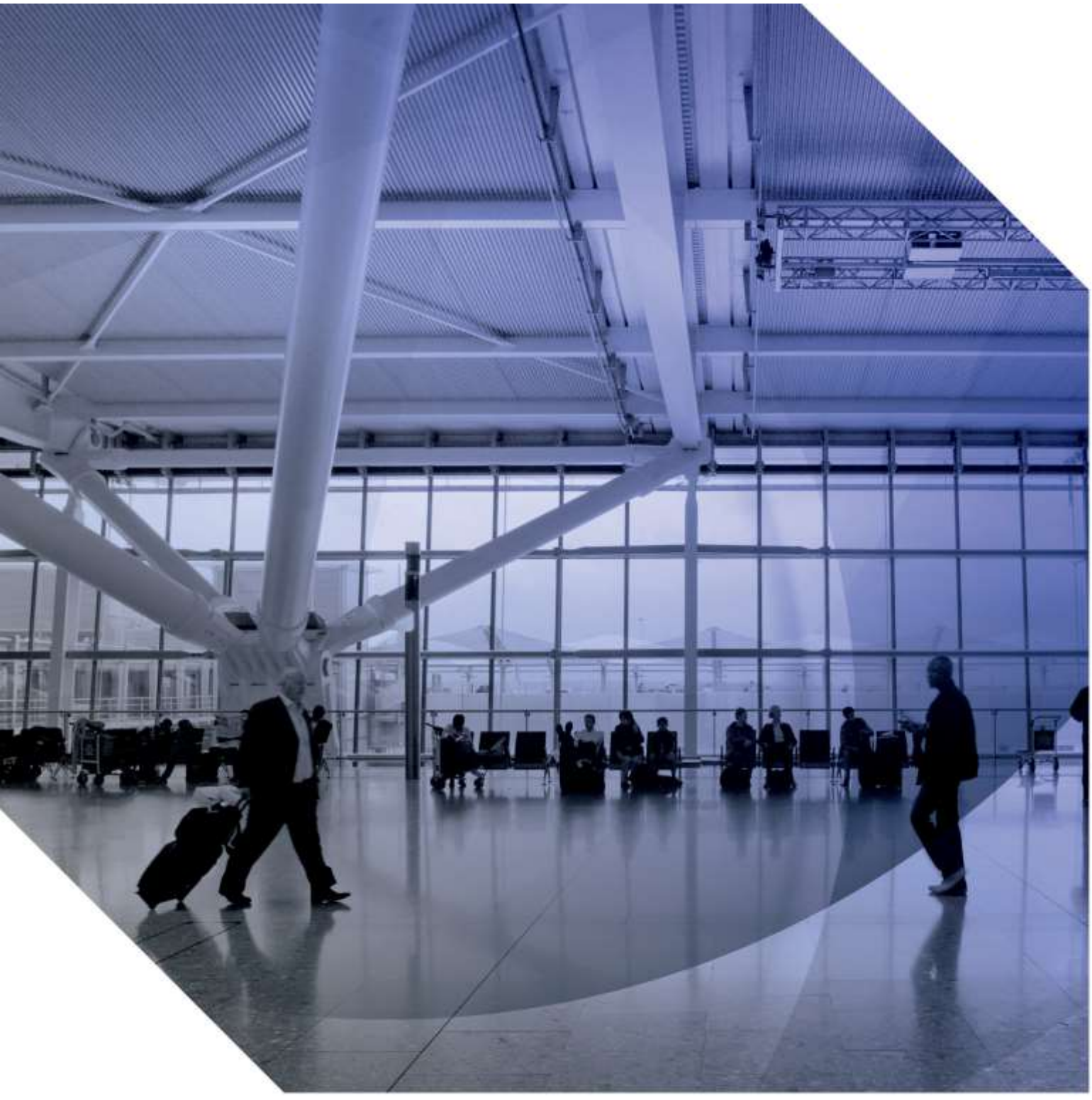
Civil Aviation Authority

Economic regulation of Heathrow: working paper on the efficiency of HAL's capital expenditure during Q6

CAP 1964



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About this document

This working paper discusses our approach to reviewing Heathrow's Airport Limited ("HAL's") capital expenditure ("capex") incurred during the Q6 price control. In particular, it includes:

- a recap of our previous work in this area;
- our method for selecting a sample of projects for review and a summary of the findings of our consultants (Arcadis) on whether there is evidence of inefficiency in relation to these projects;
- our proposed approach to reviewing these findings including in the context of broader issues; and
- the next steps.

Views invited

We welcome views on any of the issues raised in this working paper.

Please e-mail responses to economicregulation@caa.co.uk by no later than 17th November 2020. We cannot commit to take into account representations received after this date.

We expect to publish the responses we receive on our website as soon as practicable after the period for representations expires. Any material that is regarded as confidential should be clearly marked as such and included in a separate annex. Please note that we have powers and duties with respect to information under section 59 of the Civil Aviation Act 2012 and the Freedom of Information Act 2000.

If you would like to discuss any aspect of this document, please contact Mantas Aleksa (mantas.aleksa@caa.co.uk).

Introduction and summary[1]

This working paper explains our approach to reviewing the efficiency of HAL's Q6 capex. The approach we have adopted involves consideration of a wide range of evidence:

- consistent with the approach adopted for the Q5 review we have selected a sample of projects for review and used expert consultants to provide an assessment of the projects and assess whether there is evidence of inefficiency;
- we have then built on this approach by considering evidence provided by the Independent Fund Surveyor (IFS) and considered how best to take account of the development by the CMA of the Demonstrably Inefficient or Wasteful Expenditure (DIWE) framework, which has been designed to help guide regulatory reviews of capital efficiency; and
- we have also looked at wider issues, including the capitalisation of overhead costs and the lessons from the Transport Study, which has looked at broader factors driving capital efficiency.

Nonetheless, this review of Q6 capex has shown that assessing the efficiency of capex projects on an *ex post* basis is challenging and can be controversial – it is not straightforward to quantify any inefficiency, judge the scale of regulatory dis-allowances (if any) and be clear that projects are not being judged with the benefit of hindsight. Therefore, we remain of the view that it is important to continue our work on developing new forward looking incentives for capital efficiency, as explained in our August 2020 working paper on these matters.

We recognise the stretch on resources that HAL, airlines and other stakeholders are currently experiencing. This working paper includes background information on our proposed approach, and is accompanied by a thorough report by our technical consultants Arcadis. While this ensures a high level of transparency in our approach we recognise that some stakeholders may lack the resources to be able to absorb and comment on all of this information. Bearing this in mind, we are very happy to present our approach to stakeholders and explain key issues. Please contact mantas.aleksa@caa.co.uk if you would find it helpful to discuss the material in this working paper. We will also engage further with HAL and airline stakeholders to help finalise our approach to this review during the remainder of 2020 and 2021.

[1] References to previous CAA consultations, and definitions of terms used in this consultation are set out in the glossary at Appendix B

Introduction

1. A key building block in the economic regulation of HAL is its spending on capex, which covers a range of projects aimed at maintaining, renewing and enhancing the assets at the airport. Given that HAL's spending during the Q6 period amounted to around £3.2bn[2] (in 2019 prices), this expenditure will form a significant proportion of HAL's RAB (approximately 20% of the total £16.6bn RAB). As a result, through calculation of the regulatory return and depreciation on the RAB, this will feed through to become a significant component of airport charges for many years.

2. An important part of the regulation of capex during the Q6 price control period is the work we are undertaking as part of this review to determine whether:

   - there is clear evidence of inefficiency by HAL; and
   - whether on this basis we should make adjustments to HAL's RAB to provide incentives for efficiency and protect the interests of consumers.

3. Our *ex post* review of capex incurred by HAL during Q5 led to the CAA disallowing £29.6m[3] from HAL's RAB when we set the Q6 price control. The quantum of this disallowance was informed by our consultants' studies.

4. The Q6 price control initially covered the period up until December 2018. This was subsequently extended by one year until December 2019. This paper focuses on the Q6 period until December 2018, but also provides information on capital projects that were delayed into 2019 and the current iH7 period, some of which are yet to be completed (the full list of projects is set out in Table 1 of this report).

[2] Excluding expenditure on Category B & C costs. Source: HAL's regulatory accounts.

