. Flint also identified that Vienna had a very small free float and that Sydney also had an undiversified home market however it did not exclude them entirely from its analysis. Overall, Flint concluded that the greatest weight should be placed on Aena; some weight on ADP, Fraport and Zurich; and limited weight on Sydney and Vienna.³

7.4.5 It is disappointing that the CAA has placed weight on Sydney and Vienna given that these were rejected by the CMA as being unsuitable comparators and given the significant differences from Heathrow the CAA identified for these airports in terms of their regulatory frameworks and asset risks, and the liquidity constraints on the airport shares. In Flint's analysis, the asset beta of these two airports is notably lower than those of the other four comparators giving strong evidence that they are not comparable to the other airports, and therefore not comparable to Heathrow.⁴ As a consequence, inclusion of these airports has resulted in the CAA range having a lower end that is inappropriate.

7.4.6 In their report for Heathrow, Oxera based its assessment of asset beta on Aena, ADP, Fraport and Zurich only. They also concluded that Aena remains the most comparable company to Heathrow in the sample, due to the similarity of regulatory framework and other operational features.⁵

² CMA, *NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report*, March 2020, Para 12.67

³ Flint (2021), 'Estimating Heathrow's beta post covid-19', August.

⁴ Flint (2021), 'Estimating Heathrow's beta post covid-19', August, p. 23.

⁵ Oxera, *Cost of Capital issues for the H7 period*, December, Section 2.6

7.4.7 Based on these views and evidence we have used Fraport, AdP, Aena, and Zurich as appropriate comparators for estimating Heathrow's asset beta.

Estimation of Current Betas

7.4.8 In the RBP and RBP Update 1 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 daily frequency data from March 2020. Given the relatively short window at that time post March 2020, we also included a 2-year spot estimate.

7.4.9 We have used the same approach to update the estimates of beta using data up to the 30th November 2021. This has increased the period of estimation for the post-Covid estimate from 14 months to 21 months and therefore we focus on the post-Covid data only. We have also adjusted our approach to include estimates of the asset beta of Zurich. The resulting estimates are set out in Table 2.

Table 2: Estimates of Asset Beta of Comparator Airports

	Fraport	AdP	AENA	Zurich	Mean	Mean excluding Fraport
Spot (21-month daily frequency)	0.65	0.83	0.95	0.78	0.80	0.85

Source: Bloomberg/Heathrow analysis

7.4.10 Table 2 shows a range of asset beta of 0.65 to 0.95 with a mean of 0.80. Excluding Fraport, the airport least like Heathrow in characteristics, the mean is 0.85.

Estimation of Current Asset Beta for Heathrow

7.4.11 The observed range for asset beta based on data since March 2020 is 0.65 to 0.95, with a mean of between 0.80 and 0.85 depending on whether Fraport is excluded or not.

7.4.12 Of the four comparators, Frankfurt has a much more flexible regulatory system than Heathrow significantly reducing its risk in comparison. Given this, less weight should be given to the Fraport asset beta. This means that the asset beta for Heathrow is likely to be currently in the top half of this range. The mean excluding Fraport is 0.85. In addition, Flint and Oxera conclude that Aena is most alike to Heathrow in terms of risk, which also indicates that the appropriate point in the range for Heathrow is towards the top.

7.4.13 In addition to the general characteristics and regulatory framework of the comparators, it is also important to consider the relative impact of the pandemic on the different airports and the consequences this will have for their risk.

7.4.14 In RBP Update 1 we showed that the impact of the pandemic for Heathrow was much greater than for AdP, AENA, and Fraport in 2020⁶. This higher exposure to traffic risk would be expected to lead to a higher asset beta for Heathrow.

⁶ Heathrow, RBP Update 1, Chapter 5.6, Section 5.6.2.4.2, Figure 2

- 7.4.15 Oxera have also examined this issue. They identify that the CAA and Flint have not fully accounted for the differences in traffic mix, which is a factor that has a significant influence over an airport's vulnerability in the face of a pandemic. In particular, they note the importance of exposure to international traffic as during Covid-19 the recovery of domestic traffic has significantly outpaced the recovery of international traffic. This reflects rules on domestic travel being significantly relaxed compared to those on international travel.
- 7.4.16 Oxera demonstrate that traffic growth at Heathrow in 2021 has been much lower than that for AdP and Aena.⁷ They also show that the proportion of domestic travel is significantly higher for Aena and also higher for ADP.⁸ Oxera conclude that compared to comparator airports, Heathrow has demonstrated much higher vulnerability to the ongoing and future pandemics, due to its higher exposure to international traffic. This factor points towards an asset beta higher than the mid-point of the asset beta range for comparator airports⁹.
- 7.4.17 Given that the impact of Covid-19 on Heathrow had been greater than for these other airports, it is likely that were Heathrow listed its asset beta would be higher than these comparators. This suggests an asset beta for 2020 and 2021 would be at the top end of the observed range.

7.5 Estimating Asset Beta for H7

- 7.5.1 To estimate the asset beta for Heathrow in H7, an assumption is required about how asset betas in the future might differ from those observed since March 2020. The standard regulatory approach is to assume that the estimated asset beta is applicable for the next regulatory period without adjustment.
- 7.5.2 Changes in share price reflect investors' expectations about the future performance of companies. Therefore, although betas are estimated from a historical series of price movements compared to the market, they largely capture expectations about the future. This means that the starting point for H7 must be that asset betas will be consistent with current observed levels.
- 7.5.3 In contrast, the approach adopted by CAA/Flint assumes that the asset beta will revert to a long-term post pandemic value from 1st January. This sudden reduction from current values is not supported by any evidence and moreover the approach used to estimate the post-pandemic value is not based on any valid financial theory.
- 7.5.4 We present evidence below that shows in other sectors changes in risk perceptions have led to long-term increases in asset beta and that levels have not fallen back to previous levels. We also present data from futures markets that shows investors currently do not expect a material reduction in the relative volatility of airport stocks.
- 7.5.5 We then conclude showing that the appropriate approach for estimating Heathrow's asset beta during H7 is to base it on the observed range since March 2020.

⁷ Oxera, Cost of Capital issues for the H7 period, December 2021, Figure 2.1

⁸ Oxera, Cost of Capital issues for the H7 period, December 2021, Figure 2.2

⁹ Oxera, Cost of Capital issues for the H7 period, December, Section 2.3

CAA/Flint Approach to estimating post pandemic beta

- 7.5.6 The approach CAA/Flint has taken to estimating a post pandemic asset beta for Heathrow was to first identify a pre-pandemic asset beta and a 'pandemic beta'. A 'post pandemic' beta was then determined by weighting the pre-pandemic and pandemic beta estimates in relation to the proportion of time that the pandemic would be expected to apply. This approach requires assumptions of how long the pandemic beta would apply, and the frequency of pandemics.
- 7.5.7 There are two critical flaws in this approach:
- It assumes that the current level of 'pandemic beta' will revert to the new post pandemic level from the 1st of January 2022; and
 - The weighting approach applied by the CAA/Flint is not based on CAPM and is not supported by any financial theory.
- 7.5.8 If the CAA's view was that the asset beta of Heathrow was to fall during H7 from the current level towards a final post-pandemic value at some point in the future, then their estimate of asset beta for H7 should reflect the path that asset beta is expected to follow. To do otherwise would not be consistent with the actual cost of capital for diversified investors – it would breach the 'cost of tomatoes' principle.
- 7.5.9 Instead, the CAA assumes that the asset beta falls immediately to the post-pandemic level at the start of H7. No evidence has been supplied to justify this assumption. Given that measured betas reflect forward looking assumptions of investors in the recent past, such an assumption is clearly not consistent with recent market data and is clearly an error.
- 7.5.10 At present, there is no market evidence that the asset beta of airports will fall over H7. Therefore, any assumption that this might happen is conjecture as is any assumption around how quick such a fall might occur. It is not appropriate for the CAA to use conjecture to assess the WACC of Heathrow for H7.
- 7.5.11 In addition to the lack of market evidence that the asset beta will immediately fall to a new level there are significant flaws in the approach the CAA/Flint have used to estimate a 'post-pandemic' beta.
- 7.5.12 Firstly, the weighting approach used by the CAA/Flint effectively assumes that investors response to risk is linear. This is because it weights the low-risk and high-risk periods equally in proportion to their assumed duration. Such an approach is inconsistent with standard financial theory and evidence that shows investors are risk averse. As such, investors would be expected to give more weight to periods of higher risk than periods of lower risk. Given this, an equal weighting of the pre-pandemic and pandemic betas is not consistent with recognised financial theory.
- 7.5.13 In addition, the assumption by CAA/Flint that the 'pandemic beta' will reduce suddenly from 1st January 2022 also has the effect of reducing its weight in the calculation of the post pandemic beta compared to an assumption that the impact remains over a longer timescale. Given a more realistic assumption (see below) that the current high level of asset beta will persist for many years, a reasonable estimate of the post pandemic beta would be both significantly higher and also not apply until much later. Therefore, even if the method were appropriate, which it is not, the assumptions result in a significant underestimate.

- 7.5.14 Oxera note that the Flint methodology of reweighting the historical data contradicts the assumption that capital markets are efficient and that share prices and returns drawn from the most recent period best reflect market expectations of future risks and returns. They also note that the Flint approach uses a time horizon that is inappropriate for the H7 price control as it presumes a long-term post-Covid steady-state scenario, but the impact of Covid-19 is still present. They conclude that Flint's approach could result in significant error in the estimation of the beta for the H7 price control because it overlooks the ongoing effects of the pandemic¹⁰.
- 7.5.15 In combination, these errors mean that the CAA's approach in the Initial Proposals is neither supported by evidence nor by theory. Consequently, the CAA should use a different approach for the Final Proposals.

Market Evidence on potential persistence of asset beta changes

- 7.5.16 Heathrow commissioned Oxera to investigate evidence for the longevity of changes of risk perception in other sectors, and on investors' perceptions of the likely level of asset beta into H7. They have presented evidence showing:
- That sudden changes in asset beta in other sectors have persisted for a considerable period and not reverted fully to pre-change values; and
 - Implied volatilities from futures prices indicate that market participants do not expect the relative volatility of airport stocks to fall over the next five years.

Evidence from shocks in other sectors

- 7.5.17 Oxera analysed market data for FTSE100 constituents divided into 11 broad sectors. They showed that time variation in asset betas is observable across all sectors and that in particular, communication services and information technology witnessed significant breaks in the level of asset beta around the 2001 dotcom crisis. They note that the asset betas of either sector have not reverted to the pre-dotcom bubble days until today.¹¹
- 7.5.18 They conclude that the breaks observed for communication services and information technology show that significant shocks do lead to long-term or even permanent shifts in asset betas, even after the shocks have faded. The post-shock trends are unpredictable and do not follow the pattern of steady mean reversion¹².
- 7.5.19 The evidence from Oxera shows that after a shock, asset betas can maintain a new higher level for an extended period and that there is no reversion to the mean or sudden return to a new lower level. This is in contrast to the approach by Flint that assumes an immediate return to a new level and confirms that the Flint approach is not appropriate.
- 7.5.20 Caution needs to be taken before assuming that the evolution of asset betas in other sectors after sudden shocks will apply to airports. The slow reduction in asset beta in these sectors may reflect other changes in the specific sector rather than simply reflecting elapsed time since the shock event. As such, the reduction in asset beta is

¹⁰ Oxera, Cost of Capital issues for the H7 period, December 2021, Section 2.4

¹¹ Oxera, Cost of Capital issues for the H7 period, December 2021, Section 2.5

¹² Oxera, Cost of Capital issues for the H7 period, December 2021, Section 2.5

reflecting a reduction in the true underlying level of risk rather than simply investors' perceptions of risk.

- 7.5.21 In the case of Heathrow, the risk arising from a future pandemic is unlikely to be reduced at the underlying level. This represents a potential fundamental difference between the pattern observed in these sectors from that which may occur for aviation and means that the long-term reductions observed in these sectors may not be relevant.

Evidence from Futures Markets

- 7.5.22 Oxera set out an approach using futures markets to estimate a current forward-looking view of asset beta for airports. This approach calculates option-implied volatilities (IVs) from future strike prices, the spot equity price and time to maturity using option-pricing models. These IVs reflect investors' forward-looking expectations of the underlying share price volatilities. An estimate of the future beta can then be obtained by comparing the IV of the stock to that of the market. Oxera used an approach developed by French, Groth and Kolari. They note that the asset betas derived from IVs provide additional information for setting the allowed returns for the upcoming H7 price control due to their forward-looking nature¹³.
- 7.5.23 Oxera conclude that based on 21-month, 5-year daily and weekly IV-based betas for Aena and the average across all four comparators an asset beta range of 0.66–0.81 is observed using the IV approach.
- 7.5.24 This analysis provides additional evidence that the assumption by the CAA that the asset beta will reduce suddenly at the start of H7 is not consistent with investors' current views and therefore the approach adopted should not be used.
- 7.5.25 Heathrow considers that this evidence underpins the need to use contemporary post Covid-19 market data to underpin the asset beta range for H7. The IV range identified by Oxera (0.66 to 0.81) is lower than the standard estimate of asset beta (0.66 to 0.95) and therefore might suggest that Heathrow would drop down a little from the top of the range.

Overall conclusions on approach for H7

- 7.5.26 Market evidence from analysis of implied volatilities demonstrates that investors do not anticipate sudden falls in the asset beta of airports from current levels.
- 7.5.27 In addition, evidence from Information Technology shares shows that changes in asset beta due to shocks such as the dotcom crisis tend to be long lived and do not have a clear pattern of reversion. Moreover, it is not clear that such a pattern of longer-term reduction would apply to a pandemic-type risk where the underlying risk is not expected to change.
- 7.5.28 This demonstrates that the CAA's assumption that asset betas will fall significantly from the start of H7 is not supported by market evidence and is unsustainable. Even were the CAA to assume reversion to a new correctly calculated level over a longer time frame, there is no evidence to support a specific choice of time frame and the available evidence suggests that such a reversion would likely take decades.

¹³ Oxera, Cost of Capital issues for the H7 period, December 2021, Section 2.6

7.5.29 Therefore, the CAA must base its decision using robust contemporaneous market data on asset beta.

7.6 Impact of Risk Sharing

7.6.1 In its initial proposals the CAA has adjusted its beta range to reflect the impact of TRS in reducing Heathrow's risk. This adjustment is erroneous because:

- Observed asset betas reflect market assumptions around Covid-19 mitigation (which may be substantial) and the TRS in place for other airports;
- Regulatory precedent in CMA/NERL is that no adjustment needs to be made to observed betas to obtain an asset beta for a company with TRS; and
- It is not possible to robustly calculate an adjustment as it is not clear how much TRS reduces specific as opposed to systematic risk. The CAA approach significantly overestimates the impact because it assumes a correlation of Heathrow returns to market returns that is much higher than the CAA has previously stated this correlation is likely to be.

7.6.2 Fraport has a relatively flexible regulatory framework that allows it to reset charges each year to reflect traffic differences. This mitigates Fraport's traffic risk significantly. AdP is also currently setting charges on an annual basis allowing it to reflect up-to-date views on traffic. This flexibility provides significant mitigation to traffic risk and therefore the asset betas of these airports should be applicable to Heathrow without requiring an adjustment for the introduction of an explicit TRS for Heathrow.

7.6.3 Zurich also has a flexible regulatory framework based on a cumulative EVA approach that provides traffic risk sharing through the use of a flexible duration settlement. Therefore the asset beta of Zurich is applicable to Heathrow without requiring an adjustment for the introduction of TRS.

7.6.4 Aena's regulatory framework fixes tariffs for five years and sets out that it should bear all traffic risk except in exceptional circumstances, which are defined as reductions in traffic volume greater than 10% of forecast.¹⁴ Aena has applied to recover its Covid-19 losses for 2021 and 2022 in accordance with this rule.¹⁵ Therefore, the TRS in place at Aena is very similar to that proposed by Heathrow and the asset beta of Aena is therefore applicable to Heathrow without adjustment for TRS. This adds more weight to the use of the Aena asset beta for Heathrow.

7.6.5 In its inquiry into NERL the CMA made no adjustments to the observed asset beta range of airports before applying to NERL despite NERL's regulatory regime including TRS.¹⁶ This sets a clear regulatory precedent that no adjustment should be made to observed airport asset betas to account for TRS.

7.6.6 In the Initial Proposals the CAA makes an adjustment to its post-pandemic asset beta range to account for the impact of TRS. It states the TRS would be expected to mitigate 64% of Heathrow's losses, and therefore reduces the impact of Covid-19 on

¹⁴ <https://www.boe.es/boe/dias/2014/10/17/pdfs/BOE-A-2014-10517.pdf>

¹⁵ <https://portal.aena.es/en/corporate/aenas-chairman-ceo-maurici-lucena-confirms-companys-commitment-sustainability-key-strand-in-economic-recovery.html?p=1237548067436>

¹⁶ CMA, *NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report*, March 2020, para 12.70

its asset beta range by 50%.¹⁷ The CAA do not explain why this relationship is appropriate. In addition the CAA do not consider that the mitigation provided by the CAA's proposed TRS mechanism would be much less for smaller deviations.

- 7.6.7 We note that in their response to Heathrow's request for a RAB adjustment, the CAA set out its view that the likely correlation between Heathrow's equity returns and the returns on the market would be between 0.1 and 0.5.¹⁸ The CAA's TRS adjustment effectively assumes this correlation is around 0.8 up to over 1.0 for smaller traffic shocks. Such an assumption is materially inconsistent with the position on the correlation coefficient the CAA has set out previously. Based on the CAA's previous view even were such an adjustment applicable, the size of adjustment for TRS would be smaller at around a quarter to a third of the size included in the Initial Proposals.
- 7.6.8 For clarity, our position is not that TRS would have no impact on asset beta. It is that no adjustment needs to be made to the observed betas to take account of TRS. In the absence of TRS the asset beta would be higher.

7.7 Heathrow view on appropriate Beta Range

- 7.7.1 Since the start of the pandemic in March 2020, investors' perception of the risk of airports has increased. Estimates of the appropriate comparator airports to Heathrow over this period result in an asset beta range for airports of 0.65 to 0.95. There are several factors that might affect the relative position of Heathrow in this range.
- 7.7.2 The bottom of this range reflects the asset beta of Fraport, the comparator airport that is least like Heathrow. In contrast, the asset beta of AENA, which Flint and Oxera have identified as being closest in risk characteristics to Heathrow is at the top of this range. This means that the comparability of Heathrow to the airports in this range would be likely to result in an asset beta at the higher end of the range.
- 7.7.3 The impact on traffic flows during the pandemic has been greater at Heathrow than that at the comparator airports because of its higher exposure to international traffic. This means that Heathrow's traffic risk is higher than the comparators and therefore its systematic risk is likely to be higher. This higher relative risk provides upwards pressure on Heathrow's asset beta within the range identified for the comparators, and means that it might be above this range.
- 7.7.4 Forward looking evidence suggests that markets do not anticipate significant reductions in asset beta over the H7 period. Evidence from other sectors indicates that any reduction after a shock is likely to be slow and take a considerable time. This means that the estimation of asset beta for Heathrow in H7 must be based on the post March 2020 comparator range. Evidence from IV estimates of asset beta however could support downwards pressure on the point in the range for asset beta.
- 7.7.5 The introduction of traffic risk sharing results in the risk allocation of Heathrow being clearer than in Q6, which simply referred to the ability to reopen the Determination in the event of a significant change in traffic. The comparator airports all currently benefit from Traffic Risk Sharing to different extents and therefore the observed range already reflects its impact. In addition, there is clear regulatory precedent from the CMA that the asset beta for a company with TRS does not require an adjustment to

¹⁷ CAA, CAP2265C, Paras. 9.71 and 9.72

¹⁸ CAA, CAP2140 , Para 3.160

the observed betas. Therefore, the introduction of TRS should have no influence on the point in the range appropriate for Heathrow.

7.7.6 The impact of the different factors summarised above are set out in Table 3.

Table 3: Factors affecting position in the range for Heathrow Asset Beta

Risk Factor	Comparability to Heathrow	Heathrow Relative risk	Evidence from Futures	TRS	Overall
Impact on Point in the range	↑	↑	↓	↔	↑

Source: Heathrow

7.7.7 Table 3 shows that two of the factors would push up in the range, one would push down, and one have no effect. Given there are more factors pushing up in the range, than down on balance the overall impact means that an estimate slightly above the centre of the range is appropriate.

7.7.8 Given this, we consider that the estimate of asset beta used for the RBP and RBP Update 1 of 0.82 remains appropriate and conservative. It is slightly above the centre of the range for all 4 airports, and slightly below the mean asset beta of the airports excluding Fraport which has characteristics that are the least like Heathrow.

7.8 Overall Cost of Equity

7.8.1 Table 4 sets out the resulting estimate of the cost of equity for Heathrow alongside the estimates in the IBP and RBP. An additional allowance of 0.5% has been included in the cost of equity as a result of aiming up. Detail of this approach are set out in Section 7.17.

Table 4: Cost of Equity for Heathrow

	RBP Update 1	RBP Update 2
TMR	5.85%	5.85%
RFR	-2.22%	-2.10%
Gearing	60%	60%
Asset Beta	0.82	0.82
Equity Beta	1.98	1.98
Aiming Up	0.5%	0.5%
Cost of Equity Post Tax	14.2%	14.1%
Tax Rate	23.5%	23.5%
Cost of Equity Pre-Tax	18.6%	18.4%

Source: Heathrow

7.8.2 Table 4 shows that the post-tax cost of equity for RBP Update 2 is marginally lower than RBP Update 1 reflecting the slightly higher risk-free rate.

7.9 Cost of Debt

7.9.1 In its Initial Proposals, the CAA estimated the cost of debt for Heathrow in H7 to be 1.73%. This was close to Heathrow's estimate of 1.75%. However, there are a number of issues and errors in the CAA's approach that need to be corrected for their Final Proposals. In particular:

- The CAA's analysis of the cost of Heathrow foreign currency bonds was erroneous. As a consequence, the conclusions that the CAA drew from this analysis that Heathrow could issue debt below the cost of the iBoxx index is incorrect;
- The CAA's approach to adjusting for nominal debt costs for inflation is not consistent with good practice, and is vulnerable to short term swings in inflation expectations; and
- The CAA has not undertaken a proper analysis of issuance and liquidity costs for Heathrow, relying instead on regulatory precedent from other sectors that it has not shown is applicable to Heathrow. As a consequence, these costs are underestimated.

7.9.2 Each of these issues is set out in more detail below. We set out how we consider the CAA should address these issues and update our estimate of Heathrow's cost of debt for H7.

7.9.3 In addition, we revise our approach to estimating liquidity costs to take into account the need to maintain significant cash balances during 2022 and into 2023 in order to maintain financial resilience to cope with potential downside scenarios from Covid-19. There is a significant cost of carry associated with these cash balances that increases liquidity cost significantly in the early part of H7.

7.10 CAA analysis of Heathrow FX Bonds

7.10.1 The CAA set out an analysis of the cost of Heathrow's foreign currency bonds in its initial proposals¹⁹. There are four key errors in this analysis:

- The adjustment for currency swap rates has been done incorrectly;
- The comparison is not adjusted for tenor so that a bond with a specific tenor is being compared with an index with a similar tenor;
- The comparison is not adjusted for credit rating. A rated Heathrow debt is being compared to the average of the A and BBB iBoxx indices; and
- The cost of the swaps has not been included in the analysis.

7.10.2 We understand that the CAA has recognised the error in the adjustment for currency swap rates and this will be corrected in the Final Proposals.

7.10.3 We are concerned that the CAA has not adjusted its approach to adjust for tenor and credit rating. This was also an error made by Ofwat in its analysis of water company

¹⁹ CAA, CAP2265C, Tables 9.7 and 9.8

debt costs that was corrected by the CMA that made clear the importance of making such an adjustment²⁰.

- 7.10.4 In particular, the CAA's analysis did not include Heathrow's sterling debt, which is typically issued at longer tenors, and it did not include any of the Class B debt. The target credit rating for a notionally financed Heathrow is BBB+, and therefore the CAA analysis should consider both Heathrow's Class A and Class B debt.
- 7.10.5 The errors in this analysis highlight the difficulty and complexity of comparing foreign currency debt with a sterling index. As well as adjusting for tenor and credit rating, adjustments are required for foreign currency swaps, and the cost of the swap itself (that is not public). For this reason, we consider that a more robust and independent approach for the CAA to adopt is to compare the yield on Heathrow sterling bonds that have a similar tenor to the iBoxx index with the yield on the index of the same credit rating. After adjusting to include a new issue premium, this gives a clear measure of the market view of the cost of sterling debt for Heathrow over time. This is the approach that Heathrow used in the IBP and RBPs.
- 7.10.6 An additional issue with the use of foreign currency debt for a forward-looking assessment is that even where a company has reduced its historic debt cost by making efficient use of such debt, there is no guarantee that the opportunity to obtain foreign currency debt in future would persist. In general, arbitrage would be expected to lead to the cost of debt after currency swaps to be the same in sterling and other currencies. If this were not the case an entity could borrow in one currency and lend in the other at a higher rate with zero currency risk. Consequently, opportunities for lower cost tend to be temporary and in relation only to specific tenors and specific currencies at particular times.
- 7.10.7 This makes it even more important to use sterling data for assessing the future cost of debt.

7.11 Appropriate estimate of Inflation

- 7.11.1 An estimate of inflation is required to convert nominal debt costs into real debt costs. There are three approaches that can be used to estimate inflation for this purpose:
- Use expected inflation over H7;
 - Use expected inflation at the time of issuance for each debt instrument; or
 - Use an appropriate long-term estimate of inflation.
- 7.11.2 From a theoretical perspective, the most appropriate of these approaches is the second. This captures the expected real cost of each debt instrument when it is issued. However, implementing such an approach requires a reliable historical estimate of inflation expectations and an estimate of future inflation expectations. In practice this is difficult to do, and in addition such an approach is complex to implement.
- 7.11.3 To address this, the CMA used the third approach in its determinations for NERL and Water Companies by using a long-term estimate based on the Bank of England target for CPI of 2.0% plus the OBR's forecast wedge between RPI and CPI, explaining that

²⁰ E.g. CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Paras 9.749-9.750

it considered that using a longer-term estimate was the fairest way to calculate the cost of capital²¹. This resulted in an inflation estimate of 2.9% for the Water Companies²². Heathrow also used this approach in its RBP submissions. Such an approach is likely to give the same result as the second approach if inflation expectations are relatively stable and mean reverting to the Bank of England inflation target as they have been in the UK for some time.

- 7.11.4 In the Initial Proposals, the CAA has instead adopted the first of these approaches, basing its forecast on an RPI inflation forecast produced by the OBR in March²³. Subsequently, the OBR has updated its forecast as set out in Table 5 below.

Table 5: OBR forecasts of RPI

	2022	2023	2024	2025	2026	Average
March 21	2.6%	2.1%	2.5%	2.8%	3.0%	2.6%
October 21	4.6%	4.6%	3.2%	2.8%	2.8%	3.6%

Source: OBR

- 7.11.5 Table 5 shows that there has been a very large change in inflation expectations between the two forecasts. This demonstrates one of the weaknesses of the approach chosen by the CAA in that it is subject to changes in the short-term outlook for inflation that are not likely to be material over the relatively much longer life of new bonds and that would have formed no part of the expectations when historical bonds were issued.

- 7.11.6 For its Final Proposals the CAA should adopt best practice as identified by the CMA and use an appropriate long-term view of RPI of 2.9%.

7.12 Cost of embedded debt

- 7.12.1 In the Initial Proposals the CAA proposed to estimate the cost of Heathrow's embedded debt based on a notional benchmark²⁴. However, in undertaking this analysis the CAA has made a number of errors that result in it underestimating the difference in Heathrow's cost of debt compared to the benchmark. As a result, the notional benchmark for Heathrow has been underestimated.

- 7.12.2 These errors include:

- The errors in its analysis of the cost of Heathrow's foreign currency debt set out above;
- Excluding Heathrow's Class B debt from its analysis; and
- Excluding Heathrow's sterling debt from its analysis.

²¹ CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.36

²² CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.35

²³ CAA, CAP2265C, Para 9.119

²⁴ CAA, CAP2265C, Para 9.156

- 7.12.3 The CAA has excluded Class B debt from its analysis as it considers that this provides the most suitable approximation for the notional entity²⁵. However, in its initial proposals the CAA sets out its view that the notional entity should target a credit rating of BBB/BBB+²⁶. It is inconsistent for the CAA to argue in one part of its Proposals that the cost of debt for the notional entity should be based on an A- credit rating, but that its financeability should be assessed on a BBB rating for H7.
- 7.12.4 The CAA must be consistent in its approach to the cost of debt and its financeability assessment:
- If the financeability assessment is based on BBB, the cost of debt should be based on the iBoxx BBB index only, and the spread of Heathrow debt to the iBoxx BBB index should be based on the relative cost of its Class B bonds to the BBB index; or
 - If the financeability assessment is based on BBB+, then the cost of debt should be based on the average of the iBoxx A and BBB indices, and the spread of Heathrow debt should be based on the cost of its Class A debt relative to the A index and the cost of its Class B debt relative to the BBB index.
- 7.12.5 The CAA should not exclude the Class B debt from its analysis unless it is targeting a credit rating of A- for the notional company.
- 7.12.6 The CAA excluded the cost of Heathrow's sterling bonds from its analysis of spread relative to the iBoxx index. It is not clear why they are excluded. Heathrow has previously presented evidence to the CAA that the average cost at issue of its sterling debt is 0.40% higher than the iBoxx index²⁷, and that the spread on its sterling bonds was around 0.3% higher than those of Water Companies prior to Covid-19²⁸. The CAA must not exclude Heathrow's sterling debt from any future analysis of the relative cost of its debt to the iBoxx index.
- 7.12.7 This omission is particularly serious given the CAA's proposed approach to financeability that assumes that Heathrow will not require access to foreign currency debt in H7.²⁹ The CAA is therefore basing its cost of debt assessment for Heathrow in H7 on the cost of debt that it assumes Heathrow will not be able to access. This is inconsistent and inappropriate.
- 7.12.8 The impact of the pandemic on Heathrow has resulted in the spread of its debt to the index widening significantly (see Figure 1 below), and in the cost of new debt issuance subsequently being much higher than would be suggested by the iBoxx index itself. In addition to demonstrating that the costs for Heathrow are likely to be higher than the index, this also shows that the amount by which this is the case varies considerably over time. This undermines the use of a notional approach to setting Heathrow's cost of embedded debt.
- 7.12.9 Heathrow's estimate of the real cost of embedded debt on average over H7 remains 1.70% based on the actual cost of its existing debt portfolio over H7.

