Dublin Airport Opex Efficiency Assessment: Review of Consultation Responses

October 2019

Commission for Aviation Regulation

PUBLISHABLE REPORT

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EXECUTIVE SUMMARY

The Commission for Aviation Regulation (CAR) retained CEPA to assess the efficiency of Dublin Airport's operating costs (opex). This work informed its draft determination of the price cap for Dublin Airport in the next regulatory period. Following the publication of the draft determination, CAR has received several submissions relating to it and to our report. In this report, we present a detailed review of the submissions and our response to them.

The provision of corrected or new information and evidence has resulted in a number of changes to the costs and forecasts used in our draft report. This report provides a detailed analysis of the work undertaken, recording both where additional information has resulted in a change to our report and our rationale where no change has resulted. The changes described in this document have been reflected in our final report to CAR. This document should therefore be read alongside our final report.

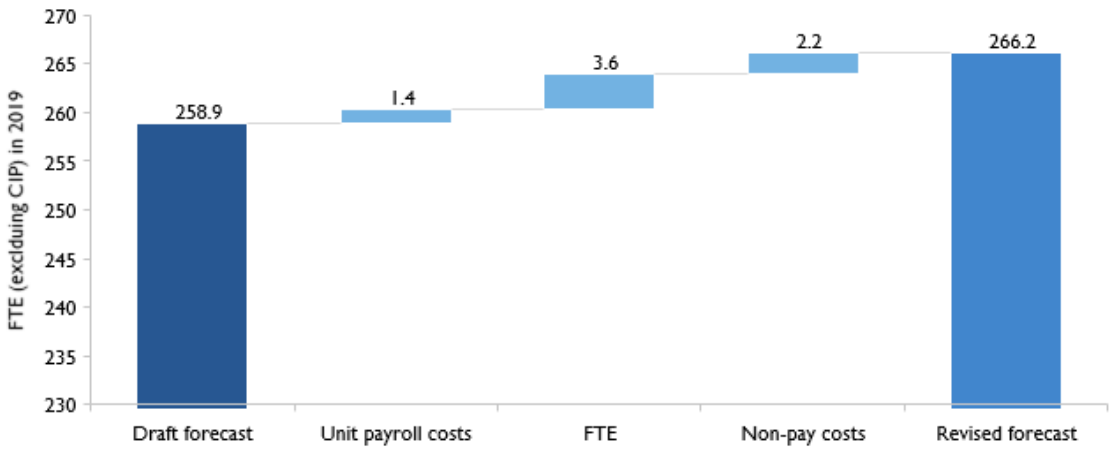
Our work starts from the development of an efficient opex baseline from which we project costs for the price control period. Our baseline estimates have come closer to Dublin Airport's estimates as part of this process but there remains a significant gap in staff numbers and costs in the year 2019. For instance, we estimate that an efficient company would have over 100 fewer staff in 2019 than Dublin airport has. This results in our baseline estimate of cost also being substantially below Dublin's current cost base.

We project staff numbers and costs forward from this date to 2024 (the end of the forthcoming control period). As the baseline has increased somewhat between our draft and final reports, our forecasts also increase but it remains the case that our estimates challenge the airport to make substantial efficiencies over the course of the next review period.

Our estimate of 2019 baseline expenditure has increased by €7.3 million, from €258.9 million to €266.2 million, as shown in Figure 1.1. However, this remains €17.1 million below Dublin Airport's anticipated costs for the year. Approximately half the increase in our draft forecast is the result of changes in our estimate of efficient staffing levels, with the biggest increases related to:

- An increase in the number of staff that are notionally categorised as Central Functions but are frontline (such as the transfer hosts and platinum services staff);
- A higher allowance for retail staffing to reflect a restructure that has taken place in 2019; and
- More maintenance staff to reflect roles that are driven by passenger volumes.

Figure 1.1: Revisions to total opex draft forecasts for 2019, including the CIP (€ million, 2017 prices)



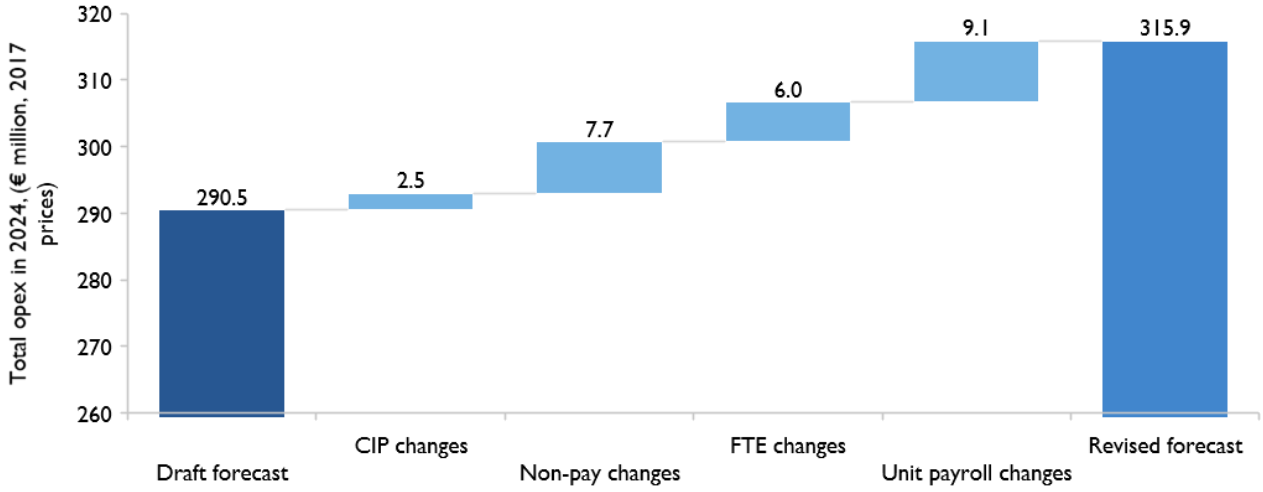
From our baseline, we then project forward over the next price control determination, to 2024. Our forecasts assume a steady increase in opex, from our revised baseline of €266.2 million in 2019 to €315.9 million in 2024. This increase is largely driven by higher opex costs as a result of Dublin Airport's Capital Investment Plan (CIP). The scale of the CIP is expected to increase operating expenditure by €19.7 million in 2024. The remainder of the increase is driven by expected wage growth, passenger driven increases in staffing levels and external contract prices.

Our estimate for efficient expenditure in 2024 is €25.4 million higher than our draft forecast, as outlined in Figure 1.2. The largest contributor is changes in unit payroll costs, driven by:

- An expected step increase in pension costs in 2020, which was not accounted for in our draft forecasts;
- Higher All Ireland wage growth assumptions; and
- Revised assumptions provided to us by Dublin Airport around the attrition rate of staff on older contracts.

The second largest contributor is the expected increase in the cost of additional US CBP officers, which drives €6.4 million of the €7.7 million additional non-pay expenditure by 2024.

Figure 1.2: Revisions to our non-pay draft forecasts for 2024, excluding the CIP (€ million, 2017 prices)



Our overall estimates of opex are presented in Table 1.1 below.

Table 1.1: Summary of forecast opex at Dublin Airport, 2019-2024 (€ million, 2017 prices)

	2019	2020	2021	2022	2023	2024
Pay	158.8	166.9	170.2	172.9	175.4	177.9
Non-pay	107.4	111.8	113.4	114.6	116.0	118.3
Total opex (excluding CIP) *Dublin Airport estimate**	**266.2** *283.3*	**278.7**	**283.6**	**287.5**	**291.4**	**296.2**
Previous forecast (excluding CIP)	258.9	264.1	266.7	268.6	270.9	273.3
CIP	0.0	0.7	3.9	16.3	20.3	19.7
Total opex (including CIP)	**266.2**	**279.4**	**287.4**	**303.8**	**311.7**	**315.9**
Opex per passenger, excl. CIP (€)	8.12	8.21	8.10	7.98	7.87	7.79
Opex per passenger, incl. CIP (€)	8.12	8.23	8.21	8.43	8.42	8.31

** Dublin Airport's estimate of 2019 opex provided to us in the Autumn of 2018 (€283 million) and the summer of 2019 (€283.3 million). Frontier Economics forecast €286 million in 2019.*

On a per passenger basis, we estimate operating expenditure to increase from €8.12 in 2019 to €8.43 in 2022, before reducing to €8.31 by 2024.

1. INTRODUCTION

1.1. BACKGROUND

The Commission for Aviation Regulation (CAR) retained CEPA to assess the efficiency of Dublin Airport's opex, to inform its draft determination of the price cap for Dublin Airport in the next regulatory period. CEPA undertook this analysis using a 'bottom-up' approach, assessing the efficiency of individual areas of expenditure, forecasting this forward and making adjustments based on expected future efficiencies and impacts from capital expenditure. This meant taking items of operating cost (e.g. security staffing, energy costs, rents etc.) at the level of granularity that facilitates clear analysis through benchmarking, expert judgement or other quantitative methods to determine the efficient levels of those costs. The scope of the study covered all opex within the regulated entity. The results of this analysis were presented in a draft report, ready to inform the draft price control determination published in May 2019.

Following the publication of the draft determination, CAR has received several submissions relating to the draft determination as well as to our report, from the following stakeholders:

- Dublin Airport (and their consultants Frontier Economics);
- ACI Europe;
- Aer Lingus;
- Norwegian Airlines;
- Irish Congress of Trade Unions;
- IATA; and
- Ryanair.

We have reviewed the submissions received on our draft report and opex-related comments on the draft determination. In this report, we present a detailed review of the submissions and our response to them. We summarise comments made as part of the consultation process which relate to our forecasts. We assess whether the submissions necessitate changes to our forecasts, and where they do, we detail the rationale for this change and the overall effect it has on our forecasts. Similarly, if we consider that no change to our forecasts is required, we provide our rationale for this. The report is intended to complement our final report, in which we provide a revised set of forecasts in support of CAR's final determination.

1.2. THIS REPORT

The remainder of this report is structured as follows:

- In Section 2, we provide a review of all consultation submissions that relate to our draft unit payroll cost forecasts, as well as outlining any revisions that we make to our draft report approach;
- In Section 3, we provide a review of all consultation submissions that relate to our draft staffing level forecasts, as well as outlining any revisions that we make to our draft report approach;
- In Section 4, we provide a review of all consultation submissions that relate to our draft non-pay forecasts, as well as outlining any revisions that we make to our draft report approach; and
- In Section 5, we summarise the results of any revisions made on our forecasts.

2. UNIT PAYROLL COSTS

In this section, we review the comments received in relation to our assumptions around unit payroll costs, i.e. wages including overtime and bonus payments, social insurance and pension contributions. We first consider the comments related to our baseline estimate of efficient unit payroll costs, which formed our view of efficient unit costs in 2019. We then consider comments related to how we have forecast future unit payroll costs.

2.1. COMMENTS ON BASELINE ESTIMATES OF UNIT PAYROLL COSTS

Dublin Airport

Dublin Airport consider that the forecasts do not adequately take into consideration its contractual obligations to staff and Labour Court pay awards. Specifically, there are three main factors that they believe were not taken into consideration:

- The airport was contractually obliged to restore pay cuts instituted in 2010 under the Cost Recovery Programme (CRP) agreement, once profitability thresholds were reached in 2015, amounting to a 5.5% pay increase in 2016;
- Staff are employed under contracts which guarantee them annual pay increments (under older contracts) and performance-related pay progression (under newer contracts); and
- A Labour Court judgement required Dublin Airport to implement a 2% pay rise in July 2014 and a further 2% pay rise in July 2015

With regards to pay rises since 2016, the airport is of the view that the pay awards agreed with unions are in line with the pay agreements implemented at comparable organisations. Furthermore, they argue that the airport must pay a premium to attract staff to work a shift pattern involving early morning starts, this is estimated at ✂✂.

In addition to the above, Dublin Airport raise two issues related to the baseline estimates of unit pay costs in our draft report, indicating that we have used incorrect assumptions about the ratio of staff on pre-2010 contracts to staff on post-2010 contracts. This, in their view, has led to a downwardly biased estimate of baseline unit payroll costs.

Finally, in relation to IT staff, Dublin Airport have provided additional evidence to support their view that the relative scarcity of IT staff is pushing up wage rates, justifying higher wage increases for IT staff than for other Dublin Airport staff.

Frontier Economics

Frontier Economics argue that national level wage trends are an inappropriate indicator of the drivers of Dublin Airport's unit payroll costs. They evidence this claim using a 2016 report[1] which shows economic growth in Dublin to be 50% above the national average. As such, Frontier question the use of national level wages to forecast Dublin Airport unit payroll growth.

[1] CSO (2016) County Incomes and Regional GDP

They also consider that the report has inappropriately compared all-Ireland *hourly* wages with Dublin Airport *annual* wages to support the judgement that wages at the airport are inefficient.

Furthermore, they urge caution in interpreting the difference between the unit costs of staff on pre-2010 and post-2010 contracts as solely representing relative efficiency. They note that it is unlikely that unions would agree that accepting temporary wage cuts in 2010 implies that workers were overpaid more generally.

Finally, Frontier Economics argue that choosing 2015 as the efficient baseline for our wage forecasts represents a logical inconsistency in our analysis. They cite our analysis which acknowledges the Labour Court pay award was unavoidable, but they argue that our analysis only partially includes its impact and does not considering the wage increases required under Cost of Recovery Programme agreement.

ICTU

ICTU argue that the assumptions we have used surrounding the pay rates at Dublin Airport are flawed for reasons including:

- The use of national growth trends being inappropriate as it includes public sector workers which have experienced slower pay growth than the private sector. Dublin Airport employees also do not enjoy the pension or other benefits of employment that apply in the public sector.
- Some of the wage growth at Dublin Airport arising from the recommendations of the Workplace Relations Commission and the Labour Court.

2.1.1. CEPA analysis and response

Differential pay rates between staff on pre-2010 and post-2010 contracts

Our estimate of wage rates for staff on older contracts was developed using estimates for the ratio of staff on pre-2010 contracts versus those on post-2010 contracts at each terminal. Dublin Airport in their response to the consultation, identified errors in the data it had previously provided to us and subsequently provided updated estimates on the number of staff under each contract type. Use of the updated figures changes our estimates of the pay premium for staff on older contracts.

However, even with this update, there continues to exist a systematic and persistent wage premium for staff on older contracts in all roles, where we are able to separately identify the average pay rates for staff on older contracts.

We disagree with Frontier Economics' view that this may not represent an inefficiency. We have not found any evidence to suggest that staff on older contracts are more productive than staff on newer contracts. Nevertheless, we recognise that it may not have been possible to fully address this pay differential over the previous price control, though we also note that it may have been possible to partially address this through a voluntary severance scheme.

Choice of benchmark to assess efficient wage growth

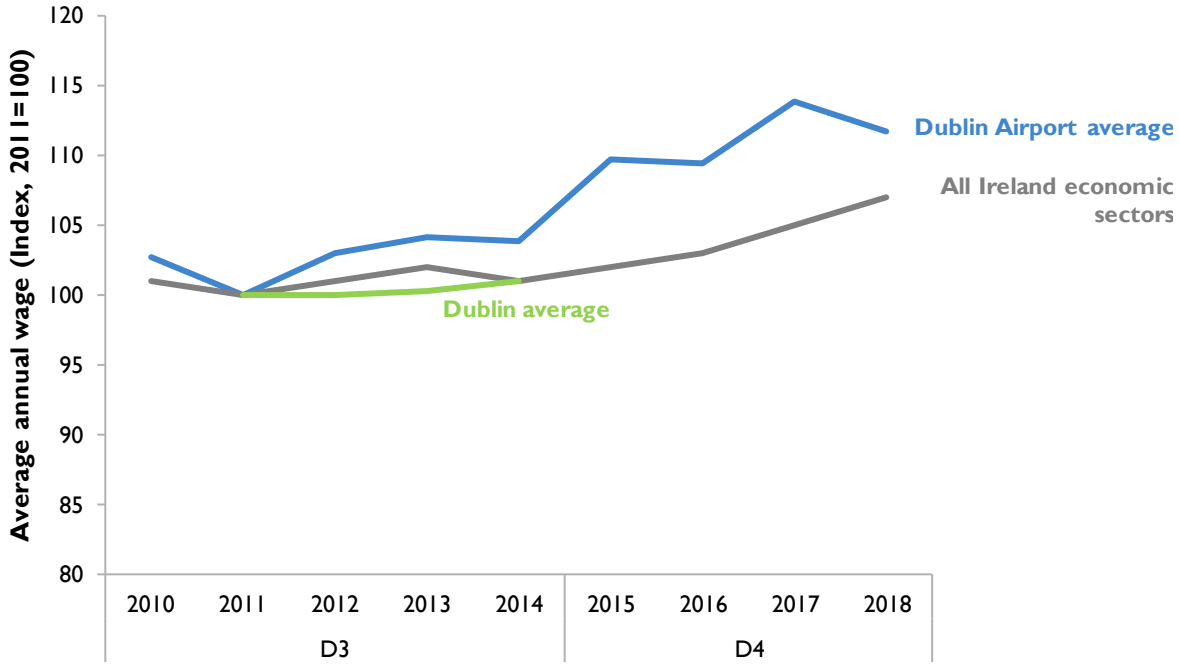
Noting the comments made in various consultation responses, we consider that it continues to be appropriate to use wage growth in the broader Irish economy, as an external benchmark for efficient wage growth, rather than using an alternate benchmark. In response to the specific comments made by consultees:

- The evidence that we have used[2] suggests that wage growth within the Dublin area (and in surrounding counties) has not been systematically stronger than wage growth elsewhere, over the period we considered. None of the respondents provide any persuasive alternative evidence to support the assertion that wage growth in Dublin (or specifically, wage growth in the areas where Dublin Airport sources its employees) has been systematically stronger than elsewhere in Ireland. As our draft report demonstrates, wage growth between 2011 and 2014 was relatively similar in Dublin as elsewhere.
- We have considered the report highlighted by Frontier Economics[3] which they assert shows that economic growth in Dublin is 50% above the national average. While the report does show that economic growth in Dublin is higher than the national average for 2016, it also shows a similar differential in growth rates in 2014. As such, we do not consider this as evidence that wages at Dublin diverged from the national average after 2014.
- Even if we exclude public sector employees from our analysis, we are confident that our conclusions still hold. We have not found a material difference between the growth rate of all Irish wages with the growth rate of non-public sector Irish wages. Between 2010 and 2018, the average regular wage growth across all NACE economic sectors was 8.2%. By excluding the public sector, the average regular wage growth increases to 8.8%. As a result, we do not believe the inclusion of public sector employees within the estimates of average wage growth is significant enough to bias our external benchmark.
- Frontier Economics are mistaken about the indicator we used in our assessment. We used annual wages rather than hourly wages and considered this inclusive of overtime and bonus payments to make it more of an appropriate comparator to Dublin Airport's payroll costs. We believe that the differences between our results and those produced by Frontier Economics are due to our analysis being based in terms of full-time staff, whereas Frontier Economics base their analysis on all staff. Frontier Economics' approach incorporates the impact of changes in working patterns, which makes it a less appropriate comparator (as we have normalised our unit costs into cost per full-time equivalent staff). We note that since the publication of our draft report, the Central Statistics Office have updated their historic series of wage growth and provided data for 2018. The effect of these changes is shown in the chart below and we incorporate it into our forecasts.

[2] CSO, Mean and Median Weekly Earnings by Sex, Region of Residence, Year and Statistic

[3] CSO (2016) County Incomes and Regional GDP

Figure 2.1: Growth in nominal wages at Dublin Airport and in the Irish economy more broadly, 2010-2018



Source: Dublin Airport; CSO Average Annual Earnings and Other Labour Costs by Type of Employment; CEPA analysis
Note: External comparators relate to average annual regular earnings (including overtime) but excluding bonuses

- We do not consider that pay agreements with other firms provide appropriate external comparators, for several reasons. The pay agreements presented as further evidence do not take into consideration the historic context of inefficiency at Dublin Airport, in terms of wages for staff on pre-2010 contracts. We also note that the Dublin Airport pay award is at the top end of the comparator examples and came in addition to the Labour Court judgement and reversal of previously implemented pay cuts. We cannot conclude that the cumulative wage growth at Dublin has been efficient without evidence of productivity improvements that match the scale of wage growth. Such evidence has not been provided.
- In relation to the comments made with respect to IT wage growth, we find evidence of marginally stronger wage growth for employees working in IT-related professions in 2018 compared with other roles. We reflect this in our estimates of efficient wages in 2019, using a separate All Ireland IT wage index.
- We have also considered Dublin Airport's argument that staff employed under older contracts are guaranteed annual pay increments. As our analysis effectively benchmarks Dublin Airport wages against broader wage growth in the Irish economy, annual pay increments are already implicit within our wage growth assumptions. This analysis also implicitly captures other occurrences such as staff attrition and that new staff tend to join at a lower point on the pay progression scale.
- Finally, we have considered Dublin Airport's argument that they need to pay a ✂✂ wage premium to attract staff to work a shift pattern involving early morning starts. Dublin Airport have not provided any evidence that such a premium has increased in recent years and consequently, if such a premium did exist, it would also be built into the unit costs of earlier years.

Consideration of Labour Court judgements and pay awards

We have reviewed the Labour Court judgements and generally consider that it would be difficult for any company to have achieved a lower pay award for the two years concerned. Similarly, the restoration of pay cuts implemented during Cost Recovery Programme was a contractual agreement that could not have been avoided. However, subsequent pay awards have been within the control of airport management.

Although, in our draft report, we attempted to model the impact of the Labour Court judgements and impact of the CRP agreement, we took a high level approach that created certain inconsistencies. For example, we assumed that all staff were covered by the CRP agreement. Additionally, we did not recognise that pay cuts were formally reversed in 2016, rather than in 2015, the year which formed our base case.

As a result, we have revised our modelling approach:

- For roles where fewer than a third of staff are covered by collective bargaining, such as IT, most Central Functions, and Capital Projects, we compare growth in unit payroll costs with All Ireland pay growth from 2014 onwards. As these roles are generally not covered by collective bargaining arrangements, we do not consider it necessary to separately model the effect of the CRP agreement or the Labour Court judgement.
- For the remaining roles, we forecast from 2010 (i.e. before the CRP pay cut was instituted) and compare growth in unit payroll costs with growth elsewhere. For the two years where the pay award was determined through the Labour Court determination, 2014 and 2015, we allow for the implementation of the pay award plus a nominal 1% allowance for pay progression. Pay progression of 1% are included as part of the pay growth rate of new staff and is referenced in the 2019 Frontier Economics report.[4]

The resultant effect of these changes on our forecasts is set out below:

Table 2.1: Baseline unit payroll costs, compared with Dublin Airport 2019 estimate and 2017 outturn (€ to nearest 100, 2017 prices)

Staffing group	2017 (outturn)	2019 (Dublin Airport estimate)	2019 (CEPA revised baseline)	2019 (CEPA draft baseline)
Maintenance	✂	✂	✂	✂
Facilities & Cleaning	✂	✂	✂	✂
Retail	✂	✂	✂	✂
Security	✂	✂	✂	✂
IT	✂	✂	✂	✂
Fire / Police	✂	✂	✂	✂
Commercial	✂	✂	✂	✂
Central Finance	✂	✂	✂	✂
SSC	✂	✂	✂	✂

[4] Frontier Economics (2019) Dublin Airport Operating Expenditure Review

Staffing group	2017 (outturn)	2019 (Dublin Airport estimate)	2019 (CEPA revised baseline)	2019 (CEPA draft baseline)
Airside Operations	✂	✂	✂	✂
Admin	✂	✂	✂	✂

The cumulative effect of these changes in terms of overall payroll costs is to increase our 2019 baseline from €154 million to €155 million (before any changes to FTE are considered). This compares with a Dublin Airport estimate for 2019 of €174 million.

2.2. COMMENTS ON FORECAST UNIT PAYROLL COSTS

Dublin Airport consider that the forecast estimates of unit pay costs, use incorrect assumptions about the attrition rate of staff on pre-2010 contracts leading to a lower estimate of forecast unit payroll costs. They also state the forecasts disregard a contractual agreement to increase employer pension contributions from 2020.

Dublin Airport, alongside Frontier Economics and ICTU, believe that having a lower wage growth rate for pre-2010 staff than for post-2010 staff is infeasible. They state that this proposal has no regard for the collective bargaining process at Dublin Airport or in the economy as a whole. Frontier Economics specifically ask where the assumption that wages for those on legacy contracts will grow at half the rate of increases for other workers is derived from.

ICTU also question the plausibility of our wage forecasts given the state of the Irish labour market. They cite the Government Summer Economic Statement[5] which noted that "average weekly earnings grew by 3.4 per cent in the first quarter of 2019, driven mainly by average hourly pay growth. Given the tightness of the labour market, an acceleration in the pace of earnings growth is expected over the medium term."

2.2.1. CEPA analysis and response

We consider that our core wage growth assumptions continue to be appropriate. We have used the latest external forecasts to set our assumption for core wage growth in 2019 and 2020. The external forecasts that we draw upon are as follows:

- Central Bank of Ireland Quarterly Bulletin, Q3 2019 (2018-2020);
- IMF World Economic Outlook, April 2019 (2018-2023);
- ESRI Quarterly Economic Commentary, Summer 2019 (2018-2020);
- Central Bank of Ireland Quarterly Bulletin, Q3 2019 (2018-2020); and
- Central Statistics Office – Annual Earnings and Labour Costs, June 2019.

We have also reviewed the arguments provided by Dublin Airport and other stakeholders challenging our assumption of slower wage growth for staff on older contracts. This was a proxy, not an action that we expect to occur in reality. For clarity, overall, we allow for real wage growth of 9% between 2019 and 2024. There are, however, a number of ways the wage premium can be reduced:

- Dublin Airport can introduce measures to improve the productivity of staff on older contracts which, as we showed in our draft report and as was acknowledged by Dublin Airport in our discussions, often lags behind staff on newer contracts.
- Dublin Airport could seek to accelerate churn e.g. through better management of issues like sickness absence.
- Dublin Airport could implement a Voluntary Severance Scheme (VSS), which we understand the Commission is considering in the Final Determination.

[5] Government of Ireland (2019) Summer Economic Statement.

We believe that with a clear strategy from Dublin Airport, it is possible to reduce the inefficient wage premium for staff on older contracts. This would likely be a longer-term strategy; despite our assumption of slower wage growth, we expect a substantial unit wage premium to persist for staff on older contracts, beyond the end of the next determination period. We continue to allow for such a premium in our targets.

In relation to Dublin Airport's comments on our treatment of pension costs, we have adjusted our analysis to separately assess pension costs from the rest of staff unit wage costs. In this analysis, we have assumed that pension costs are a fixed proportion of all staff costs inclusive of bonuses and other staff unit costs. This implicitly assumes that bonuses and other staff unit costs are the same proportion of staff unit costs over time. In our treatment of pension costs, we have explicitly controlled for the contractual agreement to increase employer pension contributions from 5% to 7% in 2020.

Finally, as with our revised baseline figures, we have updated our view on attrition rates based on the revised estimates of the historic attrition of pre-2010 staff provided by Dublin Airport. This leads to a much slower attrition rate than had previously been assumed.

The resultant effect of these changes on our forecasts is set out below:

Table 2.2: Previous forecast of unit payroll costs from 2019 to 2024 (€ to nearest 100, 2017 prices)

Staffing group	2019	2020	2021	2022	2023	2024
Maintenance *	✂	✂	✂	✂	✂	✂
Facilities and Cleaning *	✂	✂	✂	✂	✂	✂
Retail *	✂	✂	✂	✂	✂	✂
Security *	✂	✂	✂	✂	✂	✂
IT	✂	✂	✂	✂	✂	✂
Fire / Police	✂	✂	✂	✂	✂	✂
Commercial	✂	✂	✂	✂	✂	✂
Central Finance	✂	✂	✂	✂	✂	✂
Shared Services Centre	✂	✂	✂	✂	✂	✂
Airside Operations	✂	✂	✂	✂	✂	✂
Admin	✂	✂	✂	✂	✂	✂

** Weighted average of staff on pre-2010 contracts and those on post-2010 contracts*

Table 2.3: Revised forecast of unit payroll costs from 2019 to 2024 (€ to nearest 100, 2017 prices)

Staffing group	2019	2020	2021	2022	2023	2024
Maintenance *	✂	✂	✂	✂	✂	✂
Facilities and Cleaning *	✂	✂	✂	✂	✂	✂
Retail *	✂	✂	✂	✂	✂	✂
Security *	✂	✂	✂	✂	✂	✂

Staffing group	2019	2020	2021	2022	2023	2024
IT	✂	✂	✂	✂	✂	✂
Fire / Police	✂	✂	✂	✂	✂	✂
Commercial	✂	✂	✂	✂	✂	✂
Central Finance	✂	✂	✂	✂	✂	✂
Shared Services Centre	✂	✂	✂	✂	✂	✂
Airside Operations	✂	✂	✂	✂	✂	✂
Admin	✂	✂	✂	✂	✂	✂

** Weighted average of staff on pre-2010 contracts and those on post-2010 contracts*

The cumulative effect of these changes is higher wage growth than we estimated in our draft report. This can be seen in the following tables. Our estimate of 2024 payroll costs, before counting any FTE changes, rises from €163 million to €172 million.

3. STAFFING LEVELS

In this section, we review comments made in relation to our forecast staffing levels in each individual area of cost. We begin by reviewing the comments on our overall approach and then move on to our forecasts of individual staffing areas.

3.1. OVERALL APPROACH

The consultation received several responses that commented on the overall approach to producing an opex forecast, or the overall effect of the forecasts. These related to:

- Our approach to benchmarking staffing levels;
- Implicit assumptions around economies of scale; and
- Overall attainability of staffing forecasts.

3.1.1. Benchmarking

Dublin Airport argue that average headcount per passenger is an inappropriate benchmark of efficiency due to differences in outsourcing policies across airports. They suggest that by adjusting for different outsourcing policies, headcount per million passengers for Dublin Airport in 2017 is below that of Zurich and Gatwick airports. They state that making similar adjustments to a broader sample of airports would yield similar results.

Dublin Airport also considered that CEPA did not adequately adjust for different levels of outsourcing at airports when benchmarking the number of administrative FTEs per million passengers. Dublin Airport suggest that opex per passenger would be a more appropriate benchmark as it would not be skewed by the level of outsourcing/insourcing in the comparator airports.

CEPA analysis and response

In our draft report, we used average headcount per passenger to provide context to our bottom-up analysis, it is not used directly in producing our forecasts. We recognise the issues that arise from different levels of outsourcing and adjusted for this in a simple way by illustrating how the average headcount per passenger would change if the two most commonly outsourced functions, retail and cleaning, were excluded. However, we chose not to put substantial weight on this evidence, due to the risk of cherry-picking comparator airports or over-accounting for differences between comparator airports.

An opex per passenger benchmark, as suggested by Dublin Airport, is also an imperfect metric due to differences in labour cost inputs between different countries, exchange rate differentials, differences in business models between airports, as well as differences in the age and complexity of airport infrastructure assets. As such we conclude that it is not a better measure than headcount per passenger.

In our analysis, we used the average headcount per passenger metric alongside other sources of evidence, including views from airline stakeholders, the growth in headcount over the price control, and our discussions with airport management. As such, we do not consider it necessary to adjust our forecasts to specifically account for the benchmarking results. However, later in this section, we adjust our baseline estimates of staffing levels, in response to more specific comments made on particular aspects of our bottom-up analysis.

3.1.2. Implicit assumptions around economies of scale

ACI Europe notes that a constantly decreasing cost curve over the long run does not always hold for airports. They point out that empirical evidence suggests that airport costs per workload unit (WLU) decrease to the volume of around 20-30 million WLUs. But that after this point operating costs per-unit increases. ACI Europe argues that our forecasts overestimate potential economies of scale.

CEPA analysis and response

Our approach to producing the forecasts was a bottom-up assessment that considered the potential for economies of scale separately for different business functions. We assess, in our econometric benchmarking, whether economies of scale reduce as airports become larger. Although we find some evidence of reduced economies of scale, we found no evidence of diseconomies of scale as suggested by ACI Europe. In other words, we did not find any evidence to suggest that costs on a per passenger level grow as airports became larger. As a result, we make no changes to our forecasts.

3.1.3. Overall attainability of staffing forecasts

Frontier Economics have questioned the overall attainability and realism of our staffing forecasts. They state that our forecasts imply an elasticity of -0.41 between 2019 and 2024 (using staffing levels forecast by Dublin Airport for 2019) which they argue would be difficult to realise. To achieve the 2024 target, Frontier Economics argue that Dublin Airport would face significant financing difficulties.

ICTU question the feasibility of a reduction in staff numbers (in line with our 2019 efficient baseline) at a time when passenger numbers are growing and when Dublin Airport is undertaking significant capital expenditure. ICTU questions how this reduction might be achieved in practice.

CEPA analysis and response

Given the scope of our study, we applied two tests to produce our forecasts:

- To what extent has Dublin Airport achieved efficiencies that *were deliverable* during the previous price control, or expanded headcount in an efficient manner?
- To what extent are *further efficiencies achievable* during the next price control?