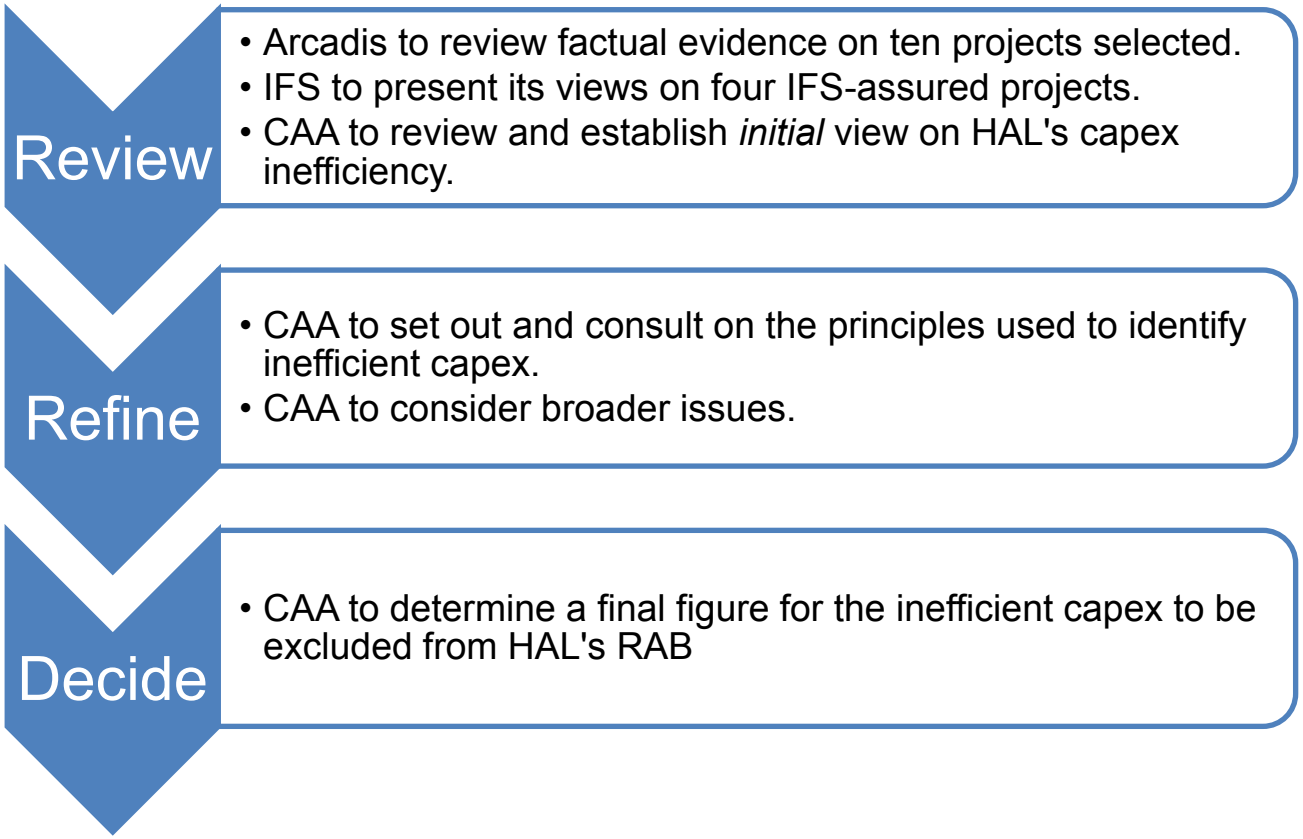
[3] In 2012 prices. More information about Q5 and relevant documents can be found in Glossary of this document.

The CAA's approach

5. The current regulatory framework for capex includes an *ex post* review with expenditure subject to an efficiency assessment at the end of the price control period. Any capex that is determined to be inefficient under this assessment may be "disallowed" from HAL's RAB and, therefore, excluded from the calculations for the following (H7) price control.

6. Our overall approach is summarised in Figure 1 below. We are currently at the review stage.

Figure 1: Proposed Q6 capex adjustment framework



Source: CAA

Process to date

7. In developing this working paper, we have considered the following:

- our statutory duties[4];
- findings by Arcadis and the IFS;
- experience from *ex post* reviews we have carried out and the results of the recent CMA review of NERL's price control arrangements;
- stakeholders' views of particular capex projects;
- the Q6 capex governance framework used by HAL; and
- wider evidence on HAL's treatment of capital overheads and the results of the Transport Study.

8. In 2018, we started reviewing HAL's overall capex during Q6. We went through a number of steps: reviewing existing evidence, developing project selection and assessment criteria, and engaging with stakeholders. We selected ten of HAL's capital projects that were then subjected to independent assessment by our consultants, Arcadis. By selecting these ten projects, our aims were to select the subset of IFS-assured projects (which are the larger and more strategically important projects in HAL's portfolio) that had already been identified as having issues with cost control and/or timely delivery, and also a sample of other (non-IFS assured) projects.

Issues dealt with in this working paper

Assessing sample projects for inefficiency

9. We summarise Arcadis' assessment criteria and its findings in chapter 1 of this working paper. We also explain our approach to reviewing these projects, including the use of the evidence submitted by IFS.

[4] Our duties are set out at Appendix A of this document.

10. Arcadis' review of the selected Q6 projects provided an independent view of HAL's efficiency. Arcadis' technical assessment focused on HAL's[5] delivery of projects by reference to HAL's Capital Efficiency Handbook ("the Handbook") and built on existing work done by the IFS, while also including additional evidence received from stakeholders.

11. We go on to consider how we should best assess the findings of Arcadis and the IFS in determining estimates of any inefficiency by HAL. In its Provisional Findings on NERL's RP3 price controls the CMA invited the CAA to develop a policy statement for NERL that better explained how the CAA would judge any disallowance of capex, following an *ex post* efficiency review. In response, the CAA submitted a draft regulatory policy statement that set out the principles and procedure that we expected to follow in determining whether any of NERL's capex should not be included in its RAB at the next price control review. In the draft policy statement, we set out a test of whether expenditure was "demonstrably inefficient or wasteful expenditure" (DIWE).

12. The CMA welcomed development of this draft regulatory policy statement and concluded that this would sufficiently specify and constrain the basis upon which the CAA would be expected to apply a disallowance of capex[6]. This approach has been used by the CMA and other regulators in the past[7] and we use this approach in chapter 1 as the basis of our assessment of HAL's capex.

13. Key issues for consultation identified in chapter 1 include:

- use of the framework for considering whether expenditure is "demonstrably inefficient or wasteful" and whether this should be modified to reflect the circumstances of HAL and the Q6 efficiency review;

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5 Arcadis's review did not consider HAL's wider internal processes in delivering these projects but focused on the efficiency of the selected sample of projects.

6 See NATS (En Route) Plc/CAA Regulatory Appeal Final Report, pg. 9, paragraph 42.

7 See, for example, UREGNI's "Guidance on the interpretation and application of the Demonstrably Inefficient or Wasteful Expenditure (DIWE) Provision", 27 July 2017: https://www.uregni.gov.uk/sites/uregni/files/media-files/Guidance%20on%20the%20interpretation%20and%20application%20of%20Demonstrably%20Inefficient%20or%20Wasteful%20Expenditure.pdf

- our approach to determining and estimating efficiency/inefficiency for the Main and Cargo Tunnel projects; and
- our overall approach and conclusions on other projects.

Broader issues

14. In chapter 2, we set out broader issues that it may be appropriate to consider as part of this review, including:

- whether there are issues arising from our use of a sample of capital projects that inform this review;
- the treatment of capital overhead costs; and
- the wider issues and difficulties with the projects discussed in chapter 1 and whether there is merit in considering the wider issues raised by other frameworks, including the Transport Study (in which efficiency initiatives and good practice were considered within capital intensive industries, with a focus on the transport sector).

15. In considering these broader areas, we note:

- the advantages of consistency with the DIWE framework discussed in chapter 1 and the Q6 price control settlement;
- the advantages of creating incentives for efficiency but also avoiding creating undue risks for HAL that might increase its cost of capital and in turn airport charges; and
- our work to develop more effective capital efficiency incentives for the H7 price control period as summarised in the August 2020 working paper.

16. Key issues for consultation include:

- our initial view that it is not appropriate to extrapolate the results of the sample of projects we have assessed and make further adjustments for inefficiency;
- that further work on capital overheads should be undertaken as part of Constructive Engagement and HAL's work on its RBP; and

- our suggestions that HAL should provide any relevant information it has on significant outperformance and the wider issues raised by the Transport Study or our concerns about its delivery of complex projects.

Next steps

17. As noted above we will consider refining the results of our analysis in response to the comments of respondents on this consultation. In making final decisions on any RAB adjustments we will consider all the information available, with a view to retaining existing incentives on HAL for efficiency but avoiding creating undue risks, such as those that might be created with judging performance with the benefit of hindsight. As part of the rounded assessment, we would consider any evidence that HAL provides of exceptional performance on the delivery of its wider capital programme.

