Capital Investment Programme 2020 +

Consultation Document

Issued: 25th October 2018

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TABLE OF CONTENTS

LIST OF FIGURES

EXECUTIVE SUMMARY

CIP 2020+
The purpose of this consultation document is to present our proposed Capital Investment Programme (CIP) from 2020 to users of Dublin Airport and other relevant stakeholders. Upon receipt of feedback from stakeholders, we will consider views before submitting the proposed CIP to the Commission for Aviation Regulation ('the Commission') for consideration as part of its Regulatory Determination that will be published in 2019. As part of this Regulatory Determination process, the Commission will carry out a public consultation – of which the CIP will be an integral component – and is expected to publish its Draft Decision in April 2019.

The proposed projects detailed in this consultation have been developed following an extensive Masterplan exercise, an internal due diligence process and a series of pre-consultation meetings with key stakeholders. The delivery of this programme would enable Dublin Airport to develop in a sustainable manner and accommodate 40 million passengers per annum (mppa) in what represents the next step of a bigger plan in which the airport can accommodate 55 mppa.

Passenger growth and future demand
Dublin Airport has experienced strong traffic growth since the existing Regulatory Determination (covering the period 2015-2019) was finalised in 2014. Annual passengers of 21.7m in 2014 experienced double-digit growth in 2015 (15.4%) and 2016 (11.4%). Supporting this growth in 2016, for example, was the introduction of 19 new routes and additional capacity on 31 existing routes. In 2017, 14 new routes were introduced, and extra capacity was added to 39 existing routes, bringing annual passengers very close to 30m. In July of this year, a new monthly record was set with a peak throughput of 3.3m passengers, contributing to an overall projection that is in excess of 31m passengers this year.

More recently however, certain downside risks have emerged in the form of Brexit and rising oil prices, for example. At present, strong Irish originating traffic is managing to offset the declines in British outbound

passengers but there is considerable uncertainty on how Brexit will affect demand over the course of the next Regulatory Determination. In recent weeks, a number of airlines have ceased to exist, and profit warnings have been issued to other airlines, but it is not known exactly how these developments will impact on our future demand profile.

We have recently been consulting with airport users on the appropriate methodology for projecting passengers over the course of the next Determination and the Commission also considered this as part of its Issues Paper earlier this year. Irrespective of the methodology that is applied by the Commission in setting its passenger targets, it is imperative that the airport is adequately positioned to accommodate 40 mppa by the end of the next Determination period, or shortly thereafter, if we are to avoid a situation whereby inadequate infrastructure is in place to cater for demand.

This CIP consultation document therefore sets out the necessary investment that is required to realise the collective opportunity that exists to achieve 40 mppa at Dublin Airport over the medium term.

Quality of service and passenger experience

Service quality at Dublin Airport high on our agenda and our strategy demands a sustained focus on understanding and meeting key needs of passengers as growth cannot be sustained without acceptable levels of service quality. Moreover, airports are ranked on a broad range of service quality measures and a percentage of our annual revenue is at stake if we do not meet certain targets. It follows that future capital investment and new infrastructure needs to be progressed with a keen focus on fundamental passenger needs and key drivers of satisfaction. In accordance with this, the proposed projects set out within this CIP have been designed in line with our commitment to deliver a good level of service quality and enhance the experience of the passenger.

Capacity assessments

Dublin Airport regularly assesses capacity across the key processing facilities. These assessments focus on the core facilities required to process passengers in addition to parking and manoeuvring aircraft across the airfield. A recent capacity assessment highlighted the below operational processors, as critically requiring immediate enhancements:

- Contact and Bus Gates
- Stands
- T1 and T2 Check-in
- T1 and T2 Central Search
- US Preclearance Facilities
- T1 Baggage Reclaim
- T1 and T2 Immigration Facilities
- T1 and T2 Transfer Facilities
- T1 and T2 Departure Lounge
- Long-Term and Short-Term Car Parking
- T1 Kerbs
- T1 and T2 Hold Baggage Screening

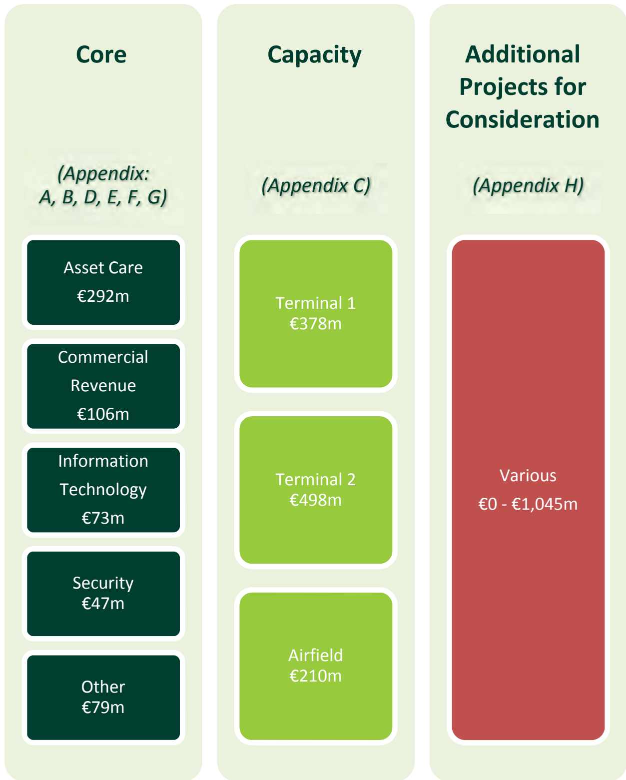
This assessment also flagged that the above facilities do not have sufficient capacity headroom or an adequate level of service quality to support the projected growth in the short term. Targeted solutions have therefore been required to alleviate emerging capacity deficits and bottleneck issues in the airport system. In line with this, the proposed projects within this CIP are designed to minimise any such deficits or bottlenecks over the medium term and ensure that service quality is not compromised.

Project groupings

The projects within this proposed CIP from 2020 have been grouped into broad categories that reflect the nature of the investment required. The proposed groupings are considered under two broad headings: Core and Capacity.

- **Core projects** broadly reflect capital expenditure required to maintain existing infrastructure and includes an element of revenue generating commercial projects.
- The group of **capacity projects** are, quite simply, required to meet future demand in a sustainable manner that does not compromise service quality.
- Those **additional projects** for consideration represent projects that have not been prioritised by Dublin Airport following an internal due diligence process but projects that we would nonetheless welcome feedback on as part of this consultation process.

Figure 1: Summary of proposed project groupings.



Cost estimates and deliverability

The proposed projects in this CIP consultation comprise 73 Core and 15 revenue generating commercial projects with an estimated combined cost of approximately €580m. This consultation also contains 20 proposed capacity projects that are estimated to cost €876m for terminal related projects and €210m for airfield related projects.

These costs are indicative and represent our latest best estimate of costs, including contingency, and there is a possibility that certain estimates will be revised as the levels of design are advanced throughout the regulatory process with the Commission. Similarly, the Commission will engage independent cost consultants who will provide draft and final reports in 2019 setting out their view of what is representative of reasonable and efficient cost estimates.

The delivery of the next CIP from 2020 will require significant coordination involving a wide range of stakeholders. Many of the proposed projects within this consultation document will require planning permission and, by its very nature, this can lead to challenges and other unrelated delays. Furthermore, while we are actively preparing our procurement department for a more significant capital investment programme, but it is also quite possible, for example, that the significant upturn in Irish construction will adversely impact procurement. It follows that the delivery timelines outlined for each project in this consultation are also best estimates and subject to change. Financeability is also key to delivering this proposed CIP, as set out below.

Financing the next CIP

Combining the next CIP with other required projects such as the North Runway, those capital projects approved as part of the second interim review of the 2014 Determination (i.e. PACE), Hold Baggage Screening in Terminal 1, this amounts to approximately €2.0bn of required capital investment. We expect to have to raise much of this required expenditure in new debt and as such, financeability is key in relation to the deliverability of the next CIP.

While the Commission has yet to set targets for the various building blocks in the forthcoming Determination due in 2019, we are of the view that it is reasonable to assume that we can deliver the next CIP without a material increase in the price cap. In other words, it is possible to deliver the required infrastructure, including those projects currently being delivered (e.g. PACE and North Runway), while keeping the average price cap relatively flat.

As the financial viability of the airport is in the interests of airport users and passengers, it is important that all stakeholders are aware that a material reduction to the current price cap of €9.57 in 2018 could impact our credit rating required to deliver the scale of investment i.e. our ability to source this increased level of debt, at most potential market conditions (i.e. weak and volatile) and at terms (include interest costs) that are favourable.

As Dublin Airport will need to secure funding in advance of starting these projects, any deferral in remuneration profile will also increase the pressure on credit metrics as liquidity is a key metric measured by rating agencies and factored into their rating analysis. In order to ensure Dublin Airport can raise the necessary funds on acceptable terms through the different market conditions, a credit rating not less than BBB+ is required. A reduction in the price cap implies that we may ultimately be unable to proceed with certain projects that have been approved by the Commission following support from airport users.

It follows that any additional projects proposed or required by airport users, beyond what is proposed in this CIP consultation, will place upward pressure on the future price cap compared to current levels.

User feedback and next steps

In line with the 2017 consultation on PACE, user feedback will play a critical role in shaping the proposed CIP that we will submit to the Commission for consideration. Again, consistent with the consultation on PACE, we intend to hold several interactive presentations to simplify what it being proposed and provide an opportunity for stakeholders to seek clarification. We encourage you to participate in this process and look forward to your feedback.

A summary of the proposed projects is set out overleaf.

Figure 2: Summary of Asset Care CSF Proposed Projects

Appendix A - Asset Care (CSF)		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.01.001	Southern Runway (R10R/28L) Delethalisation Programme	€2.2
CIP.20.01.002	Apron Rehabilitation Programme	€44.0
CIP.20.01.003	Airfield Taxiway Rehabilitation Programme	€22.0
CIP.20.01.004	Apron Road Rehabilitation Programme	€5.6
CIP.20.01.006	Airfield Southern Perimeter Road Upgrade Programme	€4.6
CIP.20.01.008	Runway Approach Lighting Mast Improvement Programme	€11.1
CIP.20.01.009	Aerodrome Ground Lighting (AGL) Improvement Programme	€4.7
CIP.20.01.010	Airfield Lighting Control & Management System Improvement Programme	€4.9
CIP.20.01.012	AGL Substation T Development Programme	€3.7
CIP.20.01.015	High Mast Lighting Improvement	€0.7
CIP.20.01.016	Airfield Maintenance Base Improvement Programme	€4.5
CIP.20.01.018	Campus Buildings Critical Maintenance	€1.5
CIP.20.01.020	Terminal 1 Façade, Roof & Spirals	€25.8
CIP.20.01.022	Terminal 1 Storm Water Drainage System	€1.1
CIP.20.01.023	Piers & Terminals Critical Maintenance	€1.9
CIP.20.01.024	Skybridge Rehabilitation	€1.2
CIP.20.01.034	Campus Roads Critical Maintenance	€9.0
CIP.20.01.039	Airport Roads Critical Maintenance	€6.9
CIP.20.01.046	Staff Car Parks Critical Maintenance	€1.7
CIP.20.01.049	Public Carpark Critical Maintenance	€2.4
CIP.20.01.056	Campus Facilities & Landside Snow Base Upgrade	€2.9
CIP.20.01.065	Airport Heavy Fleet & Equipment Replacement	€14.7
CIP.20.01.069	Airport Light Vehicle Fleet Replacements and Augmentation	€3.2
CIP.20.01.071	Electric Charger Network Facilities	€1.6
CIP.20.01.074	Advance Visual Docking Guidance System (5G, Pier 1 & Pier 2)	€5.3
CIP.20.01.087	AGL Fibre Optic Communication Network Improvement Programme	€2.0
CIP.20.01.099	RWY 16/34 Lighting for Low Visibility Procedures (LVP)	€5.5
CIP.20.07.013	Airfield Redesignation	€1.5
TOTAL		**€196**

Figure 3: Summary of Asset Care Mechanical & Electrical Proposed Projects

Appendix B - Asset Care Mechanical & Electrical (M&E)		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.02.001	Medium Voltage (MV) Electrical Network	€6.3
CIP.20.02.004	Passenger Boarding Bridges (Maintenance & P3 Enhancement) & Fixed Electrical Ground Power	€18.1
CIP.20.02.005	Lift Upgrade Programme - Terminal and Multi-Storey	€6.2
CIP.20.02.006	Airport Water & Foul Sewer Upgrade	€5.0
CIP.20.02.007	Life Safety Systems (LSS) Upgrade Programme Terminal and MSCP Buildings	€14.1
CIP.20.02.008	Terminal Buildings HVAC Upgrade	€17.8
CIP.20.02.009	Campus Buildings: Mechanical, Electrical & LSS Upgrade	€9.5
CIP.20.02.010	Pier 3 Life Extension Works - Mech, Elec and Foul Drainage	€14.0
CIP.20.02.013	Small Energy Projects	€4.8
TOTAL		**€96**

Figure 4: Summary of Commercial Revenue Proposed Projects

Appendix D - Commercial		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.04.001	Car Parking Management System (Maintenance & upgrade)	€3.1
CIP.20.04.002	Car Hire Consolidation Centre	€18.1
CIP.20.04.003	New Food & Beverage Fit-out (T1X)	€2.1
CIP.20.04.004	Digital Advertising Infrastructure	€2.2
CIP.20.04.005	Long Term Car Parking - Eastlands (2000 spaces)	€5.9
CIP.20.04.006	Terminal 1 Multi-Storey Car Park Block B (600 spaces)	€18.8
CIP.20.04.007	Terminal 2 Multi-Storey Car Park (680 spaces)	€15.1
CIP.20.04.016	Platinum Services Upgrade Works	€2.1
CIP.20.04.017	Airline Lounges - Expansion, Upgrade & New	€11.4
CIP.20.04.018	Fast Track Improvements	€1.7
CIP.20.04.021	West Apron - Accommodation & Welfare Facilities	€4.5
CIP.20.04.023	Food & Beverage Provision & Fit-out – Post CBP	€3.2
CIP.20.04.025	Commercial Property Refurbishment	€8.0
CIP.20.08.001	Retail Refurbishments, Upgrades and New Developments	€8.0
CIP.20.08.002	Retail Marketing & Media Installation	€1.5
TOTAL		**€106**

Figure 5: Summary of Information Technology Proposed Projects

Appendix E - Information Technology		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.05.001	Airfield Optimization	€7.9
CIP.20.05.002	Digital Passenger Experience	€1.8
CIP.20.05.003	Integrations and Data	€7.1
CIP.20.05.004	Baggage Systems	€1.3
CIP.20.05.005	Business Efficiency	€6.2
CIP.20.05.006	Commercial Systems	€2.3
CIP.20.05.007	Reliability, Safety, Security & Compliance	€8.2
CIP.20.05.008	Operational Devices (Support & Maintenance)	€1.8
CIP.20.05.009	Network Components - Lifecycle & Growth	€6.9
CIP.20.05.010	Passenger Processing (excl. Security Screening)	€7.0
CIP.20.05.011	Security Technology Innovation (Biometrics & FOD Detection)	€3.0
CIP.20.05.012	Servers and Storage - Lifecycle & Growth	€5.6
CIP.20.05.014	User Devices (Desktops, Mobile, Telephone, Radio)	€3.7
CIP.20.05.015	New Data Centre Hosting Location	€4.0
CIP.20.05.016	Microsoft Enterprise	€6.0
TOTAL		**€73**

Figure 6: Summary of Security Proposed Projects

Appendix F - Security		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.06.001	Cabin-Baggage X-Ray Replacement & EDS Upgrade	€14.6
CIP.20.06.007	Full Body Scanners	€1.9
CIP.20.06.009	ATRS – Additional Lane in Terminal 1	€0.6
CIP.20.06.015	Intrusion Detection Systems for Dublin Airport Boundaries	€4.0
CIP.20.06.016	Surface Road Blockers & Temporary Mobile Barriers	€1.0
CIP.20.06.022	Redevelopment of Training Facility (ASTO)	€1.2
CIP.20.06.025	Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit	€0.2
CIP.20.06.030	VCP Automation to Enable Remote Screening	€0.7
CIP.20.06.031	Autopass - T1 Replacement & T2 Install	€1.8
CIP.20.06.036	TSA - X-Ray & FBSS Replacement	€0.4
CIP.20.06.041	Security Screening Equipment - End of Life	€4.5
CIP.20.06.042	ATRS - Central Search Areas (T1 and T2)	€11.7
CIP.20.06.044	Replacement of T1 Controllers for Access Control System	€0.5
TOTAL		**€43**

Figure 7: Summary of 'Other' Proposed Projects

Appendix G - Others		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.07.001	Programme Management	€6.5
CIP.20.07.002	Minor Projects (projects generally under €100k, water pump replacements, gate area repairs etc.)	€14.5
CIP.20.07.004	Metro Coordination	€0.5
CIP.20.07.010	Office Consolidation & Refurbishment (primarily Level 4 & 5, Terminal 1)	€18.0
CIP.20.07.014	Terminal Operations Improvement Projects	€5.9
CIP.20.07.030	Large Energy Project - Photovoltaic Farm	€10.0
CIP.20.07.031	Terminal 2 HBS Standard 3	€21.0
CIP.20.07.032	Unit Load Device (ULD) Storage	€3.0
TOTAL		**€79**

Figure 8: Summary of Proposed Capacity Projects

Appendix C - Capacity		Terminal 1	Terminal 2	Airfield
CIP Number	**Project Title**	**Provisional Estimate €m (October 2018)**		
CIP.20.03.004	Gate Post 9 Expansion (West Lands)			€9.2
CIP.20.03.006	Terminal 1 Kerbs	€19.9		
CIP.20.03.011	Terminal 1 Check-In (Island 1 & 2)	€23.7		
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	€49.8		
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	€42.9		
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	€39.1		
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	€2.0		
CIP.20.03.020	Terminal 2 Check-in Area Optimisation		€9.8	
CIP.20.03.021	Terminal 2 Central Search Area Expansion		€13.6	
CIP.20.03.028	Terminal 2 Early bag store and transfer lines		€27.9	
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)		€304.1	
CIP.20.03.030	Expansion of US Pre-Clearance Facilities		€46.4	
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)		€95.8	
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	€6.1		
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	€187.9		
CIP.20.03.040	North Apron De-icing pad	€6.1		
CIP.20.03.051A	West Apron Vehicle Underpass – Northern Pier 1 Option			€85.0
CIP.20.03.052	Surface Water Environmental Compliance			€51.0
CIP.20.03.054	New Remote Apron 5M - 10 NBEs			€60.1
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)			€5.0
TOTAL		**€378**	**€498**	**€210**

Figure 9: Summary of Additional Projects for Consideration

Appendix H - Additional Projects for Consideration		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.02.002	Second Medium Voltage (MV) Connection Point	€20.0
CIP.20.04.009	Staff Car Park	€6.0
CIP.20.04.013	Central Island Redevelopment - Corballis Park	€10.3
CIP.20.06.014	Screening and Logistics Centre	€18.9
CIP.20.03.011A	Terminal 1 Check-In (Partial shoreline)	€29.9
CIP.20.03.016	Terminal 1 - Rapid Exit Arrivals	€1.3
CIP.20.03.019	Terminal 1 - 6 bay Sorter Replacement	€9.4
CIP20.03.020A	Terminal 2 Check-in Extension - Expand existing footprint	€30.0
CIP.20.03.022	Terminal 2 International Departures Lounge - Level 35 re-optimisation	€13.4
CIP.20.03.024	Terminal 2 Immigration Hall - Reorientation	€2.5
CIP.20.03.033	Enablement of Pier 3 for Precleared US bound passengers	€49.4
CIP.20.03.036A	North Apron Development – Pier 1 Extension (Module 2)	€97.7
CIP.20.03.043	Pier 1 Fixed Links and Airbridges	€14.0
CIP.20.03.043A	Pier 2 Widebody Enablement & Airbridge Install	€51.7
CIP.20.03.043B	Pier 2 Wide Body Enablement - Pier Extension	€196.8
CIP.20.03.045	New West Satellite Pier Incl. Airfield	€351.0
CIP.20.03.047	New Taxiway W	€30.3
CIP.20.03.048	Rapid Exit Taxiway RWY 10/28	€7.5
CIP.20.03.049	De-icing pad at Runway 10R	€5.0
CIP.20.03.051	West Apron Vehicle Underpass - 5G Option	€79.0
CIP.20.03.055	Engine test facility (Code E)	€10.0
CIP.20.03.070	Terminal 2 CBP Make-up and Baggage Hall entrance	€1.0
CIP.20.03.071	Fuel Line - Pier 3	€10.4
TOTAL		**€1,045**

1 DEMAND ANALYSIS

1. DEMAND ANALYSIS

1.1. Passenger Forecast Methodology and Market Outlook Consultation

The volume and composition of future airport activity is a critically important input to the capacity development plan. To inform stakeholder engagement, in early September 2018, Dublin Airport issued a consultation document which provided detailed insights on:

- Dynamics underpinning current airport traffic Methodology for projecting future demand
- Dublin Airport's strategic aims
- Demand outlook

This specific consultation closed for submissions on 19 October. Dublin Airport are currently reviewing all responses and will issue a summary conclusion by the end of October 2018.

The remainder of this section outlines the key information which was provided in the above consultation.

1.2. Review of Traffic Dynamics

Several specific changes to the dynamics and composition of traffic at Dublin Airport have emerged since publication of the 2014 Determination. While most of these changes have positively contributed to passenger and aircraft movement growth, they have also placed a peak strain on certain modules of airport infrastructure.

Changes in key airline operating models

Ryanair's increased focus on serving primary airports and Aer Lingus' continued migration towards a network model will influence the future facility requirements of both airlines. Ryanair has also signalled an interest to commence transferring passengers at Dublin, while Aer Lingus has accelerated its long-haul expansion plans, by almost doubling its long-haul fleet since 2014. The growth of narrow-body, next generation aircraft operating transatlantic routes is a significant recent market development and one that will require tailored airport infrastructure to facilitate.

There has also been a marked increase in the number of based aircraft at Dublin Airport since 2014, which is driving increased demand for overnight aircraft parking stands and first-wave departure slots. Ryanair has increased its first wave departures from 19 aircraft in 2014 to 31 aircraft in 2018, while Aer Lingus has increased its morning narrow-body departures from 24 to 28 over the same period.

New players in the market: changing growth dynamics

The number of scheduled airlines at Dublin Airport has increased from 29 in 2014 to 46 in 2018. With the arrival of Hainan Airlines and Cathay Pacific in Summer 2018, Dublin Airport now welcomes five of the world's 5-star airlines (out of a total of ten). These premium carriers require enhanced airport facilities such as business class lounges, dual-airbridges, fast-track security and chauffeur car parking. Ryanair and Aer Lingus generated up to 80% of the airport's growth in 2015 and 2016, however in 2017 and 2018, almost two thirds of the airport's growth came from 'other airlines'.

Growth in long-haul and transfer traffic

Long-haul traffic accounted for 15% of overall traffic in 2017, up from 12% in 2014. There has been an increase from 43 widebody movements on a typical busy day in 2014, to 69 per day in 2018. Long-haul flights enhance Dublin's global connectivity, but widebody aircraft place heavier demands on the airport's infrastructure. Transfer passenger volumes have doubled since 2014, increasing from 3% to 5.5% market share. In 2018, connecting volumes will cross two million passengers for the first time. The vast majority of connections at Dublin Airport are from North America to Europe (and vice versa). The West-to-East transfer flows typically occur early in the morning. Aircraft arriving off the Atlantic normally require pier served contact stands, which by extension displace certain narrow-body/short-haul flights to remote and satellite aprons. The corresponding East-to-West connections occur daily from 0900 to 1500. Longer-haul flights from the US West Coast, such as San Francisco, Los Angeles and Seattle arrive in Dublin from 1100 onwards, with onward connections to Europe and the UK taking place in the afternoon.

Market analysis

Dublin's transatlantic traffic has grown by over 50% since 2014 and Dublin is now the sixth largest airport in Europe for traffic to North America (ahead of Madrid, Rome, Barcelona, Milan and Munich).

Core European destinations have seen an increase in flight frequency and capacity. The strong resurgence in Irish outbound leisure demand has resulted in a 38% increase in passengers travelling to Southern Europe/ Mediterranean destinations since 2014. The market size in 2017 was over six million passengers.

Conversely, the UK market was flat in 2017 and is forecast to be similar in 2018. Leisure traffic flows in this market are particularly sensitive to currency fluctuations. The UK is by far Dublin's largest volume market and accounts for over one in three passenger journeys. Traffic changes in this key market will have a critical impact on overall passenger numbers at Dublin Airport.

Summary

Annual passenger volumes have increased by over ten million since 2012. the trend towards larger size aircraft continues. Growth in 2015 and 2016 was exceptional (11-15% passenger growth). The positive trend has continued through 2017 and 2018, but at a more moderate rate of circa 6%.

Short-haul traffic has increased, on average, by 9% per annum since 2013. Long-haul growth is more pronounced, with on average, a 16% increase per annum over the same period. Long-haul traffic has doubled in absolute volumes since 2013 and is now approaching 16% of total traffic.

Transfer volumes have increased by on average, 30% per annum since 2013. The share of transfer traffic has over doubled from 2.7% in 2013 to almost 6% in 2018. The rate of growth in 2018 is expected to moderate to 15% (an increase of circa 200,000 passengers on 2017).

Pre-recession, the average load factor in Dublin was in the mid-70s. In recent years, airlines have increasingly focused on volume, with load factors crossing 80% in 2015 and now plateauing in the region of 83%. The progression from 77% in 2013 to 83% today, is the equivalent of adding over two million additional passengers per annum, without any increase in aircraft movements or seat capacity.

Activity at Dublin Airport continues to be dominated by Code C aircraft, which represent 87% of annual movements. However, the increase in long-haul services

has led to a higher proportion of larger size aircraft. Code D/E aircraft now account for over 10% of total movements, up from 8% in 2013. We expect that the proportion of Code D/E aircraft will continue to gradually increase over the medium term. At present, there are no Code F operations at Dublin Airport. Since 2013, movements by Code D aircraft increased by 9% to 7,656, while movements by Code E aircraft more than doubled to 14,767. The average aircraft size has grown consistently over the past number of years. There is an expectation that average aircraft seat capacity will continue to grow by between 1-2% over the medium term.

A noticeable trend is the growth in market share of the 'Other' airlines, which has increased from 20% to 25% during the current regulatory period. The largest of the 'Other' carriers are British Airways (3%), Lufthansa (2%) and Cityjet (2%). Norwegian's market share has grown rapidly from 0.4% in 2016 to 1.3% in 2018. In 2018, six new entrants will commence operations at Dublin Airport.

There has been little change in seasonality profiles over recent years. The peak months of July and August continue to generate 21% of annual traffic. An 1%-point increase in the proportion of passengers travelling in Jan-Feb would equate to approximately 350,000 additional annual passengers.

Over half of Dublin Airport's passengers are resident outside of the Republic of Ireland. UK residents account for almost 20% of traffic. The percentage of non-Irish passengers has increased in recent years. Since 2013, non-Irish passengers have grown by an average annual rate of 12% (compared to 8% for Irish passengers). The growth in non-Irish passengers is most notable on long-haul routes. Historically, traffic volumes from Asian residents has been minimal, but this is expected to increase significantly following the introduction of direct services to Beijing and Hong Kong in 2018.

The split between leisure and business passengers has been broadly consistent from 2013 and 2018. Therefore, both segments have experienced similar rates of strong growth over the period. Leisure passengers account for approximately 80% of overall traffic. The proportion of business passengers is significantly higher on UK routes, at 27%. With over one in four passengers travelling on business, any downturn in trade or business activity (such as that presented by a hard Brexit) could have a significant negative impact on overall traffic volumes at Dublin Airport.

1.3. Dublin Airport Strategic Aims

National Aviation Policy

In considering our strategic targets, Dublin Airport is guided by the National Aviation Policy (NAP), which was published by the Department for Transport, Tourism and Sport (DTTAS) in 2015. Among the goals outlined in the NAP are:

- Creating conditions to encourage the development of new routes and services, particularly to new and emerging markets;
- Ensuring a high level of competition among airlines operating in the Irish market; and
- Optimising the operation of the Irish airport network to ensure maximum connectivity to the rest of the world

In addition, the NAP specifically references the opportunity to develop Dublin Airport as a vibrant secondary hub, competing effectively with the UK and other European airports. A hub combines local passengers with transfer passengers enabling airlines to operate services to more destinations and more frequently than could be supported by local demand alone. Irish aviation policy states that the airport should be developed into a secondary hub over a period of time and that this will involve the construction of a second runway as well as other infrastructure developments. The importance of the United States Preclearance facility is a key contributory factor to the growth in the transatlantic connecting business over recent years. However, with several European airports currently in negotiations with the United States authorities for the provision of CBP facilities, connecting traffic at Dublin Airport will undoubtedly face greater competition in the years ahead.

Transfer targets

The number of transfer passengers at Dublin Airport doubled from 800,000 to 1.6 million between 2014 and 2017. Dublin Airport's 2025 Strategy has set the following ambitious transfer targets:

- Accelerated development of Dublin as an international hub
- Grow depth, coverage and choice on the transatlantic network
- Double transfer traffic to approximately 10% of total traffic
- Maximise the scale and usage of the United States CBP facility

North American market

Dublin Airport's geographical location on the outer west coast of Europe offers a compelling strategic advantage over other Continental European hubs for one stop connections to/from North America. Ireland acts as a natural gateway between the two land masses, with populations of between four and five hundred million people on either side of the ocean.

In 2013, Dublin served 11 destinations in North America. This has increased to 21 destinations in 2018, with four new locations on the West coast (Vancouver, Seattle, Los Angeles and San Francisco).

In terms of potential new destinations, Reykjavik (a significant competitor to Dublin in the transatlantic connecting market) offers 13 North American destinations that are currently not served from Dublin (Portland, Denver, Minneapolis, Pittsburgh, Baltimore-Washington, Edmonton, Halifax, Tampa, Cleveland, Detroit, Cincinnati, Kansas and Saint Louis). Other potential new destinations in North America could include Calgary, Las Vegas, New Orleans, San Diego and Phoenix.

Expansion of intercontinental destinations

Historically, the Dublin Airport long-haul network was concentrated on North America. In recent years, connections have been added to the four major Middle Eastern hubs; Istanbul, Dubai, Abu Dhabi and Doha. In 2018, the first Asian services launched to Beijing and Hong Kong. In terms of global coverage, direct services between Dublin and the following regions remain underdeveloped and could be focus areas for new route development in the coming years;

- Top five Chinese cities, Korea, Japan, Thailand and Malaysia
- Indian Sub-Continent
- Mexico, South/Latin America and the Caribbean
- Sub-Saharan Africa

Many of the above destinations are currently served from Manchester and London Gatwick airports, which are peer competitors to Dublin for new intercontinental services.

Consumer choice and competition

In 2010, over 30% of Dublin Airport's passengers travelled on routes operated by a single carrier. By 2017, this figure had dropped to less than 19% and is on course to reduce further in 2018, as airlines offer new choices on existing services, which can lead to lower prices, improved schedule timings, greater flexibility, improved connections and ultimately, higher quality services for consumers. Obviously, some of the thinner, lower frequency routes may remain in service with one operator, but each of the top ten volume routes now have at least two airlines offering services (and in many cases three or more carriers; i.e. Barcelona (3 airlines), Paris (4 airlines), New York and London (5 airlines).

1.4. Market Outlook

The macroeconomic trends in our key source markets remain positive and should continue to support increased levels of demand. Passenger numbers and aircraft movements are expected to continue to grow over the next regulatory period and beyond. This is consistent with recent trends, industry forecasts and airline aircraft orders.

Normalised traffic growth

In recent weeks, the rolling twelve-month passenger total crossed 31 million for the first time. The airport is on track to record passenger growth of c.5.8% in 2018.

A sustained period of moderated but stable demand growth is expected. Current growth rates have subsided to mid-single digit percentages and are expected to reduce further in the medium term, across the larger, more constrained European airports. Although airline schedules are not yet finalised for 2019, Dublin Airport anticipates a further continuation of growth next year. However, a lower, more normalised rate is expected (c.3%). An unconstrained demand opportunity of an additional one million passengers certainly already exists for 2019.

The composition and mix of airport traffic will continue to broaden. We anticipate further new entrants across a range of service offerings; from new, intercontinental five-star airlines, to additional short-haul low cost services. Transfer traffic is expected to grow and account for a larger percentage of overall airport traffic. A continuation of expansion on the North Atlantic is expected, as well as increased demands for US Preclearance. Trends towards larger aircraft and higher load factors continue to drive passenger growth above aircraft movement growth, albeit load factors are currently at record levels, with limited scope to increase further.

Significant downside risks emerging

34% of traffic at Dublin Airport travels between Ireland and the UK (over 11 million passengers in 2017). No growth has occurred in this key market for over two years and the initial forecast for 2019 does not anticipate a return to growth. A hard Brexit could result in a sustained traffic decline, as swiftly as next year, in this key volume market.

Overall airport growth in 2015 and 2016 was delivered against a backdrop of oil prices at less than $50 per barrel (low of $29 was recorded in early 2016), but prices are currently on an upward trajectory and have recently surpassed $75. Oil at over $75 per barrel has historically challenged the viability of certain airline business models and the recent spate of airline collapses is concerning (two of which have negatively impacted Dublin Airport's 2019 traffic forecast).

Finally, capacity headroom at the airport over the coming years will be significantly less than during the preceding period. Runway capacity will remain constrained until 2022, when the new runway is expected to be operational, albeit planning restrictions could limit its full potential. An immediate deficit of contact stand availability is a significant issue which will be addressed in this development plan. A constrained demand profile may be a more valid forecasting assumption for the first half of the next determination.

Medium-term indicative normalised growth

There is undoubtedly an unconstrained demand opportunity to achieve an annual volume of over 40 million passengers before 2030. For planning purposes, an indicative CAGR of 2.5% would equate to an annual volume of 37 million passengers in 2025. Annually, this would equate to an additional 5.5 million passengers travelling through the airport over 2018 (+17.7%).

2 CAPACITY ASSESSMENT

2. CAPACITY ASSESSMENT

This section outlines the processes and methodologies routinely used by Dublin Airport to assess capacity across the varying processing modules. The analysis focuses on the capacity of current facilities with the planned enhancements based on the full build out of the current five-year plan and Programme of Airport Campus Enhancement (PACE).

A 'typical busy day' design day flight schedule has been developed for 40 million passengers per annum (mppa) and the capacity assessment will highlight the supply needed across the key processing modules to support future airline and passenger demand into the next decade. While 40mppa is unlikely to be reached by 2024, it is essential to have the necessary infrastructure in place to accommodate the growth on the horizon.

2.1. Methodology

A comprehensive assessment of capacity across the key processing facilities has been undertaken. This process ultimately identifies operational processors that will be at or nearing maximum capacity and require capacity enhancements to serve 40 mppa. This assessment has focused on the composition of demand and traffic across a typical busy day rather than assessing a total demand figure. High level total demand may remain the same year-on- year, but if the profile of activity fluctuates across the day, new capacity constraints may emerge.

When designing airport capacity, it is not practical or efficient to scope the infrastructure required to accommodate the absolute peak hour demand on a peak day. This approach would result in unnecessary capital investment and under-utilisation of infrastructure across a full year. It would require excessive annual operational expenditure to resource and maintain the facilities. Instead, a 'typical busy day' is used as the base case for all airport capacity assessments. This approach bridges the demand between an average day of operations and the absolute peak day of airport activity. This metric ensures that the cost, scope and specification of the airport's infrastructure is optimised to support high demand periods at an acceptable level of service quality for passengers. The annual traffic forecast figure for a given volume of passengers is extrapolated and using historic values it is then possible to calculate the annual to typical busy day ratio to understand the relationship between annual and typical busy day movements. This ratio is used to convert the annual forecast to a typical busy day equivalent figure to build the new schedule which in this case is representative of 40 mppa.

Several standard methodologies can be used to assess the typical busy hour or day for passenger and aircraft flows at the airport. These are:

- 95% busy day/hour rate
- 30th busiest hour
- Busiest timetable hour
- IATA method – second busiest day of an average week during the peak month

The typical busy day or hour may be calculated using a wide range of criteria:

- Total aircraft movements
- Total passengers
- Total departing passengers by terminal

- Transatlantic aircraft movements
- First wave departure movements

Differing 'busy days' or 'busy hours' can obviously be derived depending on the criteria used. For example, when focussing on runway infrastructure a busy day would usually be calculated based on an aircraft movement criterion.

Dublin Airport defines a 'typical busy day' based on the 95th percentile of passenger and aircraft activity (usually between the 14th and 20th busiest days in the year) and uses this for the development of its design day flight schedule. When establishing the typical busy day for Dublin Airport, the following unique considerations are relevant:

- Transatlantic movements
- First-wave departures
- Late evening arrival bank
- Transfer versus local passengers
- The composition of traffic – Thursday has a higher proportion of business passengers than Saturday

The base schedule should reflect a typical busy day for the airport in terms of movements. A breakdown of movements by geographical market served by the airport is derived from the annual traffic forecast. This split can then be used to distribute the typical busy day total ATM figure to the various geographical markets, if historic analysis has indicated that the annual ATM breakdown is like the daily percentage share of markets. New movements are added to the base schedule, and the share of movements per market is altered to reflect the anticipated profile. Elements to take into consideration while undertaking this process include:

- Growth of existing airlines and the introduction of potential new entrants
- Fleet mix changes
- Flight turnaround times
- Airline market share

To assess the capacity and future demand for each processor, a typical busy or peak day demand profile/schedule was developed for 40 mppa, often referred to as a design day flight schedule (DDFS). The capacity assessment highlights the required facilities needed across key processing modules to support future customer demands into the next decade. DDFSs for 2017 and the 40 mppa demand level were compared to show the demand and need for capacity increases. Figure 10 illustrates the rolling hour passenger volumes for the 2017 and 40 mppa DDFSs. For both arriving and departing passengers, the rolling peak hour passenger volume is forecast to increase by 45 percent from 2017 to the 40 mppa demand level.

Figure 10: Rolling Hour Passenger Volumes by Design Day Flight Schedule

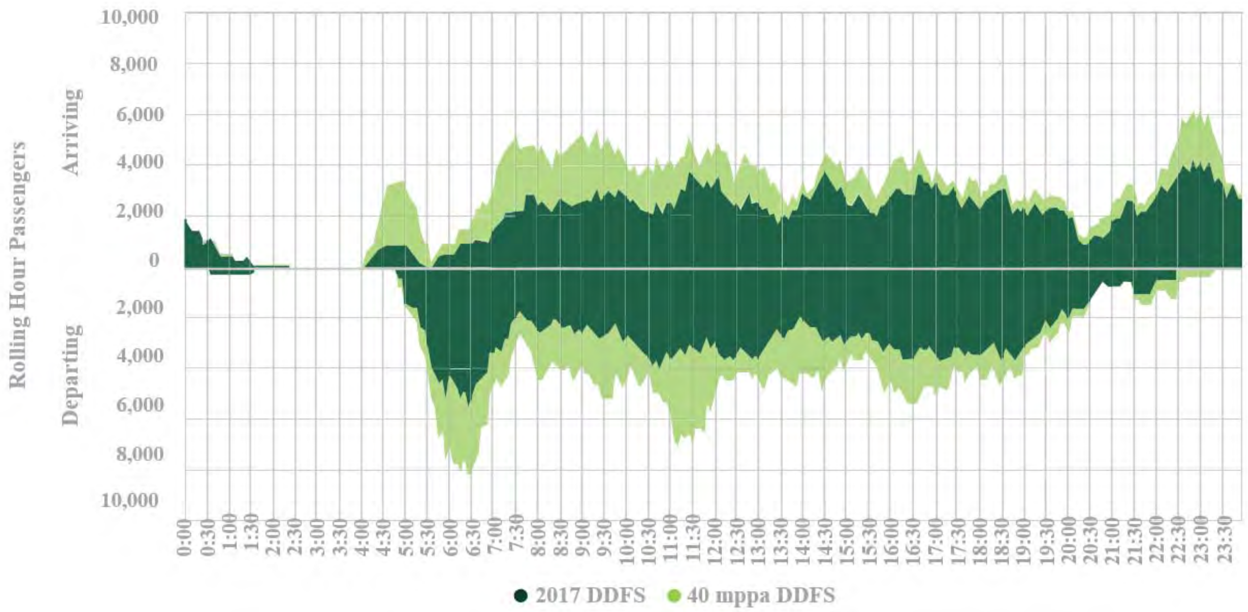
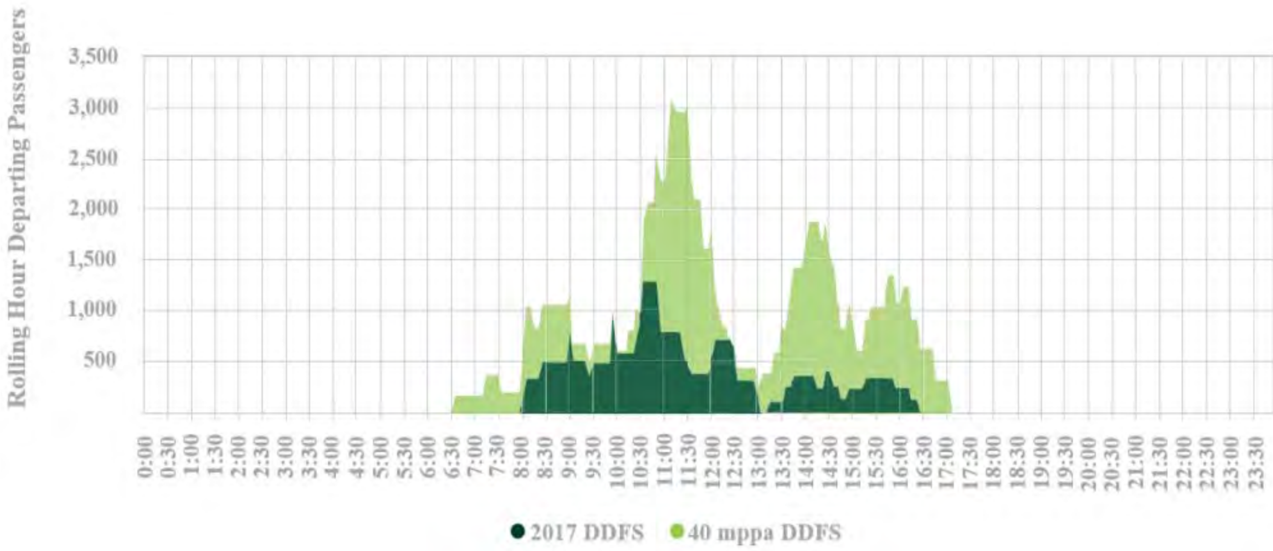


Figure 11: Rolling Hour US – Bound Departing Passenger Volumes by Design Day Flight Schedule



Due to the specific passenger type processing through the United States (US) Preclearance Facility, US-bound departing passenger volumes for the 2017 and 40 mppa DDFS are shown in Figure 11. US-bound departing passenger volumes are anticipated to grow by 135 percent from 2017 to the 40 mppa demand level. Facility requirements do not increase commensurately with peak hour passenger growth. However, it is important to understand the peak hour passenger growth occurring between the 2017 and 40 mppa DDFS.

In 2019, UK will depart from the European Union —this is commonly referred to as Brexit. Based on a typical peak day in 2017, passengers travelling between the UK and Dublin Airport accounted for one third of all passengers at the airport. Therefore, Brexit could have significant implications on the airport's future facility requirements. For analysis purposes, two scenarios were developed for future facility requirements for the 40 mppa demand level, the Before Brexit (status quo) scenario and the With Brexit scenario. Given the present lack of clarity surrounding Brexit, projects proposed as part of this CIP Consultation document do not make any specific provision for a 'hard' or 'no deal' Brexit but the hypothetical impact is identified as part of this chapter.

Each process was evaluated to determine how the worst-case With Brexit scenario will affect future facility requirements. As such, it was determined that immigration and transfer facilities will be most affected by Brexit.

2.2. Capacity Assessment - Overview

The capacity assessment examines each of the airport processors found on a passenger's journey shown in Figure 12.

Figure 12: Operational Processors – Dublin Airport

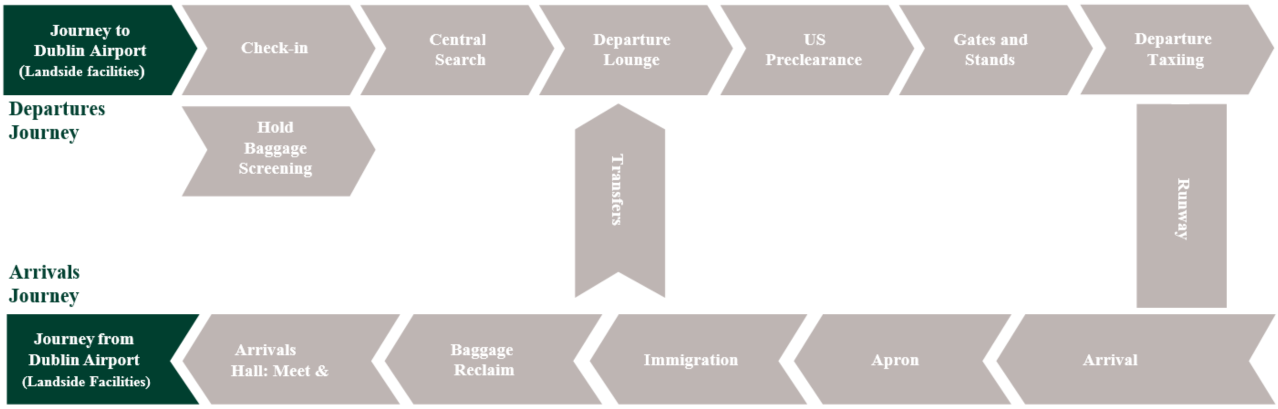


Figure 13 and Figure 14 summarise the primary departure and arrival processors at Dublin Airport. The charts are colour coded to identify which processes have sufficient capacity (Green) and which require infrastructure solutions (Red) to accommodate 40mppa demand.

Figure 13: Departure Process

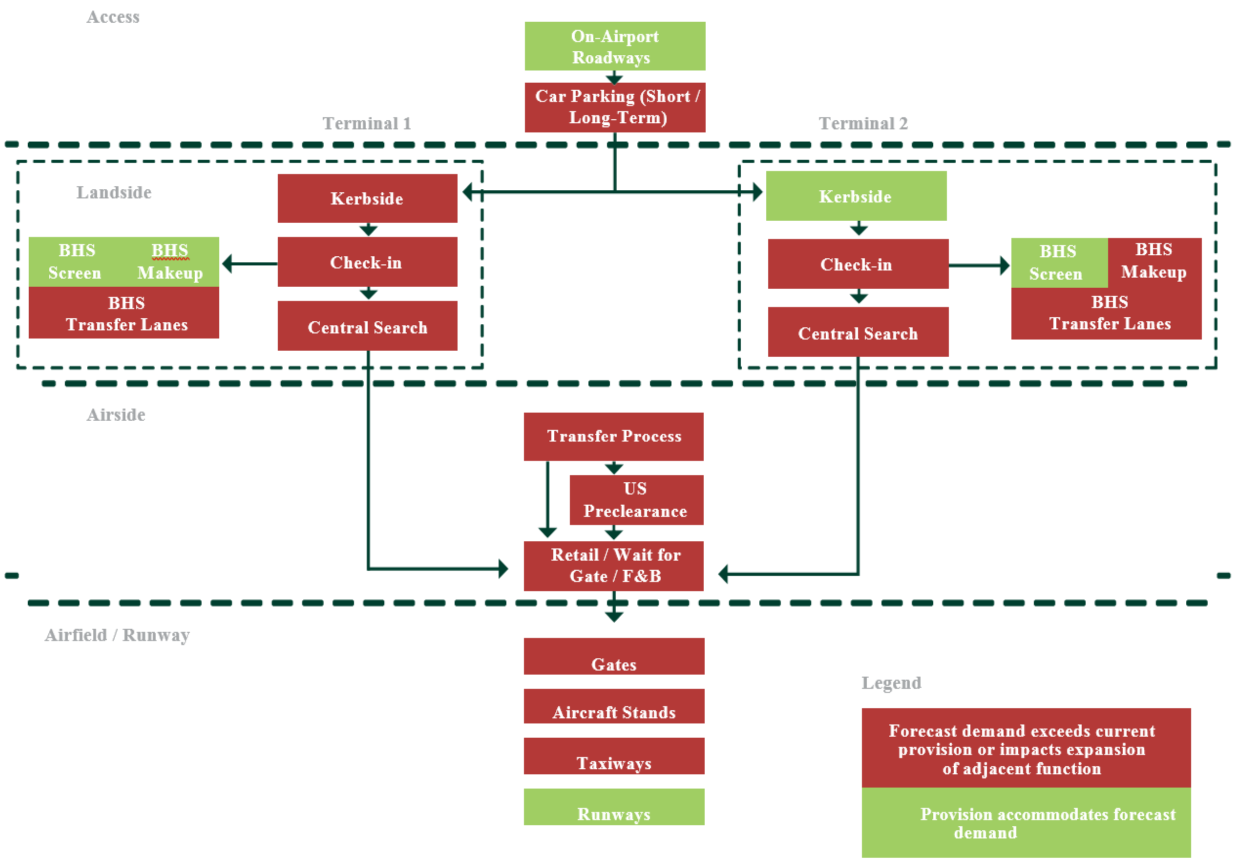
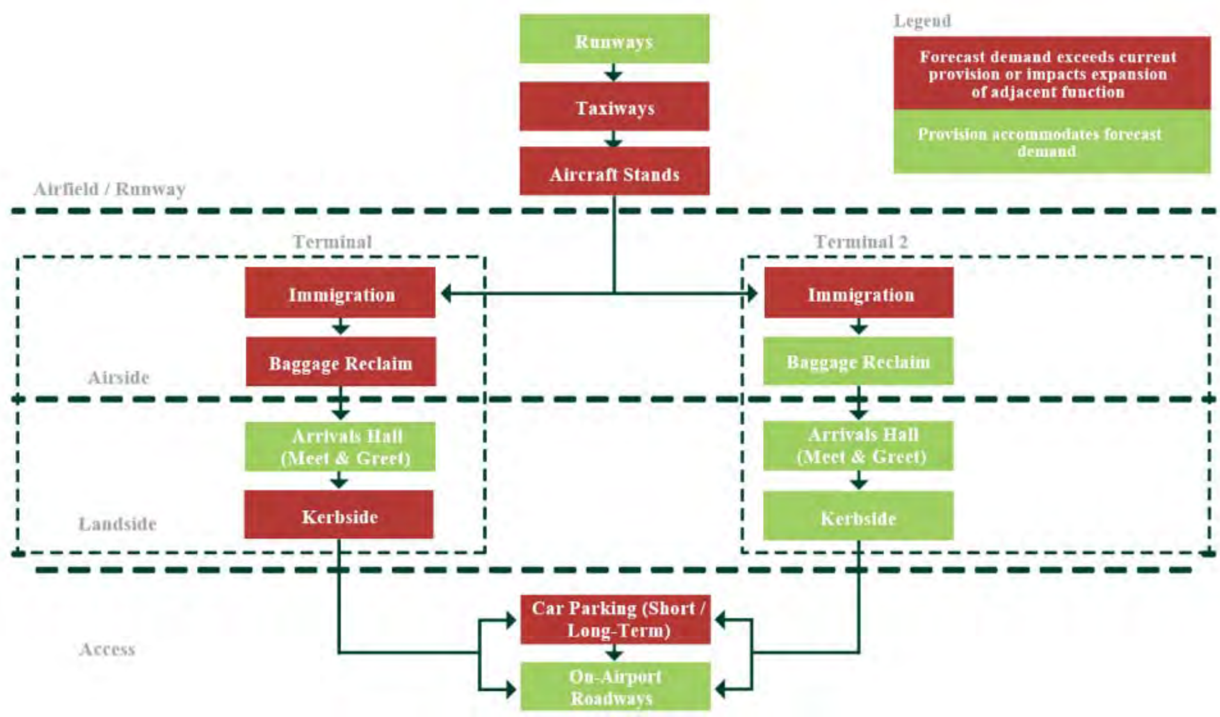


Figure 14: Arrivals Process



The following sections detail the results of the capacity assessment for each processor. A definition of the table headings is shown in Figure 15.

Figure 15: Definition of Table Headings

Heading	Definition
Current Planned Capacity (Post PACE)	This capacity number reflects (1) total capacity added to the processor as a result of projects carried out as part of the 2015 to 2019 Capital Investment Plan (CIP) and 2017 PACE (which are either in progress or complete), (2) additional capacity as a result of efficiency gains (3) loss of capacity due to new regulatory requirements, and (4) the addition of the north parallel runway.
40 mppa Facility Requirements Before Brexit	This requirement reflects the required number of units or area to satisfy the 40 mppa demand before Brexit occurs.
40 mppa Facility Requirements Before Brexit: Surplus / (Deficit)	The 40 mppa Facility Requirements Before Brexit are compared to the planned capacity, and the difference in terms of units is shown as a surplus or (deficit).
40 mppa Facility Requirements with Worst-case, With Brexit Safeguard	This requirement reflects the required number of units or area to satisfy the 40 mppa demand with the safeguards for a worst-case Brexit.
40 mppa Facility Requirements with Worst-case, With Brexit Safeguard: Surplus / (Deficit)	The 40 mppa Facility Requirements with Worst-case Brexit Safeguard are compared to the planned capacity, and the difference in terms of units is shown as a surplus or (deficit).

Unless specified, the 40 mppa facility requirements shown in the following sections are for the Before *Brexit* scenario.

2.3. Landside Facilities

Landside facilities are used by passengers to enter or exit the airport and include the roadway networks, car parking, ground transportation, and terminal kerbs. At Dublin Airport the short- term car park, public and coach stations form the central area Ground Transport Centre (GTC). The proposed Dublin City Metro North station will also be located within the GTC.

2.3.1. Long-Term and Short-Term Car Parking

It is anticipated that demand for both Long Term and Short-Term car parking facilities will exceed the available capacity and will require expansion as part of the CIP development. The planned capacity reflects the existing capacity (post PACE). Figure 16 presents the planned capacity and 40 mppa facility requirements.

Figure 16: Long-Term and Short-Term Car Parking Overview

Area (Unit)	Current Planned Capacity (Post PACE	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Long-Term Car Parking (No. of Car Spaces)	19,130	22,640	(3,510)
Short-Term Car Parking (No. of Car Spaces)	4,210	6,660	(2,450)

Findings:
As shown in Figure 16, it is anticipated that long – term and short-term vehicle parking at the 40 mppa demand level would exceed the planned capacity. Chapter 6 and Chapter 7 of this report will explore options for the requirement.

2.3.2. Ground Transportation Centre

The GTC is used by coach buses to drop-off and pick-up passengers at the airport and capacity for the GTC is expected to remain the same. However, plans to redevelop the GTC to better serve passengers by improving and promoting the public transport product and integrating the GTC with the planned Metro North Station are under consideration. Redevelopment of the GTC would enable the relocation of the Terminal 1 Public Departure Kerb from its current location to the northeast side of the Terminal 1 Multi- Storey Vehicle Parking area. This would allow DAP to align to European security best practice of locating the public kerbs 30 metres from the face of the terminal building. The planned capacity and 40 mppa facility requirements for the GTC are shown in Figure 17.

Figure 17: Ground Transportation Centre Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus / (Deficit)
Ground Transportation Centre (No. of Bus Spaces)	31	35	(4)

Findings:
As shown in Figure 17, the 40 mppa facility requirement for GTC bus spaces is anticipated to exceed planned capacity, and the additional capacity required could be incorporated into a planned GTC redevelopment.

2.3.3. Terminal 1 Kerbs

Three elements of the Terminal 1 kerb capacity and demand were assessed; kerbside buses, taxi cab forward staging, and public drop-off kerb. Some coach buses utilise the kerbside for drop-off and pick-up of passengers in lieu of the GTC. Prior to picking up passengers, taxis stage in areas located away from the terminal kerbsides. As passenger demand dictates, taxis are called from these remote staging areas to an area known as forward staging. The public drop-off kerb is used by all private vehicles, taxis, and luxury vehicles for passenger drop-off. As noted in section 2.3.2 the public drop-off kerb may be relocated to the northeast side of the Terminal 1 Multi-Storey Car Park to align with European security best practice. Figure 18 presents the Terminal 1 kerb planned capacities and 40 mppa facility requirements.

Figure 18: Terminal 1 Kerb Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus / (Deficit)
Kerbside Buses (No. of Bus Spaces)	11	13	(2)
Taxi Forward Staging (No. of Car Spaces)	35	35	0
Public Drop-Off Kerb (Length, metres)	215	300	(85)

Findings:
There is sufficient capacity to meet 40 mppa demand for taxis forward staging. Requirements for the kerbside bus and public drop-off kerb at 40 mppa demand level exceed planned capacity. However, capacity shortages could be accommodated by the GTC redevelopment for both facilities.

2.3.4. Terminal 2 Kerbs

Similar to the Terminal 1 kerb capacity, Terminal 2 kerb capacity and demand was assessed for three elements; kerbside buses, taxi forward staging, and public drop-off kerb. The planned capacities and 40 mppa facility requirements for the Terminal 2 kerbs are shown in Figure 19. There is no requirement to expand the T2 kerb capacity.

Figure 19: Terminal 2 Kerb Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Kerbside Buses (No. of Bus Spaces)	8	8	0
Taxi Forward Staging (No. of Car Spaces)	35	35	0
Public Drop-Off Kerb (Length, metres)	260	260	0

Findings:
Across all elements of the kerbside, there is sufficient capacity at Terminal 2 to meet 40 mppa demand.

2.4. Passenger Processing

2.4.1. Check-in Facility

It is proposed that airlines will be reallocated between Terminal 1 and Terminal 2 to optimise the use of existing capacity and align to airlines' business needs by the 40 mppa demand level. Key changes include consolidating all airlines serving US destinations in Terminal 2, where the US Preclearance facilities are located, and locating the remaining airlines in Terminal 1. The 40 mppa facility requirements reflect a conservative view and assume current levels of utilisation of self-service kiosks and automated baggage drop technology. Figure 20 presents the planned capacities and 40 mppa facility requirements for the Terminal 1 and Terminal 2 check-in facilities.

Figure 20: Check-in Facility Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Terminal 1 Baggage Input Device – Traditional / Auto-Baggage Drop (No. of Units)	105	132	(27)
Terminal 1 Self-Service Kiosks (No. of Units)	31	75	(44)
Terminal 2 Baggage Input Device – Traditional / Auto-Baggage Drop (No. of Units)	56	70	(14)
Terminal 2 Self-Service Kiosks (No. of Units)	76	82	(6)
Remote Locations (Hotel, Car parks, GTC) - Self-Service Kiosks (No. of Units)	0	30	(30)

Both Terminal 1 and Terminal 2 require additional baggage input device and self-service kiosks capacity to meet the 40 mppa demand level. Extra self-service kiosks will be required to roll out a remote check-in strategy where by passengers will have the option to self-check-in at locations within local hotels, public transport interchanges or car parks.

Existing island check-in areas and check-in positions at Terminal 1 require more queue and circulation space. The existing island arrangement could be replaced with a more efficient shoreline layout, which is better suited to self-service kiosks and automated bag drop technology. The shoreline layout positions the baggage input devices in a single, linear orientation with self-service kiosks located across from the baggage input positions but separated from the baggage input positions by queue and circulation space. Central Search would need to be relocated to accommodate the preferred shoreline layout at Terminal 1.

Relocating Central Search, reorienting check-in positions, and relocating the drop-off kerb would create a confluence of issues that affect how departing passengers move through Terminal 1. To properly address the check-in capacity issues in Terminal 1, the solution requires a holistic view that modernises the terminal's layout. In addition to re-envisioning the Terminal 1 departure process.

Findings:
At both terminals, new baggage input device and self-service kiosks capacity are required to meet 40 mppa demand. A broader solution to the Terminal 1 departure process is required to address capacity shortfalls at the 40 mppa demand level.

2.4.2. Hold Baggage Screening

Hold baggage screening (HBS) consists of three components: baggage x-rays, sortation universal load devices (ULD), and transfer input lanes. Terminal 2, in the future, will also have the requirement for an additional component- a hold baggage system bag store (early bag store). This is an area which used to store transfer baggage prior to transferring to its departing flight. This component better serves transfer baggage while enabling a reduction in sortation ULD.

In Terminal 1, the requirement for additional ULD positions is driven by an increase in the first wave peak hour by short haul and widebody long haul departures. In Terminal 2, the increased ULD demand is driven by a commensurate increase in US flights, which require a dedicated sortation carousel due to HBS and US Preclearance regulations. Existing belts cannot fluctuate between US and non-US flights. The hold baggage screening planned capacities and 40 mppa facility requirements are presented in Figure 21.

Note: HBS Standard 3 compliance is being consulted on with users through a parallel Supplementary Capex Process.

Figure 21: Hold Baggage Screening Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Terminal 1 Baggage X-Rays (No. of Units)	6	6	0
Terminal 1 Sortation Universal Load Devices (No. of Units)	202	202	0
Terminal 1 Transfer Input (No. of Lanes)	1	2	(1)
Terminal 2 Baggage X-Rays (No. of Units)	5	5	0
Terminal 2 Sortation Universal Load Devices (No. of Units)	236	265	(29)
Terminal 2 Transfer Input (No. of Lanes)	3	4	(1)
Terminal 2 Hold Baggage System Bag Store (No. of Bags)	0	950	(950)

Findings:
Across both terminals, there is adequate baggage x-ray capacity to meet 40 mppa demand. However, capacity is required to meet 40 mppa demand for sortation ULD and transfer inputs in Terminal 1 and Terminal 2. Terminal 2 requires a new HBS line and hold baggage system bag store, to accommodate future transfer baggage demand.

2.4.3. Central Security Facility

Current mandates requiring airports to implement Liquids, Aerosols and Gels (LAGs) Phase II by a certain date are not in effect. It is anticipated that airports and security providers would have 1 year to implement new requirements once an official announcement is made. However, facility requirements were developed from a conservative perspective assuming LAGs Phase II would be implemented over the CIP period. Status quo utilisation of 19-metre ATRS lanes and 17-metre non-ATRS lanes at Terminals 1 and 2 was also assumed. Dublin Airport must develop flexible infrastructure for passenger security screening with the ability to adapt to regulation changes while minimising disruption to processes and capacity. Figure 22 presents the planned capacities and 40 mppa facility requirements for the Terminal 1 and Terminal 2 Central Search facilities.

The x-ray lane requirement listed could be optimised and reduced by the introduction of extended lanes and the implementation of new baggage and body scanning equipment, providing higher throughput. The current Central Search in Terminal 1 is constrained on all sides, bound by the check-in and departure lounge, and the current space cannot accommodate further expansion and will require relocation. As noted earlier, the relocation of Central Search would enable the expansion of check-in and the departure lounge.

A desirable solution to accommodating future demand at Terminal 2 is to replace the existing non-ATRS lanes with ATRS lanes, which have significantly higher throughput per lane. In addition to providing a higher capacity per lane, the introduction of ATRS at Terminal 2 would standardise the security screening process and staff training across both terminals at the airport. This option is explored in Chapter 7. The use of new baggage and body scanning equipment to increase the capacity per lane and reduce unit requirements is also explored in Chapter 7.

Figure 22: Central Security Facility Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus / (Deficit)
Terminal 1 Security X-Ray Lanes (No. of Units)	15	18	(3)
Terminal 2 Security X-Ray Lanes (No. of Units)	18	19	(1)

Findings:
Current capacity at Terminals 1 and 2 Central Security is insufficient to meet 40 mppa demand. The requirements associated with the 40 mppa demand could be reduced by implementing new baggage and body scanning equipment, increasing the throughput per lane.

2.4.4. Departure Lounge

The Departure Lounge (located post Central Search) allows passengers to wait for their gate to be allocated and displayed on the Flight Information Display Screens (FIDS). On average passengers will dwell in this location for 45 minutes. Services in this area include general wait for gate seating, retail, and food and beverage (F&B) outlets. Dublin Airport proposes expansion mainly to the general seating, wait for gate and food and beverage areas. The planned capacities and 40 mppa facility requirements for the Departure Lounges are shown for Terminal 1 and Terminal 2 in Figure 23.

Figure 23: Departure Lounge

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Terminal 1 (area, square metres)	8,285	11,600	(3,315)
Terminal 2 (area, square metres)	7,830	8,800	(970)

Findings:
Terminals 1 and 2 possess insufficient capacity to meet 40 mppa demand for a departure lounge. Additional departure lounge space is required to meet 40 mppa demand which could be distributed between the terminal and piers.

2.4.5. Departure Gates & Bus Lounges

Gate space is a function of aircraft parking stand demand (i.e. a departing aircraft) – regardless of where it is parked – and requires a discrete departure gate for processing passengers prior to boarding the aircraft. An aircraft parked on the contact stand must be served by an associated gate with sufficient capacity to accommodate the required number of passengers to match the stand and aircraft classification (i.e. Code C/ Code D etc.). Gate space can also be used to temporarily hold passengers before they are bussed to remote stands or satellite facilities. A gate may be served by an airbridge or have stairs/escalators/elevators, allowing passengers to exit from the terminal to the apron and either board an aircraft directly on a contact stand or board a bus for transit to an aircraft parked on a remote stand.

Passengers bound for different flights cannot be inter-mixed through a single gate (due to the elevated risk of passengers boarding an incorrect aircraft), and therefore, a delicate staggering of flights is required from a single gate. In specific instances, short-haul flights are staggered over 20 minutes. This is to mitigate against the constraints posed by the reduced gate to stands ratio, following the introduction of new remote stands.

Figure 24 presents the planned bus and contact gate capacity and compares these to 40 mppa facility requirements. The Terminal 1 and Terminal 2 gate requirements are driven by the entrant of new widebody aircraft and a key airline operational requirement to reduce towing and bussing while increasing availability of contact stands.

Figure 24: Bus and Contact Gate Capacity

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Terminal 1 – Contact Gates (No. of NBE Gates)	38	56	(18)
Terminal 1 – Bus Gates (No. of NBE Gates)	4	3	1
Terminal 2 – Contact Gates (No. of NBE Gates)	30	44	(14)
Terminal 2 – Bus Gates (No. of NBE Gates)	3	7	(4)

Findings:
As shown in Figure 24, a capacity shortfall exists for contact gates at Terminal 1 and contact and bus gates Terminal 2 at the 40 mppa demand level. At Terminal 1, there is sufficient bus gate capacity to meet 40 mppa demand.

2.4.6. US Preclearance Facilities

Departing passengers on US–bound flights are required to process through the US Preclearance facility located on the ground level of Pier 4. Within the US Preclearance process, there are two steps; TSA–approved security screening and immigration and customs control, conducted by US Preclearance officers at podiums. Currently, the maximum number of flights the US Preclearance facility can simultaneously process is 10. This is a function of the number of aircraft parked on adjoining Pier 4 stands. The option to further increase the number of stands utilised for precleared departures is limited, as Pier 4 aircraft parking is fully utilised during the peak morning demand period.

Figure 25 presents the planned capacities and 40 mppa facility requirements of the US Preclearance facility. The current TSA X-ray lanes are non-ATRS lanes, and the 40 mppa requirements assume that these lanes will be upgraded to ATRS lanes, increasing the throughput without increasing the number of units, providing a minimum build solution. The US Preclearance officer requirements assume the continued utilisation of Biometric Screening Systems, ensuring an efficient and minimum build solution. The increase in unit requirements is driven by an increase in the number US departures which align with the strategy to grow Dublin Airport into a European to United States hub in line with the National Aviation Policy.

Figure 25: US Preclearance Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
TSA X-Ray Lanes (No. of Lanes)	6	14	(8)
Officer Podiums (No. of Positions)	15	30	(15)

Findings:
At the US Preclearance facility, the TSA X-Ray lanes and officer podiums booth will experience capacity shortfalls at the 40 mppa demand level. The number of processing units must significantly increase for both facilities to meet 40 mppa demand.

2.4.7. Immigration Facility

Several variables affect the processing capacity of immigration facilities across the airport, such as, the profile of passengers, queue presentation, state resources available, and the transaction times of EU versus non-EU passport holders.

Typically, during a transatlantic arrival bank in Terminal 2, up to 60 percent of the arriving passengers are non-EU citizens. During peak periods, where demand can temporarily exceed capacity, arriving passengers are required to queue for longer periods of time compared to the IATA's Optimum Level of Service of 10 minutes (10th edition of IATA Airport Development Reference Manual).

Immigration capacity and throughput has recently been affected by changes in procedures due to the increased threats to civil aviation throughout Europe. Resourcing levels at Irish Naturalisation and Immigration Service (INIS)—the state authority responsible for immigration service provisions—have increased in line with passenger growth, but the per passenger transaction time has also significantly increased due to changes in immigration and passport inspection procedures.
As previously mentioned, Brexit could impact the immigration processes for UK citizens; therefore, a set of requirements were developed for a Before Brexit Scenario and a Worst-case, With Brexit Scenario. Figure 26 presents the planned capacities and 40 mppa facility requirements under the Before Brexit and Worst-Case, With Brexit scenarios for the immigration facilities.

Figure 26: Immigration Facility Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements Before Brexit	40 mppa Facility Requirements Before Brexit: Surplus/(Deficit)	40 mppa Facility Requirements Worst-case, With Brexit Safeguard	40 mppa Facility Requirements Worst-case, With Brexit Safeguard: Surplus/(Deficit)
Terminal 1 – Pier 1/2: Booths (No. of Positions)	11	15	(4)	21	(10)
Terminal 1 – Pier 1/2: E-Gates (No. of Positions)	10	11	(1)	13	(3)
Pier 3: Booths (No. of Positions)	8	12	(4)	12	(4)
Pier 3: E-Gates (No. of Positions)	0	4	(4)	4	(4)
Terminal 2: Booths (No. of Positions)	12	12	0	17	(5)
Terminal 2: E-Gates (No. of Positions)	10	7	3	9	1

Findings:

Terminal 1

Pier 1/2: Across all processors, capacity is required to meet the 40 mppa demand level. There is a greater shortfall in capacity under the Worst-case Brexit safeguard at the 40 mppa demand level for the Terminal 1 Pier 1/2 immigration facilities.

Pier 3: Additional booths and the implementation of E-gates are required to meet 40 mppa demand. The facility requirements under the worst-case Brexit safeguard are the same under the Before Brexit scenario for the Pier 3 immigration facilities.

Terminal 2

There is sufficient capacity in terms of booths and E-gates to meet 40 mppa demand under the Before Brexit scenario. However, under the worst-case Brexit safeguard scenario, there is a shortfall in terms of booths, while there is sufficient E-gate capacity.

2.4.8. Transfer Facility

The number of transferring passengers is expected to grow over the next decade. Additional transfer screening facilities will be required in both terminals to ensure transferring passengers can be processed in a timely and secure manner ensuring minimum connection times can be achieved. To ensure a minimal build solution, the security screening of third state passengers will utilise Automatic Tray Return System (ATRS) enabled x-ray lanes, which have a higher processing rate than the existing, non-ATRS lanes found in the current Terminal 2 transfer facility.

Brexit could impact the transfer processes for UK passengers; therefore, a set of requirements were developed for a Before Brexit Scenario and a Worst-case, With Brexit Scenario. With Brexit, the worst-case scenario assumes all flights from the UK are considered third state This would require all passengers transferring from UK flights to undergo security screening. Figure 27 presents the planned capacities and 40 mppa facility requirements under the Before Brexit and Worst-Case, With Brexit scenarios for the transfer facilities.

Findings:

Terminal 1: Without a transfer facility in Terminal 1, all facility requirements are considered shortfalls in capacity and must be built to meet 40 mppa demand. There is a small increase in the number of immigration positions required to meet 40 mppa demand under the Worst-case, With Brexit scenario, while x-ray lane requirements remain the same.

Terminal 2: With the relocation of third state flights to Terminal 1, there are no x-ray lanes required at the Terminal 2 transfer facility at 40 mppa. However, extra transfer immigration positions are required to meet 40 mppa demand at Terminal 2. The 40 mppa demand for transfer immigration increases slightly under the Worst-case, With Brexit scenario.

Figure 27: Transfer Facility Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements Before Brexit	40 mppa Facility Requirements Before Brexit: Surplus/(Deficit)	40 mppa Facility Requirements Worst-case, With Brexit Safeguard	40 mppa Facility Requirements Worst-case, With Brexit Safeguard: Surplus/(Deficit)
Terminal 1 – Immigration (No. of Positions)	0	6	(6)	7	(7)
Terminal 1 – X-Ray Lanes (No. of Positions)	0	3	(3)	5	(5)
Terminal 2 – Immigration (No. of Positions)	12	18	(6)	19	(7)
Terminal 2 – X-Ray Lanes (No. of Positions)	3	0	3	3	0

2.4.9. Baggage Reclaim

The Terminal 1 baggage reclaim requirements at the 40 mppa demand level are driven by the widebody aircraft peak arrival wave, up gauging of existing aircraft types from small to larger narrow bodies, new long-haul entrants, and changes to airline carry-on bag policy. Many of the existing belts and passenger waiting areas are not sized for modern high capacity narrow body aircraft, or larger widebody aircraft, that are expected to operate from Terminal 1 in the future.

Terminal 1 baggage reclaim hall circulation routes are also congested at peak times due to queues for baggage service offices, passengers waiting for restrooms, as well as overflow from device waiting areas. The congestion also impedes the flow of non-reclaiming passengers on route to the arrivals exit.

The existing reclaim hall at Terminal 2 has sufficient capacity under current operating assumptions and expected traffic growth to the 40 mppa demand level. Figure 28 presents the planned capacities and 40 mppa facility requirements for the baggage reclaim hall in Terminals 1 and 2.

Figure 28: Baggage Reclaim Overview

Area (Unit)	Current Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Terminal 1 – Reclaim Area (Area, Square Metres)	1,300	1,800	(500)
Terminal 1 – Reclaim Belt (Length, Metres)	520	580	(60)
Terminal 2 – Reclaim Area (Area, Square Metres)	2,275	1,250	1,025
Terminal 2 – Reclaim Belt (Length, Metres)	460	450	10

Findings:
Terminal 1: At the 40 mppa demand level, additional baggage reclaim belt length and area are required.
Terminal 2: Reclaim belt length and area meet capacity for the 40 mppa demand level.

2.4.10. Arrivals Meet & Greet Areas

For both terminals, Dublin Airport does not anticipate any capacity constraints associated with the arrivals meet and greet areas. This facility is designed to flex throughout the day and overflow to adjacent F&B outlets and external concourse areas at peak times.

2.5. Aircraft Parking Stands

On completion of the PACE projects Dublin Airport will have 134 NBE stands, 116 available NBE stands in the East Campus and 18 NBE stands on the West Apron as shown in Figure 29.

The West Apron stands are primarily used for technical transits, cargo freighters, and ad-hoc flights due to the East Campus stands being fully utilised for commercial passenger flights. General Aviation parking is currently provided on Light Aircraft Park B (LAPB). This parking provision will be relocated to the West Apron in an open hangar configuration to facilitate the construction of Apron 5H. It is expected that to serve 40 mppa, the West Apron will also need to be utilised for, at a minimum, towed flights and eventually, commercial passenger flights.

The future stand requirement at 40 mppa would exceed the planned stand capacity due to multiple factors. Figure 30 presents the planned capacity and 40 mppa facility requirements for aircraft stands.

Figure 29: Aircraft Parking Stands Overview

Area (Unit)	Planned Capacity (Post PACE)	40 mppa Facility Requirements	40 mppa Facility Requirements: Surplus/ (Deficit)
Aircraft Stands NBE (Narrow body Equivalent)	134	154	(20)

The 40 mppa demand level includes up gauging of several flights from narrow body to widebody aircraft, increasing stand requirements. Wide-body pier-served stand availability is currently limited from 04:00 until after midday on Piers 1, 3 and 4 as seen in Figure 31. Flexible wide-body contact stands in Multi-Aircraft Ramp System (MARS) configuration are required to continue to facilitate growth for Transatlantic, Middle Eastern and Asian Services. An increase in the volume of aircraft remaining overnight increases the stand occupancy during the first wave. The standby stand requirement is based on the number of aircraft based at Dublin Airport by airlines. It is anticipated by the 40 mppa demand level, new based airlines will increase standby stand demand. Contingency stands are required to provide operational flexibility to airlines, and the contingency requirement is projected to remain constant between today and the 40 mppa demand level.

Findings:

There is a 20 NBE stand shortfall at the 40 mppa demand level when compared to the planned stand capacity after the delivery of the PACE projects.

A shortage of widebody stands for transatlantic flights and US connected stands is also envisaged.

Due to entrance of new based airlines, the number of standby stands is expected to increase at the 40 mppa demand level.

Figure 30: Stand Supply post PACE Projects

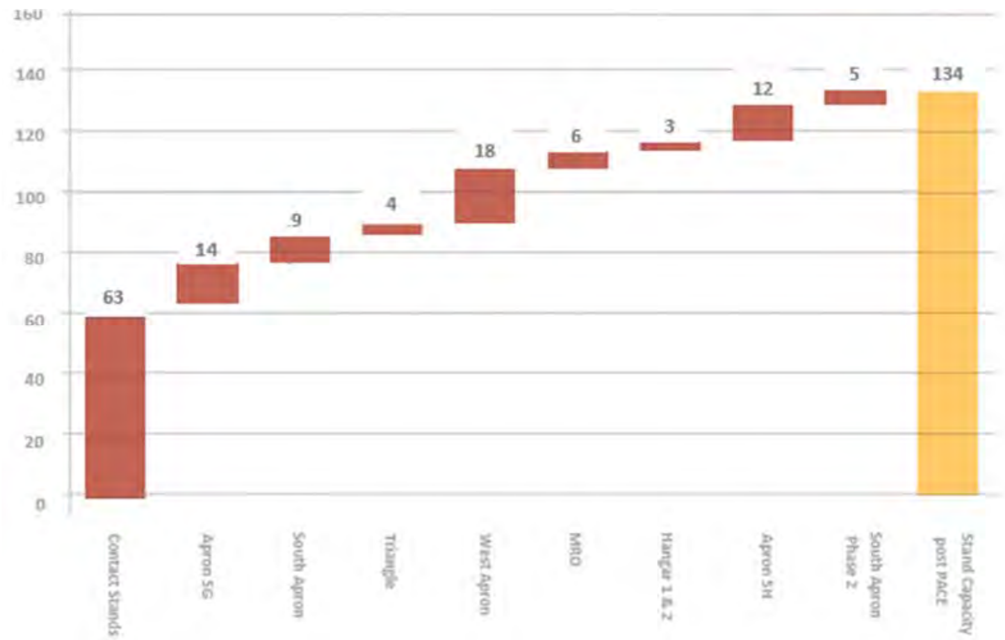
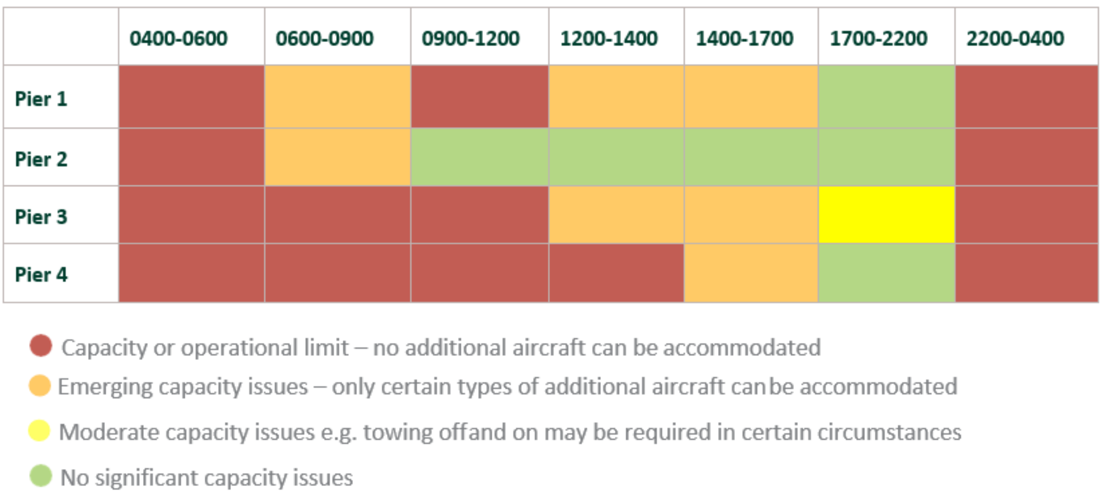


Figure 31: Assessment of Contact Stand Availability - Typical Busy Day 2018



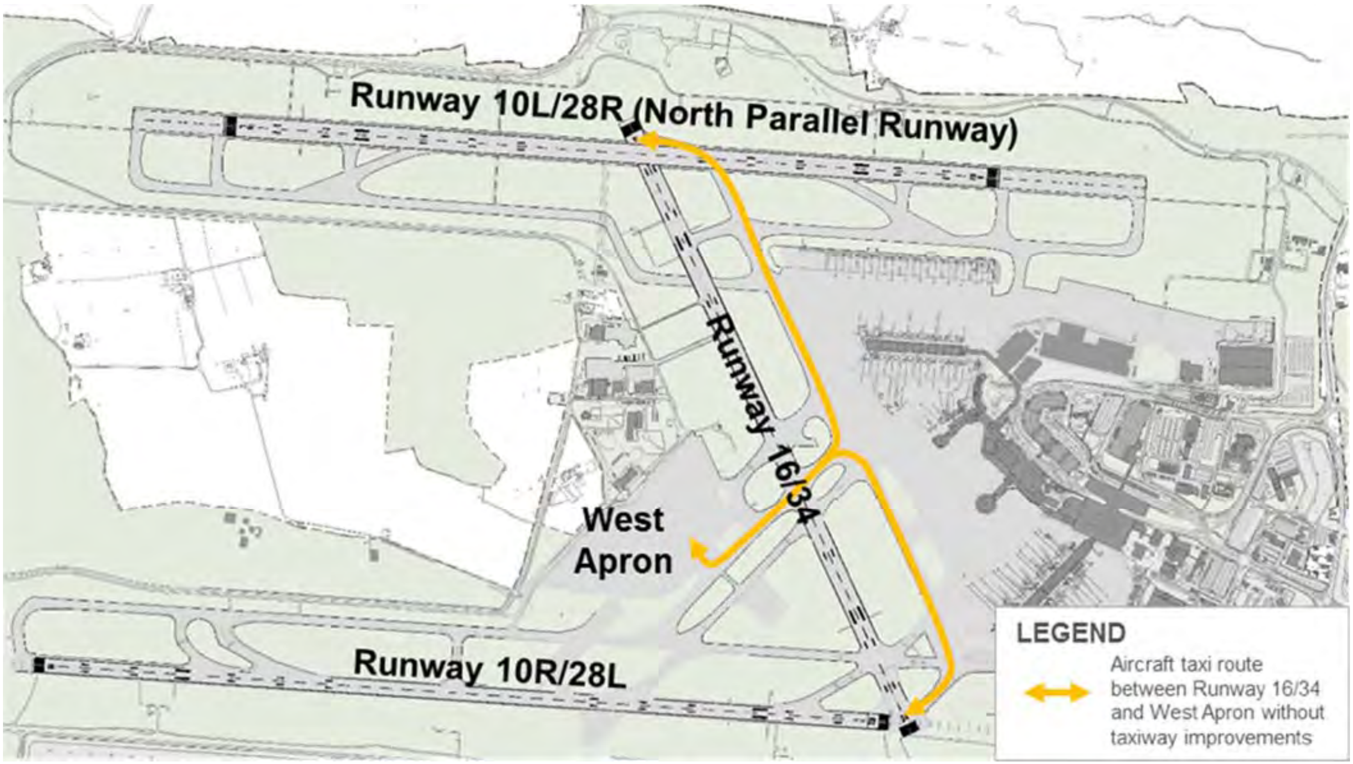
2.6. Airfield Taxiway System

It is predicted that the West Apron will be required for towed, cargo and passenger commercial flights. To enable the use of these stands for these types of operations, airfield taxiway infrastructure should be improved to provide efficient access between the West Apron and rest of the airfield, specifically to Runway 16.

Taxi routes to Runway 16 from the West Apron would be indirect, requiring unnecessary crossings of Runway 16/34. Live runway crossings by taxiing aircraft are avoided where possible because they create a safety risk. To avoid crossing live Runway 16/34, one potential solution for providing efficient access between the West Apron and Runway 16 is to create a parallel taxiway on the west side of Runway 16/34.

Figure 32 shows the potential taxi routes without a new parallel taxiway. It should be noted that the need for this taxiway is not directly tied to a demand level but rather an element of infrastructure required once the West Apron is used for commercial passenger flights.

Figure 32: Current Taxiway Route Between West Apron and Runway 16/34



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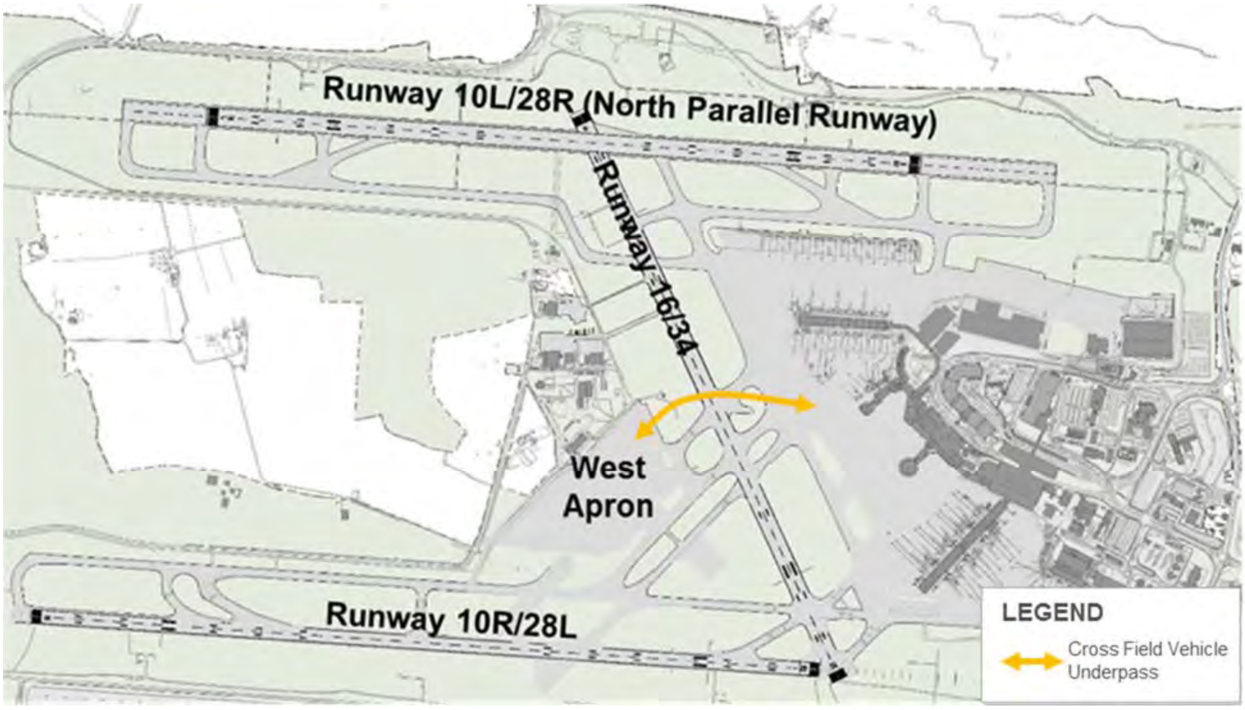
2.7. East and West Airfield Connectivity

West Apron operations have steadily increased over the last five years with airside vehicle access between the western and eastern campuses via the Northern Perimeter Road and Runway 16/34 surface crossing. It is anticipated that the West Apron will be expanded to accommodate an increase in cargo, towed and GA operations. The introduction of remote passenger commercial flights whereby passengers will be bussed from the terminal area to aircraft parked on the western aprons is also envisaged.

Due to the enablement of the Northern Runway vehicle access via the Northern Perimeter Road will no longer be possible, the alternative route via the Runway 16/34 surface crossing is only available when Runway 16/34 is not in operation and under favourable visibility operational conditions.

It is therefore envisaged that a cross field vehicle underpass will be required to safely and reliably facilitate vehicle access between the remote western and primary terminal eastern campus. Figure 33 illustrates indicatively the east west connectivity route crossing major taxiway routes and Runway 16/34.

Figure 33: Indicative Cross Field Vehicle Underpass



2.8. Runway

Our primary objective is to maximise the usage and efficiency of the existing runway infrastructure. In recent years, overall aircraft movements have increased from 170,000 (2013) to 223,000 (2017) and are forecasted to be circa 235,000 in 2018 with peak hour departure movements increasing from 31 in 2013 to 36 in 2018.

Raw demand exceeds capacity in Summer 2018 from 0600 – 1900 (local time). The over- subscription for available capacity is managed through the independent slot coordination process, which is expected to continue for future seasons.

Further runway capacity increases are required to support growth until the delivery of the North Runway which is expected to deliver sufficient capacity to accommodate the demands for 40mppa. In the short term the Runway Capacity Improvement Group (RPIG) will continue to explore and develop initiatives to deliver increases in runway capacity across the day. Current initiatives include:

- Reduced Departure – Departure Separations from 1NM to 0.7NM
- Reduced Runway Separations – Reduced Departure – Arrival Separation from 2,637m to 2,400m
- Evaluation of additional RET on Runway 28

These initiatives could deliver 1 – 2 extra runway movements per hour.

Findings:
The capacity of the runway system is constrained in the short term. The RPIG will continue to explore and develop initiatives to maximise its current capacity through non- infrastructural improvements.

The slot coordination process will continue to manage demand until the North Runway is operational

2.9. Summary

The capacity assessment study highlights the operational processors as those requiring capacity enhancements to serve the 40 mppa demand level as follows:

- Long-Term and Short-Term Car Parking
- Terminal 1 Kerbs
- Terminal 1 and Terminal 2 Check-in
- Terminal 1 and Terminal 2 Central Search
- Terminal 1 and Terminal 2 Hold Baggage Screening
- Terminal 1 and Terminal 2 Departure Lounge
- Contact and Bus Gates
- US Preclearance Facilities
- Terminal 1 and Terminal 2 Immigration Facilities
- Terminal 1 and Terminal 2 Transfer Facilities
- Terminal 1 Baggage Reclaim
- Stands
- Taxiways

The capacity assessment's findings show that the facilities discussed do not have sufficient capacity headroom or adequate levels of service to support the forecast growth. Targeted solutions are required to tactically enhance certain facilities, otherwise growth will be stifled, and quality of service will deteriorate for customers.

An immediate infrastructure solution is not required to address runway capacity. Capacity will continue to be optimised through the slot co-ordination process, with longer-term needs addressed by the introduction of the north runway.

3 STATUS OF CIP 2015 - 2019

3. STATUS OF CIP 2015 – 2019

The purpose of this section is to inform stakeholders of the status of the Capital Investment Programme covering the period 2015-2019 that was finalised by the Commission as part of the 2014 Determination. The allowance set in 2014 was predicated on lower passenger growth compared to what has materialised, which subsequently resulted in two interim reviews of the 2014 Determination by the Commission, namely in relation to the North Runway and the suite of 23 PACE Projects. While the original CIP allowance afforded Dublin Airport with a certain level of flexibility across various groupings, certain events that have transpired since 2014 have led to necessary additional expenditure compared to this original allowance. When considering the level of spend committed to essential projects in 2019 (i.e. the final year of this Determination), this results in expenditure that is €60.4m more than the original allowance. Dublin Airport are seeking support from users for this additional spend to be included in the Regulated Asset Base (RAB).

3.1. Background

In the 2014 Determination, a total allowance of €649m was received and broken down with €341m identified in six non-triggered capital envelopes/groupings and a further €308m in triggered projects as determined by CAR. This total allowance (€649m) was received from CAR to enable passenger numbers increase to 24.8m by 2019 and to deliver the North Runway.

Following strong passenger growth commencing in 2015, with 25m passengers achieved in the first year of the current Determination period, capacity became under significant pressure and it was apparent that the allowance in the CIP was insufficient to deliver new capacity to meet short term growth. Funding, through the flexibility within the allowances was partially diverted to projects that delivered capacity increases in locations that were experiencing significant pressure.[1]

[1] In submitting our response to the Issues Paper (July 2018) we identified a number of capital projects that have been required during this Determination with a view to including this necessary overspend in the RAB roll forward. Section 3 of this consultation has refined this list of projects with the most up to date information – for example, per our response to the Issues Paper Sections 11.7 (Masterplan), 11.11 (Repairs to the Departures Road) and 11.13 (Pier 1 Ground Floor Alterations) are no longer being put forward for consideration. These are being replaced by other projects with the overall ask remaining at €60m.

This allowed for growth to continue into 2016, with Business Development funding exhausted to meet the demand experienced in 2016, some 27.6m passengers. As a result, Dublin Airport embarked on a Supplementary Capital Process – Programme for Airport Campus Enhancement (PACE) concluding in June 2018 when CAR approved an additional allowance totalling €269.3m, with these projects allocated to the Business Development category. This increased the total allowed capital spend for the period to €918m (incl. runway) and was designed to meet passenger growth up to 32mppa.

Within each category, there was flexibility to deliver additional projects through overall savings / project changes or to balance over-runs and underspends within the overall allowance.

Figure 34: Summary of €60.4m Additional Expenditure

Project	Additional Expenditure
Runway 10-28 Overlay & Associated Ground Lighting	€28.6m
High Mast Lighting	€2.1m
MV Cable Replacement	€1.2m
Taxiway Redesignation	€1.4m

Critical Equipment Upgrade	€10.0m
Departures Floor Structural Works	€6.6m
US Preclearance Lounge	€3.3m
Programme Management	€0.6m
Extension of CPSRA to Airfield	€6.6m
Total	**€60.4m**

Within each of the capital envelopes, there are also specific 'deliverables' which must be achieved in order to sanction the specific project allowance as illustrated in Figure 34. Under/over spend on 4 original trigger projects is treated on a 50/50 basis in line with the 2014 Determination. The CIP flexibility is currently limited to each specific grouping; i.e. a saving on an Information Technology project cannot be reinvested towards an additional Business Development (capacity) enabling project. Therefore, insufficient allowances were available / transferrable to fund the incremental projects required to accommodate the level of demand experienced to date. Sections 3.2 – 3.8 will outline the status of each capital grouping and provide an update on the specific projects within each envelope.

Figure 35: 2014 Determination - Capital Allowances

Grouping	Capital Allowance (€m)	Deliverables
Airfield Maintenance	125	1. Runway 10/28 overlay 2. Runway 16/34 overlay 3. Airfield pollution control
Landside & Terminal Maintenance	39	None
Business Development	67	Cargo gate redevelopment
Revenue	56	Completion of T2 multi-storey carpark
Information Technology	41	None
Other	14	None
Sub Total	**341**	
Trigger Project	**Capital Allowance (€m)**	**Trigger**
North Runway (trigger)	247	Initial trigger achieved in 2015
Additional Runway 28/10 line-up points (trigger)	30	Not yet triggered
Terminal 2 Hold Baggage System Standard 3 (trigger)	13	Not yet triggered
Pier 2 Segregation (trigger)	18	Trigger was achieved in 2017
Sub-Total (Trigger)	**308**	
Overall CIP 2015 – 2019 Total	**649**	
PACE Projects **(23 projects with 10 as deliverables. All projects defined as Business Development)**	269	1. T2 Level 15 Bus Gates 2. Apron 5H & Taxiway Rehab 3. A-VDGS 4. FEGP Piers 1,2 & 3 5. South Apron Stands Ph 2 6. Link 3 Extension Taxiway 7. Realignment of Taxiway A 8. Dual Taxiway F 9. Link 6 extension Taxiway 10. South Apron Taxiway Widening
Total Revised Allowance	**918**	

3.2. Airfield Maintenance

In the Airfield Maintenance Grouping, €125m was allowed, representing circa 37% of the total capital expenditure (€341m) in the 2014 Determination. A number of key runway, taxiway and apron projects were required to ensure that the critical airfield infrastructure remained fully serviceable to support operations. All the key projects have been either completed or are currently in progress (differing phases of construction, which are listed below) with committed spend. At the end of 2019, based on committed expenditure, an additional €33.3m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

The necessary additional expenditure was brought about, mainly by the following four projects;

- Runway 10-28 Overlay (Increase - €28.6m)
- High Mast Lighting (New Project – €2.1m)
- MV Cable Replacement (New Project - €1.24m)
- Taxiway Redesignation (New Project- €1.37m)

The rationale for this additional expenditure is detailed in the section below. Please submit any views in relation to the projects identified above from the perspective of adjusting the RAB accordingly.

The original allowance is detailed in Figure 33 below;

Figure 36: 2014 Determination - Capital Allowances Airfield Maintenance

Airfield Maintenance Projects	CIP No.	Project Status	Capital Allowance
Runway 16/34 Rehabilitation	6.001	Commenced	€24.5m
Runway 10/28 Rehabilitation	6.017	Complete	€22.5m
Apron Rehabilitation	6.002	Commenced	€21.1m
Airfield Taxiway Rehabilitation	6.055	Commenced	€16.1m
Airfield Lighting Upgrade (Rwy 10/28)	6.004	Complete	€9.2m
Airfield and Apron Road Rehabilitation	6.006	Commenced	€1.7m
Taxiway AGL Upgrade	6.009	Complete	€3.9m
Airfield Vehicles and Equipment	4.001	Commenced	€5.7m
Airfield Pollution Control	9.022	Feasibility	€20.1m
Total			**€124.8m**

The status of Key Projects within the Airfield Maintenance Grouping is detailed below;

a. Runway 10/28 Overlay, Airfield Lighting and Taxiway Airfield Ground Lighting (AGL) Upgrade: these projects were delivered as one single project, in order to minimise the overall impact on operations. Work was carried out over an 18-month period and was completed in Q3 2018. This was a critical project in the 2015–2019 CIP to ensure the safe operation of aircraft on what is one of the main assets at Dublin Airport, Runway 10-28. The project delivered a resurfacing of the main runway, associated taxiways and the installation of new ground lighting. The project also included the delethalisation of manholes and other buried structures within the runway strip in order to comply with EASA regulations. To ensure the airport's main asset was operational during the operational day, work was carried out at night with handback each morning in advance of first wave departures.

Rationale to support increased allowance - €28.6m

The additional expenditure on the Runway 10-28 Rehabilitation Project (including the Airfield Ground Lighting project) was brought about for the following reasons;

I. Original Estimate

The original estimate in the amount of €22.3m was based on construction assumptions in Q3 2013 and was insufficient for the planned scope of works. As part of the cost evaluation process carried out by EY (on behalf of CAR), the EY benchmark review estimated the cost of this project at €29.5m - a delta of some €7.2m – See Extract below from EY Report.

€29,555,000 (EY/TPS estimate) v €22,300,000 (DAA estimate)	
Runway overlay	€23,010,000
Drainage replacement	€320,000
Reinstatement of AGL	€800,000
Reinstate markings	€115,000
	€24,245,000
Abnormal costs allowance	€0
	€24,245,000
Fees 6%	€1,455,000
	€25,700,000
Contingency 15%	€3,855,000
	€29,555,000
Our assessment suggests that the cost in the CIP is lower than would be expected.	

This resulted in the project having a capital allowance below the benchmark estimate.

II. Possession Period

When the budget estimates were being prepared for the project the works period possession window was assumed 2300 to 0530am (a window of 6.5 hours). The actual possession window was 2330 to 0430 (a window of 5 hours or a reduction of some 25%), i.e. c.90 minutes less than what was anticipated when the project was costed. The reduced possession window was a result of increased movements between 2200 and 2300 hour and these additional movements could not be accommodated on Runway 16-34 without significant flow control being introduced. This had a major impact on the delivery of the project, the productivity afforded to the contractor each night and the timelines. This resulted in a prolongated programme at an associated increased cost.

III. Additional Scope

When the original budget estimates were being compiled (Q3 2013 / Q1 2014) the design regulations that the project was based on was ICAO Annex 14 and associated supporting documentation. The design standards changed in 2016, as part of the EASA transition from ICAO, under EASA Certification Specification Revision 1. This had a major impact on the scope of the project and resulted in a significant variation for the inclusion of delethalisation of new manhole pits and existing manhole pits in the runway strip.

In addition, when the contract was placed the severity of deterioration of the existing runway pavement was significantly worse than expected, resulting in a lot more rehabilitation to the underlying pavement. This was not envisaged at CIP submission stage and resulted in an increase in the associated costs for pavement rehabilitation beneath the runway overlay.

While the project was on site, Dublin Airport took the opportunity to install sensors under the runway overlay pavement as part of a new Airport Weather Information System (AWIS) which was not envisaged as part of the original scope. This system will yield significant benefits to the airlines once commissioned, by having the ability to record runway contamination depths, without the need to close the runway and carry out physical inspections. This will greatly enhance the availability of real-time information for winter operations to accurately inform decisions in relation to runway usage.

IV. Weather Constraints

The contractor mobilised to site in Q4 2016 and the project was due to be completed over an 18-month duration. However, over the course of the execution of the contract we experienced 2 significant storm events, Storm Ophelia (October 2017) and Storm Emma (February 2018). These were extreme weather events that resulted in the temporary suspension of the works and subsequent compensation to the contractor. These delays resulted in disruption to the planned reinstatement of CAT III service to Runway 28 for Christmas 2017. Dublin Airport instructed the contractor to reinstate CAT III on Runway 28 to mitigate against any potential risks to the airlines or associated passengers in the busy period before Christmas 2017. These issues resulted in a significant cost impact to the contractor.

At no time during the works period were any of our airlines partners significantly impacted by the delivery of this complex and challenging project and all efforts were made to mitigate against the risk of diversions and delays to airline schedules.

V. Price variation and procurement

This project was advertised under negotiated procedure in the Official Journal of the European Union (OJEU) and we received 5 responses. Following the evaluation of the qualification submissions, 3 contractors were shortlisted to receive tender documents. Following the tender process, 2 tenders were received, and the contract was awarded to the most economically advantageous tender. The tender returns were higher than envisaged as construction inflation had increased significantly and competition was limited for this specialist work.

These issues resulted in additional necessary expenditure on the Airfield Maintenance grouping and daa are seeking for this additional expenditure to be allowed (€28.6m).

b. Runway 16/34 Rehabilitation: the first phase of this project was completed in early 2015, with the rehabilitation of the 'Runway 16/34 and Taxiway A' junction. The next phase of the project is currently at tender award stage and will involve pavement inlay and overlay works along with pavement rehabilitation at taxiway junctions. New drainage channels and gullies will be installed along with delethalisation of buried structures in the runway strip. The runway width will also be reduced from the current 61m to 45m to comply with EASA requirements and this will reduce the quantum of pavement rehabilitation required.

c. Pollution Control: The feasibility study is currently underway, and discussions are ongoing with Fingal County Council and the Environmental Protection Agency (EPA), specifically in relation to the discharge limits allowed to adjacent watercourses (in particular the Cuckoo Stream). The allowable limits will have a direct impact on the quantum of storage necessary and associated infrastructure to be provided. Given the protracted nature of establishing discharge limits and as a consequence the exact nature of the project, this project will not be complete within the 2015–2019 CIP period and Dublin Airport will look for this project to be included in CIP 2020. While this project was a deliverable, and as costs were expended on feasibility and analysis which will ultimately deliver a solution for pollution control, Dublin Airport would be seeking remuneration for these costs (€1m) as part of the current CIP, as they are essential costs to inform the solution for the project.

d. Apron, Taxiway and Road Rehabilitation: Over the course of the 2015–2019 CIP rehabilitation work has been ongoing based on a RAG map status targeting the most critical areas of pavement. Projects are underway, and several phases are complete, with over 44,000sqm of airfield pavement rehabilitated to date. This includes three phases between Piers 3 and Pier 4 (circa 33,000sqm) completed in March 2016, April 2017 and March 2018 respectively. Phase 4 of this annual apron reconstruction programme is at contract award stage and will commence in October 2018 with completion expected in March 2019. The rehabilitation of Taxiways B7 and E3 were recently completed as part of the Runway 10/28 overlay project. The ability to carry out essential apron and taxiway rehabilitation is becoming increasingly challenging, as the window for construction is reduced to primarily the winter season; i.e. November to mid-March. This is primarily due to the lack of suitable contingency parking stands in Summer, which are required to facilitate relocated operations due to the apron works around the piers.

e. High Mast Lighting Upgrade (New Project): The High Mast Lighting Upgrade project was an essential project that was required for Dublin Airport's transition application from the existing national aerodrome licence to the EASA European Certificate. This project addressed a non-compliance associated with existing lux-levels on 71 high mast lights to ensure Dublin Airport was in compliance with EASA standards and therefore retaining its operating certificate. There was no allowance for this project and Dublin Airport are seeking remuneration of the costs (€2.1m) associated with delivering this project as part of the current CIP.

f. Taxiway Redesignation (New Project): This project involves the re-designation of Taxiway Signage on the airfield as part of the Air Accident Investigation Unit Report, IRL00911044, issued in 2012 following a Monarch Airlines incident in May 2011. The recommendation from this report is highlighted below, Figure 37. The review, including consultation with stakeholders, following this report was completed in 2015, and this resulted in re-designation of the taxiway network in order to simplify taxi instructions. This approved signage re-designation scheme is gradually being rolled out throughout the airfield and as there was no allowance for this project, Dublin Airport are seeking remuneration for the costs (€1.37m) associated with delivering this project as part of the current CIP. The benefit of this project is less potential for error in pilots interpreting ATC communications.

Figure 37: Safety Recommendation from AAIU Report

> 4. SAFETY RECOMMENDATIONS
>
> **It is recommended that:**
>
> 1. Dublin Airport Authority in conjunction with the Irish Aviation Authority should review taxiway designation at EIDW in order to simplify taxi instructions. IRLD2012005
> 2. The Dublin Airport Authority considers aligning taxiways F1 and F2 in order to reduce complexity at their intersection. IRLD2012006
>
> View Safety Recommendations **for Report 2012-017**

g. MV Cable Replacement (New Project): The airfield MV electrical ring main cable dates from the late 1980's and was an old paper insulated type of cable. The cable is critical to providing the main electrical supply to the Airfield Ground Lighting systems (AGL) at Dublin Airport, with any disruption having the ability to seriously impact airport operations both during daylight hours and especially at night. The AGL system comprises all runway and taxiway lighting plus airfield signage. With changes to airside infrastructure over the past 30 years, there are a number of cable joints that join two different types of MV cable together. These transition joints are more prone to failure compared to joints of identical cable types. This project comprised of 3 sections of end of life MV electrical cable on the south side of Runway 10/28 serving the AGL system, in order to provide more reliable and robust AGL infrastructure. There was no allowance for this project and Dublin Airport are seeking remuneration for the costs (€1.2m) associated with delivering this project as part of the current CIP.

3.3. Terminals and Landside Maintenance

In the Terminals and Landside Maintenance category, €38.7m was allowed by CAR to maintain campus and terminals (T1) in the CIP period. Terminal 1 required significant investment as it is over 45-years old and has had increased passenger volume throughput and its assets have reflected this increased use. Terminal 1 had major improvements in the Arrivals and Departures Floor upgrade projects and the Life Safety Systems upgrades. Terminal 2 being less than 10 years old required minimal investment in this CIP period. At the end of 2019, based on committed expenditure, an additional €16.6m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

Figure 38: Capital Allowance Terminals and Landside Maintenances

Terminals & Landside Maintenance Projects	CIP No.	Project Status	Capital Allowance
Light Fleet	4.002	Commenced	€2.2m
Carpark Maintenance	3.004	Commenced	€4.5m
Landside Infrastructure Utilities	3.001	Commenced	€4.6m
Terminal 1 Roof Repairs / Upgrades	7.102	Phase 1, 2 & 3 Complete	€8.0m
Terminal 1 Baggage Reconciliation System	4.005	Phase 1 Complete	€1.1m
Terminal 1 Critical Equipment Upgrades	4.006	Commenced	€6.0m
Heating Ventilation Air Conditioning & Baggage Management System Upgrades	7.104	Commenced	€7.5m
Central Search Equipment (Capital Maintenance)		Commenced	€2.7m
External Roads	3.035	Phase 1 Complete	€2.0m
Total			**€38.6m**

The necessary additional expenditure was brought about, mainly by the following two projects;

- Critical Equipment Upgrades (Increase - €10.0m)
- Departures Floor Structural Works (Increase – €6.6m)

The rationale for this additional expenditure is detailed in the section below. Please submit any views in relation to the projects identified above from the perspective of adjusting the RAB accordingly.

The status of Key Projects within Terminals & Landside Maintenance is detailed below;

Terminal 1 Critical Equipment Upgrades: This project comprised a number of individual projects across Terminal 1 addressing key pieces of equipment such as heating ventilation & air conditioning (HVAC), life safety systems, baggage handling systems, and lighting. There was significant additional spend required on the Terminal 1 Life Safety Systems following detail surveys that were carried out during the design period. The specific allowance under Terminal 1 Critical Equipment Upgrades (CIP 15.4.006) was €3.7m within the overall Terminals & Landside allowance of €38.7m. When the CIP was being prepared in 2013, there was limited understanding of the amount of works required and it was only when a detailed survey was carried out in 2015 that the extent and cost of T1 LSS requirements became apparent. The cost of this additional work was €10.0m, and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

- Life Safety Systems Upgrade Phase 1 and Phase 2 is complete. Phase 3 is fully committed and on site, expected to complete in Q1 2019. These projects addressed end of life and compliance issues relating to emergency lighting, smoke detection and fire alarms.
- Phase 1 and Phase 2 of smoke dampers in Terminal 1 have been completed
- Baggage system upgrades, including baggage reconciliation (phase 1) completed in T1, with additional phases ongoing into 2019

a. **Departures Floor Structural Works (New Project):**

Figure 39: Departures Floor Structural Defects

The Terminal 1 Departures Floor was found to have some structural defects during the floor refurbishment project and required remediation works to address. The cost of this remediation work was €6.6m and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

Figure 39 details some of the structural defects uncovered.

b. Departures Road Improvements (New Project): The Departures Road was rehabilitated during this CIP period, to address structural issues associated with the original bridge deck. This project had no CIP allowance, and following the recommendations from the structural engineers, it was essential that this rehabilitation work was carried out. Flexibility within the Terminals & Landside grouping has allowed this work to be completed.

c. Terminal 1 Roof Repairs / Upgrades: Phase 1 (Terminal 1 6-Bay) and phase 2 (Terminal 1 8-Bay) upgrades are complete and phase 3 is currently on site and due for completion in Q4 2018. This project ensured that Terminal 1 roofs remained water tight preventing water ingress and damage to the underlying structure of the building. Lighting protection was also included as part of this project. The project included Piers 2 and 3 and associated extensions to Terminal 1.

d. Pier 2 Heating Ventilation Air Conditioning (HVAC): This project was complete in Q3 2017 and Pier 2 has seen an improvement in passenger comfort within the pier following these works.

3.4. Revenue

In the Revenue grouping, €56m was allowed by CAR to deliver the approved projects. The Revenue grouping comprises projects that generate a commercial return that helps to reduce Airport Charges and also some projects that are required for capacity and customer experience purposes. The status of the key projects is listed below. At the end of 2019, based on committed expenditure, an additional €3.3m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

The necessary additional expenditure was brought about, mainly by the following project;

- Preclearance Lounge (Increase - €3.3m)

The rationale for this additional expenditure is detailed in the section below. Please submit any views in relation to the projects identified above from the perspective of adjusting the RAB accordingly.

Figure 40: Summary of Revenue Grouping

Revenue Projects	CIP No.	Project Status	Capital Allowance
Terminal 2 Multi-story Carpark Phase 2	2.006	Complete	€12.4m
Digital Advertising Point of Display	2.010	Complete	€1.0m
Long-term Car Park Resurfacing	3.006	Complete	€6.8m
Commercial Property Refurbishments	2.031	Commenced	€10.6m
Retail Refurbishments	5.001	Commenced	€12.2m
Commercial Hangars Infrastructure	2.005	Project Deferred	€0.6m
Cargo Terminal Development	2.007	Project Deferred	€2.2m
Consolidated Car Rental Centre	7.116	Project Deferred to CIP 2020	€10.1m
Total			**€55.9m**

The status of Key Projects within the Revenue Grouping is detailed below

a. **T2 MSCP Upgrade (Expanded Scope):** This project was completed in early 2016 and delivered an additional four levels, providing an extra 1,400 carpark spaces. The specific allowance covered two additional levels, but flexibility within this grouping was utilized to provide a further two levels (total four constructed). This project has provided much needed additional short-term car parking capacity and is also delivering commercial revenues.

b. **Long Term Carpark - Surface Upgrade:** This project was completed in Summer 2016, with circa 5,000 long-term spaces in the Red Zone carpark upgraded to a porous surface course (delivering a superior quality product to competitors). Parking rates were subsequently increased in 2016, with higher volumes of customers now using the carpark (which is delivering incremental revenue).

c. **Commercial Property Refurbishments:** Key projects delivered under this allowance to date include Sky Bridge House refurbishment and new airline accommodation. This programme will continue into 2019 and is required to provide facilities for new airlines commencing operations at Dublin Airport.

d. **Digital Advertising:** This phase of the digital advertising programme was completed in early 2016 and delivered multiple new advertising screens across both terminals, which are now generating commercial revenue in line with projected targets.

e. **Retail Refurbishments:** A significant upgrade of the Terminal 2 retail offering is currently under construction and is due for completion in Q1 2019. This project is necessary to refresh the Terminal 2 retail offering. Terminal 2 commenced operations in 2010 and retail would normally be refreshed every 5-years to stay relevant and maintain or grow existing revenues. The upgrade to Terminal 2 retail will also provide an enhanced passenger experience.

Preclearance Lounge (New Project): This project delivered a much-needed Business Lounge post US Preclearance Clearance, provided a significantly enhanced passenger experience and additional commercial revenues. There was no CAR allowance for this project in the 2014 Final Determination, however daa proceeded with this project to ensure that Dublin Airport enhanced its US Customs & Boarder Protection (US Preclearance) product. While there was a business case to support the project, the Commission will consider future revenues from this facility and therefore daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

This project was fast-tracked to ensure Dublin remained competitive for transatlantic passengers in both the business and transfer markets. The lounge was built on the ground floor at the end of Pier 4 providing a relaxing environment for transatlantic passengers wishing to avail of this facility.

Figure 41: 51st & Green Lounge

f. Consolidated Car Rental Centre: This project was not completed in the current CIP period as requirements were not fully developed with the Car Hire companies to secure commercial agreement for the proposed development. The allowance was transferred to fund additional revenue projects, e.g. T2 MSCP additional levels. Agreement could not be made with the car hire companies based on the project in CIP2015-19 and as they have more recently aligned on their requirements to address capacity constraints and allow for future growth at Dublin Airport, a more functional project is included in CIP 2020+.

3.5. Information Technology (IT)

In the IT grouping, CAR allowed €41.3m to cover the necessary infrastructure and technology improvements that support the ongoing business demands which are increasingly more technology-focused and evolving towards automated, self-service solutions. The IT grouping is on target to spend within the allowance having received some key EU funding from the Single European Sky ATM Research (SESAR) project.

Figure 42: Summary of Information Technology (IT)

IT Projects	CIP No.	Project Status	Capital Allowance
IT Technology & Lifecycle Management	8.008	Commenced	€15.9m
IT Business Systems Investment	8.009	Commenced	€15.7m
Retail IT	5.002	Commenced	€1.6m
Business Innovation Investment	8.009c	Commenced	€8.1m
Total			**€41.3m**

The status of Key Projects within the Information Technology (IT) Grouping is detailed below;

a. IT Technology and Lifecycle Management: This grouping encapsulates user hardware, networking and cabling, data centres and other core “run” activities. It also includes necessary software licences (mainly Microsoft and Oracle). By the end of 2019, 100% of the total allowance will be invested. The investment is almost entirely allocated to hardware, networks and licences. In this period, Dublin Airport has invested in an enterprise replatform project, which brought one of the data-centres back in-house and ported onto a Linux platform, which future-proofs the architecture and supports new business applications. There is also ongoing investment in physical servers and VMWare, which provides server capacity, as well as additional physical servers that include SQL licences and storage. Additional spend has been incurred on Windows system upgrades. As passenger volumes grow and demand to be “online” at the airport increases, investment was required to enhance and ensure a robust Wi-Fi platform, supported by Wi-Fi access points to meet the expectations of our passengers and customers. There is ongoing investment in network components, MPLS Core and Distribution, firewalls and switches. The Network Infrastructure in T2 will be fully replaced by end of 2018 in order to protect the operation against component failure as T2 switches reach end of life.

b. IT Business Systems Investment: This category is expecting to be 18% over the original allowance, based on committed expenditure, by the end of the current CIP period and will utilise savings made in Retail IT and additional SESAR funding to make up the shortfall. To date, significant new projects have been delivered. There is also continuous investment in the existing systems, to ensure they meet the business needs in terms of operations and value. Key refresh projects include upgrades to the Car Park Management systems, Bag Manager / BILS to support US Preclearance and baggage reconciliation, T2 baggage systems. Examples of new systems include The Dub Hub way- finding app to enhance passenger experience, Geographical Information System (GIS) to support Infrastructure projects, Passenger Forecasting technology to optimize terminal operations and an AVD (Airfield Visual Display) system to optimize airfield operations. We will have replaced our FIDS and CCTV platforms with future proofed technology during this current CIP period. We have also rolled out a new Energy Management system to help control costs and support our environmental strategy. System resilience has been strengthened, where needed, to ensure all key services are meeting stringent targets.