The deliverability and achievability referred to above, are based on our judgment of how an airport exposed to competitive pressures would have responded to Dublin Airport's circumstances. Therefore, our assessment is *not* what is achievable from existing levels of expenditure, but what would be achievable if existing levels of expenditure reflected efficient behaviour over the previous price control. Where we have considered that Dublin Airport's existing headcount is at inefficient levels, due to its actions or inaction over the previous price control, there is a significant challenge to achieve both historic efficiencies and future efficiencies. This is intentional.

It is ultimately up to CAR to determine whether to allow a further glide path to efficient levels of staff. We have not adjusted our forecasts to reflect these comments and continue to apply the two tests set out above.

3.1.4. Changes to operating environment

Frontier Economics have questioned our use of staffing levels in 2014 as an efficient baseline for our forecasts. They argue that changes which have affected opex and staffing—such as updates to the security environment and increases in low-cost carrier passengers—have not adequately been considered in our analysis. In particular, applying a short-run elasticity and incremental costs from 2020 to 2024 to our 2019 baseline which is benchmarked against 2014 staffing levels omits significant shifts in operations which occurred between 2014 and 2019.

CEPA analysis and response

We have undertaken a bottom-up assessment of efficient future opex which considers the impact of a changing operating environment at an individual business function level. The test we have applied, is whether Dublin Airport have been able to adequately explain step increases in headcount in specific business functions, beyond those that would be expected through higher passenger volumes. Where these explanations demonstrate necessity and efficiency, we have included them. Later in this section, we consider this issue in further detail in response to specific additional evidence provided by Dublin Airport.

3.1.5. Consistency of forecast approach

Frontier Economics have questioned our overall approach to forecasting. They argue that we have taken an 'ad-hoc' approach where our treatment of costs differs across categories.

CEPA analysis and response

Our approach to forecasting has in-part been determined by the availability of robust external benchmarks. We have adapted our approach based on what we considered to be the most analytically robust way of estimating efficient levels of expenditure. For some areas, this has been to compare against external benchmarks, while for other areas we have assessed the historic evolution of costs.

In addition, various cost areas at Dublin Airport have evolved in different ways over the current determination period, and are affected to differing extents by capacity constraints. As a result, we have tailored our approach to forecasting each cost item to reflect the differences between the cost areas. Where Frontier Economic raise specific issues with our approach to forecasting, we provide additional justification in the sections below for our chosen method.

3.2. CENTRAL FUNCTIONS STAFFING

3.2.1. Commercial staff (including Platinum Services)

Dublin Airport do not consider revenue per FTE an important benchmark when determining commercial staff levels. They argue that increases in commercial revenue are driven by factors other than passenger growth and require investment in staff levels to generate revenue.

Dublin Airport argue that its financial performance justifies the investment in commercial staff numbers. Dublin Airport state that a €2 million increase in staff cost has driven a €30 million increase in revenue. They make the case that this €30 million, which would not have been available without the additional staff, has been included by CAR in their projections.

They also state that the commercial FTEs which are included within the revenue per FTE metric, includes some frontline staff managing *Platinum Services*, a premium offering to private and General Aviation travellers. These FTEs have been categorised under Central Functions, despite being operational roles. The Platinum Services offering, which was restructured in 2015 and moved to a 24-hour operation, led to an increase in FTE but also led to a six-fold increase in revenue from 2014 levels.

Dublin Airport, in their response, outline their justification for the additional staff hired since 2014, including additional staff in advertising to support further revenue growth, more staff for a new business development and innovation function, and additional roles to support revenue maintenance and generation in other parts of the business.

CEPA analysis and response

Having reviewed the evidence provided by Dublin Airport, we consider that a revenue per FTE metric continues to be an appropriate indicator of efficiency. We believe that Dublin Airport's arguments overstate the revenue impacts of additional commercial staff as, even without investment in additional staff, we would expect some growth in real non-aeronautical revenues from higher passenger numbers.

As commercial concessions are renegotiated, there is a natural expectation of higher concession payments related to passenger growth, regardless of any additional investment in commercial staff. Similarly, we expect that passenger growth will lead to additional revenues from executive lounges and fast track access.

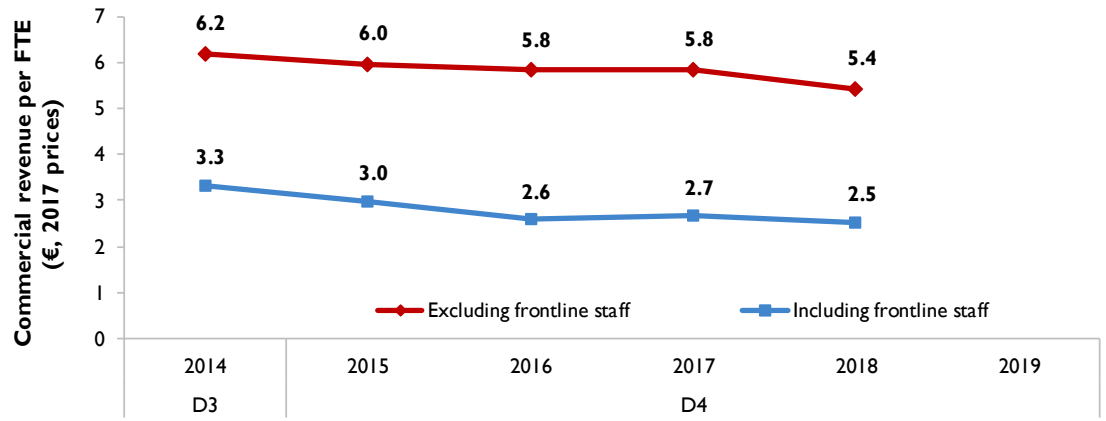
Consequently, we consider that there needs to be a much stronger case on the causal effect of additional staff, to justify the higher headcount. We note the justifications made by Dublin Airport in their consultation response and in subsequent engagement with us. However, from the evidence provided, we conclude that there has been a lack of detailed consideration as to whether new requirements are genuinely additive, or whether they could be met or partly met through a reconsideration of existing activities or more productive use of existing staff.

A revenue per FTE metric provides a simple indicator of the productivity of commercial staff without having to make explicit assumptions around how much additional revenue is generated through higher passenger volumes and how much is driven by more commercial staff. Therefore, we believe it is an appropriate way of identifying the efficiency potential for the commercial function.

In general, our analysis considers airport commercial staff as a whole, and does not make an explicit differentiation between roles within the commercial function. As such, we do not accept Dublin Airport's categorisation that we have explicitly disallowed FTEs within a particular team. Our analysis has led us to conclude that the same activities could be delivered with fewer FTEs. It is for Dublin Airport to consider how best to structure the commercial function to deliver the efficiency target.

Nevertheless, we accept that our analysis needs to be updated to remove staff that Dublin Airport have now confirmed as frontline roles (i.e. those within Platinum Services). The chart below shows the revenue generated per FTE both before and after this change. Making this adjustment leads to a reduction of 2 FTE compared with the 2017 outturn, as opposed to the 12 FTE reduction we previously estimated.

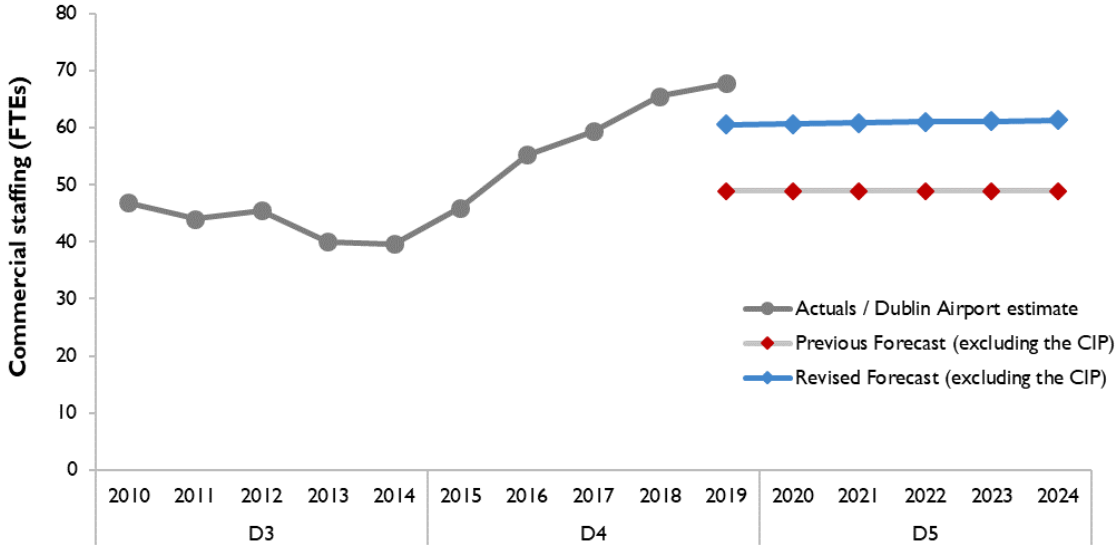
Figure 3.1: Commercial revenues excluding car parking and marketing per FTE, 2014-2018 (2017 prices)



We have separately considered the efficiency of staffing within Dublin Airport's Platinum Services offering and have concluded that the increase is justified, largely based on the longer opening hours and the substantial improvement in profitability resulting from the 2016 restructure of the service. In addition, we also note that a large driver of the increase in these FTEs is due to the Porterage service being brought in-house under Dublin Airport operation.

This means that our 2019 baseline estimate for Commercial staff (including those working in Platinum Services), is now 61 FTE, compared with our previous estimate of 49 FTE and Dublin Airport's estimate of 68 FTE. The impact of these changes is illustrated in Figure 3.2 below.

Figure 3.2: Commercial Staffing FTEs, 2010-2024.



3.2.2. HR

Dublin Airport disputes a disallowance of 9 HR FTEs, arguing that the relevant cost relates to graduates who are usually dispersed around the organisation, being held centrally for 2019. Dublin Airport notes that the annual intake of graduates is paid at a lower rate than average salary for this category and facilitates the building of talent within the airport.

Dublin Airport also disagrees with the disallowance of additional Business Partners to deal with the growing workforce and associated HR activity that comes with having additional staff. Dublin Airport states that the additional roles are necessary to:

- establish and deliver a HR Centre of Excellence (including hiring additional HR Business Partners);
- respond to additional requirements related to the introduction of GDPR and the removal of the pensions freeze; and to
- reduce reliance on external recruitment agencies.

Finally, Dublin Airport points out that the HR Transformation Office will grow by 3 FTE between 2017 and 2019 before reducing in size. However, they consider that it would be necessary to retain some staff by the end of the price control, to ensure adequate implementation of the various HR initiatives.

CEPA analysis and response

In their consultation response document, Dublin Airport state that the number of HR staff has increased by 16 from 43 FTEs in 2017, to 58 FTEs in 2019. In addition, Dublin Airport point out that the Transformation Office has 10 staff in 2018. These figures do not match the most recent data we have received from Dublin Airport. To ensure consistency with the rest of our report, we continue to use the data derived from airport accounts, rather than the figures cited in Dublin Airport's consultation response.

Upon review of Dublin Airport's consultation response, we consider it reasonable to make some changes to our approach. We have adjusted our forecasts to reflect a reallocation of some staff planning and administration roles from the Campus Services category into HR, making a corresponding change within our Campus Services forecasts. This amounts to 13 additional FTEs in 2017. We create the 2019 baseline by projecting forward 2017 FTEs, using our passenger driven elasticity assumptions.

In addition, we consider that it is sensible for an organisation the size of Dublin Airport to have a graduate intake, and we also consider the current scale of intake to be appropriate. Although we have not been able to identify where specifically in the organisation these roles would have been prior to centralisation, we have allowed for the full anticipated increase in HR graduate staff within the CPO function. This amounts to an overall increase in 4 FTE between 2017 and 2019 (rather than the 9 FTE stated by Dublin Airport in the consultation response).

For the HR Transformation Office, we allow for continued growth to 2019 and for it to be retained in size until 2021. The HR Transformation Office intends to improve efficiency through improved rostering and a reduction of paper-based administration. However, as the ongoing efficiencies that may be generated from this programme have not been incorporated into our forecasts, we do not include the costs.

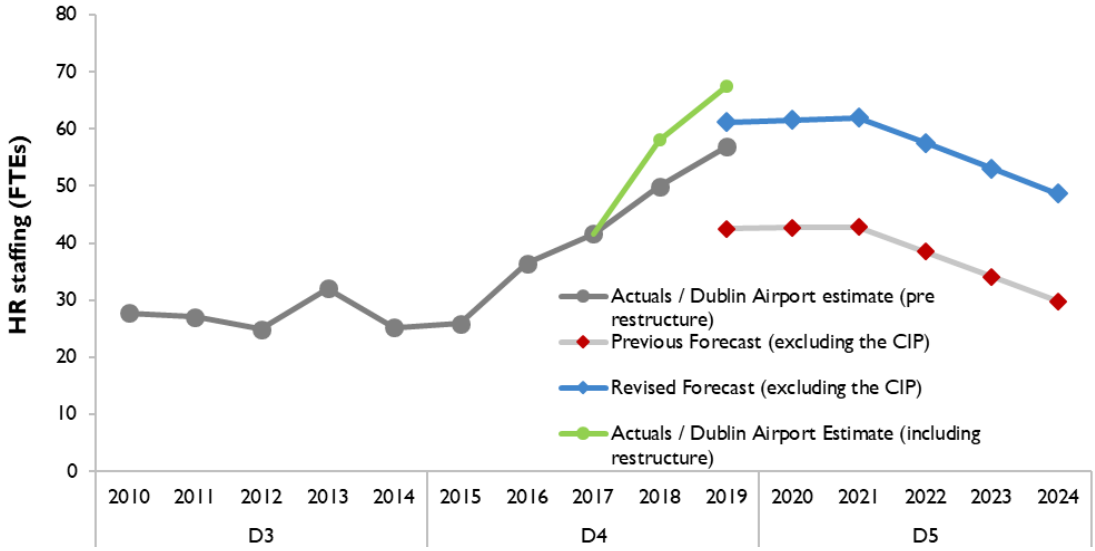
In relation to Dublin Airport's assertion that the increased HR staff will reduce reliance on external recruitment agencies, it is sensible to think that this change should lead to a reduction in external recruitment agency related costs. As this reduction has not been built into our forecasts either, it is up to

Dublin Airport to decide whether the costs of this outweigh the benefits for the organisation. As such, we continue to forecast the number of HR Transformation Office FTEs falling to zero by 2024.

However, we conclude that no further adjustment to our forecasts is necessary. We consider that the elasticity we apply with respect to staff numbers is enough to enable delivery of the above activities, without requiring additional staff beyond this. We note that Dublin Airport would like to hire additional HR Business Partners, leading to a ratio of approximately 1 HR Business Partner for every 300 FTE staff. However, we do not believe the case has been made for how such a change would lead to a more effective operation in terms of delivering efficiencies elsewhere or delivering a better-quality service for passengers. Ultimately, it is up to Dublin Airport to consider whether developing its HR Business Partner model would lead to sufficient efficiencies elsewhere in the business to justify the additional expenditure.

Overall, this means that our HR forecast for 2019 is now 61 FTE compared with our previous estimate of 43 FTE, with most of the change arising from the reallocation of 13 FTE from Campus Services to HR. This compares with Dublin Airport's previous estimate of 57 FTE (or 67 FTE following the restructure). These changes are presented in Figure 3.3 below.

Figure 3.3: HR staffing FTEs, 2010-2024



3.2.3. Transfer Hosts

Dublin Airport disagree with our assumption to fix the number of transfer hosts at 2017 levels. Broadly, they make the case that transfer hosts have helped to support an increase in passenger charges and non-aeronautical revenues. They point out that the volume of transfer passengers has increased by 145% since 2014.

In terms of the specific case for additional staff, they raise the following points:

- The opening of the new transfer facility in 2017 has increased the resourcing requirement;
- The current levels of resourcing are necessary to maintain the high levels of passenger satisfaction for this service;
- The transfer facility contains some fixed posts that require continuous resourcing while the facility is being used by passengers; and
- More complex airport operations such as arrivals from Pier 3, lead to more complex connections that mean passengers need more queue management and wayfinding support.

With regards to our forecast assumptions for the future staffing requirement for the transfer product, Frontier Economics argue that we have given insufficient justification for our elasticity estimate of 0.2.

CEPA analysis and response

While we accept that there is a case for resourcing the new transfer facility, we do not consider that Dublin Airport's approach has been fully proportionate or efficient. For example, having four fixed posts for managing Autopass and E-Gate lanes given the volumes of passengers using the transfer facility is disproportionate. By comparison, the Terminal 2 roster has just four fixed posts managing queues at immigration checks and E-Gates who handle much larger passenger volumes.

Additionally, we note that demand at transfers is peaky, as are a lot of the other activities that are undertaken by customer service staff elsewhere. We do not consider it an efficient solution to have a separate contingent of customer service staff at the transfer facility, in addition to those in Terminal 2. We consider that there are opportunities for efficiencies through greater sharing of tasks and smarter deployment of staff to suit operational peaks for the different activities.

More broadly, we observe that some Transfer Hosts are responsible for locating passengers on tight connections and escorting them to their outbound aircraft, especially if their inbound flight had been delayed. Although our forecasts allow for staff in such roles, we are not convinced that it is necessarily more efficient for an airport to be responsible for this activity. Airlines often have better sight of the number of transfer passengers and the details of their connections. The more typical arrangement, of airlines and their ground handlers assuming this role, is likely to be more appropriate given demand is peaky throughout the day.

Our previous 2019 baseline estimate retained staffing at 2017 levels when the transfer facility was opened. However, as the facility was opened mid-year, the full-year staffing impact was only realised in 2018. Therefore, we have updated our estimate of efficient staffing levels to reflect what we consider an appropriate full year impact. We do this taking the following approach.

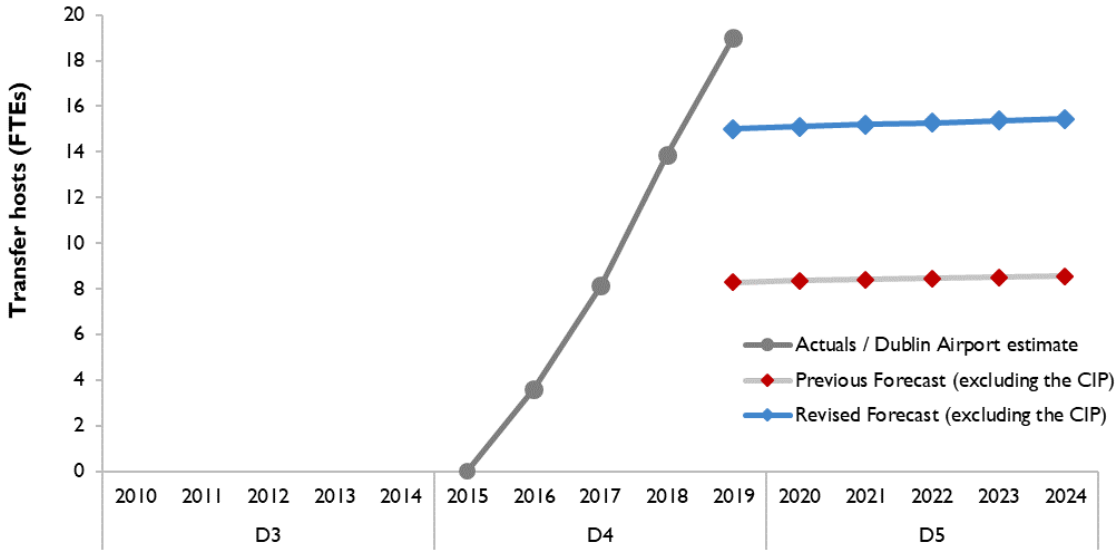
For 2019, Dublin Airport's rostering arrangements for the transfer facility implies a peak day requirement for 10 staff, and a weekly requirement of 89 staff hours. This implies a requirement of 18 FTE when building

in break requirements and leave entitlement. We disagree that this is reflective of an efficient rostering arrangement and consider that efficiencies can be realised through a more flexible allocation of staff. For example, at times of particularly high passenger volume, additional staff could be employed on an ad-hoc basis, rather than through permanent staff roles. We estimate that the transfer facility can be managed with 4 staff during off-peak hours and a maximum of 7 staff during peak hours. This analysis implies a weekly requirement of 72 staff hours and 15 FTEs.

We therefore set our baseline requirement for 2019 to 15 FTE, an increase from our previous estimate of 8 FTE but a reduction from Dublin Airport's estimate of 19 FTE. The key driver of the increase is our move from a partial year staffing estimate to a full-year staffing estimate.

With regards to our elasticity assumption for the transfer product, after reviewing the submissions made by Dublin Airport, we consider that a change to our elasticity estimate is appropriate. Given the scale of expected passenger growth at Dublin Airport, we consider that there will be an increasing requirement for Transfer Host services. However, while we understand that passenger growth could remain 'peaky' across the determination period, we consider that there is ample scope for Dublin Airport to reduce the need for Transfer Hosts through effective management of flights and transfer passengers. As such, **we have increased our elasticity assumption from 0.2 to 0.4 with respect to passenger growth.** We note that Dublin Airport assumed that these staff would remain fixed across the period from 2018 to 2024. An illustration of our changes is presented in Figure 3.4 below.

Figure 3.4: Transfer Host FTEs, 2010-2024



3.2.4. Other central function staff

Dublin Airport question our proposal to freeze staffing levels for other central function roles, either at 2014 levels or 2017 levels:

- They consider the growth in the Shared Services Centre (SSC) has not been proportionately offset by a reduction in the other central finance staff as the demands on central functions finance has expanded over the period.
- The airport has also developed a strategy function, which it states is necessary to support the airport's operations in the future.
- Finally, the airport considers that additional resourcing has been required in other administrative functions due to the introduction of additional regulatory and legislative requirements.

CEPA analysis and response

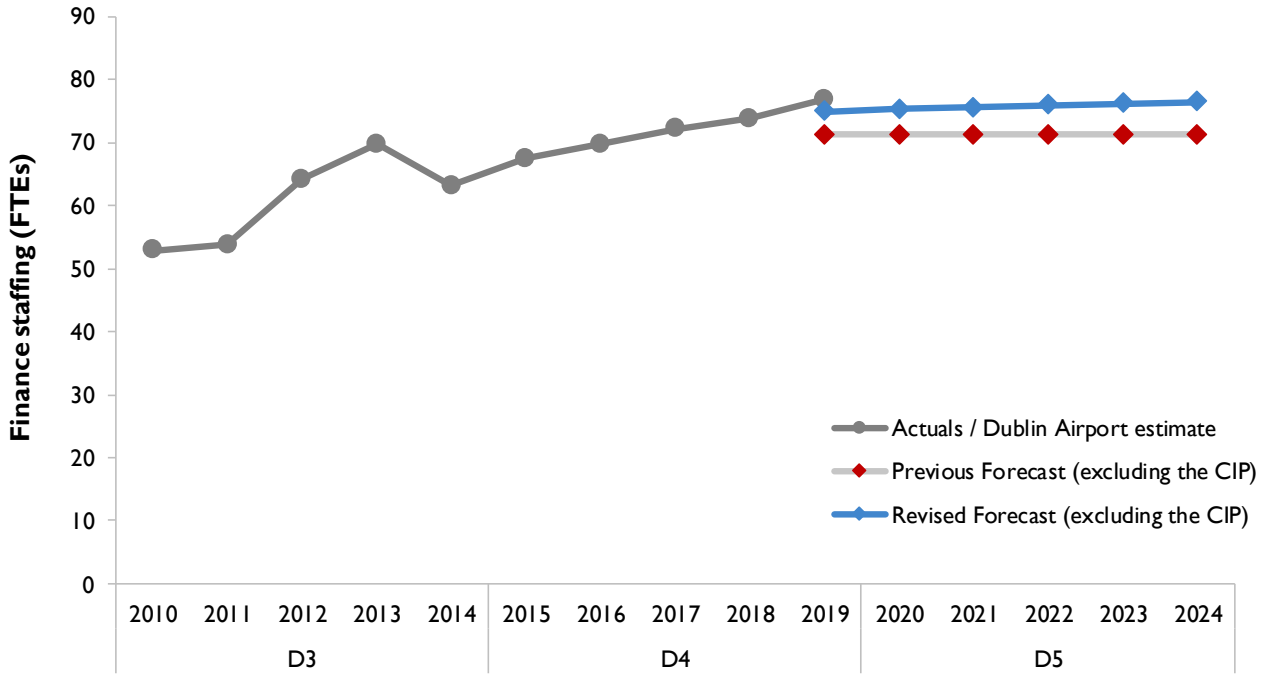
In our draft report, we reported that Dublin Airport had not realised efficiencies arising from the expansion of the SSC in terms of it facilitating a lower headcount within central finance. Dublin Airport's response partially makes the case for retaining central finance staff, such as one additional FTE employed to reduce reliance on external tax consultants. They also make the case that some of the growth in SSC staff relates to growth in the volume of activity, such as payroll activities and processing transactions.

However, on other areas, we do not consider the case has been made for retaining central finance staff as well as growing the SSC. As a result, we change our forecast as follows:

- We make an allowance for that some of the growth in SSC staff will be due to a requirement to handle additional volumes of activities, using an elasticity of 0.2. We match any further growth beyond that to a proportionate reduction in central finance staff.
- In addition, we allow for one extra FTE in relation to the additional tax activities, which we consider to be matched by reductions in consultancy spend elsewhere.

Furthermore, as set out below, we have chosen to apply a passenger volume elasticity of 0.2 for SSC staff, to reflect their workload being more directly driven by passenger volumes and employee numbers. Frontier assumed no elasticity in its forecasts for Dublin Airport. **The overall effect of our changes is that our 2019 baseline estimate for finance staff is now 75 FTE, compared with our previous estimate of 71 FTE, and Dublin Airport's estimate of 77 FTE.** The impact of this change is illustrated in Figure 3.5 below.

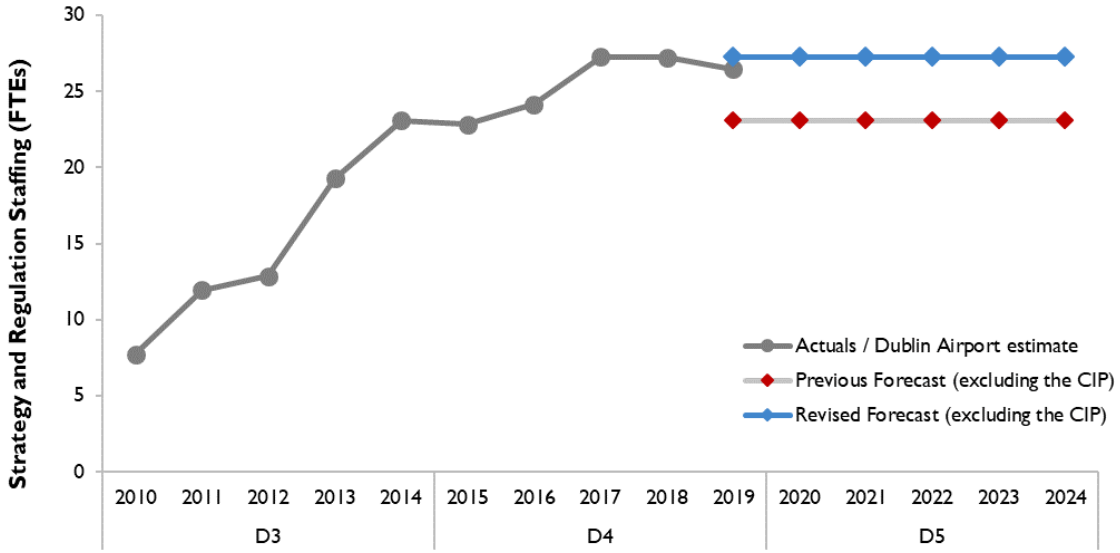
Figure 3.5: Finance Staffing FTEs, 2010-2024



In terms of the Strategy and Regulation section, we note that Dublin Airport has followed up with further descriptions of the new staffing roles in the expanded function. This description did not include details quantifying the impact of the section on business efficiency, or how it has led to improved service quality for customers. Nonetheless, in reflecting on the changes the airport has undergone since 2014 and in light of the further descriptions provided by Dublin Airport, we consider it reasonable to revise our position from the draft report, in which we assumed constant staffing at 2014 levels.

As we have used 2017 as our baseline year for most cost areas, we consider that the efficiencies and improvements referenced by Dublin Airport as a result of the Strategy and Regulation section have been implicitly incorporated into our analysis up to this date. Further efficiencies that are generated after 2017 will in general not be built-in to our analysis and as such, it would not be appropriate to include any additional costs incurred after this date. We have therefore set our target for this line item at the 2017 FTE level. Whether the costs of further increasing this programme are outweighed by the additional benefits is then a question for Dublin Airport to judge. **The overall effect of our changes is that our 2019 baseline estimate for Strategy and Regulation staff is now 27 FTE, compared with our previous estimate of 23 FTE and Dublin Airport's lower estimate of 26 FTE**. The impact of this change is presented below.

Figure 3.6: Strategy and Regulation FTEs, 2010-2024



Finally, we consider the evidence provided by Dublin Airport to support additional FTEs in other administrative roles. Most of these relate to compliance requirements which are constantly undergoing change. In their consultation response, Dublin Airport has only reported one side of this change and as such, has not given due consideration the potential savings that may be possible. In addition, we have not seen evidence that suggests that Dublin Airport have given due consideration to how an improved rationalisation of existing administrative staff could be used to cover the stated compliance requirements.

Therefore, we do not make any further change to our forecasts, retaining staffing at 2014 levels for other support staff.

3.2.5. Elasticity of Central Functions staff

Frontier Economics question the logic of some central staff categories remaining fixed as passenger numbers increase. They argue that as airports get larger, requirements on administrative staff increase and higher staffing levels should be expected. In particular, they point out that increases in marketing, procurement, concessions, finance, and accounting staff should be expected as passenger volumes increase. However, Frontier do acknowledge that functions can be 'fixed' in the short run.

CEPA analysis and response

We note the general point made by Frontier Economics in relation to elasticities and agree that there is a link between the size of an airport and staffing requirements in central functions. However, we have opted not to apply a blanket elasticity and instead we have linked our forecast staffing requirement to identifiable additional activities. For certain roles, such as commercial staff, we have linked future staffing requirements to increases in tangible outputs. For others, we consider the results of our benchmarking exercise justifies a forecast that assumes restraint in the recruitment of additional staff.

We also note that Frontier Economics, in its forecasts for Dublin Airport, did not apply an elasticity when projecting its staffing requirement for the Central Functions.

As a result, we do not consider it necessary to make any substantial changes to our forecasts. However, we have chosen to apply an adjusted elasticity of 0.2 for SSC staff, to reflect their workload being more directly driven by passenger volumes and employee numbers.

3.3. RETAIL STAFFING

Dublin Airport question our approach to benchmarking the efficiency of retail staffing levels. They state that Dufry, which we use as an external benchmark, is not necessarily a good proxy for a single airport given that its operations are spread around the world. They also argue that retail staffing in both Terminals 1 and 2 is efficient when using a wider range of benchmarks, as shown in the table below.

Table 3.1: Retail staffing efficiency in Terminal 1 and Terminal 2 of Dublin Airport as well as Dufry.

	Terminal 1	Terminal 2	Dufry
FTE per 100 square meter	10.9	6.6	6.7
Revenue per square meter	€47,534	€31,894	€23,841
Revenue per FTE	€445,436	€462,476	€356,764
Transactions per FTE	13,672	11,907	N/A
Passengers per FTE	66,179	53,344	N/A

Source: Dublin Airport

Frontier Economics, in their response, question the validity of benchmarking retail staff between Terminals 1 and 2, pointing out that Terminal 1 houses many short-haul carriers, whereas Terminal 2 primarily has long-haul departures. They argue that differences in retail consumption patterns across terminals means that it reasonable to expect the staffing requirements in both terminals to be different. Frontier Economics point out that Terminal 1 generates lower retail revenue per transaction than Terminal 2. Therefore, for Terminal 1 to generate the same level of retail revenue as Terminal 2, a higher number of transactions are required. This in turn would necessitate a higher retail staffing requirement for Terminal 1.

Both Frontier Economics and Dublin Airport argue that an elasticity of 0 for non-frontline staff is unrealistic, as more back-office staff would be required as overall retail revenues increase. They also believe that the justification for using a passenger elasticity of 0.2 for frontline staff was unclear, contrasting it to Frontier Economics' estimate of 0.46.

Finally, Dublin Airport have revised their anticipated impact of the IDL retail project at Terminal 1 on opex. They acknowledge that they had originally overestimated the staffing requirement and accordingly have provided new estimates. Dublin Airport state that the project will generate a base requirement of 50 FTEs as well as an additional 5 FTEs per annum due to passenger driven demand. They state that this incremental increase will maintain the passenger per FTE metric at 66,000.