18. We will use what we learn in this review in setting our future policy for the incentives and other arrangements relating to capex by HAL, including the capex governance framework for H7. In particular, it will be important to take account of the experience of this review in designing a stronger, more consistent and targeted incentive regime, consistent with the approach set out in our August 2020 working paper.

19. We currently envisage that there will be at least one additional round of engagement with stakeholders needed to quantify and present any potential disallowances due to inefficiency. We will also consider if there is a case for carrying out further reviews of the efficiency of HAL's capex project for projects delivered in the period 2019-2021. For example, if the IFS (or other stakeholders) identify potential inefficiencies with a project (or projects) delivered during this period.

Structure of this document

20. The structure of the rest of this working paper is as follows:

- chapter 1 describes the process we used to select our sample of projects and summarises the findings of Arcadis' report. It also introduces a structured framework for reviewing this evidence; and
- chapter 2 discusses broader issues that may be relevant to our assessment of efficiency.

21. We also set out in Appendix C a comparison between the criteria used for assessing the efficiency of capex set out in the Handbook, and comparable criteria included in the DIWE framework.

Chapter 1

Assessing the sample projects for inefficiency

Introduction

1.1 This chapter starts by summarising some of the background to HAL's capex programme in the Q6 price control period and the approach we adopted to assessing the efficiency of HAL's Q5 capex. It then sets out:

- how we selected a sample of Q6 capital projects for review;
- our approach to reviewing projects and quantifying any inefficiency;
- a summary of the results of this review for each project or a group of projects; and
- emerging themes and conclusions.

HAL's Capex in Q6

1.2 During the original five year period of the Q6 price control (April 2014 to end of December 2018), HAL spent c.£3.2billion[8] on renewing, maintaining and enhancing its assets. By the end of 2018, HAL had underspent against its capex baseline by around £260 million (both figures in 2019 prices). HAL undertook around 220 capital programmes/projects[9] of varying complexity and materiality, with some of these set to continue beyond the end of the Q6 price control. These projects have produced a range of outputs, for example: helping to facilitate growth in average aircraft size, improving HAL's baggage handling capabilities and introducing self-service journey options for passengers.

Previous experience of reviewing HAL's Q5 capex

1.3 We commissioned consultants Alan Stratford & Associates ("ASA") to assess HAL's capex efficiency on a number of key Q5 projects as part of setting the Q6

[8] Source: HAL's Regulatory accounts. Excluding Category B & C costs.

[9] Source: January 2020 Portfolio Overview Report.

price control. ASA's main finding was that most projects had generally progressed well in terms of budget and schedule. However, ASA concluded that the Terminal 3 Integrated Baggage ("T3IB") project had experienced problems that HAL should have reasonably foreseen and mitigated. ASA estimated that inefficiencies resulted in about £30 million of excess costs during Q5.

1.4 Based on ASA's assessment, and after consideration of stakeholders' views, we decided to disallow £29.6m (in 2012 prices) from HAL's RAB due to capital inefficiency. Broadly, the test we used was whether the expenditure would have been incurred by an "efficient operator" and, for the reasons outlined in our decision, we considered that certain expenditure had been inefficiently incurred.

Our approach to sampling projects

1.5 During the Q6 price control period, HAL has operated under a capex governance framework described in the Handbook that has involved the IFS in helping monitor and assess the progress of certain number of key capex projects through HAL's capex governance processes.

1.6 To understand HAL's capex envelope better and gather early views from stakeholders, we held introductory meetings with a number of key stakeholders, including the airline community. We also studied existing information and guidance, such as IFS project "close out" reports and the Handbook. In addition, we sought airlines' initial views on which projects they thought might be inefficient and why they thought this.

1.7 When selecting our sample of projects that were subject to an independent assessment, we sought to take into account what we had learned from the Q5 capex review, the key differences between the Q5 and Q6 capex frameworks, and what we had learned from our discussions with stakeholders. HAL's capex envelope can be classified into IFS and non-IFS assured projects (the IFS was first introduced in Q6) and we have selected projects for review from both these categories.

Selecting IFS-assured projects

1.8 In choosing our list of projects from those that have already been assured by the IFS for an independent review, we did not aim to select a random sample. Rather, we sought to identify key projects that could provide insight into the scale of any potential inefficiencies across the capex portfolio. That is, our aim was to select a sample of IFS-assured projects that appeared to have had significant and clearly identifiable issues with them and that were of substantial monetary value.

1.9 The four IFS-assured projects (and their accompanying project codes) we selected for an independent review were:

- Cargo Tunnel (B131).
- Main Tunnel (B131);
- T3IB (B051); and
- Terminal 5 Western Baggage Upgrade (T5WBU) (B238).

Selecting non-IFS-assured projects

1.10 For HAL's portfolio of non-IFS assured projects, we also decided to adopt a sampling approach. We decided to focus on the six projects which had the highest expenditure across the non-IFS portfolio. In total, non-IFS assured projects account for approximately half the value of the total Q6 capex portfolio.

1.11 The six non-IFS assured projects that we selected for further review were:

- Energy and Utilities Management (B066);
- Terminal 3 Pier 7 Main Roof works (B101);
- Terminal 4 Rooflight Replacement (B101);
- Terminal 4 Toilets & Finishes (B101);
- Terminal 3 Refurbishment & Enhancement – International Departure Lounge (IDL) (B316); and
- Northern Perimeter Parking (B009).

The overall sample

1.12 Airlines broadly agreed with our proposed list of IFS-assured projects that should be subject to a further review. HAL expressed certain reservations on the approach, including some concerns over use of a sample of projects. HAL said it preferred an alternative approach which would look more broadly at the portfolio of projects developed over the Q6 period.

1.13 Table 1 below sets out for all projects reviewed the last approved budget, the final (or forecast) cost and the variance between those figures. The last approved budget is the most recent budget agreed by HAL with the airline community as part of the capex governance process. The final cost is the final cost of the completed projects. In cases where projects are yet to be completed (marked with an asterisk), the Final Cost represents the estimated value at the time of Arcadis' review.

Table 1: Summary of Selected Project Costs

Project	Last Approved Budget £m	Final Cost £m	Variance £m
Projects assured by IFS			
B131: Cargo Tunnel Refurbishment*	44.9	197.0	152.1
B131: Main Tunnel Refurbishment*	86.0	146.3	60.3
B051: T3 Integrated Baggage	92.2	136.1	43.9
B238: T5 Western Baggage Upgrade	20.7	25.9	5.2
Non-IFS assured projects			
B066: Energy & Utilities Management	51.3	48.2	3.1
B101: T3 Pier 7 Roof Works	29.9	29.7	0.2
B101: T4 Rooflight Replacement	13.1	11.3	1.8
B101: T4 Toilets & Finishes	14.5	15.2	0.7
B316: T3 IDL Refurbishment & Enhancement	18.6	18.5	0.1

Project	Last Approved Budget £m	Final Cost £m	Variance £m
B009: T5 Northern Perimeter Parking	3.1	4.9	1.8

Source: Arcadis' Report on Heathrow Q6 Capex Efficiency. Figures may differ in price base between the projects: see Arcadis' report for further details. Figures in red indicate overspending against the baseline, while ones in black indicate level of underspending. *Final cost for Tunnel projects represents forecasts at the time of Arcadis' review. Works on both Main and Cargo Tunnels are due to complete in the H7 price control period.

The framework for assessing whether projects involved significant inefficiencies

HAL's Capital Efficiency Handbook

1.14 Our starting point in developing an appropriate approach for our assessment was the approach used for our review of Q5 capex efficiency, which relied on technical analysis of a sample of projects by our expert advisors, ASA.

1.15 Another key source in developing our approach is the current capex governance framework, including the definitions of efficiency set out in it. Details of the capex governance framework and associated processes are outlined in the Handbook, which was first published in 2012. There were improvements to this framework in Q6, building on lessons learned from Q5, which were captured in the 2015 update of the Handbook. A description of the existing capex governance framework and arrangements is also summarised in the August 2020 working paper.

1.16 The approach and overall governance framework set out in the Handbook provided a reference source of guidance used by both Arcadis and the IFS in their reviews of Q6 capex projects, although both organisations also drew on their relevant wider technical experience when assessing the projects. In particular, definitions of efficiency and inefficiency for HAL's capex projects set out in the Handbook were used by both Arcadis and the IFS. These definitions refer to certain "drivers" of efficiency (such as the approved cost estimate or the

defined scope for a project), which should be taken into account when assessing the efficiency of HAL's capex projects.