We have focused on staff and process efficiencies and also on delivering a better staff experience through technology. We will roll out a new Enterprise Asset management system, a new rostering and Time and attendance platform, a new Capital Project costing tool and best in class Procurement software. We have also ensured our systems and data are compliant with 2018 GDPR regulations.

c. Retail IT: 30% of this allocation will be spent by the end of 2019. The primary areas of investment were an upgrade of the Retail ERP solution and a rollout of new Tills and Payment devices. The balance of this allocation has been used to supplement other areas as detailed above.

d. IT Business Innovation Investment: We will exceed the original allowance by 65%, demonstrating the importance of being able to adopt new technology to support growth at the airport while delivering an excellent passenger and customer experience.

Projects include new CUPPS (Common Use Passenger Processing) solution across all check-in and boarding gates, CUSS (Common Use Self-Service – additional allowance under PACE) units deployed in both terminals passenger tracking technology, mobile apps supporting staff, consolidating the Web/Mobile platform to deliver greater flexibility, A visual docking guidance system (additional allowance under PACE) with integrated CDM data. We have invested significantly in Data and Analytics in order to drive value from our Data assets. In 2019, we will launch new middleware and data platforms to support seamless integration of systems internally and also with external stakeholders. We are implementing a new digital marketing platform to support consistent, value add messaging to our customers while ensuring their data remains secure and their privacy respected. We have trialled beacon technology and plan to trial biometric data capture to support airline processes in 2019.

3.6. Other Category

In the Other grouping, €14m was allowed to cover the minor projects and the CIP programme management of the original €341m. At the end of 2019, based on committed expenditure, an additional €0.6m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

The necessary additional expenditure was brought about by the following project;

- Programme Management (Increase - €0.6m)

The rationale for this additional expenditure is detailed in the section below. Please submit any views in relation to the projects identified above from the perspective of adjusting the RAB accordingly.

Figure 43: Summary of Other Projects

Other Projects	CIP No.	Project Status	Capital Allowance
Minor Projects	8.001	Commenced	€10.1m
Programme Management	8.200	Commenced	€3.5m
Total			**€13.6m**

a. **Minor Projects:** Minor projects are essential to maintain the operation on a day-to-day basis. Over 150 minor projects have been completed to date across the airport campus and will continue to end 2019. Some key projects include airfield paint markings, T1 chiller upgrade, repairs to Hangar one doors, passenger seating, passenger charge points, etc. It is essential that there is an allowance to cover these, mostly unplanned, projects on a week-to-week basis.

Programme Management: This covers the costs associated with the management of a portfolio of projects and are ongoing since 2015. These costs will continue to the end of 2019 and are required to manage the interdependencies between projects and provide consistent governance and administration for the delivery of all projects in the current CIP programme. The allowance was to cover the costs associated with programme management of the original €341m capital expenditure. With the increase in capital expenditure of €60.4m, there is a requirement for additional programme management funding, already committed, of €0.6m and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

3.7. Trigger Projects

The 2014 Final Determination included a number of 'trigger projects', where a specific requirement had to be achieved before the allowance would be provided. The status of each 'trigger' project is outlined below in Figure 44, with only two of the four projects that will have to be triggered within this CIP period.

Reconciliation of 'trigger' projects will be treated using a 50/50 mechanism to share the risk of over or under-spends between daa and users.

Figure 44: Summary of Trigger Projects

Trigger Projects	CIP No.	Project Status	Capital Allowance
Pier 2 Segregation	7.111	Complete - Trigger was achieved in 2017	€18.1m
North Runway	7.111	Initial trigger achieved in 2015	€246.7m
Additional 28/10 line-up points	6.013	Not Triggered	€30.2m
T2 Hold Baggage Standard 3	4.003	Will be triggered in 2020 – Included in CIP 2020	€13.1m
Total			**€308.4m**

The status of Key Projects within the Trigger Grouping is detailed below;

a. **Pier 2 Segregation:** This project provided for the full segregation of arriving and departing passengers in Pier 2. In this regard, Customs and Immigration have confirmed in writing that the project meets the requirements in relation to passenger segregation from all destinations. The trigger of segregation being mandated by a regulating authority was achieved and thus, the project commenced construction in 2016 and was complete in October 2017. This project provides essential flexibility to support operations with the ability to service all destinations throughout the day from Pier 2. The allowance was fully utilised on this project.

b. **Northern Runway:** The trigger of 25mppa in a 12-month period was achieved in 2015 and this project commenced construction in 2016. The runway is expected to be operational in 2021. The cost of this project is estimated at €320m and 50% of the increased spend will be recovered through the 50/50 risk share mechanism in the 2014 Determination.

c. **Additional Runway 28/10 Line-up Points:** The trigger of capacity in the peak hour (0600- 0700 local) being declared at 37 departures has not been achieved to date and this project is therefore not progressing. In addition, a feasibility study carried out in 2016 on the Runway 28 line-up point confirmed that the additional runway hold point would not deliver the capacity enhancement originally envisaged and its development was put on hold.

d. **Terminal 2 Hold Baggage System Standard 3:** This project is mandated through legislation and the timeline for EDS (Explosive Detection System) technology is set out in 'Commission Implementation Regulation (EU) No. 1087/2011 of 27 October 2011', which states that (12.4.2.7) 'Standard 2 shall expire on 1 September 2020.' and (12.4.2.11) 'All EDs shall meet Standard 3 by 1 September 2020 at the latest, unless point 12.4.2.8 applies.' (12.4.2.8 does not apply for Terminal 2). This project is currently at the contract award stage and will commence on site in Q1 2019. The trigger for remuneration will not be achieved in this regulatory period, however the project must progress now in order to achieve the required commissioning date. This project will now be included in CIP 2020 as a separate project as this 'trigger' will expire on 31st December 2019 and this is to safeguard the 'trigger' falling away.

3.8. Business Development

In the 2015–2019 CIP Business Development grouping, CAR allowed €66.6m to support a forecast three million increase in annual passenger numbers by the end of the regulatory period. At the end of 2019, based on committed expenditure, an additional €6.6m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

The necessary additional expenditure was brought about by the following projects;

- Extension of CPSRA to airfield (Increase - €6.6m)

The rationale for this additional expenditure is detailed in the section below. Please submit any views in relation to this project from the perspective of adjusting the RAB accordingly.

The projects included in the allowance, and their current status is highlighted in Figure 45 below.

Figure 45: Summary of Business Development

Business Development Projects	CIP No.	Project Status	Capital Allowance
Cargo Gate Redevelopment	6.021	Complete	€1.8m
Central Search Area – New Technologies	4.004	Complete	€13.2m

Terminal 1 Arrivals	7.121	Complete	€8.9m
Terminal 1 Façade	7.119	Commenced	€0.7m
Terminal 2 Transfer Facility	7.117	Complete	€21.6m
Airfield Infrastructure for large aircraft	6.007	Complete	€1.5m
Consolidated Staff Car Park	2.017	Feasibility	€1.5m
Pier 3 Flexibility	7.116	Project Deferred	€15.1m
Fixed Electrical Ground Power T1	7.103	Project Deferred	€1.5m
Airport Screening Centre	6.022	Project Deferred	€0.8m
Sub Total			**€66.6m**

The original Business Development allowance was targeted at achieving the following key objectives:

- Provide necessary capacity requirements to enable 24.8mppa
- Facilitate the safe operation of increasing numbers of large aircraft (e.g. B777) operating at Dublin Airport
- Improve and increase the transfer product at Dublin Airport with a streamline passenger experience
- Safeguard the continued operational life of Terminal 1 and facilitate a rebalancing of activity across terminals

Following the accelerated growth experienced in 2015, it was clear that the Business Development allowances awarded in the CIP would be insufficient to meet the forecast demands. In 2015, 25 million passengers used Dublin Airport, and this increased to 29.6 million in 2017, with current forecast indicating in excess of 31.5m by 2019. A revised programme was developed in 2016 to use the flexibility within the Business Development grouping to re-allocate the allowed capex to essential capacity enhancing projects. A number of less urgent projects were deferred, and some new projects were identified and prioritised to directly support the accelerated passenger growth profile. The original Business Development allowance was fully expended and there was no allowance for these essential capacity enhancing projects.

The revised development programme focused on:

- Enabling the relocation of non- passenger services (e.g. cargo) to the west of Runway 16/34, which would provide capacity on the eastern campus to support additional passenger services
  - - This was delivered through the CPSRA project.
- Accommodating increased gauge and larger capacity aircraft on Pier 2 and Pier 3
  - Delivered through the Pier 2 & Pier 3 realignment projects.
- Increase the number of available US preclearance stands on Pier 4
  - Delivered through the stand 400c project.
- Increase the availability of walk-out stands on Pier 1
  - Delivered through the Pier 1 Extension project.
- Increase in the number of stands available on the eastern campus,
- Increase in bussing facilities to service remote stands,
- Increase in baggage transfer capacity and the provision of enhanced operational flexibility
- Defer non-essential projects that do not elevate safety or increase capacity

The key projects required to facilitate this revised development programme are detailed below:

Extension of the CPSRA to Airfield (New Project): The extension of the 'Critical Part of the Security Restricted Area' CPSRA to airfield project allowed for the relocation of cargo services to a more accessible West Apron. Cargo operators fully support the initiative and to date, FedEX and DHL have relocated their full operation to the West Apron. Other cargo operators are also requesting relocation to the West Apron and additional facilities will be required to support the next phase of relocated operations – these are being included in CIP 2020. The relocation of cargo and other services to the West Apron maximises the ability to accommodate passenger services on the eastern campus and to date 4 NBEs are available on the East Apron due to this relocation. At the end of 2019, based on committed expenditure, an additional €6.6m will be spent on this grouping and daa are seeking that this additional expenditure be included in the RAB as part of the roll forward principles.

a. **T2 Stand 400C Conversion for US Preclearance (New Project):** The provision of an additional US Preclearance gate on Pier 4, through conversion of stand 400C to a sterile US Preclearance gate, provides the ability to park additional US Preclearance aircraft on Pier 4, whilst also maintaining the ability to accommodate short-haul operations and facilitate the T2 transfer facility. This project was required to meet the increased demand for additional US Preclearance stands. At the peak period, every stand on Pier 4 is occupied by a US Preclearance transatlantic aircraft and this project has enabled this while also allowing flexibility when not in use for US Preclearance.

b. **Pier 3 Realignment & Additional Stand:** This project provided an additional stand and increased flexibility on Pier 3, increasing aircraft gauge from A330 to B777 / A350 on three stands and also providing an additional 'walk out' Code C contact stand, thereby increasing the capacity of Pier 3 from 10 NBEs to 11 NBEs. This initiative was progressed by leveraging the recent changes to aircraft clearances published by the European Aviation Safety Agency (EASA). This project gave us a level of flexibility on Pier 3 without the requirement to progress the larger project (Ref: CIP 15 7.116)

c. **T2 Level 10 Bussing gates x 4 (New Project):** This project provided for two additional bussing gates on Level 10 Terminal 2 (gates 336 and 337) delivering additional capacity to bus passengers from Terminal 2 to remote stands (generally, to aircraft parked on the Central Apron or Northern Aprons) for first wave departures. This is a key facility for Aer Lingus Regional and is in operation every day.

d. **Pier 1 Ground Floor Boarding Gates:** This project provided additional boarding facilities on the existing ground floor of Pier 1, to allow 'walk- out' access to two existing aircraft parking stands (119 and 120). This greatly improves efficiency and removes the need to bus passengers to these stands. This was a key project to facilitate growth for Pier 1 customers.

e. **Terminal 2 BHS Transfer Dock:** This project provided the installation of an additional transfer dock in Terminal 2 to meet the growth in transfer passengers in the peak hour and enable transfer baggage capacity to increase from 540 (2015) to 810 (forecast for 2019).

f. **Pier 2 Realignment:** The realignment of the stands on Pier 2 has provided increased flexibility by providing a new Code E Multi Aircraft Ramp System (MARS) stand, an increase from Code D to Code E on one stand and an increase in aircraft gauge on five Code C stands. This project provided additional parking capacity for long-haul aircraft and reduces the number of tows from Pier 3 and Pier 4 to the West Apron or / North Apron by allowing aircraft to park on Pier 2 before being towed back to Pier 3 or Pier 4.

g. **Realignment of Taxiway Zulu:** The realignment of Taxiway Zulu has increased the capacity of Code C aircraft to/from the South Apron and Pier 4 south by allowing simultaneous Code C movements on Taxiway Z and Taxiway B1. This has provided additional flexibility and resilience to the South Apron area.

3.9. Programme of Airport Campus Enhancement (PACE)

The continued passenger growth throughout 2016 and 2017 required additional capex to meet the impending traffic growth and a Supplementary Capex Process (PACE) was initiated to provide a mid-Determination injection of funding to support this growth. Following this process an additional €269.3m was allowed increasing the overall Business Development grouping to €336m.

This allowance (PACE) is made up of 23 projects across the terminals and airfield addressing critical infrastructure to meet immediate to near term demand. The details of the projects are highlighted in the table below with the additional €269.3m defined as Business Development bringing the overall Business Development allocation for the CIP 2015–2019 to €336m. Of the approved PACE projects, €179.1m is defined as 'deliverable' projects with the balance available for completion of the remaining 13 projects or allocation to other Business Development projects if the need arises under the flexibility option within the Determination.

PACE Trigger – Project Commencement post Q4 2019.

In the Commission's Decision on the Second Interim Review of the 2014 Determination in relation to a Supplementary Capital Expenditure Allowance for Dublin Airport (Commission Paper 9/2018), which was published on 13 June 2018, the Commission approved 23 infrastructure projects subject to certain conditions being adhered to. There are initial triggers attached to the Deliverable projects, namely, the commencement of construction of the project, which is satisfied by evidence of completion of tendering for contractors and commencement of works (which could be off-site preparatory works). In this regard, the Commission's Decision singled out the South Apron Stands Phase 2 and Runway 10 Line-up points projects as being at risk of not being met at the time of the 2019 Determination (estimated to be September 2019) in which case the Commission noted that it will consider the initial trigger to have been met for the purposes of the 2019 Determination if Dublin Airport can show evidence of a clear timeline which demonstrates this to be the case.

Since this Decision on PACE in June 2018, Dublin Airport has submitted two Capex reporting quarterly updates (June and September 2018) with the latest showing that approximately five projects are projected to commence construction, and thereby adhere to the initial trigger, in Q4 2019 i.e. several months after the 2019 Determination. These include the South Apron Stands Phase 2, Apron 5H, the Bus Gates, the South Apron Taxi Widening and Runway 10 Line Up Points.

To safeguard against a situation whereby any one of these PACE projects does not commence construction by Q4 2019, due to for example circumstances beyond our control over the next 12 months, Dublin Airport is inviting views as to whether the initial trigger should be either extended or that these projects would ultimately be considered as part of the next CIP. It is not in Dublin Airport's interest or the interests of stakeholders for certain PACE projects to lose the allowance provided by the Commission in 2018. Furthermore, as these projects are deliverables Dublin Airport would not be remunerated until completion under the current treatment irrespective of whether the initial trigger is end-2019 or an extended date.

Do you agree that the Commission should consider extending the initial triggers attached to certain PACE projects to avoid a scenario whereby the allowance falls away completely, potentially compromising the delivery of the project? We would welcome any other views that you have in this regard.

Figure 46: Summary of Business Development Allowance (including PACE)

Business Development Allowance	CIP No.	Project Status	Capital Allowance
Original Business Development Allowance			€66.6m
Additional Business Development Allowance (PACE)			
T1 & T2 CUSS Check-In	1.001	Feasibility	€5.5m
Pier 1 Extension	1.002	Complete	€6.7m
South Apron PBZ	1.003	Complete	€21.3m
T1 & T2 Immigration Facilities	1.004	Feasibility	€11.1m
T2 Level 15 Bus Gates	1.005	Pre-Feasibility	€5.9m
South Apron Stands Phase 1	2.001	Complete	€9.6m
Apron 5H & Taxiway Rehabilitation	2.002	Phase 1 On Site	€49.1m
Upgrade & Realignment of Stands 101-104	2.003	Feasibility	€4.8m
Hangar 1 & Hangar 2 Stands	2.004	Feasibility	€14.4m
West Apron Stands	2.005	Feasibility	€2.2m
Pier 2 Underpass	2.006	Design	€4.8m
Pier 3 Underpass	2.007	Complete	€0.2m
West Apron Surface Access	2.008	Feasibility	€3.0m
Advanced Visual Docking Guidance System	2.009	Tender	€4.8m
Fixed Electrical Ground Power	2.010	Tender	€4.8m
South Apron Stands Phase 2	2.011	Feasibility	€37.3m
Apron Wide CCTV	2.012	Feasibility	€1.0m
Link 3 Extension Taxiway	3.001	Design	€4.7m
Realignment of Taxiway A	3.002	Design	€5.3m
Dual Taxiway F	3.003	Design	€37.3m
Link 6 extension Taxiway	3.004	Design	€5.6m
South Apron Taxiway Widening (Dual Code E)	3.005	Feasibility	€13.7m
Runway 10 Line-Up Points	3.006	Feasibility	€16.2m
Sub Total			**€269.3m**
Overall Total			**€335.6m**

3.10. Summary

Dublin Airport has committed to optimising the full suite of capital allowances awarded under the current 2014 Regulatory Determination and is currently focused on delivering the reminder of the priority CIP projects and the Supplementary Capex Projects (PACE). However, due to the unanticipated nature of the growth and the limited capital infrastructure allowance, it has been necessary to defer a number of non-essential projects and to reprioritise critical ‘capacity enabling’ projects, some of which have successfully been delivered within the Business Development allowance.

Full remuneration for the necessary additional expenditure of €60.4m across all groupings, as detailed above is being sought for inclusion in the RAB. Please submit your views of support for these projects or alternatively why you disagree with DAPs decision to fast tracking business critical projects.

4 CAPITAL INVESTMENT PRINCIPLES

4. CAPITAL INVESTMENT PRINCIPLES

4.1. Strategic Overview

Dublin Airport has a number of key strategic objectives that frame the proposed Capital Investment Programme (CIP) for CIP 2020. These high-level objectives include;

- Develop 40mppa capacity as it is essential to have the necessary infrastructure in place to accommodate the growth on the horizon, beyond 2024
- Provide increased choice and competition on all routes
- Double transfer traffic to 10% by 2025
- Develop and promote Dublin Airport as an International Hub
- Grow the transatlantic network
- Maximise scale and usage of US Preclearance facility
- Provide for an elevated passenger experience where passengers feel 'cared and looked after'.

Underpinning these objectives are a number of direct measures that are necessary to enable this strategy to be achieved;

- Reliability of existing assets including existing passenger facing equipment, lifts, escalators and travellators etc.
- Reliability and development of existing IT Network and associated infrastructure, SSKs, Autopass etc.
- Improved queue times at security and improved passenger experience, while delivering a safe and secure process.
- Improved passenger experience through additional and relevant F&B offerings, improved retail space, increased dwell areas, improved departure décor and seating.

To this end, the CIP comprises 2 distinct areas of proposed development, (a) the development required irrespective of traffic growth over the next 5-years, defined as 'CORE'. and (b) development required to accommodate traffic growth to the next key milestone of 40mppa (million passengers per annum), defined as 'Capacity'.

'CORE' development includes the following sub-categories;

- Asset Care - Capital Maintenance
- Information Technology (IT)
- Security
- Commercial Revenue
- Other Miscellaneous

With the volume of traffic that Dublin Airport has experienced over the past 5-years, growing from 21.7m in 2014 and forecast to exceed 31.5m in 2019, existing facilities are under additional pressure. Passenger requirements and expectations are also increasing with regard to technology developments and comfort levels. Passengers now expect a higher level of service.

Existing assets will require replacement, refurbishment or rehabilitation, following the natural ageing process of any asset and following the additional use these assets have experienced over the past 5-years. Terminal 2 will be almost 15-years in operation at the end of this next CIP period and investment will be required to address elements of the overall structure and facility that have asset lives of less than 15-years.

The airport over the past 10-years and particularly over the past 5-years has become heavily dependent on IT and it is essential that a robust IT infrastructure is maintained and also developed, to consider new and emerging technology that passengers will expect and that provides additional security and efficiency for airlines and other customers. The proposed investment in IT recognises this and is appropriately sized.

The security infrastructure required over the next CIP period is balanced against maintaining existing security assets (e.g. x-ray machines), compliance with required standards and regulations, providing an improved passenger experience and ensuring a safe and secure environment for both passengers and staff at Dublin Airport.

The commercial infrastructure that is proposed in CIP 2020 focuses on projects that generate the maximum return on investment, provide the greatest passenger experience and address some capacity shortfall issues, e.g. car parking.

daa has also responsibilities in relation to national and EU legislation to comply with targets for sustainable development and the proposals put forward in this CIP take cognisee of these requirements in their development and execution.

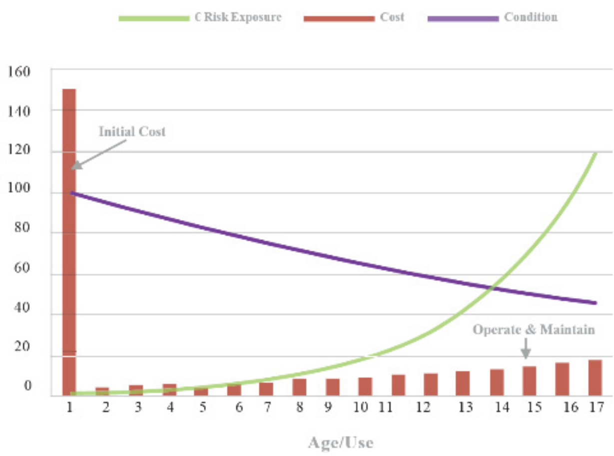
4.2. Asset Care: Capital Maintenance at Dublin Airport

Section 3 outlined the rationale for capital investment to increase capacity across individual process areas of the airport. Equally important is the need to invest in current assets requiring rehabilitation or upgrade due to failing condition, functionality constraints, obsolescence or requirement for regulatory change. This investment driver is termed Capital Maintenance.

Capital Maintenance is justified on the ongoing requirement for the asset as well as the current and forecast probability & impact of asset failure, assessing optimal investment timing and consequences of deferred investment. Failure in this context is failure to meet business objectives and is inclusive of serviceability and growth requirements.

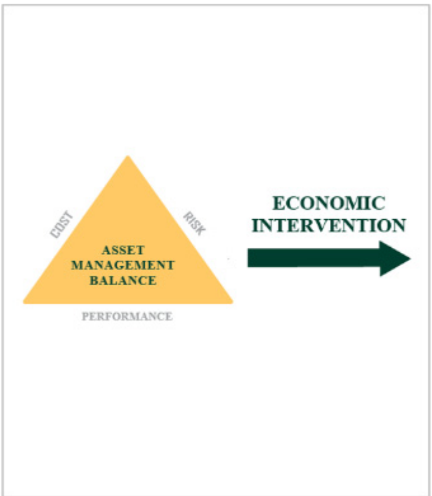
Operational expenditure and Capital Maintenance investment (totex) in existing assets are options to sustain the existing assets in service before proposals are developed to build new assets. Capital investment to maintain and replace existing assets is balanced against the pressure to invest in new assets to enable increased capacity. A complete 'run to fail' approach is detrimental to the economic well-being of the business and its customers. In the short term, cost savings are achieved, however in the medium to longer-term it presents a 'cliff edge' of investment requirements related to crisis-condition related failures, which accumulate over time. Therefore, a balanced, asset management approach is adopted. The value extracted from assets over their lifetime is sub-optimal to the business using a 'run to fail' approach as the risk and ultimate cost of catastrophic failure of the asset is high. Instead, the asset value can be maximised by systematically evaluating asset performance, risk of failure and cost of maintenance investment over its lifetime.

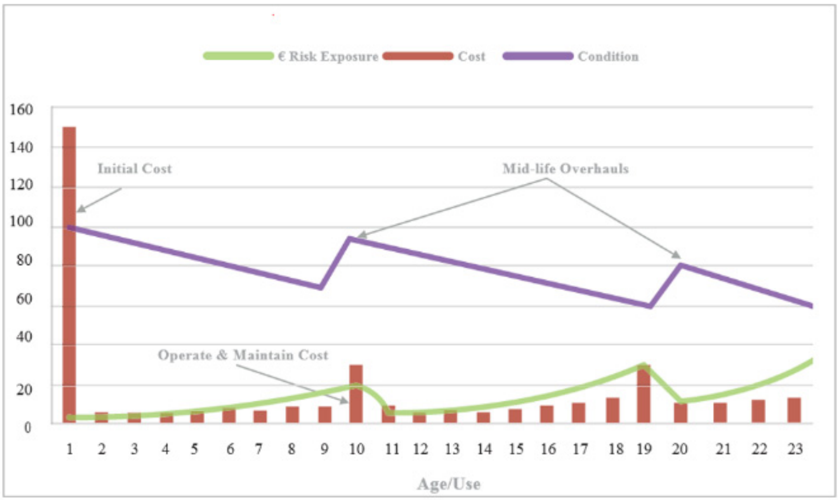
Figure 47: 'Run to Fail' Asset Management Cost/Performance/Risk Outturn



An optimal balance between Whole Life Cost (WLC) management, service delivery to customers and risk exposure is the aim of the 'economic intervention' approach to good asset management.

Figure 48: Midlife Interventions





A formal Asset Management standard, to deliver an optimal economic approach to asset management, PAS 55, was launched in 2004. This standard has been adopted by many organisations worldwide including many international airports. PAS 55 was superseded by a new international standard; ISO 55001 was published in February 2014 and Dublin Airport achieved this accreditation on 28th February 2015.

4.2.1. Understanding ISO 55001 Certification

- Asset Management is defined in ISO 55001 as the 'coordinated activity of an organisation to realise value from assets'.
- It seeks to optimise the cost, risk and performance of assets over their life cycle at an individual asset, asset system and asset portfolio level.
- Asset management translates business objectives into asset- related decisions, plans and actions within a strategic framework using a set of processes, techniques and tools.
- Improved asset management practices are particularly business critical in asset intensive organisations where there are significant challenges to address in terms of increasing service demand, increasing stakeholder expectations, a deteriorating asset base and constrained funding.

ISO 55001 certified business will schedule upgrade/replacement investment to minimise the overall cost of the asset to the business (both in terms of investment cost and costs of failure) while maintaining an appropriate service level. To retain ISO 55001 all aspects of Dublin Airport Asset Management is measured against pre-set targets, under the following headings:

- Policy, Strategy & Objectives
- Stakeholder Management, Leadership, Accountabilities & Responsibilities
- Organisation, Training & Development
- Asset Lifecycle, Financial Planning & Planning to Achieve Objectives
- Procurement
- Design & Delivery
- Operate & Maintain, Performance Evaluation
- Risk Management, Health & Safety,
- Asset Information Management
- Continuous Improvement

The benefits of asset management, as listed in ISO 55001, include, but are not limited to:

- Improved financial performance: improving the return on investments and reducing costs, while preserving asset value without sacrificing the short or long-term realisation of organisational objectives;
- Informed asset investment decisions: enabling the organisation to improve its decision making and effectively balance costs, risks, opportunities and performance;
- Managed risk: reducing financial losses, improving health and safety, good will and reputation, minimising environmental and social impact, resulting in reduced liabilities such as insurance premiums, fines and penalties;
- Improved services and outputs: assuring the performance of assets leading to improved services that meet or exceed the expectations of customers and stakeholders;
- Demonstrated social responsibility: improving the organisation's ability to reduce emissions, conserve resources and adapt to climate change, demonstrating socially responsible and ethical business practices and stewardship;
- Demonstrated compliance: transparently conforming with legal, statutory and regulatory requirements, as well as adhering to Asset Management standards, policies and processes;
- Enhanced reputation: through improved customer satisfaction, stakeholder awareness and confidence;
- Improved organisational sustainability: effectively managing short and long-term effects, expenditures and performance, improving the sustainability of operations and the organisation;
- Improved efficiency and effectiveness: reviewing and improving processes, procedures and asset performance improving efficiency and effectiveness, and the achievement of organisational objectives.

Achievement of this Asset Management Standard is an outward demonstration of the professionalism of the Asset Management function within Dublin Airport and gives assurance to our airline customers and stakeholders that the capital maintenance investments put forward are timely, necessary and proportionate.

A series of ISO 55001 external audits have been undertaken at Dublin Airport since the 2014 certification with a 5-day recertification audit completed end February 2018. This resulted in Dublin Airport being recertified and awarded with ISO 55001 certification until 28th February 2021. Yearly audits will be undertaken to ensure compliance with the Standard.

4.2.2. Asset Management in practice at Dublin Airport

Asset Health Reviews are developed at asset levels by System Managers and are used to support the Asset Management Plans. Asset Health Reviews have been conducted on current Dublin Airport assets over the past 6 years assessing condition, serviceability and risks. Failure of Condition is generally a driver for Capital Maintenance Investment whereas failure of Serviceability is generally a driver for Growth Investment. Risk is used to prioritise investment requirement. These reviews inform the proposed investments for CIP 2020 and on-going operational maintenance planning for the life of the assets.

The reviews have demonstrated that uplift in capital maintenance activity is required over the next 5 years to mitigate increasing risk of disruption to services and optimise cost input against performance output for certain areas such as:

- Airfield Pavements
- Airfield Lighting

- Passenger Boarding Bridges
- Fixed Electrical Ground Power
- Utilities
- Terminals
- Life Safety Systems
- Heating, Ventilation & Air Conditioning
- Lifts & Escalators
- Building Structures
- Energy Improvement Projects
- Campus Building Roofs, Mechanical & Electrical Services
- Road Infrastructure
- Car Park Infrastructure

Dublin Airport prioritises capital maintenance through continual risk evaluation, in line with ISO 55001, and therefore investment flexibility is important. It is for this reason that Dublin Airport includes a number of capital investment envelopes in proposed CIP 2020. Such an approach will allow flexibility in the capital investment spend to respond to changing risk assessments over the five-year period. Continual risk assessment may result in certain projects moving up (or down) the order of priority during the CIP period and investment should take place based on current risk assessment rather than the risk assessment undertaken at the beginning of the CIP period.

Figure 49: Asset Health Matrix

Score	Condition	Serviceability	Health Index
1	New or as new	Appropriate for use with >15 years spare capacity	Just built - monitor performance to design
2	Good condition	Appropriate for use with >10 years spare capacity	>10-year planning period
3	Shows moderate sign of wear	>5 years spare capacity	Monitor - On the radar within 10-year horizon
4	Intervention in next planning period	Fully utilised requiring investment in next planning period	Plan & close monitor - Next 5-year planning period
5	Intervention this planning period	Needs urgent mitigation to address service issues	Action now - This planning period

4.3. Information Technology

Information technology plays a critical role in the airport environment supporting business operations for all stakeholders through applications, infrastructure, data and network connectivity. IT supports and delivers critical business systems required for the safe, secure and efficient running of the airport for airline customers, passengers, partners and employees.

IT has also been a strategic enabler in supporting growth over the last CIP period. Significant investment was made in systems and technology to support the high volumes of aircraft and passenger movements which have been experienced since 2014. The IT portfolio has expanded considerably over the last CIP. This in turn has resulted in increased lifecycle costs to ensure the IT estate provides the expected levels of service to support the business operations at the airport for all operators.

In the next CIP period, the trend around increased spend on lifecycle will continue with approximately 70% of the total spend being allocated to maintaining the required level of service to support and manage daily operations. This includes increased investment on Cyber Security and Data privacy.

The remainder of the investment will allow the airport to continue to grow and to realise its strategy by driving further efficiencies and improved experience for passengers and airlines. The investment will, where possible, take advantage of new technologies that will support the business in a cost-effective manner.

The proposed capex investments can be grouped in two broad categories;

- Lifecycle investment which will maintain currency of the existing base of applications, servers, infrastructure, networks and devices and "keep the lights on".
- Transformation and Growth which reflects the increase in IT intensity as aviation stakeholders look to increased automation and digitization to reduce cost, drive efficiency, improve passenger experience while continuing to grow their business in a safe and secure environment.

The capex portfolio is split between 70% Lifecycle and 30% Transformation and Growth. The actual spend on the current CIP is split 60/40% across Lifecycle/Transformation.

The growth in applications, infrastructure and data to keep pace with passenger growth and the demand for increased business efficiency has resulted in significant growth in the IT landscape during the current CIP period. This growth is reflected in increased lifecycle costs to maintain the base.

The key focus of this investment package is to ensure safe, secure and reliable operations. In addition, adequate provision has been made to invest in technology to safeguard future growth of the airport. This provides a balanced approach making optimal use of investments to protect both the current and future interests of all airport stakeholders.

4.4. Commercial Revenue

Projects in this grouping are designed to maintain and grow commercial revenues for the Single Till, which has a positive impact on reducing airport charges. Commercial projects provide additional benefits as follows;

- They provide an improved passenger experience (e.g. retail, Food & Beverage offerings)
- They provide improved passenger choice (e.g. Food and Beverage offerings, car hire, car parks)
- They provide additional capacity in order to remain price competitive (e.g. car parking, lounges)
- They provide essential facilities for stakeholders (e.g. office accommodation for new airlines)
- They keep pace with new technology (e.g. digital advertising)
- They provide ongoing day-to-day maintenance and refurbishments to existing facilities.

Commercial business at Dublin Airport include, Retail, Commercial Property, Commercial Concessions, Car

Parks, Advertising, DATS, US Preclearance and other smaller revenue streams.

The majority of commercial businesses at Dublin Airport are deemed 'elastic' to passengers i.e. the revenues generated are sensitive to changes in passenger levels. Due to the significant growth in passengers since 2015, a number of businesses require further investment to meet growing passenger demand. The lack of available capacity will constrain future revenue growth unless this investment is prioritised.

All commercial projects have positive Net Present Value's (NPV's) and Internal Rate of Return (IRR's) in excess of the current regulatory Weighted Average Cost of Capital (WACC). All commercial projects are supported by individual business cases.

4.5. Security

daa has a mandatory role to "protect Civil Aviation from acts of unlawful interference" and the Security submission for CIP 2020 is framed on this requirement. In this context there are a number of key objectives in this CIP period, specifically:

- Implement a significant program to replace end-of-life Security equipment and systems.
- Respond to the forecasted passenger (PAX) growth in a manner that maintains our security and customer service compliance obligations.
- Meet enhanced security compliance requirements, focused on increased detection capability including explosives.
- Address security vulnerabilities which have been identified over the course of several reviews.
- Increase staff competency and training levels in the light of increased regulatory requirements (e.g. ASTO, additional curriculum etc.).

The projects proposed under the Security Grouping are focused on preparing Dublin Airport's security environment for these changes, so that daa both meets existing requirements and standards, and is in a position to react to future growth and evolving security risks.

- Meet the screening and security standards set-out by the EU and the Irish Aviation Authority (IAA), as expressed in the National Civil Airport Security Programme (NCASP), Regulation (EC) No 300/2008 and Commission Regulation (EU) 2015/1998.
- Meet Commission of Aviation Regulation (CAR) passenger service quality metrics under its remit from the Aviation Regulation Act (2001).
- Ensure strong fiscal governance in respect to OPEX and CAPEX expenditure on behalf of its shareholder under the Code of Practice for State Bodies.
- Adherence to appropriate health and safety, data protection (GDPR), environmental protection (EPA radiological regulations) and other relevant national regulation and directives.

The above regulations must be maintained in the face of an unpredictable and evolving European security environment (i.e. terrorism), continued passenger growth in Dublin Airport and a changing commercial environment (e.g. unknown effects of Brexit on passenger numbers and security requirements). The projects included in CIP 2020 will address;

(a) Explosive detection

Over the past 10 years the airport security environment has transformed to one of intense scrutiny of all aspects of Dublin Airport's passenger and baggage operations. Specifically, in 2015 the EU Commission stated in EU REG - 185-2015:

- Evidence has shown that terrorists are continually trying to develop new concealments for improvised explosive devices (IEDs) designed to counter the existing aviation security measures relating to cabin baggage screening.
- Certain specific aviation security measures laid down in Commission Regulation (EU) No 185/2010 (2) should therefore be amended to improve the mitigation against the threat from improvised explosive devices concealed within cabin baggage.
- The amendments should refine the technical specifications for the screening of cabin baggage using Explosive Detection Systems.

(b) **Airport Supplies and Boundary Protection:** Consequent to several internal and Regulator reviews/audits conducted over the past 5 years risks have been raised regarding the following:

- The ability of daa to consistently screen airport supplies over a growing campus which is currently undergoing extensive development: Specifically, in the context of strengthened screening requirements and regulation of vehicles and airport supplies transiting into the airfield.
- Airfield boundary and traffic security management: With the impending development of the north runway project over the next CIP, daa security has been faced with the challenge of a substantially larger active airfield boundary, which must be monitored and patrolled to ensure that unauthorised entry is detected.

(c) Cabin Baggage Screening in EU Airports

In the area of explosive detection, a new generation of dual-view and CT based systems combined with explosive detection technology/ algorithms have been developed and certified initially for hold baggage screening (HBS) but have been followed closely by equivalent systems which can provide the same approach for cabin baggage screening.

Until 2016, the latter development was not certified for use beyond the C1 standard in European airports, however as of July 2017 major manufacturers have been able to produce compliant systems in accordance with C2, with C3 systems accreditation being awarded to the first vendor in 2017.

Subsequently, as with HBS, European regulators now see nothing to inhibit the mandating of considerable higher levels of explosive screening levels for cabin baggage, which will leave operators with the choice of either higher rates of random sampling using todays approach of manual ETD testing (leading to less efficient processes and higher operational costs), or implementing EDS cabin baggage screening which will provide up to 100% EDS screening albeit with higher CAPEX outlays. Such investment will provide cost certainty and flexibility for airport operator regardless of the level of screening mandated (EDS systems can sample from 0-100% on demand).

In conclusion Dublin Airport Security proposes to enhance the Security process at Dublin Airport and leverage recent industry developments in explosive detection and security practices in order to substantially improve our detection capability and mitigate security threats.

Key elements of our equipment portfolio are coming to end of life and will no longer meet the standards required or provide the ability to drive continued improvement on our detection capability – hence programme of replacement is required. Our key focus will be to enhance our ability to react quickly to any changes in general security threat level and/or mandated regulatory changes that require implementation at short notice. In addition, there is also a need to revise the external security process (Vehicle Control Posts), deliver increased compliance across a significant campus footprint and improve stakeholder satisfaction.

4.6. Sustainability

Dublin Airport's commitment to sustainability and specifically to carbon management is a key driver of project design, selection and deliverability in CIP 2020.

daa Sustainability Strategy

daa set a high-level target to achieve carbon neutrality (Level 3+) under the Airport Carbon Accreditation programme by the end of 2020. daa's sustainability policy is based on three key principles of minimising consumption, reducing the negative impact of operations and effective communication of our activities.

The importance of sustainability as an enabler of growth has also been well recognised in recent years across many airports, and has implications across a range of environmental aspects, as follows:

1. **Increasing focus at national and international level on mitigating climate change and on energy management involving both legislative and policy development, as illustrated below:**

- Following COP21, the increasing focus on carbon emissions reduction at global level aligns with the EU 2030 carbon and energy framework Implementation requires a shift to renewable energy sources of energy generation, increasing energy efficiency, reduction of emissions in vehicular transport and development of near zero energy construction models. This transition is starting to be implemented through the development of National Climate Change Adaptation plans, implementation of energy efficiency targets at national level for 2020 and 2030 in line with EU Directives. Ireland currently looks as if it will fall short of its 2020 targets, with emissions increasing by 7% since 2015, and with the share of renewable approximately 3% behind the 16% target. It is likely that there will be no significant fines or costs imposed immediately, with efforts concentrated instead on addressing the shortfall over a short period.
- The publication of the first National Adaptation Framework in January 2018 is to be followed by Sectoral Adaptation plans outlining what measures key economic sectors are to take to help achieve national transition objective laid out in the national policy position, which was given a statutory basis in the Climate Action and Low Carbon Development Act.
- Directive 2010/31/EU of the European Parliament and Council on the energy performance of buildings (recast) Energy Efficiency requires that all new buildings will be Near Zero Energy Buildings (NZEB) by 2020, with public authorities required to ensure that all new buildings they own and occupy comply from the start of 2019.
- Dublin Airport is located adjacent to the 300km2 UNESCO designated Biosphere, and the river bodies and drains on airport feed ultimately into the Baldoyle Bay, which has been designated a Special Area of Conservation and a Special Protection Area. In relation to Surface Water quality, the publication of the recent River Basin Management Report for Ireland has highlighted the poor condition of many river bodies. The EPA is renewing its focus on improving water quality in its second River Basin Management Plan, with the Santry and Mayne rivers identified as priorities for action in the Dublin City/Fingal area.

2. **Heightened public awareness:**

- The focus on air quality problems globally, and specifically in European cities such as Paris, Amsterdam, and more recently London highlights both the increased public awareness of air quality as a public health issue, and the immediate impact that national regional or municipal regulation can have in addressing such problems.
- The challenges experienced recently by airports such as Vienna, Heathrow and Gatwick in relation to development of runway infrastructure vividly demonstrates the risks of a perception of inadequate provision for key environmental and

sustainability considerations such as noise and air quality. Vienna's proposal for a third runway were initially refused in 2017 because the benefits were deemed not to justify the negative carbon impact, with this being subsequently overturned by the constitutional court.

3. Community reaction:

- Local community representatives have identified during discussions at the Dublin Airport Environmental Working Group (DAEWG) that they would like to see Dublin Airport taking specific action to address environmental concerns, in relation to climate change and air quality.
- These include the introduction of mandatory policies in relation to the use of Low Emission Vehicles on airport to reduce emissions from NOx and particulate matter which impact negatively on local air quality.

These principles are applied across a number of priority environmental aspects:

- Energy
- Carbon
- Air quality
- Noise
- Water
- Waste

A sustainability project plan has been developed and is being implemented for each of these aspects.

4.6.1. Sustainability Implications for the CIP 2020

From a CIP perspective, the requirement to comply with energy efficiency regulation will be significant. Projects will have to be designed ab initio to be energy efficient and constructed and operated in an energy efficient manner. In particular, NZEB (near Zero Emissions Buildings) regulations will introduce a new dimension into all building construction projects. The incremental capital investment costs associated with such developments will be determined in the detail design process.

It is worth noting that daa has already achieved significant energy and carbon savings in recent years at Dublin Airport in line with government policy. daa entered into voluntary partnership with SEAI and achieved ISO 50001 Energy Management accreditation. Hence since 2012, primary energy savings of 19,564,411kWh has been achieved through effective management and implementation of energy efficient measures e.g. energy management systems, LED lighting and thermal upgrades. This represents a 9.6% reduction in final energy consumption since 2012 as measured the SEAI's Public Sector Monitoring & Reporting scheme. Similarly, since commencing engagement with the voluntary ACI Airport Carbon Accreditation (ACA) Scheme in 2009, Dublin Airport's carbon footprint decreased by 27% from a baseline of 36,917 tonnes CO2 in 2011 to 27,018 tonnes CO2 in 2016. This level of progress was largely achieved by identifying low cost, high impact projects, and we expect this to be adequate to ensure that we comply with required energy efficiency targets up to 2020.

It is important to note that we have identified we will not be able to achieve the likely 2030 targets without investment in energy projects which will address;

- Design, development and implementation of efficient holistic energy solutions across the airport campus, which will assist in addressing the requirement for renewable energy provision (new energy projects);
- Ab initio design, construction and operation of energy efficient buildings (new way of designing and building).
- Introduction of new energy efficient plant and

equipment and phased replacement of existing plant and equipment with energy efficient upgrades (procurement consideration for plant and equipment replacement).

In light of the rapid development of new technologies in this area, and the changing cost base associated with these, we are currently in the process of reviewing our energy strategy to ensure that we make the most appropriate decisions in relation to such projects, and that we consider such development not just on a case by case basis, but ensuring that the overall system provides the greatest possible efficiency and value for money.

A key sustainability consideration for all projects will be that they should be evaluated on a full lifecycle basis, as in many cases there will be a material resource efficiency benefit for such projects over the lifetime of the asset concerned, although there may be a higher capex cost to begin with. As a national infrastructure provider, we look to develop long term assets, and the current economic regulator model allows us to recoup the costs of these assets over a long period. It therefore is consistent that in determining the full cost of investment, this should be considered over the lifetime of the asset and comprehend disposal costs if appropriate, rather than focusing exclusively on the up-front cost of construction. This approach is fully in line with green procurement principles advocated by the EU and we are starting the process of integrating appropriate priority "green procurement" principles aligning with our sustainability strategy into our procurement process in line with EU recommendations in this regard.

Arising from our sustainability strategy, we will also look to highlight where particular projects confer benefits over and above capacity, efficiency or financial advantages, which may be of value to our community, staff or passengers. For example, air quality benefits associated with procurement of electric or low emission vehicles or development of Fixed Electrical Ground Power facilities should be highlighted in and considered during the evaluation process.

4.7. Service Quality

Before we consider the implications of service quality on capital investment it is worth understanding the passenger composition at Dublin Airport. Airports as global gateways deal with a wide range of nationalities with Dublin being no exception.

4.7.1. Understanding Our Passengers

Dublin Airport has been conducting market research for a significant number of years allowing it to understand the passenger and make appropriate business decisions that reflect passenger composition. The research conducted covers a wide range of issues and in this section, we will look at a number of key demographics that will provide a better understanding of the passengers using Dublin Airport and how this impacts on capital investment.

Residency Profile

A fundamental starting point is to understand the residency profile of passengers using Dublin. The last ten years of residency data shows that Dublin has been experiencing a marginal decline in Irish residents as a percentage of scheduled passenger traffic. By the end of 2017 Irish residents using Dublin Airport has dropped from 54.5% in 2008 to 51.2% in 2017 while conversely non-Irish residents has grown from 45.5% to 48.8%.

Figure 50: Scheduled Passengers - Residency

Dublin Airport Scheduled Passengers			
Residency	**2008**	**2017**	**Diff**
Irish	11.9m	14.9m	3.0m
Non-Irish	9.9m	14.2m	4.3m
Total	21.8	29.1m	

The stronger growth in non-Irish residents for example has the potential to impact on capacity development decisions on the nature and size of immigration facilities, transfer facilities, public transport, retail offering as well as commercial concession spaces for car hire & tourism information. The growth experienced in

Irish residents has the ability to influence other capacity developments such as additional car parking.

Purpose of Journey

Purpose of journey looks at the reasons for taking a trip. A high-level breakdown between business and non-business shows that while we have seen both segments of the market grow it has been the non-business segment that has delivered the majority of the growth over the last ten years.

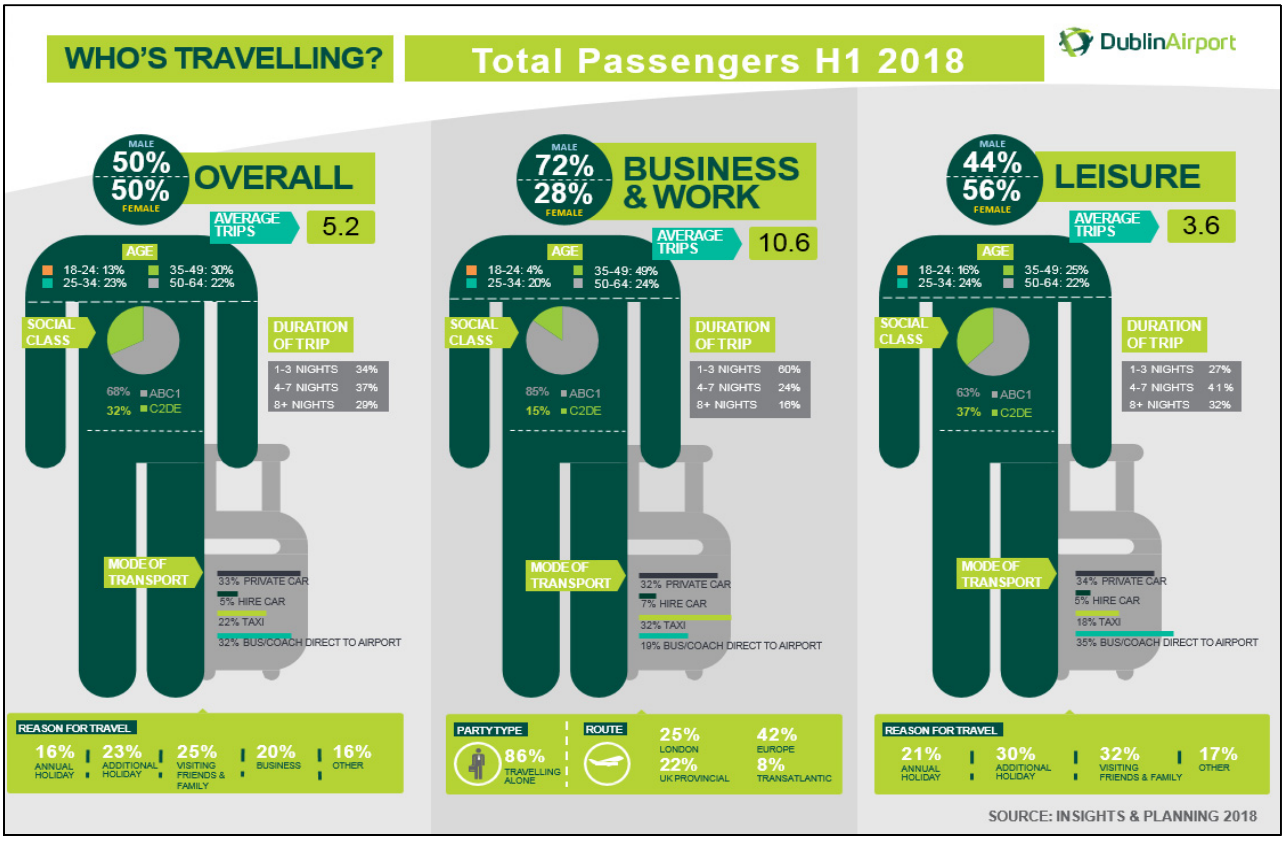
Figure 51: Scheduled Passengers – Purpose of Journey

Dublin Airport Scheduled Passengers			
Purpose of Journey	**2008**	**2017**	**Diff**
Business	4.2m	5.1m	0.9m
Non-Business	17.6m	23.9m	6.3m

Growth in business passengers is a key factor for example in the need for business class lounges, fast track facilities and general automation throughout the terminal to speed up the process for business passengers who are time sensitive. The strong growth in non-business passengers drives the need to consider capital opportunities that deliver on the needs of passengers who are not as time sensitive who require a more relaxed journey through the terminal.

The growth in an older age profile using Dublin requires consideration be given to walking distances to gates, seating arrangements and Persons of Reduced Mobility (PRM) facilities. Figure 52 below summarises the passenger composition at Dublin Airport in H1 2018.

Figure 52: Who is travelling?



4.7.2. Our Passenger Expectations

The service quality experienced by passengers has been a key element to ensuring that the passenger experience at Dublin Airport meets passenger expectations and delivers on Dublin Airport strategy to "deliver an outstanding airport experience for passengers & airlines." To this end continuous passenger surveys are undertaken to understand expectations and areas of improvement.

In considering the development of infrastructure, insight into the passenger experience element is of equal importance to the defining of infrastructure needs. This creates an inter-relationship between infrastructure architecture, experience and service as referenced in Figure 53. The passenger's journey through the airport is about how these various elements work together to meet their needs and desires. The infrastructure provides the stage upon which the other elements are played out.

Figure 53: Passenger Interrelationships

In consideration of the diversity of passengers currently using and forecast to use Dublin Airport, the Capital Investment Programme has considered and examined how all passengers and airport workers will use and experience the airport and terminal

An important qualitative component of the (Level of Service) LOS at an airport terminal is how passengers perceive their experience of transiting the airport in terms of comfort and convenience. While many factors may affect a passenger's perception of convenience, ref Figure 53, three primary factors are typically associated with airport passenger terminals:

- Distance a passenger must walk, and the associated ease or difficulty involved in traversing this distance
- Passenger's feelings about the terminal facilities and ambiance – can they find them? Is it a nice place to be?
- Time associated with moving through the terminal – the airport experience is a Sequence of processes and waits…are their expectations set for this? Do they feel in control? Do they understand what is ahead of them and what their options are?

Figure 54: Passenger Perception of Convenience

To this end four personas, representing the main categories of Dublin's customers, were used to examine their experience of Dublin Airport's new infrastructure development:

- Hank & Linda representing the mobility and hearing impaired
- Fiona representing the leisure single traveller with visual impairment
- Luca representing the business traveller
- Hallie & family representing the single adult with young children

Hank & Linda

Fiona

Luca

Hallie & Family

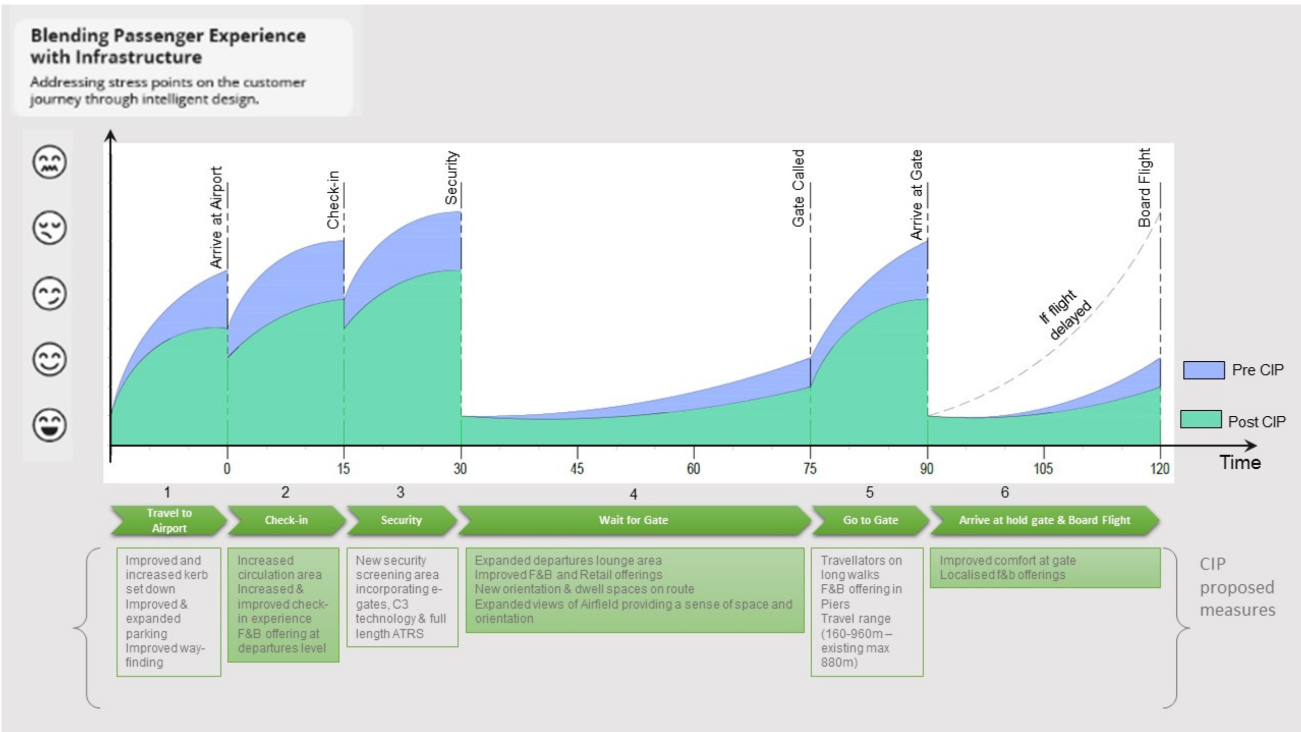
Findings from this study have been included in the development plans and recommended measures will be carried forward through to final design.

The themes trending from the study in terms of concept design inclusion include:

- Manageable walking distances & ease of travel – reducing complexity, providing spaces to dwell, providing engagement during travel.
- Understanding the difference between dwell spaces and movement spaces and how they are treated in the airport
- The re-thinking of queues and how to help manage expectations and to use the time
- Rethinking wayfinding to help passengers understand where they are and what's ahead and using a holistic approach that goes beyond signage
- Understanding the value of time by facilitating greater direct ease of access and helping passengers use their time productively.
- Simple interventions using lighting, materiality etc to enhance spaces such as gates which are the first and last touchpoint in the passenger journey.
- Identifying new opportunities for Dublin to bring that valued human touch to the airport experience and find those experiences that Dublin can become famous for.

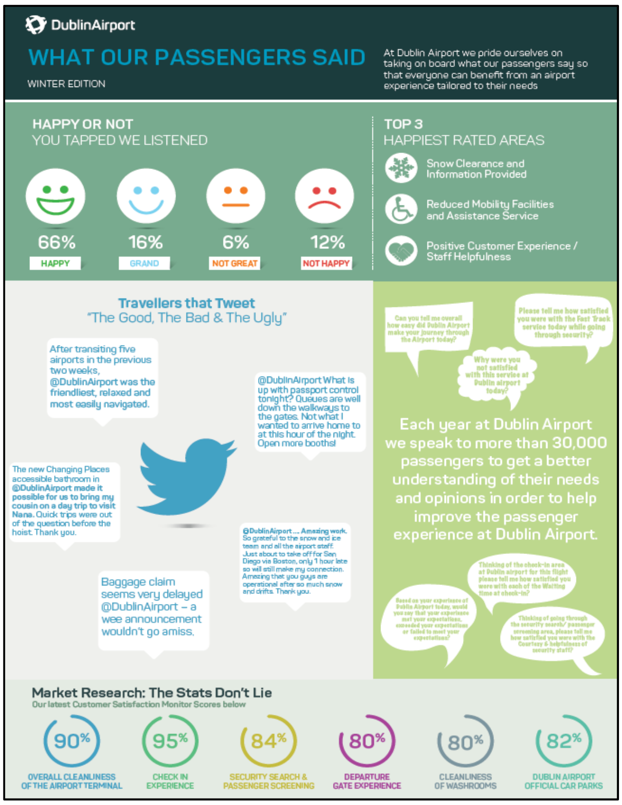
The ambition of the programme is to optimise passenger experience with provided infrastructure and passenger services as presented in Figure 55.

Figure 55: Blending Passenger Experience with Infrastructure



The current passenger experience at Dublin Airport is graphically represented in Figure 56;

Figure 56: Dublin Airport Passenger Experience



4.7.3. Service Quality Metrics

The service experience of customers has been a factor in the selection of projects for this CIP proposal. In addition to the 12 service quality metrics which can influence the price cap for 2014 - 2019, daa monitors and seeks to improve performance on a far wider range of service quality metrics. We believe this attention to the customer service experience is reflected in the high level of service provided by daa to our customers with Dublin Airport consistently ranking in the top 10 best airports since 2011 in the ACI ASQ survey from 31 airports surveyed. The Service Quality Metrics regime in place for 2015-2019 is summarized in Figure 57.

A key factor in attaining high levels of service quality is the alignment of processor capacity and demand. When a processor is utilised beyond its capacity, the quality of service will suffer. Similarly, where it is not possible to exceed the throughput capacity of a processor e.g. stands, delays and/ or other operational disruptions will result, also reducing the service experience of customers. CIP 2020 proposes capacity increases in a number of key areas to ensure service quality for both passengers and airlines remains high;

- Aircraft parking stands
- New Pier/gate development
- Short & long-term car parking
- Technology & innovation
- Check-in
- Security Central Search
- Airport Lounges
- Food & Beverage

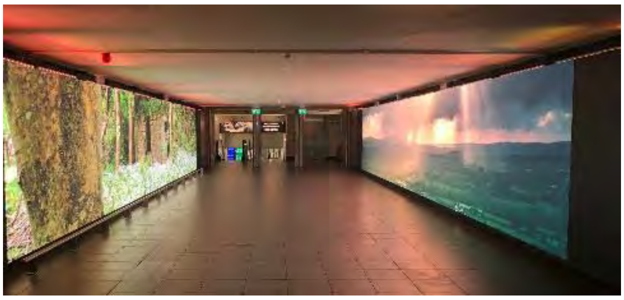
We are already experiencing aircraft parking stands under pressure as is the taxiway system in certain parts of the airfield, where delays are being experienced due to aircraft holding for a suitable parking stand or due to taxiway congestion. A significant amount of taxiway improvements will be covered under the existing PACE programme as detailed in Chapter 3.

Capacity is not the only influence on service quality requiring capital investment. Of considerable importance are such factors as;

- Changing customer expectations
- The maintenance of existing assets

Dublin Airport recognises that changing customer expectations make the issue of service quality a continuous process of improvement. As we address one issue of concern this no longer becomes an area for improvement in the short term with other areas taking its place. The following areas are of key importance to customers;

- Cleanness of toilets
- Décor / seating comfort / Visual Environment
- Check-in time
- Security/space layout & waiting time



Once these areas are addressed it is most likely that concerns such as wayfinding and F&B will become more important to passengers. There are a number of key technology trends which are changing customer expectations of transaction processing, information delivery and independent progression through the airport for example:

- Ticket sales via mobile app.;
- Flight status updates via mobile devices and/or social media;
- Self-service transfer and self-boarding kiosks

As customers' expectations of such technologies increase – availability, reliability, usability - airports (and airlines) will need to fulfil these expectations if they are to avoid a perceived drop in service quality. As can be seen from Figure 57 below the customer experience of Dublin Airport, supported by the quality of service we provide, is broadly positive. This quality of service is achieved through meeting (and in some cases exceeding) the service quality targets set by CAR for 2015-2019, and places Dublin Airport in the top five European Airports for service quality. For this reason, with regard to service quality daa is proposing that for the next regulatory determination period currently out to consultation, *(Ref: Quality of Service, 2018 – Issued to users 8th October 2018)* and CIP 2020 includes for adhering to these proposals.

While daa seeks to provide an excellent level of service quality to its customers, delivery of service quality improvement is reliant on capex investment in many instances. Such capex must be supported by the airlines and be affordable for daa.

Figure 57: Service Quality Metrics 2015-2019

	Service quality measure	Source	Target	% weight in price cap
1	Security passenger search time no longer than 30 minutes	daa	100%	1.50
2	Percentage of time out-bound baggage handling system unavailable for more than 30 minutes during hours of operation	daa	0%	0.75
3	Percentage of time in-bound baggage handling system available during hours of operation	daa	99%	0.25
4	Ease of way-finding	ACI	3.9	0.25
5	Flight information screens	ACI	3.9	0.25
6	Cleanliness of airport terminal	ACI	3.9	0.25
7	Cleanliness of washrooms	ACI	3.5	0.25
8	Comfortable waiting/gate area	ACI	3.3	0.25
9	Courtesy/helpfulness of airport staff (excluding check-in and security)	ACI	3.8	0.10
10	Courtesy/helpfulness of security staff	ACI	3.8	0.15
11	Overall satisfaction (all passengers)	ACI	3.9	0.25
12	Internet / Wi-Fi	ACI	3.1	0.25

Figure 58: Service Quality CAR Target Results

DublinAirport

Q2 2018 CAR TARGET RESULTS

CREATED BY INSIGHTS & PLANNING SOURCE: ACI DATA

PERFORMANCE AGAINST C.A.R SQM	C.A.R TARGET	Q216	Q316	Q416	Q117	Q217	Q317	Q417	Q118	Q218
Overall satisfaction	3.90	4.18	4.18	4.20	4.18	4.17	4.15	4.24	4.15	4.14
Courtesy and helpfulness of security staff	3.80	4.24	4.21	4.17	4.22	4.17	4.27	4.27	4.26	4.26
Ease of finding your way through the airport	3.90	4.24	4.26	4.20	4.29	4.22	4.26	4.27	4.23	4.19
Flight information screens	3.90	4.20	4.28	4.27	4.30	4.27	4.34	4.34	4.32	4.30
Courtesy and helpfulness of airport staff	3.80	4.29	4.24	4.27	4.33	4.29	4.39	4.34	4.34	4.35
Internet and wifi	3.10	4.14	3.99	4.08	4.17	4.04	3.88	4.01	4.08	3.94
Cleanliness of washrooms	3.50	3.88	3.81	3.93	3.90	3.86	3.88	4.05	3.93	3.85
Comfort of wait/gate areas	3.30	3.50	3.46	3.60	3.58	3.55	3.53	3.63	3.54	3.58
Cleanliness of terminal	3.90	4.16	4.12	4.21	4.21	4.16	4.16	4.26	4.23	4.18

PASSED TARGET
MATCHED TARGET
FAILED TARGET

ASQ

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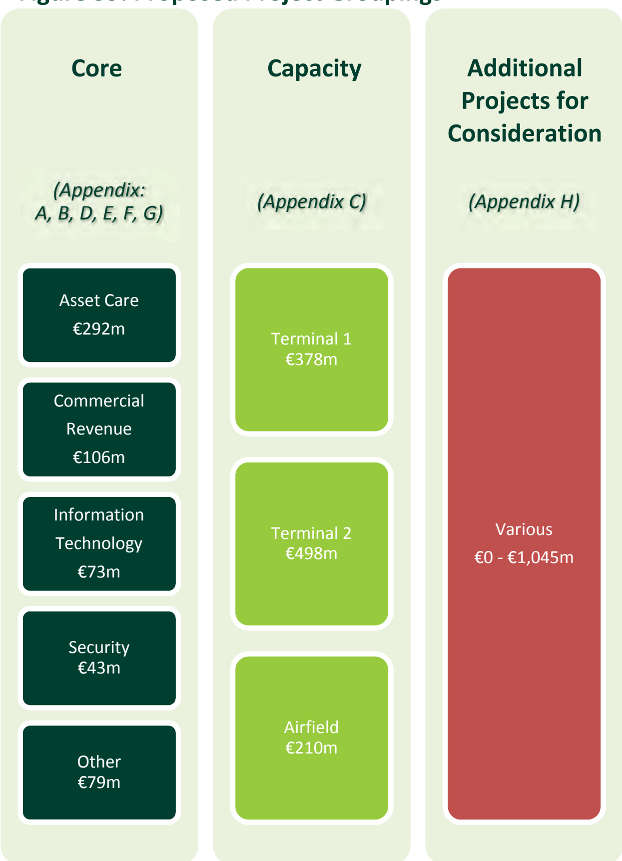
5 PROJECT GROUPING

5. PROJECT GROUPING

5.1. Background

Proposed projects in CIP 2020 have been grouped into envelopes of expenditure that reflect the broad category of investment required in each area and to provide a level of flexibility in capital spend. This level of flexibility was critical in the current CIP where capex could be diverted to critical capacity projects in order to meet the passenger demand. The proposed groupings are considered under two broad headings. 'CORE' and 'Capacity' as illustrated in Figure 59. Note: 'Additional Projects for Consideration' only form part of the project grouping for the purpose of consultation.

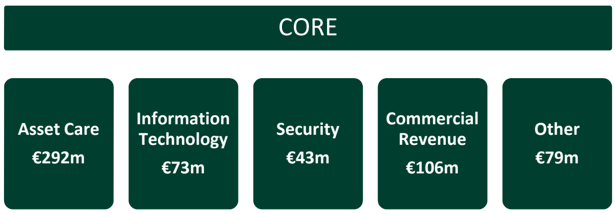
Figure 59: Proposed Project Groupings



The 'core' projects are defined as projects that, irrespective of passenger growth, are required to maintain continued safe and secure operations on a day-to-day basis and provide for technology improvements and the associated passenger expectations. 'Core' include the following sub-groups;

- Asset Care
- Information Technology
- Security
- Commercial Revenue
- Other

The projects developed under 'core' are well defined and essential to keep Dublin Airport operational, safe, secure and reliable over the next CIP period. They have been developed from a 'bottom up' process and in many cases are a continuation of current investment plans which have been phased over the past 5-years, e.g. apron rehabilitation, Life Safety Systems upgrades, roof upgrades etc. Core projects are also designed to preserve the life of Terminal 1 which will be 50-years in operation during the proposed CIP period.



5.2. Asset Care

The first of these groupings, Asset Care provides for the continuation of use of existing facilities and are broadly as a result of ageing assets and essential rehabilitation, including Terminal 1. The total proposed investment in this grouping is €292m across two distinct areas:

- Mechanical & Electrical
- Civil, Structural & Fleet (CSF)

5.2.1. Information Technology

The second of these groupings, Information Technology (IT) is essential to maintain and develop Dublin Airport as an automated 'digital airport'. It also includes the key infrastructure, controls, and software that support the critical business systems need for the safe, secure and efficient running of the airport for its customers. This grouping also contains future IT investment to support customer requirements for additional self-service, biometrics, and process automation etc.

In this context, IT has assessed the minimum need for IT capex during the next CIP period at €73m. The IT requirement for CIP 2020 is particularly challenging as Dublin Airport, airlines and other stakeholders look to increase IT investment to ensure a safe, secure and reliable operation, achieve cost savings, drive efficiency and improve the passenger and employee experience.

5.3. Security

The third grouping, Security is essential to maintain and elevate Dublin Airport as a safe and secure environment for passengers, staff and the general public. These projects will provide an improved passenger experience while on the passenger journey through the airport and address regulatory requirements and associated compliance.

5.4. Commercial Revenue

The Commercial Revenue grouping includes projects that typically generate revenue for the Single Till which offsets aeronautical costs, and in some cases also provide additional capacity, e.g. car parking. The projects within this grouping have been selected on the basis of delivering maximum revenue potential and also providing for an improved passenger experience. Provision of additional and improved car parking and car hire facilities account for a significant amount of the expenditure in this grouping in this CIP period, along with improved lounge facilities to provide a significantly improved product for our customers.

5.5. Other

The 'Other' grouping provides the necessary capital investment to manage the ongoing operation of the airport estate on short planning horizon through 'Minor Projects' and also allows for the efficient management of the capital investment programme by continuing the Programme Management principles of efficient investment as outlined in Chapter 9. This grouping also covers some miscellaneous projects that do not naturally fit within the other groupings.

5.6. Capacity

The 'capacity' grouping represents the investment in new assets required to deliver key infrastructure that will provide the additional capacity requirements from current levels of c.31mppa to c.40mppa. The capacity development plan for CIP 2020, detailed in Chapter 7, has been derived from the Masterplan outputs using a 'top-down' approach where there is a common first step to 40mppa. While 40mppa is unlikely to be reached by 2024, it is essential to have the necessary infrastructure in place to accommodate the growth on the horizon. It generally comprises 4 key areas of development, as follows;

- South Development
- North Development
- Unlocking The West
- Terminal & Landside

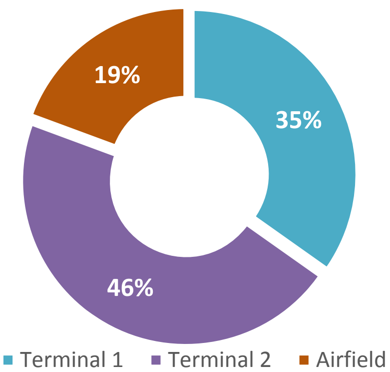
Although the four areas of development help identify the geographical spread of proposed capital projects a simpler 3 group breakdown is proposed as shown in Figure 60. This approach helps identify the required investment to facilitate current passenger forecasts (as noted in Chapter 2) with a specific focus on how growth can be facilitated in both Terminal 1 and Terminal 2.

Figure 60: Capacity Project Groupings

Capacity

Terminal 1	Terminal 2	Airfield
€378m	€498m	€210m

Figure 61: Proposed Distribution of Capacity Capex



The Terminal 2 focused development is necessary to accommodate the current growth being experienced in transatlantic traffic and to facilitate the forecast growth in this area. This includes facilities to accommodate additional widebody and narrow body contact stands and an expanded US Preclearance facility. It promotes the HUB development as outlined in the National Aviation Policy by accommodating and streamlining transfer passengers which is experiencing significant growth and is forecast to increase, as detailed in Chapter 2.

The Terminal 1 focused development supports additional 'point-to-point' traffic mainly for narrow body aircraft, with the ability to accommodate some wide-body operations.

The Airfield grouping captures important capex associated with unlocking potential capacity in the west (west of runway 16/34. With the West Apron accommodating increased aircraft movements as the East Apron experiences greater levels of utilisation, it is essential that improved access to the West Apron and future apron development on the west of the airfield is accommodated and provided for in this next CIP period. In addition, access to the West Apron will be more challenging and unsustainable with the introduction of the North Runway in 2021. Access via the perimeter road, currently a 4km (10min) journey will, on completion of the North Runway, become an 8km (20min) journey. The current proposal under PACE to provide a surface access will provide some relief in this regard, however this will not be available during Runway 16-34 operations. It is essential that the West Apron is unlocked to remove this safety concern regarding the surface crossing and provide a sustainable option ultimately for passenger activity on the West Apron. A number of options in this regard are presented in Chapter 7 below.

Figure 62: Proposed Distribution of Capacity Projects

Appendix C - Capacity		Terminal 1	Terminal 2	Airfield
CIP Number	**Project Title**	**Provisional Estimate €m (October 2018)**		
CIP.20.03.004	Gate Post 9 Expansion (West Lands)			€9.2
CIP.20.03.006	Terminal 1 Kerbs	€19.9		
CIP.20.03.011	Terminal 1 Check-In (Island 1 & 2)	€23.7		
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	€49.8		
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	€42.9		
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	€39.1		
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	€2.0		
CIP.20.03.020	Terminal 2 Check-in Area Optimisation		€9.8	
CIP.20.03.021	Terminal 2 Central Search Area Expansion		€13.6	
CIP.20.03.028	Terminal 2 Early bag store and transfer lines		€27.9	
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)		€304.1	
CIP.20.03.030	Expansion of US Pre-Clearance Facilities		€46.4	
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)		€95.8	
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	€6.1		
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	€187.9		
CIP.20.03.040	North Apron De-icing pad	€6.1		
CIP.20.03.051A	West Apron Vehicle Underpass – Northern Pier 1 Option			€85.0
CIP.20.03.052	Surface Water Environmental Compliance			€51.0
CIP.20.03.054	New Remote Apron 5M - 10 NBEs			€60.1
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)			€5.0
TOTAL		**€378**	**€498**	**€210**

A capacity shortfall in the terminals as identified in Section 4 above needs to be addressed in this CIP, and key processors that require capital investment include T2 Check-in, T1 & T2 Security, T1 Baggage reclaim and road access. The proposed project groupings where there should be flexibility within the group are as follows;

CIP 2020

Asset Care	Information Technoloy	Security
Commercial Revenue	Other	Capacity

The need for flexibility is driven by the following factors;

- A risk-based approach to capital maintenance and the ability to respond to changing risks over a 5-year period
- Project design will mature closer to implementation which may identify issues requiring flexibility not seen at the start of the CIP preparation.
- The need to be able to respond to user requirements in a dynamic manner over the short to medium term.
- To manage unforeseen requirements that are not possible to plan for over a 5-year period. This could include regulatory and safety requirements.

6 CAPEX PROPOSAL – CORE PROJECTS

6. CAPEX PROPOSAL – CORE PROJECTS

6.1. Background

Dublin Airport is seeking an allowance of €592m for investment in CORE projects, to manage the day to day operation, to ensure all assets are safe, reliable and secure, to provide to elevated security, to enhance the passenger experience through digital technology and to generate commercial revenues to offset airport charges. These projects form a fundamental part of ensuring the existing business can continue uninterrupted by meeting a number of objectives as follows;

- replacement of end of life equipment / assets
- compliance with safety and regulatory requirements
- deliver efficiency improvement projects
- deliver revenue generation projects
- provide for IT improvements and innovation

The total allowance sought represents 98 capital projects across the terminals, airfield and landside infrastructure with the following table identifying a high-level breakdown of the allowance;

Figure 63: Proposed Core Projects

Proposed CORE Projects		
Category	**Amount €m**	**Category Overview**
Asset Care Civil/ Structural/ Fleet	€196	Primarily reflecting construction work across the airfield and landside campus.
Asset Care Mechanical & Electrical	€96	Primarily reflecting terminal equipment replacement and energy efficiency projects
Commercial	€106	Primarily Revenue generation projects
IT	€71	IT upgrades and business efficiency improvements
Security	€43	Equipment replacements, security enhancements and regulatory requirements
Others	€79	Minor projects, programme management & operational projects
Total	**€592**	

6.2. Asset Care – Civil / Structural / Fleet

Asset Care projects represent the largest spend category at 49% of the total CIP with civil / structural / fleet representing 31%. These projects address issues with critical assets ranging from high mast and airfield lighting, roads, heavy & light fleet, car parking to building facades. A total of 36 projects, with a value of €196m make up this category with 4 key projects accounting for 52% of the total spend. The key projects are listed below, and full details are included on the project sheets in Appendix A;

Figure 64: Proposed Asset Care – Civil / Structural / Fleet Projects

Proposed Civil / Structural / Fleet Projects		
Project Number	**Project**	**€m**
CIP 20.01.002	Apron Rehabilitation	€44.0
CIP 20.01.003	Airfield Taxiway Rehabilitation	€22.0
CIP 20.01.065	Airport Heavy Fleet & Equipment	€14.7
CIP 20.01.020	T1 Façade, Roof & Spirals	€25.8
Various	General Projects (Reference Appendix A for full list)	€89.9
Total		**€196.4**

Apron Rehabilitation:

Many of the aircraft aprons at Dublin Airport date back to before the 1960's and in a number of cases have reached the end of their useful life. Independent condition reports have noted that areas of the aircraft pavement are in poor condition and need rehabilitation to avoid unplanned closures and disruption as a result of aprons becoming unserviceable. The allowance sought under this category is to continue the annual apron rehabilitation programme and address aprons with a remaining life of between 1 and 5 years. The apron areas included in this category are primarily the South Apron, stands associated with Pier 2 & Pier 3 and Apron Taxiway 1, Apron Taxiway 3 & Apron Taxiway 6.

Airfield Taxiway Rehabilitation

Many of the airfield taxiways at Dublin Airport were constructed between 1940, and the late 1980's as part of the current (Southern) Runway 10-28 development and are approaching the end of their useful life. The allowance sought under this category is to continue the annual airfield taxiway rehabilitation programme and address taxiways with a remaining life of between 1 and 5 years. Independent condition reports have noted that areas of the airfield taxiway pavement are in poor condition and need rehabilitation to avoid unplanned closures and disruption as a result of taxiways becoming unserviceable.

A number of taxiway were overlaid as part of the Runway 10-28 overlay project, however there are a number of additional taxiways that need rehabilitation within the next 5-7 years. The main focus of this project will be Taxiway F1, Taxiway F-Outer, Taxiway B1, Taxiway E1 and Taxiway M2.

The timely and planned rehabilitation of these taxiways is extremely important to the smooth and efficient operation of the airport by protecting the manoeuvring routes for aircraft and avoiding aircraft delays and overall business interruptions.

Heavy Fleet and Equipment

The DAA Heavy Fleet Vehicles comprise a broad mix of equipment such as fire tenders, snow and ice equipment (snow ploughs, runway de-icers, snow blowers), airfield pavement sweepers, airfield painting equipment and tractors etc. The heavy fleet consists of some 75 vehicles, distributed between 5 work areas including Fire & Emergency, Snow & Ice Operations, Operational Cleaning, Airfield Maintenance, Landside Maintenance and Support. Vehicles are maintained to the required road safety standard in accordance with best practice and are replaced when they have reached the end of their useful life. The heavy fleet plan includes the following;

- The replacement of 7 current foam tenders with 6 new standardised vehicles.
- The augmentation of the Snow & Ice fleet to allow for the introduction of the North Runway, additional aircraft pavement and to improve the efficiency of snow removal activities on existing pavement.
- Additional glycol collection sweepers, friction tester and maintenance equipment to facilitate an expanded airfield with the introduction of additional airfield pavement and the North Runway.

Terminal 1 Façade Upgrade

The façade of the original 8-bay Terminal 1 building, opened in 1971, is fitted with vertical, precast concrete fins, giving it a distinctive architectural look typical of that era. The building envelope comprising of these concrete fins suffers from age-related defects such as water ingress, corrosion, spalling, heat loss, environmental issues and needs a significant upgrade to maintain the life of the building. An in-depth feasibility study including a full structural survey of the T1 Façade was carried out in 2014 and this survey uncovered extensive degradation of the steel structure of the 8-Bay building as well as localised concrete spalling to the fins on all sides of the 8-Bay building. Immediate remedial works on the steel structure and concrete fins are currently underway as part of CIP 2015-2019 to mitigate immediate safety issues associated with spalling of concrete and the steel super-structure.

The T1 Façade is nearing the end of its useful economic life and the costly maintenance and remedial works are no longer sustainable. A full refurbishment must be carried out to sustain the building into the future and investment is required to re-life the asset and extend the useful service life of the building for at least 15 years. This project will also include the roof of the Terminal 1 8 bay original building.

6.3. Asset Care – Mechanical & Electrical

The projects included in this grouping in the amount of €93m focus on mechanical and electrical equipment across the terminals, piers and campus buildings. This investment is essential to ensure the continued operation of an ageing Terminal 1 and Pier 3. Pier 3 will be required in the next 5-years to continue to provide essential wide-body capacity and requires substantial investment to maintain operations. This grouping also includes energy efficiency projects and services projects dealing with foul water/waste and mains electrical supply to the airport campus. The key projects are listed below, and full details are included on the project sheets in Appendix B;

Figure 65: Proposed Asset Care – Mechanical & Electrical Projects

Proposed Mechanical & Electrical Projects		
Project Number	**Project**	**€m**
CIP 20.02.008	Terminal Buildings HVAC Upgrade	€17.8
CIP 20.02.004	Passenger Boarding Bridges (PBB) & FEGP	€18.1
CIP 20.02.007	Terminal & MSCP Buildings LSS Upgrade	€14.1
CIP 20.02.010	Terminal 1 Pier 3 Life Extension Works	€14.0
Various	General Projects (Reference Appendix B for full list)	€31.8
Total		**€95.8**

Terminal Buildings HVAC Upgrade

Heating Ventilation & Air Conditioning (HVAC) is required for passenger and staff comfort, heating of domestic water systems and temperature control of communication rooms and all other occupied locations.

A large portion of the Terminal 1 HVAC distribution is 50 years old and has exceeded end of life and requires replacement. This project is to replace, upgrade and refurbish end of life assets and replace with new HVAC equipment, control systems and infrastructure. The majority of the investment will be for Terminal 1 with smaller projects relating to Terminal 2, which will be almost 15-years in operation at the end of CIP 2020. This upgrade will include the refurbishment of the primary Terminal 1 Energy Centre, including the replacement of primary boilers, CHP, pumps, hot water generators and all associated pipework.

Terminal & MSCP Buildings LSS Upgrade

The Life Safety Systems (LSS) include Fire Alarm, Sprinkler, PAVA and other ancillary systems associated with fire detection, control and evacuation. The availability of LSS systems require continuous investment to ensure the terminals are fully compliant and failure to carry out these works could lead to non-compliance with a risk of closure to certain areas. Due to the criticality of the LSS systems, target compliance must be 100%. Modern LSS systems are heavily technology based and have a shorter design life, requiring more frequent replacement and component overhaul.

This project is to replace, upgrade and refurbish LSS infrastructure across both terminals in order to maintain system availability as required per regulatory service requirements. This project covers Terminals, Piers and the Carparks adjacent to Terminals 1 & 2. The funding sought is to replace ageing assets that are greater than 10 years old in the next CIP period. For example, the Terminal 2 fire safety systems will be over 10 years old entering into this CIP period.

Terminal 1 Pier 3 Life Extension Works

Pier 3 was constructed in the early 1970's, and while it has been maintained over this period, it now requires significant investment. This project relates to Mechanical and Electrical (M&E), building service requirements to ensure the pier meets the current safety regulations and operational requirements, while extending the life. The M&E plant and equipment are in service since the early 1970's and contained within a central services core. The core is now categorised as a confined space under health & safety legislation and access / egress to the area is restrictive and not compliant with current building regulations. To make the core compliant a large services decentralisation and replacement project is required on mechanical and electrical equipment.

Passenger Boarding Bridges (PBB) & FEGP

Passenger Boarding Bridges (PBBs) provide a covered walkway between airport buildings and aircraft, for transferring embarking and dis- embarking passengers. The requested investment for PBBs is to carry out the minimal capital maintenance upgrades to 6 older PBBs on Pier 3 by upgrading flooring, weathering and upgrading external finishes. This project also includes the installation of a new double airbridge on Pier 3 to accommodate the increasing wide-body aircraft requirement. The project also includes mid-life controls systems upgrade for the 19 Pier 4 PBBs and the 6 Pier 3 PBBs to maintain the required level of reliability. The provision of new flooring with improved slip resistance to all PBBs and replacement cable looms in the 19 Pier 4 PBBs is included.

Fixed Electrical Ground Power (FEGP) units are installed at airports to provide electrical power to aircraft while aircraft are on stand e.g. during turnarounds and while parked e.g. for overnight maintenance activities. This removes the need for mobile ground power units which in some cases are unable to provide adequate power to new generation widebody aircraft.

This project also includes the installation of fixed electrical ground power (FEGP) to the wider airfield stands in line with business requirements, sustainability and customer requirements for Dublin Airport. This project covers the installation of FEGP to 33 Stands on Pier 1 (not covered as part of PACE), Pier 2 and Apron 5G.

6.4. Commercial

Projects in this category primarily focus on revenue generation while enhancing the customer experience. An allowance of €106m is being sought for projects that include, additional public car parking, provision of additional and enhanced passenger lounges, fast-track passenger services, food & beverage (F&B) provision, retail and advertising. Projects in the Commercial grouping have a direct benefit to airport charges by generating revenue for the Single Till. Key projects included in this grouping are listed below and full details are included on the project sheets in Appendix D;

Figure 66: Proposed Commercial Projects

Proposed Commercial Projects		
Project Number	**Project**	**€m**
CIP 20.04.002	Consolidated Car Rental	€18.1
CIP 20.04.017	Lounge Refurbishments	€11.4
CIP 20.04.007	T2 Multi Story Car Park Extra Floors	€15.1
CIP 20.04.006	T1 Multi Story Car Park	€18.8
Various	General Projects (Reference Appendix D for full list)	€42.3
Total		**€105.7**

Consolidated Car Rental

Current car rental facilities include customer service desks in each terminal, premium rental spaces in the MSCPs and compounds in the Eastlands consisting of customer service counters, ready & return spaces and service / maintenance areas. The existing car hire facilities are capacity constrained and were insufficient to accommodate 2017 demand at an acceptable level of service across most parts of the operation. The number one customer complaint in relation to car hire is wait time at all three locations (T1, T2 and Eastlands).

Current total provision of car rental spaces across Dublin Airport is c.3500 and these spaces are used by for ready to rent, return spaces, stacking and staging and short-term vehicle storage. Capacity in 2017 was exceeded by c.1000-1500 spaces in peak, requiring operators to find additional facilities offsite. Future forecasts indicate a requirement for an additional 3000 spaces by 40mppa bringing the total requirement for spaces to 6500.

This project will provide the following;

- Additional Maintenance and Service Facilities including:
- Fuel Pumps
- Maintenance Bays
- Wash Bays
- Customer counters
- Employee and administrative offices

The new facilities have been designed to:

- Complement the existing car hire facilities at DAP,
- Protect commercial revenues – allowing for future growth
- Improve customer experience (more logical way finding) and reduced congestion
- Increase efficiencies to reduce costs for car rental operators

Lounge Refurbishments

This project will address the upgrade and extension to existing airline lounges including the T1 Lounge, T2 Lounge, 51st & Green Lounge and a new Pier 1 Lounge. Dublin Airport's lounge product requires continuous improvement and investment in order to meet customer expectations (both B2B & B2C). Upgrades will include:

- Supply and installation of all kitchen equipment
- Internal fit-out and decoration
- Improved seating
- Charging points/plug sockets
- Spa like shower facilities
- Improved servery to display variety of food (chill well, additional fridges etc.)
- Increased capacity
- New look-and-feel, including painting, furnishings & lighting

Significant growth in passenger levels over the current CIP period has resulted in lounges becoming capacity constrained at peak hours with some available capacity in the shoulder periods. The lounges are mainly utilised by wholesale (airline) passengers and as new airlines or current airlines add capacity at Dublin, the airlines passenger base using our lounges increases. With the addition of new long haul Asian routes (Cathay Pacific, Hianan etc.), these passengers tend to have a longer dwell time in the lounge resulting in over-capacity at certain times throughout the day. With passengers paying a premium to access lounge facilities it is important that passenger comfort expectations are met. Investment is therefore required in refurbishment and additional lounge capacity, to meet expectations of airlines and passengers.

T1 and T2 MSCP Extra Floors

Short Term (ST) car parking is a key passenger requirement and Dublin Airport's strategy is to provide a good quality, available and reliable product, at yield managed prices that customers value. This strategy has proved successful at generating repeat custom and growing revenue. Short term Car parks are the most convenient way for Irish originating passengers to travel to / from Dublin Airport.

ST car parks compete with competitor long term car parks and Taxi's. Our 2017 ST occupancy was 88% and 2018 occupancy will be c.92%).

Given the strong occupancy rates, demand is not being fully satisfied due to a lack of available capacity. Pricing higher than elasticity is beginning to erode our value-for-money proposition with customers seeking alternative methods of transport, putting at risk existing and future business.

This project will deliver;

- Four additional floors on the T1 MSCP building (600 spaces) Block B
- two additional floors on the T2 MSCP building (680 spaces) on the four additional floors built as part of the CIP 2015 – 2019 which proved extremely successful

6.5. Information Technology (IT)

IT supports and delivers critical business systems required for the safe, secure and efficient running of the airport for airline customers, passengers, partners and employees. The allocation of €71.3m across 15 IT projects will address issues associated with end of life equipment, efficiency, compliance and the passenger experience/processing. These projects will ensure our IT systems remain efficient and up to date enabling the uninterrupted operation of critical equipment supporting the passenger process and aircraft movements.

IT plays a vital role in suppling timely and accurate information to passengers, airlines and other stakeholders operating at the airport, improving efficiency through information flow and allowing operators to meet aircraft turnaround times on schedule. Any disruption to our IT systems even for the shortest of time frames can have significant disruptive effects long beyond the initial IT outage. Therefore, it is important that airport IT systems have redundancy, are resilient and supported by the latest technology. Key areas of investment are listed below, and full details are included on the project sheets in Appendix E;

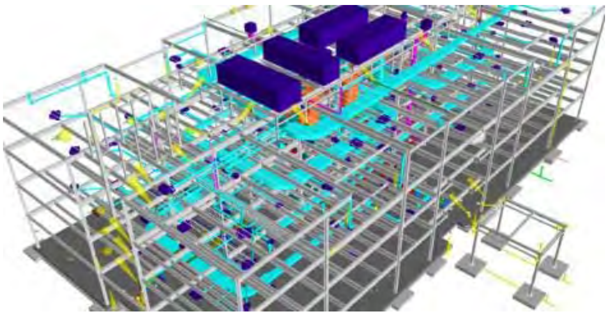
Figure 67: Proposed IT Projects

Proposed Information Technology Projects		
Project Number	**Project**	**€m**
CIP 20.05.005	IT Business Efficiency	€6.2
CIP 20.05.003	Integrations & Data	€7.1
CIP 20.05.007	IT Safety Security & Compliance	€7.0
CIP 20.05.001	Airfield Optimisation	€7.9
Various	General Projects (Reference Appendix E for full list)	€43.1
Total		**€71.3**

IT Business Efficiency

This funding will ensure Dublin Airport continues to drive value from our Business Systems through enhancements and additions to the IT estate. It will allow us to move to the next generation of applications as our business and our customers' business demands evolve. This project will deliver a number of smaller IT projects identified below;

- **Small Business Requests** – projects designed to add value to the operation.
- **Application Enhancements** – enhancements to existing business solutions.
- **ERP Investment** – assess the need for an upgrade or migration of the Oracle ERP system.
- **IT Asset Management Tool** – This will support the rollout of best in class Information Technology Infrastructural Library (ITIL) processes for Asset Management. The tool will track IT components in use across the campus e.g. Hardware, Software and Licences.
- **Airport Community App** - This funding will support investigation, design and delivery of an airport community app, similar to Gatwick Airport. The Gatwick Airport Community App is driving greater collaboration, transparency and efficiency amongst airport stakeholders.
- **Situational Awareness Tool –** This will provide Dublin Airport Operations with an end to end view of all key passenger, baggage and airfield processes. The tool will use integrated data feeds from key Airport systems to populate dashboards that will support real-time decision making across the operation.
- **Building Information Modelling System -** (BIM) is a digital representation of physical and functional characteristics of a facility. A BIM is a shared knowledge resource for information about a facility forming a reliable basis for decisions during its life-cycle; defined as existing from earliest conception to demolition.



Integrations & Data

The digital transformation of the airport operating environment will continue to accelerate with more physical assets and business processes becoming digitized and producing more data that will be required to measure and optimise performance.

This will require more sophisticated data capabilities to manage the increase in volume, the computing power to process this data and, more sophisticated tools to derive actionable insights utilising artificial intelligence and machine learning. The growth in data, driven by digital technology over the last 2-3 years has been exponential and this trend will continue. This funding request covers the technology costs to support the increasing volumes of demand for data and business insights across daa and its stakeholders. This request captures the following requirements:

- Databases, Oracle, SQL Server upgrades
- Modern Data Platform implementation
- Delivery of Business Intelligence solutions to all stakeholders
- Creation of Data Science Predictive Models (Machine Learning & AI) driving optimized processes and deeper business insights

IT Safety Security & Compliance

Dublin Airport has a responsibility to ensure it provides safe, secure & reliable infrastructure and services to all users of the airport from passengers, staff, airlines, other 3rd parties and the general public. To provide consistent safe, secure & reliable experience, there are many IT services in place including CCTV, Access Control Systems, Queue Management systems, AutoPass, Boarding Scanning services, Aircraft Docking Guidance systems etc which all require IT infrastructure to support their operation. We will continue to invest in the reliability and compliance of these systems ensuring we get the required level of vendor support on our hardware and software elements by keeping these assets current. Funding will focus on areas such as;

- CCTV Campus wide
- Access Control Campus wide
- Automatic Tray Return System (ATRS) T1 Upgrade
- Queue Management Systems
- AutoPass T1 Upgrade
- X-Ray Servers & Storage
- Airport Training Platform
- Cyber Security
- Speed Controls

Airfield Optimisation

Dublin Airport has several key IT systems in place that support this objective for the airfield operation. These include Airport Operations System (AOS), Airfield Visual Display (AVD), Advanced Docking Guidance System (A-VDGS) and Integration Platforms. These systems are widely used by key airport stakeholders. Dublin Airport will be A-CDM certified by the end of the current CIP period, supporting full data exchange between IAA, Eurocontrol, Airlines and Ground Handlers.

During the lifetime of CIP 2020 Dublin Airport will be participating in further SESAR initiatives to drive additional efficiencies and release more capacity. SESAR will grant up to 50% of the full cost of any approved project. It is proposed to implement the projects listed below which will deliver the necessary technology changes to meet the objectives of airfield capacity maximisation;

- AODB upgraded to deliver the expected level of service
- iAOP, AOP delivered as part of European wide SESAR initiative
- System enhancements to support A-CDM KPIs
- System and data integrations across all key stakeholders (SWIM)

In October 2018 Dublin Airport received confirmation of 50% funding from the European Commission in relation to an application for iAOP implementation. This funding is valued at c.€3.8m and in order to secure this funding it will be necessary to meet key milestones set out by the EU (SESAR) and deliver the project by December 2020. In this regard it will be necessary to spend capex in the order of €0.5m in 2019 which daa will seek to be recovered in CIP 2020.

Although more than €24m will be allocated to

Transformation and Growth there are still many projects, which could have a very positive impact on costs, efficiency and passenger experience, which have been foregone in an effort to minimise the expenditure. Some examples of initiatives that cannot be accommodated or will have limited deployments are:

- CCTV Analytics to support passenger movement analysis
- Chat BOTs & AI to ensure consistent, high quality, passenger experience with reduction in support headcount
- Robotics and Virtual reality, reducing headcount
- Advanced security screening, allowing Dublin Airport to react to any disruptors and opportunities around new technology in this area
- IATA FAST Travel and "trusted passenger" initiatives e.g. use of Biometric data to differentiate between passenger handling at the airport depending on risk profile.
- Limited support for self-service boarding and advanced biometrics supporting the end to end passenger journey.

6.6. Security

Dublin Airport has a mandatory role to "protect Civil Aviation from acts of unlawful interference" and the Security submission for CIP 2020 is based on addressing this requirement. An allowance of €43m is being sought to replace end of life equipment, to provide improved security processing and passenger experience by installing modern cabin-baggage screening equipment and to provide for increased security protection throughout the airfield. Key projects included in this submission are listed below and full details are included on the project sheets in Appendix F;

Figure 68: Proposed Security Projects

Proposed Security Projects		
Project Number	**Project**	**€m**
CIP 20.06.001	Cabin-baggage X-Ray Replacement & EDS Upgrade	€14.6
CIP 20.06.041	Security Screening Equipment Replacement	€4.5
CIP 20.06.015	Intrusion Detection Systems for Dublin Airport Boundaries	€4.0
CIP 20.06.007	Full Body Scanners	€1.9
Various	General Projects (Reference Appendix F for full list)	€18.0
Total		**€43.0**

Cabin Baggage X-Ray Replacement & EDS Upgrade

This project proposes the replacement of existing cabin-baggage single view X-Ray equipment across Terminal 1, Terminal 2 and other areas, with EDS technology. Many of these devices will become end-of-life within CIP 2020 period and will require replacement. In addition, growing passenger numbers also require that we increase passenger throughput, to meet forecast demand. This project will have the following advantages;

- **Detection:** The EDS equipment improves overall detection by ensuring security screeners can better recognise items which are obscured with today's standard (single view) imaging systems
- **Adapting to Regulatory changes:** This technology puts Dublin Airport in a position to easily adopt to increased explosive detection without the need for additional head count (currently more staff and Explosive Trace Detection (ETD) equipment would have to be deployed to meet such an increase which would take a significant period of time and cost to implement.
- **Passenger Experience:** The overall passenger experience is enhanced with EDS-Cabin baggage as passengers do not need to divest liquids nor mobile devices.

Security Screening Equipment Replacement

Dublin Airport is mandated both by national and European regulation (i.e. European Commission Directive EU Reg 300.2008) to ensure that all passengers (including persons other than passengers) and accompanying items e.g. cabin baggage etc.) entering the CPSRA through its terminals and vehicle-posts must be screened to an appropriate standard. This is primarily accomplished in Dublin Airport through:

- X-ray screening for cabin baggage and items carried (addressed in separate proposals – CIP.20.006.001)).
- Walk-through metal detectors (WTMD) for the screening of the passengers.
- Handheld metal detector (HHDM) for screening of passengers where they cannot be screened via WTMD due to disability (e.g. wheelchair bound), possible interference with medical devices (e.g. pace-makers) or where WTMD alarms have been triggered and a targeted examination is required to locate the threat item.

In addition to these primary screening methods, the Regulator also mandates the requirement for supplementary random screening of passengers and items carried for the presence explosives (10% of passengers). These mandatory supplementary screening requirements are implemented in Dublin Airport through:

- Liquid explosive detections systems (LEDS) – used for the detection of the presence of explosives in liquids carried by passengers
- Explosive threat Detection systems (ETD) systems: used for the detection of the presence of explosives in items carried other than liquids carried by passengers

This project proposes the following deliverables:

- A one-to-one replacement of each system is implemented
- 15 LEDs out of 15 deployed
- 57 ETDs and equipment management and monitoring system (out of 62)
- 23 WTMDs out of 37 deployed
- 65 HHMD out of 65 deployed
- 97 Mobile radios out of ~120 deployed

Intrusion Detection Systems for Dublin Airport Boundaries

This project proposes the installation of intrusion detection systems on the boundary of Dublin Airport which will;

- Improve the effectiveness of boundary monitoring by introducing automatic intrusion detection systems, which will constantly monitor the boundary of the CPSRA on a 24 x 7 basis, with emphasis on vulnerable locations on the airfield. When breaches do occur, the system will detect them as they happen and direct both CCTV recording and Airport Police responses to the specific area where they are required

Full Body Scanners

This project proposes a phased implementation of Full Body Scanners in Dublin Airport. This rollout phase will apply to Terminal 1 following evaluation of existing FBSS technology. The benefits of the project are as follows:

- **Detection:** The deployment of FBSS in the search areas will greatly enhance detection capability. Security screeners can better recognise items which require further investigation.
- **Passenger Experience:** FBSS reduce the need for manual full body searches.
- **Adapting to regulatory change:** The provision of FBSS-SS will greatly prepare DAP for any increase in security screening requirements.

6.7. Other

The projects included in this grouping in the amount of €79.5m include a number of miscellaneous projects that do not fit directly into one of the previous categories. They comprise the following list of key projects and full details are included on the project sheets in Appendix G;

Figure 69: Proposed Other Projects

Proposed Other Projects		
Project Number	**Project**	**€m**
CIP 20.07.001	Programme Management	€6.5
CIP 20.07.002	Minor Projects	€14.5
CIP 20.07.030	Large Energy Project – Photovoltaic Farm	€10.0
CIP 20.07.032	Unit Load Device (ULD) Storage - Stillage	€3.0
CIP 20.07.010	Office Consolidation & Refurbishment (Level 4 & Level 5, Terminal 1)	€18.0
CIP 20.07.031	Terminal 2 HBS – Standard 3	€21.0
CIP 20.07.014	Terminal Operations Improvement Projects	€5.9
CIP 20.07.004	METRO Coordination	€0.5
Total		**€79.5**

Programme Management

This provision covers the cost associated with managing a portfolio and programme of projects. A full description of what this cost covers in detailed in Chapter 9 – Programme Management.

Minor Projects

This provision covers the cost associated with carrying out minor projects necessary for the ongoing management of the daily airport operations on a short planning horizon and addressing essential maintenance issues as they arise. It generally covers projects valued at under €100k. Examples would include, replacement of water pumps for heating of Terminal 1, provision of additional seating / charging desks for gate areas.

Large Energy Project (Photovoltaic Farm)

This project entails developing and integrating a Solar PV Farm to generate electricity at Dublin Airport. The installation will provide opex cost reduction, facilitate long term price certainty, revenue generation capacity and compliance with regulatory energy and carbon emissions targets.

Unit Load Device (ULD) Storage - Stillage

This project provides new Unit Load Device (ULD) Storage facility at Dublin Airport. The provision of stillage by Dublin Airport for use by the ground handlers and airlines is a key enabler for more efficient use of the apron / airfield.

Office Consolidation & Refurbishment (Level 4 & Level 5, Terminal 1)

This project provides for a refurbishment of Level 4 and Level 5 Offices in Terminal 1 in order to;

- increase staff office space,
- increase commercial space to let, and
- reduce annual running costs associated with various staff locations.

Terminal 2 HBS – Standard 3

This project is mandated through legislation and the timeline for EDS (Explosive Detection System) technology is set out in 'Commission Implementation Regulation (EU) No. 1087/2011 of 27 October 2011', which states that (12.4.2.7) 'Standard 2 shall expire on 1 September 2020.' and (12.4.2.11) 'All EDs shall meet Standard 3 by 1 September 2020 at the latest, unless point 12.4.2.8 applies.' (12.4.2.8 does not apply for Terminal 2). This project was included in CIP 2015-2019 as a 'trigger' project (Ref: Chapter 3) however the trigger for the allowance will not be achieved in this regulatory period. This project must now be included in CIP 2020 as a separate project as this 'trigger' will expire on 31st December 2019 and this is to safeguard the 'trigger' falling away. This project is currently at the contract award stage and will commence on site in Q1 2019 in order to meet the necessary timelines.

Terminal 1 HBS – Standard 3

Terminal 1 HBS – Standard 3 is an extensive and complex project currently in procurement undergoing a competitive dialogue process and is being consulted on with users through a parallel Supplementary Capex Process. **It will ultimately form part of the formal CIP submission to CAR and we will continue to consult with users in parallel.**

Terminal Operations Improvements Projects

This project identifies key Terminal Operations improvement works required at Dublin Airport in the following areas;

- Washrooms
- Seating
- Luggage Trolleys
- Barriers
- Signage
- Visual Environment
- T2 OCS Relocation

METRO Coordination

This project contains the fees associated with allocating resources to ensure coordination with the MetroLink proposal during the design and construction stage. MetroLink is due to commence on site in 2021 and will require coordination and management with the design team.

7 CAPEX PROPOSAL - CAPACITY PROJECTS

7. CAPEX PROPOSAL – CAPACITY PROJECTS

Chapter 2 of this document highlights key requirements of customers and emerging capacity constraints across specific modules of airport infrastructure and this chapter seeks to identify targeted solutions to address these customer requirements and capacity deficits. This section outlines the full suite of potential capacity development projects to facilitate the continuing growth of Dublin Airport to 40mppa and the needs of customers. The development to 40mppa represents a 'common first step' in terms of the ultimate masterplan development to 55mppa. Initially we present a series of scenarios developed to understand the potential infrastructure requirement across the airport and then present the proposed projects by geographic area.

Important:

Dublin Airport is committed to providing users with the appropriate levels of project information, so that parallel evaluations and assessment can be undertaken. Therefore, the proposed solutions are developed to feasibility design level, along with the associated cost estimates and timelines for delivery (project visuals are also provided). It is important to highlight at this juncture that the proposed projects continue to be developed in preparation of the Dublin Airport CIP submission to CAR along with the estimated costings which will continue to be revised as the project design advances.

Inputs form the consultation process will also inform this design evolution. The proposals are high-level concepts, with scope to improve and amend during the detailed design phase. In summary, a total of 43 projects were identified, some of which are presented here as preferred options others have been presented as options for consultation and are identified in Chapter 10.

7.1. Introduction

Dublin Airport is striving to be an airport industry leader that can grow its business by delivering great service and value for airlines, passengers and business partners. As part of Dublin Airport's corporate & social responsibility a review of the airport's long-term strategy has been carried out; driven in part by the ever-changing needs of the aviation world, market feedback following the Commission of Aviation Regulator's determination for the period 2015-2019 and the adaption of the DTTAS National Aviation policy of 2015 (as discussed in Chapter 1).

This chapter outlines potential infrastructure projects which allow Dublin Airport to meet the forecast capacity requirement outlined in Chapter 2 – building for 40m passenger per annum (mppa) in the next capital investment period. The proposed projects are selected from the 55mmpa Masterplan (see Section 7.2.1) and are fully complaint with future infrastructure projects. Figure 70 illustrates the dual purpose of capital investment in the next CIP period; to provide for immediate capacity but also to lay the foundation for future development up to 55 mppa).

Figure 70: Long Term Development Integration

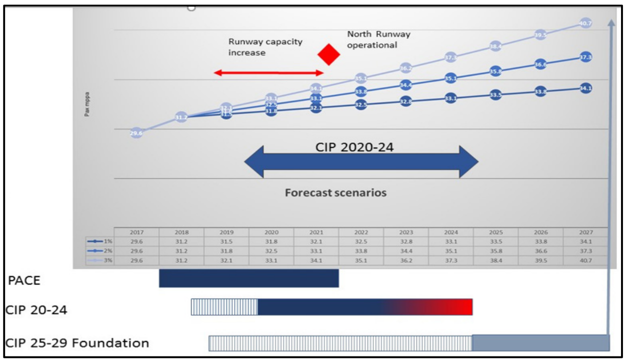


Figure 71 illustrates the role of the 5-year CIP and it inextricable link with the Dublin Airport Masterplan.

Figure 71: Capital Investment Hierarchy

The approach to the development of the capacity solutions has been two-fold, checking that each terminal passenger and baggage processing function appropriately balances with one another, thereby ensuring that no single function becomes a bottleneck that adversely affects the overall Level Of Service (LOS) whilst ensuring that the developed solutions adhere to the principle of minimal technical solution (MTS, design to deliver only the necessary value-added requirements).

7.2. Airport Masterplan

An airport Masterplan is a physical infrastructure blueprint for delivering potential future growth. Dublin Airport maintains and updates as necessary, a Masterplan which provides it with the required foresight to make future-proof decisions on airport facilities and infrastructure, and options for short, medium, and long-term development needed to accommodate future demand. The objective of the Masterplan is to formulate a balanced long-term development program for Dublin Airport that will position Dublin Airport to respond to future capacity requirements while maintaining levels of customer service, securing the Airport's role as a regional and national driver of economic growth. At Dublin Airport there have been two key Masterplan studies completed over the past 10 years. These are detailed in the 7.2.1 & 7.2.2.

Masterplan Title	Year Completed
2035 Masterplan	2009
55mmpa Masterplan	2019 (Evolving)

7.2.1. 2035 Masterplan (2009)

In February 2009, the Airport's '2035 Masterplan' was completed, which enabled Dublin Airport to provide greater clarity on the direction of its future investment plan. A timescale of 2035 was selected as the final design year, which provided a distant horizon to ensure that long-term planning strategies would be adequately tested, and that the capacity of the twin runway system would begin to approach its ultimate capacity.

The 2035 Masterplan took on a nominal starting point of 2012 as it was assumed the developments associated with the northern extension of Terminal 1, Terminal 2, Pier 4, and Apron 5G would have been completed. Additionally, the northern parallel runway developments, southern runway parallel taxiways, and western cargo development would have been completed along with the removal of runway 16/34. It also assumed that the Metro North development would be under construction and would be operational shortly thereafter.

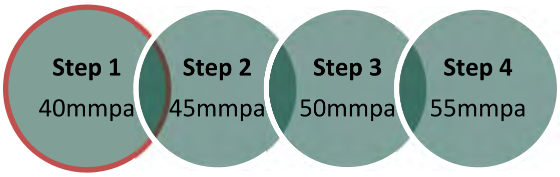
The 2035 Masterplan served to outline a long-term infrastructure plan for Dublin Airport based on known requirements in 2009. By 2016 several key Masterplan assumptions had changed (retaining RWY 16/34, passenger type / mix and forecast passenger numbers) resulting in the need for an updated Masterplan to accurately capture the future infrastructure needs of Dublin Airport. Section 7.2.2 outlines the details of the 55mppa Masterplan initiated in 2017.

7.2.2. 55mmpa Masterplan (2019 - Evolving)

In advance of the CIP2020 process Dublin Airport commissioned a review and update of the Masterplan; increasing the design horizon to 55mppa and aligning to changing passenger trends and objectives set by the National Aviation Policy for Ireland. Initial stakeholder engagement with principle customers was conducted in June 2017, with feedback informing initial drafts which will be refined and finalised in tandem with the CIP2020 process.

The current evolving masterplan with a horizon of 55mppa represents a comprehensive study of the airport describing it's short-, medium-, and long-term development plans to meet future aviation demand. The main elements contributing are long-term traffic demand forecasts, airfield configuration, and a land use plan showing the positioning of passenger terminals, cargo facilities and their associated aprons and other key airport support facilities.

Figure 72: 55mmpa Masterplan – Incremental Steps



The masterplan has been structured to facilitate alternative development routes representing capacity increments of 5mppa in steps 40mppa/45mppa/50mppa/55mppa. These stepped development phases allow for the flexibility of scalable development to ensure that the business evolves to meet its operational and business needs ensuring that safe, cost-effective airport services are delivered meeting international standards having regard to;

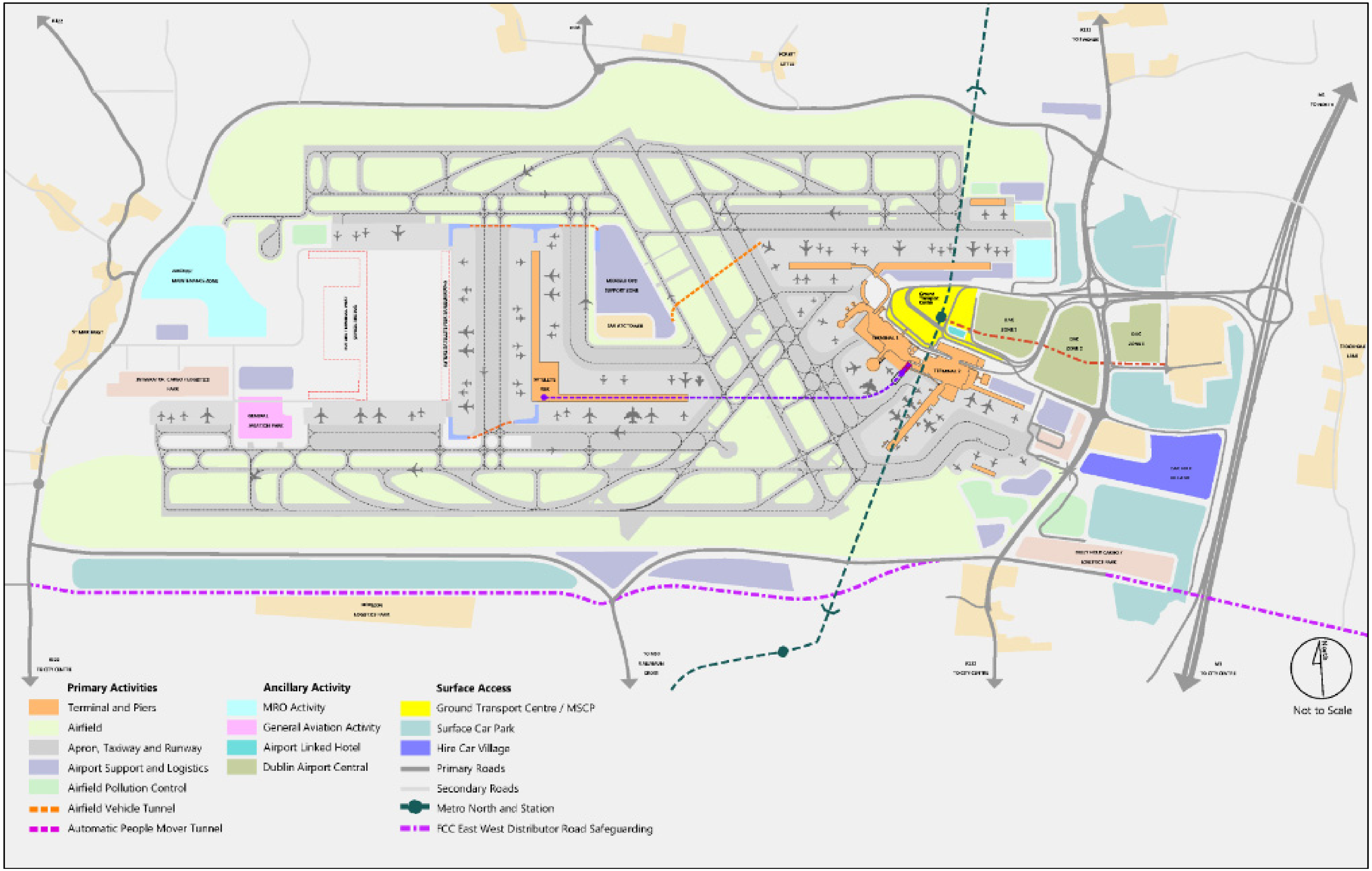
- the relevant charging principles
- the level of investment in airport services in line with safety requirements and commercial operations, to meet current and prospective needs of the airline industry
- the efficient and effective use of all resources
- operating and other costs incurred in providing aviation terminal services
- the level and quality of airport services, and the reasonable interests of the users of these services and
- the cost competitiveness of airport services with respect to international practice

Key features of the evolving 55mmpa masterplan are:

- Continued development of terminal capacity through development of the existing airport terminals, allowing for the best user experience, maximising utilisation of existing infrastructure (roads, public transport, terminal or airfield infrastructure) and overall, providing for the most efficient development pathway;
- Phased incremental development west of Runway 16/34, initially with aircraft stands, then remote pier and ultimately development of support facilities such as Maintenance, Repair & Overhaul (MRO) of aircraft;
- In the medium term, utilisation of Runway 16/34 will continue subject to demand
- Retention of Runway 16/34 in active use necessitates development of connectivity between east and west of Runway 16/34 via an underpass;

Figure 73 presents the emerging updated 55mmpa masterplan; whilst largely in line with earlier evolutions, the Masterplan facilitates the retention of Runway 16/34 as raised by CAR in the 2014 final determination. In the longer term the plan retains the flexibility to either retain Runway 16/34 as a runway or convert to a taxiway. A key point to note is that the development of capacity solutions for 40mppa are not impacted by the retention or otherwise of Runway 16/34, thus underpinning the importance of facilitating alternate routes towards the a 55mppa development and acknowledging that additional capacity can readily be realized east of Runway 16/34 with a progressive move towards developing the West Apron.

Figure 73: Emerging Dublin Airport Masterplan – Safeguarding for growth to 55mppa



7.3. CIP 2020: 40mppa

As detailed in section 7.2.2, the 55mmpa masterplan has been structured to facilitate alternative development routes representing capacity increments of 5mppa in steps 40mppa/45mppa/50mppa/55mppa. For the purpose of CIP 2020 the first common step of the 55mmpa Masterplan, going from 30mmpa to 40mmpa, has been chosen to support project selection. Figure 75 represents the 40mmpa concept arrangement. Key components of the 40mppa Capital Investment Programme include development of:

- Additional pier capacity east of Runway 16/34;
- Terminal capacity to meet demand for passenger growth while preserving service levels;
- Expanded US Preclearance facilities;
- Crossfield connectivity east to west of Runway 16/34 via an underpass;
- Additional car parking and airport support functions such as cargo and ground handling to the east of the R132.
- Additional airfield measures including taxiways and stand capacity.