CEPA analysis and response

Having reviewed the evidence now provided by Dublin Airport and Frontier Economics, we find some of the arguments made regarding our approach to benchmarking to be persuasive. Given the differences in passenger profiles between Terminals 1 and 2, it makes sense to consider a broader range of metrics than were previously considered.

We did find some issues with how the benchmarks provided by Dublin Airport in Table 3.1 above were calculated, and so have re-estimated these and present them in the table below. However, we agree that the revenue per FTE metric is the most appropriate for use as a benchmark given the differences in retail between the two terminals. With Terminal 1 staff processing many transactions but at low value, and Terminal 2 staff processing fewer, bur higher value transactions, we would expect revenue per FTE to be the most appropriate benchmark of productivity. As revenue per FTE implicitly accounts for the fact that

airport foot traffic will have an impact on efficient staffing arrangements, the use of this benchmark also addresses any inconsistency between how terminal efficiency is benchmarked, and how future staffing requirements are forecast.

Table 3.2 Retail efficiency benchmarks at Dublin Airport 2018 (2017 prices)

	Terminal 1	Terminal 2	Dufry
Revenue per FTE	€442,456	€476,118	€292,013

Source: CEPA analysis

Under this metric Dublin Airport can be considered to be more effective at generating revenues per FTE than the external comparator. Nevertheless, there does exist a gap in performance between the two terminals and we consider that Terminal 1 should be able to achieve the same revenue per FTE level as Terminal 2. We also note that Dublin Airport have already acknowledged some rostering inefficiency in Terminal 1, arising from the relative restrictiveness of older staff contracts, which they have planned to tackle over the next determination period.

Regarding the comments made by Frontier Economics in relation to the elasticities we have used, we are confident that our elasticity estimates appropriately reflect the impact of more passenger traffic. Frontier Economics' elasticity estimate of 0.46 implicitly incorporates the impact on staffing levels that arise from having additional retail space available. We have separately accounted for this impact within our analysis of the expansion of direct retail activities at Terminal 1 as well as the CIP Terminal 1 IDL expansion and the CIP retail refurbishment projects. By incorporating our FTE allowance made for these projects, our overall forecasts have an implicit elasticity of retail staff numbers to passengers of 2.45 between 2019 and 2014, and of 3.04 between 2018 and 2014. As such, we are confident that our forecasts have fully allowed for volume driven staffing increases.

In addition, we note that our forecasts have already provided an elasticity of 0.2 for non-frontline retail staff with respect to passenger numbers. In line with our analysis above, we do not consider that any further changes are required.

Finally, we consider Dublin Airport's revised assessment of the impact of the IDL on retail staffing requirements to be sensible. The staffing impact anticipated by Dublin Airport is only marginally above what our estimates and as such, do not consider the difference to be significant enough to warrant an adjustment.

Impact on forecasts

We make the following changes to our forecasts:

- We use 2018 staffing levels as the basis of our forecasts as opposed to 2017 staffing levels, and to estimate a 2019 baseline we make an allowance for:
    - higher passenger numbers in 2019, using our elasticity estimate of 0.2;
    - more sales support staff to drive improved operations; and
    - an increase in the amount of retail space in Terminal 2 dedicated to direct retail facilities, (expected to increase by approximately 400 square meters).

This approach is aligned with the Commission's Final Determination approach on Commercial Revenues. **The impact of this change means our 2019 baseline is now 348 FTE, compared with our previous estimate of 325 FTE and Dublin Airport's estimate of 359 FTE.**

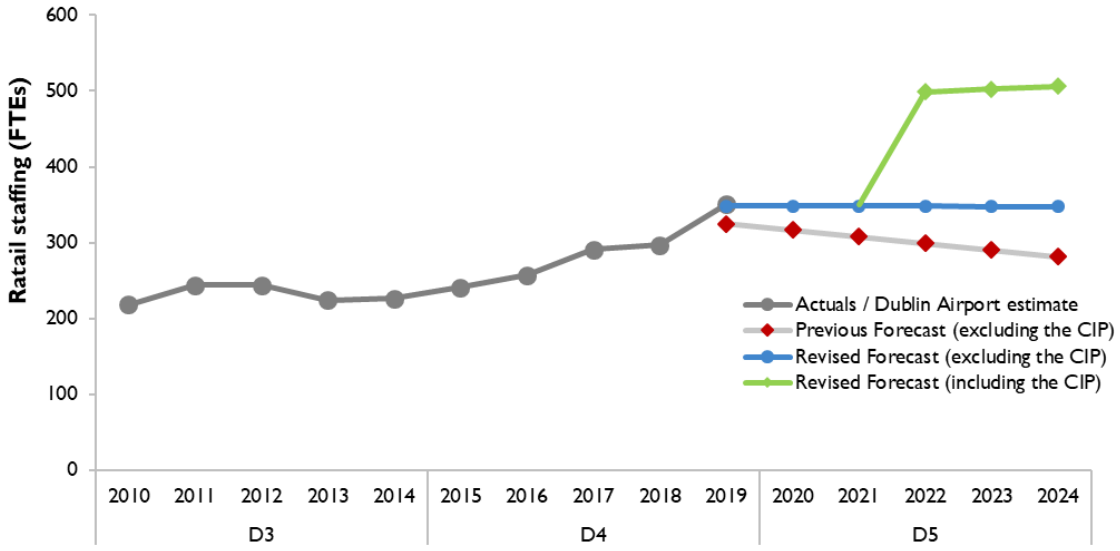
- Our estimate of the efficiency potential of Terminal 1 staffing, is updated to reflect updated benchmarking. We consider that the most appropriate benchmark would be the revenue per FTE, implying **a reduction of 11 FTE at Terminal 1** to match the productivity of Terminal 2 staff. We consider this a longer-term efficiency goal, phasing it in over the determination period.

Accounting for passenger growth and our updated efficiency target, our forecasts stay relatively constant over the determination period, with 347 FTE expected by 2024. This compares with our previous estimate for 2024 staffing levels at 282 FTE.

- We have also decided to accept in full Dublin Airport's retail staffing forecast for the IDL CIP project. This leads to an increase in retail FTEs at the IDL rising from 55 to 65 between 2022 and 2024. This compares to the forecast increase of 48 retail FTEs per year from 2022 that was made in our draft report.

Accounting for the impact of the CIP Terminal 1 IDL Reorientation and Rehabilitation and the CIP Retail Refurbishments, Upgrades and New Developments adds an additional 137 retail FTEs in 2024. The total impact of these revisions is illustrated in Figure 3.7 below.

Figure 3.7: Retail staff FTEs, 2010-2024



3.4. SECURITY STAFFING

3.4.1. Passenger presentation profile

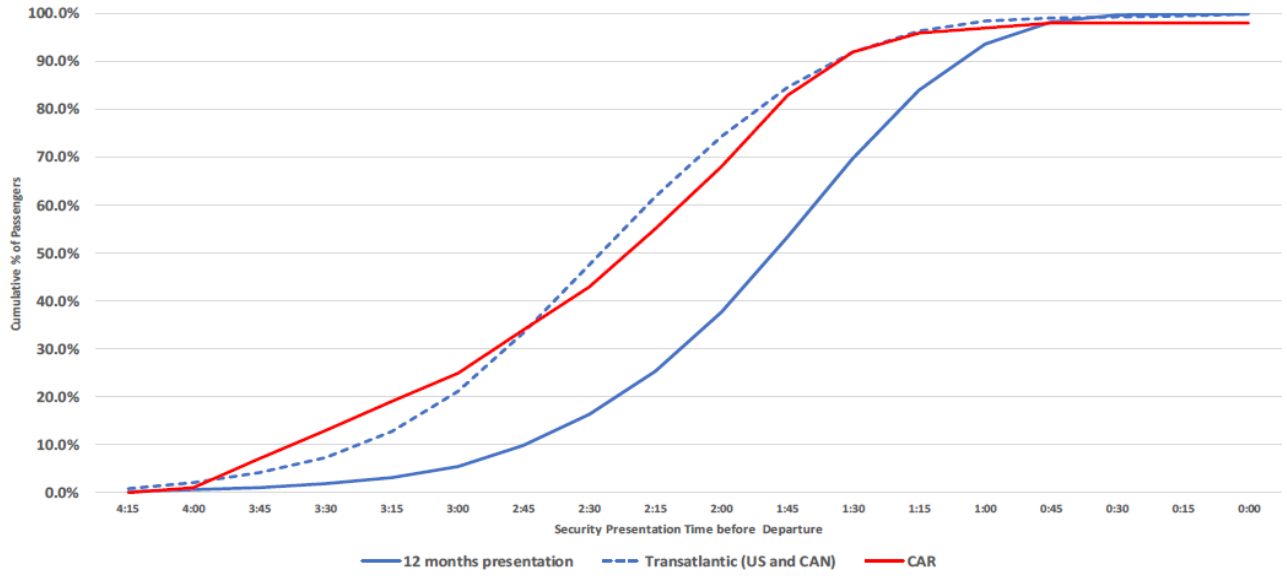
Dublin airport dispute the presentation profile used and claim that when the actual presentation profile is applied, and the correct demand requirements are used, the level of 'over-coverage' reduces by 10% and 19% for T1 and T2 respectively. They consider that this requires an additional 29 FTEs and that the actual over-coverage provided by Security rosters across Terminal 1 and Terminal 2 for both the Summer and Winter seasons has been optimised to minimise over-coverage, with the maximum levels no higher than 16% which for an operation with high volatility in demand would be deemed to be very efficient.

CEPA/TA analysis and response

Difference in assumed presentation profiles

The passenger show-up profile used in our security analysis is different to that used by Dublin Airport in its planning, as shown in Figure 3.8 below.

Figure 3.8: Comparison of passenger presentation profiles



Source: Dublin Airport response, marked confidential, Figure 5.9

The shift between the profiles indicates that in our original analysis, we assume that passengers present approximately 30 minutes earlier than in the profile Dublin Airport uses. This difference is partly offset by the fact that Dublin Airport measures the presentation profile at boarding card scan and therefore does not take into account any time spent queuing before that point. This is more pertinent for Terminal 2, where manual scan is in operation, than Terminal 1, where passengers self-scan. To understand the implications of and sensitivities to passenger presentation profiles we have reviewed the security analysis.

Our analysis made allowance for this additional time. A detailed presentation of our analysis on the impact of different presentation profiles on Terminal 1 and on Terminal 2 is presented in A.1.

Conclusions

The comparison of the staffing requirements derived from the CEPA and Dublin Airport presentation profiles indicate that the staff numbers required are insensitive to the profile applied. Comparison with actual staff numbers deployed on a single sample day indicate that both models would require higher staffing

levels than actually deployed, probably due to the difference in queue lengths applied: 10 minutes for both models and 30 minutes for the sample days.

The main impact of the different presentation profiles is that the demand curves and, hence staff requirements, derived from the CEPA profile are smoother, with lower peaks and less pronounced troughs than those derived from the Dublin Airport profile. Although this has very little impact on the overall staffing requirements, there will be an impact on rostering efficiency. It is easier to match the roster to a smooth demand profile with lower amplitude peaks and troughs than it is to match a more volatile, highly oscillating demand profile. For this reason, we have re-assessed roster efficiency based on the Dublin Airport passenger presentation profile. The results of this analysis are described in Section A.3.

However, the results of the presentation sensitivity analysis suggest that the passenger demand profiles are supply driven, especially for Terminal 2 in the early morning and, potentially, in the afternoon peak, where the availability of boarding card scanning lanes is likely resulting in pent-up demand with associated bow waves when capacity is released by opening more boarding card scanning lanes. Dublin Airport should consider and assess:

- The impact of opening central search earlier in the morning with a view to reducing the magnitude of the early morning demand peak so that fewer staff need to be rostered on early shifts (although some of these shifts would need to start earlier than at present). Lower staffing levels in the early morning would also reduce the mismatch between over supply and demand in the first trough in the demand profile.
- Opening more lanes automating the boarding card scanning process in Terminal 2 to avoid pre-security queues to smooth the flow of passengers presenting at central search. We note that automation of the boarding card scanning process at T2 is currently included as CIP project in the next period.

3.4.2. Break allocation

Dublin airport disagree with the break calculation applied which assumed an uplift of 10% on demand, spread evenly throughout the day. They argue this is infeasible as breaks must be taken within certain time limits to comply with the Organisation of Working Time Act 1997 (outlined in their 'Operating Cost' response Appendix 4). The consequent impact of this is that break demand is clustered at intervals during the day, requiring additional staff supply to ensure that legislation is adhered to. Shift start times are staggered across the day, to minimise the effect on roster supply. Notwithstanding the mitigations we outlined, Dublin airport claim the clustered break coverage increases the roster requirement by 2.8% compared to a situation where breaks are applied uniformly over the day.

CEPA/TA analysis and response

The Organisation of Working Time Act 1997 has been outlined in Dublin Airport's query response 'Operating cost Appendix 4'. This provides the regulations with which the airport must comply. These are outlined below:

- for every 4.5 hours worked, employees are entitled to a 15-minute rest period
- for every 6 hours worked, employees are entitled to a 30-minute rest period
- for points 1 and 2, these breaks cannot be given at the end of the working day
- employees are entitled to an 11-hour rest period in between shifts.

Whilst we understand that these are constraints within which Dublin Airport must work, there is more scope to plan and manage effectively to produce an efficient allocation of breaks which does not negatively impact central search, especially during peak times. In particular, Terminal 1 resource management is based on 19 separate rosters with between two and sixteen shift lines per roster. The scope for varying shift patterns within a roster of this complexity is large and will likely enable smoother break cycles.

This will certainly require change to working practices and customs. However, for a commercial organisation operating in a competitive environment these are routine challenges that would have to be addressed.

To test the impact of this, we have assessed two scenarios in the re-analysis of rostering efficiency described in Section A.3 by:

- applying a roster overhead of 2.8% as suggested by Dublin Airport
- not applying this overhead based on the premise that optimum planning and management can enable breaks to be spread near-uniformly across the day.

3.4.3. Accounting for absence

Dublin Airport has raised a number of points regarding the inclusion of staff absence in the analysis of rostering efficiency reported in the draft determination. Dublin Airport provided the following table to indicate the levels of absence expected from the roster.

Table 3.3 Dublin Airport's staff absence categories and rates

Source: Dublin Airport's response, marked confidential, Table 5.24

Ryanair, on the other hand, noted that both the sickness absence level assumed in the rosters (at 5.5%) and the actual level (at 9%) were higher than the absence level elsewhere. They commented that "*...the highest sickness absence rate for 2017 in the UK transport sector was just 3.3%. A sickness absence rate of 9% is further confirmation that Dublin Airport is not managing its staff effectively and efficiently*".

CEPA/TA analysis and response

Dublin Airport's approach is to include the absences listed in Table 3.3 as additional demand, i.e. absence is added to operational demand rather than being subtracted from the rostered supply. This is counter-intuitive but to be consistent and to enable the impact of absence to be illustrated easily we have followed this approach. A more detailed discussion of the different types of leave (annual leave, sick leave, computer-based training and other absences) and how they are applicable to Dublin Airport is presented in A.2.

Based on our analysis of the T1 Winter 2018-19 data provided by Dublin Airport, the overall absence rate for these absences was actually 2.8% rather than the 5% assumption that Dublin Airport use in planning their resourcing. In this sample analysis, the 2.8% other leave was split into the two main categories as:

- 2.1% for other leave
- 0.7% for emergency leave, including unexplained and unauthorised absences.

The following two figures show how the absence is distributed across groupings of similar absence categories.

Figure 3.9: Distribution of absence by cause, Terminal 1, winter 2018-19

✂

Source: Dublin Airport absence data, winter 2018-19

Figure 3.10: Absence as a proportion of rostered hours, Terminal 1, winter 2018-19

✂

Source: Dublin Airport absence data, winter 2018-19

As would be expected, family leave is the largest category at around ✂✂ of rostered hours or approximately ✂ FTEs.

Unauthorised/unexplained absence and paid disciplinary leave account for ✂✂ of absence or approximately ✂ FTE. It is assumed own expense absence, at ✂✂ is excluded from roster associated opex. Coupling these categories, there appears, therefore, scope to reduce emergency leave associated absence from ✂✂ to around ✂✂ of the roster.

Figure 3.11 shows the distribution of these other absences across the day and by day-of-the-week derived from the 2018-19 winter season data for Terminal 1. The chart shows that generally there are two to three staff absent across the working day except for:

- Fridays, when there are typically four to five staff absent with six absentees in the middle of the day
- Saturdays, when there are three to four staff absent during the first half of the day.

The results of our analysis of the sample data provided to us may suggest that there is scope for Dublin Airport to review 'patterns' of absence across a larger set of data and increase efficiency by taking appropriate management action.

Figure 3.11: Distribution of other absence averaged by day, Terminal 1, winter 2018-19

Source: Dublin Airport absence data, winter 2018-19, Taylor Airey analysis

To account for these absences the revised analysis in Section A.3 allows:

- 2.8% other absence in line with Dublin Airport's reported absence levels
- 2.5% other absence to assess the effect of better managing unauthorised absences.

3.4.4. Security training

Dublin airport reject the disallowance of 7 Training staff, claiming these are required to meet increased regulatory training demands and to deliver a flexible training solution that meets the needs of the business. Dublin airport state that from December 2017 Only ASTO approved staff can deliver security training and the introduction of Screener Certification requiring further training and examinations for screeners has increased demand on the unit since 2017.

CEPA/TA analysis and response

We note that the requirements for security training are bound by the relevant national and European regulation and, as such, trainers and training programmes must demonstrate compliance with appropriate standards. However, we would also note that the focus of such regulations should be expected to change over time and training requirements need to be updated on a regular basis. For example, the requirement for screeners to be certified from 2017 will have replaced previous training that the unit will have provided for security screen readers in previous years.

The changing nature of regulation would not seem to be a characteristic that is unique to Dublin Airport or to this particular regulatory period.

Dublin Airport further suggest that an increased training workload has been generated in this period by a requirement for them to train staff of external third-party organisations.

We would observe that, whilst there is a requirement on third parties at the airport to have certain staff trained to defined standards, the IAA does not stipulate that that this must be done by Dublin Airport. Whilst Dublin Airport are approved as competent to deliver such training as an ASTO, third parties also have the option of becoming an ASTO themselves or using an alternative training provider. Dublin Airport's own data also shows that the number of training hours delivered to external third parties is a relatively small proportion of the total – for example 14 x 2-hour courses were delivered in 2018. It is also noted that such external courses generate a revenue to Dublin Airport.

Dublin Airport do state however, that their 2019 staffing estimate would be expected to meet the needs of the training unit for the whole of the coming regulatory period 2020-2024.

Therefore, having reviewed Dublin Airport's consultation response on this matter, we conclude that we should retain the previous baseline and forecasts for this area.

3.4.5. Service quality

Dublin airport believe the Commission's consideration for an amendment to security queueing times will result in unnecessary complexity and that increased administrative support, staff costs and infrastructure enhancements will be required. Dublin Airport argues that the Commission has given no consideration to additional opex investments that will be required to achieve the new SQM and targets and believe the penalties will significantly penalise Dublin Airport and suggest they are unrealistic.

CEPA/TA analysis and response

All security queueing analysis has been performed assuming an average queue length of 10 minutes. This approach ensured that the security related opex projections made in this report are consistent with the enhanced security queue performance metrics proposed by CAR.

The analysis indicates that the number of security lanes needed to serve projected demand at a 10-minute queue length does not exceed the number available in either Terminal 1 or Terminal 2 prior to the developments of central search planned in the CIP.

Staffing projections have been made using the 10-minute queue length coupled with projected throughput improvements and, therefore, account for the additional staff that will be needed to open extra lanes to achieve the 10-minute queue, consistent with CAR's performance proposals.

3.4.6. Efficiency summary and impact on forecasts

Based on the comments received from stakeholders in response to the draft determination, we have revised the central search security staffing analysis. Given the length of this analysis, we have presented the detailed results of our revisions within A.3.

Table 3.4 summarises the potential Airport Search Unit efficiency savings in 2018 based on the analysis described above applying Dublin Airport's suggested roster overheads. The figure shows that with these overheads, it is not possible to make efficiency savings for Terminal 1 although overall savings of approximately 3.4% could be made for Terminal 2.

Table 3.4: Potential security efficiency savings for 2018 with Dublin Airport security overheads

Season	Terminal 1	Terminal 2
Winter	0.0%	2.4%
Summer	0.0%	4.1%
Annual	0.0%	3.4%

Table 3.5 summarises the potential Airport Search Unit efficiency savings in 2018 based on the analysis described above with reduced roster overheads and better matching the staffing profile with roster requirements across the year for Terminal 1 (see Figure A.11). In this aggressive scenario, the annual

efficiency saving in Terminal 1 would be approximately 3.3% and in Terminal 2 would be approximately 7.7% in 2018.

Table 3.5: Potential security efficiency savings for 2018 with reduced security overheads

Season	Terminal 1	Terminal 2
Winter	3.1%	5.1%
Summer	3.6%	9.3%
Annual	3.3%	7.7%

Having considered all of the points raised by Dublin Airport in their consultation response in detail, our conclusion remains as stated in the Draft report that efficiencies in the number of FTE required in the ASO population are achievable.

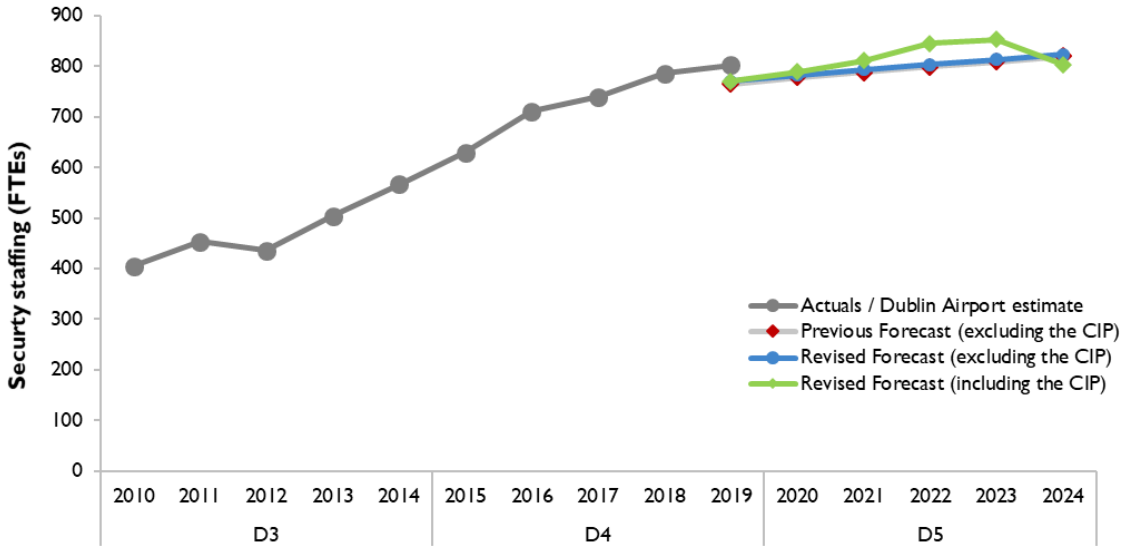
At a minimum, even using Dublin Airport's assumptions there are clear opportunities for efficiencies in T2. However, our analysis and comparison with practises we observe at other airports or in other organisations further suggest that it should be possible to achieve greater efficiencies in both terminals in line with our more aggressive scenario.

We conclude that the proposed changes to security queuing targets in the service quality management scheme to be applied in the coming regulatory period will have no impact on the conclusions drawn above.

We also conclude that consultation responses made by Dublin Airport in respect of security training staff and security supervision do not justify revisions to forecasts previously presented for those staff groups.

The overall impact on our forecasts is illustrated in Figure 3.12 below.

Figure 3.12: Security FTEs, 2010-2024



3.5. FACILITIES AND CLEANING STAFFING

Dublin Airport argue that the increase in customer service staff is due to a decision to focus on the quality of service and the need to handle very high passenger peaks in a constrained infrastructure environment. They claim that if they were to manage facilities and cleaning operations with 40 fewer staff, this would lead to a deterioration in service quality. Specifically, they make the case that terminal facility staff are required to manage the safe flow of passengers through the terminals. They point out that the number of days where passenger numbers exceed 100,000 is expected to increase from 45 days in 2017 to 132 days in 2019.

In addition, Dublin Airport argue that new infrastructure over the period from 2015-2019 generated a requirement for additional staff. They point out the introduction of the South Gates in 2017 which will generate a requirement for 10 staff when fully operational. They also mention an increase in the complexity of passenger processes as a factor leading to an increased staffing requirement. Examples given include the T2 check-in process, US CBP facility and swing gate operations.

Dublin Airport also argue that our forecasts have rejected a requirement for 12 Service Delivery Managers (SDMs) without adequate justification. They argue that the SDMs were recruited as part of a wider re-organisation of the operations department to enable the management of the business up to 40 million passengers per annum.

In their consultation response, Dublin Airport point out that they have received requests from 3rd party airport operators and airlines to resource key areas/posts in the terminals. Dublin Airport argue that they have facilitated new technologies – such as the use of the E-Gates – within the airport which would have to be terminated should appropriate staff levels not be allowed.

Finally, Dublin Airport also disagree with our view that airport signage should reduce the requirement for facilities staff. They cite a recent survey that claims that most European and US travellers agree companies should prioritise employing humans over automated services even if this means incurring a higher price.[6]

With regards to our elasticity assumptions Frontier Economics disagree with two aspects:

- They argue that for our elasticity estimate for terminal facilities staff, we have given insufficient justification for our estimate of 0.2.
- They also raise concerns over our use of a single cost driver for cleaning staff, which in their view, tends to add a downward bias to results. They question the argument put forward that passenger numbers don't drive cleaning costs upwards, believing that cleaning staff numbers are driven by floor space and passenger volume. For example, passenger volumes will have an effect on cleaning spills, littered rubbish and washrooms. Frontier Economics consider our approach inconsistent as we use two drivers for retail staff but not for cleaning staff.

CEPA analysis and response

In our draft report, we considered that Dublin Airport had failed to assess whether the requirement to manage passenger flows through new infrastructure could be handled through a re-deployment of existing staff. While we allowed for some increase in staff numbers as a result of additional passenger volumes, our 2019 baseline estimate for frontline Facilities and Cleaning staff was 375 FTE compared with Dublin

[6] Foresight Factory- Base 605-3232 online respondents per country aged 16-64 - Indonesia, July 2018

Airport's estimate of 380 FTE. Regarding Control Centre staff, we considered that it should be possible for Dublin Airport to maintain 2017 staffing levels despite volume increases.

We have considered the evidence provided by Dublin Airport following the publication of the draft report. Where the predominant purpose of customer service staff is manning a fixed position and directing passenger flows in a particular direction, our experience is that it is best practice at other airports to try and remove the need for that position. This could be done in a number of ways. For example, by providing physical signage; by supplementing physical wayfinding with digital information delivered through an airport app; or by providing passengers with better advance information about where to go next. Nevertheless, where we consider that additional staffing is necessary to improve the quality of service offered to passengers, we have made provision for it.

For frontline roles, our 2019 baseline figures are not substantially lower than Dublin Airport's estimates, and therefore, we believe the additional requirements referenced by Dublin Airport are adequately captured within our assessment. Our discussions with Dublin Airport lead us to conclude that their approach has been to plan on the basis that new tasks are additive, and that existing staff are fully utilised. We therefore repeat the comments previously made in our draft report and in Section 3.2.3 in relation to Transfer Hosts, that the scale of staffing increases could have been better managed through greater sharing of tasks and smarter deployment of staff.

The key driver behind the scale of our 2019 baseline adjustment, was our view that efficiencies could be realised through the rationalisation of control centre staff. Dublin Airport's submission seems to imply that they do not consider that efficiencies can be realised by taking such an approach. For example, Dublin Airport have argued that they require an additional 12 SDMs in order to improve the control of their overall operation. This step-change does not appear to have been included in their initial regulatory submission and does not reconcile with any concrete operational changes.

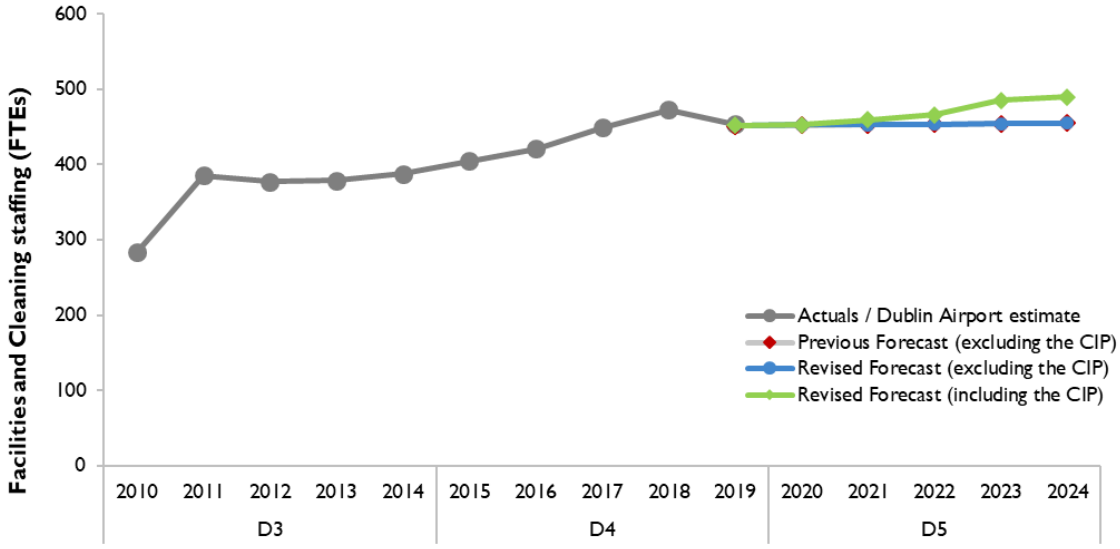
More generally, there are multiple control centres across the Dublin Airport site e.g. a terminal control centre in each terminal, an airside control room, at least one baggage control room. Our experience suggests that, where airports have consolidated these operations into combined centres, there is the opportunity to improve effectiveness through closer cross-functional working, at the same time as making efficiencies through sharing resource. One example is the adoption of the Airport Operations Centre (APOC) concept at Heathrow where control rooms across a multi-terminal site have been rationalised into one location. More generally, we consider that there are opportunities for rationalisation that can be delivered without incurring any new infrastructural requirement. For example, cloud-based technologies have made it easier to view and share systems from any location without any physical investment being required. As such, our experience suggests that there are likely to achievable benefits from the consolidation of control centres that can be delivered for little investment.

Overall, this means that our 2019 baseline estimate of 451 FTE remains unchanged, compared with a Dublin Airport estimate of 486 FTE. This baseline consists of 273 in-house cleaning FTEs, compared with Dublin Airports estimate of 274, and 176 terminal facilities and control centre FTEs compared with Dublin Airport's estimate of 205.

In relation to Frontier Economics' comments on our elasticity assumption for cleaning staff , we do not consider it necessary to change our assumption. We understand from our discussions with Dublin Airport that they take a proactive approach to cleaning areas, rather than being reactive to spills or other cleaning incidents. As such, higher passenger volumes do not automatically imply a higher FTE requirement. Therefore, we continue with our approach of forecasting based on terminal space, rather than adopting Frontier Economics' approach of forecasting based on both passenger volumes and terminal space.

This means that our approach to forecasting the Facilities and Cleaning staffing requirement is unchanged. The total impact of our forecasts is illustrated in Figure 3.13 below.

Figure 3.13: Facilities and Cleaning FTEs, 2010-2024



3.6. MAINTENANCE STAFFING

Dublin Airport point out that maintenance staff have been supporting an increasing number of assets, infrastructure, night-time maintenance and escorting. They cite the introduction of the Automatic Tray Return System (ATRS), which has increased maintenance requirements at Terminal 1. They also cite the introduction of a 24/7 roster of maintenance staff, designed to facilitate an increasing number of movements on the airfield during daytime. They argue that the introduction of the rostering arrangement required an additional 10 staff.

More broadly, Dublin Airport disagrees with the way maintenance staff were divided into passenger and non-passenger driven staff. Specifically, they argue that certain teams designated as non-passenger driven undertake activities that are affected by passenger volumes:

- The Engineering Service Team support Terminal 1, airfield, campus security, utilities and associated passenger sensitive equipment.
- The maintenance management and admin business units directly manage the operational performance and availability of passenger facing assets such as fleet, security equipment, civil structural and building architecture.

Finally, Dublin Airport make the case that our cost analysis found that Dublin Airport's current level of expenditure compared well to other external airports.

CEPA analysis and response

In our draft report, we concluded that Dublin Airport's maintenance costs in 2017 on a per passenger basis compared favourably with other airports. However, we also concluded that there was not a compelling narrative to explain subsequent increases in spend.

We have reviewed the additional maintenance requirements at Dublin Airport, such as the introduction of ATRS and the requirement to move to a 24/7 roster to accommodate changes in passenger flows. We consider that the effect of these are adequately captured within the elasticities we used to estimate efficient growth from 2014 to 2019. The additional requirements that have been introduced, are what we would expect from higher passenger volumes rather than an additional step-change.