1.17 We recognise the value of the Handbook in providing an agreed reference source of guidance for HAL's project development process, and capturing the overall governance framework and requirements on HAL for Q6 capex projects. As part of this review, we have built on the approach and guidance in the Handbook, noting that:

- further good practice in the transport sector and other comparable sectors has emerged since the Handbook was last fully updated in 2015;
- while the Handbook provides narrative descriptions of efficiency and inefficiency, it does not provide specific, structured criteria for the assessment of efficiency for capex projects; and
- the Handbook does not explicitly draw on good practice for assessing the efficiency of infrastructure projects across the regulated sectors.

Developing our approach

1.18 In considering good practice in assessing efficiency across the regulated sectors, we reviewed the approach taken by CMA as well as the approaches taken by other economic regulators such as Ofwat, Ofgem and ORR. We note that in recent years, the CMA has considered the disallowance by regulators of expenditure that has already been incurred, most recently in the CMA's findings on NERL's RP3 price controls.

1.19 In its Provisional Findings, the CMA invited the CAA to develop a policy statement for NERL that better explained how the CAA would judge any disallowance of capex, following an *ex post* efficiency review. In response, the CAA submitted a draft regulatory policy statement (the "draft policy statement"), taking into account the Provisional Findings, along with other regulatory precedent, to set out the principles and procedure it would expect to follow in determining whether any of NERL's capex should not be included in its RAB at the next price control review.

1.20 In the draft policy statement, we set out a test of whether expenditure was "demonstrably inefficient or wasteful". This approach has been used by the CMA and other regulators in the past.

1.21 A particular feature of this approach is that it places the onus on the CAA to demonstrate that HAL has been inefficient in its expenditure. So, the starting point is (unlike that in relation to setting *ex ante* allowances) that expenditure which is potentially subject to disallowance is presumed efficient, unless and until we establish that it is not. This approach provides some mitigation to the risk that we might unduly penalise HAL for decisions made at the time, but with the benefit of hindsight turn out not to be efficient. It is also broadly consistent with the approach adopted in assessing Q5 capital projects (as summarised in paragraphs 1.3 to 1.4 above).

1.22 The draft policy statement included a list of criteria (or factors) that we said we would take into account in making the assessment of whether expenditure was deemed to be demonstrably inefficient or wasteful. Many of these criteria are consistent with the requirements set out in the Handbook, for example:

- one of the criteria covers the realisation of appropriate benefits required by the users of [HAL's services][10]: a very similar requirement is set out in the Handbook for the "Benefits Realisation" driver of efficiency; and
- another criterion covers "the extent to which any expenditure was increased by any avoidable delay [by HAL….]"[11]: a similar requirement is included within the narrative description of inefficient capex in the Handbook, where an example of inefficient capex specifically refers to avoidable delay "caused by HAL that was not approved at the correct governance point".

1.23 In Appendix C, we present a more detailed comparison between the assessment criteria used in the "DIWE framework" for assessing whether expenditure is demonstrably inefficient or wasteful and the nearest equivalent requirements in

[10] factor i) in paragraph 1.26 below

[11] factor g) in paragraph 1.26 below

the Handbook, highlighting cases where criteria or requirements differ between the two frameworks.

1.24 One important overarching difference between the two frameworks is the treatment of third-party contractors: under the framework for assessing whether expenditure is demonstrably inefficient or wasteful, inefficient behaviour by one of HAL's contractors on a project is treated in the same way as inefficient behaviour by HAL's own personnel. So, the framework for assessing whether expenditure is DIWE explicitly recognises that HAL cannot contract out responsibility for project development and delivery to third parties.

1.25 Our detailed comparison shows that, while the criteria used in the DIWE framework are more explicit in many cases than the equivalent requirement in the Handbook, there is a very substantial level of consistency between the two frameworks for the majority of criteria. Overall, seven of the nine criteria are covered explicitly or implicitly as requirements in the Handbook. For the two criteria not covered (use of appropriate resources and increasing expenditure through material errors), we do not consider that these would represent undue additional requirements for HAL as:

- HAL is required (under Condition E2.1 of its Licence[12]) to maintain appropriate resources to enable it to provide airport operation services at Heathrow Airport, including delivery of approved capex projects to provide benefit to consumers; and
- it is reasonable to expect that delivery of capex projects by HAL should be free from avoidable material errors wherever possible.

1.26 We propose to adopt the same criteria for assessing HAL's expenditure as we will use for NERL, namely:

a) the extent to which HAL identified and utilised appropriate resources;

b) the process by which any third-party contract was procured;

[12] Condition E2.1 States "The Licensee shall at all times act in a manner calculated to secure that it has available to it sufficient **resources** including (without limitation) financial, management and staff resources, to enable it to provide airport operation services at the Airport.

c) the extent to which HAL was, or ought to have been, able to control relevant expenditure, including:

   i. whether HAL had in place appropriate processes to oversee and control its internal costs;

   ii. whether HAL had in place appropriate contract management processes to oversee and control third-party costs; and

   iii. to what extent these processes were applied effectively;

d) the information that was reasonably available to HAL and/or its third-party contractors, at the time that it and/or they made any relevant decisions in relation to expenditure or the control of expenditure. This includes information relating to stakeholder views in relation to that expenditure;

e) the extent to which any expenditure involved an unnecessary duplication of activity on the part of HAL and/or its third-party contractors;

f) the extent to which any expenditure was increased by any material error or mistake on the part of HAL and/or its third-party contractors;

g) the extent to which any expenditure was increased by any avoidable delay on the part of HAL and/or its third-party contractors;

h) the extent to which any expenditure was proportionate to the outputs which that expenditure was intended to, and/or did, deliver; and

i) the extent to which those outputs were appropriate outputs to be delivered in the context of creating (direct and indirect) benefits for the users of its services or in facilitating HAL's efficient compliance with regulatory or statutory obligations.

1.27 The key advantages of this proposed approach include that it:

- provides an explicit, structured set of criteria (referred to in this paper as "the DIWE criteria"), accepted across the regulated sector and recognised independently as good practice by CMA, for *ex post* assessment of efficiency for capex projects. While we consider that the Handbook provides

useful and comprehensive guidance on HAL's project development and governance processes, the Handbook does not currently provide a set of fully appropriate criteria for assessing efficiency;

- builds on the current framework described in the Handbook;
- explicitly recognises that HAL cannot contract out responsibility for project development and delivery, so that inefficiency by one of HAL's contractors on a project is treated in the same way as inefficiency by HAL's own personnel. This is a key principle, which, if it were not to be used would enable HAL to protect itself from risks inappropriately by simply contracting out a greater range of its activities. Consistent with normal commercial practice, HAL is fully responsible for procuring its capex projects efficiently, including decisions on risk allocation between HAL and its contractors. While the Handbook refers in broad terms to the role of contractors, it is unclear on the treatment of inefficient behaviour by HAL's contractors.

The review by Arcadis

1.28 Arcadis' approach was to test whether HAL had been efficient in its spending on capex on the selected projects during Q6, using the Handbook as a reference source of guidance. Arcadis used its professional judgment and expertise in making this assessment and its findings were based on the evidence and information gathered and assessed during the review.

1.29 During its engagement with HAL, the IFS and airlines, Arcadis' objective was to build on the work already done by the IFS (by using the evidence base produced by IFS as a starting point), providing a transparent assessment of whether capital expenditure has been efficiently incurred. The output of its report was to support the CAA to focus any further analysis that may need to be undertaken rather than trying to determine the exact quantum of any inefficiency.

1.30 As part of the review, Arcadis focused on the factors (or "levers") that influence the efficient delivery of a project. These factors included project scope, time, cost, risk, procurement, development process, gateway process, programme governance, and stakeholder engagement.

1.31 Arcadis assessed how HAL had dealt with these factors across the selected projects and sought to determine whether this may have resulted in significant inefficiency. Arcadis noted that there may be factors within any project that may be not delivered "as planned", albeit that those, in themselves, may not result in any inefficiency at the end of the project. The key objective in its review was to consider how HAL had delivered these projects and to determine whether HAL's actions were the cause of any inefficiency, with reference to the requirements set out in the Handbook. For example, a change in the plan may not be necessarily considered as inefficient, if the change is well managed.

1.32 Arcadis assigned the ten projects into three categories:

- projects that were delivered efficiently;
- projects potentially delivered inefficiently but where the inefficiency was difficult to quantify, or its cause difficult to quantify or to clearly attribute; and
- projects delivered inefficiently, with clear evidence that HAL's actions directly led to this outcome.

The review of selected projects

1.33 This section starts by summarising the results of the review of each IFS-assured project by Arcadis and IFS. These are the projects which were the most material and where there was the greatest concern about possible inefficiency. It also sets out our views on applying the proposed framework for assessing whether expenditure was demonstrably inefficient or wasteful for each of these projects.

1.34 It goes on to provide an overview of the review by Arcadis of the non-IFS assured projects and the implications of this for our assessment framework of whether expenditure was demonstrably inefficient or wasteful.

