



H7 Capex Delivery
Obligations Framework
- Lessons Learnt

Report for Heathrow
Airport Limited

March 2025



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Executive Summary

Introduction

This report evaluates the H7 Capex Delivery Obligations (DOs), introduced by the Civil Aviation Authority (CAA) to enhance the efficiency, transparency, and accountability of capital expenditure projects at Heathrow. Implemented during the H7 regulatory control period, the framework is designed to incentivise the delivery of capex projects within budget, on schedule, and to agreed output and quality standards.

The findings, based on a review of project data, stakeholder interviews, and specific case studies, provide insights into the framework's impact on Heathrow and its stakeholders (airlines, passengers, and freight shippers), and include recommendations for its future development.

Key observations on Delivery Obligations in H7

The operation of the current approach to capex efficiency through Delivery Obligations highlights the following key points:

- **More intensive project management and stakeholder engagement:** The framework has fostered a more intensive approach to project management and stakeholder engagement at Heathrow, especially during early stages of development. The requirement for DOs has therefore increased the intensity of planning and risk assessment, improving certainty for stakeholders.
- **Direct and indirect costs:** Implementing DOs has incurred substantial direct and indirect costs. These include financial expenditure, resource allocation, and risk management. Notably, direct costs and costs associated with project delays could be more than £3.5 million per year, with a potential for this to increase further due to indirect costs. This underlines the need to adapt the framework to drive the right behaviours and outcomes, which may not be possible with a 'one size fits all' approach.
- **Project delays:** A significant consequence of the DOs has been delays in project timelines, particularly in achieving Gateway 3 milestones.¹ Heathrow estimates these delays to be two months or more, which have implications for project costs, efficiency, and delivery schedules. This highlights the need for a more streamlined process.
- **Lack of flexibility in application:** Although there is no formal guidance on the application of DOs, a relatively standardised approach has emerged in practice, with equal weightings assigned to each obligation on outputs, quality and schedule. This does not account for varying risks across different projects, suggesting that a 'one size fits all' approach may not be appropriate.
- **Asymmetric incentives:** While the H7 capex framework provides a more balanced set of incentives compared to its predecessor, the DOs are asymmetric. Penalties are imposed for underperformance, but there are no equivalent rewards for overperformance, such as early completion or delivery to a higher standard.

Lessons for H8

As Heathrow moves towards the H8 regulatory control period, there are opportunities to improve the approach to Delivery Obligations. Building on the observations from the implementation of Delivery

¹ Gateway 3 (G3) represents a key milestone for capex delivery where the airline community agree to the business case proceeding into implementation.

Obligations described in Section 2, together with insights from the impact assessment in Section 4, possible refinements for the incentive framework are primarily related to:

- Focusing incentives where they are needed
- Minimising the impact of delays, and
- Minimising potential knock-on effects on the supply chain in the future.

These changes can be achieved by applying the DO framework in a more flexible way as follows.

Flexibility in application

Using criteria to determine which projects should face the full DO framework and in other cases using a simplified system that might:

- Place 100% of the weight on a single element (probably output); and/or
- Allowing one of the weights to be zero and the other two to adjust as necessary (say setting schedule to zero and making output and quality 50:50).

Criteria could be like those used for allocating projects to the IFS process. Say a mix of scale, complexity, interface with airlines/customers and criticality of the project, for example:

- ‘Internal projects’ at Heathrow are projects that focus on improving the systems, processes, and infrastructure that enable the airport to operate efficiently and support its core business functions. These projects may not have an immediate, direct and perceivable impact on customer experience, but they are needed ‘behind the scenes’ to keep the airport running. As Heathrow already has strong commercial incentives to deliver these projects, they could reasonably be assigned a zero weighting for schedule and thereby provide additional agility to the programme to adapt to changing circumstances.
- For commercial revenue projects, reducing the schedule weighting may incentivise early delivery, as additional time allowances to mitigate schedule risk could delay financial benefits. A reduced schedule weighting can also be considered to avoid potential duplication of risk contingency in the event fixed price contracts are utilised by the airport.
- Due to the additional complexity of delivering technology projects, a lower schedule weighting can be considered to shift focus to output and quality, if they can be adequately defined. Where this is not possible, particularly considering challenges to define the output on technology projects, the emphasis may need to be solely on quality. Zero weighting can be considered for projects with no fixed completion dates.

If this sort of criteria-based approach were still too complex, it would be possible to apply a more blanket-based approach – like that used by Ofwat for deciding whether projects are subject to the RAPID process which is similar in some respects to the DO framework. Further details of the criteria set by Ofwat are in Appendix 2.

Threshold adjustments

Consider raising the minimum threshold for DOs to focus efforts on projects where they can deliver the most value, thereby reducing resource strain on smaller projects. An increase to the £1m threshold can be considered, particularly given the anticipated increase in the number of projects subject to the framework.

Raising the threshold to £5 million would exclude 39 projects planned for 2025 and 2026, representing approximately 29% of the total planned projects for that period (and 4% by value). If the threshold is further increased to £10 million, the number of excluded projects rises to 66, accounting for around 50% of the planned projects (and 11% by value) for 2025 and 2026.



The exclusion of smaller projects would reduce direct and indirect costs associated with Delivery Obligations and provide greater flexibility to deliver the programme in an agile way, in accordance with best practice.

Cost management and standardisation

Whilst the introduction of Delivery Obligations has fostered a more intensive approach to project management and stakeholder engagement, they may inadvertently slow delivery pace, as the associated benefits of increased certainty come with additional resource requirements that have direct and indirect cost implications. Future iterations of the framework should focus on reducing these costs by streamlining processes and improving the efficiency of project management practices, striking a better balance between certainty and operational efficiency. For instance, this could be achieved by moving away from the 'one size fits all' approach that has emerged in practice when assigning equal weightings to each obligation on output, quality and schedule. A reduced schedule weighting could incentivise faster project delivery, through potential removal of time allowances to mitigate schedule risk, with desired outcomes for all stakeholders.

Heathrow also has established pre-approved quality standards for projects (i.e., Department for Transport (DfT) security standards for security lanes and adopting industry recognized technology standards on applicable technology projects) with airlines to streamline DO setting and reduce negotiation time. Where appropriate, establishing consistent and pre-approved quality standards for similar projects should continue to be encouraged to streamline the DO process. Such an approach would not only reduce administrative overhead but also ensure consistency and fairness in project evaluations.

Addressing dependencies and large complex projects

Develop guidance for projects with significant interfaces, allowing for adjusted weightings and prioritised risk assessments. For example, underweighting output and schedule may be considered if an integrated solution with multiple outputs is required to deliver all project benefits. Addressing dependencies would allow Heathrow greater flexibility to adopt a programmatic approach to capital delivery in line with best practice.

This might still not be sufficient for large projects delivered across several years. This could particularly be the case for new and innovative capital expenditure (capex) projects to modernise and expand capacity at Heathrow in H8. Some of the large, multi-year projects come with uncertainties and complexities that will inherently carry more risk at G3 as the risks may not always be fully understood. To mitigate potential project delays and capex risks, revising the G3 criteria could prove beneficial for such projects. A key consideration might be delaying the requirement for firm pricing until it becomes more reliably available including the ability to specify output expectations. Early-stage pricing requirements for such projects could lead to inaccuracies, rework and change control, as estimates made during preliminary phases could lack the precision needed for informed decision making at G3. Revising the criteria to allow firm pricing commitments only when sufficient project details are available would enable Heathrow to make more accurate decisions, reduce change control, and avoid unnecessary delays. This approach would also enhance flexibility, ensuring that projects can adapt to evolving circumstances without jeopardizing delivery timelines or escalating costs. Adopting a more programmatic and benefits/outcome-based view might be more suitable for such projects.

Conclusions and recommendations

The H7 Capex Delivery Obligations framework have contributed to a more intensive approach to project management and stakeholder engagement at Heathrow, especially during early stages of development, providing stakeholders with greater certainty and clarity. However, these benefits come with cost and resource demands, which may inadvertently constrain Heathrow's ability to deliver projects at pace. Insights gained during this initial phase highlight the need for continuous refinement and adaptation of the framework to balance efficiency, cost, and delivery speed, ensuring it remains a valuable tool for future projects.



Recommendations that could potentially be considered to refine the approach for H8 based on the lessons from nine use cases are set out below:

- Increase the project value threshold applicable for the new DO framework from £1 million to £10 million, to focus resource and efforts on projects delivering the most value to consumers.
- Consider adopting a criteria-based approach to identify projects that are subject to the new DO framework.
- If a criteria-based approach is not followed, consider underweighting or discounting the schedule weightings based on impact and visibility of projects (i.e., internal) or for identified project types (i.e., commercial revenue category or technology projects). A schedule weighting of zero should be considered for projects with no fixed completion dates.
- Underweight or discount the output weighting for technology projects as they tend to not have tangible assets and output definitions. Underweighting output should also be considered for those projects requiring integrated solutions to deliver all benefits.
- Underweight or discount quality on projects straddling both technology and infrastructure, thus causing challenges with defining the appropriate quality standard. Quality standardisation should continue to be encouraged where appropriate.
- Consider adopting a more programmatic and benefits/outcome-based approach on large and complex projects with several interfaces and dependencies and G3-G5 timeline more than 24 months.



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1 Introduction

1.1 This report

This report evaluates the H7 Capex Delivery Obligations (DOs) introduced by the Civil Aviation Authority (CAA) to enhance the efficiency, transparency, and accountability of capital expenditure projects at Heathrow. Implemented during the H7 regulatory control period, the framework is designed to incentivise the delivery of capex projects within budget, on schedule, and to agreed output and quality standards.

The findings, based on a review of project data, stakeholder interviews, and specific case studies, provide insights into the framework's impact on Heathrow and its stakeholders (airlines, passengers, and freight shippers), and include recommendations for its future development.

The report was commissioned by Heathrow Airport Limited and undertaken by KPMG LLP during October and December 2024. The scope of services is set out in Appendix 1.

1.2 Background to capex efficiency

The capex incentive mechanism for Heathrow, as outlined in the CAA's H7 Final Decision, is designed to promote efficient, timely, and high-quality investment in airport infrastructure and operations.² The capex mechanism is part of the economic regulation framework established by the CAA for the H7 regulatory period. It introduces forward-looking (ex-ante) incentives for capital expenditure, moving away from the retrospective (ex-post) assessments used in the previous regulatory period.