Beyond that, we have reviewed the activities of the Engineering Service Team, based on additional evidence provided by Dublin Airport, and consider that the team's activities are primarily passenger driven as stated by Dublin Airport. As such, we have allowed for passenger driven growth in FTE within the team.

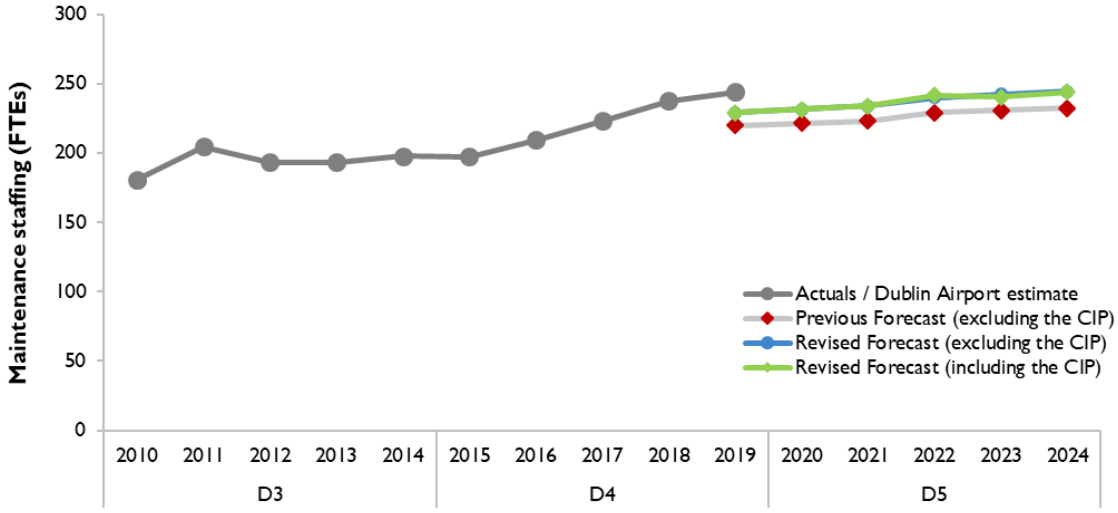
We have also considered Dublin Airport's case that our external benchmarking found that Dublin Airport's expenditure on maintenance staff compared favourably with other external airports. The benchmarking in question compared Dublin Airport's outturn maintenance pay costs for 2017 with a series of other European airports. Our analysis has assumed that maintenance costs in 2017 were efficient and we have not made any baseline adjustment to this cost base. Rather, our analysis has disallowed some of the increases in maintenance costs between 2017 and 2019 that have been anticipated by Dublin Airport. As such, we are confident that the external benchmarking exercise continues to support our approach.

Finally, we have considered Dublin Airport's arguments in relation to the need for additional maintenance management staff from 2014 levels. We recognise that Dublin Airport has been awarded the ISO55001 standard for best in class asset management. However, this was awarded in 2015. We have not found any evidence of a further step change in quality, either in the terms of performance under the service quality

metrics, views from stakeholders, or internal KPIs, to suggest that additional staffing has been warranted. Consequently, we do not make any changes to our forecasts.

The overall effect of these changes is that our 2019 baseline estimate rises from 220 FTE to 229 FTE, compared with Dublin Airport's estimate of 244 FTE. The total impact of our forecasts is illustrated in the figure below.

Figure 3.14: Maintenance FTEs, 2010-2024



3.7. AIRSIDE OPERATIONS STAFFING

Dublin Airport disagree with the conclusion from our draft report that faster growth in airside operations staff compared with flight movements is evidence of inefficiency. They argue that this analysis does not consider that airside operations have seen a large increase in movements within a constrained and ageing airside environment.

Frontier Economics also consider that the elasticity used is not adequately justified. They claim "CEPA/TA conduct the backward-looking estimation exercise (to set 2019 baseline airside operations staff) with an elasticity of 0. However, in the forward-looking forecast, they then use an elasticity of 0.1 with respect to passenger numbers. These figures are internally inconsistent and are not explained."

Ryanair, on the other hand, commented that, "CAR should be wary of Dublin Airport adding staff cost in this area as a result of disruption caused by airside capital projects. Dublin Airport's instinctive reaction is likely to be to increase staff, whereas more productive use of existing staff would be a more effective approach".

CEPA analysis and response

Dublin Airport has provided further detail and metrics illustrating the complexity of operations and the congested nature of the manoeuvring area at Dublin which they claim is the key driver of the increases in FTEs in Airside Operations over the current regulatory period. It is claimed that this change in the characteristics of operation has driven a need for additional compliance monitoring of the operators at the airport. Despite requests however, they have not provided evidence as to why the frequency of inspections planned as part of their Aerodrome Safety Management System cannot be delivered with the number of FTEs that were employed in 2017.

Whilst we fully understand the key role of the airport's Airside Operations staff in ensuring a safe operation on the airfield, we also recognise that the operators themselves have responsibilities under the relevant EASA regulations and that there are many factors that can lead to a safer operation, not just an increased 'policing' presence on the airfield.

We also note that several of the metrics quoted by Dublin Airport, such as the number of towed movements or the number of pieces of ground handling equipment on stands are not in themselves direct drivers of an additional workload for the airport's Airside Operations team. This point is similarly made by Ryanair.

The need to monitor airside operator's safety and compliance can only be argued to relate to front-line operational roles functions within Airside Operations such as the Airside Management Unit (AMU) and the FOD Control function. However, in our report, we noted that there had been significant increases in staff numbers in other functions during the current regulatory period, such as the office-based management team and the Stand Allocation function. We noted that these two functions together represented 27% of the total FTEs employed in Airside Operations in 2017.

Dublin Airport highlight that there has been an increase in airfield construction and maintenance, and this has led to a requirement for more detailed and co-ordinated planning with stakeholders. They note that an increased number of escorts have been required for such movements. We would suggest that, where these tasks relate to infrastructure construction such one-off activities could be capitalised rather than being absorbed into the cost base and carried forwards on an ongoing basis. In this context, we note the Commission's proposed 'StageGate' process. Ryanair have also commented on this point as noted above.

Dublin Airport have stated that one of the drivers of resource levels in AMU is that 'Follow Me' escorts must be provided by Dublin Airport for all non-EI taxiing aircraft larger than a code C type i.e. B737, A320 when taxiing into the south or north of the apron (proceeding onto Link 1 or Link 6). However, we also observe that the removal of this requirement and the associated reduction in operating costs is one of the benefits in the business case for the Southern Apron Taxiway Widening project included in the Programme of Airport Campus Enhancement (PACE). This project is due to deliver in 2022 in the middle of the coming regulatory period. We therefore do not believe that these costs should be considered as necessitating an ongoing increase in the operating cost base of the airport.

In a similar context, we note that the approved capital project 20.05.011 includes provision of an automated FOD detection system with a stated business case benefit that it will "reduce/remove the need of visual inspections". It does therefore also not seem appropriate to incorporate uplifts in FTEs in the FOD management unit into the ongoing cost base of the business in light of these investments.

More generally, we would note that there are four other PACE projects ongoing relating to taxiways which will serve to make the taxiway network less complicated, whilst improvements through projects relating to FEGP, A-VDGS and fuel dispensers for example, contribute towards decluttering of the Apron. Dublin Airport's rationale for additional staffing requirements arising due to complexity of the operation would therefore not appear to be a long-term phenomenon.

In the Draft report, we analysed the increase in the number of FTE and staff costs in Airside Operations in relation to increases in flight movements during the current regulatory period. We observed that both FTE numbers and associated staff costs had risen at a faster rate than flight movements in the period 2014 – 17. This would be counter to an efficiently run operation which would strive to improve metrics such as staff costs per flight movement or airside FTE per flight movement or at least manage them at a constant level.

For all the reasons described above, we suggest that the original basis of our analysis is still applicable, and the FTE baseline should be set at 2017 levels.

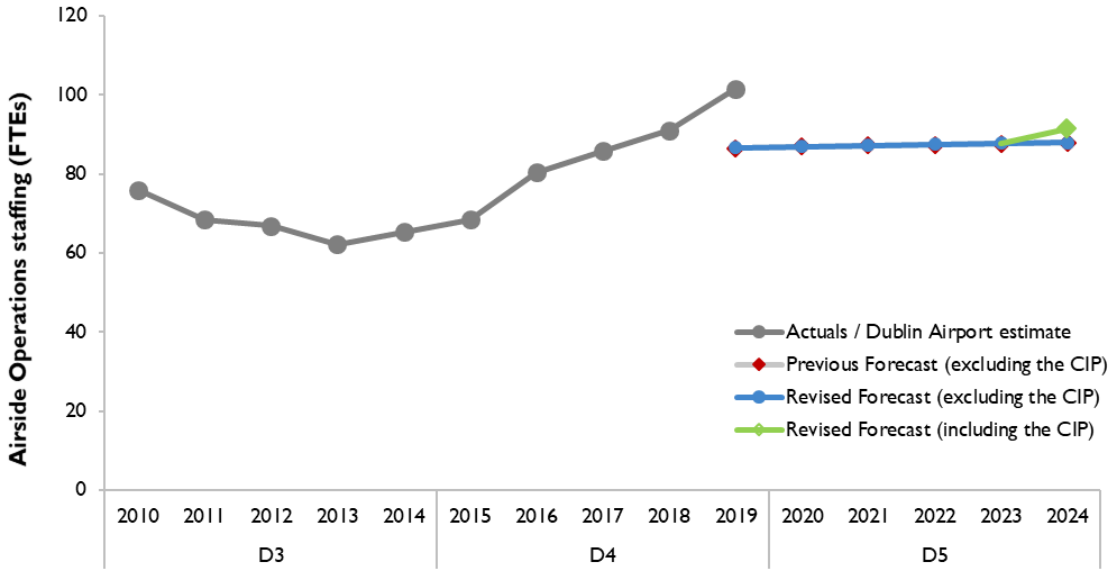
We believe that the airside operational improvements delivered by the PACE projects and other factors described above justify the relatively weak elasticity proposed in the Draft report.

We therefore stand by the forecast assumption that growth in FTEs should be driven by an elasticity of 0.1 with respect to passenger numbers.

Finally, we believe that we have consistently applied the elasticity proposed from the 2017 baseline year onwards, so we do not accept the point made by Dublin Airport/ Frontier Economics in their consultation response that there is inconsistency in our methodology.

The total impact of our forecasts is illustrated in Figure 3.15 below.

Figure 3.15: Airside Operation FTEs, 2010-2024



3.8. IT STAFFING

Dublin Airport disagree with our decision to base our 2019 baseline estimate on 2017 staffing levels, implying 69 FTE rather than 72 FTE. They consider that this would have a particular impact on two areas:

- **IT security**, where Dublin Airport consider that resourcing requirements have increased due to greater cybersecurity risks and greater compliance requirements in relation to GDPR and the Network and Information Systems Directive.
- **Data & Analytics**, where Dublin Airport consider there is a strategic need to invest in a data analytics function to exploit additional data being generated in all parts of the passenger journey.

CEPA analysis and response

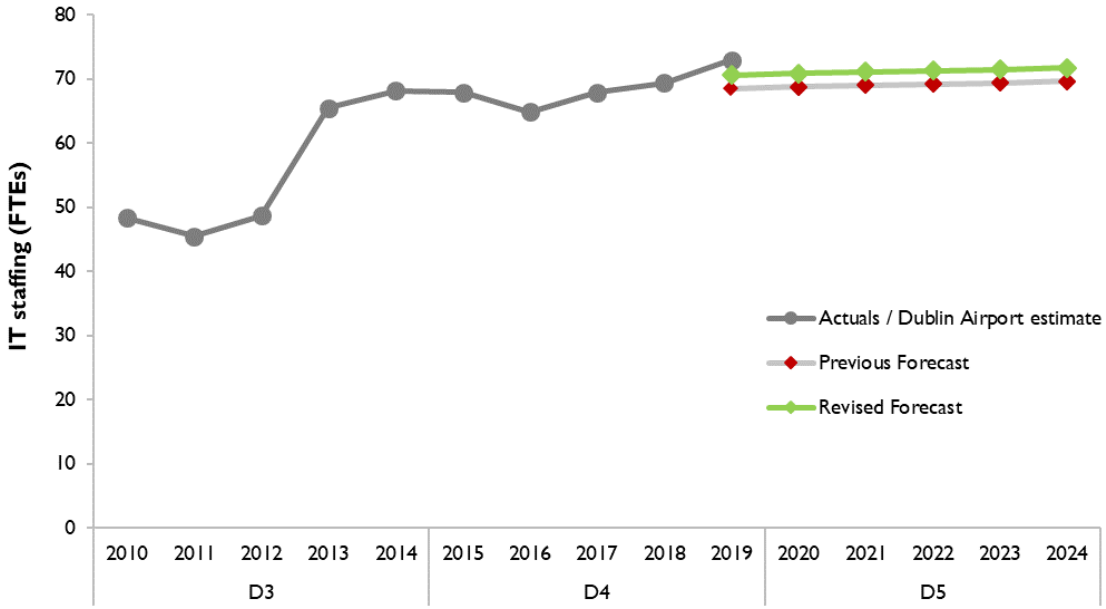
We have reviewed the additional requirements generated by the Network and Information Systems Directive and considered other evidence in relation to the potential impact of these requirements. Evidence from an impact assessment related to implementing the Directive into UK legislation has suggested the cost of additional requirements could range from £100,000 to £200,000 for a large firm, equivalent to between 1 and 2 FTE at Dublin Airport given current IT unit payroll costs.[7] Consequently, we allow for an additional 2 FTE related to cyber security in our 2019 baseline.

With regards to Dublin Airport's comments in relation to its data and analytics function, we are less convinced by the evidence provided by Dublin Airport. While we understand the logic behind investing in an analytics function, we note that the function already contained 7 FTE in 2017. Any further increases need to be matched by a clear strategy for how the intelligence derived from the analytics will be used to drive further efficiencies or an improved service.

The resultant effect is for our 2019 baseline estimate of efficient staffing levels to increase from 69 FTE to 71 FTE, which compares with a Dublin Airport estimate of 72 FTE. The total impact of our forecasts is illustrated in the figure below.

[7] Department of Culture Media and Sport (2018) NIS Regulations: Impact Assessment, https://www.gov.uk/government/publications/nis-regulations-impact-assessment

Figure 3.16: IT FTEs, 2010-2024



3.9. CAR PARK STAFF

Frontier Economics question why car park traffic was not used as a driver of car parking staff. They point out that our report acknowledges that car park staff increase with revenue – which they claim suggests that the driver for car parking staff is the number of used car parking spaces. They question why we do not apply a passenger volume-based elasticity to this category.

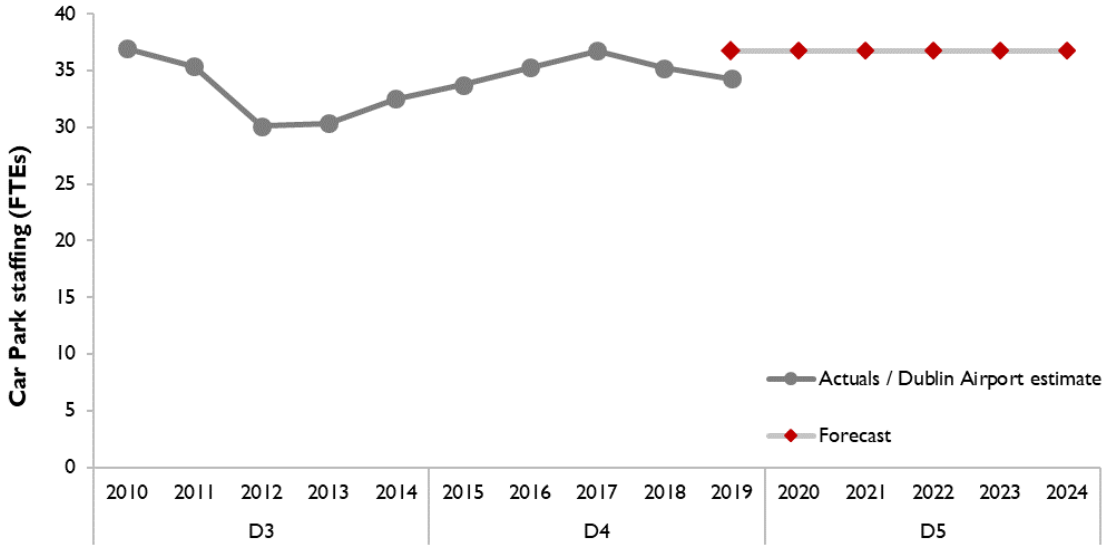
CEPA analysis and response

In our draft report, we state that we found no link between passenger numbers and the number of car park operations staff. This was corroborated in our discussions with Dublin Airport, where they stated that their staffing requirement was estimated based on the number of available car parking spaces. As a result, we separately assessed the car parking staffing requirements arising from the CIP.

We also note that Frontier Economics, in their forecasts for Dublin Airport, do not apply a passenger volume-based elasticity to their forecasts.

Consequently, we do not make any changes to our forecasts in response to the comments made. Our forecast is illustrated in Figure 3.17 below.

Figure 3.17 Car park staffing levels, 2010-2024



4. NON-PAY OPERATING EXPENDITURE

4.1. MAINTENANCE NON-PAY COSTS

Dublin Airport make four broad points in relation to the forecasts provided in our draft report. They argue that our non-pay maintenance cost forecasts have failed to take into account:

- broader wage and tender price inflation trends, which will affect contract prices;
- the impact of increased passenger volumes on contract prices when re-tendered;
- step changes in maintenance costs in the next determination period beyond those related to the CIP; and
- the achievability of the 5% efficiency target.

Taking the first of these, Dublin Airport highlight newly enacted Sectoral Employment Orders, which is legislation that recommends rates of pay for certain construction and mechanical professions. Under this legislation, the mechanical and electrical trades are entitled to a 2.7% hourly increase from September 2019 and a further 2.7% hourly increase from September 2020. Dublin Airport also highlight the Tender Prices Index issued by the Society of Chartered Surveyors Ireland which Indicates a 7.7% increase in construction prices in 2018. Dublin Airport argue that these trends imply higher contractor prices for all outsources maintenance work. They argue that a 3% price inflation adjustment should be applied to the 2019 baseline.

Additionally, Dublin Airport argue that higher passenger volumes will lead to higher contract costs when such contracts are retendered. They state that the outsourced cost of maintaining passenger sensitive equipment such as baggage belts, lifts, escalators and security equipment is approximately €3 million per annum. In their submission, Dublin Airport consider that outsourced maintenance costs related to passenger sensitive equipment be inflated at 2% per annum.

Dublin Airport also argue that the €0.04 million incremental cost not included in our draft forecasts, relates to eight new lifts installed as part of the Pier 2 segregation and Pier 1 extension projects. They state that the warranty for these lifts runs out in 2019 and that an opex allowance should be given for their maintenance in the next regulatory determination period as it will be an incremental cost. They also argue that €0.15 million in incremental costs are associated with the replacement of step chains for travellators and escalators in Terminal 2 from 2022 onwards. Dublin Airport claim that this is a unique cost for the next control period as the equipment was installed during the construction of Terminal 2 and that step chains only need replacement every 12-15 years.

Dublin Airport disagree that our 5% efficiency target is viable by 2024. They point out that 70% of airport maintenance contracts relate to specialist equipment and services and so is unlikely to generate the economies of scale that our forecasts have assumed through the 5% efficiency target.

CEPA analysis and response

After reviewing the case made by Dublin Airport, we consider that our determination forecasts overall remain reasonable. Our forecasts in the draft report increased gross non-pay maintenance expenditure at the same rate as pay expenditure. Consequently, this included an allowance for both wage growth and, contrary to Dublin Airport's submission, higher passenger numbers. We consider this adequately captures the impact of the sectoral employment orders on maintenance contract costs, which we note are nominal.

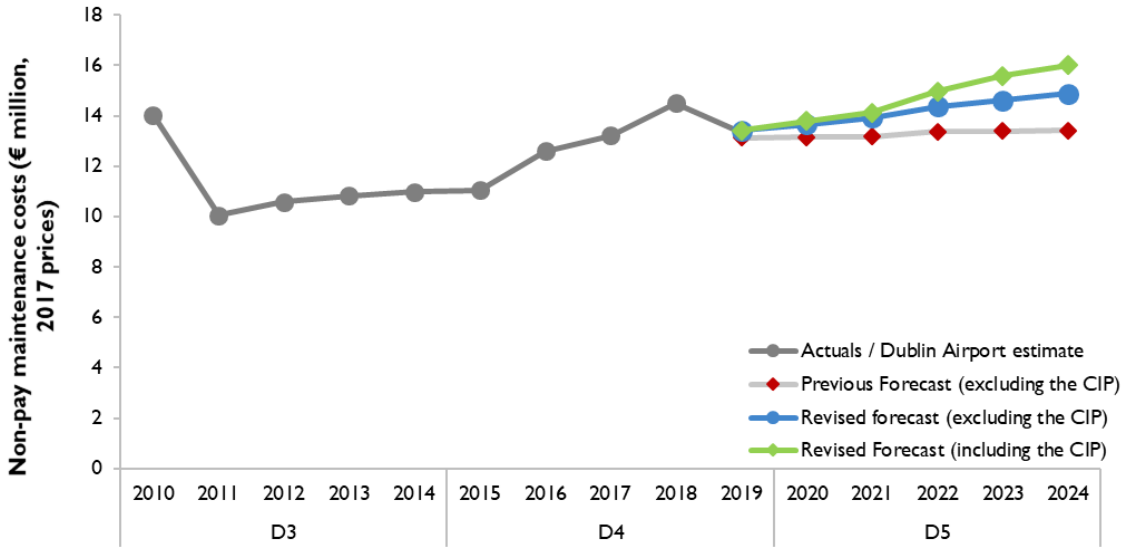
We do not agree that non-pay maintenance expenditure would increase by a higher proportion than payroll expenditure, and so do not make any changes to our gross forecasts. However, we note that the changes made to our maintenance staffing forecasts in Section 3.6, will lead to a consequential increase in our non-pay forecasts.

After reviewing the information provided by Dublin Airport, we do not see why an additional allowance is required for the new cost items related to escalator, travellator and lift maintenance. In general, we consider that there will always be assets requiring maintenance across the different determination periods. As such, we do not consider the opex impact of this maintenance to be additional to what we have already provided for within our determination forecasts.

In addition, we also maintain that the 5% efficiency target over the course of the determination period is reasonable. We note the argument made by Dublin Airport that 70% of the airport's maintenance contracts relate to specialist equipment and services. However, we consider that Dublin Airport is able to do more to consider its full range of potential suppliers. We note that the procurement function at Dublin Airport has increased from 11 FTEs in 2015 to 17 FTEs across the determination period from 2020 to 2024. We consider that the expanded function should deliver efficiencies in Dublin Airport's procurement.

The net impact of our forecasts is illustrated in Figure 4.1 below.

Figure 4.1 Non-pay maintenance costs, 2010-2024



4.2. RENTS AND RATES

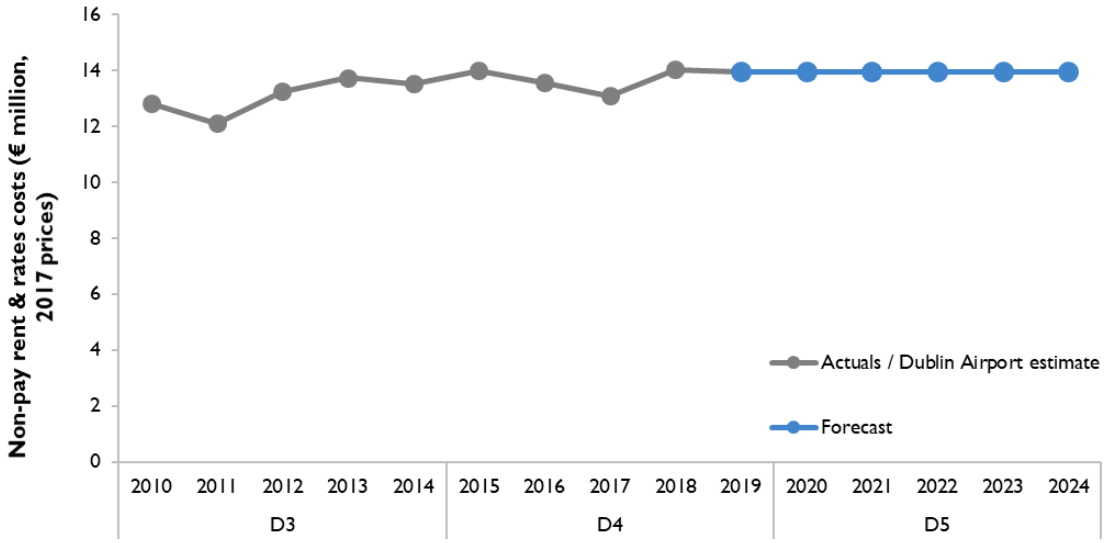
Dublin Airport highlight that updated Net Annual Valuation (NAV) issued in June 2019, resulted in a 63% increase on their previous valuation. In addition, they point out that Fingal County Council had indicated that the Annual Rate on Valuation (ARV) could rise from 0.15 to 0.191 in 2020. Dublin Airport estimate that the net impact of these changes will result in their annual rates bill will rise from €18 million in 2019 to €37 million in 2020 (in nominal terms).

Given the NAV is uncertain pending the final publication of the NAV and ARV and pending any subsequent legal appeal, Dublin Airport consider that there needs to be an appropriate regulatory mechanism exists to ensure the final concluded rates bill from 2020 is fully remunerated.

CEPA analysis and response

We have reviewed Dublin Airport's consultation response and consider its proposals to be reasonable. However, given the process for setting rates has yet to be concluded, we continue to use the draft estimate of €14 million per annum in our determination forecasts. We understand that CAR will provide a passthrough cost for Dublin Airport to make up the difference of future changes, subject to Dublin Airport demonstrating the approach that they have taken to minimising the overall level of the charge, and demonstrating that the proportion that can be recoverable from Dublin Airport charges is reasonable. As such, our forecasts are unchanged from our draft determination. This is illustrated in Figure 4.2 below.

Figure 4.2 Rent and Rates costs, 2010-2024



4.3. IT NON-PAY COSTS

Dublin Airport disagree with the baseline reduction of 2019 IT non-pay costs back to 2017 levels. They point out that 70% of the top 25 most material IT contracts have renewal dates beyond 2019. Given that these contracts are already signed, Dublin Airport argue that this shows that there is no flexibility to change costs and that the baseline efficiency reduction made in our analysis is in practice unfeasible.

- Dublin Airport state that €0.6 million of the rise in costs between 2017 and 2019 are to comply with increased GDPR and IT security regulation, IT risk mitigations and to provide support for key SESAR safety initiatives (e.g. AVDGS).
- They state that a further €0.7 million relates to new hardware, hardware support costs, service desk run costs, and connectivity and public Wi-Fi.

Dublin Airport argues that IT operating costs as a percentage of revenue was 2.8% in 2018, below the SITA benchmark of 3%. Dublin Airport also cite a survey contained in the SITA Air Transport IT Insights report[8] which indicates that 64% of airports expect IT costs to rise in 2019.

In addition, Dublin Airport disagree with our treatment of the incremental opex costs related to the IT CIP projects. Our forecasts assumed that these costs on the basis that they were already incorporated into our determination forecasts and so did not provide an additional opex allowance for the IT CIP projects. Dublin Airport argue that investment in additional applications along with increasing functionality of existing IT applications leads to an increase in IT consumption at a rate faster than passenger numbers. As such, they argue that incremental IT opex is driven by:

- incremental applications;
- data volumes increasing; and
- the increasing appetite for analytics to drive decisions and optimise operations.

Dublin Airport outlines that 40% of the proposed CIP investments relate to "transform" investments which drive incremental expenditure. The justifications given for the opex impact of specific projects is listed below.

- **CIP.20.05.007 – Reliability, Safety, Security & Compliance** – Costs relate to new support costs for IT systems security tools that do not exist within the current IT infrastructure.
- **CIP.20.05.010 – Passenger Processing (excl. Security Screening)** – Dublin Airport do not currently have any self-service boarding gates. Dublin Airport estimate a software servicing cost of €1,000 per gate. They argue that this would not be captured by applying an elasticity to current IT opex spend.
- **CIP.20.05.012 – Servers and Storage Lifecycle & Growth –** Dublin Airport expect support for 'on-premise' services to remain static as the mix of on-premise versus cloud storage shifts from 85% on-premise and 15% cloud to 70% on-premise and 30% cloud by 2024. They expect the increase in cloud data centre use to double current spend on cloud data centre hosting.

[8] SITA (2018) Air Transport Insights 2018, https://www.sita.aero/resources/type/surveys-reports/air-transport-it-insights-2018

- **Other IT CIP projects** – Dublin Airport state that the opex estimate for the rest of the IT projects in the CIP relate to either new infrastructure that is not in place today (e.g. standalone data centre) and expanded service requirements (e.g. e-commerce platform support).

CEPA analysis and response

Having reviewed the response made by Dublin Airport, we acknowledge that total IT spend meets the SITA benchmark of 3% as a percentage of total revenue for 2018. **As such, we accordingly have increased our 2019 baseline by 9% to allow for the increase in outturn non-pay IT costs between 2017 and 2018.** However, we do not consider it reasonable to provide a baseline allowance for an additional 12% increase in non-pay IT costs between 2018 and 2019 that has been forecast by Dublin Airport, without an adequate explanation of why there has been a step change in costs.

While we acknowledge some of Dublin Airport's argument in relation to additional IT security requirements, we have already provided an allowance for an extra two cyber security FTEs in Section 0 of this report. We do not consider it appropriate to provide an additional non-pay allowance to cover what is largely the same function here. We are also less convinced by Dublin Airport's argument in relation to an addition non-pay IT requirement in order to comply with GDPR. While we acknowledge that there may have been some new IT costs in the lead-up to the GDPR roll-out in May 2018, these costs have already been provided for within our adjusted 2019 baseline. As such, we do not see why GDPR should generate additional cost requirements beyond this level between 2020 and 2024. We also do not consider that the advanced visual docking guidance systems (AVGDS) are likely generate significant additional IT costs beyond what our forecasts have already provided for. We note that Dublin Airport have anticipated an opex impact of €40K per annum in relation to the CIP AVGDS at 5G, Pier 1 and Pier 2. We do not consider that the scale of this impact should materially change our core IT non-pay forecasts.

Finally, we note Dublin Airport's argument that 70% of their top 25 most material IT contracts have renewal dates beyond 2019. One implication of this argument is that Dublin Airport should have an opportunity to renegotiate these contracts during the determination period. Given the significant increase in Dublin Airport's procurement function (as outlined in Section 4.1), we consider that Dublin Airport should be able to exploit economies of scale and renegotiate improved deals as each of these contracts come up for renewal. As such, we consider that the 5% efficiency challenge by 2024 set for Dublin Airport remains a reasonable target.

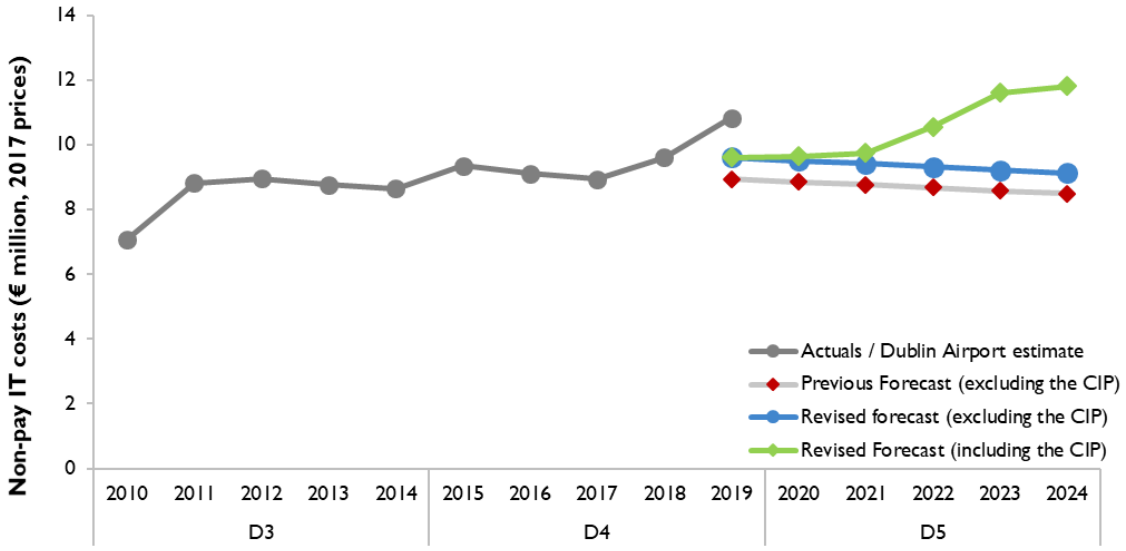
The resultant effect of our changes is for our 2019 baseline estimate of efficient non-pay IT costs to increase from €8.9 million to €9.6 million. This change implies an overall increase of €4 million between 2019 and 2024.