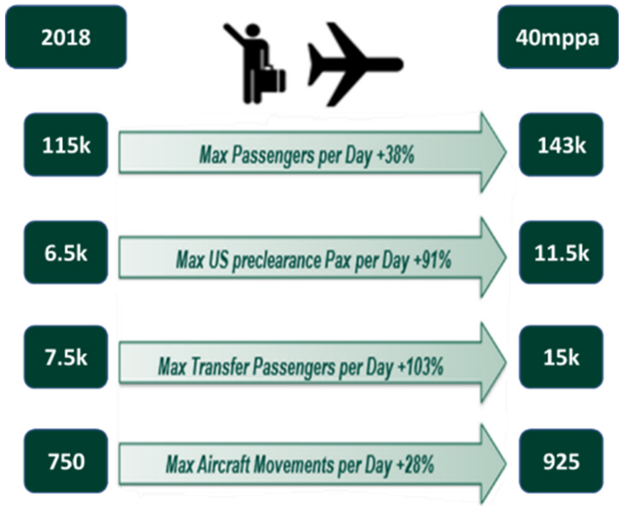


Figure 74: Daily Activity at 40 Million Passenger

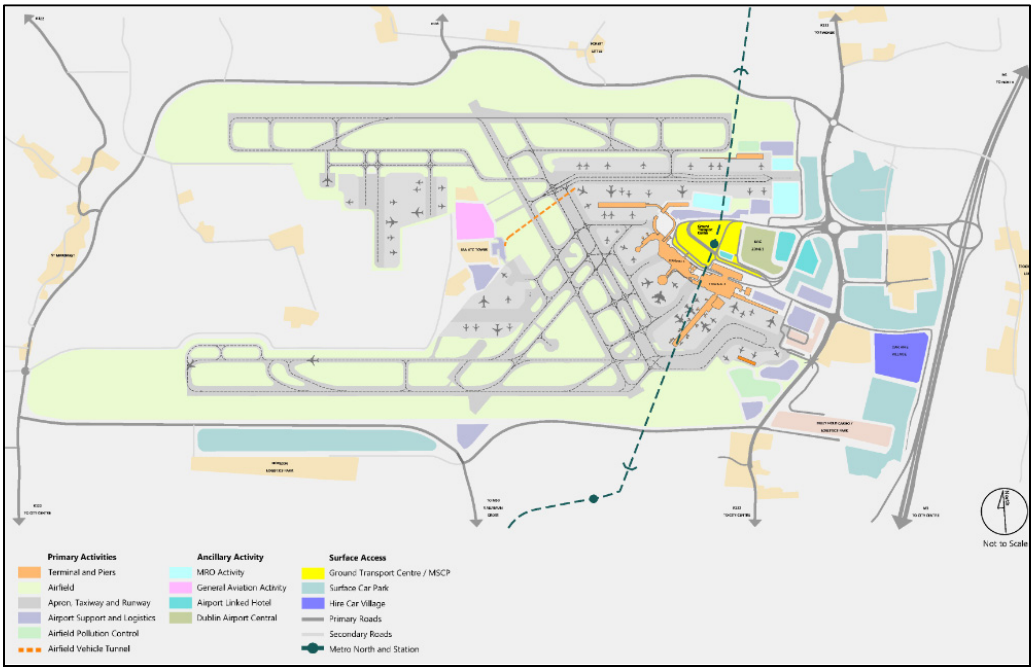
In order to bring focus to the 40mppa development options, the following two key categorizations have been considered. These are discussed in great detail in the following sections.

- **Development Zones:**

  Geographical breakdown of the airport into 4 key development zones
- **Development Scenarios:**

  Preselected suite of infrastructure projects with capability to meet capacity demands.

Figure 75: Emerging Dublin Airport 40mppa Development Plan – Safeguarding for Growth to 55mppa



7.3.1. CIP 2020: Development Zones

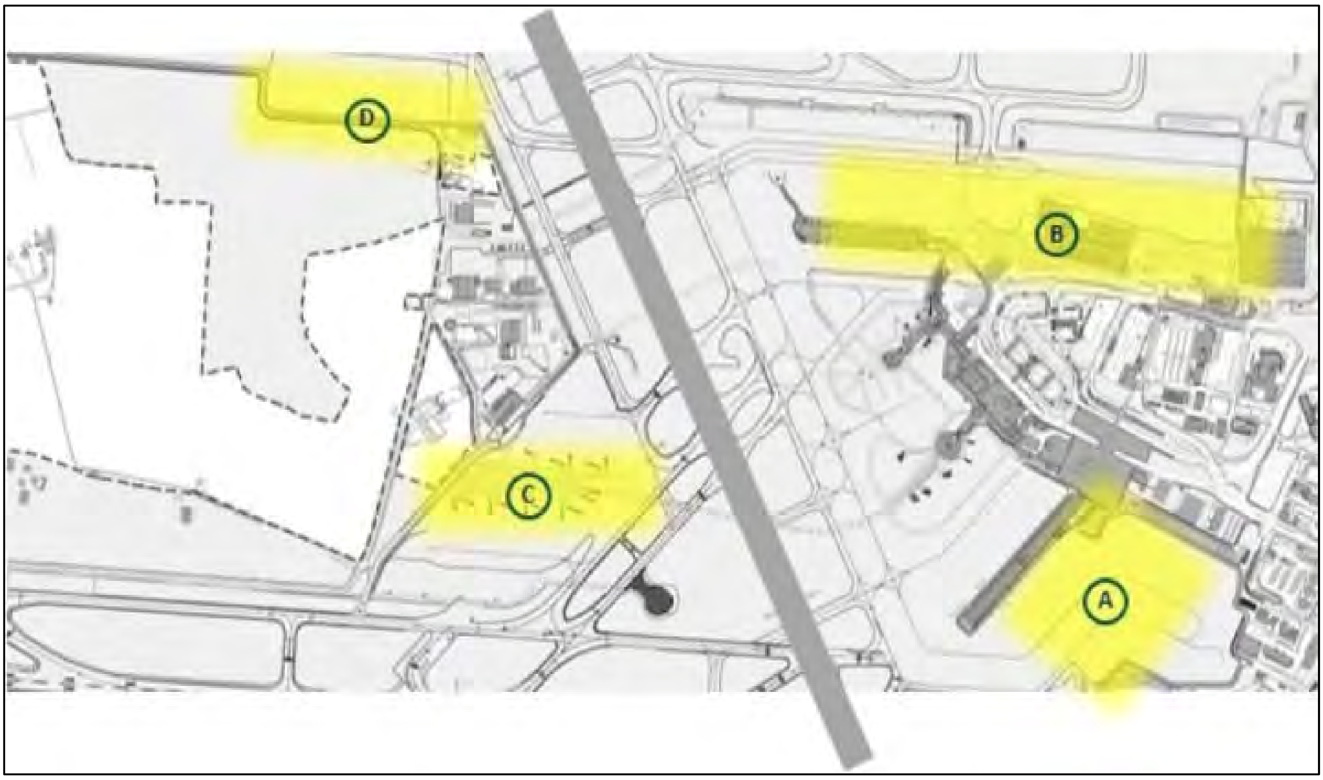
As part of the evolving 55mppa masterplan 4 key areas were identified as being the prerequisite next phase development zones to address the requirements for 40mppa and are represented below in Figure 76.

- **Zone A** – which opens a zonal expansion to capitalise primarily on US preclearance and to maximise the potential of Terminal 2
- **Zone B** – Permits significant expansion of the North Apron in terms of aircraft stands and by extension vastly improving the ratio of aircraft proximity to runway thus improving the airport's overall efficiency when stand and slot constrained
- **Zone C** – The siting of a west satellite suitable to accommodate wide body aircraft and transferring traffic
- **Zone D** – Representing the 1st phase of West Apron and stand development

These development zones help geographically recognize that increased passenger numbers result in Dublin Airport's capacity becoming strained. Numerous constraints across the airport have been identified, including the runway, contact stands, immigration facilities and security. Detailed demand analysis shows that this phase requires modest terminal reconfiguration with a larger focus on aircraft stand, pier and gate development strategically placed to support both transfers and point-to-point operations. This is reflected in the Development Scenarios in 7.3.2.

The first common step of the 55mppa Masterplan, going from 30mmpa to 40mppa, primarily focuses on maximising concentrated capacity in the east (east of Runway 16/34) and only thereafter progressively maximizing capacity on the West Apron. The 55mmpa Masterplan requires that the West Apron capacity is maximized through the following staged developments:

Figure 76: CIP 2020 Development Zones



1 Surface crossing and PACE stands on the West Apron

2 Northern parallel runway development

3 Expanded use of the west via an underpass

4 Apron and stand development in area D – Apron 5M

5 West Apron reconfiguration and extension (west satellite pier enabling)

6 Satellite pier (phase 1) on West Apron

7 APM connectivity to west satellite

8 Progressive build out of West Apron and satellite

The introduction of the North Runway in 2021 will change the operational dynamic at the airport and in equal measure will increase taxiing movements west and north of Pier 1 and open a realisation for remote stand requirement in area D identified in Figure 76 above (Apron 5M). Taxiing demand both north and south bound will increase, putting increased demand on Runway 16/34 when not in use as an operational runway. With demand on both Taxiway F-inner, Taxiway F-outer and Runway 16/34, it will be of critical importance that such routings remain unobstructed thereby driving the need to separate vehicular traffic traversing taxiways from aircraft. The opening of the west with a vehicular underpass will also facilitate the phased relocation of cargo integrators to the west.

7.3.2. CIP 2020: Development Scenarios

Following an in-depth analysis of facility requirements across the entire airport, as identified in Chapter 2, a list of potential capacity projects was developed (See Appendix C & Appendix H for specific project details). By assessing the airport capacity demand alongside the various infrastructure solutions, three alternate development scenarios emerged. Each scenario consists of a grouping of several individual projects which collectively support capacity requirements at Dublin Airport.

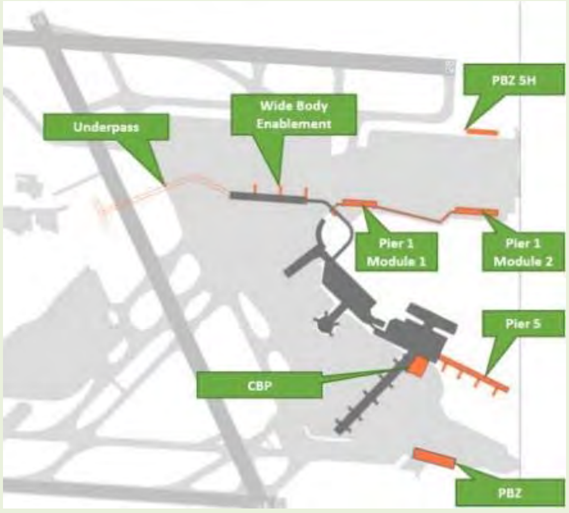
The three scenarios are described as follows:

- **Scenario 1:** Develop full North Apron, South Apron and link to the West Apron - Gross order of magnitude (GOM) cost €1.3bn excl. core
- **Scenario 2:** Develop 1st phase of north Apron, south apron, West Satellite and link to the West - GOM cost €1.7bn excl. core
- **Scenario 3**: Develop 1st phase of north Apron, south apron, 1st phase of stands in NW and link to West - GOM cost €1.1bn excl. core

Scenario 1:

Scenario 1 seeks to meet the operational needs of the business by concentrating the growing transfers market in the south, expanding the point to point low-cost carrier business to the north and east of Pier 1, with safeguarded expansion zones for long haul on the north side of Pier 1 and across the east campus.

Figure **77**: Scenario 1



This option proposes new contact piers both in the North (phase 1 (Module 1) and Phase 2 (Module 2) and the South, capacity improvement measures of differing scale to both terminals, expansion of the US Preclearance facility and phased expansion of the eastern campus apron.

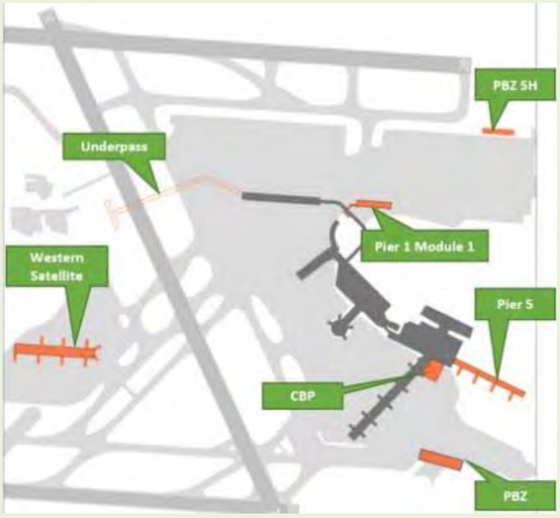
A second new western remote apron may also be required to accommodate contingency, standby and overflow aircraft. East to west campus vehicle connectivity would be enabled by a vehicular underpass below Runway 16/34.

Scenario 2:

Scenario 2 sets out to meet the operational needs of the business by concentrating the growing transfers market in the south, expanding the point to point low-cost carrier business across Pier 1 and with a part expansion of contact stands to the east of Pier 1 phase 1 (Module 1), safeguarding expansion zones for long haul and non-US transfers on a western satellite pier.

This option proposes new contact piers both in the North (phase 1 only) and South, capacity improvement measures of differing scale to both terminals, expansion of the US Preclearance facility and phased expansion of the eastern campus apron.

Figure **78**: Scenario 2



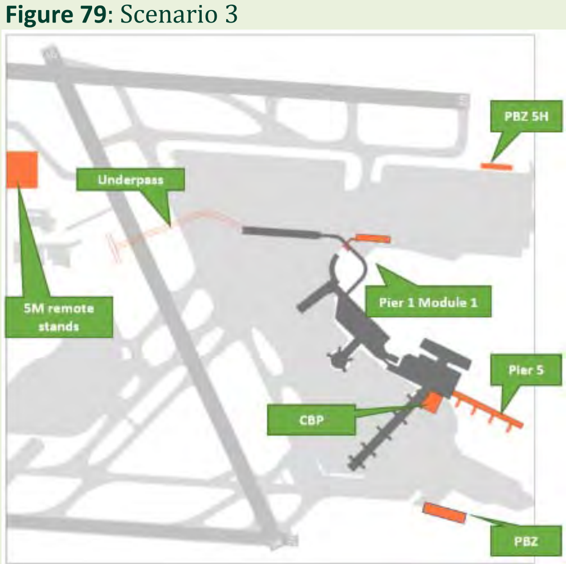
Reconfiguration of the existing West Apron and development of the Western Satellite Pier (Phase 1) is also required to accommodate non-US widebody operations with passenger connectivity via a vehicle underpass and shuttle bus.

Scenario 3:

This seeks to meet the operational needs of the business by concentrating the growing transfers market in the south, expanding the point to point low-cost carrier business to the north and east of Pier 1, with safeguarded expansion zones for long haul across the east campus.

It is proposed to have new contact piers both in the North (phase 1 only with a PBZ on 5H) and South, capacity improvement measures of differing scale to both terminal processors, expansion of the US Preclearance facility and phased expansion of eastern campus apron. Reconfiguration of the existing Pier 1 or Pier 2 is also required to accommodate non-US widebody operations.

Figure 79: Scenario 3



A second new western remote apron is needed to accommodate contingency, standby and overflow aircraft. East to west campus vehicle connectivity is enabled by an apron road underpass below Runway 16/34.

Of the three development scenarios presented above, Dublin Airport proposes **Scenario 3** as the preferred development scenario. While all three scenarios support airport growth (forecast growth details provided in Chapter 2), Scenario 3 offers the greatest all-round balance of development. Figure 80 compares the three CIP development scenarios.

Figure 80: Comparison of the Three Development Scenarios.

Work Programme	Scenario 1	Scenario 2	Scenario 3
North Apron Mod 1	Yes	Yes	Yes
North Apron Mod 2	Yes	No	No
North Apron PBZ	Yes	Yes	Yes
North Apron Pier 1 Airbridges	Option	No	Yes**
Pier 2 WB Enablement	Option	Option	
South Apron Pier 5	Yes	Yes	Yes
South Apron CBP	Yes	Yes	Yes
South Apron PBZ	Yes	Yes	Yes
South Apron Relocations	Yes	Yes	Yes
South Apron Dual Code E Taxiway	Yes	Yes	Yes
West Apron Underpass	Yes	Yes	Yes
West Apron Remote Stands	Option	No	Yes
West Satellite	No	Yes	No
Terminal 1 – Kerb	Yes	Yes	Yes
Terminal 1 – Check-in	Yes	Yes	Yes
Terminal 1 – CSA	Yes	Yes	Yes
Terminal 1 – Baggage	Yes	Yes	Yes
Terminal 1 – IDL	Yes	Yes	Yes
Terminal 2 – Check-in	Yes	Yes	Yes
Terminal 2 – CSA	Yes	Yes	Yes

*Figure 80 is only for comparative purposes, it does not capture the full suite of CIP projects under Scenario 3. These are identified in Figure 82.

**Widebody enablement on Terminal 1 – Options under consideration are included in Chapter 10

7.4. **Capacity Proposals** (Scenario 3)

This section describes the Masterplan compliant CIP2020 development route made up of individual capacity releasing projects which when brought together will safeguard the processing of 40mppa at Dublin Airport. Greater detail can be found on each project in Appendix C & Appendix H. Where applicable, both preferred and alternative development plans and project options have been presented for consultation.

In deriving the capital investment required, consideration was given towards the investment to facilitate growth from both terminals 1&2, as can be seen in Figure 81.

Figure 81: Capacity Project Groupings (Scenario 3)

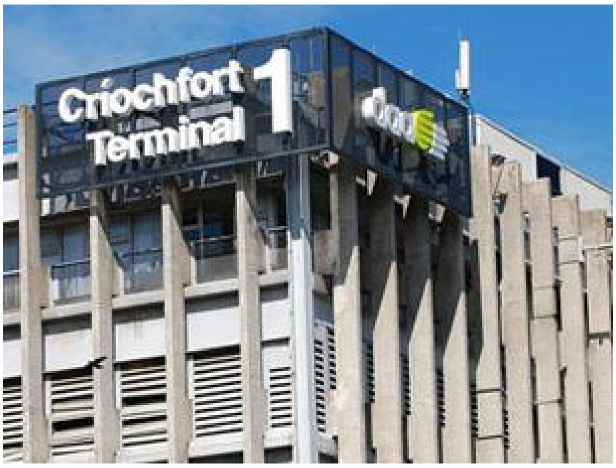
Capacity		
Terminal 1 €378m	Terminal 2 €498m	Airfield €210m

Figure 82: Summary of Proposed Capacity Projects (Scenario 3)

Appendix C - Capacity		Terminal 1	Terminal 2	Airfield
CIP Number	**Project Title**	**Provisional Estimate €m (October 2018)**		
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	€187.90		
CIP.20.03.006	Terminal 1 Kerbs	€19.90		
CIP.20.03.011	Terminal 1 Check-In (Island 1 & 2)	€23.70		
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	€49.80		
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	€42.90		
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	€39.10		
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	€2.00		
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	€6.10		
CIP.20.03.040	North Apron De-icing pad	€6.10		
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)		€304.10	
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)		€95.80	
CIP.20.03.030	Expansion of US Pre-Clearance Facilities		€46.40	
CIP.20.03.020	Terminal 2 Check-in Area Optimisation		€9.80	
CIP.20.03.021	Terminal 2 Central Search Area Expansion		€13.60	
CIP.20.03.028	Terminal 2 Early bag store and transfer lines		€27.90	
CIP.20.03.051A	West Apron Vehicle Underpass – Northern Pier 1 Option			€85.00
CIP.20.03.054	New Remote Apron 5M - 10 NBEs			€60.10
CIP.20.03.052	Surface Water Environmental Compliance			€51.00
CIP.20.03.004	Gate Post 9 Expansion (West Lands)			€9.20
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)			€5.00
TOTAL		**€378**	**€498**	**€210**

7.5. Terminal 1

Capacity		
Terminal 1 €378m	Terminal 2 €498m	Airfield €210m



Background

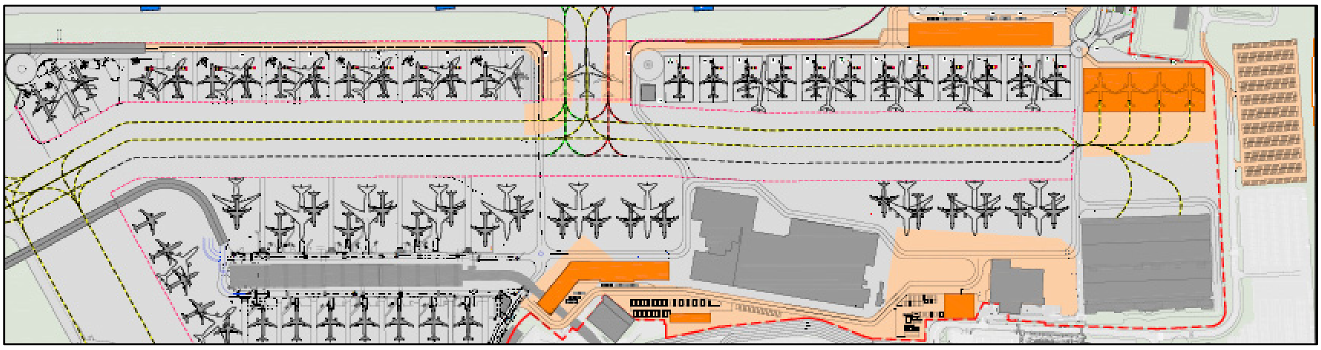
The following developments are proposed to facilitate for a potential growth in traffic of between 3 and 4 mppa in the 40mppa horizon. To this end contact and remote stands are required in the North Apron as per the Capacity Assessment in Chapter 2. In supporting the development, capacity and efficiency optimisation measures are required at set-down, the departures hall, the CSA, IDL, passport control and the baggage reclaim area to deal with the forecasted increase in passenger demand rising from 3600pph to circa 4700pph on the outbound journey and rising to 4100pph on the in-bound journey. All these facilities have been sized appropriately to accommodate sustained high volumes of traffic.

7.5.1. North Apron Development (CIP.20.03.036)

The focus of development on the North Apron has been on establishing infrastructure that will permit high-frequency operations based on point-to-point services that rely on fast turnaround times to optimize operating efficiencies. The development of a modest pier extension tailored to suit operating characteristics such as a higher proportion of O&D flights to multiple destinations, and fewer through and transfer passengers. Safeguarding for potential "interline" (sell tickets or transfer luggage) with other carriers will also form part of the CIP2020 proposal. The development in the North Apron will also seek to permit a concentration of operations by permitting the development of a relocated hangar to the east of the North Apron. The new pier facilities will accommodate a goods concessions program, with a variety of food and beverage offerings for consumption at both the pier and on-board, this will reduce the overall dependency on dwell in the IDL.

The quick turnaround times mean less time between departing flights, thus requiring an efficient utilisation of the apron parking, equipment staging, baggage loading and unloading, cleaning and fuelling operations. In supporting this requirement AVGDS, FEGP and fuel as part of CIP2020 will be brought to all feasible stands. Figure 83 shows project captured as part of the North Apron Development.

Figure 83: North Apron Development



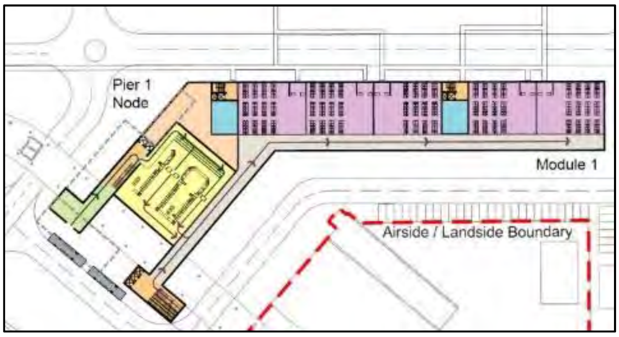
A representation of the North Apron is shown in Figure 83 above. The pier extensions serving both arriving and departing passengers have been developed to serve the base function of high frequency turnaround and high volumes. The North Apron, occupied today with MRO hangar facilities will see a progressive deployment of MRO to the west of Runway 16/34 to facilitate commercial aircraft demand. In recognising the scale of Hangar 4 and Hangar 5 the pier expansion scheme is developed to "wrap-around" the hangars whilst safeguarding connectivity between the two pier modules in line with the evolving masterplan.

CIP2020 proposes the development of Module 1a and the Pre-Boarding Zone (PBZ) to the north of Apron 5H (Module 1b is presented as 'Additional Project Under Consideration' in Appendix H. Due to their independence and scalability their development timelines remain open for consultation to meet end-user requirements. As part of the masterplan development, options are currently being examined for the full provision of satellite hold gates along Aprons 5G and Apron 5H which would serve both arriving and departing passengers with a potential direct passenger link from the new pier vertical circulation core (VCC). As part of the phasing of the development a shuttle bus arrangement is proposed to be in the current hold gates in the old central terminal building (OCTB).

Pier 1 Eastern Extension Module 1

With the growth in demand for point to point flights the next development step, is to expand Pier 1 to the east, ref Figure 83 showing module 1a & 5H PBZ. It is proposed to do this in a modular fashion. The first step would include a connection from the Skybridge, for both arriving and departing passengers. The connection facility is sized to safeguard for a potential future transfer facility which would cater for flights arriving at Pier 1 and until such a time as that demand exists, provides opportunity for orientation and commercial offerings.

Figure 84: Pier 1 Extension – Module 1

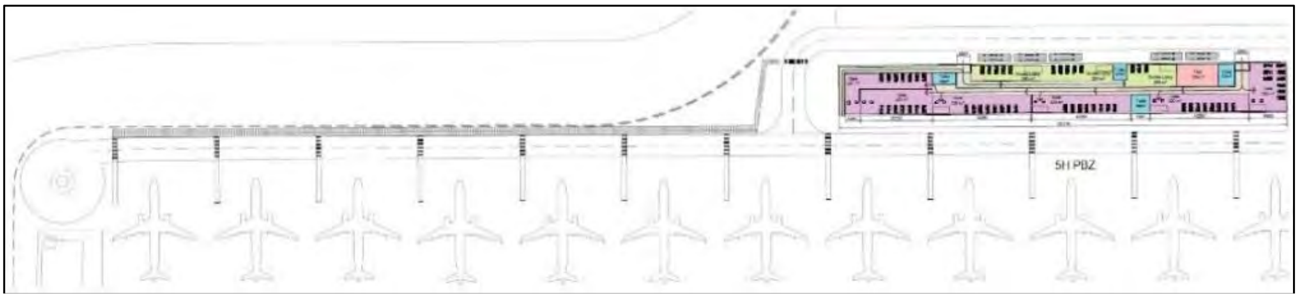


Module 1 is a two storey, five gate layout, specifically designed for walk in, walk out operations, ref Figure 84.

5H Pre-Boarding Zone (PBZ)

Under PACE, Apron 5H will provide 12 new remote stands. It is forecast that the growth in point to point flights, will require a significant number of bus to plane operations. CIP2020 proposes a Pre-Boarding Zone (PBZ) with 7 hold-gates and covered walkway to stands remote from the building on Apron 5H. This single storey structure would operate in a similar fashion to the PBZ in the South Apron. The facility would further be safeguarded for satellite expansion in the west pending finalisation of the evolving masterplan. The 5H PBZ facility includes the development of toilets and food and beverage opportunities within the building and includes carries an allowance for the refurbishment of the OCTB hold gates to facilitate shuttle bus operations to this new PBZ.

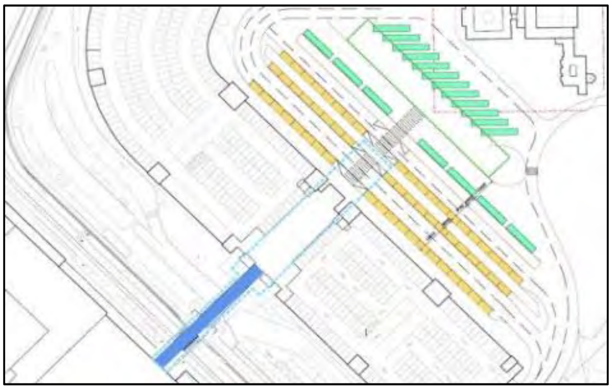
Figure 85: Apron 5H Pre-Boarding Zone



7.5.2. Terminal 1 Kerbs (CIP.20.03.006)

The capacity assessment identified increasing demands both on T1 Kerbs and on the Ground Transport Centre, shown in Figure 17, Figure 18 and Figure 19 in Chapter 2. To address this, it is proposed to develop increased kerb capacity at the back of the T1 Multi Storey Car Park (MSCP) within the central section of the Ground Transport Centre. This proposal also safeguards for the Aviation Security in Airport Development (ASIAD) requirement of 30m stand-off distance from the check-in building.

Figure 86: Ground Transportation Centre Overview



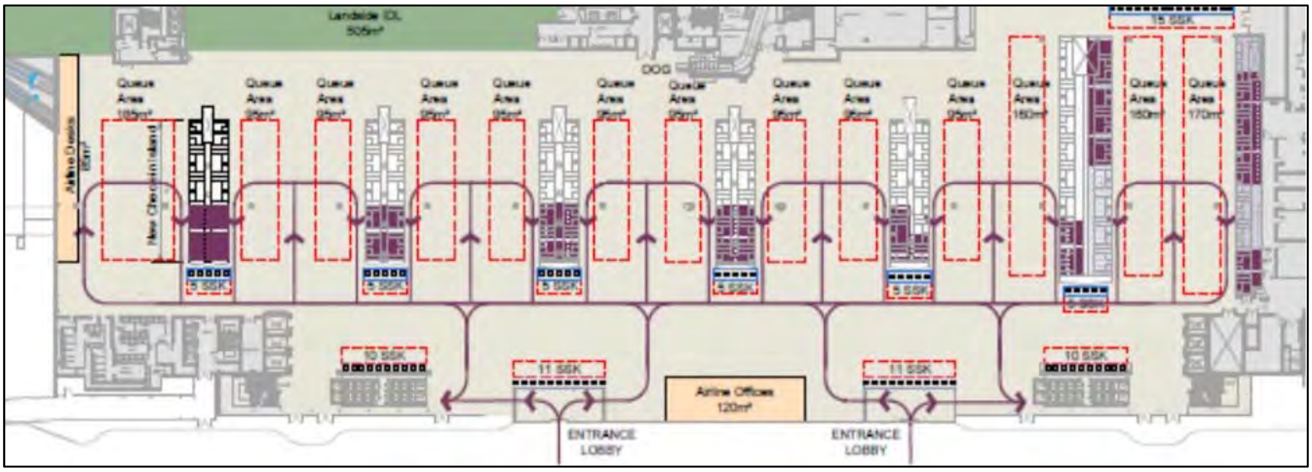
This is driven by the requirement for increased capacity and the need to safeguard the investment such that any future escalation in security risk does not render investment in the current kerbs abortive by moving the public kerbs away from the terminal. This development will see the drop off kerbs moved to the centre of the MSCP so that they form part of an integrated transport hub with reconfigured bus pull in bays adjacent to the proposed Metrolink station. See Figure 86.

7.5.3. Terminal 1 Check In (Island 1 & 2) (CIP.20.03.011)

In line with the projected growth in passengers, and the associated growth in the number of airlines operating in Terminal 1, options have been examined to increase and improve efficiency. All options take full cognisance of the shift towards bag drop and Self-Service Kiosk technologies but also takes account of the airline requirements to maintain desk presence in the check in areas.

The existing island arrangement is best replaced with a more efficient mix of shoreline and island layout, which is better suited to self-service kiosks and automated bag drop technology. The shoreline element positions the baggage input devices in a single, linear orientation with self-service kiosks located across from the baggage input positions but separated from the baggage input positions by queue and circulation space. Given the mix of airlines utilising the hall the optimum arrangement would be to implement shoreline on a phased basis working from the Area 13 towards Area 7. For now, only Phase 1 of this check-in-in strategy is proposed (See Figure 87). The second phase, Partial Shoreline (CIP.20.03.011A) is included under the 'Additional Projects under Consideration' category in Appendix H. Note: Prioritizing the reinstatement of Check-in Island 1-2 before partial shoreline will introducing redundancy in the system eliminating the construction / implementation impact to operations.

Figure 87: Base option - full island



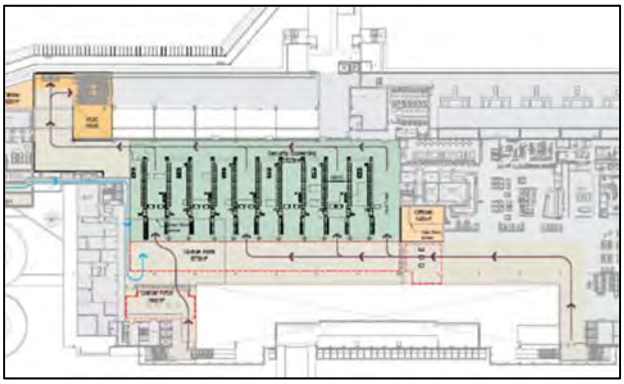
It is also proposed as part of the check-in redevelopment to provide for food and beverage offerings on the departure levels to the rear of check in. This food and beverage offering provides an opportunity for improved passenger experience.

7.5.4. Terminal 1 Central Search (CIP.20.03.012)

The Terminal 1 central security search area has over the years been modified to increase and optimise its capacity, including expansion both east and west to increase the number of lanes and the upgrade of equipment to an Automatic Tray Return System (ATRS) to improve processing capability. However, the capacity in its current location is constrained and presents a sub-optimum processing zone in terms of depth and the smooth channelling of passengers. Terminal 1 capacity can be increased to meet the 40mppa Dublin Airport demand by the readjustment of three processors namely, check-in, security and the IDL with the baggage hall remaining broadly within its current building envelope. Consequently, this removes one of the fundamental drivers for building envelope expansion.

To address the 40mppa horizon demand (c.23.5mppa in T1), it is proposed to move Central Security to the mezzanine level while maintaining fast track on the check-in hall level (See Figure 88). The move to the mezzanine requires the extension of the existing mezzanine floor over the current security queuing area and the introduction of a new vertical circulation core to the rear of security to allow passengers who have cleared through security to return to the IDL via an orientation zone. The proposal includes 11 x 25m automatic tray return system lanes with C3 baggage scanning. The introduction of C3 improves processing rates by upwards of 30% over current screening protocols whereby laptops and liquids are removed from cabin baggage for inspection.

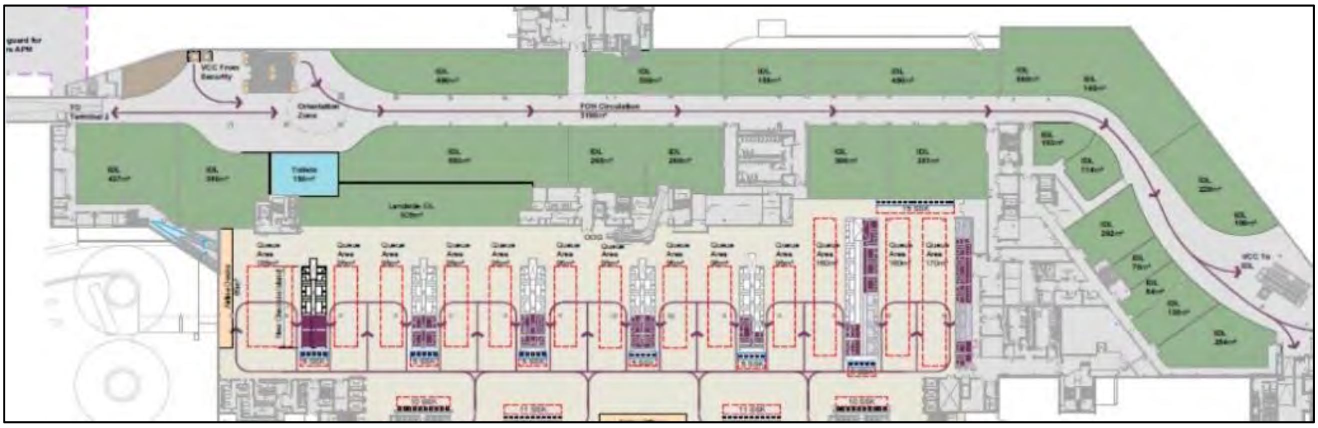
Figure 88: Terminal 1 Central Search Area



7.5.5. Terminal 1 International Departures Lounge (IDL) (CIP.20.03.013)

Today the Terminal 1 IDL operates at optimum capacity. To increase its capacity a number of measures are proposed including; introduction of a reorientation space following exit of the Central Security Area, the elongation and widening of the main circulation space, the opening up of commercial space (business lounges or similar) in the previous occupied CSA, the upgrading of both Food and Beverage and retail offerings as illustrated in Figure 89.

Figure 89: Proposal for Terminal 1 IDL



7.5.6. Terminal 1 Baggage Reclaim (CIP.20.03.015)

The Terminal 1 baggage reclaim requirements at 40 mppa demand level are driven by the widebody aircraft peak arrival wave, up gauging of existing aircraft types from small to larger narrow bodies, new long-haul entrants, and changes to airline carryon bag policy. The demand upgrade is shown in Figure 28.

It is proposed to provide the belt length required for wide body aircraft by linking existing belts 6 and 7 and converting these belts to an inclined belt arrangement. This project is driven by:

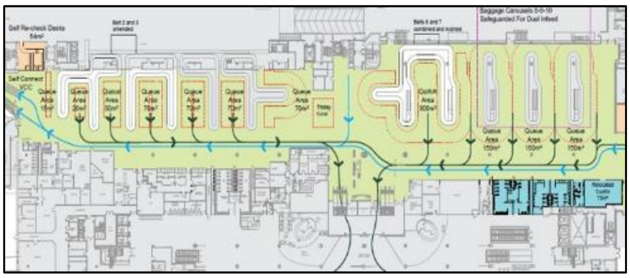
- The need to relieve existing congestion in this area and improve circulation flows
- The need for additional baggage reclaim capacity
- Improve passenger experience by enhancing the appearance of the hall
- Provide a self-connect product for passengers at Terminal 1

In addressing congestion in the reclaim area it is proposed to:

a.) widen the circulation corridor from the baggage hall entry point from Pier 1 Pier 2 (Figure 90) and

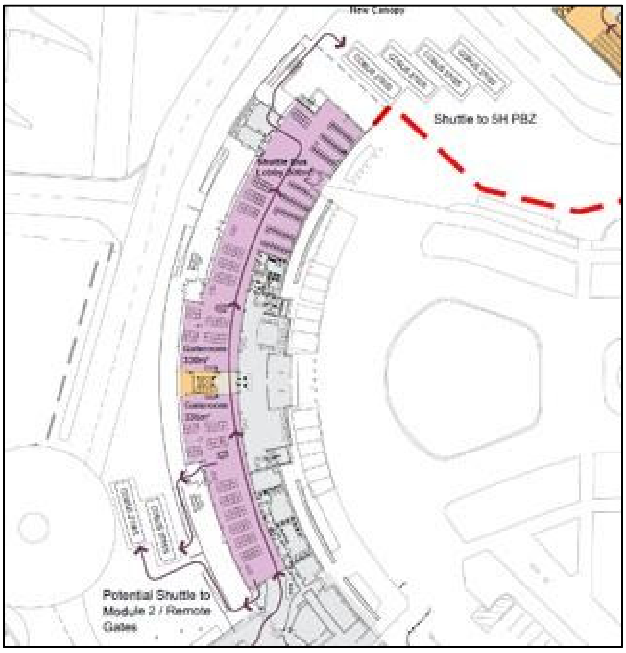
b.) to provide for a speedy exit for passengers without hold baggage to bypass the reclaim hall via a new exit point. This project (CIP.20.03.016) is included under 'Additional Projects under Consideration' in Appendix H.

Figure 90: Terminal 1 Baggage



7.5.7. T1 Shuttle, Bus Lounges & Injection Points (CIP.20.03.017)

With the provision of a Pre-Boarding Zone (PBZ) on the North Apron and more operations in the Western Apron, there will be increased bussing demand. T1 provides bus gate capability at Pier 1, Pier 2 and at the ground level of the Old Central Terminal Building (OCTB). This project will refurbish the Old Central Terminal Building ground floor to accommodate the anticipated passenger growth. The project includes the internal refurbishment of this hold room and associated facilities and the adjustment of the bus kerb to cater for the increasing bussing demand as the use of shuttle lounge.



7.5.8. Pier 3 Immigration (CIP.20.03.034)

The project purpose is to serve operations' stakeholder needs in a short-term plan by providing a stepped approach to increase capacity from Summer 2018 of approx. 31mppa up to 2024. The main project driver is that the area is not fit for purpose given the type of traffic now on the pier.

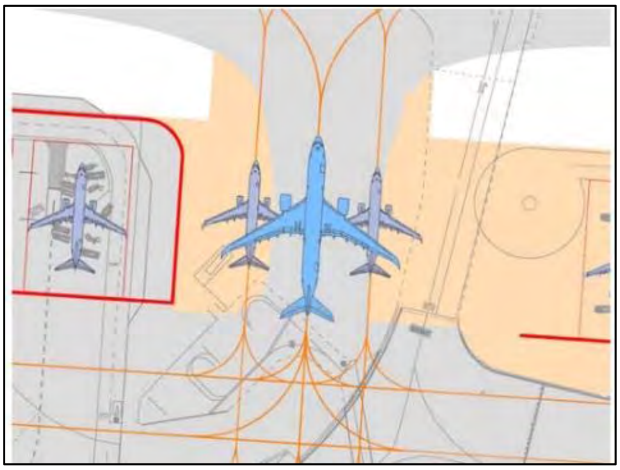
This project proposes a reconfiguration of the Pier 3 immigration hall. The objective is twofold, on the one hand it will provide an increase in capacity of passenger processing and on the other it will improve circulation and queueing areas.

The project will provide 6 no. relocated booths, a net increase of 2 booths compared to the existing situation, to cope with peak demands of arriving passengers at Pier 3. The booths will be relocated in to the hall as their current location on the neck of the pier constrains growth.

7.5.9. North Apron De-Icing Pad (CIP.20.03.040)

This project proposes to build a de-icing pad located on a taxiway link, joining 5H and 5G aprons to taxiway N. The link is centred between 5H and 5G. The de-icing pad consists of a Dual Code C de- icing points which can be used simultaneously with the ability to de-ice a single Code E aircraft. An enlarged paved area will provide sufficient space for de-icing trucks and equipment to work around the aircrafts.

New drainage for the de-icing pad will be fitted to capture surface water and de-icing agents with a controlled flow diversion to the pollution control storage tanks and surface water attenuation facilities.



7.6. Terminal 2

Capacity

Terminal 1 €378m

Terminal 2 €498m

Airfield €210m

Background

In a 40mppa scenario, the passenger numbers using Terminal 2 will rise from 12mppa to 16.5mppa. From a passenger processing perspective Terminal 2 has sufficient capacity / flexibility to accommodate the increased throughput at Kerbside and IDL. Minor capacity upgrades will be required in the check-in hall to accommodate 16.5mppa while the introduction of ATRS and new C3 screening technology is also proposed.

From a stand and gating perspective, the increase in passenger numbers from 12mppa to 16.5mppa will require more significant new infrastructure. A key role of CIP2020 is to provide facilities to accommodate growth of circa 3-4mppa from transfer passengers. Wide-body pier served stand availability is currently limited from 04:00 until after 12:00 on Piers 1, 3 and 4. Flexible wide-body stands are required to continue to facilitate growth for Transatlantic, Middle Eastern and Asian services. CIP2020 sets out plans that will promote and support the efficient and effective operations in relation to hubbing in line with the National Aviation Development Policy. The proposed infrastructure to support the hub development includes as represented in Figure 91 and Figure 92. All proposed Terminal 2 projects are detailed in the following section.

Figure 91: South Apron – Existing Arrangement

Figure 92: South Apron – Proposed Arrangement

7.6.1. New Pier 5 (CIP.20.03.029)

CIP2020 proposes to develop a flexible US-precleared/other three-storey pier extending east from Terminal 2, facilitating 4 MARS full service stands, in addition to a remote US Preclearance enabled (flexible) PBZ. CIP 2020 sets out a pier proposal designed to maximise flexibility and utilization. To support hub operations, connecting passengers will remain on the secure airside of the terminal complex transferring between aircraft. This will facilitate a rapid turnaround times for aircraft and, therefore, higher gate utilization. See Figure 93 for proposed pier layout:

The proposed pier also incorporates the following:

- Gate lounges on the 1st floor (Departures) which are physically segregated and accessible from both the 1st floor by US Preclearance passengers and the 2nd floor by all other passengers.

- Fixed airbridge links.
- 6 hold gate facility on the ground floor for non-US Preclearance Pax

Apron Level:

At apron level Pier 5 includes 6 bus lounges. A bus injection point has been located to the Pier's western end to accommodate arriving passengers, providing direct access to Terminal 2's immigration and transfer facilities.

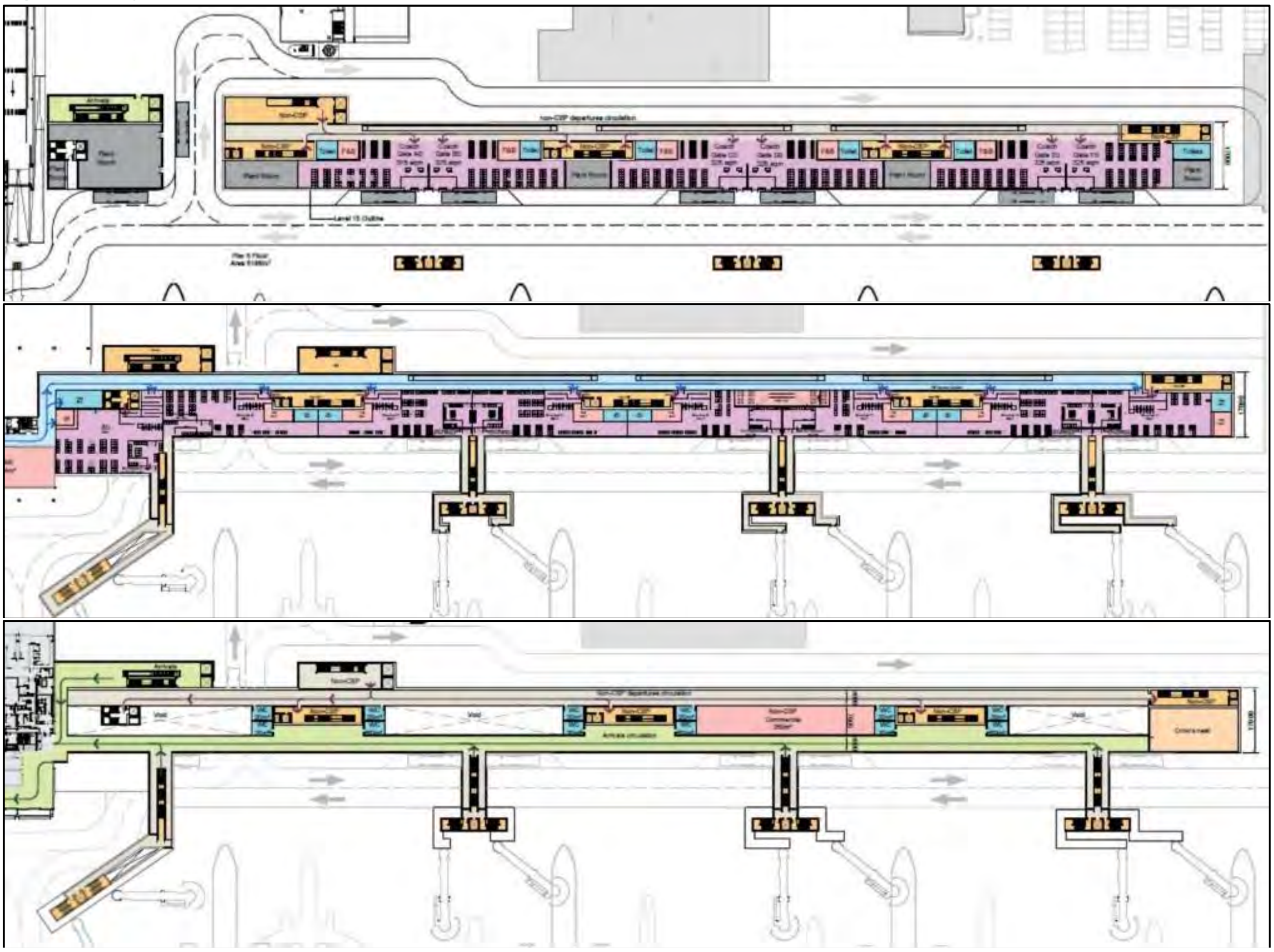
First Floor:

The first floor is the primary departures floor with 8 gates accessed either by a CBP corridor or by a non-CBP vertical circulation core descending directly from the floors above. This flexibility allows each gate to be individually used for CBP or non CBP operations, as required. Fixed links are to be equipped with airbridges and vertical cores to apron level to allow for further flexible use of the stands. A food and beverage offering will be placed at the start of the pier for US preclearance passengers and located next to an executive lounge.

Second Floor:

The second floor houses the arrivals corridor as well as the non-CBP departures corridor, (accessed via the third floor, not shown, which connects directly to the T2 departure lounge). This floor has the flexibility between corridors to accommodate future development of support facilities, including office space, commercial offerings and back of house support space.

Figure 93: Apron Level, First Floor and Second Floor



Demolition / Relocations:

This project requires the demolition and relocation or otherwise of existing premises falling within the development footprint, see Figure 91. The project safeguards options for impacted business operations and includes for the facilitation of a serviced airport logistics park east of the R132 for commercial enterprise development ref Figure 94. The construction of a secure bonded road from the South Apron over the R132 with services brought to the Eastland's logistics park is proposed as part of this development.

Commercial Enterprise Development Zone

In delivering both the south apron Pier 5 and establishing a zone for scalable expansion that meets the requirements of belly-hold into the future, it is proposed to enable a landbank to the east of the R132. This area is planned to be linked airside via a secure bonded road and over-bridge that would be provided as part of this CIP. The zone for development with indicative facility layout is shown in Figure 94 below:

Figure 94: South Apron – Commercial Enterprise Development

In facilitating EU Legislation requirements for new border inspection control facilities, CIP 2020 includes for their enablement.

7.6.2. South Apron Expansion (Remote Stands, Taxiway & Apron incl. PBZ relocation) (CIP.20.03.031)

CIP2020 assumes the adaption and implementation of Dual Code E taxiways, currently under review by IAA SRD. This will permit inbound and outbound wide body aircraft to utilise the South Apron in an operationally uninterrupted manner thereby decoupling operational constraints from the effective requirements necessary to make a hubbing operation viable. This will further improve safety of ground operations at the head of Pier 4.

It is also proposed to redevelop the southern airfield to include up to 17 stands as well as the extension of the abovementioned Dual Code E taxi lane. This redevelopment is inclusive of the relocation of the existing Pre-Boarding Zone (PBZ) building (South Gates) to accommodate the construction of Pier 5. The PBZ building will be relocated further south and will include the development of the associated road access for shuttle bus operations. Additional weather protected walkways will be either side of the PBZ and will maximise the number of serviceable walk to contact stands. See Figure 95 for South Apron Expansion.

Figure 95: South Apron – Dual Code E Taxiways and PBZ Relocation

Current estimates indicate that relocating the PBZ to the proposed location shown in Figure 95 will cost approximately €10m. This relocation cost is captured in the overall CIP.20.03.031 estimate.

7.6.3. Expansion of US Pre-Clearance Facilities (CIP.20.03.30)

Today's US Preclearance in Dublin operates based on a secondary screening facility located in Pier 4 with a standalone Hold Baggage Screening (HBS) system. Effective as this may be, there is a considerable degree of flux in the space of security alignment between the EU and US. The CIP2020 plan is to expand the current facility based on all known implementable measures for both the TSA and US Preclearance processes to enable US Preclearance on Piers 3, 4 and 5 with Piers 4 and 5 being facilitated via direct connectivity. Enablement of Pier 3 needs to remain flexible as alternatives for implementation range from sealed bussing operation to sterile gate facilities in Pier 3 to options such as satellite screening in pier 3 to fixed bridge sterile link from Pier 4.

Figure 96: Proposed US Preclearance Expansion

Figure 97: Pier 3 Remote US Preclearance Facility – Indicative Processor Locations

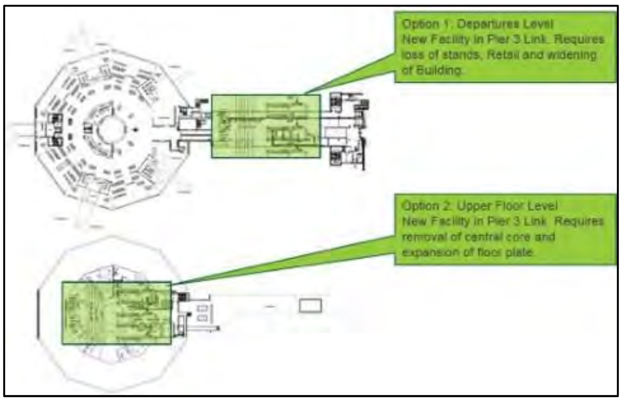


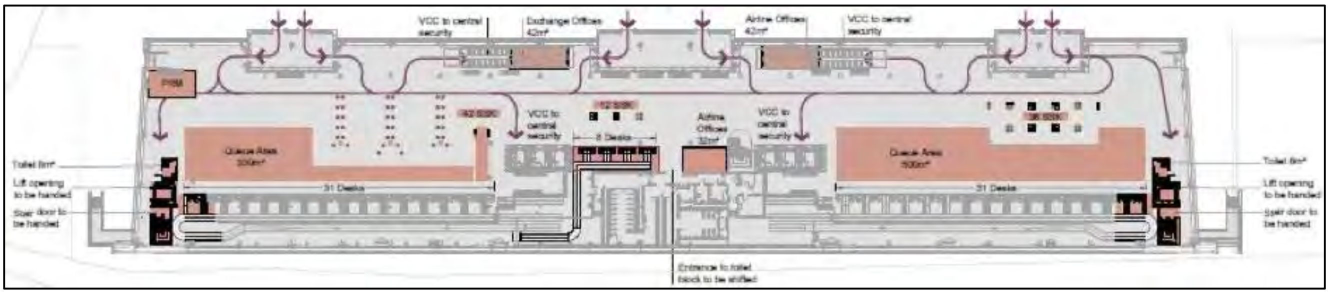
Figure 25 in chapter 2 outlines the increase in facilities required for US Preclearance to facilitate 40mppa. Existing US Preclearance is approaching capacity. It is proposed to expand and reorient the operational use of the space with the inclusion of 11 TSA screening lanes, 30 US Preclearance officer podium positions and an expanded secondary screening area. The facility will provide a direct sterile link to the newly proposed Pier 5 and the existing Pier 4 and a sealed bussing operation to a sterile area in pier 3 whilst safeguarding for a potential fixed link to Pier 3. CIP2020 should provide sufficient flexibility to implement optimal solution(s) facilitated by the adoption of new technology as it becomes viable and available. This new technology could mean:

- The potential development of a Satellite US Preclearance/ TSA facility in Pier 3 within an acceptable footprint facilitated by the application of new technology (such development today is driven by the parallel two-speed TSA screening process which leads to a requirement for a relatively significant screening facility footprint) thereafter linked to sterile gate lounges with the objective of enhancing customer experience and reducing the passenger demand in pier 4; and;
- In addition to the above a reduced footprint requirement for the extension of the existing Pier 4 US Preclearance / TSA facility;
- In addition to the above through the adoption of various technology enabled solutions including for example, facial recognition and technology that facilitates "co-mingling, alternate US preclearance processes could be developed .

7.6.4. Terminal 2 Check-In (CIP.20.03.020)

With an increased number of passengers and operators using Terminal 2 the capacity assessment has identified the need to increase the capacity at check in. It is expected that a significant proportion of growth will be accommodated via technology solutions with increased use of self- service kiosks (SSKs) and bag drops. Despite the continuing evolution of technology traditional check in desks will still be required.

Figure 98: Terminal 2 Check-in



The proposed solution within the space provides for development bag drops in the central area of T2 check in, SSKs and an increased number of traditional check in desks to meet the demand outlined in Figure 20 in Chapter 2. To achieve this, ticket desks and offices at either end of the check in building must be removed.

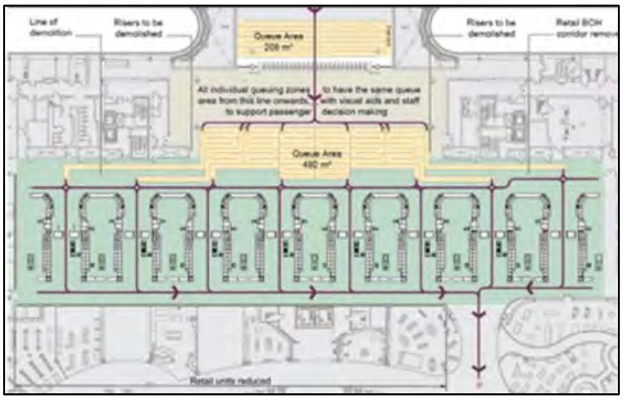
Several check-in scenarios have been analysed to understand the potential demands on the facility. In a scenario where technological innovation is not adopted by airlines, the capacity of the check hall will be exceeded. Given the geometry of the hall it is not possible to efficiently provide for further traditional check in desks over what has been presented.

An option for a physical extension to the Terminal 2 Check-in building has been examined (CIP.20.03.20A – Appendix H) and is not included in the base option on the basis that it is not essential.

7.6.5. Terminal 2 Central Search Area (CIP.20.03.021)

The principle intervention proposed in T2 is the development of T2 Central Security area to cater for the uplift in passenger numbers, as represented in Figure 22 in Chapter 2. It is proposed to develop this in line with evolving technological enhancements in security scanning equipment, using Automatic Tray Return Systems and C3 scanning technology which has upwards of 30% improved efficiency over exiting security screening equipment. Thereby demand can be met with the provision of 16 19m ATRS C3 screening lanes; as illustrated in Figure 99.

Figure 99: Terminal 2 – Central Search Area Overview

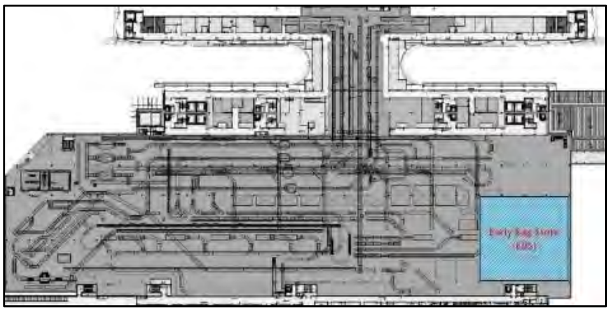


As part of this project it is proposed to reconfigure the queuing space by moving the current landside/airside wall further landside. This will allow a more efficient queue management and as a result improved passenger experience.

7.6.6. Terminal 2 Early Bag Store & Transfer Line (CIP.20.03.028)

This project proposes to construct an early bag store on the HBS mezzanine of Terminal 2. The lane- based system will have the capacity of 950 bags. The EBS will provide sufficient capacity for the early bag demand over the next CIP period. The use of an early bag store will assist in reducing the demand on CBP allocated make-up positions, which are forecast to increase beyond the current provision. A 4th Transfer line will also be installed to increase the capacity and resilience of the transfer system.

Figure 100: Early Bag Store Proposed Location



7.7. Airfield

Capacity

Terminal 1 €378m | Terminal 2 €498m | Airfield €210m

Background

The Airfield group of projects is dominated by two development options focused on maximizing capacity in operationally underutilised locations in the airport. The two-major projects included in the Airfield group are:

1.) West Apron Vehicle Underpass

2.) New Apron 5M. As cited earlier.

As noted from the outset, CIP2020 seeks to deliver the most operationally and cost-effective development plan to meet the demands of a 40mppa horizon. This CIP plans to maximise existing capacity on the east campus while opening the West Apron for maximum exploitation in consideration of its existing infrastructure and CIP2020 proposed enabled infrastructure. The Airfield projects plan an integral role in opening the West Apron for maximum exploitation

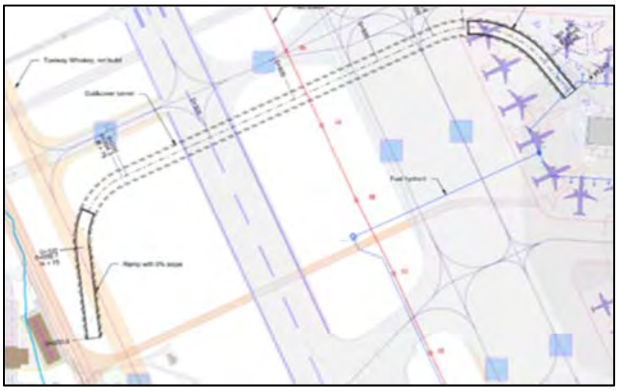
Note: This section also captures three smaller operationally critical projects (CIP.20.03.004, CIP.20.03.052 & CIP.20.03.057)

7.7.1. **West Apron Vehicle Underpass (Pier 1 Option)** (CIP.20.03.051A)

Dublin Airport is both narrow and wide body stand capacity constrained as noted in Figure 29 in Chapter 2. As the emerging masterplan retains Runway 16/34 runway in the medium term the provision of a direct connectivity to the West Apron will both ease congestion on the east and facilitate the movement of non-commercial Pax operations to the West Apron (incl. integrator cargo and MRO).

This project proposes the construction of an underpass below runway 16/34 to provide direct vehicular access between the West and East campus. A bidirectional two-lane single-cell underpass will be constructed using cut-and-cover techniques. More information is available in Appendix C under CIP.20.03.051A.

Figure 101: Underpass Location – Off Pier 1

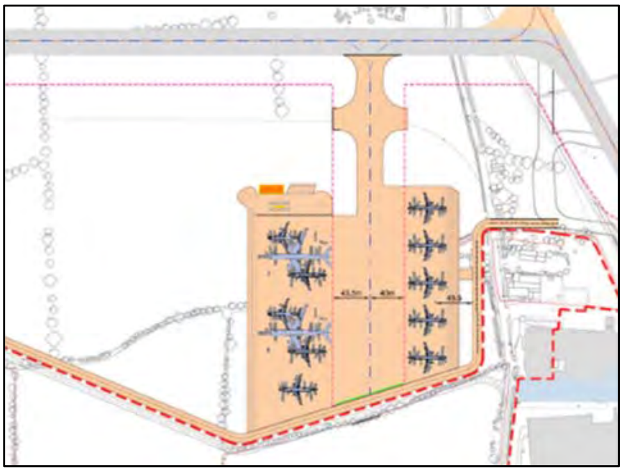


Note: Several options were considered in developing an appropriate location for an underpass including, a southern (from the head of Pier 4), central (from the head of Pier 3) and northern alignment. The northern alignment presented most advantages, length, minimised disruption to live operations, tie in with construction works of the north runway and operational traffic link at extremity of airfield operations. CIP2020 presents two options for consultation, an alignment off the west extremity of Pier 1 and an alternative from the head of stand road on Apron 5G (captured under 'Additional Projects for Consideration'.

7.7.2. **New Remote Apron 5M** (CIP.20.03.054)

CIP2020 proposes the opening of new stand capacity to the north west of the airfield, referred to as Apron 5M, see Figure 105. With the development of the North Runway, the lands to the south of its western taxiways are unlocked for airfield operations. It is proposed to develop these stands as an initial phase, in a masterplan compliant configuration to provide 10 NBE stands including 2 wide body stands. Additionally, this development further safeguards for cost effective, scalable Master Plan compliant development of remote stands in-line with future demand.

Figure 102: Apron Stands – 5M



7.7.3. Support Projects

As Dublin Airport continues to grow there are a number of projects required to support this growth. Each of these projects are listed below with further detail provided in the CIP project sheets.

Figure 103: Support Projects

CIP No.	Project	Driver	Value (€m)
CIP.20.03.052	Surface Water Environmental Compliance	Compliance	€51m
CIP.20.03.004	Gate Post 9 Expansion	Compliance	€9m
CIP.20.03.057	Airside GSE Charging Facilities	Airfield Efficiency	€5m

These, in tandem with projects proposed in the eastern campus provide a masterplan aligned, pathway for the continued growth of Dublin Airport.

7.7.4. Other Airfield Considerations

General Aviation

General Aviation (GA) currently operates on the north side of Pier 1 and its passengers are served from Platinum Services in Collinstown House and the Vehicle Control Points by exception. With the expansion of commercial passenger served stands, piers and satellite facilities there will be a need to relocate GA stand operations on a phased basis to the west of Runway 16/34 while still routing the GA passengers through Platinum Services. Aircraft stands will occupy either the north segment of the West Apron or Apron 5M. The 55mppa masterplan safeguards a zone for development adjacent to Runway 10R, see Figure 104 for indicative location:

Figure 104: Indicative GA Facilities at 55mppa

MRO

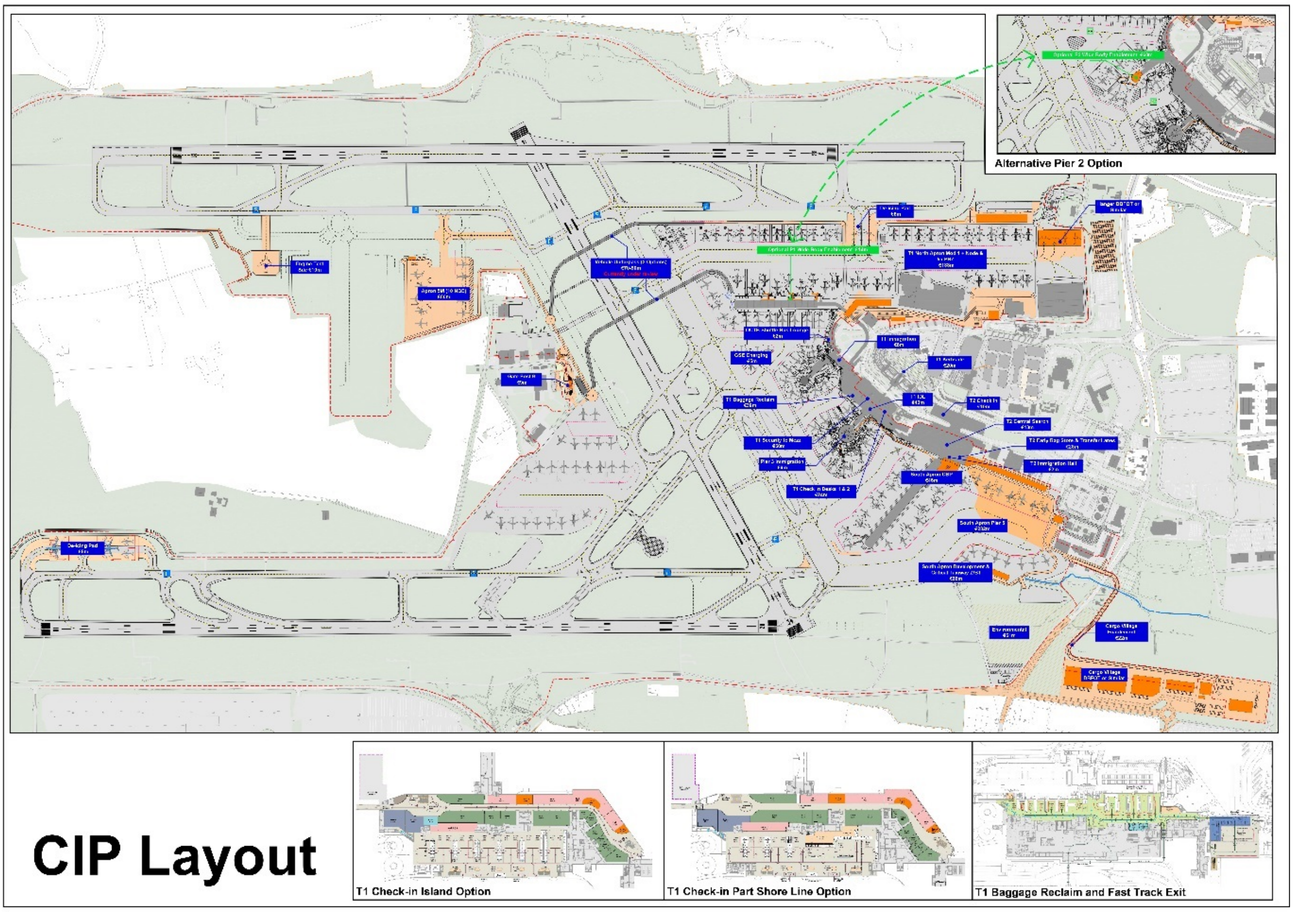
Maintenance Repair & Overhaul (MRO) is of significant importance at Dublin Airport, with facilities including an APU overhaul centre, a landing gear service centre, aircraft overhaul and aircraft painting facilities. Over the course of the following regulatory quinquennium it is anticipated that as Pier 1 builds out to serve passenger growth an MRO enabled zone to the west of Runway 16/34 will be enabled for long-term development as part of the National Aviation Policy. A zone south of Runway 10L with landside/airside VCP is safeguarded as part of the 55mppa masterplan, see Figure 105.

Figure 105: Indicative MRO Facilities at 55mppa

7.8. Summary

Dublin Airport is at an important juncture as is the aviation industry. There is a significant opportunity for Dublin Airport and its airlines to capitalise in a sustainable manner on the growth forecast in the industry and on the changes occurring. The preceding sections have outlined the business drivers for growth, the governmental direction the industry is directed to take, the capacity and demands on the existing infrastructure and the proposals considered to address both these challenges and opportunities. These are now summarised and represented below in Figure 106.

Figure 106: CIP Layout



8 FINANCIAL IMPACT / BUSINESS CASE FOR INVESTMENT

8. FINANCIAL FINANCEABILITY AND PRICE CAP IMPACT OF CIP 2020+

8.1. Overall Impact[2.] of CIP 2020+

Dublin Airport's capital investment requirements for the period of the next regulatory determination are split into the three high level categories below:

- 20 Capacity projects to enable passenger growth, some of which also generate commercial revenues (€1.1bn)
- 85 Core projects to maintain the running of the existing faciality (€477m)
- 15 Commercial projects that are required to generate additional commercial revenues (€105m)

The totality of this capex for CIP2020+ is estimated to be €1.68bn.

In setting a price cap for the period of the next regulatory determination, the Commission is expected to consider the following from a capital investment perspective:

- Outturn for CIP2015-19, including trigger projects and increased spends
- PACE projects
- T1 HBS
- 2015 Till Exit i.e. Dublin Airport City
- T2 Box 2 i.e. related to reaching the 33mppa threshold
- North Runway
- CIP 2020+

[2] Note: all price cap analysis assumes the existing 5.79% WACC

Dublin Airport believes that this required level of investment can be accommodated with the price cap from 2020 remaining broadly in line with existing pricing (€9.57 in 2018). To secure appropriate funding and ensure continued sustainable financial viability over what will be a significant period of investment, we are required to hold prices relatively flat.

8.2. Funding CIP 2020+

Dublin Airport carried €726m of net debt at December 2017 and showed debt metrics correlated with a "modest" financial risk profile (FFO: net debt 29.8%; Net debt / EBITDA 2.8x). These metrics have improved significantly since 2012 when FFO: net debt was 11.1% and Net debt / EBTIDA was 6.0x (Source: Dublin Airport Regulated entity accounts) due to the lower level of investment required over the period.

Over the next regulatory period, beginning in 2020, Dublin Airport is projecting spend of approximately €2bn on capital expenditure; €350m on North Runway, PACE & T1 HBS in addition to this CIP proposal. A reduction in the price cap implies that we may ultimately be unable to proceed with certain projects that have been approved by the Commission following support from airport users.

8.3. Overall Impact of CIP 2020+

Dublin Airport's capital investment requirements for the period of the next regulatory determination are split into the three high level categories below:

New debt requirement

The capital expenditure of €2.0bn plus anticipated gross debt repayments of €0.2bn create a funding requirement of €2.2bn over the CIP period. In addition, the shareholder expectation is for future dividend payments over the period, further increasing funding requirements.

This will be funded by 2 sources:

- Operating cashflows at Dublin Airport, which is most dependent on the price cap at Dublin Airport and the passenger levels
- New debt raised, which is a residual of the level of operating cashflows

A reduction in the price cap will have the double impact of increasing the level of debt required while also reducing the credit worthiness of Dublin Airport.

Financeability and market expectations

In order to ensure Dublin Airport can raise the necessary funds on acceptable terms through the different market conditions, a credit rating not less than BBB+ is required. This is particularly relevant given the required debt.

The capital markets and potential sources of funding will be looking for a credit rating that is both on a par with peer airports in addition to a credit rating that has headroom to withstand a downturn. Both of these are detailed below:

The relevance of Peer Airports

Dublin Airport is a relatively small share of the European Airport debt market and as such must match or better its peers to be attractive to funders. Dublin Airport's European peer airports are all rated at minimum BBB+ or equivalent on their core debt. The practice over the last ten years has been the requirement for stronger investment grade ratings.

	S&P	Moody's	Fitch
Aeroporti di Roma	BBB+	Baa1	BBB+
Aeroports de Paris	A+	NR	A+
Flughafen Zurich	AA-	NR	NR
Luchthaven Schipol	A+	A1	NR
Birmingham	NR	Baa1	NR
Brussels Airport	NR	Baa1	BBB+
Manchester Airport	NR	Baa1	BBB+
Heathrow Airport	NR	NR	A-
Gatwick Airport	NR	Baa1	BBB+
Copenhagen Airport	NR	Baa1	BBB+

Ability to withstand a downturn

Targeting not less than a BBB+ credit rating also allows headroom, in a highly cyclical industry, for a further downgrade to BBB. A BBB rated bond will be considered more volatile than a BBB+ rated bond in terms of price given the disproportionate impact of a further downgrade. Achieving the required quantum of funding and terms as a BBB rated bond is more challenging and becomes even more difficult when market conditions are weak or more volatile and increases execution risk.

S&P Credit Rating Methodology

In analysing a corporate, S&P assesses risk, competitive position, published financials and forecast future financials to assign a Business Risk Profile ("BRP") and a Financial Risk Profile ("FRP") to the company.

BRP: Business Risk Profile incorporates such factors as country risk, environment, company position, business and geographic diversification, and management strategy. Regulatory support has historically been a factor in the assessment of daa Group's BRP.

FRP: Financial Risk Profile incorporates such factors as risk management, capitalization, earnings, funding and liquidity, accounting, and governance. The FRP is assigned based on financial ratios, with most emphasis applied to FFO: Net Debt and Net debt / EBITDA.

These profiles are then used to calculate an anchor credit rating for the corporate. This rating can be changed, positively or negatively, based on S&P's assessment of the effect of six modifiers.

Dublin Airport credit metrics and implied credit rating

The 2017 Dublin Airport debt metrics correlate with a "modest" Financial Risk Profile ("FRP"), which when combined with a "strong" Business Risk Profile would likely give an anchor rating of "A". As is the case with daa Group's rating, S&P would apply a 1 notch downgrade due to the "Comparable rating analysis" modifier and ultimately get a standalone credit rating of "A-".

Financial Risk Profile	Core Ratios	
	FFO / net debt	**Net debt / EBITDA**
	(%)	(x)
Minimal	25+	Less than 2
Modest	23 - 35	2-3
Intermediate	13 - 23	3-4
Significant	9 - 13	4-5
Aggressive	6 - 9	5-6
Highly leveraged	Less than 6	Greater than 6

Rating based on "Strong" Business Risk Profile
AA / AA-
A+ / A
A- / BBB+
BBB
BB+
BB

Dublin Airport draft financial forecasts show the net debt levels growing to €1.6bn–€1.7bn during the period of the next regulatory determination, depending on passenger growth and assuming the current price cap.

While a FFO: net debt 20% or greater is consistent with an "intermediate" FRP, the Net debt / EBITDA > 4x correlates with a "Significant" FRP and thus risks a BBB rating. S&P will maintain the ability to apply the "Comparable rating analysis" modifier to adjust the anchor rating negatively by one notch.

In order to achieve a credit rating of BBB+, Dublin Airport will require a FFO:Net debt at the higher range of 13% - 23% and a FFO:Net debt closer to 3x so as to secure a FRP on the high side of "Intermediate". This would give an anchor rating of "BBB+" assuming no other changes in factors such as business and liquidity risk.

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9 PROGRAMME MANAGEMENT

9. PROGRAMME MANAGEMENT

The development programme proposed in CIP 2020, while necessary to meet the forecast demand and address imminent capacity constraints, is very ambitious and will come with significant challenges. It is a large-scale development programme with many work fronts, North, South, West, terminal and landside and requires significant coordination to ensure the impact on operations is minimised. The Capital Investment Programme, is in fact a series of Programmes, a Portfolio of Programmes, each supported by a series of associated projects, 200 plus projects in total.

In this regard an intensive Portfolio, Programme and Project Management approach to this development plan is required in order to achieve the required efficient investment in infrastructure. daa will use internationally recognised best practice for Portfolio, Programme and Project Management to support the established daa methodology for project delivery and project controls. This will set the governance, lines of authority and assurance model to deliver this major investment as efficiently as possible.

9.1. Introduction

The CIP will have key challenges that will be require ongoing management throughout the development programme as follows;

- Statutory Planning Permission will be required for the majority of the proposed development, with the exception of asset rehabilitation projects which generally do not require statutory planning. Planning by its nature will have significant challenges including environmental issues, third party objections, requests for Additional Information and the risk of subsequent delays.
- The current buoyant economic conditions in the construction industry will result in procurement and tendering challenges ensuring competition, and the ability of the local market and supply chains to meet the necessary demand. In this regard it will be necessary in many instances to tender complete programmes of work as opposed to individual projects to make bidding attractive for large construction companies.
- This development plan will present its own logistical challenges, e.g. site access, airside escorts, identification badge processing, airside contractor training, road traffic management etc. It is expected at the peak there will be over 2,000 construction workers employed in this programme.
- This development plan will also require a significant safety construction plan to ensure the safety of construction workers, airport employees, other stakeholders and passengers. Temporary works and phasing will be a key part of the programme delivery to ensure safe access / egress is maintained and to minimize the disruption to ongoing airport operations.
- The capex spend associated with this

development plan will average, over the 5-year period, c.€300m per annum and this level of expenditure requires significant governance and administration, only possible with good programme management principles and system.

- In order to achieve the required development to meet the forecast traffic growth, it will be necessary to commence a number of key projects in advance of the final CIP Determination in September 2019 in order to maintain programme. Projects requiring advance expenditure are detailed in Section 9.8 below. It may also be necessary for some projects to straddle Capital Investment Programmes,i.e. CIP 2020 and the following CIP period (assumed to be CIP 2025) and in such cases the allowance should be confirmed in advance of the project progressing to site to ensure full recovery.
- During this intense construction programme it will be necessary to continue operations with minimal disruption – this may not always be possible and options in this regard will be presented to airlines following feasibility and the detail design process.
- In this regard Programme Management principles will be adopted as 'best practice' to manage large scale capital developments.

9.2. Portfolio, Programme and Project Management

The Portfolio is the totality of daa's investment in the CIP and the associated changes needed to achieve the airports strategic objectives. The portfolio links the programmes in their common airport strategic goal. The series of Programmes identified, will be delivered following international best practice for Programme Management.

Programme Management is defined as the process of managing multiple interdependent projects or programmes of work, ensuring a standardised approach to cost, time, quality, safety, and risk, as well as ensuring adequate control, monitoring and project reporting is in place, to safeguard the efficient delivery and overall regulatory compliance of multiple suites of projects in a Capital Investment Programme.

In addition, Programme Management assesses the collective impact of the project construction on day-to-day airport operations and examines options to minimise any negative impact, ensuring minimum disruption to customers. The programme management principles for delivery of CIP 2020 are as follows;

- Expedite projects to alleviate the most significant capacity constraints
- Coordinate projects so that impact on operations is minimized.
- Group projects together that deliver the greatest economies of scale and efficiency in construction delivery and to ensure downtime of infrastructure (i.e. taxiway / stand closures) are kept to a minimum.
- Deliver individual projects in phases so that capacity can be released in stages aligned to the forecast demand
- Expedite planning and regulatory/environmental processes to manage risks early in the project timeline
- Assess the availability of construction resources (contractors) and the quantum of activity that can be managed in a live operational environment.
- Review procurement strategies to ensure the optimum value for money approach is adopted, where programme allows
- Risk Access Programme and implement pro-active mitigation measures

A detailed schedule with key milestones will be produced for each individual project and these will be rolled up into an overall programme of projects where impacts on facilities can be coordinated / realigned / rescheduled to ensure the most optimum project delivery measured against the impact on facilities.

This will include taxiway and stand projects and terminal and landside projects. Projects that impact a particular aircraft parking stand / stands will be coordinated with projects that impact the associated terminal and gate facilities, so that the most optimum use of facility closures is obtained, where possible. This will also apply to procurement approach, where projects with similar timelines and/or similar construction can be coordinated to maximise the potential for value for money.

9.3. Stakeholder Engagement

In the delivery of any potential project or programme of works, it will be essential that every avenue is explored to maintain operations with minimum disruption. It should however be recognised that it is impossible to construct large-scale projects in a live operational environment, without some impact on operations or requiring some level of temporary relocation of services or disruption to services.

Dublin Airport will endeavour to determine the optimum solution for each project and will engage with affected stakeholders to solicit views to determine the potential impact of each project or work programme on their specific operation. This will be carried out through the normal operational channels, such as bilateral discussions, where a project has a direct impact to a single user or a particular group of users.

Any disruption will be quantified and communicated directly to users, along with the mitigation plan and managed solutions if applicable. General impacts, which affect the totality of airport operations, are best managed through the existing channels; i.e. The Airport Operations Committee (AOC), the Dublin Airport Operations Planning Group (DAOPG) and the Dublin Airport Co-ordination Committee.

9.4. Portfolio and Programme Assurance

The governance of the programmes supporting the CIP will follow best practice to ensure that lines of authority, ownership of budget, and levels of delegation are clearly defined to deliver with identified and auditable controls and oversight. Portfolio Assurance will be a key element of governance of the CIP including input and oversight for Airport Operation and Airline End Users.

The governance of the programmes supporting the CIP will follow best practice to ensure that lines of authority, ownership of budget, and levels of delegation are clearly defined to deliver with identified and auditable controls and oversight. Portfolio Assurance will be a key element of governance of the CIP. Within the structure of the portfolio Assurance offices will give input and oversight for Airport Operation and Airline End Users. The inclusion of an Operations Assurance Office, and an Airline Portfolio Assurance Office will allow for meaningful consultation on development matters impacting both daa operations and airline operations. The Assurance Offices will be independent of the delivery team and give strategic level representation.

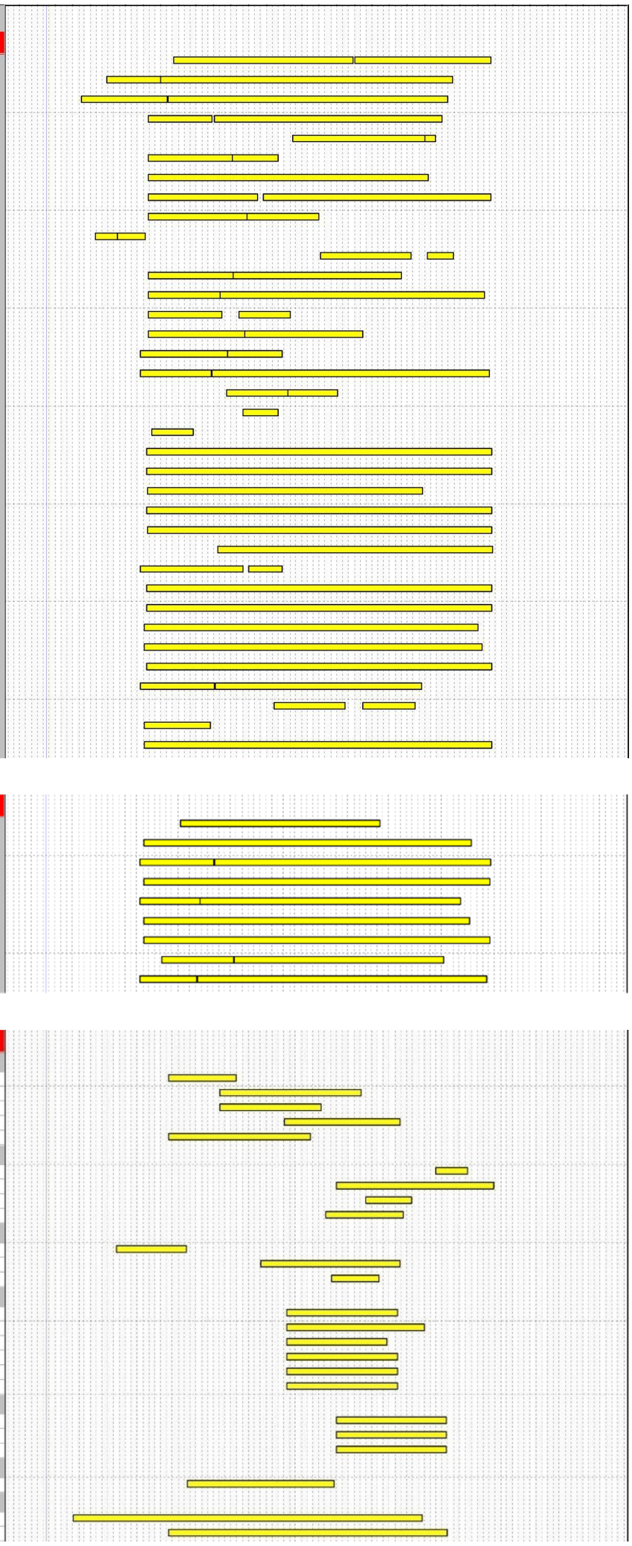
9.5. Project Delivery

Outlined below is the initial high-level project timelines for the delivery of key projects in CIP 2020. This schedule has been derived based on current high-level information and will be reviewed in detail prior to final submission of CIP proposals and again during the formal consultation period. Information that has informed this draft high-level programme is as follows:

- An individual schedule was produced for each project – over 200 in total. Schedule maturity at this stage reflects the known design development, currently indicated in scope documents.
- All schedules were combined into a wholistic programme and conflicts are identified at a high level. Conflicts can result for a number of reasons, operational impact, construction logistics, design risk, construction and planning risk etc.
- The schedule is revised to remove or mitigate the identified conflicts and the reviewed again. This process is repeated until an optimum wholistic schedule is produced and this becomes the baseline schedule for programme delivery. This will be reviewed in detail over the next few months as the project rational and scope detail matures.
- The Schedule in Figure 107 below shows the high-level programme for project delivery.

Figure 107: Project Delivery Timeframes

	Project	Start	Finish
	Core & Capacity Projects	07-Nov-18	26-Nov-27
	A. Asset Care Civil Structural Fleet	13-Feb-19	16-Dec-24
	CIP 20.01.001 Southern Runway (R10R/28L) Delethalisation Programn	09-Jun-20	10-Dec-24
	CIP.20.01.002 Apron Rehabilitation Programme	26-Jun-19	22-May-24
	CIP.20.01.003 Airfield Taxiway Rehabilitation Programme	13-Feb-19	30-Apr-24
	CIP.20.01.004 Apron Road Rehabilitation Programme	27-Jan-20	29-Mar-24
	CIP.20.01.005 Airfield Security Fence Improvement Programme	14-Feb-22	23-Feb-24
	CIP.20.01.006 Airfield Southern Perimeter Road Upgrade Programme	27-Jan-20	30-Nov-21
	CIP.20.01.008 Runway Approach Lighting Mast Improvement Program	27-Jan-20	17-Jan-24
	CIP.20.01.009 Aerodrome Ground Lighting (AGL) Improvement Progra	27-Jan-20	10-Dec-24
	CIP.20.01.010 Airfield Lighting Control & Management System Improve	27-Jan-20	29-Jun-22
	CIP.20.01.012 AGL Substation T Development Programme	29-Apr-19	09-Jan-20
	CIP.20.01.015 High Mast Lighting Improvement	08-Jul-22	29-May-24
	CIP.20.01.016 Airfield Maintenance Base Improvement Programme	27-Jan-20	31-Aug-23
	CIP.20.01.018 Campus Buildings Critical Maintenance	27-Jan-20	06-Nov-24
	CIP.20.01.019 Mobile Phone Antenna Mounting Facility	27-Jan-20	31-Jan-22
	CIP.20.01.020 Terminal 1 Façade	27-Jan-20	14-Feb-23
	CIP.20.01.022 Terminal 1 Storm Water Drainage System	16-Dec-19	23-Dec-21
	CIP.20.01.023 Piers & Terminals Critical Maintenance	16-Dec-19	29-Nov-24
	CIP.20.01.024 Skybridge Rehabilitation	10-Mar-21	04-Oct-22
	CIP.20.01.028 Terminal 1 Spirals Repairs	31-May-21	01-Dec-21
	CIP.20.01.033 Cargobridge Road	13-Feb-20	18-Sep-20
	CIP.20.01.034 Campus Roads Critical Maintenance	21-Jan-20	11-Dec-24
	CIP.20.01.035 Road Furniture	21-Jan-20	11-Dec-24
	CIP.20.01.039 Airport Roads Critical Maintenance	22-Jan-20	19-Dec-23
	CIP.20.01.040 Landside Road Surface Marking	21-Jan-20	11-Dec-24
	CIP.20.01.046 Staff Car Parks Critical Maintenance	22-Jan-20	12-Dec-24
	CIP.20.01.049 Public Carpark Critical Maintenance (Spine Roads)	21-Jan-21	16-Dec-24
	CIP.20.01.056 Campus Facilities & Landside Snow Base Upgrade	16-Dec-19	20-Dec-21
	CIP.20.01.057 Multi Storey Car Parks Critical Maintenance	21-Jan-20	11-Dec-24
	CIP.20.01.062 Wider Campus Buildings Critical Maintenance	21-Jan-20	11-Dec-24
	CIP.20.01.065 Airport Heavy Fleet & Equipment Replacement	08-Jan-20	03-Oct-24
	CIP.20.01.069 Airport Light Vehicle Fleet Replacements and Augmenta	08-Jan-20	23-Oct-24
	CIP.20.01.071 Electric Charger Network Facilities	21-Jan-20	11-Dec-24
	CIP.20.01.074 Advance Visual Docking Guidance System (5G, Pier 1 &	16-Dec-19	13-Dec-23
	CIP.20.01.087 AGL Fibre Optic Communication Network Improvement	08-Nov-21	10-Nov-23
	CIP.20.01.099 RWY 16/34 Lighting for Low Visibility Procedures (LVP)	07-Jan-20	16-Dec-20
	CIP.20.07.013 Airfield Redesignation	07-Jan-20	11-Dec-24
	B Asset Care - Mechanical and Electrical	16-Dec-19	12-Dec-24
	CIP.20.02.001 Medium Voltage (MV) Electrical Network	17-Jul-20	19-May-23
	CIP.20.02.004 Passenger Boarding Bridges (Maintenance & P3 Enhanc	06-Jan-20	04-Sep-24
	CIP.20.02.005 Lift Upgrade Programme -T erminal and Multi-Storey	16-Dec-19	12-Dec-24
	CIP.20.02.006 Airport Water & Foul Sewer Upgrade	06-Jan-20	10-Dec-24
	CIP.20.02.007 Life Safety Systems (LSS) Upgrade Programme Termina	16-Dec-19	10-Jul-24
	CIP.20.02.008 Terminal Buildings HVAC Upgrade	06-Jan-20	23-Aug-24
	CIP.20.02.009 Campus Buildings: Mechanical, Electrical & LSS Upgrad	06-Jan-20	10-Dec-24
	CIP.20.02.010 Pier 3 Life Extension Works - Mech, Elec and Foul Draina	08-Apr-20	11-Apr-24
	CIP.20.02.013 Small Energy Projects	16-Dec-19	22-Nov-24
	C Capacity.	02-Jan-19	27-Dec-24
	South Area	14-May-20	29-Aug-23
A2810	Cargo Village Enablement	14-May-20	29-Apr-21
A2460	CIP.20.03.029 Pier 5 Building	04-Feb-21	06-Feb-23
A2440	CIP.20.03.030 New CBP Facility	04-Feb-21	13-Jul-22
A2530	CIP.20.03.031 South Apron Expansion	04-Jan-22	29-Aug-23
A2720	CIP.20.03.034 Pier 3 Immigration	14-May-20	17-May-22
	North Area	08-Aug-22	27-Dec-24
A2850	CIP.20.03.017 OCTB - Bussing Lounge	28-Feb-24	13-Aug-24
A1700	CIP.20.03.036 North Apron Mod 1 + Node + 5H PBZ	03-Oct-22	27-Dec-24
A1720	CIP.20.03.040 North Apron De-Icing Pad	01-Mar-23	24-Oct-23
A1880	IP.20.03.043 Pier 1 Wide Body Enablement	08-Aug-22	12-Sep-23
	West Area	15-Aug-19	29-Aug-23
A1710	CIP.20.03.004 Gate Post 9	15-Aug-19	12-Aug-20
A2750	CIP.20.03.054 Construction 5M Stands	02-Sep-21	29-Aug-23
A2860	IP.20.03.057 De-icing pad at RWY 10R	05-Sep-22	09-May-23
	Terminal 1	18-Jan-22	02-Jan-24
A2880	CIP.20.03.006 GTC & Terminal 1 Kerbs	18-Jan-22	15-Aug-23
A2580	CIP.20.03.011 Terminal 1 Check-in	18-Jan-22	02-Jan-24
A2840	CIP.20.03.012 Terminal 1 Central Search	18-Jan-22	20-Jun-23
A2590	CIP.20.03.013 Terminal 1 IDL	18-Jan-22	15-Aug-23
A2610	CIP.20.03.015 Terminal 1 Baggage Reclaim upgrade	18-Jan-22	15-Aug-23
A2600	Terminal 1 Immigration Hall - Summary	18-Jan-22	15-Aug-23
	Terminal 2	03-Oct-22	23-Apr-24
A2660	CIP.20.03.020 Terminal 2 Check-in	03-Oct-22	23-Apr-24
A2670	CIP.20.03.021 Terminal 2 Central Search	03-Oct-22	23-Apr-24
A2690	CIP.20.03.028 Early Bag Store and transfer lines	03-Oct-22	23-Apr-24
	New East-West Tunnel	20-Aug-20	20-Sep-22
A2780	CIP.20.03.051A Tunnel Construciton	20-Aug-20	20-Sep-22
	Other Projects	02-Jan-19	29-Apr-24
A2890	CIP.20.03.052 Environmental Work Programme	02-Jan-19*	18-Dec-23
A2870	CIP.20.03.057 GSE Charging	14-May-20	29-Apr-24



D Commercial	13-Mar-19	21-Nov-24
CIP.20.04.001 Car Parking Management System (Maintenance & upgra	16-Dec-19	31-Jan-22
CIP.20.04.002 Car Hire Consolidation Centre	13-Mar-19	07-Mar-22
CIP.20.04.003 New Food & Beverage Fit-out (T1X)	27-Jan-20	25-Feb-22
CIP.20.04.004 Digital Advertising Infrastructure	27-Jan-20	30-Aug-21
CIP.20.04.005 Long Term Car Parking - Eastlands (2000 spaces)	29-Apr-19	14-Dec-21
CIP.20.04.006 Terminal 1 Multi-Storey Car Park Block B (600 spaces)	29-Apr-19	14-Dec-22
CIP.20.04.007 Terminal 2 Multi-Storey Car Park (680 spaces)	29-Apr-19	22-May-23
CIP.20.04.016 Platinum Services Upgrade Works	16-Dec-19	09-Jun-23
CIP.20.04.017 Airline Lounges - Expansion, Upgrade & New	18-Nov-19	21-Nov-24
CIP.20.04.018 Fast Track Improvements	27-Jan-20	21-Nov-24
CIP.20.04.021 West Apron - Accommodation & Welfare Facilities	27-Jan-20	11-May-23
CIP.20.04.023 Food & Beverage Provision & Fit-out – Post CBP	27-Jan-20	08-Nov-22
CIP.20.04.025 Commercial Property Refurbishment	03-Feb-20	15-Nov-24
CIP.20.08.001 Retail Refurbishments, Upgrades and New Developmen	03-Feb-20	15-Nov-24
CIP.20.08.002 Retail Marketing & Media Installation	03-Feb-20	15-Nov-24

E Information Technology	29-Apr-19	19-Nov-24
CIP.20.05.001 IT - Airfield Optimization	03-Feb-20	22-Dec-23
CIP.20.05.002 IT - Digital Passenger Experience	29-Apr-19	09-Mar-21
CIP.20.05.003 IT - Integrations and Data	18-Oct-19	12-Aug-22
CIP.20.05.004 IT - Baggage Systems	15-May-19	20-Apr-23
CIP.20.05.005 IT - Business Efficiency	22-Aug-19	20-Jun-24
CIP.20.05.006 IT - Commercial Systems	03-Feb-20	15-Nov-24
CIP.20.05.007 IT - Reliability, Safety, Security & Compliance	04-Aug-20	21-Dec-23
CIP.20.05.008 IT - Operational Devices (Support & Maintenance)	27-Jan-20	19-Nov-24
CIP.20.05.009 IT - Network Components - Lifecycle & Growth	03-Feb-20	15-Nov-24
CIP.20.05.010 IT - Passenger Processing (excl. Security Screening)	19-Nov-19	24-Oct-22
CIP.20.05.011 IT - Security Technology Innovation (Biometrics & FOD [	19-Nov-19	19-Jan-22
CIP.20.05.012 IT - Servers and Storage - Lifecycle & Growth	03-Feb-20	16-Dec-22
CIP.20.05.014 IT - User Devices (Desktops, Mobile, Telephone, Radio)	03-Feb-20	15-Nov-24
CIP.20.05.016 IT - Microsoft Enterprise	24-Jul-20	28-Jul-23

F Security	05-Nov-19	20-Dec-24
CIP.20.06.001 Cabin-Baggage X-Ray Replacement& EDS Upgrade	30-Apr-21	14-Oct-24
CIP.20.06.007 Full Body Scanners	27-Jan-20	23-Aug-23
CIP.20.06.009 ATRS - Additional Lane in Terminal 1	05-Nov-19	12-Aug-21
CIP.20.06.012 Terminal 2 Central Search Expansion	16-Dec-19	09-Feb-21
CIP.20.06.015 Intrusion Detection Systems for Dublin Airport Boundar	08-Nov-21	31-Mar-23
CIP.20.06.016 Surface Road Blockers	27-Jan-20	10-Dec-20
CIP.20.06.021 Crash Barriers - Temporary Mobile Barriers	27-Jan-20	04-Mar-21
CIP.20.06.022 Redevelopment of Training Facility (ASTO)	27-Jan-20	29-Nov-21
CIP.20.06.025 Explosive Detection Dogs (EDD) capability	06-Jan-20	30-Sep-20
CIP.20.06.030 VCP Automation to Enable Remote Screening	16-Dec-19	11-Mar-22
CIP.20.06.031 Autopass - T1 Replacement & T2 Install	09-Nov-20	17-Dec-21
CIP.20.06.035 Mobile X-ray Unit	16-Dec-19	29-Sep-20
CIP.20.06.036 TSA - X-Ray & FBSS Replacement	01-Mar-21	16-Aug-24
CIP.20.06.041 Security Screening Equipment - End of Life	16-Dec-19	20-Dec-24
CIP.20.06.042 ATRS - Central Search Areas (T1 and T2)	16-Dec-19	11-May-22
CIP.20.06.044 Replacement of T1 Controllers for Access Control Syste	16-Dec-19	18-Jun-20

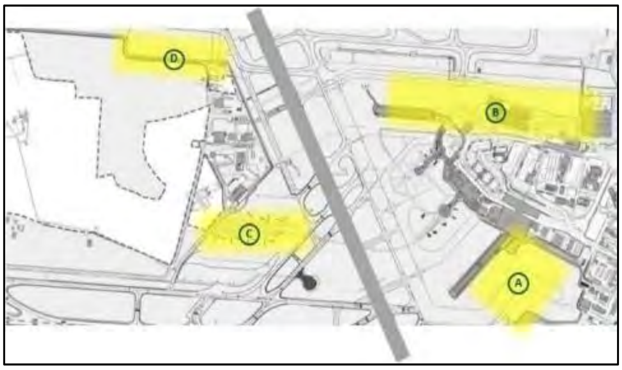
G Others	07-Nov-18	26-Nov-27
CIP.20.07.001 Programme Management	06-Jan-20	20-Dec-24
CIP.20.07.002 Minor Projects	06-Jan-20	20-Dec-24
CIP.20.07.004 Metro Coordination	01-Oct-19	26-Nov-27
CIP.20.07.010 Office Consolidation & Refurbishment (primarily Level 4	07-Nov-18	23-Dec-21
CIP.20.07.014 Terminal Operations Improvement Projects	06-Jan-20	20-Dec-24
CIP.20.07.030 Large Energy Project - Photovoltaic Farm	06-Jul-20	15-Dec-23
CIP.20.07.031 Terminal 2 HBS Standard 3	16-Dec-19	13-Dec-21

9.6. Disruption / Operational Impact

During the construction of the infrastructure required under CIP 2020 there will be necessary impacts to operations and some disruption of facilities, however, the overriding principle is to minimise operational impact, coordinate projects to align operational disruption, provide mitigation and consult with airlines, operators, ground handlers and other stakeholders to ensure all views are captured in the development of phasing and associated operational impact. It should be recognised that this is a significant large-scale development plan and will require disruption to operations during delivery.

The 4 key development zones as discussed in Chapter 7, have very different operational disruption and associated impacts and will be considered individually at a high level. The 4 key zones are identified on Figure 108 below.

Figure 108: Four Development Zones



Zone A – South Apron

The South Apron Development will be phased to minimise overall disruption to operations. Draft primary phases will include;

- Construction of displaced facilities in new locations
- Relocation of existing displaced facilities
- Construction of new stand capacity
- Construction of new apron
- Construction of new pier capacity
- Construction of new US Preclearance capacity
- Rehabilitation of existing apron pavement
- Relocation of existing PBZ facilities
- Construction of new support facilities.

During the above construction, the current intention is to retain the widebody capacity on Pier 4 and retain the narrow body capacity in the South Apron. It will however be necessary during different phases to provide bussing to stands to facilitate the construction works. Phasing and associated impacts will be reviewed and communicated with affected users throughout the project planning and delivery period.

Internally in Pier 4 and Terminal 2, as part of this development it will be necessary to relocate existing facilities and some internal disruption will be necessary. It is intended that overall gate capacity in Pier 4 will be maintained for as long as possible throughout the development, and any impact on the availability of US Preclearance stands will be coordinated to match the airline schedule, where possible. It will be necessary to relocate 2 narrow body stands to facilitate the US Preclearance expansion and this will be subject to detail design and phasing.

Zone B – North Apron

The North Apron Development will also impact operations and can be phased to minimise the overall disruption. Draft primary phases will include;

- The completion of Apron 5H (under PACE)
- The demolition of Hangar 1 and Hangar 2
- The relocation of car parking and conversion of area airside
- The construction of the additional boarding gates at Pier 1 Extension (Mod 1)
- The associated apron works for 'Mod 1'

During the above construction, the intention is to retain the current widebody and narrow body capacity on the North Apron. The addition of Apron 5H will provide additional capacity to relocate some existing operations from Pier 1 and it will be necessary to bus some operations to Apron 5H. Detail planning and phasing will be developed as the design and feasibility study progress.

Zone C – Unlocking the existing West Apron

The underpass crossing to the West Apron from the East Apron will require the closure of Runway 16-34 for a period of time, currently estimated at c.4 months (subject to detail design). It is proposed that this would be coordinated with the planned closure of Runway16-34 for the North Runway tie-in works. In addition, there will be some operational impact on the ramp where the underpass access will be constructed, and some stand closures will be required. These stand closures will be coordinated with the airline schedules and at times it will be necessary for airlines to bus additional flights to accommodate the works. The instances of this will be minimised where possible.

There are a number of options for underpass access to the West Apron and the operational impact will depend on the final option selected – options are detailed in Chapter 7 and Chapter 10.

Zone D – West Apron Stand Development

The apron development proposed in this development zone (Apron 5M – 10 NBEs) can broadly be constructed with little or no direct impact on operations. Its location is currently outside the boundary of the airfield and the majority of this apron could be constructed landside. It will however impact road access to the Westlands and road diversions and realignment will be required. It may also impact some operational requirements for service connection etc.

9.7. Cost Estimates

Cost estimates have been prepared individually for each project using the following principles;

- A standardised estimating template structure has been applied based on the Royal Institute of Chartered Surveyors BCIS system.
- Two template forms were used a simplified structure for Airfield related projects and another more granular one for Piers/ Terminals etc.
- All estimates were imported to the industry standard "CUBIT" software for consistency and data recording. Drawings when available are recorded with estimate data for ease of access.
- Estimates have used the latest benchmark information available, either within Dublin Airport or if not available external benchmark information was used.
- A process of continuous review and benchmarking is ongoing and will continue up to CAR submission (and beyond) to refine estimates as additional data/information becomes available.
- Contingency and design variability is included in each estimate – Ref Section 9.9 below for details.
- Escalation is included in each estimate – Ref Section 9.10 below for details.

The general assumptions for estimates are as follows

Cost assumptions:

- This Cost Estimate is a class 4 concept feasibility level and has a base price date of Q3 2018
- Main contractor preliminaries included at between 15% and 20% depending on project
- An allowance of 5% has been included for design development
- Low visibility procedures allowance included at 7% on certain projects with airside construction work based on Dublin Airport Construction norms.
- Design & Management costs cover Professional Fees, Design Costs, Planning Contributions, office accommodation and daa staff costs/supervision.
- Contingency is calculated at 15% of the Total Direct Cost (TDC) plus Design & Management costs.
- Escalation is included to mid-point of construction and is based on a rate of 6% per annum; in line with industry expectations and SCSI data.
- Assumes competitive tendering and procurement arrangements.

Cost Exclusions:

- VAT
- Land Acquisition Costs
- Any Development Costs outside of the scope as expressly described in the project sheets.
- Abnormal market factors and Price escalation beyond those expressly stated above.
- Specialist or customer Audio Visual & IT equipment within new buildings.
- Security and Passport Control Equipment (such as C3 body scanners etc).
- Internal loose fittings such as bins and planting etc. within new buildings.
- Disposal of any contaminated materials except where expressly stated otherwise.
- Abnormal ground conditions.
- Allowance for acceleration, premium working time, bonuses and the like
- All costs by Asset Care, IT, Security, and Commercial incl. concession fit-outs are excluded from these estimates.

Schedule assumptions:

- Schedule developed on the basis of feasibility level design only

- Project Programs developed on individual basis only, interdependencies to be determined.
- Individual project planning approvals subject to successful application for increase in airport capacity
- Regulatory application periods, inclusive of environmental appraisals, are indicative of previous applications within the campus, without appeal
- That market resources to design procure and deliver each project are available.
- External 3rd Party requirements will not delay works.
- Vacant possession of impacted facilities will be made available by 3rd parties in a timely manner
- Access to airside sites and possession of land side sites will not delay the works
- No particular restrictions on development arising from planning, inclusive of environmental approval arise

Level 1 cost information is available on the project sheets. daa has developed more detailed Level 2 cost information which we do not wish to publish (currently redacted on the project sheets) as this information is commercially sensitive and may impact our procurement process. We can share this information, on request, in a confidential manner through Non-Disclosure Agreements (NDA) with immediate stakeholders that are subject to directly paying airport charges.

9.8. Design Fees

Design fees for projects included in the CIP are allocated individually to each project. In general design fees include where appropriate;

- Project Management
- Architectural Design
- Engineering Design, Civil, Structural, M&E, Environmental etc,
- Statutory Planning
- Quantity Surveying (Cost Management)
- Construction Administration and Management
- Site Supervision and Site project managers

Consultants' fees and design and management costs are generally estimated at 15% which is a recognised benchmark allowance in cost estimates for consultants' fees and design and management costs in airport projects. This is the basis of most of our estimates, with some variances depending on the complexity or otherwise of the project.

Programme Management costs, scope as detailed in Section 9.1 above, are not included in the specific project costs and are included under a separate allowance for Programme Management – Ref Appendix G - CIP 20.7.001

We have then taken a high-level view of the design and management costs and expressed as a percentage of construction costs. In some cases, we have allocated lower percentages to reflect the nature of the works. These are projects where there will be less design input required.

These estimates are a direct percentage of construction costs and are therefore move linearly with construction cost estimates. It should be noted that the impact of escalation (Ref Section 9.10 below) on the construction costs, depending on procurement date, compounds this effect.

9.9. Contingency and Design Variability

Contingency and design variability has been derived and allocated on the basis of the level of maturity and complexity of the project.

Contingency and design variability is an allowance to cover the risk of increased costs as a result of issues that are unknown or not defined at the time of preparing the estimate and to allow for design changes as a result of the project development. The contingency and design variability amounts that we have used in the preparation of the cost estimates are generally based on the following level of maturity of the project;

- Feasibility stage - 20% of construction and design costs;
- Design stage - 10-15%, depending on the complexity of the project.
- Construction stage - 10%.

9.10. Inflation & Escalation

Cost Estimates have been prepared with a base price date of Q3 2018. In our cost estimates we have included an allowance for escalation which covers projected inflation in labour, materials, and tender price increases arising from projected market conditions up to works execution based on current trends.

The proposed Capital Investment Programme includes a total amount of c.12% for escalation.

9.11. Risk Management

The scale of the proposed CIP2020 presents a significant and important opportunity for Dublin Airport to establish an infrastructure base fit to meet the demands of a further 10mppa passengers and associated growth in ancillary aviation businesses including cargo, MRO, parking etc. With such large programmes of work brings an increased scale of challenges that require management and mitigation by the delivery agent, the end users and national bodies. The history on the successful delivery of large programmes is mixed and is well documented, with failed delivery coming generally down to poor planning and execution. “Their increasing size, complexity, and risk are frequently exacerbated by disconnected project teams, inefficient processes, and siloed data.

The result is schedule delays, cost overruns, and quality issues: according to McKinsey research, large capital projects typically take 20 percent longer to finish and cost up to 80 percent more than expected, ref Figure 109 extract from McKinsey paper - The construction productivity imperative - McKinsey Productivity Sciences Centre June 2015 Sriram Changali Azam Mohammad Mark van Nieuwland.

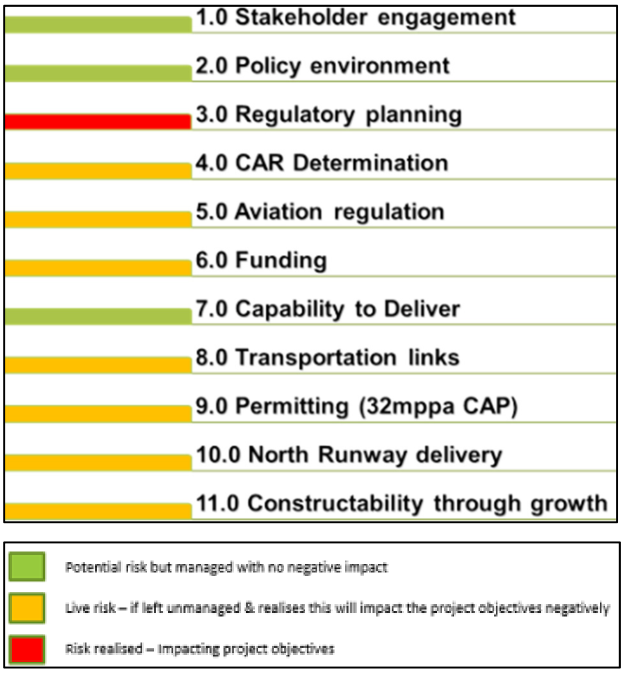
Figure 109: Capital Expenditure Over-run - McKinsey Productivity Sciences Centre

As part of the preparation of the CAR consultation programme of works the seven principles of risk mitigation at concept & design phase as recommended from the McKinsey study were and are continued to be adopted, namely:

- Build only what is needed. Seek to develop the Minimum Technical Solution (MTS) with end-user engagement
- Maintain a life cycle perspective on the projects being delivered ensuring their alignment with the masterplan
- Strengthen scenario planning - Developing options under various opportunities and challenges
- Optimize site constraints and minimise as far as possible airside works
- Early engagement with construction and procurement teams, beginning in the design phase
- Optimise engineering processes and choices. Establish early on robust feasibility studies of proposed solutions, develop designs based on scan to BIM where possible, carry out early site topographical, geotechnical and environmental investigations
- Develop modular design and standardization

A sense of the top risks and challenges is shown in Figure 110. The key takeaway being the acknowledgement of the challenges to be faced and awareness that through effective engagement of all appropriate stakeholders a roadmap towards a successful delivery can be established.

Figure 110: Top Risk & Challenges



A high-level target programme is shown in Figure 111 and Figure 112. Due to the importance of the programmes under consideration advance design will continue in parallel with the CAR consultation process to further identify potential risks and to commence the implementation of risk mitigation measures e.g. Seeking to mitigate programme critical activities such as Strategic Planning pre-consultation, constructability reviews to mitigate against the scale of airside works, to continue in depth stakeholder engagement to mitigate against unforeseen programme delivery challenges etc.

Figure 111: Program CIP 2020

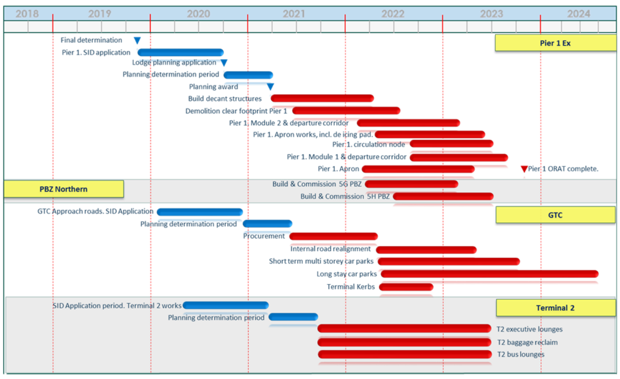
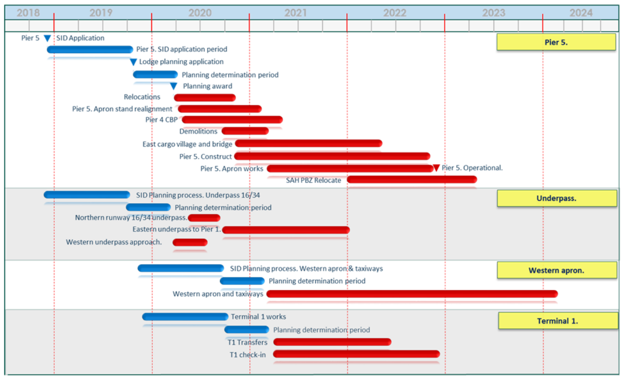


Figure 112: Program CIP 2020



In order that the above timelines are achieved it is proposed to progress with early design on the following projects in 2019 in advance of the CIP Final Determination;

Figure 113: Early Progression Projects

Project
South Apron Development (incl Pier 5 and CBP)
North Apron Development (Module 1 & Apron 5H PBZ)
Runway 16/34 Underpass
Gate 9 Westlands
Apron Reconstruction
Terminal 1 Central Search (Relocation to Mezz Level)
Sub T
T1 MSCP
T2 MSCP
Long Term Parking – Red Zone
Car Hire Consolidation
Airfield Optimisation - IT

10 ADDITIIONAL PROJECTS UNDER CONSIDERATION

10. ADDITIONAL PROJECTS UNDER CONSIDERATION

During the compilation of the proposed CIP a wide range of projects were considered however it was not possible to include all projects and projects were prioritised on the following basis;

- assets that required critical maintenance
- projects that addressed key capacity requirements, stands, gates, US Preclearance, etc.
- projects that were essential for safety, security and compliance
- projects that provided improved passenger experience
- projects that provided essential capacity and also generated commercial revenues

The additional projects included in this Chapter, also prioritized on the above basis, have not been currently included in the CIP 2020 proposal, due to potential budgetary and financeability constraints and are still under evaluation. These projects are being included for consultation to offer an opportunity for consideration by stakeholders. These projects can be defined under 3 broad headings as follows;

- Projects that provide infrastructure resilience
- Projects that provide efficiency or generate commercial revenues.
- Projects that provide alternative development options

The list of projects in this category is detailed in Figure 114 below and full details are included in the project sheets in Appendix H.

Figure 114: Projects Under Consideration (Appendix H).

Appendix H - Additional Projects for Consideration		
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**
CIP.20.02.002	Second Medium Voltage (MV) Connection Point	€20.0
CIP.20.04.009	Staff Car Park	€6.0
CIP.20.04.013	Central Island Redevelopment - Corballis Park	€10.3
CIP.20.06.014	Screening and Logistics Centre	€18.9
CIP.20.03.011A	Terminal 1 Check-In (Partial shoreline)	€29.9
CIP.20.03.016	Terminal 1 - Rapid Exit Arrivals	€1.3
CIP.20.03.019	Terminal 1 - 6 bay Sorter Replacement	€9.4
CIP20.03.020A	Terminal 2 Check-in Extension - Expand existing footprint	€30.0
CIP.20.03.022	Terminal 2 International Departures Lounge - Level 35 re-optimisation	€13.4
CIP.20.03.024	Terminal 2 Immigration Hall - Reorientation	€2.5
CIP.20.03.033	Enablement of Pier 3 for Precleared US bound passengers	€49.4
CIP.20.03.036A	North Apron Development – Pier 1 Extension (Module 2)	€97.7
CIP.20.03.043	Pier 1 Fixed Links and Airbridges	€14.0
CIP.20.03.043A	Pier 2 Widebody Enablement & Airbridge Install	€51.7
CIP.20.03.043B	Pier 2 Wide Body Enablement - Pier Extension	€196.8
CIP.20.03.045	New West Satellite Pier Incl. Airfield	€351.0
CIP.20.03.047	New Taxiway W	€30.3
CIP.20.03.048	Rapid Exit Taxiway RWY 10/28	€7.5
CIP.20.03.049	De-icing pad at Runway 10R	€5.0
CIP.20.03.051	West Apron Vehicle Underpass - 5G Option	€79.0
CIP.20.03.055	Engine test facility (Code E)	€10.0
CIP.20.03.070	Terminal 2 CBP Make-up and Baggage Hall entrance	€1.0
CIP.20.03.071	Fuel Line - Pier 3	€10.4
TOTAL		**€1,045**

Second MV Connection Point - €20m (CIP.20.02.002)

This project would provide resilience to the electrical supply in the event of a failure to the existing MV power supply. This is a ‘low risk’ project but ‘high impact’. Typically, most airports operating over 20mppa would have 2 distinct power supply connections. This is under consideration and further details are included in Appendix H – CIP 20.02.002.