Delivery Obligations are a core component of the capex mechanism, requiring Heathrow to agree specific commitments regarding a project's output, quality, and completion timeline at the Gateway 3 (G3) stage, where projects transition from 'development' to 'core' expenditure.³

The mechanism requires weights to be assigned to each obligation and adjusts the project's capex baseline costs for any under-performance against these obligations. The approach is intended to incentivise Heathrow to manage projects effectively and meet predefined objectives.

1.3 Approach to assessment

This evaluation examines the costs and benefits of setting Delivery Obligations for Heathrow and its customers, including airlines, passengers, and freight shippers. It draws upon the following sources:

- Published CAA documents that provide context for the development of the framework.
- Interviews with Heathrow's capital delivery teams involved in the framework's implementation.
- Analysis of selected 'use cases' to assess how the framework is applied in practice.

It is important to note that this evaluation does not include input from other stakeholders, such as airlines or the CAA.

The evaluation focuses on the practical application of Delivery Obligations, covering:

² CAP2524 Economic Regulation of Heathrow Airport: Limited H7 Final Decision, March 2023

³ The Heathrow Gateway Lifecycle is a process that reviews business cases at key points to guide investment decisions. The process includes a series of gateways, with G3 being a critical investment decision point.

- **Project suitability:** Determining whether certain projects are better suited than others to operate with Delivery Obligations, considering factors such as value, scope, duration, and complexity.
- **Costs and benefits:** Assessing the scale and distribution of costs and benefits associated with Delivery Obligations, with a focus on how these elements incentivise the achievement of objectives.
- **Strengths and weaknesses:** Identifying aspects of the framework that have functioned effectively and as intended, as well as areas where performance has been less satisfactory, and exploring potential refinements for future regulatory control periods.

1.4 Report structure

Following this short introduction, the remainder of the report is structured as follows:

- Section 2 provides a description of the DO framework, identifying key changes to capital efficiency incentives between the previous regulatory control period (Q6) and the current control period.
- Section 3 describes a series of nine 'use cases' exploring how the delivery obligations framework has been implemented in practice at a project-level.
- Section 4 brings together the analysis of the 'use cases' with information from the interviews with the capital delivery teams to identify the range of costs and benefits associated with Delivery Obligations.
- Section 5 concludes by identifying lessons learnt, noting how the framework could be modified to make it more efficient in future regulatory control periods.

2 Capex efficiency incentives

2.1 Introduction

The capital expenditure incentive mechanism was developed by the CAA to promote efficient investment in airport infrastructure and operations as part of the economic regulation framework for the H7 regulatory period. This mechanism introduces forward-looking (ex-ante) incentives for capital expenditure, departing from the retrospective (ex-post) assessment employed in previous regulatory control periods. The approach aims to strengthen incentives for Heathrow to manage its capital projects efficiently throughout the regulatory period.

This section outlines the capital expenditure incentive mechanism, with a focus on Delivery Obligations, highlighting the key differences in the approach to capital expenditure incentives compared to the previous regulatory control period (Q6).

2.2 Capex efficiency incentives

The key components of the capex efficiency incentive mechanism for H7 are set out in Table 1.

Table 1: Capex efficiency incentive mechanism

Component	Description
1. Ex-ante framework	— The mechanism operates on an <i>ex-ante</i> basis, meaning Heathrow's performance is measured against cost baselines agreed in advance of delivery. This approach is intended to provide stronger incentives for Heathrow to manage its capital projects efficiently throughout the regulatory period.
2. Capex categories and baselines	— The overall H7 capital envelope is set by the CAA, based on the H7 capex plan. The envelope is split into capex categories – each with common outputs/objectives and similar levels of risk and controllability. Each capex category has a SMART objective and an indicative baseline cost. Capex across all programmes is capped at the value of the capex envelope. To reallocate money from one programme to another, HAL must obtain airline agreement.
3. Gateway process	— The mechanism retains the 'development to core' process used in the Q6 regulatory period. Projects can transition from development to core capex by moving through project 'Gateways.' Decisions to move projects from development to core are agreed upon by Heathrow and the airlines at G3, ensuring that projects are sufficiently developed and costed before they proceed.
4. Delivery obligations	— Each project within a programme has its own Delivery Obligations specified at G3 and agreed with airlines. These Delivery Obligations specify each project's expected: outputs, quality, and timing. — At G3, airlines and Heathrow agree on the adjustments to capex baselines that will be applied during reconciliation if a project's Delivery Obligations are not met. They also establish the performance indicators that will be used to evaluate delivery and determine any necessary adjustments.
5. Change control	— Adjustments to the G3 baselines would only happen where changes are agreed with airlines through a change control process as part of the enhanced governance process. The CAA will only be involved if the change process is escalated.
6. Reconciliation process	— Reconciliation happens at the capex project level. The CAA will use performance against Delivery Obligations to adjust the capex baseline to reflect performance and in line with the values agreed between Heathrow/Airlines at G3, followed by an adjustment to the Regulatory Asset Base (RAB). — For projects not subject to ex-ante incentives, CAA undertakes an ex-post review of capex efficiency and establish whether any incurred costs should be disallowed.

7. Incentive rate	— A symmetrical incentive rate is applied to both over- and underspending relative to the agreed capex baselines. If Heathrow overspends on a project, 25% of the overspending will not be added to the Regulatory Asset Base (RAB), effectively disallowing it from future revenue recovery. Conversely, Heathrow can retain 25% of any underspending as a bonus, encouraging cost efficiency.
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2.3 Delivery Obligations

Within the capex efficiency incentive mechanism, delivery obligations are used as a means of adjusting the capex baseline for a project if Heathrow does not deliver what has been agreed.

At G3, airlines and Heathrow are required to agree the costs and delivery obligations associated with the project in terms of outputs, quality, and timing. They also need to agree the weighting that should be applied to each individual delivery obligation and SMART indicators that will be used to establish if each obligation has been met or partially met – Table 2 provides an example. This framework is used to determine the level of capex baseline reduction that will be associated with under-delivery.

Table 2: Delivery Obligation example

DO category	Obligation detail	Example obligation	Measurement
Output	— Clearly identifiable outputs that directly contribute to the overall purpose of the project.	— Number of lifts installed in a particular location.	— Sliding scale (increments of outputs delivered) or — Pass / fail when sliding scale not realistic
Quality	— A clearly testable or verifiable characteristic of the output(s) that demonstrates the project's requirements are met. — Specifications should align exclusively with relevant standards and avoid connections to capacity or broader outcomes.	— Top level or key standard which the lift must meet to be used.	— Sliding scale or — Pass / fail
Schedule	— The agreed schedule, measured in months between G3 CPB and G5, including Time Risk Allowance (TRA). — Note: this will include P80 G5 date for key projects.	— Non-key projects: Deterministic schedule + Time Risk Allowance. — Key projects: P80 date.	— Always sliding scale (increments of months after G5 date)

Source: Heathrow DO team internal documentation

The Delivery Obligations and associated weightings are agreed on a project-by-project basis. However, as highlighted in the 'use case' analysis in Section 3, weightings in practice have tended to default to equal allocation, regardless of the project's nature or associated risks.

Actions relating to Delivery Obligation are distributed across gateways to ensure that performance expectations are clearly defined, monitored, and evaluated throughout the project lifecycle. Although formally triggered at G3, additional considerations are applied through key gateways, as outlined in Table 3.

Table 3: DOs across the gateway lifecycle

Project stage	Gate	DO stage
Justify, design and plan	G2: Options decision	<ul style="list-style-type: none"> – Project plan outlines specific performance targets and metrics that will be used to assess project outcomes against agreed-upon outputs. – Involves collaboration between Heathrow and airlines to ensure that DOs are aligned with project objectives and stakeholder expectations. – DOs are refined and detailed.
	G3: Investment decision	<ul style="list-style-type: none"> – DO outputs, quality and schedule are formalised and agreed at G3 as part of the overall investment decision.
Deliver	G4: Start on site	<ul style="list-style-type: none"> – Projects performance is managed over G3-G5, including change control management and processes to adjust the baseline for external changes.
	G5: Build complete	<ul style="list-style-type: none"> – DOs are formally concluded and closed.
Integrate, operate and realise benefits	G6: Readiness for operations	
	G7: Capex financial closure	<ul style="list-style-type: none"> – Ex-ante/project final value and associated RAB adjustment calculated.

Source: Heathrow Strategic Capital Business Plan May 2015 and Heathrow provided documentation on DO process

In summary, the Delivery Obligations work as part of the capex efficiency incentive mechanism. They are used to adjust the baseline costs downwards if Delivery Obligations are not met. Out-turn costs are then compared against this adjusted baseline and efficiency incentives applied to the difference before costs are added to the RAB.

2.4 CAA Rationale for capex efficiency incentives

The CAA highlighted the rationale for transitioning from the retrospective (ex-post) capex efficiency assessment used in Q6 to a forward-looking (ex-ante) framework, was driven by the aim to improve the efficiency of capital expenditure and ensure that investments deliver value for consumers.

The CAA identified several limitations with the Q6 approach, including difficulties in conducting ex-post reviews, which could potentially allow inefficient capital expenditure to be incorporated into future charges. While the Q6 framework provided flexibility through its 'development to core' process, the CAA considered it to lack sufficiently robust commercial incentives for Heathrow to deliver projects within or below budget. Additionally, the asymmetry of risk exposure under Q6 - where Heathrow was penalised only for inefficiency identified in retrospective reviews - was deemed insufficient for fostering cost control throughout the regulatory period.

In response, the CAA's adoption of an ex-ante framework for H7 aims to provide clearer, stronger, and more balanced financial incentives for both overspending and underspending against agreed capex baselines. This approach is intended to encourage Heathrow to manage its capital projects more efficiently, focusing on delivering agreed outputs on time and to the required quality standards. Setting capex baselines and delivery obligations at G3 in collaboration with airlines ensures all parties share a common understanding of project goals and expectations. This approach aligns financial incentives with project delivery.

The following sections examine how this new approach has performed in practice since March 2024.

3 Delivery Obligations in practice

3.1 Introduction

This section examines the implementation of Delivery Obligations at Heathrow during the early stages of the H7 regulatory period. Drawing on detailed insights from nine use cases (presented in Appendix 5), it provides an assessment of the practical application of the framework. The analysis highlights successes, challenges, and opportunities for improvement, offering evidence-based recommendations for refining the approach.