²⁵ CAA, CAP2265C, Para 9.158

²⁶ CAA, CAP2265C, Para 11.65

²⁷ Nera, *The cost of debt for HAL in H7*, April 2019, Section 2

²⁸ RBP, Chapter 8.2, Figure 6, p36

²⁹ CAA, CAP2265C, Para 11.41

7.13 Cost of new debt

- 7.13.1 The CAA's estimate of the cost of new debt for Heathrow has been significantly affected by the errors in its analysis of Heathrow issuances since the pandemic. As a result of these errors, the CAA has assumed that Heathrow has been able to issue below the index, whereas instead its costs have been much higher.
- 7.13.2 In the RBP and RBP Update 1 we set out an approach for estimating the cost of new debt. 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. We update this analysis for Market data as at the end of November.
- 7.13.3 This approach is similar to that adopted by the CAA. The key differences are that the CAA did not include a forward adjustment; and incorrectly assessed that the cost of issuing Heathrow debt for H7 would be in line with the iBoxx indices.
- 7.13.4 Up to 30/11/21, the 6-month average of the iBoxx 10+ NFC A was 2.14% and of the iBoxx 10+ NFC BBB 2.39%. This results in an updated estimate of the current basis for the iBoxx index of 2.26% (nominal), slightly higher than the 2.09% as at March 2021 used for RBP Update 1.
- 7.13.5 We have continued to include a forward adjustment based on 20-year gilts as we consider that this gives the best forecast of rates in H7 and that it is in consumers' interest to use the best forecast. At 30th November 2021 this resulted in a forward adjustment of 0.13% on average over the period, slightly less than the adjustment at March 21 of 0.24%. Table 6 sets out the uplift and forecast iBoxx index.

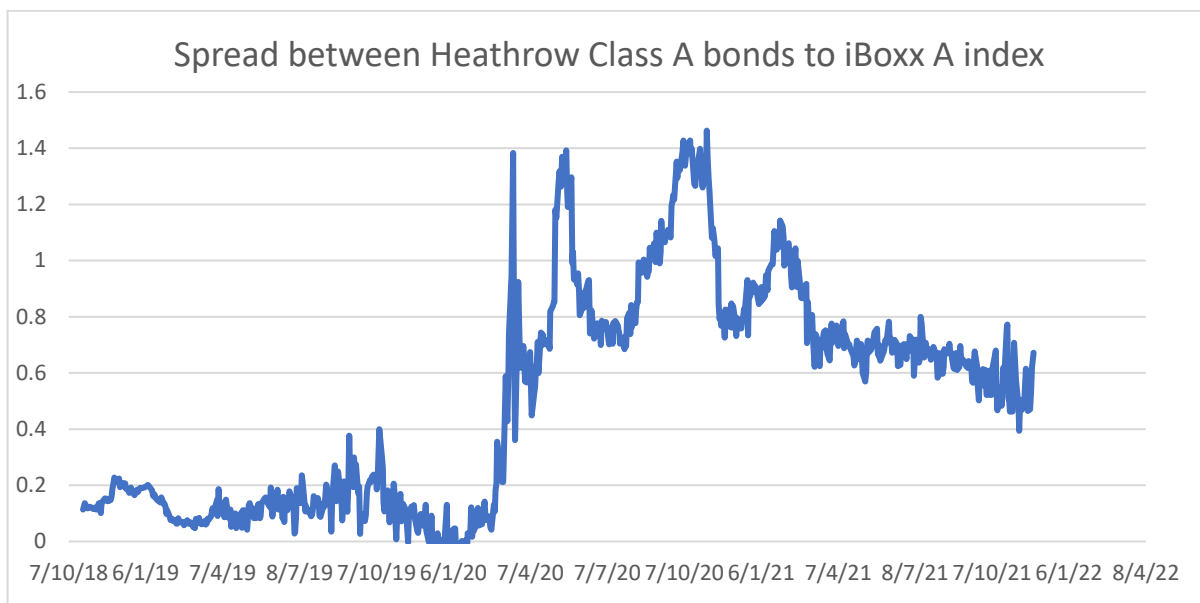
Table 6: Forecast iBoxx index

	2022	2023	2024	2025	2026
Uplift	0.06%	0.10%	0.14%	0.18%	0.20%
Forecast iBoxx index	2.32%	2.36%	2.40%	2.44%	2.46%

Source: Heathrow

- 7.13.6 As in RBP Update 1, we estimate the cost of Heathrow debt relative to the iBoxx index using an approach that: (i) Compares the yield on Heathrow debt with the yield on the comparable iBoxx index; (ii) then makes an adjustment to reflect the cost of debt is higher at issuance than when it subsequently trades and; (iii) makes an adjustment to reflect that a proportion of debt will be index linked, and this debt has a higher cost.
- 7.13.7 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 November. This comparison uses debt of similar credit rating and tenor to the iBoxx index to ensure that the comparison is valid. Figure 1 below shows the spread since 2018.

Figure 1: Spread of Heathrow Bonds to iBoxx A index



Source: Bloomberg/Heathrow Analysis

7.13.8 Figure 1 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. More recently, the level has fallen slightly, but remains considerably above the pre-pandemic level. The average spread over the six months to end November 2021 is 0.62%.

7.13.9 In the RBP we provided market evidence of the New Issuance Premium (NIP) of our most recent bond issuances showing this was in the range 10-20bp, and that the additional cost of Indexed Linked (IL) debt was 0.05%. The overall uplift is therefore 0.82% as set out in the table below.

Table 7: Uplift from iBoxx index for new Heathrow Debt

Yield %	RBP Update 1	RBP Update 2
Spread to iBoxx	1.06%	0.62%
New Issuance Premium	0.1% to 0.2%	0.1% to 0.2%
Additional Cost of IL Debt	0.05%	0.05%
Overall Spread	1.25%	0.82%

Source: Heathrow

7.13.10 Over the H7 period, the forecast cost of new debt is therefore 3.22% nominal, or 0.32% real (RPI).

7.13.11 The cost of new debt set out above reflects the current high spread of Heathrow debt that has arisen as a result of investor concern following the pandemic. It is not clear whether this change reflects a permanent (or very long-duration) effect. However, there is no evidence that the spread will reduce in H7 and it is possible that it could increase back to the levels observed earlier in 2020 and 2021. Regulatory precedent

in this area is that current interest rates give the best prediction of future rates.³⁰ We therefore consider our approach is appropriate for H7.

7.14 Weighting for new debt

- 7.14.1 In the cost of debt analysis, the CAA assume a weight for new debt of 16% to 17% stating that these are based on the financial assumptions set out in Chapter 8³¹. However, in Chapter 8 the CAA does not set out any assumptions about the amount of new debt required in H7. In Chapter 11 the CAA sets out its view that a notionally financed Heathrow would need to issue £1.9bn of debt in H7³². For a £17bn RAB at 60% gearing, this is equivalent to 19% new debt by the end of the period, or an average new debt weighting of 9.5%.
- 7.14.2 This shows that the CAA's assumption about the proportion of new debt is not consistent with the assumptions in other parts of their determination. If it were, the CAA would have used a new debt weighting of under 10%.
- 7.14.3 Heathrow considers that for the notional company in relatively steady state it is appropriate to assume that 25% of debt will be replaced in each five-year period. This results in an average share of new debt of 12.5%. Such an approach is consistent with the 20-year rolling embedded approach adopted by the CAA, and therefore it should apply this debt share for its Final Proposals.

7.15 Issuance and Liquidity costs

- 7.15.1 In the Initial Proposals the CAA set out its view that issuance and liquidity costs were 0.10% based on a report by Flint that referred to regulatory precedent³³. It appears a relatively narrow view of regulatory precedent was used as the estimate was lower than the CMA allowed for NIE in 2014 (0.15%), Bristol Water in 2015 (0.20%-0.30%) and NERL in 2020 (0.15%).
- 7.15.2 The CAA referred to the 2021 CMA decision for Water, but did not present any evidence to as to why the issuance and liquidity costs of Heathrow would be expected to be the same as that of water companies.
- 7.15.3 The CAA set out its view that it was not appropriate to base its estimate of issuance and liquidity costs on Heathrow's actual costs. It also stated that Heathrow had not set out why its costs were different to those incurred by other regulated companies³⁴.
- 7.15.4 The CAA approach is not consistent with that of the CMA. In its inquiry into NERL, the CMA stated that where there is reasonable confidence issuance and liquidity costs have been incurred in an efficient manor, it is prudent to use actual costs as a

³⁰ 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

³¹ CAA, CAP2265C, Para 9.227

³² CAA, CAP2265C, Para 11.41

³³ CAA, CAP2265C, Para 9.231

³⁴ CAA, CAP2265C, Para 9.241

guide for future costs³⁵. As a consequence, they made an allowance of 0.15% for issuance and liquidity costs for NERL³⁶.

- 7.15.5 We consider that issuance costs and the interest rate on a liquidity facility would likely be similar for Heathrow and Water and Energy companies. However, overall liquidity costs could vary significantly because the size of the facility could vary considerably from sector to sector reflecting the different risk and financing requirements.
- 7.15.6 In the CMA water inquiry, the CMA made an allowance of 0.10% for issuance and liquidity costs based on analysis by Europe Economics estimate of water company costs on behalf of Ofwat³⁷. This was based on a range for issuance costs of 0.03% to 0.06% and liquidity costs of 0.35% to 0.45%³⁸. The CMA noted that the water companies had not provided an alternative estimate.
- 7.15.7 Heathrow presented an analysis of its actual issuance costs of 0.06% in the RBP³⁹. These are within the range of 0.03% to 0.06% identified by Europe Economics for Water Companies, consistent with the allowance made by Ofwat for Water Companies, and lower than the 0.10% to 0.11% the CMA considered were efficient for NERL⁴⁰. Therefore, it is reasonable to conclude that Heathrow's actual issuance costs are efficient, and consequently they should be reflected in the allowance for H7.
- 7.15.8 Heathrow's estimate of liquidity costs was based on the cost of an appropriately sized liquidity facility for the notional company. The key elements driving the cost are the effective duration of the facility, the cashflows the facility needs to cover, and the arrangement fees and undrawn cost of maintaining the facility. The calculation for the size of the required facility is set out in Table 8.

Table 8: Required size of liquidity facility

Facility Size		RBP Update 2
Closing RAB 2021	£m	17,214
Notional Debt	£m	12,050
Average Debt Tenor	Yr	20
Expected Repayments	£m	602
Peak Capex 22-26	£m	1,510
Annual Requirement	£m	2,112
Time Horizon Required	Months	18
Facility Required	£m	3,169

Source: Heathrow

³⁵ CMA, NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report, March 2020, para 12.150

³⁶ CMA, NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report, March 2020, para 12.161

³⁷ CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.903

³⁸ CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, para 9.883

³⁹ Heathrow, RBP, Chapter 8.2, Section 8.2.5.6

⁴⁰ CMA, NATS (En Route) Plc / CAA Regulatory Appeal, Provisional findings report, March 2020, para 12.150

- 7.15.9 The costs of the facility are based on arrangement costs of 75bp for a five-year facility and commitment (non-use) fees of 25bp (based on quoted current margins from banks of 0.70% and a non-utilisation fee of 35% of margin). Table 9 sets out the effective cost of the liquidity facility based on the costs compared to the overall level of debt for the notional company.

Table 9: Cost of liquidity facility

Facility Costs		RBP Update 2
Facility Size	£m	3,169
Set up Costs		0.75%
Non Utilisation Fee		0.25%
Life	Years	5
Annualised cost of Facility	£m pa	12.6
H7 Average RAB	£m	20,980
Assumed Debt	£m	12,480
Effective interest rate	%	0.10%

Source: Heathrow

- 7.15.10 The set-up and non-utilisation costs of this facility are likely to be comparable to those in other sectors. The driver of the overall higher costs is mainly the longer liquidity horizon required by Heathrow (consistent with the requirements placed on Heathrow by the CAA for a minimum 18-month horizon). The recent Covid-19 pandemic has demonstrated the importance of adequate liquidity facilities in maintaining financial resilience.
- 7.15.11 Overall, base issuance and liquidity costs for Heathrow are 0.16%.
- 7.15.12 The estimate of liquidity costs set out above is a minimum in that it assumes that the liquidity facilities are undrawn. In practice, during the Covid-19 pandemic Heathrow has been carrying very large cash balances. This results in an additional cost of carry as the deposit rates are less than the cost of borrowing. The cash balance at the end of December 2021 is anticipated to be £2.592bn. The RCF is currently undrawn so the cost of carry is in addition to the underlying liquidity cost.
- 7.15.13 The impact of the pandemic, and the resultant increase in uncertainty means that Heathrow will continue to carry significant cash balances during 2022 and will not pay a dividend during the year. This will add significantly to liquidity costs early in H7. The additional costs are estimated to be £119m based on a cash balance of £2.592bn for 18 months, a cost of new debt for H7 of 3.22% and a deposit rate of 0.15% (based on actual cost in first 9 months of 2021). Averaged over the five years of H7 this equates to an additional liquidity cost for H7 of 0.19% on the cost of debt.
- 7.15.14 We have therefore included overall issuance and liquidity costs of 0.35% in our updated view of the cost of debt for H7 as set out in Table 10.

Table 10: Issuance and Liquidity costs for H7

Type	Cost
Issuance Costs	0.06%
Base Liquidity Costs	0.10%
Additional liquidity for 2022 and run down in 2023	0.19%
Total Liquidity and Issuance costs	0.35%

Source: Heathrow

7.16 Heathrow view of cost of debt for H7

7.16.1 Table 11 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 11: Overall Cost of debt for H7

	RBP Update 1	RBP Update 2
Cost of embedded debt	1.70%	1.70%
Cost of new debt	0.67%	0.32%
Weighting of new debt	12.5%	12.5%
Cost of Debt	1.57%	1.52%
Issuance and Liquidity Costs	0.18%	0.35%
Overall Cost of Debt	1.75%	1.87%

Source: Heathrow

7.16.2 The change in the estimate of the overall cost of debt between RBP Update 1 and RBP Update 2 largely reflects the increase in the cost of liquidity to take into account the large cash balances entering H7. This results from the need to account for the significant costs of carry required in 2022 and into 2023 to ensure sufficient financial resilience to cope with the risk from the ongoing Covid-19 pandemic and its potential impact on Heathrow cashflow.

7.17 Point in the Range

7.17.1 In the Initial Proposals the CAA did not set out a view on the appropriate part of the range to adopt for their point estimate. It noted that the need to promote investment and the financing challenges faced by Heathrow might warrant setting a point estimate of the cost of equity above the mid-point. It also stated that the application

of TRS would reduce Heathrow's risk exposure, which might lead to a point estimate of WACC that is below the midpoint.⁴¹

- 7.17.2 The CAA's position on the impact of TRS is not consistent with TRS being in place in some form for all of the comparator airports, nor with CMA regulatory precedent in respect of NERL. This is explained in more detail above in Section 7.6 above.
- 7.17.3 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 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.⁴²
- 7.17.4 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.⁴³ The CMA therefore reduced the uplift to 0.25% to reflect this modelling. In contrast to the approach the CMA adopted for its preliminary findings, this was implemented as an explicit adjustment to the cost of equity rather than by adjustments to each of the input parameters.
- 7.17.5 A key issue with a decision about a point in the range is the extent to which the identified ranges are appropriate. In the Initial Proposals, the errors in analysis by the CAA mean that the whole of the range they have identified for asset beta at the Initial Proposals is below a credible lower limit. This demonstrates that the assessment of the appropriate point in the range needs to take into account the risk and uncertainty around each of the parameters in the WACC calculation.
- 7.17.6 The factors affecting Heathrow's selection of a point estimate for asset beta are set out above in Section 7.7 and we consider that this results in a robust central estimate for asset beta of 0.82. Nevertheless, there remains uncertainty around asset beta and TMR that needs to be considered and some aiming up remains appropriate to ensure the right long-term incentives are in place for investment.
- 7.17.7 Heathrow asked Oxera to replicate the approach adopted by the CMA for Heathrow and identify the uplift to the cost of equity required to reach the 75%-ile in the cost of equity range. Oxera calculated that for Heathrow, this would result in an upwards adjustment of 0.5% to 0.6%.⁴⁴ We have therefore included a specific uplift in the Cost of Equity of 0.5% consistent with the CMA approach for Water Companies.

⁴¹ CAA, CAP226C, pp. 85–86.

⁴² 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

⁴³ 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

⁴⁴ Oxera, Cost of Capital issues for the H7 period, December 2021, Section 3

7.18 Conclusion

7.18.1 Heathrow's point estimate of the appropriate WACC for H7 is set out in Table 12.

Table 12: Heathrow estimate of WACC for H7

	RBP Update 1	RBP Update 2
Gearing	60%	60%
Cost of Equity Post Tax	14.2%	14.1%
Cost of Equity Pre-Tax	18.6%	18.4%
Cost of Debt	1.57%	1.52%
Cost of Debt Including Issuance and Liquidity costs	1.75%	1.87%
Post-tax (Vanilla) WACC	6.75%	6.77%
Pre-tax WACC	8.5%	8.5%

Source: Heathrow

8. Financial Framework

8.1. Introduction

8.1.1. In addition to RAB adjustment, the CAA's document on the H7 financial framework covers its views on:

- Asymmetric risk allowance
- Tax treatment
- Financial framework
- Price cap and financeability

This section of our response covers these issues in turn.

8.1.2. Heathrow requested that the CAA's H7 decision take into account the full impact of expected asymmetric passenger volume risks through the proposed shock factor. Heathrow proposed a shock factor which took into account the impact of Covid-19 as well as the impact of shocks pre-Covid. The CAA's Initial Proposals agree that the asymmetric demand risk associated with Covid-19 should be reflected and proposes a revenue allowance to reflect this.

8.1.3. Heathrow agrees with the overall principles of the CAA's approach and we have reflected this in our RBP Update 2 calculations. On further analysis of the CAA's approach to calculating the adjustment, we are proposing the following changes to the calculation:

- **The impact should be allowed to occur in each year.** The current calculation excludes any risk of an impact in 2022. The risk of a new pandemic is the same in each year, and in practice there may be additional risk in 2022 arising from new Covid Variants.
- **The length of the impact should be adjusted to four years.** The CAA's calculation assumes that the impacts of the pandemic will last for three years. This is not consistent with passenger forecasts showing the length of recovery from the current Covid-19 pandemic. Our calculation extends this to four years for consistency.
- **The elasticities used to calculate cost and revenue impacts should be consistent with H7 forecasts.** Currently the CAA's elasticities do not reflect forecasts. We have used the elasticities from our H7 forecasts.

8.1.4. In regard to tax, Heathrow supports the CAA's proposals to retain a pre-tax approach to determining tax allowances. We also support the CAA's proposed tax adjustment mechanism, which is an appropriate adjustment to reflect that corporation tax liability sits fully outside of Heathrow's control, and offer views on how it can best be implemented flexibly for H8.

8.1.5. We do not agree with the CAA's proposal to introduce a tax clawback mechanism. Analysis shows that in practice there is no tax benefit to be gained through increasing gearing. Under CAPM, as gearing increases tax payable would also be expected to increase. This means that there is no consumer benefit to the introduction of a

mechanism and so it is not required for H7. Further analysis is provided in Section 8.3.

8.1.6. In regard to the financial framework and financeability, we agree with the CAA's conclusions on the following issues:

- The CAA should continue to use the notional entity as its focus;
- The notional company should target a credit rating of BBB+;
- It is consistent with the CAA's duties and market expectations to target a return to dividends in 2023/24;
- A P0 adjustment is required for charges to be financeable in H7; and
- Utilising depreciation deferral could be appropriate to deliver an affordable and financeable charge.

8.1.7. However, we disagree with the CAA's analysis on affordability. Excess demand for services from Heathrow has led to fares at Heathrow including a significant congestion premium. As a consequence, increases in airport charges will likely have no effect on the charges paid by consumers and will not impact their choice of routes.

8.1.8. In addition, there are a number of areas where we have concerns about the CAA's approach which should be resolved ahead of the Final Proposals:

- **The CAA's proposals do not include the right cash-flows in the financeability analysis.**
- **The CAA's proposals do not compare the right financial ratios for its target credit rating.**
- **The CAA's proposals do not properly consider how credit rating agencies would interpret the results of the financeability analysis.** The CAA's financeability analysis assumes that rating agencies will look through poor performance at the start of the H7 period. This is not guaranteed given the impact of Covid-19 since 2020.
- **The absence of a further RAB adjustment undermines equity financeability.** As set out in Section 6 - RAB adjustment, the impact of Covid-19 has crystalised the downside risk to which Heathrow's investors are exposed. Without a further RAB adjustment, the CAA will undermine the reasonable expectations of investors to be compensated for the risk they are taking and risks the future investability of the framework.

8.2. Asymmetric Risk Allowance

8.2.1. In the Initial Proposals the CAA continues to accept that adjustments need to be made to the Determination overall to take into account the impact of the expected asymmetric nature of demand risks. However, it proposes that a different approach is needed for high impact lower likelihood events compared to the existing approach for lower impact medium likelihood events.

8.2.2. As a consequence it proposes to:

- Use the existing Q6 shock factor approach for lower impact, more frequent events; and
 - Apply a separate revenue allowance to take account of the potential risk from a future Covid-like pandemic event.
- 8.2.3. Heathrow understands the reasoning behind the approach proposed by the CAA and considers that it is appropriate. We have adapted our approach in the RBP Update 2 to reflect this methodology.
- 8.2.4. However, in adopting this approach there are two important factors to consider:
- It should be clear that the additional risk adjustment is intended to be a long-term correction, and not just for H8. We understand this is the CAA's intention; and
 - The quantification of the adjustment should be appropriate.
- 8.2.5. We have updated our estimate of the impact of lower impact events on the appropriate shock factor resulting in an estimate of 0.87%, slightly lower than the 1.07% used in the Initial Proposals. Details of this analysis are set out in the RBP Update 2 – Section 6 – Passenger Demand Update.
- 8.2.6. In respect of the major pandemic revenue allowance, the CAA's calculation depends upon:
- The potential likelihood of pandemic type events; and
 - The potential magnitude of loss that Heathrow would incur in such an event.
- 8.2.7. The CAA has used an expected frequency of between 1 in 20 years and 1 in 50 years for a pandemic scale event. This is consistent with the UK government risk register¹, and Heathrow's assessment set out in RBP Update 1².
- 8.2.8. The CAA has also set out a calculational framework for setting out the expected losses that would occur in a pandemic event such as the one currently being experienced. Although Heathrow considers that the framework is appropriate, the CAA has made errors in the inputs to its calculations, and therefore obtained an erroneous adjustment. There are four specific issues with the calculation:
- It assumes that a pandemic type event cannot occur in 2022;
 - It assumes that a pandemic type event will have a duration of only 3 years;
 - It uses the wrong revenue adjustment, particularly for the first year; and
 - The elasticities for opex and commercial revenue are not consistent with the remainder of the Initial Proposals.
- 8.2.9. The CAA approach has switched the impact of a potential pandemic off for 2022 in its calculation. However, the likelihood of a pandemic in 2022 is just as high as it is in the other years and therefore there is no reason to exclude 2022 from the calculation.

¹ UK Government, National Risk Register, 2020, p9

² Heathrow, RBB Update 1, Chapter 5.6, p6

The drop in revenue would have a smaller impact in 2022, but that is captured by the calculation as it is based on revenue in that year. In reality, the likelihood of a significant impact on passenger numbers in 2022 will be higher due to the potential impact of a new Covid-19 variant on top of the risk of a separate new pandemic.

- 8.2.10. We understand from conversations with the CAA that the calculation is intended to replicate the consequences of a potential future pandemic that has the same characteristics as the current pandemic. We agree that such an approach is appropriate. However, in implementation, we consider that the CAA has diverged from this approach.
- 8.2.11. Firstly, the CAA assumes the impact of the pandemic will last for 3 years in total. This is inconsistent with the rest of its approach. The CAA forecasts that Heathrow will only return to c80mppa in 2024 under the high scenario (i.e. returning back to normal after 5 years), and in 2025 (after 6 years) under the mid scenario. The impact should therefore be longer. The forecast for 2023 is substantially lower than the pre-pandemic traffic levels and therefore the impact of this fourth year should be included in the calculation.
- 8.2.12. The CAA has used traffic reduction assumptions that are not consistent with the current actual/forecast impact of the pandemic. In particular, the estimate of 57% in the first-year impact is significantly below the outturn impact of 73%. Based on Heathrow's latest forecast, the impacts for the four years should be: 73%, 75%, 44%, and 28%.
- 8.2.13. Correcting the inputs in the CAA spreadsheet to include a potential impact in 2022, a four-year duration, and the correct passenger impacts increases the upper quartile adjustment from £26m pa to £34m pa. Due to the timing of receiving the CAA spreadsheet setting out the calculation, we have not included this adjusted figure in RBP update 2. Nevertheless, the appropriate adjustment should be included in the Final Proposals.
- 8.2.14. The calculation should also include elasticities for operating costs and commercial revenues that are consistent with the assumptions on operating costs and commercial revenues elsewhere in the determination.

8.3. Tax Treatment

- 8.3.1. In the Initial Proposals the CAA sets out its intention to continue with a pre-tax approach to determining tax allowances. It also sets out a potential tax uncertainty mechanism and a potential tax clawback mechanism.
- 8.3.2. We welcome the CAA's proposal to retain a pre-tax approach to tax.
- 8.3.3. The tax uncertainty mechanism proposed by the CAA would take account of any changes in corporation tax rate during the period compared to those assumed in the Determination and apply any resultant change in implied pre-tax liability as an adjustment to RAB at the end of the period. Given that the rate of corporation tax is clearly outside of Heathrow's control, and moreover, that there is perhaps greater uncertainty about corporation tax rates in H7 given the current proposed increase in the Rate in 2023, we consider that an adjustment mechanism for corporation tax rate is appropriate.
- 8.3.4. We also accept that an end of period adjustment as proposed by the CAA is appropriate. However, we consider that a reasonable alternative approach to a RAB

adjustment would be a revenue adjustment during the subsequent period. We consider that a flexible approach that allowed the correction to be made by either a revenue or a RAB approach at H8 would allow more flexibility for H8 and therefore be more in consumer interests than a fixed approach.

- 8.3.5. The tax clawback mechanism proposed by the CAA is intended to share the benefits of any reduction in tax that Heathrow might obtain as a result of increasing its gearing above that of the notional company.
- 8.3.6. However, it is not clear that such benefits exist in practice. Under CAPM, the amount of tax payable would be expected to increase with higher levels of gearing. This is illustrated in Table 1 below that shows the amount of tax that would be expected to be paid for a range of asset betas and debt betas. The calculations assume a TMR of 5.85%, a RFR of -2.0% and a tax rate of 23.5%.

Table 1: Tax payable as % RCV at different levels of gearing

Gearing	Tax payable as % of RCV				
	60%	65%	70%	75%	80%
Asset Beta 0.6 debt beta 0.05	1.1%	1.2%	1.2%	1.2%	1.2%
Asset beta 0.6 debt beta 0.1	1.1%	1.1%	1.1%	1.1%	1.1%
Asset beta 0.82 debt beta 0.05	1.7%	1.7%	1.7%	1.7%	1.8%
Asset beta 0.82 debt beta 0.1	1.6%	1.6%	1.6%	1.6%	1.7%

Source: Heathrow

- 8.3.7. Table 1 shows that the amount of tax payable increases as gearing increases. This is because the cost of equity, and hence the returns on which tax is paid, increases more quickly than the gearing decreases.
- 8.3.8. Given that the tax payable would be expected to increase slightly with gearing, the tax clawback mechanism would result in additional revenues to Heathrow if it were geared above the notional level. However, given that the impact of gearing on tax payable is relatively small, the tax clawback mechanism appears to add additional complexity for little benefit. Therefore, we consider that it is not required for H7.

8.4. Financial framework

- 8.4.1. This section responds to issues raised in Chapter 8 of the CAA's Initial Proposals.

Notional financial structure

- 8.4.2. In the Initial Proposals the CAA sets out its proposed approach to continue with a notional financial approach, and to assume that Heathrow had gearing of 60% at the start of 2020 and would return to that level during H7.³
- 8.4.3. We agree that this approach is appropriate. However, we have two key concerns relating to the approach taken by the CAA in its analysis and approach to dividends.