Staff Car Park - €6m (CIP.20.04.009)

This project would provide for the relocation of staff car parking to a new location in the Eastlands with the provision of 2,000 spaces. The current plan is to relocate staff into the ‘Green’ Public car park – however the impact on potential revenue is being evaluated and if there is a strong commercial business case to build new car park for staff, this project may be included in the final submission. This is under consideration and further details are included in Appendix H – CIP 20.04.009.

Central Island Redevelopment Corballis Park - €10.3m (CIP.20.04.013)

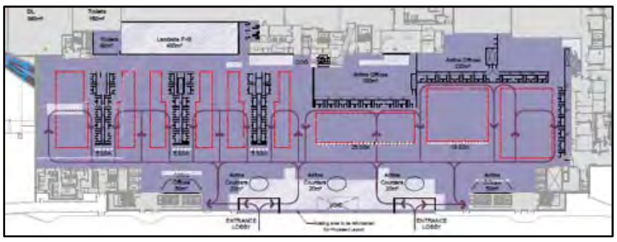
This project provides for the redevelopment of Corballis Park into more consolidated office accommodation to generate additional revenue and provide for the necessary demand for additional office space. This project is being evaluated and if there is a strong commercial business case this project may be included in the final submission. This is under consideration and further details are included in Appendix H – CIP 20.04.013.

Screening & Logistics Centre - €18.9m (CIP.20.06.014)

This project provides for the development of a dedicated screening and logistics centre for supplies / deliveries airside in line with the daa Security strategy. This project is being evaluated and if there is a strong business case / efficiency gain, this project may be included in the final submission. This is under consideration and further details are included in Appendix H – CIP 20.06.014.

Terminal 1 Check-in (Partial Shoreline) - €29.9m (CIP.20.03.011A)

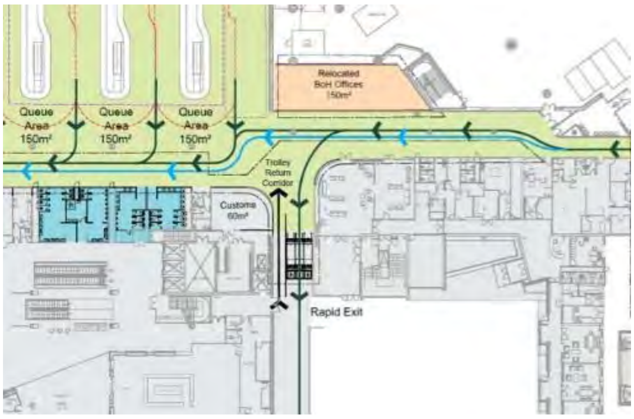
This project provides an alternative option for the development of Terminal 1 Check-in with a partial shoreline check-in and is being included in consultation for consideration by stakeholders. This project represents an alternative to Terminal 1 Check-in (Islands 1 & 2) as detailed in Chapter 7 above (Project Sheet Ref: Appendix C – CIP 20.03.011. This project is under consideration and further details are included in Appendix H – CIP 20.03.011A.



Terminal 1 - Rapid Exit Arrivals - €1.3m (CIP.20.03.016)

This project provides an option for a rapid exit from Terminal 1 Arrivals immediately after immigration, for passengers not collecting baggage in the Terminal 1 baggage reclaim hall. This project is being included in consultation for consideration by stakeholders. Further details are included in Appendix H – CIP 20.03.016.

Figure 115: Rapid Exit



Terminal 1 – 6-Bay Sorter Design - €9.4m (CIP.20.03.019)

The 6-bay baggage sorter in T1 is currently being refurbished to extend its life to 2025. However, at that point it will have reached its effective end of operational life and is likely to require replacement and expansion to meet future capacity demands. Given the proximity of this end of operational life date to the commencement of the following CIP, the development, design planning and procurement will be required within this CIP period. Therefore, a project is presented for consultation which provides for this planning. Further details are included in Appendix H – CIP 20.03.019.

Terminal 2 – Check-in Extension (Expand Existing Footprint) - €30m (CIP.20.03.020A)

This project provides an alternative option for the development of Terminal 2 Check-in by expanding the building and is being included in consultation for consideration by stakeholders. This project represents an alternative to Terminal 2 Check-in Area Optimisation as detailed in Chapter 7 above (Project Sheet Ref: Appendix C – CIP 20.03.020. This project is under consideration and further details are included in Appendix H – CIP 20.03.020A

Terminal 2 – IDL Level 35 Reoptimisation - €13.4m (CIP.20.03.022)

This project provides for an internal expansion of the Terminal 2 IDL footprint to provide an alternative dwelling area for passengers. The capacity of T2 and associated piers is sufficient from a design perspective to accommodate the forecast passenger demand to 40mppa, however this project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.022A

Terminal 2 – Immigration Hall Reorientation - €2.5m (CIP.20.03.024)

This project provides for a reconfiguration of the T2 Immigration hall to manage a more streamlined process for immigration resulting from the addition of Pier 5. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.024

Note: Following further analysis it may be necessary to considering this project (CIP.20.03.024) and Pier 5 development (CIP.20.03.029) as one project. This will be discussed in further detail during consultation.

Enablement of Pier 3 for US Preclearance Passengers - €49.4m (CIP.20.03.033)

This project provides an alternative to US Preclearance bussing to Pier 3 for US precleared flights. This project could enable an additional 5 wide-body stands on Pier 3 for use as US Preclearance without the need for bussing. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.033.

North Apron Development – Pier 1 Extension (Module 2) - €97.7m (CIP.20.03.036A)

Continued growth in the short haul point to point market requires the development of both the Apron 5H PBZ and Module 1. Together, these will provide for gates to serve up to 6 walk in, walk out stands, ref Figure 116.

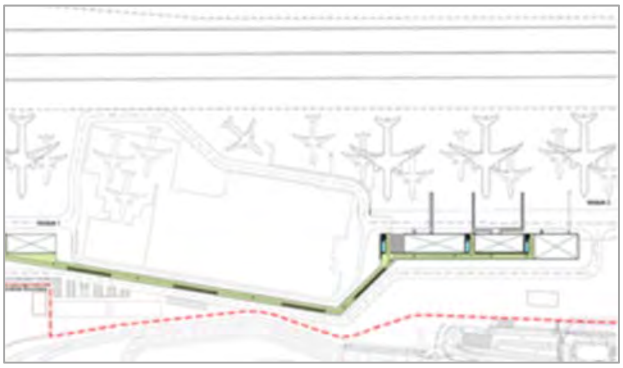
However, with an understanding that demand for additional stands and associated gate space may arise during the CIP period a further option is proposed for consultation. This optional Module 2 development is to the east of the existing Hangars 4 and 5.

It is intended to retain these hangars through this CIP period, with the ultimate long-term masterplan objective of removing them and providing a continuous pier by connecting Module 1 to Module 2. Module 2 replicates the design of Module 1 but is slightly larger offering 7 gate hold lounges.

To provide passenger connectivity between Module 2 and 1 a proposal for two-storey segregated walkway has been developed. This two-level walkway would accommodate both arriving and departing passengers and given its length would have a number of travellators.

This project could enable an additional 7 narrow-body contact stands on Pier 1 without the need for bussing. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.036A.

Figure 116: Pier 1 Extension – Module 2



Pier 1 Fixed Links and Airbridges - €14.0m (CIP.20.03.043)

CIP2020 overall development plan seeks to deliver capacity in the most operational and cost-efficient manner across the airport. In so doing accommodation for passenger transfer growth is centred in the south, LCC growth in the north and consideration for other wide-body growth across the campus. Distribution of forecasted wide-body growth is planned to be facilitated as follows:

- 2 on apron 5M (tow-on/off)
- 3 either on Pier 2 or Pier 1
- 4 in the South Apron
- 5 on Apron 5H

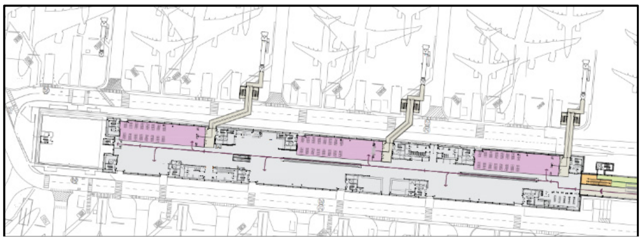
A number of wide body aircraft currently operate from Pier 1 and this will continue to increase as the airport grows to 40mppa. While some of these flights will continue to use Pier 3, a number will operate from the north.

CIP2020 proposes an option for the development of 3 fixed links bridging over the head of stand road and single airbridges from these fixed links to each stand. There are both opportunities and challenges to this proposal, i.e. relative ease of installation/ bridging of head of stand road against potential impact to efficient operations of taxiing aircraft (single Code E taxiway).

This development could also alleviate the anticipated uplift in traffic along the head of stand road should the cross-field underpass be located at the head of Pier 1 ref Figure 101.

This project is an alternative to two other projects; Pier 2 Wide-body Enablement & Airbridge Install (Ref: CIP 20.03.043A) and Pier 2 Wide Body Enablement - Pier Extension (CIP.20.03.043B). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.043.

Figure 117: Pier 1 – Fixed Links & Airbridges



Pier 2 Wide-body Enablement & Airbridge Install - €51.7m (CIP.20.03.043A)

An alternative consideration in addressing the widebody demand would be to locate the aircraft on Pier 2. The long-term plan for Pier 2 rests primarily on the continued use of Runway 16/34. Should a change ever arise in the future on the continued benefit of Runway 16/34 to airline users, capacity development steps thereafter would initially centre around Pier 3, offering the greater gain of the two and subsequently on Pier 2. In this regard it is considered that any significant capacity altering plans to Pier 2 are far into the future and there is an opportunity to maximise its current potential. Pier 2 is currently a 10 NBE stand and would retain this capacity.

Three wide body stands could be enabled and served from the current Pier 2 facility with modest internal modifications to accommodate the hold gate demand. Passengers would be segregated with the incorporation of 2 additional VCCs. All stands could be either single or dual airbridge linked. Internal modifications to the building would include a small expansion of the building to relocate washroom facilities from the rotunda and the displacement of the existing escalator back towards the neck of the pier, ref Figure 118 and Figure 119.

Figure 118: Pier 2 Widebody Option

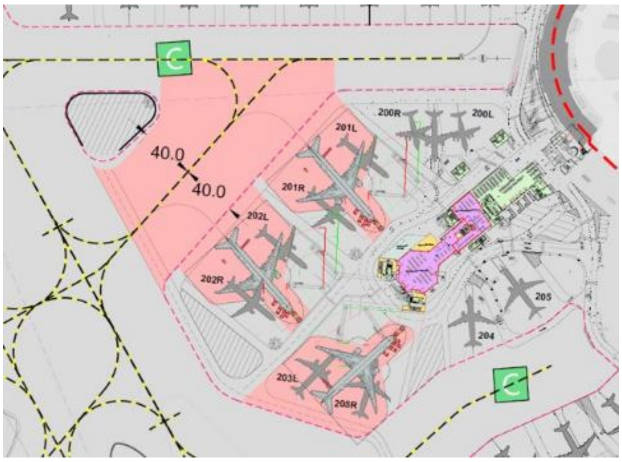
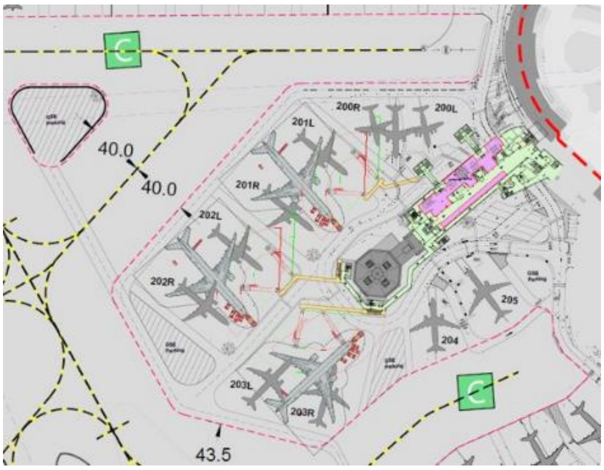


Figure 119: Pier 2 General Arrangement



This project is an alternative to Pier 1 Fixed Links & Airbridges (Ref: CIP 20.03.043) and Pier 2 Wide Body Enablement - Pier Extension (CIP.20.03.043B). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.043A.

Pier 2 Wide-body Enablement – Pier Extension €197m (CIP.20.03.043B)

Another alternative consideration in addressing the widebody demand would be extend the existing pier with fixed links and airbridges for single docking capability for widebody aircraft, to the MARS configured stands. The Pier is proposed as a two-story structure safeguarded for 3 stories. The stands 201-204 would have capacity for all aircraft types, up to and including the largest 'full code E' aircraft, such as B777-300ER and

A350. This option offers low passenger travel distance from central search to gate, sufficient hold gate capacity and concentration of wide body aircrafts on piers 2-5. See Figure 120 for the Pier 2 extension arrangement.

Figure 120: Pier 2 Extension

This project is an alternative to Pier 1 Fixed Links & Airbridges (Ref: CIP 20.03.043) and Pier 2 Wide-body Enablement & Airbridge Install (Ref: CIP 20.03.043A). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.043B.

New West Satellite Pier Incl. Airfield - €351m (CIP.20.03.045)

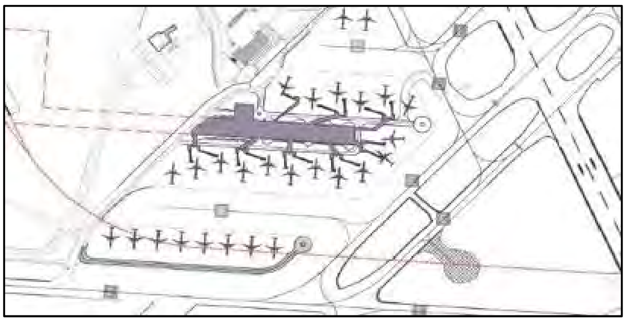
Consideration was given to facilitating the forecasted widebody and non-US transfers growth via a satellite pier west of Runway 16/34, ref Figure 121, but was provisionally discounted primarily as the 40mppa operational demands could be accommodated without its introduction and in a more cost-effective manner. The west satellite will be required post the 40mppa horizon and for this reason it is presented herein for context and consultation in relation to its most appropriate development route and timeline.

The west satellite project would deliver a full service 8 MARS stand configurated pier (served initially by shuttle bus) with segregated facilities for arrival, departure and transferring passengers. A ground floor bussing hold gate facility has been included to allow for bussing operations to and from the satellite. The building is located to accommodate a future central vehicular and/or APM (automated people mover) tunnel. The flexible layout maximises the number of contact stands and safeguards for extension westward to meet future demand and align with the evolving masterplan.

Figure 121: West Satellite Location

Figure 122: West Satellite Layout – Ground, First & Second Floor

Figure 123: West Satellite Location



This project is an alternative to Pier 1 Extension - Module 1 (Ref: CIP 20.03.036). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.045.

New Taxiway W - €30.3m (CIP.20.03.047)

This project provides a new taxiway on the west side of Runway 16-34 to facilitate increased use of the West Apron and to provide connections to the North Runway. This taxiway will also provide connection to proposed Apron 5M, 10NBEs included in this CIP proposal, (Ref: CIP 20.30.54). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.047.

Rapid Exit Taxiway Runway 28 - €7.5m (CIP.20.03.048)

This project provides a new Rapid Exit Taxiway (RET) off Runway 28 to accommodate aircraft capable of exiting before Taxiway E6 and thereby assisting to reduce runway occupancy time and increasing runway capacity. This project is currently under evaluation and may be included in the final CIP proposal subject to defined benefit. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.048.

De-icing PAD at Runway 10R - €5.0m (CIP.20.03.049)

This project provides a new de-icing pad at the Threshold 10 end of Runway 10-28 on the Runway 10 bypass taxiway included under PACE (Ref: SCP.17. This is currently under evaluation and may be included in the final CIP proposal. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.049.

West Apron Vehicle Underpass - 5G Option - €79m (CIP.20.03.051)

This project provides an alternative option for accessing the West Apron from the East Apron from Apron 5G. This option while more cost efficient has operational concerns as it requires all vehicles accessing this underpass to cross the triple taxiway on the North Apron, DN, DC, DS. This project is an alternative to the West Apron Vehicle Underpass – Northern Pier 1 Option (Ref: CIP 20.03.051A). This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.051.

Engine Test Facility (Code E) - €10m (CIP.20.03.055)

This project proposes to realign public and airfield perimeter roads, and airside/landside boundaries, to facilitate construction of a masterplan compliant section of apron and associated jet blast and noise attenuation, within existing daa land boundaries aligned with 40mppa & 55mppa Master Plan layouts. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.055.

Terminal 2 CBP Make-up and baggage hall entrance - €1m (CIP.20.03.070)

This project delivers an extension to make-up carousel 5, 24 new make-up positions and a new entrance to the baggage hall behind Pier 5. This will require modifications to the vehicle flow through the baggage hall. This is currently under evaluation and may be included in the final CIP proposal. This project is being included in consultation for consideration by stakeholders. This project is under consideration and further details are included in Appendix H – CIP 20.03.070.

Pier 3 Fuel Hydrant - €10.4m (CIP.20.03.071)

This project proposes to expand the fuel hydrant system to additional stands in Pier 3 to provide operational efficiency, additional safety and reduce congestion around the pier. The project will provide fuel hydrants to the following stands:

- 311C, 312, 313C, 314, 315C, 316, 317, 318L, 318C, 318R

Summary

A total of 23 capacity projects are still under evaluation under the category of 'Additional Projects Under Consideration' for possible inclusion in the CIP 2020. These projects cover a number of areas across the campus ranging from existing infrastructure to new builds. The majority of the proposed spend is focused on Terminal and Pier infrastructure with the balance across the airfield.

11 CONSULTATION PROCESS

11. CONSULTATION PROCESS

As an important user and partner of Dublin Airport, we acknowledge the key role you play in shaping future airport infrastructure. The proposed CIP 2020 programme is now sufficiently developed for consulting with airport stakeholders. Dublin Airport encourages all stakeholders to constructively engage in this consultation process, given the importance of delivering sufficient infrastructure to accommodate customer growth expectations and to maintain the high-quality service levels delivered throughout the airport today.

Dublin Airport appreciates your engagement in this consultation process and invites all users to attend consultation meetings and provide a written response to the CIP 2020 proposal. Dublin Airport welcomes your feedback and would like to thank you in advance for your participation, all comments, responses and submissions. For ease, we have set out the consultation questions below:

Please direct all correspondence on the CIP 2020 proposal to cip@dublinairport.com

Figure 124: Consultation Questions

No.	Category	Question
Q1	Proposed Core Projects	Do you have any observations or comments in relation to the core projects that are presented in Appendix A, B, E, F & G?
Q2	Proposed Revenue Generating Commercial Projects	Do you have any observations or comments in relation to the revenue generating commercial projects that are presented in Appendix D?
Q3	Proposed Capacity Projects	Do you have any observations or comments in relation to the capacity projects that are presented in Appendix C?
Q4	Proposed Additional Projects	Are there any additional projects presented in Appendix H that you believe must be included in the proposed CIP that is submitted to the Commission for Aviation Regulation?
Q5	South Apron Redevelopment	Do you support the rationale underpinning the relocation of the PBZ as set out in Section 7.6.2 (also CIP.20.03.031 in Appendix C) and do you think that Dublin Airport should be remunerated for necessary relocation costs?
Q6	Initial regulatory triggers in Q4 2019	Certain PACE projects had an initial trigger attached to them (e.g. South Apron Stands Phase 2) whereby construction would have to commence by Q4 2019. Do you believe that these triggers should be revisited and extended by the Commission given the possibility of certain delays outside of our control?
Q7	Key Projects	Do you support the decision by Dublin Airport to spend more than the existing CIP allowance on projects that had not been envisaged in 2014 such as Life Safety Systems and projects that received higher tender outturns (e.g runway overlay project)? Please refer to Chapter 3 for more details.
Q8	General	Do you have any further comments or general observations in relation to any of the information contained in this document?

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A ASSET CARE - CIVIL, STRUCTURAL, FLEET

APPENDIX A
Asset Care – Civil, Structural & Fleet (CSF)

Appendix A - Asset Care (CSF)			Page
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**	
CIP.20.01.001	Southern Runway (R10R/28L) Delethalisation Programme	€2.2	A-1
CIP.20.01.002	Apron Rehabilitation Programme	€44.0	A-4
CIP.20.01.003	Airfield Taxiway Rehabilitation Programme	€22.0	A-7
CIP.20.01.004	Apron Road Rehabilitation Programme	€5.6	A-10
CIP.20.01.006	Airfield Southern Perimeter Road Upgrade Programme	€4.6	A-13
CIP.20.01.008	Runway Approach Lighting Mast Improvement Programme	€11.1	A-17
CIP.20.01.009	Aerodrome Ground Lighting (AGL) Improvement Programme	€4.7	A-20
CIP.20.01.010	Airfield Lighting Control & Management System Improvement Programme	€4.9	A-24
CIP.20.01.012	AGL Substation T Development Programme	€3.7	A-27
CIP.20.01.015	High Mast Lighting Improvement	€0.7	A-30
CIP.20.01.016	Airfield Maintenance Base Improvement Programme	€4.5	A-33
CIP.20.01.018	Campus Buildings Critical Maintenance	€1.5	A-37
CIP.20.01.020	Terminal 1 Façade, Roof & Spirals	€25.8	A-41
CIP.20.01.022	Terminal 1 Storm Water Drainage System	€1.1	A-45
CIP.20.01.023	Piers & Terminals Critical Maintenance	€1.9	A-48
CIP.20.01.024	Skybridge Rehabilitation	€1.2	A-51
CIP.20.01.034	Campus Roads Critical Maintenance	€9.0	A-54
CIP.20.01.039	Airport Roads Critical Maintenance	€6.9	A-57
CIP.20.01.046	Staff Car Parks Critical Maintenance	€1.7	A-60
CIP.20.01.049	Public Carpark Critical Maintenance	€2.4	A-63
CIP.20.01.056	Campus Facilities & Landside Snow Base Upgrade	€2.9	A-66
CIP.20.01.065	Airport Heavy Fleet & Equipment Replacement	€14.7	A-69
CIP.20.01.069	Airport Light Vehicle Fleet Replacements and Augmentation	€3.2	A-72
CIP.20.01.071	Electric Charger Network Facilities	€1.6	A-75
CIP.20.01.074	Advance Visual Docking Guidance System (5G, Pier 1 & Pier 2)	€5.3	A-78
CIP.20.01.087	AGL Fibre Optic Communication Network Improvement Programme	€2.0	A-81
CIP.20.01.099	RWY 16/34 Lighting for Low Visibility Procedures (LVP)	€5.5	A-84
CIP.20.07.013	Airfield Redesignation	€1.5	A-87
TOTAL		**€196.4**	

CIP.20.01.001
Southern Runway (R10R/28L) Delethalisation Programme

Project Summary

- **This project proposes to plan and execute the residual works of the Runway 10/28 Delethalisation Programme.**

The Delethalisation of buried vertical surfaces within the runway strip is a requirement under EASA Regulations to minimise hazards to aircraft running off the runway (GM1 ADR-DSN.B.165 Objects on Runway Strips). Within the graded area of the runway strip, buried structures such as plinths, runway ends, paved taxiway edges, etc. should be delethalised, that is, so constructed as to avoid presenting a buried vertical face to aircraft wheels in soft ground conditions in any direction from which an aircraft is likely to approach.

Initial Delethalisation Works:
The delethalisation of the R10R/28L strip (Southern Runway) was partially undertaken during the recent overlay works. It was not possible to complete all delethalisation works as part of the overlay project due to the time constraints of the project (required to hand back the runway each morning). Approximately 10,000m2 of delethalisation was left undone.

This project proposes to:

- **Plan and execute the residual works of the Runway 10/28 delethalisation programme once the new North Runway is in operation and the Southern Runway can be removed from service more easily and for longer periods of time.**
- **Introduce sub-surface ramps around buried vertical hazards (manholes, sign bases, etc.) to allow aircraft to safely roll up and over these hazards if required.**

Note: The Delethalisation works associated with Runway 16/34 (and associated cost) form part of a separate upcoming Runway 16/34 rehabilitation project.

CIP.20.01.001
Southern Runway (R10R/28L) Delethalisation Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Regulation	**Secondary Driver** Safety	**Total Capex requirement** €2.2m
Underpinning Assumptions and Cost Benchmarks	• Details of Delethalisation solution as per previous works • Works to be coordinated with other maintenance requirements • Works will require the withdrawal of runway • Costs based on recent Delethalisation works under Overlay project. • No new electrical fittings required • Night-time working will be required • Works to be carried out in discrete portions to minimise operational disruption	
Opex Impact	• No material impacts on opex cost.	
Project Output	• Compliance with EASA Requirements • Delethalisation of all residual vertical surfaces within the runway strip of the Southern Runway • Reinstatement of topsoil and grasslands	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Detail Design complete:	**Q1 2022**
Procurement complete:	**Q4 2022**
Construction Commence:	**Q1 2023**
Project Handover:	**Q4 2024**

CIP.20.01.001
Southern Runway (R10R/28L) Delethalisation Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€177,725
Construction Costs	67%	€1,481,040
Escalation, Contingency & Design Variability	25%	€544,490
Total		**€2,203,254**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€1,481,040	12%	€177,725	€177,725
Total - to summary				**€177,725**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Delethalisation treatment	Redacted Cost Information			
General Prelims & Management and Staff				
Other Development Costs				
Total - to summary				**€1,481,040**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,658,765	33%	€544,490	€544,490
Total - to summary				**€544,490**

CIP.20.01.002
Apron Rehabilitation Programme

- **This project proposes to rehabilitate critical areas of the existing Apron pavement.**

The airfield aprons are a critical element of the airfield network, providing facilities for aircraft to manoeuvre, park and be serviced. Many of the main aircraft aprons at Dublin Airport date back to before the 1960's and in a number of cases, have reached the end of their useful life. Independent condition reports have noted that areas of the aircraft pavement are in poor condition and need rehabilitation.

Rehabilitation of Failed Apron:
The critical areas identified in this proposal have a remaining life between 1 and 5 years within which time the aprons will degrade significantly and will ultimately become unserviceable. Several of these areas are on major routes through the apron and if they become unserviceable will cause significant aircraft delays due to re-routing and congestion. Poor or damaged apron pavement is also a source of Foreign Object Damage (FOD) which is a health and safety risk to the aircraft. Many of the drainage systems within the apron areas have reached the end of their economic life, are in poor condition and in danger of generating FOD.

Timely interventions to rehabilitate failed aircraft aprons are critical to the safeguarding of the airline & airport business. It is proposed to carry out 83,700m2 of pavement rehabilitation between 2020 & 2024 in a planned and timely manner and on a priority basis to replace damaged pavement before they become a business interruption or health & safety risk and thereby safeguard the airport business. The rehabilitation of these pavements will be undertaken on a business criticality basis subject to in-depth condition reporting and risk analysis. This is part of the ongoing annual pavement rehabilitation programme.

Reducing Deterioration of Existing Apron:
In addition to the replacement of failed pavements, the prevention of pavement deterioration is a significant concern. The principle method of preventing such deterioration is to ensure the joints in the pavements are maintained to a high standard and failed joints are replaced on a continuous basis. Keeping pavement joints in good condition prevents water ingress under the slabs leading to early pavement failure. Individual pavement joints need to be replaced every 7-10 years. A joint replacement program is carried out every 1-2 years on a rotating & priority basis. This will continue in the 2020+ CIP period.

CIP.20.01.002
Apron Rehabilitation Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €44.0m
Underpinning Assumptions and Cost Benchmarks	• Full reconstruction of failed pavement in PQ concrete or bituminous material where appropriate • Local rationalisation of drainage may be necessary • No additional attenuation required • No new electrical fittings required • Existing electrical fittings to be removed and reinstated. • Night-time working in most areas as required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent apron reconstruction projects.	
Opex Impact	• No material impact on opex cost.	
Project Output	Pavement improvement (83,700m2) works to; • South Apron • Airfield Stands, Piers 2 and 3 • Apron Taxiway 1, 3 and 6 • Pavement Joint Replacement Programme	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q3 2019**
Planning complete:	**Q3 2019**
Detail Design complete:	**Q4 2019**
Procurement complete:	**Q2 2020**
Construction Commence:	**Q2 2020**
Project Handover:	**Q2 2024**

CIP.20.01.002
Apron Rehabilitation Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€3,055,567
Construction Costs	71%	€31,125,247
Escalation, Contingency & Design Variability	22%	€9,819,186
Total		**€44,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€31,125,247	10%	€3,055,567	€3,055,567
Total - to summary				**€3,055,567**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Area 3: Taxiway c (West) to Link 6 boundary Apron				
Area 4: South Apron A.T.L SA				
Area 5: Apron Taxiway 1 (west)				
Stand 411	Redacted Cost Information			
Stand 315-Stand 317				
Stand 203 208 & Apron Taxiway 3				
Stand 200				
General Prelims & Management and Staff				
Total - to summary				**€31,125,247**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€34,180,814	29%	€9,819,186	€9,819,186
Total - to summary				**€9,819,186**

CIP.20.01.003
Airfield Taxiway Rehabilitation Programme

Project Summary

- **This project proposes to rehabilitate critical airfield taxiways.**

Airfield taxiways are the main routes through the manoeuvring areas of the airfield over which aircraft pass when manoeuvring between the runways, aprons or aircraft stands. As such, airfield taxiways are a critical part of the airfield infrastructure as without them aircraft could not safely and efficiently access the runways, aprons, parking stands and maintenance facilities.

Many of the airfield taxiways were constructed between 1940 and the late 1980's as part of the current (Southern) Runway 10-28 development and are approaching the end of their expected life. Several taxiways have since been overlaid to extend their lives or extended to meet the increasing demands on the airport but there are a number of taxiways that are in need of rehabilitation. A recent condition report has determined that a number of the airfield taxiways are in a relatively poor condition and will need to be rehabilitated within the next five years.

The timely and planned rehabilitation of these taxiways is extremely important to the smooth and efficient operation of the airport by protecting the manoeuvring routes for the aircraft, avoiding aircraft delays and overall business interruptions. The rehabilitation of the taxiways will be undertaken on a business criticality basis subject to in-depth condition reporting and risk analysis.

Project Proposal:
A minimum of four primary airfield taxiway areas are expected to require rehabilitation over the next five years amounting to 47,200m2 of pavement. Rehabilitation of these taxiways will vary from structural bituminous overlays to full pavement reconstruction and will be carried out following full pavement structural analysis and review. Underlying issues such as pavement level, taxiway alignment, surface drainage and sub-strata weaknesses will also be resolved to ensure that the infrastructure investment will reach its full expected life.

CIP.20.01.003
Airfield Taxiway Rehabilitation Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €22.0m
Underpinning Assumptions and Cost Benchmarks	• PACE Taxiway development to proceed • North Runway re-development of Taxiway G to proceed • Apron 5H redevelopment of North Apron to proceed • Structural bituminous overlay used where possible to avoid need for full reconstruction, but full reconstruction is used for estimate. • No surface water attenuation. • Night time working. • Multi construction phasing to minimise route interruptions for taxiing aircraft. • Based on recent pavement overlay and reconstruction projects.	
Opex Impact	• No material impact on opex	
Project Output	Pavement improvements (47,200m2) to; • Taxiway M2 • Taxiway F1 & Link 2 (partial) • Taxiway F-Outer & Link 6 (partial) • Taxiway B1 and E1 (partial)	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q3 2019**
Planning complete:	**Q3 2019**
Detail Design complete:	**Q4 2019**
Procurement complete:	**Q2 2020**
Construction Commence:	**Q2 2020**
Project Handover:	**Q2 2024**

CIP.20.01.003
Airfield Taxiway Rehabilitation Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€1,654,641
Construction Costs	75%	€16,546,413
Escalation, Contingency & Design Variability	17%	€3,798,946
Total		**€22,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & management	€16,546,413	10%	€1,654,641	€1,654,641
Total - to summary				**€1,654,641**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Link 2 /Taxiway F1				
Taxiway M2 (overlay 150mm)				
Taxiway F-Outer	Redacted Cost Information			
Taxiway B1 & Taxiway E1 (50%)				
General Prelims & Management and Staff				
Total - to summary				**€16,546,413**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€18,201,054	21%	€3,798,946	€3,798,946
Total - to summary				**€3,798,946**

CIP.20.01.004
Apron Roads Rehabilitation Programme

Project Summary

- **This project proposes to undertake a rehabilitation programme of the existing Apron Roads.**

The airside apron roads are provided to allow safe and efficient access for airport and airline personnel, ground handling agents, contractors, suppliers, authorised persons and equipment to all parts of the airfield without entering active aircraft areas such as runways, taxiways, aprons and stands. The apron road is provided as an integrated part of the aircraft apron to allow immediate access to aircraft, as part of the overall airfield roadway network. Collectively the apron and perimeter roads combine to form a critical element of the airfield infrastructure, acting as safe corridors for airside activities for all authorised airside users.

Much of the apron roadway was constructed before 1960 when the adjoining apron was constructed. A condition report has identified areas of the apron road which are about to fail or have already reached the end of their functional life. When these areas fail or become unserviceable, the disruption to apron activity is significant and the Health & Safety risk to aircraft from Foreign Object Debris or Foreign Object Damage (FOD) is also increased.

Project proposal:
This project proposes the timely rehabilitation of these roadways to ensure the smooth and efficient operation of the airport by protecting the vehicular routes throughout the apron, thereby avoiding any increased safety risk, aircraft delays and overall business interruptions. The rehabilitation of the roadways will be undertaken on a business criticality basis subject to in-depth condition reporting and risk analysis. It is expected that 12,400m2 of Apron Road will need to be replaced between 2020 & 2024 based on current condition reports.

CIP.20.01.004
Apron Roads Rehabilitation Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €5.6m
Underpinning Assumptions and Cost Benchmarks	• Full reconstruction of failed apron road pavement in PQ concrete required • Structural bituminous overlay used where possible on perimeter road to avoid need for full reconstruction. • Local rationalisation of drainage may be necessary, but no additional surface water attenuation will be provided. • Costs based on recent apron road reconstruction projects. • No new electrical fittings required • Night-time working in several areas may be required • Works to be carried out in discrete portions to minimise operational disruption.	
Opex Impact	• No material impact on opex cost.	
Project Output	• Full pavement evaluation to confirm remaining structural life and schedule for rehabilitation. • 12,400m2 of apron road rehabilitation • Rehabilitation of apron road for a minimum of 15-30 years depending on solution • Reinstatement of surface markings as required	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Detail Design complete:	**Q4 2019**
Procurement complete:	**Q4 2020**
Construction Commence:	**Q4 2020**
Project Handover:	**Q1 2024**

CIP.20.01.004
Apron Roads Rehabilitation Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€549,923
Construction Costs	65%	€3,666,151
Escalation, Contingency & Design Variability	25%	€1,383,926
Total		**€5,600,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & management	€3,666,151	15%	€549,923	€549,923
Total - to summary				**€549,923**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Head of stand road from stand 400 - to stand	Redacted Cost Information			
Pier 3				
Pier 2				
Hanger1				
General Prelims inc Management and Staff				
Allowance for out of Hours /night works				
LVP				
Total - to summary				**€3,666,151**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,216,074	33%	€1,383,926	€1,383,926
Total - to summary				**€1,383,926**

CIP.20.01.006
Airfield Southern Perimeter Maintenance Road Upgrade Programme

Project Summary

- **This project proposes to rehabilitate and upgrade the Southern Perimeter Maintenance Road. (Minor Airfield Security Fence Improvements are also captured as part of this project).**

The Southern airfield perimeter road and Airfield Maintenance Facility access roads were constructed in the 1980's with the introduction of Runway 10-28 (Southern runway). The roadways are now more than 30 years old and approaching the end of their useful economic life. Sections of the perimeter and access roads are currently in very poor condition and have already failed while other areas are cracked and spalled leading to failures on a regular basis. The risk of FOD debris on the roadways is high as the roads are near the operational pavement. Therefore, action is required to improve the roads for the users and to ensure that FOD does not get carried onto operational pavements.

The roadway was originally built as an access for light maintenance and security vehicles and as such has a design weight of 5 tonnes. There is no positive drainage system associated with the roadway, its alignment follows the undulating ground levels and is sub-optimal. This leads to standing water in low- lying areas, regular road failures and increased maintenance with an increased risk of FOD from loose material.

Since the roadway came into service in 1987 a few significant changes have taken place:

- **The vehicles needed for runway maintenance have increased in size and weight, particularly the Snow & Ice equipment**
- **The airfield has been included in the CPSRA**
- **Gatepost 9 has been constructed adjacent to the West Apron and has become the main point of access for airfield maintenance vehicles and deliveries to the Asset Care Airfield Base, South of the Southern runway**

CIP.20.01.006
Airfield Southern Perimeter Maintenance Road Upgrade Programme

These changes have resulted in a significant uplift in the usage of the roadways for maintenance access, deliveries, wildlife patrols and security checks. The additional weight from HGVs and heavy maintenance vehicles has also taken a toll on the roadway. If these issues are not addressed and the perimeter road becomes unserviceable, airport vehicular traffic will have to be diverted to use the active aircraft taxiways, thereby causing disruption to aircraft movements and a higher risk of operational errors, FOD and business interruption.

This project proposes to:

- **Upgrade and partial widening of the perimeter & access roadways associated with the Southern runway to make them suitable for their current use and the increased traffic on them. The project will strengthen the current roadways to withstand the heavier vehicles and usage. It will also be widened at regular intervals to allow wide vehicles to pass safely. The future minimum width of the roadway will be 6.0m and the roadway will be widened by an additional 2.0m for 100m at 500m intervals.**
  Note: The oldest, Northern most parts of the perimeter road will be removed and realigned with the construction of the North Runway and is not included in this investment case.
- **Replace up to c.400m of airfield security fence and associated gates over the next 5 years on a phased and coordinated basis to improve the security of the airfield and be compliant with all aviation security standards and regulations.**

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €4.6m
Underpinning Assumptions and Cost Benchmarks	• Full reconstruction of failed perimeter & access road pavement in blacktop • Structural bituminous overlay along full length to avoid need for full reconstruction. • Local rationalisation of drainage may be necessary but no additional surface water attenuation. • Minimum two-way carriageway width to be 6.0m. Road to be widened to 8.0m every 500m for 100m length • Weight capacity ofthe roadway to be strengthened to 20 tonnes to meet usage requirements • No new electrical fittings required • Night-time working in a number of areas maybe required • Works to be carried out in discrete portions to minimise operational disruption • Pavement markings to be replaced • Temporary bypass options during construction to be made available	
Opex Impact	• No material impact on opex cost.	
Project Output	• Full pavement evaluation to confirm remaining structural life and schedule for rehabilitation. • c. 5km of perimeter road rehabilitation • Increased weight capacity ofthe roadway to 20 tonnes • Minimum width of carriageway to be 6.0m with local widening to 8.0m every 500m for 100m to allow safe passing of wide vehicles • Rehabilitation of apron road for a minimum of 30 years and perimeter road for 15 years. • Reinstatement of surface markings as required • Partial replaced and upgraded security fence along the airfield boundary immediately North of Southern Runway (incl. replacement of one airfield Gate)	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning Complete:	**Q3 2020**
Detail Design Complete:	**Q4 2020**
Procurement Complete:	**Q1 2021**
Construction Commence:	**Q1 2021**
Project Handover:	**Q4 2021**

CIP.20.01.006
Airfield Southern Perimeter Maintenance Road Upgrade Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€453,060
Construction Costs	67%	€3,080,901
Escalation, Contingency & Design Variability	23%	€1,076,962
Total		**€4,610,923**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & management	€3,080,901	15%	€453,060	€453,060
Total - to summary				**€453,060**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Area 1 (4,000 m2 new surface)				
Area 2 (2,000 m2 new surface)				
Area 3 (1,350 m2 new surface)				
Area 4 (750 m2 new surface)				
Area 5 (800 m2 new surface)		Redacted Cost Information		
Lay-by x 3 no				
Patch relay				
Airport Security Fence				
Main Contractors Preliminaries				
Other Development Costs				
Total - to summary				**€3,080,901**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,080,901	30%	€1,076,962	€1,076,962
Total - to summary				**€1,076,962**

CIP.20.01.008
Runway Approach Lighting Mast Improvement Programme

Project Summary

- **This project proposes to upgrade the existing Runway approach lighting masts.**

Runway Approach lighting is a critical element of the Runway Aeronautical Ground Lighting (AGL) systems. By nature of approach lights, they tend to be elevated with a high percentage mounted on Masts. At Dublin Airport, the Approach Masts on Runway 10/28 were installed in 1988 but were not replaced as part of the Runway Rehabilitation Program 2017/18 (schedule did allow time for mast replacement). Runway 16 and 34 approach masts were installed in 1994 and 2004 respectively.

The type of mast used at Dublin Airport are ADB Safety Approach Masts type SMA/3. They are tilt-able structures made of aluminium legs and struts, assembled by means of bracing clips. The masts are collapsible but not frangible as defined in EASA CS ADR-DSN.T.910 equipment frangibility requirements. These masts cannot be certified to EASA standards. There is also a concern that the masts may not support the weight of the new LED lighting fittings and are effectively at end of their useful life.

The SMA/3 Masts and the FAE light fittings on all runways are now obsolete and no longer supported by the manufacturer. The masts have served their purpose well over the past 30 years but are now no longer compliant.

This project proposes to:
Replace the SMA/s masts with modern frangible masts to cover all runways within the 2020-2024 Capital Investment Programme period.

CIP.20.01.008
Runway Approach Lighting Mast Improvement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Regulation	**Total Capex requirement** €11.1m
Underpinning Assumptions and Cost Benchmarks	• Full replacement of SMA/3 Masts with modern frangible masts • Inspection of plinths and replacement where required • No new electrical fittings required (R16 by separate project) • Some electrical circuits will need to be adjusted/ replaced • Night-time working in most areas as required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent runway reconstruction projects.	
Opex Impact	• No material impact on opex cost.	
Project Output	• Runway 10 Approach masts • Runway 28 Approach masts and circuits • Runway 16 Approach masts and circuits • Runway 34 Approach masts and circuits	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning Complete:	**Q3 2021**
Detail Design Complete:	**Q4 2021**
Procurement Complete:	**Q2 2022**
Construction Commence:	**Q2 2022**
Project Handover:	**Q1 2024**

CIP.20.01.008
Runway Approach Lighting Mast Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€956,650
Construction Costs	69%	€7,653,203
Escalation, Contingency & Design Variability	23%	€2,515,283
Total		**€11,125,136**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€7,653,203	12%	€956,650	€956,650
Total - to summary				**€956,650**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Approach Lighting	Redacted Cost Information			
Builders Work In connection with Services				
Other Development Costs				
Total - to summary				**€7,653,203**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€8,609,853	29%	€2,515,283	€2,515,283
Total - to summary				**€2,515,283**

CIP.20.01.009
Aerodrome Ground Lighting (AGL) Improvement Programme

Project Summary

- **This project proposes to upgrade existing airfield lighting, signage and sub-stations.**

Airfield lighting and signage system forms parts of the critical safety infrastructure of the Aerodrome. These systems include Aerodrome ground lighting, airfield signage, sub-station equipment and control systems. Many of these systems have been in place for the last 10-15 years and need to be upgraded and/or replaced at end of life.

There are several improvement programmes planned throughout the 2020-2024 CIP period, including;

Rehabilitation of Taxiway AGL systems;
Timely interventions to rehabilitate Taxiway AGL is critical to safeguarding of the airline & airport business. It is proposed to carry out several Taxiway AGL replacement projects between 2020 & 2024 in a planned and timely manner and on a priority basis in order to replace end of life fittings before they become a business interruption or health & safety risk and thereby safeguard the airport business.

Airfield signage;
Airfield signage is a critical form of information for pilots and Aerodrome users. End of life signage will be replaced on a priority basis in coordination with taxiway re-designation and other airfield projects.

Runway 16 approach lighting;
The Runway 16 approach lighting fitting have reached the end of their useful economic life and are no longer supported by the manufacturer. The system is no longer compliant with EASA codes and need to be replaced. A full replacement programme is required in co-ordination with the replacement of the approach masts (separate project – CIP 20.01.008).

Substation Upgrades;
The existing substation on the East and West substations where built in 1988 and Subs A and B built in 2006. Regular structural maintenance is required for each substation in relation to roofs and walls. In addition, a replacement programme for the fuel tanks needs to be completed due to the poor condition of this element of infrastructure.

DublinAirport

CIP.20.01.009
Aerodrome Ground Lighting (AGL) Improvement Programme

• **Substation Equipment Replacement;**
All AGL systems on the Airfield are powered by Constant Current Regulators (CCR's). Currently our oldest CCR's are 14 years old but still operational. The technology in this equipment is now out of date, is no longer supported by the manufacturer and they are not available for replacement or new installations. Timely replacements of equipment to guarantee safe operations of AGL equipment is critical to the safeguarding of the airline and airport business.

MCR3 type Constant Current Regulator

Taxiway Edge Lights LED

SafeLED signs which are being installed west of Runway 16

Taxiway Centreline Fitting Current D Range LED fitting

CIP.20.01.009
Aerodrome Ground Lighting (AGL) Improvement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Regulation	**Secondary Driver** End of Life	**Total Capex requirement** €4.7m
Underpinning Assumptions and Cost Benchmarks	• Taxiway AGL Upgrades • Airfield Signage Upgrades • Substation Upgrades • Substation Equipment Replacement • New electrical fittings and equipment required • Night-time working in most areas as required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent apron and taxiway lighting projects. • Approach mast for Runway 16 is replaced under a separate project (CIP20.01.008)	
Opex Impact	• No material impact on opex cost.	
Project Output	• Taxiway AGL rehabilitation • Apron signage as required • Replacement of AGL power equipment • Substation improvements	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning Complete:	**Q3 2020**
Detail Design Complete:	**Q4 2020**
Procurement Complete:	**Q3 2021**
Construction Commence:	**Q3 2021**
Project Handover:	**Q4 2024**

CIP.20.01.009
Aerodrome Ground Lighting (AGL) Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€260,368
Construction Costs	70%	€3,254,595
Escalation, Contingency & Design Variability	25%	€1,153,787
Total		**€4,668,749**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,254,595	8%	€260,368	€260,368
Total - to summary				**€260,368**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Electrical Installation: 15 CCR with Serial Communication link				
Electrical Installation: RWY 16 approach lighting Fittings & Cables	Redacted Cost Information			
Airport Specialist Installations: AGL				
Minor Building Works and Ancillary Buildings				
Main Contractors Preliminaries				
Other Development Costs				
Total - to summary				**€3,254,595**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,514,963	33%	€1,153,786	€1,153,786
Total - to summary				**€1,153,787**

CIP.20.01.010
Airfield Lighting Control & Management System Improvement Programme

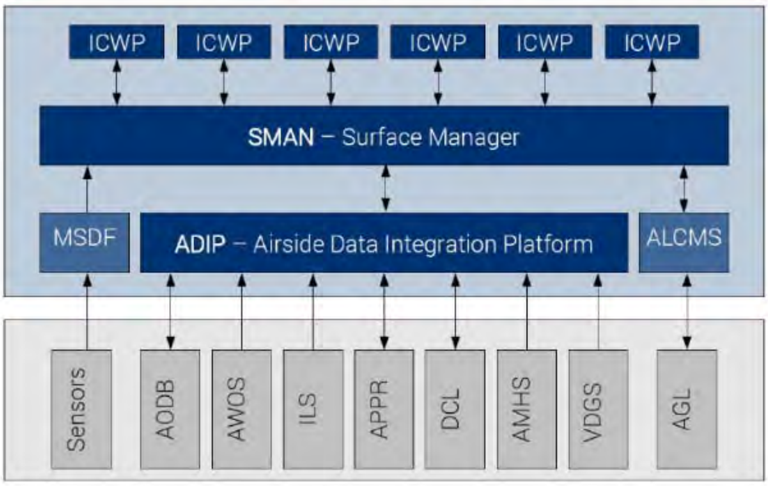
Project Summary

- **This project proposes to improve the existing Airfield Lighting Control & Management System (ALCMS).**

Increased ALCMS demands:
Further expansion of the current system to allow it to accommodate the North Runway AGL controls is being enabled but again, this will put the existing system under further pressure. While these controls will be integrated in due course, they will only be capable of adopting traditional control panels and cannot be adopted for more up-to-date switching systems such as Individual Lamp Control and Monitoring Systems (ILCMS). The development of multiple intersecting taxiways in the central area of the airfield between the North Runway and the Main Apron (NR, R16/34, Link 6/3/A & existing Taxiways R/P/M/H/B) require a more sophisticated control system due to the level of flexibility and inter-operability involved. The current system cannot handle this level of sophistication at this stage and must be upgraded.

A recent study and report on the ALCMS by external airfield specialist has concluded that, while initial improvements to the overall system could be achieved in the short term, further improvements must be made to support the changing traffic demands and flows within the airfield. A new control system will have to be procured to allow the integration of the three runways and the associated taxiways into an overall ALCMS on one platform. The report outlined a roadmap for the provision of a new ALCMS to meet the business needs over the short and medium term (next 15 years). A new ALCMS needs to be capable of supporting such future technology as Individual Lamp Control & Monitor System (ILCMS), integration with IAA A-SMGCS (Ground Control) and potentially follow-the- green (FTG) in the future if required.

This project proposes to:
Improve the current ALCMS in line with the business needs and the recommendation of the TM3 report to bring the system in line with modern control standards and technology.



Functional Architecture of Follow the Greens and A-SMGCS Level 4

CIP.20.01.010
Airfield Lighting Control & Management System Improvement Programme

Project Details Summary			
Category: Capital Maintenance			
Primary Driver End of Life	**Secondary Driver** Operational Efficiency		**Total Capex requirement** €4.9m
Underpinning Assumptions and Cost Benchmarks	• A greater level of AGL control in central manoeuvring areas will be required when the North Runway comes into service. • System will need to be more flexible to allow for a greater integration of new technologies in the future		
Opex Impact	• No material impact on opex cost.		
Project Output	• Modern Airfield Lighting Control & Monitoring System • ILCMS capability in place and working satisfactorily • System capable of a higher level of integration with other ATC systems • Increased capacity for network changes going forward • System capable of supporting future integration of FTG		
Asset Life	• 10 years		

Project Delivery Key Milestones	
Detail Design Complete:	**Q3 2020**
Procurement Complete:	**Q2 2021**
Construction Commence:	**Q2 2021**
Project Handover:	**Q3 2022**

CIP.20.01.010
Airfield Lighting Control & Management System Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	5%	€255,000
Construction Costs	70%	€3,400,000
Escalation, Contingency & Design Variability	25%	€1,199,754
Total		**€4,854,754**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,400,000	8%	€255,000	€255,000
Total - to summary				**€255,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
AGL Systems	Redacted Cost Information			
Main Contractors Preliminaries				
Other Development Costs				
Total - to summary				**€3,400,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,655,000	33%	€1,199,754	€1,199,754
Total - to summary				**€1,199,754**

CIP.20.01.012
AGL Substation T Development Programme

Project Summary

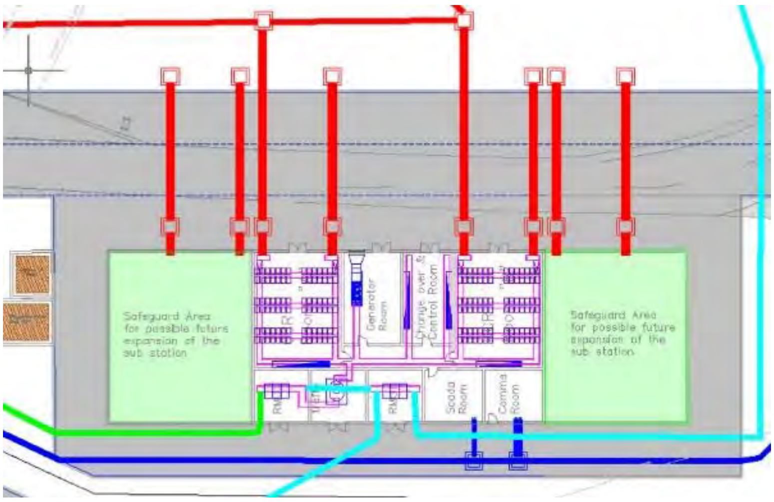
- **This project proposes to develop a new central airfield AGL substation.**

The current AGL Substation T is located in the ATC compound adjacent to the ATC Control Towers. The substation was developed in the 1980's and has since been extended to cater for the increased use of electrical systems in the airfield and ATC centre.

Demand Increases:
The AGL section of the substation is now at capacity and can no longer accommodate new infrastructure that will be needed for the North Runway, the proposed R16/34 LVP Taxiway, the improved Airfield Lighting Control System and any of the new elements of infrastructure currently being planned.

The shared nature (between IAA and daa) of the substation has led to difficulties with access and resilience in the past. While these issues have been temporarily resolved, the current solution is not sustainable in the long run and airfield operations is being impacted, particularly in LVP conditions. A recent report recommends the development of a new mid-field substation to replace the current Sub T. The new site is located centrally within the airfield and will be wholly under the control of Dublin Airport.

Substation T Development



The new substation will be sized and developed to accommodate and integrate the controls and power systems for all major taxiway and runway developments in the medium to long term. It will also increase the resilience of the substation network throughout the airfield offering greater expansion capability while providing flexibility and resilience to the supply network.

This project proposes to:
Develop a new central airfield AGL Substation, which will accommodate the relocated equipment and infrastructure from the current substation, the new equipment and circuits from the works currently being planned, the interconnectivity with the North Runway and key elements of the improved and upgraded Airfield Lighting Control & Management System (ALCMS)

CIP.20.01.012
AGL Substation T Development Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €3.7m
Underpinning Assumptions and Cost Benchmarks	• Current AGL Substation has reached capacity and cannot be expanded • Site compatible and secured under Master Plan • Planning Permission will be required • Access concerns over current site needs to be resolved	
Opex Impact	• No material impact on opex cost.	
Project Output	• New Mid-Field AGL Substation • Connectivity with Airfield MV, Comms and AGL systems • All surrounding infrastructure include accommodation for fuel tanks, mobile generators and maintenance vehicles	
Asset Life	• 30 years	

Project Delivery Key Milestones	
Detail Design Complete:	**Q4 2019**
Procurement Complete:	**Q4 2019**
Construction Commence:	**Q1 2020**
Project Handover:	**Q2 2020**

CIP.20.01.012
AGL Substation T Development Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€250,000
Construction Costs	80%	€2,956,432
Escalation, Contingency & Design Variability	13%	€496,997
Total		**€3,703,429**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€2,956,432	8%	€250,000	€250,000
Total - to summary				**€250,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Elect Mains & Sub Mains Distribution				
Diversion of Existing Services to New Sub T				
AGL Control system				
Builders Work In connection with Services	Redacted Cost Information			
Fencing, Railings and Walls				
Minor Building Works and Ancillary Buildings				
Main Contractors Preliminaries				
Other Development Costs				
Total - to summary				**€2,956,432**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,206,432	16%	€496,997	€496,997
Total - to summary				**€496,997**

CIP.20.01.015
High Mast Lighting Improvement Programme

Project Summary

- **This project proposes to upgrade the existing high mast lighting on a number of apron areas**

The airfield aprons are a critical element of the airfield network, providing facilities for aircraft to manoeuvre, park and be serviced. The apron floodlighting is to facilitate safe operations on the apron, on a de-icing/anti-icing facility, and on a designated isolated aircraft parking position intended to be used at night as required in EASA CS ADR-DSN.M.750 Apron floodlighting.

As a minimum EASA requires an average illuminance level of 20 lux on both the horizontal and vertical planes with a uniformity ratio of 4;1. In 2015 Dublin Airport increased this level to an average of 30 lux where possible on all new projects to improve safety for both passengers and operatives. To achieve this and to improve efficiencies and reduce maintenance costs, all new project and upgrades switched from Son-T fittings to LED fittings.

A large number of existing apron areas have already been converted to LED lighting. The areas which still require upgrading are as follows:

- **Pier 1**
- **Pier 4**
- **West Apron**

This project proposes to:
Improves the illumination on the stands to Dublin Airport's own standards, giving a uniform light output across the apron (currently a mixture of white and yellow lights), improving the energy efficiency of the floodlight and reducing the maintenance requirements. This project is for the replacement of the remaining Son-T Fittings to complete the HML improvement programme.

CIP.20.01.015
High Mast Lighting Improvement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Energy Saving	**Total Capex requirement** €0.74m
Underpinning Assumptions and Cost Benchmarks	• Removal of old SON-T fittings and replacing with LED fittings. • Increasing the stand lux levels averages from 20 to 30 lux • New electrical fittings required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent high mast lighting improvement projects.	
Opex Impact	• Reduction in energy costs of approx. €80k/annum once the full LED replacement programme is rolled out.	
Project Output	Replacement of old SON-T flood light units at: • Pier 1 • Pier 4 • West Apron	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Detail Design Complete:	**Q1 2023**
Procurement Complete:	**Q2 2023**
Construction Commence:	**Q3 2023**
Project Handover:	**Q2 2024**

CIP.20.01.015
High Mast Lighting Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€47,081
Construction Costs	85%	€627,750
Escalation, Contingency & Design Variability	9%	€67,483
Total		**€742,314**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€627,750	8%	€47,081	€47,081
Total - to summary				**€47,081**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Floodlighting to external surfaces and to building	Redacted Cost Information			
General Prelims				
Total - to summary				**€627,750**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€674,831	10%	€67,483	€67,483
Total - to summary				**€67,483**

CIP.20.01.016
Airfield Maintenance Base Improvement Programme

Project Summary

- **This project proposes to improve the airfield maintenance base facilities.**

The airfield maintenance base is situated immediately South and central to the Southern runway (R10/28). The base is used as the central location for all airfield maintenance personnel and equipment and the accommodation of largescale snow & ice equipment. All civil, electrical and transportation maintenance is located at this base and are carried out from this facility on a 24x7 basis.

The recent increase in passenger numbers has resulted in a significant increase in maintenance activities that are undertaken from this base. The number of personnel stationed at the facility has also increased as the shift patterns have been stepped up to a 24x7 roster. Airfield maintenance activities are now undertaken throughout the day & night to ensure that the airfield facilities are always available for the increased aircraft traffic demand.

The base also accommodates the storage of all the large-scale snow & ice equipment which must be ready for use throughout the winter period. This requires the equipment to be properly maintained and stored in a manner that keeps it in good and available condition. The current level of storage is inadequate to store all the vital equipment under cover and the lack of an adequate facility is both shortening the life of the equipment and increasing the risk of equipment failure when needed.

CIP.20.01.016
Airfield Maintenance Base Improvement Programme

The potassium acetate tanks at the maintenance base are crucial for winter maintenance and the anti-icing activities. However, the current position of these tanks is sub-optimal due to the condition of the tank bunds and their proximity to adjacent water streams. The position of the tanks is a cause of congestion within the facility as larger equipment is now in use for both the delivery and distribution of the product.

In general, the circulation space around the maintenance base is not suitable for equipment stored at and operating from the base. The layout and orientation of the facilities must be improved to improve safety, efficiency and environmental sustainability.

This project proposes to:

- **Upgrade the overall facility to improve the efficiency of the base and allow for the proper maintenance of the aerodrome on a 24x7 basis.**
- **Move the potassium acetate tanks into a new purpose build bunded area that is not congested and allows for the larger delivery and distribution equipment**
- **Construct additional storage facilities for the winter equipment, particularly the snow & ice sweeper/blowers and PA sprayers**
- **Increase the circulation yard space in and around the facility to allow the very large winter equipment to manoeuvre safely and without impediment**
- **Provide a wash-down facility at the base to maintain the equipment in good condition, particularly after using the PA**

CIP.20.01.016
Airfield Maintenance Base Improvement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €4.5m
Underpinning Assumptions and Cost Benchmarks	• Airfield maintenance base will not be moved for a minimum of 10 years • Local rationalisation of drainage may be necessary • Additional attenuation and environmental protections may be required • Adequate space is available on site for development • Night-time working is mostly avoidable but may be partially required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent similar projects.	
Opex Impact	• No material impact on opex costs.	
Project Output	• Upgraded airfield maintenance base that is adequate for current demands • Increased equipment storage for S&I equipment • Relocated Potassium Acetate tanks with new bunding • Equipment wash-down facility for equipment • Increased paved circulation and storage space for equipment • Improved security of equipment and safety facilities	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Detail Design Complete:	**Q4 2020**
Procurement Complete:	**Q2 2021**
Construction Commence:	**Q2 2021**
Project Handover:	**Q3 2023**

CIP.20.01.016
Airfield Maintenance Base Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	5%	€232,711
Construction Costs	69%	€3,102,812
Escalation, Contingency & Design Variability	26%	€1,161,829
Total		**€4,497,352**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,102,812	8%	€232,711	€232,711
Total - to summary				**€232,711**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Snow base building - 60m long x 15m deep. 12m ridge height.				
Snow base hardstanding - 1500 m2 paved area (in front of maintenance shed)	Redacted Cost Information			
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€3,102,812**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,335,523	35%	€1,161,830	€1,161,830
Total - to summary				**€1,161,829**

CIP.20.01.018
Campus Buildings Critical Maintenance

Project Summary

- **This project proposes to improve existing campus property portfolio.**

The Dublin area Campus Properties Portfolio consists of 125 Properties. The properties are occupied by Dublin Airport, Individual and Multi Tenants. The airport is divided into 11 ZONES that include Terminals, Multi Storey Car Parks and all campus buildings. The areas included under campus buildings are:

- **Corballis Park**
- **South Apron**
- **Eastland's**
- **Castlemoate**
- **OCTB**
- **Westlands**
- **Westpoint**

The age of the buildings ranges from the late 1980s to present day. The campus properties are managed, developed and maintained using in-house expertise, supported by development and maintenance specialist service providers within the terminal buildings.

Just Built Monitor performance to design	>10-year planning Period	Monitor – On the radar within 10-year planning period	Plan & close monitor – Next 5-year planning period	Action now – This planning period	Excluded in this Project Sheet	Property Boundary Lines

CIP.20.01.018
Campus Buildings Critical Maintenance

In many cases the airport campus buildings specialised in design to meet the requirements of aviation business. Whilst the age profile of the campus portfolio suggests they have reached the latter end of their design life, continuous upgrading and the "re-life" of these buildings ensures they are in good condition subject to continuous and timely upgrades. The depreciation life for a commercial building is 50 years primarily for structures. There are various building elements that have lifespans shorter than 50 years. These include;

Roofing Materials	**20 - 30 Years**
Fire Alarm Systems	**15 - 20 Years**
Mechanical & Electrical Systems	**25 – 30 Years**

Note: Several buildings have received extensive refurbishment, these building include Skybridge House (formerly TASC Building) and the ESBI. Buildings which are due to be demolished / re-purposed to facilitate for larger capacity projects will be excluded from the Campus Building Critical Maintenance allowance.

This project entails:

- **Campus Buildings: Due to the varying states of envelope, roof fabric and business criticality of the buildings, this project provides for the delivery of several essential improvement works to the structure and roofs of existing campus properties. This project also entails supplementary safety works.**
- **Wider Campus Buildings: There are protected structures within Dublin Airport (DAP) lands that are required by law to be maintained to a level so that they do not degrade into ruin. This project proposes demolishing derelict buildings, maintain known protected structures, restore farmlands and improve external land fencing.**

CIP.20.01.018
Campus Buildings Critical Maintenance

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Stakeholder Requirements / Safety	**Total Capex requirement** €1.5m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Cost based on similar projects such as the M50 Garage and the re-roofing of Cloghran house • Condition surveys to be carried out on selected buildings • Scope to include all DAA owned campus buildings	
Opex Impact	• No material impact on opex cost.	
Project Output	• Structural Improvements to Existing Campus Properties • General Campus Building Roof Repairs • Equipment Storage Facilities • Provision for cladding repairs and replacements • Walkway Renewals • Demolishing derelict buildings, • Maintain known protected structures, • Restore farmlands • Improve external land fencing.	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Campus Building Upgrades:	**Q1 2020 - Q4 2024**	

CIP.20.01.018
Campus Buildings Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€1,519,750
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,519,750**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & management (Deemed included below)	€1,519,750	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Cost per year for maintenance of the buildings	Redacted Cost Information			
Total - to summary				**€1,519,750**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,519,750	0%	€0	€0
Total - to summary				**€0**

CIP.20.01.020
T1 Façade, Roof & Spirals

Project Summary

- **This project proposes to rehabilitate the existing T1 façade. This will incorporate repair of the spiral ramps.**

A. Façade:

Terminal 1 was constructed in two phases. The 8-Bay/6 storey section was constructed circa 1970 while the 6-bay/4 storey section was constructed in the mid-1990's. Collectively the terminal is responsible for 61% of all passenger throughput in Dublin Airport and handled 18.1 million pax in 2017. The building is a combination of a six-storey composite design with a semi-exposed structural steel frame, in-situ reinforced concrete cores and slabs and curtain walls. The façade of the 8-bay building is fitted with vertical, precast concrete fins, giving it a distinctive architectural look typical for the era it was developed.

Challenges:

The building envelope suffers from age-related defects such as water ingress, corrosion, spalling, heat loss and environmental issues and needs a significant upgrade. An in-depth feasibility study including full structural survey of the areas of the T1 Façade was carried out in 2014. This survey uncovered extensive degradation of the steel structure of the 8-Bay building as well as localised concrete spalling to the fins on all sides of the 8-Bay building, to the extent that immediate remedial works on the steel structure and concrete fins were required. Note: Asbestos is present in the plant room louvres of the front façade (confirmed by OHSS Safety Consultants 28th Oct 2015).

Ongoing remedial works:

Minimal remedial works to address the worst of the safety issues associated with the façade are currently underway (not part of this request) and are prioritised to mitigate immediate safety issues associated with spalling concrete and the steel super-structure as a minimum (integrity of the façade structure will be assured for 3-5 years). The works being carried out are:

- **Identify, clean down and repair all corroded structural steel connections**
- **Identify, clean down and repair concrete fins locally where concrete spalling occurs**
- **The replacement of the plant room louvres is not included in this scheme.**

CIP.20.01.020
T1 Façade, Roof & Spirals

Project Proposal:
The T1 Façade is nearing the end of its useful economic life and the costly maintenance and remedial works are no longer sustainable. A full refurbishment must be considered for the T1 Façade & Envelope to sustain the building into the future to ensure DAP meets the expectation of the business. Preventing a cyclical reactive repair and maintenance programme (uneconomical and provides no real extension to the asset life) is required. Investment is required to re-life the asset and extend the useful service life of the building for at least 10-15 years.

Relocation of the existing Antenna Mounting facility is required. This in turn will help to optimise maintenance of all facilities.

B. Spirals:
Originally constructed as part of the Terminal building in the 1970's, the spirals served as access to 600 car parking spaces on the upper two floors. In recent years the spirals have started to show structural defects.

Many of the defects occur in the upper levels of the Spiral and on both link bridges (confirmed by Cora Report 2015 and ongoing Asset Care photo surveys).
Defects include the following:

- **Blown cover and exposed reinforcement**
- **Spalling**
- **Grout Loss – poor original workmanship**
- **Debonding on some previous remedial work (Hollow sound)**
- **Cracking**
- **Discolouration**

This project proposes:
Remedial work to repair all structural defects identified. This is critical to preserve the spirals and prevent further degradation.

CIP.20.01.020
T1 Façade, Roof & Spirals

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €25.8m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Feasibility to be undertaken to examine the current operational and business needs at Dublin airport and recommend an appropriate scalable solution that is fit for purpose and aligned with Dublin Airport business needs and development plan	
Opex Impact	• Increase in opex of approx. €50k/annum.	
Project Output	Re-life existing Façade to include • 8-bay Terminal 1 Façade • T1 Roof Upgrade Phase 3b (8-Bay section) and other roof considerations • Rectify balcony drainage issues • Repair of Spiral Ramps • Relocation of Antenna Mounting Facility	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility / Outline Design Complete:	**Q3 2020**
Planning Complete:	**Q3 2020**
Detail Design Complete:	**Q4 2020**
Procurement Complete:	**Q2 2021**
Construction Commence:	**Q2 2021**
Project Handover:	**Q1 2023**

CIP.20.01.020
T1 Façade, Roof & Spirals

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€2,432,680
Construction Costs	68%	€17,449,861
Escalation, Contingency & Design Variability	23%	€5,947,960
Total		**€25,830,500**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€17,449,861	14%	€2,432,680	€2,432,680
Total - to summary				**€2,432,680**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T1 Façade				
T1 Spirals				
T1 Antenna Mounting Facility	Redacted Cost Information			
Total - to summary				**€17,449,861**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€19,882,540	30%	€5,947,960	€5,947,960
Total - to summary				**€5,947,960**

CIP.20.01.022
T1 Storm Water Drainage System

Project Summary

- **This project proposes to upgrade the existing T1 roof surface water drainage system**

The T1 roof surface water discharges through roof gullies and into an internal network of downpipes and eventually discharges into the external storm water drainage infrastructure. This internal drainage system (downpipes) has remained relatively unchanged since T1 was built in the 1970's.
The catchment area at that time was the 8-bay terminal building itself and was designed for a 1 in 100-year storm event.

Increased demand on original drainage system:
Since then, the T1 building has been added to with extensions and additional piers. Therefore, the catchment area has been extended and rainfall levels have also increased and has surpassed the design criteria set in the 70's. Issues occur whereby the building rainwater outlets are unable to cope with the volumes of water during heavy rainfall events.

This leads to the pipes reaching full capacity, water backs up to the vertical downpipes causing leaks and pipe failures. These leaks are only identified when water appears on the terminal ceiling tiles or floors and are contained by use of receptacles under the source with warning signage. This provides poor optics within the public realm and has potential to undermine the structure of the building and tarnish the airports reputation. Where leaks are not identified by Dublin Airport staff, there is a high risk of the public slipping on wet tiles.

Past remedial works:
Some works have taken place over the past 5-year period, but these only addressed a minor number of issues. This project serves to address issues throughout the terminal building and associated piers.

This project proposes to:

- **Carry out an in-depth CCTV survey of the internal surface water drainage network (3d mapping required) to better understand the sub-optimal location and configuration of the drainage network**
- **Complete a feasibility study to determine the preferred solution (continue with gravity drainage or install syphonic drainage)**
- **Following feasibility, proceed with preferred option**

CIP.20.01.022
T1 Storm Water Drainage System

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €1.1m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Scope to include 8-bay, 6-bay, T1X, Piers 2 & 3, P2 Link, street and all other associated areas	
Opex Impact	• Reduction in ongoing maintenance works. Minor impact on Opex.	
Project Output	• Carry out an in-depth CCTV survey of the internal surface water drainage network • Survey the drainage network to create a 3D map throughout the building • Understand the sub-optimal location and configuration of the drainage network • Complete a feasibility study on the preferred solution, whether to continue with gravity drainage or install syphonic drainage. • Following feasibility, install preferred option	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility / Outline Design Complete:	**Q2 2020**
Planning Complete:	**Q2 2020**
Detail Design Complete:	**Q3 2020**
Procurement Complete:	**Q1 2021**
Construction Commence:	**Q1 2021**
Project Handover:	**Q1 2022**

CIP.20.01.022
T1 Storm Water Drainage System

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11%	€120,000
Construction Costs	67%	€750,000
Escalation, Contingency & Design Variability	23%	€254,162
Total		**€1,124,162**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€750,000	16%	€120,000	€120,000
Total - to summary				**€120,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Leak Repairs/General Pipework	Redacted Cost Information			
Flashings				
Internal Pipework and Drains				
Facade /Glass Box & Roofs interface				
Deep Clean & Lining & CCTV Inspection				
Total - to summary				**€750,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€870,000	29%	€254,162	€254,162
Total - to summary				**€254,162**

CIP.20.01.023
Piers & Terminals Critical Maintenance

Project Summary

- **This project proposes to complete necessary maintenance works on the existing Piers and Terminals (Floors, walls, doors & back-of House).**

The terminal buildings are part of the core infrastructure for Dublin Airport's (DAPs) business of facilitating inter-modal change for travellers. The terminals have one of the highest rankings in terms of Business Criticality following that of the main runway and apron area. The building facilitates the departure and arrival passenger processes including Check-in, Security, Boarding Gates, Immigration, Customs, Meet & Greet, Passenger comfort facilities (e.g. toilets), Retail and Food & Beverage to name a few. They also accommodate airport related (mostly operations) businesses that need to be near the passenger flows such as Airline and DAP management offices, as well as the necessary plant and equipment rooms for the functioning of the building.

The general condition of the terminal buildings at DAP (Terminals, Piers and associated Multi-storey Car parks) is considered good although there are certain areas to be addressed. Terminal 1 is now over 45 years old (constructed in 1972) and requires ongoing maintenance investment to ensure expected standards of service are met. Terminal 2 will require increasing maintenance investment in the 2020- 2024 CIP period as it will reach 10+ years old (constructed in 2010).

Critical ongoing maintenance:
Continuous maintenance, improvement and replacement works have been carried out over the last five years to keep airport operations running as efficiently as possible. These works need to continue into the next 5 years and beyond to maintain the level of service the passenger has come to expect from Dublin Airport.

This project proposes to:
Upgrade or replacement of various critical items within the airport piers and terminals to ensure the smooth and efficient operation of the airport and ensuring the business needs are met (project details are outline in the Project Output section).

CIP.20.01.023
Piers & Terminals Critical Maintenance

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.9m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Scope to include terminals 1 & 2 and all associated piers and links • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care costs for similar projects delivered in the last 2 years	
Opex Impact	• N/A	
Project Output	• Floor Covering Replacements • Wall panelling replacements • Door replacements • Back of House floor Replacements	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Piers & Terminals Maintenance	**2020-2024**	

CIP.20.01.023
Piers & Terminals Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11%	€216,000
Construction Costs	75%	€1,440,000
Escalation, Contingency & Design Variability	13%	€256,680
Total		**€1,912,680**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,440,000	15%	€216,000	€216,000
Total - to summary				**€216,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Replacement of Floors in T1/T2	Redacted Cost Information			
Wall panels/Door & back of house floor replacements				
Main Contractor Preliminaries				
Total - to summary				**€1,440,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,656,000	16%	€256,680	€256,680
Total - to summary				**€256,680**

CIP.20.01.024
Skybridge Rehabilitation

Project Summary

- **This project proposes a structural assessment of the Skybridge be undertaken and necessary rehabilitation works be executed.**

Constructed in 2007 to increase the gate capacity of Terminal 1 ahead of the delivery of planned Terminal 2, the Skybridge Link and Pier 1 and Skybridge link structures are the most northerly section of T1. Pier 1 is over 600m long and together with the curved 400m long Skybridge link is one of the longest combined buildings in Dublin Airport.

The Skybridge is suspended over 60% of its length. Its structure is of structural steel with in-situ concrete floor and a flat membrane roof. The structure is supported at its ends from the ground columns. The central section is suspended by high tensile steel ties from two inclined super-columns. The walls are constructed from glass and cladding panels.

In recent times the following irregularities have been identified on the Skybridge:

- **Corrosion of the Skybridge steel ties**
- **Cracks in the Terrazzo Floor Joints**

A study is required to determine the extent of degradation of the steel cables. Following the study remedial work is required on the identified defects. The cracks at each joint location on the terrazzo floor indicate that the movement joints may be inadequate for a cable stayed structure and will need to be replaced. Overall the building envelop is in fair condition with leaks evident in the roofing membrane. The condition needs to be monitored regularly to detect any developing difficulties due to its nature over time.

This project proposes to:
Carry out a full structural assessment of the suspension cables and expansion joints. Following this a recommended work programme will be developed to carry out the essential remedial works.

CIP.20.01.024
Skybridge Rehabilitation

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €1.2m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety	
Opex Impact	• N/A	
Project Output	• Full structural survey and assessment of the current condition of the structural cables and floor joints • Remedial works to all identified structural defects in suspension cables • Replace/upgrade joints • Replace Terrazzo flooring where defective	
Asset Life	• 20 Years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2021**
Detail Design Complete:	**Q3 2021**
Procurement Complete:	**Q4 2021**
Construction Commence:	**Q1 2022**
Project Handover:	**Q4 2022**

CIP.20.01.024
Skybridge Rehabilitation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€103,438
Construction Costs	69%	€827,500
Escalation, Contingency & Design Variability	23%	€271,964
Total		**€1,202,902**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€827,500	13%	€103,438	€103,438
Total - to summary				**€103,438**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Work to existing buildings	Redacted Cost Information			
Main Contractor Preliminaries				
Total - to summary				**€827,500**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€930,938	29%	€271,964	€271,964
Total - to summary				**€271,964**

CIP.20.01.034
Campus Roads Critical Maintenance

Project Summary

- **This project proposes to continue to upgrade the existing internal campus road network.**

Dublin Airport DAP is responsible for the provision, maintenance and operation of internal public use campus roads. This road network provides access to DAP Terminals 1 & 2, hotels, multi-tenant commercial buildings, multi-storey car parks, surface car parks, bus and taxi terminals, cargo transport hubs and alternative routes into the airport and the exterior of the airport facility.

The road network incorporates approximately 26 kilometres of roads. The Annual average daily traffic (AADT) on the main access route for passenger traffic in to Dublin Airport (East link/Corballis road) is approximately 24,000 vehicles per day on Eastlink Road in the southbound direction. HGV's make up approximately 1.7% of the total daily flow amounting to circa 200 HGVs per lane per day.

2018 SCRIM Survey Results

These roads are currently in a reasonable state of repair; however, sections of the road network will need to be improved within the next 2 years. Two kilometres of pavement have been identified as having very low skid resistance which will need immediate re-surfacing. A further seven and a half kilometres of pavement will require resurfacing works within this 2020-2024 CIP period to continue to meet obligatory safety standards. The replacement and/or upgrade of footpaths is also required to mitigate the risk to the health and safety of the public and airport staff due to the presence of trip hazards and low friction surfaces.

This project proposes to:
- **Deliver essential improvement / upgrade works to the internal campus road network and its infrastructure. This will ensure the needs of the airport and airline customers are met in a cost-effective and sustainable manner and the risk to public health and safety is reduced as far as practicably possible.**
- **Rehabilitation of Cargo Bridge Road**
- **Road Furniture Upgrades**
- **Upkeep of road surface markings**

DublinAirport

CIP.20.01.034
Campus Roads Critical Maintenance

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €9.0m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care Opex and Capex costs for similar projects delivered in the last 2 years. • Night Works to be priced • Traffic Management required for all projects	
Opex Impact	• N/A	
Project Output	• Internal Road improvements • Access Roads Improvements to Staff Car Parks • Maintenance facility roads • Existing drainage upgrades • Walkway renewals • Landscaping • Rehabilitation of Cargo Bridge Road • Road Furniture Upgrades • Upkeep pf road surface markings	
Asset Life	• 15 Years	

Project Delivery Key Milestones	
Internal Road improvements	**Q1 2020 – Q4 2024**
Access Roads Improvements to Staff Car Parks	**Q1 2020 – Q4 2024**
Existing drainage upgrades	**Q1 2020 – Q4 2024**
Walkway renewals	**Q1 2020 – Q4 2024**
Road Furniture Improvements	**Q1 2020 – Q4 2024**
Road surface marking and delineation	**Q1 2020 – Q4 2024**
Cargobridge Road Rehabilitation	**Q1 2020 – Q3 2020**

CIP.20.01.034
Campus Roads Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11%	€947,398
Construction Costs	67%	€6,084,353
Escalation, Contingency & Design Variability	22%	€1,986,649
Total		**€9,018,400**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€6,084,353	16%	€947,398	€947,398
Total - to summary				**€947,398**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Corballis Rd (Various)				
Atrium Roads 1-4 Rehabilitation				
Eastlink Road Inlay Works				
T2 Departures Road (Inner) Inlay Works				
Castlemoate Rd (Various)	Redacted Cost Information			
West Link Road Inlay				
Eastland Road & T2 MSCP Rd				
Cargo Bridge Road				
Road Furniture Improvements				
Road Surface Markings				
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€6,084,353**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,031,751	28%	€1,986,649	€1,986,649
Total - to summary				**€1,986,649**

CIP.20.01.039
Airport Roads Critical Maintenance

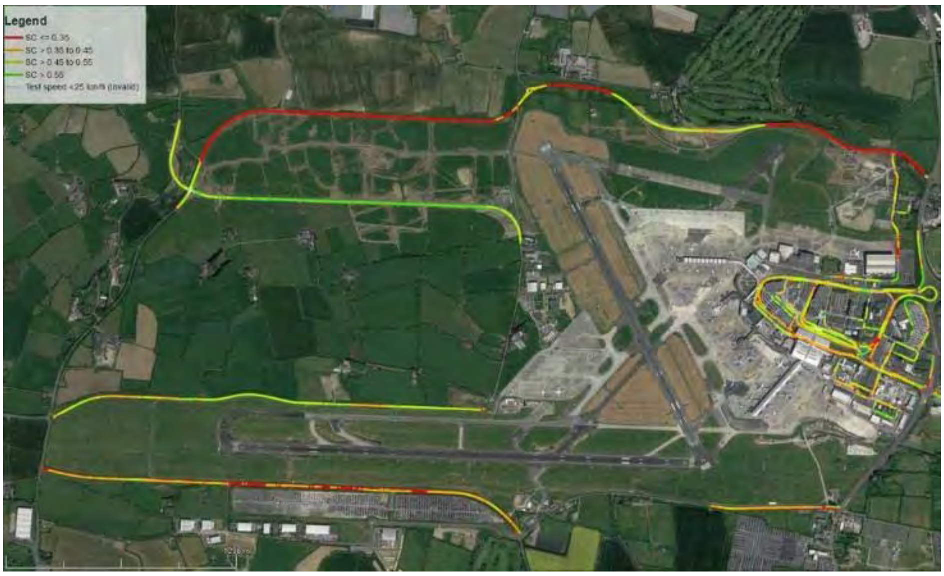
Project Summary

- **This project proposes to upgrade and improve the existing external road networks at Dublin Airport.**

Due to airport development since the 1980's, Dublin Airport (DAP) owns and maintains a number of external public roads. These roads provide access to long-term carparks, fire station, ATC facility and alternative routes into the airport and the exterior of the airport facility. The road network incorporates approximately 14kms which include the following sections of road:

Forrest Little Road	**2,490m**
Barberstown Road	**2,060m**
Pickardstown Road	**2,600m**
Portmellick Road	**2,500m**
Harristown Road	**2,790m**
Collinstown Lane	**660m**
Miscellaneous minor access roads	**1,100m**

These roads are currently in a reasonable state of repair and account for a high percentage of annual average daily traffic (AADT). The total combined AATD for the northern diversion road, south parallel road and Collinstown Lane is 59,700 light vehicles and 5,330 HGV's with the majority of the traffic using the Northern Diversion Road.



DublinAirport

CIP.20.01.039
Airport Roads Critical Maintenance

This project proposes:
Sections of the road network will need to be improved within the next 2 years. Six kilometres of pavement have been identified as having very low skid resistance which will need immediate re-surfacing. A further three kilometres of pavement will require re-strengthening works within the 2020-2024 CIP period. Several remaining sections will need improvement within the next CIP period to continue to meet obligatory safety standards.

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Regulation	**Total Capex requirement** €6.9m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care costs for similar projects delivered in the last 2 years.	
Opex Impact	• N/A	
Project Output	• External Roads Improvements • Inlay Works • Strengthening Works • Survey Requirements	
Asset Life	• 15 Years	

Project Delivery Key Milestones	
Forrest Little Road	**2020 & 2021**
Barberstown Road	**2020**
Portmellick Road	**2020**
Harristown Road	**2021-2024**
Collinstown Lane	**2021**

CIP.20.01.039
Airport Roads Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€590,345
Construction Costs	69%	€4,722,758
Escalation, Contingency & Design Variability	23%	€1,552,170
Total		**€6,865,273**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€4,722,758	13%	€590,345	€590,345
Total - to summary				**€590,345**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Barberstown road				
Forest Little road				
Forest Little road				
Collinstown lane		Redacted Cost Information		
Harristown road rehabilitation				
Portmellick road				
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€4,722,758**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,313,103	29%	€1,552,169	€1,552,169
Total - to summary				**€1,552,170**

CIP.20.01.046
Staff Car Parks Critical Maintenance

Project Summary

- **This project proposes to rehabilitate existing staff car parks Spine roads.**

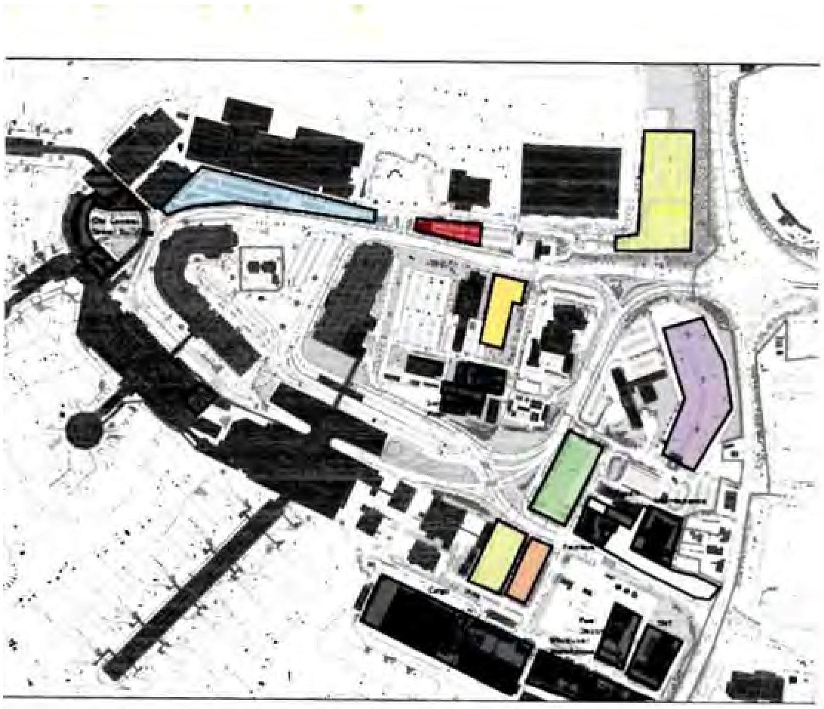
There are currently 12 No. staff car parks within the Dublin airport campus with 2,827 available spaces. Car park sizes range from 14 spaces in the Sillogue Gold to 818 spaces in the Purple car park at the back of the Radisson Hotel.

The important factors of car parks to staff are;

- **Walking distance to terminals**
- **Quality of surface**
- **Line marked spaces**

The condition of the staff car parks is considered to be fair, however some parking lots are in need of investment. The spine road of the silver staff car park for example has reached the end of its useful life and needs to be replaced. There are general drainage issues that need to be resolved to prolong the life of pavements throughout.

This project proposes to:
Deliver essential improvement and rehabilitation and upgrade works to staff car park spine roads at Dublin Airport.



Car Park	Spaces
Blue	484
OCTB/VIP & Spiral	67 & 39
Red	83
Yellow	234
Pink	87
Orange	222
Green	391
Maroon	32
Purple	818
White	295
Sillogue Gold	14
Cargo Buildings (Black)	61
EI Hanger 6	860
EI Shamrock House	217

CIP.20.01.046
Staff Car Parks Critical Maintenance

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.7m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care costs for similar projects delivered in the last 2 years such as LT red car park	
Opex Impact	• N/A	
Project Output	• Drainage Improvements • Staff Car Park Spine Road Improvements	
Asset Life	• 15 Years	

Project Delivery Key Milestones	
Drainage Improvements	**Q1 2020 – Q4 2024**
Staff Car Parks Spine Road Improvements	**Q1 2020 – Q4 2024**

CIP.20.01.046
Staff Car Parks Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€145,206
Construction Costs	69%	€1,161,647
Escalation, Contingency & Design Variability	23%	€381,784
Total		**€1,688,637**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,161,647	12%	€145,206	€145,206
Total - to summary				**€145,206**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Staff Carparks				
Main Contractor Preliminaries	Redacted Cost Information			
Other Development Costs				
Total - to summary				**€1,161,647**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,306,853	29%	€381,784	€381,784
Total - to summary				**€381,784**

CIP.20.01.049
Public Carpark Critical Maintenance

Project Summary

- **This project proposes to upgrade and improve public carparking (Spine Roads & MSCP Structural Defects).**

Dublin Airport (DAP) is responsible for the provision, maintenance and operation of public car parks. There are currently;

- **4,000 short term spaces in two multi-storey car parks (MSCP)**
- **18,600 long term spaces in three remote car parks**

Public car parks are a core piece of infrastructure at airports. They provide a necessary facility to the travelling public and meters & greeters. Income from existing car parks represents approximately 5% of total turnover. Due to increasing passenger numbers, this percentage is likely to increase. With passenger numbers set to increase, busing movements with increase causing an increased rate of deterioration of the condition of the spine roads

This project proposes to:

- **Delivery of essential upgrade and improvement works to public car park spine roads at Dublin Airport.**
- **Implement structural and waterproofing improvement works required at both Multi Storey Car Parks (MSCP) at Dublin Airport.**

CIP.20.01.049
Public Carpark Critical Maintenance

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Experience	**Total Capex requirement** €2.4m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care costs for similar projects delivered in the last 2 years such as LT red car park	
Opex Impact	• N/A	
Project Output	Public Parking (Long Term): • Drainage Improvements • Spine Road Upgrades Long Term Car Parks (LTCPS) (Green, Blue, Red) • Structural Improvements to MSCP T1 & T2 MSCP: • Replace/Repair Structural Movement Joint • Investigate and Repair drainage issues • Investigate moisture ingress issues and repair • Walkway renewals • Waterproofing membrane Repair	
Asset Life	• 15 Years	

Project Delivery Key Milestones	
Drainage Improvements	**Q1 2021 – Q4 2024**
Spine Road Upgrades Long Term Car Parks (LTCPS) (Green, Blue, Red)	**Q1 2021 – Q4 2024**
Multi-Storey Car Park Optimisation	**Q1 2020 – Q4 2024**

CIP.20.01.049
Public Carpark Critical Maintenance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	7%	€168,214
Construction Costs	76%	€1,819,737
Escalation, Contingency & Design Variability	17%	€421,376
Total		**€2,409,327**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,819,737	9%	€168,214	€168,214
Total - to summary				**€168,214**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Public Carpark Spine Roads	Redacted Cost Information			
MSCP Upgrade Works				
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€1,819,737**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,987,951	21%	€421,376	€421,376
Total - to summary				**€421,376**

CIP.20.01.056
Campus Facilities & Landside Snow Base

Project Summary

- **This project proposes providing a new purpose-built Campus Facility and Snow Base at Castlemoate.**

The Campus Facility & Snow Base is a crucial part of landside operations at Dublin Airport. It supports the efficient maintenance of all campus roads and is in a strategic location for the snow and ice response for the landside facilities. The base is housed in the original farm sheds as part of Castlemoate House and adjacent to the Dublin Airport Police K9 Unit.

The semi-open lean-to shed on the southern boundary is used for the storage of rock salt and grit and has been there for over 30 years. The salt-store is currently in a very poor condition and has reached its end of useful economic life. The current state poses a significant health and safety risk with continued use. The large shed is used for the storage of airport vehicles, equipment & contractor vehicles involved in winter maintenance landside. The layout within the building is based on an old farm shed and is not conducive for the movement & parking of vehicles. The roof is in poor condition and at the end of its useful economic life. The welfare facilities in the shed are not fit for purpose and pose a high risk to its users. In summary, the facility is not fit for purpose, the space is not being utilized to its full potential and is now impacting on the proper maintenance of the landside roads and facilities. Therefore, it needs to be rehabilitated or replaced.

Risks:
There are numerous risks associated with this facility in its current state such as:

- **Health & Safety: Buildings beyond their functional life to a point where maintenance will no longer extend the asset life. There is a risk to personnel health and safety when further degradation occurs.**
- **Environment: Currently no waste water treatment for the run-off from the yard. Salt run-off may affect water table / sources.**
- **Efficiency: Salt store open to the elements and not suitable for the storage of salt (damp causes clumps resulting spreading problems). Exposed equipment in open/semi open areasare deteriorating.**

CIP.20.01.056
Campus Facilities & Snow Base Upgrade

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €2.9m
Underpinning Assumptions and Cost Benchmarks	• To upgrade/replace the current facilities and equipment to ensure they are fit for purpose and meeting business requirements • Current site remains available but improved access is required. • Planning permission may be required	
Opex Impact	• N/A	
Project Output	• Construction of a new weathered salt store large enough to accommodate articulated vehicles to reverse into and discharge load • Adjoined equipment storage facility • Vehicle Wash Station • Task specific snow and maintenance equipment • New entrance onto Castlemoate Road • New surface water drainage and associated works • Pavement Overlay to Yard • Perimeter Fencing • Task Lighting Provision • Welfare Facilities • Works to accommodate future campus & facilities expansion • The scheme shall optimize the available space and provide the means to cope with the demands of any extreme weather event, quickly and efficiently and help keep the operation functional at all times.	
Asset Life	• 20 Years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning complete:	**Q4 2020**
Detail Design complete:	**Q4 2020**
Procurement complete:	**Q2 2021**
Construction Commence:	**Q3 2021**
Project Handover:	**Q1 2022**

CIP.20.01.056
Campus Facilities & Snow Base Upgrade

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11%	€304,763
Construction Costs	67%	€1,904,768
Escalation, Contingency & Design Variability	23%	€645,492
Total		**€2,855,024**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,904,768	16%	€304,763	€304,763
Total - to summary				**€304,763**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Electrical Installation & Communication Systems	Redacted Cost Information			
Surface Water and Foul Water Drainage				
Work to existing buildings				
Ancillary Buildings and Structures				
Main Contractor Preliminaries				
Total - to summary				**€1,904,768**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€2,209,531	29%	€645,493	€645,493
Total - to summary				**€645,492**

CIP.20.01.065
Airport Heavy Fleet & Equipment Replacement

Project Summary

- **This project proposes to provide an efficient and effective Heavy Vehicle Fleet to meet the needs of the business.**

The DAA Heavy Fleet Vehicles comprise of a broad mix of vehicles such as fire tenders, snow and ice equipment (snow ploughs, runway de- icers, snow blowers), airfield pavement sweepers, airfield painting equipment, tractors and support equipment such as hoists, cargo loaders and fork lifts. The provision of this equipment is essential for the safe and efficient operation of the airport, particularly airfield operations.

Vehicles are maintained to the required road safety standard in accordance with best practice and are replaced when they have reached the end of their useful life. Vehicle are selected based on fitness for purpose, whole life cost efficiency and standardisation. Many of these vehicles, such as the Fire Tenders, are required to fulfil the requirements of the airport licence.

The heavy fleet currently includes seventy-five vehicles, distributed between five work areas including Fire & Emergency, Snow & Ice Operations, Operational Cleaning, Airfield Maintenance, Landside Maintenance and Support. These sub-fleets have been examined in detail and an optimisation plan for the period 2020 – 2024 has been put in place taking into account the current and expected growth in demand and the introduction of new infrastructure such as Apron 5H and the North Runway.

This project proposes to:

- **Replacement of seven existing foam tenders with six new single-type vehicles**
- **Augmentation of the Snow & Ice fleet to allow for the introduction of the North Runway, additional aircraft pavement and to improve the efficiency of snow removal activities**
- **Purchase additional glycol collection sweepers, friction tester and maintenance equipment due to the introduction of additional airfield pavement**

The heavy fleet optimisation plan supports the Dublin Airport Sustainability Policy and prioritizes the purchase of Low Emission Vehicles (LEVs) where possible. It also seeks to minimise the number of vehicles needed to meet EASA Standards and the Airport Licence while providing the foundation for efficient and effective airport operations.

CIP.20.01.065
Airport Heavy Fleet & Equipment Replacement

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Operational Efficiency and Safety	**Total Capex requirement** €14.7m
Underpinning Assumptions and Cost Benchmarks	• Fleet size will grow from 75 to 92 vehicles • Fleet Optimisation Plan will be kept under review in line with the introduction of new infrastructure and growth in aircraft movements • The use of Low Emission Vehicles (LEV) will be prioritized where appropriate • Cost of vehicles excludes VAT & VRT as appropriate	
Opex Impact	• Increase in maintenance cost of approx. €100k/annum due to an increase in volume of equipment.	
Project Output	• Efficient operation of Dublin Airport through the provision of vehicles and equipment that are fit-for-purpose. • Promotion of daa Sustainability Policy and the use of LEVs where possible • Fleet Optimisation Plan in line with business needs and growth	
Asset Life	• 7 Years	

Project Delivery Key Milestones	
Provision of vehicles and equipment through the 2020-2024 period	**Q1 2020 – Q4 2024**

CIP.20.01.065
Airport Heavy Fleet & Equipment Replacement

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€14,725,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€14,725,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & management (Deemed included below)	€14,725,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Airport Heavy Vehicle purchase in 2020 - 2024 period	Redacted Cost Information			
Total - to summary				**€14,725,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€14,725,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.01.069
Airport Light Vehicle Fleet Replacements and Augmentation

Project Summary

- **This project proposes to maintain mobility within the airport wide campus by provision of an effective Light Vehicle Fleet that meets the needs of the business.**

The Dublin Airport (DAP) Light Vehicle Fleet comprises 100 road going vehicles with gross vehicle weights of less than 3,500kgs. The vehicles are used for the safe and efficient operation of the airport supporting such functions as Airport Police, Fire Service, ASU, Airport Operations & Asset Care. The mobility of these functions across the airport through the provision of a reliable light vehicle fleet is critical for the efficient, safe and secure operation of the airport.

Vehicle are selected based on fitness for purpose, whole life cost optimisation and standardisation. They are maintained to the required road safety standard in accordance with best practice and are replaced when they have reached the end of their useful economic life. The light fleet is managed centrally by specialist fleet managers and the number of vehicles in the fleet is strictly controlled and in accordance with a rolling Fleet Optimisation Plan. Vehicles associated with capital projects are not included in the core airport fleet.

Since 2015 the airport fleet has grown from 95 to 100 vehicles with the growth in aircraft movement and the need for greater ramp supervision as well as the extension of the CPSRA. The Light Fleet will need to be further increased to 111 vehicles between 2020 and 2024 to allow for the introduction of the North Runway and the extended airfield operations and maintenance.

The planned provision of replacement and additional vehicles for the light vehicle fleet between 2020 & 2024 will be in accordance with a 6-year rolling fleet optimisation plan as recommended by the specialist fleet managers. This plan optimises the number of vehicles in use as well as the vehicle type to ensure they are fit-for-purpose and are properly maintained to reach their full life cycle. The plan also supports the DAP Sustainability Policy with the prioritized used of Low Emissions Vehicles (LEVs). LEVs will be introduced into the fleet where there is proven fitness-for-purpose and cost competitiveness.

CIP.20.01.069
Airport Light Vehicle Fleet Replacements and Augmentation

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Operational Efficiency	**Secondary Driver** Safety	**Total Capex requirement** €3.21m
Underpinning Assumptions and Cost Benchmarks	• Fleet size will grow to 111 vehicles • Fleet Optimisation Plan will be kept under review in line with the introduction of new infrastructure and growth in aircraft movements • The use of Low Emission Vehicles (LEV) will be prioritized where appropriate • Cost of vehicles excludes VRT & VAT	
Opex Impact	• Increase in maintenance cost of approx. €75k/annum due to an increase in volume of equipment.	
Project Output	• Efficient operation of Dublin Airport through the provision of mobility options that are fit-for-purpose. • Promotion of daa Sustainability Policy and the use of LEVs • Modern, well maintained light vehicle fleet to meet road safety standards • Fleet Optimisation Plan in line with business needs and growth	
Asset Life	• 5 Years	
Project Delivery Key Milestones		
Provision of vehicles through the 2020-2024 period	**Q1 2020 – Q4 2024**	

CIP.20.01.069
Airport Light Vehicle Fleet Replacements and Augmentation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€3,211,500
Escalation, Contingency & Design Variability	0%	€0
Total		**€3,211,500**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€3,211,500	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Airport Light Fleet Replacement	Redacted Cost Information			
Total - to summary				**€3,211,500**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€3,211,500	0%	€0	€0
Total - to summary				**€0**

CIP.20.01.071
Electric Charger Network Facilities

Project Summary

- **This project proposes to install publicly accessible, electrical vehicle charging facilities.**

An electric vehicle network is an infrastructure system of publicly accessible charging stations to recharge electric vehicles. Government, car manufacturers, and charging infrastructure providers have entered into many agreements to create such networks.

With an abundance of accessible wind and ocean energy and distances from the capital city to key neighbouring cities ranging from 170km to 260km, Ireland is well suited to become an early adopter of electric vehicle technology. In the context of an EU commitment to achieve an 80% reduction in carbon emissions by 2050, and concerns about future scarcity, alternatives to oil will be encouraged by the EU and Irish government. In May 2017, the Government approved and published the National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland 2017 to 2030. This policy framework sets an ambitious target that by 2030 all new cars and vans sold in Ireland will be zero emissions (or zero emissions capable).

Electric vehicles (EVs) offer an increasingly realistic solution to the challenge of reducing the transport sector's Greenhouse Gas Emissions, increasing the use of renewable energy in transport and reducing reliance on imported fossil fuels. To achieve this, stimuli packages such as grants, tax incentive, tolls and parking are available.

This project proposes to:
Provide necessary infrastructure for car charging points across the campus to be made available to the public and to the growing electric maintenance fleet. It will also encourage busing providers to consider the shift into non-combustible engine vehicles.

Consequentially, this initiative will help facilitate government targets and show Dublin Airport to be a leader in sustainable solutions and improve its carbon footprint.

CIP.20.01.071
Electric Charger Network Facilities

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Environmental	**Secondary Driver** Future Proofing	**Total Capex requirement** €1.6m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Cost based on similar project such as charging points in landside Maintenance base	
Opex Impact	• Provision of electric charging station will result in increased maintenance opex amounting to approx. €30k/annum.	
Project Output	• Feasibility Study • Provision of underground ducting network and future proofing • Associated civil works • Electric charger network facilities	
Asset Life	• 10 Years	
Project Delivery Key Milestones		
Electric Charger Network Facilities	**Q1 2020 – Q4 2024**	

CIP.20.01.071
Electric Charger Network Facilities

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€161,564
Construction Costs	65%	€1,077,090
Escalation, Contingency & Design Variability	25%	€406,588
Total		**€1,645,242**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,077,090	15%	€161,564	€161,564
Total - to summary				**€161,564**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Electricity Distribution to External Plant and Equipment: (Power supply from main switchgear to external plant and equipment.)	Redacted Cost Information			
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€1,077,090**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,238,654	33%	€406,588	€406,588
Total - to summary				**€406,588**

DublinAirport

CIP.20.01.074
Advance Visual Docking Guidance System (5G, Pier 1 & 2)

Project Summary

- **This project proposes to install additional A-VDGS screens to drive operational efficiency Airside**

The A-VDGS technology guides the aircraft to within 10cm of its parking position using invisible infrared lasers to attain the aircraft's type and position. It will also display critical Airport Collaborative Decision Making (A-CDM) operational data (TOBT, TSAT, etc.) and in turn automatically distribute accurate, real-time data over the IT network.

The primary drivers for investing in A-VDGS are;
A) More Efficient use of stand Infrastructure

- **Faster and more efficient turnaround times for airlines.**
- **Better OTP through display of key turnaround information.**
- **Improved predictability through display of key arrival and departure information.**

B) Enhanced safety at gates

- **Greater visibility during reduced visibility conditions.**
- **Reduced jet blast issues due to fewer requirements for aircraft to stop before entering stand.**
- **Addressing existing DAAD's (Deviation acceptance and action document) on Pier 4 (5 Stands currently with reduced clearance).**

C) Environmental

- **Reduced ramp congestion, through less occurrences of aircraft holding on taxiways.**
- **Reduced fuel burn and emissions through less occurrences of aircraft holding on taxiways and the Airport Licence while providing the foundation for efficient airport operations.**

This project proposes:
This project entails the installation of Advanced Visual Docking Guidance System (A-VDGS) technology to aircraft parking stands on Apron 5H and Stands 102 -104.

CIP.20.01.074
Advance Visual Docking Guidance System (5G, Pier 1 & 2)

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Operational Efficiency / Safety	**Secondary Driver** Stakeholder Requirements	**Total Capex requirement** €5.3m
Underpinning Assumptions and Cost Benchmarks	• Cost based on tender returns for similar works (installed as part of PACE) • A-VDGS – T1 type unit with apron scan function. • Cost based on phased construction with minimum impact on operations. This project will require stand closures for a short period of time. • All units networked and connected to Dublin Airport - Airport Operations System (AOS).	
Opex Impact	• Additional opex costs include regular maintenance and servicing of the proposed units amounting to €40k/annum.	
Project Output	• A-VDGS units on Apron 5H and Stands 102 -104. • Provision of real time operational data to pilots on stand	
Asset Life	• 10 Years	
Project Delivery Key Milestones		
Installation of additional A-VDGS	**Q1 2020 – Q1 2024**	

DublinAirport

CIP.20.01.074
Advance Visual Docking Guidance System (5G, Pier 1 & 2)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	14%	€750,000
Construction Costs	69%	€3,652,583
Escalation, Contingency & Design Variability	17%	€927,411
Total		**€5,329,994**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,652,583	21%	€750,000	€750,000
Total - to summary				**€750,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
AVDGS - Installation (23 Units)	Redacted Cost Information			
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€3,652,583**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,402,583	21%	€927,411	€927,411
Total - to summary				**€927,411**

CIP.20.01.087
AGL Fibre Optic Communication Network Improvement Programme

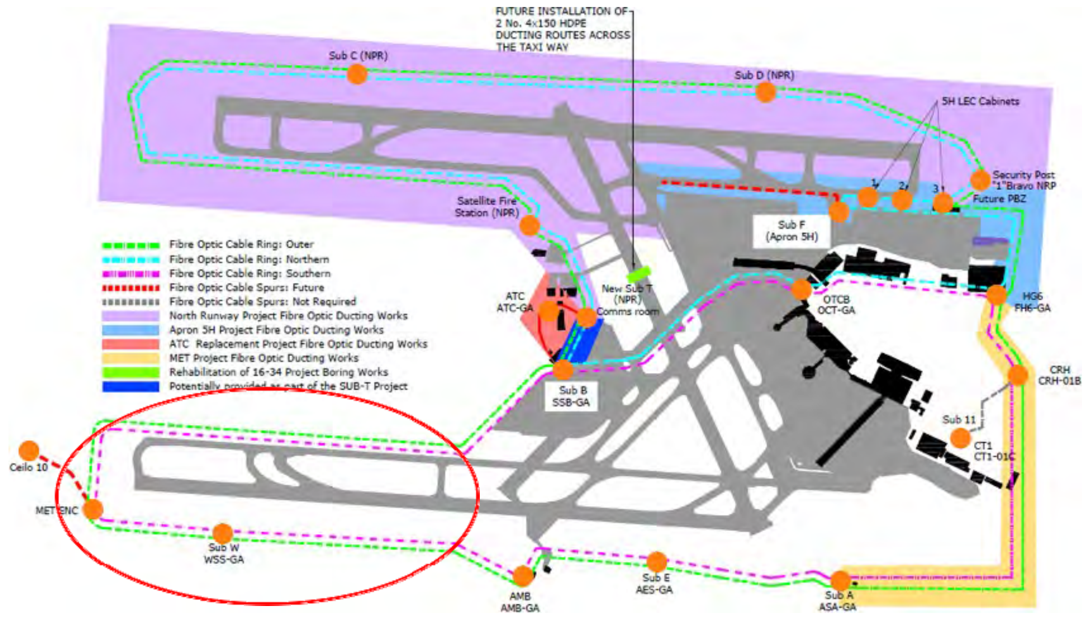
Project Summary

- **This project proposes to provide a ring configuration for the airfield fibre optic network (complete ring around RWY 10)**

The airfield ground lighting systems are controlled from the ATC control tower. The information to each substation, which controls the AGL system, is sent via a fibre optic cable network in a star formation with a copper cable back up system. This system has proven to be reliable to date but cannot accommodate changes easily. It is also not resilient in some areas.

To improve this the fibre system is been reconfigured to operate in a notational ring configuration. This resolves the capacity issues, but the Airport is still left with a major single point of failure in the Southeast corner of the airfield. To create the ring circuit the fibre pairs are part on the same cable between the Maintenance Base and West Substation. If this section of cable gets damaged control of the West Substation is lost.

Currently the fibre cable is routed from Sub B across runway 10/28 to the Maintenance Base, from there the cable becomes a radial to the West Substation. It is proposed to install a pit, duct and fibre network system which will run from the West Substation to the MET enclosure and from there to Sub B. With this facility the fibre network can be configured in a ring circuit without the cables running adjacent to each other or using more than one set of pairs from the same cable to achieve a ring circuit (see image below).
Note: The North Runway development will facilitate the 'ring' around the North Runway. This project is required to complete the ring around the South Runway only.



Airfield Fibre Optic – Proposed Network

CIP.20.01.087
AGL Fibre Optic Communication Network Improvement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €2.0m
Underpinning Assumptions and Cost Benchmarks	• Installation of pit, duct and fibre network between Sub W and Sub B • New electrical equipment required • Night-time working in most areas as required • Works to be carried out in discrete portions to minimise operational disruption • Costs based on recent construction projects.	
Opex Impact	• IT related opex costs of approx. €50k/annum.	
Project Output	• Pit & Duct System. • Fibre Network • Reconfiguring of fibre network	
Asset Life	• 20 Years	

Project Delivery Key Milestones	
Pit & Duct System.	**Q1 2022 – Q1 2024**
Fibre Network	**Q1 2022 – Q1 2024**
Reconfiguring of fibre network	**Q1 2022 – Q1 2024**

CIP.20.01.087
AGL Fibre Optic Communication Network Improvement Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	4%	€79,401
Construction Costs	79%	€1,588,026
Escalation, Contingency & Design Variability	17%	€350,160
Total		**€2,017,588**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,588,026	5%	€79,401	€79,401
Total - to summary				**€79,401**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Telecommunications and other Communication System Connections	Redacted Cost Information			
Preparatory Ground Works				
Roads and associated footways				
Main Contractor Preliminaries				
Other Development Costs				
Total - to summary				**€1,588,026**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,667,428	21%	€350,160	€350,160
Total - to summary				**€350,160**

CIP.20.01.099
RWY 16/34 Lighting for Low Visibility Procedures (LVP)

Project Summary

- **This project proposes to install LVP taxiing guidance lighting on Runway 16/34 to allow it to be used as a formal LVP Taxiway route.**

Runway 16/34:
Runway 16/34 (R16/34) is Dublin Airports' secondary and crosswind runway, primarily used during dual operation and extreme cross winds conditions as an alternative to R10/28. It is also used as the operational runway when maintenance works are being undertaken on R10/28. R16/34 is currently used as a taxiway in daylight hours, particularly as a line-up to R28. However, it cannot be used in the hours of darkness or in LVP conditions as there is no centreline lighting system.

The runway pavement extends in a general Northwest-Southeast direction between the southern R28 threshold and the midpoint of the future Northern Runway. As such the runway pavement connects the parallel runways across the full width of the site. The emerging Dublin Airport masterplan has taken this into account and, while it has confirmed that that the runway remains operational, it proposes that it also be used as a principle North-South taxiway route (both runway & taxiway). This will be a central plank of the proposed airfield circulation plan following the completion of the North Runway and will combine with the outputs from CDP2 Critical Apron Taxiway System to greatly enhance the circulation within the central airfield network.

It is further proposed that this taxiway will be used for a LVP Taxiway with enhanced centreline lighting systems to guide aircraft in the hours of darkness and in low visibility. An interleaved lighting system with back-up power supply will be installed along the centreline of the taxiing length of the runway as well as the curves and turns of the taxiway intersections. The new system will be connected to the current and updated AGL control system for ATC activation as required.

This project proposes:

Installation of LVP taxiway route lighting along Runway 16/34 and its intersections

CIP.20.01.099
RWY 16/34 Lighting for Low Visibility Procedures (LVP)

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Operational Efficiency / Safety	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €5.5m
Underpinning Assumptions and Cost Benchmarks	• R16/34 pavement has been improved under separate project • Enabling works (secondary cables and pots) for R16/34 LVP centreline has been completed prior to new surface being installed • New primary cables along length of runway and connecting back to Sub T required • New primary ducts and pit system is required to house the proposed primary cable system to Sub T. • Pits to be able to accommodate transformers and ILCMS switches. • Ducting system to include LV control ducts for future ILCMS • New CCRs required • New AGL control connections to existing system required • New secondary cables required • New LED light fittings and pots required	
Opex Impact	• Project has an opex impact of circa €50k per annum split €15k energy and €35k maintenance.	
Project Output	• Full LVP Taxiway Lighting on R16/34 and ancillary intersections	
Asset Life	• 10 Years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning complete:	**Q1 2020**
Detail Design complete:	**Q1 2020**
Construction Commence:	**Q1 2020**
Project Handover:	**Q1 2021**

CIP.20.01.099
RWY 16/34 Lighting for Low Visibility Procedures (LVP)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€5,500,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€5,500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€5,500,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Low Visibility Procedures	Redacted Cost Information			
Total - to summary				**€5,500,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€5,500,000	0%	€0	€0
Total - to summary				**€0**

DublinAirport

CIP.20.07.013
Airfield Taxiway Re-Designation Project

Project Summary

- **This project proposes to roll out an Airfield Taxiway Re-designation programme.**

The Dublin Airport Local Runway Safety Team (LRST) consisting of representatives from DAA, IAA – SRD, Air Traffic Services and based airlines (Aer Lingus, Ryanair, Air Contractors and Cityjet) completed a review of the existing taxiway naming conventions in 2013 to address the following issues:

- **Complexity of airfield layout following the completion of various airfield infrastructural developments over the previous 6 years**
- **Elongated taxiway routing instructions between ATC and pilots in radio communications**
- **Safety recommendation set out in AAIU report into the serious incident which occurred in May 2011 (Runway Incursion on Runway 16/34)**

The output from this review was that a revised taxiway designation strategy should be devised to address the issues. This strategy has now been devised and a full review of the existing airfield signage layout has been completed and a revised layout based on the new taxiway designation convention has been developed. In addition, IAA approval for certain aspects of the scheme was sought and this approval was received in September 2013. Subsequently a revised scheme with different designations as agreed with the airlines was put forward and approved by the IAA.

CIP.20.07.013
Airfield Taxiway Re-Designation Project

Business Need
The taxiway infrastructure at Dublin Airport is identified by a naming convention in compliance with ICAO (SARPS), whereby each taxiway is given a distinctive designator.

To accommodate higher traffic volumes, Dublin Airport has in recent years delivered projects to expand and improve the existing infrastructure. In many cases, these improvements have resulted in a more complex aerodrome environment within which pilots, drivers and ATS personnel must function. These projects have included changes to the apron and taxiway layout, as a result of the expansion of the Central and South Apron areas east of Runway 16/34 through the construction of Piers 1 and 4 and the construction of the West Apron to the west of Runway 16/34. As a result of increased infrastructure (and associated increase in naming e.g. F-Inner & F-Outer) communications between ATC and pilots have become complex, leading to lengthy R/T communications specifically
regarding taxi instructions, which at peak times of aircraft movements on the airfield can be a source of confusion, particularly to non-based pilots and could give rise to a reduction in safety and the potential for a runway incursion.

In addition, a separate review of the signage in place in the vicinity of the five 'Hot Spot' locations currently identified on the EIDW Aerodrome and Parking / Docking charts was completed last year and has identified a set of recommended changes to existing signs to address any ambiguity or possible misinterpretation by pilots / drivers (currently over complex). These changes have not been implemented as yet and it is now planned to implement them as part of the Taxiway Re-designation project.

Project Delivery Strategy
It is proposed to deliver the Project on a phased basis through Airfield Capital Projects (e.g. Runway 10/28 Overlay, Apron 5H, North Runway, Dual Foxtrot Taxiways, Link 6, Link 3 etc.) to minimise disruption to the business and to optimise cost.

CIP.20.07.013
Airfield Taxiway Re-Designation Project

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Safety	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €1.5m
Underpinning Assumptions and Cost Benchmarks	• Delivery to be coordinated with other Airfield Capital Projects (e.g. Runway 10/28 Overlay Project, Apron 5H, North Runway Project, Dual Foxtrot Taxiways, Link 6, Link 3 etc.) • Night time working where agreed with operations • Multi construction phasing to minimise route interruptions for taxiing aircraft	
Opex Impact	• No material impacts on opex.	
Project Output	• All Airfield Taxiways & Taxilanes will have new signage and paint marking designations	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Airfield Taxiway Re-designation	**Q1 2020 – Q4 2024**	

CIP.20.07.013
Airfield Taxiway Re-Designation Project

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€1,500,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€1,500,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Airfield Re-designation	Redacted Cost Information			
Total - to summary				**€1,500,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€1,500,000	0%	€0	€0
Total - to summary				**€0**

B ASSET CARE - MECHANICAL & ELECTRICAL

APPENDIX B
Asset Care – Mechanical & Electrical (M&E)

Appendix B - Asset Care Mechanical & Electrical (M&E)			Page
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**	
CIP.20.02.001	Medium Voltage (MV) Electrical Network	€6.3	B-1
CIP.20.02.004	Passenger Boarding Bridges (Maintenance & P3 Enhancement) & Fixed Electrical Ground Power	€18.1	B-4
CIP.20.02.005	Lift Upgrade Programme - Terminal and Multi-Storey	€6.2	B-11
CIP.20.02.006	Airport Water & Foul Sewer Upgrade	€5.0	B-14
CIP.20.02.007	Life Safety Systems (LSS) Upgrade Programme Terminal and MSCP Buildings	€14.1	B-17
CIP.20.02.008	Terminal Buildings HVAC Upgrade	€17.8	B-20
CIP.20.02.009	Campus Buildings: Mechanical, Electrical & LSS Upgrade	€9.5	B-23
CIP.20.02.010	Pier 3 Life Extension Works - Mech, Elec and Foul Drainage	€14.0	B-26
CIP.20.02.013	Small Energy Projects	€4.8	B-29
TOTAL		**€95.8**	

CIP.20.02.001
Medium Voltage (MV) Electrical Network

Project Summary

- **This project entails the upgrade and capital maintenance required on the Dublin Airport Medium Voltage (MV) Electrical Network.**

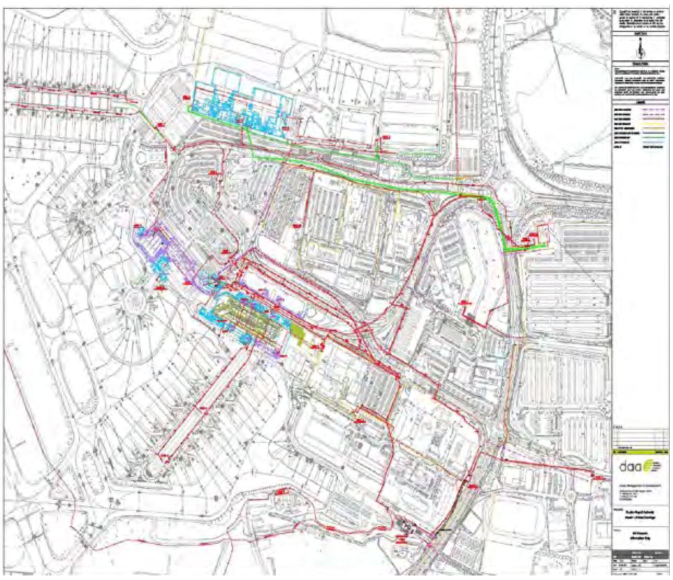
The Dublin Airport Medium Voltage (MV) Electrical Network comprises of a main 110kV/10kV Substation at Dardistown and forty-five 10kV/440v substations in various locations around the airport campus. Following a hazard and operability (HazOps) Study and Asset Health Review Workshops, a number of projects have been identified for addressing during the period of 2020 – 2024 under life cycle planning for the MV Network. Note: The projects have been identified by daa Asset Management, Asset Care & Asset Development personnel along with the daa's external specialist MV Service Provider and specialist sub-contractors.