3.2 Methodology

The findings presented here are based on a review of nine representative projects selected from six capex categories, encompassing a mix of project types, sizes, durations, and impact (whether projects are of immediate, direct and visible benefit to customers). These projects form part of a total of 23 projects that passed Gateway 3 between January 2024 and September 2024 and were subject to Heathrow's DO framework from March 2024. Insights were derived from stakeholder interviews, project documentation, and structured analysis of the use cases. Table 4 provides a summary of the nine use cases and their key characteristics. More detailed descriptions of each are described in Appendix 4.

Table 4: Use cases

#	Project name	Category	Size (EAC, £m)	Time (G3-G5)	Impact/ Visibility*	Project type	Description
1	T2 CSA, CS 7 T2B	Security	██████	██████	External	Infrastructure	Installation of 24 Computed Tomography X-ray (CTIX) security lanes.
2	Maximo upgrade	Asset Management & Compliance	██████	██████	Internal	Technology	System implementation project of cloud-based MAS and upgrading to the latest version to address the obsolescence risks and cyber vulnerabilities to the business.
3	Airfield pavement rolling lifecycle	Asset Management & Compliance	██████	██████	External	Infrastructure	Project to undertake pavement works including resurfacing and repairs on 6 x named airfield pavement blocks.
4	SCCM and VMWare application and infra upgrades	Asset Management & Compliance	██████	██████	Internal	Technology	Technology project to refresh IT infrastructure, operating systems, databases and software.
5	VIP Product proposition and refurbishment	Commercial revenue	██████	██████	External	Infrastructure	Refurbishment project of 9 areas within Windsor Suite in T5, 8 VIP lounge areas and 1 Communal area.
6	CI existing products	Commercial revenue	██████	██████	External	Technology	Delivery of 30,000 story points across several product lines.
7	AOP/NOP inc. Flow by terminal ATM efficiency	Efficient Airports	██████	██████	External	Technology	Upgrade to airport planning software, including penetration testing and update to interface with NATs.
8	Tr3 - T1 backbone phase 2	T2 Baggage	██████	██████	External	Technology/ Infrastructure	Project to install new technology fibre optic backbone cables across the Heathrow campus and connectivity migration from T1.
9	Digital VIP	Commercial revenue	██████	██████	External	Technology	Delivery of a technology project aimed improving the booking of Heathrow VIP lounges and accompanying services for customers.

Key:



Note*: for the purposes of our work, we have defined internal and external as:

- Internal: projects that focus on improving the systems, processes, and infrastructure that enable the airport to operate efficiently and support its core business functions rather than directly focusing on passenger-facing services.
- External: projects that directly enhance passenger-facing services, customer experience, or the airport's public-facing infrastructure, such as terminal upgrades, improved amenities, or initiatives aimed at increasing operational capacity to better serve airlines and passengers.



3.3 Key observations

Table 5 shows a summary of our main findings across all our use cases showing aspects of the DO framework that worked well and could be built on and evolved, as well as challenges encountered during implementation.

Table 5: Use cases overall findings

Findings area	What worked well	Challenges and areas for improvement
Engagement with project teams	— Project teams generally responded well to the additional scrutiny on schedule and cost.	— Significant step change in ways of working and culture for project teams requiring increased emphasis and resource for stakeholder management.
Setting up DOs	— Initial efforts to set up the DO process on infrastructure projects have resulted in potential precedents which can be used for similar projects in the future.	— Structured, detailed and timely training is required to ensure expectations of project teams are aligned with the DO process.
Approach to DOs	— DO drafting has evolved in line with the Ready for Price Scheduling (RPS) standardised approach since this was drafted. Prior to this, a 'tactical approach' was followed that required extensive validation with procurement, risk and commercial teams.	— Technology best practice project delivery does not fit into Heathrow's gateway approach, which is set up for infrastructure projects. As a result, technology projects are inherently more difficult to complete in the DO framework. This is partially due to the lack of tangible assets and output definition. Technology projects also use different project milestones requiring more time to define project gateways.
Quality and risk	— Use of generic quality standards aided DO development and provided a consistent approach which was pre-agreed with airlines.	— There have been instances when costs and schedule have been amended to better align with the potential commercial downside risk to Heathrow.
Change management	— Changes have generally been agreed with airlines , however, it involves lengthy discussions with the detailed impact of each change requiring evidencing .	— Projects with significant interfaces and dependencies have a high level of change risk, particularly on schedule.
Projects with dependencies	— General agreement with airlines on approach to follow to break down large outputs made up of multiple components.	— Projects with scope items that had already been delivered are more challenging to define within the DO framework.

Successes in implementation

The introduction of DOs has led to an expected improvements in project management and stakeholder engagement, albeit the improved certainty has resulted in potential cost burdens. Examples of effective implementation include:

- T2 CSA, CS & T2B (PRJ-001701): Agreement on throughput flow rates demonstrated successful collaboration with airlines, setting a precedent for similar projects.
- Airfield Pavement Rolling Lifecycle (PRJ-001795): A structured approach to defining outputs (e.g., using blocks rather than materials or area) established a clear and replicable methodology.
- Digital VIP (PRJ-001597): This project effectively leveraged the Ready for Pricing Scheduling (RPS) system, showcasing its potential to streamline DO preparation and governance.

Challenges encountered

Several challenges emerged during implementation, highlighting areas for refinement:

- Complexity of Technology Projects: Projects like the Maximo Upgrade (PRJ-001593) revealed difficulties in defining tangible outputs and aligning technology milestones. This is primarily due to Heathrow's Gateway lifecycle, which the DO framework is based upon, being inherently built for infrastructure projects.
- Negotiation Delays: Prolonged discussions on quality standards, as seen in the SCCM and VMWare upgrades (PRJ-001805), underscored the need for pre-agreed standards to accelerate project timelines. This has since been resolved by Heathrow through implementing a standard quality measure for technology projects. These projects were the first technology projects to go through the framework, so they faced additional challenges that future projects may not, as they set the standard that now can be built upon.
- Dependency Risks: Projects with significant interfaces, such as Tr3 T1 Backbone Phase 2 (PRJ-001800), faced delays due to interdependencies, underscoring the importance of tailored weighting for schedule obligations.

Weighting and flexibility

The current practice of equal weightings for output, quality, and schedule obligations often proved unsuitable. Use cases revealed that:

- Commercial revenue projects like CI Existing Products (PRJ-001856) would benefit from reduced schedule weighting to incentivise early delivery.
- Technology projects without fixed timelines, such as AOP/NOP (PRJ-001735), require zero schedule weighting to avoid unnecessary administrative burdens.
- Integrated projects straddling technology and infrastructure (e.g., Tr3 T1 Backbone Phase 2, PRJ-001800) would benefit from adjusted quality weightings to better reflect their dual nature.

While equal weightings have proven to be unsuitable, there is also a risk of increased administrative burden if negotiations over weightings occur each time. Therefore, some standardisation across similar project types (i.e., PRJ-001701 relating to security lane installation) will be useful to streamline the process and reduce the need for repeated discussions.

Technology projects

The findings from the nine use cases generally revealed that technology projects are inherently more difficult to complete under the new DO framework when compared to infrastructure projects. Some of the key challenges encountered include:

- Governance milestones: use different governance milestones and cost assurance processes when compared with infrastructure projects, making it difficult to adopt a 'one size fits all' approach to DO management.
- Outputs: do not have tangible assets and output definitions, making it more challenging to establish initial costing.
- Solution uncertainty: requires a flexible approach to arrive at an optimal solution to deliver the expected outcome and benefits.
- Project tranches: an initial tranche of works guides the next tranche, with testing and lessons learned being implemented on the go.

3.4 Lessons for H8

Based on these observations, several key lessons can inform the refinement of Delivery Obligations for the H8 regulatory control period as follows:

Flexibility in application

Tailor DO weightings to the nature and strategic importance of individual projects with flexibility to adjust the weighting based on project type, level of interfaces, and dependencies. For example:

- ‘Internal projects’ at Heathrow are projects that focus on improving the systems, processes, and infrastructure that enable the airport to operate efficiently and support its core business functions. These projects may not have an immediate, direct and perceivable impact on customer experience, but they are needed ‘behind the scenes’ to keep the airport running – such as projects involving implementing cloud-based systems (PRJ-001593) and IT upgrades (PRJ-001805). As Heathrow already has strong commercial incentives to deliver these projects, they could reasonably be assigned a zero weighting for schedule and thereby provide additional agility to the programme to adapt to changing circumstances.
- For commercial revenue projects, reducing the schedule weighting may incentivise early delivery, as additional time allowances to mitigate schedule risk could delay financial benefits (i.e., refurbishment of lounge and other communal areas, PRJ-001548). A reduced schedule weighting can also be considered to avoid potential duplication of risk contingency in the event fixed price contracts are utilised by the airport.
- Due to the additional complexity of delivering technology projects, a lower schedule weighting can be considered to shift focus to output and quality, if they can be adequately defined. Where this is not possible, particularly considering challenges to define the output on technology projects, the emphasis may need to be solely on quality. Zero weighting can be considered for projects with no fixed completion dates – such as the project to upgrade airport planning software and Heathrow’s interface with NATS (PRJ-001735).

If this sort of criteria-based approach were still too complex, it would be possible to apply a more blanket-based approach – like that used by Ofwat for deciding whether projects are subject to the RAPID process which is similar in some respects to the DO framework. Further details of the criteria set by Ofwat are in Appendix 2.

Threshold adjustments

Consider raising the minimum threshold for DOs to focus efforts on projects where they can deliver the most value, thereby reducing resource strain on smaller projects. An increase to the £1m threshold can be considered, particularly given the anticipated increase in the number of projects subject to the framework.

Raising the threshold to £5 million would exclude 39 projects planned for 2025 and 2026, representing approximately 29% of the total planned projects for that period (and 4% by value). If the threshold is further increased to £10 million, the number of excluded projects rises to 66, accounting for around 50% of the planned projects (and 11% by value) for 2025 and 2026.

The exclusion of smaller projects would reduce direct and indirect costs associated with Delivery Obligations and provide greater flexibility to deliver the programme in an agile way, in accordance with best practice and facilitate a more focussed effort on projects that can deliver the most value to consumers.