³ CAA, CAP2265C, Para. 8.41

- 8.4.4. Firstly, the CAA incorrectly set the opening gearing in its financial model and has therefore underestimated both the peak gearing in 2021, and the gearing throughout H7.
- 8.4.5. Secondly, the CAA has proposed an approach in which dividends are not paid until gearing returns to 60%. As a result of the opening gearing error, the CAA has underestimated the impact this would have on dividends.
- 8.4.6. More broadly, the CAA has not justified this approach to gearing for a notionally financed company. In principle, there is no reason why such a company would forgo dividends until its gearing was 60%. It would be far more likely to have a dividend policy that returned gearing to 60% by the end of the period and allowed dividends to be paid in each year.
- 8.4.7. In addition, the CAA does not justify its assumption that a notionally financed company would not pay a dividend in 2022, except by referring to analysts' expectations of when actual companies are likely to do so. It has not justified why this comparison is relevant to a notionally financed company. In practice, companies will take a long-term view of meeting any gearing targets they have and therefore dividends are unlikely to reflect short-term gearing issues. The more pressing constraints that affect dividends in the short-term are:
- Technical provisions in covenants that require minimum financial ratios for gearing or cashflow to be met before dividends can be paid; and
 - The need to preserve cash to provide financial resilience to the potential ongoing impact of the pandemic.
- 8.4.8. The first of these should not be relevant for a notionally financed company, and therefore should not be used by the CAA in its approach. This reinforces the inappropriateness of tying dividend payments to a specific gearing level for a notional company.
- 8.4.9. In contrast, the impact of the need to preserve cash during the pandemic is an appropriate consideration for the notional company, that might restrict dividends early in H7, and particularly in 2022. However, if the notional company is not paying dividends in order to preserve cash, it would also be expected to carry significant cash balances and the extra cost of this liquidity should be reflected in the assumed cost of debt.
- 8.4.10. In RBP Update 2 we have included the additional cost of carry in our cost of debt estimate assuming that a large cash balance is retained in 2022 and then run down during 2023. This is coupled with an assumption that dividends are resumed in 2023.
- 8.4.11. We consider that in respect of dividends, the CAA should also assume a resumption in 2023, and target a smooth dividend payout that results in gearing of 60% at the end of H7.

Depreciation

- 8.4.12. In the Initial Proposals the CAA sets out its proposed approach to base depreciation on the profile in the RBP Update as this reasonably balances the needs of current and future passengers.⁴
- 8.4.13. We agree that the depreciation profile provided is an appropriate starting point as it is based on a detailed assessment based on the lives of different assets and therefore ensures that the cost of assets is spread out fairly over time for consumers.
- 8.4.14. However, we note that the CAA has concluded that no adjustment is required for affordability reasons. Whilst we agree that this would be true for the price range they have identified, the errors the CAA has made in assessing building block mean that a corrected price range would be very much higher. Therefore, some adjustment of depreciation to address affordability potentially remains appropriate.
- 8.4.15. In RBP Update 2 we show that based on the correct building blocks the average charge in H7 before regulatory smoothing is £41.95 (2018p). We also set out that it is possible and potentially appropriate to reduce this charge to £34.07 (2018p) by deferring £635m per annum of regulatory depreciation over H7. Such a profile would lead to a more stable price for airlines over the next 10 years.
- 8.4.16. However, as explained in the RBP, we consider the conditions necessary for profiling of depreciation to be⁵:
- 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
 - 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.
- 8.4.17. Without a full RAB adjustment, neither of these conditions are met as explained in Chapter 5.1 of RBP Update 1. In particular, without a RAB adjustment:
- Investors would lose confidence in the protections of the regulatory regime around return of capital for circumstances beyond their control; and
 - The initial gearing of the notional company at the start of H7 would leave insufficient financial headroom to defer depreciation.
- 8.4.18. Therefore, any use of depreciation deferral to smooth charges is dependent upon a full RAB adjustment being made in respect of the Covid-19 losses in iH7. We show that application of an appropriate risk sharing mechanism would lead to a RAB adjustment of £2.5bn (See section 6 - RAB adjustment), considerably in excess of the £300m included in the Initial Proposals.

8.5. Price cap and financeability

- 8.5.1. This section responds to issues raised in Chapter 11 of the CAA's Initial Proposals.

Profile and affordability

⁴ CAA, CAP2265C, Paras. 8.41 & 8.42

⁵ Heathrow, RBP Update 1, Chapter 5.1, p8

- 8.5.2. In Chapter 11 the CAA set out its view of the unprofiled charge that would result from its assessment of building blocks for its upper quartile and lower quartile cases. This resulted in the charge falling from around £51 in 2022 to £28 in 2026 for the upper quartile scenario, and from £38 in 2022 to around £19 in the lower quartile scenario⁶. For the Initial Proposals, the CAA used a P0 adjustment to set flat charges in real terms (RPI) for the whole of H7⁷. This resulted in charge being well below the building block level for 2022 and slightly above for 2026.
- 8.5.3. The CAA proposed a P0 and flat profile to protect affordability by keeping prices lower earlier in the period. However, it also stated that price increases could lead to some marginal routes becoming uneconomic and as a consequence consumers would lose some choice of routes⁸. It also stated that at the top of their range consumers would need to fund significant price rises.
- 8.5.4. These concerns of the CAA are not founded on a sound understanding of the economics of Heathrow. Capacity constraints at Heathrow mean that airlines have been able to charge surplus fares and extract a scarcity rent or congestion premium. This has been estimated to be £2.0bn to £2.6bn per annum, with a premium on short haul flights of £34 and long haul of £200⁹ (2018p) per return ticket. Given the current split between short-haul and long-haul charges, pre Covid-19 airport charges would have had to increase by more than £45 to begin to eliminate this premium on short haul flights. Therefore, as long as airport charges remain below around £60, there would continue to be a congestion premium available to airlines. The availability of this premium means that increases in airport charges will not be funded by consumers and will not reduce consumer choice.
- 8.5.5. Consumers will not have to fund the increase in airport charges because the availability of the congestion premium means airlines are already charging above their costs at the maximum the market will bear. Increases in airline costs specific to Heathrow will not change the maximum fare they can achieve and therefore will not change the price that consumers pay.
- 8.5.6. Similarly, the availability of the premium means that there should be no marginal routes at Heathrow. This is because the capacity shortage means that airlines will be able to find routes with unmet demand that deliver them a premium over the fully competitive price. As a consequence, increases in airport charges will not reduce choice of routes. More widely, the movement cap at Heathrow means that the overall number of flights from Heathrow will not change whilst demand exceeds capacity.
- 8.5.7. Although Heathrow is not capacity constrained entering into H7, it is anticipated to return to its movement capacity limit during 2024. However, even at the current lower passenger numbers there is clear evidence of system capacity limits. Air fares on popular routes are much higher than the pre-pandemic levels suggesting that demand is much greater than supply. Given that airlines are not providing the extra capacity to meet this unmet demand, either they do not have any more capacity currently available, or route economics have changed such that airlines are more profitable targeting a higher yield. In either case, contrary to the CAA's assertion, increasing airport charges would neither increase the cost to consumers nor reduce the choice of routes available to them.

⁶ CAA, CAP2265C, Figure 11.1

⁷ CAA, CAP2265C, Para. 11.60

⁸ CAA, CAP2265C, Para. 11.57

⁹ Frontier Economics, Estimating the Congestion Premium at Heathrow, 2019

- 8.5.8. These errors in the CAA's analysis of the impact of price increases on consumers has led to them to the wrong balance between affordability and financeability. This is particularly relevant for charges in 2022 when passenger numbers are relatively low and financeability is most stretched.
- 8.5.9. The CAA has consulted on a price of £29.50 (2020p CPI) for 2022. This is far below even the bottom of the CAA range for the unprofiled charge for 2022 and would create a significant risk to credit ratings in 2022. It would lead to significant pre-tax losses and result in an FFO/Debt ratio of around 3% for the notional company. As set out below this is less than half the minimum ratio required for an investment grade credit rating. This creates a significant threat to Heathrow's credit rating and financial resilience.
- 8.5.10. For the Final Proposals, the CAA must take proper account of the economics of Heathrow in balancing affordability and financeability. Ensuring Heathrow is financeable is fundamental to ensuring long term value for consumers. Increases in airport charges will not affect the fare consumers pay or the choice of routes they have. Therefore, furthering consumer interests requires the CAA to place much greater weight on financeability.
- 8.5.11. This means that for the Final Proposals the CAA must:
- Set a price for 2022 that provides sufficient cashflow to restore adequate financial resilience. At a minimum, the CAA must ensure that the FFO/Debt for 2022 and 2023 combined is consistent with a comfortable investment grade credit rating and an average FFO to debt of greater than 7.0%; and
 - Ensure that the price profile over H7 provides an average FFO to debt of greater than 9.0%
- 8.5.12. Subject to the constraints above we agree with the CAA that a flat charge profile over the period is appropriate.

Debt financeability

- 8.5.13. The CAA sets out an assessment of debt financeability in Chapter 11 of the Initial proposals. We consider that the CAA makes a number of errors and failures of analysis in this assessment.
- 8.5.14. There are four key elements required for assessing financeability:
- Identifying the right credit rating to target;
 - Including the right cash-flows in the financeability analysis;
 - Comparing financial ratios to the appropriate targets for the credit rating targeted; and
 - Carefully considering how rating agencies would interpret the resultant ratios in their credit rating assessments.
- 8.5.15. In the Initial Proposals, the CAA has made errors in each of these areas. Some of these errors have arisen as a result of the CAA's mixing issues around the financing of the notional company with constraints that arise on Heathrow as a result of its actual position as a result of the current pandemic. As the CAA has set out in several places, its financeability assessment should be based on a notionally financed company. In the Initial Proposals the CAA has failed to consistently take this approach.

Target Rating

- 8.5.16. In the Initial Proposals the CAA take the view that it is appropriate to target a BBB+ rating for the notional company for H7, but that they would test its ability to raise sufficient debt at a BBB rating.
- 8.5.17. In this section we set out: the required rating for Heathrow; the required rating for a notionally finance Heathrow; and the ratings required for the notional company in H7 particularly in respect of FFO/Debt.

Required Rating for Heathrow

- 8.5.18. Heathrow's senior debt is rated BBB+/A- by Standard & Poor's (S&P) and Fitch, both with negative outlook.
- 8.5.19. 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.
- 8.5.20. 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.
- 8.5.21. 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.
- 8.5.22. 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 they are 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 ultimately bear these higher costs.

- 8.5.23. 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.
- 8.5.24. A reduction in credit rating during 2022 would have material consequences. Heathrow plans to refinance its £1.15bn Revolving Credit Facility ('RCF') during the first half of 2022 to ensure the business can maintain an appropriate liquidity position in the coming years. The events of 2020 and 2021 have demonstrated the importance of maintaining a significant liquidity buffer. The RCF comprises both a Class A and Class B tranche and is provided by a group of over 20 banks.
- 8.5.25. A downgrade in credit rating would reduce Heathrow's Class B rating to sub investment grade and its Class A rating to BBB. This would materially reduce the size of liquidity facility that Heathrow is able to access as banks' willingness to provide facilities at these lower ratings is significantly more limited. Furthermore, any banks willing to provide facilities would do so at materially higher costs. As such, a downgrade would reduce the liquidity buffer available to Heathrow, increase financing costs and significantly jeopardise its ability to cope with another downturn in demand were it to materialise. Additionally, a downgrade would result in much less capacity from banks to provide hedging coupled with much higher hedging costs. This is fundamental for Heathrow in terms of accessing foreign currency debt markets to achieve cost efficient debt financing. Any downgrade would result in a much higher cost of debt, this is not in the interests of consumers who would ultimately bear the higher costs.
- 8.5.26. 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 spreads 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.
- 8.5.27. Therefore, it is in consumers' interest that Heathrow avoids being further downgraded in 2022 and is able to restore an A- credit rating during H7.

Required rating for a Notionally Financed Heathrow

- 8.5.28. In the previous section we demonstrated that it was in consumers' interest for Heathrow to be able to restore an A- credit rating during H7. For a notionally financed

Heathrow this means targeting a rating of BBB+. This is because credit rating agencies give a one notch benefit for companies with structured debt. A notionally financed company would not be assumed to have structured debt. Therefore, the credit rating thresholds for a BBB+ rating on a notionally financed company without structured debt are the same as those used that would apply for an A- rating with structured debt.

- 8.5.29. Consequently, in line with our view that it is appropriate for the CAA to take a notional approach to Heathrow's financing, we have set out previously in the RBP and RBP Update 1 that the CAA should target a rating of BBB+ for a notionally financed company and target financial ratios in its financeability analysis that are consistent with a BBB+ rating for a company without structured debt.
- 8.5.30. This is consistent with the view of the CMA. In the Water Company inquiry, it identified that the appropriate credit rating to target for a notionally financed company at 60% gearing was BBB+.¹⁰
- 8.5.31. Taking these factors together, it is clear that regulatory precedent and the best interests of consumers means that the CAA must target a rating of BBB+ for the notionally financed company.

Financial Ratios to be targeted

- 8.5.32. The CMA also set out a clear view of the minimum credit metric levels that should be targeted to achieve difference levels of credit rating¹¹. These are set out in Table 2.

Table 2: CMA Financial Ratio Targets

Rating	FFO/Debt	AICR
BBB+	9.0%	1.5x
BBB	8.0%	1.3x
BBB-	6.0%	1.1x

Source: CMA

- 8.5.33. These credit rating thresholds have been identified by the CMA as being appropriate for a notional company with 60% gearing. As such, they are directly applicable to a notionally financed Heathrow and therefore the CAA must adopt these targets for use in its financeability assessment.
- 8.5.34. Of these metrics, the most important for Heathrow in H7 is Funds From Operations ('FFO') / Net Debt (FFO = revenue – opex – interest – tax).
- 8.5.35. Therefore, to ensure a rating of BBB+ is achievable by the end of H7, the CAA should ensure that FFO/Debt on average over the period is greater than 9.0%.

¹⁰ CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Para. 10.100

¹¹ CMA, Anglian Water Services Limited, Bristol Water plc, Northumbrian Water Limited and Yorkshire Water Services Limited price determinations, Final Report, March 2021, Para. 10.98

- 8.5.36. In addition, to ensure that the rating does not fall below its current level, the CAA must ensure that a rating of BBB is achievable in the early years of the period. This requires that the FFO/Debt on average over the first three years is greater than 8.0%.
- 8.5.37. Finally, the CAA must ensure that the FFO in 2022, the most challenging year, does not fall far below 6.0% as this will create a significant risk of a further credit rating downgrade. In addition, the CAA must ensure that the average FFO/Debt for 2022 and 2023 combined is greater than 7.0% and therefore clearly consistent with an investment grade credit rating.

Including the right cash-flows in the financeability analysis

- 8.5.38. The CAA sets out an analysis of financeability in the Initial Proposals in which it compares a range of financial metrics against appropriate targets. There are a number of key concerns we have with the analysis presented:
- The initial gearing in the model was not set at the intended level of 60%. This means that the assessment has calculated the incorrect credit metrics and cashflows;
 - The capex scenario considered by the CAA is not realistic and is too low. As a result, the requirement for new debt has been underestimated and the resulting credit metrics are optimistic;
 - The approach that links dividends to returning to 60% gearing is inappropriate and results in financial ratios in the early years being optimistic; and
 - The analysis has an unrealistic view of operating costs and commercial revenues. This is particularly an issue for the early years of H7 where the financial ratios are most stretched.
- 8.5.39. In the Initial Proposals, the CAA model an approach whereby no dividends are paid until gearing is restored to 60% and then dividends are set to maintain gearing at 60%. This approach will not work once the CAA have corrected the opening gearing position as it will take longer for gearing to return to 60%. This will also be exacerbated when the right level of capital expenditure is included.
- 8.5.40. The approach to dividends is discussed above in Section 8.4, which identifies that the approach to dividends for the notional company should:
- Commence dividends in 2023; and
 - Set a smooth dividend profile that results in gearing being at 60% at the end of H7.
- 8.5.41. The CAA must implement this approach for its Final Proposals.

Assessment of Credit Metrics

- 8.5.42. The CAA's analysis of credit metrics calculates AICR and FFO to debt metrics for 2022 and 2023 that are not consistent with an investment grade credit rating. However, it dismisses the need to make any adjustments to its process because it considers that rating agencies will look through these poor years to the better years

at the end of the period, and that in any case a downgrade in 2022 to BBB would still be investment grade¹².

8.5.43. There are two key errors in this assessment by the CAA:

- Firstly, Credit Rating agency methodologies do not allow them to look five years ahead and their analysis is based on three year averages. In addition, Heathrow has exhibited sub threshold credit metrics in 2020 and 2021 so low values in 2022 and 2023 would not be treated as isolated events. The CAA must take account of this shorter window in its analysis; and
- Secondly, Heathrow has already been downgraded one notch due to the impact of the pandemic. Therefore, the equivalent notional company should be considered as currently also being downgraded a notch and therefore already at a BBB rating. A further downgrade would be to BBB-, which would severely limit access to financing. Heathrow will need to retain access to significant liquidity throughout 2022 and into 2023 to provide sufficient resilience against the potential impacts of Covid-19. An additional downgrade could severely reduce access to such liquidity undermining financial resilience.

8.5.44. The CAA also state that they consider that the PMICR gives an unduly pessimistic view because depreciation is high compared to the assumed capex and therefore the assumed capex might give a better picture of the requirements of maintaining the asset¹³. There are two errors in this analysis:

- PMICR for regulated companies is intended to measure cash flow after maintaining the financial asset rather than the physical asset. Therefore, depreciation is the correct figure to use; and
- The capex included in the Initial Proposals is far too low to maintain the airport appropriately. The comparison with depreciation should instead be treated as a clear sign that the level of capex allowed is insufficient. In Chapter 3 - Capex we show that the right outcomes for consumers requires a capital programme of £4.1bn in H7 rather than the £2.4bn included in the Initial Proposals.

8.5.45. The CAA also state that it considers the introduction of traffic risk sharing would reduce the risk profile of the notional entity¹⁴. It is not clear that debt investors would take significant comfort from such a mechanism because:

- Firstly, as the CAA have noted, the mechanism makes no difference to cash flows within period. A significant event would still create a material and potentially unmanageable strain on the finances of the airport; and
- Secondly, creditors would likely give it little weight unless the CAA also apply the risk sharing approach to the losses in iH7. At Q6, the CAA said that their ability to revisit the settlement in the event that traffic turned out to be materially

¹² CAA, CAP2265C, Para 11.77

¹³ CAA, CAP2265C, Para 11.78

¹⁴ CAA, CAP2265C, Para 11.84

lower was credit positive¹⁵. If the CAA fail to take appropriate action for iH7, creditors will give little weight to the possibility of appropriate action in the future.

- 8.5.46. Similarly, the CAA's approach to Heathrow's request for a RAB reopener is likely to be regarded as strongly negative rather than neutral¹⁶. The CAA set out a clear expectation ahead of Q6 that exceptional circumstances would lead to an appropriate adjustment. The limited adjustment to RAB made at the Initial Proposals is likely to undermine investors' confidence that the CAA will act appropriately in such situations in the future.

Equity financeability

- 8.5.47. The CAA's IP set out an assessment of equity financeability based on a consideration of return on regulatory equity; internal rate of return; and running yield and dividends. We discuss some issues in the CAA approach in these areas below.
- 8.5.48. However, although these issues are important for equity financeability they do not include the most important requirement for equity financeability, which is that investors need to have confidence in the regulatory regime and fundamental risk balance of the framework. Three successive Regulatory periods with significantly sub-par outturns means that this basis of confidence has been undermined. We consider that the CAA's approach in the Initial Proposals fails to restore this basis of confidence and therefore equity financeability is significantly undermined.
- 8.5.49. To restore this basis of confidence the must CAA make an appropriate RAB adjustment in respect of the impact of Covid in iH7. At the outset of Q6 the CAA made clear that they would revisit the settlement in the event of that traffic turned out to be significantly lower than forecast and stated that their ability to do so was credit positive. The actual scale of adjustment currently proposed by the CAA represents less than 10% of the losses arising as a result of Covid. As such it is inconsistent with the reasonable expectations of investors at the start of Q6. The CAA must change its approach to the iH7 RAB adjustment to restore confidence in the regulatory framework.
- 8.5.50. The CAA's analysis of RoRE shows that it is negative in 2022, and that the average over the period is significantly below the allowed level¹⁷. We suspect that the discrepancy in the allowed level arises from an error in comparing a real outturn RoRE with a nominal cost of equity. More importantly, the CAA has not set out any consideration in respect of whether a negative RoRE is an appropriate outcome of its price profiling, and if not what minimum RoRE it should target in any year. We consider that proper consideration of equity financeability would rule out a price profile that led to negative RoRE in any year in the period. The CAA should adopt this as an additional requirement in its Final Proposals and ensure its price profile does not lead to negative RoRE in 2022. This is equivalent to ensuring that the notional company does not make a pre-tax loss in any year.
- 8.5.51. In Figure 11.12 of CAP2265C the CAA sets out a profile of Heathrow's actual dividends based on the dividends from Heathrow SP. The measure used by the CAA

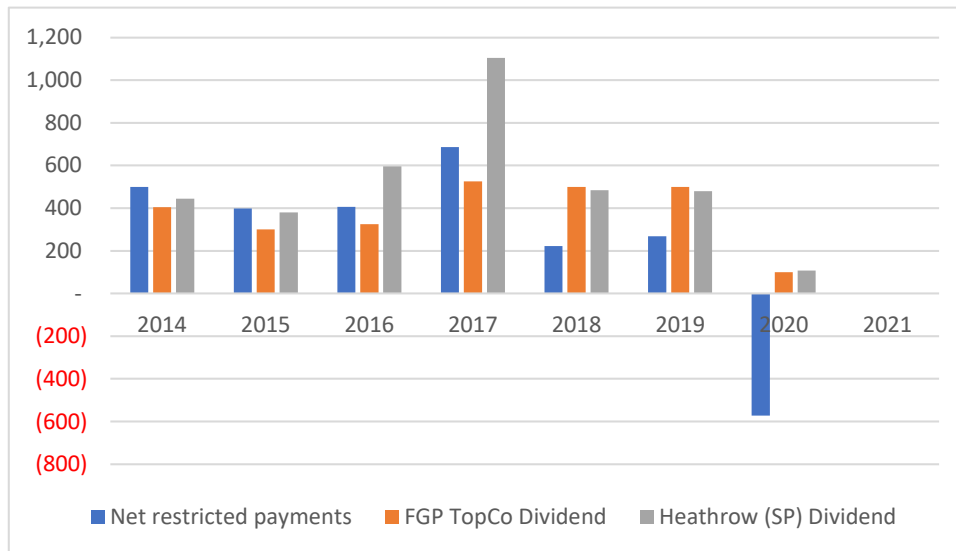
¹⁵ "The CAA's proposed licence did not propose fundamental changes to the form of regulation for HAL and hence is not expected to weaken HAL's credit strength. However, the ability of a licensing regime to revisit the price control if key assumptions, such as traffic, are significantly worse than the forecast, could be a credit strength." - CAA, CAP1151, paragraph I29

¹⁶ CAA, CAP2265C, Para 11.86

¹⁷ CAA, CAP2265C, Figure 11.11 and Table 11.3

is not the correct measure to use for this purpose as it excludes a significant amount of the cashflow between Heathrow SP and Heathrow Finance that should also be taken into account. The analysis should be based on Heathrow SP net restricted payments. This includes all cash payments outside of the SP group including dividends and interest on and repayments of subordinated loans net of cash inflows to the SP group, including proceeds of debt issuance. This results in a more accurate picture of the cash flows to equity and also reflects the equity injection into the regulated business in 2021. The net restricted payments are set out in Figure 1.

Figure 1: Heathrow SP Net restricted payments



Source: Heathrow

8.5.52. The CAA should correct its analysis for the Final Proposals.

9. Capex Incentives

9.1. Introduction

9.1.1. The CAA's Initial Proposals set out its intentions to make a number of changes to the existing capex arrangements. These changes include the introduction of additional ex-ante incentives for all H7 capex investment and a new ex-post evaluation of Delivery Obligations. We disagree with these proposed changes because;

- The CAA has not provided sufficient evidence to justify a full movement towards ex-ante incentives and has not provided a justification of the benefits they will deliver for consumers;
- The proposed changes rely heavily on the Arcadis report, which does not provide a balanced representation of our programmes, deriving erroneous conclusions;
- The CAA has not offered a coherent regulatory proposal that is in line with regulatory best practice and drawing on individual elements from other regulated sectors without making a comprehensive assessment; and
- The CAA Have not provided sufficient detail to enable a timely implementation.

9.1.2. While we disagree with the CAA's proposed framework, we are keen to reach a workable solution that would enable us to commence investment on H7 as soon as possible and continue to deliver capital flexibly and efficiently in the interests of consumers. To that end we have continued to engage at length with the CAA and the Airline Community and develop what we think is a workable solution for capital efficiency in H7.

9.1.3. In line with our response to CAP2139, we conclude that a gradual introduction of ex-ante incentives, only for those categories of our capital plan that are suitable, could represent a positive evolution to the existing capital efficiency framework. In summary, our position on capital efficiency is as follows:

- Application of ex-ante is not suitable for all capex categories and must be targeted at those which are controllable, repeatable and benchmarkable. We propose c.40% of our capex envelope is suitable for ex-ante;
- A 15% incentive rate reflects an appropriate risk profile to the areas subject to ex-ante incentives. It is aligned with the existing incentive rate of 13%, which has ensured efficiency through Q6;
- Delivery Obligations cannot be implemented for the purpose of assessing capital efficiency unless the CAA clearly articulates how it will carry out an ex-post review of performance against them. We propose no ex-post efficiency review or reconciliation process on programmes subject to ex-ante, and the current ex-post review to apply to the other programmes; and
- Triggers are not suitable if the CAA introduces Delivery Objectives. Additional delay timing incentives are not required as they cut across other incentives such as OBR and incentive rate.

9.1.4. The remainder of this chapter is structured as follows:

- Our concerns about the CAA's proposals;
- Heathrow's proposal for the H7 capital efficiency framework; and
- Detailed feedback to the CAA's proposals.

9.2. Our concerns regarding the CAA's proposals

9.3. CAA's proposals on capital efficiency are not sufficiently developed to allow for implementation in H7

- 9.3.1. Our first concern is one of timing. The CAA has effectively timed itself out to introduce changes to the framework without disrupting our delivery of the H7 investment plan.
- 9.3.2. In CAP2139, the CAA acknowledged it has been consulting on incentives for capital efficiency for four years. We are now less than one month from the start of the H7 period and the CAA has still not provided sufficient detail on its proposed capital efficiency framework to enable its implementation.
- 9.3.3. At this late stage the CAA's proposals are still without vital detail on (i) what the precise incentive will be, (ii) what criteria and process will be followed for reconciliation at the end of the period; and (iii) the role of the CAA and/or its advisors within the period. Therefore, given the lack of detail, the CAA cannot expect us to implement its proposals with less than one month to the start of H7. Any attempt to implement the framework at this stage would be too complex and expose Heathrow to unquantifiable regulatory risk, which is not in the interests of consumers.
- 9.3.4. On the other hand, the current capital efficiency process and related governance is well understood by stakeholders and has a proven track record of efficient and timely delivery. We therefore cannot see the benefit of continuing to pursue a move to this new, undefined framework at this late stage.
- 9.3.5. The lack of definition in the CAA's proposals also means that we are unable to assess the true impact of the proposed framework on our risk. Without adequate detail on the items highlighted in paragraph 9.3.3, we cannot assess the real impact of the CAA's proposals on our framework and whether it is acceptable.
- 9.3.6. This uncertainty of implementation is reflected in the CAA's CAP2275 document on proposed H7 licence modifications, where the CAA has not proposed any drafting to implement its proposed framework. Absent the ability to comment on this, we cannot accept the CAA's proposals.

9.4. The CAA's proposals do not justify how they will deliver increased consumer benefits compared to the current regulatory model

- 9.4.1. We disagree with the CAA's view that the best way to incentivise efficient capex and deliver value for money is through a universally applied forward-looking ex-ante incentive.
- 9.4.2. The proposals have failed on multiple occasions to provide any evidence on why the current framework has not delivered in the interest of consumers, what they are aiming to address, and how they are targeted and proportionate. We have asked repeatedly¹ that the CAA undertakes a Regulatory Impact Assessment on the

¹ For example, in our response to CAP1951 (October 2020), para. 13, page 4.

proposed move to ex-ante and for the CAA to quantify the expected costs and benefits for all relevant stakeholders – this has not been undertaken.