Having reviewed the evidence provided by Dublin Airport in relation to the CIP, we consider that change to our forecast impact of the CIP IT projects on non-pay IT opex is appropriate. We note that the growth of cloud-based storage (as outlined in CIP.20.05.010) is not expected to be at the expense of 'on-premise' storage. As such, the growth of cloud-storage is not expected to generate any savings through reduced 'on-premise' storage capacity. We also note that Dublin Airport do not have at-present any passenger processing gates. Therefore, we consider it appropriate to allow an incremental opex impact for the development of 125 boarding gates plus 20 self-service kiosks (SSKs) as outlined in CIP.20.05.010.

In addition, we note that our non-pay IT forecasts did not provide a passenger driven elasticity. As such, we consider that providing an allowance for the new infrastructure, expanded service requirements and new support costs outlined in CIP.20.05.007 and 'Other IT CIP projects' is reasonable.

As such, we have decided to accept in full the anticipated opex impact of the IT related CIP projects on our determination forecasts. The impact of this change increases Dublin Airport's forecast opex by €3.4 million over the determination period from 2020-2024. The impact of this change is presented below in Figure 4.3.

Figure 4.3 Non-pay IT costs, 2010-2024



4.4. MARKETING COSTS

In their submission, Dublin Airport state that marketing expenditure is critical to achieving revenue and passenger growth as well as for increasing competition in the market for passengers. They consider that current levels of expenditure are necessary to maintain and drive commercial revenues and traffic growth. They also disagree with our elasticity estimate of 0.4 and consider that an elasticity of 1.0 is more appropriate and more reflective of historical patterns. They point out that an elasticity of 1.0 was used by SDG in the 2014 Determination.

CEPA analysis and response

In our draft forecast, we did not make any adjustment to Dublin Airport's 2019 estimate of expenditure when creating our baseline. We believe that in their consultation response, Dublin Airport have misunderstood this aspect of our approach. As such, we agree with Dublin Airport that current levels of expenditure are efficient and have not made an efficiency reduction to 2019 marketing costs.

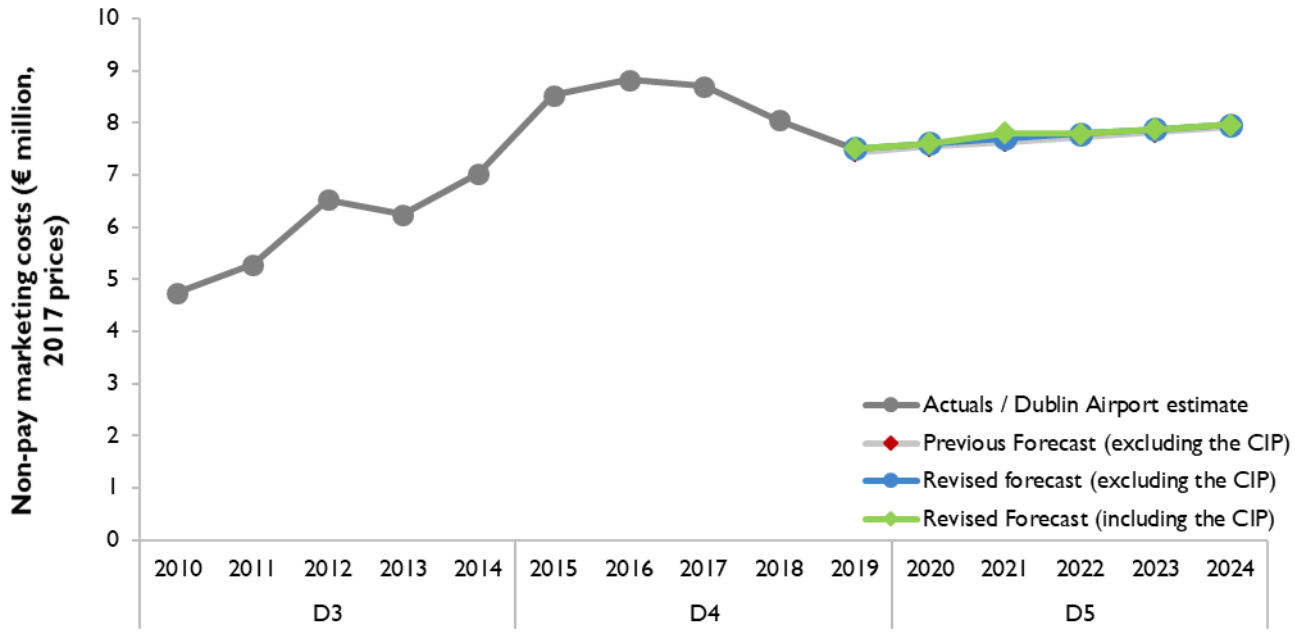
In addition, our marketing forecasts assume a real increase in expenditure; we believe we have gone beyond allowing current levels of spending to drive commercial revenues and traffic growth. However, we do not consider it is necessary to assume spend will grow on a one-for-one basis with passenger volumes.

For marketing spend related to route development support, it is routine for existing expenditure to be redeployed as previously supported routes mature. We also note that between 2015 and 2019, overall marketing costs have fallen despite strong passenger growth. Given this context and CAR's passenger forecasts, we consider our target to be reasonable. If Dublin Airport believes that it can generate more passengers from additional marketing than the additional cost incurred, it should do so.

Regarding Dublin Airport's specific comment on the elasticity used in the 2014 determination, our analysis has not been based on the work undertaken by SDG as part of that determination. We also note that overall, our forecasts are considerably more elastic than those developed for the 2014 price control determination.

As a result, we do not make any changes to our forecasts in response to the comments made by Dublin Airport. The net impact of our forecasts is illustrated in below.

Figure 4.4 Non-pay marketing costs, 2010-2024



4.5. UTILITIES EXPENDITURE

4.5.1. Water charges

Following the publication of CAR's draft determination, the Commission for Regulation of Utilities (CRU) closed a consultation on future tariffs for non-domestic water users. As an outcome of that process, the CRU issued a price of €2.80 per cubic meter of water taking effect from Q2 2020 to the end of the determination period. However, a maximum cap of +10% on the previous year's bill was issued until the annual bill comes in line with the actual price for the year. This change will lead to higher water prices than our forecasts have allowed for. Dublin Airport argue that this change should be reflected in our determination forecasts.

In addition, Dublin Airport also argue that the elasticity of water consumption to passengers that we have allowed for is too low. They provide some evidence that the average historic elasticity of water consumption to passenger volume is 0.82, as compared to the elasticity of 0.5 that we have allowed for. Dublin Airport provide evidence for this higher elasticity by simply showing the net water consumption and passenger volumes between 2015 and 2018.

CEPA analysis and response

We make several changes to our forecasts in response to Dublin Airport's comments. We consider it appropriate to adjust our forecasts to reflect the CRU's decision on water charges.[9] However, we note that Dublin Airport's analysis kept the forecast unit cost in nominal terms. In line with the rest of our report, we have converted this charge into real 2017 prices.

Table 4.1 Nominal and real water charges per cubic meter, 2019-2024 (€ per m^3)

Forecast water charges per cubic meter	2019	2020	2021	2022	2023	2024
Nominal (€)	2.21	2.22	2.66	2.80	2.80	2.80
Real, 2017 prices (€)	2.20	2.18	2.58	2.67	2.62	2.57

Source: CEPA analysis

In addition, we accept Dublin Airport's argument that they have limited control over water usage, given Dublin Airport's existing achievements at reducing water consumption. After reviewing the historic growth in water usage in relation to passenger volumes, we consider our previous elasticity estimate of 0.5 to be overly ambitious. As such, we have updated our elasticity estimate for water consumption with respect to passenger volumes to 0.8. We have also included a standing charge of €47,038 within our forecasts, which had previously been omitted from our draft analysis.

The impact of these revisions on forecast costs of water for the next determination period is presented in Table 4.2 below. Nominal increases from year to year are capped at 10% in line with the CRU determination.

[9] CRU (2019) Establishing Irish Water's Non-Domestic Tariff Framework, https://www.cru.ie/document_group/establishing-irish-waters-non-domestic-tariff-framework/

Table 4.2 Revised non-pay water cost forecast, 2019-2024

Forecast water charges per cubic meter	2019	2020	2021	2022	2023	2024
Consumption (thousand m³)	405	417	427	437	447	456
Unit cost (€ per m³, nominal)	2.22	2.66	2.80	2.80	2.80	2.80
Standing charge (€ thousand, nominal)	47	47	47	47	47	47
Uncapped charge (€ thousand, nominal)	947	1,153	1,243	1,271	1,298	1,325
Capped charge (€ thousand, nominal)	947	1,042	1,146	1,260	1,298	1,325
Revised forecast (€ thousand, 2017 prices)	930	1,009	1,091	1,178	1,189	1,190
Previous forecast (€ thousand, 2017 prices)	888	939	987	1,038	1,088	1,104

Source: CEPA analysis

4.5.2. Electricity and gas

Dublin Airport argue that the BEIS electricity price forecasts that we used to forecast electricity prices at Dublin Airport underpredict electricity price rises at Dublin Airport. They provide several reasons for this view.

First, they argue that the CIP and other capital projects will lead to an increase in import capacity at the airport. An increase in the maximum import capacity will lead to an increase in use of system electricity charges as well as an increase in the PSO levy.

Second, Dublin Airport argue that the recent government Climate Action Plan expects to equalise the electricity tax rate for business and electricity customer to €1/MWh. This would represent an increase of €0.5/MWh on the current rate which Dublin Airport estimate having an impact of €0.1m across the determination period from 2020-2024.

Third, Dublin Airport argue that the BEIS index does not consider the impact of carbon costs on future electricity prices. They provide evidence that the within-day carbon price on the EU Emissions Trading System (ETS) has increased from €8 to €26 per tonne between January 2018 and April 2019. the airport also highlight that the Department of Public Expenditure and Reform (DPER) have published a Consultation Paper on Valuing Greenhouse Gas Emissions[10] in the Public Spending Code that sets out a shadow price of carbon of €32 per tonne in 2020, rising by €6.80 a year to reach €59.20 per tonne by 2024. The recent Climate Action Plan which details an increase in carbon tax to €80/tCO2 is also highlighted. Dublin Airport argue that this will lead to an increase in electricity costs by €2.2 million across the determination period.

CEPA analysis and response

We disagree with Dublin Airport's assessment that the BEIS future energy cost forecasts are not appropriate predictors of electricity price growth at Dublin Airport. The BEIS forecasts do account for changes to EU ETS carbon prices and account for various network charges. Although the BEIS forecasts primarily relate to the GB electricity market and the UK gas market, we do not find the differences between the UK and Ireland to be substantial enough to suggest a significant divergence in retail price growth.[11]

Dublin Airport also refer to specific proposals contained within the Climate Action Plan that could lead to higher electricity unit costs over the next determination period.[12] We do not consider it appropriate to directly incorporate these plans within our forecasts, unless these plans are actually realised at this time. Further, Dublin Airport reference the shadow price of carbon set out by the DPER Consultation Paper on Valuing Greenhouse Gas Emissions in the Public Spending Code. In addition, we consider that any change in tax should be a pass-through cost and so would not be directly included within our forecasts. The shadow price referenced in this report has no bearing on costs incurred by Dublin Airport.

[10] Department of Public Expenditure and Reform (2018) Valuing Greenhouse Gas Emissions in the Public Spending Code, https://igees.gov.ie/wp-content/uploads/2018/11/Valuing-Greenhouse-Gas-Emissions.pdf

[11] We use the BEIS forecasts to estimate price *growth* rather than price *levels*. As such, we consider that inherent differences between the two markets would not have an effect unless the differences were to substantially increase or reduce over the period considered.

[12] Government of Ireland (2019) Climate Action Plan, https://www.dccae.gov.ie/documents/Climate%20Action%20Plan%202019.pdf

Finally, in relation to use of system charges related to projects leading to higher electricity consumption, we consider the impact differs depending on the type of project:

- For CIP projects, we believe the impacts are adequately captured within our assessment of opex impacts of the CIP and do not need separate consideration within our utility expenditure forecasts.
- For capital projects related to aspects of the Dublin Airport business outside the regulatory entity, we believe the costs of these will be recharged to the parent business and, therefore, do not warrant inclusion within our forecasts.
- For capital projects where electricity expenditure will be directly recharged to customers, we also do not consider it necessary to include the impact of these within our forecasts. For projects where electricity costs are directly passed on to customers, there is no need to recover costs through the aeronautical charge.
- This leaves non-CIP projects where electricity charges will be borne by Dublin Airport or recovered through aeronautical charges. We estimate the effect of this in the table below and allow for these costs in our forecasts.

Table 4.3 Impact of higher import capacity on network charges, 2020-2024 (€ thousand, 2017 prices)

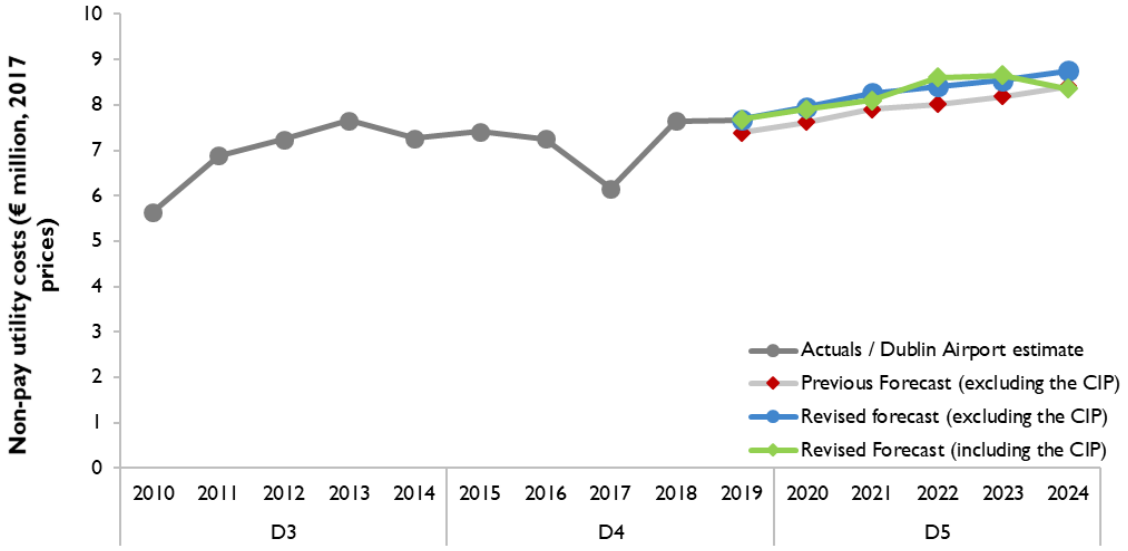
	Unit cost (€ / kVA)	2020	2021	2022	2023	2024
Incremental increase (kVA)		283	6,941	4,958	15,233	7,869
Network capacity charge	20.70	6	144	103	317	164
PSO levy	9.90	3	70	50	154	79
Total (€ thousand)		**9**	**214**	**153**	**471**	**243**

4.5.3. Summary of changes to utility forecasts

Overall, we forecast non-pay utility costs **rising from €7.7 million in 2019 to €9 million in 2024**. This compares to the forecasts developed by Frontier Economics which forecast costs rising from €7.5 million in 2019 to €9.3 million in 2024.

The overall impact of our revisions on forecast utility costs is illustrated in Figure 4.5 below.

Figure 4.5 Non-pay marketing costs, 2010-2024



4.6. INSURANCE COSTS

Dublin Airport disagree with our non-pay insurance cost forecasts. They argue that our forecasts will lead to a cumulative loss of €3.5 million over the period 2020-2024. The airport's argument is centred on the premise that insurance costs are non-discretionary and as such have increased due to:

- increased passenger traffic and the growth in airport FTEs which has led to a rise in insurance claims;
- the expected growth in the property portfolio at Dublin Airport; and
- the failure of the airport to remain within its Public Liability Policy Excess of €1.5 million. This will lead to higher premia or increased policy excesses.

Dublin Airport make a case that the insurance market has contracted due to a reduced market appetite for aviation insurance. Dublin Airport argue that this contraction will lead to higher insurance premiums.

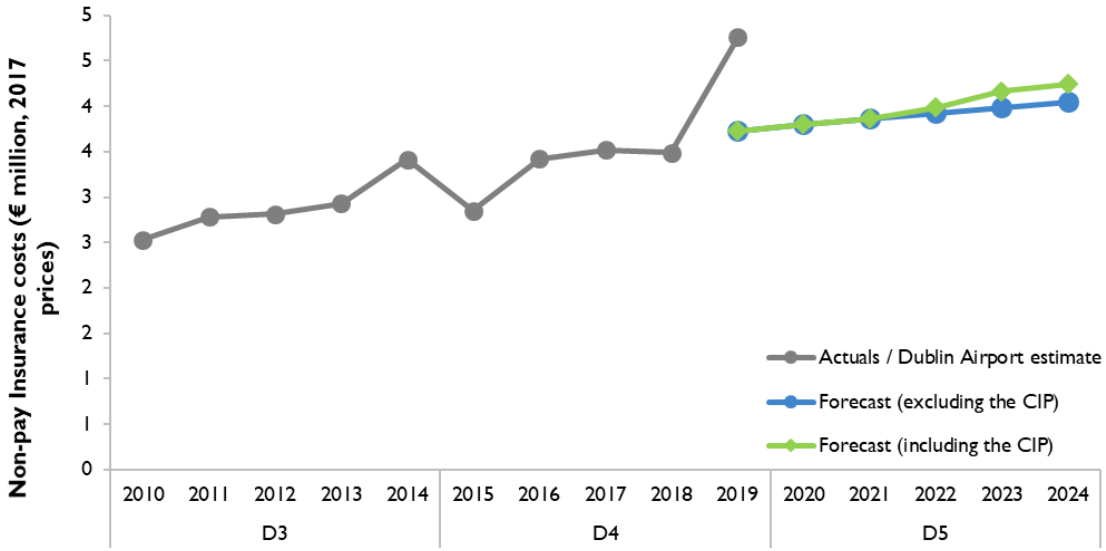
CEPA analysis and response

Having reviewed the evidence provided by Dublin Airport, we consider that our draft forecasts continue be an appropriate reflection of efficient insurance costs at Dublin Airport.

We note that between 2014-2017, the elasticity of total insurance costs to passenger numbers is 0.09. The 2019 baseline, and the determination costs from 2020-2024 were identified by projecting insurance costs from 2017 using an elasticity of 0.55 with respect to passenger numbers. As such, we are confident that our elasticity forecasts already provide an adequate allowance to cover future insurance premiums.

In relation to the growth of Dublin Airport's property portfolio, we note that the main driver of insurance costs has been employer liability. We do not see that the growth of the physical property at the airport can explain the large rise in insurance costs. In addition, we have allowed all incremental insurance costs that relate to the CIP within our forecasts. In addition, we do not consider that Dublin Airport exceeding its own Public Liability Policy Excess is a reasonable cause to alter our forecasts. We consider that Dublin Airport should focus on minimising insurance costs within their Public Liability Policy Excess rather than seeking an increased opex allowance. Our forecast insurance costs is illustrated in Figure 4.6 below.

Figure 4.6 Non-pay insurance costs, 2010-2024



4.7. OTHER NON-PAY COSTS

4.7.1. US CBP officers

Dublin Airport argue that opex related to CBP Officers should not be frozen at 2019 levels for the duration of the control period. They point to the fact that CAR has targeted increases in US preclearance passengers and non-aeronautical revenues and argue that these increases can only be realised through higher levels of opex. Dublin Airport state that they have set the CBP cost expectation based on the passenger proposition, showing that the number of officers and costs are expected to grow from €2.4 million in 2019 to €5.9 million in 2024. This results in a rise of 12 FTEs.

CEPA analysis and response

As CAR have included an associated non-aeronautical revenue target in relation to the US preclearance passengers, we consider it appropriate to change our forecasts to ensure a consistent approach between opex and non-aeronautical revenues.

Given the relatively small number of CBP officers, we think it is reasonable to assume a higher elasticity than other passenger facing roles, where rostering can be better managed by Dublin Airport. We note that CAR have provided an elasticity of 1 with respect to their revenue challenge for the CBP function and as such consider it appropriate to use the same elasticity target on the cost side. We therefore provide an elasticity of 1 for the CBP officers with respect to US preclearance passengers. However, we note that Homeland Security have paid for 30 CBP Officers to be stationed at Dublin Airport free of charge. As such, we apply the elasticity of 1 with respect to the total number of CBP Officers that are stationed at Dublin Airport inclusive of the officers that are not paid for by US Homeland Security.

We continue to use Dublin Airport's estimate for €2.4 million in nominal costs for the CBP officer function in 2019. At a unit cost of ✂✂✂✂, this implies ✂ CBP officers at the US preclearance facility. We consider that further increases in officers would only be justifiable if CBP passenger traffic is ahead of the forecasts. The total opex requirement is estimated by multiplying FTEs by the 2017 real unit cost per officer per year.

Overall, our analysis forecasts an addition ✂✂ CBP Officers at a cost of €6.4 million at Dublin Airport in 2024. This compares to Dublin Airport's request for 12 additional offers at a cost of €5.9 million. An overall summary of our forecasts is presented in Table 4.4 below.

Table 4.4: CBP opex cost forecast, 2019-2024 (2017 prices)

	2019	2020	2021	2022	2023	2024
Number of CBP officers	✂	✂	✂	✂	✂	✂
Cost per CBP officer (€ million)	✂	✂	✂	✂	✂	✂
Total cost (€ million)	**2.36**	**3.45**	**3.86**	**4.69**	**5.21**	**6.40**

Source: CEPA analysis

4.7.2. Drone detection (new cost item)

Dublin Airport estimate that an investment plan aimed to combat the dangers of Unmanned Aerial Systems (UAS) at airports, will lead to an opex impact of roundly €0.7 million across the period 2020-2024.

CEPA analysis and response

We agree that it is sensible for Dublin Airport to put in place an investment plan to counter the dangers to airport operation posed by UAS and note that CAR have provided an allowance for an IT innovation fund project, for which anti-drone technology is flagged as a candidate project. However, we have been unable to form a close assessment of what the anticipated opex costs associated with this project are intended to support.

However, CAR have requested that we provided an allowance within our determination forecasts. As such, we have **provided a forecast allowance of €0.7 million across the determination period to account for this project**. This opex cost has been included in the 'Other' category of the CIP.

4.7.3. Bussing (new cost item)

Dublin Airport anticipate that the current level of bussing costs for the South Gates will be insufficient in the future given agreements made with airlines in early 2019 to directly bus arriving passengers off aircraft to improve stand utilisation and OTP. In addition, Dublin Airport argue that the North Pre-Boarding Zone (PBZ) bussing costs were based on current levels of bussing expenditure. Due to the anticipated increase, they expect costs to increase by €0.5 million per annum from Q4 in 2024. The incremental increase in bussing costs estimated by Dublin Airport is presented in Table 4.5.

Table 4.5 Dublin Airport anticipated incremental bussing costs, 2020-2024 (€ million, 2019 prices)

	2020	2021	2022	2023	2024
South Gates	0.5	0.5	0.5	0.5	0.5
North PBZ					0.1
Total	**0.5**	**0.5**	**0.5**	**0.5**	**0.6**

Source: Dublin Airport

CEPA analysis and response

After reviewing the case made by Dublin Airport, we consider that our draft determination forecasts overall remain reasonable. Dublin Airport's agreement with the airlines saw a replacement of arriving passengers entering the PBZ and then using the shuttle bus service to the Pier 4 injection point with a direct bussing service from the aircraft to Pier 4 injection point. The procedural change should enable increased stand efficiency due to a reduced need for swing gate operations in the PBZ. As such, we are unclear as to why the procedural change should lead to such a significant step change in costs.

In addition, Dublin Airport have made a strong case that there is a significant uptake of passengers using the bussing service between 2018 and 2019. However, given the efficiencies that this service can generate, we consider the elasticity of 0.2 provided for the apron bussing service within our determination forecast to appropriately provide for this increase.

As such, we do not consider that any changes to our determination forecasts are required.

4.7.4. Metro coordination (new cost item)

Dublin Airport highlight that they have included a project of €0.5 million for Metro fees in the CIP in order to develop a dedicated resource to interface on the Metro project over five years. As CAR have not

considered this a capital project, Dublin Airport request that an opex allowance of €0.1 million per annum be made to cover this cost.

Dublin Airport anticipate that the Metro Interface will require 1 FTE per annum between 2020 and 2024 at a total cost of €0.25 million. In addition, consultants for the planning, design and site are anticipated to generate a further €0.25 million in non-pay costs over the same period.

CEPA analysis and response

After reviewing this request, we have been unable to form a close assessment of the efficiency of the anticipated costs of this project. However, after consultation with CAR, we have included an opex allowance for the full anticipated impact of this this project on opex costs within our forecasts.

This allowance is accounted for within our forecast impact of the CIP (Other category) on opex costs. We provide a forecast allowance of €0.05 million per annum in Campus Service payroll costs to account for the anticipated FTE requirement and an additional €0.05 million per annum in Other Non-Pay costs to account for the anticipated outsourced planning and design requirements. The impact of this is illustrated in Table 4.6.

Table 4.6: Impact of Metro Coordination project on opex costs, 2020-2024 (€ million, 2017 prices)

	2020	2021	2022	2023	2024
Campus Service Staff – Payroll	0.05	0.05	0.05	0.05	0.05
Other – Non pay	0.05	0.05	0.05	0.05	0.05
Total	**0.10**	**0.10**	**0.10**	**0.10**	**0.10**

Source: CEPA analysis

4.7.5. Other overheads

Dublin Airport disagrees with the proposed elasticity projection used in this category. They specifically point to the static allowance for third party lounge costs, bussing, hold baggage screening and banking and cash handling costs. Dublin Airport argue that these are all subject to change depending on passenger numbers and account for 50% of costs within this category.

CEPA analysis and response

After reviewing the case made by Dublin Airport relating to other new cost items, we consider it reasonable to change our elasticity assumption. We have accordingly applied an elasticity of 0.5 to executive lounges and VIP handling charges. These charges account for 33% of costs in this category in 2018. Note that we have already applied an elasticity of 1 with respect to passenger growth in order to forecast the growth of banking and credit card changes.

In addition, we have provided an allowance of €0.07 million per annum between 2020 to 2024 for the ground transportation (CSM Arrivals) research proposal within our forecasts.

We also note that outturn costs in this category in 2018 was almost €0.8 million above what had been forecast by Dublin Airport. **Overall, this means our forecasts for other overheads before new cost items are considered, increases from €17.8 million in 2019 to €18.3 million in 2024. This**

compares with our previous estimate of a growth from €16.9 million in 2019 to €17.3 million in 2024.

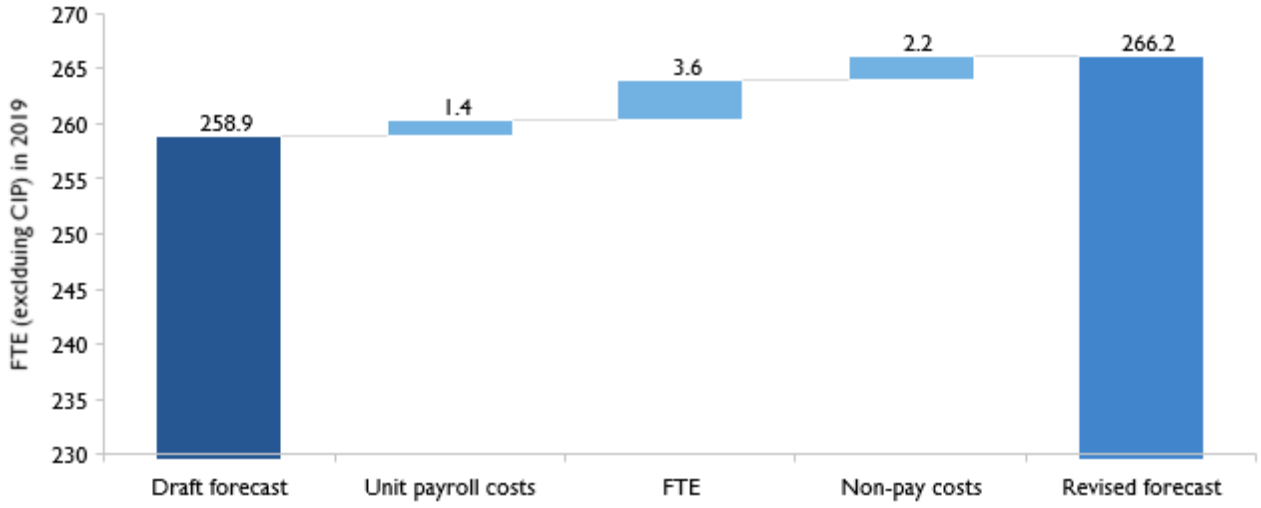
5. CONCLUSIONS AND FORECAST SUMMARY

In this report, we have reviewed the submissions received on our draft report and on opex-related comments on the draft determination. In the previous sections, we have presented a detailed review of these submissions and our response to them, highlighting where we consider that changes are necessary to our draft forecast. Our analysis continues to support the views presented by airlines around the relative efficiency of operational staffing levels and the relative inefficiency of administrative staffing levels. Non-pay expenditure overall remains reasonable, though some of the increases in recent years appear less justifiable.

Our estimate for 2019 baseline expenditure has increased by €7.3 million, from €258.9 million to €266.2 million, as shown in Figure 5.1. Approximately half this increase is driven by changes in our estimate of efficient staffing levels, with the biggest increases related to:

- More staff that are notionally categorised as Central Functions but are frontline (such as the transfer hosts and platinum services staff);
- A higher allowance for retail to reflect a restructure that has taken place in 2019; and
- More maintenance staff to reflect roles that are driven by passenger volumes.

Figure 5.1: Revisions to total opex draft forecasts for 2019, including the CIP (€ million, 2017 prices)

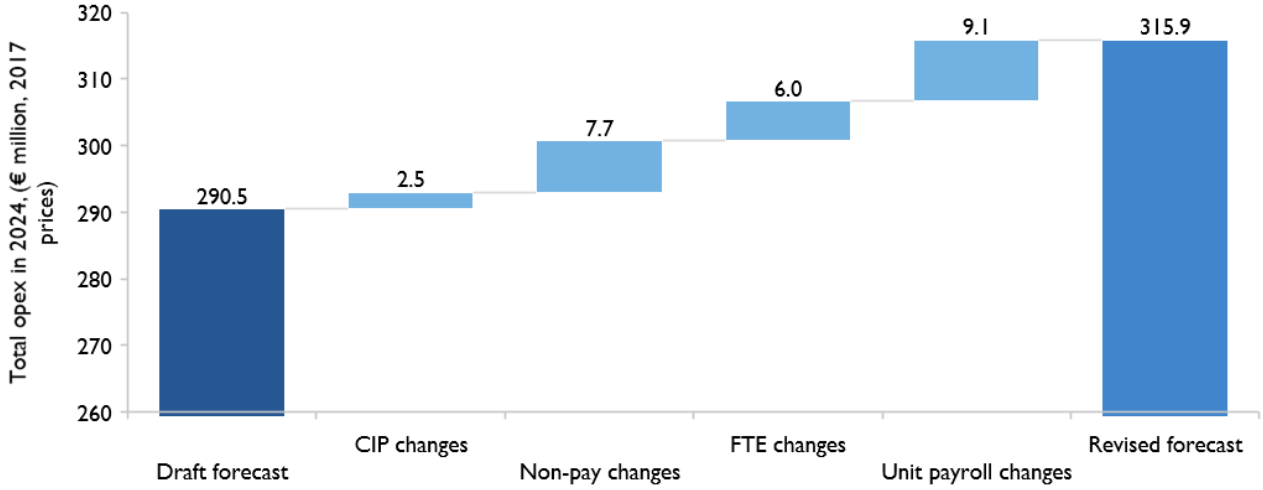


Our estimate for 2019 efficient expenditure remains €17.1 million below Dublin Airport's anticipated costs for the year. The majority of this is related to payroll costs and employee-related costs, with the largest efficiency adjustments made in Central Functions and Facilities & Cleaning.

Over the next determination period, from 2020 to 2024, our forecasts continue to assume a steady increase in opex though as noted above, this starts from a lower base than assumed by Dublin Airport and from a higher base than was originally assumed in our draft forecast. Our estimate for 2024 inclusive of the CIP has increased by €25.5 million, from €290.5 million to €315.9 million.

The breakdown of how our opex forecasts have changed for 2024 is illustrated in Figure 5.2. The largest single contributor relates to our revision to staff unit costs, driven by an expected step increase in pension costs in 2020, which we did not account for in our draft forecasts, higher All Ireland wage growth assumptions, and revised assumptions provided to us by Dublin Airport around the attrition rate of staff on older contracts. These changes have generated an additional €9.1 million in opex costs in 2024.