Cargo tunnel

1.35 The Cargo Tunnel provides a critical operational link between Terminal 4 and the Central Terminal Area and facilitates a large number of vehicle movements for cargo, catering, maintenance, airport operations and transferring passengers. The project aim is to refurbish the Cargo Tunnel with the primary objective of

reducing the life safety risk to 'As Low as Reasonably Possible'. The works cover design, building, civil engineering and services elements. Initially, both the Cargo and Main Tunnel projects were procured and managed under one construction contract but subsequently split into two separate contracts.

1.36 Having reviewed the Cargo Tunnel project, Arcadis noted that there is clear evidence that the actions of HAL may have directly contributed to wasted spending or lost benefits. In quantifying the potential value of inefficiency, Arcadis considered two aspects:

- the costs expended on the project after the contract was split from the Main Tunnel contract up to the point of pausing the project; and
- the value, if any, that may have been gained from the work carried out during the period.

1.37 Arcadis considered that the cost of £12.3m incurred as part of surveying, design and planning works is the main element of inefficient spending, and the further inclusion of "stand back review" costs of £0.5m (i.e. reassessment of the project requirements, benefits and business case) represents additional inefficient spending. Taken together, these two elements generate a value at the high end of the inefficiency range of £12.7m. Given this, Arcadis considered that the quantum of inefficiency is likely to be in the range of £0-£12.7m, but that this initial range should be revisited once the project has finished and an assessment has been made of how much of the works have been used in the final output, and/or how much of the works were abortive.

1.38 The IFS in its "End of Q6" report noted that the Cargo Tunnel project is significantly over budget and behind schedule. Furthermore, based on the latest reports by IFS, we understand that the estimated costs at completion (EACs) for the Cargo Tunnel project have continued to increase since Arcadis' analysis took place.

CAA views

1.39 The Cargo Tunnel project faced significant cost overruns of around 400% against the original budget and is now forecast to be completed during H7. We consider that this has led to a loss of benefits to consumers because of late delivery of the

project and its expected benefits. We also consider that if the risk of cost increases had been better assessed at the beginning of the project, more efficient contractual terms (in terms of risk allocation) may have been obtained by HAL through its procurement process. This, in turn could have affected the actual construction costs for both Main and Cargo Tunnels. In addition, while Arcadis' assessment indicated that some of the costs for survey, design and planning works may have been inefficient, this may also have had an impact on other historical costs already incurred (i.e. there is a risk of already completed historical work being abortive when the project restarts).

1.40 Arcadis' report noted a number of delivery issues such as a lack of alignment between budget and solution, a lack of reporting on final cost, and no ongoing review of the schedule. In addition, the project is currently paused, with a business case review ongoing.

1.41 Given this, the following criteria appear relevant to an assessment of whether HAL's expenditure on this project may be regarded as inefficient or wasteful:

- factor c): given that the project has stalled and required a fresh review, whether HAL ought to have been able to control its expenditure through having and applying appropriate processes;
- factor e): whether HAL's approach has led to unnecessary duplication of activity;
- factor f): whether mistakes by HAL and/or its contractors increased expenditure; and
- factors h) & i): proportionate outputs have not yet been fully delivered in the Q6 period that would benefit HAL's customers or consumers. Also, as delivery of outputs is now expected later than originally planned, there is a loss of benefits to consumers due to the delay in delivery of project outputs.

1.42 The multiple failings under different criteria imply inefficiencies which could lead to a possible disallowance from HAL's RAB in relation to the Cargo Tunnel project. However, we also note that the project is not yet completed and once it is, we consider that HAL should have an opportunity to make the case when the

project gateways are completed that expenditure on every element of the project should be allowed, by submitting relevant evidence at that time.

1.43 At this stage, we do not expect the top end of the inefficiency range to increase above £12.7m, although it is possible that further inefficiencies may be identified in activities that are currently in progress on this project.

Main Tunnel

1.44 The Main Tunnel serves as the primary entrance into Heathrow airport central terminal area, serving Terminals 1, 2 & 3. Similar to the Cargo Tunnel, the aim of the Main Vehicular Tunnel project is to reduce the safety risk to 'As Low as Reasonably Possible' to comply with legal requirements.

1.45 On the Main Tunnel, Arcadis concluded that the project had been delivered efficiently to date, and HAL had, by and large, acted reasonably in trying to mitigate the contractor's poor performance.

1.46 Arcadis found several examples of poor performance by HAL's contractor on this project, including continuing discovery of defects within works already completed.

1.47 The IFS in its 'End of Q6' report noted several similar issues, in particular, that the Main Tunnel project has suffered a number of significant delays and cost increases. We have also discussed these issues with the IFS and considered the implications of the IFS analysis of the project.

1.48 Furthermore, based on the latest reports by IFS, we understand that the EACs for the Main Tunnel project have continued to increase since Arcadis' analysis took place.

CAA views

1.49 Under the DIWE criteria, HAL is responsible for any inefficient management or delivery of projects by its contractors that increases cost or results in loss of benefit. So, this poor performance leading to delays and cost increases appears to indicate inefficiency. We also note a number of issues in the Arcadis' report, which may indicate inefficiency such as:

- costs have overrun by nearly 70% as against the approved budget at the time of Arcadis' review with the project yet to be fully completed;
- project works being put on hold for more than 13 months, as opposed to the three months originally planned;
- continuing discovery of defects by HAL's contractor within works already completed.

1.50 There is evidence relevant to factors c), e), f) and potentially h) and i) that may indicate that HAL's expenditure has been demonstrably inefficient or wasteful. In summary, we note the following evidence:

- a significant and continuing cost overrun against the initial baseline;
- a significant number of delays experienced;
- the continuing discovery of defects;
- the ongoing potential for material errors occurring; and
- partial delivery of project outputs.

1.51 Given this evidence, the following criteria appear relevant to an assessment of whether HAL's expenditure on this project may be regarded as inefficient or wasteful:

- factor c): a significant and continuing cost overrun against the initial baseline;
- factor e): whether HAL's approach has led to unnecessary duplication of activity;
- factor f): whether mistakes by HAL and/or its contractors increased expenditure;
- factors h) & i): proportionate outputs have not yet been fully delivered in the Q6 period that would benefit HAL's customers or consumers. Also, as delivery of outputs is now expected later than originally planned, there is a loss of benefits to consumers due to the delay in delivery of project outputs.

1.52 We note the differences between issues raised by our review of the evidence base and the overall conclusion reached by Arcadis on the efficiency of the Main

Tunnel. We would welcome further views and evidence from HAL and airline stakeholders before we reach final conclusions on these matters. In the light of further evidence and consideration we may need to undertake further work to estimate the materiality of any inefficiency associated with this Project.

T3IB and T5WBU Projects

1.53 The aim of the T3IB project is to provide a modern, highly automated baggage system for airlines using Terminal 3, which integrates with the baggage system at Terminal 5 to provide quick and reliable baggage transfers. The project has been ongoing for several years and commenced on site in 2012.

1.54 The aim of T5WBU project was to provide asset replacement for life expired IT infrastructure in Terminal 5. This would provide enhanced control and resilience to the Terminal 5 baggage system together with additional capacity to accommodate future growth. The upgraded system would also integrate with other Terminal facilities, including T3IB.

1.55 The T3IB and T5WBU projects were historically linked, with decisions made on one project having an impact on the other. Arcadis in its assessment noted that both projects faced delays and cost overruns. However, it considered that there is insufficient evidence for a firm conclusion that these projects were inefficient, although they were not entirely convinced that the projects were delivered efficiently.

1.56 On T3IB project, the IFS in its “End of Q6” report noted variation in the budget of around £43m (in nominal terms) and a three month delay to the planned delivery dates followed by a 2-month delay to completion. A number of issues were briefly mentioned such as introduction of additional project scope, management of risk profile and changes to airline handler mix.

1.57 In addition, on the T5WBU project, the IFS noted that the project was completed around seven months later than initially planned and over the budget. However, it also noted HAL’s positive engagements with the contractor as well as HAL taking steps to make sure that the contractor is held accountable for its contributions to the delay and project over-run.

CAA views

1.58 On the T3IB and T5WBU projects, we agree with Arcadis's conclusion that, given the evidence, it is unclear whether there been a degree of inefficiency that could be reasonably attributed to HAL. While Arcadis and the IFS have noted both projects did face delays and cost overruns, these appear relatively modest given the complexity of the projects. HAL has also noted the complexity of major elements of the T3IB project and that it involved innovative technology that made delivery particularly challenging.

1.59 On balance, we do not consider the issues with these projects are sufficient to warrant a finding of inefficiency under the DIWE criteria.