Cost management and standardisation

Whilst the introduction of Delivery Obligations has fostered a more intensive approach to project management and stakeholder engagement, they may inadvertently slow delivery pace, as the



associated benefits of increased certainty come with additional resource requirements that have direct and indirect cost implications. Future iterations of the framework should focus on reducing these costs by streamlining processes and improving the efficiency of project management practices, striking a better balance between certainty and operational efficiency. For instance, this could be achieved by replacing the 'one size fits all' approach, which currently assigns equal weightings to outputs, quality, and schedule obligations. A reduced schedule weighting could incentivise faster project delivery, through potential removal of time allowances to mitigate schedule risk, with desired outcomes for all stakeholders.

Heathrow also has established pre-approved quality standards for projects (i.e., Department for Transport (DfT) security standards for security lanes, PRJ-001701, and adopting industry recognized technology standards on applicable technology projects, PRJ-001735) with airlines to streamline DO setting and reduce negotiation time. Where appropriate, establishing consistent and pre-approved quality standards for similar projects should continue to be encouraged to streamline the DO process. Such an approach would not only reduce administrative overhead but also ensure consistency and fairness in project evaluations.

Addressing dependencies and large complex projects

Develop specific guidance for projects with significant interfaces, allowing for adjusted weightings and prioritised risk assessments. For example, underweighting output and schedule may be considered if an integrated solution with multiple outputs is required to deliver all project benefits – such as the project to improve booking of Heathrow VIP lounges and accompanying services (PRJ-001597). Addressing dependencies would allow Heathrow greater flexibility to adopt a programmatic approach to capital delivery in line with best practice.

This might still not be sufficient for large projects delivered across several years. This could particularly be the case for new and innovative capital expenditure (capex) projects to modernise and expand capacity at Heathrow in H8, whereas the DO framework may still apply for routine infrastructure asset replacement projects such as the airfield pavement resurfacing and repair project (PRJ-001795). Some of the large, multi-year projects come with uncertainties and complexities that will inherently carry more risk at G3 as the risks may not always be fully understood. To mitigate potential project delays and capex risks, revising the G3 criteria could prove beneficial for such projects. A key consideration might be delaying the requirement for firm pricing until it becomes more reliably available including the ability to specify output expectations. Early-stage pricing requirements for such projects could lead to inaccuracies, rework and change control, as estimates made during preliminary phases could lack the precision needed for informed decision making at G3. Revising the criteria to allow firm pricing commitments only when sufficient project details are available would enable Heathrow to make more accurate decisions, reduce change control, and avoid unnecessary delays. This approach would also enhance flexibility, ensuring that projects can adapt to evolving circumstances without jeopardizing delivery timelines or escalating costs. Adopting a more programmatic and benefits/outcome-based view might be more suitable for such projects.

3.5 Conclusion and initial recommendations

The H7 Capex Delivery Obligations have contributed to a more intensive approach to project management and stakeholder engagement at Heathrow, especially during early stages of development, providing stakeholders with greater certainty and clarity. However, these benefits come with cost and resource demands, which may inadvertently constrain Heathrow's ability to deliver projects at pace. Insights gained during this initial phase highlight the need for continuous refinement and adaptation of the framework to balance efficiency, cost, and delivery speed, ensuring it remains a valuable tool for future projects.

Incorporating these lessons will enhance the effectiveness of DOs in the H8 regulatory period, delivering greater value to Heathrow and its stakeholders. It is however important to note that the evidence-base is limited to nine use cases and therefore the findings may not be representative for all projects planned for the current H7 period. Initial recommendations that could potentially be considered to refine the approach for H8 based on the lessons from nine use cases are set out below.



- Increase the project value threshold applicable for the new DO framework from £1 million to £10 million, to focus resource and efforts on projects delivering the most value to consumers. This has the potential to exclude around 50% of the planned projects (and 11% by value) for 2025 and 2026. A framework like the (ex-post) mechanism could be retained for projects below this threshold.
- Consider adopting a criteria-based approach to identify projects that are subject to the new DO framework. Potential criteria could be, impact and visibility of projects (internal vs external), project types (e.g., the commercial revenue category or technology projects to be excluded from the framework), G3-G5 project timeline (i.e., projects with a timeline more than 24 months to be regulated through a separate mechanism), interfaces and dependencies (projects with several interfaces and dependencies to be regulated through a separate mechanism).
- While DOs provided airlines with greater certainty on delivery, the trade-off is that Heathrow are less likely to set ambitious schedules due to the financial risks if these are not met. Therefore, if a criteria-based approach is not followed, consider underweighting or discounting the schedule weightings based on impact and visibility of projects (i.e., Internal) or for identified project types (i.e., commercial revenue category or technology projects). A schedule weighting of zero should be considered for projects with no fixed completion dates.
- Underweight or discount the output weighting for technology projects as they tend to not have tangible assets and output definitions. Underweighting output should also be considered for those projects requiring integrated solutions to deliver all benefits.
- Underweight or discount quality on projects straddling both technology and infrastructure, thus causing challenges with defining the appropriate quality standard. Quality standardisation should continue to be encouraged where appropriate.
- Consider adopting a more programmatic and benefits/outcome-based approach on large and complex projects with several interfaces and dependencies and G3-G5 timeline more than 24 months.

4 Evaluation of Delivery Obligations

4.1 Introduction

This section provides an overall evaluation of the H7 Capital Framework, primarily focused on the DO aspect but not entirely.

4.2 Impact assessment

When evaluating the effectiveness of the capital framework it is necessary to:

- Employ a standard methodology, which in this case is the costs and benefits that would be considered through a Regulatory Impact Assessment (RIA).
- Assess the costs and benefits against an established baseline, which in this case is the Q6 capital framework that had been applied for Q6 and iH7.

Two factors to consider are:

- Costs will include both set-up costs and business-as-usual ones. For completeness both sets of costs should be considered but when making the comparison against Q6 it is the BAU costs that should be included.
- The processes for the new framework are still in their infancy with some of the costs being untested. It may not be possible to get an accurate quantitative value for some of the costs and benefits at this time but that does not stop a qualitative assessment being undertaken.

In the tables and commentary throughout this section, clear reference to the source of any quantitative or qualitative estimates is provided.

4.3 Overview of costs and benefits

To make the analysis of costs and benefits clear, costs and benefits have been grouped into broad categories as follows:

- Heathrow costs and benefits.
- Airlines and customers costs and benefits.

Each of these broad categories is discussed in more detail below.

4.4 Heathrow costs and benefits

Heathrow's costs can be further sub-divided into direct and indirect cost categories as follows.

Heathrow direct costs

These are costs that can be directly linked to the new framework, including:

- Project management costs associated with setting up the new systems (involving, but not limited to, the definition of DOs at G3, change management processes needed as projects move from G3 to G5 and changes to reporting systems) and implementing the systems for those projects covered.
- Costs linked to support for external users, including reviews of DO processes and standards.



Table 6 provides a summary of these costs and an estimate, where possible, of the quantitative impact. It should be noted that two of the costs noted are sunk costs and consequently not included in the ongoing/ BAU assessment.



Table 6: Heathrow direct costs

Type of cost	Description	Qualitative/ quantitative assessment	Source of evidence
Project management cost and additional planning requirements	— Additional expenses incurred due to the set-up of the DO approach and changes required and resourcing ⁴ . This would also involve costs related to detailed planning and risk management to deliver the framework going forward.	— This is currently estimated at: [REDACTED]	— Interview with Head of Capital Regulation — CAA Framework Impacts - Resource business case — Review of DO process documentation provided by the DO team
System upgrade costs (Sunk Cost)	— Additional expenses incurred due to change to Ecosys system to systemise DOs.	— This is currently estimated at [REDACTED]	— Interview with Head of Capital Regulation — Turner and Townsend Key Account Lead
Definition and development of the DO (Sunk Cost)	— Additional expenses incurred due to project to update/change the Theo systems to integrate DOs and automate the RAB.	— This is currently estimated at [REDACTED]	— Interview with Head of Capital Regulation — Figures provided by Operations Delivery lead
External requirements	— Costs related to additional external requirements	— Additional costs related to independent reviews on processes and standards may be required going forward.	— Interviews with Head of Capital Regulation and Delivery Obligation Leads — Review of DO process documentation provided by the DO team

⁴ As highlighted in Heathrow's H7 Notice of Appeal (page 105) to the Competition and Markets Authority (CMA) in 2023, [Non Confidential HAL Notice of Appeal.pdf](#).

Heathrow indirect costs

There is a potential risk of broader indirect costs that may arise from the implementation of the new framework in the future, including:

- Costs associated with delays in the delivery of projects arising from the process slowing down the delivery of projects. These costs can include: (1) resource requirements as more staff are needed to manage change control on slower progressing projects; and (2) foregone revenue if the delayed project is a commercial one.
- Implications on the supply chain, which could include: (1) potential DO risk transfer to the supply chain leading to pricing of this risk; and/or (2) a potential premium being applied if there is a need to provide a fixed price estimate earlier in the process than traditionally.
- Risk for Heathrow. The DO framework is primarily an asymmetric one (of the four elements only the cost aspect is symmetric) that can lead to penalties but no upside. As such, assuming that there is a positive, albeit possibly small, risk that some of the asymmetric DO penalties will be triggered then Heathrow would not view any investment as a 'fair bet' as it is likely to lose value as some of the RAB would be disallowed. This can be addressed in different ways, but Heathrow would expect to either receive: a higher WACC through an uplift designed to capture the asymmetry of the risk,⁵ and/or an allowance set at the 'normal' level of penalty that the company would then seek to beat.⁶

An additional risk that Heathrow could face relates to the change management process. There is an initial change management which is signed off by the stakeholders and then several months later once the cost implications have been assessed there is a final sign-off. Heathrow would have implemented the change after the initial sign-off (otherwise the project would be significantly delayed) but faces the risk that it may not be accepted once the full cost (and schedule) implications are known. This exposes Heathrow to a potential risk. Given the lack of experience in this area to date it is not possible to quantify this risk.

Table 7 provides a summary of these indirect costs and, where possible, of the quantitative impact.

⁵ The CMA at the PR19 appeals allowed an uplift on the WACC to reflect the asymmetric nature of the risks faced.

⁶ For example, this is no different to setting allowed revenues for a regulated company based on an assumed level of bad debt.