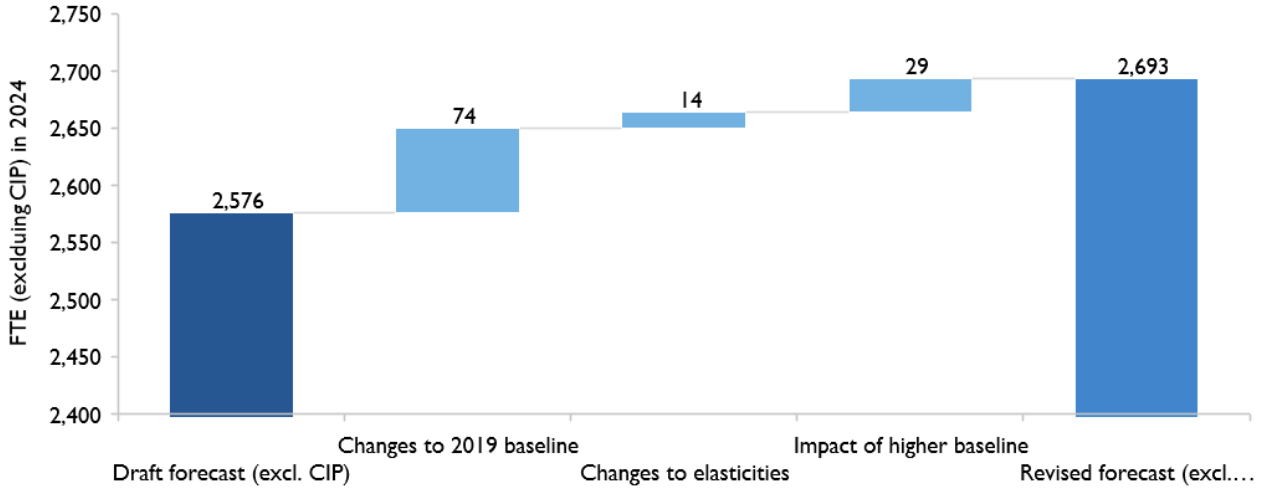
Figure 5.2: Revisions to total opex draft forecasts for 2024, including the CIP (€ million, 2017 prices)



The upward revision to FTE staff numbers generates a further €6 million in opex costs, which we present in further detail in Figure 5.3. Changes to non-pay opex have increased by €7.7 million, represented in Figure 5.4. Finally, revisions to the impact of the CIP (pay and non-pay) have led to a €2.5 million forecast increase in 2024.

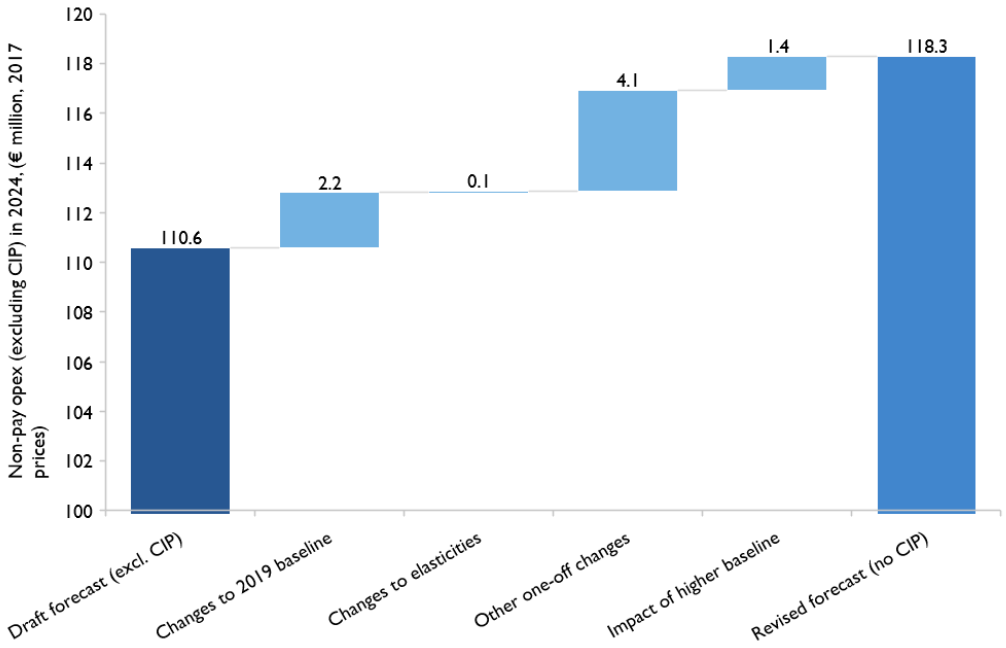
In relation to the increase in FTE numbers, changes to our 2019 baseline is the largest single driver, which as described earlier, relates to more Central Functions, Retail and Maintenance staff. Of the 119 additional in 2024 relative to our draft forecast, 74 FTEs are the direct result of changes to our 2019 baseline, with a further 29 FTEs being the result of our elasticity forecasts starting from that higher baseline. Only 14 FTEs are generated by direct changes to our elasticity assumptions.

Figure 5.3: Revisions to our FTEs draft forecasts for 2024, excluding the CIP



Overall, forecast non-pay opex for 2024 has increased by €7.7 million. Of this change, €2.2 million directly relates to the higher 2019 baseline estimate as shown above, while a further €1.4 million is due to our elasticity forecasts beginning from a higher base. €4.1 million relates to other one-off non-elasticity driven changes. Most of this increase relates to the higher forecast allowance for CBP Officers at Dublin Airport.

Figure 5.4: Revisions to our non-pay draft forecasts for 2024, excluding the CIP (€ million, 2017 prices)



The overall impact of our forecasts on staffing levels and opex, split by category of cost are illustrated in Table 5.1 and Table 5.2.

Table 5.1: Summary of forecast FTEs at Dublin Airport, 2019-2024

	2019	2020	2021	2022	2023	2024
Security	771	783	794	804	813	823
Maintenance	229	232	234	240	242	244
Central functions	321	322	323	320	316	312
Facilities and cleaning	452	452	453	454	454	455
Campus services	282	283	283	284	285	286
IT	71	71	71	71	72	72
Retail	348	348	348	348	348	347
Airside operations	87	87	87	88	88	88
Car parking	37	37	37	37	37	37
Capital projects	23	26	30	30	30	30
Total (excluding CIP) Dublin Airport estimate *	**2,619** 2,740–2,750	**2,641**	**2,661**	**2,675**	**2,684**	**2,693**
Previous Total (excluding CIP)	2,545	2,559	2,568	2,574	2,574	2,576
Implied CIP FTEs **		7	33	226	254	210
Total (including CIP)	2,619	2,648	2,693	2,90`	2,938	2,903

** Dublin Airport's estimated of 2019 FTEs provided to us in the Autumn of 2018 (2,748) and the summer of 2019 (2,743). Frontier Economics forecast 2,846 FTEs in 2019, inclusive of agency staff.*

*** We have not directly forecast the number of FTEs associated with the CIP. These figures are derived from dividing the forecast increase in CIP related payroll costs, by the appropriate wage forecast.*

Table 5.2: Summary of forecast opex at Dublin Airport, 2019-2024 (€ million, 2017 prices)

	2019	2020	2021	2022	2023	2024
Payroll						
Security	39.2	41.3	42.3	43.3	44.2	45.2
Maintenance	16.1	16.9	17.2	17.8	18.2	18.5
Central functions	26.9	28.2	28.7	28.7	28.7	28.7
Facilities and cleaning	20.7	21.6	21.8	22.0	22.2	22.5
Campus services	20.4	21.4	21.8	22.2	22.6	22.9
IT	7.4	7.9	8.0	8.2	8.4	8.5
Retail	17.7	18.5	18.7	18.9	19.1	19.3
Airside operations	6.5	6.8	6.9	7.1	7.2	7.3
Car parking	1.7	1.8	1.8	1.8	1.8	1.8
Capital projects	2.1	2.6	3.0	3.0	3.1	3.1
Non-pay						
Maintenance	13.4	13.7	13.9	14.4	14.6	14.9
Facilities and cleaning	3.8	3.8	3.7	3.7	3.6	3.6
IT	9.6	9.5	9.4	9.3	9.2	9.1
Car parking	4.8	5.0	5.0	5.2	5.3	5.4
Employee-related overheads	6.3	6.3	6.4	6.4	6.4	6.4
Rent and rates	14.0	14.0	14.0	14.0	14.0	14.0
Consultancy services	6.0	6.2	6.3	6.4	6.5	6.6
Marketing	7.5	7.6	7.7	7.8	7.9	8.0
Insurance	3.7	3.8	3.9	3.9	4.0	4.0
PRM	8.6	8.8	9.1	9.4	9.7	9.9
Other overheads	22.0	25.1	25.6	25.7	26.3	27.6
Utilities	7.7	7.9	8.3	8.4	8.5	8.8
Totals						
Pay	158.8	166.9	170.2	172.9	175.4	177.9
Non-pay	107.4	111.8	113.4	114.6	116.0	118.3
Total opex (excluding CIP) *Dublin Airport estimate**	**266.2** *283.3*	**278.7**	**283.6**	**287.5**	**291.4**	**296.2**
Previous forecast (excluding CIP)	258.9	264.1	266.7	268.6	270.9	273.3
CIP	0.0	0.7	3.9	16.3	20.3	19.7
Total opex (including CIP)	**266.2**	**279.4**	**287.4**	**303.8**	**311.7**	**315.9**
Opex per passenger, excl. CIP (€)	8.12	8.21	8.10	7.98	7.87	7.79
Opex per passenger, incl. CIP (€)	8.12	8.23	8.21	8.43	8.42	8.31

** Dublin Airport's estimate of 2019 opex provided to us in the Autumn of 2018 (€283 million) and the summer of 2019 (€283.3 million). Frontier Economics forecast €288 million in 2019*

APPENDIX A DETAILED SECURITY ANALYSIS

A.1. PASSENGER PRESENTATION PROFILES

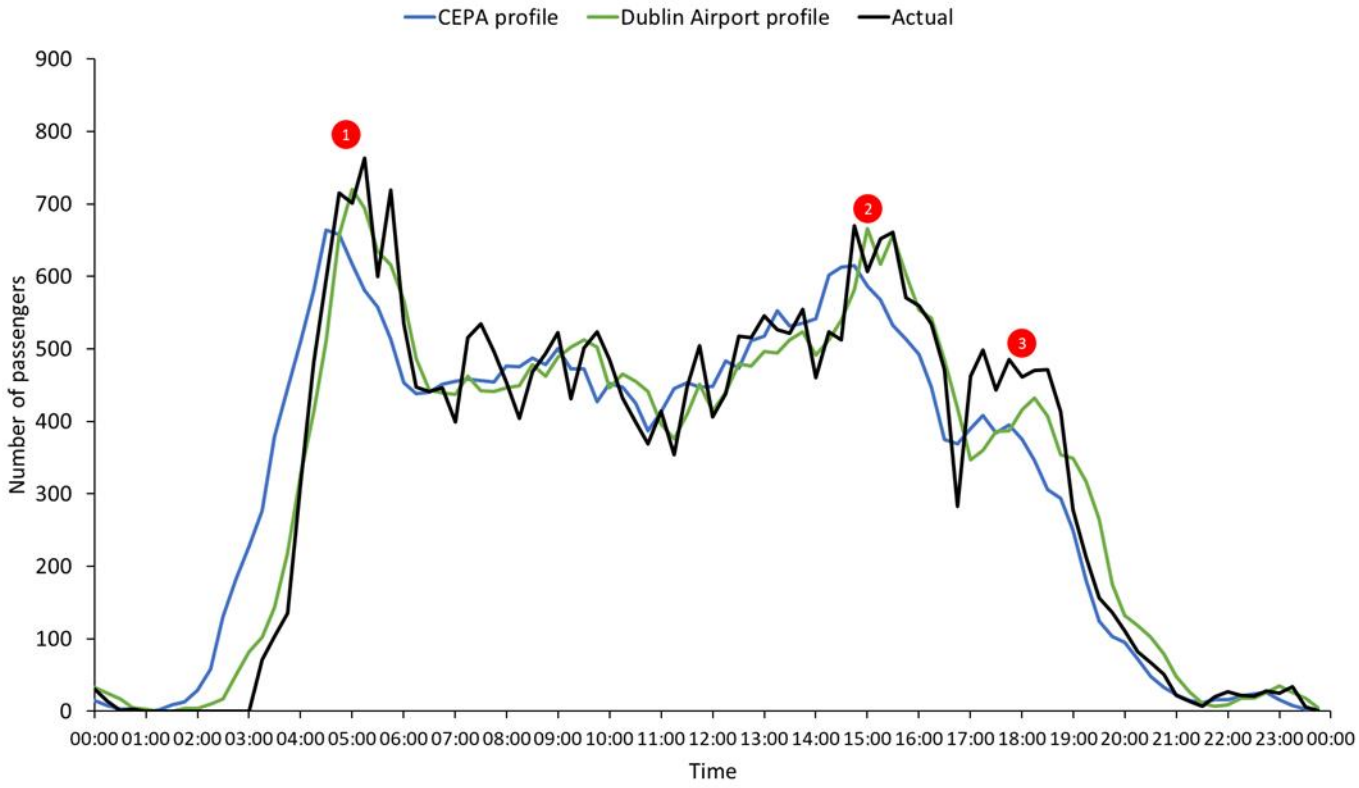
This section presents a detailed analysis of the implications of and sensitivities to passenger presentation profiles for our security staffing forecasts.

Impact of different presentation profiles on Terminal 1

Figure A.1shows the evolution of Terminal 1 passenger demand presenting at central search throughout the sample day of 27 July 2018 based on:

- modelling using the CEPA/TA passenger presentation profile
- modelling using the Dublin Airport passenger presentation profile
- the actual measured passenger throughput volumes on the day.

Figure A.1: Comparison of T1 passenger demand derived from different assumed presentation profiles and actual throughput



The modelling is based on passenger data derived from the airport operational database (AODB), whereas the actual throughput is measured at the boarding card scanners.

All three demand profiles have a similar number of total passengers for the day, with the difference less than 0.5%. The actual profile, measured by the security system has the highest value, by approximately 150 passengers. This is probably due to a combination of factors – the estimated presentation profiles may shift passengers by a few minutes outside of the actual sample day and boarding cards may occasionally be scanned twice. However, the differences are sufficiently small for our analysis to be valid.

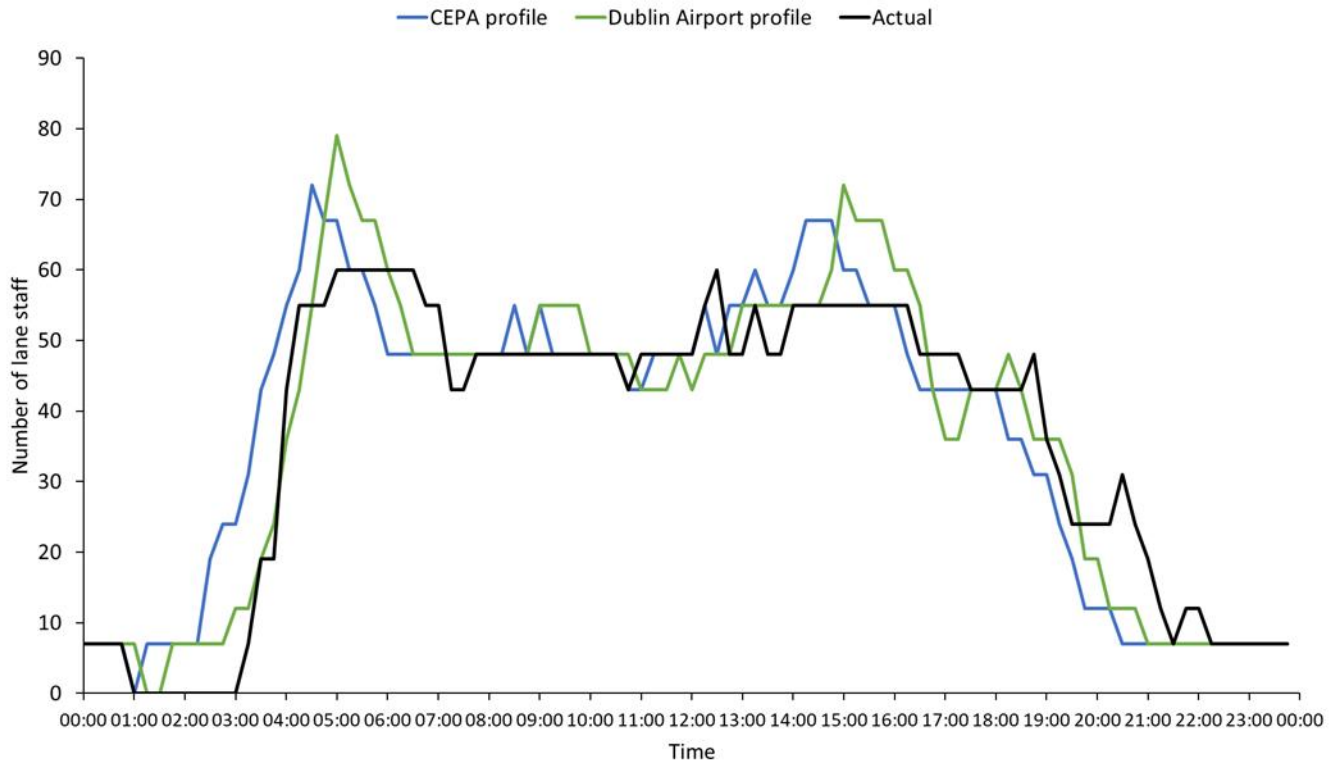
The demand modelled using the CEPA presentation profile is advanced (i.e. occurs slightly earlier) on the demand modelled using the Dublin Airport presentation profile and the actual measurements. The largest discrepancy is in the early morning, prior to central search opening at 03:15 on the sample day. At this peak

(marked 1 on the chart), the CEPA passenger profile shows earlier and lower numbers of arriving passengers than both the Dublin Airport profile and the actual throughput. This may be because the latter two passenger demand curves contain the bow-wave of the pent-up demand that is not served before central search is opened. This is important from a staffing perspective because the roster is driven by the need to serve this high narrow peak. If the height of the peak is driven by pent-up demand, it may be more efficient to manage the bow-wave by opening central search earlier and more gradually to manage the height of the first peak and match the roster with the demand profile.

There is much less discrepancy between the three profiles at the second peak (marked 2 on the chart). Although the CEPA passenger demand curve is again earlier and lower than the equivalent modelled using the Dublin Airport presentation profile. Neither the results derived using the CEPA profile nor the results derived using the Dublin Airport profile match the third peak in the actual passenger demand data. The CEPA presentation profile models demand more closely to the actual demand than the Dublin Airport presentation profile at the end of the day.

Figure A.2 compares the lane staffing profiles derived from modelling using the CEPA and Dublin Airport presentation profiles with those actually used on 27 July 2018. The chart shows that whichever presentation profile is assumed the modelled peaks are higher than the actual staffing applied on the sample day. At the end of the day after 20:00 hours, both presentation profiles result in lower staffing requirements than that actual staffing provided on the day. This is consistent with our original analysis that showed overstaffing in the evening (after 6pm) on the sample day.

Figure A.2: Comparison of T1 staffing requirements derived from different assumed presentation profiles and actual staffing



The Dublin airport passenger presentation profile results in higher and later main peaks in modelled staffing levels than the CEPA profile, especially for the first, early morning peak. The depths of the off-peak troughs derived from both presentation profiles are similar. Both presentation profiles result in higher staffing peaks that were deployed on the sample day, likely due to the different queue standards being applied: 10 minutes for both models and 30 minutes for the sample day.

Derived from the chart above for 27 July 2018, the staffing requirements for Terminal 1 central search were:

- 885 staff hours on lane duty using the CEPA presentation profile
- 880 staff hours on lane duty using the Dublin Airport presentation profile
- 863 actual hours expended on lane duty.

Extrapolated over the entire 2018 summer season:

- 173,069 staff hours would be needed assuming the CEPA passenger presentation profile
- 172,600 staff hours would be needed assuming the Dublin Airport passenger presentation profile.

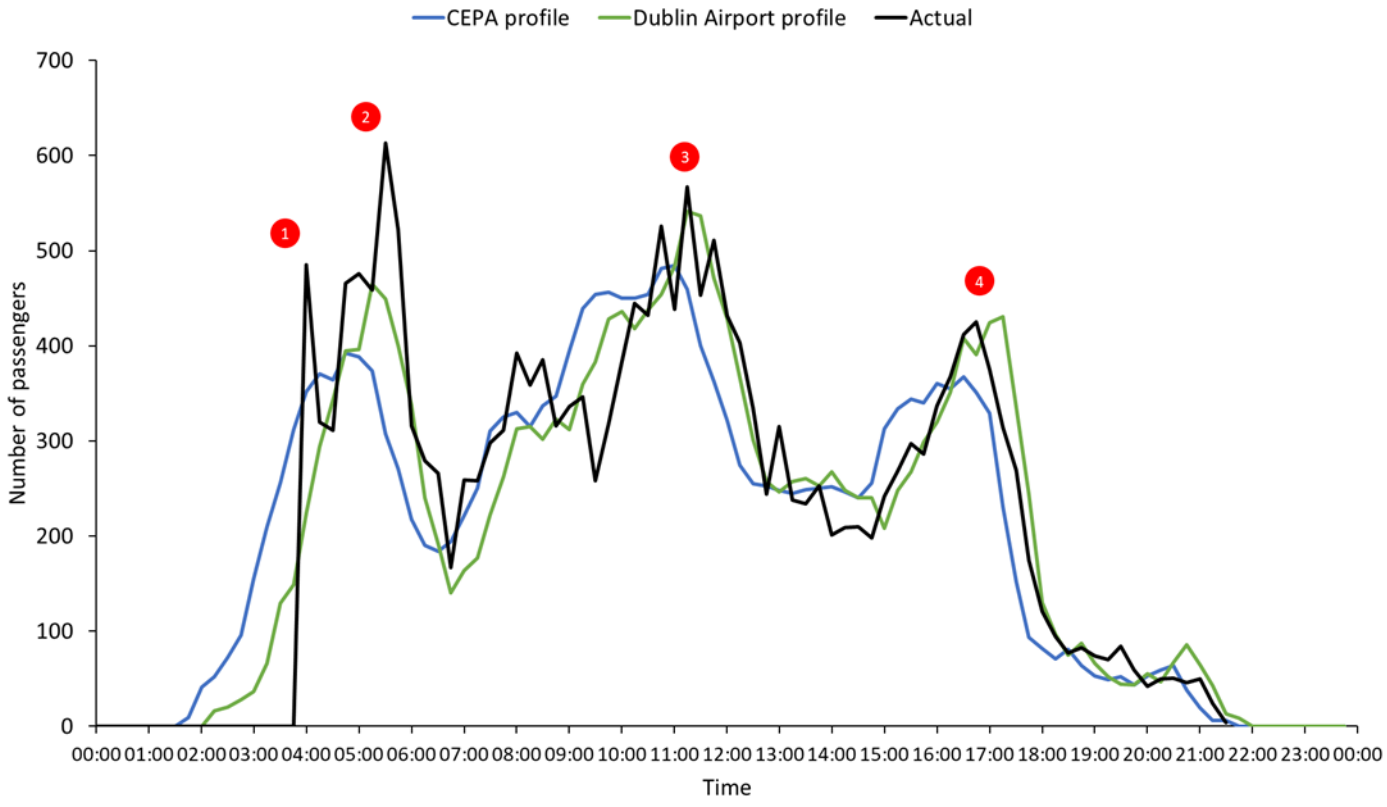
The difference between the two is less than 0.3%. Therefore, we conclude that for Terminal 1, the actual number of hours needed to staff security lanes is not particularly sensitive to the passenger presentation profile used.

Impact of different presentation profiles on Terminal 2

Figure A.3 shows the evolution of Terminal 2 passenger demand presenting at central search throughout the sample day of 27 July 2018 based on:

- modelling using the CEPA passenger presentation profile
- modelling using the Dublin Airport passenger presentation profile
- the actual measured passenger throughput volumes on the day.

Figure A.3: Comparison of T2 passenger demand derived from different assumed presentation profiles and actual throughput



The modelling is based on passenger data derived from the airport operational database (AODB), whereas the actual throughput is measured at the boarding card scanners.

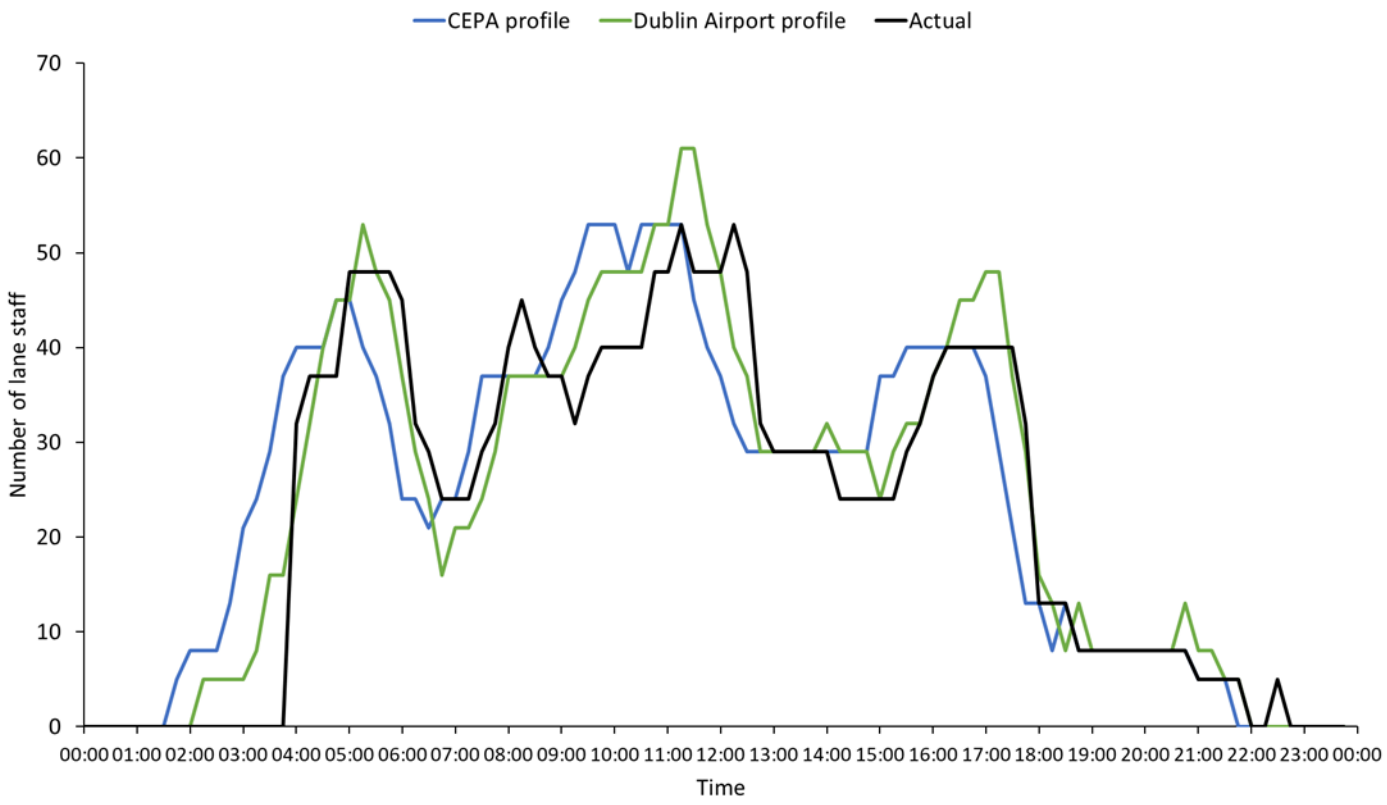
The demand curves generated from the AODB data using the CEPA and Dublin Airport passenger presentation profiles have identical number of passengers. However, both profiles have a lower count by approximately 1.5% from compared to the total count of passengers from the security system. This equates to 304 passengers. The reason for the discrepancy in actual passenger numbers counted by these two airport systems is not known.

As with the Terminal 1 results, the passenger demand generated from the CEPA presentation profile is advanced on the demand curve generated from the Dublin Airport presentation profile and the actual passenger throughput.

In the early morning, neither the passenger demand derived from the CEPA presentation profile nor the demand derived from the Dublin Airport presentation profile matches the actual passenger flow through the boarding pass scanner, (peaks one and two, on the chart).).). As for Terminal 1, the difference is very likely due an initial surge releasing pent up demand caused by the central search not opening until 04:00, illustrated by peak one. In addition, the boarding card scanning system in Terminal 2 is manual as opposed to automated in Terminal 1. Varying numbers of lanes are open depending on the demand level. Queues can be observed at boarding card scan when there are only a small number of lanes open. Peak two, observed as a large spike in the actual passenger flow, is likely due to additional boarding card gates being opened to relieve a building queue, again resulting in a surge of passengers. This implies that better management of the flow of passengers into Terminal 2 central search could ameliorate the spikes observed in the actual passenger flows and facilitate the matching of supply and demand at the screening lanes.

Figure A.4 below compares the Terminal 2 lane staffing profiles derived from modelling using the CEPA and Dublin Airport presentation profiles with those used on 27 July 2018.

Figure A.4: Comparison of T2 staffing requirements derived from different assumed presentation profiles and actual staffing



As expected, the peaks in the staffing profiles derived from the CEPA presentation profile are earlier and lower than those derived from the Dublin Airport presentation profile. Similarly, the troughs in the staffing profile derived from the CEPA presentation profile are shallower than those derived from the Dublin Airport presentation profile. The peaks in the actual staffing profile are lower than those derived from the Dublin Airport presentation profile and are similar to those derived from the CEPA profile.

As rostering is driven by the peaks, higher peaks will require deployment of more staff, which will be surplus during the off-peak periods.

Derived from the chart above for 27 July 2018 the staffing requirements for Terminal 2 central search were:

- 584 staff hours derived from the CEPA presentation profile
- 579 staff hours derived from the Dublin Airport presentation profile
- 550 actual hours expended on lane duty.

Extrapolated over the 2018 summer season:

- 108,643 hours would be needed based on the CEPA passenger presentation profile
- 108,481 hours would be needed for the Dublin Airport passenger presentation profile.

The difference between the two is less than 0.2%. It is concluded therefore for Terminal 2, the actual number of hours needed to staff security lanes is not particularly sensitive to the passenger presentation profiles used.

A.2. LEAVE ENTITLEMENTS

A more detailed discussion of the different types of leave (annual leave, sick leave, computer-based training and other absences) and how they are applicable to Dublin Airport is presented in A.2.

Annual leave

Terminal 1: Annual leave is not rostered for Terminal 1 staff and was omitted from the original roster efficiency analysis. Annual leave has been inserted in the revised analysis (see Section A.3) at a rate of 15% of the rostered staffing level for Terminal 1. This level of leave represents 33 days per year for an FTE, which comprises nine public holidays and, therefore, 24 annual leave days per year. Our approach assumes that annual leave is distributed evenly across the year. As rostering is driven by peaks in demand, it would be more efficient to manage leave such that a lower proportion was taken during the peaks and a higher proportion was taken during off-peak periods.

Terminal 2: Annual leave is built-in to the roster for Terminal 2 so was included in the original analysis.

Sick leave

Sick leave was subtracted from the rostered supply in the original analysis. In the revised analysis (see Section A.3), sick leave has been included in the demand profile at rates of [redacted] to reflect Dublin Airport's target sickness rate but also at a [redacted] rate to reflect Ryanair's comment on transport workers' sickness rates in the UK. These rates have been applied to both Terminal 1 and Terminal 2.

Computer-based training

Computer-based training is included in the rosters for both Terminal 1 and Terminal 2 and was included in the original analysis. It is included in the same way in the revised analysis, i.e. accounted for in the roster, not added into the demand profile.

Other absence

Dublin Airport includes various other categories of absence in it plans its resources for the Airport Search Units. In the table above, absences are grouped into two main categories "*other leave (maternity, parental leave, etc)*" and "*emergency leave (force majeure, etc)*". Each category is planned at an absence rate of 2.5% making a total of 5%. To put this into context, Dublin Airport are therefore planning that there will be around 10 days per year per FTE where every staff member is absent, over and above their annual leave entitlement, and in addition to any sickness absence.

Based on limited data provided by Dublin Airport for Terminal 1 absence for the 2018-19 winter season, the actual categories included as other absence are:

- Other leave:
    - carers' leave
    - company business
    - compassionate leave
    - court duty
    - jury duty
    - maternity leave
    - parental leave
    - participation
    - paternity leave
    - union business
    - unpaid maternity leave.
- Emergency leave:
    - disciplinary leave - paid
    - emergency leave
    - force majeure
    - lost hours – attendance
    - own expense
    - unauthorised absence
    - unexplained absence.

We understand that an entitlement to several of these categories of absence is enshrined in Irish Employment laws such as The Parental Leave Acts, 1998-2013. Clearly Dublin Airport, as a responsible employer, is duty bound to follow these laws.