Non-IFS Projects

1.60 As noted earlier, the non-IFS projects cover a sample of six projects that were subject to Arcadis' review. Arcadis determined that all six projects have been delivered efficiently but also noted that this is not to say that there were no delays, over-runs or issues within these projects. Arcadis considered that the impact of these is not substantial enough to have delivered a financial or benefits loss to consumers due to the actions of HAL. Arcadis did not recommend that any further analysis or investigation is required on these projects.

1.61 Based on Arcadis' findings we propose not to analyse these projects further as there is insufficient evidence to support a finding that expenditure was demonstrably inefficient or wasteful. More details on these projects can be found in the accompanying report by Arcadis.

Summary of emerging themes and conclusions

1.62 The review by Arcadis indicated that there was no evidence of significant inefficiency in seven of the ten projects that it reviewed. It noted that this did not imply that there were no delays, overruns or other issues within these projects, but the impact of these is not considered substantial enough to indicate significant inefficiency. Six of the projects that were determined to have been delivered efficiently were non-IFS assured projects. As noted, Arcadis did not

recommend that any further analysis is required on these six non-IFS assured projects.

1.63 Arcadis identified potential inefficiency in the following projects: T3IB, T5WBU and Cargo Tunnel. For the first two of these, Arcadis considered that HAL's actions may have contributed to the inefficiency of those projects but found that the impact of the inefficiency in these cases was difficult to quantify and/or difficult to clearly attribute to HAL.

1.64 As discussed above there were issues with the Cargo Tunnel, but the provisional estimate of inefficiency is relatively modest, with a range of £0-12.7 million. We have also identified possible issues with the Main Tunnel. Further work will be required to finalise estimates of any inefficiency.

1.65 Arcadis identified two common issues that may have contributed to inefficient outcomes. These were:

- lack of clarity of scope: for all four IFS-assured projects and three non-IFS projects, there would appear to have been a lack of definition in the scope of the project at the time of HAL entering into contract with its contractor. This, according to Arcadis, may have contributed to the cost and time overruns on these projects; and
- using an inappropriate contract model: across the majority of the projects reviewed, HAL chose a form of contract that included a contractor favourable "pain/gain mechanism" to share the risks of the project between HAL and the contractor. Arcadis took the view that it was clear that, in its adopted form, the contract did not incentivise contractors to the degree required, and other contract forms or different pain/gain structures may have been better suited to the projects at hand.

1.66 From our detailed assessment of these projects, as outlined in this chapter, it is apparent that in respect of the most complex capital projects undertaken by HAL there appear to be a number of common issues:

- overruns against the agreed cost baseline potentially leading to poorer outcomes from a project planning perspective;

- contractor and/or HAL performance, notably in relation to abortive works where HAL may be paying twice for the same outputs; and
- material delays potentially meaning that the envisaged project benefits are delivered later than initially planned, leading to potential detriment to consumers.

1.67 We note that difficulties with complex projects are to be expected, at least some of the time, but we are concerned about the apparent existence of common difficulties across a number of issues which may indicate a degree of inefficiency by HAL.

1.68 The following chapter discusses whether there are broader issues we should take into account as part of this review, including the common issues/difficulties with a number of HAL's capital projects that we have discussed above.

Views invited

1.69 Views are invited on any aspect of our approach to reviewing projects and the quantification of inefficiency, and in particular on:

- our use of the DIWE framework and whether this should be modified to reflect the circumstances of HAL and the Q6 efficiency review;
- the approach we have taken to the initial estimate of inefficiency for the Cargo Tunnel project;
- the efficiency/inefficiency of the Main Tunnel project; and
- our overall conclusions on other projects.

Chapter 2

Broader issues

Introduction

2.1 This chapter considers whether there are broader issues we should take into account in this review, including:

- whether there are issues created by our use of a sample of capital projects to inform this review;
- the treatment of capital overhead costs; and
- the wider issues/difficulties with the projects discussed in chapter 1 and whether there is merit in considering the wider issues raised by other frameworks, such as the Transport Study.

2.2 In considering these broader areas we will need to be mindful of consistency with:

- the framework for assessing whether expenditure is demonstrably inefficient or wasteful discussed in chapter 1;
- the Q6 price control settlement and the advantages of not creating any undue risks for HAL; and
- our work to develop more effective capital efficiency incentives for the H7 price control period, discussed in the August 2020 working paper.

The use of a sample of projects

2.3 The use of a sample of projects raises the question of whether the results of our analysis and the identification of inefficiency should in some way be extrapolated across all of HAL's capex programme.

2.4 Our initial view is that such an approach may not be appropriate for the following reasons:

- the sample of IFS assured projects focused on those projects where discussions with stakeholders and other evidence suggested we were most likely to find that problems had arisen. As such, these projects should not be considered to be a representative sample of HAL's wider capex programme; and
- in its review of non-IFS assured projects, Arcadis did not identify any inefficiency.

2.5 HAL has also questioned the use of a sample, noting that, across a large portfolio of projects, there will be some projects that go less well than others and that this does not necessarily indicate inefficiency across the portfolio. Generally, we have taken a conservative approach to identifying inefficiency and, so, we are not convinced our approach creates bias. HAL is also free to bring forward examples of projects where it considers it has delivered in a way that demonstrates very significant outperformance, and we will consider this alongside other evidence in reaching our final judgements on the appropriate level of any disallowance of capex from the RAB.

Capital overhead costs

2.6 In addition to the project costs that have been the focus of the Arcadis review, HAL also recovers certain overhead costs through its RAB. These have been discussed with airlines as part of the constructive engagement ("CE") process.

2.7 In the presentation pack circulated by HAL on 18 June 2020, HAL provided more details in relation to questions from the airline community on these overhead costs. HAL noted that these costs comprise capital costs which are not directly attributable to specific projects: for example, costs for consultancy services, logistics, people and HAL overheads. They also noted that the applied overhead rate (as a percentage) is relatively stable across most projects.

2.8 Airlines have questioned HAL's existing approach to applying a mark-up to capex projects to account for Leadership and Logistics costs ("L&L costs"), noting that a standard mark-up (as a proportion of total estimated costs) is usually applied to estimated project costs irrespective of the complexity or size of the project. The

airlines have also said that some elements of this mark-up appear to relate to recovery of opex rather than capex.

2.9 We agree with airlines that this topic requires further exploration during the current CE process: use of a standard mark-up may reduce transparency of these elements of cost estimates and weaken incentives on HAL to manage its own central costs (including L&L costs) effectively on each project. Looking forward to the RBP, we expect HAL to provide more detail on the drivers and rationale for its approach to estimating and applying L&L costs and explain how this approach is applied for each relevant key project.

2.10 Nonetheless, given the relative stability of overheads as a percentage of project costs we do not propose further work on these matters as part of the Q6 efficiency review.

Wider issues

2.11 In chapter 1, we noted that Arcadis' review focused on the "end value" delivery of projects. This approach might not necessarily capture broader issues with HAL's capital programme, and we also noted in chapter 1 that we had concerns with a lack of clarity on scope, costs overruns, contractor performance and late delivery on HAL's more complex projects.

2.12 Bearing the above in mind, we have considered whether there may be advantages in considering whether wider assessment frameworks might also provide insight into HAL's relative efficiency. In this light, we consider the Transport Study below.