- 9.4.3. As part of its justification, the CAA notes the following points:
- The current framework does not provide a sufficiently strong incentive for efficiency; and
 - The ex-post review element of the current framework is difficult and contentious to carry out.
- 9.4.4. We do not agree that the current framework does not provide the right incentives for efficiency. The Q6 capex arrangements have been in place for 8 years and have helped deliver an airport that has been consistently ranked as one of the best airports in Europe and worldwide by consumers.
- 9.4.5. By the end of 2019 around 720 projects had passed the Gateway 3 (G3) process, with a total value of £2.9 billion (2018 prices). The current framework ensured projects in Heathrow's portfolio were completed within 0.5% of their estimated G3 value.
- 9.4.6. The efficiency of this £2.9bn has been robustly reviewed throughout the process and we cannot find any evidence of significant inefficient spend across the Q6 portfolio. On the contrary, the Independent Fund Surveyor (IFS)², clearly stated that cost and time overruns for high value and high complexity projects are often caused by reasons outside of the project team's control, with low value and low complexity projects generally delivered on time and under budget. It is also worth noting that a cost overrun does not automatically mean it is inefficient.
- 9.4.7. The CAA's consultants, Arcadis, identified a potential inefficiency of £12.7m through the end of the Q6 review. This represents 0.44% of the overall portfolio. This should give confidence to the CAA and stakeholders on the level of efficiency already delivered under the current incentive mechanism. Furthermore, we are already subject to an ex-ante incentive across our whole capex programme of 13% via the financing cost incentive.
- 9.4.8. It is not clear that the CAA's proposals for capital efficiency will remedy its concerns with the current ex-post review process. Instead, we believe that proposing ex-ante incentives on all capital projects will exacerbate, rather than alleviate, the CAA's concerns with the complexity of efficiency reviews.
- 9.4.9. Under the current framework, the CAA has access to a wealth of information on our capital delivery. Through Q6 the IFS has produced over 650 reports on our capital delivery, which provides the CAA with valuable information with which it can assess efficiency.
- 9.4.10. The CAA's proposals, although still yet to be fully defined, propose an ex-post assessment of delivery against Delivery Obligations to ensure that Heathrow has delivered what was agreed when the investment decision is approved. This means that the CAA will continue to have an ex-post review process as part of its efficiency framework.

² IFS was established in Q6 as a recommendation from the CAA to enable an independent body to provide real time review of efficiency. The IFS was then jointly commissioned by Heathrow and the airline community to review and scrutinise our spending decisions.

9.4.11. Reconciling delivery against Delivery Obligations will require a judgement from the CAA as to whether we have delivered as agreed, as well as the quantification of any non-delivery. The current ex-post review process is a more objective exercise in determining efficiency, guided by the Capital Efficiency Handbook and real time monitoring by the IFS. This highlights that the CAA's proposed framework is likely to be more contentious and open to challenge from all parties.

9.4.12. Furthermore, a move to ex-ante incentives on projects for which the approach is not suitable will increase the risk of higher delivery costs and longer schedules. This will likely raise costs for customers through the increase in risk provisions associated with obtaining price certainty, which is not in the interest of consumers.

9.5. The CAA's ex-ante proposals rely heavily on the Arcadis report which contains errors and is not a balanced representation of our capital programmes

9.5.1. We agree with the CAA's principle that the application of ex-ante incentives should be guided by the nature and characteristics of the underlying projects. The CAA commissioned Arcadis to review our proposed capital programmes and assess whether or not they are suitable for ex-ante regulation. These findings have been used by the CAA to justify its proposals.

9.5.2. We disagree with the findings of the assessment carried out by Arcadis on the programmes contained in our capex envelope in the RBP Update 1. It is not an accurate nor a balanced representation of the nature of programmes or their risk, controllability, and complexity. It mischaracterises the programmes and has led to the wrong conclusion. In particular for, Asset replacement – generational renewals (T2 baggage); Regulated Security; Commercial revenue (generate incremental revenues); Efficient airport (automation and digitalisation); Carbon and sustainability and Future ready airport. These programmes are high in complexity, vary in controllability and regular/repeatable activity.

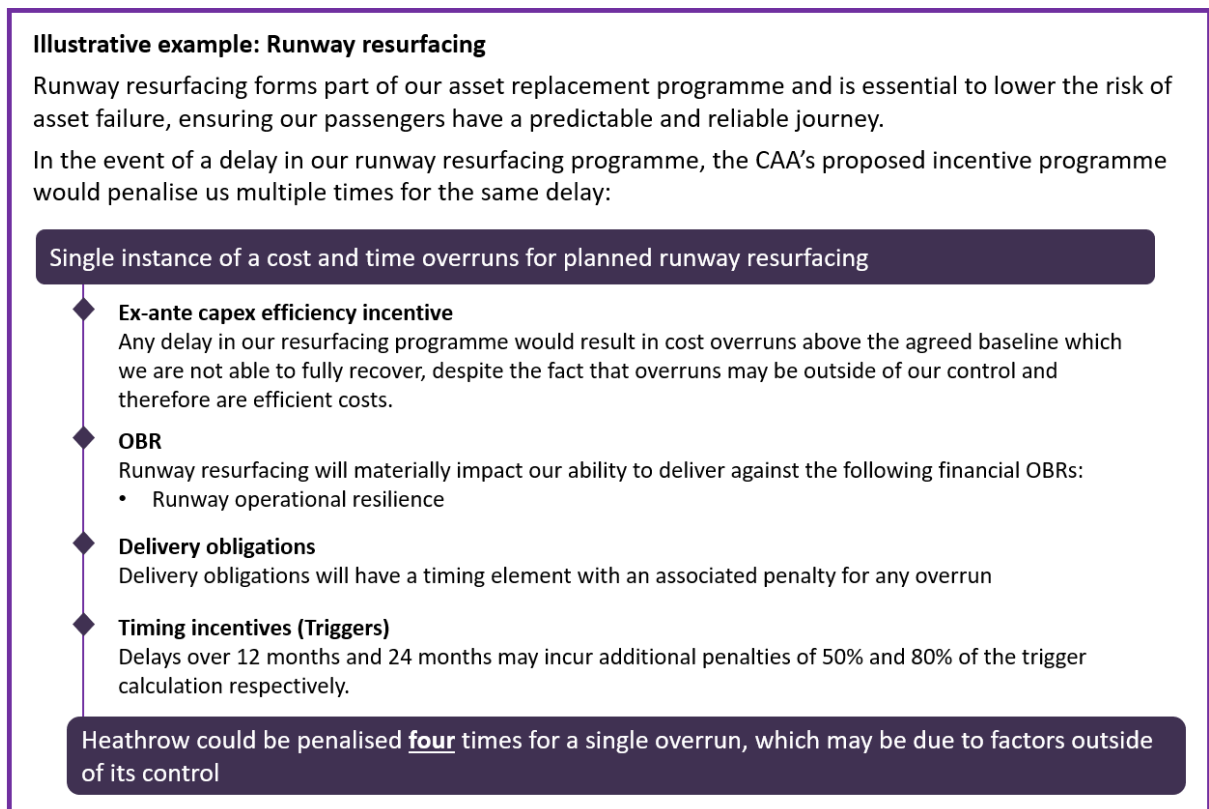
9.5.3. We have replicated the work carried out by Arcadis on each programme, using the latest available information, and have come to a different conclusion, which supports our original view in the RBP Update 1 that ex-ante is suitable only for some programmes. This is shown in Table 4.

9.6. The CAA's Initial Proposals do not offer a coherent regulatory proposal that is in line with regulatory best practice, and draws on individual elements from other regulated sectors without making a comprehensive assessment

9.6.1. The CAA's Initial Proposals propose several changes to capex incentives and sets out its view for each individual element (albeit some elements are not finalised). However, when considered as a whole, these individual elements do not come together to create a single coherent regulatory model.

9.6.2. A well-designed and proportionate regulatory model should ensure that there are no opportunities for double jeopardy across individual elements. This is not the case for the Initial Proposals, which include both implicit and explicit instances of incentive overlap. For example, in the event of a time overrun, there is a risk that we could be penalised four times for the same overrun, twice explicitly via the timing element of Delivery Obligations and timing incentives (triggers), and twice implicitly via the impact on OBR metrics and the ex-ante incentive rate on associated cost-overruns. This is clearly disproportionate and introduces an unacceptable level of risk, which will ultimately be reflected in the project cost. The below diagram sets out the multiple incentive overlaps:

Figure 1: Runway resurfacing illustration of incentive overlaps



Source: Heathrow

- 9.6.3. The CAA's Initial Proposals and supporting analysis make direct comparisons with other regulated sectors, such as water, energy, and rail, to justify the proposals. However, this approach is flawed and misunderstands how the regulatory approach works in each of those sectors.
- 9.6.4. Even putting aside differences in our underlying assets, which we discuss further in our specific response on ex-ante incentives, the overarching regulatory model in other industries is very different from the model proposed by the CAA. We are concerned that the CAA have cherry picked individual elements across various other regulatory regimes without due consideration of their wider regulatory context or how they interact with one another, leading to an inconsistent regulatory regime. We cite some examples below:
- **Ex-ante incentive rate.** The introduction of an ex-ante incentive rate is motivated by a desire to ensure efficient spend. However, whilst Totex sharing incentives exist in the water industry, they are not perceived as an ex-ante incentive (which are provided via project specific ex-ante outcome-delivery incentives). Rather it originates from the menu-regulation approach adopted at PR14, which has the objective of reducing regulatory burden and increasing accuracy of company business plans, and was retained for PR19 without the menu. Furthermore, sharing mechanisms in both water and energy are at Totex level rather than for individual projects as proposed, providing flexibility for companies to freely optimise spend against outcomes.
 - **Ex-post Delivery Obligations.** The CAA's Initial Proposals have justified the introduction of ex-post assessment of Delivery Obligations by referencing Price

Control Deliverables (PCDs) in energy. However, these are fundamentally different from the CAA's proposals. PCDs for gas distributors are subject to a materiality threshold of £5m to ensure proportionality. This means that less than 50% of baseline allowance relates to defined deliverables, and only a proportion of that will be linked to evaluative PCDs rather than mechanistic PCDs or volume drivers³. In comparison, the proposals place Delivery Obligations across our whole capex programme.

- **Role of airlines and perverse incentives.** There is no equivalent to the role of airlines in regulated utilities such as water and energy. We fully support the role that airlines played in our capital programme via the development and core gateway process in Q6. We believe the CAA's proposed incentive structure will result in an increased burden of governance, leading to a more time-consuming process than the existing approach with more escalations to the CAA. This would have the impact of increasing the risk of higher costs of delivery and longer schedules, which are not in the interest of consumers.

9.7. The CAA's Initial Proposals have not provided sufficient detail to enable a timely implementation

- 9.7.1. The current level of uncertainty means that it may not be practicable to implement the CAA's proposals. Limiting detail to high level principles at the start of H7 and then establishing the detail on the framework and reconciliation process within H7 when a Delivery Obligation is nearing its delivery, introduces unnecessary and unacceptable risks on us. Rather than building on the well-established strengths of UK regulatory frameworks - predictability and certainty - to enable private investment, the CAA's Initial Proposals undermine incentives for us to invest in H7. In the absence of the required level of detail, we have no alternative but to prepare cost estimates and schedules for H7 based on the Q6 capex arrangements.
- 9.7.2. We summarise below the areas in the Initial Proposals on each capex incentive /arrangement where no detail has been presented and where the incentive properties overlap and create perverse incentives.

³ Ofgem (2021). RIIO-2 Final Determinations – GD Sector Annex.
https://www.ofgem.gov.uk/sites/default/files/docs/2021/02/final_determinations_-_gd_annex_revised.pdf

Table 1: Summary of capital incentive measures proposed in the CAA's Initial Proposals

Measure	New	Incentive overlap	Detail presented by CAA
Explicit Ex-ante incentive	Yes	Yes	Yes
Ex-ante incentive 20% - 30%	Yes		No
Development & Core	No		Yes
Capex categories	No		Yes
Delivery Objectives	Yes		Yes
Delivery Obligations	Yes	Yes	Partial
Outputs	No		Partial
Quality requirements	No		Partial
Timing requirements	No	Yes	Partial
Timing incentive	Partial	Yes	No
Trigger	No	Yes	No
Late delivery penalty	Yes	Yes	No
Capex envelope change	No		Partial
CAA role (start of period)	Yes		No
Approval of Delivery Objectives/Obligations and Cost	Yes		No
Reporting requirements	Yes	Yes	No
CAA role (in period)	Yes		No
Process to change overall envelope	Yes		Partial
Decision maker to change overall envelope	Yes		No
Reconciliation process at end of period	Yes		No
Assessment of Delivery Obligations are met	Yes		No
CAA advisors	Yes	Yes	No
IFS role	No	Yes	No
Enhanced governance arrangements	Yes		No
Licence conditions on new framework	Yes		No

Source: Heathrow

9.8. Our proposal for the H7 capital efficiency framework

- 9.8.1. The CAA's Initial Proposals have not evidenced how a blanket ex-ante approach furthers the interest of consumers. Furthermore, given the highlighted errors on the proposed implementation of ex-ante, like double jeopardy of incentives, overall regulatory incentive package and lack of detail on the framework, we are unable to accept the CAA's Initial Proposals for the H7 capital efficiency framework as set out.
- 9.8.2. However, we are keen to reach a workable solution that provides certainty and allows us to get on with the necessary H7 investment programme in the interest of consumers.
- 9.8.3. We have engaged at length with the CAA and the airline community, and propose an alternative framework in this chapter. These proposals acknowledge the CAA's concerns around the current capital framework and the potential benefits of a gradual transition to ex-ante incentives where these are appropriate and proportionate. We summarise these proposals in Table 2 and the remainder of this chapter provides our justifications.

Table 2: Heathrow's proposed capital incentives framework

Element	Heathrow proposal
Ex-ante efficiency model	<ul style="list-style-type: none"> • If the CAA continues with ex-ante, it should be applied in a targeted and proportionate manner and not across the entire capex envelope. • Ex-ante has potential suitability to be applied to majority of (1) Asset Management and Compliance; and elements of (2) Commercial Revenues, (3) Efficient Airport and (4) Carbon & Sustainability. • Remaining capex categories should be subject to existing financing incentives, which is equivalent to 13% ex-ante efficiency incentive.
Efficiency rate	<ul style="list-style-type: none"> • The 15% incentive rate is suitable for categories subject to additional ex-ante regulation.
Delivery Obligations and Objectives and reconciliation process	<ul style="list-style-type: none"> • In the absence of detail from the CAA on the reconciliation process and how Delivery Obligations will be assessed – both the reconciliation process and Delivery Obligations cannot be implemented. • OBR metrics should be used instead of Delivery Obligations to avoid double jeopardy, and ensure our capex programme delivers outcomes for consumers. • The Capital Expenditure Chapter (Chapter 3) sets out our Programme Delivery Objectives. • Reconciliation/efficiency review – there should be no reconciliation process or ex-post review on programmes subject to ex-ante (as the proposed 15% efficiency rate

Element	Heathrow proposal
	provides the right incentive) and the current ex-post review should apply for other programmes.
Capex categories	<ul style="list-style-type: none"> We propose an alternative sub-division of the asset management programme that better reflects how those assets are managed (see Capital Expenditure – Chapter 3, from section 3.5.22).
Timing incentives	<ul style="list-style-type: none"> Triggers to apply based on similar criteria to today (but subject to CAA not introducing Delivery Obligations). OBRs and incentive rates act as timing incentives (no additional timing incentives to avoid overlaps).
Dealing with changes to Heathrow’s capex programme	<ul style="list-style-type: none"> As long as sufficient detail is provided, new governance processes could take effect no earlier than 1 January 2023 to allow sufficient time for implementation of the framework. Construction inflation explicitly recognised and accounted for in the establishment of initial capex category baselines. Further detail discussions with CAA and airlines on the criteria and process for adjusting the capex envelope and change control is required.
Q6/iH7 projects	<ul style="list-style-type: none"> We agree with the CAA that Q6 and iH7 projects should continue to be subject to the current Q6 capital arrangements for assessment of efficiency.

Source: Heathrow

9.8.4. This package of capex incentives builds on the Q6 capex arrangements. They are clear, manageable, and provide protection to airlines, Heathrow, and investors alike. Moreover, they provide a clear route to implementation through the existing governance arrangements with the airlines and deliver for consumers.

9.9. Detailed feedback on the CAA’s Initial Proposals

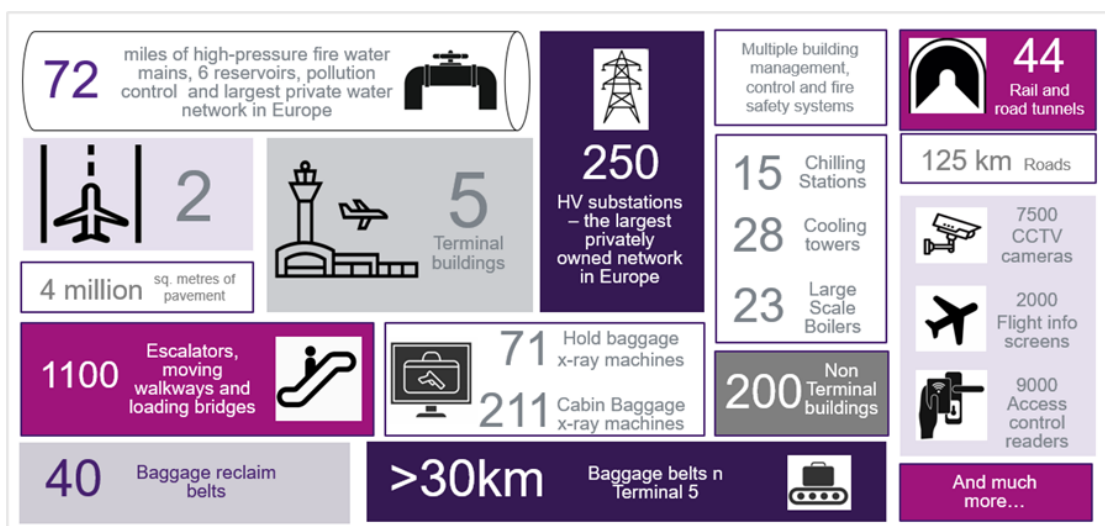
9.9.1. We set out our detailed response to the CAA’s Initial Proposals below. For consistency we use the same categories as those outlined in Table 2 above. Where we disagree with the CAA’s Initial Proposals, we outline the reasons why this is the case and why we believe our alternative proposals are in the interest of consumers.

9.10. Ex-ante efficiency model

9.10.1. As we set out above, the CAA has failed to provide evidence as to why the current framework has not delivered in the interest of consumers and how its proposals to move to a uniform ex-ante incentive framework will deliver benefits for consumers.

- 9.10.2. The CAA’s Initial Proposals also draw on comparisons with other regulated industries to conclude on the appropriateness of ex-ante incentive regulation. Comparing ex-ante incentive rates across different sectors is not appropriate when the overarching regulatory frameworks differ significantly. For example, in the water sector, the current ex-ante incentive rates can be traced back to PR14 when Ofwat provided companies with a cost menu. Menu regulation is based on the idea that, to overcome information asymmetry, the regulator can design a menu of up-front cost allowances and sharing rates that induce efficient information revelation. Ofwat implemented a menu-based approach at PR14 and then observed that most companies ended up with sharing rates around 50%, so at PR19 the approach was simplified.
- 9.10.3. Together with the cost-sharing rate, Ofwat introduced outcome delivery incentives and Totex (regulating total expenditure as opposed to capex and opex separately). The package of incentives that water companies are faced with is very different from the regulatory approach to Heathrow, for example it includes a menu-based approach for costs. Totex and outcome delivery incentives in the water sector mean that companies are incentivised to innovate as they can flexibly decide how to use their total allowance to achieve the outcomes. In the absence of a comprehensive review of regulatory frameworks, comparing ex-ante incentives across sectors is flawed as it fails to take into account the full set of incentives that companies face *in the round*. Similar conclusions apply to other sectors. Cherry-picking specific examples from other sectors leads to the wrong conclusions and perverse incentives.
- 9.10.4. The view reached by the CAA and Arcadis comparing our business to other sectors is overly simplistic and a mischaracterisation. The claim that water and rail assets are older, spread around the country and often buried in complex urban environments – and that projects at Heathrow are therefore less complex given they are relatively new and confined to a specific operational site – does not hold true. Figure 2 highlights the diversity of our assets.

Figure 2: The diversity of Heathrow’s asset base makes comparisons with other sectors problematic



Source: Heathrow

- 9.10.5. Moving to an ex-ante approach would exacerbate, rather than alleviate, the difficulties the CAA cite as reasons to move to ex-ante in its Initial Proposals. An ex-ante framework is reliant on the ability to estimate efficient costs, often multiple years in advance of delivery, and therefore requires reliable forecasts supported by historical or benchmarking data.
- 9.10.6. In contrast, the nature, scale, and complexity of our business means that capex projects, particularly large projects, are (i) one-off projects with little to no historic data or comparators to enable benchmarking, and (ii) subject to significant factors outside of our control. The move to ex-ante regulation for each and every one of our capital programmes will therefore inevitably expose us to greater forecast error and increase risk provisions included thereby increasing costs to customers.
- 9.10.7. The current implicit 13% ex-ante incentive rate already delivers cost-efficiency and additional incentives will only raise costs for customers. As discussed, Arcadis identified only 0.44% of the overall portfolio as being potentially inefficient. This should give confidence to CAA and stakeholders around our level of efficiency.
- 9.5.8 The CAA's Initial Proposals have not presented any evidence to justify why such a material change is required from the well-established Q6 capex arrangements of ex-post reviews. We ask again for the CAA to present the quantified evidence it has used to identify that the current framework may not have provided sufficiently strong incentives for efficiency over Q6.
- 9.5.9 Whilst we do not agree with the proposed move to ex-ante incentives, if the CAA continues to persist with this move it should adopt a more proportionate and targeted approach.
- 9.5.10 The CAA set out in its Initial Proposals that the application of ex-ante incentives should be assessed on an individual programme basis and should reflect their specific characteristics. However, the CAA's Initial Proposals present an incorrect view that is appropriate to apply ex-ante incentives to the entire capex envelope, ignoring the complexity and nature of projects at Heathrow.
- 9.5.11 We have conducted robust analysis of our proposed capex categories to determine whether ex-ante incentives are appropriate for each category. To ensure a balanced view, we asked Jacobs⁴ to carry out an assessment to recommend a criteria that can be used to assess the suitability of ex-ante, using their extensive knowledge of regulated sectors and global transport.
- 9.5.12 Using the Jacobs criteria we established that ex-ante regulation is suitable for part of our asset replacement programme, within which projects are smaller and more repeatable in nature and therefore able to be easily benchmarked. More broadly, we applied the Jacobs criteria to all our capex categories in RBP Update 1. It was clear and evidenced that not all capex categories were suitable for ex-ante incentives. We concluded that Asset Replacement – Asset Maintenance, Commercial Revenue – Protect Existing Revenues and Efficient Airport – Avoid Material Opex Increases categories would be the only categories suitable for ex-ante incentives.
- 9.5.13 In comparison, our other capital programmes have far greater uncertainty. For example, automation projects are inherently 'new' in nature and have more risk of deviation in scope, programme, cost and quality, even post-G3. The same risks apply

⁴A18 Jacobs report

to complex projects with greater unknowns. We ask the CAA to explain why it considers the Jacobs report was not balanced⁵.

9.5.14 We welcome Arcadis using the criteria developed by Jacobs but refute its conclusion that our capital programmes do not exhibit significant differences in controllability and risk. Its assessment is overly simplistic and does not reflect the realities of our capital programme. It also does not provide sufficient detail on how qualitative judgements across individual criteria have been consistently consolidated to reach a final assessment, or what it would consider a *sufficient difference* to merit different incentive arrangements.

9.5.15 For example, Arcadis’ programme and capex category review of RBP Update 1 recognised that, compared to Asset Replacement, our Future Ready Airport Programme (now merged with the Efficient Airport Programme) had lower controllability, greater variation in risk profile, and cannot be considered regular or repeated activity. However, Arcadis make no differentiation in its final assessment of CAA definition compliance. Table 3 summarises the view on both these programmes from the Arcadis report.

Table 3: Arcadis review of programmes

	Asset replacement	Future Ready airport	Comparison of suitability for ex-ante
HAL level of controllability	High	Medium	Lower
Risk profile in Programme	Majority similar	Differing	Lower
Regular and repeated activity	Yes	No	Lower
Efficient contracting	Yes	Yes	Same
Planned and sequenced	Yes	Yes	Same
Programme complexity	Low	Low	Same
Clearly defined output	Yes	Yes	Same
CAA definition compliance	Yes	Yes	

Despite scoring lower on the top 3 criteria, asset replacement and future-ready airport are considered to have no significant difference in suitability for ex-ante regulation

Source: Heathrow – adapted from Arcadis

9.5.16 We have replicated the work carried out by Arcadis on each programme in RBP Update 1 and come to a different conclusion. We have used the Arcadis capex category definition compliance assessment and then used our expert view to make an accurate and balanced assessment, which supports our view on the suitability of ex-ante, as below:

⁵ The CAA’s proposals for the ex-ante framework are dealt with in more detail in para 97ff of the legal annex

Table 4: Heathrow review of Arcadis assessment, by programme (RPB Update 1)

Criteria	Asset Management & Compliance	T2 baggage	Reg Security
HAL Level of controllability	MEDIUM - Inherent risk on the unknown asset condition - surveys etc are carried out in advance but it is not always possible to ascertain the exact situation until works commence. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis.	MEDIUM - the major area of unknowns will be the works in the existing T1 estate, where issues such as asbestos could arise. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis Need to work with multiple handlers and operating models/requirements is a key consideration in T2.	LOW - major focus is on meeting the requirements & timelines in the Mandate. Hence limited ability to sequence for efficiency given this interface with ongoing operations. We remain exposed to DfT changing rules & processes which could impact on infrastructure. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis.
Risk profile in programme	DIFFERING - as per the Arcadis assessment there will be different risk profiles across the portfolio.	DIFFERING - work to maintain the existing building fabric will be very different to those required on the current controls system. And these will be very different to the installation of a new system in T2A.	DIFFERING - some elements - such as machine purchase, are low. Other elements vary - there is a different infrastructure risk in an aging T3 compared to a relatively new T2. And other elements are unique and not yet clear - such as algorithms.
Regular & repeated activity	YES - In many cases Yes. However with an ageing and existing estate there are always unique, innovative and novel solutions required - e.g. fire main.	NO - It is not a regular occurrence to switch over to a new outbound baggage system. This is a once in a generation activity.	NO - Individual elements may have been done before, but never on such a scale, with associated issues of training & rostering, while maintaining day to day operations The introduction of new technology at scale and pace is new.
Efficient contracting	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium in some circumstances. Some projects may focus on time as the premium rather than capex - e.g. runway resurfacing.	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.
Planned & sequenced	YES - in the main Heathrow has the ability to plan and sequence the works.	YES - in the main Heathrow has the ability to plan and sequence the works.	MEDIUM - The ability to sequence efficiently is limited by the constraints of the deadline, alongside the need to work in multiple live operational areas at once. Also the works need to be co-ordinated across infrastructure, technology, training and rostering. While

Criteria	Asset Management & Compliance	T2 baggage	Reg Security
			maintaining the day to day operation. This will result in sub-optimal delivery tranches.
Programme Complexity	MEDIUM- Most elements will be Low, with notable exception being the runway resurfacing.	HIGH - as noted by Arcadis, baggage system are complex. One example will be the requirement for a seamless operational cutover.	HIGH - the magnitude to change across more than 120 security lanes across terminals and external areas is incomparable to previous works on security or to any other airport.
Clearly Defined Output	YES - Outputs can be defined at the appropriate time.	YES - Outputs can be defined at the appropriate time however the end elements will be in H8. Clear waypoints in H7 may not be so easily determined.	YES - output can be defined at the point of investment decision.
CAA Definition Compliance	YES - For many cases Yes. Certain specific projects will demonstrate the characteristics suitable for ex post - runway resurfacing being a prime example.	NO - The complexity and risk of an aging estate and need to maintain current operations during construction and commissioning lead to an assessment of more suitable for ex post.	NO - The deadlines, sequencing and novel elements across the whole estate, in a passenger facing environment, lead to a highly risky programme. More suitable for ex post.

Source: Heathrow

Table 5: Heathrow review of Arcadis assessment, by programme (RPB Update 1)

	Commercial Revenues	Efficient Airport	Carbon & Sustainability
HAL Level of controllability	MEDIUM - Sections are within Heathrow's ability to control. Other elements will have significant interface with external areas - such as cargo.	LOW - some elements will be developed by Heathrow. In other areas the programme will respond to airline and other requests - such as automation of the passenger, airfield and baggage processes. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis.	MEDIUM - as noted by Arcadis Heathrow will not be able to develop all the requirements directly. Elements will be in response to airline/handler/other requirements Consideration of working in operational environment and impact of variability of BAU operations on a daily basis.
Risk profile in programme	DIFFERING - digital transformation will have a different risk profile and considerations than the property Development.	DIFFERING - some areas may have high risk as first of type automation deployments.	DIFFERING - some elements such as Pre Conditioned Air - are known. Other areas may involve novel or emerging technologies.

	Commercial Revenues	Efficient Airport	Carbon & Sustainability
Regular & repeated activity	MEDIUM - Certain elements - such as shell & core - are repeatable. However others such as digital will be unique and innovative.	MEDIUM - some elements will be repeatable once established - such as automation roll out. Others will be one offs - such as Compass Centre Exit.	MEDIUM - some elements will be repeatable. However others - such as airspace change - are one off unique activities.
Efficient contracting	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	High - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	High - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.
Planned & sequenced	YES - in the main Heathrow has the ability to plan and sequence the works.	YES - in the main Heathrow has the ability to plan and sequence the works.	MEDIUM - The ability to sequence will be driven by external factors - such as take up in electric vehicle fleet, or wider airspace change initiative.
Programme Complexity	LOW - there are many individual elements but no cross cutting co-ordination required when compared to Regulated Security.	HIGH - with a large focus on automation, technology, and working across Team Heathrow the deployment of this programme is considered complex.	HIGH - for elements such as airspace change or hydrogen infrastructure. Low - for elements such as EV charging.
Clearly Defined Output	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.
CAA Definition Compliance	PARTIAL - For many cases Yes. Certain specific projects will demonstrate the characteristics suitable for ex post - CTA redevelopment being a prime example.	PARTIAL - For some cases - Yes. Once elements of automation are understand and tested, trialled, they could be rolled out in a repeatable manner.	NO - For some cases - Yes. The category has some elements which are suitable for ex ante - repeatable, benchmarkable - e.g. PCA, EV Charging. However, other elements - airspace modernisation, new tech - are not for ex ante.