Table 7: Heathrow indirect costs

Type of cost	Description	Qualitative/ quantitative assessment
Potential delays	<ul style="list-style-type: none"> — If projects take longer to get to G3 to drive increased certainty, there is a risk that overall project timelines could be extended (depending on whether this longer route to G3 will impact the overall timelines to G5). Despite the potential for increased certainty, this may not drive efficiency as it hinders new methods of delivery being tested. 	<ul style="list-style-type: none"> — May lead to additional costs to the order of £2.5 million to £3.0 million owing to a two-month delay, due to increased resource requirements and dependencies with other projects. The extent of costs will depend on whether this longer route to G3 will impact the overall timeline to G5. — Some projects (i.e., commercial revenue) could result in foregone revenues. — Delays could also cause additional administrative effort to renew expiring supplier contracts.
Implications on supply chain costs	<ul style="list-style-type: none"> — Potential DO risk transfer to the supply chain leading to pricing of this risk. — Potential premium being applied if there is a need to provide a fixed price estimate earlier in the process than traditionally. This premium is likely to err on the high side to protect the supply chain. 	<ul style="list-style-type: none"> — Whilst the supply chain does not directly take on any of the DO risk, if there is a need to provide a fixed price earlier in the process, it could potentially lead to cost risk being incorporated in tender prices.
Risk of DO penalties being imposed	<ul style="list-style-type: none"> — The asymmetry in the DO process means that Heathrow is potentially exposed to a penalty. That penalty could be estimated and included as a cost of the approach. 	<ul style="list-style-type: none"> — Box 1 and Appendix 5 provides an illustrative example as well as a process for determining an evidence base for a worked through value.

To provide an estimate of the indirect costs associated with asymmetry risk, Box 1 sets out an illustration based on stated assumptions.

Box 1: Illustrative asymmetric risk estimation

Assumptions

- 10% of projects (by value) fail to meet one of the three asymmetric penalty targets and face a 5% of the cost penalty.
- All three elements of the framework have equal weight.
- There are £3 billion of projects subject to the framework in H7.
- Projects have an average asset life of 25 years and are subject to a WACC of 5%.

Calculation

10% of projects equates to £300 million.

If they fail just one of the three elements then one third of the project value is subject to the penalty, this gives £100 million.

If the penalty is 5% then this equates to £5 million i.e., an average of £1 million per year.

If the penalty is applied through the RAB, then the average impact during H7 will be:

£1 million x 50% to give the average RAB over the life of the asset, i.e., £0.5 million.

Depreciation on £1 million gives £0.04 million per year.

Profit on the average RAB gives £0.5 million x 5%, which is £0.025 million per year.

So average annual impact of a £1 million penalty is £0.065 million, which means that a £5 million penalty would generate an average cost of £0.325 million per year.

Since this penalty is applied by disallowing some of the RAB, Heathrow would be immediately under-funded by the size of the penalty, and this should be viewed as a cash cost in the year it happens.

Of course, if the full 25% penalty was applied then, *ceteris paribus*, the cost would be £5 million per year.

Over H7 more work is needed to refine these assumptions. Even with relatively modest assumptions, significant annual costs may arise. This is true for both a potential supply chain premium and the 'normal' level of asymmetric risk.⁷ The inclusion of this as either a WACC uplift or an operational cost is a choice that Heathrow and the CAA may want to consider.

Table 8 summarises the benefits of the DO framework, including project management benefits associated with the new system.

⁷ The CMA H7 appeal final report, para 11.95(f), can be interpreted as meaning that the costs of expected penalties should be incorporated into the capex programme.

Table 8: Heathrow benefits

Type of cost	Description	Qualitative/ quantitative assessment	Source of evidence
Improved project management practices	<ul style="list-style-type: none"> — Detailed review process will identify potential risks and uncertainties early in the project lifecycle, allowing for better planning and mitigation strategies. — Additional documentation and consideration of scope, risks and uncertainties involved in a project from inception. 	<ul style="list-style-type: none"> — May lead to more accurate cost and schedule plans. — May help increase confidence in project delivery by ensuring that projects are based on a solid understanding of the scope, risks, and uncertainties involved. 	<ul style="list-style-type: none"> — Interviews with Head of Capital Regulation and Delivery Obligation Leads — Review of DO process documentation provided by the DO team



4.5 Airline and customer costs and benefits

Other stakeholders play an important role in the capex process and obviously benefit from the investment. Table 9 and Table 10 summarise the costs and benefits.

Two key costs can be identified. First, the airlines will be required to spend more time on their aspects of the project management. This means increased involvement at G3 and the significantly increased change management volume, requiring dedicated resources. It is not yet possible to quantify this cost but for airlines and alliances that are active at Heathrow this could be a non-negligible cost.

The second key cost is for customers and arises from the potential delay to projects. Investment is undertaken to deliver new services, improve quality of existing services or maintain the service provided by existing assets. All these actions ultimately benefit customers (either passengers or cargo users).

If the new process delays the delivery of these projects by a matter of months, then customers could either see:

- Existing services deteriorate for that time; or
- A delay in the provision of the new and/or improved service.

Both will lead to customers facing a loss of consumer value. How great this loss is depends-on the:

- Length of delay.
- Type of service being provided.
- The customer willingness to pay for the service (as a proxy of the lost consumer value).

Where the project is a commercial one then the foregone revenue (discussed above) acts as a proxy for the loss of consumer value and does not need to be considered again. For non-commercial projects the assessment of loss of consumer value based on willingness-to-pay needs to be determined.

There are clearly benefits arising from this capital framework, primarily related to greater transparency around outputs, schedule and cost.

What value airlines and customers place on these is likely to depend on:

- The criticality of the project.
- Whether the project is airline/customer facing.
- The size of the project.

These criteria are like those used in Q6 with respect to the Independent Fund Surveyor (IFS)⁸.

⁸ The Independent Fund Surveyor (IFS) is an external body appointed by Heathrow and the airlines to provide an ongoing assessment of the reasonableness of all major decisions made on key programmes and projects and that capital is being expended efficiently to deliver the outcomes of the business cases.

Table 9: Airline and customer costs

Type of cost	Description	Qualitative/ quantitative assessment	Source of evidence
Additional engagement between airlines and Heathrow	<ul style="list-style-type: none"> — Airlines have a stronger role to play in the governance process, meaning that they need to review and approve additional requirements. — This has cost implications for both the airlines and Heathrow. 	<ul style="list-style-type: none"> — Additional resource required to carry out additional engagement and stakeholder management between airlines and Heathrow. — Potential costs may emerge due to additional back and forth extended overall project timelines. Whilst constructive engagement is positive, airlines may not need to have visibility across all projects (e.g., Heathrow corporate office remodel). 	<ul style="list-style-type: none"> — Interviews with Head of Capital Regulation and Delivery Obligation Leads. — Review of DO process documentation provided by the DO team.
Potential delays	<ul style="list-style-type: none"> — The approach could lead to projects being slower than they were under Q6. This additional delay would imply that customers lose value for the period of the delay. 	<ul style="list-style-type: none"> — This needs to be reviewed as the process develops over H7. 	<ul style="list-style-type: none"> — Interviews with Head of Capital Regulation and Delivery Obligation Leads. — Review of DO process documentation.
Additional costs to customers	<ul style="list-style-type: none"> — The additional costs incurred by Heathrow in delivering the DO process are likely to be recouped at some time from customers. This higher cost could imply a loss of consumer surplus – a deadweight loss that could be valued. 	<ul style="list-style-type: none"> — It is likely that these costs will be small and so this cost is likely to not be material. 	<ul style="list-style-type: none"> — Interviews with Head of Capital Regulation and Delivery Obligation Leads. — Review of DO process documentation.

Table 10: Airline and customer benefits

Type of cost	Description	Qualitative/ quantitative assessment	Source of evidence
Greater transparency and visibility for airlines	<ul style="list-style-type: none"> The DO process provides airlines with greater visibility into Heathrow's project plans and a stronger negotiation position. 	<ul style="list-style-type: none"> Can support airlines to better plan their own operations and resources, therefore improving overall outcomes for customers. 	<ul style="list-style-type: none"> Interviews with Head of Capital Regulation and Delivery Obligation Leads. Review of DO process documentation provided by the DO team.
Better informed investment decision	<ul style="list-style-type: none"> The new framework encourages projects to have a more mature design before the investment decision is made. 	<ul style="list-style-type: none"> Allows a more matured solution ahead of G3, with costs being appropriately captured in the scope at G3. 	<ul style="list-style-type: none"> Interviews with Head of Capital Regulation and Delivery Obligation Leads. Review of DO process documentation provided by the DO team.



4.6 Key findings

In summary, the Heathrow BAU related costs could be in the region of [REDACTED] – based solely on direct project management costs – while further possibly significantly larger cost could arise due to potential delays, potential supply chain uplifts for early fixed-price costs and the asymmetric risk faced by Heathrow. Once additional costs associated with possible revenue losses from commercial projects are also considered, the cost could be materially greater.

Other direct and indirect costs cannot yet be quantified given the length of operation of the new framework and the consequent lack of evidence even though the price control period for implementing the H7 final decision is almost finished. There is good reason to believe that these yet to be quantified costs are material. This is especially true around the potential delays that may occur owing to projects reaching G3 later than they had during Q6 and not being able to recover that lost time by G5.

There are obvious benefits of the framework, especially around some improvements in increased certainty up to G3 and the transparency that airlines and customers are benefiting from. What is not clear is whether those benefits justify the costs that need to be incurred.

Given these findings, it is possible to consider some refinements of the framework that could continue to deliver significant benefits while minimising the costs being faced. Refinements are not unusual when regulatory regimes have as significant an impact as the DO framework has. For example, both Ofwat and Ofgem refined their menu-based regimes over several price controls and more recently Ofgem has been refining and simplifying its Business Plan Incentive. Potential refinements are discussed in the following section.

5 Key observations and lessons for H8

5.1 Introduction

The forward-looking Capex Framework introduced at Heathrow in H7 sought to address limitations with the previous retrospective approach by providing greater transparency of capex delivery and a more symmetrical approach to financial incentives.

Although the framework has only been in place since March 2024, the work presented in this report has sought to evaluate how the framework it is working in practice, considering the direct and indirect costs and benefits to Heathrow and its customers.

In drawing observations and lessons for H8, we have drawn on analysis of a series of ‘use cases’ to explore how the framework is working in practice.