The Transport Study

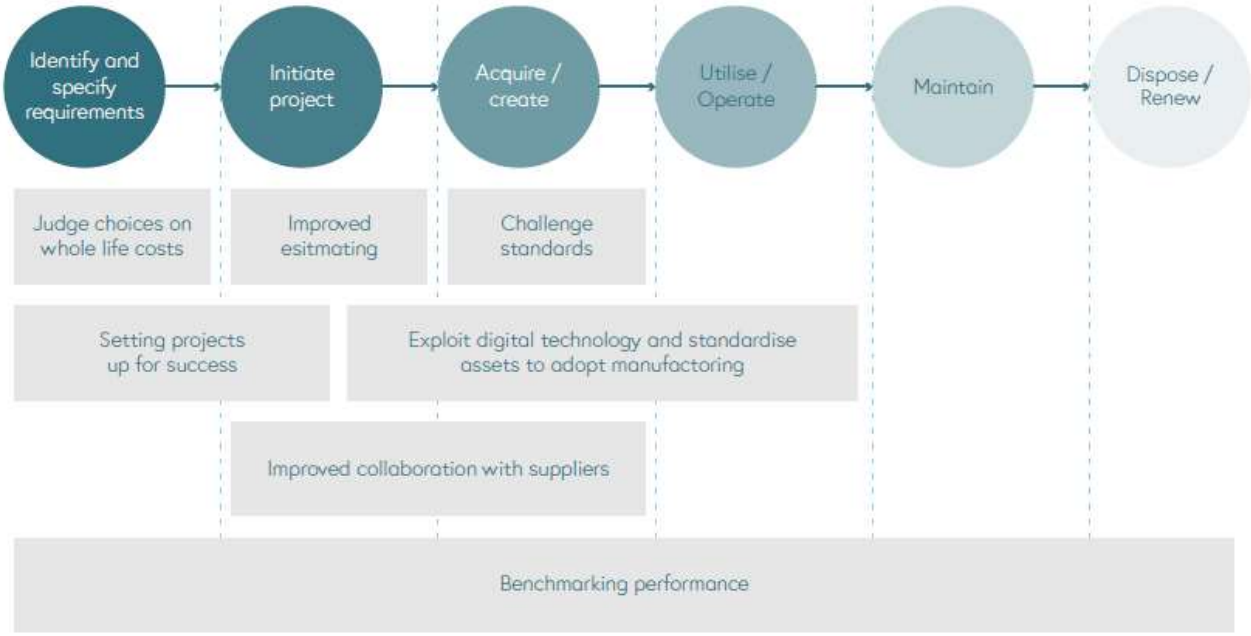
2.13 The Transport Study arose from a cross-transport sector initiative led by Department for Transport (DfT) in 2017 to identify and challenge key factors which may have caused inefficiency in project development and delivery of major transport infrastructure projects. The Transport Study team comprised major infrastructure operators and scheme promoters, including Network Rail, Crossrail Ltd and Highways England as well as DfT. The Transport Study team produced

an update in March 2019, which used Heathrow expansion as a specific case study to illustrate one of the efficiency challenges, with input from HAL.

2.14 The Transport Study presented examples of efficiency initiatives and good practice within a subset of capital intensive industries, with a focus on the transport sector. It considered the findings from previous reports and case study analysis that looked at the transport, infrastructure and construction sectors, to identify how these could be applied to help boost productivity and drive efficiency. The Transport Study noted that the greatest opportunities to drive efficiency are typically during the early stages of investment planning.

2.15 The Transport Study approach is summarised in the figure below. We note that one of these initiatives, "standardising assets to adopt manufacturing", is generally more relevant to the rail industry rather than to airports.

Figure 3: Investment life cycle and challenges to improve efficiency



Source: The Transport Study, 2017

2.16 To illustrate what a list of supplementary questions may look like in relation to the framework set out in the Transport Study, we consider that relevant questions may include:

- did HAL undertake appropriate project costs optioneering, judging choices on whole life project costs?
- is there evidence of improved cost/schedule estimating over time?
- did HAL do enough in setting up the projects to be successful from the start?
- did HAL do enough in exploiting technology to drive efficiency?
- is there evidence that collaboration with suppliers has improved throughout the Q6 price control?
- was an appropriate level of performance benchmarking undertaken throughout project delivery?

2.17 We intend to consider information HAL provides in relation to the above questions and, if HAL does exceptionally well in addressing these questions, we may choose to revise our initial inefficiency range downwards when considering any potential disallowance.

2.18 In addition to using the framework set out in the Transport Study, we intend to assess any evidence of the level of support from key stakeholders for HAL's capital programme and spending on the projects we have assessed. In particular, we will consider any evidence from the Q6 capex governance process (e.g. minutes of meetings etc), where airline stakeholders have had a significant role to play in approving and monitoring capital projects.

Other policy considerations for the H7 period

2.19 We noted in chapter 1 that cost estimates for the Cargo Tunnel project and the Main Tunnel project increased substantially compared to the initial approval of the project's cost estimate through airline-airport governance. When cost estimates increase without estimated benefits also increasing, the economic (business) case for a project will deteriorate: in some cases, the impact of this is to weaken the business case for a project to the extent that it no longer represents value for money for airlines or for HAL.

2.20 We explained in the June 2020 Consultation why HAL should enhance its business case development process, with a clearer focus on the benefits

throughout the project lifecycle that will arise from the proposed expenditure and the timing of when those benefits will be delivered. An enhanced approach to business case development is required for H7 to help HAL to avoid significant cost overruns and potential inefficiencies on future capex projects, noting the Transport Study's finding that the greatest opportunities to drive efficiency are during the early stages of investment planning.

2.21 This approach should also support the development of improved incentives for cost efficiency as envisaged in our August 2020 consultation.

Views invited

2.22 Views are invited on any aspect of our approach to the broader issues we have identified with respect to capital efficiency and in particular on:

- our initial view that it is not appropriate to extrapolate the results of the sample of projects we have assessed and make further adjustments for inefficiency;
- that further work on capital overheads should be undertaken as part of Constructive Engagement and HAL's work on its RBP; and
- our suggestions that HAL should provide any relevant information it has on significant outperformance and the wider issues raised by the Transport Study or our concerns about its delivery of complex projects.

Appendix A

Our duties

1. The CAA is an independent economic regulator. Our duties in relation to the economic regulation of airport operation services ("AOS"), including capacity expansion, are set out in the CAA12.

2. CAA12 gives the CAA a general ("primary") duty, to carry out its functions under CAA12 in a manner which it considers will further the interests of users of air transport services regarding the range, availability, continuity, cost and quality of AOS.

3. CAA12 defines users of air transport services as present and future passengers and those with a right in property carried by the service (i.e. cargo owners). We often refer to these users by using the shorthand of "consumers".

4. The CAA must also carry out its functions, where appropriate, in a manner that will promote competition in the provision of AOS.

5. In discharging this primary duty, the CAA must also have regard to a range of other matters specified in the CAA12. These include:

   - the need to secure that each licensee is able to finance its licensed activities;
   - the need to secure that all reasonable demands for AOS are met;
   - the need to promote economy and efficiency on the part of licensees in the provision of AOS;
   - the need to secure that the licensee is able to take reasonable measures to reduce, control and/or mitigate adverse environmental effects;
   - any guidance issued by the Secretary of State or international obligation on the UK notified by the Secretary of State; and
   - the Better Regulation principles.

6. In relation to the capacity expansion at Heathrow, these duties relate to the CAA's functions concerning the activities of HAL as the operator at Heathrow.

7. CAA12 also sets out the circumstances in which we can regulate airport operators through an economic licence. In particular, airport operators must be subject to economic regulation where they fulfil the Market Power Test as set out in CAA12. Airport operators that do not fulfil the Test are not subject to economic regulation. As a result of the market power determinations we completed in 2014 both HAL and GAL are subject to economic regulation.

8. We are only required to update these determinations if we are requested to do so and there has been a material change in circumstances since the most recent determination. We may also undertake a market power determination whenever we consider it appropriate to do so.

Appendix B

Glossary

Acronym/ term	Definition
The August 2020 Working Paper	CAA publication CAP 1951 “Economic regulation of Heathrow Airport Limited: working paper on capital expenditure efficiency incentives”. See: CAP1951 publication.
The June 2020 Consultation	CAA publication CAP1940 “Economic regulation of Heathrow: policy update and consultation”. See: CAP1940 publication.
Baseline	The expenditure amount allowed for a particular regulatory building block.
CAA (“us”/”we”)	The Civil Aviation Authority.
CAA12	Civil Aviation Act 2012.
Capex	Capital expenditure.
CMA	The Competition and Markets Authority
CMA Provisional Findings	CMA provisional findings report in relation to the NERL RP3 regulatory appeal.
Consumers	As defined in CAA12, consumers are passengers and cargo owners, both now and in the future.
DIWE	Demonstrably Inefficient or Wasteful Expenditure.
Draft Policy Statement	See: Reference to the CMA of NERL RP3 price controls: CAA response to provisional finding (CAP 1910) at Appendix B: https://assets.publishing.service.gov.uk/media/5eb12841d3bf7f652ad79d5c/CAA_PF_response.pdf
EAC	Project cost Estimate at Completion.