Works required as part of this project are as follows:

- **Replacement of old end of life sections of cable on the existing MV network. Planned Partial Discharge Testing has been undertaken to determine performance and degradation of the existing system, these tests have identified several sections of cable in need of replacement;**

- **Replacement of old (end of asset life) substation switchgears and transformers;**

- **Replacement of the existing MV SCADA system. The current MV SCADA system was installed in 2008 & 2009 and while still fully operational the system will require a complete replacement as control equipment and software are reaching end of life. Dublin Airport has been advised that the existing SCADA system will no longer be supported efficiently from 2020 (components and software).**



CIP.20.02.001
Medium Voltage (MV) Electrical Network

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Safety	**Total Capex requirement** €6.3m
Underpinning Assumptions and Cost Benchmarks	• Costs based on recently completed projects and consultation with MV specialists. • Works to be carried out in discrete portions to minimiseoperationaldisruption • Phased work fronts to be utilised where possible.	
Opex Impact	• No material opex impact.	
Project Output	• Replacement of remaining old section of the Airfield Ring • Replace MV SCADA system • Replacement of 10 No Transformers and 7 No Switch Gear	
Asset Life	• 20years	

Project Delivery Key Milestones	
Airfield Ring	**Q3 2021**
Switch Gear in Substations 6, 9, 10 & 11	**Q4 2020**
Transformers in Substations 5 &19 and Switchgear in Substation 19	**Q4 2020**
Transformers in Substations 1 ,8, 6 Bay & Hangar 6	**Q2 2023**
MV SCADA system	**Q3 2021**

CIP.20.02.001
Medium Voltage (MV) Electrical Network

LEVEL1 - CostAnalysis	Represents	Total
Design and Management Costs	5%	€339,818
Construction Costs	72%	€4,530,907
Escalation, Contingency & Design Variability	23%	€1,422,934
Total		**€6,293,659**

LEVEL2 - Cost Analysis				
DesignandManagementCosts	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€4,530,907	8%	€339,818	€339,818
Total-tosummary				**€339,818**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Electricity Distribution to External Plant and Equipment.	Redacted Cost Information			
Telecommunications and other Communication System Connections				
Main Contractors Preliminaries				
Other Development Costs				
Total-tosummary				**€4,530,907**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,870,725	29%	€1,422,934	€1,422,934
Total-tosummary				**€1,422,934**

CIP.20.02.004
Passenger Boarding Bridges (Maintenance and Pier 3 Enhancements) & Fixed Electrical Ground Power

Project Summary

- **This project relates to the refurbishment of Passenger Boarding Bridges (PBB's), the provision of a dual airbridge on Pier 3 and the expansion of FEGP at Dublin Airport (including the upgrade of Pier 4 FEGP).**

Passenger Boarding Bridges (Maintenance):

There are currently 27 PBB's at Dublin Airport; 19 on Pier 4 and 8 on Pier 3. This project requests investment in PBBs to carry out the following refurbishment:

- **Replace end of life flooring, weathering and external finishes to the older 6 No. Pier 3 PBB's**
- **Mid-life control systems upgrade for the 19 No Pier 4 PBB's and the 6 No. Pier 3 PBB's to maintain the required level of reliability.**
- **Replace flooring with improved slip resistance to all PBB's and replacement of cable looms in the 19 Pier 4 PBBs.**

Passenger Boarding Bridges (Pier 3 Dual Airbridge):

This project seeks to provide a second dual airbridge docking solution to Pier 3 to meet demand (the growth in widebody docking on Pier 3). The project includes the addition of a new airbridge, rotunda & fixed link. Stand 315C has been identified as the preferred location for the proposed second dual airbridge docking solution. Note: Terminal 1 currently only has one stand (316) with dual-airbridge docking capability. The growth in widebody long-haul operations has resulted in Pier 3 now operating at maximum capacity with scheduled widebody operations every morning.

DublinAirport

CIP.20.02.004
Passenger Boarding Bridges (Maintenance and Pier 3 Enhancements) & Fixed Electrical Ground Power

Fixed Electric Ground Power (FEGP):

Fixed Electrical Ground Power (FEGP) units are installed at airports to provide electrical power to aircraft while they are on stand e.g. during turnarounds and while parked e.g. for overnight maintenance activities. This project seeks to provide the following:

- **Replacement of 27 No Pier 4 FEGP units with modern solid-state technology. The existing 27 No units are approaching the end of their asset life. The proposed replacements are more reliable than the existing technology which will result in greater availability, less downtime and lower maintenance costs.**
- **The installation of 33 No FEGP units to stands on Pier 1, Pier 2 and Apron 5G. Expanding the FEGP availability to the wider airfield is a key business development, sustainability and customer objective for Dublin Airport.**

CIP.20.02.004
Passenger Boarding Bridges (PBB) & Fixed Electrical Ground Power (FEGP)

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Experience	**Total Capex requirement** €18.1m
Underpinning Assumptions and Cost Benchmarks	• PBB Costs based on recent costs for PBB Replacement and for similar Upgrade Works • FEGP Costs based on recent tendered rates	
Opex Impact	• Operating costs estimated at €0.3m p.a. this is for increased costs for energy and maintenance.	
Project Output	• Pier 3 Dual Airbridge Installation. • Pier 3&4 PBB Control Systems Upgrade 25 No. PBBs • Pier 2 3& 4 PBB Flooring Replacements, Weathering and Cable Loom replacements. • Pier 4 FEGP Replacements (27 no PBB Mounted FEGP) • FEGP Installation to Pier 1, Pier 2 & 5G (33 No Ground Mounted FEGP)	
Asset Life	• 15 Years	

Project Delivery Key Milestones	
Pier 3 Dual Airbridge	**Q2 2020**
Pier 3 A/B's Painting and Weathering	**Q1 2020**
Pier 3&4 A/B Control Systems Upgrade 26 No A/Bs	**Q4 2022**
Pier 4 A/Bs Flooring Replacement	**Q1 2022**
Pier 3 A/Bs Flooring Replacement	**Q1 2022**
Pier 4 A/Bs Cable Loom Replacement	**Q1 2024**
FEGP Pier 4 Ground Power Replacements	**Q3 2020**
Pier 2, 11 No FEGP	**Q2 2023**
Pier 1, 8 No FEGP	**Q3 2020**
Apron 5G, 14 No FEGP	**Q3 2024**

CIP.20.02.004
Passenger Boarding Bridges (PBB) & Fixed Electrical Ground Power (FEGP)

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	3%	€513,995
Construction Costs	76%	€13,706,525
Escalation, Contingency & Design Variability	21%	€3,846,651
Total		**€18,067,171**

LEVEL2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General allowance- Design & Management Costs	€13,706,525	4%	€513,995	€513,995
Total-tosummary				**€513,995**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Air Bridges				
Electricity Distribution to External Plant and Equipment (incl. Telecommunications)	Redacted Cost Information			
Minor Building Works & Ancillary Buildings				
Main Contractors Preliminaries				
Other Development Costs				
Total-tosummary				**€13,706,525**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€14,220,520	27%	€3,846,651	€3,846,651
Total-tosummary				**€3,846,651**

CIP.20.02.005
Lift Refurbishment & Replacement Programme for Terminal and Multi Story Buildings

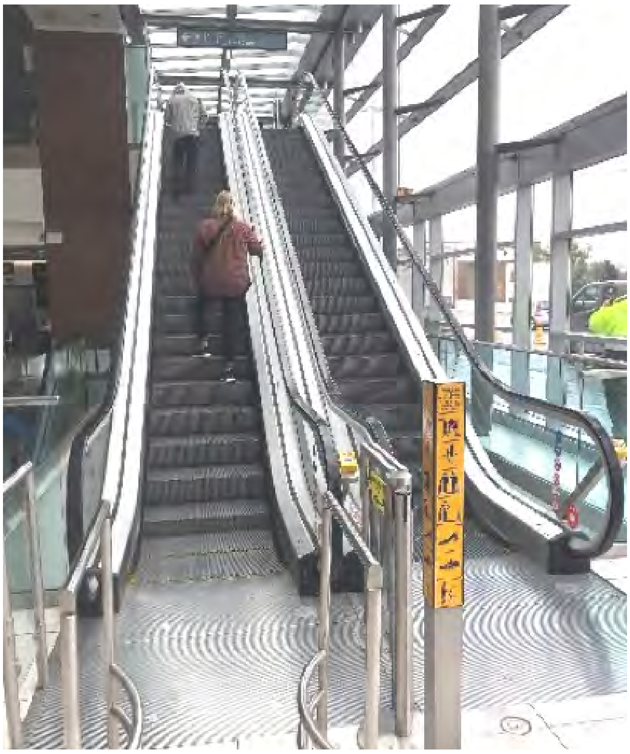
Project Summary

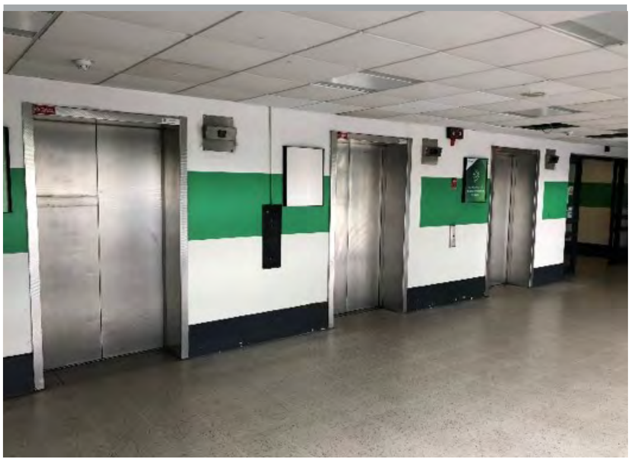
- **This project entails the end of life replacement of passenger and business critical lifts & escalators, refurbishment upgrades, lift door replacements and controller upgrades to lifts and escalators.**

Lifts, Escalators and Travellators are provided in Terminals and Multi Story Carparks in Dublin airport to ensure the efficient vertical circulation of passengers, airport users, staff, baggage trolleys and goods. They are particularly important to meeting the vertical movement requirement of Passengers with Reduced Mobility (PRMs). In the next 5 years many of Terminal 1 Lifts, Escalators and Travellators will have exceeded 25 years in service.

This project seeks to achieve the following:

- **Complete phase 1 of a 2 phase Terminal 1 lift and escalator replacement programme, component upgrade to extend equipment life and reliability and refurbishment of Lifts and escalators to extend asset life. Phase 1 requires the full replacement of 6 lifts & 4 No Escalators. Note: Several of the lift shafts will also require altering to satisfy new EN standards.**
- **Installation of a lift monitoring technology across terminals, carparks and campus buildings to allow for accurate monitoring of lift performance, optimised maintenance, improved availability, instantaneous notice of lift failures and passenger lift entrapments;**
- **Replacement of 13 No Lift Door Replacements for Heavy Goods Lifts across both terminals and door controller upgrades in T1**
- **Complete replacement of 7 lifts and 3 escalators in T1 Multi Story Car Park. These lifts and escalators have in the past received a midlife rebuild but are now end of life.**





CIP.20.02.005
Lift Refurbishment & Replacement Programme for Terminal and Multi Story Buildings

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Experience	**Total Capex requirement** €6.2m

Underpinning Assumptions and Cost Benchmarks	• Costs based on providing fully operational lifts in compliance with current building Regulations
Opex Impact	• No material opex impact.
Project Output	• PT1 Lift Replacement Programme (Phase 1) • MSCP Blocks A, B&C Lift Replacements (7 Lifts) • T1 & T2 Lift & Escalator Capital Upgrades (Doors, controls, controllers and Lift Monitoring system) • T1 Escalator Replacement Programme (Phase 1) • T1 MSCP Replacement of 3 No Escalators
Asset Life	• 20 years

Project Delivery Key Milestones	
Terminal 1 replacement programme (6 lifts & 4 Escalators)	**Q1 2023– Q2 2024**
Terminal 1 MSCP replacement programme (7 lifts & 3 Escalators)	**Q1 2021 – Q1 2023**
Lift Door Replacements (13 No)	**Q2 2020 – Q2 2021**
Terminal 1 Lift Monitoring system	**Q4 2020 – Q2 2021**
Upgrading Escalator Controllers (21 No)	**Q3 2020 – Q2 2021**

CIP.20.02.005
Lift Refurbishment & Replacement Programme for Terminal and Multi Story Buildings

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€369,000
Construction Costs	79%	€4,920,000
Escalation, Contingency & Design Variability	15%	€950,856
Total		**€6,239,856**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€4,920,000	8%	€369,000	€369,000
Total-to summary				**€369,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Lifts & Enclosed Hoists				
Escalators	Redacted Cost Information			
Other Development Costs				
Total-to summary				**€4,920,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,289,000	18%	€950,856	€950,856
Total-to summary				**€950,856**

CIP.20.02.006
Airport Water & Foul Sewer Upgrade

Project Summary

- **This project entails the replacement, upgrade and refurbishment of critical Airport Campus Utility Mains and Foul Water services.**

Mains Water:

Dublin Airport (DAP) is supplied with potable water from Ballycoolin Reservoir, via a 900mm diameter reducing to a 600mm diameter trunk main. From a connection on the 600mm trunk (owned by DAP) a two-cell reservoir with a 14,500 cubic metres capacity is supplied. The estimated length of DAP potable water mains is 32.5km, while the length of fire main on site is 6.7km. The two pipe networks overall contain approximately 550 sluice valves and 350 fire hydrants. The project for the mains ring entails the following

- **Installation of underground pipework to complete the mains water "Ring" between the terminals and the reservoir as this is currently a single point of failure;**
- **Installation of a Reservoir Mains Bypass to allow mains direct feeding of the Mains Water Ring main (eliminate risk of catastrophic failure or pollution in the mains water reservoir);**
- **Installation of a mains water interconnection from the T2 Domestic Water Storage to the T1 Domestic Water storage tanks to increase the T1 Water Storage capacity;**
- **Replacement of end of life and defective sluice valves, fire hydrants and sections of underground water mains.**

Foul Water:

The foul sewer infrastructure at Dublin Airport comprises a network of small sewer pipes from the two terminals and all campus buildings, a 450mm collector sewer and a 900mm outfall sewer. This outfall sewer in turn enters the Local Authority Owned Swords Road branch sewer, which then joins the Dublin City Council North Fringe sewer. While the main collector and outfall sewers convey under gravity, there are 5 No. ejector stations and 17 No. pumps installed to complete the system. The project for the foul water entails the following

- **End of life replacements of Ejector stations and pumping stations**
- **Replace sewer junctions. The South Apron to the main sewer outfall and an undersized junction between the ALSAA swimming pool and MC78.**

CIP.20.02.006
Airport Water & Foul Sewer Upgrade

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Environmental	**Total Capex requirement** €5.0m
Underpinning Assumptions and Cost Benchmarks	• T2–T1 Domestic Water Services Project Feasibility completed Q2/2018 • Mains Water Ring Main Completion between Hangar 6 & Reservoir costed as part of 5H • Mains Water Reservoir Bypass is a landside project and external rates should be accurate. • Replacement of Defective Valves and Fire Water Hydrants are localised works • Ejector Pump Replacements are localised projects. • Costs based on tender returns for similar works in 2017 and quotations from recently costed works. The replacement costs are based on Asset Care Opex and Capex costs for similar projects delivered in the last 2 years.	
Opex Impact	• No material Opex Impact.	
Project Output	• Mains Water Hydrant & Valve Replacements • Potable Water Resilience & Main Reservoir Upgrade (Terminal 1, Mains Reservoir Bypass, Completion of Ring at Hangar 6) • Replacement of Water Mains (North, South, and West Aprons and Corballis park) adjacent to M50 Garage • Foul System Upgrade Works (South Apron Outfall & Pumping Stations Upgrades)	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Airport Mains, Surface, Fire & Foul Water Upgrades:	**Q1 2020 – Q4 2024**
T1 Domestic Water Resilience	**Q3 2020 – Q3 2021**
South Apron & Corballis Park	**Q1 2021 – Q3 2021**
Mains Water Resilience Reservoir Bypass, Completion of Ring at Hangar 6, Replacement of mains water pipework and valves at North Apron and Hangars	**Q3 2020 – Q1 2022**
Address South Apron Complex Sewer	**Q1 2021 – Q3 2021**

CIP.20.02.006
Airport Water & Foul Sewer Upgrade

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€296,858
Construction Costs	75%	€3,710,725
Escalation, Contingency & Design Variability	19%	€945,629
Total		**€4,953,212**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,710,725	8%	€296,858	€296,858
Total - to summary				**€296,858**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Services - Water Mains Supply	Redacted Cost Information			
Ex Works - Supply to Building				
Ex Works - Fire mains & hydrant				
Main Contractors Preliminaries				
Other Development Costs				
Total - to summary				**€3,710,725**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,007,583	24%	€945,629	€945,629
Total - to summary				**€945,629**

CIP.20.02.007
Life Safety Systems (LSS) Replacement Programme Terminal and MSCP Buildings

Project Summary

- **This project entails replacement, upgrade and refurbishment of LSS (Life Safety Systems) infrastructure across terminals, piers and Carparks (adjacent to T1 & T2) to maintain system availability as required per regulatory service requirements.**

The LSS systems at Dublin Airport includes fire alarm, sprinkler, PAVA and other ancillary systems associated with fire detection, control and evacuation. The availability of LSS systems require continuous investment to ensure the terminal is fully compliant, failure to carry out these works could lead to non-compliance and subsequent closure. Due to the criticality of the LSS systems, target compliance must be 100%. Works required as part of this project include:

- **Fire Alarm Replacement Programme: Replacement of 90 fire alarm panels and circa 8000 devices in both terminals that will have exceeded or are approaching end of supported and maintainable life. This project identifies an upgrade of control and field components to ensure the required level of service is met. Opex and life cycle costs are key drivers behind the need for upgrades**
- **Fire and smoke damper replacement: Execution of Phase 3 smoke damper replacement (as per Michael Slattery Fire Consultants Report). Essential work to ensure complaint building fire compartmentation.**
- **Smoke extract fans: Replacement / upgrade smoke extract fans across both terminals.**
- **Static invertors: Replace end of life static invertors. Critical to ensure safe back-up power for Emergency lighting.**
- **PAVA: Replace Terminal PAVA system as it will be at end of life during the 2020-2024 CIP period. Required replacement of all active equipment (amplifiers, desk microphones, control software) as support and parts become obsolete.**

Note: The Terminal 1 Life Safety systems have been upgraded over the previous 2 CIP Periods. The funding sought from this project is to replace ageing assets >10 years old in next CIP period. Also, the Terminal 2 Fire Safety systems will be over 10 years old in the 2020-2024 CIP period.

CIP.20.02.007
Life Safety Systems (LSS) Replacement Programme Terminal and MSCP Buildings

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Regulation	**Secondary Driver** End of Life	**Total Capex requirement** €14.1m
Underpinning Assumptions and Cost Benchmarks	• Costs based on recent LSS Continuous improvement and Capital Projects	
Opex Impact	• No material impact on opex costs.	
Project Output	• T1 Fire Alarm, Static Invertors Replacement & Upgrade Programme • T2 Fire Alarm, Static Invertor and UPS & Ancillary Equipment Replacement & Upgrade Programme. • T1 Smoke Damper & Smoke Fans Replacement • T1 PAVA & Sprinkler Equipment Replacement & Upgrade Programme.	
Asset Life	• 10 Years	

Project Delivery Key Milestones	
T1 Fire Alarm Replacement	**Q3 2022– Q2 2024**
T2 Fire Alarm Panels & Device Replacement & MSFD Battery Replacement	**Q2 2023 – Q2 2024**
T1 & T2 Replacement of Static Invertors & Static Invertor Battery's	**Q3 2020 – Q1 2023**
T2 Major UPS Replacements	**Q3 2020**
T1 Smoke Fan Replacements	**Q2 2022 – Q1 2024**

CIP.20.02.007
Life Safety Systems (LSS) Replacement Programme Terminal and MSCP Buildings

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€914,214
Construction Costs	72%	€10,189,525
Escalation, Contingency & Design Variability	21%	€3,003,562
Total		**€14,107,301**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General allowance- Design & Management Costs	€10,189,525	7%	€764,214	€764,214
T1 Sprinkler System Capacity Review	€10,189,525	1%	€150,000	€150,000
Total-to summary				**€914,214**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Lighting Installation	Redacted Cost Information			
T1 Fire Alarm Panel Replacement Programme				
T1 Smoke Damper Replacement Programme				
T2 Fire Alarm & Head Unit Replacement				
PAVA Racks				
Fire Fighting System (Other)				
Other Development Costs				
Lighting Installation				
Total-to summary				**€10,189,525**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€11,103,739	27%	€3,003,562	€3,003,562
Total-to summary				**€3,003,562**

CIP.20.02.008
Terminal Buildings HVAC Replacement Programme

Project Summary

- **This project entails the upgrade of T1 MTHW and BMS Systems and replacement of End of Life Primary and Secondary HVAC Equipment.**

HVAC (Heating Ventilation & Air Conditioning) is required for passenger and staff comfort, heating of domestic water systems and temperature control of communication rooms and all other occupied locations. Works required as part of this project include:

- **T1 HVAC Programme: Continuation of upgrade to the T1 Central MTHW HVAC systems with replacement of the boilers, water heaters and associated energy controls. This work also incorporates the replacement of end of life major and minor chiller plants, major pumps, ancillary equipment and to continue the BMS upgrade programme started in the previous CIP.**
- **Refurbishment of the T1 Energy Centre: This work involves the replacement of primary boilers, CHP, pumps, hot water generators and pipework. The works will also require the hire of a fully controllable temporary boiler and hot water generator equipment for the duration of the works.**
- **T2 HVAC: The T2 HVAC system will be over 10 years old during the 2020-2024 CIP period, therefore this project includes for the replacement of primary circulation pumps and end of life secondary equipment such as door curtains and fan coil units. The work also includes upgrades to the T2 BMS operating system and field controllers**
- **T2 CHP Rebuild: The T2 CHP will require a major rebuild as part of this project. Upgrade of operating and control equipment is also required.**

The majority of the T1 HVAC distribution is 50 years old and has exceeded end of life.
The replacement of these systems is difficult and disruptive and will result in areas being taken out of service for considerable periods of time. The major areas requiring these works are Terminal 1 Basement, Level 4 & level 5 and Pier 1.

CIP.20.02.008
Terminal Buildings HVAC Replacement Programme

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Environmental	**Total Capex requirement** €17.8m
Underpinning Assumptions and Cost Benchmarks	• The current projects identified are listed as individual projects. • BMS system: upgrade of T2 system with current versions of software and controllers and to replace the entire T1 system on a phased basis (online with other projects)	
Opex Impact	• Upgraded system in Terminal 1 will deliver a reduction in energy costs of circa €0.15m per annum. •	
Project Output	• T1 HVAC Upgrade T1 Energy Centre Refurbishment / Decentralisation & CHP • T1 BMS Upgrade • T1 Chiller & Ancillary HVAC Equipment Replacements • T1 Domestic Water & Electrical Boards Upgrade works • T2 CHP4 Mid Life Rebuild • T2 BMS Upgrade & Minor HVAC Pumps and Equipment Replacement	
Asset Life	• 20 Years	

Project Delivery Key Milestones	
T1 HVAC Upgrade & T1 BMS Upgrade (1, 2 & 6)	**Q1 2020 – Q2 2024**
T1 Chiller Replacements (3)	**Q3 2020 – Q2 2021**
Terminal 1 Domestic Water Services Upgrade	
T1 & T2 HVAC Minor Equipment Replacement (4,10)	**Q3 2020 – Q3 2021**
T2 BMS Software and Controller Upgrade	**Q2 2021 – Q2 2022**
T2 Minor HVAC Pumps and Equipment Replacement	**Q3 2021 – Q3 2024**

CIP.20.02.008
Terminal Buildings HVAC Upgrade Programme

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€1,002,459
Construction Costs	75%	€13,366,125
Escalation, Contingency & Design Variability	19%	€3,412,539
Total		**€17,781,123**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€13,366,125	8%	€1,002,459	€1,002,459
Total-to summary				**€1,002,459**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Domestic Water Distribution				
Central Heating & Cooling: T1 MTHW upgrades (incl. T1 Energy Centre refurbishment)				
Central Heating & Cooling: Other				
Ventilation Systems: Central Ventilation				
Ventilation Systems: Local & Specialist Ventilation	Redacted Cost Information			
Ventilation Systems: BMS System				
Elec: Mains & Sub mains distribution				
Elec: Local Generation Systems				
Minor Build Works and Ancillary Buildings				
Main Contractor Preliminaries				
Total-to summary				**€13,366,125**
Escalation, Contingency & Design	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€14,368,584	24%	€3,412,538	€3,412,538
Total-to summary				**€3,412,539**

CIP.20.02.009
Campus Buildings - Mech., Elec. & LSS Upgrade

Project Summary

- **This project identifies the required upgrades of Mechanical, Electrical and Life Safety Systems to the DAP Campus buildings to ensure buildings are compliant with Regulatory Standards and facilities are fit for use (maintained on a risk-based approach).**

The Dublin Airport (DAP) strategy for maintaining Campus buildings has been to maintain and refurbish the facilities and services where necessary to improve asset performance and satisfy tenant requirement. For all refurbishments, the current approach is to deliver upgrade works to a minimum technical requirement whilst encouraging and utilising new equipment, materials and technology to reduce Whole Life Cycle Costs and improved tenant comfort and the sustainability of the facility.

The two key components of this project are as follows:

- **Life Safety Systems: The upgrade of Life Safety Systems and other statutory systems are prioritised as they are a legal requirement. This project requires LSS fire alarm replacement in a number of buildings.**
- **M&E Systems (predominately HVAC): The upgrade of campus buildings HVAC systems is required to ensure Dublin Airport meets customer service and regulatory Energy and Sustainability targets. The investment approach is centred around life cycle analysis, reinvestment and intervention where failure is likely to occur. The projects identified are mainly the replacement of local boilers and heating systems, incorporation of low level controls and replacement of local electrical distribution boards and re-wiring where required.**

CIP.20.02.009
Campus Buildings - Mech., Elec. & LSS Upgrade

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Regulation	**Secondary Driver** End of Life	**Total Capex requirement** €9.5m
Underpinning Assumptions and Cost Benchmarks	• Upgrade costs (for most projects) are based upon minimum technical solutions delivered by asset care to achieve regulatory, sustainability and tenant requirements.	
Opex Impact	• Nil opex impact as reduction in energy costs will be offset by a reduction in energy recharges passed onto concessionaires.	
Project Output	• Mechanical, electrical and life safety systems compliant campus buildings as per regulatory, sustainability and tenant requirements.	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Campus Buildings – Mech., Elec, & LSS upgrades:	**Q1 2020 – Q4 2024**	

CIP.20.02.009
Campus Buildings - Mech., Elec. & LSS Upgrade

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€573,705
Construction Costs	77%	€7,262,086
Escalation, Contingency & Design Variability	17%	€1,640,619
Total		**€9,476,410**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€7,262,086	8%	€573,705	€573,705
Total-to summary				**€573,705**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Campus Small Energy Projects	Redacted Cost Information			
Campus building LSS replacement Projects				
Campus building Elec MDB replacement programme				
Lighting Upgrades to Campus Buildings				
Landside Base Expansion				
Collinstown House				
Cloghran House				
Others (31 other buildings)				
Total-to summary				**€7,262,086**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,835,791	21%	€1,640,618	€1,640,618
Total-to summary				**€1,640,619**

CIP.20.02.010
Pier 3 Life Extension Works - Mech, Elec and Foul Drainage

Project Summary

- **This project proposes life extension works to Pier 3 to ensure the facility meets current Health and Safety requirements and improves the overall passenger experience. The project includes the replacement of M&E plant and equipment and upgrade of foul waste system.**

Pier 3 was constructed in the early 1970's and has been continually maintained over this period to ensure an acceptable level of service whilst maintaining statutory requirements with a number of passenger experience capital projects completed during the last CIP. The two key components of this project are as follows:

Mech & Elec – Plant and Equipment:

One of the key drivers behind this upgrade project is the non-compliance of the existing Pier 3 central service core. The Pier 3 M&E services plant and equipment (in service since the early 1970's) are contained within a central services core which is now categorised as a confined space as per the current Building Regulations. Subsequently access and egress to the area is now restrictive. This project proposes:

- **Decentralisation and replacement of mechanical and electrical equipment: All mechanical equipment is end of life and it is proposed to replace and relocate to available roof. A new external services riser is required to connect the plant and equipment.**
- **Note: The project will require careful planning and co-ordination as the Pier operation and level of service cannot be interrupted and tie ins to existing primary M&E services will require specialist intervention.**
- **Relocation and upgrade of electrical services: All electrical services are to be moved out of the core with a safe access central electrical switch room provided. Full re- wire of primary and secondary electrical services and local distribution boards is also required.**

Foul Waste:

The collection of foul waste also requires re-design in Pier 3. The current design comprises of a below ground level retention tank which is accessed via an internal 'bolted lid'. The location of tank is now categorised as a confined space as per current Building Regulations. The tank also possesses a biological hazard as the foul waste becomes pressurised and has in the past caused local soiling. The project proposes:

- **Relocate foul waste service: All foul waste services in Pier 3 are to be relocated to an external ramp secondary storage tank / ejector station with connectivity to the main head of stand foul sewer.**

CIP.20.02.010
Pier 3 Life Extension Works - Mech, Elec and Foul Drainage

Project Details Summary		
Category: Capital Maintenance		
Primary Driver End of Life	**Secondary Driver** Customer Expectation	**Total Capex requirement** €14.0m
Underpinning Assumptions and Cost Benchmarks	• Upgrade to be compliant with current health and safety standards. • Large areas of the Pier require complete re-wiring.	
Opex Impact	• No material impact on opex.	

Project Output	• T1 Pier 3 HVAC Replacement • T1 Pier 3 Electrical Replacement • T1 Pier 3 Drainage / Foul Sewer Upgrade
Asset Life	• 15 years
Project Delivery Key Milestones	
M&E Plant and Equipment	**Q2 2021 – Q3 2023**
Foul Waste upgrade	**Q2 2021 – Q2 2023**
Pier 3 Façade upgrade	**Q2 2023 – Q2 2024**

CIP.20.02.010
Pier 3 Life Extension Works - Mech, Elec and Foul Drainage

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€1,260,918
Construction Costs	72%	€10,087,343
Escalation, Contingency & Design Variability	19%	€2,695,212
Total		**€14,043,473**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€10,087,343	13%	€1,260,918	€1,260,918
Total-to summary				**€1,260,918**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T1 Pier 3 HVAC Replacement				
T1 Pier 3 Electrical Replacement				
T1 Pier 3 Drainage /Foul Sewer Upgrade inc Sump/Pumps and Lines	Redacted Cost Information			
Main Contractor Preliminaries				
Design Development				
Total-to summary				**€10,087,343**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€11,348,261	24%	€2,695,212	€2,695,212
Total-to summary				**€2,695,212**

CIP.20.02.013
Small Energy Projects

Project Summary

- **This project proposes using new energy efficient and sustainable equipment and control systems for the purposes of improving energy consumption, reducing energy cost, reducing carbon emissions, improving air quality and reducing noise. The project entails a range of works across Energy Utilities, HVAC, Transport and Lighting that will replace, upgrade and install new systems across the campus.**

Compliance with recent legislation and policy statements will require Dublin Airport to upgrade existing systems and equipment to improve energy consumption and environmental performance. At a time of increased cost, market volatility and climate change awareness the co-benefits of cost, sustainability and social responsibility represented by the projects cannot be overstated. The most notable legislation and policy statements applicable to DAP include:

- **Clean Energy for all Europeans (Clean Energy Package, CEP)**
- **National Energy Efficiency Action Plan (NEEAP) and National Mitigation Plan (NMP)**
- **iSEM (Integrated Single Electricity Market)**

The works associated with this project include:

- **Terminals Lighting Upgrades: Continuation of the conversion of the Terminal buildings to full LED lighting systems.**
- **Campus and Road Lighting Upgrades: Upgrade of the road and street lighting around the campus to latest LED technology.**
- **Electrical Demand Management: The provision of technology and control systems to reduce Time of Use (TOU) electrical tariffs at peak times on campus. The technologies include battery storage systems and microgrid management that will also allow for future revenue generation. Implementation of the works will allow a reduced electrical recharge rate to tenants and concessionaires on campus.**
- **Thermal Demand Management: The continued improvement in thermal infrastructure across stand-alone campus buildings. Retrofit of oil to natural gas for heating, and the use of thermal storage systems and improved building management systems to reduce cost and maximise efficiency. Conversion to natural gas also facilitates the emergence of bio gas onto the nation gas network.**
- **Gas & Water monitoring and Power Generation: Telemetry and automatic monitoring systems to ensure continuous improvement. Localised and smaller distributed power generating systems to be used to ensure minimal reliance on the main electrical network.**

CIP.20.02.013
Small Energy Projects

Project Details Summary		
Category: Capital Maintenance		
Primary Driver Regulation	**Secondary Driver** Environmental	**Total Capex requirement** €4.8m
Underpinning Assumptions and Cost Benchmarks	• Costs based on recently completed project Consultation with industry	
Opex Impact	• Energy savings of approx. €300k/annum will be delivered by the project.	
Project Output	• Terminals Lighting Upgrades • Campus road and street lighting upgrades • Battery Storage and microgrid control systems • Heating and thermal energy storage systems • Localised small-scale power generation at remote buildings • Gas and Water Network Telemetry Upgrades, Bore Well provision • Revenue stream from electrical demand and capacity markets.	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Small Energy Projects – Dublin Airport	**Q1 2020 – Q4 2024**	

CIP.20.02.013
Small Energy Projects

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	7%	€337,099
Construction Costs	93%	€4,494,656
Escalation, Contingency & Design Variability	0%	€0
Total		**€4,831,755**

LEVEL2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€4,494,656	8%	€337,099	€337,099
Total-tosummary				**€337,099**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Campus Lighting LED upgrades				
Terminals LED Upgrades				
Electrical Demand Management				
Thermal Demand Management Projects		Redacted Cost Information		
Power Generation				
External Street Lighting Systems				
Main Contractor Prelims				
Other Development Costs				
Total-tosummary				**€4,494,656**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,831,755	0%	€0	€0
Total-tosummary				**€0**

C CAPACITY

APPENDIX C
Capacity

Appendix C - Capacity		Terminal 1	Terminal 2	Airfield	Page
CIP Number	Project Title	Provisional Estimate €m (October 2018)			
CIP.20.03.004	Gate Post 9 Expansion (West Lands)			€9.2	C-2
CIP.20.03.006	Terminal 1 Kerbs	€19.9			C-5
CIP.20.03.011	Terminal 1 Check-In (Island 1 & 2)	€23.7			C-8
CIP.20.03.012	Terminal 1 Central Search - Relocation to Mezz Level	€49.8			C-11
CIP.20.03.013	Terminal 1 Departure Lounge (IDL) Reorientation and Rehabilitation	€42.9			C-14
CIP.20.03.015	Terminal 1 Baggage Reclaim Upgrade & Alterations	€39.1			C-19
CIP.20.03.017	Terminal 1 Shuttle, bus lounges and injection points	€2.0			C-23
CIP.20.03.020	Terminal 2 Check-in Area Optimisation		€9.8		C-26
CIP.20.03.021	Terminal 2 Central Search Area Expansion		€13.6		C-29
CIP.20.03.028	Terminal 2 Early bag store and transfer lines		€27.9		C-32
CIP.20.03.029	New Pier 5 (T2 and CBP Enabled)		€304.1		C-36
CIP.20.03.030	Expansion of US Pre-Clearance Facilities		€46.4		C-41
CIP.20.03.031	South Apron Expansion (Remote Stands, Taxiway and Apron)		€95.8		C-46
CIP.20.03.034	Pier 3 Immigration (Upgrade & Expansion)	€6.1			C-50
CIP.20.03.036	North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ	€187.9			C-54
CIP.20.03.040	North Apron De-icing pad	€6.1			C-60
CIP.20.03.051A	West Apron Vehicle Underpass – Northern Pier 1 Option			€85.0	C-63
CIP.20.03.052	Surface Water Environmental Compliance			€51.0	C-67
CIP.20.03.054	New Remote Apron 5M - 10 NBEs			€60.1	C-71
CIP.20.03.057	Airside GSE Charging Facilities (Ground Handlers)			€5.0	C-74
TOTAL		€378	€498	€210	

CIP.20.03.004
Gate Post 9 Expansion (West Lands)

Project Summary

- **Dublin proposes the construction of a new Gate post similar to the existing gate post 4 with dedicated lanes for construction traffic to improve the efficiency of works on the West campus of the airport.**

The existing Gate Post 9 opened in January 2016 as part of the delivery of the CPSRA project, and was designed and delivered with a life of just 7-8 months to allow construction of a permanent gate post. The approval for continued use of the temporary post was extended to July 2020 when the original 'permanent post' solution did not proceed. This proposed development will provide access to the CPSRA for all stakeholders operating West of Runway 16-34 and should safeguard for future expansion to increase capacity at the post for all airport and construction operations.

While the primary driver to construct a new gate post 9 is a security requirement, there are also operational benefits/drivers;

- **The existing Gate post 9 was delivered as a temporary solution in lieu of permanent gate post at Westlands. It continues to operate under a temporary approval from IAA, which has been extended until July 2020 on the premise that the permanent solution (this project) is delivered before the approval expires.**
- **The temporary gate post was purchased as a used modular unit with an intended life of 7-8 months. As such, it is now incurring additional OPEX costs to maintain, as it was not designed to facilitate the volume of throughput that it is now experiencing.**
- **Operational demand is also exceeding capacity, with numerous conflicts between cargo and construction traffic being reported, which is also resulting in delays to the cargo operations. This reinforces the requirement for dedicated construction lane(s)**
- **The requirement to permanently relocate additional cargo operators to the West Campus in the short-medium term to release valuable stand capacity East of Runway 16-34 will further increase the volumes of traffic accessing the airfield via Gate 9. This includes conflict between operating times of cargo traffic, which is driving the requirement for a second entry lane. The relocation of some cargo operations is currently contingent on the provision of a second entry lane.**

This project will consist of a 5 lane Vehicle Check Point with 4 inbound lanes and 1 outbound lane. 2 no. inbound lane will be designated for construction traffic only with the other 2 inbound lanes for other airport operations. The lanes will be covered by a canopy and will be provided with all the equipment to function as a vehicle airlock. A control post with all the security requirements will be constructed. The facility will be equipped with all the necessary security equipment.

CIP.20.03.004
Gate Post 9 Expansion (West Lands)

The design of the VCP will be similar to the existing VCP4 which has proven to perform more than adequately. The area will include a car park and equipped staff facilities to provide a comfortable working environment.

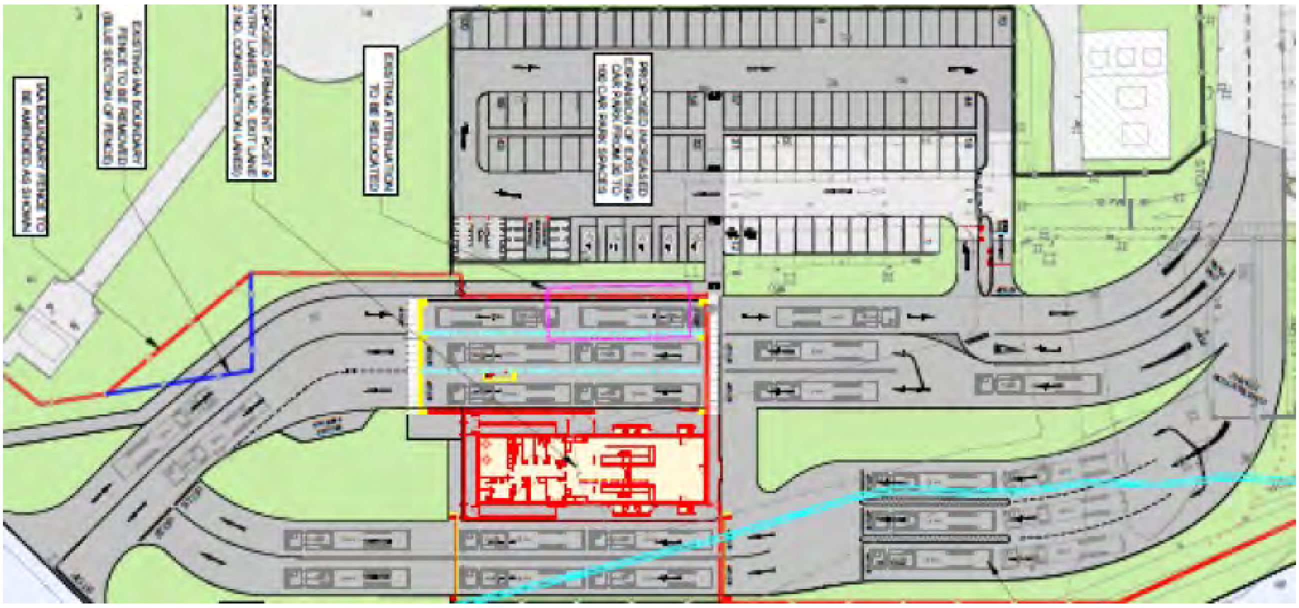


Exhibit 1. Plan view of the proposed Gate Post 9 layout

CIP.20.03.004
Gate Post 9 Expansion (West Lands)

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity Constraint	**Secondary Driver** Security	**Total Capex requirement** €9.2m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) • This cost does not include the requirement to re-locate and infill existing attenuation tank (132m2) built for the CPSRA project in the event of further expansion of the gate.	
Opex Impact	• Increased opex costs of €0.6m p.a. for additional resources manning the increased number of lanes at the gate post.	
Project Output	• A 5 lane Vehicle Check point. 4 inbound lanes and 1 outbound lane. 2 inbound lane will be designated for construction traffic only with the other 2 inbound lanes for other airport operations. • Control post with all security requirements • Perimeter Security mitigations – boundary breach etc. • Entry and exit barrier control with panic alarm • ASU stations • Turning circle for rejected vehicles turn around and exit after entering the airlock • Airside layby for escort vehicles to pull in/wait • Hostilevehicle mitigations at the 90 degree turn to the post. Delta Blocks • Security equipment for scanning pedestrians / drivers (2 lanes) • Car parking	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q3 2018**
Planning complete	**Q2 2019**
Detailed design complete	**Q1 2019**
Procurement complete	**Q2 2019**
Construction commence	**Q2 2019**
Construction complete	**Q1 2020**
Project handover	**Q2 2020**

CIP.20.03.004
Gate Post 9 Expansion (West Lands)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,190,000**
Construction Costs	**64%**	**€5,950,000**
Escalation, Contingency & Design Variability	**23%**	**€2,090,000**
Total Installed Cost (TIC)	**100%**	**€9,230,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€5,950,000.00	20%	€1,190,981	€1,190,981
Total - to summary				**€1,190,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Substructure				
Superstructure - Frame				
Superstructure - Others				
Internal Finishes				
Fitting /Furnishings & Equipment				
Services				
External Works				
Main Contractors Preliminaries				
Total - to summary				**€5,950,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€2,087,600	€2,087,600
Total - to summary				**€2,090,000**

CIP.20.03.006
Terminal 1 Kerbs

Project Summary

- **Dublin Airport proposes the relocation of Terminal 1 drop-off kerbs to the other side of the Multi Story Car Park as envisaged in the Masterplan and retrofitting of the atrium to become the new gateway to the airport.**

Terminal 1 kerb side departures level traffic is currently beyond capacity. To accommodate future growth the drop off kerb requires lengthening and expansion.

A solution is required which considers potential future trends in security regulation. It is anticipated that a minimum clearance distances between public cars and the façade entrance to terminals may become mandatory, as it has in the UK. It is therefore prudent to develop additional kerb capacity remote from the terminal.

This area is identified in the Masterplan as the Ground Transport Centre (GTC) it is an important multifunctional public realm that will become the main access point to the airport. This area will contain the future metro station, main drop-off pick-up facilities, short-term multi-story carparks and coach services. Operational efficiency, commercial offering and architectural quality of this space will all be critical to its success.

This project proposes to build the following components as a first phase to developing the GTC to become the new gateway to the airport:

- **Relocation and increase in the Terminal 1 kerbs drop off to the other side of the multi-storey car park (MSCP) where bussing services are currently located**
- **A refurbished MSCP atrium space with passenger segregation to become the new entrance to Terminal 1 with a canopy extending either way from Terminal 1 forecourt to the kerb set-down areas at the GTC**
- **Reconfiguration of vehicle access and pedestrian routes to and from the GTC and the main road network around the airport**

This proposal has the added benefit that it safeguards against future regulation change by moving public vehicles away from the face of T1. Public vehicles will now set down where the busses are currently located, and the bus bays will be reconfigured to a more space efficient new saw-toothed bay configuration to accommodate the displaced bussing services.

The existing Terminal 1 kerbsides will be reduced at departures will be used for registered vehicles only (Airport Police, hotel buses etc.) At arrivals level taxi and commercial bus services will remain as existing.

CIP.20.03.006
Terminal 1 Kerbs

Exhibit 1. Overall view of the new proposed GTC phase 1

Another focus area of this project is the retrofitting of the central Atrium to the MSCP building. This space will be enhanced to become the new entrance to the terminal with new stair lifts for passenger segregation to Departures and arrivals levels.

New canopies extending from the MSCP atrium into the GTC and Terminal 1 forecourt will provide shelter all along the passenger circulation area.

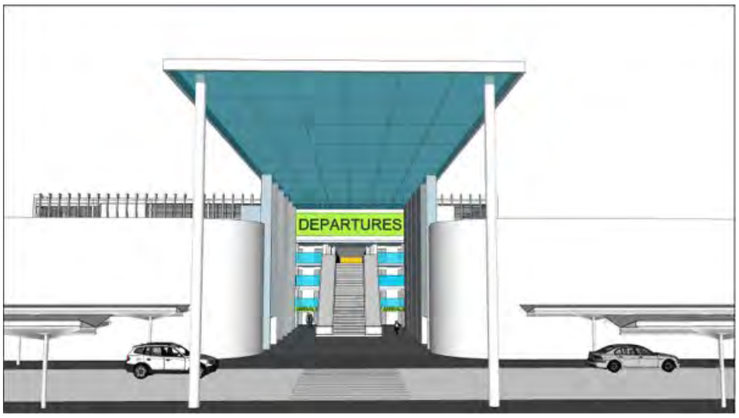


Exhibit 2. New entrance to terminal via MSCP atrium

CIP.20.03.006
Terminal 1 Kerbs

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity Constraint	**Secondary Driver** Security	**Total Capex requirement** €19.9m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Provision of additional private vehicle and coach set down • Safeguarding for potential future standoff distance • Safeguards for future link to Metro Pavilion • Retains Church • Does not include for potential disruption from the development of or final design of potential Metrolink station Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Increased kerb lengths will require additional policing; however, it will be accommodated within current resources.	
Project Output	• Departures forecourt split between existing forecourt and new private vehicle parking in horseshoe • Existing forecourt retained for premium product and registered vehicles • New set down and coach parking in horseshoe • Ground level routing for passengers with implementation of zebra crossings • Improved passenger flows into Terminal 1	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Detailed design complete	**Q4 2019**
Procurement complete	**Q4 2020**
Construction commence	**Q4 2020**
Construction complete	**Q4 2021**
Project handover	**Q2 2021**

CIP.20.03.006
Terminal 1 Kerbs

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€2,500,000**
Construction Costs	**64%**	**€12,490,000**
Escalation, Contingency & Design Variability	**23%**	**€4,920,000**
Total Installed Cost (TIC)	**100%**	**€19,910,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€12,490,000	20%	€2,497,202	€2,497,202
Total - to summary				**€2,500,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works				
Buildings	Redacted Cost Information			
Airfield				
Total - to summary				**€12,490,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€4,918,239	€4,918,239
Total - to summary				**€4,920,000**

CIP.20.03.011
Terminal 1 Check-In (Island 1 & 2)

Project Summary

- **Dublin Airport proposes the redesign of the check-in hall to provide new check-in capacity, and modifications to the reconfigured circulation areas.**

With anticipated growth in passenger numbers, as well as the increasing number of airlines operating at Dublin Airport, the existing check-in provision will not meet anticipated demand.

Increased demand drives the requirement for more check-in positions, self-service kiosks (SSK's), and bag drop points and queueing areas. An increase in the number of passengers transiting through to the central search area also requires improved circulation areas within the hall.

This project falls within the Terminal 1 development and is driven by the following:

- **Check-in demand requirements hall requirements**
- **SSK and bag drop requirements**
- **Circulation areas to service increase passenger numbers and desks, SSKs and bag drop positions**

This project proposes the reinstatement of a check-in island 1, (Area 1 and 2). The project provides a single island configuration with new check-in desks and additional SSKs throughout the hall. It also allows for the modification of entrance lobbies to increase circulation space within the hall. A total of five Airline counters and offices will be located to the front of the six SSKs locations and will provide assistance to departing passengers. A variant to this scheme is included in Appendix H for consultation.

Located behind the proposed seven island check-in desks additional space will be allocated for Landside food and beverage opportunities.

The forecourt will be moved out to align with the terminal's façade and provides additional space around the entrance lobbies

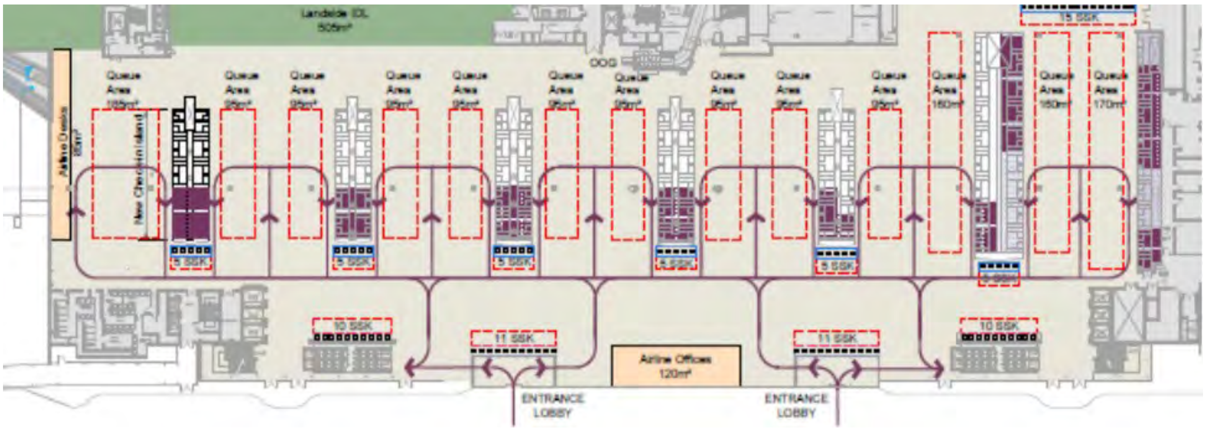


Exhibit 1. Proposed layout of check in hall in Terminal 1

CIP.20.03.011
Terminal 1 Check-In (Island 1 & 2)

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €23.7m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Provision of additional check-in processing capacity • Create better access, wayfinding and improve passenger flows within the Check-In facility • Existing security to be relocated to mezzanine level Cost assumptions: (refer to general cost assumptions) • Flooring to be made good • Minor allowance included for existing check in area and existing check in island counters to cover maintenance/very light touch refurbishment • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• • Opex increase of €0.7m p.a. for additional check-in deck and SSK running costs.	
Project Output	• Check-In Island Area 1-2 reinstated, adding 20 new positions • SSK's provided at front of Check In Islands • New Landside Food and beverage at check-in level • Airline Offices relocated to front of concourse • Entrance Lobbies pulled forward to align with T1 façade	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Detailed design complete	**Q4 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q1 2021**
Project handover	**Q1 2021**

CIP.20.03.011
Terminal 1 Check-In (Island 1 & 2)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€2,980,000**
Construction Costs	**64%**	**€14,880,000**
Escalation, Contingency & Design Variability	**23%**	**€5,860,000**
Total Installed Cost (TIC)	**100%**	**€23,720,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€14,880,000	20%	€2,975,042	€2,975,042
Total - to summary				**€2,980,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Airline Offices				
SSK & Check-in Desks				
Fit-out Works				
Total - to summary				**€14,880,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€5,859,345	€5,859,345
Total - to summary				**€5,860,000**

CIP.20.03.012
Terminal 1 Central Search – Relocation to Mezz level

Project Summary

- **Dublin Airport propose the relocation of the already congested central search area (CSA) to mezzanine level of T1**

During peak demand hours, the existing central security search has reached its capacity limit, resulting in a below standard service level. Additionally, the adjacent facilities of departure lounge and check-in are nearing their respective capacity limits.

In addition, there is no further space on the same level in which to extend when future technology requirements, such as C3 scanners, and anticipated passenger growth numbers (increased queuing), are considered.

To achieve an appropriate level of service, the anticipated overall space required exceeds the existing floor area available. Therefore, it is proposed to relocate central search to the mezzanine level above to provide a more seamless security screening process.

This project will be part of Terminal 1's development and is driven by the following:

- **The need to provide additional security processing capacity**
- **Safeguard for future body scanning demand**
- **Provide standard C3 scanning equipment**
- **Provide space for the growth of the check in area and the departure lounge**

The mezzanine floor will be enlarged, through the extension of the floor slab, with new floored areas to accommodate 11 ATRS security screening lanes. The floor will have two main dedicated check-in level access points; the first at the existing food court escalator and lift core, and the second escalator accessible from the eastern side of the check-in area (CIP 20.03.011). Main Passenger flows are further modulated through two security combs to enter the central queuing area. The passengers will access the extended departure lounge area (CIP 20.03.013) via a new vertical circulation core.

Construction works will be phased and aligned with other T1 projects.

CIP.20.03.012
Terminal 1 Central Search – Relocation to Mezz level

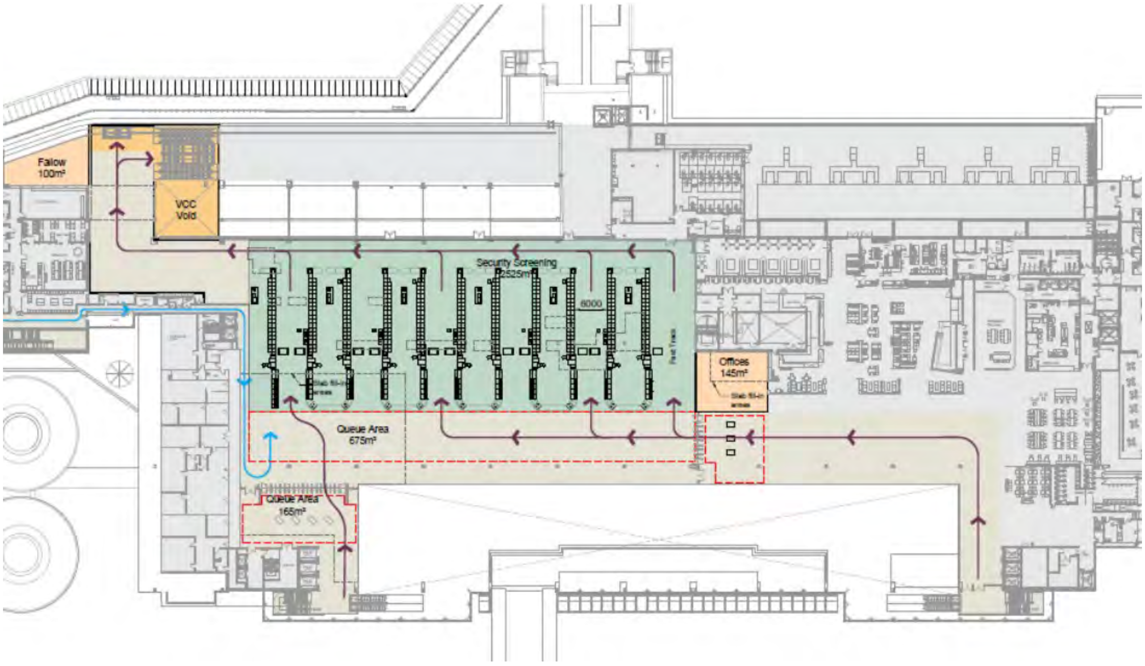


Exhibit 1. Layout of new proposed CSA at mezzanine level in terminal 1

CIP.20.03.012
Terminal 1 Central Search – Relocation to Mezz level

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** Business Volume Growth	**Total Capex requirement** €49.8m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • IAA submission required, and approval needed prior to implementation • Central Search facility to move to Mezzanine level • Slab infill at mezzanine level required • Safeguarding for increased body scanning demand Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) • **Costs exclude new security equipment**	
Opex Impact	• Opex increase of €0.8m p.a. for additional Customer Service Assistants.	
Project Output	• Space for 25m ATRS lanes added • Food and Beverage offer reduced • Slab infill as indicated • New Vertical Circulation Core (VCC)	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Detailed design complete	**Q4 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q4 2021**
Project handover	**Q4 2021**

CIP.20.03.012
Terminal 1 Central Search – Relocation to Mezz level

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€6,250,000**
Construction Costs	**64%**	**€31,260,000**
Escalation, Contingency & Design Variability	**23%**	**€12,320,000**
Total Installed Cost (TIC)	**100%**	**€49,830,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€31,260,000	20%	€6,252,498	€6,252,498
Total - to summary				**€6,250,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment to Mezzanine	Redacted Cost Information			
Vertical Circulation Core				
Structural Infill				
Equipment				
Total - to summary				**€31,260,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€12,314,295	€12,314,295
Total - to summary				**€12,320,000**

CIP.20.03.013
Terminal 1 Departure Lounge (IDL) Reorientation & Rehabilitation

Project Summary

- **Dublin Airport proposes to extend and reconfigure of the IDL facility with the addition of circulation, seating, lounges and food and beverage offerings**

During peak demand hours, the departures lounge reaches its capacity. As does the adjacent Central Search and Check-In areas. Given the anticipated growth in passenger numbers, the future capacity requirements, in terms of area, will exceed the international departure lounge's current hold capacity.

The relocation of the Central Search facilities (CIP 20.03.012) from the departures level of T1 to the mezzanine level provides additional areas which it is not proposed that the departure lounge will grow into.

This project falls under the Terminal 1 development and is driven by:
- **The need to provide additional passenger area for passengers dwelling in the departures lounge**
- **Enhance passenger experience at Terminal 1**

The project proposes an extended IDL where screened passengers, exiting from new mezzanine level's central search area, will descend to the newly expanded departure lounge. The expanding areas will include for new business lounges, circulation, orientation, food and beverage and retail offering.

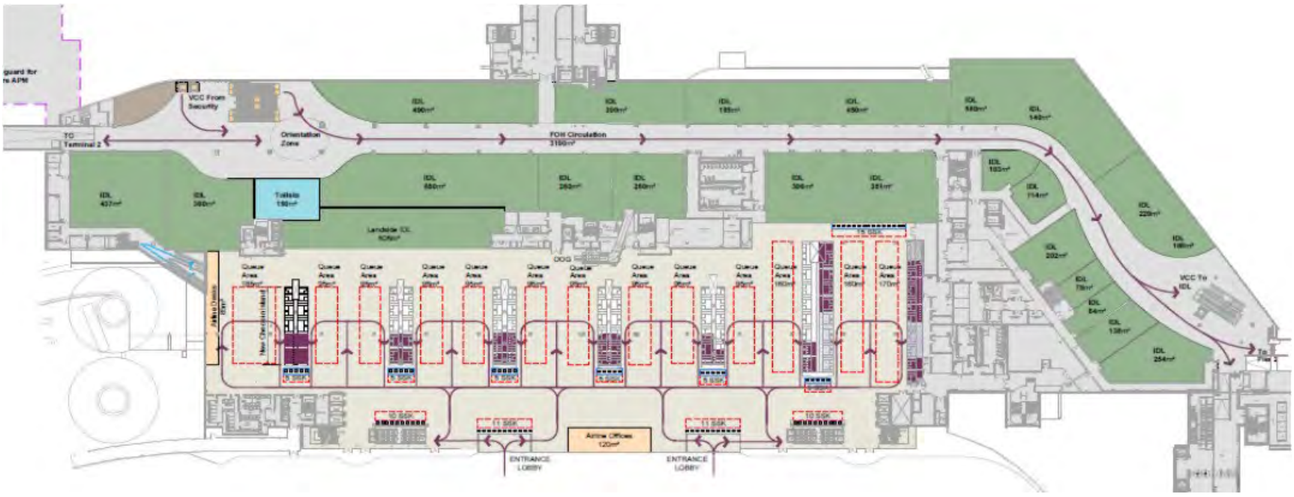


Exhibit 1. Proposed new layout of expanded IDL at Terminal 1

CIP.20.03.013
Terminal 1 Departure Lounge (IDL) Reorientation & Rehabilitation

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Business Development	**Total Capex requirement** €42.9m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • The central security screening area moves to the mezzanine level • Airline Lounges are relocated to IDL level Cost assumptions: (refer to general cost assumptions) • Cost estimate includes for providing new retail and F&B units in space previously occupied by security. • Minor allowance included for some minor maintenance works to existing retail and F&B units only • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Opex increase of €3m p.a. for additional retail staff and variable costs associated with larger retail footprint.	
Revenue Impacts	• Revenue increase of €6m p.a. for larger retail footprint.	
Project Output	• New Vertical Circulation Core (VCC) from Central Search directs passenger flows to the IDL • Extended departure lounge allowing for additional circulation space, retail, seating, food and beverage and business lounge offerings • Increased holding capacity for dwelling passengers and opportunity for fast track	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Detailed design complete	**Q4 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q1 2022**
Project handover	**Q1 2022**

CIP.20.03.013
Terminal 1 Departure Lounge (IDL) Reorientation & Rehabilitation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€5,380,000**
Construction Costs	**64%**	**€26,890,000**
Escalation, Contingency & Design Variability	**23%**	**€10,590,000**
Total Installed Cost (TIC)	**100%**	**€42,860,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€26,890,000	20%	€5,378,849	€5,378,849
Total - to summary				**€5,380,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Strip Out Existing Security Area				
New IDL Wait for Gate / F&B	Redacted Cost Information			
Refurbishment Existing Retail / F&B				
Total - to summary				**€26,890,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€10,593,642	€10,593,642
Total - to summary				**€10,590,000**

CIP.20.03.015
Terminal 1 Baggage Reclaim Upgrade & Alterations

Project Summary

- **Dublin Airport proposes the reconfiguration of the baggage reclaim hall to provide increased reclaim belt lengths, additional queueing space, improved circulation and general refurbishment.**

With the anticipated growth in passenger numbers, the existing hall’s capacity will not provide the circulation space requirement nor provide the length of reclaim belt length required to meet demand. Additionally, baggage hall’s existing finishes and appearance requires extensive refurbishment.

This project will deliver a redesigned hall. Increased reclaim belt lengths will be achieved by combining belts 6+7, the removal of belt 1 and amendment of belt 2. Belts 3-5 and 8-10 will remain with minor retrofitting works required. Additional queueing space around belts and widened circulation areas will further reduce passenger congestion resulting in the need for the relocation of landside wall (immigration hall).

This project forms part of the T1’s development and is driven by:

- **The need to relieve existing congestion in this area and improve circulation flows**
- **The need for additional baggage reclaim capacity**
- **Improve passenger experience by enhancing the appearance of the hall**
- **Provide a self-connect product for passengers at Terminal 1**

At the hall’s eastern end, a self-connect product opportunity is provided to allow passengers check-in their bags immediately after belt collection via a single check-in desk.

The project will also refurbish walls and ceiling finishes generally, to bring these finishes in line with the standard of the adjacent arrivals area.

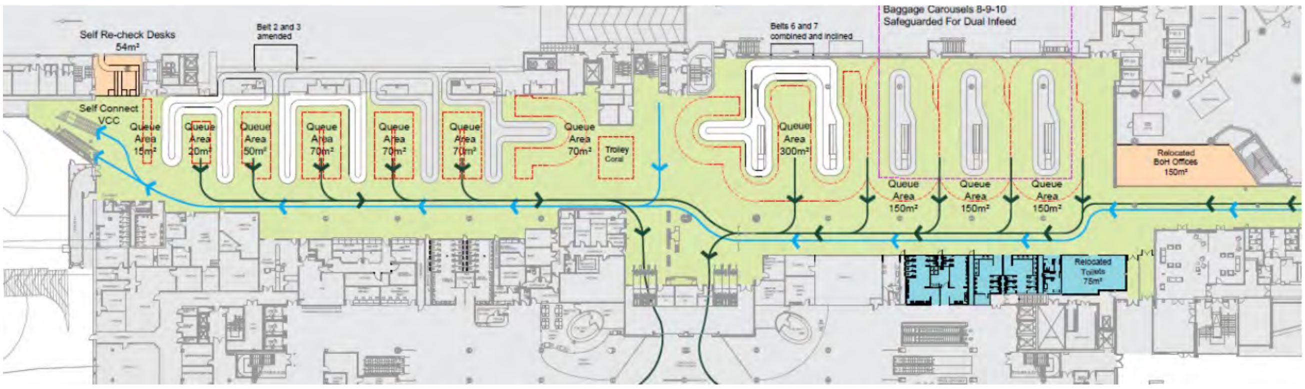


Exhibit 1. Proposed layout with enlarged belt and circulation corridors/areas

CIP.20.03.015
Terminal 1 Baggage Reclaim Upgrade & Alterations

Exhibit 2. Existing baggage reclaim hall

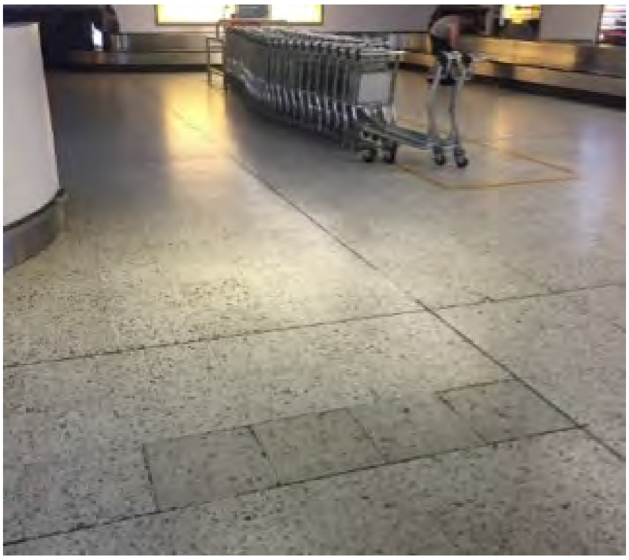


Exhibit 3. Existing baggage reclaim hall condition of floor

CIP.20.03.015
Terminal 1 Baggage Reclaim Upgrade and Alterations

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** User Requests	**Total Capex requirement** €39.1m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Internal areas around Reclaim Hall to be relocated/ refurbished to improve circulation in Arrival Hall • Widened and improved circulation • Belts can be extended and reconfigured belts for capacity • Connectivity to HBS subject to final design of HBS upgrade Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• N/A	
Project Output	• Widening of corridor post immigration hall to Reclaim Hall • Belt 1 removed • Belt 2, 3 amended and increased in length • Belts 6-7 combined • VCC adjacent to Belt 10 removed • Offices relocated adjacent to Immigration corridor • Toilets partially relocated; to be made good; flooring in this area to match existing front-of-house finishes • Floors and ceilings refurbished around baggage reclaim area • New self-connect check in desks provided	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Detailed design complete	**Q4 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q4 2022**
Project handover	**Q4 2022**

CIP.20.03.015
Terminal 1 Baggage Reclaim Upgrade and Alterations

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€4,910,000**
Construction Costs	**64%**	**€24,540,000**
Escalation, Contingency & Design Variability	**23%**	**€9,660,000**
Total Installed Cost (TIC)	**100%**	**€39,110,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€24,540,000	20%	€4,906,230	€4,906,230
Total - to summary				**€4,910,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment of Baggage Hall & Circulation Space	Redacted Cost Information			
Refurbishment / Construction of new toilets				
Construction of BOH offices				
Allowance for new floor and ceiling finishes to baggage hall				
Equipment				
Total - to summary				**€24,540,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€9,662,819	€9,662,819
Total - to summary				**€9,660,000**

CIP.20.03.017
Terminal 1 Shuttle, Bus Lounges and Injection Points

Project Summary

- **Dublin airport proposes the re-design and refurbishment of shuttle lounges, bus hold rooms, injection points and other bussing associated facilities.**

With the provision of a Pre-Boarding Zone (PBZ) on the North Apron and more operations in the Western Apron, there will be increased bussing demand. T1 provides bus gate capability at Pier 1, Pier 2 and at the ground level of the Old Central Terminal Building (OCTB).

This project will refurbish the Old Central Terminal Building ground floor to accommodate the anticipated passenger growth. The project includes the internal refurbishment of this hold room and associated facilities and the adjustment of the bus kerb to cater for the increasing bussing demand as the use of shuttle lounge.

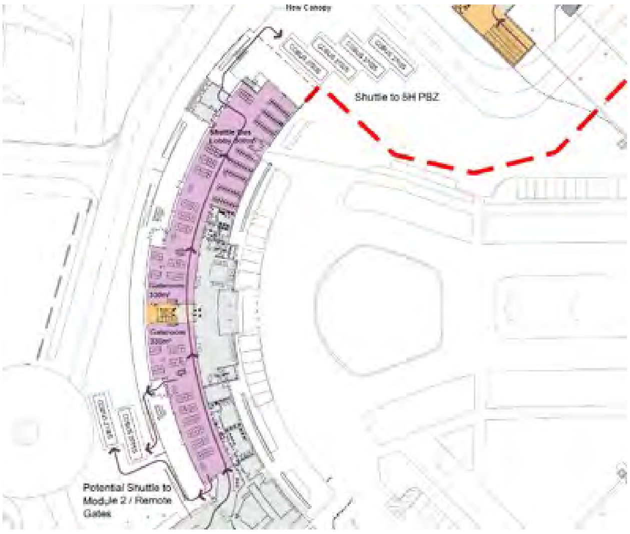


Exhibit 1: OCTB bus hold gate rooms and proposed area of refurbishment

The OCTB bus lounges will be another component of the airport's overall bussing strategy and also includes the newly constructed transfer facility, the proposed bus lounges in Pier 5, Terminal 1 injection points and exiting Pier 1 and 2 bus lounges.

CIP.20.03.017
Terminal 1 Shuttle, Bus Lounges and Injection Points

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** User Requests	**Total Capex requirement** €2m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • - Cost assumptions: (refer to general cost assumptions) • Main contractor preliminaries included at between 15% and 20% depending on project Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	Increased opex costs of €0.1m p.a. for additional staff to manage new injection points at terminals	
Project Output	• New bus lounges at OCTB • New bussed operation to remote stands • New injection points to Terminals • New shuttle bus operation to North Apron PBZ building	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q2 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q1 2022**
Construction commence	**Q3 2022**
Construction complete	**Q2 2023**
Project handover	**Q2 2023**

CIP.20.03.017
Terminal 1 Shuttle, Bus Lounges and Injection Points

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€250,000**
Construction Costs	**64%**	**€1,250,000**
Escalation, Contingency & Design Variability	**23%**	**€490,000**
Total Installed Cost (TIC)	**100%**	**€1,990,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€1,250,000	20%	€249,480	€249,480
Total - to summary				**€250,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment	Redacted Cost Information			
Building Works				
Glazed Canopy				
Adjustment to Blast Fence				
Total - to summary				**€1,250,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€491,351	€491,351
Total - to summary				**€490,000**

CIP.20.03.020
Terminal 2 Check-In Area Optimisation

Project Summary

- **Dublin Airport proposes the upgrade of the Terminal 2 check-in hall infrastructure to facilitate ongoing passenger growth with technology upgrades and new installations.**

In the last five years, the passenger footfall in the Terminal 2 (T2) check-in area has increased, and the airport has facilitated this increased demand through technology upgrades, known as the “CUSS” project. Phase 3 of this project, using PACE funds, is now being implemented. While technology has led to an increased operational efficiency through quicker processing, anticipated future passenger growth, now requires more physical infrastructure in the form of check-in positions, bag drops and Self Service Kiosks (SSK’s)to meet this increasing passenger throughput.

Installing more check-in desks, utilising technology for faster passenger processing, enhancing passenger experience solutions, providing queueing area managed solutions, and improving circulation spaces better utilises the existing floor area so that a further extension is not required.

Given the limited number of additional traditional check-in desks this solution requires a greater uptake in the use of SSKs over current use, to meet demand.
This project falls under the Terminal 2 development and is driven by:

- **The requirement to accommodate additional check-in positions and SSK’s.**
- **The need to maximise capacity within the existing check-in hall footprint**

This project delivers a redesigned check-in hall area, with additional self-service kiosks and new bag drop/check-in desks. Access to the extended Central Search Area (CIP.20.03.021) will remain the same. Construction works will be phased and aligned with other T2 projects.

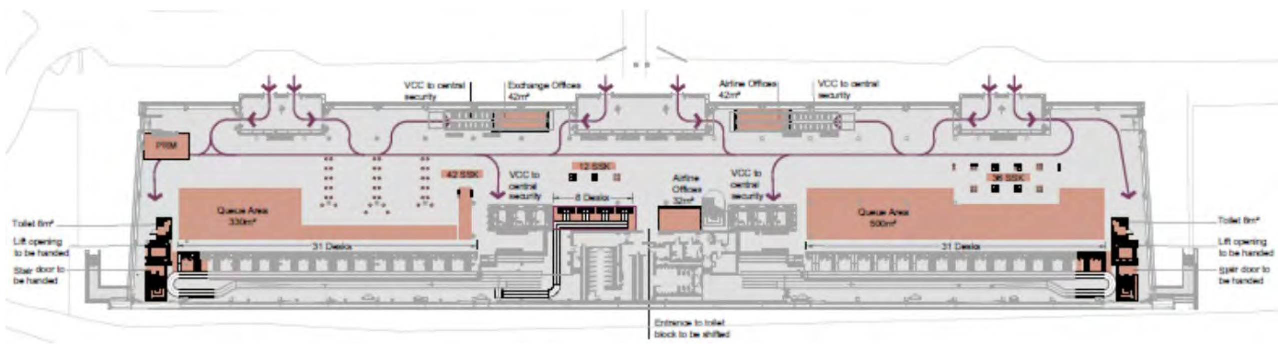


Exhibit 1. New Terminal 2 check-in proposed layout

CIP.20.03.020
Terminal 2 Check-In Area Optimisation

Project Details Summary		
Category: Passenger Processing		
Primary Driver Business Volume Growth	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €9.8m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Increase in provision to cater to increased capacity • Facility Requirements require greater uptake in SSK usage over today • New locations of belts to be validated Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus design & management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Opex increase of €0.5m p.a. for additional check-in deck and SSK running costs.	
Project Output	• Increase in capacity accommodated within existing footprint • Four additional check-in desks provided with collector belt connection to existing bag conveyors • Ninety self-service kiosks required • Eight bag drop counters • Additional queuing area • Exchange offices (42sq.m.) relocated to front of concourse	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q4 2021**
Construction commence	**Q1 2022**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.020
Terminal 2 Check-In Area Optimisation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,230,000**
Construction Costs	**64%**	**€6,130,000**
Escalation, Contingency & Design Variability	**23%**	**€2,410,000**
Total Installed Cost (TIC)	**100%**	**€9,770,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€6,130,000	20%	€1,226,595	€1,226,595
Total - to summary				**€1,230,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment / Relocations	Redacted Cost Information			
Check-in & SSK's				
Baggage Modifications				
Total - to summary				**€6,130,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€2,415,779	€2,415,779
Total - to summary				**€2,410,000**

CIP.20.03.021
Terminal 2 Central Search Area Expansion

Project Summary

- **Dublin airport proposes the Terminal 2 central search area be expanded and reconfigured.**

The central search area (CSA) of Terminal 2 (T2) is the critical passenger gateway connecting the Landside and Airside facilities. This secure area ensures passengers are compliant with EU security regulations and air travel security protocols. It is important that it operates smoothly and efficiently. For this CIP period, the anticipated peak passenger volumes travelling through the facility requires a larger area than the existing facility can accommodate.

The three major drivers for this project are as follows:

- **Anticipated increases in passenger volumes will require the following additional facilities:**
  a. Number of queuing lanes and repacking facilities.
  b. Increase in the central search processor area to accommodate future demand.
- **Security Equipment changes:**
  a. Provide for Automatic Tray Return Systems. The lessons learned from the use of ATRS in Terminal 1 highlight a significant improvement in the consistency of screening of cabin baggage when compared to the manual lane approach.
  b. Provide standard C3 scanning equipment
  c. Safeguard for future body scanning demand
  d. Remote Screening: The ability to deploy remote screening in Terminal 2 as well as Terminal 1 is dependent on the deployment of ATRS (Project CIP.20.06.012).
- **Regulation: New rules will restrict the individual from observing the security check point area**

This area expansion project proposes a two-phase approach, as follows:

- **Landside dividing screens relocation: Existing glass screens to move further landside.**
- **Airside dividing wall relocation: The separation wall will be moved further into a previously safeguarded retail service corridor.**

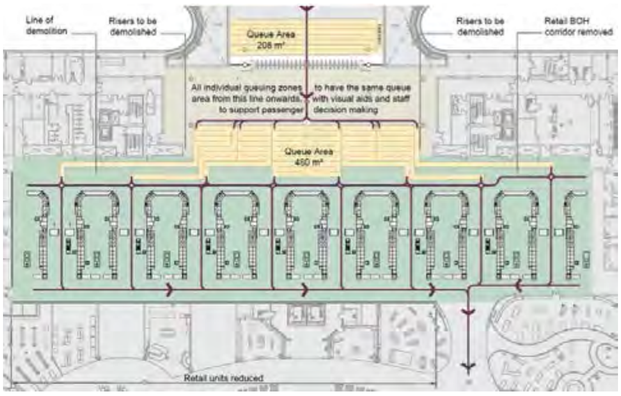


Exhibit 1.Plan view of new proposed CSA at Terminal 2.

CIP.20.03.021
Terminal 2 Central Search Area Expansion

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** Business Volume Growth	**Total Capex requirement** €13.6m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • IAA submission required, and approval needed prior to implementation • C3 Scanner and ATRS equipment Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) • Cost of screening equipment provided for under security project	
Opex Impact	• Increased opex costs of €0.1m p.a. for incremental access control system costs.	
Project Output	• Space provision for 17m of ATRS lanes • Partial removal of risers; general making good of finishes to match existing front-of-house finishes • Wall added to core on right side of queuing area • Retail back-of-house corridor removed to accommodate security lanes • Retail unit footprint reduced to line of lift cores • Entry to departure lounge from Security modified with new wall	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q4 2021**
Construction commence	**Q1 2022**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.021
Terminal 2 Central Search Area Expansion

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,700,000**
Construction Costs	**64%**	**€8,510,000**
Escalation, Contingency & Design Variability	**23%**	**€3,350,000**
Total Installed Cost (TIC)	**100%**	**€13,560,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€8,510,000	20%	€1,702,387	€1,702,387
Total - to summary				**€1,700,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Refurbishment Security Area & Queue Space				
Total - to summary				**€8,510,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€3,352,850	€3,352,850
Total - to summary				**€3,350,000**

CIP.20.03.028
Terminal 2 Early Bag Store & Transfer Lines

Project Summary

- **Dublin airport proposes the installation of an Early Baggage Store system within the HBS room of Terminal 2.**

The transfers' product at Dublin Airport is a significant area of growth, due in part to the presence of US CBP in Terminal 2. The Terminal currently has 3 transfer input lines. As transfer demand is expected to grow dramatically in the future, there will be a need to increase the number of transfer lines. Capacity analysis of the Transfer system had identified a shortfall in existing capacity which will be exceeded during the next CIP period. A 4th Transfer Input line is required to facilitate the future demand of 40mppa.

Terminal 2 handles all US CBP flights and a significant number of long haul flights. Passengers travelling on these flights may originate in Ireland, or transfer through the Terminal. Early check-in products offered by airlines and long stop-over transferring passengers have resulted in a significant rise in early bags being processed through the HBS. These bags arrive at the sorter ahead of the make-up position being available, thus being classed as early bags. The bag sits on the sorter for long periods until a make-up location has been identified. This can cause 'die back' through the system, as no space is available to sort these bags to make-up locations.

With the increasing growth in transfer traffic there is a need for increased connectivity between terminals. The current HBS upgrade provides for a single connection, but capacity analysis indicates that its peak capacity will be exceeded, and a second line is required during this CIP period.

The proposed project will construct an early bag store on the HBS mezzanine of Terminal 2. The lane- based system will have the capacity of 950 bags. The EBS will provide sufficient capacity for the early bag demand over the next CIP period. The use of an early bag store will assist in reducing the demand on CBP allocated make-up positions, which are forecast to increase beyond the current provision. A 4th Transfer line will also be installed to increase the capacity and resilience of the transfer system.

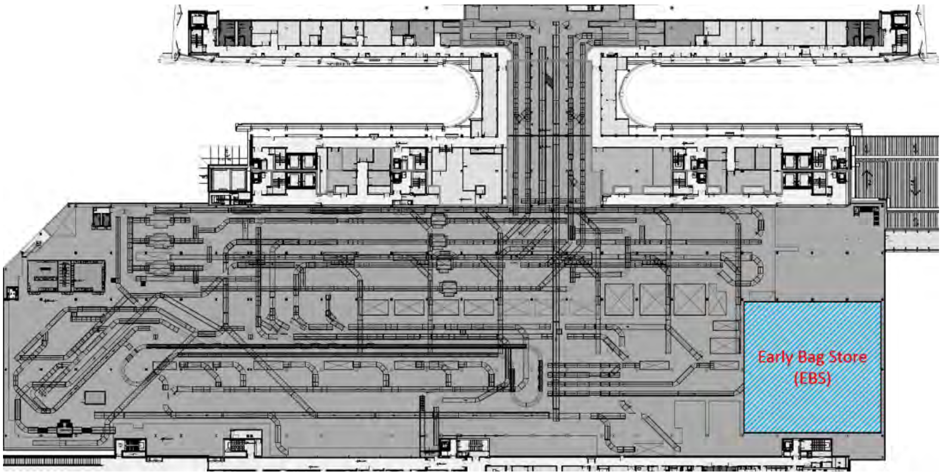


Exhibit 1. Early bag store proposed location

CIP.20.03.028
Terminal 2 Early Bag Store & Transfer Lines

Exhibit 2. Photograph of an EBS system - Typical

CIP.20.03.028
Terminal 2 Early Bag Store & Transfer Lines

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** HUB operations	**Total Capex requirement** €27.9m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • System costs based on market research. • System to be built within the HBS existing footprint. Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Escalation is included to mid-point of construction and is based on a rate of 6% per annum • Assumes traditional competitive main contractor tendering and procurement arrangements Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• N/A	
Project Output	• 950 position Early bag store • Bag transfer line in T2 • Additional Inter terminal transfer line	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q4 2021**
Construction commence	**Q1 2022**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.028
Terminal 2 Early Bag Store & Transfer Lines

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€3,600,000**
Construction Costs	**64%**	**€18,000,000**
Escalation, Contingency & Design Variability	**23%**	**€6,310,000**
Total Installed Cost (TIC)	**100%**	**€27,910,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€18,000,000	20%	€3,600,000	€3,600,000
Total - to summary				**€3,600,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Provision of Additional EBS Positions	Redacted Cost Information			
Total - to summary				**€18,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€6,310,000	€6,310,000
Total - to summary				**€6,310,000**

CIP.20.03.029
New Pier 5 (T2 & CBP Enabled)

Project Summary

- **This project proposes the construction of a new Pier 5 (as part of South Apron Development).**

As a result of the increased number and frequency of new long-haul routes, and in particular long-haul routes to the US; it is anticipated that there will, over the course of the forth coming CIP period, be continued growth in demand for US-precleared enabled Wide Body stands.

This demand is driven by Ireland's strategic position as a connecting node between USA and Europe, and further leverages Dublin's position of being the only European capital with US preclearance. This is reflective of the National Aviation Strategy's policy position of developing Dublin Airport as a hub airport.

In line with the wider South Apron Development, Pier 5 enables the provision of 4 wide body contact stands located close to Pier 4's US-preclearance facility.

The pier's design incorporates maximum flexibility, and consists of the following key features:

- **The pier can service all flights across the airfield. The Pier's Apron level has been designed with 6 bus lounges accommodating both CBP and non CBP operations**
- **The departures level, (located on the first floor), has been designed with enclosed gate hold rooms which can be accessed directly from the same level US-preclearance facility or, for non-US-preclearance passengers, from the level above. This accommodates side by side CBP and Non CBP departures. The gate lounges are appropriately designed and sized to incorporate pre-boarding facilities.**
- **To maximize operational efficiency and minimize time on stand, the access to and from aircraft for passengers has been provided using fixed links, with the capacity for both airbridge and walk in/ walk out enplaning and deplaning**

The project safeguards options for impacted business operations. The construction of a secure bonded road from the South Apron over the R132 with services brought to the Eastland's logistics park is proposed as part of this development.

CIP.20.03.029
New Pier 5 (T2 & CBP Enabled)

At Apron level Pier 5 includes 6 bus lounges. A bus injection point has been located to the Pier's western end to accommodate arriving passengers, providing direct access to Terminal 2's immigration and transfer facilities.

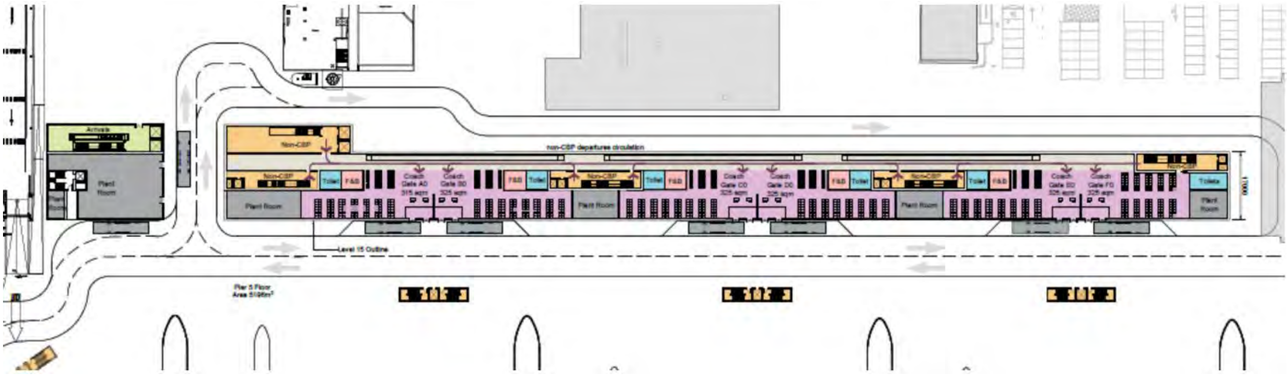


Exhibit 1. Apron Level

First Floor

The first floor is the primary departures floor with 8 gates accessed either by a CBP corridor or by a non-CBP vertical circulation core descending directly from the floors above. This flexibility allows each gate to be individually used for CBP or non CBP operations, as required. Fixed links are to be equipped with airbridges and vertical cores to apron level to allow for further flexible use of the stands. A food and beverage offering will be placed at the start of the pier for CBP passengers, and located next to an executive lounge.

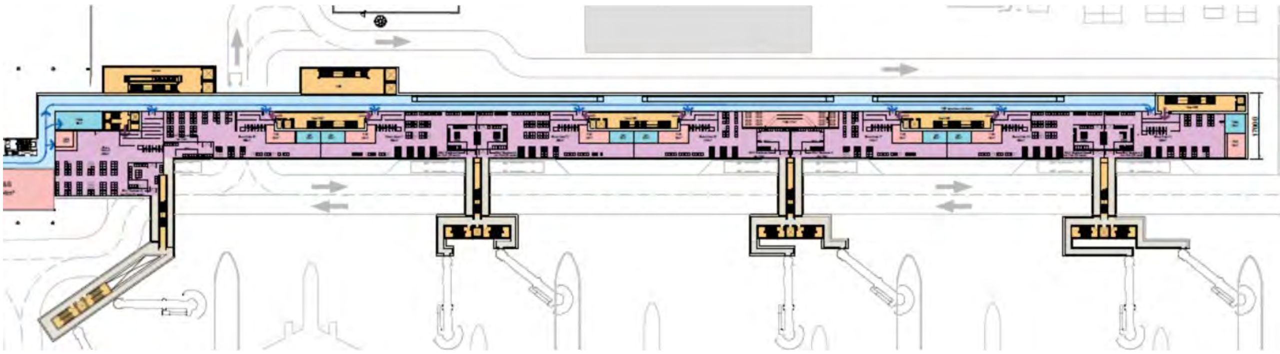


Exhibit 2. First Floor

CIP.20.03.029
New Pier 5 (T2 & CBP Enabled)

Second and third floors

The second floor houses the arrivals corridor as well as the non-CBP departures corridor, (accessed via the third floor, not shown, which connects directly to the T2 departure lounge). This floor has the flexibility between corridors to accommodate future development of support facilities, including office space, commercial offerings and back of house support space.

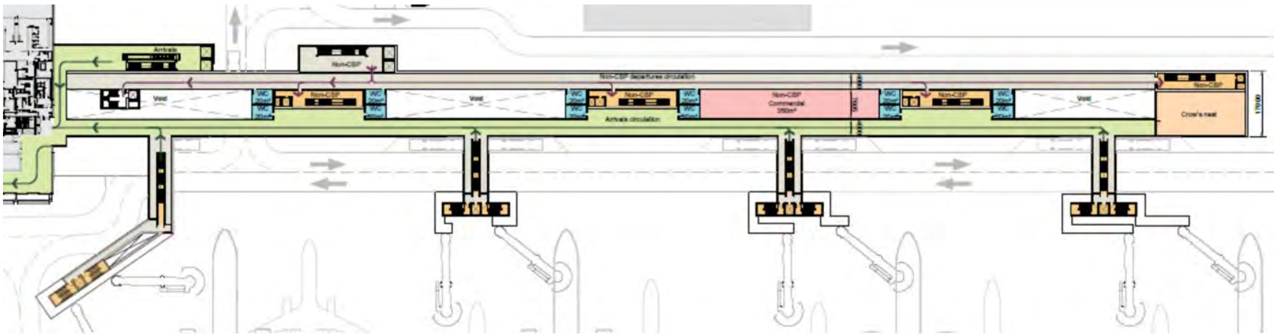


Exhibit 3. Second floor

DublinAirport

CIP.20.03.029
New Pier 5 (T2 & CBP Enabled)

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** User Requests	**Total Capex requirement** €304.08m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Flexibility of operations for simultaneous CBP /non-CBP flights • Operational accommodation to be accommodated as part of relocations • Segregated Arrivals and Departures • CBP/Non-CBP enabled bussing facilities • Safeguarding for future expansion of Terminal 2 Cost assumptions: • Demolition of existing buildings included • Airfield ramp around Pier 5 • Contingency is calculated at 15% of the TDC plus Design & Management costs • Similar specification to Pier 4 Program assumptions: • Phased relocation of tenants • Single phased construction	
Opex Impact	• Opex increase of €3.9m p.a. for: Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates and Energy costs.	
Revenue Impact	• Revenue loss of €4.6m p.a. due to demolishment of Cargo's 1 and 2, Flight Catering Facilities and office block.	
Project Output	• New 4 level Pier • Direct link to Terminal 2 and Pier 4 CBP facilities • 8 no. new Gaterooms, which can flex to provide space for larger aircraft and CBP / non-CBP operations • 6 no. new Bus Gates • Fixed links to serve 4 no. MARS (8 no. NBE) contact stands • 8 no. Airbridges to contact stands • New Food and Beverage and Executive Lounge offering on first floor • Segregated movements for arriving passengers and CBP and non CBP departing passengers • Serviced and Airside accessible Cargo sites, including development of secure road and bridge over R132 but excluding cargo site development.	
Asset Life	• 25 years	
Project Delivery Key Milestones		
Feasibility/outline design complete	**Q4 2018**	
Planning complete	**Q1 2020**	

CIP.20.03.029
New Pier 5 (T2 & CBP Enabled)

Detailed design complete	**Q3 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q4 2022**
Project handover	**Q4 2022**

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€39,220,000**
Construction Costs	**64%**	**€196,110,000**
Escalation, Contingency & Design Variability	**23%**	**€68,750,000**
Total Installed Cost (TIC)	**100%**	**€304,080,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€196,110,000	20%	€39,220,275	€39,220,275
Total - to summary				**€39,220,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Buildings				
Airfield				
Cargo Village Enabling				
Total - to summary				**€196,110,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€68,746,867	€68,746,867
Total - to summary				**€68,750,000**

CIP.20.03.030
Expansion of US Pre-Clearance Facilities

Project Summary

- **Dublin Airport proposes to reconfigure and expand the US Pre-Clearance facilities in Pier4**

Increasing Capacity of Pre-Clearance Facility
As a result of the increased number and frequency of new US long-haul routes; it is anticipated that there will, over the course of the forth coming CIP period, be continued growth in demand for US preclearance facilities.

This demand is driven by Ireland's strategic position as a connecting node between USA and Europe, and further leverages Dublin's position of being the only European capital with US preclearance.
This is reflective of the National Aviation Strategy's policy position of developing Dublin Airport as a hub airport.

This resulting demand uplift translates into an increased requirement for US Preclearance capacity. Dublin Airport and US Immigration Authorities are currently engaged and are actively exploring the use of emerging technology to achieve this uplift in capacity while minimizing footprint.

The current facility's configuration limits how it can expand, therefore as part of this project, it is proposed to re-orientate and increase the facility to include a minimum of 11 US transport Security (TSA) security screening lanes and 30 US Customs and Border Protection (CBP) officer positions, as well as being tailored to the needs of emerging technologies. Security lanes will be fitted with 19m ATRS equipment. Additional space will accommodate secondary screening, queue space, circulation space and staff accommodation.

The reconfiguration also safeguards for future expansion eastward. The new CBP facility will be directly linked to Pier 4 and the new Pier 5 by new vertical circulation corridors. The enlarged hall includes for a dedicated vertical circulation and direct link for screened passengers to access the new Pier 5 project (part of the South Apron development). This project is proposed to provide sufficient flexibility to implement optimal solution(s) facilitated by the adoption of new technology as it becomes viable and available, refer Chapter 7.

CIP.20.03.030
Expansion of US Pre-Clearance Facilities

Exhibit 1. Pier 4 proposed enlarged CBP facility at Apron level

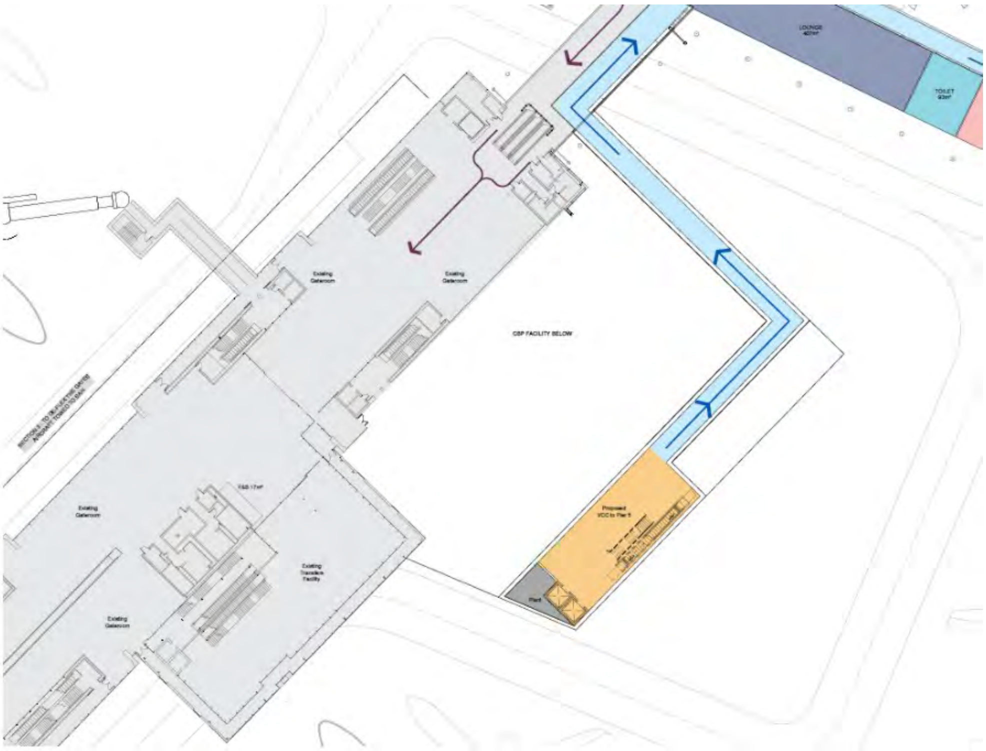


Exhibit 2. Pier 4 proposed enlarged CBP facility on the first floor

CIP.20.03.030
Expansion of US Pre-Clearance Facilities

Increased Flexibility on Pier 4
A second project component will allow for increased Pier 4 flexibility, known as 'de-flex' of Pier 4.

In the event of a delay to a US bound flight scheduled to depart from Pier 4's central section, two ground floor available gate rooms will be assigned to board flights from either side of the pier without accessing to the first-floor gate rooms. Thereafter, these areas will be returned to non-CBP use as required. To achieve this, an external corridor connecting the existing gate hold rooms and vertical circulation cores on the ground floor of Pier 4 is proposed.

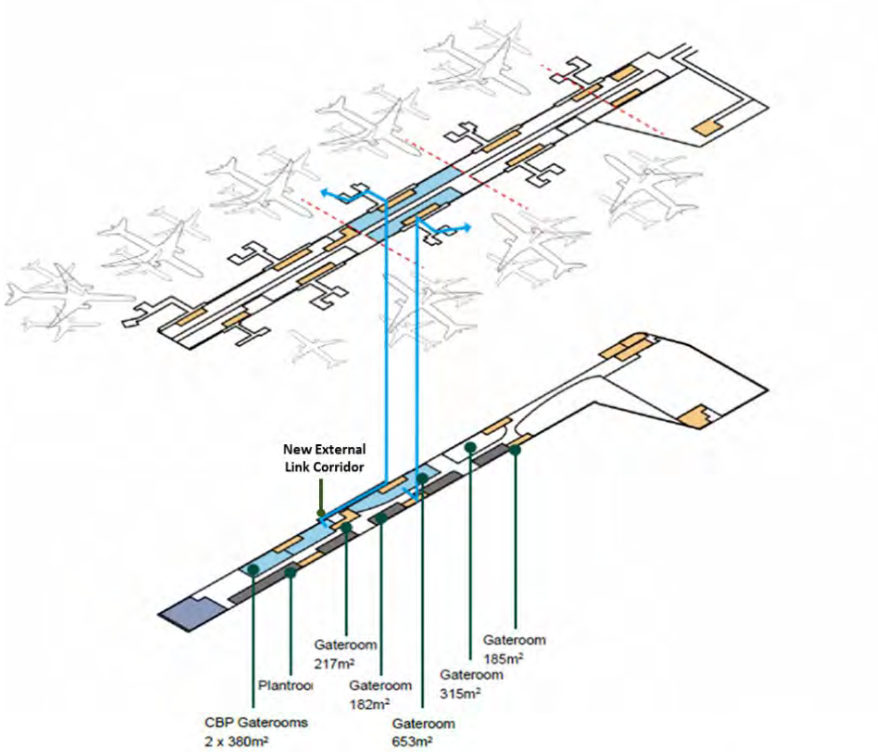


Exhibit 3. Axonometric view of Pier 4 Apron and First floor

In addition to increasing flexibility in pier 4 and in consideration of the operational flexibility required in order to balance US-preclearance requirements with technology & infrastructure it would be necessary, as a 1st phase, to enable pier 3 as a US-precleared sterile hold space via bussing from pier 4/5. The infrastructure to facilitate these needs is described in steps 1-3 inclusive in project sheet CIP 20.03.033 and would represent a supplemented delivery & cost requirement as indicated in steps 1-3 to the above pier 4 increased flexibility cost.

CIP.20.03.030
Expansion of US Pre-Clearance Facilities

Project Details Summary		
Category: Capacity Development		
Primary Driver Passenger Processing	**Secondary Driver** Addressing User Requirements	**Total Capex requirement** € 46.4m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Reorientation and expansion of existing facility • Reorientation to facilitate scalable development • Pier 4 CBP Operation maintained • Dedicated link to Pier 5 Cost assumptions: • Contingency is calculated at 15% of the TDC plus Design & Management costs • Based on similar specification to current CBP facility • Based on 11 lane TSA facility Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Opex increase of €1.9m p.a. for: • Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates and Energy costs.	
Project Output	• Increased footprint for US Pre-clearance facility hall • 11 no. new TSA 19m ATRS Lanes • 30 no. Officer Booths • Increased queuing areas for TSA Screening and CBP • New welfare facilities at US Pre-clearance Facility • New Vertical Circulation and access corridors to Pier 5 • US-preclearance sterile area and swing gate operation facilitation in pier 3	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Design complete	**Q3 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q4 2020**
Construction complete	**Q1 2022**
Project handover	**Q1 2022**

CIP.20.03.030
Expansion of US Pre-Clearance Facilities

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€5,990,000**
Construction Costs	**64%**	**€29,940,000**
Escalation, Contingency & Design Variability	**23%**	**€10,500,000**
Total Installed Cost (TIC)	**100%**	**€46,430,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€29,940,000	20%	€5,988,072	€5,988,072
Total - to summary				**€5,990,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Buildings				
Airfield				
Total - to summary				**€29,940,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€10,496,131	€10,496,131
Total - to summary				**€10,500,000**

CIP.20.03.031
South Apron Expansion (Remote Stands, Taxiway & Apron)

Project Summary

- **As part of South Apron Development, Dublin Airport proposes the relocation of the existing Pre-Boarding Zone and the expansion of the southern airfield including new aircraft stands and the extension of the Dual Code E taxi-lane.**

As a result of increased number and frequency new long-haul routes, and in particular long-haul routes to the US; it is anticipated that there will be continued growth in demand for CBP enabled Wide Body stands

This demand is driven by Ireland's strategic position as a connecting node between USA and Europe, and further leverages Dublin's position of being the only European capital with US preclearance.
This is reflective of the National Aviation Strategies policy position of developing Dublin Airport as a secondary hub European airport.

As part of the wider South Apron Development Pier 5 (CIP.20.03.029) meets this demand through the provision of 4 wide body contact stands which are strategically located close to TSA and CBP facilities on Pier 4 and other south apron short haul, narrow body stands.

It is therefore proposed to redevelop the southern airfield to include up to 17 stands and the extension of a Dual Code E taxi lane around Pier 4 and adjacent to the proposed Pier 5. This redevelopment is inclusive of the relocation of the existing PBZ building to accommodate the construction of Pier 5.

The new stands will be a mix of: 1) direct contact stands, served from Pier 5, walk to contacts stands, served from the relocated PBZ and; 2) remote contact stands, served by bussing operations from Pier 5. The increased apron area will provide: enlarged manoeuvring area with a Dual Code E taxilane to allow optimal operational flexibility; head and back of stand access roads; as well as additional areas for GSE parking and an extended road network.

The Dual Code E taxilanes layout eases ground operations by minimizing delays caused by pushback procedures of Wide Body aircrafts, using a joined loop. This will facilitate uninterrupted Code E Aircraft taxi from South Apron to Pier 1 (reinstatement of Taxiway Yankee as Code E – connecting Taxiway Zulu to F-Inner). This also provides for 34 Narrow Body Equivalent stands (NBE) or 14 MARS stands and 6 NBEs. The existing PBZ will be relocated with new walkways to serve up to 9 NBE. This projects also proposes a diversion of the cuckoo stream, the existing pollution control facility and contaminated runoff storage tank.

CIP.20.03.031
South Apron Expansion (Remote Stands, Taxiway & Apron)

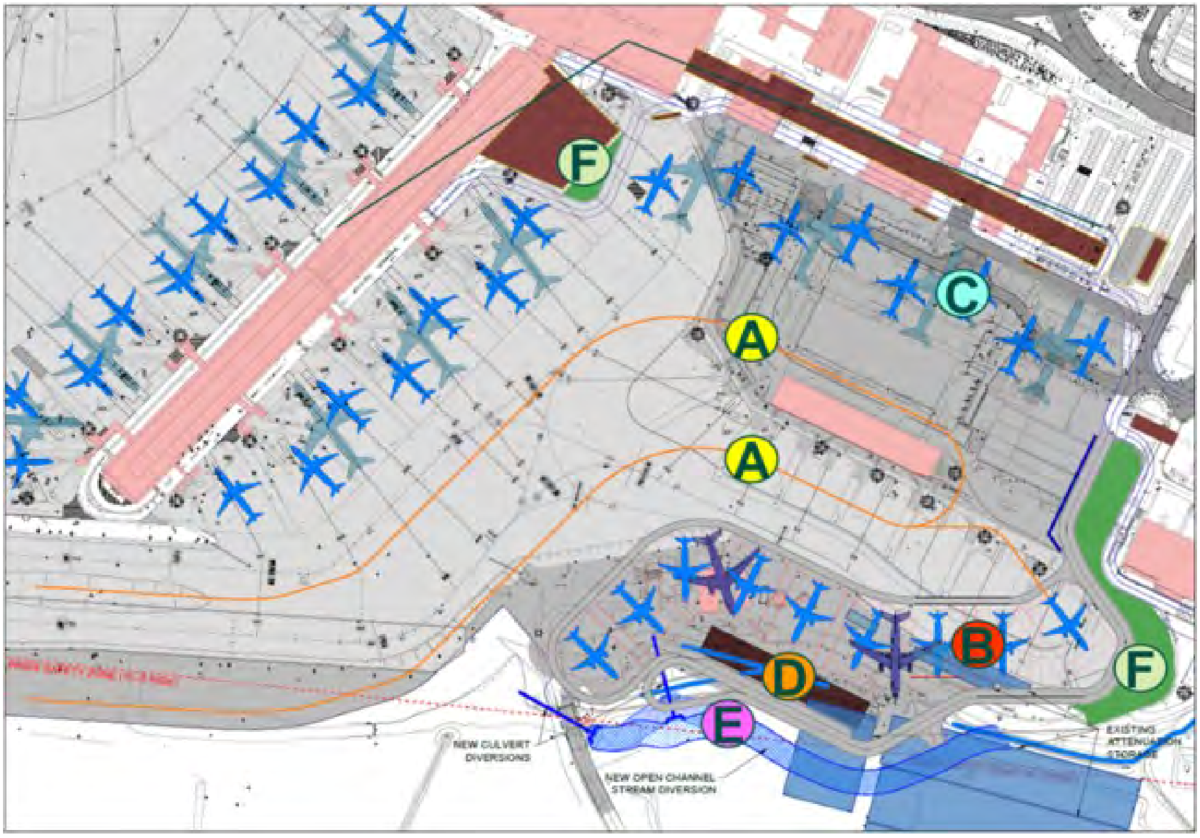


Exhibit 1. South Apron airfield expansion, Dual Code E Taxiway Option

Features to the new South Apron:

- **A: New Dual Code E Taxilanes**
- **B: 9 new remote stands incorporating PACE approved pavement expansion**
- **C: 8 New NBE contact stands on Pier 5**
- **D: Relocated PBZ serving remote stands**
- **E: Diversion of the Cuckoo stream**
- **F: GSE parking areas**

As part of the airfield expansion the existing Pre-Boarding Zone (PBZ) building will be relocated further south and will include the development of the associated road access for shuttle bus operations. Additional weather protected walkways will be either side of the PBZ and will maximise the number of serviceable walk to contact stands.

Current estimates indicate that relocating the PBZ to the proposed location shown above will cost approximately €10m. This relocation cost is captured in the overall CIP.20.03.031 estimate.

CIP.20.03.031
South Apron Expansion (Remote Stands, Taxiway & Apron)

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** € 95.8m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Existing pavements retained • Local surface water attenuation only • Night time working may be necessary for certain works • Multi construction phasing to maximise number of stands in use at all times • Enhanced operational flexibility due to provision of Dual Code E taxilane Cost assumptions: • Relocation of stakeholder costs included • Demolition of existing buildings included • Airfield ramp around Pier 5 • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) Program assumptions: **4 Principal phases of construction achievable** • Phase 1 – Pier 5 site clearance and Southern stands - • Phase 2 – Pier 5 stands and Southern PBZ • Phase 3 – Taxi lanes constructed, Sothern stands completed • Phase 4 – Completion	
Opex Impact	• N/A	
Project Output	• Dual code E taxilanes • Increased quantum of stands in South Apron (34NBE) • Relocated PBZ serving 9 new NBE stands • Increased operational flexibility • Additional area of GSE parking • Weather protected walkways to PBZ	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2020**
Design complete	**Q3 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q1 2021**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.031
South Apron Expansion (Remote Stands, Taxiway & Apron)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€12,350,000**
Construction Costs	**64%**	**€61,760,000**
Escalation, Contingency & Design Variability	**23%**	**€21,650,000**
Total Installed Cost (TIC)	**100%**	**€95,760,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€61,760,000	20%	€12,351,124	€12,351,124
Total - to summary				**€12,350,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works				
Buildings	Redacted Cost Information			
Airfield				
Total - to summary				**€61,760,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€21,649,545	€21,649,545
Total - to summary				**€21,650,000**

CIP.20.03.034
Pier 3 Immigration (Upgrade & Expansion)

Project Summary

- **Dublin Airport proposes to reconfigure Pier 3 Immigration by providing more passport control booths, improving passenger routes and circulation spaces.**

The project purpose is to serve operations' stakeholder needs in a short-term plan by providing a stepped approach to increase capacity from Summer 2018 of approx. 31mppa up to 2024. The main project driver is that the area is not fit for purpose given the type of traffic now on the pier.

Pier 3 arrivals area is experiencing capacity issues are being experienced from insufficient queueing space to cope with increased passenger numbers and non-EU profiles. Currently, larger widebody aircraft are moving onto Pier 3, significantly increasing the non-EU immigration queue times in excess of 35 minutes i.e. the profile of passenger has changed increasing the amount of non-EU passengers on the pier. Additionally, the overall product and passenger experience is unsatisfactory, particularly in terms of approach to the processing booths, visual aesthetics and passenger perception. This project requires investment commensurate with the lifecycle of the pier.

The short-term stepped plan proposed through this project should address the following requirements:

- **Provision of additional queueing space above current provision by reducing the central core space, as required.**
- **Improve route for passengers continuing to T2 (passengers walk through each gate arrival node, requiring management by CSAs).**
- **Improve transfers process to T2. Review of potential transfers from Pier 1 to Pier 3 with bus pickup point i.e. bussing opportunity.**
- **Provision for additional booths and e-gates.**
- **Additional facilities required (currently no washrooms exist in Pier 3 arrivals facility)**
- **SSK requirement to enable non-EU (Etihad etc.) passengers to print their boarding cards before presenting at immigration.**
- **Provision of bypass corridor for transferring passengers.**
- **Re-design of nodes and current circulation to improve passenger flow.**

This project proposes a reconfiguration of the Pier 3 immigration hall. The objective is twofold, on the one hand it will provide an increase in capacity of passenger processing and on the other it will improve circulation and queueing areas.

The project will provide 6 no. relocated booths, a net increase of 2 booths compared to the existing situation, to cope with peak demands of arriving passengers at Pier 3. The booths will be relocated in to the hall as their current location on the neck of the pier constrains growth.

Offices surrounding the centre of the Pier will be relocated elsewhere providing new space for a queueing. Circulation corridors will be reconfigured to allow an orderly flow of passengers into the queueing areas. These interventions allow for a better management of arriving passengers freeing space around the hall and providing an overall better passenger experience at this Pier.

CIP.20.03.034
Pier 3 Immigration (Upgrade & Expansion)

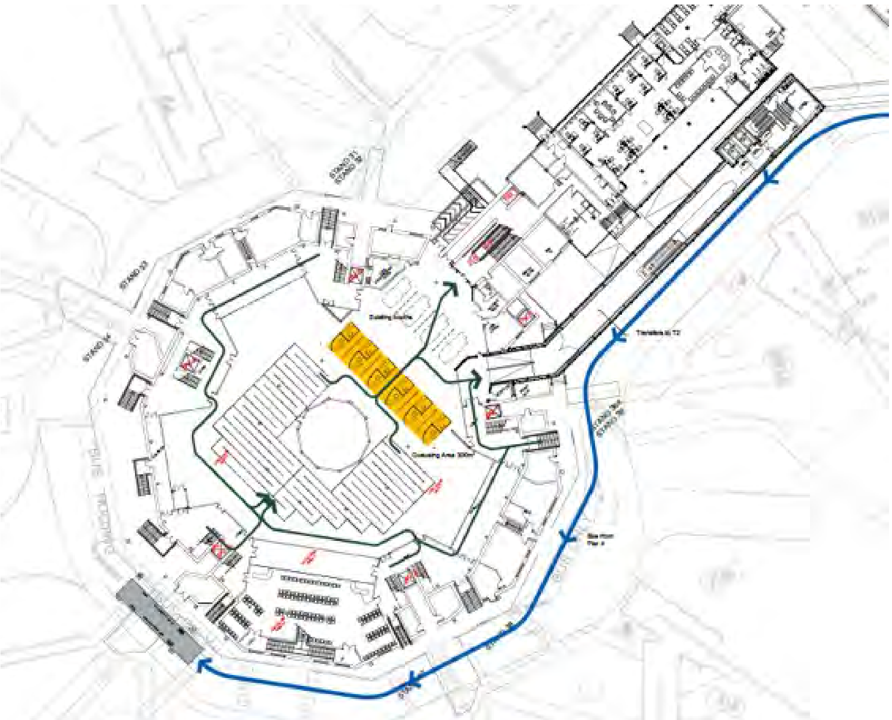


Exhibit 1. Pier 3 Immigration; passenger routes and circulation

Exhibit 2. Current queue space and line of sight to immigration

CIP.20.03.034
Pier 3 Immigration (Upgrade & Expansion)

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity Constraints & Passenger Processing	**Secondary Driver** Customer & stakeholder requirements Passenger facilitation Level of service	**Total Capex requirement** € 6m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Optimises use of critical infrastructure. Supports airline growth and efficiency. • Minimum requirement to Operational requirements and ensure continued use of Pier 3 up to 40mppa. • Meets user requirements and improve passenger experience. • Long non-EU queues on daily basis, in excess of 35 minutes • Operational management • Availability of central core to expand queue space Cost assumptions: • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Opex increase of €0.4m p.a. for additional Customer Service Assistants	
Project Output	• 2 no. new passport control booths. • Improvement to queueing area in Pier3 arrivals. • Address operational issues and transfer issues. • Reduce amount of operations • Supports non-EU flights relocation to Pier 3.	
Asset Life	• 6 years	

Project Delivery Key Milestones	
Feasibility / requirements / pilot complete:	**Q4 2018**
Planning complete:	**Q1 2020**
Design complete:	**Q3 2020**
Procurement complete:	**Q3 2019**
Construction commence	**Q2 2020**
Construction complete	**Q2 2021**
Project handover	**Q2 2021**

CIP.20.03.034
Pier 3 Immigration (Upgrade & Expansion)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€760,000**
Construction Costs	**63%**	**€3,800,000**
Escalation, Contingency & Design Variability	**25%**	**€1,490,000**
Total Installed Cost (TIC)	**100%**	**€6,050,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€3,800,000.00	20%	€760,000	€760,000
Total - to summary				**€760,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment & Building Works	Redacted Cost Information			
Total - to summary				**€3,800,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€1,490,000	€1,490,000
Total - to summary				**€1,490,000**

CIP.20.03.036
North Apron Development –
Pier 1 Extension (Module 1) & Apron 5H PBZ

Project Summary

- **Dublin Airport proposes to further develop the North Apron Area by constructing the new East Pier 1 (Module 1) and a Pre-Boarding Zone (PBZ) building (5H).**

The North Apron (Aprons to the north of Pier 1 and 2) accommodates approximately 58% of the short-haul point to point flights operating from Dublin Airport today. In line with the masterplan and customers expressed preference the next logical step for the North Apron is the continued development of this stand capacity through the conversion of remote north Apron stands to walk in walk out contact stands.