Source: Heathrow

9.5.17 Table 6 sets out our updated proposal for capital programmes (as set out in Chapter 3 – Capital Investment) that are suitable for ex-ante, based on the criteria developed by Jacobs and Arcadis. For the capex categories which are not suitable for ex-ante incentives, we propose that the current ex-post approach to capex is retained along with the 13% financing incentive already included in the framework.

Table 6: Heathrow's proposal for incentives and treatment of H7 projects

Capex category	% of the H7 Portfolio	Subject to existing 13% financing incentive	Suitable for additional ex-ante treatment
Asset management & compliance (Baggage and Airfield)	13%	✓	X
Asset management & compliance (Other asset management)	29%	✓	✓
iH7 Roll over	3%	✓	X
T2 Baggage	11%	✓	X
Regulated Security	18%	✓	X
Carbon & sustainability (Decarbonising ground operations landing and take off, Enabling zero emissions aircraft, Decarbonising heat and electrical network upgrades)	2%	✓	X
Carbon & sustainability (Airfield Ground Efficiency - Pre Conditioned Air (PCA); Decarbonising surface access and vehicles)	2%	✓	✓
Crossrail	2%	✓	X
Commercial (Retail & media, Digital transformation and property)	10%	✓	X
Commercial Revenue (Surface access and cargo (incl. agile fund))	2%	✓	✓
Efficient Airport (Passenger automation, Baggage and Airfield automation)	3%	✓	X

Capex category	% of the H7 Portfolio	Subject to existing 13% financing incentive	Suitable for additional ex-ante treatment
Efficient Airport (Compass Centre Exit, Terminal Capacity Optimisation, Service Initiatives)	4%	✓	✓
Expansion	1%	✓	X

Source: Heathrow

9.5.18 We have come to the view that the majority of (1) Asset Management and Compliance; and elements of (2) Commercial Revenue, (3) Efficient Airport and (4) Carbon & Sustainability are suitable for ex-ante. Table 6 sets out the detailed assessment we have replicated across each of our updated programmes to support our view. This is also based on using the Arcadis capex category definition compliance assessment in conjunction with our expert view:

Table 6a: Heathrow review of Arcadis assessment, by programme (RPB Update 2)

	Asset Management & Compliance - Airfield and Baggage	Asset Management & Compliance (Other)	T2 baggage	Reg Security
HAL Level of controllability	MEDIUM - Inherent risk on the unknown asset condition - surveys etc are carried out in advance but it is not always possible to ascertain the exact situation until works commence Consideration of working in operational environment and impact of variability of BAU operations on a daily basis. This is key issues with projects such as runway resurfacing.	HIGH - Inherent risk on the unknown asset condition - surveys etc are carried out in advance but it is not always possible to ascertain the exact situation until works commence Consideration of working in operational environment and impact of variability of BAU operations on a daily basis. The Compliance elements are less known and controllable, and not explicitly foreseen in some circumstances.	MEDIUM - the major area of unknowns will be the works in the existing T1 estate, where issues such as asbestos could arise. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis Need to work with multiple handlers and operating models/requirements is a key consideration in T2.	LOW - major focus is on meeting the requirements & timelines in the Mandate. Hence limited ability to sequence for efficiency given this interface with ongoing operations. We remain exposed to DfT changing rules & processes which could impact on infrastructure. Consideration of working in operational environment and impact of variability of BAU operations on a daily basis.
Risk profile in programme	DIFFERING - the risks on the airfield normal projects will be different to those relating to the runway resurfacing, and also to those in the baggage sphere.	DIFFERING - as per the Arcadis assessment there will be different risk profiles across the portfolio.	DIFFERING - work to maintain the existing building fabric will be very different to those required on the current controls system. And these will be very different to the installation of a new system in T2A.	DIFFERING - some elements - such as machine purchase, are low. Others elements vary - there is a different infrastructure risk in an aging T3 compared to a relatively new T2. And other elements are unique and not yet clear - such as algorithms.
Regular & repeated activity	LIMITED - there is some repeatability with both runways requiring works but these are once in a decade instances.	YES - In many cases Yes. However with an ageing and existing estate there are always unique and novel solutions required - e.g. fire main.	NO - It is not a regular occurrence to switch over to a new outbound baggage system. This is a once in a generation activity.	NO - Individual elements may have been done before, but never on such a scale, with associated issues of training & rostering, while maintaining day to day operations The introduction of new technology at scale and pace is new.
Efficient contracting	HIGH - Heathrow will use the most appropriate contract - going fixed	HIGH - Heathrow will use the most appropriate contract - going fixed	HIGH - Heathrow will use the most appropriate contract - going fixed	HIGH - Heathrow will use the most appropriate contract - going fixed

	Asset Management & Compliance - Airfield and Baggage	Asset Management & Compliance (Other)	T2 baggage	Reg Security
	price could involve significant risk premium in some circumstances.	price could involve significant risk premium in some circumstances.	price could involve significant risk premium.	price could involve significant risk premium.
Planned & sequenced	YES - works will require carefully planning and sequencing, especially the runway resurfacing.	YES - in the main Heathrow has the ability to plan and sequence the works.	YES - in the main Heathrow has the ability to plan and sequence the works.	MEDIUM - The ability to sequence efficiently is limited by the constraints of the deadline, alongside the need to work in multiple live operational areas at once. Also the works need to be co-ordinated across infrastructure, technology, training and rostering. While maintaining the day-to-day operation. This will result in sub-optimal delivery tranches.
Programme Complexity	HIGH - complexity is in the main all around the interface with the operation, short operational windows, and the need for continued daily services.	MEDIUM- Most elements will be Low, with notable exception being the runway resurfacing.	HIGH - as noted by Arcadis, baggage system are complex. One example will be the requirement for a seamless operational cutover.	HIGH - the magnitude to change across >120 security lanes across terminals and external areas is incomparable to previous works on security or to any other airport.
Clearly Defined Output	YES - Outputs can be defined at the appropriate time.	YES - Outputs can be defined at the appropriate time.	YES - Outputs can be defined at the appropriate time however the end elements will be in H8. Clear waypoints in H7 may not be so easily determined.	YES - output can be defined at the point of investment decision.
CAA Definition Compliance	NO - the criticality of the assets and operational impact of non availability means that the projects will work around the operation and flex when possession periods change.	YES - For many cases Yes. Certain specific projects will demonstrate the characteristics suitable for ex post.	NO - The complexity and risk of an aging estate and need to maintain current ops during construction and commissioning lead to an assessment of more suitable for ex post.	NO - The deadlines, sequencing and novel elements across the whole estate, in a passenger facing environment, lead to a highly risky programme. More suitable for ex post.

Source: Heathrow

Table 6b: Heathrow review of Arcadis assessment, by programme (RPB Update 2)

	Commercial Revenues - Surface Access, Cargo	Commercial Revenues - Retail & Media, Digital Transformation, Property	Efficient Airport - Compass Centre Exit, Terminal Capacity Optimisation, Service Initiatives	Efficient Airport - Baggage Automation, Airfield Automation, Passenger Process Automation
HAL Level of controllability	MEDIUM - Sections are within Heathrow's ability to control. There will be interface with some external parties such as cargo.	MEDIUM - Sections are within Heathrow's ability to control.	HIGH - majority of elements within Heathrow control.	MEDIUM - automation will require linkages and connection to third party systems, and ways of operation. Largely driven by airline/handler requirements.
Risk profile in programme	SIMILAR - largely external infrastructure.	DIFFERING - digital transformation will have a different risk profile and considerations than the Property Development.	DIFFERING - there are different risks but most of activities have been undertaken beforehand.	SIMILAR - scope based on automation and technology deployment, and process changes.
Regular & repeated activity	LIMITED - cargo redevelopment is a one off activity.	LIMITED - certain smaller elements - such as shell & core - are repeatable. However others such as digital will be unique and innovative. The property estate will be a series of different developments.	MEDIUM - some elements will be repeatable once established - such as services initiatives. Others will be one offs - such as Compass Centre Exit.	MEDIUM - once proof of concept and initial works undertaken, some repeatable elements will be possible.
Efficient contracting	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.
Planned & sequenced	YES - in the main Heathrow has the ability to plan and sequence the works.	YES - in the main Heathrow has the ability to plan and sequence the works. Works more likely to be in passenger environment when compared to other Commercial aspects.	YES - in the main Heathrow has the ability to plan and sequence the works.	YES - in the main Heathrow has the ability to plan and sequence the works.
Programme Complexity	LOW - there are many individual elements but no cross cutting co-ordination required when compared to Regulated Security.	MEDIUM - there are many individual elements but no cross cutting co-ordination required when compared to Regulated Security.	LOW - most elements are self contained.	HIGH - automation projects will need to fit into wider eco-systems, and interface with 3rd party systems.

	Commercial Revenues - Surface Access, Cargo	Commercial Revenues - Retail & Media, Digital Transformation, Property	Efficient Airport - Compass Centre Exit, Terminal Capacity Optimisation, Service Initiatives	Efficient Airport - Baggage Automation, Airfield Automation, Passenger Process Automation
Clearly Defined Output	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.
CAA Definition Compliance	YES	NO	YES	NO

Source: Heathrow

Table 6c: Heathrow review of Arcadis assessment, by programme (RPB Update 2)

	Carbon & Sustainability - Decarbonising Ground Operations Landing and Take Off	Carbon & Sustainability - Airfield Ground Efficiency - Pre Conditioned Air (PCA)	Carbon & Sustainability - Enabling zero emissions aircraft	Carbon & Sustainability - Decarbonising surface access and vehicles	Carbon & Sustainability - Decarbonising Heat and Electrical network Upgrades
HAL Level of controllability	LOW - airspace change programme is wider than Heathrow so will be dependant on regional/national procedures & programmes.	HIGH - subject to agreed procedures and sufficient network capacity.	LOW - will be subject to evolving worldwide standards and new technology.	MEDIUM - will need to respond to market growth and demand - from airlines, handlers, consumers and other airport used.	MEDIUM - subject to agreed procedures and sufficient network capacity.
Risk profile in programme	DIFFERING - some elements such as physical infrastructure may be low, whereas process and airspace change will be more complex.	SIMILAR - there may be differences across the terminals but largely similar.	HIGH - unproven and new technology.	SIMILAR - though likely different risks with airside and landside installation for charging. And different for mode share initiatives.	SIMILAR - though will need use of trails etc to determine most appropriate solution.
Regular & repeated activity	NO. This will be a one off activity.	MEDIUM - some repeatable elements will be possible.	It is likely to be in H8 but this element is initial development.	YES - In many cases Yes.	NO. This will be a one off activity.

	Carbon & Sustainability - Decarbonising Ground Operations Landing and Take Off	Carbon & Sustainability - Airfield Ground Efficiency - Pre Conditioned Air (PCA)	Carbon & Sustainability - Enabling zero emissions aircraft	Carbon & Sustainability - Decarbonising surface access and vehicles	Carbon & Sustainability - Decarbonising Heat and Electrical network Upgrades
Efficient contracting	HIGH - Heathrow will use the most appropriate contract - going fixed price could involve significant risk premium.	HIGH - Heathrow will use the most appropriate contract.	HIGH - Heathrow will use the most appropriate contract.	HIGH - Heathrow will use the most appropriate contract.	HIGH - Heathrow will use the most appropriate contract.
Planned & sequenced	YES - will require careful planning and sequencing - with considerations and impacts wider than the Heathrow boundary.	YES - installation will require co-ordination and planning of stand outages.	YES - any switchover/introduction would need careful deployment alongside new aircraft fleet.	YES - will require careful planning and sequencing alongside other projects.	YES - will require careful planning and sequencing alongside other projects, and scheduling for most appropriate seasonal deployment.
Programme Complexity	HIGH - multiple parties and entities involved in delivery of airspace change programme.	LOW. Dependant on type of PCA unit selection and specific installation criteria.	HIGH. Unknown solution at the moment.	LOW. Subject to standardisation of charging systems and associated technology i.e. billing.	MEDIUM- the need to undertake trials and establish best technology to achieve goals highlights the complexity.
Clearly Defined Output	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.	YES - output can be defined at the point of investment decision.
CAA Definition Compliance	NO	YES	NO	YES	NO

Source: Heathrow

- 9.5.19 As explained above and in Chapter 3 – Capital Expenditure, there is a broad range of projects within the majority of cost categories. Therefore, we have sub divided some of the programmes in our assessment. We have separated some programmes because there are multiple sub groups within each cost category that increases the uniqueness and characteristics. For example, Commercial Revenue includes Retail and Media Development. This element within commercial includes some more straightforward known elements such as Shell & Core works, but alongside this there are new and unique elements such as Digital fulfilment.
- 9.5.20 Therefore, we ask the CAA to adopt a proportionate, targeted, and effective approach to the application of ex-ante. Ex-ante should only be applied where we have regular and repeated experience in development; capex that can be efficiently contracted with a high degree of certainty without the introduction of excessive risk provisions; and for capex that can be sequenced with a high degree of certainty without reducing benefits to consumers.
- 9.5.21 Chapter 3 - Capital Expenditure and its associated appendices include further information on our programmes. We ask Arcadis and the CAA to revisit and reassess their work based on the information in our response to the CAA's Initial proposals and RBP Update 2 and continue engaging with us to find a proportionate and targeted approach.

9.11. Efficiency rates

- 9.11.1. We welcome the CAA providing a view on the incentive rate, which as we set out should only apply to specific capex programmes. We also welcome the CAA's recognition that 'the incentive rates in other sectors (in the region of 40% - 50%) are unlikely to be appropriate for H7'⁶ and reiterate our position that direct comparisons to other industries on the incentive rate alone is not a coherent approach (as discussed above).
- 9.11.2. However, we disagree with the CAA's proposed range. The CAA has proposed an incentive rate between 20% and 30% based on our historical capex performance and the impact of the incentive rate on its RoRE, which it suggests is in line with the April 2018 consultation. No evidence has been provided on these estimates, and the CAA has not confirmed that its Initial Proposals are based on more detailed analysis, which it itself said was 'required to understand both the financial and the practical implications of ex-ante capex incentives'⁷.
- 9.11.3. We set out evidence below to demonstrate that an incentive rate of 20% - 30% is not proportionate and would result in over-penalising us. The CAA's Q6 capex efficiency review concluded that of the 10 projects reviewed by Arcadis, only £12.7m was inefficient, which represents 4.9% of total overspend of those 10 projects. As we have set out in Chapter 12 - Ex-Post Capital Review, we reject the CAA's view that overspend on the Cargo Tunnel was inefficient. Notwithstanding this, it is clear that we are already financially incentivised via the existing implicit 13% financing cost incentive, leaving us to bear the costs of efficient cost overruns outside of our control.

⁶ CAA, CAP2265D, page 15, para. 12.47

⁷ CAA, CAP1658, page 63, para. 4.27

- 9.11.4. Figure 3 below applies the CAA proposed inefficiency of 4.9% (as discussed above) to an illustrative capex programme of £400m. Whilst this calculation is illustrative, it clearly shows that the CAA’s proposed range is disproportionate. As we have shown, the CAA’s proposed inefficient spend is an extremely small proportion of Heathrow’s total capital programme, but there is already a financial penalty in place for any perceived inefficient overspend via the existing framework. Increasing the incentive rate to 20% - 30% would further increase this penalisation.
- 9.11.5. Therefore, whilst we accept that maintaining the incentive rate at 13%-15% via the financing incentive and ex-ante incentives for specific capex categories builds in some leeway for uncertainty, the CAA’s proposal to effectively double the incentive rate for our whole capital programme is clearly disproportionate. It will result in an unacceptable level of risk for our business, which will simply be reflected in higher costs to achieve price certainty.

Figure 3: Example of incentive rates on an illustrative portfolio

Illustrative example						
<i>Assuming an illustrative portfolio of £400m of capex and applying Q6 performance, the CAA’s proposed incentive rate of 20% - 30% would lead Heathrow to bear at least £42m - £69m of efficient spend.</i>						
Budget (£m)	Inefficient overspend (£m)	Inefficient overspend as % of total capex	Overpayment (£m)			
			13%	15%	20%	30%
400	13.6	4.9%	22	28	42	69

Source: Heathrow

Incentive mechanism

- 9.11.6. We have provided evidence to show that the proposed range is not proportionate or justified. We also have concerns on specific areas of the proposed incentive design:
- The incentive rate does not reflect variations in risk and controllability across our capex programme and conflicts with recommendations from the CAA’s own advisors.
 - The incentive rate does not incorporate a cap or floor and exposes us to unlimited downside risk.
 - The incentive rate will stifle innovation incentives and dampen risk appetite and the cost of improving outcomes for our customers.
- 9.11.7. As Jacobs discusses in its report, airport developments are some of the most complex assets to deliver⁸. We have greater levels of asset diversity compared to electricity, water, and toll roads, whose assets have higher levels of homogeneity. Furthermore, the greater number of companies within each of these sectors allows for extensive benchmarking, providing greater confidence around the forecast efficient baseline and enabling higher incentive rates while maintaining an acceptable degree of risk. In comparison, all airports, their incentive models, and their passenger preferences

⁸A18 Jacobs report

are different and therefore opportunities for credible project benchmarking are limited to smaller, repeatable, and less bespoke projects.

- 9.11.8. Furthermore, forecast risk is asymmetric, with significantly higher risk of underestimating efficient costs than over-estimation. HM Treasury guidance for business cases (The Green Book) states that there is ‘a proven tendency of appraisers to be optimistically biased about key project parameters, including capital costs’⁹. It therefore requires that all public sector investments make specific optimism bias adjustments. For example, TfL estimates for the Crossrail 2 had an optimism bias of 66%. An incentive rate within the proposed range of 20% - 30% would therefore expose our business to significantly higher forecast risk, meaning that any price certainty provided by ex-ante regulation will simply be a risk transfer and not in the interest of consumers.
- 9.11.9. As part of its incentive design process, the CAA’s advisors (CEPA) recommended that ‘incentive strength should be proportionate to the confidence in the baseline. An accurate baseline might have a strong incentive, while a highly uncertain baseline would justify a weaker incentive.’¹⁰
- 9.11.10. Furthermore, the CAA’s proposals also do not include a cap and floor on incentives. The CAA’s previous advisors, CEPA, recommended the inclusion of a cap and floor when using ex-ante regulatory models, stating that they “*help to address multiple issues*” and provide investors with “*a useful downside protection against extreme circumstances*” while retaining an efficiency incentive within the cap and floor. The absence of these controls means that, under the CAA’s proposals, we are exposed to unlimited downside, again increasing our risk exposure and associated costs.
- 9.11.11. Finally, an incentive rate within the CAA’s proposed range will significantly reduce our ability to take an outcomes-oriented approach to capital investment, stifling our ability to take forward new and innovative programmes as these costs cannot be reasonably benchmarked.
- 9.11.12. This impact will be greatest where solutions are being developed with limited precedent to draw on to forecast baseline costs. Whilst we do not agree with all of Arcadis’ assessment, it does recognise that some of our capital programmes, such as carbon and sustainability, are “*emerging and new*”. An ex-ante model of regulation with incentive rates of 20%-30%, combined with prescriptive Delivery Obligations that are not outcomes based will be a barrier to adopting new decarbonisation solutions within our capex programme and undermine our national ambitions on decarbonisation.

9.12. Delivery Obligations, Objectives and reconciliation process

- 9.12.1. We agree that Delivery Objectives can play an important role to establish what the current intention of our plan is at the start of H7. Delivery Objectives would form the baseline from which agreed change will be tracked.
- 9.12.2. However, the CAA’s Initial Proposals provide no meaningful detail on Delivery Obligations and how they will be assessed. This places significant risk on us as we will be entering into H7 not knowing how our capex spend will be assessed for

⁹https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938046/The_Green_Book_2020.pdf – page 9, para 2.21

¹⁰ http://publicapps.caa.co.uk/docs/33/CAA_ExAnteCapexIncentives_310319.pdf

efficiency. Given the imminent start of H7, we cannot accept this level of uncertainty and the proposal, and therefore we have not provided draft Delivery Obligations.

- 9.12.3. We do not agree that Delivery Obligations should be used for reconciliation. Delivery Obligations are already implicit in every investment decision today as part of the existing capex governance process. However, the CAA's proposition within the Initial Proposals for the use of Delivery Obligations for reconciliation is neither practicable nor proportionate.
- 9.12.4. Under the Initial Proposals capex arrangements, each Delivery Obligation will be assessed for each capex programme. We understand that the proposal entails that Delivery Obligations would be set at a point in the period when a number of projects have not been through the Investment Decision. It would not be appropriate to set a Delivery Obligation at this stage, as the ability to deliver against it would not be within our control. Further engagement and agreement with the airline community would be required to agree Investment Decisions on those projects not sufficiently mature.
- 9.12.5. Furthermore, Delivery Obligations at the capex programme level is not practicable. At the same time, it is clear that setting Delivery Obligations for each and every project is not proportionate. If Delivery Obligations were set on individual projects as per Q6 this would create significant challenges and ambiguity. During Q6 there were over 650 investment decisions at G3. This would have meant that 650 investment decisions would be assessed. Moreover, Jacobs' analysis shows that our capex projects are skewed heavily towards smaller expenditure, meaning that any benefit delivered by the CAA's proposals for an individual investment decision would be significantly outweighed by the associated administrative cost and burden.

Table 7: Analysis of Q6 projects by spending

Description	£50m+	£10m-50m	£5m - £10m	£2m - 5m	<£2m
Proportion of projects	1%	9%	10%	23%	56%

Source: Heathrow (Note: subject to rounding differences)

- 9.12.6. We ask the CAA to demonstrate how this process is proportionate and targeted, and ask the CAA to undertake and share the cost benefit analysis that persuades them this is in the interest of consumers. We draw its attention to the Government's recent findings on regulatory best practice, which sets emphasis on the need for proportionality and sets out a new proposed '*proportionality principle*' that ensures regulatory measures are proportionate to the scale and risks being mitigated¹¹. Even Ofgem's Price Control Deliverables (PCDs), which the CAA draws a comparison to, incorporate a materiality threshold of £5m to ensure that PCDs remain proportionate.
- 9.12.7. If the CAA persists with Delivery Obligations, we outline some principles that should be used to develop a proposal with airlines. These principles should reflect:

¹¹ Taskforce on Innovation Growth and Regulatory Reform (2021). FINAL_TIGRR_REPORT__1_.pdf (publishing.service.gov.uk)

- **Size:** Delivery Obligations are more appropriate at a project investment level. This may be at an aggregated project level of specific tranches of projects. Where the projects are simple and repeatable, such as in asset management, we will look to bundle projects together, rather than take them through individually.
- **Complexity:** Reflecting the learning from Q6 we are looking to develop and establish different delivery supply chains dependant on the complexity of the project, and not take a one size fits all approach. Given the areas where costs exceeded the estimate were typically on the larger more complex projects we therefore propose a de minimis threshold of complexity or value. This is more appropriate and proportionate for the application of Delivery Obligations.
- **Timing:** The timing of assessing any potential Delivery Obligations should be continuous through the regulated period and not wait until the end of H7. This allows the review to be carried out with up-to-date information and with the project managers responsible for the delivery.

OBR Metrics

- 9.12.8. The CAA states in its Initial Proposals that OBR metrics should not be used as Delivery Objectives or Obligations as they “*capture elements of delivery beyond specific capex programmes*”. We disagree with this statement. There is a clear and tangible link between asset management and the OBR framework and both opex and capex will contribute to delivery against these outcomes in the short term. Having separate Delivery Obligations would therefore leave us open to double jeopardy, particularly as any delays in delivery would also result in cost overruns.
- 9.12.9. We have mapped out the key linkages between our asset management programme and OBR metrics in Table 8, and it is clear there are numerous overlaps.

Table 8: Link between asset management programme and OBR metrics

	Baggage	Rail	Mech	Elec	Controls	Civils	Airfield	Tech	Compliance	Commercial
Cleanliness	✓	✓	✓	✓		✓				✓
Wayfinding		✓	✓	✓		✓		✓		
Helpfulness/attitude of security staff						✓				
Wi-Fi performance								✓		
Security queue time - central search				✓	✓			✓		
Security queue time - transfer search				✓	✓			✓		
Security queue time - staff search				✓	✓			✓		
Control post vehicle queue time			✓	✓	✓	✓		✓		
Availability of lifts, escalators and travelators			✓	✓	✓	✓				
Availability of check-in infrastructure	✓			✓						
Availability of arrival baggage carousels	✓			✓		✓				
Availability of T5 TTS		✓		✓						
Availability of stands			✓	✓	✓	✓	✓			
Provision of stand facilities			✓	✓	✓	✓				
Pier served stand usage			✓	✓	✓		✓			
Runway operational resilience			✓	✓	✓		✓			
Hygiene safety testing										
Timely delivery from departures baggage system	✓			✓		✓				
Overall satisfaction	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Customer effort (ease)	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Enjoy my time at the airport	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

	Baggage	Rail	Mech	Elec	Controls	Civils	Airfield	Tech	Compliance	Commercial
Airport that meets my needs	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Feel safe & secure	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Ease of access to the airport		✓	✓	✓		✓		✓		✓
Helpfulness/attitude of airport staff										
Being able to social distance if I want to										
Ease of understanding Heathrow's Covid 19 safety information										
Passengers with reduce mobility - overall satisfaction			✓	✓	✓	✓		✓		
Departures flight punctuality	✓	✓	✓	✓	✓	✓	✓	✓		
Airport Departure management	✓	✓	✓	✓	✓	✓	✓	✓		
Airport Arrivals management			✓	✓	✓	✓	✓	✓		
% of UK population within 3 hrs		✓	✓	✓	✓	✓		✓		
Passenger injuries	✓	✓	✓	✓	✓	✓	✓	✓	✓	
Immigration queue times				✓						
Reduction in Heathrow's carbon footprint	✓	✓	✓	✓	✓	✓	✓	✓		

Source: Heathrow

Ex-post approach to the reconciliation process

- 9.12.10. The CAA have stated that it will only provide *high level principles* on how Delivery Obligations will be assessed and that the actual method of assessing delivery will only be set after the capex programme has been delivered. This level of uncertainty is unacceptable. We cannot enter into H7 without knowing the criteria of how it will be assessed and how potential inefficiency will be identified. We simply ask for transparency on the precise criteria and process. It is unclear as to whether the three elements (outputs, quality and timing) of the Delivery Obligation have equal weighting in the assessment. Furthermore, at this late stage the CAA are still uncertain how timing will be assessed in any Delivery Obligation. We strongly object to the CAA's proposals to use an ex-post approach to the reconciliation process.
- 9.12.11. There is established regulatory precedent that new incentive mechanisms should be sufficiently developed before they are introduced to allow all stakeholders to adequately assess the impact on their business. The CMA's evaluation of the CAA's proposals for the capex information incentive for NATS found that it provided an insufficient specification on how performance will be assessed and would expose NERL to additional risk associated with "*uncertainty over the regulatory treatment of capex that exceeded the RP3 allowance*". On this basis the CMA concluded that the capex information incentive should not be applied. We are in a similar position with the CAA's proposed Delivery Obligations, which are not fit for purpose.
- 9.12.12. The CAA's proposals also are contrary to the recommendations of the Taskforce on Innovation, Growth, and Regulatory Reform (TIGGR), both in terms of proportionality and regulatory offsetting¹². This includes a recommendation to re-introduce a '*One in, X-out*' condition for new regulation. Rather than minimising new regulation, the CAA's Initial Proposals set to introduce several new mechanisms without streamlining the existing process.
- 9.12.13. We also note that the CAA has referenced Ofgem's PCDs as a basis for applying an ex-ante approach. We have already set out why this comparison does not hold. Not only are many of Ofgem's PCDs mechanistic rather than evaluative, but they also only apply to a proportion of baseline spend. Even when PCDs are evaluated, Ofgem provide a clear process and approach to evaluation including historic cost benchmarking analysis and bespoke engineering and cost assessment. In comparison the CAA have failed to provide these details.
- 9.12.14. Furthermore, PCDs are set for specific projects rather than the capex programme level currently proposed by the CAA, which will be far more contentious to holistically assess. More widely, Ofgem's PCDs are set in the wider context of a very different regulatory regime. Similarly, the process for reconciliation in the water sector is based on clear guidance provided upfront to water companies (the reconciliation rulebook) designed to offer the level of certainty required for this type of regulation.
- 9.12.15. Therefore, we propose that programmes subject to ex-ante should only be subject to the proposed 15% incentive with no ex-post reviews. However, all other programmes should continue to be assessed by the current ex-post process.