5.2 Key observations on Delivery Obligations during H7

The current approach to capex efficiency through Delivery Obligations (DOs) has yielded mixed results. While it has placed greater focus on project management and stakeholder engagement, it has also incurred direct and indirect costs, caused potential project delays, and lacked flexibility in application. Additionally, the asymmetric incentives associated with DOs may not be the most effective way to motivate performance.

5.3 Lessons for H8

As Heathrow moves towards the H8 regulatory control period, there are opportunities to improve the approach to Delivery Obligations. Building on the observations from the implementation of Delivery Obligations described in Section 2, together with insights from the impact assessment in Section 4, possible refinements for the incentive framework are primarily related to:

- Focusing incentives where they are needed
- Minimising the impact of delays, and
- Minimising the potential knock-on effects on the supply chain in the future.

These changes can be achieved by applying the DO framework in a more flexible way, as outlined in Table 11.

Table 11: Lessons for H8

Insight area	Rationale	Example
Increased flexibility in application	<ul style="list-style-type: none"> — Using criteria to determine which projects should face the full DO framework and in other cases using a simplified system that might: <ul style="list-style-type: none"> – Place 100% of the weight on a single element (probably output); and/or – Allowing one of the weights to be zero and the other two to adjust as necessary (say setting schedule to zero and making output and quality 50:50). 	<ul style="list-style-type: none"> — Internal projects have lower costs and shorter G3-G5 timelines, therefore they may adopt a zero weighting for schedule to reduce the volume of potential changes, considering their internal visibility and impact. — For commercial revenue projects, reducing the schedule weighting may incentivise early delivery, as additional time allowances to mitigate schedule risk could delay financial benefits. A reduced schedule weighting can also

	<ul style="list-style-type: none"> Criteria could be like those used for allocating projects to the IFS process. Say a mix of scale, complexity, interface with airlines/customers and criticality of the project. If this criteria-based approach proves too complex, a simpler blanket approach could be adopted, similar to Ofwat's RAPID process for determining project eligibility, which shares similarities with the DO framework (see Appendix 2 for further details on this). 	<p>be considered to avoid potential duplication of risk contingency in the event fixed price contracts are utilised by the airport.</p> <ul style="list-style-type: none"> For technology projects, where there are additional complexities in delivery, a lower schedule weighting can be considered to shift focus to output and quality, if they can be adequately defined. Where this is not possible, particularly considering challenges to define the output on technology projects, the emphasis may need to be solely on quality. Zero weighting can be considered for projects with no fixed completion dates.
Threshold adjustments	<ul style="list-style-type: none"> Increasing the minimum threshold for Delivery Obligations (DOs) allows Heathrow to prioritise efforts on projects where they can deliver the greatest value, whilst also reducing the resource burden associated with smaller projects. This is especially relevant as Heathrow expects the number of projects subject to the framework to significantly increase over the next twelve months. 	<ul style="list-style-type: none"> The £1 million threshold would include around 133 projects planned for 2025 and 2026. Raising the threshold to £5 million would exclude 39 projects planned for 2025 and 2026, representing approximately 29% of the total planned projects for that period (and 4% by value). Raising the threshold to £10 million would exclude 66 projects, accounting for around 50% of the planned projects (and 11% by value) for 2025 and 2026.
Cost management and standardisation	<ul style="list-style-type: none"> Whilst the introduction of DOs has fostered a more intensive approach to project management and stakeholder engagement, they may inadvertently slow delivery pace, as the associated benefits of increased certainty come with additional resource requirements that have direct and indirect cost implications. Where appropriate, establishing consistent and pre-approved quality standards for similar projects should continue to be encouraged to streamline the DO process. 	<ul style="list-style-type: none"> Future iterations of the framework should focus on reducing these costs by streamlining processes and improving the efficiency of project management practices, striking a better balance between certainty and operational efficiency. For instance, this could be achieved by moving away from the 'one size fits all' approach that has emerged in practice when assigning equal weightings to each obligation on output, quality and schedule. Pre-approved quality standards could reduce administrative overheads and ensure consistency and fairness in project evaluations.
Addressing dependencies	<ul style="list-style-type: none"> Develop specific guidance for projects with significant dependencies to enable adjusted weightings and prioritised risk assessments that account for their inherent complexity. Addressing project dependencies effectively would also provide Heathrow with greater flexibility, supporting the adoption of a programmatic approach to capital delivery while aligning with industry best practices and enhancing overall efficiency. 	<ul style="list-style-type: none"> Output weightings could be reduced for projects requiring integrated solutions with multiple outputs to realize full benefits. This would ensure that the framework accommodates the unique challenges of such projects.

<p>Large and complex projects</p>	<ul style="list-style-type: none"> — Some of the large, multi-year projects come with uncertainties and complexities that will inherently carry more risk at G3 as the risks may not always be fully understood. To mitigate potential project delays and capex risks, revising the G3 criteria could prove beneficial for such projects. — Early-stage pricing requirements often lead to inaccuracies and rework, as estimates made too early may lack precision. Allowing firm pricing only when sufficient project details are available would improve accuracy, reduce budget overruns, and prevent delays. This approach would also provide flexibility, enabling projects to adapt to changes without risking timelines or costs. 	<ul style="list-style-type: none"> — Firm pricing requirement is delayed until it becomes more reliably available.
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5.4 Initial recommendations for H8

Incorporating these lessons will enhance the effectiveness of DOs in the H8 regulatory period, delivering greater value to Heathrow and its stakeholders. It is however important to note that the evidence-base is limited to nine use cases and therefore the findings may not be representative for all projects planned for the current H7 period. Initial recommendations that could potentially be considered to refine the approach for H8 based on the lessons from nine use cases are set out below.

- Increase the project value threshold applicable for the new DO framework from £1 million to £10 million, to focus resource and efforts on projects delivering the most value to consumers. This has the potential to exclude around 50% of the planned projects (and 11% by value) for 2025 and 2026. A framework like the (ex-post) mechanism could be retained for projects below this threshold.
- Consider adopting a criteria-based approach to identify projects that are subject to the new DO framework. Potential criteria could be, impact and visibility of projects (internal vs external), project types (i.e., the commercial revenue category or technology projects to be excluded from the framework), G3-G5 project timeline (i.e., projects with a timeline in excess of 24 months to be regulated through a separate mechanism), interfaces and dependencies (projects with several interfaces and dependencies to be regulated through a separate mechanism).
- While DOs provided airlines with greater certainty on delivery, the trade-off is that Heathrow are less likely to set ambitious schedules due to the financial risks if these are not met. Therefore, if a criteria-based approach is not followed, consider underweighting or discounting the schedule weightings based on impact and visibility of projects (i.e., Internal) or for identified project types (i.e., commercial revenue category or technology projects). A schedule weighting of zero should be considered for projects with no fixed completion dates.
- Underweight or discount the output weighting for technology projects as they tend to not have tangible assets and output definitions. Underweighting output should also be considered for those projects requiring integrated solutions to deliver all benefits.
- Underweight or discount quality on projects straddling both technology and infrastructure, thus causing challenges with defining the appropriate quality standard. Quality standardisation should continue to be encouraged where appropriate.
- Consider adopting a more programmatic and benefits/outcome-based approach on large and complex projects with several interfaces and dependencies and G3-G5 timeline more than 24 months.

5.5 Conclusion

The H7 Capex Delivery Obligations have contributed to a more intensive approach to project management at early stages and increased stakeholder engagement at Heathrow, providing stakeholders with greater certainty and clarity. However, these benefits come with cost and resource demands, which may inadvertently constrain Heathrow's ability to deliver projects at pace. Insights gained during this initial phase highlight the need for continuous refinement and adaptation of the framework to balance efficiency, cost, and delivery speed, ensuring it remains a valuable tool for future projects.



Appendix 1 KPMG Scope of Services

We will provide HAL with strategic insights to refine the H7 capex incentives framework. We will focus on lessons learnt and adapt the framework to better suit a range of projects. We will provide case-study evidence from structured and systematic evaluation of the process and outcomes of delivering capital projects under the H7 capex incentive framework to make evidence-based contributions to the CAA on the evolutions of the incentive framework.

To deliver this, we will use the following four step approach in the delivery of services:

Step 1: Project Selection

Agree a sample of up to seven projects for analysis and use the following to determine the sample:

- The sample should cover a diverse range of projects covering all the capex categories – one subcategory from the 10 asset management and compliance categories, T2 baggage, regulated security, commercial revenues, efficient airport, carbon and sustainability, and iH7 rollover.
- The sample should include projects of different values, scopes, durations, complexities, gateway stages and delivery obligations (DOs).
- The sample should cover a wide set of characteristics to ensure identification of lessons from past performance:
 - Q6/iH7 rollover projects that are subject to Q6 capex triggers.
 - Projects progressed from 'development' to 'core' and reflecting the G3 level of maturity in estimates prior to Q4 FY22 (and therefore with an established baseline with largely incurred or committed cost estimates).
 - Projects that progressed to G3 during H7 but post FY22.
 - Projects still undergoing scoping, specifying and budgeting (at G0-G2 stages).
- The sample should cover a material proportion of the total H7 capex plan, in turn reflecting the weighting of DOs.

Step 2: Evidence Assembly

Assemble evidence and insights of each selected project to support a structured assessment of the performance of the incentive framework, this will involve:

- Setting out the key characteristics underpinning the new ex-ante incentive mechanism – in particular, application of the 25% incentive rate and the DO incentive mechanism and there implications on the opening RAB for H8.
- Gathering evidence on any adjustments (actual or anticipated) to the baseline cap during the two time-windows (01/02/2024 to 31/03/2024 or 01/02/2025 to 31/03/2025), as well as distinguishing the performance of delivery objectives and obligations at the respective capex category level and project level.
- Carrying out an extensive stakeholder mapping with the Company to identify all stakeholders the Supplier would need to consult to gather evidence.
- Assembling evidence to populate the analytical framework by engaging in in-depth discussions with the identified stakeholders and analysing project documentation and performance data.

Step 3: Evaluation

Provide specification of the evaluation framework to consider:

- Whether the mechanism supports the regulatory objectives in terms of performance and efficiency.



- Whether the mechanism is appropriately structured in terms of incentive rates, scope, flexibility, practicality, accuracy, allocation of risk, and governance. This will be set out as a structured framework with defined criteria to enable the consistent assessment of each project in the sample.
- Whether the mechanism has had unintended consequences for the planning and delivery of efficient and effective capex, and more generally the smooth running of the airport for customers.