The proposed project falls within the North Apron Development and is driven by the following:

- **increase in the number of Pier and PBZ walk-out contact stands**
- **delivery of the Masterplan's objective of Pier 1 eastern Phase 1 development**
- **to continually maintain the levels of service provided at the airport and enhance the passenger experience**

A variant to this option is included in Appendix H for consultation i.e. the development of Pier 1 module 2 in advance of this PBZ.

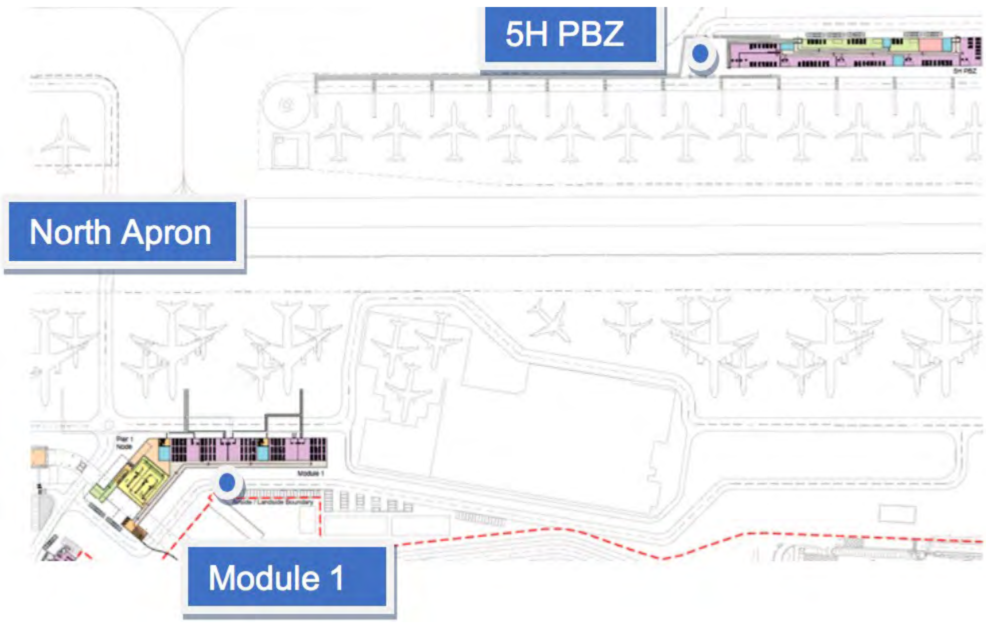


Exhibit 1. Overall view of the North apron development

CIP.20.03.036
North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ

Eastern Extension of Pier 1 – Module 1

The Eastern Pier 1 extension will be built in phases to accommodate existing buildings under use. It is proposed the first element of the existing Pier 1 extension be module 1, with module 2 then developed at the most easterly end (CIP.20.03.036A) with the central pier component subsequently being infilled in another CIP period.

Module 1 itself, a two-storey building, is a simple, functional design, focused on the provision of walk- out contact stands for short haul operations. Departures are located on apron level, with 5 no. double height Code C gates for 4 no. new narrow body aircraft walk-out contact and remote stands. The building is linked directly to the skybridge via a departures corridor and vertical circulation cores. The first floor consists of an arrivals corridor with vertical circulation cores which connect to the stands.

The node building, that connects module 1 with the sky bridge, has been developed with a flexible space, which in the near term can accommodate retail, food and beverage but in the medium to long term can accommodate a transfer facility. This transfer facility would be used to process transfer passengers coming from Pier 1 and the future Module 1 prior to them being bussed to the injection points across the airport. An associated shuttle and bus kerb also forms part of this facility.

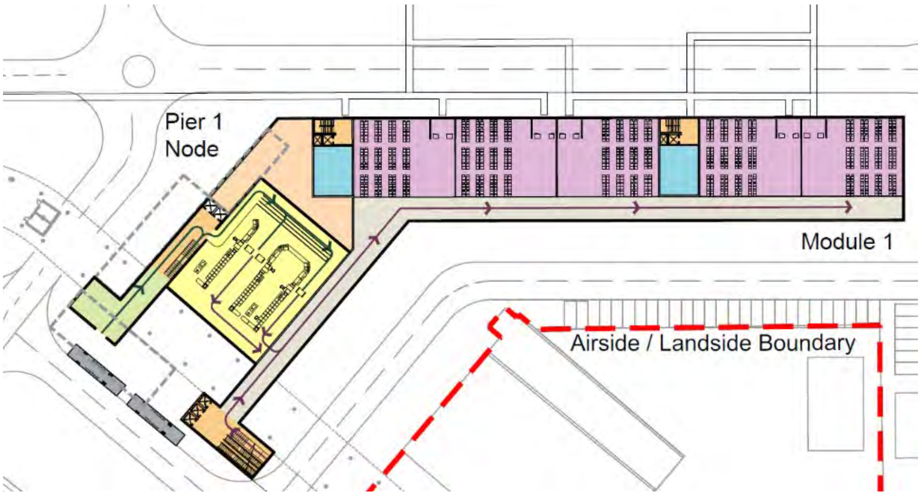


Exhibit 2. Module 1 Departures Level 00

CIP.20.03.036
North Apron Development –
Pier 1 Extension (Module 1) & Apron 5H PBZ

The development of this first phase of the eastern build out of Pier 1 provides for redevelopment of the associated stands and infrastructure.

The development also includes for demolition of existing structures (North terminal etc.) and development of the apron to the east of 5H to allow for future potential development of displaced hangar space (by others).

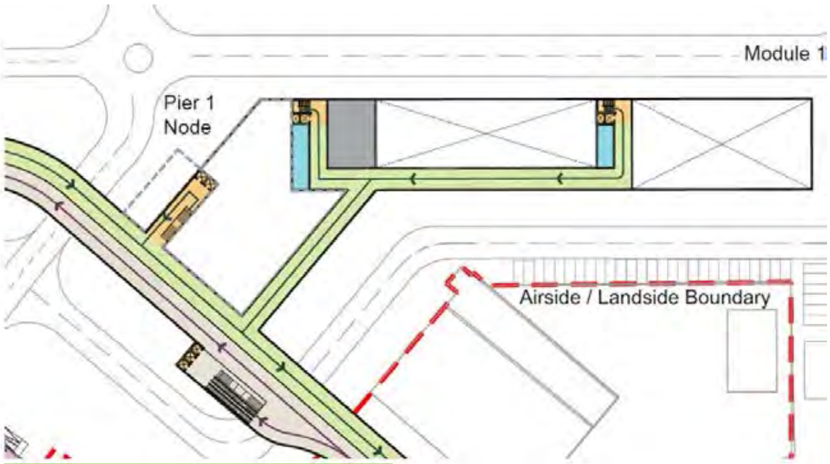


Exhibit 3. Module 1 Arrivals Level 10

5H Pre-boarding Zone

A remote Pre-Boarding Zone building located on the northern side of the Apron 5H will further increase the number of walk-out contact stands (12 no.) provided in the northern airfield. The facility is designed for both arrivals and departures mode, with passengers bussed with a shuttle service to and from the existing OCTB. This single-storey building, similar in design to the existing PBZ on the south apron, will provide 9 no. passenger holding areas, toilet provisions for the forecast passenger capacity and additional limited space for F&B/Retail opportunities. To maximise the number of contact stands serviced from the PBZ, a weather protected walkway will be constructed to the west. The area will be equipped with jet blast protection deflectors to protect passenger operations from taxiing aircraft utilising the Northern Runway. The project also includes for the construction of an inner road all around the PBZ, with bus turnouts to the back feeding into a shuttle lounge.

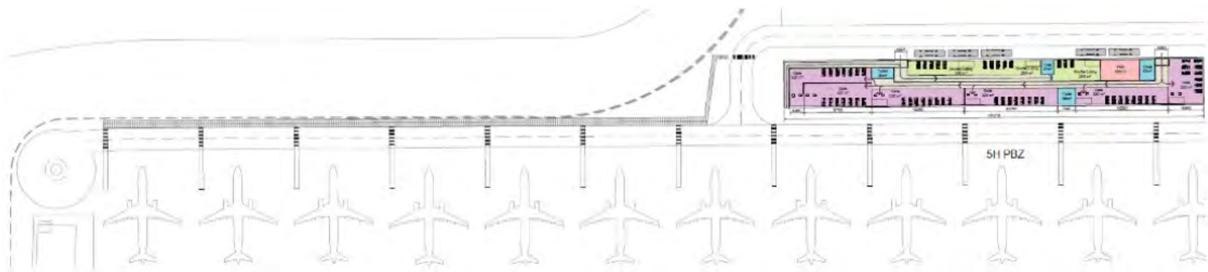


Exhibit 4. Plan view of PBZ ground floor and protected walkway along apron 5H

CIP.20.03.036
North Apron Development –
Pier 1 Extension (Module 1) & Apron 5H PBZ

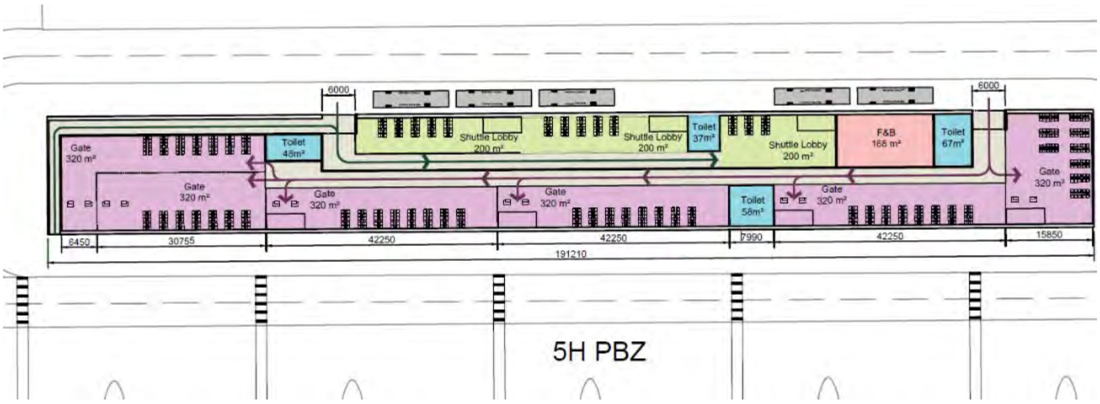


Exhibit 5: Cross-section of protected walkways to stands

CIP.20.03.036
North Apron Development – Pier 1 Extension (Module 1) & Apron 5H PBZ

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** User Requirements	**Total Capex requirement** €187.9
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Walk out stand requirement on North Apron • Segregated Arrivals and Departures • Safeguarding for future transfers need Cost assumptions: • Traditional construction method (not modular) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) Program assumptions: • Module 1: Assumes landside construction will reduce the need for additional personnel to escort the materials/vehicles on site. Landside construction not viable for 5H.	
Opex Impact	• Opex increase of €5.1m p.a. for: • Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates, Bussing and Energy costs.	
Revenue Impact	• Loss of €1.2m p.a. in revenue due to demolishment of Hangar 1.	
Project Output	• Pier 1 extension east (Module 1) • New PBZ building serving 5H	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q4 2018**
Planning complete:	**Q2 2020**
Design complete:	**Q3 2020**
Procurement complete:	**Q1 2021**
Construction commence	**Q3 2022**
Construction complete	**Q4 2024**
Project handover	**Q4 2024**

CIP.20.03.036
North Apron Development –
Pier 1 Extension (Module 1) & Apron 5H PBZ

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**11%**	**€20,140,000**
Construction Costs	**65%**	**€121,330,000**
Escalation, Contingency & Design Variability	**25%**	**€46,440,000**
Total Installed Cost (TIC)	**100%**	**€187,910,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€121,330,000	20%	€20,141,635	€20,141,635
Total - to summary				**€20,140,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works				
Module 1				
Buildings				
Airfield				
Transfer Node				
Buildings	Redacted Cost Information			
Airfield				
PBZ 5H				
Buildings				
Airfield				
General Airfield Improvements				
Total - to summary				**€121,330,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€46,436,653	€46,436,653
Total - to summary				**€46,440,000**

DublinAirport

CIP.20.03.040
North Apron De-icing Pad

Project Summary

- **Dublin Airport proposes the construction of a de-icing pad on a taxiway link at the north apron**

The new North Runway together with the envisaged Northern Development will increase the aircraft traffic significantly around the North Apron. During winter operations de-icing of aircraft prior to departure is required. It has been an airline request to provide a dedicated de-icing pad in the north apron to facilitate growth in operations based in the North & Central Apron.

Following de-icing, aircraft have a limited 'hold-over time' before needing to be de-iced again. The departure queue at times can be in excess of the hold-over time, currently resulting in aircraft having to return to stand to de-ice again. This can be exacerbated when departure queues are increased due to reduction in runway capacity because of deteriorating or poor weather conditions. Many examples of this were encountered during the cold weather event of 2018. De-iced aircraft encountered issues with re-icing while taxing to the end of runway 10, and locating a remote de-icing pad in that area would remove the requirement for aircraft to return to stand to de-ice again. In addition, it also allows stand capacity to be released should de-icing delays on the apron occur, by allowing aircraft to push-back without de-icing on stand, and de-ice remotely prior to take-off. A separate Project (CIP.20.03.049) will address this issue for Easterly operations (RWY 10) when, using compass departures, the existing Runway 10 (future runway 10R) becomes the primary departure runway. This learning has resulted in the request to also develop a de-icing pad for Westerly operations, whereby the future Runway 28 R, (the North runway) is the primary departure runway.

This project falls within the North Apron Development and is driven by:

- **Need for a dedicated de-icing area during winter operations at the north apron**

This project proposes to build a de-icing pad located on a taxiway link, joining 5H and 5G aprons to taxiway N. The link is centred between 5H and 5G. The de-icing pad consists of a Dual Code C de- icing points which can be used simultaneously with the ability to de-ice a single Code E aircraft. An enlarged paved area will provide sufficient space for de-icing trucks and equipment to work around the aircrafts.

New drainage for the de-icing pad will be fitted to capture surface water and de-icing agents with a controlled flow diversion to the pollution control storage tanks and surface water attenuation facilities.

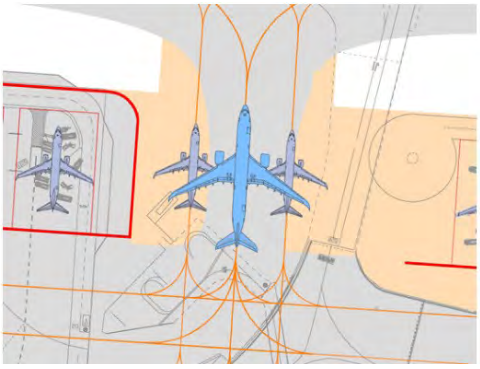


Exhibit 1: Code E de-icing pad

CIP.20.03.040
North Apron De-icing Pad

Project Details Summary		
Category: Capacity Development		
Primary Driver Operational Efficiency	**Secondary Driver** User Request	**Total Capex requirement** € 6.1m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Assumes landside construction • Assumes drainage connectivity to proposed north Apron network Cost assumptions: • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) Program assumptions: • Single phase construction	
Opex Impact	• N/A	
Project Output	• 8000m2 of concrete de-icing pad • glycol collection • AGL & Flood lighting	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q4 2018**
Planning complete:	**Q3 2020**
Detail Design complete:	**Q4 2021**
Procurement complete:	**Q2 2022**
Construction:	**Q4 2022**
Construction complete:	**Q3 2023**
Project Handover:	**Q3 2023**

CIP.20.03.040
North Apron De-icing Pad

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**11%**	**€770,000**
Construction Costs	**75%**	**€3,840,000**
Escalation, Contingency & Design Variability	**13%**	**€1,510,000**
Total Installed Cost (TIC)	**100%**	**€6,120,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€3,840,000	20%	€767,748	€767,748
Total - to summary				**€770,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
De-icing Pad				
Airfield				
Total - to summary				**€3,840,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€1,512,079	€1,512,079
Total - to summary				**€1,510,000**

CIP.20.03.051A
West Apron Vehicle Underpass - Pier 1 Option

Project Summary

- **This project proposes the construction of a vehicle underpass below runway 16/34 linking Pier 1 to the Western campus.**

The current Masterplan envisages an expansion of the airport to the West campus, keeping the crosswind runway 16/34 operational. In order to meet the capacity uplift forecasted in the upcoming CIP period, full use of the West apron and additional aircraft stands are required. To enable passenger operations on the West apron, the connectivity between the West campus and the East campus needs to be resolved. Capacity studies suggest that by 2024, there will be in excess of 3.500 vehicles/day accessing this area. The types of vehicles required to access the west apron include buses, tugs, loaders and bowsers.

In the absence of access to the West, the capacity of the airport will be restricted to the stand capacity in the Eastern campus.

This project proposes the construction of an underpass below runway 16/34 to provide direct vehicular access between the West and East campus. A bidirectional two-lane single-cell underpass will be constructed using cut-and-cover techniques.

The underpass alignment will be at the Northern part of the airfield linking Pier 1 to the Western campus directly. A ramp 140m long will provide access to the underpass from the end of Pier 1. The underpass will run below the existing Taxiway F-Inner & F-Outer, and Runway 16/34, and will then ramp up another 140m to surface level at the West Apron access beside the new built substation. The overall dimensions to the underpass will be 4.55 m headroom by 5 m lane width with maintenance sidewalks either side. The tunnel alignment results in the loss of 1 NBE stand on Pier 1.

This alignment requires apron traffic to travel along the head of stand road on Pier 1 resulting in in potential conflicts between walk in/walk out passenger flows and apron traffic. It is proposed to alleviate this through the construction of fixed links across crossing the head of stand road (CIP.20.03.043) It does however remove the potential apron congestion that the 5G alignment encounters by removing the need to cross a live triple taxiway (TWY DN, DS & C as described in Underpass Northern Option).

It is proposed that section of the underpass directly under Runway 16/34 be completed during the planned 2020 closure of RWY 16-34 to facilitate tie-in of the Northern Runway.

CIP.20.03.051A
West Apron Vehicle Underpass - Pier 1 Option

Exhibit 1. Plan view of proposed northern alignment to the vehicular tunnel

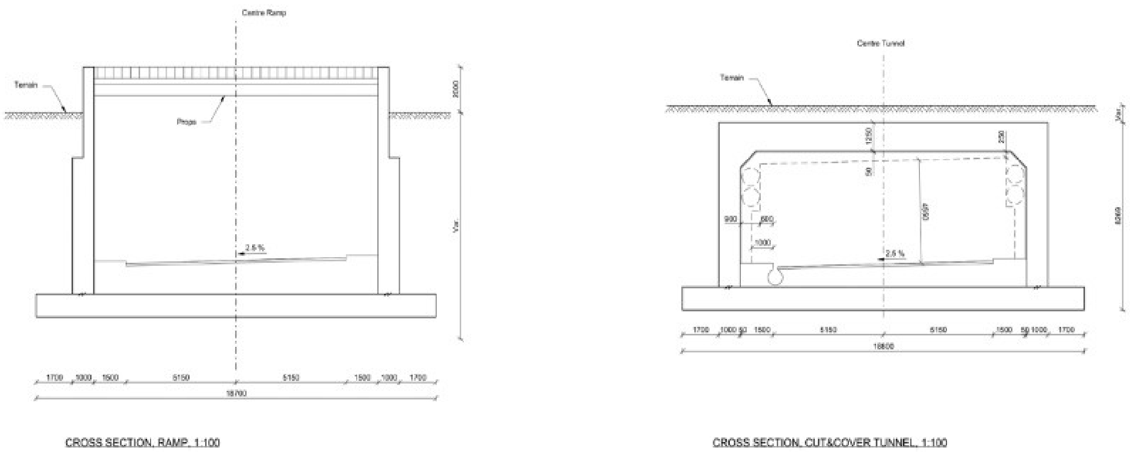


Exhibit 2. Typical cross-section of vehicular tunnel

DublinAirport

CIP.20.03.051A
West Apron Vehicle Underpass - Pier 1 Option

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** West Campus Connectivity	**Total Capex requirement** €85.0m
Underpinning Assumptions and Cost Benchmarks	• A build-only ("traditional") contract for construction. • Underpass design is to TII "Design of Road Tunnels" based on 40 mppa projected traffic volumes. • All excavated material assumed to be inert. Max distance to tip 20kms • Backfill material to be imported. • Programme and costs based on open-cut excavation and no piling. • Price based on continuous construction. 2 shifts, 8 hours per shift, 7 days a week. • Operational impact not assessed. Allowance for construction / temporary works uplift included. • Assumed all works will be constructed within an airside environment. • Costs presented assumed inflation to be at 6 % each year to take to Q2 2021. • Unobstructed access assumed for the construction due to other ongoing construction projects • Ideal land take for construction works – longer taxiing routes may be necessary for arriving and departing aircraft. • Priority given to construction traffic to enable works to be completed within closure periods. • Works are constructed as one continuous project. (i.e. no additional excavation and backfilling) • Estimate class – Class IV (-30 / +50) – base estimate presented.	
Opex Impact	• Opex increase of €0.2m p.a. for additional technology costs.	
Project Output	• Road vehicle underpass improving connectivity between Terminal 1 and 2 and Western Campus • Access ramps from apron road network to underpass • Access roads on west apron • Ventilation equipment associated with underpass	
Asset Life	• 50 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q4 2018**
Planning complete:	**Q1 2020**
Detail Design complete: (sufficient for build-only contract)	**Q1 2020**
Procurement complete: (12 months total including PQ)	**Q1 2020**
Construction Commence: (inc. enabling works)	**Q2 2020**
Construction Completed:	**Q4 2022**
Project Handover:	**Q4 2022**

CIP.20.03.051A
West Apron Vehicle Underpass - Pier 1 Option

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€10,000,000**
Construction Costs	**63%**	**€50,000,000**
Escalation, Contingency & Design Variability	**25%**	**€19,700,000**
Total Installed Cost (TIC)	**100%**	**€80,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€50,000,000	20%	€10,000,000	€10,000,000
Total - to summary				**€10,000,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Infrastructure				
Airfield				
Services				
Total - to summary				**€50,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€19,695,000	€19,695,000
Total - to summary				**€19,700,000**

CIP.20.03.052
Surface Water Environmental Compliance

Project Summary

- **Management and treatment of surface water run-off at airports, especially for the surface water loaded with de-icing contaminants, is an increasingly challenging and costly problem for airport authorities and needs to be addressed in line with regulations.**

Storage and On-site Treatment
Management and treatment of surface water runoff, especially for the de-icing agents infused surface water, is a challenging and costly problem for airport authorities. Statutory regulators and water utilities agencies are enforcing stricter restrictions; therefore, the airport authorities must develop and implement effective surface water run-off management strategies.

The existing surface water infrastructure at Dublin Airport does not meet best practice. It is likely that in the near future stricter licences conditions on discharge flows and loads into the receiving surface water streams will come into place. As the anticipated passenger growth continues, additional pressure will further overload the inadequate water infrastructure.

This project proposes to upgrade the existing surface water collection network, divert the existing Cuckoo stream through the airfield and to provide additional storage and treatment facilities for polluted runoff. This project will ultimately improve the water quality in local waterways in line with Fingal County Council River Basin Management Plan. This will be achieved through the separation of clean water from polluted run-off and the provision of a more controlled pollution management system which will reduce the risk of insufficient storage being available to cater for pollution events.
It should be noted that storage requirements are sensitive to the concentration limits for discharges to sewer imposed by Irish Water and the limits imposed by Fingal County Council on the capacity of local waterways to accept polluted flows. This proposal assumes surface attenuation tanks with associated control measures to mitigate risk from bird strikes (below ground storage estimated to incurs an additional estimated €38m capital cost.

It is anticipated that the proposed infrastructure will be implemented over three CIP phases.
Only Phase 1 of the overall project is proposed in this CIP period. This includes the construction of a downstream centralised storage and treatment facility for polluted run-off and associated pumping stations as well as network reconfiguration works, a diversion of the Cuckoo stream and construction of a roof water interceptor sewer. The proposed Phase 1 pipeline works are shown in full lines on the graphic below. Future phased pipeline works are shown in dashed lines.

CIP.20.03.052
Surface Water Environmental Compliance

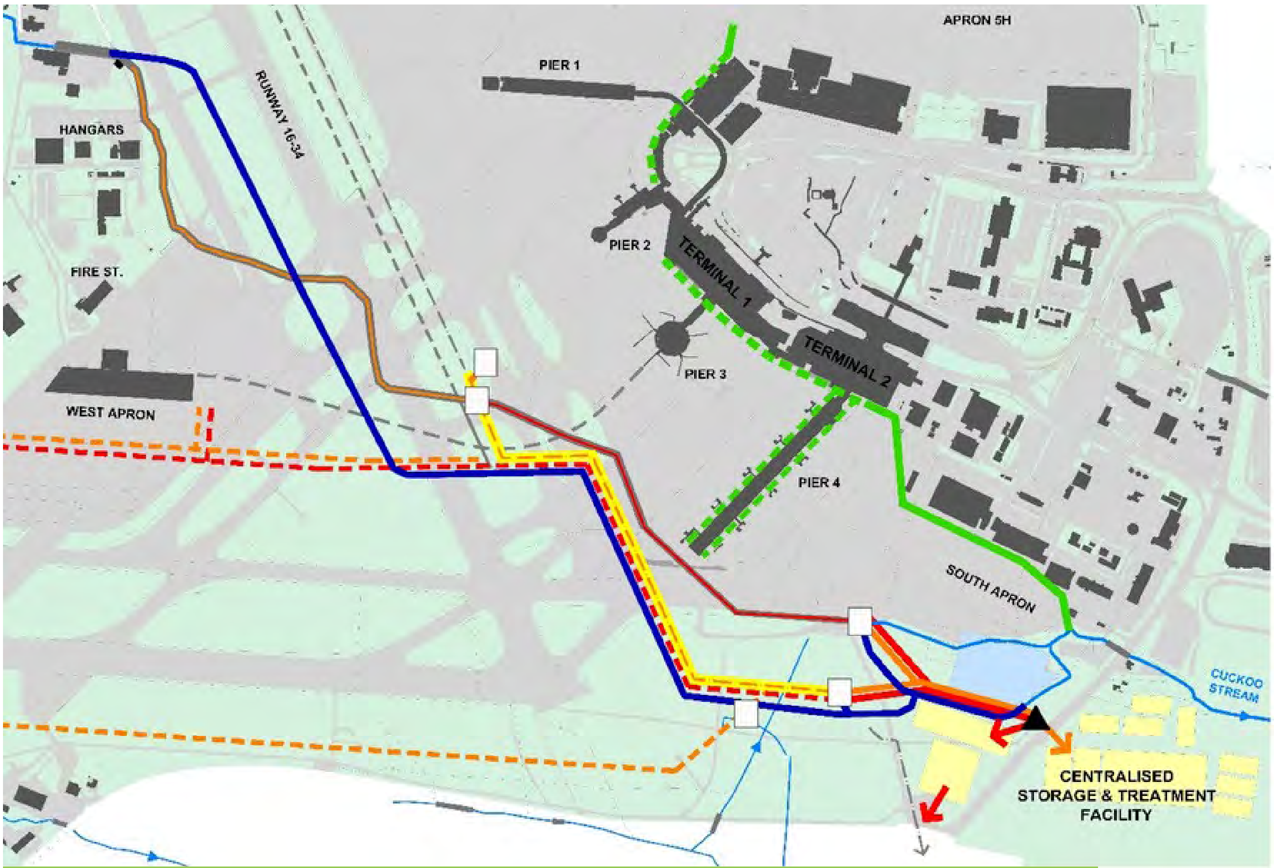


Exhibit 1. Proposed Cuckoo diversion (Blue), roof water diversion (Green), centralised polluted effluent collection (Yellow, red and orange)

DublinAirport

CIP.20.03.052
Surface Water Environmental Compliance

Project Details Summary		
Category: Capacity Development		
Primary Driver Replacement	**Secondary Driver** Regulatory	**Total Capex requirement** €51m
Underpinning Assumptions and Cost Benchmarks	Design assumptions: • Night time working included for the roof water interceptor sewer. • Multi construction phasing to minimise disruption to airport operations. • Trenchless construction techniques to be used underneath taxiways etc. to minimise route interruptions for taxiing aircraft. • It is assumed that works proposed for future CIP phases progress as planned. • Cost based on surface pond attenuation • Network cost includes a deduction for the upgrade of the proposed North Runway sewer as this sewer is to be partly funded by the North Runway project. • Existing 20,000m3 clean run-off attenuation is retained. • 11,000m3 of the polluted run-off attenuation to be funded as part of Airfield works. • North Runway and Apron 5H developments, including associated drainage works, to proceed. • Pipeline sizing has been carried out under the assumption that the proposed 55mpaa developments to the west of the airfield will proceed later. • Clean and local contaminated surface water attenuation to be provided under Airfield WPC Projects.	
Opex Impact	• No material Opex impact. • There will be an Opex impact associated with the provision of additional storage and treatment, but this will be offset by a reduction in the volume of run-off currently being discharged to public sewer.	
Project Output	• Construction of downstream centralised storage and treatment facilities for polluted run-off and associated pumping stations. • Construction of Cuckoo stream diversion using a combination of open channel construction and box culvert construction. • Construction of pipelines for the collection of polluted run-off and reconfiguration of existing network. • Installation of monitoring and decision points for determining the level of pollution of run-off. • Roof water interceptor sewer for terminal buildings, piers, south apron and connection of all roof drainage pipework. • Ancillary Civil and MEICA infrastructure associated with the above works.	
Asset Life	• 20 years	

CIP.20.03.052
Surface Water Environmental Compliance

Project Delivery Key Milestones	
Feasibility / requirements / pilot complete:	**Q4 2018**
Planning complete:	**Q1 2020**
Design complete:	**Q1 2020**
Procurement complete:	**Q1 2020**
Construction Commence:	**Q2 2020**
Construction Completed:	**Q4 2024**
Project Handover:	**Q4 2024**

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€6,400,000**
Construction Costs	**63%**	**€32,000,000**
Escalation, Contingency & Design Variability	**25%**	**€12,610,000**
Total Installed Cost (TIC)	**100%**	**€51,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€32,000,000	20%	€6,400,000	€6,400,000
Total - to summary				**€6,400,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Cuckoo Stream Diversion Works				
Roof Water Diversion Works				
Pollution Control				
Total - to summary				**€32,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€12,604,000	€12,604,000
Total - to summary				**€12,610,000**

CIP.20.03.054
New Remote Apron 5M – 10 NBEs

Project Summary

- **Dublin airport proposes to construct a new aircraft stand (5M Apron) to allow a remote stand and to safeguard future westward expansion.**

In order to meet the capacity uplift forecasted in the upcoming CIP period, full use of the West apron and delivery of an additional 10 NBE aircraft stands are required.

West Apron operations have steadily increased over the last five years to facilitate growth in the East. This proposed apron in the West of the Campus will facilitate the relocation of all non-passenger terminal related operations (cargo, towing operations, GA, Standby aircraft etc.), provide a release valve to facilitate the temporary closure of existing infrastructure required to deliver multiple construction projects, and ultimately facilitate future growth in all areas.

Additionally, this development further safeguards for cost effective, scalable Master Plan compliant development of remote stands in-line with future demand.

This development will require the realignment of the R108.

This option safeguards for relatively simple and cost effective future expansion, without multiple road diversions. The apron will be connected to Parallel Taxiway Mike (M) via link taxiway.

The project will allow for the following:

- **10 no. NBE of MARS configured stands, for multiple users, such as Cargo, General Aviation, towing operations, standby aircraft and contingency.**
- **Blast screen along southern edge**
- **67,000m2 Apron (incl. connecting taxiway)**
- **Realignment of the R108 public road (Alignment also brings other lands airside to accommodate other potential facilities including Code E – Engine test facility)**
- **Potential future apron expansion in line with the airport Masterplan**

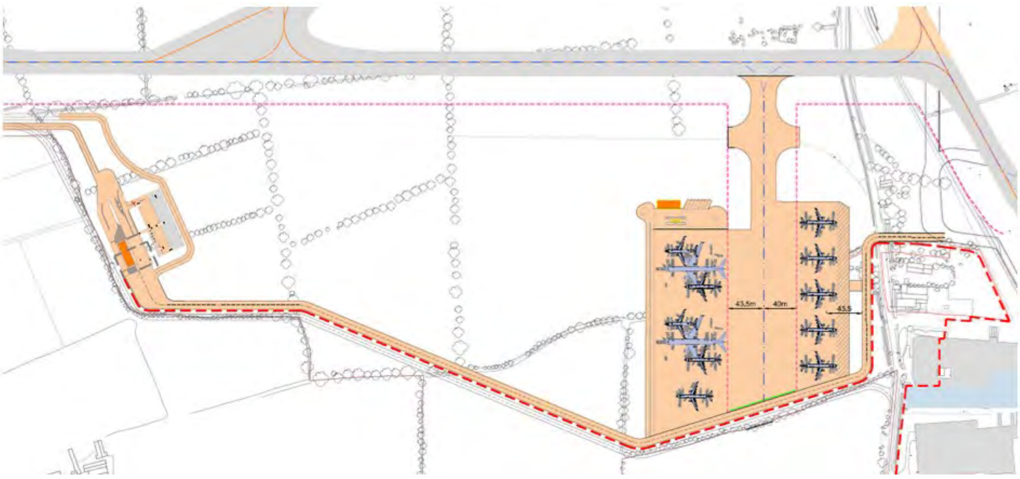


Exhibit 1. Plan view of the proposed apron 5M

CIP.20.03.054
New Remote Apron 5M – 10 NBEs

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** Business Development	**Total Capex requirement** €60.1m
Underpinning Assumptions and Cost Benchmarks	Design assumptions: • Runway 10L-28R OLS constraints Cost assumptions: • 5M Apron can be constructed landside of the airside/ landside boundary which will reduce costs and duration of construction. • A landside construction will reduce the need for additional personnel to escort the materials/vehicles and reduce security requirements. • An OLS assessment may be required for large cranes/ plant to ensure there is no impact on the southern or northern runway surfaces • 5M Apron can be constructed with the North Hub project to minimise construction costs, security delays and overall construction time scale. • 5M will only require floodlighting and SEGS. • 5M will be safeguarded for the future addition of FEGP and A-VDGS. Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• Opex increase of €1.4m p.a. for additional staff and rates costs.	
Project Output	• New apron construction comprising 10 NBE West of RWY 16-34 • EASA compliant design • Master Plan compliant solution • All associated AGL, signage & required lighting (HML) • Realignment of R108 & perimeter road • Safeguard for future Master Plan aligned expansion (additional apron)	
Asset Life	• 30 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q2 2021**
Procurement complete	**Q4 2022**
Construction commence	**Q1 2023**
Construction complete	**Q4 2024**
Project handover	**Q4 2024**

CIP.20.03.054
New Remote Apron 5M – 10 NBEs

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€7,540,000**
Construction Costs	**63%**	**€37,680,000**
Escalation, Contingency & Design Variability	**25%**	**€14,840,000**
Total Installed Cost (TIC)	**100%**	**€60,060,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€37,680,000	20%	€7,536,087	€7,536,087
Total - to summary				**€7,540,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Airfield				
Roads Paths & Paving				
Total - to summary				**€37,680,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€14,842,324	€14,842,324
Total - to summary				**€14,840,000**

CIP.20.03.057
Airside GSE Charging Facilities (Ground Handling)

Project Summary

- **Dublin Airport proposes the installation of Ground Support Equipment electrical charging locations around the airfield.**

With the abundance of accessible wind and ocean energy, Ireland is well suited to become an early adopter of electric vehicle technology. Within the aviation industry it is anticipated that there will be a systematic conversion of all ground support equipment to be electric in the upcoming years. In this manner the airport is required to keep up to pace with delivering the infrastructure required to enable this change.

This trend falls in line with Dublin airports sustainability strategy and the European directives for the reduction of gas emissions and will make a significant difference to the airport's carbon footprint. The project will also see a significant reduction in fuel costs as it will trigger the conversion of the whole GSE fleet in the airport to utilizing electrical vehicles.

The drivers to this project are:

- **To provide the required infrastructure to keep up with trends in emerging technology around GSE vehicles**
- **To work towards a more sustainable and greener environment around the airport**

This project proposes the installation of GSE electrical fast charging locations across the airfield. This initiative will help facilitate government targets and show Dublin Airport to be a leader in sustainable solutions and improve its carbon footprint.

Exhibit 1. Example of outdoor GSE fast charging equipment

CIP.20.03.057
Airside GSE Charging Facilities (Ground Handling)

Project Details Summary		
Category: Capacity Development		
Primary Driver Sustainability	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €5.0m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Escalation is included to mid-point of construction and is based on a rate of 6% per annum Cost Exclusions: (refer to general cost exclusions)	
Opex Impact	• No material Opex impact. • There are potential savings in reduced use of fuel around the airport however, there will be an increase in the overall power demand. Both changes are expected to marginally change Opex costs.	
Project Output	• Outdoor fast charging units	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q2 2021**
Detailed design complete	**Q3 2021**
Procurement complete	**Q4 2021**
Construction commence	**Q4 2021**
Construction complete	**Q4 2022**
Project handover	**Q4 2022**

CIP.20.03.057
Airside GSE Charging Facilities (Ground Handling)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€630,000**
Construction Costs	**63%**	**€3,150,000**
Escalation, Contingency & Design Variability	**25%**	**€1,240,000**
Total Installed Cost (TIC)	**100%**	**€5,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€3,150,000	20%	€630,000	€630,000
Total - to summary				**€630,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
GSE Charging facilities Incl. Electrical				
Civil Works				
Total - to summary				**€3,150,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€1,240,000	€1,240,000
Total - to summary				**€1,240,000**

D COMMERCIAL

APPENDIX D
Commercial

Appendix D - Commercial			Page
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**	
CIP.20.04.001	Car Parking Management System (Maintenance & upgrade)	€3.1	D-1
CIP.20.04.002	Car Hire Consolidation Centre	€18.1	D-4
CIP.20.04.003	New Food & Beverage Fit-out (T1X)	€2.1	D-8
CIP.20.04.004	Digital Advertising Infrastructure	€2.2	D-12
CIP.20.04.005	Long Term Car Parking - Eastlands (2000 spaces)	€5.9	D-15
CIP.20.04.006	Terminal 1 Multi-Storey Car Park Block B (600 spaces)	€18.8	D-18
CIP.20.04.007	Terminal 2 Multi-Storey Car Park (680 spaces)	€15.1	D-23
CIP.20.04.016	Platinum Services Upgrade Works	€2.1	D-27
CIP.20.04.017	Airline Lounges - Expansion, Upgrade & New	€11.4	D-31
CIP.20.04.018	Fast Track Improvements	€1.7	D-35
CIP.20.04.021	West Apron - Accommodation & Welfare Facilities	€4.5	D-38
CIP.20.04.023	Food & Beverage Provision & Fit-out – Post CBP	€3.2	D-43
CIP.20.04.025	Commercial Property Refurbishment	€8.0	D-47
CIP.20.08.001	Retail Refurbishments, Upgrades and New Developments	€8.0	D-50
CIP.20.08.002	Retail Marketing & Media Installation	€1.5	D-54
TOTAL		**€105.7**	

CIP.20.04.001
Car Parking Management System (Maintenance and Upgrade)

Project Summary

- **This project identifies the upgrade requirements for the existing car park management system at Dublin Airport.**

The existing car park management system (installed in 2006), allows efficient and effective management of front-end customer operations. This equipment enables delivery of service as well as collection of revenue. To continue the running of car parks and upgrade our capability, the asset will need to be replaced, as the existing car park management system at Dublin Airport is now end of life (existing system has a 10-year asset life).

The software is now dated and has limited functionality in an ever more connected world. The new software will allow us to technologically connect our passenger and our service, increasing convenience and insight. Additional, the new software will not only allow us to be smarter at time of implementation, it will include a series of roadmap developments to stay on top of passengers demands to protect the revenue stream.

This project consists of replacing the following equipment across the 4 short term car parks and the 3 long term car parks:

- **24 entry terminals**
- **16 exit terminals**
- **21 pay stations**
- **34 barriers**
- **34 CCTV cameras**
- **34 ANPR (Auto Number Plate Recognition) cameras**
- **Provision of new sensor technology hardware (focus on specific sections of short term car parks for premium paying customers).**

DublinAirport

CIP.20.04.001
Car Parking Management System (Maintenance and Upgrade)

Project Details Summary		
Category: Car Parks		
Primary Driver Customer Experience / Stakeholder Requirements	**Secondary Driver** End of Life	**Total Capex requirement** €3.1m

Underpinning Assumptions and Cost Benchmarks	• High level costs assumed based on work with existing suppliers and other major suppliers in the market.
Opex Impact	• <€0.1m p.a. for energy, maintenance and IT costs
Revenue Impact	• N/A
Project Output	• New Car park management system, with capacity for smart interfaces, identification and future payment technology capabilities
Asset Life	• 10 years
IRR	• N/A
Payback Period	• N/A
NPV	• N/A

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q2 2020**
Detail Design complete:	**Q1 2021**
Procurement complete:	**Q4 2021**
Construction Commence:	**Q4 2021**
Project Handover:	**Q1 2022**

CIP.20.04.001
Car Parking Management System (Maintenance and Upgrade)

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	6%	€187,500
Construction Costs	81%	€2,500,000
Escalation, Contingency & Design Variability	13%	€416,563
Total		**€3,104,063**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€2,500,000	8%	€187,500	€187,500
Total-tosummary				**€187,500**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Fittings / Furnishings & Equipment	Redacted Cost Information			
Total-tosummary				**€2,500,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€2,687,500	16%	€416,563	€416,563
Total-tosummary				**€416,563**

CIP.20.04.002
Car Hire Consolidation Centre

Project Summary

- **This project identifies the need to expand the existing car hire facility at Dublin Airport to include 3000 additional car rental spaces and increased service / maintenance areas**

Car Hire is one of Dublin Airport's largest concessionaire business. Current car rental facilities include:

- **Customer service desks in each terminal**
- **Premium rental spaces in the MSCPs (Multi-Storey Car Parks)**
- **Vehicle storage**
- **Compounds in Eastlands consisting of:**
  - **Customer service counters**
  - **Ready & return spaces**
  - **Service / maintenance areas.**

The last major investment in car rental facilities was in 2006. Since that time, car rental has seen a period of significant growth outpacing passenger growth at Dublin Airport for the last 7 years. The existing car hire facilities are now capacity constrained, resulting in additional operating costs for car operators to manage operations. Existing facilities were insufficient to accommodate 2017 demand at an acceptable level of service across most parts of the facility. Customers have expressed discontent with the queue wait times at all three car hire facilities locations (T1, T2 and Eastlands). Car rental operators indicate standards, ranging from 10 minutes to over an hour.

CIP.20.04.002
Car Hire Consolidation Centre

The growth in car rental transactions over the last 5 years has imposed significant operational pressure, particularly in high season, impacting on customer experience and increasingly requiring the use of additional public car parking spaces and offsite facilities to meet demand. It is envisaged by 2022, demand will exceed capacity across all functions of the facility, leading to poor levels of customer service, increased operational costs for car hire and the potential for growth to be constrained. To facilitate future growth and to provide a positive customer experience, it is essential to invest in our car hire facilities at Dublin Airport.

This project proposes the following:

- **3000 additional car rental spaces:**
  Current total provision of car rental spaces across Dublin Airport is approximately 3500. These spaces are used by car rental for ready to rent, return spaces, stacking and staging and short-term vehicle storage. Capacity in 2017 was exceeded by approximately 1000-1500 spaces in peak season requiring operators to find additional facilities offsite. During this time, it is not possible to accommodate car rental in public car parks as the public car parks are at 100% capacity. Future forecasts (based on modest passenger growth rates) indicate a requirement for an additional 3000 spaces by 2024 bringing total requirements for 6,500 spaces.

- **Additional Maintenance and Service Facilities including:**
  - **Fuel Pumps**
  - **Maintenance Bays**
  - **Wash Bays**
  - **Customer counters**
  - **Employee and administrative offices**

The new facilities have been designed to:

- **Complement the existing car hire facilities at Dublin**
- **Protect commercial revenues**
- **Allowing for future growth as the 2018 facilities are at capacity**
- **Improve customer experience (way finding, etc.) and reduced congestion**
- **Increase efficiencies to reduce costs for car rental operators**

CIP.20.04.002
Car Hire Consolidation Centre

Project Details Summary		
Category: Concessions		
Primary Driver Capacity / Constraints	**Secondary Driver** Customer Experience / Revenue Opportunity	**Total Capex requirement** €18.1m
Underpinning Assumptions and Cost Benchmarks	• Benchmarked against previous car park works carried out at Dublin Airport. High level costs assumed based on work with existing suppliers and other major suppliers in the market.	
Opex Impact	• N/A	
Revenue Impact	• €1.7m p.a.	
Project Output	• Expanded care hire facility to allow for future growth	
Asset Life	• 15 years	
IRR	• 11%	
Payback period	• 12 years	
NPV	• €14.6m	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q2 2019**
Planning complete:	**Q3 2020**
Detail Design complete:	**Q3 2020**
Procurement complete:	**Q3 2020**
Construction Commence:	**Q4 2020**
Construction complete	**Q2 2022**
Project Handover:	**Q2 2022**

CIP.20.04.002
Car Hire Consolidation Centre

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	95%	€17,215,500
Escalation, Contingency & Design Variability	5%	€860,775
Total		**€18,076,275**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (deemed included below)	€17,215,500	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Car Park Spaces	Redacted Cost Information			
Maintenance Bays + Fuelling Point				
Wash bays				
Counter Fit-out & Office Area				
Works in Wastelands				
Total-to summary				**€17,215,500**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€17,215,500	5%	€860,775	€860,775
Total-to summary				**€860,775**

CIP.20.04.003
New Food & Beverage Fit-out (T1X)

Project Summary

- **This project identifies the benefits of converting 500sqm of existing retail space & 200sqm of passenger seating space at Terminal 1 (T1x) into food and beverage space.**

Today there are 40 food and beverage (F&B) units across Terminal 1 and Terminal 2 at Dublin, operated by 13 concessionaires. Despite increased passenger numbers in recent years F&B passenger average spend (PAS) has flatlined since 2015 as F&B facilities have become capacity constrained. Current estimates suggest that the International Departures Lounge (IDL) facilities at Terminal 1 currently under catered for F&B by approximately 80%.

This project proposes the following:

- **The development of a new flagship 700sqm F&B space at T1X. This unit will include a 300sqm kitchen (producing fresh food) and deliver a quality F&B experience for passengers.**

CIP.20.04.003
New Food & Beverage Fit-out (T1X)

Location of new F&B unit at T1x, airside:

CIP.20.04.003
New Food & Beverage Fit-out (T1X)

Project Details Summary		
Category: Food and Beverage (F&B)		
Primary Driver Capacity / Constraints	**Secondary Driver** Revenue Opportunity	**Total Capex requirement** €2.1m
Underpinning Assumptions and Cost Benchmarks	• Interior fit out by F&B concessionaire	
Opex Impact	• N/A	
Revenue Impact	• €0.4m p.a.	
Project Output	• New shell & core space with services, suitable for 700sq.m. F&B unit at T1X • Consolidated staff welfare facilities • New storage facilities	
Asset Life	• 105 years	
IRR	• 21%	
Payback period	• 8 years	
NPV	• €5.4m	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning complete:	**Q2 2021**
Detail Design complete:	**Q3 2021**
Procurement complete:	**Q3 2021**
Construction Commence:	**Q3 2021**
Project Handover:	**Q1 2022**

CIP.20.04.003
New Food & Beverage Fit-out (T1X)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€123,375
Construction Costs	77%	€1,645,000
Escalation, Contingency & Design Variability	17%	€366,938
Total		**€2,135,313**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,645,000	8%	€123,375	€123,375
Total-to summary				**€123,375**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Fittings / Furnishings & Equipment	Redacted Cost Information			
Total-to summary				**€1,645,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,768,375	21%	€366,938	€366,938
Total-to summary				**€366,938**

CIP.20.04.004
Digital Advertising Infrastructure

Project Summary

- **This project identifies the benefits to updating, expanding and future proofing the digital advertising infrastructure at Dublin Airport.**

This expansion in digital advertising will see Dublin Airport lead the way in the Irish and international digital advertising arena with the proposed installation of large LED 'statement' digital formats in both T1 & T2. Together with the existing digital AerPod network, these new formats will provide Dublin Airport with the single largest digital advertising footprint in the market.

Currently digital advertising footprint accounts for only circa 15% of our total advertising inventory yet contributes 20+% of total revenue. This is set to increase over the coming years with all forecasts (domestic and international) pointing to DOOH (Digital Out Of Home) as the only segment set to grow. With this investment the total advertising inventory ratio would improve to circa 25% Digital and account for approx. 40% of growing total revenue, enabling Dublin Airport to capitalise on the only area forecast to show growth over next 5+ years, off-setting the expected decline in static advertising.

In terms of technical format specifics, the main driver of this growth will be delivered via larger digital displays & formats as they are more ergonomically advantageous for the advertisers (with lower production costs Vs. vinyl printing), enable more flexible creative opportunities with immediate and responsive copy changes and generate higher levels of customer engagement and personalization especially if programmatically optimized.

This project proposes the following:
- **T2 retail concourse (airside) – install one / two large key statement formats**
- **Upgrade of at least three existing key advertising static sites to digital LED formats in T2**
- **Upgrade of at least two existing key advertising static sites to digital LED formats in T1**
- **Upgrade and expansion of existing digital AerPods network**

CIP.20.04.004
Digital Advertising Infrastructure

Project Details Summary		
Category: Commercial Advertising		
Primary Driver Revenue Opportunity	**Secondary Driver** Customer Experience	**Total Capex requirement** €2.2m
Underpinning Assumptions and Cost Benchmarks	• Costs based on providing fully designed and operational digital inventory network, connected to existing network • Costs based on estimates provided by supplier on similar projects • Costs based on current market rates re. latest available digital LED technologies • Commercial forecasts based on current Irish and international advertising market conditions and forecast trends	
Opex Impact	• <€0.05m p.a. – minimal software maintenance costs	
Revenue Impact	• €0.5m p.a.	
Project Output	• T2 retail concourse (airside) – one/two large key statement formats installed • Upgrade of at least three existing key advertising static sites to digital LED formats in T2 • Upgrade of at least two existing key advertising static sites to digital LED formats in T1 • Upgrade and expansion of existing digital AerPods network	
Asset Life	• 5 years	
IRR	• 14%	
Payback period	• 3 Years	
NPV	• €0.4m	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning complete:	**Q1 2020**
Detail Design complete:	**Q3 2020**
Procurement complete:	**Q4 2020**
Construction Commence:	**Q4 2020**
Project Handover:	**Q3 2021**

CIP.20.04.004
Digital Advertising Infrastructure

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	4%	€89,450
Construction Costs	82%	€1,789,000
Escalation, Contingency & Design Variability	13%	€291,160
Total		**€2,169,610**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€1,789,000	5%	€89,450	€89,450
Total-to summary				**€89,450**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Large LED Digital - T1				
Large LED Digital - T2				
Upgrade existing AerPods				
Expansion of AerPods			Redacted Cost Information	
Upgrade existing key static site - T1				
Upgrade existing key static site - T2				
Power, Cabling & Trays				
Total-to summary				**€1,789,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,878,450	16%	€291,160	€291,160
Total-to summary				**€291,160**

CIP.20.04.005
Long Term Car Parking – Eastlands (2,000 spaces)

Project Summary

- **This project identifies the benefits of providing increased flexible long-term carparking in the Eastlands**

Long Term car parking is a key passenger requirement at Dublin Airport. It is our missions to provide a quality and reliable product, at yield managed prices. Customers value has proven successful in generating repeat custom and growing revenue. 2018 occupancy rates for our long term red car park product is expected for 90% for the full year and was 100% during peak summer months where demand was substantially stronger than supply in the total market.

Proposed Location – Express Red Carpark:

This project proposes to add 2000 new spaces to the existing Express Red Car Park, our highest quality long-term car park. Following the resurfacing upgrade project in 2015, the carpark became popular with business and leisure consumers and is now at full capacity. The 2015 refurbishment allowed us to change the product proposition by delivering a higher quality product and yielding increased revenue from each space. The Express Red Car Park is seen as preferable over other budget products such as Holiday Blue, as it more popular with customers (bigger demand all year round as its closer to terminals and has a shorter bus journey), offers a greater return and the associated car park has permanent planning permission as opposed to a weaker product with temporary planning permission (long term blue).

CIP.20.04.005
Long Term Car Parking – Eastlands (2,000 spaces)

Spaces – Build & Specification:

The new spaces will be built on a green field site and deliver a porous permeable paving solution, with adequate lighting, kerbing and signage (aligned with existing standard in Express Red Car Park). This carpark is situated immediately parallel to the existing red car park resulting in efficient use of bussing and existing entry/egress infrastructure.

Flexible Use for Maximum Utilisation (Public Car Parking & Car Rental)

Flexibility:

Dublin Airport has a deficit for parking facilities for both long term car park customers and car hire storage facilities. The aim of this investment is to increase overall parking capacity, which can be used flexibly to meet the seasonal needs of long term parking and car hire storage, ensuring maximum usage and occupancy of both businesses. It will allow a flexible solution with car hire through use of a moveable mesh harris fence which can be changed with minimum effort and opex.

The two businesses have an inverse relationship with leisure travel. i.e. peak long-term (LT) car park requirements take place over the summer months and key leisure periods. At these times, car hire has a high percentage of their fleet rented out and so require low storage facilities. Similarly, the inverse is also true with low car park demand occasions mean that car hire requires higher car storage facilities. These spaces facilitate public car parking when demand is at its highest over the summer months and car hire vehicle storage in the shoulder seasons during in-fleeting / de-fleeting when rental accumulations at the airport are at their highest.

Note – this project reduces the capital requirement of the Car Hire Development project which would need a higher allowance to accommodate storage demands in the event this project did not proceed.

CIP.20.04.005
Long Term Car Parking – Eastlands (2,000 spaces)

Project Details Summary		
Category: Car Parks		
Primary Driver Capacity / Constraints	**Secondary Driver** Revenue Opportunity	**Total Capex requirement** €5.9m
Underpinning Assumptions and Cost Benchmarks	• Costs based similar projects completed in the past.	
Opex Impact	• Operating costs estimated at €400k p.a. This is for increased costs for rates, cleaning, maintenance, security and transaction costs.	
Revenue Impact	• €2.0m p.a.	
Project Output	• 2000 'flexible' car parking spaces in Eastlands with connectivity to current Express Red car park. Same quality of finish (surface, access, signage etc.) to be maintained. Flexibility to all spaces to be used for car hire or car parking (connecting to existing entrances / exits).	
Asset Life	• 20 years	
IRR	• 23%	
Payback period	• 4.5 years	
NPV	• €19.8m	
Project Delivery Key Milestones		
Feasibility / Outline Design complete:	**Q3 2019**	
Planning complete:	**Q4 2020**	
Detail Design complete:	**Q4 2020**	
Procurement complete:	**Q1 2021**	
Construction Commence:	**Q1 2021**	
Project Handover:	**Q1 2022**	

CIP.20.04.005
Long Term Car Parking – Eastlands (2,000 spaces)

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	10%	€570,938
Construction Costs	77%	€4,567,500
Escalation, Contingency & Design Variability	13%	€796,458
Total		**€5,934,895**

LEVEL2-CostAnalysis				
DesignandManagementCosts	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€4,567,500	13%	€570,938	€570,938
Total-tosummary				**€570,938**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Car Park Spaces				
Main Contractor Prelims	Redacted Cost Information			
Other Development Costs				
Total-tosummary				**€4,567,500**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,138,438	15%	€796,458	€796,458
Total-tosummary				**€796,458**

CIP.20.04.006
Terminal 1 Multi-Storey Car Park
Block B (600 spaces)

Project Summary

- **This project identifies the benefits of providing increased short-term car parking spaces at the existing Terminal 1 (Block B) Multi-Storey Car Park.**

Short Term car parking is a key passenger requirement at Dublin Airport. It is our missions to provide a quality and reliable product, at yield managed prices. Customers value has proven successful in generating repeat custom and growing revenue. Short Term car parks are the most convenient way for Irish based vehicle owners to travel to / from the airport as it offers parking within close proximity of the terminal for convenient arrivals / departures and account for c.50% of car parking revenue.

Short term occupancy rates are expected to be 88% for the full year in 2018 with peak months reaching high 95%+. Growth is flat-lining since 2016 due to a lack of available spaces/capacity and elasticity of price points which customers are willing to pay. Pricing higher than elasticity points at large demand periods erodes the value-for-money proposition and results in customers seeking alternative methods of transport, putting future short-term (ST) business at risk. We have enforced strong yield management to manage demand levels which has resulted in increased revenue however, a reduction in transactions.

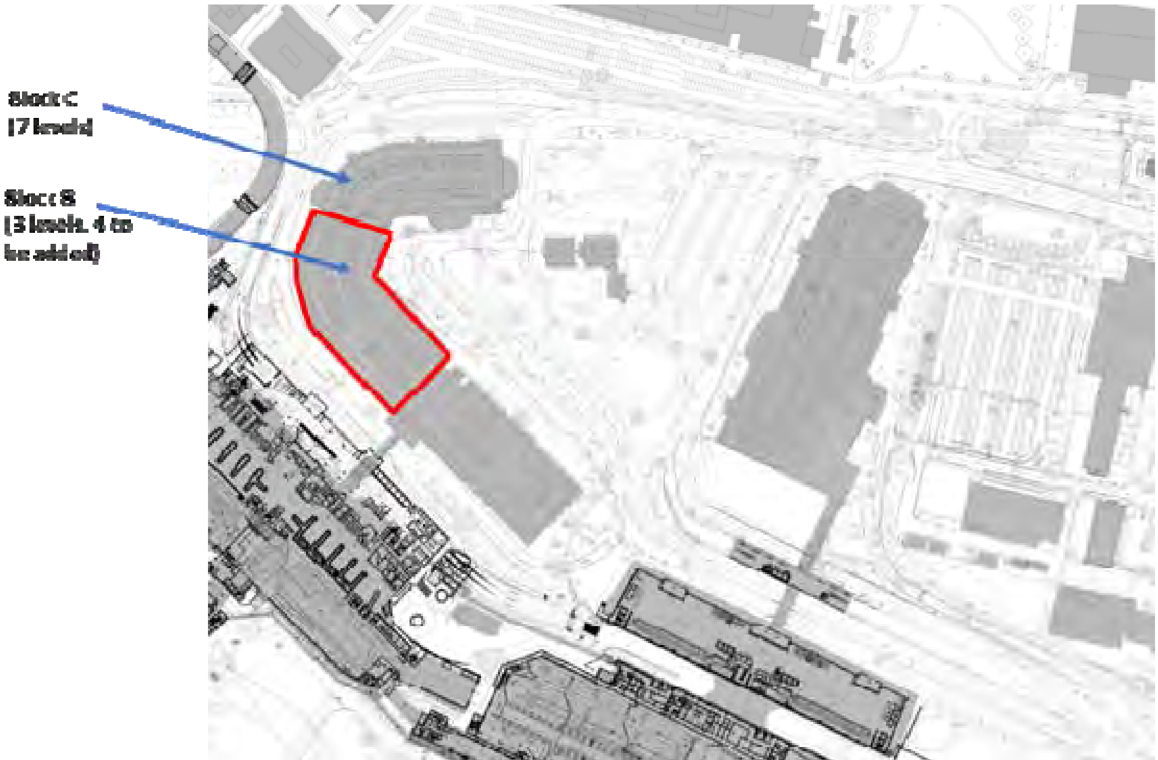
This project proposes the following:

- **Provide four new floors at the existing T1 ST Block B car park (c. 600 spaces).**
  The increased capacity will be built on top of Block B car park (4 levels - to match the height of Block C). These spaces will be connected to the existing (neighbouring) infrastructure within Block C, eliminating the need to build ramps between levels or additional entry/ exit points.
  The existing lift shafts will need to be extended whilst the lift carts etc will need to be replaced

CIP.20.04.006
Terminal 1 Multi-Storey Car Park Block B (600 spaces)

Adding capacity will allow us to:

- **Grow revenue and translate increasing passengers to transactions to avoid customers transferring to alternative modes of transport**
- **Continue to sell parking at rates customers believe to be good value**



Terminal 1 Multi-Storey Car Park Block B

CIP.20.04.006
Terminal 1 Multi-Storey Car Park Block B (600 spaces)

Project Details Summary		
Category: Car Parks		
Primary Driver Capacity / Constraints	**Secondary Driver** Revenue Opportunity	**Total Capex requirement** €18.8m
Underpinning Assumptions and Cost Benchmarks	• Feasibility based on basic structural report (originally undertaken in 2002, revised in 2018 E. Kelly) • Additional ramps between levels or additional entry/ exit points not required.	
Opex Impact	• Operating costs estimated at c.€400k p.a. This includes costs for rates, maintenance, cleaning and transaction costs.	
Revenue Impact	• €1.9m p.a.	
Project Output	• Four new floors on top of MSCP Block B car park, connected into existing asset with similar quality product as currently exists	
Asset Life	• 25 years	
IRR	• 8%	
Payback period	• 12.5 years	
NPV	• €6.5m	
Project Delivery Key Milestones		
Feasibility / Outline Design complete:	**Q2 2020**	
Planning complete:	**Q3 2021**	
Detail Design complete:	**Q4 2021**	
Procurement complete:	**Q1 2022**	
Construction Commence:	**Q2 2022**	
Project Handover:	**Q3 2023 phased handover**	

CIP.20.04.006
Terminal 1 Multi-Storey Car Park
Block B (600 spaces)

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	11%	€2,128,145
Construction Costs	75%	€14,187,636
Escalation, Contingency & Design Variability	13%	€2,528,946
Total		**€18,844,727**

LEVEL2-CostAnalysis				
DesignandManagementCosts	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€14,187,636	15%	€2,128,145	€2,128,145
Total-tosummary				**€2,128,145**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works				
Substructure				
Superstructure - Frame				
Superstructure - Others				
Internal Finishes	Redacted Cost Information			
Fitting /Furnishings & Equipment				
Services				
External Works				
Main Contractors Preliminaries				
Total-tosummary				**€14,187,636**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€16,315,781	15%	€2,528,946	€2,528,946
Total-tosummary				**€2,528,946**

CIP.20.04.007
Terminal 2 Multi-Storey Car Park
(680 spaces)

Project Summary

- **This project identifies the benefits of providing increased short-term car parking spaces at the existing Terminal 2 Multi-Storey Car Park.**

Short Term car parking is a key passenger requirement at Dublin Airport. It is our missions to provide a quality and reliable product, at yield managed prices. Providing value to customers has proven successful in generating repeat custom and growing revenue. Short Term car parks are the most convenient way for Irish based vehicle owners to travel to / from the airport as it offers parking within close proximity of the terminal for convenient arrivals / departures and account for c.50% of car parking revenue.

Short term occupancy rates are expected to be 88% for the full year in 2018 with peak months reaching high 95%+. Growth is flat-lining since 2016 due to a lack of available spaces/capacity and elasticity of price points which customers are willing to pay. Pricing higher than elasticity points at large demand periods erodes the value-for-money proposition and results in customers seeking alternative methods of transport, putting future short-term (ST) business at risk. We have enforced strong yield management to manage demand levels which has resulted in increased revenue however, a reduction in transactions.

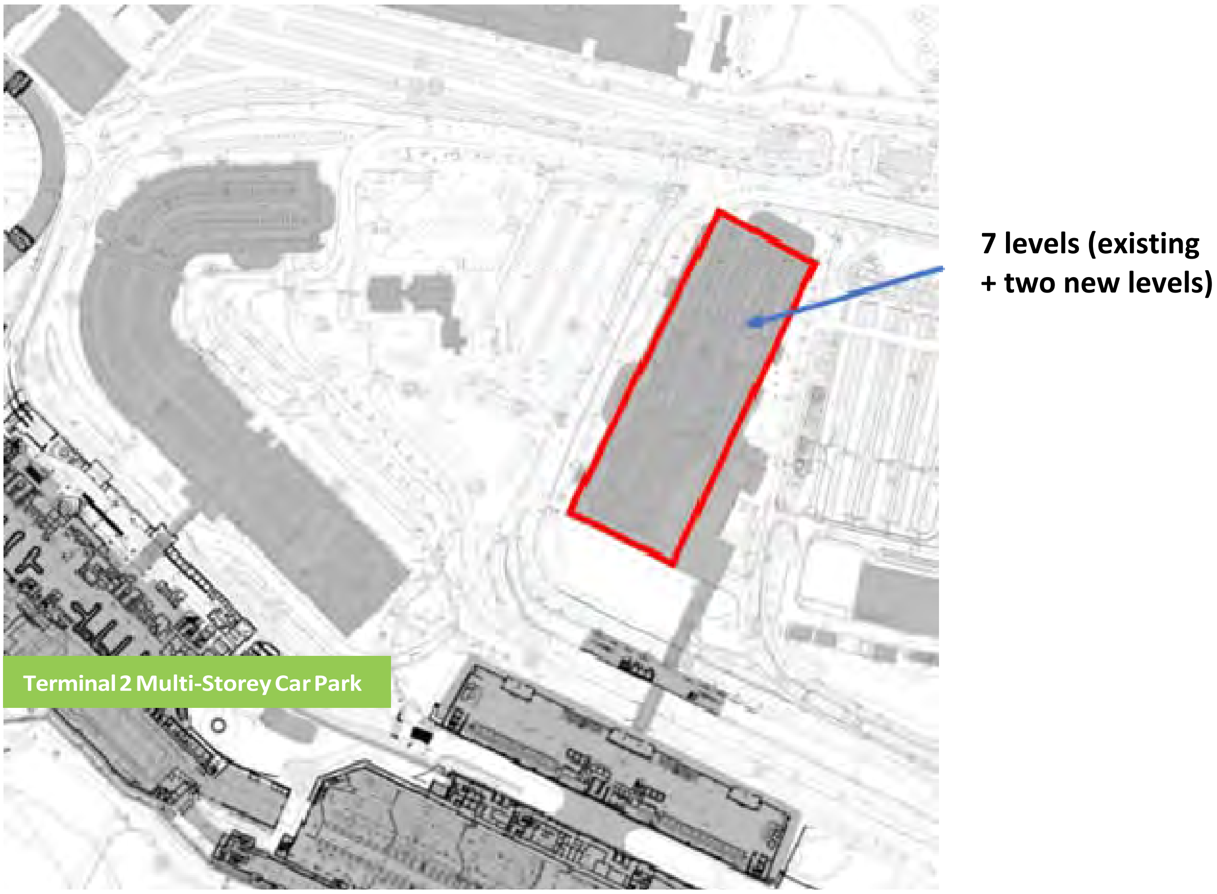
This project proposes the following:

- **Provide 2 new floors at the existing T2 ST (c. 680 spaces)**
- **The added capacity will be built on top of the T2 Multi-Storey Car Park (2 levels). This allows a direct connection to existing infrastructure thus eliminating the need to build additional entry/ exit points. The existing lift shafts will need to be extended to reach the two new floors**

CIP.20.04.007
Terminal 2 Multi-Storey Car Park
(680 spaces)

Adding capacity will allow us to:

- **Grow revenue and translate increasing passengers to transactions to avoid customers transferring to alternative modes of transport**
- **Continue to sell parking at rates customers believe to be good value**



CIP.20.04.007
Terminal 2 Multi-Storey Car Park (680 spaces)

Project Details Summary		
Category: Car parks		
Primary Driver Revenue opportunity	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €15.1m

Underpinning Assumptions and Cost Benchmarks	• Based on similar works completed on other Multi Storey Car Parks (Structural Report - E. Kelly) • Additional ramps between levels or additional entry / exit points not required.
Opex Impact	• Operating costs estimated at c.€400k p.a. This includes costs for rates, maintenance, cleaning and transaction costs.
Revenue Impact	• €2.1m p.a.
Project Output	• **Two new floors on top of the T2 Multi Storey Car Park, connected into existing asset with similar quality product as currently exists.**
Asset Life	• 25 years
IRR	• 11%
Payback period	• 9.5 years
NPV	• €12.7m

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q2 2020**
Planning complete:	**Q3 2021**
Detail Design complete:	**Q3 2021**
Procurement complete:	**Q1 2022**
Construction Commence:	**Q1 2022**
Project Handover:	**Q1 2024 phased handover**

CIP.20.04.007
Terminal 2 Multi-Storey Car Park (680 spaces)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	11%	€1,703,370
Construction Costs	75%	€11,355,798
Escalation, Contingency & Design Variability	13%	€2,024,171
Total		**€15,083,339**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€11,355,798	15%	€1,703,370	€1,703,370
Total - to summary				**€1,703,370**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Major Demolition Works	Redacted Cost Information			
Superstructure - Frame				
Superstructure - Floor, Roof, Walls				
Internal Finishes				
Fitting /Furnishings & Equipment				
Services				
External Works				
Main Contractors Preliminaries				
Total - to summary				**€11,355,798**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€13,059,168	16%	€2,024,171	€2,024,171
Total - to summary				**€2,024,171**

CIP.20.04.016
Platinum Services Upgrade Works

Project Summary

- **This project identifies the benefits of upgrading the existing Platinum Services product at Dublin Airport.**

Platinum Services is a 24-hour private terminal at Dublin Airport, open 7 days a week, with on-demand services to meet individual client needs whether departing, arriving or simply in need of a place to conduct business on the airport campus.

This project provides several significant improvements to passengers using the Platinum Services facilities. This project can be broken down into the following three sections:

1. **Platinum Upgrades**
2. **Platinum Capacity**

CIP.20.04.016
Platinum Services Upgrade Works

1. Platinum Upgrades:

Platinum Service suites require continuous improvement and investment to meet customer expectations (both B2B & B2C). With increasing passenger numbers, the maintenance of the suites has become more critical. This platinum upgrade works will provide:

- **New soft furnishings**
- **Fixtures**
- **Lighting**
- **Design features**
- **Kitchen Upgrade (replacing existing back-of house kitchen)**

2. Platinum Capacity:

Suite Capacity:
Currently Platinum Services operates 7 suites, one of which is a designated meeting room facility. During busy periods, there are 70+ movements on peak days. Suite availability becomes a capacity constraint. This product has the potential to add more capacity by splitting / dividing Suite 3 into 2 suites when required (flexible design) and provide a refurbishment of the back-reception area to allow for an overflow area when all suites are occupied.

General Aviation (GA) Porch:
GA is integral to the revenue of Platinum Services at Dublin Airport equating to 48% of movements in 2017. This project plans to introduce a communal area for GA passengers in the airside porch which would free up valuable landside suites for an overall more efficient operation. The provision of a GA porch reduces the peak capacity constraints in PS and subsequently allows for increased availability for commercial clientele. By providing a communal facility, Platinum Services has the flexibility to accommodate late bookings which will not impact on suite capacity allocations and will increase.

The Platinum capacity project will provide:

- **Increase suite capacity**
- **New general aviation Porch**
- **Overflow area**

CIP.20.04.016
Platinum Services Upgrade Works

Project Details Summary		
Category: Dublin Airport Travel Services		
Primary Driver Revenue Opportunity	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €2.1m
Underpinning Assumptions and Cost Benchmarks	• Based on similar works completed on other upgrade projects • Works to be completed without disruption to 24/7 Platinum services Note: Business case results are based on €1m investment on GA porch and additional suite capacity. No business case included for upgrades and security segregation.	
Opex Impact	• Minor Opex increase – cleaning services and food & beverage stocking <€0.05m p.a.	
Revenue Impact	• €0.3m p.a.	
Project Output	• **New arrival corridor** • **Reduction in size of Suite 6** • **Fully compliant with dept/arriving SOP's** • **Ability to convert suite 3 into two separate suites.** • **Back reception area to comfortably accommodate overflow clients** • **Maintain alternative access and egress through back porch area** • **New fit for purpose waiting/dwell area for meet & greet services in Platinum** • **Fully private area with direct connection to the main Platinum facility**	
Asset Life	• 7 years	
IRR	• 28%	
Payback Period	• 4 years	
NPV	• €2m	
Project Delivery Key Milestones		
Procurement complete:	**Q4 2021**	
Construction Commence:	**Q1 2022**	
Project Handover:	**Q3 2023**	

CIP.20.04.016
Platinum Services Upgrade Works

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	7%	€146,771
Construction Costs	93%	€1,956,942
Escalation, Contingency & Design Variability	0%	€0
Total		**€2,103,712**

LEVEL2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€1,956,942	7%	€146,771	€146,771
Total-tosummary				**€146,771**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Fit-Out: Porch				
Fit-Out: Press Suite	Redacted Cost Information			
Fit-Out: Other				
Total-tosummary				**€1,956,942**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€2,103,712	0%	€0	€0
Total-tosummary				**€0**

CIP.20.04.017
Airline Lounges – Expansion, Upgrade & New

Project Summary

- **This project identifies the benefits of upgrading and increasing the existing Airline Lounges offering at Dublin Airport**

Our lounges offer a tranquil setting, comfortable, air-conditioned lounges with a range of lounge offerings (complimentary drinks, snacks, newspapers etc.) Dublin Airport currently operates the following lounges:

- **Terminal 1 Lounge**
- **Terminal 2 Lounge**
- **51st & Green Lounge**

This project proposes several improvements to existing lounge offering at Dublin Airport. This project can be broken down into the following two sections:

1. **Lounge Upgrades**
2. **Increase Lounge Capacity**

CIP.20.04.017
Airline Lounges – Expansion, Upgrade & New

1. Lounge Upgrades:

Lounge products need continuous improvement and investment to meet customer expectations (both B2B & B2C). With increasing passenger numbers, the maintenance of Lounges has become more challenging. An ongoing Lounge upgrades programme is required to maintain the required standard. Upgrade works to be completed over the 2020-2024 CIP period include:

- **Supply and installation of all kitchen equipment**
- **Internal fitout and decoration**
- **Varying seating types**
- **Charging points/ plug sockets**
- **Spa like shower facilities**
- **Improved servery to display variety of food (chill well, additional fridges etc.)**
- **New look and feel – furnishings, lighting, etc.**

The existing lounges will require the following works:

- **T2 Lounge Upgrade - Upgrade**
- **51st&Green Upgrade - Full interior upgrade**

The T1 lounge is not proposed for upgrade as it will be relocated to facilitate security moving to the Mezzanine level of Terminal 1.

2. Increase Lounge Capacity:

Significant growth in passenger levels over the current regulatory period (2014 – 2019) has pushed lounges to capacity at peak hours. Capacity in the shoulder periods of the day (differs between products i.e. T1, T2 and CBP lounge) but peak hours operate a max capacity. The lounges are mainly utilised by wholesale (airline) passengers, but as new airlines and current airlines add capacity on Dublin Airport routes, the airlines passenger base using our lounges continues to increase. More recently, the addition of new long haul Asian routes has seen longer lounge dwell time by new passengers resulting in pinch points at certain times throughout the day, impacting our customer experience.

This project proposes the following potential lounge capacity increasing projects:

- **Pier 1 Lounge**
- **Mezz level in T2 Lounge**
- **Terminal 2 Arrivals Lounge**

The T1 lounge is not proposed for capacity expansion as it will be relocated to facilitate security moving to the Mezzanine level of Terminal 1.

CIP.20.04.017
Airline Lounges – Expansion, Upgrade and New

Project Details Summary		
Category: Commercial (Dublin Airport Travel Services)		
Primary Driver Capacity / Constraints	**Secondary Driver** Revenue Opportunity / Customer Experience	**Total Capex requirement** €11.4m
Underpinning Assumptions and Cost Benchmarks	• Cost based on current Lounge fit-out costs: • Costs based on preliminary site inspection indicative cost • Works to be completed without disruption to surrounding operational areas. Note: Business case results based on €11m investment for increased capacity and new lounges. No business case included for upgrades.	
Opex Impact	• Increase in operating costs per annum of €1.2m for lounge costs and consumables	
Revenue Impact	• €2.6m p.a.	
Project Output	• New fit for purpose area to facilitate extra capacity • Build alternative Lounge offerings for passengers who we do not capture with current products • Provide an appropriate arrivals product for our long-haul customers	
Asset Life	• 7 years	
IRR	• 18%	
Payback Period	• 7 years	
NPV	• €9m	
Project Delivery Key Milestones		
Airline Lounges	**Q4 2019 – Q4 2024**	

CIP.20.04.017
Airline Lounges – Expansion, Upgrade and New

LEVEL1 - CostAnalysis	Represents	Total
Design and Management Costs	5%	€615,000
Construction Costs	72%	€8,200,000
Escalation, Contingency & Design Variability	23%	€2,575,214
Total		**€11,390,214**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€8,200,000	8%	€615,000	€615,000
Total-tosummary				**€615,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Lounge upgrade	Redacted Cost Information			
Lounge Expansion				
Total-tosummary				**€8,200,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€8,815,000	29%	€2,575,214	€2,575,214
Total-tosummary				**€2,575,214**

CIP.20.04.018
Fast Track Improvements

Project Summary

- **This project identifies improvements required at existing Fast Track facilities and the benefits of providing a new Fast Track Arrivals product at Dublin Airport.**

Fast Track welcomes 760k users per year at Dublin Airport. Fast Track minimises any waiting time and gets passengers through Security in less than 10 minutes, with average queue times today less than three minutes.

This project seeks to improve the existing Fast- Track product while also proposing a new Arrival Fast Track product. This project can be broken into the following two categories:

1. **Fast Track – Upgrades to existing facilities**
2. **Fast Track – Arrival**

CIP.20.04.018
Fast Track Improvements

1. Fast Track – Upgrades to existing facilities:

Conventional security processing (via Central Search Areas) at Dublin Airport has adapted to new technology in recent years to improve overall processing time. The introduction of ATRS (in Terminal 1) and other technological advancements have made the conventional product much quicker and puts at risk the unique selling point of 'speed' for Fast Track users. To remain as the preferred processing product Fast Track needs to seek product improvements which work towards the aim of delighting customers.

- **Barista Bar: Provision of beverage offerings at the end of the security lane (automatic selection pre-screening)**
- **Access Control: Provision of improved access control to Fast Track. Existing visual inspection by Airport Search Unit (ASU) officer is timely and alternative technology to be considered (fingerprint, phone or eye retina scanning)**
- **Visual improvements: Improvement required to existing lane – making it look & feel different from central search**
- **Modern security equipment: Seamless security equipment to be considered**

2. Fast Track Arrivals:

This project proposes a dedicated 'queue skip' channel through passport control and immigration process. This service is available in many other international airports. Several of Dublin Airports newest 4 & 5 star airlines have requested an Arrival Fast Track type product with the intention to use it for their first class, business class and frequent flyer customers.

The proposal is to contract directly with airlines, charging them a fixed fee per passenger. This would then be extended to our online sales channel (Dublinairport.com) and permit sale on self-service kiosks if capacity is available. This product would be introduced in both Terminals.

CIP.20.04.018
Fast Track Improvements

Project Details Summary		
Category: Commercial (Dublin Airport Travel Services)		
Primary Driver Revenue Opportunity	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.7m
Underpinning Assumptions and Cost Benchmarks	• Cost based on current Fast Track capex project (T2 entrance)	
Opex Impact	• Operating cost impact c.€0.4m p.a. for payroll costs and IT booking costs	
Revenue Impact	• €0.6m p.a.	
Project Output	• Two arrivals queue jumps in both terminals • Increased commercial revenues • Contract agreements with airlines on arrivals product • Improved service offering in our Fast Track channel • Ability to increase prices gradually with product improvements • Increase customer numbers	
Asset Life	• 7 years	
IRR	• 19%	
Payback Period	• 9 years	
NPV	• €2.6m	
Project Delivery Key Milestones		
Projects Complete:	**Q1 2020 – Q4 2024**	

DublinAirport

CIP.20.04.018
Fast Track Improvements

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	89%	€1,500,000
Escalation, Contingency & Design Variability	11%	€185,400
Total		**€1,685,400**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€1,500,000	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Fast track arrivals channel	Redacted Cost Information			
Fast track product improvements				
Total-to summary				**€1,500,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,500,000	12%	€185,400	€185,400
Total-to summary				**€185,400**

DublinAirport

CIP.20.04.021
West Apron - Accommodation & Welfare Facilities

Project Summary

- **This project identifies the need for accommodation and welfare facilities on the West Apron.**

Dublin Airport's aim is to ease apron congestion by relocating dedicated cargo flights to the west apron along with the third country transition flights. Several cargo aircraft now operate from the West Apron but there exists a shortfall in accommodation and / or welfare facilities in that location. The lack of facilities is one of the key reasons operators/handlers/line maintenance companies are reluctant to operate from the West Apron.

Increased Activity on the West Apron

There is now an additional urgency for Cargo, Line Maintenance, MRO and Transit Aircraft Services administration and storage accommodation in the area, as plans are already in place to move additional cargo airlines such as, TNT, UPS, Blue Bird, BDA and Carousel to the West Apron by Q1 2019. This relocation will bring with it the associated handlers and line maintenance companies.

Furthermore, it is also foreseen that the West Apron will facilitate increased parking and overflow parking for homebased carriers "standby aircraft" and General Aviation respectively (Surface Crossing being progressed from PACE). Proposals in the CIP (additional narrow-bodied stands West of RWY 16/34 and RWY 16/34 underpass) will increase overall activity in the West Apron. Collectively, this drives the requirement for the development of office and storage accommodation to service the significantly increased Line Maintenance, Ground Handling, Cargo Handlers, General Aviation and airline activity in the area.

Proposed Location: 1,666 sqm site on West Apron

CIP.20.04.021
West Apron - Accommodation & Welfare Facilities

This project proposes the following:

- **Development of West Apron accommodation (as indicated in the drawing on previous page)**
- **Phased development: 50% shell and core and 50% fully developed. Facility can be further development in line with increased activity on the West Apron**

It is not expected that the West Apron Services Accommodation will go into full occupancy immediately, however its development will allow more aircraft to be positioned in the area which in turn will drive demand for accommodation. Expected breakdown of the property is estimated to be 40% storage accommodation, 60% office accommodation, allowing 300sq.m. for common areas. The site area for development is approx. 1,666sq.m.

CIP.20.04.021
West Apron - Accommodation & Welfare Facilities

Project Details Summary		
Category: Property		
Primary Driver Revenue Opportunity	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €4.5m
Underpinning Assumptions and Cost Benchmarks	• Cost based on similar airside projects	
Opex Impact	• N/A	
Revenue Impact	• €0.5m p.a.	
Project Output	• Development of urgently required accommodation in the west apron to cater for existing and future operators of dedicated cargo, Line Maintenance, MRO and Transit Aircraft Services administration. • Reduce congestion on both the north and south aprons • Increase in commercial property revenue	
Asset Life	• 15 years	
IRR	• 10%	
Payback Period	• 7 years	
NPV	• €2.0m	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q2 2020**
Planning complete:	**Q3 2021**
Detail Design complete:	**Q3 2021**
Procurement complete:	**Q4 2021**
Construction Commence:	**Q4 2021**
Project Handover:	**Q2 2023 (phased)**

CIP.20.04.021
West Apron - Accommodation & Welfare Facilities

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€455,590
Construction Costs	79%	€3,531,920
Escalation, Contingency & Design Variability	11%	€492,856
Total		**€4,480,366**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,531,920	13%	€455,590	€455,590
Total-to summary				**€455,590**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
General Allowance for Construction	Redacted Cost Information			
Total-to summary				**€3,531,920**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,987,510	12%	€492,856	€492,856
Total–to summary				**€492,856**

CIP.20.04.023
Food & Beverage Provision and Fit-out – Post CBP

Project Summary

- **This project identifies the need for increased Food & Beverage offerings for Post CBP passengers.**

The US Preclearance (US CBP) facility at Terminal 2 is a purpose-built facility that allows US bound passengers to undertake all US immigration, customs and agriculture inspections at Dublin Airport prior to departure. Since its introduction, Dublin Airport has witnessed a steady growth in transatlantic passenger and use of the CBP facility. This in turn has put increased pressure on the small F&B offering currently in the area.

The overall F&B passenger experience is considered poor due to the constrained environment. The small range and overcrowding compounds this issue. Currently there are no kitchen or storage facilities. Today there is 168sq.m. of F&B space. This is considered 63% below industry benchmarks, yet by 2024, there will be a requirement for 700 sqm. These capacity constraints have led to penetration drops over the summer months which directly impacts the Average Transaction Value (ATV). ATV in this area is approx. €6 and this cannot be increased due to the limited offering. An opportunity exists to;

- Improve passenger experience through provision of better F&B offering post CBP
- Increase sales and ATV

CIP.20.04.023
Food & Beverage Provision and Fit-out – Post CBP

This project proposes the following:

- **Construct new F&B space adjacent to 51st&Green: This space is currently underutilised ramp accommodation (see image below)**
- **Maximise Commercial Revenue opportunities for Post CBP passenger dwell time**

CIP.20.04.023
Food & Beverage Provision & Fit-out – Post CBP

Project Details Summary		
Category: Food and Beverage		
Primary Driver Capacity / Constraints & Customer Experience	**Secondary Driver** Revenue Opportunity	**Total Capex requirement** €3.2m
Underpinning Assumptions and Cost Benchmarks	• Construction of new unit is to shell & core standard. • Fit out by concessionaire.	
Opex Impact	• N/A	
Revenue Impact	• €0.4m p.a.	
Project Output	• New F&B space in US CBP	
Asset Life	• 5 years	
IRR	• 22%	
Payback Period	• 8 years	
NPV	• €6.5m	

Project Delivery Key Milestones	
Procurement complete:	**Q1 2022**
Construction Commence:	**Q1 2022**
Project Handover:	**Q4 2022**

CIP.20.04.023
Food & Beverage Provision & Fit-out – Post CBP

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€185,850
Construction Costs	77%	€2,478,000
Escalation, Contingency & Design Variability	17%	€552,749
Total		**€3,216,599**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€2,478,000	8%	€185,850	€185,850
Total-to summary				**€185,850**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Gen. Fittings Furnishings and Equipment	Redacted Cost Information			
Total-to summary				**€2,478,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€2,663,850	21%	€552,749	€552,749
Total–to summary				**€552,749**

CIP.20.04.025
Commercial Property Refurbishment

Project Summary

- **This project identifies the need for ongoing Commercial Property Refurbishment at Dublin Airport**

Commercial properties across campus and terminals at Dublin Airport is circa 50 years old and requires significant ongoing refurbishment to bring it to a fit for purpose standard expected for existing and potential commercial occupants. Accommodation is considered sub-standard in several areas across the terminals and piers (ramp accommodation) and requires refurbishment works in advance of occupation by licence fee paying customers.

Investment typically includes fitting out of offices, furniture minor mechanical and electrical services, minor life safety systems and IT (Mech & Elec and LSS typically only second fix). Property accommodation includes but is not limited to Cargo terminal buildings and warehouse facilities, Collinstown House as well as terminal/ramp accommodation.
These projects are typically undertaken at short notice when a potential customer has requested specific areas and commercial terms are agreed.

An allowance in the 2015 – 2019 CIP of €10.6m was granted for commercial property refurbishments. This aided the refurbishment of Skybridge House and several smaller refurbishments (Cargo 3/4, terminal office space, etc.). A similar allowance for the forthcoming period is required to maintain building standards, protect the current revenue stream and seek potential revenue opportunities.

CIP.20.04.025
Commercial Property Refurbishment

Project Details Summary		
Category: Property		
Primary Driver Revenue Opportunity	**Secondary Driver** End of Life	**Total Capex requirement** €8m

Underpinning Assumptions and Cost Benchmarks	• 500-1,500sqm to be refurbished annually at a cost of €2,000 per sqm. NOTE: No financial business case included as capex required to maintain revenues and tenant property specifications over the term.
Opex Impact	• N/A
Revenue Impact	• Projects will be assessed on a case by case basis. Some projects will be required to maintain existing revenue levels.
Project Output	• Quality, fit for purpose tenant accommodation • Refurbishment or altered office space • Quality fit-for-purpose ramp accommodation
Asset Life	• 7 years

Project Delivery Key Milestones	
Commercial Property Refurbishment (Campus)	**Q1 2020 – Q4 2024**

CIP.20.04.025
Commercial Property Refurbishment

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€450,000
Construction Costs	75%	€6,000,000
Escalation, Contingency & Design Variability	19%	€1,521,942
Total		**€7,971,942**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€6,000,000	8%	€450,000	€450,000
Total-to summary				**€450,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Gen. Fittings Furnishings and Equipment	Redacted Cost Information			
Total-to summary				**€6,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€6,450,000	24%	€1,521,942	€1,521,942
Total-to summary				**€1,521,942**

DublinAirport

CIP.20.08.001
Retail Refurbishments, Upgrades and New Developments

Project Summary

- **This project provides for refurbishment, upgrade and expansion of existing retail offerings at Dublin Airport across both terminals and associated piers.**

Retail is a critical contributor to both improving passenger experience and increasing commercial revenue at Dublin Airport . Investing in new customer focused retail opportunities can dramatically improve the customer experience and help increase overall passenger spends.

ARI have many secondary stores strategically located in T1 & T2 to provide passengers either a primary or secondary opportunity to shop. This project seeks to provide new store locations aligned with the DAP development strategy and refresh and expand existing locations, including the introduction of new Perfume and Cosmetic (P&C) vendors, and refresh performing P&C vendors under an existing 50/50 cost share agreement, to ensure we adapt to the changing passenger profile and maximise revenue operativities.

a) Pier 100 store expansion and redevelopment.

b) T2 Arrivals store upgrade.

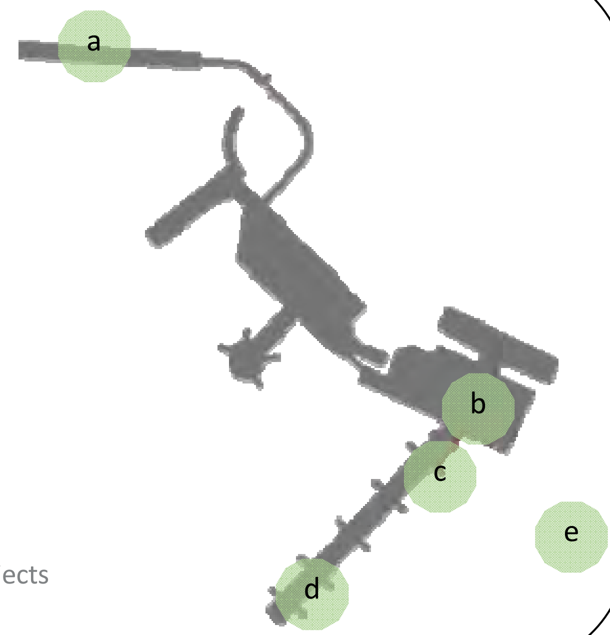
c) New Retail Store Pier 400 transfer route.

d) Pier 400 (CBP) store upgrade.

e) New retail store Southern gates.

f) New ARI Concept Stores (Terminals)

Note: T1 Redevelopment captured under T1 Capacity Projects



To support this objective, ARI ensure the appropriate logistics structure and equipment is in place, and an operational contingency budget available to react to unforeseen opportunities or rectify unforeseen issues. Therefore, included in this project budget is new logistics equipment and a yearly operational contingency figure.

CIP.20.08.001
Retail Refurbishments, Upgrades and New Developments

The following is considered within this project:

Location of Offerings:
A lot of passenger time is spent at departure gates with no core category representation or opportunity to purchase last minute gift and beauty purchases. Provision of purchases in these locations maximizes the experience for airport guests.

Space Constraints:
Most of the retail space in the pier shops and Arrivals is unable to maximise current potential due to space constraints for all categories – Retail space has not developed proportionally to passenger growth over recent years. Improve retail space would allow Liquor and Confectionery to vastly improve range and product selection, focus would be given to core categories, sub-categories [such as Whiskey and last-minute gifting opportunities.

ARI Penetration:
ARI seeks to increase its penetration, conversion and profitability by leveraging untapped potential of the sunglasses category in GTR & the unique relevance of the category for anyone on a journey
The primary benefit arises from improved profitability, as ARI moves to direct supply from varying existing models. Other key benefits include; improved customer experience, arising from retail theatre, technology and innovations in the category and a full array of brand availability.

The Passenger
ARI seek to continue to provide retailing opportunities for all passengers. Most passengers are captured within the T1 & T2 main store areas however, ARI acknowledge the requirement to ensure secondary opportunities are provided in Piers. These shops focus on the passenger demographic and present key items / best sellers specific to that location, informed through customer insights and behavioral analysis.

Strategy
ARI seek to maximise retailing opportunities and revenues to our shareholders by identifying all retailing locations fully aligned with the DAP expansion strategy. New stores are located to ensure that passengers that may not have had the opportunity to shop within the main Duty-Free stores in T1 or T2 have an opportunity to purchase close to their Gate.

IT
The IT infrastructure will be updated & reconfigured to meet the needs of the business and expand the customer experience.

CIP.20.08.001
Retail Refurbishments, Upgrades and New Developments

Project Details Summary		
Category: Retail		
Primary Driver Revenue Opportunity	**Secondary Driver** Customer Experience	**Total Capex requirement** €8.0m
Underpinning Assumptions and Cost Benchmarks	• Construction costs benchmarked on recently tendered Retail Redevelopment project in Terminal 2 – 2018 • Construction rates reviewed and validated by AMD. • Logistics equipment costs validated by known suppliers.	
Opex Impact	• Opex impact of €6.1m p.a. mainly driven by additional payroll/FTE's and other variable costs such as: logistics, credit card fees, retail bags etc.	
Revenue Impact	• €8.1m p.a.	
Project Output	• New retail store Southern gates • New Retail Store Pier 400 transfer route • Pier 100 store expansion and redevelopment • Pier 400 (CBP) store upgrade • T2 Arrivals store upgrade • 2 new logistics adjustable platforms • Electric pallet trucks & equip • Operational contingency • P&C 50/50 New and Refresh brands • New ARI concept stores	
Asset Life	• 5 years	
IRR	• 8.2%	
Payback period	• 4 years	
NPV	• €0.6m	
Project Delivery Key Milestones		
ARI Stores - Secondary Locations (Upgrades & Expansion):	**Q1 2020 – Q4 2024**	

CIP.20.08.001
Retail Refurbishments, Upgrades and New Developments

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€8,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€8,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs (Deemed included below)	€8,000,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Pier 100	Redacted Cost Information			
T2 Arrivals Store				
Pier 400				
CBP				
South Gates				
Operational Contingency				
Logistic Infrastructure				
50/50 cost share vendor installations				
Concept Stores				
Total - to summary				**€8,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€8,000,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.08.002
Retail Marketing & Media installation

Project Summary

- **This project identifies Marketing and Media opportunities at Dublin Airport.**

ARI is developing new, innovative retail technology initiatives to improve the customer experience in our various shops across the globe. Emphasising ARI's core values and based on ARI's "Experience is everything" proposition. This value-based proposition is supported by three (3) strands to ARI's Brand Promise:

- To deliver the most outstanding shopping experiences
- To make shopping easier for our customers
- To find innovative ways of making things better for our customers

Media for in store brand promotions

A significant element of the designs that ARI develops for its various stores incorporates the supply and installation of various elements of retail technology and digital media.

The benefits of integration of retail technologies and digital rich media as part of retail store development are 3-fold:

- **Digital rich media has been proven to generate engagement, traffic and footfall into stores, to enhance brand attractiveness; and to encourage passengers to shop/buy inside the store zone. High quality content and communications can both engage and inform passengers as part of the passenger journey with right products, /services/information at the right time. Digital also works as part of the overall store design strategy to provide an enhanced store shopping experience.**
- **Offering additional instore digital touchpoints as part of promotional agreements with key**

CIP.20.08.002
Retail Marketing & Media installation

suppliers can enhance overall contract negotiations, margins & terms. This is now a major component of promotional negotiations and frequently requested by suppliers
- **Utilizing digital can offer more effective ways of managing collateral, in regards reducing the need for print and install of traditional POS**

Commercial
Marketing and media is designed through a customer first approach and there is a balance between informative communications, brand advertising & retail store communications. The potential return on investments can be identified both directly (through supplier revenues/ margin enhancements) and indirectly through engagement, increased penetration & additional dwell time spent in store, plus customer satisfaction tracking with our overall instore experience measures.

The Passenger
The use of strategically located media installations will add significantly to the passenger experience. New installations will inform, engage, delight and add a sense of theatre to the journey.

Strategy
The strategy is to engage passengers with the right message at the right time in an engaging way that compliments on the overall store experience and where appropriate link the on and off-line shopping experience.

Media for FIDs, LOOP & Cross Category messaging

CIP.20.08.002
Retail Marketing & Media installation

Project Details Summary		
Category: Retail		
Primary Driver Revenue Opportunity	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.5m
Underpinning Assumptions and Cost Benchmarks	• All costs estimated from current DAP framework cost schedules, and from current T2 media installations.	
Opex Impact	• No material opex impact.	
Revenue Impact	• €0.5m p.a.	
Project Output	• New media installations delivering a new ARI media strategy	
Asset Life	• 5 years	
IRR	• 8.4%	
Payback period	• 4 years	
NPV	• €0.1m	
Project Delivery Key Milestones		
ARI – Marketing & Media	**Q1 2020 – Q4 2024**	

CIP.20.08.002
Retail Marketing & Media installation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€1,500,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs (Deemed included below)	€1,500,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Marketing & Media	Redacted Cost Information			
Total - to summary				**€1,500,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability (Deemed included above)	€1,500,000	0%	€0	€0
Total - to summary				**€0**

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E INFORMATION TECHNOLOGY

APPENDIX E
Information Technology (IT)

Appendix E - Information Technology			Page
CIP Number	Project Title	Provisional Estimate €m October 2018	
CIP.20.05.001	Airfield Optimization	€7.9	E-2
CIP.20.05.002	Digital Passenger Experience	€1.8	E-6
CIP.20.05.003	Integrations and Data	€7.1	E-9
CIP.20.05.004	Baggage Systems	€1.3	E-12
CIP.20.05.005	Business Efficiency	€6.2	E-15
CIP.20.05.006	Commercial Systems	€2.3	E-20
CIP.20.05.007	Reliability, Safety, Security & Compliance	€8.2	E-23
CIP.20.05.008	Operational Devices (Support & Maintenance)	€1.8	E-28
CIP.20.05.009	Network Components - Lifecycle & Growth	€6.9	E-31
CIP.20.05.010	Passenger Processing (excl. Security Screening)	€7.0	E-34
CIP.20.05.011	Security Technology Innovation (Biometrics & FOD Detection)	€3.0	E-37
CIP.20.05.012	Servers and Storage - Lifecycle & Growth	€5.6	E-40
CIP.20.05.014	User Devices (Desktops, Mobile, Telephone, Radio)	€3.7	E-43
CIP.20.05.015	New Data Centre Hosting Location	€4.0	E-46
CIP.20.05.016	Microsoft Enterprise	€6.0	E-49
TOTAL		**€73m**	

CIP.20.05.001
IT - Airfield Optimisation

Project Summary

- This project proposes that Dublin Airport participate in further SESAR (Single European Sky ATM Research) initiatives to drive additional efficiencies and release more capacity.

Dublin Airport (DAP) and its key stakeholders, IAA (Irish Aviation Authority), Eurocontrol, Airlines and handling agents have a common goal to continue to drive efficiencies across airfield operations, its key processes and supporting infrastructure while maintaining the highest standards of safety and compliance. DAP has several key IT systems in place that support this objective for the airfield operation. These include Airport Operations System (AOS), Airfield Visual Display (AVD), Advanced Docking Guidance system (A-VDGS), Integration Platform. These systems are widely used by all Stakeholders. DAP will be A-CDM (Airport Collaborative Decision Making) certified by the end of the current CIP period, supporting full data exchange between IAA, Eurocontrol, Airlines and Handlers.

SESAR:
SESAR is a European wide initiative, designed to completely overhaul European airspace and its air traffic management (ATM). DAP is one of 25 airports that is obliged (initially under the "Pilot Common Project" PCP Regulation) to deploy these solutions – many are in the remit of the ANSP (Air Navigation Service Provider) but there are a number that the airport is directly responsible for, in both the airport operations area and IT.

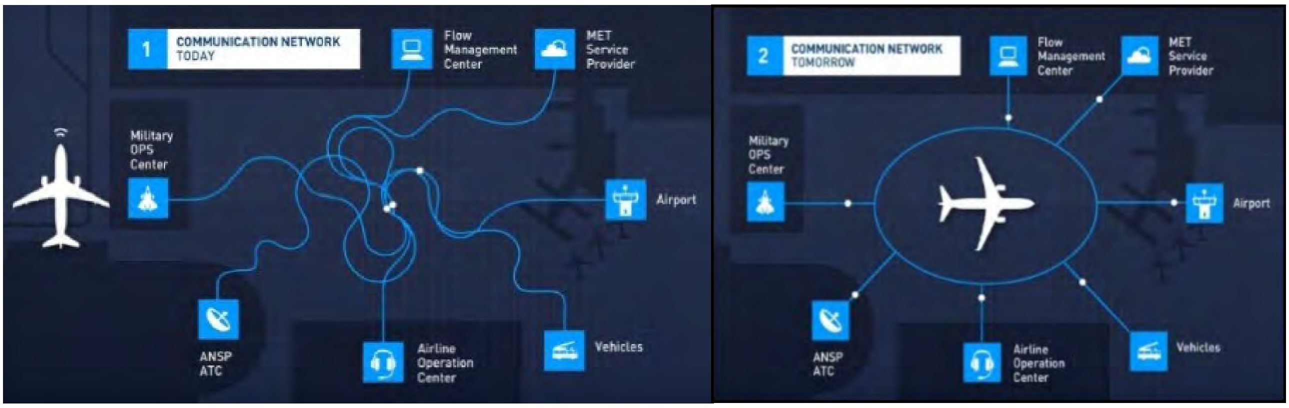
Targeting Efficiency & Safety Improvements:
The airport and its partners are constantly seeking new ways of delivering efficiencies and improving safety standards for all who operate on the airfield. As the number of aircraft movements increases over the 2020-2024 CIP period, there will be a greater reliance on IT systems and Data to deliver an increase in capacity in a safe and reliable manner. During the lifetime of 2020-2024 CIP DAP will be participating in further SESAR initiatives (as proposed in this project) to drive additional efficiencies and release more capacity. SESAR will grant up to 50% of the full cost of any approved project.

CIP.20.05.001
IT - Airfield Optimisation

The proposal can be split into the following four groups:

1. Airport Operational Database (AODB) upgrade:
2. Upgrade of the existing operational systems to deliver a new centralised information system that monitors all events at the airport in real-time and allows immediate interaction with all systems.
3. IAOP / NOP delivered as part of European wide SESAR initiative:
4. The Initial Airport Operations Plan (IAOP) provides a single, common and collaboratively-agreed rolling plan for an individual airport while the Network Operations Plan (NOP) provides a global plan for the network and aims to connect the AOP of all the airports on one single network.

   The combination of AOP and NOP increases predictability across the network and at individual airports. For DAP this will ensure that DAP facilities are used in a better, more efficient, optimised way.
5. A-CDM Key Performance Indicators (KPIs): System enhancements required to support KPIs tracking of operations (e.g. TOBT – Target Off Block Time, TSAT – Target Start-up Approval Time, etc.)
6. System and data integrations across all key stakeholders (SWIM).
7. The aim of System Wide Information Management (SWIM) is to provide information users with relevant and commonly understandable information. It does not refer to a single solution or technology, but rather a global level of interoperability and standardisation that enables users and providers to exchange data without having to use different interfaces or protocols. For DAP this will result in increased cost efficiency, easily accessible information sharing and improved service operation.



The role of SWIM (System Wide Information Management).

Note on Funding:
In the past, DAP availed of SESAR funding to partially fund efficiency improving initiatives. Approximately €6m SESAR funding has been secured to date (approx. 43% of the overall investment). Programs supported by SESAR to date include A-CDM, A-VDGS, AVD and SWIM Integration Platform. Dublin Airport has already applied for the 2018 SESAR call for An Initial Airport Operations Plan (iAOP) and should be updated on outcome by September 2018. DAP also plans to submit applications for further SESAR programs of work to be delivered within the lifetime of this 2020-2024 CIP (e.g., AOP/ NOP and additional SWIM initiatives).

CIP.20.05.001
IT - Airfield Optimisation

<table>
<tr><th colspan="3">Project Details Summary</th></tr>
<tr><td colspan="3">Category: Information Technology</td></tr>
<tr><td>Primary Driver
Operational Efficiency</td><td>Secondary Driver
Stakeholder Requirements</td><td>Total Capex requirement
€7.9m</td></tr>
<tr><td>Underpinning Assumptions and Cost Benchmarks</td><td colspan="2">• A-CDM KPIs will continue to be tweaked and supporting systems and processes updated to deliver positive business outcomes for all stakeholders
• Regulatory landscape will remain as is
• New runway will come on line in 2022 bringing increase in aircraft movements
• European wide initiatives will drive programs of improvement across all stakeholders
• Data sharing across all stakeholders will continue to grow
• SESAR funding will continue through CIP Lifetime and significant projects such as iAOP will proceed
• The AOS platform will be upgraded rather than replaced
• A new integration platform introduced in 2019 will support all system integrations</td></tr>
<tr><td>Opex Impact</td><td colspan="2">• Normalised incremental opex impact of c.€0.1m additional cost p.a. relating to systems support</td></tr>
<tr><td>Project Output</td><td colspan="2">• AODB and AVD upgrades to deliver the expected level of service and functionality
• IAOP, NOP delivered as part of European wide initiative
• System enhancements to support A-CDM KPIs
• System and data integrations across all key stakeholders (SWIM)</td></tr>
<tr><td>Asset Life</td><td colspan="2">• 5 years</td></tr>
<tr><th colspan="3">Project Delivery Key Milestones</th></tr>
<tr><td colspan="2">AODB, and AVD software upgrades and enhancements</td><td>Ongoing</td></tr>
<tr><td colspan="2">iAOP rolled out</td><td>Q4 2023</td></tr>
<tr><td colspan="2">SWIM initiatives</td><td>Q4 2023</td></tr>
<tr><td colspan="2">System and Data integration</td><td>Q4 2022</td></tr>
</table>

CIP.20.05.001
IT - Airfield Optimisation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€7,900,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€7,900,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€7,900,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs				
AODB, AVD, A-VDGS upgrades and enhancements				
Initial Airport Operation Plan (iAOP) rolled out	Redacted Cost Information			
SWIM initiatives				
System and Data integrations				
Total - to summary				**€7,900,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,900,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.002
IT – Digital Passenger Experience

Project Summary

- **This project proposes investment in Dublin Airport Mobile and Web channels and supporting infrastructure to ensure passengers get the best possible digital experience throughout all airport touchpoints**

A key objective of the Dublin Airport (DAP) strategy is to delight our passengers. Digital technology plays a large part in people's daily lives, making everyday tasks simpler and providing relevant information to assist. Airports and travel can be a stressful experience for many people, but technology can significantly reduce this stress by putting the passenger in control with the right tools and information.

Passenger Expectations:
A recent survey of our web and mobile B2C offerings found DAP to be lagging its counterparts. DAP offerings were deemed not user friendly, not providing easy access to information and services and not supporting any level of personalization or contextual messaging to passengers or staff supporting those passengers. In the upcoming 2020-2024 CIP period DAP will target the following goals to improve the overall B2C offerings:

- **Invest in Mobile and Web channels and supporting infrastructure to ensure DAP passengers receive the best possible digital experience throughout all airport touchpoints.**
- **Provide passengers with accurate, contextual information at all stages of the passenger journey.**
- **Offer high quality products and services through digital channels through mobile.**
- **Use digital means to alleviate passenger distress when unexpected or non-standard events occur at the airport.**

This project proposes the following (to ensure DAP achieve the above-mentioned goals):
- **Web and Mobile development platform: The provision of a development platform will allow DAP build functionality in one place but deploy simultaneously to Web and Mobile assets. This will require a re-platform of the existing website and a move from Native to Hybrid Apps, making DAP digital B2C channels more cost efficient and agile.**
- **Updated Platforms: Platforms will be kept current and relevant through regularrefreshes.**
- **Web and Mobile Channels: DAP will continue to enhance web and mobile channels basedon analytics and passenger feedback.**
- **Digital signage and interactive screens: Digital Screens supporting passenger engagement tobe provided in dwell and leisure areas to enhance the passenger experience (only ITelement).**

DublinAirport

CIP.20.05.002
IT – Digital Passenger Experience

Project Details Summary		
Category: Information Technology		
Primary Driver Customer Experience	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €1.75m
Underpinning Assumptions and Cost Benchmarks	• Smartphones will continue to be the device of choice for passengers • Development will be "mobile first" • Younger demographic will expect all travel related information and services to be provided through digital channels	
Opex Impact	• Normalised opex impact of nil due to additional opex costs relating to solutions system support being offset by savings relating to reduced operational resource requirements	
Project Output	• Mobile development platform in place supporting Web and Mobile assets • Web and mobile channels kept current and in line with user expectations • Contextual and personalized services and products throughout the passenger journey • Single view of the passenger supporting personalized offers • Digital Screens supporting passenger engagement in dwell areas	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Software enhancements to Mobile and Web platforms	**Ongoing**
Web and Mobile Platform in place with current Web and App Assets migrated	**2020**
Digital screens and interactive devices rolled out	**2023**

CIP.20.05.002
IT – Digital Passenger Experience

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€1,750,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,750,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€1,750,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Web & Mobile Platform	Redacted Cost Information			
Digital Passenger Engagement				
Retail Digital Engagement				
Total - to summary				**€1,750,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,750,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.003
IT - Integrations and Data

Project Summary

- **This project identifies the technology required to support the increasing volumes and demand for data and business insights across Dublin Airport and its stakeholders.**

Digital transformation of the airport operating environment will continue to accelerate with more and more physical assets and business processes becoming digitised, producing more data that will be required to measure and optimise performance,

This will require more sophisticated data capabilities to manage the increase in volume, the compute power to process this data and, more sophisticated tools to derive actionable insights utilising artificial intelligence and machine learning. The growth in data, driven by digital technology over the last 2-3 years has been exponential and this trend will continue.

The backend data platforms that house this data are currently powered by Oracle and Microsoft products and this will likely continue. This project identifies the technology projects required to support the increasing volumes and demand for data and business insights across Dublin Airport and its stakeholders. This project captures the following requirements:

- **Databases, Oracle, SQL Server upgrades**
- **Modern Data Platform implementation**
- **Delivery of Business Intelligence solutions to all stakeholders**
- **Creation of Data Science Predictive Models (Machine Learning & AI) driving optimized processes and deeper business insights**
- **Final phase of delivery of Integration platform to connect systems and data across stakeholders**

CIP.20.05.003
IT - Integrations and Data

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency	**Secondary Driver** Customer Experience	**Total Capex requirement** €7.05m
Underpinning Assumptions and Cost Benchmarks	• Digital transformation of the operating environment driving increase in data • Greater business reliance on real-time data and analytics • Business demand for data and data driven insights will continue to grow • Introduction of integration and data platforms will lay the foundations to harness data and deliver that data and meaningful business insights to aviation stakeholders • IT Development costs will remain relatively static	
Opex Impact	• Normalised opex impact of c.€0.1m saving p.a. associated with additional databases, integration and data platforms costs being offset by savings through analytic optimisation	
Project Output	• Lifecycle upgrades to existing database infrastructure • Modern enterprise data platform including a Data Science lab • Data management capabilities enabling real-time integration between applications and IOT devices. • Enhancements to enterprise analytics to optimise passenger flows, airfield management, asset management, commercial travel services and retail.	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Modern Data Platform Completed	**Q1 - 2024**
Enhancements to enterprise analytics	**Ongoing**
Data management capabilities	**Ongoing**
Lifecycle database upgrades	**Ongoing**

CIP.20.05.003
IT - Integrations and Data

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€7,050,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€7,050,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€7,050,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Databases Oracle, SQL Server, new data platform upgrades	Redacted Cost Information			
Integration Platform Upgrade				
Modern Data Platform (Final phase of delivery)				
BI Platform & Development				
Data Science Predictive Models (Machine Learning & AI)				
Data Integration Services				
Total - to summary				**€7,050,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,050,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.004
IT - Baggage Systems

Project Summary

- **This project identifies the investment required in the IT component of Baggage System at Dublin Airport.**

Baggage handling is a critical service provided by Dublin Airport (DAP) to its airline customers and passengers. Baggage handling is supported by complex Electro Mechanical systems that are largely controlled by IT systems. This investment will ensure those IT systems can meet operational demands and cater for growth in baggage while keeping current with any regulatory changes. The following two projects have been identified as requirements during the next 2020-2024 CIP period:

1. Baggage Image Location System (BILS) Replacement
BILS provides baggage imaging, weighing and location services for USCBP to pre-clear US flight operations. BILS also provides Baggage Reconciliation System (BRS) services for all T2 airlines. It is likely that T1 Airlines will also adopt the airport BRS in the future. The BRS platform will be an integral part of any IATA 753 solutions being provided by DAP. Note: There have been issues with the current platform which have had an adverse impact on airline baggage operations. DAP plan to replace the platform and potentially the associated hardware during the 2020-2024 CIP period

2. Baggage Management Software
Baggage Handling System (BHS) is a conveyor system transporting checked luggage to and from aircraft. Both the T1 and T2 BHS have IT components that are key to their operation, these include:

- **SAC: Sort Allocation Computer services manage both the Sortation and Tracking ofbags.**
- **SCADA: Supervisory control and data acquisition (SCADA) services provides visualization of the status of the Baggage Handling system.**

The SAC and SCADA for T2 will be replaced by end 2018 and the T1 components will be replaced as part of the Standard 3 /HBS project (2020-22)

Project:
This project covers any future upgrades or enhancements to these services. DAP will continue to invest in the reliability of the IT baggage services to ensure regulatory compliance and vendor support on both hardware and software elements.

CIP.20.05.004
IT - Baggage Systems

Project Details Summary		
Category: Information Technology		
Primary Driver Regulation	**Secondary Driver** End of Life	**Total Capex requirement** €1.3m
Underpinning Assumptions and Cost Benchmarks	• Regulatory compliance of baggage screening standards and US customs achieved • Lifecycle Management to keep on supported platforms, hardware & software • Replacement of hardware peripherals in line with recommended life expectation • The technology platforms to support our security & compliance services will be upgraded/refreshed in line with technology advances.	
Opex Impact	• Normalised incremental opex impact of c.€0.1m p.a. relating to expanded service requirements	
Project Output	• Compliant Hardware & Software on all our IT baggage services	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Baggage Image Location System (BILS) replacement	**2022**
Baggage Management Software upgrade and enhancements	**2021, 2023**

CIP.20.05.004
IT - Baggage Systems

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€1,300,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,300,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€1,300,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Baggage Image Location System (BILS)	Redacted Cost Information			
Baggage Management Software				
Total - to summary				**€1,300,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,300,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.005
IT - Business Efficiency

Project Summary

- **This project identifies the need to invest in our Business Systems through enhancements and additions to the existing IT estate.**

One of the Dublin Airport (DAP) strategic goals is to "build for our future". To enable business to transform and grow, DAP needs reliable, flexible and efficient business systems. It is critically important to continue to capitalize on previous IT investments by ensuring those systems remain current and adapt to changing business needs. DAP has invested in some strategic business applications such as Oracle ERP, Kronos Time and Attendance, IBM Maximo for Asset Maintenance and Baggage Management solutions.

Technology also plays a major part in delivering optimized processes for all airport stakeholders. Technology solutions can enhance our customer and passenger experience, reduce FTE and associated costs and in some cases negate the need for major infrastructure capex projects. The following section describes important IT Business Efficiency projects required at DAP.
The key Business Efficiency Projects identified are as follows:

1. **Application Enhancements**
2. **ERP Investment**
3. **IT Asset Management Tool**
4. **Airport Community App**
5. **Situational Awareness Tool**
6. **Building Information Modelling System**
7. **Small Building Request**

1. Application enhancements
IT continues to drive value from the existing business systems by taking advantage of enhancements to those solutions to meet the constantly changing business needs of DAP and its customers. During the lifetime of this CIP, we expect to continue to develop applications such as

- **Enterprise Asset Management platform (e.g. sensor deployment & IOT gateway)**
- **Rostering Systems**
- **Time and Attendance systems**
- **Energy Management systems**
- **Billing solution**

2. ERP (Enterprise Resource Planning) Investment
ERP is a business process management software (currently provided by Oracle at DAP) that allows DAP to use a system of integrated applications to manage the business and automate many back- office functions related to technology, services and human resources. Up to date ERP is critical for the organisation as it can improve productivity, increase efficiencies, decrease costs and streamline processes. In 2018 / 2019 DAP will review the strategic direction of current ERP systems. This review will result in moving to the next generation of Oracle ERP in the cloud or possibly a selection of an alternative platform to support core business.

CIP.20.05.005
IT - Business Efficiency

Note on DAP System: The current HR platform is inefficient and does not support mobility, self- service, single source of truth for employees, there is a need to move to a modern, reliable platform to drive business efficiency

3. **IT Asset Management tool**
ITIL (IT Information Library) is a framework of best practices for delivering IT services. DAP requires the implementation of ITIL Service Asset and Configuration Management system to maintain information about Configuration Items (Software, Hardware, Services, Licences) required to deliver an effective IT service at the Airport. IT are currently managing a large estate of IT assets on a paper-based system.

This project proposed the implementation of an IT Asset management tool which will support the rollout of best in class ITIL processes for DAP Asset management. The tool will track IT components (e.g. Hardware, Software and Licences) in use across the entire DAP campus ensuring assets are properly controlled, and that accurate and reliable information about those assets is available when and where it is needed. This information includes details of how the assets have been configured and the relationships between assets.

4. Airport Community App
This project proposes the implementation of a DAP Community App. The Community App will give staff working in and around the airport, even those who do not work directly for DAP, easier access to information about airport matters, such as flights, passenger density, local weather and transport status. Note:
Gatwick currently have a Community App which is known to drive greater collaboration, transparency and efficiency amongst airport stakeholders.