¹² BEIS (2021). Reforming the framework for Better Regulation. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1005119/reforming-the-framework-for-better-regulation.pdf

9.13. Capex Categories

- 9.13.1. In the event the CAA continues with its ex-ante approach that is applied at a capex programme level, we agree with the recommendation by Arcadis and CAA to sub-divide the asset management programme into smaller capex categories. However, we propose an alternative sub-divide. The CAA Initial Proposals were more suitable for ease of delivery, rather than our revised proposal, which is based on the risk profile of the individual systems. A systems focus is more aligned to the programmatic approach and the focus on the outputs and outcomes.
- 9.13.2. This approach gives ten categories as opposed to the six proposed. This meets the objective of giving clarity at a cost category level without going into a plethora of different categories. We believe the location-based split of the Asset Management programme proposed by the CAA is unworkable due to the need to articulate a single Delivery Obligation for each cost category. For example, if the only thing that unites the projects in a cost category is that they are physically located close together (e.g. "Terminals"), it would not be possible to develop a single Delivery Obligation articulating the scope, outcomes or benefits of the cost category, as these would be wide-ranging.
- 9.13.3. The categories are:
- Baggage
 - Rail
 - Mechanical
 - Electrical
 - Controls
 - Civils
 - Airfield
 - Technology
 - Compliance
 - Commercial Asset Management & Compliance

9.14. Timing incentives

- 9.14.1. The CAA is proposing to retain triggers alongside Delivery Obligations and introduce new penalties on late project delivery. We disagree with this proposal. The CAA itself recognises that its proposed cost incentive mechanism is designed to incentivise delivery. Any proposed incentive rate is a strong incentive, particularly as any time overruns are typically associated with cost overruns. Additional standalone timing incentives and triggers would create a double jeopardy effect.
- 9.14.2. Furthermore, whilst we do not agree with the use of Delivery Obligations for reconciliation, we point out the CAA's proposals for triggers alongside Delivery Obligations would introduce yet another layer of incentive overlap. The CAA has made clear that its proposals for Delivery Obligations will include timing requirements. This is a clear timing incentive for us to achieve and another timing incentive is double jeopardy and not consistent with good regulatory principles.
- 9.14.3. The regulatory model already incentivises us to deliver projects as soon as possible in several ways – be it risk reduction and efficiency projects to reduce opex; or commercial and capacity projects to grow revenue streams.
- 9.14.4. Similarly, additional penalties for delayed delivery of capex categories are neither proportionate nor targeted. Any potential projects with lengthy delays beyond 12

months will already carry a strong incentive as Heathrow would be subject to the cost risk beyond any potential incentive rate set by the CAA, and the impact of the Delivery Obligation.

- 9.14.5. During Q6 there was only one trigger project out of nineteen that had a length delay over 12 months, which Heathrow has continued to make the trigger payments for through aeronautical charges. There is no evidence why this additional incentive in addition to the incentive rate is required or how it is proportionate.
- 9.14.6. There were three other projects which missed the trigger dates. None of these were deemed inefficient¹³.

9.15. Dealing with changes to Heathrow's capex programme

- 9.15.1. Our view on implementing the CAA's H7 capex arrangements until 2023 at the earliest assumes that the CAA's Final Proposals will provide the full detail on incentives and capex arrangements. However, if the CAA's policy is not fully developed with the appropriate detail then implementation timescales will need to be reassessed.
- 9.15.2. We note the CAA view that all existing governance arrangements will need to be updated with stakeholders to reflect the CAA's decision on capex policy framework. It is agreed that the Capital Efficiency Handbook will need to be revised to incorporate the current position. It will need to describe how the current continuing projects will be managed and assessed under the ex-post arrangement, and the processes for any ex-ante cost categories.
- 9.15.3. The CAA also intends to bring forward certain licence changes that require us to provide sufficient information for the purposes of the capex arrangements. We note the CAA has provided no detail in CAP2275, other than that it is still consulting on these matters.
- 9.15.4. Whilst we welcome the CAA proposing to retain the development and core capex arrangements into H7, we disagree that development and core does not provide suitable protection to consumers to address significant changes in the capex envelope.
- 9.15.5. Development and core is sufficient to deal with significant changes in the capex envelope. It has built in governance where airline agreement is required to change the overall capex envelope. The enhanced engagement associated to this and the additional step in the event of disagreement, decisions are escalated to the CAA. This provides appropriate protection to consumers.
- 9.15.6. We support the approach proposed by the CAA to maintain the Q6 arrangements where Heathrow and airlines can agree a change to the overall capex envelope. We note the CAA proposing certain circumstances that can enable a change to the overall envelope. Whilst we agree this is helpful, we do not want to restrict or be too prescriptive on the circumstances which may then impede our ability to deliver in the interests of the consumer, particularly where an urgent need may arise to respond to safety, security and resilience of the airport operation.
- 9.15.7. We note the CAA's proposed process on changing the capex envelope and this will require further discussion with airlines and the CAA to agree a swift and efficient process to act in the interests of consumers. This process would be for significant

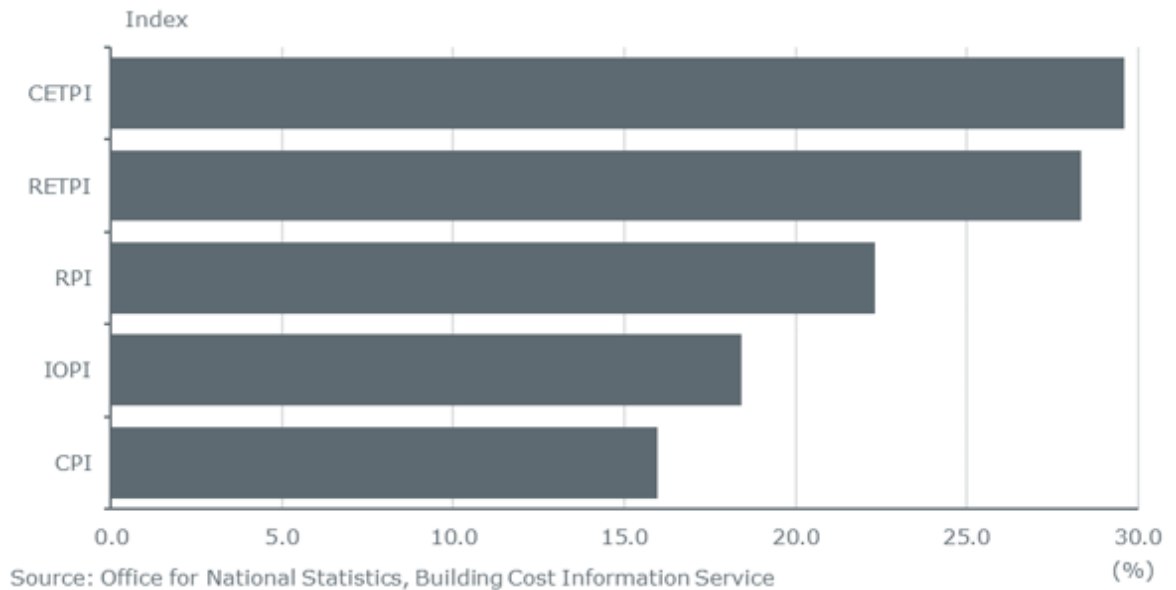
¹³ The discovery of more asbestos on the Code F Bravo taxiway project than had previously been identified via surveys provides an example of delay driver amongst these projects.

changes to the overall envelope, and not for agreed movements between the capex categories. Prior to any increase in the envelope, we would look to reassess the performance across the existing portfolio and look for opportunities to redeploy baseline. Significant change may not be linked to simply the increase in passenger volumes. This is a lagging indicator.

Construction inflation

- 9.15.8. Construction inflation is likely to be an issue that needs to be recognised and accounted for in the establishment of initial capex category baselines. We are currently starting to undertake a procurement exercise to appoint a new supply chain for H7 and, as we already do, we will seek to minimise inflationary pressures wherever possible. However, it is likely that Construction Inflation could diverge significantly from the standard inflation approach on the rest of the building blocks.
- 9.15.9. The application of CPI/RPI (which we note is still to be determined by the CAA at this stage in the process) at the start of the period is unlikely to be sufficient. There are a number of factors facing the construction industry. Industry specific indices are generally outpacing the non-industry specific indices, highlighting inflationary pressure could be felt more within the infrastructure sector.
- 9.15.10. A current analysis from October 2021 shows the difference in the industry specific indices compared to the overall index.

Figure 4: Difference in industry specific indices, compared to the overall index



- CEPTI – BCIS Civil Engineering Tender Price Index
- RETPI - BCIS All-in Tender Price Index
- IOPI - Infrastructure Output Price Index. It should be noted, however, that the IOPI does not have an external forecast, with trend data used as a proxy to estimate inflation expectations. This may not give a wholly robust outlook for inflation for the IOPI, misguiding forecast comparisons.

9.15.11. This means that continually applying RPI may leave us exposed to additional inflation allowances and risk. The only inconsistency is the IOPI, which is below the RPI, increasing by 18.4 percent compared to the RPI's 22.3 percent. The caveat here,

however, is that the IOPI forecast is only the extended recent historical average, rather than an econometric forecast.

9.15.12. Given these complexities we will need to continue engagement with the CAA and airlines on how best to minimise the impact of inflation on final costings to deliver for consumers.

9.16. Q6/iH7 projects

9.16.1. We agree with the CAA that Q6 and iH7 projects should continue to be subject to the current Q6 capital arrangements for assessment of efficiency.

10. ORCs

10.1. Introduction

- 10.1.1. The CAA's Initial Proposals provide useful guidance on the Other Regulated Charges (ORC) mechanism for H7. We welcome the CAA's broad acceptance of the arrangements agreed between Heathrow and the Airline Community through Constructive Engagement in 2021, which are intended to resolve the key issues apparent in the ORC mechanism through the Q6 period.
- 10.1.2. For H7, it will be important to ensure that we learn the lessons from the impact of Covid-19. The H7 ORC protocol should include a clear mechanism for repricing ORCs in-year in extreme circumstances. The protocol should also ensure that the ORC process is cost beneficial and proportionate. Consumer interests are not served by time-consuming governance arrangements which are inefficient. Instead, the ORC mechanism should focus on allowing collaboration between Heathrow and its customers to ensure that we provide the best service for the most efficient cost.
- 10.1.3. In this chapter, we discuss the elements that we believe need to be resolved such as (1) implementation of the marginal cost approach, (2) business rates approach, (3) charges for bus and coach service and (4) general governance. We propose a solution for each of them in this chapter. We also provide our response to each of the CAA proposed ORC changes, recommendations to future governance and finally present our updated ORC financials.
- 10.1.4. We also note under the requirements of the ORC protocol, we have engaged extensively with airline and non-airline users of ORCs on our charges for 2022. We have reflected these agreed charges in our ORC forecast as part of RBP Update 2.

10.2. Marginal Cost Approach

- 10.2.1. We welcome the CAA's support for our proposed marginal cost approach to ORCs for the H7 period. Moving the annuities for airline related ORCs outside of the ORC mechanism has been an area of clear agreement between Heathrow and the Airline Community and will be pivotal in ensuring that ORCs can remain resilient to any potential future demand shocks.
- 10.2.2. It is in the passenger interest that the marginal cost approach is adopted across all ORCs. While not all of the services are provided directly to airlines, all of the services provided through the ORC mechanism ultimately ensure that passengers receive the services they require when travelling through Heathrow. Moving all fixed costs to the airport charge means that we are able to set a single and transparent price for each service and work with all of our customers to ensure that unit price is as efficient as possible through the period by focusing on the things we can change together. This approach was presented to the Airline Community at ORCG as part of our 2022 pricing and we have received no objections.
- 10.2.3. Moving to a marginal cost approach is also important to ensure that we can continue to meet our sustainability goals. By removing the large fixed costs that sit within ORCs such as electricity, PCA and FEGP we can ensure that more sustainable options are more affordable for all of our customers. The 2022 pricing consultation responses from the non-airline airport user group are supportive of this.

- 10.2.4. Due to the structure of the ORC mechanism, the inclusion of large amounts of fixed costs in charges for these services through the inclusion of annuities and allocated costs dramatically increases cost per use. Through Q6, we have seen that these fixed costs can discourage use of the services, leading to lower usage and meaning the high costs have to be spread across a decreasing user base. This disincentivises the use of these sustainable alternative services.
- 10.2.5. Ensuring the ORC price is commercially attractive will be particularly important when thinking about the move to Electric Vehicle charging. If infrastructure costs and allocated costs are accounted for within the airport charge, our unit ORC charge will reflect only the unit price of electricity. This will have clear benefits for our passengers and Team Heathrow in ensuring that we can meet our net zero commitments.

10.3. Changes to the scope of ORCs

- 10.3.1. The CAA's Initial Proposals support our plans to move a number of ORCs into the airport charge based on assessment against the agreed ORC decision tree. We also welcome the CAA acceptance of our proposals to safeguard for the inclusions of future, new ORCs such as winter resilience and cargo. We will continue to work with the Airline Community on the form of these charges through the period. However, there remains discrepancies for key items as set out below.

Bus and Coach

- 10.3.2. We disagree with the CAA's proposals and continue to believe that moving charges for bus and coach services from ORCs to a commercial charging basis is the right approach.
- 10.3.3. For bus and coach services, the CAA's Initial Proposals note that further consultation is required as it has not received representations from airlines and other stakeholders following the publication of our RBP Update 1 in June of this year. Following the publication of our RBP Update 1, we offered consultation sessions with the Airline Community in particular to discuss in more detail areas where we were proposing to change our approach from our RBP position in December 2020, however these offers were not taken up.
- 10.3.4. We are engaging with our bus and coach customers on our proposals. On 16 December we attended the Bus and Coach forum to provide more details on our proposals.
- 10.3.5. It remains our view that the best approach is to treat bus and coach charges as a commercial charge, rather than an ORC. This is because:
- The provision of bus and coach services is key to our surface access strategy and our targets to increase public transport usage. Therefore, we need to ensure that we have the flexibility to set the charges to attract the correct provision of services to the airport and to be able to offer differentiated pricing to incentivise the best use of airport assets.
 - Unlike other transport services which are covered with ORCs, such as taxi feeder park charges, the provision of bus and coach services is a competitive market with a number of different providers running services to and from Heathrow. This means that bilateral engagement is required in order to ensure that the correct arrangements are in place with each provider. The ORC framework and governance arrangements were designed for homogeneous

markets and focus on multilateral engagement with cost recovery pricing and does not allow for this bilateral focus on pricing.

- 10.3.6. We look forward to the CAA's Final Proposal on the treatment of bus and coach charges and stand ready to provide any information required by the CAA to help with its decision.

Business Rates

- 10.3.7. A key area of divergence between our plan and the CAA's Initial Proposals is recovery of business rates. This has also been an area of disagreement between Heathrow and the Airline Community.
- 10.3.8. We had proposed consolidating the costs of business rates, which are currently split between recovery through the airport charge and individual ORCs, into one single business rates ORC charged on a per passenger basis. This would allow us to consult the Airline Community on any changes to business rates and to transparently pass through any differences between forecast and actual business rates. It would also provide the Airline Community with the security of the transparency requirements governing ORCs set out in the Licence.
- 10.3.9. In its Initial Proposals, the CAA indicated that it does not agree with our proposal. We note the CAA's emerging decision to retain the charging mechanism for business rates as part of the airport charge with the current 80/20 sharing mechanism in contrast to our proposal to recover business rates through the ORC mechanism.
- 10.3.10. Given the CAA's emerging position, we have revised our approach to business rates in H7 and removed them from our forecast of ORCs in our RBP Update 2 document. Business rates recovery is now included as part of the airport charge.
- 10.3.11. However, we disagree with the CAA's proposed 80/20 mechanism for the recovery of rates. As set out in more detail in Chapter 1 – Overall Approach to Regulation - of our response, we are expecting a revaluation of our business rates bill coming into force in 2023. The outcome of this review is still uncertain, and we are continuing to engage with the Valuation Office Agency (VOA) on both the methodology for the valuation and this size of the resultant rates bill.
- 10.3.12. Throughout engagement on our H7 plans, Heathrow and the Airline Community were united in the view that a 100% pass through of business rates would be the right way forward. While we disagreed on the exact mechanism, we were also in agreement that engagement and governance around the level of rates would provide the appropriate level of challenge to ensure that we were managing our business rates efficiently. It is unclear who the CAA's proposed approach will be beneficial given that airlines and Heathrow are in agreement with this principle, so we seek clarification from the CAA as to why this decision is consistent with its statutory duties and ask it to reconsider.
- 10.3.13. It is also unclear whether an 'efficiency' mechanism is appropriate in this instance. Heathrow has limited control over the business rates bill, with valuation methodologies already established. We commit to continuing to engage with the CAA throughout the valuation process so the CAA can understand our engagement with the VOA and the implications for future costs.
- 10.3.14. Under the current timeline, we expect to have an outcome from this process by mid-2022, ahead of the CAA's planned date for the implementation for the H7 licence. For

this reason, the most pragmatic way forward would be for the CAA to include the final revaluation from the start of 2023 to avoid inappropriate assumptions being included within the price control, which require adjustment from the very start.

- 10.3.15. The CAA's proposals note "*Only the residual costs allocated to third parties (around £6 million) should be treated as an ORC*". We have reviewed the current recovery of rates through ORCs and can confirm that the only non-airline ORC which includes the recovery of rates is the ORC for the taxi feeder park of which the charge for business rates only reflected around £60,000 of the total cost (less than 0.5%). In order to ensure that our approach is proportionate and transparent we recommend that all business rates costs should be consolidated into the airport charge and reflected in the CAA's forecasts on that basis.

10.4. Governance arrangements

- 10.4.1. The CAA has identified some areas where ORC governance has not worked as effectively as it might. This was recognised by Heathrow in our RBP Update 1 submission, and we agree that work will need to be done to refine the ORC protocol for H7. In particular, we envisage making changes to the process for addressing under and over recovery against actual costs. We do not agree that further licence conditions or controls by the CAA are required to ensure that Heathrow complies with the ORC protocol. Heathrow has consistently and fully complied with the ORC protocol throughout Q6, it is simply that this document needs updating to reflect new learning.
- 10.4.2. We welcome the CAA proposed flexibility through the implementation of a self-modification provision in the Licence. This will allow us to continue to work collaboratively with the Airline Community through H7 to ensure that ORCs remain fit for purpose and cover the required services.
- 10.4.3. We agree that it is important that any disputes regarding ORCs can be resolved in a transparent and timely manner. However, a key purpose of the ORC mechanism is to foster collaborative working between Heathrow and its customers for the benefit of consumers on what is a purely commercial matter. Indeed, this was a key driver behind the agreed move to a marginal cost approach, allowing Heathrow and the Airline Community to focus on the costs over which they had the most scope to influence through H7. Therefore, we propose that the CAA role in any ORC escalations is related to procedural issues only. This ensures that Heathrow and ORC users can continue to work together on the costs and required service levels but that any escalations relating to disagreements on the process followed can be quickly resolved by the CAA. Further, this would ensure that the CAA resources are used only when necessary and proportionate, which is in line with their regulatory objectives.
- 10.4.4. We will submit a full response to the CAA CAP2275 consultation on its proposed licence conditions for H7, however we note the changes the CAA is proposing to the current licence conditions include further detail about the information provision requirements for Heathrow when engaging with customers on ORCs. In our view the proposed new definition of users of specified facilities is too broad and will make it difficult to engage and agree with that group, importing a higher level of inefficiency into ORC management. It should be limited in scope to airlines and ground service users and must be proportionate.
- 10.4.5. We agree that having increased clarity on the level of information which should be provided under the ORC mechanism is helpful and will be required for the CAA to

resolve any disputes regarding the ORC process. However, any information requirements should be proportionate. Information is provided in the context of assuring Heathrow's performance against ensuring efficient provision of those services by Heathrow and any additional policy or licence requirements most certainly should not seek to intercede airlines, other users or the CAA into Heathrow's commercial dealings.

- 10.4.6. We currently provide a level of detail and granularity of our cost base which is above and beyond either the levels required by the current licence or the levels which would be expected from a supplier supplying these services to customers. Key examples include the engagement throughout Covid-19, where we shared extensive information with the Airline Community about our cost base, including detailed information about our suppliers' use of the furlough scheme and savings from organisational restructuring.
- 10.4.7. The below example from our September ORCG meeting highlights the level of detail provided in regular trackers (monthly) in addition to regular deep dives through specific ORC working groups:

Figure 1: Baggage tracker from ORCG 23/09/2021

[X]

Source: Heathrow

- 10.4.8. These line-by-line cost reviews are resource and time intensive and provide very detailed information. Throughout Q6, our ORC governance consisted of 11 hours per month of engagement with the Airline Community split across six meetings. The process of preparation and wash up of each of these meetings incurs 24 hours of finance colleague time and 16 hours of time from the ORC team. With the packs for ORCG meetings often containing upwards of 40 pages, 30 of which contain financial updates. this level of governance is then repeated for monthly ORC Working Groups for items such as PRS.
- 10.4.9. Given this, we do not think that providing additional material, above or beyond the current level provided, would be proportionate or of any benefit to customers or consumers. Instead, it would serve to delay governance and increase the time and cost of delivery of key services.
- 10.4.10. For this reason, we propose to include greater clarity on the level of information which will be provided by Heathrow in the H7 ORC protocol which will be based on the level of information shared by Heathrow in Q6 and the associated feedback from users. Including these requirements within the protocol rather than the licence allows flexibility to work with customers and agree the level of detail to be provided on a case-by-case basis. We will engage with customers through 2022 to agree the appropriate drafting. A duplicative licence condition would not be necessary and is likely to lead to unnecessary confusion.
- 10.4.11. In regard to other aspects of the protocol, we propose to commence engagement with the Airline Community and redraft the protocol in early 2022, in parallel with the CAA H7 process, to ensure it remains consistent with the CAA H7 decision. In preparation for this exercise, we have begun identifying the key areas which we believe need to be reviewed and clarified as part of the update:

- **Escalation processes:** As set out above, we agree that the path to resolving disputes regarding Heathrow's application of the agreed ORC process should have a clear escalation route to the CAA. The ORC protocol should be updated to reflect this protocol and include the key steps for formally escalating this issue through joint governance forums.
- **Governance groups:** Many of the services provided under the ORC mechanism are of key importance to delivering the right outcomes for consumers. Baggage performance for example is a key area of value for consumers and the Passengers Requiring Support (PRS) service is vital for passengers who need support on their airport journey. The ORC mechanism allows for collaboration, not only on the cost of services but the service levels provided by Heathrow and implementation of best practice by users to reduce overall inefficiency, and it is important that the governance structure brings together these conversations. Currently, a focus on cost in an ORC working group or conversation about a contract tender could be at odds with conversations regarding service taking place in other operational forums focussed on meeting consumer needs.

We have clearly seen through the H7 process that the Airline Community has been requesting stretch targets on services such as satisfaction with the PRS service which are outside of the SLAs agreed and monitored through ORC governance. For H7, the CAA has agreed that a measure of PRS satisfaction should be included within the OBR framework. If conversations on costs and service are not joined up, we will not have the resources to enable improved performance against this measure. Integrated conversations will help to provide a consistent and balanced approach and ensure we are working together to providing the service levels consumers expect at an appropriate cost.

- **Under / over recovery timelines and repricing:** While the transition to a marginal cost approach for ORCs will reduce the impact of under and over recoveries, we still believe that clarity will be required on the process for repricing if there is an extreme event or significant change in demand that would have a material impact on our ability to recover ORCs. In particular, it is important to ensure that there is flexibility to change prices during the year if the outturn is significantly different from the assumptions used to set prices.

This could be achieved by implementing a simple mid-year review process which is triggered when passenger volumes exceed or fall below a certain threshold. We propose that a threshold of 10% could be appropriate, in line with the 10% threshold proposed by the CAA in its risk sharing mechanism. When the need for the review process is triggered, ORCs would then be reviewed and repriced to reflect the current forecasts.

Additional triggers should also be considered, such as legislative changes, agreed changes in service levels, changes in capacity or changes in the use of services which drive material changes to cost and therefore could materially impact the over or under recovery position in the current or following year.

10.4.12. As set out above, we will continue to engage with the Airline Community on these proposals through early 2022.

10.5. Forecast of ORC revenues

- 10.5.1. We have engaged airline and non-airline users of ORCs on our charges for 2022 and we have reflected these charges in our ORC forecast as part of our RBP Update 2 document.
- 10.5.2. We are using this forecast as our baseline for forecasting ORCs across H7. We have calculated the value of ORCs compared to our overall opex base. Our 2022 ORCs represent [%] of our opex base. We have then applied this [%] figure to our opex each year in H7. This will ensure that our forecasts are grounded in 2022 actuals and will ensure that efficiencies across our cost base as a whole are reflected in our ORC forecasts.

Table 1: Summary of ORCs – RBP Update 1 vs RBP Update 2

ORCs (£m, 2018p)	2022	2023	2024	2025	2026	H7 Total
RBP Update 1	[%]	[%]	[%]	[%]	[%]	[%]
RBP Update 2	[%]	[%]	[%]	[%]	[%]	[%]

Source: Heathrow

11. Outcome Based Regulation (OBR)

11.1 Introduction

- 11.1.1 Overall, we are supportive of the CAA's move to Outcome Based Regulation. Including more reputational measures, which span the passenger journey at Heathrow, helps focus all of Team Heathrow colleagues on meeting the needs of consumers.
- 11.1.2 We welcome the CAA's proposal to accept our proposed consumer outcomes and agree in principle with the need for a continuous improvement mechanism to ensure that the OBR regime continues to reflect the issues which are important to passengers.
- 11.1.3 We agree with the CAA's proposal to maintain monthly measurement of OBR measures, as per the Q6 framework. This ensures that Heathrow is incentivised to deliver service efficiently, focus on the longer-term outcome and is not exposed to increased risk of performance rebates due to activities outside of Heathrow's control causing daily variations in performance. It would not be in the interests of consumers to expose Heathrow to uncontrollable risk or to incentivise inefficient resource planning.
- 11.1.4 However, elements of OBR in the CAA's Initial Proposals are not consistent to its policy aims previously set out earlier in the H7 process. Instead, the proposals represent only minor changes compared to the Q6 regime. The Initial Proposals appear to contradict the following policy points set out by the CAA in CAP1540:
- ***“The overall package of measures should cover all aspects of airport operations that are either directly or indirectly important to consumers.”***
– The CAA's proposals do not include measures to cover all aspects of airport operations which are important to consumers. An example of this is the decision to exclude measures on value for money, choice of flights and baggage misconnect rates.
 - ***“Targets should be based on evidence and take account of the following factors: - customer preferences and satisfaction with respect to historical and current performance levels; - the scope for improving performance (including consideration of innovative ways of working) without incurring significant extra costs on the basis of setting demonstrably challenging targets for management; and - the willingness of consumers and airlines to pay for investment to further improve performance beyond that possible using existing facilities.”***
– The CAA's proposals base targets on Q6 service levels and historic performance only. There is no consideration of preference of consumers or the scope and cost of improving performance.
 - ***“Where practicable incentives should be both positive (reward) and negative (penalty)”***
– The CAA's proposals do not follow this principle. Instead, the CAA has broadly retained the asymmetric Q6 incentive structure which only allows for limited bonuses on four measures while eighteen measures could be subject to penalties.
 - ***“Incentives must be justified and calibrated with respect to consumer priorities and willingness to pay.”***
– The CAA's proposals continue to apply the Q6 methodology for incentives and calibration. This is not in line with

evidence from consumers which shows that they value every unit of performance and that, in many cases, a bonus would be appropriate given the value received by consumers through increased service.¹

- ***“They must also be integrated with the business plan and HAL’s proposals for efficiency incentives”*** – The CAA’s proposals for targets and incentives are not integrated with the business plan. The CAA’s document on targets and incentives was published after the Initial Proposals and key areas such as the level of allowed capital expenditure and opex are not integrated or reflected in the CAA’s proposed targets. For example, the incentives on OBR overlap and create double jeopardy with the CAA’s proposed H7 capex arrangements.

- 11.1.5 The CAA appear to have given a lot of weight to the unevidenced opinions of the airline community in decisions over new measures, rather than how those views clearly link back to the end outcome the consumer desires and is clearly linked to the consumer insight. This is evidenced by actions such as the inclusion of a narrow check-in infrastructure measure as per airline requests, rather than a more rounded measure of check-in experience which is linked to consumer insights. As identified by the Australian Competition and Consumer Commission, this creates a risk as *“airline interests do not necessarily coincide with the interests of the broader community”* and that *“although airlines can be expected to seek a commercial advantage in negotiations with airports they cannot be expected to seek lower prices overall for the benefit of the broader community”*²
- 11.1.6 The CAA’s targets are not in line with the objective of the service quality regime as set out in the Initial Proposals. The Initial Proposals state that the service quality regime is there to ensure that Heathrow provides a “good” service and to incentivise “good” performance. However, by setting targets of above 4.00 the CAA is actually requiring Heathrow to provide a level of service which is deemed “excellent” by consumers.
- 11.1.7 The CAA’s approach to the incentive structure is not in line with best practice in other regulated sectors. There has been clear precedent through the price controls in water and energy to ensure that service quality measures properly reflect the value of increases and decreases in service levels to consumers. This has led to a movement towards sliding scale incentive mechanisms and properly calibrated bonuses for all measures where performance above target would provide value for consumers. Instead, the CAA is continuing to propose the use of knife edge incentives and a heavily asymmetric bonus and rebate structure.
- 11.1.8 The Initial Proposals did not include information on H7 targets. This has since been provided in a publication on 19 November with a proposed response time of only 7 weeks including several bank holidays. The separate nature of these documents evidences the lack of a consistent and coherent approach from the CAA through its price control framework. There are inconsistencies between the CAA’s conclusions on the targets that it assumes Heathrow can achieve and the cost allowances in the CAA’s Initial Proposals, for example:

¹ Evidence sources include: Systra, Heathrow Airport Customer Valuation Research, November 2018, Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020

² ACCC, Productivity Commission Inquiry into the Economic Regulation of Airports - ACCC submission in response to the draft inquiry report, 2019

- The Arcadis report, used by the CAA to evidence its views on targets and the potential for service degradation notes that “*The concept of an Enhanced Service Overlay (ESO) is deemed reasonable for asset related measures to ensure the reliable delivery of services and to mitigate against low frequency, but high impact events*”³. Although the Arcadis report notes that the CAA has made an allowance for opex overlays in its forecast, this is not evident in the CAA’s upper and lower quartile opex forecasts.
- The Arcadis report references our proposed investment in Pre-Conditioned Air (PCA) through H7 as part of our carbon and sustainability programme. The CAA’s proposals do not allow the capital for this programme within the proposed envelope.
- The Arcadis report notes that our proposed investment in making targeted improvements for Passengers Requiring Support (PRS) within our RBP Update 1 ‘Optimal plan’ ensures that PRS are treated with dignity and care and should therefore be part of our minimum capital spend. However, the CAA’s proposals do not include this spend within any capital envelope.