However, this 'Other Absence' is classified into many categories, several of which seem to overlap or duplicate. Several of the categories also seem ill-defined. For example, in the case of Force Majeure leave, the act sets out Employee entitlements to paid leave where, due to the illness or injury of a named list of people, their presence is indispensable at the location of that person. We understand that Force majeure leave entitlement is a maximum of 3 days' paid leave in a 12-month period, subject to a maximum of 5 days' leave in a 36-month period. We are therefore unclear as to why Dublin Airport would need to have further leave categories and be planning for additional lost time for issues such as 'Emergency Leave' which would appear to cover the same circumstances.

The complexity of the system suggests a risk that management levers are not as strong as could be expected in a commercial business operating in a competitive environment.

A.3. REVISED STAFFING ANALYSIS

Based on the comments received from stakeholders in response to the draft determination, we have revised the central search security staffing analysis. The detailed results of this analysis are presented below.

T1 summer season

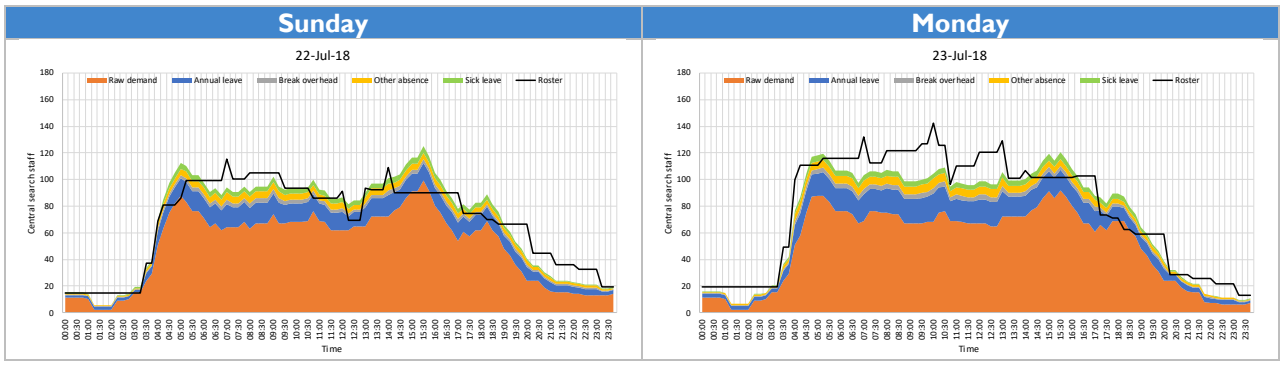
Current rosters

Figure A.5 compares staff supply derived from the Terminal 1 summer roster with staff demand for a peak week in July 2018. Similarly, Figure A.6 compares staff supply derived from the summer roster with staff demand for an off-peak week in October 2018.

The staff supply, shown as the black line in the charts, is derived directly from the summer roster provided by Dublin Airport with an allowance for breaks, assuming those breaks can be distributed evenly across shifts. The staff demand is displayed as the sum of several components following the approach and comments made by Dublin Airport on the original analysis. These components are:

- raw demand comprising the sum of the variable demand driven by passengers presenting at Central Search and the fixed profile of demand driven by the need to staff static security posts across the terminal. This variable, Central Search, part of this demand profile has been derived using the Dublin Airport's own passenger presentation profile, amended from the passenger presentation profile used in the original analysis
- staff annual leave, assumed to be [redacted] of the rostered supply, as indicated by Dublin Airport
- an additional overhead of [redacted] of rostered supply, indicated by Dublin Airport as necessary to account for the constraint of not being able to distribute breaks uniformly across shifts
- other absences, as described in Section 3.4.3 of the main report, and assumed to be ✂✂ of rostered supply as derived from analysis of Terminal 1 absence data for winter 2018-19 provided by Dublin Airport
- sick leave, at the Dublin Airport target level of [redacted] of rostered supply.

Figure A.5: Comparison of staff demand with roster, Terminal 1, one week in July 2018



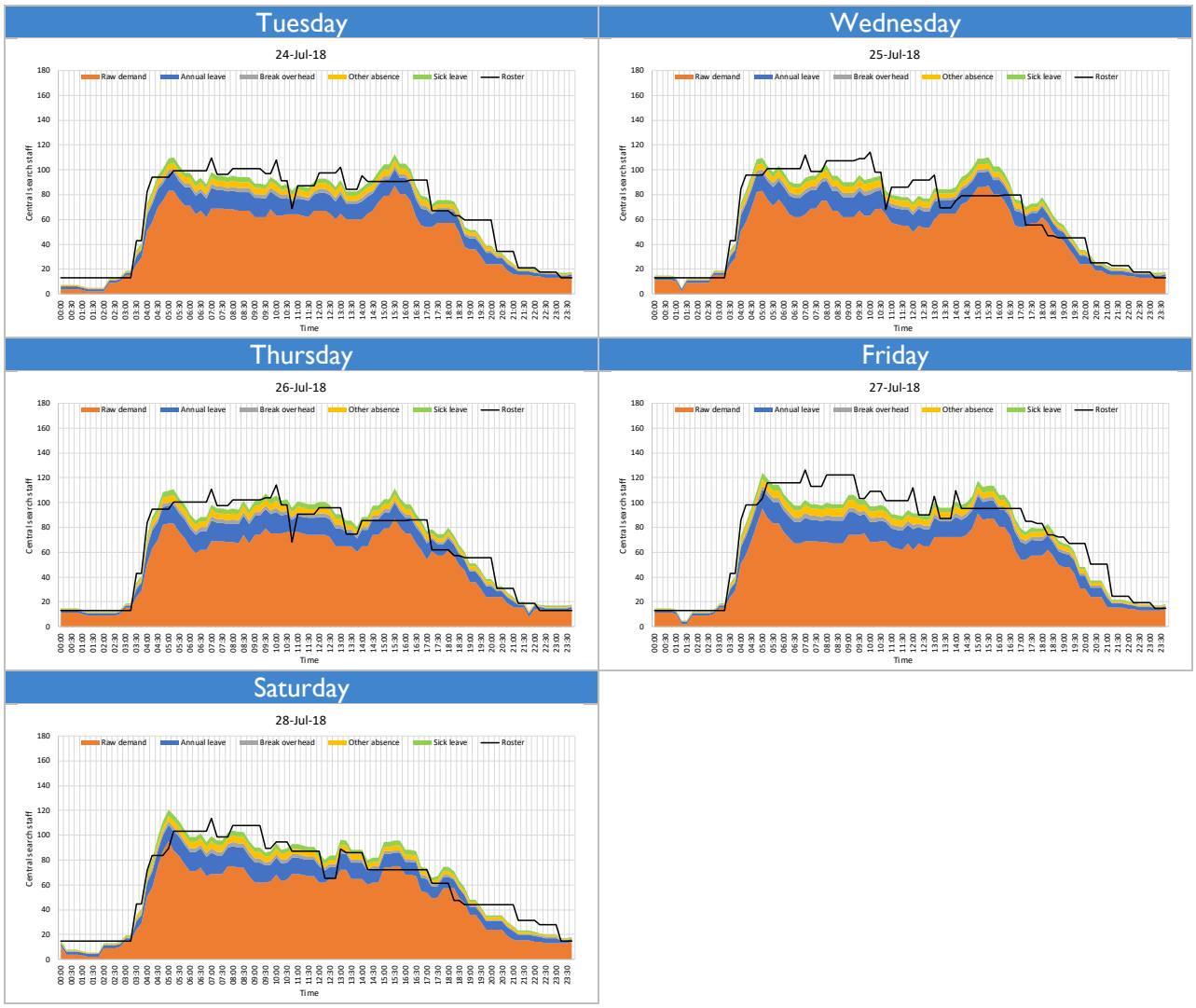
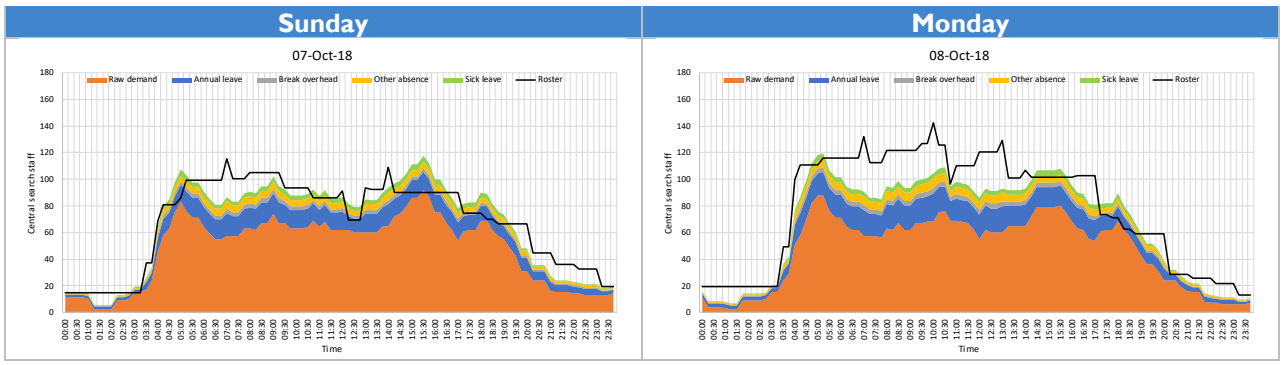
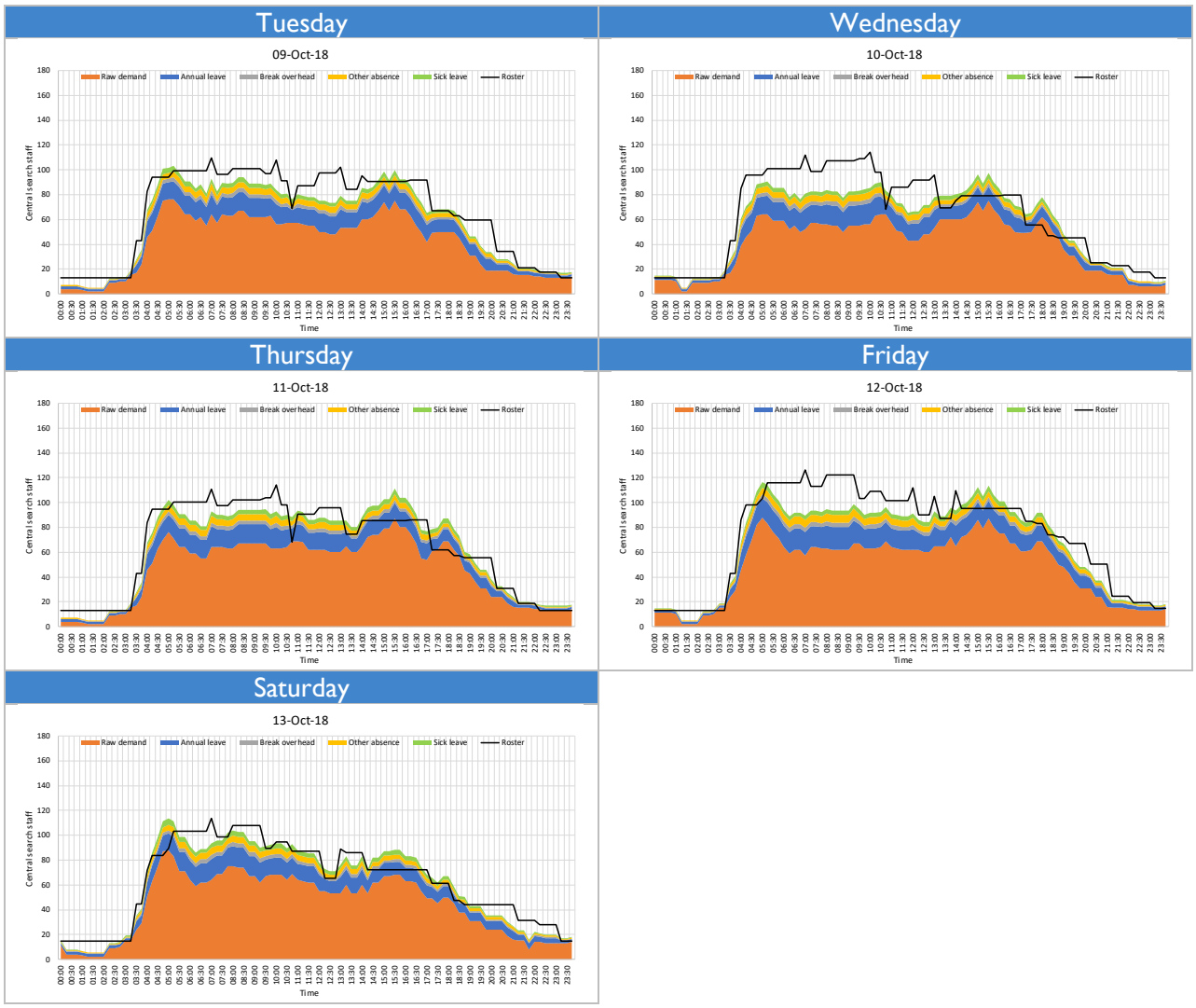


Figure A.6: Comparison of staff demand with roster, Terminal 1, one week in October 2018





The charts show that:

- for the peak (July) and off-peak (October) samples, Sunday, Tuesday, Thursday and Saturday rostered supply is well-matched to raw demand and associated overheads
- for the peak (July) and off-peak (October) samples, Monday, Wednesday and Friday supply exceeds raw demand and overheads for the period between the early morning and late afternoon peaks with the gap, as expected, greater for the off-peak period than the peak
- supply barely meets demand in the late afternoon peak.

Scope for efficiency

The scope for potential efficiency savings across the summer season has been estimated by comparing the daily rostered supply with the daily staffing demand as illustrated in the charts above. The total number of staff hours required for each day are compared to the total number of staff hours derived from the roster. An efficiency benchmark of 15% has been assumed such that:

- on a given day if the rostered hours are less than 15% above the demand hours, then no efficiency savings are possible for that day

- on a given day if the rostered hours are greater than 15% above the demand hours, then an efficiency saving is possible of the difference between the rostered hours and the 15% benchmark.

Figure A.7 shows the potential for daily efficiency gap defined as the difference between rostered supply and demand as a proportion of the rostered supply. A positive value indicates that supply exceeds demand; a negative value (not shown) indicates the demand exceeds supply and zero indicates that the roster perfectly matches demand.

The chart has been derived using Dublin Airport roster overheads:

- [redacted] annual leave, applied uniformly across the year
- [redacted] mark-up up on breaks
- [redacted] sick leave
- ✂✂ other absences.

Assuming these overheads, the chart shows that there is very limited scope for efficiency savings, with the efficiency gap only exceeding the efficiency benchmark (blue bar crossing the red line) on four days early in the season.

Figure A.7: T1 roster efficiency, summer 2018 with Dublin Airport roster overheads

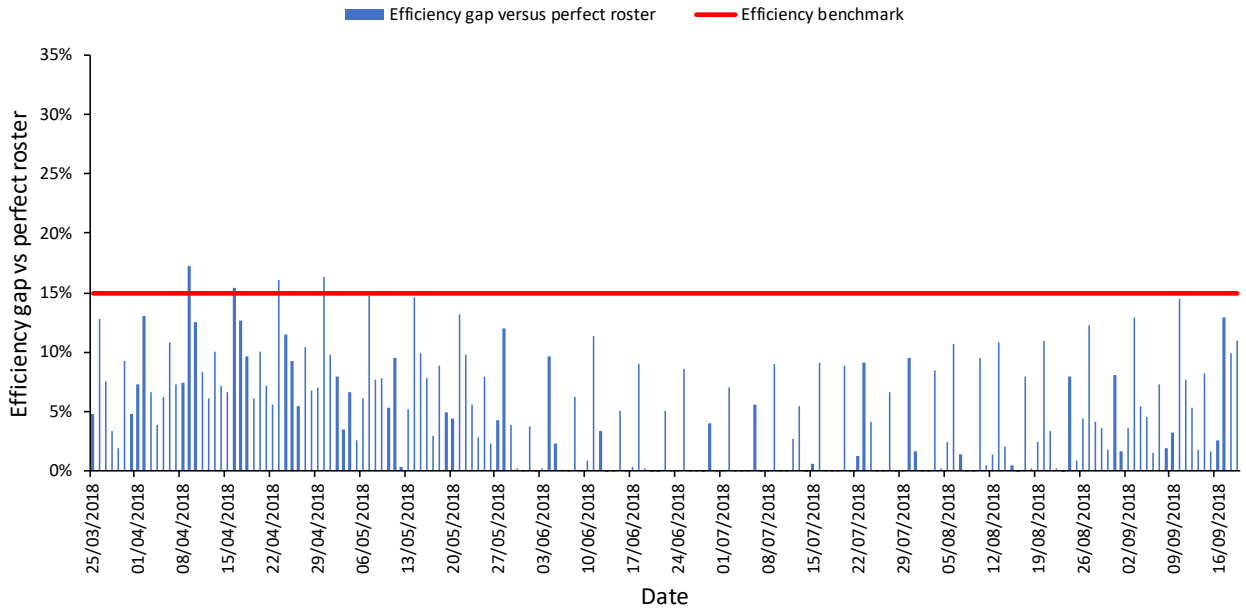
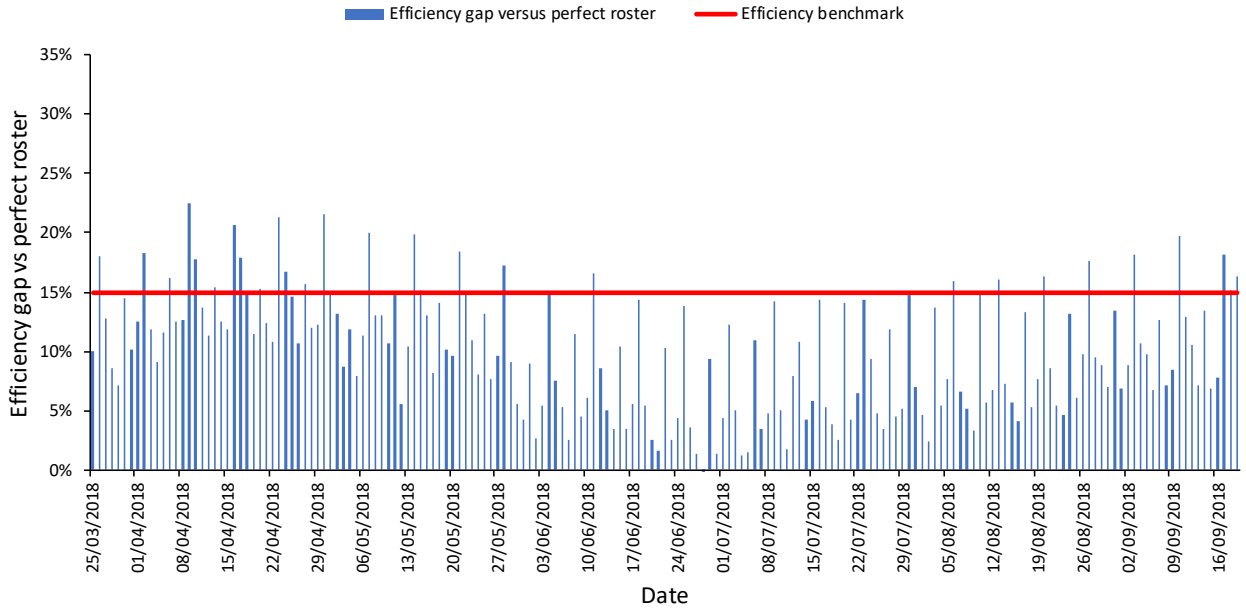


Figure A.8 shows the potential for Terminal 1 Airport Search Unit efficiency savings over the 2018 summer season if the roster overheads are reduced to the following:

- [redacted] annual leave, applied uniformly across the year (unchanged)
- a zero mark-up up on breaks, reduced from [redacted], assuming it is possible to spread breaks uniformly across shifts through changes to employment contracts
- sick leave reduced from [redacted] to [redacted] in line with Ryanair's comments
- other absences reduced from ✂✂ to ✂✂ by improved management of unapproved and unexplained absences.

The figure shows that reducing roster overheads increases the scope for efficiency saving but this remains small at approximately 0.3% over the season.

Figure A.8: T1 roster efficiency, summer 2018 with reduced roster overheads

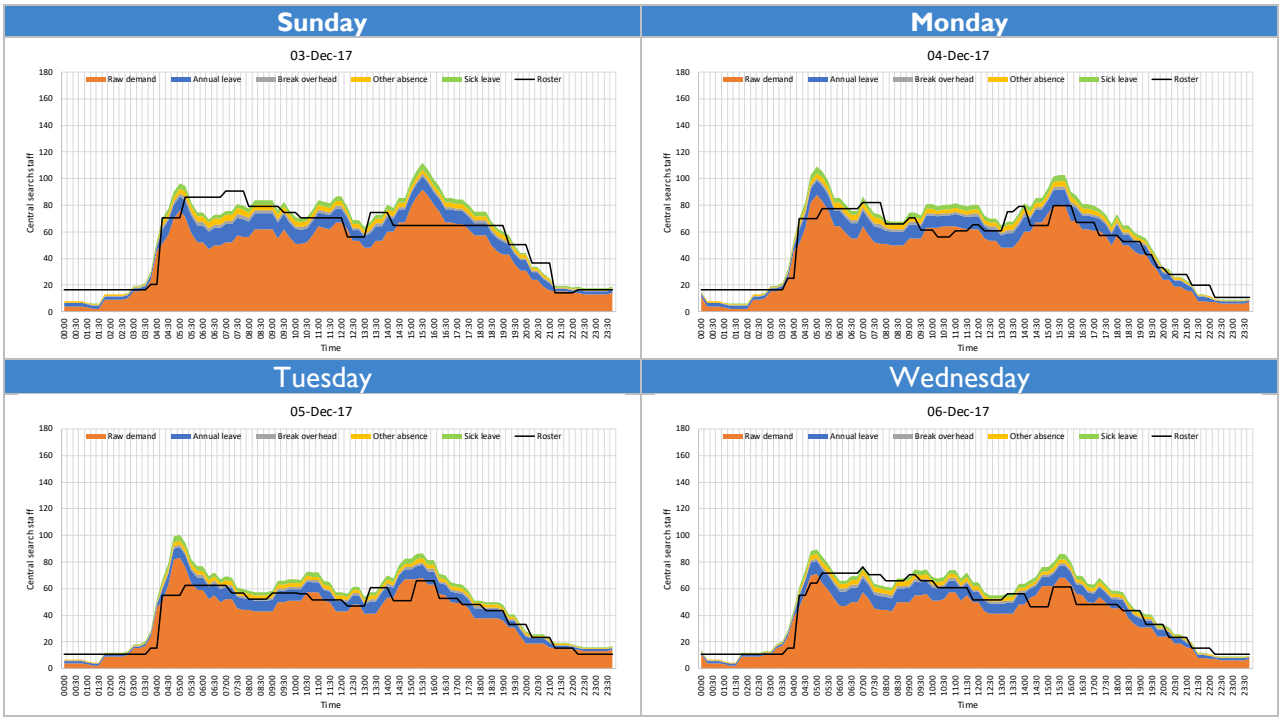


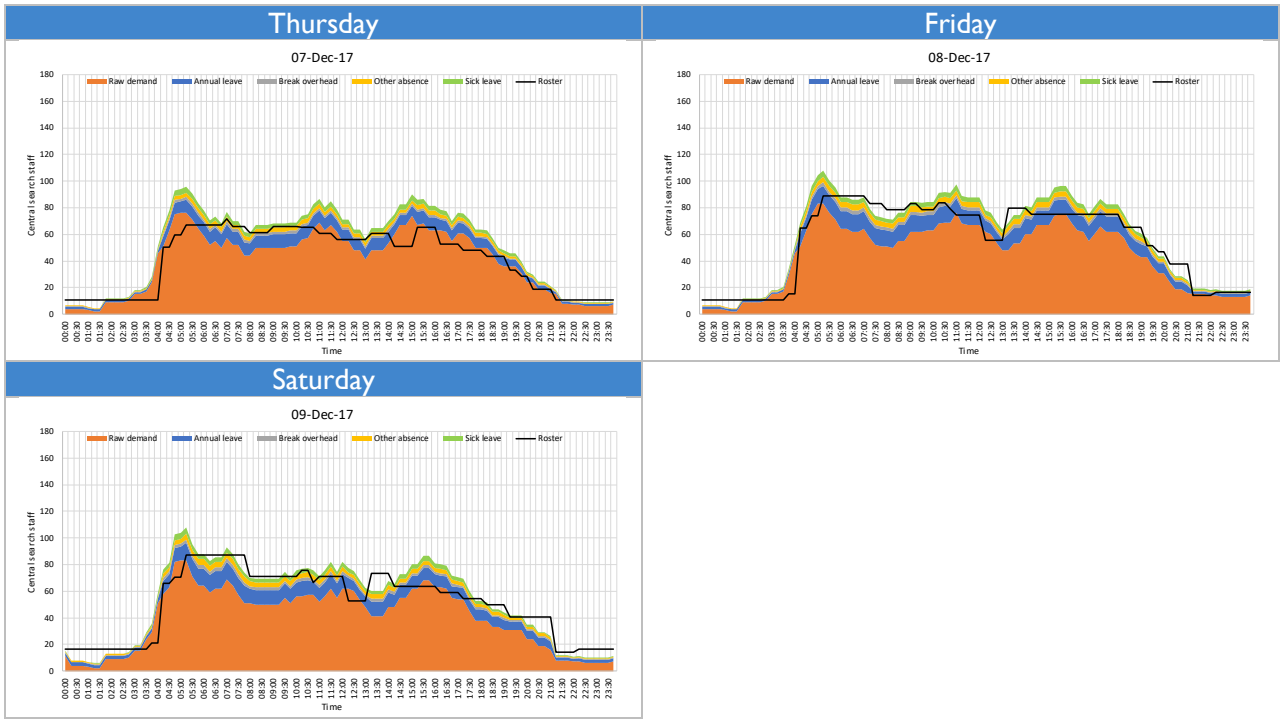
T1 winter season

Current rosters

Figure A.9 compares staff supply derived from the Terminal 1 winter roster with staff demand for the first week in December 2017 following the same approach as described above for the summer roster. The roster overheads proposed by Dublin Airport are assumed.

Figure A.9: Comparison of staff demand with roster, Terminal 1, one week in December 2017



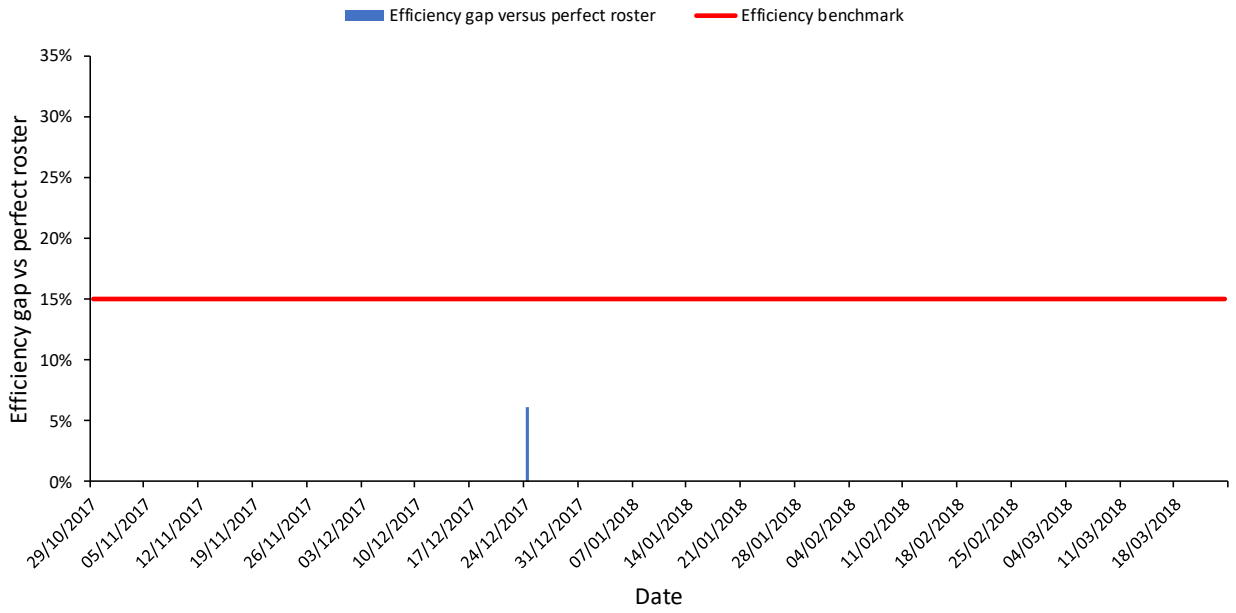


The figure shows that the winter roster supply is consistently below demand. This is consistent with the results obtained in the previous analysis

Scope for efficiency

Figure A.10 shows that there is no efficiency gap for the Terminal 1 2017-18 winter roster. On the contrary, the figure indicates that for that season there was staff under-supply to achieve a 10-minute queue performance.

Figure A.10: T1 roster efficiency, winter 2017-18 with reduced roster overheads



Comparison of T1 winter and summer rosters

This more detailed examination of both summer and winter rosters suggests that:

- the number of FTEs required to fulfil the winter roster is approximately 300
- the number of FTEs required to fulfil the summer roster is approximately 360.

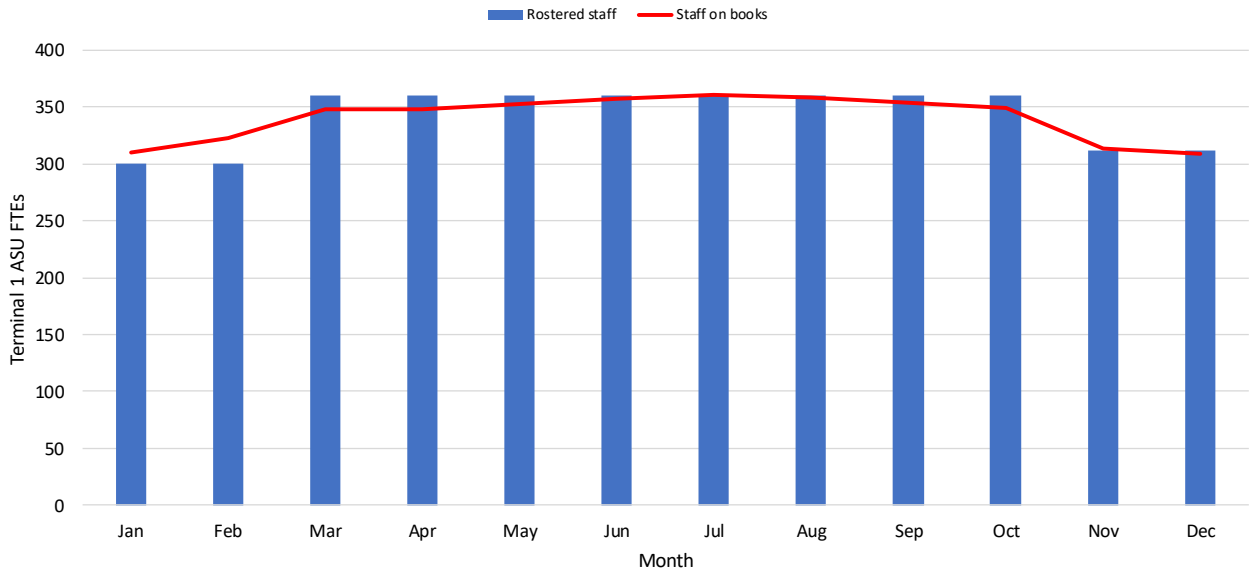
For calendar year 2018, Dublin Airport reports that the average number of FTEs in the Terminal 1 Airport Search Unit is 352, closer to the summer roster figure than the winter.

A simple average for FTEs has been calculated based on the following assumptions:

- half of the difference between the summer and winter rosters comprises seasonal staff that work and are paid in the summer (March to October) but not the winter (January and February, and November and December)
- the other half of the difference arises from the attrition/recruitment process
- training of new staff to meet the summer demand takes place during the first three months of the year so these staff (approximately 30 in total) are on the payroll but not the roster
- these staff are retained at the end of the summer period to account for extra staff needed due to traffic growth
- attrition over the summer period occurs at around five per month and these are replaced at a rate sufficient to ensure that there are sufficient staff available to meet the peak summer demand

Figure A.11 shows a staff profile that meets the peak summer roster demand of approximately 360 FTE, rising from 300 FTEs in the preceding winter and falling to 312 FTEs in the following number, which is the number needed on the roster to account for traffic growth at an elasticity of 0.62. The staff on books figure is higher than roster requirements in January and February to reflect recruitment and training; is slightly lower than the roster in March, April, May, September and October to reflect reduced demand compared to the summer peak; and matches the roster requirements in the peak months of June, July and August.

Figure A.11: Model of T1 staffing profile for 2018



The overall result of applying the staffing profile in the figure above is that the average number of FTEs required over the year is reduced from 352 to 341, representing a 2% saving. This potential saving is appropriate as there is limited scope for efficiency within the roster.