Step 4: Recommendations

Develop actionable recommendations to enhance the ex-ante capex incentive framework which shall include:

- Proposed amendments to the framework based on evidence.
- Suggest alternative approaches for projects outside the framework.
- Outline strategies to improve stakeholder engagement.

Appendix 2 Ofwat's criteria-based approach

Ofwat, in collaboration with the Environment Agency (EA) and the Drinking Water Inspectorate (DWI) through the Regulators' Alliance for Progressing Infrastructure Development (RAPID), employs a structured, criteria-based approach to determine which water infrastructure projects are included in the RAPID program. This process is designed to identify and advance strategic water resource solutions that address long-term water resilience challenges in England and Wales⁹.

Criteria for Inclusion in the RAPID Program:

1. Scale and impact

- *Large scale*: projects with a deployable output exceeding 50 megalitres per day are considered substantial enough to warrant inclusion.
- *Regional significance*: solutions involving collaboration between two or more water companies, indicating a broader regional impact, are prioritised.

2. Feasibility and strategic fit

- Projects must demonstrate technical and economic feasibility, aligning with strategic water resource management plans and contributing to national water resilience objectives.

3. Environmental and water quality considerations

- Solutions should address potential environmental and water quality risks, ensuring they do not adversely affect ecosystems and comply with regulatory standards.

4. Innovation and value

- Projects that incorporate innovative approaches or technologies and offer best value solutions to meet supply-demand challenges are favoured.

Process for Evaluation and Inclusion:

1. **Proposal submission**: water companies submit project proposals detailing how they meet the above criteria.
2. **Assessment gates**: the RAPID program utilises a gated process to evaluate and monitor project progress:
 - **Gate One**: initial assessment to ensure projects are on track and merit continued investigation.
 - **Gate Two**: detailed evaluation focusing on alignment with water resources planning and readiness for further development.
 - **Gate Three**: checkpoint assessing preparedness for planning application submissions, including environmental and technical considerations.
 - **Gate Four**: final review before construction, ensuring all regulatory and planning requirements are met.
3. **Funding decisions**: at each gate, Ofwat decides on the allocation of funding for the subsequent phase, based on the project's adherence to criteria and demonstrated progress.

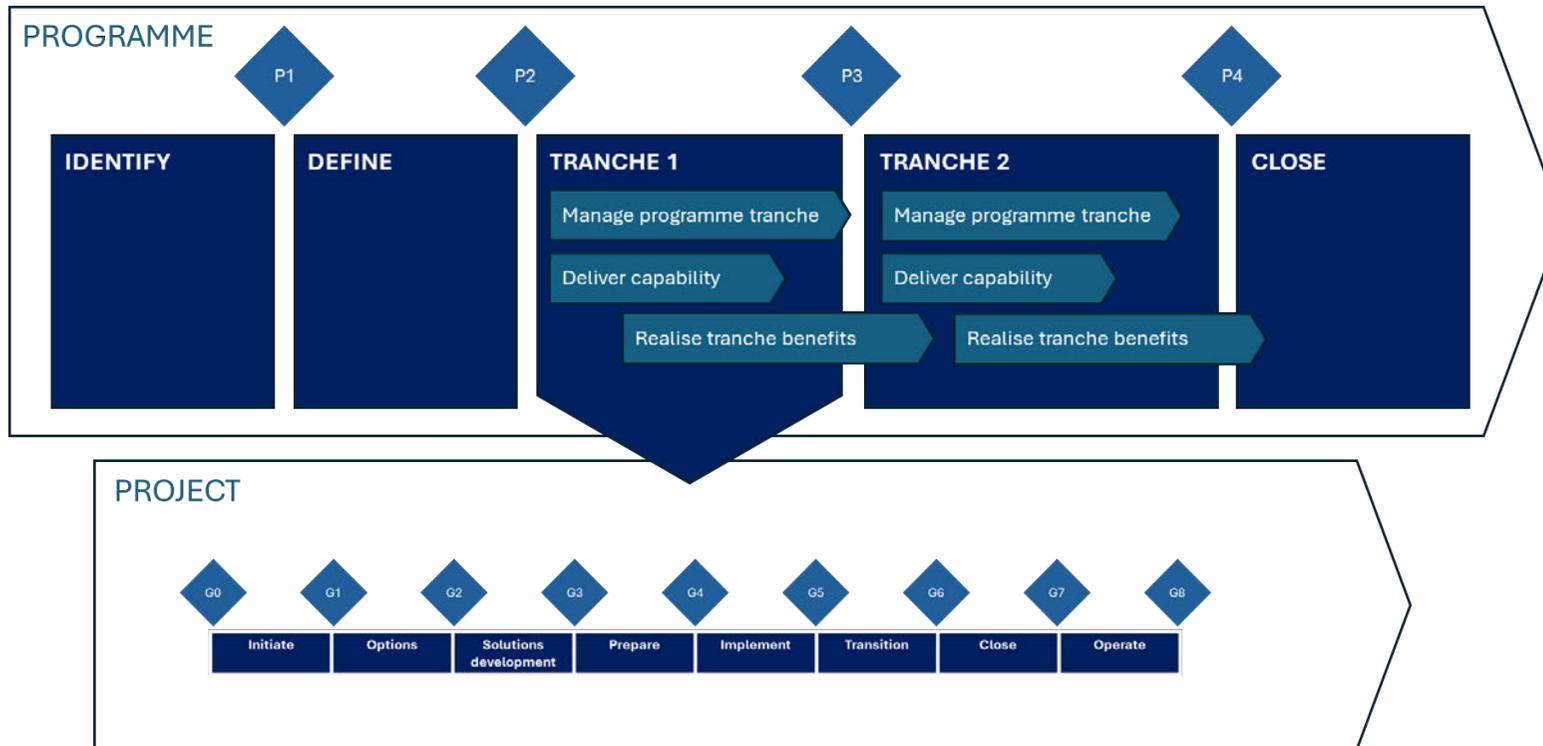
This structured approach aims to ensure that only projects with significant potential to enhance water resilience and deliver value are advanced, facilitating the development of infrastructure that meets the future needs of water users and the environment.¹⁰

⁹ Approach to the RAPID programme and gated process for PR24 - Environment Agency, Ofwat and DWI – August 2024 - [Approach-to-the-RAPID-programme-and-gated-process-for-PR24.pdf](#)

¹⁰ Strategic regional water resource solutions guidance for gate two – Environment Agency, Ofwat and DWI – April 2022 - [ofwat.gov.uk/wp-content/uploads/2022/02/Strategic-regional-water-resource-solutions-guidance-for-gate-two_RAPID.pdf](#)

Appendix 3 Heathrow's Programme Gateway Lifecycle

Programmes are managed through Programme Tranches, which are groups of projects delivering specific outputs. All projects within a programme follow the Heathrow Project Lifecycle and pass through the project Gateways (G2-G8). The strategic assessment (G0) and initiation (G1) occur during the Programme Definition stage. This is shown below:



Gateway 3 (G3) is a crucial decision point where Heathrow and the Airline Community decide whether to proceed with the Business Case. If the investment is no longer needed, unused funds may either be refunded to the Airline Community or redirected to a new Business Case. Additionally:

- It marks the handover of Capex from Development to Core through the Capital Portfolio Board.
- The Business Case transitions from Programme to Delivery, requiring confidence in the schedule, cost, and risks before awarding a contract to the Delivery Integrator.

Appendix 4 Feedback on use cases

Detailed findings and learning on each of the nine use cases are summarised in this Appendix.

Use cases summary in the following pages:

PRJ-001701 - B7680.08 - T2 CSA, CS & T2B

PRJ-001593 - B71-026.00 - Maximo upgrade

PRJ-001795 - B71-099.00 Airfield Pavement Rolling Lifecycle – 2024 Project 1

PRJ-001805 - B71-103 SCCM and VMWare Application and Infrastructure Upgrades - 2023

PRJ-001548 - B75-018.01 - VIP Product Proposition and Refurbishment

PRJ-001856 - B75-058.00 CI Existing Products 2024-2026

PRJ-001735 - B76-010 - AOP/NOP inc .Flow by terminal ATM efficiency

PRJ-001800 - B73-015.00 - Tr3 - T1 Backbone Phase 2

PRJ-001597 - B75-020.00 - Digital VI



1. PRJ-001701 - B7680.08 - T2 CSA, CS & T2B

Description: Installation of 24 Computed Tomography X-ray (CTiX) security lanes

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Security	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External Infrastructure project
What worked well								
<ul style="list-style-type: none"> – Reaching an agreement on the standard approach to throughput flow rates, with agreement with airlines on what was deemed reasonable by both parties. – All external changes at the time of writing had been agreed with airlines, except for one (i.e., 100ml rule) which requires further evidence on the impact of the change. – Use of the DfT security standards aided DO development and provided a consistent approach which was pre-agreed with the airline community. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – Deviation from standard weightings. – High number of outputs. – Higher value placed on delivery of last lane as airlines wanted to ensure that all lanes were delivered. While this could set a precedent for other security projects, an alternative and simplified DO structure was also being considered. – Throughput trial added to the DO which is more outcome focused than output. However, reached an agreement with airlines on how future throughput trials would be measured (i.e., standard approach for agreeing which flow rates would be used). – DO required a lot of negotiation to get approval, with potential for escalation to have happened sooner in the process. 								
Observations for H8								
Standard DO weightings may be applicable for similar project types.								



2. PRJ-001593 - B71-026.00 - Maximo upgrade

Description: A system implementation project of cloud-based multi-agent system (MAS) and upgrading to the latest supported version (i.e., MAS8), to address the obsolescence risks and cyber vulnerabilities to the business.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Asset Management & Compliance	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	Internal Technology project
What worked well								
<ul style="list-style-type: none"> – This was the first technology project to go through the DO process. The technology team responded well to scrutiny on schedule and cost, particularly as technology projects do not go through the same cost assurance as infrastructure projects. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – As the process was new, training had not been completed by all teams involved. This resulted in additional stakeholder management required to align project teams expectations. – Technology projects do not have tangible assets and output definition, unlike infrastructure projects. This meant that to implement the framework, the team required more detailed discussions to define outputs. – Technology projects use different project milestones to infrastructure (QG3a & QG3b compared to G3) which required additional time to confirm the gateway to define G3. – Technology projects do not go through the same cost assurance process as infrastructure projects, making it more challenging to establish initial costs. Following a review of 'core' costs in the risk register, costs were increased. – Lengthy discussions with airlines were required to develop quality standards for technology projects. Standard technology standards have now been agreed for use across all technology projects. – Maximo has an element of scope that has been paused (mobile Maximo) as the solution is not viable with the volume of data needed at the airport. This has since been approved in principle by airlines subject to a full impact assessment. 								
Observations for H8								
Consider an alternative approach for technology projects with largely internal visibility.								