11.1.9 A key disconnect between the CAA’s proposals on OBR and the rest of its Initial Proposals comes from its approach to carbon and sustainability more widely. This is particularly concerning given the requirement under CAA12 that “*...each holder of a licence under this Chapter...is able to take reasonable measures to reduce, control or mitigate the adverse environmental effects of the airport to which the licence relates, facilities used or intended to be used in connection with that airport (“associated facilities”) and aircraft using that airport.*”⁴

11.1.10 In its document, the CAA notes that its broader approach to service quality through OBR should “*capture a wider range of service quality indicators and be underpinned by evidence about the aspects of service quality that consumers value (including the support for HAL in reducing its carbon footprint)*”. The CAA’s proposals accept our proposed wider measure of carbon reduction at Heathrow that is based on clear consumer insight. However, this is at odds with the CAA’s approach to capital spend, where it does not allow the £150m of proposed investment in Carbon and Sustainability across H7. If the CAA is committed to meeting its statutory duties and further believes that carbon reduction is important to and in the interests of consumers it should ensure that the price control contains appropriate allowances to ensure carbon reduction can be achieved.

11.1.11 In order to ensure that the wider price control, and the OBR scheme in particular, incentivise the delivery of the right outcomes for consumers the Final Proposals should:

- Include measures on value for money, choice of flights, overall check-in satisfaction and baggage misconnect rates to ensure we are measuring the service elements that matter to consumers as informed by direct consumer insight.

³ Arcadis report, [https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20\(CAP2274A\).pdf](https://publicapps.caa.co.uk/docs/33/OBR%20Assessment%20Arcadis%20(CAP2274A).pdf), page 8

⁴ Section 1(3) (d) Civil Aviation Act 2012

- Remove the Covid-19 measure for being able to social distance at the airport, given the removal in the wider UK guidance, change in expectations at the airport⁵ and low proportion of UK population now doing social distancing⁶
- Remove financial incentives from ‘Timely Delivery of baggage’ and ‘Check-in Infrastructure’ measures where the achieving the target is not within Heathrow’s direct control.
- Introduce a sliding scale incentive mechanism where consumer research has shown that passengers value every unit of service in a particular area. More information is set out in Section 11.5.
- Introduce bonuses for all measures where consumer research shows that consumers value an improvement in service. More information is provided in Section 11.5.5.
- Review its targets to ensure the evidence base behind the proposed targets is robust as the past is not a predictor of the future, particularly given the current uncertainties caused by the Covid-19 pandemic.
- Revise its proposed target levels for rebates payable on Wi-Fi, Wayfinding and Cleanliness to ensure these reflect ‘good’ minimum service levels, not expectations of excellence.
- Make an explicit allowance for the Enhanced Service Overlay, PCA and carbon investment, and investment in Passengers Requiring Support to ensure consistency with its views on targets.

11.1.12 This chapter responds to the CAA’s proposals on Outcomes, Measures, Targets and Incentives in turn and then provides views on the proposals for continuous improvement.

11.2 Outcomes

11.2.1 We welcome the CAA’s acceptance of our proposed consumer outcomes for H7. As noted by the CAA, our proposed outcomes can be tracked back to the results of extensive consumer research that were subject to robust challenge by the Consumer Challenge Board (CCB). We will therefore continue to plan for H7 using these outcomes.

11.3 Measures

What we measure

11.3.1 As stated above, we welcome the CAA’s intention to include new measures in the OBR framework to better capture the entire passenger journey through Heathrow, from booking to arrivals. We agree that this is aligned with the principles of OBR and will better allow us to understand whether we are truly delivering on the key consumer outcomes through H7. We are broadly supportive of the CAA’s proposals for measures in H7 with just three areas of concern:

⁵ *Insites Consulting, Passenger priorities post COVID-19, October 2021*

⁶ ONS, Coronavirus and the social impacts on Great Britain, November 2021

- The proposed removal of measures on value for money and offering the flights consumers want;
- The introduction of the check-in availability measure; and
- The exclusion of a measure on baggage misconnect rates.

11.3.2 Given the wider approach to measures taken by the CAA and the CAA's acceptance of our outcomes, we are confused by the CAA's decision not to include measures of overall value for money and whether Heathrow provides flights that consumers want. Particularly when 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.*"⁷

- Perceived value for money to the consumer of their overall journey comes out as the top driver when deciding which airport to fly from.⁸ We also see that perceptions of Value for Money are regularly used in other regulated sectors.⁹ The services and facilities we provide at Heathrow to influence this perception of value for money are somewhat within Heathrow's control. Additionally, Heathrow has some influence over the surface access options serving the airport, the cost and availability of which impact perceived value. This means that the CAA's conclusion that Heathrow has little or no control over this measure is wrong. It is also important that Heathrow and the airport community understand current and potential passengers' perceptions of value for money and how this compares to other airports in order to work together and make the right decisions on elements of our plan through H7.

We will measure value for money in three ways which will allow us to act to make progress against the measure:

1. Gaining a current perception of value of flights from each airport through the Travel Behaviour survey, and what is driving value so over time can see how this changes.
2. Beginning an acceptability study in 2022 looking at airfares at Heathrow, Heathrow airport charge and the overall value of travel.
3. Review our market share.

This will be a key factor in ensuring we meet the outcome "*an airport I want to travel from that offers me a good value choice of flights*".

- Offering the destination that consumers want to fly to is one of the top three key drivers determining which airport a consumer chooses to fly from.¹⁰ It is important that Heathrow and the airport community work together in order to offer the range of flights that consumers expect so that we can jointly recover and grow. This measure is currently tracked through Heathrow's Travel Behaviours survey. Our Aviation team can review the results of this survey and work with existing and new airlines to influence the route network and identify

⁷ Section 1(1) Civil Aviation Act 2012, see also paragraphs 9ff and 32ff of the legal annex

⁸ Savanta, Heathrow Travel Behaviour Survey, November 2021

⁹ Annual report by the Consumer Council for Water (Water Matters) that focuses on value for money <https://www.ccwater.org.uk/wp-content/uploads/2021/06/Water-Matters-2020-Data-Report.pdf>

¹⁰ Savanta, Heathrow Travel Behaviour Survey, November 2021

key gaps which could be filled to meet consumer needs. As above, this is key to ensuring we can understand whether we are meeting the outcome “*an airport I want to travel from that offers me a good value choice of flights*”.

- 11.3.3 We therefore continue to believe that these measures should be included within the OBR framework for H7.
- 11.3.4 In our June 2021 RBP we proposed including a measure of passengers’ ability to social distance at the airport. The CAA has included this measure in their Initial Proposals. Since June 2021, the guidance around the need to social distance has changed and consumer behaviour and views have altered as a result. This has resulted in its importance to passengers while at the airport reducing.¹¹ Additionally, outside of the airport context, only 39% of the UK population now trying to maintain social distancing in their everyday life.¹² As a result it is now not appropriate to include a measure about being able to social distance at Heathrow.
- 11.3.5 The CAA has proposed to implement a measure of check-in infrastructure availability as part of the H7 OBR scheme. We agree that measurement of the check-in experience is important for consumers, however a measure focusing purely on infrastructure availability does not measure the key drivers of satisfaction with the process for consumers. In addition, it is not measurable.
- 11.3.6 Our insight shows that passengers have four core needs at check-in: information, automation, sense of flow and consistency. In addition, the need for help and assistance from staff is constant across the experience. The check-in infrastructure, therefore, only forms a small part of these needs.¹³
- 11.3.7 Key driver analysis shows that the key driver of satisfaction with the check-in process is ease of the experience.¹⁴ This is driven by three elements, time taken to check-in, wayfinding and helpfulness of staff. Therefore, a measure of ease of check-in experience would better measure the aspect of the journey which is important to passengers.
- 11.3.8 The CAA’s proposals to measure the availability of check-in infrastructure is not measurable. Check-in infrastructure is comprised of the following elements:
- Check-in desk hardware
 - Check-in desk software
 - Common use self-service check-in kiosks (CUSS)
 - Self-service bag drop
 - Baggage belts
- 11.3.9 Of the above, ‘CUSS machines’, ‘self-service bag drop’ and ‘baggage belts’ are within Heathrow’s control. However, the availability of baggage belts is already covered by the new measure of ‘baggage timely delivery’, accepted by the CAA in its Initial Proposals. This means that only the ‘self-service bag drop’ and ‘CUSS machines’ are

¹¹ *Insites Consulting, Passenger priorities post COVID-19, October 2021*

¹² ONS, Coronavirus and the social impacts on Great Britain, November 2021

¹³ Heathrow Passenger Needs at Check-In – November 2021

¹⁴ Heathrow QSM Pilot Jun 2021 to Aug 2021 – Sample size: 1,178

within Heathrow's control and not already measured through other measures in the service quality scheme.

11.3.10 We have reviewed the potential to measure the availability of these assets as part of this proposed measure, however even though we already do have business measures for the availability of CUSS and Self Bag drop, a robust measure which only includes asset failures which are within Heathrow's control is not available. Service outages at these assets are largely driven by failures in airline software and/or human error. These failures cannot be differentiated from failures caused by issues under Heathrow's control, such as power and network outages. Some recent examples of where the airline community have caused an engineer to be called as check-in infrastructure became unavailable to consumers are:

- Turkish Airlines updated their mobile app in 2019 and the update was not effective which resulted in it closing CUSS machines that should have been available for common use.
- China Airlines Software caused every CUSS machine to crash after a passengers used it to try and check-in.

11.3.11 There are other non-software or infrastructure factors outside Heathrow's control that have a significant impact on operational performance and the passenger experience of check-in:

- Heathrow infrastructure can be 100% operational, but if there is a lack of airline or handler resource to operate it which can result in long waiting times and negatively impact on passenger satisfaction.
- The processes employed by airlines currently result in significant variations in both the service experience and time it takes to check-in. This is not within Heathrow's control.
- Requirements of regulators and governments. The regular and ongoing changes made to documentation / process requirements as a result, of Covid-19 continue to cause material disruption and increased check-in transaction times. This is exacerbated by a reduction in self-service check-in use as airlines have had to revert to manual and often paper-based processes.

11.3.12 Given that:

- The evidence shows that the key driver of satisfaction is overall ease of check-in experience;
- A large element of the check-in process is outside Heathrow's control; and
- Any measure of check-in infrastructure availability would have to be a reputational measure due to the interdependency between airline software/human performance and Heathrow infrastructure performance as it is not possible to separate when it is Heathrow responsibility for an asset not being available.

It would be more appropriate and more closely linked to consumer evidence to include one overall reputational measure of overall check-in satisfaction, rather than the CAA's proposed limited asset availability measure.

- 11.3.13 We support the CAA including the new measure of Baggage Timely Delivery in the H7 framework. This measure was developed through extensive consultation with the Airline Community. We will continue to engage with the Airline Community on how it is applied in practice.
- 11.3.14 The CAA's Initial Proposals suggest that this measure is included as a financial measure from the start of the H7 period. This is not possible due to the system changes required to implement the measure.
- 11.3.15 In a similar way to the issues with the measurement of check-in availability, the timely delivery of baggage is impacted by a number of different parties. Bags could fail the timely delivery measure if airlines allow late check-in, if there are issues with bag tagging or if connecting flights are late. Failure against the target in these circumstances should not be attributable to Heathrow. This means that further work will have to be carried out to ensure that the measure only captures performance which is within Heathrow's control.
- 11.3.16 In addition to discussions with the Airline Community to establish appropriate exemptions, currently we do not have a consistent way of identifying all the required exceptions across the different terminals which creates a degree of noise in the data. This means there will be elements in the available data we report that sit outside of Heathrow's direct control, for example:
- In Terminal 2 we are unable to identify if a bag has been checked in late as the current bag scanning point is not at check-in but further into the actual baggage system.
 - In Terminal 5, where a bag is automatically re-flighted to a later flight by the airline, Heathrow has no visibility of this and so will be recorded as tipping less than 20 mins before departure in the data we currently have.
- 11.3.17 It is possible to resolve most of these issues, but it would require Heathrow to upgrade the baggage monitoring system in a number of terminals solely to obtain a clean data set for this measure. An investment which would deliver minimal additional benefit to the consumer. Due to a very limited impact on consumer outcomes, this project was deprioritised and removed from Heathrow's H7 capital or opex plans in 2020 and is currently not included in our updated plans.
- 11.3.18 Without the required monitoring system updates, including Timely Delivery of Baggage as a financial measure, disincentivises Heathrow from behaviours that currently support delivering the overall outcome that consumers want of travelling with their baggage, as it would encourage Heathrow to:
- Remove handlers ability to request a later bag tipping time (less than 20 minutes) for operational reasons. Currently Heathrow offers the handlers flexibility to change the time window for building the bags for a flight if required but this is currently captured as a failure in the data available.
 - Reduce the ability for airlines to accept late check-in of bags into the baggage system. As this would currently be captured as a failure in some terminals.
 - Prioritise maintenance windows over requests from airlines to open check-in earlier without them incurring any additional costs through ORC's.

The Baggage Timely Delivery measure should therefore be included as a reputational measure for H7 transitioning into a financial at some point in H8 when we are able to invest in the required system updates to be able to accurately measure.

- 11.3.19 The CAA should also include a wider measure focussed on baggage misconnect rates. It is very important for Heathrow's passengers that their bags and belongings reach their destination at the same time they do.¹⁵ While the measure would be reputational as it is influenced by the performance of Heathrow, airlines and ground handlers, it allows us to report on whether all parties operating at Heathrow have been able to deliver this key requirement for passengers in a more rounded way than the timely delivery measure in isolation. The measure will also be important to ensure Heathrow, the Airline Community and ground handlers can develop joint performance improvement plans, see the impacts of collaborative working through H7 and understand how changes are impacting the delivery of service to consumers.
- 11.3.20 The CAA has made an error by including both the proposed Departures Punctuality and Airport Departures Management measures in its Initial Proposals. Both of these measures appear to measure the percentage of flights departing within 15 minutes. We know that punctuality is important to consumers¹⁶ and therefore it should be included within the framework, however, only one measure reporting on the percentage of flights departing within 15 minutes is required.
- 11.3.21 Ahead of H7 we will need to be cognisant of changes in Government guidance and policy surrounding Covid-19. The H7 framework proposes to include a number of new measures relating directly to Covid-19, such as the ability to social distance and the ease of understanding of Covid-19 information. Consumer expectations around Covid-19 are continuing to change as Government guidance changes; social distancing is not currently required and as a consequence may not need to be measured in H7. Therefore, we will need to keep these measures under review.

How we measure

- 11.3.22 Separate from what to measure through the scheme, there is the question of how it is measured. We support the position taken by the CAA in its Initial Proposals to retain a monthly approach to the measurement of service quality metrics. A move to daily measurement would not be in the interests of consumers as it would have a number of consequences for efficiency, safety and risk.
- 11.3.23 Overall, we believe that a move to daily measurement would not be in line with the CAA's wider objectives to set a price control which incentivises Heathrow to be efficient, deliver the levels of service expected by consumers and has an appropriate balance of risk and reward. Nor would it deliver the objectives with the least intervention possible. A move to daily measurement of service targets would increase opex and subject Heathrow to the impacts of variations in performance outside of our direct control. This increases the risk faced by Heathrow and would not be in the interests of consumers:
- As highlighted by the CAA, a move to daily targets would effectively increase the service target Heathrow was expected to deliver. Planning to deliver this level of service and resilience would come at an increased cost. This is not provisioned in the CAA's opex forecasts, would be unlikely to be efficient, and there is no justification for it given the relatively high levels of passenger overall

¹⁵ Incite Service Degradation Research – Nov 2021

¹⁶ Incite Service Degradation Research – Nov 2021

satisfaction that compare favourably with other comparable airports¹⁷. Examples of the impacts of moving to daily targets for both security and asset availability measures would be:

- For security, this would mean extra rostering of colleagues as resilience and opening more lanes.
 - For asset availability, this would mean extra rostering of colleagues as well as new supplier agreements requiring faster turnaround of support, where this is possible, leading to more cost.
- Moving to daily targets would mean that Heathrow would be exposed to increased risk of failure due to events outside of our own control and influence. In the case of security, disruption to consumers on the way to the airport such as an accident on a motorway or an airline check-in system going down can have a significant impact on when consumers present themselves at security search. While we maintain detailed forecasts to ensure we have adequate resource and resilience to deliver on our queue time targets, such an occurrence causing a large and unforeseeable increase in passengers presenting at security at the same time will inevitably mean that we are unable to meet our targets. The current framework allows us to recover service without being penalised, however a daily target would expose us to this uncontrollable risk.
 - The same is true of asset availability metrics, where our ability to recover from downtime is often impacted by our ability to source and replace parts. For many of our assets, it would not be possible to source the required parts in enough time to meet a daily measure. This would mean we would have no incentive to improve performance as we would not be able to meet the metric.
 - A consequential impact of a measurement mechanism which is more influenced by events outside of Heathrow's control is a higher regulatory burden. The only way of managing the risk of failing a service target due to events outside of our control is to seek alleviation from the Airline Community. This would increase governance and therefore the time and resource needed by all parties to manage the service quality scheme for no demonstrable benefit. This would not be efficient and is therefore not in the interests of consumers.
 - Daily measures would increase the pressure on engineering colleagues to fix faults fast rather than well. This could lead to longer periods of downtime in the longer-term and could cause safety issues.

11.3.24 In its report, Frontier Economics also highlight concerns around a move to daily measurement, including:¹⁸

- Measures with more volatile daily movements would require lower targets in order to be achievable. Targets in the water sector are set on an annual basis as this allows variations in the weather to be accounted for across the year

¹⁷ ACI, ASQ Survey 2019-2021

¹⁸ Frontier Economics, "H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics' independent review of the CAA's Initial Proposals for OBR", December 2021, Section 5.2, Page 11

without having to engage in an administratively burdensome process of reconciling weather events with performance.

- Daily measurement may focus Heathrow on short-term compliance with service targets in response to daily fluctuations in demand and service rather than a focus on medium to long-term improvements through development and innovation.

11.3.25 We therefore consider that the CAA is correct to continue measuring service quality performance on a monthly basis.

11.4 Targets

11.4.1 The evidence base used by the CAA to justify its H7 targets is not robust. The CAA relies on work carried out by Arcadis which narrowly focuses on using historical performance to justify future targets. This is not in line with regulatory precedent or good practice, nor is it in line with the CAA's own policy on OBR:

"Targets should be based on evidence and take account of the following factors:

- *customer preferences and satisfaction with respect to historical and current performance levels;*
- *the scope for improving performance (including consideration of innovative ways of working) without incurring significant extra costs on the basis of setting demonstrably challenging targets for management; and*
- *the willingness of consumers and airlines to pay for investment to further improve performance beyond that possible using existing facilities. This willingness to pay information should also be used as part of process of robust investment appraisal to identify the most cost beneficial option to deliver service improvement".¹⁹*

11.4.2 We are also disappointed that the CAA did not provide targets within its Initial Proposals. Due to this delay, we have not been able to fully evaluate the CAA's proposed package for H7 through the eight-week consultation period on its Initial Proposals. As such, our response cannot fully take account of the impact of the CAA's proposed cost allowances on our ability to deliver the proposed service targets. This is a clear process failing from the CAA.

11.4.3 This section of our response provides an overview of our position on the CAA's Initial Proposals and the contents of its CAP2274 consultation. We will be providing a full response to the CAA's CAP2274 consultation on service quality targets on 18 January.

Evidence base for setting targets

11.4.4 The CAA uses work carried out by Arcadis to inform its proposals for measures, targets and incentives. This work is fundamentally flawed as it makes key errors in its assessment of Heathrow's historic performance.

11.4.5 The Arcadis report fails to take account of the fact that Heathrow's performance is measured on a monthly basis and instead assessed historic performance on an

¹⁹ CAA, CAP1540, Page 23, Paragraph 2.13

annual basis. This leads to misleading and inaccurate conclusions about Heathrow's ability to meet targets and therefore the potential for applying stretch to current Q6 targets. An example of this is Arcadis' finding that Heathrow has historically been able to meet and perform above target for the two-car availability measure on the Terminal 5 track transit system (TTS). Arcadis' report appears to show that we performed comfortably above the 97% target in 2018/19 and 2019/20, however, in reality we failed this measure in September and October 2019 paying a total rebate of £628,800.

- 11.4.6 Additionally, the report does not attempt to deal with the question of whether or not historic performance can be an accurate indicator of future performance in this circumstance. Arcadis itself notes that data from 2020 and 2021 may not be representative of future performance given historically low passenger levels, although it should be noted that it then goes on to contradict this view by using this same data as part of its evidence base for justifying stretch targets. Using periods of low passenger volume and a favourable passenger mix which have resulted in record levels of performance is not a true representation of likely future performance when passengers number grow. This issue is also compounded by the fact that Heathrow shut its oldest terminal buildings for most of 2020/2021 period, consolidating passengers through our newer more efficient terminals that historically have achieved the highest levels of performance.
- 11.4.7 There is no discussion of the unique circumstances we are likely to see in H7 and how this differs from Q6. As set out in our response to the CAA's proposals on opex, we expect the build back of passenger volumes over H7 to be very peaky and that schedules will be very different from those we see currently. This means we will be facing a very different and more volatile operational environment in H7. This is set out in more detail in Chapter 4 – Operating Expenditure.
- 11.4.8 We also expect consumer expectations to continue to evolve throughout the pandemic. As set out in Chapter 2 of our RBP Update 2, while key consumer outcomes remain the same, we are seeing changing passenger needs. At the start of the pandemic more passengers expected social distancing during their journeys, however this expectation is now changing. Passengers now want to see Covid-19 processes integrated into the passenger journey and have returning expectations that their higher-level needs around retail and dining will be met. These changing expectations mean that we cannot rely on past measures of satisfaction to predict the appropriate target going forwards.
- 11.4.9 Frontier Economics' report on the implementation of OBR also notes the difficulties of using historical performance to set future service targets. In particular, it notes that the CAA should review the condition of H7 'in the round' when setting service targets. It notes that²⁰:
- The CAA's view on future service targets should take into account decisions made in other parts of the price control, particularly cost allowances. This means that the CAA needs to take into account the difference in cost allowances between the periods when using historical data.
 - Both the level and profile of future demand is uncertain. The CAA has recognised this uncertainty in other parts of the price control, however it has

²⁰ Frontier Economics, "H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics' independent review of the CAA's Initial Proposals for OBR", December 2021, Section 6

not taken account of this uncertainty and the potential for sudden changes in demand in its views on service quality.

- Consumer preferences and expectations have evolved during Covid-19, meaning that historical performance against satisfaction measures is likely to relate to an out-of-date consumer context.
- Heathrow's asset portfolio is older going in to H7. High levels of performance in Q6 correspond to the useful life phase of assets with lower failure rates and stable performance.

11.4.10 The CAA's Final Proposals should take a view on the appropriate targets for H7 using all of the data available to the CAA. This includes historic performance, future operating environments, proposed H7 capital and operating cost allowances, and consumer preferences.

Proposed H7 targets

11.4.11 The CAA appears to be relying on flawed evidence from external consultants to support some of the proposed targets. We urge the CAA to reconsider some of the proposals, as outlined below, to ensure that they are supported by appropriately robust and interrogated evidence.

11.4.12 We accept the conclusion that it would not be appropriate to increase targets for asset management and queue time measures in H7. We are already required to achieve 99% availability or adherence to queue time metrics and further improvement is not likely to be cost beneficial.

11.4.13 However, as set out above, we will only be able to achieve these targets with commensurate cost allowances from the CAA. This point was noted by Arcadis in its views on the Enhanced Service Overlay (ESO), Passengers Requiring Support (PRS) and pre-conditioned air (PCA).

- As set out in Chapter 4 – Operating Expenditure, we require an ESO of £43m across H7 to maintain resilience as our assets reach end of life throughout the H7 period. We also require an ESO of £25m across H7 to improve our services to PRS.
- As set out in Chapter 3 – Capital Expenditure – we require a capital envelope of £4.1bn over H7 which contains £1.7bn of investment in asset management spend and allocations for Carbon and Sustainability (including PCA) and PRS to ensure that service and resilience remains in line with Q6 standards.

11.4.14 We are concerned by the CAA's proposals to increase targets for Wi-Fi, Wayfinding and cleanliness. We agree that these are key service elements for passengers, however, we do not think the evidence base used by the CAA to justify this increase in targets is robust. The CAA has not allowed capital within its H7 Initial Proposals to improve service and future consumer expectations cannot be derived from historical performance against these measures.

11.4.15 This is particularly the case for cleanliness which is highly linked to the impact of Covid-19 on consumer perceptions. But also for Wi-Fi, where we have seen over time that perceptions of Wi-Fi decline as technological improvements are made away from the airport in terms of speed and coverage, with the only way for Heathrow meet the enhanced consumer expectation and re-establish previous levels of satisfaction is to

upgrade the Wi-Fi infrastructure that requires capital expenditure that the CAA have excluded from its initial proposals.

- 11.4.16 The Initial Proposals state that the service quality regime is there to ensure that Heathrow provides a “good” service, and it incentivises “good” performance. However, by setting targets of 4.00 and above the CAA is clearly expecting Heathrow to provide a level of service which is deemed “excellent” by consumers through proposing to increase targets for satisfaction measures above 4.00.
- 11.4.17 Under the Quality Service Monitor (QSM) measurement system where consumers are asked to rate Heathrow a scale of 5 = Excellent, 4=Good, 3=Average, 2=Poor and 1=Extremely Poor, anything above 4.00 requires a proportion of ratings to be excellent (5). While we can understand why the CAA would want to target excellent performance and provide bonuses for achieving this, we do not think it is appropriate for rebates to be paid on performance which has been assessed as “good” by passengers – a rating which fully meets the CAA’s expected outcome. Therefore, we propose that for satisfaction measures, a dead band should be put in place between the CAA’s proposed target and a service level of 4.00 to ensure that rebates are only paid when Heathrow fails to provide a “good” service for passengers.

11.5 Incentives

Sliding scale versus knife edge incentive structure

- 11.5.1 We are disappointed in the CAA’s proposals to continue to implement a knife edge incentive scheme. This goes against the CAA’s own policy on OBR in CAP1540²¹, regulatory best practice and breaks the link between clear consumer valuations of service and the regulatory incentives in place. We note that the CAA has sought to reduce the weight attached to the clear and compelling consumer evidence Heathrow has provided but at the same time the CAA has not, itself, sought to gather any consumer evidence independently. In the event the CAA continues to disregard Heathrow’s evidence we would expect to see alternative consumer insight being collated directly by the CAA.
- 11.5.2 Our consumer insight shows us that passengers place a clear monetary value on both increases and decreases in service levels. Moving to a sliding scale incentive structure would ensure a clear golden thread between this consumer valuation and our rebates and bonuses.²²
- 11.5.3 In its report, Frontier Economics sets out that regulatory precedent supports the use of sliding scale incentives and notes that *“Sliding scales also represent sound economic principles, as they can more adequately incentivise outcome delivery by sending strong signals around the detriment and benefit corresponding to different service levels”*²³.
- In PR19, Ofwat strongly discouraged the use of knife edge incentives as they do not provide incentives beyond the performance threshold.

²¹ “Incentives must be justified and calibrated with respect to consumer priorities and willingness to pay” CAA, CAP1540, Page 23, Paragraph 2.15

²² Systra, Heathrow Airport Customer Valuation Research, November 2018, Systra, Understanding Consumer Need Priorities in a (Post) Covid-19 World, November 2020

²³ Frontier Economics, “H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics’ independent review of the CAA’s Initial Proposals for OBR”, December 2021, Section 7.1

- For RIIO-2 Ofgem used sliding scale incentives to ensure that penalties reflected the consumer detriment associated with service decline and the value to the consumer of any improvement.
- For NERL's price control the CAA used a sliding scale incentive design.

11.5.4 We, therefore, continue to believe that a sliding scale incentive structure is the correct approach for H7:

- In line with the CAA policy set out in CAP1540, it ensures that incentives are calibrated with respect to consumer priorities and willingness to pay.
- It is in line with regulatory precedent.
- It ensures the right economic incentives on Heathrow.