This revised analysis has reduced the scope for efficiencies in T1 identified in the Draft report primarily due to the reintroduction of an annual leave demand mark up in this terminal to reflect the fact that leave is not rostered as it is in T2. This version of the modelling therefore now accurately reflects way in which Dublin Airport plan staff in T1. However better management of leave quotas to avoid peak times, or ultimately introducing rostered leave into T1 could provide further benefits. These and other opportunities are discussed further in our overall summary at the end of this section.

T2 summer season

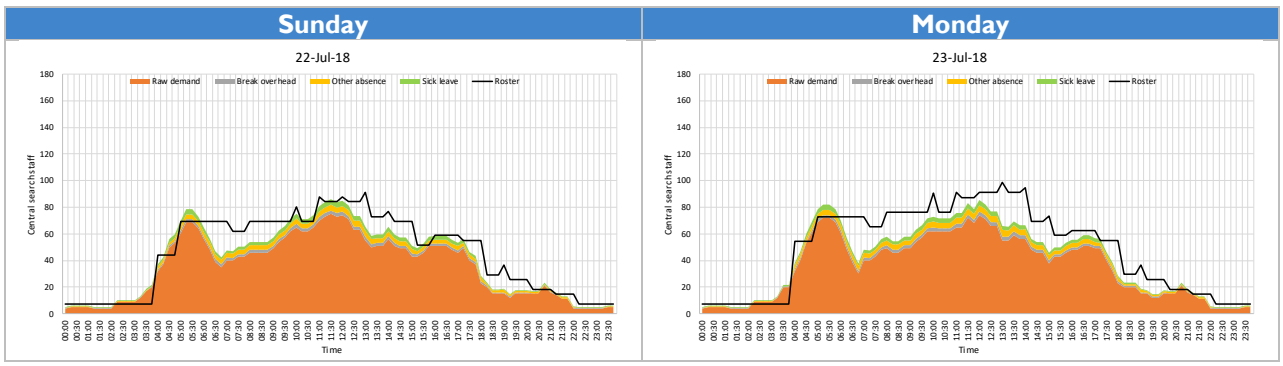
Current rosters

Figure A.12 compares staff supply derived from the Terminal 2 summer roster with staff demand for a peak week in July 2018. Similarly, Figure A.13 compares staff supply derived from the summer roster with staff demand for an off-peak week in October 2018.

The staff supply, shown as the black line in the charts, is derived directly from the summer roster provided by Dublin Airport with an allowance for breaks, assuming those breaks can be distributed evenly across shifts. The staff demand is displayed as the sum of several components following the approach and comments made by Dublin Airport on the original analysis. These components are:

- raw demand comprising the sum of the variable demand driven by passengers presenting at Central Search and the fixed profile of demand driven by the need to staff static security posts across the terminal. This variable, Central Search, part of this demand profile has been derived using the Dublin Airport's own passenger presentation profile, amended from the passenger presentation profile used in the original analysis
- an additional overhead of [redacted] of rostered supply, indicated by Dublin Airport as necessary to account for the constraint of not being able to distribute breaks uniformly across shifts
- other absences, as described in Section 3.4.3, and assumed to be [redacted] of rostered supply as derived from analysis of Terminal 1 absence data for winter 2018-19 provided by Dublin Airport, assuming that this absence profile also applies to Terminal 2
- sick leave, at the Dublin Airport target level of [redacted] of rostered supply.

Figure A.12: Comparison of staff demand with roster, Terminal 2, one week in July 2018 2018



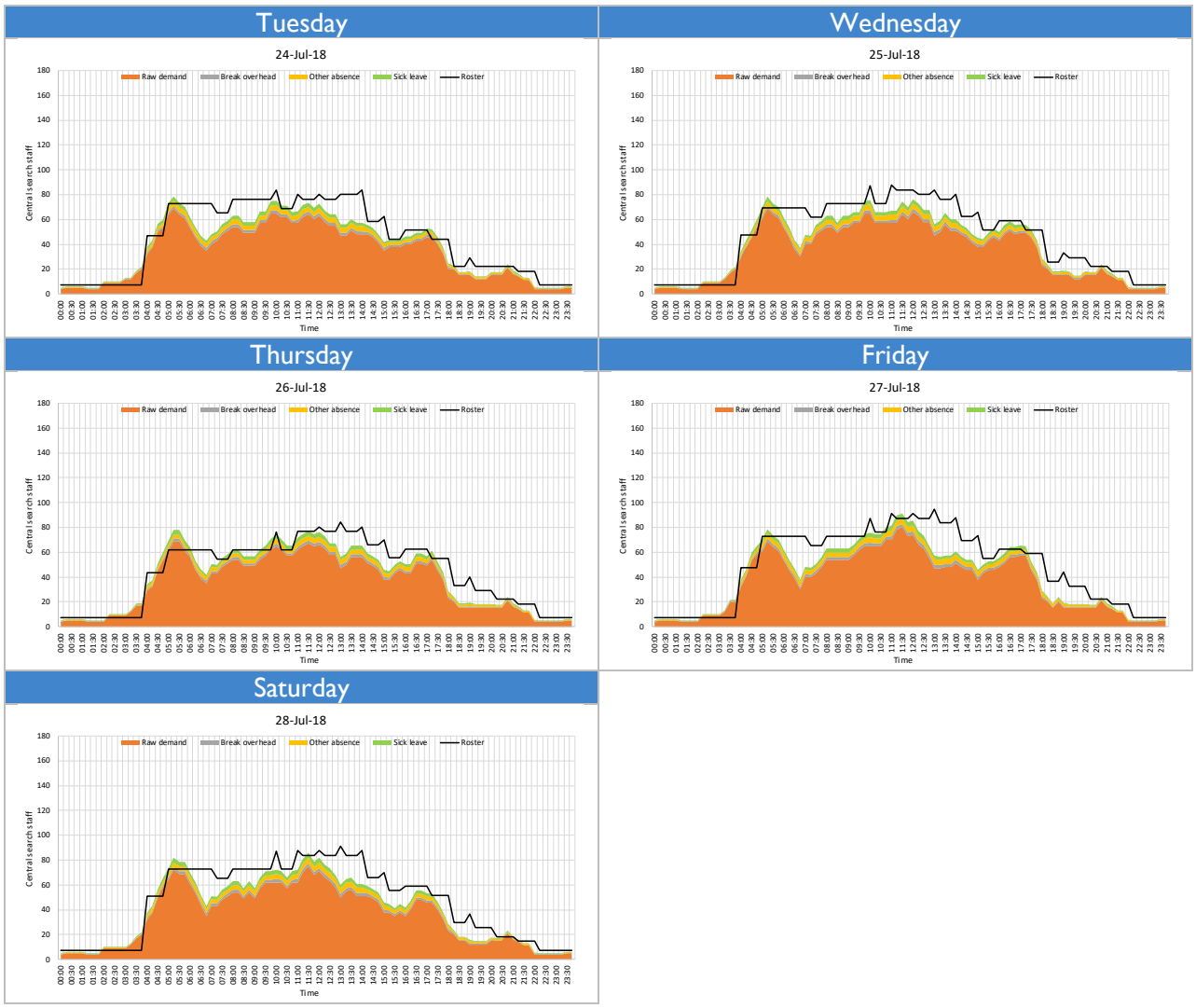
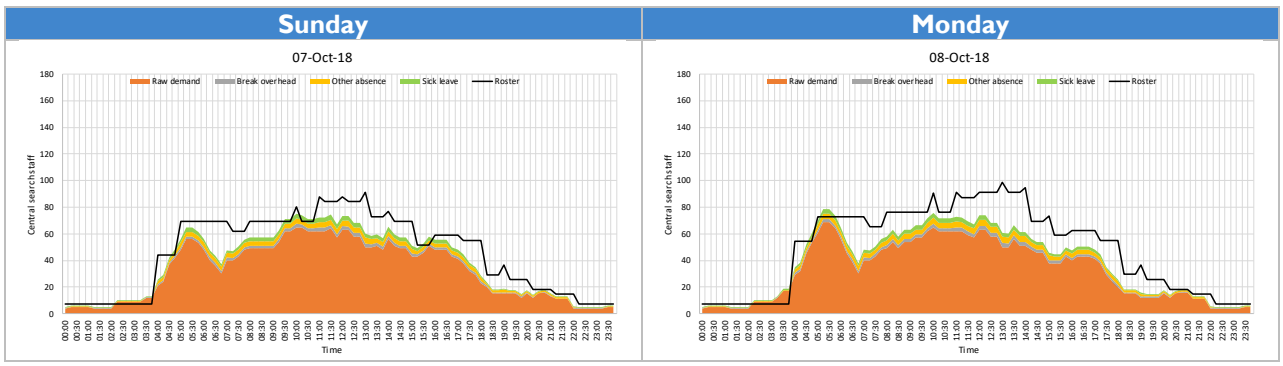
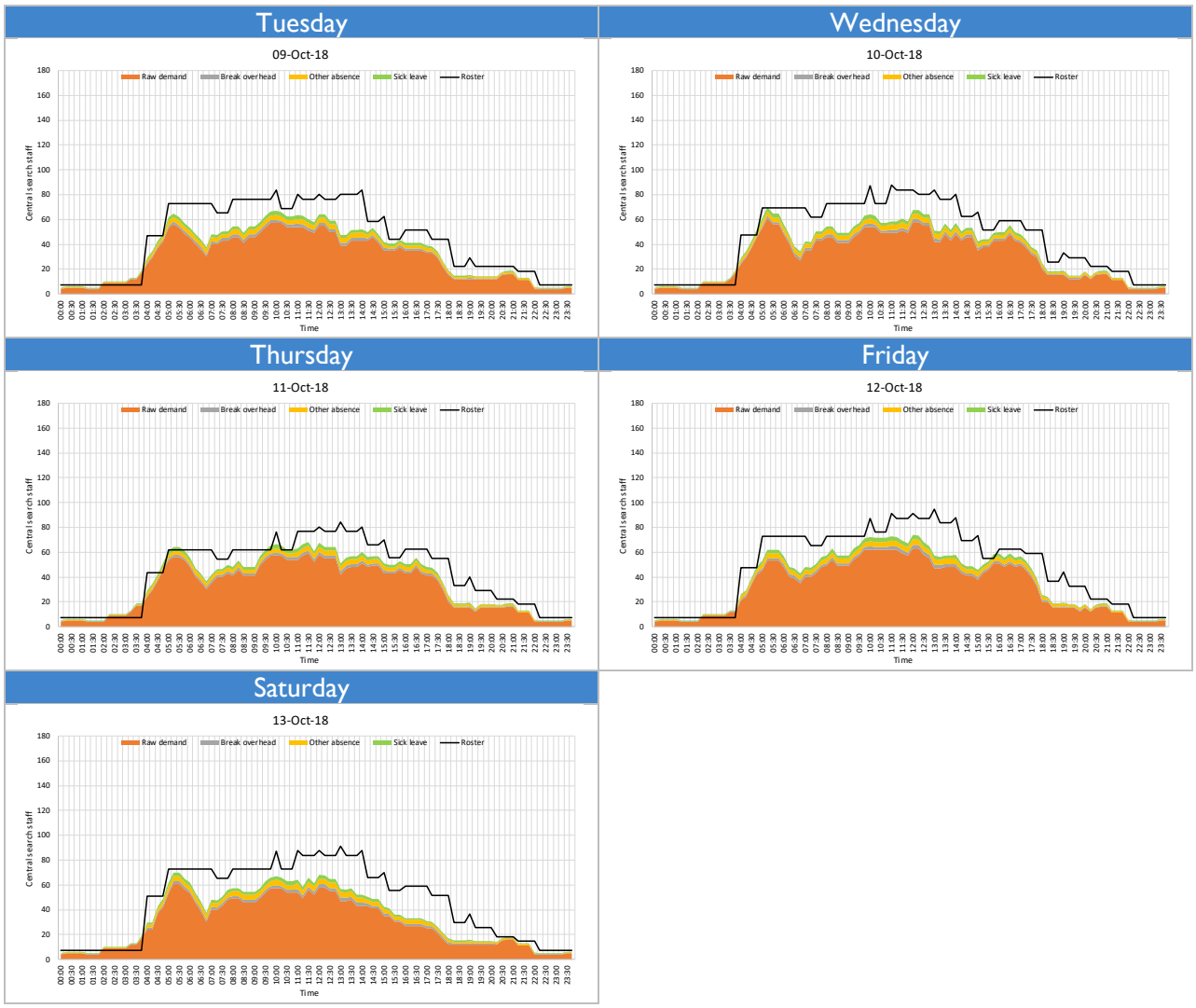


Figure A.13: Comparison of staff demand with roster, Terminal 2, one week in October 2018





The charts show that:

- for the July peak month there is a close match between the roster and peak demand but there is oversupply following the peaks. This implies that if the peaks could be smoothed, for example by allowing pent-up demand to flow through security earlier particularly in the morning (see Section 3.4.1 on passenger presentation profile), the peaks could be reduced and the roster could be better matched to the demand profile
- for the October off-peak month, there is generally over-supply after the first morning peak. Again, if this peak could be smoothed, the roster could be matched better to the demand profile.

Scope for efficiency

As with Terminal 1, the scope for potential efficiency savings across the summer season has been estimated by comparing the daily rostered supply with the daily staffing demand as illustrated in the charts above. The total number of staff hours required for each day are compared to the total number of staff hours derived from the roster. An efficiency benchmark of 15% has been assumed such that:

- on a given day if the rostered hours are less than 15% above the demand hours, then no efficiency savings are possible for that day

- on a given day if the rostered hours are greater than 15% above the demand hours, then an efficiency saving is possible of the difference between the rostered hours and the 15% benchmark.

Figure A.14 shows the potential for daily efficiency gap defined as the difference between rostered supply and demand as a proportion of the rostered supply. A positive value indicates that supply exceeds demand; a negative value (not shown) indicates the demand exceeds supply and zero indicates that the roster perfectly matches demand.

The chart has been derived using Dublin Airport roster overheads:

- [redacted] mark-up up on breaks
- [redacted] sick leave
- ✂✂ other absences.

Assuming these overheads, the chart shows that there is scope for efficiency savings and the beginning and end of the season, outside of the peak times. Using the 15% efficiency benchmark implies that across the season a 4.1% saving could potentially be made.

Figure A.14: T2 roster efficiency, summer 2018 with Dublin Airport roster overheads

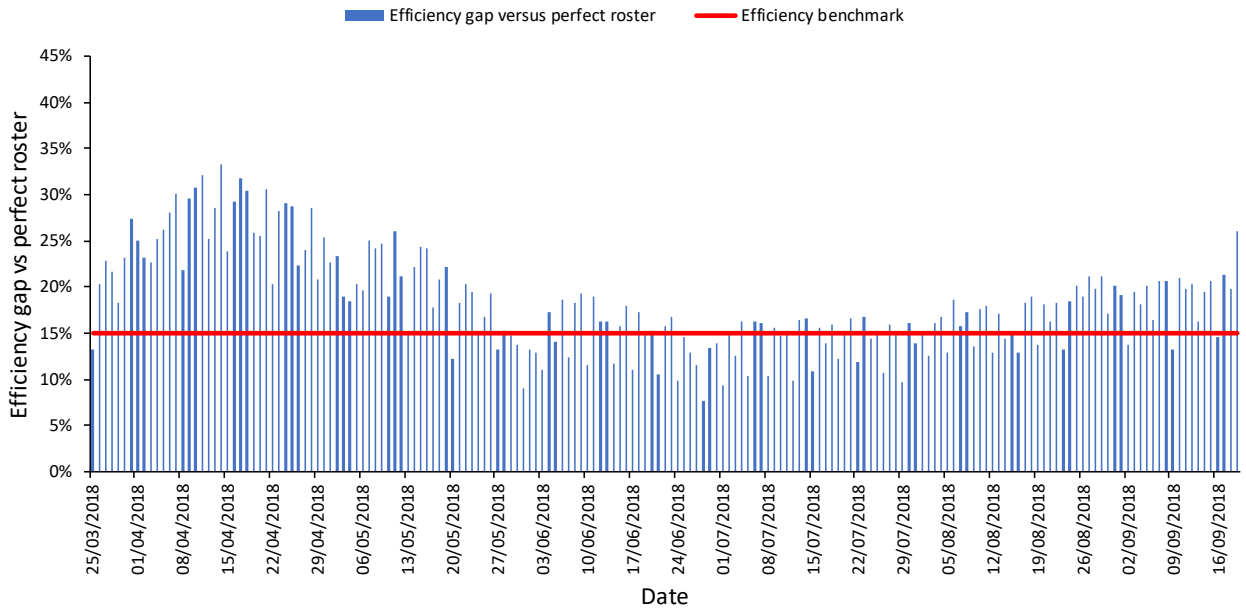
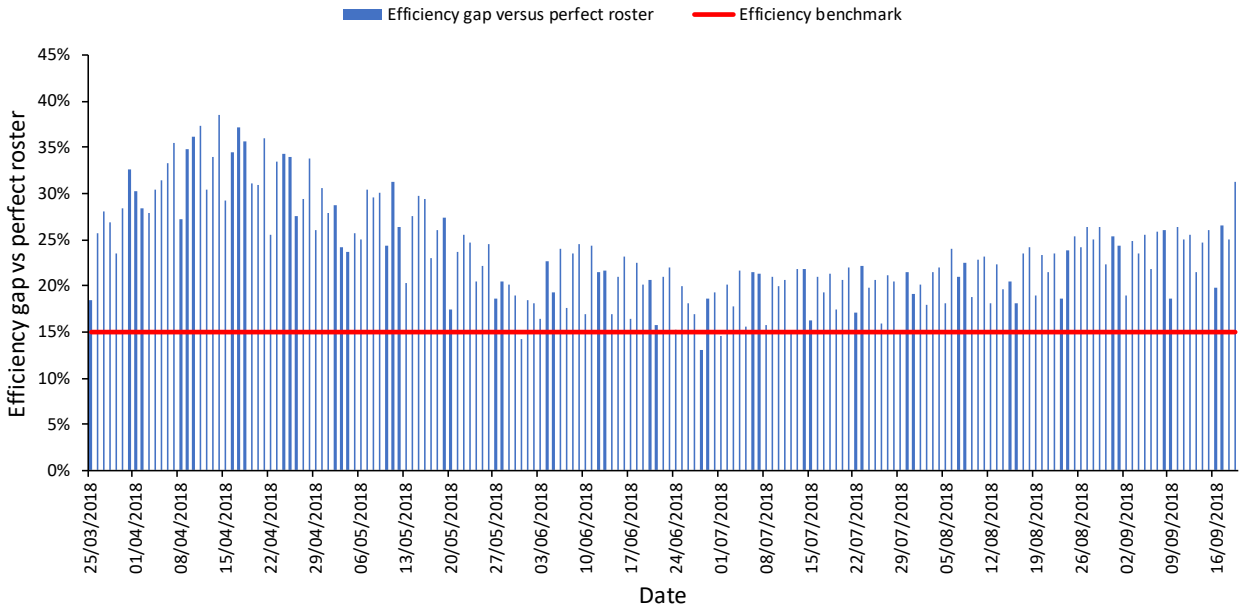


Figure A.15 shows the potential for Terminal 2 Airport Search Unit efficiency savings over the 2018 summer season if the roster overheads are reduced to the following:

- a zero mark-up up on breaks, reduced from [redacted], assuming it is possible to spread breaks uniformly across shifts through changes to employment contracts
- sick leave reduced from [redacted] to [redacted] in line with Ryanair's comments
- other absences reduced from [redacted] to [redacted] by improved management of unauthorised and unexplained absences.

Figure A.15: T2 roster efficiency, summer 2018 with reduced roster overheads



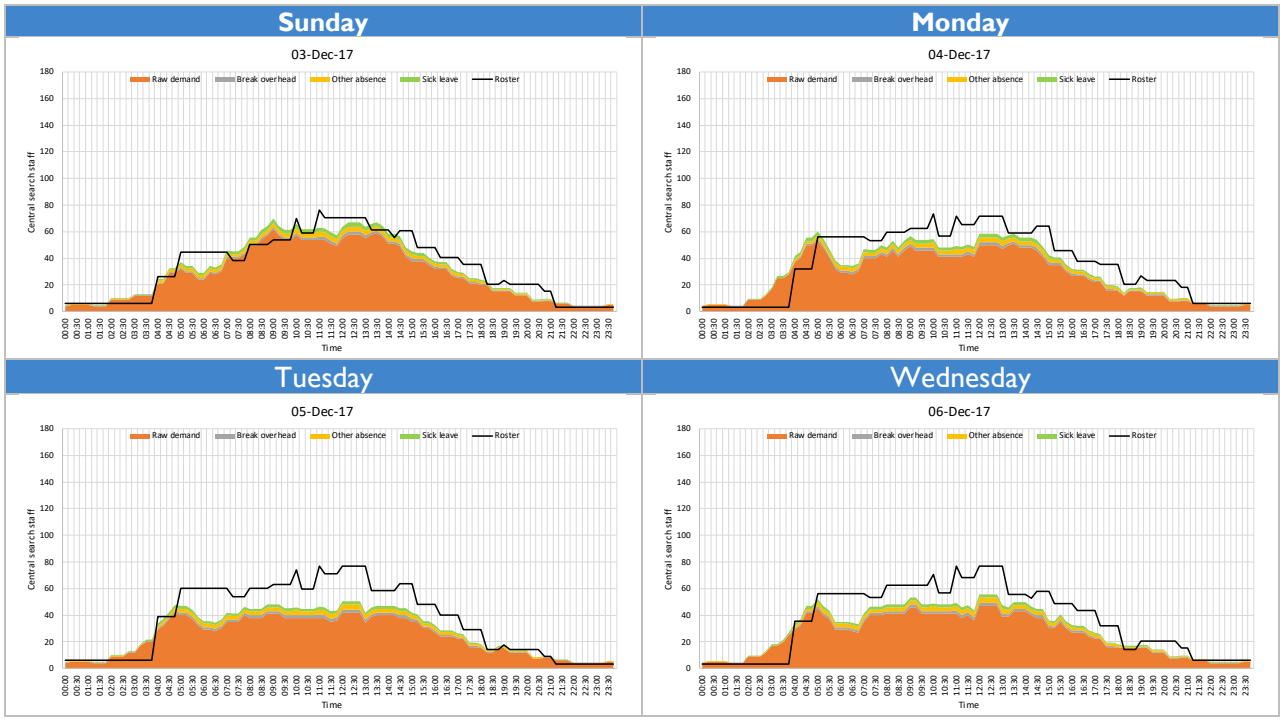
The figure shows that reducing roster overheads increases the scope for efficiency saving to 8.8% over the season.

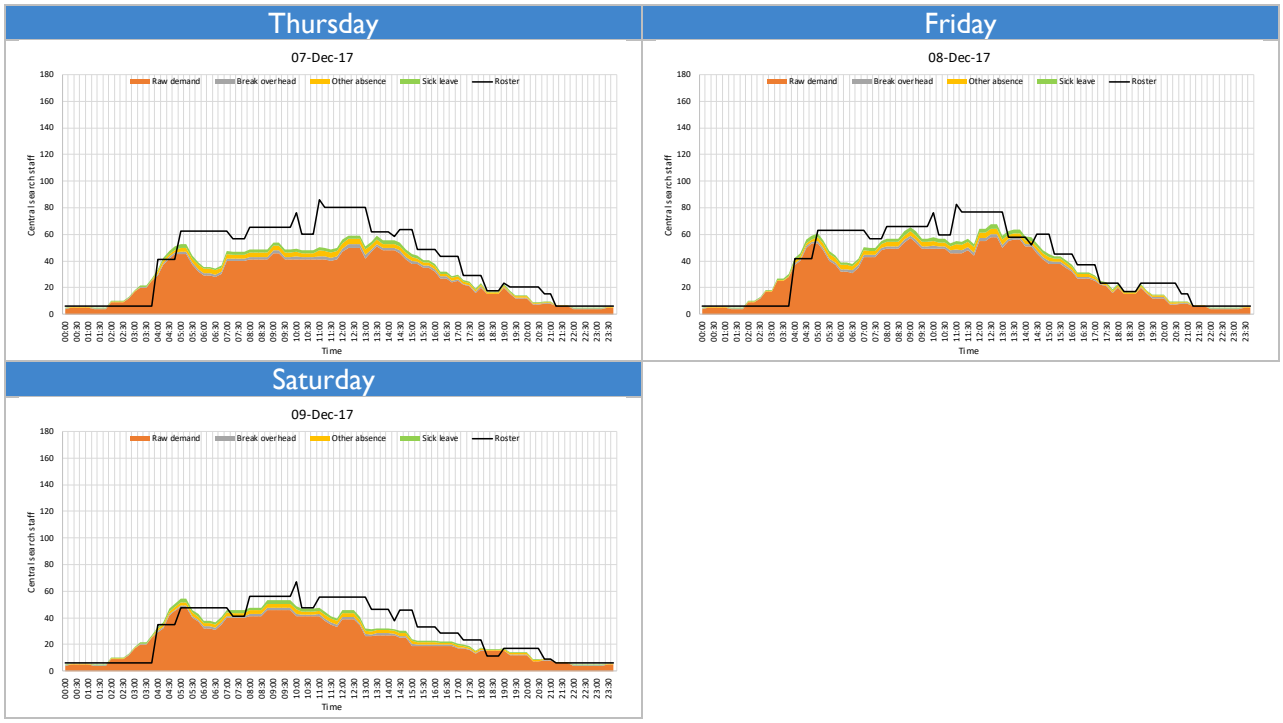
T2 winter season

Current rosters

Figure A.16 compares staff supply derived from the Terminal 2 winter roster with staff demand for a week in December 2017.

Figure A.16: Comparison of staff demand with roster, Terminal 2, one week in December 2017





The charts show a much-reduced early morning peak compared to the summer demand profile. They show a good match between supply and demand for Sunday, Monday, Friday and Saturday but suggest some oversupply on Tuesday, Wednesday and Thursday. The charts illustrate the benefit of smoothing the early morning peak in matching supply and demand.

Scope for efficiency

Figure A.17 shows the potential for daily efficiency gap defined as the difference between rostered supply and demand as a proportion of the rostered supply. A positive value indicates that supply exceeds demand; a negative value (not shown) indicates the demand exceeds supply and zero indicates that the roster perfectly matches demand.

The chart has been derived using Dublin Airport roster overheads:

- [redacted] mark-up up on breaks
- [redacted] sick leave
- ✂✂ other absences.

Assuming these overheads, the chart shows that there is limited scope for efficiency savings, generally on Tuesdays, Wednesdays and Thursdays (as noted above).

Figure A.17 suggests a potential efficiency saving of 2.4% for the Terminal 2 winter season assuming Dublin Airport roster overheads.

Figure A.17: T2 roster efficiency, winter 2017-18 with Dublin Airport roster overheads

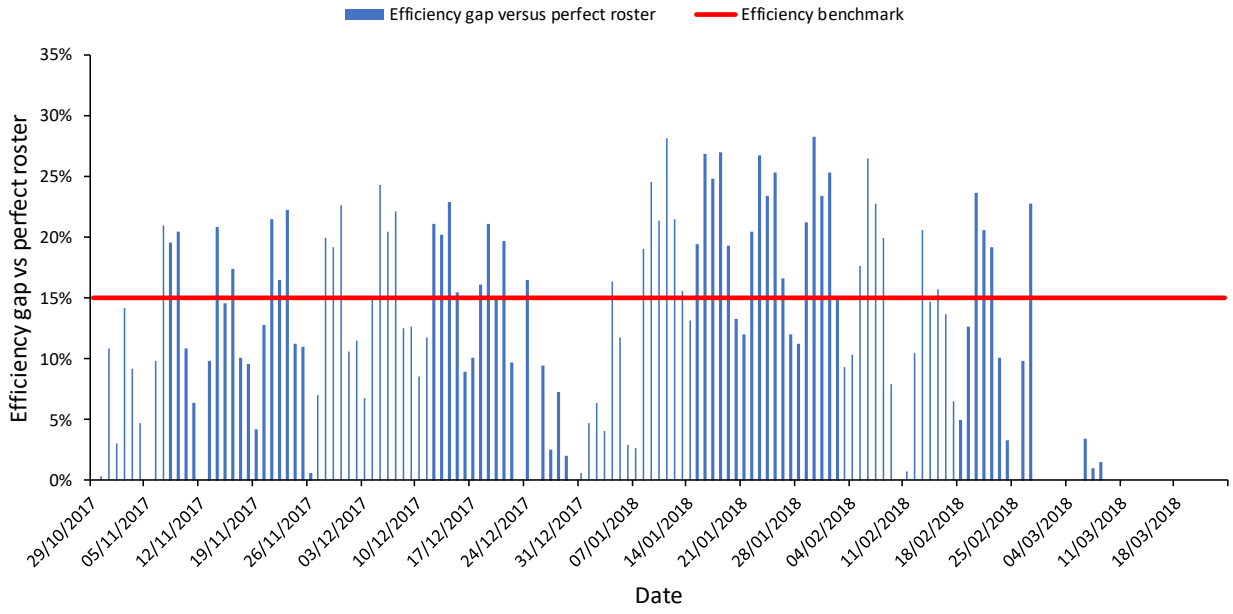
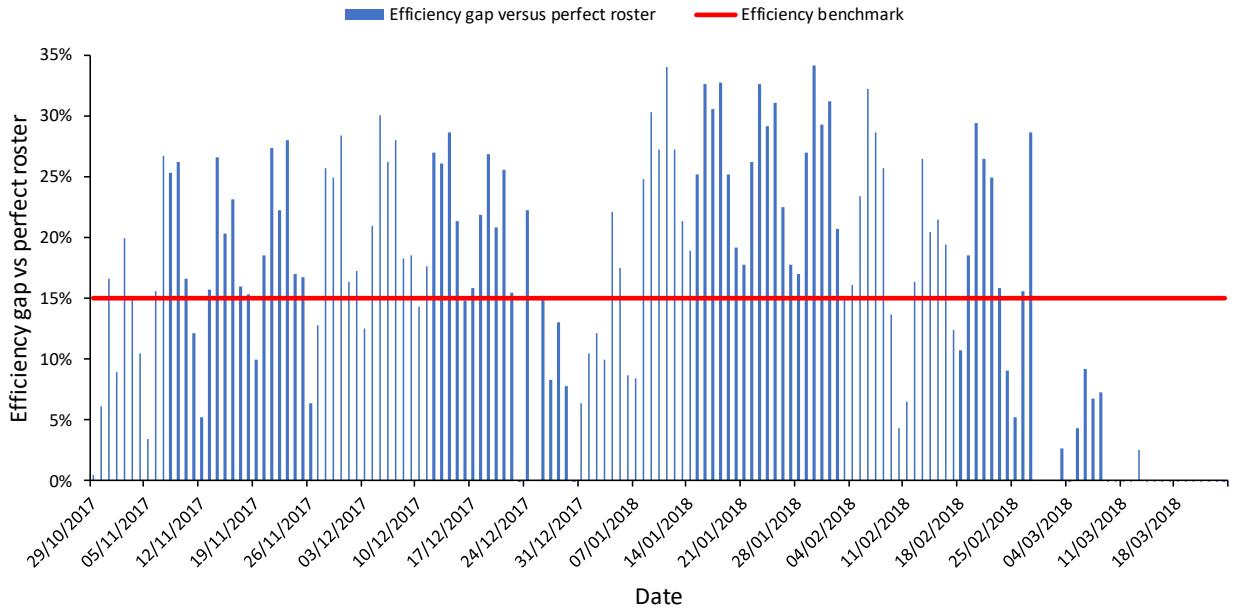


Figure A.18 shows the potential for Terminal 2 Airport Search Unit efficiency savings over the 2017-18 winter season if the roster overheads are reduced to the following:

- a zero mark-up up on breaks, reduced from [redacted], assuming it is possible to spread breaks uniformly across shifts through changes to employment contracts
- sick leave reduced from [redacted] to [redacted] in line with Ryanair's comments
- other absences reduced from ✂✂ to ✂✂ by improved management of unauthorised and unexplained absences.

Figure A.18: T2 roster efficiency, winter 2017-18 with reduced roster overheads



The figure suggests a potential efficiency saving of 4.8% over the winter season.

Comparison of T2 winter and summer rosters

More detailed examination of both summer and winter rosters suggests that the summer and winter rosters are closely matched:

- the number of FTEs required to fulfil the winter roster is approximately 220
- the number of FTEs required to fulfil the summer roster is approximately 229.

For calendar year 2018, Dublin Airport reports that the average number of FTEs in the Terminal 2 Airport Search Unit is 234, which after our re-baselining to allow for potential Terminal 2 roster efficiencies is reduced to 226. There is likely no scope, therefore, for efficiency savings by better matching the FTE profile with roster requirements without double counting.

Queens House
55-56 Lincoln's Inn Fields
London WC2A 3LJ
United Kingdom

Level 20, Tower 2
Darling Park, 201 Sussex St
Sydney NSW 2000
Australia

CEPA Ltd
@CepaLtd