3. PRJ-001795 - B71-099.00 Airfield Pavement Rolling Lifecycle – 2024 Project 1

Description: A project to undertake pavement works including resurfacing and repairs on 6 x named airfield pavement blocks.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Asset Management & Compliance	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External Infrastructure project
What worked well								
<ul style="list-style-type: none"> – This was the first infrastructure project that went through the DO process. Required the team to define and consider several variations for how the output should be measured (i.e., by block, area in m2 or by type of material). The team assessed potential implications and difficulties of defining more/ less detailed outputs for the DOs and how this is measured post completion. – As a result of this initial effort, the output measure of blocks will be used as a precedence going forward. As a team, there was an understanding that the process of defining the framework needed to be developed and a recognition of the efforts required to bring the project teams on the journey. This set the baseline for future DOs. – The initial cost estimate was based on information provided by key risks question set (KRQS). After discussions and reviewing the risk buffer, the cost was adjusted to better reflect the expected risks. This helped both the project and delivery teams understand how to define costs based on development and core activities, and what level of risk to include in the initial cost estimate. This process was valuable for both teams to ensure a more accurate and realistic baseline cost for the project. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – The project has significant dependencies with runway resurfacing projects and as a result potential upstream implications resulting in changes to DOs. – Several discussions were required to identify the correct schedule DO due to the need for alignment to the TRA and wider risk register and dependencies. – There were delays to contracting on this project as the contract was already in place and this work was a CE to the existing contract. The details of the CE were not finalised ahead of G3 which meant that the project started later than intended impacting project schedule. – Several changes have been raised on this project that have gone through the change control process, with all external changes approved in principle by the airlines. Awaiting full impact assessments to be taken through governance for full approval. 								
Observations for H8								
Reduce the weighting on schedule and output on projects with significant interfaces and dependencies with other projects.								



4. PRJ-001805 - B71-103 SCCM and VMWare Application and Infrastructure Upgrades - 2023

Description: Technology project to refresh IT infrastructure, operating systems, databases and software.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Asset Management & Compliance	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	Internal technology project
What worked well								
<ul style="list-style-type: none"> – The initial cost estimate was based on information provided by KRQS. However, there were lengthy discussions about how to categorise 'Development' and 'Core' costs for this specific project. As a result, the initial cost estimate of £3.37m was reduced to £2.94m after discussions with the program and finance teams about how technology costs should be classified. This process helped to ensure a more accurate and consistent cost estimate for the project. – There are ongoing discussions with airlines more generally on defining 'Development' and 'Core' costs. – This was the second technology project to go through the DO process, which allowed the team to leverage learnings from the first project (Maximo upgrade). 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – The DO team noted a significant step change in ways of working and culture for project team. – TRA in the schedule initially did not match the expected TRA in the risk register. – Challenges in identifying the right output DO - with cloud-based solutions, outputs can be difficult to quantify and measure. – As this also involved installation of new machines, there was a lack of clarity on the level of output detail required for different categories (i.e., physical vs. non-physical outputs). – Some scope items had already been completed, which made it challenging to include them as part of the DO as they had technically been achieved. – This project has an external change approved in principle. Following G3 approval, VM Ware has been sold and as a result licence fees for the product has increased threefold. This would have a significant impact on operational costs, with the team looking into an alternative software supplier to mitigate cost impacts. A full impact assessment is being carried out by the team. 								
Observations for H8								
Consider an alternative approach for technology projects with a significant reliance on the supply chain.								



5. PRJ-001548 - B75-018.01 - VIP Product Proposition and Refurbishment

Description: Refurbishment project of 9 areas within Windsor Suite in T5, 8 VIP lounge areas and 1 Communal area.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Commercial revenue	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External infrastructure project
What worked well								
<ul style="list-style-type: none"> - No external changes at the time of writing the report. - Project assurance questions raised by the DO team were addressed ahead of G3. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> - The DO team faced challenges when identifying individual items that needed refurbishment within the areas covered and developing a clear scope for this DO. - Breaking down space by location while avoiding the use of m2 as it would not be measured when BIU (Bringing Into Use). - Heathrow quality standards did not apply, therefore, bespoke standards relating to the fit out were used. - Standard weightings were used for this project. 								
Observations for H8								
Given resolutions to challenges around output and quality setting, reduce schedule weighting for Commercial Revenue to incentivise early delivery.								



6. PRJ-001856 - B75-058.00 CI Existing Products 2024-2026

Description: Technology product to deliver 30,000 story points across several product lines. By delivering Continuous Improvement to support ongoing functional delivery from the product backlog and cyber protection. Heathrow and Heathrow Express will be able to provide an up-to-date, secure digital user experience on both .com & App capabilities.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Commercial revenue	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External technology project
What worked well								
<ul style="list-style-type: none"> - Agreed approach to breaking down large outputs made up of multiple interactions. - Used PAWG to discuss approach with airlines. - Prompted conversations on how multiple outputs should be bundled. - Agreement that 10 outputs is the maximum number of outputs that teams should be aiming for. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> - Challenges from getting endorsement from the technology team for this project. - Schedule obligation is not as relevant here as this is a fixed time contract providing set teams or number of story points output over the three years. The number of sprints is fixed at 16 per year and this is all built into the supplier contracts. - The team faced challenges in specifying the quantity of outputs, due to it being a technology project and Story points being the key measure. - Difficulty in breaking down 000s of story points into outputs that would not put unreasonable burden on STO process or change process in case of changes. 								
Observations for H8								
Remove schedule weighting on fixed time contracts with output and delivery schedules built into supplier contracts.								



7. PRJ-001735 - B76-010 - AOP/NOP inc. Flow by terminal ATM efficiency

Description: Upgrade to airport planning software, including penetration testing and update to interface with NATs.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Efficient airports	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External technology project
What worked well								
<ul style="list-style-type: none"> – Since this project was developed before the ready for price scheduling (RPS) system was implemented, the DO team conducted additional checks on the project risks and procurement approach. This provided an extra layer of assurance for the project. – Using pre-approved generic technology standards helped to streamline the development of the DO and ensured consistency with industry standards. – This was an early DO developed using the tactical approach. DO drafting has evolved to use the RPS approach. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – Challenges in setting the schedule obligations as this project has no fixed completion date. As the AOP system will still be supported until completion, a set completion date is not necessary. – There were also challenges in measuring the success of the project. – Costs were changing up to the point the governance pack was finalised and issued. – EA was stood up after the other Solution Programmes and was still developing processes and approaches which took longer to work through (i.e., cost information was changing up to governance and originally the project had no fixed completion date). – Difficulties with identifying 'development' and 'core' costs. – Known challenges around interfacing with third parties such as Eurocontrol. – Pass/ fail project on outputs as it was not possible to take into service elements of the outputs as it was an integrated system – this posed the greatest risk for Heathrow. 								
Observations for H8								
Remove schedule weighting on technology projects with no fixed completion dates and with significant interfaces with third parties.								



8. PRJ-001800 - B73-015.00 - Tr3 - T1 Backbone Phase 2

Description: A project to install new technology fibre optic backbone cables across the Heathrow campus and connectivity migration from T1.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
T2 Baggage	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External Technology/ Infrastructure project
What worked well								
<ul style="list-style-type: none"> – A deep understanding of the output enabled the team to provide a justification for deviation away from agreed standards. – Whilst there are elements of technology in this project, the quality DO include infrastructure standards and not the usual technology standards as it was deemed to be the most applicable. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – Risk and TRA reflect level of risk associated with the projects. – Required a few attempts at breaking down the DO in a way that provided a reasonable sized group of outputs that could be classed and taken into service independently. – There were queries around whether removal of cabling should be an output as this is normally avoided. However, this was considered as it had accounted for a significant element of cost. 								
Observations for H8								
Underweight quality on projects which straddle both technology and infrastructure.								



9. PRJ-001597 - B75-020.00 - Digital VIP

Description: Delivery of a technology project aimed improving the booking of Heathrow VIP lounges and accompanying services for customers.

Category	Project value (£m)	G3 & G5 dates	Output	Quality	Schedule	Output measure & number	Slippages & other changes	Impact/ Visibility
Commercial	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	[REDACTED]	External technology project
What worked well								
<ul style="list-style-type: none"> – This was one of the first projects to go through the RPS approach. The project successfully passed through both the Ready for Pricing and G3 Readiness milestones. – Project teams were able to respond to all questions in G3 readiness review or provide a plan for getting the required information. – The project relied on generic technology standards. The DO team noted that this could be reviewed in the future to ensure they are meaningful for the customer. 								
Challenges to implementing DOs								
<ul style="list-style-type: none"> – Identifying the relevant number of outputs and whether they could be delivered independently. The DO went through several iterations as the outputs could not be delivered independently. – Outputs were originally broken down to avoid pass / fail which was challenged by the airlines as an integrated system was required to deliver all the benefits. – Standard technology quality standards were used; however, the information came in late and RPS and G3 readiness were held on subsequent days meaning the true value from these assurance processes would not have been achieved. – Issues with defining and confirming the 'development' and 'core' cost split. 								
Observations for H8								
Underweight schedule and output on Commercial Revenue projects to incentivise early delivery and facilitate delivery of integrated systems.								



Appendix 5 Evaluating the costs of the asymmetric penalties

One way in which the impact of the asymmetric penalties can be assessed is set out below.

Evidence on risk

- 1) Collect evidence on the probability of a penalty being applied
 - a) Include different characteristics of the projects
 - b) Include a time factor to establish whether the probability is constant over time
- 2) Collect evidence on the scale of penalties paid
- 3) Assess the risk (and most likely probability distribution) and scale of penalty by project characteristics and time so that a view on the scale of risk for the coming price control period can be assessed

Forecast forward

- 1) Establish the best possible forward-looking view on project type, scale etc.
- 2) Apply the probability distribution to the forward-looking data to determine expected number of DO penalties.
- 3) Apply the average penalty (granular value if sufficient information is available) to the expected number of penalties to generate an expected total asymmetric penalty.

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