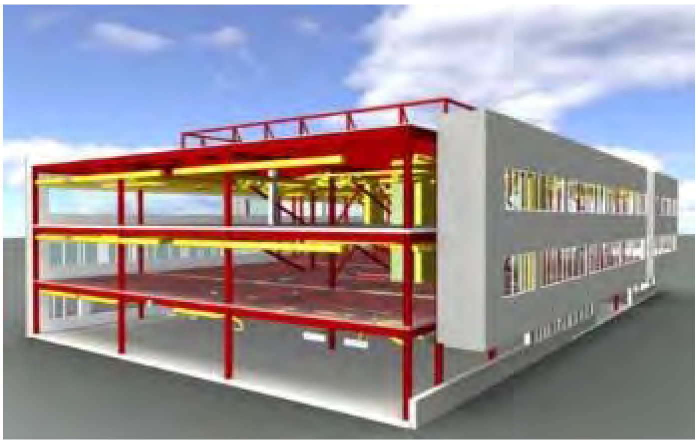
5. Situational Awareness Tool
Due to increased capacity constraints, airports worldwide are moving towards an end to end view (using visualisation tools for airport activity) of their operations to realise more efficient operations through sharing of information. A situational awareness tool recognises the dependencies between stakeholders and provides alerts and triggers to those stakeholders to take necessary actions in the event of any issue occurring in the Passenger, Baggage or Airfield pipelines.

CIP.20.05.005
IT - Business Efficiency

A situational awareness tool will provide Dublin Airport Operations with an end to end view of all key passenger, baggage and airfield processes. The tool will use integrated data feeds from key Airport systems (AODB – Airport Operational Database, GPS Tracking etc.) to populate dashboards that will support real-time decision making across the operation. Note: A Business rules engine will be incorporated into the tool allowing us to configure the appropriate actions based on set of data or events.

6. Building Information Modelling System

Building Information Modelling (BIM) is a digital representation of the complete physical and functional characteristics of a built asset. A single BIM model of an asset can contain information on design, construction, logistics, operation, maintenance, budgets and schedules critical to the completion of that asset. Effective BIM implementation can result in the following:



- **Reduced project management**
- **Foster communication and co-ordination**
- **Identify errors early**
- **Reduce rework**
- **Reduce costs**
- **Improve quality.**

DAP proposed to implement BIM technology and establish processes to ensure the BIM records become the single source of truth for all capital works on our infrastructure. Given that DAP is proposing significant investment in infrastructure in the 2020-2024 CIP period it is critical that the correct technology is implemented to maximise project efficiency.

7. Small Business requests

IT will spend approximately €200k per annum on Small Business requests delivering a program of incremental changes to the business each year.
Typically, these are small development projects delivered by internal IT resources that add incremental value to the business. Past examples include the rollout of online forums on mobile devices (allowing staff capture and review data on a real-time basis), small infrastructure projects such as Office set ups and Moves (e.g. onboarding new handling agent).

CIP.20.05.005
IT - Business Efficiency

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency	**Secondary Driver** Future Proofing	**Total Capex requirement** €6.2m
Underpinning Assumptions and Cost Benchmarks	• Regulatory standards & Compliance achieved on all software. • Lifecycle Management to keep on vendor supported platforms, hardware & software • Replacement of software and/or hardware peripherals in line with recommended life expectation, e.g. software versions. • Investment in new applications & software when business benefits are obvious. • R&D in emerging disruptive technologies such as Blockchain and wearables.	
Opex Impact	• Normalised opex impact of nil due to additional support costs due to new and expanded solution support being offset by operational efficiencies	
Project Output	• Compliant Hardware & Software on all business systems. • Continued improvement in our business processes executed through technology • New disruptive technology to provide opportunities for transformation and growth	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Application upgrades and enhancements	**Ongoing**
ERP Investment (HR, Finance, Procurement, AMD, Inventory)	**2021, 2024**
IT Asset Management	**2021**
Airport Community App	**2020**
Situational Awareness Tool	**2022**
Building Information Modelling	**2022**
Small Business Requests, Internal Build	**Ongoing**

CIP.20.05.005
IT - Business Efficiency

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€6,200,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€6,200,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€6,200,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Small Business Requests				
Application Enhancement & Small Business Requests				
Situational Awareness Tool				
ERP Investment			Redacted Cost Information	
Airport Community App				
Building Information Modelling System				
Enterprise Asset Management				
Total - to summary				**€6,200,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€6,200,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.006
IT - Commercial Systems

Project Summary

- **This project identifies key IT projects required to grow and improve Commercial offerings at Dublin Airport.**

Dublin Airport will continue to invest in systems and technology to grow and improve Commercial offerings to passengers and customers alike. This investment will support a best in class passenger experience at the airport, helping to make Dublin Airport of choice for passengers and airline customers.

DAP commercial IT services include:

- **Car Parks systems including Booking Websites, Apps, Booking Engine, Car park entry and exit systems and payment processing at all touch points**
- **Retail systems, including ERP, Websites and Mobile Apps**
- **Dublin Airport Travel Services –Websites, Apps and Booking engine**
- **Platinum Services – Websites, Apps and Booking Engine.**

Dublin Airport will also continue to invest in the reliability and security of these services to ensure vendor support on hardware and software elements. Dublin Airport will also invest in future initiatives to further grow business. The B2C digital customer channels will be supported by a new consolidated E-commerce platform to enhance the user experience and reduce associated support costs. The three key components of this project are as follows:

Car Parks Hardware & Software - The Car Park Management system (CPMS) manages all long term and short-term car parking. The system comprises of central software which controls entry/exit of the car parks. The CPMS is integrated with Web and Mobile channels. It is also integrated with Airline websites to provide easy car park booking for passengers

This project proposes lifecycle funding for all IT software and hardware components of the car park management system.
Important: The physical equipment (Barriers, Pay stations etc) are not included in this provision (see CIP.20.04.001).

Retail ERP
Microsoft Navision is the ERP used by Dublin Airport Retail. It provides financial and inventory control for the Dublin airport shops. To comply with vendor support agreements and to deliver enhancements to the Retail business, the Navision platform is upgraded every 4 to 5 years.

E - Commerce Platform
Dublin Airport will consolidate its services including Car Parking, Fast track, Lounges, Platinum Services onto one E-commerce platform delivering a seamless user experience to passengers who wish to avail of Airport services. This new platform will provide cost efficient and agile delivery of new and enhanced products to the airport, its passengers and airline customers. This consolidation will also reduce Opex costs associated with running multiple platforms

CIP.20.05.006
IT - Commercial Systems

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency / Regulation	**Secondary Driver** Customer Experience	**Total Capex requirement** €2.3m
Underpinning Assumptions and Cost Benchmarks	• Regulatory standards & Compliance achieved e.g. GDPR, Cybersecurity • Lifecycle Management to keep on vendor supported platforms, hardware & software • Replacement of hardware peripherals in line with recommended life expectation, e.g. Car Parks readers. • Passenger expectations and use of digital technology, in particular the use of mobile, will continue to grow.	
Opex Impact	• Normalised incremental opex impact of €0.1m p.a. relating to platform support	
Project Output	• Compliant Hardware & Software • Applications remain current and supported • Enhance & Grow commercial opportunities through digital channels • New Consolidated E-Commerce Platform supporting Dublin Airport B2C Digital channels	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Car Park systems hardware upgrades	**Ongoing as components need replacement**
Retail ERP upgrades	**2021, 2024**
Implementation and enhancement of Consolidated E-Commerce platform to support B2C Digital channels	**2020 implementation Ongoing enhancements**

CIP.20.05.006
IT - Commercial Systems

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€2,300,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€2,300,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€2,300,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Car Parks Hardware & Software	Redacted Cost Information			
Retail ERP				
E-Commerce Platforms				
Total - to summary				**€2,300,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€2,300,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.007
IT - Reliability, Safety, Security & Compliance

Project Summary

- **This project identifies the need to invest in Safety, Security and Compliance Systems at Dublin Airport.**

Dublin Airport (DAP) has a responsibility to ensure it provides safe, secure & reliable infrastructure and services to all users of the airport from Passengers, Staff, Airlines, other 3rd parties and the public. To provide consistent safe, secure & reliable experience, there are many IT services in place in DAP, these include CCTV, Access Control Systems, Queue Management systems and Auto Pass Boarding Scanning services and Docking Guidance systems. DAP will continue to invest in the reliability and compliance of these systems ensuring to get the required level of vendor support on our hardware and software elements by keeping these assets current.

DAP will invest also in technology to enhance the safety of all employees on the DAP campus. This includes airlines, tenants, retail operators and handlers. Some examples of new investment are Training platforms to ensure people remain safe and compliant, Airside Speed controls to prevent accidents etc. These initiatives will benefit every employee working at the airport. The nine sub-projects identified are as follows:

1. **CCTV**
2. **Access Control**
3. **ATRS T1 Upgrade**
4. **Queue Management System (QMS)**
5. **Autopass (T1 Upgrade)**
6. **X Ray Storage & Servers**
7. **Airport Training Platform**
8. **Cyber Security**
9. **Speed Controls**

1. CCTV (Campus Wide)

CCTV is a business-critical security monitoring system that is integrated with multiple T1 and T2 building systems. CCTV is also an operational tool (in ACC) that significantly reduced DAP staff cost.

Today there are approximately 1600 CCTV cameras deployed across the campus with numbers increasing as the airport and the business requirement expands. Approximately one third of these cameras are fully integrated IP devices. The remainder are analogue cameras that are limited in terms of data and control. This request also captures the needs of Apron wide CCTV (Stands, taxi break points & apron roads). As part of PACE a total of 86 Apron wide CCTV cameras address the operational needs around Pier 1, 2,3 & 4. This request addresses the outstanding apron location 5G.

Cameras have an average lifespan of 7 years and a replacement program is in place to guarantee levels of service.

CIP.20.05.007
IT - Reliability, Safety, Security & Compliance

Older analogue devices are replaced by IP devices when broken or reaching end of life. This project covers the following:

- **Lifecycle upgrades of the CCTV camera estate**
- **Upgrade of the CCTV backend platform**
- **Apron CCTV**

2. Access Control (Campus wide)
Access control is the selective restriction of access to a place, building, room, resource or installation. To gain access to a restricted location an individual generally needs to have authorisation or to be given permission to enter by someone that already has authorisation. At DAP Access Control manages access across the airport (airside boundary, external and internal doors) and is integrated with alarms, CCTV and fire systems to ensure rapid response to incidents. Access Controls assists with the regulatory mandate to adequately secure the airport (includes IAA, ICAO & ECAC regulations). This project proposes the following:

- **Upgrade (hardware and software) of the current Access Control system. This will be required at least twice during the 2020-2024 CIP period to ensure regulatory compliance.**

3. ATRS (T1 upgrade)
Automatic Tray Return System (ATRS) is a security screening conveyor system designed to allow for increased throughput and reduction in staff tray handling. Today ATRS is installed in Terminal 1. The ATRS system also incorporates a remote screening operation (screening from dedicated screening facility elsewhere in the terminal) which further improves throughput ability. This project proposes the following:

- **Upgrade of the ATRS software operating in T1 (deployed in 2017)**

4. Queue Management System (QMS)
QMS measures the length of key queues around the airport such as security search and USCBP for example by capturing the movements of passengers' electronic devices through Bluefi (Bluetooth & Wifi). The system allows DAP to better understand queue metrics at the airport (critical to meet Commission for Aviation Regulation queue time regulations) & provides notifications to inform appropriate mobilisation of staff to manage queues (if required). This project proposes:

- **Software upgrades to existing QMS system**
- **Deployment of technology (potentially expand existing QMS system) in other areas where queues need to be monitored (e.g. Immigration).**

5. AutoPass (T1 upgrade)
The Autopass system (installed in T1) provides a self-service access to the central search area by scanning PAX boarding cards (paper or mobile). Today, the software that captures and authenticates passenger boarding card data for use by DAP security / operations management is known as SeMS (Security Management System). This system will be 10+ years in service during the 2020-2024 CIP. This project proposes the following:

- **Upgrades and integrations of AutoPass systems**

CIP.20.05.007
IT - Reliability, Safety, Security & Compliance

6. X-Ray Servers & Storage

X-Ray Image processing, storage and retention is a key compliance requirement at DAP (Image retention period may change according to Regulatory and GDPR requirements). This project proposes:

- **Hardware for X-Ray Image processing, storage and retention**

7. Airport Training Platform

DAP provide and store all training records for staff working airside. The training records interface into access control to ensure compliance on refresher training (e.g. airside ramp driving). Much of the training statuses are captured on paper records. This project proposes the following:

- **DAP to invest in an online training platform to allow all airport staff easy access to training at their convenience.**

The platform will be tightly integrated with systems such as Access Control and E-HR to ensure only certified personnel can carry out duties in restricted areas. The platform will remove all the paper records currently in use across DAP and provide centralized, digitized training records which can be shared with 3rd party stakeholders such as Airlines and Handling agents. The platform will be integrated with Core HR to have training records centralized and associated with individual Dublin Airport staff. The solution will ensure that all staff operating at the airport including 3rd parties have appropriate training to maintain a safe working environment for all.

8. Cyber Security

Cybersecurity is the body of technologies, processes and practices designed to protect networks, computers, programs and data from attack, damage or unauthorized access. In this context, security includes both cybersecurity and physical security. As we adopt more technology and generate more data, the requirement for better preventative and remediation cybersecurity solutions will grow. This is an ongoing battle as technologies evolve creating both new opportunities for the business but also for those who seek to harm it. This project proposes:

- **Ongoing investment in tools to monitor and detect any activity that may pose a threat to the security of the Airport's IT systems that could result in adverse impacts on the operation and passenger experience.**

Without ongoing investment in tooling and monitoring, the risk to key Operational systems at DAP would increase with the potential to bring about major operation disruption. DAP will invest in tools to quickly react to any threat detected to provide the necessary protection. As airport dependence on IT systems and Data increases, so does the need to have the tooling and processes in place to protect those assets

9. Speed Controls

There have been several incidents at DAP which have resulted in personal injury and damage to equipment both in the baggage hall and airside resulting from vehicles being driven at excessive speed. This project proposes the following:

- **Introduce technology to monitor airside vehicle speeds. Up to 12 high tech CCTV cameras will be deployed in strategic airside locations.**
- **Provision of 42 fixed CCTV cameras around the Apron Roads to monitor road traffic activities. Note: Road Traffic Collision incidents have increased due to increased ground handler activity.**

This project will make all airside locations a safer environment in which to operate.

CIP.20.05.007
IT - Reliability, Safety, Security & Compliance

Project Details Summary		
Category: Information Technology		
Primary Driver Safety	**Secondary Driver** Regulation	**Total Capex requirement** €8.23m
Underpinning Assumptions and Cost Benchmarks	• Regulatory & Compliance (IAA, ICAO, ECAC, CAR) • Any future audit findings addressed • Lifecycle Management to keep on vendor supported platforms, hardware & software • Replacement of hardware peripherals in line with recommended life expectation, e.g. CCTV Cameras, QMS Blip Nodes, Access Control MIPS etc • The technology platforms to support our security & compliance services will be upgraded/refreshed in line with technology advances.	
Opex Impact	• Normalised incremental opex impact of c.€0.3m p.a. relating to Cyber Security systems support	
Project Output	• Reliable, Compliant hardware & software on all security services	
Asset Life	• 5 years	

Project Delivery Key Milestones	
CCTV - Growth, IP switchover, upgrades to support innovation	**Ongoing**
CCTV – Backend System	**Q4 2022**
Access Control Hardware & Software	**2021, 2023**
ATRS T1 upgrades	**2022**
QMS upgrades – Hardware & Software	**2021, 2023**
AutoPass (SEMS) T1 upgrades	**2021, 2023**
Smiths X-Ray Servers & Storage increase	**2023**
Airport Training Platforms	**Q4 2020**
Cyber Security Initiatives	**Ongoing**
Airside Speed Controls	**2021**

CIP.20.05.007
IT - Reliability, Safety, Security & Compliance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€8,230,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€8,230,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€8,230,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
CCTV - IP switchover				
CCTV – Backend System, minor upgrade				
Access Control Hardware & Software				
ATRS Hardware & Software				
QMS – Hardware & Software			Redacted Cost Information	
AutoPass (SEMS) Hardware & Software				
Smiths X-Ray Servers & Storage				
Airport Training Platforms				
Cyber Security Initiatives				
Speed Controls				
Total - to summary				**€8,230,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€8,230,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.008
IT - Operational Devices (Support & Maintenance)

Project Summary

- **This project identifies the refresh requirements for all IT devices supporting operations at Dublin Airport.**

There are various technologies and multiple devices that are required to support the Operation at the Dublin Airport. In general, these types of devices have a life expectancy of 4 to 5 years. This project will ensure that all are fully functioning and reliable to support business and regulatory requirements. This project covers:

1. **Retail and Payment Devices**
2. **FIDS Hardware**
3. **Digital Pods**

1. Retail and Payment Devices

There are more than 60 POS (point of sale) terminals in Retail areas across the DAP campus. In support of the POS terminals there are also handheld credit card devices that operate as resilience to POS and as a mechanism to deploy during busy times to ensure queue times at tills is kept to a minimum. This project proposes the following for retail and payment devices:

- **Lifecycle upgrades every 4 to 5 years on each POS & handheld device.**

Note: Regulatory changes such as PCI (Payment Card Industry) compliance requirements may also drive the need to replace this hardware.

2. Flight Information Display System (FIDS) Hardware

DAP have over 800 FIDS throughout the campus. These screens serve multiple purposes, including – Departure Check in Areas, Queue Times, Departure Gate Times, Gate Numbers and Flight Information, Arrival Information, Baggage Belt Information, Way Finding for Transfer Passengers etc.

FID screens also enable a smooth operation at DAP back of house operations, such as Baggage areas where display information is utilised by DAP, airlines and handlers. This project proposes:

- **Lifecycle replacements are typically 5 years per device, equating to replacement of 20% annually.**

3. Digital Pods

Dublin Airport launched digital advertising screens located along all parts of the customer journey in 2015 (62 in total across T1 & T2). The display system chosen was a 70” screen (24-hour display) known as Aerpods™. This project proposes the following;

- **Lifecycle upgrades for Aerpods in 2021/2022**

CIP.20.05.008
IT - Operational Devices (Support & Maintenance)

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency / Capacity	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.75m
Underpinning Assumptions and Cost Benchmarks	• Operational Devices need to have high level of reliability and availability • Regulatory & Compliance achieved e.g. PCI compliance • Lifecycle Management to keep on vendor supported platforms, hardware & software • Replacement of hardware peripherals in line with recommended life expectation • All screens will be replaced at least once in a 5-year period, including FIDS, Digital Pods • Passenger facing screens will provide rich, contextual content, alleviating stress and delivering an excellent passenger experience • Retail devices will be replaced on a 5-year lifecycle program • Costs of devices will increase by 10% over the previous CIP period	
Opex Impact	• N/A	
Project Output	• Passengers will be provided with engaging, rich, contextual content on screens to enhance their airport experience • Dublin Airport Retail supported by fully functioning equipment delivering quality service to passengers and staff • Screens will be energy efficient supporting the Dublin Airport carbon neutral goal	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Retail Hardware	**2021, 2024**
FIDS Hardware	**Ongoing as per lifecycle policy**
Digital Pods	**Ongoing as devices become unserviceable**

CIP.20.05.008
IT - Operational Devices (Support & Maintenance)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€1,750,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€1,750,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€1,750,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Retail Hardware	Redacted Cost Information			
FIDs Hardware				
Digital PODs				
Total - to summary				**€1,750,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,750,000	0%	€0	€0
Total - to summary				**€0**

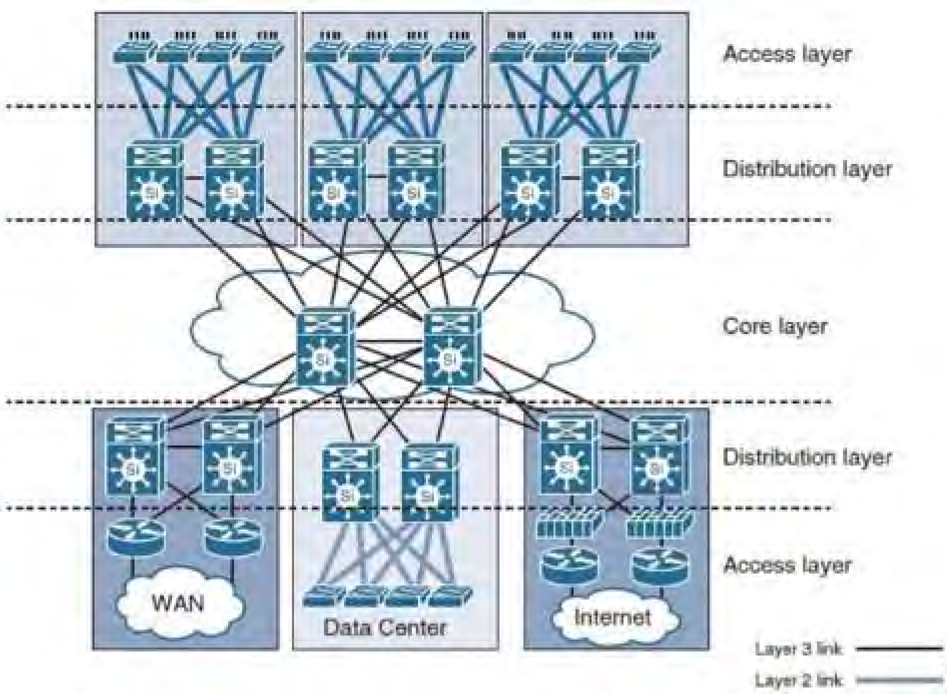
CIP.20.05.009
IT Network Components - Lifecycle & Growth

Project Summary

- **This project identifies the need to replace IT network components as they reach the end of their useful life as well as the importance of catering for growing requirements through the addition of increased capacity.**

The Dublin Airport (DAP) IT Network covers the entire campus and comprises over 600 access layer switches, 10 physical edge switches and a complex and fully resilient core and data centre network. DAP also owns and manages all physical fibre and copper cable and associated ducting within the campus.

These network products reach the end of their useful life for various reasons. These reasons may be due to technology innovation and development driving changes in the product, or the products simply mature over time and are replaced by functionally richer technology. Independently of this the risk of component failure increase significantly as the product age goes beyond 7 years.



Typical Modular Enterprise Campus Architecture

Up to date and supported network hardware and software are essential to the delivery of campus wide services and to the efficient and effective management of network services to the airport. Continuing changes in technology require that we have a systematic plan for upgrading and replacing technology to ensure that we have supported network services. The following replacement works are identified in this project:

- **Replace Network Access Switches**
- **Replace Core and Physical Edge (PE) Switches**
- **Replace Firewalls, WAN Routers and Load Balancers**
- **Replace WiFi (Access Points, Controllers and backend solution)**
- **Cabling and cable infrastructure replacements & growth.**

CIP.20.05.009
IT Network Components - Lifecycle & Growth

Project Details Summary		
Category: Information Technology		
Primary Driver End of Life	**Secondary Driver** Capacity	**Total Capex requirement** €6.9m
Underpinning Assumptions and Cost Benchmarks	• All Wired Network components will be replaced on a 7-year lifecycle and costs based on costs from current projects. WiFi is on a 3-year lifecycle.	
Opex Impact	• No material impact on opex costs.	
Project Output	• Fully supportable Network environment with no devices over 7 years old, all software on manufacturers supported versions and additional capacity and speeds delivered.	
Asset Life	• 5 Years	

Project Delivery Key Milestones	
Replace Network Access Switches	**Ongoing**
Replace Core and Physical Edge (PE) Switches	**Ongoing**
Replace Firewalls, WAN Routers and Load Balancers	**Ongoing**
Replace WiFi (Access Points, Switches & Controllers)	**Ongoing**
Cabling and cable infrastructure replacements & growth.	**Ongoing**

CIP.20.05.009
IT Network Components - Lifecycle & Growth

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€6,875,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€6,875,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€6,875,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Replace Network Access Switches	Redacted Cost Information			
Cabling & Cable Infrastructure (includes telephony and trunk radio)				
Total - to summary				**€6,875,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€6,875,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.010
IT - Passenger Processing (excl. Security Screening)

Project Summary

- **This project identifies necessary IT upgrades to existing passenger processes as well as making provision for future self-service passenger processes.**

There are several key passenger processes supported by technology at Dublin Airport (DAP). These include Check-In, Bag Drop and Boarding and they are supported by both Common Use Passenger Processing (CUPPS) and Common Use Self Service (CUSS) platforms. The following projects are identified for improved passenger processing:

1. **CUPPS and CUSS Hardware and Software**
2. **Self Service Boarding (25 gates)**

1. CUPPS and CUSS Hardware and Software – (refresh + CUSS extension in T1 & T2)
CUPPS at DAP comprises a hardware estate of €800k covering 500+ PCs and associated monitors, printers and scanners (e.g. Boarding Pass printers) and Bag Tag printers which are all connected to a backend software platform that is in turn connected to the Airline DCS (Departure Control System).

DAP also invested heavily in CUSS SSKs and Bag Drops to support increased passenger growth in constrained check in areas while delivering the best possible passenger experience. By end of 2019, approximately €6.5m will have been invested in self-service technology across both terminals.

This proposed investment will ensure that the CUPPS and CUSS technology continues to deliver the expected level of service to DAP airlines, handlers and passengers through hardware and software refreshes, additional hardware to support growth, provision of enhancing peripherals e.g. Cameras, payment devices etc.

2. Self Service Boarding (25 gates)
There is an ever-increasing demand from our Airline Customers to deliver more passenger self-service solutions. In addition to extending the Check in, Bag Tag, and Bag drop processing solutions currently in use, Dublin Airport also plan to rollout 25 Self Service boarding gates on a trial basis to meet expected airline demand.

CIP.20.05.010
IT - Passenger Processing (excl. Security Screening)

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency	**Secondary Driver** Capacity	**Total Capex requirement** €7.0m
Underpinning Assumptions and Cost Benchmarks	• Airlines will continue to drive their customers to use Self Service • Airline processes will support self-service boarding • There will be no change in regulation requiring a return to Agent processing • Costs based on rollout of CUPPS and CUSS equipment in 2015- 2019 • Costs for Self-Boarding gates based on Market Research • Airlines will be open to sharing CUSS infrastructure.	
Opex Impact	• Normalised incremental opex impact of €0.2m due to increased number of units	
Project Output	• Robust CUPPS and CUSS platform to support check in and bag drop operations for growing passenger numbers • CUPPS/CUSS software enhancements to meet Business needs • Rollout of 25 Self Service boarding gates on a trial basis supporting new airline processes • CUSS SSKs will gradually be replaced by Hybrid models supporting traditional native CUSS applications running concurrently with CUWS platform	
Asset Life	• 5 years	

Project Delivery Key Milestones	
CUPPS/CUSS Hardware and software refresh	**2022 (software upgrade) Hardware replaced as it becomes unserviceable**
CUSS extension in T1 and T2	**2020 - 2024**
Self Service Boarding rollout	**2020, 2021**

CIP.20.05.010
IT - Passenger Processing (excl. Security Screening)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€7,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€7,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€7,000,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
CUPPS Hardware and Software refresh	Redacted Cost Information			
CUSS (SSK & SBD) Hardware and Software refresh				
Self Service Boarding				
Self Service Extension				
Total - to summary				**€7,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,000,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.011
IT - Security Technology Innovation (Biometrics & FOD Detection)

Project Summary

- **This project proposes IT driven solutions to delivering a safer and more efficient airport environment.**

Dublin Airport (DAP) is constantly seeking new ways to improve the safety and security of passengers, employees and any 3rd party operating within or doing business with the airport. In addition to providing a safe environment, the airport wants to provide the best user experience for all groups of users through the provision of technology to alleviate stress at the airport. The projects outlined below will help DAP harness new technology to deliver a safer, more efficient airport environment.

1. Biometric Identification:
This project proposes the introduction of Biometric identification for passengers, employees and 3rd parties operating within the airport campus. As this technology becomes mainstream, it will reduce/ remove the need for physical document checks for passengers and will support a seamless journey from check-in through to passenger screening and boarding. In addition to providing a higher level of security in terms of who is travelling, it will deliver significant staffing efficiencies to airlines, handlers and airports. For airport and 3rd party staff working within the airport, the introduction of biometrics will greatly enhance Access control technology reducing the risk of unauthorized persons accessing restricted areas at DAP.

2. Foreign Object Debris (FOD) detection technology
FOD is any object that does not belong in or near airplanes and, as a result, can injure airport or airline personnel and damage airplanes. This project proposes the introduction of Foreign Object Debris (FOD) detection technology on runways, taxi ways and ramp that will remove/ reduce the need of visual inspections and therefore reduce the possibility of human error that could potentially result in a catastrophic event. FOD detection technology also offsets the need for full manual inspections and therefore reduces FOD inspection Opex costs.

The technology options to meet this safety requirement are evolving. The Airport will select the most cost-efficient solution to meet the business needs. Options include cameras, radars & robotics.

CIP.20.05.011
IT - Security Technology Innovation (Biometrics & FOD Detection)

Project Details Summary		
Category: Information Technology		
Primary Driver Safety / Security	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €3.0m
Underpinning Assumptions and Cost Benchmarks	• Biometric Identification will become standard practice with Airlines and Airports • Regulation will support the collection and use of biometric data • Airlines and handlers will work with Dublin Airport to put the technology and processes in place to make the airport a safer environment for all • Biometric devices can be retrofitted to much of the existing IT infrastructure e.g Cameras on Self Service Kiosks • Data sharing across all stakeholders will continue to grow • FOD detection technology will become main stream and reduce in cost	
Opex Impact	• Normalised opex impact of nil due to additional support costs for new service solutions being offset by operational efficiencies	
Project Output	• Biometric devices deployed at key passenger processing point, check in, Security screening, Boarding, immigration, terminal exits • Biometric data will be collected and shared across all stakeholders supporting common security and safety goals • An automated FOD detection solution will replace manual inspections which will increase airside safety and reduce manpower requirements	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Biometrics supporting the passenger journey	**Q4 2020**
Biometrics supporting access to restricted areas	**Q4 2021**
FOD detection solution on runways and taxiways	**2022**

DublinAirport

CIP.20.05.011
IT - Security Technology Innovation (Biometrics & FOD Detection)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€3,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€3,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€3,000,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Biometric devices and platforms for Pass & Staff	Redacted Cost Information			
FOD Detection Solution				
Total - to summary				**€3,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,000,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.012
IT Servers and Storage - Lifecycle & Growth

Project Summary

- **This project identifies the IT Server and Storage upgrades required to ensure Dublin Airport maintains a secure and up-to-date IT infrastructure.**

The current underpinning infrastructure (Servers & Storage) that supports Dublin Airport (DAP) IT Services is part of an overall digital ecosystem that comprises of physical and software related elements. It is imperative that this ecosystem is kept up to date and upgraded, as each part of the ecosystem has a dependency on the other. These upgrades can be either hardware upgrades, bug fixes, software enhancements, performance improvements or security upgrades.

Ageing & Under Capacity IT Systems:
As systems get older the technology becomes outdated and faster more efficient technology becomes available. Vendors release fewer upgrades for older technology, so the risk of failure and service outage increases. Support and running costs of older devices and software is also higher. As a result, DAP IT has set the lifecycle policy on servers and storage at 5 years. In addition, as business volumes grow, and more IT systems come on stream, the need for additional servers and storage also increases.
The additional server capacity will be required to ensure system performance is optimized to meet the needs of the Airport Community and deliver services against agreed SLAs. The growth rate on this infrastructure is normally around 15% per annum to cater for increased demand.
The exponential growth in Data as the business continues to move from physical to digital will drive significant investment in storage.

The aim of this ongoing project is to keep our Server & Storage environment at levels and age where it is fully supported and capable of supporting new features as they become available from our Vendors. This is critical to meeting our service level agreement (SLA) with our businesses while ensuring we have the capacity to grow our increasingly digital business.

This project requests the following:

- **Replace and add Blade & Physical Servers**
- **Replace and add Storage Arrays**
- **Replace & Upgrade Operating Systems, Backup/Recovery and Event Management**
- **Telephony Backend Servers and PABX upgrade**

CIP.20.05.012
IT Servers and Storage - Lifecycle & Growth

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency / End of Life	**Secondary Driver** Capacity	**Total Capex requirement** €5.57m
Underpinning Assumptions and Cost Benchmarks	• All Server & Storage components will be replaced on a 5-year lifecycle and costs based on costs from current projects.	
Opex Impact	• Normalised incremental opex impact of €0.2m for third party licensing, support and maintenance	
Project Output	• Fully supportable Server & Storage environment with no components over 5 years old, all software on manufacturers supported versions and additional capacity and speeds delivered.	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Replace Blade & Physical Servers	**Ongoing**
Replace Storage Arrays	**Ongoing**
Replace & Upgrade Operating Systems, Backup/ Recovery and Event Management	**Ongoing**
Telephony Backend and PABX Upgrade	**Q4 2022**

CIP.20.05.012
IT Servers and Storage - Lifecycle & Growth

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€5,570,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€5,570,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€5,570,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Servers & Storage				
Operating Systems and Monitoring	Redacted Cost Information			
Telephony Backend and PABX Upgrade				
Total - to summary				**€5,570,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,570,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.014
IT - User Devices (Desktops, Mobile, Telephone, Radio)

Project Summary

- **This project identifies user device upgrades required to ensure Dublin Airport staff can efficiently perform their roles.**

Dublin Airport (DAP) staff rely on technology to perform their roles in ensuring the airport runs smoothly. The operations and back office teams use a range of devices in their day job including:

- **Personal Computers (PCs)**
- **Laptops**
- **Mobile Phones**
- **Radios**
- **Phones.**

The use of Desktops/ Laptops is an essential enabler across all DAP business functions. As of 2018, approx. 1700 units are used to allow our business users, both internal and external, interact with our IT services daily.

The reliance on mobile technology to deliver business efficiencies means that some staff operating in the airport need more than one device to be fully efficient. Mobile devices allow our people work from any place at any time and negate the need to return to an office location to upload critical data and interact with key systems. Radios and Telephony will continue to play a significant part in airport operations into the future. Note: As staff numbers grow in line with passenger numbers, the number of these devices will increase.

This project proposes:

- **Replacement / Upgrade of IT user devices to maintain a guaranteed level of service for staff and optimize business efficiency.**

CIP.20.05.014
IT - User Devices (Desktops, Mobile, Telephone, Radio)

Project Details Summary		
Category: Information Technology		
Primary Driver End of Life	**Secondary Driver** Capacity	**Total Capex requirement** €3.7m
Underpinning Assumptions and Cost Benchmarks	• Costs of devices will increase by 10% over the previous CIP • Mobile Device usage will continue to grow in the workplace • Radio will continue to be widely used in the airport campus • Telephony will continue to be widely used in the airport campus • Staff numbers will grow to cope with passenger numbers through the CIP period • Devices will reduce in cost and so costs will remain in line with current CIP	
Opex Impact	• N/A	
Project Output	• Guaranteed levels of services for all staff • Staff equipped with the necessary level of technology to optimize business efficiency	
Asset Life	• 5 years	
Project Delivery Key Milestones		
User Devices – Replacement and Growth	**Ongoing lifecycle policy**	

CIP.20.05.014
IT - User Devices (Desktops, Mobile, Telephone, Radio)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€3,700,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€3,700,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€3,700,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Desk tops and Mobile Devices – Replacement and Growth	Redacted Cost Information			
Telephony and Radio – Replacement and Growth				
Total - to summary				**€3,700,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,700,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.015
New Data Centre Hosting Location

Project Summary

- **This project identifies the need for a new data centre Hosting Location at Dublin Airport.**

Dublin Airport (DAP) currently uses two on site data centres to provide hosting facilities for all critical IT systems. These data centres have a capacity for 152 cabinets each with utilisation currently at approximately 70% of available cabinet space.

- **Primary data centre: Located in on Level 5 in Terminal 1. Last refurbished in 2009.**
- **Secondary data centre: Located on the second floor in Cloghran house. Purpose built in 2009.**

Benefits of a new hosting location?
This proposal recommends the construction of a new primary data centre to ensure long term cost effective IT hosting facilities. The optimum location for a new hosting location will be on DAP owned land near the airport but with sufficient separation to eliminate the risk of a single incident impacting both hosting locations (currently both data centres are with 800m of each other). The rationale for this is:

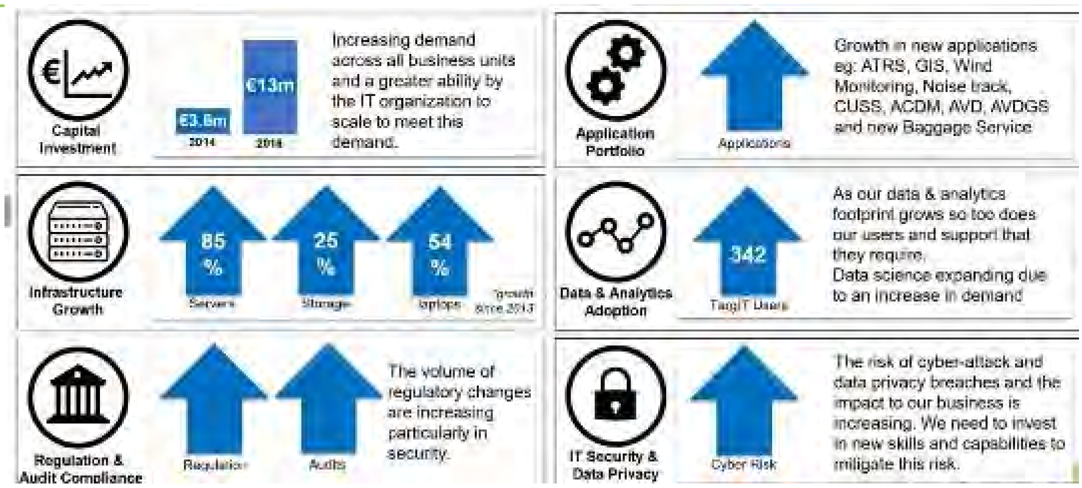
- Existing Locations: Currently the location of both hosting locations (within other buildings) limits DAPs ability to meet all the criteria required for a Tier 3 hosting facility (e.g. Data Centre Power Audit 2017). It also exposes the hosting location to unnecessary risks related to building maintenance (e.g. power supply testing).
- Cost: Building on DAP owned land of low commercial value (distant from terminals and airport facilities) will help keep construction costs to a minimum while releasing the existing hosting space in Level 5 for additional DAP office space.
- Connectivity: Building near the airport allows DAP to leverage existing investments in the airport network where full data centre interconnectivity can be achieved on DAP owned fibre reducing operating costs.
- Criticality: An on-campus location minimises dependency on third party external communication links ensuring we can fulfil our responsibilities in relation to the Critical National Infrastructure directive by minimising any risk of failure.

Utilisation of external / cloud services?
In the last three years DAP has invested in rationalising the use of external data centres as these were not providing extra resilience but were adding significant cost. DAP therefore exited from its' hosting arrangements 2017 & 2018. All critical systems are now hosted from the on-campus data centres with limited cloud-based hosting used for external Websites. As the demand for IT services continues to grow and the business becomes increasingly dependent on their uninterrupted operation DAP needs to ensure that the facilities keep pace with these requirements.

Requirements:
It is proposed that an initial space of circa 200 SQM should be delivered in new hosting location. The location is to be constructed with a foundation / slab of 400 SQM to accommodate a second similarly sized unit if required.

Note: If a new hosting location does not proceed then significant investment (circa €1.1m) will be required on the Level 5 facility in 2020 to upgrade air conditioning, fire suppression, power supply, generator and other facilities.

CIP.20.05.015
New Data Centre Hosting Location



Business Context: Growth in the Consumption of IT Services

Project Details Summary		
Category: Information Technology		
Primary Driver Operational Efficiency	**Secondary Driver** Capacity	**Total Capex requirement** €4.0m
Underpinning Assumptions and Cost Benchmarks	• Current data centre hosting locations are not suitable to meet our needs for the next ten years • Solution will be a modular unit with 150 – 200 SQM capacity and slab capacity to accommodate a second unit if required in future	
Opex Impact	• Normalised incremental opex impact of €0.1m for maintenance and upkeep	
Project Output	• New IT Hosting location with dedicated fibre inter-connectivity to our existing hosting location in Cloghran House.	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Detail Design complete:	**Q1 2021**
Procurement complete:	**Q4 2021**
Construction Commence:	**Q2 2022**
Construction Complete	**Q3 2023**
Project Handover:	**Q4 2023**

CIP.20.05.015
New Data Centre Hosting Location

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€4,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€4,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€4,000,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Data Centre hosting upgrade & New Data Centre	Redacted Cost Information			
Total - to summary				**€4,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,000,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.05.016
IT - Microsoft Enterprise Licence

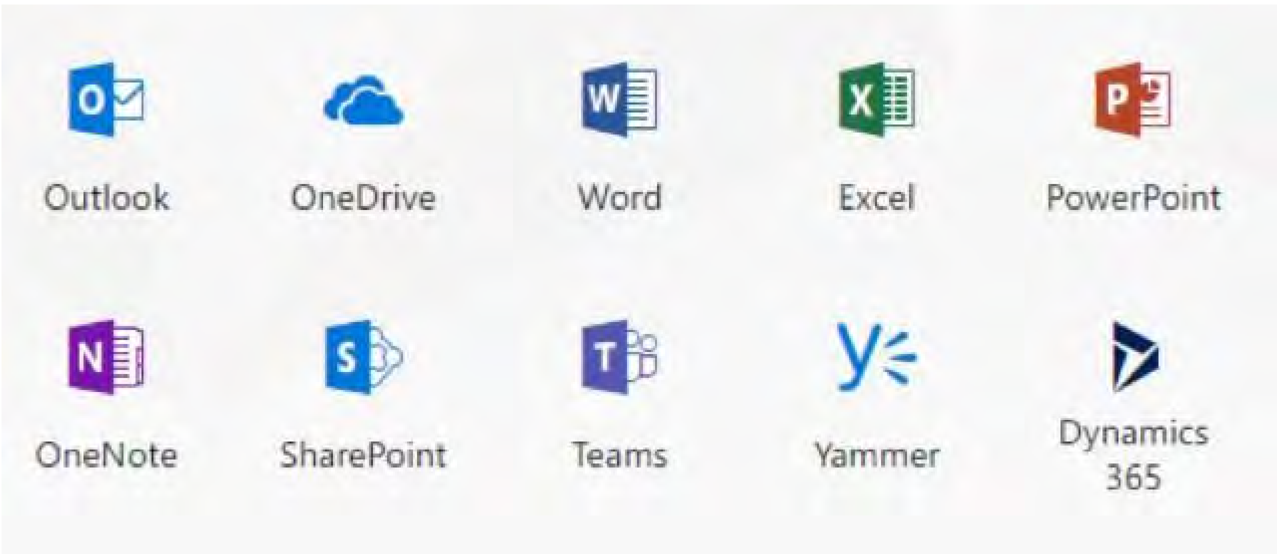
Project Summary

- **This project identifies the need for Dublin Airport to renew Microsoft Enterprise Licences over the 2020-2024 CIP period.**

A Microsoft Enterprise Licence is a three-year agreement for an agreed Microsoft Software Bundle for a specified number of employees / devices. The price for the bundle is set at the outset and covers the three-year period. Any variation in volumes is catered for by a 'True-Up' payment at the end of each of the three years.

Microsoft software is essential to support employee productivity and mobility using Microsoft Office 365 suite at DAP. This provides DAP staff with a cost-effective means of accessing basic office products such as Word, Excel and PowerPoint. Improved productivity through enhanced collaboration is achieved with SharePoint, OneDrive and Skype for Business. Additionally, the security of corporate data is achieved through the deployment of InTune, Microsoft Protect, Advanced Threat Analytics and associated security products.
Note: Enterprise Licence has proven to be the most cost-effective method of procuring the software There are no realistic alternatives.

This licencing also covers use of MS SQL database services and systems management software to help manage DAP Microsoft server estate.



CIP.20.05.016
IT - Microsoft Enterprise Licence

Project Details Summary		
Category: Information Technology		
Primary Driver End of Life / Regulation	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €6.0m
Underpinning Assumptions and Cost Benchmarks	• Microsoft continue to be a market leader in this space • Enterprise Licencing continues to be the most cost-effective method of procurement • The profile of staff growth continues to follow historic patterns • DAP will continue to achieve discount levels achieved in previous years	
Opex Impact	• No impact to opex costs	
Project Output	• Productive and mobile workforce whose data is secure. • Properly licenced Microsoft software for servers and desktop	
Asset Life	• 3 years	

Project Delivery Key Milestones	
Microsoft Enterprise Licencing – Renewal 1	**July 2020**
Microsoft Enterprise Licencing – Renewal 2	**July 2023**

CIP.20.05.016
IT - Microsoft Enterprise Licence

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Implementation Costs	100%	€6,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€6,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€6,000,000	0%	€0	€0
Total - to summary				**€0**
Implementation Costs	**Quantity**	**Unit**	**Rate**	**Total**
Microsoft Enterprise Licensing	Redacted Cost Information			
Total - to summary				**€6,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€6,000,000	0%	€0	€0
Total - to summary				**€0**

F SECURITY

APPENDIX F
Security

Appendix F - Security			Page
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**	
CIP.20.06.001	Cabin-Baggage X-Ray Replacement & EDS Upgrade	€14.6	F-1
CIP.20.06.007	Full Body Scanners	€1.9	F-5
CIP.20.06.009	ATRS – Additional Lane in Terminal 1	€0.6	F-8
CIP.20.06.015	Intrusion Detection Systems for Dublin Airport Boundaries	€4.0	F-11
CIP.20.06.016	Surface Road Blockers & Temporary Mobile Barriers	€1.0	F-14
CIP.20.06.022	Redevelopment of Training Facility (ASTO)	€1.2	F-17
CIP.20.06.025	Detection: Explosive Detection Dogs (EDD) and Mobile X Ray Unit	€0.2	F-21
CIP.20.06.030	VCP Automation to Enable Remote Screening	€0.7	F-24
CIP.20.06.031	Autopass - T1 Replacement & T2 Install	€1.8	F-27
CIP.20.06.036	TSA - X-Ray & FBSS Replacement	€0.4	F-30
CIP.20.06.041	Security Screening Equipment - End of Life	€4.5	F-33
CIP.20.06.042	ATRS - Central Search Areas (T1 and T2)	€11.7	F-37
CIP.20.06.044	Replacement of T1 Controllers for Access Control System	€0.5	F-41
TOTAL		**€43.0**	

CIP.20.06.001
Cabin-Baggage X-Ray Replacement & EDS Upgrade

Project Summary

- **This project proposes a phased replacement of all existing single-view X-ray systems with Explosive Detection System (EDS) equipment in all search areas in Dublin Airport.**

Dublin Airport is mandated both by national and European regulation (i.e. European Commission Directive EU Reg 300.2008) to ensure that all items carried by persons entering the CPSRA (Critical Part, Security Restricted Area) through its terminals and vehicle-posts are screened to an appropriate standard. The primary method in Dublin Airport for achieving this is X-ray screening.

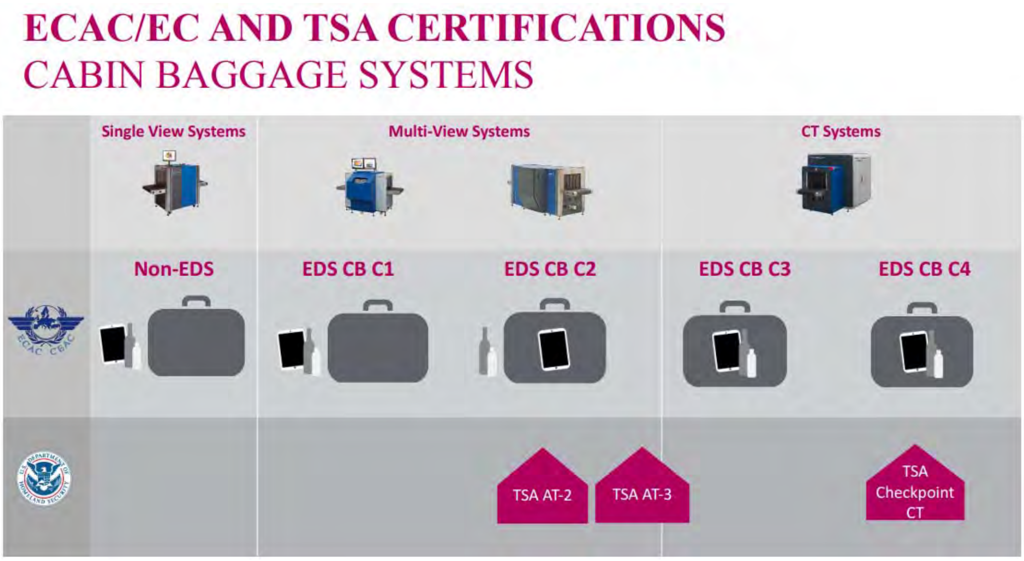
In the three primary security operations areas in Dublin Airport (Terminal 1, Terminal 2 and the Vehicle Control Posts) there is an existing installed base of 53 X-ray systems. Many of these devices will become end-of-life within the 2020-2024 CIP period. None of the existing systems provide an upgrade path to EDS.

This project proposes a full replacement of all end of life single-view X-ray systems at Dublin Airport with Explosive Detection System (EDS). The provision of EDS Cabin Baggage has the following advantages:

- **Detection: The EDS equipment improves overall detection by ensuring security screeners can better recognise items which are obscured with today's standard (single view) imaging systems**
- **Adapting to Regulatory changes: This technology puts Dublin Airport in a position where by it can easily adapt to increased explosive detection without the need for additional head count (currently more staff and Explosive Trace Detection (ETD) equipment would have to be deployed to meet such an increase which would take a significant period of time and cost to implement).**

CIP.20.06.001
Cabin-Baggage X-Ray Replacement & EDS Upgrade

- **Passenger Experience: The overall passenger experience is enhanced with EDS-Cabin baggage (CB). EDS-CB system allows the passenger to leave permissible liquids and gels as well as large electrical items in their bag for screening, avoiding the current delays caused by having to divest these items.**
- **Efficiency: The lower images per person (IPP) is significantly lower with EDS screening units and is forecast to enable Dublin Airport to screen more passengers than single-view systems by approximately 100 PPH/lane in T1 and 45 PPH/lane in T2. The throughput benefits will result in a reduction in the number of lanes required along with the associated capital and operational costs.**



This project proposes the following phases for cabin baggage X-ray replacement:

- **Phase 1 – T1: Rollout of EDS Cabin Baggage screening in a suitable CSA location (proposal for T1 CSA relocation is considered in CIP 2020-2024). T1 will require 13 active and 2 redundant EDS-CB lanes. T1 Currently has 12 active lanes with 3 redundant lanes.**
- **Phase 2 – T2: Rollout of EDS Cabin Baggage screening in the existing T2 CSA. T2 will require 10 active and 2 redundant EDS-CB lanes. T2 Currently has 15 active lanes with 3 redundant lanes.**
- **Phase 3 – Others: Rollout of EDS CB in the remaining areas outside of the T1 and T2 CSAs (Transfer and VCPs)**

CIP.20.06.001
Cabin-Baggage X-Ray Replacement & EDS Upgrade

Project Details Summary		
Category: Security		
Primary Driver Regulation	**Secondary Driver** End of Life	**Total Capex requirement** €14.6m
Underpinning Assumptions and Cost Benchmarks	• System costs based on market research with relevant vendors and industry forums (ACI, IATA and airports) • Re-use of all existing IT network CCTV, Blu-fi etc • Contingency is set at 10%	
Opex Impact	• Normalised net opex impact of c.€1m saving p.a. being driven by reduced resource requirements as a result of processing throughput efficiencies	
Project Output	• Rollout of EDS CB systems in all screening areas of the Dublin Airport Campus (not incl. CBP). • Training	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / requirements / pilot complete:	**Q3 2021**
Planning complete:	**Q4 2021**
Design complete:	**Q1 2022**
Procurement complete:	**Q2 2022**
Rollout T1 (Phase I)	**Q2 2024**
Rollout T2 (Phase II)	**Q1 2024**
Rollout – Remaining Screening areas – (Phase III)	**Q4 2024**

CIP.20.06.001
Cabin-Baggage X-Ray Replacement & EDS Upgrade

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	91%	€13,307,150
Escalation, Contingency & Design Variability	9%	€1,330,715
Total		**€14,637,865**

LEVEL2 - Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€13,307,150	0%	€0	€0
Total-tosummary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T1 X-Rays - Units				
T1 X-Rays - Sundries + Backend Storage				
T2 X-Rays - Units				
T2 X-Rays - Sundries + Backend Storage	Redacted Cost Information			
VCP X-Rays - Units				
T1 X-Rays - Sundries + Backend Storage				
System Management				
Total-tosummary				**€13,307,150**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€13,307,150	10%	€1,330,715	€1,330,715
Total-tosummary				**€1,330,715**

CIP.20.06.007
Full Body Scanners

Project Summary

- **This project proposes a phased implementation of Full Body Scanners / Shoe Scanners in Dublin Airport.**

Dublin Airport (DAP) is mandated both by national and European regulation (i.e. European Commission Directive EU Reg 300.2008) to ensure that all persons entering the CPSRA (Critical Part, Security Restricted Area) through its terminals and vehicle-posts are screened to an appropriate standard. Currently the only method used for screening all passengers entering the CPSRA is Walk Through Metal Detectors (WTMD). In-order to improve our overall detection capability and align DAP with the emerging European standards, DAP now proposes to deploy Full Body Scanners initially as a secondary screening methodology for alarm resolution at the WTMD for selected lanes in Terminal 1 and 2 Central Search Area (CSA).

This project proposes the following:

- **Pilot: Evaluation of existing certified FBSS technologies suitable for use at DAP. Focus primarily on screening capability, operational efficiency, customer interaction and processing time.**
- **Open Journal Tender: Full EU tender cycle required prior to choosing vendor.**
- **Rollout Phase: This phase of the project will implement FBSS to Terminal 1.**

The benefits to providing Full Body Scanners (FBSS) at DAP are as follows:

- **Detection: The deployment of FBSS in the search areas will greatly enhance detection capability. Security screeners can better recognise items which require further investigation.**
- **Passenger Experience: FBSS reduce the need for manual full body searches.**
- **Adapting to regulatory change: The provision of FBSS-SS will greatly prepare DAP for any increase in security screening requirements. Note: Recently issued regulatory changes by the UK civil aviation regulator (CAA) to airports within their remit mandated the use of full body security scanners (FBSS) to the extent of 25% of passengers by the end of 2017, and 100% of passengers by the end of 2019.**

CIP.20.06.007
Full Body Scanners

Project Details Summary		
Category: Security		
Primary Driver Safety / Security	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.9m
Underpinning Assumptions and Cost Benchmarks	• Full Open Journal tender required • No civil, mechanical or electrical works included in this proposal • Footprint increase in CSA due to FBSS rollout to be captured under other capacity projects • No additional Blu-fi etc requirements • Provision of new data and power infrastructure required • Contingency is assumed at 10%	
Opex Impact	• Normalised incremental opex impact of c.€0.5m p.a. relating to equipment support and additional resource requirements	
Project Output	• Rollout and commissioning of 4 FBSS in Terminal CSA	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / requirements / pilot complete	**Q2 2020**
Planning complete:	**Q3 2020**
Design complete:	**Q4 2020**
Procurement complete:	**Q1 2021**
Rollout T1 (Phase II)	**Q1 2022**
Rollout T2 (Phase III)	**Q4 2022**
Project Handover:	**Q3 2023**

CIP.20.06.007
Full Body Scanners

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	6%	€123,315
Construction Costs	85%	€1,644,200
Escalation, Contingency & Design Variability	9%	€176,752
Total		**€1,944,267**

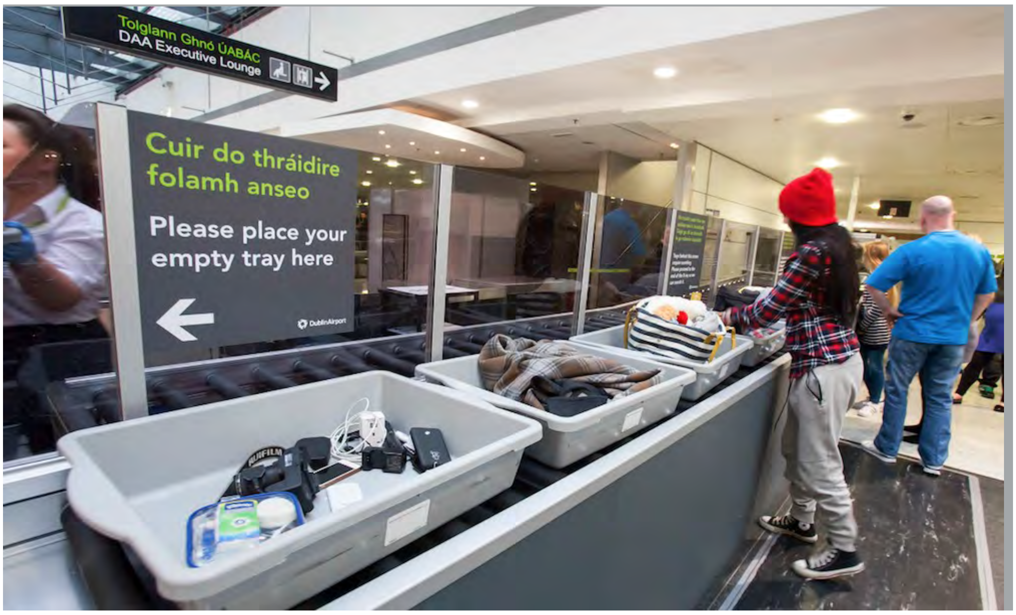
LEVEL2-Cost Analysis				
Design and Management Costs	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€1,644,200	8%	€123,315	€123,315
Total-tosummary				**€123,315**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T1 - FBSS (incl. support)	Redacted Cost Information			
Total-tosummary				**€1,644,200**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,767,515	10%	€176,752	€176,752
Total-tosummary				**€176,752**

CIP.20.06.009
ATRS - Additional Lane in T1

Project Summary

- **This project proposes to convert the existing staff entry/exit lane in the departures level of the T1 CSA to a new passenger ATRS lane.**

The introduction of the Automatic Tray Return System (ATRS) in Terminal 1 in Dublin Airport has enabled an increase in screening capacity in this Central Search Area (CSA) by more than the originally targeted 15%. The passenger forecast for T1 is expected to reach capacity by 2021 at which time the capacity of the existing 15 lanes will have reached its limit (with 2 lanes for resilience/redundancy). To address this pending capacity issue, this project provides for the provision of one additional lane in the existing location to meet this Pax growth. Specifically, there is a need to provide sufficient screening capacity up until the fourth quarter of 2022, when the planned expansion to the Terminal 1 Mezzanine is completed. This project is therefore positioned primarily as a capacity proposal but would also act as risk mitigation against exceeding queue time should there be delays in completing the Terminal 1 CSA Expansion initiative beyond its scheduled completion date.



This project proposes to convert the existing staff entry/exit lane in the departures level of the CSA in T1 to a new passenger ATRS lane, specifically:

- **Close the existing staff entry in the departure level of the CSA in T1**
- **Convert this area to provide passenger access.**
- **Install 1 new ATRS screening lane in T1 CSA.**

CIP.20.06.009
ATRS - Additional Lane in T1

Project Details Summary		
Category: Security		
Primary Driver Operational Efficiency	**Secondary Driver** Customer Experience	**Total Capex requirement** €0.6m
Underpinning Assumptions and Cost Benchmarks	• No Open Journal tender will be required, systems will be provided under the existing framework agreements • IAA submission required, and approval needed prior to implementation • System costs are based on the AMD project for ATRS phase I for T1 in 2016 from Dublin Airport assets register • No changes to regulation, configurations etc already approved and in operation • To reduce costs, it is assumed that for the period of its operation a current spare x-ray unit will be used. • Contingency is set at 10%	
Opex Impact	• Normalised incremental opex impact of c.€0.01m p.a. relating to equipment support and additional resource requirements	
Project Output	• New ATRS lane in Terminal 1 CSA	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2020**
Planning complete:	**Q2 2020**
Detail Design complete:	**Q2 2020**
Procurement complete:	**Q3 2020**
Construction Commence:	**Q3 2020**
Construction Completed	**Q3 2021**
Project Handover:	**Q3 2021**

CIP.20.06.009
ATRS - Additional Lane in T1

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€50,088
Construction Costs	72%	€400,702
Escalation, Contingency & Design Variability	19%	€106,368
Total		**€557,158**

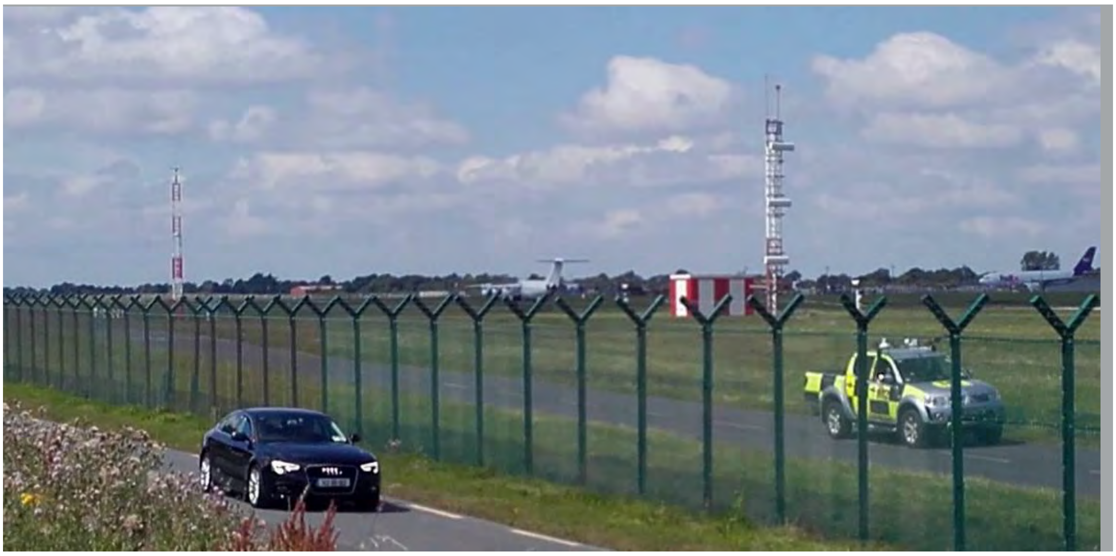
LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€400,702	13%	€50,088	€50,088
Total-to summary				**€50,088**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
ATRS Lane				
Electrical mechanical, civil costs to reconfigure staff lane to screening lane	Redacted Cost Information			
ATRS Lane Fit-out - Other				
ATRS Lane				
Total-to summary				**€400,702**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€450,789	24%	€106,368	€106,368
Total-to summary				**€106,368**

CIP.20.06.015
Intrusion Detection Systems for Dublin Airport Boundaries

Project Summary

- **This project identifies the requirement for improved boundary monitoring by introducing automatic intrusion detection systems.**

Surveillance, patrols and other physical controls are required at airports to identify suspicious behaviour of persons, identify vulnerabilities which could be exploited to carry out an act of unlawful interference and in order to deter persons from committing such acts. Currently the frequency and means of undertaking surveillance and patrols are based on a risk assessment as stipulated by the IAA. The risk assessment considers the limitations of current means of undertaking surveillance, and patrols. Presently all such monitoring and patrolling of these boundaries is undertaken by the Airport Police via manual patrols and/ or monitoring of CCTV cameras which are dispersed around the boundaries.



Ensuring that there is no penetration of the airport boundaries are hampered by:

- **Having patrols present at the right time and place when unauthorised intrusions occur, which by their nature are not predictable or guaranteed.**
- **Bad weather and poor visibility conditions (i.e. night-time), which can limit the ability of patrols to detect intrusions.**

This project proposes the following:

- **Improve the effectiveness of boundary monitoring by introducing automatic intrusion detection systems, which will constantly monitor the boundary of the CPSRA on a 24x7 basis, with emphasis on vulnerable locations on the airfield. When breaches do occur, the system will detect them as they happen and direct both CCTV recording and Airport Police responses to the specific**

CIP.20.06.015
Intrusion Detection Systems for Dublin Airport Boundaries

area where they are required.

Project Details Summary		
Category: Security		
Primary Driver Security / Safety	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €4.0m
Underpinning Assumptions and Cost Benchmarks	• Full Open Journal tender required • IAA submission required, and approval needed prior to implementation • System costs based on discussions with vendors who presently implement similar systems and functionality	
Opex Impact	• Normalised incremental opex impact of c.€0.1m p.a. relating to equipment support and additional resource requirements	
Project Output	• Implementation of Intrusion Detection technology for airport boundaries • Supporting civil and IT infrastructure • Training	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / requirements complete:	**Q1 2022**
Planning complete:	**Q1 2022**
Design complete:	**Q1 2022**
Procurement complete:	**Q3 2022**
Construction completed	**Q1 2023**
Project Handover:	**Q2 2023**

CIP.20.06.015
Intrusion Detection Systems for Dublin Airport Boundaries

LEVEL1-CostAnalysis	Represents	Total
Design and Management Costs	10%	€392,491
Construction Costs	65%	€2,616,610
Escalation, Contingency & Design Variability	25%	€987,737
Total		**€3,996,839**

LEVEL2-CostAnalysis				
DesignandManagementCosts	**Value**	**%Fee**	**Total Fee**	**Total**
General Design & Management	€2,616,610	15%	€392,491	€392,491
Total-tosummary				**€392,491**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Intrusion Detection - NAV0112 - FLIR radar type - 1 km range	Redacted Cost Information			
Intrusion Detection - PTZ cameras				
Intrusion Detection - IT Integrations				
Intrusion Detection - Other				
Builders Work In connection with Services				
Other Development Costs				
Total-tosummary				**€2,616,610**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,009,101	33%	€987,737	€987,737
Total-tosummary				**€987,737**

CIP.20.06.016
Surface Road Blockers & Temp. Mobile Barriers

Project Summary

- **This project identifies the requirement for portable vehicle ramps and temporary mobile barriers at each of the four active vehicle control posts (VCPs) at Dublin Airport.**

Dublin Airport presently has 4 vehicle control posts (VCPs) allowing airport supplies and their accompanying vehicles and drivers to be screened prior to entering the Critical Part Security Restricted Area (CPSRA), as is required under EU regulation and the Airport Security Program (ASP). At present these access points are composed of non-armoured, raiseable, steel gates during opening hours and supplemented by steel-wire fence gates during out-of-hours. These elements of the VCP which are used to prevent breaches do not meet the PAS (Publicly Available Specification for vehicle security barriers) standards used in many airports to reduce the risk of unauthorised access via vehicles "ramming" these security points (e.g. Heathrow).

Given the central role the VCPs play in ensuring the security integrity of the airside aspect of the airports operation and in view of the increasing security risks to the airport as a target for unauthorised intrusions, it has been noted in several risk assessments that the VCPs should be equipped with hostile vehicle mitigation systems which are cognisant of Aviation Security in Airport Development (ASIAD) best practices and comply with PAS 69:2013 standards.

Therefore, this project proposes to address the above risk by:
- **Deploying 4 sets of PAS 68 portable armoured ramps at each of the four active VCPs (1 Alpha, 4, 9 and 32), which would allow for continuous deployment to supplement the existing wire-fence gating during operational hours.**
- **Provide emergency, solar powered, mobile replacement security gates for each post.**
  Note: Gates can be transported to the site of any permanent gate malfunction (incl. power outage) and allows the screening staff to proceed while controlling the entry and exit of vehicles.

CIP.20.06.016
Surface Road Blockers & Temp. Mobile Barriers

Project Details Summary		
Category: Security		
Primary Driver Security / Safety	**Secondary Driver** Stakeholder Requirements	**Total Capex requirement** €1.0m
Underpinning Assumptions and Cost Benchmarks	• Full Open Journal tender required • IAA submission required, and approval needed prior to implementation • Costs are based on 2016 budgetary estimates provided by vendor in the absence of detailed / requirements and based on equivalent deployments in the UK • Minimal civil, electrical and mechanical works	
Opex Impact	• Normalised incremental opex impact of c.€0.04m p.a. relating to equipment support and maintenance	
Project Output	Surface Road Blockers: • Deployment of portable vehicle ramps at the 4 VCPs • Training • Reporting Temporary Mobile Barriers: • Procurement of mobile gates, transport trailers and forklift truck • Training	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / requirements complete:	**Q2 2020**
Procurement complete:	**Q2 2020**
Build complete	**Q4 2020**
Training Complete	**Q4 2020**
Project Handover:	**Q4 2020**

CIP.20.06.016
Surface Road Blockers & Temp. Mobile Barriers

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	87%	€824,419
Escalation, Contingency & Design Variability	13%	€127,785
Total		**€952,204**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€824,419	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Gate 9				
Gate 32				
Gate 4		Redacted Cost Information		
Gate 1 Alpha				
Total-to summary				**€824,419**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€824,419	15%	€127,785	€127,785
Total-to summary				**€127,785**

CIP.20.06.022
Redevelopment of Training Facility (ASTO)

Project Summary

- **This project identifies the increased security training facilities required at Dublin Airport.**

Dublin Airport (DAP) security training and certification is governed under mandatory requirements specified in the Airport Security Programme (ASP), Chapter 11 and derived from Authority under EC Regulation 300/2008, EC Regulation 2015/1998, Commission Decision 8005.2017. Under recent changes to the ASP (December 2017), DAP will conduct all training via the auspices of the newly certified Aviation Security Training Organisation (ASTO). This presents a significant change in the training model needed to ensure DAP has sufficiently qualified security staff and requires a more focused and specialised approach to training provision.

The security training demands for Dublin Airport have evolved significantly over the past 3 years due to increased Regulatory requirements for all systems used in screening. The level of detail, number of required tests and level of audit during testing has increased exponentially (especially around screening systems – e.g. ATRS). The current facilities available for training (incl. ASTO) at DAP are composed of a mix of shared training rooms, rental facilities (hotels etc) and staff offices. Also, there are no dedicated hands-on training facilities (with dedicated training equipment) which results in the completion of critical training using live CSA equipment (the resultant obstruction to operations is not an optimal solution). Given the increase in both staff and additional volume of regulatory training, the current arrangement is at risk of not meeting IAA requirements or the future volume of training that must be completed.

CIP.20.06.022
Redevelopment of Training Facility (ASTO)

This project proposes:

- **Facilities: Consolidated facilities in which the ASTO can deliver training and examination of security staff and administer/manage activities of the ASTO. This requires a minimal refurbishment of 2 additional rooms within the existing Castlemoate facility.**
- **Equipment: Dedicated screening equipment to provide hands on instruction to those being trained - mirror equipment currently in operation in the screening operations areas (Terminal 1, 2 and VCPs)**
- **E-training platform: Platform to allow remote security training via a dedicated training application from which all security training courses can be designed, developed, taught and evaluated (via any remote location in either Dublin and Cork airport)**

The benefits of redeveloping existing training facilities at DAP are as follows:

- **Professionalise the approach to training (including recurrent training) to ensure it is aligned correctly with the ASP.**
- **Assist in addressing continuing non - conformances and improve screening standards (ongoing effort at DAP).**
- **Provide flexibility to DAP regarding ongoing testing and validation of systems and processes. This proposal will minimise the need to disrupt security operations when responding to new security requirements (threats and increased requirements from IAA).**
- **Provide capability to offer training facilities to other parties within the Irish aviation industry.**

CIP.20.06.022
Redevelopment of Training Facility (ASTO)

Project Details Summary		
Category: Security		
Primary Driver Operational Efficiency	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.2m
Underpinning Assumptions and Cost Benchmarks	• Castlemoate location assumed to be location for this project • Contingency @10%	
Opex Impact	• Normalised incremental opex impact of c.€0.04m p.a. relating to security training equipment support and maintenance	
Project Output	• New ASTO Training Facilities	
Asset Life	• 15 years	
Project Delivery Key Milestones		
Feasibility / Outline Design complete:	**Q2 2020**	
Planning complete:	**Q3 2020**	
Detail Design complete:	**Q3 2020**	
Procurement complete:	**Q4 2020**	
Construction Commence:	**Q4 2020**	
Build complete	**Q4 2021**	
Project Handover:	**Q4 2021**	

CIP.20.06.022
Redevelopment of Training Facility (ASTO)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€112,554
Construction Costs	77%	€900,434
Escalation, Contingency & Design Variability	13%	€157,013
Total		**€1,170,001**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€900,434	13%	€112,554	€112,554
Total-to summary				**€112,554**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Internal Finishes				
ATRS				
ETD				
LEDS		Redacted Cost Information		
WTMD, HHMD & PVM				
MIP				
Training Equipment				
Classrooms				
Total-to summary				**€900,434**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,012,988	15%	€157,013	€157,013
Total-to summary				**€157,013**

DublinAirport

CIP.20.06.025
Detection: Explosive Detection Dogs (EDD) Capability & Mobile X-Ray Unit

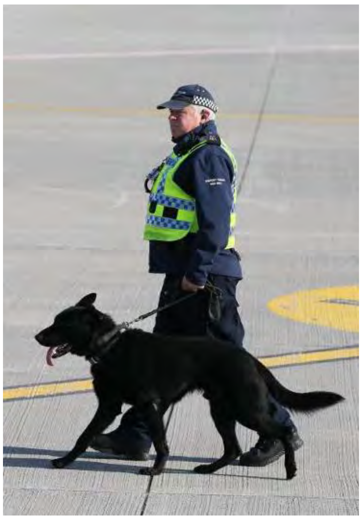
Project Summary

- **This project identifies the need:**

  A. To augment the existing Airport Police Dog units at Castlemoate House with specifically trained Explosive Dog Detection units which can be deployed rapidly across the campus when required.

  B. To procure 2 portable X-ray units for Dublin Airport Police

A. Explosive Detection Dog (EDD) Capability:



This project proposes to augment the existing Airport Police Dog units at Castlemoate House with specifically trained EDD units (3 no.) which can be deployed rapidly across the campus when required. Expanding EDD capability helps randomise search times and location to avoid counter measures, supports rapid mobilisation to threats regardless of location or time and expands explosive detection beyond the Central Search Areas (incl. vehicles). The key components of this project are as follows:

- **Facilities at Dublin Airport: This includes the refurbishment of existing housing and the provision of 3 new kennels**
- **Facilities at residence of handler: Provision of 3 kennels at the handler's residence**
- **Vehicle equipment: 1 x twin mobile vehicle box**

B. Mobile X Ray Unit:

This proposal (mobile X-ray unit) looks to reduce the requirement for EOD deployment on all occasions by introducing a preceding phase of examination. Officers, without disturbing or moving the suspect baggage or item, can conduct an x-ray examination of the suspicious luggage and determine the right course of action – remove the item or if required escalate to the EOD. This project proposes:

- **Procure 2 portable X-ray units for the DAP Police.**

CIP.20.06.025
Detection: Explosive Detection Dogs (EDD) Capability & Mobile X-Ray Unit

Project Details Summary		
Category: Security		
Primary Driver Security / Safety	**Secondary Driver** Regulation	**Total Capex requirement** €0.2m
Underpinning Assumptions and Cost Benchmarks	• Vacant outhouses in Castlemoate assumed to be location for EDD Kennels project (no new build requirement) • Contingency @10%	
Opex Impact	• Normalised incremental opex impact of c.€0.03m p.a. relating to facilities upkeep and equipment support.	
Project Output	EDD Capability: • 3 explosive detection dog teams • Refurbish kennels at Castlemoate • Build of kennels at handler's residence • Dog and handler training Mobile X-Ray Unit: • Procurement of 2 portable security x-rays • Training	
Asset Life	• 6 years	
Project Delivery Key Milestones		
EDD Capability (delivered):	**Q3 2020**	
Mobile X Ray Unit (procured):	**Q3 2020**	

CIP.20.06.025
Detection: Explosive Detection Dogs (EDD) Capability & Mobile X-Ray Unit

LEVEL1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	87%	€151,420
Escalation, Contingency & Design Variability	13%	€23,470
Total		**€174,890**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€151,420	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
3 x kennels, concrete base and drainage	Redacted Cost Information			
Refurbishment of existing housing				
Other Works				
X Ray Equipment				
Total-to summary				**€151,420**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€151,420	16%	€23,470	€23,470
Total-to summary				**€23,470**

CIP.20.06.030
VCP Automation to Enable Remote Screening

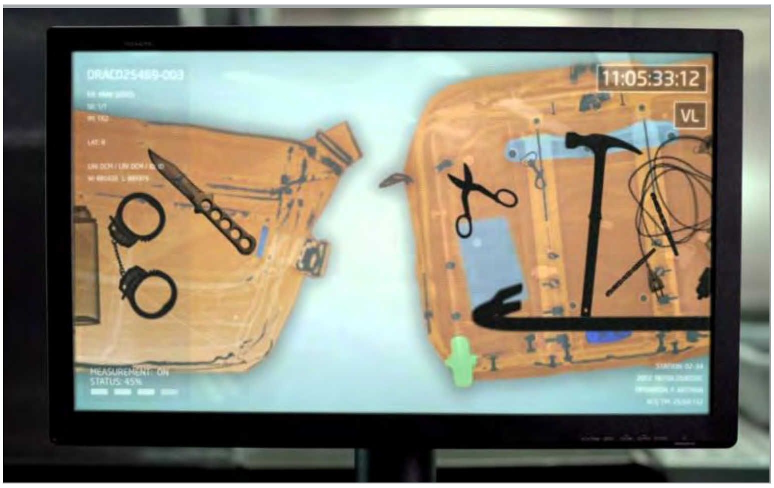
Project Summary

- **This project proposes a redesigned x-ray screening system with the implementation of remote screening functionality at each of the 4 Vehicle Control Posts (VCPs).**

Since 2016 Dublin Airport has deployed ATRS in T1 CSA and has subsequently availed of:

- **Improved security consistency in relation to compliance.**
- **Improved operational efficiencies.**
- **Configuration for remote screening to deliver further compliance improvements and efficiencies.**

Considering these benefits, Dublin Airport proposes to extend remote screening to the existing 4 VCPs (Gatepost 1 Alpha, 4, 9 and 32) to avail of resource efficiency opportunities through the centralisation of X-Ray screening at DAP.



This project proposes that only the relevant elements of the full ATRS systems (VCP and CSA have different volumes of throughput) are implemented as follows:

- **Remote screening software.**
- **Lane automation**
  - **PLC logic & photoelectric**
  - **Transfers tables**
  - **Separator units at x-ray entry points**
  - **Reject lane holding 1 tray**
  - **Review workstation**
- **Introduction of larger trays to facilitate cabin crew luggage sizes.**

CIP.20.06.030
VCP Automation to Enable Remote Screening

Project Details Summary		
Category: Security		
Primary Driver Security / Safety	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €0.7m
Underpinning Assumptions and Cost Benchmarks	• No further major regulatory changes will be implemented in the next five years regarding ATRS • Full Open Journal tender may be required • IAA submission required, and approval needed prior to implementation • Costs are based on 2018 high level budgetary estimates provided by the vendor	
Opex Impact	• Normalised incremental opex impact of c.€0.04m p.a. relating to vendor equipment support costs	
Project Output	• Deployment of remote screening to all VCPs on the Dublin Airport Campus • Training • Reporting	
Asset Life	• 7 years	
Project Delivery Key Milestones		
Feasibility / requirements complete:	**Q1 2020**	
Procurement complete:	**Q2 2020**	
Build complete	**Q1 2022**	
Training Complete	**Q1 2022**	
Project Handover:	**Q1 2022**	

CIP.20.06.030
VCP Automation to Enable Remote Screening

LEVEL1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	87%	€595,100
Escalation, Contingency & Design Variability	13%	€92,241
Total		**€687,341**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€595,100	0%	€0	€0
Total-tosummary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
ATRS - ATRS Lanes	Redacted Cost Information			
ATRS - Mech & Elec for Screening Room				
ATRS - Equipment (incl. PCs, IT, CCTV etc)				
Total-tosummary				**€595,100**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€595,100	16%	€92,241	€92,241
Total-tosummary				**€92,241**

CIP.20.06.031
Autopass – T1 Replacement & T2 Install

Project Summary

- **This project proposes implementing Autopass in Terminal 2 and replacing end of life Autopass in Terminal 1.**

The Autopass service automatically reads passenger's boarding card and if valid allows them access to the central screening area with minimal intervention from Dublin Airport staff. The implementation of the "Autopass" service in Terminal 1 has provided passengers with a faster, more convenient approach to the Central Screening Area and makes better use of staff resources within Security Operations.

The service also assists Dublin Airport in its overall management of passenger queue times by enabling larger flows of passengers into the CSA than manual boarding pass checks. Given the success of the Autopass service in Terminal 1 Dublin Airport proposes to:

- **Replace end-of-life Autopass system in T1 (install 15 entry points). This will need to be coordinated with T1 CSA relocation projects proposed in 2020-2024 CIP. The number of Autopass gates in T1 will increase from 10 to 15 entry points (considering forecast PAX numbers and new CSA location).**
- **Rollout of Autopass in T2 (install 10 entry points): It is proposed to replicate the T1 Autopass service in T2 to provide customers with a common product offering, optimise queue times and avail of Opex savings through reduced numbers of boarding pass check staff.**

CIP.20.06.031
Autopass – T1 Replacement & T2 Install

Project Details Summary		
Category: Security		
Primary Driver Operations Efficiency	**Secondary Driver** Customer Experience	**Total Capex requirement** €1.8m
Underpinning Assumptions and Cost Benchmarks	• No major structural changes will be required to convert the existing manual boarding card check gates to Autopass gates • Costs are based on previous Autopass projects pricing • Contingency is taken at 10%	
Opex Impact	• Normalised incremental opex impact of c.€0.05m p.a. relating to systems software support costs	
Project Output	• Deployment of Autopass in Terminal 1 & 2 departures • Training	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q1 2021**
Planning complete:	**Q1 2021**
Detail Design complete:	**Q1 2021**
Procurement complete:	**Q1 2021**
Construction Commence:	**Q2 2021**
Construction Complete	**Q4 2021**
Project Handover:	**Q4 2021**

CIP.20.06.031
Autopass – T1 Replacement & T2 Install

LEVEL1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	81%	€1,441,992
Escalation, Contingency & Design Variability	19%	€340,253
Total		**€1,782,245**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€1,441,992	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T2 Autopass	Redacted Cost Information			
T1 (EOL replacement)				
Total-to summary				**€1,441,992**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€1,441,992	24%	€340,252	€340,252
Total-to summary				**€340,253**

CIP.20.06.036
TSA - X-Ray & FBSS Replacement

Project Summary

- **This project identifies screening equipment upgrade requirements at US preclearance areas in Dublin Airport.**

The Transport Security Administration (TSA) US Preclearance screening area in Dublin Airport (DAP) has, as part of its cabin-baggage screening process, X-ray systems which recheck passenger's cabin baggage and a full-body scanning system which can be used on a randomised basis to scan passengers entering the area for US bound flights. These systems are mandated by the TSA as one of the conditions for pre-clearance of passengers and, over the course of the next CIP, these systems will reach end-of-life and will require replacement to ensure compliance and operational efficiency.

This project proposes:

- **Replacement of 1 full body screening unit**
- **Replacement of 5 X-ray systems**

CIP.20.06.036
TSA - X-Ray & FBSS Replacement

Project Details Summary		
Category: Security		
Primary Driver End of Life	**Secondary Driver** Regulation (TSA)	**Total Capex requirement** €0.4m
Underpinning Assumptions and Cost Benchmarks	• There will be a re-use of all existing network and power infrastructure • There will be no major changes to the standards or functionality which are in use today • Systems will be purchased under existing procurement frameworks/contracts • System costs based on historical 2017 pricing • Contingency is taken at 10%	
Opex Impact	• N/A	
Project Output	• Replacement of 1 full body screening unit • Replacement of 5 X-ray systems	
Asset Life	• 7 years	

Project Delivery Key Milestones	
FBSS: Contracts and supply agreements in place	**Q1 2022**
FBSS: Rollout complete of new WTMD replacement	**Q3 2022**
X Ray: Contracts and supply agreements in place	**Q1 2020**
X Ray: Rollout of new X-ray replacement commencement	**Q1 2021**
X Ray: Rollout of new X-ray replacement complete	**Q3 2024**

CIP.20.06.036
TSA - X-Ray & FBSS Replacement

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	91%	€332,200
Escalation, Contingency & Design Variability	9%	€33,220
Total		**€365,420**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€332,200	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
TSA X-ray Replacement (5No.)	Redacted Cost Information			
TSA FBSS Replacement (1No.)				
Total-to summary				**€332,200**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€332,200	10%	€33,220	€33,220
Total-to summary				**€33,220**

DublinAirport

CIP.20.06.041
Security Screening Equipment - End of Life

Project Summary

- **This project identifies the need for end of life replacement of screening equipment in Dublin Airport.**

Dublin Airport is mandated both by national and European regulation (i.e. European Commission Directive EU Reg 300.2008) to ensure that all passengers (including persons other and passengers) and accompanying items (e.g. cabin baggage etc.) entering the CPSRA through its terminals and vehicle-posts must be screened to an appropriate standard. This is primarily accomplished in Dublin Airport through:

- **X-ray screening for cabin baggage and items carried (addressed in separate proposals – CIP.20.006.001)).**
- **Walk-through metal detectors (WTMD) for the screening of the passengers.**
- **Handheld metal detector (HHDM) for screening of passengers where they cannot be screened via WTMD due to disability (e.g. wheelchair bound), possible interference with medical devices (e.g. pace-makers) or where WTMD alarms have been triggered and a targeted examination is required to locate the threat item.**

CIP.20.06.041
Security Screening Equipment - End of Life

In addition to these primary screening methods, the Regulator also mandates the requirement for supplementary random screening of passengers and items carried for the presence explosives (10% of passengers). Presently Dublin Airport is required to test a minimum of 10% of all passengers and their hand baggage for explosives and to implement a secondary search where x-ray and WTMDs have triggered an alarm.
These mandatory supplementary screening requirements are implemented in Dublin Airport through:

- **Liquid explosive detections systems (LEDS) – used for the detection of the presence of explosives in liquids carried by passengers**
- **Explosive threat Detection systems (ETD) systems: used for the detection of the presence of explosives in items carried other than liquids carried by passengers**

This project proposes the following deliverables:

- **A one-to-one replacement of each system is implemented**
    - **15 LEDs out of 15 deployed**
    - **57 ETDs and equipment management and monitoring system (out of 62)**
    - **23 WTMDs out of 37 deployed**
    - **65 HHMD out of 65 deployed**
    - **97 Mobile radios out of ~120 deployed**
- **Where possible, only one system model will be procured for each screening category**
- **An Open Journal (Competitive bidding) tendering process required given the expected 5-year costs of the project.**
- **The new units procured under this project will include a change in technology which will no longer require the use of radio-active elements/sources in these devices where applicable. This reduces risks to operators and management overhead.**

Reduction in radioactive source-based systems in Dublin Airport:

Given the existing base of ETDs and LEDS systems operate with the use of a radioactive source (RS), the opportunity will be taken to replace the RS existing models where possible. This approach is in line with Dublin Airport's strategy to reduce the number of radiological licenses and overall footprint in the airport campus. Research indicates that this can be done within the near- equivalent unit cost as per today.

CIP.20.06.041
Security Screening Equipment - End of Life

Project Details Summary		
Category: Security		
Primary Driver End of Life	**Secondary Driver** Regulation	**Total Capex requirement** €4.5m
Underpinning Assumptions and Cost Benchmarks	• There will be a re-use of all existing network and power infrastructure where applicable • There will be no major changes to the standards or functionality which are in use today • A full Open Journal tender will be required supported by operational trials • System costs based on historical 2014/2015 pricing • Contingency is taken at 10% (to take account for unknown costs of moving to non-radiological source systems and any PAX growth impact)	
Opex Impact	• Normalised incremental opex impact of c.€0.1m p.a. relating to increased vendor support costs due to higher specifications and increased technology elements	
Project Output	Replacement of: • 15 LEDs of 15 deployed • 57 ETDs and equipment management and monitoring system (out of 62) • 23 WTMDs of 37 deployed • 65 HHMD of 65 deployed • 97 Mobile radios of ~120 deployed	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Tender complete:	**Q4 2018**
Contracts and supply agreements in place	**Q1 2019**
Rollout of new ETD replacement commencement	**Q1 2020**
Rollout of new ETD replacement complete	**Q4 2024**

CIP.20.06.041
Security Screening Equipment - End of Life

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	91%	€4,060,750
Escalation, Contingency & Design Variability	9%	€406,075
Total		**€4,466,825**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management (Deemed included below)	€4,060,750	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
ETD Replacement - T1, T2, VCP & Other	Redacted Cost Information			
LEDS - T1, T2, VCP & Other				
HHMD				
Mobile Radios				
WTMD				
Total-to summary				**€4,060,750**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,060,750	10%	€406,075	€406,075
Total-to summary				**€406,075**

CIP.20.06.042
ATRS - Central Search Areas (T1 & T2)

Project Summary

- **This project identifies the need for end of life replacement of screening equipment in Dublin Airport.**

Since 2016 Dublin Airport (DAP) has deployed an Automatic Tray Return System (ATRS) in T1 which provides passengers with a system-controlled flow for the processing of cabin baggage screening in the Central Search Area. The system has been able to provide:

- **Improved security consistency in relation to compliance.**
- **Improved operational efficiencies of 20% when compared to equivalent manual tray systems.**
- **More efficient movement of passengers (Slow passengers do not inhibit or prevent efficient passengers from progressing).**
- **A quieter working and customer environment.**
- **Easy loading and unloading of cabin baggage.**
- **Configuration of remote screening to deliver further compliance improvements and efficiencies.**
- **Improved performance data compared to manual systems.**

Over the period of the next CIP, DAP Security Operations anticipate that the forecasted PAX will require an extension/expansion of this system in both CSAs in order to accommodate the increase in expected volume of cabin baggage requiring screening into the Critical Part Security Restricted Area (CPSRA).

CIP.20.06.042
ATRS - Central Search Areas (T1 & T2)

The project proposes the following:

- **Replace the existing 15 ATRS lanes (19-meter system configuration) with 17 longer ATRS lanes (25-meter system configuration) which will enable improved throughput sufficient to meet the forecasted increase. It is proposed that the existing older units in T1 will then be transferred to and reused in the CSA in T2.**
- **Newly deploy the ATRS service to Terminal 2 (using the existing T1 ATRS system), in the expectation that T2 CSA will be able to avail of the increased throughput productivity but in addition:**
    - **Provide a consistent product offering to all DAP passengers regardless of which terminal they use.**
    - **Extend the use of remote screening to this area of screening operation and standardise operational processes across both terminals.**
    - **Position DAP for staff interoperability between terminals.**
- **Expand the existing remote screening facility to accommodate the additional screeners needed to monitor the new T2 lanes.**

CIP.20.06.042
ATRS - Central Search Areas (T1 & T2)

Project Details Summary		
Category: Security		
Primary Driver Regulation	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €11.7m
Underpinning Assumptions and Cost Benchmarks	• Total number of lanes are based on CIP 40mppa Facility Requirements Rev 27 and assumed that EDS-CB (proposed separately) is approved to enable IPP of 1.2. This is a key dependency regarding the quantities included in this proposal • IAA submission (& approval) required, • Costs are based on 2016 Asset register D14206 for T1 ATRS project supplemented by workshops with Dublin Airport IT and Security Operations • Project assumed the implementation of the T2 and T1 CSA expansion projects • No further major regulatory changes will be implemented in the next five years • Contingency @10%	
Opex Impact	• Normalised net opex impact of c.€0.4m saving p.a. being driven by savings in resource requirements as a result of processing throughput efficiencies which offset increased equipment support costs	
Project Output	• 15 x 25-meter ATRS lanes deployed in T1 • 12 x 17-meter ATRS lanes deployed in T2 • Extension of the remote screening room to accommodate T2 remote screening • Training for T2 Staff	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q2 2020**
Planning complete:	**Q2 2020**
Procurement complete:	**Q3 2020**
Construction Commence:	**Q3 2020**
Construction Completed	**Q2 2022**

DublinAirport

CIP.20.06.042
ATRS - Central Search Areas (T1 & T2)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€674,295
Construction Costs	77%	€8,990,595
Escalation, Contingency & Design Variability	17%	€2,029,627
Total		**€11,694,517**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
T1 - General Design & Management	€8,990,595	4%	€399,815	€399,815
T2 - General Design & Management	€8,990,595	3%	€274,480	€274,480
Total-to summary				**€674,295**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
T1 - ATRS lanes				
T1 - Support to ATRS Lanes (lengthening of 19m lanes, CCTV, BLUFI etc)	Redacted Cost Information			
T2 ATRS (reuse of T1 lanes - 19m lanes)				
Remote Screening Room (fit-out - 10 Workstations)				
Total-to summary				**€8,990,595**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€9,664,890	21%	€2,029,627	€2,029,627
Total-to summary				**€2,029,627**

CIP.20.06.044
Replacement of T1 Controllers for Access Control System

Project Summary

- **This project identifies the need for end of life replacement of Terminal 1 Controllers for Access Control System.**

Access control is the selective restriction of access to a place, building, room, resource or installation. To gain access to a restricted location an individual generally needs to have authorisation or to be given permission to enter by someone that already has authorisation

In Dublin Airport Access Control is deployed across all restricted boundaries through the use of Access Control Controllers. Currently 155 Bedas type controllers used to maintain access control are approaching end of life and not compliant with new readers coming on line. The Bedas controllers are on average 13-14 years old and are becoming increasingly unreliable leading to issues with stakeholders; freezing during boarding and failure to return to service following power interruption / outage are some of the issues with the controllers.

This project proposes:
Replacement of all end of life Bedas type controllers. Readers currently in use will sit on new type be-net controllers which will enable the business to retain existing mixture of readers
currently in service and put in place a program for controlled replacement of old readers leading to upgraded and fully compatible access solution. This will tie in with the road map for the future of Access Control and guarantee asset life for an additional 10 years. The project will be delivered in 3 phases, each phase will cover c.50 Controllers.

Project Benefits
As the Controllers are at the end of lifecycle and are not compatible with the new readers, the main benefit of this project is to retain the Access Control functionality and reliability of the system.

CIP.20.06.044
Replacement of T1 Controllers for Access Control System

Project Details Summary			
Category: Security			
Primary Driver End of Life	**Secondary Driver** Security / Safety		**Total Capex requirement** €0.5m
Underpinning Assumptions and Cost Benchmarks	• Existing framework vendor is assumed as supplier for this proposal • Based on the results of the site survey, daa will decide which Controllers need to be upgraded • Project will be delivered in 3 phases (caa 50 Controllers in each phase) • Estimated total cost of outstanding controllers: • €500 000 • Additional €97 660 will cover any network/ cabling needed, site resource, PM, etc.		
Opex Impact	• No material impact on opex.		
Project Output	• Upgrade of 155 T1 Controllers		
Asset Life	• 7 Years		
Project Delivery Key Milestones			
Replacement of T1 Controllers for Access Control System		**Q2 2020**	

DublinAirport

CIP.20.06.044
Replacement of T1 Controllers for Access Control System

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€30,176
Construction Costs	75%	€402,341
Escalation, Contingency & Design Variability	19%	€102,057
Total		**€534,574**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
T1 - General Design & Management	€402,341	7%	€30,176	€30,176
Total - to summary				**€30,176**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
DAA Controller Upgrade PHASE 2	Redacted Cost Information			
DAA Controller Upgrade PHASE 3 Costs				
Total - to summary				**€402,341**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€432,517	24%	€102,057	€102,057
Total - to summary				**€102,057**

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G OTHERS

APPENDIX G
Others

Appendix G - Others			Page
CIP Number	Project Title	Provisional Estimate €m October 2018	
CIP.20.07.001	Programme Management	€6.5	G-1
CIP.20.07.002	Minor Projects (projects generally under €100k, water pump replacements, gate area repairs etc.)	€14.5	G-4
CIP.20.07.004	Metro Coordination	€0.5	G-7
CIP.20.07.010	Office Consolidation & Refurbishment (primarily Level 4 & 5, Terminal 1)	€18.0	G-10
CIP.20.07.014	Terminal Operations Improvement Projects	€5.9	G-13
CIP.20.07.030	Large Energy Project - Photovoltaic Farm	€10.0	G-18
CIP.20.07.031	Terminal 2 HBS Standard 3	€21.0	G-21
CIP.20.07.032	Unit Load Device (ULD) Storage	€3.0	G-25
TOTAL		**€79.5**	

CIP.20.07.001
Programme Management

Project Summary

- **This budget contains the costs associated with Programme Management for CIP 2020 to 2024 period.**

In this context Programme Management can be defined as the process of managing the multiple interdependent projects contained in the CIP with the objective of ensuring strategic standardisation in approach to managing cost, risk, change control, time, quality, safety, project reporting and monitoring and controlling all projects within the CIP. All projects within the CIP will be delivered using the Programme Management methodology.

Programme Management will include;

- Optimisation and prioritisation of projects for delivery
- Integration of cost and schedule through project control procedures
- Driving risk management and associated risk mitigation
- Driving compliance with Programme and Project procedures to manage the ongoing capital spend at Dublin Airport and to continue the delivery of projects within budget and on programme.
- Integration of cost and schedule through project control procedures and provision of performance metrics.
- Providing Procurement strategy to ensure best buy in the market place.
- Providing interface management to ensure minimal disruption to operations and passengers.
- Providing dedicated Programme and Project Environmental and Health and Safety management systems and personnel.
- Providing proactive Stakeholder Management across all projects.
- Reviewing / Updating all procedures to meet on-going requirements.

CIP.20.07.001
Programme Management

Project Details Summary		
Category: Other		
Primary Driver Future Proofing	**Secondary Driver** Safety	**Total Capex requirement** €6.5m
Underpinning Assumptions and Cost Benchmarks	• FTE of 5 Senior Technical Staff • FTE of 3 support staff / admin • FTE of 4 Safety Staff • BIM computer software • Specialist consultants on Environment • Specialist Consultants on Planning	
Opex Impact	• N/A	
Project Output	• Minimise operational disruption through careful sequencing of CIP projects and work programmes • Ensure safety standards are applied to all projects to protect staff, customers and passengers • Achieve value for money through most optimum procurement route • Provide programme leadership and governance to CIP 2020 – 2024 • Actively manage risk and in particular risk mitigation to achieve cost and timeline objectives	
Asset Life	• 5 Years	

Project Delivery Key Milestones	
Initial Set-up:	**Q3 2019**
Ongoing Programme Management Commence:	**Q1 2020**
Ongoing Programme Management Complete:	**Q4 2024**

CIP.20.07.001
Programme Management

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	90%	€6,000,000
Construction Costs	0%	€0
Escalation, Contingency & Design Variability	10%	€500,000
Total		**€6,500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Technical Staff	Redacted Cost Information			
Support Staff				
Safety Staff				
Specialist Consultants (Environment)				
Specialist Consultants (Planning)				
Total - to summary				**€6,000,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
N./A.				
Total - to summary				**€0**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€4,500,000	11%	€500,000	€500,000
Total - to summary				**€500,000**

CIP.20.07.002
Minor Projects

Project Summary

- **This budget contains the costs associated with addressing minor projects, typically under €100k, that arise on an annual basis.**

Minor projects comprise numerous small value projects that arise on an annual basis to address the normal operation of a c.30 million passengers per annum airport. These projects would normally be valued at under €100k and include projects across the full airport campus, from landside to terminals to airfield. These projects are essential to keep the airport operating on a day to day basis and can be generally broken down into the following categories.

General Maintenance

- **General upkeep / upgrade and refurbishment of the external and internal elements of the Main Terminal Building, Piers, Airside and Landside operational buildings. e.g. replacement of life expired matwells in Terminal 2 lobby's, replacement of life expired floor cleaning equipment.**
- **Unforeseen reactive works including maintenance, refurbishment and/or upgrades to the runways, taxiways, aprons, parking stands or critical services in the Airside Operational area. e.g. replacement of individual concrete slabs on the apron following breakup to address FOD issues, removal and replacement of collapsed drainage systems.**

Efficiency

- **Minor projects to improve energy or operational efficiencies. These projects would include replacing halogen lighting with LED lighting. e.g. replacement of the halogen lighting in Terminal 2 baggage reclaim area.**

Airport Operations

- **Ensure Dublin Airport building compliance with current regulatory standards relating to Health and Safety, Fire Strategy and Management systems and Building Regulations. Modifications to Life Safety Systems**
- **Response to ongoing operational / security infrastructural requirements. Projects in this category can range from the purchase of radios for security, renewing passenger seat coverings, improving apron line markings to road signage.**

CIP.20.07.002
Minor Projects

Project Details Summary		
Category: Other		
Primary Driver End of Life	**Secondary Driver** Operational Efficiency / Stakeholder Requirements	**Total Capex requirement** €14.5m
Underpinning Assumptions and Cost Benchmarks	• Costs based on historic spend analyses airport operations projects in current and previous CIPs • Cost based on average spend of €2m / year • Costs commensurate with ongoing maintenance and upgrade associated with 30mppa airport.	
Opex Impact	• Minimal Opex impact envisaged – will materialise as projects are delivered	
Project Output	• Minor projects to address day to day issues. • Minimise operational disruption through ability to address unforeseen issues. • Ability to respond to essential minor airline requirements • Ability to respond to passenger requirements.	
Asset Life	• 7 years	

Project Delivery Key Milestones	
Initial Set-up:	**Q3 2019**
Minor Projects Commence:	**Q1 2020**
Minor Projects Complete:	**Q4 2024**

CIP.20.07.002
Minor Projects

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€14,540,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€14,540,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€14,540,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
General Maintenance	Redacted Cost Information			
Total - to summary				**€14,540,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€14,540,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.07.004
Metro Coordination

Project Summary

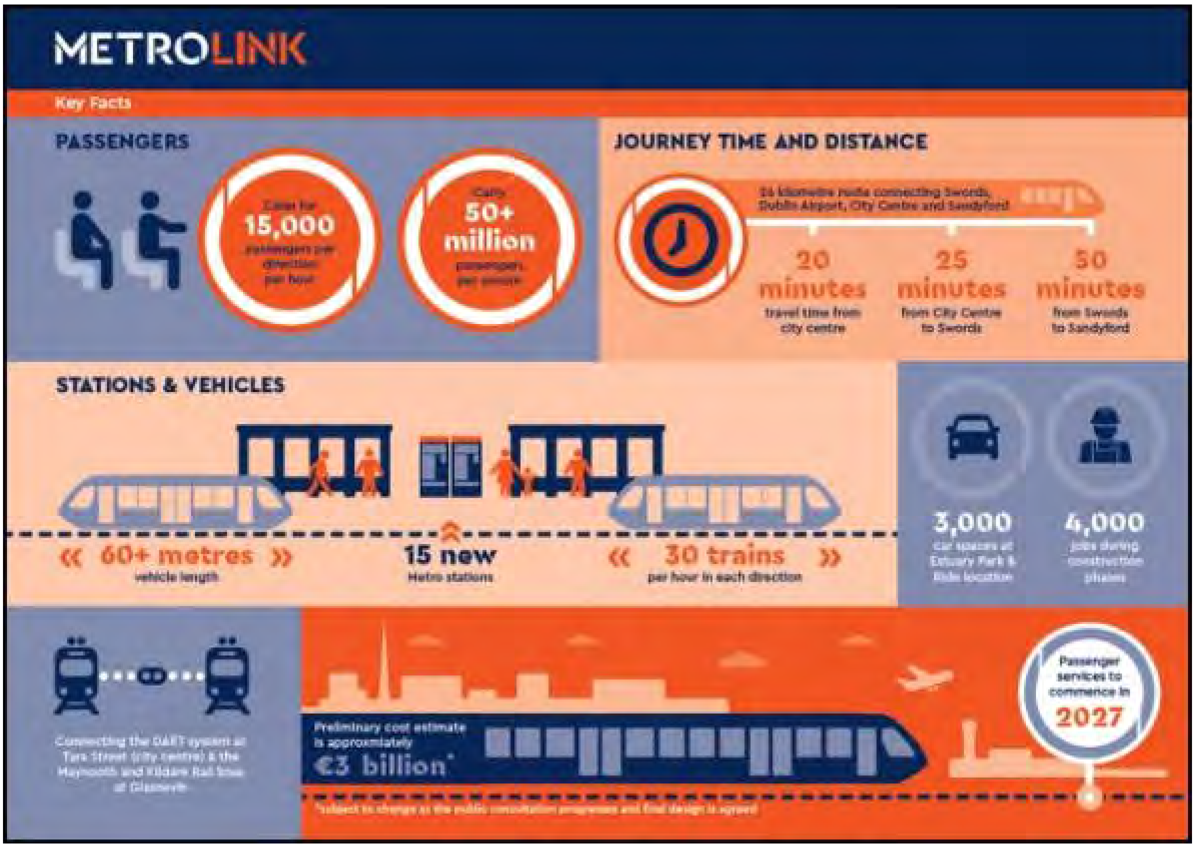
- **This budget contains the fees associated with allocating resources to ensure coordination with the MetroLink proposal during the design and construction stage.**

METRO Proposal

The MetroLink project is the development of a north-south high frequency, high capacity, electric urban railway service that will run between Swords and Sandyford, connecting key destinations including Dublin Airport and the City Centre along the 26km route. A large proportion of the route will be underground, including where it passes under the important city centre area and Dublin Airport.

There will be a total of 25 stations, including a station at Dublin Airport, with a journey time to the city centre of 20 minutes.

Construction is due to commence in 2021 and this project is required to cover resource fees and specialist consultants to ensure adequate coordination between Dublin Airport and the MetroLink project, so that the passenger needs are addressed in the design and implementation of the MetroLink project.



DublinAirport

CIP.20.07.004
Metro Coordination

Project Details Summary		
Category: Other		
Primary Driver Future Proofing	**Secondary Driver** Stakeholder Requirements	**Total Capex requirement** €0.5m
Underpinning Assumptions and Cost Benchmarks	• 1 No. FTE Dedicated resources required to interface with the Metro project x 5 years. • Specialist design consultants required to review Metro proposals	
Opex Impact	• N/A	
Project Output	• Passenger and airport concerns / requirements addressed in the design and phasing of the project in relation to the construction of the station at Dublin Airport. • Passenger journey times to city centre are minimised through the station design and interface with other modes of transport and terminal connections • Minimum disruption to airport operations during construction.	
Asset Life	• 40 Years	

Project Delivery Key Milestones	
Interface with MetroLink Commences:	**Q4 2019**
Construction of Dublin Airport Station Commences:	**Q4 2021 (TBC)**
Construction of Dublin Airport Station Completes:	**Q4 2025 (TBC)**
MetroLink to Dublin Airport Operational	**Q2 2027 (TBC)**

CIP.20.07.004
Metro Coordination

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	100%	€500,000
Construction Costs	0%	€0
Escalation, Contingency & Design Variability	0%	€0
Total		**€500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
METRO Interface – 1 FTE (5 Years)	Redacted Cost Information			
Metro Consultants – Planning				
Metro Consultants – Design				
Metro Consultants – Site				
Total - to summary				**€500,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
N./A.				
Total - to summary				**€0**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€500,000	0%	€0	€0
Total - to summary				**€0**

CIP.20.07.010
Office Consolidation & Refurbishment (primary Level 4 & 5, Terminal 1)

Project Summary

- **This project proposes a refurbishment of Terminal 1 staff office space in order to; increase staff office space, increase commercial space to let and reduce annual running costs associated with various staff locations.**

Currently daa / Dublin Airport has a number of office / non-frontline staff located in a number of buildings (or part of) around the Dublin Airport Campus. A number of buildings such as Cargo 1 and the North Terminal require demolishment in the near term due to proposed masterplan capacity enhancing projects and will require a number of staff to be rehoused. Additionally, some of the office space occupied is aged and requires significant investment in the absence of this project. Thus, there is an opportunity to upgrade facilities and consolidate staff in order to; rehouse staff, increase commercial space and revenue at Dublin Airport and reduce annual opex running costs.

This project will fund the refurbishment of levels 4 and 5 located in Terminal 1. It will increase the capacity allowance for staff in that location by 100% which will allow daa to vacate staff from Cloghran House and Cargo 6 buildings and let to respective tenants. Additionally, operating costs incurred from these buildings will reduce as the costs will be passed onto tenants. Current annual running costs include; repairs and maintenance, light and heat, Fingal County Council property rates and rent payable to Dublin Airport Central.

This project proposes:

- **full strip out, repair and refurbishment of level 4**
- **full strip out, repair and refurbishment of level 5**
- **new light wells to introduce additional light to level 4**
- **minor refurbishment works to Cargo 6 in advance of letting**

CIP.20.07.010
Office Consolidation & Refurbishment (primary Level 4 & 5, Terminal 1)

Project Details Summary		
Category: Other		
Primary Driver End of Life	**Secondary Driver** Revenue Opportunity (Opex Saving)	**Total Capex requirement** €18.0m
Underpinning Assumptions and Cost Benchmarks	• The following building considerations to be included are: Performance, sustainability, environmental, utilization of space and health & safety • Cost based on similar fit-out projects in recent years	
Opex Impact	Annual cost saving to €1.1m per annum due to: • lower repairs and maintenance; • light and heat; • property rates; and • rental charges to DAC.	
Revenue Impact	• Increased annual normalised revenue of €0.3m p.a.	
Project Output	• Fully refurbished staff office space in Terminal 1 • Increased office capacity for staff in areas that are required to support operational capacity increases e.g. Piers • Increased commercial revenue from Cargo 6 vacated space • Reduced opex costs due to consolidated areas	
Asset Life	• 25 Years	
NPV	• €0.3m	
IRR	• 6.0%	
Payback Period (years)	• 13.5 years	

Project Delivery Key Milestones	
Feasibility / requirements / pilot complete:	**Q4 2020**
Planning complete:	**Q1 2022**
Design complete:	**Q3 2021**
Procurement complete:	**Q2 2022**
Construction Complete	**Q1 2023**

CIP.20.07.010
Office Consolidation & Refurbishment (primary Level 4 & 5, Terminal 1)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	8%	€1,404,439
Construction Costs	75%	€13,439,350
Escalation, Contingency & Design Variability	18%	€3,156,211
Total		**€18,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€13,439,350	10%	€1,404,439	€1,404,439
Total - to summary				**€1,404,439**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Office Refurbishment	Redacted Cost Information			
Main Contractor Prelims				
Other Development Costs				
Total - to summary				**€13,439,350**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€14,843,789	21%	€3,156,211	€3,156,211
Total - to summary				**€3,156,211**

CIP.20.07.014
Terminal Operations Improvements Projects

Project Summary

- **This project identifies key Terminal Operations improvement works required at Dublin Airport.**

Over the 2020-2024 CIP period Dublin Airport (DAP) plans to implement several small terminal operation improvement projects to improve the overall passenger experience. The key projects being considered can be categorised as follows:

1. **Washrooms**
2. **Seating**
3. **Luggage Trolleys**
4. **Barriers**
5. **Signage**
6. **Visual environment**
7. **T2 OCS relocation**

1. Washrooms

Clean, accessible and well-stocked washroom can significantly improve the passenger experience which in turn contributes to the traveller's perception (and brand image) ofthe airport. Today, the washrooms in Pier 1 & 2 are sub-standard and in need of a full upgrade and refurbishment. This is to address Asset Care maintenance issues and improve the passenger perception of these areas. There is also insufficient capacity in these areas to deal with projected passenger demand.
Note: These refurbishments will reduce the amount of maintenance and Asset Care call-outs.

2. Seating

Seating is a significant factor in maintaining passenger satisfaction at airports. Seating offers passengers an opportunity to relax and unwind in the fast-paced airport environment. According to Dublin Airport metrics, 50-70% of departing passengers should be seated to meet targeted level of service.

To improve seating and waiting gate comfort, additional boarding gate seating is required in Piers 1, 2 and 3. This project proposes 1,000 seating banks (4 seats per bank) be provided in areas with insufficient seating.

CIP.20.07.014
Terminal Operations Improvements Projects

3. Luggage Trolleys

Luggage trolleys allow passengers in the airport to easily transport large items of luggage long distances. Today, DAP requires 3,000 new trolleys to serve essential operations in T1 and T2(replace existing end of life trolleys and allow for increase passenger forecasts). This is to ensure there is adequate passenger service.

Note: In 2010, there were approximately 5,000 trolleys in DAP while today there are only 2,500 in circulation in the current fleet.

4. Barriers

Barriers are a critical means to managing queuing spaces and cordoning off access to restricted areas in airports. Today, DAP has several different types of barrier (including several bespoke airline barriers) provided across the entire facility. This project proposes the implementation of a standardised DAP tensile 'topped' barrier which would be fixed in place for 24hours of operation throughout the facility. A total of 1,500 new barriers are required during the 2020-2024 CIP period.

The key driver behind standardising barrier operation at DAP is to comply with new airport security regulations which minimises the number of loose fittings in landside areas which could pose security risks. Also, replacement of existing tensile barriers will provide a consistent approach to barrier layout and potentially reduce FTE resources, freeing up approx. 3 FTE per day for other operational work.

5. Signage

Intuitive signage can easily disseminate important information from the airport to the travelling public, give passengers more control over their journey (wayfinding signage) and improve overall passenger satisfaction. Over the 2020-2024 CIP period DAP will required an ongoing investment in signage (New wayfinding and lightboxes) to ensure efficient passenger operations.

Note: Spend on signage will continue similar to today spend.

CIP.20.07.014
Terminal Operations Improvements Projects

6. Visual Environment

The Visual Environment initiatives serve to create a common and unifying visual environment that is developed with the Dublin Airport brand guidelines, essence (warmth, practicality, ingenuity) and positioning (best use of travel time) in mind. Dublin Airport Passenger Experience (DAPEX) investigates the current and future needs of passengers and adapts the environment to create memorable and engaging experiences.

Some of the benefits of the DAPEX are as follows:

- **Improve the journey for passengers throughout our terminals**
- **Ensure Dublin Airport does not become sterile and without personality**
- **Breathe new life into old infrastructure**
- **Create a connection with passengers**
- **Add value to our airline partners by enhancing their product**
- **Bring a greater consistency to all DAP offerings (Terminal 2 Vs Terminal 1)**
- **Improve staff working environment**

Given the feedback from airline customers and passengers DAP proposes to continue the project to cover new infrastructure and address areas that need addressing throughout the airport. This will be delivered through DAP visual environment work stream and the connecting journeys project which DAP partner with local organisations to give a platform to emerging artists.

7. T2 OCS Relocation

Catering for passengers who require special assistance (disabled persons or persons with reduced mobility) is a key consideration at DAP (in line with EC 1107/2006). The One Complete Solution (OCS) Group provides this service in both Terminal 1 & 2.

In Terminal 2 the OCS reception is located on level 10 of check-in adjacent to the Aer Lingus ticket desks. This area is currently a reception/waiting space for PRMs being transported by wheelchair to their destination in the terminal. The current location is unsuitable as it utilises key space in check-in and prevents expansion of the OCS operation. Additionally, the space can be used for alternative accommodation.

This project proposes relocating the existing PRM reception / waiting space from the existing location (south-east corner of T2 Check-in) to a new location beside washrooms / vending / bag wrap area in Terminal 2 Check in.

CIP.20.07.014
Terminal Operations Improvements Projects

Project Details Summary		
Category: Other		
Primary Driver Customer Experience	**Secondary Driver** End of Life	**Total Capex requirement** €5.9m
Underpinning Assumptions and Cost Benchmarks	• Costs based on previous projects completed in 2016-2018	
Opex Impact	• N/A	
Project Output	• Refurbishment of washrooms in Pier 1 & 2 to similar standard to toilets in other locations in DAP • Continued improvement in: Seating. Luggage Trolleys, Barriers and Signage • Further Visual Environment Initiatives (T1 Immigration, CBP Departure Gates, Air-bridges, T1 Orientation Area, Terminal Entrances (front doors), Carparks, T1 Mezzanine, Pier 2 Departures • Relocation of Terminal 2 OCS accommodation	
Asset Life	• 5 years	

Project Delivery Key Milestones	
Terminal Operations Improvement Programme	**Q1 2020 – Q4 2024**

CIP.20.07.014
Terminal Operations Improvements Projects

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€342,353
Construction Costs	89%	€5,300,758
Escalation, Contingency & Design Variability	5%	€282,156
Total		**€5,925,266**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€5,300,758	6%	€342,353	€342,353
Total - to summary				**€342,353**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Washrooms/toilets (minor refurbishments)	Redacted Cost Information			
Trolleys				
Barriers				
Signage				
Visual Environment				
OCS Relocation				
Seating				
Total - to summary				**€5,300,758**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,643,110	5%	€282,156	€282,156
Total - to summary				**€282,156**

CIP.20.07.030
Large Energy Project – Photovoltaic Farm

Project Summary

- **This project entails developing and integrating a Solar PV Farm to generate electricity at Dublin Airport. The installation will provide opex cost reduction, facilitate long term price certainty, revenue generation capacity and compliance with regulatory energy and carbon emissions targets.**

This project is to develop a 40-45-acre Solar PV Farm to supply electricity to Dublin Airport to reduce its on-site import of peak cost electricity and energy/carbon footprints.

Since commencing engagement with the voluntary ACI Airport Carbon Accreditation (ACA) Scheme in 2009, Dublin Airport's footprint decreased by 27% from a baseline of 36,917 tonnes CO2 in 2011 to 27,018 tonnes CO2 in 2016, and it has recently committed to making the significant step of achieving carbon neutrality under the UNFCC and ICAO recognised ACA scheme by 2020.

Dublin Airport entered the public sector energy monitoring and reporting scheme with SEAI in 2012 to reduce its energy consumption by 33% by 2020 and is on target to achieve this through implementation of a range of projects including replacing existing lighting systems with more energy efficient LED technology, installing more efficient heating and cooling systems, and improved building management systems to assist in the active management of energy consumption. The new phase of the public-sector scheme will apply from 2020-30 with targets based on average consumption from 2016-2018. Dublin Airport achieved certification in 2016 under the ISO 50001 standard for its energy management systems and has implemented energy management processes to ensure this will be retained in future.