Acronym/ term	Definition
End of Q6 Report	IFS submission "End of Regulatory Period Q6 Report for CAA". Short report summarising the IFS findings, themes, trends & observations on the projects and programmes reviewed by the IFS during the Q6 regulatory period.
Ex ante	Based on forecasts/before an event.
Ex post	Based on actuals/after the event.
The Handbook	HAL's Capital Efficiency Handbook. One of a number of documents produced by HAL with airlines as part of the airport/airline capex governance protocol for Q6. The other documents include the Q6 Capital Investment Triggers Handbook, and the Capital Investment Protocol. The documents are intended to provide detail and guidance to those involved in the Heathrow project Gateway lifecycle process.
H7	The next HAL price control, assumed to be in place from 1 January 2022. If set for the usual five year period, this will run for the years 2022-2026.
HAL	Heathrow Airport Limited, the licence holder and operator of Heathrow airport.
IFS	The Independent Fund Surveyor for Heathrow, which is jointly appointed by HAL and the airlines, with a duty of care to the CAA. The scope of the IFS role is broadly to assure that capital funds are invested efficiently to meet agreed project objectives. The role is undertaken by Gardiner & Theobald LLP.
iH7	Interim H7 price control. Runs from 1 January 2020 until 31 December 2021.
NERL	NATS En Route plc
Opex	Operational expenditure.
Q5 or Q5 price control	The "Q5" price control is the price control for the period from 2008 to 2014. See for example CAA decision document covering Q5 price control here.
Q6 or Q6 price control	The "Q6" price control is the price control for the period from April 2014 to end of December 2018, the approach to which has subsequently been successively extended to cover 2019-2021. The Q6 final proposals document can be found here.
RAB	Regulatory Asset Base.
RP3	The NERL Reference Period 3 price control that was originally expected to run from 1 January 2020 to 31 December 2024 but was subject to regulatory appeal to the CMA.

Acronym/ term	Definition
Transport Infrastructure Efficiency Strategy (the "Transport Study") study	Transport Infrastructure Efficiency Strategy, 2017. Publication can be found here.

Appendix C

Comparison of Capex Efficiency Frameworks - Capital Efficiency Handbook and DIWE approaches

Introduction

1. We explain our approach to the assessment of HAL's capex in paragraphs 1.18 to 1.27 of this document: in particular, we explain why we are proposing to adopt the DIWE approach, and why that approach represents a logical next step from the existing framework for the treatment of capex. The existing framework is set out in a suite of documents produced and maintained by HAL, primarily the 2015 version of the Capital Efficiency Handbook ("the Handbook").

2. This Appendix therefore compares two potential approaches for assessing the efficiency of HAL's capex on an *ex post* basis: the approach adopted by CMA which assesses expenditure that may be "Demonstrably Inefficient or Wasteful", and the existing approach used by HAL, as set out in the Handbook.

Comparison of Capital Efficiency Handbook and DIWE approaches

3. Our comparison of the structure and specific guidance (or criteria) on use of the two approaches for assessing capital efficiency is summarised in this section. We start by describing and comparing key relevant features of the two approaches, before comparing specific assessment criteria in Table 2 below.

DIWE framework

4. The DIWE framework provides structured criteria, definitions and some supporting narrative, for *ex post* reviews of capex projects in the regulated infrastructure sectors. The approach is set out in a 10 page guidance note developed by URENGI.

5. The DIWE approach takes into account the following high-level factors:

- assessment should be based on the information reasonably available to HAL at the time that it made the relevant decision about that expenditure;
- misallocated/duplicated spend is automatically treated as DIWE; and
- no expenditure shall be deemed demonstrably inefficient or wasteful simply by virtue of a statistical or quantitative analysis that compares very aggregated measures of HAL's costs with the costs of other companies.

6. The DIWE guidance then sets out nine criteria for assessing inefficiency, captured in the table below.

Capital Efficiency Handbook

7. The Handbook contains definitions, examples and factors for consideration (in the section on Efficiency), but does not set out explicit criteria for assessing the efficiency of capex projects.

8. The framework in the Handbook was agreed between HAL and airlines during Q6. It was used by Arcadis and the IFS as a reference point for their reviews of capex projects. The Handbook as a whole runs to 40 pages, with much of the content relating to details of HAL's internal governance processes.

9. Efficient Capex is defined in the Handbook as "the delivery of an asset in a manner which optimises and balances Scope, Time, Cost, and Risk, procured in an appropriate manner having followed a structured Development process with appropriate decision points and governance"

10. HAL defines in the Handbook six key "drivers" (factors) to take into account when assessing efficiency:

- Benefit realisation;
- Cost;
- Time [Schedule];
- Risk;

- Specification; and
- Acquisition [Procurement].

The description of these drivers varies between narrative explanation and partial or implicit criteria for assessment.

11. Conversely, in the Handbook, "Inefficient Capex" is Capex which is not Efficient as defined above and "which has directly resulted in a financial or benefit loss".

12. The table below compares the Handbook approach and the DIWE approach (as applicable to HAL) by comparing relevant definitions or descriptions in the Handbook to the DIWE criteria set out in the July 2017 URENGI guidance (see pg.10 for the reference).

Table 2: Comparison of DIWE criteria and Capital Efficiency Handbook (CEH) equivalent definitions/descriptions

DIWE #	**DIWE criterion** - edited for HAL	**CEH equivalent definition/description & comparison to DIWE criterion**	**CEH ref**
1	the extent to which **HAL identified and utilised appropriate resources.**	**Implicitly covered** in the Handbook: e.g. Inefficiency is not balancing "Scope, Time, Cost, and Risk", which implies an inefficient management of resource by HAL at some stage in the process.	P39, 3rd para
2	the process by which any **third-party contract was procured.**	**Explicitly covered**: efficient capex is "procured in an appropriate manner", also one of the drivers in the Handbook is: "Acquisition [Procurement]: The use of appropriate and alternative tendering / contracting methods to procure the design and delivery of the Works, in a manner which provides an appropriate balance of responsibility between the parties for cost certainty, risk, schedule and specification."	P38, 6th driver (bullet point)
3	the extent to which HAL was, or ought to have been, **able to control relevant expenditure**, including: - whether HAL had in place **appropriate processes to oversee and control its internal costs;** - whether HAL had in place **appropriate contract management processes** to oversee and control **third-party costs**; and - to what extent **these processes were applied effectively**.	**Explicit**, although the definition in the Handbook differs from DIWE and the Handbook provides (much) less precision. "Cost" is defined as the cost estimate approved at the G3 planning Gateway, which appears to be equivalent to DIWE "relevant expenditure". The "Cost" factor in the Handbook used to assess efficiency also refers to: "use of cost intelligence such as	P38, 2nd driver

DIWE #	**DIWE criterion** - edited for HAL	**CEH equivalent definition/description & comparison to DIWE criterion**	**CEH ref**
		benchmarking to inform and challenge as the project develops". The DIWE sub-criteria are similar to our historic (and current) approach to assessing the efficiency of early costs.	
4	the **information** that was reasonably **available to HAL** and/or its third-party contractors, **at the time** that it and/or they **made** any relevant **decisions in relation to expenditure** or the control of expenditure. This **includes** information relating to **stakeholder views** in relation to that expenditure.	**Implicit**: the Handbook states that efficient capex has "followed a structured Development process with appropriate decision points and governance". The "structured development process" set out in the Handbook requires specific documents/ information before approval at G3, which is the investment decision point e.g. Requirements document, Business Case, Stakeholder Management Plan. These documents/information require input and ultimately approval from airline stakeholders and (where appropriate) DfT in the relevant governance groups.	Definition: P38 Development process: P 9-10
5	the extent to which any **expenditure involved an unnecessary duplication of activity** on the part of HAL and/or its third-party contractors.	**Implicit**: an example of inefficient capex specifically refers to re-work that was not approved at the correct governance point.	P40, point b)
6	the extent to which any **expenditure was increased by any material error or mistake** on the part of HAL and/or its third-party contractors.	**Implicit:** while the Handbook states that "it is likely that at some point on all projects mistakes will be made", however the definition of inefficiency refers to "a financial or benefit loss" – if expenditure increases due to a	P39

DIWE #	**DIWE criterion** - edited for HAL	**CEH equivalent definition/description & comparison to DIWE criterion**	**CEH ref**
		material error by HAL and is allowed in the RAB, then airline charges will also increase, which is an additional (inefficient) cost to airlines/consumers in the round.	
7	the extent to which any **expenditure was increased by any avoidable delay** on the part of HAL and/or its third-party contractors.	**Implicit**: an example of inefficient capex specifically refers to delay caused by HAL that was not approved at the correct governance point.	P40, point b)
8	the extent to which any **expenditure was proportionate to the outputs** which that expenditure was intended to, and/or did, deliver.	**Implicit**: the drivers in the Handbook for Benefits Realisation and Specification refer to the need to "deliver the identified benefits", with the benefits defined in the Business Case for the project. If identified benefits are not fully delivered for the cost specified in the Business Case, the project has (implicitly) not delivered proportionate outputs as required.	P38, bullet points
9	the extent to which those **outputs were appropriate outputs** to be delivered in the context of **creating (direct and indirect) benefits for the users** of its services **or in facilitating** HAL's efficient **compliance** with regulatory or statutory obligations.	**Explicit**: the driver in the Handbook for Benefits Realisation states "[benefits are] as defined in the business case. In addition to delivering a monetary benefit to the business they may include benefits such as maintaining operational status, improved passenger experience; statutory **compliance** or similar."	P38, 1st bullet point

Source: CAA