Overall level of rebates and bonuses

11.5.5 We also continue to believe that the scope for bonuses should be increased beyond the 1.44% currently in place. The CAA's proposed upside and downside remains heavily asymmetric and does not reflect the CAA's policy as set out in CAP1540 which stated "*(w)here practicable incentives should be both positive (reward) and negative (penalty).*"²⁴ The CAA's proposals only include a potential bonus on four measures: central search queue times, cleanliness, wayfinding and timely delivery of baggage.

11.5.6 This approach is also out of line with regulatory precedent. In its report, Frontier Economics highlights that the CAA's Initial Proposals point to a downside which is c. 4.9x larger than the potential upside for Heathrow. This is out of step with the approach taken by Ofgem and Ofwat, which only have a downside for outcome incentives of around 2.3-2.4x larger than its upside ranges.²⁵

11.5.7 Frontier Economics go on to question why this larger difference between the potential upside and downside is in the interests of consumers. It notes that "*where poor service and delivery by regulated monopolies can result in significant detriment and negative externalities, it is not entirely apparent why an airport should be faced with more skewed and stretching incentive package*"²⁶.

11.5.8 The report notes that, in contrast, a more balanced package of bonuses and rebates is likely to be appropriate to further the interests of consumers in regard to service at Heathrow as it would incentivise Heathrow to deliver high levels of service through innovation and efficiencies.

11.5.9 We ask the CAA to review the balance of bonuses and rebates, taking into account its own guidance, regulatory precedent and the consumer benefit which it is generating through its proposals.

Assigning bonuses and rebates

²⁴ CAA, CAP1540, Page 23, Paragraph 2.14

²⁵ Frontier Economics, "H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics' independent review of the CAA's Initial Proposals for OBR", December 2021, Section 7.2

²⁶ Frontier Economics, "H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics' independent review of the CAA's Initial Proposals for OBR", December 2021, Section 7.2, Page 18

- 11.5.10 The CAA’s proposed approach to allocating rebates and bonuses is not in line with its policy on OBR. In its CAP1540 policy, the CAA set out that *“Incentives must be justified and calibrated with respect to consumer priorities and willingness to pay”*.²⁷ However, in its CAP2274 paper on OBR, the CAA noted that its approach to allocating rebates and bonuses was built on the Q6 framework, which was not established using consumer willingness to pay *“starting point for considering the proposed allocation of rebates for H7 was the current set of rebates under the SQRB scheme”*.²⁸
- 11.5.11 As set out in our December 2020 RBP and our response to the CAA’s Way Forward document earlier this year, our proposed allocation of rebates and bonuses is based on direct consumer insights:
- 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 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.²⁹
 - To ensure that no decrease 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.
 - 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
- 11.5.12 Based on the above methodology, we consider that our approach to allocating bonuses and rebates is in line with the CAA’s policy on OBR. The CAA’s proposed approach however is not.
- 11.5.13 The CAA’s approach to setting bonuses appears to be arbitrary. For example, the CAA’s rebates place a same weighting on performance of check-in infrastructure availability, 0.46, as they do on Runway Operational Resilience, when we know from our consumer insight that flight punctuality is by far valued³⁰³¹ as the most important thing to consumers. Additionally, if the runway is not operating this will have a significant impact on all passengers while the availability of check-in infrastructure measures only a small part of the check-in experience and some consumers do not use it at all.

²⁷ CAA, CAP1540, Page 23, Paragraph 2.15

²⁸ CAA, Economic regulation of Heathrow Airport Limited: H7 Initial Proposals Working paper on outcome based regulation, November 2021

²⁹ Systra, Heathrow Airport Passenger Priorities in a Post-Covid World, December 2020

³⁰ *Incite Consulting, Service Degradation Research – Nov 2021*

³¹ Systra, *Understanding Consumer Need Priorities in a (Post) Covid-19 World*, November 2020

11.5.14 While we agree that the four areas identified by the CAA as largely being appropriate for the application of a bonus given consumer valuations of service increases, there are other areas which are also valued by consumers where the CAA has not proposed a bonus. Frontier Economics highlights this inconsistency in its report:³²

Figure 1 - Frontier Economics review of Heathrow's consumer valuations and the CAA's proposed bonuses

Measure	Improvement aspect	Benefit (% airfare)	Outperformance rewarded?
Central search	<ul style="list-style-type: none"> 9 out of 10 times you will go through security in less than 3 mins 	1.27%	✓
Cleanliness	<ul style="list-style-type: none"> Enhanced cleaning so surfaces are Covid-19 safe (UV cleaning, Covid-19 safe coatings, sanitisation surface tests) There is always a member of the cleaning staff present, assuring everything is constantly cleaned 	1.13 to 1.33%	✓
Wayfinding	<ul style="list-style-type: none"> Real time information [on wayfinding] is provided Physical signage and personalised wayfinding on your mobile device in multiple languages 	1.04 to 1.23%	✓
Timely delivery of baggage	<ul style="list-style-type: none"> 9 out of 1000 passengers' baggage will not travel with them on the same flight to 7 out of 1000 passengers' baggage will not travel with them 	0.95%	✓
Availability of arrivals baggage carousels	<ul style="list-style-type: none"> 9 out of 10 times you wait no more than 35 mins [for your bags to be delivered after your plane lands] 	1.38%	✗
Wi-Fi performance	<ul style="list-style-type: none"> Ultra-High-speed Wi-Fi with total coverage throughout airport at any time 	1.24%	✗
Security staff helpfulness / attitude performance	<ul style="list-style-type: none"> Staff deployed to help anywhere along the passenger journey 	1.19%	✗
Availability of check-in infrastructure	<ul style="list-style-type: none"> You are able to choose self-service bag drop machines if you want 	0.99%	✗

11.5.15 The CAA's Final Proposals should also take account of whether the measures it is proposing should have bonuses can be measured. As set out in paragraph 11.3.14 baggage timely delivery cannot be included as a financial measure from the start of H7.

11.5.16 On 20 August 2021, we provided the CAA with a comprehensive evidence base of consumer valuations to evidence our proposals for the allocation of bonuses, which the CAA has failed to account for in its initial proposals. This is set out below:

³² Frontier Economics, "H7 INITIAL PROPOSALS ON OUTCOME-BASED REGULATION - Frontier Economics' independent review of the CAA's Initial Proposals for OBR", December 2021, Figure 6

Table 1 - Heathrow consolidated evidence base for proposed H7 bonus structure

Measure	Evidence base
Provision of stand facilities	<ul style="list-style-type: none"> • The provision of stand facilities is key to ensuring smooth and speedy progress through the airport for passengers as part of the predictable and reliable outcome. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Once a consumer reaches their departure gate, they want to receive a punctual departure and comfort journey on their plane³³. It is Heathrow's responsibility to ensure that the equipment and assets are available to help enable to airport community to deliver this for the consumer. • Our passenger priorities and willingness to pay work shows that passengers value increases in punctuality. Our most recent passenger priorities work showed that passengers value a 2% increase in flights departing on time at 1.25% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Given the high service standard achieved and the need to ensure that bonuses only reflect exceptional service, we have proposed that a bonus is only applied for 100% availability of stand facilities.
Stand Availability	<ul style="list-style-type: none"> • Stand availability is key an easy and quick journey through the airport for passengers as part of the predictable and reliable outcome. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Stand availability is essential to enable punctuality on arrivals and departures that consumers are looking for³⁴. • Our most recent passenger priorities work showed that passengers value a 2% increase in flights departing on time at 1.25% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Given the high service standard achieved and the need to ensure that bonuses only reflect exceptional service, we have proposed that a bonus is only applied for 100% availability of stand facilities.

³³ IATA, *Global Passenger Survey*, 2015

³⁴ Accent, *H7 Service Package Choices Follow up Research*, October 2020

Measure	Evidence base
Wayfinding	<ul style="list-style-type: none"> Wayfinding, including the provision of clear signage and clear terminal layout form part of the predictable and reliable outcome. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. The ability of consumers to navigate through the airport is critical to ensure they arrive at their aircraft on time and can efficiently leave the airport once they land³⁵. Wayfinding is also a key driver of both Departures and Arrivals Satisfaction. Our passenger priorities and willingness to pay work shows that passengers attribute value to a range of different improvements to wayfinding to make their journey easier. Our most recent passenger priorities work showed that passengers value improvements to the provision real time information and digital wayfinding to ensure they have an easy journey. Passengers valued increased digital wayfinding information at 1.03% of their airfare. Passengers also value improvements to real time information on queues to help them navigate their airport journey. This evidences the clear value to passengers of incentivising improved performance levels. This measure is based on passenger perception where they are asked to rate wayfinding on a scale from 1 to 5 (1 = Extremely Poor, 2 = Poor, 3 = Average, 4 = Good and 5 = Excellent). Given that the proposed bonus target for H7 is greater than 4, even achieving the baseline level of service relies on achieving a high level of passengers providing Excellent (5) ratings, whereas it could be argued that anything above an Average rating meets and exceeds the required level of service standard. For example, if 100% of passengers rated wayfinding 'Good' the mean score would be 4 and Heathrow would be paying a rebate even when we are delivering more than the acceptable level of service to the consumer. As a result, sliding scales for this metric would seem the most appropriate approach given the high targets we are aspiring to meet and shows that we are going beyond minimum level expected and in terms of bonuses that when they are paid that we are delivering an excellent service to consumers.
Central search queue time:	<ul style="list-style-type: none"> Security queue time is key to ensuring an easy and quick journey through the airport for passengers as part of the predictable and reliable outcome. The predictable and reliable outcome was ranked

³⁵ ACI, *Guidelines for Passenger Services at European Airports*, 2011

Measure	Evidence base
% queue times < 5 mins	<p>as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus.</p>
% queue times < 10 mins	<ul style="list-style-type: none"> • Consumers see security as one of the most stressful parts of their departures journey³⁶. Consumers are looking for security to deliver four key things; get me through efficiently, keep me safe, make me feel cared for and keep me informed about what I need to do.³⁷ • Our passenger priorities and willingness to pay work shows that current direct passengers value a two minute drop in security queue time at 1.25% of their airfare, with potential passengers valuing the same improvement at 1.46% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 99% for queue times <5 minutes and 100% for queue times under <10 minutes.
Transfer search queue time % queue times < 10 mins	<ul style="list-style-type: none"> • Security queue time is key to ensuring an easy and quick journey through the airport for passengers as part of the predictable and reliable outcome. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Similar to central search queue times, security experience is a key driver for connecting passenger overall satisfaction with their airport experience³⁸. • Our passenger priorities and willingness to pay work shows that current connecting passengers value a two minute drop in security queue time at 1.24% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
Staff search queue time % queue times < 10 mins	<ul style="list-style-type: none"> • Targeting predictable queue times for colleagues is required in order to give consumers the predictable and reliable journey they are looking for. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus.

³⁶ KPMG, *Overview - Passenger centric journeys - Approach and Findings*, 2016

³⁷ Heathrow/Join the Dots, *Customer Needs in Security*, 2020

³⁸ Heathrow, *2018 KDA_Departure_Arrivals_Connections*, 2018

Measure	Evidence base
	<ul style="list-style-type: none"> • Our most recent passenger priorities work showed that passengers value a 2% increase in flights departing on time at 1.25% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
<p>Control post vehicle Queue Time</p> <p>% vehicle queue times < 15 mins</p>	<ul style="list-style-type: none"> • Predictable journeys for airfield vehicles are required in order to give consumers the predictable and reliable journey they are looking for.³⁹ Control post vehicle queue time is also an essential measure to ensure the interests of cargo owners are furthered. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Our most recent passenger priorities work showed that passengers value a 2% increase in flights departing on time at 1.25% of their airfare. This evidences the clear value to passengers of incentivising improved performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
<p>Availability of lifts, escalators, travellers (renamed from PSE)</p>	<ul style="list-style-type: none"> • Good availability of lifts, escalators and travellers is required to give consumers the predictable and reliable journey they are looking for.⁴⁰ It is important that Heathrow maintains the different lifts, escalators and travellers that assist consumer in having a smooth journey. If these are not available, it leads to delays in the passenger journey which can impact punctuality and satisfaction. The predictable and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Our most recent passenger priorities work showed that passengers value the disbenefit of a 14% drop in availability of lifts, escalators and travellers at 1.01% of their airfare. This evidences the clear value to passengers of incentivising performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
<p>Terminal 5 Track Transit System (TTS)</p>	<ul style="list-style-type: none"> • Availability of the Terminal 5 TTS is important to ensure that the airport is easy to move through for passengers and therefore sits within the predictable and reliable journey outcome. The predictable

³⁹ Blue Marble Research, *Consumer Outcomes – Future Measures*, September 2020

⁴⁰ Blue Marble Research, *Consumer Outcomes – Future Measures*, September 2020

Measure	Evidence base
<p>Availability 1 train target</p> <p>Availability 2 trains target</p>	<p>and reliable outcome was ranked as the most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus.</p> <ul style="list-style-type: none"> • Our most recent passenger priorities work showed that passengers value the disbenefit of a 14% drop in availability of lifts, escalators and travelators which impacts their airport journey at 1.01% of their airfare. This evidences the clear value to passengers of incentivising performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
<p>Cleanliness</p>	<ul style="list-style-type: none"> • Cleanliness has always been a key driver of consumer overall satisfaction with their airport experience⁴¹ but since Covid-19 it has come under a greater spotlight, thus moving up consumers priority list⁴². Cleanliness is important to ensure that passengers feel safe through their journey and forms a central part of the comfortable and secure outcome. The comfortable and secure outcome (basic comforts) was ranked the second most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Our passenger priorities and willingness to pay work shows that passengers attribute value to improved cleanliness, in particular post-Covid. This showed that current direct passengers valued an enhanced level of cleanliness at 1.30% of their airfare, with potential direct passengers valuing it at 1.98% of their airfare. Passengers also values increased cleanliness in toilet facilities at 1.10% for current direct passengers and 1.38% for potential direct passengers. This evidences the clear value to passengers of incentivising improved performance levels. • This measure is based on passenger perception where they are asked to rate cleanliness on a scale from 1 to 5 (1 = Extremely Poor, 2 = Poor, 3 = Average, 4 = Good and 5 = Excellent). Given that the proposed bonus target for H7 is greater than 4, even achieving the baseline level of service relies on achieving a high level of passengers providing Excellent (5) ratings, whereas it could be argued that anything above an Average rating meets and exceeds the required level of service standard. For example, if 100% of passengers rated cleanliness 'Good' the mean score would be 4 and Heathrow would be paying a rebate even when we are delivering more than the acceptable level of service to the consumer. As a result, sliding scales for this metric would seem the most appropriate approach given the high targets we are aspiring to

⁴¹ Heathrow, *Heathrow, 2018 KDA Departure Arrivals Connections*, 2018

⁴² Systra, *Understanding Consumer Need Priorities in a (Post) Covid-19 World*, November 2020

Measure	Evidence base
	<p>meet and shows that we are going beyond minimum level expected and in terms of bonuses that when they are paid that we are delivering an excellent level of cleanliness in the consumers eyes.</p>
<p>Pier service – % passengers accessing pier served stand (excl. T5)</p>	<ul style="list-style-type: none"> • Consumers prefer to be able to walk onto their plane directly from a terminal building, compared with being exposed to the elements or bussed to their plane.⁴³ Pier service therefore plays a key role in the delivery of the comfortable and secure outcome. • Our most recent passenger priorities work showed that passengers value the disbenefit of a 10% decrease in pier service at 0.92% of their airfare. This evidences the clear value to passengers of incentivising performance levels. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 99%.
<p>Baggage System Reclaim Availability – arrivals carousel</p>	<ul style="list-style-type: none"> • Consumers want to be safely reunited with their baggage as soon as possible so they can smoothly continue on their journey⁴⁴. Baggage reclaim system availability therefore plays a key role in the delivery of the comfortable and secure outcome. • Our most recent passenger priorities work showed that current direct passengers value improved performance in waiting times for their bags at 1.35% of their airfare. This valuation is higher for potential direct passengers at 1.82% of their airfare. • Our proposals ensure that bonuses are only awarded for exceptional performance by setting the threshold at 100%.
<p>Wi-Fi performance</p>	<ul style="list-style-type: none"> • Consumer expectations over the availability and speed of internet connection in public spaces has increased in importance over time⁴⁵. The provision of Wi-Fi is a basic expectation for passengers and forms part of the comfortable and secure outcome. The comfortable and secure outcome (basic comforts) was ranked the second most important outcome for consumers across their journey and used to set the relative weighting of the financial incentive proposed for this measure, including the proposed bonus. • Our passenger priorities work shows that passengers continue to value improvements in Wi-Fi. This showed that direct passengers valued improved Wi-Fi provision at between 2.21% and 1.33% of their airfare and improved Wi-Fi was the second most valued improvement by connecting passengers. This evidences the clear value to passengers of incentivising improved performance levels.

⁴³ Systra, *Understanding Consumer Need Priorities in a (Post) Covid-19 World*, November 2020

⁴⁴ Join the Dots, *Horizon Report Arrivals*, 2018

⁴⁵ Truth Consulting, *DNA Integrated Analysis: The way forward*, May 2017

Measure	Evidence base
	<ul style="list-style-type: none"> This measure is based on passenger perception where they are asked to rate WiFi on a scale from 1 to 5 (1 = Extremely Poor, 2 = Poor, 3 = Average, 4 = Good and 5 = Excellent). Given that the proposed bonus target for H7 is greater than 4, even achieving the baseline level of service relies on achieving a high level of passengers providing Excellent (5) ratings, whereas it could be argued that anything above an Average rating meets and exceeds the required level of service standard. For example, if 99% of passengers rated WiFi 'Good' and 1% rated it 'Average' the mean score would be 3.99 and Heathrow would be paying a rebate even when we are delivering more than the acceptable level of service to the consumer. As a result, sliding scales for this metric would seem the most appropriate approach given the high targets we are aspiring to meet and shows that we are going beyond minimum level expected and in terms of bonuses that when they are paid that we are delivering an excellent service to consumers.
Helpfulness/ Attitude of security staff	<ul style="list-style-type: none"> Passengers expect airport staff to be courteous, able to help and visible and available. Consumers see security as one of the most stressful stages of their departures journey⁴⁶. Heathrow's security staff play a key role in reassuring consumers and making them feel cared for.⁴⁷ This is a key part of our cared for outcome. This measure is based on passenger perception where they are asked to rate Helpfulness/Attitude of security staff on a scale from 1 to 5 (1 = Extremely Poor, 2 = Poor, 3 = Average, 4 = Good and 5 = Excellent). Given that the proposed bonus target for H7 is greater than 4, even achieving the baseline level of service relies on achieving a high level of passengers providing Excellent (5) ratings, whereas it could be argued that anything above an Average rating meets and exceeds the required level of service standard. For example, if 100% of passengers rated Helpfulness/ Attitude of Security Staff as 'Good' the mean score would be 4 and Heathrow would be paying a rebate even when we are delivering more than the acceptable level of service to the consumer. As a result, sliding scales for this metric would seem the most appropriate approach given the high targets we are aspiring to meet and shows that we are going beyond minimum level expected and in terms of bonuses that when they are paid that we are delivering an excellent service to consumers.

11.6 Continuous improvement

11.6.1 As set out in our IBP, we support the general principle of continuous improvement, however it would be inappropriate for the CAA to expose Heathrow to changing levels

⁴⁶ KPMG, *Overview - Passenger centric journeys - Approach and Findings*, 2016

⁴⁷ Heathrow/Join the Dots, *Customer Needs in Security*, 2020

of financial risk through the period without allowing for this in the overall settlement. It would not be in the interests of consumers for Heathrow to be exposed to unknown regulatory risk. Additionally, there is no precedent in best practice from other regulatory sectors for adopting this approach.

11.6.2 The approach risks creating a perverse incentive on Heathrow. Rather than being incentivised to improve performance, meet targets and earn bonuses, the CAA's framework in the round, with the inclusion of continuous improvement, could incentivise us to minimise outperformance against targets to avoid the potential for an in-period increase in targets. This could lead to consumer detriment.

11.6.3 If continuous improvement is to be introduced, it should:

- Be narrowly focused on facilitating the introduction or removal of measures based on robust consumer insight. It is important that any changes maintain a clear link back to consumer evidence and the overall outcome that it would be delivering.
- Allow for time to establish a suitable level of baseline for any brand-new measures to ensure that realistic targets can be set.
- Ensure that any changes to reputational targets made during the period are closely aligned to changes in the capital expenditure allowances for the period so that Heathrow has a fair chance of being able to achieve the new target.

11.6.4 Licence modifications

11.6.5 We note that the CAA has also published a consultation on its proposed H7 licence conditions, which includes conditions for the implementation of OBR. We will respond to the CAA's CAP2275 consultation on licence modifications by the revised deadline of 21 January 2022.

12. Ex-Post Capital Review

12.1. Introduction

- 12.1.1. We remain confident that all Q6 capital expenditure has been delivered efficiently. We are therefore disappointed in the CAA's assessment that £12.7m should be adjusted from the RAB in relation to the cargo tunnel. There is no clear evidence that the actions of Heathrow may have directly attributed to wasted spend or lost benefits and we therefore do not consider that any adjustment should be made.
- 12.1.2. There have been extensive reviews undertaken by the Independent Fund Surveyor (IFS) and numerous detailed governance sessions with stakeholders on the detail of the Q6 capital expenditure, and we have demonstrated projects have been delivered efficiently.
- 12.1.3. We note the CAA's view that it will maintain the option for further assessment for the cargo and main tunnel projects. We maintain that it is important for the CAA to conduct reviews a timely fashion when the activity is relatively recent. We would not expect a re-examination of the historic Q6 spend to be undertaken at the end of H7, rather a focus entirely on only the new elements of investment.
- 12.1.4. As set out in the chapter 6.1 - Capital Incentives - we are concerned about the lack of development of the CAA's policies on capital incentives at this late stage in the H7 process. We agree with the CAA that Heathrow and the airlines will need to update governance documents to reflect the new incentive framework, however this can only be completed once the CAA has set out its decision and a clear framework.
- 12.1.5. The CAA's final policy will take time to embed into governance and we will need to work closely with the airlines to ensure the framework works for all stakeholders. The CAA's final policy on capital incentives should therefore take effect no earlier than 1 January 2023 to allow sufficient time for implementation. This view assumes that the CAA's Final Proposal will provide the full detail on incentives and capex arrangements. However, if the CAA's policy is not fully developed with the appropriate detail, then implementation timescales will need to be reassessed.

12.2. Cargo Tunnel

- 12.2.1. We are disappointed in the CAA's view of inefficiency at the upper end of its range at £12.7m.
- 12.2.2. As we set out in our response to CAP1996, the cargo tunnel has been a challenging project. Heathrow has managed the project proactively with the best information available at the time. Furthermore, there is no clear evidence that the actions of Heathrow may have directly attributed to wasted spend or lost benefits. We therefore do not consider that any adjustment should be made.
- 12.2.3. As noted by Arcadis "*The value, if any, that has and can in the future be gained from the work carried out was not readily available at the time of the Arcadis review. This would require a detailed breakdown of the figures identifying those works which have been taken forward to provide a benefit against those works now considered to be abortive. Until such a stage has been reached it would not be possible to develop any meaningful assessment of the quantum of any inefficiency*". It is therefore not clear

to us why the CAA has decided that “*the evidence base at that time provided strong support for an adjustment of £12.7 million*”¹.

- 12.2.4. It should be noted that the cargo tunnel has gone through the pseudo gateway process with the pseudo G3 passed in October 2021. The airline community attended the meeting for interest and understanding on how the project was progressing but was not a proxy for their endorsement or approval. Nonetheless, a key reason for conducting the pseudo gateway process was to allow airlines full transparency over the total costs and solution being delivered.
- 12.2.5. As part of the pseudo process the IFS was engaged and completed pseudo G1, pseudo G2, pseudo G2 update and pseudo G3 gateway reviews. They noted in the G3 review that “*The IFS commends the project team for their robust management of the development of the project through the current stage, including how they have addressed the challenges associated with material inflation to minimise cost exposure, as well as, identifying and securing opportunities to improve the schedule duration since the Pseudo-G2 Update*”².
- 12.2.6. The Executive Summary of their report ended, “*In conclusion, and recognising the historic challenges associated with this project, the IFS considers that the project team has provided suitable evidence of robustness for the stage and we see no major reason that would prevent the project from being considered for onward progression to the Pseudo-G3, providing a time-bound and prioritised plan is put in place to address the observations and recommendations included within this report.*”
- 12.2.7. Heathrow expects that any post project review of the cargo tunnel would start from the baseline established at the pseudo G3, as that would be the appropriate measure from which efficiency should be judged.
- 12.2.8. It should be noted that on 17 November 2020, in response to CAP1964 and almost one year prior to the CAA’s Initial Proposals, Heathrow raised the point that the £12.25 million suggested inefficiency in Surveys, Design and Planning spend includes £0.75 million of asbestos-related removal and assurance costs that should be considered separately from the other survey, design and planning spend. It is therefore a mischaracterisation for the CAA to suggest that this argument was raised “*late in the process*”³. It is surprising that the CAA has dismissed this issue, apparently without due consideration, and we ask it to reevaluate this.

12.3. Main Tunnel and remaining capital projects

- 12.3.1. We agree with the CAA’s interim assessment that there has been no inefficient spend on the main tunnel.
- 12.3.2. We also agree with the CAA’s position that all other projects have been delivered efficiently and there will be no further adjustments in relation to them. All projects been delivered efficiently, and have been through appropriate governance and engagement, with no evidence to suggest inefficiency.

¹ P47 <https://publicapps.caa.co.uk/docs/33/CAP2265E%20H7%20Appendices.pdf>

² P6 Independent Fund Surveyor Report B131 Tunnels Refurbishment (Cargo)Pseudo-G3Gateway Review, 12th October 2021

³ P47 <https://publicapps.caa.co.uk/docs/33/CAP2265E%20H7%20Appendices.pdf>

12.4. Capital overheads and risk allowance

- 12.4.1. Capital overheads and risk allowance will be driven by the CAA's H7 capex arrangements. Nonetheless, overheads and risk allowance will need to be explicitly accounted for when establishing initial capex category baselines. We agree that this requires further engagement with the CAA and airlines.
- 12.4.2. Further detail on this is set out in the Capital Incentives chapter.

12.5. iH7 capital projects overheads and risk allowance

- 12.5.1. We agree with the CAA that any iH7 projects that require any further review should be subject to the existing ex-post review capex arrangements.
- 12.5.2. Any review should be completed in a timely manner and in line when those projects are completed, which avoids placing disproportionate pressure on stakeholders at the end of the H7 period and ensures the history of the project is relatively recent. We do not consider it is appropriate for the CAA to conduct further ex-post reviews towards the end of the H7 price control period by default; the reviews should be conducted in a timely fashion following the completion of the project.
- 12.5.3. We continue to encourage the CAA to plan on the basis to avoid reopening the H7 RAB position at the end of H7 as this leads to significant uncertainty and increased risk. We ask for the CAA to provide clarity by setting the scope of further reviews with a corresponding timeline. This would be helpful for all stakeholders.

13. Expansion Review

- 13.1 It is important to recognise that prior to the pandemic, Heathrow was working to meet the challenge set by the Secretary of State to secure planning consent by end of 2021 and deliver runway opening by 2026 in order to maximise consumer benefits.
- 13.2 The expansion programme would have become the UK's most comprehensive and technically challenging Development Consent Order (DCO), presenting unique challenges that no other major planning programme had faced.
- 13.3 Heathrow had to ensure it had the right capabilities, expertise, and governance arrangements to meet the requirements of the CAA and the Secretary of State. We had close monitoring of costs against well formulated budgets with the best available information at the time.
- 13.4 We welcome and agree with the CAA's view that:
- Heathrow has not “unilaterally withdrawn” from the expansion process and there is no case for changing the overall policy of recovery of expansion costs.
 - When expansion restarts, there needs to be a clear CAA policy on how costs can be recovered by Heathrow.
 - All 2018 Category B spend can be added to the RAB.
 - Category B and C costs incurred before March 2020 can be added to RAB subject to efficiency review.
 - Winddown costs (i.e. costs incurred after March 2020) can also be added to the RAB subject to its efficiency review. (Heathrow will make submissions on actual costs for 2020 and 2021 as soon as practicable).
 - Appeal costs should be treated in the same manner as other expansion costs and can be added to the RAB subject to efficiency review.
 - Interim Property Hardship Scheme costs can be added to the RAB.
 - Risk sharing arrangements, recovery caps of costs incurred in 2020 and 2021 will not apply.
- 13.5 We disagree with the CAA's view on financing costs to be applied at 4.83%. We direct the CAA to our previous submissions which evidences the prevailing rate should be used and we propose the use of the final H7 WACC.
- 13.6 We disagree with the CAA view that there is potential for up to £5.3m inefficiency. There is no potential inefficiency, as demonstrated by previous assessments carried out by the CAA's own consultants. A cost overrun does not mean inefficiency.
- 13.7 We note the CAA recognises that in some cases “It is hard to make the case that the full amount is inefficient” and then applies arbitrary benchmark percentages for inefficiency. We ask the CAA to provide the evidence it used to come to these assumptions.

- 13.8 We have provided the CAA with substantial amounts of evidence that demonstrate that all costs were directly related to the DCO and efficiently incurred. This should lead the CAA to a clear conclusion that all the costs are efficient.
- 13.9 Nonetheless, Heathrow will separately provide further evidence to the CAA on the amber categories of potential inefficiency.