Dublin Airport has already implemented a small scale Solar PV array as part of a shift towards renewable energy generation and is currently generating 90,000KWh per annum.

As these technologies have matured it has become feasible to use lands at Dublin Airport for the development of new energy facilities, which could be of benefit to the wider Fingal region. Furthermore, with energy generating and/or storage facilities developed at the airport, the capability to offset energy import from the grid will reduce peak energy demand and associated energy consumption and costs. The ability to export to the grid and provide demand reduction services will provide further revenue generation capacity and the ability for Dublin Airport to maintain its lower cost of electricity to the campus and its tenant's.

CIP.20.07.030
Large Energy Project – Photovoltaic Farm

Project Details Summary		
Category: Other		
Primary Driver Sustainability / Regulation	**Secondary Driver** Revenue Opportunity (Opex Offset)	**Total Capex requirement** €10.0m
Underpinning Assumptions and Cost Benchmarks	• Costs assumptions based on costs for similar project within the airport campus – PV Solar supply at reservoir at Dublin Airport. • Consultation with industry specialists and collaborative partners ESB and Enernoc.	
Opex Impact	• Opex cost savings of up to €0.6m on energy per annum. • Potential future carbon tax costs. •	
Revenue Impact	• Revenue Generation of €0.13m per annum through electrical demand and capacity markets.	
Project Output	• Supply of 4.5% of Dublin Airport overall energy requirements and 9.3% of its electrical requirements. • Assist in compliance with regulatory Energy Targets applicable to daa. • Effective Energy hedge to secure long term lower price of electricity for daa and tenants of the airport campus. • Reduction in Carbon Emissions from airport operations. • Assist with compliance of Masterplan development with new Building Regulations and Near Zero Energy Buildings legislation.	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Initial Set-up:	**Q3 2020**
Planning Permission:	**Q3 2021**
Construction Commence:	**Q1 2022**
Construction complete:	**Q4 2023**

CIP.20.07.030
Large Energy Project – Photovoltaic Farm

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	6%	€633,750
Construction Costs	85%	€8,450,000
Escalation, Contingency & Design Variability	9%	€916,250
Total		**€10,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€8,450,000	8%	€633,750	€633,750
Total - to summary				**€633,750**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Supply & Installation of 1kw PV panel and ancillaries (8m2 panel)	Redacted Cost Information			
Total - to summary				**€8,450,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€9,083,750	10%	€916,250	€916,250
Total - to summary				**€916,250**

CIP.20.07.031
HBS Standard 3 - Terminal 2

Project Summary

- **This budget contains the costs associated with upgrading the Standard 2 HBS equipment in Terminal 2 to Standard 3 HBS in line with EU Regulations.**

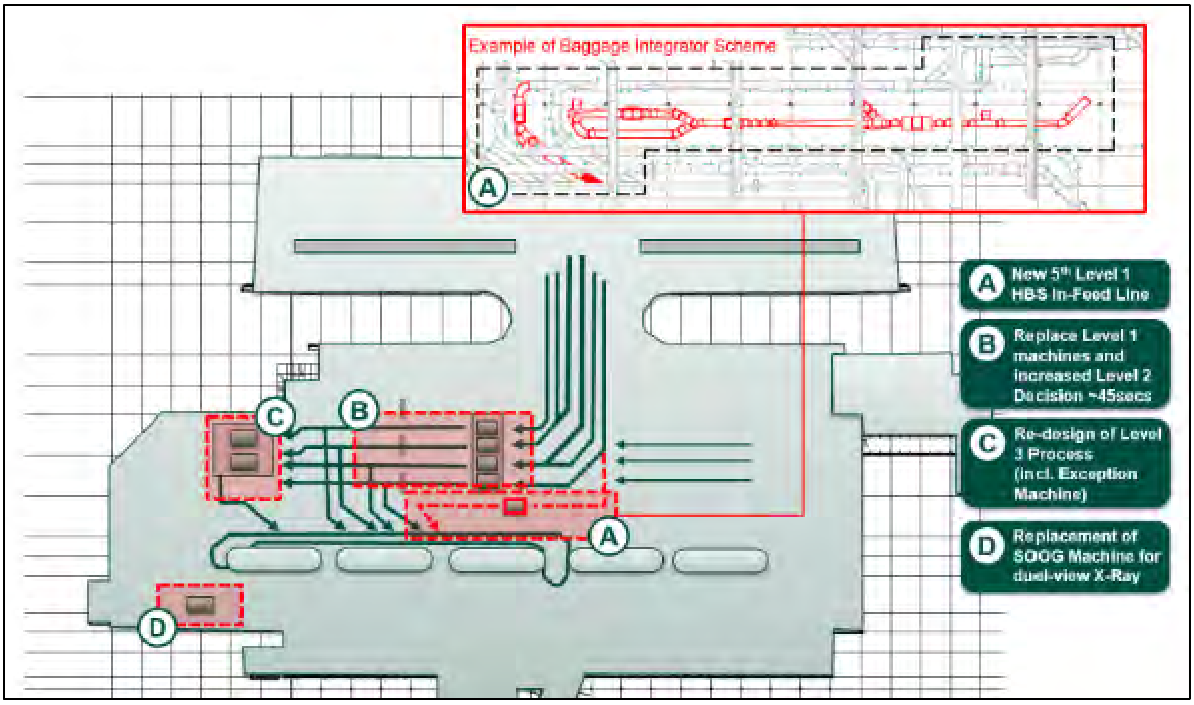
The primary driver for this upgrade is to ensure that HBS at Dublin Terminal 2 is compliant with the requirements of Commission Implementing Regulation 2015/1998.

The Regulation requires that the current Standard 2 Explosive Detection Systems (EDS), used as part of the Hold Baggage Screening (HBS) process Terminal 2 at Dublin Airport be replaced with new compliant Standard 3 EDS equipment, in line with the requirements and timelines set out in this regulation.

This Regulation stipulates that Standard 2 EDS equipment is removed from service by 1 September 2020.

While the timeline for the project is being driven by regulatory requirements, the solution implemented will be such as to future proof (capacity, structures and systems) for up to 40mppa at Dublin Airport.

An allowance for Standard 3 Upgrade to Terminal 2 was included in the current CIP 2015 to 2019, however the trigger will not be reached in the current regulatory period, so this project is being included in CIP 2019 - 2024.



CIP.20.07.031
HBS Standard 3 - Terminal 2

The existing Terminal 2 HBS (Hold Baggage Screening) system was brought into operation in November 2010 deployed with a mix of Standard 2 and Standard 3 EDS (Explosive Detection Systems). The Standard 2 EDS are due to expire on 1 September 2020 in accordance with Commission Implementing Regulation 2015/1998. In addition, the EDS screening machines currently deployed in Terminal 2 have an asset life of 10 years and will be reaching end of life in this CIP period.

The project comprises the upgrade of the existing T2 baggage systems to deploy Standard 3 EDS systems in line with the current legislative requirements. The works will involve the replacement of existing EDS screening equipment and upgrades to the existing BHS systems to incorporate the new Standard 3 EDS solution. The baggage system in T2 was designed with a certain level of flexibility to facilitate the integration of new Standard 3 EDS equipment. The baggage hall in T2 was also purpose built and has fewer physical, spatial and weight constraints than T1.

The scope of works are as follows;

- replacement of 6 Standard 2 EDS machines with 6 Standard 3 EDS machines.
- replacement of the Super Out of Gauge (SOOG) X-Ray screening machine.
- modifications to the entry and exit conveyors to ensure correct routing into machines and adequate tracking time after screening.
- modifications to the control system to accommodate the Standard 3 technology.
- re-design of the level 3 HBS area including modifications to the structural support and surrounding services.
- the installation of a fifth screening line to meet capacity demand on completion of installation. The current HBS system in T2 has 4 x level 1 screening machines (3 operational and 1 for resilience). At 35mppa, the passenger demand will require 5 x level 1 screening machines (4 operational and 1 for resilience). In addition, it is not possible to currently remove one level 1 HBS machine as 3 machines are required to manage the current passenger demand and the remaining resilience is essential to safeguard from any system failure. The fifth line is therefore also required to enable the project to be delivered.

The solution in Terminal 2 will require the phased installation to facilitate the new Standard 3 HBS screening technology and associated conveyor changes to be carried out while minimising any operational disruptions.

CIP.20.07.031
HBS Standard 3 - Terminal 2

Project Details Summary		
Category: Other		
Primary Driver Regulation	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €21.0m
Underpinning Assumptions and Cost Benchmarks	• System costs are based on pre-tender estimates collated in active procurement process. • Majority of existing BHS system to be maintained in current operational layout. • Existing HBS screening equipment to be replaced for inline Standard 3 EDS screening machines.	
Opex Impact	• Additional operating costs required for maintaining, supporting and running the Standard 3 HBS machines are €300k p.a. per terminal.	
Project Output	• Standard 3 compliant system in Terminal 2. • Re-design of the existing Baggage Handling System to accommodate Standard 3. • Replacement of 6 Standard 2 EDS machines with 6 Standard 3 EDS machines. • Replacement of the Super Out of Gauge (SOOG) X-Ray screening machine. • Modifications to the entry and exit conveyors to ensure correct routing into machines and adequate tracking time after screening. • Modifications to the control system to accommodate the Standard 3 technology. • Re-design of the level 3 HBS area including modifications to the structural support and surrounding services. • The installation of a fifth screening line to meet capacity demand on completion of installation.	
Asset Life	• 10 Years	

Project Delivery Key Milestones	
Procurement complete:	**Q4 2018**
Start on site:	**Q4 2019**
Project Handover:	**Q4 2021**

DublinAirport

CIP.20.07.031
HBS Standard 3 - Terminal 2

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	16%	€3,315,000
Construction Costs	76%	€15,885,000
Escalation, Contingency & Design Variability	9%	€1,800,000
Total		**€21,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Multi Discipline Consultant	Redacted Cost Information			
Capitalized Labour				
Minor Consultants – External				
Surveys – Site				
Total - to summary				**€3,315,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Baggage Integrator & EDS Equipment	Redacted Cost Information			
Enabling Works				
General Project Costs				
Total - to summary				**€15,885,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€9,600,000	9%	€1,800,000	€1,800,000
Total - to summary				**€1,800,000**

CIP.20.07.032
Unit Load Device Storage - Stillage

Project Summary

- **This project identifies the need for new Unit Load Device Storage at Dublin Airport.**

Unit load devices (ULDs) are used to load luggage, freight, and mail on wide-body aircraft and specific narrow-body aircraft. ULDs allows a large quantity of cargo to be bundled into a single unit. Since this leads to fewer units to load, it saves ground crews time and effort and helps prevent delayed flights.

When not in use, ULDs are parked in dedicated zones away from other apron / airfield activity but within reach of airline and ground handler agents. In recent years the space available for ULD parking has reduced significantly due to increased activity at DAP. Annual passenger numbers have grown by 50% since 2013 resulting in a significant increase in GSE including ULDs on the airfield. Over the same period, GSE parking areas have been reduced due to various construction projects (e.g. PBZ Project, Pier 1 Extension). The lack of available space will be compounded by the removal of Aircraft Park Charlie (as part of North Runway Project) and up to 7,000m3 of GSE parking in September 2019.

As a result of the above challenges, DAP and stakeholders will need to be more efficient with all available space on the airfield. The provision of stillage by DAP for use by the ground handlers and airlines is a key enabler for more efficient use of the airfield.

The following benefits will be realized by the provision of ULD Stillage:

- **Safety:** Poor weather conditions (e.g. high winds) can result in ULDs being blown around the apron causing damage to vehicles and aircraft as well as injuries to airport ground staff and passengers

- **Efficient Use of Space:** Stillage of two to three storeys high will maximise the use of existing pavement on the airside and also result in the unlocking of additional space on the airside

- **Operator Efficiency:** Stillage will have a positive impact on the operating efficiency of the airlines and ground handlers with certainty over where the ULDs should be placed or taken from before, during and after aircraft turning around operations

This project proposes:

- **The provision ULD Stillage to improve Apron utilization and improve operational safety.**

CIP.20.07.032
Unit Load Device Storage - Stillage

Project Details Summary		
Category: Other		
Primary Driver Safety / Stakeholder Requirements	**Secondary Driver** Capacity / Constraints	**Total Capex requirement** €3.0m

Underpinning Assumptions and Cost Benchmarks	• Delivery to be coordinated with other Airfield Capital Projects (e.g. Runway 10/28 Overlay Project, Apron 5H, North Runway Project, Dual Foxtrot Taxiways, Link 6, Link 3 etc.) • Night time working where agreed with operations • Multi construction phasing to minimise disruption to operations
Opex Impact	• Opex costs shall be minimal and will mainly involve preventative and reactive maintenance of the equipment – Capital and opex costs will most likely form part of a commercial lease agreement between daa and the ground handlers/airlines
Project Output	• Provision of still for Stakeholders (ground handlers and airlines) for their ULDs resulting in enhanced safety and efficiency on the airfield
Asset Life	• 15 Years

Project Delivery Key Milestones	
Provision of ULD Stillage	**2020-2024**

CIP.20.07.032
Unit Load Device Storage - Stillage

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€3,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€3,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs (Deemed included above)	€3,000,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
ULD Stillage	Redacted Cost Information			
Total - to summary				**€3,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€3,000,000	0%	€0	€0
Total - to summary				**€0**

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H ADDITIONAL PROJECTS UNDER CONSIDERATION

APPENDIX H
Additional projects under consideration

Appendix H - Additional Projects under Consideration			Page
CIP Number	**Project Title**	**Provisional Estimate €m October 2018**	
CIP.20.02.002	Second Medium Voltage (MV) Connection Point	€20.0	H-1
CIP.20.04.009	Staff Car Park	€6.0	H-4
CIP.20.04.013	Central Island Redevelopment - Corballis Park	€10.3	H-7
CIP.20.06.014	Screening and Logistics Centre	€18.9	H-10
CIP.20.03.011A	Terminal 1 Check-In (Partial shoreline)	€29.9	H-14
CIP.20.03.016	Terminal 1 - Rapid Exit Arrivals	€1.3	H-17
CIP.20.03.019	Terminal 1 - 6 bay Sorter Replacement	€9.4	H-20
CIP20.03.020A	Terminal 2 Check-in Extension - Expand existing footprint	€30.0	H-23
CIP.20.03.022	Terminal 2 International Departures Lounge - Level 35 Reoptimisation	€13.4	H-26
CIP.20.03.024	Terminal 2 Immigration Hall - Reorientation	€2.5	H-29
CIP.20.03.033	Enablement of Pier 3 for Precleared US bound passengers	€49.4	H-32
CIP.20.03.036A	North Apron Development – Pier 1 Extension (Module 2)	€97.7	H-36
CIP.20.03.043	Pier 1 Fixed Links and Airbridges	€14.0	H-40
CIP.20.03.043A	Pier 2 Widebody Enablement & Airbridge Install	€51.7	H-44
CIP.20.03.043B	Pier 2 Wide Body Enablement – Pier Extension	€196.8	H-47
CIP.20.03.045	New West Satellite Pier incl. Airfield	€351.0	H-50
CIP.20.03.047	New Taxiway W	€30.3	H-54
CIP.20.03.048	Rapid Exit Taxiway RWY 10/28	€7.5	H-58
CIP.20.03.049	De-icing pad at Runway 10R	€5.0	H-61
CIP.20.03.051	West Apron Vehicle Underpass - 5G Option	€79.0	H-64
CIP.20.03.055	Engine test facility (Code E)	€10.0	H-68
CIP.20.03.070	Terminal 2 CBP Make-up and Baggage Hall entrance	€1.0	H-71
CIP.20.03.071	Fuel Line - Pier 3	€10.4	H-74
TOTAL		**€1,045**	

CIP.20.02.002
Second Medium Voltage (MV) Connection Point

Project Summary

- **This project proposes that a second electrical supply point be provided at Dublin Airport to protect the entire airport campus from the risk of a single-point failure at the current electrical connection point at Dardisdown Substation.**

Electricity is supplied to Dublin Airport via a dual 110kV supply from ESB Networks. The two supplies come from Finglas and Kilmore, over diverse underground routes. The two supplies enter the airport at the main airport 110kV/10kV substation known as Dardistown Substation. A dual supply at 110kV is generally considered secure and dependable but both incoming supplies connect to the Dublin Airport network at the same point in Dardistown, this represents a single point of failure. Although a single point of failure event is unlikely (e.g. catastrophic fire or explosion, aircraft incident or terrorist attack) the operational impact would be significant. The recovery time from a single point failure is likely to be greater than 1 month. This project will provide a second 110kV substation in a location a significant distance away from the existing single Dublin Airport electricity connection point at Dardistown 110kV substation

Can existing generators maintain the operation?

While on-site standby generators would keep the airfield and some terminal operations functioning, several of the terminal services would not be operational, nor would campus infrastructure such as car parks and campus buildings. Overall, it would not be possible to continue with normal airport operations. Note: Existing standby generators are designed to keep the airport operational in the event of a short power interruption, this is typically not more than for a two-hour outage.

How many connection points do other Airport have?

In the UK and Europe, the provision of more than one connection point to critical industries is common to ensure business continuity assurance. In the case of airports, Heathrow, Gatwick and Bournemouth airports have two electricity connection points.

CIP.20.02.002
Second Medium Voltage (MV) Connection Point

Project Details Summary		
Category: MV Network		
Primary Driver Operational Efficiency	**Secondary Driver** Safety	**Total Capex requirement** €20m
Underpinning Assumptions and Cost Benchmarks	• Costs based on consultation with MV specialists.	
Opex Impacts	• The increased annual maintenance costs for the additional 110Kv Substation is approx. €15k. • Depending on where the second connection point is fed from, extra annual MIC charges of up to €400k could apply. • Additional energy costs of €0.1m.	
Project Output	• Substation building. • Transformers, switchgear, cabling and SCADA. • Security fencing, fire alarm and CCTV.	
Asset Life	• 25 Years	

Project Delivery Key Milestones	
Second Medium Voltage (MV) Connection Point	**Q1 2022**

CIP.20.02.002
Second Medium Voltage (MV) Connection Point

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	0%	€0
Construction Costs	100%	€20,000,000
Escalation, Contingency & Design Variability	0%	€0
Total		**€20,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General allowance- Design & Management Costs (Deemed included below)	€20,000,000	0%	€0	€0
Total-to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Elect Mains & Sub Mains Distribution	Redacted Cost Information			
Total-to summary				**€20,000,000**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€20,000,000	0%	€0	€0
Total-to summary				**€0**

CIP.20.04.009
Staff Car Park

Project Summary

- **This project entails the consolidation of staff car parking at Dublin Airport.**

Staff car parks are currently full to capacity and fragmented around the campus. Over the period of the next CIP, Dublin Airport (DAP) and DAC developments will replace staff car parks inside the central campus (c1000 spaces). These need to be replaced as well as allow for growth in demand due to increased staff numbers.

Current Status:
Staff car parks marked in purple

Future Status:
Additional staff parking (LT Green car park)
Additional Public Parking in Eastland's (2000)

To replace the existing staff parking and also facilitate the growth in staff DAP will need increased staff parking capacity. This can be achieved by dedicating the existing Public LT Green car park to staff car parking.

The green car park is a purpose-built car park. This well positioned location (from staff perspective) coupled with a high frequency bus connectivity to terminals 1 & 2 will allow DAP to consolidate most staff car parking to one location (existing Public LT Green) and transport staff to desired location in a timely manner. It should be noted that the unfulfilled demand for parking will be required to change modal split (potential limiting for all companies) or be accommodated within a public car park during off peak.

The public parking displaced by repurposing the existing Public LT Green will be replaced and linked into existing red car park. This will not require additional entry/exits and minimal additional bussing resulting in an efficient use of space. The new space in the existing LT red car park will be built to a similar specification

CIP.20.04.009
Staff Car Park

of the express red car park (porous surface, lighting, signage etc.).
This investment will not deliver a return but should be considered in the context of capacity development. Adding capacity of similar quality to express red car park will allow DAP to:

- Facilitate airport expansion
- Offer a consistent product and service to the majority of airport users
- Improve the employee experience

Project Details Summary		
Category: Other		
Primary Driver Capacity	**Secondary Driver** Employee wellbeing	**Total Capex requirement** €6.0m
Underpinning Assumptions and Cost Benchmarks	• High level costs assumed • Planning costs and rates need to be verified	
Opex Impacts	• The increased annual maintenance costs for the additional 110Kv Substation is approx. €15k. • Depending on where the second connection point is fed from, extra annual MIC charges of up to €400k could apply. • Additional energy costs of €0.1m.	
Project Output	• 3000 spaces on driving range site, of similar standard to express red car park, complete with real time bus information, entry/exit equipment. • Upgrade LT green car park for staff and build out more public capacity to replace in Eastland's (2400 spaces).	
Asset Life	• 25 Years	

Project Delivery Key Milestones	
Planning complete:	**Q4 2019**
Detail Design complete:	**Q4 2019**
Procurement complete:	**Q1 2020**
Construction Commence:	**Q2 2020**
Project Handover:	**Q2 2021**

CIP.20.04.009
Staff Car Park

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€577,201
Construction Costs	77%	€4,617,605
Escalation, Contingency & Design Variability	13%	€805,195
Total		**€6,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€4,617,605	13%	€577,201	€577,201
Total - to summary				**€577,201**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Car Park Spaces	Redacted Cost Information			
Main Contractor Prelims				
Other Development Costs				
Total - to summary				**€4,617,605**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€5,194,805	16%	€805,195	€805,195
Total - to summary				**€805,195**

DublinAirport

CIP.20.04.013
Central Island Redevelopment – Corballis Park

Project Summary

- **This project identifies the benefits of redeveloping facilities at Central Island Corballis Park.**

Central Island in Corballis park is made up of five small buildings (some with more than one tenant) representing a total of 1,226 sqm. The buildings include International House, Universal House, the SIPTU building, IALPA house, WFS House, Medical House and Universal House. Many of these buildings are considered not to tenant specification / standard and at end of their asset life.

Development space at the airport is limited and Central Island in Corballis Park creates an opportunity to accommodate future demand and grow revenues. As almost all Commercial Property at Dublin Airport is fully occupied, there is high demand for both office and contractor accommodation.

Rather than refurbishing the existing buildings, the preferred option would be to demolish the existing units and build purpose-built office and contractor accommodation. A feasibility study followed by full design of the existing area is required to maximise on the footprint of approx. 5,800 sqm. Demand to date has been for additional cargo and office space and accommodate for short term letting.

This project recommends;

- **Focusing on mainly office space as there is a higher revenue return and meets current demand and future expectations**

Estimated cost for office accommodation in Central Island is as follows;

- **Demolition for all options in Corballis Park**
- **2885 sqm office accommodation**
- **This cost accounts for accounts for demolition, construction costs, design & management fees and contingency.**

DublinAirport

CIP.20.04.013
Central Island Redevelopment - Corballis Park

Project Details Summary		
Category: Property		
Primary Driver Revenue	**Secondary Driver** Capacity Development	**Total Capex requirement** €10.3m
Underpinning Assumptions and Cost Benchmarks	• 500-1,500sqm to be refurbished annually at a cost of €2,000 per sqm.	
Opex Impacts	• N/A	
Normalised Revenue Impact	• €1m p.a.	
Project Output	• Development of quality, fit for purpose tenant accommodation that maximises the footprint of an under-utilised area.	
Asset Life	• 25 years	
IRR	• 10%	
Payback period	• 10 years	
NPV	• €5.9m	

Project Delivery Key Milestones	
Procurement complete:	**Q1 2021**
Construction Commence:	**Q2 2021**
Construction complete	**Q1 2022**
Project Handover:	**Q1 2022**

CIP.20.04.013
Central Island Redevelopment - Corballis Park

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	10%	€1,035,413
Construction Costs	67%	€6,902,750
Escalation, Contingency & Design Variability	23%	€2,319,055
Total		**€10,257,217**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management	€6,902,750	15%	€1,035,413	€1,035,413
Total-to summary				**€1,035,413**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Demolition of existing	Redacted Cost Information			
Office building Allowance				
Total-to summary				**€6,902,750**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€7,938,163	29%	€2,319,054	€2,319,054
Total-to summary				**€2,319,055**

CIP.20.06.014
Screening & Logistics Centre

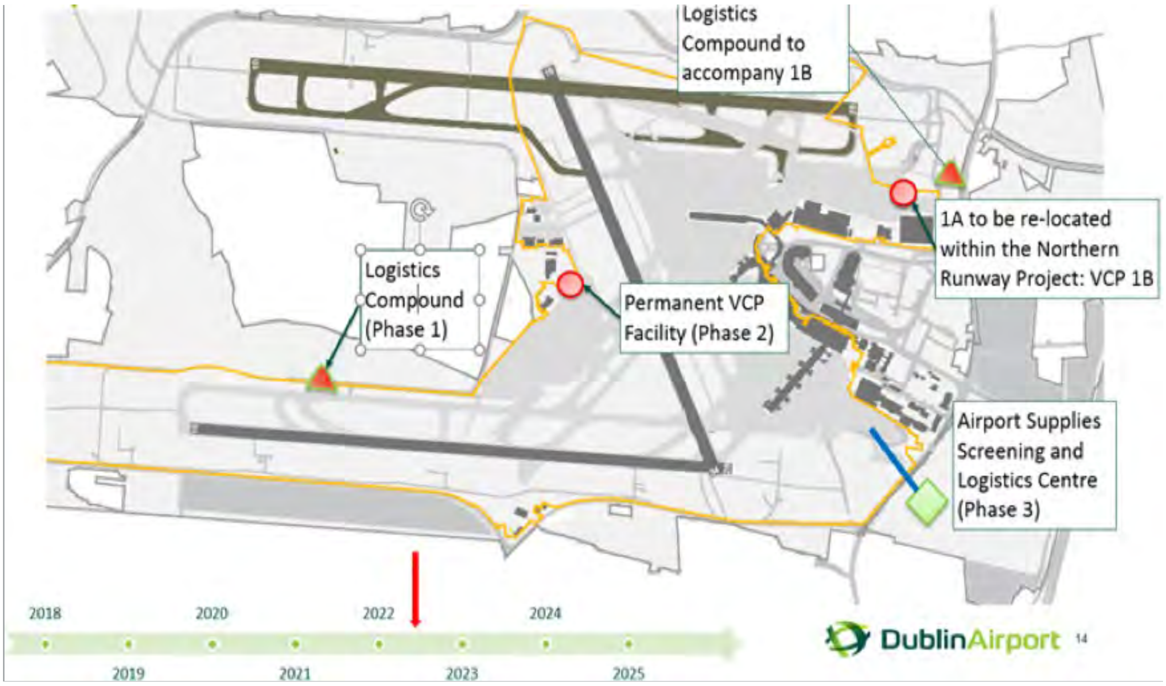
Project Summary

- **This project proposes the development of a new Consolidated Screening and Logistics Centre at Dublin Airport.**

The present approach to screening of airport supplies and examination of vehicles going airside is conducted at Vehicle Control Posts (VCPs) dispersed at 4 different locations throughout the airport campus (i.e. Gates 1A, 4, 9 and 32).

This project proposes a significant change in operations methodology to optimise the operation of the vehicle control posts. This will comprise of three key elements in a dedicated facility as follows:

- **Airport supplies screening centre (ASSC): delivering a central point for screening all airport supplies on a pre-booked basis, ensuring all vehicles presenting to the gateposts are processed in the same way.**
- **Logistics centre: providing a facility where goods can be stored in advance of screening and subsequently scheduled for delivery to the CPSRA on vehicles which are optimally loaded, reducing the numbers of vehicles required to present at the gateposts.**
- **A facility to provide safe, discrete and secure processing of passengers in Garda custody, their items carried and where appropriate their escorts (along with their items carried), away from the environs of the main gateposts.**



CIP.20.06.014
Screening & Logistics Centre

The project proposes to be implemented over three phases:

- **Phase 1 - Modifications to VCP 9 and VCP 11. Introduce a Logistics Compound.**
- **Introduction of an on-line Delivery Booking System for all deliveries.**
- **Phase 2 – Construction of permanent VCP 9 facility and decommissioning of VCP 11 and Fire Station entry post.**
- **Phase 3 – Construction of Consolidation Centre with dedicated bridge access into the bond road.**

Project Benefits:

The following section outlines several of the benefits of providing a consolidated Screening & Logistic Centre at Dublin Airport.

Compliance and Operations benefits

- **Providing a consistent, optimised approach to the screening of airport supplies and the examination of vehicles.**
- **Reducing the number of suppliers entering the CPSRA by 33% over the course of the next CIP.**
- **Increase substantially the level of reporting and data available to Dublin Airport regarding airport supplies delivered (assist with forecast/predictive traffic analysis)**
- **Potential reduction of the number of VCPs required on a given day/night.**
- **Reduction in the requirement for ASU personnel in construction activities.**
- **The ability to implement scheduling of vendor delivery slots (ease existing congestion)**

Financial benefits

- **Potential for reduction in infrastructure project costs due to increased efficiency of contractors' labour resources.**
- **Given the reduced number of vehicles entering the CPSRA there will be a consequent reduction in the resource requirements leading to a reduction in lower OPEX spend for this function.**
- **Re-use of material on projects. The Consolidation Centre will remove excess materials from projects and store for a given duration to cover any variations/rework. This will reduce the opportunity for damage caused to materials whilst being stored in a live working environment.**
- **Potential for revenue generated by office/welfare support to construction companies.**
- **Reduced requirement to provide expensive escorts.**

Construction project benefits

- **Greater delivery reliability for construction projects.**
- **Potential to provide Contractor offsite parking.**
- **Part used/excess construction materials can be removed from site for re-use or disposal.**
- **Reduction in construction vehicular movements on ramp by 30%.(re Wilson James Report 18th Jan 18).**
- **Co-ordinated approach with airport operations and security with respect to deliveries. (reducing wear and tear on the ramps/roads.)**
- **First step to commence pre-assembly/off site construction for projects**

CIP.20.06.014
Screening & Logistics Centre

Project Details Summary		
Category: Plant and Equipment		
Primary Driver Regulatory	**Secondary Driver** End of Life	**Total Capex requirement** €18.9m
Underpinning Assumptions and Cost Benchmarks	• 4 vehicle bays, 2 staff screening areas, 2 offices and 1 canteen • Service is outsourced • Site location variances not included • IAA will approve project • Planning permission will be granted	
Opex Impacts	• Increase in system support costs annually from 2023. Provision of consolidated screening and logistics centre will reduce Opex at other gateposts	
Project Output	• Building and fit-out of new Airport Supplies Screening and Logistics Centre • New outsourced service provided	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility / requirements complete:	**Q1 2020**
Planning complete:	**Q1 2020**
Detail Design complete:	**Q1 2020**
Procurement complete:	**Q2 2020**
Development commenced:	**Q2 2020**
Development complete	**Q2 2022**
Project Handover:	**Q2 2022**

CIP.20.06.014
Screening & Logistics Centre

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	9%	€1,646,000
Construction Costs	69%	€12,960,884
Escalation, Contingency & Design Variability	23%	€4,267,255
Total		**€18,874,138**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
General Design & Management on construction, prelims and design development	€12,960,884	13%	€1,646,000	€1,646,000
Total-to summary				**€1,646,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Excavation	Redacted Cost Information			
Base				
Frame				
Façade, Roof, Services & Drainage				
Access Road				
Superstructure				
External Works				
Equipment				
Main Contractor Preliminaries				
Other Development Costs				
Total-to summary				**€12,960,884**
Escalation, Contingency & Design Variability	**Value**	**%**	**Total**	**Total**
Escalation, Contingency & Design Variability	€14,606,883	29%	€4,267,255	€4,267,255
Total-to summary				**€4,267,255**

CIP.20.03.011A
Terminal 1 Check-In (Partial shoreline)

Project Summary

- *Dublin Airport proposes the redesign of the check-in hall to provide new check-in capacity, and modifications to the reconfigured circulation areas. In this option check in capacity is provided through the development of a shoreline check-in facility.*

With anticipated growth in passenger numbers, as well as the increasing number of airlines operating at the Airport, the existing check-in provision will not meet anticipated demand.

Increased demand drives the requirement for more check-in positions, self-service kiosks (SSK's), and bag drop points and queueing areas. An increase in the number of passengers transiting through to the central search area also requires improved circulation areas within the hall.

This project falls within the Terminal 1 development and is driven by the following:

- *Check-in demand requirements hall requirements*
- *SSK and bag drop requirements*
- *Circulation areas to service increase passenger numbers and desks, SSK's and bag drop positions*

This project proposes the reinstatement of a check-in island 1, (Area 1 and 2). The project provides a single island configuration with new check-in desks and additional SSK's throughout the hall. It also allows for the optional modification of entrance lobbies to increase circulation space within the hall.
A total of five Airline counters and offices will be located to the front of the six SSK's locations and will provide assistance to departing passengers.

In addition, it reconfigures the right-hand side of the fall to a shoreline configuration. This configuration allows for improved circulation and flexibility of check in operations. Given the reduced number of desks it requires a greater up take in the use of SSK's than the alternate island configuration.

Located behind the proposed seven island check-in desks additional space will be allocated for Landside food and beverage opportunities.

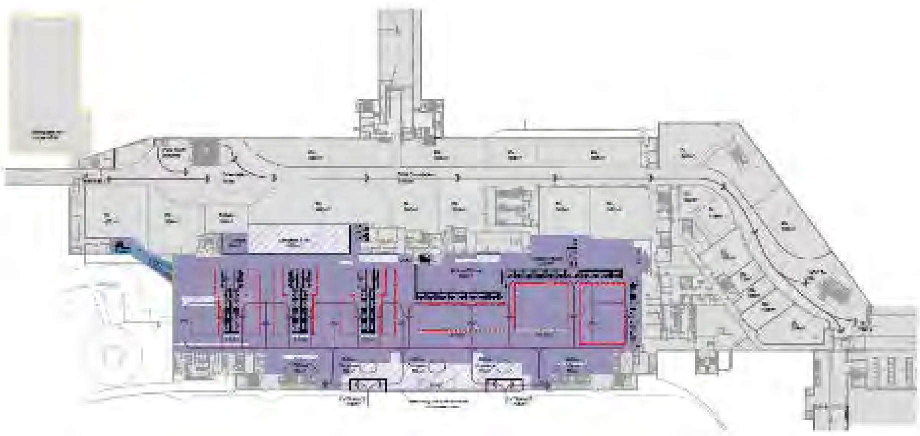


Exhibit 1. Proposed layout of check in hall in Terminal 1

The forecourt will be moved out to align with the terminal's façade and provides additional space around the entrance lobbies.

CIP.20.03.011A
Terminal 1 Check-In (Partial shoreline)

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €29.9m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Provision of additional check-in processing capacity • Greater uptake in SSK to accommodate demand • Create better access, wayfinding and improve passenger flows within the Check-In facility • Existing security to be relocated to mezzanine level Cost assumptions: • Flooring to be made good • Minor allowance included for existing check in area and existing check in island counters to cover maintenance/very light touch refurbishment • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• Increase of €0.3m p.a. for servicing of additional check-in desks.	
Project Output	• Check-In Island Area 1-2 reinstated, adding 20 new positions • New Shoreline configuration to right hand side of hall, to create better passenger movement and queuing space • SSK's provided at front of shoreline configuration • New Landside Food and beverage at check-in level • Airline back of house Offices located to rear of shoreline configuration • Airline/ Ticketing Offices kiosks provided to front of concourse • Entrance Lobbies pulled forward to align with T1 façade	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q3 2021**
Construction commence	**Q3 2021**
Construction complete	**Q2 2023**
Project handover	**Q2 2023**

CIP.20.03.011A
Terminal 1 Check-In (Partial shoreline)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€3,760,000**
Construction Costs	**63%**	**€18,750,000**
Escalation, Contingency & Design Variability	**25%**	**€7,380,000**
Total Installed Cost (TIC)	**100%**	**€29,890,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€18,750,000	20%	€3,750,803	€3,750,803
Total - to summary				**€3,760,000**
Construction Costs	Redacted Cost Information			
Refurbishment / Relocations				
Check-in, SSK's & Airline Desks				
Baggage Modifications				
Total - to summary				**€18,750,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€7,387,206	€7,387,206
Total - to summary				**€7,380,000**

CIP.20.03.016
Terminal 1 - Rapid Exit Arrivals

Project Summary

- *Dublin Airport proposes the construction of a new Rapid Exit for passengers with carryon only luggage*

At present arriving passengers exit into the arrivals area via the existing baggage reclaim hall. As passenger numbers grow, the existing baggage hall will meet the demand for circulation space requirements. A rapid exit point is proposed to relieve the growing circulation pressure.

All arriving passengers transit through the baggage hall at present. This includes passengers with carry-on only luggage and those with checked-in luggage. It is proposed to split these passenger types into two separate streams, by offering the carry-on luggage passengers the Rapid Exit option to bypass the baggage hall entirely and exit directly to the kerb. This thereby reduces the passengers' journey times, improves arriving passengers' experiences, while also reducing baggage hall congestion. The

project drivers are:

- *Provide a requested "Rapid Exit" to reduce the length of the exiting passengers' journey and improve the arriving passengers' experience*
- *Alleviation of congestion at the baggage reclaim hall circulation areas*

This project proposes an alternative access to the kerb for arriving passengers located at the entrance of the baggage reclaim hall. This new corridor will allow passengers to exit the terminal, after passing T1 Immigration Hall and before entering the baggage reclaim hall itself.

The corridor will be fitted out with customs facilities and "no return" doors. The space will be shared with the trolley return corridor.

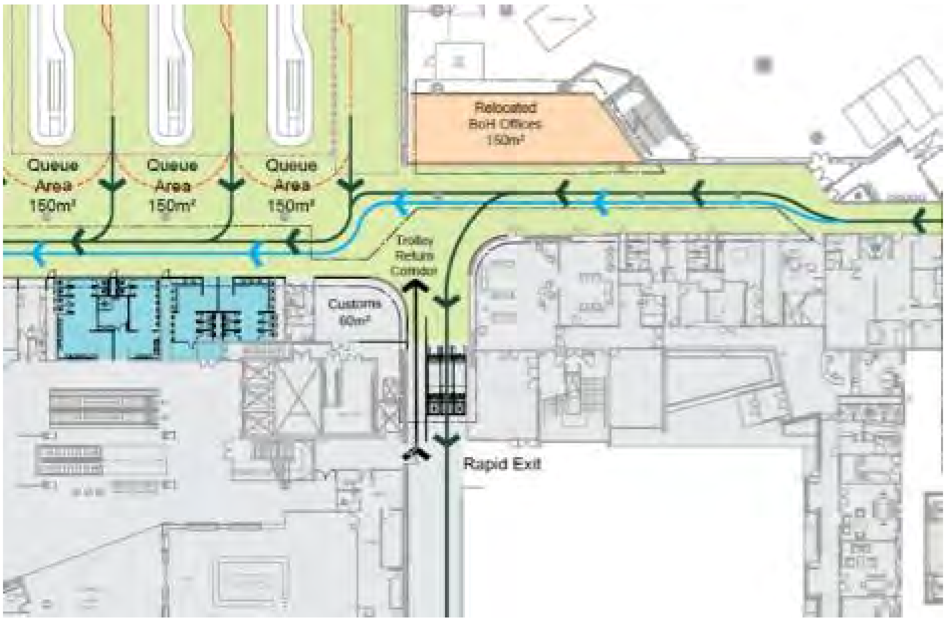


Exhibit 1. Proposed Rapid Exit at Terminal 1 Baggage reclaim hall

CIP.20.03.016
Terminal 1 - Rapid Exit Arrivals

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** User request	**Total Capex requirement** €1.25m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Internal areas around reclaim Hall to be relocated/ refurbished to improve circulation in Arrival Hall • Provision of a 'Rapid Exit' facility for passengers who do not need to collect bags • Minimise impact on Platinum Lounge as far as possible • Customs product redefinition to include for rapid exit Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• N/A	
Project Output	• Exit corridor from Immigration Hall to improve passenger circulation towards forecourt • Rapid Exit provided prior to entry into Reclaim Hall, providing route through to the Car Park • New Customs Checkpoint and Back of House Office provided at Rapid Exit • New anti-backtrack doors at Rapid Exit • Provides smoother passenger movement and better wayfinding	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q3 2021**
Construction commence	**Q3 2021**
Construction complete	**Q2 2023**
Project handover	**Q2 2023**

CIP.20.03.016
Terminal 1 - Rapid Exit Arrivals

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€160,000**
Construction Costs	**62%**	**€780,000**
Escalation, Contingency & Design Variability	**25%**	**€310,000**
Total Installed Cost (TIC)	**100%**	**€1,250,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€780,000	20%	€156,975	€156,975
Total - to summary				**€160,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Refurbishment / Relocations	Redacted Cost Information			
Anti-Passback Doors				
Total - to summary				**€780,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€309,162	€309,162
Total - to summary				**€310,000**

CIP.20.03.019
Terminal 1 – Design of a 6 Bay Sorter

Project Summary

- *Dublin Airport proposes to undertake a design of the Baggage Handling Sorter at Terminal 1*

The T1 Baggage Handling System is undergoing significant changes to accommodate the HBS Standard 3 equipment and this will renew the 'end of life' T1 Sorter. The existing sorter's design life has been extended due to regular ongoing preventative maintenance with major overhauls. The extending of the system's life is becoming difficult as replacement parts are becoming obsolete and more difficult to source. The new replacement will improve future baggage handling system capacity and improve customer service. Once renewed, the end of life will be extended to 2025.

The proposed project seeks funding for the design related costs of a new sorter which will replace the asset once it reaches its estimated end of life in 2025. This project does not plan on replacing the sorter in this CIP period. However, to replace this asset when it reaches the end of asset life in 2025, daa will need to procure baggage integrators and consultants to prepare the design and tender in this CIP period.

Exhibit 1. Baggage bay sorter

Construction works will be phased and aligned with other T1 projects in the 2025-2029 CIP period.

CIP.20.03.019
Terminal 1 – Design of a 6 Bay Sorter

Project Details Summary		
Category: Capacity Development		
Primary Driver End of asset life	**Secondary Driver** Operational efficiency	**Total Capex requirement** €9.4m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) • Excludes installation of the baggage sorter system	
Opex Impacts	• N/A	
Project Output	• Full detailed design of a new baggage sorter system	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q1 2023**
Planning complete	**Q1 2024**
Procurement complete	**Q4 2023**
Detailed design complete	**Q4 2024**
Project handover	**Q4 2024**

CIP.20.03.019
Terminal 1 – Design of a 6 Bay Sorter

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**0%**	**€0**
Construction Costs	**100%**	**€9,400,000**
Escalation, Contingency & Design Variability	**0%**	**€0**
Total Installed Cost (TIC)	**100%**	**€9,400,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€9,400,000	0%	€0	€0
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Design of 6-Bay Sorter	Redacted Cost Information			
Total - to summary				**€9,400,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€0	€0
Total - to summary				**€0**

CIP.20.03.020A
Terminal 2 Check-In Area Extension – Expand existing footprint

Project Summary

- *Dublin Airport proposes the extension of the Terminal 2 check-in hall*

In the last five years, T2's check-in area passenger footfall has increased, and the airport has facilitated this increased demand through technology upgrades, known as the "CUSS" project. Phase 3 of this project, is now being implemented. While technology has led to an increased operational efficiency through quicker processing, anticipated future passenger growth, driven by Pier 5 development (CIP.20.03.029), now requires more physical infrastructure in the form of check-in positions, bag drops and Self-Service Kiosks (SSK's) to meet this increasing passenger throughput.
This option assumes that there continues to be demand for traditional check-in desks and that use of SSKs is in line with current practice.

This project falls under the Terminal 2 development and is driven by:

- *The requirement to accommodate additional check-in positions and SSK's.*

This project delivers a redesigned check-in hall area, with additional check in desks, self-service kiosks and new bag drop/check-in desks. Access to the extended Central Search Area (CIP.20.03.021) will remain the same.

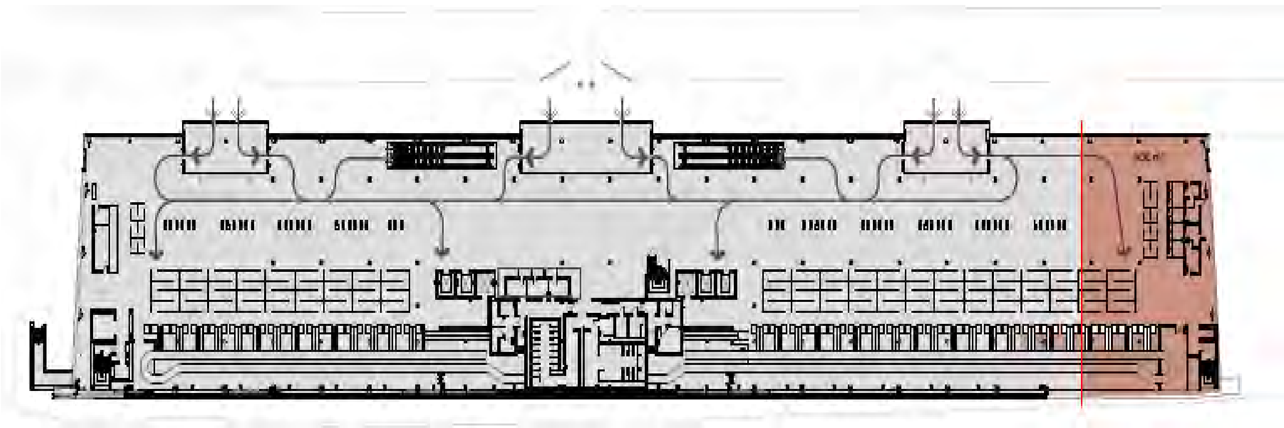


Exhibit 1. New Terminal 2 check-in proposed layout

CIP.20.03.020A
Terminal 2 Check-In Area Extension – Expand existing footprint

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €30m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) Cost Exclusions: (refer to general cost exclusions) • Allowance for acceleration, premium working time, bonuses and the like • All costs by asset care and commercial concession fit-outs are excluded from this estimate	
Opex Impacts	• N/A	
Project Output	• 670msq full height extension to T2 Check-in (12 desks)	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q1 2022**
Procurement complete	**Q2 2023**
Construction commence	**Q2 2022**
Construction complete	**Q1 2024**
Project handover	**Q1 2024**

CIP.20.03.020A
Terminal 2 Check-In Area Extension – Expand existing footprint

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€3,780,000**
Construction Costs	**63%**	**€18,900,000**
Escalation, Contingency & Design Variability	**25%**	**€7,450,000**
Total Installed Cost (TIC)	**100%**	**€30,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€18,900,000.00	20%	€3,780,000	€3,780,000
Total - to summary				**€3,780,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Substructure				
Superstructure - Frame				
Superstructure - Others				
Internal Finishes				
Fitting /Furnishings & Equipment				
Services				
External Works				
Main Contractors Preliminaries				
Total - to summary				**€18,900,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€7,444,710	€7,444,710
Total - to summary				**€7,450,000**

CIP.20.03.022
Terminal 2 International Departures Lounge – Level 35 Reoptimisation

Project Summary

- *Dublin Airport proposes the expansion of the Departures Lounge at Terminal2*

The passenger numbers using Terminal 2 (T2) are expected to grow during this CIP period, in particular this growth is driven by the delivery of the South Apron Pier 5 (CIP.20.03.029), in the latter half of this CIP period.

While it is anticipated that the terminal, with piers, will have adequate capacity to accommodate this growth there may be a requirement to develop of additional passenger holding capacity for passengers dwelling in the departures lounge. This is being presented for consultation as an optional project.

This project falls under the Terminal 2 development and is driven by:

- *Provision of additional passenger area for passengers dwelling in the departures lounge*
- *Enhance passenger experience at Terminal 2*

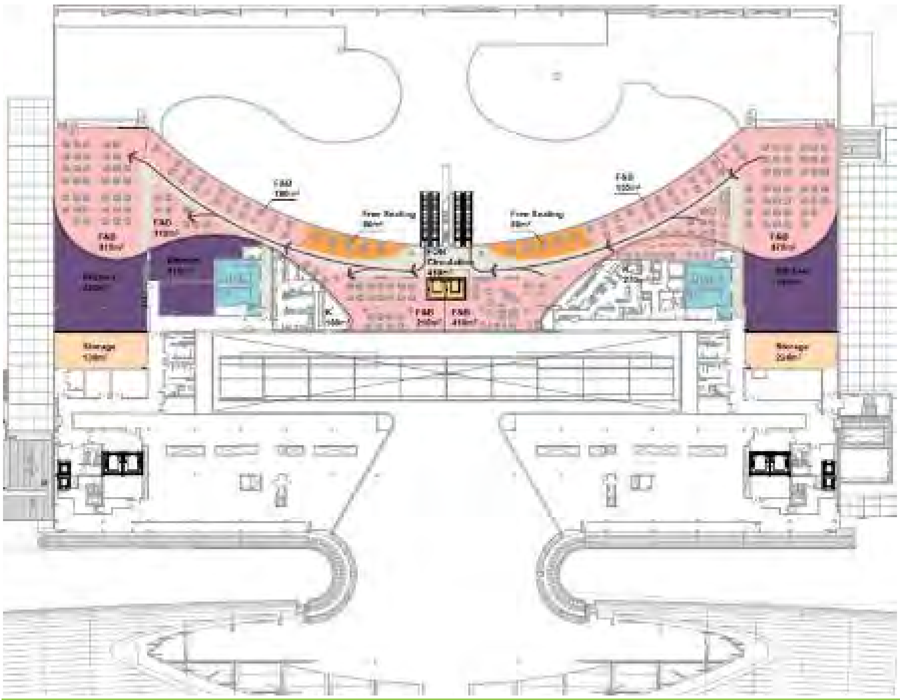


Exhibit 1. Proposed limited IDL expansion within existing building footprint to the sides of level 4

It is proposed to concentrate the expansion to level 35 of the terminal, (the existing food court mezzanine), by expanding into the existing free areas to the sides of the terminal. Construction works will be phased and aligned with other T2 projects.

DublinAirport

CIP.20.03.022
Terminal 2 International Departures Lounge – Level 35 Reoptimisation

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Development	**Secondary Driver** Business Volume Growth	**Total Capex requirement** €13.4m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Escalation is included to mid-point of construction and is based on a rate of 6% per annum Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• N/A	
Project Output	• Additional free seating areas in Terminal 2 IDL Level 35 • Commercial offering opportunities at Terminal 2 IDL Level 35	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q1 2022**
Procurement complete	**Q2 2023**
Construction commence	**Q2 2022**
Construction complete	**Q1 2024**
Project handover	**Q1 2024**

CIP.20.03.022
Terminal 2 International Departures Lounge – Level 35 Reoptimisation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,680,000**
Construction Costs	**63%**	**€8,400,000**
Escalation, Contingency & Design Variability	**25%**	**€3,310,000**
Total Installed Cost (TIC)	**100%**	**€13,390,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€8,400,000.00	20%	€1,680,336	€1,680,336
Total - to summary				**€1,680,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Structural Works	Redacted Cost Information			
Refurbishment Works				
Maintenance Works				
Total - to summary				**€8,400,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€3,309,422	€3,309,422
Total - to summary				**€3,310,000**

CIP.20.03.024
Terminal 2 Immigration Hall - Reorientation

Project Summary

- *Dublin airport proposes immigration hall be reconfigured to facilitate the South Apron's development*

With the addition of Pier 5, the current immigration requires minor reconfigure to accommodate passenger flows from the Piers which will now approach the immigration hall from different directions.

This project design drivers are to allow:

- *To connect Pier 5's new arrivals corridor to the immigration hall and transfer facility*

This project reconfigures the immigration hall to provide direct access to and from Pier 5. Queueing areas are further separated from the circulation corridors to allow better crossflows of passengers arriving from Pier 4, Pier 5 and transfer routes.

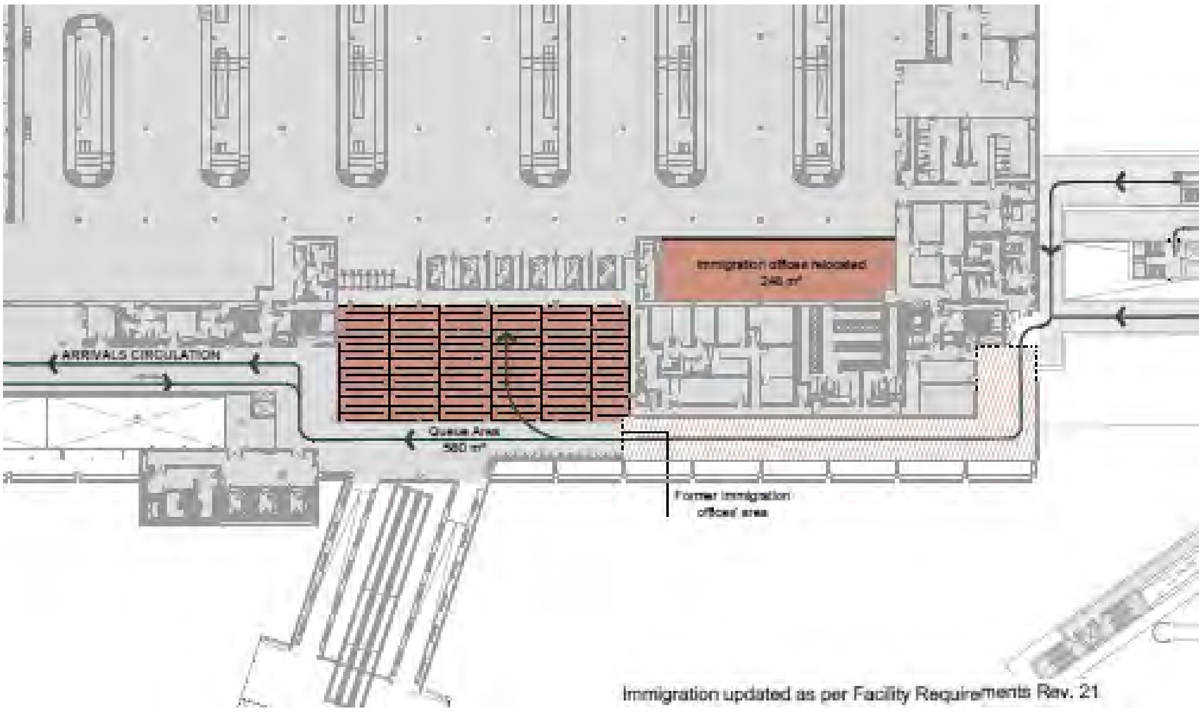


Exhibit 1. Proposed layout for immigration facilities at Terminal 2.

CIP.20.03.024
Terminal 2 Immigration Hall - Reorientation

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity	**Secondary Driver** Business Volume Growth	**Total Capex requirement** €2.5m
Underpinning Assumptions and Cost Benchmarks	Design assumptions • Relocation of offices to new areas is achievable • New Pier 5 is built according to the concept design Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• No significant impacts on Opex	
Project Output	• Relocation of security offices • Enhanced circulation areas and access points from piers	
Asset Life	• 10 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q1 2022**
Procurement complete	**Q1 2022**
Construction commence	**Q1 2022**
Construction complete	**Q1 2024**
Project handover	**Q1 2024**

CIP.20.03.024
Terminal 2 Immigration Hall - Reorientation

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**12%**	**€310,000**
Construction Costs	**63%**	**€1,570,000**
Escalation, Contingency & Design Variability	**25%**	**€620,000**
Total Installed Cost (TIC)	**100%**	**€2,500,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€1,570,000.00	20%	€314,874	€314,874
Total - to summary				**€310,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation and Demolition Works	Redacted Cost Information			
Refurbishment & Fitout Works				
Total - to summary				**€1,570,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€620,144	€620,144
Total - to summary				**€620,000**

DublinAirport

CIP.20.03.033
Enablement of Pier 3 for Pre-Clearance US Bound Passengers

Project Summary

- *Dublin airport proposes the phased development of Pier 3, inclusive of reconfiguration to accommodate precleared passengers, a new one-way fixed corridor to Pier 4 and apron upgrades*

As a result of increased number and frequency of new long-haul routes, and long-haul routes to the US; it is anticipated that there will, over the course of the forth coming CIP period, be continued growth in demand for enabled Wide Body stands, with the capacity to accommodate Precleared US bound passengers.

This demand is driven by Ireland's strategic position as a connecting node between USA and Europe, and further leverages Dublin's position of being the only European capital with US preclearance.
This is reflective of the National Aviation Strategy's policy position of developing Dublin Airport as a secondary hub European airport.

As part of the wider South Apron Development, Pier 5 addresses this demand through the provision of 4 wide body contact stands. However, the rate of wide body stand demand may exceed the southern apron's capacity, thus requiring further wide body capacity elsewhere. Pier 3, given its location with respect to the US Preclearance facility, also has wide body capacity and could address this capacity shortfall, by facilitating departures for US bound flights.

It also has the capacity at some future date to be made enabled as a satellite for US Preclearance activities. This project is being advanced as an alternate option to bussing to a sterile area in pier 3 for consultation.

Pier 3 and its associated apron could be developed in phases, (a more detailed description is provided in chapter 7 in relation to technology development and the need to maintain flexibility in relation to US-preclearance):

1. **In order to facilitate the use of Pier 3 by wide body aircraft, it is necessary to rehabilitate several sections of apron / stand around the existing pier which have become dilapidated. This will include associated works to AGL, services, line marking and other airfield infrastructure items. (€8m)**

2. **US precleared passengers being initially bused directly to plane, from Piers 4 or 5. This option could also provide for the use of the pier in dedicated precleared mode. This phase would be served by buses from Piers 4 or 5. (€4.9m)**

3. **Pier 3 reconfiguration at departures level to create a sterile area to enable simultaneous precleared and non-precleared operations by providing new flexible gates. The designs would include new individual toilet blocks to accommodate the swing operation. This proposal of swingable gates allows size and operational flexibility on the pier. This phase would continue to be served by a sealed bus solution from Piers 4 or 5. (€16.5m)**

4. **As part of the final phase, the pier could be made accessible by a new one-way corridor directly linking departing passengers from Pier 4's US Preclearance facilities. The fixed corridor would run alongside Terminal 2 façade and would be accessed by a dedicated vertical circulation area located next to US pre-clearance facilities. At the other end the corridor will connect directly to the departures level at Pier 3. (€20m)**

CIP.20.03.033
Enablement of Pier 3 for Pre-Clearance US Bound Passengers

Phase 1 – Bus to plane

Phase 2 – reconfiguration of Pier 3 to accommodate swing gate facility

Phase 3 – Connection to Pier 4 UD Preclearance

Exhibit 1. Potential Phases 1-3 of development of Pier 3

With current US preclearance infrastructure requirements, the pier cannot, without extensive rebuild, accommodate an ‘in-pier’ preclearance processing facility. However, with emerging technologies pre-clearance from this pier may be possible, with the subsequent reduction of demand on the Pier 4 facility.

CIP.20.03.033
Enablement of Pier 3 for Pre-Clearance US Bound Passengers

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Transfer Operations	**Total Capex requirement** €49.4m
Underpinning Assumptions and Cost Benchmarks	Design assumptions • Pavement reconstruction required for new loading of Wide Body aircraft • Airside construction will require all plant, personnel and materials to be fully security screened before entering airside • Plant equipment at Pier 4 can be relocated elsewhere • Revised operations for US Preclearance • Assumes apron rehabilitation is completed by core projects Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) Program assumptions • Phasing shall be done to ensure minimum disruption to the airfield operations • Phasing will ensure maximum number of active stands during construction	
Opex Impacts	Increased cost of €0.8m p.a. for: • New fixed link corridor to service and maintain • New installed travellators • Staff to manage swingable gates at Pier 3 • Increased number of toilets	
Project Output	• Fixed link equipped with travellators connecting Pier 4 and Pier 3 • Fully refurbished departures level of Pier 3 with swingable gates • New airbridges to WB contact stands • Increased Mars and Code C stands	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q4 2021**
Procurement complete	**Q3 2022**
Construction commence	**Q4 2021**
Construction complete	**Q4 2023**
Project handover	**Q4 2023**

CIP.20.03.033
Enablement of Pier 3 for Pre-Clearance US Bound Passengers

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€6,195,000**
Construction Costs	**63%**	**€30,970,000**
Escalation, Contingency & Design Variability	**25%**	**€12,200,000**
Total Installed Cost (TIC)	**100%**	**€49,365,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€30,970,000	20%	€6,194,343	€6,194,343
Total - to summary				**€6,195,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Airfield	Redacted Cost Information			
Retro-Fit and Refurbishment to Pier 3 & 4				
Pier 3 Link				
Total - to summary				**€30,970,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€12,199,758	€12,199,758
Total - to summary				**€12,200,000**

CIP.20.03.036A
North Apron Development – Pier 1 Extension (Module 2)

Project Summary

- *Dublin Airport proposes to further develop the North Apron Area by further constructing the phase 2 East Pier 1 (Module 2) as a variant in terms of phased delivery to the PBZ on 5H.*

The North Apron (Aprons to the north of Pier 1 and 2) accommodates approximately 58% of the short-haul point to point flights operating from Dublin Airport today. In line with the masterplan and customers expressed preference the next logical step for the North Apron is the continued development of this stand capacity through the conversion of remote north Apron stands to walk in walk out contact stands.

Having developed the first phase of the North Apron (Module 1 and 5H PBZ) (CIP.20.03.036A), this project represents the next stage of development with the development of the eastern most extremity of Pier 1 development.

The proposed project falls within the North Apron Development and is driven by the following:

- *increase in the number of Pier walk-out contact stands*
- *delivery of the Masterplan's objective of Pier 1 eastern Phase 1 development*
- *to continually maintain the levels of service provided at the airport and enhance the passenger experience*

These objectives are achieved through the development of:

- *the 2nd phase of this Pier 1 development to provide additional walk-out contact including associated apron and pier infrastructure*
- *Development of fixed link walkway connecting Module 2 to Module 1*

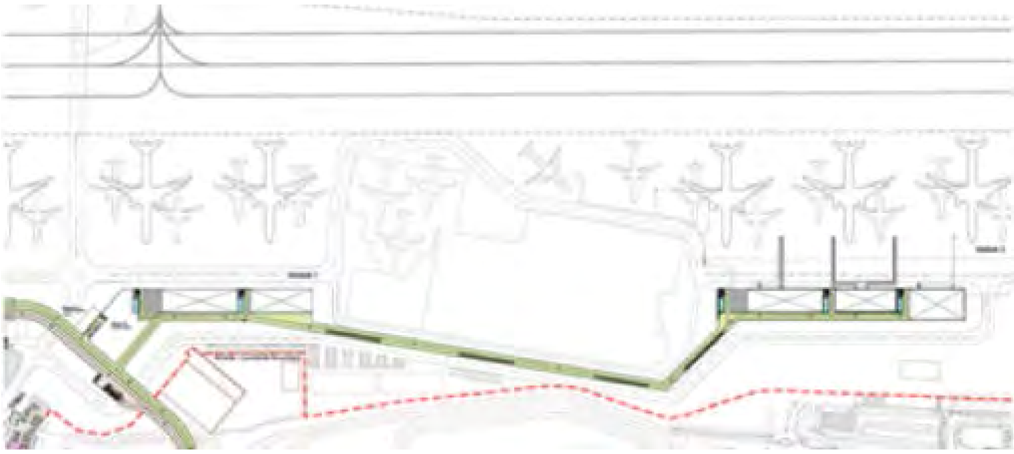


Exhibit 1. Overall view of the North apron development

CIP.20.03.036A
North Apron Development – Pier 1 Extension (Module 2)

Eastern Extension of Pier 1 – Module 2

Module 2 building is located to the East of the MRO hangars and its location falls in line with the future extended Pier 1 envisaged in the masterplan. Designed for both departures and arrivals operations it will serve 7 NBE walk-in/walk-out contact stands. The building of rectangular footprint will house 2 levels. Departures will occur at ground level with 7 no. Double height Code C gates for the new contact stands. Level 2 will include an arrivals corridor with vertical circulation cores that connect to the stands.

Module 2 is directly connected to Module 1 and the future transfer node at Pier 1 via a fixed walkway link that will run along the front of the MRO hangars. The 2-level walkway will operate in both departures and arrivals mode and will be equipped with travellators to reduce travelling times.

Exhibit 2. Layout of Module 2 and fixed link to Module 1 Level 00

Exhibit 3. Layout of Module 2 and fixed link to Module 1 Level 10

DublinAirport

CIP.20.03.036A
North Apron Development – Pier 1 Extension (Module 2)

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €97.7
Underpinning Assumptions and Cost Benchmarks	Design assumptions • Walk out stand requirement on North Apron • Segregated Arrivals and Departures Cost assumptions: (refer to general cost assumptions) • Partial relocation of existing facilities to other existing buildings • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) Program assumptions • Assumes landside construction will reduce the need for additional personnel to escort the materials/ vehicles on site.	
Opex Impacts	• Opex increase of €2.1m p.a. for: • Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates, Bussing and Energy costs.	
Project Output	• New Module 2 building with 7 no. boarding gates • New fixed link connecting directly to Module 1 and the rest of the passenger terminal facilities	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q3 2021**
Procurement complete	**Q1 2022**
Construction commence	**Q2 2022**
Construction complete	**Q4 2024**
Project handover	**Q4 2024**

CIP.20.03.036A
North Apron Development – Pier 1 Extension (Module 2)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**11%**	**€10,904,000**
Construction Costs	**64%**	**€62,640,000**
Escalation, Contingency & Design Variability	**25%**	**€24,140,000**
Total Installed Cost (TIC)	**100%**	**€97,680,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€62,640,000.00	20%	€10,903,567	€10,903,567
Total - to summary				**€10,904,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Module 2				
Link Walkway				
Airfield				
Total - to summary				**€62,640,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€24,140,622	€24,140,622
Total - to summary				**€24,140,000**

CIP.20.03.043
Pier 1 Fixed Links and Airbridges

Project Summary

- *Dublin Airport proposes the retrofitting of fixed links and airbridges on Pier 1*

The growth in Dublin Airport's widebody long-haul operations has been such that Piers 3 & 4 are now at capacity with scheduled widebody operations every morning. Consequently, narrow body & wide body operators with airbridge preference, are overflowing to other piers.

With the anticipated growth in U.S. bound wide body flights absorbing almost fully the capacity of Pier 4 and 5 (CIP.20.03.029). A phased development of Pier 3 (CIP.20.03.033A) has been presented for consultation but there remains a balance of demand which requires accommodation on the airfield. Pier 3 has the only airbridge served stands in Terminal 1 and it is therefore necessary to deliver additional airbridge capacity for the growing demand of operators; presented in this option on Pier 1, North side.

Additionally, the fixed links would segregate departing passenger flows from vehicular traffic, increasing passenger safety and reducing airline marshalling requirements. This is of particular relevance should the Pier 1 cross field underpass progress. As the anticipated volume of traffic along the face of Pier 1 is anticipated to increase significantly over time.

This project falls within the North Apron Development and is driven by:

- *The need to deploy and increased number of Wide Body enabled stands around the airfield*
- *The need to segregate increased apron traffic and departing passenger movements*

Exhibit 1. Aerial photo of existing Pier 1

CIP.20.03.043
Pier 1 Fixed Links and Airbridges

This project proposes the retrofitting of fixed links and airbridges for single docking capability for widebody aircraft, to the MARS configured stands on the North side of Pier 1, namely stands;

- *108 L/C/R*
- *109 L/C/R*
- *110 L/C/R*

The stands 108 to 111 have capacity for all aircraft types, up to and including the largest 'full code E' aircraft, such as B777-300ER and A350. The fixed links will be built with segregated corridors and individual VCC's providing for a single airbridge docking capability at one NBE stand and a walk to NBE stand within the same MARS stand. Existing VCC's in Pier 1 will be used to connect the new fixed links to both the departures and arrivals level.

The retrofitting will as part of the delivery also address existing gate conflicts and include the retrofit of corridors so to enable boarding of code E aircraft via single airbridges. The fixed links will be designed to safeguard for future installation of a second airbridge and allow for dual airbridge operations.

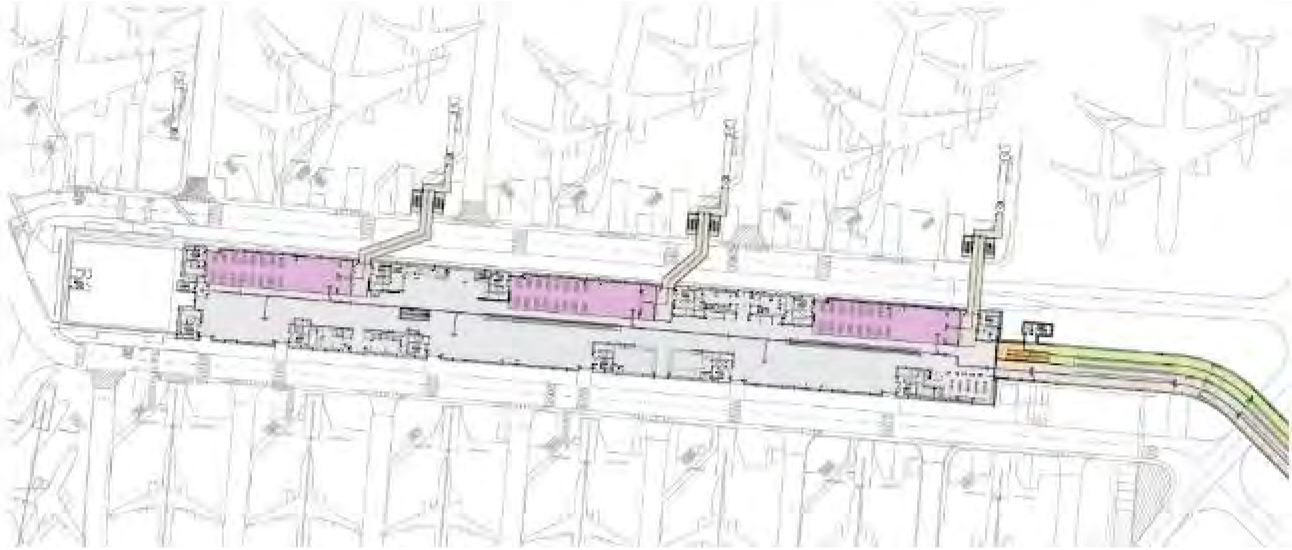


Exhibit 2. Proposed layout of airbridges on pier 1

CIP.20.03.043
Pier 1 Fixed Links and Airbridges

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €14.0m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions) • Excludes any fit-out/refurbishment works within Pier 1	
Opex Impacts	• N/A	
Project Output	• 3 no. double corridor fixed links attached to the north side of Pier 1 • 3 no. new airbridges • 6 no. new VCCs to allow for walk to procedures to stands 108-110	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility / Outline Design complete:	**Q4 2018**
Planning complete:	**Q3 2020**
Detail Design complete:	**Q3 2021**
Procurement complete:	**Q1 2022**
Construction:	**Q2 2022**
Construction complete:	**Q2 2023**
Project Handover:	**Q2 2023**

CIP.20.03.043
Pier 1 Fixed Links and Airbridges

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**11%**	**€1,760,000**
Construction Costs	**75%**	**€8,810,000**
Escalation, Contingency & Design Variability	**13%**	**€3,470,000**
Total Installed Cost (TIC)	**100%**	**€14,040,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€8,809,196	20%	€1,761,839	€1,761,839
Total - to summary				**€1,760,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Buildings				
Airfield				
Total - to summary				**€8,809,196**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€3,469,942	€3,469,942
Total - to summary				**€3,470,000**

CIP.20.03.043A
Pier 2 Wide Body Enablement & Airbridge Install

Project Summary

- *Dublin Airport proposes as an option the retrofitting of fixed links and airbridges on Pier 2*

The growth in Dublin airport's widebody long-haul operations has been such that Piers 3 & 4 are now at capacity with scheduled widebody operations every morning. Consequently, narrow body & wide body operators with airbridge preference, are overflowing to other piers.

With the anticipated growth in U.S. bound wide body flights absorbing almost fully the capacity of Pier 4 and 5 (CIP.20.03.029). A phased development of Pier 3 (CIP.20.03.033A) has been presented for consultation but there remains a balance of non-US bound wide body aircraft which requires accommodation on the airfield.

This demand can be addressed by either of three options: the provision of three airbridge enabled contact stands on Pier 1, airbridges arranged around the existing Pier 2 or the provision of an air bridge enabled extension to Pier 2. Pier 1 is presented under CIP.20.03.043, Pier 2 extension is presented under CIP.20.03.43B and herein is the proposal for Pier 2 wide body stand enablement on the existing Pier 2.

This project falls within the North Apron Development and is driven by:

- *The need to deploy and increased number of Wide Body enabled stands around the airfield*

Exhibit 1. Proposed development of Pier 2 (First floor level)

This proposal can accommodate 3 airbridge served wide body aircraft or 10 narrow body aircraft. This is achieved through the retrofitting of fixed links and airbridges for single docking capability for widebody aircraft, to the MARS configured stands on Pier 2, namely stands;

- *201 L/C/R*
- *202 L/C/R*
- *203 L/C/R*

CIP.20.03.043A
Pier 2 Wide Body Enablement & Airbridge Install

The stands 201-203 have capacity for all aircraft types, up to and including the largest 'full code E' aircraft, such as B777-300ER and A350. The project offers low passenger travel distance from central search to gate, sufficient hold gate capacity and concentration of wide body aircrafts on Piers 2-5.

As part of the Asset Care works ref CIP 20.01.002, the apron in this area is proposed to be upgraded as it is at end of life and will be designed to support code E aircraft.

Some limited modification works within the pier will be required to ensure that the pier can facilitate three code E gates. In consideration of the expected originating wide body aircraft no additional facility over and above existing provisions is planned for transfer passengers.

In consideration of 16/34 continued operations as a runway/taxiway into the medium-term future the minimum asset life on investments on Pier 2 is expected to be at minimum 15+ years.

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €51.7m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Includes for limited refurbishment of Pier 2 Cost Exclusions: (refer to general cost exclusions) • Limited pavement upgrades to accommodate WB fleet	
Opex Impacts	• N/A	
Project Output	• Wide body enablement of 3 No. Stands • Refurbishment of Pier 2	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q2 2019**
Planning complete	**Q2 2020**
Detailed design complete	**Q2 2020**
Procurement complete	**Q4 2020**
Construction commence	**Q1 2021**
Construction complete	**Q2 2022**
Project handover	**Q3 2022**

CIP.20.03.043A
Pier 2 Wide Body Enablement & Airbridge Install

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€6,513,000**
Construction Costs	**63%**	**€32,560,000**
Escalation, Contingency & Design Variability	**24%**	**€12,600,000**
Total Installed Cost (TIC)	**100%**	**€51,670,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€32,560,000	20%	€6,512,814	€6,512,814
Total - to summary				**€6,513,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Buildings				
Airfield				
Total - to summary				**€32,560,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€12,602,295	€12,602,295
Total - to summary				**€12,600,000**

CIP.20.03.043B
Pier 2 Wide Body Enablement – Pier Extension

Project Summary

- **This project proposes an extension to the existing Pier 2**

The growth in Dublin Airport's widebody long-haul operations has been such that Pier 3 and Pier 4 are now at capacity with scheduled widebody operations every morning. Consequently, narrow body & wide body operators with airbridge preference, are overflowing to other piers. With the anticipated growth in U.S. bound widebody flights absorbing almost fully the capacity of Pier 4 and 5 (CIP.20.03.029). A phased development of Pier 3 (CIP.20.03.033A) has been presented for consultation but there remains a balance of non-US bound wide body aircraft which requires accommodation on the airfield.

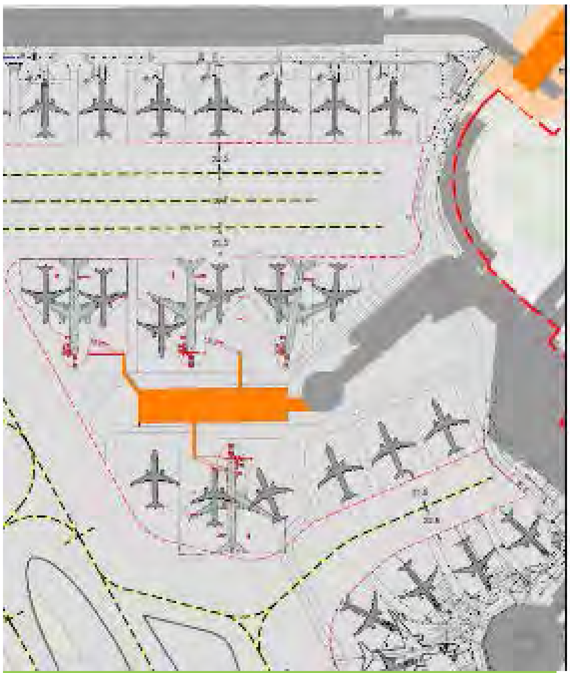


Exhibit 1. Proposed extension of Pier 2 (First floor level)

This demand can be addressed by a number of options: the provision of three airbridge enabled contact stands on the northern side of Pier 1 (Appendix H - CIP 20.3.043), Pier 2 enablement through fixed links (Appendix H - CIP 20.3.043A) or through extension of Pier 2 (this project).

This project falls within the North Apron Development and is driven by:

- **The need to deploy and increased number of Wide Body enabled stands around the airfield**

This proposal can accommodate 4 airbridge served wide body aircraft or 12 narrow body aircraft. This is achieved through the extension of the existing pier and the addition of fixed links and airbridges for single docking capability for widebody aircraft, to the MARS configured stands on Pier 2. The Pier is proposed as a two-story structure safeguarded for 3 stories. The stands 201-204 have capacity for all aircraft types, up to and including the largest 'full code E' aircraft, such as B777-300ER and A350. The project offers low passenger travel distance from central search to gate, sufficient hold gate capacity and concentration of wide body aircraft on Piers 2-5.

As part of the Asset Care works ref CIP 20.01.002, the apron in this area is proposed to be upgraded as it is at end of life and will be designed to support Code E aircraft. In consideration of the expected originating wide body aircraft no additional facility over and above existing provisions is planned for transfer passengers.

This project is aligned with the masterplan and could be further extended in line with the ultimate masterplan development.

CIP.20.03.043B
Pier 2 Wide Body Enablement – Pier Extension

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €197m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Includes for limited refurbishment of Pier 2 Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• Opex increase of €1.9m p.a. for: • Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates and Energy costs.	
Project Output	• Wide body enablement of 4 No. Stands • Extension of Pier 2	
Asset Life	• 20+ years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q2 2019**
Planning complete	**Q2 2020**
Detailed design complete	**Q2 2020**
Procurement complete	**Q4 2020**
Construction commence	**Q1 2021**
Construction complete	**Q2 2022**
Project handover	**Q3 2022**

CIP.20.03.043B
Pier 2 Wide Body Enablement - Extension

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€24,699,024**
Construction Costs	**63%**	**€123,495,120**
Escalation, Contingency & Design Variability	**24%**	**€48,644,127**
Total Installed Cost (TIC)	**100%**	**€196,838,271**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs				**€24,699,024**
Total - to summary				
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Pier Building	Redacted Cost Information			
Airfield Works				
Others				
Total - to summary				**€123,495,120**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1			**€48,644,127**
Total - to summary				**€48,644,127**

CIP.20.03.045
New West Satellite Pier Including Airfield

Project Summary

- *Dublin Airport is proposing as an option the development of a satellite pier on the west apron.*

As a result of increased number and frequency new long-haul routes; it is anticipated that there will, over the course of the forth coming CIP period, be continued growth in demand for more enabled Wide Body stands. This project proposes, as an option for consultation, the development of a Wide Body enabled Remote Pier located in the airport's western campus.

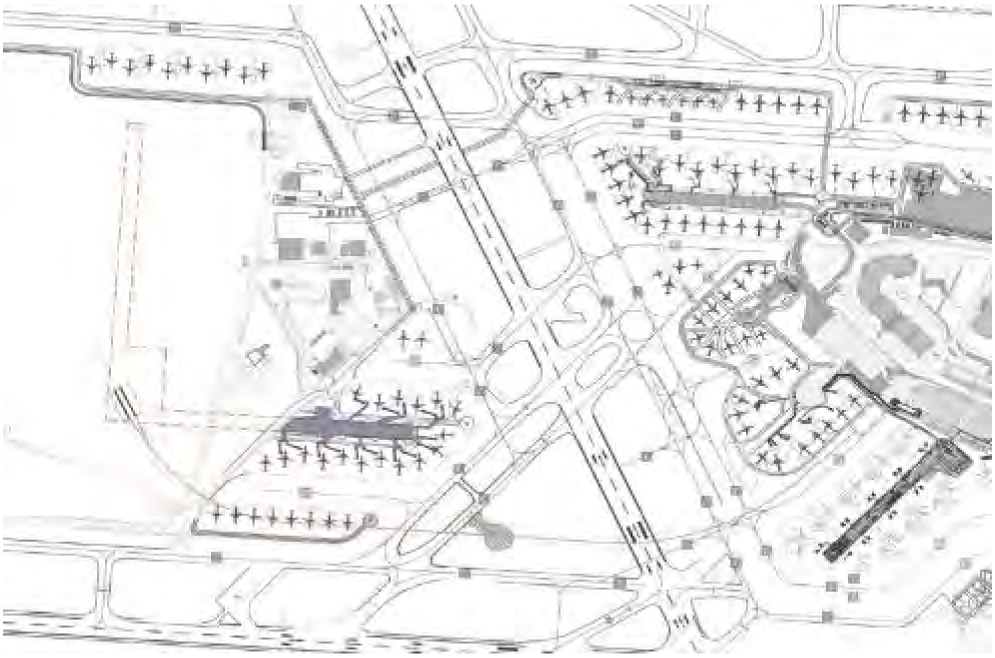


Exhibit 1. Plan view of Western Satellite Pier

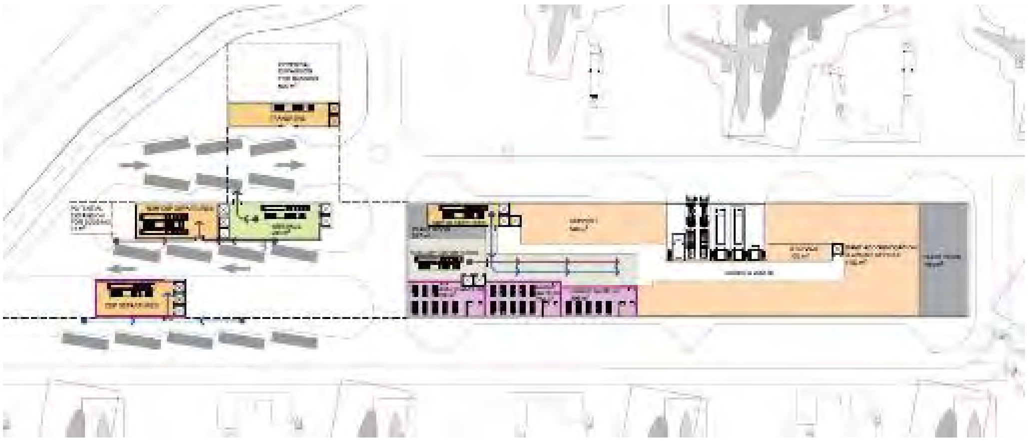
The Western Satellite Pier building is designed for both arrivals and departures mode and has been safeguarded with a flexible design that allows for future CBP/non-CBP operations. It will house passenger holding areas, apron facilities and additional space for F&B/Retail opportunities. A ground floor bussing lounge allows for bussing operations to and from the satellite as well as a transfer node facility to the side of the building. The flexible layout maximises the number of contact stands and safeguards for extension Masterplan.

The drivers to this project are the following:

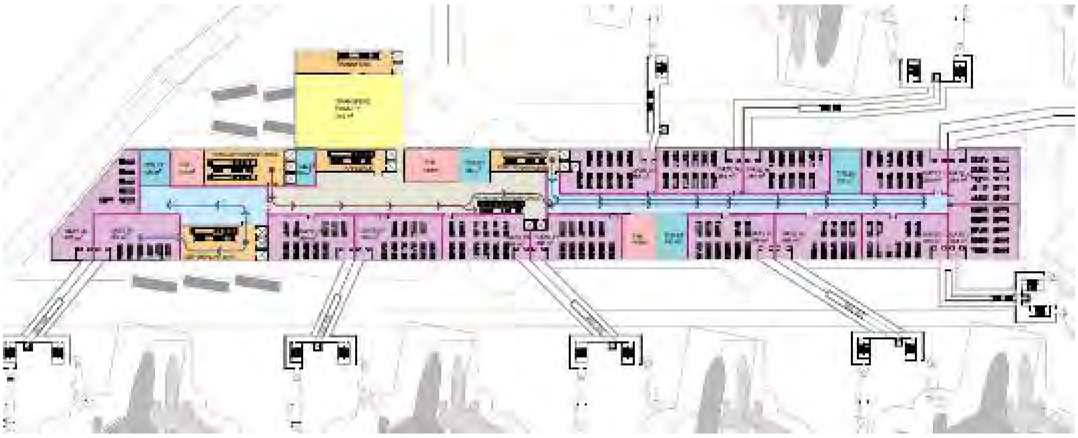
- *Facilitate growth in wide-body demand*
- *Provide phased development to meet future capacity demands*
- *Provide a first phase satellite building in accordance with the Masterplan.*
- *Upgrade and expansion of the Apron to allocate new contact and remote stands.*

CIP.20.03.045
New West Satellite Pier Including Airfield

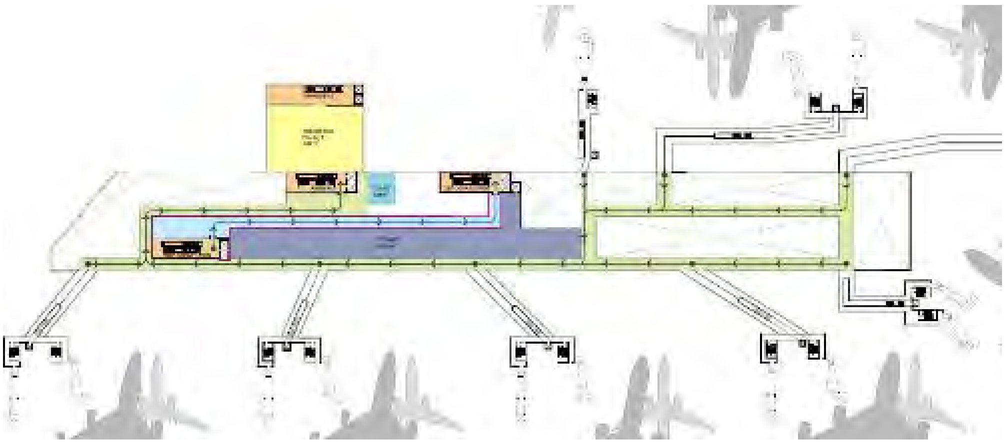
Exhibit 2. West Satellite configuration



Ground Floor Configuration



First Floor Configuration



Second Floor Configuration

CIP.20.03.045
New West Satellite Pier Including Airfield

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €351m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • APM not safeguarded in this part of the building footprint Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• Opex increase of €5.3m p.a. for: • Cleaning, Customer Service Assistants, Repairs & Maintenance, Insurance, Rates, Bussing and Energy costs.	
Project Output	• Western Satellite, with capacity for 8 Airbridge connected Wide body Aircraft • Reconfiguration of West Apron (+4 Narrow body equivalent)	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q2 2020**
Detailed design complete	**Q3 2020**
Procurement complete	**Q2 2021**
Construction commence	**Q2 2021**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.045
New West Satellite Pier Including Airfield

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€44,050,000**
Construction Costs	**63%**	**€220,250,000**
Escalation, Contingency & Design Variability	**25%**	**€86,760,000**
Total Installed Cost (TIC)	**100%**	**€351,060,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€220,250,000	20%	€44,050,073	€44,050,073
Total - to summary				**€44,050,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Buildings				
Airfield				
Total - to summary				**€220,250,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€86,756,618	€86,756,618
Total - to summary				**€86,760,000**

CIP.20.03.047
New Taxiway W

Project Summary

- *Dublin Airport proposes the construction of a new full parallel taxiway to the west of the cross- wind runway 16/34, Taxiway W.*

With the delivery of the Northern Runway, the airport will operate parallel runway operations. This will increase the runway capacity to meet the forecasted peak demands and is presented here as an option for consultation.

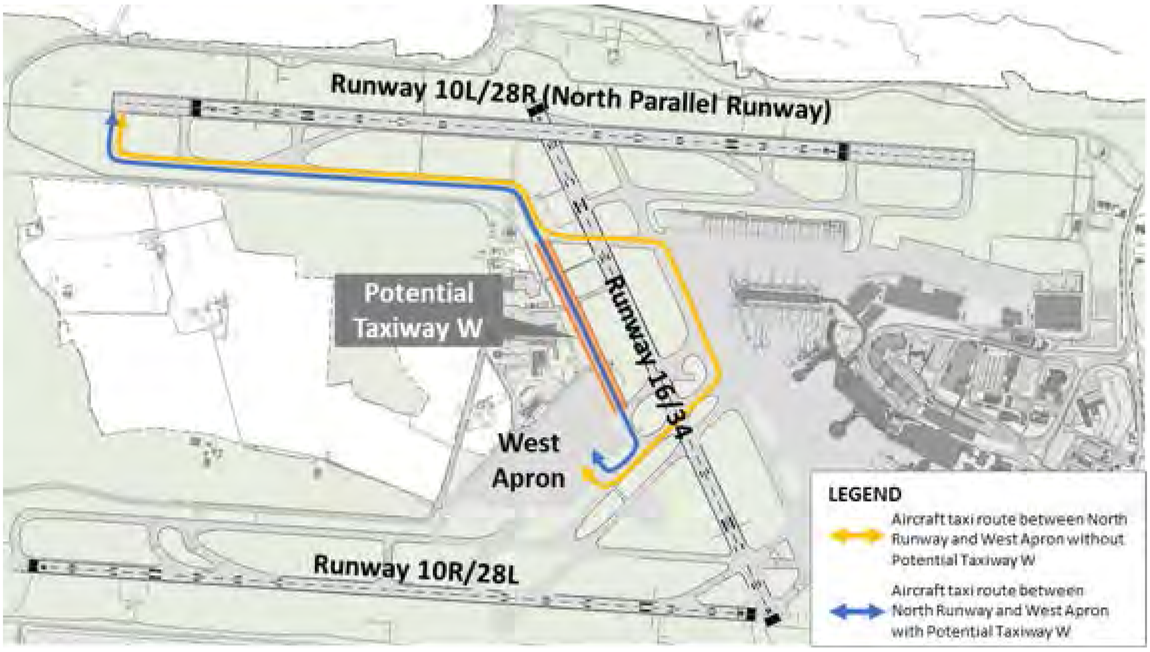


Exhibit 1. Aircraft taxi route with / without Taxiway W

West Apron operations have steadily increased over the last five years. It is anticipated that the Western Campus will be expanded to accommodate the relocation of all non-passenger terminal related operations (cargo, towing operations and GA), provide a release valve to facilitate the temporary closure of existing infrastructure required to deliver multiple construction projects, and ultimately facilitate future growth. This is in-line with the development of Apron 5M and potential repurposing of the existing West Apron stands.

Taxiway W will allow aircraft operating form Apron 5M and the West Apron to manoeuvre north south when the crosswind runway in in operation, without impeding runway operations.

This project will deliver a full parallel taxiway to the west of runway 16/34. The proposed layout has been divided into 3 sections, the first being an exit taxiway from the North Runway to Taxiway Mike, Section 2 from Taxiway W8 to Taxiway W5 and a third section that links the West apron to Taxiway W2. The taxiway comprises of three sections as shown in the sketch below. It is 25 metres wide (Code E).

CIP.20.03.047
New Taxiway W

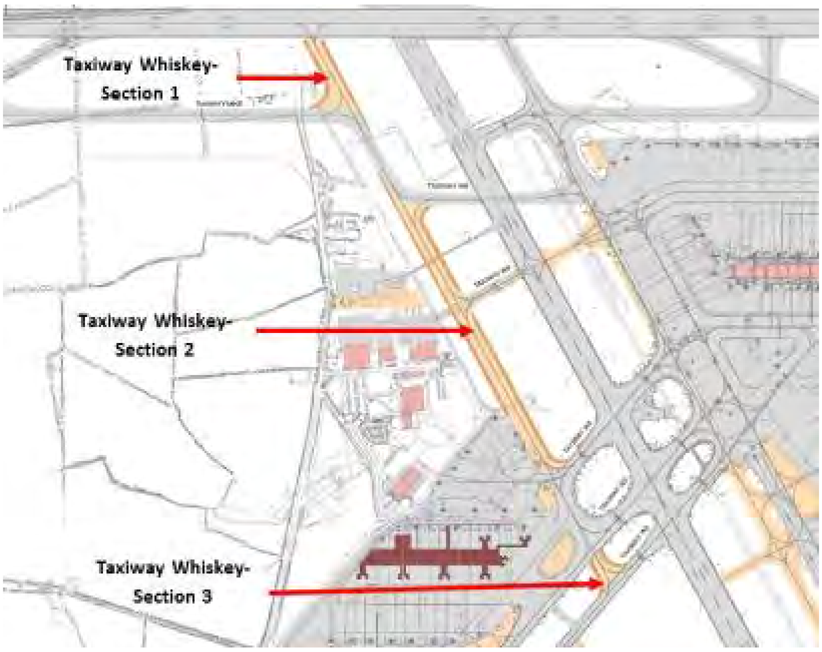


Exhibit 1. Proposed layout of taxiway Whiskey

CIP.20.03.047
New Taxiway W

Project Details Summary		
Category: Capacity Development		
Primary Driver Operational Efficiency	**Secondary Driver** -	**Total Capex requirement** €30.3m
Underpinning Assumptions and Cost Benchmarks	Design assumptions: • Pavements are designed for the most onerous aircraft, the B777-300 ER. • New airfield ground lighting along centreline at 30 metres c/c • AGL supplied by substation "T" • Results in more efficient operations • Does not include for crossing of underpass routes Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 20% of the TDC plus Design & Management costs • Escalation is included to mid-point of construction and is based on a rate of 6% per annum Cost Exclusions: (refer to general cost exclusions) Programme assumptions: • Construction of full scheme under one contract in an airside environment	
Opex Impacts	• N/A	
Project Output	• North South taxiway parallel to 16/34 • Reduces the traffic on other taxiways throughout the airfield • Reduces the need to use Runway 16/34 as a taxiway • Additional access to the West Apron without crossing Runway 16/34.	
Asset Life	• 25 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q4 2021**
Procurement complete	**Q2 2022**
Construction commence	**Q2 2022**
Construction complete	**Q4 2024**
Project handover	**Q4 2024**

CIP.20.03.047
New Taxiway W

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€3,800,000**
Construction Costs	**63%**	**€19,000,000**
Escalation, Contingency & Design Variability	**25%**	**€7,480,000**
Total Installed Cost (TIC)	**100%**	**€30,280,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€19,000,000.00	20%	€3,799,674	€3,799,674
Total - to summary				**€3,800,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Airfield				
Roads Paths & Paving's				
Total - to summary				**€19,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€7,483,459	€7,483,459
Total - to summary				**€7,480,000**

DublinAirport

CIP.20.03.048
Rapid Exit Taxiway RWY 10/28

Project Summary

- *Dublin Airport proposes the construction of a new Rapid Exit Taxiway (RET) on Runway (RWY) 10/28.*

This project seeks to improve efficiency of the existing Runway 10-28 through construction of a Rapid Exit Taxiway to facilitate expeditious runway vacation for arrivals on Runway 28 adjacent to the existing exit taxiway E5. This will reduce runway occupancy times driving efficiencies and increased runway capacity.

One of the key drivers to this project has been the request from the operating airlines at Dublin Airport and is presented here as an option for consultation.

The selection of this specific location is aligned with the airport Master Plan, and the proposed mode of operations in dual parallel runway operations, whereby Runway 28L (Existing/Southern Runway) is the primary arrival runway, and Runway 28R (North runway) the primary departure runway in 28 operations.

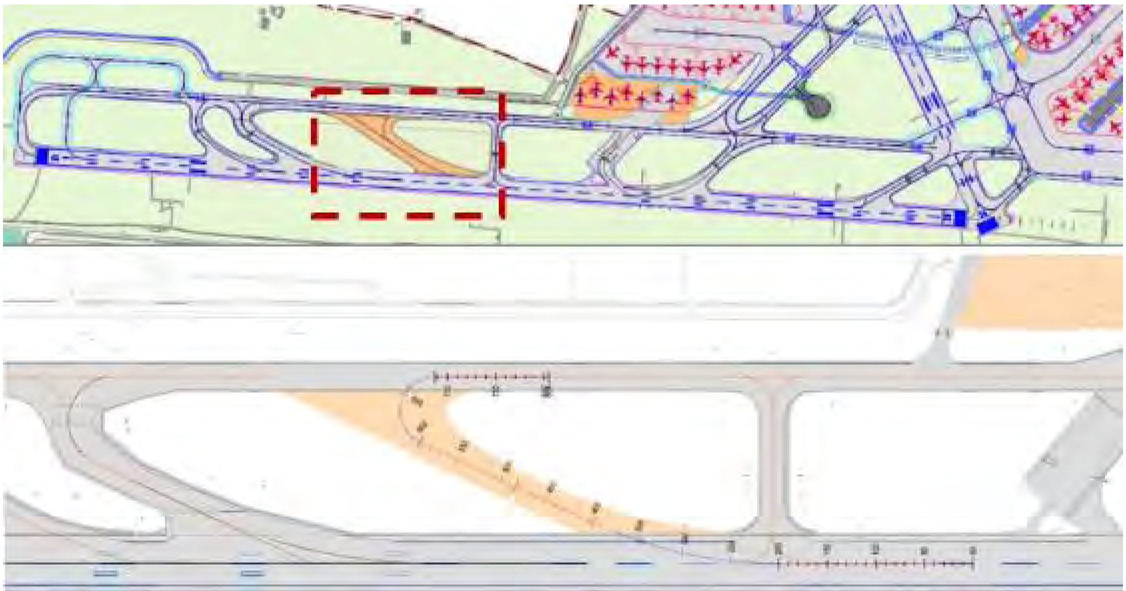


Exhibit1. Proposed new RET for Runway 28L

CIP.20.03.048
Rapid Exit Taxiway RWY 10/28

Project Details Summary		
Category: Capacity Development		
Primary Driver Capacity Constraint	**Secondary Driver** Security	**Total Capex requirement** €7.5m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs • Escalation is included to mid-point of construction and is based on a rate of 6% per annum Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• N/A	
Project Output	• EASA compliant design • Master Plan compliant solution • Rapid Exit Taxiway (RET) for Runway 28 arrivals • Associated centreline & TWY edge AGL • Compliance with Drainage & Environmental requirements	
Asset Life	• 20 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q2 2020**
Detailed design complete	**Q3 2020**
Procurement complete	**Q1 2021**
Construction commence	**Q2 2022**
Construction complete	**Q4 2022**
Project handover	**Q4 2022**

CIP.20.03.048
Rapid Exit Taxiway RWY 10/28

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€940,000**
Construction Costs	**63%**	**€4,720,000**
Escalation, Contingency & Design Variability	**25%**	**€1,860,000**
Total Installed Cost (TIC)	**100%**	**€7,520,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€4,720,000.00	20%	€943,021	€943,021
Total - to summary				**€940,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Airfield Works	Redacted Cost Information			
Total - to summary				**€4,720,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€1,857,279	€1,857,279
Total - to summary				**€1,860,000**

CIP.20.03.049
De-icing Pad at Runway 10R

Project Summary

- *Dublin Airport proposes to construct a de-icing pad to enhance the airport's operations during severe cold weather event*

Following de-icing, aircraft have a limited 'hold-over time' before needing to be de-iced again. The departure queue at times can be in excess of the hold-over time, currently resulting in aircraft having to return to stand to de-ice again. This can be exacerbated when departure queues are increased due to reduction in runway capacity because of deteriorating or poor weather conditions. Many examples of this were encountered during the cold weather event of 2018, and resulted in many stakeholders calling for a remote de-icing pad for Runway 10. De-iced aircraft encountered issues with re-icing while taxing to the end of runway 10, and locating a remote de-icing pad in that area would remove the requirement for aircraft to return to stand to de-ice again. In addition, it also allows stand capacity to be released should de-icing delays on the apron occur, by allowing aircraft to push-back without de- icing on stand, and de-ice remotely prior to take-off. A separate Project (CIP.20.03.040) will address this issue for Westerly operations (RWY 28R) when using compass departures. This project seeks to deliver a solution for the existing Runway 10 (future runway 10R), which becomes the primary departure runway in parallel runway Westerly operations.

It is proposed to build a purpose built de-icing facility with the previously approved PACE Runway 10 Line Up Points project. This project will deliver an additional Runway line-up point, bypass taxiway and associated infrastructure. This project proposes the delivery of remote de-icing pads on the new bypass taxiway and be constructed in conjunction with the PACE approved Runway 10 line-up point project.

The de-icing pad is located next to the southern runway's 10 Threshold. This pad will allow the de- icing of 2 code E's or 4 code C's aircraft with a further queuing area allocated to waiting for 2 code C aircraft. The proposed design allows two separate accesses and exits with one shared access/exit to minimize disruption and avoid congestion.

CIP.20.03.049
De-icing Pad at Runway 10R

Project Details Summary		
Category: Airfield / taxiways		
Primary Driver Operational Efficiency	**Secondary Driver** Addressing User Requests	**Total Capex requirement** €5.0m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs Cost Exclusions: (refer to general cost exclusions)	
Opex Impacts	• N/A	
Project Output	• 35,000m2 of concrete de-icing pad • Glycol collection • AGL & Flood lighting	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q3 2020**
Detailed design complete	**Q4 2021**
Procurement complete	**Q2 2022**
Construction commence	**Q2 2022**
Construction complete	**Q1 2023**
Project handover	**Q1 2023**

CIP.20.03.049
De-icing Pad at Runway 10R

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**16%**	**€820,000**
Construction Costs	**66%**	**€3,290,000**
Escalation, Contingency & Design Variability	**18%**	**€890,000**
Total Installed Cost (TIC)	**100%**	**€5,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€3,290,000	20%	€822,000	€822,000
Total - to summary				**€820,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Allowance for De-icing Works	Redacted Cost Information			
Total - to summary				**€3,290,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€888,000	€888,000
Total - to summary				**€890,000**

CIP.20.03.051
West Apron Vehicle Underpass – 5G Option

Project Summary

- *Dublin Airport proposes the construction of vehicle underpass below Runway 16/34 linking 5G apron to the Western campus.*

The current Masterplan envisages an expansion of the airport west, keeping runway 16/34 operational. In order to meet the capacity uplift forecast in the upcoming CIP period, full use of the west apron and additional aircraft stands are required. To enable passenger operations on the west apron, the connectivity between the west apron and the east campus needs to be resolved. Capacity studies suggest that by 2024, there will be upwards of potentially 3.500 vehicles/day accessing this area. The types of vehicles required to access the west apron include buses, tugs, loaders and bowsers.

This project proposes the construction of an underpass below runway 16/34 to provide direct vehicular access. A bidirectional two-lane single-cell underpass will be constructed using cut-and- cover techniques.

The underpass alignment will be at the Northern part of the airfield linking Apron 5G to the Western campus directly. A ramp 170m long will provide access to the underpass from 5G. The underpass will run below the existing Taxiway F-Outer, and Runway 16/34, then ramp up 140m to ground level at the West apron. The overall dimensions to the underpass will be 4.55m headroom by 5m lane width with maintenance sidewalks either side.

This alignment requires apron traffic to cross Taxiways DN, DS, and C when crossing to the head of stand road on 5G. This could result in significant apron vehicle congestion. It does however remove the potential conflict which the Pier 1 alignment creates between traffic and pedestrians along the northern face of Pier 1. This Alignment also conflicts with the long-term aspiration of the Masterplan to provide for triple taxiways to the north of Pier 1, and potentially requires a stream diversion.

It is proposed that section of the underpass directly under Runway 16/34 be completed during its planned closure in 2020 to facilitate tie-in of the Northern Runway.

Exhibit 1. Plan view of proposed northern alignment to the vehicular underpass

CIP.20.03.051
West Apron Vehicle Underpass – 5G Option

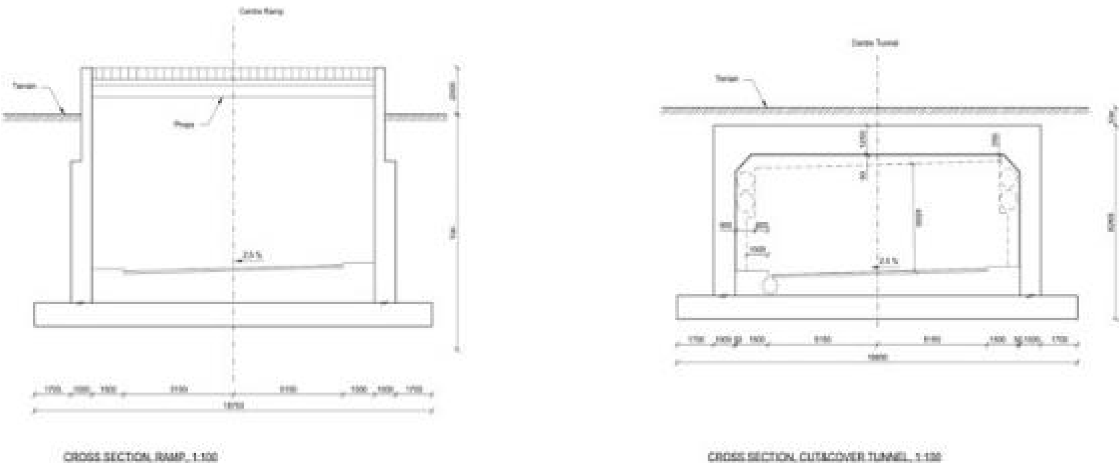


Exhibit 1. Plan view of proposed northern alignment to the vehicular underpass

CIP.20.03.051
West Apron Vehicle Underpass – 5G Option

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** West Campus Connectivity	**Total Capex requirement** €79m
Underpinning Assumptions and Cost Benchmarks	• A build-only ("traditional") contract for construction. • Underpass design is to TII "Design of Road Tunnels" based on 40 mppa projected traffic volumes. • Construction price index used is as per midpoint of construction (i.e. Q2 2021). • All excavated material assumed to be inert. Max distance to tip 20kms • Backfill material to be imported. • Programme and costs based on open-cut excavation and no piling. • Price based on continuous construction. 2 shifts, 8 hours per shift, 7 days a week. • Operational impact not assessed. Allowance for construction / temporary works uplift included. • Assumed all works will be constructed within an airside environment. • Costs presented assumed inflation to be at 6 % each year to take to Q2 2021. • Unfettered access assumed for the construction due to other ongoing construction projects • Ideal land take for construction works – longer taxiing routes may be necessary for arriving and departing aircraft. • Priority given to construction traffic to enable works to be completed within closure periods. • Works are constructed as one continuous project. (i.e. no additional excavation and backfilling) • Estimate class – Class IV (-30 / +50) – base estimate presented. • Requires surface crossing of Taxiway C to use tunnel. • Works are constructed as one continuous project. (i.e. no additional excavation and backfilling)	
Opex Impact	• Opex increase of €0.2m p.a. for additional technology costs.	
Project Output	• Road vehicle underpass improving connectivity between Terminal 1 and 2 and Western Apron area. • Ventilation equipment associated with underpass	
Asset Life	• 50 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q2 2020**
Detailed design complete	**Q3 2019**
Procurement complete	**Q2 2020**
Construction commence	**Q2 2020**
Construction complete	**Q2 2022**
Project handover	**Q3 2022**

CIP.20.03.051
West Apron Vehicle Underpass – 5G Option

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€10,000,000**
Construction Costs	**63%**	**€49,000,000**
Escalation, Contingency & Design Variability	**25%**	**€20,000,000**
Total Installed Cost (TIC)	**100%**	**€79,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€50,000,000.00	20%	€10,000,000	€10,000,000
Total - to summary				**€10,000,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Infrastructure				
Airfield				
Services				
Total - to summary				**€49,000,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€20,000,000	€20,000,000
Total - to summary				**€20,000,000**

CIP.20.03.055
Engine Test Facility (Code E)

Project Summary

- *Dublin Airport proposes to construct a new Code E enabled engine test facility in the western airport campus.*

Existing test facilities currently do not meet the masterplan objective of providing a Code E enabled test facility as:

- *The North Runway development requires the removal of the existing engine test site by May 2019 to allow its construction to begin.*
- *A new Code C engine test facility is being provided between Taxiways H2 & B3 by the North Runway project. However, the location cannot be upgraded to a Code E facility due its runway proximity and the required sight lines to the Air Traffic Control tower.*

Therefore, to meet this objective it is proposed to develop a new engine test facility in the airport's western campus

The project proposes to realign public and airfield perimeter roads, and airside/landside boundaries, to facilitate construction of a masterplan compliant section of apron and associated jet blast and noise attenuation, within existing daa land boundaries aligned with 40mppa & 55mppa Master Plan layouts.

The project also includes for a taxiway link to access the site.

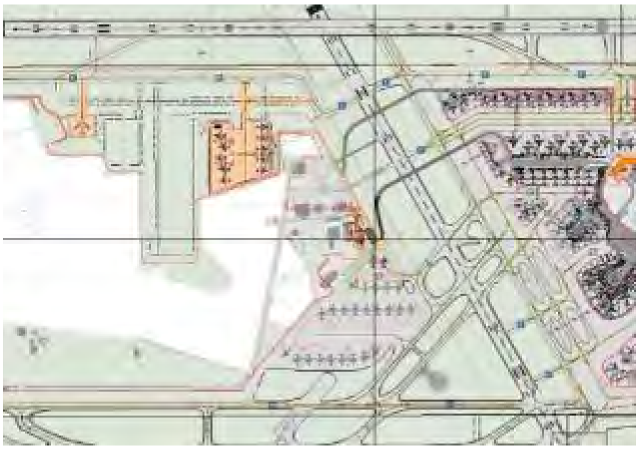


Exhibit 1 and 2. Key plan highlighting location of new engine test facility

CIP.20.03.055
Engine Test Facility (Code E)

Project Details Summary		
Category: Airfield		
Primary Driver Capacity & MRO	**Secondary Driver** Operational Efficiency	**Total Capex requirement** €10.0m
Underpinning Assumptions and Cost Benchmarks	Design assumptions: • Works will be carried out in a landside environment • Realignment of R108 and perimeter road in-line with Master Plan • Provision of Taxiway access to the North Runway 'Mike (M)' parallel taxiway • Optimises use of critical infrastructure. • Supports airline growth and airfield operational efficiency Cost assumptions and exclusions: (refer to general cost assumptions)	
Opex Impacts	• N/A	
Project Output	• New apron construction comprising Code E Engine test site & taxiway connectivity • EASA compliant design • Master Plan compliant solution • All associated AGL, signage & required lighting (HML) • Jet blast and Noise attenuation • Service road access linking to the realigned perimeter road • Realignment of R108 and perimeter road	
Asset Life	• 15 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2020**
Planning complete	**Q2 2021**
Detailed design complete	**Q2 2021**
Procurement complete	**Q4 2021**
Construction commence	**Q4 2021**
Construction complete	**Q4 2022**
Project handover	**Q1 2023**

CIP.20.03.055
Engine Test Facility (Code E)

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,250,000**
Construction Costs	**63%**	**€6,280,000**
Escalation, Contingency & Design Variability	**25%**	**€2,470,000**
Total Installed Cost (TIC)	**100%**	**€10,000,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€6,275,000.00	20%	€1,255,000	€1,255,000
Total - to summary				**€1,250,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Facilitation & Demolition Works	Redacted Cost Information			
Infrastructure				
Airfield				
Services				
Total - to summary				**€6,275,000**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	€2,471,723	€2,471,723
Total - to summary				**€2,470,000**

CIP.20.03.070
Terminal 2 CBP Make-up and baggage hall entrance

Project Summary

- *Dublin Airport proposes the extension of Baggage Make-up Carousel 5 and a new entrance to the T2 Baggage Hall*

With increased transfer requirement and additional check in desks, there will be a requirement for additional make-up positions to allow for the increase volume of bags and flights departing for the USA. US CBP flights are limited to make up positions on carousels 4&5 within the baggage hall. These existing make-up positions will not be sufficient to cater for the anticipated future passenger growth, driven by Pier 5 development (CIP.20.03.029). Physical infrastructure, in the form of additional make-up positions will be required to meet this increase in US CBP flights.
This option assumes that there continues to be demand for US CBP make-up positions and make-up carousels 4 and 5 are segregated for US CBP flights only.
This project falls under the Terminal 2 development and is driven by:

- *The requirement to accommodate additional CBP make-up positions within the baggage hall*

This project delivers an extension to make-up carousel 5, 24 new make-up positions and a new entrance to the baggage hall behind Pier 5. This will require modifications to the vehicle flow through the baggage hall.

Exhibit 1. New Terminal 2 carousel 5 extension and entrance to baggage hall

CIP.20.03.070
Terminal 2 CBP Make-up and baggage hall entrance

Project Details Summary		
Category: Capacity Development		
Primary Driver Business Volume Growth	**Secondary Driver** Capacity	**Total Capex requirement** €1.04m
Underpinning Assumptions and Cost Benchmarks	Cost assumptions: *(refer to general cost assumptions)* Cost Exclusions: *(refer to general cost exclusions)* • Allowance for acceleration, premium working time, bonuses and the like • All costs by asset care are excluded from this estimate	
Opex Impacts	• Increased length of Baggage make-up carousel and modified flows through the baggage hall area for maintenance	
Project Output	• 24 new CBP baggage make up positions, new entrance to the baggage hall.	
Asset Life	30 years	

Project Delivery Key Milestones	
Feasibility/outline design complete	**Q4 2018**
Planning complete	**Q1 2021**
Detailed design complete	**Q1 2022**
Procurement complete	**Q2 2023**
Construction commence	**Q2 2022**
Construction complete	**Q1 2024**
Project handover	**Q1 2024**

CIP.20.03.070
Terminal 2 CBP Make-up and baggage hall entrance

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€130,000**
Construction Costs	**63%**	**€650,000**
Escalation, Contingency & Design Variability	**25%**	**€260,000**
Total Installed Cost (TIC)	**100%**	**€1,040,000**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€650,000.00	20%	€130,000	€130,000
Total - to summary				**€130,000**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Baggage Hall Entrance	Redacted Cost Information			
Baggage Modifications				
Services Modifications				
Total - to summary				**€650,000**
Escalation, Contingency & Design Variability				
Escalation, Contingency & Design Variability	1	Sum	€256,035	€256,035
Total - to summary				**€260,000**

CIP.20.03.071
Pier 3 Fuel Hydrant

Project Summary

- *Dublin Airport proposes the installation of a fuel hydrant system to service aircraft parked on Pier 3.*

The provision of fuel hydrants in place of the existing tanker arrangement at Pier 3 is considered as an optimal fueling method since it provides an environmentally friendly, fast and reliable refueling method with overall positive impact on safety and efficiency of everyday airport operations. This proposed Pier 3 Fuel Hydrant System consists of a network of underground piping that transports fuel from tanks in the fuel farm to aircraft while managing fuel intake.

Currently Dublin Airport is carrying out a fuel pipeline project to provide this service throughout Pier 1, Pier 4 and a single stand on Pier 3 (316). Since the installation of air bridges on Pier 3 to serve wide-body aircraft, many long-haul carriers have been allocated to this pier. This has increased the amount and complexity of turnaround operations in a very congested area. The installation of fuel hydrants around this pier would improve its operational performance noticeably not only by reducing the traffic congestion and freeing up space but also from a Safety point of view.

This project proposes to expand the fuel hydrant system to further stands in Pier 3. The project will provide the following:

- **Fuel pipeline and hydrant pits at stands 311C, 312, 313C, 314, 315C, 317 and 318L, 318C, 318R**

Exhibit 1. Left to right: Plan view of proposed fuel extension around Pier 3 and photo of fuel hydrant.

CIP.20.03.071
Pier 3 Fuel Hydrant

Project Details Summary		
Category: Capacity Development		
Primary Driver Operational Efficiency	**Secondary Driver** Safety	**Total Capex requirement** €10.4m
Underpinning Assumptions and Cost Benchmarks	Design assumptions; • Similar fuel provision and scope as required for Pier 1. Cost assumptions: (refer to general cost assumptions) • Contingency is calculated at 15% of the TDC plus Design & Management costs	
Opex Impact	• Potential benefits in OPEX using fuel hydrants at stands.	
Project Output	• Fuel pipeline around Pier 3 • Fuel hydrants at the following stands; • 311C, 312, 313C, 314, 315C, 317 and 318L, 318C, 318R	
Asset Life	• 20 years	
Project Delivery Key Milestones		
Construction phase	**Q1 2020 – Q3 2020**	

CIP.20.03.071
Pier 3 Fuel Hydrant

LEVEL 1 - Cost Analysis	Represents	Total
Design and Management Costs	**13%**	**€1,303,563**
Total Direct Cost	**63%**	**€6,517,815**
Escalation, Contingency & Design Variability	**25%**	**€2,567,368**
Total Installed Cost (TIC)	**100%**	**€10,388,746**

LEVEL 2 - Cost Analysis				
Design and Management Costs	**Value**	**% Fee**	**Total Fee**	**Total**
Design & Management Costs	€6,517,815	20%	€1,303,563	€1,303,563
Total - to summary				**€0**
Construction Costs	**Quantity**	**Unit**	**Rate**	**Total**
Pier 3 Fuel Hydrant	Redacted Cost Information			
Total - to summary				**€6,517,815**
Escalation, Contingency & Design Variability	**Quantity**	**Unit**	**Rate**	**Total**
Escalation, Contingency & Design Variability	1	Sum	-	€2,567,368
Total - to summary				**€2,567,368**

Thank **You**

Capital Investment Programme consultation document